Mono County | Town of Mammoth Lakes

Multi-Jurisdictional Hazard Mitigation Plan (MJHMP)

APPENDIX A: ADOPTION RESOLUTIONS

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Adoption resolutions to be added following adoption by the Mono County Board of Supervisors and the Mammoth Lakes Town Council.

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Mono County | Town of Mammoth Lakes

Multi-Jurisdictional Hazard Mitigation Plan (MJHMP)

APPENDIX B: MEETING & OUTREACH MATERIALS

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B.1 Planning Team Meetings B-1
B.1.1 Planning Team Meeting #1 - June 15, 2017 ..... B-2
B.1.2 Planning Team Meeting #2 – September 29, 2017 ..... B-7
B.1.3 Planning Team Meeting #3 – December 13, 2017 ..... B-16
B.1.4 Planning Team Meeting #4 – January 25, 2018 ..... B-27
B.1.5 Planning Team Meeting #5 – April 5, 2018 ..... B-35
B.2 Status of Mitigation Actions from Previous Plan B-43
B.3 Public Survey B-51
B.3.1 Survey Questions B-51
B.3.2 Summary of Results B-58
B.3.3 Survey Responses B-65
B.4 Community/Stakeholder Meetings B-67
B.4.1 Stakeholder Meetings – September 28-29, 2017 ..... B-68
B.4.2 RPAC Meetings – December 12-13, 2017 ..... B-84
B.4.3 Town of Mammoth Lakes Planning Commission Hearing – December 12, 2017 ..... B-89
B.4.4 Fire Chiefs Meeting – December 13, 2017 ..... B-94
B.4.5 Collaborative Planning Team Meeting – January 25, 2018 ..... B-103
B.4.6 Long Valley RPAC Meeting – January 24, 2018 ..... B-110
B.4.7 CAC and RPAC Meetings – April 4-5, 2018 ..... B-115

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B.1 Planning Team Meetings

The Planning Team held five meetings during the plan development process at which they helped guide the development of the plan, provided data, and reviewed draft pieces of the plan. Agendas, power point presentations and minutes from meetings are provided below (in chronological order).

B.1.1 Planning Team Meeting #1 - June 15, 2017

AGENDA: Planning Team Meeting

MONO COUNTY MULTI-JURISDICTIONAL LOCAL HAZARD MITIGATION PLAN

June 15, 2017

1. **Introductions**
2. **Project Goals and Expectations**
3. **Work Program**
    a. Community Profiles
    b. Community Outreach and Involvement
        - Community meetings (1 with each RPAC + 2 with stakeholders)
        - HMP Team meetings (5 – see below)
    c. Risk Assessment
        - Capabilities assessment
        - Hazard profiles
        - Vulnerability assessment
        - Critical facilities loss estimation
        - Land use and development trends
    d. Mitigation Strategy
        - Goals and objectives
        - Strategies and actions
        - Plan maintenance
    e. LHMP Draft and Adoption
        - Draft plan and update REP
        - AB 2140/Safety Element
        - Submit draft plan to FEMA
        - Adoption
    f. Additional optional tasks
4. **Timing for Project Check-Ins**
5. **Initial Work Program Steps**
    a. Schedule with deliverables
    b. Data needs/data collection

c. Community engagement strategy

d. HMP Team composition/meeting schedule

- Meeting 1: Introduction, discussion of plan goals/objectives, identification of hazards of concern and identification of data/information
- Meeting 2: Review of hazards profiles and hazards mapping
- Meeting 3: Review of risk assessment and loss estimations
- Meeting 4: Discussion of mitigation actions and action prioritization
- Meeting 5: Review/discussion of administrative draft HMP document

6. **Communications and Role of County and Town Staff**
7. **Wrap Up**

Meeting Notes – Mtg #1

Attendees: Jeff Henderson, Mike Skowronek, Starla Barker, Emma Reed, Holly Pearson, Wendy Sugimura, Michael Schaeffer (County Administrative), Paul McFarland (Public Works), Brian, and Ingrid Braun (Sheriff)

Not in attendance: Pam Kobylarz (will be out for maternity leave later this year)

*2011 Mono County HMP was written but never adopted; may not have been approvable by CalOES/FEMA

1. Introductions
2. Project Goals and Expectations
   a. Ensure successful adoption and implementation of this plan
   b. Ensure other plans are updated with information that comes out of HMP update
   c. Successfully engage stakeholders and regional advisory committee
   d. Ensure life/safety and prevent cookie cutter approaches that do not necessarily match up
   e. Ensure plan includes what the jurisdiction actually does rather than lofty direction
   f. Ensure that hazard profiles are appropriate and relevant to communities in the jurisdiction (i.e., avalanches have affected several homes this year)
      - Make certain that hazard zones are identified so further buildings/development projects account for these
      - Make sure that zones (i.e., fire protection zone) are well-defined and precisely mapped
   g. Most politically charged issue relating to this project is *property values* and how they may be affected by designated/mapped hazard zones

- Issues relating to secondary access when roads/routes are shut down due to rockslides, avalanches, etc.
- Backup/Evidence of need for secondary access will be useful when attempting to get funding for additional roads, etc.
- These issues and more will come up through the community engagement process for this plan

h. Another overarching goal is to ensure implementation will follow the completion of the HMP (i.e., importance of the long-term)
   - Identifying mitigation projects and issues in the plan will help with prioritization and implementation of these projects and will make a good case to obtain funding for these
   - What percentage of funding comes from local revenue for mitigation projects?
   - Need to consider who are the partners, not just in the County, but possibly neighboring counties in the region, etc.
   - Need to associate grant resources with the actions/projects in the HMP to ensure funding for these to get implemented

3. Work Program
   a. Community Profiles
      - First step in the process
   b. Community Outreach and Involvement
      - Community meetings (1 with each RPAC + 2 with stakeholders)
        - See more detailed meeting schedule below in step 5
      - HMP Team meetings
        - The group on the phone today is the "core" group but there may be a few more for Team meetings (possible addition of three more staff)
        - Local fire department reps and County Public Health staff should be involved also
        - Stakeholders would include public agencies also
        - Planning Commission could be included in community meetings
        - Core Team will do outreach to let other potential attendees know when meetings are being held
   c. Risk Assessment
      - Capabilities assessment
        - Town's draft EOP just got completed; Pam will put Jeff in touch with the contractor who is working on that document -> Willdan
      - Hazard profiles
      - Vulnerability assessment

- Critical facilities loss estimation
- Land use and development trends

d. Mitigation Strategy
   - Goals and objectives
   - Strategies and actions
     - Michael Baker will get input on these from Planning Team before finalizing them in the plan document
   - Plan maintenance

e. LHMP Draft and Adoption
   - Draft plan and update REP
   - AB 2140/Safety Element
   - Submit draft plan to FEMA
   - Adoption

f. Additional optional tasks
   - *Wendy* will check if grant money can be used for actual mitigation actions/projects resulting from this plan (need to check with FEMA on eligible expenses)

4. Timing for Project Check-Ins
   a. Grant funding expires in May 2019
   b. Bi-weekly half-hour check-in calls with County reps for duration of project
5. Initial Work Program Steps
   a. We are meeting internally next week
   b. Will be taking first steps laid out in proposal
   c. One of the first things we have will be a data collection list (County will need to confirm, provide additional, etc.)
   d. A proposed schedule for meetings, deliverables, etc. will be created and run by everyone involved (ideally will have several meetings in same day or over a couple of days)
   e. *Wendy* will complete a contact list for jurisdiction staff and *Jeff* will complete with Baker contact list for full project staff list
   f. Schedule with deliverables
      - Grant funding expires in May 2019
      - There is time between when the HMP schedule ends and the end of the grant funding timeline
      - Extra funding for additional/optional projects (i.e., CWPP) can be approved fairly easily
   g. Data needs/data collection

- Initial item – County will need to provide input on data collection (confirmation and additional data/information needed)

h. Community engagement strategy
   - This will be an initial item also

i. HMP Team composition/meeting schedule
   - Meeting 1: Introduction, discussion of plan goals/objectives, identification of hazards of concern and identification of data/information
   - Meeting 2: Review of hazards profiles and hazards mapping
   - Meeting 3: Review of risk assessment and loss estimations
   - Meeting 4: Discussion of mitigation actions and action prioritization
   - Meeting 5: Review/discussion of administrative draft HMP

6. Communications and Role of County and Town Staff
   a. Core Team of County staff plus some extended staff from various departments to be involved in the planning process
   b. Primary people Wendy will be hearing from will be Jeff Henderson (Rancho Cordova) and Emma Reed (Oakland)
   c. All County staff should feel free to reach out to Baker Team
7. Wrap Up

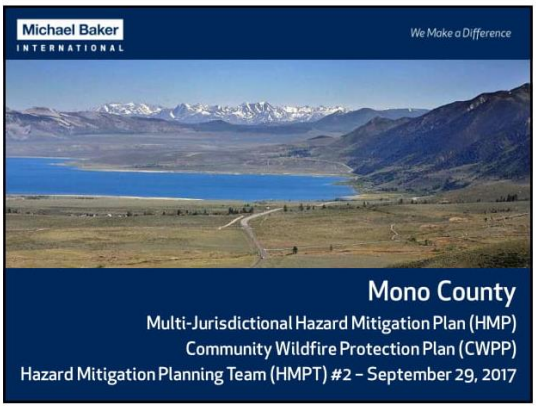
B.1.2 Planning Team Meeting #2 – September 29, 2017

AGENDA: Planning Team Meeting

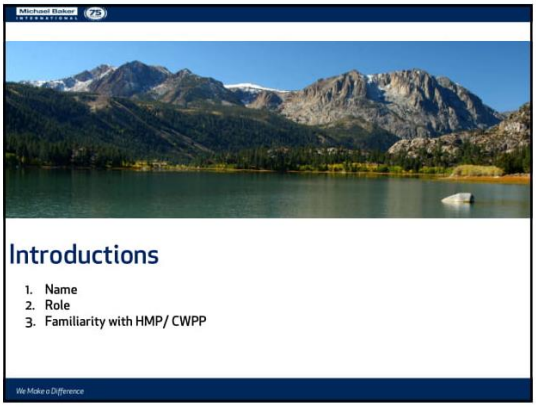
MONO COUNTY MULTI-JURISDICTIONAL LOCAL HAZARD MITIGATION PLAN

September 29, 2017 -- 10:30am-12:00pm -- Town/Co Conference Room

1. **Introductions**
2. **Review Agenda and Meeting Objectives**
3. **Overview of Project**
    a. Project Objectives
    b. HMP Requirements and CWPP Requirements
    c. Plan Development Process and Timeline
    d. Consultant Role vs Planning Team Role
4. **Updates Since Project Kick-off**
    a. Survey Results
5. **Exercise: Hazards Profiles and Ranking**
    a. Confirm Identified Hazards Relevant to Mono County and Hazards to Focus on (aka Profile)
    b. Hazard Ranking
6. **Mitigation Capabilities**
    a. In a perfect world, what types of capabilities would allow you to implement mitigation actions?
    b. What is currently limiting mitigation efforts? i.e.: $$$, regulatory tools (policies, programs, ordinance, codes, plans), personnel, programs, infrastructure, equipment?
7. **Review Public Outreach Strategy**
    a. Website
    b. Public Survey
    c. Public Meeting
8. **Next Steps and Upcoming Planning Team Meetings**
9. **Open Floor**

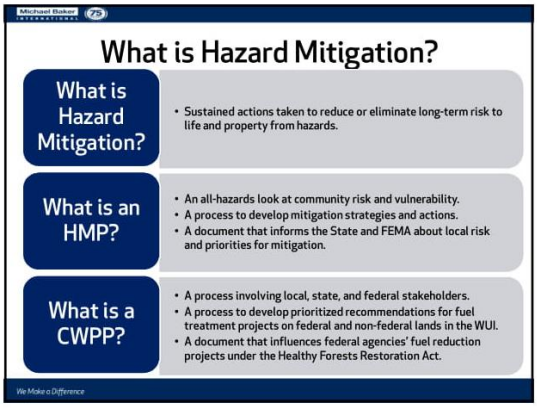

Michael Baker
INTERNATIONAL
We Make a Difference
Mono County
Multi-Jurisdictional Hazard Mitigation Plan (HMP)
Community Wildfire Protection Plan (CWPP)
Hazard Mitigation Planning Team (HMPT) #2 – September 29, 2017


Agenda
Introductions
Meeting Objectives
HMP/CWPP Requirements and Development Process
Updates Since Kick-Off Meeting
Hazard Profiling and Ranking Exercise
Schedule
Next Steps
We Make a Difference
2
1/4/2019


Introductions
1. Name
2. Role
3. Familiarity with HMP/ CWPP
We Make a Difference


Meeting Objectives
Requirements
Plan Development Process
Hazard Identification
Capabilities
Schedule & Next Steps
We Make a Difference


Project Overview
We Make a Difference


What is Hazard Mitigation?
What is Hazard Mitigation?
Sustained actions taken to reduce or eliminate long-term risk to life and property from hazards.
What is an HMP?
An all-hazards look at community risk and vulnerability.
A process to develop mitigation strategies and actions.
A document that informs the State and FEMA about local risk and priorities for mitigation.
What is a CWPP?
A process involving local, state, and federal stakeholders.
A process to develop prioritized recommendations for fuel treatment projects on federal and non-federal lands in the WUI.
A document that influences federal agencies' fuel reduction projects under the Healthy Forests Restoration Act.
We Make a Difference

Project Objectives

- ✓ FEMA-approved HMP
- ✓ Community-approved CWPP
- ✓ Integrated Mitigation Strategy
- ✓ Implementable Mitigation Actions
- ✓ Well-defined maintenance procedures

Project Goals

- Influence over where/how federal agencies implement projects
- Incorporate risk/mitigation into other local plans
- Inform and gain input/support from stakeholders/communities
- Evaluate changing risks from development and climate change

State and Federal Requirements

HMP Requirements

Must Describe:

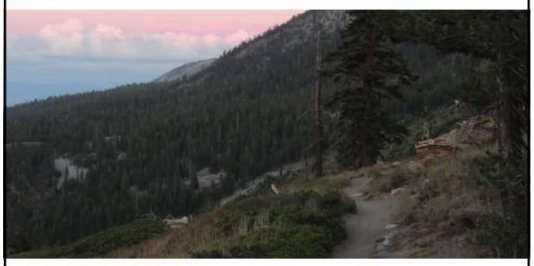
- How the plan was prepared
- Who was involved
- Opportunities for public and stakeholder involvement
- Review and inclusion of existing plans, reports, studies, etc.
- Continual public participation
- Monitoring and updating of the plan

Must Develop:

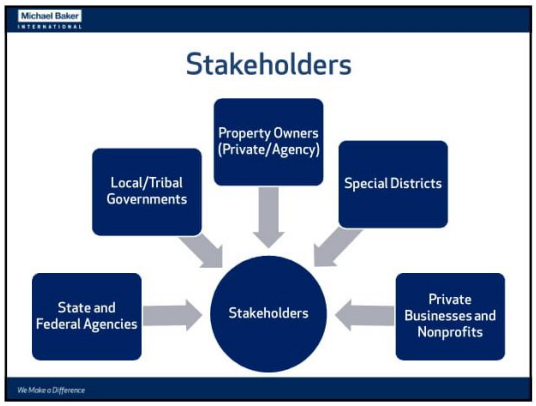
CWPP Requirements

Should include:

- Be collaboratively developed by local and state govt. representatives, in consultation with federal agencies and other interested parties.
- Identify and prioritize areas for hazardous fuel reduction treatments.
- Recommend the types and methods of treatment that will protect at-risk communities and essential infrastructure.
- Recommend measures that homeowners and communities can take to reduce the ignitability of structures.



HMP & CWPP Development Process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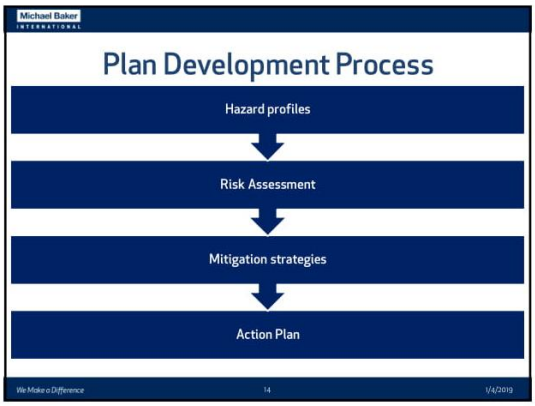
Stakeholders
Property Owners (Private/Agency)
Local/Tribal Governments
Special Districts
State and Federal Agencies
Stakeholders
Private Businesses and Nonprofits
We Make a Difference


Michael Baker
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Plan Development Process
Hazard profiles
Risk Assessment
Mitigation strategies
Action Plan
We Make a Difference
14
1/4/2019


Michael Baker
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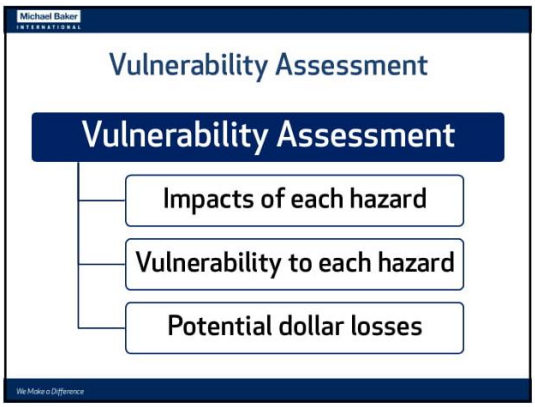
Hazard Profiles and Risk Assessment
Profiles for 9 County Regions + Mammoth Lakes.
Describe all hazards that affect the community.
Provide rationale for excluding recognized hazards.
Extent
Past events
Chance of future events
Location
Hazard profile
Climate change impacts
We Make a Difference


Michael Baker
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Vulnerability Assessment
Vulnerability Assessment
Impacts of each hazard
Vulnerability to each hazard
Potential dollar losses
We Make a Difference


Michael Baker
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Mitigation Strategies
Goals
Overarching objectives
Strategies
Comprehensive, specific actions
Action plan
Prioritizes actions
Includes responsibilities and cost-benefit review
We Make a Difference


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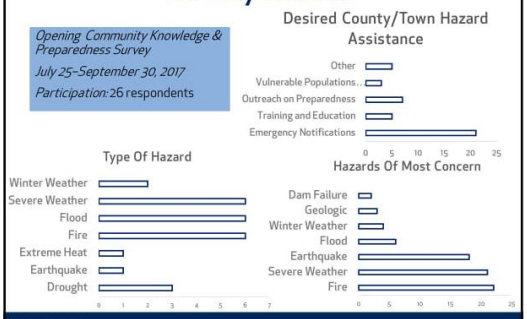
Updates Since Kickoff
We Make a Difference

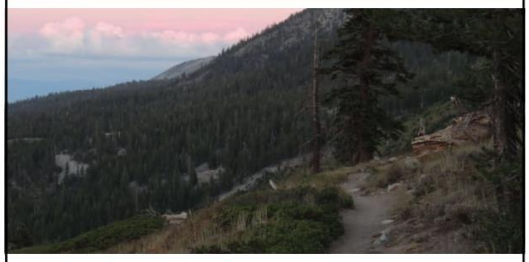
Survey Results

Opening Community Knowledge & Preparedness Survey

July 25–September 30, 2017

Participation: 26 respondents





Hazards to Profile & Ranking Exercise

Potential Hazards

Avalanche	Flood	Sea level rise
Climate change	Geological hazards	Seismic hazards
Coastal erosion	Hail	Severe wind
Coastal storm (storm surge)	Hazardous materials*	Severe winter weather
Dam failure	Human-caused hazards*	Tornado
Disease/pest management	Hurricane	Tsunami
Drought	Land subsidence	Volcano
Earthquake fault rupture	Landslide and mudflow	Wildfire
Expansive soils	Liquefaction	Others?
Extreme heat/cold	Lightning	

* - FEMA only requires/reviews natural hazards

Relevant Hazards?

Avalanche	Flood	Sea level rise
Climate change #	Geological hazards	Seismic hazards
Coastal erosion	Hail	Severe wind
Coastal storm (Storm Surge)	Hazardous materials*	Severe winter weather
Dam failure	Human-caused hazards*	Tornado
Disease/pest management	Hurricane	Tsunami
Drought	Land subsidence	Volcano
Earthquake fault rupture	Landslide and mudflow	Wildfire
Expansive soils	Liquefaction	Others?
Extreme heat/cold	Lightning	

- Can be addressed specifically per hazard

Hazards to Profile

2006	2017/8
Avalanche	Avalanche
Dam failure	Dam failure
Flood	Flood
Landslide	Landslide
Seismic	Seismic
Severe winter storm	Severe winter storm
Volcanic hazards	Volcanic hazards
Wildfire	Wildfire

Hazard Ranking Exercise

Hazard Ranking Exercise

Instructions

- Four criteria
  - Probability (how likely is it to occur)
  - Location (who and what does it affect over what area)
  - Primary Impact (Damage to life, property, facilities and functions)
  - Secondary Impacts (What are longterm consequences and what does recovery look like for the larger community)

We Make a Difference

Hazard Ranking Exercise

Probability: Estimated likelihood of occurrence based on historical data. May also wish to consider the effect of recent development and climate changes on likelihood of occurrence.

Ranking 1-4

1. Unlikely: Less than 1 percent probability of occurrence in the next year or a recurrence interval of greater than every 100 years.
2. 1 to 10 percent probability of occurrence in the next year or a recurrence interval of 11 to 100 years.
3. 10 to 90 percent probability of occurrence in the next year or a recurrence interval of 1 to 10 years.
4. 90 to 100 percent probability of occurrence in the next year or a recurrence interval of less than 1 year.

We Make a Difference

Hazard Ranking Exercise

Location: Based on potential size of geographical area of communities (life, property, infrastructure) affected by hazard.

Ranking 1-4

1. Negligible: Less than 10 percent of planning area or isolated single-point occurrences.
2. 2. Limited: 10 to 25 percent of the planning area or limited single-point occurrences.
3. Significant: 25 to 75 percent of planning area or frequent single-point occurrences.
4. Extensive: 75 to 100 percent of planning area or consistent single-point occurrences.

We Make a Difference

Hazard Ranking Exercise

Primary Impact: Based on percentage of damage to life, property, facilities and functions in affected communities.

Ranking 1-4

1. Negligible: Low classification on scientific scale. Negligible property damage (<5%). Minimal injuries that are easily treatable, and no deaths. Negligible quality of life lost. Critical facilities compromised for less than 24 hours.
2. Moderate: Moderate classification. Slight property damage (5%-25%). Some injuries /illnesses, some serious or long-term, but few or no deaths. Critical facilities compromised for 24hrs-1 week.
3. Severe: Severe classification. Moderate property damage (25%-50%). Many injuries/illnesses, including many serious resulting in deaths. Critical facilities compromised for 1 week-1 month.
4. Catastrophic: Extreme classification. Severe property damage (>50%). Many injuries/illnesses that result in permanent disability and many deaths. Critical facilities compromised for more than 1 month.

We Make a Difference

Hazard Ranking Exercise

Secondary Impacts: Impacts to community at large including secondary hazards, long-term health, economic, social and cultural impacts.

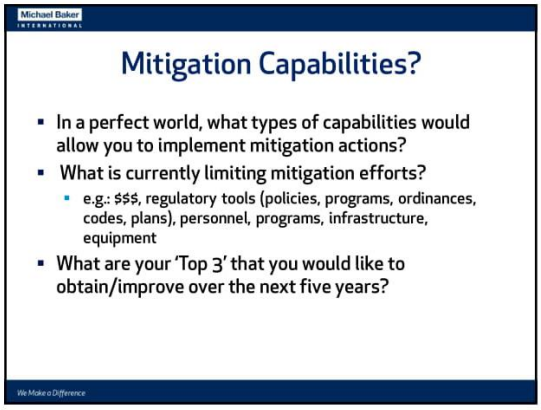
Ranking 1-4

1. None: No or minimal loss of social and economic functions, downtime, and changes in physical or cultural attributes.
2. Low: Limited loss of social and economic functions, downtime, and changes in physical or cultural attributes.
3. Moderate: Some persistent loss of social and economic functions, downtime, and noticeable changes in physical or cultural attributes.
4. High: Major loss of function, downtime, and changes in physical or cultural attributes.

We Make a Difference

Mitigation Capability Review

We Make a Difference



Meeting Notes – Mtg #2

Attendees

- Bob Rooks – Mono County EMS – created last CWPP for the county (2008)

    - Grady – PW Director for Town. Town's EOP is nearly completed, just finished training related to plan.
    - Al Davis – Mammoth Lakes Police Chief
    - Louis Molina – County EH Director
    - Jerry Le Francois – Mono County Planning, LTC. LTC wants staff to put together a winter debrief from last winter.
    - Wendy Sugimura
    - Scott Burns
    - Tony Dublino – Assistant CAO. Some familiarity with these plans. Former solid waste services director, was directly involved in cleanup efforts after recent fires.
    - Mike Garner – Michael Baker Int'l.

- Priority Hazards discussion – is it based on potential to occur, or potential to have a big impact?

- Man-made hazards – consider hazardous freight movement. Include as a hazard.

- "Severe Winter Storm" – needs to include "snow" in title

- For Wildfire hazards – consider ignition sources as part of the "wildfire" hazard.

- Dam Failure – is it a weather issue, or something else? This is relevant, keep for now.

- Potentially remove Liquefaction as a hazard.

- Town discussions of climate change are centered on Adaptation.

- Tony – there was interest in having risk factors established really high – due to funding possibilities. Caused some blow-back on insurance ratings? But this is public data in the end – insurance companies can get the information and use it. Our risk layers are already publicly available.

- Real issues with snow were snow removal and propane tank issues. These are mitigatable.

- Top results for each participant in hazards priority survey:

    - Wildfire, Seismic Hazards, Landslide/Fault Rupture
    - Seismic, Severe Weather, Volcano
    - Wildfire,

- Smoke/PM issues – important health hazards. Consider secondary impacts of smoke/PM – originating from the Central Valley and controlled burns.

    - Wildfire, Seismic/Earthquake/Landslide

- Seismic is a long-term impact – longer recovery period.

    - Wildfire, Severe Winter Weather (snow), Flood

- With Severe Weather – be sure to consider secondary issues.

- Ideal world Mitigation
    - Undergrounding utilities
    - Enhanced Digital 395 project
    - Communications capabilities – Notifications (Reverse 911 system)
- Slinkert Fire – residents were unsure what was going on, or what to do.
    - Eliminate cell dead zones on Highway 395.
    - Unlimited resources for fuel reduction? How can we provide additional resources for fuel reduction. Policies and ordinances that are out there don't allow us to manage resources.
    - Investigate full access for brush clearance to all of the WUI.
    - Personnel is always going to be an issue here – don't have a large corps of first responders.
- Fire stations and medic stations throughout the County are in need of hardening. (Mammoth is in good shape.)
- Evacuation Routes – Need better secondary access to Mono City, Twin Lakes, other locations.
- Engage SCE, DWP, Liberty – also propane providers.

Other Staff Discussion:

- Assessor Data. Parcel Viewer – attribute table for assessor data. Gather a list of specific attributes they need from the assessor.
- Avalanche – "conditional development area." Build here at your own risk. They sign a waiver. Avalanche expert mapped out areas 30 years ago.
    - Identify Avalanche Influence areas.
- Highest risk outside Alaska. All communities are at the bottom of "runout zones." Crosses state highways.
- Can Caltrans grant money apply Sustainable Transportation Grant – go after resiliency grant because of wet snow flow. Or could just look at where it impacts public assets.
- Walt has secondary access map
- Gases route outside June Lake.
- Planning areas from SP3. Demographics.
- Wendy – Will provide Housing Needs Assessment.
- 395, 203 & Creek Maintenance.
- Digital 395 – Nate Greenberg. Repeaters. 911 redundancy – all Nate

- High tension areas are the big ones & can't do anything about melt but power down, no water, no heat.
- Communications – no cell service during a big event.
- Notification – Code red system works best but depends on cell. What to do about notifications? What the public should do?
- Eliminate dead zones for cell service.
- Unlimited fuel reduction. Policies sometimes prevent.
- Clearance – since we don't have access to forest land on back side of homes.
- We are on our own for snow. Yes for fire, equipment.
- Personnel is always an issue.
- Sections of County have old buildings that won't. Rural area stations are old & not to standards. Same is true for medic facilities.
- Secondary evacuation routes. Twin Lakes, Swall, June Lake, Mono.
- Tribal Contact List
- Contact Propane companies in county.

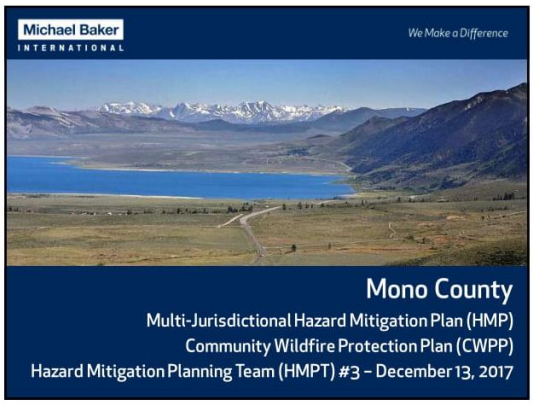
B.1.3 Planning Team Meeting #3 – December 13, 2017

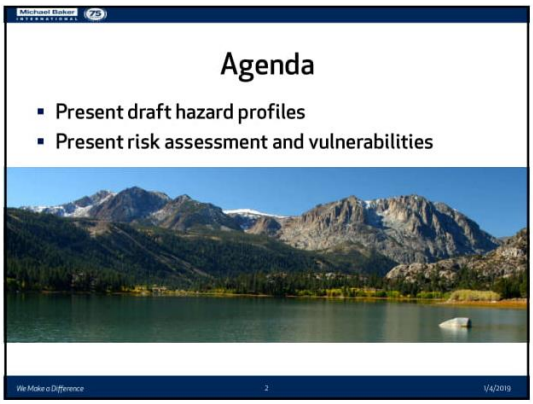
AGENDA: Planning Team Meeting

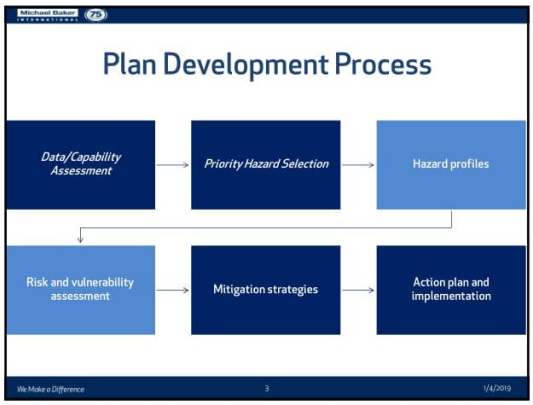
MONO COUNTY MULTI-JURISDICTIONAL LOCAL HAZARD MITIGATION PLAN

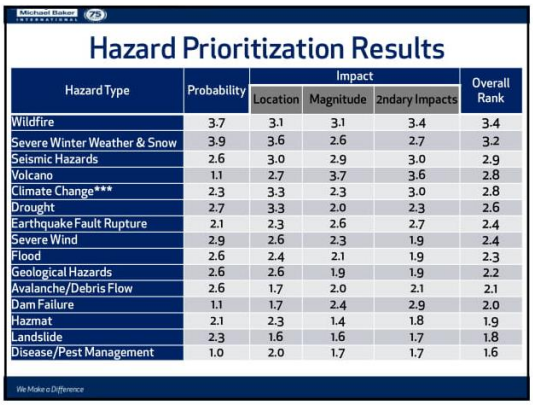
December 13, 2017

1. **Review Agenda and Meeting Objectives**
2. **Presentation: Hazard risk and vulnerability assessment**
    a. Hazard prioritization results summary
    b. Hazard profile and vulnerabilities assessment process
    c. Priority hazard risk and vulnerability assessment results
3. **Next Steps and Upcoming Planning Team Meetings**
4. **Open Floor**

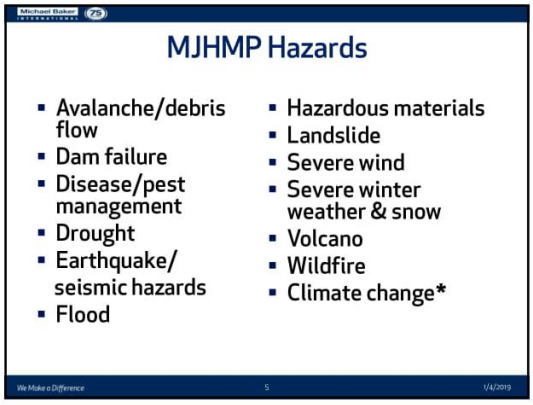


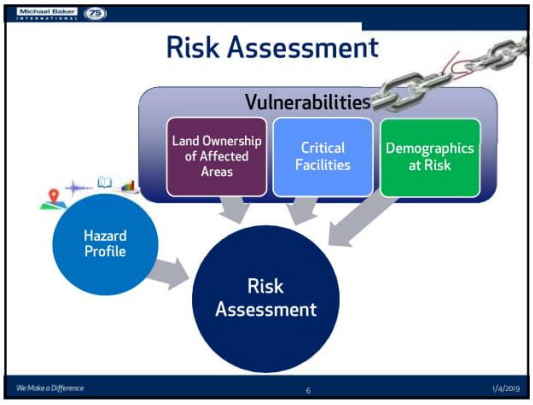






Hazard Type	Probability	Impact			Overall Rank
		Location	Magnitude	2ndary Impacts	
Wildfire	3.7	3.1	3.1	3.4	3.4
Severe Winter Weather & Snow	3.9	3.6	2.6	2.7	3.2
Seismic Hazards	2.6	3.0	2.9	3.0	2.9
Volcano	1.1	2.7	3.7	3.6	2.8
Climate Change***	2.3	3.3	2.3	3.0	2.8
Drought	2.7	3.3	2.0	2.3	2.6
Earthquake Fault Rupture	2.1	2.3	2.6	2.7	2.4
Severe Wind	2.9	2.6	2.3	1.9	2.4
Flood	2.6	2.4	2.1	1.9	2.3
Geological Hazards	2.6	2.6	1.9	1.9	2.2
Avalanche/Debris Flow	2.6	1.7	2.0	2.1	2.1
Dam Failure	1.1	1.7	2.4	2.9	2.0
Hazmat	2.1	2.3	1.4	1.8	1.9
Landslide	2.3	1.6	1.6	1.7	1.8
Disease/Pest Management	1.0	2.0	1.7	1.7	1.6



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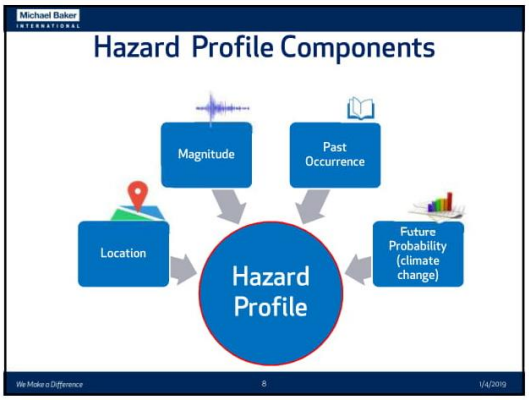
Risk Assessment
Hazard Profile
Risk Assessment
We Make a Difference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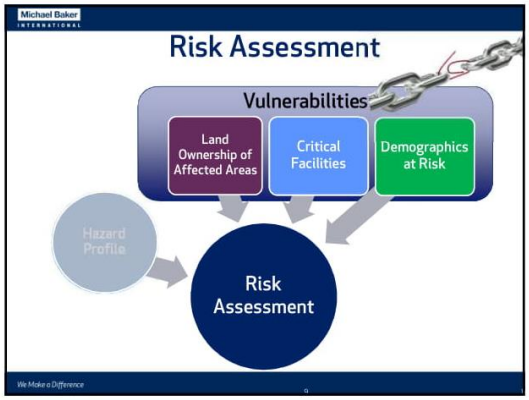
Hazard Profile Components
Magnitude
Past Occurrence
Location
Future Probability (climate change)
Hazard Profile
We Make a Difference
8
1/4/2019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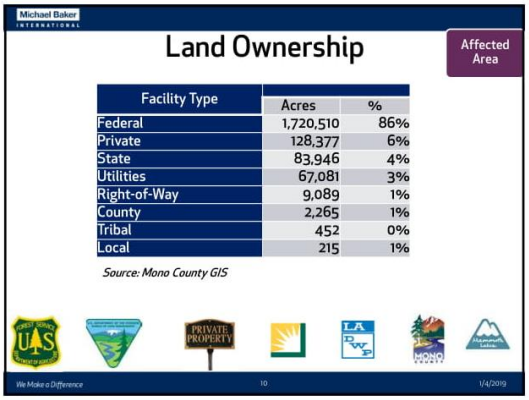
Risk Assessment
Vulnerabilities
Land Ownership of Affected Areas
Critical Facilities
Demographics at Risk
Hazard Profile
Risk Assessment
We Make a Difference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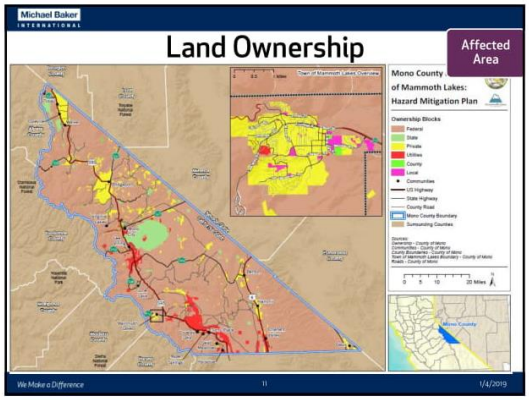
Land Ownership
Affected Area
Facility Type
Acres
%
Federal 1,720,510 86%
Private 128,377 6%
State 83,946 4%
Utilities 67,081 3%
Right-of-Way 9,089 1%
County 2,265 1%
Tribal 452 0%
Local 215 1%
Source: Mono County GIS
We Make a Difference
10
1/4/2019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Land Ownership
Affected Area
Mono County
of Mammoth Lakes:
Hazard Mitigation Plan
We Make a Difference
11
1/4/2019


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Planning Areas & Urban Communities
Affected Area
Planning Area | Communities | Advisory Body
Antelope Valley | Topaz, Coleville, Walker | Antelope Valley RPAC
Benton Valley | Benton | Benton/Hammil RPAC
Bodie Hills | Dispersed properties | None
Bridgeport | Bridgeport | Bridgeport Area RPAC
Chalfant | Chalfant | Chalfant Valley RPAC
Hammil | Hammil | Benton/Hammil RPAC
June Lake | June Lake, Crestview | June Lake CAC
Crowley | Crowley Lake, Aspen Springs, Sunny Slopes, McGee Creek, Tom's Place | Long Valley RPAC
Mammoth Vicinity | Dispersed properties | None
Mono Basin | Mono City, Lee Vining | Mono Basin RPAC
Oasis | Oasis | None
Paradise | Paradise | None
Sonora Junction | Marine Corps MWTC | None
Swauger Creek | Dispersed properties | Swauger Creek PG
Upper Owens | Dispersed properties | None
Wheeler Crest | Wheeler Crest, Swall Meadows | Wheeler Crest PAC
No Planning Area | Virginia Lakes, Lundy Lake | None
We Make a Difference
12
1/4/2019

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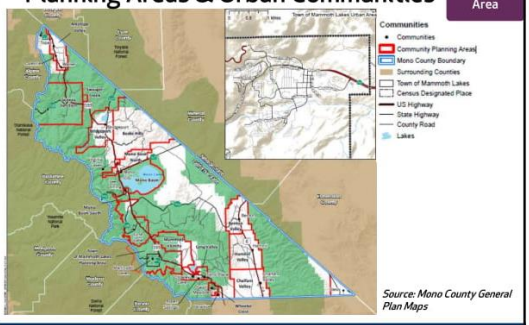
Planning Areas & Urban Communities

Affected Area



Source: Mono County General Plan Maps

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Critical Facilities

Critical Facilities

Facility Type	Mono County	Mammoth Lakes
Communications Facility	9	2
Emergency Operations Center	8	4
Emergency Services	20	4
Hazardous Materials	5	1
Lifeline Utility Systems	47	5
Medical Services	3	3
Schools	6	5
Transportation Systems	9	1
Vulnerable Populations (senior living facilities)	5	0
Total	113	25

Source: Mono County 2006 MHMP & GIS

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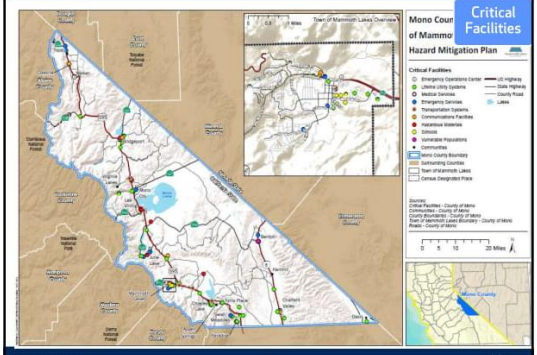
Critical Facilities

Critical Facilities



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Socially Vulnerable Populations

Demographics at risk

- Data available from Census population surveys, only for hazards with official location-specific zones

Topic	Indicators
Education Level	Population over age 25 with less than a high school education
Income	Making less than 80% of their county's median family income
Median HH Income	Median household income
Poverty	Households at or below federal poverty level
Employment	Population over the age of 16 that is unemployed and eligible for the labor force
Linguistic Isolation	Households where no one over age 14 speaks English well
Elderly	Households with members over 65
Disability	Households with a disabled member
Total Population	Total population

Source: 2015 5-year ACS

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Avalanche/Debris Flow

- Available Risk Area is dated - pursuing new maps from the State

Historical data identifies communities and roadways commonly at risk:

Planning Area	General Location
Bridgeport	Twin Lakes Area
Crowly	Crowley Lake, east of McGee Mountain base
	Crowley Lake, Ojai Ridge
	Rock Creek Road Narrows
June Lake	Eastern side of community, SR 158
Mono Basin	North of Lee Vining
Wheeler Crest	Swall Meadows
	Lower Rock Creek Road Narrows
Outside planning area	Virginia Lakes, north side
	Lundy Lake, west side
Mammoth Lakes	Sherwin Range, Lake Mary, Old Mammoth

Sources: Local news, Eastern Sierra Avalanche Center NOAH Storm Events database, Mono County Public Works Department, Mono County General Plan Maps

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Dam Failure

- 21 dams in the county; several others outside that could impact county area
- No dam failures, several near misses
- California Division of Safety of Dams Condition Assessment fair and poor rated dams:

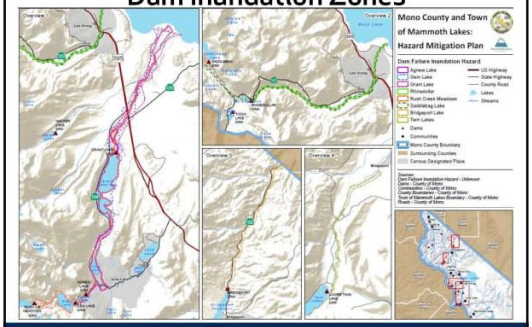
Name	Condition Assessment
Agnew Lake	Poor
Gem Lake	Fair
Lower Twin Lake	Fair
Rush Creek Meadows	Fair
Upper Twin Lake	Fair

Division of Safety of Dams Condition Assessment Ratings

Rating	Definitions
Satisfactory	Acceptable performance is expected under all loading conditions, in accordance with regulatory criteria or tolerable risk guidelines.
Fair	Rare or extreme hydrologic and/or seismic events may result in a dam safety deficiency. Risk may be in the range to take further action. Safety may be under evaluation.
Poor	A dam safety deficiency is recognized for loading conditions that may realistically occur. Remedial action is necessary.
Unsatisfactory	A dam safety deficiency is recognized that requires immediate or emergency remedial action for problem resolution.

Sources: California Department of Water Resources, Division of Dam Safety of Dams, 2017. Note: Dam inundation zone analysis dates vary greatly

Dam Inundation Zones



We Make a Difference 19 1/4/2019

Dam Inundation Vulnerability

- Dam inundation zones are narrow but one or more failures could have cascading effects
- 2 critical facilities at risk: utility structures inside inundation zones

Acres in dam inundation zone by ownership:

Ownership	Acres
Federal	3,333
Private	380
State	523
Unknown	241
Utility	2,547

Planning areas/communities at most risk:

Planning Area	General Location
June Lake	South of Silver Lake, SR 158, US 395, Rush Creek, 2 lifeline utilities
Mono Basin	Lee Vining, SR 120, US 395
Swauger Creek	SR 182
Bridgeport Valley	Twin Lakes, Twin Lakes Road
Mammoth Lakes	None

We Make a Difference 20 1/4/2019

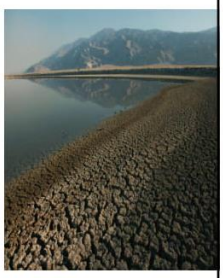
Disease/Pest Management

- Risk consistent throughout county and relatively low
- Deer mice present in county but no hantavirus outbreaks recorded
- Mosquitos are present
  - Most prevalent in Tri-Valley
- Invasive beetles and other problems in forest areas
- Elderly and immunocompromised persons at greater risk from diseases such as influenza

We Make a Difference

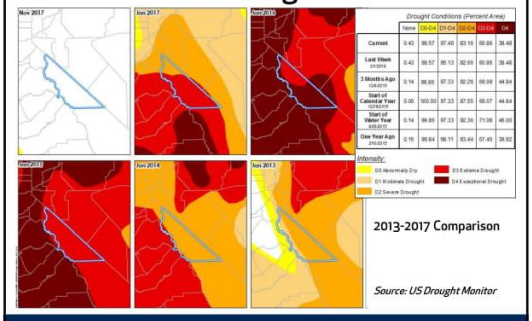
Drought

- Drought severity varies widely year over year
- Southern Mono County generally at greater risk, but no zones
- Drought in other parts of California can affect impacts on Mono County water supplies



We Make a Difference

Drought



We Make a Difference 23 1/4/2019

Drought Vulnerability

- Both urbanized and rural areas can be affected
- Lower-income populations may lose water supplies in extreme cases
- Agriculture and natural eco-system (affecting recreation and tourist industry) most affected
- Water supply at risk in long-term droughts—no part of the county with specific well issues

We Make a Difference

Earthquake/Seismic Hazards

- Intense ground-shaking is possible in entire county
- Historic epicenters mostly in southern end of county
- Most frequent shaking in Long Valley, Mammoth Vicinity, and Mammoth Lakes
- 11 named fault zones, numerous smaller faults

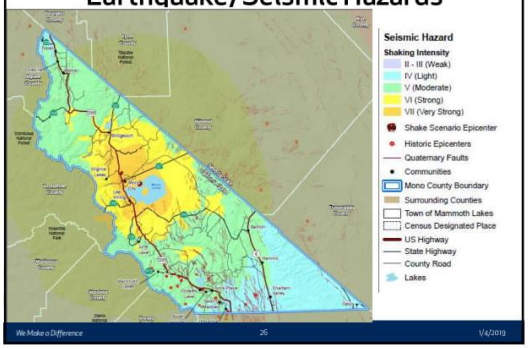
Planning Areas with Most Acreage at Direct Risk of Fault Rupture:

Planning Area	Acres in Hazard Zone	Percentage of Total Planning Area
Chalfant Valley	20,525	34%
Oasis	1,591	10%
Mammoth Vicinity	11,869	10%

Sources: US Geological Survey Shakemaps, California Department of Conservation Alquist-Priolo Earthquake Fault Zone maps, Harvard Geologic Center

We Make a Difference 25 1/4/2019

Earthquake/Seismic Hazards



We Make a Difference 26 1/4/2019

Fault Vulnerabilities

Critical Facility Type	# in fault zone*
Communications Facilities	1
Emergency Operations Center	1
Emergency Services	1
Hazardous Materials	1
Lifeline Utility Systems	1
Lifeline Utility Systems	2
Schools	1
Transportation Systems	1

- Earthquakes have caused structural damage and property loss in the past
- Can trigger other hazards such as fire, flood, landslides, and dam failure

* fault only, not shaking

Type	Acres in Hazard Zone*	% in Category
Federal	47,125	2.7%
State	618	3.9%
County	13	0.7%
Local	-	5.3%
Utilities	3.538	6.2%
Right of way	559	0.6%
Private	4.993	0.0%

We Make a Difference 27 1/4/2019

Fault Social Vulnerabilities

- No residents Mammoth Lakes fault zones
- 3% of county residents in fault zones

Social Vulnerability Metric	Mono County
Poverty	4
Linguistic Isolation	1
Elderly	39
Disability	18
Total population	413
Households	142

- Socially vulnerable populations don't appear to be more likely to be in zones

We Make a Difference 28 1/4/2019

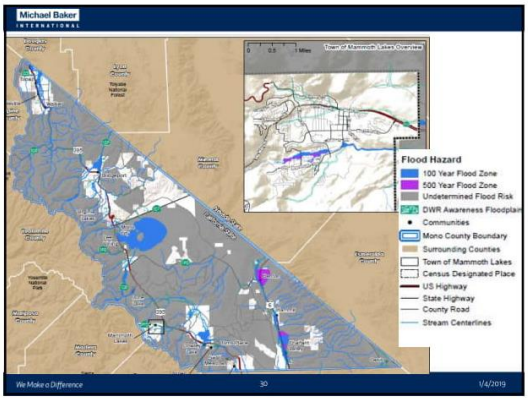
Flood

- Result of snowmelt and short, intense rainstorms when ground is saturated
- 3 watersheds: Owens River, Mono Lake, and the Walker River—some flood risk in all
- Hazard exposure highest in low-lying areas of county
  - Tri-Valley
- Total area covers 3.4% of county

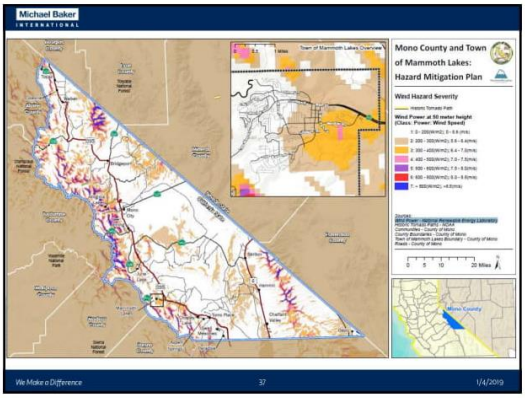
Planning Area	General Location
Tri-Valley (Benton, Hammil, Chalfant)	Throughout area, flat valley floor, US 6
Sonora Junction	Pickel Meadow along the West Walker River
June Lake	Along Grant and June Lakes and creek connections
Antelope Valley	Topaz, Coleville, and Walker along West Walker River, East Slough and much of the valley floor in between
Bridgeport Valley	Along the East Walker River and creeks flowing into Bridgeport Reservoir, inc. Bridgeport and Twin Lakes
Mammoth Lakes	Along Mammoth Creek in Mammoth Lakes and Hot Creek to the east

Sources: FEMA 100-Year, 500-Year Flood Map. Note: Does not include "local flooding"

We Make a Difference



We Make a Difference 30 1/4/2019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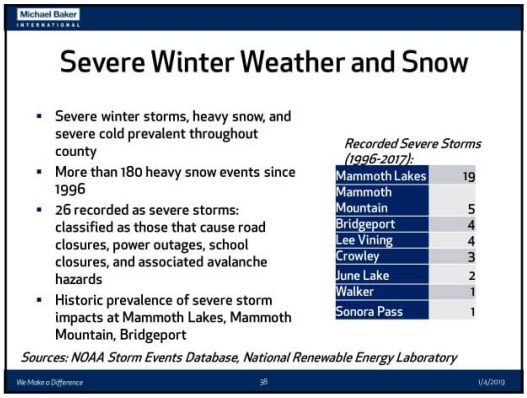
Mono County and Town of Mammoth Lakes: Hazard Mitigation Plan
Wind Hazard Severity
We Make a Difference
37
1/4/2019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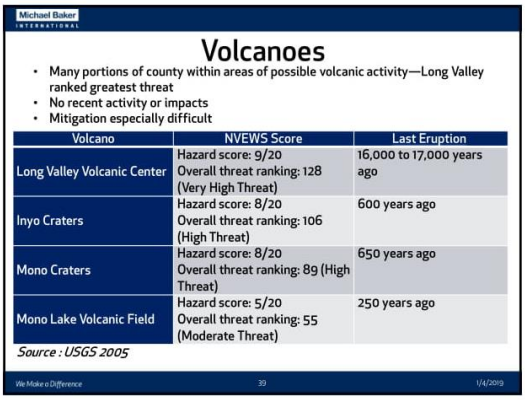
Severe Winter Weather and Snow
Severe winter storms, heavy snow, and severe cold prevalent throughout county
More than 180 heavy snow events since 1996
26 recorded as severe storms: classified as those that cause road closures, power outages, school closures, and associated avalanche hazards
Historic prevalence of severe storm impacts at Mammoth Lakes, Mammoth Mountain, Bridgeport
Recorded Severe Storms (1996-2017):
Mammoth Lakes 19
Mammoth Mountain 5
Bridgeport 4
Lee Vining 4
Crowley 3
June Lake 2
Walker 1
Sonora Pass 1
Sources: NOAA Storm Events Database, National Renewable Energy Laboratory
We Make a Difference
38
1/4/2019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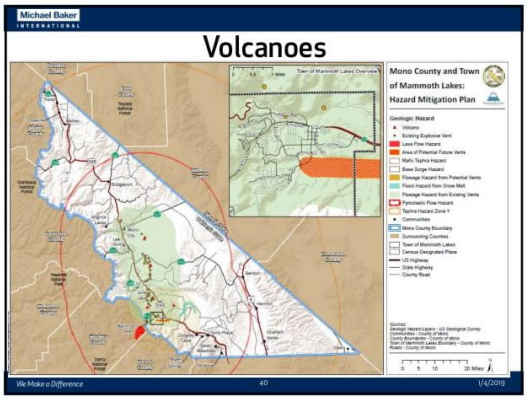
Volcanoes
Many portions of county within areas of possible volcanic activity—Long Valley ranked greatest threat
No recent activity or impacts
Mitigation especially difficult
Volcano | NVEWS Score | Last Eruption
Long Valley Volcanic Center | Hazard score: 9/20 Overall threat ranking: 128 (Very High Threat) | 16,000 to 17,000 years ago
Inyo Craters | Hazard score: 8/20 Overall threat ranking: 106 (High Threat) | 600 years ago
Mono Craters | Hazard score: 8/20 Overall threat ranking: 89 (High Threat) | 650 years ago
Mono Lake Volcanic Field | Hazard score: 5/20 Overall threat ranking: 55 (Moderate Threat) | 250 years ago
Source : USGS 2005
We Make a Difference
39
1/4/2019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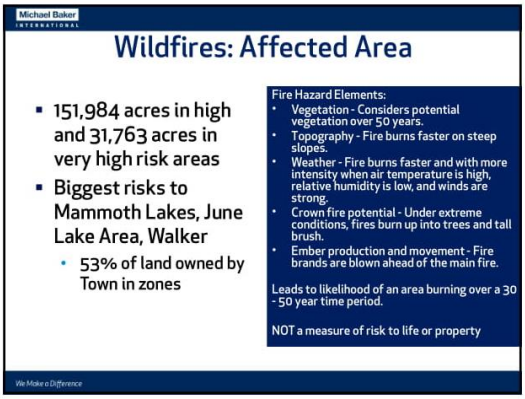
Volcanoes
Mono County and Town of Mammoth Lakes: Hazard Mitigation Plan
We Make a Difference
40
1/4/2019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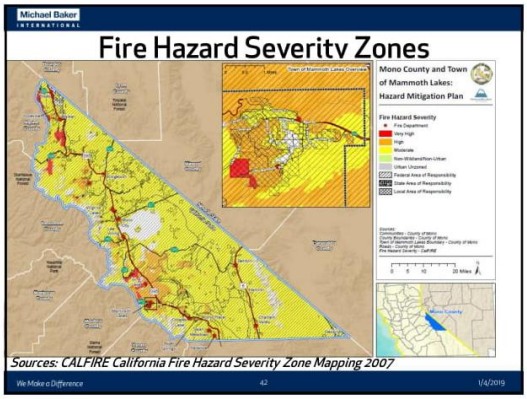
Wildfires: Affected Area
151,984 acres in high and 31,763 acres in very high risk areas
Biggest risks to Mammoth Lakes, June Lake Area, Walker
53% of land owned by Town in zones
Fire Hazard Elements:
Vegetation - Considers potential vegetation over 50 years.
Topography - Fire burns faster on steep slopes.
Weather - Fire burns faster and with more intensity when air temperature is high, relative humidity is low, and winds are strong.
Crown fire potential - Under extreme conditions, fires burn up into trees and tall brush.
Ember production and movement - Fire brands are blown ahead of the main fire.
Leads to likelihood of an area burning over a 30 - 50 year time period.
NOT a measure of risk to life or property
We Make a Difference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Fire Hazard Severity Zones
Mono County and Town of Mammoth Lakes: Hazard Mitigation Plan
Sources: CALFIRE California Fire Hazard Severity Zone Mapping 2007
We Make a Difference
42
1/4/2019

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Land Ownership Category	Acres in High Hazard Zone	Acres in Very High Hazard Zone	% acres in Categories
Federal	131,194	27,671	9.2%
State	3,140	2,565	6.8%
County	52	138	8.4%
Local	114	0	53.3%
Utilities	8,308	126	12.6%
Right of way	1,204	361	17.5%
Private	7,972	902	6.9%

Source: CALFIRE 2007 California Fire Hazard Severity Zone Maps, Mono County GIS

Critical Facility Type	Hazard Class	
	High	Very High
Communications Facilities	3	0
Emergency Operations Center	5	0
Emergency Services	7	2
Lifeline Utility Systems	10	1
Medical Services	3	0
Transportation Systems	3	0
Vulnerable Populations	1	0
Hazardous Materials	0	1

Planning Area	Acres in H& VH	% PA
Mammoth Vicinity	53,912	43.4%
June Lake	20,629	38.9%
Swauger Creek	663	35.0%
Mono Basin South	1,979	27.9%
Long Valley	3,649	20.2%
Sonora Junction	18,673	16.3%
Bridgeport	3,000	5.8%
Antelope Valley	1,279	4.3%
Wheeler Crest	244	4.2%
Mono Basin North	268	0.9%

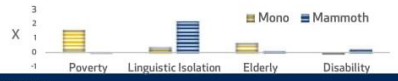
We Make a Difference 43 1/4/2019

HD2 Michael Baker INTERNATIONAL

Wildfires Social Vulnerability

Social Vulnerability Metric	In High or very high fire hazard zone	
	Mono County	Mammoth Lakes
Poverty	67	34
Linguistic Isolation	14	182
Elderly	292	170
Disability	537	136
Total population	1,452	2,397
Households	537	930

% of populations within zones compared to whole jurisdiction



We Make a Difference

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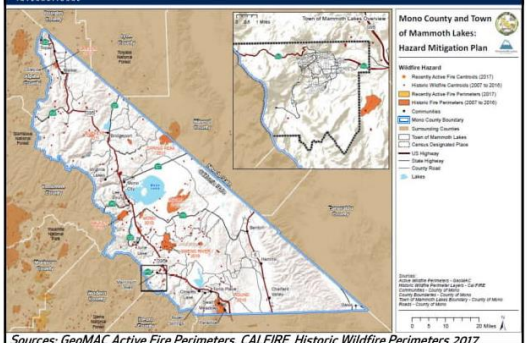

Sources: GeoMAC Active Fire Perimeters, CALFIRE Historic Wildfire Perimeters 2017

We Make a Difference 45 1/4/2019

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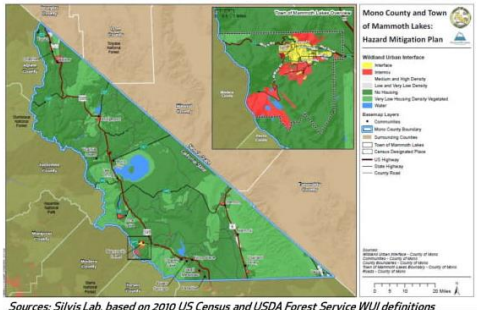
Wildland Urban Interface



Sources: Silvis Lab, based on 2010 US Census and USDA Forest Service WUI definitions

We Make a Difference 46 1/4/2019

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Draft CWPP Measure Review

- Categorize each measure: HD1
  - Low, medium or high priority; or
  - Completed
  - Remove/not important

We Make a Difference 47 1/4/2019

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Project List Review

- Review handout of ongoing and proposed future projects.
- Identify projects missing from list or new projects to add to list.

We Make a Difference 48 1/4/2019

Climate Change

Hazards profiles likely to change:

- Wildfire (heat, eco-system changes, lower precipitation)
- Drought (lower precipitation)
- Flood (stronger storms)
- Severe winter storms (stronger storms)
- Disease (eco-system changes

Data Sources:

- Cal-Adapt
- NOAA Climate Resilience Toolkit
- California Hazard Mitigation Plan

We Make a Difference 49 1/4/2019

Affected Areas: Summary

Hazard	Unincorporated County			Mammoth Lakes		
	Affected Acres	%	# Critical Facilities	Affected Acres	%	# Critical Facilities
Dam failure	7,024	0.35%	2	0	0	0
Flood (100-year)	74,901	3.73%	0	427	2.70%	0
Flood (500-year)	10,841	0.54%	8	447	2.80%	2
Fault rupture	56,509	2.81%	9	338	2.10%	3
Wildfire (very high risk)	151,513	7.55%	4	476	3.00%	1
Wildfire (high risk)	26,364	1.31%	32	5,402	33.71%	18

We Make a Difference 50 1/4/2019

Affected Areas: Local Control

Natural Hazard	Unincorporated County	
	Affected Acres	%
Dam failure	2,927	0.15%
Flood (100-year)	21,403	1.06%
Flood (500-year)	2,590	0.13%
Fault rupture	8,544	0.42%
Wildfire (very high risk)	1,166	0.06%
Wildfire (high risk)	16,332	0.81%
Wildfire (moderate risk)	2,927	0.15%

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Schedule Review

We Make a Difference

Event	Topics	Time Frame
Project Kickoff	Initial Meeting with County/Town Staff	June 2017
Stakeholder Meetings	Information Gathering & Awareness	Sep 29-29, 2017
Planning Team Meeting & RPAC Meetings & Town PC	Hazard Profiles & Risk Assessment	Dec 12-13, 2017
Planning Team Meeting & RPAC Workshop	Mitigation Actions & Draft Plan Presentation	Jan 17, 2018
Public Review MJHMP	Public Review of Document	March 2018
Submit to Cal OES/FEMA	Cal OES/FEMA Review of Document	April 2018
Final MJHMP	Public Hearing & Adoption	May 2018

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Timeline/Next Steps

- Finalize data collection (particularly corrections to planning area or critical facilities) [NOW]
- Outreach/engagement (online survey on website) [NOW]
- Prepare draft mitigation actions and CWPP actions for review [NOW and next 2 weeks]
- Conduct LHMP team meeting #4 to review draft mitigation actions and Draft Document [January]

We Make a Difference

Meeting Notes – Mtg #3

- Planning Areas Table: Paradise and Wheeler Crest – have a joint grant to complete the CWPP. It's under the auspices of Wheeler Crest Fire Safe Council. Add the FSC for both Wheeler Crest and Paradise.
- In the plan document, let's use some additional break-out/inset maps to identify community areas in addition to TOML.
- Lifeline utility systems – Given Frontier's lack of response in TriValley – may not want to consider all as lifeline. Also need to include tribal facilities. And, Camp Antelope. There is a clinic in Camp Antelope, and Benton tribe is pursuing resources for similar. Supervisor will provide our contact info to tribal chair.
- Cindy.nelson@cpuc.ca.gov would be good contact regarding lifeline utilities. Document these concerns in the plan.
- Should expand the socially vulnerable population areas to include designated DUCs by the state.
- Agnew Dam – confirm contact with SCE. **(follow up with Wendy)**
- Where did we determine that mosquitoes are most prevalent in Tri-Valley? There is a dedicated mosquito control function in the Town. It seems like this would be a bigger issue in west county, where its wetter and there are wetlands present. Talk to Ag Commissioner (Inyo Co) in Bishop – they did a count, got as many as 5k trapped, where only 10% of that is normal. **Wendy will pass along contact info.**
- Antelope Valley District – drilled about 20 new wells last year to replace domestic wells gone dry. Wendy to provide additional information from Louis. DWR can provide groundwater basin data related to overdraft. It's the south part of the county, includes Tri-Valley and wraps around to Swall Meadows. Will be a GSP prepared.

- Change "Coleville" to Antelope Valley – on severe wind. This is a hazard throughout the entire valley.
- Problems with severity zones – they fail to incorporate fire history. Fire history means fuel type conversion, means more frequent fires. Swall Meadows to Crowley Lake – has gone from 11 year interval to 8 year interval. Climate Change discussion has to do with invasive species, which has changed fuels. Major incidents around TOML have not been in the community, but rather in adjacent areas where fuel types have changed. Severity zone mapping doesn't capture historic trends – if its burned before, it will burn again.
- FRAP – developed and geared for 4,000 ft elevations on the west slope, not geared for Great Basin, elevation, and fuel types. Fire history also needs to be considered. Confirm if the FRAP updates are including changes in vegetation.
- Historic Fires map – go farther back than 2007. There was a lot of fire activity in the 1990s. Bridgeport Fire isn't on the map, but was only 3 years ago.
- Swall Meadows fire caused significant structural loss – that's an indicator of risk. Consider prioritizing the areas with potential for structural loss.
- Reason there's a second access road out of TOML is due to the 1980 earthquake. Need to capture accurate data to understand and prioritize the risks. In practice, its Antelope Valley and Swall Meadows into Tri-Valley.
- Try to synch all of the historic information to 1996+. (Swall Meadows Fires 1981, 1992, 2002, 2015, evac'd again in 2016)
- Fire intervals are potentially more important than structural damage information. Perhaps some tables of fire centers near communities going back a number of years. Our purpose is to protect the population – and we should be focusing on vulnerabilities.
- Can define the WUI as we want for CWPP. Should also consider approved subdivision applications. **Will work with staff to refine the WUI mapping.**
- 2009 WUI map may be a better representation. Should extend Very High all the way up to State line. Also, the Extreme area should be extended down to Walker.
- Caltrans did a big rockfall project near Lee Vining – temporary fencing, etc. Much of the work done in this location was due to the burn scar. Can be discussed in the plan narrative – build the relationship between the burn scars, flooding, and landslides.
- Did we also consider distance to outside resources to respond to incidents?
- Plan needs to clearly describe the isolation of Mono County. American Red Cross refused to call the Nevada Chapter for support in Mono County because Mono is in California.

- Because of isolation, there's a need to harden response capacity.
- Regarding water in Mammoth Lakes, should try and get in touch with Chris Weibert
- Regarding fire outcomes—Crowley shows no historic fire circles and fairly low risk but fires throughout the 1990's, the Canyon Fire was extremely threatening.
- Frequently, in various parts of the County. Some fires have results in days without power OR phones for Crowley
    - Both Verizon and Frontier refuse to utilize digital 395 have facilities that remain highly susceptible to fire
- Fred Stump notes that the county used to have access to an excursion vehicle which acted as a mobile, multiple frequency repeater and allowed great operability, but that vehicle was taken away for alternative uses.
- Access roads remain a major issue.
    - Access not adequate for parts of Mono City.
    - Many 2ndary access routes are through BLM land and are not adequately maintained. It's a major difficulty coordinating across the all the agencies that a 2ndary access route may pass through to identify responsibly for/ensure full maintenance.
    - NEPA exemptions may be critical to get better maintenance and additional access routes that must pass through federal lands

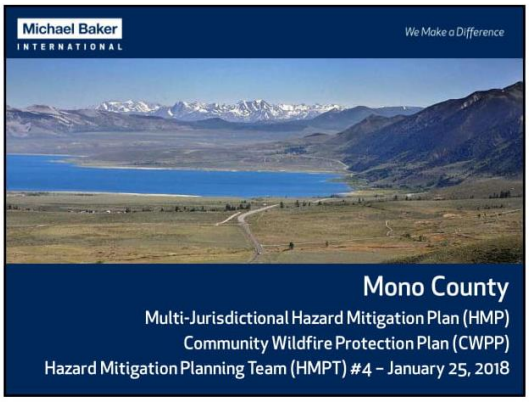
B.1.4 Planning Team Meeting #4 – January 25, 2018

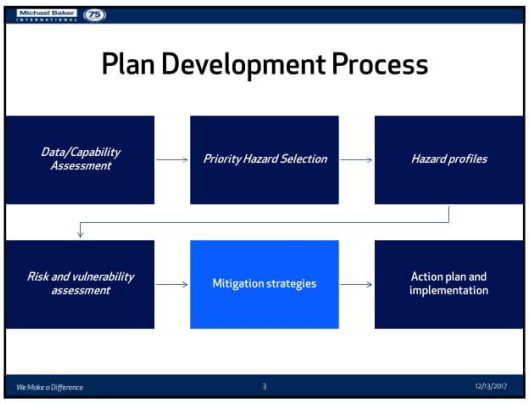
AGENDA: Planning Team Meeting

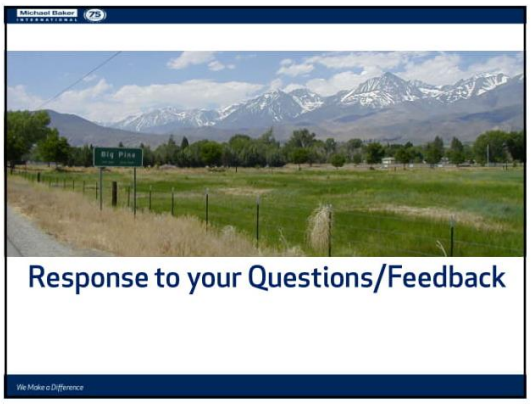
MONO COUNTY MULTI-JURISDICTIONAL LOCAL HAZARD MITIGATION PLAN

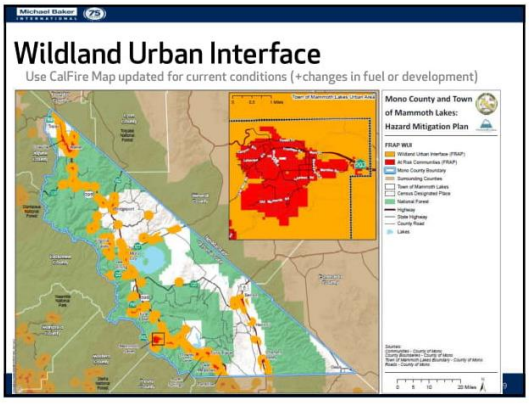
January 25, 2018

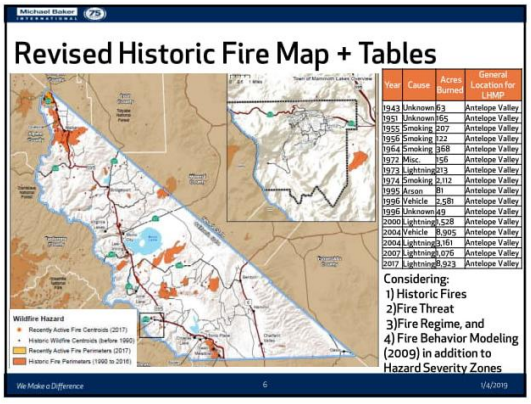
1. **Response to Feedback**
2. **Priority Measures**
    a. Review Goals
    b. Priority Measures Review Exercise
3. **Next Steps**
    a. Draft Plan
    b. Plan Adoption
    c. Plan Implementation and Maintenance











Year	Cause	Acres Burned	General Location for LHMP
1943	Unknown	63	Antelope Valley
1951	Unknown	65	Antelope Valley
1955	Smoking	207	Antelope Valley
1956	Smoking	122	Antelope Valley
1964	Smoking	368	Antelope Valley
1972	Misc.	56	Antelope Valley
1973	Lightning	213	Antelope Valley
1974	Smoking	2,112	Antelope Valley
1995	Arson	81	Antelope Valley
1996	Vehicle	2,581	Antelope Valley
1996	Unknown	49	Antelope Valley
2000	Lightning	8,528	Antelope Valley
2004	Vehicle	8,905	Antelope Valley
2004	Lightning	3,161	Antelope Valley
2007	Lightning	9,076	Antelope Valley
2017	Lightning	8,923	Antelope Valley

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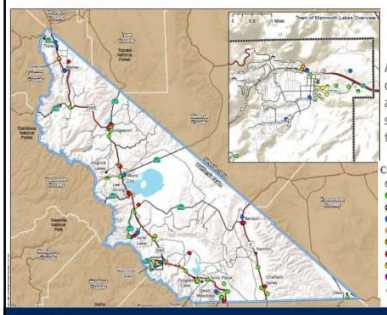
Critical Facilities



Added: Repeaters, cell towers, additional transfer stations/landfills, tribal facilities

Critical Facilities
- Emergency Operations Center
- Lifeline Utility Systems
- Medical Services
- Emergency Services
- Transportation Systems
- Communications Facilities
- Hazardous Materials
- Schools
- Vulnerable Populations
- Communities

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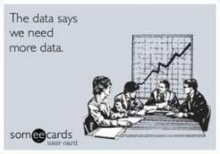
Information not available

- More specific number or locations for mosquitos—study samples are too small and recent
- More detailed information on the effects of dam failure under multiple scenarios. However, new legislation in 2017 requires dam owners to complete updated inundation mapping
- More refined and up-to-date avalanche risk areas



We Make a Difference 8 1/4/2019

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Goals and Measures

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Review Goals

Goals

§201.4(c)(3): the plan must include a mitigation strategy that includes goals that are based on the risk assessment and that should be consistent with goals from other State and local jurisdictions' plans and policies.

The goals and objectives should:

- Be based on the findings of the local and State risk assessments.
- Represent a long-term vision for hazard reduction or enhancement of mitigation capabilities.

FEMA requires that grant requests support an LHMP Goal

We Make a Difference 10

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Review Goals

Mono County General Plan Goals
1. Avoid the exposure of people and improvements to unreasonable risks of damage or injury from earthquakes and other geologic hazards.
2. Avoid exposure of people and improvements to unreasonable risks of damage or injury from flood hazards.
3. Avoid exposure of people and improvements to unreasonable risks of damage or injury from fire hazards.
4. Avoid exposure of people and improvements to unreasonable risks of damage or injury from avalanche hazards.
5. Reduce the risks from natural hazards by planning for safe development, increasing public awareness of the natural hazards in Mono County, and providing an integrated multi-agency approach to emergency response.

Town of Mammoth Lakes General Plan Goals
1. Keep Mammoth Lakes a safe place to live, work and play.
2. Minimize loss of life, injury, property damage, and natural resource destruction from all public safety hazards.
3. Maintain adequate emergency response capabilities.

We Make a Difference 11

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Priority Measures

Measures
- Identify actions County and Town should take reduce risk and improve preparedness and response

Priority Measures
- High urgency
- Limited number (~20 or less)
- 5-year timeline
- Support funding pursuits

Not having a measure does NOT preclude grant funding

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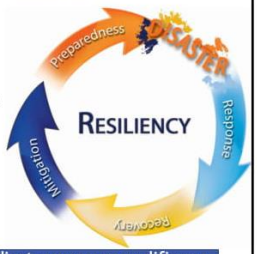
Mitigation Measures

- Mitigation under FEMA
  - Some measures must be 'mitigation' for FEMA to approve
  - "Action taken to reduce or eliminate long-term risk to hazards"



*A blue box with white text indicates measure qualifies as mitigation

We Make a Difference 13

Priority Measures Review Exercise

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Multiple Hazards

Continue to work with state and federal agencies and wireless providers to expand and improve coverage/interoperability of cell and radio service in county.
Develop a lead Public Information Officer (PIO) position, and necessary support positions.
Create a countywide hazard coordinator position to coordinate development of mitigation and response plans, coordinate community group efforts and public outreach efforts, communications to and between volunteer fire and first-response departments, and pursue funding opportunities.
Study available alternative emergency communications technologies that may provide more reliable service than existing radio communications technology in use.
Seek funding opportunities, in coordination with neighboring jurisdictions, to purchase a cell-on-wheels (COW).
Work with SCE to identify vulnerabilities and malfunctions in the local power grid, and coordinate on efforts to make the power grid more resilient to hazard events.
Pursue additional funding to underground powerlines in and near urbanized communities and the Town of Mammoth Lakes.

We Make a Difference 15

General Comments

Are these highest priority?	Are there other measures that should be high priority?	Is there anything you would change?

We Make a Difference 16

Avalanche Hazard

Complete avalanche mapping for the County's GIS system, including data for the Town of Mammoth Lakes. Upon completion of mapping, require an avalanche risk assessment for all development proposed within identified high-risk areas.

We Make a Difference 17

General Comments

Is this highest priority?	Are there other measures that should be high priority?	Is there anything you would change?

We Make a Difference 18

Dam Failure Hazard

Work with owners of dams in the county with a condition assessment of 'Fair' or lower to identify project or operational improvements and funding necessary to complete the improvements.

We Make a Difference 19

General Comments

Is this highest priority?	Are there other measures that should be high priority?	Is there anything you would change?

We Make a Difference 20

Drought Hazard

Integrate changes in precipitation and snowpack levels as a result of climate change into long-term water availability forecasts for the County and Town and encourage private water providers to do so.

We Make a Difference 21

General Comments

Is this highest priority?	Are there other measures that should be high priority?	Is there anything you would change?

We Make a Difference 22

Earthquake Hazard

Conduct a comprehensive survey of the structural condition of all buildings. Coordinate this survey with existing information from the Unreinforced Masonry Building survey and the Housing Conditions survey. Based on results, consider pursuing grants to fund structural retrofits.

We Make a Difference 23

General Comments

Is this highest priority?	Are there other measures that should be high priority?	Is there anything you would change?

We Make a Difference 24

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Flood Hazard

Incorporate the DWR Awareness Floodplain Maps into the land use planning process for the County and the Town and add this information to each agency's GIS system as those maps become available. Request FEMA to include the DWR Awareness Floodplain Map data on the FIRM maps.

Pursue grants to establish a program to provide funding for flood elevation of existing public and private structures.

We Make a Difference 25

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General Comments

Are these highest priority?	Are there other measures that should be high priority?	Is there anything you would change?

We Make a Difference 26

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Wildfire Hazard

Ensure street signs and driveway markers are highly visible and reflective. For dead-end streets, require all addresses on a street to be displayed at each property entrance. Require new development to meet these standards. Provide information to community members about the importance of visible addresses on homes in compliance with California Fire Safe Regulations.

For communities identified to be at highest fire risk, complete a parcel-level analysis. Incorporate into a GIS system, and use to prioritize parcel-level defensible space improvements.

Prioritize powerline segments for undergrounding to reduce fire risk and seek funding for implementation.

Identify communities most in need of backup generators for water supply and work with them to obtain the appropriate equipment and permits.

In communities with inadequate water storage and pressure for firefighting, work with local fire departments to fund, site, permit, and install new facilities.

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General Comments

Are these highest priority?	Are there other measures that should be high priority?	Is there anything you would change?

We Make a Difference 28

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Landslide Hazard

In coordination with landowners, support efforts to plant and maintain native vegetation on exposed slopes and recently burned areas to control erosion and landslides.

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General Comments

Is this highest priority?	Are there other measures that should be high priority?	Is there anything you would change?

We Make a Difference 30

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Severe Winter Storm and Snow Hazard

Work with tribal governments and community organizations to provide check-ins to vulnerable persons, including elderly residents, socially isolated persons, and immunocompromised individuals, during extremely cold temperature events.

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General Comments

Is this highest priority?	Are there other measures that should be high priority?	Is there anything you would change?

We Make a Difference 32

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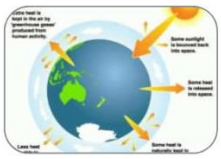
Climate Change

Reevaluate changes to hazards and risks as a result of climate change every five years based on more current available information, and revise the LHMP to account for new information.



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General Comments

Is this highest priority?	Are there other measures that should be high priority?	Is there anything you would change?

We Make a Difference 34

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Hazards without separate priority measures

- Disease and pest management
- Hazardous materials
- Volcano
- Wind




We Make a Difference 35

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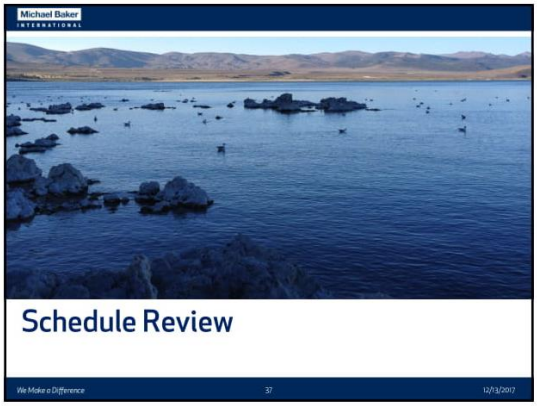
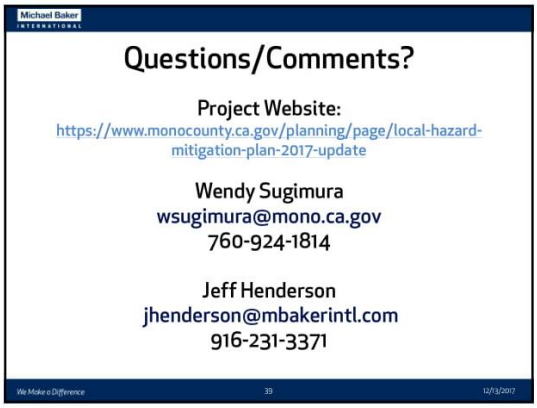
General Comments

Are there measures that should be high priority?	Is there anything you would change?

We Make a Difference 36





Meeting Notes – Mtg #4

- Fire history Q - Dave: any consideration in changes to vegetation in the last decade?
    - Dana: last vegetation data I have is from 2009 in the last CWPP, so we don't have truly up-to-date info.
    - Dave: some areas are completely different, esp. in post-fire areas
    - Dana: CalFire said they'll be coming out with data this year but that we shouldn't wait for that to come out. May be worth considering an on the ground inventory based on funding
    - Fred: Just talk in narrative about the change due to fires and invasive species, etc. to leave space for future changes and updates.

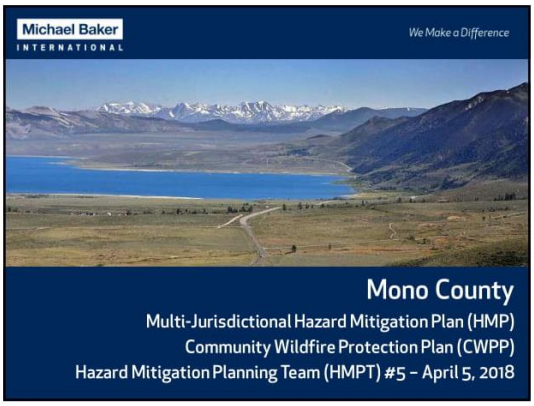
B.1.5 Planning Team Meeting #5 – April 5, 2018

AGENDA: Planning Team Meeting

MONO COUNTY MULTI-JURISDICTIONAL LOCAL HAZARD MITIGATION PLAN

April 5, 2018

1. **Over of Draft MJHMP & CWPP**
    a. Chapter 1 – Introduction
    b. Chapter 2 – Community Profile
    c. Chapter 3 – Hazards Assessment
    d. Chapter 4 – Risk Assessment
    e. Chapter 5 – Mitigation Measures
    f. Chapter 6 – Plan Maintenance and Capabilities
    g. Chapter 7 – Community Wildfire Protection Plan
2. **Comments & Questions for each chapter**
3. **Next Steps & Schedule**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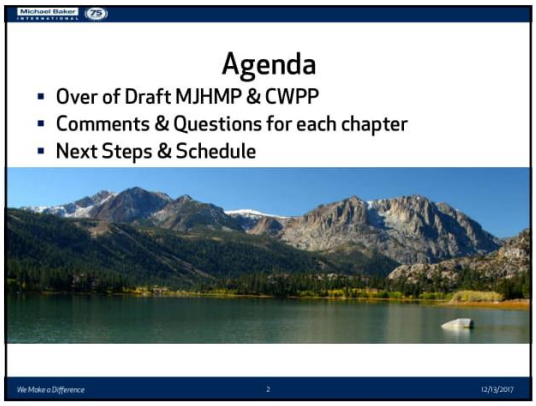
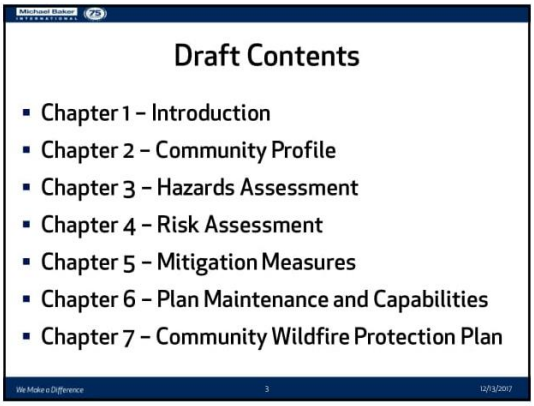
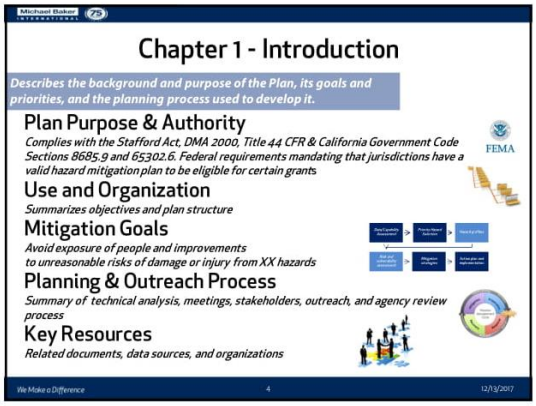
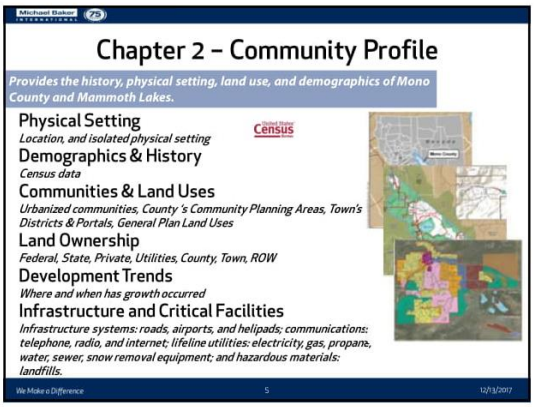
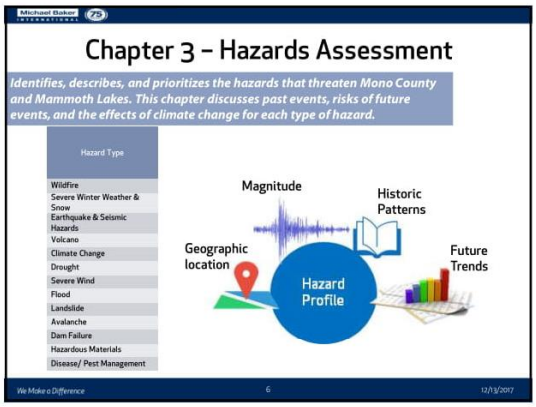
Mono County
Multi-Jurisdictional Hazard Mitigation Plan (HMP)
Community Wildfire Protection Plan (CWPP)
Hazard Mitigation Planning Team (HMPT) #5 – April 5, 2018


Agenda
Over of Draft MJHMP & CWPP
Comments & Questions for each chapter
Next Steps & Schedule
We Make a Difference
2
12/13/2017


Draft Contents
Chapter 1 – Introduction
Chapter 2 – Community Profile
Chapter 3 – Hazards Assessment
Chapter 4 – Risk Assessment
Chapter 5 – Mitigation Measures
Chapter 6 – Plan Maintenance and Capabilities
Chapter 7 – Community Wildfire Protection Plan
We Make a Difference
3
12/13/2017

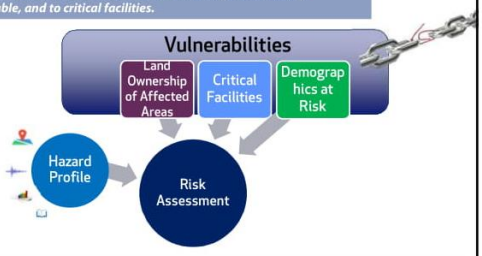

Chapter 1 - Introduction
Describes the background and purpose of the Plan, its goals and priorities, and the planning process used to develop it.
Plan Purpose & Authority
Complies with the Stafford Act, DMA 2000, Title 44 CFR & California Government Code Sections 8685.9 and 65302.6. Federal requirements mandating that jurisdictions have a valid hazard mitigation plan to be eligible for certain grants
FEMA
Use and Organization
Summarizes objectives and plan structure
Mitigation Goals
Avoid exposure of people and improvements to unreasonable risks of damage or injury from XX hazards
Planning & Outreach Process
Summary of technical analysis, meetings, stakeholders, outreach, and agency review process
Key Resources
Related documents, data sources, and organizations
We Make a Difference
4
12/13/2017


Chapter 2 – Community Profile
Provides the history, physical setting, land use, and demographics of Mono County and Mammoth Lakes.
Physical Setting
Location, and isolated physical setting
Census
Demographics & History
Census data
Communities & Land Uses
Urbanized communities, County 's Community Planning Areas, Town's Districts & Portals, General Plan Land Uses
Land Ownership
Federal, State, Private, Utilities, County, Town, ROW
Development Trends
Where and when has growth occurred
Infrastructure and Critical Facilities
Infrastructure systems: roads, airports, and helipads; communications: telephone, radio, and internet; lifeline utilities: electricity, gas, propane, water, sewer, snow removal equipment; and hazardous materials: landfills.
We Make a Difference
5
12/13/2017


Chapter 3 – Hazards Assessment
Identifies, describes, and prioritizes the hazards that threaten Mono County and Mammoth Lakes. This chapter discusses past events, risks of future events, and the effects of climate change for each type of hazard.
Hazard Type
Wildfire
Severe Winter Weather & Snow
Earthquake & Seismic Hazards
Volcano
Climate Change
Drought
Severe Wind
Flood
Landslide
Avalanche
Dam Failure
Hazardous Materials
Disease/ Pest Management
Magnitude
Historic Patterns
Geographic location
Future Trends
Hazard Profile
We Make a Difference
6
12/13/2017

Chapter 4 - Risk Assessment

Describes the risks posed by each hazard type to county and city residents, particularly those who are more likely to be socially vulnerable, and to critical facilities.



Chapter 5 – Mitigation Measures

Lists mitigation measures to reduce the risks from hazards. This chapter also provides an overview of the County's and the Town's existing capabilities to reduce vulnerability to hazard events.

Priority measure

Measure Number	Measure	Applicability	Responsible Department	Timeline
Multiple Hazards				
1.1	Work with SCE to identify vulnerabilities and malfunctions in the local power grid, and coordinate on efforts to make the power grid more resilient to hazard events and reduce fire risk. Underground line segments, prioritized by feasibility, community vulnerability to power loss, and locational risk of fire.	Mono County	Public Works	Short-term
1.2	Study available alternative emergency communications technologies that may provide more reliable service than existing radio communications technology in use.	Mono County	Information Technology	Short-term
1.3	Require individuals, as well as companies, that provide home or accommodation rentals to clearly post available emergency evacuation routes for guests.	Mono County, Town of Mammoth Lakes	Community Development	Short-term

Chapter 6 – Maintenance & Capabilities

Describes the process for implementing, monitoring, and evaluating the MJHMP, and opportunities for continued public involvement.

Planning Team should meet at least once annually, as initiated by the County Community Development Department

Team to evaluate:

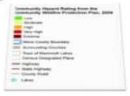
- hazard events that year and lessons learned
- Mitigation actions successfully/not successfully implemented
- Schedule & feasibility to implement future mitigation actions
- New Issues not covered in Plan
- Funding opportunities
- New scientific or mapping data
- Other hazard-related programs or initiatives underway

Chapter 7 – Community Wildfire Protection Plan

Describes how the plan meets the requirements of the Healthy Forest Restoration Act; analysis of wildfire-related hazards and risks in the WUI; identifying ongoing and planned fuel management projects; and mitigation measures designed to prevent and/or reduce the damage associated with wildfire to WUI assets, also known as values.

Includes:

- Hazard Profile and Risk Assessment based on State Fire Hazard Severity Mapping
- Defines WUI
- Evaluates Fire Regime Condition Class
- Includes Fire Behavior Potential: Rate of spread, Flame length, crown fire activity (based on 2009 modeling)
- Community Area Specific Wildfire Hazard Ranking & major changes in fire risk over previous decade, including fuels modification projects and communities' physical characteristics



Planning Area	Community Area	Single-Route Access	Steep/ Narrow Roads	Water Supply	Lacks Water Supply/ Pressure	Lacks Adequate Addressing
		✓	✓			✓

Schedule Review

Event	Topics	Time Frame
Project Kickoff	Initial Meeting with County/Town Staff	June 2017
Stakeholder Meetings	Information Gathering & Awareness	Sep 29-29, 2017
Planning Team Meeting & RPAC Meetings & Town PC	Hazard Profiles & Risk Assessment	Dec 12-13, 2017
Planning Team Meeting & RPAC Workshop	Mitigation Actions & Draft Plan Presentation	Jan 17, 2018
Public Review MJHMP	Public Review of Document	March 2018
Submit to Cal OES/FEMA	Cal OES/FEMA Review of Document	April 2018
Final MJHMP	Public Hearing & Adoption	May 2018

Timeline/Next Steps

- Public Review Period for Draft MJHMP/CWPP (NOW)
- Planning Commission Meetings (MAY)
- CalOES and FEMA Review of Draft (JUNE)

Questions/Comments?

Project Website:
https://www.monocounty.ca.gov/planning/page/local-hazard-mitigation-plan-2017-update

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760-924-1814

Dana Hoffman
dhoffman@mbakerintl.com
510-213-7921

Chapter 1: Planning Team Meetings

- Kickoff meeting – June 15, 2017. Planning Team members discussed the goals and objectives of the project, outlined the Plan development process and requirements, determined the public outreach approach, and identified relevant hazards.
- Meeting #2 – September 29, 2017. The Planning Team provided an overview of the project and sought input on the goals, past and current efforts, current limitations, and information sources for the content of the MJHMP.
- Meeting #3 – December 13, 2017. Planning Team members presented the draft hazard profiles and the results of the hazard risk assessment and vulnerabilities, including impacts to critical facilities and social vulnerability.
- Meeting #4 – January 25, 2018. Planning Team members discussed and revised the draft hazard mitigation measures.
- Meeting #5 –April 4, 2018. Planning Team members reviewed the draft plan and provided comments.

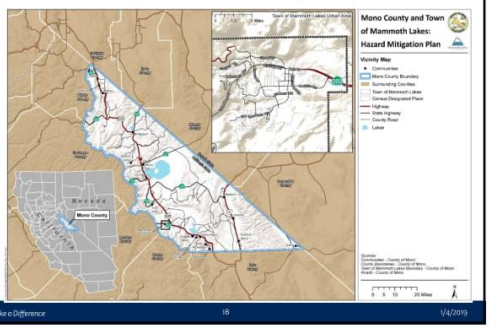
Chapter 1: Key Resources List

Section	Key Resources
Multiple hazards	Cal-Adapt
	California Climate Adaptation Planning Guide
	California Multi-Hazard Mitigation Plan
Dam failure	California Department of Water Resources dam database
	US Army Corps of Engineers National Inventory of Dams
Disease/pest management	Owens Valley Mosquito Abatement Program
Drought	US Drought Monitor
	Tri-Valley Groundwater Management District
Flood	Federal Emergency Management Agency flood maps
Geologic hazards	US Geological Survey volcano database
Hazardous materials	California Department of Toxic Substances Control EnviroStor database
	State Water Resources Control Board cleanup sites database
	State Water Resources Control Board underground storage tanks database
Seismic hazards	California Geological Survey Fault Activity Map of California
	US Geological Survey ShakeMaps
Severe weather	California Environmental Protection Agency and California Department of Public Health extreme heat preparation materials
	California Contingency Plan for Extreme Cold/Freeze
	National Oceanic and Atmospheric Administration severe weather database files
	National Weather Service watch/warning/advisory records
	Western Regional Climate Center
Wildfire	California Department of Forestry and Fire Protection FRAP Mapping and Fire Hazard Severity Zones
	2009 FlamMap Assessment

Chapter 1: Stakeholders List

Mono County
Wendy Sugimura, Senior Analyst – Mono County Community Development Department
Michael Draper, Planning Analyst – Mono County Community Development Department
Tony Dublino, Assistant County Administrative Officer – Mono County
Ingrid Braun, Sheriff-Coroner – Mono County Sheriff Office
Bob Rooks, Chief – Mono County Emergency Medical Services
Louis Molina, Environmental Health Director – Mono County Health Department
Gerry Le Francois – Mono County Airport Land Use Commission
Fred Stump, Mono County Supervisor
Town of Mammoth Lakes
Thom Heller, Fire Marshal – Mammoth Lakes Fire Protection District
Frank Frievalt, Fire Chief – Mammoth Lakes Fire Protection District
Al Davis, Chief of Police – Mammoth Lakes Police Department
Grady Dutton, Public Works Director – Town of Mammoth Lakes
Haislip Hayes, Engineering Manager – Town of Mammoth Lakes
Pam Kobylarz, Assistant to the Town Manager – Town of Mammoth Lakes
Other Organizations
Mike Curti, Fire Chief – Antelope Valley Fire District
Taro Pasina, Interagency Fire Management Officer – Inyo National Forest Supervisor's Office
Matt Edmiston – Cal Fire
Sagar Fowler – Cal Fire, San Bernardino Unit, Battalion 4
Temple Fletcher, Director – REMSA Care Flight
Shannon Anderson, Chief of Fire and Emergency Services – Marine Corps Mountain Warfare Fire Department
Rodney Allen, S-7 Mission Assurance Director – Marine Corps Mountain Warfare Fire Department
Brett D. Hawn, Chief of Police – Marine Corps Police Department, Marine Corps Mountain Warfare Training Center
Doug Toskin, S-7 Emergency Manager – Marine Corps Mountain Warfare Fire Department
Karen Farrel-Ingram – Wheeler Crest Fire Safe Council
Bruce Woodworth – Antelope Valley CERT
Chris Weibert, HR/Risk Analyst – Mammoth Community Water District
Austin West, Transportation Planner – Caltrans District 9
Greg Miller, Maintenance Manager – Caltrans District 9
Lieutenant William "Bill" Boyes – Bridgeport CHP
Karla Benedicto – Cal OES
Andy Selters, President – Pine Glade Association, Inc.
Steven Butler, Construction Manager – Los Angeles Department of Water and Power
Ben Butler, Operations – Los Angeles Department of Water and Power
Greg Loveland, Electrical/Waterworks Engineer – Los Angeles Department of Water and Power
Bob Stiens, Public Affairs Liaison – Southern California Edison

Chapter 2: Vicinity Map



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Chapter 2: Demographics (2015)

Educational Attainment (25+ years)	Mono County		Mammoth Lakes	
	Population	Percentage	Population	Percentage
Less than 9th grade	890	6.2%	650	8.0%
9th grade to 12th grade (no diploma)	575	4.1%	275	3.4%
High school graduate or equivalent	1,626	11.5%	963	11.9%
Some college (no degree)	2,690	19.0%	1,230	15.2%
Associate's degree	777	5.5%	433	5.3%
Bachelor's degree	2,243	15.9%	1,238	15.3%
Graduate or professional degree	889	6.3%	444	5.5%

Note: Due to rounding, the totals presented in this table may not equal the sum of all rows.

Sources: US Census Bureau, American Community Survey (2011–2015)

Category	Mono County	Mammoth Lakes
Total population	14,146	8,104
Median age	38.5 years	32.6 years
Elderly population (65+ years)	1,881 (13.3%)	557 (6.9%)
Foreign-born population	2,364 (16.6%)	672 (8.3%)
Number of households	4,906	2,693
Average household size	2.82	2.95
Median household income	$56,944	$55,799
Rental households	1,587 (34.4%)	1,444 (43.7%)

Race/Ethnicity	Mono County		Mammoth Lakes	
	Population	Percentage	Population	Percentage
White	12,379	87.5%	6,938	88.4%
Black or African American	140	1.0%	44	0.5%
American Indian and Alaska Native	485	3.4%	59	0.7%
Asian	345	2.4%	267	3.3%
Native Hawaiian and Other Pacific Islander	28	0.2%	0	0.0%
Some other or multiple race	1,291	9.1%	799	9.9%
Hispanic or Latino (of any race) *	3,862	27.3%	2,972	36.7%

* The US Census does not count Hispanic or Latino persons as a separate racial or ethnic category; therefore, the Hispanic or Latino population reported here is also included in the other racial or ethnic categories.

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Chapter 2: Communities

Topaz: The northernmost town in Mono County, Topaz has a residential population of 50 but is a popular recreational destination for gambling, fishing, and water sports. The town abuts Topaz Lake and has moderate hillsides directly to the east along US 395. Topaz is part of Antelope Valley.

Coleville and Walker: Also part of Antelope Valley, and running alongside the Walker River and US 395, the neighboring communities of Coleville and Walker have their history in ranching, with populations of 495 and 721, respectively. Ranching and farming remain an important activity today along with tourist attractions. The areas near the river and adjacent to these towns include riparian vegetation, irrigated farmland, and grasses, while the hills to the west have rock slopes, dry chaparral, and dispersed coniferous trees.

Bridgeport: The county seat, Bridgeport, has a population of 575, located in the relatively lush and green Bridgeport Valley surrounded by grasses & farmland.

Mono City: This is a small community of 172 residents located just north of Mono Lake. It is in a relatively flat landscape and is adjacent to Mill Creek.

Lee Vining: Located on the southwest side of Mono Lake and near the intersection of US 395 with SR 120, Lee Vining is a frequent stop-off point for visitors headed to Yosemite in summer months. The community at the mouth of Lee Vining Creek sits at the foot of several steeply sloped mountains.

June Lake: A dispersed community of 629 residents spread alongside the tall Carson Peak and SR 158. SR 158, also known as the June Lake Loop, provides access to the scenic June Lake, June Mountain Ski Area, and numerous hiking trailheads.

Chalfant, Hammil, and Benton: These three communities, often referred to as the Tri-Valley area, are home to over 900 residents. SR 6 runs north–south through the three communities and into Nevada, while SR 120 connects from Benton back to US 395. Located in a flat valley that sits in the Long Valley caldera, this area forms the largest agricultural basins in the county. Primarily an agricultural community, dramatic landscapes and several hot springs bring a number of recreational visitors to the area.

Crowley Lake/Hilton Creek and McGee Creek: The communities of Crowley Lake/Hilton Creek and the much smaller McGee Creek are located adjacent to each other and Crowley Lake, a popular recreational destination for fishing and other water sports. With 45 miles of shoreline, Crowley Lake offers a marina, RV sites, boat rentals, and shops. Together the communities have a resident population of just over 9,000.

Aspen Springs and Sunny Slopes: Just south of Crowley Lake, these two communities, situated on either side of US 395, share similar character and geography. Together, they are home to approximately 250 residents. On the south side of US 395, Aspen Springs can only be accessed via Crowley Lake Drive.

Tom's Place: Along Crowley Lake Drive from Aspen Springs is a small community of roughly 60 permanent residents located on Forest Service-owned land. Tom's Place is surrounded by dense coniferous forest and primarily made up of cabins, stores, and other facilities that make up Tom's Place Resort. Although the bulk of development is directly adjacent to US 395, a number of residences are located up Rock Creek Road.

Swall Meadows and Paradise: Swall Meadows, and its smaller southern neighbor Paradise, have roughly 220 and 150 residents, respectively. They are residential communities partway up the sloping Sherwin Grade with no commercial development, and surrounded by juniper and sub-alpine vegetation. These communities can only be accessed via a single roadway, the Lower Rock Creek Road to Swall Meadows Road.

Oasis: The county's southernmost community, and located within 3 miles of the Nevada border along SR 168 where it intersects NV 266, Oasis is isolated from other Mono County communities. With a permanent population of approximately 20, it is also one of the county's smallest communities. Oasis is located in Fish Lake Valley and is surrounded by flat land with dry and bushy vegetation.

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Chapter 2: Mammoth Lakes Description

The town is a four-season resort community with a small permanent population and many seasonal or one-time visitors. Vacation residences and lodging facilities accommodate a substantially larger population of second homeowners and visitors than the town's 8,000 permanent residents. The local economy is based primarily on tourism, especially during summer and winter months when visitation rates are highest. Winter conditions support skiing, snowboarding, and other outdoor recreational uses. In the summer, hiking, fishing, camping, bicycling (mountain and road), golfing, and sightseeing are popular resident and visitor activities. Since the town's economy is tourist-driven, much of the resident population works in the service industry; other large employers include government and resource extraction companies.

Mammoth Lakes is located close to US 395, but can only be accessed via SR 203 and, outside winter closure months, via Mammoth Scenic Loop. Southern portions of the city, notably Old Mammoth, the Bluffs, Valentine Reserve, and Lake Mary area, can only be accessed via Old Mammoth Road and Lake Mary Road. The town is located on the lower slopes with dense coniferous forest.

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Chapter 2: Land Ownership

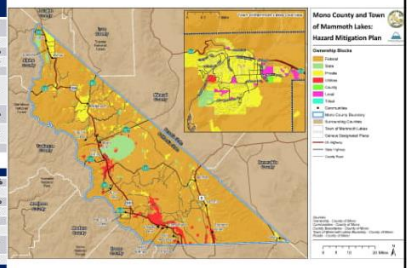
County

Owner	Acres	%
Federal	1,720,939	85.54 %
State	83,966	4.17%
Private	128,385	6.38%
Utilities	67,081	3.33%
County	2,266	0.11%
Town of Mammoth Lakes	215	0.01%
Right of Way	8,960	0.45%
Unknown	109	0.01%
Total	2,011,921	100

Mammoth Lakes

Owner	Acres	%
Federal	12,832	80.06%
State	2	0.01%
Private	2,387	14.89%
Utilities	37	0.23%
County	44	0.27%
Local	189	1.18%
Right of Way	537	3.35%
Total	16,027	100.00

Note: Due to rounding, the totals presented in this table may not equal the sum of all rows.



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Chapter 2: Community Planning Area Summaries

Planning Area	Communities	Advisory Body	Topography	Land Uses	Buildout (units)
Antelope Valley	Topaz, Coleville, Walker	Antelope Valley RPAC	Flat valley; gentle and steep slopes valley floor; several running waterways	Predominantly residential; limited commercial, lodging, agriculture, public uses	1,586
Benton Valley	Benton	Benton/Hammil RPAC	Flat valley; rolling hills; hot springs	Predominantly residential; limited commercial, lodging, public uses	729
Bodie Hills	Dispersed properties	None	Low mountain range; steep valley floors	Low density residential; agriculture	317
Bridgeport	Bridgeport	Bridgeport Area RPAC	Flat valley; steep slopes; adjacent to Mono Lake	Mixed density residential; commercial; lodging; entertainment; public facilities	3,166
Chalfant	Chalfant	Chalfant Valley RPAC	Flat valley		542
Hammil	Hammil	Benton/Hammil RPAC	Flat valley	Low density residential; limited commercial; agriculture	285
June Lake	June Lake, Crestview	June Lake Citizens Advisory Committee	Gentle and steep slopes several water bodies	Predominantly residential; limited commercial, lodging, public uses	3,011
Crowley	Crowley Lake/Hilton Creek, Aspen Springs, Sunny Slopes, Tom's Place, McGee Creek	Long Valley RPAC	Gentle and steep slopes, valley floor; several water bodies	Predominantly residential; limited commercial, lodging, public uses	1,839
Mammoth Vicinity	Dispersed properties	None	Flat valley; gentle slopes	Low density residential; agriculture	17
Mono Basin/Mono Basin North	Mono City, Lee Vining	Mono Basin RPAC	Low slopes, adjacent to Mono Lake	Predominantly residential; limited commercial, lodging, public uses	880
Oasis	Oasis	None	Flat valley	Limited residential; agriculture	102
Paradise	Paradise	None	Flat valley adjacent to running water bodies and steep slopes	Limited residential; agriculture	199
Sonora Junction	Marine Corps Mountain Warfare Training Center	None	Gentle and steep slopes; high peaks; several small waterways	Low density residential; military; public facilities	138
Swauger Creek	Dispersed properties	Swauger Creek/Devil's Gate Planning Group	Gentle and steep slopes; high peaks; several small waterways	Wildlands	8
Upper Owens	Dispersed properties	None	Flat valley; gentle and steep slopes	Low density residential; agriculture	52
Wheeler Crest	Swall Meadows	Wheeler Crest Planning Advisory Committee	Gentle and steep slopes	Low density residential; limited commercial; agriculture	389
Outside Planning Area	Virginia Lakes; Dispersed properties	None	Flat valley; gentle and steep slopes; high peaks; valley floor; several running waterways	Low density residential; limited commercial; agriculture; wildlands	670

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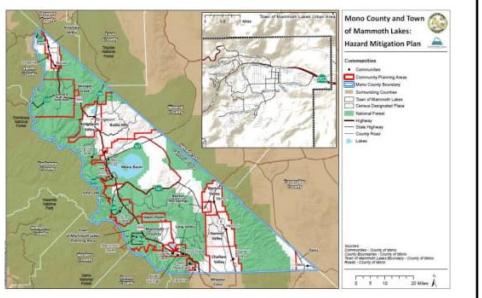
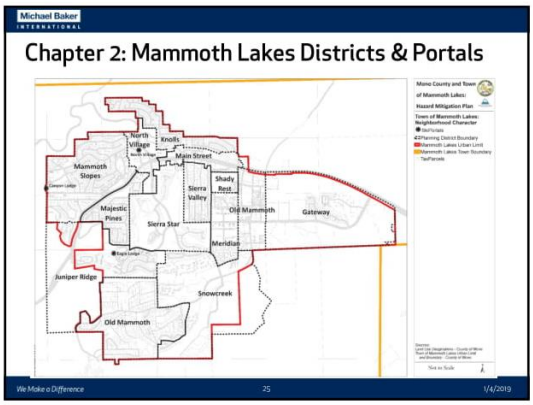
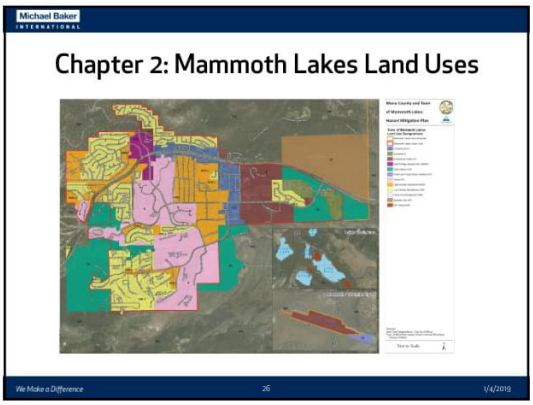
Chapter 2: Community Planning Areas




Michael Baker INTERNATIONAL
Chapter 2: Mammoth Lakes Districts & Portals
North Village
Knolls
Main Street
Mammoth Slopes
Shady Rest
Sierra Valley
Majestic Pines
Sierra Star
Old Mammoth
Gateway
Meridian
Juniper Ridge
Snowcreek
Old Mammoth
Mono County and Town of Mammoth Lakes: Hazard Mitigation Plan
We Make a Difference
25
1/4/2019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Chapter 2: Mammoth Lakes Land Uses
We Make a Difference
26
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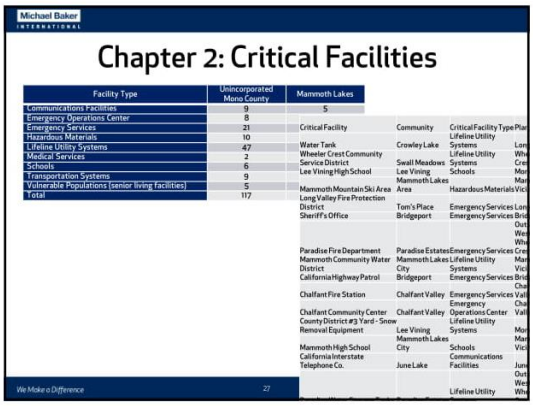
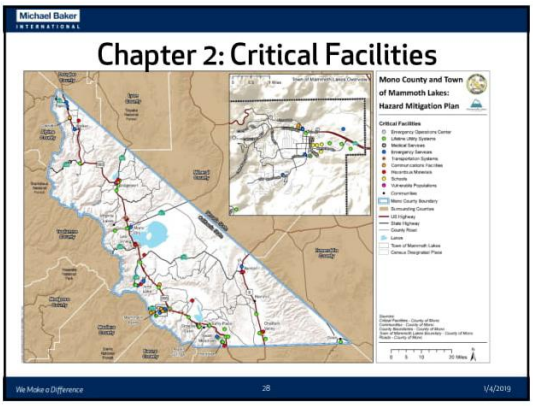
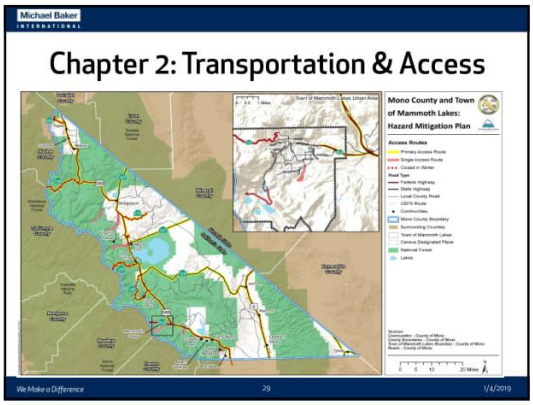
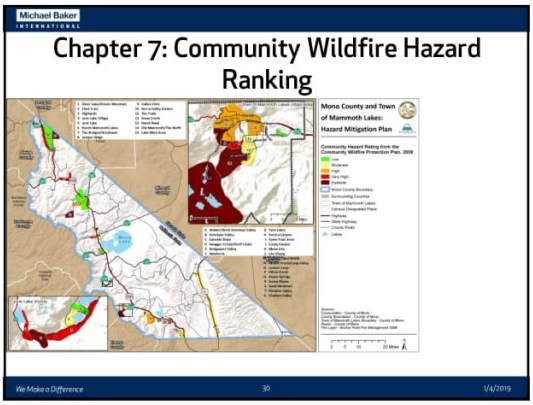

Michael Baker INTERNATIONAL
Chapter 2: Critical Facilities
Facility Type | Unincorporated Mono County | Mammoth Lakes
Communications Facilities | 9 | 5
Emergency Operations Center | 8
Emergency Services | 21
Hazardous Materials | 10
Lifeline Utility Systems | 47
Medical Services | 2
Schools | 6
Transportation Systems | 9
Vulnerable Populations (senior living facilities) | 5
Total | 117
Critical Facility
Water Tank
Wheeler Crest Community Service District
Lee Vining High School
Mammoth Mountain Ski Area
Long Valley Fire Protection District
Sheriff's Office
Paradise Fire Department
Mammoth Community Water District
California Highway Patrol
Chalfant Fire Station
Chalfant Community Center
County District #3 Yard - Snow Removal Equipment
Mammoth High School
California Interstate Telephone Co.
Community
Crowley Lake
Swall Meadows
Lee Vining
Mammoth Lakes
Area
Tom's Place
Bridgeport
Paradise Estates
Mammoth Lakes
City
Bridgeport
Chalfant Valley
Chalfant Valley
Lee Vining
Mammoth Lakes
City
June Lake
Critical Facility Type
Lifeline Utility Systems
Lifeline Utility Systems
Schools
Hazardous Materials
Emergency Services
Emergency Services
Emergency Services
Lifeline Utility Systems
Emergency Services
Emergency Operations Center
Lifeline Utility Systems
Schools
Communications Facilities
Lifeline Utility
We Make a Difference
27


Michael Baker INTERNATIONAL
Chapter 2: Critical Facilities
Mono County and Town of Mammoth Lakes: Hazard Mitigation Plan
We Make a Difference
28
1/4/2019

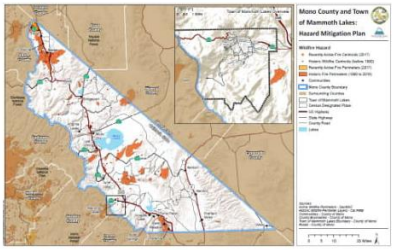

Michael Baker INTERNATIONAL
Chapter 2: Transportation & Access
Mono County and Town of Mammoth Lakes: Hazard Mitigation Plan
We Make a Difference
29
1/4/2019


Michael Baker INTERNATIONAL
Chapter 7: Community Wildfire Hazard Ranking
Mono County and Town of Mammoth Lakes: Hazard Mitigation Plan
We Make a Difference
30
1/4/2019

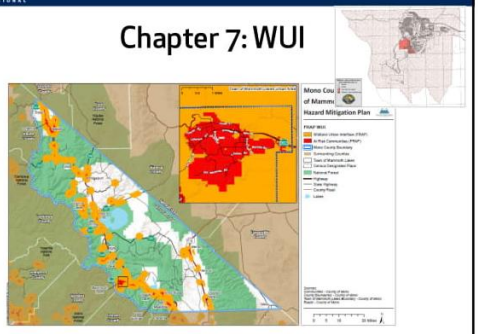
Chapter 7: Physical characteristics

Planning Area	Community Area	Single-Route Access	Steep/ Narrow Roads	Water Supply	Lacks Water Supply/ Pressure	Lacks Adequate Addressing
Mammoth Lakes	Lake Mary Area	x	x	Draft	x	
	Old Mammoth/ The Bluffs	x	x	Hydrants		
	The Bridges/ Greyhawk		x	Hydrants	x	
	The Trails			Hydrants		
	Valley Vista	x		Hydrants		x
	Snowcreek	x		Hydrants		
	North Mammoth Lakes			Hydrants		
	Ranch Road	x		Hydrants		
	Sierra Valley Estates			Hydrants		x
Antelope Valley	Eastside Slope	x	x	None	x	x
	Antelope Valley/ Topaz			Draft	x	x
	Walker	x	x	Draft	x	
Sonora Junction	Swauger Creek/ Devil's Gate	x		Draft		x
	Mountain Warfare Training Center			Draft	x	
Bridgeport Valley	Bridgeport Valley			Hydrants		
	Twin Lakes	x	x	Draft	x	
	Virginia Lakes	x	x	Draft	x	x
	Rancheria-Bridgeport			Creek weir (portable pump)	x	
	Aurora Canyon	x		Hydrants		
	Sweetwater Road			Draft		x
	Evans Tract Area			Hydrants		x
Mono Basin	Lundy Canyon	x	x	Draft	x	
	Mono City		x	Hydrants	x	x
	Lee Vining			Hydrants		
June Lake	June Lake	x	x	Hydrants		x
	June Lake Village			Hydrants		
	Clark Tract		x	Hydrants		x
	Highlands	x		Hydrants		
	Silver Lake & Dream	x		Hydrants		x

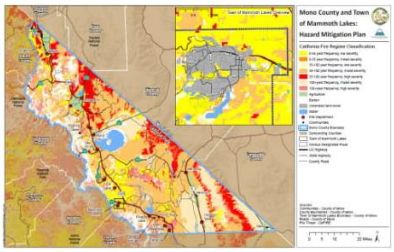
Chapter 7: historic fires



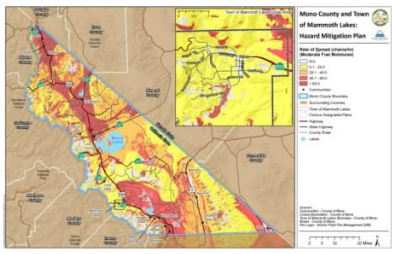
Chapter 7: WUI



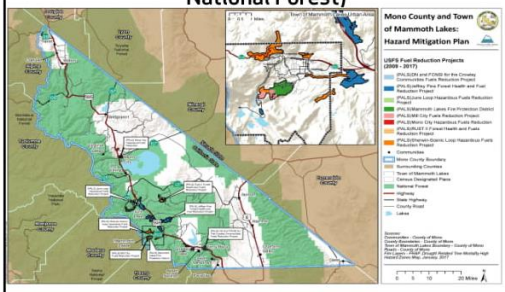
Chapter 7: Fire Regime Condition Class



Chapter 7: Fire Behavior (ROS)



Chapter 7:Fuels Modification Projects (Inyo National Forest)



Meeting Notes – Mtg #5

County/Town Comments

- Propane incidents in Town of Mammoth Lakes: last year tank caught on fire under the snow, another where a house burned due to propane. Combination of issues with tanks and lines. Issues with ability to dig out tank. Description makes it sound more like issues that urban areas have with propane line systems exploding – Mono doesn't have that problem, and only issues with some lines in the Town.
- Woodstoves and pellets – Ch 2. Heating sources description – a lot of homes are heated by cordwood and pellets.
- Prime farmland additional info – identified areas that could be considered prime farmland in a database, but they don't officially designate it prime farmland.
- Double check "large scale solar" – County doesn't think there is one.
- Extreme heat in tri-valley – wasn't evaluated.
    - Wendy: Leave it out. If the board or commission is aware they can bring it up.
- Clarify "Mammoth vicinity" versus "Town of Mammoth"
- Alquist-Priolo map – why not included?
    - Dana: different sources show it differently so there's not a consistent map. Could still include though.
    - Wendy: it'd still be helpful because we have policies linked directly to that, and explain what is consistent or not across sources.
- Table of potential funding sources for studies?
    - Yes, that'd be helpful
- Infrastructure table in Ch 7 – Town and Fire Dept review and confirm accuracy
- Access route priorities
    - Lake Mary neighborhood – maybe call it Lakespace Inn because Lake Mary isn't a neighborhood. It's vacation homes and cabins.

