

Biological Assessment: Unincorporated Communities of Mono County

DRAFT – August 20, 2014

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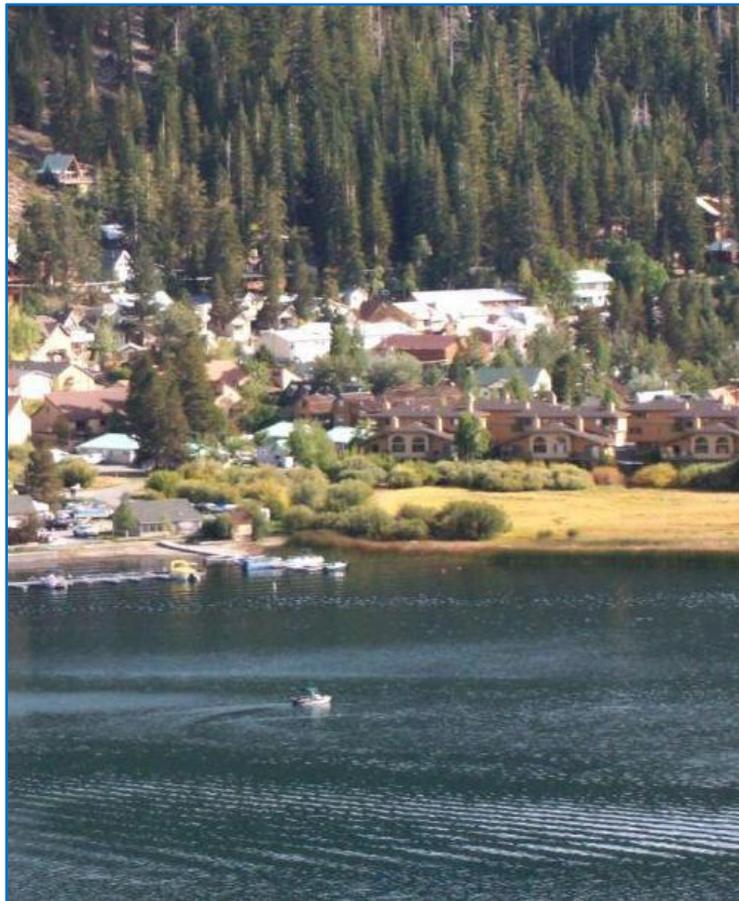


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Biological Assessment: Towns of Mono County

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Introduction

Area Plans have been completed by the Mono County Planning Department for the majority of unincorporated community (“town”) areas in Mono County. All of these Plans anticipate population growth, and some foresee increases in recreational facilities and tourist visits.. Unavoidable impacts from the planned growth of towns and the consequent imposed human activities include adverse significant effects upon biological resources. Impacts occur during and subsequent to conversion of native landscapes and vegetation to impermeable surfaces, and with the incremental addition of impediments to ecological flow within the habitats that exist and contribute to the attractive character of these towns. Stated goals in the various Area Plan policies seek to balance these unavoidable impacts with the need to preserve as much of the area’s native character as possible. This assessment identifies and addresses specific impacts to sensitive species and habitats, ecosystem function, and the overall landscape integrity that have been and will continue to be created by business, housing, and infrastructure development in Mono County. Mammoth Lakes (i.e., the “Town of Mammoth Lakes”) incorporated in 1984, and is not included in this study.

Methods and Results

General analyses that were previously performed to inform Area Plan development and adoption in Mono County provide an important basis for this study. Chalfant Valley, Benton, Wheeler Crest, Long Valley, and June Lake Area Plans, and Area Plan provisions recorded in the 2007 Mono County General Plan for Benton Hot Springs, Mono Basin, Bridgeport, and Antelope Valley, and conclusions and mitigations recorded in MEA and EIR documents for those plans (County of Mono, 1993, 2000, 2004, Mono County Planning Department, 2001, Mono County LAFC, 2009, Mono Basin RPAC, 2012) are incorporated herein. The current analysis is intended to focus in greater detail on actions and mitigations for issues that are developing with Plan implementation. Town area included here (Table 1) currently range in population from xxxx (Long Valley) to xxxx (June Lake). Their extents for mapping and analysis (“study area”) were determined by the Mono County Planning Department, who at each town area included contiguous blocks of privately owned lands that are zoned for potential development, and a 200 ft buffer of public lands on all sides.

Plant communities present within each of the 16 town study areas were inventoried in 2013-2014. A total of 11,718 acres of the most densely populated areas of Mono County were inventoried (Table 1). Based upon initial visits in 2013, community boundaries were mapped onto aerial imagery dated September 2013 with 1 meter resolution. Of the 2174 community type polygons that were generated, 2108 (97%) were subsequently visited to ground-truth boundaries (Fall 2013), classify the communities and dominant alliances present (Fall 2013), and inventory the native and non-native plant species that characterize the assigned community types (Fall 2013 and Spring 2014). Surveys were

limited to points of access and viewing from public roads and adjoining public lands, so were suitable for recording visual estimates of the dominant species' relative frequencies in each vegetation stratum. This level of survey does not meet California Department of Fish and Wildlife (CDFW) floristic rigor standards for determining rare species presence or absence (CDFW, 2009), but does allow assignment of alliance names as defined by CDFW (2010). At this level of community classification, CDFW status as "Sensitive" can be determined for the occurring vegetation.

Each vegetation polygon was assigned to one community type using naming adapted from Holland (1986), which is a classification that uses physiographic landscape position in part to distinguish types. Alliance type naming is more precisely distinguished by the dominant plant species, but may imply physiographic features based upon the habitat requirements of dominants. One predominant (and normally the only) alliance type present was determined for each mapped polygon, using the classification system presented by Sawyer, *et al.*, (2009). Plant species were identified using nomenclature that is presented by Baldwin, *et al.*, (2012).

Table 1. Unincorporated community (town) area names used in this report and in the associated database of plant community (habitat) types. Total acreage of all mapped polygons in each study area is given.

Chalfant Valley	802	McGee Creek	127
Benton	955	Long Valley	54
Benton Hot Springs	168	June Lake	852
Paradise	214	Lee Vining	642
Swall Meadows	1164	Bridgeport	1138
Tom's Place	442	Walker	2869
Little Round Valley	385	Coleville	962
Crowley Lake	620	Topaz	324

Community type data (Appendix C) is for any particular polygon the average of up to ten separate on-the-ground surveys as described above, depending on the size of the mapped habitat, accessibility, and the level of vegetation variability encountered in the field. Ground-truth visits included collection of representative plant species lists, recording of average vegetative condition, height, and cover, and level of disturbance, and an assessment of current habitat fragmentation and isolation within the urban and urban fringe landscape. Access was gained by owner permission at some larger properties.

Lack of access to confirm the assigned vegetation type at all aspects that were occupied by that vegetation type within the 2108 occurrences that were checked would allow for mis-assignment error if subtle transitions or small, embedded communities were also not visible on the aerial photographs. It is estimated that these unobserved transitions of alliances within a uniform-appearing community type may have been omitted from the map at up to 5% of vegetated polygons greater than 1.5 acres in size (5% of 791 polygons). Unintentional omission of small, embedded alliance types from the mapping and analysis is considered a more significant error for the analyses presented here than error inherent to the drawing of community boundaries. Acreage is subject to interpretation of where to put boundaries between often broadly grading communities. In Mono County, broad ecotones were especially common at meadow/scrub boundaries in the riparian zone. Finally, plant lists developed for each town (App. B) are intentionally incomplete and should be regarded only as records of the most prominent species, the canopy or sward dominant species for alliance type assignments, and non-native species presence as observed in 2013-2014. No attempt was made to inventory the entire assemblage or look for sensitive plant populations.

At the project level for any subset of these polygons, it would therefore be appropriate to map habitat types and plan surveys where sensitive species may potentially occur, and to conduct transect-style floristic surveys at the appropriate time of year (per CDFW, 2009) to distinguish common from sensitive species. At the project level of scrutiny, additional community types, as used in this report are not expected. However, finer-grained or transitional alliance types may be detected or distinguished by the project botanist in some cases. Also, boundaries as drawn here are not substitutes ofr those that would be drawn upon formal delineation of wetlands (per ACOE, 1987, 2004). For example, the Willow Riparian Scrub alliance type *Salix lasiolepis-Salix lutea* assigned to a riparian vegetation zone would at the project level be potentially subdivided to map one or more meadow alliances in the areas between willow clumps, and a marsh alliance at emergent streamside habitat, as this effort will allow a correct delineation of wetlands, demonstrate planned avoidance, or calculate the acreage of unavoidable impact and compensatory mitigation.

Sensitive plant species are in a few cases known to occur (currently or historically) within town study areas (App. A). Many more sensitive plant species could have some potential to be found within the diverse physical environments that were mapped as available, ranging from exposed upland slopes and rock outcrops to lowland wet meadows, seep zones, shaded riparian corridors and devegetated or otherwise disturbed habitats (App. C). A list of potentially occurring sensitive plant species was compiled after reviewing regional data (Mono County Planning Department 2001, Halford and Fatooh 1994, California Native Plant Society (CNPS) 2001, 2014, CalFlora 2014, CDFW 2014a, 2014b, Consortium of California Herbaria, 2014), regional floras (Baldwin, *et al.* 2012, Jepson Herbarium, 2014), and reports from various local botanical surveys that have been performed for the preparation of environmental documents (listed in discussions for each town, below), personal communications with local agency botanists, and April 2014 searches of the California Natural Diversity Database (CNDDB) records for the nine quadrangle area surrounding each town. Potentially occurring plant species were considered to be "Sensitive" if they have state or federal status as rare, threatened or endangered (CDFW 2014a), or are listed in the CNDDB list of special plants (CDFW 2014b), or are listed by CNPS in their inventory of

sensitive California plants (CNPS 2001, 2014), or are included in the most recent sensitive plant or watch lists prepared by U.S. Forest Service - Inyo and Toiyabe National Forests (USFS 2006a, 2006b, 2009, 2013a) or Bureau of Land Management, Bishop (BLM, 2012).

CNDDDB records and literature search results indicate that 78 special status plant species, 3 sensitive bryophytes, and one sensitive lichen (Table 2), and two sensitive plant communities (Water Birch Riparian Scrub and Mono Pumice Flats) occur at or within 20 miles of the 16 town areas, and are known from native or disturbed settings that bear some resemblance to habitats mapped as available within town areas (see also tables for each town area). No critical habitat designations currently intersect the town areas included in this study. Species that exhibit a relatively ephemeral, annual growth (*Cryptantha fendleri*, *Phacelia gymnoclada*, *Phacelia inyoensis*, *Plagiobothrys parishii*, *Atriplex argentea* var. *hilmanii*, *Atriplex pusilla*, *Micromonolepis pusilla*, *Lupinus pusillus* var. *intermontanus*, *Calyptridium pygmaeum*, *Eremothera boothii* ssp., *Aliciella triodon*, *Eriogonum nutans* var. *nutans*, and *Oryctes nevadensis*) may be present only in the seed bank in some years, and could appear in otherwise ruderal settings (roadsides, devegetated lots). Sensitive perennial and shrub species (there are no trees) would be generally expected only in areas with relic or fairly intact native vegetation. However, the perennial herbs *Hulsea vestita* ssp. *inyoensis*, *Astragalus monoensis*, *Allium atrorubens* var. *atrorubens*, and *Muilla coronata* could colonize or persist as bulbs in recently or regularly disturbed situations.

Table 2. Sensitive vascular plant, bryophyte and lichen species that potentially occur in the habitats mapped at 16 towns in Mono County. Species and habitat types for each town are summarized separately in tables provided in the analysis for each town. Habit codes: A = annual species, P = perennial, G = grass, GL = grass-like growth, H = herbaceous growth, S = shrub.

<u>Family</u>	<u>Species</u>	<u>Habit</u>
Peltigeraceae	<i>Peltigera gowardii</i>	
Bruchiaceae	<i>Bruchia bolanderi</i>	
Orthotrichaceae	<i>Orthotrichum shevockii</i>	
Thuidiaceae	<i>Helodium blandowii</i>	
Ophioglossaceae	<i>Botrychium ascendens</i>	PH
	<i>Botrychium crenulatum</i>	PH
	<i>Botrychium lunaria</i>	PH
Apiaceae	<i>Cymopterus globosus</i>	PH
Asteraceae	<i>Chaetadelpha wheeleri</i>	PH
	<i>Crepis runcinata</i> ssp. <i>hallii</i>	PH
	<i>Ericameria albida</i>	S

<u>Family</u>	<u>Species</u>	<u>Habit</u>
Asteraceae (cont.)	<i>Hulsea vestita</i> ssp. <i>inyoensis</i>	PH
	<i>Hymenopappus filifolius</i> var. <i>nanus</i>	PH
	<i>Sphaeromeria potentilloides</i> var. <i>nitrophila</i>	PH
	<i>Tetradymia tetrameres</i>	S
Boraginaceae	<i>Cryptantha fendleri</i>	AH
	<i>Mertensia oblongifolia</i> var. <i>oblongifolia</i>	PH
	<i>Phacelia gymnoclada</i>	AH
	<i>Phacelia inyoensis</i>	AH
	<i>Phacelia monoensis</i>	AH
	<i>Plagiobothrys parishii</i>	AH
Brassicaceae	<i>Boechera bodiensis</i>	PH
	<i>Boechera cobrensis</i>	PH
	<i>Boechera dispar</i>	PH
	<i>Boechera tularensis</i>	PH
	<i>Cusickiella quadricostata</i>	PH
	<i>Draba praealta</i>	PH
	<i>Streptanthus oliganthus</i>	PH
	<i>Thelypodium integrifolium</i> ssp. <i>complanatum</i>	PH
	<i>Thelypodium milleflorum</i>	PH
Caryophyllaceae	<i>Minuartia stricta</i>	PH
	<i>Silene oregana</i>	PH
Chenopodiaceae	<i>Atriplex argentea</i> var. <i>hillmanii</i>	AH
	<i>Atriplex pusilla</i>	AH
	<i>Micromonolepis pusilla</i>	AH
Fabaceae	<i>Astragalus argophyllus</i> var. <i>argophyllus</i>	PH
	<i>Astragalus johannis-howellii</i>	PH
	<i>Astragalus lemmonii</i>	PH
	<i>Astragalus monoensis</i>	PH
	<i>Astragalus oophorus</i> var. <i>lavinii</i>	PH
	<i>Astragalus platytropis</i>	PH
	<i>Astragalus serenoii</i> var. <i>shockleyi</i>	PH
	<i>Lupinus duranii</i>	PH
	<i>Lupinus gracilentus</i>	PH
	<i>Lupinus magnificus</i> var. <i>hesperius</i>	PH
<i>Lupinus pusillus</i> var. <i>intermontanus</i>	AH	
Loasaceae	<i>Mentzelia inyoensis</i>	PH
	<i>Mentzelia torreyi</i>	PH

<u>Family</u>	<u>Species</u>	<u>Habit</u>
Malvaceae	<i>Sidalcea covillei</i>	PH
	<i>Sidalcea multifida</i>	PH
Montiaceae	<i>Calyptridium pygmaeum</i>	AH
Onagraceae	<i>Epilobium howellii</i>	PH
	<i>Eremothera boothii</i> ssp. <i>boothii</i>	AH
	<i>Eremothera boothii</i> ssp. <i>intermedia</i>	AH
Orobanchaceae	<i>Orobanche ludoviciana</i> var. <i>arenosa</i>	PH
	<i>Pedicularis crenulata</i>	PH
Parnassiaceae	<i>Parnassia parviflora</i>	PGL
Polemoniaceae	<i>Aliciella triodon</i>	AH
Polygalaceae	<i>Polygala intermontana</i>	S
	<i>Polygala subspinosa</i>	PH
Polygonaceae	<i>Dedeckera eurekaensis</i>	S
	<i>Eriogonum shockleyi</i> var. <i>shockleyi</i>	PH
	<i>Eriogonum nutans</i> var. <i>nutans</i>	AH
Ranunculaceae	<i>Ranunculus hydrocharoides</i>	PH
Rosaceae	<i>Ivesia kingii</i> var. <i>kingii</i>	PH
Sarcobataceae	<i>Sarcobatus baileyi</i>	S
Solanaceae	<i>Oryctes nevadensis</i>	AH
Violaceae	<i>Viola purpurea</i> ssp. <i>aurea</i>	PH
Alliaceae	<i>Allium atrorubens</i> var. <i>atrorubens</i>	PGL
Cyperaceae	<i>Carex petasata</i>	NPGL
	<i>Carex scirpoidea</i> ssp. <i>pseudoscirpoidea</i>	NPGL
	<i>Carex vallicola</i>	NPGL
Juncaginaceae	<i>Triglochin palustris</i>	PH
Liliaceae	<i>Calochortus excavatus</i>	PGL

<u>Family</u>	<u>Species</u>	<u>Habit</u>
Poaceae	<i>Agrostis humilis</i>	PG
	<i>Glyceria grandis</i>	PG
	<i>Spartina gracilis</i>	PG
	<i>Sphenopholis obtusata</i>	PG
	<i>Stipa divaricata</i>	PG
Potamogetonaceae	<i>Potamogeton robbinsii</i>	PH
	<i>Stuckenia filiformis</i> ssp. <i>alpina</i>	PH
Themidaceae	<i>Muilla coronata</i>	PGL

Sensitive wildlife species reside, pass or migrate through, forage, roost, den, breed, nest, or raise their young in the available habitats remaining at or created by town development. Some species may rely on habitats within towns for a critical stage of their lives, for example the (long-lived) bald eagle (*Haliaeetus leucocephalus*) pair that loyally returns to a nest site within the June Lake study area. Sensitive wild life species, as used in this report, meet the definitions of rare or endangered 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 local agencies as locally rare. Based upon a review of available regional data (Mono County Planning Dept., 2001, CDFW, 2014c, 2014d,), reports from various local wildlife resource surveys that have been performed for the preparation of environmental documents, personal communications with knowledgeable agency personnel, and April 2014 searches of the CNDDDB records for the nine quadrangle area surrounding each town, 40 species have some potential to occur within the 16 Mono County town study areas (Table 3). Individuals for each have been documented historically or sometimes recently to occur within 20 miles and in native or disturbed habitat settings that bear some resemblance to habitats mapped as available (see tables for each town area). There are currently no critical habitat designations intersecting the town areas included in this study.

Table 3. Sensitive wildlife species that potentially occur in the habitats mapped at 16 towns in Mono County. Species and habitat types for each town are summarized separately in tables provided in the analysis for each town.

<u>Taxonomic Group</u>	<u>Species</u>	
Mollusks	<i>Pyrgulopsis aardahli</i>	Benton Valley springsnail
	<i>Pyrgulopsis owensensis</i>	Owens Valley springsnail
	<i>Pyrgulopsis wongi</i>	Wong's springsnail

<u>Taxonomic Group</u>	<u>Species</u>	
Fish	<i>Catostomus fumeiventris</i>	Owens sucker
	<i>Rhinichthys osculus</i> ssp. 2	Owens speckled dace
	<i>Rhinichthys osculus</i> ssp. 5	Long Valley speckled dace
	<i>Siphateles bicolor snyderi</i>	Owens tui chub
Amphibians	<i>Hydromantes platycephalus</i>	Mount Lyell salamander
	<i>Lithobates pipiens</i>	northern leopard frog
	<i>Rana sierrae</i>	Sierra Nevada yellow-legged frog
Reptiles	<i>Elgaria panamintina</i>	Panamint alligator lizard
Birds	<i>Accipiter gentilis</i> (nesting)	northern goshawk
	<i>Aquila chrysaetos</i> (nesting)	golden eagle
	<i>Buteo swainsoni</i> (nesting)	Swainson's hawk
	<i>Centrocercus urophasianus</i> (nesting, leks)	greater sage grouse
	<i>Circus cyaneus</i> (nesting)	northern harrier
	<i>Dendroica petechia breweri</i> (nesting)	yellow warbler
	<i>Empidonax traillii</i> (nesting)	willow flycatcher
	<i>Falco mexicanus</i> (nesting)	prairie falcon
	<i>Haliaeetus leucocephalus</i> (nesting)	bald eagle
	<i>Pandion haliaetus</i> (nesting)	osprey
	<i>Riparia riparia</i> (nesting)	bank swallow
<i>Spizella breweri</i> (nesting)	Brewer's sparrow	
<i>Xanthocephalus xanthocephalus</i> (nesting)	yellow-headed blackbird	
Mammals	<i>Antrozous pallidus</i>	pallid bat
	<i>Aplodontia rufa californica</i>	Sierra Nevada mountain beaver
	<i>Brachylagus idahoensis</i>	pygmy rabbit
	<i>Euderma maculatum</i>	spotted bat
	<i>Eumops perotis californicus</i>	western mastiff bat
	<i>Lepus townsendii townsendii</i>	western white-tailed jackrabbit
	<i>Martes americana sierrae</i>	Sierra marten
	<i>Martes pennanti</i> West Coast DPS	fisher
	<i>Microtus californicus vallicola</i>	Owens Valley vole
	<i>Myotis ciliolabrum</i>	western small-footed myotis (bat)
	<i>Myotis evotis</i>	long-eared myotis
	<i>Myotis thysanodes</i>	fringed myotis
	<i>Myotis yumanensis</i>	Yuma myotis
	<i>Sorex lyelli</i>	Mount Lyell shrew
<i>Taxidea taxus</i>	American badger	
<i>Vulpes vulpes necator</i>	Sierra Nevada red fox	

Towns in Mono County share an extensive amount of edge with relatively undisturbed native habitats. The landscape within each town area is substantially more diverse than is found beyond its borders, and each thus embodies a substantial amount of habitat transitional area. Edge or ecotonal habitat areas are generally recognized as invaluablely productive for wildlife resources (Leopold, 1933). One important reason why local diversity is high is that nearly all study area towns have arisen from historical foundations at watered streams. Riparian zones naturally are spatially more variable in soil moisture, shading, cover density, and intensity of wildlife usage. Riparian trees and dense vegetation, regionally limited aquatic habitats and sources of surface water, and productive edge habitats can be accessed by wildlife that are attracted to, pass through regularly, or are adapted to the environment modified by the town setting. Known and potential corridors for seasonal wildlife movement and annual dispersal and hence genetic flow are intersected and impacted by the current pattern and location of existing and planned development, especially at towns situated along the base of the Sierra Nevada. Riparian community types (1154 total acres mapped) account for 35% of all mapped polygons in the study area but only 9.9% of the total area mapped. The average riparian zone polygon size is 1.5 acres, with most polygons (63%) having mapped areas of 1.0 acres or less. Given this average size, even small projects will have the potential to substantially impact individual occurrences of riparian communities.

There are town habitat characteristics that are potentially attractive to wildlife, such as human food within all town areas. Landscaping vegetation and irrigation, canals and flowing ditches, and common behaviors such as careless handling of trash, provision of bird feeders, and other deliberate feeding to attract wildlife contribute to the overall carrying capacity of town habitats. Some species, including predators that were once considered relatively uncommon in Mono County (*e.g.*, ravens), have greatly benefitted from town subsidies and have increased their local populations. Towns thus have presumably affected the predator-prey balance of the region, with negative consequences for sensitive prey species. While town features thought to be attractive to wildlife inform the list of sensitive wildlife species that may potentially occur, any actual or sustained presence of sensitive species would likely be diminished by presumable (*i.e.*, typical) urbanized habitat degradations, including long-term loss of surface and groundwater quality, mortality due to domestic pets and introduced trout, and nuisance removal of individuals. Effects widely observed during surveys included loss of habitat connectivity (isolation), collision removal of individual animals, and siting and maintenance of roads and fences that function as linear barriers to wildlife movement.

Areas mapped as having been converted from native vegetation included roads, buildings, and other developed impervious surfaces (2408 acres total), agricultural crops (388 acres), fenced pastures and irrigated meadows (198 acres), and exposed reservoir lakebed (35 acres). Some areas in Bridgeport, Walker, Coleville, and Topaz (63 acres total) were classified as Non-Native Grassland, being historically devegetated by conversion or sildfire and now likely arrested at their earliest successional state of sparse to dense cheatgrass (*Bromus tectorum*) and tumble mustard (*Sisymbrium altissimum*). The remaining area totaling 8627 acres was classified as native vegetation types (Table 4).

The native community types remaining in towns can appear merely as relic variants of the undisturbed examples on adjacent public lands, with loss of edge vegetation, cover and species diversity, and prominent invasions of non-native plant species. Upland scrub and woodland polygons

that were mapped in most towns may encompass larger acreage but appear as convoluted, relatively isolated habitats among houses and roadways (Figures 2-16). But more than half or all occurrences were found to have retained a distinctly native character, with the assembled species being primarily native, some connectivity to the surrounding landscape retained, and ecotonal vegetation transitions – particularly upland to riparian community type transitions – maintaining high plant species diversity and cover. For each town, there generally remains too potential for wildlife usage, and some potential for sensitive wildlife presence in the habitats where ongoing development will occur. Furthermore, riparian corridors that have relatively high value for maintaining diversity and supporting wildlife in the generally arid Eastern Sierra Nevada region often are the least impeded community types mapped within towns. The lengthy, corridor-like (uninterrupted) polygons that were mapped in most towns imply there are utile movement pathways for regular use by wildlife.

Table 4. Community types present within the Mono County town areas. Total study area acreage mapped for each type is given. Alliance names and CDFW codes assigned within each type are given in the analysis for each town.

Upland community types	Area Mapped (acres)	Potential Wetland Community Types	Area Mapped (acres)
Sierran White Fir Forest	65	Aspen Forest	65
Lodgepole Pine Forest	20	Lodgepole Pine Riparian Forest	47
Jeffrey Pine Forest	322	Aspen Riparian Forest	82
Pinyon-Juniper Woodland	1047	Great Basin Riparian Forest	115
Great Basin Juniper Woodland	31	Silver Sagebrush Scrub	3.8
Mountain Mahogany Scrub	171	Black Greasewood Scrub	355
Mixed Montane Chaparral	165	Wild Rose Riparian Scrub	6.3
Big Sagebrush Scrub	3483	Willow Riparian Scrub	437
Great Basin Mixed Scrub	1143	Water Birch Riparian Scrub	80
Rubber Rabbitbrush Scrub	392	Dry Montane Meadow	225
High Desert Blackbrush Scrub	141	Creeping Wildrye Meadow	196
Desert Saltbush Scrub	16	Wet Montane Meadow	64
Shadscale Scrub	66	Montane Freshwater Marsh	36
Non-Native Grassland	71	Transmontane Freshwater Marsh	4.7
cropped fields	388	Transmontane Alkaline Marsh	0.2
devegetated/converted	2408	Wet Alkaline Meadow	5.1
		Dry Alkaline Meadow	90
		Alkali Sacaton Grassland	2.9

Chalfant Valley

Plant Communities and Species

Mapping of relatively undisturbed to highly disturbed, characteristically Mojavean desert scrub assemblages in the northern two Chalfant Valley unincorporated community (“town”) areas (Figure 2) included a single, relatively intact but narrow corridor of riparian-like rubber rabbitbrush (*Ericameria nauseosa*) and basin big sagebrush (*Artemisia tridentata* var. *tridentata*). This corridor adheres to the channelized (constructed) bed and banks of an unnamed conductor of ephemeral flows generated by larger precipitation events. Flows may occur during the rainy season (December – April) or immediately following significant rain summer monsoonal events. Mapping of plant communities in the southern town area, in contrast, included flash flood-conducting channels of the White Mountains lower fans, and a linear, fault-controlled spring series along a scarp east of White Mountain Estates. While the steep, arroyo-like, distributory fan channels in the southern area exhibit no patterned shift in vegetation from the surrounding xeric scrub, all relatively low-lying areas adjacent to and below the expressed linear scarp support a dramatic shift to dominance by phreatophytic species. The prevalence of plant species that in the arid climate of the Eastern Sierra Nevada and Intermountain Regions) require sustained surface water or shallow groundwater that is seasonally raised into the rooting zone (“phreatophytes”, or facultative and obligate wetland species, as listed in Appendix B) signals communities where potential Clean Water Act-related regulations would apply and project causing disturbance.

Vegetation throughout the Chalfant Valley study area occurs on primarily upland alluvial soils, which have developed desert pavement ranging from sparse (and disturbed) to competent. Dominant scrub types in these setting (Table 5) include many thorny, summer-deciduous shrubs, with very low abundances of perennial herbs and grasses. Shrubs are often widely spaced. Soils nearest Highway 6 in all three inventoried town areas, however, exhibit finer texture, are often white in appearance due to an episodic crust, and are invariably wind-scoured wherever recent disturbance has caused native cover loss. These soils support several phreatophytic dominants, including locally rare patches of Alkali Sacaton Grassland (*Sporobolus airoides*) west of White Mountain Estates, and Black Greasewood (*Sarcobatus vermiculatus*) Scrub that is locally typical of relic lakebed habitats, or basins that may become flooded after large precipitation events. In all these situations, fugitive dust emissions are evident where the surface protection, either the desert pavement or the vegetation, have been altered due to land clearing, construction, livestock pasturing, or OHV travel.

The Chalfant Valley study area is among the most weed-free of the town areas included in this investigation. Representative annuals present in May 2014 included white-stemmed blazing star (*Mentzelia albicaulis*), desert pincushion (*Ceanactis stevioides*), roundleaf puncturebract (*Oxytheca perfoliata*), Watson’s spineflower (*Chorizanthe watsonii*), rigid spineflower (*Chorizanthe rigida*) and club-fruit evening primrose (*Chylismia claviformis* ssp. *lancifolia*). Non-native annual grasses have apparently not reached this area. The only non-native herb found in 2014 was Russian thistle (*Salsola tragus*). This invasive weed occurs often densely at disturbed areas among the existing houses and is becoming widespread in relatively undisturbed upland scrub across the study area. Non-native tamarisk and black locust trees have been planted within the Wild Rose Riparian Scrub and Willow Riparian Scrub wetland

Table 5. Plant communities mapped within the 802 acre Chalfant Valley study area in 2014. The study area includes conversion to agricultural systems (93 acres) and 349 acres of impervious surfaces. Community names (after Holland, 1986) are cross-referenced to the CDFG (2010) classification and 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		
Big Sagebrush Scrub 35.110.00	Big Sagebrush Shrubland <i>Artemisia tridentata-Atriplex canescens</i>	1.6
Big Sagebrush Scrub 35.110.01	Big Sagebrush Shrubland <i>Artemisia tridentata-Ericameria nauseosa</i>	20.8
Great Basin Mixed Scrub 33.280.00	Big Sagebrush Shrubland <i>Ephedra nevadensis-Psorothamnus arborescens</i>	13
Great Basin Mixed Scrub 33.280.02	Nevada Ephedra Shrubland <i>Ephedra nevadensis-Atriplex confertifolia</i>	14
Rubber Rabbitbrush Scrub 35.310.00	Rubber Rabbitbrush Shrubland <i>Ericameria nauseosa-Atriplex canescens</i>	2.8
Rubber Rabbitbrush Scrub 36.310.00	Rubber Rabbitbrush Shrubland <i>Ericameria nauseosa-Ephedra nevadensis</i>	1.5
Desert Saltbush Scrub 35.310.00	Four-Wing Saltbush Shrubland <i>Atriplex canescens-Sarcobatus vermiculatus</i>	12
Shadscale Scrub 36.320.00	Shadscale Shrubland <i>Atriplex confertifolia-Artemisia spinescens</i>	1.6
Shadscale Scrub 36.320.10	Shadscale Shrubland <i>A. confertifolia-Psorothamnus arborescens/P. polydenius</i>	64
Black Greasewood Scrub 36.400.01	Black Greasewood Shrubland <i>Sarcobatus vermiculatus-Ericameria nauseosa</i>	51
Black Greasewood Scrub 36.400.01	Black Greasewood Shrubland <i>Sarcobatus vermiculatus-Psorothamnus arborescens</i>	16
Black Greasewood Scrub 36.400.02*	Black Greasewood Shrubland <i>Sarcobatus vermiculatus-Atriplex confertifolia</i>	160
wetland communities		
Willow Riparian Scrub 52.050.08	Sandbar Willow Thicket <i>Salix exigua-Salix lasiolepis</i>	0.3
Wild Rose Riparian Scrub 63.320.00*	Interior Rose Thicket <i>Rosa woodsii-Salix exigua</i>	0.4
Transmontane Alkaline Marsh 52.050.08*	Cattail Marsh <i>Typha latifolia-Phragmites australis</i>	0.1
Alkali Sacaton Grassland 41.010.02*	Alkali Sacaton Grassland <i>Sporobolus airoides-Ericameria nauseosa</i>	1.2

assemblages in the southernmost town area, and threaten to spread into the larger spring complex that borders this area to the southeast.

The plant communities mapped within the Chalfant Valley study area in 2014 include a shifting mosaic of upland dominants that may be classified as Great Basin Mixed Scrub, Desert Saltbush Scrub, and Shadscale Scrub (Table 5). There are also relatively small, embedded stands of Rubber Rabbitbrush Scrub at disturbed and recovering upland soils and Big Sagebrush Scrub at seasonally moist soils. Alkali Sacaton Grassland occurs at the lowest elevations of the study area, on alkali sink soils where there is often an epialic crust. Vegetation at the limited seep zone habitat of the southern area is classified as either Transmontane Alkaline Marsh (Cattail Marsh at perennially wet soils) or Wild Rose Riparian Scrub (perennially to seasonally moist soils occurring downslope from seeps). Black Greasewood Scrub usually occurs in lower fan and bottomlands settings, and has been largely displaced within the northwestern portion of the study area.

Sensitive Plant Communities and Species

The upland xeric scrub of the study area, being broadly representative of Mojavean scrub types, is considered common and widespread in California. Dominance by these thorny native shrubs is not widespread in the Owens Valley, and Chalfant Valley's Mojavean scrub occurs at the transition between the Great Basin and Mojave Desert floral provinces, so some species occur at the extreme north or west of their known ranges. The patchy prominence of indigo bush species, for examples, includes a disjunct population of Nevada dalea (*P. polydenius*). The diversity of native shrubs is correspondingly high, and would be difficult to replicate in mitigatory plantings. Furthermore, agricultural clearings that have been abandoned for many decades in this area have yet to return to functional (ie, soil stabilizing) native plant cover or species assemblages resembling the undisturbed condition.

A total of 26 sensitive species have some likelihood to occur or are documented to occur within the study area (Table 6). Owens Valley checkerbloom is State listed as Endangered. July gold is State listed as Rare. In addition to species indicated by CNDDDB search results, analyses of the potential impacts from planned disturbance to alkaline scrub and meadow vegetation (Table 5) should consider potential impacts to the white-flowered rabbitbrush and alkali cord grass, which if present would be considered locally rare.

Alliances representing Transmontane Alkaline Marsh, Wild Rose Riparian Scrub, Alkali Sacation Grassland, and Black Greasewood Scrub are classified as Sensitive by CDFW (2010). Alkali Sacaton Grassland and Wild Rose Riparian Scrub are very limited habitats that feature seasonally or perennially inundated to moist rooting zone soils. Transmontane Alkaline Marsh is the least diverse community present, and its single occurrence has been altered by water diversion. The fault-controlled hydrology that supports this community also supports broader areas classified here as Big Sagebrush Scrub. This community is locally rare and restricted to seep zones, and is highly diverse near Transmontane Alkaline Marsh. The occurrence east of White Mountain Estates is known to support small populations of the sensitive species silver-leaved milkvetch, Shockley's buckwheat, and alkali ivesia (Paulus, 2004). Some

alkali sink (relic lakebed-like) habitats found at the lowest elevations of Chalfant Valley support small stands of Alkali Sacaton Grassland. More typically undisturbed sinks, Black Greasewood Scrub or Shadscale Scrub. Areas of Wild Rose Riparian Scrub and Willow Riparian Scrub, and possibly Big Sagebrush Scrub and Black Greasewood Scrub, would be subject to CDFW Section 1600 Streambed Alteration Permit research and mitigations if significant alteration is proposed.

Table 6. Potentially occurring sensitive plant species in the available plant communities at Chalfant Valley. Flowering period is taken from CNPS (2014).

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Aliciella triodon</i> coyote gilia herbaceous annual	2B.2	S2	April-June	Big Sagebrush Scrub Great Basin Mixed Scrub Desert Saltbush Scrub Shadscale Scrub
<i>Astragalus argophyllus</i> var. <i>argophyllus</i> silver-leaved milkvetch herbaceous perennial	2B.2	S1	May-July	Big Sagebrush Scrub Willow Riparian Scrub Wild Rose Riparian Scrub
<i>Astragalus serenoii</i> var. <i>shockleyi</i> Shockley's milkvetch herbaceous perennial	2B.2	S2	April-July	Big Sagebrush Scrub Great Basin Mixed Scrub Desert Saltbush Scrub Shadscale Scrub Black Greasewood Scrub
<i>Atriplex argentea</i> var. <i>hillmanii</i> Hillman's silverscale herbaceous annual	2B.2	S2	June-Sept	Big Sagebrush Scrub Rubber Rabbitbrush Scrub Black Greasewood Scrub Alkali Sacaton Grassland
<i>Boechera dispar</i> pinyon rockcress herbaceous perennial	2B.3	S3	March-June	Big Sagebrush Scrub Great Basin Mixed Scrub Desert Saltbush Scrub Shadscale Scrub
<i>Calochortus excavatus</i> Inyo County star-tulip bulbiferous herb	1B.1	S2	April-July	Big Sagebrush Scrub Willow Riparian Scrub Wild Rose Riparian Scrub Transmontane Alkaline Marsh
<i>Chaetadelpa wheeleri</i> Wheeler's dune-broom rhizomatous herb	2B.2	S2	April-Sept	Rubber Rabbitbrush Scrub Shadscale Scrub Black Greasewood Scrub Alkali Sacaton Grassland

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Crepis runcinata</i> ssp. <i>hallii</i> Hall's meadow hawksbeard herbaceous perennial	2B.1	S1S2	May-July	Big Sagebrush Scrub Willow Riparian Scrub Wild Rose Riparian Scrub Black Black Greasewood Scrub Alkali Sacaton Grassland
<i>Dedeckera eurekaensis</i> July gold deciduous herb	1B.3	S3	May-August	Big Sagebrush Scrub Great Basin Mixed Scrub Desert Saltbush Scrub Shadscale Scrub
<i>Eremothera boothii</i> ssp. <i>intermedia</i> Booth's hairy evening primrose herbaceous annual	2B.3	S2S3	May-June	Big Sagebrush Scrub Great Basin Mixed Scrub Rubber Rabbitbrush Scrub Desert Saltbush Scrub Shadscale Scrub
<i>Ericameria albida</i> white-flowered rabbitbrush shrub	4.2	S3	June-Nov	Big Sagebrush Scrub Black Greasewood Scrub Alkali Sacaton Grassland
<i>Eriogonum shockleyi</i> var. <i>shockleyi</i> Shockley's buckwheat herbaceous perennial	4.3	S3	May-July	Big Sagebrush Scrub Great Basin Mixed Scrub Desert Saltbush Scrub Shadscale Scrub Black Greasewood Scrub
<i>Ivesia kingii</i> var. <i>kingii</i> alkali ivesia herbaceous perennial	2B.2	S2	May-August	Big Sagebrush Scrub Willow Riparian Scrub Wild Rose Riparian Scrub
<i>Mentzelia inyoensis</i> Inyo blazing star herbaceous perennial	1B.3	S2	April-Oct	Great Basin Mixed Scrub Desert Saltbush Scrub Shadscale Scrub
<i>Mentzelia torreyi</i> Torrey's blazing star herbaceous perennial	2B.2	S2	June-August	Big Sagebrush Scrub Great Basin Mixed Scrub Desert Saltbush Scrub Shadscale Scrub Black Greasewood Scrub
<i>Oryctes nevadensis</i> Nevada oryctes herbaceous annual	2B.1	S2	April-June	Desert Saltbush Scrub Shadscale Scrub Black Greasewood Scrub

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Parnassia parviflora</i> small-flowered grass of Parnassus herbaceous perennial	2B.2	S2	Aug-Sept	Big Sagebrush Scrub Willow Riparian Scrub Wild Rose Riparian Scrub Transmontane Alkaline Marsh
<i>Phacelia inyoensis</i> Inyo phacelia herbaceous annual	1B.2	S2	Apr-Aug	Big Sagebrush Scrub Willow Riparian Scrub Wild Rose Riparian Scrub Transmontane Alkaline Marsh
<i>Plagiobothrys parishii</i> Parish's popcornflower herbaceous annual	1B.1	S1	March-July	Big Sagebrush Scrub Willow Riparian Scrub Black Greasewood Scrub Alkali Sacaton Grassland Wild Rose Riparian Scrub
<i>Sarcobatus baileyi</i> Bailey's greasewood deciduous shrub	2B.3	S1	April-July	Big Sagebrush Scrub Rubber Rabbitbrush Scrub Black Greasewood Scrub Alkali Sacaton Grassland Wild Rose Riparian Scrub
<i>Sidalcea covillei</i> Owens Valley checkerbloom herbaceous perennial	1B.1	S2	April-June	Big Sagebrush Scrub Willow Riparian Scrub Wild Rose Riparian Scrub Transmontane Alkaline Marsh Alkali Sacaton Grassland
<i>Spartina gracilis</i> alkali cord grass perennial grass	4.2	S3	June-Aug	Big Sagebrush Scrub Black Greasewood Scrub Willow Riparian Scrub Wild Rose Riparian Scrub Transmontane Alkaline Marsh Alkali Sacaton Grassland
<i>Sphenopholis obtusata</i> prairie wedge grass perennial grass	2B.2	S2	April-July	Willow Riparian Scrub Wild Rose Riparian Scrub Transmontane Alkaline Marsh
<i>Stipa divaricata</i> small-flowered ricegrass perennial grass	2B.3	S2S3	June-Sept	Big Sagebrush Scrub Great Basin Mixed Scrub Desert Saltbush Scrub Shadscale Scrub

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Thelypodium integrifolium</i> ssp. <i>complanatum</i> foxtail thelypodium herbaceous perennial	2B.2	S2	June-Oct	Big Sagebrush Scrub Black Greasewood Scrub Willow Riparian Scrub Wild Rose Riparian Scrub Alkali Sacaton Grassland
<i>Thelypodium milleflorum</i> many-flowered thelypodium herbaceous perennial	2B.2	S2S3	April-June	Big Sagebrush Scrub Great Basin Mixed Scrub Desert Saltbush Scrub Shadscale Scrub

1. Rank or status, by agency:

CNPS = California Native Plant Society listings (CNPS, 2001, 2014)

1B = rare and endangered in California and elsewhere

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

4 = plants of limited distribution in California – watchlist species

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 occurrences threatened or no current threats known).

CNDDDB = California Natural Diversity Data Base rankings (CDFW, 2014b)

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

Projects that will disturb the soil or remove vegetation that is classified here as Great Basin Mixed Scrub or Desert Saltbush Scrub should include surveys for presence of coyote gilia, Shockley's milkvetch, pinyon rockcress, July gold, Booth's hairy evening primrose, Shockley's buckwheat, Inyo blazing star, Torrey's blazing star, small-flowered ricegrass, and many-flowered thelypodium. Projects that will disturb the soil or remove Shadscale Scrub should include surveys for all these species, as well as Wheeler's dune broom and Nevada oryctes, which could potentially occur where dune-like aeolian deposits are present. Disturbed areas embedded within these communities may harbor coyote gilia or Booth's hairy evening primrose if even one dominant shrub species has been allowed to begin recovery there.

Projects that will disturb the soil or remove vegetation classified here as Big Sagebrush Scrub should include surveys for presence of coyote gilia, silver-leaf milkvetch, Shockley's milkvetch, Hillman's silverscale, pinyon rockcress, Inyo County star-tulip, Hall's meadow hawksbeard, July gold, Booth's hairy evening primrose, white-flowered rabbitbrush, Shockley's buckwheat, alkali ivesia, Torrey's blazing star, small-flowered grass of Parnassus, Inyo phacelia, Parish's popcornflower, Bailey's greasewood, Owens Valley checkerbloom, alkali cord grass, small-flowered ricegrass, foxtail thelypodium, and many-flowered thelypodium, as this community occurs in a transitional position between sensitive alkaline

spring or alkali sink communities and upland xeric scrub. Perennial herbs in this setting may be cryptic during years of below normal rainfall.

Projects that will disturb the soil or remove Alkali Sacaton Grassland should include surveys for presence of Hillman's silverscale, Wheeler's dune broom, Hall's meadow hawksbeard, white-flowered rabbitbrush, Inyo phacelia, Parish's popcornflower, Bailey's greasewood, alkali cord grass, and foxtail thelypodium. Projects that will disturb Black Greasewood Scrub should include surveys for all these as well as Shockley's milkvetch, Shockley's buckwheat, Torrey's blazing star, and Nevada oryctes. Projects that will disturb Rubber Rabbitbrush Scrub, which at Chalfant Valley usually is seral on cleared lands in the alkali sink habitat, should include surveys to check for presence of Hillman's silverscale, Wheeler's dune broom, Booth's hairy evening primrose, Nevada oryctes, and Bailey's greasewood.

Projects that will disturb the soil or affect Willow Riparian Scrub, Wild Rose Riparian Scrub, or Transmontane Alkaline Marsh must include consultation with CDFW regarding Streambed Alteration permitting and may trigger Section 404 consultation with the U.S. Army Corps of Engineers (ACOE). Environmental documentation should include delineation of wetland and tributary resources, and surveys for presence of silver-leaf milkvetch, Inyo County star-tulip, Hall's meadow hawksbeard, alkali ivesia, small-flowered grass of Parnassus, Inyo phacelia, Parish's popcornflower, Bailey's greasewood, Owens Valley checkerbloom, alkali cord grass, prairie wedge grass, and foxtail thelypodium.

Sensitive Wildlife

Based upon the available high desert habitats remaining within the Chalfant Valley study area, a total of nine sensitive species were identified as having some potential to occur as residents there or to spend a critical stage of their life cycle there (Table 7). No federally listed wildlife species are included. The State Candidate species Townsend's big-eared bat (*Corynorhinus townsendii*) has some potential to forage over Chalfant Valley, but is not expected to use any of the available habitats for day roosting, for hibernating, or for establishing natal rookeries. Golden eagle (*Aquila chrysaetos*), prairie falcon (*Falco mexicanus*), and spotted bat (*Euderma maculatum*) may similarly use the available habitats for foraging, but would be very unlikely to nest, roost or breed within the study area (Appendix A). White Mountains skipper (*Hesperius miriamae longaevicola*), White Mountains icarioides blue butterfly (*Plebejus icarioides albohalos*), and White Mountains saepiolus blue butterfly (*P. saepiolus albomontanus*), the local invertebrate species that are considered Special Animals by CNDDDB (all have no other legal status), are all subalpine or alpine habitat dwellers and so would be very unlikely to occur in the Chalfant Valley area.

Pygulopsid springsnails of the Owens Valley and nearby Fish Slough have some potential to occur at the perennial spring east of White Mountain Estates. This spring, which is flanked by seasonal seeps to the north and south, and is the northernmost extension of the extensive spring complex on immediately adjacent BLM and LADWP lands to the south, could support Owens Valley springsnail. Although not indicated for this area in CNDDDB records, presence at Transmontane Alkaline Marsh is also possible for Fish Slough springsnail (*Pyrgulopsis perturbata*) and Wong's springsnail (*P. wongii*), which are considered Special Animals by CNDDDB (CDFW, 2014d).

Willow communities within the study area are not large enough or productive enough to support nesting Southwestern willow flycatcher (*Empidonax traillii ssp. extimus*). This bird species, which is federally listed as Endangered, has been observed foraging at the northern edge of Inyo County within extensive meadow and riparian habitats near Bishop and Laws about 8 miles south. Critical Habitat designated by the U.S. Fish and Wildlife Service in 2013 for this species does not include any part of Mono County (USFWS, 2013a). It is possible that individuals pass through the study area during annual migration. Generally, impacts to migratory birds such as willow flycatcher would only occur as direct effect upon nest success or loss of significant amounts of nesting habitat. For willow flycatcher specifically, projects in known or potential breeding habitats (see Paradise through Lee Vining, below) should include analysis as to whether implementation (new buildings, livestock presence) will improve habitat for brown-headed cowbird (*Molothrus ater*), which is a significant nest parasite that has been identified as a primary threat to the recovery of willow flycatcher in this region.

Table 7. Sensitive wildlife species that could potentially occur within the Chalfant Valley study area. Key to status codes is given below, NL = not listed.

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
mollusks			
<i>Pyrgulopsis owensensis</i> Owens Valley springsnail	SSC	S1S2	Transmontane Alkaline Marsh
fish			
<i>Rhinichthys osculus ssp. 2</i> Owens speckled dace	SSC	S1S2	Transmontane Alkaline Marsh
amphibians			
<i>Lithobates pipiens</i> northern leopard frog	SSC	S2	Willow Riparian Scrub Wild Rose Riparian Scrub Transmontane Alkaline Marsh
reptiles			
<i>Elgaria panamintina</i> Panamint alligator lizard	SSC	S1S2	Big Sagebrush Scrub Desert Saltbush Scrub Willow Riparian Scrub Wild Rose Riparian Scrub Transmontane Alkaline Marsh
birds			
<i>Buteo swainsoni</i> (nesting) Swainson's hawk	Threatened	S2	Big Sagebrush Scrub
mammals			
<i>Antrozous pallidus</i> pallid bat	SSC	S3	disturbed habitats with buildings

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
mammals (cont.) <i>Lepus townsendii townsendii</i> western white-tailed jackrabbit	SSC	S2	Big Sagebrush Scrub Willow Riparian Scrub Wild Rose Riparian Scrub
<i>Myotis ciliolabrum</i> western small-footed myotis	NL	S2S3	disturbed habitats with buildings
<i>Taxidea taxus</i> American badger	SSC	S4	Big Sagebrush Scrub Great Basin Mixed Scrub Rubber Rabbitbrush Scrub Desert Saltbush Scrub Shadscale Scrub Black Greasewood Scrub Alkali Sacaton Grassland Wild Rose Riparian Scrub

1. Rank or status, by agency:

CDFW = State of California under the California Endangered Species Act (CDFW, 2014c)

SSC = Species of Special Concern (CDFW, 2014d)

State ranking = CNDDDB State Conservation Ranking as reported by CDFW (2014d)

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.

Willow leaf litter accumulation, although patchy at the small occurrences of Willow Riparian Scrub and Wild Rose Riparian Scrub on the fan east of White Mountain Estates, could provide near-spring habitat for Panamint alligator lizard. However, the flow is entirely diverted into a pipe shortly after the water emerges, so the habitat on-site is relatively dry. The remnant Transmontane Alkaline Marsh appears to sustain perennial ponding at the diversion, and so could support Owens speckled dace and northern leopard frog populations. Any project that would directly impact the wetland habitat, cause siltation, or alter its springfed hydrology should include an assessment of these impacts on Panamint alligator lizard, Owens speckled dace, northern leopard frog, and the sensitive habitats that remain available for these species.

Several species of bat that are considered sensitive are known to occur regionally, and may forage for insects over habitats available in the Chalfant Valley town area (Table 7). Of these, only pallid bat would be adapted to roosting or establishing natal colony rookeries within the study limits. Pallid bats and western small-footed myotis are known to sometimes use buildings, while the other potentially occurring bats are considered to be more sensitive to human presence. Hoary bat (*Lasiurus cinereus*) and long-legged myotis (*Myotis volans*), which are considered Special Animals by CNDDDB (but have no other legal status), may also forage occasionally in Chalfant Valley, but neither species is adapted to use

the available town habitats for roosting or rookeries. Projects that include removal of buildings that have been unused for some time should include surveys to demonstrate avoidance of roosting bats and colony rookeries, in order to avoid impacts to pallid bat and western small-footed myotis.

Big Sagebrush scrub east of White Mountain Estates includes mature trees that border a large complex of Transmontane Alkaline Marsh and Saltgrass Alkaline Meadow on BLM and LADWP lands to the immediate south. There is some possibility this habitat could be chosen for nesting by Swainson's hawk, and this species may forage in the area also. American badger may use this and many other open habitats in the Chalfant Valley study area. Direct impacts to this species and western white-tailed jackrabbit would be unlikely due to the mobility of these species, but surveys for active burrows of large diameter would be needed in order to convincingly demonstrate avoidance.

Benton

Plant Communities and Species

The characteristically Great Basin scrub assemblages within Benton and the near-town portion of Benton Valley were inventoried in September 2013 and April 2014. Much of the local vegetation is in a moderately disturbed to highly (historically) disturbed condition. The least affected plant assemblages now occupy the lowest elevations of the study area, where runoff briefly but reliably accumulates or did so in former times. This vegetation is classified as Black Greasewood Scrub. Any vertical relief above this sink is slight. No steep slopes or areas of prograding fan habitats were encountered. A single interrupted, but vaguely riparian corridor-like stand of Willow Riparian Scrub dominated by narrow-leaved willow (*Salix exigua*) suggests that flows from large springs at Benton Hot Springs (see below) at least historically reached the Benton Valley bottomlands. Relatively shallow groundwater may still be available at this willow stand, but otherwise evidence of dependable seasonal or perennial surface flows, elevated water tables, and springs – as would be reflected by shifts in the native vegetation – were not found within the Benton study area.

The absence of even moderate habitat diversity for plants has led to the development of relatively monotonous community structure and composition in the less disturbed areas. Bottomlands Black Greasewood Scrub communities are consistently sparse appearing, with subtle shifts in species that are co-dominant in the shrub canopy. The transition between basin stands dominated by black greasewood (*Sarcobatus vermiculatus*) stands and uplands scrub dominated by big sagebrush (*Artemisia tridentata* var. *vaseyana*) is normally gradual. The very xeric uplands Big Sagebrush Scrub is almost entirely a big sagebrush – Nevada ephedra (*Ephedra nevadensis*) association (Table 8) with relatively low abundances of native grasses or perennial herbs under the shrub canopy.

The landscape has a dry, desert-like appearance. Any surface water flows or ponding would be ephemeral. Upland and bottomland alluvial soils lack desert pavement. Bottomland soils that support Black Greasewood Scrub exhibit finer texture and are often white in appearance due to an epialic crust. These latter soils support several species that would in this xeric environment require a groundwater resource accessible within their rooting zone during the growing season. Alkali seepbush (*Suaeda nigra*) and Torrey saltbush (*Atriplex lentiformis* var. *torreyi*) occur as scattered co-dominants. These species, basin wildrye (*Elymus cinereus*), and other species considered adapted to wetland soils, occur in Black Greasewood Scrub but do not appear elsewhere. Black greasewood is considered a facultative wetland species (App. B). Any project that would function to reduce the seasonal dependability of the rooting zone groundwater resource for use by phreatophytic vegetation would very likely lead to a loss of Black Greasewood Scrub and increases in devegetated, emissive saline areas. Devegetation may similarly be difficult to repair and may lead to fugitive dust emissions following project-related disturbance in upland Big Sagebrush Scrub, or Rubber Rabbitbrush Scrub acreage within the study area.

Representative annuals present in May 2014 included tansy mustards (*Descurainia californica*, *D. longipedicellata*) and rosy gilia (*Gilia sinuata*). Non-native plants were found widely throughout the study area in 2014. Red brome (*Bromus madritensis* ssp. *rubens*), Russian thistle (*Salsola tragus*), and

London rocket (*Sisymbrium irio*) occur often densely at disturbed areas among the existing housing and in cleared (especially agricultural) areas. All of these non-natives have invaded widely into the relatively undisturbed scrub habitats nearby, especially Black Greasewood Scrub. Noxious halogeton (*Halogeton glomeratus*) was found only in agricultural settings in 2013-2014. Non-native tamarisk (*Tamarix parviflora*) and black locust (*Robinia pseudoacacia*) trees have been planted widely as shade trees in the Benton town area, but both species appear to require irrigation and so are not spreading at this time.

Table 8. Plant communities that were mapped within the 956 acre Benton study area in 2014. Community names (after Holland, 1986) are cross-referenced to the CDFG (2010) classification and 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		
Big Sagebrush Scrub 35.110.00	Big Sagebrush Shrubland <i>Artemisia tridentata-Atriplex canescens</i>	1.1
Big Sagebrush Scrub 35.110.01	Big Sagebrush Shrubland <i>Artemisia tridentata-Ericameria nauseosa</i>	44
Big Sagebrush Scrub 35.110.13	Big Sagebrush Shrubland <i>Artemisia tridentata-Ephedra nevadensis</i>	492
Rubber Rabbitbrush Scrub 35.310.00	Rubber Rabbitbrush Shrubland <i>Ericameria nauseosa-Artemisia tridentata</i>	64
bottomlands communities		
Willow Riparian Scrub 61.209.00	Sandbar Willow Thicket <i>Salix exigua-Ericameria nauseosa</i>	0.4
Desert Saltbush Scrub 36.370.00	Torrey Saltbush Shrubland <i>Atriplex torreyi-Artemisia tridentata</i>	3.9
Black Greasewood Scrub 36.400.00*	Budsage Shrubland <i>Sarcobatus vermiculatus-Artemisia spinescens</i>	12
Black Greasewood Scrub 36.400.00*	Black Greasewood Shrubland <i>Sarcobatus vermiculatus-Ericameria nauseosa</i>	43
Black Greasewood Scrub 36.400.01	Black Greasewood Shrubland <i>Sarcobatus vermiculatus</i>	64
Desert Saltbush Scrub 36.370.00	Torrey Saltbush Shrubland <i>Atriplex torreyi-Artemisia tridentata</i>	3.9

Rubber Rabbitbrush Scrub occurs as seral vegetation where Big Sagebrush Scrub has been historically removed, or along the broad transition between Black Greasewood Scrub and Big Sagebrush

Scrub. Some apparently long-abandoned agricultural fields were noted to support Rubber Rabbitbrush Scrub, but in other areas they were only poorly recovered to native vegetation, rather supporting only scattered shrubs in an often dense stand of non-native pioneer annuals. Evidence of late seral return of historically disturbed areas to big-sagebrush – Nevada ephedra was not observed. This may reflect local soil deficiency or superabundance of chemical species that limit survivorship of big sagebrush and black greasewood in Benton. Much of the disturbed habitat cleared for cropping or other purposes now appears to be a source of fugitive dust emissions. If this outcome is predictive of revegetation results generally, it suggests that recovery to native vegetation cover in the time span of years rather than decades would often require sustained, active planting, re-planting, and possibly provision of dry season supplemental irrigation.

Sensitive Plant Communities and Species

The upland xeric scrub of the study area, being broadly representative of Great Basin scrub types, is considered common and widespread in California east of the Sierra Nevada. Dominance by black greasewood is less common, and may or may not in this region and climate represent the extents of jurisdictional wetlands as defined by the Federal Clean Water Act (Section 404) or by California Fish and Wildlife code (Section 1600). Black Greasewood Scrub includes a predominance by FAC, FACW, or OBL species (ACOE, 2012) throughout its 119 acre extent, as do the more limited areas of Desert Saltbush Scrub and Willow Riparian Scrub. The xeric scrub-like alliances present at Benton would appear to be too dry to support most of the sensitive plant species that can be found regionally in more mesic habitats (App. A). However, none of these areas support dense vegetation, alkaline meadow grasses, species that are specially adapted to anaerobic alkaline soils (e.g., saltgrass *Distichlis spicata*), or the typical shallow-rooted native perennials of the region. Whether or not tagged as “wetland” habitat, about half of the occurring Black Greasewood Scrub alliances would be considered Sensitive by CDFW (Table 8). Jurisdictional status should be determined if a project is to directly or indirectly impact Black Greasewood Scrub, Desert Saltbush Scrub or Willow Riparian Scrub.

A total of 13 sensitive plant species and one bryophyte species have some likelihood to occur within the study area (Table 9). None of these are federally or state listed, but Bodie Hills rockcress is considered Sensitive by regional offices of the BLM and USFS, and Shevock’s bristle moss is considered Sensitive by BLM. All 14 species have some likelihood to be present despite the general pervasiveness of vegetation disturbance within the study area, but none of these species are known to be particularly adapted to mechanically disturbed habitats. Booth’s hairy evening primrose was not found in CNDDDB (2014) records, but was included due its presence at a recent burn scar disturbance in nearby Watterson Canyon xeric scrub (Paulus, 2007).

Projects that will disturb the soil or remove vegetation in upland communities that are classified here as Big Sagebrush Scrub or Rubber Rabbitbrush Scrub should include surveys for presence of every sensitive plant species that may have some likelihood to occur in the Benton study area (Table 9). Attention should be given to identifying embedded small sandy areas such as dunes that are regularly disturbed by aeolian processes, as these areas have some likelihood to include Wheeler’s dune broom, sand dune cryptantha, or Booth’s evening primrose (either subspecies). Disturbed upland areas may

harbor Booth’s hairy evening primrose if even one dominant shrub species has been allowed to begin recovery there. Annual herbaceous species such as sand dune cryptantha, Booth’s evening primrose, dwarf monolepis, and naked-stem phacelia may not be present outside the seed bank in years of below-normal to normal (average) precipitation. Perennial herbs in this setting may similarly be cryptic during years of below normal rainfall.

