

Crowley Fish Camp
Assessment of Biological Resources
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Introduction

A review of biological resources that occur or may potentially occur at Crowley Fish Camp near the town of Crowley Lake, Mono County, California was conducted in May-June 2017. This project includes existing recreational, boat and vehicle storage, and management facilities near the shoreline of Crowley Reservoir (Figure 1). The project also includes proposed new additions to improve and expand the existing facility operations. These existing project-related uses, and construction and operation of the proposed new uses, will occupy up to 17.0 acres within the larger Crowley Fish Camp site. To date, these improvements (Table 1) have displaced vegetation and disturbed the soil profile in an area totaling 16.5 acres (Figure 2). All areas that could be potentially affected by either the construction or by routine operations were included in the assessment of biological resources.

Table 1. List of existing and proposed facilities included in the study of biological resources.¹

FACILITIES DESCRIPTION	CURRENT PROJECT REVIEW	
	MONO COUNTY	MONO COUNTY and HCD
Existing Facilities and Uses		
Entry Building & Gatehouse	✓	
Entry Gates and Fencing	✓	
Tackle Shop and Offices	✓	
Pelican Point Grill building and deck	✓	
Park Model Cabin Trailer #1	✓	✓
Park Model Cabin Trailer #2	✓	✓
Park Model Cabin Trailer #3	✓	✓
Manager Home	✓	✓
Existing Water Storage Tank	✓	
Domestic Well House	✓	
Existing RV Camp Sites with hook-ups (24 total)	✓	✓
Existing Dry Camp Sites	✓	✓
Boat and Trailer Storage Area	✓	
Maintenance Yard	✓	
Landscape Pond	✓	
Septic System Areas (2 total)	✓	
Proposed Facilities and Uses		
New Water Storage Tank	✓	
New RV Camp Sites with hook-ups (7)	✓	✓
New Water Spigot to Serve Dry Camp Sites	✓	✓
New Propane Tank (1 tank)	✓	
New Portable bathrooms & showers (up to 3 total)	✓	
New Septic System Connection	✓	

¹ Note that this table addresses only those facilities directly analyzed in the biological report, and excludes project elements (such as the floating toilets) that lacked potential biological significance.

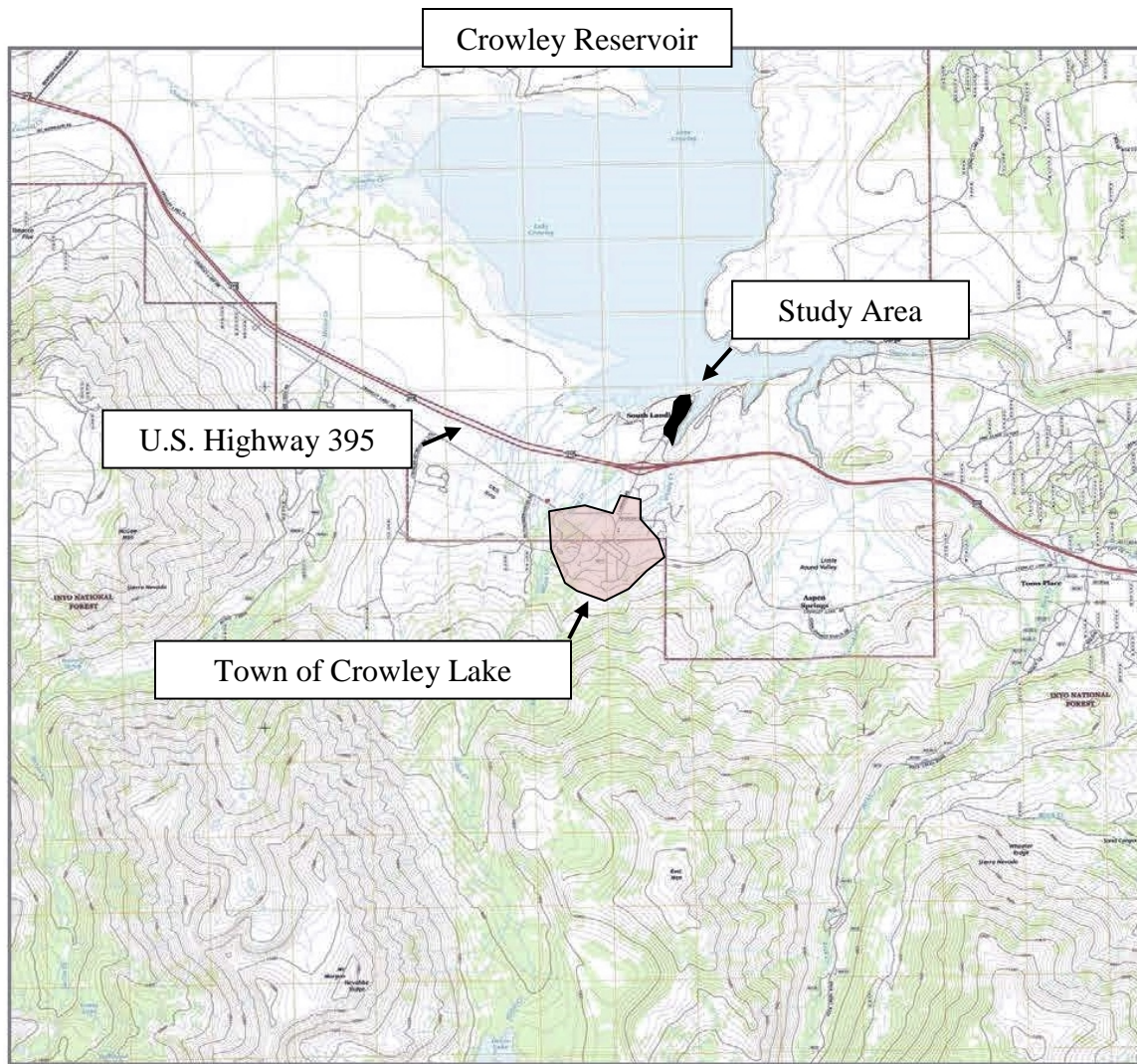


Figure 1. Location of the 28.8 acre Crowley Fish Camp study area near the Town of Crowley Lake, Mono County, California.

Study Area

The study area for assessment of biological resource presence and potential project impacts (Figure 2) was defined as the entire area where project elements (Table 1) occur or will occur, the paved and unpaved approach roads as they now exist between the entry gate and boat ramp, and an additional 50 feet of buffer area in all directions. Total area of the study area is 28.8 acres. The buffer is entirely outside the area of project direct effect, but may be affected indirectly by project operation. Vegetative conditions that were documented within the buffer in 2017 also may be the best available representation or reference to the plant community as it would have existed prior to the construction of the existing project elements.

