Technical Appendix 10

Terrestrial Wildlife Including Special Status Species

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Acronyms and Abbreviations

Acronym or Abbreviation	Full Phrase
AZ	Arizona
BLM	Bureau of Land Management
CA	California
CSC	California Species of Concern
ESA	Endangered Species Act
km	kilometer
LCR MSCP	Lower Colorado River Multi-Species Conservation Program
maf	million-acre-feet
NIB	Northerly International Boundary
NV	Nevada
SIB	Southerly International Boundary
FWS	United States Fish and Wildlife Service
UT	Utah

TA 10. Terrestrial Wildlife Including Special Status Species

TA 10.1 Affected Environment

This section provides an overview of the general terrestrial wildlife typically found within marsh, woody riparian, and upland habitats in the analysis area, as described in **TA 9.2** in **TA 9**, Vegetation Including Special Status Species, including invertebrates, amphibians, reptiles, birds, and mammals. This section also includes special status species, which are defined here as those listed as Bureau of Land Management sensitive species in the overlapping Arizona, California, Utah, and Nevada Bureau of Land Management field offices; species covered under the Lower Colorado River Multi-Species Conservation Program (LCR MSCP); and species listed as threatened, endangered, or proposed for listing by the U.S. Fish and Wildlife Service (BLM 2017, 2018, 2019, 2023; LCR MSCP 2022; FWS 2025b). **TA 10 Attachment 1** provides a table of the species considered in this document, including their listing status, the river reaches they typically inhabit, and the habitat types most important to their life histories. **TA 10 Attachment 1** was developed with input from cooperating agencies and local experts.

In addition to analyzing the impacts on wildlife in the analysis area as defined in the Vegetation section (see **TA 9.2** in **TA 9**, Vegetation Including Special Status Species), impacts are also evaluated for the LCR MSCP conservation areas. These areas were established to provide habitat for species listed under the Endangered Species Act (ESA) or that may become listed under the ESA and that use habitat along the Colorado River from Lake Mead down to the Southerly International Boundary (SIB; LCR MSCP 2025). The Colorado River in this area has been highly modified by several dams and water diversions, which have affected the growth and establishment of marsh and woody riparian habitat (see **TA 9.1** in **TA 9**, Vegetation Including Special Status Species). The LCR MSCP Habitat Conservation Plan and subsequent ESA consultations identified the impacts on marsh, woody riparian, upland, and backwater habitats predicted from existing and anticipated future river operations, and the program established the conservation areas and off-river land acquisitions to mitigate for these losses and provide reliable suitable habitat for wildlife (LCR MSCP 2025). There are 18 conservation areas aimed at conserving 27 species, with a goal of creating 5,940 acres of cottonwood/willow, 1,320 acres of honey mesquite, 568 acres of marsh, and 484 acres of backwater habitats. In addition to the conservation areas, several wildlife refuges and lands managed for wildlife are present below Hoover Dam. These include Havasu National Wildlife Refuge, Bill Williams River National Wildlife Refuge, Cibola National Wildlife Refuge, Imperial National Wildlife Refuge, Gooseflats Wildlife Area, Lake Mead National Recreation Area, and Mittry Lake Wildlife Management Area.

TA 9, Vegetation Including Special Status Species describes the marsh, woody riparian, and upland habitat types, which are used in this section to determine the affected environment and environmental impacts on wildlife, including special status species.

TA 10.1.1 Marsh Habitat

See **TA 9**, Vegetation Including Special Status Species, for a description of marsh habitat. There are approximately 4,327 acres of marsh habitat in the analysis area (**Table TA 9-1** in **TA 9**, Vegetation Including Special Status Species). Marsh habitat can be vulnerable to harmful algal blooms due to increased water temperature and nutrient input. Harmful algal blooms can reduce water quality that can impact marsh vegetation, in turn reducing habitat quality and quantity for wildlife. Harmful algal blooms can also cause toxic water conditions that can be harmful to wildlife that contact or drink the water (CRS 2020). See **TA 6**, Water Quality, for more information on harmful algal blooms.

Invertebrates. Marshes are rich in invertebrate diversity, including mosquitoes (family Culicidae), water beetles (family Hydrophilidae), and midges (family Chironomidae). Many aquatic invertebrates use marsh habitat for egg laying. These invertebrates are a vital part of the food web, supporting a variety of other wildlife species, including special status species and aquatic species, which are described in further detail in **TA 8**, Biological Resources – Fish and Other Aquatic Resources. Four special status invertebrate species predominantly use marsh habitat (**TA 10 Attachment 1**).

Amphibians and Reptiles. Marsh habitat along the Colorado River provides important resources for amphibian and reptile life stages. Amphibians lay eggs in standing water, where aquatic vegetation offers shelter and protection for eggs and developing larvae. Marshes also serve as important refuges for juvenile amphibians and reptiles, providing abundant food sources like insects and small invertebrates, which are crucial for growth and development. For reptiles, marshes offer both a food-rich environment and opportunities for thermoregulation. These areas are particularly valuable during the breeding season, providing critical hydration and temporary refuges during extreme temperatures. Ten special status amphibians and reptiles, including the northern Mexican gartersnake (*Thamnophis eques megalops*), a federally threatened species, predominantly use marsh habitat (**Table TA 9-1**). Northern Mexican gartersnakes use marsh habitat along large rivers and tributaries where they forage for fish, amphibians, lizards, small mammals, and invertebrates (AZGFD 2025). Northern Mexican gartersnakes are difficult to detect, and their occupied range along the Colorado River is unknown, although known occurrences exist within the Lake Havasu National Wildlife Refuge in 2015 and 2019 (LCR MSCP 2020; FWS 2024). Minnow trapping was conducted in 2024 in previously occupied habitat, and ongoing camera trapping surveys are occurring at Topock Marsh. The 2024 and 2025 surveys resulted in no detections of this species (Sabine 2025). It is assumed northern Mexican gartersnakes could be present in the analysis area within the Hoover Dam to SIB reaches (**TA 10 Attachment 1**).

The introduction and spread of aquatic invasive species has affected amphibian populations in the Colorado River system, which can affect species that prey on amphibians, such as the northern Mexican gartersnake (Reclamation 2024, Section 3.8 Aquatics). Nonnative fish prey on native amphibian eggs, larvae, or adults. Common predatory aquatic invasive species are detailed in **TA 8**, Biological Resources – Fish and Other Aquatic Resources.

Birds. Marshes provide essential nesting sites for waterfowl and other wetland-dependent bird species. These birds depend on dense vegetation to conceal their nests from predators and provide suitable areas for raising their young (Hinojosa-Huerta 2004). Migratory birds use marsh habitat as stopover sites for resting, foraging, breeding, and nesting. Twelve special status species, including Yuma Ridgway's rail (*Rallus obsoletus yumanensis*), a federally listed endangered species, predominantly use marsh habitat (**TA 10 Attachment 1**). Yuma Ridgway's rails use marsh habitat for both foraging and nesting, typically in areas dominated by cattails (*Typha* sp.) and bulrushes (*Scirpus* spp.; FWS 2009). Within the analysis area, Yuma Ridgway's rails are found in the Lake Mead to Hoover Dam and Davis Dam to the Northerly International Boundary (NIB) reaches. Most Yuma Ridgway's rails in the analysis area are found in the Davis Dam to NIB reaches, which contained between 30 percent and 58 percent of the United States population from 1995 through 2013 (Reclamation 2023). Surveys conducted from 2006 through 2022 detected 120 to 339 Yuma Ridgway's rails annually between Davis and Imperial Dams (Reclamation 2023). Surveys at selected sites in the Davis Dam to NIB reach from 2023 through 2025 detected 43 to 78 Yuma Ridgway's rails annually (Kahl 2024, 2025a, 2025b, 2025c; Ronning 2025). Yuma Ridgway's rail is a highly mobile species, with a subset of the lower Colorado River population exhibiting migratory movements. Although some rails flew over 900 kilometers (km) to wintering areas in the United Mexican States (Mexico), the three rails that were documented returning to their breeding grounds all returned to within 32 km of their original capture locations (Harrity and Conway 2020). The readiness with which rails colonize habitats distant from established breeding sites is unclear.

