# SECTION 3. ENVIRONMENTAL SETTING AND BIOLOGICAL RESOURCES

# 3.0 ENVIRONMENTAL SETTING AND BIOLOGICAL RESOURCES

## 3.1 Environmental Setting

The Plan Area is bounded by the Sierra Nevada to the west and the White and Inyo Mountains to the east (Figure 1-1 to 1-8) and from the Mono Basin in the north to the Inyo-Kern County line to the south. It includes most of the riparian habitat within Mono Basin, Long Valley, Owens Valley, Merritt Cut, and Rose Valley. The Sierra Nevada casts a rainshadow over the Plan Area resulting in low precipitation. The Owens River originates at Big Springs in southwestern Mono County, flows into Crowley Reservoir, through the Owens River Gorge and into the Owens Valley. Roughly 5 miles south of Tinemeha Reservoir the Owens River is diverted into the LAA. However, some perennial flow is maintained to the Lower Owens River and Owens Lake Delta. Currently, Owens Lake consists of a brine pool, alkali meadows, natural and artificial springs, barren playa and various dust control mitigation areas that are managed with water, gravel or vegetation. The majority of the Owens Lake area is not owned by the City and therefore, not part of the Plan Area. The Plan Area does include lands adjacent to and directly south of Owens Lake.

LADWP diverts surface water and pumps groundwater from the Plan Area into the LAA system, which provides approximately one-third of City's water supply. Approximately 56 percent of the total water supply (runoff, flowing groundwater and pumped water) collected from the Plan Area remains in the area for within-basin uses (LADWP 2010-Urban Water Management Plan).

## 3.2 Climate

The Mono Basin is characterized by a high altitude Mediterranean climate with great seasonal and annual precipitation variability. The area receives 6-13 inches of precipitation a year, with 80 percent of that between November and April in the form of snow (Gaines 1981). After a storm on cool days the poconip, or dense fog, covers the basin and leaves a dusting of frost. In the spring and fall, winds are common; some reaching speeds of 100 miles per hour; and during the summer thunderstorms often form (Gaines 1981). Mean daily winter temperatures (December through February) are usually below freezing throughout the basin, while mean daily summer temperatures are between 60 and 65 degrees F. Summer daily maximums normally range from 75 to 85 degrees F and winter daily maximums are often above freezing (Jones and Stokes Associates, 1993).

The Long Valley climate is semi-arid and moderate. Due to its high altitude, this area has a dry-summer humid continental climate, with long, snowy winters, and warm, dry summers. Snowfall is particularly heavy from December through March, and averages 206 inches per season. On average, there are 21 days of 80 degrees F + highs and 5.2 nights of sub-0 degrees F lows annually. This area has winter average lows of 16 to 21 degrees F to summer average highs of 70 to 80 degrees F (www.ncdc.noaa.gov/sotc/national/2009/12). Precipitation totals about 20 to 25 in per year, divided between winter snows and summer thunderstorms.

The Owens Valley has hot, dry summers and moderately cold winters. Relative humidity is low to moderate ranging from 6 to 100 percent and averages less than 30 percent during the summer months and more than 40 percent during the winter months (Duell 1990). Evapotranspiration is high (range of 8.9 to 37.4 in per year)

(Danskin 1998). Air temperatures vary greatly from a winter low of 2 degrees F to a summer high of 107 degrees F. The average low January temperature in winter is 21 degrees F and the average high July temperature is 99 degrees F.

Above10, 000 feet, the majority of precipitation falls as snow and averages 30 inches in snow-water equivalent. In the Owens Valley, average precipitation is 4 to 6 inches; in the White and Inyo Mountains it is 7 to 10 inches. Most precipitation falls between December and February.

Rose Valley is a hot, arid desert region with wide annual temperature fluctuations that occur from a high of 119 degrees F to a low of 1 degree F. Winds are known to reach as high as 75 mph on a sunny day. The area receives 5-7 inches of precipitation per year while the area's open potential water evaporation rate has been estimated to be up to 65 to 80 inches per year (CWRCB 1993, Bauer 2002). Surface water bodies in the Rose Valley area consist of perennial springs sustained by groundwater flow, ephemeral streams and washes that mainly flow in the winter, and manmade lakes and reservoirs.

## 3.3 Topography, Geology, and Soils

The Owens Valley is the most southwestern basin in the Basin and Range geologic province, which is characterized by a series of separate and parallel mountain ranges interposed with broad valleys. The Owens Valley floor elevation ranges from 3,000 to 4,500 ft. The topographic relief from neighboring mountains varies from 3,700 to 10,800 ft. The valley floor is underlain by valley fill that consists of unconsolidated to moderately consolidated alluvial fan, transition-zone, glacial and talus, and fluvial and lacustrine deposits. The valley fill also includes interlayered recent volcanic flows such as Red Hill and pyroclastic rocks such as the Bishop Tuff (Danskin 1998).

A major geologic feature of the region is the Owens Valley Fault, which extends from Bishop in the north to south of Owens Lake.

The Volcanic Tablelands, located at the northern end of the Owens Valley and extending north to Mono Lake, are part of a 580 square mi area covered by volcanic ash flows from the eruption of Long Valley Caldera approximately 760,000 years ago. The region remains geologically active with faulting at the base of the Sierra Nevada and crustal stretching of the Basin and Range Province. The tablelands consist of several layers of compacted ash known as Bishop Tuff, which is up to 600 ft deep in places. The soils associated with this formation are very shallow and well-drained. The dominant rocky and loamy soil textures are generally nutrient poor, with low levels of inorganic nitrogen and plant-available phosphorus. The NRCS (no date) mapped and classified Owens Valley soils.

## 3.4 Vegetation Communities

Three major bioregions meet within the Owens Valley: the Sierra Nevada, Great Basin Desert, and Mojave Desert, resulting in high biological diversity. Vegetation is controlled by the arid to semi-arid conditions, the high salinity of soil, and the presence of a shallow water table. Vegetation communities of the Plan Area include Emergent Wetland, Alkali Meadow, Rush-sedge Meadow, Alkali Shrub, Upland Shrub, Riparian Forest, Riparian Shrub, Pinyon-juniper Woodland, and Jeffrey Pine Woodland (modified from Cheatham and Haller 1975).

Emergent wetlands occur throughout the Plan Area in locations with surface water and near surface water. Dominant species include cattail (*Typha* spp.), bulrush or tule (*Schoenoplectus acutus*), and phragmites (*Phragmites australis*). Under some conditions, these species become invasive and efforts to control them are ongoing.

Wet meadow communities occur throughout the Plan Area in locations with high water tables. Dominant alkali meadow species are tolerant of high salinity and alkalinity. These species include alkali sacaton (*Sporobolus airoides*) and salt grass (*Distichlis spicata*). The rush-sedge meadow communities are dominated by Nebraska sedge *(Carex nebraskensis*) and Baltic rush (*Juncus balticus*). Sensitive meadow species include Inyo County mariposa lily (*Calochortus excavates*), a California Species of Special Concern, and the Owens Valley checkerbloom (*Sidalcea covillei*), a California endangered species.

Riparian forest and shrub communities occur along the Owens River and along streams draining from the Sierra Nevada. Common tree species include Fremont cottonwood (*Populus fremontii*), Gooding's black willow (*Salix gooddingii*), and red willow (*Salix laevigata*). Understory species include coyote willow (*Salix exigua*), Woods' rose (*Rosa woodsii*), grasses, rushes and sedges. Saltcedar (*Tamarix ramosissima*) and perennial pepperweed (*Lepidium latifolium*), nonnative species, have invaded many riparian areas in the Plan Area, and efforts to eradicate them are ongoing.

Alkali shrub communities occur throughout the Plan Area in locations with high water tables. They are dominated by Nevada saltbush (*Atriplex torreyi*), rabbitbrush (*Ericameria nauseosa*), greasewood (*Sarcobatus vermiculatus*), and inkweed (*Suaeda moquinii*).

Upland shrub community occurs on the lower slopes and alluvial fans from nearby mountain ranges. Species such as shadscale (*Atriplex confertifolia*), Nevada ephedra (*Ephedra nevadensis*), and California buckwheat (*Eriogonum fasciculatum*) are common; in addition, blackbrush (*Coleogyne ramosissima*) and sagebrush (*Artemesia* spp.) are more common in the northern Plan Area, while creosote bush (*Larrea tridentata*) and burro bush (*Ambrosia dumosa*) are found in the southern Plan Area.

Pinyon-juniper and Jeffrey pine woodlands are a minor component of the Plan Area. They occur along Owens Gorge, east side of Mono Lake, and at the Buttermilk area (west of Bishop). Dominant species are pinyon pine (*Pinus monophylla*), juniper (*Juniperus osteosperma*), and Jeffrey pine (*Pinus jeffreyi*).

Endemic species within the Plan Area include: the Lone Pine milkvetch (*Astragalus sepultipes*), Inyo bedstraw (*Galium hypotrichium* ssp. i*nyoense*), Big Pine biscuitroot

(*Lomatium rigidum*), Inyo meadow lupine (*Lupinus pratensis* var. *eriostachyus*), Inyo beardtongue (*Penstemon papillatus*), Inyo phacelia (*Phacelia inyoensis)*, Owens Valley checkerbloom (*Sidalcea covillei*), Inyo County Mariposa Lily (*Calochortus excavatus*), Fish Slough milk-vetch (*Astragalus lentiginosus* var. *piscinensis*), Mono County phacelia (*Phacelia monoensis*), and Mono milkvetch (*Astragalus monoensis*).

## 3.5 Wildlife Resources

In general, wildlife habitats and the associated wildlife species differ between the Mono and Inyo Counties largely due to differences in elevation and vegetation communities. Wildlife are closely associated with the various vegetation communities described previously (see section 3.4).

Emergent wetlands, alkali and rush-sedge meadows, riparian forest and shrub, and alkali shrub communities provide habitat for Botta's pocket gopher (*Thomomys bottae*) and Owens Valley vole (*Microtus californicus valicola*), a California Species of Special Concern. The introduced tule elk (*Cervus canadensis nannodes*) typically occurs in meadows around the Owens River and tributaries, moving into irrigated pastures to forage, and making seasonal movements into surrounding upland vegetation and onto alluvial fans. Meadow communities and wetlands support species such as Marsh Wren (*Cistothorus palustris*), Common Yellowthroat (*Geothlypis trichas*), Savannah Sparrow(*Passerculus sandwichensis*), Red-winged Blackbird(*Agelaius phoeniceus*), Western Meadowlark(*Sturnella neglecta*), and the introduced American bullfrog (*Lithobates catesebeiana*).

Wet meadow and riparian areas typically support fewer lizard species, however snakes such as northern rubber boa (*Charina bottae*), Sierra garter snake (*Thamnophis couchii*), and wandering garter snake (*Thamnophis elegans vagrans*) are frequently found. Amphibian species include western toad (*Anaxyrus boreas*), and Great Basin spadefoot (*Speainter montana*), and the introduced American bullfrog. Mammal species in these habitat types include mule deer (*Odocoileus hemionus*), the American beaver (*Castor canadensis*), and montane vole (*Microtus montanus*). Riparian areas, including associated wet meadow habitats, support the following breeding bird species, depending on elevation and vegetation structure: Red-breasted Sapsucker (*Sphyrapicus rubber*), Hairy Woodpecker (*Picoides villosus*), House Wren (*Troglodytes aedon*), American Robin (*Turdus migratorius*), Yellow Warbler (Setophaga *petechia*), Song Sparrow (*Melospiza melodia)*, and Brewer's Blackbird (*Euphagus cyanocephalus*).

More mesic alkali meadow and riparian communities provide habitat for fewer reptiles but may include amphibians such as Sierran treefrog (*Pseudacris sierra*), western toad, Great Basin spadefoot, and nonnative tiger salamander (*Ambystoma tigrinum*). Mammals that typically utilize riparian communities include raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), desert woodrat (*Neotoma lepida*), and American beaver. Bird species found breeding in most riparian areas are Bewick's Wren (*Thryomanes bewickii*), House Wren, Nuttall's Woodpecker(*Picoidesnuttallii*), Northern Flicker (*Colaptes auratus*), Spotted Towhee (*Pipilo maculates*), and Song Sparrow.