B.2 Status of Mitigation Actions from Previous Plan

The following table illustrates the mitigation actions includes in the previous mitigation plan as well as the status of each action.

Status of 2006 Mitigation Actions

2006 Plan Numbering Scheme	2006 Plan Project Description	STATUS
Multiple Hazards		
1	The county and the town do not have the detailed information necessary to complete the "Estimate Losses" section of this LHMP with any specificity. Completing a detailed inventory of existing assets would enable the county and town to understand more fully the areas and types of development most susceptible to identified hazards and to identify more specific mitigation for each hazard. The county and the town need to inventory existing development to obtaining the following data: • Type of Structures – The county and town do not have data on the types of existing structures on parcels. Building stock is currently classified only by land use designation, making it difficult to accurately divide building stock into the suggested categories (residential, commercial, industrial, agricultural, religious/non-profit, government, education, utilities). • Construction – The county and town do not have data on the construction of all existing structures (wood, steel, masonry) etc., making it difficult to determine susceptibility to hazards, value of structure, and replacement value. • Size of Buildings – The county and town do not store information at the building level. There are no databases that give building size by square foot. • Total Number of Buildings – The GIS system does not include building footprints; the total number of buildings would need to be estimated based on a rough calculation of all developed parcels in the town and county (parcels with a structural value > $10,000).	Revised and incorporated into mitigation measure 1.4

Status of 2006 Mitigation Actions

2006 Plan Numbering Scheme	2006 Plan Project Description	STATUS
1 cont.	• Value of Structures – The only valuation tool available to the county and town is the most recent tax assessment of a structure; often it is terribly outdated and undervalues the structure. • Value of Contents – This would depend on the information gathered in Items 1-4 above. • Total Replacement Value – This is dependent on updating Items 1-6 above. • Calculate the Proportion of Assets Located in Hazard Areas – Currently, because it is difficult to accurately divide building stock into the suggested categories (See Item 1 above), it would be difficult to come up with an accurate proportion within a hazard area.	
2	Once the county updates its GIS and databases as specified in Mitigation 1 above, it can then use the FEMA document Understanding Your Risks: Identifying Hazards and Estimating Losses (FEMA 386-2) to plot loss estimation values and develop corresponding GIS map products for all areas of the county including Mammoth Lakes.	Revised and incorporated into mitigation measure 1.4
3	Many areas in the county, including communities, do not have adequate cell phone or radio service and do not have a reliable method to call for help or to receive warnings in case of emergencies. Installing additional cell and radio towers to ensure adequate coverage throughout the county would help mitigate potential impacts from several hazards by providing a warning system.	Revised and incorporated into mitigation measure 1.5
Avalanche		
A-1	Many of the parcels in avalanche hazard zones are adjacent to or on public lands managed by the US Forest Service. Placing those properties into federal ownership or into the ownership of land conservation organizations and restricting their use to permanent open space use would eliminate existing avalanche hazards to people and property.	Revised and incorporated into mitigation measure 10.4

Status of 2006 Mitigation Actions

2006 Plan Numbering Scheme	2006 Plan Project Description	STATUS
A-2	Complete avalanche mapping for the County's GIS system, including data for Mammoth Lakes.	Revised and incorporated into mitigation measure 10.1
Dam Failure		
D-1	Work with the US Forest Service to study the potential impacts of the failure of Rock Creek Dam. Once the impacts have been assessed, develop and implement an emergency response plan.	Revised and incorporated into mitigation measure 11.2
Flood		
F-1	Document past flood events on the GIS system in order to develop historic flooding patterns for the area that can be used to better understand where repetitive flooding hazards occur and enable the County and Town to minimize risks to existing development in those areas.	Continued as mitigation measure 9.3
F-2	Request FEMA to update the FIRM maps for the county, particularly for the Walker River watershed communities, the June Lake Loop, and the Tri-Valley area. As maps are updated, input that data on the county and town's GIS system.	Mono County provided LiDAR data for cooperative mapping project with FEMA. Continued opportunities for improved mapping. Revised and incorporated into mitigation measure 9.2

Status of 2006 Mitigation Actions

2006 Plan Numbering Scheme	2006 Plan Project Description	STATUS
F-3	Request DWR to complete the Awareness Floodplain Maps for the county, particularly for the Walker River watershed communities, the June Lake Loop, and the Tri-Valley area. As the maps are completed, input that data on the county and town's GIS system.	(Wendy to check with Public Works)
F-4	Incorporate the DWR Awareness Floodplain Maps into the land use planning process for the county and the town and the GIS system as those maps become available. Request FEMA to include the DWR Awareness Floodplain Map data on the FIRM maps.	(Wendy to check with Public Works)
F-5	Ensure that ongoing stream restoration efforts throughout the county and town address flood management issues during the planning and implementation of those restoration efforts.	Deleted, not relevant. County and Town not directly involved with stream restoration efforts.
F-6	Ensure that property owners are aware of flood hazards and practices necessary to diminish the impacts of those hazards through an ongoing public education program. This should include information on participation in the NFIP.	Revised and incorporated into mitigation measure 9.4

Status of 2006 Mitigation Actions

2006 Plan Numbering Scheme	2006 Plan Project Description	STATUS
F-7	The County and the Town shall develop a Comprehensive Flood Management Strategy for the county that includes the following elements: 1. Flood management strategies for each watershed in the County. Watersheds should be considered as single management units since upstream land management decisions affect downstream parcels. 2. Watershed-based flood management should include all agencies/entities whose decisions affect flood management. 3. Adequate floodplain management should stress: a. Avoiding risks in the floodplain. b. Minimizing the effects of those risks when they cannot be avoided. c. Mitigating the effects of damage when it occurs. d. Accomplishing the above in such a way that diminishes negative environmental impacts. e. Nonstructural mitigation (e.g. standards requiring elevation above the base flood level) should be given preference over structural mitigation (e.g. constructing diversion channels), when feasible. 4. Implementation programs.	Revised and incorporated into mitigation measure 9.5
Seismic		
S-1	The County and the Town shall conduct a comprehensive survey of the structural condition of all buildings. Coordinate this survey with existing information from the Unreinforced Masonry Building survey and the Housing Conditions survey. Once the survey is completed, input the data on the GIS system.	Revised and incorporated into mitigation measure 4.1

Status of 2006 Mitigation Actions

2006 Plan Numbering Scheme	2006 Plan Project Description	STATUS
S-2	Utilizing the structural survey required in Mitigation S-1, pinpoint structurally hazardous areas and buildings and develop a rehabilitation and replacement program to mitigate the impacts to unsafe structures from identified hazards in the area, including seismic hazards. Input data on structurally hazardous areas/buildings on the GIS system.	Revised and incorporated into mitigation measure 4.1
S-3	Seek funding to implement the rehabilitation and replacement program to mitigate impacts to unsafe structures.	Unknown
Wildfire		
W-1	Update the County's General Plan Safety Element to ensure that it thoroughly addresses fire hazard planning. Utilize OPR's Fire Hazard Planning during the update.	Complete
W-2	Review the current update of the Town's General Plan Safety Element to ensure it thoroughly addresses fire hazard planning.	Complete
W-3	Review and, if necessary update, the County's General Plan land use policies and regulations and building regulations to ensure that they address fire hazard planning as a component of the development process.	Complete
W-4	Ensure that wildland fire hazards are disclosed during real estate transactions as required. Ensure that wildland fire hazards are disclosed during the building permit process.	Continued as mitigation measure 2.8

Status of 2006 Mitigation Actions

2006 Plan Numbering Scheme	2006 Plan Project Description	STATUS
W-5	Develop community-level fire plans for communities throughout the county, utilizing resources and assistance from the California Fire Alliance. These fire plans should address the following: • Developing an informed, educated public that takes responsibility for its own decisions relating to wildfire protection. • Developing an effective wildfire suppression program for local communities. • Developing an aggressive hazardous fuel management program. • Revising land use policies and standards to ensure that they protect life, property and local resource values. • Implementing construction and property standards that provide defensible space.	Continued as mitigation measure 2.6
W-6	Develop and implement an ongoing countywide program to increase public awareness of wildland fire hazards.	Replaced by mitigation measure 2.7
W-7	All communities and fire protection districts should participate in the Eastern Sierra Regional Firesafe Council.	No longer relevant. Eastern Sierra Fire Safe Council no longer exists. Replaced by mitigation measure 2.5
W-8	The county and the town should appoint a fire hazard coordinator with the responsibility for developing fire plans for the county, participating in the Eastern Sierra Regional Firesafe Council and the California Fire Alliance, coordinating with local, state, and federal fire protection and suppression entities, developing and implementing public education and awareness programs concerning fire safety including safe building materials and landscaping, and applying for funding for fire hazard mitigation such as fuel reduction programs.	Revised and incorporated into mitigation measure 2.2

Status of 2006 Mitigation Actions

2006 Plan Numbering Scheme	2006 Plan Project Description	STATUS
W-9	Mono County's Collaborative Planning Team should include representatives from the Eastern Sierra Regional Firesafe Council and local, state, and federal agencies concerned with fire protection. Fire hazard planning, pre-fire management programs, and public education should be a focus of the Collaborative Planning Team.	No longer relevant. Eastern Sierra Fire Safe Council no longer exists. Replaced by mitigation measure 2.5
W-10	Help local landowners participate in the state's Vegetation Management Program (VMP), when applicable. The Vegetation Management Program (VMP) is a cost-sharing program that focuses on the use of prescribed fire and mechanical means to address wildland fire fuel hazards and other resource management issues on State Responsibility Area (SRA) lands.	Revised and incorporated into mitigation measure 2.9
W-11	Help local landowners participate in CDF's hazardous fuel reduction program.	Revised and incorporated into mitigation measure 2.9
W-12	Help local landowners participate in the BLM's Wildland Urban Interface Grant Awards program for hazardous fuel reduction.	Revised and incorporated into mitigation measure 2.9
W-13	For communities with only one access route, develop and implement a plan to provide an emergency access route for the community.	Revised and incorporated into measure 1.6

B.3 Public Survey

Mono County and the Town of Mammoth Lakes prepared a survey for members of the public to assist with development of the Multi-Jurisdictional Hazard Mitigation Plan (MJHMP). The survey gauges respondents' awareness and past experiences with hazard events, preparedness for future hazards, and views on effective hazard mitigation strategies. The survey received 26 responses, although not all respondents answered each question. This section presents the survey questions (Section B.1.1), a summary of the results of the public outreach survey (Section B.1.2), as well as a spreadsheet that compiled all responses received (Section B.1.3).

B.3.1 Survey Questions

The survey included 24 questions to be completed and returned to staff by August 31, 2017. Questions focused on awareness of natural hazards in Mono County, and the perceived preparedness for such hazards.

2017 Mono County Multi-Jurisdictional Hazard Mitigation Plan Survey

I. Introduction

Mono County and the Town of Mammoth Lakes, in partnership with other key agencies, are preparing a Multi-Jurisdictional Hazard Mitigation Plan in an effort to reduce the risk of natural disasters for residents, businesses, and visitors. This plan identifies natural hazards throughout Mono County and assesses the vulnerability of critical infrastructure and facilities to these hazards. Using this understanding, the plan lists potential actions to reduce risk and future damage.

Is your home or office building susceptible to damage from earthquakes, floods, fire, or avalanches? Do you want to recover more quickly from disasters and prevent future damage from these and other natural hazards? Your participation in this survey can make Mono County and Mammoth Lakes more resilient to disasters. Your responses to this survey will inform the plan preparation. Thank you for your time and cooperation in responding to the brief survey below.

II. Hazard Awareness

1. Please indicate your place of residence

- ◯ a. Town of Mammoth Lakes
- ◯ b. Unincorporated areas of Mono County
- ◯ c. Tribal lands in Mono County
- ◯ d. Outside Mono County

2. If you live in an unincorporated area of Mono County, please indicate which unincorporated community you live in from among the following:

- ◯ a. Antelope Valley
- ◯ b. Benton/Hammil
- ◯ c. Bridgeport Valley
- ◯ d. Chalfant
- ◯ e. Crowley
- ◯ f. June Lake
- ◯ g. Long Valley/Tom's Place/Sunny Slopes
- ◯ h. Mono Basin
- ◯ i. Paradise
- ◯ j. Wheeler Crest
- ◯ k. Other (please specify): _____

3. Please indicate your place of employment

- ◯ a. Town of Mammoth Lakes
- ◯ b. Unincorporated areas Mono County
- ◯ c. Tribal lands in Mono County
- ◯ d. Outside Mono County

4. What is the ZIP Code of your home?

   _____

5. Have you been impacted at all by a disaster in your current residence?
   - ◯ a. Yes
   - ◯ b. No

6. If you answered yes to the previous question, please select the type of disaster that you have been impacted by (select all that apply).
   - ☐ a. Avalanche
   - ☐ b. Drought
   - ☐ c. Earthquakes
   - ☐ d. Exposure to hazardous materials
   - ☐ e. Extreme heat
   - ☐ f. Fire
   - ☐ g. Flooding
   - ☐ h. Landslides
   - ☐ i. Severe weather (winds, thunderstorms, hail etc.)
   - ☐ j. Severe winter weather

Please list any additional hazards that have previously impacted your neighborhood or home.

7. The following hazards are among those which could potentially impact Mono County. Please mark the THREE (3) hazards that are of most concern to your neighborhood or home.
   - ☐ a. Avalanche
   - ☐ b. Dam failure
   - ☐ c. Earthquakes
   - ☐ d. Flooding
   - ☐ e. Geologic threats (landslides, volcanoes, etc.)
   - ☐ f. Severe weather (winds, thunderstorms, hail, etc.)
   - ☐ g. Severe winter weather
   - ☐ h. Fire

Please list any additional hazards that present a threat to your neighborhood or home.

8. The planning team is using various data sources to identify hazards in your community; however, some of these data sources do not provide local data at a general County-wide or Town-wide level. Are there any small-scale issues, such as flooding/ponding at a certain intersection during rain, which you would like the planning team to consider?

◯ a. I am not aware of any local hazards
◯ b. I am aware of local hazards

If you are aware of such hazards, please provide as much detail as possible, including location and type of hazard.

9. If you are a homeowner, do you have adequate homeowners insurance to cover the hazards that could impact your home?

◯ a. Yes, my insurance coverage should be adequate.
◯ b. No, I don't believe my insurance coverage would be adequate for a major disaster.
◯ c. Unsure.
◯ d. I do not have an insurance policy.
◯ e. Not applicable; I rent my current residence.

10. If you rent your residence, do you have renters insurance?

◯ a. Yes
◯ b. No
◯ c. Not applicable; I own my residence.

11. Do you have flood insurance for your home?

◯ a. Yes, I own my home and have flood insurance.
◯ b. Yes, I rent my home and have flood insurance.
◯ c. No, but I am interested in reviewing flood insurance options (http://www.floodsmart.gov/floodsmart/).

12. Please note any additional insurance you have for your home or property (i.e., earthquake insurance).

13. Have you done anything to your home to make it less vulnerable to hazards such as earthquakes, floods, and fires, or do you plan to?

- ◯ a. Yes, I have taken action to make my home less vulnerable to hazards.
- ◯ b. I have not taken action to make my home less vulnerable to hazards, but do plan to.
- ◯ c. No, I have not and do not plan to take action to make my home less vulnerable to hazards.

14. If a severe hazard event occurred today such that all services were cut off from your home (power, gas, water, sewer) and you were unable to leave or access a store for 72 hours, which of these items do you have readily available?

- ☐ a. Blanket(s) / sleeping bag(s)
- ☐ b. Can opener
- ☐ c. Canned / nonperishable foods (ready to eat)
- ☐ d. Cash
- ☐ e. Cooking and eating utensils
- ☐ f. Extra clothes and shoes
- ☐ g. Extra medications
- ☐ h. First aid kit / supplies
- ☐ i. Flashlight (with batteries)
- ☐ j. Gas grill / camping stove
- ☐ k. Gasoline
- ☐ l. Handheld "walkie-talkie" radios
- ☐ m. Important family photos/ documentation in a water- and fireproof container
- ☐ n. Pet supplies
- ☐ o. Portable AM/FM radio (solar powered, hand crank, or batteries)
- ☐ p. Potable water (3 gallons per person)
- ☐ q. Secondary source of heat
- ☐ r. Telephone (with batteries)

What else, if anything, do you have in your emergency kit?

For more information on preparing an emergency kit, please visit: http://m.fema.gov/build-a-kit.

15. Are you familiar with the special needs of your neighbors in the event of a disaster situation (special needs may include limited mobility, severe medical conditions, memory impairments)?

- ◯ a. Yes
- ◯ b. No

16. Are you a trained member of your Community Emergency Response Team (CERT)?

- ◯ a. Yes (please specify which team in the box below)
- ◯ b. No, but I would like to learn more about CERT.
- ◯ c. No, I am not interested in being a trained CERT member.

For more information about CERT, please visit: www.citizencorps.gov/cert.

Mono County – Hazards Survey

Please share with us why you are a trained CERT member, or why you are not yet part of CERT if there is a specific reason.

17. How can Mono County and the Town of Mammoth Lakes help you become more prepared for a disaster? (choose all that apply)

- ☐ a. Provide effective emergency notifications and communication.
- ☐ b. Provide training and education to residents and business owners on how to reduce future damage.
- ☐ c. Provide community outreach regarding emergency preparedness.
- ☐ d. Create awareness of special needs and vulnerable populations.
- ☐ e. Other (please specify)

If you work outside of Mono County or are not currently employed, please skip to question 20.

18. What is the ZIP code of your workplace?

_____

19. Does your employer have a plan for disaster recovery in place?

- ○ a. Yes
- ○ b. No
- ○ c. I don't know

20. Does your employer have a workforce communications plan to implement following a disaster so they are able to contact you?

- ○ a. Yes
- ○ b. No
- ○ c. I don't know

III. Recommendations and Future Participation

21. Please list any studies you are aware of conducted in Mono County or the region regarding the risk of future hazard events (e.g., mining impact studies, dam inundation analyses).

22. Would you like to review and comment on the draft of the 2017 Mono County Multi-Jurisdictional Hazard Mitigation Plan?

◯ a. Yes; please notify me using my contact information in the next question.
◯ b. No

23. If you would like to be notified of future opportunities to participate in hazard mitigation and resiliency planning, please provide your name and e-mail address. If you do not have an e-mail address, please provide your mailing address.

Full Name:	
E-mail Address:	
Street Address:	
City, State, Zip:	

24. Please provide us with any additional comments/suggestions/questions that you have regarding your risk of future hazard events.

Thank you for taking the time to complete this survey. If you have any questions, or if you know of other people/organizations that should be involved in the hazard mitigation planning process, please contact Jeff Henderson at jhenderson@mbakerintl.com or Emma Reed at emma.reed@mbakerintl.com.

Please return survey by August 31st. The survey may be returned as follows:

1. Via email to: emma.reed@mbakerintl.com
2. Via postal mail: Wendy Sugimura
   PO Box 347
   Mammoth Lakes, CA 93546
3. Drop off at County Community Development offices in Bridgeport (74 School Street, Annex I) or Mammoth (437 Old Mammoth Road, STE P); or the Town of Mammoth Lakes office (437 Old Mammoth Road, STE R).

B.3.2 Summary of Results

Place of Residence (Questions 1-4)

This section established residence and employment of the survey respondents. All survey respondents lived in unincorporated Mono County and owned their homes. No survey participants were Town of Mammoth Lakes residents. **Figures 1** and **2** summarize the home community and zip code of respondents. Most respondents did not answer questions relating to employment, which may suggest that respondents are predominantly retired or work from home.

Figure 1: Home Community

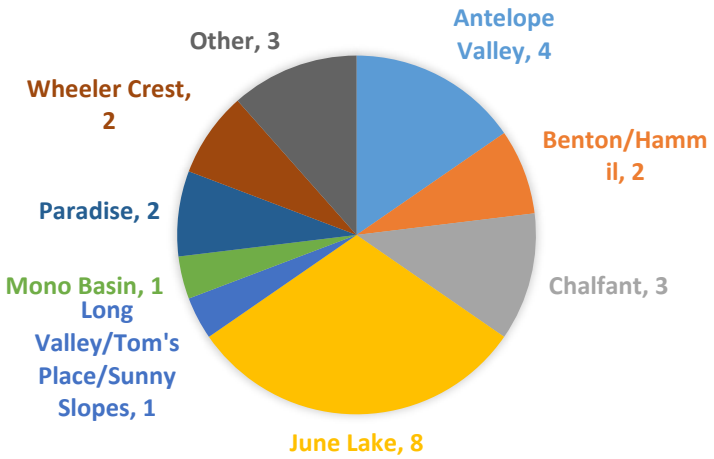
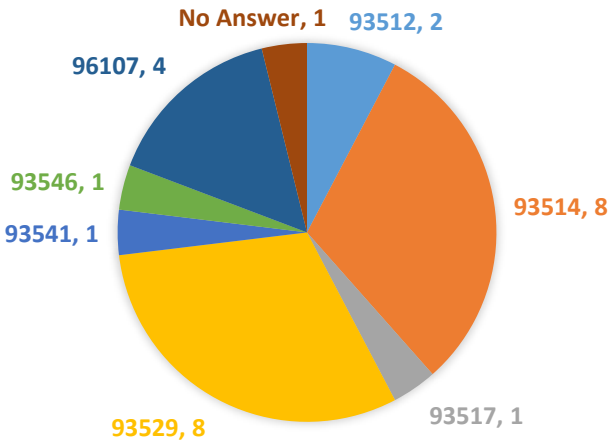


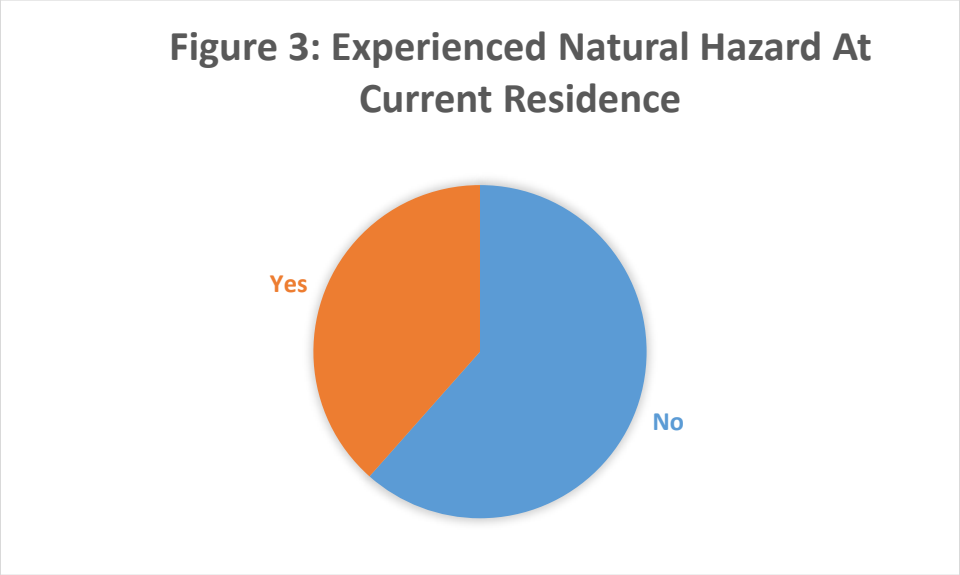
Figure 2: Home Zip Code

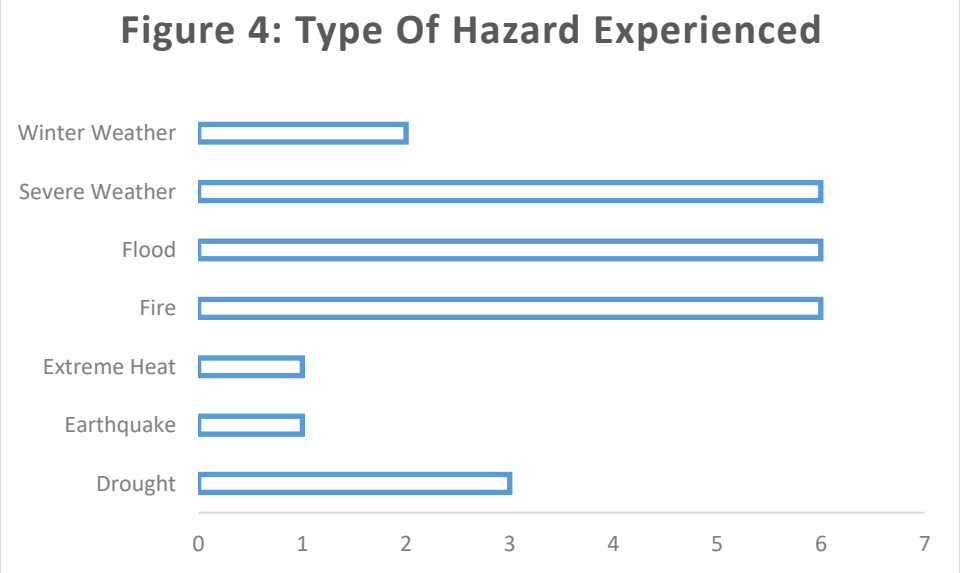


Hazard Awareness and Concern (Questions 5-7)

The next set of questions related to the respondents' awareness of and experience with natural hazards in Mono County. As shown in **Figure 3**, approximately 40 percent of respondents have

been affected by a natural disaster at their current residence in Mono County. Of those that had, a handful had experienced several types of hazard events. **Figure 4** shows that fire, floods, and severe weather have been experienced the most.



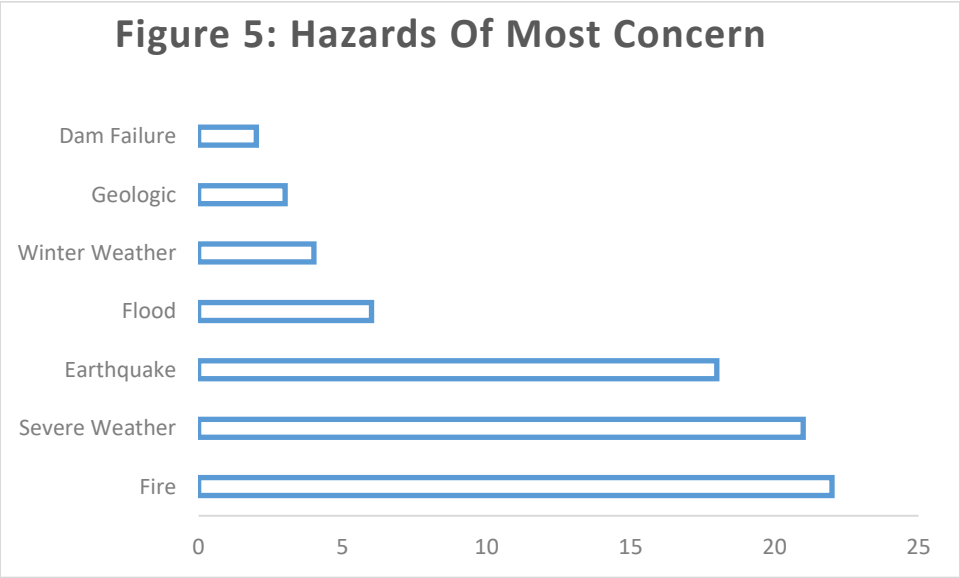


As shown in **Table 1**, Antelope Valley, June Lake, and Paradise each had the most respondents reporting they had been impacted by a hazard of some kind.

Table 1: Hazard Impact by Community Residence

Community	Drought	Earthquake	Extreme Heat	Fire	Flood	Severe Weather	Winter Storm	Total
Antelope Valley	1	--	--	1	1	1	--	**4**
June Lake	1	--	--	--	3	--	--	**4**
Paradise		--	1	2	--	1	--	**4**
Wheeler Crest	1	--	--	1	--	1	--	**3**
Chalfant		--	--	--	2	--	--	**2**
Benton/ Hammil	--	--	--	--	--	--	--	**0**
Long Valley/ Tom's Place/ Sunny Slopes	--	--	--	--	--	--	--	**0**
Mono Basin	--	--	--	--	--	--	--	**0**
Other	--	1	--	2	--	--	--	**3**
Total	**3**	**1**	**1**	**6**	**6**	**3**	**0**	**20**

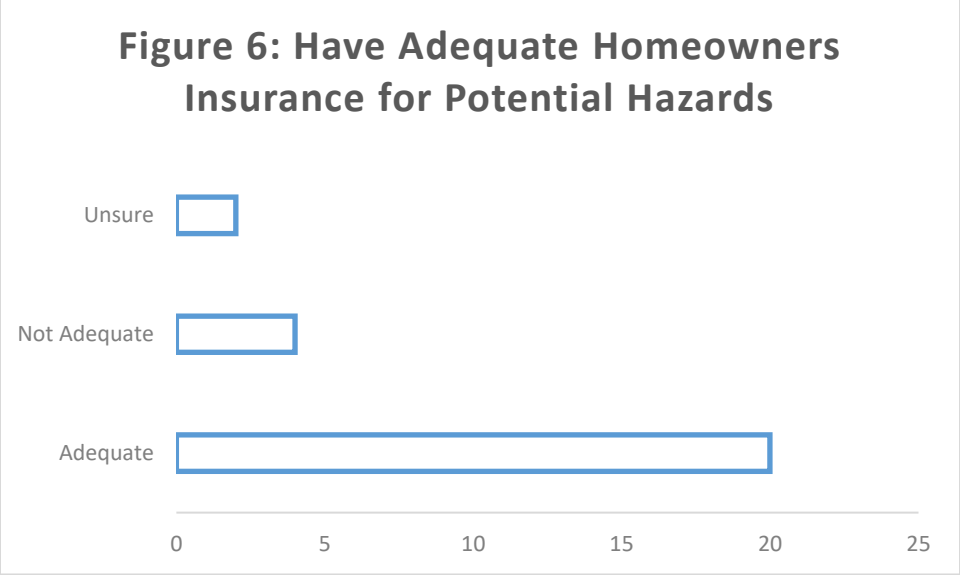
Respondents were also asked which of the seven listed hazards that could potentially impact Mono County cause them the most concern regarding their home and neighborhood. Respondents were able to select up to three hazards. **Figure 5** shows the hazards that most frequently selected as a concern to respondents. Fire, severe weather, and earthquakes were the top three concerns.

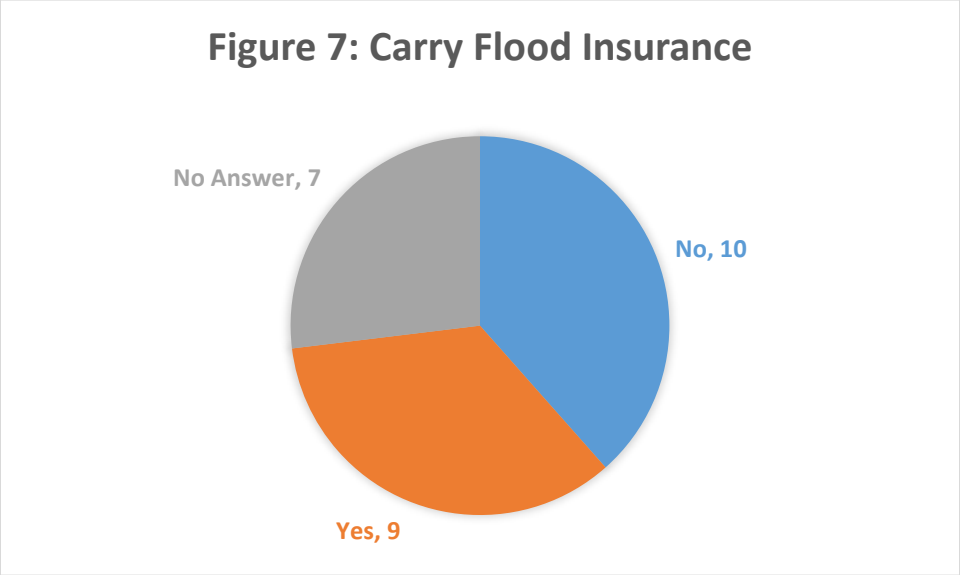


Hazard Knowledge and Preparation (Questions 8-16)

The survey included a series of questions relating to respondents' current level of preparedness for the impacts of potential hazards in the county, including having insurance, emergency kit items, and emergency response training and awareness. In general, most respondents indicated they carried comprehensive insurance for hazards and kept many or all of the items listed for home preparedness.

Figures 6 and **7** show homeowners' responses as to whether they felt their insurance was adequate and whether they owned flood insurance, respectively. The survey included an open-ended question asking if property owners carried any additional insurance for their property. In this space, nearly all indicated they also carry earthquake insurance and in some cases also commented on the need and costs of carrying flood insurance.

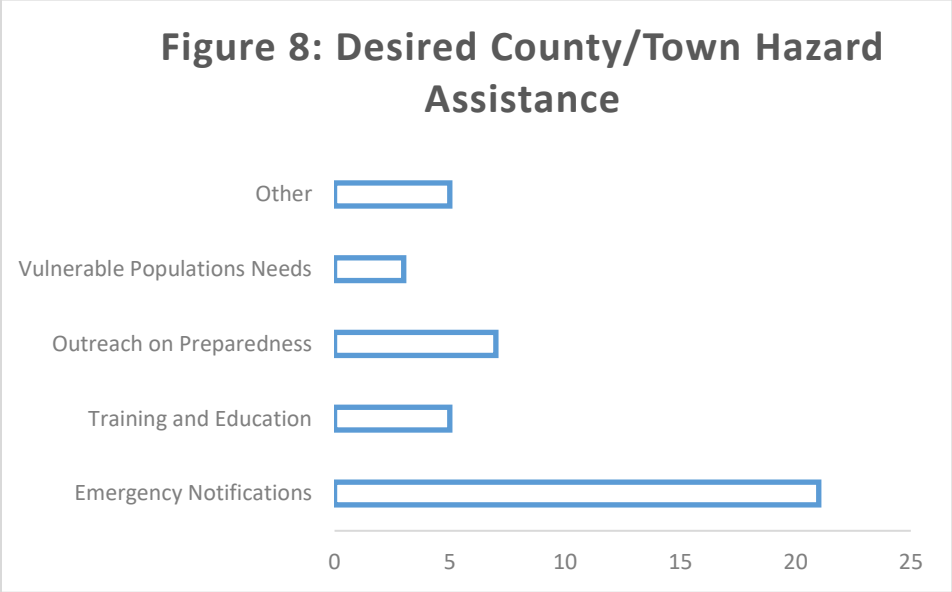




Most respondents felt they have taken steps to prepare their homes in case of a hazard event. The survey listed 18 items that might be included in home emergency kits (e.g., canned food, cash, walkie-talkies) in case of a hazard event causing services to be cut off for 72 hours. Most respondents indicated they owned half or more of the listed items. More than half also indicated they were familiar with any special needs their neighbors would have in a disaster situation. Only one survey respondent indicated being a currently trained member of the Community Emergency Response Team (CERT).

Mono County and Town of Mammoth Lakes Assistance (Question 17)

The survey included a question asking how respondents feel the County and Town of Mammoth Lakes might best help them be prepared for a disaster. The survey listed four potential actions and provided space for additional write-in answers. The potential actions were: providing emergency notifications and communication; training and education on how to reduce future damage; community outreach regarding emergency preparedness; and creation of awareness for special needs and vulnerable populations. Nearly all respondents felt that the County and Town should provide emergency notifications, while smaller numbers felt the jurisdictions should provide multiple other services. **Figure 8** shows the sum of selected items for each desired assistance action.



Employer Actions (Questions 18-20)

The survey included several questions about respondents' employers and the actions the employers may be taking to reduce risk from hazards. Nearly all respondents left this section blank. A possible explanation is that respondents are primarily retired—which several respondents wrote they were—or self-employed. Consequently, very little data was collected on this topic.

Future Participation and Contact Information (Questions 21-24)

The last section of the survey was devoted to collecting contact information for respondents to opt in regarding further involvement in the planning process. The majority provided contact information and indicated they would be willing to review and comment on the draft plan when it is ready.

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B.3.3 Survey Responses

Questions 1-12

Survey Code	1. Residence	2. Community	3. Place Employed	4. Home Zip	5. Impacted By Disaster?	6. Type of Disaster	6. Type of Disaster	6. Type of Disaster	6. Type of Disaster	7. Hazards of most concern	7. Hazards of most concern	7. Hazards of most concern	8. Small-Scale Issues	9. Adequate Insurance	10. Renters Insurance	11. Flood Insurance	12. Additional Insurance
1	Unincorp	J.L.	Outside	93529	Yes	Drought	Flood	Sev Weather	Wint Weather	EQ	Flood	Fire	Am Aware	Adequate	N/A	Yes, own	Earthquake
2	Unincorp	J.L.	Outside	93529	No	No Answer	No Answer	No Answer	No Answer	Sev Weather	Wint Weather	Fire	Am Aware	Adequate	N/A	Yes, own	None
3	Unincorp	B./H.	retired	93512	No	No Answer	No Answer	No Answer	No Answer	Flood	EQ	Sev Weather	Not Aware	Adequate	N/A	Yes, own	Earthquake
4	Unincorp	Other	No Answer	93514	Yes	Fire	Sev Weather	No Answer	No Answer	Sev Weather	Wint Weather	Fire	Not Aware	Adequate	N/A	No Answer	Write-in see survey
5	Unincorp	A.V.	retired	96107	No	Flood	Fire	No Answer	No Answer	EQ	Sev Weather	Fire	Detail...	Adequate	N/A	No Answer	Earthquake
6	Unincorp	J.L.	Unincorp	93529	Yes	Flood	No Answer	No Answer	No Answer	EQ	Flood	Fire	Am Aware	Adequate	N/A	No	Fire
7	Unincorp	A.V.	Unincorp	96107	No	No Answer	No Answer	No Answer	No Answer	EQ	Sev Weather	Fire	Am Aware	Adequate		Yes, own	None
8	Unincorp	Chalfant	Outside	93514	yes	Flood	No Answer	No Answer	No Answer	Flood	Geologic	Sev Weather	Am Aware	Not Adeq	N/A	Yes, own	Write-in see survey
9	Unincorp	Chalfant	Outside	93514	No	No Answer	No Answer	No Answer	No Answer	EQ	Sev Weather	Fire	Not Aware	Adequate	N/A	Yes, own	Earthquake
10	Unincorp	A.V.	Unincorp	96107	Yes	Drought	Sev Weather	No Answer	No Answer	Sev Weather	Wint Weather	Fire	Not Aware	Adequate	N/A	No Answer	None
11	Unincorp	J.L.	Outside	93529	No	No Answer	No Answer	No Answer	No Answer	EQ	Sev Weather	Fire	Not Aware	Unsure	N/A	No	No Answer
12	Unincorp	W.C.	No Answer	93514	No	No Answer	No Answer	No Answer	No Answer	EQ	Sev Weather	Fire	Am Aware	Not Adeq	N/A	Yes, own	Write-in see survey
13	Unincorp	A.V.	Unincorp	96107	No	No Answer	No Answer	No Answer	No Answer	Fire	No Answer	No Answer	Am Aware	Adequate	N/A	No Answer	Write-in see survey
14	Unincorp	J.L.	No Answer	93529	No	No Answer	No Answer	No Answer	No Answer	Sev Weather	Wint Weather	Fire	Am Aware	Adequate	N/A	No	Write-in see survey
15	Unincorp	Paradise	Outside	93514	Yes	Fire	Sev Weather	No Answer	No Answer	EQ	Sev Weather	Fire	Am Aware	Unsure	N/A	Yes, own	No Answer
16	Unincorp	W.C.	No Answer	93514	Yes	Drought	Fire	Sev Weather	Lower Rock Creek	EQ	Sev Weather	Fire	Am Aware	Adequate	N/A	No	Earthquake
17	Unincorp	J.L.	Unincorp	93529	No	No Answer	No Answer	No Answer	No Answer	EQ	Geologic	Fire	am Aware	Adequate	N/A	No	No Answer
18	Unincorp	Other	Unincorp	93517	Yes	EQ	Fire	Wint Weather	Sev Weather	Flood	EQ	Fire	Am Aware	Adequate	N/A	No	Earthquake
19	Unincorp	Paradise	No Answer	93514	Yes	Ex Heat	Fire	No Answer	No Answer	EQ	Sev Weather	Fire	Am Aware	Adequate	N/A	No	No Answer
20	Unincorp	M.B.	No Answer	93541	No	No Answer	No Answer	No Answer	No Answer	EQ	Sev Weather	Fire	Am Aware	Adequate	N/A	No Answer	Earthquake
21	Unincorp	B./H.	Tribal	93512	No	No Answer	No Answer	No Answer	No Answer	EQ	Geologic	Sev Weather	Not Aware	Adequate	No	No	No Answer
22	Unincorp	Chalfant	Outside	93514	Yes	Flood	No Answer	No Answer	No Answer	EQ	Flood	Sev Weather	Not Aware	Adequate	N/A	Yes, own	No Answer
23	Unincorp	J.L.	No Answer	93529	No	No Answer	No Answer	No Answer	No Answer	Dam Fail	Sev Weather	Fire	Am Aware	Adequate	N/A	No	Write-in see survey
24	Unincorp	J.L.	Unincorp	93529	No	Flood	No Answer	No Answer	No Answer	Dam Fail	Sev Weather	Fire	Am Aware	Not Adeq	N/A	No	No Answer
25	Unincorp	Other	Outside	No Answer	No	No Answer	No Answer	No Answer	No Answer	EQ	Sev Weather	Fire	Not Aware	Not Adeq	N/A	No Answer	No Answer
26	Unincorp	L.V./T.P./S.S.	No Answer	93546	No	No Answer	No Answer	No Answer	No Answer	EQ	Sev Weather	Fire	Not Aware	Adequate	N/A	No Answer	Earthquake

Questions 13-24

Survey Code	13. Action to Diminish Vulnera	14. Items Readily Available	15. Familiar with Special Need	16. CERT Trained & Why/Why	17. How Mono County can He	17. How Mono County can He	18. Work Zip Code	19. Employer Disaster Plan	20. Employer Communication	22. Review/Comment on MJH	23. Contact for Future Involve	Email	Address	Town	Zip	24. Additional Comments
1	Yes	Multiple, see survey	Yes	Not interested	Training/Ed	Awareness	No Answer	No Answer	No Answer	Yes	--	--	--	--	--	
2	Yes	Multiple, see survey	Yes	Not interested	Other…	Complete elevation cert	93514	No	No	Yes	--	--	--	--	--	
3	No, plan to	Multiple, see survey	No	No, but like to	Notifications	Training/education, out	No Answer	No Answer	No Answer	Yes	--	--	--	--	--	
4	Yes	Multiple, see survey	Yes	Not interested	Other…	Need to start by identify	No Answer	No Answer	No Answer	Yes	--	--	--	--	--	
5	Yes	Multiple, see survey	Yes	Yes	Notifications	Training/education, out	No Answer	No Answer	No Answer	No	--	--	--	--	--	
6	Yes	Multiple, see survey	No	Not interested	Notifications	Training/education, out	93529	Yes	Yes	Yes	--	--	--	--	--	
7	Yes	Multiple, see survey	No	No, but like to	Notifications	Outreach, awareness	96107	Yes	Yes	No	--	--	--	--	--	
8	Yes	Multiple, see survey	No	No, but like to	Notifications	Outreach	No Answer	No Answer	No Answer	Yes	--	--	--	--	--	Write-in see survey
9	Yes	Multiple, see survey	Yes	Not interested	Notifications	Other…	93514	Yes	Yes	Yes	--	--	--	--	--	
10	Yes	Multiple, see survey	Yes	Not interested	Notifications	Awareness	No Answer	No	No	No	--	--	--	--	--	
11	No, plan to	Multiple, see survey	No	No, but like to	Notifications	Training/ed, outreach	91361	Don't Know	Don't Know	Yes	--	--	--	--	--	
12	Yes	Multiple, see survey	No	Not interested	Notifications	Well, in case of a major	No Answer	No Answer	No Answer	Yes	--	--	--	--	--	Write-in see survey
13	Yes	Multiple, see survey	No	Not interested	Other…	Other…	No Answer	No Answer	No Answer	No	--	--	--	--	--	
14	Yes	Multiple, see survey	Yes	Not interested	Notifications	Outreach, awareness	retired	No Answer	No Answer	Yes	--	--	--	--	--	
15	Yes	Multiple, see survey	Yes	Not interested	Notifications	Outreach	93514	Yes	yes	No	--	--	--	--	--	
16	Yes	No Answer	Yes	No, but like to	Notifications	Training/education, out	No Answer	No Answer	No Answer	Yes	--	--	--	--	--	Write-in see survey
17	Yes	Multiple, see survey	Yes	Not interested	Notifications	Awareness	93529	Yes	Yes	Yes	--	--	--	--	--	
18	Yes	Multiple, see survey	Yes	No, but like to	Notifications	Training/education, out	93517	Yes	Yes	Yes	--	--	--	--	--	
19	Yes	Multiple, see survey	Yes	Not interested	Notifications	Awareness	No Answer	No Answer	No Answer	No	--	--	--	--	--	Write-in see survey
20	Yes	Multiple, see survey	No	Not interested	Notifications	Training/ed, outreach	Retired	No Answer	No Answer	Yes	--	--	--	--	--	Write-in see survey
21	No, no plans	Multiple, see survey	No	No, but like to	Notifications	Training/ed, outreach, a	93512	No	No	Yes	--	--	--	--	--	
22	Yes	Multiple, see survey	Yes	Not interested	Notifications	Other…	93514	No	No	No	--	--	--	--	--	
23	No, plan to	Multiple, see survey	Yes	Not interested	Notifications	Outreach	No Answer	No Answer	No Answer	No	--	--	--	--	--	
24	Yes	Multiple, see survey	No	No, but like to	Notifications	Training/Ed	93529	No	Yes	Yes	--	--	--	--	--	Write-in see survey
25	Yes	Multiple, see survey	Yes	Not interested	Other…	Other…	No Answer	No Answer	Yes	No Ans	--	--	--	--	--	Write-in see survey
26	Yes	Multiple, see survey	No	Not interested	Notifications	Training/ed, Outreach, a	No Answer	No Answer	No Answer	yes	--	--	--	--	--	

B.4 Community/Stakeholder Meetings

Throughout the planning process a variety of community meetings were held. Information gathering sessions occurred with key stakeholders at the beginning of the planning process; advisory meetings were conducted with the Mono County Regional Planning Advisory Committees (RPACs) for input and feedback throughout Plan development; and presentations about the MJHMP were given at standing community meetings. Agendas, presentations and minutes from meetings are provided below (in chronological order).

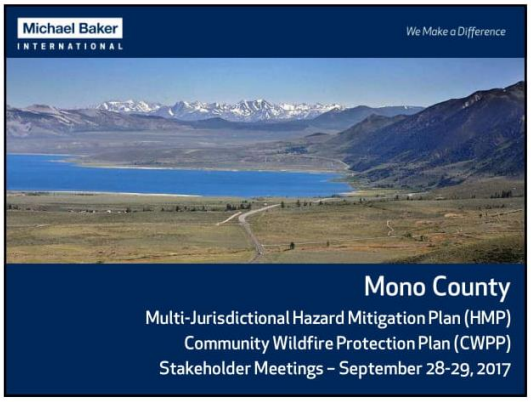
B.4.1 Stakeholder Meetings – September 28-29, 2017

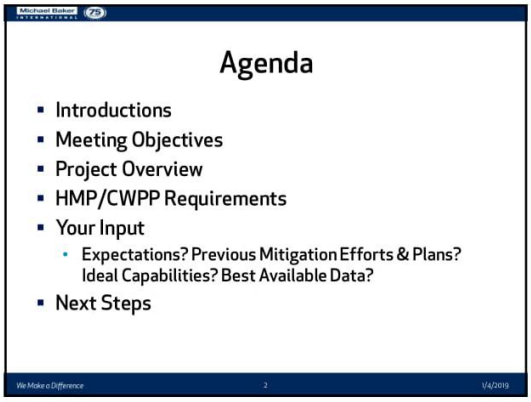
AGENDA: Stakeholder Meetings

MONO COUNTY MULTI-JURISDICTIONAL LOCAL HAZARD MITIGATION PLAN

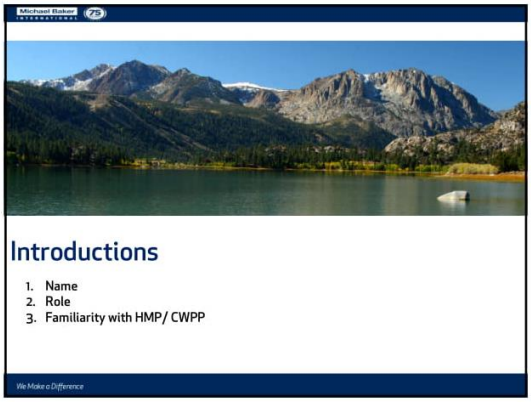
September 28-29, 2017

1. **Introductions**
2. **Review Agenda and Meeting Objectives**
3. **Overview of Project**
    a. Project Objectives
    b. Project Benefits
    c. HMP Requirements and CWP Requirements
4. **Stakeholder Discussion Questions**
    a. **Stakeholder Expectations for the HMP/CWPP**
        - What do you want to achieve through these planning processes?
        - What is your end goal?
        - Can these planning processes align with existing efforts?
        - You will be content if this plan _____?
        - Does your district intent to formally adopt the HMP?
    b. **Previous Planning and Mitigation Efforts**
        - Past mitigation actions (10-Year Strategy Implementation Plan [2006])?
    c. **Mitigation Capabilities?**
        - In a perfect world, what types of capabilities would allow you to implement mitigation actions?
        - What is currently limiting mitigation efforts? i.e.: $$$, regulatory tools (policies, programs, ordinance, codes, plans), personnel, programs, infrastructure, equipment?
    d. **Best Available Data?**
        - Historical events
        - Risk/vulnerability
        - Critical facilities
        - Past mitigation actions
        - Other applicable studies, reports
    e. **Specific Areas/Locations of Concern**
5. **Project Schedule**
6. **Questions and Comments**

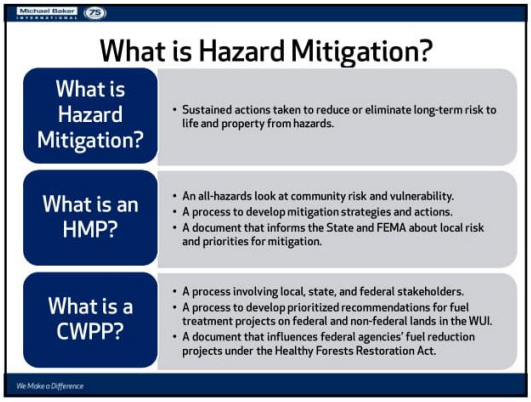

Michael Baker
INTERNATIONAL
We Make a Difference
Mono County
Multi-Jurisdictional Hazard Mitigation Plan (HMP)
Community Wildfire Protection Plan (CWPP)
Stakeholder Meetings – September 28-29, 2017


Agenda
Introductions
Meeting Objectives
Project Overview
HMP/CWPP Requirements
Your Input
Expectations? Previous Mitigation Efforts & Plans? Ideal Capabilities? Best Available Data?
Next Steps
We Make a Difference
2
1/4/2019


Meeting Objectives
Inform
Input
Resources
Relationship
We Make a Difference


Introductions
1. Name
2. Role
3. Familiarity with HMP/ CWPP
We Make a Difference


Project Overview
We Make a Difference


What is Hazard Mitigation?
What is Hazard Mitigation?
Sustained actions taken to reduce or eliminate long-term risk to life and property from hazards.
What is an HMP?
An all-hazards look at community risk and vulnerability.
A process to develop mitigation strategies and actions.
A document that informs the State and FEMA about local risk and priorities for mitigation.
What is a CWPP?
A process involving local, state, and federal stakeholders.
A process to develop prioritized recommendations for fuel treatment projects on federal and non-federal lands in the WUI.
A document that influences federal agencies' fuel reduction projects under the Healthy Forests Restoration Act.
We Make a Difference

Project Objectives & Requirements

- ✓ FEMA-approved HMP
- ✓ Community-approved CWPP
- ✓ Integrated mitigation strategy
- ✓ Implementable mitigation actions
- ✓ Well-defined maintenance

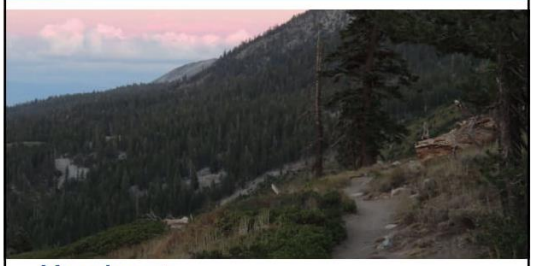
Capability Assessments | Risk & Vulnerability Assessment Results | Existing Plans / Identified Projects | FEMA Guidance / Best Practices | Public Survey Results

We Make a Difference

Additional Project Objectives/Benefits

- Influence over where/how federal agencies implement projects
- Incorporate risk/mitigation into other local plans
- Inform and gain input/support from stakeholders/communities
- Evaluate changing risks from development and climate change

We Make a Difference



Your Input

We Make a Difference

HMP/CWPP Expectations?

- What do you want to achieve through these planning processes?
- What issues should be addressed?
- What is your end goal?
- Can these planning processes align with existing efforts?
- You will be content if this plan _____

We Make a Difference

Risk and Vulnerability?

- Historical events
- Vulnerabilities
- Problem sites/areas
- Critical facilities
- Systems, programs, policies that are strong/weak

We Make a Difference

Mitigation Capabilities?

- In a perfect world, what types of capabilities would allow you to implement mitigation actions?
- What is currently limiting mitigation efforts?
  - e.g.: $$$, regulatory tools (policies, programs, ordinances, codes, plans), personnel, programs, infrastructure, equipment

We Make a Difference

Previous Planning and Mitigation Efforts?

- Past plans?
- Risk assessments?
- Action plans?
- Past mitigation actions?

Next Steps

Project Schedule

Event	Topics	Time Frame
Project Kickoff	Initial Meeting with County/Town Staff	June 2017
Stakeholder Meetings	Information Gathering & Awareness	Sep 28-29, 2017
Planning Team Meeting & RPAC Workshop	Hazard Profiles & Risk Assessment	Oct 25-26, 2017
Planning Team Meeting & RPAC Workshop	Mitigation Actions & Draft Plan Presentation	Jan 8-10, 2018
Public Meeting	Mitigation Actions & Draft Plan Presentation	Jan 8-10, 2018
Public Review MJHMP	Public Review of Document	March 2018
Submit to Cal OES/FEMA	Cal OES/FEMA Review of Document	April 2018
Final MJHMP	Public Hearing & Adoption	May 2018

Website with updates, information, and survey coming soon!

Questions/Comments?

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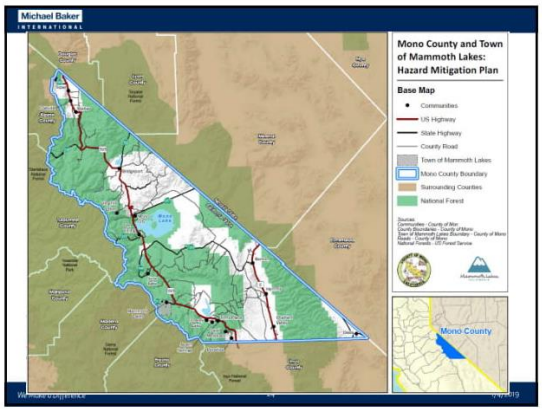
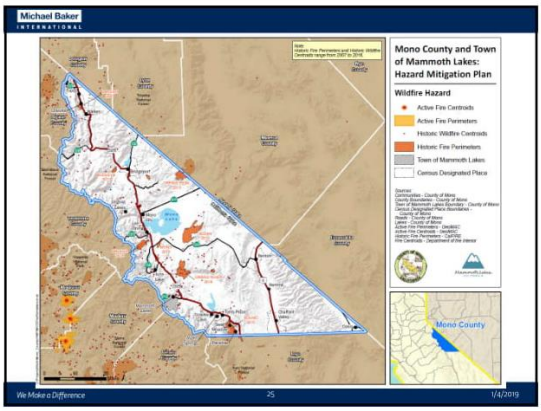




Meeting Notes – September Stakeholder Mtgs

September 28 – Bridgeport 11 am

- Bruce Woodworth – Mono County RCD – also Antelope Valley CERT. Prepares 20-page plans for emergency situations on occasion.
- Karla Benedicto – CalOES representative.
- Sgt. West - CHP

- Expectation – Improve access to mitigation funding for rural areas – the cost-benefit isn't usually favorable, but the damage potential is still high. Short answer is "money".
- Traffic and amount of people are always a failure in plans for evacuation – easy to use the FEMA guidelines for evacuation, but its not practical. Let's get a realistic plan for evacuation and how we'll move people, and be sure that they are adapted to weather and seasonal conditions. CHP has a good operations plan with Nevada DOT – but all traffic outside of Mammoth is CHP
- Emergency Operations Plan – would use EOP. SCE has a plan for all seasons. This process needs to daylight the evacuation plans and ensure that stakeholders feel it is adequate. Focus potential mitigation resources on improving evacuation capacity.
- CHP and Caltrans have an outstanding relationship here – not much red tape.
- County Public Works are also very helpful – outstanding job with the resources available. So few people here, we have to work together as a team.
- Volunteer firefighters here are very effective, and strong volunteer network.
- Plan shouldn't be limited to "natural" hazards – consider plane crashes, man-made hazards, terrorist attacks, etc. as well.
- Dams – should be considered critical infrastructure – but what's critical may depend on the hazard in question. Inspection stations could be critical. **Hwy 395 is likely the biggest critical facility**. A dam failure would wash-out 395 which is the only way in and out. Edison also has plans and federal guidelines. (should engage SCE into conversations, perhaps also LADWP).
- 2015 fires – resulted from high wind events when telephone poles came down starting a series of fires.
- CHP's biggest issue is Highway 395 and whether the main artery would be inaccessible. There are certain areas here that would be completely cut off. Weather could prevent flight access or allow for goods to be brought in only by air. **Mammoth Airport is also a critical facility.**

- (Look at Edison's EOP and hazards plans.)
- Communications Interoperability – Testing. Need exercises to test strength of the plans. Have done exercises (Dr. Johnson in Health Department has brought folks together.) Its table-top exercises at this point – but that doesn't test communications in the field. Need to test and make sure communications work. There's been a "radio rodeo" event – issues with towers, etc. But our communications equipment is challenging. This is a technology issue – hard to get facilities to where they need to be. Bridgeport did try mobile communications: radios, batteries, and back-up. This is also a process matter.
- Mitigation Capabilities – keeping culverts clear is an ongoing and conscientious effort. Maintaining riparian zones is also helpful to keep water flowing.
- Invest in exercises as part of mitigation – wholescale response exercise in the County would be educational and helpful. Look for grants and resources to support this. Someone who is actively testing exercises.
- Need to look at radio system – make it better. There are means for reverse 911.
- Bruce - Standard Operating Guidelines –
    - Mass casualty/haz mat
    - Health/Pandemic
    - Flood Emergency
    - Fire Emergency
    - Earthquake
    - Power outage – power → water → habitability in rural environments
- Recent power outage – County didn't see as a need for reverse 911 deployment. (Need both reverse 911 for hardlines, and reverse 911 for cell phones)
- Mono County has some partial coverage for cell phone reverse 911.
- CHP has all kinds of action plans – SOPs, which are statewide.
- Need – volcanic eruption action plan. Gathering dust on a state level.

September 28 – Bridgeport 1:00pm

- Dana, Jeff, Karla, Wendy, Mike Garner (M. Baker)
- Doug Toskin – Marine Corps Mountain Warfare Training Center (MWTC)
- Brett Hawn – Marine Corps MWTC
- Ron Allen – Marine Corps MWTC – police, fire, safety, staff protection
- Shannon Anderson – Marine Corps MWTC – 25 years DOD and lots of hazard planning in the past. Involved with unified command in Mono County. Participant in recent fire effort.

    - Thom Heller – Mammoth Lakes FD (conference call-in) – been involved in Town and Forest Svc EM plans.

- 1997 100-year flood – hit North County pretty hard. Pickle Meadow was flooded out, lost Sonora Bridge on SR 108, had to evacuate the base. Had to evacuate 60 horses and mules – Walker River Canyon was flooded out. Most folks here live in Douglas County NV – Silver Creek fire.
- Also, Propane explosion at military housing – County responded very well. There were concerns about whether the homes then were safe. These affected the base and bled over into County services, etc. How can we help others, as well as they help us? Installation Commander can provide military resources for 3 days. Don't have D9 Caterpillars, but do have some earthmoving equipment, a big water bowl (movable tank for potable water), limited amount of MREs. However, if we're surging – mission priority remains taking care of the on-site Marines.
- Swift-water rescue – for Lyon County – had to stay mission-focused.
- Fire Chief Anderson: This year, lots of localized flooding from snowmelt – Base Fire Department is swift-water rescue certified and completes training each year. Add to plan – ready to provide that service. Able to assist.
- "Tyranny of distance" – is a big challenge to being responsive with assistance. We also have limited use of helicopters to assist with disasters. Some lift capability that can be authorized by the base commander. All depends on timing.
- DSCA – base would not be the place where people would be evacuated to, or would provide services. County already has those resources in place. However, supporting responders before USFS can get resources in place – can bed, feed, fuel resources until USFS gets setup. Best service we can provide is to support responders.
- Don't have a portable fuel capability for stranded vehicles. FEMA Region IX report every six months regarding capabilities that the base has.
- Is a staging area a possibility – to pass through resources to the south? Yes, it's a possibility. Base commander is all about mutual aid. Community plans liaison officers always attend. In the summertime, we used to have 500+ surge of Marines to attend training and would let County know. Definitely would support staging. Airfield has limitations and FEMA knows what they are – limited space and refilling capabilities.
- Have worked together with County and military base – dynamic relationship for 25+ years. Dynamic and wonderful support resource.

- Re: Mitigation – Slinkert fire – when poles and wires were burned, Antelope Valley had no power. Some sort of backup power would be ideal. Perfect mitigation example. Pre-stage generator or generator on very short leash plugged into north part of the County. Backup generator was in Las Vegas – took 2-3 days to arrive. Liberty Energy is provider for Antelope Valley.
- Central California Threat Center – Can we engage Liberty Energy to deal with more than what they are doing now? **Get redundant power supply options** – or staged generators, etc.
- As a mitigation contribution, base commander could authorize siting/staging for major generator.
- 1997 flood – SR 108 is vulnerable because of the bridges. Scoured around the bridges, took days to blast earth from surrounding areas and resupport the bridge. Can't get materials over the hill to us in the winter. **SR 108 and US 395 are the most critical facilities**. Can we ensure better routes? Or open facilities when we need to – it's a Caltrans issue.
- Riparian zones – need to consider the inter-agency relationships and needs of riparian areas – how they are managed, how that contributes to flooding, how washed out bridges. Walker River Canyon is still vulnerable to high water and scouring. 4,000 cfs – but it never flooded. Some campgrounds affected. Road closure was a greater issue from the Slinkert Fire. Doing mitigation with controlled burns? Power in northern part of County gets knocked out all the time – South County ends up with similar problems with the biggest issue being loss of phone coverage and data disruption due to trunk lines getting cut.
- Geothermal plant is potentially a backfill. EMS in the County is very limited. Mammoth has good hospital – closest, other than Carson City and Reno. Almost an hour of flight from Bridgeport to get a victim to care – vulnerable with regard to emergency medical services. Particularly if air service gets limited. 5 ambulances in the County, 3 at base, 2 in Mammoth. Pilots won't fly/not safe to fly in conditions. Another record year of snowfall coming. Vehicle accidents in Walker Canyon but fortunate not to have a high number of incidents. If have natural variation in cycles, you build up sediment, then flush it out.
- Money is a big constraint – not much investment here in these items. Paramedics approached base to see if they could coordinate all of the EMS calls in North County. Unfortunately, no. Redundant utilities, cell towers on wheels, these are all good improvements. Needed a "cow" – for fire fighting. Only 3-4 for the whole state and privately owned equipment. Cell towers are a big issue throughout the County – Verizon put one in at the base.

- Need to recognize we're a remote part of the state – need to come up with alternate means that we can afford, support and have control over. We're going to be in a difficult time under an event, and need to work together. FEMA's current push is for 72 hours of preparation which is not enough – threats are real, particularly when we're this remote. Public education is a mitigation capacity and should be reinforced. Antelope Valley CERT has some efforts going, but kind of hit and miss in terms of having enough training. Down in Mammoth, CERT is doing better. Having trouble up here just getting volunteer firefighters. **Supporting and investing in CERT in Antelope Valley would be a great mitigation action**. Consider social vulnerability – identify folks who cannot self-evacuate, or are energy dependent, etc. Dr. Johnson and his staff are working on this issue – and doing a great job.
- Red Cross – consider reaching out to Red Cross as well.
- Shelters are in place – more than likely, people will go north to Douglas County, depending on connections and need.
- For evacuation, either North or South –
- Mutual Aid Agreements with multiple agencies (4+).
- Power should be #1 issue – redundant power. Potable water – most people are on wells, which are power dependent. Road networks are issues.
- Life support – how to provide the basic needs to maintain life. Need own resources available here – life support. Consider undergrounding the utilities – Edison/LADWP/Liberty Energy – how much would it cost to bury lines for Liberty Energy? Edison doesn't want to bury anything greater than 33KV. Strong resistance to bury anything greater than 33KV. **Digital 395 was a successful bury project and accomplished very quickly – look to this as a model.** Marine Corps base is the absolute end of the line for SCE – backup generator on base capable of running a small city, but can't put power on the grid. Trying to go solar – energy independent. Edison said no to pushing power back to the grid.

September 28 – Mammoth Lakes 3:30pm

- Thom Heller – Mammoth FD – Fire Marshall **CWPP in 2008 with the County**, lots of fuels reduction work. $400k grant for fuel reduction, fuel management plan submitted to state, applying for SNC grant for fuels reduction. Working with CWPP out of Colorado in hopes of putting together a **CPAW endorsement. Active Firesafe Council in Town.**
- Sagar Fowler – CalFIRE, new to the area, but never dealt with planning process
- Mark Ingraham – Inyo NF and Bishop BLM – let's update the Forest Service contracts
- Ingrid Braun – Sheriff and Director of Emergency Services
- Jeff, Dana, Wendy, Karla

- Road system is a confining situation – we have limited number of roads, challenging weather events, not as much power issues as in the north part of county. But, major communication issues on south part of County. We work together as a community of responders – give and take, considering our isolated situation, we do a good job of piecing together solutions.
- Lack of redundancy of communication system is a huge issue. Verizon hasn't fixed it. Perhaps 50% of people here no longer have land lines. US 395 and US 6 are really our only highway options. Major event strands people here.
- Living in a forest, the natural disasters are what get us. Avalanche, forest fires, homes in Twin Lakes area in avalanche zone, also Virginia Lakes, Mammoth, and June Lake Loop.
- Will be content if this plan gets finished, approved, so funds are available.
- Incident that will affect everyone here is wildfire – likely most devastating in the short term. Earthquake and volcanic activity could also be major events. 6.0 earthquake could stretch recovery resources to max, particularly with community growth.
- Weak systems – radio communication. We're working on it, but requires more money. Operating at 1995 standards now. Under Digital 395, there's so much more that we can do. Hired Delta Wireless to evaluate – we can provide their study. Checked out repeaters, looking at car-to-car communications. Its already better now, medics have noticed improvement, as has Town FD. Modernizing and digitizing this toward the future would make big improvements. Traditional systems don't work in the mountain environment.
- The more we can work interagency in finding solutions, the better. USFS has developed a good system, which is available in spots, not uniform coverage. If we could work together on co-locating resources, that would be best.
- Topography makes communication systems challenging. **Delta has a written assessment and upgrade recommendations.**
- Wendy – Emphasis on implementable, fundable projects identified in the plan.
- **2008 CWPP is Countywide… need to reference.** Includes update to project list and defensible space inspections.
- County EOP and other emergency plans also available.
- Secondary emergency access – Issue in Old Mammoth area? What's on the books? Installed Waterford Bridge just for that purpose. From that point west, we're working on one other location Snowcreek 1,2,3 to connect. Topography to the west is challenging. Becoming cost-prohibitive. Lakes Basin has one road in and out – in summertime, 3,000 people up there,

plus campsites and resorts. Only one way in, one way out. Its in the fire avenue due to winds, etc.

- Heller: May have computerized list of troublesome secondary access spots.
- US 395 is becoming an increasingly busy route for hazardous materials such as fuel spill, gas and asphalt.
- Propane – probably from an incident standpoint, the greatest potential hazard.
- Walker River Canyon – big impacts in 1997. It's pretty well armored – strong storm winters will push debris through. Walker River never flooded this year. Topaz Lake loses half its capacity but not sure what is left to be done for that.
- Infrastructure is relatively old – high potential for infrastructure to be impacted.
- Flooding events in Tri-Valley – last year, rain-runoff. DWP came out with graders and cleared it out. Storm system just sort of sat over Tri-Valley – BLM land, DWP lands, Caltrans roads ROW, floodplains. Big events, limitations to what could be done because of jurisdictional boundaries and where water could be diverted – cross-jurisdictional issues, who's responsible to mitigate this? DWP? Landowners? Caltrans? Only one house significantly impacted – had a basement.
- Education as a mitigation strategy/along with volunteers-CERT. Town enabled people this winter with too much snow on roofs – but its private responsibility. Don't set expectations that government is going to solve those problems.
- Radon – County Env. Health have Radon test kits. Radon mitigation system permits were on rise. Hard to find someone who does Radon mitigation – have to get someone down from Reno. Also expensive.
- Has County infrastructure been hardened enough to withstand risks? Potential shelters, etc. Community Centers are relatively new, mostly one-story. EAPs for Edison – Sheriff has their plans – we're talking weekly. Agnew Dam – was a scary proposition, but resulted now in good coordination. Three Dams for Edison, also need to add DWP. Sheriff can provide contacts.
- County facilities are built to building codes – but not specifically hardened to hazards. Current jail was built in mid-1980s. New jail will be where old hospital site was. Will have dispatch and be built to critical facility standards. Should identify critical facilities for purpose, then develop programs to retrofit to critical facility standards. Look at in EOP.

- Schools/higher education – participate in unified command meetings. Use their buildings as shelters, and generation. Sheriff meets regularly with school reps. Mammoth USD has recently held workshops on upgrading their facilities.
- Look at Red Spano Meadow area in Madera County. Only road in and out of there in summer months is a hazard. Got a FLAP grant for part of that. Look at moving County line to provide better emergency access. Madera does not pay… We have an MOU with Madera County to provide service – Madera gets the property tax revenue, but doesn't pay.
- Cell phone coverage generally an issue in Walker River Canyon– needs to be improved. Disabled semi from bear strike, couldn't call it in to dispatch. Benton has spotty coverage.
- Wildlife hazards – animal crossings – Wendy to send a few studies on optimal locations.
- Rockfall – Lower Rock Creek location. SR 158 between south junction and Oak Ridge. Public works may know more about rock fall locations. Also an avalanche zone. Lundy and Tioga Road. Caltrans can also provide input on this. Ask Caltrans about rockwall . GasX project near Lee Vining to trigger avalanche and open road.
- CalFIRE – information and help would come from foresters. Defensible space reviews as well.
- BLM – Commsite issue should be an easy fix – providing a spot for communications facilities. Communications is lacking and a big challenge. Two new repeaters installed this week at Piper. Should extend to Sagehen, Benton.
- What's condition of OES system up here? Potato keeps coming up. Radio rodeo happens on occasion. OES has a radio shop in Bishop. Microwave and radio. OES communications backbone is aging. FirstNET – safety communications system integrated nationwide. CHP can now come up on County's frequency and provide backup. Good levels of cooperation.
- Red Meadows - Do what we can toward fuel reduction. Still downed trees from wind events from 5 years ago. BLM is having a vegetation reduction meeting on Monday, including project list. Also seeking a list of firesafe councils. See if we have a solid list of fuel reduction projects. Sheriff sent a sharepoint link of local Firesafe Councils.
- BLM list of contacts needs to be updated/replaced.

September 28 – Mammoth Lakes 4:30pm

- Andy Seltzer
- Dana, Jeff

- From Tom's Place … Sunnyslopes HOA – hoping to form a FireSafe Council
- Obvious fire hazard – CalFIRE has community in highest fire hazard severity zone. February 2015 fire created significant hazards. 49 homes taken out.
- Pine Glen: 48-home tract on Forest Service Recreational Residence tract. Adjacent to 70 private homes in Sunnyslopes. Forest service has done some work 3-4 years ago. Community organizing themselves to remove branches. Working to coordinate a fuels-reduction plan for our area. Substantial hazards, particularly with drought. 2 HOAs working together.
- Other concerns – water supply to support suppression. USFS has denied permitting to create any fire suppression. Sunnyslope does take care of this issue on their own. USFS didn't want to create a precedent for other areas.
- Long Valley FD is supportive of creating fire suppression water supply.
- Fuels reduction efforts would be helpful.
- Crawley Lake – water for helicopters – end up borrowing water from water district.
- Combined hazards of wind, fire, and power line outages. Power lines are really vulnerable. What is Edison's liability for homes lost due to power line-caused fires?
- Neighborhood has power lines attached to trees still. What's the voltage of the lines in different locations? Is risk based on the voltage? Is it possible to underground the lines?
- No real flooding issues. The key hazard here is really fire. Perhaps also earthquakes.
- Fuel reduction, water suppression opportunities. Tom's Place resort would also be interested in hearing what's happening with this project.
- Probably a big range in terms of awareness of preparedness and evacuation strategies. Most residents have been around 15+ years.
- Folks are generally aware of evacuation routes, have annual meetings, and cover this information.
- Assuming we make a FireSafe Council – would likely include LowerRock Creek tract. 70-130 homes. Major fuels reduction concern.
- Provided email: Andy Selters – info@andyselters.com. Send existing CWPP.

September 29 – Mammoth Lakes 9am

- Karen, Wheeler Crest Firesafe Council (20 miles south near Swall Meadows. Swall community and Paradise community, 200 homes or so. Active, got going after the Round fire. Just got a grant from CalFire to do their own CWPP. Want to work together to make. *will share info on the consultants they are working with)
- Austin, Transportation planner with Caltrans district 9
- Greg, Caltrans, Maintenance manager (which includes Inyo, Mono, and E. Kern, 30 years here)
- Chris, water district HR Risk Analyst. Keeps track of the districts plans
- Wendy, county staff
- Scott, county staff

- Karla: education comment, train for the types of things you'd do without
- Karen: 2nd home owners, full-time, tourists, Airbnb,. A lot of those people aren't in the loop about how to be fire safe. Raising awareness to all those groups. And how to be realistic about what kind of help can get to them, and how personally prepared they need to be if a big one comes along.
- Caltrans: Does the district have documentation or mapping of hazards that effect the roads? Yes, but would have to look up where. Winter impacts.
- Biggest issue is no alternative routes, which CHP gives a lot of pressure on but we close even with high winds.
- Also District 9 is a really big district. Just hired a 2nd PIO to help do public information notices for this very big district.
- They use wind monitors and videos in certain locations. The cell/radio signal problem impacts the updates of that information
- 167, community summit.
- RW information system, working to get more of that in place
- Caltrans and CHP work together to make the call of when to shut down roads
- Wind socks are just used as indicators to drivers of which direction the wind is blowing. Flashers are useful. Need more in high issue areas
- Karen: would like to see a comprehensive look at all the hazards and identification of who is responsible for dealing with each of those hazards and who in government are the contact points to communities. Also clarity on what is the responsibilities of the community vs the government

- Greg: agreements with local governments so we can take action without liability . Caltrans is not supposed to even go off their own roads to plow. They have also stepped in for a couple areas that they are not technically responsible to help. They have the resources, but end up waiting on a call to cross the line.
- Highway 6 flooded the Tri-Valley area. DWP and the District were involved and got through it. Hammel—had a lot of flooding.
- Swall, needs to coordinate closely between the council.
- In that fire, there was an issue because it started in Inyo and then jumped into Mono.
- Highway 6 also has wind issues too
- Blowing dust in the Tri-Valley because of the farming. Air pollution control district is the enforcing agency, conservation management plans are supposed to address those. It is unclear how much those have helped. Power lines, wind events and fire events.
- Caltrans has a generator but ultimately has issues having enough fuel. On February 6, 2015, countywide wind event took out power. Fuel from generators.
- Caltrans has its own radios. Also have dead spots. Actively working on that.
- Dale Schmidt fire chief for Wheeler Crest area has a lot to say about communications issues. Should follow up with him.
- Code Red system has been around for a couple years and is getting better. But that doesn't help if the service is down.
- Digital 395 was a savior in a previous case. They are in last phase to complete that project. Additional improvements to it are needed in order to make it better. Local agencies haven't actually connected into the Digital 395. For instance, Caltrans uses a really old system to connect to the new wires of Digital 395.
- **Caltrans maintenance stations are all critical facilities**. Facilities are supposed to have a go bag for 72 hours but none really have fuel for that amount of time. They run out of fuel more than anything else and don't have the current capacity on site to store enough of it.
- Paradise and Swall Meadows are very dependent on Rock Creek Road which is vulnerable to a number of hazards. Frequently half of it gets closed due to flooding/run-off, storms, avalanche, etc. They have been building alternate routes (several of the "scenic loops") since the 1980s and need more of those.
- And DON'T forget the passes like SR 108. Opening and closing becomes a big effort and there are still issues of people getting stuck. Swall Meadows itself doesn't have secondary

access and Swall Meadows road is the only way into a 200-home area. There are only a few 4-wheel dirt roads through forest service land.

- We haven't talked much about tourist population, which is usually invisible to demographics data. The percentage of the Town at any given time is huge and many of them are not English speakers. There is usually a lot of freight and goods movement coming through. Caltrans is doing a study on dealing with additional goods movement.
- Karen: they have a really popular bike trail. Biker sparked a fire by cheat grass getting hit by a spark. It is super flammable. Should we be closing recreational trails use in very extreme fire danger times?
- Greg: Caltrans meets regularly with SCE, DWP to discuss. A lot of issues with dams. They kicked out the recreational users at the time the dam was an issue.
- Could the "red flag" fire day warnings be informational but also trigger a set of actions such as shutting down areas or certain activities?
- What about native plant restoration? Seed mix. Need to be careful about what seeds to use and is a long-term process. Serious invasive weeds are increasing fire danger. Information to local property owners on preferred plants is needed. Revegetation efforts any time the ground is being disturbed.
- BEAR reports. Forest service reports after a major fire to evaluate.
- Ideal capabilities: In a perfect world the Forest Service would exchange land for private properties in avalanche areas, and make that open space. In a perfect world, we have a way to control how much foreign vegetation comes in. Just to clean a culvert, Caltrans need to wait several weeks and get a conservation evaluation
- CalFire never comes back to check on its regulations/rules. Further enforcement is needed. Property owners that are away aren't doing the frequent maintenance around their homes that needs to be done. What enforcement processes are in place?? Anything?
- Swall's parcel based CWPP. Deer Creek consultant will be doing a parcel-by-parcel evaluation and rating system and will be using the same criteria that CalFire uses.
- SNC grant to June Lake to take out dead trees.
- There is an issue of getting insurance for property owners after the maps come out. Has been especially true for June Lake. There needs to be better awareness of what insurance options are. Raise awareness of what you should be looking for in home insurance.

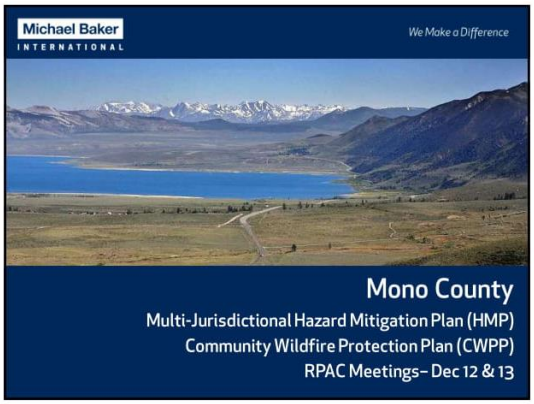
B.4.2 RPAC Meetings – December 12-13, 2017

AGENDA: RPAC Meetings

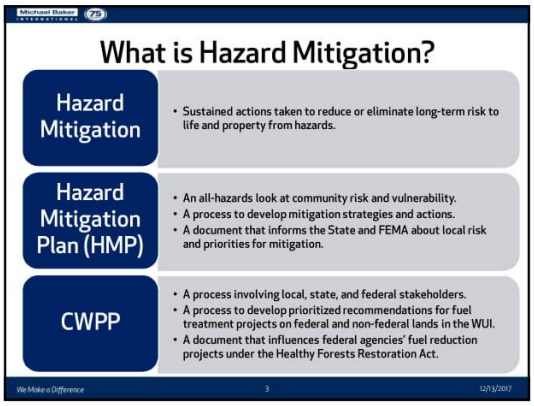
MONO COUNTY MULTI-JURISDICTIONAL LOCAL HAZARD MITIGATION PLAN

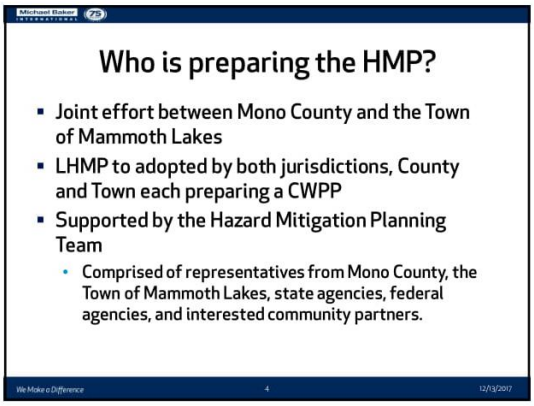
December 12 & 13, 2017

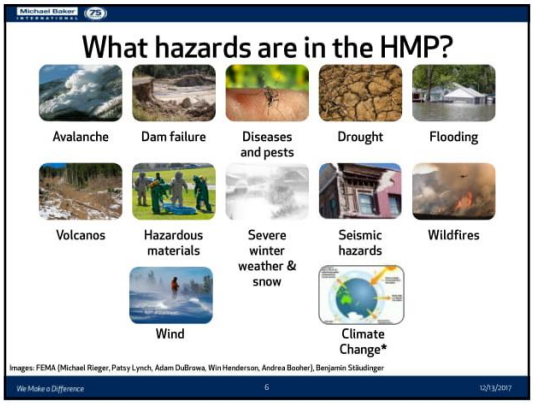
1. **Introductions**
2. **What is Hazard Mitigation?**
3. **Hazards in the HMP**
    a. Hazard profile
    b. Risk Assessment
4. **Hazard Areas Relevant to Area**
    a. Bridgeport Valley (Dec 12th)
    b. Mono Basin (Dec 13th)
5. **Project Schedule**
6. **Questions and Comments**

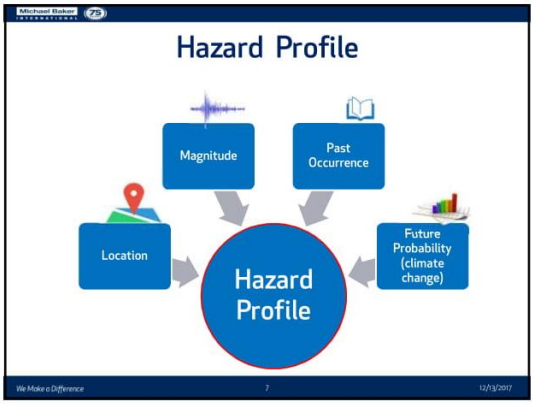

Michael Baker
INTERNATIONAL
We Make a Difference
Mono County
Multi-Jurisdictional Hazard Mitigation Plan (HMP)
Community Wildfire Protection Plan (CWPP)
RPAC Meetings– Dec 12 & 13

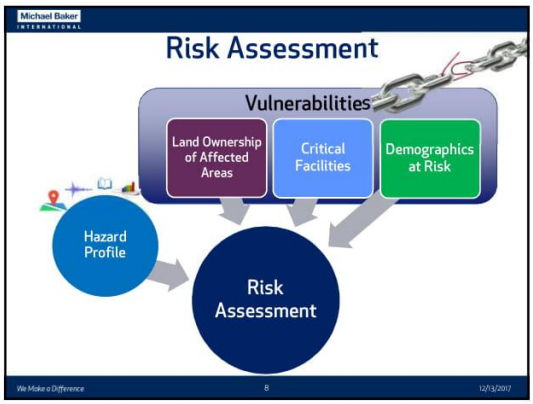

What is Hazard Mitigation?
Preparedness
DISASTER
Response
Recovery
Mitigation
RESILIENCY
We Make a Difference
2
12/13/2017

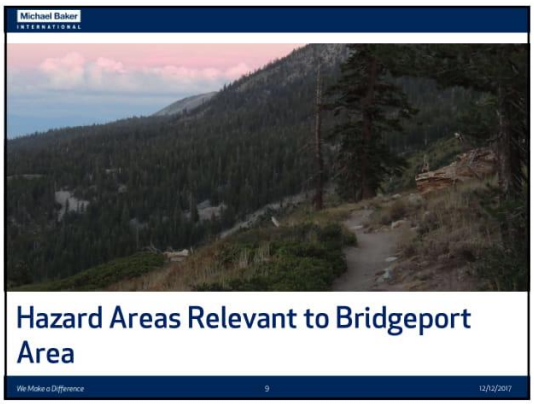

What is Hazard Mitigation?
Hazard Mitigation
• Sustained actions taken to reduce or eliminate long-term risk to life and property from hazards.
Hazard Mitigation Plan (HMP)
• An all-hazards look at community risk and vulnerability.
• A process to develop mitigation strategies and actions.
• A document that informs the State and FEMA about local risk and priorities for mitigation.
CWPP
• A process involving local, state, and federal stakeholders.
• A process to develop prioritized recommendations for fuel treatment projects on federal and non-federal lands in the WUI.
• A document that influences federal agencies' fuel reduction projects under the Healthy Forests Restoration Act.
We Make a Difference
3
12/13/2017


Who is preparing the HMP?
▪ Joint effort between Mono County and the Town of Mammoth Lakes
▪ LHMP to adopted by both jurisdictions, County and Town each preparing a CWPP
▪ Supported by the Hazard Mitigation Planning Team
• Comprised of representatives from Mono County, the Town of Mammoth Lakes, state agencies, federal agencies, and interested community partners.
We Make a Difference
4
12/13/2017

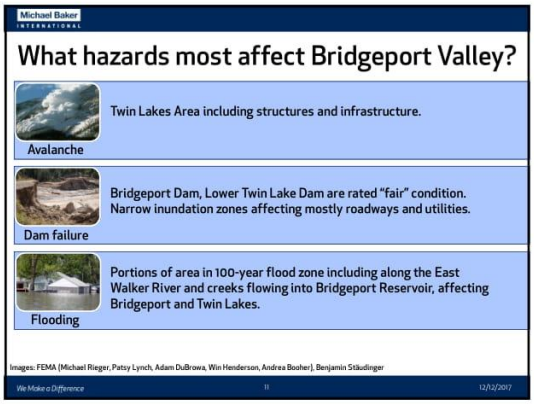

What hazards are in the HMP?
Avalanche
Dam failure
Diseases and pests
Drought
Flooding
Volcanos
Hazardous materials
Severe winter weather & snow
Seismic hazards
Wildfires
Wind
Climate Change*
Images: FEMA (Michael Rieger, Patsy Lynch, Adam DuBrowa, Win Henderson, Andrea Booher), Benjamin Stäudinger
We Make a Difference
6
12/13/2017


Hazard Profile
Magnitude
Past Occurrence
Location
Hazard Profile
Future Probability (climate change)
We Make a Difference
7
12/13/2017


Michael Baker INTERNATIONAL
Risk Assessment
Vulnerabilities
Land Ownership of Affected Areas
Critical Facilities
Demographics at Risk
Hazard Profile
Risk Assessment
We Make a Difference
8
12/13/2017


Michael Baker INTERNATIONAL
Hazard Areas Relevant to Bridgeport Area
We Make a Difference
9
12/12/2017


Michael Baker INTERNATIONAL
What hazards affect Bridgeport Valley?
Avalanche
Dam failure
Diseases and pests
Drought
Flooding
Volcanos
Hazardous materials
Severe winter weather & snow
Seismic hazards
Wildfires
Climate Change*
All of them! But some more than others
We Make a Difference
10
12/12/2017


Michael Baker INTERNATIONAL
What hazards most affect Bridgeport Valley?
Avalanche
Twin Lakes Area including structures and infrastructure.
Dam failure
Bridgeport Dam, Lower Twin Lake Dam are rated "fair" condition. Narrow inundation zones affecting mostly roadways and utilities.
Flooding
Portions of area in 100-year flood zone including along the East Walker River and creeks flowing into Bridgeport Reservoir, affecting Bridgeport and Twin Lakes.
Images: FEMA (Michael Rieger, Patsy Lynch, Adam DuBrowa, Win Henderson, Andrea Booher), Benjamin Stäudinger
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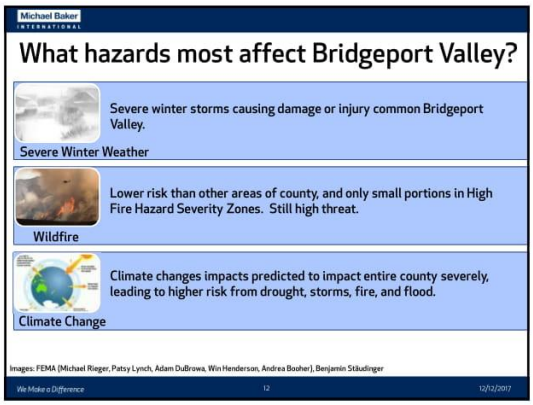
11
12/12/2017


Michael Baker INTERNATIONAL
What hazards most affect Bridgeport Valley?
Severe winter storms causing damage or injury common Bridgeport Valley.
Severe Winter Weather
Lower risk than other areas of county, and only small portions in High Fire Hazard Severity Zones. Still high threat.
Wildfire
Climate changes impacts predicted to impact entire county severely, leading to higher risk from drought, storms, fire, and flood.
Climate Change
Images: FEMA (Michael Rieger, Patsy Lynch, Adam DuBrowa, Win Henderson, Andrea Booher), Benjamin Stäudinger
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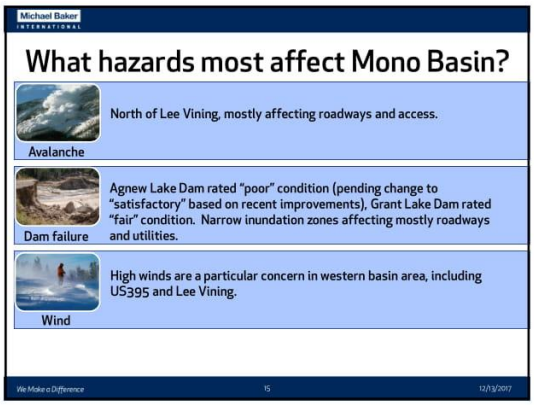
12
12/12/2017


Michael Baker INTERNATIONAL
What hazards most affect Mono Basin?
Avalanche
North of Lee Vining, mostly affecting roadways and access.
Dam failure
Agnew Lake Dam rated "poor" condition (pending change to "satisfactory" based on recent improvements), Grant Lake Dam rated "fair" condition. Narrow inundation zones affecting mostly roadways and utilities.
Wind
High winds are a particular concern in western basin area, including US395 and Lee Vining.
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15
12/13/2017

What hazards most affect Mono Basin?

Severe winter storms and heavy snow common throughout the basin.

Severe Winter Weather

Portions of area west of Lee Vining and South of SR-120 in High Fire Hazard Severity Zone.

Wildfire

Climate changes impacts predicted to impact entire county severely, leading to higher risk from drought, storms, fire, and flood.

Climate Change

Images: FEMA (Michael Rieger, Patsy Lynch, Adam DuBrowa, Win Henderson, Andrea Booher), Benjamin Stäudinger

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Project Schedule

Event	Topics	Timeframe
Project Kickoff	Initial Meeting with County/Town Staff	June 2017
Stakeholder Meetings	Information Gathering & Awareness	Sep 29-30, 2017
Planning Team Meeting & RPAC Meetings & Town PC	Hazard Profiles & Risk Assessment	Dec 12-13, 2017
Planning Team Meeting & RPAC Workshop	Mitigation Actions & Draft Plan Presentation	Jan 24-25, 2018
Public Review MJHMP	Public Review of Document	March 2018
Submit to Cal OES/FEMA	Cal OES/FEMA Review of Document	April 2018
Final MJHMP	Public Hearing & Adoption	May 2018

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Questions/Comments?

Project Website:
https://www.monocounty.ca.gov/planning/page/local-hazard-mitigation-plan-2017-update

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Jeff Henderson
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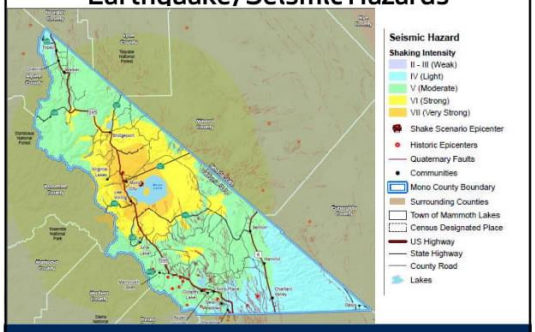
Earthquake/Seismic Hazards



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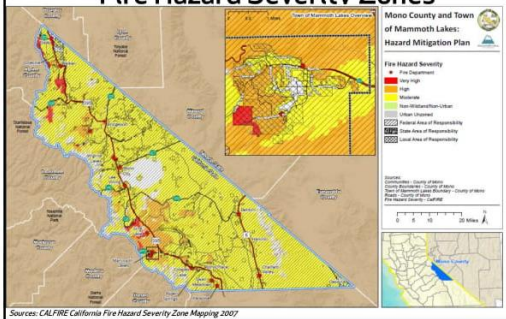
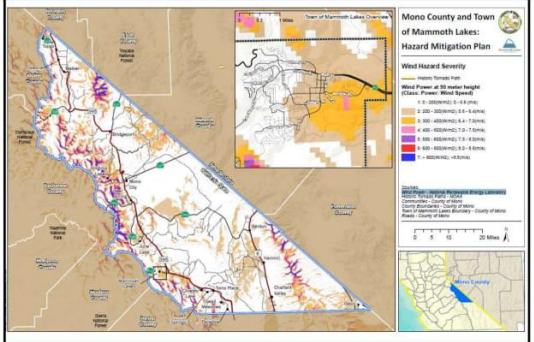
Fire Hazard Severity Zones

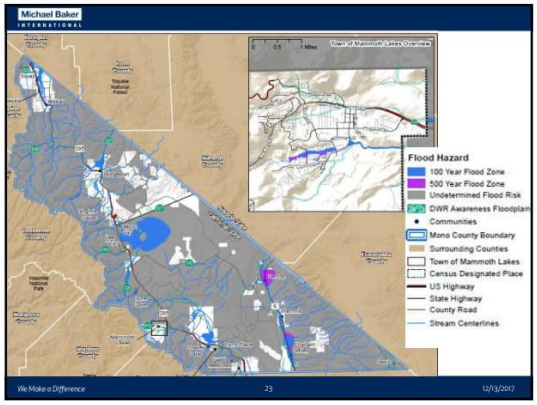


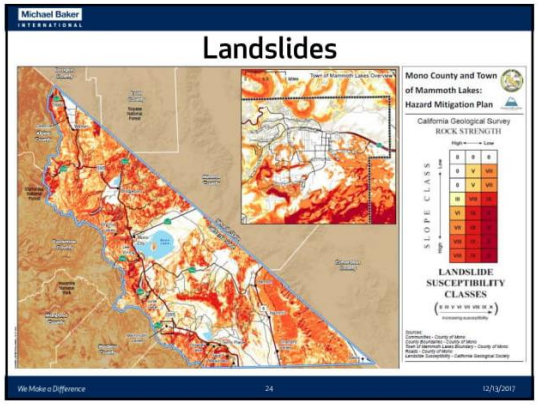
Sources: CALFIRE California Fire Hazard Severity Zone Mapping 2007

We Make a Difference 21 12/13/2017



We Make a Difference 22 12/13/2017





Meeting Notes -December RPAC Mtgs

December 12 - Bridgeport RPAC

- HMP Overview presentation
- Question: Live near Bridgeport Reservoir – what would happen if the Dam for Twin Lakes were to breach? Is there enough capacity in Bridgeport Reservoir to accommodate?
    - Modeling doesn't account for multiple, secondary failures.
- How do we see the Hazard Mitigation Plan integrating with the EOP, and Continuation of Services plan?
    - Types of plans have to do with where in the emergency management cycle they occur.

December 13 - Mono Basin RPAC

- Race Communication fiber optic cable. Work would be owner's cost.
- Mono Basin fire safe council getting started again. Starting up monthly.
- Caltrans presentation: Lee Vining Rehab. 3R. will shut down road for a period of time. 40 year roadway improvement project visioning led by MIG
    - Rock fall issue fixed along Lee Vining roadway.
- Question to SCE: undergrounding powerlines and prioritization. Continued interest in undergrounding. Avenue from town to visitor center. Been on wish list for a long time.
    - SCE removing a distribution line.
    - Share the cost with TeleCom
    - Rural 20a funds
        - Prioritization has not been established

- HMP Overview presentation

    - June lake dams
    - Rush creek drainage has had
    - Comment on wildfire. **Just for mono basin they just put together historic fire boundaries. They committee can share that data with us.**

B.4.3 Town of Mammoth Lakes Planning Commission Hearing – December 12, 2017

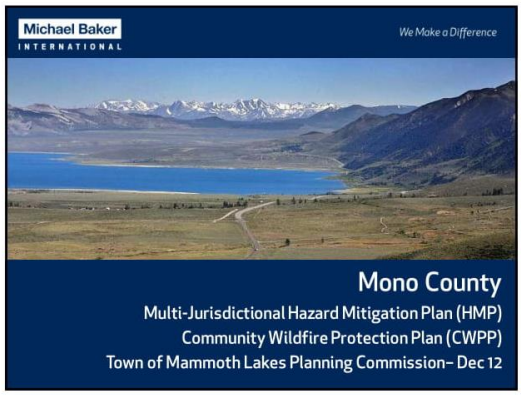
AGENDA: Town of Mammoth Lakes Planning Commission

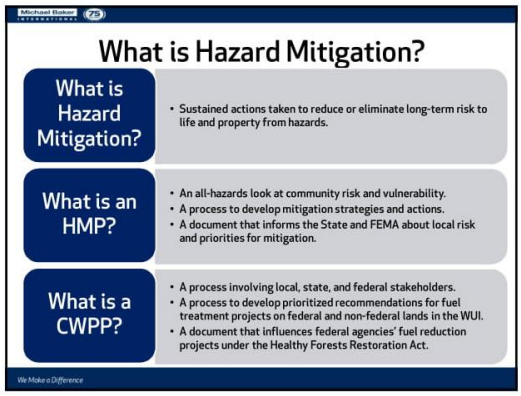
MONO COUNTY MULTI-JURISDICTIONAL LOCAL HAZARD MITIGATION PLAN

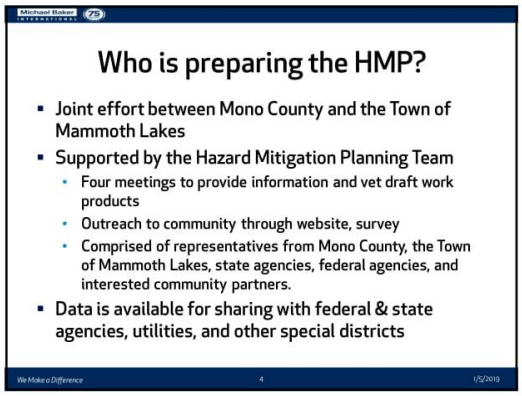
December 12, 2017

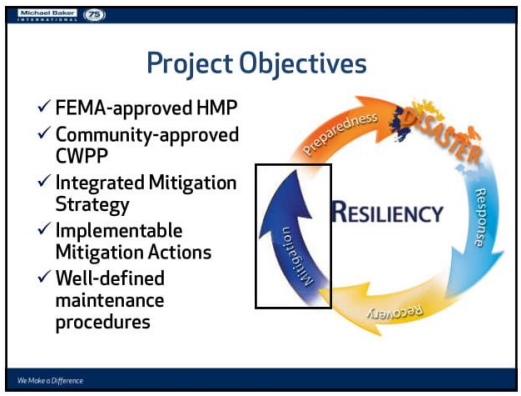
1. **What is Hazard Mitigation?**
2. **Project Objectives and Goals**
3. **Hazards in the HMP**
4. **State and Federal Requirements**
    a. HMP Requirements
    b. CWPP Requirements
5. **HMP & CWPP Development Process**
    a. Stakeholders and Outreach
    b. Hazard Areas
    c. Schedule and Timeline
6. **Questions and Comments**

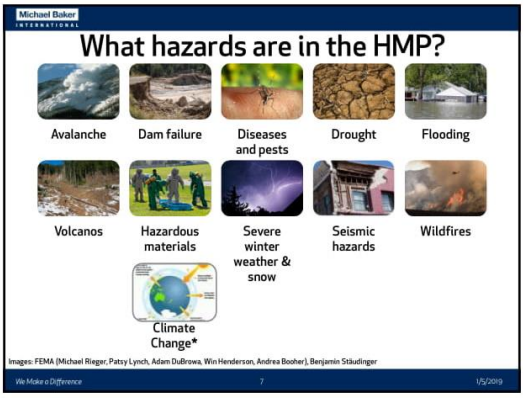
PowerPoint Presentation – Mammoth Lakes Planning Commission Hearing










Michael Baker
INTERNATIONAL
What hazards are in the HMP?
Avalanche
Dam failure
Diseases and pests
Drought
Flooding
Volcanos
Hazardous materials
Severe winter weather & snow
Seismic hazards
Wildfires
Climate Change*
Images: FEMA (Michael Rieger, Patsy Lynch, Adam DuBrowa, Win Henderson, Andrea Booher), Benjamin Stäudinger
We Make a Difference
7
1/5/2019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INTERNATIONAL
FEMA
Cal OES
State and Federal Requirements
We Make a Difference


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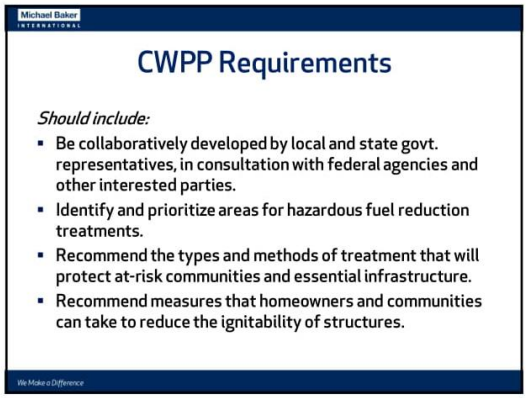
HMP Requirements
Must Describe:
How the plan was prepared
Who was involved
Opportunities for public and stakeholder involvement
Review and inclusion of existing plans, reports, studies, etc.
Continual public participation
Monitoring and updating of the plan
Must Develop:
Mitigation Strategy
We Make a Difference


Michael Baker
INTERNATIONAL
CWPP Requirements
Should include:
Be collaboratively developed by local and state govt. representatives, in consultation with federal agencies and other interested parties.
Identify and prioritize areas for hazardous fuel reduction treatments.
Recommend the types and methods of treatment that will protect at-risk communities and essential infrastructure.
Recommend measures that homeowners and communities can take to reduce the ignitability of structures.
We Make a Difference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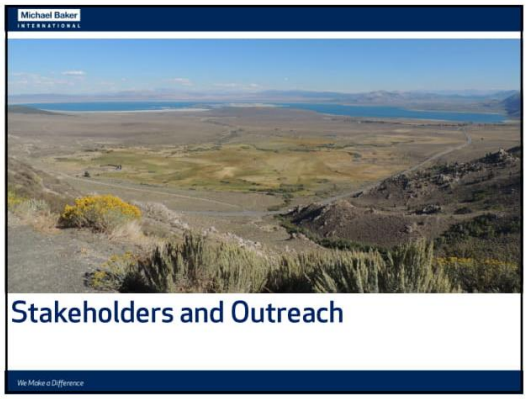
HMP & CWPP Development Process
We Make a Difference


Michael Baker
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Stakeholders and Outreach
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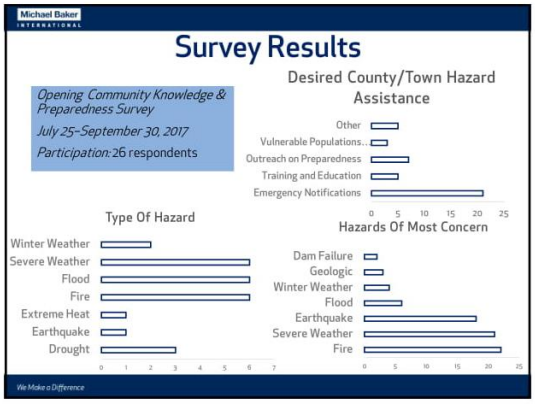
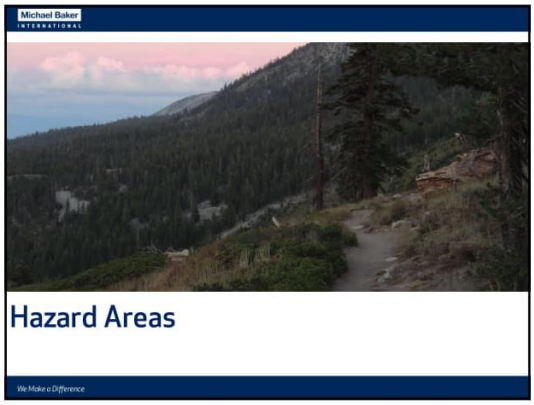
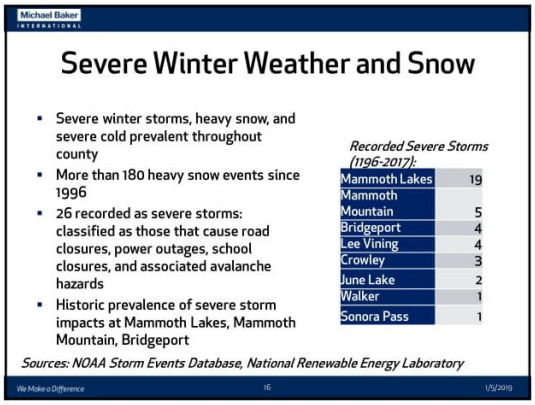
Stakeholders
Property Owners (Private/Agency)
Local/Tribal Governments
Special Districts
State and Federal Agencies
Stakeholders
Private Businesses and Nonprofits
We Make a Difference


Michael Baker
Survey Results
Opening Community Knowledge & Preparedness Survey
July 25-September 30, 2017
Participation: 26 respondents
Desired County/Town Hazard Assistance
Other
Vulnerable Populations
Outreach on Preparedness
Training and Education
Emergency Notifications
Type Of Hazard
Winter Weather
Severe Weather
Flood
Fire
Extreme Heat
Earthquake
Drought
Hazards Of Most Concern
Dam Failure
Geologic
Winter Weather
Flood
Earthquake
Severe Weather
Fire
We Make a Difference


Michael Baker
Hazard Areas
We Make a Difference


Michael Baker
Severe Winter Weather and Snow
Severe winter storms, heavy snow, and severe cold prevalent throughout county
More than 180 heavy snow events since 1996
26 recorded as severe storms: classified as those that cause road closures, power outages, school closures, and associated avalanche hazards
Historic prevalence of severe storm impacts at Mammoth Lakes, Mammoth Mountain, Bridgeport
Recorded Severe Storms (1196-2017):
Mammoth Lakes 19
Mammoth Mountain 5
Bridgeport 4
Lee Vining 4
Crowley 3
June Lake 2
Walker 1
Sonora Pass 1
Sources: NOAA Storm Events Database, National Renewable Energy Laboratory
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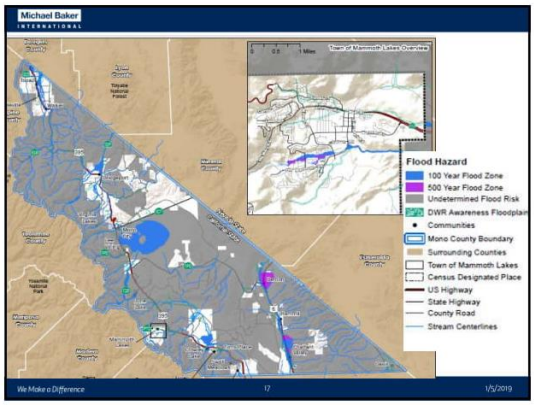
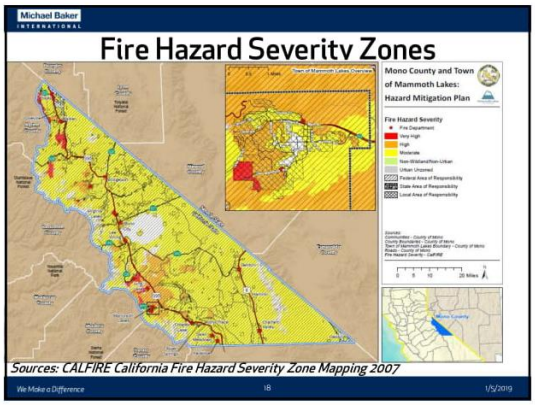
16
1/5/2019


Michael Baker
Flood Hazard
100 Year Flood Zone
500 Year Flood Zone
Undetermined Flood Risk
DWR Awareness Floodplain
Communities
Mono County Boundary
Surrounding Counties
Town of Mammoth Lakes
Census Designated Place
US Highway
State Highway
County Road
Stream Centerlines
We Make a Difference
17
1/5/2019


Michael Baker
Fire Hazard Severity Zones
Mono County and Town of Mammoth Lakes: Hazard Mitigation Plan
Fire Hazard Severity
Sources: CALFIRE California Fire Hazard Severity Zone Mapping 2007
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1/5/2019

Affected Area

Natural Hazard	Acres	%
Dam failure	427	2.70%
Flood (100-year)	447	2.80%
Flood (500-year)	338	2.10%
Fault rupture	476	3.00%
Wildfire (very high risk)	5,402	33.71%
Wildfire (high risk)	427	2.70%
Wildfire (moderate risk)	447	2.80%

Schedule and Timeline

Event	Topics	Timeframe
Project Kickoff	Initial Meeting with County/Town Staff	June 2017
Stakeholder Meetings	Information Gathering & Awareness	Sep 29-29, 2017
Planning Team Meeting & RPAC Meetings & Town PC	Hazard Profiles & Risk Assessment	Dec 12-13, 2017
Planning Team Meeting & RPAC Workshop	Mitigation Actions & Draft Plan Presentation	Jan 17, 2018
Public Review MJHMP	Public Review of Document	March 2018
Submit to Cal OES/FEMA	Cal OES/FEMA Review of Document	April 2018
Final MJHMP	Public Hearing & Adoption	May 2018

Questions/Comments?

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Wendy Sugimura
wsugimura@mono.ca.gov
760-924-1814

Jeff Henderson
jhenderson@mbakerintl.com
916-231-3371

B.4.4 Fire Chiefs Meeting – December 13, 2017

AGENDA: Fire Hazard Stakeholder Meeting

MONO COUNTY MULTI-JURISDICTIONAL LOCAL HAZARD MITIGATION PLAN

December 13, 2017

1. **Introductions**
2. **Review Agenda and Meeting Objectives**
3. **Presentation: Overview of Project**
    a. Project objectives
    b. Hazard profile and vulnerabilities assessment process
    c. Fire hazard assessment results
4. **Community infrastructure needs review**
5. **Draft CWPP measure review and input**
6. **Project Schedule**
7. **Questions and Comments**

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Mono County

Multi-Jurisdictional Hazard Mitigation Plan (HMP)
Community Wildfire Protection Plan (CWPP)
Fire Chiefs & Stakeholders Meeting– December 13, 2017

Agenda

- Present draft wildfire hazard profile
- Present risk assessment and vulnerabilities
- Measures and project list discussion

We Make a Difference 2 12/13/2017

Who is preparing the HMP/CWPP?

- Joint effort between Mono County and the Town of Mammoth Lakes
- LHMP to adopted by both jurisdictions, CWPP by Mono County only
- Supported by the Hazard Mitigation Planning Team
  - Four meetings to provide information and vet draft work products
  - Outreach to community through website, survey
  - Comprised of representatives from Mono County, the Town of Mammoth Lakes, state agencies, federal agencies, and interested community partners.
- Data is available for sharing with Federal& State Agencies, utilities, and other special districts

We Make a Difference 3 12/13/2017

Project Goals

- Influence over where/how federal agencies implement projects
- Incorporate risk/mitigation into other local plans
- Inform and gain input/support from stakeholders/communities
- Evaluate changing risks from development and climate change

We Make a Difference 4 12/13/2017

Strategies: HMP vs CWPP

LHMP

- Mitigation focused Measures
- Action Plan

CWPP

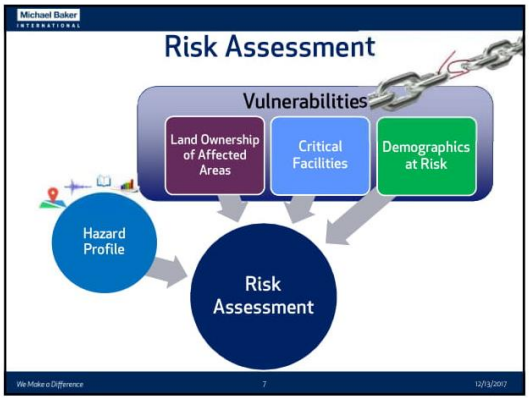
- Measures for mitigation, preparedness, and response for WUI
- Project List for fuel reduction, prioritized by communities at most risk in WUI

We Make a Difference 5 12/13/2017

MJHMP Hazards

- Avalanche/debris flow
- Dam failure
- Disease/pest management
- Drought
- Earthquake/ seismic hazards
- Flood
- Hazardous materials
- Landslide
- Severe wind
- Severe winter weather & snow
- Volcano
- Wildfire
- Climate change*

We Make a Difference 6 12/13/2017


Michael Baker
INTERNATIONAL
Risk Assessment
Vulnerabilities
Land Ownership of Affected Areas
Critical Facilities
Demographics at Risk
Hazard Profile
Risk Assessment
We Make a Difference
7
12/13/2017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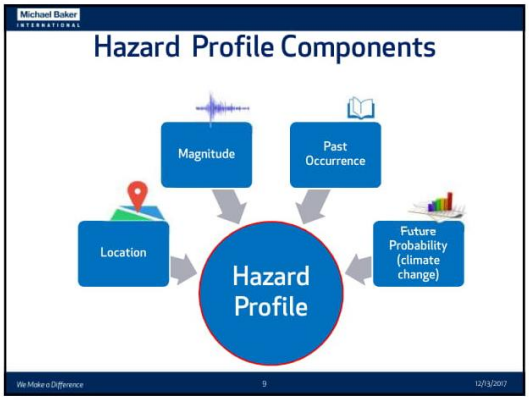
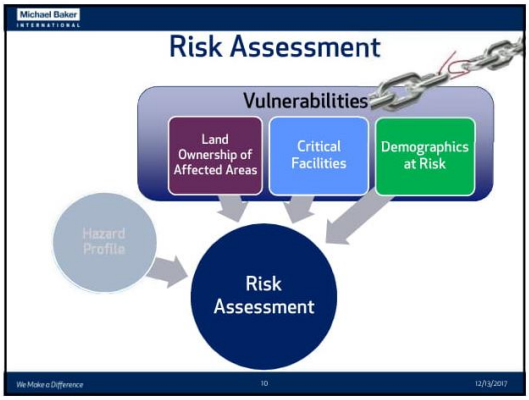
Risk Assessment
Hazard Profile
Risk Assessment
We Make a Difference
8
12/13/2017


Michael Baker
INTERNATIONAL
Hazard Profile Components
Magnitude
Past Occurrence
Location
Future Probability (climate change)
Hazard Profile
We Make a Difference
9
12/13/2017


Michael Baker
INTERNATIONAL
Risk Assessment
Vulnerabilities
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Critical Facilities
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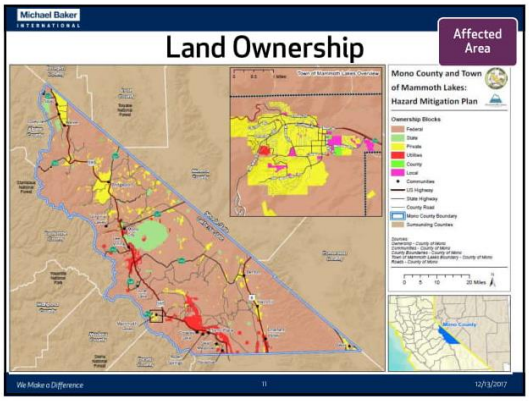
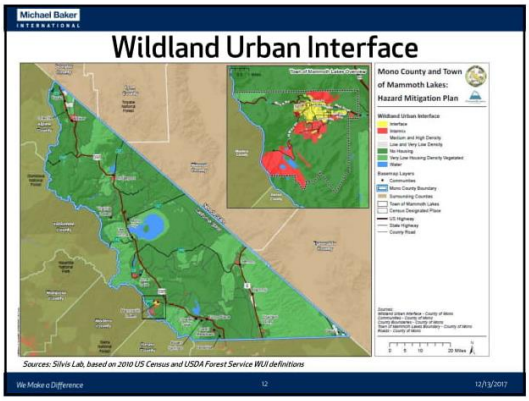
Hazard Profile
Risk Assessment
We Make a Difference
10
12/13/2017


Michael Baker
INTERNATIONAL
Land Ownership
Affected Area
Mono County and Town of Mammoth Lakes: Hazard Mitigation Plan
We Make a Difference
11
12/13/2017


Michael Baker
INTERNATIONAL
Wildland Urban Interface
Mono County and Town of Mammoth Lakes: Hazard Mitigation Plan
Sources: Silvis Lab, based on 2010 US Census and USDA Forest Service WUI definitions
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12/13/2017

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Planning Areas & Urban Communities

Affected Area

Planning Area	Communities	Advisory Body
Antelope Valley	Topaz, Coleville, Walker	Antelope Valley Fire District
Benton Valley	Benton	White Mountain Special Fire District
Bodie Hills	Dispersed properties	
Bridgeport	Bridgeport	Bridgeport Fire Protection District; Mountain Warfare Fire Division; Marine Corps Mountain Warfare Fire Dpt.
Chalfant	Chalfant	Chalfant Valley Fire Department
Hammil	Hammil	White Mountain Special Fire District
June Lake	June Lake, Crestview	June Lake Fire Department
Crowley	Crowley Lake, Aspen Springs, Sunny Slopes, McGee Creek, Tom's Place	Long Valley Fire Protection District
Mammoth Vicinity	Dispersed properties	
Mono Basin	Mono City, Lee Vining	Mono City Special Fire District; Lee Vining Volunteer Fire Department
Oasis	Oasis	
Paradise	Paradise	Paradise Special Fire District
Sonora Junction	Marine Corps MWTC	
Swauger Creek	Dispersed properties	
Upper Owens	Dispersed properties	
Wheeler Crest	Wheeler Crest, Swall Meadows	Wheeler Crest Special Fire District
No Planning Area	Virginia Lakes, Lundy Lake	

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Planning Areas & Urban Communities

Affected Area

Source: Mono County General Plan Maps

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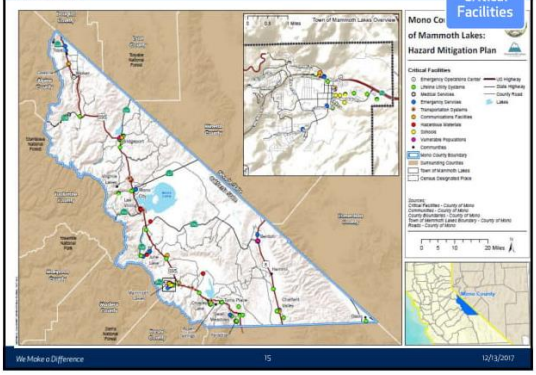
Critical Facilities



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Socially Vulnerable Populations

Demographics at risk

- Data available from Census population surveys, only for hazards with official location-specific zones

Topic	Indicators
Education Level	Population over age 25 with less than a high school education
Income	Making less than 80% of their county's median family income
Median HH Income	Median household income
Poverty	Households at or below federal poverty level
Employment	Population over the age of 16 that is unemployed and eligible for the labor force
Linguistic Isolation	Households where no one over age 14 speaks English well
Elderly	Households with members over 65
Disability	Households with a disabled member
Total Population	Total population

Source: 2015 5-year ACS

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Wildfires: Affected Area

- 151,984 acres in high and 31,763 acres in very high risk areas
- Biggest risks to Mammoth Lakes, June Lake Area, Walker
  - 53% of land owned by Town in zones

Fire Hazard Elements:

- **Vegetation** - Considers potential vegetation over 50 years.
- **Topography** - Fire burns faster on steep slopes.
- **Weather** - Fire burns faster and with more intensity when air temperature is high, relative humidity is low, and winds are strong.
- **Crown fire potential** - Under extreme conditions, fires burn up into trees and tall brush.
- **Ember production and movement** - Fire brands are blown ahead of the main fire.