Table 9. Potentially occurring sensitive plant and bryophyte species in the available plant communities at Benton. Flowering period is taken from CNPS (2014). NL = not listed.

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Orthotrichum shevockii</i> Shevock’s bristle moss bryophyte on rocks	1B.3		-	Big Sagebrush Scrub Rubber Rabbitbrush Scrub Desert Saltbush Scrub Black Greasewood Scrub
<i>Allium atrorubens</i> var. <i>atrorubens</i> Great Basin onion bulbiferous herb	2B.3	S2	May-June	Big Sagebrush Scrub Rubber Rabbitbrush Scrub Desert Saltbush Scrub Willow Riparian Scrub
<i>Boechera bodiensis</i> Bodie Hills rockcress herbaceous perennial	1B.3	S2	June-August	Big Sagebrush Scrub Rubber Rabbitbrush Scrub
<i>Boechera dispar</i> pinyon rockcress herbaceous perennial	2B.3	S3	March-June	Big Sagebrush Scrub Rubber Rabbitbrush Scrub
<i>Chaetadelpa wheeleri</i> Wheeler’s dune-broom rhizomatous herb	2B.2	S2	April-Sept	Big Sagebrush Scrub Rubber Rabbitbrush Scrub Desert Saltbush Scrub Black Greasewood Scrub
<i>Cryptantha fendleri</i> sand dune cryptantha herbaceous annual	2B.2	S1	June-July	Big Sagebrush Scrub Rubber Rabbitbrush Scrub Desert Saltbush Scrub Willow Riparian Scrub
<i>Cymopterus globosus</i> globose cymopterus herbaceous perennial	2B.2	S1	March-June	Big Sagebrush Scrub Rubber Rabbitbrush Scrub Black Greasewood Scrub

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Eremothera boothii</i> ssp. <i>boothii</i> Booth's evening primrose herbaceous annual	2B.3	S2	April-Sept	Big Sagebrush Scrub Rubber Rabbitbrush Scrub Desert Saltbush Scrub Willow Riparian Scrub
<i>Eremothera boothii</i> ssp. <i>intermedia</i> Booth's hairy evening primrose herbaceous annual	2B.3	S2S3	May-June	Big Sagebrush Scrub Rubber Rabbitbrush Scrub Desert Saltbush Scrub Willow Riparian Scrub
<i>Micromonolepis pusilla</i> dwarf monolepis herbaceous annual	2B.3	S2	May-August	Big Sagebrush Scrub Rubber Rabbitbrush Scrub
<i>Orobanche ludoviciana</i> var. <i>arenosa</i> Suksdorf's broom-rape herbaceous perennial	2B.3	S2	June-Oct	Big Sagebrush Scrub Rubber Rabbitbrush Scrub Desert Saltbush Scrub Willow Riparian Scrub
<i>Phacelia gymnoclada</i> naked-stem phacelia herbaceous annual	2B.2	S2	Apr-Aug	Big Sagebrush Scrub Rubber Rabbitbrush Scrub
<i>Polygala intermontana</i> intermountain milkwort shrub	2B.3	S2	June-July	Big Sagebrush Scrub Rubber Rabbitbrush Scrub
<i>Viola purpurea</i> ssp. <i>aurea</i> golden violet herbaceous perennial	2B.2	S2S3	April-June	Big Sagebrush Scrub Rubber Rabbitbrush Scrub

1. Rank or status, by agency:

CNPS = California Native Plant Society listings (CNPS, 2001, 2014)

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 occurrences threatened or no current threats known).

CNDDDB = California Natural Diversity Data Base rankings (CDFW, 2014b)

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

Projects that will disturb the soil or remove vegetation classified here as Black Greasewood Scrub should include surveys for Shevock's bristle moss (on rocks), Wheeler's dune broom (especially sandy open areas), and globose cymopterus. Within Big Sagebrush Scrub, small stands of relic alkaline grassland dominated by alkali Sacaton (*Sporobolus airoides*) or saltgrass (*Distichlis spicata*), which are Sensitive (per CDFG, 2010), may have been overlooked at the scale of mapping applied here. Presence of these species would signal localized areas of seasonally sustained shallow groundwater, and habitat capable of supporting locally rare or sensitive status species such as those identified for more mesic regional habitat types(see Benton Hot Springs, below).

The isolated, rather small occurrences of Willow Riparian Scrub and Desert Saltbush Scrub within the Benton study area are associated with relatively sandy soils that are periodically freshened by ephemeral surface flows. Projects that will disturb Willow Riparian Scrub should include surveys for Great Basin onion, sand dune cryptantha, Booth's evening primrose, Booth's hairy evening primrose, and Suksdorf's broom-rape. Any disturbance to the channelized (disturbed) habitat occupied by Desert Saltbush Scrub, where there is a relatively greater saline-alkaline character, should include surveys for presence of Shevock's bristle moss and Wheeler's dune broom. Desert Saltbush Scrub's position is embedded within Black Greasewood Scrub, and would be included with the large Black Greasewood Scrub stand in any analysis of wetland presence and function. Environmental documentation in the arroyo-like channel that supports Willow Riparian Scrub should similarly include identification and delineation of wetland and tributary resources, and consultation with CDFW and ACOE regarding whether permitting would be required for any planned soil or vegetation disturbance.

Sensitive Wildlife

Based upon the availability of the high desert habitats remaining within the Benton study area, three sensitive animal species were identified as having some potential to occur there during the nesting season or as residents (Table 10). No federally listed wildlife species were identified, but Swainson's hawk is listed by the state as Threatened. Townsend's big-eared bat (*Corynorhinus townsendii*), a State Candidate for listing, has some potential to forage over Benton due to the proximity of roosting sites recently documented for this species. This species is not expected to use any of the available habitats for day roosting, for hibernating, or for establishing natal rookeries. Like Townsend's big-eared bats, spotted bats (*Euderma maculatum*) are known to use mine shafts on nearby Blind Spring Hill for roosting. No mines or caves that might be attractive to bats occur in the study area. Spotted bats forage primarily in riparian corridors or similarly wet habitats (Pierson and Rainey, 1998), and so would be very unlikely to forage over Benton. There are no large trees in the natural or developed landscape, only non-native shade trees at the houses in town. Golden eagle (*Aquila chrysaetos*) and prairie falcon (*Falco mexicanus*), which may use similar habitats in Chalfant Valley, could use the available Benton habitats for foraging, but would be very unlikely to nest, roost or breed within the study area.

The project area's lack of aquatic habitats excludes occurrence of sensitive fish, and presence of the obligately aquatic mollusks Benton Valley springsnail (*Pyrgolosis aardahli*) and Wong's springsnail (*P. wongi*). Its high desert scrub at 5350 ft. (1630 m) bears no resemblance to the high elevation habitats in the White Mountains for greater sage grouse. While it is unknown where high elevation grouse relocate

to during winter months, the 14 mile distance to the nearest recently documented use (Casazza, *et al.*, 2007) and lack of sagebrush dominance at the site make it very unlikely that greater sage grouse use the study area. As the nearest conifer forest is at much higher elevations more than 10 miles distant, it is very unlikely northern goshawk use the project area. Perennial grasses are present only at very low frequencies throughout the entire study area, making it is very unlikely that Owens Valley vole uses the available habitats. The dated occurrences of western white-tailed jackrabbit (three in 1941-42) at the nearby basin associated with Black Lake depict use of sagebrush-dominated scrub near or bordering alkaline meadow habitat, which is not present in or near the study area. It is more likely that the substantial evidence of rabbit use that was noted in 2014 throughout Black Greasewood Scrub should be attributed to common cottontail (*Sylvilagus* sp.) and/or black-tailed jackrabbit (*Lepus californicus*).

Table 10. Sensitive wildlife species that could potentially occur within the Benton study area. Key to status codes is given below, NL = not listed.

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
birds			
<i>Buteo swainsoni</i> (nesting) Swainson’s hawk	Threatened	S2	disturbed (trees near agricultural fields)
mammals			
<i>Lepus townsendii townsendii</i> western white-tailed jackrabbit	SSC	S2	all available native habitats
<i>Myotis ciliolabrum</i> western small-footed myotis	NL	S2S3	disturbed habitats with buildings

1. Rank or status, by agency:

CDFW = State of California under the California Endangered Species Act (CDFW, 2014c)

SSC = Species of Special Concern (CDFW, 2014d)

State ranking = CNDDDB State Conservation Ranking as reported by CDFW (2014d)

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.

Benton’s irrigated agricultural lands often include mature trees that could be chosen for nesting by Swainson’s hawk, and this species may forage in the area also. Trees bordering or near areas suitable for foraging by Swainson’s hawk should be checked for active nests prior to any disturbance during the period March 15- September 15. Direct impacts to western white-tailed jackrabbit would be unlikely due to the mobility of these species, but surveys for active burrows of large diameter would be needed in order to demonstrate avoidance. Projects that include removal of buildings that have been unused for some time should include surveys to demonstrate avoidance of roosting bats and colony rookeries, in order to avoid impacts to western small-footed myotis.

Benton Hot Springs

Plant Communities and Species

Vegetation in and near the town of Benton Hot Springs (Figure 4) occupies a north-south trending depression in the rising landscape between Benton Valley and the Glass Mountains. The vegetation was mapped generally near and at the lowest elevations of this depression, in and around the area of historical settlement. This is also an area where groundwater interception is widespread and often perennial in the form of flowing springs. Some east-facing slopes to the west of town were also included. The Benton Hot Springs artesian complex supports an extensive array of wetland communities ranging from marsh to dry alkaline meadows, which abruptly stand out from the high desert sagebrush scrub and pinyon-juniper woodland-dominated landscape of the surrounding slopes. Given their regional context, the freshwater wetlands and artesian springs at the study area should be regarded as rare habitats. Most of these resources are privately owned, and these holdings include large marsh and meadow mosaics (“Benton Meadows”) that extend to the northeast beyond the study area boundaries. Despite an often high degree of disturbance, and intensive use for livestock grazing, these marsh and meadow habitats function to maintain plant and wildlife diversity for the area, and are known to support populations of several sensitive species.

Disturbed habitat mapped in 2014 totals 20 acres within the 168 acre study area. It is largely centralized near the intersection of State Highway 120 and Yellowjacket Road. This long-disturbed historic district interrupts primarily the mesic native community types Creeping Wildrye Meadow and Dry Alkaline Meadow. The central district also lies at the mouth of a large arroyo, with apparently little historical opportunity or effort made to build diversion structures. However, several water conducting ditches are present. They function to carry perennial spring outflows through the central district, and discharge them to the Benton Meadows wetlands. The larger springs in the area have invariably been improved with berms in order to pond water and divert and restrict distribution of some portion of the outflow to create meadows for livestock grazing. Devegetation in and near the central district has thus become complete or nearly so in the areas between channelized aquatic features, and there has been a conversion of the plant communities to non-native trees and other weedy vegetation. In the circumstance where disturbance has not occurred regularly or recently, Rubber Rabbitbrush Scrub has developed patchy, often sparse cover. Upland habitats that occur naturally on the slopes that fringe the historically disturbed area meanwhile remain relatively undisturbed. They support a pattern of shifting shrub canopy dominance that is likely fire-induced. Great Basin Mixed Scrub alliances in this area exhibit an overall high native plant species diversity, a variety of microhabitat types for use by wildlife, and a very high degree of connectivity to the relatively large and pristine blocks of Great Basin scrub or high desert woodland habitats of the surrounding public lands.

Great Basin Mixed Scrub, the dominant scrub type in the upland setting (Table 11) includes a relatively high diversity of native shrub species, but very low diversities of perennial herbs and grasses (App. B). Wetland soils adjacent to spring outflows and dominated by large Fremont cottonwood (*Populus fremontii*) were classified as degraded examples of native Great Basin Riparian Forest. Widely scattered, remnant fragments of Creeping Wildrye Meadow dominated by creeping wildrye (*Elymus*

triticoides) and Dry Alkaline Meadow dominated by saltgrass (*Distichlis spicata*) occur near some springs. These communities rely upon rooting zone soil moisture levels that are normally restricted to spring-driven wetland habitats to maintain a preponderance of phreatophytic species. These plants would otherwise not occur here, given the long summer drought that is typical of the Benton Hot Springs climate. Within the study area, water diversion and channelization of outflows from springs currently limits the natural expression of wetland vegetation, especially within partly developed parcels at or downslope from springs. On the other hand, redistribution eastward to Benton Meadows currently maintains a larger area of long-standing wetland habitat than would likely occur under the unmodified condition. Impacts to all wetlands of this drainage unit must be considered whenever future proposals contemplate flow changes at upslope sources within the study area. Projects that would directly or indirectly impact the amount or timing of recharge to wetland communities should include analysis of the potential for change in acreage of naturally occurring and irrigated wetland communities, as they occur only rarely in the region and function to maintain native plant and wildlife species diversity.

Table 11. Plant communities that were mapped within the 168 acre Benton Hot Springs study area in 2014. The study area includes 20 acres of converted or impervious surfaces. Community names (after Holland, 1986) are cross-referenced to the CDFG (2010) classification and 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 33.285.00	Green Ephedra Shrubland <i>Ephedra viridis-Psorothamnus arborescens</i>	93
Rubber Rabbitbrush Scrub 35.310.00	Rubber Rabbitbrush Shrubland <i>Ericameria nauseosa-Artemisia tridentata</i>	28
wetland communities		
Great Basin Riparian Forest 61.130.15*	Fremont Poplar Riparian Forest <i>Populus fremontii-Salix laevigata</i>	2.0
Transmontane Freshwater Marsh 52.122.00	Hardstem Bulrush Marsh <i>Schoenoplectus acutus</i>	4.7
Creeping Wildrye Meadow 41.080.00*	Creeping Rye Grass Turf <i>Elymus triticoides-Juncus mexicanus</i>	5.0
Dry Alkaline Meadow 41.200.00	Salt Grass Flats <i>Distichlis spicata-Elymus triticoides</i>	14
Alkali Sacaton Grassland 41.010.02*	Alkali Sacaton Grassland <i>Sporobolus airoides-Ericameria nauseosa</i>	1.7

Non-native plants were found widely throughout the historically disturbed central district of Benton Hot Springs in 2013-2014. Invasive cheatgrass (*Bromus tectorum*), Russian thistle (*Salsola tragus*), and horned smotherweed (*Bassia hyssopifolia*) occur densely. These non-natives have not invaded widely into relatively undisturbed scrub habitats outside the central district, but have spread along roadsides across the entire study area. Tansy mustard (*Descurainia sophia*), Bermuda grass (*Cynodon dactylon*), Russian thistle and cheatgrass have invaded wetland habitats, especially where grazing or mechanical scraping has removed the native cover of perennial grasses and sedges. Non-native Siberian elm (*Ulmus pumila*), black locust (*Robinia pseudoacacia*), and tamarisk (*Tamarix parviflora*) trees are currently spreading in Great Basin Riparian Forest and other areas with reliable groundwater (or applied irrigation), and threaten to further deplete root zone water and surface water resource availability for native plants and wildlife habitat. Representative annuals present in April-May 2014 included desert dandelion (*Malacothrix glabrata*), tansy mustard (*Descurainia pinnata* ssp. *brachycarpa*), desert pincushion (*Chaenactis stevoides*), white layia (*Layia glandulosa*), desert fiddleneck (*Amsinckia tessellata*), and Nevada gilia (*Gilia brecciarum*).

Apparent wetland community trends within the Benton Hot Springs study area include loss of acreage, and invasion by non-native plants. The primary drivers for this shift in dominance would include ongoing or frequent mechanical disturbance, which opens former meadow area habitats for species replacement by pioneers and weedy plants, and lowering of the seasonal water table maxima. Root zone inundation naturally limits invasion by plant species that are not adapted to anaerobic conditions. For example, upland sagebrush (*Artemisia tridentata*) and rabbitbrush (*Ericameria nauseosa*) invasion is currently altering the relic Alkali Sacaton Grassland community associated with the hot springs complex, and this long-term shift could not be sustained if seasonal inundation by shallow groundwater regularly occurred. As this example shows, further reductions in the extent or duration of seasonal inundation in areas mapped as wetland community types (Table 11) would promote the long-term trend of wetland acreage loss. Alternatively, projects that would enhance inundation extent or duration could rapidly bring about a reversal in this trend of degradation, as even a single season of inundation cannot be tolerated by non-adapted (upland) plants. Similarly, wetlands that have become invaded by non-native species are a worthy target for future mitigation efforts, as removal of “water-mining” non-native trees (Siberian elm, tamarisk, black locust) and other weeds would increase the extent and duration of rooting zone inundation and maintain anaerobic conditions to which native community dominants are adapted.

Sensitive Plant Communities and Species

The upland xeric scrub of the study area is considered common and widespread in California east of the Sierra Nevada and eastward into the Great Basin floristic province. Dominance by native species adapted to spring-controlled wetland hydrology is less common in this region, and the Benton Hot Springs complex should be regarded as an isolated habitat island within a much greater expanse of xeric Great Basin sagebrush scrub and pinyon-juniper woodlands. All remnant areas of marsh, riparian, and meadow communities may be considered jurisdictional as defined by the Federal Clean Water Act (Section 404) or by California Fish and Wildlife code (Section 1600). Great Basin Riparian Forest and Creeping Wildrye Meadow and Alkali Sacaton Grassland are considered Sensitive by CDFW (CDFG, 2010). These and other wetland communities within the study area may include embedded stands that

are similarly classifiable as state Sensitive, yet were not recognized at the scale of this survey (e.g., *Schoenoplectus americanus* alliances, *Juncus nevadensis* alliances). The study area’s mesic community types may be described as “rare” in or “disappearing” from inhabited areas of the Great Basin, and so may be subject to “no net loss” rules for mitigation, should federal or state jurisdiction be asserted in an area that is proposed to be disturbed by a project. While these communities are historically disturbed, and degraded by spring flow diversions and non-native species introductions, they provide important surface water and foraging resources for migrating and resident wildlife. In any case, it may prove difficult to replace (as opposed to enhance) existing wetland functions, which include maintaining species diversity. Surveys in support of permitting that are designed to determine whether or not there exists a predominance by FAC, FACW, or OBL species (per ACOE, 2012) should also routinely include searches for potentially occurring sensitive plant species (Table 12), given there are several known populations that have been found in wetland habitats adjoining the study area.

A total of 21 sensitive plant species and one sensitive bryophyte species have some likelihood to occur in the study area (Table 12). Long Valley milkvetch is state listed as Rare. Long Valley milkvetch and Bodie Hills rockcress, Inyo County star-tulip, alkali ivesia, Inyo phacelia, and Parish’s popcornflower, along with Shevock’s bristle moss, are considered Sensitive by regional offices of the BLM and/or USFS. Potentially occurring sensitive plant populations segregate into two groups, those having a likelihood to occur in uplands, especially Great Basin Mixed Scrub, and those having some likelihood to occur within the remaining relatively intact wetland areas (Table 12). The Benton Hot Springs study area also includes channelized outflows that retain little or no riparian character due to concentrated livestock use and routine devegetation of banks as maintenance (observed at all locations sampled in 2014). However, the aquatic perennial herb frog’s-bit buttercup, which may occur at springs in Transmontane Freshwater Marsh, could also occur in perennially watered outflow channels that cross through areas mapped here as disturbed and devegetated.

Table 12. Potentially occurring sensitive bryophyte and plant species in the available plant communities at Benton Hot Springs. Flowering period is taken from CNPS (2014). NL = not listed.

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Orthotrichum shevockii</i> Shevock’s bristle moss bryophyte on rocks	1B.3	NL	-	Great Basin Mixed Scrub Rubber Rabbitbrush Scrub
<i>Allium atrorubens</i> var. <i>atrorubens</i> Great Basin onion bulbiferous herb	2B.3	S2	May-June	Great Basin Mixed Scrub Rubber Rabbitbrush Scrub

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Astragalus johannis-howellii</i> Long Valley milkvetch herbaceous perennial	1B.2	S2	June-August	Great Basin Mixed Scrub Rubber Rabbitbrush Scrub
<i>Atriplex pusilla</i> smooth saltbush herbaceous annual	2B.1	S1	June-Sept	Rubber Rabbitbrush Scrub Creeping Wildrye Meadow Dry Alkaline Meadow Alkali Sacaton Grassland
<i>Boecheira bodiensis</i> Bodie Hills rockcress herbaceous perennial	1B.3	S2	June-August	Great Basin Mixed Scrub Rubber Rabbitbrush Scrub
<i>Boecheira dispar</i> pinyon rockcress herbaceous perennial	2B.3	S3	March-June	Great Basin Mixed Scrub Rubber Rabbitbrush Scrub
<i>Calochortus excavatus</i> Inyo County star-tulip bulbiferous herb	1B.1	S2	April-July	Rubber Rabbitbrush Scrub Creeping Wildrye Meadow Dry Alkaline Meadow Alkali Sacaton Grassland
<i>Chaetadelpa wheeleri</i> Wheeler's dune-broom rhizomatous herb	2B.2	S2	April-Sept	Great Basin Mixed Scrub Rubber Rabbitbrush Scrub
<i>Crepis runcinata ssp. hallii</i> Hall's meadow hawksbeard herbaceous perennial	2B.1	S1S2	May-July	Rubber Rabbitbrush Scrub Creeping Wildrye Meadow Dry Alkaline Meadow Alkali Sacaton Grassland
<i>Cryptantha fendleri</i> sand dune cryptantha herbaceous annual	2B.2	S1	June-July	Great Basin Mixed Scrub Rubber Rabbitbrush Scrub
<i>Cymopterus globosus</i> globose cymopterus herbaceous perennial	2B.2	S1	March-June	Great Basin Mixed Scrub Rubber Rabbitbrush Scrub

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Eremothera boothii</i> ssp. <i>boothii</i> Booth's evening primrose herbaceous annual	2B.3	S2	April-Sept	Great Basin Mixed Scrub Rubber Rabbitbrush Scrub
<i>Eremothera boothii</i> ssp. <i>intermedia</i> Booth's hairy evening primrose herbaceous annual	2B.3	S2S3	May-June	Great Basin Mixed Scrub Rubber Rabbitbrush Scrub
<i>Ivesia kingii</i> var. <i>kingii</i> alkali ivesia herbaceous perennial	2B.2	S2	May-August	Creeping Wildrye Meadow
<i>Micromonolepis pusilla</i> dwarf monolepis herbaceous annual	2B.3	S2	May-August	Great Basin Mixed Scrub Rubber Rabbitbrush Scrub
<i>Orobanche ludoviciana</i> var. <i>arenosa</i> Suksdorf's broom-rape herbaceous perennial	2B.3	S2	June-Oct	Great Basin Mixed Scrub Rubber Rabbitbrush Scrub
<i>Phacelia gymnoclada</i> naked-stem phacelia herbaceous annual	2B.2	S2	Apr-August	Great Basin Mixed Scrub Rubber Rabbitbrush Scrub
<i>Phacelia inyoensis</i> Inyo phacelia herbaceous annual	1B.2	S2	Apr-August	Creeping Wildrye Meadow Dry Alkaline Meadow Alkali Sacaton Grassland
<i>Plagiobothrys parishii</i> Parish's popcornflower herbaceous annual	1B.1	S1	March-July	Creeping Wildrye Meadow Dry Alkaline Meadow Alkali Sacaton Grassland
<i>Ranunculus hydrocharoides</i> frog's-bit buttercup herbaceous perennial	2B.1	S1	May-Sept	Transmontane Freshwater Marsh channelized spring flows

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDB		
<i>Sphaeromeria potentilloides var. nitrophila</i> alkali tansy sage herbaceous perennial	2B.2	S2	June-July	Creeping Wildrye Meadow Dry Alkaline Meadow Alkali Sacaton Grassland
<i>Viola purpurea ssp. aurea</i> golden violet herbaceous perennial	2B.2	S2S3	April-June	Great Basin Mixed Scrub Rubber Rabbitbrush Scrub

1. Rank or status, by agency:

CNPS = California Native Plant Society listings (CNPS, 2001, 2014)

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 occurrences threatened or no current threats known).

CNDDB = California Natural Diversity Data Base rankings (CDFW, 2014b)

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

Projects that will disturb the soil or remove vegetation classified here as Great Basin Mixed Scrub or Rubber Rabbitbrush Scrub should include surveys to determine whether Shevock's bristle moss, Great Basin onion, Long Valley milkvetch, Bodie Hills rockcress, pinyon rockcress, Wheeler's dune broom, sand dune cryptantha, globose cymopterus, Booth's evening primrose (both subspecies), dwarf monolepis, Suksdorf's broom-rape, naked-stem phacelia, or golden violet are present. Wheeler's dune broom, sand dune cryptantha, and Booth's evening primrose would be adapted to sandy habitats such as fire scars or in sediments deposited by the arroyos that cross through upland scrub in the study area's western half. Even disturbed areas may be suspected to harbor annuals such as Booth's hairy evening primrose if dominant shrub species have been allowed to begin recovery there. Shifts in composition marking the transition between upland and wetland habitats appear to be for the most part abrupt in the Benton Hot Springs study area. Where upland scrub communities are locally ecotonal with Dry Alkaline Meadow or Creeping Wildrye Meadow, preconstruction surveys should also include searches for populations of smooth saltbush, Inyo County star-tulip, and Hall's meadow hawksbeard. Expanded searches in ecotonal Great Basin Mixed Scrub or Rubber Rabbitbrush Scrub could be conservatively triggered wherever an increase in grass cover to above 5% is evident.

Projects that will disturb the soil or remove vegetation classified here as Creeping Wildrye Meadow, Dry Alkaline Meadow, or Alkali Sacaton Meadow should include surveys for presence of smooth saltbush, Inyo County star-tulip, Hall's meadow hawksbeard, Parish's popcornflower, Inyo phacelia, and alkali tansy sage. Projects that will disturb Creeping Wildrye Meadow should also include surveys for presence of alkali ivesia. Projects that will disturb Transmontane Freshwater Marsh or any perennially watered ditches should include surveys for all the species that potentially may occur in Creeping Wildrye Meadow, Dry Alkaline Meadow, or Alkali Sacaton Meadow as described above, and frog's bit buttercup.

Projects within or adjacent to Creeping Wildrye Meadow, Dry Alkaline Meadow should take fair responsibility for the foreseeable impacts of construction, trenching, or water diversion upon the extent of the sensitive plant communities and any sensitive plant populations that are discovered therein. The indirect impacts to sensitive communities and any discovered sensitive plant populations from such activities may be difficult to quantify in pre-project environmental impact disclosures, suggesting that post-construction monitoring will be key to avoiding further long-term impacts to the area's springfed habitats. New water production projects appropriately would include not only predictions about impacts to artesian spring flows, but also potential impacts of the resultant cone of depression upon seasonal maxima and timing of shallow groundwater recharge of the rooting zone for plants. Projects that must displace some remaining area of functional wetland could appropriately target as mitigations the enhancement of remaining resources: 1) removal of existing populations of non-native invasive species and 2) restoration of lands becoming dried by water diversions. Substantial improvement would be expected where these actions would improve the a habitat's seasonal maxima and timing of shallow groundwater recharge in the favor of native plants generally and restore habitats for sensitive plants in particular.

Sensitive Wildlife

Based upon the available Great Basin scrub, riparian forest, and wetland marsh and meadow habitats that occur within the Benton Hot Springs study area, six sensitive species were identified as having some potential to occur there during the nesting season or as residents (Table 13). No federally listed wildlife species are included, but Swainson's hawk is listed by the state as Threatened. Owens speckled dace, western white-tailed jackrabbit, and Owens Valley vole are CDFW Species of Special Concern. Prairie falcon (*Falco mexicanus*), a CDFW watchlist species, may forage locally but is very unlikely to nest in the study area due to an absence of montane vertical cliff habitat. The State Candidate species Townsend's big-eared bat (*Corynorhinus townsendii*) has some potential to forage over Benton Hot Springs, due to the proximity of recently documented roosting sites for this species, but is not expected to use any of the available habitats for day roosting, for hibernating, or for establishing natal rookeries. Spotted bats (*Euderma maculatum*) are known to use mine shafts on nearby Blind Spring Hill for roosting. No mines or caves that might be attractive to bats occur in the study area. Spotted bats forage primarily in riparian corridors or similarly wet habitats (Pierson and Rainey, 1998), and so may forage over Benton Hot Springs.

Table 13. Sensitive wildlife species that could potentially occur within the Benton Hot Springs study area. Key to status codes is given below, NL = not listed.

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
mollusks			
<i>Pyrgulopsis aardahli</i> Benton Valley springsnail	NL	S1	Transmontane Freshwater Marsh channelized spring flows
<i>Pyrgulopsis wongi</i> Wong's springsnail	NL	S1S2	Transmontane Freshwater Marsh channelized spring flows
fish			
<i>Rhinichthys osculus</i> ssp. 2 Owens speckled dace	SSC	S1S2	Transmontane Freshwater Marsh channelized spring flows
birds			
<i>Buteo swainsoni</i> (nesting) Swainson's hawk	Threatened	S2	Great Basin Riparian Forest
mammals			
<i>Lepus townsendii townsendii</i> western white-tailed jackrabbit	SSC	S2	Great Basin Mixed Scrub Rubber Rabbitbrush Scrub
<i>Microtus californicus vallicola</i> Owens Valley vole	SSC	S1	Creeping Wildrye meadow

1. Rank or status, by agency:

CDFW = State of California under the California Endangered Species Act (CDFW, 2014c)

SSC = Species of Special Concern (CDFW, 2014d)

State ranking = CNDDDB State Conservation Ranking as reported by CDFW (2014d)

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.

Benton Meadows (irrigated) lands, which are located adjacent to the study area, are patchily bordered by mature Fremont's cottonwood trees that could be chosen for nesting by Swainson's hawk. This species may forage in the expansive meadows now managed as livestock pasture. Trees near Benton Meadows habitats that are suitable for foraging by Swainson's hawk should be checked for active nests prior to tree removal, trimming, or other nearby disturbance that must take place during the period March 15- September 15.

The potential for occurrence of the sensitive mammals western white-tailed jackrabbit and Owens Valley vole are based upon known habitat requirements for these species, and upon historical collections from nearby valleys (App. A3). The dated occurrences of western white-tailed jackrabbit (three in 1941-42) at the nearby basin associated with Black Lake depict use of sagebrush-dominated scrub near or bordering alkaline meadow habitat that has some resemblance to habitat available in the study area. Direct impacts to western white-tailed jackrabbit would be unlikely due to the mobility of these species, but surveys for active burrows of large diameter would be needed in order to thoroughly demonstrate avoidance. The somewhat questionable 1912 collection of Owens Valley vole that CNDDDB (CDFW, 2014e) has attributed to the Benton Valley area may actually be from a (possibly extinct) Benton Meadows population. The meadow habitat of the Benton Hot Springs area may have once had much more in common with the known requirements of this species. Prior to intensive livestock grazing and trampling as practiced during the 20th century and to date, these meadows may have once expansively provided the moist, lush turf habitat where all known extant populations are found. Presence of this species in the study area would be possible in any relic grassy stands that have been protected from devegetation associated with long-term pasturage.

Paradise

Plant Communities and Species

Paradise's plant communities were inventoried January 3-5 and May 6-8, 2014. Soils in the study area are derived either from granitic alluvium or from Bishop tuff volcanic material, the latter with widespread areas of surface rockiness and shallow soil profile. The landscape is generally sloped with south and west-facing aspects. The slopes are vegetated by assemblages of shrubs having a habit that is stiff but usually not thorny. For the most part these assemblages were assigned the classification High Desert Blackbrush Scrub (Table 14). Soil depth appears to strongly influence the species composition (relative frequencies of canopy dominants), average height, and total cover development of the shrub species assemblage. Co-dominants with blackbrush (*Coleogyne ramosissima*) include big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), green rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*), rubber rabbitbrush (*Ericameria nauseosa*), and needleleaf rabbitbrush (*E. teretifolia*). While usually subdominant, any of these shrubs can attain numerical dominance within High Desert Blackbrush Scrub. Similar patch-sized successional mosaics are common on slopes around the nearby Round Valley, where they can be attributed mainly to the effects of wildfire. Although slightly incised channels bearing scour marks indicate that flows cross (at least ephemerally) through areas mapped as High Desert Blackbrush Scrub, no linear patterns of changes in species frequencies or changes in abundances that could be associated with wetter habitats were observed within its mapped extent in the study area.

The xeric upland habitat at Paradise is bisected by a corridor of starkly different vegetation in Lower Rock Creek gorge. The mouth of this gorge is located near where Lower Rock Creek exits the southern edge of the Paradise study area. Lower Rock Creek, which is a resource with much of the native character and charm associated with perennial streams of this region, may also be fairly described as a tightly managed conveyance, due to long-standing diversion and control structures that are located approximately seven miles upstream. As a result of firm control, the flow is perennial and the normal spring runoff is attenuated. Lower Rock Creek floodplain vegetation is not generally subject to normal flood functions, so disturbance and deposition of soil and nutrients are not naturally driving vegetation dynamics there. Floodplain habitats in the bottom of the gorge are signaled by an abrupt species shift to dominance by phreatophytes (facultative or obligate wetland species), indicating a narrow riparian corridor at sustained surface water or at a least a shallow groundwater table that is seasonally raised into the rooting zone. Water Birch Riparian Scrub and Non-Native Riparian Woodland are also the result of long-term historical disturbance. Water Birch Riparian Scrub is interrupted by stands of non-native tree and understory species. Water Birch Riparian Scrub classification is based upon the presence of dense water birch (*Betula occidentalis*) and willow (*Salix exigua* and *S. lasiolepis*), but the occurrence at Paradise also includes a sometimes dense overcanopy of ponderosa pine (*Pinus ponderosa*). These are the only tall trees that occur naturally within the Paradise study area. The adjacent gorge walls, which are steep and greater than 100 ft in height, are characteristically where Big Sagebrush Scrub and High Desert Blackbrush Scrub achieve the lowest cover of native shrubs found in the Paradise study area, as the soil is commonly shallow or absent from the exposed volcanic talus.

Table 14. Plant communities that were mapped within the 214 acre Paradise study area in 2014. The study area includes 52 acres where vegetation has been converted to impervious surfaces, and 0.8 acres of irrigated meadow within the Lower Rock Creek flood plain. Plant community names (after Holland, 1986) are cross-referenced to CDFG (2010) classification 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		
High Desert Blackbrush Scrub 33.020.01*	Blackbrush Shrubland <i>Coleogyne ramosissima</i>	5.4
High Desert Blackbrush Scrub 33.020.00	Blackbrush Shrubland <i>Coleogyne ramosissima-Artemisia tridentata</i>	100.3
High Desert Blackbrush Scrub 33.020.03	Blackbrush Shrubland <i>Coleogyne ramosissima-Ephedra nevadensis</i>	15
High Desert Blackbrush Scrub 33.020.00	Blackbrush Shrubland <i>Coleogyne ramosissima-Ericameria teretifolia</i>	17
High Desert Blackbrush Scrub 33.020.00	Blackbrush Shrubland <i>Coleogyne ramosissima-Ericameria nauseosa</i>	3.3
Big Sagebrush Scrub 35.110.02	Big Sagebrush Shrubland <i>Artemisia tridentata</i>	4.4
Big Sagebrush Scrub 35.110.01	Big Sagebrush Shrubland <i>Artemisia tridentata-Ericameria nauseosa</i>	5.5
Big Sagebrush Scrub 35.110.14	Big Sagebrush Shrubland <i>Artemisia tridentata-Ericameria teretifolia</i>	2.3
Rubber Rabbitbrush Scrub 35.310.00	Rubber Rabbitbrush Shrubland <i>Ericameria nauseosa-Ephedra nevadensis</i>	1.3
riparian communities		
Water Birch Riparian Scrub 63.610.01*	Water Birch Thicket <i>Betula occidentalis-Salix lasiolepis</i>	4.5
Non-Native Riparian Woodland -	Black Locust Thicket <i>Robinia pseudoacacia</i>	2.5

Mapping of upland scrub assemblages included separation from High Desert Blackbrush Scrub of several larger stands where big sagebrush or rubber rabbitbrush were dominant in an absence or near-absence of blackbrush presence (Table 14). These Big Sagebrush Scrub and Rubber Rabbitbrush Scrub communities mainly occupy hilltop and gorge edge habitats with relatively deep soil development. High diversity and perennial cover of up to 30% has been attained in all upland scrub community types at

Paradise, despite the local rain shadow and long summer droughts that are features of the climate. However, native grasses and perennial herbs are never prominent. No examples of scrub supporting greater than about 1% total cover by native perennial grasses were found during the 2013-14 survey. Native annuals, in contrast, can be very abundant (Paulus, 2004b), or like the other high desert towns included here (Chalfant Valley, Benton, Benton Hot Springs) can be essentially absent during years of below-average winter and spring precipitation. Representative native annuals present in 2014 included Fremont yellow throats (*Phacelia fremontii*), Great Basin woollystar (*Eriastrum sparsiflorum*), Nevada gilia (*Gilia brecciarum* ssp. *brecciarum*), pineapple chamomile (*Matricaria discoidea*), blazing star (*Mentzelia obscura*), chia (*Salvia columbariae*), Nuttall's tiquilia (*Tiquilia nuttallii*), cushion cryptantha (*Cryptantha circumscissa*), spotted buckwheat (*Eriogonum maculatum*), and moth combseed (*Pectocarya setosa*).

The introduced annual cheatgrass (*Bromus tectorum*) at some locations formed dense stands under and between blackbrush and other shrub canopies in 2014. It appears that cheatgrass is by far the most abundant annual present in the Paradise area, a trend that was established at least a decade ago (Paulus, 2004b). Cheatgrass, which is present in every mapped community, is a significant threat to stand dominance by blackbrush because it imparts increased vulnerability to destructive wildfire. Blackbrush does not stump sprout and its return to the stand may take hundreds of years (Sawyer, *et al.*, 2009). Another prominent non-native species found in 2014 was Russian thistle (*Salsola tragus*), an annual herb that occurs densely at disturbed areas among the existing houses and has also invaded widely into relatively undisturbed scrub habitats. At Lower Rock Creek, non-native black locust (*Robinia pseudoacacia*) trees and viney periwinkle (*Vinca major*) that were historically planted into an irrigated floodplain area near the former Paradise Camp are now aggressively spreading downstream within the riparian corridor.

Sensitive Plant Communities and Species

Study area stands of Big Sagebrush Scrub and Rubber Rabbitbrush are examples of community types that are common and widespread throughout Mono County and the intermountain Great Basin. Relatively pure stands of blackbrush within the larger mosaic of High Desert Blackbrush Scrub are considered Sensitive by CDFW (CDFG, 2010). These and all stands where blackbrush is dominant or co-dominant are currently threatened by a pervasive presence of naturalized cheatgrass, which is a noxious weed whose invasive potential is considered High Cal-IPC, 2014). Cheatgrass increases fire spread and destructiveness in native shrublands such as the otherwise long-lived stands of blackbrush. Pure stands of blackbrush are uncommon in the study area and in the Round Valley landscape generally, as fire has significantly reduced this community's extent during the last two decades.

The occurrence of Water Birch Riparian Scrub associated with Lower Rock Creek is considered Sensitive by CDFW, and is contiguous with a corridor of similar vegetation upstream and downstream from the study area. The local stand is interrupted by black locust (Non-Native Riparian Woodland) trees that threaten to further spread in the riparian zone. This invasive species has become naturalized in many riparian communities in the Owens Valley, and is also gaining prominence in Antelope Valley (see Walker, Coleville, and Topaz, below). Water Birch Riparian Scrub at Paradise features a locally rare

overcanopy of ponderosa pine trees, which provide shade for the aquatic habitat and enhance the community’s vertical structure and cover for wildlife. Meadows and springs do not occur within the study area. No evidences of alkaline character or saline soils were observed in any of the occurring habitats, and species adapted to tolerate such habitats were not encountered.

A total of 14 sensitive plant species have some likelihood to occur or are documented to occur within the study area (Table 15). Long Valley milkvetch is state listed as Rare, and is considered Sensitive by regional BLM and USFS offices. All are identified as Special Plants by CNDDDB. Regionally occurring sensitive species of alkaline and non-alkaline meadow or spring margin habitats would be very unlikely to occur within the Paradise study area, because these habitat types are not present. While not found in CNDDDB records for the region, it appears the emergent species Frog’s bit buttercup could be adapted to the relatively quiet waters present at Lower Rock Creek, and so was included as having some likelihood to occur. Inyo blazing star (*Mentzelia inyoensis*, not included) was once thought to occur in the region, but the single CNDDDB record’s location is now considered to be in error.

Table 15. Potentially occurring sensitive plant species in the available plant communities at Paradise. Flowering period is taken from CNPS (2014).

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Allium atrorubens</i> var. <i>atorrubens</i> Great Basin onion bulbiferous herb	2B.3	S2	May-June	High Desert Blackbrush Scrub Big Sagebrush Scrub Rubber Rabbitbrush Scrub
<i>Astragalus johannis-howellii</i> Long Valley milkvetch herbaceous perennial	1B.2	S2	June-August	High Desert Blackbrush Scrub Big Sagebrush Scrub Rubber Rabbitbrush Scrub
<i>Astragalus lemmonii</i> Lemmon’s milkvetch herbaceous perennial	1B.2	S2	May-Sept	Water Birch Riparian Scrub Black Locust Non-Native Riparian Woodland
<i>Boechnera dispar</i> pinyon rockcress herbaceous perennial	2B.3	S3	March-June	High Desert Blackbrush Scrub Big Sagebrush Scrub Rubber Rabbitbrush Scrub

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Chaetadelpa wheeleri</i> Wheeler's dune-broom rhizomatous herb	2B.2	S2	April-Sept	High Desert Blackbrush Scrub Big Sagebrush Scrub Rubber Rabbitbrush Scrub
<i>Hulsea vestita</i> <i>ssp. inyoensis</i> Inyo hulsea herbaceous perennial	2B.2	S1S2	April-June	High Desert Blackbrush Scrub Big Sagebrush Scrub Rubber Rabbitbrush Scrub
<i>Lupinus magnificus</i> <i>var. hesperius</i> McGee Meadows lupine herbaceous perennial	1B.3	S2	April-June	High Desert Blackbrush Scrub Big Sagebrush Scrub Rubber Rabbitbrush Scrub
<i>Mentzelia torreyi</i> Torrey's blazing star herbaceous perennial	2B.2	S2	June-August	High Desert Blackbrush Scrub Big Sagebrush Scrub Rubber Rabbitbrush Scrub
<i>Muilla coronata</i> crowned Muilla bulbiferous herb	4.2	S3?	March-May	High Desert Blackbrush Scrub Big Sagebrush Scrub Rubber Rabbitbrush Scrub Water Birch Riparian Scrub Black Locust Non-Native Riparian Woodland
<i>Oryctes nevadensis</i> Nevada oryctes herbaceous annual	2B.1	S2	April-June	High Desert Blackbrush Scrub Big Sagebrush Scrub Rubber Rabbitbrush Scrub
<i>Ranunculus hydrocharoides</i> frog's-bit buttercup herbaceous perennial	2B.1	S1	May-Sept	Water Birch Riparian Scrub Black Locust Non-Native Riparian Woodland
<i>Sarcobatus baileyi</i> Bailey's greasewood deciduous shrub	2B.3	S1	April-July	High Desert Blackbrush Scrub Big Sagebrush Scrub Rubber Rabbitbrush Scrub

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Thelypodium integrifolium</i> ssp. <i>complanatum</i> foxtail thelypodium herbaceous perennial	2B.2	S2	June-Oct	High Desert Blackbrush Scrub Big Sagebrush Scrub Rubber Rabbitbrush Scrub
<i>Thelypodium milleflorum</i> many-flowered thelypodium herbaceous perennial	2B.2	S2S3	April-June	High Desert Blackbrush Scrub Big Sagebrush Scrub Rubber Rabbitbrush Scrub

1. Rank or status, by agency:

CNPS = California Native Plant Society listings (CNPS, 2001, 2014)

1B = rare and endangered in California and elsewhere

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

4 = plants of limited distribution in California – watchlist species

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 occurrences threatened or no current threats known).

CNDDDB = California Natural Diversity Data Base rankings (CDFW, 2014b)

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

? indicates CNDDDB uncertainty in assigning rank.

Potentially occurring sensitive plant populations would have some likelihood to occur in upland High Desert Blackbrush Scrub, Big Sagebrush Scrub, or Rubber Rabbitbrush Scrub, or within Lower Rock Creek riparian communities (Table 14), but generally not in both. Paradise upland and riparian habitat classes are widely divergent in their provision of soil moisture and shading for plants, and the ecotonal transitions between plant communities are generally distinct. The sensitive crowned muilla is a clear exception to this distinction between assemblages, as a population is known to occur in the relatively deep, sandy soil at the upland-riparian margin north of Lower Rock Creek Road (Paulus, 2010). While no clear indications of saline or alkaline character were observed among the sandy soils derived from decomposed granite or Bishop tuff at Paradise, these habitat patches could support populations of the annual Nevada oryctes or the perennial Wheeler’s dune broom, as well as other potentially occurring sensitive species that are known to be adapted locally to sandy, seasonally moist but drying soils. The environmental analysis for any projects that would impact areas of sandy soil, including the upland-riparian boundary area along Lower Rock Creek, should include surveys for Nevada oryctes, Wheeler’s dune broom, Great Basin onion, Bailey’s greasewood, McGee Meadows lupine, and many-flowered thelypodium.

Projects that will disturb the soil or remove vegetation classified here as High Desert Blackbrush Scrub, Big Sagebrush Scrub, or Rubber Rabbitbrush Scrub should include surveys for presence of Great Basin onion, Long Valley milkvetch, pinyon rockcress, Wheeler's dune broom, Inyo hulsea, McGee Meadows lupine, Torrey blazing star, crowned muilla, Nevada oryctes, Bailey's greasewood, foxtail thelypodium, and many-flowered thelypodium. Retention of relatively pure blackbrush stands would be preferable due to their designated Sensitive status (CDFG, 2010) and increasing rarity within the Round Valley area. Retention of Big Sagebrush Scrub stands that have some component of bitterbrush (*Purshia tridentata*) would be preferable for maintaining range carrying capacity for the Round Valley migratory deer herd.

Projects that will disturb the soil or remove Water Birch Riparian Scrub or Non-Native Riparian Woodland should include surveys for the presence of Lemmon's milkvetch and Frog's-bit buttercup. Ecotonal habitat associated with these communities, while narrow and historically disturbed, maintains a high plant diversity that includes a population of the CNPS watchlist species crowned muilla, and may support other sensitive plant populations as described above. Lower Rock Creek is tributary to the Owens River, which has been called a Water of the United States by the U.S. Army Corps of Engineers, and supports CDFW-designated Sensitive Water Birch Riparian Scrub within the study area. Therefore, any project that will disturb the soil within the banks of Lower Rock Creek, or will disturb the vegetation there, or will impact the current flow regime that supports the riparian community, must include consultation with Clean Water Act regulatory agencies pursuant to meeting permitting requirements. Delineation of Waters resources should recognize areas where historical disturbance has displaced native phreatophytic species. Even there (*e.g.*, Non-Native Riparian Woodland), habitat function continues to maintain native diversity, and the possibility of sensitive species presence remains. Big Sagebrush Scrub adjacent to Water Birch Riparian Scrub and Non-Native Riparian Woodland is uniquely dominated by basin big sagebrush (*A. t. ssp. tridentata*), and several other species that do not occur with upland Big Sagebrush Scrub, suggesting that riverine influence on the vegetation extends outward to include the broader, seasonally drying uplands-riparian ecotones.

Sensitive Wildlife

Based upon the available high desert scrub and riparian habitats identified within the Paradise study area, a total of 15 sensitive animal species were identified as having some potential to nest there or occur as residents in the available habitats (Table 16). Owens tui chub is state and federally listed as Endangered. Willow flycatcher, also state and federally listed as Endangered, may choose the intact Water Birch Riparian Scrub subcanopy for nesting. However, no portion of the Paradise study area is part of the designated Critical Habitat for this species, nor is any part of the other town study areas (USFWS, 2013). Swainson's hawk and bank swallow are state listed as Threatened, and may also use habitats associated with the Lower Rock Creek corridor. Relatively little is known about the state Threatened species Sierra Nevada red fox, but CNDDB records depict individuals foraging in developed areas elsewhere, and so foxes could have some likelihood to enter any habitat within the study area. There exists some potential for the State Candidate species Townsend's big-eared bat (*Corynorhinus townsendii*) to forage over Paradise, but this species is not expected to use any of the available habitats for day roosting, for hibernating, or for establishing natal rookeries. Species known to reside or spend a

critical stage of their life cycle in the naturally occurring and created meadows and alkaline habitats of nearby Round Valley (App. A) are very unlikely to occur at Paradise because meadow and alkaline habitats are absent.

Table 16. Sensitive wildlife species that could potentially occur within the Paradise study area. Key to status codes is given below, NL = not listed.

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
mollusks			
<i>Pyrgulopsis wongi</i> Wong's springsnail	NL	S1S2	Water Birch Riparian Scrub Black Locust Non-Native Riparian Woodland
fish			
<i>Catostomus fumeiventris</i> Owens sucker	SSC	S3	Water Birch Riparian Scrub Black Locust Non-Native Riparian Woodland
<i>Rhinichthys osculus</i> ssp. 2 Owens speckled dace	SSC	S1S2	Water Birch Riparian Scrub Black Locust Non-Native Riparian Woodland
<i>Siphateles bicolor snyderi</i> Owens tui chub	Endangered	S1	Water Birch Riparian Scrub Black Locust Non-Native Riparian Woodland
amphibians			
<i>Hydromantes platycephalus</i> Mount Lyell salamander	SSC	S3	Water Birch Riparian Scrub Black Locust Non-Native Riparian Woodland
<i>Lithobates pipiens</i> northern leopard frog	SSC	S2	Water Birch Riparian Scrub Black Locust Non-Native Riparian Woodland
birds			
<i>Aquila chrysaetos</i> (nesting) golden eagle	FP	S3	High Desert Blackbrush Scrub (at Lower Rock Creek gorge) Water Birch Riparian Scrub
<i>Buteo swainsoni</i> (nesting) Swainson's hawk	Threatened	S2	Water Birch Riparian Scrub Black Locust Non-Native Riparian Woodland
<i>Empidonax traillii</i> (nesting) willow flycatcher	Endangered	S1	Water Birch Riparian Scrub

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
birds (cont.)			
<i>Falco mexicanus</i> (nesting) prairie falcon	W	S3	High Desert Blackbrush Scrub (at Lower Rock Creek gorge)
<i>Riparia riparia</i> (nesting) bank swallow	Threatened	S2S3	High Desert Blackbrush Scrub (at Lower Rock Creek gorge)
mammals			
<i>Antrozous pallidus</i> pallid bat	SSC	S3	High Desert Blackbrush Scrub (at Lower Rock Creek gorge) disturbed habitats with buildings
<i>Euderma maculatum</i> spotted bat	SSC	S2S3	High Desert Blackbrush Scrub (at Lower Rock Creek gorge)
<i>Lepus townsendii townsendii</i> western white-tailed jackrabbit	SSC	S3?	High Desert Blackbrush Scrub Big Sagebrush Scrub Rubber Rabbitbrush Scrub Water Birch Riparian Scrub
<i>Vulpes vulpes necator</i> Sierra Nevada red fox	Threatened	S1	High Desert Blackbrush Scrub Big Sagebrush Scrub Rubber Rabbitbrush Scrub Water Birch Riparian Scrub

1. Rank or status, by agency:

CDFW = State of California under the California Endangered Species Act (CDFW, 2014c)

SSC = Species of Special Concern (CDFW, 2014d),

W = Watchlist species of limited distribution or recent decline (CDFW, 2014d),

FP = Fully Protected: take cannot be authorized except for recovery-related activities (CDFW, 2014d).

State ranking = CNDDDB State Conservation Ranking as reported by CDFW (2014d)

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,

? indicates CNDDDB uncertainty in assigning rank.

Any project that would directly impact the Lower Rock Creek riparian habitat, cause siltation, or alter its seasonal hydrology should include an assessment of the effects these impacts could have on Wong's springsnail, Owens sucker, Owens speckled dace, Owens tui chub, Mount Lyell salamander, northern leopard frog, and nesting willow flycatcher. Willow flycatcher absence during the breeding (late May to late June) and nesting (middle June to late August) seasons can be assured only if proper methods are used (Bombay, *et al.*, 2000). The riparian corridor is narrow and is located centrally in Paradise, so analyses of the potential impacts from projects that will take place in nearby upland habitats should include determination of whether Swainson's hawks or golden eagles are using any of the riparian pines for nesting.

The steep, cliff-like rock faces that define the Lower Rock Creek gorge within the study area and for many miles upstream have some likelihood to be chosen for nesting by golden eagle, prairie falcon, and bank swallow. Pallid bats and spotted bats may use the available crevices in these rock faces for day roosting, hibernation or natal rookery establishment. These bats may also forage throughout the study area. Spotted bats are never found far from rocky outcrops or cliffs, suggesting that the species' distribution is limited by the availability of suitable roosting habitat (Pierson and Rainey, 1998). As no other portions of the Paradise area feature trees, cliffs, caves, or crevices suitable for bats, they would generally not be expected to use the more general expanses of High Desert Blackbrush Scrub, Big Sagebrush Scrub, or Rubber Rabbitbrush Scrub for roosting or reproduction. However, pallid bats have been known to use abandoned buildings for such uses, so projects contemplating alteration or removal of such structures should include determination of whether bats are present.

Upland scrub habitat provides somewhat marginal browse for mule deer (*Odocoileus hemionus*), but could contribute to winter viability of the Round Valley Herd. The Paradise study area is within the corridor used by this herd for migration between summer and winter ranges, but resident deer may be found during any time of year at any of the mapped habitats. Additional development within the area could cumulatively function to inhibit migrational movement or reduce availability of browse during the critical winter holding period (November through April) at Round Valley. Construction activities during this period may similarly affect deer use of the available browse. Mule deer may also seek to use the reliably available surface water at Lower Rock Creek, and may use the riparian corridor for cover during movements. Direct impacts to western white-tailed jackrabbit and Sierra Nevada red fox individuals would be very unlikely due to the mobility of these species, but surveys for active burrows of large diameter would be needed at any of the relatively undisturbed habitats in the study area in order to demonstrate avoidance.

Swall Meadows

Plant Communities and Species

Small Meadows’ location near the Sherwin Summit is regionally transitional between high desert landscapes of the Lower Owens River and lower montane landscapes of the Upper Owens River. Species representative of both bioregions have assembled into the diverse plant communities that are present within the Swall Meadows study area (Figure 6). The complexity of these plant communities is further increased by a correspondingly high diversity of the available habitats. At Swall Meadows, areas of dry uplands are intricately arrayed between corridors of spring-driven riparian and wetland meadow. This naturally variable pattern has been altered, interrupted, and sometimes replaced by the historic and ongoing pattern of development. The various types of development-related disturbance have created additional habitat niches for plant species, over time fostering a dynamic species composition to nearly every vegetation community that is present. Wildfire has also driven patchy successional dynamism in some areas. In summary, Swall Meadows’ environment supports a notably wide variety of plant species (App. A) and many community types (Table 17) at various successional stages. Not surprisingly, the broad range of habitats is associated with an unusually inclusive list of potentially occurring sensitive plant species (Table 18).

Table 17. Plant communities that were mapped within the 1164 acre Swall Meadows study area in 2014. The study area also includes 0.7 acres mapped as converted to agriculture, and 106 acres converted to impervious surfaces (roads, houses, etc.) Community names (after Holland, 1986) are cross-referenced to the CDFG (2010) classification and 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		
Big Sagebrush Scrub 35.110.07	Big Sagebrush Shrubland <i>Artemisia tridentata</i> - <i>Purshia tridentata</i>	116
Big Sagebrush Scrub 35.110.12	Big Sagebrush Shrubland <i>Artemisia tridentata</i> - <i>Chrysothamnus viscidiflorus</i> - <i>Purshia tridentata</i>	9.6
Great Basin Mixed Scrub 35.200.00*	Bitterbrush Shrubland <i>Purshia tridentata</i> - <i>Ericameria nauseosa</i>	92
Great Basin Mixed Scrub 35.200.00*	Bitterbrush Shrubland <i>Purshia tridentata</i> - <i>Prunus andersonii</i>	9.8
Great Basin Mixed Scrub 35.200.02*	Bitterbrush Shrubland <i>Purshia tridentata</i> - <i>Artemisia tridentata</i>	102
Rubber Rabbitbrush Scrub 35.310.00	Rubber Rabbitbrush Shrubland <i>Ericameria nauseosa</i> - <i>Purshia tridentata</i>	216

Holland name and CDFW classification number	Alliance and primary association names	acreage in study area
upland communities (cont.)		
Mixed Montane Chaparral -	Mojave Whitethorn Shrubland <i>Ceanothus vestitus</i> - <i>Purshia tridentata</i> - <i>Chrysothamnus viscidiflorus</i>	165
Pinyon-Juniper Woodland 87.040.00	Singleleaf Pinyon Woodland <i>Pinus monophylla</i> - <i>Purshia tridentata</i>	96
Jeffrey Pine Forest 87.020.00	Jeffrey Pine Forest [†] <i>Pinus jeffreyi</i> / <i>Pinus ponderosa</i> - <i>Artemisia tridentata</i>	42
Jeffrey Pine Forest 87.020.00	Jeffrey Pine Forest <i>Pinus jeffreyi</i> / <i>Pinus ponderosa</i> - <i>Ceanothus vestitus</i>	6.8
wetland and potential wetland communities		
Willow Riparian Scrub 61.201.01*	Arroyo Willow Thicket <i>Salix lasiolepis</i>	2.7
Willow Riparian Scrub 61.209.00	Sandbar Willow Thicket <i>Salix exigua</i> - <i>Rosa woodsii</i>	7.6
Willow Riparian Scrub 61.209.00	Sandbar Willow Thicket <i>Salix exigua</i> - <i>Salix lasiolepis</i>	43
Water Birch Riparian Scrub 63.610.01*	Water Birch Thicket <i>Betula occidentalis</i> - <i>Salix lasiolepis</i>	55
Montane Freshwater Marsh 45.130.00	Nebraska Sedge Marsh <i>Carex nebrascensis</i> - <i>Carex</i> spp.	0.9
Wet Montane Meadow 42.060.01	Kentucky Bluegrass Turf <i>Poa pratensis</i> - <i>Carex nebrascensis</i>	2.0
Dry Montane Meadow 45.169.00*	Creeping Ryegrass Turf <i>Carex douglasii</i> - <i>Juncus balticus</i> - <i>Rosa woodsii</i>	81
Dry Montane Meadow 41.080.00*	Creeping Ryegrass Turf <i>Elymus triticoides</i> - <i>Pteridium aquilinum</i>	6.0
Dry Montane Meadow 41.020.00*	Basin Wildrye Meadow <i>Elymus cinereus</i> - <i>Rosa woodsii</i>	4.1

† 87.010.25* *Pinus ponderosa*/*Pinus jeffreyi*-*Artemisia tridentata* where *P. ponderosa* is prominent

Upland scrub communities are broadly zonal, with Mojave whitethorn (*Ceanothus vestitus*) dominant on the uppermost slopes, big sagebrush (*Artemisia tridentata*) dominant on xeric slopes (mainly south and east-facing) located away from surface water, and bitterbrush (*Purshia tridentata*) or rubber rabbitbrush (primarily *Chrysothamnus nauseosus* var. *speciosa*) dominant on slopes adjacent to

local riparian corridors and the large Swall Meadows spring complex. There are some broad similarities among the various scrub expressions, which were classified as either Big Sagebrush Scrub, Great Basin Mixed Scrub, Rubber Rabbitbrush Scrub, or Mixed Montane Chaparral. Bitterbrush, rubber rabbitbrush, big sagebrush, and curl-leaf rabbitbrush (*Chrysothamnus viscidiflorus*) are present at dominant or sub-dominant frequencies at every upland community occurrence in the study area. Cover by shrubs averages 2-3 ft in height and total cover is nearly always 20-40%. The highest amount and most uniform cover is exhibited by Mixed Montane Chaparral in a stand that densely covers 165 acres of the study area. The nearly impassable canopy of relatively pure Mojave whitethorn at Mixed Montane Chaparral likely reflects the undevelopable steepness of the upper slopes it occupies, as well as an absence of recent wildfire. This stand may simply be one of the larger seral block that make up a landscape shaped by fire history. Understanding the pattern of serial dynamism in upland scrub types of this area will be important to future management decisions that will affect not only the fire safety of the Wheeler Crest residential zone, but also local browse conditions for mule deer that migrate to Round Valley (including Swall Meadows) each winter.