In upland shrub communities, common reptile species in the Plan Area include the common side-blotched lizard (*Uta stansburiana*), zebra-tailed lizard (*Callisaurus draconoides*), yellow-backed spiny lizard (*Sceloporus uniformis [*formerly *deserti]),*

*western fence lizard (Sceloporus occidentalis)*, common sagebrush lizard (*Sceloporus graciosus*), striped whipsnake (*Coluber taeniatus*), common kingsnake (*Lampropeltis getula*), gopher snake (*Pituophis catenifer*), and rattlesnakes (*Crotalus* spp.). Because of the dry conditions of this vegetation community, amphibians are uncommon.

Small mammals include kangaroo rats (*Dipodomys* spp.), pocket mice (*Perognathus* spp.), least chipmunk (*Neotamias minimus*), California ground squirrel (*Otospermophilus beecheyi*), white-tailed antelope ground squirrel (*Ammospermophilus leucurus*), black-tailed jackrabbits (*Lepus californicus*), and desert cottontail (*Sylvilagus audubonii*). The pygmy rabbit (*Brachylagus idahoensis*), a California Species of Special Concern, occurs in sagebrush habitats in Long Valley and the Mono Basin.

Large mammals typically have large home ranges, thus they may utilize many different vegetation communities, and commonly include coyote (*Canis latrans*), kit fox (*Vulpes macrotis*), gray fox (*Urocyon cineroargenteus*), and mule deer. Less common mammals in the Plan Area include badger (*Taxidea taxus*), bobcat (*Lynx rufus*), and mountain lion (*Felis concolor*).

Bird species typically found breeding in the upland shrub vegetation communities include Le Conte's Thrasher (*Toxostoma lecontei)*, Sage Thrasher (*Oreoscoptes montanus*), Green-tailed Towhee(*Pipilo chlorurus*), Brewer's Sparrow (*Spizella breweri*), Sage Sparrow (*Artemisiospiza belli*), and Black-throated Sparrow (*Amphispiza bilineata)*. The Greater Sage-Grouse (*Centrocercus urophasianus*), occurs in Mono County, particularly in Long Valley.

The aquatic communities in the Plan Area are dominated by nonnative predatory fish species, introduced for recreational fishing, such as largemouth bass (*Microperus salmoides*), brown trout (*Salmo trutta*), rainbow trout (*Oncorhynchus mykiss*), and catfishes (*Ictaluridae*). Mosquitofish (*Gambusia affinis*), also a nonnative species, were introduced in many areas for mosquito control. The most common native fish is the Owens sucker (*Catostomus fumeiventris*). Hybrid tui chubs occur in the Plan Area.

Aquatic invertebrates include nonnative crayfish (*Procambarus clarkii and Pacifastacus leniisculus*), native mussels (*Anodonta* spp.), spring snails (*Pyrgulopsi*s spp.), and nonnative invasive New Zealand mud snails (*Potamopyrgus antipodarum*) and Asian clam (*Corbicula* sp.). Common macroinvertebrates include diptera (midge), amphipoda (scud), and bivalvia (clam).

## 3.6 Hydrology: Streams, Rivers, and Drainages

In the Plan Area, the major surface waters in the Mono Basin are Mill, Wilson, Lee Vining, Walker, Parker, and Rush Creeks, which all flow into Mono Lake. Grant Reservoir is located on Rush Creek. In addition, there are numerous springs and seeps located around Mono Lake.

In the Owens Basin, the Owens River headwaters are located at Big Springs. The Upper Owens River then flows through Long Valley and empties into Crowley Reservoir. The main tributaries to the Upper Owens River are Mammoth, Hot, Little Hot, Convict, and McGee Creeks. Below Crowley Reservoir, the river flows into the Owens River Gorge, which runs 20 mi to Pleasant Valley Reservoir. Rock Creek and Pine Creek join the Owens River just upstream of Pleasant Valley Reservoir. Lower

Horton and Lower McGee Creeks are tributary to the Owen River downstream of Pleasant Valley Reservoir. The Middle Owens River runs from Pleasant Valley south past Bishop and Big Pine to the LAA Intake downstream of Tinemeha Reservoir. Main tributaries to the Middle Owens River are Bishop, and Big Pine Creeks. Downstream of the Intake, the Lower Owens River continues south to the Owens River Delta. Following implementation of the Lower Owens River Project in December 2006, perennial flow has been maintained in the Lower Owens River downstream of the Intake. The Los Angeles Aqueduct lies well west of the Owens River, and from the Intake south to the Alabama Gates. It is an open, unlined channel. From the Alabama Gate south to Haiwee Reservoir, the Aqueduct is open, but is a concrete-lined channel. South of Haiwee Reservoir, the Aqueduct is a lined, closed system. While several creeks originating from the east slope of the Sierra Nevada historically were tributary to the Owens River, there are currently no major tributaries to the Lower Owens River. Water from the larger creek systems such as Independence, Oak, and Lone Pine Creeks is used to irrigate pastures for the purpose of livestock grazing.

Water is provided to other small lakes within the Plan Area including Klondike Lake, Buckley Ponds, Upper and Lower Twin Lakes, Goose Lake, Billy Lake, and Diaz Lake. The Blackrock Waterfowl Management Area provides up to 500 acres of flooded habitat each year, including some open water and ponded areas. In addition, there are numerous canals and ditches that are used to divert flow from the Owens River and its tributaries for irrigation, groundwater recharge, and other purposes (Appendix D).

Groundwater pumping is conducted in the Owens Valley portion of the Owens River watershed for export to the City of Los Angeles as well as for in-valley uses such as irrigation, storage, and residential uses.

The Owens Valley Groundwater Basin encompasses 1,030 square mi that underlie the Benton, Hammil, and Chalfant Valleys in Mono County, and Round and Owens Valleys in Inyo County. In Chalfant, Benton and Hammil Valleys groundwater is managed by Tri-Valley Groundwater Management District. Groundwater in Round and Owens Valley is managed under the Water Agreement of 1991, and the levels and quality are monitored by LADWP and Inyo County Water and Health Departments.

Some waters in the Owens and Mono Basins have been classified as impaired by the Lahontan Regional Water Quality Control Board. They are impaired because of the presence of naturally occurring metals and flow alterations.

## 3.7 Existing Land Uses

The area is largely undeveloped. The predominant land uses in the Plan Area are ranching and recreation.

LADWP owns approximately 251,000 acres in Inyo County and 63,000 acres in Mono County. Inyo is the second largest county in California in total area (10,140 square mi); the population is 17,945. Mono County encompasses approximately 3,100 square mi and has a population of 9,956. Most land in these counties is publically owned; federal agencies manage 92 percent of Inyo County and 88 percent of Mono County. About 1 percent of Inyo County lands are privately owned. The remaining lands are owned by the City, State, or local agencies. Shoshone, Paiute and other Indian lands occur adjacent to the Plan Area. Inyo and Mono Counties are generally rural and sparsely settled, with residents concentrated around communities such as Lee Vining, Mammoth Lakes, Bishop, Big Pine, Independence and Lone Pine.

Within the Plan Area (314,000 non-urban acres owned by the City), there are about 22,100 acres of irrigated agricultural lands; about 2,000 acres are for crops (e.g., alfalfa) and the remainder is irrigated pastures used for livestock grazing (Appendices A and F).

Outdoor recreation-related tourism is the foundation of the region's economy. City lands in Inyo and Mono Counties provide ample opportunities for outdoor recreation involving the Owens River streams, lakes, and reservoirs, as well as access to wilderness areas and high mountain environments. Popular points of interest located in or near the Plan Area include: Death Valley National Park, Yosemite National Park, Sequoia and King's Canyon National Parks, Ancient Bristlecone Pine Forest, Alabama Hills, John Muir Wilderness, Ansel Adams Wilderness, Mammoth Mountain Ski Resort, Mammoth Lakes, Owens River Gorge, Bridgeport Reservoir, Pleasant Valley Reservoir, and Crowley Reservoir.

## 3.8 Listed Plant and Animal, and Species of Special Concern in the Plan Area and Areas Adjacent to the Plan Area.

**Table 3- 1. Listed Plants and Animals under ESA and CESA, and Species of Special Concern in the Plan Area**

| SCIENTIFIC NAME | COMMON NAME | FEDERAL LIST STATUS | CALIFORNIA STATE LIST STATUS | OTHER STATE STATUS* |
|---|---|---|---|---|
| **Plants** | | | | |
| *Astragalus lentiginosus var. piscinensis* | Fish Slough milk-vetch | Threatened | None | |
| *Sidalcea covillei* | Owens Valley checkerbloom | None | Endangered | |
| **Invertebrates** | | | | |
| *Pyrgulopsis owensensis* | Owens Valley springsnail | None | None | SSC |
| *Pyrgulopsis perturbata* | Fish Slough springsnail | None | None | SSC |
| **Amphibians** | | | | |
| *Batrachoseps campi* | Inyo Mountains slender salamander | None | None | SSC |
| *Hydromantes sp.* | Owens Valley web-toed salamander | None | None | SSC |
| *Lithobates pipiens* | northern leopard frog | None | None | SSC |
| *Rana sierrae* | Sierra Nevada yellow-legged frog | Endangered | Candidate Endangered | |
| **Reptiles** | | | | |
| *Gopherus agassizii* | desert tortoise | Threatened | Threatened | |
| **Fish** | | | | |
| *Catostomus fumeiventris* | Owens sucker | None | None | SSC |
| *Cyprinodon radiosus* | Owens pupfish | Endangered | Endangered | FP |
| *Rhinichthys osculus ssp.* | Owens speckled dace | None | None | SSC |
| *Rhinichthys osculus ssp.* | Long Valley speckled dace | None | None | SSC |
| *Siphateles bicolor snyderi* | Owens tui chub | Endangered | Endangered | |
| **Birds** | | | | |
| *Centrocercus urophasianus* | Greater Sage-grouse | None | None | |
| *Ixobrychus exilis* | Least Bittern | None | None | SSC |
| *Accipiter gentilis* | Northern Goshawk | None | None | SSC |

| SCIENTIFIC NAME | COMMON NAME | FEDERAL LIST STATUS | CALIFORNIA STATE LIST STATUS | OTHER STATE STATUS* |
|---|---|---|---|---|
| *Aquila chrysaetos* | Golden Eagle | None** | None | FP |
| *Buteo swainsoni* | Swainson's Hawk | None | Threatened | |
| *Circus cyaneus* | Northern Harrier | None | None | SSC |
| *Elenanus leucurus* | White-tailed Kite | None | None | FP |
| *Haliaeetus leucocephalus* | Bald Eagle | Delisted** | Endangered | FP |
| *Falco peregrinus anatum* | Peregrine Falcon | Delisted | None | FP |
| *Charadrius nivosus* | Snowy Plover (Inland population) | None | None | SSC |
| *Charadrius montanus* | Mountain Plover | None | None | SSC |
| *Western DPS Coccyzus americanus* | Yellow-billed Cuckoo | Threatened | Endangered | |
| *Asio otus* | Long-eared Owl | None | None | SSC |
| *Athene cunicularia* | Burrowing Owl | None | None | SSC |
| *Empidonax traillii* | Willow Flycatcher | None | Endangered | |
| *Empidonax traillii extimus* | Southwestern Willow Flycatcher | Endangered | Endangered | |
| *Lanius ludovicianus* | Loggerhead Shrike | None | None | SSC |
| *Vireo bellii pusillus* | Least Bell's Vireo | Endangered | Endangered | |
| *Riparia riparia* | Bank Swallow | None | Threatened | |
| *Setophaga petechia* | Yellow Warbler | None | None | SSC |
| *Icteria virens* | Yellow-breasted Chat | None | None | SSC |
| *Piranga rubra* | Summer Tanager | None | None | SSC |
| *Xanthocephalus xanthocephalus* | Yellow-headed Blackbird | None | None | SSC |
| **Mammals** | | | | |
| *Sorex lyelli* | Mount Lyell shrew | None | None | SSC |
| *Antrozous pallidus* | pallid bat | None | None | SSC |
| *Corynorhinus townsendii* | Townsend's big-eared bat | None | Candidate | SSC |
| *Euderma maculatum* | spotted bat | None | None | SSC |
| *Lasiurus blossevillii* | western red bat | None | None | SSC |

| SCIENTIFIC NAME | COMMON NAME | FEDERAL LIST STATUS | CALIFORNIA STATE LIST STATUS | OTHER STATE STATUS* |
|---|---|---|---|---|
| *Eumops perotis californicus* | western mastiff bat | None | None | SSC |
| *Brachylagus idahoensis* | pygmy rabbit | None | None | SSC |
| *Lepus americanus tahoensis* | Sierra Nevada snowshoe hare | None | None | SSC |
| *Lepus townsendii townsendii* | western white-tailed jackrabbit | None | None | SSC |
| *Aplodontia rufa californica* | Sierra Nevada mountain beaver | None | None | SSC |
| *Xerospermophilus mohavensis* | Mohave ground squirrel | None | Threatened | |
| *Microtus californicus vallicola* | Owens Valley vole | None | None | SSC |
| *Vulpes vulpes necator* | Sierra Nevada red fox | None | Threatened | |
| *Gulo gulo* | California wolverine | None | Threatened | FP |
| *Taxidea taxus* | American badger | None | None | SSC |
| *Ovis canadensis sierrae* | Sierra Nevada bighorn sheep | Endangered | Endangered | FP |