Leads to likelihood of an area burning over a 30 - 50 year time period.

NOT a measure of risk to life or property

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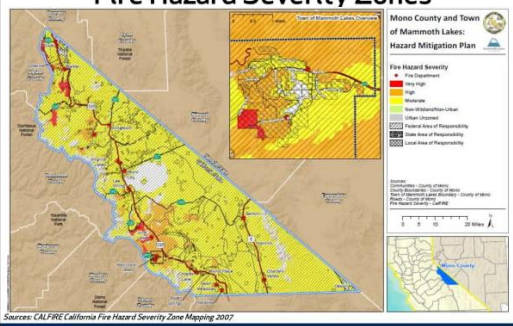
Fire Hazard Severity Zones



Sources: CALFIRE California Fire Hazard Severity Zone Mapping 2007

Land Ownership Category	Acres in High Hazard Zone	Acres in Very High Hazard Zone	% acres in Categories
Federal	131,194	27,671	9.2%
State	3,140	2,565	6.8%
County	52	138	8.4%
Local	114	0	53.3%
Utilities	8,308	126	12.6%
Right of way	1,204	361	17.5%
Private	7,972	902	6.9%

Source: CALFIRE 2007 California Fire Hazard Severity Zone Maps, Mono County GIS

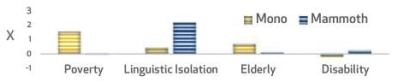
Critical Facility Type	Hazard Class	
	High	Very High
Communications Facilities	3	0
Emergency Operations Center	5	0
Emergency Services	7	2
Lifeline Utility Systems	10	1
Medical Services	3	0
Transportation Systems	3	0
Vulnerable Populations	1	0
Hazardous Materials	0	1

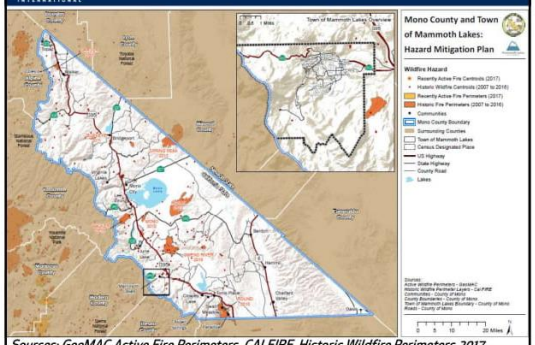
Planning Area	Acres in H& VH	% PA
Mammoth Vicinity	53,912	43.4%
June Lake	20,629	38.9%
Swauger Creek	663	35.0%
Mono Basin South	1,979	27.9%
Long Valley	3,649	20.2%
Sonora Junction	18,673	16.3%
Bridgeport	3,000	5.8%
Antelope Valley	1,279	4.3%
Wheeler Crest	244	4.2%
Mono Basin North	268	0.9%

Wildfires Social Vulnerability

Social Vulnerability Metric	In High or very high fire hazard zone	
	Mono County	Mammoth Lakes
Poverty	67	34
Linguistic Isolation	14	182
Elderly	292	170
Disability	537	136
Total population	1,452	2,397
Households	537	930

% of populations within zones compared to whole jurisdiction

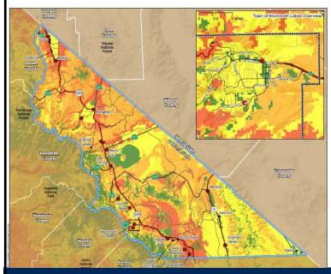




Sources: GeoMAC Active Fire Perimeters, CALFIRE Historic Wildfire Perimeters 2017

Wildfire Threat

Wildfire threat model is a composite index of fire threat that reflects both the chance of wildfires (expected fire frequency) and the prevailing potential fire behavior.



Predicated on frequency of fire weather, ignition patterns, expected rate of spread, and past fire history.

Fire Threat
Little or No Threat
Moderate
High
Very High
Extreme
Fire Department
Communities
US Highway
State Highway
County Road
Mono County Boundary
Surrounding Counties
Town of Mammoth Lakes
Census Designated Place

Source: CALFIRE 2014 Fire Threat

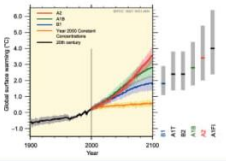
Climate Change

Hazards profiles likely to change:

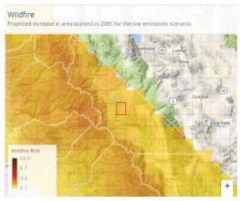
- Wildfire (heat, eco-system changes, lower precipitation)
- Drought (lower precipitation)
- Flood (stronger storms)
- Severe winter storms (stronger storms)
- Disease (eco-system changes

Data Sources:

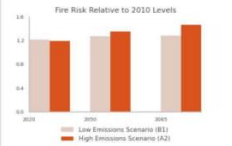
- Cal-Adapt
- NOAA Climate Resilience Toolkit
- California Hazard Mitigation Plan



Climate Change Impacts on Wildfire



	2020	2050	2085
Low Emission Scenario:	1.22	1.27	1.29
High Emission Scenario:	1.2	1.35	1.47



Wildfire Infrastructure Needs by community

Infrastructure Lacking	Lake Mary Area	Old Mammoth	Clark Tract	The Bridges/Greyhawk	Valley Vista	Snow Creek	North Mammoth Lakes	Sierra Valley Estates	Eastside Slope	Walker	Swauger Creek	Twin Lakes/Virginia Lakes	Rancheria	Aurora Canyon	Lundy Canyon	Evans Tract Area	Mono City	June Lake	Silver Lake	Convict Lake/SNARL	Juniper Loop	Sunny Slopes	Aspen Springs	McGee Creek/Long Valley	Hilton Creek	Chalfant Valley	Swall Meadows	Paradise
One way in and out	x	x		x	x	x			x		x	x		x	x			x	x	x		x	x		x		x	x
Overhead powerlines		x	x		x		x	x	x			x		x	x	x	x	x				x	x			x	x	
Adequate water supply or pressure				x								x	x				x				x					x		
Adequate addressing			x		x	x			x		x					x	x	x	x		x			x		x	x	

Mammoth Lakes

Draft CWPP Measure Review

- Categorize each measure:
  - Low, medium or high priority; or
  - Completed
  - Remove/not important

Schedule Review

Event	Topics	Time Frame
Project Kickoff	Initial Meeting with County/Town Staff	June 2017
Stakeholder Meetings	Information Gathering & Awareness	Sep 29-29, 2017
Planning Team Meeting & RPAC Meetings & Town PC	Hazard Profiles & Risk Assessment	Dec 12-13, 2017
Planning Team Meeting & RPAC Workshop	Mitigation Actions & Draft Plan Presentation	Jan 17, 2018
Public Review MJHMP	Public Review of Document	March 2018
Submit to Cal OES/FEMA	Cal OES/FEMA Review of Document	April 2018
Final MJHMP	Public Hearing & Adoption	May 2018

Timeline/Next Steps

- Finalize data collection (particularly corrections to planning area or critical facilities) [NOW]
- Outreach/engagement (online survey on website) [NOW]
- Prepare draft mitigation actions and CWPP actions for review [NOW and next 2 weeks]
- Conduct LHMP team meeting #4 to review draft mitigation actions and Draft Document [January]

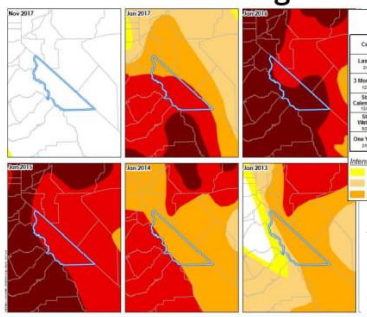
Questions/Comments?

Project Website:
https://www.monocounty.ca.gov/planning/page/local-hazard-mitigation-plan-2017-update

Wendy Sugimura
wsugimura@mono.ca.gov
760-924-1814

Jeff Henderson
jhenderson@mbakerintl.com
916-231-3371

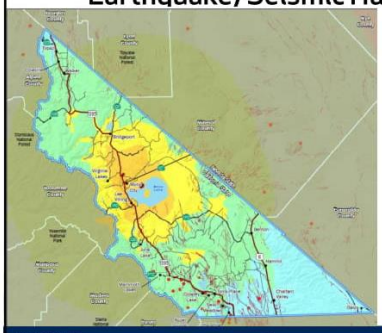
Drought



2013-2017 Comparison

Source: US Drought Monitor

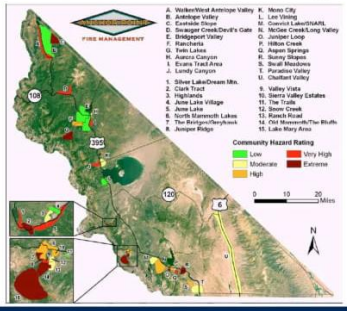
Earthquake/Seismic Hazards



Man-Made Hazards

- Wide-ranging category of substances. Some tracked by agencies, others not
- Only 1 hazardous material site identified by State Water Board, open & being evaluated
- Propane container sites/locations not available
  - Greatest risk: in transit on roadways; old and degraded tank sites
- Radon sites/locations not known but County-rated by EPA to have a predicted average indoor radon screening levels from 2 to 4 pCi/L, above safe levels of 2pCi/L

2009 CWPP WUI & Ratings



Project List Review

- Review handout of ongoing and proposed future projects.
- Identify projects missing from list or suggested new fuel reductions locations/priorities

Meeting Notes - December Fire Chiefs Mtg

- Deer Creek Resources – doing Swall Valley CWPP modeling.
- Explain differences between interface and intermix
    - Interface – communicates a harder boundary
    - Intermix – more of a mix of housing and fuels
- Any correlation between the WUI and California Building Code? Seems like there should be some correlation.
- PRC 42-90, 42-91 provides information regarding access information and egress, as well as construction methods.
- Could we base our work off of the State's WUI information (CalFIRE) – the CalFIRE maps are much older (like 2000)?
    - Overlay older CalFIRE WUI information with newer federal data and identify any major gaps – then fill gaps based on research info.
- What types of vegetation are included in areas characterized as highly flammable/fuels.
- All the vegetation types changed in 2015 due to the fires.
- Does Swall Meadows CWPP cover Paradise too? Yes; can incorporate their more precise WUI in Countywide plan if schedules allow.
- County should have all of the local fire district boundaries available. If we don't have them, ask for copy.
- Regarding table showing planning areas, communities, and related fire response providers (Slide 13):
    - If one of the local volunteer fire districts aren't covering an area, who does? Look to CalFire maps of responsibility areas. Either Local, and then the rest is mostly Federal or Forest Service
    - Mono City can provide Fire District boundary maps – does overlap with Forest Service, runs up to the end of Lundy Canyon. Dispersed, not contiguous.
    - For Wheeler Crest – there's no separate community called Wheeler Crest, just Swall Meadows.
    - No "Special" Fire Protection districts, just Districts
    - Add Pine Glade community to Crowley Planning Area
    - Not sure who covers Oasis. May be a volunteer department that serves from Nevada. Maybe Dyer?
        - Big Pines (Inyo County) may provide fire protection for Oasis. It's mostly ag uses.
        - Also consider interagency collaborations from Nevada – along 167?

- Critical facilities map and Hazard Severity Map and Fire Threat Map (Slides 15, 18, 22)
    - Clarify that roads and powerlines are critical facilities on the critical facilities map.
    - **Send the critical facilities list to County staff (Michael and Wendy) to verify.**
    - Areas N and E of Mono City are rated "moderate" but we question that – there's very high potential in this area. Mono City has all of the criteria for high fire potential except for topography.
    - Swall Meadows is doing parcel-based assessments for fire modeling.
    - Reimbursement is easier for repairs/mitigation for High and Very High FHSZs.
    - **Adjust colors between high, very high, extreme colors on Fire Threat map. And differ from color for fire stations.**
- Regarding table showing which communities have which infrastructure related problems for fire risk (Slide 25):
    - Adequate water supply: "x" both Swall Meadows and Paradise
    - Addressing: "x" for Paradise
    - Walker: "x" for all four
    - "x" for all communities on overhead powerlines
- Regarding Draft CWPP measures (handout/attachment)
    - In Measures – only LRA is Antelope Valley. Can remove WUI codes re: ignitability. A lot of these measures are already completed.
    - Measures list – add items related to water tank installation. Add 50,000g water tanks to reduce ISO ratings. Some insurance companies are cancelling insurance in the WUI.
    - 5-year plan for Topaz, Colville, Walker – get a 50,000g tank. Tank wouldn't meet scenic byway standards, went instead for smaller in-ground tanks, but also denied due to groundwater quality concerns. Mapping of hydrants? There aren't hydrants in many places.
    - Where a 5-year plan exists – or where fire districts can provide working lists of projects, that's really helpful.
    - Antelope Valley wants to remain rural – don't want urban infrastructure, but do need a water tank. Should facilitate need through the County. ~1,200 residents in Antelope Valley.
    - Under "Organizational" – We already do ops plans…
    - Eastern Sierra Fire Safe Council – not around anymore. BLM should provide a list of the firesafe councils in the County.
- Swall Meadows/Paradise – could attend Crowley RPAC for input/review of the LHMP/CWPP. There's a Firesafe Council meeting on February 5 which would be good for presentation.
- Swall Meadows emergency access road – narrowed down to Quail Circle road alternative. May need to work with residents regarding need for easement across private property to provide for road.

- Input from USFS Forester: There are opportunities for grants on anything we put into the Mono County CWPP – and grant openings are coming. Would like to see large fuel reduction projects in there, they have a better chance of being funded. House numbers, street signs, multiple ingress/egress (especially in Swall) – this needs to be setup and ready for when the Cap and Trade funding is coming.

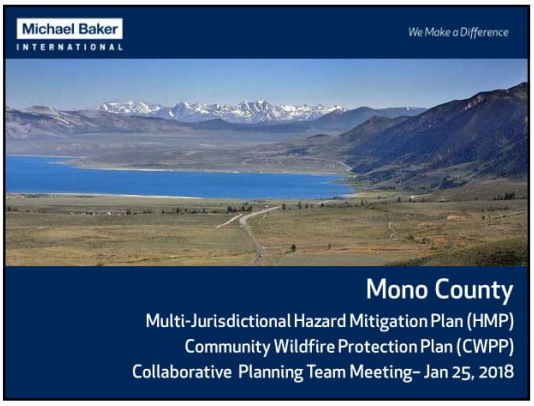
B.4.5 Collaborative Planning Team Meeting – January 25, 2018

AGENDA: Collaborative Planning Team Meeting

MONO COUNTY MULTI-JURISDICTIONAL LOCAL HAZARD MITIGATION PLAN

January 25, 2018

1. **Requirement, Purpose, and Process**
2. **Present Draft Hazard Profiles**
3. **Present Risk Assessment and Vulnerabilities**
4. **Questions and Comments**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Mono County
Multi-Jurisdictional Hazard Mitigation Plan (HMP)
Community Wildfire Protection Plan (CWPP)
Collaborative Planning Team Meeting– Jan 25, 2018


Agenda
Requirement, purpose, and process
Present draft hazard profiles
Present risk assessment and vulnerabilities
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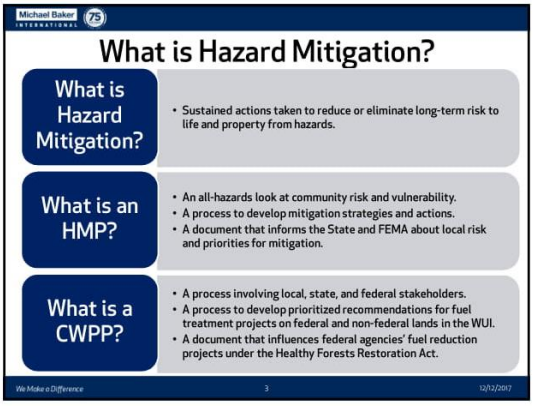
12/13/2017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Sustained actions taken to reduce or eliminate long-term risk to life and property from hazards.
What is an HMP?
An all-hazards look at community risk and vulnerability.
A process to develop mitigation strategies and actions.
A document that informs the State and FEMA about local risk and priorities for mitigation.
What is a CWPP?
A process involving local, state, and federal stakeholders.
A process to develop prioritized recommendations for fuel treatment projects on federal and non-federal lands in the WUI.
A document that influences federal agencies' fuel reduction projects under the Healthy Forests Restoration Act.
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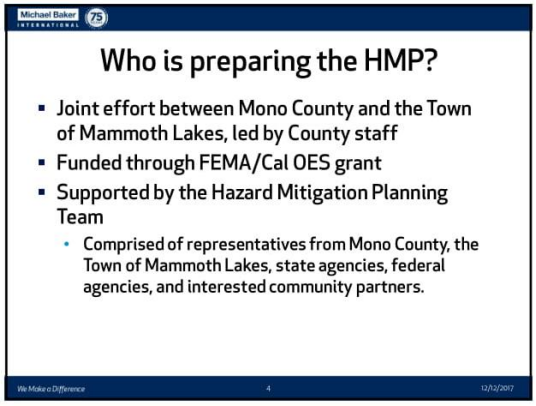
12/12/2017


Who is preparing the HMP?
Joint effort between Mono County and the Town of Mammoth Lakes, led by County staff
Funded through FEMA/Cal OES grant
Supported by the Hazard Mitigation Planning Team
Comprised of representatives from Mono County, the Town of Mammoth Lakes, state agencies, federal agencies, and interested community partners.
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Project Goals
Influence over where/how federal agencies implement projects
Incorporate risk/mitigation into other local plans
Inform and gain input/support from stakeholders/communities
Evaluate changing risks from development and climate change
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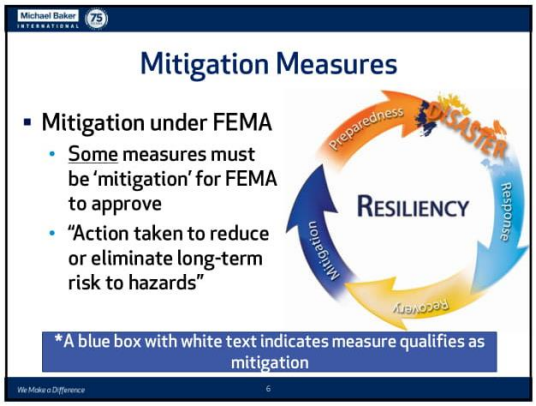
12/12/2017


Mitigation Measures
Mitigation under FEMA
Some measures must be 'mitigation' for FEMA to approve
"Action taken to reduce or eliminate long-term risk to hazards"
Preparedness
DISASTER
Response
Recovery
Mitigation
RESILIENCY
*A blue box with white text indicates measure qualifies as mitigation
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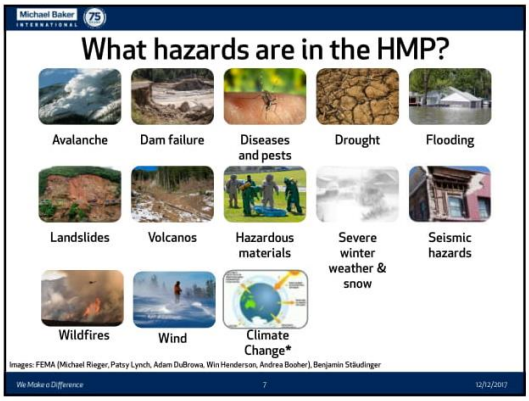
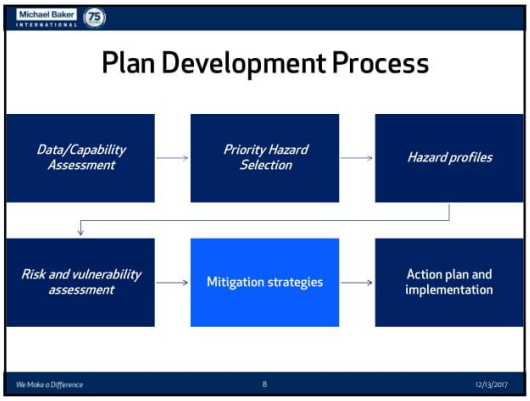
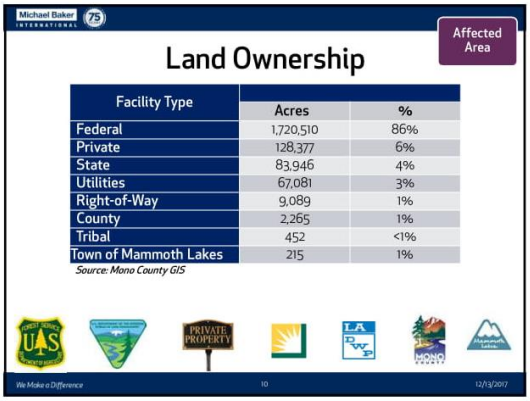
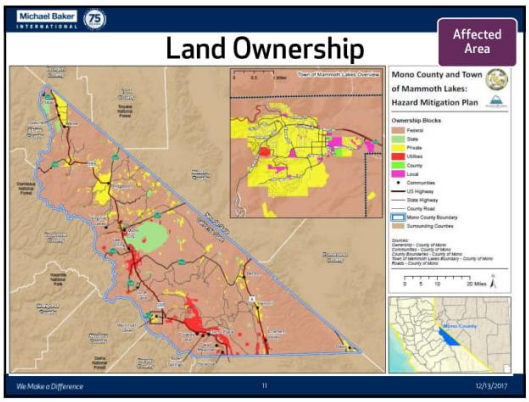


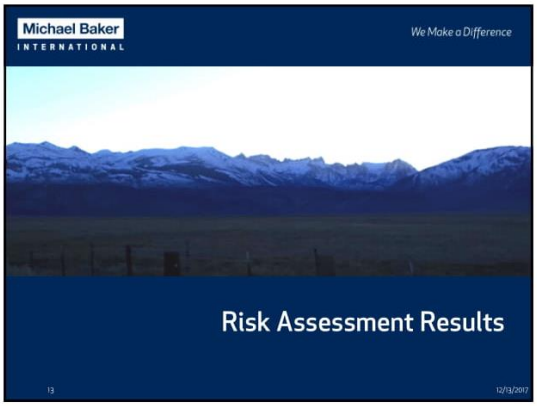




Facility Type	Acres	%
Federal	1,720,510	86%
Private	128,377	6%
State	83,946	4%
Utilities	67,081	3%
Right-of-Way	9,089	1%
County	2,265	1%
Tribal	452	<1%
Town of Mammoth Lakes	215	1%

Source: Mono County GIS

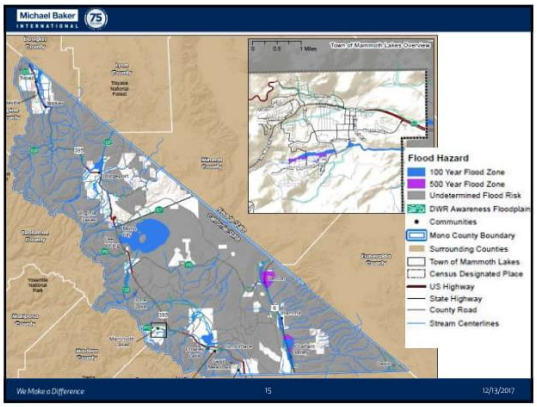




Defined Hazard Area Summary

Hazard	Unincorporated County			Mammoth Lakes		
	Affected Acres	%	# Critical Facilities	Affected Acres	%	# Critical Facilities
Dam failure	7,024	0.35%	2	0	0	0
Flood (100-year)	74,901	3.73%	0	427	2.70%	0
Flood (500-year)	10,841	0.54%	8	447	2.80%	2
Fault rupture	56,509	2.81%	9	338	2.10%	3
Wildfire (very high risk)	151,513	7.55%	4	476	3.00%	1
Wildfire (high risk)	26,364	1.31%	32	5,402	33.71%	18

- General location and assets at risk from hazards with no defined hazard area also included, such as for Drought and Man-made hazards.



Flood Vulnerability

Land Ownership Category	Acres in Hazard Zone	% in Category
Federal	7,683	0.4%
State	45,725	54.5%
County	105	4.6%
Town	7	3.1%
Utility	7,129	10.6%
Right of way	509	4.9%
Private	14,169	11.0%
Total	75,328	3.7%

- More than 50% of state land and 11% of privately owned land
- Historic events show greatest damage in Chalfant Valley, Walker River Canyon, and Antelope Valley
- Mammoth Lakes experiences flood damage along Mammoth Creek

- No Critical Facilities in 100-year flood zone
- 8 Critical Facilities in 500-year flood zones including 3 senior living facilities, 2 schools

Avalanche/Debris Flow

- Pursuing new studies that can accurately map hazard areas

Historical data identifies communities and roadways commonly at risk:

Planning Area	General Location
Bridgeport	Twin Lakes Area
Crowly	Crowley Lake, east of McGee Mountain base
	Crowley Lake, Ojai Ridge
	Rock Creek Road Narrows
June Lake	Eastern side of community, SR 158
Mono Basin	North of Lee Vining
Wheeler Crest	Swall Meadows
	Lower Rock Creek Road Narrows
Outside planning area	Virginia Lakes, north side
	Lundy Lake, west side
Mammoth Lakes	Lake Mary, Old Mammoth/The Bluffs

Sources: Local news, Eastern Sierra Avalanche Center NOAH Storm Events database, Mono County Public Works Department, Mono County General Plan Maps

CWPP Analysis

- Included as an easily removable chapter of the LHMP
- Focused on wildfire risk and fuel reduction in the WUI
- Supplements Risk Assessment with additional analysis and community-level risk and vulnerability
- Includes additional action measures, less focus on mitigation only

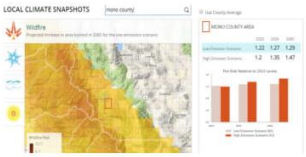
Climate Change

Hazards profiles likely to change:

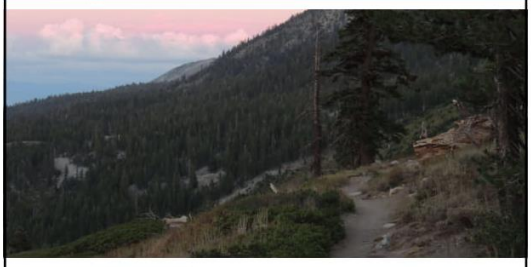
- Wildfire (heat, eco-system changes, lower precipitation)
- Drought (lower precipitation)
- Flood (stronger storms)
- Severe winter storms (stronger storms)
- Disease (eco-system changes

Data Sources:

- Cal-Adapt
- NOAA Climate Resilience Toolkit
- California Hazard Mitigation Plan



Plan Development Process



Hazard Areas Relevant to Long Valley?

What hazards affect Bridgeport Valley?

Nearly of them! But some more than others

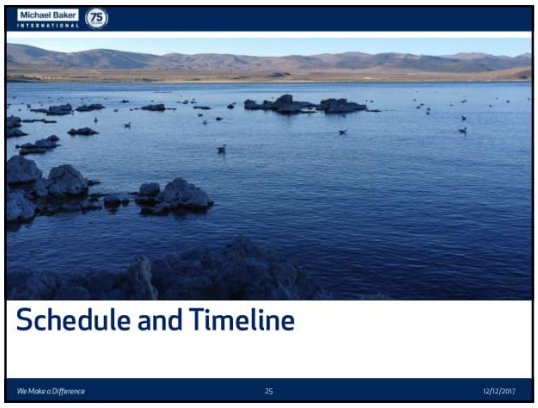
What hazards most affect LongValley?

Originating from McGee Mountain and slope below Castle Rock. Affecting US-395, local roads, and in extreme conditions, residential development.

Severe wind events may occur virtually anywhere in Mono County, but they can be of particular concern near Crowley Lake.

Crowley Lake areas, Tom's Place, and Swall Meadow are in Very High fire threat areas identified by CalFire.

Images: FEMA (Michael Rieger, Patsy Lynch, Adam DuBrowa, Win Henderson, Andrea Booher), Benjamin Stäudinger



Schedule and Timeline

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Event	Topics	Time Frame
Project Kickoff	*Initial Meeting with County/Town Staff*	*June 2017*
Stakeholder Meetings	*Information Gathering & Awareness*	*Sep 29-29, 2017*
Planning Team Meeting & RPAC Meetings & Town PC	*Hazard Profiles & Risk Assessment*	*Dec 12-13, 2017*
Planning Team Meeting & RPAC Workshop	*Mitigation Actions*	*Jan 24-25, 2018*
Planning Team Review	Draft MJHMP/CWPP Presentation	Feb 16- Mar 02, 2018
Present Public Review MJHMP/CWPP (followed by review period	Public Review of Document	March 2018
Planning Commission Meetings	Public Review of Document & Revisions to Safety Element	Mid-April, 2018
Submit to Cal OES/FEMA	Cal OES/FEMA Review of Document	April 2018
Final MJHMP	Public Hearing & Adoption	June/July 2018

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Questions/Comments?

Project Website:
https://www.monocounty.ca.gov/planning/page/local-hazard-mitigation-plan-2017-update

Wendy Sugimura
wsugimura@mono.ca.gov
760-924-1814

Dana Hoffman
dhoffman@mbakerintl.com
510-213-7921

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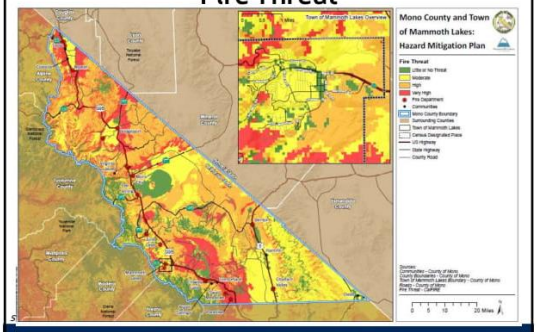
Fire Threat



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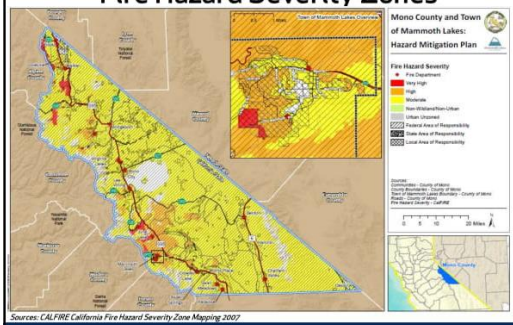
Fire Hazard Severity Zones



Sources: CALFIRE California Fire Hazard Severity Zone Mapping 2007

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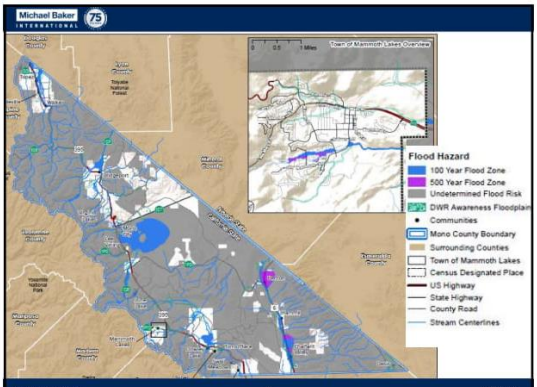

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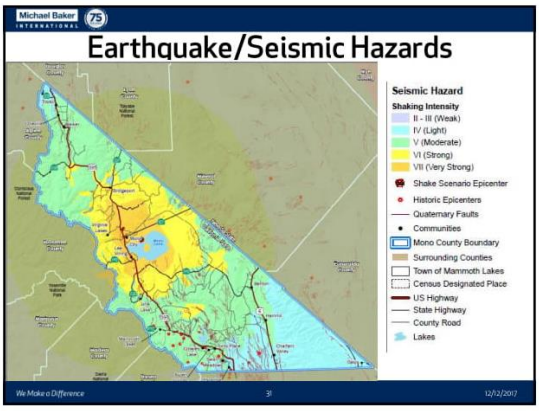
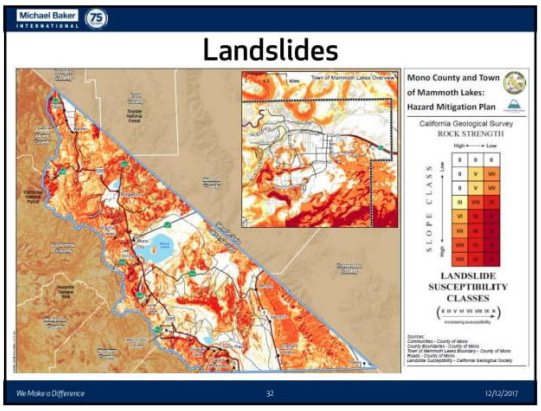
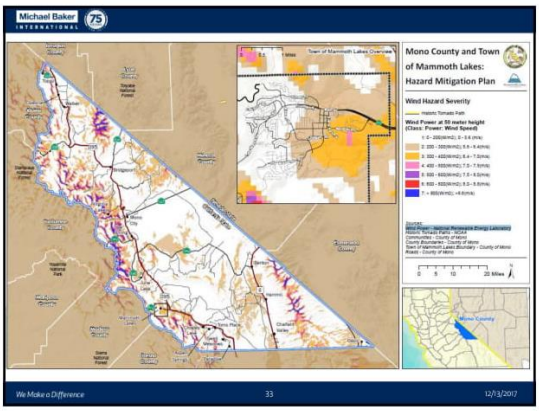






Meeting Notes - Collaborative Planning Team Mtg

- Q: Consideration of Federal WUI?
    - Yes, we looked at it. It seems for the plan that the CalFire WUI is the most preferred. Forest Service is broader, but the WUI is out for comment to the Fire people if they'd like to modify it.
- Q: Have you looked at scale and intensity of fire, and recent history versus long-term? Because there's been a substantial change.
    - I've heard that, unfortunately for this round we're depending on CalFire mapping and modeling done in 2009. We've been told updated ones will come out in the next year, but that we should proceed without them.
- Q: Last year they didn't consider heavy snow to be a condition to get money back; that it didn't qualify.

- Goals have to specify the hazards you want the mitigations to address to get funding back, and previously the goal didn't specify heavy snow – that will be corrected in this Plan.

- Fire and Fuels Management Plan update
  - Hoping to be done this year

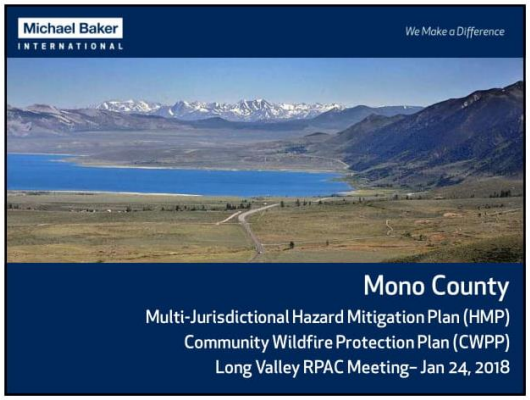
B.4.6 Long Valley RPAC Meeting – January 24, 2018

AGENDA: Long Valley RPAC Meeting

MONO COUNTY MULTI-JURISDICTIONAL LOCAL HAZARD MITIGATION PLAN

January 24, 2018

1. **Introductions**
2. **What is Hazard Mitigation?**
3. **Hazards in the HMP**
   a. Hazard Profile
   b. Risk Assessment
4. **Hazard Areas Relevant to Long Valley**
5. **Project Schedule**
6. **Questions and Comments**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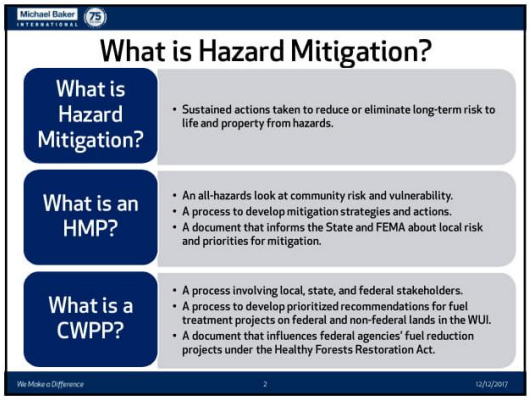
Long Valley RPAC Meeting– Jan 24, 2018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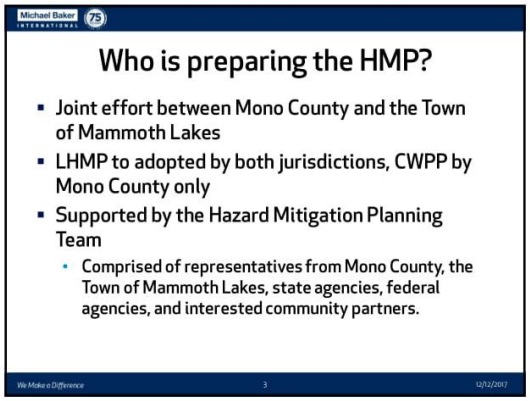
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▪ LHMP to adopted by both jurisdictions, CWPP by Mono County only
▪ Supported by the Hazard Mitigation Planning Team
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12/12/2017


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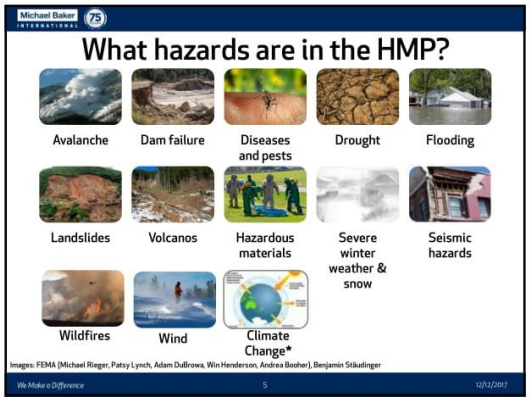
12/12/2017


What hazards are in the HMP?
Avalanche
Dam failure
Diseases and pests
Drought
Flooding
Landslides
Volcanos
Hazardous materials
Severe winter weather & snow
Seismic hazards
Wildfires
Wind
Climate Change*
Images: FEMA (Michael Rieger, Patsy Lynch, Adam DuBrowa, Win Henderson, Andrea Booher), Benjamin Stiludinger
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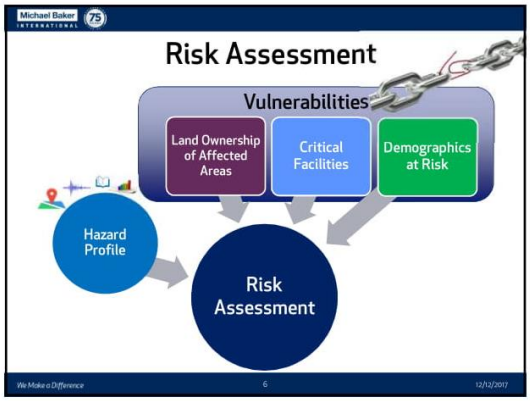
12/12/2017


Risk Assessment
Vulnerabilities
Land Ownership of Affected Areas
Critical Facilities
Demographics at Risk
Hazard Profile
Risk Assessment
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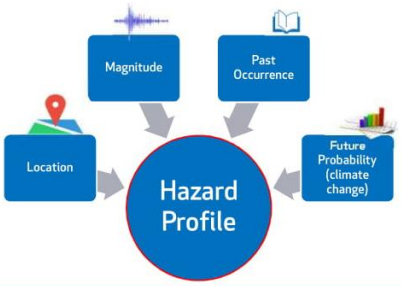
12/12/2017

Hazard Profile Components



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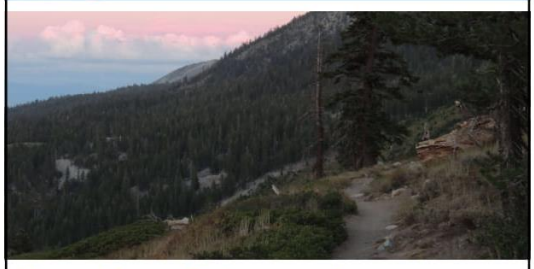

Hazard Areas Relevant to Long Valley?

We Make a Difference 8 12/12/2017

What hazards affect Long Valley?

Nearly of them! But some more than others

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What hazards most affect Long Valley?

Avalanche — Originating from McGee Mountain and slope below Castle Rock. Affecting US-395, local roads, and in extreme conditions, residential development.

Severe Wind — Severe wind events may occur virtually anywhere in Mono County, but they can be of particular concern near Crowley Lake.

Wildfire — Crowley Lake areas, Tom's Place, and Swall Meadow are in Very High fire threat areas identified by CalFire.

Images: FEMA (Michael Rieger, Patsy Lynch, Adam DuBrowa, Win Henderson, Andrea Booher), Benjamin Stäudinger

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Schedule and Timeline

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Event	Topics	Time Frame
Project Kickoff	*Initial Meeting with County/Town Staff*	*June 2017*
Stakeholder Meetings	*Information Gathering & Awareness*	*Sep 29-29, 2017*
Planning Team Meeting & RPAC Meetings & Town PC	*Hazard Profiles & Risk Assessment*	*Dec 12-13, 2017*
Planning Team Meeting & RPAC Workshop	*Mitigation Actions*	*Jan 24-25, 2018*
Planning Team Review	Draft MJHMP/CWPP Presentation	Feb 16- Mar 02, 2018
Present Public Review MJHMP/CWPP (followed by review period	Public Review of Document	March 2018
Planning Commission Meetings	Public Review of Document & Revisions to Safety Element	Mid-April, 2018
Submit to Cal OES/FEMA	Cal OES/FEMA Review of Document	April 2018
Final MJHMP	Public Hearing & Adoption	June/July 2018

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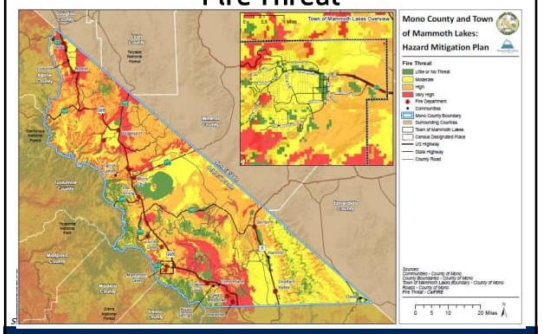
Questions/Comments?

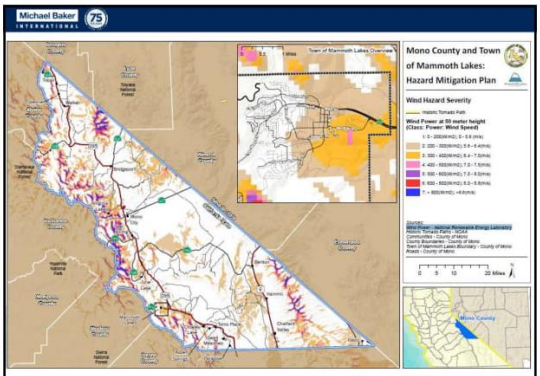
Project Website:
https://www.monocounty.ca.gov/planning/page/local-hazard-mitigation-plan-2017-update

Wendy Sugimura
wsugimura@mono.ca.gov
760-924-1814

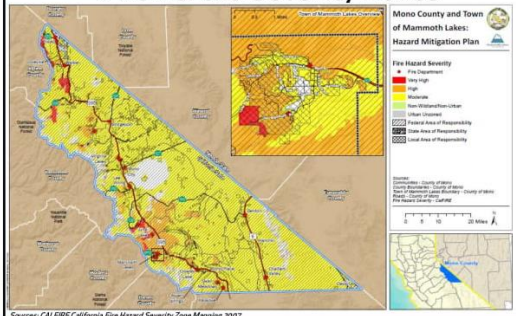
Dana Hoffman
dhoffman@mbakerintl.com
510-213-7921

Fire Threat

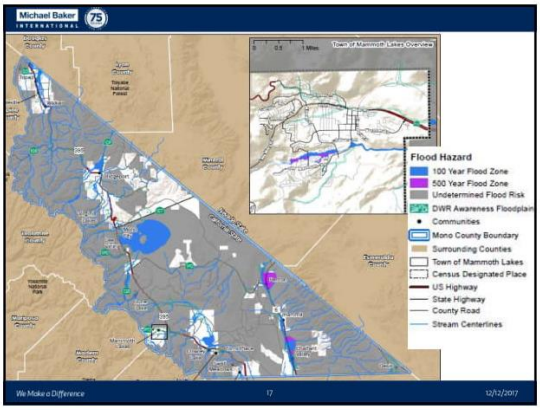




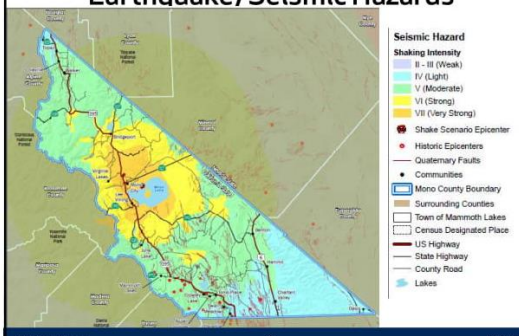
Fire Hazard Severity Zones

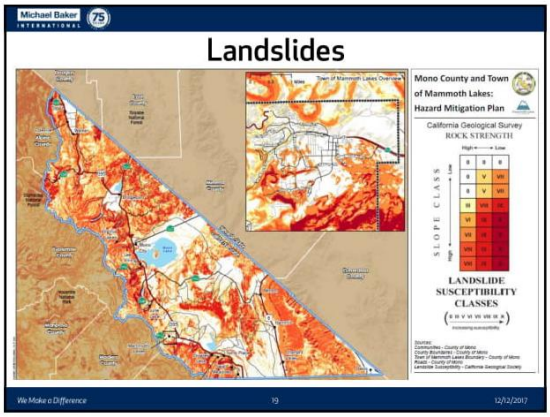


Sources: CALFIRE California Fire Hazard Severity Zone Mapping 2007



Earthquake/Seismic Hazards





Meeting Notes - Long Valley RPAC Mtg

- Members of Fire Safe Council of Swall Meadows/Paradise in attendance – interested in doing their own fire safety plan and getting an additional evacuation route.
- Communications – getting broadband and fiber optic in County slowly to residents and businesses through (Company named Race? Raze?). Grant funded. Will not cover Hammill Valley and some other areas in the County.
- Hazards comment from attendee – Swall Meadows has high winds specifically
    - Dana: It's countywide assessment and there won't be specific measures for any one area, so Swall Meadows will be covered.
- Question – when you add something to the plan, do you reiterate what we request you to say, or do you make a judgment call on whether something is needed in the Plan?
    - Dana: We do rate levels of risk and create measures based on that risk. So the intent is to look at the communities at greatest risk, and implementation depends on funding as well.
- Do you do site visits, drones?
    - Not for this one; mostly using State data and updating with current local information.
    - Staff: do have an avalanche consultant on staff and she analyzed risks last year and is involved in warnings and evacuations, and that will fit into the measures that we're already doing.
    - Sheriff: there is an avalanche meeting coming up and anyone living in an avalanche zone should get a notice. Covering evacuations notices including code reds and IPAS(?) which notifies cell phone owners based on their current location when there's an avalanche danger. First Net – first responder network for entire nation to give priority to first responder networks – AT&T will provide service for these networks

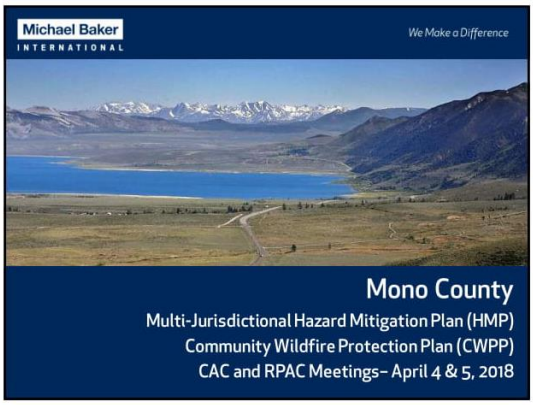
B.4.7 CAC and RPAC Meetings – April 4-5, 2018

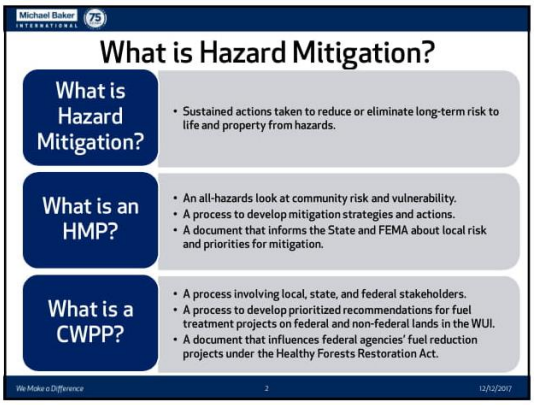
AGENDA: CAC and RPAC Meetings

MONO COUNTY MULTI-JURISDICTIONAL LOCAL HAZARD MITIGATION PLAN

April 4 & 5, 2018

1. **Introductions**
2. **What is Hazard Mitigation?**
3. **Hazards in the HMP**
    a. Hazard Profile
    b. Risk Assessment
4. **Hazard Areas Relevant to Area**
    a. June Lake (April 4th)
    b. Antelope Valley (April 5th)
5. **Project Schedule**
6. **Questions and Comments**


Michael Baker
INTERNATIONAL
We Make a Difference
Mono County
Multi-Jurisdictional Hazard Mitigation Plan (HMP)
Community Wildfire Protection Plan (CWPP)
CAC and RPAC Meetings– April 4 & 5, 2018


What is Hazard Mitigation?
What is Hazard Mitigation?
• Sustained actions taken to reduce or eliminate long-term risk to life and property from hazards.
What is an HMP?
• An all-hazards look at community risk and vulnerability.
• A process to develop mitigation strategies and actions.
• A document that informs the State and FEMA about local risk and priorities for mitigation.
What is a CWPP?
• A process involving local, state, and federal stakeholders.
• A process to develop prioritized recommendations for fuel treatment projects on federal and non-federal lands in the WUI.
• A document that influences federal agencies' fuel reduction projects under the Healthy Forests Restoration Act.
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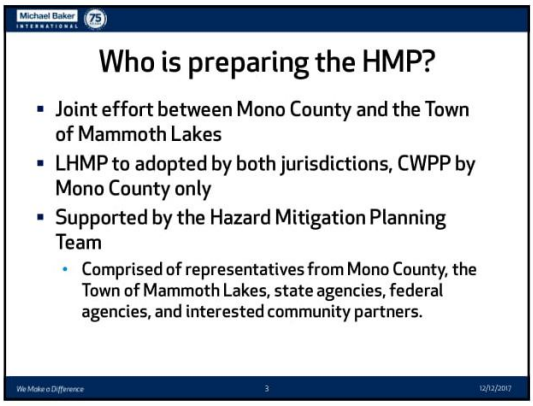
2
12/12/2017


Who is preparing the HMP?
▪ Joint effort between Mono County and the Town of Mammoth Lakes
▪ LHMP to adopted by both jurisdictions, CWPP by Mono County only
▪ Supported by the Hazard Mitigation Planning Team
• Comprised of representatives from Mono County, the Town of Mammoth Lakes, state agencies, federal agencies, and interested community partners.
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3
12/12/2017


Project Goals
Influence over where/how federal agencies implement projects
Incorporate risk/mitigation into other local plans
Inform and gain input/support from stakeholders/communities
Evaluate changing risks from development and climate change
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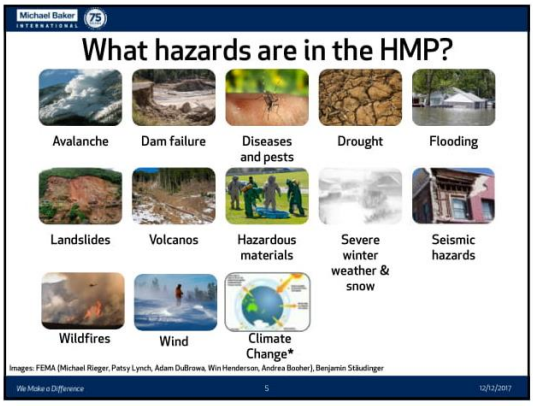
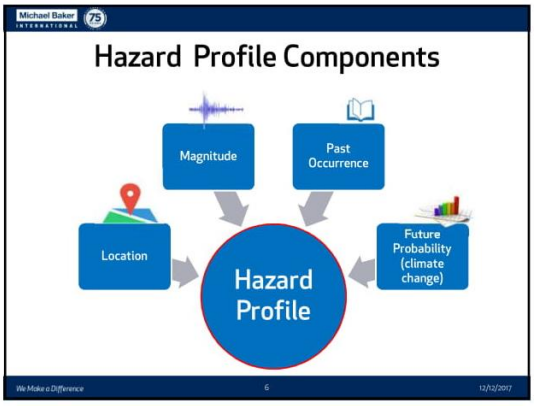
4
12/12/2017


What hazards are in the HMP?
Avalanche
Dam failure
Diseases and pests
Drought
Flooding
Landslides
Volcanos
Hazardous materials
Severe winter weather & snow
Seismic hazards
Wildfires
Wind
Climate Change*
Images: FEMA (Michael Rieger, Patsy Lynch, Adam DuBrowa, Win Henderson, Andrea Booher), Benjamin Stäudinger
We Make a Difference
5
12/12/2017


Hazard Profile Components
Magnitude
Past Occurrence
Location
Hazard Profile
Future Probability (climate change)
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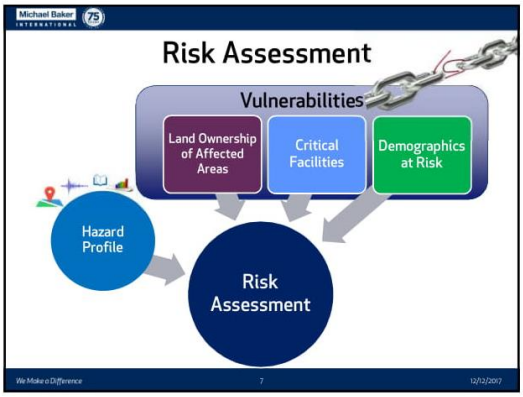
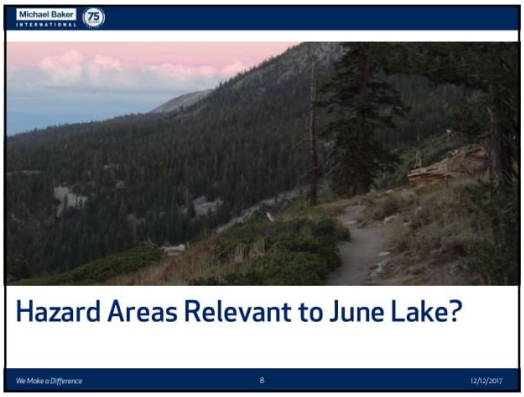
6
12/12/2017


Risk Assessment
Vulnerabilities
Land Ownership of Affected Areas
Critical Facilities
Demographics at Risk
Hazard Profile
Risk Assessment
We Make a Difference
7
12/12/2017


Hazard Areas Relevant to June Lake?
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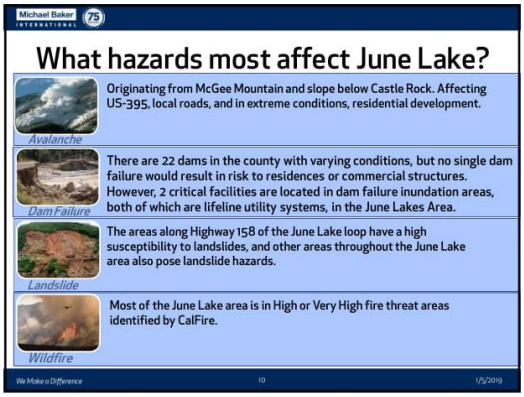
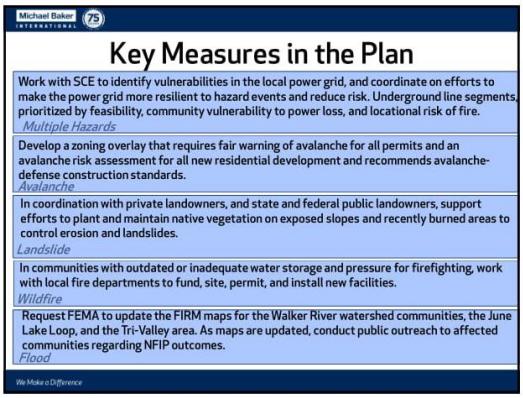
8
12/12/2017


What hazards affect June Lake?
Avalanche
Dam failure
Diseases and pests
Drought
Flooding
Landslides
Volcanos
Hazardous materials
Severe winter weather & snow
Seismic hazards
Wildfires
Wind
Climate Change*
All of them! But some more than others
We Make a Difference
9
12/12/2017


What hazards most affect June Lake?
Originating from McGee Mountain and slope below Castle Rock. Affecting US-395, local roads, and in extreme conditions, residential development.
Avalanche
There are 22 dams in the county with varying conditions, but no single dam failure would result in risk to residences or commercial structures. However, 2 critical facilities are located in dam failure inundation areas, both of which are lifeline utility systems, in the June Lakes Area.
Dam Failure
The areas along Highway 158 of the June Lake loop have a high susceptibility to landslides, and other areas throughout the June Lake area also pose landslide hazards.
Landslide
Most of the June Lake area is in High or Very High fire threat areas identified by CalFire.
Wildfire
We Make a Difference
10
1/5/2019


Key Measures in the Plan
Work with SCE to identify vulnerabilities in the local power grid, and coordinate on efforts to make the power grid more resilient to hazard events and reduce risk. Underground line segments, prioritized by feasibility, community vulnerability to power loss, and locational risk of fire.
Multiple Hazards
Develop a zoning overlay that requires fair warning of avalanche for all permits and an avalanche risk assessment for all new residential development and recommends avalanche-defense construction standards.
Avalanche
In coordination with private landowners, and state and federal public landowners, support efforts to plant and maintain native vegetation on exposed slopes and recently burned areas to control erosion and landslides.
Landslide
In communities with outdated or inadequate water storage and pressure for firefighting, work with local fire departments to fund, site, permit, and install new facilities.
Wildfire
Request FEMA to update the FIRM maps for the Walker River watershed communities, the June Lake Loop, and the Tri-Valley area. As maps are updated, conduct public outreach to affected communities regarding NFIP outcomes.
Flood
We Make a Difference


Hazard Areas Relevant to Antelope Valley?
We Make a Difference
12
12/12/2017

What hazards affect Antelope Valley?

Diseases and pests | Drought | Flooding | Landslides | Volcanos

Hazardous materials | Severe winter weather & snow | Seismic hazards | Wind | Wildfires

Climate Change*

What hazards most affect Antelope Valley?

Flooding

Flooding can occur along the West Walker River and the East Slough, as well as much of the valley floor in between.

Landslide

Areas west of Topaz, east of Walker, and along Walker Canyon Road have a high risk of landslide.

Wildfire

Areas west and south of Topaz and Walker are in Very High fire threat areas identified by CalFire. The rest of Antelope Valley is classified as a Moderate fire threat area. Decades of fires and changing conditions mean fire risk may be greater than CalFire mapping identifies.

Images: FEMA (Michael Rieger, Patsy Lynch, Adam DuBrowa, Win Henderson, Andrea Booher), Benjamin Stäudinger

Key Measures in the Plan

Multiple Hazards

Work with SCE to identify vulnerabilities in the local power grid, and coordinate on efforts to make the power grid more resilient to hazard events and reduce fire risk. Underground line segments, prioritized by feasibility, community vulnerability to power loss, and locational risk of fire.

Flooding

Request FEMA to update the FIRM maps for the Walker River watershed communities, the June Lake Loop, and the Tri-Valley area. As maps are updated, conduct public outreach to affected communities regarding NFIP outcomes.

Landslide

In coordination with private landowners, and state and federal public landowners, support efforts to plant and maintain native vegetation on exposed slopes and recently burned areas to control erosion and landslides.

Wildfire

In communities with outdated or inadequate water storage and pressure for firefighting, work with local fire departments to fund, site, permit, and install new tanks and related facilities

Schedule and Timeline

Event	Topics	Time Frame
Project Kickoff	*Initial Meeting with County/Town Staff*	*June 2017*
Stakeholder Meetings	*Information Gathering & Awareness*	*Sep 29-29, 2017*
Planning Team Meeting & RPAC Meetings & Town PC	*Hazard Profiles & Risk Assessment*	*Dec 12-13, 2017*
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Planning Team Review	*Draft MJHMP/CWPP Presentation*	*Feb 16- Mar 02, 2018*
Present Public Review MJHMP/CWPP (followed by review period)	Public Review of Document	May, 2018
Planning Commission Meetings	Public Review of Document & Revisions to Safety Element	June, 2018
Submit to Cal OES/FEMA	Cal OES/FEMA Review of Document	July, 2018
Final MJHMP	Public Hearing & Adoption	July/August 2018

Questions/Comments?

Project Website:
https://www.monocounty.ca.gov/planning/page/local-hazard-mitigation-plan-2017-update

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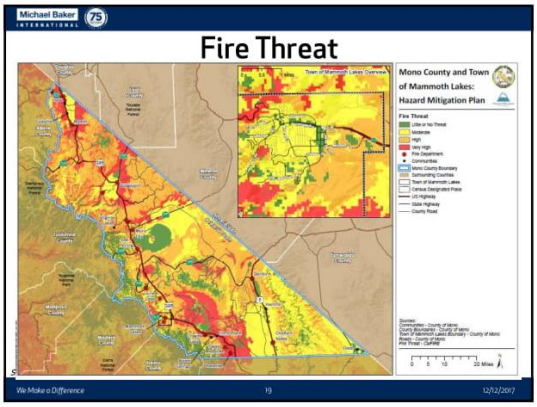
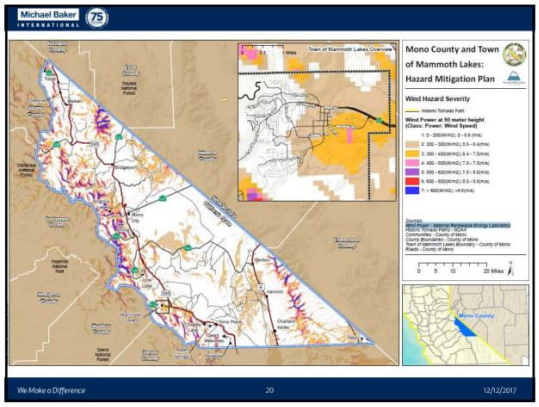
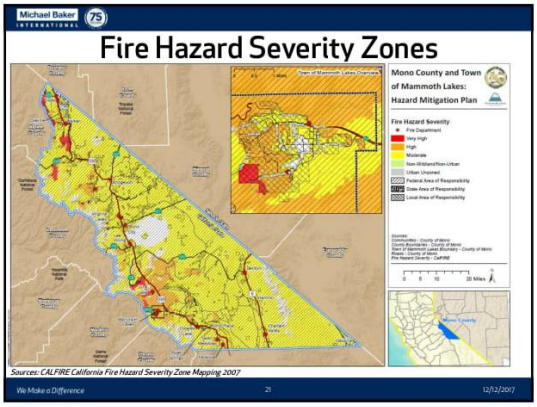

Michael Baker
Fire Threat
Mono County and Town of Mammoth Lakes: Hazard Mitigation Plan
We Make a Difference
19
12/12/2017


Michael Baker
Mono County and Town of Mammoth Lakes: Hazard Mitigation Plan
Wind Hazard Severity
We Make a Difference
20
12/12/2017


Michael Baker
Fire Hazard Severity Zones
Mono County and Town of Mammoth Lakes: Hazard Mitigation Plan
Sources: CALFIRE California Fire Hazard Severity Zone Mapping 2007
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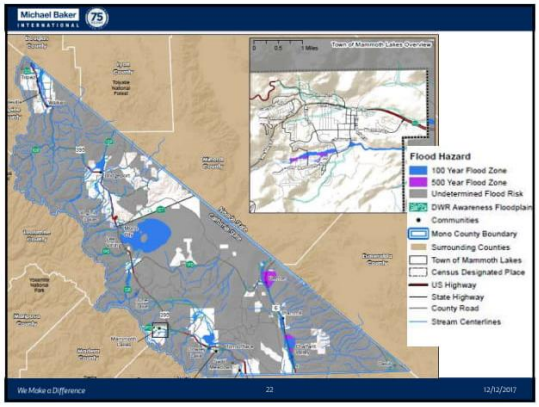
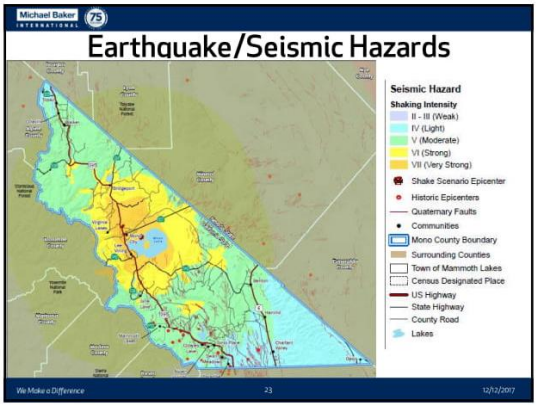
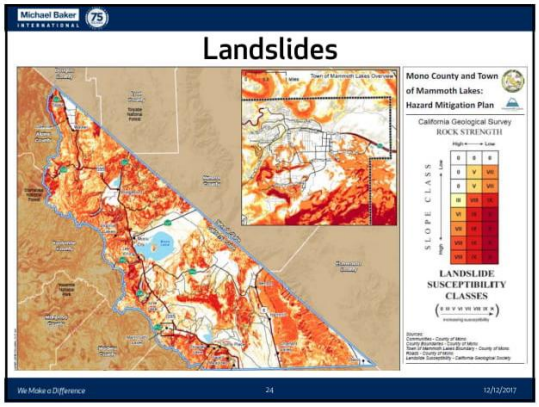
21
12/12/2017


Michael Baker
Flood Hazard
100 Year Flood Zone
500 Year Flood Zone
Undetermined Flood Risk
DWR Awareness Floodplain
Communities
Mono County Boundary
Surrounding Counties
Town of Mammoth Lakes
Census Designated Place
US Highway
State Highway
County Road
Stream Centerlines
We Make a Difference
22
12/12/2017


Michael Baker
Earthquake/Seismic Hazards
Seismic Hazard
Shaking Intensity
II - III (Weak)
IV (Light)
V (Moderate)
VI (Strong)
VII (Very Strong)
Shake Scenario Epicenter
Historic Epicenters
Quaternary Faults
Communities
Mono County Boundary
Surrounding Counties
Town of Mammoth Lakes
Census Designated Place
US Highway
State Highway
County Road
Lakes
We Make a Difference
23
12/12/2017


Michael Baker
Landslides
Mono County and Town of Mammoth Lakes: Hazard Mitigation Plan
California Geological Survey
ROCK STRENGTH
SLOPE CLASS
LANDSLIDE SUSCEPTIBILITY CLASSES
We Make a Difference
24
12/12/2017

Meeting Notes - CAC and RPCA Mtgs

April 5 - Antelope Valley RPAC Mtg

- Power outages, energy issues are a key problem
- Most current hazard is wind – occurs more frequently and causes more problems than the others listed
- No fire hydrants in Antelope Valley area. Need water tanks, etc because of no hydrants and difficult to get to rivers to get water for fires.

Mono County | Town of Mammoth Lakes

Multi-Jurisdictional Hazard Mitigation Plan (MJHMP)

APPENDIX C: CRITICAL FACILITIES

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Critical Facility List – Mono County and the Town of Mammoth Lakes

Facility Name	Community	Critical Facility Type	Address	Hazard Zone?			
				Flood	Fire (High or Very High)	Dam Failure	EQ Fault
Benton Fire Camp - BLM	Benton	Emergency Services	27485 HWY 6	500 yr	---	---	---
White Mountain Fire Protection District - Benton Fire Department	Benton	Emergency Services	25474 HWY 6	500 yr	---	---	---
Benton Transfer Station / Landfill	Benton	Hazardous Materials		500 yr	---	---	---
County District #2 Yard - Snow Removal Equipment	Benton	Lifeline Utility Systems	25574 HWY 6	500 yr	---	---	---
Edna Beaman Elementary School	Benton	Schools	25541 HWY 6	500 yr	---	---	---
Benton Community Center	Benton	Vulnerable Populations		500 yr	---	---	---
Benton Park	Benton	Vulnerable Populations	58869 HWY 120	500 yr	---	---	---
Benton Senior Center	Benton	Vulnerable Populations	58869 HWY 120	500 yr	---	---	---
California Interstate Telephone Co.	Bridgeport	Communications Facilities		---	---	---	---
Escape Broadband LLC	Bridgeport	Communications Facilities	45 S Buckeye Drive	100 yr	---	---	---
Mono County Memorial Hall	Bridgeport	Emergency Operations Center	73 N School Street	---	---	---	---
Mono County Offices	Bridgeport	Emergency Operations Center	49 Bryant Street	---	---	---	---
Bridgeport Fire Station	Bridgeport	Emergency Services	309 Main Street	---	---	---	---
California Highway Patrol	Bridgeport	Emergency Services	125 Main Street	---	---	---	---
Sheriff's Office	Bridgeport	Emergency Services	49 Bryant Street	---	---	---	---
Bridgeport Transfer Station / Landfill	Bridgeport	Hazardous Materials		---	---	---	---
Amerigas	Bridgeport	Lifeline Utility Systems	Bridgeport	---	---	---	---
Bridgeport Public Utilities District	Bridgeport	Lifeline Utility Systems	233 Twin Lakes Road	---	---	---	---
Bridgeport Public Utilities District	Bridgeport	Lifeline Utility Systems	Bridgeport	---	---	---	---
Bridgeport Public Utilities District	Bridgeport	Lifeline Utility Systems	Bridgeport	---	---	---	---
Bridgeport Public Utilities District	Bridgeport	Lifeline Utility Systems	149 Stock Drive	100 yr	---	---	---
Bridgeport Public Utilities District	Bridgeport	Lifeline Utility Systems	Bridgeport	---	---	---	---

Critical Facility List – Mono County and the Town of Mammoth Lakes

Facility Name	Community	Critical Facility Type	Address	Hazard Zone?			
				Flood	Fire (High or Very High)	Dam Failure	EQ Fault
Bridgeport Public Utilities District	Bridgeport	Lifeline Utility Systems	118 Twin Lakes Road	---	---	---	---
Bridgeport Public Utilities District	Bridgeport	Lifeline Utility Systems	1111 Aurora Canyon Road	---	---	---	---
Bridgeport Public Utilities District	Bridgeport	Lifeline Utility Systems	153 S Buckeye Drive	---	---	---	---
Bridgeport Public Utilities District - Sewer Ponds	Bridgeport	Lifeline Utility Systems	Bridgeport	---	---	---	---
CalTrans - Snow Removal Equipment	Bridgeport	Lifeline Utility Systems	415 Jack Sawyer Road	---	---	---	---
County District #4 Yard - Snow Removal Equipment	Bridgeport	Lifeline Utility Systems	197 Jack Sawyer Road	---	---	---	---
So. California Edison Company	Bridgeport	Lifeline Utility Systems	Bridgeport	---	---	---	---
So. California Edison Company	Bridgeport	Lifeline Utility Systems	Bridgeport	---	---	---	---
Bridgeport Elementary School	Bridgeport	Schools	205 Kingsley Street	---	---	---	---
Bryant Field Airport	Bridgeport	Transportation Systems	76 Stock Drive	---	---	---	---
Helipad - Bridgeport Clinic	Bridgeport	Transportation Systems	193 Twin Lakes Road	---	---	---	---
Helipad - Bryant Field	Bridgeport	Transportation Systems	76 Stock Drive	---	---	---	---
Bridgeport Senior Center	Bridgeport	Vulnerable Populations	Bridgeport	---	---	---	---
Continental Telephone Co.	Chalfant Valley	Communications Facilities	Chalfant Valley	100 yr	---	---	---
Chalfant Community Center	Chalfant Valley	Emergency Operations Center	215 Valley Road	100 yr	---	---	---
Chalfant Fire Station	Chalfant Valley	Emergency Services	215 Valley Road	100 yr	---	---	---

Critical Facility List – Mono County and the Town of Mammoth Lakes

Facility Name	Community	Critical Facility Type	Address	Hazard Zone?			
				Flood	Fire (High or Very High)	Dam Failure	EQ Fault
Chalfant Transfer Station / Landfill	Chalfant Valley	Hazardous Materials		---	---	---	---
Chalfant Valley Mutual Water Co.	Chalfant Valley	Lifeline Utility Systems	Chalfant Valley	---	---	---	---
Chalfant Valley Mutual Water Co.	Chalfant Valley	Lifeline Utility Systems	Chalfant Valley	---	---	---	---
New Communications of the Southwest, Inc.	Coleville	Communications Facilities	111671 HWY 395	---	---	---	---
Coleville Elementary School	Coleville	Schools	111527 HWY 395	---	---	---	---
Coleville High School	Coleville	Schools	111591 HWY 395	---	---	---	---
Continental Telephone Co.	Crestview	Communications Facilities		---	High	---	---
CalTrans - Snow Removal Equipment	Crestview	Lifeline Utility Systems	34084 HWY 395	---	High	---	---
Continental Telephone Co.	Crowley Lake	Communications Facilities	4035 Crowley Lake Drive	---	High	---	---
Crowley Lake Community Center	Crowley Lake	Emergency Operations Center	58 Pearson Road	---	High	---	---
Crowley Sub Station	Crowley Lake	Emergency Services	3605 Crowley Lake Drive	---	High	---	---
Long Valley Fire Department	Crowley Lake	Emergency Services	3605 Crowley Lake Drive	---	High	---	---
Crowley Mutual Water Company	Crowley Lake	Lifeline Utility Systems	80 South Landing Road	---	High	---	---
DWP Hydroelectric Generating Station	Crowley Lake	Lifeline Utility Systems	Crowley Lake	---	---	---	---
Hilton Creek Community Service District	Crowley Lake	Lifeline Utility Systems	Crowley Lake	---	High	---	---
McGee CalTrans	Crowley Lake	Lifeline Utility Systems	518 Crowley Lake Place	---	---	---	---

Critical Facility List – Mono County and the Town of Mammoth Lakes

Facility Name	Community	Critical Facility Type	Address	Hazard Zone?			
				Flood	Fire (High or Very High)	Dam Failure	EQ Fault
Mountain Meadows Mutual Water Co.	Crowley Lake	Lifeline Utility Systems	93 Meadow View Drive	---	High	---	---
Water Tank	Crowley Lake	Lifeline Utility Systems	Crowley Lake	---	High	---	---
South Landing Road/Crowley Overpass	Crowley Lake	Transportation Systems		---	High	---	---
So. California Edison Company	Hammil Valley	Lifeline Utility Systems	Hammil Valley	---	---	---	---
California Interstate Telephone Co.	June Lake	Communications Facilities	June Lake	---	High	---	---
June Lake Community Center	June Lake	Emergency Operations Center	90 W Granite Avenue	---	High	---	---
June Lake Fire Department	June Lake	Emergency Services		---	Very High	---	---
June Lake Fire Station #2	June Lake	Emergency Services	5205 HWY 158	---	Very High	---	---
June Mountain Ski Area (JMSA)	June Lake	Hazardous Materials	3819 HWY 158	---	Very High	---	---
June Lake Public Utilitiy District	June Lake	Lifeline Utility Systems	45125 HWY 395	---	---	---	---
So. California Edison Company	June Lake	Lifeline Utility Systems	June Lake	---	Very High	Yes	---
So. California Edison Company	June Lake	Lifeline Utility Systems	June Lake	---	Very High	Yes	Inside Fault Rupture Zone
California Interstate Telephone Co.	Lee Vining	Communications Facilities	41 Third Street	---	---	---	Inside Fault Rupture Zone
Lee Vining Indian and Community Center	Lee Vining	Emergency Operations Center	296 Mattly Avenue	---	---	---	---
Lee Vining Fire Department	Lee Vining	Emergency Services	51468 HWY 395	---	---	---	---
Cal Tans - Lee Vining Station	Lee Vining	Hazardous Materials	51548 HWY 395	---	---	---	---
County District #3 Yard - Snow Removal Equipment	Lee Vining	Lifeline Utility Systems	51596 HWY 395	---	---	---	---
Lee Vining Public Utility District	Lee Vining	Lifeline Utility Systems	Lee Vining	---	---	---	---

Critical Facility List – Mono County and the Town of Mammoth Lakes

Facility Name	Community	Critical Facility Type	Address	Hazard Zone?			
				Flood	Fire (High or Very High)	Dam Failure	EQ Fault
Lee Vining Elementary School	Lee Vining	Schools	132 Lee Vining Avenue	---	---	---	Inside Fault Rupture Zone
Lee Vining High School	Lee Vining	Schools	51710 HWY 395	---	---	---	---
Lee Vining Airport	Lee Vining	Transportation Systems	Lee Vining	---	---	---	---
MMSA Canyon Lodge	Mammoth Lakes Area	Emergency Operations Center		---	High	---	Inside Fault Rupture Zone
Mammoth Mountain Ski Area	Mammoth Lakes Area	Hazardous Materials	10400 Minaret Road	---	---	---	---
Mammoth Overpass	Mammoth Lakes Area	Transportation Systems		---	---	---	Inside Fault Rupture Zone
California Interstate Telephone Co.	Mammoth Lakes City	Communications Facilities	55 Pinecrest Street	---	---	---	---
Continental Telephone Co.	Mammoth Lakes City	Communications Facilities	39 Pinecrest Avenue	---	---	---	---
Frontier Communications	Mammoth Lakes City	Communications Facilities		---	---	---	---
MMSA Bottom Gondola Site	Mammoth Lakes City	Communications Facilities		---	---	---	---
MMSA Electronic Site	Mammoth Lakes City	Communications Facilities		---	---	---	---
MMSA Lincoln Peak Site	Mammoth Lakes City	Communications Facilities		---	---	---	---
MMSA McCoy Station Site	Mammoth Lakes City	Communications Facilities		---	---	---	---

Critical Facility List – Mono County and the Town of Mammoth Lakes

Facility Name	Community	Critical Facility Type	Address	Hazard Zone?			
				Flood	Fire (High or Very High)	Dam Failure	EQ Fault
Mono County Office of Education	Mammoth Lakes City	Communications Facilities	451 Sierra Park Road	---	---	---	---
Reflector Site	Mammoth Lakes City	Communications Facilities		---	High	---	---
Westin Hotel	Mammoth Lakes City	Communications Facilities		---	---	---	---
Mammoth Community Center	Mammoth Lakes City	Emergency Operations Center	960 Forest Trail	---	---	---	---
Mammoth Lakes California Welcome Center	Mammoth Lakes City	Emergency Operations Center	16 Banner Road, Unit 16	---	High	---	---
Mono County Offices	Mammoth Lakes City	Emergency Operations Center	437 Old Mammoth Road	---	---	---	---
Town of Mammoth Lakes Offices/Suite Z	Mammoth Lakes City	Emergency Operations Center	437 Old Mammoth Road	---	---	---	---
Mammoth Hospital Helicopter Landing Area	Mammoth Lakes City	Emergency Services		---	---	---	---
Mammoth Lakes Fire Station #1	Mammoth Lakes City	Emergency Services	3150 Main Street	---	High	---	---
Mammoth Lakes Fire Station #2	Mammoth Lakes City	Emergency Services	1574 Old Mammoth Road	---	High	---	---
Mammoth Lakes Police Department	Mammoth Lakes City	Emergency Services	58 Thompson Way	---	High	---	---
Mammoth Paramedics - 3	Mammoth Lakes City	Emergency Services	3150 Main Street	---	High	---	---
Amerigas - Propane	Mammoth Lakes City	Lifeline Utility Systems	464 Commerce Circle	---	---	---	---
Mammoth Community Water District	Mammoth Lakes City	Lifeline Utility Systems	1315 Meridian Blvd.	---	High	---	---

Critical Facility List – Mono County and the Town of Mammoth Lakes

Facility Name	Community	Critical Facility Type	Address	Hazard Zone?			
				Flood	Fire (High or Very High)	Dam Failure	EQ Fault
Mammoth Disposal	Mammoth Lakes City	Lifeline Utility Systems	59 Commerce Drive	---	High	---	---
Mammoth Pacific Geothermal Site	Mammoth Lakes City	Lifeline Utility Systems	94 Casa Diablo Cutoff	---	---	---	Inside Fault Rupture Zone
Mammoth Water District	Mammoth Lakes City	Lifeline Utility Systems		---	High	---	---
Rite Aid Parking Lot, Mammoth Lakes	Mammoth Lakes City	Lifeline Utility Systems	26 Old Mammoth Road, Unit A	---	---	---	---
So. California Edison Company	Mammoth Lakes City	Lifeline Utility Systems	3001 Chateau Road	---	---	---	---
So. California Edison Company	Mammoth Lakes City	Lifeline Utility Systems	58896 HWY 120	500 yr	---	---	---
Turner Gas - Propane	Mammoth Lakes City	Lifeline Utility Systems	3439 Main Street	---	---	---	---
Mammoth Hospital/Sierra Park Clinic	Mammoth Lakes City	Medical Services	185 Sierra Park Road	---	High	---	---
Mono County Public Health - Mammoth Lakes	Mammoth Lakes City	Medical Services	437 Old Mammoth Road	---	---	---	---
Cerro Coso Community College	Mammoth Lakes City	Schools	101 College Parkway	---	---	---	---
Mammoth Elementary School	Mammoth Lakes City	Schools	1500 Meridian Blvd.	---	---	---	---
Mammoth High School	Mammoth Lakes City	Schools	365 Sierra Park Road	---	---	---	---
Mammoth Middle School	Mammoth Lakes City	Schools	1600 Meridian Blvd.	---	---	---	---

Critical Facility List – Mono County and the Town of Mammoth Lakes

Facility Name	Community	Critical Facility Type	Address	Hazard Zone?			
				Flood	Fire (High or Very High)	Dam Failure	EQ Fault
Sierra High School	Mammoth Lakes City	Schools	461 Sierra Park Road	---	---	---	---
Helipad - Mammoth Hospital	Mammoth Lakes City	Transportation Systems	185 Sierra Park Road	---	High	---	---
Mono County Volunteer Fire Dept.	Mono City	Emergency Services	Mono City	---	---	---	---
California Electric Power Co.	Mono City	Lifeline Utility Systems	Mono City	---	High	---	---
Lundy Mutual Water Company #1	Mono City	Lifeline Utility Systems	Mono City	---	---	---	---
Lundy Mutual Water Company #2	Mono City	Lifeline Utility Systems	Mono City	---	---	---	---
So. California Edison Company	Mono City	Lifeline Utility Systems	Mono City	---	---	---	---
So. California Edison Company	Oasis	Lifeline Utility Systems	Oasis	---	---	---	---
Paradise Fire Department	Paradise Estates	Emergency Services	5300 Lower Rock Creek Road	---	---	---	---
Paradise Transfer Station	Paradise Estates	Hazardous Materials		100 yr	---	---	---
Paradise Water Storage Tanks	Paradise Estates	Lifeline Utility Systems	Paradise Estates	---	---	---	---
Paradise Water Supply Wells	Paradise Estates	Lifeline Utility Systems	Paradise Estates	---	---	---	---
USMC Mtn. Warfare Training Center - Fire Station	Pickle Meadows	Emergency Services	Pickle Meadows	---	High	---	---
MWTC Medical Clinic	Pickle Meadows	Medical Services	Pickle Meadows	---	High	---	---
Helipad - USMC Mountain Warfare Training Center	Pickle Meadows	Transportation Systems	Pickle Meadows	---	High	---	---
Pumice Valley Landfill	Pumice Valley	Hazardous Materials	200 Dross Road	---	---	---	---
CalTrans - Snow Removal Equipment	Sonora Junction	Lifeline Utility Systems	93922 HWY 395	---	---	---	---

Critical Facility List – Mono County and the Town of Mammoth Lakes

Facility Name	Community	Critical Facility Type	Address	Hazard Zone?			
				Flood	Fire (High or Very High)	Dam Failure	EQ Fault
Wheeler Crest Volunteer Fire Dept.	Swall Meadows	Emergency Services	Swall Meadows	---	---	---	---
DWP Hydroelectric Generating Station	Swall Meadows	Lifeline Utility Systems	Swall Meadows	---	---	---	---
Sherwin Sand Shed	Swall Meadows	Lifeline Utility Systems	Swall Meadows	---	---	---	---
Wheeler Crest Community Service District	Swall Meadows	Lifeline Utility Systems	334 Rimrock Drive	---	---	---	---
Long Valley Fire Protection District	Tom's Place	Emergency Services	Tom's Place	---	---	---	---
Birchim Community Service District	Tom's Place	Lifeline Utility Systems	636 Owens Gorge Road	---	---	---	---
Antelope Valley Fire District; Topaz Station #2	Topaz	Emergency Services	Topaz	---	---	---	---
Topaz Interagency Fire Control Station	Topaz	Emergency Services	116999 HWY 395	---	---	---	Inside Fault Rupture Zone
Continental Telephone Co.	Virginia Lakes	Communications Facilities	Virginia Lakes	---	---	---	---
Conway Summit Fire Station	Virginia Lakes	Emergency Services	63560 HWY 395	---	---	---	---
Caltrans - Snow Removal Equipment	Virginia Lakes	Lifeline Utility Systems	63560 HWY 395	---	---	---	---
So. California Edison Company	Virginia Lakes	Lifeline Utility Systems	Whitmore Hot Springs	---	High	---	Inside Fault Rupture Zone
Helipad - Conway Summit	Virginia Lakes	Transportation Systems		---		---	---
Walker Community Center	Walker	Emergency Operations Center	442 Mule Deer Road	---	High	---	---
Mono Rescue / Antelope Valley FD; Station #1	Walker	Emergency Services	51 Shop Road	---	High	---	---
Walker Paramedics - 1	Walker	Emergency Services		---	High	---	---

Critical Facility List – Mono County and the Town of Mammoth Lakes

Facility Name	Community	Critical Facility Type	Address	Hazard Zone?			
				Flood	Fire (High or Very High)	Dam Failure	EQ Fault
Walker Transfer Station / Landfill	Walker	Hazardous Materials		---	---	---	---
County District #5 Yard - Snow Removal Equipment	Walker	Lifeline Utility Systems	62 Shop Road	---	High	---	---
Toibye Indian Health Project	Walker	Medical Services	259 Camp Antelope Road	---	---	---	---
Antelope Senior Center	Walker	Vulnerable Populations	399 Mule Deer Road	---	High	---	---
White Mountain Mutual Water Co.	White Mountain Estates	Lifeline Utility Systems	197 Sequoia Street	---	---	---	---
Benton Crossing Landfill	Whitmore hot Springs	Hazardous Materials	899 Pit Road	---	---	---	---
Mammoth Yosemite Airport	Whitmore hot Springs	Transportation Systems	Mammoth Lakes City	---	---	---	---

Mono County | Town of Mammoth Lakes

Multi-Jurisdictional Hazard Mitigation Plan (MJHMP)

APPENDIX D: MONO COUNTY HAZUS FAULTS REPORTS

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Hazus-MH: Earthquake Global Risk Report

Region Name: Mono_County_EQ_RC

Earthquake Scenario: M6.9-Fish Slough v14

Print Date: January 09, 2018

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.

Table of Contents

Section	Page #
General Description of the Region	3
Building and Lifeline Inventory	4
Building Inventory	
Critical Facility Inventory	
Transportation and Utility Lifeline Inventory	
Earthquake Scenario Parameters	6
Direct Earthquake Damage	7
Buildings Damage	
Critical Facilities Damage	
Transportation and Utility Lifeline Damage	
Induced Earthquake Damage	11
Debris Generation	
Social Impact	12
Shelter Requirements	
Casualties	
Economic Loss	13
Building Losses	
Transportation and Utility Lifeline Losses	
Appendix A: County Listing for the Region	
Appendix B: Regional Population and Building Value Data	

General Description of the Region

Hazus is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop earthquake losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from earthquakes and to prepare for emergency response and recovery.

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

California

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 3,131.05 square miles and contains 3 census tracts. There are over 5 thousand households in the region which has a total population of 14,202 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 8 thousand buildings in the region with a total building replacement value (excluding contents) of 2,755 (millions of dollars). Approximately 95.00 % of the buildings (and 89.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 2,656 and 360 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

Hazus estimates that there are 8 thousand buildings in the region which have an aggregate total replacement value of 2,755 (millions of dollars) . Appendix B provides a general distribution of the building value by State and County.

In terms of building construction types found in the region, wood frame construction makes up 81% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

Hazus breaks critical facilities into two (2) groups: essential facilities and high potential loss facilities (HPL). Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 15 beds. There are 22 schools, 10 fire stations, 3 police stations and 0 emergency operation facilities. With respect to high potential loss facilities (HPL), there are 0 dams identified within the inventory. Of these, 0 of the dams are classified as 'high hazard'. The inventory also includes 0 hazardous material sites, 0 military installations and 0 nuclear power plants.

Transportation and Utility Lifeline Inventory

Within Hazus, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 1 and 2.

The total value of the lifeline inventory is over 3,016.00 (millions of dollars). This inventory includes over 588 kilometers of highways, 29 bridges, 1,085 kilometers of pipes.

Table 1: Transportation System Lifeline Inventory

System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	29	13.20
	Segments	44	2,593.10
	Tunnels	0	0.00
	Subtotal		**2,606.30**
Railways	Bridges	0	0.00
	Facilities	0	0.00
	Segments	0	0.00
	Tunnels	0	0.00
	Subtotal		**0.00**
Light Rail	Bridges	0	0.00
	Facilities	0	0.00
	Segments	0	0.00
	Tunnels	0	0.00
	Subtotal		**0.00**
Bus	Facilities	1	1.30
	Subtotal		**1.30**
Ferry	Facilities	0	0.00
	Subtotal		**0.00**
Port	Facilities	0	0.00
	Subtotal		**0.00**
Airport	Facilities	1	10.70
	Runways	1	38.00
	Subtotal		**48.60**
	Total		**2,656.20**

Table 2: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	10.90
	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**10.90**
Waste Water	Distribution Lines	NA	6.50
	Facilities	1	78.60
	Pipelines	0	0.00
		Subtotal	**85.10**
Natural Gas	Distribution Lines	NA	4.30
	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**4.30**
Oil Systems	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**0.00**
Electrical Power	Facilities	2	259.60
		Subtotal	**259.60**
Communication	Facilities	1	0.10
		Subtotal	**0.10**
		Total	**360.00**

Earthquake Scenario

Hazus uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.

Scenario Name	M6.9-Fish Slough v14
Type of Earthquake	
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	NA
Longitude of Epicenter	0.00
Latitude of Epicenter	0.00
Earthquake Magnitude	6.89
Depth (km)	0.00
Rupture Length (Km)	0.00
Rupture Orientation (degrees)	0.00
Attenuation Function	

Building Damage

Building Damage

Hazus estimates that about 448 buildings will be at least moderately damaged. This is over 5.00 % of the buildings in the region. There are an estimated 7 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus technical manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 below summarizes the expected damage by general building type.

Damage categories by General Occupancy Type

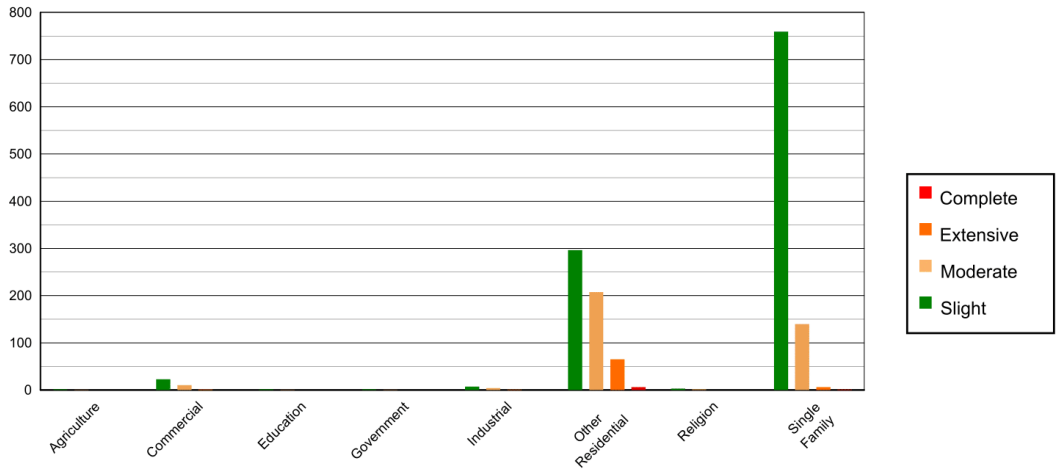


Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	12	0.18	2	0.14	1	0.21	0	0.23	0	0.29
Commercial	241	3.39	23	2.11	11	2.88	2	2.49	0	2.26
Education	19	0.27	1	0.13	0	0.13	0	0.10	0	0.06
Government	24	0.33	2	0.14	1	0.17	0	0.14	0	0.13
Industrial	57	0.80	8	0.69	4	1.17	1	1.22	0	1.22
Other Residential	1,767	24.79	296	27.09	208	56.84	65	87.42	6	76.26
Religion	36	0.50	3	0.31	1	0.38	0	0.34	0	0.33
Single Family	4,969	69.74	759	69.39	140	38.21	6	8.08	2	19.45
Total	**7,125**		**1,094**		**365**		**75**		**8**	

Table 4: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	5,962	83.67	860	78.58	151	41.25	6	7.91	2	21.31
Steel	139	1.96	15	1.33	9	2.49	2	2.32	0	1.84
Concrete	159	2.23	17	1.53	6	1.74	1	1.67	0	1.24
Precast	64	0.90	7	0.63	4	1.20	1	1.14	0	0.83
RM	222	3.12	16	1.51	10	2.71	2	2.69	0	0.90
URM	47	0.66	7	0.66	4	0.97	1	1.01	0	2.16
MH	531	7.45	172	15.76	181	49.65	62	83.25	6	71.71
Total	**7,125**		**1,094**		**365**		**75**		**8**	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had 15 hospital beds available for use. On the day of the earthquake, the model estimates that only 14 hospital beds (96.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 100.00% of the beds will be back in service. By 30 days, 100.00% will be operational.

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	1	0	0	1
Schools	22	0	0	20
EOCs	0	0	0	0
PoliceStations	3	0	0	3
FireStations	10	0	0	8

Transportation Lifeline Damage

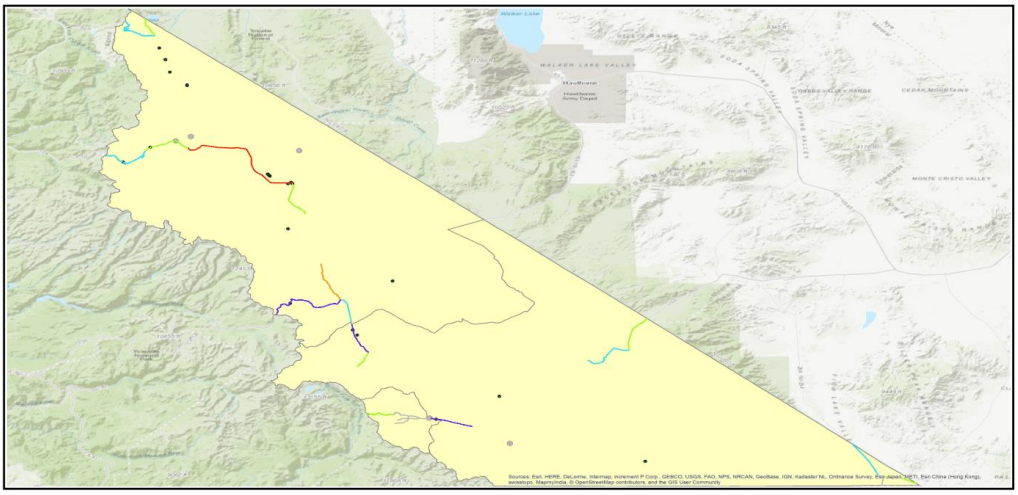


Table 6: Expected Damage to the Transportation Systems

System	Component		Number of Locations			
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 % After Day 1	With Functionality > 50 % After Day 7
Highway	Segments	44	0	0	44	44
	Bridges	29	0	0	29	29
	Tunnels	0	0	0	0	0
Railways	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	1	0	0	1	1
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	1	0	0	1	1
	Runways	1	0	0	1	1

Table 6 provides damage estimates for the transportation system.

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, Hazus performs a simplified system performance analysis. Table 9 provides a summary of the system performance information.

Table 7 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	0	0	0	0	0
Waste Water	1	0	0	1	1
Natural Gas	0	0	0	0	0
Oil Systems	0	0	0	0	0
Electrical Power	2	0	0	2	2
Communication	1	0	0	1	1

Table 8 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	543	18	4
Waste Water	326	13	3
Natural Gas	217	4	1
Oil	0	0	0

Table 9: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	5,768	0	0	0	0	0
Electric Power		0	0	0	0	0

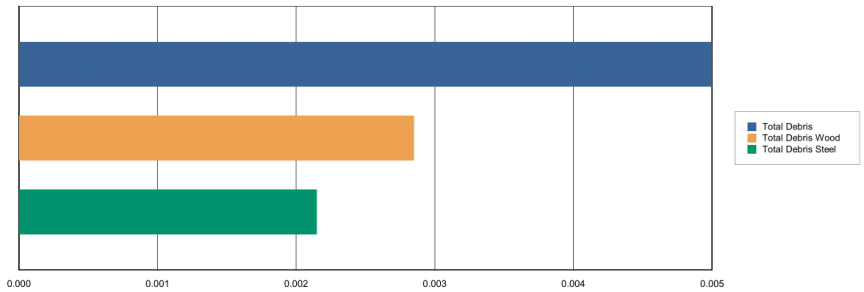
Induced Earthquake Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0.01 million tons of debris will be generated. Of the total amount, Brick/Wood comprises 57.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 200 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Earthquake Debris (millions of tons)



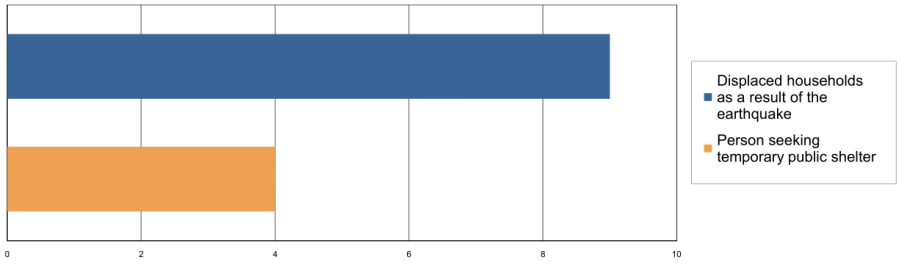
Brick/ Wood	Reinforced Concrete/Steel	Total Debris	Truck Load
0.00	0.00	0.01	200 (@25 tons/truck)

Social Impact

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 9 households to be displaced due to the earthquake. Of these, 4 people (out of a total population of 14,202) will seek temporary shelter in public shelters.

Displaced Households/ Persons Seeking Short Term Public Shelter



Displaced households as a result of the earthquake	Persons seeking temporary public shelter
9	4

Casualties

Hazus estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 10 provides a summary of the casualties estimated for this earthquake

Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	0	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	0	0	0	0
	Other-Residential	2	0	0	0
	Single Family	1	0	0	0
	Total	**3**	**0**	**0**	**0**
2 PM	Commercial	2	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	0	0	0	0
	Other-Residential	0	0	0	0
	Single Family	0	0	0	0
	Total	**4**	**1**	**0**	**0**
5 PM	Commercial	2	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	0	0	0	0
	Other-Residential	1	0	0	0
	Single Family	0	0	0	0
	Total	**3**	**0**	**0**	**0**

Economic Loss

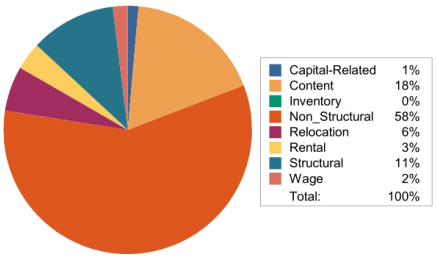
The total economic loss estimated for the earthquake is 43.38 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 33.15 (millions of dollars); 13 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 86 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

Earthquake Losses by Loss Type ($ millions)



Earthquake Losses by Occupancy Type ($ millions)

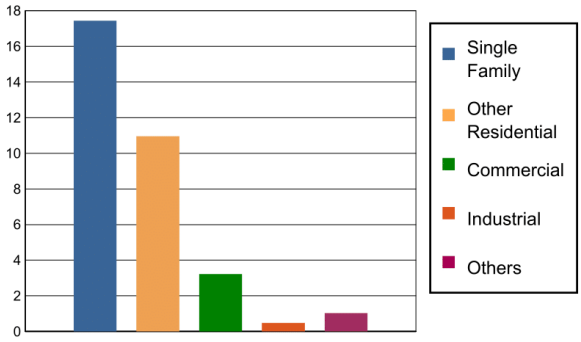


Table 11: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.00	0.29	0.31	0.01	0.06	0.66
	Capital-Related	0.00	0.12	0.34	0.01	0.01	0.47
	Rental	0.31	0.66	0.16	0.00	0.01	1.14
	Relocation	1.01	0.67	0.21	0.02	0.10	2.01
	Subtotal	**1.31**	**1.74**	**1.03**	**0.04**	**0.17**	**4.29**
Capital Stock Losses							
	Structural	1.95	1.22	0.32	0.06	0.13	3.68
	Non_Structural	10.74	6.59	1.24	0.23	0.47	19.28
	Content	3.44	1.41	0.61	0.13	0.26	5.86
	Inventory	0.00	0.00	0.02	0.02	0.00	0.04
	Subtotal	**16.13**	**9.23**	**2.19**	**0.45**	**0.87**	**28.86**
	Total	**17.45**	**10.96**	**3.22**	**0.49**	**1.04**	**33.15**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, Hazus computes the direct repair cost for each component only. There are no losses computed by Hazus for business interruption due to lifeline outages. Tables 12 & 13 provide a detailed breakdown in the expected lifeline losses.

Table 12: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	2,593.13	$0.00	0.00
	Bridges	13.15	$0.01	0.05
	Tunnels	0.00	$0.00	0.00
	Subtotal	**2,606**	**0.00**	
Railways	Segments	0.00	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0**	**0.00**	
Light Rail	Segments	0.00	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0**	**0.00**	
Bus	Facilities	1.29	$0.01	0.82
	Subtotal	**1**	**0.00**	
Ferry	Facilities	0.00	$0.00	0.00
	Subtotal	**0**	**0.00**	
Port	Facilities	0.00	$0.00	0.00
	Subtotal	**0**	**0.00**	
Airport	Facilities	10.65	$1.04	9.73
	Runways	37.96	$0.00	0.00
	Subtotal	**49**	**1.00**	
	Total	**2,656.20**	**1.10**	

Table 13: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Distribution Lines	10.90	$0.08	0.74
	Subtotal	**10.85**	**$0.08**	
Waste Water	Pipelines	0.00	$0.00	0.00
	Facilities	78.60	$2.00	2.54
	Distribution Lines	6.50	$0.06	0.88
	Subtotal	**85.10**	**$2.05**	
Natural Gas	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Distribution Lines	4.30	$0.02	0.38
	Subtotal	**4.34**	**$0.02**	
Oil Systems	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**$0.00**	
Electrical Power	Facilities	259.60	$7.02	2.70
	Subtotal	**259.60**	**$7.02**	
Communication	Facilities	0.10	$0.00	1.27
	Subtotal	**0.12**	**$0.00**	
	Total	**360.01**	**$9.17**	

Appendix A: County Listing for the Region

Mono,CA

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
California	Mono	14,202	2,459	296	2,755
Total State		**14,202**	**2,459**	**296**	**2,755**
Total Region		**14,202**	**2,459**	**296**	**2,755**

Hazus-MH: Earthquake Global Risk Report

Region Name: Mono_County_EQ_RC

Earthquake Scenario: M6.9-Hilton Creek v14

Print Date: January 09, 2018

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.

Table of Contents

Section	Page #
General Description of the Region	3
Building and Lifeline Inventory	4
Building Inventory	
Critical Facility Inventory	
Transportation and Utility Lifeline Inventory	
Earthquake Scenario Parameters	6
Direct Earthquake Damage	7
Buildings Damage	
Critical Facilities Damage	
Transportation and Utility Lifeline Damage	
Induced Earthquake Damage	11
Debris Generation	
Social Impact	12
Shelter Requirements	
Casualties	
Economic Loss	13
Building Losses	
Transportation and Utility Lifeline Losses	
Appendix A: County Listing for the Region	
Appendix B: Regional Population and Building Value Data	

General Description of the Region

Hazus is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop earthquake losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from earthquakes and to prepare for emergency response and recovery.

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

California

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 3,131.05 square miles and contains 3 census tracts. There are over 5 thousand households in the region which has a total population of 14,202 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 8 thousand buildings in the region with a total building replacement value (excluding contents) of 2,755 (millions of dollars). Approximately 95.00 % of the buildings (and 89.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 2,656 and 360 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

Hazus estimates that there are 8 thousand buildings in the region which have an aggregate total replacement value of 2,755 (millions of dollars) . Appendix B provides a general distribution of the building value by State and County.

In terms of building construction types found in the region, wood frame construction makes up 81% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

Hazus breaks critical facilities into two (2) groups: essential facilities and high potential loss facilities (HPL). Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 15 beds. There are 22 schools, 10 fire stations, 3 police stations and 0 emergency operation facilities. With respect to high potential loss facilities (HPL), there are 0 dams identified within the inventory. Of these, 0 of the dams are classified as 'high hazard'. The inventory also includes 0 hazardous material sites, 0 military installations and 0 nuclear power plants.

Transportation and Utility Lifeline Inventory

Within Hazus, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 1 and 2.

The total value of the lifeline inventory is over 3,016.00 (millions of dollars). This inventory includes over 588 kilometers of highways, 29 bridges, 1,085 kilometers of pipes.

Table 1: Transportation System Lifeline Inventory

System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	29	13.20
	Segments	44	2,593.10
	Tunnels	0	0.00
	Subtotal		**2,606.30**
Railways	Bridges	0	0.00
	Facilities	0	0.00
	Segments	0	0.00
	Tunnels	0	0.00
	Subtotal		**0.00**
Light Rail	Bridges	0	0.00
	Facilities	0	0.00
	Segments	0	0.00
	Tunnels	0	0.00
	Subtotal		**0.00**
Bus	Facilities	1	1.30
	Subtotal		**1.30**
Ferry	Facilities	0	0.00
	Subtotal		**0.00**
Port	Facilities	0	0.00
	Subtotal		**0.00**
Airport	Facilities	1	10.70
	Runways	1	38.00
	Subtotal		**48.60**
	Total		**2,656.20**

Table 2: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	10.90
	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**10.90**
Waste Water	Distribution Lines	NA	6.50
	Facilities	1	78.60
	Pipelines	0	0.00
		Subtotal	**85.10**
Natural Gas	Distribution Lines	NA	4.30
	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**4.30**
Oil Systems	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**0.00**
Electrical Power	Facilities	2	259.60
		Subtotal	**259.60**
Communication	Facilities	1	0.10
		Subtotal	**0.10**
		Total	**360.00**

Earthquake Scenario

Hazus uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.

Scenario Name	M6.9-Hilton Creek v14
Type of Earthquake	
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	NA
Longitude of Epicenter	0.00
Latitude of Epicenter	0.00
Earthquake Magnitude	6.92
Depth (km)	0.00
Rupture Length (Km)	0.00
Rupture Orientation (degrees)	0.00
Attenuation Function	

Building Damage

Building Damage

Hazus estimates that about 922 buildings will be at least moderately damaged. This is over 11.00 % of the buildings in the region. There are an estimated 15 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus technical manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 below summarizes the expected damage by general building type.

Damage categories by General Occupancy Type

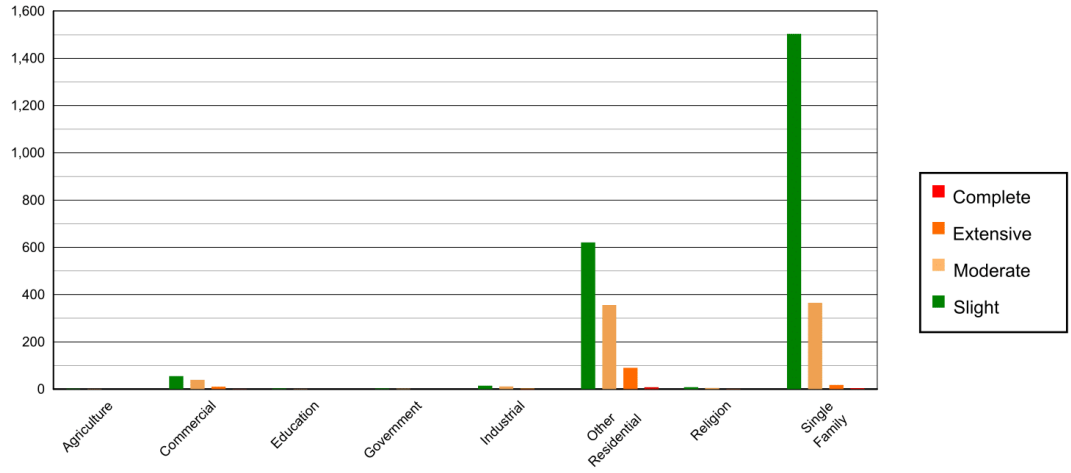


Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	12	0.22	2	0.08	1	0.11	0	0.14	0	0.15
Commercial	170	3.08	55	2.49	40	5.10	10	8.38	1	8.66
Education	16	0.28	3	0.15	2	0.22	0	0.29	0	0.21
Government	20	0.37	3	0.15	2	0.24	0	0.39	0	0.40
Industrial	40	0.73	15	0.66	12	1.47	3	2.59	0	2.69
Other Residential	1,266	22.87	621	28.09	356	45.52	90	72.56	9	56.61
Religion	25	0.46	9	0.39	5	0.70	1	1.15	0	1.21
Single Family	3,984	72.00	1,503	67.99	365	46.64	18	14.50	5	30.08
Total	**5,534**		**2,210**		**783**		**124**		**15**	

Table 4: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	4,624	83.56	1871	84.63	458	58.47	21	17.22	6	38.17
Steel	90	1.62	32	1.44	33	4.16	10	8.05	1	6.28
Concrete	103	1.86	44	1.99	27	3.50	8	6.56	1	5.32
Precast	43	0.77	15	0.66	14	1.85	4	3.55	0	2.77
RM	165	2.99	41	1.87	34	4.33	10	7.72	1	3.46
URM	27	0.48	14	0.65	12	1.58	4	3.42	1	9.11
MH	483	8.72	194	8.76	205	26.12	66	53.49	5	34.89
Total	**5,534**		**2,210**		**783**		**124**		**15**	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had 15 hospital beds available for use. On the day of the earthquake, the model estimates that only 8 hospital beds (59.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 94.00% of the beds will be back in service. By 30 days, 100.00% will be operational.

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	1	0	0	1
Schools	22	0	0	11
EOCs	0	0	0	0
PoliceStations	3	0	0	1
FireStations	10	0	0	6

Transportation Lifeline Damage

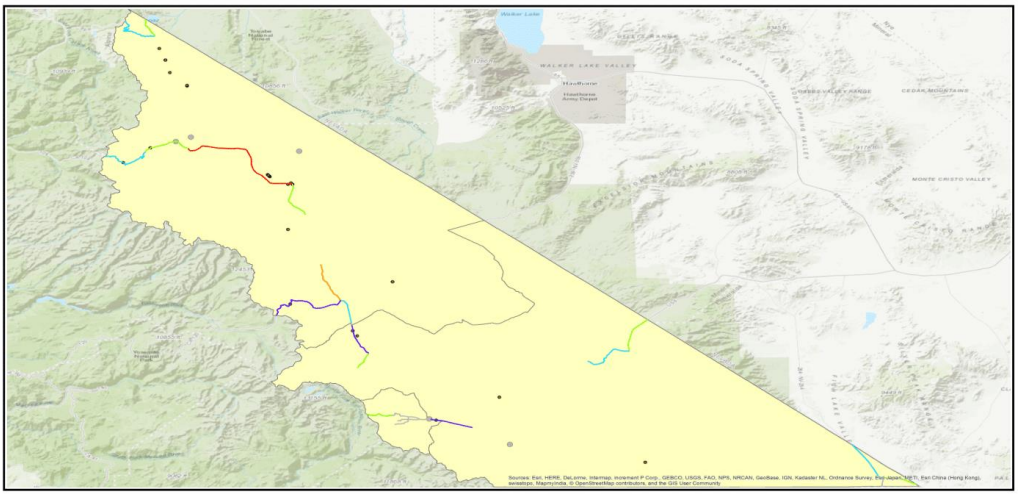


Table 6: Expected Damage to the Transportation Systems

System	Component		Number of Locations			
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	44	0	0	44	44
	Bridges	29	0	0	29	29
	Tunnels	0	0	0	0	0
Railways	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	1	0	0	1	1
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	1	1	0	1	1
	Runways	1	0	0	1	1

Table 6 provides damage estimates for the transportation system.

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, Hazus performs a simplified system performance analysis. Table 9 provides a summary of the system performance information.

Table 7 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	0	0	0	0	0
Waste Water	1	1	0	0	1
Natural Gas	0	0	0	0	0
Oil Systems	0	0	0	0	0
Electrical Power	2	0	0	1	2
Communication	1	0	0	1	1

Table 8 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	543	35	9
Waste Water	326	25	6
Natural Gas	217	7	2
Oil	0	0	0

Table 9: Expected Potable Water and Electric Power System Performance

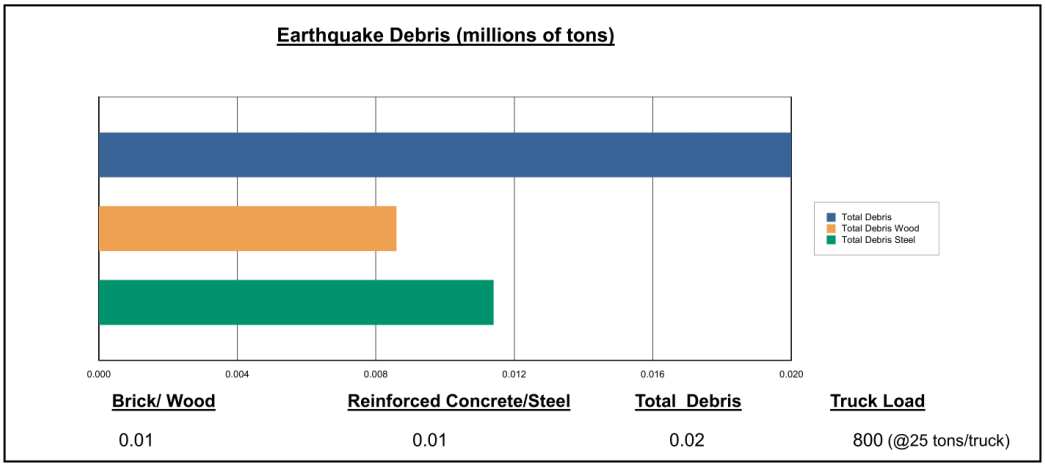
	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	5,768	0	0	0	0	0
Electric Power		0	0	0	0	0

Induced Earthquake Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0.02 million tons of debris will be generated. Of the total amount, Brick/Wood comprises 43.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 800 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.



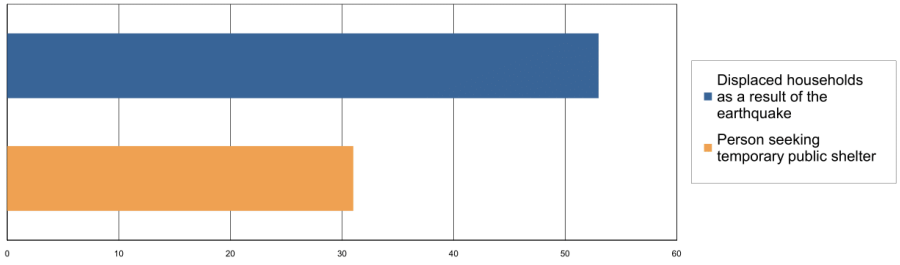
Brick/ Wood	Reinforced Concrete/Steel	Total Debris	Truck Load
0.01	0.01	0.02	800 (@25 tons/truck)

Social Impact

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 53 households to be displaced due to the earthquake. Of these, 31 people (out of a total population of 14,202) will seek temporary shelter in public shelters.