Mammals. Mammals use marsh habitat for shelter, foraging, and as a critical drinking water resource. This habitat also plays a role in the reproductive cycle of some species, such as beavers (*Castor canadensis*). Other species rely on the aquatic plants and invertebrates in marsh habitats as essential food sources. Three special status mammal species predominantly use marsh habitat (**TA 10 Attachment 1**).

TA 10.1.2 Woody Riparian Habitat

See **TA 9**, Vegetation Including Special Status Species, for a description of woody riparian habitat. There are approximately 48,827 acres of woody riparian habitat within the analysis area (**Table TA 9-1**). Similar to marsh habitat, woody riparian habitat is vulnerable to harmful algal blooms (CRS 2020), which can impact wildlife that use this habitat type.

Invertebrates. Woody riparian habitat supports a variety of common terrestrial invertebrates, including winged (Pterygota) and wingless (Apterygota) insects. These insects play a crucial role in the terrestrial ecosystem as both pollinators and as a food source for other wildlife, including special status species. Several insect species (e.g., mayflies [Leptophlebiidae], stoneflies [Plecoptera], caddisflies [Limnephilidae], dragonflies [Anisoptera], and beetles [Coleoptera]) breed in the woody riparian habitat along the Colorado River, taking advantage of the vegetation, moisture, and organic matter that these environments provide (Kennedy et al. 2016). Woody riparian habitat also supports the adult life stages of aquatic insects that are an important part of the aquatic ecosystem, which are described in further detail in **TA 8**, Biological Resources – Fish and Other Aquatic Resources.

Thirty-two special status invertebrate species predominantly use woody riparian habitat, including the monarch butterfly (*Danaus plexippus*), a federally proposed threatened species (**TA 10 Attachment 1**). Monarch butterflies use milkweed (*Asclepias* spp.) that grow in a variety of upland habitat types for breeding habitat as well as other nectar-producing plants while foraging. In Arizona, monarchs are present and seasonally abundant, having been recorded every month of the year when seasonal temperatures are conducive, including documented overwintering at riparian locales. Monarchs often occur near riparian areas or other locations that contain water, including around ciénegas, creeks, washes, roadside ditches, and irrigated gardens. Monarchs favor riparian areas and rivers for migration (Morris et al. 2015). Within the analysis area, milkweed that could be used by breeding monarch butterflies is known to occur in isolated patches along the river (Cavezza 2025, Pilkington 2021, Philips et al. 1987; **TA 10 Attachment 1**).

Amphibians and Reptiles. Woody riparian habitat provides forage and cover for common reptile and amphibian species, such as turtles, snakes, frogs, and salamanders. The thick woody cover provides temperature regulation opportunities as well as habitat for food sources for reptiles and amphibians, which includes plants, small mammals, and invertebrates. Additionally, woody riparian habitat can be used by species that forage in adjacent habitat as cover to avoid predation. Ten special status species amphibians or reptiles predominantly use woody riparian habitat (**TA 10 Attachment 1**).

Birds. Birds, including raptors, utilize woody riparian habitat along the Colorado River for nesting, foraging, and sheltering during migration. Bird species benefit from the rich resources and shelter provided by woody riparian habitats, which are crucial for foraging and nesting activities (Hinojosa-Huerta 2013). Native riparian vegetation, such as cottonwoods and willows, offer nesting sites and cover which are especially valuable for species that depend on dense canopy structures. This habitat structure is particularly important for raptors that rely on elevated branches for hunting perches and nesting sites. Twenty-three special status bird species predominantly use woody riparian habitat, including southwestern willow flycatcher (*Empidonax traillii extimus*), a federally listed endangered species, and western yellow-billed cuckoo (*Coccyzus americanus*), a federally listed threatened species (**Table TA 9-1**).

Southwestern willow flycatchers nest in dense riparian habitat near slow-moving water in the Glen Canyon to Lake Mead, Lake Mead to Hoover Dam, and Davis Dam to Parker Dam reaches. Southwestern willow flycatchers are often identified in tamarisk-dominant riparian habitat along the above-mentioned reaches. Generally, the analysis area does not provide extensive stands of dense riparian habitat suitable for breeding southwestern willow flycatchers. Along lake margins, suitable habitats are generally limited to inflow areas. Newly established riparian vegetation can be used as breeding habitat by southwestern willow flycatchers within 3 years of establishment (Paxton et al. 2007). Two southwestern willow flycatcher breeding sites have been documented within the analysis area in recent years: Lower Las Vegas Wash, in the Lake Mead reach, and Topock Marsh, in the Hoover Dam to SIB reach. A single nesting pair was documented at Lower Las Vegas Wash in 2021 (SWCA 2022). Between two and six southwestern willow flycatcher pairs bred at Topock Marsh each year in 2018 through 2022 (McLeod et al. 2023). No breeding or resident southwestern willow flycatchers were confirmed in the analysis area in 2023 or 2024, although suspected southwestern willow flycatchers were detected at two spring-fed locations in the Glen Canyon Dam to Lake Mead

reach in 2023 (McLeod and Pellegrini 2024; McLeod and Pellegrini in prep.; Terwilliger and Whyte 2023). Surveys of these spring-fed locations in 2025 resulted in no southwestern willow flycatcher detections (Robertson 2025).

Migrant and transient southwestern willow flycatchers could use woody riparian habitat throughout the Glen Canyon to Lake Mead and Davis Dam to SIB reaches. Southwestern willow flycatchers readily colonize new suitable habitats that are near established breeding sites, but long-distance movements are relatively rare. Southwestern willow flycatchers exhibit fidelity to local areas, commonly returning from the wintering grounds to breed at the same site where they held a territory in the previous year. Half of adult returns in the lower Colorado River region in 1998 through 2012 resulted in movements of 40 meters or less, and less than 20 percent of movements were greater than 1 km. Movements between 100 and 259 km were recorded in approximately 2 percent of cases. Average natal dispersal distances were greater than adult movement distances, although 90 percent of recorded dispersal movements were 75 km or less (McLeod and Pellegrini 2013). Because long-distance movements are uncommon, one of the southwestern willow flycatcher recovery strategies is to establish habitat close to existing breeding sites to increase the likelihood of colonization (FWS 2002:75).

Western yellow-billed cuckoos nest in riparian woodlands with mature willow and cottonwood from Glen Canyon Dam to Hoover Dam and Davis Dam to NIB. Extensive riparian woodlands suitable for western yellow-billed cuckoo breeding are currently present only in LCR MSCP conservation areas from Davis Dam to NIB (see LCR MSCP 2022 for a description of the conservation areas), where cuckoos begin using cottonwood-willow habitats after two growing seasons (McNeil et al. 2013). Surveys of the conservation areas in 2018 through 2022 resulted in an estimated 46 to 66 western yellow-billed cuckoo territories annually (Parametrix and Southern Sierra Research Station 2019; Tracy et al. 2023). Since comprehensive surveys of the conservation areas completed in 2022, the Bureau of Reclamation has surveyed several conservation areas each year and continues to detect the species in suitable habitat. A single possible western yellow-billed cuckoo territory was documented at Lower Las Vegas Wash in the Lake Mead reach in 2021 (SWCA 2022). Migrant and transient yellow-billed cuckoos could use woody riparian habitat throughout the Glen Canyon to Lake Mead and Davis Dam to SIB reaches. Yellow-billed cuckoo is a highly mobile species and able to move to suitable habitats wherever they are available. Dispersal data from 19 yellow-billed cuckoos along the lower Colorado River indicate that while most between-year returns were to the same or adjacent sites, three movements of approximately 40 km were recorded, and one movement of approximately 75 km was recorded (Tracy et al. 2023). Yellow-billed cuckoos have been documented using previous breeding habitat areas and colonizing new habitats at conservation areas along the lower Colorado River from 2008 to 2018 (LCR MSCP 2019). These observations provide evidence that their selection of breeding sites are not restricted to previous breeding area and they may be able to use suitable habitat wherever available.