Mixed Montane Chaparral is generally the most uniform of any scrub type present, but it is also the only community significantly affected by current firebreak maintenance practices. Big Sagebrush Scrub, Great Basin Mixed Scrub, and Rubber Rabbitbrush Scrub typically exhibit less uniformity in total shrub cover and species' distributions, reflecting in part the local history of agricultural conversion and rural housing development. As a general pattern, the most recent areas of vegetation disturbance are associated with stands that are relatively rich in rubber rabbitbrush. Rubber Rabbitbrush Scrub (which is clearly dominated by rubber rabbitbrush) is a "naturally occurring" regional response to mechanical disturbance, but it is also attributable to natural development in the context of intense herbivory of other, more palatable shrub species. At Swall Meadows, such a response has been in part induced by long-term livestock grazing, but it is also occurring in the context of grazing by mule deer that at times is even more intensive.

The local importance of bitterbrush appears to be widely challenged in this portion of the range. Rubber Rabbitbrush Scrub's prominence amid the expanse of bitterbrush-dominated Great Basin Mixed Scrub that occurs between and near Dry Montane Meadow or Willow Riparian Scrub may reflect type change on a large scale in the Swall Meadows area. This vegetation pattern may be a response to loss of seasonal shallow groundwater flux. While grazing pressure can affect the fitness of individual shrubs, habitat alteration on a larger scale would provide an explanation for why graze-killed shrubs have not been replaced by a new cohort of the same species. At Swall Meadows, groundwater development and the ongoing function of long-standing surface water diversions and drainage ditches has likely opened niche space for species adapted to lowering of seasonal water tables (e.g., rubber rabbitbrush). Post-project seeding within areas of Rubber Rabbitbrush Scrub or Great Basin Mixed Scrub is now equally likely to result in the successful establishment of rubber rabbitbrush. If contemporaneous change is indeed indicated by the observed shifting of canopy dominance, then replacement of Great Basin Mixed Scrub dominants (especially bitterbrush) by rubber rabbitbrush or big sagebrush as a trend may be hypothesized to continue in the absence of corrective management. The potential for causing type conversions should be considered during the environmental analysis of projects that could affect Swall

Meadows' groundwater hydrology, especially if browse availability for mule deer will be affected on the long term. Given that bitterbrush is a limiting factor for Round Valley mule deer winter maintenance and subsequent fawn production, revegetation direction should consistently discourage establishment of Big Sagebrush Scrub and Rubber Rabbitbrush Scrub, and instead target establishment of Great Basin Mixed Scrub in a timely fashion wherever possible.

Jeffrey Pine Forest and Pinyon-Juniper Woodland within the study area are sparsely treed, with canopy closure rarely surpassing 10%. The trees of Pinyon-Juniper Woodland, which are nearly 100% singleleaf pinyon (*Pinus monophylla*), have a clumped distribution that creates wide canopy gap areas. In the Woodland setting, the understory scrub provides as much or greater cover than the trees, and has a composition and appearance similar to the study area's stands of Great Basin Mixed Scrub. Trees in Jeffrey Pine Forest include both Jeffrey pine (*Pinus jeffreyi*) and ponderosa pine (*P. ponderosa*), with relatively equal spacing resulting where thinning has been practiced. The understories in Jeffrey Pine Forest stands are somewhat sparser and weedier, resembling either the Big Sagebrush Scrub or Mixed Montane Chaparral stands in which the trees are embedded. The relatively open canopy and scrubby understory suggests that both the Jeffrey Pine Forest and Pinyon-Juniper Woodland communities should be equivalent to Scrub communities within the study area when considering the likelihood for occurrence of rare species.

Jeffrey Pine Forest and Pinyon-Juniper Woodland are the only upland community types that were found (not all occurrences) on soil derived from volcanic Bishop tuff. Pumice was also present at these occurrences, but no open pumice gravel flats or swales were found. All other communities at Swall Meadows are on granitic alluvium. Like other upland communities, these Forest and Woodland types should be assumed to include habitat variations such as rocky outcrops, areas of very steep slopes and groundcreep, and ephemeral seeps that are outlying from the main spring complex. Jeffrey pine and ponderosa pine appear to hybridize in the area, so that typical cone characters are mixed. If at the project level it is determined that the local forest has a predominance of trees identified as ponderosa pine, then the community type should be Ponderosa Pine Forest and the alliance becomes the Sensitive (CDFG, 2010) *Pinus ponderosa-P. jeffreyi/Artemisia tridentata* (87.010.25).

Swall Meadows' wetland communities are supplied by artesian surface and near-surface flows that are arrayed in a linear north-to-south arrangement across the study area and beyond. Potential wetland community types dependent upon these springs include Willow Riparian Scrub, Water Birch Riparian Scrub, Montane Freshwater Marsh, Wet Montane Meadow, and Dry Montane Meadow. All of these types experience surface water or an elevated shallow groundwater table during some part of the growing season. The preponderance of plant species that were found are considered to be adapted to wetland soil and moisture conditions (App. B). Mapped Riparian Scrub and Meadow occurrences usually include a central corridor of emergent marsh vegetation that would be classified as Montane Freshwater Marsh at the project level of inventory. Water Birch Riparian Scrub, Montane Freshwater Marsh, and Wet Montane Meadow also include species that persist only where it is perennially saturated within the rooting zone. Hydrologic input to these communities is partly controlled by the activity of a local fault. Other significant controls include annual mountain block recharge and human diversion. In an overall landscape that is heavily influenced by the rain shadow effects of the adjacent, steeply rising Sierra

Nevada, and is thereby challenging for plants during lengthy summer drought periods, Swall Meadows' spring-driven communities function to maintain a diversity of species. Nearly all of the plant species occurring in the potential wetland types (Table 17) are otherwise absent from the upland community types within the study area, and from slopes of the surrounding Wheeler Crest landscape.

The spring complex at Swall Meadows is geographically extensive enough to be ecologically significant. However, surface flows (including those that are apparently perennial at their source) have not been robust enough to recently become tributary to the downslope Lower Rock Creek. All water that has been spread by or collected by the area's ditches, and all naturally occurring, in-channel surface flows eventually percolate to below the reach of plants within or near the southern boundary of the study area. This is presumably indicated by the extent of in-channel Water Birch Riparian Scrub, Willow Riparian Scrub, and (rarely) Wet Montane Meadow assemblages. In this climate, evaporative drying cycles at springfed outflows have the potential to create pockets of saline or alkaline soil. At least one Dry Montane Meadow patch of sub-community size has been documented at a swale in these lower reaches (Paulus, 2003). That swale is dominated by saltgrass (*Distichlis spicata*). Far more commonly, Dry Montane Meadow habitat supports low growing native and non-native grasses and native perennial herbs or sedges as dominants (Table 17). Shrubs are generally only a minor component of the occurring meadow vegetation. However, large areas of former agricultural fields and orchard lands (for example, across much of the Eastern Sierra Land Trust reserve) are recovering native cover that is substantially composed of vegetatively spreading wild rose (*Rosa woodsii*), and shrubby patches of Willow Riparian Scrub dominants (*Salix lasiolepis*, *S. exigua*) are scattered throughout the areas mapped as Wet Montane Meadow and Dry Montane Meadow. Despite substantial historical disturbance, springfed communities at Swall now feature good native plant species diversity and structural variability that is considered attractive to mule deer use, to birds that are nesting, and to other wildlife that require cover for concealment.

All of the communities within the study area are infested with the non-native annual cheatgrass (*Bromus tectorum*). This species is considered naturalized to sagebrush scrub and upland scrub habitats generally of Mono County. Its presence is widespread at nearly every community included in this study (exceptions are Chalfant Valley and Benton). Its dominance at Swall Meadows increases the area's susceptibility to fire, and may delay the recovery of disturbed areas to desirable vegetation types such as Great Basin Mixed Scrub. This species is patchily the most densely growing of any found in Dry Montane Meadow, giving the community a weedy appearance. Unfortunately, it is this same degree of pervasiveness – more specifically, an overwhelming seedbank presence – that would make successful control unlikely at the project level. Other non-native species that are common in meadow habitats and other potential wetland types include common timothy grass (*Phleum pratense*), Kentucky bluegrass (*Poa pratensis*), woolly mullein (*Verbascum thapsus*), and white sweetclover (*Melilotus albus*). Russian thistle (*Salsola tragus*) is most common roadside, but has spread to some degree into the near-town fringes of upland scrub types and Pinyon-Juniper Woodland.

Sensitive Plant Communities and Species

A total of 27 sensitive plant species and one sensitive bryophyte species have some likelihood to occur within the Swall Meadows study area (Table 18), although no sensitive species have previously been documented at the study area in CNDDDB records (App. A) or in the available grey literature. No potentially occurring species are federally listed or candidates for listing. Long Valley milkvetch and Mono milkvetch are state listed as Rare, and are considered Sensitive by regional BLM and USFS offices. Owens Valley checkerbloom is state listed as Endangered, and is considered Sensitive by BLM. Inyo beardtongue (*Penstemon papillatus*), a species of granitic outcrops in pinyon-juniper woodland and coniferous forest habitats, is not included in CNDDDB Rarefind records (CDFG, 2014e), but was included as potentially occurring in the study area due to recent (2011) reporting of a population creekside at the mouth of Rock Creek Canyon (Consortium, 2014). Various historical reports (1938-1952) also place this species near Whiskey Creek and Hilton Creek near the northern edge of the Crowley Lake study area.

Table 18. Potentially occurring sensitive plant species in the available plant communities at Swall Meadows. Flowering period is taken from CNPS (2014).

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Astragalus johannis-howellii</i> Long Valley milkvetch herbaceous perennial	1B.2	S2	June-August	Big Sagebrush Scrub Great Basin Mixed Scrub Rubber Rabbitbrush Scrub Mixed Montane Chaparral Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Astragalus lemmonii</i> Lemmon's milkvetch herbaceous perennial	1B.2	S2	May-Sept	Water Birch Riparian Scrub Willow Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow Dry Montane Meadow Dry Alkaline Meadow
<i>Astragalus monoensis</i> Mono milkvetch herbaceous perennial	1B.2	S2	June-August	Pinyon-Juniper Woodland Jeffrey Pine Forest disturbed roadsides
<i>Boechera dispar</i> pinyon rockcress herbaceous perennial	2B.3	S3	March-June	Pinyon-Juniper Woodland Jeffrey Pine Forest

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Botrychium ascendens</i> upswept moonwort rhizomatous herb	2B.3	S2	sporangia July-August	Water Birch Riparian Scrub Willow Riparian Scrub Wet Montane Meadow
<i>Botrychium crenulatum</i> scalloped moonwort rhizomatous herb	2B.2	S2	sporangia June-Sept	Water Birch Riparian Scrub Willow Riparian Scrub Wet Montane Meadow
<i>Calochortus excavatus</i> Inyo County star-tulip bulbiferous herb	1B.1	S2	April-July	Dry Montane Meadow Dry Alkaline Meadow
<i>Calyptridium pygmaeum</i> pygmy pussypaws herbaceous annual	1B.2	S2	June-August	Jeffrey Pine Forest
<i>Crepis runcinata</i> ssp. <i>hallii</i> Hall's meadow hawksbeard herbaceous perennial	2B.1	S1S2	May-July	Dry Montane Meadow Dry Alkaline Meadow
<i>Epilobium howellii</i> subalpine fireweed stoloniferous herb	4.3	S4	July-August	Water Birch Riparian Scrub Willow Riparian Scrub Wet Montane Meadow
<i>Eremothera boothii</i> ssp. <i>boothii</i> Booth's evening primrose herbaceous annual	2B.3	S2	April-Sept	Big Sagebrush Scrub Great Basin Mixed Scrub Rubber Rabbitbrush Scrub Mixed Montane Chaparral Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Eremothera boothii</i> ssp. <i>intermedia</i> Booth's hairy evening primrose herbaceous annual	2B.3	S2S3	May-June	Big Sagebrush Scrub Great Basin Mixed Scrub Rubber Rabbitbrush Scrub Mixed Montane Chaparral Pinyon-Juniper Woodland Jeffrey Pine Forest

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDB		
<i>Helodium blandowii</i> Blandow's bog moss bryophyte	2B.3	S1	-	Water Birch Riparian Scrub Willow Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
<i>Hulsea vestita</i> <i>ssp. inyoensis</i> Inyo hulsea herbaceous perennial	2B.2	S1S2	April-June	Big Sagebrush Scrub Great Basin Mixed Scrub Rubber Rabbitbrush Scrub Mixed Montane Chaparral Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Lupinus gracilentus</i> slender lupine herbaceous perennial	1B.3	S2	July-August	Jeffrey Pine Forest
<i>Mentzelia torreyi</i> Torrey's blazing star herbaceous perennial	2B.2	S2	June-August	Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Micromonolepis pusilla</i> dwarf monolepis herbaceous annual	2B.3	S2	May-August	Big Sagebrush Scrub Great Basin Mixed Scrub Rubber Rabbitbrush Scrub Mixed Montane Chaparral Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Parnassia parviflora</i> small-flowered grass of Parnassus herbaceous perennial	2B.2	S2	Aug-Sept	Water Birch Riparian Scrub Willow Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
<i>Pedicularis crenulata</i> scalloped-leaved lousewort herbaceous perennial	2B.2	S1	June-July	Water Birch Riparian Scrub Willow Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
<i>Penstemon papillatus</i> Inyo beardtongue herbaceous perennial	4.3	S3	June-July	Pinyon-Juniper Woodland Jeffrey Pine Forest

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Phacelia gymnoclada</i> naked-stem phacelia herbaceous annual	2B.3	S2	April-August	Big Sagebrush Scrub Great Basin Mixed Scrub Rubber Rabbitbrush Scrub Mixed Montane Chaparral Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Phacelia inyoensis</i> Inyo phacelia herbaceous annual	1B.2	S2	April-August	Dry Montane Meadow Dry Alkaline Meadow
<i>Sidalcea covillei</i> Owens Valley checkerbloom herbaceous perennial	1B.1	S2	April-June	Water Birch Riparian Scrub Willow Riparian Scrub Wet Montane Meadow Dry Montane Meadow Dry Alkaline Meadow
<i>Sphaeromeria potentilloides var. nitrophila</i> alkali tansy sage herbaceous perennial	2B.2	S2	June-July	Dry Montane Meadow Dry Alkaline Meadow
<i>Stuckenia filiformis</i> ssp. <i>alpina</i> slender-leaved pondweed rhizomatous herb	2B.2	S3	May-July	Water Birch Riparian Scrub Willow Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
<i>Thelypodium integrifolium</i> ssp. <i>complanatum</i> foxtail thelypodium herbaceous perennial	2B.2	S2	June-Oct	Big Sagebrush Scrub Great Basin Mixed Scrub Rubber Rabbitbrush Scrub Mixed Montane Chaparral Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Triglochin palustris</i> marsh arrow-grass rhizomatous herb	2B.3	S3	July-August	Water Birch Riparian Scrub Willow Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Viola purpurea</i> ssp. <i>aurea</i> golden violet herbaceous perennial	2B.2	S2S3	April-June	Big Sagebrush Scrub Great Basin Mixed Scrub Rubber Rabbitbrush Scrub Mixed Montane Chaparral Pinyon-Juniper Woodland Jeffrey Pine Forest

1. Rank or status, by agency:

CNPS = California Native Plant Society listings (CNPS, 2001, 2014)

1B = rare and endangered in California and elsewhere

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

4 = plants of limited distribution in California – watchlist species

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 occurrences threatened or no current threats known).

CNDDDB = California Natural Diversity Data Base rankings (CDFW, 2014b)

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 = Apparently Secure: uncommon but not rare in California

Many of the potentially occurring sensitive plant species are adapted to habitats with wetland character such as springs and seeps, meadows, and riparian corridors. Sensitive species that regionally occur at freshwater wetland habitats (upswept moonwort, scalloped moonwort, subalpine fireweed, Blandow’s bog moss, small-flowered grass of Parnassus, scalloped-leaved lousewort, slender-leaved pondweed, and marsh arrow-grass) may occur where suitable conditions are provided by Swall Meadows’ many seasonal and perennial springflows. Regionally occurring sensitive species of alkaline and saline meadow or springs (Inyo County star tulip, Hall’s meadow hawksbeard, Inyo phacelia, alkali tansy-sage, and Owens Valley checkerbloom) also have some likelihood to occur where suitable habitat has been created at drying margins of the freshwater features.

Projects that include disturbance of the vegetation or soil profiles should include delineation of the extents of habitats that are seasonally or perennially moist. In this environment, elevated seasonal groundwater dynamics would be indicated by abrupt shifts in the species composition and increases in total cover at the patch scale. Although no aquatic features within the study area appear to be tributary to a Waters of the United States, areas classified here as Water Birch Riparian Scrub, Willow Riparian Scrub, Wet Montane Meadow, Dry Montane Meadow, or Alkaline Meadow may be considered wetland resources by California Department of Fish and Wildlife, and may therefore be subject to permit requirements if disturbed. The entire community extents of Water Birch Riparian Scrub, and Willow Riparian Scrub that is dominated by arroyo willow (*Salix lasiolepis*), and Dry Montane Meadow

dominated by either creeping ryegrass (*Elymus triticoides*) or ashy wildrye (*Elymus cinereus*), are also considered Sensitive. Montane Freshwater Marsh, which as noted above may be narrowly present within any potential wetland community occurrences mapped here, may include alliances other than Nebraska sedge (*Carex nebrascensis*) that are considered Sensitive (CDFG, 2010) at a finer grain of analysis.

Big Sagebrush Scrub is not extensive within the study area but is common and widespread throughout Mono County and the intermountain Great Basin. Great Basin Mixed Scrub that is dominated by bitterbrush is considered Sensitive by CDFW (CDFG, 2010). Stands at Swall Meadows where bitterbrush is dominant or co-dominant are currently threatened by invasive naturalized cheatgrass, by overgrazing by mule deer, and possibly by drawdown of local shallow groundwater. Due to canopy dominance by bitterbrush, Great Basin Mixed Scrub occurrences are considered important as forage resources for the Round Valley Herd of mule deer. The perceived sensitivity of this community, especially in southern Mono County, has been heightened by a series of destructive fires that have substantially reduced its regional presence (Sawyer, *et al.*, 2009). Rubber Rabbitbrush Scrub, Jeffrey Pine Forest, and Pinyon-Juniper Woodland are examples of community types that are common locally and widespread regionally. It should be noted, however, that bitterbrush dominance widely extends into the understory shrub canopy that occurs in Pinyon-Juniper Woodland at Swall Meadows. Due to its similarity to sensitive Great Basin Mixed Scrub, at least within the shrub stratum, Pinyon-Juniper Woodland also may be considered locally sensitive and regarded as having high potential utility for mule deer.

Projects that will include disturbance of the vegetation or soil profile in Jeffrey Pine Forest or Pinyon-Juniper Woodland should include surveys at the appropriate timing (Table 18) to determine the presence or absence of populations of Long Valley milkvetch, Mono milkvetch, pinyon rockcress, Booth's evening primrose (both ssp.), Inyo hulsea, Torrey's blazing star, dwarf monolepis, Inyo beardtongue, naked phacelia, foxtail thelypodium, and golden violet. Projects within Jeffrey Pine Forest should also include appropriate surveys for pygmy pussypaws and slender lupine. The potential for occurrence of Mono milkvetch is based in part on the presence of volcanic gravelly soil in upland Woodland and Forest areas. Because the nearest occurrence of Mono milkvetch is in presumably granitic gravel, and is also in a disturbed roadside setting, directed surveys intended to exclude the presence of Mono milkvetch must be extended to roadside disturbed gravels in any of the upland habitats mapped here.

Projects that will include disturbance of the vegetation or soil profile in Big Sagebrush Scrub, Great Basin Mixed Scrub, Rubber Rabbitbrush Scrub, or Mixed Montane Chaparral communities should include surveys to determine the presence/absence of Long Valley milkvetch, Booth's evening primrose, Inyo hulsea, dwarf monolepis, naked phacelia, foxtail thelypodium, and golden violet. These potentially occurring species have known adaptation to sandy openings between shrub canopies, but most of the nearest known populations of Inyo hulsea and foxtail thelypodium are associated with rocky habitats or outcrops.

Projects that will disturb the vegetation, alter the hydrology seasonally or permanently, or alter the bed or banks of any natural channel, water-spreading ditch or surface drain in Water Birch Riparian Scrub, Willow Riparian Scrub, Montane Freshwater Marsh, or Wet Montane Meadow should include surveys to determine the presence/absence of Lemmon’s milkvetch, upswept moonwort, scalloped moonwort, subalpine fireweed, Blandow’s bog moss, small-flowered grass of Parnassus, scallop-leaved lousewort, Owens Valley checkerbloom, slender-leaved pondweed, and marsh arrow-grass. If a project would disturb the vegetation, hydrology, or contours in Dry Montane Meadow, or in embedded Dry Alkaline Meadow detected at the project level, then surveys should include searches for Lemmon’s milkvetch, Inyo County star-tulip, Hall’s meadow hawksbeard, Inyo phacelia, alkali tansy sage, and Owens Valley checkerbloom.

Sensitive Wildlife

Based upon the available high desert scrub and riparian habitats identified within the Swall Meadows study area, a total of 10 sensitive animal species were identified as having some potential to nest there or occur as residents in the available habitats (Table 19). Willow flycatcher, which is state and federally listed as Endangered, may choose to nest in Water Birch Riparian Scrub, Willow Riparian Scrub, or the willow clumps in adjacent meadow habitat. Relatively little is known about the state Threatened species Sierra Nevada red fox, but they have been seen foraging in developed areas and so individuals have some likelihood to enter any habitat within the study area. Speckled dace are known from the nearby Long Valley, where they can occur at long-isolated freshwater springs of similar size to those present at Swall Meadows. Similarly, Wong’s springsnail is known from often isolated springs, and may be dispersed to distant habitats by birds. The federally endangered Sierra Nevada yellow-legged frog is known to occur at an outlying Witcher Spring location, within 1.3 miles of aquatic resources associated with Swall Meadows (CDFW, 2013). Swall Meadows and all other town areas included in this study lie well outside the Critical Habitat extents proposed by USFWS (2013). Given the relatively moist habitat and presence of perennial springs in the intervening landscape, it is possible that Swall Meadows aquatic resources lie within dispersal range from the known Sierra Nevada yellow-legged frog population.

Table 19. Sensitive wildlife species that could potentially occur within the Swall Meadows study area. Key to status codes is given below, NL = not listed.

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
mollusks			
<i>Pyrgulopsis wongi</i> Wong’s springsnail	NL	S1S2	Water Birch Riparian Scrub Willow Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
fish			
<i>Rhinichthys osculus</i> ssp. 2 Owens speckled dace	SSC	S1S2	Water Birch Riparian Scrub Willow Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
<i>Rhinichthys osculus</i> ssp. 5 Long Valley speckled dace	NL	S1	Water Birch Riparian Scrub Willow Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
amphibians			
<i>Hydromantes platycephalus</i> Mount Lyell salamander	SSC	S3	Water Birch Riparian Scrub Willow Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
<i>Lithobates pipiens</i> northern leopard frog	SSC	S2	Water Birch Riparian Scrub Willow Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
<i>Rana sierrae</i> Sierra Nev. yellow-legged frog	Threatened	S1	Water Birch Riparian Scrub Willow Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
birds			
<i>Empidonax traillii</i> (nesting) willow flycatcher	Endangered	S1	Water Birch Riparian Scrub Willow Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
mammals			
<i>Lepus townsendii townsendii</i> western white-tailed jackrabbit	SSC	S3?	Big Sagebrush Scrub Great Basin Mixed Scrub Rubber Rabbitbrush Scrub Mixed Montane Chaparral Pinyon-Juniper Woodland Jeffrey Pine Forest Dry Montane Meadow
<i>Microtus californicus vallicola</i> Owens Valley vole	SSC	S1	Water Birch Riparian Scrub Willow Riparian Scrub Wet Montane Meadow Dry Montane Meadow

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
mammals (cont.)			
<i>Vulpes vulpes necator</i> Sierra Nevada red fox	Threatened	S1	Big Sagebrush Scrub Great Basin Mixed Scrub Rubber Rabbitbrush Scrub Mixed Montane Chaparral Pinyon-Juniper Woodland Jeffrey Pine Forest Dry Montane Meadow

1. Rank or status, by agency:

CDFW = State of California under the California Endangered Species Act (CDFW, 2014c)

SSC = Species of Special Concern (CDFW, 2014d)

State ranking = CNDDDB State Conservation Ranking as reported by CDFW (2014d)

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,

? indicates CNDDDB uncertainty in assigning rank.

Any project that would directly impact Water Birch Riparian Scrub, Willow Riparian Scrub, Montane Freshwater Marsh, or Wet Montane Meadow (which is adjacent to Willow Riparian Scrub and often contains isolated willows) should include nesting season (approx. Mar. 15 – Sept. 15) surveys for willow flycatcher. If a breeding pair or nesting is observed, the site should be avoided (buffered) until subsequent clearance of the site has established the fledging has completed. Within these same communities, surveys of aquatic habitat should include Wong’s springsnail, Owens speckled dace, Long Valley speckled dace, northern leopard frog, and Sierra Nevada yellow-legged frog. The adjacent banks and meadows in Water Birch Riparian Scrub, Willow Riparian Scrub, Montane Freshwater Marsh, and Wet Montane Meadow may harbor Mt. Lyell salamander, northern leopard frog, Sierra Nevada yellow-legged frog and Owens Valley vole. Owens Valley vole also has some potential to occur at denser vegetation within Dry Montane Meadow.

Any project that would disturb the vegetation or the soil profile in an upland community type (Table 17), or in Dry Montane Meadow, should include surveys to exclude burrow use by Sierra Nevada red fox and use by western white-tailed jackrabbit. Being highly mobile, individuals would be expected to flee to avoid direct impact, but may be affected by noise and any increased presence of dogs and night lighting. Impacts to these species and to mule deer would be mainly indirect, but may include increased collision with vehicles as a direct impact. Any changes to the availability of the Round Valley mule deer herd’s winter forage, which consists primarily of bitterbrush within the study area and southward into the Round Valley and Buttermilks area, would potentially reduce the carrying capacity of their winter range. Fencing and night lighting can reduce habitat utility for these animals as effectively as long-term vegetation type conversion or water development. These impediments may also impact

the migratory path used by these deer during their twice annual movement between their winter range and Sierra Nevada habitats to the north. The cumulative losses of range carrying capacity, access to surface water, and corridors for migratory movement associated with increasing development density at Swall Meadows are significant impacts that should be considered during the planning process.

Tom's Place

Plant Communities and Species

Tom's Place vegetation is composed almost completely of upland types. There are about equal proportions of interwoven, primarily native lower montane coniferous forest and Great Basin scrub types (Table 20). Upland forest and scrub sparsely occupies granitic-derived alluvial fan soils southwest of Hwy 395, and also cover the pumice-dominated soil on and between Bishop tuff outcrops northeast of Hwy 395. The only relief from this pattern is a corridor of riparian vegetation that is narrowly adherent to Rock Creek as it traverses the study area (Figure 7). Rock Creek is a perennial stream that has been channelized (historically disturbed and routed) and is subject to ongoing partial diversion at a point immediately southwest of U.S. Highway 395. Below this diversion, the flow (now called "Lower Rock Creek") is highly controlled, with little seasonal variation in quantity allowed for many decades. This history of manipulation has resulted in riparian vegetation recovery to even-aged, continuous stands of water birch (*Betula occidentalis*), dense scrubby willows (*Salix exigua*, *S. lasiolepis*), and black cottonwood (*Populus trichocarpa*) that were separated into Water Birch Riparian Scrub, Willow Riparian Scrub, and Great Basin Riparian Forest alliances. Naturally, this corridor stands out starkly within the otherwise xeric vegetation of the local landscape. The upland-wetland edge at Lower Rock Creek is consistently abrupt, and lacks the streamside meadows, oxbows and side channels that would be typical of naturally formed perennial streamcourses of the region.

Plants growing at the study area's Rock Creek fan habitat to the southwest of U.S. Hwy 395 generally occupy a single east-facing aspect. The vegetation there is mainly uniform big sagebrush (*Artemisia tridentata*) and bitterbrush (*Purshia tridentata*) with or without an overcanopy of singleleaf pinyon (*Pinus monophylla*) and occasional Sierra juniper (*Juniperus grandis*). Tuff outcrops to the north of the highway in contrast present a relatively great variation in slope steepness and microhabitat characters including shading and soil depth. Outcrops were invariably mapped as Jeffrey Pine Forest where the coniferous canopy exceeds 10% absolute cover. But most tuff-related habitat in the study area is actually in the moderately sloped or basin-like setting that occurs between outcrops. These areas support only sparse growth by coniferous trees. Correspondingly, the majority of vegetation presence northeast of U.S. Hwy 395 is as discreet, shrubby stands that are dominated by bitterbrush. Bitterbrush Shrublands commonly have established 40-50% total living shrub canopy cover. Perennial herbs and grasses patchily achieve 10-20% absolute cover. Other basins that appear to be internally drained and have a high degree of south-facing aspect have developed a relatively lower, sparser, and entirely treeless cover of big sagebrush and bitterbrush that is patchily dominated by grasses (especially *Stipa hymenoides*) and granite prickly phlox (*Linanthus pungens*). Steeper south and west-facing slopes exhibit clear shifts to curl-leaf mountain mahogany (*Cercocarpus ledifolius*) in the Mountain Mahogany Woodland community or singleleaf pinyon in Pinyon-Juniper Woodland. Undisturbed Mountain Mahogany Woodland has often developed impassably dense canopy cover to 10 ft in height. A tall (40-50 ft) canopy of conifers (*Pinus jeffreyi*, with lesser components of *P. ponderosa* and *J. grandis*) occurs sparsely throughout these communities.

Table 20. Plant communities that were mapped within the 442 acre Tom’s Place study area in 2014. The study area also includes 55 acres that have been already converted to impervious surfaces (roads, houses, etc.) Community names (after Holland, 1986) are cross-referenced to the CDFG (2010) classification and 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		
Big Sagebrush Scrub 35.110.07	Big Sagebrush Shrubland <i>Artemisia tridentata</i> - <i>Purshia tridentata</i>	7.3
Great Basin Mixed Scrub 35.200.02*	Bitterbrush Shrubland <i>Purshia tridentata</i> - <i>Artemisia tridentata</i>	125
Rubber Rabbitbrush Scrub 35.310.00	Rubber Rabbitbrush Shrubland <i>Ericameria nauseosa</i> - <i>Purshia tridentata</i>	0.4
Mountain Mahogany Scrub 76.200.00	Curl-leaf Mountain Mahogany Scrub <i>Cercocarpus ledifolius</i> - <i>Purshia tridentata</i>	39
Pinyon-juniper Woodland 87.040.00	Singleleaf Pinyon Woodland <i>Pinus monophylla</i> - <i>Juniperus grandis</i>	0.7
Pinyon-Juniper Woodland 87.040.12	Singleleaf Pinyon Woodland <i>Pinus monophylla</i> - <i>Cercocarpus ledifolius</i>	27
Jeffrey Pine Forest 87.020.00	Jeffrey Pine Forest <i>Pinus jeffreyi</i> - <i>Artemisia tridentata</i>	5.9
Jeffrey Pine Forest 87.020.26	Jeffrey Pine Forest <i>Pinus jeffreyi</i> - <i>Pinus monophylla</i>	1.6
Jeffrey Pine Forest 87.020.21*	Jeffrey Pine Forest <i>Pinus jeffreyi</i> - <i>Purshia tridentata</i>	175
riparian communities		
Willow Riparian Scrub 61.201.00	Arroyo Willow Thicket <i>Salix lasiolepis</i> - <i>Salix lutea</i>	0.7
Water Birch Riparian Scrub 63.610.01*	Water Birch Thicket <i>Betula occidentalis</i> - <i>Salix lasiolepis</i>	3.9
Great Basin Riparian Forest 61.120.03*	Black Cottonwood Forest <i>Populus trichocarpa</i> - <i>Pinus jeffreyi</i>	0.4

Water birch is generally the most common tree present in the riparian scrub associated with Rock Creek. While the assemblage is not diverse, the stand is uniform and now has a generally native, undisturbed character despite a long history of channel manipulation. Exceptions are the disturbed diversion works located southwest of U.S. Hwy 395, the highway overcrossing, and one reach located immediately adjacent to Owens Gorge Road that is subject to routine devegetation for maintenance of a

municipal well. Pine trees have established a sparse overcanopy both above and below the diversion. While a wildlife/pedestrian underpass has been provided at Hwy 395, infrastructure associated with the highway and the diversion works have permanently interrupted the only riparian corridor of the study area. Additional development would further reduce the Water Birch Riparian Scrub-related ecological functions of provision for wildlife surface water, cover and movement where the study area intercepts Lower Rock Creek.

Vegetation disturbance at Tom's Place has been largely confined to the aforementioned infrastructure at existing housing, and around the historical resort area at Crowley Lake Drive. The outlying upland plant communities remain largely native in character, and are well-connected to larger expanses of undisturbed public lands in all directions. These areas are, however, penetrated by an extensive system of unimproved or somewhat improved roads, especially in the Pine Glade area. Pine Glade, which was developed as moderate density USFS lease cabins, is intermediate in disturbance when compared to the densely developed housing areas adjacent to Crowley Lake Drive or Owens Gorge Rd and the outlying undeveloped lands. Some developed areas and roadsides at Tom's Place are currently infested with cheatgrass (*Bromus tectorum*). This locally naturalized annual species may be expected to spread over time along disturbed roads and into all study area communities. Prostrate knotweed (*Polygonum aviculare* ssp. *depressum*), another introduced annual species, is also present at roadside habitats but is not expected to spread beyond there. The non-native annuals tumble mustard (*Sisymbrium altissimum*) and Russian thistle (*Salsola tragus*) were observed to be spreading into Great Basin Mixed Scrub and Pinyon-juniper woodland from disturbed habitats southwest of U.S. Hwy 395 and appear likely to become widespread within the study area.

Sensitive Plant Communities and Species

Great Basin Mixed Scrub, which is consistently composed of relatively pure stands of bitterbrush within the Tom's Place study area, is considered Sensitive by CDFW (CDFG, 2010). Tom's Place habitats support more extensive and densely growing, healthy stands of bitterbrush than were observed at any other town study area in 2013-2014. Stands where bitterbrush is dominant or co-dominant are currently threatened by invasive naturalized cheatgrass, a noxious weed (invasive potential considered High by Cal-IPC, 2014) that encourages fire spread in native shrublands. In 2013-2014, cheatgrass was observed to be widespread at roadsides and within Great Basin Mixed Scrub nearest U.S. Highway 395. Sensitivity of Bitterbrush Shrublands in southern Mono County has been exacerbated by a series of destructive fires that have substantially reduced its regional presence (Sawyer, *et al.*, 2009). Great Basin Mixed Scrub present at Tom's Place within the normal migratory route would be considered a limiting resource for mule deer (in this case, the Round Valley Herd). Big Sagebrush Scrub, meanwhile, is an example of a community type that is not extensive within the study area but is common and widespread throughout Mono County and the intermountain Great Basin.

Bitterbrush prevalence extends widely into the understory shrub canopies of Jeffrey Pine Forest, Mountain Mahogany Scrub, and Pinyon-Juniper Woodland. Ecotones between bitterbrush-dominated Great Basin Mixed Scrub and these communities are often broad, appearing as a gradual increases in the abundance of singleleaf pinyon or pine trees. Forest and woodland communities are thus characterized

by sometimes dense cover (i.e, 40-50% total absolute cover) by mainly bitterbrush. Vegetation classified here as Jeffrey Pine Forest having this bitterbrush-dominated understory assemblage is recognized as Sensitive by CDFW (CDFG, 2010). Stands of Mountain Mahogany Scrub and Pinyon-Juniper Woodland generally appear to be very similar to sensitive Jeffrey Pine Forest and Great Basin Mixed Scrub, at least within the shrub stratum, so these communities also may be considered Sensitive in consideration of their regional rareness and potential direct and cumulative impacts to critical mule deer forage resources.

Water Birch Riparian Scrub associated with Rock Creek is considered Sensitive by CDFW. It is interrupted within the study area by existing development between Crowley Lake Drive and Owens Gorge Road. The single Great Basin Riparian Forest occurrence, which appears to be a relic fragment of a once larger stand, is also considered Sensitive by CDFW. Water Birch Riparian Scrub and Great Basin Riparian Forest include a sparse overcanopy of Jeffrey pine and lodgepole pine trees, which provide shade for the aquatic habitat while enhancing the vertical structure of these communities and increasing their provision of cover for wildlife. Mid-canopy sub-dominants with water birch include arroyo willow (*Salix lasiolepis*), shining willow (*S. lasiandra*), yellow willow (*S. lutea*), and narrowleaf willow (*S. exigua*). The sparse bands of Baltic rush (*Juncus balticus* ssp. *ater*) and creeping wildrye *Elymus triticoides* of less than 10 ft width that occur adjacent to the riparian zone may be included in the jurisdictional Waters extent, but meadow-like assemblages are otherwise absent from the study area. Evidences of alkaline character or saline soils were not observed in any of the occurring habitats, and species adapted to tolerate such habitats were not encountered. No springs occur within the study area.

A total of 15 sensitive plant species and one sensitive bryophyte have some likelihood to occur within the study area (Table 21). No potentially occurring species are federally listed or candidates for listing. Long Valley milkvetch and Mono milkvetch are state listed as Rare, and are considered Sensitive by regional BLM and USFS offices. Masonic rockcress does not appear in CNDDDB records, but is included due to a population reported at Mammoth-Yosemite airport (Paulus, 2010b). Regionally occurring sensitive species of alkaline and non-alkaline meadow or spring margin habitats would be very unlikely to occur within the Tom's Place study area, because these habitat types are not present. The ditch-like, perennially watered banks of Rock Creek may provide habitat that is suitable for Lemmon's milkvetch, as one nearby occurrence of this species is at an analogous setting along a maintained water-spreading channel (App. A6). The emergent species marsh arrow-grass may be adapted to relatively quiet waters where they are present at Rock Creek. Pumice soils of the internally drained basins between Bishop tuff outcrops at Tom's Place could provide habitat that is suitable for Mono milkvetch. This species could also colonize gravelly areas that are frequently disturbed such as roadsides.

Potentially occurring sensitive plant populations could either have some likelihood to occur in upland scrub, woodland or forest habitats (Table 20), or could have some likelihood to occur within the narrow Rock Creek riparian area, but generally not in both. The ecotonal margins between communities at Tom's Place are abrupt and visually distinct. Soils within upland habitats are sandy, being derived either from decomposed granite (southwest of U.S. Hwy 395) or from Bishop tuff and pumice parent material. Long Valley milkvetch, Masonic rockcress, pygmy pussypaws, Booth's evening primrose (both spp.), dwarf monolepis, foxtail thelypody, and golden violet are regionally regarded as typically occurring

in granite sands, a soil type that is found at every upland type to some degree. Mono milkvetch, Inyo hulsea, and Torrey’s blazing star are known to typically occur in soils derived from volcanic parent material, which also occur in each upland type to some degree.

Table 21. Potentially occurring sensitive plant species in the available plant communities at Tom’s Place. Flowering period is taken from CNPS (2014).

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Astragalus johannis-howellii</i> Long Valley milkvetch herbaceous perennial	1B.2	S2	June-August	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Astragalus lemmonii</i> Lemmon’s milkvetch herbaceous perennial	1B.2	S2	May-Sept	Willow Riparian Scrub Water Birch Riparian Scrub Great Basin Riparian Forest
<i>Astragalus monoensis</i> Mono milkvetch herbaceous perennial	1B.2	S2	June-August	Big Sagebrush Scrub Great Basin Mixed Scrub Jeffrey Pine Forest
<i>Boechea cobrensis</i> Masonic rockcress herbaceous perennial	2B.3	S3	June-July	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Boechea dispar</i> pinyon rockcress herbaceous perennial	2B.3	S3	March-June	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Calyptridium pygmaeum</i> pygmy pussypaws herbaceous annual	1B.2	S2	June-August	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland Jeffrey Pine Forest

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Eremothera boothii</i> ssp. <i>boothii</i> Booth's evening primrose herbaceous annual	2B.3	S2	April-Sept	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Eremothera boothii</i> ssp. <i>intermedia</i> Booth's hairy evening primrose herbaceous annual	2B.3	S2S3	May-June	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Helodium blandowii</i> Blandow's bog moss bryophyte	2B.3	S1	-	Willow Riparian Scrub Water Birch Riparian Scrub Great Basin Riparian Forest
<i>Hulsea vestita</i> ssp. <i>inyoensis</i> Inyo hulsea herbaceous perennial	2B.2	S1S2	April-June	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Mentzelia torreyi</i> Torrey's blazing star herbaceous perennial	2B.2	S2	June-August	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Micromonolepis pusilla</i> dwarf monolepis herbaceous annual	2B.3	S2	May-August	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Penstemon papillatus</i> Inyo beardtongue herbaceous perennial	4.3	S3	June-July	Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Thelypodium integrifolium</i> ssp. <i>complanatum</i> foxtail thelypodium herbaceous perennial	2B.2	S2	June-Oct	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland Jeffrey Pine Forest

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Triglochin palustris</i> marsh arrow-grass rhizomatous herb	2B.3	S3	July-August	Willow Riparian Scrub Water Birch Riparian Scrub Great Basin Riparian Forest
<i>Viola purpurea</i> ssp. <i>aurea</i> golden violet herbaceous perennial	2B.2	S2S3	April-June	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland Jeffrey Pine Forest

1. Rank or status, by agency:

CNPS = California Native Plant Society listings (CNPS, 2001, 2014)

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 occurrences threatened or no current threats known).

CNDDDB = California Natural Diversity Data Base rankings (CDFW, 2014b)

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

Projects that will disturb the soil or remove vegetation classified here as Big Sagebrush Scrub, Great Basin Mixed Scrub, Rubber Rabbitbrush Scrub, Mountain Mahogany Scrub, Pinyon-Juniper Woodland, or Jeffrey Pine Forest should include surveys for presence of Long Valley milkvetch, Masonic rockcress, pinyon rockcress, pygmy pussypaws, Booth's evening primrose (both ssp.), Inyo hulsea, Torrey blazing star, dwarf monolepis, foxtail thelypodium, and golden violet. Projects that will disturb the soil or remove vegetation from Big Sagebrush Scrub, Great Basin Mixed Scrub, or Jeffrey Pine Forest should include surveys for presence of Mono milkvetch, as these are the only upland community types that include basin habitats or relatively flat areas that are typical of this species. Projects that will disturb Pinyon-Juniper Woodland or Jeffrey Pine Forest should also include Inyo beardtongue when surveying for potentially occurring sensitive plants. Retention of all relatively pure bitterbrush stands in areas classified here as Great Basin Mixed Scrub would be desirable due to their designated Sensitive status (CDFG, 2010) and increasing rarity within the South Mono County area. Retention of any stands that have some component of bitterbrush would be preferable for maintaining range carrying capacity for the Round Valley migratory deer herd.

Projects that will disturb the soil or remove Water Birch Riparian Scrub or Great Basin Riparian Forest should include surveys for presence of Lemmon's milkvetch, marsh arrow-grass, and Blandow's bog moss. Rock Creek is tributary to the Owens River, which has been called a Water of the United

States by the U.S. Army Corps of Engineers. The perennial flow supports a CDFW-designated Sensitive Water Birch Riparian Scrub community within the study area. Therefore, any project that will disturb the soil within the banks of Rock Creek, or will disturb the vegetation there, or will impact the current flow regime that supports the riparian community, must include consultation with regulatory agencies pursuant to meeting permitting requirements. Delineation of Waters resources should recognize that historical disturbance has displaced native species but that predominantly native plant community structure and composition has recovered. There is some habitat function to maintain native diversity including (potentially) habitats for sensitive plant species, and there is some function to provide cover and a somewhat impeded movement corridor for wildlife that reside at or migrate within the local landscape.

Sensitive Wildlife

Based upon the available high desert scrub and riparian habitats identified within the Tom's Place study area, a total of 12 sensitive animal species were identified as having some potential to nest there or occur as residents in the available habitats (Table 22). Nesting bald eagle do not appear in CNDDDB records, and currently the nearest known active nest site is 26 miles northwest in the June Lake area. This species is nevertheless considered to have some likelihood to occur in the Tom's Place study area, as nearby Crowley Lake is a known foraging habitat (Christopher A. Joseph Associates, 2008) and marginal nesting habitat within 2 miles of the lake and the Owens River is available. As bald eagle range expands in California, it has been found that new nest sites are more commonly established in forested areas of human habitation and relatively greater disturbance than is characteristic of long-established nest sites, and that nest success in these situations was actually higher than at remote sites (Airola, 2007).

Willow flycatcher is state listed as Endangered (ssp. *extimus* and *traillii*) and federally listed as Endangered (ssp. *extimus*). Nesting willow flycatchers may choose the narrow, moderately disturbed water birch and willow-dominated riparian corridor of Upper Rock Creek, but their more typical nesting habitat of large willow scrublands with intervening relatively undisturbed meadow habitat is not present. Sierra Nevada red fox, which is state listed as Threatened, may move through or forage within any of the available habitats, but the level of human disturbance at least centrally among existing developments is not consistent with the general habitat requirements of this seldom seen animal. Den establishment in the study area would be expected only in the outlying, less fragmented upland scrub and forest areas.

Any project that would directly impact Jeffrey Pine Forest or Pinyon-Juniper Woodland should include an assessment of potential impacts upon nesting northern goshawk, bald eagle, spotted bat, western white-tailed jackrabbit, Sierra marten, and Sierra Nevada red fox. Northern goshawk pairs have established eyries within 1.0 mile of Tom's Place, in coniferous forest habitat on the upper fan of Upper Rock Creek. Northern goshawk or bald eagle could choose to nest in one of the (usually taller) Jeffrey pines in Jeffrey Pine Forest, or could choose one of the isolated Jeffrey or lodgepole pines that occur in areas mapped as Pinyon-Juniper Woodland. Sierra marten may den in larger downed boles of pines that are scattered throughout each of these tree-dominated communities. Sierra marten sometimes have

been known to occupy even somewhat disturbed or open forest stands, as long as sufficient woody debris and understory cover is present (Kucera, 1996). An occurrence of this species that was documented at Tom’s Place depicts an individual killed while crossing U.S. Hwy 395, in habitat that only distantly emulates the more highly closed-canopy pine forest of typical occurrences. The relatively dense canopy associated with the Rock Creek riparian corridor may serve as a pathway for dispersal of this and other mammals that are more normally found in locations isolated from human activity.

Table 22. Sensitive wildlife species that could potentially occur within the Tom’s Place study area. Key to status codes is given below, NL = not listed.

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
fish			
<i>Catostomus fumeiventris</i> Owens sucker	SSC	S3	Willow Riparian Scrub Water Birch Riparian Scrub Great Basin Riparian Forest
<i>Rhinichthys osculus</i> ssp. 2 Owens speckled dace	SSC	S1S2	Willow Riparian Scrub Water Birch Riparian Scrub Great Basin Riparian Forest
<i>Siphateles bicolor snyderi</i> Owens tui chub	Endangered	S1	Willow Riparian Scrub Water Birch Riparian Scrub Great Basin Riparian Forest
amphibians			
<i>Hydromantes platycephalus</i> Mount Lyell salamander	SSC	S3	Willow Riparian Scrub Water Birch Riparian Scrub Great Basin Riparian Forest
<i>Lithobates pipiens</i> northern leopard frog	SSC	S2	Willow Riparian Scrub Water Birch Riparian Scrub Great Basin Riparian Forest
birds			
<i>Accipiter gentilis</i> (nesting) northern goshawk	SSC	S3	Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Empidonax traillii</i> (nesting) willow flycatcher	Endangered	S1	Willow Riparian Scrub Water Birch Riparian Scrub

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
birds (cont.)			
<i>Haliaeetus leucocephalus</i> (nesting) bald eagle	Endangered FP	S2	Pinyon-Juniper Woodland Jeffrey Pine Forest
mammals			
<i>Euderma maculatum</i> spotted bat	SSC	S2S3	Mountain Mahogany Scrub Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Lepus townsendii townsendii</i> western white-tailed jackrabbit	SSC	S3?	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Martes americana sierrae</i> Sierra marten	NL	S3S4	Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Vulpes vulpes necator</i> Sierra Nevada red fox	Threatened	S1	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland Jeffrey Pine Forest

1. Rank or status, by agency:

CDFW = State of California under the California Endangered Species Act (CDFW, 2014c)

SSC = Species of Special Concern (CDFW, 2014d),

FP = Fully Protected (take cannot be authorized except for recovery-related activities, CDFW, 2014d).

State ranking = CNDDDB State Conservation Ranking as reported by CDFW (2014d)

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.

Any project that would directly impact Big Sagebrush Scrub, Great Basin Mixed Scrub, or Mountain Mahogany Scrub should include an assessment of potential impacts upon western white-tailed jackrabbit and Sierra Nevada red fox. While due to their high mobility neither species would be expected to be directly impacted by projects, surveys for large-diameter burrows would be required to demonstrate avoidance. Any project that would directly impact Mountain Mahogany Scrub should also include an assessment of potential impacts upon spotted bat. The habitats available at Tom's Place occupies a landscape position intermediate between the Owens River Gorge and the Rock Creek

perennial aquatic habitats, both of which would be considered suitable to meet foraging requirements for spotted bat.. Spotted bat may use crevices that are abundant in the exposed Bishop tuff volcanic flow. Bats were observed foraging in and near the habitats where outcrops are present, which includes Mountain Mahogany Scrub, Pinyon-Juniper Woodland, and Jeffrey Pine Forest. No caves or mines are present, but flow conduits for Rock Creek at U.S. Hwy 395 may be suitable as roosting habitat (the cave-like wildlife underpass is not suitable for bat roosting).

Aquatic habitats are perennially watered within the study area. The riparian corridor vegetation provides shading, bank stabilization, concealment cover for wildlife, and water purification for Rock Creek. The Rock Creek drainage is directly connected to the Lower Owens River at approximately 10 miles downstream, in an area where populations of Owens sucker, Owens speckled dace, Owens tui chub, and northern leopard frog are all known to occur. The stabilized (gated) flows below the LADWP diversion of Rock Creek at Tom's Place may be conducive to upstream dispersal of any of these species, although predatory non-native trout are present for the entire length. Relic populations of fish are also possible, as they are known to occur in the nearby Owens River Gorge at an identical elevation. This is considered less likely for Owens speckled dace due to the lack of isolated springs on site. Changes to the flow regime or projects that would remove riparian vegetation should be considered in light of their potential impacts to sensitive aquatic wildlife at Rock Creek. Removal of riparian cover may also impact the utility of the surface water for wildlife such as mule deer, as Rock Creek is a relatively isolated water source in the local landscape. During the xeric late summer and fall months, mule deer need to move to surface water as often as daily (usually nocturnally), so any change in habitat quality or accessibility at Rock Creek could reduce the overall carrying capacity of the surrounding habitats.

Little Round Valley

Plant Communities and Species

Little Round Valley is located at the southwestern edge of the Long Valley section of the Owens River drainage. The study area’s 6900 – 7800 ft elevation range is above the high desert landscapes of the Lower Owens River and entering into the montane landscapes of the Upper Owens River. Diverse, dry habitats vegetated with upland forest, scrub, and woodland and are intricately arrayed between corridors of spring-driven riparian scrub and wetland meadow (Figure 8). The varied environment thus supports a wide variety of plant species (App. B), and there is a potential for the occurring habitats to be suitable for a relatively long list of regionally occurring sensitive plant species.

Variability in slope steepness, soil depth and moisture regime, and soil type, adds to the long-term environmental range (i.e., number of habitats) that is available for plants at Little Round Valley. Soils of the study area are derived from granitic parent materials, which accumulated at the base of the Sierran escarpment as alluvial fans or groundcreep deposits. Upland habitats include alluvial fan soils and rocky outcrops with a high degree of exposure. Fan slopes are steep to the south of Crowley Lake Drive, but the terrain north of this road is relatively level., and soils are deeper. Deep alluvium nearer Crowley Lake Drive features several artesian springs and higher soil moisture availability in general. Soil moisture ranges from seasonally xeric to perennially wet or inundated by spring flows. North of Crowley Lake Drive, there is a further transition to volcanic deposits and soil development that is associated with a large Bishop tuff flow that makes up the southern rim of Long Valley. North of Crowley Lake Drive, soils have patchily developed clear indications of elevated salinity and alkaline character where spring flows disperse and percolate.

Table 23. Plant communities that were mapped within the 385 acre Little Round Valley study area in 2014. The study area also includes 7 acres mapped as converted to agriculture, and 42 acres converted to impervious surfaces (roads, houses, etc.). Community names (after Holland, 1986) are cross-referenced to the CDFG (2010) classification and 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		
Big Sagebrush Scrub 35.110.07	Big Sagebrush Shrubland <i>Artemisia tridentata-Purshia tridentata</i>	131
Big Sagebrush Scrub 35.110.01	Big Sagebrush Shrubland <i>Artemisia tridentata-Ericameria nauseosa</i>	5.4
Great Basin Mixed Scrub 35.200.02*	Bitterbrush Shrubland <i>Purshia tridentata-Artemisia tridentata</i>	33

Holland name and CDFW classification number	Alliance and primary association names	acreage in study area
upland communities (cont.)		
Mountain Mahogany Scrub 76.200.01	Curl-leaf Mountain Mahogany Scrub <i>Cercocarpus ledifolius-Artemisia tridentata</i>	15
Pinyon-Juniper Woodland 87.040.00	Singleleaf Pinyon Woodland <i>Pinus monophylla-Purshia tridentata</i>	17
Pinyon-Juniper Woodland 87.040.02	Singleleaf Pinyon Woodland <i>Pinus monophylla-Artemisia tridentata</i>	48
Jeffrey Pine Forest 87.020.26	Jeffrey Pine Forest <i>Pinus jeffreyi-Pinus monophylla</i>	6.0
wetland and potential wetland communities		
Aspen Forest 61.111.00*	Aspen Grove <i>Populus tremuloides-Salix lasiolepis</i>	1.9
Aspen Riparian Forest 61.111.10*	Aspen Grove <i>Populus tremuloides-Rosa woodsii</i>	17
Willow Riparian Scrub 61.201.00	Arroyo Willow Thicket <i>Salix lasiolepis-Salix lutea-Salix exigua/Rosa woodsii</i>	5.7
Willow Riparian Scrub 61.212.00*	Geyer Willow Thicket <i>Salix geyeriana-Salix lasiolepis</i>	0.8
Willow Riparian Scrub 61.209.00	Sandbar Willow Thicket <i>Salix exigua-Rosa woodsii</i>	5.7
Wild Rose Riparian Scrub 63.320.00*	Interior Rose Thicket <i>Rosa woodsii-Salix exigua-Poa pratensis</i>	2.4
Silver Sagebrush Scrub 35.150.05*	Silver Sagebrush Shrubland <i>Artemisia cana-Iris missouriensis</i>	3.8
Wet Montane Meadow 45.130.00	Nebraska Sedge Marsh <i>Carex nebrascensis-Carex praegracilis</i>	1.4
Wet Montane Meadow 42.060.00	Baltic Rush Marsh <i>Juncus Balticus-Carex praegracilis</i>	3.2
Creeping Wildrye Meadow 41.080.00*	Creeping Rye Grass Turf <i>Elymus triticoides-Poa pratensis</i>	9.3
Dry Montane Meadow 42.060.00	Kentucky Bluegrass Turf <i>Poa pratensis-Juncus balticus</i>	28
Dry Montane Meadow 45.169.00*	Douglas Sedge Meadow <i>Carex douglasii-Artemisia tridentata</i>	0.6

Mountain Mahogany Scrub and sparse Jeffrey Pine Forest occur only on the steepest portions of fan habitat and on granitic outcrops at the extreme southeastern corner of the study area. Tall scrub dominated by sometimes impassably dense patches of mountain mahogany (*Cercocarpus ledifolius* var. *intermontanus*) and scattered forest stands of Jeffrey pine (*Pinus jeffreyi*) always include a shrub stratum between the trees that is dominated by big sagebrush (*Artemisia tridentata*). The understory of Pinyon-Juniper Woodland is dominated by either big sagebrush or by bitterbrush (*Purshia tridentata*). Big sagebrush Scrub dominated by big sagebrush is much more extensive than is Great Basin Mixed Scrub dominated by bitterbrush within the study area. Neither typically has more than about 1% absolute cover by native grasses such as western ricegrass (*Stipa hymenoides*). Cheatgrass (*Bromus tectorum*) invasiveness into native upland scrub is largely absent, with the exception of stands bordering Crowley Lake Drive. This non-native annual is much more widespread or is considered naturalized throughout upland scrub types in nearly every other Mono County town area inventoried in 2013-14.

Wetland and potential wetland community types are diverse and relatively extensive within the study area (Table 23). The many springs and spring-driven flows that cross Little Round Valley in a south-to-north direction support relatively dense growths that were classified as Aspen Forest, Aspen Riparian Forest, Willow Riparian Scrub, Wild Rose Riparian Scrub, Silver Sagebrush Scrub, Wet Montane Meadow, Creeping Wildrye Meadow, or Dry Montane Meadow. At least seasonal inundation within the rooting zone would be expected within the extents of the dominant plants, as these community types consist mainly of species with recognized adaptation to the hydrology and the reduced soil profiles that are characteristically found in wetlands (App. B). These flows are tributary to the Crowley reservoir (the Owens River). Areas mapped as wetland and potentially wetland community types (Table 23) are likely to qualify for state or federal jurisdiction under Clean Water Act law. As such, permits would be required for projects that propose to disturb the vegetation, alter the bed or banks, or change the flow timing or magnitude. Because of their typically broad ecotones with the adjacent upland communities, the limits of regulatory jurisdiction may be difficult to establish definitively. The scale of mapping that is presented here would not be sufficient for delineations pursuant to project permitting.

Perennially moist to seasonally inundated soils are vegetated by Wet Montane Meadow and Dry Montane Meadow stands of introduced Kentucky bluegrass (*Poa pratensis*), with Baltic rush (*Juncus balticus* ssp. *ater*) and several other sedge, rush, and mostly native perennial grass co-dominants. The wettest zones are dominated by Nebraska sedge (*Carex nebrascensis*). The outermost zones of Dry Montane Meadow sometimes include a silver sagebrush (*Artemisia cana* ssp. *bolanderi*) shrub canopy, which was mapped separately as Silver Sagebrush Scrub. Silver sagebrush occupies the broad transition from wetland-like Dry Montane Meadow or Creeping Wildrye Meadow to Big Sagebrush Scrub, usually with clearly co-dominant western blue flag (*Iris missouriensis*), but several other species may assume co-dominance within this zone. Where Douglas sedge (*Carex douglasii*) patchily assumes dominance (to occasionally form almost pure stands), the community is assignable to the state Sensitive Douglas Sedge (Provisional) Alliance. Community-sized assemblages featuring species of saline or alkaline habitats were not found, however, long-term evaporate deposition appears to have created small, weakly saline soil habitat patches at outer meadow margins.

Wetland and potential wetland meadow alliances north of Crowley Lake Drive are substantially impacted by current grazing practices, regardless of ownership. Dominance by the non-native pasture grass Kentucky bluegrass is evidence of a long history of grazing influences. The non-native perennials quack grass (*Elymus repens*) and common timothy (*Phleum pratense*) were also historically introduced. Wet Montane Meadow (less than 5 acres total in the study area) is the least extensive of the spring-related vegetation alliances present, yet appears to be more intensively used for grazing by sheep. Creeping Wildrye Meadow and other drying habitats appeared to be substantially less devegetated and trampled when annual grazing had ended in late 2013. The practice of grazing is potentially altering the species assemblage in the wettest zones of meadows north of Crowley Lake Drive. While emergent Wet Montane Meadow vegetation at perennial springs and wettest outflow channels is now monotonous stands of Nebraska sedge (*Carex nebrascensis*) and clustered field sedge (*C. praegracilis*), marginal areas (at the Wet Meadow – Dry Meadow interface) indicate a potentially much higher diversity is possible. For example, very small areas could be classified during detailed study as the Sensitive alliance Sierra Rush (*Juncus nevadensis*) Marsh (CNDDDB No. 45.567.00*).

Sensitive Plant Communities and Species

Big Sagebrush Scrub, Mountain Mahogany Scrub, and Jeffrey Pine Forest are examples of community types that are extensive locally and are also common and widespread throughout Mono County and the Great Basin. Great Basin Mixed Scrub, which is composed of mainly bitterbrush within the Little Round Valley study area, is considered Sensitive by CDFW (CDFG, 2010). Sensitivity of this community, especially in southern Mono County, has been exacerbated by a series of destructive fires that have substantially reduced its regional presence (Sawyer, *et al.*, 2009). In 2013–2014, cheatgrass was observed to be present at Crowley Lake Drive and within adjacent Big Sagebrush Scrub. It has not yet spread into Great Basin Mixed Scrub. Although relatively limited within the Little Round Valley study area, Great Basin Mixed Scrub would be considered important as forage resources for Round Valley Herd mule deer because the study area intersects their normal twice yearly deer migration route.