**SSC is a California State Species of Special Concern; FP is a California State Fully Protected Species*
*** Protected under the Bald and Golden Eagle Protection Act*

### 3.8.1 Speckled Dace

Little is known about the biology of the Owens Speckled Dace (OSD) and Long Valley Speckled Dace (LVSD) specifically and the following discussion includes generalizations from other speckled dace subspecies, unless otherwise indicated.

Identification

The OSD and LVSD are undescribed putative subspecies of *Rhinichthys osculus* within the Cyprinidae or minnow family. There is a wide range of morphological variation within this species. The OSD and LVSD are small and slender (standard length roughly 1.6 inches) with usually 8 dorsal fin rays (varies 6-9), usually 7 anal fin rays (varies 6-8), small subterminal mouths, a pointed snout, and small scales (lateral line usually has 60-66 scales, varies 47-89) (Sada 1989, Moyle 2002).

Taxonomy and Genetics

Subspecies of speckled dace tend to be recognized by region; the Owens Gorge separates the Long Valley and Owens regions. In addition, the OSD and LVSD have been distinguished based on morphological (Sada 1989) and genetic analysis (Sada et al. 1995). Compared to OSD, LVSD have higher pectoral and pelvic fin ray counts, a higher lateral line scale count, and a lower lateral line pore count and lack maxillary barbells, while OSD have maxillary barbells on at least one side (Sada et al.1995). Further morphometric and molecular analyses are needed to fully resolve relationships within this species (Moyle 2002).

Distribution

Historically four regional morphological varieties occurred in Long Valley, Benton Valley, Owens Valley, and Little Lake (Sada 1989). The current range of speckled dace has been severely reduced (Moyle 2002).

Historically, OSD may have occurred from Benton Valley to Little Lake, in the Owens River, low elevation springs, streams, and lakes. Currently OSD is known to occur in irrigation ditches associated with Bishop Creek including Giroud Ditch, China Slough, and the A-drain; McNally ditch near Laws; lower Horton, North Fork of Bishop, Rock, and Pine Creeks; C-2 return Ditch in Round Valley; and Fish Slough (CDFW unpublished data).

LVSD may have been widespread in Long Valley. Historic collections were made in springs feeding the Little Alkali Lake area, Whitmore Springs, Hot Creek, and near Benton Crossing Bridge (Sada 1989). Currently LVSD occur at Whitmore Springs and Becky's pond (a private pond in Bishop; CDFW unpublished data). The Little Alkali area population has not been observed since 1998 (Malengo 1998).

Habitat

Little is known about the habitat preferences of OSD and LVSD. Other subspecies occupy a wide range of thermal habitats and are known from rivers, lakes, streams, and springs. In the Owens Valley, speckled dace have been documented in water up to 88 degrees F in small creeks, spring-fed marshes, thermal springs, ditches, and private ponds (CDFW unpublished data). OSD are most abundant in areas where predatory fishes are absent (CDFW unpublished data).

Diet

Typically speckled dace are found in small, loosely affiliated groups, using their subterminal mouths to eat invertebrate larvae from the bottom of riffles including: hydropsychid, caddisflies, baetid mayflies, chironomid midge, and simuliid midge larvae (Moyle 2002). However, speckled dace diet changes seasonally, and depending on the habitat, can also include flying insects at the water's surface, zooplankton, mayfly and stonefly nymphs, as well as filamentous algae. Activity level of speckled dace varies with season and avian predator presence (Moyle 2002).

Reproduction and Other Behavior

Speckled dace in general are likely induced to spawn in June and July by increasing water temperatures. Speckled dace tend to become sexually mature in their second year. Spawning occurs on gravel in shallow water lakes or on the edge of stream riffles. Males congregate and prepare a spawning area of bare gravel and rocks by removing algae and detritus. A female enters the area and releases a few eggs while surrounded by males that are releasing sperm. Within six days embryos hatch and larval fish remain for 7-8 days. Fry tend to concentrate in warm shallows. Speckled dace typically have a life span of 3 years, but may live 6 or more years. Speckled dace growth is variable but they tend to reach 0.8-1.2 in within their first year and typically grow 0.5 inch each year thereafter, with females growing faster than males (Moyle 2002).

Conservation Status

OSD is currently designated a Species of Special Concern by the State of California due to their diminished range (Moyle et al.1995). OSD and LVSD have not been proposed for federal or state listing, however, the Owens Basin Wetland and Aquatic Species Recovery Plan, Inyo and Mono Counties, California (USFWS 1998) provides recommendations to protect the speckled dace including establishing priority conservation areas. However, Moyle (2002) considers both the OSD and LVSD to be threatened or endangered, meaning the species are likely to become extinct or extirpated in less than 25 years unless conservation actions are implemented.

Threats

Current threats to the speckled dace in the Plan Area include competition and predation by nonnative aquatic species such as black bass, bluegill, brown trout, brown bullhead catfish (*Ameiurus nebulosus*), mosquito fish, and Sacramento perch. In Long Valley the potential spread of introduced predatory tiger salamanders (*Ambystoma tigrinum*) is of concern. Some water gathering activities may affect speckled dace habitat.

### 3.8.2 Owens Tui Chub

Identification

The Owens tui chub (*Siphateles bicolor snyderi*) reaches 4 to 8 in standard length (Miller 1973) and is olive above and whitish below, with blue and gold reflections along the side. The side of the head is also gold, with the strongest coloration along the margin of the preopercle (FWIE 1996).

*Taxonomy and Genetics*

Owens tui chub is in the minnow family (Cyprinidae). It is believed to have diverged from its closest relative, the Lahontan tui chub (*Siphateles bicolor obesa*), during the Pleistocene Epoch (Miller 1973, USFWS 1998b). Recent genetic analysis of Owens tui chub populations revealed two distinct lineages: Owens and toikona (Chen et al. 2007).

Distribution

The Owens tui chub is endemic to Owens and Long Valleys. Historically, Owens tui chub was abundant and occupied all valley-floor wetlands and aquatic habitats in and near the Owens River in Inyo and Mono Counties (Gilbert 1893, Snyder 1917, Miller 1973). Owens tui chub has been eliminated from almost their entire historic range.

Currently, there are only six isolated populations: Sotcher Lake, Hot Creek headwaters (AB and CD springs), Little Hot Creek headwaters, Upper Owens River Gorge, ponds at White Mountain Research Center, and Mule Spring. Three populations (Hot Creek head waters, Owens Gorge, and ponds at White Mountain Research Center are located within the Plan Area. The Toikona lineage is present at both Mule Spring and one pond at White Mountain Research Center; the Owens lineage occurs at all other sites (but see below regarding the threat of hybridization).

Habitat

OTC prefers low velocity water as is found in portions of the Owens River, associated tributaries, springs, sloughs, drainage ditches, and irrigation canals (USFWS 1990). It prefers areas with dense aquatic vegetation that provides both cover and habitat for invertebrate prey). Owens tui chub populations persist only where they are isolated from introgression by nonnative tui chubs.

Diet

The Owens tui chub is an opportunistic omnivore that consumes small fish, aquatic invertebrates (such as snails, small clams, caddisfly larvae, and midge larvae insects), vegetation, and detritus (Cooper 1978; McEwan 1990, 1991; Parmenter pers comm 2013). Owens tui chub feeds mainly by gleaning and grazing among submerged vegetation. Its diet varies seasonally (McEwan 1990) dominated by chironomid larvae and algae in spring, chironomid larvae in summer, hydroptilid caddisflies in fall, and chironomid larvae in winter (McEwan 1990).

Reproduction and Other Behaviors

Tui chubs in general are long lived, with examples up to 35 years (Crain and Corcoron 2000). Sexual maturity is likely reached by 2 years of age (McEwan 1989, 1990). Spawning occurs from February through September (CDFW unpublished data) with spawning likely triggered by day length at spring sites (McEwan 1990) and warm water temperatures at riverine and lacustrine or lake-like habitats (McEwan 1989). Spawning usually occurs in water less than 5 ft deep over gravel substrate, aquatic vegetation, or algae covered rocks (Moyle 2002). Eggs adhere to these features (Moyle 2002). There may be multiple spawning bouts during the breeding season (Moyle 1976), and each female produces large numbers of eggs at each bout (McEwan 1989). Similar species of tui chubs produce 4,000 to 50,000 eggs per female per season (Vickers

1973). Hatching time is likely influenced by water temperature, with eggs hatching earlier in warmer water (Cooper 1978). Fry congregate in areas with cover (Moyle 1976). Growth during the first summer is rapid; with yearling fish up to 2.2 in (CDFW unpublished data).

Conservation Status

In 1985, the federal government listed Owens tui chub as endangered and designated critical habitat in the Owens River Gorge and Hot Creek headwaters. The USFWS issued a recovery plan which includes OTC in 1998, and in the five-year review determined that Owens tui chub still warrants endangered status (USFWS 2009). California listed Owens tui chub as endangered on January 10, 1974 based on its reduced distribution and abundance.

Threats

Threats to Owens tui chub include: introgression (interbreeding with other tui chubs), habitat loss and alteration, predation, disease, competition, inbreeding depression, genetic drift, population loss from random (stochastic) events, and climate change. Lahontan tui chub, which are endemic to the water basin north of the Plan Area, were introduced to the Owens basin decades ago. Tui chubs interbreed easily, which is the main threat to the genetic integrity of Owens tui chub. Introgressed tui chubs occur in the Owens River and various creeks, canals, and ditches that connect to the Owens River.

Habitat has been lost or altered from diversion and impoundment of water from the Owens River and tributaries. Owens tui chub evolved without fish predators, therefore they are poorly adapted to coexist with introduced brown trout, rainbow trout, largemouth bass, and other predatory fishes. Owens tui chub also likely compete with the sixteen nonnative fish species that have been introduced in their native range as well as other nonnative aquatic species such as the American bullfrog. Small populations are susceptible to loss of genetic diversity from inbreeding depression and genetic drift. Having a limited number of refuge sites may result in significant loss of individuals and/or populations from stochastic events. Although the Owens tui chub faces a high degree of threat, it also has a high potential for recovery (USFWS 2009).

### 3.8.3 Owens Pupfish

Identification

Owens pupfish (*Cyprinodon radiosus*) are small (less than 2.5 in total length), chunky, freshwater fish with upturned mouths and rounded anal and dorsal fins (Moyle 2002). Females are olive-brown with a purplish sheen and lateral blotches and bars; males are larger, and during breeding are bright blue with purplish lateral bars (Miller and Pister 1971).