The average elevation of the project area is 6815 ft (2078 m). Crowley Fish Camp is situated lakeside within extensive unforested shrublands immediately north of the four-lane U.S. Highway 395, and north of the Town of Crowley Lake. The Highway and town occupy terrain at the base of the steeply sloping eastern flank of the central Sierra Nevada Range, where the vegetation transitions to coniferous forest. The climate is montane; the average winter temperature is 32° F, and the frost-free growing season is about 150 days. The average summer air temperature is 70° F (Natural Resource Conservation Service, 1996). The growing season (May to October) is normally xeric, and is characterized by moderate daytime temperatures and low humidity, but thunderstorms can irregularly interrupt this pattern. Snowfall may begin in September, but is most likely to accumulate in this area during the period November to April.

Plant communities

The study area for this review totals 28.8 acres. When the project has been fully implemented, the fraction of the study area that will retain native vegetation will be reduced from 12.3 acres to 11.8 acres (less than 20%, excluding the buffers). Much of this remaining area now supports the plant community type Great Basin Mixed Scrub (Table 2). The buffer area is patchily devegetated, otherwise retaining a relatively undisturbed cover classified as Big Sagebrush Scrub (Figure 3). Both of these plant community types are common and widespread on the eastern slopes of the Sierra Nevada and throughout the Great Basin Floristic Province (Sawyer, et al, 2009). Both are typical of xeric habitats in uplands settings, such as the habitat observed within the study area.

No indications of wetland habitats or shifts in the vegetation indicating locally elevated water tables were found within the 28.8 acre study area. Rather, shrub canopies are uniformly distributed in the fragmented patches where Great Basin Mixed Scrub or Big Sagebrush Scrub remains unaffected by recent mechanical disturbance. No other potentially flooded or seasonally mesic habitats (e.g., wetland swales, ephemeral stream beds) were found within the study area.



Figure 2. Crowley Fish Camp study area for biological resources. Surveys to inventory plant and wildlife resources and search for sensitive species were conducted in May and June 2017. The study area is 28.8 acres. The base image date is June 2016.

Table 2. Plant communities that were mapped within the 28.8 acre Crowley Fish Camp study area in 2017. The study area currently includes 16.5 acres that have been converted to roads, buildings, camp sites, and other impervious or devegetated surfaces. Community names (after Holland, 1986) are cross-referenced to the California Department of Fish and Wildlife classification (CDFG, 2010), and the Sawyer, *et al.* (2009) Alliance classification. * are designated “sensitive” by CDFW (CDFG, 2010).

Holland name and CDFW classification number	Alliance and primary association names	acreage in study area
upland communities		
Great Basin Mixed Scrub 35.200.02*	Bitterbrush Shrubland <i>Purshia tridentata</i> - <i>Artemisia tridentata</i>	2.5
Big Sagebrush Scrub 35.110.02	Big Sagebrush Shrubland <i>Artemisia tridentata</i>	9.8

Great Basin Mixed Scrub

Great Basin Mixed Scrub, which is California Department of Fish and Wildlife (CDFW) plant community code 35.110.07 (CDFG, 2010), occurs within the study area as an isolated bitterbrush-big sagebrush (*Purshia tridentata* – *Artemisia tridentata*) alliance. The native shrub canopy averages 2 ft in height and provides a uniform 20-30% living cover with at least 50% of this cover contributed by bitterbrush. This community type is considered to be sensitive by CDFW. It has been documented in recent decline in the Eastern Sierra Nevada region, especially southern Mono County, due mainly to wildfire (Sawyer, *et al.*, 2009). When the project has been fully implemented, the current extent of this plant community will be reduced from 2.5 acres to 2.1 acres.

Local sensitivity of the occurring alliance must also be considered within the context of the project’s location near a known migratory mule deer movement corridor (see Wildlife, below), because the migrating deer are known to rely primarily on bitterbrush for sustenance (Monteith, *et al.*, 2009). However, mapped occurrences at the Crowley Fish Camp study area (Figure 3) have each become ecologically isolated within the already developed extents of the project. Remnant Great Basin Mixed Scrub occurs now only as patches of 0.8 acres to less than 0.1 acres amid existing camping and water recreation developments.

Dominants bitterbrush and sagebrush are joined at about 10% relative frequency by curl-leaf rabbitbrush (*Chrysothamnus viscidiflorus*), and at very low frequencies by spineless horsebrush (*Tetradymia canescens*), rubber rabbitbrush (*Ericameria nauseosa*), and patches of desert peach (*Prunus andersonii*). Native perennials such as silvery lupine (*Lupinus argenteus* var. *heteranthus*) and annuals especially summer snow (*Gayophytum* spp.) were generally abundant in 2017 (full species list is given in Appendix A). Native perennial grasses, however, were infrequent and scattered in Great Basin Mixed Scrub.



Figure 3. Plant communities present within the 28.8 acre Crowley Fish Camp study area in June 2017. Disturbed and devegetated areas (unshaded) currently total 16.5 acres, and will total up to 17.0 acres when project implementation is completed.

Big Sagebrush Scrub

Maturing big sagebrush (*Artemisia tridentata*) clearly dominate in Big Sagebrush Scrub, comprising on average 80% of the shrub layer. The canopy also regularly includes bitterbrush and curl-leaf rabbitbrush. Bitterbrush contributes a relatively minor (5-10%) fraction of the total shrub layer living cover, but it has achieved noticeably denser stands near the edges of paved surfaces. As in Great Basin Mixed Scrub, trees are normally absent. However, native black poplars (*Populus trichocarpus*) have been introduced near the lake shore, around the buildings, and near the maintenance yard. Unlike the occurring isolated Great Basin Mixed Scrub, Big Sagebrush Scrub within the study area (Figure 3) is generally well connected to off-site areas that are less frequently or intensely disturbed.

The total living shrub canopy cover attained in Big Sagebrush Scrub averages 20%, and average height is two feet. The overall diversity of plant species is higher in comparison with Great Basin Mixed Scrub (Appendix A). But there is little structural variation between the two community types. Because of this, ecotones appear to be very broad and the only visual indication of plant community boundaries is the shift in shrub canopy dominance between bitterbrush and big sagebrush. When the project has been fully implemented, the current extent of this plant community will be reduced from 9.9 acres to 9.8 acres.

Non-Native Plants

A total of six non-native species (Table 3) were found growing within the study area. The annual cheat grass (*Bromus tectorum*) was found throughout the entire project area. This species has become widespread in Mono County scrub habitats, and nearly all in close proximity to U.S. Highway 395 are either currently supporting populations or in high danger of being invaded by this noxious weed. Cheat grass, which is the most abundant non-native plant occurring within the project area assemblage in 2017, is an invasive noxious weed as defined by the California Exotic Pest Plant Council (CalEPPC code A-1: “are the most invasive pest plants, and are already widespread”). High density cheat grass stands are thought to increase the risk and frequency of wildfire (CalEPPC, 1999).