Silver Sagebrush Scrub occurs at the often broad margin between wetland (usually Dry Montane Meadow) and upland (usually Big Sagebrush Scrub) community types. This community and the adjacent areas of Wet Montane Meadow and Dry Montane Meadow are regularly grazed by herded sheep. Silver sagebrush Scrub, which is classified as Sensitive by the State of California (CDFG, 2010), may also fit state and federal criteria that define “adjacent wetland”. As in Wet and Dry Montane Meadow, there is a predominance of FAC and FACW vegetation present (App. B). Relatively pure Dry Montane Meadow stands of Douglas sedge (*Carex douglasii*) were separated out as a second Sensitive community type in this setting, Douglas Sedge Meadow, and smaller patch-sized stands may be more widespread in areas mapped as Dry Montane Meadow.

Springfed areas of tree grove and riparian forest that consist of nearly 100% quaking aspen (*Populus tremuloides*) at Little Round Valley are state Sensitive (CDFG, 2010). Aspen-dominated stands occur either as an isolated seep zone Aspen Forest, or as Aspen Riparian Forest adjacent to steeply falling outflows from one of the perennial springs. It is tenable that the historical extents of the treed communities were likely greater, as developed housing is situated within or adjacent to all the relatively

low-lying outflow areas south of Crowley Lake Drive. Some spring flows there have been redirected to roadsides ditches. Interior wild rose (*Rosa woodsii*) is the most common co-dominant in stream reaches that are less domesticated, and where the understory has not been cleared quaking aspen and interior wild rose form intact, brief riparian corridor segments between the houses. Aspen Riparian Foirest at higher elevations of the study area generally transitions downslope to Willow Riparian Scrub or small occurrences of Wild Rose Riparian Scrub (Figure 8). Wild Rose Riparian Scrub is considered to a Sensitive alliance (CDFG, 2010). Willow Riparian Scrub would also be considered state Sensitive where Geyer’s willow (*Salix geyeriana*) is dominant in the riparian canopy. Flows from all of these occurrences are under normal circumstances tributary to Owens River, a municipal water source and important fishery which has been called a Waters of the United States where it enters Owens Lake.

A total of 29 sensitive plant species and one sensitive bryophyte species have some likelihood to occur within the Little Round Valley study area (Table 24). No sensitive species have previously been documented at the study area in CNDDDB records or in available grey literature. Masonic rockcress does not appear in CNDDDB records, but is included due to a population documented recently (Paulus, 2010) in Great Basin Mixed Scrub at Mammoth-Yosemite airport, 8 miles west at 7020 ft (2140 m) elevation. None of the potentially occurring sensitive plant species are federally listed or candidates for listing. Long Valley milkvetch and Mono milkvetch are state listed as Rare, and are considered Sensitive by regional BLM and USFS offices. Many of the other species may be adapted to springs, seeps, and wetland habitats at Little Round Valley’s prominent meadows and riparian corridors. Perennial and seasonal spring flows, which maintain suitable conditions at freshwater wetland habitats, have some potential to also support Lemmon’s milkvetch, upswept moonwort, scalloped moonwort, subalpine fireweed, Blandow’s bog moss, small-flowered grass of Parnassus, scalloped-leaved lousewort, slender-leaved pondweed, and marsh arrow-grass. Regionally occurring sensitive species of alkaline and saline meadow or springs – smooth saltbush, Inyo County star tulip, Hall’s meadow hawksbeard, Inyo phacelia, and alkali tansy-sage – also have some likelihood to occur where the drying margins of these freshwater features have (weakly) concentrated evaporite salts.

Table 24. Potentially occurring sensitive plant species in the available plant communities at Little Round Valley. Flowering period is taken from CNPS (2014).

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Astragalus johannis-howellii</i> Long Valley milkvetch herbaceous perennial	1B.2	S2	June-August	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland Jeffrey Pine Forest

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Astragalus lemmonii</i> Lemmon's milkvetch herbaceous perennial	1B.2	S2	May-Sept	Aspen Riparian Forest Willow Riparian Scrub Wet Montane Meadow
<i>Astragalus monoensis</i> Mono milkvetch herbaceous perennial	1B.2	S2	June-August	Big Sagebrush Scrub
<i>Atriplex pusilla</i> smooth saltbush herbaceous annual	2B.1	S1	June-Sept	Wild Rose Riparian Scrub Silver Sagebrush Scrub Creeping Wildrye Meadow Dry Montane Meadow
<i>Boechea cobrensis</i> Masonic rockcress herbaceous perennial	2B.3	S3	June-July	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Boechea dispar</i> pinyon rockcress herbaceous perennial	2B.3	S3	March-June	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Botrychium ascendens</i> upswept moonwort rhizomatous herb	2B.3	S2	sporangia July-August	Aspen Forest Aspen Riparian Forest Willow Riparian Scrub Wild Rose Riparian Scrub Wet Montane Meadow
<i>Botrychium crenulatum</i> scalloped moonwort rhizomatous herb	2B.2	S2	sporangia June-Sept	Aspen Forest Aspen Riparian Forest Willow Riparian Scrub Wild Rose Riparian Scrub Wet Montane Meadow
<i>Calochortus excavatus</i> Inyo County star-tulip bulbiferous herb	1B.1	S2	April-July	Wild Rose Riparian Scrub Silver Sagebrush Scrub Creeping Wildrye Meadow Dry Montane Meadow

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Calyptridium pygmaeum</i> pygmy pussypaws herbaceous annual	1B.2	S2	June-August	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Carex scirpoidea</i> ssp. <i>pseudoscirpoidea</i> western single-spiked sedge rhizomatous herb	2B.2	S2	July-Sept	Aspen Forest Aspen Riparian Forest Willow Riparian Scrub Wet Montane Meadow
<i>Crepis runcinata</i> ssp. <i>hallii</i> Hall's meadow hawksbeard herbaceous perennial	2B.1	S1S2	May-July	Wild Rose Riparian Scrub Silver Sagebrush Scrub Creeping Wildrye Meadow Dry Montane Meadow
<i>Epilobium howellii</i> subalpine fireweed stoloniferous herb	4.3	S4	July-August	Aspen Forest Aspen Riparian Forest Willow Riparian Scrub Wet Montane Meadow
<i>Eremothera boothii</i> ssp. <i>boothii</i> Booth's evening primrose herbaceous annual	2B.3	S2	April-Sept	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland Jeffrey Pine Forest Silver Sagebrush Scrub
<i>Eremothera boothii</i> ssp. <i>intermedia</i> Booth's hairy evening primrose herbaceous annual	2B.3	S2S3	May-June	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland Jeffrey Pine Forest Silver Sagebrush Scrub
<i>Helodium blandowii</i> Blandow's bog moss bryophyte	2B.3	S1	-	Aspen Forest Aspen Riparian Forest Willow Riparian Scrub Wet Montane Meadow

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Hulsea vestita</i> ssp. <i>inyoensis</i> Inyo hulsea herbaceous perennial	2B.2	S1S2	April-June	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Ivesia kingii</i> var. <i>kingii</i> alkali ivesia herbaceous perennial	2B.2	S2	May-August	Wild Rose Riparian Scrub Silver Sagebrush Scrub Creeping Wildrye Meadow Dry Montane Meadow
<i>Mentzelia torreyi</i> Torrey's blazing star herbaceous perennial	2B.2	S2	June-August	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Micromonolepis pusilla</i> dwarf monolepis herbaceous annual	2B.3	S2	May-August	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Parnassia parviflora</i> small-flowered grass of Parnassus herbaceous perennial	2B.2	S2	Aug-Sept	Aspen Forest Aspen Riparian Forest Willow Riparian Scrub Wet Montane Meadow
<i>Pedicularis crenulata</i> scalloped-leaved lousewort herbaceous perennial	2B.2	S1	June-July	Willow Riparian Scrub Wet Montane Meadow
<i>Penstemon papillatus</i> Inyo beardtongue herbaceous perennial	4.3	S3	June-July	Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Phacelia gymnoclada</i> naked-stem phacelia herbaceous annual	2B.3	S2	April-August	Big Sagebrush Scrub Silver Sagebrush Scrub

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Phacelia inyoensis</i> Inyo phacelia herbaceous annual	1B.2	S2	Apr-August	Wild Rose Riparian Scrub Silver Sagebrush Scrub Creeping Wildrye Meadow Dry Montane Meadow
<i>Sphaeromeria potentilloides</i> var. <i>nitrophila</i> alkali tansy sage herbaceous perennial	2B.2	S2	June-July	Wild Rose Riparian Scrub Silver Sagebrush Scrub Creeping Wildrye Meadow Dry Montane Meadow
<i>Stuckenia filiformis</i> ssp. <i>alpina</i> slender-leaved pondweed rhizomatous herb	2B.2	S3	May-July	Aspen Riparian Forest Willow Riparian Scrub Wet Montane Meadow
<i>Thelypodium integrifolium</i> ssp. <i>complanatum</i> foxtail thelypodium herbaceous perennial	2B.2	S2	June-Oct	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Triglochin palustris</i> marsh arrow-grass rhizomatous herb	2B.3	S3	July-August	Aspen Riparian Forest Willow Riparian Scrub Wet Montane Meadow
<i>Viola purpurea</i> ssp. <i>aurea</i> golden violet herbaceous perennial	2B.2	S2S3	April-June	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland Jeffrey Pine Forest

1. Rank or status, by agency:

CNPS = California Native Plant Society listings (CNPS, 2001, 2014)

1B = rare and endangered in California and elsewhere

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

4 = plants of limited distribution in California – watchlist species

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 occurrences threatened or no current threats known).

CNDDDB = California Natural Diversity Data Base rankings (CDFW, 2014b)

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 = Apparently Secure: uncommon but not rare in California

Projects that will disturb the soil or remove vegetation classified here as Big Sagebrush Scrub, Great Basin Mixed Scrub, Mountain Mahogany Scrub, Pinyon-Juniper Woodland, or Jeffrey Pine Forest should include surveys for presence of Long Valley milkvetch, Masonic rockcress, pinyon rockcress, pygmy pussypaws, Booth's evening primrose (both ssp.), Inyo hulsea, Torrey blazing star, dwarf monolepis, Inyo beardtongue, foxtail thelypodium, and golden violet. Projects that will disturb the soil or remove vegetation from Big Sagebrush Scrub should also include surveys for presence of Mono milkvetch and naked-stem phacelia. Big Sagebrush Scrub is the only occurring upland community that was observed to have areas of basin habitats or other relatively flat areas in the portion of the study area that exhibit pumice-dominated soils, and surveys there should include searches for Mono milkvetch. Projects that will disturb Pinyon-Juniper Woodland or Jeffrey Pine Forest should also include surveys for Inyo beardtongue. Masonic rockcress was not included in regional CNDDDB records, but is included due to a population reported at Mammoth-Yosemite Airport (Paulus, 2010). Retention of Great Basin Mixed Scrub would be desirable due to the community's designated Sensitive status (CDFG, 2010) and increasing rarity within the South Mono County area. Retention of any stands that have some component of bitterbrush would be preferable also for maintaining migratory range carrying capacity for the Round Valley deer herd.

Projects that will disturb the soil or remove Aspen Riparian Forest, Willow Riparian Scrub, or Wet Montane Meadow will unavoidably affect the channel banks and water quality of the flows to which this vegetation narrowly adheres. Environmental analysis should include direct and indirect impacts to Lemmon's milkvetch, upswept moonwort, scalloped moonwort, western single-spiked sedge, subalpine fireweed, small-flowered grass of Parnassas, slender-leaved pondweed, marsh arrow-grass, and Blandow's bog moss. The diminutive ferns upswept moonwort and scalloped moonwort have some potential to occur in Wet Meadow habitat, but only in the limited conditions of the community being shaded by willows. Both moonworts, western single-spiked sedge, subalpine fireweed, small-flowered grass of Parnassas, and Blandow's bog moss also have some potential to occur in the Aspen Forest community. Upswept moonwort, scalloped moonwort, and Blandow's bog moss have some potential to occur in Wild Rose Riparian Scrub. Despite the "domesticated" character of most of the Aspen Forest occurrences (due to fire clearing, landscaping), there remains some functions of this Sensitive community to maintain native diversity and the mapped occurrences may provide habitat for sensitive plant species. All of the occurring riparian communities provide surface water, cover, and a movement corridor for wildlife that reside or migrate within the local landscape. There exists some likelihood that moist, relatively undisturbed near-stream meadows and openings in Willow Riparian Scrub could support an unknown population of scalloped-leaved lousewort, a species known only from its single Long Valley population located seven miles to the north (App. A).

Projects that will disturb Dry Montane Meadow, Creeping Wildrye Meadow, or adjacent Silver Sagebrush Scrub or Wild Rose Riparian Scrub, should include surveys for the presence of smooth saltbush, Inyo County star-tulip, Hall's meadow hawksbeard, alkali ivesia, Inyo phacelia, and alkali tansy

sage. The sensitive annual naked-stem phacelia has some potential to occur within the broad transition where Silver Sagebrush Scrub grades into Big Sagebrush Scrub. Generally, these communities and areas of Wet Montane Meadow lying north of Crowley Lake Drive are the only communities in the study area (aside from areas mapped as Agriculture Disturbed) that are regularly grazed, in this case most evidently by herded sheep.

Sensitive Wildlife

Based upon the available high desert scrub and riparian habitats identified within the Little Round Valley study area, a total of 12 sensitive animal species were identified as having some potential to nest there or occur as residents in the available habitats (Table 25). Willow flycatcher is state listed as Endangered (ssp. *extimus* and *traillii*) and federally listed as Endangered (ssp. *extimus*). Nesting willow flycatchers may choose the narrow, moderately disturbed willow-dominated riparian corridors of Little Round Valley's spring outflow channels, but their more typical nesting habitat of large willow scrublands with intervening relatively undisturbed meadow habitat are not present. They may also use the limited areas of Aspen Riparian Forest (less than 2 acres) where there is a relatively intact willow-dominated subcanopy. Communities that feature willows (Table 23), and willow or wild rose patches adjacent to Wet Montane Meadow, should first be surveyed for the presence of willow flycatcher territories, if any disturbance is planned for the nesting season. Sierra Nevada red fox, which is state listed as Threatened, may move through or forage within any of the available habitats, but the level of human disturbance at least centrally among existing developments is not consistent with the general habitat requirements of this seldom seen animal. Den establishment in the study area would be likely only in the outlying, less fragmented upland scrub and wetland fringe areas.

Any project that would directly impact Pinyon-Juniper Woodland or Jeffrey Pine Forest should include assessment of possible impacts upon northern goshawk, prairie falcon, spotted bat, and Sierra marten. These two community types are the only habitats that include large pines that may be chosen for nesting by northern goshawk, and the only containing large boles of downed pines that in relatively undisturbed habitat locations may be suitable for dens of Sierra Marten. Large outcrops and areas of vertical, exposed granite that could be occupied by crevice-roosting spotted bats or cliff-nesting prairie falcons were found only in these two community types and in small areas of Mountain Mahogany Scrub. The study area aquatic habitats and meadows would provide suitable foraging habitat for spotted bats and other more common bat species.

Big Sagebrush Scrub in Little Round Valley is patchily disturbed, adjacent to existing housing and other town infrastructure, and has become fragmented by fences, roads, and overhead power lines, yet this community can bear some resemblance to sagebrush scrub habitats of the Long Valley area that are currently occupied by greater sage grouse. Little Round Valley sagebrush scrub has no direct connection to lek and summer range areas of the local population (South Mono Population Management Unit), but the sagebrush-meadow array north of Crowley Lake Drive conceivably may be reached by overwintering or brood-raising individuals. No historical records of use of the available meadow areas for lekking or wintering were uncovered in the literature review. Projects that contemplate impacts to Big Sagebrush

Scrub should also include surveys for large diameter burrows that may be occupied by western white-tailed jackrabbit or Sierra Nevada red fox.

Table 25. Sensitive wildlife species that could potentially occur within the Little Round Valley study area. Key to status codes is given below, NL = not listed.

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
mollusks			
<i>Pyrgulopsis wongi</i> Wong's springsnail	NL	S1S2	Aspen Forest Aspen Riparian Forest Willow Riparian Scrub Wet Montane Meadow
fish			
<i>Rhinichthys osculus</i> ssp. 2 Owens speckled dace	SSC	S1S2	Aspen Forest Aspen Riparian Forest Willow Riparian Scrub Wet Montane Meadow
<i>Rhinichthys osculus</i> ssp. 5 Long Valley speckled dace	NL	S1	Aspen Forest Aspen Riparian Forest Willow Riparian Scrub Wet Montane Meadow
amphibians			
<i>Hydromantes platycephalus</i> Mount Lyell salamander	SSC	S3	Aspen Forest Aspen Riparian Forest Willow Riparian Scrub Wet Montane Meadow
birds			
<i>Accipiter gentilis</i> (nesting) northern goshawk	SSC	S3	Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Centrocercus urophasianus</i> Bi-State DPS (nesting, leks) greater sage grouse	SSC	S3	Big Sagebrush Scrub Silver Sagebrush Scrub Creeping Wildrye Meadow Dry Montane Meadow
<i>Empidonax traillii</i> (nesting) willow flycatcher	Endangered	S1	Aspen Riparian Forest Willow Riparian Scrub Wild Rose Riparian Scrub

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
<i>Falco mexicanus</i> (nesting) prairie falcon	W	S3	Mountain Mahogany Scrub Pinyon-Juniper Woodland Jeffrey Pine Forest
mammals <i>Euderma maculatum</i> spotted bat	SSC	S2S3	Mountain Mahogany Scrub Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Lepus townsendii townsendii</i> western white-tailed jackrabbit	SSC	S3?	Mountain Mahogany Scrub Pinyon-Juniper Woodland Jeffrey Pine Forest Big Sagebrush Scrub Wild Rose Riparian Scrub Silver Sagebrush Scrub Creeping Wildrye Meadow Montane Meadow
<i>Martes americana sierrae</i> Sierra marten	NL	S3S4	Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Vulpes vulpes necator</i> Sierra Nevada red fox	Threatened	S1	Big Sagebrush Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland Jeffrey Pine Forest

1. Rank or status, by agency:

CDFW = State of California under the California Endangered Species Act (CDFW, 2014c)

SSC = Species of Special Concern (CDFW, 2014d),

W = Watchlist species of limited distribution or recent decline (CDFW, 2014d).

State ranking = CNDDDB State Conservation Ranking as reported by CDFW (2014d)

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.

Perennial springs and outflow streams arising in the southern portion of the study area have been widely altered or have been redirected to culverts and ditches near existing infrastructure. Springfed areas north of Crowley Lake Drive are periodically impacted by intensive livestock grazing and trampling. Any further manipulations or proposed projects that will impact vegetation that provides shaded habitat, bank stabilization, flow attenuation, water purification, and seasonal storage in areas classified as Aspen Forest, Aspen Riparian Forest, Willow Riparian Scrub, or Wet Meadow should include

assessments of the potential impacts to wetland function and to Wong's springsnail, Long Valley speckled dace, Owens speckled dace, and Mount Lyell salamander. Larger outflows from study area springs eventually merge off-site and flows then seasonally reach Crowley Lake. However, no perennially watered, larger pools or quiet flows such as could be occupied by Owens sucker (*Catostomus fumeiventris*) or Owens tui chub (*Siphateles bicolor snyderi*) were found within the study area.

Crowley Lake

Plant Communities and Species

Crowley Lake is situated at a large natural springs complex near the southern edge of Long Valley. Flows from these springs gather into the perennially watered channels of Whiskey Creek (a.k.a. Whiskey Creek) and Hilton Creek, or are widely spread to create pastures, eventually becoming tributary to the adjacent Crowley Lake reservoir. The relatively lush vegetation within the Crowley Lake study area has been historically expanded by water spreading across alluvial fan and glacial till surfaces near those streams. Some of these long-term irrigated meadows are still routinely grazed, but housing density is becoming higher in springfed, riparian, and irrigated habitats except those mapped at the outer study area fringes.

The native habitats that remain within the study area include diverse upland scrub, woodland, and forest community types (Table 26) intricately arranged between corridors of riverine and spring-driven riparian forest, riparian scrub, and wetland meadow (Figure 9). The Crowley Lake spring complex is centrally located along a linear array of coldwater springs that stretches between Swall Meadows (see above) and Long Valley (see below). Collectively, the Crowley Lake springs are the most extensive and most productive complex in the set. Artesian flows are driven by mountain block recharge, and so have some seasonal pattern of higher springtime and early summer flow, but are also likely under some control of tectonic forces or fault control. Prior to the creation of Crowley Lake and canalization of the Upper Owens River, these wetland and spring habitats would have been important, dependable refugia for rare plant and animal species (especially aquatic and wetland species) that became ecologically isolated within the overall xeric landscape of the Long Valley Caldera. It remains possible that isolated populations of species now regarded as sensitive remain within the fragmented habitats that are available to varying degrees within the Crowley Lake town area.

It is not surprising that the complex Crowley Lake environment supports a large diversity of plant species (App. A). Upland habitats include alluvial fan soils, steep slopes, and rocky outcrops. The ecotones between the Big Sagebrush Scrub, Mountain Mahogany Scrub, and Pinyon-Juniper Woodland communities there are often broad. In contrast, transitions farther downslope between upland types and the wetland communities Aspen Riparian Forest, Willow Riparian Scrub, and Dry Montane Meadow are typically abrupt and visually obvious. This characteristic would tend to facilitate planning for avoidance of sensitive riparian and wetland resources. Within upland community types, change in soil parent material is also associated with shifts in species composition. While fans lying south of Crowley Lake Drive and west of South Landing Road are derived from alluvial granitic-derived deposits, soils of Whiskey Creek and adjacent uplands north of Crowley Lake Drive are derived from Bishop tuff volcanic flow material and are often pumice-dominated. Scrub and woodland vegetation in the tuff soils area is noticeably different in shrub canopy composition, and achieves a total cover that is consistently lower. Tuff soil habitat are some of the driest in the study area, but diversity per unit area there can be nearly as high as that found in wetland habitats.

The riverine and spring-driven flows that cross the study area support relatively dense, corridor-like growths that are classifiable as Aspen Forest, Aspen Riparian Forest, Great Basin Riparian Forest, Willow Riparian Scrub, Montane Freshwater Marsh, Wet Montane Meadow, or Dry Montane Meadow. These corridors are relatively intact, even though they pass narrowly among the houses. Within the extents of these plant communities, occurring plant species would be expected to have adaptation to at least seasonal inundation within their rooting zones. Collectively, these communities encompass almost 120 acres of the 440 acres of undeveloped land in the Crowley Lake study area, and support a high diversity of species do not generally occur in the available upland habitats. Permits normally required under Clean Water Act law would likely be required for projects that propose to disturb the vegetation, alter the bed or banks, or change the flow timing or magnitude within any areas classified as supporting a wetland or potential wetland community (Table 26).

Upland community types include Big Sagebrush Scrub, Great Basin Mixed Scrub, Rubber Rabbitbrush Scrub, Mountain Mahogany Scrub, and Pinyon-Juniper Woodland. Mountain Mahogany Scrub and Pinyon-Juniper Woodland occur on the steepest portions of fan habitat and on granitic outcrops at higher elevations along the southern edge of the study area. The shrub stratum between trees in these communities is dominated by big sagebrush (*Artemisia tridentata*) or bitterbrush (*Purshia tridentata*). Mountain Mahogany Scrub and Pinyon-Juniper Woodland include scattered Jeffrey pine (*Pinus jeffreyi*) and Sierra juniper (*Juniperus grandis*). Singleleaf pinyon (*Pinus monophylla*) is clearly the most abundant upland tree. Big sagebrush Scrub and Great Basin Mixed Scrub occur on the lower fans, on relatively xeric slopes, between riparian corridors, and adjacent to irrigated and naturally occurring meadow areas. Bitterbrush dominance in the local landscape is extensive (Table 26). Within the study area, both Big Sagebrush Scrub and Great Basin Mixed Scrub are becoming moderately fragmented by development, and the assemblages are becoming weedy at the urban interface. Cheatgrass (*Bromus tectorum*), which is present at roadsides throughout the study area, has also invaded every dry meadow community occurrence and was often found at roadside scrub communities in 2013-14.

Table 26. Plant communities that were mapped within the 620 acre Crowley Lake study area in 2014. The study area includes 182 acres where vegetation has been converted to houses, roads and other impervious surfaces. Community names (after Holland, 1986) are cross-referenced to the CDFG (2010) classification and 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		
Big Sagebrush Scrub 35.110.07	Big Sagebrush Shrubland <i>Artemisia tridentata</i> - <i>Purshia tridentata</i>	81
Big Sagebrush Scrub 35.110.01	Big Sagebrush Shrubland <i>Artemisia tridentata</i> - <i>Ericameria nauseosa</i>	5.8
Great Basin Mixed Scrub 35.200.00*	Bitterbrush Shrubland <i>Purshia tridentata</i> - <i>Artemisia tridentata</i>	111

Holland name and CDFW classification number	Alliance and primary association names	acreage in study area
upland communities (cont.)		
Rubber Rabbitbrush Scrub 35.310.00	Rubber Rabbitbrush Shrubland <i>Ericameria nauseosa-Purshia tridentata</i>	4.5
Rubber Rabbitbrush Scrub 35.310.00	Rubber Rabbitbrush Shrubland <i>Ericameria nauseosa-Artemisia tridentata</i>	2.0
Mountain Mahogany Scrub 76.200.01	Curl-leaf Mountain Mahogany Scrub <i>Cercocarpus ledifolius-Artemisia tridentata</i>	44
Pinyon-Juniper Woodland 87.040.12	Pinus monophylla Woodland <i>Pinus monophylla-Cercocarpus ledifolius/Purshia tridentata/Artemisia tridentata</i>	57
wetland and potential wetland communities		
Great Basin Riparian Forest 61.120.10*	Black Cottonwood Forest <i>Populus trichocarpa-Salix lasiolepis</i>	0.4
Aspen Forest 61.111.06*	Aspen Grove <i>Populus tremuloides-Artemisia tridentata</i>	3.1
Aspen Riparian Forest 61.111.10*	Aspen Grove <i>Populus tremuloides-Rosa woodsii</i>	71
Willow Riparian Scrub 61.201.00	Arroyo Willow Thicket <i>Salix lasiolepis-Salix lasiandra Salix lutea/Salix geyeriana</i>	4.2
Willow Riparian Scrub 61.212.00*	Geyer Willow Thicket <i>Salix geyeriana- Salix lasiolepis/Salix lutea</i>	2.3
Willow Riparian Scrub 61.209.00	Sandbar Willow Thicket <i>Salix exigua-Salix lasiolepis</i>	9.8
Willow Riparian Scrub 61.209.00	Sandbar Willow Thicket <i>Salix exigua-Rosa woodsii</i>	0.7
Water Birch Riparian Scrub 63.610.00*	Water Birch Thicket <i>Betula occidentalis-Populus tremuloides</i>	4.9
Water Birch Riparian Scrub 63.610.01*	Water Birch Thicket <i>Betula occidentalis-Salix lasiolepis/ Salix lutea/Salix geyeriana</i>	5.5
Montane Freshwater Marsh 52.050.00	Cattail Marsh <i>Typha latifolia-Carex nebrascensis</i>	0.2
Wet Montane Meadow 42.060.00	Kentucky Bluegrass Turf <i>Poa pratensis-Carex spp.</i>	9.6
Dry Montane Meadow 41.277.00	Mat Muhly Meadow <i>Muhlenbergia richardsonis-Juncus balticus</i>	7.3
Dry Montane Meadow 42.060.00	Kentucky Bluegrass Turf <i>Poa pratensis-Juncus balticus</i>	13

Riparian Scrub and Forest communities nearest to perennial springs sometimes transition to Water Birch Riparian Scrub (Figure 9). Small embedded marsh and aquatic impoundments were found at several springs, and additional examples are likely in areas of Water Birch Riparian Scrub and Aspen Riparian Forest that were not completely accessible for this inventory. Downstream, treeless areas of seasonally drying or perennially moist soils are densely covered by Dry Montane Meadow stands of introduced Kentucky bluegrass (*Poa pratensis*), or native mat muhly (*Muhlenbergia richardsonis*) with Baltic rush (*Juncus balticus* ssp. *ater*) and several other sedge, rush, and (mostly native) perennial grass co-dominants. The main meadow species were noted to have established zonal distributions, reflecting a dependable pattern of hydrologic input in meadows associated with Hilton Creek and Whisky Creek. Some irrigated meadows are now used for livestock grazing. Native Dry Montane Meadows and Wet Montane Meadows exhibit abrupt edges with other community types. Analogous pasture habitats associated with many decades of water spreading are also sharply bounded at flowing ditches. Native and converted/irrigated meadow habitats at the northern edge of the study area were once contiguous with the extensive lakeshore meadows at Crowley Reservoir, but power transmission corridors and the 4-lane U.S. Highway 395 now present a significant barrier to wildlife use and population dispersal from the reservoir area and the larger portion of Long Valley.

Sensitive Plant Communities and Species

Upland scrub within the Crowley Lake study area is generally dominated or co-dominated by bitterbrush shrubs. Great Basin Mixed Scrub that is composed of mainly bitterbrush is considered Sensitive by CDFW (CDFG, 2010). Sensitivity of this community, especially in southern Mono County, is highlighted by recent reduction in its regional presence due to a series of destructive fires. Great Basin Mixed Scrub at Crowley Lake is considered important as forage resources for Round Valley Herd mule deer because it occurs within the herd's normal twice yearly migration route. Big Sagebrush Scrub, Rubber Rabbitbrush Scrub, and Mountain Mahogany Scrub are examples of community types that are also extensive locally but – unlike Great Basin Mixed Scrub – are not regarded as uncommon or critical to mule deer range carrying capacity.

Quaking aspen (*Populus tremuloides*) dominance with up to 80% canopy closure occurs in habitats that are either 1) isolated seep zones with little or no surface flow (mapped in Crowley Lake as Aspen Forest), and 2) spring or riverine stands with a defined corridor that is aligned with seasonal or perennial surface flow (Aspen Riparian Forest). The most common subcanopy co-dominants in cases where the understory has not been cleared are interior wild rose (*Rosa woodsii*) and arroyo willow (*Salix lasiolepis*). Great Basin Riparian Forest in one very limited, highly disturbed area is dominated by black cottonwood (*Populus trichocarpa*) trees, some of which are large and old. All of these Riparian Forest communities would be considered Sensitive (CDFG, 2010). In the riparian setting, Aspen Riparian Forest corridors always transition to Willow Riparian Scrub as they pass through town. Willow Riparian Scrub assemblages in Crowley Lake become Sensitive wherever stand dominance of greater than 50% is held either by Geyer willow (*S. geyeriana*) or by water birch (*Betula occidentalis*). Geyer willow dominance is more common along perennially watered stream channels, while water birch is more common at and immediately below the larger springs. Flows from all of these occurrences are tributary to the Crowley Reservoir, which is a municipal water source, important fishery, and part of the Owens River watershed.

A total of 25 sensitive plant species and one sensitive bryophyte species have some likelihood to occur within the Crowley Lake study area (Table 27). Lemmon’s milkvetch, Inyo County star tulip, small-flowered grass of Parnassas, and Inyo beardtongue are all documented as occurring within or very near to the area that was inventoried in 2013-14. All of these records (dated 1933 to 1958) depict historical collections from manipulated meadow environments maintained by irrigation. Populations may still be extant there, or at an analogous naturally occurring wetland. Inyo beardtongue is actually more likely to be found in relatively undisturbed and dry forested habitats. Long Valley milkvetch and Mono milkvetch are state listed as Rare, and are considered Sensitive by regional BLM and USFS offices. No potentially occurring species are federally listed or candidates for listing. Masonic rockcress is included due to a population reported by Paulus (2010) in Great Basin Mixed Scrub at Mammoth-Yosemite airport, 5 miles northwest at 7020 ft (2140 m) elevation. Pine fritillary is also not included in regional CNDDDB records, but is known to occur in moist aspen forest at Convict Creek (Orr and Howald, 2000).

Table 27. Potentially occurring sensitive plant species in the available plant communities at the town of Crowley Lake. Flowering period is taken from CNPS (2014).

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Astragalus johannis-howellii</i> Long Valley milkvetch herbaceous perennial	1B.2	S2	June-August	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland
<i>Astragalus lemmonii</i> Lemmon’s milkvetch herbaceous perennial	1B.2	S2	May-Sept	Aspen Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow irrigated meadows
<i>Astragalus monoensis</i> Mono milkvetch herbaceous perennial	1B.2	S2	June-August	Big Sagebrush Scrub Great Basin Mixed Scrub Rubber Rabbitbrush Scrub
<i>Boechera cobrensis</i> Masonic rockcress herbaceous perennial	2B.3	S3	June-July	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland
<i>Boechera dispar</i> pinyon rockcress herbaceous perennial	2B.3	S3	March-June	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Botrychium ascendens</i> upswept moonwort rhizomatous herb	2B.3	S2	sporangia July-August	Aspen Forest Aspen Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Wet Montane Meadow
<i>Botrychium crenulatum</i> scalloped moonwort rhizomatous herb	2B.2	S2	sporangia June-Sept	Aspen Forest Aspen Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Wet Montane Meadow
<i>Calochortus excavatus</i> Inyo County star-tulip bulbiferous herb	1B.1	S2	April-July	Dry Montane Meadow irrigated meadows
<i>Calyptridium pygmaeum</i> pygmy pussypaws herbaceous annual	1B.2	S2	June-August	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland
<i>Carex scirpoidea</i> ssp. <i>pseudoscirpoidea</i> western single-spiked sedge rhizomatous herb	2B.2	S2	July-Sept	Aspen Forest Aspen Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
<i>Epilobium howellii</i> subalpine fireweed stoloniferous herb	4.3	S4	July-August	Aspen Forest Aspen Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Wet Montane Meadow
<i>Eremothera boothii</i> ssp. <i>boothii</i> Booth's evening primrose herbaceous annual	2B.3	S2	April-Sept	Big Sagebrush Scrub Great Basin Mixed Scrub Rubber Rabbitbrush Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland
<i>Eremothera boothii</i> ssp. <i>intermedia</i> Booth's hairy evening primrose herbaceous annual	2B.3	S2S3	May-June	Big Sagebrush Scrub Great Basin Mixed Scrub Rubber Rabbitbrush Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Fritillaria pinetorum</i> pine fritillary bulbiferous herb	4.3	S3	May-Sept	Aspen Forest Aspen Riparian Forest
<i>Helodium blandowii</i> Blandow's bog moss bryophyte	2B.3	S1	-	Aspen Forest Aspen Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
<i>Hulsea vestita</i> <i>ssp. inyoensis</i> Inyo hulsea herbaceous perennial	2B.2	S1S2	April-June	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland
<i>Mentzelia torreyi</i> Torrey's blazing star herbaceous perennial	2B.2	S2	June-August	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland
<i>Micromonolepis pusilla</i> dwarf monolepis herbaceous annual	2B.3	S2	May-August	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland
<i>Parnassia parviflora</i> small-flowered grass of Parnassus herbaceous perennial	2B.2	S2	Aug-Sept	Aspen Forest Aspen Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow irrigated meadows
<i>Pedicularis crenulata</i> scalloped-leaved lousewort herbaceous perennial	2B.2	S1	June-July	Willow Riparian Scrub Wet Montane Meadow irrigated meadows
<i>Penstemon papillatus</i> Inyo beardtongue herbaceous perennial	4.3	S3	June-July	Pinyon-Juniper Woodland

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Phacelia gymnoclada</i> naked-stem phacelia herbaceous annual	2B.3	S2	April-August	Big Sagebrush Scrub Great Basin Mixed Scrub Rubber Rabbitbrush Scrub
<i>Stuckenia filiformis</i> <i>ssp. alpina</i> slender-leaved pondweed rhizomatous herb	2B.2	S3	May-July	Aspen Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
<i>Thelypodium integrifolium</i> <i>ssp. complanatum</i> foxtail thelypodium herbaceous perennial	2B.2	S2	June-Oct	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland
<i>Triglochin palustris</i> marsh arrow-grass rhizomatous herb	2B.3	S3	July-August	Aspen Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow irrigated meadows
<i>Viola purpurea ssp. aurea</i> golden violet herbaceous perennial	2B.2	S2S3	April-June	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Pinyon-Juniper Woodland

1. Rank or status, by agency:

CNPS = California Native Plant Society listings (CNPS, 2001, 2014)

1B = rare and endangered in California and elsewhere,

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

4 = plants of limited distribution in California – watchlist species.

Treat 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 occurrences threatened or no current threats known).

CNDDDB = California Natural Diversity Data Base rankings (CDFW, 2014b)

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 = Apparently Secure: uncommon but not rare in California.

Great Basin Riparian Forest, Aspen Forest, Aspen Riparian Forest, and Willow Riparian Scrub, including the occurring Sensitive community types, maintain native diversity including (potentially) habitats for sensitive plant species. They shade aquatic habitats, and provide cover and a movement corridor for wildlife that reside or migrate within the local landscape. Many of the potentially occurring sensitive plant species are adapted to wetland habitats such as springs, seeps, meadows, and riparian corridors. Sensitive species known to regionally occur at freshwater wetland habitats (Lemmon's milkvetch, upswept moonwort, scalloped moonwort, western single-spiked sedge, subalpine fireweed, Blandow's bog moss, small-flowered grass of Parnassus, scalloped-leaved lousewort, slender-leaved pondweed, and marsh arrow-grass) may occur where suitable conditions are provided by one of the many seasonal and perennial springflows in areas mapped as Aspen Forest, Aspen Riparian Forest, Willow Riparian Scrub, Water Birch Riparian Scrub, Montane Freshwater Marsh, and Wet Montane Meadow. Projects that will disturb the soil or remove vegetation classified here as one of these community types should include analysis of potential impacts to all these species. Projects that will disturb Aspen Forest or Aspen Riparian Forest could also include surveying for pine fritillary. Vegetation responses to form Willow Riparian Scrub and Wet Montane Meadow communities where long-standing, perennial water spreading (irrigation) has been practiced have some likelihood to include populations of the perennial species Lemmon's milkvetch, Inyo County star tulip, small-flowered grass of Parnassus, scalloped-leaved lousewort, and marsh arrow-grass.

Regionally occurring sensitive species of alkaline and saline meadow or springs, such as smooth saltbush (*Atriplex pusilla*), Inyo County star tulip (*Calochortus excavaeus*), Hall's meadow hawksbeard (*Crepis runcinata* ssp. *hallii*), Inyo phacelia (*Phacelia inyoensis*), and alkali tansy sage (*Sphaeromeria potentilloides* var. *nitrophila*), would appear to have very little or no likelihood to occur within the Crowley Lake study area due to lack of alkaline or saline soil habitats, however, one occurrence of Inyo County star tulip was documented in 1958 at an atypically freshened and (presumably) reliably irrigated Dry Montane Meadow habitat near the western edge of the study area.

Projects that will disturb the soil or remove vegetation that has been classified here as Big Sagebrush Scrub, Great Basin Mixed Scrub, Mountain Mahogany Scrub, or Pinyon-Juniper Woodland should include surveys to determine the presence/absence of Long Valley milkvetch, Masonic rockcress, pinyon rockcress, pygmy pussypaws, Booth's evening primrose (both ssp.), Inyo hulsea, Torrey blazing star, dwarf monolepis, foxtail thelypodium, and golden violet. Projects that will disturb Pinyon-Juniper Woodland should also include surveys for Inyo beardtongue. Projects that will disturb Big Sagebrush Scrub, Great Basin Mixed Scrub, or Rubber Rabbitbrush Scrub should also include surveys for Mono milkvetch and naked-stem phacelia, especially at basin habitats or flats east of South Landing Road that exhibit pumice-dominated soils. Retention of all relatively pure bitterbrush stands in areas classified here as Great Basin Mixed Scrub would be desirable due to their designated Sensitive status (CDFG, 2010), their increasing rarity within the South Mono County area, and their role in maintaining range carrying capacity for the Round Valley migratory deer herd.

Sensitive Wildlife

Based upon the available upland, wetland, and potential wetland habitats identified within the Crowley Lake study area (Table 26), a total of 15 sensitive animal species were identified as having some potential to nest there or occur as residents in the available habitats (Table 28). Willow flycatcher is state listed as Endangered (ssp. *extimus* and *trillii*) and federally listed as Endangered (ssp. *extimus*). Nesting willow flycatchers may choose the narrow to moderately extensive, but generally ecologically isolated and disturbed Willow Riparian Scrub corridors associated with Crowley Lake’s artesian flows. They may also use the limited areas of Water Birch Riparian Scrub where there is a relatively intact willow-dominated subcanopy. Nesting bald eagle do not appear in CNDDDB records, and currently the nearest active nest site is nearly 20 miles northwest in the June Lake area. This species is considered to have some likelihood to nest in the Crowley Lake study area, as the Crowley Reservoir is a known foraging habitat (Christopher A. Joseph Associates, 2008). Sierra Nevada red fox, which is state listed as Threatened, may move through or forage within any of the available habitats, but the level of human disturbance at least centrally among existing developments is not consistent with the general habitat requirements of this reclusive animal. Den establishment in the study area would be likely only in the outlying, less fragmented upland scrub and wetland fringe areas. Avoidance of direct impacts to this species and to western white-tailed jackrabbits could be assured in any community type by performing surveys to clear the site of large occupied burrows or rabbit “forms” immediately prior to the start of project construction.

Table 28. Sensitive wildlife species that could potentially occur within the Crowley Lake study area. Key to status codes is given below, NL = not listed.

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
mollusks			
<i>Pyrgulopsis wongi</i> Wong’s springsnail	NL	S1S2	Aspen Forest Aspen Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
fish			
<i>Catostomus fumeiventris</i> Owens sucker	SSC	S3	Aspen Riparian Forest Great Basin Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow ditches in irrigated meadow

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
fish (cont.)			
<i>Rhinichthys osculus</i> ssp. 2 Owens speckled dace	SSC	S1S2	Aspen Riparian Forest Great Basin Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow ditches in irrigated meadow
<i>Rhinichthys osculus</i> ssp. 5 Long Valley speckled dace	NL	S1	Aspen Riparian Forest Great Basin Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow ditches in irrigated meadow
<i>Siphateles bicolor snyderi</i> Owens tui chub	Endangered	S1	Aspen Riparian Forest Great Basin Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow ditches in irrigated meadow
amphibians			
<i>Hydromantes platycephalus</i> Mount Lyell salamander	SSC	S3	Aspen Riparian Forest Great Basin Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
birds			
<i>Accipiter gentilis</i> (nesting) northern goshawk	SSC	S3	Pinyon-Juniper Woodland Jeffrey Pine Forest
<i>Centrocercus urophasianus</i> Bi-State DPS (nesting, leks) greater sage grouse	SSC	S3	Big Sagebrush Scrub Dry Montane Meadow
<i>Empidonax traillii</i> (nesting) willow flycatcher	Endangered	S1	Aspen Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
birds (cont.)			
<i>Falco mexicanus</i> (nesting) prairie falcon	W	S3	Mountain Mahogany Scrub Pinyon-Juniper Woodland
<i>Haliaeetus leucocephalus</i> (nesting) bald eagle	Endangered FP	S2	Pinyon-Juniper Woodland
mammals			
<i>Euderma maculatum</i> spotted bat	SSC	S2S3	Mountain Mahogany Scrub Pinyon-Juniper Woodland
<i>Lepus townsendii townsendii</i> western white-tailed jackrabbit	SSC	S3?	Mountain Mahogany Scrub Pinyon-Juniper Woodland Big Sagebrush Scrub Rubber Rabbitbrush Scrub Dry Montane Meadow
<i>Martes americana sierrae</i> Sierra marten	NL	S3S4	Pinyon-Juniper Woodland
<i>Vulpes vulpes necator</i> Sierra Nevada red fox	Threatened	S1	Mountain Mahogany Scrub Pinyon-Juniper Woodland Big Sagebrush Scrub Rubber Rabbitbrush Scrub Dry Montane Meadow

1. Rank or status, by agency:

CDFW = State of California under the California Endangered Species Act (CDFW, 2014c)

SSC = Species of Special Concern (CDFW, 2014d),

W = Watchlist species of limited distribution or recent decline (CDFW, 2014d),

FP = Fully Protected (take cannot be authorized except for recovery-related activities, CDFW, 2014d).

State ranking = CNDDDB State Conservation Ranking as reported by CDFW (2014d)

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.

Any project that directly impacts Pinyon-Juniper Woodland should include an assessment of possible impacts upon northern goshawk, prairie falcon, spotted bat, and Sierra marten. This type presents the only habitat that includes large pines that may be chosen for nesting by northern goshawk and bald eagle, and the only containing large boles of downed pines that in relatively undisturbed

habitat locations may be suitable for dens of Sierra Marten. Large outcrops and areas of vertical, exposed granite that could be occupied by crevice-roosting spotted bats or cliff-nesting prairie falcons were found only in Pinyon-Juniper Woodland and in small areas of Mountain Mahogany Scrub. The study area's aquatic habitats and meadows would provide suitable foraging habitat for spotted bats and other more common bat species that are roosting within the study area or in the extensive undisturbed habitats of nearby public lands.

Great Basin Mixed Scrub and Big Sagebrush Scrub in the southwestern portion of Long Valley, including the Crowley Lake study area, are to some degree ecologically isolated from the larger habitat block of the central and northern Long Valley, due to the barriers presented by U.S. Hwy 395 and its parallel overhead power transmission corridors. Yet Big Sagebrush Scrub habitats at the Crowley Lake town fringes are known to be currently used by the Long Valley population of greater sage grouse, which is a federal Proposed Threatened species. Great Basin Mixed Scrub (and also Big Sagebrush Scrub) at Crowley Lake provides critical forage that sustains the locally congregated pathways for the semi-annual migration of mule deer. Within Crowley Lake, existing housing, fences, and other town and highway infrastructure-related linear barriers to wildlife movement have incrementally converted or fragmented Great Basin Mixed Scrub and Big Sagebrush Scrub. Further development will continue to constrict the narrow wildlife movement corridor between U.S. Hwy 395 and the eastern Sierra Nevada scarp. Future projects that contemplate additional restrictions to the extent of Great Basin Mixed Scrub and Big Sagebrush Scrub will potentially impact population size or even viability of greater sage grouse and the Round Valley deer herd.

While some perennial springs and outflow streambeds in the study area have been widely altered or redirected to culverts and ditches, many appear to remain within naturally formed bed and banks and harbor only native vegetation. Perennially watered, larger pools or reaches of quiet flows could possibly be occupied by Owens sucker (*Catostomus fumeiventris*) or Owens tui chub (*Siphateles bicolor snyderi*). The available aquatic habitat may be a refugium for genetically pure Owens tui chub that once were present in the Crowley Lake reservoir. Springs and outflow channel habitats, even where disturbed, also have some likelihood to maintain populations of sensitive dace that are known to populate other springs in the Long Valley basin. This likelihood extends to long-standing, perennially watered ditches used for water spreading, as these conveyances are ultimately connected to Hilton Creek, and Crowley Reservoir. Wong's springsnail has some potential to occur in any stand of Aspen Forest that features an embedded perennial spring, even if the surface water extent is isolated from the Hilton or Whisky Creek tributary flows. Any further manipulations or proposed projects that will impact riparian vegetation that provides shaded habitat, bank stabilization, flow attenuation, water purification, and seasonal storage in areas classified as Aspen Forest, Aspen Riparian Forest, Great Basin Riparian Forest, Willow Riparian Scrub, Water Birch Riparian Scrub, Montane Freshwater Marsh, or Wet Montane Meadow should include an assessments of potential impacts to Wong's springsnail, Long Valley speckled dace, Owens speckled dace, Owens tui chub, and Owens sucker.

Aquatic habitats exhibiting rocky, moist edges could potentially harbor Mount Lyell salamander, a species whose known distribution is widely scattered in the eastern Sierra Nevada. Aquatic and near-aquatic habitats at Crowley Lake, however, are very unlikely to support extant Yosemite toad (*Anaxyrus*

canorus) or Sierra Nevada yellow-legged frog (*Rana sierrae*) populations. Yosemite toads require relatively undisturbed meadows with seasonal pools for egg-laying and metamorphosis to adult stage, which do not occur within the study area. The occurring meadows are created by water spreading, and so do not feature a seasonally elevated water table that would remain watered long enough to allow metamorphosis. Flows and ponding that do occur there are too ephemeral, and the habitat is intensely grazed by livestock. The nearest extant population of Sierra Nevada yellow-legged frog is in the Rock Creek watershed, which is hydrologically and (for frogs) ecologically distant, with no available dispersal route to the Hilton Creek watershed. The Hilton Creek watershed is currently without any extant populations, and there is considered to be “no possibility” for population restoration due to non-native predatory fish and disease (CDFW, 2013).

McGee Creek and Long Valley

Plant Communities and Species

The unincorporated communities of McGee Creek and Long Valley were analyzed as one study area due to their proximity to each other and similarity of landscape position. Each is adjacent to the U.S. Highway 395 corridor, a north-south trending four-lane roadway that partially isolates the areas of existing and potential development from the larger eastward expanse of the Owens River drainage and the Long Valley Basin. The town of McGee Creek is associated with the perennial stream McGee Creek where it exits canyon terrain of the Sierra Nevada high country and enters the Long Valley Basin. After passing through town, McGee Creek flows to the Crowley Lake reservoir, less than one mile to the northeast. The Long Valley study area is associated with two naturally occurring perennial springs at the edge of the Long Valley Basin, northwest of the mouth of McGee Creek Canyon. The outflows from those springs, as at McGee Creek, traverse both town and highway as they flow to Crowley Lake. The town habitats thus surround substantial reaches of dependably mesic corridors within the larger Long Valley area. Most of each half of the study area is vegetated dry, upland vegetation (Figure 10). The more limited, relatively lush wetland and potential wetland plant community types of McGee Creek and Long Valley (Table 29) are tightly adherent to flowing springs and seep zones, to narrowly incised conductor channels for perennial and seasonal surface flows, and to narrow strips of land between the delta-like array of channels that has been historically created for water spreading.

Native vegetation covers deep, granitic alluvium that has been deposited as a result of erosive riverine and glacial shaping forces. Volcanic forces were once certainly important in shaping the landscape at all towns of the Long Valley caldera, but basaltic and pumice-based soils and outcrops are not evident anywhere in this study area. The spring complex at the town of Long Valley is located at the northern end of a linear array of coldwater springs that stretches southward (see Swall Meadows, above). The artesian flows at Long Valley are driven by mountain block recharge, but are also likely under some control of tectonic forces or fault activity. The riverine flows at McGee Creek would also be patterned by seasonal recharge from the steeply rising Sierra Nevada to the west, but aquatic habitats there would experience a more dramatic annual variability of surface flows, including spring flooding flows, and drying of channel edges and secondary channel streambeds during the typically long summer drought.

Within the study area, fragments of upland scrub classified as Big Sagebrush Scrub or Great Basin Mixed Scrub are arranged between and around the corridors of riverine and spring-driven Great Basin Riparian Forest, and riparian scrub and meadow assemblages (Table 29). Upland forest vegetation does not occur within the study area. The outermost northern edge is abruptly demarcated by U.S. Hwy 395, but an expansive landscape dominated by relatively xeric sagebrush and bitterbrush scrub extends outward from the western, southern, and eastern edges of each town. Aquatic habitats within the study area maintain some degree of connectivity to the Owens River hydrologic basin through large culverts that pass under Hwy 395, and through downslope diversion canals and water spreading ditches, some of which are eventually tributary to Crowley Lake. Therefore, the study area's habitats are all connected to the major habitat types of the Long Valley area, but within a context of apparent partial isolation that is

enforced by Hwy 395 and the adjacent overhead power lines, fencing, and firebreak maintenance associated with the highway corridor.

Riverine and spring-driven flows that gather and cross the study area in a south-to-northward direction support relatively dense growths that are classifiable as Aspen Forest, Aspen Riparian Forest, Great Basin Riparian Forest, Willow Riparian Scrub, Water Birch Riparian Scrub, Montane Freshwater Marsh, Wet Montane Meadow, or Dry Montane Meadow. A prevalence of plants occurring within the extents of each of these plant communities are regarded as having adaptation to at least some period of rooting zone inundation during the normal growing season (ACOE, 2012). These communities account for more than half of the prominent species encountered in the McGee Creek and Long Valley study area (FAC, FACW, or OBL species in App. B), and may provide refugia for populations of species that have become locally sensitive due to loss of their required native aquatic or near-aquatic habitats. Permits normally required under Clean Water Act law (and the associated formal delineation of the extent of jurisdictional wetland and tributary resources) would likely be required for projects that propose to disturb the vegetation, alter the bed or banks, or change the flow timing or magnitude within any areas classified as supporting a wetland or potential wetland community (Table 29).

Table 29. Plant communities that were mapped within the 181 acre McGee Creek and Long Valley study area in 2014. The study area includes 45 acres that have been converted to houses, roads, and other impervious surfaces. Community names (after Holland, 1986) are cross-referenced to the CDFG (2010) classification and 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		
Big Sagebrush Scrub 35.110.07	Big Sagebrush Shrubland <i>Artemisia tridentata</i> - <i>Purshia tridentata</i>	47
Big Sagebrush Scrub 35.110.01	Big Sagebrush Shrubland <i>Artemisia tridentata</i> - <i>Ericameria nauseosa</i>	1.1
Great Basin Mixed Scrub 35.200.02*	Bitterbrush Shrubland <i>Purshia tridentata</i> - <i>Artemisia tridentata</i>	62
wetland and potential wetland communities		
Great Basin Riparian Forest 61.120.10*	Black Cottonwood Forest <i>Populus trichocarpa</i> - <i>Salix lasiolepis</i>	5.2
Great Basin Riparian Forest 61.120.00*	Black Cottonwood Forest <i>Populus trichocarpa</i> - <i>Betula occidentalis</i>	3.1
Aspen Forest 61.111.06*	Aspen Grove <i>Populus tremuloides</i> - <i>Artemisia tridentata</i>	0.2
Aspen Riparian Forest 61.111.10*	Aspen Grove <i>Populus tremuloides</i> - <i>Rosa woodsii</i>	0.4

Holland name and CDFW classification number	Alliance and primary association names	acreage in study area
wetland and potential wetland communities (cont.)		
Willow Riparian Scrub 61.201.00	Arroyo Willow Thicket <i>Salix lasiolepis-Salix exigua</i>	1.4
Willow Riparian Scrub 61.209.00	Sandbar Willow Thicket <i>Salix exigua-Rosa woodsii</i>	1.7
Water Birch Riparian Scrub 63.610.00*	Water Birch Thicket <i>Betula occidentalis-Populus tremuloides</i>	2.5
Water Birch Riparian Scrub 63.610.01*	Water Birch Thicket <i>Betula occidentalis-Salix lasiolepis/Salix lutea</i>	3.3
Montane Freshwater Marsh 45.168.01*	Water Sedge Marsh <i>Carex aquatilis</i>	1.3
Montane Freshwater Marsh 52.120.01	Beaked Sedge Marsh <i>Carex utriculata-Senecio hydrophilus</i>	0.7
Wet Montane Meadow 45.562.00	Baltic Rush Marsh <i>Juncus balticus-Carex nebrascensis</i>	0.5
Dry Montane Meadow 42.060.00	Kentucky Bluegrass Turf <i>Poa pratensis-Rosa woodsii</i>	0.3
Dry Montane Meadow 42.060.00	Kentucky Bluegrass Turf <i>Poa pratensis-Juncus balticus</i>	4.9

Upland community types include Great Basin Mixed Scrub and Big Sagebrush Scrub. The shrub stratum in these treeless communities is dominated by bitterbrush (*Purshia tridentata*) or less often by big sagebrush (*Artemisia tridentata*). Great Basin Mixed Scrub and Big sagebrush Scrub stands have been historically disturbed in patches, and those nearest the riparian vegetation interfaces are now becoming fragmented or isolated by housing development. Historical disturbance, vectors associated with the U.S. Hwy 395 corridor, and widespread firebreak creation in this area likely explain why upland scrub assemblages within the study area appear comparatively weedier than is typical of similar scrub elsewhere in Long Valley. Cheatgrass (*Bromus tectorum*) is present throughout the study area, even where the shrub canopy appears to be otherwise relatively undisturbed, and has invaded into every dry meadow habitat. Annual tumble mustard (*Sisymbrium altissimum*), Russian thistle (*Salsola tragus*), and tansy mustard (*Descurainia sophia*) are also present in otherwise native upland settings, and have begun to spread from devegetated habitats into relatively undisturbed upland scrub.

Marsh, wet meadow, and dry meadow community types are associated with the relatively less manipulated portions of outflows from the two largest springs at Long Valley. The wettest areas nearest the springs at Long Valley have retained much of their native character and a relatively high diversity of plant species, despite partial diversion for the town's domestic water supply. Marshes (2 acres total) include small, ponded basins and slow-flowing channels that are up to 100% covered by beaked sedge

(*Carex utriculata*), Nebraska sedge (*C. nebrascensis*), and Baltic rush (*Juncus balticus*). At McGee Creek, the only aquatic habitat that has developed a marsh-like community type is a domesticated stream channel where McGee Creek surface flows have been diverted and impounded to create resort fishing ponds. Less frequently cleared shorelines of the fishing ponds are currently dominated by emergent, nearly pure stands of water sedge (*C. aquatilis*). Seasonally drying soils fringing the aquatic features are vegetated by isolated Dry Montane Meadow stands of primarily introduced Kentucky bluegrass (*Poa pratensis*). Dry Montane Meadow and Wet Montane Meadow occurrences are invariably edged with planted trees and otherwise disturbed vegetation. Their small size, juxtaposition adjacent to or within town developments, and location west of power lines and Hwy 395 now present significant barriers for wildlife use and for population dispersal to or from the extensive Crowley Lake shoreline wetlands and long-standing irrigated meadows that are located to the north of the highway corridor.

Sensitive Plant Communities and Species

The shrub canopies of all Great Basin Mixed Scrub mapped within the McGee Creek and Long Valley study area (including thinned firebreaks) are composed of mainly bitterbrush. All study area Great Basin Mixed Scrub is thus considered Sensitive by CDFW (CDFG, 2010). Openings in the shrub canopy or internally drained basins featuring pumice ash or gravel soils, as would be expected at the Sensitive community Mono Pumice Flats, were not found. Sensitivity of this community locally is based in part upon its critical role in sustaining the migratory Round Valley Deer Herd. Overall availability of browse provided by this community has decreased in Mono County during recent decades (Sawyer, *et al.*, 2009), mainly due to wildfire. Both towns lie along the known spring and fall migration route for mule deer. As the community is made more susceptible to wildfire by the presence of cheatgrass (Cal-IPC, 2014), activities such as firebreak creation or other projects that will devegetate upland scrub even temporarily should include post-construction practices designed to minimize the prominence of this species. Permanent loss of acreage supporting a high relative frequency of bitterbrush should be avoided where possible. Impacts to Big Sagebrush Scrub, which is normally considered common and widespread throughout Mono County and the Great Basin, should in this case be considered in light of the subdominant frequencies of bitterbrush throughout all occurrences within the study area.

Aspen Riparian Forest, Great Basin Riparian Forest, and Water Birch Riparian Scrub are considered Sensitive by CDFW (CDFG, 2010). One additional tree-dominated community, a quaking aspen – big sagebrush alliance associated with a non-riparian, seasonal seep zone, and classified here as Aspen Forest, is also considered Sensitive by CDFW. With up to 80% canopy closure, these communities provide concealment cover for wildlife movements along the riparian corridor, provide shading for the aquatic habitat and microhabitat requirements for potentially occurring sensitive plant species, provide outflow channel bank stabilization, and vertical structure in a generally treeless local landscape. Some of the black cottonwood (*P. trichocarpa*) trees are large and old. Introduced poplars are prominent near houses at Long Valley. Willows (*Salix* spp.), interior wild rose (*Rosa woodsii*) and water birch are the most abundant members of the subcanopy. Willow-dominated communities in the study area are not considered sensitive, but relatively undisturbed stands outside of the developed zone and nearest the Long Valley springs may be extensive enough to be chosen by nesting willow flycatcher (*Empidonax*

traillii) and other sensitive animal species (see below). More generally, the regional rarity of riparian habitats and willow-dominated community types should be considered if any removal within the study area is contemplated.

The monospecific, presumably disturbed, and currently interrupted stands of water sedge within McGee Creek diversion ponds would likely be considered Sensitive (CDFG, 2010). Other marshy stands that were classified as Montane Freshwater Marsh or Wet Montane Meadow have much greater diversity and provide up to 100% total cover by wetland species, but the species assemblages are not themselves state Sensitive. Montane Freshwater Marsh within the study area retains some function to provide forage and refuge habitat for aquatic wildlife, and to improve water quality. McGee Creek is a tributary to the Owens River, which is a domestic water supply. Because the areas are wetlands, any project that would seek to add fill material or otherwise alter the habitat should include consultation with concerned state and federal Clean Water Act regulating agencies.