Taxonomy and Genetics

Owens pupfish are in the family Cyprinodontidae (Moyle 2002). Other members of their genus occur in the southwestern U.S., northern Mexico, and Atlantic and gulf coasts from Massachusetts to Venezuela. Ancestral Owens pupfish may have entered the Owens Basin through Death Valley when waters of the Colorado River and Death Valley systems were probably connected during the Miocene (3.4-3.6 mya; Echelle et

al. 2005). The current Owens pupfish population is derived from about 200 individuals that were rediscovered in Fish Slough in 1964 (Miller and Pister 1971). Recent genetic work demonstrated that Owens pupfish have experienced population bottlenecks and genetic drift; and underscored a need for active management of both habitats and gene flow (Finger et al. 2014).

Distribution

Owens pupfish is an Owens Valley endemic species that historically was wide-spread and abundant in the Owens River, and in springs, sloughs, irrigation ditches, swamps, and flooded pastures from Fish Slough to the Owens River delta (USFWS 1998). Owens pupfish became scarce throughout their historical range by the 1930s (USFWS 1998). By 1937, Owens pupfish only occurred in Fish Slough and springs east of Independence; by 1942, the species was believed to be extinct (Miller and Pister 1971). Owens pupfish were later found in Fish Slough in very low numbers. This range reduction has been attributed primarily to the establishment of nonnative predatory fishes (see Threats below). Until recently Owens pupfish occurred at Warm Springs on City land. Failure to maintain the waterway resulted in extirpation of this population. Today Owens pupfish are found in isolated refuges at Fish Slough (BLM Spring, the Letter Ponds, Marvin's Marsh), Mule Spring, and Well 368.

BLM Spring is on BLM land. Estimates of the population vary from 1,000-10,000 (USFWS 2009). This site has required surveillance and removal of illegally stocked largemouth bass which occasionally appear.

The Letter Ponds are south of BLM Spring on BLM land. The population at this site has been self-maintaining since it was established in 1987. The population abundance exceeded 100 individuals when monitored in 2010 (CDFW unpublished data).

Marvin's Marsh is on City land south of the Northwest Springs cattle enclosure and east of the Fish Slough channel. Owens pupfish were introduced here in 1971 and have been consistently observed at this site since that time (CDFW unpublished data). The population abundance has been estimated between 100 to 1000 individuals (USFWS 2009).

Lower Mule Spring Pond is on the western toe of the Inyo-White Mountains in a historic limestone quarry on BLM land. The current population was introduced in 2007 and has been consistently observed since that time (CDFW unpublished data). The population was estimated at 345 individuals using mark-recapture in 2010 (CDFW unpublished data).

Artesian Well 368, west of the Lower Owens River, is on City land. Owens pupfish were introduced in 1986 and the population was estimated to number 100 to 1,000 individuals (USFWS 2009) prior to a habitat enhancement project completed in 2012.

### Habitat

Owens pupfish will occupy most aquatic habitat if it is predator-free, has warm water, and food is plentiful. They evolved in the Owens Basin with three other fishes: Owens tui chub, Owens speckled dace, and Owens sucker. Typical habitat for the Owens pupfish is shallow (2 in to 3 ft) still to slow moving warm waters with sparse cattails and bulrush, and a sand-silt detritus bottom (USFWS 1984). Owens pupfish can withstand temperature variations that range from 32 to 111 degrees F; during the winter they can persist in ice-covered refuge ponds (Mire 1993). To reproduce, pupfish require water temperatures that range from 64 to 95 degrees F (FWIE 1996).

### Diet

Owens pupfish are opportunistic omnivores, possessing both a long gut for digesting vegetable matter, and sharply toothed jaws to capture small prey items and scavenge larger animal material. Their diet changes seasonally depending on food availability and consists of aquatic insects (midge larvae, mayfly larvae, and beetle larvae and adults), snails, algae, plankton, small crustaceans, mollusks, detritus, diatoms, and arthropods (FWIE 1996).

### Reproduction and Other Behaviors

Spawning occurs in spring and summer when water temperatures are near 68 degrees F (FWIE 1996). Male Owens pupfish are territorial, defending areas of substrate with minimal current, from competing males. Female pupfish occupy habitats along the margins of areas defended by males (Mire 1993). Females lay 1-2 eggs at a time, more than 200 times per day (Mire and Millett 1994), often with a variety of different males and on a variety of substrates including silt, submerged plant stems, algae, flat rocks or crevices. Ninety-five percent of spawned eggs are fertilized. Eggs incubate for approximately 6 days before hatching in water temperatures ranging from 70 to 81 F. Juvenile pupfish grow rapidly to sexual maturity in 3 to 4 months (Barlow 1961) and are usually able to spawn before their first winter (Mire 1993).

Owens pupfish rarely live more than 1-year (Soltz and Naiman 1978) but have been documented to live as long as 3 years in refuge habitats (Mire 1993). Adults frequently occupy deeper water than juveniles, but all life stages may be found in the various microhabitats available with little preference (Sada and Deacon 1994). Owens pupfish are seasonally active in response to temperature fluctuations. In the fall when water temperatures decrease, they become dormant and bury themselves in the substrate until the spring.

### Conservation Status

The Owens pupfish was listed as federally endangered on March 22, 1967. In 1971, the Owens pupfish was listed as endangered by the State of California. It is also a fully protected species under California Fish and Game Code § 5515. The USFWS issued a recovery plan for the Owens pupfish in 1998 but no critical habitat is designated.

### Threats

A primary threat to Owens pupfish population viability is invasion by nonnative predatory fishes, particularly largemouth bass. A second common cause of extirpation occurs when encroaching emergent vegetation shifts habitat suitability from that preferred by pupfish to conditions favoring nonnative species (e.g., mosquitofish, crayfish, and bullfrogs). In addition, Owens pupfish are threatened by genetic drift, population loss from stochastic events, and loss of oxbow habitats

along the Owens River due to flow regulation. Recent genetic analysis of these populations indicates that losses of genetic diversity in each population have occurred (Finger et al. 2014). The isolated nature of refuge sites will require active management to maintain genetic variation and to initiate repopulation after stochastic extirpations.

### 3.8.4 Greater Sage-Grouse

#### Identification

Greater Sage-Grouse (*Centrocercus urophasianus*; GRSG) are the largest grouse in North America. Adult males range in size from 26 to 30 inches and weigh between 4 and 7 pounds (lb). Adult females range in size from 19 to 23 inches and weigh between 2 and 4 lb., (USFWS 2002b). GRSG have dark grayish-brown body plumage with small gray and white speckles, fleshy yellow combs over the eyes, and long pointed tails. Males also have blackish chin and throat feathers, conspicuous phylloplumes (specialized erectile feathers) at the back of the head and neck, and white feathers forming a ruff around the neck and upper belly. During breeding displays, males inflate olive-green apteria (fleshy bare patches of skin) on their breasts (Schroeder et al. 1999).

#### Taxonomy and Genetics

The Greater Sage-Grouse is in the Phasianidae family. The Greater Sage-Grouse in the Plan Area are part of the Bi-State Population. The Bi-State area includes Inyo, Mono and Alpine Counties in California, and parts of western Nevada. The Bi-State Population contains a large number of unique mitochondrial and nuclear DNA haplotypes, indicating thousands of years or longer of separation from other populations of Greater Sage-Grouse (Benedict et al. 2003, Oyler–McCance et al. 2005). The amount of genetic difference between birds in the Bi-State Population and other populations of GRSG is similar if not greater than that seen between Gunnison Sage-Grouse and its neighboring populations of Greater Sage-Grouse in Colorado (Oyler-McCance and Casazza 2011). The Bi-State population is recognized as a Distinct Population Segment by the USFWS (USFWS 2010).

#### Distribution

The historic distribution of GRSG included sagebrush habitats in British Columbia, west to eastern California, south to Nevada, and east to Oklahoma (Schroeder et al. 1999). The historic distribution of the Bi-State Population included eastern Alpine, northern Inyo, and most of Mono Counties, California and western Nevada (Hall et al. 2008). This population was once connected to the rest of the GRSG population and is now isolated (USFWS 2010).

The current distribution of GRSG is reduced from the historic distribution because the species has been extirpated from Nebraska, Kansas, Oklahoma, New Mexico, Arizona and British Columbia (Schroeder et al. 1999). Although the current range of the Bi-State population in California was presumed reduced from the historic range (Leach and Hensley, 1954; Hall 1995, Schroeder et al. 2004), the extent of loss is not well understood and there may have been no net loss (Hall et al. 2008).

Five population management units (PMUs) have been identified in the Bi-State Area and three of these at least partially occur within the Plan Area. These are the Bodie, South Mono, and White Mountains PMU (Bi-State Sage-Grouse Conservation Team 2012). The available data indicate that use of City lands in the Bodie PMU is limited because of the small area of City lands in this PMU. There are no known leks on City land in the Bodie PMU, although in 2006, a lone male was observed strutting north of the Thompson Ranch along the northwest shore of

Mono Lake (S. Nelson, BLM, pers comm). This area was checked again in 2013, but no strutting activity was observed. Radio-tracking data from 2002-2005 did not detect any use on City land, although birds were recorded within approximately 1.5 miles of City parcels supporting potential habitat. No broods have been documented (S. Nelson, BLM, pers. comm.).

The portion of the South Mono PMU that lies within the Plan Area receives high use by GRSG year-round. The South Mono PMU has three breeding complexes, two of which occur on City land – Long Valley and Parker. In the Long Valley breeding complex, there are eight trend leks, three of which are on City land. All known leks (one lek and several satellite leks) in the Parker breeding complex are on City land.

There are no records of GRSG in that portion of the Plan Area within the White Mountains PMU.

Population

Traditionally sage-grouse populations have been monitored by counting the number of males attending leks during spring. Multiple counts are conducted during the strutting season, with the maximum male count obtained used as the population index for that particular year (Johnson et al. 2007). Estimates of population size across regional areas involve the use of population expansion estimators, and make assumptions with regard to male attendance and male to female ratio.

The entire population of GRSG is estimated to be 175,000 individuals across their range (Connely et al. 2004). The Bi-State population range (2002-20123) is estimated to be 1,833 (USFWS 2013). In 2004, the population in Mono County was estimated at 2,223 breeding birds at 22 leks (Hall et al. 2008). The estimated size of the South Mono PMU in 2003 was between 1,015 and 1,515 birds, with approximately 90 percent of the population in Long Valley (BiState Team 2004). The long-term average peak male attendance for the nine leks counted in Long Valley for the period 1987-2011 is 250 (Bi-State Technical Advisory Committee 2012). The population estimate for the Bodie PMU, which includes birds in the adjacent Mount Grant PMU, is between 560 and 830 birds (BiState Team 2004). Lek count data is not available for the White Mountains PMU, however a total of 206 GRSG (males and females) were seen in the White Mountains during a March 2006 helicopter flight (Bi-State Technical Advisory Committee 2012).

Habitat

In general, Greater Sage-Grouse are dependent on large areas of contiguous sagebrush (Patterson 1952, Connelly et al. 2004, Connelly et al. 2011a, 2011b, Wisdom et al. 2011) interspersed with mesic areas including wet meadows or riparian areas but specific habitat requirements vary by season.

Lekking sites

Sage-grouse congregate at courtship areas known as lek sites. Lek sites range in size from less than 0.1 acre to more than 90 acres, and can host from several to hundreds of males. Leks typically include areas of bare soil, short-grass steppe, windswept ridges, exposed knolls, or relatively open sites. Leks are surrounded by dense shrub-steppe cover for escape, thermal, and feeding cover (Connelly et al. 2004).

Nesting and brood-rearing habitat

Within the Bi-State area, the majority of nesting occurs within 3.2 miles of a lek (Coates pers comm 2012). Nesting habitat typically contains sagebrush with an understory of native grasses and forbs with horizontal and vertical structural diversity that provides an insect prey base, herbaceous forage for pre-laying and nesting hens, and cover/concealment for the hen while incubating (Gregg 1991, Schroeder et al. 1999, Connelly et al. 2004, Connelly et al. 2011a, Connelly et al. 2011b). In Mono County, Kolada et al (2008a) found that most nests were under mountain big sagebrush (*Artemisia tridentata vaseyana*) or bitterbrush (*Purshia tridentata*) and shrub cover around nest sites was greater than reported in other studies. Nest success in Mono County was also related to increased cover of shrub species other than sagebrush (Kolada et al 2008b). No direct relationship was found between nest success and sagebrush cover or residual grass cover (Kolada et al 2008b).