Mammals. Mammals along the Colorado River rely on woody riparian habitat for shelter, food, breeding, young rearing, and movement corridors. These areas provide resources that support a diverse range of species, from small rodents to large herbivores such as bighorn sheep (*Ovis spp.*) and carnivores. They also support aquatic invertebrates, fish, and small mammals, which serve as prey for carnivores. Bats are particularly dependent on woody riparian habitats, using them as foraging

grounds where they feed on insects attracted to water sources and dense vegetation. Beavers (*Castor canadensis*) play a particularly important role in these ecosystems by using woody riparian vegetation to construct dams and lodges. These structures create ponds that enhance water availability, benefitting many other species. Twenty-seven special status mammals, all bats, predominantly use woody riparian habitat (**TA 10 Attachment 1**).

TA 10.1.3 Upland Habitat

Upland habitat is described in **TA 9**, Vegetation Including Special Status Species, and is predominantly characterized as desert scrub in the analysis area. There are approximately 120,266 acres of upland habitat within the analysis area (**Table TA 9-1**).

Invertebrates. Desert scrub and upland habitat support a variety of invertebrates, including scorpions (*Scorpionidae spp.*), beetles (Coleoptera), and ants (*Formicidae spp*). These invertebrates are key components of the desert ecosystem, serving as both predators and prey. Thirty-eight special status invertebrate species predominantly use upland habitat (**TA 10 Attachment 1**).

Amphibians and Reptiles. Amphibians and reptiles utilize upland habitat along the Colorado River for critical life cycle activities, such as foraging, shelter, and breeding. While many species are closely tied to water sources for reproduction, some spend a significant portion of their lives in the surrounding uplands. The upland habitat along the Colorado River provides essential resources for a variety of reptile species, particularly those that rely on the region's rocky outcrops, sandy soil, and sparse vegetation, such as tortoises and lizards. These species use the sparse vegetation to hide from predators and shelter from extreme temperatures, and the sun-heated rocks provide a surface for basking and regulating body temperature. Fifteen special status amphibians and reptiles predominantly use desert scrub and upland habitat types, including the Mojave desert tortoise (*Gopherus agassizii*), a federally listed threatened species, and the Sonoran desert tortoise (*Gopherus morafkai*), a Bureau of Land Management-sensitive species that is also protected under a candidate conservation agreement (FWS 2015; **TA 10 Attachment 1**).

Due to the difficulty in determining whether a tortoise is Mojave or Sonoran based on morphology alone, any tortoise found in the area immediately south and east of the Colorado River in northwest Arizona are listed as similarity of appearance (threatened) under the ESA (FWS 1990). Although the threatened Mojave desert tortoise population range is defined as north and west of the Colorado River, recent genetic samples collected from tortoises near Lake Mead in Arizona were confirmed to be Mojave desert tortoise rather than Sonoran desert tortoise (FWS 2022). The Mojave and Sonoran desert tortoises are upland-obligate species that utilize open desert for burrowing and foraging and favor creosote bush (*Larrea tridentata*) habitats.

Birds. Desert scrub habitat along the Colorado River provides important nesting sites for several bird species. Additionally, some species actively forage for small mammals, reptiles, and insects within the scrub, often using the terrain's natural features, such as rock outcrops and sandy flats to hunt and track prey. Desert scrub habitat also serves as habitat for breeding or as seasonal stopovers during migration. Twenty-four special status bird species predominantly use desert scrub and upland habitat, none of which are federally listed species (**TA 10 Attachment 1**).

Mammals. Small mammals use desert scrub for food and shelter, often using shrubs and low vegetation to hide from predators. The desert scrub also provides a variety of food sources, including grasses, shrubs, and seeds. Mice, rabbits, and other rodents use desert scrub environments to dig burrows to stay cool in the desert heat and for shelter from predators. Large mammals also use desert scrub for foraging and denning. Bats use desert scrub habitats for roosting and reproduction, roosting in rock crevices, abandoned buildings, or beneath the bark of trees found in desert scrub areas. Eleven special status mammal species predominantly use upland habitat, none of which are federally listed species (**TA 10 Attachment 1**).

TA 10.2 Environmental Consequences

TA 10.2.1 Methodology

This Wildlife section relies on the outcomes of the vegetation analysis, the methodology for which is outlined in **TA 9.2.1**, Methodology in **TA 9**, Vegetation Including Special Status Species.

Impact Analysis Area

The analysis area is the same as described in **TA 9.2.1**, Impact Analysis Area.

Assumptions

- Upland wildlife species, including special status species, that do not rely directly on the Colorado River or on woody riparian and marsh vegetation influenced by elevation or flows, are not included in the impact analysis because changes in operations would not impact these species.
- Impacts on wildlife, including special status species, are driven by impacts on vegetation.

Impact Indicators

- Terrestrial wildlife species using marsh habitat – changes in water fluctuations within a single year compared to historical conditions.
- Terrestrial wildlife species using woody riparian habitat – changes in water fluctuations in the preceding 5 years compared to historical conditions. Terrestrial wildlife species using upland habitat – changes in water fluctuations over either the preceding single year or preceding 5 years compared to historical conditions.

TA 10.2.2 Issue 1: How would changes in the management of the Colorado River impact terrestrial wildlife species habitat availability, including for special status species?

Lake Powell

As discussed in **TA 9.2** in **TA 9**, Vegetation Including Special Status Species, Lake Powell's surface water elevations fluctuate on a short-term (annual) and long-term (5-year) scale that causes changes in water availability, which results in the establishment, re-establishment, or loss of upland, marsh, and woody riparian habitat over time. Wildlife, including special status species (hereafter referred to

as wildlife), that currently use the Lake Powell analysis area have adapted to these changing conditions over the past 60 years.

Under all alternatives, modeling indicates a greater range of variability in Lake Powell's surface elevations compared to historic conditions for both marsh and woody riparian habitat in the first decade (2027–2039) (**TA 9**, Vegetation Including Special Status Species, **Figures TA 9-7** and **TA 9-8**). As described in **TA 9.2** in **TA 9**, Vegetation Including Special Status Species, this greater variability would result in changes in the vegetation extent compared to existing conditions, and could decrease vegetation cover. While Lake Powell would continue to support at least some upland, marsh, and woody riparian habitat, the location of where conditions are suitable to support each of these habitat types is likely to change. Areas that currently support marsh, woody riparian, or upland habitat could transition to one of the other habitat types. With increased variability, wildlife would have to adapt to changing habitat availability on a larger scale than under historical conditions. For those species capable of moving long distances, such as large mammals, bats, birds, and some amphibians, reptiles, and invertebrates, this change in habitat availability would likely have less long-term impacts provided that suitable habitat is available within their dispersal or migratory range. This could also result in the range expansion or contraction of some species, including into new reaches, as they adapt to changing habitat availability. For less mobile species, such as some small mammals, amphibians, reptiles, and invertebrates, the transition from one habitat type to another may impact foraging, breeding, or sheltering behaviors, which can impact survival and reproduction. Decreased survival and reproduction on a large-scale can result in a decreased population size. Smaller local populations are more vulnerable to environmental stochasticity, which can lead to even greater reductions in population size and the risk of local extirpation (Rosenzweig 1995).

During the second (2040–2049) and third (2050–2060) decades, modeling indicates a range of variability more similar to historical conditions for the Enhanced Coordination Alternative and Max Flexibility Alternative compared to the other alternatives as well as compared to the first decade (2027–2039; **TA 9**, Vegetation Including Special Status Species, **Figures TA 9-7** and **TA 9-8**). This would result in habitat variability similar to what is currently on the landscape; wildlife would need to adapt to changing habitat conditions at the same scale as historical conditions. For all other alternatives, variability would remain high in the second (2040–2049) and third (2050–2060) decades, and wildlife would continue to need to adapt to changing habitat availability on a larger scale compared to historical conditions.