A total of 21 sensitive plant species and one sensitive bryophyte species have some likelihood to occur within the McGee Creek and Long Valley study area (Table 30). No known populations of any of these species within the study area were uncovered in the literature search. Long Valley milkvetch and Mono milkvetch are state listed as Rare, and are considered Sensitive by regional BLM and USFS offices. No potentially occurring species are federally listed or candidates for listing. CNDDDB records (dated 1933 to 1958) for Lemmon's milkvetch, Inyo County star tulip, and small-flowered grass of Parnassas document occurrences within similar habitat near Hilton Creek. Located less than two miles east of the study area, Hilton Creek is the nearest riparian corridor habitat. While not included in CNDDDB records, Masonic rockcress is known to occur in Great Basin Mixed Scrub at Mammoth-Yosemite airport, 1.6 miles northwest at 7020 ft (2140 m) elevation (Paulus, 2010). Pine fritillary was added as potentially occurring due to recently documented populations at relatively moist forested areas at SNARL (Orr and Howald, 2000), 2-3 miles north at 7100 ft (2160 m), and Casa Diablo (Paulus, 2002), 7 miles northwest at 7400 ft (2260 m) elevation.

Projects that will disturb the soil or remove vegetation that has been classified here as Great Basin Mixed Scrub or Big Sagebrush Scrub should include surveys to determine the presence/absence of the potentially occurring plant species Long Valley milkvetch, Mono milkvetch, Masonic rockcress, pinyon rockcress, Booth's evening primrose (both ssp.), Inyo hulsea, dwarf monolepis, naked-stem phacelia, and foxtail thelypodium. Mono milkvetch is also known to occur in gravelly roadside habitats. The annual species Booth's evening primrose, dwarf monolepis, and naked-stem phacelia, have some likelihood to occur as well in relatively open areas of sagebrush scrub, including the extensive firebreaks that interrupt the native scrub, and other historically and recently disturbed habitats. These annuals may be present in the seedbank only during years of below normal winter and spring precipitation.

Projects that will disturb the soil or remove vegetation that is classified here as Aspen Riparian Forest, Great Basin Riparian Forest, Willow Riparian Scrub, Water Birch Riparian Scrub, Montane Freshwater Marsh, or Wet Montane Meadow should include properly timed surveys for Lemmon's milkvetch, western single-spiked sedge, subalpine fireweed, Blandow's bog moss, small-flowered grass of Parnassus, slender-leaved pondweed, and marsh arrow-grass. Projects that will be affecting Aspen

Riparian Forest, Great Basin Riparian Forest, Willow Riparian Scrub, or Water Birch Riparian Scrub (shaded, moist habitats) should also include surveys for upswept moonwort and scalloped moonwort. Projects that will affect Aspen Riparian Forest or Great Basin Riparian Forest could also survey for pine fritillary. Scalloped-leaved lousewort may occur where suitable moist, open meadow conditions are provided between the trees at Wet Montane Meadow or Willow Riparian Scrub.

Table 30. Sensitive plant species that may potentially occur in the available plant communities at the towns of McGee Creek and Long Valley. Flowering period is taken from CNPS (2014).

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Astragalus johannis-howellii</i> Long Valley milkvetch herbaceous perennial	1B.2	S2	June-August	Big Sagebrush Scrub Great Basin Mixed Scrub
<i>Astragalus lemmonii</i> Lemmon's milkvetch herbaceous perennial	1B.2	S2	May-Sept	Aspen Riparian Forest Great Basin Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
<i>Astragalus monoensis</i> Mono milkvetch herbaceous perennial	1B.2	S2	June-August	Big Sagebrush Scrub Great Basin Mixed Scrub
<i>Boechera cobrensis</i> Masonic rockcress herbaceous perennial	2B.3	S3	June-July	Big Sagebrush Scrub Great Basin Mixed Scrub
<i>Boechera dispar</i> pinyon rockcress herbaceous perennial	2B.3	S3	March-June	Big Sagebrush Scrub Great Basin Mixed Scrub
<i>Botrychium ascendens</i> upswept moonwort rhizomatous herb	2B.3	S2	sporangia July-August	Aspen Riparian Forest Great Basin Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub
<i>Botrychium crenulatum</i> scalloped moonwort rhizomatous herb	2B.2	S2	sporangia June-Sept	Aspen Riparian Forest Great Basin Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDB		
<i>Calochortus excavatus</i> Inyo County star-tulip bulbiferous herb	1B.1	S2	April-July	Aspen Forest Dry Montane Meadow
<i>Carex scirpoidea</i> ssp. <i>pseudoscirpoidea</i> western single-spiked sedge rhizomatous herb	2B.2	S2	July-Sept	Aspen Riparian Forest Great Basin Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
<i>Epilobium howellii</i> subalpine fireweed stoloniferous herb	4.3	S4	July-August	Aspen Riparian Forest Great Basin Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
<i>Eremothera boothii</i> ssp. <i>boothii</i> Booth's evening primrose herbaceous annual	2B.3	S2	April-Sept	Big Sagebrush Scrub Great Basin Mixed Scrub
<i>Eremothera boothii</i> ssp. <i>intermedia</i> Booth's hairy evening primrose herbaceous annual	2B.3	S2S3	May-June	Big Sagebrush Scrub Great Basin Mixed Scrub
<i>Fritillaria pinetorum</i> pine fritillary bulbiferous herb	4.3	S3	May-Sept	Aspen Riparian Forest Great Basin Riparian Forest
<i>Helodium blandowii</i> Blandow's bog moss bryophyte	2B.3	S1	-	Aspen Riparian Forest Great Basin Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Hulsea vestita</i> ssp. <i>inyoensis</i> Inyo hulsea herbaceous perennial	2B.2	S1S2	April-June	Big Sagebrush Scrub Great Basin Mixed Scrub
<i>Micromonolepis pusilla</i> dwarf monolepis herbaceous annual	2B.3	S2	May-August	Big Sagebrush Scrub Great Basin Mixed Scrub
<i>Parnassia parviflora</i> small-flowered grass of Parnassus herbaceous perennial	2B.2	S2	Aug-Sept	Aspen Riparian Forest Great Basin Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
<i>Pedicularis crenulata</i> scalloped-leaved lousewort herbaceous perennial	2B.2	S1	June-July	Willow Riparian Scrub Wet Montane Meadow
<i>Phacelia gymnoclada</i> naked-stem phacelia herbaceous annual	2B.3	S2	April-August	Big Sagebrush Scrub Great Basin Mixed Scrub
<i>Stuckenia filiformis</i> ssp. <i>alpina</i> slender-leaved pondweed rhizomatous herb	2B.2	S3	May-July	Aspen Riparian Forest Great Basin Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
<i>Thelypodium integrifolium</i> ssp. <i>complanatum</i> foxtail thelypodium herbaceous perennial	2B.2	S2	June-Oct	Big Sagebrush Scrub Great Basin Mixed Scrub

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Triglochin palustris</i> marsh arrow-grass rhizomatous herb	2B.3	S3	July-August	Aspen Riparian Forest Great Basin Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow

1. Rank or status, by agency:

CNPS = California Native Plant Society listings (CNPS, 2001, 2014)

1B = rare and endangered in California and elsewhere,

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

4 = plants of limited distribution in California – watchlist species.

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 occurrences threatened or no current threats known).

CNDDDB = California Natural Diversity Data Base rankings (CDFW, 2014b)

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.

One small area of relatively xeric Dry Montane Meadow near McGee Creek, and an adjacent sandbar willow – interior wild rose alliance classified as Willow Riparian Scrub, appear to provide the most suitable habitat available for Inyo County star-tulip within the study area. One population was documented in 1958 in an atypical (non-saline), likely similar Dry Montane Meadow habitat at nearby Hilton Creek. All other (more distant) known populations of this species are from alkaline meadow and meadow margin habitats. The McGee Creek habitat is seasonally moistened by freshwater seep zone flows, and the cycle of seasonal evaporative drying there may have caused elevated soil salinity or alkalinity. While similarity to the habitat requirements for Inyo County star-tulip is rather broad, the known nearby (historical) occurrence provides some evidence that such conditions could be tolerated by a local population. Regionally occurring sensitive species that are typical of more mesic alkaline and saline meadows or meadow margins, including smooth saltbush (*Atriplex pusilla*), Hall’s meadow hawksbeard (*Crepis runcinata* ssp. *hallii*), Inyo phacelia (*Phacelia inyoensis*), and alkali tansy-sage (*Sphaeromeria potentilloides* var. *nitrophila*) would appear to have very little likelihood to occur within the McGee Creek and Long Valley study area due to lack of suitable habitat.

Sensitive Wildlife

Based upon the available scrub and riparian communities identified within the McGee Creek and Long Valley study area, a total of 14 sensitive animal species were identified as having some potential to nest there or occur as residents in the available habitats (Table 31). American badger, a species that is not in CNDDDB records for the region, nevertheless has some potential to occur based upon recently documented occurrences in sagebrush scrub near Mammoth Creek, 8 miles northwest at approximately 7550 ft (2300 m), as reported by CAJA (2008). Sierra Nevada mountain beaver was added to the search list for McGee Creek and Long Valley town areas as having been captured in traps placed in the riparian zone of Lower Mammoth Creek (Steele, 1989). There is some possibility that riparian habitats within the study areas are suitable for mountain beaver denning, as those areas are sometimes densely vegetated and are not generally subject to trampling by livestock.

Willow flycatcher is state listed as Endangered (ssp. *extimus* and *traillii*) and federally listed as Endangered (ssp. *extimus*). Nesting willow flycatchers could choose the remnant areas of less disturbed, willow-dominated scrub that occur adjacent to Long Valley's spring outflow channels, or along McGee Creek in the southern half of the McGee Creek study area (Figure 10). They may also use those limited areas of Water Birch Riparian Scrub where willows are present in the streamside canopy. However, their typically preferred nesting habitat of more extensive willow scrublands with intervening relatively undisturbed meadow (*e.g.*, the habitat described for the nearest known occurrences in App. A) is not present. Swainson's hawk (*Buteo swainsoni*) may nest in larger trees that line the meadow and marsh habitats. Even though these habitats for wildlife are somewhat isolated and very limited in acreage, they are located just across U.S. Hwy 395 from the more extensive (and treeless) Crowley Lake shoreline meadows. The irrigated meadows and wetlands of nearby Crowley Lake also provide a potential recruitment source for sensitive fish, amphibian, and mammalian species (Table 31). Sierra Nevada red fox, which is state listed as Threatened, may move through or forage at any of the available habitats, but the level of human disturbance at least centrally among existing developments is not consistent with the general habitat requirements of this seldom seen animal. Den establishment in the study area would be possible only in the outlying, less fragmented upland scrub and wetland fringe areas.

Bald eagles (*Haliaeetus leucocephalus*) are known to use Convict Lake, Convict Creek, Hot Creek, and Alkali Ponds aquatic habitats north of the study area towns in the Long Valley region (Brandley, 2000), and they possibly nest at Hilton Lake, 8 miles south at 3000-3200 m (USFS, 2013). It can be assumed normal use extends to Crowley Lake. Aquatic resources in town areas of Long Valley, however, do not match the large scale or fish predation opportunities of the known use areas, and large conifers that would be suitable for nesting do not occur within or near town limits. It is very unlikely that bald eagles would be affected by any projects there.

Table 31. Sensitive wildlife species that could potentially occur within the McGee Creek and Long Valley study area. Key to status codes is given below, NL = not listed.

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
mollusks			
<i>Pyrgulopsis wongi</i> Wong's springsnail	NL	S1S2	Aspen Riparian Forest Great Basin Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
fish			
<i>Catostomus fumeiventris</i> Owens sucker	SSC	S3	Aspen Riparian Forest Great Basin Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
<i>Rhinichthys osculus</i> ssp. 2 Owens speckled dace	SSC	S1S2	Aspen Riparian Forest Great Basin Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
<i>Rhinichthys osculus</i> ssp. 5 Long Valley speckled dace	NL	S1	Aspen Riparian Forest Great Basin Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
<i>Siphateles bicolor snyderi</i> Owens tui chub	Endangered	S1	Aspen Riparian Forest Great Basin Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
amphibians			
<i>Hydromantes platycephalus</i> Mount Lyell salamander	SSC	S3	Aspen Riparian Forest Great Basin Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
birds			
<i>Buteo swainsoni</i> (nesting) Swainson's hawk	Threatened	S2	Aspen Forest Aspen Riparian Forest Great Basin Riparian Forest
<i>Centrocercus urophasianus</i> Bi-State DPS (nesting, leks) greater sage grouse	SSC	S3	Big Sagebrush Scrub Great Basin Mixed Scrub
<i>Empidonax traillii</i> (nesting) willow flycatcher	Endangered	S1	Aspen Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub
mammals			
<i>Aplodontia rufa californica</i> Sierra Nevada mountain beaver	SSC	S2S3	Great Basin Riparian Forest Aspen Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
<i>Lepus townsendii townsendii</i> western white-tailed jackrabbit	SSC	S3?	Aspen Forest Big Sagebrush Scrub Great Basin Mixed Scrub Dry Montane Meadow
<i>Sorex lyelli</i> Mount Lyell shrew	SSC	S2S3	Great Basin Riparian Forest Aspen Riparian Forest Willow Riparian Scrub Water Birch Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
mammals (cont.)			
<i>Taxidea taxus</i> American badger	SSC	S4	Big Sagebrush Scrub Great Basin Mixed Scrub Dry Montane Meadow
<i>Vulpes vulpes necator</i> Sierra Nevada red fox	Threatened	S1	Big Sagebrush Scrub Great Basin Mixed Scrub Dry Montane Meadow

1. Rank or status, by agency:

CDFW = State of California under the California Endangered Species Act (CDFW, 2014c)

SSC = Species of Special Concern (CDFW, 2014d).

State ranking = CNDDDB State Conservation Ranking as reported by CDFW (2014d)

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.

Greater sage grouse, which is a federal Proposed Threatened species, are known to use sagebrush scrub vegetation and embedded meadow-like openings in the central Long Valley area. Big Sagebrush Scrub, Great Basin Mixed Scrub and Dry Montane Meadow in the western portion of Long Valley, including the study area, are to some degree ecologically isolated from the larger habitat block of the central and northern Long Valley, due to U.S. Hwy 395 and its parallel overhead power transmission corridor. Riparian trees, as well as trees planted as landscaping, overlook much of the available foraging and brood-raising habitat at the study area. There are no openings in the extant canopy that resemble lek habitat. But scrub and meadow habitats that are available adjoining the nearby Crowley Lake are known to be currently used by greater sage grouse despite these same natural and man-made barriers. It is possible that greater sage grouse occasionally forage in upland scrub at McGee Creek and Long Valley, and possible that they would choose areas of greatest shrub density for nesting (nearest known lek distance less than two miles).

Projects proposing impacts to Big Sagebrush Scrub, Great Basin Mixed Scrub, or Dry Montane Meadow should also include surveys for large diameter burrows that may be occupied by western white-tailed jackrabbit, American badger, or Sierra Nevada red fox. Finally, Big Sagebrush Scrub and Great Basin Mixed Scrub provide forage that sustains the historic pathway for semiannual migration of the Round Valley Deer Herd. Projects that would seek to replace extant bitterbrush-dominated acreage must consider the cumulative impacts upon carrying capacity of the migration route. Projects that

would function to narrow the available corridor for deer movement may increase the likelihood of increased collision mortality due to redirection of migrants into the Hwy 395 corridor.

Aquatic habitats exhibiting rocky, moist edges could potentially harbor Mount Lyell salamander, a species whose known distribution is widely scattered in the eastern Sierra Nevada. Aquatic and near-aquatic habitats at McGee Creek and Long Valley, however, are very unlikely to support extant Yosemite toad (*Anaxyrus canorus*) or Sierra Nevada yellow-legged frog (*Rana sierrae*) populations. Yosemite toad requires relatively undisturbed meadows with seasonal pools for egg-laying and metamorphosis to adult stage, which do not occur within the study area. The nearest extant population of Sierra Nevada yellow-legged frog is in the San Joaquin River watershed, which is ecologically distant for frogs, and there is no conceivable dispersal route to the McGee Creek watershed. McGee Creek is now considered to be without any extant populations, and with “no possibility” for population restoration due to non-native predatory fish and disease (CDFW, 2013).

Artesian sources and near-spring reaches of outflow channels in Long Valley, as well as the main channel of McGee Creek, have the appearance of retaining their naturally formed bed and banks. These same channels are associated with dense, primarily native riparian forest or scrub growth. Elsewhere, all of these channels have been historically altered and the flows have been redirected to culverts and ditches. But even so, hydrologic connections to aquatic habitats of the Upper Owens River generally have been maintained. Any perennially watered, larger pools or reaches of quiet flows in the study area could possibly be occupied by Owens sucker. The aquatic habitat could be a refugium for genetically pure Owens tui chub that once were present in the Crowley Lake reservoir. Also, Long Valley’s relatively undisturbed springs and outflow channel habitats have some likelihood to maintain populations of sensitive dace and springsnails (Table 31) that are known to populate other springs in the Owens River watershed. Any further manipulations or proposed projects that will impact riparian vegetation would potentially impact its provision of shaded habitat, bank stabilization, seasonal storage, and water purification in areas classified here as Aspen Riparian Forest, Great Basin Riparian Forest, Willow Riparian Scrub, Water Birch Riparian Scrub, Montane Freshwater Marsh, or Wet Montane Meadow.

Projects directly or indirectly impacting communities dominated by phreatophytes or containing a watered channel may cause impacts to Wong’s springsnail, Long Valley speckled dace, Owens speckled dace, Owens tui chub, Owens sucker, and Mount Lyell salamander. Willow Riparian Scrub and Water Birch Riparian Scrub communities that are entirely or partly dominated by willows should be surveyed for Mount Lyell shrew, and for the presence of willow flycatcher territories if any disturbance is planned for the breeding season. Projects that would disturb Aspen Riparian Forest, Willow Riparian Scrub, or Water Birch Riparian Scrub should include surveys to detect burrow systems created by Sierra Nevada mountain beaver. These rodents typically maintain burrow systems in riparian thickets along streams or bordering wet meadows (Steele, 1989). Where appropriate habitat exists, it may be unoccupied due to conflict with past and current grazing uses (Mono County Planning Department, 1990). Livestock use is often concentrated in riparian bank vegetation, causing burrows to be trampled closed.

June Lake

Plant Communities and Species

The town of June Lake study area includes valley bottoms and adjacent slopes of the June Lake Village area, the Highlands area near Gull Lake, and the Downcanyon neighborhoods near Rush Creek, Reversed Creek, and Silver Lake. Development for the most part to provide resort facilities and single family housing at these three areas of June Lake has in recent decades filled in the buildable landscape to a relatively high degree of completion, yet many areas continue to support a diverse collection of native meadow, scrub and forest plant communities (Figure 11). The widespread pattern of historical and current habitat disturbance is evident where the vegetation exhibits various stages of recovery. Within the central portions of each town area, native plant communities now persist at riparian zones, wetland areas, and unbuildable steep and rugged outcrops and slopes. Contiguous blocks of relatively undisturbed habitat now occur only marginally. At the larger scale, June Lake town areas are embedded within expansive areas of open and relatively undisturbed forest and sagebrush scrub habitat that is administered by the U.S. Forest Service, Inyo National Forest.

The study area is located within the Reversed Creek hydrologic basin, between its headwaters in the Village area to the confluence of Reversed Creek with Rush Creek. Powerful springs underlying June Lake and Gull Lake flow sufficiently to maintain lake freshness and a famed non-native trout fishery, yet there is virtually no discharge conducted by the Reversed Creek where it exits the lakes. Underground discharge from these headwater lakes may underlie at least some of the hundreds of artesian springs that water the downslope basin and collect in the lower portion of Reversed Creek. There are also small, seasonal to weakly perennial tributary streams that enter the Downcanyon area from the steeply rising mountains to the west. Together, these relatively abundant aquatic features create a finely grained texture of alternating mesic and xeric habitats. The diversity of the plant communities that are naturally supported in this environment (Table 32) imparts much towards the attractiveness of this area to visitors. Furthermore, the Reversed Creek drainage is atypically oriented so that flow is westerly towards the nearby Sierra Nevada crest, which presents unusual or relatively broad physiographic conditions for plants. Habitat variability has influenced the species assemblage, resulting in a relatively inclusive list of native flora.

Wet Montane Meadow, Dry Montane Meadow and Willow Riparian Scrub communities have developed patchily at mesic habitats within the landscape. All occurrences feature seasonal or perennial spring flows and shallow groundwater tables that annually (at least seasonally) saturate the rooting zone for plants. They beneficially function to store, filter, and release tributary flows to Reversed Creek, which is a domestic water supply. Wet Montane Meadow, Dry Montane Meadow and Willow Riparian Scrub generally lack overstory pines and aspens, yet were consistently mapped as adjacent to Aspen Forest, Aspen Riparian Forest, or Lodgepole Pine Riparian Forest. No occurrences of water birch (*Betula occidentalis*) thickets or streamside corridors (*i.e.*, Water Birch Riparian Scrub) were found. Freshwater Marsh (*sensu* Holland's Montane Freshwater Marsh) is emergent vegetation that is found lakeside at June Lake, Gull Lake, and Silver Lake, in habitats that are perennially flooded or saturated. However, near-lake habitats, riverine corridors and even spring complex areas more commonly have

become densely forested by lodgepole pine (*Pinus contorta*). Gap areas in coniferous forest canopies, and often the understory canopy in Lodgepole Pine Riparian Forest, are further shaded by dense clonal patches of quaking aspen (*Populus tremuloides*). These deciduous trees create attractive fall displays throughout the June Lake area in areas mapped as Aspen Forest, Aspen Riparian Forest, and Lodgepole Pine Riparian Forest.

Table 32. Plant communities that were mapped within the 852 acre June Lake study area in 2014. The study area includes a total of 154 acres that have been converted to houses, roads and other Impervious surfaces in the Village, Highlands, and Downcanyon areas. Community names (after Holland, 1986) are cross-referenced to the CDFG (2010) classification and 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		
Big Sagebrush Scrub 35.110.07	Big Sagebrush Shrubland <i>Artemisia tridentata</i> - <i>Purshia tridentata</i>	191
Big Sagebrush Scrub 35.110.01	Big Sagebrush Shrubland <i>Artemisia tridentata</i> - <i>Ericameria nauseosa</i>	2.9
Mountain Mahogany Scrub 76.200.01	Curl-leaf Mountain Mahogany Scrub <i>Cercocarpus ledifolius</i> - <i>Artemisia tridentata</i>	40
Mountain Mahogany Scrub 76.200.00	Curl-leaf Mountain Mahogany Scrub <i>Cercocarpus ledifolius</i> - <i>Pinus monophylla</i>	31
Great Basin Juniper Woodland 89.200.00	Sierra Juniper Woodland <i>Juniperus grandis</i> - <i>Pinus jeffreyi</i> / <i>Pinus monophylla</i>	31
Sierran White Fir Forest 88.500.00	White Fir Forest <i>Abies concolor</i> - <i>Pinus jeffreyi</i>	65
Jeffrey Pine Forest 87.020.00	Jeffrey Pine Forest <i>Pinus jeffreyi</i> - <i>Artemisia tridentata</i>	48
Jeffrey Pine Forest 87.020.00	Jeffrey Pine Forest <i>Pinus jeffreyi</i> - <i>Juniperus grandis</i>	37
Lodgepole Pine Forest 87.080.00	Lodgepole Pine Forest <i>Pinus contorta</i> - <i>Abies concolor</i>	6.5
Lodgepole Pine Forest 87.080.00	Lodgepole Pine Forest <i>Pinus contorta</i> - <i>Pinus jeffreyi</i>	11
Lodgepole Pine Forest 87.080.00	Lodgepole Pine Forest <i>Pinus contorta</i> - <i>Populus tremuloides</i>	4.9

Holland name and CDFW classification number	Alliance and primary association names	acreage in study area
wetland and potential wetland communities		
Aspen Forest 61.111.06*	Aspen Grove <i>Populus tremuloides-Artemisia tridentata</i>	8.3
Aspen Forest 61.111.10*	Aspen Grove <i>Populus tremuloides-Rosa woodsii</i>	11
Aspen Riparian Forest 61.111.00*	Aspen Grove <i>Populus tremuloides-Salix lasiolepis</i>	11
Aspen Riparian Forest 61.111.00*	Aspen Grove <i>Populus tremuloides-Pinus contorta</i>	14
Lodgepole Pine Riparian Forest 87.080.00	Lodgepole Pine Forest <i>Pinus contorta-Salix spp.</i>	36
Lodgepole Pine Riparian Forest closest fit 52.113.00*	Lodgepole Pine Forest <i>Pinus contorta-Scirpus microcarpus</i>	8.2
Willow Riparian Scrub 61.204.00*	Shining Willow Thicket <i>Salix lasiandra-Salix lasiolepis/Salix lutea</i>	9.0
Willow Riparian Scrub 61.204.00*	Shining Willow Thicket <i>Salix lasiandra-Salix geyeriana</i>	1.2
Willow Riparian Scrub 61.201.00	Arroyo Willow Thicket <i>Salix lasiolepis-Salix geyeriana-Salix lutea/Salix exigua</i>	50
Willow Riparian Scrub 61.209.00	Sandbar Willow Thicket <i>Salix exigua-Salix lasiolepis/Salix geyeriana</i>	0.4
Montane Freshwater Marsh 52.122.01	Hardstem Bulrush Marsh <i>Schoenoplectus acutus var. occidentalis</i>	18
Wet Montane Meadow 52.113.00*	Small-Fruited Bulrush Marsh <i>Scirpus microcarpus-Agrostis spp./Populus tremuloides</i>	3.3
Wet Montane Meadow 45.130.00	Baltic Rush Marsh <i>Juncus balticus-Elymus triticoides</i>	6.1
Wet Montane Meadow 45.130.00	Nebraska Sedge Meadow <i>Carex nebrascensis-Carex spp</i>	15
Creeping Wildrye Meadow 41.080.00*	Creeping Rye Grass Turf <i>Elymus triticoides-Poa pratensis-Juncus balticus</i>	20
Dry Montane Meadow 42.060.01	Kentucky Bluegrass Turf <i>Poa pratensis-Carex pellita/Carex spp.</i>	19

Wet Montane Meadow vegetation is dependent upon perennial riverine or springfed flows that create at least seasonal saturation reaching the soil surface. The largest, least disturbed Wet Montane Meadow areas occur in association with Willow Riparian Scrub and Freshwater Marsh at the edge of Silver Lake. The annual pattern of lake level change at Silver Lake leads to seasonal drying except within the Reversed Creek channel, lakeside marshes, and fishing ponds that have been constructed along its edge. Conditions of seasonal flooding with narrowly incised, perennially flowing central channels are also created where closely arrayed springs occur on relatively level terrain. Ponding and relatively marshy conditions have been created by berm construction in some cases. Whether in the open (i.e., at a forest canopy gap), or as understory swards in Lodgepole Riparian Forest, herbaceous wet meadow vegetation is diverse and dense, and has often developed thatchy organic accumulations. Commonly, small-fruited bulrush (*Scirpus microcarpus*) establishes up to 100% cover in Wet Montane Meadow, thinned areas, and even closed-canopy Lodgepole Pine Riparian Forest situations. Other communities including the large expanses of Wet Montane Meadow at Rush Creek and Silver Lake are dominated by sedges or by native perennial grasses (Table 32). Wet Montane Meadow occurrences are currently free of invasive non-native species. Bouncing bet soapwort (*Saponaria officinalis*) was the only non-native found in Lodgepole Pine Riparian Forest in 2013.

Community types Big Sagebrush Scrub, Curl-leaf Mountain Mahogany Scrub, Great Basin Juniper Woodland, Jeffrey Pine Forest, Lodgepole Pine Forest, and Sierran White Fir Forest, and also ruderal or disturbed areas generally, occur at xeric habitats. These community types support strictly upland species assemblages. Upland communities are narrowly absent from the lowest elevations of the Village and Highlands, and widely absent from the Reversed Creek basin. They collectively occupying 470 acres (68%) of the approximately 690 acres of undeveloped area within the study area, and 99% of outcrops and other areas with a slope of greater than 5%. Although sparsely vegetated in comparison to the study area's wetland community types, upland communities have developed species compositions and architectures that create fire danger, and so they will be universally targeted for fuel reduction thinning treatment in 2014-2016 (P. McCahon, personal comm.) As of this survey, upland coniferous forest densities do not exceed 40% of total canopy closure. Higher tree densities may occur now or post-thin, but only at the scale of small patches, and only in areas classified as Lodgepole Pine Riparian Forest. Upland forest understory assemblages are usually dominated by big sagebrush (*Artemisia tridentata*). Whether for infrastructure emplacement, for fire fuel reduction, or for general landscaping associated with housing and resort buildings, some level of recent understory disturbance was observed at every mapped occurrence. Lodgepole Pine Forest, the only upland community that is found at the lowest elevations of the Reversed Creek Basin, is also the only upland forest type at June Lake lacking shrub-filled (i.e., Big Sagebrush Scrub-like) canopy gaps. All of the upland community types that are present at June Lake occur commonly within undeveloped areas of Mono County (Mono County Planning Department 2001), and are to varying degrees widespread in the Eastern Sierra Nevada (Sawyer, *et al.* 2009).

The Big Sagebrush Scrub canopy at June Lake is mainly big sagebrush (*Artemisia tridentata*), with a relatively minor contribution by bitterbrush (*Purshia tridentata*). Downcanyon stands patchily include tobacco brush (*Ceanothus velutinus*) and green Manzanita (*Arctostaphylos patula*). A high diversity of

native perennial and annual species has been recorded throughout this type in June Lake (Bagley, 1995, Paulus, 2013). Occurrences are typically on steep, rocky or fan-like slopes, and all include 1-10% canopy cover by forest trees such as Jeffrey pine (*Pinus jeffreyi*) and Sierra juniper (*Juniperus grandis*). The community's ecotones with Mountain Mahogany Scrub are particularly indistinct, and large curl-leaf mountain mahogany (*Cercocarpus ledifolius*, to 4 m) are regularly part of the Big Sagebrush Scrub assemblage in rocky areas.

Big Sagebrush Scrub at June Lake is often weedy, with a total of nine non-native species found in 2013-2014. As with all but the wettest habitats in this study area, there is a ubiquitous presence of cheatgrass (*Bromus tectorum*). Sparser but equally widespread populations of the non-native annuals Russian thistle (*Salsola tragus*), tumble mustard (*Sisymbrium altissimum*), smooth brome (*Bromus inermis*), and tansy mustard (*Descurainia sophia*) occur throughout much of the area occupied by upland community types. Riparian forest communities throughout the study area include cheatgrass densely (usually) to sparsely (at wetter sites), annual peppergrass (*Lepidium perfoliatum*), and several consistently present biennial or perennial species including salsify (*Tragopogon dubius*), mullein (*Verbascum thapsus*), orchard grass (*Dactylis glomerata*), timothy (*Phleum pratense*), Kentucky bluegrass (*Poa pratensis*), and fowl bluegrass (*Poa palustris*). Non-native species that occur but are not already spread throughout the available habitats include Canadian thistle (*Cirsium arvense*), hare's ear (*Conrigia orientalis*), Jerusalem oak (*Dysphania botrys*), knotweed (*Polygonum agyrocoleon*), and bouncing bet soapwort.

Riverine and spring-driven flows that cross the study area support relatively dense growths of plants would be expected to have adaptation to at least seasonal inundation within their rooting zones. A high percentage of the prominent species there are classified by federal regulators (ACOE, 2012) as FAC, FACW, or OBL wetland species (App. B). Permits and a formal delineation of the extent of jurisdictional wetland and tributary resources as normally specified under Clean Water Act law would likely be required for projects that propose to disturb the vegetation, alter the bed or banks, or change the flow timing or magnitude within any areas classified as supporting a wetland or potential wetland community. These communities occupy habitats that retain a high level of function to maintain local species diversity. They provide movement and dispersal corridors for wildlife. Given the apparent connectivity of Village area flows and aquifers to widespread springfed habitat maintenance in the Downcanyon area, it is a reasonable assumption that diversions and groundwater manipulations may likely have far-reaching effect.

Sensitive Plant Communities and Species

All Big Sagebrush Scrub mapped in the June Lake study area would be considered common and widespread throughout Mono County and the Great Basin. Openings in the shrub canopy or internally drained basins featuring pumice ash or gravel soils, as would be expected at the Sensitive community Mono Pumice Flats, were not found. However, vegetation at an internally drained basin immediately beyond the northwestern edge of the Village portion of the study area has elements of Mono Pumice Flats, including sparse scrub cover and pumice gravel soil. Populations of the state Rare species Mono milkvetch (*Astragalus monoensis*) and the BLM/USFS Sensitive species Mono Lake lupine (*Lupinus*

duranii) occur there (Bagley, 1995). Community mapping should include searches for occurrence of Mono Pumice Flat at flat or depressed terrain with upland scrub vegetation, which occurs only within the Village-Highlands portion of the study area.

Upland Mountain Mahogany Scrub, Great Basin Juniper Woodland, Sierran White Fir Forest, Jeffrey Pine Forest, and Lodgepole Pine Forest plant communities in the June Lake area are generally considered common and widespread in Mono County and the Eastern Sierra Nevada. None of the forest found in the study area (or in any other town area studied here) would be considered old growth or old forest as defined in regional forest management plans (USFS, 2004). Large diameter, presumably ancient Sierra juniper (*Juniperus grandis*) occur in Great Basin Juniper Woodland and Jeffrey Pine Forest, where they provide habitat for cavity nesters, insectivorous birds, and raptors. Like quaking aspen (*Populus tremuloides*) trees in the state Sensitive Aspen Forest and Aspen Riparian Forest, these iconic trees impart scenic quality to the exposed slopes and outcrops where they occur, and any losses would be a significant impact.

Dry Montane Meadow is found most extensively near Rush Creek and Silver Lake. Most areas that were sampled exhibited patchy swards of non-native Kentucky bluegrass (*Poa pratensis*), woolly sedge (*Carex pellita*), or other sedges, in combinations that would not be considered Sensitive. Where creeping wildrye (*Elymus triticoides*) assumes overall dominance (19 acres total), the community was classified as the Sensitive type Creeping Wildrye Meadow. Wet Montane Meadow stands dominated by small-fruited bulrush (*Scirpus microcarpus*) are considered Sensitive by CDFW. Wet Montane Meadows are seasonally marshy, due to shallow groundwater elevated to the surface by discharge from springs, or by flooding flows of Reversed Creek, or by adjacent lake levels. The community functions to provide habitat for aquatic wildlife, stabilize channel banks, and improve water quality. Reversed Creek and Rush Creek are tributary to the Owens River and the Los Angeles Aqueduct, which are used for domestic water supply.

Wet Montane Meadow occurrences usually closely abut or are entirely embedded within stands of Lodgepole Pine Riparian Forest along Reversed Creek. Small-fruited bulrush, in particular, can form a carpet of dense, wetland-like understory cover in Lodgepole Pine Riparian Forest. At the wetter habitat extremes, Downcanyon vegetation that occurs within near-stream zones inundated by closely spaced, perennial artesian flows are part of an unusual, possibly seral combination of dense wet meadow sward and densely invasive, semi-emergent lodgepole pine (*Pinus contorta*). This “fen-forest” combination has been described as regionally rare (Curry, 1996) and would be considered Sensitive by CDFW. Other marshy or seasonally inundated areas classified here as Wet Montane Meadow have similarly high (or higher) species diversity and provide up to 100% herbaceous cover, but the species assemblages are not themselves state Sensitive (CDFG, 2010).

Willow Riparian Scrub is relatively extensive in the Downcanyon area, but occurs throughout the study area. Most Village area occurrences are highly isolated amid town developments and exhibit signs of recovery from recent, intense or ongoing disturbance. Willow Riparian Scrub fragments are the only native plant communities remaining among resort and housing developments in the Village lowlands between June Lake and Gull Lake. Willow-dominated riparian and meadow margin communities are

considered Sensitive by CDFW (CDFG, 2010) at occurrences where Shining willow (*Salix lasiandra*) is the most abundant tree (10 acres total). Federal Endangered willow flycatcher (*Empidonax traillii extimus*) have been documented as recently using willow scrub stands of the Rush Creek watershed. During the 1980's, nesting pairs were known to choose study area Willow Riparian Scrub occurrences, including even an isolated and disturbed patch in the central Village area (CNDDDB, 2014e). Aspen-dominated stands in the June Lake area are associated with seep zones that seasonally dry at least near the edges (Aspen Forest community), or with the riparian zone of Rush Creek, Reversed Creek and its tributaries, or at lakeshore habitat (Aspen Riparian Forest community), retain much of their native character and would be considered state Sensitive. Quaking aspen often is an important subcanopy or canopy species in areas classified as Lodgepole Pine Riparian Forest. Quaking aspen will likely increase in importance in response to the practice of forest thinning of the overstory pines, and a corresponding increase in acreage that will be classifiable as Sensitive alliances of Aspen Forest and Aspen Riparian Forest can be expected.

Sensitive Lodgepole Pine Riparian Forest is the dominant vegetation type of the watershed bottomlands associated with Reversed Creek in the Downcanyon area of June Lake. Occurrences are closely situated with the sometimes Sensitive alliances of Willow Riparian Scrub, Aspen Forest, Aspen Riparian Forest, and Wet Montane Meadow in riparian and spring-fed wetland settings. Despite its central landscape position amid developing neighborhoods and resort uses, Lodgepole Pine Riparian Forest provides a densely vegetated corridor for wildlife movement and dispersal throughout much of the June Lake study area. This community is likely to be treated as Sensitive by CDFW when found in its usual riparian corridor or riverine floodplain position, even where herbaceous species other than small-fruited bulrush provide the majority of understory cover. Furthermore, any project that seeks to add fill material in the wetlands that support Lodgepole Pine Riparian Forest, Willow Riparian Scrub, Aspen Forest, Aspen Riparian Forest, or Wet Montane Meadow in riparian and spring-fed wetland settings should include early consultation with concerned state and federal Clean Water Act regulating agencies, in order to formulate permit conditions. As Waters of the State of California, such projects would also require action pursuant to entering into a Streambed Alteration Agreement with CDFW.

A total of 22 sensitive plant species, one sensitive bryophyte species, and one sensitive lichen species have some likelihood to occur within the June Lake study area (Table 33). Booth's evening primrose and Booth's hairy evening primrose are the only annuals on the list. These species would be expected at upland and disturbed habitats only. Long Valley milkvetch and Mono milkvetch are state listed as Rare, and are considered Sensitive by regional BLM and USFS offices. No potentially occurring species are federally listed or candidates for listing. Regionally occurring sensitive species that typically occur in saline or alkaline soils would be very unlikely, as habitats exhibiting characteristics of elevated salinity (epialic deposition, saline or alkaline-tolerant species prominence) were not found anywhere within the June Lake study area.

No known sensitive plant populations at June Lake were uncovered in the literature search. Mono Lake lupine and Mono milkvetch occur in open sagebrush scrub immediately northeast of the Village area, and would have potential to be found in the study area's relatively non-sloping upland scrub with pumice-dominated soils (e.g., small Mono Pumice Flats inclusions in Big Sagebrush Scrub, if

any occur). Other species that have likelihood to occur in the available upland communities generally have no requirements for specific slope or aspect., but the chance of finding Tulare rockcress or Masonic Mountain Jewelflower is substantially increased at relatively steep habitats associated with numerous study area outcrops. Rocky soils there have remained relatively undisturbed by human development. Wetland communities also have several species that may occur, with likelihood depending on whether requirements for varying degrees of dependable habitat wetness are met. For example, Liddon’s sedge, western single-spike sedge, and western valley sedge would be more likely than other wetland species (Table 33) to occur in the available Dry Montane Meadow habitat. However, these species would also have some likelihood to occur in drier microhabitats such as mounds of slightly higher topography that are certain to be embedded within areas mapped as wetter habitat (i.e., Wet Montane Meadow, Willow Riparian Scrub, Lodgepole Riparian Forest, Aspen Riparian Forest, and Aspen Forest). Similarly, species expected of relatively wetter habitats with greater or seasonally sustained soil flooding may occur at small depressions or conveyances embedded within Dry Montane Meadow. The wettest, recognizably “aquatic” habitats in these communities or in Freshwater Marsh could support Robbins’ pondweed, slender-leaved pondweed, and aquatic felt lichen, as these species would only occur where flooding is sustained.

Table 33. Potentially occurring sensitive plant species in the available plant communities at the June Lake (Village, Highlands and Downcanyon) study area. Flowering period is taken from CNPS (2014).

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Agrostis humilis</i> mountain bentgrass herbaceous perennial	2B.3	S2	July-Sept	Great Basin Juniper Woodland Sierran White Fir Forest Jeffrey Pine Forest Lodgepole Pine Forest Lodgepole Pine Riparian Forest Willow Riparian Scrub Wet Montane Meadow Creeping Wildrye Meadow Dry Montane Meadow
<i>Astragalus johannis-howellii</i> Long Valley milkvetch herbaceous perennial	1B.2	S2	June-August	Big Sagebrush Scrub Mountain Mahogany Scrub Great Basin Juniper Woodland Sierran White Fir Forest Jeffrey Pine Forest

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Astragalus monoensis</i> Mono milkvetch herbaceous perennial	1B.2	S2	June-August	Big Sagebrush Scrub Mountain Mahogany Scrub Great Basin Juniper Woodland Jeffrey Pine Forest
<i>Boechea cobrensis</i> Masonic rockcress herbaceous perennial	2B.3	S1S2	June-July	Big Sagebrush Scrub Mountain Mahogany Scrub Great Basin Juniper Woodland Sierran White Fir Forest Jeffrey Pine Forest
<i>Boechea tularensis</i> Tulare rockcress herbaceous perennial	2B.3	S2	June-July	Big Sagebrush Scrub Mountain Mahogany Scrub Great Basin Juniper Woodland Sierran White Fir Forest Jeffrey Pine Forest
<i>Botrychium crenulatum</i> scalloped moonwort rhizomatous herb	2B.2	S2	sporangia June-Sept	Aspen Forest Aspen Riparian Forest Lodgepole Pine Riparian Forest Willow Riparian Scrub Wet Montane Meadow
<i>Botrychium lunaria</i> common moonwort rhizomatous herb	2B.3	S2?	sporangia August	Aspen Forest Aspen Riparian Forest Lodgepole Pine Riparian Forest Willow Riparian Scrub Wet Montane Meadow
<i>Bruchia bolanderi</i> Bolander's candlemoss bryophyte	2B.2	S3?	-	Aspen Forest Aspen Riparian Forest Lodgepole Pine Riparian Forest Willow Riparian Scrub Wet Montane Meadow
<i>Carex petasata</i> Liddon's sedge herbaceous perennial	2B.3	S2	May-July	Great Basin Juniper Woodland Sierran White Fir Forest Jeffrey Pine Forest Aspen Forest Aspen Riparian Forest Wet Montane Meadow Creeping Wildrye Meadow Dry Montane Meadow

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Carex scirpoidea</i> ssp. <i>pseudoscirpoidea</i> western single-spiked sedge rhizomatous herb	2B.2	S2	July-Sept	Aspen Forest Aspen Riparian Forest Lodgepole Pine Riparian Forest Willow Riparian Scrub Wet Montane Meadow Creeping Wildrye Meadow Dry Montane Meadow
<i>Carex vallicola</i> western valley sedge rhizomatous herb	2B.3	S2	July-August	Aspen Forest Aspen Riparian Forest Lodgepole Pine Riparian Forest Willow Riparian Scrub Wet Montane Meadow Creeping Wildrye Meadow Dry Montane Meadow
<i>Draba praealta</i> tall draba herbaceous perennial	2B.3	S3	July-August	Aspen Forest Aspen Riparian Forest Lodgepole Pine Riparian Forest Willow Riparian Scrub Wet Montane Meadow Creeping Wildrye Meadow Dry Montane Meadow
<i>Epilobium howellii</i> subalpine fireweed stoloniferous herb	4.3	S4	July-August	Aspen Forest Aspen Riparian Forest Lodgepole Pine Riparian Forest Willow Riparian Scrub Wet Montane Meadow Creeping Wildrye Meadow Dry Montane Meadow
<i>Eremothera boothii</i> ssp. <i>boothii</i> Booth's evening primrose herbaceous annual	2B.3	S2	April-Sept	Big Sagebrush Scrub Mountain Mahogany Scrub Great Basin Juniper Woodland Sierran White Fir Forest Jeffrey Pine Forest
<i>Eremothera boothii</i> ssp. <i>intermedia</i> Booth's hairy evening primrose herbaceous annual	2B.3	S2S3	May-June	Big Sagebrush Scrub Mountain Mahogany Scrub Great Basin Juniper Woodland Sierran White Fir Forest Jeffrey Pine Forest

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDB		
<i>Lupinus duranii</i> Mono Lake lupine herbaceous perennial	1B.2	S2	May-August	Big Sagebrush Scrub Mountain Mahogany Scrub Great Basin Juniper Woodland Jeffrey Pine Forest
<i>Mentzelia torreyi</i> Torrey's blazing star herbaceous perennial	2B.2	S2	June-August	Big Sagebrush Scrub Mountain Mahogany Scrub Great Basin Juniper Woodland Sierran White Fir Forest Jeffrey Pine Forest
<i>Minuartia stricta</i> bog sandwort herbaceous perennial	2B.3	S2	July-Sept	Aspen Forest Aspen Riparian Forest Lodgepole Pine Riparian Forest Willow Riparian Scrub Creeping Wildrye Meadow Wet Montane Meadow
<i>Peltigera gowardii</i> aquatic felt lichen lichen	-	S3	July-August	Aspen Forest Aspen Riparian Forest Lodgepole Pine Riparian Forest Willow Riparian Scrub Wet Montane Meadow
<i>Potamogeton robbinsii</i> Robbins' pondweed rhizomatous herb	2B.3	S3	July-August	Aspen Forest Aspen Riparian Forest Lodgepole Pine Riparian Forest Willow Riparian Scrub Freshwater Marsh Wet Montane Meadow
<i>Silene oregana</i> Oregon campion herbaceous perennial	2B.3	S2	July-Sept	Big Sagebrush Scrub Mountain Mahogany Scrub Great Basin Juniper Woodland Sierran White Fir Forest Jeffrey Pine Forest
<i>Streptanthus oliganthus</i> Masonic Mountain jewelflower herbaceous perennial	1B.2	S2	June-July	Big Sagebrush Scrub Mountain Mahogany Scrub Great Basin Juniper Woodland Sierran White Fir Forest Jeffrey Pine Forest

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Stuckenia filiformis</i> <i>ssp. alpina</i> slender-leaved pondweed rhizomatous herb	2B.2	S3	May-July	Aspen Forest Aspen Riparian Forest Lodgepole Pine Riparian Forest Willow Riparian Scrub Freshwater Marsh Wet Montane Meadow
<i>Viola purpurea ssp. aurea</i> golden violet herbaceous perennial	2B.2	S2S3	April-June	Big Sagebrush Scrub Mountain Mahogany Scrub Great Basin Juniper Woodland Sierran White Fir Forest Jeffrey Pine Forest

1. Rank or status, by agency:

CNPS = California Native Plant Society listings (CNPS, 2001, 2014)

1B = rare and endangered in California and elsewhere,

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

4 = plants of limited distribution in California – watchlist species.

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 occurrences threatened or no current threats known).

CNDDDB = California Natural Diversity Data Base rankings (CDFW, 2014b)

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 = Apparently Secure: uncommon but not rare in California,

? indicates CNDDDB uncertainty in assigning rank.

Projects that will disturb the soil or remove vegetation that has been classified here as Big Sagebrush Scrub, Mountain Mahogany Scrub, Great Basin Juniper Woodland, Sierran White Fir Forest, or Jeffrey Pine Forest should include surveys to determine the presence/absence of Long Valley milkvetch, Masonic rockcress, Tulare rockcress, Booth's evening primrose (both ssp.), Torrey's blazing star, Oregon champion, Masonic Mountain jewelflower, and golden violet. Booth's evening primrose may be present in the seedbank only during years of below normal winter and spring precipitation. Projects that will disturb Big Sagebrush Scrub, Mountain Mahogany Scrub, Great Basin Juniper Woodland, or Jeffrey Pine Forest should also include mapping to determine whether vegetation classifiable as Mono Pumice Flats is present, and whether pumice-dominated habitats harbor Mono milkvetch or Mono Lake lupine. Mono milkvetch is also known to occur in gravelly roadside habitats with pumice soil. In addition, projects that will disturb Great Basin Juniper Woodland, Sierran White Fir Forest, or Jeffrey Pine Forest should include a survey for the presence of mountain bentgrass and Liddon's sedge.

Projects that will disturb the soil or remove vegetation that is classified here as Aspen Forest, Aspen Riparian Forest, Lodgepole Pine Riparian Forest, Willow Riparian Scrub, or Wet Montane Meadow should include determination of whether the potentially occurring sensitive plant species scalloped moonwort, common moonwort, western single-spiked sedge, western valley sedge, tall draba, subalpine fireweed, bog sandwort, subalpine fireweed, Robbins' pondweed, and slender-leaved pondweed, or the potentially occurring bryophyte Bolander's candle moss, or the potentially occurring lichen aquatic felt lichen will be affected. Projects that will disturb Dry Montane Meadow should also include surveys for mountain bentgrass, Liddon's sedge, western single-spiked sedge, western valley sedge, tall draba, and subalpine fireweed. Liddon's sedge also has some likelihood to occur in dry or marginal zones of Aspen Forest, Aspen Riparian Forest, and Wet Montane Meadow. Mountain bentgrass has some likelihood to occur in Lodgepole Pine Forest, Lodgepole Pine Riparian Forest, and Wet Montane Meadow. In the unlikely situation that inundated lakeside areas are to be affected directly by dredging or revegetation projects, or dried for a substantial time during the growing season due to lake level manipulation, then the potential impacts to Robbins' pondweed and slender-leaved pondweed should be considered.

Sensitive Wildlife

Based upon the available forest, upland scrub, and riparian communities identified within the June Lake study area, a total of 22 sensitive animal species were identified as having some potential to nest there or reside in the available habitats (Table 34). Willow flycatcher is state and federally listed as Endangered. The State of California lists Sierra Nevada red fox and Swainson's hawk as Threatened, and lists bald eagle as Endangered and Fully Protected. The West Coast DPS of fisher has been proposed as Threatened by the state. Greater sage grouse has been proposed as Threatened (with final decision expected in mid-2015) under the federal Endangered Species Act. The Parker Meadows population of greater sage grouse (Bi-State DPS) is known to use breeding habitat within five miles of the study area, but none of the study area is included within the proposed Critical Habitat for the DPS's recovery.

Aquatic and adjacent meadow habitat types present within the June Lake study area are very unlikely to support populations of the sensitive amphibians Yosemite toad (*Anaxyrus canorus*, species is federal listed as Threatened) and Sierra Nevada yellow-legged frog (*Rana sierrae*, federal Endangered). The Reversed Creek drainage has a long history as a popular non-native trout fishery. Being effective predators of the listed amphibians, non-native trout presence was identified as a primary driver for loss of populations for both species (USFWS, 2013b). Yosemite toad has not been found in recent decades within the Reversed Creek or Rush Creek watersheds (CDFW, 2013). Sierra Nevada yellow-legged frog occurs only at the highest elevation of the Rush Creek watershed, at tarn habitat that is isolated from predatory trout. It is very unlikely that either amphibian species could immigrate into the study area by overcoming the significant ecological barriers that now exist, including the substantial overland travel that would be required, trout-laden waters, and dams on Rush Creek. Neither species' proposed Critical Habitat for recovery from listing to non-listed status includes any portion of the June Lake study area (USFWS, 2013b).

Conversion to housing and resort facilities, and related developments such as long-term trout introduction and widespread forest thinning and understory removal, have altered and sometimes

fragmented the habitats for wildlife, especially in bottomlands within or just outside the riparian zone. The largest habitat blocks remaining in the study area are contiguous with Inyo National Forest lands at steep, unbuildable upland slopes and outcrops, but even these will be subject to the ongoing canopy thinning. The open, uncluttered stands that are the desired condition after thinning (maximum 10-20% canopy closure) would not meet species the closed-canopy forest environment requirements (40-70% canopy closure) for species such as great grey owl (*Strix nebulosa*), and northern goshawk (*Accipiter gentilis*). Riparian corridors now include areas of up to 40% canopy closure that are primarily vegetated by tall pines of Lodgepole Riparian Forest, but these potential movement paths for wildlife have become interrupted or constricted by many roads and sometimes dense housing. Aquatic habitats include many culverts for highway and residential road crossings. Yet some bottomlands riparian communities have generally retained denser cover and some corridor-like function for wildlife movements and access to surface water. Additional permanent conversions to impervious surfaces and housing, etc. in Lodgepole Pine Riparian Forest, Aspen Riparian Forest, or Willow Riparian Scrub would cause further significant losses of habitat connectivity in the study area, unless building setbacks recognizing riparian corridor function are (more) strictly implemented.

Table 34. Sensitive wildlife species that could potentially occur within the June Lake study area. Key to status codes (CDFG, 2011) is given below, NL = not listed.

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
amphibians			
<i>Hydromantes platycephalus</i> Mount Lyell salamander	SSC	S3	Aspen Forest Aspen Riparian Forest Lodgepole Pine Riparian Forest Willow Riparian Scrub Wet Montane Meadow
birds			
<i>Buteo swainsoni</i> (nesting) Swainson's hawk	Threatened	S2	Aspen Forest Aspen Riparian Forest Lodgepole Pine Riparian Forest
<i>Centrocercus urophasianus</i> Bi-State DPS (nesting, leks) greater sage grouse	SSC	S3	Big Sagebrush Scrub
<i>Circus cyaneus</i> (nesting) northern harrier	SSC	S3	Willow Riparian Scrub Wet Montane Meadow

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
<i>Dendroica petechia breweri</i> (nesting) yellow warbler	SSC	S2	Aspen Forest Aspen Riparian Forest Lodgepole Pine Riparian Forest Willow Riparian Scrub Wet Montane Meadow
birds (cont.)			
<i>Empidonax traillii</i> (nesting) willow flycatcher	Endangered	S1	Aspen Forest Aspen Riparian Forest Lodgepole Pine Riparian Forest Willow Riparian Scrub Wet Montane Meadow
<i>Haliaeetus leucocephalus</i> (nesting) bald eagle	Endangered FP	S2	Mountain Mahogany Scrub Great Basin Juniper Woodland Sierran White Fir Forest Jeffrey Pine Forest Lodgepole Pine Forest Lodgepole Pine Riparian Forest
<i>Pandion haliaetus</i> (nesting) osprey	W	S3	Mountain Mahogany Scrub Great Basin Juniper Woodland Sierran White Fir Forest Jeffrey Pine Forest Lodgepole Pine Forest Lodgepole Pine Riparian Forest
<i>Spizella breweri</i> (nesting) Brewer's sparrow	NL	S3	Mountain Mahogany Scrub Great Basin Juniper Woodland Sierran White Fir Forest Jeffrey Pine Forest
<i>Xanthocephalus xanthocephalus</i> (nesting) yellow-headed blackbird	SSC	S3S4	Willow Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
mammals			
<i>Aplodontia rufa californica</i> Sierra Nevada mountain beaver	SSC	S2S3	Lodgepole Pine Forest Aspen Forest Aspen Riparian Forest Lodgepole Pine Riparian Forest Willow Riparian Scrub

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
<i>Brachylagus idahoensis</i> pygmy rabbit	SSC	S3	Big Sagebrush Scrub Mountain Mahogany Scrub Great Basin Juniper Woodland Sierran White Fir Forest Jeffrey Pine Forest
mammals (cont.)			
<i>Euderma maculatum</i> spotted bat	SSC	S2S3	Mountain Mahogany Scrub Great Basin Juniper Woodland Sierran White Fir Forest Jeffrey Pine Forest Lodgepole Pine Forest
<i>Eumops perotis californicus</i> western mastiff bat	SSC	S3?	Mountain Mahogany Scrub Great Basin Juniper Woodland Sierran White Fir Forest Jeffrey Pine Forest Lodgepole Pine Forest Aspen Forest Aspen Riparian Forest Lodgepole Pine Riparian Forest
<i>Lepus townsendii townsendii</i> western white-tailed jackrabbit	SSC	S3?	Aspen Forest Big Sagebrush Scrub Mountain Mahogany Scrub Great Basin Juniper Woodland Sierran White Fir Forest Jeffrey Pine Forest Creeping Wildrye Meadow Dry Montane Meadow
<i>Martes americana sierrae</i> Sierra marten	NL	S3S4	Sierran White Fir Forest Jeffrey Pine Forest Lodgepole Pine Forest Lodgepole Pine Riparian Forest
<i>Martes pennanti</i> West Coast DPS fisher	SSC Candidate Threatened	S2S3	Lodgepole Pine Forest Aspen Forest Aspen Riparian Forest Lodgepole Pine Riparian Forest

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
<i>Myotis evotis</i> long-eared myotis	NL	S4?	Mountain Mahogany Scrub Great Basin Juniper Woodland Sierran White Fir Forest Jeffrey Pine Forest Lodgepole Pine Forest Aspen Forest Aspen Riparian Forest Lodgepole Pine Riparian Forest
mammals (cont.)			
<i>Myotis yumanensis</i> Yuma myotis	NL	S4?	Lodgepole Pine Forest Aspen Forest Aspen Riparian Forest Lodgepole Pine Riparian Forest
<i>Sorex lyelli</i> Mount Lyell shrew	SSC	S2S3	Willow Riparian Scrub Wet Montane Meadow
<i>Taxidea taxus</i> American badger	SSC	S4	Mountain Mahogany Scrub Great Basin Juniper Woodland Sierran White Fir Forest Jeffrey Pine Forest Creeping Wildrye Meadow Dry Montane Meadow
<i>Vulpes vulpes necator</i> Sierra Nevada red fox	Threatened	S1	Big Sagebrush Scrub Mountain Mahogany Scrub Great Basin Juniper Woodland Sierran White Fir Forest Jeffrey Pine Forest Creeping Wildrye Meadow Dry Montane Meadow

1. Rank or status, by agency:

CDFW = State of California under the California Endangered Species Act (CDFW, 2014c)

SSC = Species of Special Concern (CDFW, 2014d),

W = Watchlist species of limited distribution or recent decline (CDFW, 2014d),

FP = Fully Protected (take cannot be authorized except for recovery-related activities, CDFW, 2014d).

State ranking = CNDDDB State Conservation Ranking as reported by CDFW (2014d)

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.

Projects that will disturb the soil or remove vegetation that has been classified here as Big Sagebrush Scrub should include surveys to determine the presence/absence of greater sage grouse, pygmy rabbit, western white-tailed jackrabbit, and Sierra Nevada red fox. Sagebrush scrub can also occur in canopy gaps at Mountain Mahogany Scrub, Great Basin Juniper Woodland, Sierran White Fir Forest, and Jeffrey Pine Forest. Greater sage grouse have been known to choose treeless sagebrush scrub within 2 miles of the study area for nesting and brood raising (T. Taylor, personal comm.) Big Sagebrush Scrub within the study area (191 acres) is somewhat compromised for use by greater sage grouse, due to a consistent presence of coniferous trees at low frequency. Adults typically avoid trees because they can serve as predator perches. Despite the presence of trees, sagebrush-dominated habitat within the study area should be checked for grouse presence if any disturbance is to occur during the nesting season, due to the close proximity of known nesting habitat.

Big Sagebrush Scrub within the study area generally does not attain the 50% or greater cover that is most likely to support pygmy rabbit in Mono County (Larrucea and Brussard, 2008). However, the species is widespread and has been called “abundant” in the nearby Mono Basin (Beauvais, *et al.*, 2008), and they are found up to 8400 ft elevation in the Bodie Hills. Small “islands” of suitable habitat with relatively dense cover may exist within some stands. Experienced researchers caution that pygmy rabbits are adaptable to a wide variation in sagebrush cover and height, and can even occur in willow, bitterbrush, or rabbitbrush-dominated scrub at Mono Lake (Collins, 1998), as long as the soil is deep and loamy enough for burrowing (Ulmschneider, 2004). Local populations that, like pygmy rabbit, are at the edge or the species’ known range, may gain increased importance for regional diversity and genetic resiliency.