Early brood-rearing areas are generally close to nest sites and are open stands of sagebrush (less than 15 percent canopy cover) with greater than or equal to 15 percent cover of grasses and forbs (Connelly et al. 2004). Later in the season, as sagebrush habitats dry, GRSG and their broods move toward more mesic habitats (Hall et al 2008). Brood rearing locations in South Mono PMU are distributed around wet and dry meadows (Casazza et al. 2007). In the Bodie PMU, brooding and late summer habitat is around high altitude meadows, springs, and streams above 9,000 feet. Fewer birds with broods are found at low elevation spring-fed or irrigated wet meadow sites such as Bridgeport Valley and Conway Ranch (BiState 2004). The main brood rearing and late summer habitat in the White Mountains PMU is also primarily high altitude sites above 9,000 feet.

Wintering Habitat

Habitat selection during winter is influenced by snow depth and snow hardness, topography, and vegetation height and cover (Connelly 2009). GRSG feed almost exclusively on the leaves of sagebrush in the winter; they will be found in areas where sagebrush plants are accessible above existing snow cover. Snow hardness effects habitat selection because sage grouse are known to roost in snow burrows and tunnels under shrubs presumably for energy conservation. Topography influences winter habitat selection as slope, elevation and aspect can influence snow cover, depth, and hardness, and variations in topography can provide microhabitats that may provide protection from wind. Vegetation height and cover influence habitat selection in that the height of the vegetation determines whether the sagebrush is available, depending on snow cover. Shrub cover on winter sites has been found to be low to moderate, varying from 6-43 percent (Schroeder et al 1999). Because the different species of sagebrush vary in the heights they obtain, as well as their palatability, these factors are also expected to influence winter habitat selection. The amount of herbaceous cover in wintering areas appears to be irrelevant because of the almost complete reliance on sagebrush leaves for food during this time period.

Diet

GRSG are unique from other grouse species in that they do not have a muscular gizzard, and therefore are unable to digest seeds (McAdoo and Back 2001). This species relies on soft foods, including leaves, buds, and insects with the leaves and buds of various sagebrush (Artemisia spp.) species composing the bulk of the diet throughout the year.

During the first two weeks of life, insects such as grasshoppers (Orthoptera), beetles (Coleoptera), and ants (Hymenoptera), comprise more than 50 percent the diet by volume

(McAdoo and Back 2001, Peterson 1970). After the first two weeks of life, the proportion of insects in the diet decreases while plant material, especially forbs, becomes the main component of the diet for the remainder of the summer for both young and adult grouse. Forbs that GRSG consume include: common dandelion (*Taraxacum officinale*), yellow salsify (*Tragopogon dubius*), prickly lettuce (*Lactuca serriola*), common pepperweed (*Lepidium densiflorum*), Harkness' flaxflower (*Linanthus harknessii*), tapertip hawksbeard (*Crepisa cuminata*), locoweed (*Astragalus convallarius*), phlox (*Phlox longifolia*), and common yarrow (*Achillea millifolum*) (McAdoo and Back 2001, Peterson 1970). Cultivated herbaceous broad-leaved plants (alfalfa, clover) are important early fall food sources, when available. As annual or perennial forb food sources desiccate and become unavailable in late summer or early fall, sagebrush becomes a larger component of the diet (McAdoo and Back 2001). In the winter, GRSG subsist almost exclusively on leaves of sagebrush. Sagebrush is essential to the winter survival of GRSG as the winter diet is composed almost entirely of leaves of various sagebrush species. Sagebrush species vary in their palatability and availability. For example, mountain big sagebrush is highly palatable, and a major food source for sage-grouse in the winter (Rosentreter 2004). This species may become less available as a food source during winters with heavy snow cover.

Reproduction and Other Behavior

GRSG congregate in leks in the spring with a peak period of March and April. Males defend individual territories within leks and perform elaborate displays with their specialized plumage and vocalizations to attract females. Lek sites are used year after year, however lek site attendance varies seasonally, and not all males may be present, even at peak breeding time (Johnson and Rowland 2007).

Females build a nest on the ground consisting of a shallow scrape with a thin lining of plant material often placed under sagebrush or other shrub species. Nesting and brooding occur from April to July. GRSG clutch size ranges from 6 to 9 eggs with an average of 7 eggs (Connelly et al. 2011 a). Chicks hatch after a period of approximately 26 days; they fly at 7-14 days (Terres 1980). Broods may disband at 10-12 weeks when the chicks have molted into their juvenile plumage. Males do not participate in nest building, incubation of eggs, or rearing chicks.

Nesting rates of yearling females are 25 percent less than adult females (Schroeder et al. 1999). The likelihood of a female nesting in a given year averages 78 percent in western areas of the range (California, Nevada, Idaho, Oregon, Washington, and Utah) (Connelly et al. 2011a). Nest success rates in Mono County varied from 68 percent in the north near Jackass Spring, to 21 percent in the south in Long Valley (Kolada et al. 2008). The overall nest survival estimate rate in Mono County of 43.4 percent overlaps that of several other studies (Kolada et al. 2008). Re-nesting only occurs if the original nest is lost (Schroeder et al. 1999) and re-nesting rates are much lower than for other game bird species (Connelly et al. 2004) ranging from 10-14 percent in the Bi-State area from 2003-2005 (Casazza et al. 2009).

GRSG typically live between 3 and 6 years, but individuals up to 9 years old have been recorded in the wild (Connelly et al. 2004). Hens typically survive longer due to a disproportionate impact of predation during courtship to males (Schroeder et al. 1999). While both males and females are capable of breeding the first spring after hatching, young males are rarely successful due to the dominance of older males on the lek (Schroeder et al. 1999).

GRSG habitat needs vary seasonally and thus they are known to move from breeding habitat in spring to nesting and brood-rearing habitat in summer to wintering habitat. Populations making long-distance movements of more than six miles between distinct seasonal ranges are considered migratory, while those that do not make long-distance movements are non-migratory. Birds inhabiting the Bodie Hills portion of the Bodie PMU are migratory, while the South Mono PMU is considered nonmigratory.

In the Bi-State area, average movements were generally less than 1.3 miles, but up to 20 miles (Casazza et al. 2009). No birds made movements outside their respective PMUs of capture (USFWS 2010). The mean annual home range for females in Long Valley ranges from 11.6 to 13.4 square miles while the mean for males is 14.1 square miles (Casazza et al. 2007). The mean annual home range is smaller for birds in the Mono Basin portion of South Mono at 5.2 to 6.5 square miles for females and 4.5 to 8.6 square miles for males (Casazza et al. 2007).

Sage-Grouse exhibit strong site fidelity to seasonal ranges (Keister and Willis 1986; Fischer et al. 1993); females usually return to the same area to nest each year (Fischer et al. 1993) and may nest within 656 feet of their previous year's nest (Gates 1983; Lyon 2000).

Conservation Status

In 2000, the Western Association of Fish and Wildlife Agencies, including all of the states and provinces in the species range, signed an agreement to develop local, state and national conservation strategies for sage-grouse. In 2005, the USFWS provided a "not warranted" response to multiple petitions to list the GRSG as either threatened or endangered in all of its range. In 2008, this decision was reconsidered and the USFWS issued a data call for the most recent information on trends in GRSG populations and habitat to assist in their listing decision (Western Association of Fish and Wildlife Agencies 2008). The USFWS issued a finding in 2010 that: 1) listing the GRSG (rangewide) is not warranted, based on the determination that the western subspecies is not a valid taxon and thus is not a listable entity under the ESA; and 2) listing the Bi-State area which meets the criteria as a Distinct Population Segment of the GRSG, is warranted but precluded by higher priority listing actions (USFWS 2010). With this finding, the USFWS designated the Bi-State population of GRSG as a candidate species. The USFWS proposed the Bi-State population of GRSG as Threatened in 2014 (78FR 64358) but published a withdrawal on April 23, 2015 (80FR 22828).

The CDFW classifies the GRSG as both a species of special concern and a harvest species. Species of special concern are species that have experienced or formerly experienced serious (non-cyclical) population declines or range retractions (not reversed) that, if continued or resumed, could qualify them for state threatened or endangered status. As a harvest species, CDFW regulates hunting of GRSG. The 2011-2012 hunting season was limited to two days in fall with a bag limit of one per day per hunter and a possession limit of one per season per hunter.

Threats

Threats to GRSG in the Bi-State area vary by PMU. In the South Mono PMU, the highest priority threats identified were wildfire, the Benton Crossing landfill, recreation and human disturbance, and urbanization (Bi-State TAC 2012). Wildfire and pinyon-juniper encroachment were identified as the highest priority threats in Bodie PMU. The only high level threat in the White Mountains PMU is pinyon-juniper encroachment.

Threats to the South Mono PMU will be discussed in detail as the majority of acreage and sage-grouse in the Plan Area are the Long Valley breeding complex, which is the stronghold of the South Mono PMU, is relatively large, stable, and resistance to ongoing impacts. It is considered vulnerable however because seasonal habitats are confined to a relatively small area and this breeding population is isolated from other Bi-State populations. Wildfire in the Long Valley area is of concern because it would result in the direct loss of habitat, habitat fragmentation, and could result in long-term changes in habitat quality. The Benton Crossing landfill is considered a threat because it supports a subsidized population of Common Raven (*Corvus corax*) (Bi-State TAC 2012). Ravens are known predators of both sage-grouse nests and fledglings and increased raven populations from anthropogenic subsidies have been implicated in increased nest predation by ravens (Bi-State TAC 2012). The potential threats from recreation and human disturbance exist year round in the Long Valley portion of the PMU. The primary risk from recreation is disturbance and displacement from important use areas such as leks and brood habitats (Bi-State TAC 2012). Recreation can also adversely affect habitat quality and quantity. Urbanization is considered a moderate to high risk in South Mono because of the potential for commercial, residential or recreational development of private rangelands within the PMU that occur on or adjacent to key sage-grouse habitat. The majority of City land in the South Mono PMU includes large areas of key sage-grouse habitat.

### 3.8.5 Yellow-billed Cuckoo

#### Identification

Yellow-billed Cuckoo (*Coccyzus americanus*; YBCU) is a medium-sized bird about 12 inches in length, and weighing about 2 ounces (oz). YBCU has a slender, long-tailed profile, with a fairly stout and slightly down-curved bill, which is blue-black with yellow on the basal half of the lower bill. The plumage is grayish-brown above and white below, with rufous primary flight feathers. The tail feathers are boldly patterned with black and white below. The legs are short and bluish-gray, and adults have a narrow, yellow eye ring. Juveniles resemble adults, except the tail pattern is less distinct, and the lower bill may have little or no yellow. Adult males tend to have a slightly larger bill, and the white in the tail tends to form oval spots, whereas in females the white spots tend to be connected and less distinct (Hughes 1999). YBCUs have zygodactyl feet -two toes pointed forward and two pointed backward (USFWS 2011). Though the cuckoo is often silent, it has a distinct, throaty call. Unmated males have a coo-coo-coo-coo call while mated males have a “kowlp” call that is a guttural, wooden kakakakakakakakakakakakakakakowkowkowkowkowkow, which slows down and slurs at the end. Females also give the first half of the “kowlp” song, called the “knocker” call (Center for Biological Diversity 1998).

#### Taxonomy and Genetics

The YBCU is a member of the family Cuculidae (Cuckoos). The USFWS has identified the western population as a Distinct Population Segment based on morphological and genetic data (USFWS 2011). Throughout the remainder of the document, “YBCU” will refer to birds that are part of the Distinct Population Segment.