Russian thistle (*Salsola tragus*), tansy mustard (*Descurainia sophia*), and tumble mustard (*Sisymbrium altissimum*) have established populations that extend beyond the immediate areas of frequent and intensive recreation-related and facilities maintenance-related disturbance. All three species have invaded into relatively undisturbed stands of Great Basin Mixed Scrub and Big Sagebrush Scrub. The smaller on-site populations of knotweed (*Polygonum aviculare*) and redstem filaree (*Erodium cicutarium*) meanwhile appear to be currently limited to roadside and maintenance yard areas.

Further disturbances to the project area’s plant communities may encourage the local spread of Russian thistle, tansy mustard, tumble mustard, knotweed, and redstem filaree; however, spread of these pre-existing species within the study area is considered negative but not significant in the context of the larger historically disturbed lake access area. Cheat grass currently occurs at < 1% absolute cover, and it generally provides < 5% of the total plant community living cover throughout the project area. Weed control that is applied following any

new disturbance will be effective if treatment robustly covers the entire study area, but the likelihood that eradication of cheat grass can be achieved is very low. Cheat grass control to maintain low abundance between the native shrub canopies may nevertheless be desirable in camping areas because dense, senescent swards created annually by this species can significantly increase the potential for ignition in an area that naturally (in the absence of disturbance) would be free of annual grasses.

Table 3. Non-native plant species that were found within the 28.8 acre Crowley Fish Camp study area in 2017. CDFA and Cal-IPC weed ratings are given.

Species	CDFA	Cal-IPC
cheat grass (<i>Bromus tectorum</i>)	-	High
common knotweed (<i>Polygonum aviculare</i>)	-	-
redstem filaree (<i>Erodium cicutarium</i>)	-	limited
Russian thistle (<i>Salsola tragus</i>)	C	limited
tansy mustard (<i>Descurainia sophia</i>)	-	limited
tumble mustard (<i>Sisymbrium altissimum</i>)	-	-

Notes:

CDFA Noxious Weeds List (California Department of Food and Agriculture, 2017):

List C – A pest of known economic or environmental detriment and, if present in California, it is usually widespread. C-rated organisms are eligible to enter the state as long as the commodities with which they are associated conform to pest cleanliness standards when found in nursery stock shipments. If found in the state, they are subject to regulations designed to retard spread or to suppress at the discretion of the individual county agricultural commissioner. There is no state enforced action other than providing for pest cleanliness.

Cal-IPC Invasiveness Ratings (California Invasive Plant Council, 2017):

High – These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.

Limited – These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

Sensitive plant species

A list of sensitive plant species that could have some potential to occur within the habitats currently available at the project site was compiled (Table 4), based upon a review of regional data (U.S. Fish and Wildlife Service, 2017, California Native Plant Society (CNPS), 2017, CalFlora, 2017, California Department of Fish and Wildlife (CDFW), 2017a, 2017b), environmental documentation prepared for nearby projects (Paulus, 2011, 2015a, 2015b), published regional floras (Baldwin, et al., 2012, Jepson Herbarium, 2017), and a June 2017 search

of the California Natural Diversity Database (CNDDDB) records for the USGS Tom’s Place, Watterson Canyon, Whitmore Hot Springs, Convict Lake, Mt. Abbot, Mt. Morgan, Rovana, Casa Diablo Mountain, and Banner Ridge quadrangles (CDFW, 2017c).

Table 4. Sensitive plant species that potentially could occur at the Crowley Fish Camp project. Flowering period data is from CNPS (2001). None of these species are federally listed. A key to the rank or status symbols follows the table. NL = not listed.

Scientific Name Common Name Life Form	Rank or Status				Habitat	Flowering Period
	USFS BLM	CDFW	CNPS	NDDDB		
<i>Astragalus johannis-howellii</i> Long Valley milkvetch herbaceous perennial	S S	R	1B.2	S1	sagebrush scrub, often sandy	June-August
<i>Astragalus monoensis</i> ¹ Mono milkvetch herbaceous perennial	S S	R	1B.2	S2	open pumice soils, roadsides	June-August
<i>Boechea cobrensis</i> Masonic rock cress herbaceous perennial	NL	NL	2B.3	S2	sagebrush scrub	June-July
<i>Boechea dispar</i> pinyon rock cress herbaceous perennial	NL	NL	2B.3	S3	xeric scrub, woodland	March-June
<i>Eremothera boothii</i> ssp. <i>boothii</i> Booth evening primrose herbaceous annual	NL	NL	2B.3	S2	sagebrush scrub	April-May
<i>Eremothera boothii</i> ssp. <i>intermedia</i> Booth hairy evening primrose herbaceous annual	NL	NL	2B.3	S3	sagebrush scrub, fire scars	June
<i>Hulsea vestita</i> ssp. <i>inyoensis</i> Inyo hulsea herbaceous perennial	NL	NL	2B.2	S2	sagebrush scrub, talus, sometimes Bishop tuff	April-June
<i>Mentzelia torreyi</i> Torrey’s blazing star herbaceous perennial	NL	NL	2B.2	S2	sandy or alkaline scrub	June-August

Scientific Name Common Name Life Form	Rank or Status				Habitat	Flowering Period
	USFS BLM	CDFW	CNPS	NDDDB		
<i>Micromonolepis pusilla</i> dwarf monolepis herbaceous annual	NL	NL	2B.3	S3?	low areas in sagebrush scrub	May- August
<i>Phacelia gymnoclada</i> naked-stem phacelia herbaceous annual	NL	NL	2B.3	S2	sagebrush scrub, gravelly, usually clay	May-June
<i>Thelypodium integrifolium</i> ssp. <i>complanatum</i> foxtail thelypodium herbaceous perennial	NL	NL	2B.2	S2	sagebrush scrub, mesic	June- October
<i>Viola purpurea</i> ssp. <i>aurea</i> golden violet herbaceous perennial	NL	NL	2B.2	S2	sagebrush scrub, often sandy	April-June

Rank or status, by agency:

BLM and USFS = US Forest Service, Inyo National Forest, Bishop Office (USFS, 2013a, 2013b) and Bureau of Land Management, Bishop Office (BLM, 2015)

S = Sensitive List

CDFW = California Department of Fish and Game listings under the Native Plant Protection Act and the California Endangered Species Act (CDFW, 2017a).

R = Rare

CNPS = California Native Plant Society listings (CNPS, 2001, 2017)

1B = rare and endangered in California and elsewhere

2B = rare, threatened or endangered in California, but more common elsewhere

Threat Code extensions:

.1 is Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat)

.2 is Fairly endangered in California (20-80% of occurrences threatened)

.3 is Not very endangered in California (< 20% of occ's threatened or no current threats known.