In addition to the annual and 5-year changes in water elevation, modeling indicates Lake Powell would gradually rise in elevation over time under the Enhanced Coordination and Maximum Operational Flexibility Alternatives in all but the critically dry modeled conditions (**TA 3.2** in **TA 3**, Hydrologic Resources, **Table TA 3-4 and TA 3.1, Figure TA 3-1s**). This would result in a shift of marsh and woody riparian vegetation along the new shoreline over time. The rise in water elevation would result in a marginal loss of upland habitat, but is not likely to impact wildlife that use marsh or woody riparian habitat, as the shift would be gradual enough for vegetation to continue to re-establish along the new shoreline. Under all other alternatives, modeling indicates water levels would remain the same or decrease in elevation. Similarly, vegetation would re-establish along the lower shoreline as the water elevations change over time. As water elevations lower, the distance to water for upland species would increase. However, given the ability for vegetation to adapt to changing

water levels, this change in water elevation, either to a higher elevation under the Enhanced Coordination or Maximum Operational Flexibility Alternatives or to a similar or lower elevation under all other alternatives, is not likely to impact foraging, breeding, or sheltering behaviors for wildlife. Except for the Enhanced Coordination and Maximum Operational Flexibility Alternatives, in all but the critically dry modeled conditions, the lowering of the water elevation in Lake Powell could increase the potential for harmful algal blooms, which could impact wildlife directly through increased toxicity exposure or indirectly through reductions in habitat quality and quantity.

While monarch butterfly primarily use woody riparian habitat for migration, they also use marsh and upland habitat regularly. Given the shifting availability of marsh, woody riparian, and upland habitat, and the ability to use features from all three habitat types, monarch butterflies are likely to be able to find suitable habitat under all alternatives in the Lake Powell analysis area. Species specific impacts will be addressed in future Section 7 ESA BOs.

Glen Canyon Dam to Lake Mead

Similar to Lake Powell, the Glen Canyon Dam to Lake Mead reach experiences fluctuating water levels that cause changes in water availability, which results in the establishment, re-establishment, or loss of upland, marsh, and woody riparian habitat over time. Wildlife in the Glen Canyon Dam to Lake Mead analysis area have had to adapt to these changing conditions in the past.

As shown in **TA 9**, Vegetation Including Special Status Species, **Figures TA 9-9** and **TA 9-10**, marsh and woody riparian habitat across all three sub-reaches of the Glen Canyon Dam to Lake Mead reach is modeled to respond similarly under all alternatives, and the wide interquartile ranges in **TA 9**, Vegetation Including Special Status Species, **Figure TA 9-10** indicate that future acreages of woody riparian habitat are difficult to predict. Under the wet modeled conditions, less suitable habitat for marsh and woody riparian species is modeled for all alternatives than under modeled historical conditions. Under the critically dry modeled conditions, more suitable habitat for woody riparian species is modeled under the No Action Alternative compared to modeled historical conditions. whereas modeled variability under the other alternatives is too wide to interpret whether there would be more or less suitable habitat for marsh or woody riparian vegetation. Therefore, the amount of habitat available for wildlife species, including southwestern willow flycatcher and yellow-billed cuckoo, is affected primarily by modeled antecedent conditions rather than by the alternatives. Species specific impacts will be addressed in future Section 7 ESA BOs.

Similar patterns are apparent for native species richness, proportion of native species cover, and annual total vegetation cover (**TA 9**, Vegetation Including Special Status Species, **Figures TA 9-11**, **TA 9-12**, and **TA 9-13**). Increased species richness, proportion of native species cover, and annual total vegetation cover would be beneficial to wildlife species for foraging and breeding habitat. However, increasing each of these factors is driven by the modeled antecedent conditions rather than by the alternatives, with additional habitat available under the critically dry modeled conditions. This is likely due to encroachment of vegetation into areas exposed by lower water levels.

With potentially decreasing water levels at Lake Powell, the temperature of releases from Glen Canyon Dam could increase, increasing the potential for harmful algal blooms in the Glen Canyon

Dam to Lake Mead reach. Harmful algal blooms could impact wildlife directly through increased toxicity exposure or indirectly by reducing habitat quality and quantity.

Lake Mead

Similar to Lake Powell, Lake Mead experiences fluctuating water levels on an annual and 5-year time scale that cause changes in water availability, which results in the establishment, re-establishment, or loss of upland, marsh, and woody riparian habitat over time. Wildlife in the Lake Mead analysis area have had to adapt to these changing conditions in the past. As described for Lake Powell, the first decade (2027–2039) exhibits higher variability compared to historical conditions under all alternatives, which would result in changes in habitat availability on a larger scale compared to existing conditions (**TA 9**, Vegetation Including Special Status Species, **Figures TA 9-10** and **TA 9-11**). Marsh and woody riparian vegetation is expected to decrease in response to the increase in variability.

Wildlife species that are capable of moving longer distances would be less likely to be affected by increased variability provided that suitable habitat is available within their dispersal or migratory range. Even for species that are highly mobile, there may be energetic costs to finding suitable habitat in a fragmented landscape if the distance between suitable habitat is outside their typical movement patterns. Increased energetic costs can impact survival and reproduction. Species that are less mobile may experience impacts on foraging, breeding, or sheltering behaviors, which can also impact survival and reproduction. Decreased survival and reproduction through increased energetic costs while searching for suitable habitat or through impacts on foraging, breeding, or sheltering behaviors can result in a decreased population size. Smaller local populations are more vulnerable to environmental stochasticity, which can lead to even greater reductions in population size and the risk of local extirpation (Rosenzweig 1995).

Unlike Lake Powell, the second (2040–2049) and third (2050–2060) decades exhibit variability similar to historical conditions for the Basic Coordination and Maximum Operational Flexibility Alternatives, rather than the Enhanced Coordination and Maximum Operational Flexibility Alternatives. However, the impacts on wildlife would be the same as described under Lake Powell for the Enhanced Coordination and Maximum Operational Flexibility Alternatives. That is, wildlife would need to adapt to changing habitat conditions at a rate more similar to historical conditions under the Basic Coordination and Maximum Operational Flexibility Alternatives, and would need to adapt to changing habitat conditions on a larger scale for the remaining alternatives.

As described in **TA 9.2** in **TA 9**, Vegetation Including Special Status Species, for all alternatives, Lake Mead elevations could rise, fall, or remain the same compared to existing conditions under all but the wet conditions (**TA 3.2** in **TA 3**, Hydrologic Resources, **Figure TA 3-11**). Similar to Lake Powell, whether the water elevations increase, decrease, or stay the same compared to existing conditions, wildlife would likely be able to adapt to these slower changes and follow the vegetation as it reestablishes along the shoreline. Should water elevations decrease under any of the alternatives, the lowering of the water elevation in Lake Mead could increase the potential for harmful algal blooms, which could impact wildlife directly through increased toxicity exposure or indirectly through reduced habitat quality and quantity.

Listed threatened and endangered species with potential to occur in the Lake Mead analysis area consist of southwestern willow flycatcher, yellow-billed cuckoo, Yuma Ridgway's rail, and Mojave desert tortoise. Impacts have been previously assessed in the LCR MSCP Habitat Conservation Plan, 2007 FEIS, and 2004 SEIS and associated BOs. Additional Section 7 and Section 10 ESA processes are ongoing and additional impacts will be disclosed in future Biological Opinions and Habitat Conservation Plans. Southwestern willow flycatcher and yellow-billed cuckoo rely on woody riparian habitat, which has modeled increased variability and therefore decreased habitat availability in the first decade (2027–2039) compared to historical conditions. These species are capable of moving long distances to access suitable habitat, although southwestern willow flycatchers exhibit local site fidelity and most readily colonize sites that are near existing breeding sites. The loss of suitable breeding habitat in a river reach could result in southwestern willow flycatchers being slow to recolonize the area even if suitable habitat redevelops. For both species, if water levels fluctuate or rise to the extent that habitat is unavailable, then impacts on nesting may occur. Yuma Ridgway's rails rely on marsh habitat, which may also experience increased variability and therefore decreased habitat availability in the first decade (2027–2039) compared to historical conditions. Yuma Ridgway's rails are also capable of moving long distances to access suitable habitat, although the readiness with which they colonize new areas far from established breeding sites is unclear. For all three species, as variability returns closer to historical conditions in the second (2040–2049) and third (2050–2060) decades for the Basic Coordination and Maximum Operational Flexibility Alternatives, suitable habitat would likely be available similar to historical conditions.