#### Distribution

The cuckoo is a summer resident only in North America, arriving on its breeding grounds in the west from late May to early July (Laymon 2000). The YBCU formerly bred from southwestern British Columbia, western Washington, northern Utah, central Colorado and western Texas south and west to southern Baja California, and Sinaloa and Chihuahua Mexico (AOU 1957). The YBCU is known to winter in South America (Laymon 2000).

YBCU have been extirpated from British Columbia, Washington and Oregon. The current range is limited to approximately 871,300 square miles in disjointed fragments of riparian habitats from northern Utah, western Colorado, southwestern Wyoming, and southeastern Idaho southward into northwestern Mexico and westward into southern Nevada and California (Ehrlich et al. 1988, in Laymon 1998).

A 1977 survey of YBCU populations in California indicated that cuckoos occupied habitat in the Sacramento Valley, the South Fork of the Kern River, the Santa Ana River in Riverside County, the Owens Valley, the Amargosa River, and on both sides of the Colorado River from the Nevada state line to the Mexican border (Gaines 1977). In 1977, 141 birds were found in California. By 1986 the breeding population decreased to 31-42 pairs (Laymon and Halterman 1987). In California, breeding is now restricted to isolated sites in the Sacramento, Amargosa, Kern, Santa Ana, and Colorado River valleys (Hughes 1999). YBCU may occasionally breed in Inyo County based on reports of paired birds (Laymon 2000). There are no known breeding locations for YBCU in Mono County.

The first documented occurrence of YBCUs in Owens Valley was in 1891 in Bishop (Grinnell and Miller 1944). In 1917, two Yellow-billed Cuckoos were collected along the Owens River, north of Independence. Also along the Owens River, just upstream of Tinemeha Reservoir, a cuckoo was observed in 1992. Two breeding pairs and an unmated male were reported upstream of Tinemeha Reservoir in 1993 (Laymon 2000). A lone cuckoo was observed at this location in 1997 (CNDDB).

Based on CNDDB records, in the Baker Creek area, YBCUs have been noted as far back as 1968 when a single bird was observed. In 1977, three birds were seen, and nesting was suspected. Birds were observed annually from 1991-1993, with a high of up to 8-9 birds present in 1991, and breeding has been suspected. Two to three birds were been observed at this site in 1995 and 1999. During recent surveys, the number of cuckoo detections has been as follows: a total five in 2007 (minimum of two individuals using the site); 6-7 in 2008 (minimum of 4-5 individuals on one visit), and one in 2009. In all years, birds were only detected in the Brown Pasture, south of Sugarloaf Road. No cuckoos were detected in 2009 or 2010 (House 2010).

At Hogback Creek a single cuckoo was observed in 1977 and 1986. Two cuckoos were also observed in June and July of 1991. No cuckoos were detected at this site in 2009 or 2010. Most recently, a single cuckoo was observed at Hogback Creek in July 2012 (House 2012).

### Habitat

YBCU occupies large patches of riparian habitat, particularly woodlands with mature cottonwoods and mid-successional willows. Riparian habitats consistently used by cuckoos along the Kern and Sacramento Rivers in California are characterized by high canopy cover, structural diversity, and an extensive understory (Whitfield and Stankek 2011).

Habitat patch size is a very important landscape feature for Yellow-billed Cuckoos. The trend towards increased occupancy with increased patch size is significant (Laymon and Halterman 1989, McNeil et al. 2011). In California, away from the Colorado River, cuckoos occupied 10 percent of 21 sites 49 to 99 acres in extent; 59 percent of 17 sites 101 to 198 acres in extent; and 100 percent of seven sites greater than 198 acres in extent (Laymon and Halterman 1989). Along the Colorado River, sites occupied by cuckoos were also significantly larger than

unoccupied sites, with occupied sites having a median size of 121 acres (range of 50-191 acres), while median size of unoccupied sites was 24 acres (range of 10-34 acres) (McNeil et al. 2011).

After increased area, McNeil et al. (2011) found several tree-related variables as important predictors of site occupancy including increased average total canopy height and cover. Structurally diverse habitat is desirable as large tall trees are often used for foraging, while smaller trees are often used for nest placement. Cuckoos often place their nest in dense willow understory foliage, usually on horizontal branches 9.8 to 16.4 feet above the ground (Laymon et al. 1997). Along the Colorado River, nests were also found in Fremont cottonwood and saltcedar trees (McNeil et al. 2011).

Areas of habitat of seemingly adequate size might not be used as breeding sites due to their isolation from other habitat patches. Temple (1986) emphasized the use of a core area (greater than 328 feet from the edge) instead of total area to determine the usable size of a forest fragment. Therefore, the more circular (and less linear) a patch, the greater the usable space. The distance a cuckoo can forage from the nest is limited by its need to return frequently to the nest. A habitat patch of 99 acres that is 247 feet wide and 1,312 feet long might be unsuitable, while a square or circular patch the same size would be suitable. In the Sacramento and Kern rivers, cuckoo nests were located in areas with lower temperatures and higher humidity than the surrounding landscape (Launer et al. 1990).

Diet

The diet of YBCUs consists primarily of large insects such as caterpillars, katydids, cicadas, grasshoppers, and crickets. They also eat bird eggs, frogs, lizards, snails, berries, seeds, and fruits. Caterpillars and katydids appear to be preferred food, while tree frogs and grasshoppers appear to be "fast food" that can be caught quickly to placate the young while adults pursue preferred food. Food resources vary greatly from year to year and have a significant impact on reproductive success (Laymon et al. 1997).

Along the South Fork Kern River in California, the preferred food for YBCUs is sphinx moth larvae (Laymon et al. 1997), however, the predominant food is the hairy caterpillar (*Malacosoma* spp.), which YBCUs work back and forth through their bill before swallowing to aid in removing the hairs (Laymon and Halterman 1989). Its ability to eat toxic, hairy, and spiny caterpillars indicates a highly specialized evolution (Ryser 1985). YBCU densities have been correlated to the abundance of caterpillars and other large insects (Nolan and Thompson 1975).

Reproduction and Other Behavior

YBCU generally begin to arrive on their breeding grounds in California in May; nesting begins in mid-June and may continue into early September (Laymon 1998). YBCU's clutch size is usually two or three eggs laid at intervals of 1 to 3 days. Eggs are incubated for 9-11 days. While females do most of the incubation, up to 30 percent may be done by males (Laymon 2000). Once the large, heavy, bluish eggs hatch, the young develop rapidly, and leave the nest at 7-9 days after hatching. The parents continue to care for the young after they leave the nest. The young are capable of flight approximately 21 days after hatching (Hilt 2000). Generally YBCUs raise their own young, but are known to lay eggs in the nests of other cuckoos or other bird species (Hughes 1999). Most YBCUs begin breeding in their second calendar year. YBCUs are believed to be monogamous though their breeding system has not been thoroughly studied (Hilt 2000). YBCU depart the breeding grounds between late July and September (Laymon 1998).

YBCUs employ various strategies to maximize reproductive success, depending on resource availability. YBCUs will delay nesting if sufficient food for breeding is not available (Laymon 2000). Nesting success rates are high for YBCU, most likely due to the asynchronous hatching strategy (eggs hatch at different times), which keeps the total food needs of the clutch at a steady level (Laymon 1980). When resources are abundant, YBCU have been known to have up to three clutches in a single breeding season, though most populations only breed once per year (Laymon 1998). YBCU also vary clutch size in accordance with prey abundance. Nesting pairs are sometimes aided by unrelated younger male helpers at the nest (Laymon 1998).

Although little is known about site fidelity, recent data suggest site fidelity exists among male YBCU, and at least to some extent by females also (McNeil et al 2012). Breeding pairs of YBCUs at the South Fork Kern River use the same territory for up to three years indicating at least some breeding site fidelity (Laymon 1998). YBCU may be partially nomadic (Robbins et al. 1983), and may make within season movements between non-contiguous habitat areas up to 3 to 3.7 mi apart (McNeil et al 2012).

Adult YBCUs are prey for Cooper's Hawk (*Accipiter cooperi*) and falcons; Red-shouldered Hawk (*Buteo lineatus*) and Northern Harrier (*Circus cyaneus*) have been observed preying on nestlings (Laymon and Halterman 1990). Other likely nest predators include snakes, mammals, and other birds (Nolan 1963, Launer et. al 1990).

Conservation Status

The USFWS listed YBCU is Threatened under the ESA in 2014. YBCU was listed by California as threatened on June 27, 1971 and uplisted to endangered on March 26, 1988.

Threats

The main threats to YBCU populations are the destruction, modification, and fragmentation of habitat, the inadequacy of existing regulatory mechanisms and other factors including the potential for local extirpation, and pesticides (USFWS 2001). Habitat losses range-wide in the western United States have occurred as a result of conversion of riparian habitat to agricultural or other uses, dam and river flow management, stream channelization, and livestock grazing and pesticide use. Breeding habitat quality has also been affected by the invasion of nonnative plants (e.g., salt cedar) and groundwater pumping (USFWS 2001).

*Habitat Loss and Degradation*

Riparian habitat acreage in the western United States has been lost due to conversion to other uses land uses, and this loss is estimated to be more than 90 percent for most western states including California, Arizona, and New Mexico (USFWS 2001). Compounding the loss of acreage is fragmentation effects in which remaining patches are smaller, more isolated, and less likely to be interspersed with suitable migratory stopover habitats. The YBCU, which requires large areas of riparian forest, especially in the western portions of its range (Wiggins 2005), may be highly susceptible to the effects of fragmentation. Riparian habitats have also been modified and degraded by activities such as livestock grazing, groundwater pumping, water diversion, water impoundment, flood control, and recreational uses.

*Inadequacy of Existing Regulatory Mechanisms*

Prior to being listed as Threatened, the Migratory Bird Treaty Act was the only federal protection provided to the YBCU (USFWS 2001). This act prevents direct take of the species, but does not prevent habitat destruction unless direct mortality or destruction of active nests would occur. This species is listed as endangered in California, but under CESA essential habitat has no legal protection because "take" does not include destruction of habitat.

*Potential for Local Extirpation*

The riparian habitat upon which the YBCU depends has been reduced and degraded throughout its range in the western continental U.S. The habitat rarity and small, isolated populations of YBCU make this species increasingly susceptible to local extirpation through stochastic (random) events such as fires, floods, predation, and land development (USFWS 2001).

*Pesticides*

Pesticide use may affect YBCUs directly or indirectly. Laymon (1980) reported sub-lethal poisoning of nestlings when walnut orchards were sprayed with Zolone, a broad-spectrum insecticide. Pesticide use may also affect cuckoos indirectly by reducing prey numbers. When applied on a widespread area, the use of larvicides for mosquito control is a threat to YBCU (Laymon 1998). Other applications that affect potential insect prey or pesticide-laden agricultural runoff, that impacts amphibian prey such as tree frogs (*Pseudacris* spp.) threatens YBCU.

### 3.8.6 Willow Flycatcher

Identification

Willow Flycatcher (*Empidonax traillii*; WIFL) is about 5.75 in long, and weighs about 0.42 oz. It has a grayish-green back and wings, whitish throat, light grey-olive breast, and pale yellowish belly. Two wingbars are visible; the eye ring is faint or absent. The upper mandible is dark, the lower is light with a yellowish tone (Seutin 1987, Paxton et al. 1997, Sogge et al. 1997, SWCA 2000). The Southwestern Willow Flycatcher (SWFL) is generally paler than other willow flycatcher subspecies, and differs in wing formula, bill length, and wing to tail ratio (Unitt 1987 and 1997, M. R. Browning 1993). Song form differences also occur among some willow flycatcher subspecies (Sedgwick 2001).

Taxonomy and Genetics

The SWFL is one of five recognized subspecies of the Willow Flycatcher, which are distinguished primarily by subtle differences in color, morphology and habitat use (USFWS 2002a, USGS 2005). These subspecies occupy separate breeding ranges across the United States and southern Canada. Both Great Basin Willow Flycatcher (*E. t. adastus*) and SWFL (*E.t. extimus*) are thought to occur within the Plan Area (Craig and Williams 1998). SWFLs have been genetically verified as far north as Pleasant Valley Reservoir (Paxton 2000). Genetic and colorimetric analyses have shown the population on Rush Creek to be within the boundary zone between subspecies and therefore show signs of intergradation (Paxton et al 2010).