CNDDDB = California Natural Diversity Data Base rankings by the CDFG (CDFW, 2017b)

S1 = Critically imperiled in California due to extreme rarity (often 5 or fewer populations) or because of factor(s) such as very steep declines making it especially vulnerable to extirpation from the state.

S2 = Imperiled in California because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from state.

S3 = Vulnerable in California due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation from the state.

Literature Review Results

Potentially occurring plant species were considered to be “sensitive” if they have current

state or federal status as Rare, Threatened, Endangered, or Candidate (CDFW, 2017a), or are listed in the CNDDDB list of special plants (CDFW, 2017b), or are listed by CNPS in their inventory of sensitive California plants (CNPS, 2017), or are included in the most recent sensitive plant or watch lists prepared by Inyo National Forest (U.S. Forest Service, 2013a, 2013b) or Bureau of Land Management, Bishop office (BLM, 2015). No previously documented on-site occurrences of rare plant species appear in CNDDDB records (Appendix B). This information, however, must be interpreted in the general context that the absence of CNDDDB records concerning the project area does not signify that rare plants are absent, rather that none have been reported.

The CNDDDB records and literature search results indicate that 12 sensitive plant species occur within 15 miles of the project and in montane scrub settings that bear some resemblance to habitats available within the study area. The milkvetches *Astragalus johannis-howellii* and *A. monoensis* (syn. *A. monoensis* var. *monoensis*) are state listed Rare species. None are federal listed or candidate species. One sensitive species not found in CNDDDB records, Masonic rock cress (*Boechea cobrensis*), is included because it was recently observed 5.5 miles north in vegetation resembling the project area's Big Sagebrush Scrub (Paulus, 2010).

The two Booth's evening primrose subspecies (*Camissonia boothii* ssp.), dwarf monolepis (*Micromonolepis pusilla*), and naked-stem phacelia (*Phacelia gymnoclada*) are annual species. Members of the annual species assemblage that were present at the time of survey represented a diverse set of species, furthermore populations of annuals were relatively abundant in response to above-average precipitation in the area during the late spring. It therefore appears very likely that sensitive annuals, if present, would have been detected. All potentially occurring sensitive plants would be expected to exhibit leaves, flowers, and maturing or mature fruit during the May and June survey period (Table 4). Visits to nearby known populations of *Lupinus duranii*, *Astragalus monoensis*, and *Arabis cobrensis* during the period May 19 to July 2, 2017, confirm that diagnostic characters would have been available, even for relatively early-blooming perennials.

Sensitive plants known to occur in nearby alkaline meadow or scrub habitats (*Atriplex pusilla*, *Calochortus excavatus*, *Crepis runcinata* ssp. *hallii*, *Ivesia kingii* var. *kingii*, *Phacelia inyoensis*, *Sidalcea covillei*, and *Sphaeromeria potentilloides* var. *nitrophila*) may be excluded as very unlikely to occur, because their relatively moist habitat and alkaline or saline soil habitats are not present within the study area. Similarly, locally occurring sensitive species that are restricted to freshwater streamside habitats (e.g., *Astragalus lemmonii*, *Botrychium* spp., *Carex scirpoidea* ssp. *pseudoscirpoidea*, *Epilobium howellii*, *Helodium blandowii*, *Ivesia unguiculata*, *Kobresia myosuroides*, *Parnassia parviflora*, *Pedicularis crenulata*, *Salix* spp., *Stuckenia filiformis*, and *Triglochin palustris*) may be excluded because the scrub vegetation present across the entire study area is uniformly xeric. Suitably wet habitat for these species does not occur.

Field Survey Results

Searches for rare plant populations were conducted (per CDFG, 2009) on May 18 and June 3-5, 2017. Any species that were not recognized at once were keyed by the consulting botanist using The Jepson Manual (Baldwin, *et al.*, 2012). All populations encountered were identified to a level of taxa that was sufficient to determine sensitive species presence or absence.

Transect spacing was 10-25 feet in scrub-covered areas.

Sensitive plant populations were not found during the field survey. Only common plant species (Appendix A) occur in areas that would be disturbed by new construction. No members of the distinctive genera *Boecheria*, *Eremothera*, *Hulsea*, *Micromonolepis*, *Thelypodium*, or *Viola* occur in the project area. The widely occurring *Camissonia pusilla* does not bear typical ovate leaves or white corollas that would be expected if *Eremothera boothii* were present. The occurring *Astragalus* exhibited ovoid, either densely woolly or bladderly-inflated fruits, not the narrowly half-ellipsoid, sparsely hairy fruits expected of *A. johannis-howelli* or *A. monoensis*. The only occurring *Mentzelia*, white-stemmed blazing star (*M. albicaulis*), is an annual that is overall diminutive in comparison to the robust perennial *M. torreyi*, so confident separation was possible. The common annual species *Phacelia bicolor* was separated from potentially occurring *P. gymnoclada* based upon degree of leaf lobing. Occurring *P. bicolor* exhibited cauline leaves with lobes that reach the midrib, in contrast to the shallowly lobed to entire (unlobed) cauline leaves that are typical of *P. gymnoclada*. Based upon these findings, it is unlikely the project will affect any sensitive plant populations.

Habitat for Wildlife

A review of wildlife that may potentially occupy or use the Great Basin Mixed Scrub, Big Sagebrush Scrub, and disturbed habitats that are available at the Crowley Fish Camp site was conducted in May 2017. New construction will affect undeveloped but historically disturbed fragments of native scrub that are embedded within or abutting the already developed and operational portions of the camping and water recreation facility (Figure 3). Ongoing facility operations have altered the available habitats due to intense human activity, including substantial vehicular ingress/egress and uses by domestic pets. These uses are seasonal, peaking during summer recreation and falling off to near absence (caretaker staffing only) during the winter period of late October through mid-April.

Existing developments that are nearby and may influence wildlife usage of the project site include a line of power poles that bisect the study area in the north-south direction, the four-lane U.S. Highway 395 less than 1000 feet to the south of the project's entry gate facility, and the Town of Crowley Lake extending southward from the south edge of the highway (Figure 4). Historically long-standing water-spreading operations using open ditches maintain a productive mixed meadow and scrub habitat above the confluence of Hilton Creek and Crowley Reservoir. The relatively wet, grass and sedge-dominated meadows created along Hilton Creek (Figure 4) approach from the west to within 1500 feet of the study area. Existing developments at Crowley Fish Camp, meanwhile, occupy a peninsula-like area of slightly elevated terrain between the Hilton Creek and Whisky Creek drainages. This undulation in the former alluvial plain was not inundated upon the creation of Crowley Reservoir in 1941, and the location has been an important lake access point ever since.