Displaced Households/ Persons Seeking Short Term Public Shelter



Displaced households as a result of the earthquake	Persons seeking temporary public shelter
53	31

Casualties

Hazus estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 10 provides a summary of the casualties estimated for this earthquake

Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	0	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	0	0	0	0
	Other-Residential	6	1	0	0
	Single Family	3	0	0	0
	Total	**9**	**1**	**0**	**0**
2 PM	Commercial	9	2	0	0
	Commuting	0	0	0	0
	Educational	2	0	0	0
	Hotels	0	0	0	0
	Industrial	1	0	0	0
	Other-Residential	1	0	0	0
	Single Family	0	0	0	0
	Total	**14**	**2**	**0**	**1**
5 PM	Commercial	6	1	0	0
	Commuting	0	0	1	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	1	0	0	0
	Other-Residential	2	0	0	0
	Single Family	1	0	0	0
	Total	**11**	**2**	**1**	**0**

Economic Loss

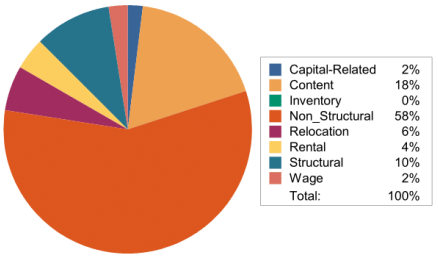
The total economic loss estimated for the earthquake is 159.29 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 118.72 (millions of dollars); 14 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 82 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

Earthquake Losses by Loss Type ($ millions)



Earthquake Losses by Occupancy Type ($ millions)

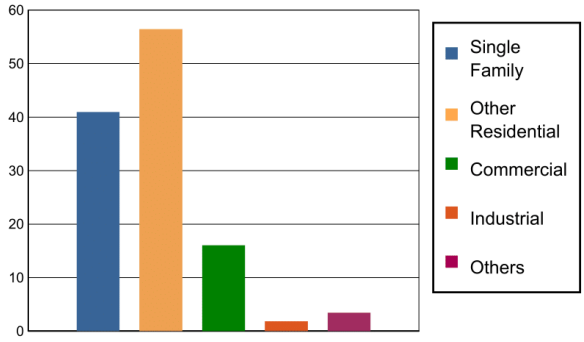


Table 11: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.00	1.02	1.69	0.03	0.14	2.88
	Capital-Related	0.00	0.44	1.72	0.02	0.02	2.20
	Rental	0.78	3.39	0.78	0.01	0.05	5.02
	Relocation	2.67	2.36	1.16	0.10	0.41	6.71
	Subtotal	**3.45**	**7.20**	**5.35**	**0.16**	**0.63**	**16.80**
Capital Stock Losses							
	Structural	4.57	5.06	1.70	0.23	0.43	12.00
	Non_Structural	24.89	35.14	5.93	0.86	1.58	68.38
	Content	8.05	9.04	2.98	0.50	0.81	21.38
	Inventory	0.00	0.00	0.07	0.08	0.00	0.15
	Subtotal	**37.51**	**49.23**	**10.68**	**1.67**	**2.82**	**101.92**
	Total	**40.97**	**56.44**	**16.03**	**1.83**	**3.45**	**118.72**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, Hazus computes the direct repair cost for each component only. There are no losses computed by Hazus for business interruption due to lifeline outages. Tables 12 & 13 provide a detailed breakdown in the expected lifeline losses.

Table 12: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	2,593.13	$0.00	0.00
	Bridges	13.15	$0.43	3.26
	Tunnels	0.00	$0.00	0.00
	Subtotal	**2,606**	**0.40**	
Railways	Segments	0.00	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0**	**0.00**	
Light Rail	Segments	0.00	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0**	**0.00**	
Bus	Facilities	1.29	$0.00	0.33
	Subtotal	**1**	**0.00**	
Ferry	Facilities	0.00	$0.00	0.00
	Subtotal	**0**	**0.00**	
Port	Facilities	0.00	$0.00	0.00
	Subtotal	**0**	**0.00**	
Airport	Facilities	10.65	$4.46	41.92
	Runways	37.96	$0.00	0.00
	Subtotal	**49**	**4.50**	
	Total	**2,656.20**	**4.90**	

Table 13: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Distribution Lines	10.90	$0.16	1.45
	Subtotal	**10.85**	**$0.16**	
Waste Water	Pipelines	0.00	$0.00	0.00
	Facilities	78.60	$13.22	16.82
	Distribution Lines	6.50	$0.11	1.74
	Subtotal	**85.10**	**$13.33**	
Natural Gas	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Distribution Lines	4.30	$0.03	0.75
	Subtotal	**4.34**	**$0.03**	
Oil Systems	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**$0.00**	
Electrical Power	Facilities	259.60	$22.14	8.53
	Subtotal	**259.60**	**$22.14**	
Communication	Facilities	0.10	$0.01	7.71
	Subtotal	**0.12**	**$0.01**	
	Total	**360.01**	**$35.67**	

Appendix A: County Listing for the Region

Mono,CA

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
California	Mono	14,202	2,459	296	2,755
Total State		**14,202**	**2,459**	**296**	**2,755**
Total Region		**14,202**	**2,459**	**296**	**2,755**

Hazus-MH: Earthquake Global Risk Report

Region Name: Mono_County_EQ_RC

Earthquake Scenario: M7.4-White Mountains v15

Print Date: January 09, 2018

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.

Table of Contents

Section	Page #
General Description of the Region	3
Building and Lifeline Inventory	4
Building Inventory	
Critical Facility Inventory	
Transportation and Utility Lifeline Inventory	
Earthquake Scenario Parameters	6
Direct Earthquake Damage	7
Buildings Damage	
Critical Facilities Damage	
Transportation and Utility Lifeline Damage	
Induced Earthquake Damage	11
Debris Generation	
Social Impact	12
Shelter Requirements	
Casualties	
Economic Loss	13
Building Losses	
Transportation and Utility Lifeline Losses	
Appendix A: County Listing for the Region	
Appendix B: Regional Population and Building Value Data	

General Description of the Region

Hazus is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop earthquake losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from earthquakes and to prepare for emergency response and recovery.

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

California

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 3,131.05 square miles and contains 3 census tracts. There are over 5 thousand households in the region which has a total population of 14,202 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 8 thousand buildings in the region with a total building replacement value (excluding contents) of 2,755 (millions of dollars). Approximately 95.00 % of the buildings (and 89.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 2,656 and 360 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

Hazus estimates that there are 8 thousand buildings in the region which have an aggregate total replacement value of 2,755 (millions of dollars) . Appendix B provides a general distribution of the building value by State and County.

In terms of building construction types found in the region, wood frame construction makes up 81% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

Hazus breaks critical facilities into two (2) groups: essential facilities and high potential loss facilities (HPL). Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 15 beds. There are 22 schools, 10 fire stations, 3 police stations and 0 emergency operation facilities. With respect to high potential loss facilities (HPL), there are 0 dams identified within the inventory. Of these, 0 of the dams are classified as 'high hazard'. The inventory also includes 0 hazardous material sites, 0 military installations and 0 nuclear power plants.

Transportation and Utility Lifeline Inventory

Within Hazus, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 1 and 2.

The total value of the lifeline inventory is over 3,016.00 (millions of dollars). This inventory includes over 588 kilometers of highways, 29 bridges, 1,085 kilometers of pipes.

Table 1: Transportation System Lifeline Inventory

System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	29	13.20
	Segments	44	2,593.10
	Tunnels	0	0.00
	Subtotal		**2,606.30**
Railways	Bridges	0	0.00
	Facilities	0	0.00
	Segments	0	0.00
	Tunnels	0	0.00
	Subtotal		**0.00**
Light Rail	Bridges	0	0.00
	Facilities	0	0.00
	Segments	0	0.00
	Tunnels	0	0.00
	Subtotal		**0.00**
Bus	Facilities	1	1.30
	Subtotal		**1.30**
Ferry	Facilities	0	0.00
	Subtotal		**0.00**
Port	Facilities	0	0.00
	Subtotal		**0.00**
Airport	Facilities	1	10.70
	Runways	1	38.00
	Subtotal		**48.60**
	Total		**2,656.20**

Table 2: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	10.90
	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**10.90**
Waste Water	Distribution Lines	NA	6.50
	Facilities	1	78.60
	Pipelines	0	0.00
		Subtotal	**85.10**
Natural Gas	Distribution Lines	NA	4.30
	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**4.30**
Oil Systems	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**0.00**
Electrical Power	Facilities	2	259.60
		Subtotal	**259.60**
Communication	Facilities	1	0.10
		Subtotal	**0.10**
		Total	**360.00**

Earthquake Scenario

Hazus uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.

Scenario Name	M7.4-White Mountains v15
Type of Earthquake	
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	NA
Longitude of Epicenter	0.00
Latitude of Epicenter	0.00
Earthquake Magnitude	7.38
Depth (km)	0.00
Rupture Length (Km)	0.00
Rupture Orientation (degrees)	0.00
Attenuation Function	

Building Damage

Building Damage

Hazus estimates that about 448 buildings will be at least moderately damaged. This is over 5.00 % of the buildings in the region. There are an estimated 7 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus technical manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 below summarizes the expected damage by general building type.

Damage categories by General Occupancy Type

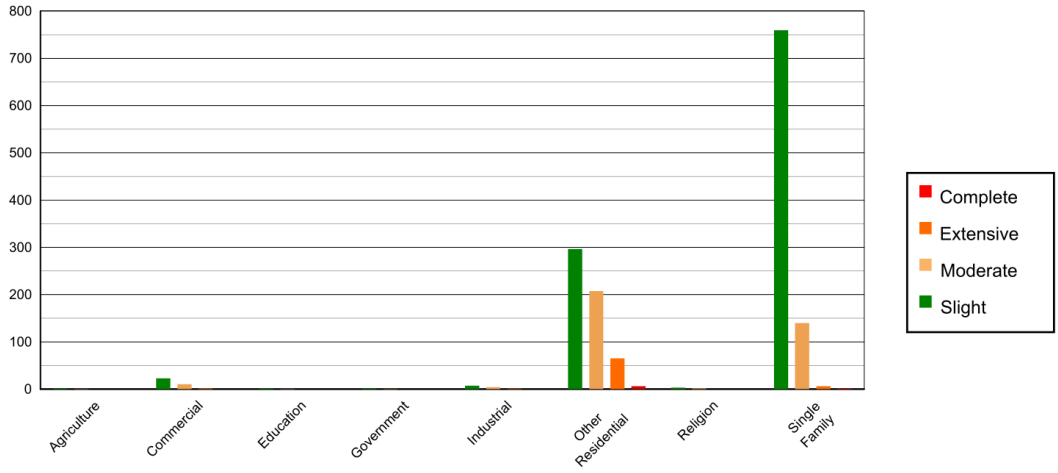


Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	12	0.18	2	0.14	1	0.21	0	0.23	0	0.29
Commercial	241	3.39	23	2.11	11	2.88	2	2.49	0	2.26
Education	19	0.27	1	0.13	0	0.13	0	0.10	0	0.06
Government	24	0.33	2	0.14	1	0.17	0	0.14	0	0.13
Industrial	57	0.80	8	0.69	4	1.17	1	1.22	0	1.22
Other Residential	1,767	24.79	296	27.09	208	56.84	65	87.42	6	76.26
Religion	36	0.50	3	0.31	1	0.38	0	0.34	0	0.33
Single Family	4,969	69.74	759	69.39	140	38.21	6	8.08	2	19.45
Total	**7,125**		**1,094**		**365**		**75**		**8**	

Table 4: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	5,962	83.67	860	78.58	151	41.25	6	7.91	2	21.31
Steel	139	1.96	15	1.33	9	2.49	2	2.32	0	1.84
Concrete	159	2.23	17	1.53	6	1.74	1	1.67	0	1.24
Precast	64	0.90	7	0.63	4	1.20	1	1.14	0	0.83
RM	222	3.12	16	1.51	10	2.71	2	2.69	0	0.90
URM	47	0.66	7	0.66	4	0.97	1	1.01	0	2.16
MH	531	7.45	172	15.76	181	49.65	62	83.25	6	71.71
Total	**7,125**		**1,094**		**365**		**75**		**8**	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had 15 hospital beds available for use. On the day of the earthquake, the model estimates that only 14 hospital beds (96.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 100.00% of the beds will be back in service. By 30 days, 100.00% will be operational.

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	1	0	0	1
Schools	22	0	0	20
EOCs	0	0	0	0
PoliceStations	3	0	0	3
FireStations	10	0	0	8

Transportation Lifeline Damage

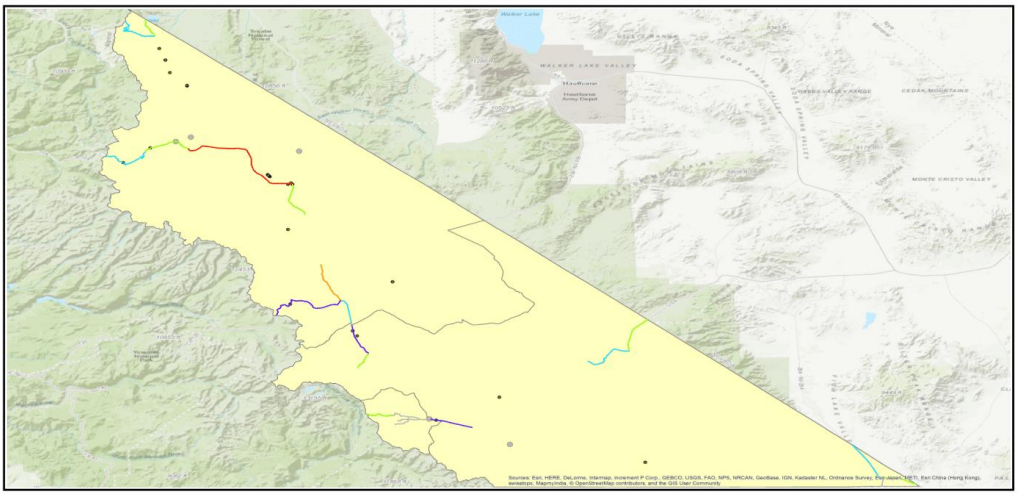


Table 6: Expected Damage to the Transportation Systems

System	Component		Number of Locations			
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 % After Day 1	With Functionality > 50 % After Day 7
Highway	Segments	44	0	0	44	44
	Bridges	29	0	0	29	29
	Tunnels	0	0	0	0	0
Railways	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	1	0	0	1	1
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	1	0	0	1	1
	Runways	1	0	0	1	1

Table 6 provides damage estimates for the transportation system.

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, Hazus performs a simplified system performance analysis. Table 9 provides a summary of the system performance information.

Table 7 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	0	0	0	0	0
Waste Water	1	0	0	1	1
Natural Gas	0	0	0	0	0
Oil Systems	0	0	0	0	0
Electrical Power	2	0	0	2	2
Communication	1	0	0	1	1

Table 8 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	543	18	4
Waste Water	326	13	3
Natural Gas	217	4	1
Oil	0	0	0

Table 9: Expected Potable Water and Electric Power System Performance

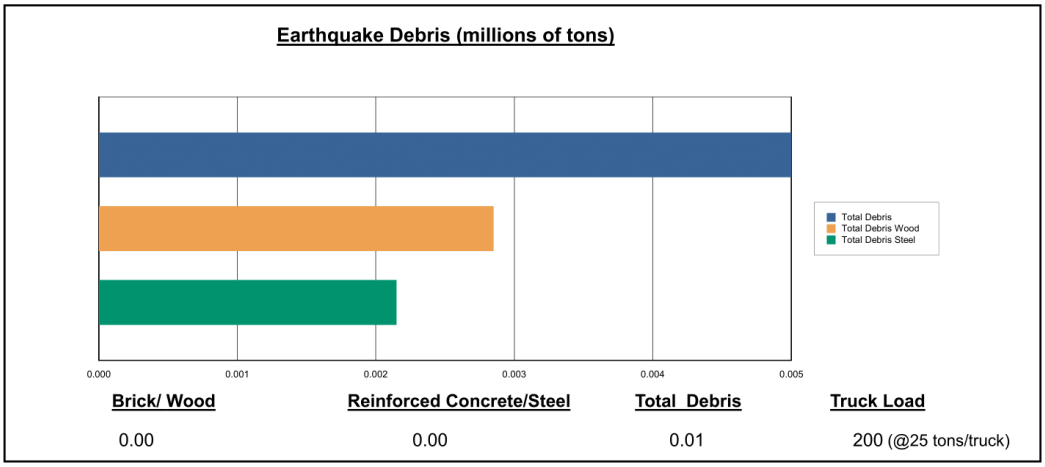
	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	5,768	0	0	0	0	0
Electric Power		0	0	0	0	0

Induced Earthquake Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0.01 million tons of debris will be generated. Of the total amount, Brick/Wood comprises 57.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 200 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.



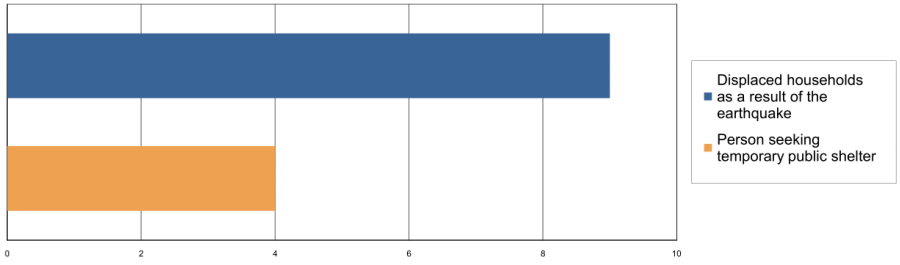
Brick/ Wood	Reinforced Concrete/Steel	Total Debris	Truck Load
0.00	0.00	0.01	200 (@25 tons/truck)

Social Impact

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 9 households to be displaced due to the earthquake. Of these, 4 people (out of a total population of 14,202) will seek temporary shelter in public shelters.

Displaced Households/ Persons Seeking Short Term Public Shelter



Displaced households as a result of the earthquake	Persons seeking temporary public shelter
9	4

Casualties

Hazus estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 10 provides a summary of the casualties estimated for this earthquake

Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	0	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	0	0	0	0
	Other-Residential	2	0	0	0
	Single Family	1	0	0	0
	Total	**3**	**0**	**0**	**0**
2 PM	Commercial	2	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	0	0	0	0
	Other-Residential	0	0	0	0
	Single Family	0	0	0	0
	Total	**4**	**1**	**0**	**0**
5 PM	Commercial	2	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	0	0	0	0
	Other-Residential	1	0	0	0
	Single Family	0	0	0	0
	Total	**3**	**0**	**0**	**0**

Economic Loss

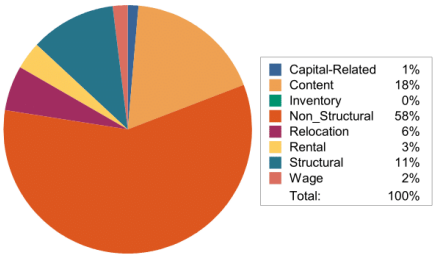
The total economic loss estimated for the earthquake is 43.38 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 33.15 (millions of dollars); 13 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 86 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

Earthquake Losses by Loss Type ($ millions)



Earthquake Losses by Occupancy Type ($ millions)

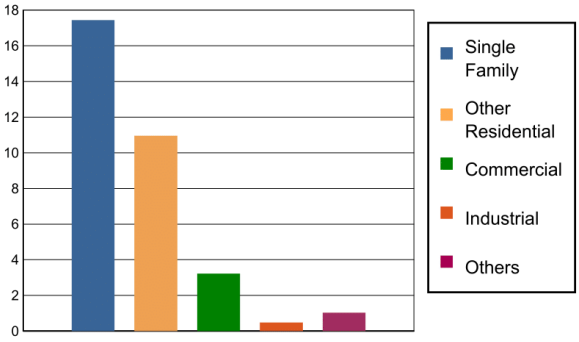


Table 11: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.00	0.29	0.31	0.01	0.06	0.66
	Capital-Related	0.00	0.12	0.34	0.01	0.01	0.47
	Rental	0.31	0.66	0.16	0.00	0.01	1.14
	Relocation	1.01	0.67	0.21	0.02	0.10	2.01
	Subtotal	**1.31**	**1.74**	**1.03**	**0.04**	**0.17**	**4.29**
Capital Stock Losses							
	Structural	1.95	1.22	0.32	0.06	0.13	3.68
	Non_Structural	10.74	6.59	1.24	0.23	0.47	19.28
	Content	3.44	1.41	0.61	0.13	0.26	5.86
	Inventory	0.00	0.00	0.02	0.02	0.00	0.04
	Subtotal	**16.13**	**9.23**	**2.19**	**0.45**	**0.87**	**28.86**
	Total	**17.45**	**10.96**	**3.22**	**0.49**	**1.04**	**33.15**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, Hazus computes the direct repair cost for each component only. There are no losses computed by Hazus for business interruption due to lifeline outages. Tables 12 & 13 provide a detailed breakdown in the expected lifeline losses.

Table 12: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	2,593.13	$0.00	0.00
	Bridges	13.15	$0.01	0.05
	Tunnels	0.00	$0.00	0.00
	Subtotal	**2,606**	**0.00**	
Railways	Segments	0.00	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0**	**0.00**	
Light Rail	Segments	0.00	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0**	**0.00**	
Bus	Facilities	1.29	$0.01	0.82
	Subtotal	**1**	**0.00**	
Ferry	Facilities	0.00	$0.00	0.00
	Subtotal	**0**	**0.00**	
Port	Facilities	0.00	$0.00	0.00
	Subtotal	**0**	**0.00**	
Airport	Facilities	10.65	$1.04	9.73
	Runways	37.96	$0.00	0.00
	Subtotal	**49**	**1.00**	
	Total	**2,656.20**	**1.10**	

Table 13: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Distribution Lines	10.90	$0.08	0.74
	Subtotal	**10.85**	**$0.08**	
Waste Water	Pipelines	0.00	$0.00	0.00
	Facilities	78.60	$2.00	2.54
	Distribution Lines	6.50	$0.06	0.88
	Subtotal	**85.10**	**$2.05**	
Natural Gas	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Distribution Lines	4.30	$0.02	0.38
	Subtotal	**4.34**	**$0.02**	
Oil Systems	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**$0.00**	
Electrical Power	Facilities	259.60	$7.02	2.70
	Subtotal	**259.60**	**$7.02**	
Communication	Facilities	0.10	$0.00	1.27
	Subtotal	**0.12**	**$0.00**	
	Total	**360.01**	**$9.17**	

Appendix A: County Listing for the Region

Mono,CA

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
California	Mono	14,202	2,459	296	2,755
Total State		**14,202**	**2,459**	**296**	**2,755**
Total Region		**14,202**	**2,459**	**296**	**2,755**

Mono County | Town of Mammoth Lakes

Multi-Jurisdictional Hazard Mitigation Plan (MJHMP)

APPENDIX E: MONO COUNTY HAZUS FLOOD REPORTS

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Hazus-MH: Flood Global Risk Report

Region Name:	MC_Flooding
Flood Scenario:	Scenario 1
Print Date:	Wednesday, January 24, 2018

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Flood. These results can be improved by using enhanced inventory data and flood hazard information.

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Table of Contents

Section	Page #
General Description of the Region	3
Building Inventory	
General Building Stock	4
Essential Facility Inventory	5
Flood Scenario Parameters	6
Building Damage	
General Building Stock	7
Essential Facilities Damage	9
Induced Flood Damage	10
Debris Generation	
Social Impact	10
Shelter Requirements	
Economic Loss	12
Building-Related Losses	
Appendix A: County Listing for the Region	15
Appendix B: Regional Population and Building Value Data	16

General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- California

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 3,132 square miles and contains 3,050 census blocks. The region contains over 6 thousand households and has a total population of 14,202 people (2010 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 8,667 buildings in the region with a total building replacement value (excluding contents) of 2,756 million dollars (2010 dollars). Approximately 94.81% of the buildings (and 89.24% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 8,667 buildings in the region which have an aggregate total replacement value of 2,756 million (2014 dollars). Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	2,459,157	89.2%
Commercial	190,438	6.9%
Industrial	29,199	1.1%
Agricultural	4,271	0.2%
Religion	27,839	1.0%
Government	23,498	0.9%
Education	21,330	0.8%
Total	**2,755,732**	**100.0%**

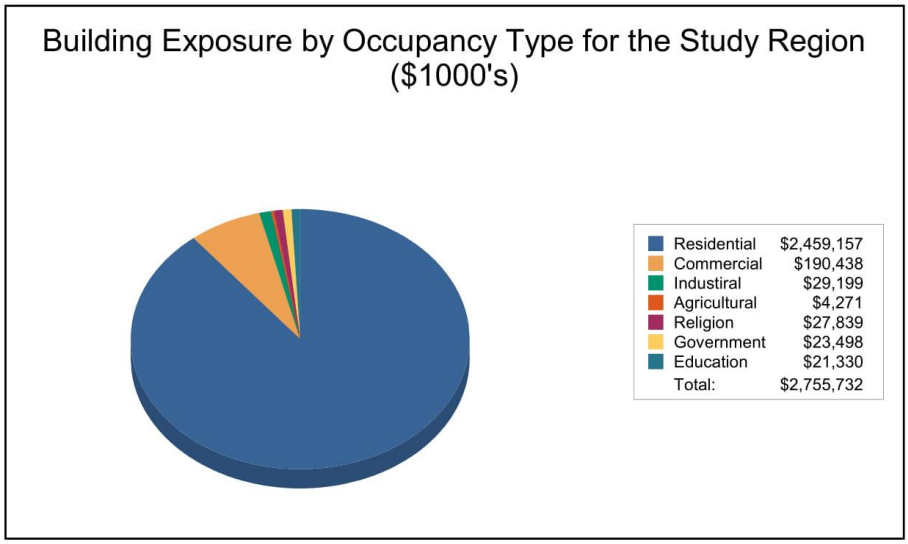
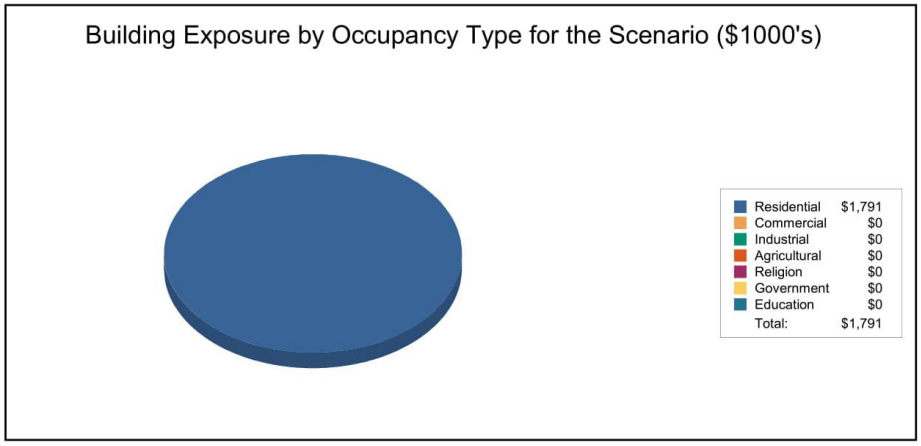


Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	1,791	100.0%
Commercial	0	0.0%
Industrial	0	0.0%
Agricultural	0	0.0%
Religion	0	0.0%
Government	0	0.0%
Education	0	0.0%
Total	**1,791**	**100.0%**



Essential Facility Inventory

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 15 beds.
There are 22 schools, 10 fire stations, 3 police stations and no emergency operation centers.

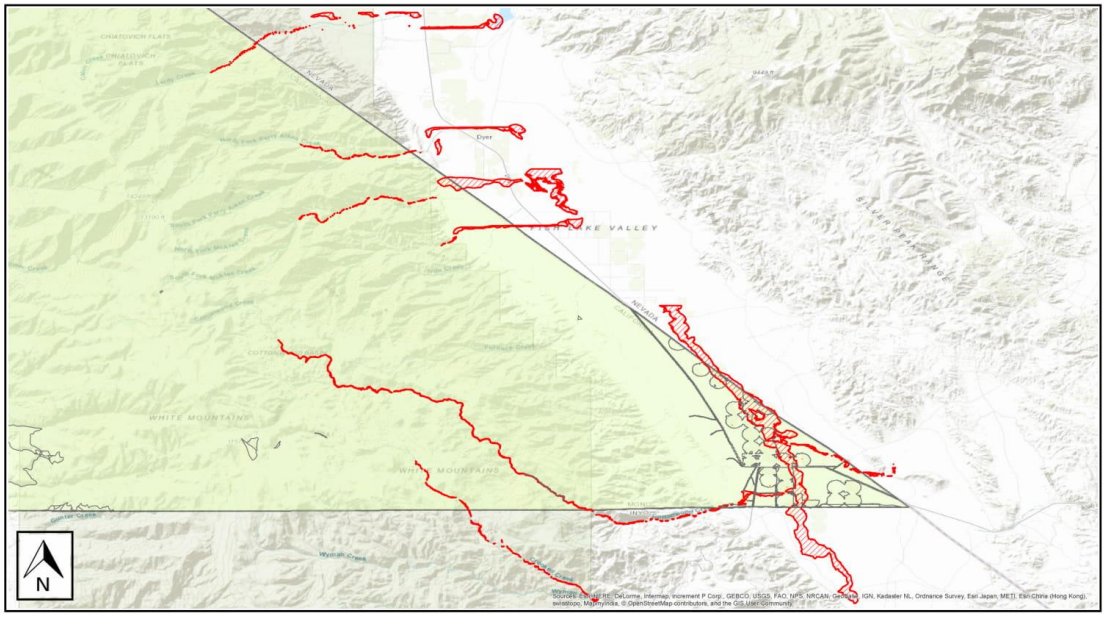
Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	MC_Flooding
Scenario Name:	Scenario 1
Return Period Analyzed:	100
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



Building Damage

General Building Stock Damage

Hazus estimates that about 0 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the scenario. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = $300K) Overview Map

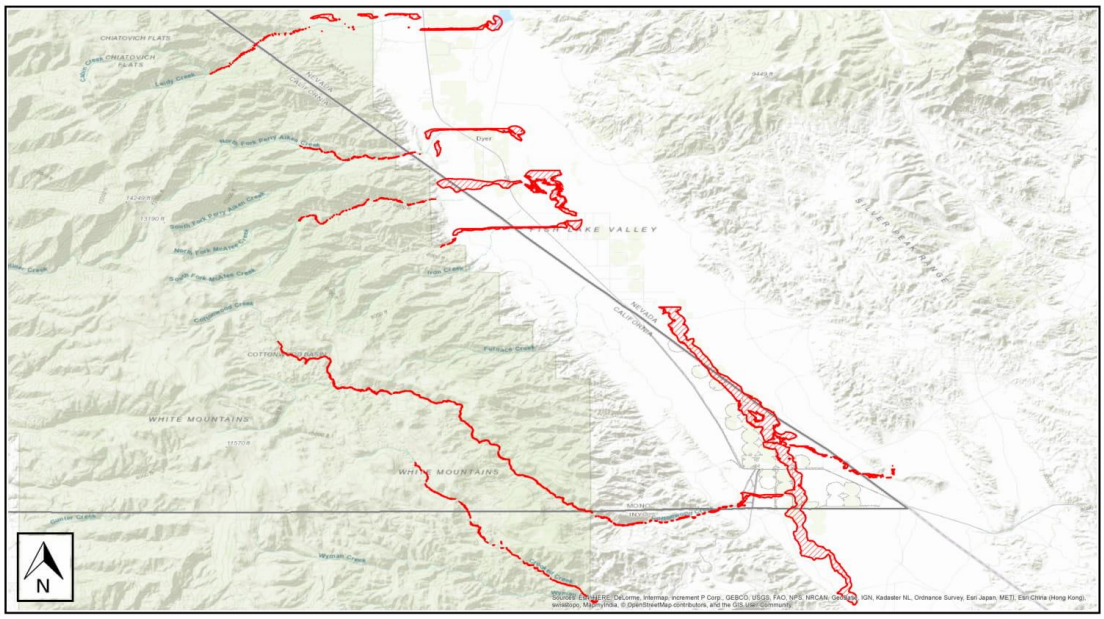


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Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	**0**		**0**		**0**		**0**		**0**		**0**	

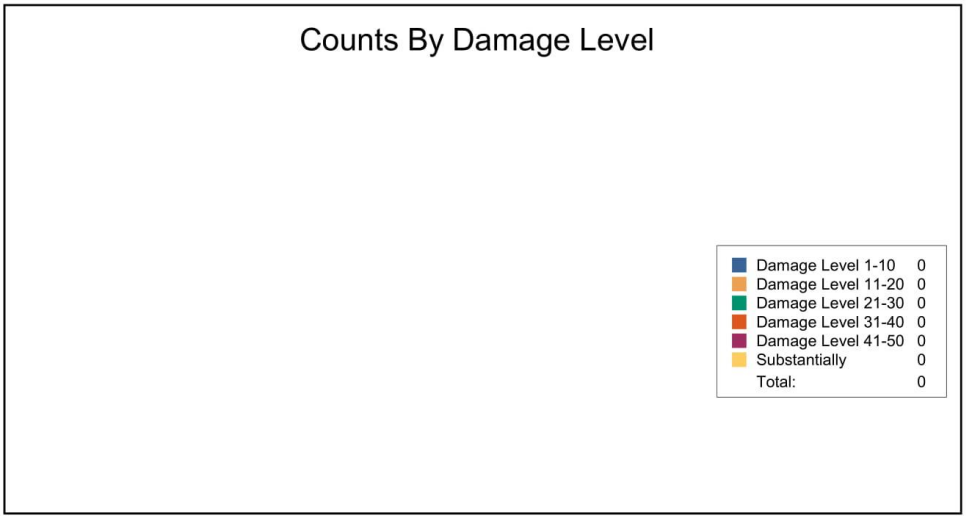


Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	0	0	0	0	0	0	0	0	0	0
ManufHousing	0	0	0	0	0	0	0	0	0	0	0	0
Masonry	0	0	0	0	0	0	0	0	0	0	0	0
Steel	0	0	0	0	0	0	0	0	0	0	0	0
Wood	0	0	0	0	0	0	0	0	0	0	0	0

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 15 hospital beds available for use. On the day of the scenario flood event, the model estimates that 15 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Fire Stations	10	0	0	0
Hospitals	1	0	0	0
Police Stations	3	0	0	0
Schools	22	0	0	0

If this report displays all zeros or is blank, two possibilities can explain this.

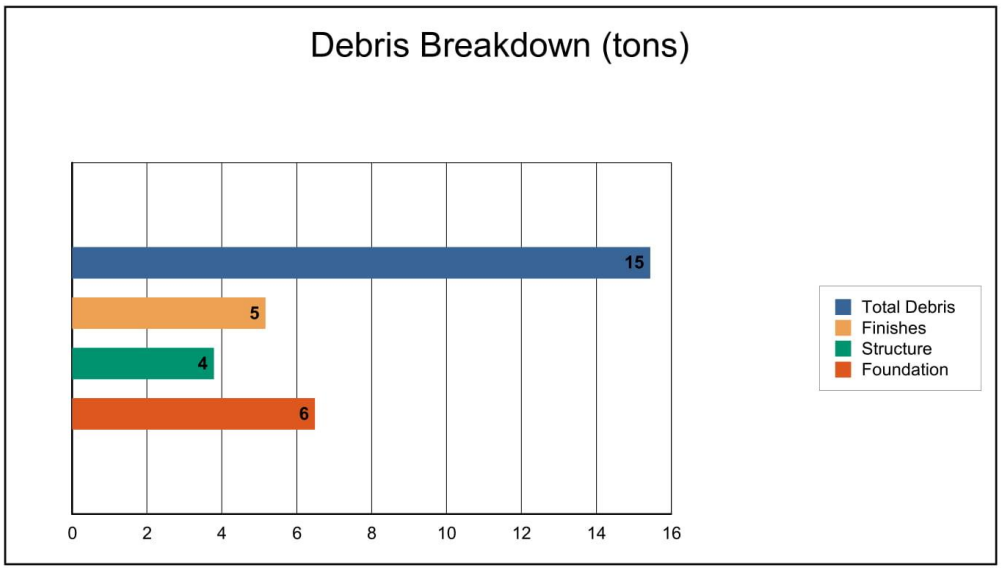
(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

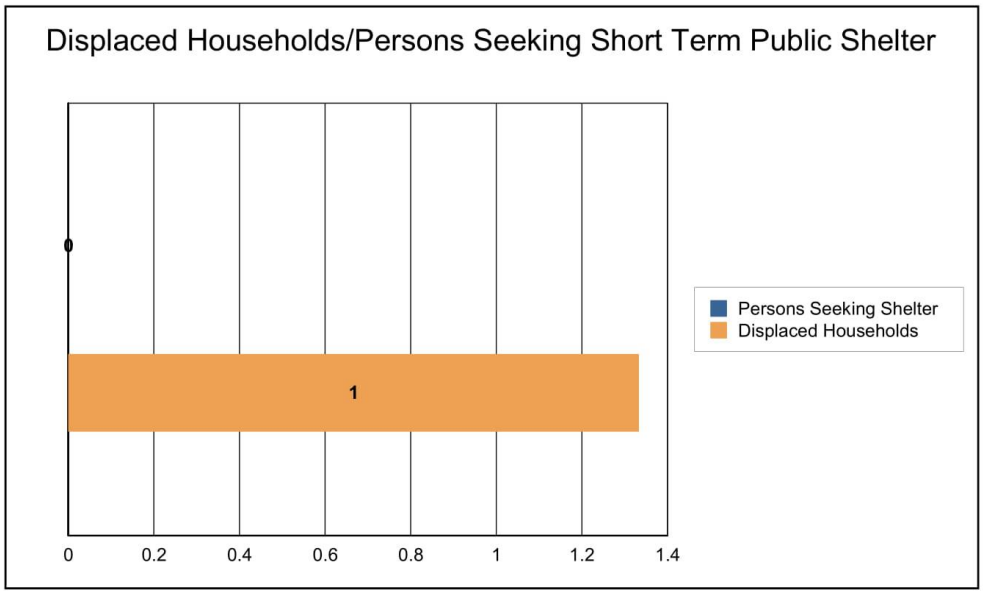


The model estimates that a total of 15 tons of debris will be generated. Of the total amount, Finishes comprises 33% of the total, Structure comprises 25% of the total. If the debris tonnage is converted into an estimated number of truckloads, it will require 1 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 1 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 0 people (out of a total population of 14,202) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 0.09 million dollars, which represents 4.97 % of the total replacement value of the scenario buildings.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 0.09 million dollars. 0% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 100.00% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

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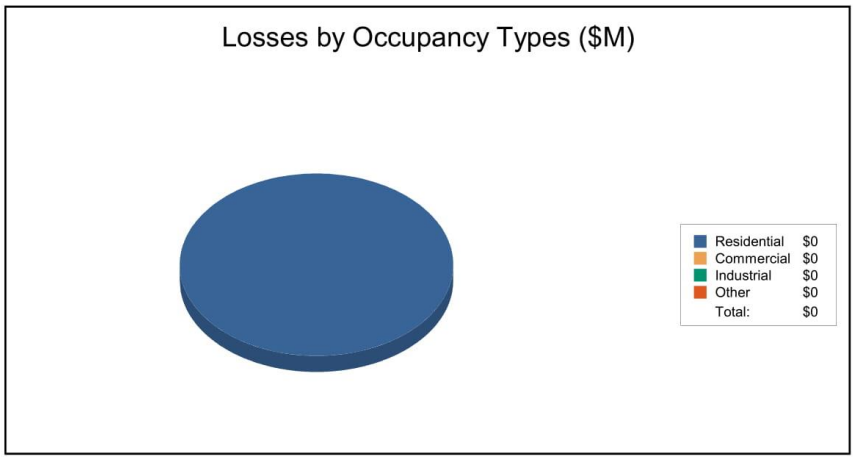
Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	0.06	0.00	0.00	0.00	0.06
	Content	0.03	0.00	0.00	0.00	0.03
	Inventory	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.09**	**0.00**	**0.00**	**0.00**	**0.09**
Business Interruption						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	0.00	0.00	0.00	0.00	0.00
	Rental Income	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
ALL	**Total**	**0.09**	**0.00**	**0.00**	**0.00**	**0.09**



Appendix A: County Listing for the Region

California
- Mono

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Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
California				
Mono	14,202	2,459,157	296,575	2,755,732
Total	**14,202**	**2,459,157**	**296,575**	**2,755,732**
Total Study Region	**14,202**	**2,459,157**	**296,575**	**2,755,732**

Hazus-MH: Flood Global Risk Report

Region Name:	MC_Flooding
Flood Scenario:	Scenario 2
Print Date:	Wednesday, January 24, 2018

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Flood. These results can be improved by using enhanced inventory data and flood hazard information.

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Table of Contents

Section	Page #
General Description of the Region	3
Building Inventory	
General Building Stock	4
Essential Facility Inventory	5
Flood Scenario Parameters	6
Building Damage	
General Building Stock	7
Essential Facilities Damage	9
Induced Flood Damage	10
Debris Generation	
Social Impact	10
Shelter Requirements	
Economic Loss	12
Building-Related Losses	
Appendix A: County Listing for the Region	15
Appendix B: Regional Population and Building Value Data	16

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The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

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Note:
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Building Inventory

General Building Stock

Hazus estimates that there are 8,667 buildings in the region which have an aggregate total replacement value of 2,756 million (2014 dollars). Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
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Agricultural	4,271	0.2%
Religion	27,839	1.0%
Government	23,498	0.9%
Education	21,330	0.8%
Total	**2,755,732**	**100.0%**

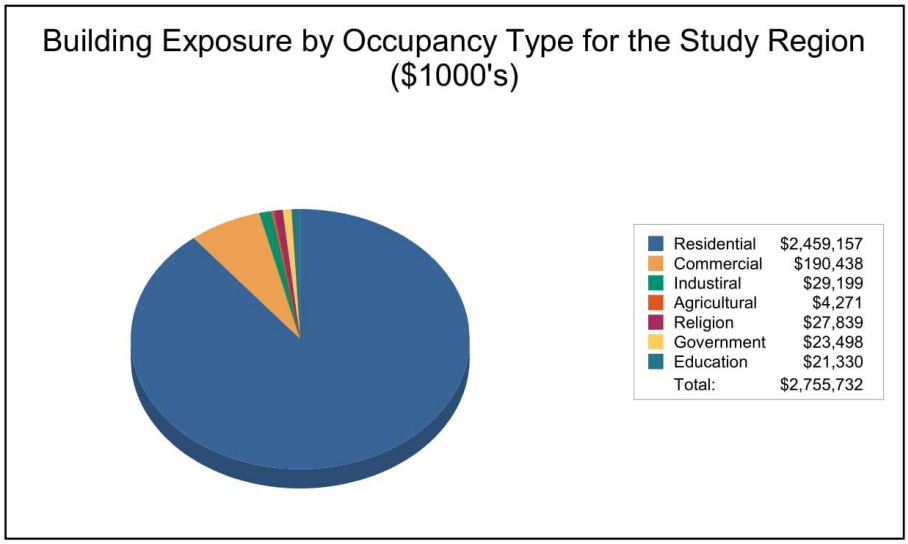
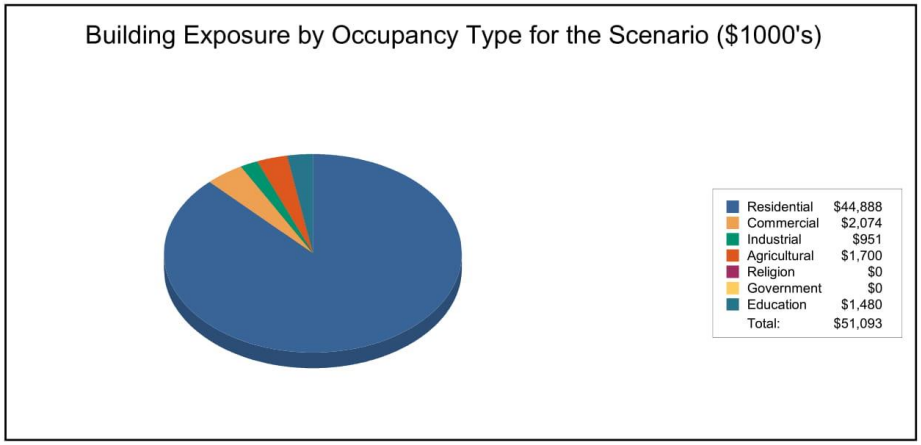


Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	44,888	87.9%
Commercial	2,074	4.1%
Industrial	951	1.9%
Agricultural	1,700	3.3%
Religion	0	0.0%
Government	0	0.0%
Education	1,480	2.9%
Total	**51,093**	**100.0%**



Essential Facility Inventory

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 15 beds.
There are 22 schools, 10 fire stations, 3 police stations and no emergency operation centers.

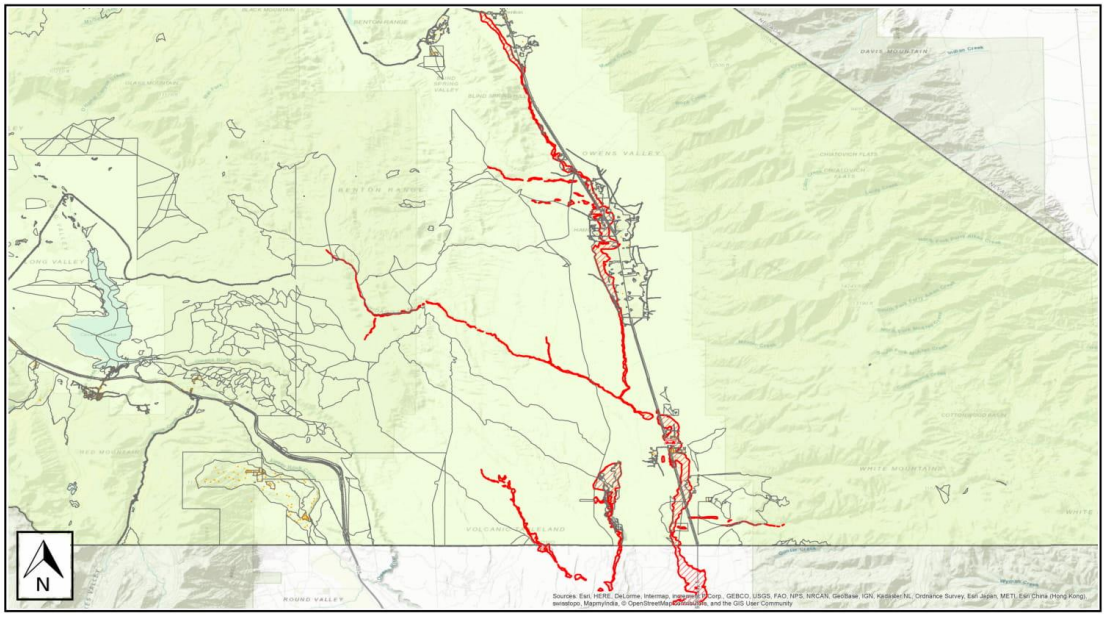
Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	MC_Flooding
Scenario Name:	Scenario 2
Return Period Analyzed:	100
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



Building Damage

General Building Stock Damage

Hazus estimates that about 62 buildings will be at least moderately damaged. This is over 13% of the total number of buildings in the scenario. There are an estimated 48 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = $300K) Overview Map

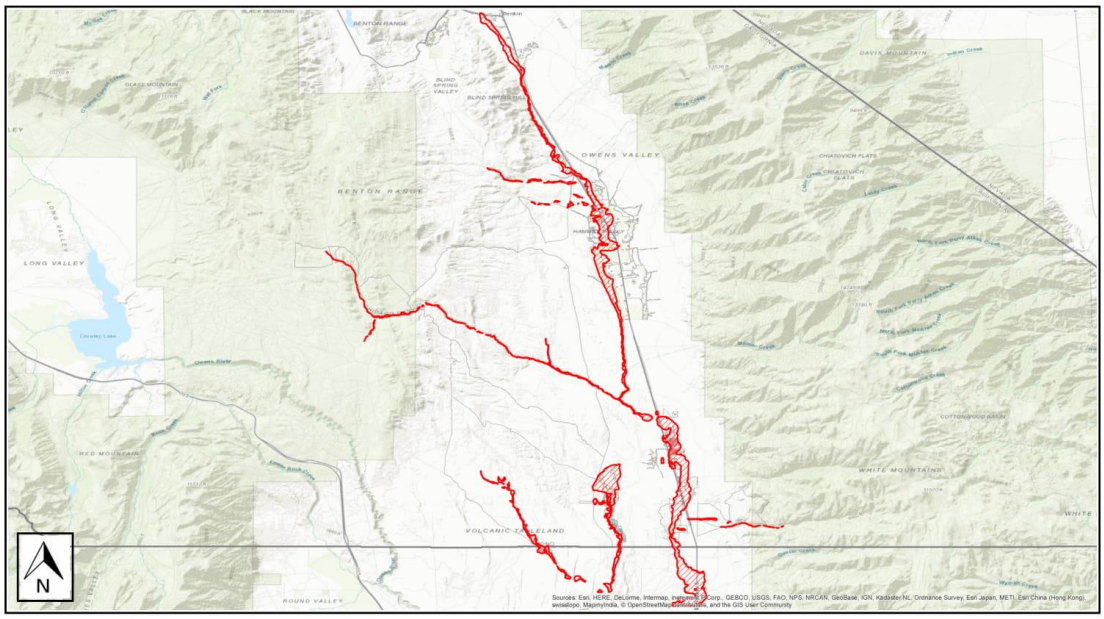


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Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	0	0.00	3	4.84	5	8.06	3	4.84	3	4.84	48	77.42
Total	**0**		**3**		**5**		**3**		**3**		**48**	

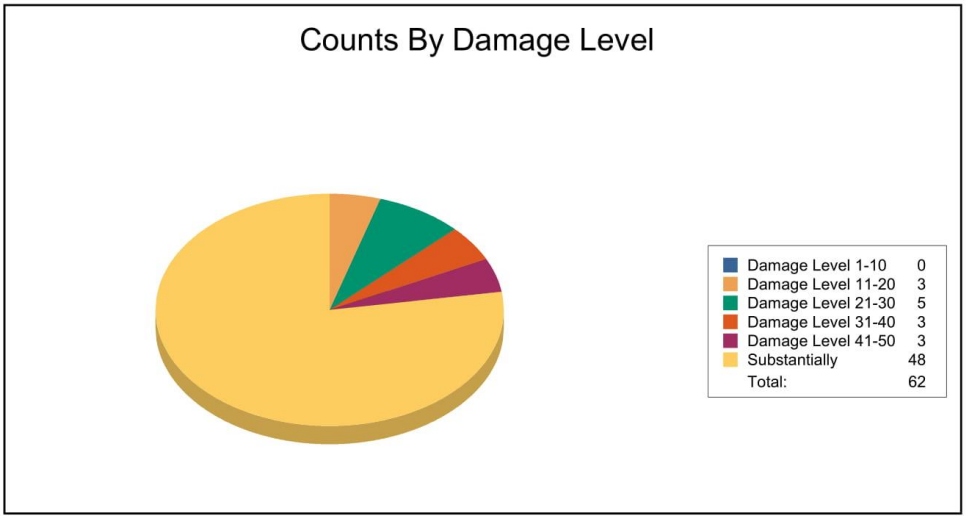


Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	0	0	0	0	0	0	0	0	0	0
ManufHousing	0	0	0	0	0	0	0	0	0	0	34	100
Masonry	0	0	0	0	0	0	0	0	0	0	0	0
Steel	0	0	0	0	0	0	0	0	0	0	0	0
Wood	0	0	3	11	5	18	3	11	3	11	14	50

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 15 hospital beds available for use. On the day of the scenario flood event, the model estimates that 15 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Fire Stations	10	1	0	1
Hospitals	1	0	0	0
Police Stations	3	0	0	0
Schools	22	0	0	0

If this report displays all zeros or is blank, two possibilities can explain this.

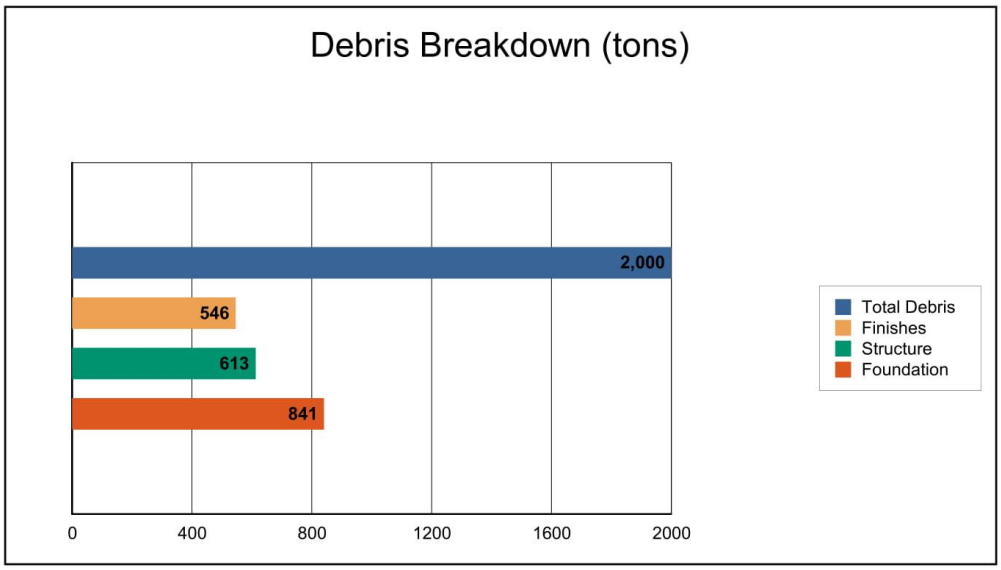
(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

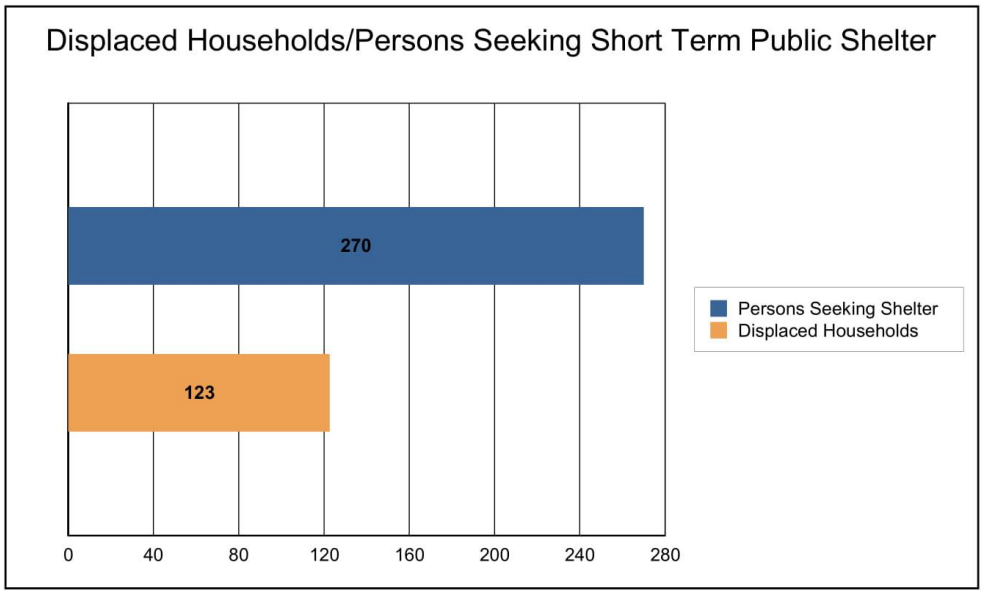


The model estimates that a total of 2,000 tons of debris will be generated. Of the total amount, Finishes comprises 27% of the total, Structure comprises 31% of the total. If the debris tonnage is converted into an estimated number of truckloads, it will require 80 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 123 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 270 people (out of a total population of 14,202) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 15.61 million dollars, which represents 30.54 % of the total replacement value of the scenario buildings.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 15.60 million dollars. 0% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 89.75% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

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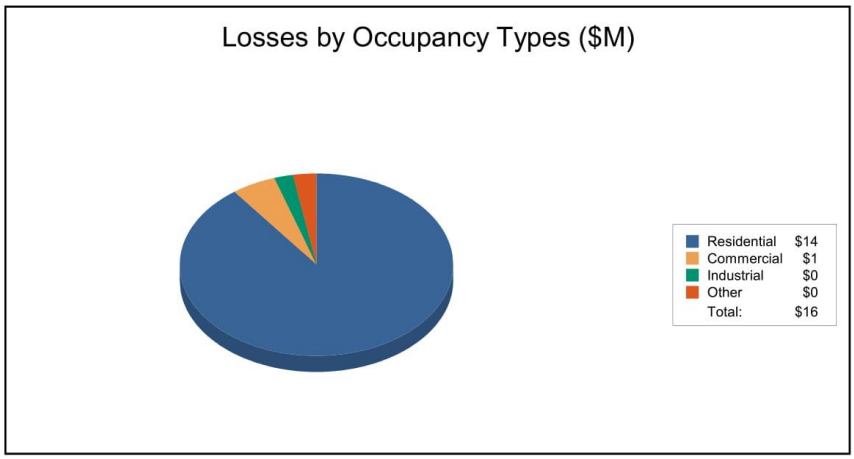
Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	9.26	0.25	0.13	0.13	9.77
	Content	4.73	0.58	0.17	0.28	5.75
	Inventory	0.00	0.01	0.02	0.04	0.07
	Subtotal	**14.00**	**0.83**	**0.32**	**0.44**	**15.60**
Business Interruption						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	0.01	0.00	0.00	0.00	0.01
	Rental Income	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.01**	**0.00**	**0.00**	**0.00**	**0.01**
ALL	**Total**	**14.01**	**0.83**	**0.32**	**0.44**	**15.61**



Appendix A: County Listing for the Region

California
- Mono

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
California				
Mono	14,202	2,459,157	296,575	2,755,732
Total	**14,202**	**2,459,157**	**296,575**	**2,755,732**
Total Study Region	**14,202**	**2,459,157**	**296,575**	**2,755,732**

Hazus-MH: Flood Global Risk Report

Region Name:	MC_Flooding
Flood Scenario:	Scenario 3
Print Date:	Wednesday, January 24, 2018

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Flood. These results can be improved by using enhanced inventory data and flood hazard information.

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Table of Contents

Section	Page #
General Description of the Region	3
Building Inventory	
General Building Stock	4
Essential Facility Inventory	5
Flood Scenario Parameters	6
Building Damage	
General Building Stock	7
Essential Facilities Damage	9
Induced Flood Damage	10
Debris Generation	
Social Impact	10
Shelter Requirements	
Economic Loss	12
Building-Related Losses	
Appendix A: County Listing for the Region	15
Appendix B: Regional Population and Building Value Data	16

General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- California

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 3,132 square miles and contains 3,050 census blocks. The region contains over 6 thousand households and has a total population of 14,202 people (2010 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 8,667 buildings in the region with a total building replacement value (excluding contents) of 2,756 million dollars (2010 dollars). Approximately 94.81% of the buildings (and 89.24% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 8,667 buildings in the region which have an aggregate total replacement value of 2,756 million (2014 dollars). Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	2,459,157	89.2%
Commercial	190,438	6.9%
Industrial	29,199	1.1%
Agricultural	4,271	0.2%
Religion	27,839	1.0%
Government	23,498	0.9%
Education	21,330	0.8%
Total	**2,755,732**	**100.0%**

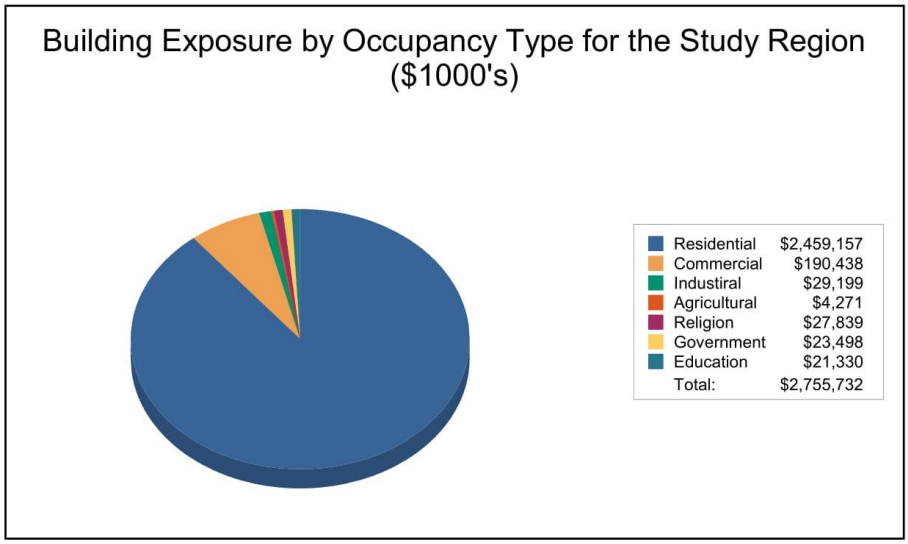
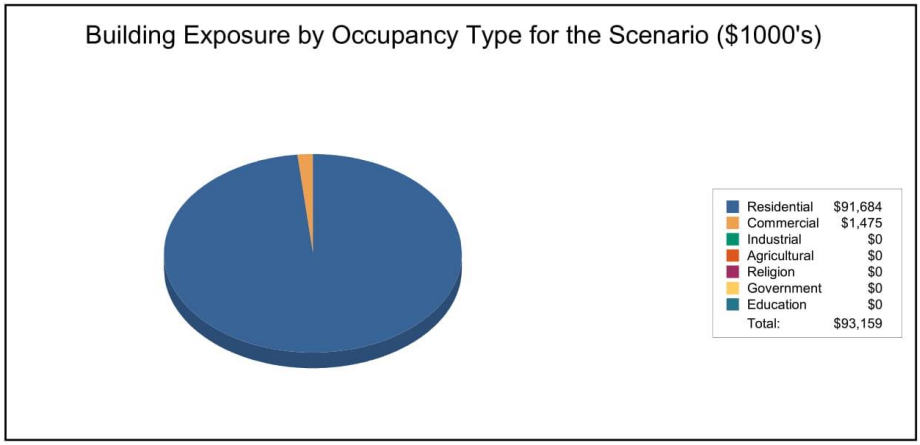


Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	91,684	98.4%
Commercial	1,475	1.6%
Industrial	0	0.0%
Agricultural	0	0.0%
Religion	0	0.0%
Government	0	0.0%
Education	0	0.0%
Total	**93,159**	**100.0%**



Essential Facility Inventory

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 15 beds.
There are 22 schools, 10 fire stations, 3 police stations and no emergency operation centers.

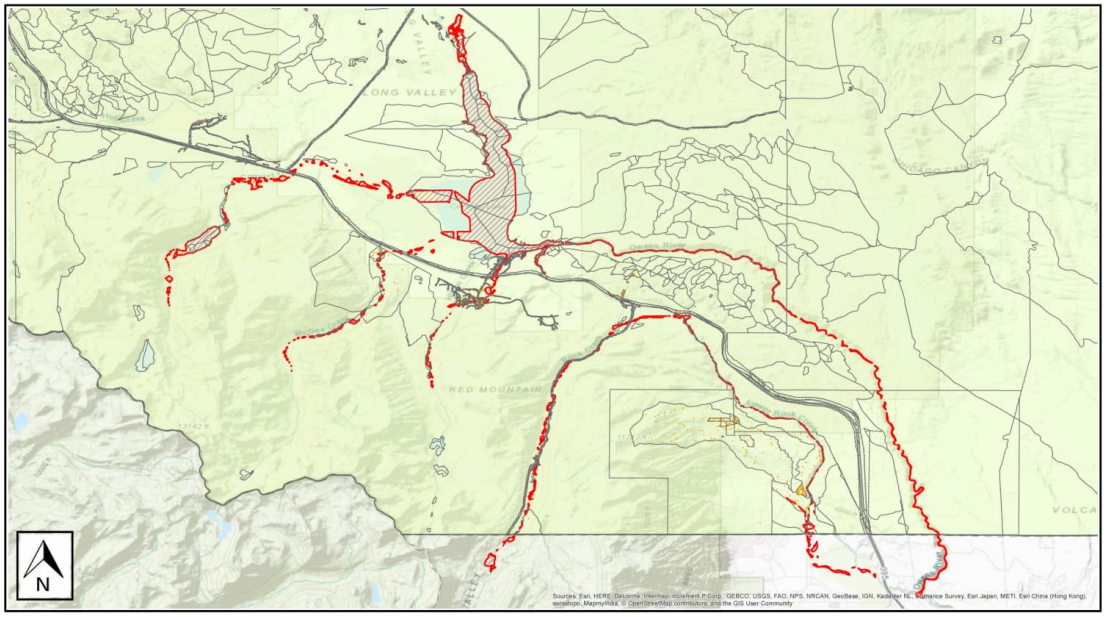
Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	MC_Flooding
Scenario Name:	Scenario 3
Return Period Analyzed:	100
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



Building Damage

General Building Stock Damage

Hazus estimates that about 7 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the scenario. There are an estimated 7 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = $300K) Overview Map

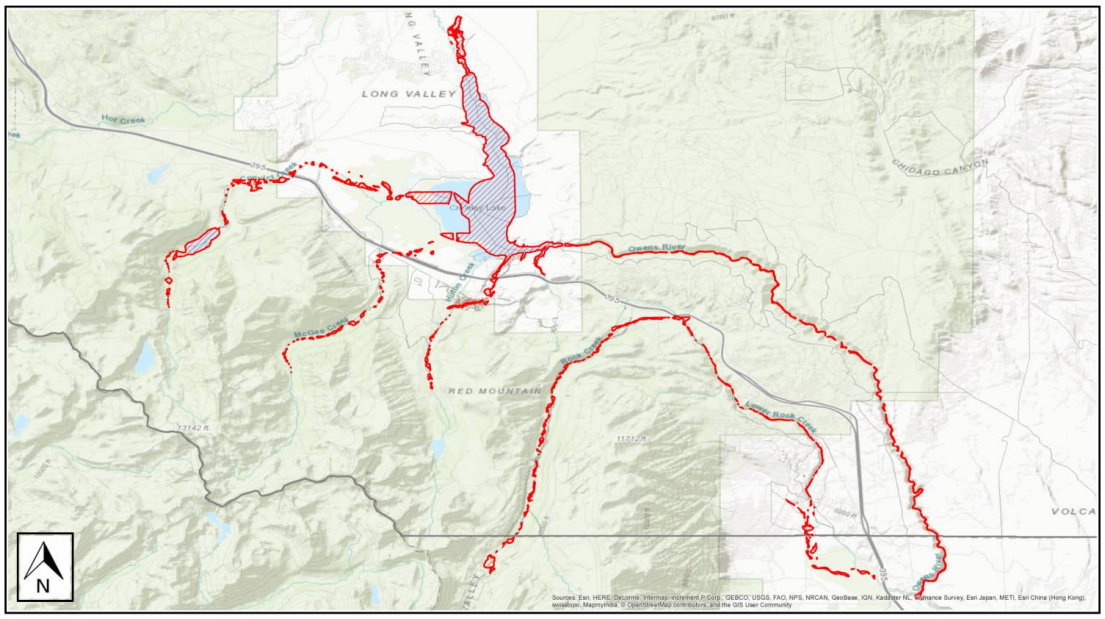


Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	7	100.00
Total	**0**		**0**		**0**		**0**		**0**		**7**	

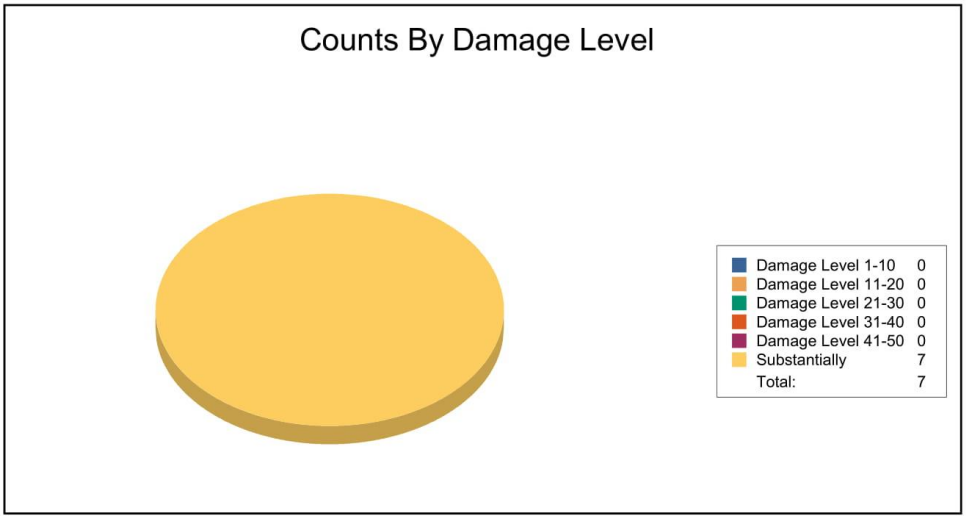


Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	0	0	0	0	0	0	0	0	0	0
ManufHousing	0	0	0	0	0	0	0	0	0	0	1	100
Masonry	0	0	0	0	0	0	0	0	0	0	0	0
Steel	0	0	0	0	0	0	0	0	0	0	0	0
Wood	0	0	0	0	0	0	0	0	0	0	6	100

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 15 hospital beds available for use. On the day of the scenario flood event, the model estimates that 15 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Fire Stations	10	0	0	0
Hospitals	1	0	0	0
Police Stations	3	0	0	0
Schools	22	0	0	0

If this report displays all zeros or is blank, two possibilities can explain this.

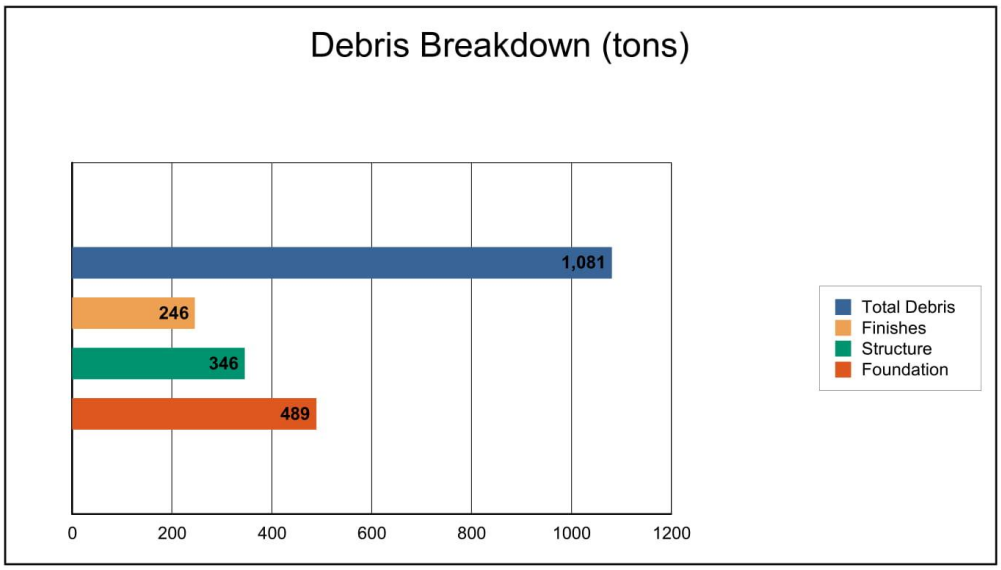
(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

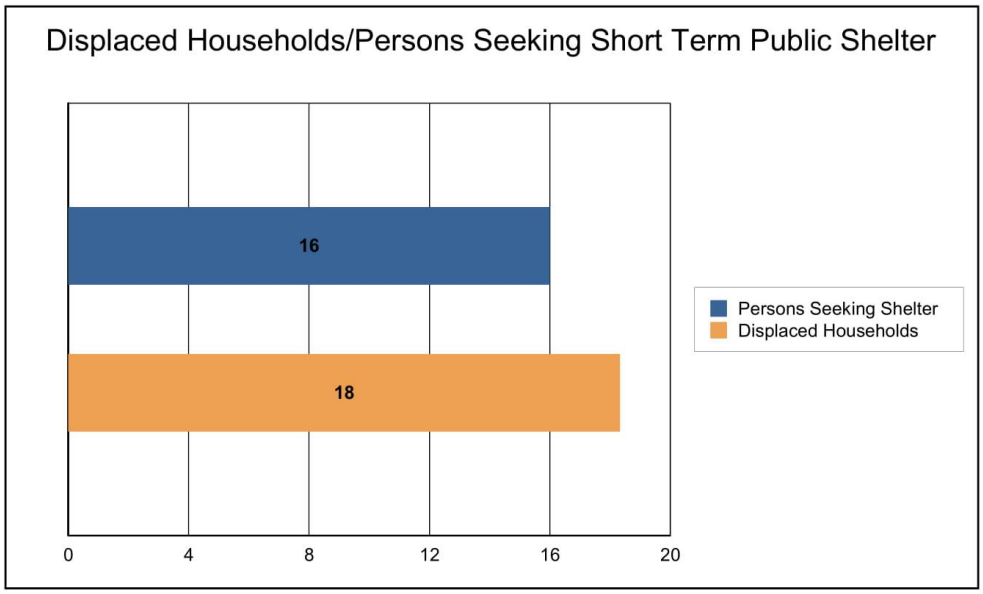


The model estimates that a total of 1,081 tons of debris will be generated. Of the total amount, Finishes comprises 23% of the total, Structure comprises 32% of the total. If the debris tonnage is converted into an estimated number of truckloads, it will require 43 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 18 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 16 people (out of a total population of 14,202) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 7.35 million dollars, which represents 7.89 % of the total replacement value of the scenario buildings.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 7.35 million dollars. 0% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 99.01% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

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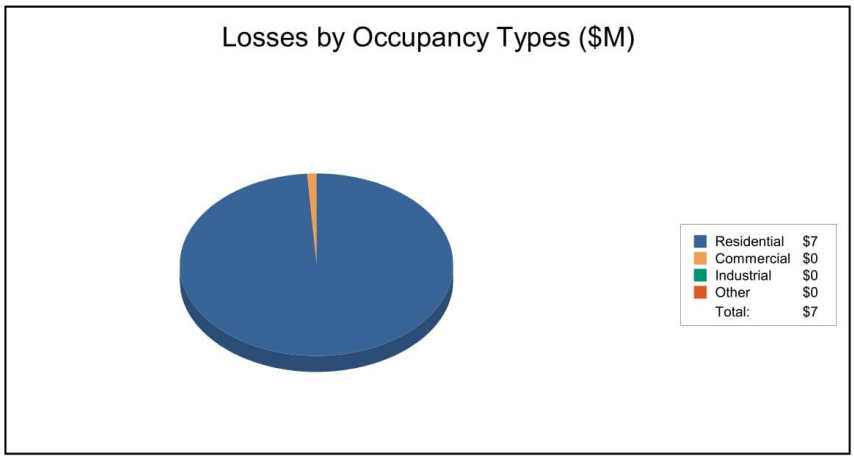
Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	4.90	0.03	0.00	0.00	4.94
	Content	2.38	0.04	0.00	0.00	2.42
	Inventory	0.00	0.00	0.00	0.00	0.00
	Subtotal	**7.28**	**0.07**	**0.00**	**0.00**	**7.35**
Business Interruption						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	0.00	0.00	0.00	0.00	0.00
	Rental Income	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
ALL	**Total**	**7.28**	**0.07**	**0.00**	**0.00**	**7.35**



Appendix A: County Listing for the Region

California
- Mono

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars) Residential	Non-Residential	Total
California				
Mono	14,202	2,459,157	296,575	2,755,732
Total	**14,202**	**2,459,157**	**296,575**	**2,755,732**
Total Study Region	**14,202**	**2,459,157**	**296,575**	**2,755,732**

Hazus-MH: Flood Global Risk Report

Region Name:	MC_Flooding
Flood Scenario:	Scenario 4
Print Date:	Wednesday, January 24, 2018

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

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Table of Contents

Section	Page #
General Description of the Region	3
Building Inventory	
General Building Stock	4
Essential Facility Inventory	5
Flood Scenario Parameters	6
Building Damage	
General Building Stock	7
Essential Facilities Damage	9
Induced Flood Damage	10
Debris Generation	
Social Impact	10
Shelter Requirements	
Economic Loss	12
Building-Related Losses	
Appendix A: County Listing for the Region	15
Appendix B: Regional Population and Building Value Data	16

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The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- California

Note:
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There are an estimated 8,667 buildings in the region with a total building replacement value (excluding contents) of 2,756 million dollars (2010 dollars). Approximately 94.81% of the buildings (and 89.24% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 8,667 buildings in the region which have an aggregate total replacement value of 2,756 million (2014 dollars). Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	2,459,157	89.2%
Commercial	190,438	6.9%
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Agricultural	4,271	0.2%
Religion	27,839	1.0%
Government	23,498	0.9%
Education	21,330	0.8%
Total	**2,755,732**	**100.0%**

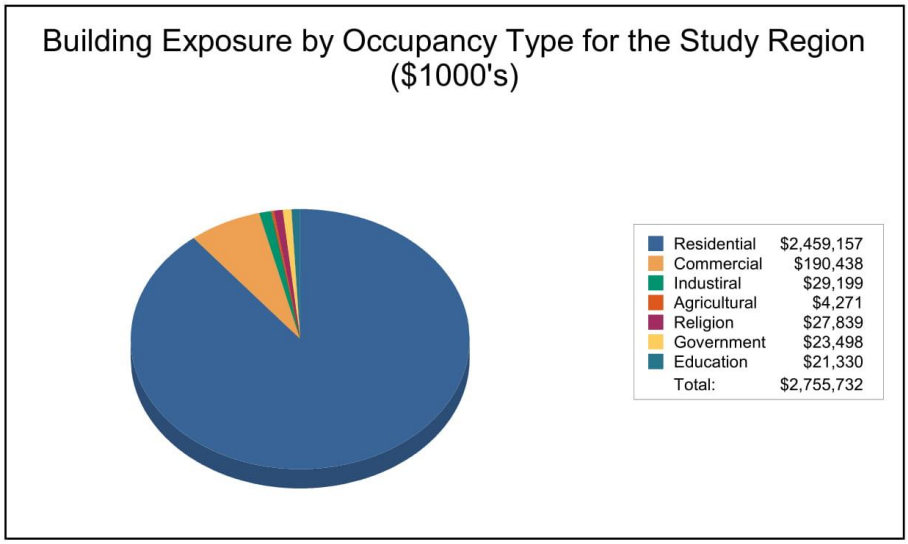
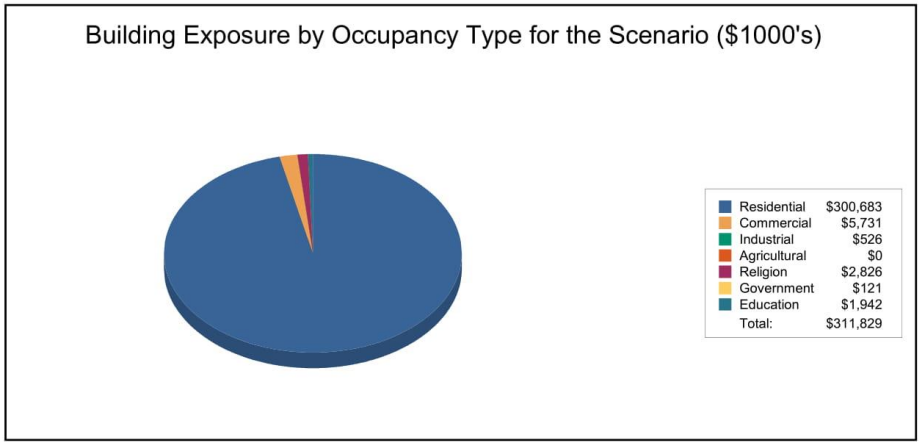


Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	300,683	96.4%
Commercial	5,731	1.8%
Industrial	526	0.2%
Agricultural	0	0.0%
Religion	2,826	0.9%
Government	121	0.0%
Education	1,942	0.6%
Total	**311,829**	**100.0%**



Essential Facility Inventory

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 15 beds.
There are 22 schools, 10 fire stations, 3 police stations and no emergency operation centers.

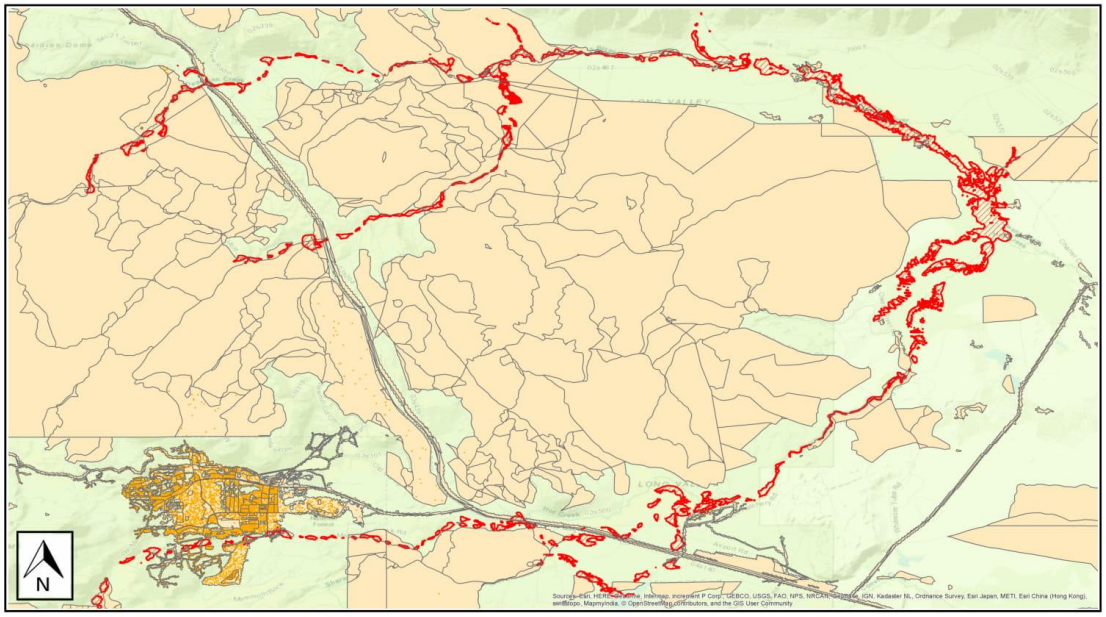
Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	MC_Flooding
Scenario Name:	Scenario 4
Return Period Analyzed:	100
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



Building Damage

General Building Stock Damage

Hazus estimates that about 8 buildings will be at least moderately damaged. This is over 56% of the total number of buildings in the scenario. There are an estimated 1 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = $300K) Overview Map

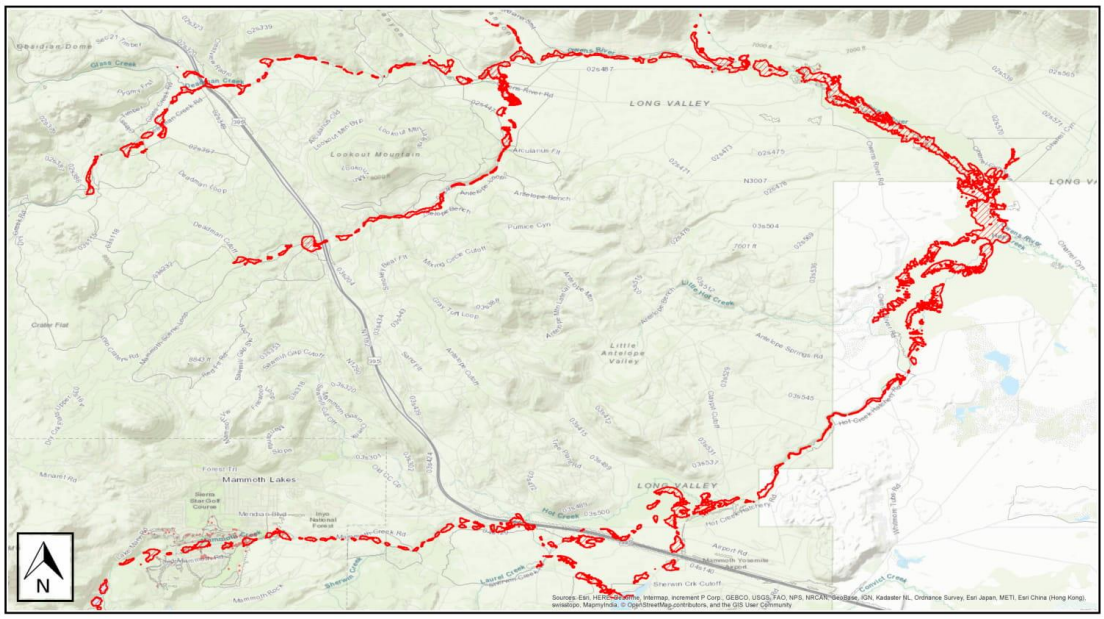


Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	1	11.11	3	33.33	1	11.11	2	22.22	1	11.11	1	11.11
Total	**1**		**3**		**1**		**2**		**1**		**1**	

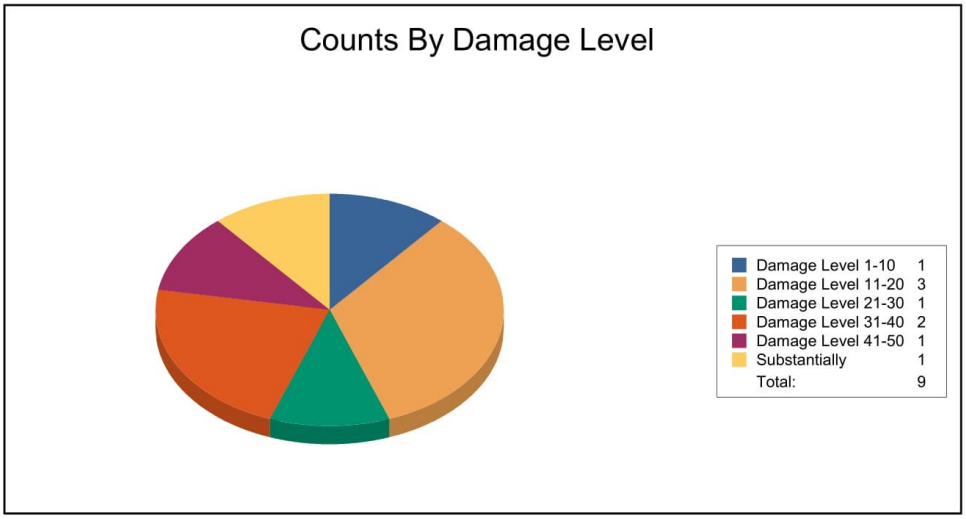


Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	0	0	0	0	0	0	0	0	0	0
ManufHousing	0	0	0	0	0	0	0	0	0	0	0	0
Masonry	0	0	0	0	0	0	0	0	0	0	0	0
Steel	0	0	0	0	0	0	0	0	0	0	0	0
Wood	1	11	3	33	1	11	2	22	1	11	1	11

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 15 hospital beds available for use. On the day of the scenario flood event, the model estimates that 15 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Fire Stations	10	0	0	0
Hospitals	1	0	0	0
Police Stations	3	0	0	0
Schools	22	0	0	0

If this report displays all zeros or is blank, two possibilities can explain this.

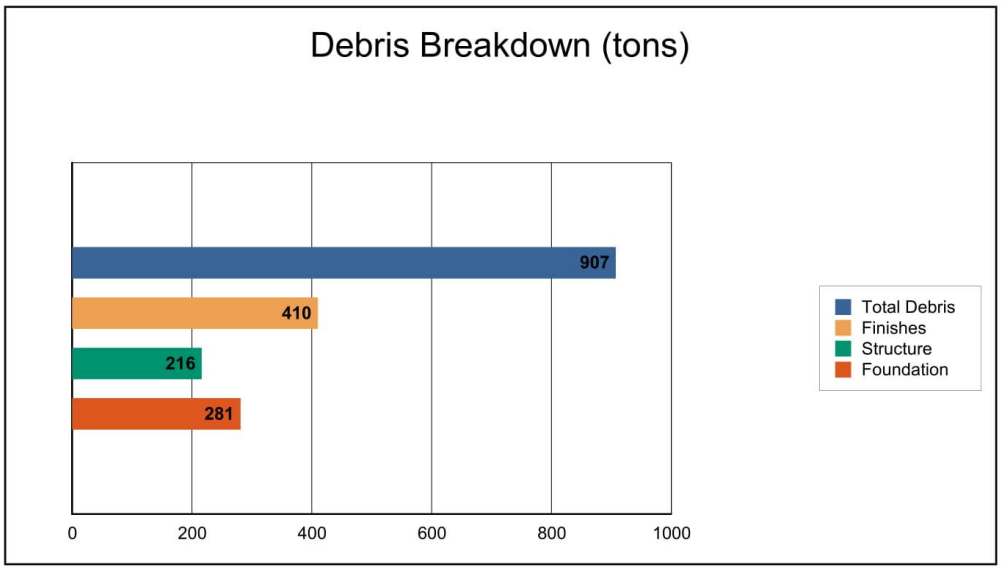
(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

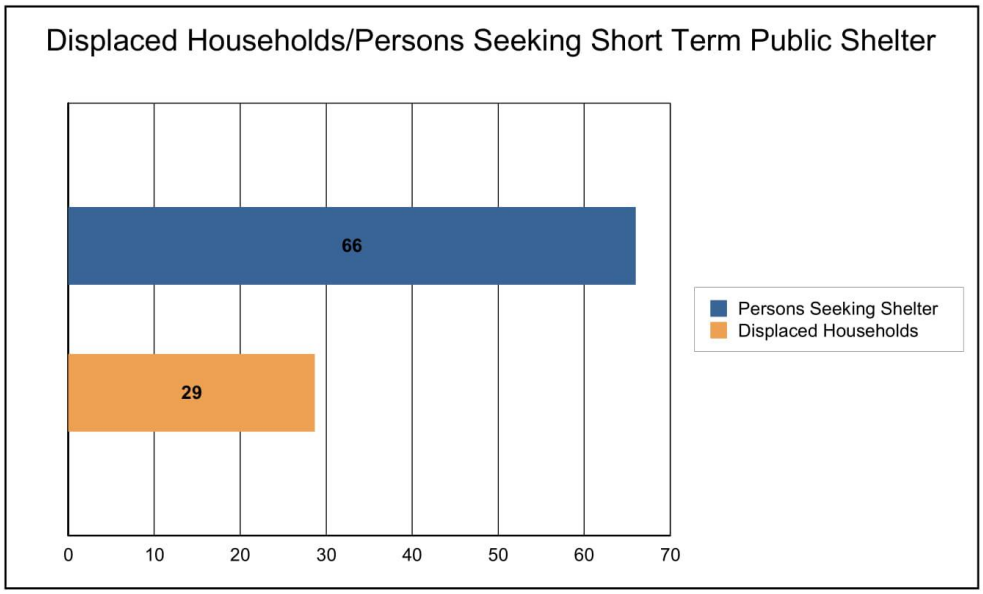


The model estimates that a total of 907 tons of debris will be generated. Of the total amount, Finishes comprises 45% of the total, Structure comprises 24% of the total. If the debris tonnage is converted into an estimated number of truckloads, it will require 36 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 29 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 66 people (out of a total population of 14,202) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 8.89 million dollars, which represents 2.85 % of the total replacement value of the scenario buildings.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 8.88 million dollars. 0% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 89.34% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

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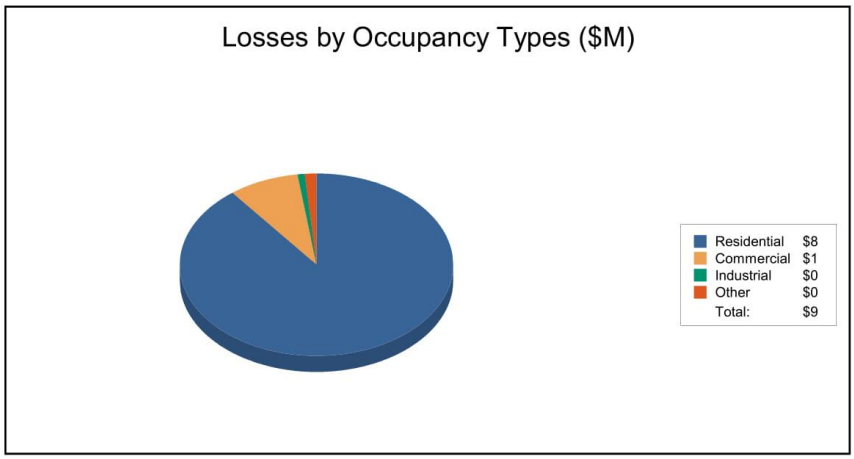
Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	5.08	0.17	0.02	0.02	5.29
	Content	2.86	0.57	0.05	0.11	3.59
	Inventory	0.00	0.01	0.00	0.00	0.01
	Subtotal	**7.94**	**0.74**	**0.07**	**0.13**	**8.88**
Business Interruption						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	0.00	0.00	0.00	0.00	0.00
	Rental Income	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.00**	**0.01**	**0.00**	**0.00**	**0.01**
ALL	**Total**	**7.94**	**0.75**	**0.07**	**0.13**	**8.89**



Appendix A: County Listing for the Region

California
- Mono

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Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
California				
Mono	14,202	2,459,157	296,575	2,755,732
Total	**14,202**	**2,459,157**	**296,575**	**2,755,732**
Total Study Region	**14,202**	**2,459,157**	**296,575**	**2,755,732**

Hazus-MH: Flood Global Risk Report

Region Name:	MC_Flooding
Flood Scenario:	Scenario 5
Print Date:	Wednesday, January 24, 2018

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Flood. These results can be improved by using enhanced inventory data and flood hazard information.

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Table of Contents

Section	Page #
General Description of the Region	3
Building Inventory	
General Building Stock	4
Essential Facility Inventory	5
Flood Scenario Parameters	6
Building Damage	
General Building Stock	7
Essential Facilities Damage	9
Induced Flood Damage	10
Debris Generation	
Social Impact	10
Shelter Requirements	
Economic Loss	12
Building-Related Losses	
Appendix A: County Listing for the Region	15
Appendix B: Regional Population and Building Value Data	16

General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- California

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 3,132 square miles and contains 3,050 census blocks. The region contains over 6 thousand households and has a total population of 14,202 people (2010 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 8,667 buildings in the region with a total building replacement value (excluding contents) of 2,756 million dollars (2010 dollars). Approximately 94.81% of the buildings (and 89.24% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 8,667 buildings in the region which have an aggregate total replacement value of 2,756 million (2014 dollars). Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	2,459,157	89.2%
Commercial	190,438	6.9%
Industrial	29,199	1.1%
Agricultural	4,271	0.2%
Religion	27,839	1.0%
Government	23,498	0.9%
Education	21,330	0.8%
Total	**2,755,732**	**100.0%**

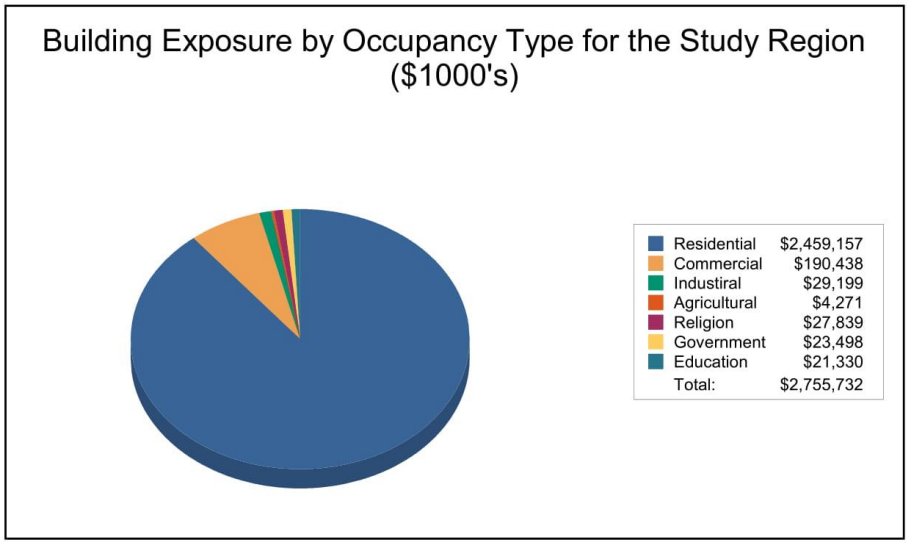
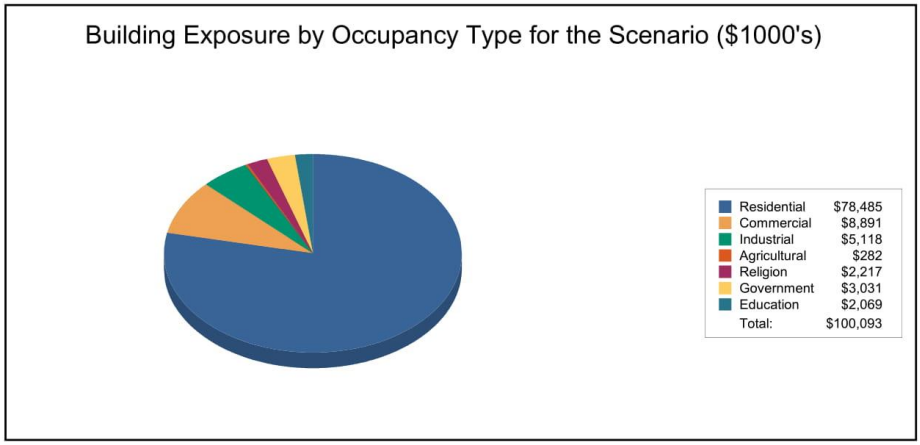


Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	78,485	78.4%
Commercial	8,891	8.9%
Industrial	5,118	5.1%
Agricultural	282	0.3%
Religion	2,217	2.2%
Government	3,031	3.0%
Education	2,069	2.1%
Total	**100,093**	**100.0%**



Essential Facility Inventory

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 15 beds.
There are 22 schools, 10 fire stations, 3 police stations and no emergency operation centers.

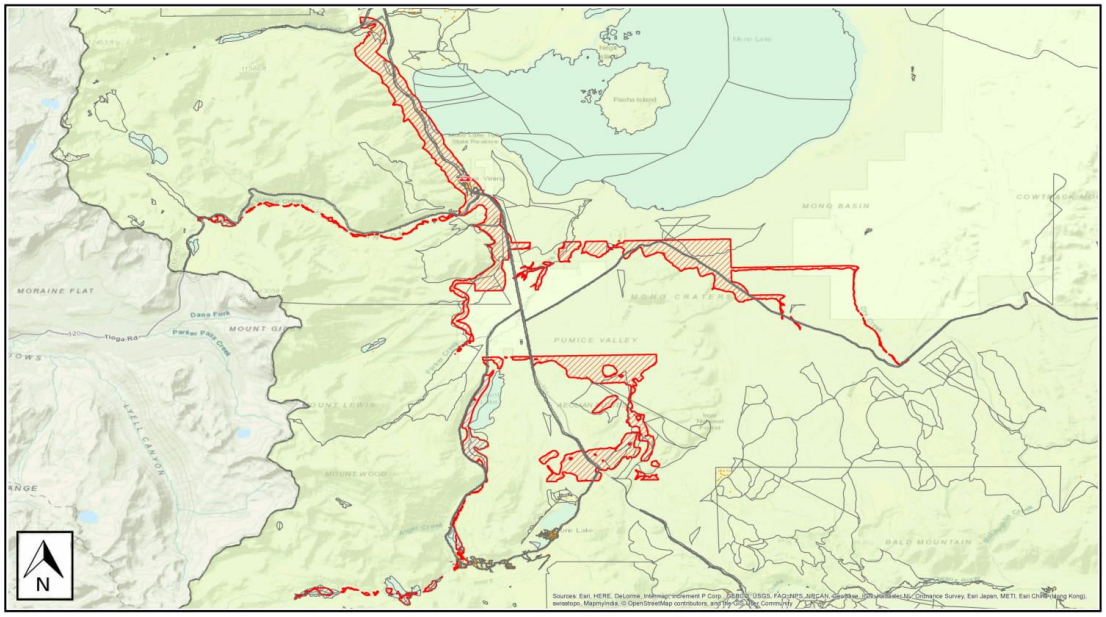
Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	MC_Flooding
Scenario Name:	Scenario 5
Return Period Analyzed:	100
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



Building Damage

General Building Stock Damage

Hazus estimates that about 53 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the scenario. There are an estimated 53 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = $300K) Overview Map

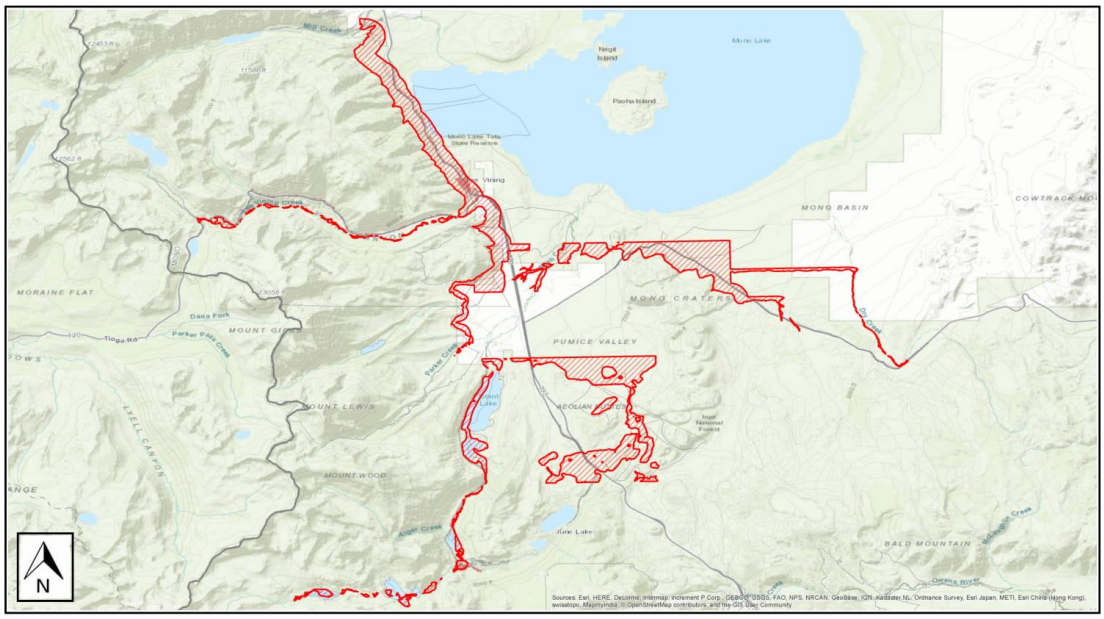


Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	4	100.00
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	49	100.00
Total	**0**		**0**		**0**		**0**		**0**		**53**	

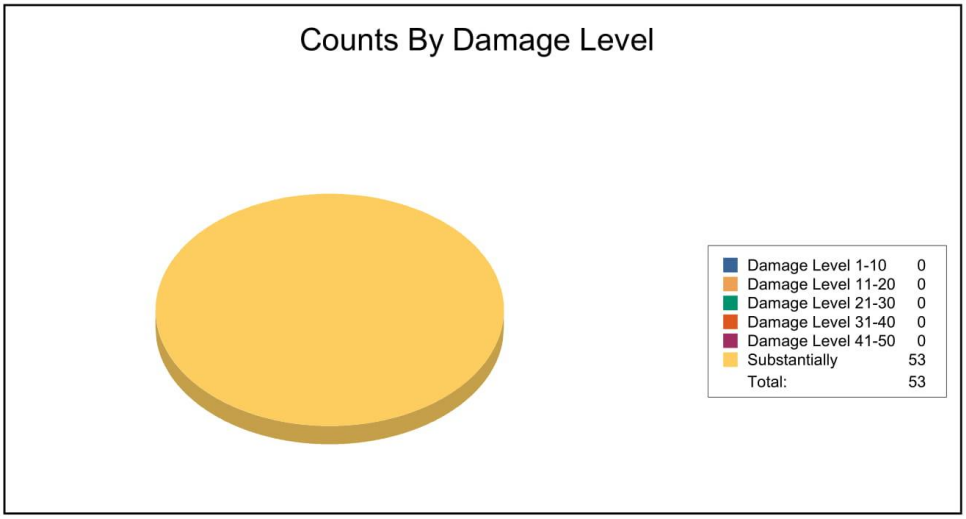


Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	0	0	0	0	0	0	0	0	1	100
ManufHousing	0	0	0	0	0	0	0	0	0	0	7	100
Masonry	0	0	0	0	0	0	0	0	0	0	1	100
Steel	0	0	0	0	0	0	0	0	0	0	0	0
Wood	0	0	0	0	0	0	0	0	0	0	43	100

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 15 hospital beds available for use. On the day of the scenario flood event, the model estimates that 15 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Fire Stations	10	0	1	1
Hospitals	1	0	0	0
Police Stations	3	0	0	0
Schools	22	0	0	0

If this report displays all zeros or is blank, two possibilities can explain this.

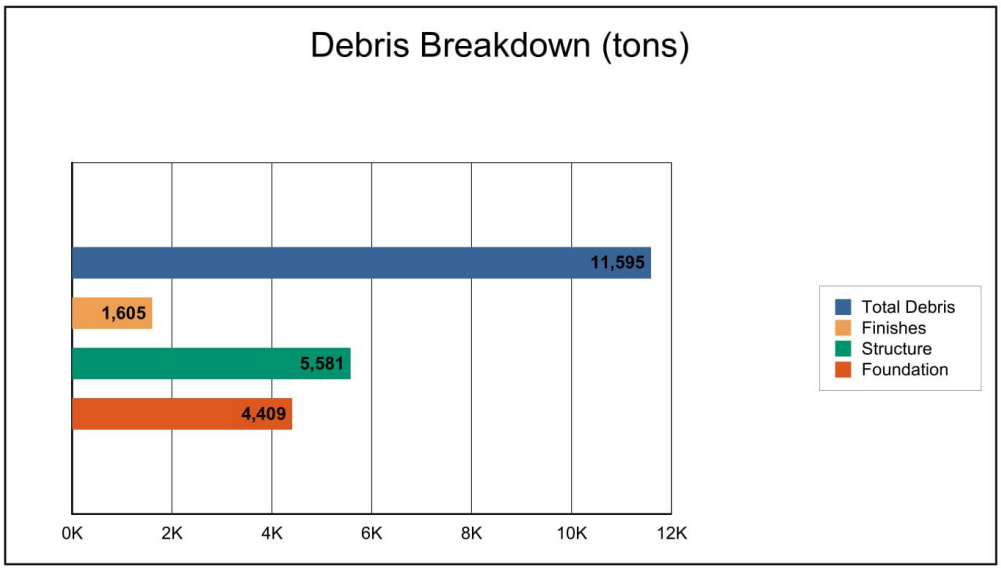
(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

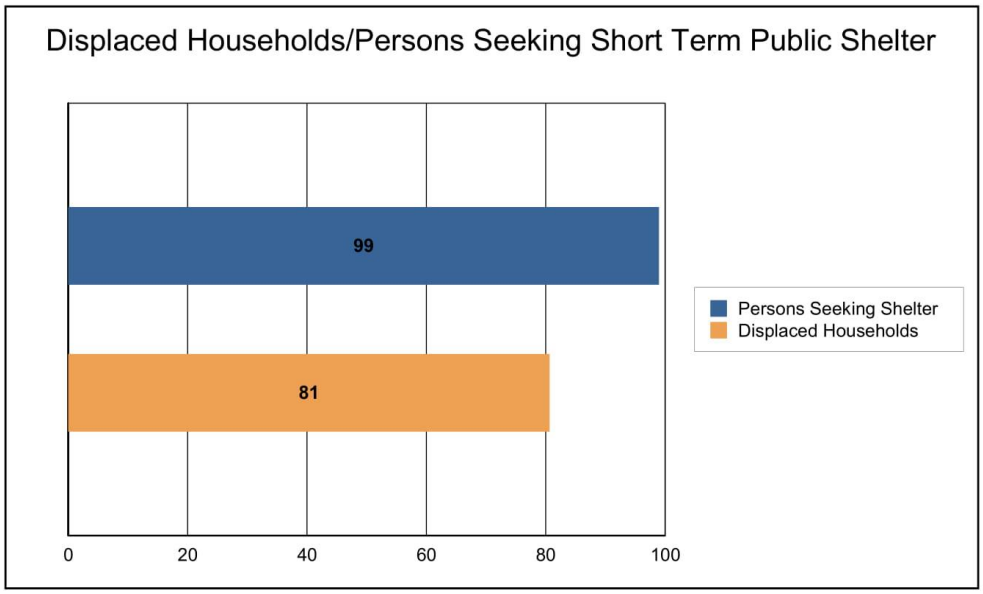


The model estimates that a total of 11,595 tons of debris will be generated. Of the total amount, Finishes comprises 14% of the total, Structure comprises 48% of the total. If the debris tonnage is converted into an estimated number of truckloads, it will require 464 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 81 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 99 people (out of a total population of 14,202) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 62.81 million dollars, which represents 62.75 % of the total replacement value of the scenario buildings.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 62.40 million dollars. 1% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 64.73% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

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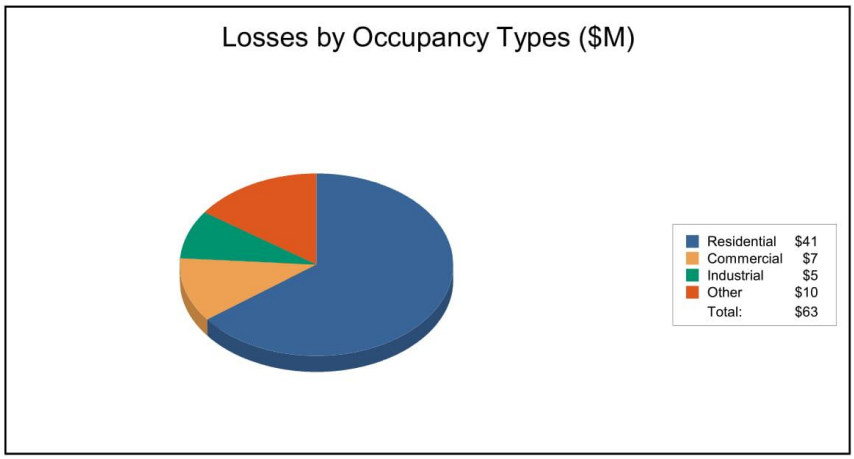
Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	26.67	3.41	1.84	3.81	35.72
	Content	13.90	3.68	3.27	5.44	26.29
	Inventory	0.00	0.05	0.33	0.01	0.39
	Subtotal	**40.57**	**7.13**	**5.44**	**9.25**	**62.40**
Business Interruption						
	Income	0.02	0.02	0.00	0.01	0.04
	Relocation	0.01	0.00	0.00	0.01	0.01
	Rental Income	0.03	0.00	0.00	0.00	0.03
	Wage	0.04	0.01	0.00	0.28	0.33
	Subtotal	**0.09**	**0.03**	**0.00**	**0.29**	**0.41**
ALL	**Total**	**40.66**	**7.16**	**5.45**	**9.55**	**62.81**



Appendix A: County Listing for the Region

California
- Mono

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Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
California				
Mono	14,202	2,459,157	296,575	2,755,732
Total	**14,202**	**2,459,157**	**296,575**	**2,755,732**
Total Study Region	**14,202**	**2,459,157**	**296,575**	**2,755,732**

Hazus-MH: Flood Global Risk Report

Region Name:	MC_Flooding
Flood Scenario:	Scenario 6
Print Date:	Wednesday, January 24, 2018

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Flood. These results can be improved by using enhanced inventory data and flood hazard information.

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Table of Contents

Section	Page #
General Description of the Region	3
Building Inventory	
General Building Stock	4
Essential Facility Inventory	5
Flood Scenario Parameters	6
Building Damage	
General Building Stock	7
Essential Facilities Damage	9
Induced Flood Damage	10
Debris Generation	
Social Impact	10
Shelter Requirements	
Economic Loss	12
Building-Related Losses	
Appendix A: County Listing for the Region	15
Appendix B: Regional Population and Building Value Data	16

General Description of the Region

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The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- California

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 3,132 square miles and contains 3,050 census blocks. The region contains over 6 thousand households and has a total population of 14,202 people (2010 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 8,667 buildings in the region with a total building replacement value (excluding contents) of 2,756 million dollars (2010 dollars). Approximately 94.81% of the buildings (and 89.24% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 8,667 buildings in the region which have an aggregate total replacement value of 2,756 million (2014 dollars). Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	2,459,157	89.2%
Commercial	190,438	6.9%
Industrial	29,199	1.1%
Agricultural	4,271	0.2%
Religion	27,839	1.0%
Government	23,498	0.9%
Education	21,330	0.8%
Total	**2,755,732**	**100.0%**

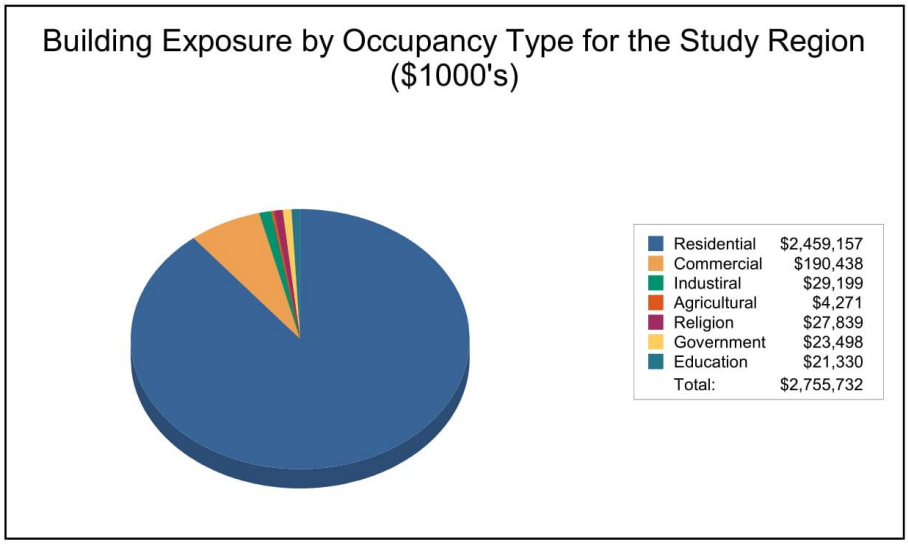

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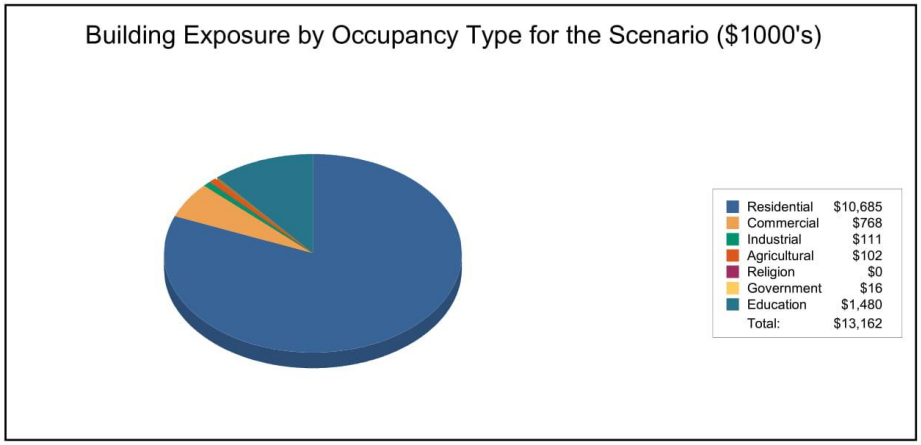
Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	10,685	81.2%
Commercial	768	5.8%
Industrial	111	0.8%
Agricultural	102	0.8%
Religion	0	0.0%
Government	16	0.1%
Education	1,480	11.2%
Total	**13,162**	**100.0%**



Essential Facility Inventory

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 15 beds.
There are 22 schools, 10 fire stations, 3 police stations and no emergency operation centers.

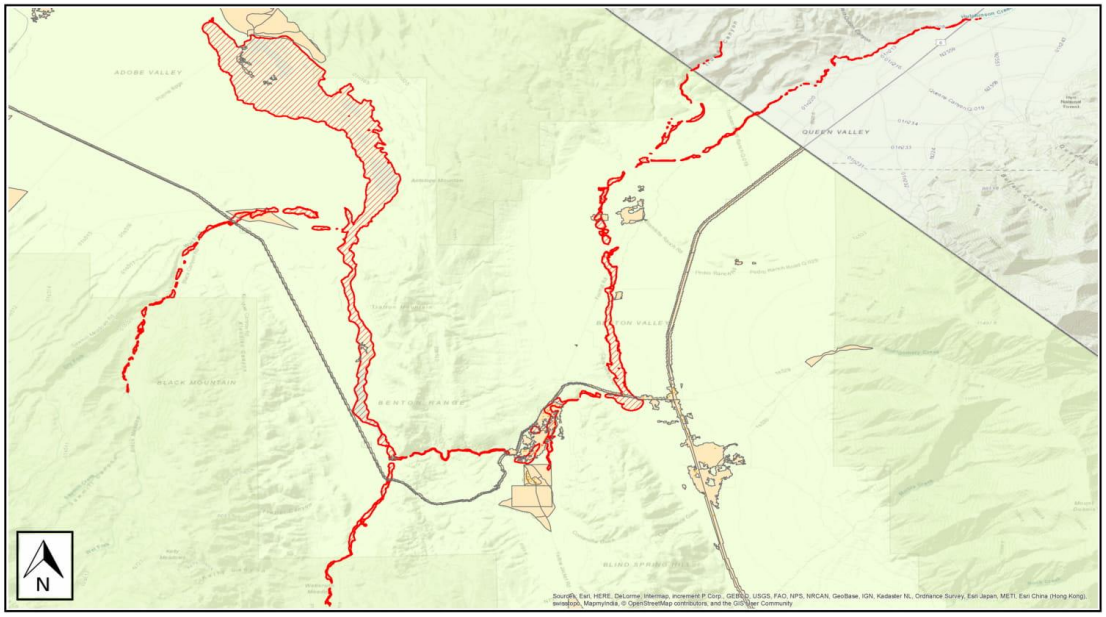
Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	MC_Flooding
Scenario Name:	Scenario 6
Return Period Analyzed:	100
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



Building Damage

General Building Stock Damage

Hazus estimates that about 0 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the scenario. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = $300K) Overview Map

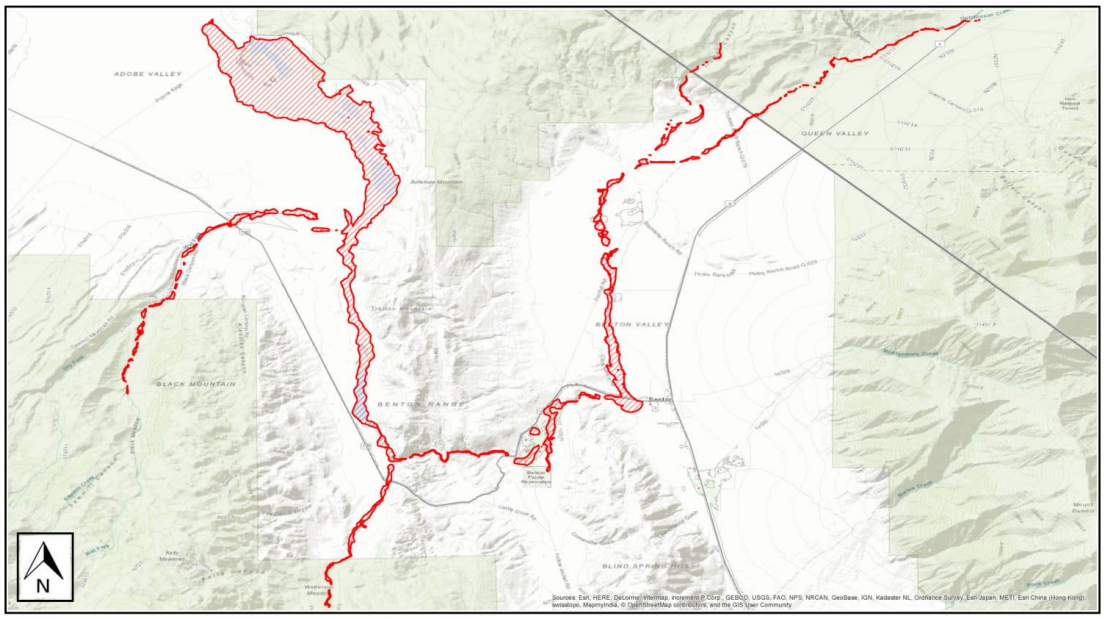


Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	**0**		**0**		**0**		**0**		**0**		**0**	

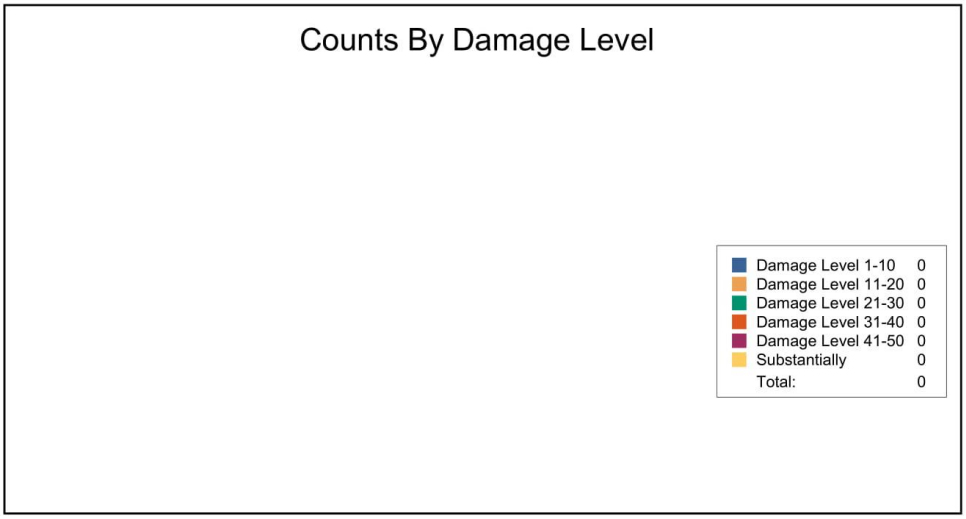


Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	0	0	0	0	0	0	0	0	0	0
ManufHousing	0	0	0	0	0	0	0	0	0	0	0	0
Masonry	0	0	0	0	0	0	0	0	0	0	0	0
Steel	0	0	0	0	0	0	0	0	0	0	0	0
Wood	0	0	0	0	0	0	0	0	0	0	0	0

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 15 hospital beds available for use. On the day of the scenario flood event, the model estimates that 15 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Fire Stations	10	0	0	0
Hospitals	1	0	0	0
Police Stations	3	0	0	0
Schools	22	0	0	0

If this report displays all zeros or is blank, two possibilities can explain this.