Sierra Nevada red fox occurrences are sparse and historical, but their secretive nature may allow their presence to go undetected. Like pygmy rabbits and western white-tailed jackrabbits, adult foxes are highly mobile and would be very unlikely to suffer direct impacts during construction. They may become victims of collisions with vehicles (CNDDDB, 2014e) that enter the habitat during or after project completion. Project-related surveys should be directed towards identifying scat and locating dens, if present. The likelihood of Sierra Nevada red fox occurrence in Mono County must be evaluated as lessened, as targeted surveys in 1996-2002 failed to detect even one (Perrine, *et al.*, 2010). Burrow surveys in relatively level terrain would conclusively document whether dispersal has led to a current occurrence within a project area, in any case. A burrow survey would also demonstrate presence or absence of resident pygmy rabbits. Destruction of fox or rabbit burrows with evidence of occupation during the March-September period when litters are present (Dobler and Dixon, 1990) would likely be considered “take”, which is unauthorized unless a CESA 2081(b) permit has been issued by CDFW. Projects that would erect new perches for potential raptor and raven predators of grouse, rabbits or hares would potentially impact the distribution of these species unless mitigations to deter all new predatory perching are implemented for the life of the project.

Projects that will disturb the soil or remove vegetation that has been classified here as Aspen Forest, Aspen Riparian Forest, or Lodgepole Pine Riparian Forest should include surveys for nesting Swainson's hawk, for roosting western mastiff bat and myotis bats, and for resident Sierra Nevada mountain beaver and fisher. Communities of these types provide large trees that would be suitable for Swainson's hawk nesting where they occur at the expansive meadow and marsh complex adjacent to Silver Lake. Throughout the study area, these communities provide large trees and dead standing boles that could be used for natal colonies or day roosting by western mastiff bat, long-eared myotis, and Yuma myotis. Bats were observed roosting in crevices in outcrops within the boundaries of Lodgepole Pine Riparian Forest during community mapping for this study. Mountain Mahogany Scrub, Great Basin Juniper Woodland, Sierran White Fir Forest, Jeffrey Pine Forest, and Lodgepole Pine Forest (upland setting) also provide the large trees, standing hollow boles, and outcrops with crevices that could provide roosts for western mastiff bat and long-eared myotis. Of these types, Downcanyon Lodgepole Pine Forest occurrences are sufficiently close to water to also provide potential habitat for Yuma myotis. Sierran White Fir Forest and Jeffrey Pine Forest provide the coarse woody debris, snags, and occasional large-diameter tree boles that could be used by Sierra marten as thermally advantageous den sites, and cover and habitat for prey species such as chipmunks. Sierra Marten locally can even occur in thinned or recovering forest if these habitat features are present (Kucera, 1996). Large downed tree boles that could be used by denning Sierra Nevada mountain beaver, Sierra marten or fisher are also present to some lesser degree (due to widespread clearing to reduce danger of wildfire in the urban-forest interface) in Lodgepole Pine Riparian Forest and at Lodgepole Pine Forest where it occurs adjacent to a riparian zone.

Upland communities with large standing trees, including Mountain Mahogany Scrub, Great Basin Juniper Woodland, Sierran White Fir Forest, Jeffrey Pine Forest, and Lodgepole Pine Forest, also have some likelihood to be chosen for nesting by bald eagle and osprey. A bald eagle nest is active near housing along the southwestern edge of June Lake. The pair has chosen a large pine in an area of relatively low tree canopy closure at the fringe of existing housing (S. Farley, personal comm.) Ospreys are commonly observed foraging at aquatic habitats across the area, but nests within the study area are only suspected at this time. These community types may also serve as nesting habitat for Brewer's sparrow, because they include scrub vegetation growing between trees having clumped distributions (e.g., most Mountain Mahogany Scrub occurrences) or in canopy gaps (all upland Forest types except Lodgepole Pine Forest). These types may also provide suitable natal colony or day roosting habitat for spotted bat, as some occurrences include large, relatively undisturbed outcrops with crevices. Finally, these types may provide suitable habitat for American badger, which would produce characteristically enlarged burrows as a sign of residence.

Projects that will disturb Willow Riparian Scrub or Wet Montane Meadow should include survey work that is appropriately timed to determine whether breeding populations of yellow warbler, willow flycatcher, and yellow-headed blackbird are present. Wet Montane Meadow is included because study area occurrences are never entirely treeless. Most have clumped, relatively isolated willows, and all are immediately adjacent to densely treed Willow Riparian Scrub. Yellow warbler and willow flycatcher surveys should also be extended to any areas of Aspen Forest, Aspen Riparian Forest, or Lodgepole

Riparian Forest that may be affected, as occurrences of these community types often include perennial surface water and a dense subcanopy of typical Willow Riparian Scrub dominants (Table 32). Much of Reversed Creek above its confluence with Rush Creek features Lodgepole Pine Riparian Forest with an interrupted corridor of willows that narrowly adhere to its banks. Yellow-headed blackbird could also choose study area Freshwater Marsh vegetation for nesting. Breeding behavior was observed among yellow-headed blackbirds at Gull Lake during mapping for this study in May 2014. Northern harrier have some potential to nest at the large meadow and marsh complex mapped as Willow Riparian Scrub and Wet Montane Meadow adjacent to Silver Lake. Mount Lyell shrew has some potential to occur where the Willow Riparian Scrub and Wet Montane Meadow herbaceous cover is densely grassy. All of these habitats, where they include rocky banks or moist, rocky near-bank habitat, could potentially provide habitat for Mount Lyell salamander.

Projects that will disturb drier meadow margins and ecotones with upland scrub or forest that are classified here as Creeping Wildrye Meadow or Dry Montane Meadow should include surveys for presence of western white-tailed jackrabbit, American badger, and Sierra Nevada red fox. It is very unlikely that either community type would be used for chick-rearing by greater sage grouse, as all occurrences within the study area are highly isolated within an otherwise urbanized or forested local landscape. Mule deer of the Casa Diablo migratory herd were observed using Creeping Wildrye Meadow, Dry Montane Meadow, Wet Montane Meadow, and even disturbed resort lawns for foraging. They have been known to use the Downcanyon Lodgepole Pine Forest (upland type), which feature often dense meadow assemblages in the understory and at tree canopy gaps, for annual fawning and early natal fawn raising (T. Taylor, personal comm.) Any project that could cause loss of Creeping Wildrye Meadow, Dry Montane Meadow, or Wet Montane Meadow, or of deer fawning, concealment, or movement corridor habitat, should include an assessment of the potential impact to the Casa Diablo mule deer herd.

Lee Vining

Plant Communities and Species

Development with conversion of vegetation communities at Lee Vining has been relatively centralized, occurring mainly along the U.S. Hwy. 395 transportation and communication corridor to the south and north of where the highway crosses over Lee Vining Creek. Urban habitat development is rather complete, in the sense that isolated native habitat patches or corridors of native vegetation do not occur among the houses and businesses of central Lee Vining (Figure 12). Development has displaced mainly upland sagebrush scrub of the near-shore habitat bordering Mono Lake. The only scrub vegetation with remaining native character is at the study area margins, where it is contiguous with expansive stands that extend north, south and east into the largely undisturbed Mono Basin Scenic Area. In contrast, Lee Vining Creek retains characteristics of undisturbed riparian forest and scrub that include (on either side of the large culverts under Hwy 395) a relatively uninterrupted canopy of trees, dense understory growth and plant debris accumulations, and a seasonally dynamic, high energy central channel and spring flood channel hydrology. There remains a verdant growth of a high diversity of native species at Lee Vining Creek, without ongoing impacts from livestock grazing.

The entire landscape is weedy, or becoming so. As in nearly every Mono County study area that was included here, Lee Vining landscaping plantings frequently include Siberian elm (*Ulmus pumila*), which has high potential to spread into otherwise native riparian habitats such as Lee Vining Creek. Naturalized weeds that are similarly typical of Mono County disturbed habitats, including cheatgrass (*Bromus tectorum*), tumble mustard (*Sisymbrium altissimum*), prostrate knotweed (*Polygonum aviculare* ssp. *depressum*), clasping peppergrass (*Lepidium perfoliatum*), tansy mustard (*Descurainia sophia*), crested wheatgrass (*Agropyron cristatum* ssp. *pectinatum*), woolly mullein (*Verbascum thapsus*), Russian thistle (*Salsola tragus*), and white sweetclover (*Melilotus albus*), are all present at Lee Vining. As usual, cheatgrass and to a lesser degree tumble mustard, tansy mustard, and Russian thistle are spreading into relatively less disturbed adjacent habitats, with their locus for spread consistently being the highway. But some weeds that are typical of unincorporated town areas laying both north and south along Hwy 395, including summer cypress (*Kochia scoparia*) and horned smotherweed (*Bassia hyssopifolia*), were not found during surveys in 2013 and 2014.

Upland plant communities at Lee Vining were classified as Big Sagebrush Scrub and Great Basin Mixed Scrub in about equal portions (Table 35). Small areas of Mountain Mahogany Scrub, and the sensitive Mixed Montane Chaparral alliance Bitter Cherry Thicket (a potential wetland community type), occur at the outer margins of the Lee Vining Creek riparian zone. Riparian vegetation at Lee Vining was mapped as Aspen Riparian Forest. Occasional larger Jeffrey pine trees patchily form a loose overcanopy in this community. The vertical habitat structure at the riparian corridor is not matched anywhere else within the undeveloped study area. Trees are otherwise widely scattered and small, except for planted non-natives in town. The only other apparent vegetative responses to elevated groundwater availability are small patches classified as either Utah Serviceberry Thicket or the Willow Riparian Scrub alliance Sandbar Willow Thicket. Utah Serviceberry Thicket is a locally rare community type. In Lee Vining, small clumps of these two communities narrowly demarcate a series of seep zones that is traceable parallel

the Hwy 395 both to the north and to the south of its junction with State Hwy 120 (Figure 12). None of these seeps has created a recognizable outflow channel. One additional seasonal seep may exist at the landscaped outer edge of the school’s playing field. Communities that are recognizable as meadows do not occur, even in association with the riparian corridor or seep zones.

Table 35. Plant communities that were mapped within the 642 acre Lee Vining study area in 2014. The study area includes 193 acres that have been converted to houses, roads, and other impervious surfaces. Community names (after Holland, 1986) are cross-referenced to the CDFG (2010) classification and 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		
Big Sagebrush Scrub 35.110.07	Big Sagebrush Shrubland <i>Artemisia tridentata</i> - <i>Purshia tridentata</i>	224
Big Sagebrush Scrub 35.110.01	Big Sagebrush Shrubland <i>Artemisia tridentata</i> - <i>Ericameria nauseosa</i>	10
Great Basin Mixed Scrub 35.200.00*	Bitterbrush Shrubland <i>Purshia tridentata</i> - <i>Artemisia tridentata</i>	202
Mountain Mahogany Scrub 76.200.01	Curl-leaf Mountain Mahogany Scrub <i>Cercocarpus ledifolius</i> - <i>Artemisia tridentata</i>	1.2
potential wetland communities at seep zones		
Aspen Forest 61.111.06*	Aspen Grove <i>Populus tremuloides</i> - <i>Artemisia tridentata</i>	0.4
Mixed Montane Chaparral 37.900.00	Bitter Cherry Thicket <i>Prunus emarginata</i> - <i>Shepherdia argentea</i>	0.2
Mixed Montane Chaparral closest fit 35.200.00*	Utah Serviceberry Thicket <i>Amelanchier utahensis</i> - <i>Purshia tridentata</i>	0.8
Willow Riparian Scrub 61.209.00	Sandbar Willow Thicket <i>Salix exigua</i> - <i>Rosa woodsii</i>	0.5
riparian wetland communities		
Aspen Riparian Forest 61.111.10*	Aspen Grove <i>Populus tremuloides</i> - <i>Rosa woodsii</i> / <i>Cornus sericea</i>	9.1

Soils are mainly granitic sands and gravels associated with deposition on the Lee Vining Creek fan where it exits the Sierra Nevada range and enters the Mono Lake Basin. However, the higher post-glacial lake levels resulted in significant deposits of pumice-based sand and gravel throughout the study area, in wave berms that remain visible in Big Sagebrush Scrub and Great Basin Mixed Scrub. Transitions between mature big sagebrush and bitterbrush predominance in these two communities often parallel

relic wave berm microtopography. Assemblages that suggest significantly elevated soil salinity or alkalinity, however, do not occur at Lee Vining as they do elsewhere in the Mono Lake Basin. Beyond development, which includes a large pumice mine and a municipal airport, vegetation east of Highway 120's intersection with U.S. Hwy 395 has been recently (and visibly) influenced by wildfire. Large blocks of former tall and dense mixed scrub and pinyon woodland were completely destroyed by fire in 2000, and the vegetation now is classifiable as seral Big Sagebrush Scrub. Seral return to the condition of unburned Big Sagebrush Scrub or Bitterbrush Shrublands in local stands that average up to 5 ft height and 40-50% living canopy cover (*e.g.*, stands classified as Great Basin Mixed Scrub between the airport and pumice mine) following total canopy loss across the southernmost portion of the study area appears to be delayed or even patchily arrested due to heavy cheatgrass infestation. Subcommunity-sized stands of nearly pure cheatgrass that may be classified as Non-Native Annual Grassland persist in this community as of the 2014 survey date.

Revegetation may fail to successfully mitigate for impacts associated with conversion losses, unless the pattern of the dominant shrub species' distributions in relatively undisturbed upland scrub is accounted for. Mitigative revegetation would have greater likelihood to succeed if plantings take into account local berm aspect, for example by modeling the palette upon reference stands in the relatively undisturbed northernmost portion of the study area. The pattern of shrub canopy dominance shifts generally include higher shrub diversity on the berm faces having a northern-facing aspect, contrasting with relatively pure stands of short to stunted big sagebrush in the shallowly depressed topography between berms. Ideally, husbandry would include suppression of cheatgrass. Where such berms are absent (often due to historical leveling), recovery has generally favored development of mixed stands with a preponderance of bitterbrush, an important mule deer forage plant.

Lee Vining Creek flows in a gorge-like canyon, bisecting the predominantly upland vegetation of the study area. The ecotones of the relatively densely vegetated riparian zone are abrupt. This corridor is continuous with segments westward up Lee Vining Canyon, and also with an uninterrupted corridor to the stream's confluence with Mono Lake. Most of the riparian cover should be considered recently developed or developing, and likely the Aspen Riparian Forest there is relatively dynamic in terms of extent, cover and species composition. This section of Lee Vining Creek conducts strong perennial flows under normal conditions now, but was nearly or completely dewatered during 1947-1986 under Los Angeles Department of Water and Power management, causing loss of the tree canopy except for a few large pines and aspen immediately north of U.S. Hwy 395 (LADWP, 1993). Living tree cover now is 40-70% streamside, consisting of mainly quaking aspen (*Populus tremuloides*) and six species of willows ranging between 10 ft to 30 ft in height in the subcanopy. The understory is dense and remarkably diverse, and the assemblage features a clear prevalence of hydrophytic species (App. B).

Aspen Riparian Forest at Lee Vining Creek provides a rather undisturbed corridor of cover for wildlife movement and critical life stage uses such as nesting. Exceptions are a hydropower facility and large culverts that convey the flow under the four-lane U.S. Hwy 395. Large conifers that grow within the corridor could provide nesting locations for raptors and day roosting locations for bats that depend upon nearby Mono Lake shoreline habitats. The dense aspen and pine trees collectively provide shade for the perennial Lee Vining Creek flow, which supports a well-known trout fishery. They also stabilize

the banks of its high-energy main channel, and create microhabitat conditions that allow for an increased diversity of subcanopy willows and other native plant cover. Aspen Riparian Forest trees function to maintain the channel's elevation, which would in their absence likely be down-cutting now in response to a significant diversion-related lowering of Mono Lake's level. Possibly as a consequence of the downcutting that has historically occurred, there are no meadow assemblages present either streamside or at the buffer zone between riparian and upland communities in the study area.

Sensitive Plant Communities and Species

Big Sagebrush Scrub is considered common and widespread throughout Mono County and the Great Basin. Utah Serviceberry Thicket, which is a visually distinct and taller vegetation patch at one seep zone location, is embedded in otherwise unremarkable sagebrush scrub. The abrupt shift to bitterbrush as a co-dominant at this Utah Serviceberry Thicket is sufficient to recognize the assemblage as state Sensitive (CDFG, 2010) as well as locally rare. Silver Buffaloberry Thicket is also a locally rare assemblage, found in Mono County only at isolated springs and therefore subject to long-term livestock grazing and trampling impacts. The example within the study area is not grazed by livestock, increasing its value as a rare community type, but even such relatively undisturbed communities of this type have not been recognized at the level of the State as Sensitive. Openings in the Big Sagebrush Scrub canopy or internally drained basins featuring pumice ash or gravel soils, as would be expected at the Sensitive community Mono Pumice Flats, do occur in the swale-like low areas between relic wave berms. These habitats are associated with stunting of the dominant shrubs. While no species assemblages featuring typical Mono Pumice Flats dominants such as Parry's rabbitbrush (*Ericameria parryi*) or western needlegrass (*Stipa occidentalis*) were found, environmental analyses that include Big Sagebrush Scrub community mapping on pumice soils should include searches for occurrence of the CDFW Sensitive Mono Pumice Flats plant community.

Great Basin Mixed Scrub, having a greater bitterbrush shrub canopy component relative to co-dominant big sagebrush, is considered Sensitive by CDFW (CDFG, 2010). These and all stands where bitterbrush is dominant are currently threatened by naturalized cheatgrass, which is a noxious weed (invasive potential considered High by Cal-IPC, 2013) that increases fire spread in native shrublands. Within the study area, it is likely that 42 acres of former Great Basin Mixed Scrub were removed by the May 2000 wildfire. More recently, a trend toward fire-related loss of this community type has been noted for Mono County (Sawyer, *et al.*, 2009). Stands remaining unburned near the airport connect Lee Vining Creek to the expansive shrublands of the southern Mono Lake Basin and Pumice Valley, and exhibit a high abundance of browse sign and movement use by mule deer. Average height of stands where wave berm topography is absent is consistently 5 ft or higher, with densities approaching 50% living cover at the community scale. As is typical for the Lee Vining area, abundances of native grasses and other perennial herbs are generally very low, on average collectively contributing at most 1-5% of total vegetative cover. Further removal this scrub could limit its connectivity to Lee Vining Creek and its overall utility for mule deer.

Communities that are dominated by quaking aspen tree are also considered Sensitive by CDFW. At a finer scale, patches within this community could be mapped as Great Basin Riparian Forest (*Populus trichocarpa* – *Populus tremuloides*), which is also a Sensitive community type (CDFG, 2010). The young population structure of emerging (sapling) black cottonwood is an indication that this community is yet in recovery from decades of dewatering of this reach of Lee Vining Creek. Aspen Riparian Forest includes several species of native willows, and is the most diverse of the communities found within the study area. Non-native species that have joined the assemblage include Siberian elm, cheese weed (*Malva parviflora*), alfalfa (*Medicago sativa*), and bouncing bet soapwort (*Saponaria officinalis*). As diversions have now lessened, a continued trajectory toward the development of this community toward Black Cottonwood Riparian Forest can be expected.

A total of 17 sensitive plant species and one sensitive lichen species have some likelihood to occur within the Lee Vining study area (Table 36). No known populations of sensitive species within Lee Vining were uncovered in the literature search. Mono milkvetch is state listed as Rare, and is considered Sensitive by regional BLM and USFS offices. Mono milkvetch is endemic to the Mono Lake Basin and a few other nearby depressions where vegetation is sparse and nutrient-poor pumice gravel soils are present. Booth’s evening primrose and intermontane lupine, which are the only annuals on the list, are also the only sensitive species that have some likelihood to occur in mechanically disturbed habitats.

Table 36. Potentially occurring sensitive plant species in the available plant communities at the Lee Vining study area. Flowering period is taken from CNPS (2014).

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Allium atrorubens</i> var. <i>atrorubens</i> Great Basin onion bulbiferous herb	2B.3	S2	May-June	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Mixed Montane Chaparral Aspen Forest Willow Riparian Scrub
<i>Astragalus monoensis</i> Mono milkvetch herbaceous perennial	1B.2	S2	June-August	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub
<i>Boechera cobrensis</i> Masonic rockcress herbaceous perennial	2B.3	S1S2	June-July	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Mixed Montane Chaparral Aspen Forest

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Botrychium crenulatum</i> scalloped moonwort rhizomatous herb	2B.2	S2	sporangia June-Sept	Aspen Riparian Forest
<i>Botrychium lunaria</i> common moonwort rhizomatous herb	2B.3	S2?	sporangia August	Aspen Riparian Forest
<i>Chaetadelpha wheeleri</i> Wheeler's dune-broom rhizomatous herb	2B.2	S2	April-Sept	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub
<i>Cusickiella quadricostata</i> Bodie Hills cusickiella herbaceous perennial	1B.2	S2	May-July	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub
<i>Eremothera boothii</i> ssp. <i>boothii</i> Booth's evening primrose herbaceous annual	2B.3	S2	April-Sept	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Mixed Montane Chaparral Aspen Forest Willow Riparian Scrub
<i>Lupinus duranii</i> Mono Lake lupine herbaceous perennial	1B.2	S2	May-August	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub
<i>Lupinus pusillus</i> var. <i>intermontanus</i> intermontane lupine herbaceous annual	2B.3	S2	May-June	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub
<i>Mentzelia torreyi</i> Torrey's blazing star herbaceous perennial	2B.2	S2	June-August	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub
<i>Peltigera gowardii</i> aquatic felt lichen lichen	-	S3	July-August	Aspen Riparian Forest

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Potamogeton robbinsii</i> Robbins' pondweed rhizomatous herb	2B.3	S3	July-August	Aspen Riparian Forest
<i>Silene oregana</i> Oregon campion herbaceous perennial	2B.3	S2	July-Sept	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub
<i>Streptanthus oliganthus</i> Masonic Mountain jewelflower herbaceous perennial	1B.2	S2	June-July	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub
<i>Stuckenia filiformis</i> <i>ssp. alpina</i> slender-leaved pondweed rhizomatous herb	2B.2	S3	May-July	Aspen Riparian Forest
<i>Tetradymia tetrameres</i> dune horsebrush shrub	2B.2	S2	August	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub
<i>Viola purpurea ssp. aurea</i> golden violet herbaceous perennial	2B.2	S2S3	April-June	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Mixed Montane Chaparral Aspen Forest Willow Riparian Scrub

1. Rank or status, by agency:

CNPS = California Native Plant Society listings (CNPS, 2001, 2014)

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 occurrences threatened or no current threats known).

CNDDDB = California Natural Diversity Data Base rankings (CDFW, 2014b)

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

? indicates CNDDDB uncertainty in assigning rank.

Projects that will disturb the soil or remove vegetation that has been classified here as Big Sagebrush Scrub, Great Basin Mixed Scrub, or Mountain Mahogany Scrub should include pre-project surveys to determine whether the project could impact the potentially occurring sensitive plant species Great Basin onion, Mono milkvetch, Masonic rockcress, Wheeler's dune broom, Bodie Hills cusickiella, Booth's evening primrose, Mono Lake lupine, intermontane lupine, Torrey's blazing star, Oregon champion, Masonic Mountain jewelflower, dune horsebrush, and golden violet. Projects that would disturb the relatively dry, scrubby assemblages classified here as Mixed Montane Chaparral, Aspen Grove, and Sandbar Willow Thicket should also include surveying for Great Basin onion, Booth's evening primrose, and golden violet. The relatively large expanses of Big Sagebrush Scrub and Great Basin Mixed Scrub could include small, embedded examples of Mono Pumice Flats or similarly open habitat suitable for Mono milkvetch and Mono Lake lupine. Relatively lower terrain between relic wave berms exhibit characteristics of low-fertility pumice soils that have added likelihood for Mono milkvetch and Mono Lake lupine presence. These communities may also include dune-like areas or small, wind-disturbed, sandy inclusions that have added likelihood for Wheeler's dune broom, intermontane lupine, and dune horsebrush.

Projects that will disturb the soil or remove vegetation that has been classified here as Aspen Riparian Forest at the Lee Vining Creek riparian zone should include pre-project surveys to determine whether the project could impact the potentially occurring sensitive plant species scalloped moonwort, common moonwort, Robbins' pondweed, and slender-leaved pondweed. Projects that would affect the water quality or the seasonal pattern of channelized flow, or alter the existing bed or banks of Lee Vining Creek could indirectly impact occurring moonworts if shading currently provided by riparian trees is affected. Such activities could directly impact the aquatic pondweeds by drying the habitat or increasing channel cutdown and energy to the point that quieter water needed for growth of these species becomes unavailable. Mitigations targeting removal of invasive Siberian elm or other non-native species from the ecologically valuable Lee Vining Creek riparian forest corridor would significantly encourage native plant recovery, may enhance the habitats for potentially occurring sensitive species, and would benefit wildlife that frequently use riparian and aquatic resources, including mule deer.

Sensitive Wildlife

Based upon the available scrub and riparian communities identified within the Lee Vining study area, a total of 16 sensitive animal species were identified as having some potential to nest there or reside in the available habitats (Table 37). Bald eagles (*Haliaeetus leucocephalus*) have been known to winter in small numbers along the western shore of Mono Lake (Mono County Planning Department, 1990) and have been observed perching at the mouth of Lee Vining Creek (USFS, 1988). While they may forage along Lee Vining Creek, nesting within the study area is very unlikely due to lack of large, isolated pines in the available habitat. Long-eared owl, although not listed in CNDDDB records for the region, was added due to recent reporting of an individual near the western shore of Mono Lake, about two miles north. One young individual was seen perching in a mesic willow stand there in June of 2012 (Caltrans, 2012).

Table 37. Sensitive wildlife species that could potentially occur within the Lee Vining study area. Key to status codes (CDFG, 2011) is given below, NL = not listed.

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
amphibians			
<i>Hydromantes platycephalus</i> Mount Lyell salamander	SSC	S3	Aspen Riparian Forest Willow Riparian Scrub
birds			
<i>Asio otus</i> (nesting) long-eared owl	SSC	S2	Aspen Riparian Forest
<i>Centrocercus urophasianus</i> Bi-State DPS (nesting, leks) greater sage grouse	SSC	S3	Big Sagebrush Scrub Great Basin Mixed Scrub
<i>Dendroica petechia breweri</i> (nesting) yellow warbler	SSC	S2	Aspen Riparian Forest
<i>Empidonax traillii</i> (nesting) willow flycatcher	Endangered	S1	Aspen Riparian Forest
<i>Pandion haliaetus</i> (nesting) osprey	W	S3	Aspen Riparian Forest
<i>Riparia riparia</i> (nesting) bank swallow	Threatened	S2S3	Big Sagebrush Scrub (at Lee Vining Creek Canyon)
<i>Spizella breweri</i> (nesting) Brewer's sparrow	NL	S3	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub
mammals			
<i>Aplodontia rufa californica</i> Sierra Nevada mountain beaver	SSC	S2S3	Aspen Riparian Forest
<i>Brachylagus idahoensis</i> pygmy rabbit	SSC	S3	Big Sagebrush Scrub Great Basin Mixed Scrub

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
mammals (cont.)			
<i>Eumops perotis californicus</i> western mastiff bat	SSC	S3?	Aspen Riparian Forest
<i>Lepus townsendii townsendii</i> western white-tailed jackrabbit	SSC	S3?	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Aspen Forest Mixed Montane Chaparral
<i>Myotis evotis</i> long-eared myotis	NL	S4?	Aspen Riparian Forest
<i>Myotis yumanensis</i> Yuma myotis	NL	S4?	Aspen Riparian Forest
<i>Taxidea taxus</i> American badger	SSC	S4	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Aspen Forest Mixed Montane Chaparral
<i>Vulpes vulpes necator</i> Sierra Nevada red fox	Threatened	S1	Big Sagebrush Scrub Great Basin Mixed Scrub Mountain Mahogany Scrub Aspen Forest Mixed Montane Chaparral

1. Rank or status, by agency:

CDFW = State of California under the California Endangered Species Act (CDFW, 2014c)

SSC = Species of Special Concern (CDFW, 2014d),

W = Watchlist species of limited distribution or recent decline (CDFW, 2014d).

State ranking = CNDDDB State Conservation Ranking as reported by CDFW (2014d)

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.

Willow flycatcher is state and federally listed as Endangered. Greater sage grouse has been proposed as Threatened (with final decision expected in mid-2015) under the federal Endangered Species Act. The Parker Meadows population of the greater sage grouse Bi-State DPS is known to use

breeding habitat within five miles of the study area, and some of the study area has been included within the proposed Critical Habitat for the species' recovery (USFWS, 2013b). The State of California lists Sierra Nevada red fox and bank swallow as Threatened. There are no cliff habitats that could be used by peregrine falcons (*Falco peregrines*). Once extirpated from Mono County, a few were re-introduced to upper Lee Vining Creek Canyon in 1988 (USFS, 1988), but none have subsequently appeared in CNDDDB records for the Mono Basin region. Osprey nesting in the Mono Lake Basin will typically choose tufa at nearby Mono Lake, but in other settings nest in large pines that are near their aquatic foraging habitat. The overcanopy pines at the Lee Vining Creek corridor are located within one mile of Mono Lake. On the other hand, study area pines appear to be too sparsely arrayed to provide nesting habitat for forest raptors of the region such as northern goshawk (*Accipiter gentilis*).

Aquatic habitat present within the Lee Vining study area at Lee Vining Creek is very unlikely to support populations of the sensitive amphibians Yosemite toad (*Anaxyrus canorus*, species is federal listed as Threatened) and Sierra Nevada yellow-legged frog (*Rana sierrae*, federal Endangered). The Lee Vining Creek drainage has a long history as a non-native trout fishery. Being effective predators of the listed amphibians, non-native trout presence was identified as a primary driver for loss of populations for both species (USFWS, 2014). Yosemite toad does occur within the uppermost reaches of the Lee Vining Creek watershed, but the lower reach that intersects the study area is well below the elevation of regional known populations and proposed Critical Habitat. Sierra Nevada yellow-legged frog does not occur anywhere in the watershed (CDFW, 2013). It is very unlikely that either species could immigrate into the study area by overcoming the significant ecological barriers that now exist, including the substantial overland travel that would be required, trout-laden waters, and dams on Upper Lee Vining Creek.

Projects that will disturb the soil or remove upland vegetation that has been classified here as Big Sagebrush Scrub or Great Basin Mixed Scrub should include surveys to determine the presence or absence of greater sage grouse, Brewer's sparrow, pygmy rabbit, western white-tailed jackrabbit, American badger, and Sierra Nevada red fox. Dense and tall stands of big sagebrush and bitterbrush are available within nearly every occurrence. Ecological barriers to dispersal into scrub communities north of U.S. Hwy 395 from known Mono Basin populations of pygmy rabbit and for other sensitive species that potentially may be present are not substantial. Big Sagebrush Scrub habitat occurring within the steep slopes of the Lee Vining Creek Canyon and pumice mine spoils may contain natural or man-made, very steep and open banks that would be suitable for nesting bank swallows. The nearest active colony is at berms created to pond water for ranching use. The small curl-leaf mountain mahogany stand mapped here as Mountain Mahogany Scrub recently was altered by fire, but if disturbance of this near-stream area is planned, field surveys should be done for nesting Brewer's sparrow, and for western white-tailed jackrabbit, American badger, and Sierra Nevada red fox burrows. Occupied burrows for these three mammals could also potentially be found in Aspen Forest and Mixed Montane Chaparral. Stands with relatively higher big sagebrush contribution, which are found mainly to the west and north of the town, include <1% to 5% cover by small singleleaf pinyon (*Pinus monophylla*), a species that under current conditions is invading into scrub and thereby reducing its suitability for sensitive wildlife such as pygmy rabbit and greater sage grouse.

Projects that will disturb the soil or remove vegetation that has been classified here as Aspen Riparian Forest or Willow Riparian Scrub should include surveys to determine whether Mount Lyell salamander. Projects that will disturb Aspen Riparian Forest should also include surveys to determine whether Sierra Nevada mountain beaver, or nesting yellow warbler, willow flycatcher, osprey, or roosting western mastiff bat, long-eared myotis, or Yuma myotis are present. Large riparian trees that survived channel dewatering, and hollow trees and large standing snags that are present in Aspen Riparian Forest could be used by sensitive bats for day roosting or natal colony establishment. These bats may also potentially use the Lee Vining Creek culverts under Hwy 395. Western mastiff bats may also roost in buildings that are not in regular use. Nesting yellow warbler and willow flycatcher potentially may use the understory willows in Aspen Riparian Forest for nesting during the period March 15 through September 15.

Bridgeport

Plant Communities and Species

The Bridgeport study area includes the area immediately south and east of Bridgeport Reservoir in the easternmost part of Bridgeport Valley. Central Bridgeport occupies a small portion of the basin flatlands that characterize the wider Bridgeport Valley, while additional development has sprawled into the foothills where they abut the Valley. Basin flatlands in this area are densely vegetated, whether through long-established water spreading practices or due to naturally occurring shallow groundwater and artesian springs. Numerous conveyances of irrigation water as well as springfed seasonal and perennial discharges intersect the study area, as does the East Walker River as it enters the Bridgeport Reservoir. Further flatlands development would impact Bridgeport Valley's natural and irrigated meadow and willow scrub habitats and may affect water quality in the East Walker Hydrologic Unit. The potential for disturbing naturally occurring and relatively undisturbed vegetation is perhaps greater in the hilly portions of the study area, east and southeast outside of the Bridgeport central district. Plant communities there are crossed by many unimproved roadways, but retain primarily native species composition, relatively undisturbed cover, and community connectivity to habitats of the Bodie Hills on public lands (Figure 13).

Irrigated flatlands that are currently managed as livestock pasture have developed vegetation communities that were classified as Wet Montane Meadow, Creeping Wildrye Meadow, and Dry Alkaline Meadow. Management has maintained or created seasonal or perennial flows and shallow groundwater tables that annually (at least seasonally) saturate the rooting zone for plants. Due to the long history of this management, soils in Bridgeport Valley have developed reductimorphic characters associated with wetland meadow hydrology (Curry, 1996). Irrigated pastures (grazed or ungrazed) therefore likely beneficially function to store, filter, and release tributary flows to the East Walker River. Irrigated flatlands that are managed to provide pasture now widely support the weediest of the local plant assemblages, with a total 20 non-native species found in 2013-2014. There is ubiquitous presence of cheatgrass (*Bromus tectorum*). Sparser but equally widespread populations of species that are typical of agriculturally disturbed areas, including Kentucky bluegrass (*Poa pratensis*), hoary cress (*Lepidium* spp.), white goosefoot (*Chenopodium album*), prickly lettuce (*Lactuca serriola*), cheese weed (*Malva parviflora*), horned smotherweed (*Bassia hyssopifolia*) and white sweetclover (*Melilotus albus*), are all more or less confined to occurrence at irrigated pasture or the adjoining roadsides. Non-native species such as Russian thistle (*Salsola tragus*), tumble mustard (*Sisymbrium altissimum*), tansy mustard (*Descurainia sophia*), and cheatgrass are the chief pioneer colonists of mechanically disturbed uplands, and have also spread into the nearby upland communities.

Limited examples of naturally maintained Montane Freshwater Marsh, Wet Montane Meadow, Willow Riparian Scrub, Creeping Wildrye Meadow, and Dry Alkaline Meadow occur at artesian flows and long-standing drainage conveyances throughout the Bridgeport study area. Plant diversity and cover are typically low at study area occurrences, even in situations where grazing is excluded. Local wetlands clearly exhibit an apparent history of use and manipulation. The Freshwater Marsh (*sensu* Holland's Transmontane Freshwater Marsh) classification recognizes emergent vegetation that is sparsely found

streamside at East Walker River, and marginally in habitats that are perennially flooded or saturated by Bridgeport Reservoir. These wetland communities (Table 38) visibly transition to upland Big Sagebrush Scrub or Rubber Rabbitbrush Scrub In irrigated systems, or to Black Greasewood Scrub at naturally watered occurrences.

Table 38. Plant communities that were mapped within the 1138 acre Bridgeport study area in 2014. The study area includes 1.3 acres converted to cropping systems, 26 acres of seasonally flooded lakebed, and 323 acres (including a 25 acre landfill site) that have been completely devegetated or converted to houses, roads, and other impervious surfaces. Community names (after Holland, 1986) are cross-referenced to the CDFG (2010) classification and 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		
Big Sagebrush Scrub 35.111.02	Big Sagebrush Shrubland <i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	191
Big Sagebrush Scrub 35.111.00	Big Sagebrush Shrubland <i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>	16
Big Sagebrush Scrub 35.110.01	Big Sagebrush Shrubland <i>Artemisia tridentata</i> - <i>Ericameria nauseosa</i>	89
Big Sagebrush Scrub 35.110.00	Big Sagebrush Shrubland <i>Artemisia tridentata</i> - <i>Chrysothamnus viscidiflorus</i>	132
Big Sagebrush Scrub 35.110.00	Big Sagebrush Shrubland <i>Artemisia tridentata</i> - <i>Prunus andersonii</i>	3.1
Big Sagebrush Scrub 35.110.07	Big Sagebrush Shrubland <i>Artemisia tridentata</i> - <i>Purshia tridentata</i>	14
Black Greasewood Scrub 36.400.00*	Black Greasewood Shrubland <i>Sarcobatus vermiculatus</i> - <i>Distichlis spicata</i>	8.7
Rubber Rabbitbrush Scrub 35.310.00	Rubber Rabbitbrush Shrubland <i>Ericameria nauseosa</i> - <i>Artemisia tridentata</i>	57
Rubber Rabbitbrush Scrub 35.310.00	Rubber Rabbitbrush Shrubland <i>Ericameria nauseosa</i> - <i>Elymus triticoides</i>	4.7
Pinyon-Juniper Woodland 87.040.00	Singleleaf Pinyon Woodland <i>Pinus monophylla</i> - <i>Juniperus grandis</i>	70
Non-Native Grassland 42.020.00	Cheatgrass Grassland <i>Bromus tectorum</i> - <i>Salsola tragus</i>	1.3

Holland name and CDFW classification number	Alliance and primary association names	acreage in study area
wetland communities and potential created wetland communities		
Willow Riparian Scrub 61.201.00	Arroyo Willow Thicket <i>Salix lasiolepis-Salix exigua</i>	0.8
Willow Riparian Scrub 61.209.00	Sandbar Willow Thicket <i>Salix exigua-Salix lasiolepis</i>	5.3
Willow Riparian Scrub 61.209.00	Sandbar Willow Thicket <i>Salix exigua-Rosa woodsii</i>	1.5
Montane Freshwater Marsh 52.103.02	Cattail Marsh <i>Typha latifolia</i>	0.5
Wet Montane Meadow 45.562.04	Baltic Rush Marsh <i>Juncus balticus-Carex praegracilis</i>	6.3
Wet Montane Meadow 45.130.00	Nebraska Sedge Meadow <i>Carex nebrascensis</i>	8.9
Creeping Wildrye Meadow 41.080.00*	Creeping Rye Grass Turf <i>Elymus triticoides-Juncus balticus</i>	59
Creeping Wildrye Meadow 41.080.00*	Creeping Rye Grass Turf <i>Elymus triticoides-Carex praegracilis</i>	35
Creeping Wildrye Meadow 41.080.01*	Creeping Rye Grass Turf <i>Elymus triticoides-Juncus balticus</i>	2.4
Dry Alkaline Meadow 41.200.05	Salt Grass Flats <i>Distichlis spicata-Juncus balticus</i>	37
Dry Alkaline Meadow 41.200.00	Salt Grass Flats <i>Distichlis spicata-Poa secunda-Puccinellia lemmonii</i>	31
Dry Alkaline Meadow 41.200.00	Salt Grass Flats <i>Distichlis spicata-Amphiscirpus nevadensis</i> - <i>Juncus balticus</i>	5.6
Dry Alkaline Meadow 41.200.00	Salt Grass Flats <i>Distichlis spicata-Elymus triticoides</i> - <i>Juncus balticus</i>	6.5

A high percentage of the prominent species in all communities supported by mesic conditions, whether irrigated or not and whether grazed or not, have been classified by federal regulators (ACOE, 2012) as adapted to wetland habitats (App. B). Permits normally required under Clean Water Act law would possibly be required for projects that propose to disturb the vegetation, alter the bed or banks, or change the flow timing or magnitude within any area where the community has been classified as a wetland or potential wetland community. A formal delineation of the extent of jurisdictional wetland and tributary resources that is performed with methodology appropriate to address whether criteria for wetland soils and hydrology are satisfied would be needed to apply for such a permit.

Upland Big Sagebrush Scrub and Pinyon-Juniper Woodland are the dominant vegetation types on private lands of the rolling hills adjacent to the Bridgeport Valley floor. The habitat of these plant communities generally lacks naturally occurring surface conveyances, other than for ephemeral flows following precipitation events. No riparian corridor vegetation interrupts the study area upland Big Sagebrush Scrub or Pinyon-Juniper Woodland at Bridgeport. Trees in Pinyon-Juniper Woodland reach up to 30 ft in height and canopy closure ranges up to 30% in the relatively undisturbed stands east of town. Singleleaf pinyon (*Pinus monophylla*) is joined by up to 40% relative frequency of Sierra juniper (*Juniperus grandis*). Scrub growing to the east of the Bridgeport Reservoir exhibits relatively uniform 20-30% total living cover and is composed almost entirely of mountain sagebrush (*Artemisia tridentata* ssp. *vaseyana*). Scrub east and south of town is more diverse, with yellow rabbitbrush (*Chrysothamnus viscidiflorus*), bitterbrush (*Purshia tridentata*), and rubber rabbitbrush (*Ericameria nauseosa*) joining as canopy co-dominants. Mountain sagebrush – bitterbrush scrub of up to 40% total living cover serves as the understory shrub canopy in Pinyon-Juniper Woodland. East of the reservoir, Mountain sagebrush-dominated habitat often includes a relatively intact desert pavement that coincides with an absence of non-native species. Cheatgrass, Russian thistle, and tumble mustard gain prominence in the assembled species near the existing developments only, such as housing and a recently decommissioned landfill. Singleleaf pinyon have widely become invasive into every mapped Big Sagebrush Scrub block in the Bridgeport study area.

The transitions between hillslope Big Sagebrush Scrub and pasture and meadow communities of the Bridgeport Valley floor (Table 38) are often distinctly vegetated by shrub species that are not found elsewhere as dominants. Rubber Rabbitbrush Scrub and Black Greasewood Scrub occupy non-irrigated valley fringe soils that also feature a crustal accumulation of evaporite salts and accumulations or erosions of wind-blown topsoil. Either transitional community type can achieve living cover densities of up to 60% canopy closure, and relatively high average stand heights of up to 5 ft. Due to their landscape position, these scrub communities are often frequently disturbed by OHV traffic and some occurrences are becoming fragmented by unrestrained use.

Sensitive Plant Communities and Species

Big Sagebrush Scrub is considered common and widespread throughout Mono County and the Great Basin. Locally unusual, likely soil fertility-related inclusions of open, low-growing and non-diverse hilltop scrub dominated by Wyoming sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) occur to the east of U.S. Highway 395 south of Mt. Patterson Dr. Stands with a substantial fraction of shrub canopy contributed by bitterbrush also occur in this same area and areas mapped as Pinyon-Juniper Woodland. Bitterbrush is an important browse species for mule deer, and abundant sign were observed at the time of the vegetation survey. However, none of the plant alliances found in Bridgeport's upland soils on hill slopes are considered sensitive by CDFW.

Black Greasewood Scrub, which occurs in limited areas of valley bottom fringe habitat is not a regionally abundant type, and is listed as Sensitive by CDFW (2010). This community is restricted to near-seep habitats where the soil has developed relatively high salinity and alkalinity due to long-term

evaporite deposition. Black greasewood (*Sarcobatus vermiculatus*) clearly dominates the shrub canopy, most commonly in association with a lower abundance of rubber rabbitbrush and a substantial saltgrass (*Distichlis spicata*) sward as an understory. More commonly in this setting, soils are not as saline or alkaline, and the regionally common Rubber Rabbitbrush Scrub community type (saltgrass understory sparse or absent) is present. Black greasewood and saltgrass are both facultative wetland (FACW) species in the arid west (Corps, 2012), so any proposed disturbance to Black Greasewood Scrub must also include investigation to address its potentially jurisdictional wetland status. As intensive use of OHV routes has favored saltgrass and more open areas of greasewood canopy gap, rare plants that may potentially occur in Dry Alkaline Meadow community types (e.g., saltgrass meadows) would also have some likelihood to occur in Black Greasewood Scrub.

Large expanses within the irrigated meadows of the Bridgeport Valley are dominated by the rhizomatous (perennial) grass creeping wildrye (*Elymus triticoides*). This predominance was recorded in heavily grazed and trampled settings, as well as in long-term livestock exclosures adjacent to Twin Lakes Road and west of U.S. Hwy 395. This case of a native meadow grass being highly adapted to the created habitat may warrant recognition as the state sensitive community Creeping Wildrye Meadow. However, intensive livestock impacts that are inherent to the local pasture practice have reduced or removed inherent beneficial functions that are usually recognized as values or reasons for conservation of native examples of rare plant communities. Importantly, native meadow species are present but are otherwise (usually) only minor members of the grazed sward. Values associated with dense meadow cover and accumulation of soil organic matter appear to be absent where grazing is allowed. Non-native species often are co-dominant or dominant, so dominance by creeping wildrye can be mapped as continuous across the available habitat only where exclusion has been complete for many years. It would be more appropriate to consider only those occurrences that have developed dense, primarily native creeping wildrye swards due to exclusion from grazing as actually fitting the definition of a state Sensitive community.

Substantial riparian forest or woodland development is lacking along the East Walker River where it traverses the study area. A few, large arroyo willow (*Salix lasiolepis*), possibly remaining from former riparian forest (now absent from Bridgeport), are scattered riverside near U.S. Hwy 395, and throughout the central residential and business/government district. Younger grove dominated by small arroyo willow occur in patches along the banks downstream from the highway. These limited occurrences were mapped as Willow Riparian Scrub. Occurrences of water birch (*Betula occidentalis*) thickets or streamside corridors (i.e., Water Birch Riparian Scrub) were not found. Patchy, emergent herbs were the only species within the banks, even in the ungrazed reach between the highway and Stock Drive. This weakly defined riparian zone (indistinct from irrigated meadow in grazed areas, or trampled bare) was classified as Montane Freshwater Marsh.

A total of 20 sensitive plant species and one sensitive bryophyte species have some likelihood to occur within the Bridgeport study area (Table 39). Dugway's wild buckwheat and intermontane lupine are the only annuals on the list, and would be the only upland habitat species that may also be expected to have some likelihood of occurrence in mechanically disturbed areas. Long Valley milkvetch is listed as Rare (CDFW, 2014a), and is considered Sensitive by regional BLM and USFS offices. None of the sensitive

plant species with some likelihood to occur in the available Bridgeport habitats are federally listed or are candidates for listing. No known populations within the study area were found during the literature review.

Table 39. Potentially occurring sensitive plant species in the available plant communities at the Bridgeport study area. Flowering period is taken from CNPS (2014).

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Allium atrorubens</i> var. <i>atrorubens</i> Great Basin onion bulbiferous herb	2B.3	S2	May-June	Big Sagebrush Scrub Pinyon-Juniper Woodland
<i>Astragalus johannis-howellii</i> Long Valley milkvetch herbaceous perennial	1B.2	S2	June-August	Big Sagebrush Scrub Pinyon-Juniper Woodland
<i>Astragalus oophorus</i> var. <i>lavinii</i> Lavin's milkvetch herbaceous perennial	1B.2	S1	June	Big Sagebrush Scrub Pinyon-Juniper Woodland
<i>Astragalus platytropis</i> broad-keeled milkvetch herbaceous perennial	2B.2	S2	June-Sept	Big Sagebrush Scrub Pinyon-Juniper Woodland
<i>Boechera bodiensis</i> Bodie Hills rockcress herbaceous perennial	1B.3	S2	June-August	Big Sagebrush Scrub Pinyon-Juniper Woodland
<i>Boechera cobrensis</i> Masonic rockcress herbaceous perennial	2B.3	S1S2	June-July	Big Sagebrush Scrub Pinyon-Juniper Woodland
<i>Calochortus excavatus</i> Inyo County star-tulip bulbiferous herb	1B.1	S2	April-July	Black Greasewood Scrub Creeping Wildrye Meadow Dry Alkaline Meadow

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Carex vallicola</i> western valley sedge rhizomatous herb	2B.3	S2	July-August	Rubber Rabbitbrush Scrub Creeping Wildrye Meadow
<i>Crepis runcinata</i> ssp. <i>hallii</i> Hall's meadow hawksbeard herbaceous perennial	2B.1	S1S2	May-July	Black Greasewood Scrub Creeping Wildrye Meadow Dry Alkaline Meadow
<i>Cusickiella quadricostata</i> Bodie Hills cusickiella herbaceous perennial	1B.2	S2	May-July	Big Sagebrush Scrub Pinyon-Juniper Woodland
<i>Eriogonum nutans</i> var. <i>nutans</i> Dugway's wild buckwheat herbaceous annual	2B.3	S3	May-Oct	Black Greasewood Scrub Dry Alkaline Meadow
<i>Glyceria grandis</i> American manna grass rhizomatous herb	2B.3	S2	June-August	Willow Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
<i>Helodium blandowii</i> Blandow's bog moss bryophyte	2B.3	S1	-	Willow Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
<i>Lupinus pusillus</i> var. <i>intermontanus</i> intermontane lupine herbaceous annual	2B.3	S2	May-June	Black Greasewood Scrub Rubber Rabbitbrush Scrub Dry Alkaline Meadow
<i>Mentzelia torreyi</i> Torrey's blazing star herbaceous perennial	2B.2	S2	June-August	Big Sagebrush Scrub Black Greasewood Scrub Rubber Rabbitbrush Scrub Pinyon-Juniper Woodland Dry Alkaline Meadow
<i>Mertensia oblongifolia</i> var. <i>oblongifolia</i> sagebrush bluebells herbaceous perennial	2B.2	S2.2?	April-July	Big Sagebrush Scrub Rubber Rabbitbrush Scrub Pinyon-Juniper Woodland Dry Alkaline Meadow

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Sphaeromeria potentilloides var. nitrophila</i> alkali tansy sage herbaceous perennial	2B.2	S2	June-July	Black Greasewood Scrub Dry Alkaline Meadow
<i>Sphenopholis obtusata</i> prairie wedge grass herbaceous perennial	1B.2	S2	April-July	Willow Riparian Scrub Creeping Wildrye Meadow Montane Freshwater Marsh Wet Montane Meadow Dry Alkaline Meadow
<i>Streptanthus oliganthus</i> Masonic Mountain jewelflower herbaceous perennial	1B.2	S2	June-July	Big Sagebrush Scrub Pinyon-Juniper Woodland
<i>Thelypodium milleflorum</i> many-flowered thelypodium herbaceous perennial	2B.2	S2S3	April-June	Big Sagebrush Scrub Pinyon-Juniper Woodland
<i>Viola purpurea ssp. aurea</i> golden violet herbaceous perennial	2B.2	S2S3	April-June	Big Sagebrush Scrub Pinyon-Juniper Woodland

1. Rank or status, by agency:

CNPS = California Native Plant Society listings (CNPS, 2001, 2014)

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 occurrences threatened or no current threats known).

CNDDDB = California Natural Diversity Data Base rankings (CDFW, 2014b)

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,

? indicates CNDDDB uncertainty in assigning rank.

Projects that propose to disturb the soil or remove vegetation that has been classified here as Big Sagebrush Scrub or Pinyon-Juniper Woodland should include surveys to determine the presence or absence of Great Basin onion, Long Valley milkvetch, Lavin's milkvetch, broad-keeled milkvetch, Bodie Hills milkvetch, Masonic rockcress, Bodie Hills cusickiella, Torrey's blazing star, sagebrush bluebells, Masonic Mountain jewelflower, many-flowered thelypodium, and golden violet. Most of these species would have a somewhat increased likelihood of occurring where the upland habitat features rock outcrops, rocky talus, or loose, sandy microhabitats.

Projects that propose to disturb the soil or remove vegetation classified as Rubber Rabbitbrush Scrub should include surveys to determine the presence/absence of western valley sedge, intermontane lupine, Torrey's blazing star, and sagebrush bluebells. This community would be treated as an upland native type, but may also be found in recovering mechanically disturbed situations where likelihood of sensitive population occurrence has been reduced or eliminated. Black Greasewood Scrub, a type that is likely to be treated as a wetland community type at some study area occurrences, would have some likelihood to harbor sensitive species that are adapted to elevated soil salinity and alkalinity. Projects proposing to disturb the soil or remove vegetation classified as Black Greasewood Scrub should include field surveys to determine whether Inyo County star-tulip, Hall's meadow hawksbeard, Dugway's wild buckwheat, intermontane lupine, Torrey's blazing star, and alkali tansy sage are present or absent.

Projects that will disturb the soil or remove vegetation that is classified here as Willow Riparian Scrub, Montane Freshwater Marsh, or Wet Montane Meadow should include surveys to determine whether American manna grass, prairie wedge grass, or Blandow's bog moss are present. Drier, yet still potentially wetland soils that are vegetated by Creeping Wildrye Meadow (especially, occurrences that have been ungrazed for at least several growing seasons) would potentially provide habitat for sensitive plant species that are adapted to seasonal drying without a significant saline evaporite buildup, such as Inyo County star-tulip, western valley sedge, Hall's meadow hawksbeard, prairie wedge grass, Dugway's wild buckwheat, intermontane lupine, sagebrush bluebells, Torrey's blazing star, and alkali tansy sage. Projects that would disturb or remove Dry Alkaline Meadow should be treated as potentially requiring wetland delineation, and they will in this context be similar to relatively more freshened areas of Dry Montane Meadow. Embedded, visible zones of sparser vegetation or saline-alkaline scald-like patches in Creeping Wildrye Meadow would best be treated as Dry Alkaline Meadow with regard to appropriate searches for sensitive species. Similarly, relatively freshened habitats present as swales or seasonal ditches embedded within areas mapped as Dry Alkaline Meadow would be treated as Creeping Wildrye Meadow when developing the sensitive species search list.

Sensitive Wildlife

Based upon the available plant communities identified within the Bridgeport study area, a total of six sensitive animal species were identified as having some potential to nest there or reside in the available habitats (Table 40). Greater sage grouse has been proposed as Threatened (with the final decision expected mid-2015) under the federal Endangered Species Act. The Bodie Hills population of the greater sage grouse Bi-State DPS is known to use over-wintering and brood-raising habitat within five miles of the study area. Development such as that anticipated in Bridgeport, which is the largest

private land block within the hypothesized range of the Bodie Hills Population Management Unit (USFWS, 2013b), has been identified as a threat to the population due to the habitat fragmentation that comes with installations of fencing, power lines, and landscaping trees. Furthermore, the encroachment of singleleaf pinyon trees into otherwise open Big Sagebrush Scrub has been identified as a threat to nesting success, early chick survival, and habitat connectivity (Bi-State Technical Advisory Committee, 2012). Most sagebrush habitat within the study area is somewhat compromised for use by greater sage grouse, due to a consistent presence of coniferous trees at low frequency. Adults typically avoid trees because they can serve as predator perches (T. Taylor, personal comm.)

Table 40. Sensitive wildlife species that could potentially occur within the Bridgeport study area. Key to status codes (CDFG, 2011) is given below, NL = not listed.

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
mollusks			
<i>Pyrgulopsis wongi</i> Wong's springsnail	SSC	S1S2	Willow Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow
birds			
<i>Centrocercus urophasianus</i> Bi-State DPS (wintering, brood-raising) greater sage grouse	SSC	S3	Big Sagebrush Scrub Black Greasewood Scrub Creeping Wildrye Meadow Dry Alkaline Meadow
mammals			
<i>Brachylagus idahoensis</i> pygmy rabbit	SSC	S3	Big Sagebrush Scrub Black Greasewood Scrub Rubber Rabbitbrush Scrub Pinyon-Juniper Woodland
<i>Lepus townsendii townsendii</i> western white-tailed jackrabbit	SSC	S3?	Big Sagebrush Scrub Black Greasewood Scrub Rubber Rabbitbrush Scrub Pinyon-Juniper Woodland Creeping Wildrye Meadow Dry Alkaline Meadow
<i>Sorex lyelli</i> Mount Lyell shrew	SSC	S2S3	Willow Riparian Scrub Montane Freshwater Marsh Wet Montane Meadow Creeping Wildrye Meadow

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
mammals (cont.)			
<i>Taxidea taxus</i> American badger	SSC	S4	Big Sagebrush Scrub Black Greasewood Scrub Rubber Rabbitbrush Scrub Pinyon-Juniper Woodland Creeping Wildrye Meadow Dry Alkaline Meadow

1. Rank or status, by agency:

CDFW = State of California under the California Endangered Species Act (CDFW, 2014c)

SSC = Species of Special Concern (CDFW, 2014d).

State ranking = CNDDDB State Conservation Ranking as reported by CDFW (2014d)

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.

Aquatic and adjacent willow scrub and wet meadow habitat types within the Bridgeport study area are very unlikely to support a population of the federal Threatened fish Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*). The known population within the East Walker River watershed (By-Day Creek, specifically) is located roughly five miles upstream from the Bridgeport reservoir in protected habitat known as Great Basin Cutthroat Trout Headwaters. The occupied habitat is protected from non-native trout invasion by in-channel flow gaps and other barriers. In contrast, the Lower East Walker River and Bridgeport Reservoir are popular as non-native trout fisheries. Being effective competitors of the listed fish (USFWS, 2003), non-native trout presence and barriers render very unlikely any potential that Lahontan cutthroat trout could establish a new population within the study area's aquatic habitats. Wong's springsnail may disperse to new aquatic resources by transport on aquatic birds and, unlike the sensitive trout, thereby gains some likelihood to occur in any freshened surface waters that retain a liquid flow through summer drought and the freezing temperatures of winter.

Among the potentially occurring sensitive species (Table 40), the likelihood of occurrences at any habitat fragments mapped in the central or historical district of Bridgeport (west of the East Walker River) should be fairly evaluated in consideration of the completeness of habitat isolation in the converted landscape there. For example, Big Sagebrush Scrub fragments may retain some likelihood of use by American badger, but would be very unlikely to be used by greater sage grouse, due to differing species' requirements regarding habitat isolation and tree presence. Other highly fragmented types within and adjoining the central district include Willow Riparian Scrub, Montane Freshwater Marsh, Wet Montane Meadow, and Creeping Wildrye Meadow (Figure 13). All of the larger habitat blocks remaining in the study area, on the other hand, border the more widely spaced development that has occurred to

the east of the East Walker River, where less fragmented areas of habitat remain for the most part contiguous with very large expanses of undeveloped public lands. It would not be tenable to conclude that adjoining or surrounding development-related habitat modification has rendered Big Sagebrush Scrub, Pinyon-Juniper Woodland, Black Greasewood Scrub, Rubber Rabbitbrush Scrub, or Dry Alkaline Meadow unavailable to sensitive mammals (Table 40) when evaluating potential impacts for projects proposed outside the central district.

Projects that will disturb the soil or remove vegetation that has been classified here as Big Sagebrush Scrub should include surveys to determine the presence/absence of greater sage grouse, pygmy rabbit, and western white-tailed jackrabbit. Pygmy rabbit and western white-tailed jackrabbit use should also be documented just prior to construction where sagebrush scrub occurs at tree canopy gaps at Pinyon-Juniper Woodland. Big Sagebrush Scrub within the study area generally does not attain cover values greater than 40%, which is below the 50% or greater cover that is most likely to support pygmy rabbit. But small “islands” of suitably dense cover may exist for warren excavation within some stands. Despite the presence of scattered conifers, sagebrush-dominated habitat within the study area should be checked for greater sage grouse presence if any disturbance is to occur during the local grouse breeding and nesting season (March through July) or over-wintering season (November through March). Projects that would erect new perches for potential raptor and raven predators of grouse, rabbits or hares could influence predator-prey relations in the vicinity for the life of the project, unless mitigations to deter perching are maintained.

Any project that proposes to disturb saturated soils, or change the timing or magnitude of the local surface hydrology, or remove vegetation that is classified here as Willow Riparian Scrub, Montane Freshwater Marsh, or Wet Montane Meadow should include a survey for Wong’s springsnail wherever perennially maintained, freshwater aquatic habitat is present. Willow Riparian Scrub, Wet Montane Meadow, and Montane Freshwater Marsh habitats should also be evaluated regarding potential impacts to Mt. Lyell shrew wherever meadow grass and grass-like cover surpasses the total cover provided by willow trees. Habitat with moist and dense, ungrazed grassy swards occur adjacent to the East Walker River north U.S. Hwy 395. Projects that disturb the vegetation during the nesting season for migratory birds (March 15 – Sept. 15) have some likelihood of affecting birds that are included in Migratory Bird Treaty Act protections. In town study areas, this potential significant impact would be reliably (and routinely) predicted for riparian communities, even those that are highly modified or intensely grazed. Generally, some likelihood that nest avoidance protocols (buffers, restricted work hours) will be needed does exist.; town habitats provide migratory bird nesting opportunities with some greater degree of attractiveness than would be assumed for the expansive treeless scrub and meadow habitats in Mono County. There is no available justification for failing to extend the analysis of construction-related potential impacts on nesting MBTA birds to projects in any habitat type at any town considered here if disturbance must occur during the nesting season.