Distribution

The Southwestern Willow Flycatcher inhabits riparian woodlands in southwestern North America from the Rocky Mountains and Rio Grande River west to the Pacific Ocean, and from Northern

Mexico north to southern California, Nevada, Utah, and Colorado. . The winter range for WIFL includes southern Mexico, Central America, and extends south into Ecuador (Paxton et al 2011). The lowlands of Costa Rica appear to be a key wintering area for SWFL (Paxton et al. 2011).

Willow Flycatchers were first recorded in the Owens Valley in 1917 (CNDDB). A breeding population of SWFL (24 territories in 2001) is present in the Plan Area along the Owens River and adjacent tributaries, from Pleasant Valley downstream to south of East Line Street, east of Bishop (Whitfield 2001). Additional isolated territories have been documented along Lone Pine Creek (1999), and the Owens River north of Tinemeha (1999 and 2006) and south of Collins Road (2006). Migrant Willow Flycatchers of unknown subspecies have been encountered in the Owens River Gorge during surveys (Laymon and Williams 2000, LADWP 2008); however, no territorial birds have been documented.

WIFLs were once a common breeding bird in the Mono Basin (Grinnell and Storer 1924). Surveys in the 1990s documented no flycatchers in the basin and the species was thought to be extirpated (Jones and Stokes 1993). Two territorial WIFL males were documented on Rush Creek in 2000 indicating a recent recolonization (Heath et al. 2001; McCreedy and Heath 2004). In 2001, two successful flycatcher nests were documented, the first to be documented in the Mono Basin in the past thirty years. In 2004, 16 birds were documented, and in 2010 there were 6 birds present (McCreedy 2011).

Habitat

WIFL is a riparian obligate species that inhabits riparian deciduous shrubs, particularly willow species (Grinnell and Miller 1944). Little is known about the habitat characteristics of *E. t. adastus* in California (Craig and Williams 1998). SWFL occupy dense streamside vegetation dominated by willows, baccharis (*Baccharis* spp.), and arrowweed (*Pluchea* spp.), or where other plants occur in thickets, usually in association with Fremont cottonwood and other riparian tree overstory. SWFLs breed in substantially different types of riparian habitat across a large geographical area and elevational range. SWFL is found primarily in lower elevation riparian habitats, but occurs from sea level up to 8,200 ft (USFWS 2002a). Nesting sites usually have dense foliage from the ground level to about 13 feet above ground. SWFL only establish nests near surface water or saturated soil (Sogge et al. 1997b, Whitfield et al. 1997). Water may dry up later in the season, and is not necessarily present at the later stages of the breeding cycle. At the South Fork Kern River, the distance from SWFL nests to nearest water averaged 70 feet with almost half of the nests above water at the time they were built (Whitfield et al. 1997). Along Rush Creek, the average distance from WIFL nests to surface water was 423 feet (McCreedy and Heath 2004).

Riparian patches used by breeding flycatchers vary in shape and size, ranging from a relatively contiguous stand of uniform vegetation to an irregularly shaped mosaic of dense vegetation with open areas (Sogge et al. 2010). The SWFL has been found nesting in patches as small as 1.98 acres, and in areas as large as several hundred acres (Sogge et al. 2010). Because territories are frequently clumped or distributed near a habitat patch edge, the vegetative composition of individual territories may differ from the overall composition of the habitat patch (Durst et al. 2007). A recent comprehensive synopsis of all known SWFL territories (N=1262) found that 44 percent had mostly native vegetation, 4 percent had mostly exotic vegetation and 50 percent had a mixture of native and exotic vegetation. Furthermore, 58 percent of breeding territories were dominated by native willow, 22 percent by exotic saltcedar and 11 percent by native box elder (*Acer negundo*). All other tree species account for only about 7 percent of

territories (Durst et al. 2007). In many of these cases, exotics contributed significantly to the habitat structure by providing a dense lower strata that flycatchers prefer (Durst et al. 2007).

### Reproduction and Other Behavior

SWFL is a neotropical migrant and arrives on its breeding grounds generally between early May to early June and nesting may continue into mid-August (USFWS 2002a). SWFL are usually seasonally monogamous but between-year mate fidelity is low (USFWS 2002a). Not all territorial males are mated (USFWS 2002a).

Small open-cup nests are often placed in the fork of a branch with small vertical stems to support the nest. Flycatcher nest plants are usually rooted in, or overhang standing water (Whitfield and Enos 1996, Sferra et al. 1997 in USFWS 2002a). Females build the nest during a period of 4 to 7 days, with little or no assistance from the male. Most nests are used only once (USFWS 2002a). Nest height can range from 2 to 59 ft above ground, and may be related to height of nest plant, overall canopy height, and/or the height of the vegetation strata that contain small twigs and live growth (USFWS 2002a). Typically nest height is relatively low, e.g., 6.5 to 23 ft. Females tend to lay one egg per day, until the nest contains three or four eggs. Incubation begins after the last egg is laid, lasts 12 to 13 days, and is typically done by the female (USFWS 2002a). SWFLs typically raise one brood per year (USFWS 1993). Young fledge in late June through mid-August. Adults leave breeding territories after the young fledge and fledglings disperse from the breeding areas about a week or two later (Finch and Stoleson 2000).

Most SWFLs return to former breeding areas but may move 1.2 to 18 miles within the breeding area between years (USFWS 2002a).

### Diet

The SWFL is a diurnal generalist insectivore, foraging within or near dense riparian vegetation on a wide range of flying and ground or vegetation-dwelling invertebrate prey. Prey size ranges from small flying ants (Formicidae) to large dragonflies (Odonata). Common prey species include true bugs (order Hemiptera; Drost et al. 2003), wasps and bees (Hymenoptera), flies (Diptera), beetles (Coleoptera), butterflies/moths and caterpillars (Lepidoptera), spittlebugs (Homoptera; Beal 1912, McCabe 1991), leafhoppers (Cicadellidae) and ants (Formicidae; Durst et al. 2008b).

### Conservation Status

The SWFL was listed as endangered under the ESA in 1995 (60 FR 10695) and critical habitat designation was last revised in 2013. The Plan Area contains the USFWS designated Owens Management Unit which includes the Owens River and its tributaries, extending from below Pleasant Valley Reservoir downstream to Owens Lake (USFWS 2002a). This management unit was excluded from critical habitat designation in 2013 (USFWS 2013). All Willow Flycatcher subspecies have been listed as endangered under CESA since 1991.

The USFWS and LADWP entered into a 10-year MOU in 2005 to implement the *Conservation Strategy for the Southwestern Willow Flycatcher on City of Los Angeles Department of Water and Power Lands in the Owens Management Unit*. This document outlines actions to enhance habitat for the SWFL on 49,000 acres along the Owens River. LADWP has implemented actions in the Conservation Strategy to reduce adverse effects associated with livestock grazing, recreation, and the management of wildfires on LADWP lands and improve habitat.

## Threats

The Recovery Plan identified four factors as reasons for decline and as continued threats to SWFL: habitat loss and modification, changes in abundance of other species (including exotic plants and Brown-headed Cowbird (*Molothrus ater*)), vulnerability of small populations, and migration and winter range stresses.

### *Habitat Loss and Degradation*

The primary cause of the SWFL's decline is loss and modification of riparian nesting habitat. Habitat loss and degradation have been the result of changes in a number of land use practices. The loss of riparian habitat in most western states is estimated to be more than 90 percent. The operation of dams and reservoirs alters the natural hydrological cycles both upstream and downstream of a dam (USFWS 2002a). This can lead to changes in the quality of habitat for SWFLs, and long-term changes in the riparian community. Water diversion and groundwater pumping have affected flycatcher habitat within its range by reducing water or groundwater tables in riparian ecosystems. Flood control projects and efforts to increase watershed yield have impacted SWFL habitat by reducing the volume and width of riparian habitats. Improperly managed livestock grazing can result in significant alterations to riparian communities, altering plant community structure and reducing the overall density of vegetation. Effects on SWFL habitat from recreation include increased incidence of fire, vegetation trampling, bank erosion, etc. Fire has been identified as an imminent threat as many riparian plants are neither fire-adapted nor fire-regenerated (USFWS 2002a) and fires in riparian areas can cause drastic changes in plant density and species composition. Agricultural development has resulted in direct loss of riparian habitat in river bottoms, but in some areas has also resulted in the increase in likelihood of parasitism by Brown-headed Cowbirds by creating favorable foraging areas for cowbirds in proximity to remaining riparian habitat. Urbanization has resulted in direct impacts to SWFL habitat through removal, but also indirect affects through increased potential predators, disturbance, habitat degradation due to changes in hydrology, or vegetation removal projects (USFWS 2002a).

### *Changes in Abundance of Other Species*

Exotic plants have had varying effects on SWFL habitat. Principal nonnative plants species that have invaded flycatcher habitats include saltcedar, Russian olive (*Elaeagnus angustifolia*), and giant reed (*Arundo donax*) in some parts of California. Exotic plant species such as saltcedar may affect the multi-layered structure of riparian systems, especially where the exotic species becomes dominant (USFWS 1993). Exotic plant species may also affect flycatcher habitat by changing plant species diversity, shifting relative species abundances, altering biomass, fire regimes, thermal regimes, or insect fauna (in USFWS 1993).

Another threat is an increase in brood parasitism by the Brown-headed Cowbird (Molothrus ater), which inhibit reproductive success and recruitment and further reduce population levels. At Rush Creek, a population decline in WIFL has been attributed to high Brown-Headed Cowbird parasitism, low return and immigration rates, and eggs lost to depredation (McCreedy and Heath 2004).

### *Vulnerability of Small Populations*

Small populations of SWFL are vulnerable to stochastic events such as flood, fire, and reduced gene flow (USFWS 2002a).

*Migration and Winter Range Stresses*

Habitat loss and degradation have also impacted migration stopover and wintering habitat (USFWS 2002a).

### 3.8.7 Bell's Vireo

Most of the information below relates to Least Bell's Vireo (LBVI) because this subspecies has been documented in the Plan Area. However, Arizona Bell's Vireo may occur in the Plan Area now or in the future. Therefore, all subspecies of Bell's Vireos are covered under the Plan.

Identification

The Bell's Vireo (*Vireo belli*; BEVI) is a small vireo (4.5-5 in) weighing 0.25-0.35 oz) with short rounded wings, short blunt bill with a hooked upper mandible. The plumage varies regionally. It is generally drab gray to green above to white to yellow below and the breast is unstreaked. They have a faint white eye ring and two pale wing bars (Kus et. al 2010). Least Bell's Vireo (*V. b. pusillis*) are entirely grayish. It is easily distinguished by its song (cheedle-cheedle-chee, cheedle-cheedle-chew; Peterson 1961). By the first breeding season, males have unique but fixed repertoires of 5 to 15 songs that can be used to identify individuals (Beck 1996, USFWS 1998b).

Taxonomy and Genetics

BEVI are in the order Passeriformes and family Vireonidae. There are four subspecies, two of which occur in California, the LBVI and the Arizona Bell's Vireo (*V. b. arizonae*) The eastern limit of the range of LBVI is contentious and birds in the East Mohave Desert and Death Valley area may be Arizona Bell's Vireos (Patten, no date).

Distribution

LBVI is restricted to California and northern Baja California, occurring from approximately 175 feet elevation in Death Valley up to 4,100 feet near Bishop, California (Grinnell and Miller 1944). Grinnell characterized LBVI as common to locally abundant with favorable habitat conditions (Grinnell and Miller 1944). Historically, LBVI was widespread throughout riparian woodlands in the Central Valley of California north to Tehama County, and in the low elevation valleys of California and northern Baja (USFWS 1998b). The San Joaquin and Sacramento Valleys were formally the center of the vireo's breeding range, supporting 60-80 percent of the population (USFWS 2006). The current range of LBVI in California, is much reduced and includes: Santa Clara River, Mojave River, near Gilroy, Central Valley, Camp Pendleton, and southeastern Inyo County. The number of known territories in Inyo County has increased from 0 in the 1970s to 11 during 2001-2005 with present populations known to occur at China Ranch Wash and the Amargosa River (USFWS 2006). No genetic analysis has been done to identify the subspecies of this population (Patten et al. 2003). The remaining populations are concentrated in southern California, with more than 99 percent of the breeding population occurring from Santa Barbara County south (USFWS 2006).