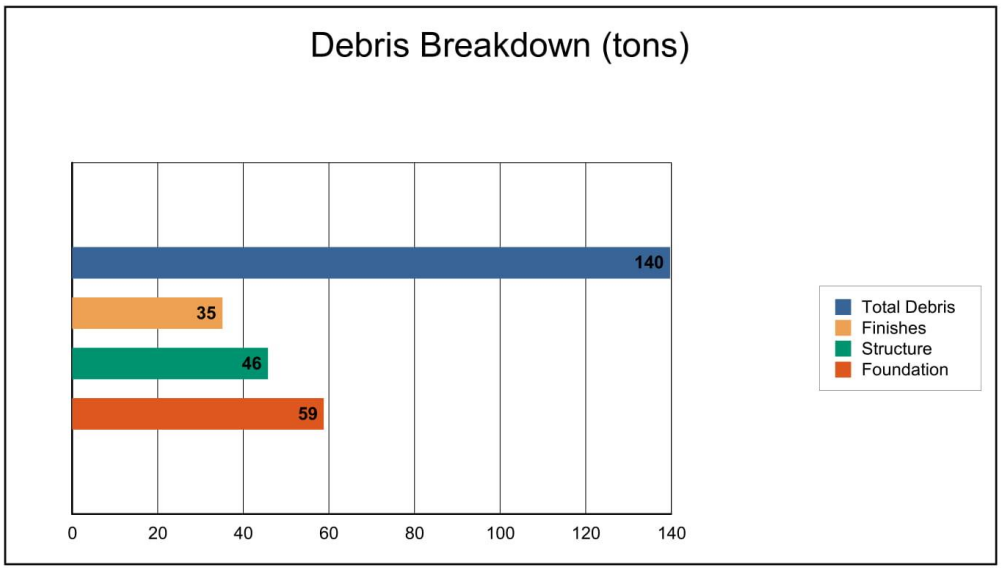
(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

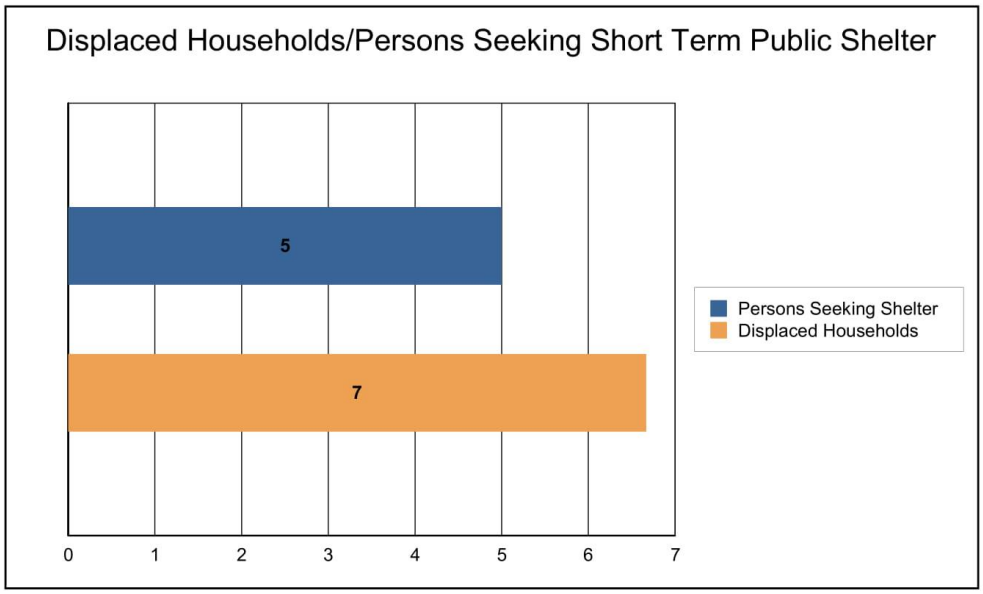


The model estimates that a total of 140 tons of debris will be generated. Of the total amount, Finishes comprises 25% of the total, Structure comprises 33% of the total. If the debris tonnage is converted into an estimated number of truckloads, it will require 6 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 7 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 5 people (out of a total population of 14,202) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 1.10 million dollars, which represents 8.33 % of the total replacement value of the scenario buildings.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 1.10 million dollars. 0% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 78.85% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

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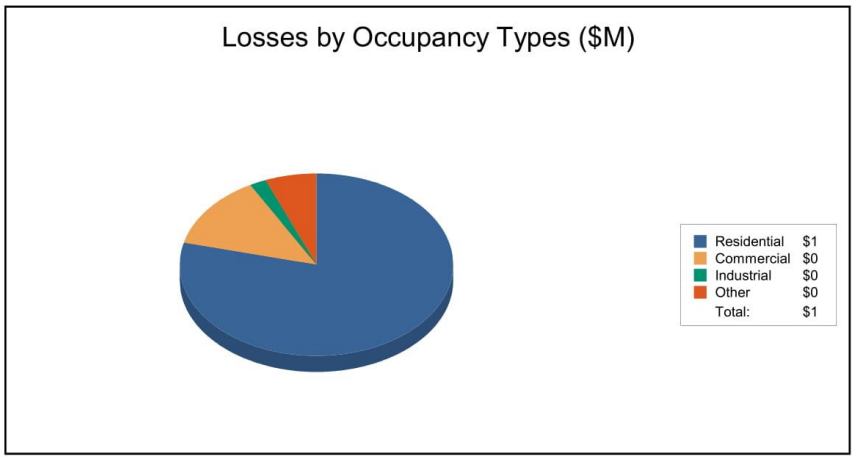
Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	0.58	0.04	0.01	0.01	0.64
	Content	0.29	0.10	0.01	0.05	0.45
	Inventory	0.00	0.01	0.00	0.00	0.01
	Subtotal	**0.87**	**0.15**	**0.02**	**0.07**	**1.10**
Business Interruption						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	0.00	0.00	0.00	0.00	0.00
	Rental Income	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
ALL	**Total**	**0.87**	**0.15**	**0.02**	**0.07**	**1.10**



Appendix A: County Listing for the Region

California
- Mono

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars) Residential	Non-Residential	Total
California				
Mono	14,202	2,459,157	296,575	2,755,732
Total	**14,202**	**2,459,157**	**296,575**	**2,755,732**
Total Study Region	**14,202**	**2,459,157**	**296,575**	**2,755,732**

Hazus-MH: Flood Global Risk Report

Region Name:	MC_Flooding
Flood Scenario:	Scenario 7
Print Date:	Wednesday, January 24, 2018

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Flood. These results can be improved by using enhanced inventory data and flood hazard information.

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Table of Contents

Section	Page #
General Description of the Region	3
Building Inventory	
General Building Stock	4
Essential Facility Inventory	5
Flood Scenario Parameters	6
Building Damage	
General Building Stock	7
Essential Facilities Damage	9
Induced Flood Damage	10
Debris Generation	
Social Impact	10
Shelter Requirements	
Economic Loss	12
Building-Related Losses	
Appendix A: County Listing for the Region	15
Appendix B: Regional Population and Building Value Data	16

General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- California

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 3,132 square miles and contains 3,050 census blocks. The region contains over 6 thousand households and has a total population of 14,202 people (2010 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 8,667 buildings in the region with a total building replacement value (excluding contents) of 2,756 million dollars (2010 dollars). Approximately 94.81% of the buildings (and 89.24% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 8,667 buildings in the region which have an aggregate total replacement value of 2,756 million (2014 dollars). Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	2,459,157	89.2%
Commercial	190,438	6.9%
Industrial	29,199	1.1%
Agricultural	4,271	0.2%
Religion	27,839	1.0%
Government	23,498	0.9%
Education	21,330	0.8%
Total	**2,755,732**	**100.0%**

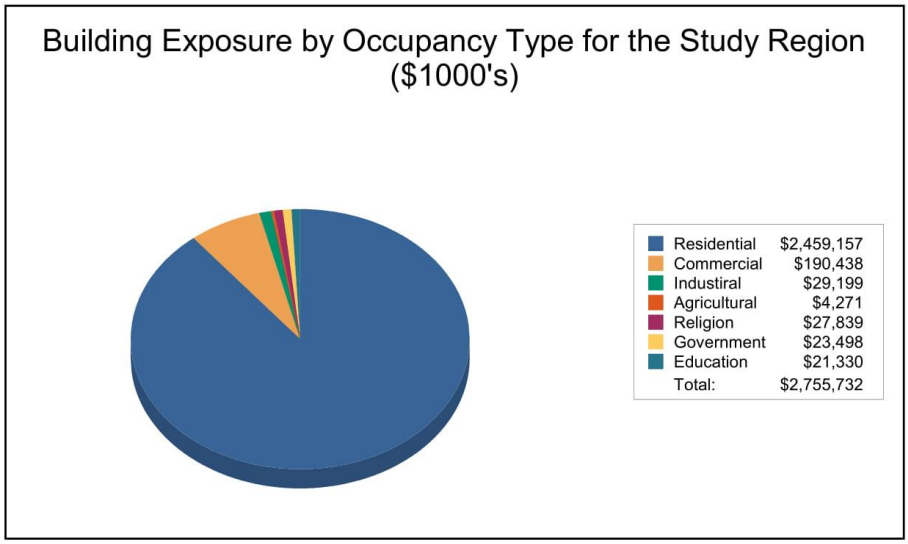
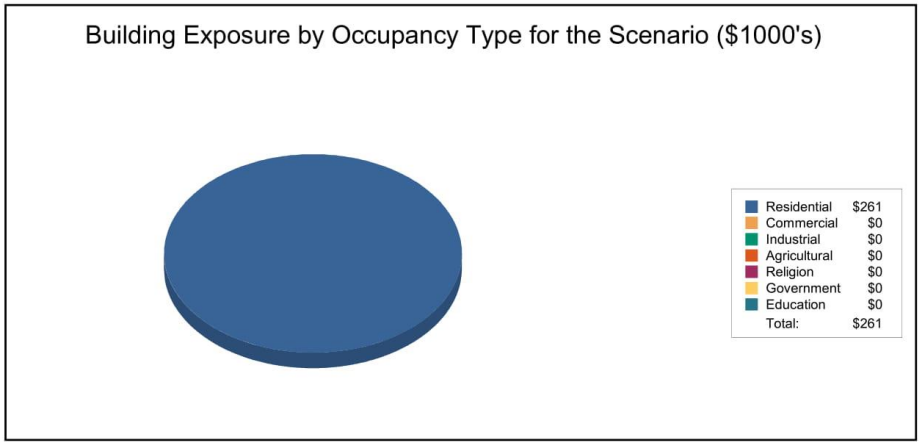


Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	261	100.0%
Commercial	0	0.0%
Industrial	0	0.0%
Agricultural	0	0.0%
Religion	0	0.0%
Government	0	0.0%
Education	0	0.0%
Total	**261**	**100.0%**



Essential Facility Inventory

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 15 beds.
There are 22 schools, 10 fire stations, 3 police stations and no emergency operation centers.

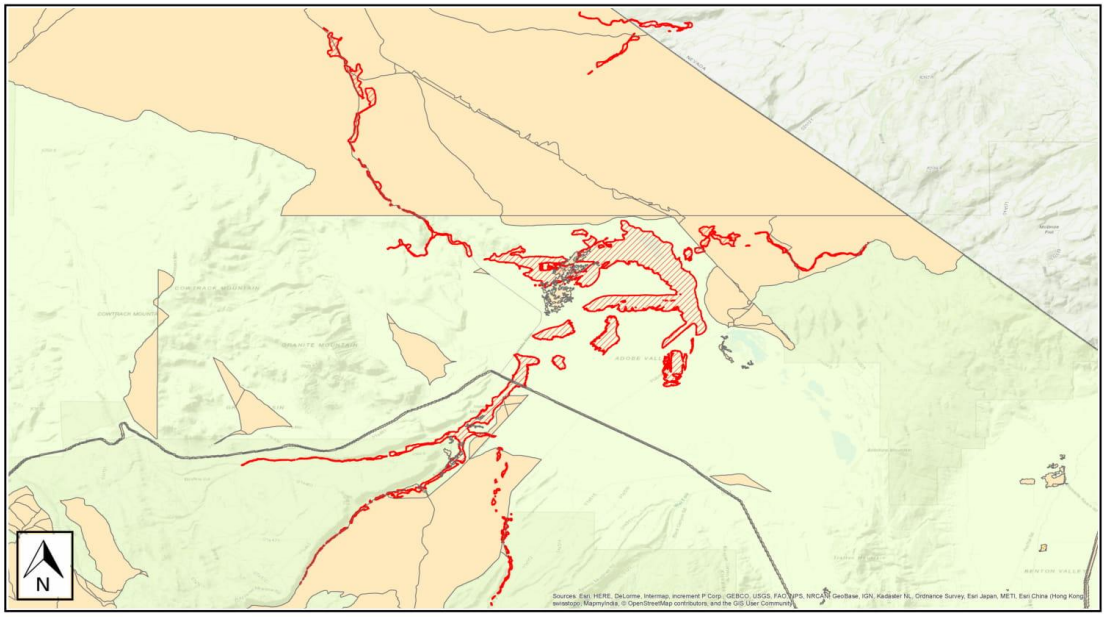
Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	MC_Flooding
Scenario Name:	Scenario 7
Return Period Analyzed:	100
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



Building Damage

General Building Stock Damage

Hazus estimates that about 0 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the scenario. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = $300K) Overview Map

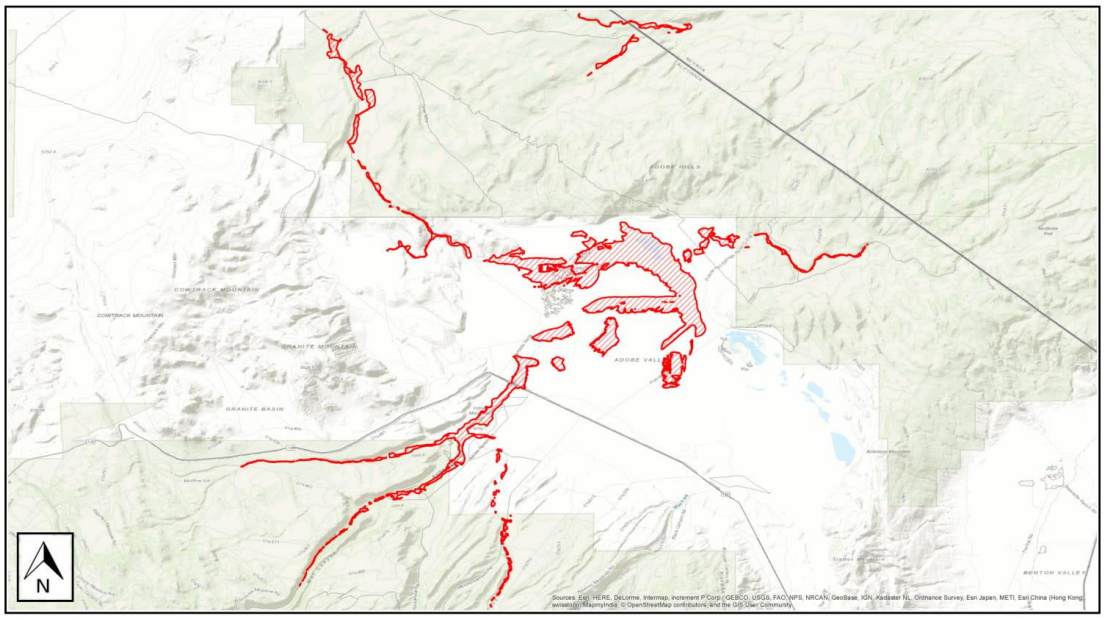


Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	**0**		**0**		**0**		**0**		**0**		**0**	

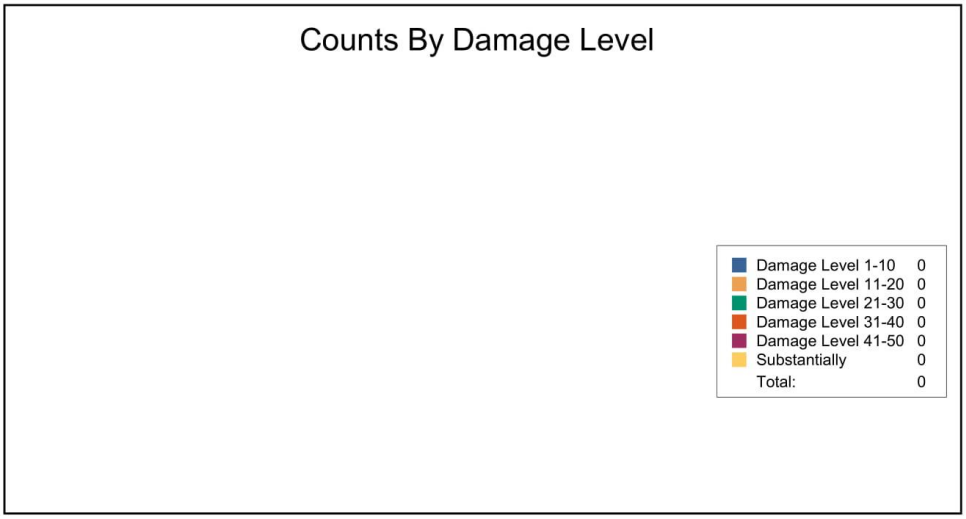


Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	0	0	0	0	0	0	0	0	0	0
ManufHousing	0	0	0	0	0	0	0	0	0	0	0	0
Masonry	0	0	0	0	0	0	0	0	0	0	0	0
Steel	0	0	0	0	0	0	0	0	0	0	0	0
Wood	0	0	0	0	0	0	0	0	0	0	0	0

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 15 hospital beds available for use. On the day of the scenario flood event, the model estimates that 15 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Fire Stations	10	0	0	0
Hospitals	1	0	0	0
Police Stations	3	0	0	0
Schools	22	0	0	0

If this report displays all zeros or is blank, two possibilities can explain this.

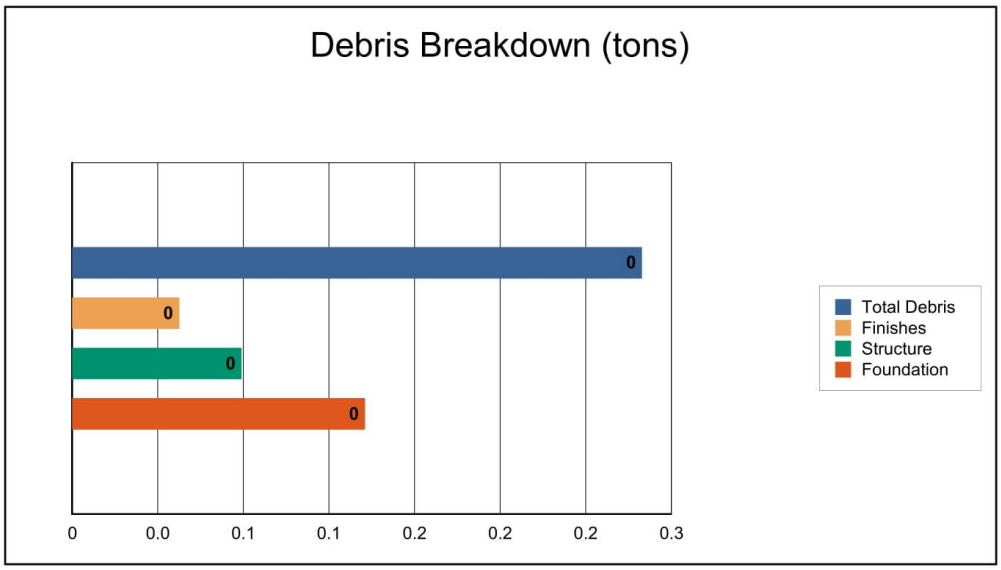
(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

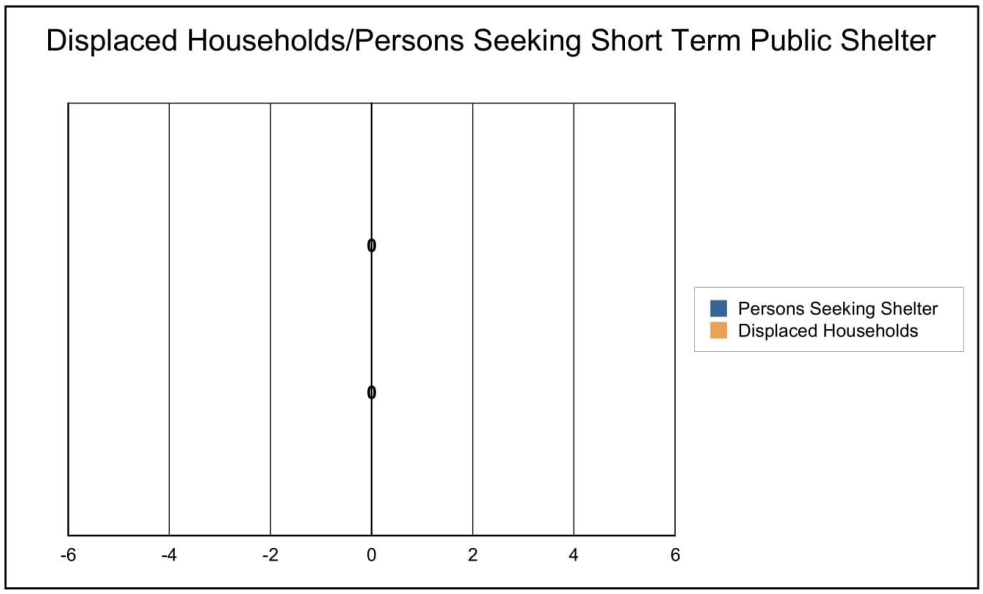


The model estimates that a total of 0 tons of debris will be generated. Of the total amount, Finishes comprises 19% of the total, Structure comprises 30% of the total. If the debris tonnage is converted into an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 0 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 0 people (out of a total population of 14,202) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 0.00 million dollars, which represents 0.00 % of the total replacement value of the scenario buildings.

Building-Related Losses

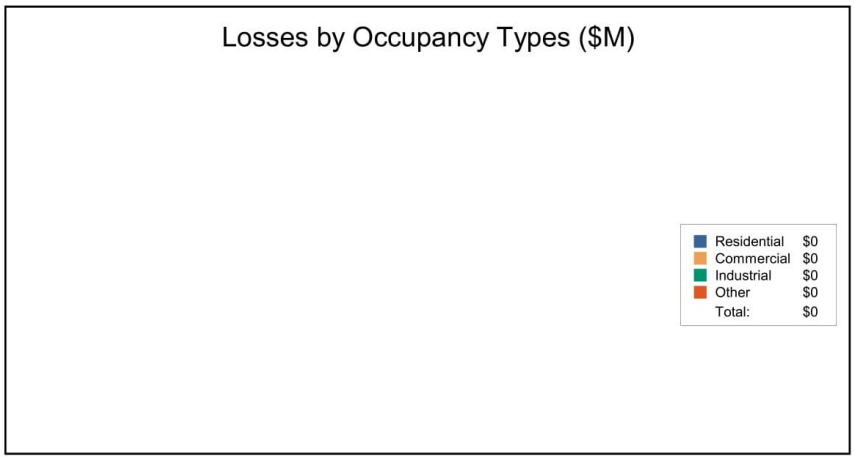
The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 0.00 million dollars. 0% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 0.00% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	0.00	0.00	0.00	0.00	0.00
	Content	0.00	0.00	0.00	0.00	0.00
	Inventory	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Business Interruption						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	0.00	0.00	0.00	0.00	0.00
	Rental Income	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
ALL	**Total**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**



Appendix A: County Listing for the Region

California
- Mono

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars) Residential	Non-Residential	Total
California				
Mono	14,202	2,459,157	296,575	2,755,732
Total	**14,202**	**2,459,157**	**296,575**	**2,755,732**
Total Study Region	**14,202**	**2,459,157**	**296,575**	**2,755,732**

Hazus-MH: Flood Global Risk Report

Region Name:	MC_Flooding
Flood Scenario:	Scenario 8
Print Date:	Wednesday, January 24, 2018

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

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Table of Contents

Section	Page #
General Description of the Region	3
Building Inventory	
General Building Stock	4
Essential Facility Inventory	5
Flood Scenario Parameters	6
Building Damage	
General Building Stock	7
Essential Facilities Damage	9
Induced Flood Damage	10
Debris Generation	
Social Impact	10
Shelter Requirements	
Economic Loss	12
Building-Related Losses	
Appendix A: County Listing for the Region	15
Appendix B: Regional Population and Building Value Data	16

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The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- California

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 3,132 square miles and contains 3,050 census blocks. The region contains over 6 thousand households and has a total population of 14,202 people (2010 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 8,667 buildings in the region with a total building replacement value (excluding contents) of 2,756 million dollars (2010 dollars). Approximately 94.81% of the buildings (and 89.24% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 8,667 buildings in the region which have an aggregate total replacement value of 2,756 million (2014 dollars). Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

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Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	2,459,157	89.2%
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Agricultural	4,271	0.2%
Religion	27,839	1.0%
Government	23,498	0.9%
Education	21,330	0.8%
Total	**2,755,732**	**100.0%**

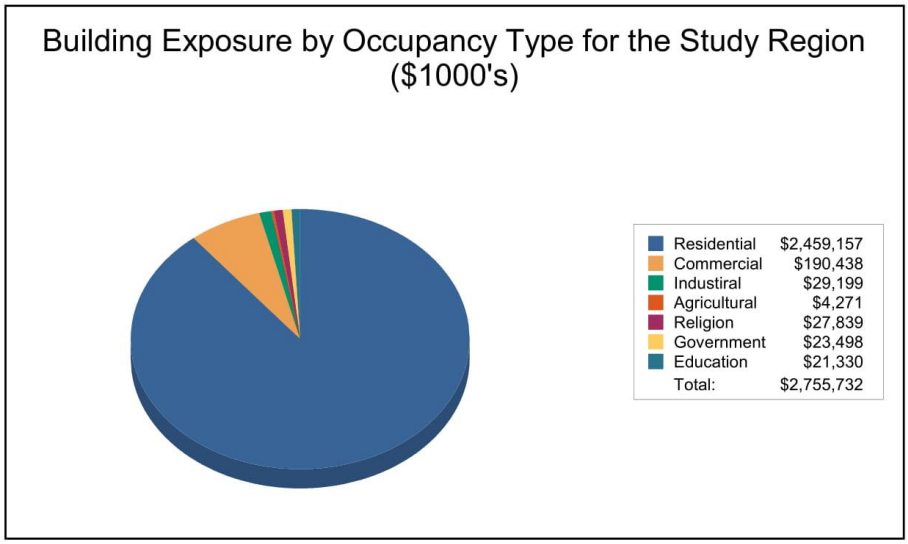
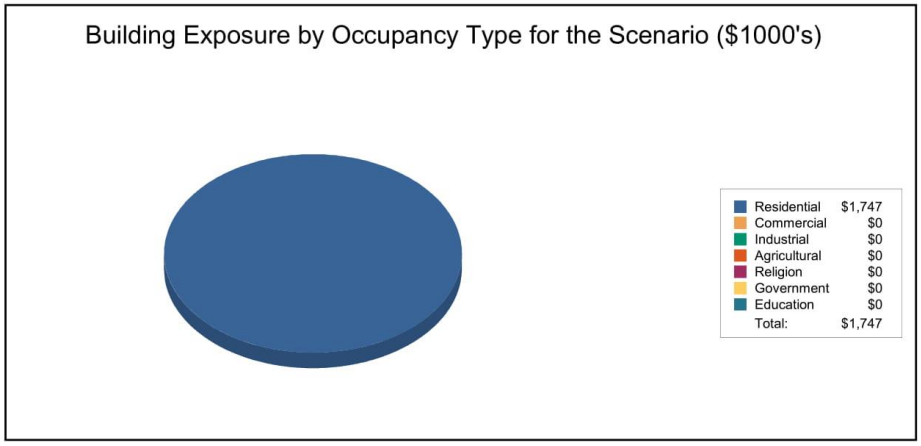


Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	1,747	100.0%
Commercial	0	0.0%
Industrial	0	0.0%
Agricultural	0	0.0%
Religion	0	0.0%
Government	0	0.0%
Education	0	0.0%
Total	**1,747**	**100.0%**



Essential Facility Inventory

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 15 beds.
There are 22 schools, 10 fire stations, 3 police stations and no emergency operation centers.

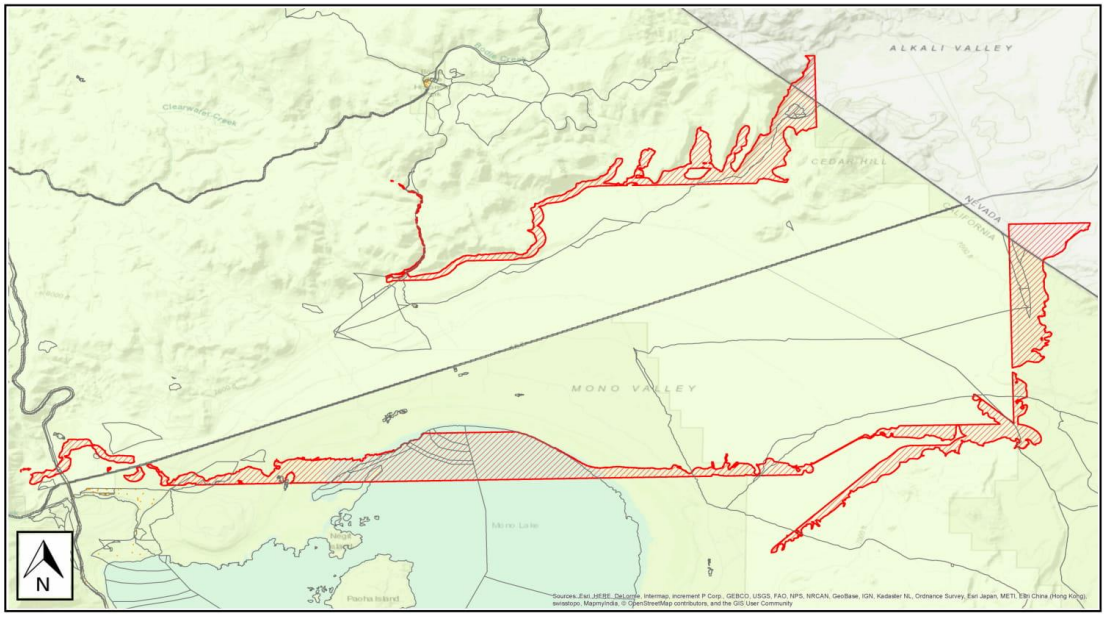
Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	MC_Flooding
Scenario Name:	Scenario 8
Return Period Analyzed:	100
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



Building Damage

General Building Stock Damage

Hazus estimates that about 0 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the scenario. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = $300K) Overview Map

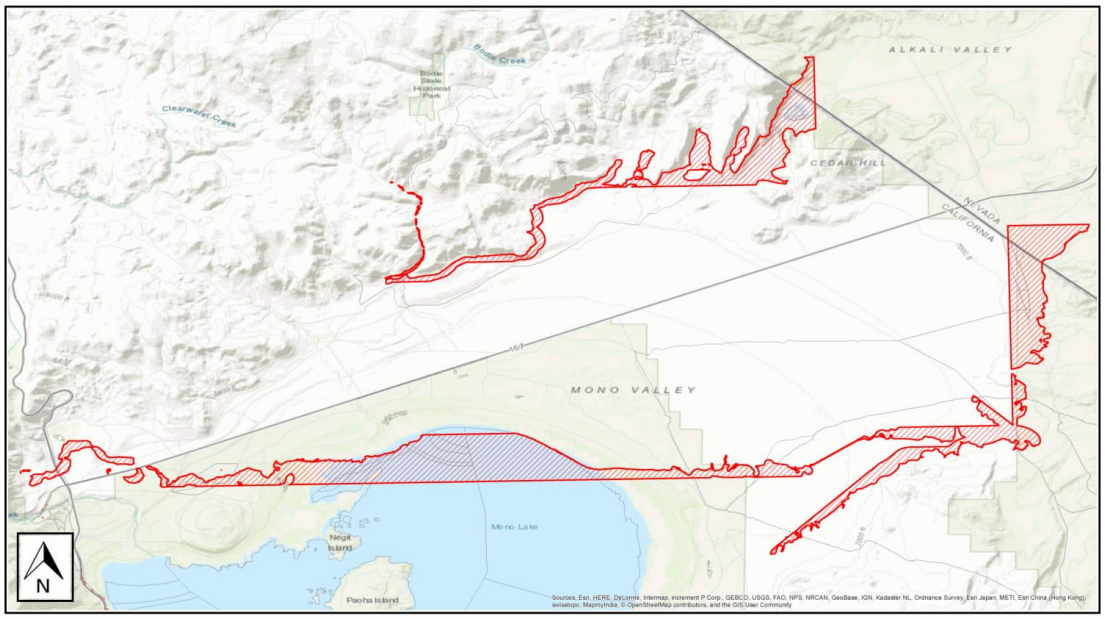


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Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	**0**		**0**		**0**		**0**		**0**		**0**	

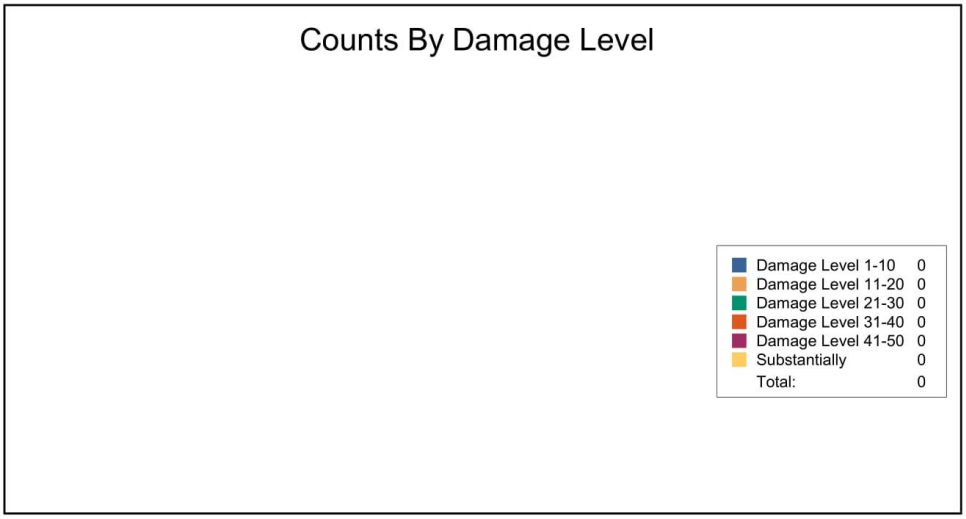


Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	0	0	0	0	0	0	0	0	0	0
ManufHousing	0	0	0	0	0	0	0	0	0	0	0	0
Masonry	0	0	0	0	0	0	0	0	0	0	0	0
Steel	0	0	0	0	0	0	0	0	0	0	0	0
Wood	0	0	0	0	0	0	0	0	0	0	0	0

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 15 hospital beds available for use. On the day of the scenario flood event, the model estimates that 15 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Fire Stations	10	0	0	0
Hospitals	1	0	0	0
Police Stations	3	0	0	0
Schools	22	0	0	0

If this report displays all zeros or is blank, two possibilities can explain this.

(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

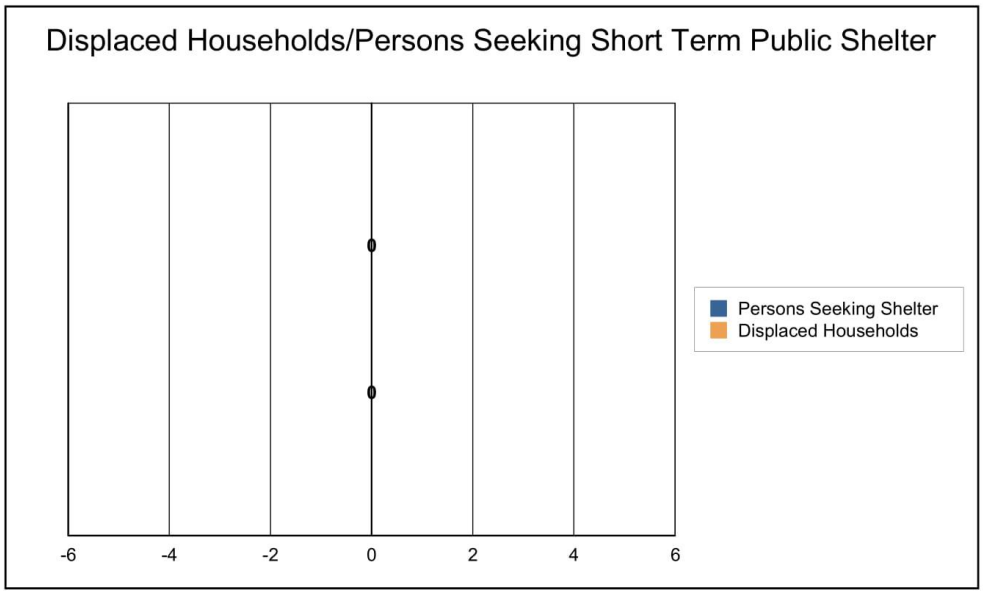
Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

Analysis has not been performed for this Scenario.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 0 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 0 people (out of a total population of 14,202) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 0.10 million dollars, which represents 5.50 % of the total replacement value of the scenario buildings.

Building-Related Losses

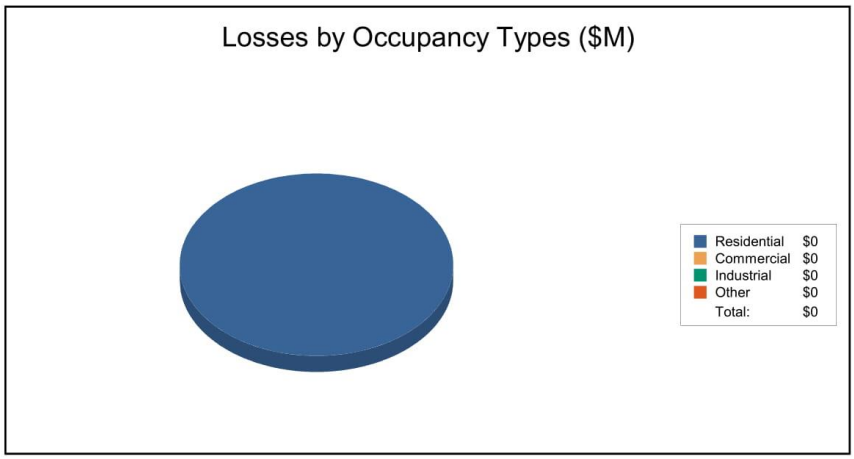
The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 0.10 million dollars. 0% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 100.00% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	0.07	0.00	0.00	0.00	0.07
	Content	0.03	0.00	0.00	0.00	0.03
	Inventory	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.10**	**0.00**	**0.00**	**0.00**	**0.10**
Business Interruption						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	0.00	0.00	0.00	0.00	0.00
	Rental Income	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
ALL	**Total**	**0.10**	**0.00**	**0.00**	**0.00**	**0.10**



Appendix A: County Listing for the Region

California
- Mono

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
California				
Mono	14,202	2,459,157	296,575	2,755,732
Total	**14,202**	**2,459,157**	**296,575**	**2,755,732**
Total Study Region	**14,202**	**2,459,157**	**296,575**	**2,755,732**

Hazus-MH: Flood Global Risk Report

Region Name:	MC_Flooding
Flood Scenario:	Scenario 9
Print Date:	Wednesday, January 24, 2018

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Flood. These results can be improved by using enhanced inventory data and flood hazard information.

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Table of Contents

Section	Page #
General Description of the Region	3
Building Inventory	
General Building Stock	4
Essential Facility Inventory	5
Flood Scenario Parameters	6
Building Damage	
General Building Stock	7
Essential Facilities Damage	9
Induced Flood Damage	10
Debris Generation	
Social Impact	10
Shelter Requirements	
Economic Loss	12
Building-Related Losses	
Appendix A: County Listing for the Region	15
Appendix B: Regional Population and Building Value Data	16

General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- California

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 3,132 square miles and contains 3,050 census blocks. The region contains over 6 thousand households and has a total population of 14,202 people (2010 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 8,667 buildings in the region with a total building replacement value (excluding contents) of 2,756 million dollars (2010 dollars). Approximately 94.81% of the buildings (and 89.24% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 8,667 buildings in the region which have an aggregate total replacement value of 2,756 million (2014 dollars). Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	2,459,157	89.2%
Commercial	190,438	6.9%
Industrial	29,199	1.1%
Agricultural	4,271	0.2%
Religion	27,839	1.0%
Government	23,498	0.9%
Education	21,330	0.8%
Total	**2,755,732**	**100.0%**

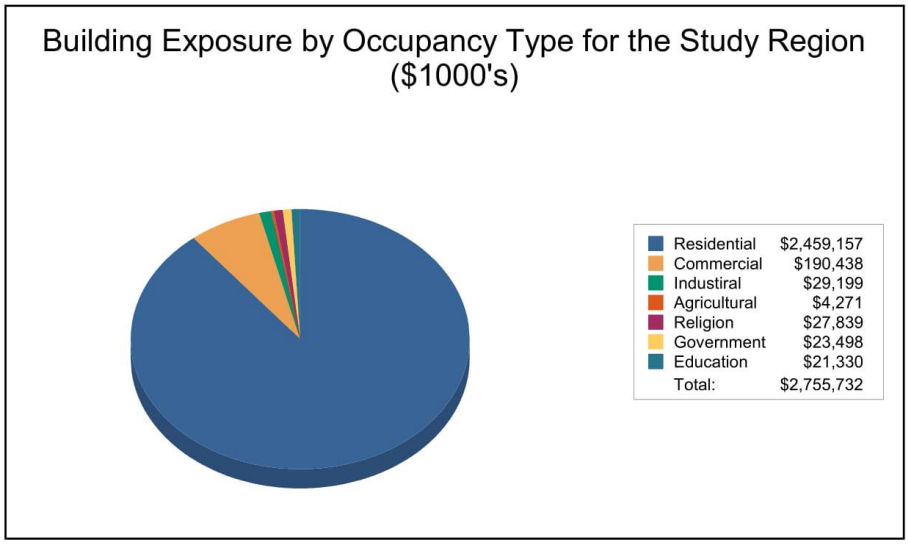
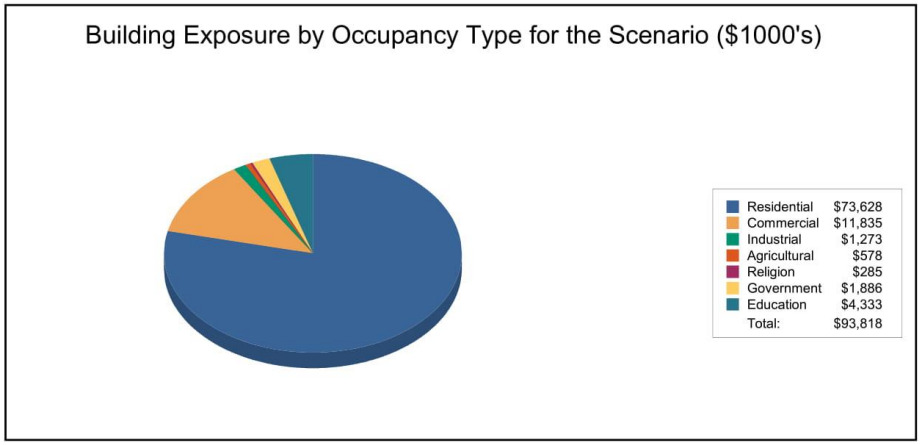


Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	73,628	78.5%
Commercial	11,835	12.6%
Industrial	1,273	1.4%
Agricultural	578	0.6%
Religion	285	0.3%
Government	1,886	2.0%
Education	4,333	4.6%
Total	**93,818**	**100.0%**



Essential Facility Inventory

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 15 beds.
There are 22 schools, 10 fire stations, 3 police stations and no emergency operation centers.

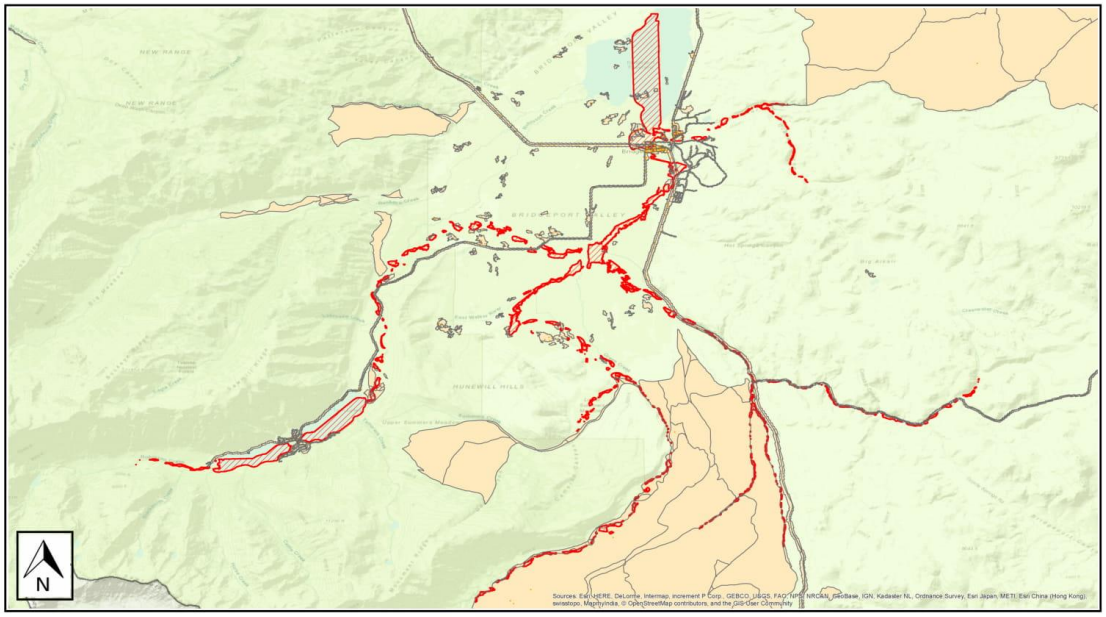
Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	MC_Flooding
Scenario Name:	Scenario 9
Return Period Analyzed:	100
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



Building Damage

General Building Stock Damage

Hazus estimates that about 13 buildings will be at least moderately damaged. This is over 73% of the total number of buildings in the scenario. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = $300K) Overview Map

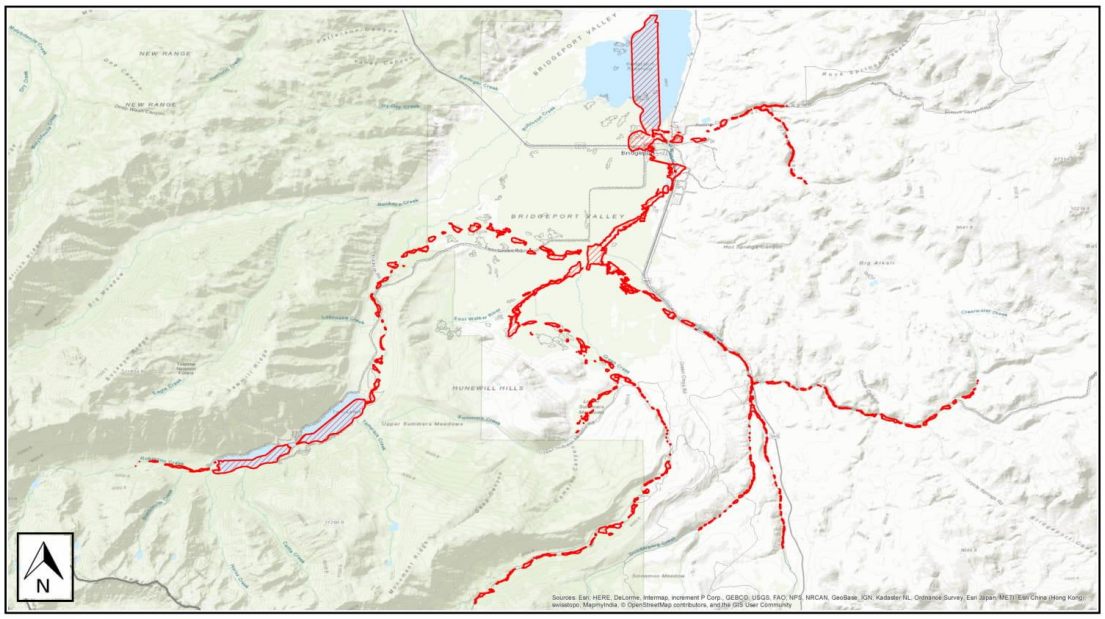


Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	6	31.58	9	47.37	1	5.26	1	5.26	2	10.53	0	0.00
Total	**6**		**9**		**1**		**1**		**2**		**0**	

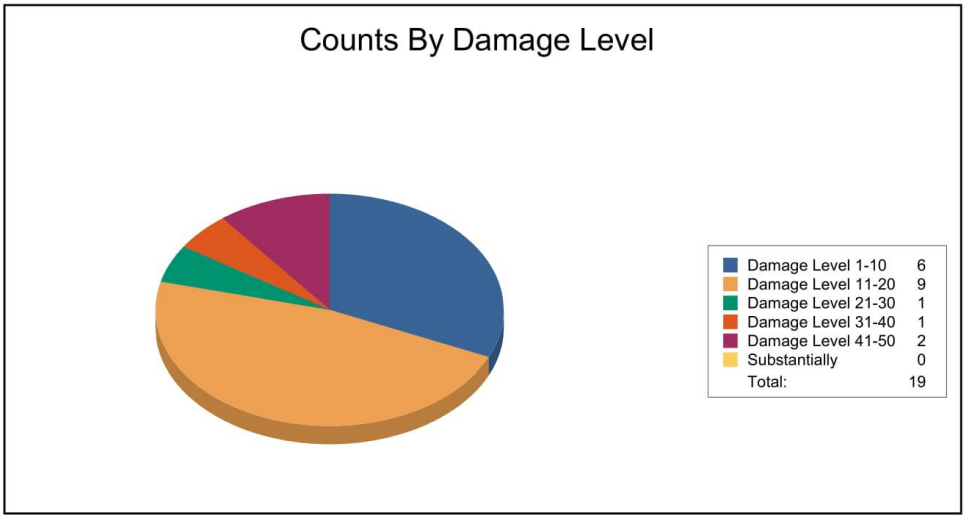


Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	0	0	0	0	0	0	0	0	0	0
ManufHousing	0	0	0	0	0	0	0	0	0	0	0	0
Masonry	0	0	0	0	0	0	0	0	0	0	0	0
Steel	0	0	0	0	0	0	0	0	0	0	0	0
Wood	6	32	9	47	1	5	1	5	2	11	0	0

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 15 hospital beds available for use. On the day of the scenario flood event, the model estimates that 15 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Fire Stations	10	0	0	0
Hospitals	1	0	0	0
Police Stations	3	0	0	0
Schools	22	0	0	0

If this report displays all zeros or is blank, two possibilities can explain this.

(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

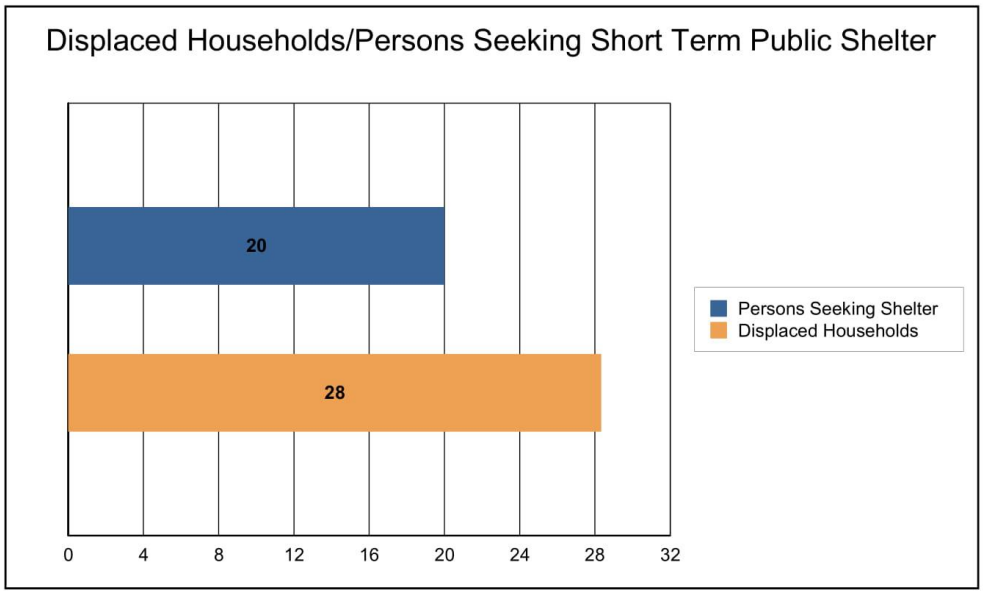
Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

Analysis has not been performed for this Scenario.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 28 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 20 people (out of a total population of 14,202) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 3.60 million dollars, which represents 3.84 % of the total replacement value of the scenario buildings.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 3.58 million dollars. 1% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 75.04% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

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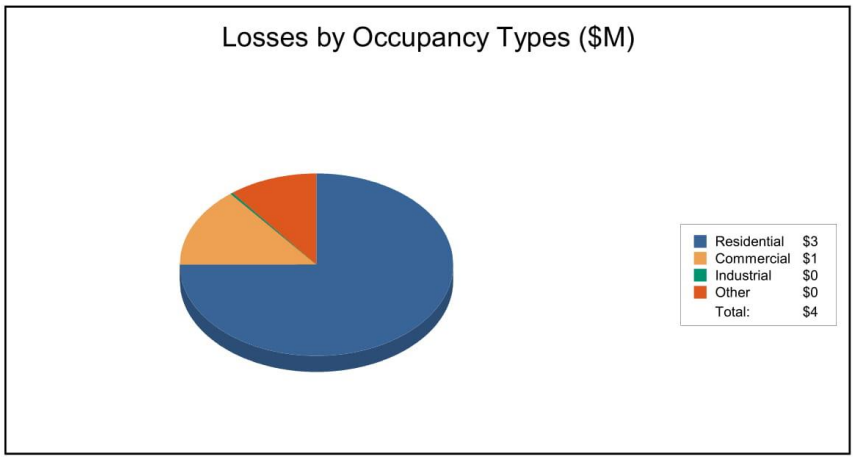
Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	1.76	0.09	0.00	0.06	1.92
	Content	0.94	0.41	0.01	0.31	1.66
	Inventory	0.00	0.00	0.00	0.00	0.00
	Subtotal	**2.70**	**0.50**	**0.01**	**0.37**	**3.58**
Business Interruption						
	Income	0.00	0.00	0.00	0.00	0.01
	Relocation	0.00	0.00	0.00	0.00	0.00
	Rental Income	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.00	0.00	0.01	0.01
	Subtotal	**0.00**	**0.01**	**0.00**	**0.01**	**0.02**
ALL	**Total**	**2.70**	**0.51**	**0.01**	**0.38**	**3.60**



Appendix A: County Listing for the Region

California
- Mono

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Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
California				
Mono	14,202	2,459,157	296,575	2,755,732
Total	**14,202**	**2,459,157**	**296,575**	**2,755,732**
Total Study Region	**14,202**	**2,459,157**	**296,575**	**2,755,732**

Hazus-MH: Flood Global Risk Report

Region Name:	MC_Flooding
Flood Scenario:	Scenarios 10
Print Date:	Wednesday, January 24, 2018

Disclaimer:
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Totals only reflect data for those census tracts/blocks included in the user's study region.

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Table of Contents

Section	Page #
General Description of the Region	3
Building Inventory	
General Building Stock	4
Essential Facility Inventory	5
Flood Scenario Parameters	6
Building Damage	
General Building Stock	7
Essential Facilities Damage	9
Induced Flood Damage	10
Debris Generation	
Social Impact	10
Shelter Requirements	
Economic Loss	12
Building-Related Losses	
Appendix A: County Listing for the Region	15
Appendix B: Regional Population and Building Value Data	16

General Description of the Region

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The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- California

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 3,132 square miles and contains 3,050 census blocks. The region contains over 6 thousand households and has a total population of 14,202 people (2010 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 8,667 buildings in the region with a total building replacement value (excluding contents) of 2,756 million dollars (2010 dollars). Approximately 94.81% of the buildings (and 89.24% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 8,667 buildings in the region which have an aggregate total replacement value of 2,756 million (2014 dollars). Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

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Building Exposure by Occupancy Type for the Study Region

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Industrial	29,199	1.1%
Agricultural	4,271	0.2%
Religion	27,839	1.0%
Government	23,498	0.9%
Education	21,330	0.8%
Total	**2,755,732**	**100.0%**

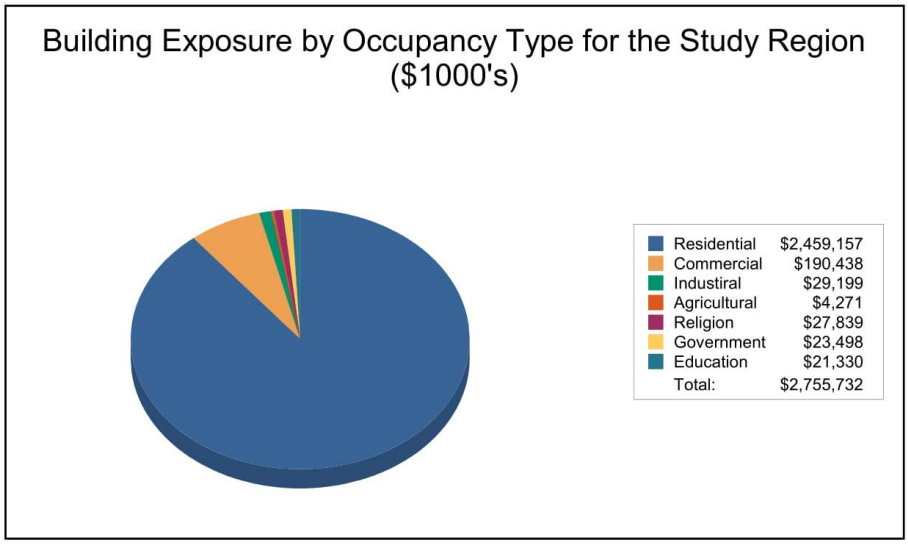
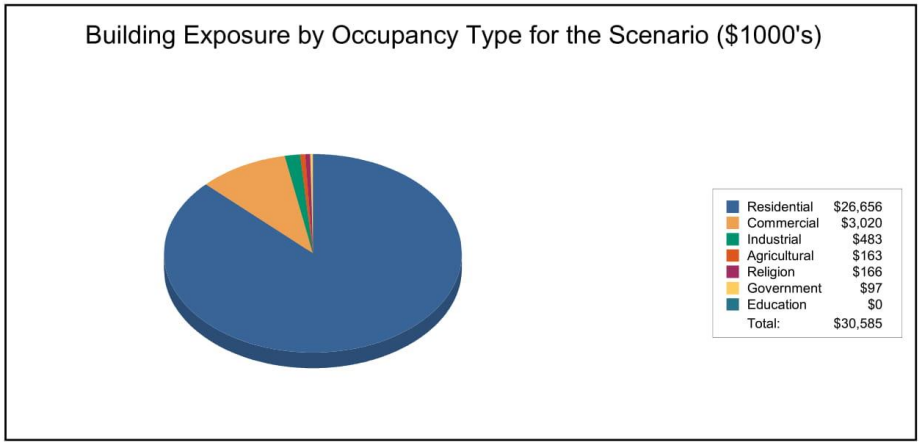


Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	26,656	87.2%
Commercial	3,020	9.9%
Industrial	483	1.6%
Agricultural	163	0.5%
Religion	166	0.5%
Government	97	0.3%
Education	0	0.0%
Total	**30,585**	**100.0%**



Essential Facility Inventory

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 15 beds.
There are 22 schools, 10 fire stations, 3 police stations and no emergency operation centers.

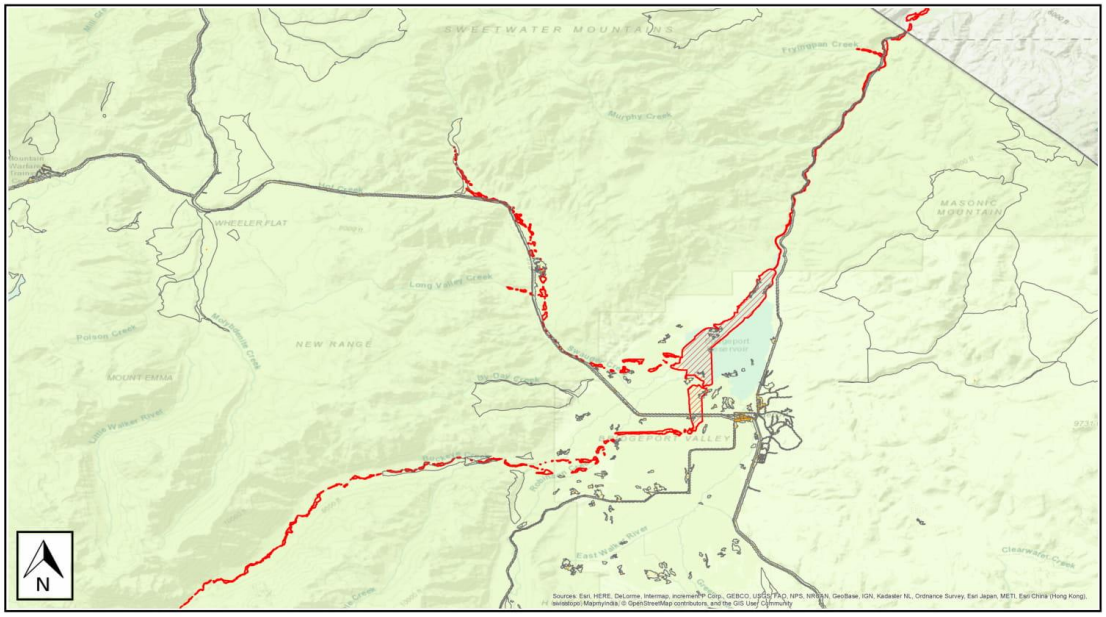
Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	MC_Flooding
Scenario Name:	Scenarios 10
Return Period Analyzed:	100
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



Building Damage

General Building Stock Damage

Hazus estimates that about 0 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the scenario. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = $300K) Overview Map

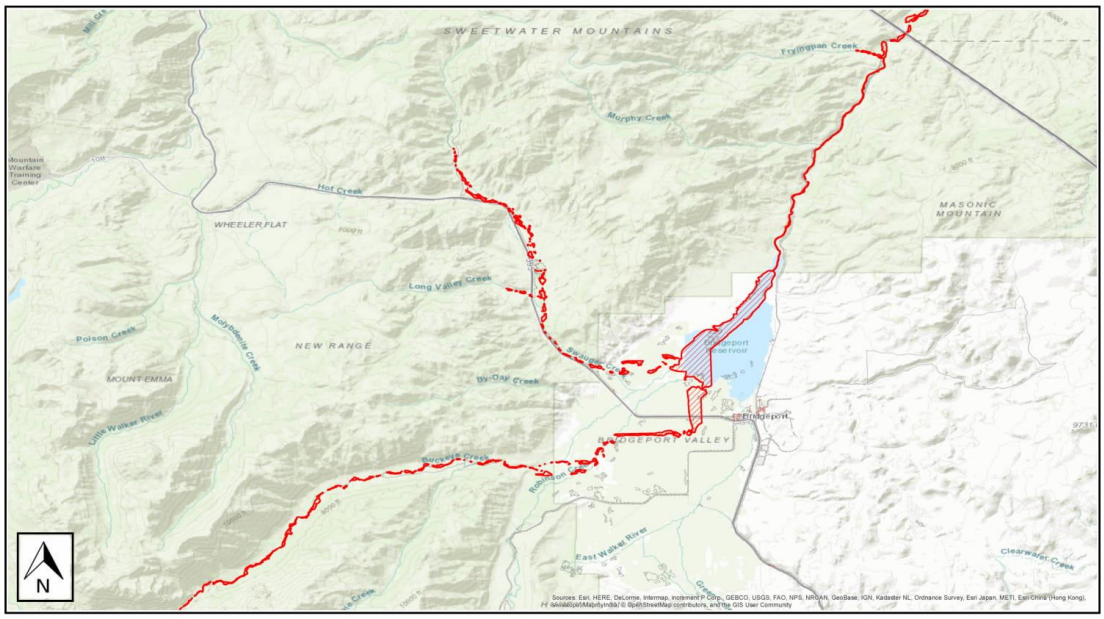


Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	**0**		**0**		**0**		**0**		**0**		**0**	

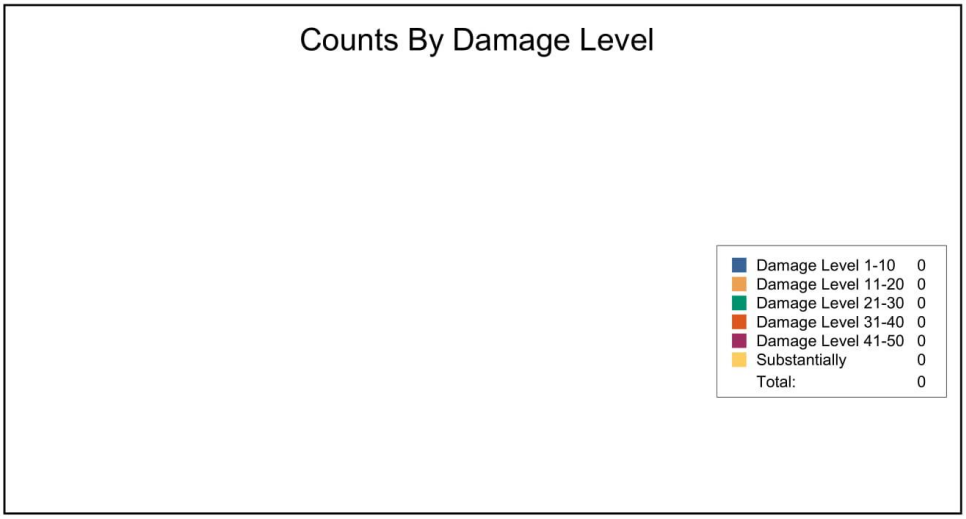


Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	0	0	0	0	0	0	0	0	0	0
ManufHousing	0	0	0	0	0	0	0	0	0	0	0	0
Masonry	0	0	0	0	0	0	0	0	0	0	0	0
Steel	0	0	0	0	0	0	0	0	0	0	0	0
Wood	0	0	0	0	0	0	0	0	0	0	0	0

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 15 hospital beds available for use. On the day of the scenario flood event, the model estimates that 15 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Fire Stations	10	0	0	0
Hospitals	1	0	0	0
Police Stations	3	0	0	0
Schools	22	0	0	0

If this report displays all zeros or is blank, two possibilities can explain this.

(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

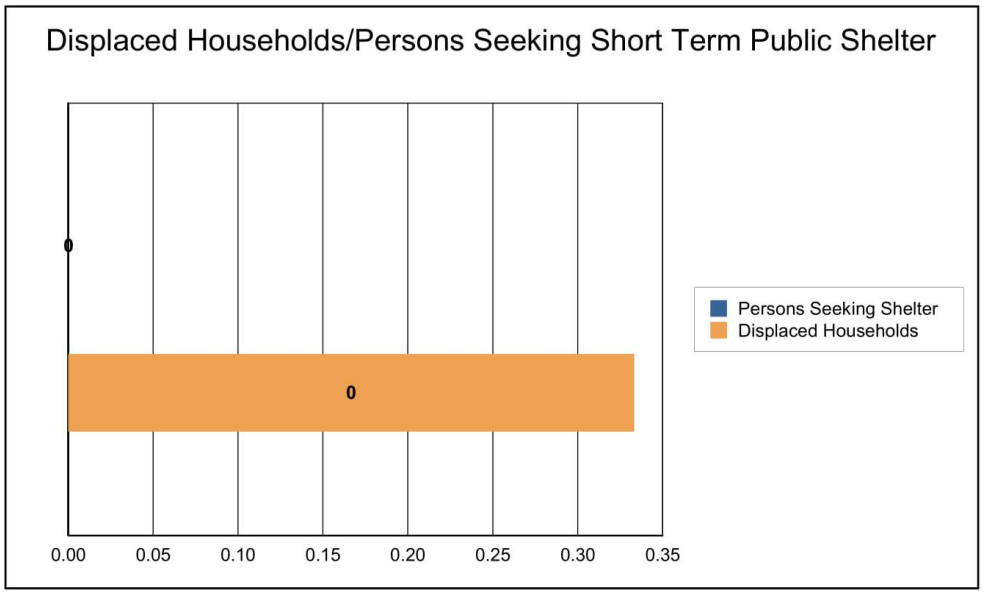
Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

Analysis has not been performed for this Scenario.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 0 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 0 people (out of a total population of 14,202) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 0.16 million dollars, which represents 0.51 % of the total replacement value of the scenario buildings.

Building-Related Losses

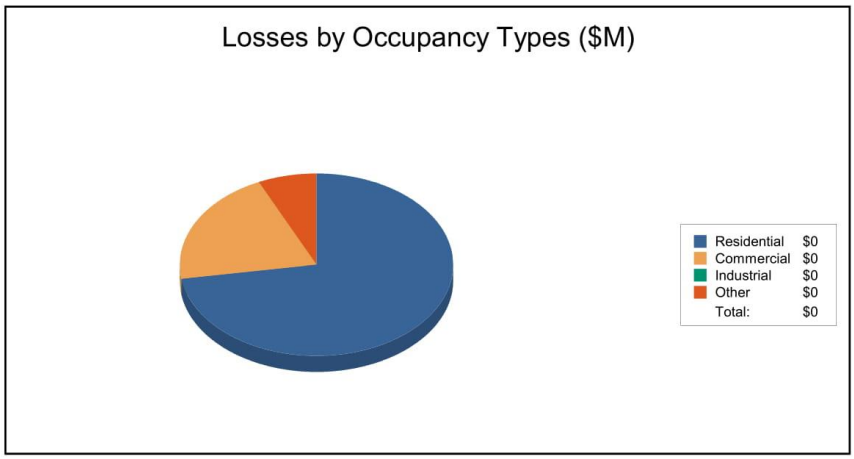
The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 0.16 million dollars. 0% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 72.61% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	0.08	0.01	0.00	0.00	0.09
	Content	0.04	0.02	0.00	0.01	0.07
	Inventory	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.11**	**0.03**	**0.00**	**0.01**	**0.16**
Business Interruption						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	0.00	0.00	0.00	0.00	0.00
	Rental Income	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
ALL	**Total**	**0.11**	**0.03**	**0.00**	**0.01**	**0.16**



Appendix A: County Listing for the Region

California
- Mono

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Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
California				
Mono	14,202	2,459,157	296,575	2,755,732
Total	**14,202**	**2,459,157**	**296,575**	**2,755,732**
Total Study Region	**14,202**	**2,459,157**	**296,575**	**2,755,732**

Hazus-MH: Flood Global Risk Report

Region Name:	MC_Flooding
Flood Scenario:	Scenario 11
Print Date:	Wednesday, January 24, 2018

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Flood. These results can be improved by using enhanced inventory data and flood hazard information.

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Table of Contents

Section	Page #
General Description of the Region	3
Building Inventory	
General Building Stock	4
Essential Facility Inventory	5
Flood Scenario Parameters	6
Building Damage	
General Building Stock	7
Essential Facilities Damage	9
Induced Flood Damage	10
Debris Generation	
Social Impact	10
Shelter Requirements	
Economic Loss	12
Building-Related Losses	
Appendix A: County Listing for the Region	15
Appendix B: Regional Population and Building Value Data	16

General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- California

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 3,132 square miles and contains 3,050 census blocks. The region contains over 6 thousand households and has a total population of 14,202 people (2010 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 8,667 buildings in the region with a total building replacement value (excluding contents) of 2,756 million dollars (2010 dollars). Approximately 94.81% of the buildings (and 89.24% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 8,667 buildings in the region which have an aggregate total replacement value of 2,756 million (2014 dollars). Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	2,459,157	89.2%
Commercial	190,438	6.9%
Industrial	29,199	1.1%
Agricultural	4,271	0.2%
Religion	27,839	1.0%
Government	23,498	0.9%
Education	21,330	0.8%
Total	**2,755,732**	**100.0%**

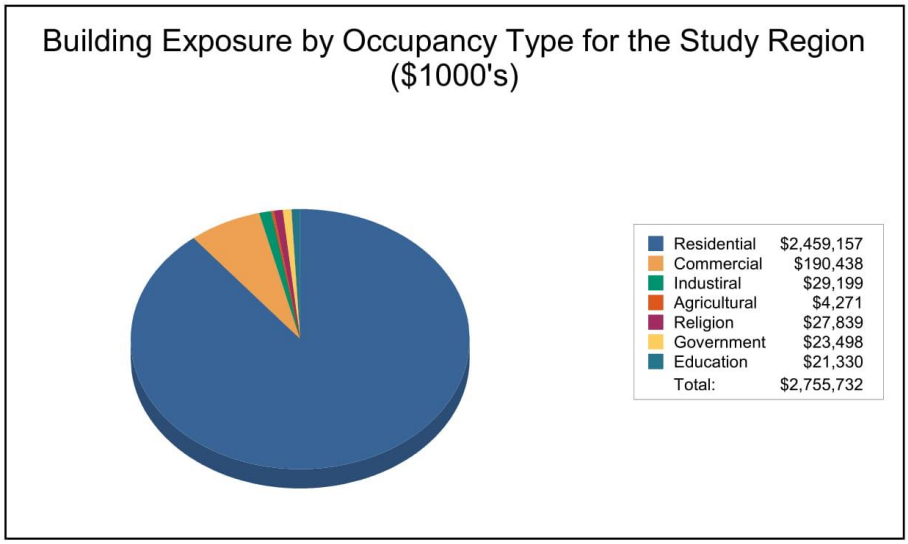
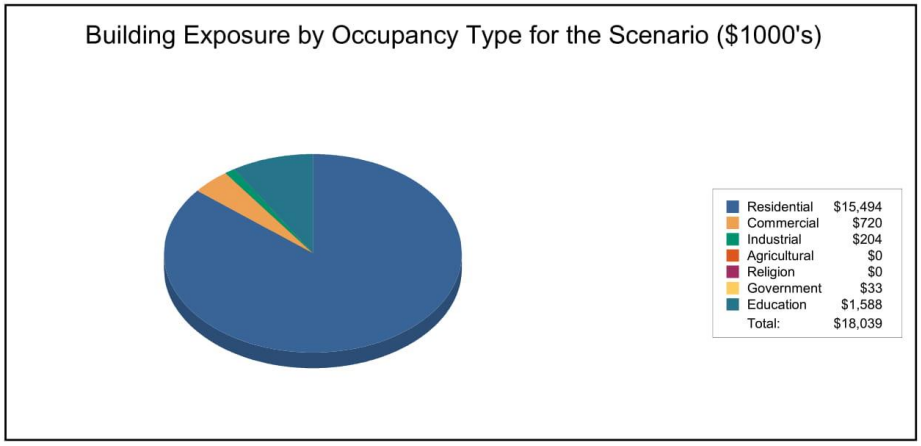


Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	15,494	85.9%
Commercial	720	4.0%
Industrial	204	1.1%
Agricultural	0	0.0%
Religion	0	0.0%
Government	33	0.2%
Education	1,588	8.8%
Total	**18,039**	**100.0%**



Essential Facility Inventory

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 15 beds.
There are 22 schools, 10 fire stations, 3 police stations and no emergency operation centers.

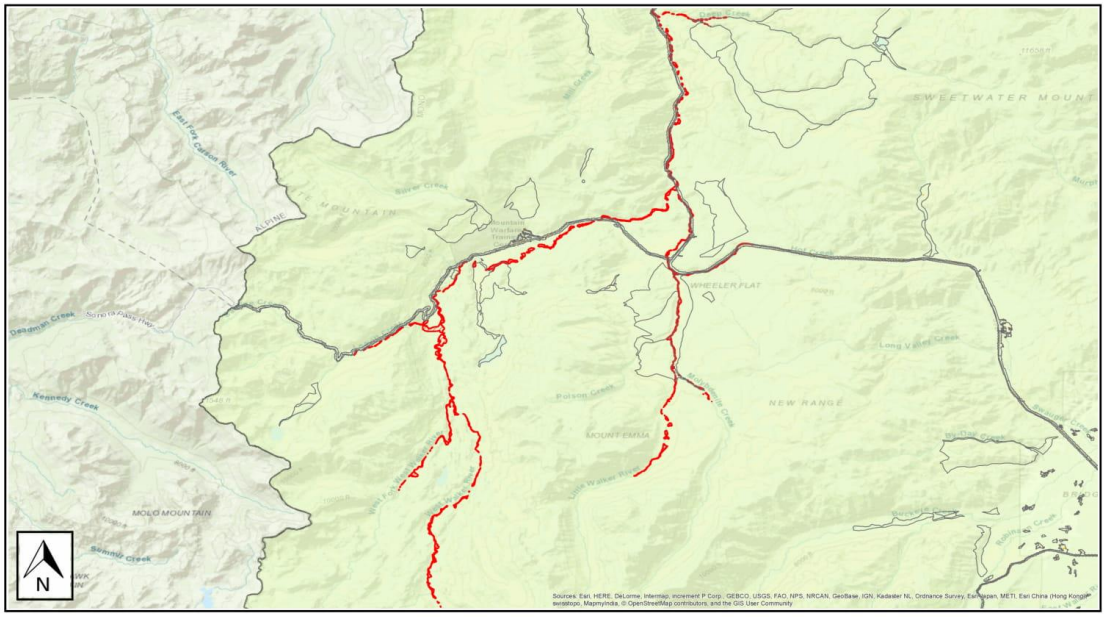
Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	MC_Flooding
Scenario Name:	Scenario 11
Return Period Analyzed:	100
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



Building Damage

General Building Stock Damage

Hazus estimates that about 0 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the scenario. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = $300K) Overview Map

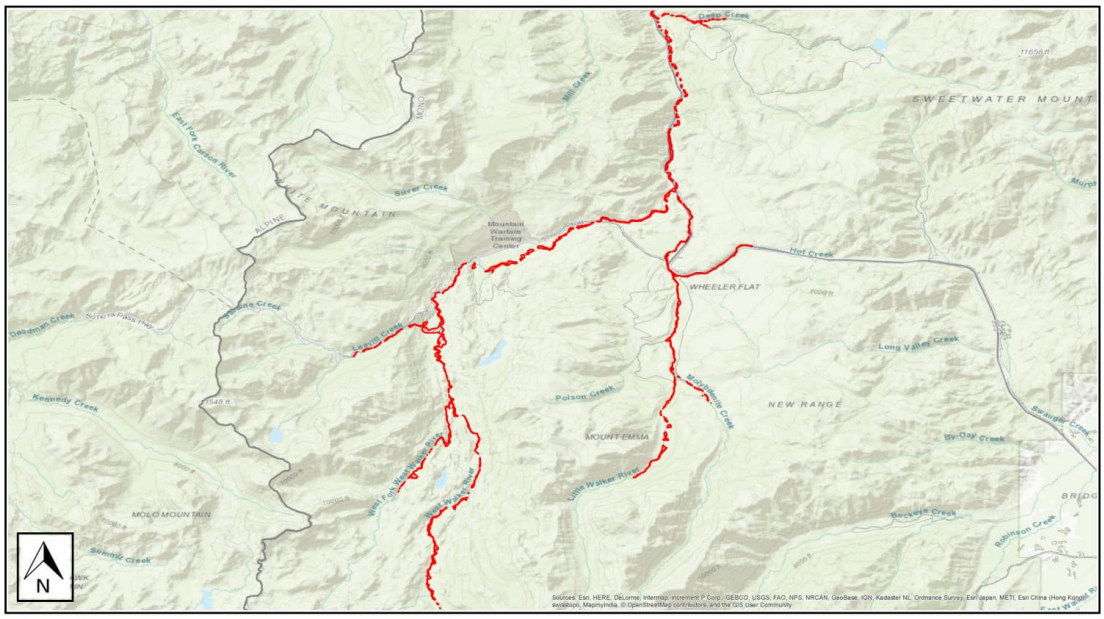


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Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	**0**		**0**		**0**		**0**		**0**		**0**	

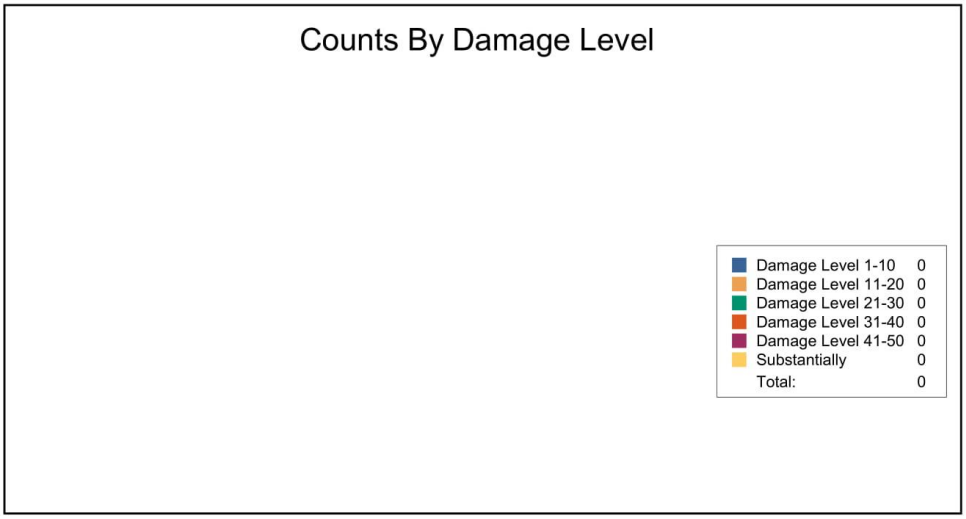


Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	0	0	0	0	0	0	0	0	0	0
ManufHousing	0	0	0	0	0	0	0	0	0	0	0	0
Masonry	0	0	0	0	0	0	0	0	0	0	0	0
Steel	0	0	0	0	0	0	0	0	0	0	0	0
Wood	0	0	0	0	0	0	0	0	0	0	0	0

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 15 hospital beds available for use. On the day of the scenario flood event, the model estimates that 15 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Fire Stations	10	0	0	0
Hospitals	1	0	0	0
Police Stations	3	0	0	0
Schools	22	0	0	0

If this report displays all zeros or is blank, two possibilities can explain this.

(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

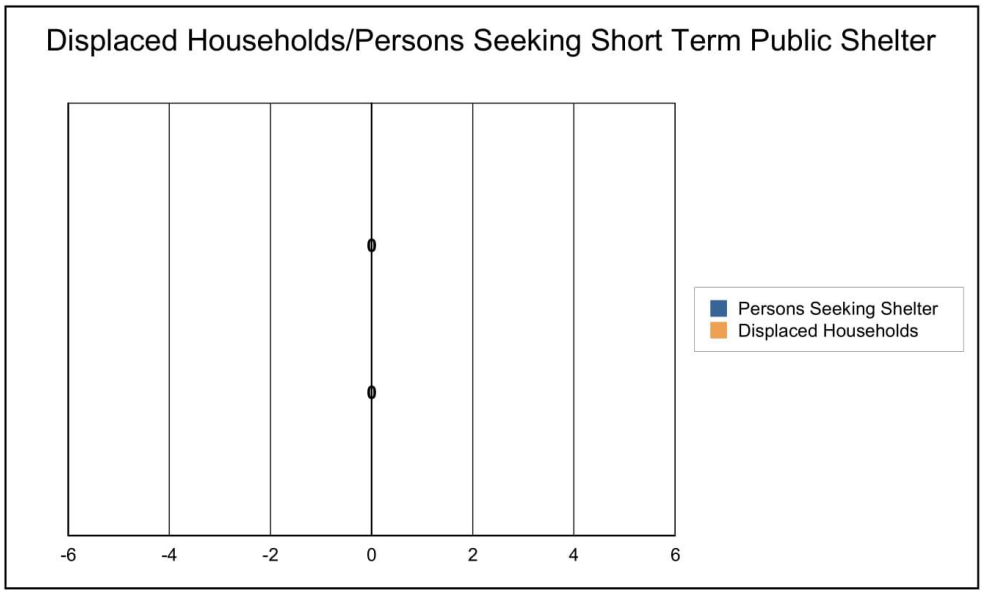
Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

Analysis has not been performed for this Scenario.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 0 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 0 people (out of a total population of 14,202) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 0.04 million dollars, which represents 0.24 % of the total replacement value of the scenario buildings.

Building-Related Losses

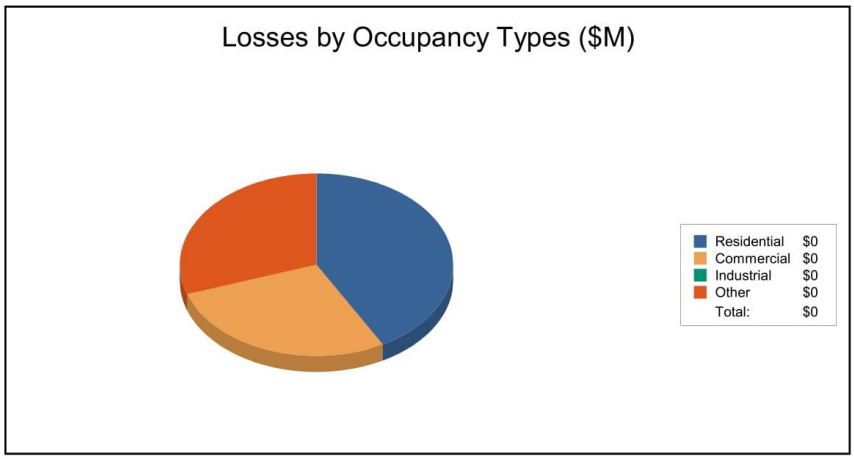
The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 0.04 million dollars. 0% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 41.86% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	0.01	0.01	0.00	0.00	0.02
	Content	0.01	0.01	0.00	0.01	0.02
	Inventory	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.02**	**0.01**	**0.00**	**0.01**	**0.04**
Business Interruption						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	0.00	0.00	0.00	0.00	0.00
	Rental Income	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
ALL	**Total**	**0.02**	**0.01**	**0.00**	**0.01**	**0.04**



Appendix A: County Listing for the Region

California
- Mono

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Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
California				
Mono	14,202	2,459,157	296,575	2,755,732
Total	**14,202**	**2,459,157**	**296,575**	**2,755,732**
Total Study Region	**14,202**	**2,459,157**	**296,575**	**2,755,732**

Hazus-MH: Flood Global Risk Report

Region Name:	MC_Flooding
Flood Scenario:	Scenario 12
Print Date:	Wednesday, January 24, 2018

Disclaimer:
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Totals only reflect data for those census tracts/blocks included in the user's study region.

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Table of Contents

Section	Page #
General Description of the Region	3
Building Inventory	
General Building Stock	4
Essential Facility Inventory	5
Flood Scenario Parameters	6
Building Damage	
General Building Stock	7
Essential Facilities Damage	9
Induced Flood Damage	10
Debris Generation	
Social Impact	10
Shelter Requirements	
Economic Loss	12
Building-Related Losses	
Appendix A: County Listing for the Region	15
Appendix B: Regional Population and Building Value Data	16

General Description of the Region

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The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- California

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 3,132 square miles and contains 3,050 census blocks. The region contains over 6 thousand households and has a total population of 14,202 people (2010 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 8,667 buildings in the region with a total building replacement value (excluding contents) of 2,756 million dollars (2010 dollars). Approximately 94.81% of the buildings (and 89.24% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 8,667 buildings in the region which have an aggregate total replacement value of 2,756 million (2014 dollars). Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	2,459,157	89.2%
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Industrial	29,199	1.1%
Agricultural	4,271	0.2%
Religion	27,839	1.0%
Government	23,498	0.9%
Education	21,330	0.8%
Total	**2,755,732**	**100.0%**

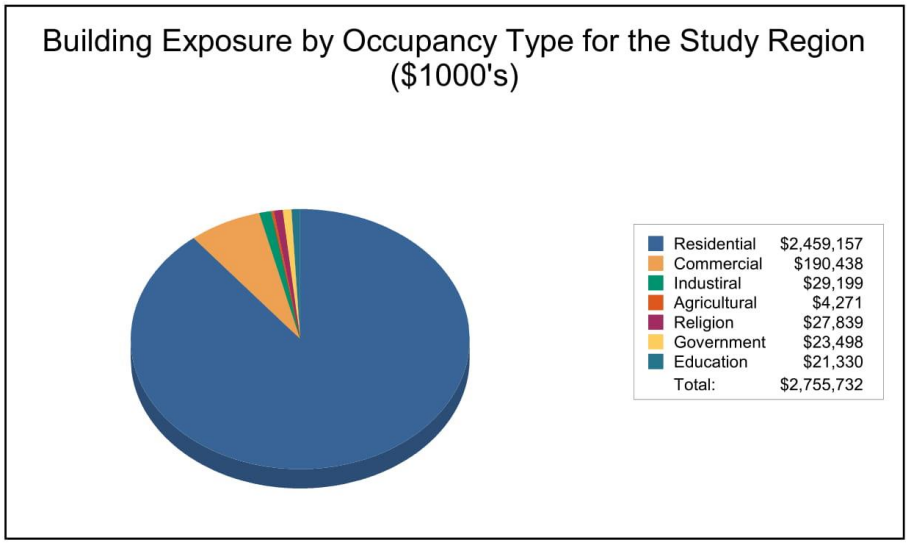
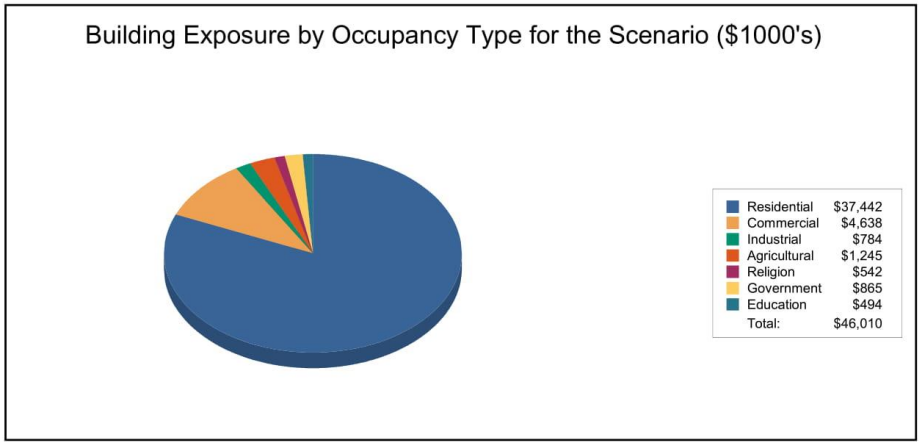


Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	37,442	81.4%
Commercial	4,638	10.1%
Industrial	784	1.7%
Agricultural	1,245	2.7%
Religion	542	1.2%
Government	865	1.9%
Education	494	1.1%
Total	**46,010**	**100.0%**



Essential Facility Inventory

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 15 beds.
There are 22 schools, 10 fire stations, 3 police stations and no emergency operation centers.

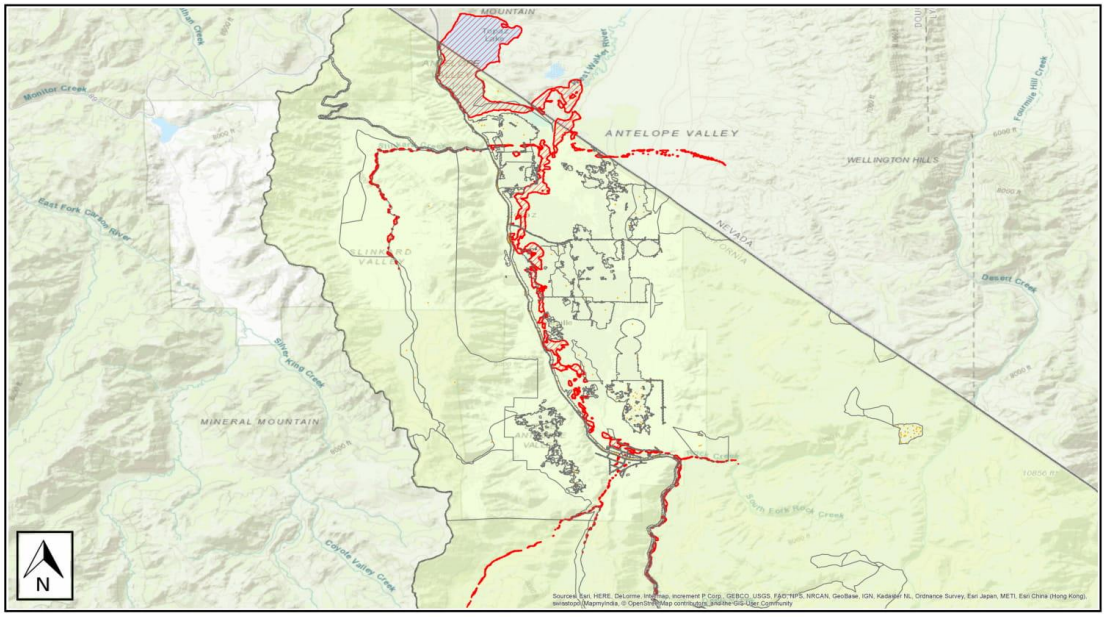
Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	MC_Flooding
Scenario Name:	Scenario 12
Return Period Analyzed:	100
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



Building Damage

General Building Stock Damage

Hazus estimates that about 0 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the scenario. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = $300K) Overview Map

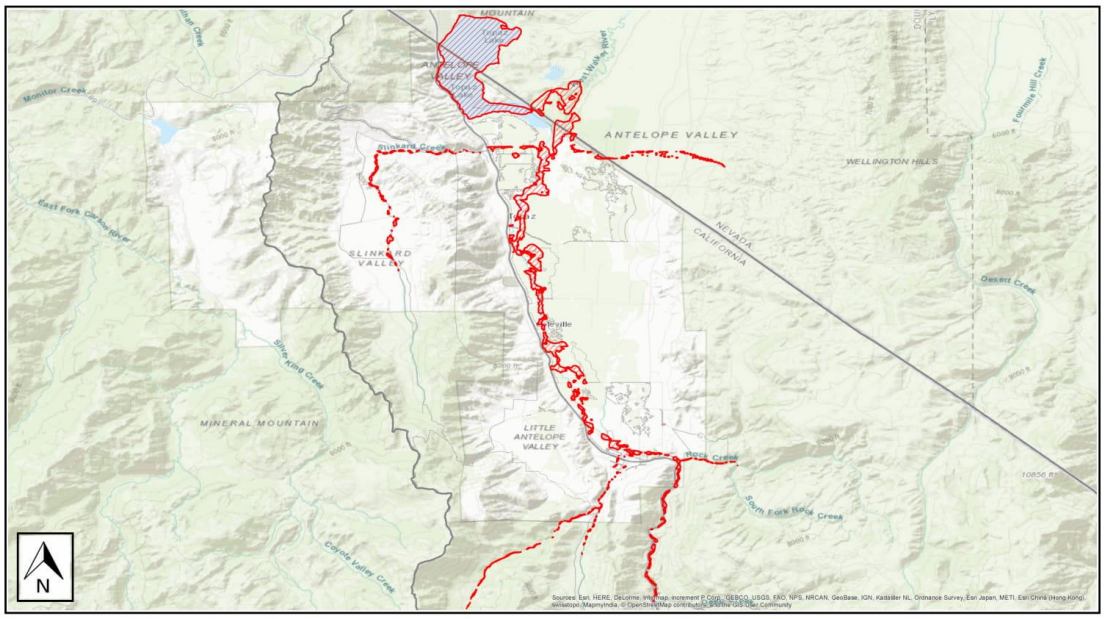


Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	**0**		**0**		**0**		**0**		**0**		**0**	

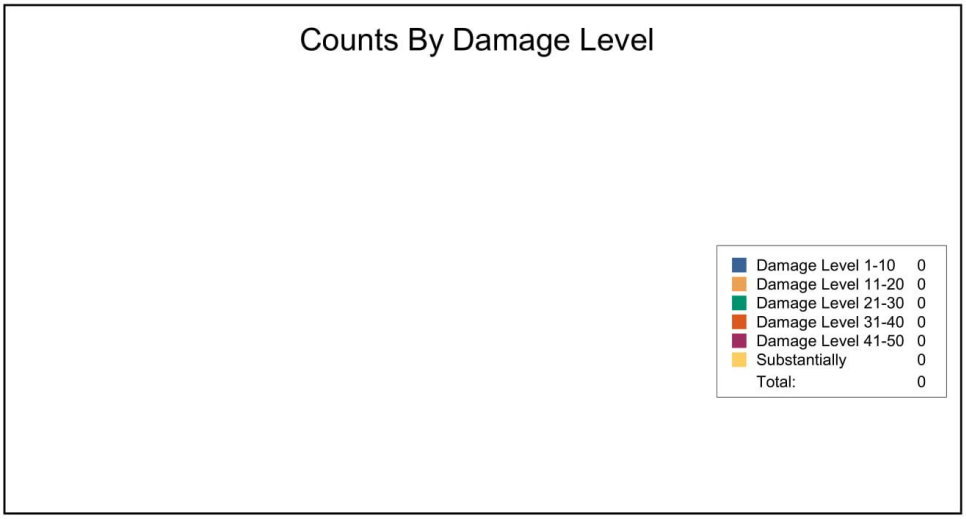


Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	0	0	0	0	0	0	0	0	0	0
ManufHousing	0	0	0	0	0	0	0	0	0	0	0	0
Masonry	0	0	0	0	0	0	0	0	0	0	0	0
Steel	0	0	0	0	0	0	0	0	0	0	0	0
Wood	0	0	0	0	0	0	0	0	0	0	0	0

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 15 hospital beds available for use. On the day of the scenario flood event, the model estimates that 15 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Fire Stations	10	0	0	0
Hospitals	1	0	0	0
Police Stations	3	0	0	0
Schools	22	0	0	0

If this report displays all zeros or is blank, two possibilities can explain this.

(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

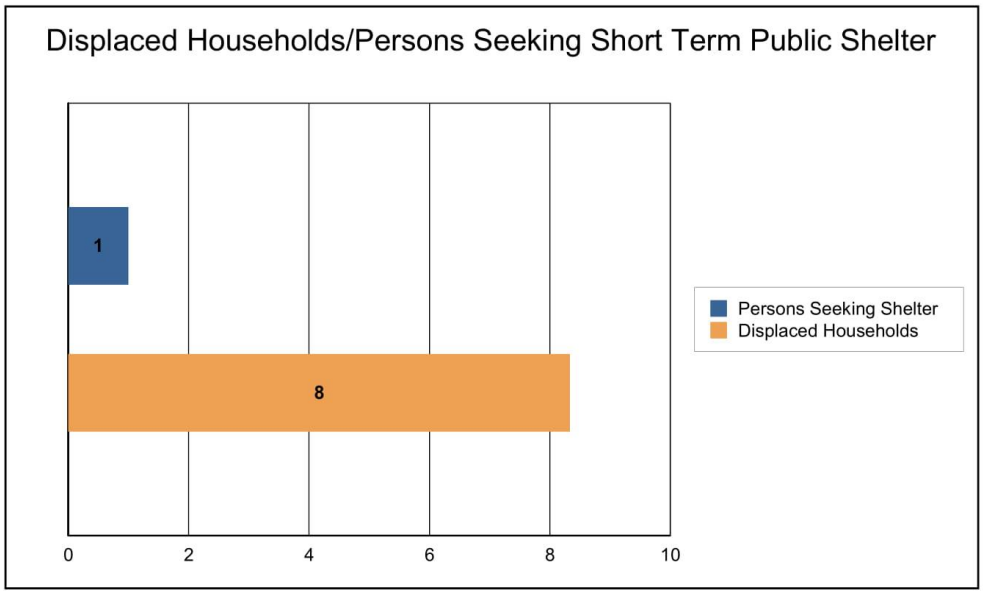
Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

Analysis has not been performed for this Scenario.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 8 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 1 people (out of a total population of 14,202) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 1.16 million dollars, which represents 2.52 % of the total replacement value of the scenario buildings.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

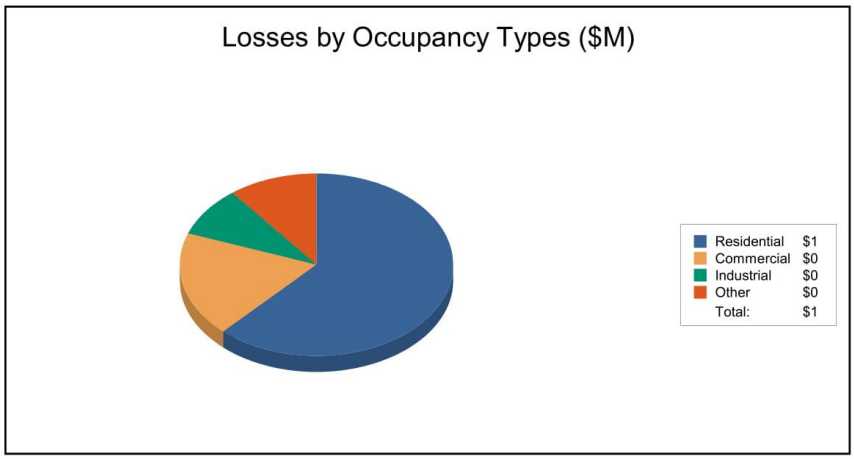
The total building-related losses were 1.16 million dollars. 0% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 61.90% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

HAZUS MH
EARTHQUAKE • WIND • FLOOD

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	0.49	0.08	0.03	0.04	0.63
	Content	0.23	0.14	0.06	0.08	0.52
	Inventory	0.00	0.00	0.01	0.00	0.01
	Subtotal	**0.72**	**0.22**	**0.10**	**0.12**	**1.16**
Business Interruption						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	0.00	0.00	0.00	0.00	0.00
	Rental Income	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
ALL	**Total**	**0.72**	**0.22**	**0.10**	**0.12**	**1.16**



Appendix A: County Listing for the Region

California
- Mono

HAZUS MH
EARTHQUAKE • WIND • FLOOD

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
California				
Mono	14,202	2,459,157	296,575	2,755,732
Total	**14,202**	**2,459,157**	**296,575**	**2,755,732**
Total Study Region	**14,202**	**2,459,157**	**296,575**	**2,755,732**

Mono County | Town of Mammoth Lakes

Multi-Jurisdictional Hazard Mitigation Plan (MJHMP)

APPENDIX F: CWPP APPENDICES

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The Mono County Community Wildfire Protection Plan (CWPP) is Chapter 7 of this MJHMP. The following are the six appendices to the Mono County CWPP:

- CWPP Appendix 1: Fire Behavior Potential Analysis Methodology
- CWPP Appendix 2: Neighborhood Ignitability Analysis and Recommendations
- CWPP Appendix 3: Structural Triage and Preparation
- CWPP Appendix 4: Access and Water Supply Recommended Guidelines
- CWPP Appendix 5: Dry Hydrant Manual
- CWPP AppenType equation here.dix 6: Mono County CWPP Collaborative Effort

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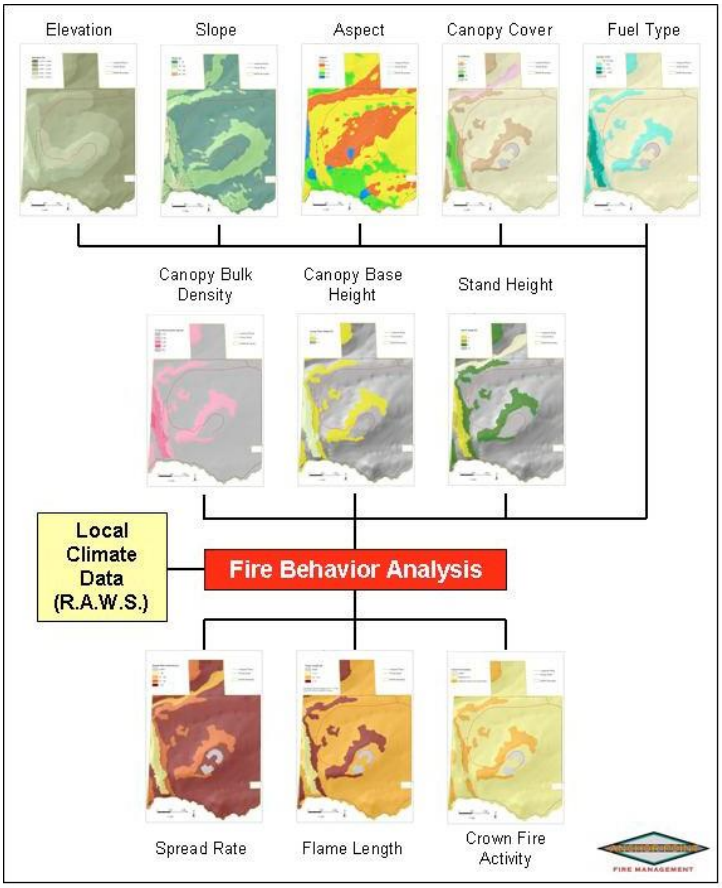
CWPP Appendix 1:
Fire Behavior Potential Analysis Methodology

Purpose

The purpose of this document is to describe the methodology used to evaluate the threat represented by physical hazards – such as fuels, weather and topography – to values-at-risk in the study area, by modeling their effects on fire behavior potential.

Figure 1. Flow Chart



The fire behavior potential analysis reports graphically the probable range of spread rate, flame length, and crown fire potential for the analysis area, based upon a set of inputs significant to fire behavior. The model inputs include aspect, slope, elevation, canopy cover, fuel type, canopy bulk density, canopy base height, stand height, and climate data. The model outputs are determined

using FlamMap[1], which combines surface fire predictions with the potential for crown fire development. Calculations for surface fire predictions (rate of spread and flame length) are based on the USDA Forest Service's BEHAVE[2] model.

BEHAVE

The BEHAVE fire behavior prediction and fuel modeling system was employed to determine surface fire behavior estimates for this study. BEHAVE is a nationally recognized set of calculations used to estimate a surface fire's intensity and rate of spread given certain conditions of topography, fuels, and weather. The BEHAVE modeling system has been used for a variety of applications, including prediction of an ongoing fire, prescribed fire planning, fuel hazard assessment, initial attack dispatch, and fire prevention planning and training. Predictions of wildland fire behavior are made for a single point in time and space, given simple user-defined fuels, weather, and topography. Requested values depend on the modeling choices made by the user.

Assumptions of BEHAVE:

- Fire is predicted at the flaming front
- Fire is free burning
- Behavior is heavily weighted towards the fine fuels
- Continuous and uniform fuels
- Surface fires

FlamMap

Anchor Point uses FlamMap to evaluate the potential fire conditions in the fire behavior study area. Mono County encompasses 2,004,344 acres (3,131.8 square miles). The study area for the fire behavior analysis covers approximately 2,213,067 acres (3,457.9 square miles). This area includes the entire county plus a one-mile buffer in all directions. The use of this buffer provides the county with an analysis of potential fire behavior on adjacent lands. The study area is broken down into grid cells of 10-meters per side (10M). Using existing vector and raster spatial data and field data, ArcGIS spatial analysis capabilities are used to calculate model inputs for each 10M cell.

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[1] Mark Finney, Stuart Brittain and Rob Seli., The Joint Fire Sciences Program of the Rocky Mountain Research Station (USDA Forest Service, Missoula, Montana), the Bureau of Land Management and Systems for Environmental Management (Missoula, Montana).

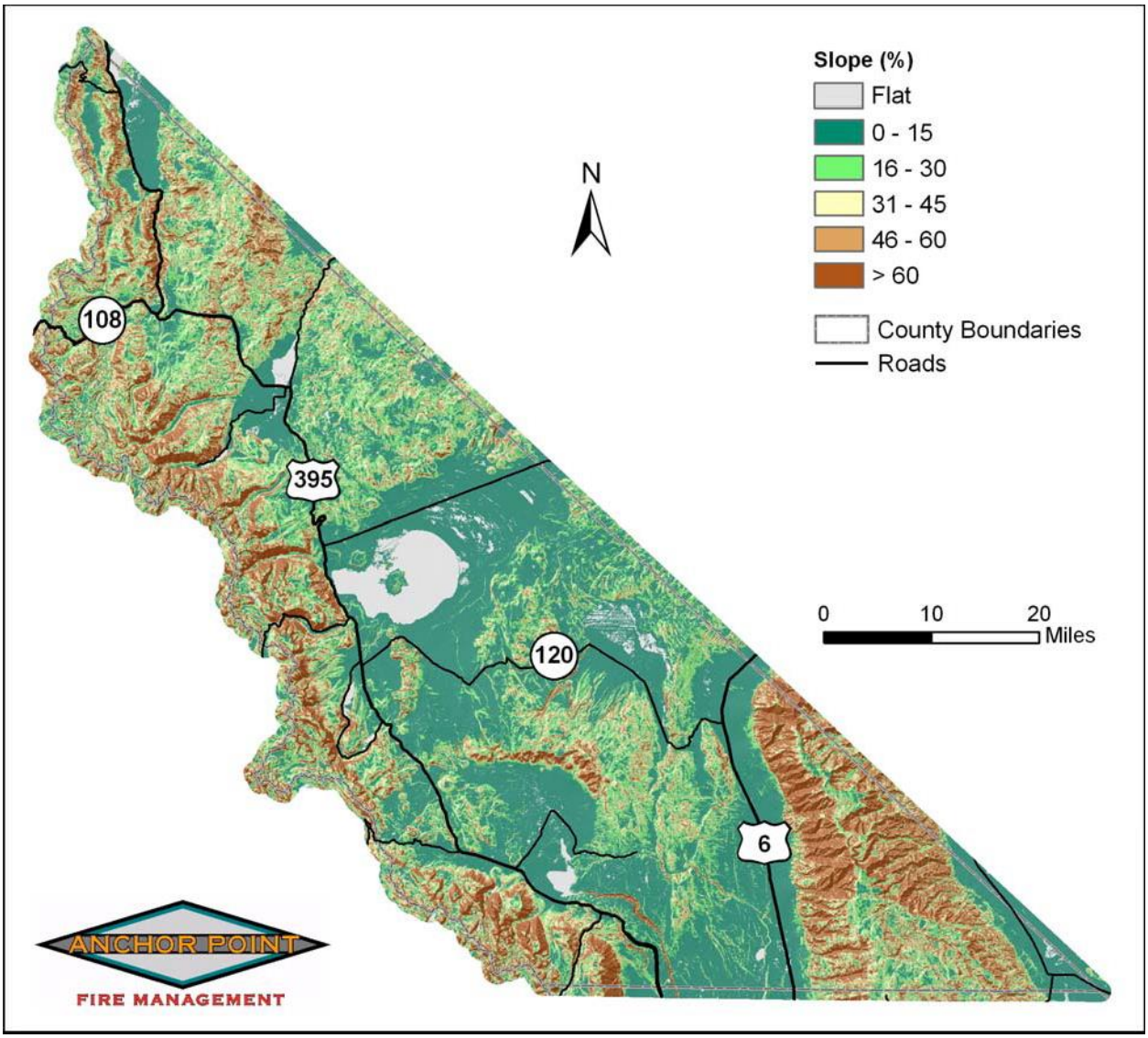
[2] Patricia L. Andrews, producer and designer, Collin D. Bevins, programmer and designer, The Joint Fire Sciences Program of the Rocky Mountain Research Station (USDA Forest Service, Missoula, Montana) and Systems for Environmental Management (Missoula, Montana).

These values are input into FlamMap, along with reference weather and fuel moisture (long-term weather observations statistically calculated from the Rifle Remote Automated Weather Station information). The outputs of FlamMap include the estimated Rate of Spread (ROS) (from BEHAVE), Flame Length (FL) (from BEHAVE) and Crown Fire Activity for a fire in that 10M cell. The model computes these values for each cell in the study area independently, so the data in each cell is unaffected by adjacent cells.

Fire Behavior Inputs

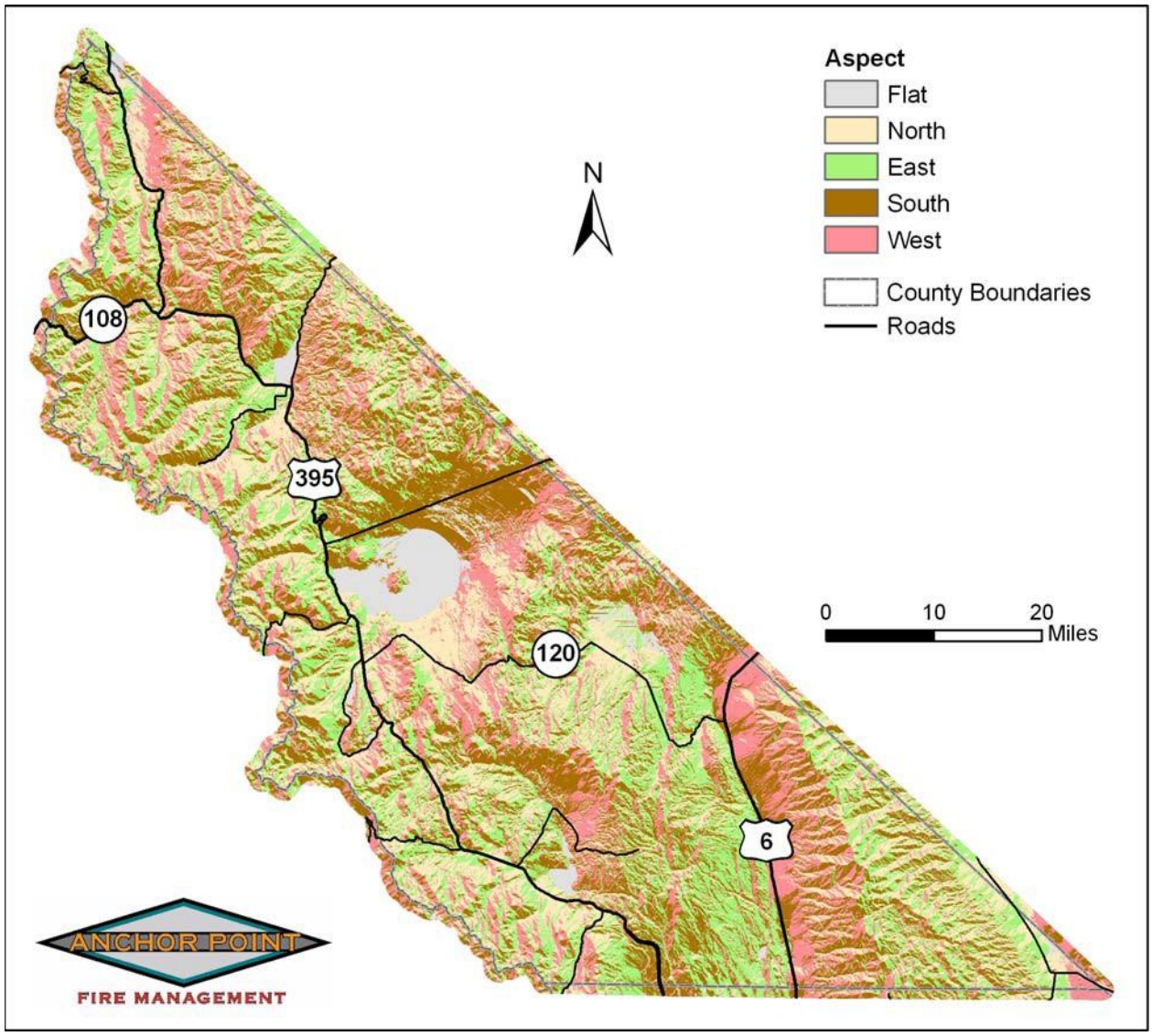
The major factors influencing fire behavior are fuels (type and coverage), weather, and topography (aspect, slope and elevation). The following pages contain a brief explanation of each.

Figure 2. Percent Slope



Slopes are shown here as percent (rise/run x100). Steeper slopes intensify fire behavior and thus will contribute to a higher wildfire hazard rating. Rates of spread for a slope of 30% are typically double those of flat terrain, when all other influences are equal.