Projects that will disturb the drier meadows and meadow margins that are classified here as Black Greasewood Scrub, Wet Montane Meadow, Creeping Wildrye Meadow, or Dry Alkaline Meadow (irrigated or not, grazed or not), should include surveys to detect presence of brood-rearing greater sage grouse, and western white-tailed jackrabbit (also a migratory species), and American badger. There is

some likelihood that irrigated and naturally occurring meadows in the Bridgeport area would be used for brood-rearing (July-September) by greater sage grouse (T. Taylor, personal comm.) Highly mobile birds and mammals would be unlikely to suffer direct impacts from a project, unless young broods (greater sage grouse) or occupied burrows (American badger) are present. Projects that propose to disturb Black Greasewood Scrub should also include surveys for pygmy rabbit warrens. Projects that include ungrazed Creeping Wildrye Meadow may potentially have some impact on Mt. Lyell shrew. No migratory mule deer herds use the study area for part of an migratory corridor, but holding deer may use Wet Montane Meadow, Creeping Wildrye Meadow (including irrigated meadows), and even residential lawns in town for foraging when outlying resources in Big Sagebrush Scrub or Pinyon-Juniper Woodland (*i.e.*, native bitterbrush) is covered by snow or otherwise low in availability.

Walker

Plant Communities and Species

The Walker study area covers a large portion of the basin flatlands and the proximal slopes at the southern end of Antelope Valley. The study area also includes the lowest portion of the gorge-like West Walker River Canyon, at the reach where the West Walker River enters Antelope Valley. Current development is most concentrated near Mill Creek and its confluence with the Walker River (Figure 14). But housing has sprawled north and westward across the private holdings that together account for all Antelope Valley floor lands. Infilling in this larger portion of the Walker study area has occurred at relatively wide spacing, and has occurred particularly at the Antelope Valley rim. Farmland and irrigated pasture, which unlike housing is practiced with near-complete removal of native habitats, occurs in limited areas near the central Antelope Valley. Actually, most of the Antelope Valley between Walker and Topaz is currently converted to farmland use, but this rural area is for the most part excluded from the current study.

The potential for additional project-related disturbance of naturally occurring and relatively undisturbed vegetation would be greater in the non-agricultural portions of the study area that lie to the north and east of the West Walker River, and along the riparian corridor of the West Walker River. To the west of the river, historic development and recent devastating wildfire have removed most of the native vegetation and created monotonous habitats dominated by weedy non-native plants. Unburned communities in this landscape positions are now largely isolated in regards to plant and wildlife species dispersal. In contrast, Big Sagebrush Scrub, Great Basin Mixed Scrub, and Pinyon-Juniper Woodland communities adjoining the river and occurring in more native uplands north and east of the river are interrupted by embedded roads and houses, but they remain essentially intact with regard to species dispersal and wildlife movements. They have developed or maintained relatively high habitat variability and primarily native and robust species diversities. Likewise, canals that have been long in service conducting irrigation water to agricultural lands elsewhere in Antelope Valley, for example, provide several long, largely uninterrupted corridors of aquatic resources and riparian vegetation that cross the otherwise xeric upland landscape. The mainly native assemblages of Great Basin Riparian Forest, Willow Riparian Scrub, and Creeping Wildrye Meadow that have become well established at canals account for roughly half of the total plant species diversity in this portion of the study area. The upland scrub and woodland communities between or adjacent to these canals can be described as relatively undisturbed in the interstices among roadways and houses. Wildfire has not driven recent vegetation dynamics.

Wildfire has had a large influence on the vegetation west of U.S. Highway 395 and vegetation within and near the West Walker River Canyon. Fires in these areas burned uniformly, so that former pinyon-juniper woodland and upland scrub cover now remains only at small, isolated portions of the landscape and in-town areas between houses that were protected from burning. Areas of regrowth of native shrubs are widespread, and seedling singleleaf pinyon (*Pinus monophylla*) have begun to emerge from the regrowth in scattered patches. The community type Big Sagebrush Scrub was mapped where seral shrub growth has attained greater than 1% total canopy cover by native big sagebrush (*Artemisia tridentata*), bush penstemon (*Keckiella breviflora*), green ephedra (*Ephedra viridis*), and/or desert peach

(*Prunus andersonii*). This type occurs on mainly steep slopes, and co-dominance by any of the common shrub species appears to correlate loosely with slope aspect and rockiness. A similarly sparse, variable-appearing and weedy Mixed Montane Chaparral scrub dominated by Mojave whitethorn (*Ceanothus vestitus*) occurs in the burnt habitat east of the West Walker River Canyon.

For the near future at least, analysis at the project level of could be reasonably conclude that any local occurrence of seral (recovering) Big Sagebrush Scrub or Mixed Montane Chaparral community types are interspersed with or perhaps better considered as Non-Native Grassland (CNDDDB 42.020.00) dominated by cheatgrass (*Bromus tectorum*) and tumble mustard (*Sisymbrium altissimum*). The current prevalence of annual cheatgrass is one of the most undesirable outcomes from the recent fire history of the study area. Cheatgrass is an effective competitor for soil moisture (Sawyer, *et al.*, 2009), and its presence increases the likelihood and frequency of wildfire and facilitates burning with greater intensity and uniformity (Cal-IPC, 2014). Mapping these areas as a Cheatgrass Grassland alliance recognizes that the seral recovery of Big Sagebrush Scrub, Pinyon-Juniper Woodland, and native upland community types in general, may be long inhibited, or even permanently regarded as unlikely, because cheatgrass growth and ignition has assumed control of local vegetation dynamics.

Table 41. Plant communities that were mapped within the 2869 acre Walker study area in 2014. The study area includes 182 acres that have been converted to cropping systems, and 512 acres that have been converted to houses, roads, and other impervious surfaces. Community names (after Holland, 1986) are cross-referenced to the CDFG (2010) classification and 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		
Big Sagebrush Scrub 35.110.00	Big Sagebrush Shrubland <i>Artemisia tridentata ssp. wyomingensis</i>	18
Big Sagebrush Scrub 35.110.00	Big Sagebrush Shrubland <i>Artemisia tridentata-Ephedra viridis</i>	684
Big Sagebrush Scrub 35.110.07	Big Sagebrush Shrubland <i>Artemisia tridentata-Purshia tridentata</i>	195
Big Sagebrush Scrub 35.110.00	Big Sagebrush Shrubland <i>Artemisia tridentata-Chrysothamnus viscidiflorus</i>	145
Big Sagebrush Scrub 35.110.01	Big Sagebrush Shrubland <i>Artemisia tridentata-Ericameria nauseosa</i>	49
Big Sagebrush Scrub 35.110.00	Big Sagebrush Shrubland <i>Artemisia tridentata-Prunus andersonii</i>	19
Great Basin Mixed Scrub 35.200.02*	Bitterbrush Shrubland <i>Purshia tridentata-Artemisia tridentata</i>	36
Great Basin Mixed Scrub 33.285.01	Green Ephedra Shrubland <i>Ephedra viridis-Artemisia tridentata</i>	103

Holland name and CDFW classification number	Alliance and primary association names	acreage in study area
upland communities (cont.)		
Rubber Rabbitbrush Scrub 35.310.00	Rubber Rabbitbrush Shrubland <i>Ericameria nauseosa</i>	7.4
Mixed Montane Chaparral -	Whitethorn Shrubland <i>Ceanothus vestitus-Prunus andersonii</i> <i>-Artemisia tridentata</i>	84
Pinyon-Juniper Woodland 87.040.00	Singleleaf Pinyon Woodland <i>Pinus monophylla-Purshia tridentata</i>	15
Pinyon-Juniper Woodland 87.040.02	Singleleaf Pinyon Woodland <i>Pinus monophylla-Artemisia tridentata</i>	549
Pinyon-Juniper Woodland 87.040.02	Singleleaf Pinyon Woodland <i>Pinus monophylla-Ephedra viridis</i>	20
Non-Native Grassland 42.020.00	Cheatgrass Grassland <i>Bromus tectorum-Sisymbrium altissimum</i>	54

wetland communities and potential wetland communities

Great Basin Riparian Forest 61.120.10*	Black Cottonwood Forest <i>Populus trichocarpa-Salix lasiolepis-Salix exigua</i>	58
Willow Riparian Scrub 61.201.00	Arroyo Willow Thicket <i>Salix lasiolepis-Salix lasiandra-Salix exigua</i>	1.9
Willow Riparian Scrub 61.201.00	Arroyo Willow Thicket <i>Salix lasiolepis-Salix exigua</i>	73
Willow Riparian Scrub 61.209.00	Sandbar Willow Thicket <i>Salix exigua-Rosa woodsii</i>	39
Transmontane Alkaline Marsh 41.061.01	Common Reed Marsh ¹ <i>Phragmites australis</i>	0.1
Creeping Wildrye Meadow 41.080.00*	Creeping Rye Grass Turf <i>Elymus triticoides-Poa pratensis</i>	25

1. A single, small occurrence in Walker River Canyon. May also occur at isolated locations among hills near the eastern edge of the study area.

Vegetation immediately adherent to the West Walker River (Figure 14) is recovering from an impressive flood event in 1997. Very few large trees now occur upstream from the mouth of the West Walker River Canyon. Debris from this flood was deposited in and near the active channel below this mouth, and the first floodplain terrace was extensively buried or scoured. Now in the second decade of regrowth, Great Basin Riparian Forest and Willow Riparian Scrub communities are densely encroaching across the floodplain terrace zone and have begun to stabilize and shade the active channel. Great Basin Riparian Forest regrowth is usually dominated by black cottonwood (*Populus trichocarpa*) that are emerging from a subcanopy of mainly arroyo willow (*Salix lasiolepis*) or sandbar willow (*S. exigua*). Between these Forest stands, the riparian corridor is made continuous by dense stands of these same willows (mainly sandbar willow) that lack the cottonwood overcanopy. Two perennial tributaries, Mill Creek and Rock Creek, confluence with the West Walker River within the study area. The narrow Great

Basin Riparian Forest and Willow Riparian Scrub corridors of each tributary, and the even more narrowly vegetated riparian-like corridors (10 ft to 50 ft wide) of perennially watered canals and ditches that cross the study area have been largely left unaffected by recent wildfires and the 1997 flood. But these stands are being invaded by non-native black locust (*Robinia pseudoacacia*) and Siberian elm (*Ulmus pumila*), trees that are abundantly planted at town residences and businesses, and Russian olive (*Elaeagnus angustifolia*). While some non-native annuals are naturalized to a degree that would likely make the effectiveness of local control short-term at best, riparian tree canopy enhancement through removal of Russian olive, Siberian elm, and black locust would be effective and thus be a good target for project-related impact mitigation in this area.

Native scrub has also been extensively lost or converted to Non-Native Grassland at parcels where indiscriminate vegetation clearing possibly related to fire fuel reduction has been practiced. Smaller examples of this “clear-cut” land management practice occur adjacent to U.S. Hwy 395 and are scattered within the unburned Big Sagebrush Scrub matrix east of Riverside Drive (Figure 14). Former agricultural fields, infrequently irrigated pasture, and unirrigated fallow areas of the lowlands laying east of the West Walker River exhibit sparse (often grazed) shrub recovery that is occurring among dense annual growth of cheatgrass, tumble mustard, Russian thistle (*Salsola tragus*), and 14 other non-native species (App. B). The ongoing disturbance regime in Walker’s upland areas will serve to sustain a local source of propagules for common and sometimes noxious non-native weedy invasions of surrounding habitats. The extensive dominance of weeds, especially in disturbed areas exhibiting weak native shrub recruitment in (unburned) central Walker, suggests that the naturalized non-natives can compete strongly with native upland shrubs. This arresting affect is likely becoming more pervasive. Already, there is no example of a native plant community assemblage that is free of invasive non-native species at the Walker study area. In addition to cheatgrass, invasive Russian thistle, tumble mustard, and tansy mustard (*Descurainia sophia*) are becoming widely established in relatively undisturbed Big Sagebrush Scrub, Great Basin Mixed Scrub, and Pinyon-Juniper Woodland. Cheatgrass, puncture vine (*Tribulus terrestris*), clasping peppergrass (*Lepidium perfoliatum*), and common knotweed (*Polygonum aviculare* ssp. *depressum*) were present roadside at nearly every ground truth location sampled in 2013-2014. Meanwhile, cheatgrass, white sweetclover (*Melilotus albus*) and non-native trees have attained patchy high density in the study area’s mesic habitats.

Native scrub in the xeric environment of Walker’s upland habitats has been generally slow to recover after mechanical devegetation, just as it is slow to recover from devastating fire. In the future, recovery may be further lengthened or frustrated by climate change toward increased summer drought and type conversion (i.e., derailment of the native succession process) by ever-present cheatgrass and other non-native pioneer species. Walker area revegetation efforts in upland settings appear unlikely to result in a desirable vegetative condition unless additional multi-year inputs such as herbicidal weed control and irrigation of shrub seedlings are applied. Given the undesirable fuel condition created by clearing and the difficulty in directing regrowth to sustainable native cover, unnecessary devegetation during construction or done as a general practice by land owners should be discouraged in this fire prone area.

Pastures that are irrigated in the Walker area have developed relatively dense vegetation that ranges from primarily non-native swards to relatively wet, long-standing assemblages that bear some resemblance to native meadows of the region. Widely used non-native pasture grasses include the perennials Kentucky bluegrass (*Poa pratensis*) and false manna grass (*Torreyochloa erecta*). In somewhat drier situations, native creeping wildrye (*Elymus triticoides*) and Baltic rush (*Juncus balticus*) are adapted to perennial livestock grazing and trampling. East of the Walker River, these lands receive irrigation waters from one of the three perennially flowing Walker River diversion canals. Excess waters are gathered and returned to the West Walker River, which ultimately crosses into Nevada and thereby qualifies as a Waters of the United States subject to jurisdiction by the U.S. Army Corps of Engineers. The long-standing irrigation works in Walker, which can be identified by their dense and primarily native hedgerow-thickets of willows and interior wild rose (*Rosa woodsii*), and even the historically wettest portions of meadow-like pasturelands, should be discussed in reference to Clean Water Act regulations if development is proposed.

Sensitive Plant Communities and Species

Big Sagebrush Scrub, which is by far the most common scrub type encountered in the study area (Table 41, 1110 total acres), is considered common and widespread throughout Mono County and the Great Basin. Stands of Great Basin Mixed Scrub with a dominant fraction of shrub canopy contributed by bitterbrush (*Purshia tridentata*) occur adjacent to the Walker River and Mill Creek riparian corridors (36 total acres). Bitterbrush can also be a shrub stratum dominant in areas mapped as Pinyon-Juniper Woodland (15 acres). Areas of bitterbrush dominance, especially in a wildlife use area such as those adjacent to riparian corridors, would be considered sensitive by CDFW (2010). Bitterbrush is an important browse species for mule deer, and riparian corridors in the study area likely provide suitable habitat for wildlife foraging and movements. Walker, Coleville, and Topaz are all within the winter range of the West Walker Deer Herd, which is used from November through April (Taylor, 1994).

Irrigated meadows of the Antelope Valley are sometimes dominated by the rhizomatous grass creeping wildrye (*Elymus triticoides*). This predominance was recorded in heavily grazed and trampled settings, as well as in ditches and canal banks where livestock grazing has been excluded (25 acres total). The circumstance of a native meadow grass being highly adapted to the created habitat creates a need to evaluate on a case-by-case basis whether an occurrence in Walker of vegetation that is dominated by creeping wildrye warrants recognition as the state sensitive community Creeping Wildrye Meadow. In most cases, intensive livestock impacts that are inherent to the local pasture practice will have prevented the development of beneficial functions that are usually recognized as values or reasons for conservation of native examples of rare plant communities. For occurrences that have developed a predominantly native, hydrophytic (wetland-adapted) assemblage under long-term irrigation, it would be appropriate to consider areas (e.g., ditches and swales) that also meet criteria for wetland hydrology and hydric soil as actually fitting the definition of a state Sensitive community.

Stands of the state Sensitive alliance Black Cottonwood Forest are restricted to the banks of the West Walker River, and to short lengths along perennially watered canals near their diversion points.

Black cottonwood and the less abundant Fremont cottonwood (*Populus fremontii*) to 70 ft tall form an interrupted overcanopy that narrowly follows the canal or river bank above the high water mark. West Walker River occurrences of this community, which were devastated by the 1997 Walker River flood, are likely to expand in apparency as widespread cohorts of small cottonwoods emerge from dense willow thickets that currently line the banks. Because the river passes through a populated area, the understory has been patchily modified by removal of the otherwise densely growing willows, roses and upland shrubs. The vegetation generally has become impassably dense where the understory has been allowed to grow, providing bank stabilization and a high cover value for wildlife use.

A total of 13 sensitive plant species and two sensitive bryophyte species have some likelihood to occur within the Walker study area (Table 42). Mono County phacelia is the only annual species and would be the only species of upland habitats that may also have some likelihood of occurrence in mechanically disturbed areas. None of the sensitive plant species with some likelihood to occur in the available Walker habitats are federally or state listed or are candidates for listing. Known populations within the study area were not found during the literature review.

Table 42. Potentially occurring sensitive plant species in the available plant communities at the Walker study area. Flowering period is taken from CNPS (2014).

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Astragalus oophorus</i> var. <i>lavinii</i> Lavin's milkvetch herbaceous perennial	1B.2	S1	June	Big Sagebrush Scrub Great Basin Mixed Scrub Mixed Montane Chaparral Pinyon-Juniper Woodland
<i>Boechera bodiensis</i> Bodie Hills rockcress herbaceous perennial	1B.3	S2	June-August	Big Sagebrush Scrub Great Basin Mixed Scrub Mixed Montane Chaparral Pinyon-Juniper Woodland
<i>Carex petasata</i> Liddon's sedge herbaceous perennial	2B.3	S2	May-July	Pinyon-Juniper Woodland Creeping Wildrye Meadow
<i>Carex vallicola</i> western valley sedge rhizomatous herb	2B.3	S2	July-August	Willow Riparian Scrub Creeping Wildrye Meadow

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Cusickiella quadricostata</i> Bodie Hills cusickiella herbaceous perennial	1B.2	S2	May-July	Big Sagebrush Scrub Great Basin Mixed Scrub Mixed Montane Chaparral Pinyon-Juniper Woodland
<i>Glyceria grandis</i> American manna grass rhizomatous herb	2B.3	S2	June-August	Great Basin Riparian Forest Willow Riparian Scrub Creeping Wildrye Meadow
<i>Helodium blandowii</i> Blandow's bog moss bryophyte	2B.3	S1	-	Great Basin Riparian Forest Willow Riparian Scrub Creeping Wildrye Meadow
<i>Hymenopappus filifolius</i> var. <i>nanus</i> little cutleaf herbaceous perennial	2B.3	S2S3	May-Sept	Big Sagebrush Scrub Great Basin Mixed Scrub Mixed Montane Chaparral Pinyon-Juniper Woodland
<i>Mertensia oblongifolia</i> var. <i>oblongifolia</i> sagebrush bluebells herbaceous perennial	2B.2	S2.2?	April-July	Big Sagebrush Scrub Great Basin Mixed Scrub Pinyon-Juniper Woodland Creeping Wildrye Meadow
<i>Orthotrichum shevockii</i> Shevock's bristle moss bryophyte on rocks	1B.3		-	Big Sagebrush Scrub Great Basin Mixed Scrub Mixed Montane Chaparral Pinyon-Juniper Woodland
<i>Phacelia monoensis</i> Mono County phacelia herbaceous annual	1B.1	S2	May-July	Big Sagebrush Scrub Great Basin Mixed Scrub Mixed Montane Chaparral Pinyon-Juniper Woodland
<i>Polygala subspinosa</i> spiny milkwort herbaceous perennial	2B.2	S3	May-August	Big Sagebrush Scrub Great Basin Mixed Scrub Mixed Montane Chaparral Pinyon-Juniper Woodland

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Sidalcea multifida</i> cutleaf checkerbloom herbaceous perennial	2B.3	S2	May-Sept	Big Sagebrush Scrub Great Basin Mixed Scrub Mixed Montane Chaparral Pinyon-Juniper Woodland Creeping Wildrye Meadow
<i>Sphenopholis obtusata</i> prairie wedge grass herbaceous perennial	1B.2	S2	April-July	Willow Riparian Scrub Creeping Wildrye Meadow
<i>Streptanthus oliganthus</i> Masonic Mountain jewelflower herbaceous perennial	1B.2	S2	June-July	Big Sagebrush Scrub Great Basin Mixed Scrub Mixed Montane Chaparral Pinyon-Juniper Woodland

1. Rank or status, by agency:

CNPS = California Native Plant Society listings (CNPS, 2001, 2014)

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 occurrences threatened or no current threats known).

CNDDDB = California Natural Diversity Data Base rankings (CDFW, 2014b)

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,

? indicates CNDDDB uncertainty in assigning rank.

Projects that propose to disturb the soil or remove vegetation that has been classified here as Big Sagebrush Scrub, Great Basin Mixed Scrub, Mixed Montane Chaparral, or Pinyon-Juniper Woodland should include surveys to determine the presence or absence of lavin's milkvetch, Bodie Hills rockcress, Bodie Hills cusickiella, little cutleaf, Mono County phacelia, sagebrush bluebells, Shevock's bristle moss, spiny milkwort, cutleaf checkerbloom, and Masonic Mountain jewelflower. Relatively moist areas of Big Sagebrush Scrub, Great Basin Mixed Scrub, or Mixed Montane Chaparral that adjoin the West Walker River riparian zone should also be searched for prairie wedge grass population presence. Projects that would cause disturbance to Pinyon-Juniper Woodland should also be searched for populations of

Liddon’s sedge. Sparse, recovering Big Sagebrush Scrub and Non-Native Grassland that occur on steep slopes at West Walker River Canyon and at the eastern and western study area edges affected by recent wildfire should be treated as Pinyon-Juniper Woodland with regard to conducting searches for potentially occurring sensitive plant species.

Projects that propose to disturb the soil or remove vegetation that has been classified as Great Basin Riparian Forest, Willow Riparian Scrub or Creeping Wildrye Meadow (grazed or not) should include surveys to determine the presence or absence of American manna grass, Blandow’s bog moss, western valley sedge and prairie wedge grass. Any projects that would disturb Creeping Wildrye Meadow should also include surveys for Liddon’s sedge, sagebrush bluebells, and cutleaf checkerbloom. Analyses of Creeping Wildrye Meadow natural function should strive to distinguish between areas of grazing impact that do provide potential habitat for sensitive plant species versus those areas that do not, and should in support review irrigation history, prevalence of hydrophytic native vegetation, and wetland hydrology or hydric soils development where they occur. Any occurrence of these community types can include a central channel with bed and banks, which at the project level may be separately classified as aquatic habitat types such as emergent freshwater marsh or wet meadow.

Sensitive Wildlife

Based upon the available scrub and riparian communities identified within the Walker study area, a total of eight sensitive animal species were identified as having some potential to nest there or reside in the available habitats (Table 43). Greater sage grouse has been proposed as Threatened (with final decision expected mid-2015) under the federal Endangered Species Act. While not included in the CNDDDB search results for the region, greater sage grouse (Bi-State DPS) of both the Pine Nut and the Desert Creek/Fales Population Management Units conceivably use sagebrush and meadow resources of the study area. Individuals of the Desert Creek/Fales grouse population have been detected using overwintering and brood-raising habitat in Antelope Valley (T. Taylor, personal communication 4/24/14). No other state or federally listed species or candidate species have likelihood to occur in the study area.

Table 43. Sensitive wildlife species that could potentially occur within the Walker study area. Key to status codes (CDFG, 2011) is given below, NL = not listed.

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
birds			
<i>Centrocercus urophasianus</i> Bi-State DPS (nesting, leks) greater sage grouse	SSC	S3	Big Sagebrush Scrub Great Basin Mixed Scrub Mixed Montane Chaparral Creeping Wildrye Meadow

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
mammals			
<i>Antrozous pallidus</i> pallid bat	SSC	S3	Big Sagebrush Scrub Great Basin Mixed Scrub Mixed Montane Chaparral Pinyon-Juniper Woodland disturbed habitats with buildings
<i>Lepus townsendii townsendii</i> western white-tailed jackrabbit	SSC	S3?	Big Sagebrush Scrub Great Basin Mixed Scrub Mixed Montane Chaparral Pinyon-Juniper Woodland Willow Riparian Scrub Creeping Wildrye Meadow
<i>Myotis ciliolabrum</i> western small-footed myotis	NL	S2S3	Big Sagebrush Scrub Great Basin Mixed Scrub Mixed Montane Chaparral Pinyon-Juniper Woodland disturbed habitats with buildings
<i>Myotis evotis</i> long-eared myotis	NL	S4?	Big Sagebrush Scrub Great Basin Mixed Scrub Mixed Montane Chaparral Pinyon-Juniper Woodland Great Basin Riparian Forest Willow Riparian Scrub
<i>Myotis thysanodes</i> fringed myotis	NL	S4	Big Sagebrush Scrub Great Basin Mixed Scrub Mixed Montane Chaparral Pinyon-Juniper Woodland disturbed habitats with buildings
<i>Myotis yumanensis</i> Yuma myotis	NL	S4?	Big Sagebrush Scrub Great Basin Mixed Scrub Mixed Montane Chaparral Pinyon-Juniper Woodland Great Basin Riparian Forest disturbed habitats with buildings

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
mammals (cont.)			
<i>Taxidea taxus</i> American badger	SSC	S4	Big Sagebrush Scrub Great Basin Mixed Scrub Scrub Mixed Montane Chaparral Pinyon-Juniper Woodland Great Basin Riparian Forest Creeping Wildrye Meadow

1. Rank or status, by agency:

CDFW = State of California under the California Endangered Species Act (CDFW, 2014c)

SSC = Species of Special Concern (CDFW, 2014d).

State ranking = CNDDDB State Conservation Ranking as reported by CDFW (2014d)

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.

Projects that will disturb the soil or remove vegetation that has been classified here as Big Sagebrush Scrub, Great Basin Mixed Scrub, or Mixed Montane Chaparral should include pre-disturbance (pre-construction) surveys for wintering greater sage grouse, and western white-tailed jackrabbit, and American badger. Projects that will disturb Pinyon-Juniper Woodland should also include surveys for western white-tailed jackrabbit and American badger. Where these community types include rock outcrops with potential crevice habitat for roosting bats, pre-construction searches should be conducted for evidence of bat presence including pallid bat, western small-footed myotis, long-eared myotis, fringed myotis, and Yuma myotis. Non-Native Grassland that has patchily developed following recent wildfires on the steep slopes at West Walker River Canyon, and at the eastern and western study area edges, also includes occurrences of potential bat habitat at outcrops. Myotis bats, except possibly long-eared myotis, may also occupy old buildings that have become derelict and unused. Any project at Walker that assumes pre-construction removal of such structures should also include a pre-demolition search for bats including potentially roosting myotis bats.

Projects that will disturb the soil or remove vegetation that has been classified here as Creeping Wildrye Meadow (grazed or ungrazed) should include pre-construction surveys for brood-rearing greater sage grouse, western white-tailed jackrabbit, and American badger. Projects that will disturb Willow Riparian Scrub should also include surveys for western white-tailed jackrabbit and American badger. Where Great Basin Riparian Forest or Willow Riparian Scrub include large standing trees with potential hollow habitat for roosting bats, searches should be conducted for evidence of bat presence including Yuma myotis. Projects that require removal of large trees should include pre-felling or pre-trimming searches for bats including potentially roosting Yuma myotis. Sensitive bats may forage over any of the upland or riparian communities within the study area. Yuma myotis has some potential to occur at bridge or

culvert structures embedded within Great Basin Riparian Forest and Willow Riparian Scrub. Projects that will enclose or underground habitat at existing bridge or culvert openings should include grating emplacement in order to avoid disturbing roosting bats including Yuma myotis.

Coleville

Plant Communities and Species

Coleville's unincorporated community lands occupy westside basin flatlands near the southern end of the Antelope Valley. The Coleville study area includes areas near the West Walker River as it flows immediately downstream from the Walker study area. Development is now rarely concentrated. Blocks that already have been converted to buildings and impervious surfaces at high density exist near the school and at a mobile home park adjacent to U.S. Hwy 395. Otherwise, such improvements are scattered (Figure 15). In the spaces between, however, native vegetation has generally been replaced by irrigated pasture or cropping systems, and former habitat value to wildlife has been rarely retained. This rural, farm system management continues across Antelope Valley floor lands to the east of the West Walker River. Study in 2013-2014 focused on lands west of the West Walker River, adjacent to the U.S. Hwy 395 corridor, however, so the more extensive agricultural lands to the east are not included.

Plant communities that occur within irrigated pasture settings in the Coleville study area are often largely native in species composition (Table 44). Fields that are irrigated heavily or in a sustained manner during the growing season are dominated by clovers (*Trifolium* spp.), Baltic rush (*Juncus balticus* ssp. *ater*), and Nevada bluegrass (*Poa secunda*) hybrids, or by various non-native pasture species such as Kentucky bluegrass (*Poa pratensis* ssp. *pratensis*), white clover (*Trifolium repens*), common Timothy (*Phleum pratense*), and woolly velvet grass (*Holcus lanatus*). Other irrigated areas are dominated by native creeping wildrye (*Elymus triticoides*), which typically has assumed dominance where grazing has been suspended or excluded, such as roadside irrigation ditches. At Coleville's wetter irrigated meadow occurrences, each must be individually judged regarding whether plant community classification non-native pasturelands, or as native Creeping Wildrye Meadow is warranted. Drying margins and fields, and seep zone margins supplemented (or not) by irrigation, in contrast, are more consistently vegetated with native Dry Alkaline Meadow dominants such as saltgrass (*Distichlis spicata*). Perennially watered ditches that are roadside, and thereby excluded from grazing, are also consistently vegetated by mainly native species. Hedgerow-like stands of wild rose (*Rosa woodsii*), arroyo willow (*Salix lasiolepis*), and sandbar willow (*S. exigua*) are supplemented by irrigation, and so should be considered fragile due to dependence on ditch management. Yet they present predominantly native, corridor-like examples of Wild Rose Riparian Scrub and Willow Riparian Scrub that are valuable for wildlife use and maintenance of biological diversity. At the project level of analysis, small canopy gaps in these perennially watered scrub corridors could be classified separately as Montane Freshwater alliances (e.g., *Schoenoplectus acutus* – *Typha latifolia* 52.122.04).

Vegetation immediately adherent to the West Walker River is in the second decade of regrowth after a large flood in 1997. Great Basin Riparian Forest and Willow Riparian Scrub communities are now densely colonizing the floodplain terrace zone and beginning to stabilize and shade the active channel. Great Basin Riparian Forest regrowth is dominated by cottonwoods (*Populus* spp.), that are emerging from a dense canopy of arroyo or sandbar willow. Big sagebrush (*Artemisia tridentata* ssp. *tridentata*) to 10 ft are patchily but densely co-dominant with river bank sandbar willows, marking areas of Willow Riparian Scrub that were not devegetated by the flood. One tributary to the West Walker River enters

the western edge of the study area. Flows in this channel arise from a series of large springs near Mill Canyon Road, and support dense growth of Willow Riparian Scrub. This (unnamed) perennial stream is then successively diverted at points both to the west and east of U.S. Hwy 395, creating the channelized flows that supply much of the surface irrigation water delivered to Coleville fields. The relatively broad West Walker River riparian zone vegetation, and the narrow riparian corridors of these canals and other perennially watered conveyances, all appear susceptible to invasion by non-native black locust (*Robinia pseudoacacia*) and Siberian elm (*Ulmus pumila*) trees, as well as noxious weeds like bouncing bet soapwort (*Saponaria officinalis*), spotted knapweed (*Centaurea stoebe* ssp. *micranthos*), and white sweetclover (*Melilotus albus*).

Table 44. Plant communities that were mapped within the 962 acre Coleville study area in 2014. The study area includes 64 acres that have been converted to agricultural systems, and 99 acres that have been converted to houses, roads, and other impervious surfaces. Community names (after Holland, 1986) are cross-referenced to the CDFG (2010) classification and 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		
Big Sagebrush Scrub 35.110.07	Big Sagebrush Shrubland <i>Artemisia tridentata</i> - <i>Purshia tridentata</i>	45
Big Sagebrush Scrub 35.110.00	seral Big Sagebrush Shrubland <i>Artemisia tridentata</i> - <i>Ephedra viridis</i>	357
Big Sagebrush Scrub 35.110.01	Big Sagebrush Shrubland <i>Artemisia tridentata</i> - <i>Ericameria nauseosa</i>	5.1
Big Sagebrush Scrub 35.110.00	Big Sagebrush Shrubland <i>Artemisia tridentata</i> - <i>Prunus andersonii</i>	10
Pinyon-Juniper Woodland 87.040.02	Singleleaf Pinyon Woodland <i>Pinus monophylla</i> - <i>Artemisia tridentata</i>	143
Non-Native Grassland 42.020.00	Cheatgrass Grassland <i>Bromus tectorum</i> - <i>Salsola tragus</i>	5.4
wetland communities and irrigated pastures		
Great Basin Riparian Forest 61.120.10*	Black Cottonwood Forest <i>Populus trichocarpa</i> - <i>Salix lasiolepis</i>	31
Great Basin Riparian Forest 61.120.00*	Black Cottonwood Forest <i>Populus trichocarpa</i> - <i>Elymus triticoides</i>	8.8
Willow Riparian Scrub 61.201.00	Arroyo Willow Thicket <i>Salix lasiolepis</i> - <i>Salix exigua</i>	46
Willow Riparian Scrub 61.209.00	Sandbar Willow Thicket <i>Salix exigua</i> - <i>Ericameria nauseosa</i>	2.1

Holland name and CDFW classification number	Alliance and primary association names	acreage in study area
Willow Riparian Scrub 61.209.00	Sandbar Willow Thicket <i>Salix exigua-Rosa woodsii</i>	28
Willow Riparian Scrub 61.209.00	Sandbar Willow Thicket <i>Salix exigua-Artemisia tridentata</i>	18
Wild Rose Riparian Scrub 63.320.00*	Interior Rose Thicket <i>Rosa woodsii-Salix exigua-Salix lasiolepis</i>	3.4
Dry Montane Meadow 42.060.00	Kentucky Bluegrass Turf <i>Poa pratensis-Elymus triticoides</i>	41
Creeping Wildrye Meadow 41.080.00*	Creeping Rye Grass Turf <i>Elymus triticoides-Juncus balticus</i>	6.9
Creeping Wildrye Meadow 41.080.00*	Creeping Rye Grass Turf <i>Elymus triticoides-Distichlis spicata</i>	44

Wildfire has had a large influence on the local upland vegetation, which in the study area occurs almost entirely west of U.S. Highway 395. Within the Coleville study area, recent wildfire has affected former Big Sagebrush Scrub and Pinyon-Juniper Woodland on and near the steep, undeveloped slopes of Centennial Bluff. Areas of regrowth of native vegetation were mapped as the community type Big Sagebrush Scrub where big sagebrush is returning with bitterbrush, rabbitbrush (*Ericameria nauseosa*), green ephedra (*Ephedra viridis*), and/or desert peach (*Prunus andersonii*), and growth has attained greater than 1% total cover. Patch-sized areas of bush penstemon (*Keckiella breviflora*) and Wright's buckwheat (*Eriogonum wrightii* var. *subscaposum*) are also developing in these seral stands.

Non-native cheatgrass (*Bromus tectorum*) currently prevails in the fire zone and even patchily forms monospecific stands. Cheatgrass is an effective competitor for soil moisture (Sawyer, *et al.*, 2009) and its presence at these frequencies certainly increases the likelihood of wildfire. Cheatgrass facilitates burning with greater frequency, intensity and uniformity (Cal-IPC, 2014). Along with non-native pioneer annuals such as Russian thistle (*Salsola tragus*) and tumble mustard (*Sisymbrium altissimum*), it has also attained dominance following mechanical soil disturbance in Coleville. Given this species' widespread distribution in the fire zone, along the highway, and at mechanically disturbed sites, cheatgrass is the most important weed of this area. Control that minimizes competition and fire danger from cheatgrass will be an important component of successful revegetation in this landscape. Given the undesirable fuel condition created by clearing, and the difficulty in directing regrowth to sustainable native cover in this fire prone area, it is logical to develop policies that would discourage unnecessary devegetation during construction or done as a general practice by land owners. Rather, revegetation that establishes native shrub dominance in upland habitats is needed, and would be most beneficial to maintaining corridors of wildlife habitat for movements between the West Walker River riparian resources and the extensive public lands to the west.

Sensitive Plant Communities and Species

All upland plant communities with a well-developed tree or shrub canopy are relic fragments at the margin of a fire-denuded landscape, and the types therefore would be considered locally unusual at the Coleville study area. Regionally, however, all are considered common and widespread throughout Mono County and the Great Basin. Big Sagebrush Scrub reaches an average height of 3 ft and shrub canopy density of 40%. In contrast, shrubs in burn areas have rarely established greater than 5% total living cover. Singleleaf Pinyon Woodland also has been locally impacted by fire, and is now reduced to a single occurrence within the study area, and small patches in the nearby hills.

Limited areas within the irrigated meadows of the Coleville study area are dominated by the native perennial grass creeping wildrye (*Elymus triticoides*). Some irrigated meadow vegetation that is dominated by creeping wildrye likely warrants recognition as the state sensitive community Creeping Wildrye Meadow. Intensive livestock use at the local pastures can widely prevent the development of the beneficial functions that are usually recognized as values or reasons for conservation of rare plant communities in their native setting. When working in Creeping Wildrye Meadow that has developed a predominantly native, hydrophytic (wetland-adapted) assemblage under long-term irrigation, it would be appropriate to consider at least those areas (e.g., ditches and swales) that also meet criteria for wetland hydrology and hydric soil as actually fitting the definition of a state Sensitive community.

Black Cottonwood Forest, which is confined to scattered occurrences on the banks of the West Walker River, or along irrigation canals and ditches that are present throughout the study area, is a state Sensitive type (CDFG, 2010). At banks of the West Walker River, tall black cottonwood and less frequent Fremont cottonwood (*Populus fremontii*) form an interrupted overcanopy that emerges from thickets of dense willow. Tree stands that abut existing developments provide shade and vertical habitat structure, but generally lack much or all of the expected lower vegetation strata. Similarly, roadside and within-pasture trees that were not mapped as Great Basin Riparian Forest have attained iconic age and stature, but the native understory is lacking or is provided almost entirely by creeping wildrye.

Irrigation supply canals and ditches in the Coleville area are often watered by artesian spring flow, and have developed dense assemblages of predominantly phreatophytic species. Longer-used diversion and collection conveyances can be identified by their primarily native hedgerow-like thickets of interior wild rose, sandbar willow, and arroyo willow. Wild Rose Riparian Scrub is considered state Sensitive (3.4 acres total). Excess irrigation waters are gathered and returned to the West Walker River. Because the West Walker River ultimately crosses into Nevada and thereby qualifies as a Waters of the United States subject to jurisdiction by the U.S. Army Corps of Engineers, tributary irrigation works and adjacent meadow-like pasturelands should be investigated in the context of Clean Water Act regulations whenever development or dewatering is proposed. Values that may be affected by project-related changes in the vegetative cover of these conveyances include maintenance of local species diversity, provision of nesting bird habitat and cover for wildlife movements (e.g., daily movements to a water source), and groundwater storage and purification. As valued resources, these communities are an

appropriate target for enhancement whenever project-related mitigations for devegetation or impact to nearby wetlands are formulated. Removal of Siberian elm and black locust in particular would be effective as enhancement, as these non-native trees are aggressively spreading in wetland habitats, where their growth appears to inhibit native willows and poplars.

A total of 9 sensitive plant species and one sensitive bryophyte species have some likelihood to occur within the Coleville study area (Table 45). None of the plant species in the list are annuals, and none would be expected to have any likelihood of occurrence in recently mechanically disturbed areas. None are federally or state listed or are candidates for listing, and no known populations were found to have been documented within the study area. All potentially occurring plant species are perennials that may be present in upland habitats or at relatively open, near-upland margins of seeps and other aquatic features of the study area.

Table 45. Potentially occurring sensitive plant species in the available plant communities at the Walker study area. Flowering period is taken from CNPS (2014).

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Astragalus oophorus</i> var. <i>lavinii</i> Lavin's milkvetch herbaceous perennial	1B.2	S1	June	Big Sagebrush Scrub Pinyon-Juniper Woodland
<i>Carex petasata</i> Liddon's sedge herbaceous perennial	2B.3	S2	May-July	Pinyon-Juniper Woodland Great Basin Riparian Forest Willow Riparian Scrub Wild Rose Riparian Scrub Creeping Wildrye Meadow Dry Montane Meadow
<i>Carex vallicola</i> western valley sedge rhizomatous herb	2B.3	S2	July-August	Pinyon-Juniper Woodland Great Basin Riparian Forest Willow Riparian Scrub Wild Rose Riparian Scrub Creeping Wildrye Meadow Dry Montane Meadow
<i>Cusickiella quadricostata</i> Bodie Hills cusickiella herbaceous perennial	1B.2	S2	May-July	Big Sagebrush Scrub Pinyon-Juniper Woodland

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Glyceria grandis</i> American manna grass rhizomatous herb	2B.3	S2	June-August	Great Basin Riparian Forest Willow Riparian Scrub Wild Rose Riparian Scrub Creeping Wildrye Meadow Dry Montane Meadow
<i>Hymenopappus filifolius</i> var. <i>nanus</i> little cutleaf herbaceous perennial	2B.3	S2S3	May-Sept	Big Sagebrush Scrub Pinyon-Juniper Woodland
<i>Orthotrichum shevockii</i> Shevock's bristle moss bryophyte on rocks	1B.3		-	Big Sagebrush Scrub Pinyon-Juniper Woodland
<i>Polygala subspinosa</i> spiny milkwort herbaceous perennial	2B.2	S3	May-August	Big Sagebrush Scrub Pinyon-Juniper Woodland
<i>Sidalcea multifida</i> cutleaf checkerbloom herbaceous perennial	2B.3	S2	May-Sept	Big Sagebrush Scrub Pinyon-Juniper Woodland Great Basin Riparian Forest Willow Riparian Scrub Wild Rose Riparian Scrub Creeping Wildrye Meadow Dry Montane Meadow
<i>Streptanthus oliganthus</i> Masonic Mountain jewelflower herbaceous perennial	1B.2	S2	June-July	Big Sagebrush Scrub Pinyon-Juniper Woodland

1. Rank or status, by agency:

CNPS = California Native Plant Society listings (CNPS, 2001, 2014)

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 occurrences threatened or no current threats known).

CNDDDB = California Natural Diversity Data Base rankings (CDFW, 2014b)

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.

Projects that propose to disturb the soil or remove vegetation that has been classified here as Big Sagebrush Scrub or Pinyon-Juniper Woodland should include surveys to determine the presence or absence of Lavin's milkvetch, Bodie Hills cusickiella, little cutleaf, Shevock's bristle moss, spiny milkwort, cutleaf checkerbloom, and Masonic Mountain jewelflower. Relatively moist areas of Pinyon-Juniper Woodland, especially where the community is intersected by an unlined irrigation conveyance should also be searched for presence of Liddon's sedge or western valley sedge populations. Non-Native Grassland that may be mapped at the project level of analysis adjacent to U.S. Hwy 395 and on burned slopes west of the highway should be treated as Pinyon-Juniper Woodland with regard to conducting searches for potentially occurring sensitive plant species.

Projects that propose to disturb the soil or remove vegetation that has been classified as Great Basin Riparian Forest, Willow Riparian Scrub, Wild Rose Riparian Scrub, Creeping Wildrye Meadow, or Dry Montane Meadow (grazed or not) should include surveys to determine the presence or absence of Liddon's sedge, western valley sedge, American manna grass, and cutleaf checkerbloom. Community mapping performed in Creeping Wildrye Meadow and Dry Montane Meadow should strive to distinguish between areas of grazing impact that do provide potential habitat for sensitive plant species versus those areas that do not. Investigations pursuant to determining the requirements for Clean Water Act permitting in created meadow/pasture and irrigation conveyance settings should document irrigation history, prevalence of hydrophytic native vegetation, and development of wetland hydrology, hydric soils, and ecological function development where they occur, in order to determine impact extent and formulate reasonable mitigations.

Sensitive Wildlife

Based upon the available scrub and riparian communities identified within the Coleville study area, a total of seven sensitive animal species were identified as having some potential to use the available habitats (Table 46). Sierra Nevada mountain beaver, while not recorded in CNDDDB records, has been reported in the general area of Slinkard Creek (BLM, 2007). While the Coleville study area (and most of Slinkard Creek to the west) is well below the elevation of CNDDDB reported sightings, some ungrazed riparian habitat that is broadly analogous to habitat available at nearby Slinkard Creek does occur in Great Basin Riparian Forest and Willow Riparian Scrub. Greater sage grouse has been proposed as Threatened (with final decision expected mid-2015) under the federal Endangered Species Act. While the species is not included in CNDDDB search results for the region, greater sage grouse (Bi-State DPS) of the Desert Creek/Fales grouse population have been detected using over-wintering and brood-raising habitat in Antelope Valley (T. Taylor, personal comm.) The U.S. Hwy 395 transportation corridor, which bisects the study area in a north-south direction (Figure 15), is a significant barrier for grouse and other wildlife that would otherwise move between upland habitats of the Centennial Bluff area and riparian habitats of the West Walker River bottomlands.

Table 46. Sensitive wildlife species that could potentially occur within the Coleville study area. Key to status codes (CDFG, 2011) is given below, NL = not listed.

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
birds			
<i>Centrocercus urophasianus</i> Bi-State DPS (nesting, leks) greater sage grouse	SSC	S3	Creeping Wildrye Meadow Dry Montane Meadow irrigated pastures
mammals			
<i>Antrozous pallidus</i> pallid bat	SSC	S3	Big Sagebrush Scrub Pinyon-Juniper Woodland disturbed habitats with buildings
<i>Aplodontia rufa californica</i> Sierra Nevada mountain beaver	SSC	S2S3	Great Basin Riparian Forest Willow Riparian Scrub
<i>Myotis ciliolabrum</i> western small-footed myotis	NL	S2S3	Big Sagebrush Scrub Pinyon-Juniper Woodland disturbed habitats with buildings
<i>Myotis evotis</i> long-eared myotis	NL	S4?	Big Sagebrush Scrub Pinyon-Juniper Woodland Great Basin Riparian Forest Willow Riparian Scrub
<i>Myotis thysanodes</i> fringed myotis	NL	S4	Big Sagebrush Scrub Pinyon-Juniper Woodland disturbed habitats with buildings
<i>Myotis yumanensis</i> Yuma myotis	NL	S4?	Big Sagebrush Scrub Pinyon-Juniper Woodland Great Basin Riparian Forest Willow Riparian Scrub disturbed habitats with buildings

1. Rank or status, by agency:

CDFW = State of California under the California Endangered Species Act (CDFW, 2014c)

SSC = Species of Special Concern (CDFW, 2014d).

State ranking = CNDDDB State Conservation Ranking as reported by CDFW (2014d)

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.

Projects that will disturb the soil or vegetation in areas that have been classified here as Big Sagebrush Scrub or Pinyon-Juniper Woodland and include rock outcrops with potential crevice habitat for roosting bats should include pre-construction surveys for evidence of bat presence. Potentially occurring sensitive bat species include pallid bat, western small-footed myotis, long-eared myotis, fringed myotis, and Yuma myotis. Non-Native Grassland that has patchily developed following recent wildfires may also include occurrences of potential bat habitat at outcrops. Myotis bats, except possibly long-eared myotis, may also occupy old buildings that have become derelict and unused. Any project at Coleville that assumes pre-construction removal of such structures may impact sensitive bats unless the project implements a pre-demolition search for bats including potentially roosting myotis bats.

Projects that will disturb the soil or remove any vegetation that has been classified here as Creeping Wildrye Meadow or Dry Montane Meadow (grazed or ungrazed) should include properly timed pre-construction surveys for brood-rearing greater sage grouse. Projects that will disturb riparian zones classified as Great Basin Riparian Forest or Willow Riparian Scrub should include surveys for dens or use by Sierra Nevada mountain beaver. If Great Basin Riparian Forest or Willow Riparian Scrub stands that include large trees with potential hollow habitat for roosting bats will be disturbed, then pre-construction searches should be conducted for evidence of occupation by bats including potentially roosting long-eared myotis or Yuma myotis. Sensitive bats may forage over any of the upland or riparian communities within the study area. Yuma myotis has some potential to occur at bridges and in culvert structures embedded within Great Basin Riparian Forest or Willow Riparian Scrub. Projects that enclose or underground habitat at existing bridge or culvert openings should include grating emplacement in order to avoid trapping or excluding roosting bats including Yuma myotis.

Topaz

Plant Communities and Species

The Topaz study area includes private lands in two separate blocks centered on the historic town and the lakeside area at the California-Nevada border. These relatively densely occupied areas are narrowly arrayed to the east and west of U.S. Hwy 395 as it traverses the western margin of Antelope Valley. The West Walker River flows to the east of the southern block. The northern block is intercepted by California Creek and Topaz Lake. Development in the study area adjacent to these features would affect primarily native vegetation on dry slopes rising from the Antelope Valley, or wetland communities associated with the West Walker River, California Creek, and Topaz Lake (Table 47), or habitats where the native vegetation has been replaced by irrigated pasture or cropping systems. In more limited cases, impacts could occur to seep zone resources, or to the riparian corridors associated with long-standing canals and ditches that distribute and collect applied irrigation throughout the study area,. Depending on location and amount of devegetation required, projects could also further diminish the availability of corridor habitats for wildlife movements between the riparian and aquatic resources of the West Walker River and extensive upland habitats of the western Antelope Valley margin. These pathways between existing developments in Topaz, as in Coleville, are already somewhat compromised as all are bisected by the U.S. Hwy 395 transportation corridor (Figure 16).

Upland scrub vegetation communities were mapped as the types Big Sagebrush Scrub, Great Basin Mixed Scrub, or Rubber Rabbitbrush Scrub. Dry slopes west of U.S. Hwy 395 are covered by Big Sagebrush Scrub dominated by sagebrush (*Artemisia tridentata*) or by Great Basin Mixed Scrub that is dominated by green ephedra (*Ephedra viridis*). Both are common community types that occur widely in the Eastern Sierra Nevada and western Great Basin. Other prominent shrubs in these communities are Wright's buckwheat (*Eriogonum wrightii* var. *subscaposum*) and desert peach (*Prunus andersonii*). Non-native annual cheatgrass (*Bromus tectorum*) is currently the most abundant and widespread grass in the upland communities, but the native perennials squirreltail grass (*Elymus elymoides*), western ricegrass (*Stipa hymenoides*), and western needlegrass (*S. occidentalis*) are present at low frequency. Dry margins of irrigated meadows, lower slopes adjacent to the West Walker River riparian zone, and areas currently recovering from mechanical disturbance have developed shrubby Rubber Rabbitbrush Scrub. Native saltgrass (*Distichlis spicata*) or creeping wildrye (*Elymus triticoides*) provide up to 70% living cover in the subcanopy, suggesting that this community can signal the presence of high groundwater such as would be found at seep zones.

Upland Pinyon-Juniper Woodland vegetation occurs only in one location near the state border, and that occurrence is disturbed and weedy. It is likely this community was much more prominent in the local landscape, especially on the foothill slopes that are offsite immediately to the west of the study area, until very large wildfires of the last two decades. Singleleaf pinyon (*Pinus monophylla*) now remain at low densities in the narrow strip of sloping habitat between U.S. Hwy 395 and Topaz Lake, often among planted shade trees and residences that were protected from wildfire. The remaining native understory scrub resembles Big Sagebrush in composition, but never achieves greater than about 10% living cover. It also resembles areas of recent mechanical devegetation, as non-native cheatgrass,

Russian thistle (*Salsola tragus*), and tumble mustard (*Sisymbrium altissimum*) are densely invasive. Woodland habitat is rather isolated due to development, wildfire, and the highway upon which it borders. Nevertheless, this community retains a degree of habitat value for wildlife, as it provides the most open corridor for access to Topaz Lake from extensive upland habitats to the west.

Table 47. Plant communities that were mapped within the 324 acre Topaz study area in 2014. The study area includes 8.3 acres of disturbed seasonal lakebed, and 85 acres that have been converted to houses, roads, and other impervious surfaces. Community names (after Holland, 1986) are cross-referenced to the CDFG (2010) classification and 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		
Big Sagebrush Scrub 35.110.00	Big Sagebrush Shrubland <i>Artemisia tridentata-Ephedra viridis</i>	81
Big Sagebrush Scrub 35.110.01	Big Sagebrush Shrubland <i>Artemisia tridentata-Ericameria nauseosa</i>	15
Big Sagebrush Scrub 35.110.01	Big Sagebrush Shrubland <i>Artemisia tridentata-Prunus andersonii</i>	9.7
Great Basin Mixed Scrub 33.285.01	Green Ephedra Shrubland <i>Ephedra viridis-Artemisia tridentata</i>	62
Rubber Rabbitbrush Scrub 35.310.00	Rubber Rabbitbrush Shrubland <i>Ericameria nauseosa-Elymus triticoides</i>	3.6
Pinyon-Juniper Woodland 87.040.02	Singleleaf Pinyon Woodland <i>Pinus monophylla-Artemisia tridentata</i>	4.8
Non-Native Grassland 42.020.00	Cheatgrass Grassland <i>Bromus tectorum-Sisymbrium altissimum</i>	2.2
wetland communities		
Great Basin Riparian Forest 61.120.10*	Fremont Cottonwood Forest <i>Populus fremontii-Salix lasiolepis</i>	5.3
Great Basin Riparian Forest 61.120.11*	Fremont Cottonwood Forest <i>Populus fremontii-Rubus ursinus</i>	0.5
Willow Riparian Scrub 61.201.00	Arroyo Willow Thicket <i>Salix lasiolepis-Salix exigua-Rosa woodsii</i>	4.7
Willow Riparian Scrub 61.209.00	Sandbar Willow Thicket <i>Salix exigua-Rosa woodsii</i>	10
Wet Montane Meadow -	irrigated pasture/meadow <i>Elymus triticoides-Juncus balticus-Trifolium spp.</i>	22
Creeping Wildrye Meadow 41.080.00*	Creeping Rye Grass Turf <i>Elymus triticoides-Distichlis spicata</i>	8.9

Plant communities that occur within irrigated and grazed pasture settings in the Topaz study area are seldom composed of primarily native species. Wet Meadow pastures that are irrigated in a heavy, sustained manner during the growing season are dominated by various non-native pasture species such as Kentucky bluegrass (*Poa pratensis* ssp. *pratensis*) and white clover (*Trifolium repens*). Elsewhere, seep zones and drying pastures of slightly higher elevation, are dominated by creeping wildrye (*Elymus triticoides*), a native perennial grass that typically has assumed dominance and can form thick, dense swards where grazing has been suspended or excluded, and Baltic rush (*Juncus balticus*). Canals and ditches that are seasonally to perennially watered are often excluded from grazing. Narrow, resilient corridors of riparian scrub vegetation dominated by native sandbar willow (*Salix exigua*) persist widely at these conveyances, as ditch bank clearing is not widely practiced as part of routing dredging maintenance. Less disturbed Willow Riparian Scrub stands include interior wild rose (*Rosa woodsii*), arroyo willow (*Salix lasiolepis*), and service berry (*Shepherdia argentea*) in the shrub canopy (averaging 10 ft stand height) as well as a diverse assemblage of native and non-native species in the subcanopy. Flowing at the edges of fields or roads, the hedgerow-like Willow Riparian Scrub communities of the southern Topaz study area block provide stable, densely vegetated pathways for wildlife movements. Ecological functions that would be lost if relatively uninterrupted, densely vegetated examples are removed include groundwater storage and purification, wildlife use (foraging, concealment, movement, nesting), and maintenance of biological diversity.

Sensitive Plant Communities and Species

Pastures that have long been irrigated in the Topaz area have developed relatively dense assemblages of predominantly phreatophytic species that are adapted to a regime of livestock grazing and trampling. The associated irrigation supply canals and ditches are often watered by artesian spring flow, and excess waters are gathered and returned to the West Walker River. Because the West Walker River ultimately crosses into Nevada and thereby qualifies as a Waters of the United States subject to jurisdiction by the U.S. Army Corps of Engineers, tributary irrigation works and adjacent Wet Meadow-like pastures should be discussed in the context of Clean Water Act regulations whenever development is proposed. Long-used diversion and collection conveyances can be identified by their primarily native hedgerow-like thickets of sandbar willow, arroyo willow, and interior wild rose. At occurrences that have developed a predominantly native, hydrophytic (wetland-adapted) Willow Riparian Scrub, Wet Meadow, or Creeping Wildrye Meadow assemblage under long-term irrigation, it is possible that other recognizable wetland characteristics have developed (Curry, 1996). Where creeping wildrye is dominant, it would be appropriate to consider ecologically functional areas (often, ditches and swales) that also meet criteria for wetland hydrology and hydric soil as actually fitting the definition of the state Sensitive community Creeping Wildrye Meadow. As wetlands, Willow Riparian Scrub, Wet Meadow, and Creeping Wildrye Meadow are appropriate targets for habitat enhancement whenever project-related mitigations for revegetation or impact to wetlands are proposed. Removal of Siberian elm (*Ulmus pumila*) and black locust (*Robinia pseudoacacia*) in particular would be effective. These non-native trees are aggressively spreading in wetland meadow and riparian habitats throughout Antelope Valley (see Walker, Coleville), where their growth appears to inhibit native willows and poplars.

Fremont Cottonwood Forest occurrences in the Topaz study area, despite modification that in some cases has completely removed other native species from the understory, are considered state Sensitive (CDFG, 2010). Remaining Fremont cottonwood (*Populus fremontii*) and less abundant black cottonwood (*P. trichocarpa*) form a shading canopy among residences and campground facilities. They also provide vertical habitat structure, and many roadside trees are iconic in age and stature. Planted roadside trees were not mapped as Fremont Cottonwood Forest. It is likely this vegetation type was once more extensive in the Antelope Valley, especially at main channel bank and floodplain habitat and along tributaries to the West Walker River. California Creek, a perennial tributary to Topaz Lake and the West Walker River, crosses through the study area in a disturbed/re-directed channel that does not currently support any riparian forest overcanopy. Rather, it supports mechanically disturbed or burned Willow Riparian Scrub with California blackberry (*Rubus ursinus*) and cottonwood saplings present. This diverse assemblage appears to be developing into Fremont Cottonwood Forest or Black Cottonwood Forest (see Coleville), and so may be treated as a sensitive type during project-related environmental analysis. Relic, often highly disturbed Great Basin Riparian Forest of the Topaz area is susceptible to invasion by non-native trees such as black locust and Siberian elm. Occurrences also widely support populations of the weeds bouncing bet soapwort (*Saponaria officinalis*), yellow sweetclover (*Melilotus officinalis*), and white sweetclover (*Melilotus albus*). Relic and recovering stands would be good targets for enhancement mitigations intended to restore habitat values and beneficial uses of aquatic and riparian scrub/forest resources.

A total of 9 sensitive plant species and one sensitive bryophyte species have some likelihood to occur within the Coleville study area (Table 48). None of the plant species in the list are annuals, and none would be expected to have any likelihood of occurrence in recently mechanically disturbed areas. None are federally or state listed or are candidates for listing, and no known populations were found to have been documented within the study area. All potentially occurring plant species are perennials that may be present in upland habitats or at relatively open, near-upland margins of seeps and other aquatic features of the study area.

Projects that propose to disturb the soil or remove vegetation that has been classified here as Big Sagebrush Scrub, Great Basin Mixed Scrub, or Pinyon-Juniper Woodland should include surveys to determine the presence or absence of Lavin's milkvetch, Bodie Hills cusickiella, little cutleaf, Shevock's bristle moss, spiny milkwort, cutleaf checkerbloom, and Masonic Mountain jewelflower. Relatively moist areas of Pinyon-Juniper Woodland, near Topaz Lake should also be checked for presence of Liddon's sedge and western valley sedge populations.

Projects that propose to disturb the soil or remove naturally maintained or irrigated vegetation that has been classified as Willow Riparian Scrub, Wet Meadow, or Creeping Wildrye Meadow should include surveys for Liddon's sedge, western valley sedge, American manna grass, and cutleaf checkerbloom. Unmapped seasonal ditches and canals by long-standing operation that cross through otherwise xeric habitats should be treated as Willow Riparian Scrub or Creeping Wildrye Meadow with regard to conducting rare plant surveys.

Table 48. Potentially occurring sensitive plant species in the available plant communities at the Topaz study area. Flowering period is taken from CNPS (2014).