Mojave desert tortoises rely on upland habitat. While upland habitat availability is modeled to change under all alternatives in each of the decades, Mojave desert tortoises would have suitable habitat available upslope and would be capable of moving away from rising water levels. Survivorship would depend on the quantity and quality of available forage in adjacent areas they would relocate to. As water levels fluctuate, upland habitat loss would be equal to the areas of change unless water fluctuations stabilized and upland vegetation was able to re-establish. Decreased survival and reproduction on a large-scale can result in a decreased population size. Smaller local populations are more vulnerable to environmental stochasticity, which can lead to even greater reductions in population size and the risk of local extirpation (Rosenzweig 1995).

As described for Lake Powell, monarch butterflies are likely to find suitable habitat under each alternative and are unlikely to be affected.

Hoover Dam to SIB

Similar to Lake Powell and Lake Mead, the Hoover Dam to SIB reach experiences fluctuating water levels on an annual and 5-year timescale that causes changes in water availability, which results in the establishment, re-establishment, or loss of upland, marsh, and woody riparian habitat over time. Wildlife in the Hoover Dam to SIB analysis area had to adapt to these changing conditions in the past.

The LCR MSCP Habitat Conservation Plan and subsequent Biological Opinions set habitat creation goals associated with predicted impacts from flow reductions in the LCR MSCP planning area (Reclamation 2004; FWS 2005, 2018, 2022, 2024). A summary of the habitat creation goals and habitat created towards those goals as of 2025 (LCR MSCP 2025) are included as **Table TA 10-1**.

The habitat creation goals are based on the amount of predicted impacts from 2004-present. Approximate acres of habitat present in each reach is summarized in **Table TA 10-1**.

Table TA 10-1
Summary of Habitat Creation Goals and Habitat Acres Created from Lake Mead to the SIB

Habitat Type	Habitat Creation Goal[1]	Acres Created through 2025[2]
Marsh	568	362
Woody Riparian (Cottonwood-willow and honey mesquite)	7,260	7,000

Source: [1]Reclamation 2004; FWS 2005, 2022, 2024 [2]LCR MSCP 2020, 2025

Table TA 10-2 and **Table TA 10-3** demonstrate the amounts of acres affected, habitat created, and habitat creation commitments. Although it is unknown exactly how many acres of habitat will be affected over the next 30 years, referencing the amounts of acres affected over the last 20 years, the amount of habitat present in the reaches (**Table TA 9-1**), and how those acres were mitigated, allows for a greater understanding of future implications. Future impacts and habitat creation commitments will be included in future ESA Section 7 Biological Opinions and Section 10 Habitat Conservation Plans.

As described for Lake Powell and Lake Mead, the first decade (2027–2039) exhibits high levels of variability compared to historical conditions for all alternatives, which would result in changes in habitat availability on a larger scale compared to existing conditions, especially for woody riparian habitat (**TA 9**, Vegetation Including Special Status Species, **Figures TA 9-12** and **TA 9-13**). Marsh and woody riparian habitat are modeled to decrease in the first decade in response to increased variability. Similar to Lake Mead, wildlife species could experience decreased population levels or localized extirpations if the increased variability results in increased energy expenditure to find suitable habitat or impacts foraging, breeding, and sheltering behaviors.

For the Hoover Dam to SIB reach, the Basic Coordination and No Action Alternatives would result in variability most similar to historical conditions in the second (2040–2049) and third (2050–2060) decades for both marsh and woody riparian habitats (**TA 9**, Vegetation Including Special Status Species, **Figures TA 9-12** and **TA 9-13**). The impacts on wildlife would be the same as described for Lake Powell and Lake Mead; wildlife would need to adapt to changing habitat conditions at a rate more similar to historical conditions under the Basic Coordination and No Action Alternatives and would need to adapt to changing habitat conditions on a larger scale for the remaining alternatives. This could impact wildlife through changes in foraging, breeding, or sheltering behaviors, which can impact survival and reproductive rates of individuals. Decreased survival and reproduction on a large-scale can have population-level impacts.

Table TA 10-2
Summary of Federal and Non-Federal Flow Related Affected Acres Included in 2004, 2018, 2022, and 2024 HCPs and BOs

Species	Federal and Non-Federal Flow Related Impacts (acres) 2004				
Section 7 consultation	2004 BO and HCP[1]	Additional Impacts 2018 BA, BO and HCP[2]	Additional Impacts 2022 BA and BO[3]	Additional Impacts 2024[4] BA and BO	Total
Yuma Ridgway's Rail	133	N/A	7	84[5]	224
SW Willow Flycatcher	1,784	N/A	0[6]	0[7]	1,784
Yellow-billed Cuckoo	1,425	N/A	0[8]	0[9]	1,420
Mojave Desert Tortoise	0	N/A	0[10]	0	0
Northern Mexican Gartersnake	N/A	1081	7	84	1,172

[1] 2004 BO Table 2-56
[2] 2018 BO Tables 4-5 and 5-5 (same acres shared by Federal and Non-Federal assessments.
[3] 2022 BA
[4] 2025 BA
[5] The proposed action may have additional, temporary impacts on 16 acres of potential marsh habitat at Topock Marsh due to delayed completion of projects related to full implementation of AMM2, which was designed to avoid impacts of flow-related covered activities on covered species habitats at Topock Marsh (see Section 5.5.1.1 of LCR MSCP 2004b). Implementation of conservation measures, including creation of 41 acres of new marsh habitat and additional avoidance and minimization measures, will offset the effects of reduction in flow.
[6] Almost all existing and potential habitat for the southwestern willow flycatcher that will be affected was previously analyzed, incidental take was issued, and mitigation was established under the LCR MSCP (LCR MSCP 2004a, FWS 2005); therefore, no additional impacts are anticipated beyond those already assessed.
[7] Almost all existing and potential habitat for the southwestern willow flycatcher that will be affected was previously analyzed (see Section 4), incidental take was issued, and mitigation was established under the LCR MSCP (LCR MSCP 2004a, FWS 2005). An exception to this includes Topock Marsh, which was excluded from impacted habitat based on the implementation of AMM2. Increased reduction in flow may temporarily affect 10.9 acres of southwestern willow flycatcher breeding sites15 at Topock Marsh due to delayed completion of projects related to full implementation of AMM2, which was designed to avoid impacts of flow-related covered activities on covered species habitats at Topock Marsh (see Section 5.5.2.1 of LCR MSCP 2004b). Implementation of avoidance and minimization conservation measures and continued implementation of the LCR MSCP will offset the effects of reduction in flow.
[8] The original LCR MSCP analysis assumed the loss of almost all cottonwood-willow existing and potential habitat for the western yellow-billed cuckoo that will be affected was previously analyzed (see Section 4), incidental take was issued, and mitigation was established under the LCR MSCP (2005); therefore, no additional impacts are anticipated beyond those already assessed.
[9] Almost all cottonwood-willow existing and potential habitat for the western yellow-billed cuckoo that will be affected was previously analyzed (see Section 4), incidental take was issued, and mitigation was established under the LCR MSCP (2005). An exception to this includes Topock Marsh which was excluded from impacted habitat based on the implementation of AMM2. Increased reduction in flow may temporarily affect 133 acres of potential cottonwood-willow habitat at Topock Marsh due to delayed completion of projects related to full implementation of AMM2, which was designed to avoid impacts of flow-related covered activities on covered species habitats at Topock Marsh (see Section 5.5.14.1 of LCR MSCP 2004b). Implementation of avoidance and minimization conservation measures and continued implementation of the LCR MSCP will offset the effects of reduction in flow
[10] Is not affected by flow related covered activities.