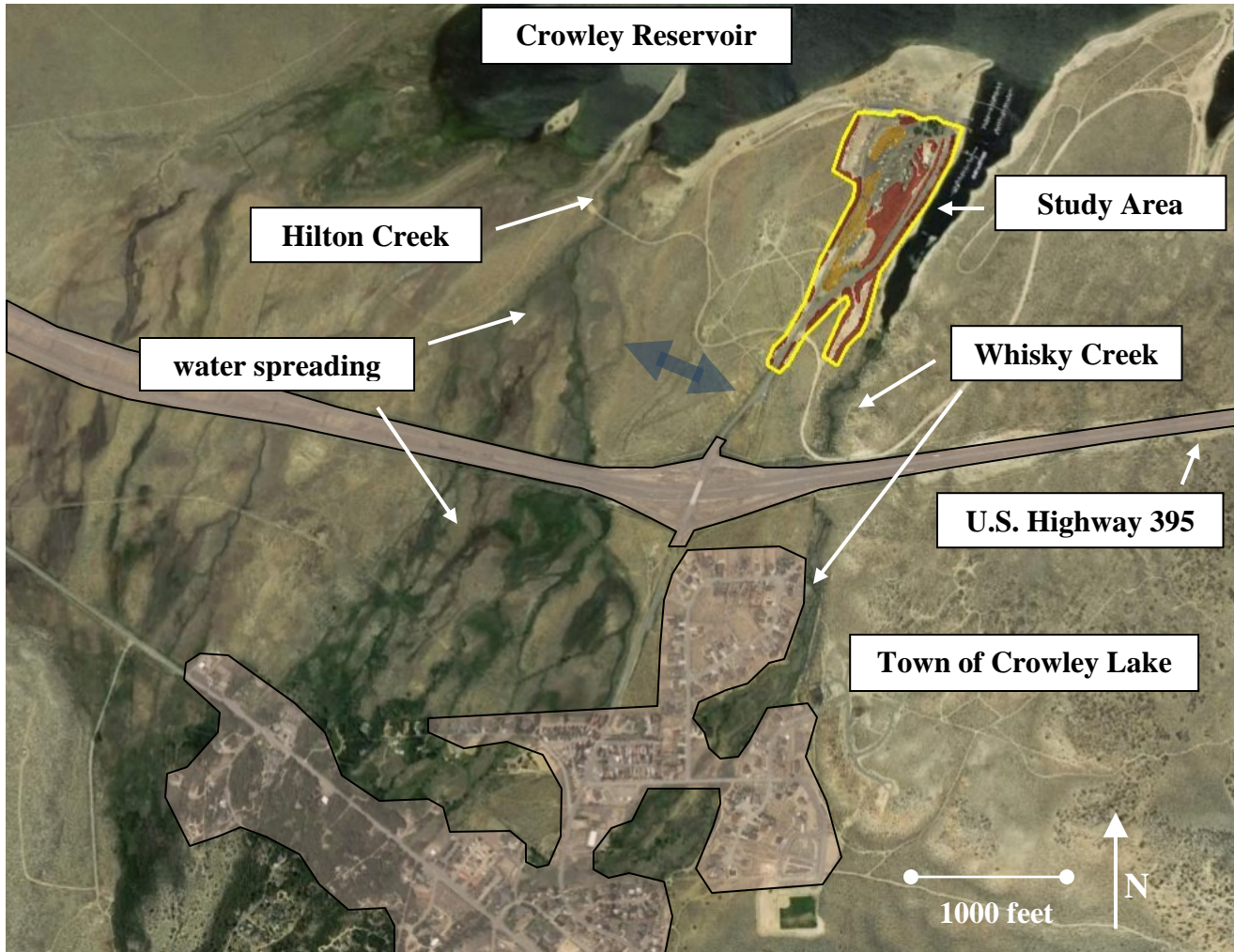


Figure 4. Landscape features and a likely movement corridor (blue arrow) that may influence wildlife usage of the project area.

Sensitive Wildlife Species

Based upon a review of available regional data regional data (U.S. Fish and Wildlife Service, 2017, California Department of Fish and Wildlife (CDFW), 2017d, 2017e), environmental documentation prepared for nearby projects (Paulus, 2011, 2015b), and a May 2017 search of the California Natural Diversity Database (CNDDDB) records for the USGS Tom's Place, Watterson Canyon, Whitmore Hot Springs, Convict Lake, Mt. Abbot, Mt. Morgan, Rovana, Casa Diablo Mountain, and Banner Ridge quadrangles (CDFW, 2017c), three sensitive wildlife species were identified as having some potential to occur within the study area (Table 5). It is possible that these species use the available habitats for foraging or pass through the study area during annual migrations. No critical habitat designations currently intersect the study area.

“Sensitive wildlife species”, as used in this report, meet the definitions of rare or endangered species under the California Environmental Quality Act (Section 15380 CEQA Guidelines), or are considered candidates for state or federal listing as threatened or endangered, or are listed by CDFW as Species of Special Concern, or are listed by local agencies as locally rare. Mule deer are considered important harvest species by the CDFW and in this analysis will be treated as sensitive. Deer herds in Mono County are defined by their winter holding ranges, the lower elevation Eastern Sierra locations that provide pine forest, pinyon-juniper woodland, and sagebrush scrub habitats suitable for overwintering. The Crowley Fish Camp location is marginally within the migration corridor that is predictably used by deer of the Round Valley Herd to approach and later depart their winter range (Monteith, *et al.*, 2009).

The May 2017 CNDDDB records review did not uncover previously documented occurrences of sensitive wildlife species within the study area. This result, however, must be interpreted in the general context that the absence of CNDDDB records concerning the study area does not signify that sensitive wildlife species are absent, rather that none have been reported. The absence of aquatic habitat within the existing facilities, the areas that may be disturbed by new construction, and the 50 ft buffers outside the project excludes sensitive mollusk, amphibian, and fish presence. Any surface ponding and runoff that occurs within the study area's habitats for wildlife is ephemeral in duration, as indicated by the uniformly xerophyllic vegetation. The 6815 ft (2078 m) average elevation of the study area is outside the normal range of Sierra Nevada bighorn sheep (*Ovis canadensis sierrae*), whose preferred year-round habitats are on steep mountain slopes at elevations greater than 9000-10000 ft (2750-3050 m). The absence of tall trees and cliffs makes nesting by sensitive raptors and swallows that are known to use the area very unlikely.

Despite development as a campground and water recreation facility during recent decades, there currently remains some possibility of use by greater sage grouse (*Centrocercus urophasianus*), western white-tailed jackrabbit (*Lepus townsendii townsendii*), and Sierra Nevada red fox (*Vulpes vulpes necator*). All are relatively mobile species that could enter the study area while foraging or migrating, as the habitats they are known to use at least seasonally include xeric scrub that is dominated by sagebrush (Table 5).