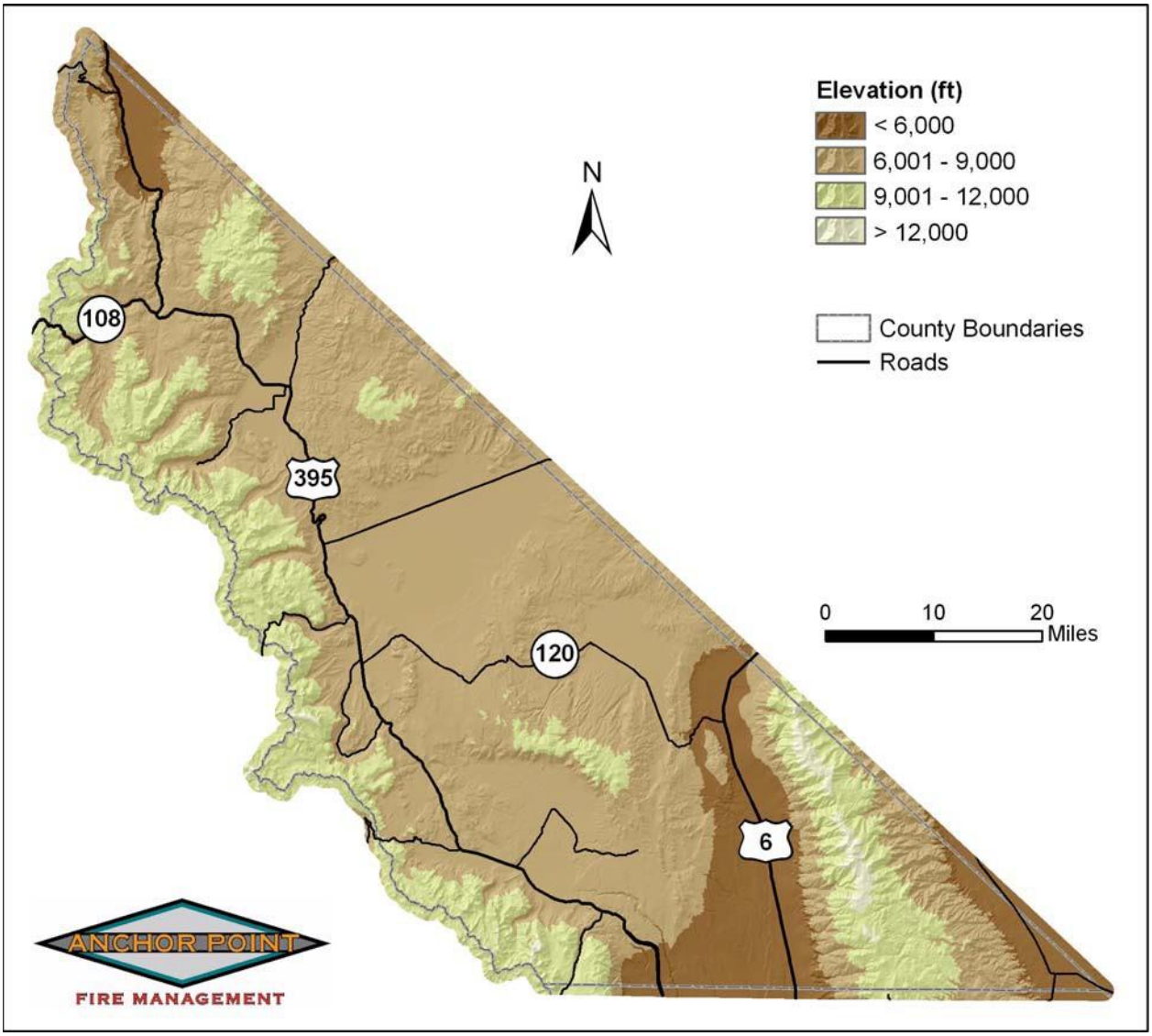
Figure 3. Aspect



Aspects are shown as degrees from north ranging from 0 to 360 according to their orientation. Aspects are influential in the type and quantity of vegetative fuels. Fuels on south facing slopes tend to be drier and more lightly loaded than fuels on north facing slopes, when all other influences are equal. Aspect also has an influence on plant species dominance.

Classification	North	East	South	West
Range (degrees)	**315-45**	**45-135**	**135-225**	**225-315**

Figure 4. Elevation



Elevations within the study area range from 4,200' to over 10,000'. As elevation increases, environmental conditions, fuel species, and characteristics change.

Fuel Models and Fire Behavior

Fire behavior fuel models are a set of numbers that describe fuels in terms that a fire behavior model, in this case FlamMap, can use. There are seven characteristics used to categorize fuel models.

- Fuel Loading
- Size and Shape
- Compactness
- Horizontal Continuity

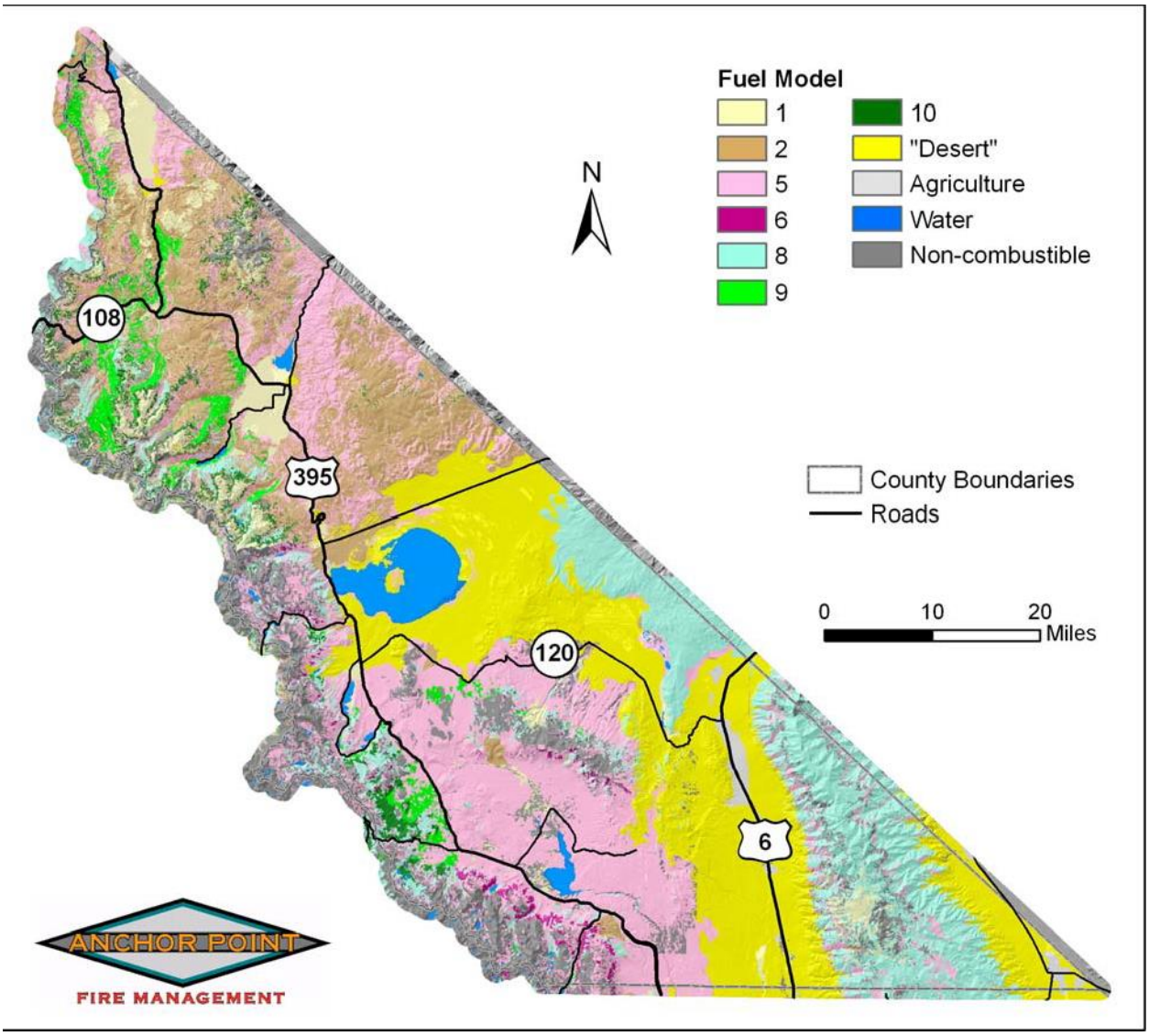
- Vertical Arrangement
- Moisture Content
- Chemical Content

Each of the major fuel types present in the study area are described below in terms of the characteristics that coincide with that fuel model. Fuel model descriptions are taken from Anderson's *Aids to Determining Fuel Models for Estimating Fire Behavior*[3], a national standard guide to fuel modeling, unless otherwise noted. **Vegetation for the project area may or may not be specifically listed in the description**. Plant species are only an aid to help visualize the characteristics of the model. The photos are taken from the project area and show where the local vegetation fits in.

The study area is represented primarily by eight fuel models (FM): FM 1, 2, 5, 6, 8, 9, 10 and 15 (a CDF custom fuel model). Other fuel models may exist, but not in quantities sufficient to significantly influence fire behavior in the Wildland Urban Interface. **Figure 5** displays the fuel types graphically for the study area.

[3] Anderson, Hal E., *Aids to Determining Fuel Models for Estimating Fire Behavior*, National Wildfire Coordinating Group, NFES 1574, April 1982.

Figure 5. Mono County Fuel Models



"Desert" is a custom CDF fuel model (FM 15). Fuel models 97, 98, and 99 in the map legend indicate areas of insignificant combustibility such as water, rock, sand, etc.

Figure 6. Short Grass

FUEL MODEL 1

Characteristics

Grasslands and savanna are represented along with stubble, grass-tundra, and grass-shrub combinations.

Common Types/Species

Annual and perennial grasses are included in this fuel model.

Fire Behavior

Fire spread is governed by the fine, very porous, and continuous herbaceous fuels that have cured or are nearly cured. Fires in this fuel model are surface fires that move rapidly through the cured grass and associated material. Very little shrub or timber is present—generally less than one third of the area.

Figure 7. Open canopy timber and shrubs with grass understory

FUEL MODEL 2

Characteristics

Fire spread is primarily through the fine herbaceous fuels, either curing or dead.

Common Types/Species

Open shrub lands and pine stands or scrub oak stands that cover one third to two thirds of the area may generally fit this model. Such stands may include clumps of fuels that generate higher intensities and that may produce firebrands. Some Pinyon-juniper may be in this model.

Fire Behavior

These are surface fires where the herbaceous material—in addition to litter and dead-down stemwood from the open shrub or timber overstory—contributes to the fire intensity.

Figure 8. Young green stands of sage and chaparral

FUEL MODEL 5

Characteristics

This model consists of continuous stands of low brush. Generally, heights do not exceed six feet. The stands will have a grass or scattered grass understory. Usually shrubs are short and almost totally cover the area.

Common Types/Species

Young, green stands with no dead wood would qualify: laurel, vine maple, alder, or even chaparral, manzanita, or chamise. Mountain grasses are also associated with this type.

Fire Behavior

The fires are generally not very intense because surface fuel loads are light, the shrubs are young with little dead material, and the foliage contains little volatile material. Fire is generally carried in the surface fuels that are made up of litter cast by the shrubs and the grasses or forbs in the understory. Cured leaves retained on shrubs can cause greater intensities.

Figure 9. Mixed stands of mesquite and big sage less than 6 feet high

FUEL MODEL 6

Characteristics

Shrubs in Fuel Model 6 are older than, but not as tall as, the shrub types of Fuel Model 4. They also do not contain as much fuel as FM 4.

Common Types/Species

A broad range of shrub conditions is covered by this model. Fuel situations to be considered include intermediate stands of chamise, chaparral, oak brush, low pocosin, Alaskan spruce taiga, and shrub tundra. Even hardwood slash that has cured can be considered. Pinyon-juniper shrub lands may be represented but may over-predict rate of spread except at high winds, such as 20 mi/h (32 km/h) at the 20-foot level.

Fire Behavior

Fires carry through the shrub layer where the foliage is more flammable than fuel model 5, but this requires moderate winds, greater than 8 mi/h (13 km/h), at mid-flame height. Fire will drop to the ground at low wind speeds or at openings in the stand.

Figure 10. Aspen stands

FUEL MODEL 8

Characteristics

Hardwoods that have leafed out support fire in the compact litter layer. This layer is mainly needles, leaves, and occasionally twigs because little undergrowth is present in the stand. Amounts of needle and woody litter are also low.

Common Types/Species

Closed canopy stands of short-needle conifers or hardwoods. Representative conifer types are white pine, Lodgepole pine, spruce, fir and larch.

Fire Behavior

Fires in this fuel model are slow burning and low intensity, burning in surface fuels. Fuels are mainly needles and woody litter. Heavier fuel loadings from old dead and down trees or branches can cause flare-ups. Heavier fuel loads have the potential to develop crown fires in extreme burning conditions.

Figure 11. Mixed conifer stands with moderate loads of dead and down

FUEL MODEL 9

Characteristics

This stand is represented by closed canopy stands of Ponderosa pine and mixed conifer. Understory may consist of small trees and shrubs, grasses, and moderate concentrations of down, dead woody litter. High amounts of needle litter may be present. This model can exist from foothills to sub-alpine.

Common Types/Species

This model can include Ponderosa pine, Lodgepole pine, and a mixture of Douglas-fir spruce and pine. Some mountain shrubs and grasses are present.

Fire Behavior

Fires run through surface litter, torching of individual trees is possible. Under high burning conditions, crown fires can be encountered.

Figure 12. Mixed conifer stands with heavy dead and regeneration in the understory

FUEL MODEL 10

Characteristics

This model is represented by dense stands of over-mature ponderosa pine, Lodgepole pine, mixed-conifer, and continuous stands of Douglas-fir. In all stand types, heavy down material is present. There is also a large amount of dead, down woody fuels. Reproduction may be present, acting as ladder fuels. This model includes stands of budworm-killed Douglas-fir, closed stands of ponderosa pine with large amounts of ladder and surface fuels, and stands of Lodgepole pine with heavy loadings of downed trees. This model can occur from the foothills through the sub-alpine zone.

Common Types/Species

All types of vegetation can occur in this model, but primary species are Douglas-fir, ponderosa pine and Lodgepole pine.

Fire Behavior

Fire intensities can be moderate to extreme. Fire moves through dead, down woody material. Torching and spotting are more frequent. Crown fires are quite possible.

Figure 13. Desert shrubs and grasses (custom fuel model from FRAP)

FUEL MODEL 15

FM 15 is a desert grass custom model. It most closely resembles the Scott and Burgan FM 121 (GS1).[4] The following descriptions are from "Standard Fire Behavior Fuel Models: A Comprehensive Set for Use with Rothermel's Surface Fire Spread Model" by Joe H. Scott and Robert E. Burgan.[5]

Characteristics

The primary carrier of fire in GS1 is grass and shrubs combined. Shrubs are about one foot high, grass load is low.

Common Types/Species

Dry-climate grasses and shrubs.

Fire Behavior

Spread rate is moderate: flame length is low. Moisture of extinction is low.

---

[4] Source: email communication from David Sapsis, Wildland Fire Scientist, CDF Fire and Resource Assessment Program (FRAP), August 17, 2006.

[5] Joe H. Scott and Robert E. Burgan, *Standard Fire Behavior Fuel Models: A Comprehensive Set for Use with Rothermel's Surface Fire Spread Model*, USDA Forest Service Rocky Mountain Research Station, General Technical Report RMRS-GTR-153, June 2005, page 36.

Reference Weather Used in the Fire Behavior Potential Evaluation

Inyo and Mono Counties cover an area of over 8,000,000 acres. The study area includes the highest (Mt. Whitney 14,495') and the lowest (Badwater Flats 282' below sea level) points in the continental United States. Mammoth Lakes averages 385 inches (32 feet) of snowfall per year[6] and Death Valley (2.5 inches of precipitation annually, July average temperature of 115 °F)[7] is one of the hottest and driest places in the western hemisphere. No single set of weather inputs can capture the range of variability that exists in the study area and no single weather station is adequate to provide the weather inputs for the fire behavior analysis. Seasonal percentile weather reports were generated for all of the available Remote Automated Weather Stations (RAWS) and reviewed by our staff Fire Behavior Analyst (FBAN). Sites with poor data or significant errors were eliminated. Data from 10 RAWS were used to create fire weather zones for use in the fire behavior potential analysis. Site information for these stations is displayed in **Table 1**.

After evaluating the RAWS data, three fire weather zones were created for use in the fire behavior potential analysis. Percentile weather observations were calculated from each station using the Fire Family Plus software package to generate a moderate fire weather conditions class and an extreme fire weather conditions class. The moderate conditions class (16th to 89th percentile) was calculated for each variable (1 hour, 10 hour, and 100 hour fuel moisture, woody fuel moisture, herbaceous fuel moisture, and wind speed). This weather condition class most closely represents an average fire season day. Conditions class data from the stations within each zone were then averaged together to create an aggregate value for calculating the weather inputs for **FlamMap** for each fire weather zone.

The extreme conditions class was calculated using 97th percentile weather data. In other words, the weather conditions existing on the three to five most severe fire weather days (sorted by Spread Component) in each season were averaged together. It is reasonable to assume similar conditions may exist for at least five days of the fire season during an average year. During extreme years, such conditions may exist for significantly longer periods. These calculations may be conservative compared to observed fire behavior. Each weather zone is described below. Elevation ranges and vegetation descriptions are approximate.

Mountain Weather Zone (Fire Weather Zone 1) - Elevation 7,000' to 14,495', RAWS sites used: Crestview CA, Gaylor Meadow (Tuolumne) CA. The mountain fire weather zone contains the high elevations of the Sierra Nevada, Inyo, White and Sweetwater mountain ranges. Although high

[6] http://www.sfgate.com/cgi-bin/document.cgi?file=/sports/skiing/pages/resorts/mammoth.DTL

[7] http://www.nps.gov/archive/deva/weather.htm

elevations exist in other portions of the study area, most notably in the Panamint and Amargosa mountain ranges in Death Valley National Park, the areas included in the mountain weather zone are typically substantially wetter and cooler than the high elevations of the desert areas. The presence of heavy to moderate coverage of timber makes surface fuels in the mountain zone the most shaded of the three weather zones. The values used in **FlamMap** for the mountain weather zone are shown in **Table 2**.

High Valleys Weather Zone (Fire Weather Zone 2) – Elevation 3,000' to 7,000', RAWS sites used: Walker CA, Bridgeport CA, Benton CA, Rock Creek CA, Owens Valley CA and Oak Creek CA. This fire weather zone contains the high valleys of the US 395 and US 6 corridors including Antelope Valley, Mono Valley, Chalfant Valley and the Owens Valley. The majority of WUI communities in the study area occur in this weather zone. Vegetative cover includes irrigated agricultural, Pinyon-juniper stands, sage and annual grasses. The values used in **FlamMap** for the high valleys weather zone are shown in **Table 3**.

Desert Weather Zone (Fire Weather Zone 3) – Elevation -282' to 11,000', RAWS sites used: Panamint CA, Oriental Wash NV. This fire weather zone includes Death Valley National Park, China Lake and portions of the Amargosa desert. Although elevations vary widely in this weather zone, the weather inputs used reflect the conditions below 7,000 feet. The high peaks have greater vegetation, usually Pinyon and other pine species, and more moisture but the vast majority of this zone is hot, dry and sparse in vegetation. That being said, however, wildland fires do occur in Death Valley (the Calico fire occurred just shortly before the data collection was done for this report) and WUI communities exist in this weather zone. The values used in **FlamMap** for the desert weather zone are shown in **Table 4**.

Table1: RAWS Site Information (listed north to south)

Walker, CA (Station ID # 043707)	
Latitude (dd mm ss)	38° 33' 55" N
Longitude (dd mm ss)	119° 27' 33" W
Elevation (ft.)	5,440
Bridgeport, CA (Station ID # 043702)	
Latitude (dd mm ss)	38° 16' 19" N
Longitude (dd mm ss)	119° 17' 21" W
Elevation (ft.)	6,650
Gaylor Meadow, CA (Station ID # 043611)	
Latitude (dd mm ss)	37° 52' 06" N

Table1: RAWS Site Information (listed north to south)

Longitude (dd mm ss)	119° 19' 06" W
Elevation (ft.)	9,270
Benton, CA (Station ID # 043708)	
Latitude (dd mm ss)	37° 50' 35" N
Longitude (dd mm ss)	118° 28' 40" W
Elevation (ft.)	5,450
Crestview, CA (Station ID # 043709)	
Latitude (dd mm ss)	37° 44' 42" N
Longitude (dd mm ss)	118° 59' 00" W
Elevation (ft.)	7,600
Rock Creek, CA (Station ID # 043710)	
Latitude (dd mm ss)	37° 33' 05" N
Longitude (dd mm ss)	118° 40' 02" W
Elevation (ft.)	7,040
Owens Valley, CA (Station ID # 044803)	
Latitude (dd mm ss)	37° 23' 24" N
Longitude (dd mm ss)	118° 33' 02" W
Elevation (ft.)	4,640
Oriental Wash, NV (Station ID # 261502)	
Latitude (dd mm ss)	37° 14' 07" N
Longitude (dd mm ss)	117° 29' 47" W
Elevation (ft.)	4,100
Oak Creek, CA (Station ID # 044804)	
Latitude (dd mm ss)	36° 50' 33" N
Longitude (dd mm ss)	118° 15' 34" W
Elevation (ft.)	4,100

Table1: RAWS Site Information (listed north to south)

Panamint, CA (Station ID # 044806)	
Latitude (dd mm ss)	36° 07' 13" N
Longitude (dd mm ss)	117° 05' 16" W
Elevation (ft.)	6,880

Table 2: FlamMap Weather Inputs, Alpine Weather Zone

Moderate Weather Conditions		Extreme Weather Conditions	
Variable	**Value**	**Variable**	**Value**
20 ft Wind speed up slope	15 mph	20 ft Wind speed up slope	23 mph
Herbaceous fuel moisture	67%		
Woody fuel moisture	98%	Herbaceous fuel moisture	30%
100-hr fuel moisture	12%	Woody fuel moisture	71%
10-hr fuel moisture	7%	100-hr fuel moisture	8%
1-hr fuel moisture	5%	10-hr fuel moisture	4%

Table 3: FlamMap Inputs High Valleys Weather Zone

Moderate Weather Conditions		Extreme Weather Conditions	
Variable	**Value**	**Variable**	**Value**
20 ft Wind speed up slope	18 mph	20 ft Wind speed up slope	36 mph
Herbaceous fuel moisture	31%	Herbaceous fuel moisture	31%
Woody fuel moisture	61%	Woody fuel moisture	59%
100-hr fuel moisture	6%	100-hr fuel moisture	6%
10-hr fuel moisture	4%	10-hr fuel moisture	3%
1-hr fuel moisture	3%	1-hr fuel moisture	3%

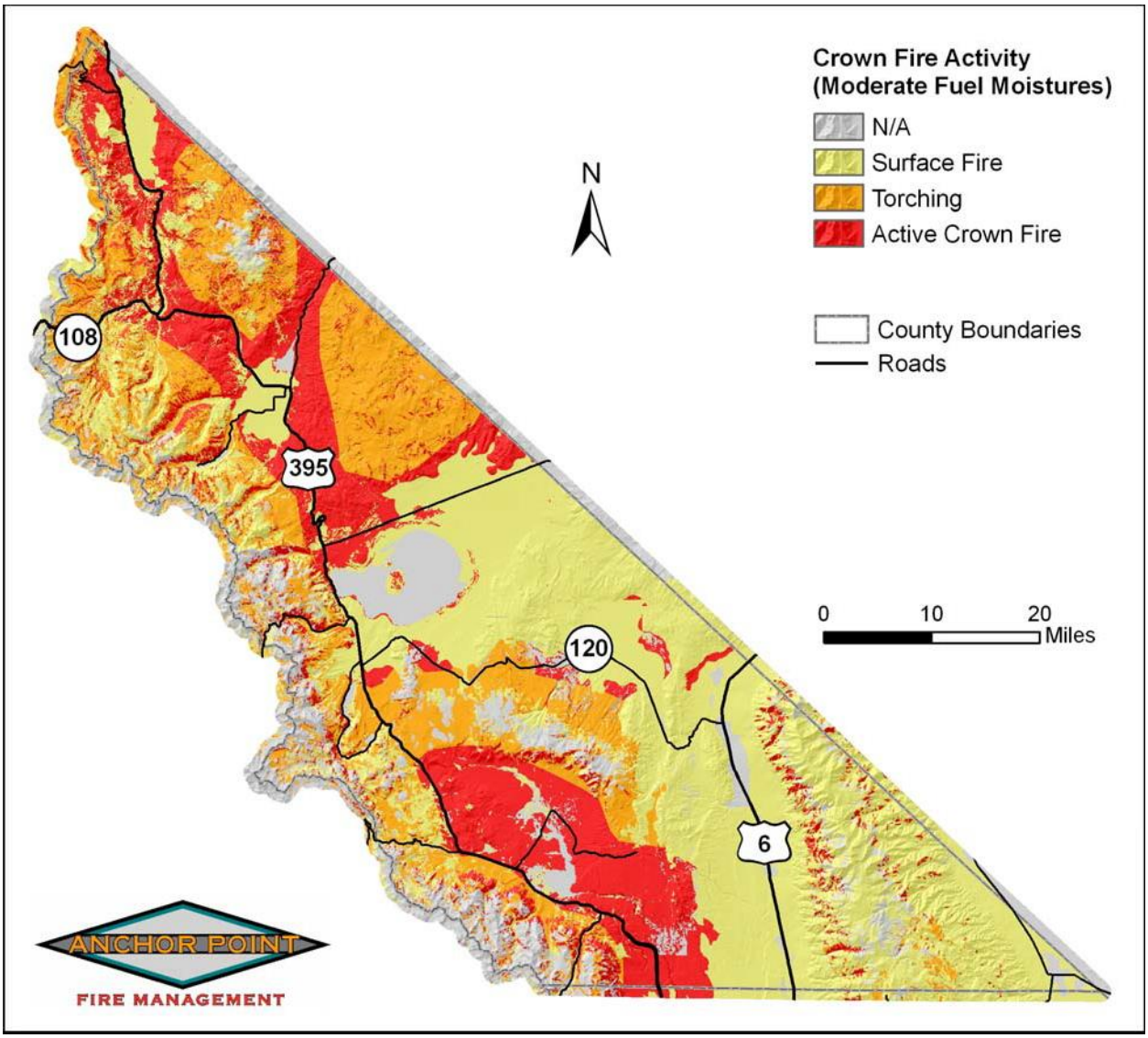
Table 4: FlamMap Inputs Desert Weather Zone

Moderate Weather Conditions		Extreme Weather Conditions	
Variable	**Value**	**Variable**	**Value**
20 ft Wind speed up slope	19 mph	20 ft Wind speed up slope	30 mph
Herbaceous fuel moisture	34%	Herbaceous fuel moisture	34%
Woody fuel moisture	60%	Woody fuel moisture	57%
100-hr fuel moisture	5%	100-hr fuel moisture	4%
10-hr fuel moisture	4%	10-hr fuel moisture	3%
1-hr fuel moisture	3%	1-hr fuel moisture	2%

Note:

Winds at 20 ft will be significantly less noticeable at ground level. Therefore, a "gentle breeze" may actually constitute an 11 MPH 20-foot wind, adding one of the components necessary for extreme weather conditions.

Figure 14. Predictions of Crown Fire Activity (Moderate Weather Conditions



Fire Behavior Analysis Outputs

Crown fire activity, rate of spread, and flame length are derived from the fire behavior predictions. The following maps graphically display the outputs of **FlamMap** for both average and extreme weather conditions.

Crown fire activity values are generated by the **FlamMap** model and classified into four categories based on standard ranges: Active, Passive, Surface, and Not Applicable. In the surface fire category, little or no tree torching will be expected. During passive crown fire activity, isolated torching of trees or groups of trees will be observed and canopy runs will be limited to short distances. During

active crown fire activity, sustained runs through the canopy will be observed that may be independent of surface fire activity.

Figure 15. Predictions of Crown Fire Activity (Extreme Weather Conditions)

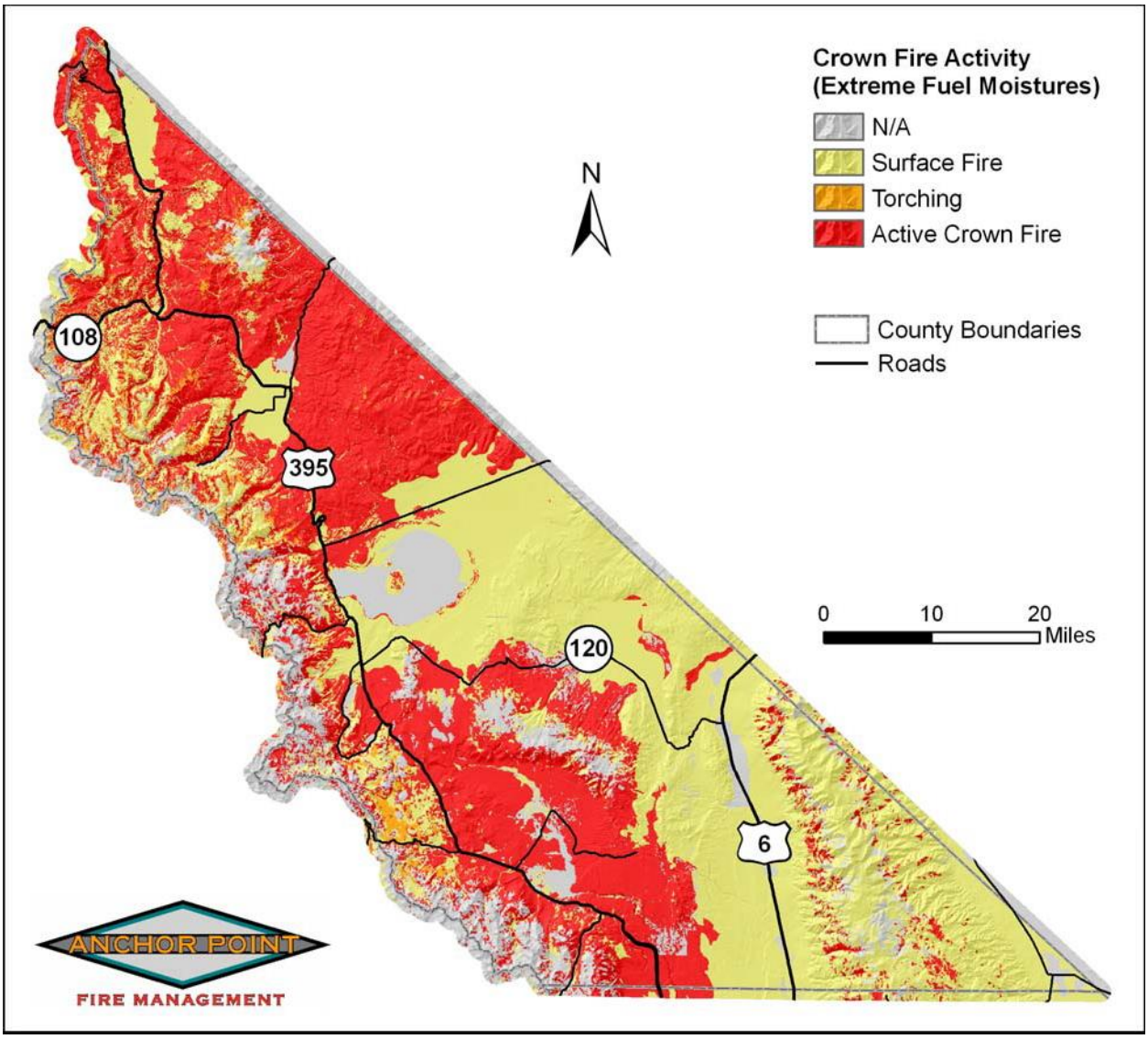
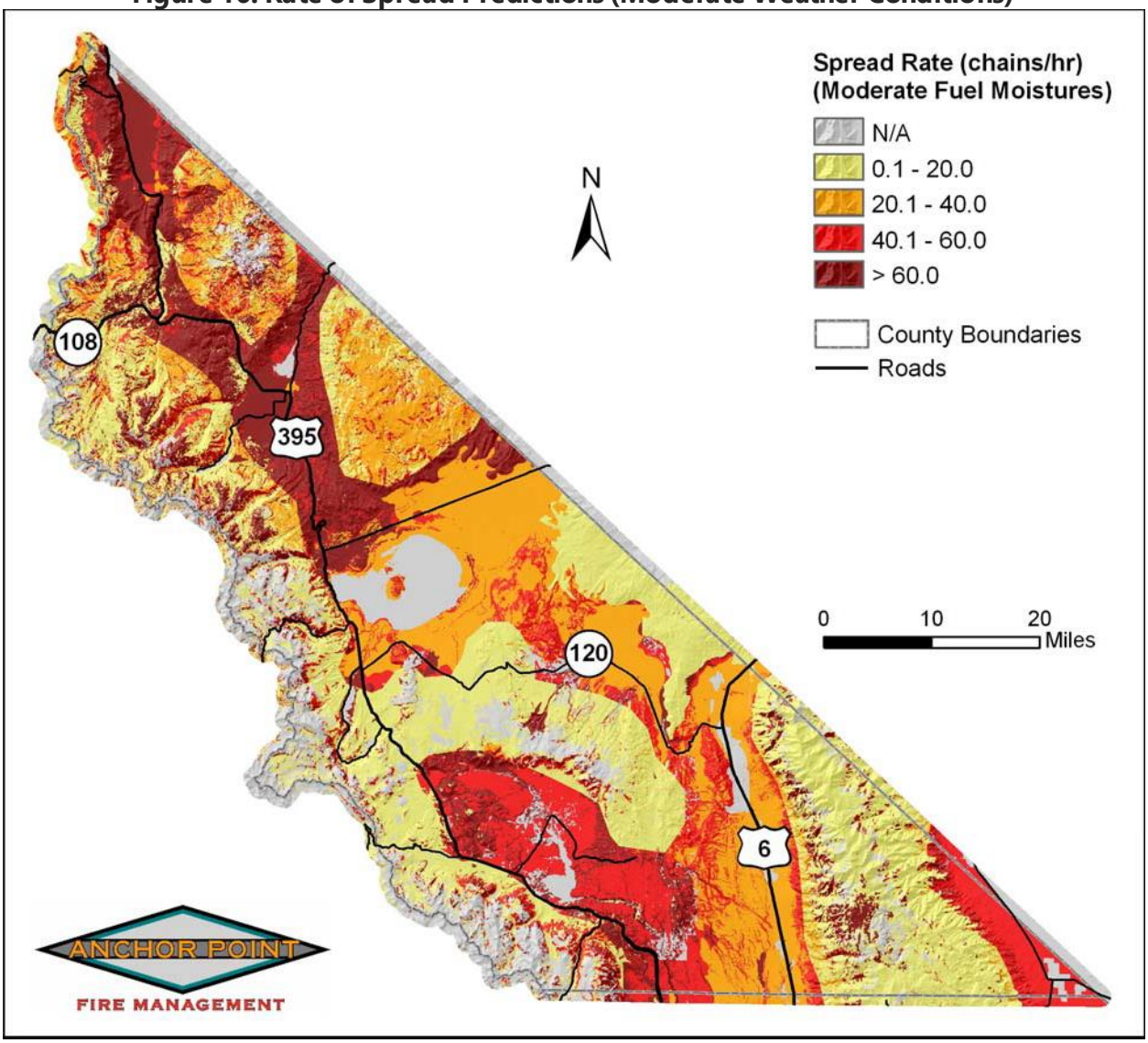


Figure 16. Rate of Spread Predictions (Moderate Weather Conditions)

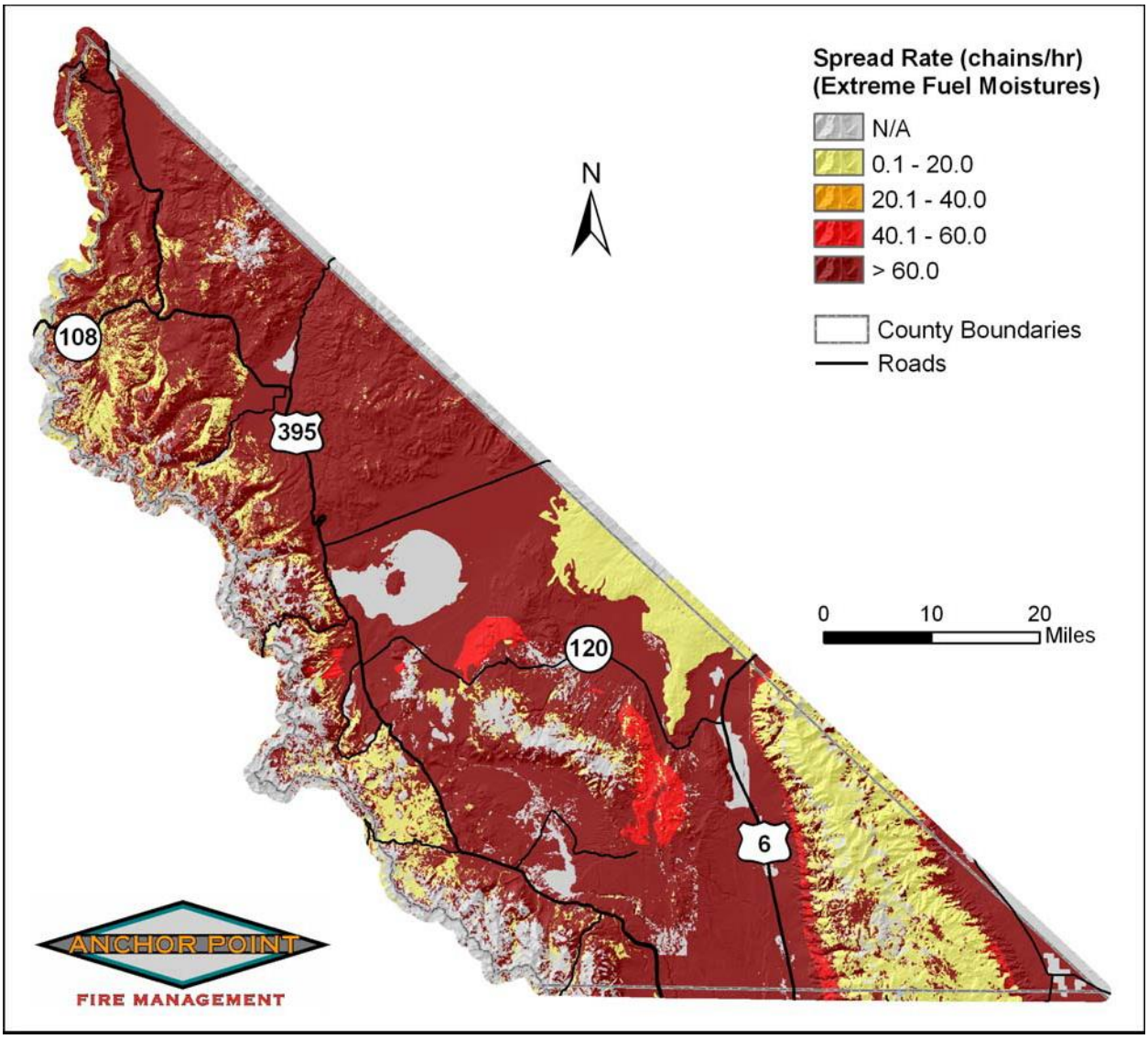


Rate of spread in chains/hour

(1 chain=66 ft) (80 chains/HR = 1 MPH)

Spread rate values are generated by the **FlamMap** model and classified into four categories based on standard ranges: 0-20 ch/h (chains/hour), 20.1-40 ch/h, 40.1-60 ch/h, and greater than 60 ch/h. A chain is a logging measurement that is equal to 66 feet. One mile equals 80 chains. 1 ch/h equals approximately 1 foot/minute or 80 chains per hour equals 1 mile per hour.

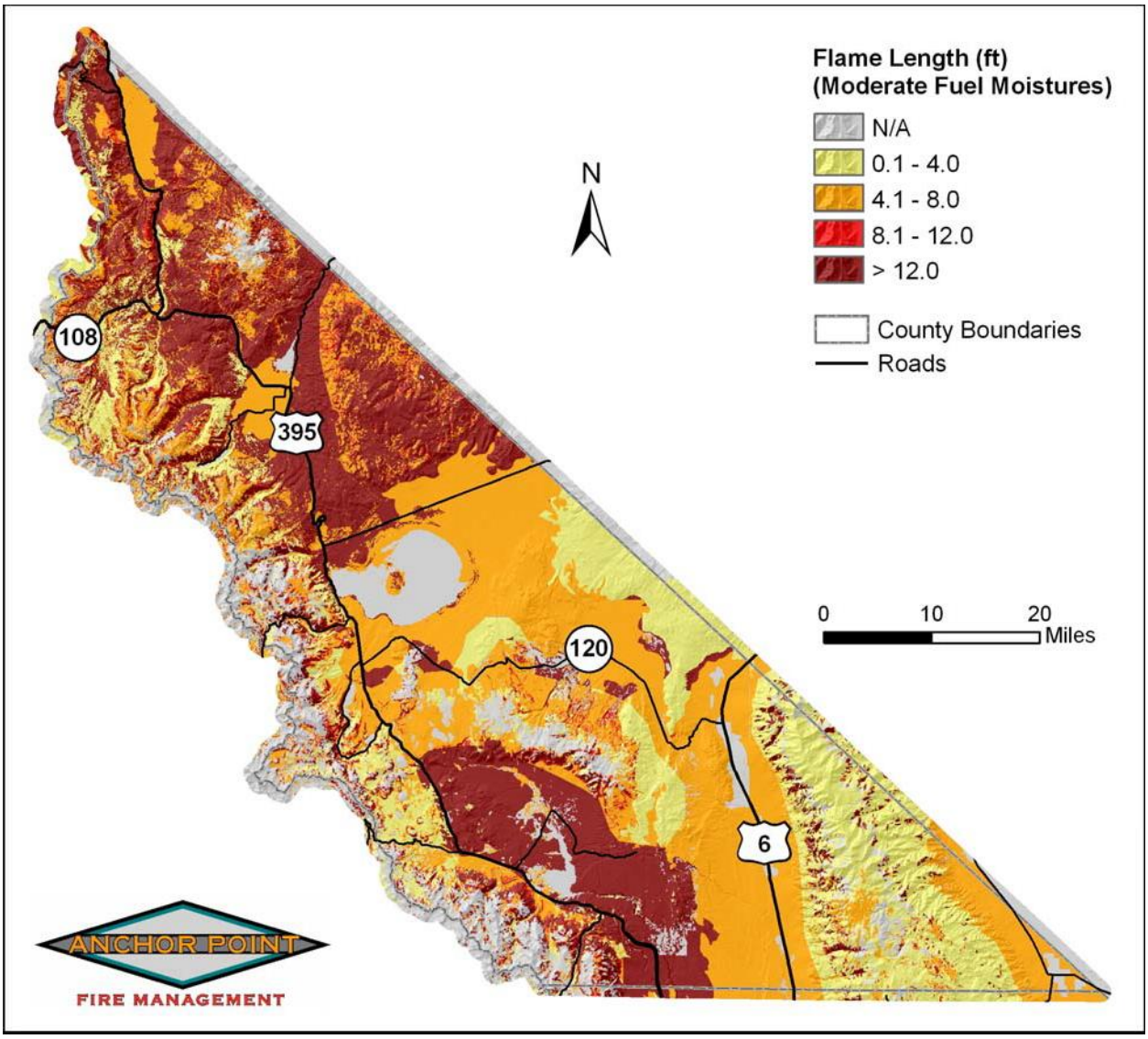
Figure 17. Rate of Spread Predictions (Extreme Weather Conditions)



Rate of spread in chains/hour

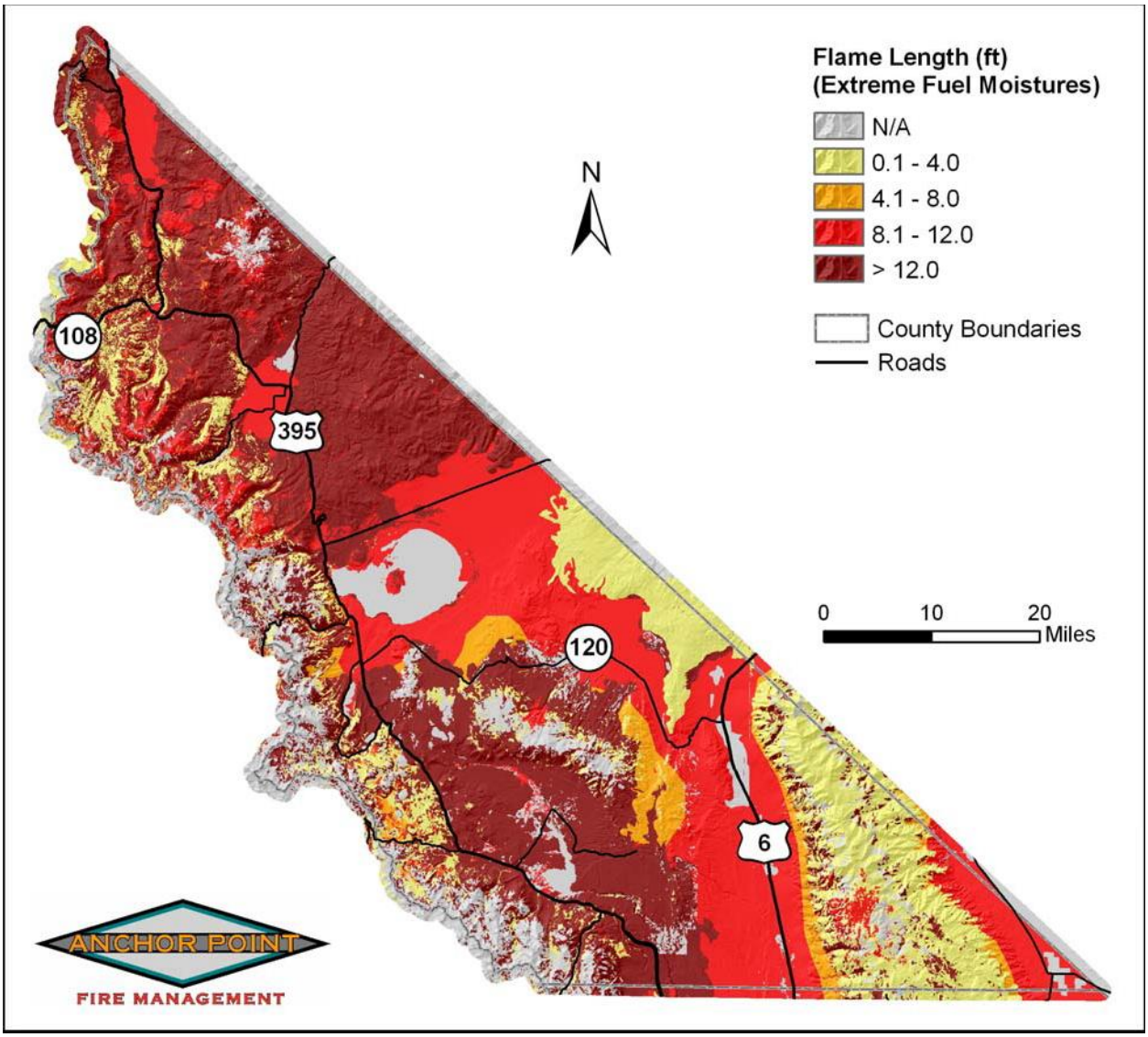
(1 chain=66 ft) (80 chains/HR = 1 MPH)

Figure 18. Flame Length Predictions (Moderate Weather Conditions)



Flame length values are generated by the **FlamMap** model and classified in the four categories based on standard ranges: 0-4 feet, 4.1-8 feet, 8.1-12 feet and 12.1-60 feet. Flame lengths of 4 feet and less are acceptable for direct attack by hand crews. Flame lengths of 8 feet and less are suitable for direct attack by machinery. With flame lengths of greater than 8 feet, indirect attack and aerial attack are the preferred methods.

Figure 19. Flame Length Predictions (Extreme Weather Conditions)



Fire Behavior Interpretation and Limitations

This evaluation is a prediction of likely fire behavior, given a standardized set of conditions and a single point source ignition at every point. It does not consider cumulative impacts of increased fire intensity over time and space. The model does not calculate the probability that a wildfire will occur. It assumes an ignition occurrence for every cell (each 10 x 10 meter area).

Weather conditions are extremely variable and not all combinations are accounted for. These outputs are best used for pre-planning and not as a stand-alone product for tactical planning. Whenever possible, fire behavior calculations should be done with actual weather observations

during the fire. The most current ERC values should also be calculated and distributed during the fire season to be used as a guideline for fire behavior potential.

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CWPP Appendix 2:
Neighborhood Ignitability Analysis and Recommendations

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Purpose

The purpose of this appendix is to examine in greater detail the communities in the study area. Of the 36 WUI communities in Mono County, nine were found to represent an extreme hazard; eight were rated as very high hazard; six as high hazard; eight as moderate hazard; and five as low hazard. **Figure 1** below represents this in pie chart format for easy visual reference. On the following pages, maps, charts and tables using these same statistics can be found, and should be used for reference throughout this document.

Figure 1. Community Groupings by Hazard Class

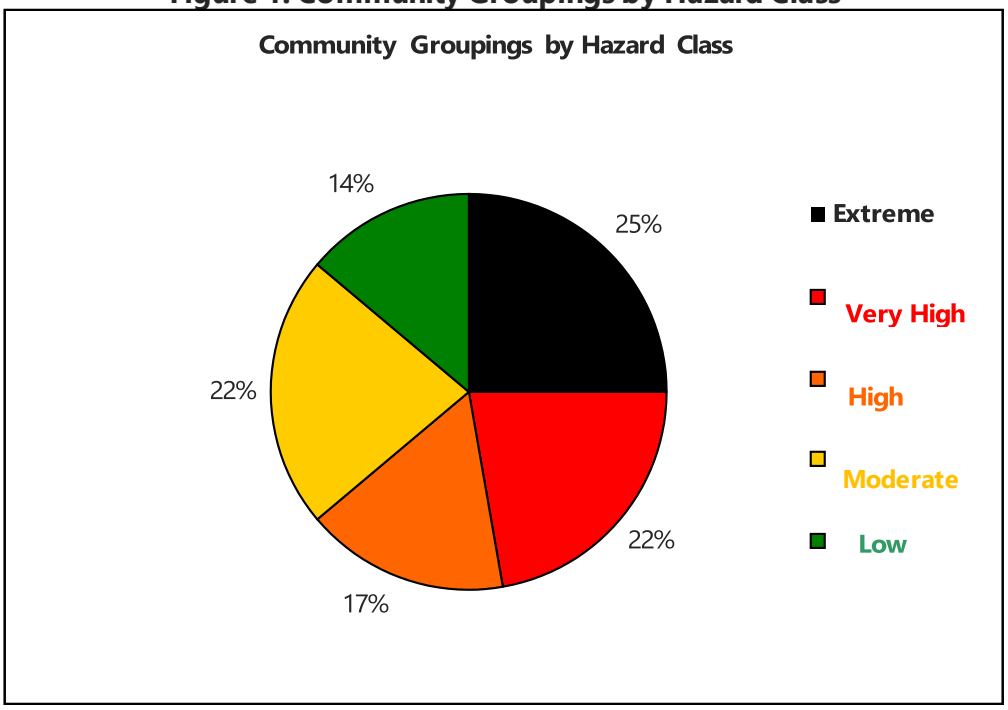

Figure 2. Mono County Community Hazard Rating Map

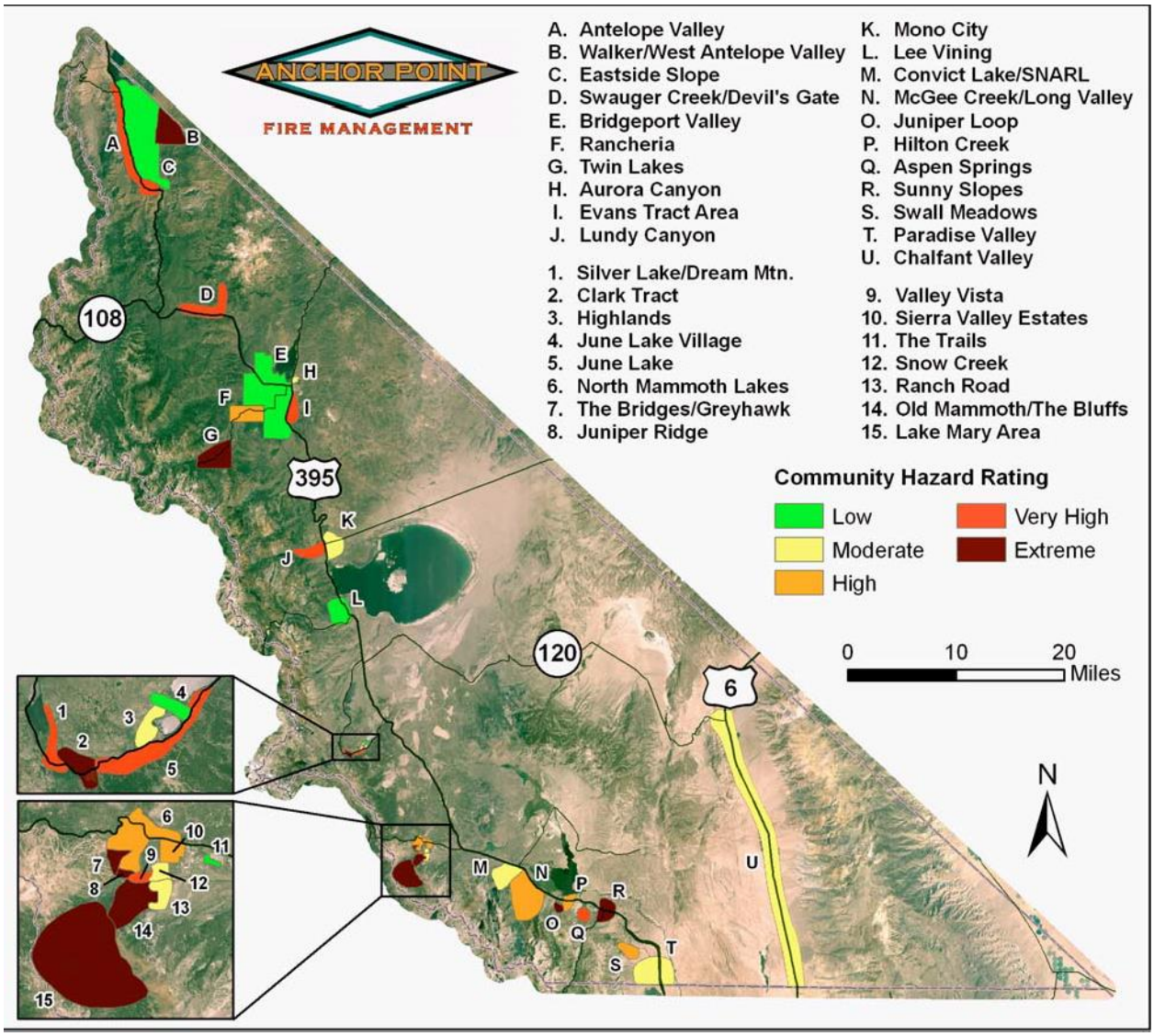

Figure 3. Mono County Communities by Hazard Rating

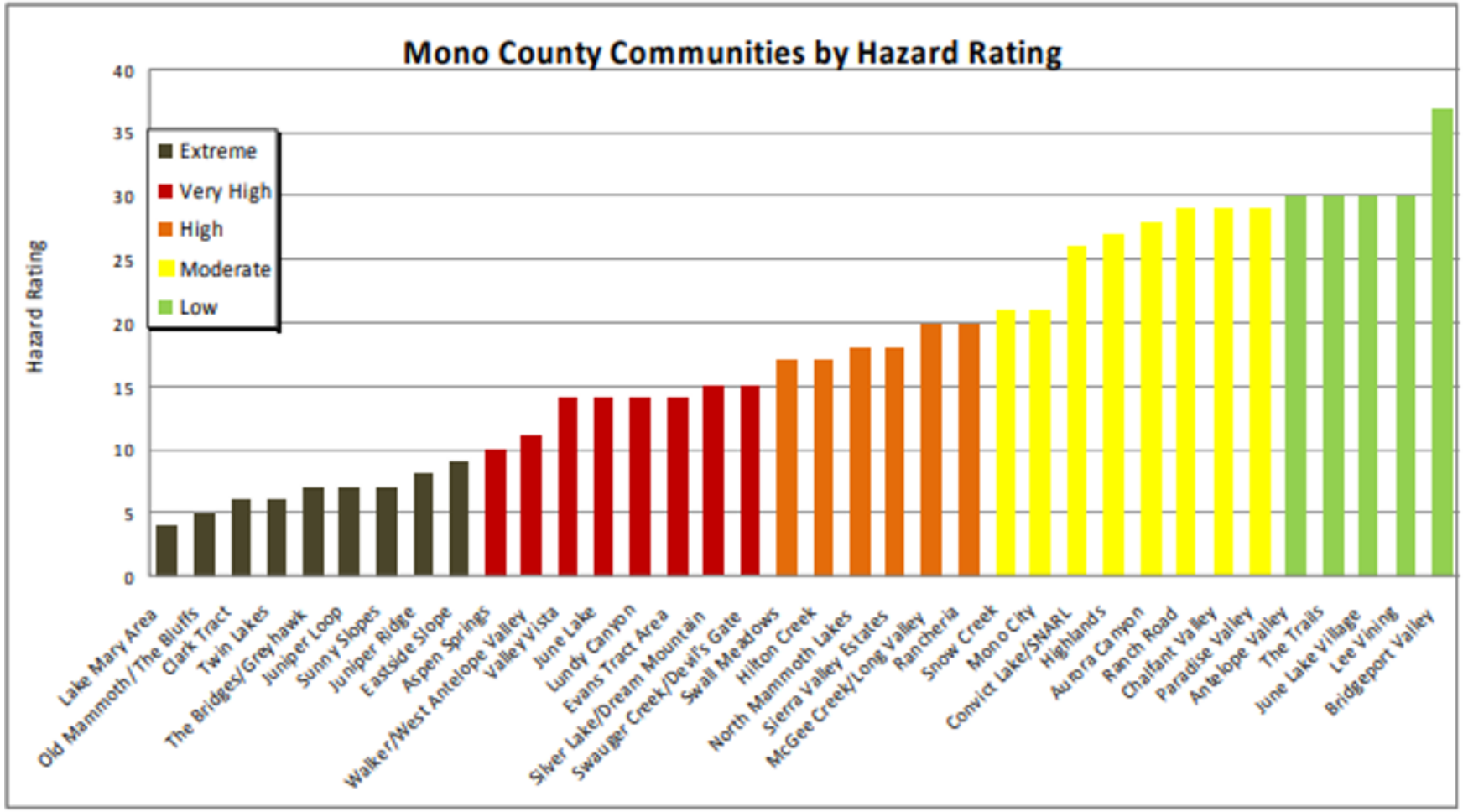

Table 1. Mono County Communities by Hazard Rating

1. Lake Mary Area	19. Hilton Creek
2. Old Mammoth/The Bluffs	20. North Mammoth Lakes
3. Clark Tract	21. Sierra Valley Estates (Mammoth area)
4. Twin Lakes (and Virginia Lakes)	22. McGee Creek/Long Valley
5. The Bridges/Greyhawk	23. Rancheria (Bridgeport area)
6. Juniper Loop (Crowley Lake area)	24. Snow Creek
7. Sunny Slopes	25. Mono City
8. Juniper Ridge (Mammoth Lakes area)	26. Convict Lake/SNARL
9. East Side Slope (Antelope Valley)	27. Highlands
10. Aspen Springs	28. Aurora Creek
11. Walker/West Antelope Valley	29. Ranch Road (Mammoth Lakes area)
12. Valley Vista	30. Chalfant Valley
13. June Lake	31 Paradise Valley
14. Lundy Canyon	32. Antelope Valley
15. Evans Tract Area	33. The Trails
16. Silver Lake/Dream Mountain	34. June Lake Village
17. Swauger Creek/Devils Gate	35. Lee Vining
18. Swall Meadows	36. Bridgeport Valley

GENERAL RECOMMENDATIONS

A combination of adequate access, ignition resistant construction, and fuels reduction should create a safe environment for emergency service personnel and provide reasonable protection to structures from a wildfire. These techniques should also significantly reduce the chances of a structure fire becoming an ignition source to the surrounding wildlands.

In addition to the suggested mitigations listed for the individual communities, several general measures can be taken to improve fire safety. The following recommendations should be noted and practiced by anyone living in the Wildland-Urban Interface:

- Be aware of the current fire danger in the area.
- Clean your roof and gutters at least two times a year, especially during cure-up in autumn.
- Stack firewood uphill or on a side contour, at least 30 feet away from structures.
- Don't store combustibles or firewood under decks.
- Maintain and clean spark arresters on chimneys.
- When possible, maintain an irrigated greenbelt around the home.
- Connect, and have available, a minimum of 50 feet of garden hose.
- Post reflective lot and/or house numbers so that they are clearly visible from the main road. Reflective numbers should also be visible on the structure itself.
- Trees along driveways should be limbed and thinned as necessary to maintain a minimum 13'6" vertical clearance for emergency vehicle access.
- Maintain your defensible space constantly.
    - Mow grass and weeds to a low height.
    - Remove any branches overhanging the roof or chimney.
    - Remove all trash, debris, and cuttings from the defensible space.

Note:

All communities rated as extreme to high hazard level were recommended for a parcel-level analysis. In the moderate level communities a parcel-level analysis was recommended only if the evaluator found that a significant number of homes had no, or ineffective, defensible space or a significant number of hazards near homes was detected. In short, the recommendation was made if the evaluator felt a parcel-level analysis would generate a noticeable improvement in the community's defensibility.

Technical Terms

The following definitions apply to terms used in the "Description" and "Comments and Mitigation" sections of this appendix.

Defensible Space: An area around a structure where fuels and vegetation are modified, cleared, or reduced to slow the spread of wildfire toward or from the structure. The design and extent of the defensible space is based on fuels, topography, and the design and materials of the structure.

Extended Defensible Space (also known as Zone 3): In this defensible space zone, treatment is continued beyond the recommended minimum boundary for defensible space. This zone focuses on forest management, with fuels reduction being a secondary function.

Shelter-in-Place Areas: There are several ways to protect the public from an advancing wildfire. One of these methods is evacuation, and involves relocation of the threatened population to a safer area. Another is to instruct people to remain inside their homes or public buildings until the danger passes. This concept is new to wildfire in the United States, but not to hazardous materials incident response, where time, hazards, and sheer logistics often make evacuation impossible. This concept is the dominant modality for public protection from wildfires in Australia, where fast moving, non-persistent fires in light fuels make evacuation impractical. The success of this tactic depends on a detailed pre-plan that takes into account the construction type and materials of the building used, topography, depth and type of the fuel profile, as well as current and expected weather and fire behavior.

Citizen Safety Zone: An area that can be used for protection by residents in the event that the main evacuation route is compromised. The area should be maintained, cleared of fuels, and large enough for all residents of the area to survive an advancing wildfire without special equipment or training.

Fuelbreak: A natural or constructed discontinuity in a fuel profile used to segregate, stop, or reduce the spread of fire. As a practical matter, fuelbreaks in the WUI are most effective against crown fires.

Community Assessment Methodology

The community level methodology for this assessment uses a Wildfire Hazard Rating (WHR) that was developed specifically to evaluate communities within the Wildland Urban Interface (WUI) for their relative wildfire hazard.[1] The WHR model combines physical infrastructure such as structure

[1] C. White, "Community Wildfire Hazard Rating Form" *Wildfire Hazard Mitigation and Response Plan*, Colorado State Forest Service, Ft. Collins, CO, 1986.

density and roads, and fire behavior components like fuels and topography, with the field experience and knowledge of wildland fire experts. This methodology has been proven and refined by use in rating over 1,400 neighborhoods throughout the United States.

Many knowledgeable and experienced fire management professionals were queried about specific environmental and infrastructure factors, and wildfire behavior and hazards. Weightings within the model were established through these queries. The model was designed to be applicable throughout the western United States.

The model was developed from the perspective of performing structural triage on a threatened community in the path of an advancing wildfire with moderate fire behavior. The WHR survey and fuel model ground truthing are accomplished by field surveyors with WUI fire experience. The rating system assigns up to a maximum of 60 points based on seven categories: average lot size, slope, primary aspect, average fuel type, fuel continuity, dominant construction type and surface fuel loading. The higher the community scores, the lower its wildfire hazard. For example, a community with an average lot size of less than 1 acre and slopes of greater than 30% would receive 0 points for those factors, whereas a community with an average lot size of 5 acres and slopes of less than 15% would receive 16 points for the same factors. Additional hazards are then subtracted from the subtotal of points earned in the seven categories to give a final numeric value. The final value is then used to group communities into one of five hazard ratings: Extreme, Very High, High, Moderate, or Low.

It is important to note that not all groupings occur in every geographic region. There are some areas with no low hazard communities, just as there are some areas with no extreme communities. The rankings are also related to what is customary for the area. For example, a high hazard area on the plains of Kansas may not look like a high hazard area in the Sierra Nevada. The system creates a relative ranking of community hazards in relation to the other communities in the study area. It is designed to be used by experienced wildland firefighters who have a familiarity with structural triage operations and fire behavior in the interface.

COMMUNITIES

1. Lake Mary Area

Hazard Rating	Extreme
Does the neighborhood have dual access roads?	No
Are there road grades > 8%?	Yes
Are all access roads of adequate width?	No
Average lot size:	1-5 Acres
Fuel models found in the neighborhood:	8, 10, 5
Water supply:	Draft from lakes

Steep slopes, ravines, inadequate roads, propane tanks, power lines, wood roofs

Description: The Lake Mary Area community consists of forest service lease cabins and resort properties in heavy timber surrounding an alpine lake. Most structures are widely spaced. The dominant construction type is small cabins with flammable or log siding and asphalt or metal roofs; however, there are several wood roofs in this community. There are some narrow, steep roads and driveways. Addressing here is poor. Most homes are within two miles of the nearest fire station (Station 2, Mammoth Lakes Fire Department). There are no hydrants, but it is possible to draft from lakes in this community. Fuels are heavy loads of mixed conifer. There are few defensible spaces here. Topography is steep and complex.

LAKE MARY AREA RECOMMENDATIONS

- A parcel-level analysis is recommended.
- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Extended defensible space is recommended for most homes due to position, fuels and terrain.
- Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy fuels. Replace all shake roofs with non- combustible types such as metal or composite shingle.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
- Clean leaf and needle litter from roofs and gutters and away from foundations. Clear flammable vegetation away from power lines near homes. Clear weeds and flammable vegetation to at least 30 feet away from propane tanks.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Consider creating a shelter-in-place plan that includes preplanned escape routes from homes with flammable construction types to homes designated as last resort shelter-in-place areas. Concentrate thinning efforts on fuels below the access to these homes. Shelter-in-place tactics are only recommended for ignition-resistant homes with conforming extended defensible space, and even then only as a last resort, due to the dangerous fuels and topography in this community.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Add reflective addressing to all driveways and homes.
- Consider adding dry hydrant installations to the lakes in this community to improve the speed of water handling.

2. Old Mammoth/The Bluffs

Hazard Rating	Extreme
Does the neighborhood have dual access roads?	No
Are there road grades > 8%?	Yes
Are all access roads of adequate width?	No
Average lot size:	<1 Acre
Fuel models found in the neighborhood:	10, 9, 5
Water supply:	Hydrants

Steep slopes, ravines, inadequate roads, natural chimneys, propane tanks, power lines, wood roofs

Description: This community contains moderate to large homes on small lots. Dominant construction is wood siding with a mix of asphalt and wood shake roofs. This is a high density community. Access is poor in some areas. There are several dead-end roads and some very narrow roads with poor surfaces. Poor address markers are common, many with missing or inconsistent placement and low visibility. Many homes have wood decks and projections. In Old Mammoth in particular, there are overhead power lines and propane tanks (many overgrown with vegetation). Very few homes have defensible space. Many yards have flammable clutter including wood stacked against the structure. There are hydrants every 300 feet throughout most of this area. Fuels are primarily heavy loads of mixed conifers (FM 10). The topography in this community is steep and complex.

OLD MAMMOTH/THE BLUFFS RECOMMENDATIONS

- A parcel-level analysis is recommended.
- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Extended defensible space is recommended for homes located in dangerous topography (saddles, above natural chimneys, mid-slope on steep slopes or summits) with heavy fuel loads near or below the home.
- Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy fuels. Replace all shake roofs with non- combustible types such as metal or composite shingle.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
- Clean leaf and needle litter from roofs and gutters and away from foundations. Clear flammable vegetation away from power lines near homes. Clear weeds and flammable vegetation to at least 30 feet away from propane tanks.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Consider creating a shelter-in-place plan that includes preplanned escape routes from homes with flammable construction types to homes designated as last resort shelter-in-place areas. Concentrate thinning efforts on fuels below the access to these homes. Shelter-in-place tactics are only recommended for ignition-resistant homes with conforming extended defensible space, and even then only as a last resort, due to the dangerous fuels and topography in this community.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Add reflective addressing to all driveways and homes.

3. Clark Tract

Hazard Rating	Extreme
Does the neighborhood have dual access roads?	Yes
Are there road grades > 8%?	Yes
Are all access roads of adequate width?	No
Average lot size:	<1 Acre
Fuel models found in the neighborhood:	5, 8, 10
Water supply:	Hydrants

Steep slopes, ravines, inadequate roads, natural chimneys, power line, wood roofs

Description: The Clark Tract community is comprised of small homes on small lots. Homes are mostly wood siding construction with a mix of asphalt, metal and wood roof types. Construction is generally older in this community, and some homes have wood decks or projections. Most homes do not have visible address markers, and the few that do are not reflective. Access is generally poor. Roads are rough, steep and narrow. Most roads and driveways are dirt and rutting and washboarding is typical. Although there are two ways in and out of this community, there are also several dead-end roads. There are fire hydrants in this community. Very few homes have any defensible space. Overhead power lines may represent a hazard to fire apparatus. Fuels are heavy to moderate loads of mixed conifer and shrubs often with sage in the understory. Topography is steep and complex.

CLARK TRACT RECOMMENDATIONS

- A parcel-level analysis is recommended.
- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Extended defensible space is recommended for homes located in dangerous topography (saddles, above natural chimneys, mid-slope on steep slopes or summits) with heavy fuel loads near or below the home.
- Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy fuels. Replace all shake roofs with non- combustible types such as metal or composite shingle.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
- Clean leaf and needle litter from roofs and gutters and away from foundations. Clear flammable vegetation away from power lines near homes.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Add reflective addressing to all driveways and homes.

4. Twin Lakes (includes Virginia Lakes Area)

Hazard Rating	Extreme
Does the neighborhood have dual access roads?	No
Are there road grades > 8%?	Yes
Are all access roads of adequate width?	No
Average lot size:	<1 Acre
Fuel models found in the neighborhood:	8, 2, 9
Water supply:	Hydrants

Steep slopes, ravines, inadequate roads, inadequate water supply, power lines, wood roofs

Description: These two communities are very similar, even though they are separated by several miles. They each contain cabins built in the 1930s and 1940s with modern construction mixed in. Most homes are moderate size on small lots. Wood siding with an asphalt or metal roof is the most common construction type; however, there are almost as many wood shake roofs in this community as ignition resistant roofs. Street signs are non-reflective wooden markers and some are broken. Most would be hard to see in dark or smoky conditions. Most homes have address markers on the home and at the street, but they are generally not reflective and may be difficult to spot in dark or smoky conditions. There are some very poor roads in these communities and some long narrow driveways. There are a few homes with minimum defensible space, but most have vegetation growing right up to the structure. Fuels are moderate to heavy loads of mixed

conifers and aspen stands with shrubs and grasses in the understory. There are also heavy loads of standing dead fuels present. These communities have overhead power lines which may be a hazard to fire apparatus. There are also areas of heavy recreational use throughout both communities. This increases both the likelihood of an ignition and the difficulty of evacuation and access. The topography in these areas is complex and steep.

TWIN LAKES / VIRGINIA LAKES RECOMMENDATIONS

- A parcel-level analysis is recommended.
- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Extended defensible space is recommended for homes located in dangerous topography (saddles, above natural chimneys, mid-slope on steep slopes or summits) with heavy fuel loads near or below the home.
- Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy fuels. Replace all shake roofs with non- combustible types such as metal or composite shingle.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
- Clean leaf and needle litter from roofs and gutters and away from foundations. Clear flammable vegetation away from power lines near homes.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Improving the water supply to increase hydrant pressure and flow should be a priority project.
- Replacing broken and non-reflective street signs should also be considered a priority project.

- Add reflective addressing to all driveways and homes.

- A fuels reduction grant project (#09USFS-SFA0059) has been funded by the USFS. The project will begin during the summer of 2009, and substantial fuels reduction will occur within private residential and recreational properties of Upper Twin Lakes bordering the Humboldt-Toiyabe National Forest. The fuels reduction work includes a combination of understory thinning, trimming, and chipping of dead trees and brush along the south shore of Upper Twin Lakes, and along the western boundary of Mono Village Resort. All fuels reduction recommendations should be coordinated with private and federal agencies, regardless of jurisdictional ownership to ensure best value and functionality.

5. The Bridges/Greyhawk

Hazard Rating	Extreme
Does the neighborhood have dual access roads?	No
Are there road grades > 8%?	Yes
Are all access roads of adequate width?	No
Average lot size:	<1 Acre
Fuel models found in the neighborhood:	5, 8
Water supply:	Hydrants

Steep slopes, ravines, inadequate roads, inadequate water supply, wood roofs

Description: This community consists primarily of newer construction, condo complexes and large to moderate size homes on small lots. This is a high density community surrounded by wildland fuels. The dominant construction type is wood siding with asphalt or metal roofs, but there are also some wood shake roofs in this community. The homes have address markers, but most are not reflective. Road surfaces are good, although there are some narrow streets and steep grades (>10%) which make both evacuation and firefighter access more difficult.

Most homes do not have adequate defensible space. Hydrants are good except for along John Muir Road, where the spacing is approximately ¼ mile and the hydrant flows are low. This community has heavy loads of mixed conifer and shrub fuels. The topography is steep and complex.

THE BRIDGES/GREYHAWK RECOMMENDATIONS

- A parcel-level analysis is recommended.
- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Extended defensible space is recommended for homes located in dangerous topography (saddles, above natural chimneys, mid-slope on steep slopes or summits) with heavy fuel loads near or below the home.
- Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy fuels. Replace all shake roofs with non- combustible types such as metal or composite shingle.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
- Clean leaf and needle litter from roofs and gutters and away from foundations.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Investigate improving the water supply to increase pressure and flow of the hydrants along John Muir Road.
- Add reflective addressing to all driveways and homes.

6. Juniper Loop

Hazard Rating	Extreme
Does the neighborhood have dual access roads?	Yes
Are there road grades > 8%?	Yes
Are all access roads of adequate width?	No
Average lot size:	<1 Acre
Fuel models found in the neighborhood:	5, 8
Water supply:	None

Steep slopes, ravines, inadequate roads, inadequate water supply, power lines, wood roofs

Description: This community is a mix of old and new construction. The dominant construction type consists of wood siding with asphalt or metal roofs; however, there are some wood shake roofs in this community. Addressing is poor in this community. Address markers are difficult to locate on many homes, and in some cases, they are missing entirely. Roads are steep and narrow with no pullouts or turnarounds for fire apparatus. Many driveways are rough and narrow with vegetation encroaching upon the drivable surface. There is no water supply for fire suppression and few homes have any defensible space. This community has overhead power lines which may be a hazard to fire apparatus. There are heavy loads of mixed timber and shrub fuels including Pinyon-juniper, Jeffrey pine, bitterbrush and sage. In the drainages, aspen with sage and other shrubs in the understory become dominant. Dead and down material loads are moderate to heavy

in some parts of this community. The general topography is complex and moderate to steep.

JUNIPER LOOP RECOMMENDATIONS

- A parcel-level analysis is recommended.
- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Extended defensible space is recommended for homes located in dangerous topography (saddles, above natural chimneys, mid-slope on steep slopes or summits) with heavy fuel loads near or below the home.
- Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy fuels. Replace all shake roofs with non- combustible types such as metal or composite shingle.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
- Clean leaf and needle litter from roofs and gutters and away from foundations. Clear flammable vegetation away from power lines near homes.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Investigate the possibility of improving and widening the road surface of the primary access roads into this community. High density and poor roads will make this community difficult to evacuate quickly in the event of a rapidly moving fire.
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Investigate the possibility of adding at least two large (10,000 - 30,000 gallon) community cisterns for fire suppression use. *Improving water supply is a critical need in Juniper Loop.*
- Add reflective addressing to all driveways and homes.

7. Sunny Slopes

Hazard Rating	Extreme
Does the neighborhood have dual access roads?	No
Are there road grades > 8%?	Yes
Are all access roads of adequate width?	No
Average lot size:	<1 Acre
Fuel models found in the neighborhood:	5, 8
Water supply:	Hydrants

Steep slopes, ravines, inadequate roads, inadequate water supply, power lines, wood roofs

Description: This community is a mix of year-round private cabins and USFS lease cabins, some dating back as far as 1916. Construction is generally wood siding or log with wood shake roofs, but approximately 40% of the structures have ignition-resistant (metal or asphalt) roofs. Cabins are small to moderate size on small lots making this a fairly dense community. Some residences in this community are more than five miles from the nearest fire station. There is a good hydrant network in some parts of Sunny Slopes, but the hydrant network and the Sunny Slopes water supply does not service any of the USFS lease properties. There are several steep, narrow roads and some are little more than rough dirt tracks. This community has overhead power lines which may be a hazard to fire apparatus. Few properties have any defensible space. Fuels are moderate loads of open canopy Jeffery pine with sage and other shrubs in the understory. Topography is

complex and moderate to steep. There are many outcroppings of volcanic rock, which will be a hazard to firefighters, especially at night or in smoky conditions.

SUNNY SLOPES RECOMMENDATIONS

- A parcel-level analysis is recommended.
- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Extended defensible space is recommended for homes located in dangerous topography (saddles, above natural chimneys, mid-slope on steep slopes or summits) with heavy fuel loads near or below the home.
- Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy fuels. Replace all shake roofs with non- combustible types such as metal or composite shingle.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
- Clean leaf and needle litter from roofs and gutters and away from foundations. Clear flammable vegetation away from power lines near homes.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Investigate the possibility of improving and widening the road surface of the primary access roads accessing the forest service lease cabins on the north side of highway
- 395. This will improve evacuation for residents and access for firefighters.
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- For fire suppression in areas not serviced by the hydrant network, investigate the possibility of adding cisterns (2,500 gallons or greater) at least every ¼ mile.
- Add reflective addressing to all driveways and homes.

8. Juniper Ridge

Hazard Rating	Extreme
Does the neighborhood have dual access roads?	No
Are there road grades > 8%?	Yes
Are all access roads of adequate width?	No
Average lot size:	<1 Acre
Fuel models found in the neighborhood:	5, 8, 10
Water supply:	Hydrants

Steep slopes, ravines, natural chimneys, inadequate roads, wood roofs

Description: Not to be confused with Juniper Loop (community #6), Juniper Ridge is a subdivision in Mammoth Lakes. This is a dense community of moderate to large homes on small lots. All these homes are of newer wood siding construction, but approximately 50% have wood shake roofs. Addressing is present for all of the residences, but is not reflective. This community does have a good hydrant network. The road surfaces are all good, but there are some steep grades (>10%). There are no pullouts or turnarounds for fire apparatus and this community has only one way in and out. Most homes do not have adequate defensible space. Fuels are heavy loads of mixed conifer and shrubs with heavy ladder fuels and moderate loads of dead and down materials. The general topography is steep and complex.

JUNIPER RIDGE RECOMMENDATIONS

- A parcel-level analysis is recommended.
- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Extended defensible space is recommended for homes located in dangerous topography (saddles, above natural chimneys, mid-slope on steep slopes or summits) with heavy fuel loads near or below the home.
- Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy fuels. Replace all shake roofs with non- combustible types such as metal or composite shingle.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
- Clean leaf and needle litter from roofs and gutters and away from foundations.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segment.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Add reflective addressing to all driveways and homes.

9. East Side Slope – Antelope Valley Area (also known as East Side Lane)

Hazard Rating	Extreme
Does the neighborhood have dual access roads?	No
Are there road grades > 8%?	Yes
Are all access roads of adequate width?	No
Average lot size:	<5 Acre
Fuel models found in the neighborhood:	6, 5, 1
Water supply:	None

Steep slopes, ravines, no water supply, inadequate roads, power lines, propane tanks, wood roofs

Description: This is a community of approximately 50 homes on large lots. This area was threatened by the Jackass Flats Fire in 2006. Access could be challenging due to complex terrain. There is no water for fire suppression in this community and there are power lines and propane tanks which may be a hazard to firefighters. Fuels are primarily heavy loads of Pinyon - juniper, sage and grass. The general topography is steep and complex.

EASTSIDE SLOPE RECOMMENDATIONS

- A parcel-level analysis is recommended.
- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Extended defensible space is recommended for homes located in dangerous topography (saddles, above natural chimneys, mid-slope on steep slopes or summits) with heavy fuel loads near or below the home.
- Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy fuels. Replace all shake roofs with non- combustible types such as metal or composite shingle.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
- Clean leaf and needle litter from roofs and gutters and away from foundations. Clear flammable vegetation away from power lines near homes. Clear weeds and flammable vegetation to at least 30 feet away from propane tanks.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Consider adding at least two large (10,000 - 30,000 gallon) cisterns for fire suppression use in this community. *Water supply is a critical need in Eastside Slope.*
- Add reflective addressing to all driveways and homes.

10. Aspen Spring

Hazard Rating	**Very High**
Does the neighborhood have dual access roads?	Yes
Are there road grades > 8%?	Yes
Are all access roads of adequate width?	No
Average lot size:	1-5 Acres
Fuel models found in the neighborhood:	5, 8
Water supply:	One cistern (60,000 gallons)

Steep slopes, ravines, inadequate roads, inadequate water supply, power lines, wood roofs

Description: This is a community of large homes on moderate to large lots. Homes are of mixed ages, but older wood siding construction is dominant. Approximately 50% of the homes in Aspen Spring have wood shake roofs. Addressing is poor in this community. Some homes have no address markers and others are not easily visible. None of the address markers that are present are reflective. Road surfaces are generally good, but most of the roads and driveways are steep and narrow (some up to 16% grade). There is only one large cistern for fire suppression and it is in need of repair. Few homes have adequate defensible space. Fuels are moderate to heavy loads of Pinyon-juniper, sage, bitterbrush and other shrubs. Topography is steep and complex.

ASPEN SPRING RECOMMENDATIONS

- A parcel-level analysis is recommended.
- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Extended defensible space is recommended for homes located in dangerous topography (saddles, above natural chimneys, mid-slope on steep slopes or summits) with heavy fuel loads near or below the home.
- Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy fuels. Replace all shake roofs with non- combustible types such as metal or composite shingle.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
- Clean leaf and needle litter from roofs and gutters and away from foundations. Clear flammable vegetation away from power lines near homes.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- *Repairing the existing cistern should be considered a priority project for this community.* Investigate the possibility of adding an additional cistern to further improve the water supply.
- Add reflective addressing to all driveways and homes.

11. Walker/West Antelope Valley

Hazard Rating	**Very High**
Does the neighborhood have dual access roads?	No
Are there road grades > 8%?	Yes
Are all access roads of adequate width?	No
Average lot size:	1-5 Acres
Fuel models found in the neighborhood:	15, 5, 2, 1
Water supply: stock ponds	Possible draft from river and

Ravines, natural chimneys, inadequate roads, inadequate water supply, power lines, propane farm, wood roofs

Description: Homes on the west side of highway 395 through Antelope Valley are primarily small to moderate size, on moderate to large lots. This area has an active fire history and steep complex terrain; however, most of the homes are located near the highway where the terrain is more moderate. Access for homes located near the highway is generally good, but addressing is generally poor. Homes south of highway 395 in the Walker area are built on moderate to steep slopes and in ravines. The density is higher here and most of the residences in this community are on small lots. Access roads are steeper here and driveways are longer, but like the rest of this community, access roads and driveways running off highway 395 are narrow with rough dirt surfaces. There are several dead ends and few turnarounds adequate for fire apparatus. There is

no apparent water supply for fire suppression, although it may be possible to draft from the Walker River at some points. There are overhead power lines and propane tanks which may be a hazard to fire apparatus. Few homes have adequate defensible space.

Fuels are much heavier here than on the east side of Antelope Valley (east of Hwy 395) and consist primarily of moderate to heavy loads of Pinyon-juniper, sage and other shrubs. The general topography is complex and moderate to steep.

WALKER/WEST ANTELOPE VALLEY RECOMMENDATIONS

- A parcel-level analysis is recommended.
- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Extended defensible space is recommended for homes located in dangerous topography (saddles, above natural chimneys, mid-slope on steep slopes or summits) with heavy fuel loads near or below the home.
- Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy fuels. Replace all shake roofs with non- combustible types such as metal or composite shingle.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
- Clean leaf and needle litter from roofs and gutters and away from foundations. Clear flammable vegetation away from power lines near homes. Clear weeds and flammable vegetation to at least 30 feet away from propane tanks.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Investigate the possibility of adding some large (20,000 - 30,000 gallon) cisterns especially in

the Walker area. A reliable water supply for fire suppression is a critical need in this community.

- Add reflective addressing to all driveways and homes.

12. Valley Vista

Hazard Rating	**Very High**
Does the neighborhood have dual access roads?	No
Are there road grades > 8%?	No
Are all access roads of adequate width?	Yes
Average lot size:	<1 Acres
Fuel models found in the neighborhood:	5, 9
Water supply:	Hydrants
Hazards:	Ravines, steep slopes, power lines, wood roofs

Description: This community consists of condos and moderate size homes on small lots. Construction is primarily newer wood siding with asphalt or metal roofs, although many homes still have wood shake roofs. Many also have flammable projections and decks. Roads are generally wide enough with good surfaces, but there are some steep grades. Addressing is present on most homes, but not reflective and difficult to locate in many cases. There is a good hydrant network, but few homes have any defensible space and most have vegetation growing right up to the structure. There are overhead power lines which may be a hazard to fire apparatus. Fuels are heavy loads of mixed conifers with plentiful ladder fuels. Terrain is generally moderate to steep and complex.

VALLEY VISTA RECOMMENDATIONS

- A parcel-level analysis is recommended.
- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Extended defensible space is recommended for homes located in dangerous topography (saddles, above natural chimneys, mid-slope on steep slopes or summits) with heavy fuel loads near or below the home.
- Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy fuels. Replace all shake roofs with non- combustible types such as metal or composite shingle.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
- Clean leaf and needle litter from roofs and gutters and away from foundations. Clear flammable vegetation away from power lines near homes.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Add reflective addressing to all driveways and homes.

13. June Lake

Hazard Rating	**Very High**
Does the neighborhood have dual access roads?	No
Are there road grades > 8%?	Yes
Are all access roads of adequate width?	No
Average lot size:	<1 Acres
Fuel models found in the neighborhood:	9, 5
Water supply:	Hydrants

Steep slopes, inadequate roads, power lines, wood roofs

Description: Small houses and cabins on small to moderate size lots. Wood siding construction with metal and asphalt roofs is dominant, although there are still some homes with wood shake roofs in this community. Most of the construction is older and many of these properties were USFS lease cabins which have been converted to private ownership. Many homes do not have address markers. Markers are inconsistent and generally non-reflective on the homes where they are present. Many street signs are also missing in this community, but there is a program being considered to correct this problem. Roads are generally poor, consisting of rough, narrow dirt tracks, and they are steep in spots. There are several dead ends in this community and there are no pullouts and few turnarounds suitable for fire apparatus. This community does have a good hydrant network. Few homes have any defensible spaces and there are many properties with

flammable yard clutter. There are overhead power lines which may be a hazard to fire apparatus. Fuels are predominately heavy loads of Jeffrey pine with grass and shrubs in the understory. Ladder fuels are plentiful. The general topography is steep.

JUNE LAKE RECOMMENDATIONS

- A parcel-level analysis is recommended.
- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Extended defensible space is recommended for homes located in dangerous topography (in saddles, above natural chimneys, mid-slope on steep slopes or summits) with heavy fuel loads near or below the home.
- Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy fuels. Replace all shake roofs with non- combustible types such as metal or composite shingle.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
- Clean leaf and needle litter from roofs and gutters and away from foundations. Clear flammable vegetation away from power lines near homes.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Add reflective addressing to all driveways and homes.

14. Lundy Canyon

Hazard Rating	Very High
Does the neighborhood have dual access roads?	No
Are there road grades > 8%?	No
Are all access roads of adequate width?	Yes
Average lot size:	<1 Acres
Fuel models found in the neighborhood:	5, 2, 8, 1

Drafting from streams may be possible, but not likely

Steep slopes, ravines, inadequate roads, inadequate water supply, no fire protection

Description: The Lundy Canyon community consists of moderate size homes on small lots. Most homes are wood siding with metal roofs and are newer construction. Addressing and roads are generally good. There is no water for fire suppression and this community is not covered by a fire protection district. There is a BLM fire station that may respond to this area, and Mono City FD may respond here as well. Heavy recreational use could result in a higher risk of ignition and potential evacuation difficulties in this community. Fuels are continuous beds of sage and other shrubs with ornamental plantings of conifer near homes. Fuels in the drainages consist of a mix of conifers and riparian hardwoods. Fuel loading is generally moderate, but flammable ornamental plantings and the lack of defensible space make these fuels more hazardous. Although the

topography near the homes is generally low to moderate, the overall topography of the area is steep and complex.

LUNDY CANYON RECOMMENDATIONS

- A parcel-level analysis is recommended.
- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Extended defensible space is recommended for homes located in dangerous topography (in saddles, above natural chimneys, mid-slope on steep slopes or summits) with heavy fuel loads near or below the home.
- Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy fuels. Replace all shake roofs with non- combustible types such as metal or composite shingle.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
- Clean leaf and needle litter from roofs and gutters and away from foundations.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- If there is no agreement already in place, this community should contract with the nearest fire department (most likely Mono City FD) for structure protection in the event of a wildfire.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Investigate the possibility of adding one or two large (20,000 - 30,000 gallon) cisterns in this community. *A reliable water supply for fire suppression is a critical need in Lundy Canyon.*
- *An evacuation plan for this community is highly recommended.* Heavy recreation traffic during the summer could hamper evacuation efforts in this single-access community.
- Add reflective addressing to all driveways and homes.

15. Evans Tract Area

Hazard Rating	**Very High**
Does the neighborhood have dual access roads?	Yes
Are there road grades > 8%?	No
Are all access roads of adequate width?	No
Average lot size:	<1 Acres
Fuel models found in the neighborhood:	5, 2, 1
Water supply:	Hydrants

Ravines, inadequate roads, power lines, propane tanks, wood roofs

Description: The Evans Tract Area community consists of small homes on small lots with a mix of old and new construction. The dominant construction type is wood siding with asphalt roofs, but there are some wood shake roofs in this community. Most homes have some type of address marker, but generally they are not reflective and hard to find on some properties. Most access roads have good surfaces, but are steep and narrow. Most of the driveways are short and offer good access to the structure, but there are no pullouts and few turnarounds adequate for fire apparatus. This community has an adequate hydrant network. Few homes have any defensible space and there are some properties with flammable yard clutter including firewood stacked against the home. There are overhead power lines and propane tanks surrounded by vegetation which may be a hazard to fire operations. Fuels are moderate to heavy loads of sage and Pinyon-

juniper near the homes, transitioning to heavy Pinyon-juniper on the upper slopes. Topography is moderate to steep and complex.

EVANS TRACT AREA RECOMMENDATIONS

- A parcel-level analysis is recommended.
- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Extended defensible space is recommended for homes located in dangerous topography (saddles, above natural chimneys, mid-slope on steep slopes or summits) with heavy fuel loads near or below the home.
- Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy fuels. Replace all shake roofs with non- combustible types such as metal or composite shingle.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
- Clean leaf and needle litter from roofs and gutters and away from foundations. Clear flammable vegetation away from power lines near homes. Clear weeds and flammable vegetation to at least 30 feet away from propane tanks.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Add reflective addressing to all driveways and homes.

16. Silver Lake & Dream Mountain

Hazard Rating	**Very High**
Does the neighborhood have dual access roads?	No
Are there road grades > 8%?	No
Are all access roads of adequate width?	No
Average lot size:	<1 Acres
Fuel models found in the neighborhood:	5, 9, 8, 1
Water supply:	Hydrants
Hazards:	Inadequate roads, wood roofs

Description: Most of the residences in this community are small forest service lease cabins on small lots. Most construction is older; wood or log siding with metal or asphalt roofs is dominant. There are, however, several cabins with wood roofs in this community. Roads in this community are narrow with poor, rutted dirt surfaces. Addressing is also poor and many homes do not have any address marker. There is an adequate hydrant network in this community. Most homes do not have any defensible space. Fuels are heavy loads of decadent aspen and mixed conifer with heavy dead and down in the understory. Shrubs and other ladder fuels are also heavy throughout this community. Topography is generally moderate to low.

SILVER LAKE & DREAM MOUNTAIN RECOMMENDATIONS

- A parcel-level analysis is recommended.
- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Extended defensible space is recommended for homes located in dangerous topography (saddles, above natural chimneys, mid-slope on steep slopes or summits) with heavy fuel loads near or below the home.
- Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy fuels. Replace all shake roofs with non- combustible types such as metal or composite shingle.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
- Clean leaf and needle litter from roofs and gutters and away from foundations. Clear flammable vegetation away from power lines near homes. Clear weeds and flammable vegetation to at least 30 feet away from propane tanks.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Wherever possible road surfaces should be improved and vegetation thinned along access roads and driveways. This is especially important for narrow driveways and road segments.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Add reflective addressing to all driveways and homes.

17. Swauger Creek & Devil's Gate

Hazard Rating	Very High
Does the neighborhood have dual access roads?	No
Are there road grades > 8%?	No
Are all access roads of adequate width?	No
Average lot size:	>5 Acres
Fuel models found in the neighborhood:	2, 5
Water supply: by USFS	Draft sites marked and mapped
Hazards:	Inadequate roads, wood roofs

Description: This community contains moderate to large homes on large lots (minimum 40 acres). Dominant construction is wood siding with metal or asphalt roofs, but there are some wooden roofs and many homes have flammable projections and decks. Addressing is poor. Most homes do not have address markers at the driveway and if there are markers on the homes they are not visible from the road. Access roads are dirt and are narrow in spots. There are several long, narrow driveways with no pullouts or turnarounds suitable for apparatus. There are marked draft sites for fire suppression in this community. There has been some mitigation work in this area, but there are still several homes with vegetation growing right up to the structure. Fuels are primarily conifers with grasses and sage in the understory, becoming sage- dominant in the bottoms. There

are also significant stands of aspen and mixed conifers in the riparian drainages. Topography varies widely from broad flat areas to steep slopes complicated by ravines and chimneys.

SWAUGER CREEK & DEVIL'S GATE RECOMMENDATIONS

- A parcel-level analysis is recommended.
- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Extended defensible space is recommended for homes located in dangerous topography (saddles, above natural chimneys, mid-slope on steep slopes or summits) with heavy fuel loads near or below the home.
- Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy fuels. Replace all shake roofs with non- combustible types such as metal or composite shingle.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
- Clean leaf and needle litter from roofs and gutters and away from foundations.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the Home Mitigation section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Add reflective addressing to all driveways and homes.

The following recommendations have been taken from the **Devil's Gate Swauger Creek Fire Safe Council's board report** and has been included here at their request. The report lists fuels reduction projects to be completed in order to lessen the fire hazard and provide better access for Fire Equipment in the Devil's Gate Swauger Creek Fire Safe Council's area

These projects, specifications and recommendations have not been evaluated or prioritized by Anchor Point. They are reprinted here verbatim.

- Create a fuel shaded fuel break interface between U. S. Forest Service, Bureau of Land Management Lands and private lands. 200 foot wide shaded fuelbreak between these boundaries. Approximately eight miles.

- Create a shaded fuelbreak along existing driveways, 100 feet each side, enlarging driveway width to allow for large fire trucks and apparatus to pass. On long driveways over 300 feet long, provide for turnouts every 300 feet for passing and at the ends create "Y" or "Hammerhead turnarounds" for driveways that do not have space to turnaround.

- Install reflective street sign numbers at the entrance of each driveway coming off the main roadway. This will create a north-south fire break in the area. Approximately 4 miles.

- Clear around existing homes and create shaded fuelbreaks, minimum 150 feet. This could be more depending on the terrain and slopes.

- Road maintenance making the road easier access with Fire Equipment and create shaded fuel break on existing fire road going west from Valdez property, to United States Forestry land. Approximately 1.5 miles.

- Aspen Grove restoration and shaded fuel break, South end of Valdez Property. Approximately 3 Acres.

- Create 200 foot wide, 100 feet each side of road, shaded fuel break along Highway 395 Corridor from Rattlesnake bend to 1 mile west of Devil's gate rocks. Approximately 3.5 miles. Heavily traveled road and vulnerable for manmade fires, lighted cigarettes thrown from vehicles etc.

- Create signs and show place for shaded fuel break when completed on Highway 395 a major Highway with large volumes of traffic. Leave small section as it was to start with, showing major difference and potential fire hazard removal.

- Create shaded fuel break along Power Line Road 100 feet each side, widen areas to permit large Fire Equipment access. Approximately 2 miles long.

- Create a North South shaded fuel break on "Woods" Property, most winds come from the westerly direction. Approximately 1.5 miles long. Along his driveway to meet width and turn around requirements and West property line.

- Aspen Grove restoration and shaded fuel break, on "Woods" Property. Approximately 25 acres.

- Obtain water tender, storage facility and training of residents for operation of this unit for wildland fires initial attack until back up units arrive.

- Install 25,000 gallon water storage tank along Highway 395, to provide a quick source of water to refill fire apparatus, areas not close to Swauger Creeks existing draft points.
- 300 acres ladder fuels reduction on private property, various locations within Devil's Gate Swauger Creek Fire Safe Council's area.
- Create shaded fuel break, on Quartz Mine Road 150 feet each side and improve road width for approximately 1.5 miles.
- Finish Swauger Creek Road widen shaded fuel break to existing dedicated road right-of-way.
- Review all created shaded fuel breaks for maintenance every 5 years.

18. Swall Meadows

Hazard Rating	High
Does the neighborhood have dual access roads?	No
Are there road grades > 8%?	Yes
Are all access roads of adequate width?	No
Average lot size:	<1 Acre
Fuel models found in the neighborhood:	5, 8
Water supply:	Hydrants

Inadequate roads, steep slopes, ravines, power lines

Description: There have been two large fires in this community since 1982. Most homes are moderate to small size on moderate lots, with a mix of old and new construction. Wood siding with metal or asphalt roofs is the dominant construction type. There are a few homes with some defensible space, but there are also many homes with vegetation growing right up to the structure. There are also some properties with flammable yard clutter. There is one way in and out of this community and the access road is narrow, winding and constructed mid-slope for a considerable distance. There are some steep narrow driveways and some poor dirt roads in this community. Addressing is generally poor (missing and inconsistent markers, few reflective).

Overhead power lines exist which may be a hazard to fire apparatus. There are hydrants in this community and there is a fire station located on Willow Drive. Fuels are primarily sage and Jeffery

pine, with sage in the understory (except in drainages where a mix of hardwood, shrubs and cedars is dominant). Topography is moderate to steep.

SWALL MEADOWS RECOMMENDATIONS

- A parcel-level analysis is recommended.
- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Extended defensible space is recommended for homes located in dangerous topography (saddles, above natural chimneys, mid-slope on steep slopes or summits) with heavy fuel loads near or below the home.
- Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy fuels.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
- Clean leaf and needle litter from roofs and gutters and away from foundations. Clear flammable vegetation away from power lines near homes. Clear weeds and flammable vegetation to at least 30 feet away from propane tanks.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Investigate the possibility of improving and widening the road surface of the rougher dirt access roads.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Add reflective addressing to all driveways and homes.

19. Hilton Creek

Hazard Rating	High
Does the neighborhood have dual access roads?	No
Are there road grades > 8%?	Yes
Are all access roads of adequate width?	No
Average lot size:	<1 Acre
Fuel models found in the neighborhood:	5
Water supply:	Hydrants

Inadequate roads, steep slopes, ravines, wood roofs

Description: Delta Drive serves as the dividing line between this community and the more hazardous Juniper Loop community. Most of the homes were built in the 1980s and the dominant construction type is wood siding with asphalt or metal roofs. There are some wood roofs in this community and few homes have adequate defensible spaces; however, the fuels are not as dense and the topography not as steep as in Juniper Loop. There are several dead- end roads in this community. Most, but not all, of the access roads are of adequate width, but some are steep. Addressing is generally present, but not reflective, and some markers are hard to locate. There is a good water supply in this community. Fuels are moderate loads of Pinyon- juniper and sage. Topography is moderate to steep.

HILTON CREEK RECOMMENDATIONS

- A parcel-level analysis is recommended.
- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Extended defensible space is recommended for homes located in dangerous topography (saddles, above natural chimneys, mid-slope on steep slopes or summits) with heavy fuel loads near or below the home.
- Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy fuels. Replace all shake roofs with non- combustible types such as metal or composite shingle.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
- Clean leaf and needle litter from roofs and gutters and away from foundations.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Add reflective addressing to all driveways and homes.

20. North Mammoth Lakes

Hazard Rating	**High**
Does the neighborhood have dual access roads?	Yes
Are there road grades > 8%?	No
Are all access roads of adequate width?	Yes
Average lot size:	<1 Acre
Fuel models found in the neighborhood:	5, 9, 10
Water supply:	Hydrants
Hazards:	Power lines, propane tanks, wood roofs

Description: This is a high density community of small to moderate size homes and condo complexes. Most construction is wood siding with a metal or asphalt roof, but some shake roofs are present. Most homes do not have adequate defensible space and many have vegetation growing right up to the structure. Roads are generally good and most driveways are short.

Addressing is present, but not reflective, and some markers are hard to find. There is a good hydrant network in this neighborhood and most homes are within two miles of a fire station. Fuels are moderate to heavy loads of shrubs and mixed conifer with moderate dead and down material and plentiful ladder fuels. Topography is moderate to low.

NORTH MAMMOTH LAKES RECOMMENDATIONS

- A parcel-level analysis is recommended.
- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Extended defensible space is recommended for homes located in dangerous topography (saddles, above natural chimneys, mid-slope on steep slopes or summits) with heavy fuel loads near or below the home.
- Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy fuels. Replace all shake roofs with non- combustible types such as metal or composite shingle.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
- Clean leaf and needle litter from roofs and gutters and away from foundations. Clear flammable vegetation away from power lines near homes. Clear weeds and flammable vegetation to at least 30 feet away from propane tanks.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Add reflective addressing to all driveways and homes.

21. Sierra Valley Estates (Mammoth Lakes area)

Hazard Rating	High
Does the neighborhood have dual access roads?	Yes
Are there road grades > 8%?	No
Are all access roads of adequate width?	Yes
Average lot size:	<1 Acre
Fuel models found in the neighborhood:	5, 9, 10
Water supply:	Hydrants
Hazards:	Power lines, propane tanks, wood roofs

Description: This is a high density community of small homes and apartments on small lots. Most construction is older and quite a bit of it is very hazardous. Wood A-frames with cedar shake roofs that go almost all the way to the ground are common. Wood siding is dominant and roofs are a mix of asphalt and wood shake. There are no homes with adequate defensible spaces and many residences have flammable yard clutter. Addressing is poor and most homes do not have any address markers. There are power lines and propane tanks which can create a hazard for firefighters. There is a good hydrant network and most homes are within 2 miles of a fire station. Fuels are heavy to moderate loads of mixed conifer. Topography is low to flat.

SIERRA VALLEY ESTATES RECOMMENDATIONS

- A parcel-level analysis is recommended.
- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Extended defensible space is recommended for homes located in dangerous topography (saddles, above natural chimneys, mid-slope on steep slopes or summits) with heavy fuel loads near or below the home.
- Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy fuels. Replace all shake roofs with non- combustible types such as metal or composite shingle.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
- Clean leaf and needle litter from roofs and gutters and away from foundations. Clear flammable vegetation away from power lines near homes. Clear weeds and flammable vegetation to at least 30 feet away from propane tanks.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Add reflective addressing to all driveways and homes.

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22. McGee Creek/Long Valley

Hazard Rating	**High**
Does the neighborhood have dual access roads?	Yes
Are there road grades > 8%?	No
Are all access roads of adequate width?	No
Average lot size:	<1 Acre
Fuel models found in the neighborhood:	5, 6
Water supply:	Hydrants, one creek-fed cistern
Hazards:	Ravines, wood roofs

Description: This is a community of small to moderate sized homes on small lots. Homes are in clusters interspersed with LADWP and public lands. Construction is a mix of new and older types and some areas are still being built out. Wood siding is dominant and roofs are a mix of asphalt and metal with some wood shakes. There are a few homes with defensible spaces but many residences have vegetation growing right up to the structure and some have flammable yard clutter. Access roads are generally good, but there are some steep grades and long narrow driveways. Most homes do not have address markers that are visible from the street. The McGee Creek area has a good hydrant network and there is a creek-fed cistern with a standpipe connection in the Long Valley area that can supply adequate flows. Fuels are light to moderate

loads of shrubs, predominately sage, and short grasses with ornamental plantings near homes. Topography is low to moderate with some ravines in the McGee Creek area.

MCGEE CREEK/LONG VALLEY RECOMMENDATIONS

- A parcel-level analysis is recommended.
- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Extended defensible space is recommended for homes located in dangerous topography (saddles, above natural chimneys, mid-slope on steep slopes or summits) with heavy fuel loads near or below the home.
- Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy fuels. Replace all shake roofs with non- combustible types such as metal or composite shingle.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
- Clean leaf and needle litter from roofs and gutters and away from foundations.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Add reflective addressing to all driveways and homes.

23. Rancheria – Bridgeport Area

Hazard Rating	High
Does the neighborhood have dual access roads?	Yes
Are there road grades > 8%?	No
Are all access roads of adequate width?	No
Average lot size:	1-5 Acres
Fuel models found in the neighborhood:	10, 1, 5
Water supply:	Creek weir (portable pump only)
Hazards:	Inadequate roads, wood roofs

Description: This is a community of small to moderate size homes on moderate sized lots. Wood siding construction is dominant and roofs are approximately half wood shake and half ignition-resistant construction, primarily asphalt. A few homes have some defensible space, but most have vegetation growing right up to the structure. There are many homes with flammable decks and projections and some homes with flammable yard clutter. Most roads are paved and relatively flat but many are narrow and overgrown. There is a secondary access off of Hackmore, but this narrow dirt road is overgrown and would need fuels reduction and surface improvement to be a good escape route. Address markers are generally present, but not reflective and difficult to see on most homes. The only water for fire suppression in this community is from a six-foot concrete creek weir. Fuels are heavy mixed conifer with aspen and riparian shrubs in the creek bottoms.

Topography is generally low, but some homes back up to steeper slopes and rolling materials could be a hazard.

RANCHERIA RECOMMENDATIONS

- A parcel-level analysis is recommended.
- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Extended defensible space is recommended for homes located in dangerous topography (saddles, above natural chimneys, mid-slope on steep slopes or summits) with heavy fuel loads near or below the home.
- Extended defensible space is recommended for homes located at the bottom of steep slopes with heavy fuels above to prevent rolling burning materials from igniting structures.
- Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy fuels. Replace all shake roofs with non- combustible types such as metal or composite shingle.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
- Clean leaf and needle litter from roofs and gutters and away from foundations.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Consider a shaded fuelbreak or linked defensible spaces for homes adjacent to the heavier conifer fuel beds.
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- The secondary access off Hackmore should be thinned to conform to shaded fuelbreak recommendations (see the main report for details) and the surface improved to provide a viable escape route.

- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Add reflective addressing to all driveways and homes.

24. Snow Creek

Hazard Rating	Moderate
Does the neighborhood have dual access roads?	No
Are there road grades > 8%?	No
Are all access roads of adequate width?	Yes
Average lot size:	<1 Acres
Fuel models found in the neighborhood:	5, 9
Water supply:	Hydrants
Hazards:	Wood roofs

Description: This is a high density community of primarily town homes and condos. Single family homes are small on small lots. Wood siding with shake roofs is the dominant construction type. Some homes have wood piles and other flammable materials too close to the structure and/or under flammable projections and decks. Some homes have defensible space. Roads are good and most driveways are short and paved. Most homes have address markers but many are not visible (covered by vegetation). This area has a good hydrant network and is less than one mile from Mammoth Lakes FD Station 2. Fuels are conifers with grass and shrubs in the understory broken by irrigated lawns. Topography is low to flat.

SNOW CREEK RECOMMENDATIONS

- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Extended defensible space is recommended for homes with heavy fuel loads near or below the home.
- Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy fuels. Replace all shake roofs with non- combustible types such as metal or composite shingle.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
- Clean leaf and needle litter from roofs and gutters and away from foundations.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Add reflective addressing to all driveways and homes. Clean all vegetation away from existing address markers.

25. Mono City

Hazard Rating	**Moderate**
Does the neighborhood have dual access roads?	No
Are there road grades > 8%?	No
Are all access roads of adequate width?	Yes
Average lot size:	<1 Acres
Fuel models found in the neighborhood:	2
Water supply:	Hydrants (but poor flows)

Inadequate water supply, power lines, wood roofs

Description: This is a community of small homes on small lots. Most construction is older wood siding with metal or asphalt roofs, although there are several wood shake roofs in this community. Few homes have any defensible space. Roads and driveways are generally good. Some are dirt, but most have good surfaces and are of adequate width. Some homes are missing address markers and most others are present but not reflective and may be difficult to locate. Hydrants are present but flows are poor. Mono City has a volunteer fire department.

Overhead power lines are present which may be a hazard to firefighters. Fuels are primarily sage, mesquite and other shrubs and are continuous except for some irrigated lawns.

Topography is low to flat.

MONO CITY RECOMMENDATIONS

- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Extended defensible space is recommended for homes with heavy fuel loads near or below the home.
- Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy fuels. Replace all shake roofs with non- combustible types such as metal or composite shingle.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
- Clean leaf and needle litter from roofs and gutters and away from foundations.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- A second means of ingress/egress is needed for this community. A committee with the Mono Basin RPAC is currently working on this issue as of the writing of this report.
- Consider supplementing the poor hydrant network with a large (10,000 - 30,000) community cistern.
- Install a generator to keep the current water system operating during power outages.
- Add reflective addressing to all driveways and homes.

26. Convict Lake/SNARL

Hazard Rating	Moderate
Does the neighborhood have dual access roads?	No
Are there road grades > 8%?	No
Are all access roads of adequate width?	No
Average lot size:	<1 Acres
Fuel models found in the neighborhood:	5, 6
Water supply:	Hydrants (Convict Lake only)

Inadequate water supply, inadequate access roads, ravines

Description: SNARL (Sierra Nevada Aquatic Lab) has residential housing for the research lab. The residences are wood and metal siding with metal roofs. This is an isolated area and address markers are not applicable, although the buildings are numbered. This area is a long distance from the nearest fire station. The only water for fire suppression is a pump system fed by a small reservoir, which is inadequate for this community. Fuels are a mixture of shrubs and short grasses. Topography is low to flat.

The residences at Convict Lake are predominately cabins and duplex units with one large summer resort property. There is a mix of old and new construction. Most residences are wood siding with metal or asphalt roofs. Addressing is poor and this area is a long distance from the nearest fire station. This community has a network of 2 ½" standpipe hydrants gravity fed by a 60,000 gallon

cistern. Fuels are moderate loads of shrubs as much as four to six feet high in some areas. Near residences, aspen with sage and other shrubs in the understory is dominant. Topography is low to moderate with some ravines.

CONVICT LAKE/SNARL RECOMMENDATIONS

- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Extended defensible space is recommended for homes with heavy fuel loads near or below the home.
- Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy fuels.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
- Clean leaf and needle litter from roofs and gutters and away from foundations.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Consider supplementing the small reservoir at SNARL with a large (10,000 - 30,000) community cistern.
- Add reflective addressing to all driveways and homes in Convict Lake (not applicable to SNARL).

27. Highlands

Hazard Rating	**Moderate**
Does the neighborhood have dual access roads?	No
Are there road grades > 8%?	No
Are all access roads of adequate width?	Yes
Average lot size:	<1 Acres
Fuel models found in the neighborhood:	5, 6
Water supply:	Hydrants
Hazards:	Propane tanks

Description: This is a community of moderate size homes on small lots. This community is still being built out and is likely to become a high density area. Most construction is newer rock and wood siding with ignition resistant roofs. Some homes have defensible spaces, but most have shrubs and ornamental vegetation too close to the structure. Most roads are good and addressing is generally present, but not reflective, and may be difficult to locate at some residences. This community has a good hydrant network. Fuels are moderate loads of primarily sage and other short shrubs. Fuel beds are generally continuous throughout this community.

Topography is low to moderate.

HIGHLANDS RECOMMENDATIONS

- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy fuels.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials, especially where such openings are located on slopes above heavy fuels.
- Clean leaf and needle litter from roofs and gutters and away from foundations. Clear flammable vegetation away from power lines near homes. Clear weeds and flammable vegetation to at least 30 feet away from propane tanks.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Add reflective addressing to all driveways and homes.

28. Aurora Canyon

Hazard Rating	Moderate
Does the neighborhood have dual access roads?	No
Are there road grades > 8%?	No
Are all access roads of adequate width?	Yes
Average lot size:	<1 Acres
Fuel models found in the neighborhood:	15, 2
Water supply:	Hydrants
Hazards:	Power lines, propane tanks

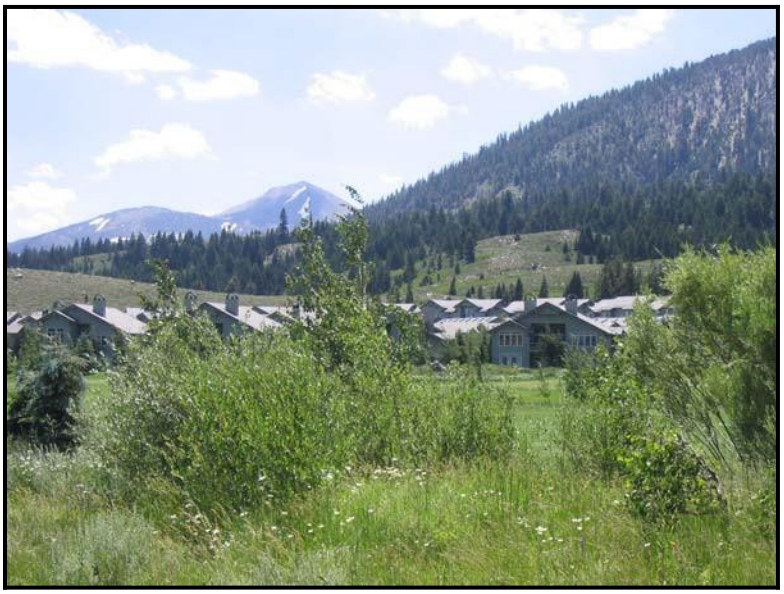
Description: This is a community of small homes on small lots. The dominant construction type is wood siding with asphalt roofs. Some homes have defensible spaces but most have ornamental plantings, grasses and/or sage too close to the structure. Roads are generally good and most homes have addressing present on the structure, but most markers are not reflective and some are difficult to locate. There are no address markers on the street, but most driveways are short. Power lines and propane tanks exist, which can be hazardous to firefighters. There is an adequate hydrant network in this community. Fuels are light loads of small sage and grasses (CDF desert fuel model, FM 15). Fuels change to Pinyon-juniper dominant further up canyon.

Topography is low to moderate.

AURORA CANYON RECOMMENDATIONS

- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Discourage the use of combustible materials for decks, siding and roofs.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials.
- Clean leaf and needle litter from roofs and gutters and away from foundations. Clear flammable vegetation away from power lines near homes. Clear weeds and flammable vegetation to at least 30 feet away from propane tanks.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Add reflective addressing to all driveways and homes.

29. Ranch Road – Mammoth Lakes area



Hazard Rating	Moderate
Does the neighborhood have dual access roads?	No
Are there road grades > 8%?	No
Are all access roads of adequate width?	Yes
Average lot size:	<1 Acres
Fuel models found in the neighborhood:	5, 1
Water supply:	Hydrants
Hazards:	Wood roofs, power lines, propane tanks

Description: This is a high density community of newer homes. Homes are small to moderate size on small lots. The dominant construction type is log, wood siding or wood siding with partial rock veneer. Roofs are predominately wood shake, although there are also many asphalt roofs. Many homes have flammable projections and decks. Most homes do not have any defensible space, and flammable ornamental plantings too close to the structure are common. All homes have address markers, but most are not reflective and there are no address markers at the street. There is a good hydrant network in this community (hydrants every 300 to 500 feet) and all of the homes are less than one mile from a fire station. Fuels are moderate to light loads of sage, riparian shrubs and grasses. Topography is flat to gently rolling.

RANCH ROAD AREA RECOMMENDATIONS

- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Discourage the use of combustible materials for decks, siding and roofs.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials.
- Clean leaf and needle litter from roofs and gutters and away from foundations. Clear flammable vegetation away from power lines near homes. Clear weeds and flammable vegetation to at least 30 feet away from propane tanks.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Add reflective addressing to all driveways and homes.

30. Chalfant Valley

Hazard Rating	Moderate
Does the neighborhood have dual access roads?	Yes
Are there road grades > 8%?	Yes
Are all access roads of adequate width?	Yes
Average lot size:	1-5 Acres
Fuel models found in the neighborhood:	15
Water supply:	None

No water supply, ravines, power lines, propane tanks

Description: Residences in this community are primarily ranch and farm properties with small to moderate size homes on moderate to large lots. There is a mix of old and new construction with wood siding and asphalt or metal roofs as the dominant type, although there are also many trailer homes in this community. Many properties have flammable outbuildings and several have cluttered yards. Although there are some homes with defensible space (mostly resulting from agricultural irrigation), there are many homes with native vegetation and ornamental plantings too close to the structure. Some access roads and long driveways are dirt, but most are flat and of adequate width. Addressing is poor. Many homes do not have markers, there are several long driveways with no marker at the street, and some homes only have a mailbox as a marker. Most of the markers that do exist are not reflective and some are difficult to locate. There is no water

supply for fire suppression and many of the homes are a long way from the nearest fire station. Power lines and propane tanks exist which may be a hazard to firefighters. Fuels are light loads of small sage and grasses (CDF desert fuel model, FM 15). Fuels are discontinuous, broken by irrigated agricultural fields and lawns. The general topography is low to flat. However, topography does increase closer to the White Mountains, and there are some ravines in this area.

CHALFANT VALLEY RECOMMENDATIONS

- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Extended defensible space is recommended for homes with heavy fuel loads near or below the home.
- Discourage the use of combustible materials for decks, siding and roofs.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials.
- Clean leaf and needle litter from roofs and gutters and away from foundations. Clear flammable vegetation away from power lines near homes. Clear weeds and flammable vegetation to at least 30 feet away from propane tanks.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Water supply is a critical need in Chalfant Valley. This community is very spread out along Highway 6. Consider adding at least one large (10,000 - 30,000 gallon) cistern in each of the most populated areas (Benton, Hammil and Chalfant Valley) for fire suppression use in this community.
- Add reflective addressing to all driveways and homes.

31. Paradise Valley

Hazard Rating	**Moderate**
Does the neighborhood have dual access roads?	No
Are there road grades > 8%?	No
Are all access roads of adequate width?	No
Average lot size:	<1 Acre
Fuel models found in the neighborhood:	5, 15
Water supply:	Hydrants
Hazards:	Ravines, wood roofs, propane tanks

Description: Approximately 175 people live in this community of small to moderate size homes on small lots. Most of the construction is newer with wood siding and asphalt roofs, but there are at least two wood shake roofs in this community. There are 83 homes currently built with plans to increase to 138 at maximum build out. Some homes have defensible space, but some have ornamental plantings and sage too close to the structure. Roads are good, paved and of adequate width. Most driveways are short. Address markers are present, but not reflective except for some reflective numbers on mailboxes. There is a good hydrant network in this community and all of the homes are within one mile of a fire station. Propane tanks exist which may be a hazard to firefighters, although most of the tanks are fairly new. Fuels are light loads of sage and desert

grasses. Plants are generally widely spaced except for willow and aspen present in some drainages. Topography is low to moderate with some ravines.

PARADISE VALLEY RECOMMENDATIONS

- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Extended defensible space is recommended for homes with heavy fuel loads near or below the home and for homes above ravines or other hazardous topographic features.
- Discourage the use of combustible materials for decks, siding and roofs.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials.
- Clean leaf and needle litter from roofs and gutters and away from foundations. Clear flammable vegetation away from power lines near homes. Clear weeds and flammable vegetation to at least 30 feet away from propane tanks.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Add reflective addressing to all driveways and homes.

32. Antelope Valley

Hazard Rating	Low
Does the neighborhood have dual access roads?	Yes
Are there road grades > 8%?	No
Are all access roads of adequate width?	No
Average lot size:	1-5 Acre
Fuel models found in the neighborhood:	1, 5
Water supply:	Hydrants

Inadequate access roads, no water supply, power lines, propane tanks

Description: This community, which is primarily located in the central portion of Antelope Valley, is dominated by agricultural properties. There are also some homes around Topaz Lake, which is an area of heavy recreational use. Except for the homes around the Lake and in the town of Topaz (population 100), most of the homes are small to moderate size on large lots.