Table TA 10-3
ESA Section 7 Habitat Creation Commitments and Habitat Created 2005-Present

Section 7 Habitat Creation Commitments (acres) - Conservation/Mitigation Commitments					LCR MSCP Land Cover Created for the Species (between 2005-2025) (acres)
2004 BO	2018 BO	2022 BO	2024 BO	Total	All[11] (created/creditable)
512	N/A	15	41	568	362
4050	N/A	0	0	4050	945
4050	N/A	0	0	4050	2553
230 acres of existing habitat protection[12]	N/A	0	0	230	230 acres purchased

Under all alternatives, flows from Hoover Dam to SIB are modeled to decrease under average and dry hydrologic conditions (**Table TA 3-21** and **Figure TA 3-27**, **TA 3.2** in **TA 3**, Hydrologic Resources). As described in **TA 9.2** in **TA** 9, Vegetation Including Special Status Species, a recent change analysis found that marsh vegetation decreased from 2000 to 2024 (RiverRestoration.org 2025). With a higher level of variability and decreased releases, marsh vegetation is modeled to continue to decrease over time and be replaced by either upland habitat or woody riparian habitat. Wildlife species that use marsh habitat in the Hoover Dam to SIB reach are modeled to experience greater levels of habitat loss than under historical conditions if future conditions are dry or average. This habitat loss could impact wildlife's ability to forage, breed, nest, and shelter in the area, causing them to relocate or possibly impact survival rates. The potential for decreased water levels in Lake Mead could also result in increased temperatures released from Hoover Dam. This could increase the potential for harmful algal blooms, which impact marsh and woody riparian vegetation, and could impact wildlife directly through increased toxicity exposure or indirectly through reductions in habitat quality and quantity.

Federal, state, and tribal managed habitat areas, such as Cibola National Wildlife Refuge, depend on water from the Colorado River to ensure functional habitat for wildlife. If water in the river drops below the level at which water is able to properly flow through diversion structures or pumps are able to function, there may be impacts on habitat unless another method is used to transport water to the managed habitat areas. If a prolonged period of dryness occurs, woody riparian and marsh vegetation may begin to desiccate; however, the extent to which this will occur is unknown. Listed threatened and endangered wildlife species that have the potential to occur in the Hoover Dam to SIB analysis area are southwestern willow flycatcher, yellow-billed cuckoo, Yuma Ridgway's rail, northern Mexican gartersnake, and Mojave desert tortoise. Impacts have been previously assessed in the LCR MSCP HCP, 2007 FEIS, and 2004 SEIS and associated BOs. Additional Section 7 and Section 10 ESA processes are ongoing and additional impacts will be disclosed in future BOs and HCPs. Migrant and transient southwestern willow flycatchers and yellow-billed cuckoos could be

[11] Lower Colorado River Multi-Species Conservation Program. 2025. Final Implementation Report, Fiscal Year 2026 Work Plan and Budget, Fiscal Year 2024 Accomplishment Report. Bureau of Reclamation, Boulder City, Nevada. Table 1-8

[12] Net loss in habitat is fully mitigated by protecting 230 acres of desert tortoise habitat in accordance with mitigation requirements in the document entitle "Compensation for Desert Tortoise" (Desert Tortoise Compensation Team 1991).

affected by the general availability of woody riparian vegetation in which they forage and shelter, which is modeled to decrease in the first decade (2027–2039) under all alternatives (**TA 9**, Vegetation Including Special Status Species, **Figures TA 9-12** and **TA 9-13**). In the second (2040–2049) and third (2050–2060) decades, decreased cover of woody riparian vegetation is modeled under all alternatives, but to a lesser extent under the Basic Coordination and No Action Alternatives (**TA 9**, Vegetation Including Special Status Species, **Figures TA 9-12** and **TA 9-13**). Breeding southwestern willow flycatchers have been present in recent years at Topock Marsh, while breeding yellow-billed cuckoos are found in LCR MSCP conservation areas and other restored habitat. Woody riparian vegetation in these areas could be affected by the alternatives if they result in shortage allocation reductions of water deliveries. Reductions in water allocations to the conservation areas could reduce the amount of woody riparian habitat available for yellow-billed cuckoo breeding.

Decreased cover of marsh vegetation may occur in the first decade (2027–2039) for all alternatives, which could affect Yuma Ridgway's rail by reducing the amount of habitat available for breeding, feeding, and sheltering. Under the Basic Coordination and No Action Alternatives, marsh vegetation may re-establish in the later decades (2040–2049 and 2050–2059) to an extent similar to recent conditions. However, under dry to average future conditions, marsh vegetation is modeled to decrease over time under all alternatives, which could reduce the amount of habitat available for Yuma Ridgway's rails for breeding, feeding, and sheltering.

The most recent confirmed Northern Mexican gartersnake sightings have been in Topock Marsh on the Havasu National Wildlife Refuge. Marsh vegetation at Topock Marsh could be affected by the alternatives if they result in shortage allocation reductions of water deliveries. Northern Mexican gartersnakes are less capable of moving long distances. Should a Northern Mexican gartersnake be present in marsh habitat that experiences higher levels of variability that results in the loss of that marsh habitat, as is possible in the first decade (2027–2039) under all alternatives, Northern Mexican gartersnakes may not be able to find suitable replacement habitat, which could cause local extirpations. In the second (2040–2049) and third (2040–2049) decades, the Basic Coordination and No Action Alternatives would have conditions more similar to historical conditions, which may support Northern Mexican gartersnakes in a condition more similar to existing conditions. Mojave desert tortoise are likely to be able to move to upland habitat as the habitat conditions change over time.

Water levels are modeled to decrease under all alternatives under dry and average conditions. This may result in additional upland habitat for Mojave desert tortoise. Similar to Lake Powell and Lake Mead, monarch butterfly is likely to find suitable habitat under each alternative and are unlikely to be affected.

TA 10.2.3 Summary Comparison of Alternatives

Marsh vegetation requires consistent inundation, so when variability increases from historical conditions on an annual scale, marsh vegetation is expected to decrease in extent. Woody riparian vegetation is more resilient to water fluctuations, but when variability increases from historical conditions on a 5-year scale, woody riparian vegetation is expected to decrease in extent. Similarly, if

variability decreases on an annual or 5-year scale, marsh, woody riparian vegetation, or upland may increase in extent.

For Lake Powell, the Enhanced Coordination and Maximum Operational Flexibility Alternatives would result in wildlife habitat availability most similar to historical conditions (**TA 9**, Vegetation Including Special Status Species, **Table TA 9-4**). The Maximum Operational Flexibility Alternative would also result in wildlife habitat availability most similar to historical conditions for Lake Mead. However, for Hoover Dam to the SIB, the Maximum Operational Flexibility and Enhanced Coordination Alternatives would result in wildlife habitat availability least similar to historical conditions with subsequent impacts on wildlife foraging, breeding, or sheltering behaviors, which can reduce reproduction and survival of individuals. Similarly, the Basic Coordination Alternative would result in wildlife habitat least similar to historical conditions for Lake Powell, but would be closest to historical conditions for Lake Mead and Hoover Dam to the SIB. Therefore, no single alternative would result in wildlife habitat availability similar to historical conditions across all reaches. For all reaches, multiple alternatives provide variability more similar to historical conditions than Continued Current Strategies Comparative Baseline except for the Hoover Dam to SIB reach, where only the Basic Coordination Alternative would result in variability more similar to historical conditions. This suggests that a change in management from current strategies would benefit a large portion of the analysis area, but would not benefit the Hoover Dam to SIB reach unless the Basic Coordination Alternative was selected.