Table 5. Sensitive wildlife species that potentially could use the disturbed habitats available at the Crowley Fish Camp study area. Key to status codes are given below, NL = not listed.

species	Rank or Status			habitat
	USFWS	CDFW	CNDDDB	
birds				
<i>Centrocercus urophasianus</i> greater sage grouse (foraging or migrating only)	USFS Sensitive	SSC	S3	sagebrush scrub
mammals				
<i>Lepus townsendii townsendii</i> western white-tailed jackrabbit	-	SSC	S3?	coniferous forest, sagebrush scrub
<i>Vulpes vulpes necator</i> Sierra Nevada red fox	USFS Sensitive	Threatened	S1	coniferous forest, sagebrush scrub

Rank or status, by agency:

USFS = US Forest Service, Inyo National Forest, Bishop Office (USFS, 2013c).

CDFW = State of California under the California Endangered Species Act (CDFW, 2017c)

SSC = Species of Special Concern (CDFW, 2017d).

State ranking = CNDDDB State Conservation Ranking as reported by CDFW (2017d)

S1 is Critically Imperiled: often 5 or fewer populations, or steep rate of decline,

S2 is Imperiled: often 20 or fewer populations, steep decline, or very restricted range,

S3 is Vulnerable: often 80 or fewer populations, declining or restricted range,

S4 is Apparently Secure: uncommon but not rare in California,

? indicates CNDDDB uncertainty in assigning rank.

Buildings and trees were searched closely for nesting birds and roosting bats during the May-June 2017 survey, finding no animals and no guano accumulations. Mines and caves that could be used by potentially occurring sensitive bats for day roosting, breeding and hibernation do not occur within the study area. While suitable foraging habitat may be present nearby, the absence of inhabited roosting structures makes it unlikely that any bats will be affected by project construction. There are no trees or structures suitable for nesting by passerine birds within 200 ft of the area where new project-related construction would occur. The only wildlife seen within the study area during the surveys in May and June 2017 are common species of the region (Table 6).

Table 6. Wildlife observed within the 28.8 acre Crowley Fish Camp study area in May and June 2017.

sagebrush lizard	<i>Sceloporus graciosus</i>
red-tailed hawk	<i>Buteo jamaicensis</i>
California gull	<i>Callipepla californica</i>
Eurasian collared dove	<i>Streptopelia decaocto</i>
green-tailed towhee	<i>Pipilo chlorurus</i>
raven	<i>Corvus corax</i>

ground squirrel
deer mouse

Spermophilus beecheyi
Peromyscus sp.

Greater Sage Grouse

Greater sage grouse are specialist species that generally occupy open (treeless) sagebrush scrub (Bi-State Technical Advisory Committee, 2012). Seasonally, adults with (or without) chicks may expand their habitat use to include meadows. Greater sage grouse are threatened by development that disturbs these habitats and disrupts breeding. Their habitats have been fragmented by linear barriers such as fencing and degraded by new perches and human-provided subsidies for the predators of sage grouse adults, chicks and nests (Bi-State TAC, 2012). Documented uses of sagebrush scrub habitat by members of the South Mono Basin Population Management Unit (PMU) near Crowley Reservoir include foraging, nesting, and breeding (Federal Aviation Administration, 2007). The nearest known lek (breeding) site and associated nesting and brooding area is located in an expansive and relatively undisturbed stand of sagebrush scrub 3.9 miles to the northwest of the study area.

It is typical for females to disperse into scrub cover seeking relative isolation during nesting, choosing cover that averages near 50% (Casazza, *et al.*, 2005), or roughly twice the 20-30% cover density present near the project. The available cover is relatively short and widely spaced, and so would be insufficient for nesting. Openings in the shrub canopy resembling local leks do not occur in the study area. It is therefore very unlikely that the project will have any impact upon the breeding capacity or success of the local PMU, unless the project creates new subsidies or attractants to predators of sage grouse chicks that may be using the available habitat adjoining the project area for foraging, or creates substantial risk of mortality from increased collisions with vehicles. These impacts could occur during the annual operational period of late April through the end of October, which is the period when greater sage grouse typically would be completing breeding, dispersing, nesting, and raising chicks.

It is very unlikely that foraging sage grouse would use the sparsely covered and intensely disturbed sagebrush scrub margins that are embedded within or adjoin the study area during normal project operations, as these operations include continuous human and dog presence, noise, and recreational activity. It is possible that grouse would enter the relatively unencumbered corridor between the entry gate and camping facilities, to access sagebrush habitat south of Whisky Creek. Given the project's proposed addition of new camping spaces, water service for the existing dry camp site, and other improvements, the resulting increase in motorized traffic will create at least some increased risk of vehicle-grouse collisions near the entry gate during the annual period late April through the end of October, unless vehicular speed is enforceably controlled at below the level where grouse can be avoided. The proposed increase in camping use furthermore has the potential to create additional new attractants for typical avian and mammalian predators of greater sage grouse, unless effective measures to prevent predator access are implemented.

It is conceivable that sage grouse enter the study area during winter foraging. Exposed sagebrush can become scarce during the snowy winter months, and the slightly raised and open, windier topography may become exposed to offer sagebrush foraging resources more frequently than surrounding areas. While this use has not been observed, adults were observed to use meadows that are maintained by water spreading operations along Hilton Creek to the west during

May-June 2013, 2014, and 2017 (personal obs.), and this habitat extends to within 1500 ft of the study area's west edge (Figure 4). All project operations are ceased during the potential period of winter foraging use, so there is no increased risk of mortality due to vehicle collisions. The proposed new construction will not increase the local availability of high perches that impart advantage to typical predators of overwintering greater sage grouse. Furthermore, during this season there will be no operations-based creation of trash and other potential attractants and subsidies for predators. It is therefore unlikely that the project will have any impact upon sage grouse resource use or mortality during winter months.

Sagebrush scrub within the project area has been marginalized historically and currently occurs as isolated fragments amid the array of project camping and water recreation-related elements (Figure 3). Loss of up to 0.5 acres of Great Basin Mixed Scrub and Big Sagebrush Scrub habitat due to new project-related construction will not significantly affect the availability of sagebrush for greater sage grouse foraging in the Southern Long Valley region.

Western White-tailed Jackrabbit

Western white-tailed jackrabbits are thought to inhabit a variety of montane habitats in the Eastern Sierra Nevada, including Big Sagebrush Scrub that provides a substantial shrub cover. Individuals do not congregate, and are mainly nocturnal when foraging. Sightings regionally appear to be very uncommon, and may be restricted to individuals that are migrating to lower elevation scrub during summer months (C.A. Joseph and Assoc., 2007). Highly mobile hares could conceivably enter the study area during the normal operational period of the project.