Near the lake and in Topaz, homes are closer together, but still tend to be on moderate size lots. Most of the homes in this area are older and the dominant construction type is wood siding with an asphalt or metal roof. Many homes have defensible space mostly due to agricultural irrigation, but there are some with sage and ornamental plantings growing right up to the structure. There is a volunteer fire station and a BLM fire station in Topaz. There is no water for fire suppression in this community, although there are likely to be places on Topaz Lake or the Walker River where it

will be possible to draft depending on the water levels. Other than Highway 395, most of the roads are improved dirt. Widths are generally good, but there are some long narrow driveways. Addressing is poor, with many homes not marked at the driveway or the structure. Fuels are generally light loads of sage and short grasses except for scattered riparian shrubs and hardwoods in drainages and planted near some homes. Fuels are discontinuous due to large irrigated agricultural plots. Topography is generally low to flat.

ANTELOPE VALLEY RECOMMENDATIONS

- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Discourage the use of combustible materials for decks, siding and roofs.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials.
- Clean leaf and needle litter from roofs and gutters and away from foundations. Clear flammable vegetation away from power lines near homes. Clear weeds and flammable vegetation to at least 30 feet away from propane tanks.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Inventory and preplan all draft sites and any stock tanks or other water sources which could be useful for fire suppression.
- Add reflective addressing to all driveways and homes.

33. The Trails

Hazard Rating	Low
Does the neighborhood have dual access roads?	Yes
Are there road grades > 8%?	No
Are all access roads of adequate width?	Yes
Average lot size:	<1 Acre
Fuel models found in the neighborhood:	5, 28
Water supply:	Hydrants
Hazards:	Heavy ornamental plantings

Description: This is a community of primarily moderate size homes on small lots. Most of the construction is newer and this community is still being built out. Wood siding with an asphalt or metal roof is dominant. Flammable decks and projections are common. Although the native fuels are light, most homes do not have any defensible space, because conifers and flammable ornamentals are planted too close to (in most cases right up to) the structure. Ornamental plantings are the biggest threat to the homes in this community. Roads are good and driveways are short. Address markers are present, but not reflective. The homes in this community are approximately two miles from the nearest fire station (Mammoth Lakes Station 1). Fuels are primarily light loads of short sage with occasional conifers, except for the heavy ornamental

plantings near the homes noted above. This community backs up to a cleared industrial park which is a significant fuelbreak. Topography is low to flat.

THE TRAILS RECOMMENDATIONS

- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Discourage the use of combustible materials for decks, siding and roofs.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials.
- Clean leaf and needle litter from roofs and gutters and away from foundations.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Add reflective addressing to all driveways and homes.

34. June Lake Village

Hazard Rating	Low
Does the neighborhood have dual access roads?	Yes
Are there road grades > 8%?	No
Are all access roads of adequate width?	No
Average lot size:	<1 Acre
Fuel models found in the neighborhood:	5
Water supply:	Hydrants
Hazards:	Power lines, wood roofs

Description: This is a community of small houses on small lots. Most of the construction is older and in various states of repair. Wood siding with an asphalt or metal roof is dominant, but there are some wooden roofs in this community. Flammable decks and projections are common. Roads are narrow but the surfaces are generally good and driveways are short.

Addressing is poor. Many homes do not have markers. Most of the markers that do exist are not reflective and some are difficult to locate. This area has a good hydrant network and is close to the June Lakes fire station. Power lines and propane tanks exist which may be a hazard to firefighters. Fuels are riparian shrubs and grasses broken by irrigated lawns. Topography is moderate to low.

JUNE LAKE VILLAGE RECOMMENDATIONS

- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Discourage the use of combustible materials for decks, siding and roofs.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials.
- Clean leaf and needle litter from roofs and gutters and away from foundations. Clear flammable vegetation away from power lines near homes. Clear weeds and flammable vegetation to at least 30 feet away from propane tanks.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Add reflective addressing to all driveways and homes.

35. Lee Vining

Hazard Rating	Low
Does the neighborhood have dual access roads?	Yes
Are there road grades > 8%?	No
Are all access roads of adequate width?	Yes
Average lot size:	<1 Acre
Fuel models found in the neighborhood:	15
Water supply:	Hydrants
Hazards:	Power lines, wood roofs

Description: This is a community of small houses on small lots. Most of the construction is older and in various states of repair. Wood siding with an asphalt or metal roof is dominant, although there are some wooden roofs in this community. Flammable decks and projections are common. Roads are generally good and driveways are short. Addressing is poor. Many homes do not have markers. Most of the markers that do exist are not reflective and some are difficult to locate. This area has a good hydrant network and there is a volunteer fire station in this community. There is also a USFS fire station in Lee Vining. Power lines and propane tanks exist which may be a hazard to firefighters. Fuels are light loads of small sage and grasses (CDF desert fuel model, FM 15). Fuels are discontinuous, broken by irrigated lawns. Topography is moderate to low.

LEE VINING RECOMMENDATIONS

- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Discourage the use of combustible materials for decks, siding and roofs.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials.
- Clean leaf and needle litter from roofs and gutters and away from foundations. Clear flammable vegetation away from power lines near homes. Clear weeds and flammable vegetation to at least 30 feet away from propane tanks.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Add reflective addressing to all driveways and homes.

36. Bridgeport Valley

Hazard Rating	Low
Does the neighborhood have dual access roads?	Yes
Are there road grades > 8%?	No
Are all access roads of adequate width?	Yes
Average lot size:	1-5 Acre
Fuel models found in the neighborhood:	1, 5
Water supply:	Hydrants
Hazards:	Power lines, propane tanks

Description: This community is dominated by agricultural properties. Lot sizes vary from small lots in the town of Bridgeport to large agricultural properties. Homes in this area are a mix of new and old construction. The dominant construction type is wood siding with asphalt or metal roofs. Most homes have defensible space primarily due to agricultural irrigation and the lack of native fuels. Some roads are dirt, but most are flat and of adequate width. There are some long driveways with no pullout or turnaround for apparatus. Addressing outside of the town of Bridgeport is poor, with many homes not marked at the driveway or the structure. Homes in Bridgeport generally have address markers, but most are not reflective and some are difficult to locate. There is a good hydrant network in Bridgeport. There is also a volunteer fire station and a USFS fire station in

Bridgeport. Fuels are generally light loads of short grasses and sage which are quite discontinuous due to large irrigated agricultural plots and irrigated lawns.

Although surrounded by hills, this community is in a flat valley bottom.

BRIDGEPORT VALLEY RECOMMENDATIONS

- Adequate defensible space is recommended for all homes (see the **Home Mitigation**
- section in the main report for details).
- Discourage the use of combustible materials for decks, siding and roofs.
- Open areas below decks and projections should be enclosed or screened to prevent the ingress of embers and kept clean of flammable materials.
- Clean leaf and needle litter from roofs and gutters and away from foundations. Clear flammable vegetation away from power lines near homes. Clear weeds and flammable vegetation to at least 30 feet away from propane tanks.
- Discourage the planting of flammable ornamentals such as conifers within 30 feet of homes. Encourage the use of fire and drought tolerant plants for ornamental plantings especially within 30 feet of homes (see the **Home Mitigation** section in the main report).
- Thin vegetation along access roads and driveways. This is especially important for narrow driveways and road segments.
- Wherever possible, on driveways and private roads longer than 300 feet, add pullouts for emergency apparatus. Turnarounds should be constructed at the end of all driveways and dead-end roads.
- Add reflective addressing to all driveways and homes.

CWPP Appendix 3:
STRUCTURAL TRIAGE AND PREPARATION

SIZE UP CONSIDERATIONS

- What is the current and expected weather?
- Are fuels heavy, moderate, or light? What is the arrangement and continuity of fuels?
- Note any hazardous topography.
- What have fires in this area done before?
- What is the fire's current and expected behavior?
  - What is the rate and direction of spread?
  - What is the potential for spotting and firebrands?
  - Will topographical features or expected weather changes affect the rate of spread?
- What are the number and density of structures threatened?
- What are the available resources?
- Will you have to evacuate people or animals?
  - Are there residents who will not evacuate?
- How hazardous is the structure?
  - What is the roofing material?
  - Are the gutters full of litter?
  - Are there open eves and unscreened vents?
  - Does the structure have wooden decking?
  - Is there defensible space?
  - Are there large windows with flammable drapes or curtains?
  - What is the size and location of propane tanks and/or fuel storage tanks?

FIREFIGHTER SAFETY

- What are the routes of egress and ingress?
  - What is the largest engine that can access the structure safely?

- Are the roads two-way or one-way?
- Are there road grades steeper than 8%?
- Are the road surfaces all-weather?
- Are there load-limited bridges?

- Are there anchor points for line construction?
- Are there adequate safety zones?
- What are the escape routes?
- Are there special hazards such as hazardous materials, explosives, high-voltage lines, or above- ground fuel tanks?
- Are communications adequate?

STRUCTURAL TRIAGE CATEGORIES

Sort structures into three categories:

1. **Stand Alone or Not Threatened**
2. **Defendable**
3. **Not Defendable**

- Factors that may make an attempt to save a structure too dangerous or hopeless:
  - The fire is making sustained runs in live fuels and there is little or no defensible space
  - Spot fires are too numerous to control with existing resources
  - Water supply will be exhausted before the threat has passed
  - The roof is more than ¼ involved in flames
  - There is fire inside the structure
  - Rapid egress from the area is dangerous or may be delayed

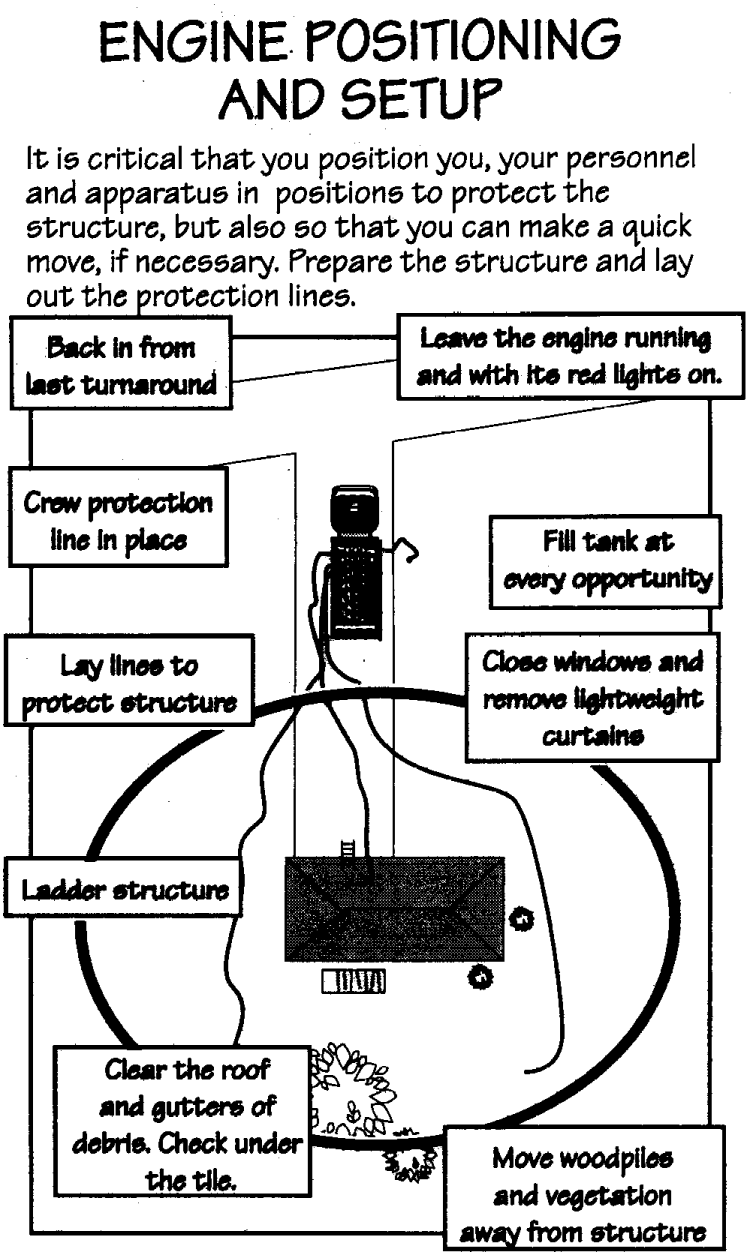
APPARATUS PLACEMENT CONSIDERATIONS

Common Ignition Points (remember, in windy conditions, firebrands can enter almost any opening)

- Flammable roof coverings and debris
- Unscreened vents, windows, or holes

- Open doors, windows, or crawl spaces
- Wooden decks, lawn furniture, stacked wood, and trash piles
- Openings under porches or patio covers

Note: See diagram for Engine Positioning and Setup



Teie,William C.,1995, Firefighter's Guide, Urban/Wildland Situations. Deer Valley Press

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CWPP Appendix 4:
ACCESS AND WATER SUPPLY RECOMMENDED GUIDELINES

INTRODUCTION

This appendix has been designed with public education in mind, and is intended to help familiarize homeowners, contractors, and developers with the general principles of the access and water supply needs of firefighters. The recommendations in this section are based on proven practices. However, they are not meant to be a substitute for locally adopted codes.

Emergency response personnel do their best to respond to calls in a timely manner, often while negotiating difficult terrain. Planning for access by emergency equipment allows for a more efficient response, improving safety for residents and their families, as well as that of the firefighters and emergency medical technicians that will arrive on scene. This is especially important in rural areas, where response times may be considerably longer than in cities.

ACCESS GUIDELINES

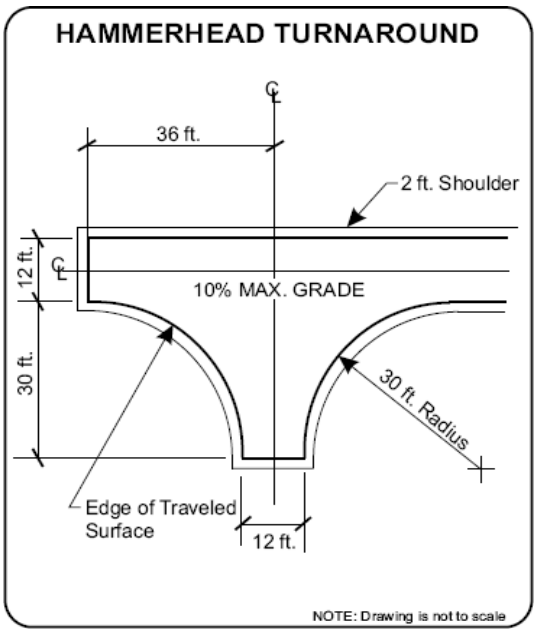
Driveway Turnarounds

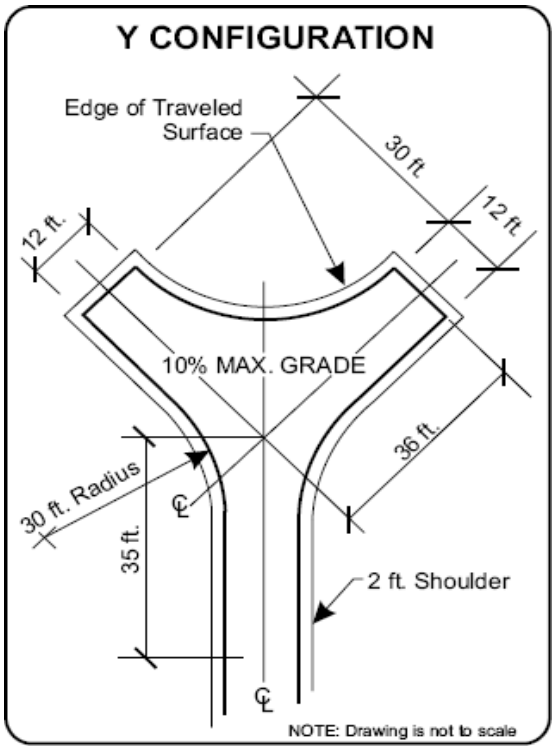
Turnarounds unobstructed by parked vehicles should be located at the end of every driveway. They should be designed to allow for the safe reversal of direction by emergency equipment. The "Y" and "Hammerhead" turnarounds shown below are preferred because they provide the necessary access, while minimizing disturbance to the site.

Driveway Width and Height

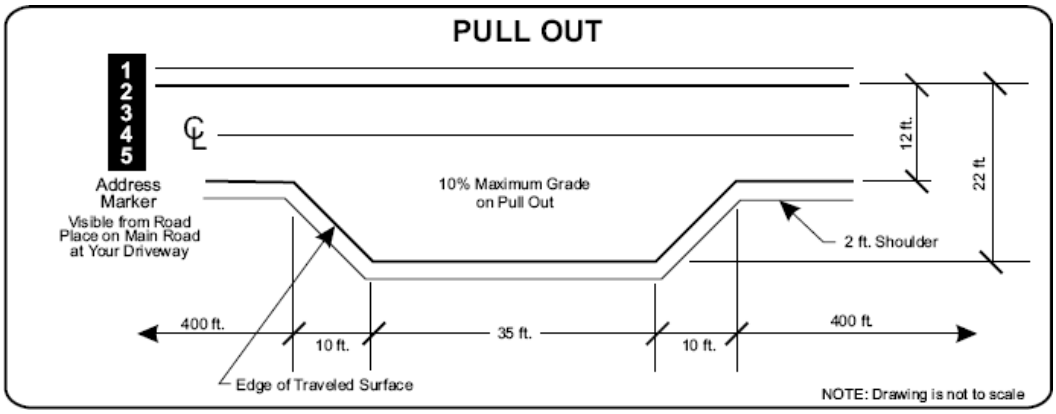
Driveways should have an unobstructed vertical clearance of 13 feet 6 inches. Trees may need to be limbed and utility lines relocated, to provide the necessary clearance. Driveways should have a 12 foot-wide drivable surface and 14 feet of horizontal clearance.

Note: Diagrams illustrating these guidelines can be seen on the next page.





Driveway pullouts should be designed with sufficient length and width to allow emergency vehicles to pass one another during emergency operations. These features should be placed at 400-foot intervals along driveways and private access roads (community driveways). The location of pullouts may be modified slightly to accommodate physical barriers such as rock outcroppings, wetlands, and other natural or manmade features.



Address Markers

Every building should have a permanently posted, reflective address marker mounted on a non-combustible pole. The sign should be placed and maintained at each driveway entrance. Care should be taken to ensure that the location will not become obscured by vegetation, snow, or other features, whether natural or manmade. It is critical that the location and markings be adequate for easy night-time viewing. It is preferable to locate markers in a consistent manner within each community. A good guideline for this practice is to place the markers five feet above ground level on the right side of every driveway. Where access to multiple homes is provided by a single driveway, all addresses accessed via that driveway should be clearly listed on the driveway marker. Where multi-access driveways split, each fork should indicate all residences accessed by that fork, and the proper direction of travel to arrive at a given address. It is not adequate simply to mark addresses on a common pole in the center of the fork. Further, residential homes should have an additional reflective address marker permanently attached to the home, in clear view of the driveway or access road. Homes that are marked by lot number while under construction should have the lot number removed and a permanent address marker posted before granting a certificate of occupancy.

Bridge Load Limits

Bridge load limits should be posted with a permanently mounted, reflective marker at both entrances to the bridge. Care should be taken to ensure that these markers will not become obscured by vegetation, snow, or other features, whether natural or manmade. It is critical that the location of the markings and the markings themselves be adequate for easy night- time viewing.

ALTERNATIVE WATER SOURCES

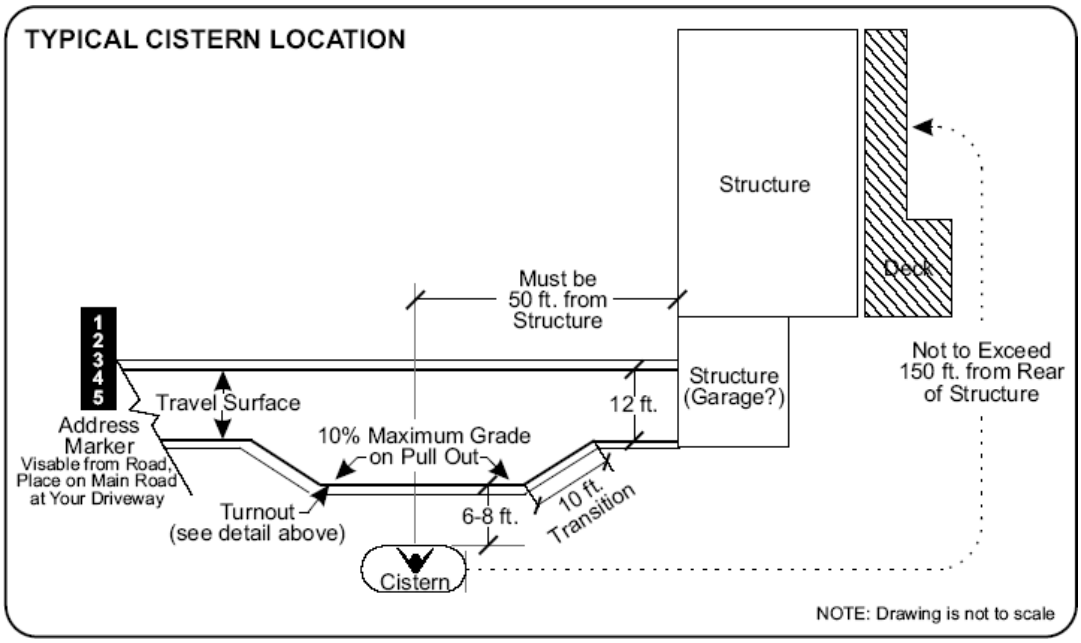
In the study area, like in many WUI areas in the west, water is a critical fire suppression issue. Although some communities in Mono County have a good network of pressurized hydrants, the hazard assessment revealed several communities in the study area which are a considerable distance from reliable water sources for fire suppression. The following information on the use of cisterns and dry hydrant installations has been included to provide information regarding supplementing existing pressurized hydrants, cisterns and natural water sources. It is not intended to be a replacement for existing water supplies. For more detailed recommendations regarding enhancement of the existing water supply system, please see the **Water Supply** section of the main report.

CISTERNS

Once emergency vehicles have arrived on site, they will need a dependable supply of water to help control the fire. Although residential wells with outdoor taps can be used by fire crews to help fill engine tanks, they are not adequate for fire control. If the property is a significant distance from a reliable water supply or fire station, it may be advisable to employ one of the following water supply options:

- An on-site 1,800 - 2,500 gallon cistern for each residence.
- A monetary contribution to a large community cistern fund.

For more information about local standards and regulations, please contact your local fire department.



DRY HYDRANTS

Dry hydrant installations allow much faster and more reliable access to ponds and tanks than conventional drafting. Specific recommendations for dry hydrant locations may be found in the **Water Supply** section of the main report. Guidelines for the construction and maintenance of dry hydrants may be found in the *Dry Hydrant Manual* included as a supplement to this report.

It is always helpful to discuss any potential construction project with the fire department. Local fire department officials or the CDF can help determine what kind of access and water supply options will work best for your site. While the guidelines in this appendix have been assembled by querying firefighters with extensive Wildland-Urban Interface firefighting and fire code experience, local fire officials are in the best position to offer site-specific information.

CWPP Appendix 5:
DRY HYDRANT MANUAL

A Guide for Developing Alternative Water Sources for Rural Fire Protection From code originally developed for Summit County, Colorado.

ALTERNATE WATER SUPPLY POLICY

SCOPE

This policy is intended to offer guidance and assistance to the property owner, contractor, or developer for meeting the requirements of the Uniform Fire Code and Chapter 14 (as amended) of the Uniform Building Code for the provision of adequate water supplies for rural firefighting. This policy does not necessarily meet ISO requirements for installation of a draft fire hydrant.

GOALS

1. To reduce ISO ratings
2. To design each installation with the capability of flowing 1,000 gpm
3. To obtain points for fire mitigation
4. To function to protect life and property

DEFINITION

A draft fire hydrant is a specially designed and constructed fire hydrant, which has been approved by the Fire Department having jurisdiction. A draft fire hydrant must be connected to a year-round draft water source of sufficient capacity to meet any fire- fighting needs for the property or properties involved. Fire hydrants which are connected to a pressurized municipal watercourse are not covered by this policy.

PERMITS

A. A review of the draft fire hydrant plans must be completed by the Fire Department having jurisdiction prior to issuing a grading permit to allow construction of a draft hydrant. A site plan review is used to determine site- specific requirements including, but not limited to, depth of pipe, required insulation materials, backfill requirements, and draft site requirement. Additionally, it may be necessary to submit information about drought conditions for the past 50 years.

B. A statement authorizing access to and use of the draft fire hydrant by the Fire Department and its agents must be signed by the owner of the property on which the draft hydrant will be located. The Fire Department having jurisdiction will be using water under the presumption of non-injury/non-consumption for fire emergency use.

ACCEPTANCE TESTING

All draft hydrants are subject to acceptance testing approved by the Fire Department having jurisdiction, prior to being accepted as a water source. Acceptance testing must include GPM verification of the water source. Maintenance and testing will return water within 200 feet of its drainage.

MAINTENANCE

A. Draft fire hydrants require bi-annual testing and maintenance. The hydrants should be tested with a pumper. Back-flushing followed by a pumper test at a maximum designed flow rate is required, and records of each test need to be kept. Tests of this kind will not only verify that the hydrant is in proper condition, but will also ensure that the line and strainer are clear of silt, thus keeping water supply available for any fire emergency.

B. A homeowner using the draft hydrant who has obtained points for mitigation or an ISO classification is responsible at all times for maintaining the draft hydrant. This maintenance includes keeping the draft hydrant and its protective barriers free from obstruction by vehicles, materials, structures, snow, or other obstructions, and ensuring that the draft hydrant is in a serviceable condition at all times.

C. It is the responsibility of the property owners using the hydrant for mitigation of ISO classification purposes to immediately notify the Fire Department having jurisdiction of any draft hydrant which is obstructed, damaged, or out of service for any reason.

DESIGN REQUIREMENTS

A. All draft hydrants must be located within 8 feet of a road with year-round maintenance. Access to the system must conform to the road and bridge standards in Appendix D, Access and Water Supply.

B. All draft hydrants must have a single draft connection located no more than 30" from the fire apparatus, measured from the grade level of the roadway where the fire apparatus will be parked, to the top of the draft hydrant's threaded connection. Additionally, life is determined by measuring from year-round low level of the water surface to the truck intake.

C. All draft hydrants must have a draft tube running horizontally from the water source to the base of the riser, constructed of PVC no smaller than six inches in diameter. PVC pipe meeting AWWA specification C9000 with a SDR of 18 or less may be required through or under foundations and under driveways (schedule 80 pipe or its equivalent may be deemed necessary in some instances). All joints must be sealed to ensure that they are watertight, airtight, and root proof.

D. The piping must be placed in bedding material of ¾-inch washed or screen rock, or in native soils, providing that the native soils contain no sharp materials or stones larger than 2½ inches that may damage the piping.

E. The bedding material must be placed to a depth of 4 inches below the pipe and 6 inches above the top of the pipe.

F. The draft hydrant pipe extending from the water source to the rise pipe connection must have a minimum grade of .5% to a maximum of 2% toward the water source. (This excludes the riser section immediately preceding the fire department connection).

G. All draft fire hydrants must have a single draft connection consisting of an approved fitting and cap with 6-inch male NST threads. (Size of connection is determined by the Fire Department having jurisdiction.)

H. No more than two elbows are recommended. Elbows may be 90 or 45 degree bends. (See Figure 1.)

INSTALLATION REQUIREMENTS

A. Draft fire hydrants must be painted red (using oil base paint) with reflective tape, to protect PVC pipe from the adverse effects of sunlight and to assist in the rapid location and identification by the Fire Department.

B. All draft fire hydrants must be protected from damage by snowplows, motor vehicles, etc., by the installation of three steel pipes buried three feet into the ground with four feet extending above the grade level of the roadway. The entire pipe must be filled with concrete. The protective pipes must be located in a triangle configuration approximately three feet away from the draft hydrant. Steel pipes must also be painted with red oil base paint and reflective tape.

C. All draft hydrants must have a sign stating "draft hydrant" displayed in a location acceptable to the Fire Department having jurisdiction.

The above policy is subject to change or modification by the Fire Department having jurisdiction.

MAXIMUM LIFT CONSIDERATIONS

Definition: Lift is determined by measuring from the lowest level of the water surface to the truck intake, which is 36" above grade.

Maximum vertical lift recommendations:

Elevation	Do Not Exceed
4,000 ft	13 ft
5,000 ft.	12 ft.
6,000 ft.	11 ft.
7,000 ft.	10 ft.
8,000 ft.	9 ft.
9,000 ft.	8 ft.
10,000 ft.	7 ft.

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CWPP Appendix 6:
MONO COUNTY CWPP COLLABORATIVE EFFORT

THE NEED FOR A CWPP

In response to the Healthy Forest Restoration Act (HFRA), and in an effort to create incentives, Congress directed interface communities to prepare a Community Wildfire Protection Plan (CWPP). Once completed, a CWPP provides statutory incentives for the federal agencies to consider the priorities of local communities as they develop, and implement forest management and hazardous fuel reduction projects.

CWPPs can take a variety of forms, based on the needs of the people involved in their development. CWPPs may address issues such as wildfire response, hazard mitigation, community preparedness, structure protection, or all of the above.

The minimum requirements for a CWPP are:

- Collaboration between local and state government representatives, in consultation with federal agencies and other interested parties.
- Addressed in this appendix
- Prioritized fuel reduction in identified areas, as well as recommendations for the type and methods of treatments
- Addressed in Main CWPP report (see recommendations sections)
- Recommendations and treatment measures for homeowners and communities to reduce the ignitability of those structures in the project area.
- Addressed in Appendix B of this CWPP

INTER-AGENCY COLLABORATION

Roles and Responsibilities

To be successful, wildfire mitigation in the interface must be a community-based, collaborative effort. Stakeholders and, primarily, Mono County and the local Fire Safe Councils, will have the greatest responsibility for implementing the recommended mitigation projects. Cal Fire and the USFS/BLM will be valuable participants in addressing cross-boundary projects throughout the area.

Nearly all of the recommendations from this report affect private land or access roads to private land. There are also mitigation recommendations for individual structures, which are the responsibility of the homeowner. Homeowners will, however, need a point of contact to help them implement these recommendations. The best defensible space will be created with oversight and expert advice from the fire department and/or government forestry personnel. One-on-one dialog will continue to build the relationship with community members. This level of involvement will allow agencies to keep track of the progress and update this plan to reflect the latest modifications at the community level.

THE COLLABORATIVE PROCESS

"The initial step in developing a CWPP should be the formation of an operating group with representation from local government, local fire authorities, and the state agency responsible for forest management. (…) Once convened, members of the core team should engage local representatives… to begin sharing perspectives, priorities, and other information relevant to the planning process."[1]

Numerous federal, State, local, and private agencies (stakeholders) participated in this CWPP. These stakeholders included:

- Mono County stakeholders:
  - Debra Hein, BLM
  - Bob Rooks, Mammoth Lakes, FD
  - Dale Schmidt, LADWP/Wheeler VFD
- Mono County communities including:
  - Lake Mary Area
  - Twin Lakes
  - June Lake
  - Swauger Creek/Devils Gate
  - North Mammoth Lakes
  - Mono City

[1] A handbook for Wildland-Urban Interface Communities March 2004, http://www.safnet.org/policyandpress/cwpphandbook.pdf

- Lee Vining

- Mammoth Lakes Fire Protection District
- Mono County Supervisors
- California Department of Fire (CalFire)
- Bureau of Land Management
- United States Forest Service
- Anchor Point Group

The true collaborative process was initiated through a stakeholder meeting held in June, 2005. The purpose of the meetings was to bring all past, current, and future efforts and needs to the table. The primary focus was on the identification and delineation of communities, areas of concern, and values at risk. Best practices and anticipated "roadblocks" were identified.

A second round of stakeholder meetings was held in January of 2009 to present the results and discuss any issues or concerns with the draft report.

In addition, public meetings were held to get input and feedback from residents. There was support for the projects and interest in convening community meetings to start the process. Comments were incorporated into the final document.

FUNDING CWPP RECOMMENDATIONS

There are many sources of funds available for implementing the recommendations within the CWPP. Some available grants and websites where more information can be found are provided below.

- **Agency: Homeland Security, Office for Domestic Preparedness**
  - Purpose: to assist local, state, regional, or national organizations in addressing fire prevention and safety. The emphasis for these grants is the prevention of fire-related injuries to children.
  - More information: http://www.firegrantsupport.com/
- **Agency: Federal Emergency Management Agency (FEMA)**
  - Purpose: to improve firefighting operations, purchase firefighting vehicles, equipment, and personal protective equipment, fund fire prevention programs, and establish wellness and fitness programs.

- More information: http://usfa.fema.gov/dhtml/inside-usfa/grants.cfm

- **Agency: National Volunteer Fire Council**
  - Purpose: to support volunteer fire departments
  - More information: http://www.nvfc.org/federalfunding.html

- **Agency: Community Facilities Grant Program**
  - Purpose: to help rural communities. Funding is provided for fire stations
  - More information: www.rurdev.usda.gov/rhs/

- **Agency: Firehouse.com**
  - Purpose: emergency services grants
  - More information: www.firehouse.com/funding/grants.html

- **Agency: Cooperative Forestry Assistance**
  - Purpose: to assist in the advancement of forest resources management, the control of insects and diseases affecting trees and forests, the improvement and maintenance of fish and wildlife habitat, and the planning and conduct of urban and community forestry programs
  - More information: www.usfa.fema.gov/dhtml/inside-usfa/cfda10664.html

- **Agency: Forest Service, Economic Action Programs**
  - Purpose: Economic Action Programs that work with local communities to identify, develop, and expand economic opportunities related to traditionally underutilized wood products and to expand the utilization of wood removed through hazardous fuel reduction treatments.
  - More information: www.fireplan.gov/community_assist.cfm

- **Agency: FEMA**
  - Purpose: Assistance to Firefighters Grant Program
  - More information: www.usfa.fema.gov/dhtml/inside-usfa/apply.cfm and www.nvfc.org/federalfunding.html

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Multi-Jurisdictional Hazard Mitigation Plan (MJHMP)

APPENDIX G: FHSZ MODEL PRIMER

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FACT SHEET:

Fire Hazard Severity Zone Model
A Non-technical Primer

California Department of Forestry and Fire Protection
Office of the State Fire Marshal

Most of the highest wildfire losses take place during hot, windy days or nights when flames spread so fast that many buildings catch fire and overwhelm available firefighting forces. Many buildings ignite when burning embers land on wood roofs, blow in through vents, pile up in cracks, or become lodged under boards. By constructing buildings in a way that reduces the ability of embers to intrude, a major cause of structure ignition is reduced.

Recently adopted building codes reduce the risk of burning embers igniting buildings. Standards are already in effect for roofs and attic vents. Application of roofing standards depends on the Fire Hazard Severity Zone of a property. New building codes for California, will require siding, exterior doors, decking, windows, eaves, wall vents and enclosed overhanging decks, to meet new test standards. These standards apply throughout areas where the State has financial responsibility for wildland fire protection and for local responsibility areas zoned as very high fire hazard severity.

While all of California is subject to some degree of fire hazard, there are specific features that make some areas more hazardous. California law requires CAL FIRE to identify the severity of fire hazard statewide. These fire zones, called Fire Hazard Severity Zones are based on factors such as fuel, slope of the land and fire weather. There are three zones, based on increasing fire hazard: medium, high and very high.

Model Behind Fire Hazard Severity Zone Mapping

The zone designation for each specific parcel is initially assigned by a computer model. The model is based both on existing fire behavior modeling techniques used by fire scientists throughout the United States and on new methodologies and data developed by the Fire Center at the University of California in Berkeley.

The model evaluates land area using characteristics that affect the probability that the area will burn and the potential fire behavior that is expected should the area burn in a wildfire. Many factors are considered such as fire history, existing and potential fuel, flame length, blowing embers, terrain, and typical weather for the area.

Hazard Versus Risk

As required by law, the model evaluates "hazard" not "risk." *Hazard* refers to physical conditions that cause damage. "Hazard" as calculated in the model is based on the physical conditions that give a likelihood that an area will burn in the future, the heat produced when it does burn, and a prediction of the embers that spread the fire. It is based on the potential vegetation that will grow in the area over the next 30 –50 years.

Risk, on the other hand, is the potential damage a fire can do to values at risk in the area under existing and future conditions. Risk does consider modifications that affect susceptibility of property to damage,

such as defensible space, irrigation and sprinklers, and building construction that reduces the risk of burning embers igniting buildings. Hazard does not equal risk, but is an important factor in determining risk.

Zones and Parcels

Mapping an area as large as California requires the creation of spatial units called zones. Zones are areas that form the spatial building blocks for constructing a map. They are akin to the pieces in a jig-saw puzzle.

Zones are created by computer from areas of similar terrain, vegetation, and fuel types. They are areas that have relatively similar burn probabilities and fire behavior characteristics. The zone size varies from 20 acres and larger in urbanized areas to 200 acres and larger in wildland areas. Urban areas are treated differently in mapping due to the significant changes in both fuel conditions and burn probability that happen as areas become urbanized.

Wildland zones are areas of similar terrain and fuel conditions created by using computer techniques to build the boundaries. Areas dominated by brush lands on steep slopes will generally occur in different zones than flat grassland areas.

Urban zones are delineated based on minimum area and average parcel size. They must be at least 20 acres in size, and contain average parcel sizes that are less than two acres per parcel. In most counties, urban zones were developed using parcel data. Where such data was not available parcel density was interpreted using 2000 census data and statewide vegetation map data. In practice, the majority of areas mapped as urban zones have parcel sizes less than one acre, with highly developed infrastructure and ornamental vegetation.

Fundamental to understanding the map is that hazard zones do not exist at scales smaller than those used to create the zones. Thus when looking at the map, one needs to know how information is averaged across the zone to derive the final hazard ranking. The zones will have smaller areas within them of different hazard characteristics. This detail is lost when scores are averaged over the entire area of the zone to obtain a zone-wide description of hazard

Focus on Characterizing Fire Behavior and Fire Hazard to Buildings

Since new building standards seek to reduce the chance that buildings will ignite in a wildfire, the model focuses on those descriptions of fire behavior that influence structure ignition. The model uses fire behavior characteristics that describe the intensity of both radiation and convection from nearby flame sources (using flame length as a measure) and mass transport of firebrands due to convection lifting and wind).

Intrinsic to hazard, consequently, is the estimation of probability, or chance. Further, the conditions that give rise to hazard for an area are not solely a function of conditions in that particular area. Firebrands landing in an area may be produced some distance away, and hence the hazard for an area is influenced by hazards off-site

Terms Used

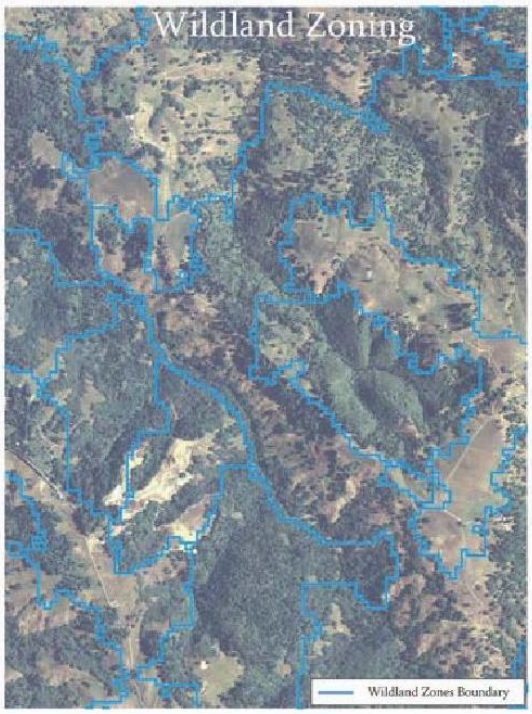
Fire Hazard Severity has two key components: probability of burning and expected fire behavior. The factors considered in determining hazard are: 1) how often an area will burn; and 2) when it does burn, what characteristics might lead to buildings being ignited?

Fire behavior refers to the physical characteristics of the fire – examples include rate of spread, length of flames, and the ability to produce firebrands or embers.

Burn probability describes the average chance of a fire burning an area in any given year. It is based on the fire records spanning the last 55 years. Some areas of the state have much higher chances of burning, and this is reflected in the hazard zones.

Zoning and Scoring

The model uses building blocks to derive FHSZ classes based on a two-step process: Zoning and Scoring (See Figure 1). Urban areas are treated differently from wildlands due to the significant changes in both fuel conditions and burn probability that happen as areas become urbanized



Each wildland zone gets scores that tie together the burn probability with the expected flame sizes predicted by fuels, slope, and expected fire weather. Since it describes potential hazard to buildings, the model characterizes the fuel potential of the area over a 30-50 year period and the maximum expected hazard value is used.

While some areas may have recently been treated and currently have only moderate hazard, buildings in that area will be exposed to increasing hazards as these vegetation fuels develop, hence the use of "climax" or fuel potential in the model. As with the chance of fire, expected flame size varies significantly from one fuel type to the next.

Areas also receive a score for the amount of firebrands (burning embers transported by the wind) that are expected to land on an area. In the model, firebrands are produced based on fuel types and a model describing the distribution of firebrands transported from the source area. The firebrand score is a function of the number of brands that are expected to land on a given area, and are consequently influenced by areas around them where the embers are produced.

Each wildland zone gets an area-averaged classification for flaming and firebrands, which together determine the final hazard ranking for the zone: moderate, high or very high.

Urban zones are scored based on their proximity to wildland zones and the flame score for that wildland zone, the number of firebrands being produced in the wildlands and received in the urban area, and the amount of vegetation fuels present in the urban zone. Urban areas immediately next to wildland zones typically have the highest hazard, and areas more removed from the wildlands have lower hazards.

The influence of wildland fire hazard into urban areas can range from only about 200 feet in low hazard conditions, to nearly a mile in very high hazard areas. The nature and depth of the zones are a function of both how likely a flame front will penetrate, and how many firebrands are expected to land in the urbanized areas.

Results of the Model

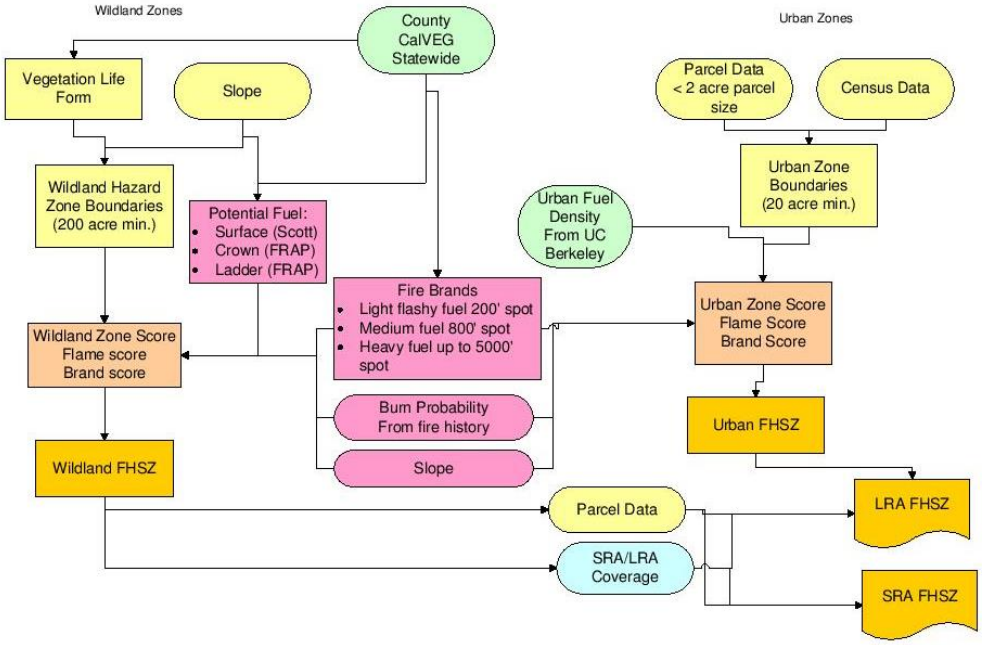
Results of the model lead to revised maps of fire hazard severity. To summarize, classification of a zone as moderate, high or very high fire hazard is based on the severity of fire behavior that leads to building

ignition. Each area of the map gets a score for flame length, embers, and the likelihood of the area burning. Scores are averaged over the zone areas. Final FHSZ class (moderate, high and very high) is determined based on the averaged scores for the zone.

Model results were tested and validated in four counties with very different conditions: Butte, Calaveras, Sonoma, and San Diego. Further, draft maps have been reviewed by the 21 CAL FIRE units and six contract counties; their recommendations for changes were evaluated and incorporated when appropriate.

Updated information and support documents for FHSZ are available on CAL FIRE's Fire and Resource Assessment Program's website at http://frap.cdf.ca.gov/fhsz/review.html.

Figure 1: FIRE HAZARD SEVERITY ZONING MODEL STRUCTURE



California Department of Forestry and Fire Protection May 2007

Mono County | Town of Mammoth Lakes

Multi-Jurisdictional Hazard Mitigation Plan (MJHMP)

APPENDIX H: HISTORIC FIRE LIST

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Historic Fires - Mono County and Town of Mammoth Lakes

Year	Fire Name	Cause	Acres Burned	Community Planning Area
1943	Unnamed	Unknown/Unidentified	633	Antelope Valley
1946	Unnamed	Unknown/Unidentified	227	Antelope Valley (Near)
1947	Unnamed	Unknown/Unidentified	146	Antelope Valley (Near)
1947	Unnamed	Unknown/Unidentified	537	Sonora Junction (Near)
1948	Unnamed	Unknown/Unidentified	515	Bodie Hills
1951	Unnamed	Unknown/Unidentified	165	Antelope Valley
1951	Unnamed	Unknown/Unidentified	115	Antelope Valley (Near)
1953	Unnamed	Unknown/Unidentified	122	Bodie Hills (Near)
1955	Unnamed	Smoking	207	Antelope Valley
1955	Unnamed	Lightning	71	Bodie Hills
1956	Unnamed	Smoking	122	Antelope Valley
1956	Unnamed	Lightning	243	Antelope Valley (Near)
1958	Paradise #2	Unknown/Unidentified	351	Wheeler Crest (Near)
1959	Unnamed	Lightning	101	Bodie Hills (Near)
1960	Summit	Unknown/Unidentified	611	Bodie Hills
1961	Unnamed	Lightning	324	Bodie Hills
1961	Unnamed	Lightning	44	Sonora Junction
1962	Unnamed	Lightning	70	Antelope Valley (Near)
1964	Unnamed	Smoking	368	Antelope Valley
1964	Unnamed	Debris	682	Antelope Valley (Near)
1964	Unnamed	Campfire	100	Bridgeport
1964	Unnamed	Miscellaneous	362	Bridgeport (Near)
1964	Unnamed	Smoking	27	Sonora Junction
1966	Unnamed	Lightning	19	Bodie Hills (Near)

Historic Fires - Mono County and Town of Mammoth Lakes

Year	Fire Name	Cause	Acres Burned	Community Planning Area
1966	Unnamed	Miscellaneous	327	Mammoth Vicinity
1970	Unnamed	Lightning	63	Antelope Valley (Near)
1970	Unnamed	Debris	4	Bodie Hills (Near)
1970	Unnamed	Playing with Fire	36	Mono Basin
1972	Unnamed	Miscellaneous	156	Antelope Valley
1972	Unnamed	Lightning	150	June Lake (Near)
1972	Unnamed	Playing with Fire	1,458	June Lake (Near)
1972	Unnamed	Miscellaneous	36	Long Valley
1972	Unnamed	Miscellaneous	120	Long Valley
1972	Unnamed	Lightning	698	Long Valley
1972	Unnamed	Equipment Use	153	Mammoth Vicinity
1972	Unnamed	Campfire	16	Oasis (Near)
1973	Unnamed	Lightning	213	Antelope Valley
1973	Unnamed	Unknown/Unidentified	376	Antelope Valley (Near)
1973	Unnamed	Miscellaneous	189	Bridgeport
1974	Swall	Miscellaneous	667	Wheeler Crest
1974	Unnamed	Smoking	2,112	Antelope Valley
1974	Unnamed	Lightning	9	Antelope Valley (Near)
1974	Unnamed	Lightning	662	Antelope Valley (Near)
1974	Unnamed	Equipment Use	22	Sonora Junction
1974	Unnamed	Lightning	108	Sonora Junction
1977	Unnamed	Lightning	74	Benton Hot Springs (Near)
1977	Unnamed	Lightning	102	Benton Hot Springs (Near)
1977	Unnamed	Lightning	352	Bridgeport (Near)
1977	Unnamed	Debris	277	Sonora Junction
1978	Unnamed	Lightning	349	Mono Basin
1979	Unnamed	Arson	25	Sonora Junction

Historic Fires - Mono County and Town of Mammoth Lakes

Year	Fire Name	Cause	Acres Burned	Community Planning Area
1980	Unnamed	Lightning	15	Antelope Valley (Near)
1981	Swall	Miscellaneous	3,159	Wheeler Crest
1983	Unnamed	Equipment Use	24	Antelope Valley (Near)
1983	Unnamed	Miscellaneous	266	Wheeler Crest (Near)
1984	Cow	Unknown/Unidentified	3,087	Mono Basin
1984	Unnamed	Miscellaneous	27	Long Valley (Near)
1985	Owens	Miscellaneous	3,061	Upper Owens
1985	Unnamed	Smoking	212	Benton
1985	Unnamed	Lightning	117	Bodie Hills
1985	Unnamed	Lightning	16	Bridgeport (Near)
1985	Unnamed	Unknown/Unidentified	798	June Lake (Near)
1985	Unnamed	Playing with Fire	88	Sonora Junction
1985	Unnamed	Miscellaneous	277	Wheeler Crest (Near)
1986	Unnamed	Lightning	11	Bodie Hills
1986	Unnamed	Miscellaneous	21	Mammoth Vicinity
1986	Unnamed	Lightning	538	Mono Basin
1986	Unnamed	Lightning	40	Upper Owens (Near)
1987	Laurel	Arson	1,018	Mammoth Vicinity
1987	Mammoth	Unknown/Unidentified	640	Mammoth Vicinity
1987	Unnamed	Lightning	76	June Lake
1987	Unnamed	Miscellaneous	436	Mammoth Vicinity
1987	Unnamed	Lightning	179	Upper Owens (Near)
1988	Unnamed	Lightning	57	Sonora Junction (Near)
1989	French	Lightning	44	Bodie Hills
1989	Unnamed	Lightning	77	Upper Owens (Near)
1990	Unnamed	Lightning	382	Sonora Junction

Historic Fires - Mono County and Town of Mammoth Lakes

Year	Fire Name	Cause	Acres Burned	Community Planning Area
1990	Unnamed	Lightning	56	Upper Owens (Near)
1993	Unnamed	Lightning	545	Upper Owens (Near)
1994	Unnamed	Lightning	67	Sonora Junction
1995	Larsen	Arson	81	Antelope Valley
1996	Coleville	Vehicle	2,581	Antelope Valley
1996	Mt. Jackson	Lightning	857	Bridgeport
1996	Tioga	Lightning	14	Mono Basin
1996	Unnamed	Unknown/Unidentified	49	Antelope Valley
1997	Dechambeau	Lightning	42	Mono Basin
1999	Dechambeau	Debris	11	Mono Basin
1999	Unnamed	Smoking	246	Sonora Junction
2000	Azusa	Campfire	700	Mono Basin
2000	Unnamed	Lightning	1,528	Antelope Valley
2001	Crater	Lightning	5,590	Mono Basin
2001	Mclaughlin	Lightning	2,714	Upper Owens
2002	Birch	Lightning	2,549	Wheeler Crest
2002	Cannon	Campfire	26,684	Antelope Valley
2002	Piute	Miscellaneous	392	Chalfant Valley (Near)
2003	Dexter	Lightning	2,460	Upper Owens (Near)
2003	June	Miscellaneous	50	June Lake
2003	Lundy Fire	Unknown/Unidentified	740	Mono Basin
2003	Mcgee	Lightning	8	Mammoth Vicinity
2004	Crater Mountain	Lightning	190	June Lake (Near)
2004	Dana	Lightning	3,161	Antelope Valley
2004	Dechambeau	Lightning	27	Mono Basin

Historic Fires - Mono County and Town of Mammoth Lakes

Year	Fire Name	Cause	Acres Burned	Community Planning Area
2004	Gates Complex	Vehicle	8,905	Antelope Valley
2005	Beach	Lightning	45	Mono Basin
2005	Glass	Arson	19	June Lake
2005	Mcgee	Arson	34	Upper Owens (Near)
2005	Rock	Miscellaneous	12	Long Valley (Near)
2006	Ghost	Lightning	83	Benton Hot Springs (Near)
2006	Sawmill	Debris	7,437	Benton Hot Springs (Near)
2006	Shooting	Miscellaneous	18	Mammoth Vicinity
2007	Conway	Lightning	89	Bodie Hills (Near)
2007	June	Lightning	680	June Lake
2007	Larson	Lightning	1,076	Antelope Valley
2007	Oharel	Lightning	597	Upper Owens (Near)
2007	Sentinel	Lightning	12	Upper Owens (Near)
2008	Sherwin	Lightning	355	Mammoth Vicinity
2008	Tioga	Miscellaneous	22	Mono Basin
2009	N. Glass	Lightning	91	Benton Hot Springs (Near)
2010	Bramlette	Lightning	98	Benton Hot Springs
2010	Mono	Lightning	1,205	Mono Basin
2010	Potato	Lightning	632	Bodie Hills
2011	Buckeye	Lightning	1,046	Bridgeport
2012	Adobe	Lightning	31	Mono Basin
2012	Biederman	Lightning	20	Bodie Hills
2012	Indian	Lightning	12,575	Mono Basin
2012	Sage Hen	Lightning	12	Upper Owens (Near)
2013	Spring Peak	Lightning	14,267	Bodie Hills
2014	Bodie	Lightning	93	Bodie Hills

Historic Fires - Mono County and Town of Mammoth Lakes

Year	Fire Name	Cause	Acres Burned	Community Planning Area
2014	Conway	Vehicle	46	Mono Basin
2014	June	Equipment Use	45	June Lake
2015	Round	Miscellaneous	6,538	Wheeler Crest
2015	Unnamed	Vehicle	27	Bridgeport (Near)
2015	Van Dyke	Unknown/Unidentified	512	Bridgeport
2015	Walker	Miscellaneous	3,816	Mono Basin/June Lake
2016	Clark	Lightning	2,822	Upper Owens (Near)
2016	Marina	Miscellaneous	641	Mono Basin
2016	Owens River	Miscellaneous	5,461	Upper Owens
2016	Rock Creek	Equipment Use	123	Wheeler Crest
2016	Wilson	Miscellaneous	16	Mono Basin
2017	Slinkard	Lightning	8,925	Antelope Valley

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Multi-Jurisdictional Hazard Mitigation Plan (MJHMP)

APPENDIX I: WHEELER CREST CWPP

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Wheeler Crest Community Wildfire Protection Plan

January 2019

DISCLAIMER:

This document analyzes wildfire hazard for the Wheeler Crest CWPP area and makes recommendations on ways that residents in the area can reduce their collective exposure to wildfire-caused losses.

Under typical wildfire burning conditions, all the project area has the potential to support very rapid rates of wildfire spread. There are NO low-priority areas for fire hazard mitigation in the project area.

Wildfire behavior is the product of numerous factors, some of which are weather-dependent and difficult or impossible to quantify. The suggestions in this assessment are based upon field surveys, technical analysis, and the professional experience of the authors. Errors may exist in this analysis and could include improper recording of field data due to GPS accuracy or surveyor error, computational errors, data entry mistakes and any other conceivable cause.

This data comprises a simplification of the physical environment intended to allow the authors to make general recommendations about reducing potential fire behavior at the community scale. Site-specific changes in fuel hazard and wildfire risk (such as annual mowing, grazing, and weed clearance, the growth of flammable ornamental plants and native vegetation, and other changes in the physical environment) will quickly render this data inaccurate.

THIS DATA DESCRIBES VEGETATION AND WILDFIRE HAZARD CONDITIONS IN THE PROJECT AREA AT A SINGLE POINT OF TIME, FALL 2017. ANY FUTURE USE OF THIS DATA FOR OTHER PLANNING, CODE ENFORCEMENT, OR HAZARD MITIGATION WORK IS NOT RECOMMENDED WITHOUT FIRST CHECKING PHYSICAL CONDITIONS ON THE GROUND.

Table of Contents

Wheeler Crest Community Wildfire Protection Plan Mutual Agreement Page 5

Executive Summary 6

1. Requirements of a Community Wildfire Protection Plan (CWPP) 7

Federal 7

State of California 7

Local Jurisdictions and Private Entities 8

2. Planning Process 10

Primary Stakeholders 10

Public Education Effort 11

Process and Plan Development 12

Community and Agency Involvement 14

3. Community Description 16

Weather 16

Demographics 16

Vegetation 16

2017 Wildfire Hazard Assessment 16

Wildland Urban Interface 19

Inyo National Forest Draft Land Management Plan 21

Role of Community Wildfire Protection Plans 21

4. Community Hazard and Risk Assessment 23

Wildland Fire Behavior 23

Winds 25

Current Risk Analysis/Resistance to Control 26

Resistance to Control vs. Structure Losses During the 2015 Round Fire 27

Large Fire History 30

5. Community Preparedness for a Wildfire Emergency and Action Plan to Improve Preparedness 32

Wildfire is Coming! Are You Prepared? 32

Preventing Home Ignitions During Wildfires 32

Summary of High-Priority Firesafe Building Improvements 34

Compliance with California Defensible Space Regulations 35

Wildfire Evacuation 35

Emergency Communications and Evacuation Warnings 36

Alerting and Warning People with Access and Functional Needs (PAFN) 37

Water Sources or Availability of Water for Fire Suppression. 37
Road Issues that could Prevent Easy Evacuation. 37
6. Fuel Treatments Completed and Recommended Projects 39
USFS/BLM Projects in the CWPP Area 40
CAL FIRE Projects 43
Wheeler Crest Community Projects 43
Southern California Edison 49
7. Monitoring and Evaluating the CWPP Recommendations and Accomplishments 50
Monitoring and Evaluation 50
8. Local Agencies' Wildfire Response Capabilities 54
Wheeler Crest Fire Department 54
Paradise Fire Department 56
Appendix A – Community Questionnaire Results 59
Appendix B - Fire Behavior Modeling 65
Vegetation and Fuel Model 68
Appendix C - Wheeler Crest Community Service District Information 74
Appendix D - Quail Circle Emergency Evacuation Route 80
References/Links 86

Figure 1- Map of CWPP Area, (Base Map) 13
Figure 2 - CWPP defined Wildland Urban Interface 20
Figure 3 - Map of Inyo National Forest Fire Management Zone for Alt B Modified 22
Figure 4 - Fire Behavior Inputs and Outputs. 23
Figure 5 - ERC Pocket Card for Wheeler Crest 25
Figure 6 - Swall Meadows Resistance to Control Map and Destroyed Structures 28
Figure 7 - Paradise Resistance to Control and Destroyed Structures 29
Figure 8 - Large Fire History Map 31
Figure 9 - BLM Fuels Projects 41
Figure 10 - USFS Fuels Projects 42
Figure 11 - Fire Safe Council Fuel Reduction Projects 48
Figure 12 - FireFamily Weather for FLAMMAP 67
Figure 13 - Sample Vegetation Photo 1 68
Figure 14 - Sample Vegetation Photo 2 69
Figure 15 - Sample Vegetation Photo 3 70
Figure 16 - Sample Vegetation Photo 4 71
Figure 17 - Flame Length Map 72
Figure 18 - Rate of Spread 73

Table 1 - Core Planning Team 14
Table 2 - Public Meeting Attendance 14
Table 3 - Stakeholders 15
Table 4 - Hazard Assessment Results 17
Table 5 - Hazard Assessment Summary of Recommendations 17
Table 6 - Resistance to control matrix 26
Table 7 - Effective Fire Suppression efforts 27
Table 8 - Resistance to Control vs. Structure Losses During the 2015 Round Fire 27
Table 9 - Large fire history in the CWPP Area 30
Table 10 - CWPP Project Data sheet 39
Table 11 - Ownership Acreage by WUI Zone 40
Table 12 – Paradise Community Projects 44
Table 13 – Swall Meadows Community Projects 46
Table 14 - Monitoring and Evaluating a CWPP 53
Table 15 - Wheeler Crest Fire Department Response Capabilities 55
Table 16 - Paradise Fire Department Response Capabilities 57

Wheeler Crest Wildfire Protection Plan Mutual Agreement Page

This Community Wildfire Protection Plan (CWPP) was developed for the communities of Swall Meadows and Paradise Camp. The following entities mutually agree with the contents of this Community Wildfire Protection Plan.

Karen Ferrell-Ingram, President
Wheeler Crest Fire Safe Council
Date: 1-21-19

Ann Klinefelter, Chairperson
Paradise Fire Protection District
Date: 1/16/19

Bill Goodman, Chairman
Wheeler Crest Fire Protection District
Date: 1.20.19

Dale Schmidt, Chief
Wheeler Crest Fire & Paradise Fire
Date: 1-22-19

Glenn Barley, Unit Chief
San Bernardino Unit, California Department of Forestry and Fire
Date: 1/15/19

Taro Pusina, Fire Management Officer
Inyo National Forest/BLM Bishop Field Office
Date: 1/22/19

Fred Stump, Supervisor - DISTRICT 2
Mono County Board of Supervisors
Date: 1-20-19

Report Prepared by Wildland Rx, Inc. & Deer Creek Resources

Executive Summary

This report provides a comprehensive, science-based assessment of wildfire hazards and risks within the communities of Swall Meadows and Paradise Camp (for the purposes of this report, these communities are referred to as "Wheeler Crest."). It establishes short-term and long-term strategies for creating more 'wildfire-permeable' conditions within the two communities. 'Wildfire-permeable' describes a condition where wildfires can burn through a community without destroying major infrastructure, homes, or other assets.

No matter what hazard mitigation efforts are undertaken around the communities, weather conditions in the area guarantee uncontrollable wildfires will burn through the area in the future - mitigation efforts should focus on 'hardening' assets at risk in anticipation of these future fires.

This document:

- Identifies existing hazardous fuel treatment projects and priorities for future projects.
- Describes community wildfire safety education opportunities.
- Estimates the hazards associated with wildland fire in proximity to communities.
- Provides communities with cost-effective opportunities to reduce future wildfire losses.

1. Requirements of a Community Wildfire Protection Plan (CWPP)

CWPP documents have evolved over the past decade due to changes in Federal and State policies. The following is a list of how those requirements have evolved within the different agencies:

Federal

CWPPs are required to be consistent with and tiered to ***the 2010 Federal Land Assistance Management and Enhancement (FLAME) Act*** and ***The Healthy Forest Restoration Act (HFRA) of 2003.***

The Federal policies that implement these acts are the ***10 Year Implementation Plan for HFRA*** and the '***National Cohesive Wildland Fire Management Strategy*** *(Cohesive Strategy)*' for the FLAME Act – The Cohesive Strategy is a national collaborative effort to make meaningful progress towards three goals:

- Resilient Landscapes
- Fire Adapted Communities
- Safe and Effective Wildfire Response

The Healthy Forest Restoration Act (HFRA) gives funding priority to projects identified in a CWPP (HFRA sec 103 [d1]) and directs Federal agencies to consider recommendations identified in CWPPs (HFRA sec. 103[b]) and implement those projects on federal lands (HFRA sec. 102[a]).

State of California

This analysis is consistent and supported by the findings in the ***2010 Forest and Range Assessment of California***. (California Department of Forestry and Fire Protection, Fire and Resource Assessment Program, 2010)
http://frap.fire.ca.gov/data/assessment2010/pdfs/california_forest_assessment_nov22.pdf

The ***2010 Strategic Fire Plan for California*** (State Board of Forestry and California Department of Forestry and Fire Protection, November 2010) is the State's road map for reducing the risk of wildfire. By placing the emphasis on what needs to be done long before a fire starts, the plan looks to reduce firefighting costs and property losses, increase firefighter safety, and contribute to ecosystem health. The plan was a cooperative effort between the State Board of Forestry and the California Department of Forestry and Fire Protection (CAL FIRE). The basic principles of the fire plan are as follows:

- Encourage community involvement to ensure that fire protection solutions meet local needs.
- Identify public and private community assets (natural and manmade) at risk to wildfire damage.
- Develop solutions and implement cooperative projects to reduce a community's potential wildfire losses.

Links:
California Fire Plan
http://cdfdata.fire.ca.gov/pub/fireplan/fpupload/fpppdf668.pdf
CAL FIRE San Bernardino Unit Fire Plan
http://cdfdata.fire.ca.gov/pub/fireplan/fpupload/fpppdf1603.pdf
Swall Meadows and Paradise are a part of CAL FIRE, San Bernardino Unit, Battalion 4.

Local Jurisdictions and Private Entities

Local authorities such as fire departments, fire protection associations, county planning departments and other authorities can determine local needs for fuel treatments, equipment, personnel, training, mitigation needs, local ordinances or code adoption and enforcement. Local assessments can also identify which mitigation programs are best for a given community, such as NFPA's "Firewise" and the International Association of Fire Chief's (IAFC) "Ready, Set, Go!"

Regulation through codes and ordinances and subsequent enforcement is a major challenge for communities-at-risk since most of those communities are small. Even if they have authority to adopt codes, many communities do not have the resources to enforce them.

Mono County Planning for Wildfire Mitigation
Mono County has done a considerable amount of wildfire mitigation planning:

- ***Mono County General Plan*** - https://monocounty.ca.gov/planning/page/general-plan
- ***Mono County Hazardous Mitigation Plan*** (draft format): https://monocounty.ca.gov/sites/default/files/fileattachments/planning_division/page/10087/mono_co._town_of_mammoth_lakes_hmp_public_review_draft_june_2018_sm.pdf
- The ***Mono County CWPP*** https://monocounty.ca.gov/sites/default/files/fileattachments/community_development/page/5697/monocountycwpp.pdf

Southern California Edison (SCE)
Electric utilities throughout California fall under the direction of the California Public Utilities Commission (CPUC), which updated their fire safety rules after the wildfires of 2017. This new rulemaking process mapped high fire-hazard areas in the State and requires utilities to develop mitigations to reduce fire ignition hazards posed by their electrical transmission infrastructure.

The CWPP area falls into an area mapped as Tier 2 or 'elevated wildfire risk'. It is the responsibility of SCE to develop and submit a plan to reduce the risk of fire ignitions by overhead facilities in high fire-threat areas during extreme fire-weather events. This planning effort reached out to SCE for specific information on the status of their planning work to comply with these new CPUC rules. Due to the litigation regarding damages incurred in the Round Fire, SCE was not able to provide information for this CWPP. Information on the new CPUC rules can be found at http://www.cpuc.ca.gov/firethreatmaps.

The Los Angeles Department of Water and Power (LADWP)
LADWP owns land near the communities identified in the CWPP and should become a part of solving the wildfire problems associated with the hazards posed by their operations within the community base map area.

Eastern Sierra Land Trust (ESLT)
ESLT has participated in planning meetings for this CWPP and their involvement is required for the implementation of several of the proposed projects. They can also help with wildfire safety education for visitors to lands under their management. http://www.eslt.org/

California Department of Fish and Wildlife (CDFW)
CDFW is a landowner within the area and has participated in the stakeholder meetings. Their involvement is important regarding advice on protection of important natural resources and implementation of fire safe maintenance of their properties within the Wildland Urban Interface (WUI) boundary.

2. Planning Process

Primary Stakeholders

Government Agencies

- United State Forest Service, Inyo National Forest
- Bureau of Land Management
- CAL FIRE, San Bernardino Unit
- Mono County
- California Department of Fish and Wildlife

Non-Government Agency Involvement

- Wheeler Crest Fire Safe Council
- Eastern Sierra Land Trust

Fire Department Involvement

- Wheeler Crest Fire
- Paradise Fire
- CAL FIRE (limited protection responsibility)
- US Forest Service (direct protection responsibility)

Invited Parties that Did Not Participate

- Southern California Edison
- Los Angeles Department of Water and Power

Primary CWPP Development Team Members and Responsibilities

The Wheeler Crest CWPP Project Team and consultants Deer Creek Resources and WildlandRx, were responsible for the following:

- Facilitating and coordinating the over-all CWPP process with, federal agencies, and other key stakeholders.
- Conducting landscape-scale hazard, values, and risk assessments for all lands within the designated CWPP area.
- Assisting fire departments in providing general discussions and assessments of their departments.
- Providing technical expertise in developing prescriptions for wildfire mitigation treatments.
- Assembling and maintaining the final CWPP document.
- Assisting in public education efforts for the CWPP.
- Writing a general assessment of fire suppression resources in the project area.

CAL FIRE

- Provided funding for the CWPP.
- Provided oversight of the CWPP process.
- Provided guidance and technical expertise for CWPP development.
- Provided information on past, current, and future mitigation efforts around the county.

United States Forest Service (USFS)/Bureau of Land Management (BLM) Interagency Fire Management Organization

- Provided information to past, current, and future mitigation work being conducted on Forest Service properties within or adjacent to the CWPP area.
- Provided a general discussion on Forest Service wildfire programs (suppression, mitigation, training, prevention, etc.).

Mono County

- The County completed a county wide CWPP in 2009 that provides a base for communities in the county.
- The County currently has created a draft Multi-Jurisdictional Hazard Mitigation plan and wants input from Wheeler Crest.
- The Mono County Department of Public Works has provided road development assistance.
- Provides local fire safe regulations.

Joint Tasks

- Identifying appropriate landscape-scale hazard reduction areas throughout the CWPP area.
- Identifying WUI boundaries throughout CWPP area.
- Developing an implementation plan for this project.
- Facilitating and/or participating in community meetings that allow the public and other stakeholders to provide input and stay informed about this process.
- Outreach and work to create bottom-up interest in WUI communities to develop smaller-scale CWPPs and project-specific implementation plans.
- Assisting interested WUI communities in developing smaller scale CWPPs and executing project-specific implementation plans.

Public Education Effort

Public education is a key component to the successful implementation of any CWPP. The Wheeler Crest Fire Safe Council, local fire prevention officers, law enforcement officers, CAL FIRE and federal agencies should continue to use the CWPP development team to implement required residential clearance standards and evacuation planning.

It is important to remind the communities that residential clearance and roadside clearance are the responsibilities of the community not the fire department. Communities may have to conduct their own work days to clear the roadsides so fire equipment and civilians can safely travel the roads during fire events. Mono County Public Works Department may need to widen the roads and put in turn arounds to allow fire equipment space to turn around. These are only a few of the responsibilities of the communities to keep them safe from a wildfire. The job of the fire departments and the Fire Safe Council is to educate the community about what needs to be done to provide for safe ingress and egress for residents and fire equipment.

One of the primary purposes of the Fire Safe Council is to educate the public about wildfire safety. It is also the responsibility of the Fire Safe Council to keep the community informed of projects and to prepare grant proposals.

Process and Plan Development

Planning Area Boundaries

The Planning area boundary was established within the volunteer fire department boundaries and additional areas were added based on the analysis of the WUI, urban core, defense zone and the threat zones. The draft planning area boundary was presented to the stakeholders at the first and second stakeholders meeting and a final area was then identified for the CWPP. See Figure 1.

Stakeholder Meetings

Meetings were held in Swall Meadows and were attended by the USFS/BLM Interagency Fire Management Organization, CAL FIRE, California Department of Fish and Wildlife, Eastern Sierra Land Trust, Wheeler Crest Community Water District, Wheeler Crest Fire Protection District, Paradise Fire Protection District and Wheeler Crest Fire Safe Council.

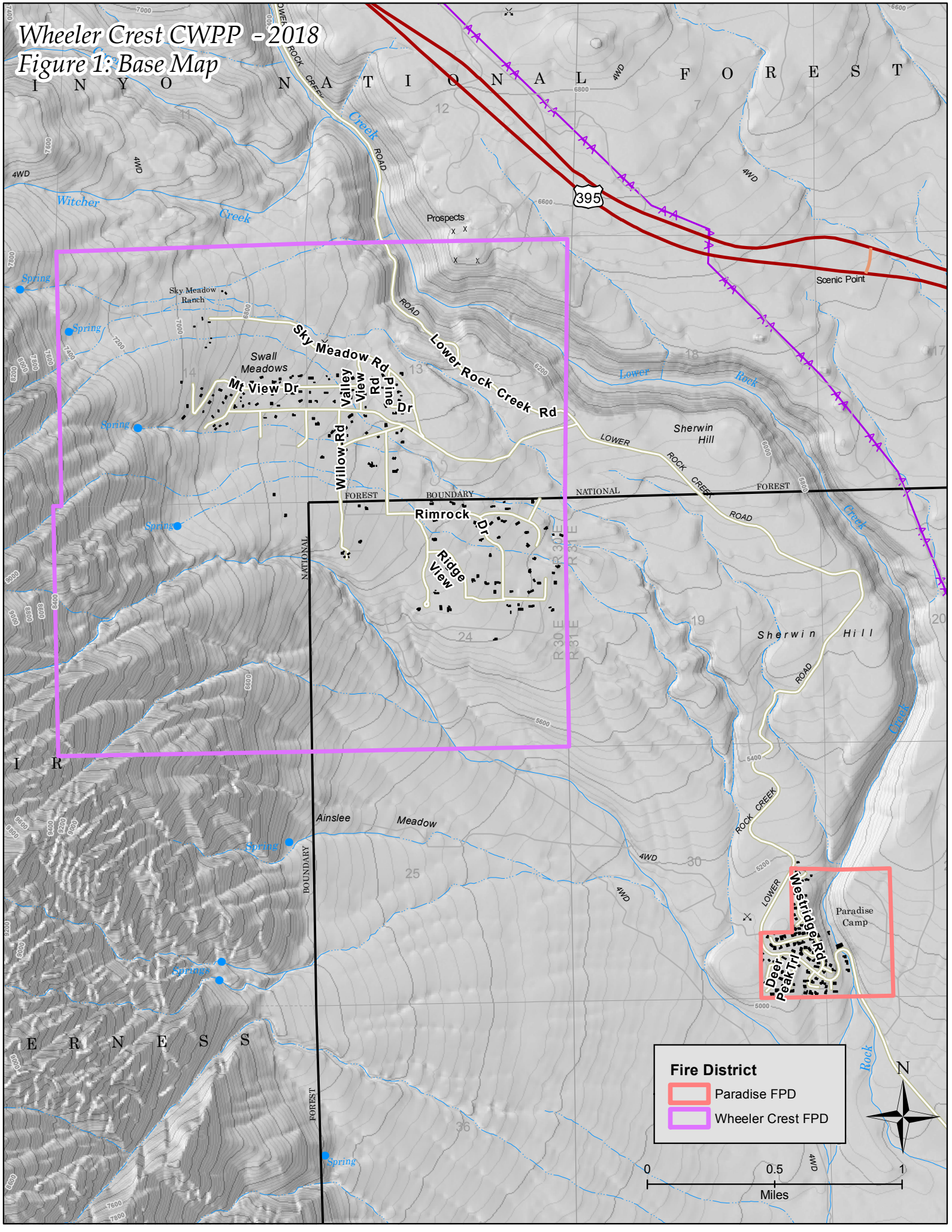
Community Meetings

Meetings were held in Swall Meadows and Paradise to discuss community concerns and the CWPP process as well to promote input to the CWPP. In addition, an online questionnaire was developed by the Fire Safe Council in order to gather additional input from the community. The results of the questionnaire can be found in Appendix A**.**

Funding

This project was funded by a grant from CAL FIRE's 2016-2017 State Responsibility Area Fire Prevention Fund (SRAFPF) and Tree Mortality (TM) Grant Program.

Wheeler Crest CWPP - 2018
Figure 1: Base Map



Core Planning Team

Name	Title	Organization
Chief Dale Schmidt	Chief	Wheeler Crest and Paradise Fire Departments
Ann Klinefelter	Wheeler Crest CWPP Project Team	Paradise Fire Protection District
James McConachie	Wheeler Crest CWPP Project Team	Paradise Fire Protection District
Karen Ferrell-Ingram	Wheeler Crest CWPP Project Team	Wheeler Crest Fire Safe Council
Donalda Day	Wheeler Crest CWPP Project Team	Wheeler Crest Fire Safe Council
Janet Hatfield	Wheeler Crest CWPP Project Team	Wheeler Crest Fire Safe Council
Dave Parker	Wheeler Crest CWPP Project Team	Wheeler Crest Fire Safe Council
Barry Callenberger	Consultant	Wildland Rx
Paul Lackovic	Consultant	Deer Creek Resources

Table 1 - Core Planning Team

Community and Agency Involvement

Stakeholders and Public Meetings

Meeting Focus	Meeting Date	Meeting Location	Number of People in Attendance
Community Meeting	November 14, 2017	Wheeler Crest Fire Station	53
Community Meeting	November 13, 2017	Paradise Fire Station	52
Stakeholder meeting	May 22, 2018	Wheeler Crest Fire Station	13

Table 2 - Public Meeting Attendance

Stakeholders

Name	Title	Organization
Heather Stone	Veg/Fuels Planner	USFS/BLM
Daniel O'Conner	Veg/Fuels Leader	USFS/BLM
Alisa Ellsworth	Senior Environmental Scientist	CA Dept Fish and Wildlife
Michael Draper	Community Development	Mono County
Chief Dale Schmidt, Mike Day, Glenn Inouye		Wheeler Crest Fire Department
Chief Dale Schmidt, Ann Klinefelter, James McConachie		Paradise Fire Department
Randy Keller	Board Member	Eastern Sierra Land Trust
Karen Ferrell-Ingram	Wheeler Crest CWPP Project Team	Fire Safe Council
Donalda Day	Wheeler Crest CWPP Project Team	Fire Safe Council
Henry Herrera	Unit Forester	CAL FIRE
Paul Melendez	Division Chief	CAL FIRE
Sagar Fowler	Battalion Chief	CAL FIRE
Matt Edmiston	Battalion Chief	CAL FIRE
Ian McBride	Forestry Assistant	CAL FIRE

Table 3 - Stakeholders

3. Community Description

Weather

The eastern side of the Sierra Nevada Range has average summer temperatures from the 60s to the low 80s with winter temperatures in the low 20s to upper 40s. Precipitation averages less than 12 inches per year, coming mainly between November and April. Humidity varies throughout the year and is often extremely low during winter months. Summer humidity is often the below 20 percent and can drop below 10 percent for long periods of time

Demographics

Swall Meadows is located in southern Mono County, California. The community is residential, including second homes and a volunteer fire department; it has no commercial development. Geographically, it sits partway up the Sherwin Grade below the Wheeler Crest of the eastern Sierra Nevada mountains, at an elevation range of approximately 6,000 to 7,000 feet (1,800 to 2,100 m). It is accessed from "old HWY 395", or Lower Rock Creek Rd. Swall Meadows is located approximately 20 miles (32 km) north of Bishop and 25 miles (40 km) south of Mammoth Lakes. The 2010 United States Census reported that Swall Meadows had a population of 220 with 128 housing units at an average density of 28.7 per square mile (11.1/km).[1]

Paradise

Paradise Camp is a residential community that is also in southern Mono County, located approximately five miles south of Swall Meadows along Lower Rock Creek Road and approximately 15 miles north of Bishop, California. It is accessed from "old HWY 395", or Lower Rock Creek Rd. It has a volunteer fire department and no commercial development. The 2010 United States Census reported that Paradise had a population of 153 with 87 housing units at an average density of 20.0 per square mile (7.7/km).[2]

Vegetation

The predominate vegetation is grass, blackbrush, big sagebrush, antelope bitterbrush and rabbitbrush at the low elevations with some single-leaf pinyon pine, Sierra juniper and Jeffrey pine stands at the higher elevations. All the forested areas have continuous grass in the understory, with scattered sagebrush. Much of the vegetation in the CWPP area was burned over during the Round Fire in February 2015.

2017 Wildfire Hazard Assessment

In November 2017, the CWPP consultants conducted surveys of fuel loading, structure clearance, construction, and proximity to undeveloped lots for 225 developed parcels in the Wheeler Crest CWPP area. Parcels were scored based on 5 criteria, defensible space, fire resistant construction, fuel loading, proximity to undeveloped lots and mean slope >20% which was determined using a digital elevation model (DEM). These individual scores were added together, generating an overall hazard score on a scale of 0-5, 5 being the highest hazard.

[1] Wkipedia, September 28, 2018
[2] Wikipedia

Surveyors also provided vegetation management recommendations for reducing the overall hazard level as well as additional comments regarding the fire safe condition of the lots. The full hazard assessment document is available for download at, https://sites.google.com/view/wheelercrestcwpp/documents#h.p_Y0zXignGTba1.

Results

Most of the parcels in Wheeler Crest, 66%, were given a rating of two or three and 20% of the parcels received a rating of four. Only 4% of parcels were given a rating of 5 while 2% of parcels received a rating of 0. Table 4 below summarizes the results of the hazard assessment survey.

Hazard Rating	0 Low	1	2	3	4	5 Extreme	Total
Total	5	18	61	88	44	9	225

Table 4 - Hazard Assessment Results

Surveyors also made hazard reduction recommendations based upon their knowledge of fire behavior and professional firefighting experience. The most recommended treatment in the survey is "Remove flammable vegetation near structures," used 62% of the time. The next most frequently suggested treatment option was; "Good-maintain in existing condition," used 16% of the time. Table 5, below, summarizes the recommended treatments.

Recommendation	Total
Good - maintain in existing condition	37
Major thinning or brushing work needed	3
Prune low branches/remove ladder fuels	9
Remove dead trees	8
Remove fine grassy fuels	7
Remove flammable vegetation near structures	140
Remove surface fuels	13
Thin small trees	8

Table 5 - Hazard Assessment Summary of Recommendations

Discussion

The survey results indicate that many of the lots within the Wheeler Crest CWPP area are currently in a relatively fire safe condition. However, this should not be taken as grounds for complacency - things can always be improved. To maintain low hazard levels, the community must be vigilant in maintaining good existing conditions as well as treating problem areas. Landowners must take on the responsibility for creating a fire safe environment, for themselves and their neighbors.

The reference photos found in the Hazard Assessment, show the wide variety of conditions across the survey area and suggest strategies for reducing the hazard.

Managing fuels can be very expensive and energy intensive. However, it is not as costly or energy intensive as losing a home and everything in it. Fires will continue to burn in the area, winds will continue to push them out of our control, sagebrush and cheat grass will continue to sprout from the ground.

We suggest maintaining the community in a condition that is 'permeable to wildfire'. This requires landowners to create defensible space around their homes, retrofit them with fire resistant building materials, and get to know *how fire works on this landscape*.

Wildland Urban Interface

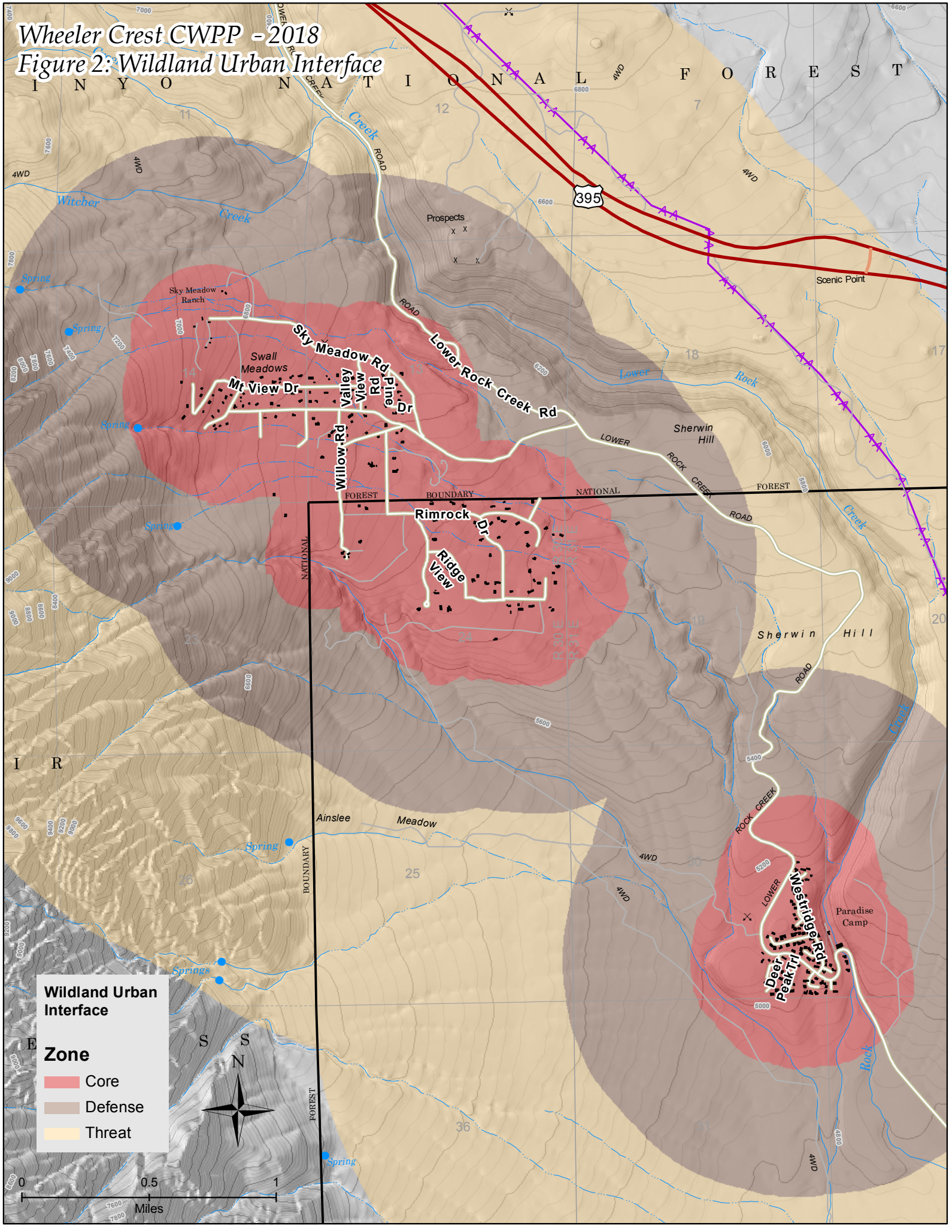
"…the Wildland-Urban Interface (WUI) is the area where houses meet or intermingle with undeveloped wildland vegetation (USDA and USDI 2001)[3]." This national definition came from the Federal Register 66 of 2001. Many changes have occurred to the terminology that surrounds the definition of a WUI area, but the basic definition is unchanged. The WUI today is broken into two distinct areas, the **defense zone** is the area within .5 mile of the urban core and the **threat zone** is the area within 1.25 miles of the defense zone. Figure 2 shows the WUI areas developed for the CWPP.

Defense Zone. The Defense Zone is the area surrounding the communities up to .5 miles outside the community. This area should have priority when it comes to fuels reduction: specifically fuels reduction projects and California Public Resources Code (CPRC) 4291 (CAL FIRE Defensible Space Requirements) enforcement. The intent of treatment of the fuels in the defense zone is reduce the fire behavior under extreme weather conditions so that suppression resources can adequately engage the fire before it reaches homes and other important community infrastructure. This means that the fire behavior should be such that the flame lengths are less than 4 feet and the rates of spread are slow enough for ground resources to suppress the fire.

Threat Zone. The Threat Zone is an extension of the Defense Zone. It is a lower priority for treatments except for those areas where fires are known to start, or a fire start could spread rapidly into the community. Evacuation routes within the threat zone are another exception to treatment priorities, in the case of evacuation routes they are considered part of the defense zone and treated with high priority.

[3] USDA and USDI. 2001. Urban wildland interface communities within vicinity of Federal lands that are at high risk from wildfire. Federal Register 66:75 1-777.

Wheeler Crest CWPP - 2018
Figure 2: Wildland Urban Interface



Inyo National Forest Draft Land Management Plan

The Inyo National Forest Draft Land Management Plan (LMP) *'Alternative B Modified'* takes a different approach to defining the WUI – replacing the distance-based Defense, and Threat Zones with strategic fire management zones. The USFS WUI defined in the Draft Land Management Plan (Figure 3) is different from the WUI created for this project. That difference is due to several reasons within the draft Inyo plan. The Forest only has its boundary on the north and northwest side of Swall Meadows. The forest has identified that part of the community in its fire management zone for communities. The community needs to stay engaged with the Land Management Plan process to be sure any concerns that the community may have are addressed. The following is a quote from the Draft Decision Notice for the LMP

"The approach to fire management meets the needs for public safety, given that communities are located immediately next to the national forest, and supports increasing the pace and scale of restoration. Components of the final plan (alternative B-modified) related to fire management strive to achieve both. The plan establishes four zones (as management areas) with plan components associated with them. The zones represent a range of different objectives (protection and resource) and conditions (social, ecological, and environmental) in which fires can be managed to achieve multiple objectives."[4]

The Healthy Forest Restoration Act of 2003 specifically states how the community WUI should be defined by federal agencies without a CWPP. The intent of any CWPP is to define the WUI for the community. This document has defined it along with input from the community and local fire departments. The CWPP bases the WUI on population density and wildfire threats to the community.

Role of Community Wildfire Protection Plans

The HFRA provides communities with a tremendous opportunity to influence where and how federal agencies implement fuel reduction projects on federal lands and how additional federal funds may be distributed for projects on nonfederal lands. A CWPP is the most effective way to take advantage of this opportunity.[5]

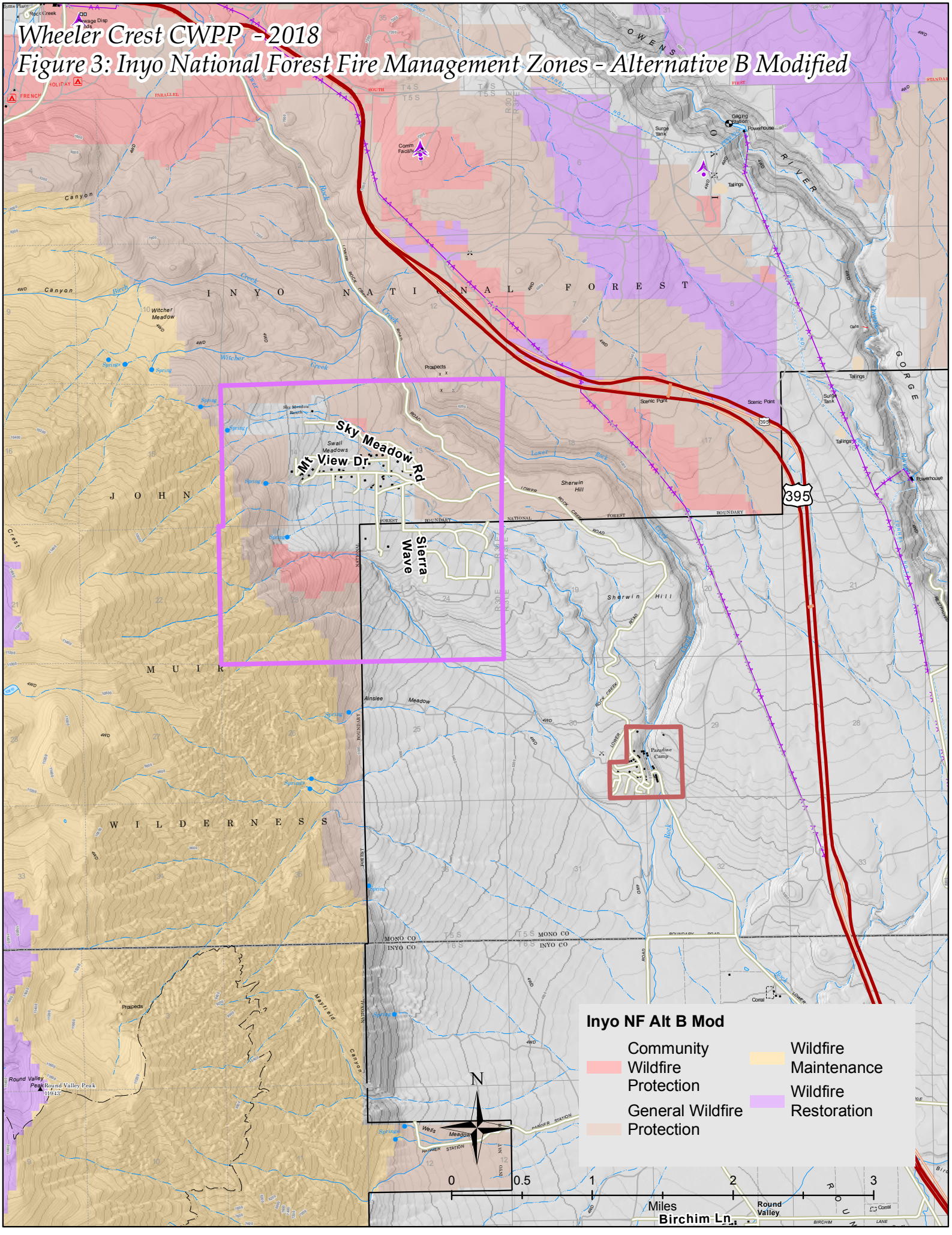
Although there are differences in Defense and Threat Zone distances within USFS documents, the key is that land managers, fire experts and the community work together on a project by project basis to collaborate and decide on appropriate application of Defense and Threat Zone distances based on all the factors influencing fire including topography, fuels, climate and fire history. This allows the community to influence Forest Service projects as they may impact the communities in and around the Forest Service managed lands.

[4] Draft Record of Decision for the Inyo National Forest Land Management Plan, U. S. Forest Service August 2018 page 8

[5] Preparing a Community Wildfire Protection Plan, Handbook for Wildland Urban Interface Communities, March 2004

Wheeler Crest CWPP - 2018

Figure 3: Inyo National Forest Fire Management Zones - Alternative B Modified



4. Community Hazard and Risk Assessment

Wildland Fire Behavior

The wildland fire behavior analysis developed for this CWPP was designed to examine the existing fire hazard and potential losses in the event of a wildfire and establish and prioritize the best treatment locations for fuel reduction treatments based on expected fire behavior (with input from local wildfire experts).

The assessment used fuels mapping data, made available from Landfire (Landscape Fire and Resource Management Planning Tools), a shared program between the wildland fire management programs of the U.S. Department of Agriculture Forest Service and U.S. Department of the Interior, providing landscape scale geo-spatial products to support cross-boundary planning, management, and operations. https://www.landfire.gov/index.php

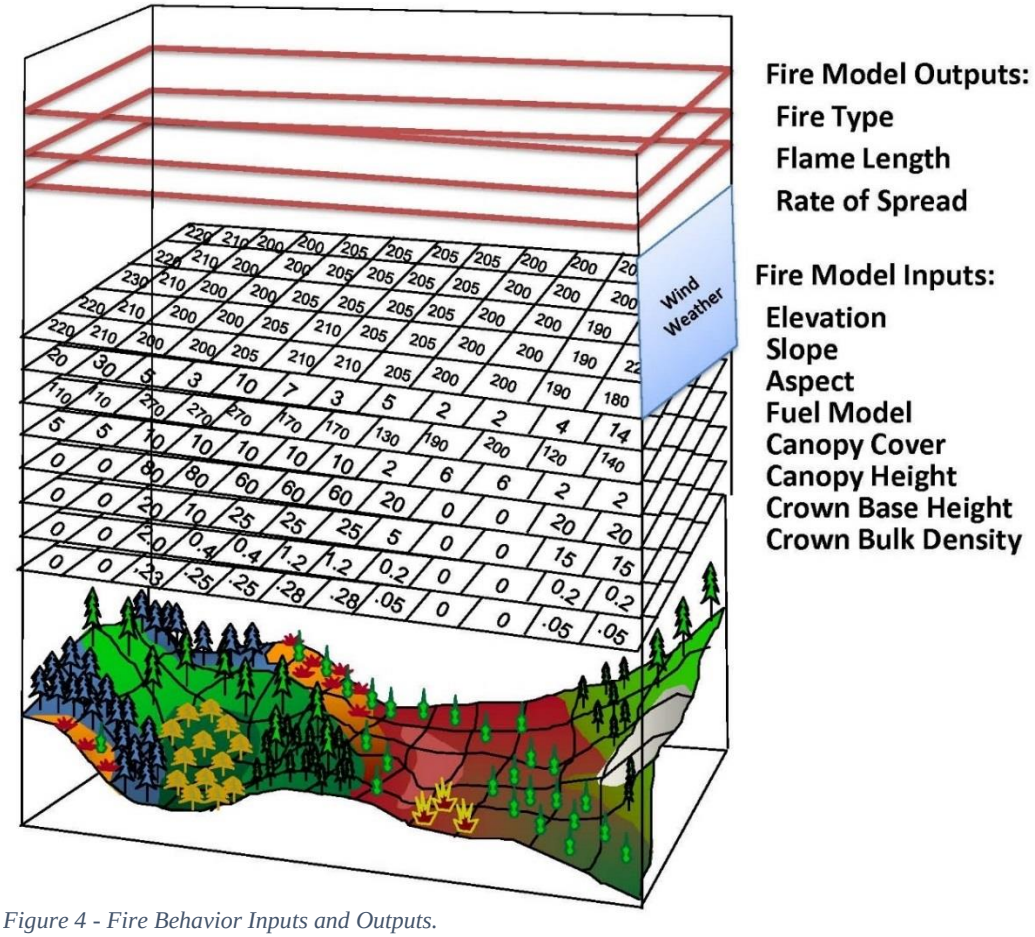


Figure 4 - Fire Behavior Inputs and Outputs.

The Round Fire, which occurred in February of 2015 made short term changes to the fuel models provided by Landfire. These changes were taken into consideration and the models were ground truthed by the consultants. Weather data was taken from the *'Rock Creek'* Remote Automated Weather Station (RAWS) along with local interpretation of the wind created by Wheeler Crest. The models are described in further detail in Appendix B.

Fire Weather and Fuel Moisture

Weather from two US Forest Service Remote Automated Weather Stations (RAWS), Rock Creek and Benton, were evaluated for weather trends and the Rock Creek station was determined to be the most representative of the Wheeler Crest CWWP area. Trends in temperature and relative humidity affect the moisture content of both dead and living vegetation, determining how well they will burn.

The fire behavior measurement used for this assessment was the Energy Release Component (ERC), a National Fire Danger Rating System (NFDRS) index. It is directly related to the 24-hour, potential worst case and total available energy (BTUs) per unit area (in square feet) within the flaming front at the head of a fire.

The ERC can serve as a good characterization of fire hazard throughout the season as it tracks seasonal fire danger trends well. The ERC is a function of the fuel model and the live and dead fuel moistures. Fuel loading, woody fuel moistures, and larger fuel moistures all have an influence on the ERC, while the lighter fuels have less influence and **wind speed has none**. ERC has low variability and is the best fire danger index for indicating the effects of intermediate to long-term drying on fire behavior, if it is a significant factor. It is not intended for use as a drought index. (https://gacc.nifc.gov/oscc/fuelsFireDanger.definitions.php)

The ERC graph (Figure 5) for the Rock Creek RAWS Station indicates when fuels conditions in the CWPP area can support fires that are likely to escape initial attack, generally when the ERC reaches above 20. The graph shows the average ERC, the maximum historic ERC, and the minimum historic ERC, from 2007 through 2017. The period that a wildfire is most likely to escape initial attack begins around July 15 and lasts well into October on the average year. However, during drought years and outside the normal fire season wildfires can also escape initial attack. The maximum observed values (the upper line on the graph) show that *weather conditions in the CWPP area can support large fire throughout the entire year.* The Round Fire had an ERC of 24 well above the average and close to the 90th percentile.

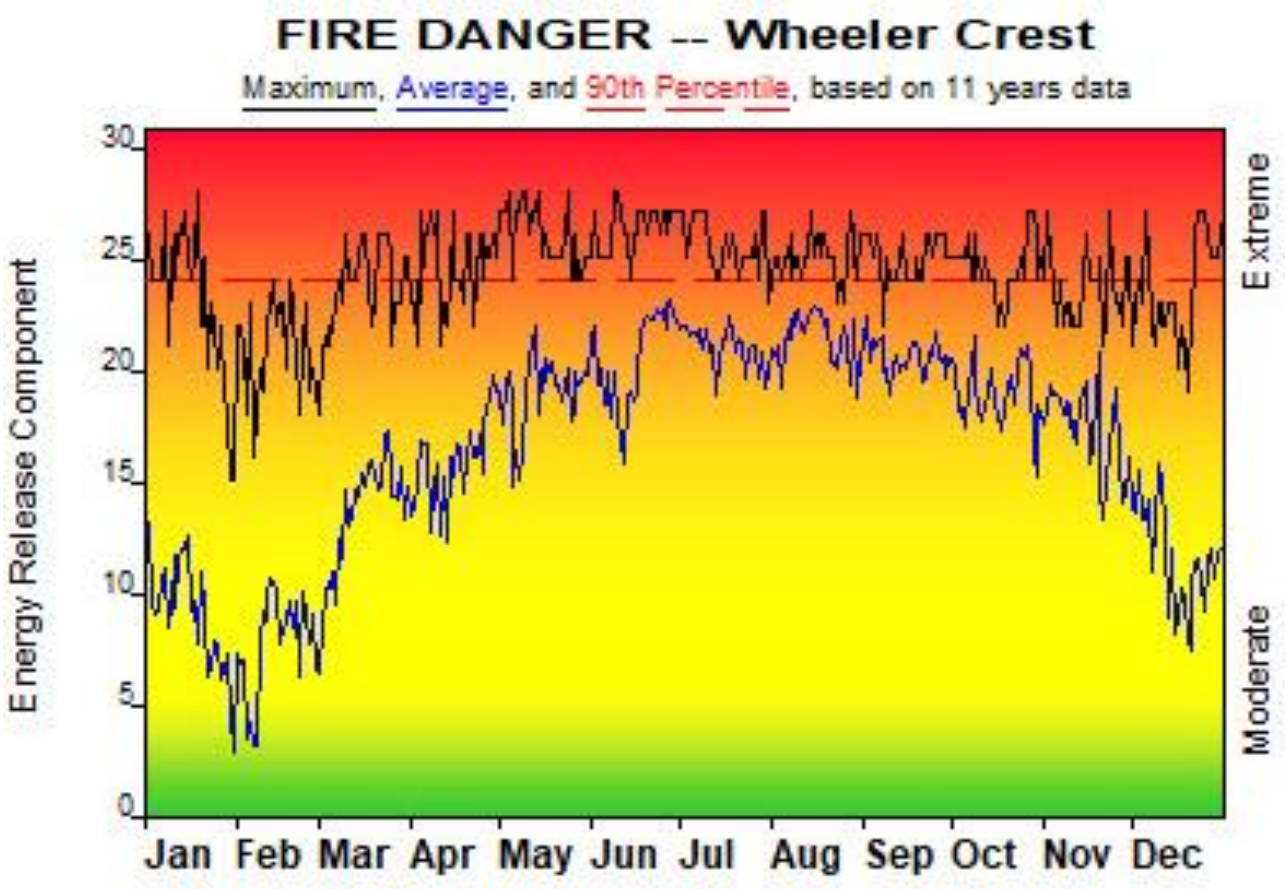


Figure 5 - ERC Pocket Card for Wheeler Crest

"The Fire Danger Pocket Card provides a format for interpreting and communicating key index values provided by the National Fire Danger Rating System. The objective is to lead to greater awareness of fire danger and subsequently increased firefighter safety. The Pocket Card provides a description of seasonal changes in fire danger in a local area. It is useful to both local and out-of-area firefighters."[6]

Winds

Another important factor in rapid fire spread is wind speed and direction. Winds in the area are strongly influenced by Wheeler Crest, an 8-mile-long north to south ridge sitting directly west of the communities, and the desert landscape of the Great Basin to the east. In the months of September and October, winds often become erratic during the passage of cold fronts. The winds during those months are predominately from the east and northeast and are very dry, increasing the difficulty in controlling wildfires. Wind speed and direction is also influenced by vegetation type and terrain (slope and aspect). The local and diurnal winds can be greatly increased by topographic features. There is no RAWS station located in the community. The

[6] https://famit.nwcg.gov/applications/WIMS/PocketCards

nearest RAWS is the Rock Creek Station which does not completely represent the winds in the community but is the only source of weather that resembles those conditions.

Current Risk Analysis/Resistance to Control

Resistance to Control (RTC) is used to help fire managers articulate several factors in order to determine the difficulty of controlling an ongoing wildfire. Three important fire behavior outputs from the FlamMap fire behavior model were compiled to calculate Resistance to Control: **Flame Length** (intensity), **Rate of Spread** (speed), and **Fire Type** (surface, torching, or actively crowning wildfire). The resistance to control formula is as follows:

Flame length + Rate of Spread + Fire Type = Analysis Score = RTC
Formula example:
3.4 + 4.8 + 10 = 18.2 = 1 (Low)

Flame Length (feet)	Rate of Spread (Chains / hour) *	Fire Type X 10	Analysis Score	Resistance to Control
0 to 3.9	0 to 4.9	1x10=10	Less than 18.8	Low (1)
3.9 to 7.9	4.9 to 9.9	10	18.9 to 27.8	Moderate (2)
7.9 to 10.9	9.9 to 19.9	2x10=20	27.9 to 50.8	High (3)
10.9 to 19.9	19.9 to 39.9	20	50.9 to 79.8	Very High (4)
20 +	40 +	3x10=30	79.9 and greater	Extreme (5)

Table 6 - Resistance to control matrix

*One Chain equals 66 feet, 40 chains per hour equals ½ mile per hour rate of spread

Table 7 illustrates the range of flame lengths and the type of effective suppression efforts required. Much of the CWPP area modeling has flame lengths greater than 4 feet and requires a combination of direct and indirect suppression tactics during much of the fire season. Dozers and aircraft are often part of the initial attack suppression effort and generally can go direct on flame lengths up to 8 feet.

Resistance to Control		Interpretation
Low 1		• Fire can generally be attacked at the head or flanks by persons with hand tools and or engines • Handlines should hold the fire
Moderate 2		• Fire is too intense for direct attack on the head by persons using hand tools • Handlines cannot be relied on to hold the fire • Equipment such as dozers, fire engines, and retardant aircraft can be effective
High 3		• Fire may present serious control problems --torching out, crowning, and spotting • Control efforts at the fire head will probably be ineffective
Very High 4		• Crowning spotting and major fire runs are probable • Control efforts at the head of the fire are ineffective
Extreme 5		

Table 7 - Effective Fire Suppression efforts

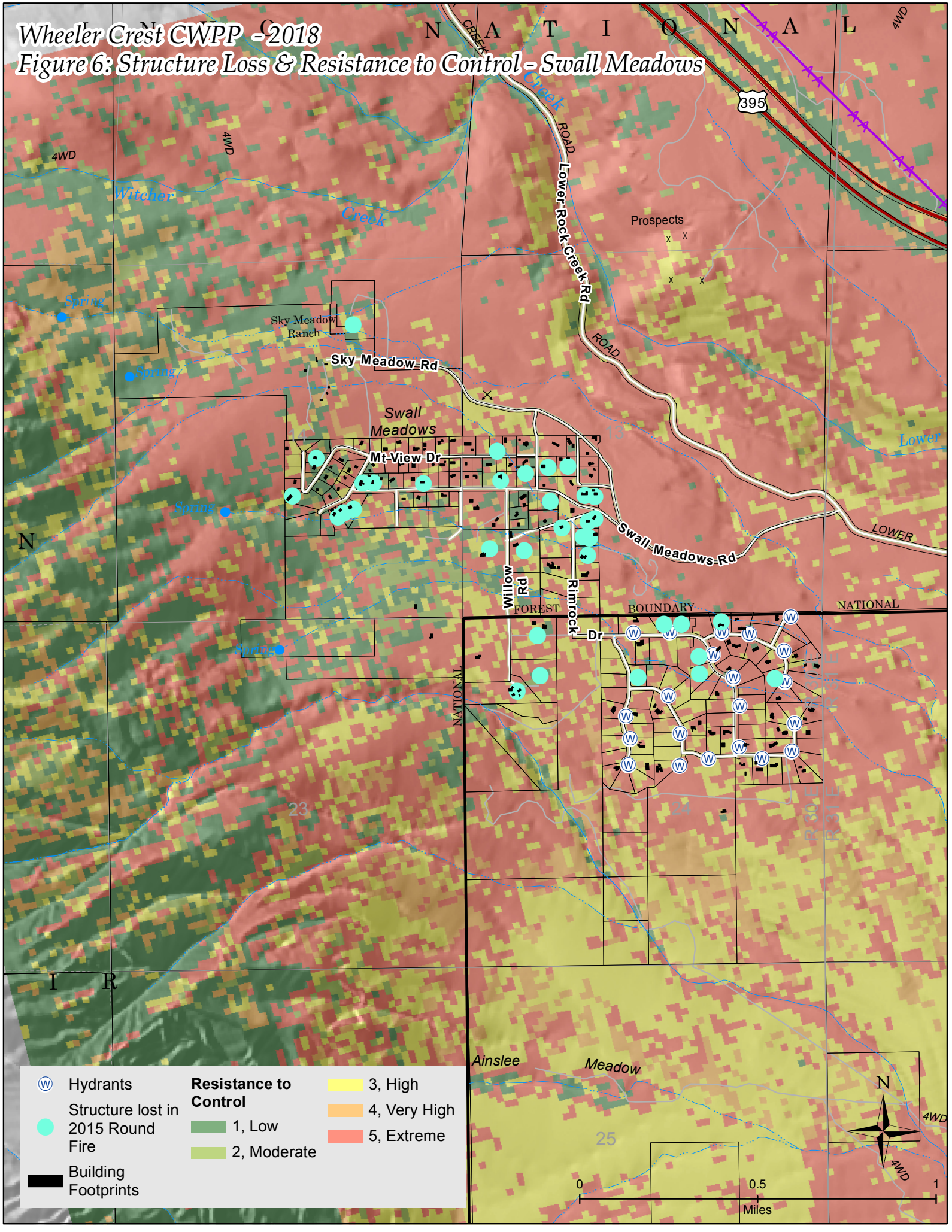
A Resistance to Control rating above moderate means suppression efforts are unlikely to succeed unless there is a break in the vegetation or a change in the weather. The RTC maps (Figures 6 and 7 below) show places in the CWPP area where ignitions are likely to escape initial attack, where asset loss could be the greatest, and where investment in treatments might have the greatest impact on fire spread and suppression effectiveness. Table 8 compares the results of our RTC modeling effort against observed damages during the 2015 Round Fire.

Resistance to Control vs. Structure Losses During the 2015 Round Fire

Resistance to Control	% of Structure Loss	Number of Structures lost
Low	14%	5
Moderate	6%	2
High	14%	5
Very High	3%	1
Extreme	64%	23

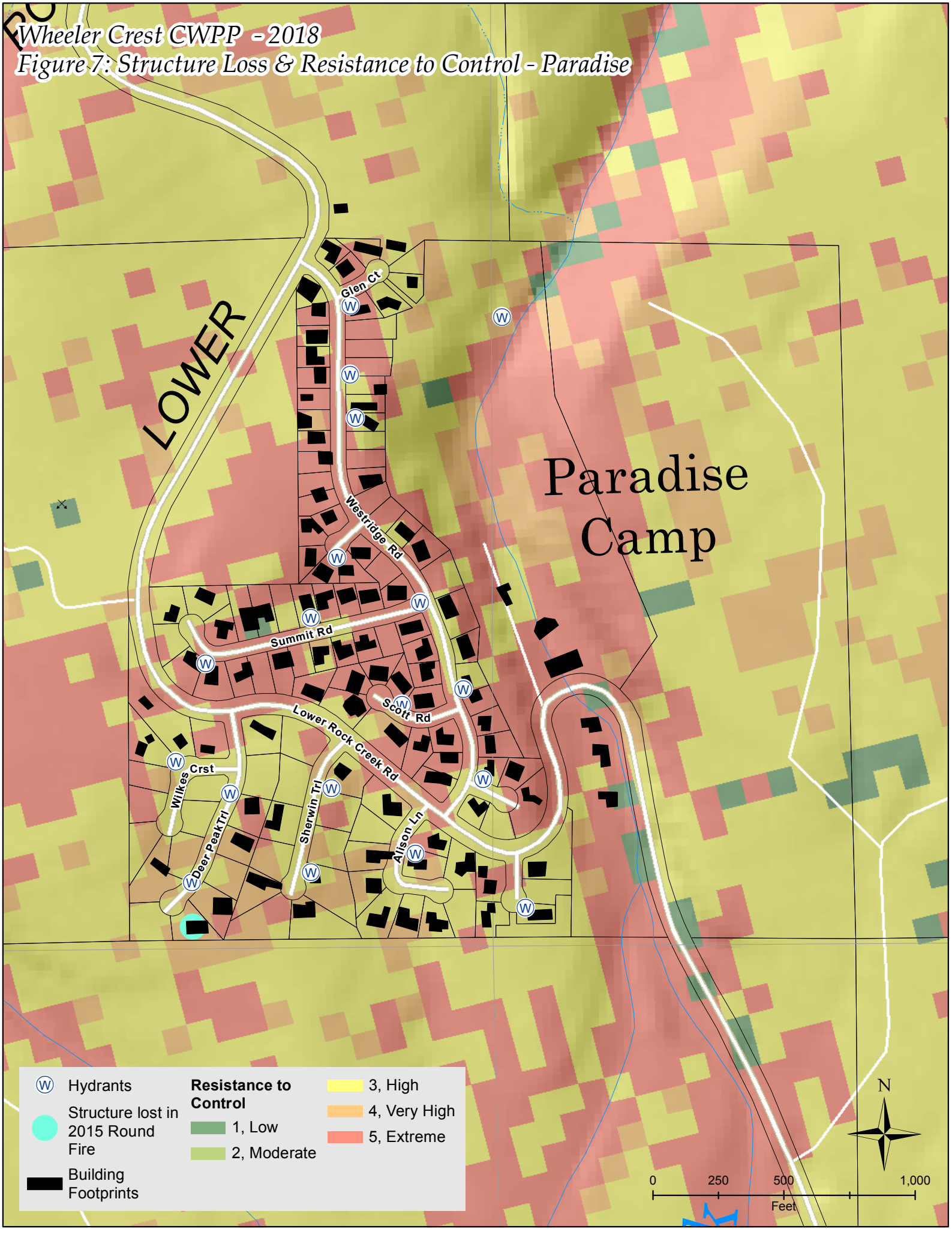
Table 8 - Resistance to Control vs. Structure Losses During the 2015 Round Fire

Wheeler Crest CWPP -2018
Figure 6: Structure Loss & Resistance to Control - Swall Meadows



Wheeler Crest CWPP - 2018

Figure 7: Structure Loss & Resistance to Control - Paradise



Large Fire History

YEAR	AGENCY	FIRE NAME	DATE	CAUSE	ACRES
1958	San Bernardino CAL FIRE	PARADISE #2	7/28/1958	14 - Unknown	351
1974	San Bernardino CAL FIRE	SWALL	2/28/1974	9 - Miscellaneous	666
1981	San Bernardino CAL FIRE	SWALL	8/9/1981	9 - Fireworks	3159
1983	Inyo National Forest			9 - Miscellaneous	265
1985	Inyo National Forest		8/8/1985	9 - Miscellaneous	277
2002	Inyo National Forest	BIRCH	7/1/2002	1 – Downed power line	2549
2015	San Bernardino CAL FIRE	ROUND	2/6/2015	9 – Downed power line	6537
2016	Inyo National Forest	ROCK CREEK	8/5/2016	2 – Bike pedal strike to a rock	123

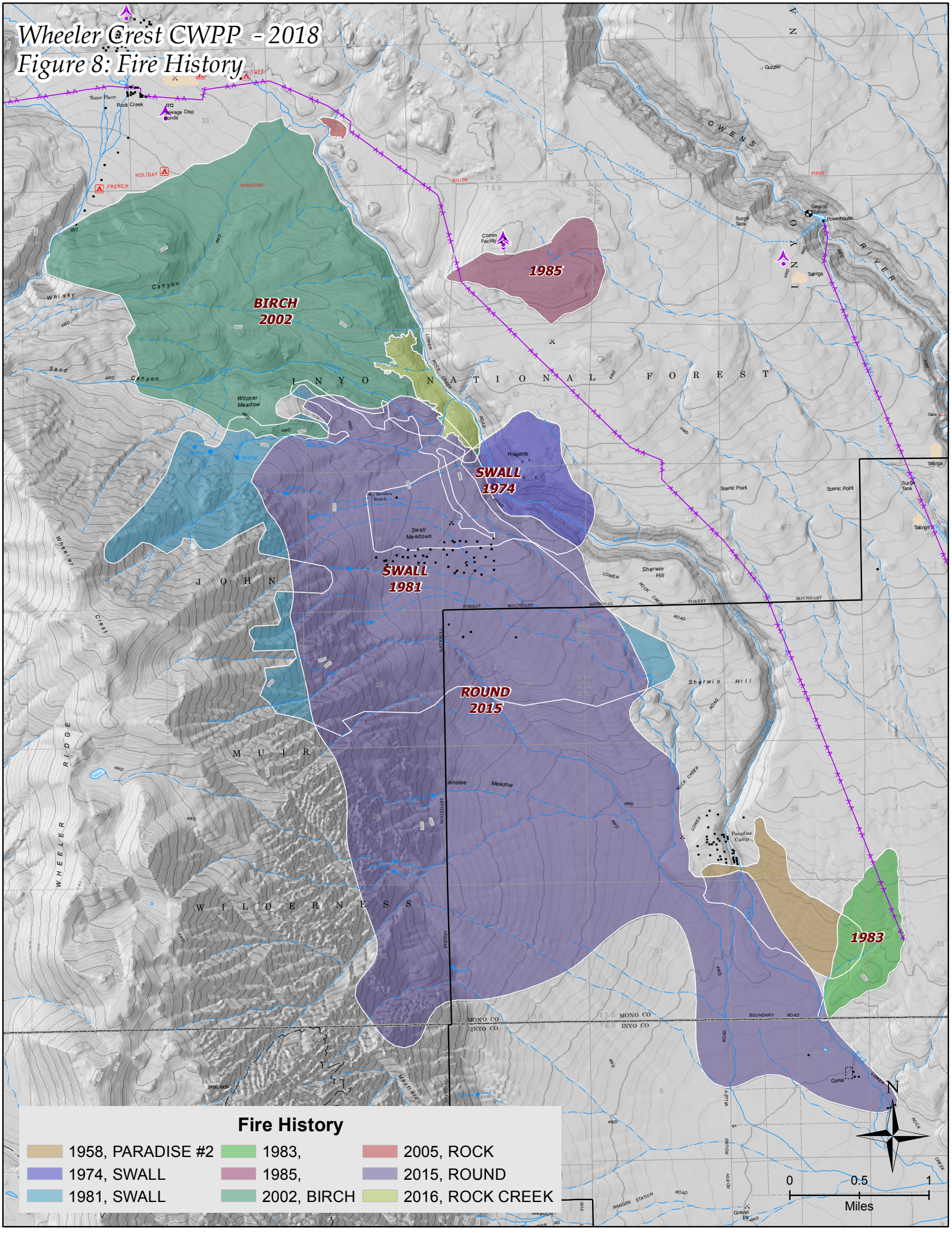
Table 9 - Large fire history in the CWPP Area

Fire History Summary

The Wheeler Crest CWPP area has had eight large fires that were a threat to the communities from 1958 until 2016 (Figure 8). Four of these fires had a significant impact on the communities: the 1958 Paradise Fire, 1974 Swall Fire, 1981 Swall fire, and most recently the 2015 Round Fire. The 2015 Round Fire was the most significant fire for several reasons.

- Structure loss was high with 46 structures lost.
- It was caused by a downed powerline due to high winds.
- It occurred outside the "normal" fire season on February 6, 2015 when fire suppression resources are low.
- It occurred during a major California drought.
- Frontal erratic wind speeds were clocked at more than 60 MPH, prohibiting the use of aerial firefighting resources.
- The vegetation was made up of several types that contribute to rapid growth and make suppression efforts difficult.

Wheeler Crest CWPP - 2018
Figure 8: Fire History



5. *Community Preparedness for a Wildfire Emergency and Action Plan to Improve Preparedness*

Wildfire is Coming! Are You Prepared?