Under all alternatives, the first decade (2027–2039) would experience more variability, which would likely result in a reduction of marsh and woody riparian habitat and therefore impacts on wildlife compared to historical conditions. All alternatives see conditions return to closer to historical conditions in the second (2040–2049) and third (2050–2060) decades, which would likely result in wildlife habitat reestablishing to a similar extent. Where variability eliminates or prevents establishment of marsh, woody riparian, or upland habitat, there may be a shift to one of the other habitat types.

For the Glen Canyon Dam to Lake Mead reach, the alternative that would result in wildlife habitat availability most similar to historic conditions depends strongly on initial modeled antecedent conditions. Under the Dry Flow Category (10–12 million-acre-feet [maf]) and Critically Dry Flow Category (4.46–10 maf), some differences among the alternatives emerge, presumably because there are greater differences in the lowest flows, the median flows, and peak flows under those conditions. However, across all alternatives, all sub-reaches, and all evaluated criteria (suitable habitat area, native species richness, proportion native species cover, and annual total vegetation cover), the interquartile ranges of the alternatives often overlap. When the interquartile ranges overlap, it is difficult to say whether one alternative is truly different from another. Therefore, no single alternative emerged as the best or worst for retaining wildlife habitat similar to historic conditions.

For all reaches, a decrease in water elevation or flow could increase water temperatures, which would increase the potential for harmful algal blooms. Harmful algal blooms can cause direct impacts on wildlife through increased toxicity or indirect impacts through decreases in habitat quality and quantity. The Enhanced Coordination and Maximum Operational Flexibility Alternatives would have increased water levels in Powell in all but the critically dry modeled conditions, which

would result in the lowest potential for a harmful algal bloom. For Lake Mead, all alternatives may result in a lowered elevation, which could increase the potential for a harmful algal bloom in Lake Mead and in the Hoover Dam to SIB reach.

TA 10.3 Glossary

All terms are captured and defined in the Vegetation and Special Status Species section.

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TA 10 Attachment 1

Special Status Wildlife Species List

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TA 10 Attachment 1. Special Status Wildlife Species

Common Name (*Scientific Name*)	Listing Status	Habitat	Lake Powell	Glen Canyon Dam to Lake Mead	Lake Mead	Hoover Dam to SIB	Potential Impact
Birds							
American peregrine falcon *(Falco peregrinus)*	Bureau of Land Management (BLM) Arizona (AZ), BLM Nevada (NV)	Woody Riparian	X	X	X	X	Yes, this species forages along the Colorado River corridor and could be affected by reductions in bat and bird populations associated with loss of riparian and marsh habitat (NDOW 2025a).
American white pelican *(Pelicanus erythrorhynchos)*	BLM Utah (UT)	Marsh	X	X	X	X	No, this species is migratory and does not breed in the analysis area (Van Tatenhove et al. 2025).
Arizona Bell's vireo *(Vireo bellii arizonae)*	BLM California (CA), BLM NV, LCR MSCP	Woody Riparian	X	X	X	X	Yes, the analysis area is within the spring and summer range of this species (LCR MSCP 2016).
Arizona grasshopper sparrow *(Ammodramus savannarum ammolegus)*	BLM AZ	Upland	—	X	X	X	No, this species is a migrant and does not breed within the analysis area. It would not be affected by any alternative (NatureServe 2025a).

Common Name (*Scientific Name*)	Listing Status	Habitat	Lake Powell	Glen Canyon Dam to Lake Mead	Lake Mead	Hoover Dam to SIB	Potential Impact
Bald eagle *(Haliaeetus leucocephalus)*	BLM AZ, BLM NV, BLM UT	Woody Riparian	X	X	X	X	Yes, this species is present during winter months (November-February) in the Grand Canyon. They are present in winter and spring at Lake Mead, Lake Mohave and Lake Havasu (Buehler 2022).
Bank swallow *(Riparia riparia)*	BLM CA, BLM NV	Marsh	—	X	—	X	No, this species is a migrant that does not breed in the analysis area (Garrison and Turner 2020).
Bendire's thrasher *(Toxostoma bendirei)*	BLM CA, BLM NV, CA Species of Concern (CSC)	Upland	—	—	—	X	Yes, this species forages in riparian habitat (England & Laudenslayer 2020).
Black swift *(Cypseloides niger)*	BLM UT	Upland	X	—	—	—	No, this species forages over diverse habitat types. It nests behind waterfalls, which will not be affected by any alternative (Gunn et al. 2023).
Black-chinned sparrow *(Spizella atrogularis)*	BLM NV	Upland	X	X	—	—	No, this species is found in upland habitats such as desertscrub and pinyon-juniper woodlands, which will not be impacted by any alternative (Pandolfino et al 2024).
Black-throated gray warbler *(Setophaga nigrescens)*	BLM NV	Woody Riparian	X	X	X	X	Yes, this species overwinters in cottonwood-willow habitat (Guzy and Lowther 2020).
Brewer's sparrow *(Spizella breweri)*	BLM NV	Upland	X	X	X	X	No, this species is found in diverse upland habitats which will not be impacted by any alternative (Rotenberry et al. 2020).

Common Name (*Scientific Name*)	Listing Status	Habitat	Lake Powell	Glen Canyon Dam to Lake Mead	Lake Mead	Hoover Dam to SIB	Potential Impact
Broad-tailed hummingbird *(Selasphorus platycercus)*	BLM NV	Woody Riparian	—	X	—	—	Yes, this species breeds in riparian corridors in northern Arizona (Camfield et al. 2020).
Brown crested flycatcher *(Myiarchus tyrannulus)*		Woody Riparian	—	X	X	X	Yes, the analysis area is within the breeding range of this species (Cardiff and Dittmann 2020).
Burrowing owl *(Athene cunicularia)*	BLM UT, BLM NV	Upland	X	—	X	X	Yes, this species utilizes desert habitat for foraging and nesting (Poulin et al. 2020).
Cactus ferruginous pygmy owl *(Glaucidium brasilianum cactorum)*	BLM AZ, **threatened**	Upland	—	—	—	—	No, the range for this species is outside of areas affected by any alternatives (FWS 2025a).
California black rail *(Laterallus jamaicensis coturniculus)*	BLM AZ, BLM CA, LCR MSCP	Marsh	—	—	—	X	Yes, this species nests in marsh areas and the analysis area is within the species' range (Eddleman et al. 2020).
California brown pelican *(Pelecanus occidentalis californicus)*	BLM CA	Marsh	—	X	—	X	No, this species is rarely detected and does not breed in the analysis area (NPS 2022).
California condor *(Gymnogyps californianus)*	BLM AZ, endangered	Upland	X	X	—	—	Yes, this species breeds and nests within the Grand Canyon (FWS 2025b).
Cassin's finch *(Haemorhous cassinii)*	BLM NV	Upland	X	X	—	—	No, this species is found in pinyon-juniper and mixed-conifer forests which will not be affected by any alternative (Hahn 2020).