Because of the elevational range within with the species has occurred historically, BEVIs are not expected to occur in Mono County. Within the Owens Valley, LBVI were observed in 1891 along Bishop Creek, in Lone Pine, and in Olancha (Fisher 1893). A nesting pair of Bell's Vireo was observed along the Owens River near Big Pine in 2008 (House 2008). LADWP staff re-visited the site numerous times and observed the pair feeding a cowbird chick and a vireo chick in early June. The female was observed later in the season carrying food while the male was singing nearby, suggesting the pair had re-nested. Although the sub-specific status of these particular birds was not confirmed, this is the first pair and first recorded nesting attempt of Bell's Vireo in the Owens Valley in many decades.

Habitat

The Least Bell's Vireo is a riparian obligate breeding species that occurs in cottonwood-willow woodlands, oak woodlands, and mule fat scrub (USFWS 1998). Although LBVIs typically nests in willow-dominated areas, habitat structure is of more importance than plant species composition. LBVI have been associated with early successional habitats (5-10 years) that provide appropriate structure (USFWS 1998). Essential habitat components are the presence of dense cover within 3-6 feet of the ground where nests are typically placed, and a dense stratified canopy for foraging (USFWS 1998a).

Nests are suspended from small branching forks in small trees, shrubs, or herbaceous vegetation (Barlow 1962). Nests are generally placed between 1.5 and 4.5 feet off the ground (Brown 1993, Kus 2002). A variety of plants are used however willows and rose are the most frequently used nesting substrate (Franzreb 1989). Typical nest placement is such that the nests may be susceptible to damage from wind, cattle, and predators.

Feeding habitat for the LBVI is primarily riparian habitat but may also include adjoining habitats. LBVI forage in all levels of the canopy but tend to focus within 13 ft of the ground in willows (*Salix* spp.) (Franzreb 1989). Birds documented using non-riparian areas for foraging tend to occupy edge territories in narrower portions of the riparian habitat that had fewer riparian trees and shrubs (Kus and Miner 1989).

Diet

LBVIs are insectivorous and prey on a wide variety of crawling and flying invertebrates including spiders, caterpillars, beetles, true bugs, grasshoppers, and moths (Western Riverside County MSHCP 2003).

Reproduction and Other Behavior

LBVI is a subtropical migrant that arrives on its breeding grounds in mid-March to mid-April. Males arrive first and establish territories that range in size from 0.5 to 7.5 acres (USFWS 1998a). Females arrive several days after the males and pairs spends 4-5 days constructing a cup-shaped nest, typically in the fork of a tree or shrub branch within 3 ft of the ground. Nests are located in a variety of plant species including: most commonly willow, mule fat, and wild rose, and less frequently Fremont cottonwood, California sycamore (*Platanus racemosa*), and herbaceous species. Egg-laying begins one to two days after completion of nest construction. Clutch size ranges from two to five eggs, typically three to four. Both parents incubate for roughly 14 days and feed

the nestlings for 10 to 12 days until fledging. Adults continue to care for fledglings for 2 weeks (USFWS 1998a). LBVI may attempt to re-nest up to five times in a breeding season, although most fledge young from one or two nests (B. Kus pers comm, cited in USFWS 1998a). Reproductive success ranges from an average of 1.1 to 2.4 fledglings per nest (USFWS 1998a).

Although BEVI has a life span of up to 7 years, a large proportion (70 to 90 percent) die before reaching 1-year (USFWS 1998a). Sources of mortality include nest predation, which ranges from 25 to 40 percent (USFWS 2006), and nest parasitism by the larger Brown-headed Cowbird.

LBVI depart in late August or September for wintering grounds in southern Baja California, Mexico (USFWS 1998a).

Conservation Status

The LBVI was listed as endangered under the ESA on May 2, 1986; critical habitat was designated on February 2, 1994. No other passerine species in California is known to have experienced as dramatic a decline as the LBVI (USFWS 1986). No critical habitat was designated in Inyo or Mono Counties. The USFWS issued a draft recovery plan in 1998 and as of this writing a final recovery plan has not been issued. LBVI was listed by California as endangered on October 2, 1980 and the Arizona Bell's Vireo as endangered on March 17, 1988.

Threats

The *Draft Least Bell's Vireo Recovery Plan* identified habitat loss and degradation and cowbird parasitism as the two main reasons for decline and as continued threats to the species. The 5-year review verified that these factors continued threaten to the species (USFWS 2006).

*Habitat Loss and Degradation*

Throughout the range, riparian habitats used by LBVI have been lost due to agricultural development, urban development, flood control projects, and water development projects. In the Central Valley, once the stronghold of this species distribution, more than 95 percent of riparian habitats have been lost, accounting for up to 60-80 percent of the original vireo population in California (USFWS 1986). Similar impacts have taken place to riparian systems in southern California, and at the time of listing, only small isolated populations of LBVI existed in Southern California. Based on information provided in the 5-year review, the trend of riparian habitat loss and degradation appears to have been substantially reduced (USFWS 2006).

*Cowbird Parasitism*

Nest parasitism is a novel threat to LBVI in evolutionary terms, as the Brown-headed Cowbird was historically rare within the range of the vireo. Brown-headed Cowbirds are now common throughout the current range of LBVI. Brown-headed Cowbird populations expanded due largely to improved or created feeding habitats, and to a lesser extent, improved breeding habitat (Rothstein 1993). Nest parasitism continues to be a significant threat to LBVI, but while cowbird trapping may halt LBVI population declines over the short-term, trapping may not be the best management tool for long-term recovery of LBVI (USFWS 2006).

In general, small populations of LBVIs may be parasitized more heavily than larger populations (Peer et al. 2005, USFWS 2006). In addition to managing Brown-headed Cowbirds, negative impact of cowbirds can be mitigated through land management; specifically high microhabitat cover around vireo nests to reduce rates of cowbird parasitism (Sharp and Kus 2006). However, other studies have found no relationship between microhabitat and nest predation (Kus et al. 2008).

Range wide, the LBVI population was estimated at 291 pairs in 1986 at the time of listing (USFWS 1986). Improvements in habitat abundance and quality, and effective cowbird control have resulted in an increase in the population to an estimated 2,968 pairs in 2005 (USFWS 2006). Maintaining habitat quality and addressing cowbird parasitism are believed to both be necessary to sustain LBVI populations (USFWS 2006).

## 3.9 Habitat Suitability Analysis – Avian Species

Habitat suitability for the YBCU, WIFL, and BEVI was determined based on: *Habitat Suitability Index Models: Southwestern Willow Flycatcher, Least Bell's Vireo, California Yellow-billed Cuckoo, Swainson's Hawk* (Ecosystem Sciences and Laymon 2007), The Habitat Suitability Index (HSI) models are explained in Appendix B.

The HSI values were grouped into the following qualitative classes: high, moderate, low, or unsuitable. Because the habitat suitability categories are based on species-specific attributes pertaining to reproduction, the definitions vary by species. These categories are defined below by species. Table 3 shows the amount of existing habitat (acres) available for each covered bird species by HSI category. Acreage of existing suitable habitat differs by species, as it is affected by specific criteria described by the model, and the values of certain parameters assigned to existing riparian vegetation polygons used to apply the HSI model. Results are summarized below by species.

**Table 3- 2. Acreage of Suitable Habitat per Suitability Class for Riparian Obligate Bird Species**

| 2014 | Acreage of Suitable Habitat | | | |
|---|---|---|---|---|
| **HCP Riparian Obligate Species** | **Low** | **Moderate** | **High** | **Total** |
| Yellow-billed Cuckoo | 157.4 | 102.4 | 50.7 | 310.5 |
| Southwestern Willow Flycatcher | 1259.9 | 601.9 | 221.1 | 2082.9 |
| Least Bell's Vireo | 321.4 | 921.9 | 23.5 | 1266.9 |

### 3.9.1 Yellow-billed Cuckoo Habitat Suitability

The habitat attributes used to determine reproductive suitability index (SIR) and HSI for the YBCU include: percent canopy cover; average canopy height of trees greater than 9.8 ft tall and greater than 4 ft in DBH; basal area of trees, and foliage volume of trees. The quality of YBCU breeding habitat was then classified into low, moderate, high or unsuitable based on these habitat parameters.

We evaluated all riparian habitats in the Plan Area to determine existing habitat for the YBCU. A total of 310.5 ac of riparian habitat were determined to be suitable habitat for the SWFL (Appendix B, Figures 4 and 5 depict all habitats—complete suitability ratings). Based on the habitat mapping, 157.4 ac were classified as low, 102.4 ac as moderate, and 0.4 ac has high suitability.

### 3.9.2 Southwestern Willow Flycatcher Habitat Suitability

The habitat variables used to determine SIR and HSI include: presence or nearby presence of running or standing water or super-saturated soil at the beginning of the breeding season; percent canopy closure; percent tree foliage cover (the percent of the ground surface that is shaded by a three dimensional projection of the foliage of all live woody vegetation within 3.3 to 10 ft of the ground); and width of riparian habitat. Habitat suitability is rated from high to unsuitable based on the criteria.

We evaluated all riparian habitats in the Plan Area to determine existing habitat for the SWFL. A total of 2082.9 ac of riparian habitat were determined to be suitable habitat for the SWFL (Appendix B, Figures 4 and 5 depict all habitats—complete suitability ratings). Based on the habitat mapping, 1259.9 ac were classified as low, 601.9 ac as moderate, and 221.1 ac has high suitability.

#### Bell's Vireo

The habitat attributes used to determine SIR and HSI include: percent riparian shrub cover in the 0 to 9.8 ft range; percent canopy closure of all live woody vegetation taller than 6.6 ft; and width of riparian habitat. Habitat suitability for the LBV is rated from high to unsuitable based on these habitat attributes, which, for purposes of the model, meet requirements for both reproduction and feeding habitat, even though nesting requirements may be more restrictive. A description of the criteria used to rate habitat suitability for the LBV.

All City lands below 4,100 ft that contain riparian communities were examined to determine habitat suitability for the LBV.

### 3.9.3 Greater Sage-Grouse Habitat Suitability Model

Suitable habitat for the Greater Sage-Grouse within the Plan Area was defined based on the Preliminary Priority Habitat (PPH) map supplied by U.S. Geological Services (USGS). The PPH map was developed by the Bi-State Greater Sage-Grouse Technical Advisory Committee to provide a defensible decision support tool for management of sage-grouse populations (Technical Advisory Committee) http://sagebrusheco.nv.gov/uploadedFiles/sagebrusheconvgov/content/Meetings/USGS_GrSG_Habitat_Mapping.pdf.

The PPH mapping, based on 100 ft resolution Landsat imagery, was further refined by removing polygons of selected cover types (i.e. developed land, water, reservoir shoreline, Jeffrey pine complex, singleleaf pine complex, canyon complex, abandoned agriculture, greasewood, and eolian land) identified from high-resolution 2009 imagery.

Potential GRSG habitat was identified on City land in Long Valley and the Mono Basin. A total of 31,511 ac is considered potential habitat breeding, nesting and brood rearing, and wintering. The amount of habitat for each seasonal need was not calculated.

### 3.9.4 Habitat Suitability Analysis – Fish Species

No quantitative models exist for any of the covered fish species. Water quality and other habitat parameters do not appear to be limiting factors within the Plan Area.

Based on current distribution habitat suitability is largely determined by presence of perennial water and interactions with nonnative aquatic species. Occupied habitat is identified in the Species Accounts and will be used for evaluating impacts to covered fish species.

Potential habitat that is currently unoccupied is discussed in Section 5.