There are many resources available to communities to increase fire preparedness. CAL FIRE has developed many free educational materials and a website devoted to up-to-date guidance about safe evacuation and protecting lives and property from wildfire – http://readyforwildfire.org/.

The National Fire Protection Association has a public education effort that offers dozens of fact sheets designed to help keep homeowners, homes, and communities safe from fire and related hazards. Check out https://www.nfpa.org/Public-Education.

The Wheeler Crest Fire Safe Council is an active community education organization focused on fire safety and awareness in Swall Meadows. Holding quarterly meetings, this group brings in wildfire experts to speak to the community on various subjects, as well as organizing volunteers for grant-funded community wildfire mitigation projects such as brush pick-ups and fuelbreak maintenance. Paradise has an active Fire Protection District Commission but unfortunately, does not currently have a Fire Safe Council. There are many resources available to a Fire Safe Council, such as grant funding for projects, and Paradise residents should consider acting to start such a community group.

Preventing Home Ignitions During Wildfires

To reduce ember ignitions and fire spread, homeowners should be sure they're addressing these three areas:

- Limit the amount of flammable vegetation within the 100' defensible space zone around the house.
- Choose fire-resistant building materials.
- Perform regular maintenance as needed within the three vegetation zones around the house.

Defensible Space/Vegetation Management

Vegetation management is important for protecting homes in Paradise and Swall Meadows from wildfire. The most damaging fires in the area will be driven by high winds, with grass being the primary agent of fire spread. Under windy conditions, fuelbreaks will not stop the spread of fire, and should only be cut and maintained directly adjacent to roads and homes, where reducing brush and conifer fuel loading can reduce fire intensities, improving public and emergency responder safety during wildfire events.

The CWPP area is in the middle of an important deer migration route and brush provides important browse for the deer, especially in the winter (Scheinost, P.L., J. Scianna, D.G. Ogle. 2010). Where possible, outside of the 100' defensible space buffer, fuels management should focus on pruning dead material out of the brush. Avoid removing entire shrubs. Removing brush also creates openings for invasive grasses such as cheatgrass, which increase fire spread rates

and have no browse value for wildlife. Soil disturbance causes the spread of weeds - no mastication or mowing of brush is recommended.

Defensible Space – The first 5 feet.
The area within five feet of the home is *the most critical zone* to keep clear of flammable materials. It must meet or exceed PRC 4291 requirements. This zone should be covered with rock, cement, pavers, bare earth, or green grass.

No dead grass, dead trees, weeds, landscape mulch, firewood, lumber, tarps, or anything else, which can burn should be in this zone. Wooden fences should never touch a building – leave a 12-18" gap and fill it with wire fencing, chain-link, or another material which cannot spread fire from a burning fence to your house. Remove anything stored underneath decks or porches.

Remove flammable shrubs and trees. This includes native plants, such as: big sagebrush, antelope bitterbrush, rubber rabbitbrush, curly leaf rabbitbrush, bunch grasses, and pine. Ornamental plants that should be removed or not planted in this area include evergreens (juniper, lavender, spruce, mugo pine, arborvitae, etc.), Scotch broom and large exotic grasses. When removing shrubs, leave the root systems in place.

Defensible Space – Five to 30 feet.
This is the area 5-30' from the house and must meet or exceed PRC 4291 requirements:

- Clear vegetation from under or within 10 feet of propane tanks.
- Remove most brush. If you wish to retain a few specimen plants, make sure they are free of dead wood and leaves, pruned to reduce the amount of fuel, and separated from adjacent brush.
- Shorter plants, less than 2 feet tall, are better choices than taller plants.
- Deciduous shrubs and trees are better choices than evergreen types. Avoid planting juniper, mugo pine, spruce, Jeffery pine, or arborvitae.
- Keep your firewood out of this zone.
- Create fuelbreaks with driveways, walkways/paths, patios, rock.
- Keep lawns and native grasses mowed to a height of two inches or less.
- Remove ladder fuels (vegetation under trees) so a surface fire cannot reach the tree crowns.
- Prune trees up six to ten feet from the ground; for shorter trees do not exceed 1/3 of the overall tree height.
- Space trees to have a minimum of eighteen feet between crowns with this distance increasing along with the percentage of slope.
- Tree placement should be planned to ensure the mature canopy is no closer than ten feet to the edge of the structure.
- Tree and shrubs in this zone should be limited to small clusters of a few each to break up the continuity of the vegetation across the landscape.

Defensible Space – The Extended Zone
30-100 feet, and out as far as 200 feet if you are on a steep slope. This zone should also meet or exceed PRC 4291 requirements. The goal here is not to eliminate fire but to interrupt fire's path and keep flames smaller and on the ground.

- Weed eat all grasses down to 4" or less.
- Dispose of heavy accumulations of ground litter/debris.
- Remove dead plant and tree material.
- Remove small conifers growing between mature trees.
- Remove vegetation adjacent to storage sheds or other outbuildings within this area.
- Trees 30 to 60 feet from the home should have at least 12 feet between canopy tops.
- Trees 60 to 100 feet from the home should have at least 6 feet between the canopy tops.

Summary of High-Priority Firesafe Building Improvements

From University of California Cooperative Extension, 2010, *Home Survival in Wildfire Prone Areas Building Materials and Design Considerations*.

Roofing
Use materials with a Class A fire rating. Follow installation instructions to insure performance as designed and tested. Keep in mind that roof edge openings in the eaves and gabled ends need to be properly installed and meet current firesafe standards or they will increase structure ignitability. Simply having a Class A roof rating is not the only thing needed to improve a home's survivability. A good reference is, https://ucanr.edu/sites/Wildfire/Roof/Roof_Covering/

Gutters
If debris accumulates in the gutter—and if it is ignited by embers—the flames will impinge on components at the edge of the roof. Clean vegetative debris from gutter on a regular basis. Some gutter cover devices result in the accumulation of debris behind the device.

Plug gaps that occur between roof covering and roof sheathing, which can occur at the roof edge (for example, with a barrel-style roof) or at the ridge.

Make sure to clear needles and other combustible debris from areas where the roof intersects with walls (such as at a dormer) or other roof sections (such as at a valley)

Vents
Attic and crawl space vents are susceptible to the entry of small embers. These embers can ignite fine fuels that have accumulated in these areas. At a minimum, replace ¼" mesh screen with ⅛" mesh. Consider making vent covers that can be installed prior to the approach of a wildfire (and removed after the wildfire threat has passed). https://ucanr.edu/sites/Wildfire/Vents/

Decks
Decks are vulnerable to an under-deck surface fire or direct ember exposure from above. If ignited, the deck will provide a longer flaming exposure to the side of your house and potentially your eaves.

Avoid storing combustible materials under your deck. At a minimum, use deck boards that comply with the provisions of the California Building Code. Noncombustible and ignition-resistant materials are available for use. It is also a good idea to seal deck bottoms with metal screens to prevent ember entry.

Windows
An open window is the most vulnerable window during a wildfire. Window shutters or other pre-made window covers provide additional protection for the window. The glass is the most vulnerable part of your window. Multi-pane tempered glass windows will provide the most protection for a reasonable cost. Special fire-rated glass is also available, but it is much more expensive than tempered glass. Maintaining adequate defensible space and using shutters or covers, will provide similar protection at lower cost. Window screens can also help protect the glass from radiant heat exposure.

Eaves
Depending on the siting of the home on the parcel, as well as the combustibility of siding and decking, the eave can be vulnerable to ember and flame exposure. If you have open-eave construction, inspect blocking-rafter tail joints for openings. Seal or box in openings with noncombustible or ignition-resistant material.

Depending on the siting of the home on your parcel, a wide overhang could result in a greater wildfire exposure (e.g., if your home is located midslope, a wildfire burning up the slope might cause more severe ember and flame exposure to the underside of the eave). We still recommend having a wide overhang, which adds protection from rain and sun.

Siding
The type of siding is less important than other factors in your home construction when it comes to wildfire. The key is to reduce the likelihood for prolonged exposure of the siding to flames, regardless of source (i.e., nearby vegetation or another burning building). Reduce the amount of combustible materials near your home.

If ignited, combustible siding can result in flaming exposure to other components, such as windows and eave and vents. When using combustible siding, the more complicated lap joint designs (such as tongue-and-groove and ship lap) provide more protection against flame penetration at lap joints. Although joints are normally viewed as being vulnerable, in this case you are looking for a joint that decreases the ability of fire to move from the outside to the inside of your home—so "complicated" is good. Underlying sheathing will also improve the resistance of a siding product to penetration from flames. Adding a layer of 5/8" sheetrock under the siding material can provide an extra level of protection.

Compliance with California Defensible Space Regulations

None of the information above is intended to contradict any of the requirements of California Public Resource Code 4291 – Defensible Space. All properties should be kept in a condition which meets or exceeds the current requirements of PRC 4291. (Link to full text of PRC 4291 can be found in the References section).

Wildfire Evacuation

Historically, fires in the CWPP area have been driven by high winds, spreading incredibly quickly. It is always best to evacuate as soon as possible when the order is given by the Mono

County Sheriff's Office. CAL FIRE has critical information on what to do if you inadvertently become trapped near a wildfire: http://www.readyforwildfire.org/What-To-Do-If-Trapped/

WHAT TO DO IF YOU BECOME TRAPPED NEAR A WILDFIRE

While in your vehicle:
- Stay calm.
- Park your vehicle in an area clear of vegetation.
- Close all vehicle windows and vents.
- Cover yourself with wool blanket or jacket.
- Lie on vehicle floor.
- Use your cell phone to advise officials—call 911.

While on foot:
- Stay calm.
- Go to an area clear of vegetation, a ditch or depression on level ground if possible.
- Lie face down, cover up your body.
- Use your cell phone to advise officials—call 911.

While in your home:
- Stay calm, keep your family together.
- Call 911 and inform authorities of your location.
- Fill sinks and tubs with cold water.
- Keep doors and windows closed but unlocked.
- Stay inside your house.
- Stay away from outside walls and windows.

Emergency Communications and Evacuation Warnings

Mono County utilizes what is known as the CodeRed Emergency Alert System when a critical incident or emergency situation takes place within the county. Alerts are sent by phone or text to notify the entire county or specific areas within the county of important information. All residents should register for CodeRed alerts ASAP by going to the Mono County Sheriff's Office website: https://monosheriff.org/sheriff/page/codered-emergency-alert-system.

The Mono County Emergency Operations Plan (2012) warns: “No one system exists that can quickly alert and warn every citizen of an evacuation emergency. Effective public alert and warning will be accomplished only using multiple systems…" “(Emergency) vehicle loudspeakers are the best way to give instant directions to the public that may not be near a radio or TV during late night hours when most people are sleeping and wouldn’t see EAS alerts, or away from their phones (for CodeRed alerts), or during power outages."

The fire districts could install distinctive evacuation sirens, which could be used to signal evacuation to residents.

During development of this document several people suggested the idea of developing a 'Phone-Tree' for notifying each other of wildfire events. Power outages may make many cordless or internet-based/VOIP phones unusable during a wildfire, but this idea bears further discussion.

More information on Mono County Emergency Communications is available at these links:

https://monosheriff.org/sheriff/page/emergency-services
https://monosheriff.org/sheriff/page/codered-emergency-alert-system
https://monosheriff.org/sites/default/files/fileattachments/sheriff_-_coroner/page/8077/mono_county_oa_eop_2012.pdf

Alerting and Warning People with Access and Functional Needs (PAFN)

Mono County maintains a registry for residents who may need special assistance during an evacuation event. Residents with access and functional needs should register with emergency response agencies so those agencies can better serve them in a disaster or other emergency. Information shared with the registry will remain private and only shared with emergency response agencies. To sign up for the registry or request more information, visit https://monosheriff.org/sheriff/page/codered-emergency-alert-system or call Mono County Health Department at (760) 924-1830.

General information on preparing for wildfire evacuations:
http://www.readyforwildfire.org/

Emergency information may be available local radio stations: KIBS 100.7 FM, KBOV 1230 AM, and local TV Stations: https://www.sierrawave.net/

Water Sources or Availability of Water for Fire Suppression.

Existing water tanks need to be augmented with tanks that are larger and better able to supply the needs of the two communities, as described by the recommendations of the respective water districts. The upper two-thirds of the community of Swall Meadows does not have water-district hydrants. Installing fire hydrants will be expensive and it may make more sense to install several water tanks to provide an adequate water source. New homes are required by code to have a 2500-gallon water storage tank for firefighting purposes. There are at least 19 parcels in Swall Meadows that meet this requirement.

Most major wildfires in the project area occur during periods of high winds where power outages are likely. The two water districts that service portions of the communities have stated a need for backup diesel generators to operate their pumps when grid-power is unavailable.

Road Issues that could Prevent Easy Evacuation.

Swall Meadows has only one access in and out via Swall Meadows Road. Both Swall Meadows and Paradise have only Lower Rock Creek Road to get in or out of their communities.

The Wheeler Crest Fire Department and Fire Safe Council have recommended construction of a gated emergency access road that would extend north from Quail Circle, connecting with Swall

Meadows Road. See maps and Mono County Public Works analysis in Appendix D.

The CWPP consulting team also recommends spending time and energy on roadside clearance projects which reduce fire intensity along the established roads in Swall Meadows. The US Forest Service has an obligation to work with communities to provide safe roadside clearances to allow for safe evacuations. The community needs to work with the private and public land agencies to reduce the fire hazards that exist along the roads and come to an agreement on what is necessary.

6. Fuel Treatments Completed and Recommended Projects

This section is devoted to fuel treatments that have been done in the past 10 years and treatments that are recommended through evaluation of the fire behavior and local fire experience.

Table 10 below is a worksheet for use to better understand the needs when applying for a grant to treat an area. The worksheet is made up of items that are typically asked when applying for a grant. Once a priority is set the project manager should gather the information requested in the worksheet.

CWPP PROJECT DEFINITION DATA SHEET	
Grantee:	
Project Title:	Project Coordinates:
Project Number:	Priority:
CEQA Status:	Project Status:
Project Type:	
Number of Acres:	
Fuel Type:	Treatment:
Parcels requiring right of entry:	
Habitable Structures protected by project:	
Estimated Cost per Acre:	Total estimated cost:
Funding Source:	
Insert Project Map (Standard GIS format)	
And a "Current" photo	

Table 10 - CWPP Project Data sheet

USFS/BLM Projects in the CWPP Area

The USFS has been proactive with treatments on their land in and near the communities. The communities have had concerns about the treatments and has been involved with communicating to and influencing the USFS in implementing treatments that will provide the best possible protection. Table 11 below is a breakdown of the acreages of the Wildland Urban Interface (WUI) Zones by owner.

Acreage per WUI Zone (both communities) by Owner					
Owner	**Core**	**Defense**	**Threat**	**Total**	**% of WUI**
USFS	357.80	1544.52	5461.14	7363.46	46.45%
BLM	192.76	1428.26	3138.72	4759.74	30.02%
LAWPD	195.91	568.05	1672.86	2436.82	15.37%
CADFW	86.86	63.07	0.00	149.93	0.95%
Private	743.94	148.30	14.55	906.79	5.72%
ESLT (Easement & fee owned)	143.25	93.48	0.00	236.73	1.49%
TOTAL	1720.52	3845.68	10287.27	15853.47	100.00%

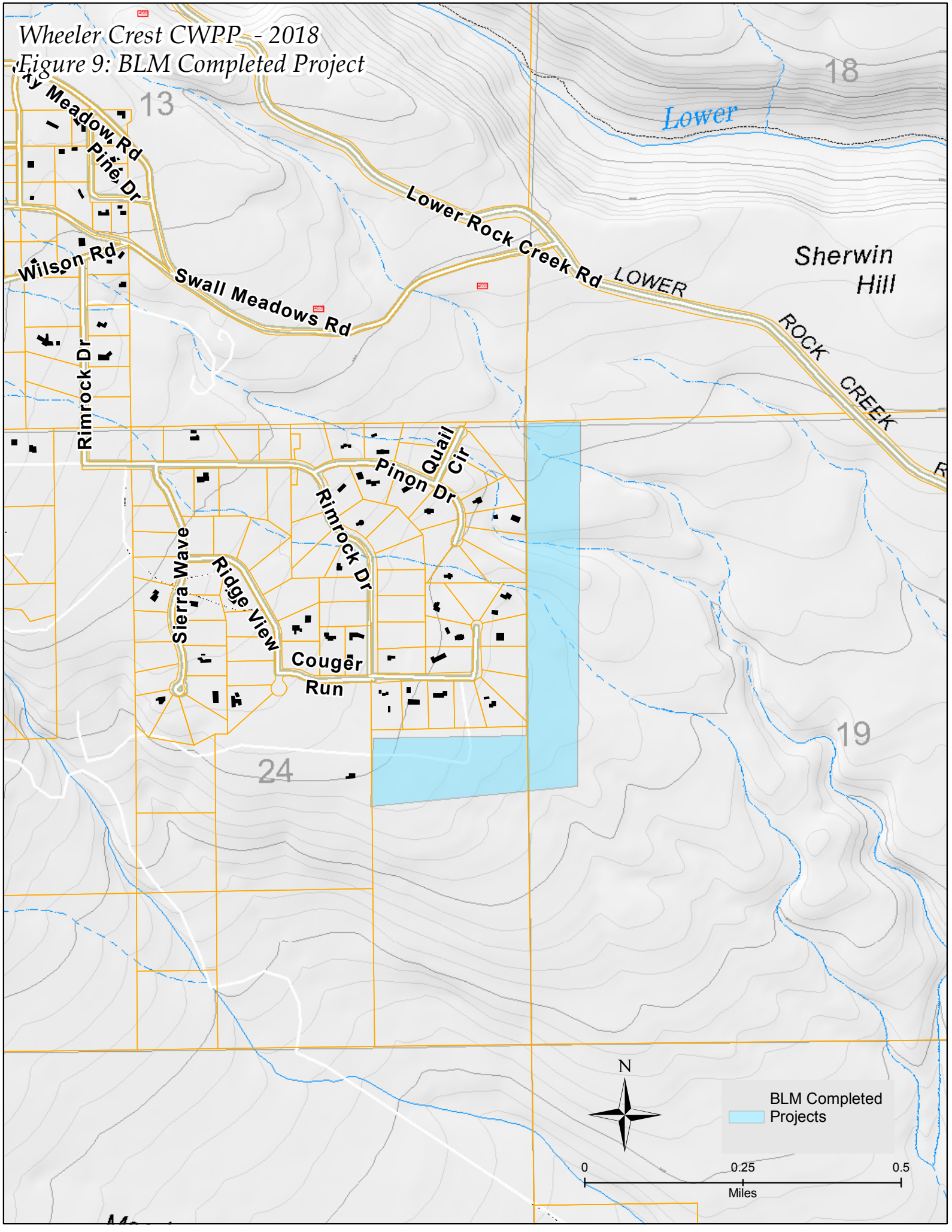
Table 11 - Ownership Acreage by WUI Zone

The USFS has a responsibility to work with the communities when developing treatments to reduce the fire hazards within these zones. The identified WUI zones also help the communities establish priorities for projects adjacent to where the USFS has determined the need for treatment. This kind of synergy between the community and the USFS will improve protection and increase the effectiveness of hazardous fuel reduction. The Fire Safe Council has been proactive in its participation with the USFS and will continue to do so in the future. It is important for the community the USFS and BLM to continue to work together to create fire-resilient conditions in the CWPP area.

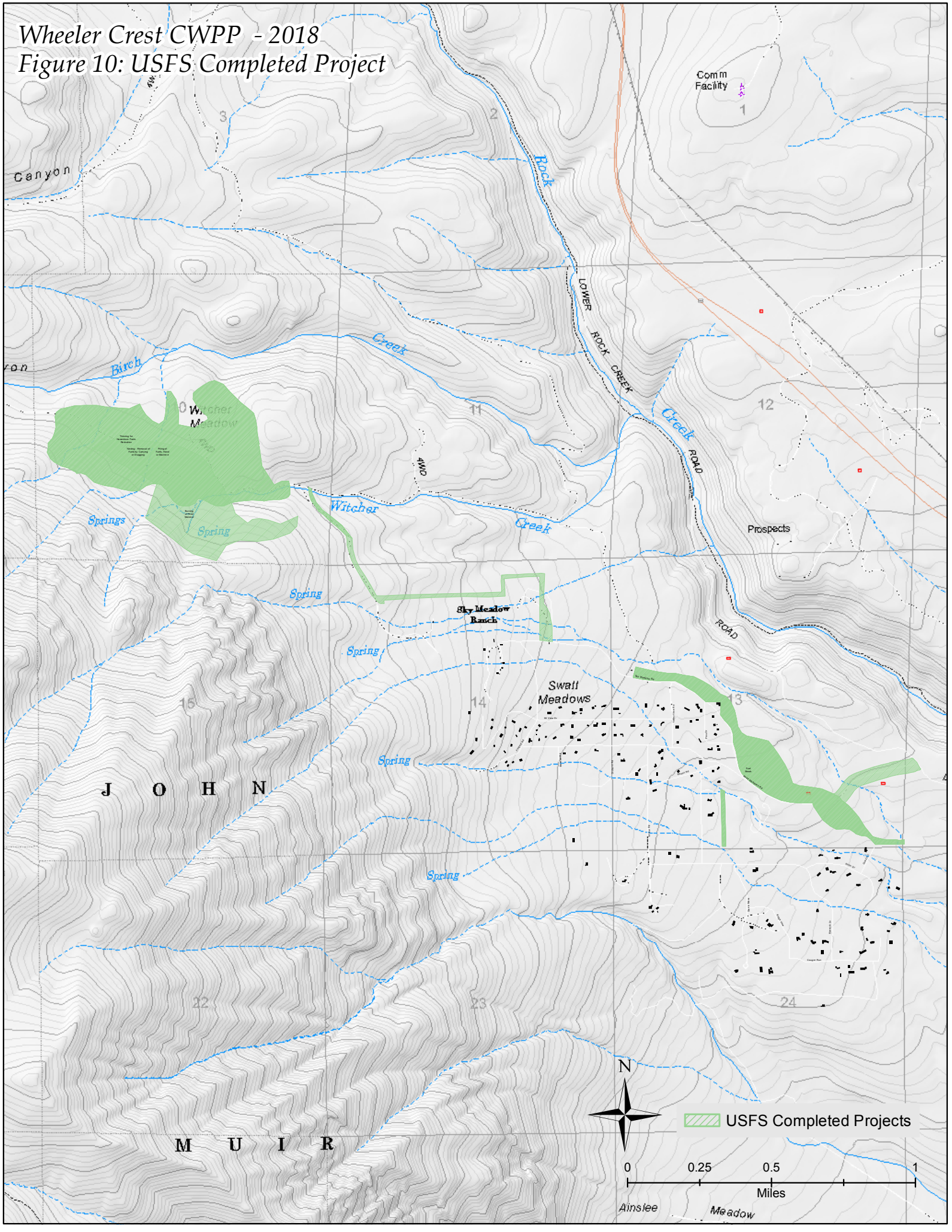
It is important for the community to work with the various land ownerships to be sure the treatments that were implemented get maintained on a regular schedule to prevent their useful life from expiring. The agencies should be able to recommend a treatment schedule.

The Bureau of Land Management (BLM) completed a fuel reduction project on the south and east sides of lower Swall Meadows (Figure 9). The United States Forest Service (USFS) completed a fuel reduction project on the east and north sides of Swall Meadows (Figure 10).

Wheeler Crest CWPP - 2018
Figure 9: BLM Completed Project



Wheeler Crest CWPP - 2018
Figure 10: USFS Completed Project



CAL FIRE Projects

The communities and the local fire departments have used the local CAL FIRE fire crew from Owens Valley Conservation Camp (CC) in Bishop. The 2018 San Bernardino Unit Fire Plan identifies Swall Meadows roadside thinning and removal of roadside dead trees from the Round Fire on USFS land as project tasks for Owens Valley CC crews. The Unit Fire Plan also says the crews will do maintenance and clean-up around the fire stations in Paradise and Swall Meadows.[7]

Wheeler Crest Community Projects

From 2009 to 2017, the Wheeler Crest FPD and FSC successfully completed three fuel-reduction grants (two funded by the CA Fire Safe Council, one by CAL FIRE). All three facilitated the removal of several hundred tons of vegetation from ~100 homeowners' lots, as well as the creation and maintenance of nine fuelbreaks that provide critical buffers for helping slow fire movement into and within the residential community (Figure 11). These projects, which the community views as ongoing, also had contained a significant outreach and education component, comprised of community meetings, informational letters to homeowners, and one-on-one consultations about affected properties. The following table is a list of projects and their priorities developed by the Swall Meadows and Paradise communities. They were created in conjunction with Deer Creek Resources, Wildland Rx, local Fire Chief Dale Schmidt, water districts and core team members.

[7] Unit Strategic Fire Plan San Bernardino Unit, CAL FIRE, May 2017. http://cdfdata.fire.ca.gov/pub/fireplan/fpupload/fpppdf1632.pdf

Table 12 – Paradise Community Projects

Project ID	Type	Description	Lead Agency	Priority
1	Community Preparedness	Establish and maintain a Paradise Fire Safe Council	PFPD	1
2	Community Preparedness	Conduct education outreach program for high/moderate hazard parcel owners	PFPD	1
3	Community Preparedness	Establish and maintain a fire safe education program to cover topics including, defensible space, structure hardening, fire behavior, invasive weed control, evacuation planning and preparation, include planning for people with special needs	PFPD	1
4	Community Preparedness	Work with Mono County to improve cell phone coverage	PFPD	2
5	Community Preparedness	Create Wildfire Safety notebooks for residents, including the CWPP, tips for evacuation of people and small and large animals, home preparation, and emergency information	PFPD	2
6	Fuel Reduction	Facilitate defensible space maintenance for residents through street pick-up, chipping, dump vouchers	PFPD	1
7	Fuel Reduction	Identify and construct fuelbreaks in strategic locations around community	PFPD	1
8	Fuel Reduction	Work with owners of undeveloped lots to clear high hazard flammable vegetation	PFPD	1
9	Fuel Reduction	Work collaboratively with BLM and LADWP to identify priority fuel reduction projects on abutting public lands, and to assist with funding via grants	PFPD	2
10	Fuel Reduction	Work with Mono County on annual road easement maintenance	PFPD	2
11	Fuel Reduction	Work with Mono County to create a comprehensive weed abatement program	PFPD	2
12	Structure Survivability	Work with Mono County on developing a grant program that provides residents who own older, non-compliant WUI structures the opportunity to make the exteriors code-compliant	PFPD	1
13	Emergency Water Supply	Replace 9 older Dresser hydrants	PFPD	2

14	Emergency Water Supply	Add 70,000 gallons water storage (existing storage, 110,000 gallons, to service 107 homes + 38 unimproved lots is insufficient based on daily draw down)	PFPD	2
15	Emergency Water Supply	Add back up power (80kw generator) for community wells	PFPD	3
16	Access and Egress	Work with Mono County to install reflective, fire resistant street signs	PFPD	1
17	Access and Egress	Work with residents to install reflective, fire resistant home address signs	PFPD	1
18	Access and Egress	Work with the LADWP and BLM to repair road to Ainsley Meadow to the west of Paradise to facilitate access by emergency vehicles	PFPD	2
19	Fire Department Readiness	Create pre-fire notebooks and geo-referenced PDF map app for local fire departments and out of area emergency personnel	PFPD	1
20	Fire Department Readiness	Work with Mono County to enhance radio communication capabilities for FD	PFPD	1

Table 13 – Swall Meadows Community Projects

Project ID	Type	Description	Lead Agency	Priority
1	Community Preparedness	Conduct education outreach program for high/moderate hazard parcel owners	WCFSC	1
2	Community Preparedness	Develop a fire safe education program that includes defensible space, structure hardening, fire behavior, invasive weed control, evacuation planning and preparation, include planning for people with special needs	WCFSC	1
3	Community Preparedness	Create Wildfire Safety notebooks for residents, including the CWPP, tips for evacuation of people and animals, and emergency information	WCFSC	1
4	Community Preparedness	Install evacuation siren(s) to alert community to emergency evacuation orders	WCFSC, WCFPD	1
5	Community Preparedness	Create Wheeler Crest Fire Safe Council website	WCFSC	3
6	Community Preparedness	Work with Mono County to improve cell phone coverage	WCFSC	3
7	Fuel Reduction	Facilitate defensible space maintenance for residents and fuel load reduction on vacant parcels through brush street pick-up, chipping, and dump vouchers	WCFSC	1
8	Fuel Reduction	Work with owners of undeveloped lots to clear high hazard flammable vegetation	WCFSC	1
9	Fuel Reduction	Work with SCE and Mono County to maintain fire mitigation around power lines and put lines underground where high hazards exist	WCFSC	1
10	Fuel Reduction	Work collaboratively with INF, CDFW, BLM and ESLT to identify priority fuelbreaks and fuel reduction projects on abutting public lands, and to assist with funding via grants	WCFSC	2
11	Fuel Reduction	Work with Mono County to create a comprehensive weed abatement program	WCFSC	2
12	Structure Survivability	Work with Mono County and/or NGOs on developing a grant program that provides residents who own older, non-compliant WUI structures the opportunity to make the exteriors code-compliant	WCFSC	1
13	Emergency Water Supply	Drill well and install large water tank to supply Firehouse	WCFPD	1
14	Emergency Water Supply	Increase number of individual emergency water storage tanks and create annual monitoring and maintenance program for tanks. Create a map of the location of tanks.	WCFSC	2
15	Emergency Water Supply	Install water storage tank(s) and hydrants in upper Swall Meadows	WCFSC	3
16	Emergency Water Supply	Add back up power for Wheeler Crest Community Services District water system	WCCSD	3
17	Access and Egress	Work with Mono County to install reflective, fire resistant street signs	WCFSC	1

18	Access and Egress	Work with Mono County and Inyo National Forest to build emergency access route from Quail Circle to Swall Meadows Road	WCFSC	1
19	Fire Department Readiness	Create pre-fire notebooks and geo-referenced PDF map app for local fire departments and out of area emergency personnel	WCFSC	1
20	Fire Department Readiness	Work with Mono County to enhance radio communication capabilities for FD	WCFPD	2

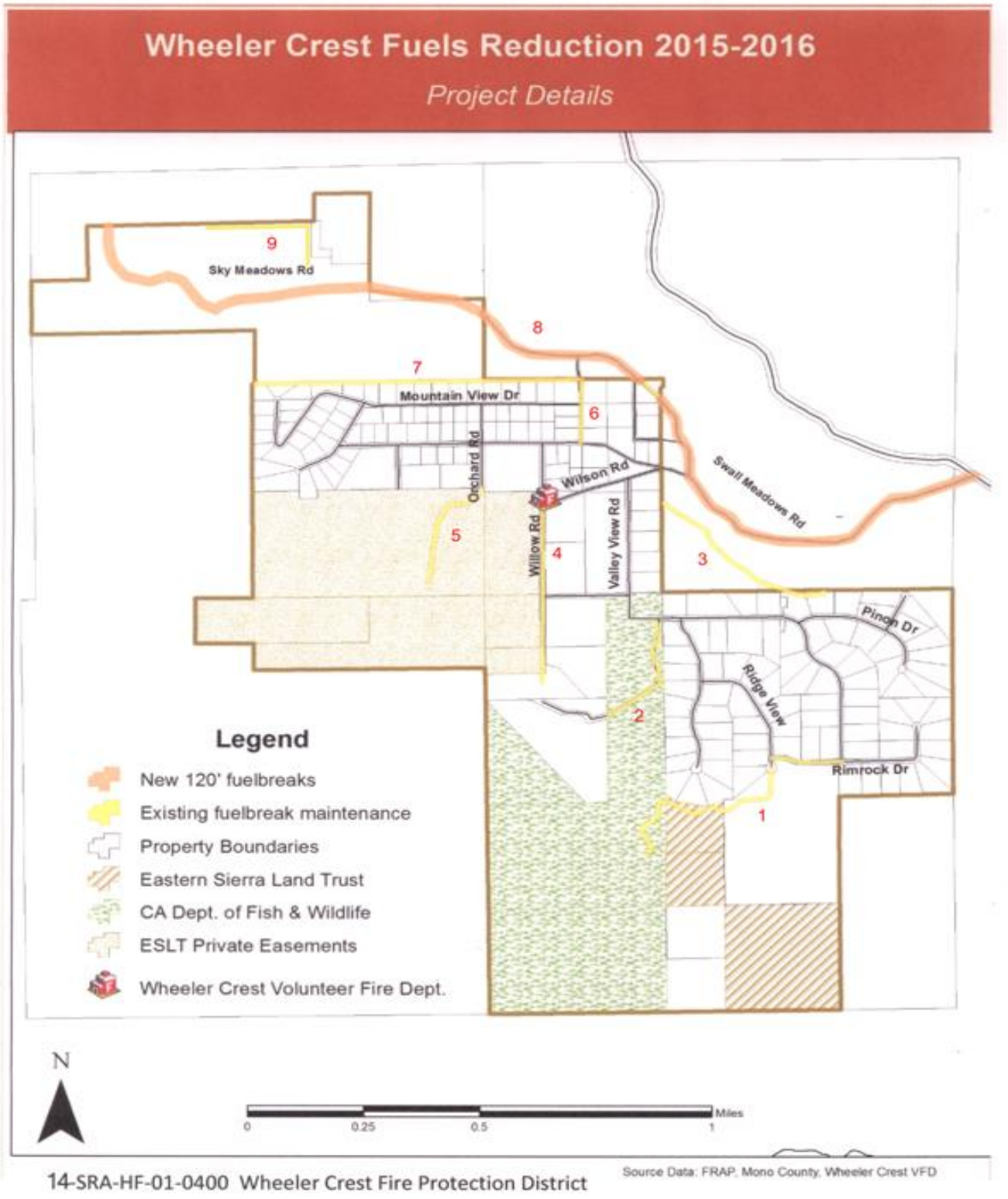


Figure 11 - Fire Safe Council Fuel Reduction Projects

Southern California Edison

The California Public Utilities Commission has designated the Swall Meadows and Paradise communities as a Tier 2. This means that the Utility has a responsibility to make certain changes to its infrastructure.

More information needs to be provided to the Fire Safe Council about how Southern California Edison plans to harden their electrical transmission infrastructure in the CWPP project area but due to a court case related to the Round Fire, they could not provide information at the time of the development of this document and did not participate.

More information on utility fire hazard mitigation requirements can be found at:

http://www.cpuc.ca.gov/firethreatmaps/

7. Monitoring and Evaluating the CWPP Recommendations and Accomplishments

Monitoring and Evaluation

A CWPP does not end when it is adopted; a thorough process should involve a continuous cycle of collaborative planning, implementation, monitoring and adapting strategies based on lessons learned. As communities learn from successes and challenges during the development and implementation of their CWPP, stakeholders may identify new actions, propose a shift in how decisions are made, or actions are accomplished, and evaluate the resources necessary for successful CWPP implementation.

- Track accomplishments and identify the extent to which CWPP goals have been met.
- Examine collaborative relationships and their contributions to CWPP implementation, including existing participants and potential new partners.
- Identify actions and priority fuels reduction projects that have not been implemented, and why; set a course for future actions and update the plan.

The following table is a framework that can help a community in monitoring and evaluating its CWPP. The table lists six CWPP goals and a series of questions to help communities monitor and evaluate accomplishments, challenges, and how well goals have been met. Communities and agencies may want to work together to ensure that, at a minimum, data are collected to evaluate the plan measures to gain consistency. The community must recognize that fire safety is rapidly changing. It is likely that new developments and new sources of funding for fire safety will become available from year to year. It is recommended that this plan be reviewed on an annual basis by the fire districts with updates every 5 years or sooner if necessary.

Responsibility for monitoring evaluating and updating the CWPP falls on the Wheeler Crest Fire Safe Council and the Wheeler Crest Fire Protection District as well as the Paradise Fire Safe Council (when formed) and the Paradise Fire Protection District.

CWPP Monitoring and Evaluation Table	
1. Partnerships and Collaboration	1.1 Who has been involved with CWPP development and implementation? How have relationships grown or changed through implementation? What resources did they bring to the table?
	1.2 Have partners involved in the planning process remained engaged in implementation? Have new partners become involved? How have the relationships established through the CWPP enhanced opportunities to address CWPP goals?
	1.3 How has the collaborative process assisted in implementing the CWPP and building capacity for the community to reduce wildfire risk?
	1.4 Has CWPP collaboration made a difference or had a positive impact on local organizations, neighborhoods and/or actions?
2. Risk Assessment	2.1 How has population growth/change and development in your community affected wildfire risk?
	2.2 Are there new or updated data sources that may change the risk assessment and influence fuels priorities?
	2.3 Has the community enacted a wildfire-related ordinance? If so, county, state, or local?
	2.4 Has the community enforced local or CPR 4291 ordinances
3. Reducing Hazardous Fuels	3.1 How many acres have been treated for hazardous fuels reduction on public and private land that were identified as high-priority projects in the CWPP? What percentage of total acres treated does this constitute? Have fuels reduction projects been maintained?

	3.2 How many fuels reduction projects have spanned ownership boundaries to include public and private land?
	3.3 What is the number and percent of residents that have participated in projects and completed defensible space on their land?
	3.4 How many hazardous fuels reduction projects have been implemented in connection with a forest restoration project?
	3.5 Economic development resulting from fuels reduction? How many local jobs have resulted because of fuels reduction or restoration activities?
	3.6 Evaluate any CWPP fuels treatment utilized during suppression for effectiveness
	3.7 Are there funding sources for fuels Projects?
4. Reducing Structural Ignitability	4.1 What kind of resource losses (homes, property, infra-structure, etc.) have occurred from wildfires?
	4.2 Are the current codes and regulations for wildfire hazard adequate? If not, are there efforts to change or update them? Are there action items in the CWPP to develop codes and recommendations?
	4.3 Has the public knowledge and understanding about structural ignitability been increased by strategies adopted in the CWPP? Have homeowners been educated on how to reduce home ignitability, and are they replacing flammable building components with non-flammable materials?
	4.4 How many Firewise Communities have been recognized? How many citizens, neighborhoods, or communities have taken action to increase the resilience of their structure to fire?

	4.5 How has the availability and capacity of local fire agencies to respond to wildland and structural fires improved or changed since the CWPP was developed?
	4.6 Are the PRC 4291 defensible space requirements being met?
5. Education and Outreach	5.1 What kind of public involvement has the CWPP fostered? Examples include public education, household visits, demonstration projects, etc.
	5.2 Has a change in public awareness about wildfire resulted from the plan?
	5.3 What kinds of activities have citizens taken to reduce wildfire risk?
6. Emergency Management	6.1 Is the CWPP integrated within the county or municipal Emergency Operations Plan?
	6.2 Does the CWPP include an evacuation plan? If yes, has it been tested or implemented since the CWPP adoption?
	6.3 Is the CWPP aligned with other hazard mitigation plans or efforts?
	6.4 Create an Evacuation Website and be sure it is operational and has been updated with new information

Table 14 - Monitoring and Evaluating a CWPP

* Include goals that can be evaluated with measures as part of a local CWPP evaluation process. This table identifies specific measures that relate to outcomes that can be evaluated at a national level and are associated with HFRA or identified within the 10-Year Implementation Plan.

8. Local Agencies' Wildfire Response Capabilities

Wheeler Crest Fire Department

Administrative Address:	129 Willow Road, Swall Meadows, CA 93514			
Primary Service Area:	Swall Meadows			
Primary Service Population:	Approximately 220 (per 2018 Mono Co. draft Hazard Mitigation Plan)			
FY2018 Adopted Budget:	Budgeted Revenue: $72,141			
Emergency Medical Service:	EMTs			
SERVICES PROVIDED:		Who		
Specific Services	Self	Contract		
1. Dispatch	Mono County	CAD 911 Dispatch		
2. Fire Suppression	Yes			
3. Basic Rescue	Yes			
4. Advanced Rescue	No			
5. Vegetation Mgmt.	WCFSC			
6. Fire Code Permit/Enforcement	Yes/no			
7. Haz Mat Response	No			
8. Construction Plan Check	Yes			
9. Fire Investigation	No			
10. Community Info/ Education WCFSC				

Fire Stations: 1	Equipment ICS Type	No.	Location	
	Type 1 engine	2		
	Type 3 engine	1		
	Type 1 water tender	1		
Personnel:	Number	Position		
Paid Staff:	0			
Reserve-Volunteers:	18 volunteers			
Support Vehicles	0			
SERVICE PROFILE:				
Service Calls (CY 2017)*	Count		Average Response Time	
Structure Fire	0			
Wildland Fire	17		15-30 minutes	
EMS/Rescue	3		10 minutes	
Hazardous Conditions	Vehicle Fires: 2		15 minutes	
Service Call	0			
Good Intent	Non-medical: 2		5 minutes	
All Others				
Totals	24			
Notes on Service calls	Wildland Fires: were out of district calls EMS/Rescue: Were in district and out of district Non-medical: were in district Vehicle Fires: were on Sherwin Grade			
ISO Class Rating	3/3Y Hydrant/No hydrant			

Table 15 - Wheeler Crest Fire Department Response Capabilities

Paradise Fire Department

Administrative Address:	5300 Old Sherwin Grade Road, Bishop, CA 93514			
Primary Service Area:	Paradise Camp			
Primary Service Population:	Approximately 150 (per 2018 Mono Co. draft Hazard Mitigation Plan)			
FY2018 Adopted Budget:	$25,300			
Emergency Medical Service:	EMT			
SERVICES PROVIDED:		Who		
Specific Services	Self	Contract		
1. Dispatch	Mono County	CAD 911 Dispatch		
2. Fire Suppression	Yes			
3. Basic Rescue	Yes			
4. Advanced Rescue	No			
5. Vegetation Mgmt.	No			
6. Fire Code Permit/Enforcement	No			
7. Haz Mat Response	No			
8. Construction Plan Check	Yes			
9. Fire Investigation	No			
10. Community Info/Education: Paradise Fire Protection District				
	Type 1 engine	1		
	Type 6 engine	1		
Personnel:	Number	Position		

Paid Staff:	0			
Reserve-Volunteers:	5 Reserve, 9 volunteers			
Support Vehicles	0			
SERVICE PROFILE:				
Service Calls (CY 2017)*	Count		Average Response Time	
Structure Fire	0			
Wildland Fire	1		12 minutes	
EMS/Rescue	9		12 minutes	
Hazardous Conditions	Vehicle Fires: 7		12 minutes	
Service Call	2		2 minutes (these are in station response)	
Good Intent	0			
All Others				
Totals	19			
ISO Class Rating	8			

Table 16 - Paradise Fire Department Response Capabilities

The Inyo National Forest fire organization is combined with the Bureau of Land Management (BLM) Bishop Field Office fire organization into one Interagency Fire Management Organization. The management area combines the public land of the Inyo National Forest and BLM Bishop Field Office in Inyo and Mono Counties in California and part of Mineral and Esmeralda Counties in Nevada, covering over 2 million acres. The Interagency Fire Management Organization maintains 8 fire stations with 9 engines, 7 fire prevention patrol units, 2 water tenders, a 10-person fire use management hand crew, a 20-person hotshot crew, an air tanker reload base and a helitack base.

In Mono County the State Responsibility Area (SRA) for wildland fire inside the Inyo National Forest is in the direct protection area (DPA) of the Inyo National Forest. This is provided under contract and the state pays the USFS for this service. The SRA outside the National Forest boundaries in Mono County is in the DPA of the BLM. In exchange the BLM land in Inyo County is in the DPA of CAL FIRE's San Bernardino Unit, Eastern Sierra Division. The DPAs are evaluated periodically by the agencies to determine payments and responsibilities. That evaluation is usually at the request of one of the agencies and can change yearly.

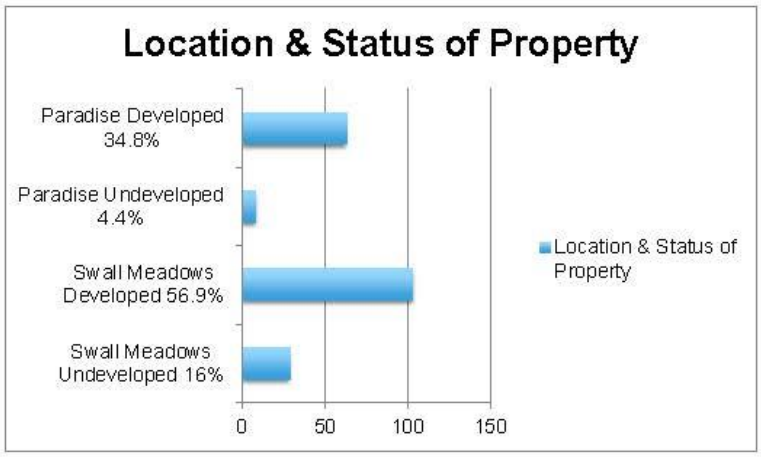
This document is not meant to make recommendations for fire suppression resources. It should be pointed out, however, that determining DPAs is the responsibility of the fire agencies, whether they be local, state, or federal. Local fire departments can do the review through its Insurance Service Office (ISO) rating or can independently determine suppression needs by a third-party analysis. It is not the responsibility of the CWPP to recommend changes unless the local fire departments have concerns and want those concerns identified.

Appendix A – Community Questionnaire Results

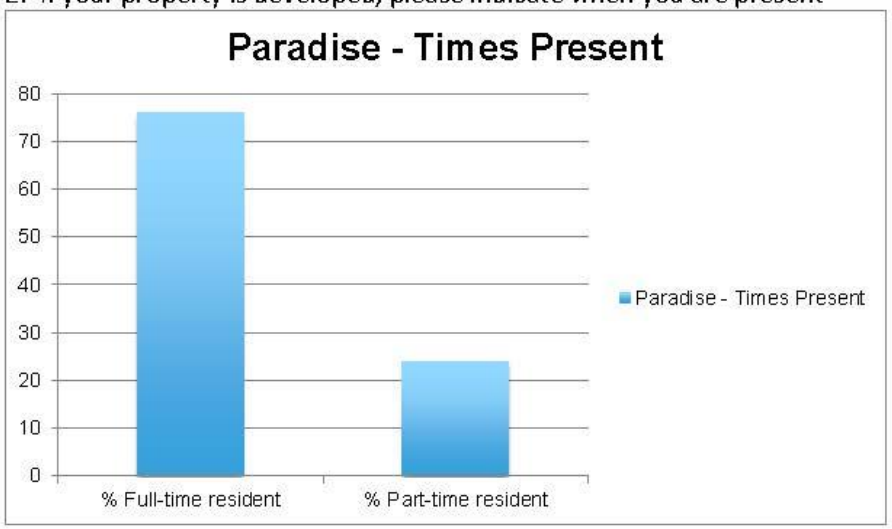
Wheeler Crest and Paradise Community Wildfire Protection Plan
Survey Results

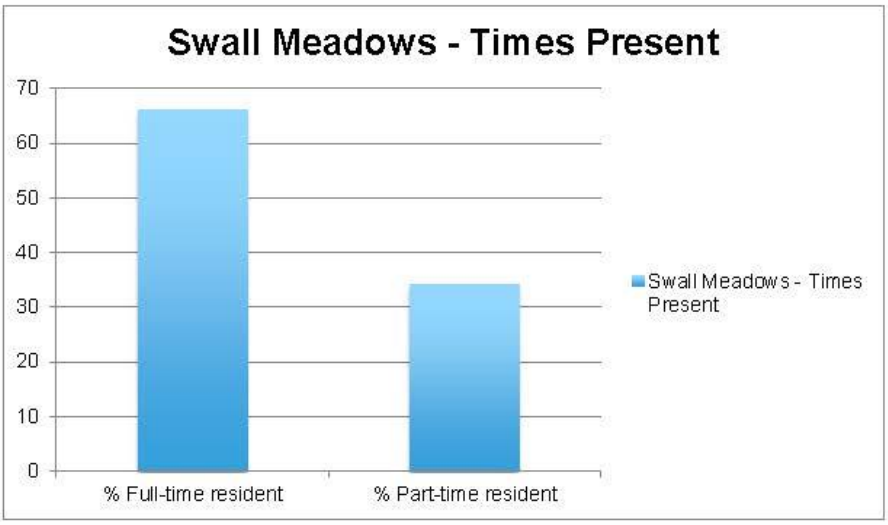
The survey was mailed out to 325 property owners in Swall Meadows and Paradise. The mailing included a self-addressed return envelope. The survey was also available online. Total surveys returned were 184 for a 57% return rate.

1. Please indicate the area and status of your property

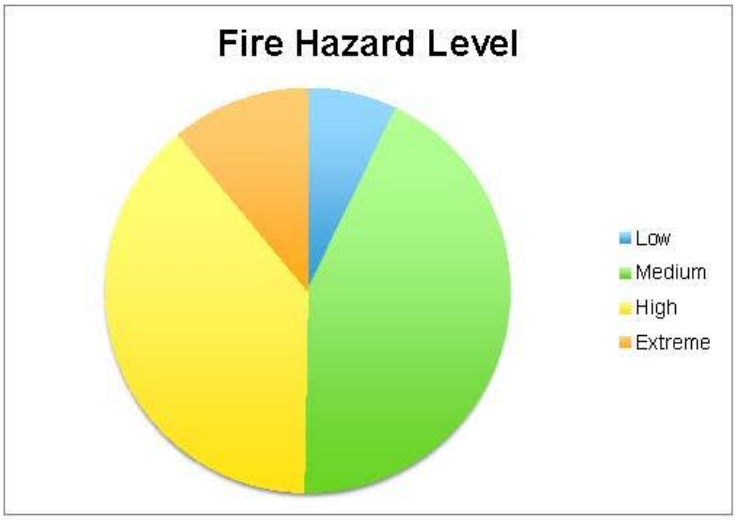


2. If your property is developed, please indicate when you are present



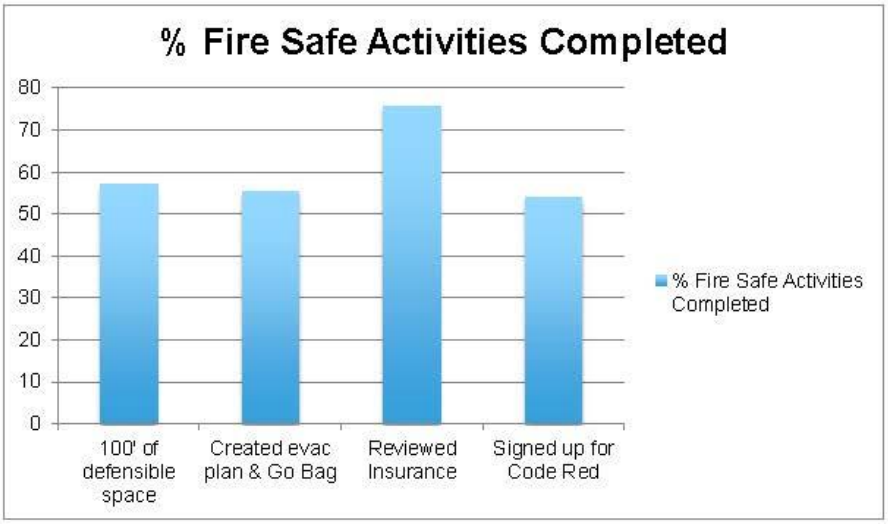


3. How would you characterize the fire hazard in your neighborhood?

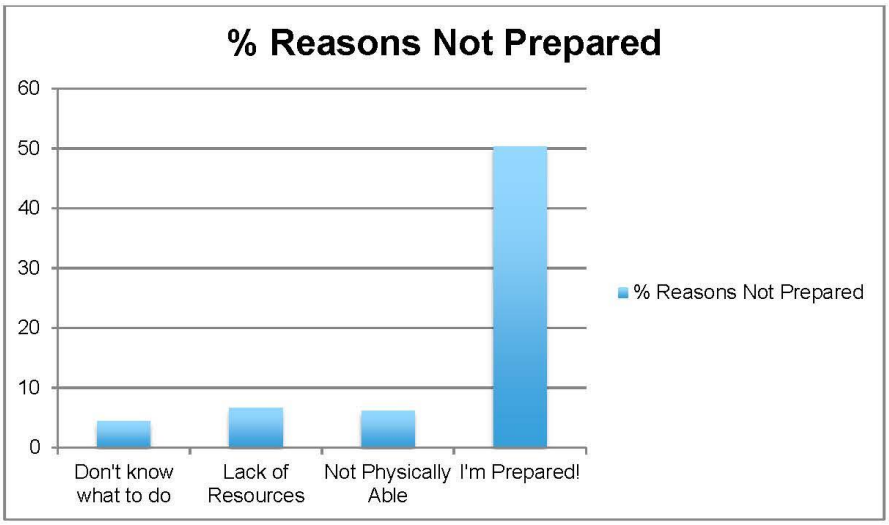


4. How safe do you feel from damage and destruction from a wildland fire?

5. Please check all the fire safe activities that you have completed



6. Please check all reasons that you may not be prepared for the next wildfire



7. Please indicate your interest in learning more about wildfire preparedness for the following subjects

Invasive Species Management	57.5%
Evacuation planning and procedures	48.1%
Fire Behavior Basics	42%
Defensible space	39.8%
Fire Resistant Structures	32.6%
Home insurance	23.2%

8. How would you like wildfire preparedness information disseminated?

Email	54.9%
Website/Weblink	45.1%
Fire Safe Council meetings	29.7%
Physical Paper Mailing of Materials	28.6%
NextDoor community email	26.3%
Community Bulletin Board	6.3%

9. Swall Meadows - What would you like to see done in your neighborhood to improve fire safety?

Top Themes from Swall Meadows

1. Unimproved lots and roadsides should have flammable brush and weeds removed.
2. Invasive and flammable weeds in and around the community should be removed
3. Secondary emergency access road should be developed
4. Better management of surrounding public lands
5. Fire breaks should be maintained
6. More community fire preparedness education
7. Bury power lines

Paradise - What would you like to see done in your neighborhood to improve fire safety?

Top Themes

1. Fuels reduction, weed control, and defensible space within the neighborhood
2. More water storage
3. Fire break around the perimeter of Paradise
4. Back up power for mutual well pumps
5. More participation in Fire Dept.

10. Swall Meadows - What are your most pressing thoughts or concerns regarding wildfire?

Top Themes

1. Fear of the next fire
2. Evacuation concerns
3. Flammable vegetation in and around the community
4. Power lines

Paradise - What are your most pressing thoughts or concerns regarding wildfire?

Top Themes

1. Safety and evacuation
2. Neighbors not having defensible space around their property

11. Swall Meadows – How can we help you be more prepared for a wildfire?

Top Themes

1. Continue community education and engagement
2. Provide property defensible space evaluations
3. Encourage maintenance of vacant lots
4. Make it very easy to get rid of excess brush every year

Paradise - How can we help you be more prepared for a wildfire?

Top Themes

1. Provide education and information to the community
2. Provide help with fuel reduction
3. Seek funding to help with fire preparedness

Appendix B - Fire Behavior Modeling

Fire Behavior Modeling Descriptions
(from http://www.fire.org/)

FlamMap is a fire behavior mapping and analysis program that computes potential fire behavior characteristics (spread rate, flame length, fire line intensity, etc.) over an entire FARSITE landscape for constant weather and fuel moisture conditions.

- FlamMap software creates raster maps of potential fire behavior characteristics (spread rate, flame length, crown fire activity, etc.) and environmental conditions (dead fuel moistures, mid-flame wind speeds, and solar irradiance) over an entire *FARSITE* landscape. These raster maps can be viewed in FlamMap or exported for use in a GIS, image, or word processor.
- FlamMap is not a replacement for *FARSITE* or a complete fire growth simulation model. There is no temporal component in FlamMap. It uses spatial information on topography and fuels to calculate fire behavior characteristics at one instant.
- It uses the same spatial and tabular data as *FARSITE*:
    - a Landscape (.LCP) File,
    - Initial Fuel Moistures (.FMS) File,
    - optional Custom Fuel Model (.FMD),
    - optional Conversion (.CNV),
    - optional Weather (.WTR), and
    - optional Wind (.WND) Files.
- It incorporates the following fire behavior models:
    - Rothermel's 1972 surface fire model
    - Van Wagner's 1977 crown fire initiation model
    - Rothermel's 1991 crown fire spread model
    - Nelson's 2000 dead fuel moisture model
- FlamMap runs under Microsoft Windows operating systems (Windows 95, 98, me, NT, 2000, and XP) and features a graphical user interface.
- Users may need the support of a geographic information system (GIS) analyst to use FlamMap because it requires spatial coincident landscape raster information to run.

FlamMap is widely used by the National Park Service, Forest Service, and other federal and state land management agencies in support of fire management activities. It is designed for use by those familiar with fuels, weather, topography, wildfire situations, and the associated terminology. Because of its complexity, only users with the proper fire behavior training and experience should use FlamMap where the outputs are to be used for making fire and land management decisions.

Fire Behavior Indicators

Crown Fire

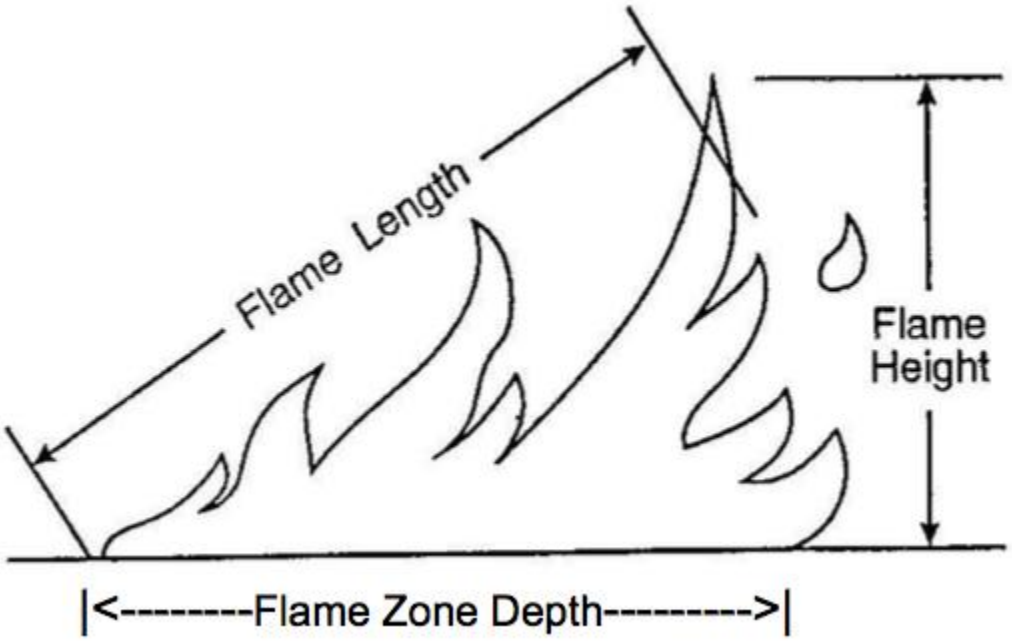
- Fire type 1 is a surface fire; the fire is generally on the ground, high likelihood of initial attack success.
- Fire type 2 is a passive crown fire, (torching and short-range spotting).
- Fire type 3 is an active crown fire, (fire actively moving in the crowns of trees with mid to long range spotting).

Rate of Spread

- Measures in feet per minute

Flame Length

- Measured in feet
- ***Flame Length:*** The distance measured from the average flame tip to the middle of the active flaming zone at the base of the fire. It is measured on a slant when the flames are tilted due to effects of wind and slope.
- ***Flame Height:*** The average height of flames as measured vertically, up and down. It is estimated by comparing the flame to a nearby object of known height. Flame height is needed to estimate spot distance from a burning pile.



FireFamilyPlus

https://www.firelab.org/project/firefamilyplus

FireFamilyPlus is a software system used to summarize and analyze historic daily fire weather observations and to compute fire danger indices based on the National Fire Danger Rating

System (NFDRS) or the Canadian Fire Danger Rating System (CAN). Fire occurrence data can also be analyzed and cross-referenced with weather data to help determine critical levels for staffing and to establish fire danger for an area. This program was used to develop the weather parameters to run FLAMMAP those parameters are listed below. The 90th percentile weather was used for this analysis. This is indicative of high fire danger days during the fire season when humidity is less than 15%, temperatures are greater than 70º, and wind speeds are greater than 6

043710 - Percentile Weather for RERAP: ERC - Model: 7C2AE1

FireFamily Plus Percentile Weather Report for RERAP

Station: 043710: ROCK CREEK Variable: ERC
Model: 7C2AE1
Data Years: 2007 - 2017
Date Range: January 1 - December 31
Wind Directions: N, NE, E, SE, W, NW

Percentiles, Probabilities, and Mid-Points

Variable/Component Range	Low	Mod	High	Ext
Percentile Range	0 - 15	16 - 89	90 - 97	98 - 100
Climatol. Probability	15	75	7	3
Mid-Point ERC	0 - 0	19 - 19	24 - 24	26 - 26
Num Observations	1140	612	424	118
Calculated Spread Comp.	0	12	15	16
Calculated ERC	0	19	24	26

Fuel Moistures

1 Hour Fuel Moisture	34.58	3.77	1.71	0.91
10 Hour Fuel Moisture	34.70	5.03	2.66	1.87
100 Hour Fuel Moisture	25.64	9.18	6.41	5.70
Herbaceous Fuel Moisture	34.73	5.79	2.08	0.91
Woody Fuel Moisture	51.09	61.23	58.81	56.30
20' Wind Speed	4.50	6.62	6.32	6.11
1000 Hour Fuel Moisture	27.16	10.64	8.40	9.29

7950 Weather Records Used, 7280 Days With Wind (91.57%)

miles per hour.

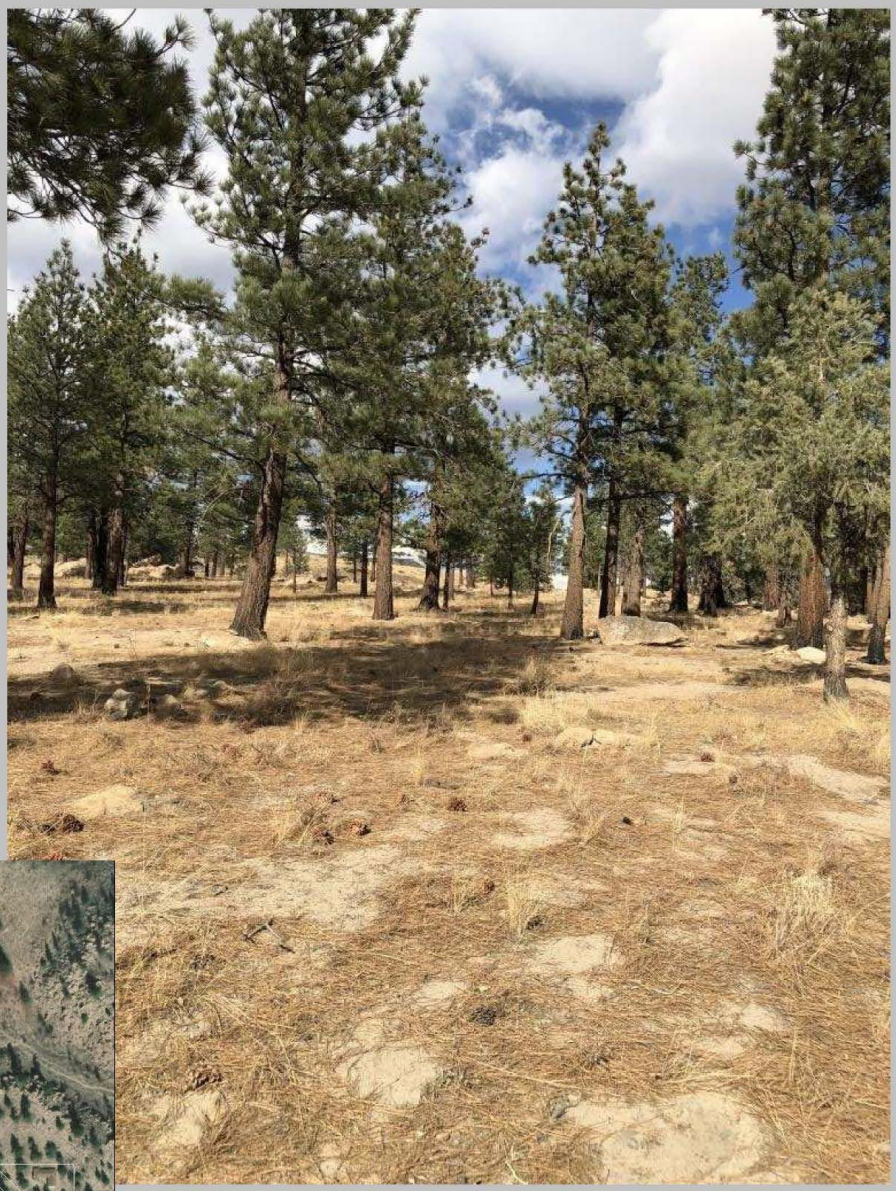
Figure 12 - FireFamily Weather for FLAMMAP

Vegetation and Fuel Model

Photo 1

Vegetation
Jeffrey pine overstory,
conifer litter and low grass.

Fire Behavior
Low flame length low rate of spread limited crown fire.



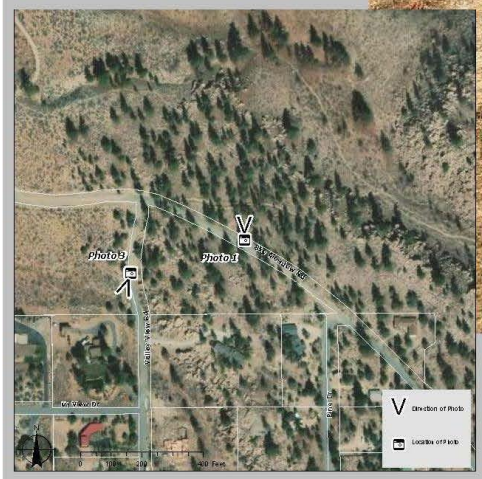


Figure 13 - Sample Vegetation Photo 1

Photo 2

Vegetation
Sagebrush, pinyon pine, juniper.

Fire Behavior
Rapid rate of spread high flame lengths. Active crown fire.

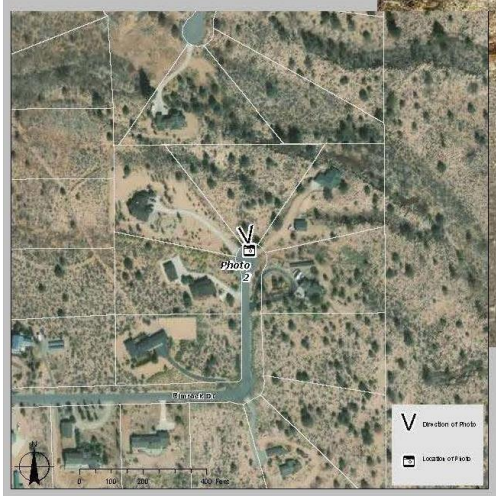
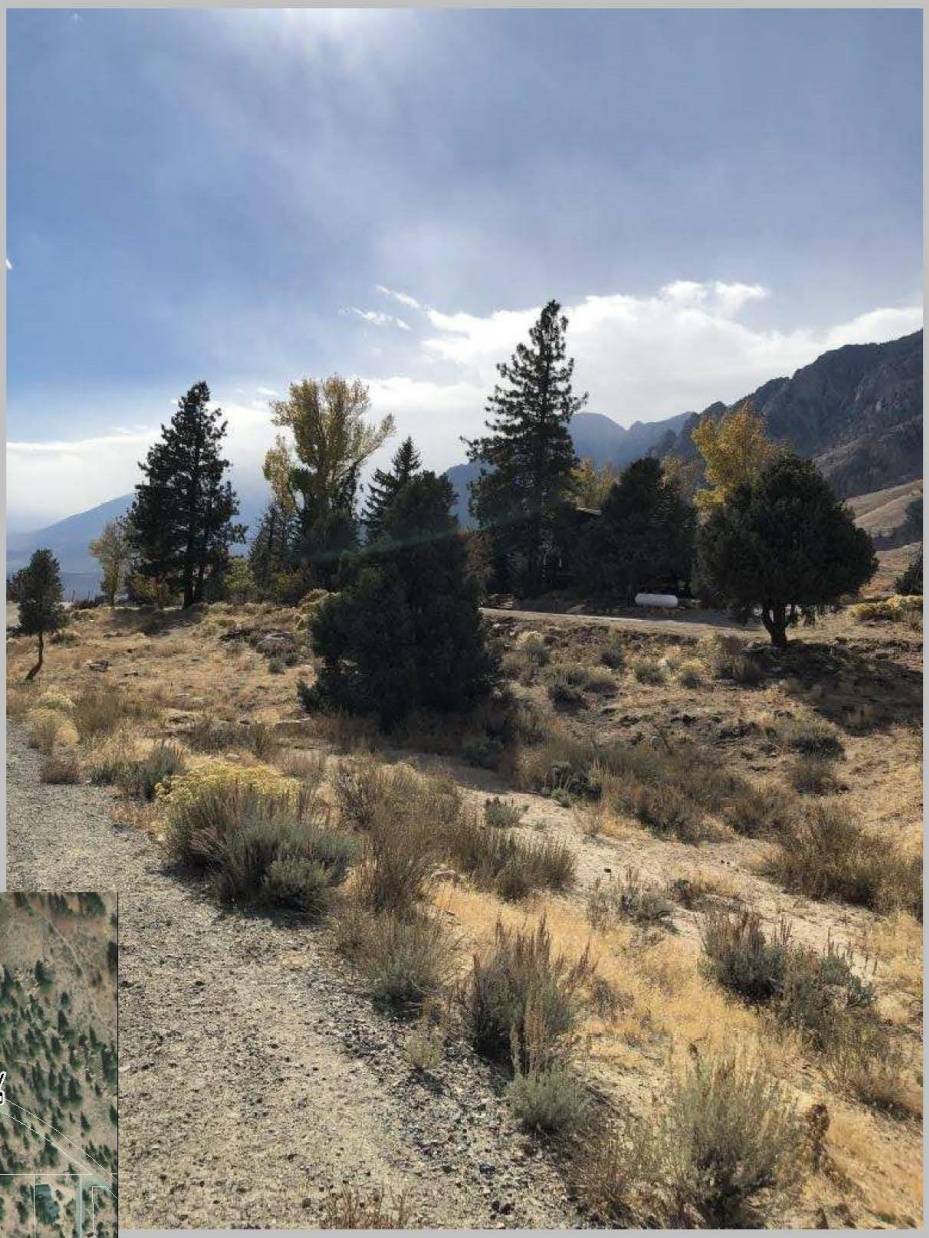


Figure 14 - Sample Vegetation Photo 2

Photo 3

Vegetation
Sagebrush, pinyon pine, juniper, grasses, and Jeffrey pine.

Fire Behavior
Rapid rate of spread, crown fire and extreme flame lengths.



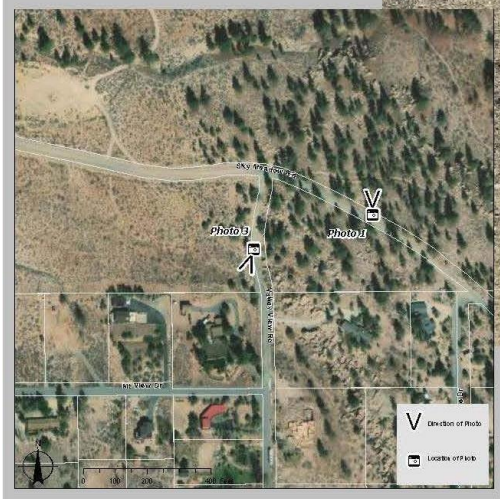
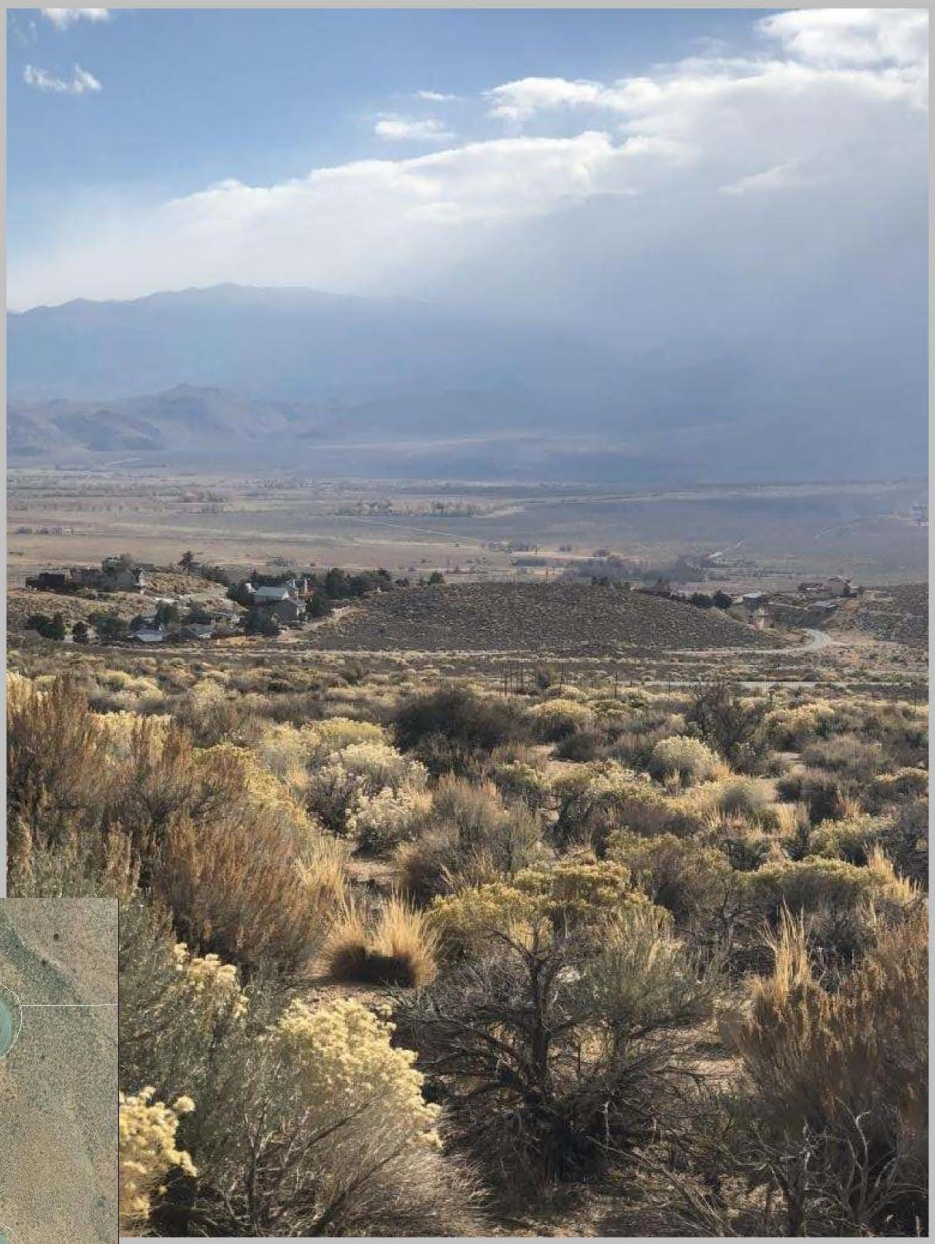


Figure 15 - Sample Vegetation Photo 3

Photo 4

Vegetation
Sagebrush and grasses in the foreground, in midground below the homes in Paradise is blackbrush.

Fire Behavior
Foreground: rapid rate of spread and high flame lengths, midground will burn under high winds with high flame lengths and rapid rates of spread.



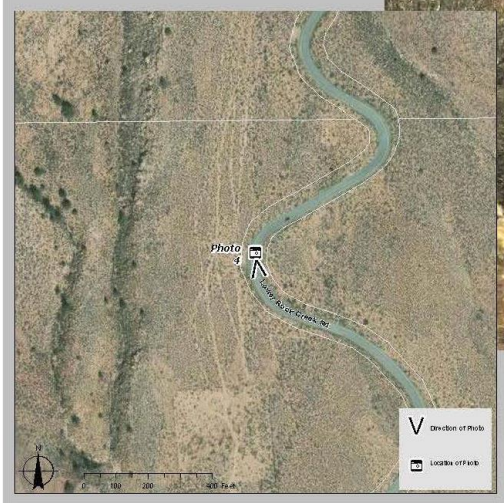
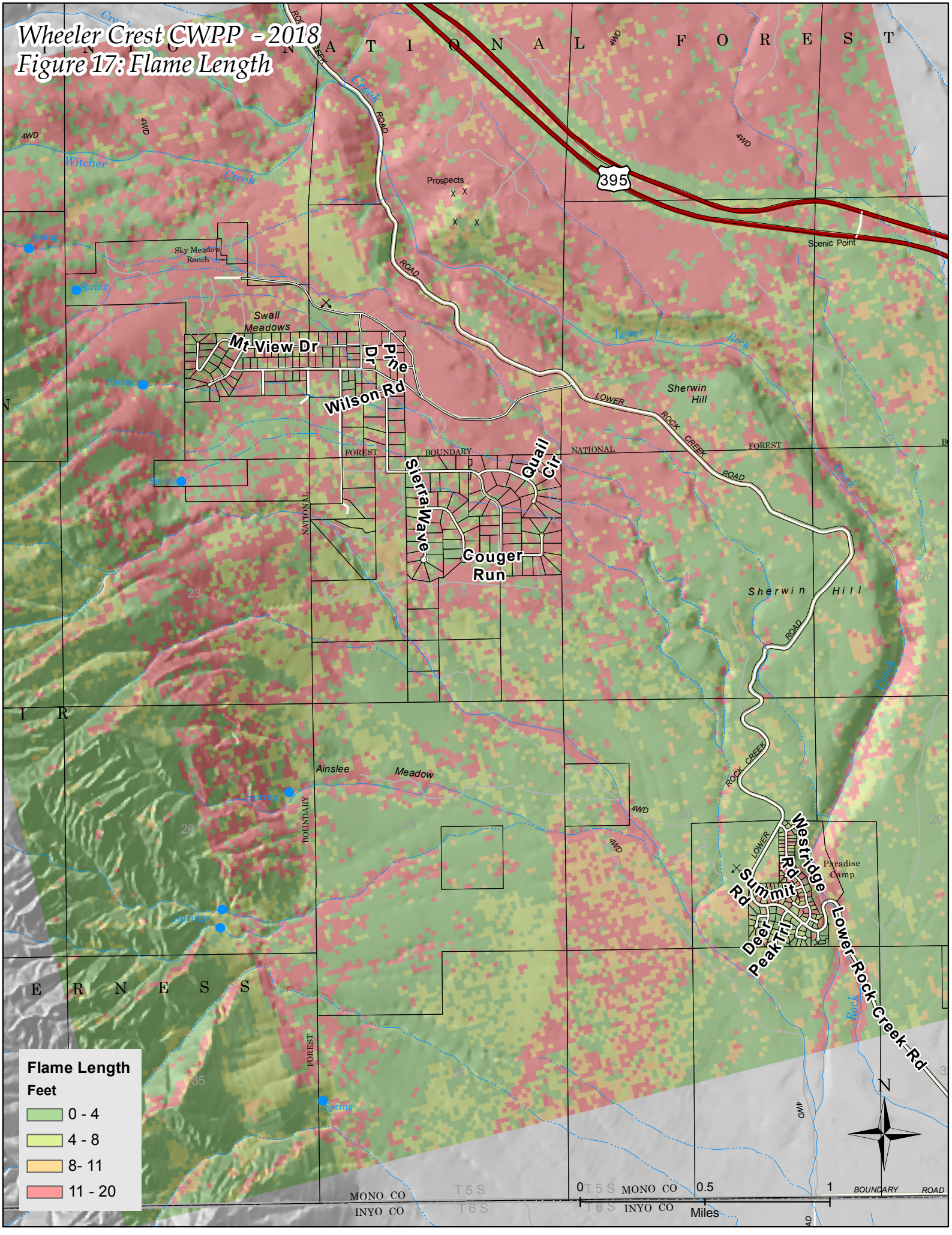
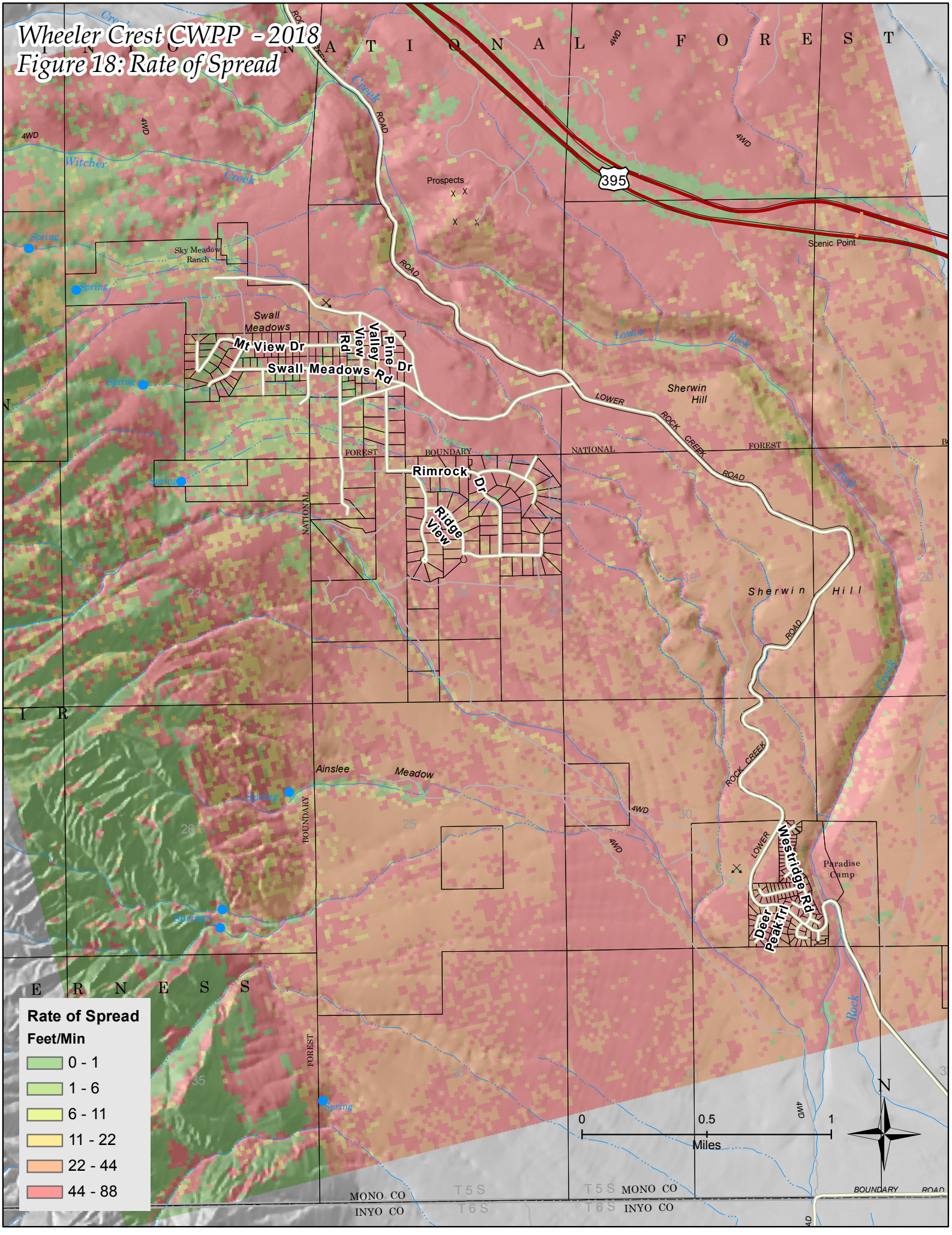


Figure 16 - Sample Vegetation Photo 4

Wheeler Crest CWPP - 2018
Figure 17: Flame Length



Wheeler Crest CWPP - 2018
Figure 18: Rate of Spread



Appendix C - Wheeler Crest Community Service District Information

From an August 2018 letter from the Chairman to CWPP Consultant Barry Callenberger.

There are two water systems under the Wheeler Crest Community Service District WCCSD. The ***Hilltop system*** consists of 14 active laterals, gravity fed from an artesian well (no electricity is required), a 7500-gallon reservoir with limited pressure and almost no firefighting capability. Homes on that water system that were lost in the fire have had to put in individual water tanks for fire suppression and egress to satisfy current water pressure requirements. Although there is a conventional well as a back-up, we do not have any plans for any kind of generator. E.g. a backup to the backup.

The ***Lower Swall Meadows Water System*** (LSMWS) is more robust and currently has the capacity to support 86 laterals or households although only 43 are currently active. All wells fill Reservoir 2. Reservoir 2 fills Reservoir 1. Seems backwards but Reservoir 2 was built higher in elevation. Reservoir 1 can be filled manually with no electricity (from Reservoir 2). Since our Well 4 is our highest producing well, that would be the most likely candidate for generator backup. Once again, it flows into and fills Reservoir 2.

You will see mention of our Sierra Controls that normally control the pumping of our wells based on the need to fill the reservoirs. We recently lost this box due to a lightning strike in addition to 2 wells. The wells were brought back online almost immediately. The reservoirs were simply monitored manually, and the wells were turned on manually until the Sierra Controls box was restored. E.g. we not currently have plans for emergency power backup to the Sierra Controls cluster.

In pressure station 2, it is a vault that monitors pressures where if hydrants are suddenly pulling water from the system, it opens a pressure reduction valve to normalize the pressure in the lower portion of the system until the hydrants are no longer pulling water.

The following is an excerpt from out standards and procedures manual.

Zone of Benefit

unconnected laterals	43
connected laterals	43

Pinon Ranch – 41 lots	14 Unconnected	27 connected
Rimrock Ranch - 46 lots	30 Unconnected	16 connected

Fire hydrants 23

Active Wells

- current static water levels and flow rates are averages

	Casing	Pump	Built	Elev	Depth Well/Pump	H20 Level Orig/Curr	Flow Rate Orig/Curr
Well 2	6 “	7.5 hp, 480V, 3ph	1971	6253	342/315	164/221	55 / 48
Well 4	12”	10 hp, 240V, 3ph	1999	6395	360/?	95/116	95 / 124
Well 5	8”	10 hp, 240V, 2ph	2011	6212	460/440	304/314	40 / 40

Retired wells

	Casing	Pump	Built	Elev	Well Depth	H20 Level	Flow Rate
Well 1	8”	7.5 hp 240 v, 3ph	1998 ret 2016	6153	430	150	22
Well 3	6”	None	1973	6395	150	150	

Reservoirs **Update 6/5/2017**

	Capacity in Gal	Location	Comp	Built	Elev
Reservoir 1	100,000	Pinon above PS1	Steel	1982	6180
Reservoir 2	120,000 – 5 20,000 tanks linked	Easement below O’Dells	Fiberglass	2000	6318

Other Stations with Pressure Reduction

	Primary Function	Pressure Reduction	Constructed	Elevation

PS1 – Pressure Station 1	Controls filling of Reservoir 1 from Reservoir 2	75 / 45	2015	6153
PR2 – Pressure Reduction Vault 2	Pressure Reduction Only	104 / 45	2002	6084

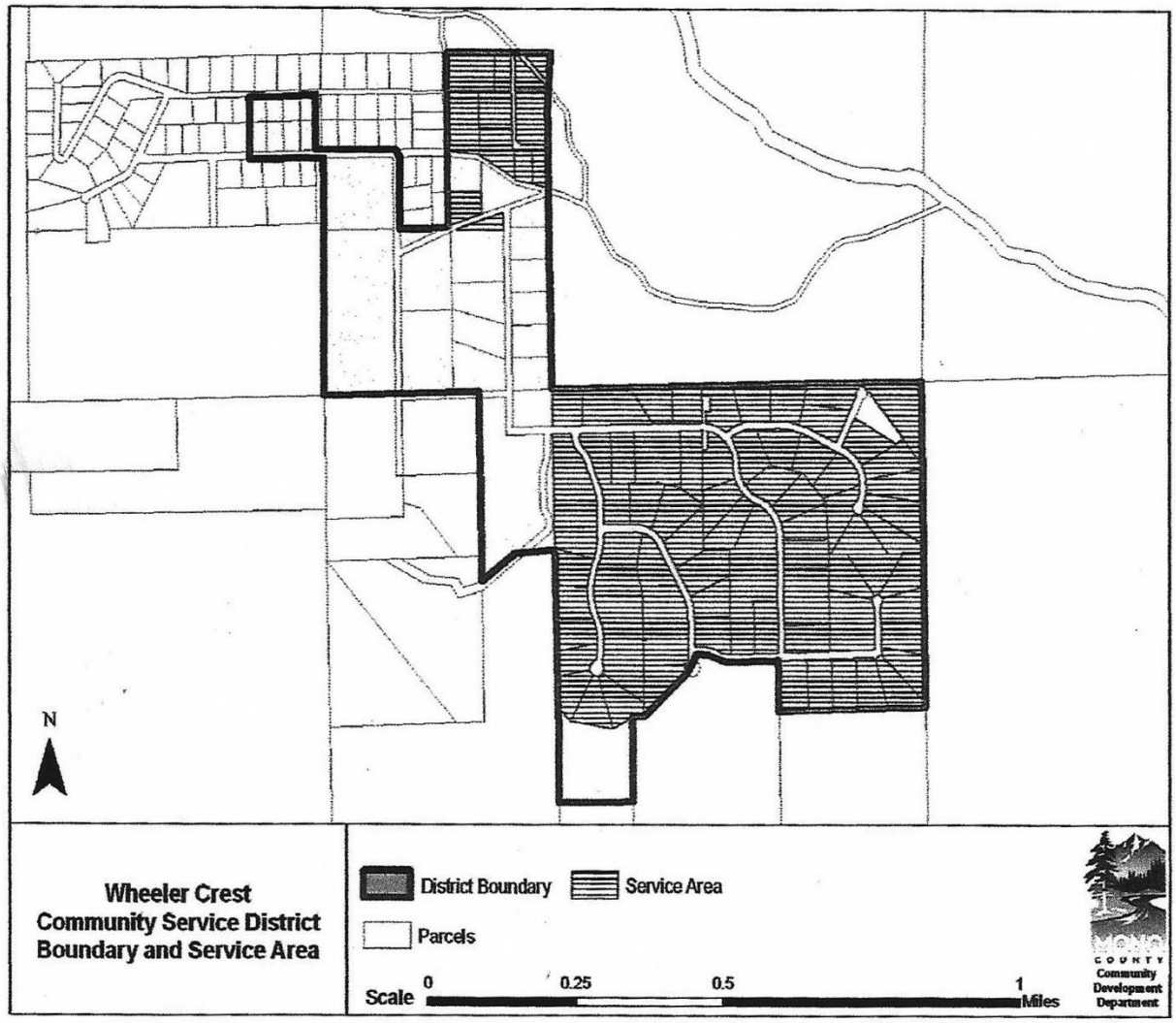
WELL AUTOMATED CONTROL SYSTEM (Sierra Controls)
- Automatically turns on pumps and opens valves depending on levels of the reservoirs
- Telemetry communications between - control panels in PS1 and WH2
  - Reservoirs 1 & 2 (monitors levels)
  - well pumps (2,4,5) turns them on and off
  - fill valve from Res 2 to fill Res 1 (located in PS1)
- *All alarm triggers turns on light outside of WH2

Pressure Station 1 (PS1) Control House - Opens valve to fill Reservoir 1 from Reservoir 2

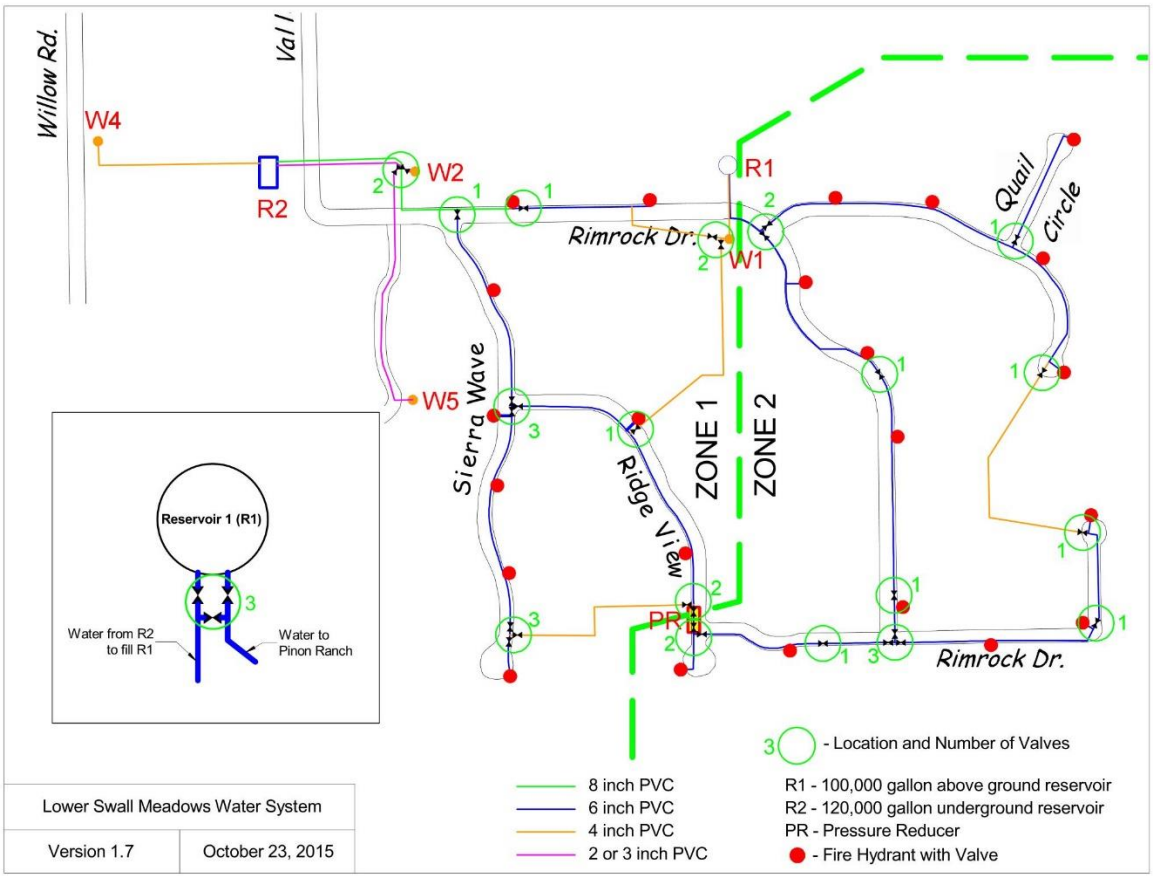
Scheduled hours of Operation	23:00 – 6:00 Daily
R1 fill level start	8.5 feet
R1 fill level stop	9.5 feet
R1 high alarm*	10 feet
R1 low alarm*	7 feet

Well House 2 (WH2) Controls - Turns on pumps in Wells 2,4,5 to fill Reservoir 2 (R2)
Alternates lead, lag and stand-by between each well pump daily

Scheduled hours of Operation	23:00 – 6:00 Daily
R2 Lead Pump start	8.5 feet
R2 Lead Pump stop	9.5 feet
R2 Lag Pump start	8 feet
R2 Lag Pump stop	9.5 feet
R2 Standby Pump start	7 feet
R2 Standby Pump stop	9 feet
R2 High alarm*	9.7 feet



- For a short narrative of what happened to the water supply during the Round Fire in 2015 or previous fires – see wheelercrestcsd.org
- The full name of your water district contact information in an emergency - see wheelercrestcsd.org
- Any needs you see that can improve the community fire suppression and water service capabilities. We talked extensively at a meeting about our district only supplies the lower portion of Swall Meadows. An engineering study was completed to place a reservoir in Upper Swall with water lines and hydrants running down the main streets.
- Do you have any maintenance concerns that you may want to apply for a grant to update services or repair. Inspected inside of our above ground steel Reservoir 1. It requires painting. It will have to be taken out of service, drained, sand blasted and painted. Estimate received of $80,000. A grant would be nice.



I hope this answers all your immediate questions. Let me know if there's anything else.

Thanks,
Glenn Inouye
Wheeler Crest Community Service District – Chairman
Ghinouye1@gmail.com
760 914-0405

The Following is a letter to the Wheeler Crest CWPP outlining the needs of the water district that services the Paradise Community

LOWER ROCK CREEK MUTUAL WATER COMPANY
245 UPPER CANYON ROAD
BISHOP, CA 93514

December 18, 2017
To whom it may concern
Re: Community Wildfire Protection Plan

The Lower Rock Creek Mutual Water Company (LRCMWC) serves the residents of the Sierra Paradise Estates and the Rock Creek Canyon Development. The goal of the company is to supply residents with an adequate supply of potable water for domestic use and fire protection. To that end, I submit that additional water storage and a standby generator for the LRCMWC would considerably increase fire suppression capabilities to support not only the Paradise Fire Department but any and all fire departments responding for area fires. National Storage Tank, Inc. has provided cost estimates for a few options:

1. Corrugated Bolted Steel Tank with interior lining, 20-year warranty, rough cost $0.60/gallon
2. Coated Carbon Bolted Steel Tank, 1-year warranty, rough cost $0.70/gallon
3. Underground Fiberglass 35,000gall tanks, 30-year warranty, rough cost $2.00/gal

Though the LRCMWC water storage tanks always maintain in reserve the required minimum of 60,000 gallons of water for fire protection, the numerous fire trucks drawing from our hydrants during the Round Fire drained the entire water system within a few hours - leaving the hydrants empty and open. Water is the number one agent for fire suppression. The combined capacity of our two existing water storage tanks when full is 110,000 gallons. Our "Business Plan" includes an additional 100,000 gallons of storage by build out (100,000gal tank X $0.60 = $60,000 plus site prep, controls, permits, etc.).

The Round Fire burned numerous power poles cutting off the necessary electrical power to run our water well. A standby generator would have kept the well in operation providing an additional 130 gallons per minute (7,800 gallons/hour) of available water for fire suppression. The water company has installed the necessary panel to switch from commercial to emergency power. A Generac Commercial 70kW (Alum-EPA/CA Emissions) to supply emergency power for our well can be purchased today from NORWALL POWER SYSTEMS for $19,299 - includes free shipping.

Additionally, nine of the twenty-two fire hydrants in Paradise Estates are nearly fifty years old, repair parts are no longer available from the manufacturer, and aftermarket parts are increasingly difficult to locate. The price quote from Western Nevada Supply for a new hydrant is $2,464.63 - not including tax or installation. Removing brush/fuel for a minimum of 100 feet from the perimeter of the development would considerably reduce the risk of structure losses.

James Moyer (760-387-0070)
President, Board of Directors
Lower Rock Creek Mutual Water Company

Swall Meadows Water District

Appendix D - Quail Circle Emergency Evacuation Route

Walter Lehmann

From:	Walter Lehmann
Sent:	Thursday, November 19, 2015 6:25 PM
To:	'Dale Schmidt (skymeadowranch@schat.net)'
Cc:	Fred Stump (fstump@mono.ca.gov); Garrett Higerd (ghigerd@mono.ca.gov); Paul Roten (proten@mono.ca.gov)
Subject:	Swall Meadows - potential emergency access
Attachments:	Pinion-Quail Circle ROW - TMB9PG67.PDF; Pinion-Quail Circle ROW - TMB9PG67A.PDF; Pinion-Quail Circle ROW - TMB9PG67B.PDF; Pinon-Quail Circle Imp Plan 1984.PDF; Swall Meadows Potential Emergency Access Route.pdf; TM37-27A Pinon Ranch - CC&Rs Vol 418-316.pdf

Dale,

Per your request I have prepared a preliminary diagram of a proposed emergency access route from Quail Circle to Swall Meadows Road. The distances and elevations are approximate and should be field surveyed to verify the feasibility of this route. Also attached are the Pinon Ranch Subdivision Maps, the CC&Rs, and the Quail Circle Road Improvement Plan.

Unfortunately I misspoke that there was an easement coming off of Quail Circle to USFS Land. To create that easement, permission from the owners of Lot 5 and/or Lot 6 would be needed. Let me know if you require additional public records for Swall Meadows.

Walt Lehmann
Engineering Technician III
Mono County Dept. of Public Works
P.O. Box 457
Bridgeport, CA 93517
wlehmann@mono.ca.gov
760.932.5445

Support of Land Development, Facilities and Capital Improvement Projects.
Assisting with project coordination, public document requests and drafting.

Swall Meadows Potential Emergency Access Route

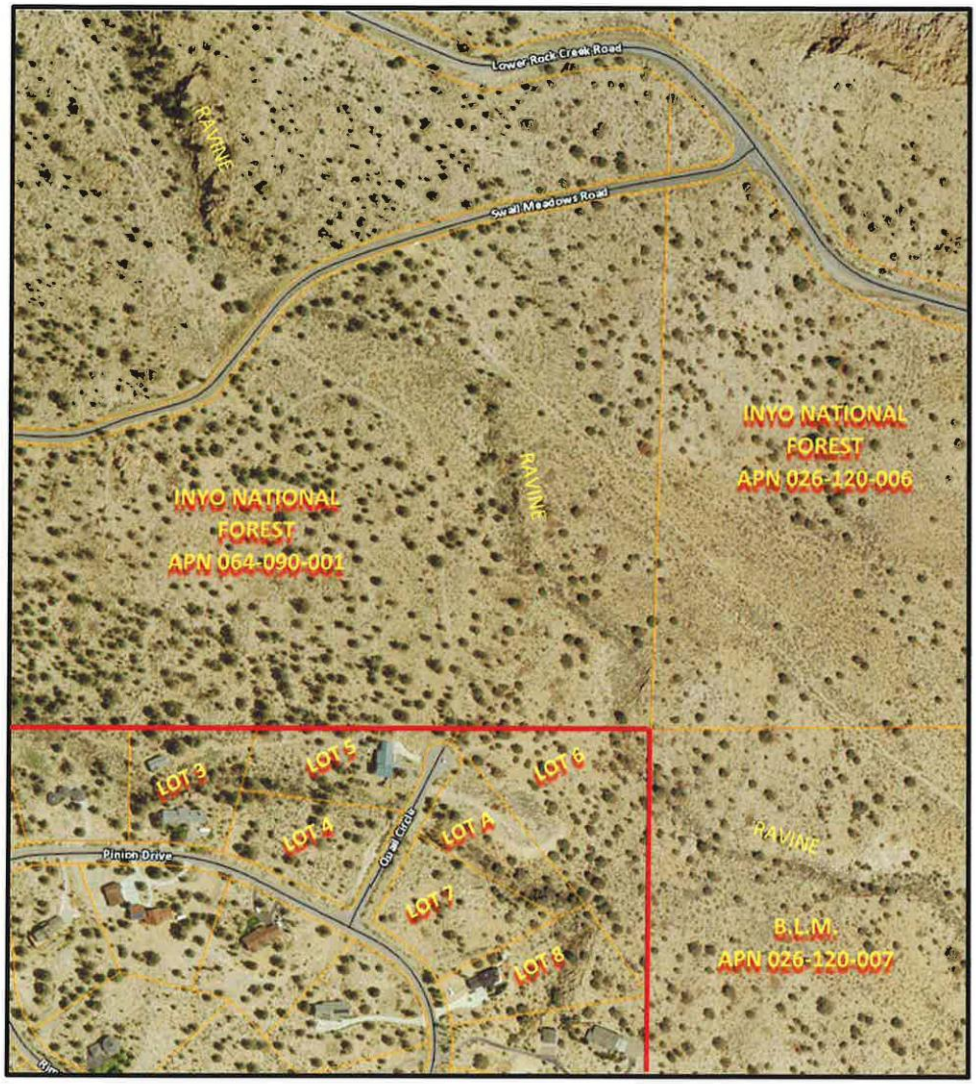


FIGURE 1 – VICINITY MAP

North-eastern corner of Pinon Ranch Subdivision (Tract 37-27A, TMB 9, PG. 67)

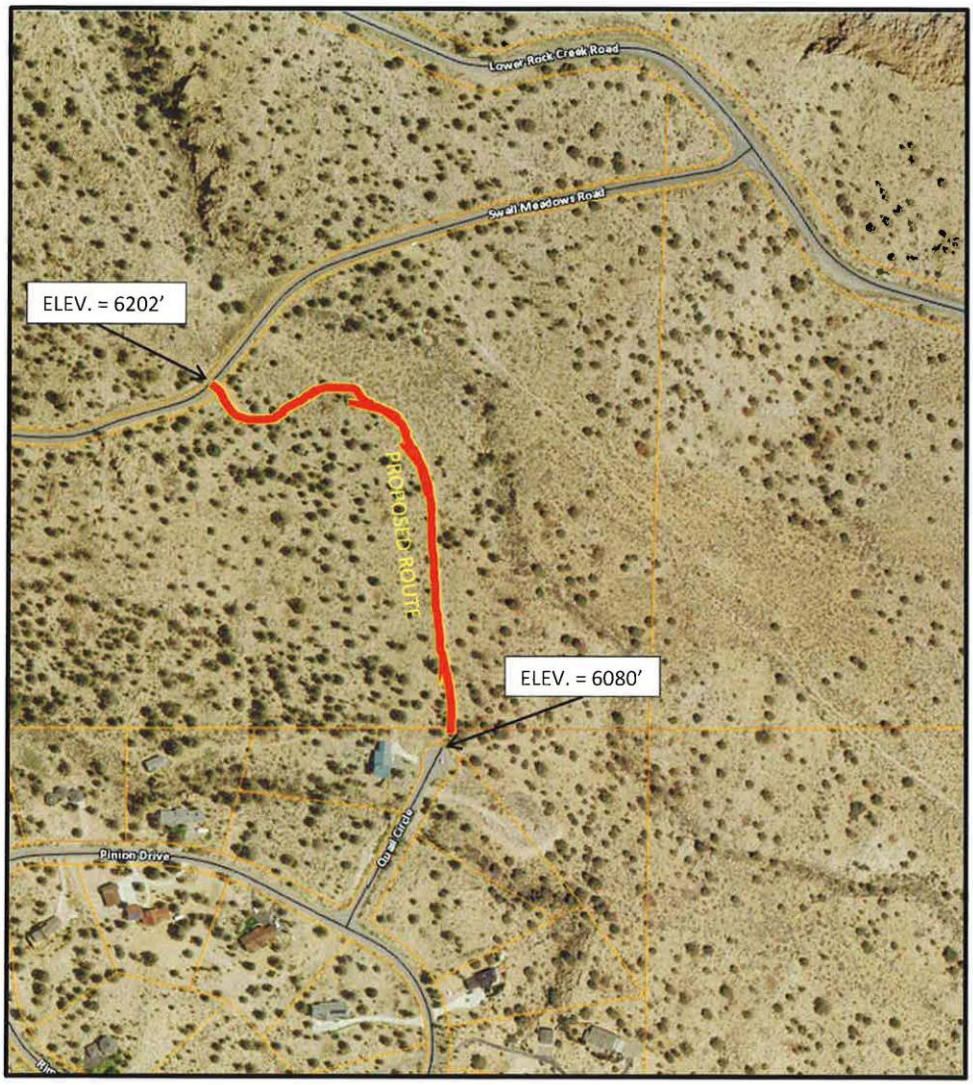


FIGURE 2 – PROPOSED ROUTE

1,420' Route Length and 122' Elevation Gain from Quail Circle to Swall Meadows Road (8.6% Grade)

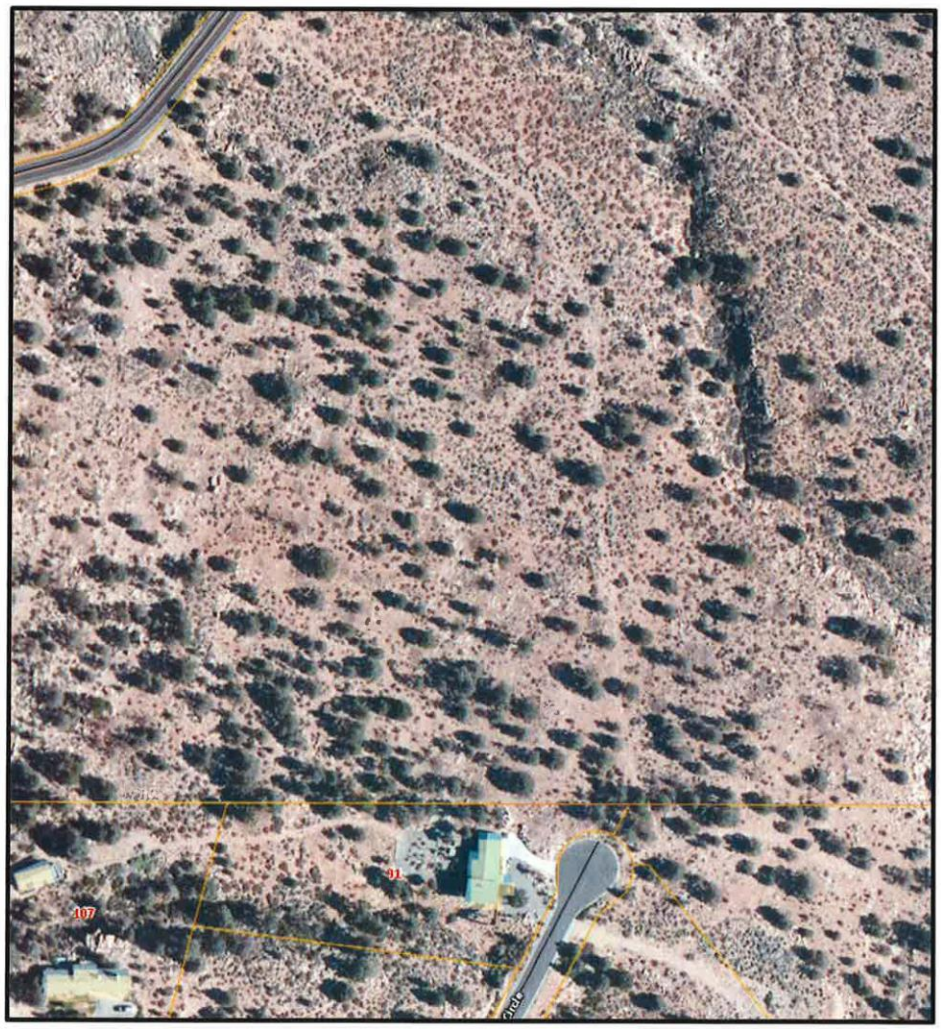
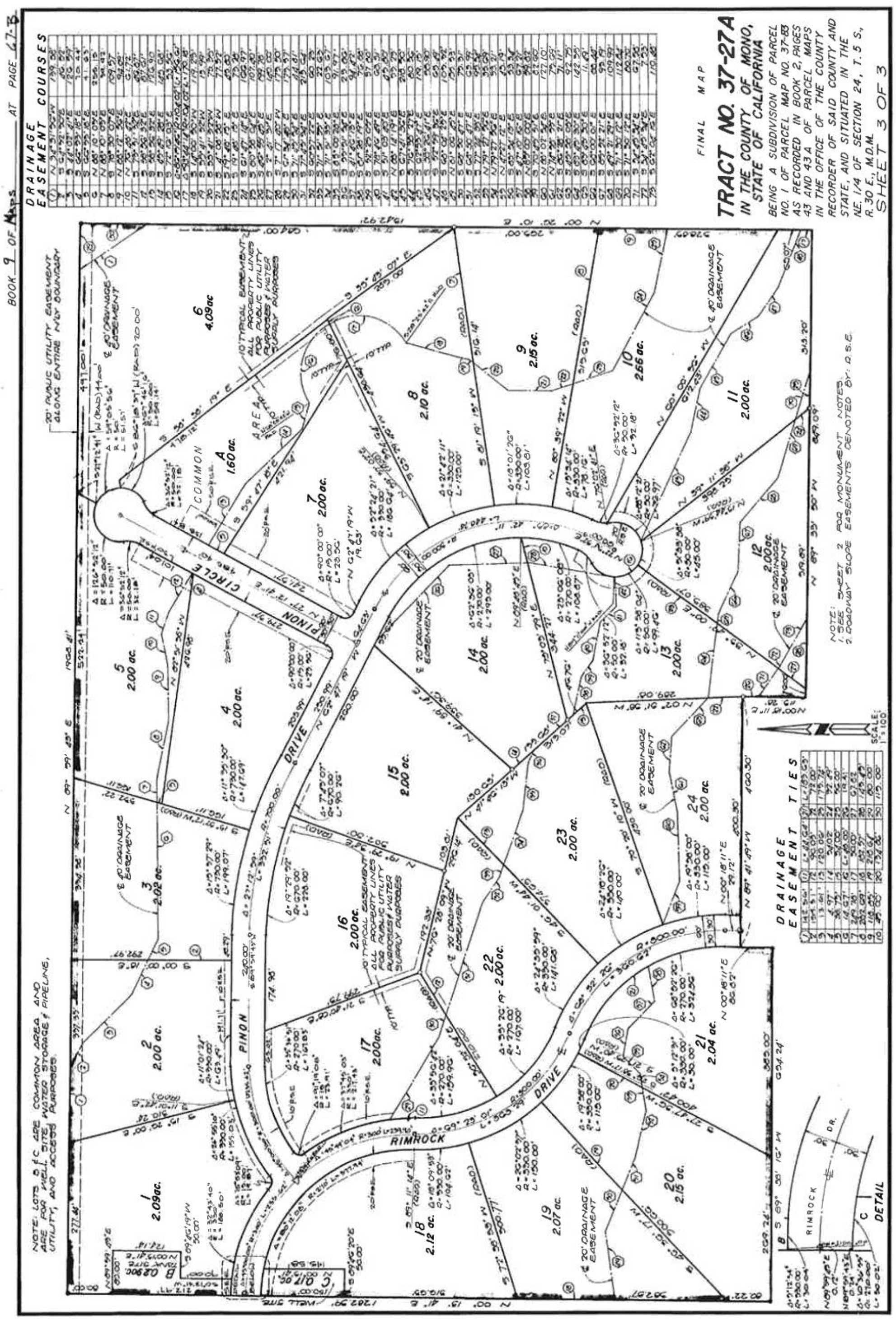
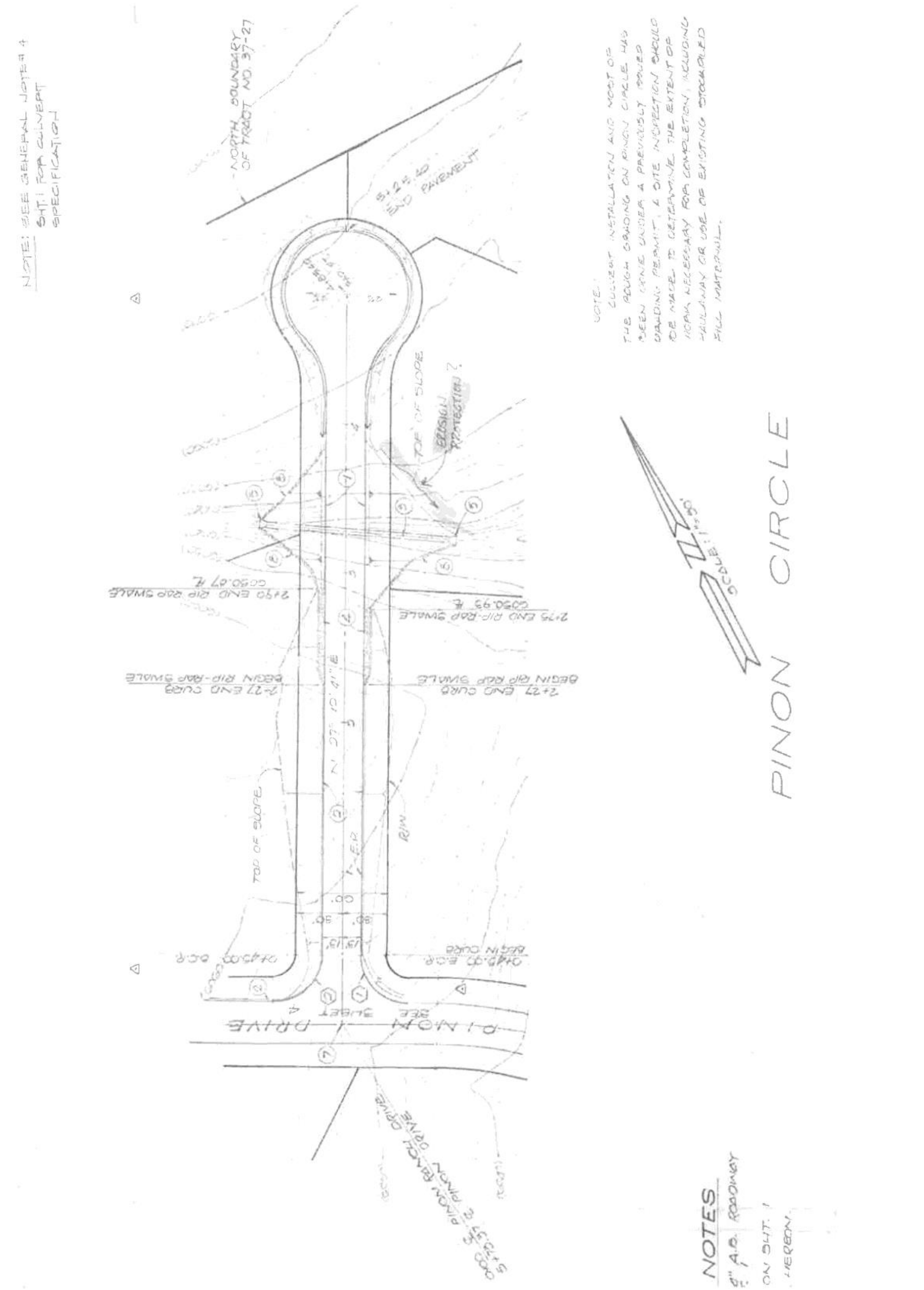


FIGURE 3 – DETAIL VIEW


FINAL MAP
TRACT NO. 37-27A
IN THE COUNTY OF MONO, STATE OF CALIFORNIA
SHEET 3 OF 3
DRAINAGE EASEMENT COURSES
DRAINAGE EASEMENT TIES
RIMROCK DRIVE
PINON DRIVE
PINON CIRCLE


PINON CIRCLE
NOTES

References/Links

Preparing your home and Family for a wildfire, *Wildfire is Coming are you prepared,*

http://www.readyforwildfire.org/

California Public Resources Code 4291 – Defensible Space:
https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?sectionNum=4291.&lawCode=PRC

Unit Strategic Fire Plan San Bernardino Unit, CAL FIRE, May 2017
http://cdfdata.fire.ca.gov/pub/fireplan/fpupload/fpppdf1632.pdf

Mono County Emergency Operations Plan (2012):
https://monosheriff.org/sites/default/files/fileattachments/sheriff_-_coroner/page/8077/mono_county_oa_eop_2012.pdf

WUI Research Bibliography for Resource Managers:
http://www.cafiresci.org/s/CFSC_WUI_Bibliography_Sept2012.pdf

University of Nevada Cooperative Extension, 2004, *The Combustibility of Landscape Mulches*
https://www.unce.unr.edu/publications/files/nr/2011/sp1104.pdf

Firewise – How to Prepare Your Home for Wildfires
https://www.nfpa.org/-/media/Files/Firewise/Fact-sheets/FirewiseHowToPrepareYourHomeForWildfires.pdf

University of Nevada Cooperative Extension, 2006, *Living with Fire in the Tahoe Basin*
https://www.unce.unr.edu/publications/files/nr/2006/SP0611.pdf

University of California Cooperative Extension, 2010, *Home Survival In Wildfire Prone Areas Building Materials and Design Considerations*
https://ucanr.edu/sites/postfire/files/247816.pdf

Scheinost, P.L., J. Scianna, D.G. Ogle. 2010. Plant guide for rubber rabbitbrush (Ericameria nauseosa). USDA Natural Resources Conservation Service, Pullman Plant Materials Center, Pullman, WA. https://plants.usda.gov/plantguide/pdf/pg_erna10.pdf

Fire Adaptive Communities: The National Wildfire Coordinating Group defines a fire adapted community as "A human community consisting of informed and prepared citizens collaboratively planning and taking action to safely coexist with wildland fire."
https://fireadapted.org/