Presence of this species within the project area could be detected during winter months by searching for forms in the snow. In other season, they would be more difficult to detect. No hare-sized burrows that could be appropriated by western white-tailed jackrabbit were found during the May-June 2017 survey, however pellets attributable to a larger rabbit or hare species were found. As discussed above for greater sage grouse, the project would increase the risk of vehicle-hare collisions due to increased traffic volume, unless vehicular speed is enforceably controlled at below the level where hares can be avoided. The proposed increase in camping use furthermore has the potential to create additional new attractants for typical avian and mammalian predators of small mammals including jackrabbits, unless effective measures to prevent predator access to new subsidies are implemented.

Remaining scrub habitat within the project area has been marginalized historically and currently occurs as isolated fragments (Figure 3). Loss of up to 0.5 acres of this scrub habitat would not have a significant effect on highly mobile hares that may travel through the area.

Sierra Nevada Red Fox

Like western white-tailed jackrabbit, Sierra Nevada red fox are very elusive due primarily to rarity and are highly mobile within large montane ranges that are thought to include migration movements to lower elevations. Reproducing and resident foxes adopt relatively large and conspicuous burrow-like holes. No dens attributable to fox or any other mammal larger than California ground squirrel (*Spermophilus beecheyi*) were seen during the May-June 2017 survey. Small rodent burrows, which were sparsely occupied within scrub fragments throughout the study area, had not been recently excavated by predators.

It is unlikely that new construction will affect any den or directly impact highly mobile Sierra Nevada red fox. The area that will be devegetated by the project represents a very small fraction of the regionally available foraging habitat for this species. As no records of recent and nearby sightings were uncovered, and no evidence of recent use of the study area was detected, it is very unlikely that the removal of up to 0.5 acres of Great Basin Mixed Scrub and Big Sagebrush Scrub potential foraging habitat due to project-related construction will significantly affect any Sierra Nevada red fox.

Mule Deer

Mule deer are considered important harvest species by the CDFW. Scrub habitats in Mono County, especially those supporting a highly palatable browse component such as bitterbrush (*Purshia tridentata*), provide crucial resources for adult reconditioning and fawn survival in late spring through early fall months. Migrating does in early spring are notably reliant upon the availability of high quality bitterbrush to maintain good health and reproductive success (Monteith, *et al.*, 2009). Radio-collar tracking of migrating deer of the Round Valley Herd has shown that the location of Crowley Fish Camp (Figure 4) is partly within or at the northern margin of the corridor that is traditionally used for their annual migration movement (Figure 5). The Round Valley Herd size has decreased in recent years, and is now at about 1200 deer (T. Taylor, personal comm., July 2017).

Great Basin Mixed Scrub and Big Sagebrush Scrub vegetation within the study area seasonally meet the habitat requirements for mule deer. Bitterbrush is dominant or co-dominant in the shrub layer. Deer may enter the study area to forage, migrate, or hold (suspend migration) during the late October to late April annual period of Crowley Fish Camp non-operation. Up to 0.5 acres of this seasonally available resource for deer will be displaced by proposed project-related construction. The local abundance of bitterbrush will be reduced; however, the bitterbrush available within the project area is isolated from the extensive off-site scrub that comprises the bulk of the available habitat for foraging, migrating and holding. During intensive botanical survey and wildlife survey transecting of these isolated patches, there were no evidences of mule deer use in recent months. The only tracks observed in bitterbrush-dominated Great Basin Mixed Scrub were those of domestic dogs and possibly coyote, and no mule deer fecal pellet groups were seen. No vegetated areas near the established or proposed recreational facilities would be suitable for substantial deer use for foraging or holding during the seasonal operational period of Crowley Fish Camp (late April through late October), due to constant human presence, domestic dog presence, noise, and night lighting.

It is possible that mule deer may enter the southernmost, least developed part of the study area within the normal period of Crowley Fish Camp operations, during annual migration. Spring migration (east to west across the study area and South Landing Drive) occurs in the study area during the period early April through late May (later into June in snowy years). Fall migration (west to east) begins in late September and extends into late November. Thus the latter portion of the normal spring migration period, as well as the early portion of normal fall migration, occurs during annual facility operations. Human activity during the intersected spring migration period is much higher than activity during the intersected fall migration period. For example, up to 100 vehicle trips (mainly during daytime hours) are expected each day on the road between the entry gate and area of operations during May, but only about 30 trips are expected on average days during fall operations. In contrast to the peninsular landscape position of the developed, northern

part of the study area, the roadway in the southern study area that is used for all Crowley Fish Camp vehicular entry and exit passes through a relatively open corridor that likely is also used by mule deer migrating to the north of U.S. Highway 395 (Figure 4). The unpaved campsite group near Whisky Creek also encroaches slightly into this corridor. In early June 2017, evidence of deer use in this area included sparse pellet groups, and one set of tracks crossing through the unpaved campsite group that was observed during the botanical survey. No systematic survey to quantify deer use was performed.

If this corridor, which is indicated by published radio-collar data (Figure 5), by landscape position (Figure 4), and by sign of deer use in 2017, is compromised by new linear barriers to movement, unleashed dogs, or night lighting created by the proposed project, then it is likely that migratory deer movements will be significantly affected. Linear barriers that are oriented in the north-south direction and dogs that are unleashed by campers could direct migrating or resident deer onto U.S. Hwy 395. Deer movements that are associated with migration, as well as potentially occurring daily movements to water (e.g., at Whisky Creek) by resident deer, are mainly nocturnal. New lighting that reduces concealment or increases the advantage of nocturnal predators would thwart such movements, may cause loss of access to crucial resources associated with Hilton Creek riparian communities and adjacent high-quality bitterbrush stands, and in effect would partially close an already encumbered migration corridor. New barriers or lighting that is confined to the northern, more densely developed and occupied portion of the study area (Figure 3), meanwhile, would have no substantial effect on mule deer seasonal use or upon the function of the likely migration corridor.