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Astragalus oophorus</i> var. <i>lavinii</i> Lavin's milkvetch herbaceous perennial	1B.2	S1	June	Big Sagebrush Scrub Great Basin Mixed Scrub Pinyon-Juniper Woodland
<i>Carex petasata</i> Liddon's sedge herbaceous perennial	2B.3	S2	May-July	Pinyon-Juniper Woodland Willow Riparian Scrub Creeping Wildrye Meadow irrigated meadow
<i>Carex vallicola</i> western valley sedge rhizomatous herb	2B.3	S2	July-August	Pinyon-Juniper Woodland Willow Riparian Scrub Creeping Wildrye Meadow irrigated meadow
<i>Cusickiella quadricostata</i> Bodie Hills cusickiella herbaceous perennial	1B.2	S2	May-July	Big Sagebrush Scrub Great Basin Mixed Scrub Pinyon-Juniper Woodland
<i>Glyceria grandis</i> American manna grass rhizomatous herb	2B.3	S2	June-August	Willow Riparian Scrub Creeping Wildrye Meadow irrigated meadow
<i>Hymenopappus filifolius</i> var. <i>nanus</i> little cutleaf herbaceous perennial	2B.3	S2S3	May-Sept	Big Sagebrush Scrub Great Basin Mixed Scrub Pinyon-Juniper Woodland
<i>Orthotrichum shevockii</i> Shevock's bristle moss bryophyte on rocks	1B.3		-	Big Sagebrush Scrub Great Basin Mixed Scrub Pinyon-Juniper Woodland
<i>Polygala subspinosa</i> spiny milkwort herbaceous perennial	2B.2	S3	May-August	Big Sagebrush Scrub Great Basin Mixed Scrub Pinyon-Juniper Woodland

Scientific Name Common Name Life Form	Rank or Status ¹		Flowering Period	Communities Some Potential for Occurrence
	CNPS	CNDDDB		
<i>Sidalcea multifida</i> cutleaf checkerbloom herbaceous perennial	2B.3	S2	May-Sept	Big Sagebrush Scrub Great Basin Mixed Scrub Pinyon-Juniper Woodland Willow Riparian Scrub Creeping Wildrye Meadow irrigated meadow
<i>Streptanthus oliganthus</i> Masonic Mountain jewelflower herbaceous perennial	1B.2	S2	June-July	Big Sagebrush Scrub Great Basin Mixed Scrub Pinyon-Juniper Woodland

1. Rank or status, by agency:

CNPS = California Native Plant Society listings (CNPS, 2001, 2014)

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 occurrences threatened or no current threats known).

CNDDDB = California Natural Diversity Data Base rankings (CDFW, 2014b)

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.

Sensitive Wildlife

Based upon the available scrub, woodland and riparian communities identified within the Topaz study area, a total of seven sensitive animal species were identified as having some potential to occur at the available habitats (Table 49). Bald eagles have been known to nest in Antelope Valley near Topaz Lake, but projects within the study area would all occur greater than one mile from the known nest. The southern polygon is greater than two miles from potential foraging habitat at Topaz Lake, and neither town polygon includes stands of large pines. Bald eagles may perch or forage from larger cottonwood trees in the northern polygon at Topaz Lake.

Sierra Nevada mountain beaver, while not recorded in CNDDDB records, has been reported in the general area of Slinkard Creek (BLM, 2007). While the Topaz study area is well below the elevation of CNDDDB reported sightings, some ungrazed riparian habitat that is broadly similar to habitat available at Slinkard Creek does occur in Great Basin Riparian Forest and Willow Riparian Scrub. Greater sage grouse (Bi-State Distinct Population Unit) has been proposed as Threatened (with final decision expected mid-2015) under the federal Endangered Species Act. Topaz is within the general area that has been

recognized by the Bi-State Working Group (2012) as providing important grouse habitat. While the species is not included in CNDDDB search results for the region, greater sage grouse (Bi-State DPS) of both the Desert Creek/Fales and the Pine Nut Population Management Units conceivably use meadow-like pasture resources of the study area for brood-raising. Individuals of the Desert Creek/Fales grouse population have been detected using over-wintering and brood-raising habitat in Antelope Valley (T. Taylor, personal comm.). No other state or federally listed species or candidate species have likelihood to occur in the study area.

Table 49. Sensitive wildlife species that could potentially occur within the Topaz study area. Key to status codes (CDFG, 2011) is given below, NL = not listed.

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
birds			
<i>Centrocercus urophasianus</i> Bi-State DPS (nesting, leks) greater sage grouse	SSC	S3	Big Sagebrush Scrub Great Basin Mixed Scrub Pinyon-Juniper Woodland Creeping Wildrye Meadow irrigated meadows
mammals			
<i>Antrozous pallidus</i> pallid bat	SSC	S3	Big Sagebrush Scrub Great Basin Mixed Scrub Pinyon-Juniper Woodland disturbed habitats with buildings
<i>Aplodontia rufa californica</i> Sierra Nevada mountain beaver	SSC	S2S3	Great Basin Riparian Forest Willow Riparian Scrub
<i>Myotis ciliolabrum</i> western small-footed myotis	NL	S2S3	Big Sagebrush Scrub Great Basin Mixed Scrub Pinyon-Juniper Woodland disturbed habitats with buildings
<i>Myotis evotis</i> long-eared myotis	NL	S4?	Big Sagebrush Scrub Great Basin Mixed Scrub Pinyon-Juniper Woodland Great Basin Riparian Forest Willow Riparian Scrub
<i>Myotis thysanodes</i> fringed myotis	NL	S4	Big Sagebrush Scrub Great Basin Mixed Scrub Pinyon-Juniper Woodland disturbed habitats with buildings

species	status ¹		Communities Some Potential for Occurrence
	CDFW	State ranking	
mammals (cont.)			
<i>Myotis yumanensis</i> Yuma myotis	NL	S4?	Big Sagebrush Scrub Great Basin Mixed Scrub Pinyon-Juniper Woodland Great Basin Riparian Forest Willow Riparian Scrub disturbed habitats with buildings

1. Rank or status, by agency:

CDFW = State of California under the California Endangered Species Act (CDFW, 2014c)

SSC = Species of Special Concern (CDFW, 2014d).

State ranking = CNDDDB State Conservation Ranking as reported by CDFW (2014d)

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.

Projects that will disturb the soil or vegetation in areas that have been classified here as Big Sagebrush Scrub, Great Basin Mixed Scrub, or Pinyon-Juniper Woodland and include rock outcrops with potential crevice habitat for roosting bats should include pre-construction surveys for evidence of bat presence. Potentially occurring sensitive bat species include pallid bat, western small-footed myotis, long-eared myotis, fringed myotis, and Yuma myotis. Myotis bats, except possibly long-eared myotis, may also occupy old buildings that have become derelict and unused. Any project at Topaz that will remove derelict structures should also include a pre-demolition search for bats including potentially roosting myotis bats. Projects that will reduce the availability of wildfire-diminished upland scrub with dominant or co-dominant big sagebrush (Big Sagebrush Scrub, Great Basin Mixed Scrub) should consider the project-related and cumulative impacts upon local greater sage grouse carrying capacity.

Projects that will disturb the soil or remove vegetation that has been classified here as Wet Meadow or Creeping Wildrye Meadow (grazed or ungrazed) should include pre-construction surveys for brood-rearing greater sage grouse. Projects that will disturb riparian zones classified as Great Basin Riparian Forest or Willow Riparian Scrub should include surveys for dens in use by Sierra Nevada mountain beaver. If Great Basin Riparian Forest or Willow Riparian Scrub stands that include large trees with potential hollow habitat for roosting bats will be disturbed, then pre-construction searches should be conducted for evidence of occupation by bats including potentially roosting long-eared myotis and Yuma myotis. Sensitive bats may forage at any time of year over any of the upland or riparian communities within the study area. Yuma myotis has some potential to occur at bridge or culvert structures embedded within Great Basin Riparian Forest and Willow Riparian Scrub. Projects that will enclose or underground habitat at existing bridge or culvert openings should include grating emplacement in order to avoid disturbing roosting bats including Yuma myotis.

Synthesis

Based upon the foregoing analysis, several issues that are general to Mono County town areas emerge. Recommendations are derived from types of conflicts and impacts that can arise with infill development in town areas, rather than specific findings of species actual presence. Documentation of all occurrences is beyond the scope of this document; surveys to determine habitat type presence were not sufficiently thorough or detailed to detect sensitive species presence or absence. By highlighting general issues, standard or equitably applied prescriptions that will reduce or mitigate foreseeable impacts can be identified.

The biological values that will be impacted by projects in town areas can be determined based upon consideration of general factors, including: size of the affected habitat relative to the availability of this habitat post-project (regional context), the current level of habitat disturbance, the site's species and habitat diversity, abundance of indicator species (as per USFS, 2004), presence of sensitive species, the site's regional importance to populations of sensitive species and important/protected migrants, and the degree to which the onsite habitats are regionally rare and are therefore considered sensitive. Generally, impacts would be considered less than significant if they occur in demonstrably common or degraded habitats where the best available, preferably current information shows that sensitive species do not currently occupy or otherwise rely upon as essential to some stage of their life cycles. But in the long term, infilling development and the associated increases in vehicular traffic, unrestrained domestic pets, noise, and lighting reduce habitat carrying capacity and biological diversity at the scale of the town extent. Some impacts (e.g., invasive non-native plants) can eventually move beyond town extents if not checked.

Riparian Habitats

Plant communities in riparian settings are some of the most encroached-upon types in Mono County. Riparian plant community loss has been more generally a state-wide trend, and a substantial subset of these types has become recognized as Sensitive in CDFW code. In Mono County, riparian communities so designated are all considered regionally uncommon to rare also. Typical historical settlement patterns near surface water, and focused recreational use, in some cases combined with long-term water diversion, all have contributed to loss and disturbance. But unlike more highly populated areas of California, the degree of acreage loss and functional loss at streams that intersect Mono County town areas is generally slight at this time. Riparian corridors retain much of their native character, and many of the 74 vegetation alliance types present (Table 50) would be considered sensitive by CDFW (2010). In all, 1306 acres were judged to be riparian community types. This is 15% of all undeveloped acreage remaining in the unincorporated communities inventoried here. Of these, 572 acres (44%) are considered Sensitive by the State of California (CDFG, 2010).

Table 50. Alliances present in riparian zone habitats of the unincorporated communities of Mono County. Alliances considered sensitive by CDFW (CDFG, 2010) are indicated, and total acreage mapped in all town areas is given.

Alliance Types			Area (acres)
Montane Freshwater Marsh			
<i>Carex aquatilis</i>		Sensitive	1.3
<i>Carex utriculata-Senecio hydrophilus</i>			0.7
<i>Schoenoplectus acutus</i> var. <i>occidentalis</i>			17
Transmontane Freshwater Marsh			
<i>Schoenoplectus acutus</i> var. <i>occidentalis</i>			4.7
<i>Typha latifolia</i>			0.6
Transmontane Alkaline Marsh			
<i>Phragmites australis</i>			0.1
<i>Typha latifolia-Phragmites australis</i>		Sensitive	0.1
Wet Montane Meadow			
<i>Carex nebrascensis</i> -----			18
<i>Carex nebrascensis-Carex praegracilis</i>			1.4
<i>Carex nebrascensis-Carex vesicaria-Carex</i> spp.			0.9
<i>Carex nebrascensis-Carex</i> spp.- <i>Poa pratensis</i>			4.5
<i>Carex nebrascensis-Typha latifolia</i>			1.5
<i>Juncus balticus-Carex nebrascensis</i>			0.5
<i>Juncus balticus-Carex praegracilis</i>			6.3
<i>Juncus balticus-Elymus triticoides</i>			6.1
<i>Juncus balticus-Trifolium</i> ssp.- <i>Elymus triticoides</i> -----			22
<i>Scirpus microcarpus-Agrostis</i> spp.		Sensitive	3.3
<i>Poa pratensis-Carex nebrascensis</i>			2.0
<i>Poa pratensis-Carex praegracilis</i>			3.2
Creeping Wildrye Meadow			
<i>Elymus triticoides</i>		Sensitive	2.8
<i>Elymus triticoides-Juncus mexicanus</i>		Sensitive	5.0
<i>Elymus triticoides-Juncus balticus</i> -----		Sensitive	64
<i>Elymus triticoides-Poa pratensis</i> -----		Sensitive	54
<i>Elymus triticoides-Pteridium aquilinum</i>		Sensitive	5.3
<i>Elymus triticoides-Distichlis spicata</i> -----		Sensitive	53
<i>Elymus triticoides-Artemisia tridentata</i>		Sensitive	2.4
Dry Montane Meadow			
<i>Carex douglasii-Juncus balticus</i> -----		Sensitive	24
<i>Carex douglasii-Rosa woodsii</i> -----		Sensitive	57
<i>Carex douglasii-Artemisia tridentata</i>			0.5
<i>Elymus cinereus-Rosa woodsii</i>		Sensitive	4.1
<i>Muhlenbergia richardsonis-Juncus balticus</i>			7.3
<i>Poa pratensis-Juncus balticus</i> -----			47
<i>Poa pratensis-Carex pellita</i>			2.9

Alliance Types			Area (acres)
Dry Montane Meadow (cont.)			
<i>Poa pratensis-Carex</i> spp.	-----	-----	26
<i>Poa pratensis-Rosa woodsii</i>			0.1
<i>Poa pratensis-Elymus triticoides</i>	-----	-----	41
Dry Alkaline Meadow			
<i>Distichlis spicata-Amphiscirpus nevadensis</i>			5.6
<i>Distichlis spicata-Juncus balticus</i>	-----	-----	37
<i>Distichlis spicata-Elymus triticoides</i>	-----	-----	21
<i>Distichlis spicata-Poa secunda</i>	-----	-----	31
Alkali Sacaton Grassland			
<i>Sporobolus airoides-Ericameria nauseosa</i>		Sensitive	2.9
Big Sagebrush Scrub			
<i>Artemisia tridentata-Atriplex torreyi</i>			3.9
Silver Sagebrush Scrub			
<i>Artemisia cana-Iris missouriensis</i>		Sensitive	3.8
Wild Rose Riparian Scrub			
<i>Rosa woodsii</i>		Sensitive	1.4
<i>Rosa woodsii-Salix lasiolepis</i>		Sensitive	0.8
<i>Rosa woodsii-Salix exigua</i>		Sensitive	4.0
Willow Riparian Scrub			
<i>Salix exigua</i> var. <i>exigua</i>			6.6
<i>Salix exigua-Salix lasiolepis</i>	-----	-----	64
<i>Salix exigua-Ericameria nauseosa</i>			2.8
<i>Salix exigua-Rosa woodsii</i>	-----	-----	89
<i>Salix exigua-Artemisia tridentate</i>	-----	-----	18
<i>Salix geyeriana-Salix lasiolepis</i>		Sensitive	0.8
<i>Salix geyeriana-Salix lasiolepis-Salix lutea</i>		Sensitive	2.3
<i>Salix lasiandra-Salix lasiolepis</i>		Sensitive	9.9
<i>Salix lasiolepis</i>		Sensitive	8.7
<i>Salix lasiolepis-Salix exigua</i>	-----	-----	101
<i>Salix lasiolepis-Salix exigua-Rosa woodsii</i>	-----	-----	26
<i>Salix lasiolepis-Salix lutea</i>			5.4
<i>Salix lasiolepis-Salix geyeriana</i>	-----	-----	48
<i>Salix lasiolepis-Salix lasiandra</i>			1.9
Water Birch Riparian Scrub			
<i>Betula occidentalis-Populus tremuloides</i>		Sensitive	7.5
<i>Betula occidentalis-Salix lasiolepis</i>	-----	Sensitive	64
<i>Betula occidentalis-Salix lasiolepis-Salix lutea/Salix geyeriana</i>		Sensitive	8.7
Aspen Riparian Forest			
<i>Populus tremuloides-Rosa woodsii</i>	-----	Sensitive	108
<i>Populus tremuloides-Salix</i> spp.		Sensitive	12.5
Lodgepole Pine Riparian Forest			
<i>Pinus contorta-Salix</i> spp.	-----	-----	36
<i>Pinus contorta-Populus tremuloides</i>			2.8
<i>Scirpus microcarpus-Pinus contorta</i>		Sensitive	8.2

Alliance Types		Area (acres)
Great Basin Riparian Forest		
<i>Populus fremontii-Salix laevigata</i>	Sensitive	2.0
<i>Populus fremontii-Salix lasiolepis</i>	Sensitive	5.8
<i>Populus trichocarpa-Salix lasiolepis</i> -----	Sensitive -----	89
<i>Populus trichocarpa-Betula occidentalis</i>	Sensitive	2.8
<i>Populus trichocarpa-Elymus triticoides</i>	Sensitive	7.8
<i>Populus trichocarpa-Ulmus pumila/Robinia pseudoacacia</i>	Sensitive	4.6

New development will likely require that additional human consumption is drawn from surface streams – desert and mountain streams that water an already water-limited natural environment. But maintaining these streams is also regarded as very important in the County’s General Plan directive to protect the area’s valuable natural resources. Any project including new seasonal or perennial surface water diversion would be considered to have an impact if there are new patterns established in seasonal water quality, or retraction (drying) of riparian corridor soils resulting in significant changes to the associated vegetation’s extent or species composition. At the scale of streams within Mono County towns studied here, significant impacts are most effectively judged as attributable responses that are detectable by monitoring. Conflicts with construction scheduling are likely where sufficient baseline data for the parameter in question does not exist, as collection of accurate pre-project data for later comparisons is costly and time consuming. Exceptions would be the West Walker River in Walker, the East Walker River in Bridgeport, and Lee Vining Creek in Lee Vining, where existing data describing long-term stream performance may in some situations be sufficient to produce modeled responses prior to finalizing project design.

In all cases, the routine requirement for monitoring of downstream vegetation response (or lack thereof) and periodic scientific comparison to pre-construction botanical survey results could underpin the County’s effort to minimize further impacts to riparian communities. Objective, repeated-measures monitoring would defensibly detect attributable loss of biological diversity. With clear and robust, pre-identified thresholds that are and empowered to trigger changes (*i.e.*, re-watering), these potentially significant impacts and reduction of landscape carrying capacity for important dependent species such as mule deer and greater sage grouse can be avoided. Regarding the more subtle potential impacts associated with reduced water quality from incremental diversions, Mono County could most effectively minimize potential impacts to biological resources if a system monitoring stations was implemented to establish baseline conditions and protocols to be used for comparison to future post-project conditions. Parameters of concern that have been identified in the Owens River above Crowley Lake and that would serve to indicate habitat health for game trout and sensitive aquatic species include concentrations of naturally occurring constituents (phosphorus, arsenic, mercury), suspended sediment loading, and water temperature (Knapp, *et al.*, 1993, Mono County Planning Department, 2007).

Potential new water quality impacts include external, possibly far-reaching downstream effects to hydrologically isolated surface aquatic systems (Chalfant Valley, Benton, Benton Hot Springs, Swall Meadows, Little Round Valley, and Crowley Lake), and to tributary (ecologically connected) systems and major rivers including Lower Rock Creek (Paradise, Tom's Place), Owens River (Little Round Valley, Crowley Lake, McGee Creek, Long Valley), Rush Creek (June Lake), Lee Vining Creek (Lee Vining), East Walker River (Bridgeport), Mill Creek (Walker), California Creek (Topaz), and West Walker River (Walker, Coleville). Priority for pre-development monitoring could be allocated to streams where sensitive fish, mollusks, or amphibians have some likelihood to occur within town or immediately downstream, in Chalfant Valley, Benton Hot Springs, Paradise, Swall Meadows, Tom's Place, Little Round Valley, Crowley Lake, June Lake, Lee Vining, and Bridgeport. It would be possible to detect attributable change if formally recorded sampling protocols, analyte lists, data sharing requirements, and data are updated annually, and if flow and other previously recorded data has been collected to generate a baseline profile for streams that may be impacted by new diversion. Vegetation and water quality monitoring provide quantitative trend data for impact judgment, and also a backstop that can trigger project adaptation to management that account for and minimize riparian zone impacts.

Given the consistent, relatively high degree of intersection of wetland and riparian systems with study area extents, existing Best Management Practice standards and requirements should always be applied. Furthermore, the often sensitive resources represented or potentially represented in the types of plant communities that are present strongly suggest that discretionary conditions should be always supplemented by site-specific measures that are meant to minimize erosion and subsequent deposition into wetlands and aquatic habitats, in order to better assure that town area riparian and lakeshore wetlands are not indirectly impacted by projects that are "avoiding wetland impacts". Avoidance and minimization of direct impacts during construction can be assured by requiring fencing that is sufficient to exclude equipment entry into wetlands and setbacks. Confirmation that direct impacts associated with construction have been avoided would be assured by 1) requiring that applicants demonstrate knowledge of the location of all outer wetland boundaries, and 2) applying building setback limits that are by rule measured from the outermost margin of any vegetation community having a prevalence of phreatophytic species. Potential indirect impacts will best be minimized by carefully requiring specific placements for sediment control BMP's (e.g., wattle) to avoid discharge into the stream. Despite all of these efforts, construction that is located adjacent to sensitive riparian and aquatic resources must be assumed to have some unavoidable impact if it planned to occur during the normal spring runoff or late summer monsoonal rainy period.

Potential ongoing impacts to riparian and aquatic resources from existing housing and other constructed projects is addressed to a large degree by existing requirements aimed at maintaining water quality, for example requirements for spill clean-up, and setback minima for leach fields. Still, all roads, yards for equipment, and municipal parking lots contribute runoff tainted with oil and other pollutants to the environment. Physical wetland buffering from these uses and discharges would be the best BMP to add for minimizing this ongoing impact following each precipitation event. Implementing preserved, enhanced or created upland vegetation as a buffer immediately adjacent to any (isolated or connected) aquatic systems will remove sediments, excess nutrients and other pollutants before they can enter

wetlands and riparian zones, provide infiltration to charge shallow groundwater and attenuate storm stream flows, and provide wildlife habitat including movement corridors. In order to derive the greatest benefit at town areas in Mono County, buffers should be continuous within the area of prescribed impact avoidance, fitted with force dissipaters and sedimentation/cleanout basins (where channelized runoff is occurring), and densely vegetated with mainly bitterbrush (*Purshia tridentata*). In snow storage areas, buffers could include engineered swales or catchments in order to enhance snowmelt infiltration. More generally, it has been observed that buffer functions such as provision of habitat for wildlife are more highly retained or created where buffers are located away from housing, due to lessened impacts of predation by domestic pets (Castelle, *et al.*, 1992). Also, it is generally agreed that (depending on the functions and values that are to be retained or enhanced), greater benefit will be derived where a greater buffer width is allowed (Brown and Schaefer, 1987, Rogers, *et al.*, 1988).

Avoidance can be understood to also include a pre-project demonstration that beneficial wetland and riparian zone functions will not be significantly affected. Resources within towns provide integral beneficial functions that may include providing habitat for wetland-dependent species, which potentially includes sensitive plant, mollusk, fish, amphibian, and mammal species (Appendix A), mule deer, and migratory birds. Wetlands attenuate floods and trap sediments, facilitating biogeochemical transformations, storage and release of limiting nutrients to highly productive riparian vegetation. They are repositories for high biological diversity in an otherwise arid, somewhat monotonous landscape. For some species (*e.g.*, wetland-obligate plants, springsnails, and meadow shrews), the relatively isolated wetlands of Mono County may functionally harbor individual demes of a sustainable metapopulation, at least where connective dispersal corridors remain intact. Avoiding and minimizing impacts to aquatic, wetland, and riparian resources will also, in the aggregate, enhance these functions' translation to opportunities for recreation, pasturage, and education.

Weeds

A total of 59 non-native species were detected and recorded as "prominent" in one or more community types within the 16 town areas inventoried in 2013-14 (Table 51). Very few appear to be restricted entirely to points of recent or frequent disturbance. In addition to often great abundance at ruderal settings, many of these species are facultatively or obligately adapted to wetland meadow and riparian habitat conditions (Table 52). These species have invaded to varying degrees into the native wetland and riparian settings that persist within and adjacent to town areas. A smaller subset of species has invaded into relatively undisturbed upland scrub and forest communities. Non-native species displace native vegetation and in Mono County appear to interrupt normal successional vegetation recovery. Some, such as the problematic annual cheatgrass (*Bromus tectorum*), increase the risk of wildfire, or have other noxious qualities such as toxicity or thorniness.

The invasive annuals cheatgrass, tumble mustard (*Sisymbrium altissimum*), and Russian thistle (*Salsola tragus*) are the most widespread problem weeds in Mono County. All are naturalized to the extent that their eradication is impractical. They are to be expected in disturbed upland settings, Big Sagebrush Scrub, Great Basin Mixed Scrub, Black Greasewood Scrub, Rubber Rabbitbrush Scrub, Mountain Mahogany Scrub, Pinyon-Juniper Woodland, and Jeffrey Pine Forest, and will sometimes be

found in more mesic irrigated and riparian settings. Like other weedy species of more limited contexts, cheatgrass, tumble mustard and Russian thistle widely fill pioneer niches that are abundant at any given time in town areas. Application of researched, proven controls such as timed grazing and pre-emergent herbicides are not feasible in town areas, at least on any scale to bring about control of widely spread non-natives with regionally established seedbanks. Town areas, as a consequence, will continue to be propagule sources for public lands of the local landscape, even as controls are implemented there. It has now become more appropriate to choose populations of less ubiquitous species as targets directed for mitigatory control, perhaps, or to base any project-related control measures on more pressing needs such as fire fuel reduction.

Some widely occurring non-native species have been deliberately introduced widely into otherwise native environments in order to provide pasturage. Kentucky bluegrass, common timothy, and white clover are examples of perennial species that will tend to persist in the naturally occurring meadows where they were historically planted, however all would quickly disappear from the created meadow settings they now dominate, should irrigation be withdrawn. These and other wetland-adapted species (Table 52) are considered threats to remnant stands of primarily native Wet Montane Meadow, Dry Montane Meadow, and Creeping Wildrye Meadow that occur in most town areas and in the connected riparian corridors. Non-native population eradication using non-chemical methods would be facilitated by the limited habitat extents they have exploited and population distributions they have achieved in riparian corridor plant communities. If annual monitoring and eradication are accomplished prior to seed set, simple removal can be effective within three years of population detection (Paulus, 2012, for example). If underground structures are present (*e.g.*, Bermuda grass, other perennial grasses), then a method of chemical eradication that is sensitive to wetland application would likely be indicated.

Finally, non-native trees may currently present one of the best opportunities for enhancement mitigation efforts. The non-native trees Siberian elm, black locust, white poplar, Russian olive, and salt-cedar have traditionally been chosen for landscaping in windbreak and shadetree positions at various Mono County towns (Table 51). Other trees are also currently used, but those species are not prone to horticultural escape into the surrounding environment. The more highly adapted trees have widely invaded Cottonwood Riparian Forest and Willow Riparian Scrub communities. Water Birch Riparian Scrub, riparian Dry Montane Meadow and Creeping Wildrye Meadow have also been impacted. Given these trees' potentially substantial water use, their rapid growth to relatively great stature, and general impalatability to wildlife and insects, their competitive advantage poses a risk (sometimes imminent) of vegetation type conversion in all mesic habitats adjacent to housing in every unincorporated community of Mono County.

As mitigation for new population introductions of naturalized weeds that will predictably occur with any new ground disturbance and revegetation, programmatic eradication of known populations of relative restricted species (*e.g.*, invasive riparian trees) could be implemented as a condition of permits that allow such disturbance. Eradication of non-native perennial plant and tree populations in CDFW-jurisdictional riparian zones and on adjacent public lands would enhance habitats identified here as being otherwise relatively intact and valuable for sensitive wildlife use and natural aesthetics. For on-

site measures, species that should be targeted when proscribing prevention of new population establishment (no plants for one year following eradication) include any species not listed as occurring at the time of the pre-construction botanical survey, and species of limited distribution that have some potential to spread into the surrounding landscape. The entire area of activity and equipment entry would be included within the multi-year weed monitoring and eradication scope of such projects.

As town areas are now propagule sources and may become propagule sources for additional weed species, compensatory mitigation should specifically target and prioritize: 1) all non-native tree species listed in Table 52, 2) all perennial herbaceous species listed in Table 52, and 3) species whose invasiveness threat is rated by the California Invasive Pest Council (Cal-IPC, 2014) as limited, moderate, or high (horned smotherweed, purple false brome, red brome, spotted knapweed, Canada thistle, Bermuda grass, orchard grass, tansy mustard, Russian olive, red-stem filaree, common halogeton, woolly velvet grass, summer cypress, oxeye daisy, common horehound, black locust, curly dock, bouncing bet soapwort, London rocket, salt-cedar, woolly mullein, and periwinkle). Cheatgrass (Cal-IPC rating High), Kentucky bluegrass (Limited), and Russian thistle (Limited) are so widely naturalized that control is best framed in terms of limits to relative frequency or cover allowable in areas of post-project on-site disturbance and re-vegetation. Limiting cheatgrass relative cover to 10% of the herbaceous total at the last year of monitoring, for example, could be mandated in recognition of the increased fire susceptibility that is imposed by cheatgrass upon Mono County's upland scrub vegetation. The good news is that, with consistent, long-term application of mitigation that favors native plant establishment, and by taking advantage of opportunities to eradicate non-natives when their population distributions are still limited (i.e., to a small riparian corridor occurrence, or to the immediate area of a project's disturbance), the spread and establishment of most of the many identified, potentially invasive species can be avoided or minimized.

Table 51. Unincorporated communities of Mono County where populations of non-native species were found in 2014.
 (r) signifies species that were found only in ruderal settings such as roadsides.

species	Chalfant Valley														
	Benton	Benton Hot Springs	Paradise	Swall Meadows	Tom's Place	Little Round Valley	Crowley Lake	McGee Creek	Long Valley	June Lake	Lee Vining	Bridgeport	Walker	Coleville	Topaz
<i>Agrostis gigantea</i>							X								
<i>Agropyron cristatum</i>					X	X	X	X		X	X	X		X	
<i>Artemisia biennis</i>													X		X
<i>Atriplex micrantha</i>												X			X
<i>Atriplex rosea</i>												X			
<i>Bassia hyssopifolia</i>		X					X	X	X			X			
<i>Brachypodium distachyon</i> (r)									X			X			
<i>Bromus inermis</i>							X			X		X			
<i>Bromus madritensis</i> ssp. <i>rubens</i>	X						X								
<i>Bromus tectorum</i>		X	X	X	X	X	X	X	X	X	X	X	X	X	X
<i>Centaurea stoebe</i> ssp. <i>micranthos</i>														X	
<i>Chenopodium album</i> (r)				X			X					X	X		
<i>Cirsium arvense</i>										X					
<i>Conrigia orientalis</i> (r)										X					
<i>Cynodon dactylon</i>		X													
<i>Dactylis glomerata</i>										X					X
<i>Descurainia sophia</i>	X	X			X	X	X	X		X	X	X	X	X	X
<i>Elaeagnus angustifolia</i>				X								X	X		X
<i>Elymus hispidus</i>									X			X			
<i>Elymus repens</i>										X					
<i>Erodium cicutarium</i>			X							X	X	X	X	X	X
<i>Halogeton glomeratus</i> (r)	X														

species	Chalfant Valley	Benton	Benton Hot Springs	Paradise	Swall Meadows	Tom's Place	Little Round Valley	Crowley Lake	McGee Creek	Long Valley	June Lake	Lee Vining	Bridgeport	Walker	Coleville	Topaz
<i>Holcus lanatus</i>															X	
<i>Kochia scoparia</i>							X	X	X	X			X	X	X	X
<i>Lactuca serriola</i>								X			X		X		X	X
<i>Lepidium appelianum</i>													X			
<i>Lepidium chalapense</i> (r)													X			
<i>Lepidium perfoliatum</i>											X	X	X	X	X	X
<i>Leucanthemum vulgare</i>								X								
<i>Malva parviflora</i>											X	X	X			
<i>Marrubium vulgare</i>													X	X		
<i>Medicago sativa</i>												X			X	
<i>Melilotus albus</i>					X		X	X	X		X	X	X	X	X	X
<i>Melilotus officinalis</i>																X
<i>Mentha spicata</i>															X	
<i>Nymphaea</i> sp.			X													
<i>Phleum pratense</i>					X		X	X	X	X	X		X		X	X
<i>Plantago major</i>											X					
<i>Poa palustris</i>								X			X					
<i>Poa pratensis</i>					X	X	X	X	X	X	X		X	X	X	X
<i>Polygonum argyrocoleon</i> (r)											X					
<i>Polygonum aviculare</i> (r)						X	X	X	X	X	X	X	X	X	X	X
<i>Populus alba</i>							X	X		X	X		X			X
<i>Robinia pseudoacacia</i>	X	X	X	X										X	X	X
<i>Rumex crispus</i>								X					X			
<i>Salsola tragus</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

species	Chalfant Valley	Benton	Benton Hot Springs	Paradise	Swall Meadows	Tom's Place	Little Round Valley	Crowley Lake	McGee Creek	Long Valley	June Lake	Lee Vining	Bridgeport	Walker	Coleville	Topaz
<i>Saponaria officinalis</i>								X			X	X		X	X	X
<i>Sisymbrium altissimum</i>					X	X	X	X	X	X	X	X	X	X	X	X
<i>Sisymbrium irio</i> (r)		X														
<i>Tamarix parviflora</i>	X	X	X													
<i>Taraxacum officinale</i>											X					
<i>Thlaspi arvense</i>											X					
<i>Torreyochloa erecta</i>													X			
<i>Tragopogon dubius</i>					X			X			X		X	X	X	X
<i>Tribulus terrestris</i> (r)														X	X	X
<i>Trifolium repens</i>								X			X		X		X	X
<i>Ulmus pumila</i>	X	X	X	X		X						X		X	X	X
<i>Verbascum thapsus</i>					X		X	X	X	X	X	X	X	X	X	X
<i>Vinca major</i>				X												

Table 52. Non-native plant species that have established some prominence within one or more Mono County town areas. Wetland indicator status is taken from U.S. Army Corps of Engineers (2012). † = species considered to be “noxious weeds” as defined in California Food and Agriculture Code Section 5004. (CDFA, 2010). Key to habit and wetland status codes is given below.

species	common name	habit	wetland status
<i>Agrostis gigantea</i>	giant red-top grass	PG	fac. wetland (FACW)
<i>Agropyron cristatum</i>	crested wheatgrass	PG	
<i>Artemisia biennis</i>	biennial sagewort	AH	fac. wetland (FACW)
<i>Atriplex micrantha</i>	Russian orache	AH	
<i>Atriplex rosea</i>	tumbling oracle	AH	fac. upland
<i>Bassia hyssopifolia</i>	horned smotherweed	AH	fac. wetland (FACW)
<i>Brachypodium distachyon</i>	purple false brome	AG	
<i>Bromus inermis</i>	smooth brome	PG	fac. wetland (FAC)
<i>Bromus madritensis</i> ssp. <i>rubens</i>	red brome	AG	fac. upland
<i>Bromus tectorum</i>	cheatgrass	AG	
<i>Centaurea stoebe</i> ssp. <i>micranthos</i> †	spotted knapweed	PH	
<i>Chenopodium album</i>	white goosefoot	AH	fac. upland
<i>Cirsium arvense</i> †	Canadian thistle	PH	fac. wetland (FAC)
<i>Conrigia orientalis</i>	hare’s ear	AH	
<i>Cynodon dactylon</i>	Bermuda grass	PG	fac. upland
<i>Dactylis glomerata</i>	orchard grass	PG	fac. upland
<i>Descurainia sophia</i>	tansy mustard	AH	
<i>Elaeagnus angustifolia</i>	Russian olive	T	fac. wetland (FAC)
<i>Elymus hispidus</i>	intermediate wheatgrass	PG	
<i>Elymus repens</i> †	quack grass	PG	fac. wetland (FAC)
<i>Erodium cicutarium</i>	red-stem filaree	AH	
<i>Halogeton glomeratus</i> †	common halogeton	PH	
<i>Holcus lanatus</i>	woolly velvet grass	PG	fac. wetland (FAC)
<i>Kochia scoparia</i>	summer cypress	AH	
<i>Lactuca serriola</i>	prickly lettuce	AH	fac. upland
<i>Lepidium appelianum</i>	globetop hoary cress	AH	
<i>Lepidium chalapense</i> †	lens-pod hoary grass	PH	fac. upland
<i>Lepidium perfoliatum</i>	clasping peppergrass	AH	fac. upland
<i>Leucanthemum vulgare</i>	oxeye daisy	IPH	facultative upland
<i>Malva parviflora</i>	cheese weed	AH	
<i>Marrubium vulgare</i>	common horehound	PH	fac. upland
<i>Medicago sativa</i>	alfalfa	PH	
<i>Melilotus albus</i>	white sweetclover	AH	
<i>Melilotus officinalis</i>	yellow sweetclover	AH	fac. upland
<i>Mentha spicata</i>	common spearmint	PH	obligate wetland
<i>Nymphaea</i> sp.	waterlily	PH	obligate wetland

species	common name	habit	wetland status
<i>Phleum pratense</i>	common Timothy grass	PG	fac. wetland (FAC)
<i>Plantago major</i>	common plantain	PH	fac. wetland (FAC)
<i>Poa palustris</i>	fowl bluegrass	PG	fac. wetland (FAC)
<i>Poa pratensis</i>	Kentucky bluegrass	PH	fac. wetland (FAC)
<i>Polygonum argyrocoleon</i>	Persian knotweed	AH	
<i>Polygonum aviculare</i>	prostrate knotweed	AH	fac. wetland (FAC)
<i>Populus alba</i>	white poplar	T	
<i>Robinia pseudoacacia</i>	common black locust	T	fac. upland
<i>Rumex crispus</i>	curly dock	PH	fac. wetland (FAC)
<i>Salsola tragus</i>	Russian thistle	AH	fac. upland
<i>Saponaria officinalis</i>	bouncing bet soapwort	PH	fac. upland
<i>Sisymbrium altissimum</i>	tumble mustard	AH	fac. upland
<i>Sisymbrium irio</i>	London rocket	AH	
<i>Tamarix parviflora</i> †	common salt-cedar	T	fac. wetland (FACW)
<i>Taraxacum officinale</i>	common dandelion	PH	fac. upland
<i>Thlaspi arvense</i>	field pennycress	AH	
<i>Torreyochloa erecta</i>	false manna grass	PG	obligate wetland
<i>Tragopogon dubius</i>	yellow salsify	PH	
<i>Tribulus terrestris</i> †	common puncture vine	AH	
<i>Trifolium repens</i>	common white clover	PH	fac. wetland (FAC)
<i>Ulmus pumila</i>	Siberian elm	T	
<i>Verbascum thapsus</i>	woolly mullein	BH	fac. upland
<i>Vinca major</i>	periwinkle	PH	

key to growth habit codes:

A	annual
G	grass
GL	grass-like
H	herb
P	perennial
S	shrub
T	tree

obligate wetland (OBL) - almost always (>99% probability) occurs in wetlands,

facultative wetland (FACW) - usually (66-99% probability) occurs in wetlands,

facultative (FAC) - equally likely to occur in wetlands or non-wetlands (34-66% probability of occurrence in wetlands),

facultative upland (FACU) - usually occurs in uplands, but occasionally (1-33% probability) occurs in wetlands.

Mule Deer

Mule deer are an important game species, are important in the local food web of the County's natural environments, and thus directly or indirectly contribute to economic forces that sustain many of Mono County's livelihoods. Recent local herd size trends have raised concerns that the local carrying capacity has been significantly reduced, as mortality of individuals has exceeded fecundity during the last decade (CDFW, 2011). Common impacts to survivorship and fecundity that could affect mule deer when they enter areas of human habitation include reduction of critical browse and vehicle collisions. Critical browse is limited in availability by uncontrollable factors such as climate, by nitrogen deposition that favors invasive non-natives (Dukes and Mooney, 1999), by wildfire, by tent caterpillar outbreaks that affect plant productivity, and in Mono County by habitat isolation where highways and fences create linear barriers, and by permanent conversion to housing and agriculture. Critical browse is located in holding areas and along migratory routes, where concentrated deer use and inflexibility of migratory behavior (Jones & Stokes, 1999) can combine to exacerbate browse depletion to below what is needed to sustain the current population and maintain doe health for successful fawning. Deer movements show a high fidelity to specific "traditional" (i.e., learned) routes during migration (T. Taylor, personal communication). Policies that would seek to improve deer herd health and function in Mono County must take into account that deer exhibit a migratory behavior that focuses use and controls overall carrying capacity at well defined, relatively confined portions of the landscape where holding (especially winter holding) and migratory movements occur annually.

Much of the predominantly native vegetation remaining in unincorporated communities is dominated by bitterbrush (*Purshia tridentata*), which is recognized as important deer forage (Neal, 1988) and is clearly the most important of the browse plants used by deer in this region (Monteith, *et al.*, 2011). A total of 2445 acres (28%) of all undeveloped acreage remaining in these areas is classified as Great Basin Mixed Scrub or some other type where bitterbrush is prominent and more or less available for use by mule deer. Much of the densest bitterbrush cover, and several unincorporated community areas, lay along the twice annual migration corridors used by the Casa Diablo and Round Valley Herds. Casa Diablo Herd spring migration reaches the Lee Vining area in April to early May, depending on snowfall and plant phenology timing, then peaks in late May to early June and is completed by mid-June (Taylor, 1988). Fall migration thus begins in late September or early October, often prior to the first snowfall, and is completed by the second week of November (Jones and Stokes Associates, 1999). Evidence suggests that fall migrants can be expected to arrive in town areas with the first set of consecutive cold nights (10° F or lower), which directly affects browse availability (Paulus, 2011). The timing of Round Valley Herd spring and fall migration is similar (Kucera, 1988), but the routes are more highly intercepted by unincorporated community and ancillary infrastructure development. Paradise, Swall Meadows, Tom's Place, Little Round Valley, Crowley Lake, McGee Creek, and Long Valley all lay along traditional spring and fall routes, at the locations of substantial water, riparian forage and critical bitterbrush browse resources for migrating deer. Paradise and Swall Meadows are furthermore within the winter holding range of the Round Valley herd, so browse resources there would also be considered critical to the health and survivorship of individuals. The situation in Antelope Valley is less predictable due to the catastrophic effects of wildfire upon forage plants. Deer of the West Walker Herd

use available habitat in Walker, Coleville, and Topaz as winter range during the November 1 to April 30 period. Dense Big Sagebrush Scrub and Great Basin Mixed Scrub between US Hwy 395 and the Sierra Nevada to the west was once considered critical as migratory and winter holding habitat (Taylor, 1994), but loss of this cover has now forced behavioral change that has presumably significantly reduced deer presence and the potential for projects to adversely impact browse vegetation and fawning habitats that would be critical to herd health.

Based upon the close relationship between the success of bitterbrush and the overall carrying capacity of the landscape, especially the various holding areas, it would be helpful to adopt a “no net loss” policy for vegetation types with a substantial component of bitterbrush – the Great Basin Mixed Scrub and Big Sagebrush Scrub alliances where bitterbrush is a co-dominant, as well as Pinyon-Juniper woodland or Jeffrey Pine Forest where bitterbrush is important in the subcanopy. To facilitate no net loss of acreage, verified post-disturbance revegetation and post-project reclamation where these types occur could be a required step, with specific revegetation goals that will encourage replacement of bitterbrush-dominated habitat. Furthermore, all seed mixes that are implemented in these vegetation types or any other upland type should be required to include a substantial component of locally collected bitterbrush seed. Control of wildfire in bitterbrush scrub should rank a high priority, but firebreak management that targets removal of non-bitterbrush shrub dominants where possible would reduce firebreak impacts on local carrying capacity for deer. Residential and facility lighting that exceeds the structured human use area to illuminate vegetation dominated by bitterbrush should be prohibited.

Projects that would cause further loss of carrying capacity at critical migration paths and traditional holding areas could minimize this impact by implementing compensatory (off-site) mitigation based upon fair analysis of local effects and regional cumulative effects. Offsite mitigation at a ratio greater than 1:1 required for acres of browse habitat lost to conversion would be fairly compensatory, based on the recognition that habitat fragmentation actually occurs on a somewhat greater scale than is represented by the project footprint or its area of temporary disturbance. Wildfire defensible space requirements should be included when calculating project-related acreage loss impact in this (and any other) community type. Furthermore, even if revegetation adjacent to recent construction is fully in attainment of goals stated in the project environmental documentation, the restored habitat is less likely to be utilized due to the new human habitation, roadway, etc. New fences, and the added domestic pets, lighting and vehicles incrementally reduce the availability of adjacent habitats as they become further embedded within the human environment (Smith, *et al.*, 1989). While onsite revegetation that targets restoration of native vegetation with a high component of bitterbrush will likely add an increment of carrying capacity in critical areas, restoration of public lands or public trust conservation lands that have been compromised by wildfire, overgrazing, or historic conversion (*e.g.*, abandoned agricultural lands) would ultimately create a greater amount of carrying capacity.

Indirect loss of browse availability in critical areas for any given project has a strong temporal variation because migration and holding behaviors have identifiable, limited periods at any particular location. Construction-related impacts that potentially would be caused by temporary fencing, untethered dogs, and construction lighting would lose relevance if construction can be completed when

migration or holding of deer is not occurring locally. If construction must overlap a period when the local browse becomes a critical area, then impacts can be minimized by routinely requiring leashing of dogs, lighting that is shuttered, and avoidance of creating any new linear barrier that would force deer onto roadways or into concentrations (i.e., “pinch points”) that would give advantage to their natural predators. Speed limit requirements for construction vehicles would be appropriate for larger projects or projects that are far from paved roads. Construction-related impacts that predictably increase as part of an annual influx of animals can be effectively avoided if County Area Plans encode specific construction windows that are sensitive to known critical areas of migration and holding. At the towns that intersect primary migration routes or holding areas, the construction windows that would minimize direct impacts and avoid temporary reduction of local carrying capacity are May 15 – September 15 (Paradise, Swall Meadows, Tom’s Place, Little Round Valley, Crowley Lake, McGee Creek, and Long Valley), November 15 – March 15 or June 15 – September 15 (June Lake and Lee Vining), and April 15 to October 15 (Walker, Coleville, and Topaz).

Every project that will convert native browse habitat to another use will also increase the odds that moving deer (and other sensitive wildlife) will be killed by collision with a vehicle. The 4-lane U.S. Highway 395 has historically been a significant cause of this type of mortality, as most of the migratory pathways and many seasonal holding areas are intersected. Other paved roadways with lower speeds may also be associated with deer mortality due to the reduced visibility of the mountainous terrain and forest cover. New impacts caused by projects near paved roads could be minimized by not allowing any construction-related linear barriers that could force movements onto the roadway. Walls, rock piles, high fences, or other more permanent linear barriers should not be allowed if they would be continuous with the edge of roads. In the critical areas of Tom’s Place, Little Round Valley, Crowley Lake, McGee Creek, and Long Valley, project design should consciously account for the flow of deer migratory movements, for example by orienting all new linear barriers parallel to the primary migratory route of the area, while leaving gaps of darkness and natural cover, or aligning subdivision property boundaries and the resulting gaps between houses along deer trails identified during pre-project studies, in order to retain migratory routes. Traditional landscape linkages such as deer herd migration routes that in fair disclosure of potential project-related environmental effects may be considered as site-specific development constraints, just as overly steep slope is regarded now. This analysis, if required, would signify a replacement of the oversimplified paradigm that losses of small increments of common vegetation types in Mono County are always “insignificant” because there is a vast sea of similar type elsewhere.

Larger projects in the Round Valley Herd’s known migration corridors (including Paradise, Swall Meadows, Tom’s Place, Little Round Valley, Crowley Lake, McGee Creek, and Long Valley) would now likely threaten the continued existence of this herd. Large-scale maintenance practices that typically cause devegetation for safety reasons (firebreaks, roadside visibility) should substitute mowing (shrub finished height would ideally be at least 2 ft) wherever possible if applied within this migration route, in order to minimize impact to critical browse. Larger new development projects that would substantially narrow or close a migratory route could be required to reserve a viable corridor in suitable existing habitat as mitigation (for example, see Mono County Planning Department, 1990). At the scale of any

project in identified migration corridors, prescribed compensatory mitigation that increases the width or attractiveness of on-site or nearby movement corridors, especially those that are relatively unimpeded and away from paved roads, would help to minimize the unavoidable cumulative effect of corridor closure that is inherent to all projects in these critical areas.

Design considerations related to deer herd health should be an important input when new roads are envisioned or when substantial road improvements are authorized by the County. Deer movements along migratory paths that intersect roads are presumably predictable in location generally (e.g., Taylor, 1988, 1994), and mule deer exhibit high fidelity to seasonal ranges (Hyingstrom, *et al.*, 2008), therefore planning to reduce collisions is a realistic goal. Migrating deer mortality from collisions at US Hwy 395 in Mono County over six years of study was actually unrelated to traffic volume; rather most fatalities were associated with road features called cutbanks or fillslopes, and with the presence of guardrails (Jones and Stokes Associates, 1999). If the presence of a traditional migration path can be detected prior to finalizing the design of any new road or road improvement, then the road that the County subsequently authorizes or constructs may minimize collisions by conscientiously configuring the road's centerline, cutbanks, fillslopes, and signage in areas with obstructed visibility. Planners can account for traditional deer movements in the design (or improvement) of new and existing roads where they cross migration corridors or holding areas. Unavoidable new cut and fill locations could be mitigated by requirements for strategically placed fencing in some situations. Short but impassable sections of fencing can be used to guide deer into crossing at areas of greater visibility. More extensive roadside fencing, if needed for livestock exclusion, should be required to fit standards that would ease passage by deer: a maximum of three wires placed at 20, 30, and 42 inches above the ground surface, with the lowest wire a smooth strand. Improvements that incrementally restore habitat connectivity for deer and reverse the fragmentation associated with road development would help to offset the increase in collision likelihood that comes from a growing human population and increased tourism.

Another mitigation that would empower avoidance of deer at the design stage would be the addition of undercrossings where US Hwy 395 crosses traditional migratory routes. Undercrossings can also be engineered into bridges that cross relatively intact riparian corridors to enhance the habitat. For sensitive species generally, various underpass designs have been tested (Transportation Research Board, 2007) and emplaced in an effort to minimize the increasingly recognized effects that roads have upon wildlife (Shilling, *et al.*, 2002, Shilling, 2007). No occurrences of a known population of sensitive wildlife that would benefit from such installations (except mule deer) were uncovered during the literature review for this study. However, there are several smaller-sized wetland and aquatic species that have some potential to occur where town area riparian habitat is or will be crossed by roads. Presence of any of these species should demand consideration when designing to construct or upgrade roads that service development, including installation of suitable undercrossings or culverts for wildlife passage. Restoration of overall community integrity and habitat connectivity for sensitive species that use riparian zones and wetlands would partly mitigate the negative effects of increasing vehicle traffic intensity, for these species and for mule deer.

Trail System

Providing for the use of non-motorized transportation is a directive of the current Regional Transportation Plan (Mono County Community Development Department, 2005). Trail systems would provide mitigation for increased human usage of roads and town area habitats and consequent impacts to air quality, by facilitating reductions of motorized vehicle travel. The habitats available for potential trail system development within-town and on the adjacent public lands fringe, as classified here, would generally not contain sensitive element constraints that would make such projects infeasible.

The general findings are that new off-highway trails can readily be designed to avoid direct impact to populations of sensitive plants, can be routed to minimize direct impacts to sensitive plant community types and locally important ecotonal areas, and are less likely to cause additional habitat fragmentation from devegetation or conversion to impervious surfaces. Trails do not pose a physical barrier to movement, dispersal, or gene flow for any of the potentially occurring sensitive wildlife species identified (Table 3). Loss of sensitive plant communities can be minimized at every town if trail construction is limited to upland types to the maximum extent possible. However, there is some likelihood of impact to vegetation dominated by bitterbrush (*Purshia tridentata*) in upland settings between Swall Meadows and McGee Creek along the known migratory route of Round Valley Herd mule deer. New, trail-related direct loss of critical Great Basin Mixed Scrub for these deer or for deer using similar plant communities in Lee Vining and Walker could be mitigated by enhancing offsite critical browse to improve conditions for migrants as they pass around town areas.

Trail use and maintenance may cause direct and indirect impacts to sensitive species, whether it is constructed as improved-unpaved surfaces or as paved roadbeds. Fast-moving cyclists may collide with the potentially occurring species northern leopard frog, Mt. Lyell salamander, Owens Valley vole, Sierra Nevada mountain beaver, pygmy rabbit, and Mt. Lyell shrew. These and other potentially occurring small mammals – western white-tailed jackrabbit, Sierra marten, fisher, American badger, and Sierra Nevada red fox – may be taken by dogs in the company of trail users. Mule deer may be harassed, and fawning disrupted if trails pass through habitat where suitable forage or cover occurs. Predation on sensitive species may be increased to levels causing local extirpation if trail use attracts coyotes, ravens or black bears due to human feeding or trash.

Some of these potentially significant impacts from use and maintenance can be avoided if trail entry into riparian and spring-fed habitats (Table 50) is minimized. Linear corridors of riparian habitat should be crossed at a perpendicular angle to minimize habitat loss and chance for collisions. Pygmy rabbit is the only small, behaviorally susceptible species that may be affected by collisions in the upland community types (Big Sagebrush Scrub, Rubber Rabbitbrush Scrub, Great Basin Mixed Scrub) mapped (June Lake, Lee Vining, and Bridgeport only). Because pygmy rabbits rarely stray far from their perennial burrow complex site (Collins, 1998), routing well wide of detected burrows will also help to minimize the potential for collisions. Signage can also mitigate for some of these potential impacts. Speed limits can be posted at sensitive habitat areas to reduce the chance for collisions. Informational signs at trailheads should include notice that sensitive species may occur in the area, what they look like, and how to avoid collisions. Signs there should also include information regarding the local timing of mule deer fawning,

based upon consultation with a knowledgeable CDFW biologist, and clear warnings of the impacts and consequences of unleashing dogs on the trail. Bear-proof trash receptacles could be provided to minimize the potential for trail use to influence predator presence.

Greater Sage Grouse

New roads, fences, and aboveground transmission pole lines will contribute to the ongoing fragmentation of sagebrush habitat in Mono County, which is required in large expanses for sustaining greater sage grouse (Bi-State Distinct Population Segment) populations. Exurban development (which is not analyzed here) contributes disproportionately to the degree that such fragmentation will occur. For town areas, it is presumable that most impact on habitat suitability will be from ongoing uses and facility maintenance. But transportation and communications uses of town residents inescapably must also extend out into the sagebrush habitat in the form of roads, exclusion fencing, and towers. The landfill in southern Mono County is a noted, specific example of how the towns' spheres of influence reach out to affect greater sage grouse. In addition to producing noise, traffic, and fencing deterrents to grouse habitat use, a subsidized population of common ravens has been created. More generally, refuse and road-killed animals tend to subsidize raven populations, and also omnivorous coyote. A strategy for conservation of the DPS at large has been thoroughly analyzed in the Bi-State Action Plan (Bi-State Technical Advisory Committee, 2012). Effective actions to help mitigate the effects of roads and road maintenance (impacts include new noise, grouse collision with vehicles, and fencing), communications (impacts are new perching and nesting sites for grouse predators), in-town trash, roadkill, and landfills (impact is artificially enhanced carrying capacity for ravens and other effective predators) are available.

Routine implementation of Bi-State Action Plan measures has been shown to minimize these effects if done at a large enough scale. The County could adopt Action Plan reasoning when permitting any projects that will, for example, erect any new potential predator perch above the height of the surrounding vegetation in potentially occupied habitat. In this case, requirement for raptor (and raven) deterrence throughout the life of the project would avoid the potentially significant impacts associated with permitting the use. Similar reasoning suggest adoption of Plan measures regarding fencing in the right of way, and timing of activities that might deter habitat use or nesting success. Noise and parking impacts to breeding or nesting grouse can be further minimized by coordinating right of way activities with BLM, which is the managing agency for most of the occupied habitat that is crossed by roads in Mono County. Routing shoulder grading, for example, could maintain avoidance of grouse if it is accomplished by scheduling work near leks and nesting habitat (as specified by BLM) for the period late August to early February. Offsite mitigations for projects that will create (primarily offsite) increases in road use or use of fencing in known and potential sage grouse habitat could fund large-scale fence marking to prevent grouse mortality from fence collisions, and conversion of traditional 3-strand fencing to fencing that can be "let down" during annual breeding, nesting dispersal, or migratory movement periods (Bi-State Local Area Working Group, 2004). Allowing any impacts that will further fragment sagebrush habitat or destroy habitat quality and connectivity would be contrary to recovery goals for the species, and may lead to DPS listing under the federal Endangered Species Act.

Predators of grouse nests and chicks have dispersed far from their town, roadside and landfill centers of population subsidy into the surrounding sagebrush habitat at an unsustainably high rate. Cassaza, *et al.* (2007) concluded that avian and mammalian predation was the greatest threat to Bi-State nest success, brood survival, and even adult survival in every Population Management Unit they studied. Increasing predation due to greater predator presence in this case appears to justify predator control as mitigation. Increasing predation also may be effectively ameliorated through requirements that all projects that could provide predatory perches for raptors such as golden eagles or for ravens must implement deterrents to perching (e.g., “raptor spikes”). These installations should also be subject to follow-up monitoring to ensure effectiveness. Conditions of Approval should also include prohibiting creation of trash and other attractants for ravens and coyotes, and prohibiting creation of new nest sites for ravens in or near greater sage grouse habitat as is currently recognized by the Bi-State TAC (2012) and U.S. Forest Service (2013b). This would include the town areas of Little Round Valley, Crowley Lake, McGee Creek, Long Valley, Lee Vining, June Lake, Walker, Coleville, and Topaz. The County’s planned 2023 relocation of the Long Valley landfill will remove a significant predator subsidy from its central location within habitat occupied by the South Mono Population Management Unit. More immediately, the County could mitigate the ongoing landfill impact by seeking a permitted control program to reduce predator pressure.

Direct impacts to grouse habitat within town study areas are less certain, and in most cases will likely not occur with in-fill located projects. Towns may be a source of ignition for wildfire impacts to the surrounding scrub, and greater sage grouse habitat preservation justifies making the control of wildfire in areas of sagebrush scrub habitat a priority. Unburned Big Sagebrush Scrub, Great Basin Mixed Scrub, Dry Montane Meadow, and Wet Montane Meadow occurrences mapped within the Little Round Valley, Crowley Lake, McGee Creek, Long Valley, June Lake, Lee Vining, Walker, Coleville, and Topaz study area limits were more or less compromised for grouse use due to the high degree of existing fragmentation and isolation, the presence of landscape trees and encroaching native pines, adjacency to existing infrastructure and housing, and assumed presence of domestic pets as predators (Paulus, 2014). Larger lot sizes and generous setback distances help in preserving a larger habitat viability, but these measures are defeated where firebreak clearing or windbreak treerow planting is allowed to encroach to near lot edges. Other, non-ministerial or advisory measures may be effective if near-lek habitat (present at Crowley Lake, McGee Creek and Long Valley) avoidance measures such as lek buffering, seasonal road closures, or near-lek parking restrictions are to be uniformly implemented during pre-project planning.

In the rare circumstance that pre-project analysis shows a significant direct impact to viable habitat in town areas, it would appear that appropriately conferred mitigation contributing to off-site, larger scale efforts to reverse landscape-level changes in the environment – creeping sagebrush scrub habitat degradation due to the encroachment of pinyon-juniper woodland trees and non-native cheatgrass, control of the significant disease threat West Nile Virus, and withdrawal of historically created or preserved meadow habitats at historically (often irrigated) pastures (Bi-State TAC, 2012) – would be more effective use of conservation resources. Late brood-rearing habitat appears to be especially threatened, as 75% is privately owned (USFWS, 2013). Direct loss of suitable habitat through isolation or conversion is mitigated to some degree whenever the County encourages completion of land exchange agreements and conservation easements in critical areas that would be susceptible to the impacts of exurban development.

Other Nesting Birds

Construction or infrastructure maintenance activities that will remove vegetation within the regional bird nesting period of February 15 through September 15 has some potential to destroy or negatively influence the nest success of birds protected by the Migratory Bird Treaty Act and federal or state Endangered Species Act designations. Protections apply to individual birds and nests at this point, as no ESA Critical Habitat designations currently intersect the town areas included in this analysis. If construction must occur during this period, the only method available to minimize and avoid impacts to nesting birds is pre-construction surveying, marking and buffering of nests. Surveys must be conducted by a qualified biologist, must occur within a few days of the start of vegetation-disturbing activities, and must include at least a 100 ft buffer where construction activities are not allowed until after fledging has occurred. If these surveys are verified through timely reporting, and reporting of violations to CDFW is a routinely required condition, then the chance of unintended take will be minimized. For sensitive bird species sightings specifically, requiring reporting of pre-construction survey sightings and coordination with CDFW will serve to minimize potential impacts to their chosen breeding habitats.

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