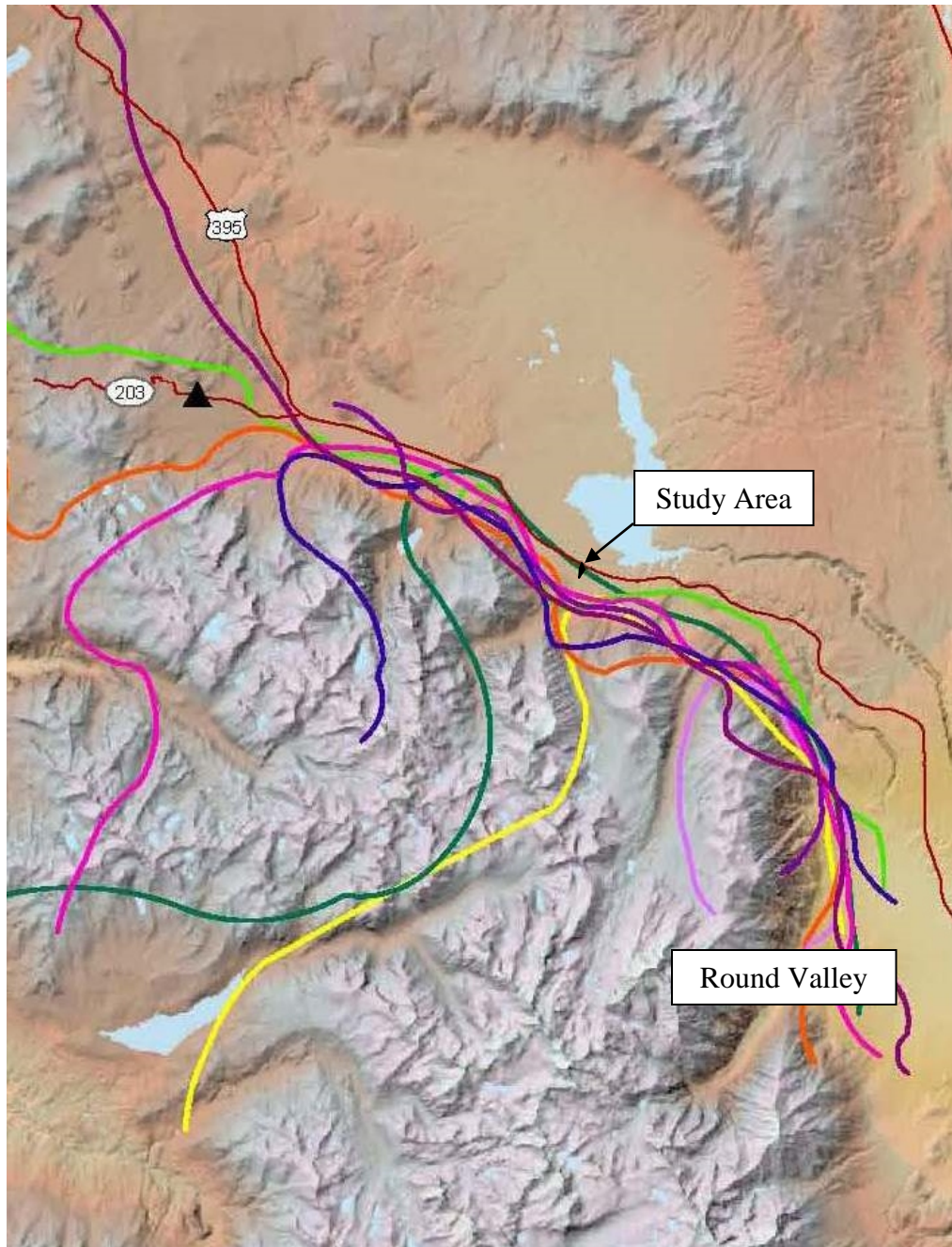


Figure 5. Radio-collar tracking data documenting normal migration routes used by mule deer of the Round Valley Herd.

The project includes the proposal to add improved campsites and provide water for other campsites, which will lead to increased vehicular traffic across the likely deer migration corridor. The “main” road within the study area extends from South Landing Drive at the existing entry gate, and all traffic approaching the site’s facilities and other roads must use this route. The approach route crosses the direction of migrational travel in a direct, perpendicular fashion, with very good

visibility should animals move onto the pavement. While the proposed increase in vehicular traffic on this road increases the risk of collisions with migrating mule deer, it should be possible to enforceably control the speed of all vehicles at below the level where deer can be avoided. Considering the need to similarly avoid potential new collisions with greater sage grouse, western white-tailed jackrabbit, and Sierra Nevada red fox, sensitive wildlife including migrating mule deer reasonably can be avoided by drivers traveling at speeds less than 20-25 mph. Potentially occurring sensitive wildlife are relatively large and mobile, and all would be most likely to be present nocturnally during the period when project-related traffic is at a minimum.

Summary of Potential Impacts

1. Loss of Bitterbrush-Dominated Shrublands

New construction proposed within the study area will displace up to 0.5 acres of historically disturbed and fragmented Great Basin Mixed Scrub and Big Sagebrush Scrub vegetation. Great Basin Mixed Scrub is considered a sensitive plant community type by the State of California, and the dominant shrub bitterbrush is known to provide crucial forage for resident and migrating mule deer. The loss of fragmented shrubland remnants that are embedded within long-standing recreational developments is not considered to be a significant impact. The displacement by new campground sites and facilities of up to 0.4 acres of bitterbrush-dominated scrub, as well as up to 0.1 acres of scrub where bitterbrush is present but not dominant, can be reduced to below the level of significance if bitterbrush is seeded into disturbed areas and sparse sagebrush scrub totaling at least one acre within the likely mule deer migration corridor where it intersects the Crowley Fish Camp approach road and entry gate area.

2. Increased Risk of Vehicle-Wildlife Collisions

Due to increased vehicular traffic in the relatively undeveloped area near the entry gate, there exists some increased likelihood of collision between vehicles using the road to enter or exit Crowley Fish Camp and wildlife including greater sage grouse, western white-tailed jackrabbit, and Sierra Nevada red fox, and migrating mule deer, unless all vehicle speeds are controlled below 20-25 miles per hour and drivers are made aware of the risk of collision if speeds are greater. A limit of “Wildlife Crossing – 15 mph” that is posted and also enforced between the entry gate and existing campground facilities would slow vehicles to a speed that allows drivers to wildlife. Drivers should be informed of the potential presence of wildlife on the roadway as a routine at first contact when arriving at the entry gate.

3. Partial Closure of a Migratory Corridor

New construction and ongoing operations in the southern, less developed portion of the Crowley Fish Camp site must not include the emplacement of linear barriers to migration, such as fences, which could redirect migrating deer onto U.S. Highway 395. Similarly, safety lighting in the area of the likely migration corridor should be minimal and shielded so that the darkened width of the corridor is not substantially reduced. This includes lighting at the entry gate, along the approach road, and at the semi-developed campground near Whisky Creek. This latter area, where increased camper occupancy is expected as a result of the project, must as an advertised condition of occupancy require full-time leashing of dogs to avoid increased incidence of mule deer being chased into U.S. Highway 395 traffic.

4. Increased Subsidies for Potential Predators of Sensitive Wildlife

The increase in use by campers will create additional trash, which can become a dependable food source for potential predators of sensitive wildlife that may use Crowley Fish Camp's remaining shrublands fragments, if access to this food source is allowed. All food and trash should be secured such that bears and ravens cannot gain access to it. This standard should be sufficient for all potential predators whose locally subsidized increase in presence would add predatory pressure upon wildlife including greater sage grouse and western white-tailed jackrabbit.

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