Common Name (*Scientific Name*)	Listing Status	Habitat	Lake Powell	Glen Canyon Dam to Lake Mead	Lake Mead	Hoover Dam to SIB	Potential Impact
Clark's grebe *(Aechmophorus clarkii)*	ASC	Marsh	—	—	X	X	Yes, this species breeds in open marshes and forages in open water in reservoirs (LaPorte et al. 2020).
Common nighthawk *(Chordeiles minor)*	BLM NV	Upland	X	X	—	—	No, this species breeds in uplands which will not be affected by any alternative (Cornell 2025).
Crissal thrasher *(Toxostoma crissale)*	BLM CA, BLM NV	Woody Riparian	—	X	—	X	Yes, the analysis area is within the year round range for this species (Bringham et al. 2020).
Elf owl *(Micrathene whitneyi)*	BLM CA, LCR MSCP	Woody Riparian	—	—	—	X	Yes, this species has been observed along and near Lake Havasu, Bill Williams River Delta, and near Yuma (McKernan and Braden 2002; Wise-Gervais 2005; MSCP 2010; Henry et al. 2020).
Ferruginous hawk *(Buteo regalis)*	BLM UT, BLM NV	Upland	X	X	—	—	No, this species forages over diverse habitat types. It nests on exposed cliffs or solitary trees or infrastructure, which will not be affected by any alternative (Ng et al. 2020).
Flammulated owl *(Psiloscopis flammeolus)*	BLM NV	Upland	—	X	—	—	No, this species is found in conifer forests which will not be affected by any alternative (Linkhart and McCallum 2020).
Gila woodpecker *(Melanerpes* uropygialis)	BLM CA, LCR MSCP	Woody Riparian	—	—	—	X	Yes, the analysis area is in the range of this species (Edwards and Schnell 2020).
Gilded flicker *(Colaptes chrysoides)*	BLM AZ, BLM NV, BLM CA	Woody Riparian	—	—	—	X	Yes, this species will nest in willow or cottonwood which may be affected (Moore et al. 2020).
Golden eagle *(Aquila chrysaetos)*	BLM UT, BLM NV, BLM AZ	Upland	X	X	X	X	Yes, although this species is rarely detected nesting (iNaturalist 2025a).

Common Name (*Scientific Name*)	Listing Status	Habitat	Lake Powell	Glen Canyon Dam to Lake Mead	Lake Mead	Hoover Dam to SIB	Potential Impact
Grace's warbler *(Setophaga graciae)*	BLM NV	Upland	X	X	—	—	No, this species is found in conifer forests which will not be affected by any alternative (Staicer and Guzy 2020).
Great Basin willow flycatcher *(Empidonax traillii adastus)*	BLM NV	Woody Riparian	—	—	X	X	No, this species does not nest in the analysis area (NDOW 2025b).
Least bittern *(Ixobrychus exilis)*	BLM NV, LCR MSCP	Marsh	—	X	X	X	Yes, this species utilizes marsh habitat and breeds within the analysis area (FWS 2012; Poole et al. 2024).
LeConte's thrasher *(Toxostoma lecontei)*	BLM AZ, BLM NV	Upland	—	—	X	X	No, this species utilizes dry grassland and desert habitat for foraging and nesting, which will not be affected by any alternative (Sheppard 2020)
Lewis's woodpecker *(Melanerpes lewis)*	BLM NV	Woody Riparian	X	X	X	X	Yes, this species is found in riparian areas, and its range is within the analysis area (Vierling 2020).
Loggerhead shrike *(Lanius ludovicianus)*	CSC, BLM NV	Upland	X	X	X	X	No, this species is found in uplands (shrublands, desertscrub, grasslands) which will not be affected by any alternative (Yousef 2020).
Long-billed curlew *(Numenius americanus)*	BLM NV	Marsh	—	—	—	X	Yes, this species breeds in grasslands but migrates and overwinters in riverine marshes including lower Colorado River (Dugger and Dugger 2020).
Long-eared owl *(Asio otus)*	BLM NV	Woody Riparian	X	X	X	X	Yes, this species overwinters in willow and tamarisk which may be affected (Marks et al. 2020).

Common Name (*Scientific Name*)	Listing Status	Habitat	Lake Powell	Glen Canyon Dam to Lake Mead	Lake Mead	Hoover Dam to SIB	Potential Impact
Lucy's warbler *(Vermivora luciae)*	BLM CA	Woody Riparian	X	X	—	X	Yes, although this species is rare, it has been observed in Lake Mead Recreation area and breeds in tamarisk which may be affected (Johnson et al. 2020).
Mountain plover *(Charadrius montanus)*	BLM CA	Upland	—	—	—	X	Yes, this species is present in the analysis area (FWS 2025c).
Northern goshawk *(Accipiter gentilis)*	BLM AZ	Upland	—	X	—	—	No, this species utilizes upland forested habitat with high canopy cover for foraging and nesting; this habitat will not be affected by any alternative (NDOW 2025c).
Northern Harrier *(Circus cyaneus)*	CSC	Marsh		X	X	X	Yes, this species may be found in marshes during non-breeding season (Smith et al. 2020).
Olive-sided flycatcher *(Contopus cooperi)*	BLM NV	Woody Riparian	X	X	X	X	Yes, this species uses riparian habitat during migration and its range is within the analysis area (Altman and Sallabanks 2020).
Phainopepla *(Phainopepla nitens)*	BLM NV	Woody Riparian	—	X	X	X	Yes, this species uses honey mesquite riparian habitat (Chu and Walsberg 2020).
Pinyon jay *(Gynorhinus cyanocephalus)*	BLM NV	Upland	X	X	—	—	No, this species is found in upland pinyon-juniper habitat which will not be affected by any alternative (Johnson and Sadoti 2023).
Sagebrush sparrow *(Atrtemisiospiza nevadadensis)*	BLM NV	Upland	X	X	X	X	No, this species is found in upland habitat which will not be affected by any alternative (Martin et al. 2025).
Sage thrasher *(Oreoscoptes montanus)*	BLM NV	Upland	X	X	X	X	No, this species is found in upland habitat which will not be affected by any alternative (Reynolds et al. 2020).

Common Name (*Scientific Name*)	**Listing Status**	**Habitat**	**Lake Powell**	**Glen Canyon Dam to Lake Mead**	**Lake Mead**	**Hoover Dam to SIB**	**Potential Impact**
Scott's oriole *(Icterus parisorum)*	BLM NV	Upland	X	X	—	—	No, this species is found in upland oak/scrub habitat which will not be affected by any alternative (Flood 2020).
Short-eared owl *(Asio flammeus)*	BLM NV	Marsh	—	—	X	X	Yes, this species winters in marsh habitat which may be affected (Wiggins et al. 2020).
Sonoran yellow warbler *(Dendroica petechia sonorana)*	LCR MSCP	Woody Riparian	—	—	X	X	Yes, this speices' breeding range exists in the lower Colorado River valley (Shuford and Gardali 2008).
Southwestern willow flycatcher *(Empidonax traillii extimus)*	BLM AZ, BLM CA, BLM NV, LCR MSCP, **Endangered**	**Woody Riparian**	**—**	**X**	**X**	**X**	Yes, this species is found in riparian areas across the southwest including Lake Mead and the lower Colorado River (FWS 2025d).
Summer tanager *(Piranga rubra)*	LCR MSCP	Woody Riparian	—	X	X	X	Yes, this species is found in the Colorado River area during breeding season (Audubon 2025a).
Swainson's hawk *(Buteo swainsoni)*	BLM CA, BLM NV	Upland	—	X	—	X	No, this species forages over diverse habitat types which will not be affected by any alternative (Bechard et al. 2020).
Tricolored blackbird *(Agelaius tricolor)*	BLM CA	Marsh	—	—	—	—	No, the analysis area is outside of the species' range (Audubon 2025b).
Verdin *(Auriparus flaviceps)*	BLM NV	Woody Riparian	—	—	X	X	Yes, this species nests in honey mesquite in the riparian woodland along the lower Colorado River (Webster 2020).

Common Name (*Scientific Name*)	Listing Status	Habitat	Lake Powell	Glen Canyon Dam to Lake Mead	Lake Mead	Hoover Dam to SIB	Potential Impact
Vermilion flycatcher *(Pyrocephalus rubinus)*	LCR MSCP, CSC	Woody Riparian	—	—	X	X	Yes, this species utilizes riparian habitat and has been observed in Lake Mead Recreation area (NPSpecies 2011a) and in the Lower Colorado Region, including at Cibola National Wildlife Refuge, Region 5, and Region 12 (LCR MSCP 2021).
Virginia's warbler *(Leiothlypis virginiae)*	BLM NV	Upland	—	X	X	—	No, this species is found in upland pinyon-juniper habitat which will not be affected by any alternative (Audubon 2025c).
Western snowy plover *(Charadrius nivosus nivosus)*	BLM NV	Marsh	—	—	X	—	Yes, this species nested at the Overton Arm of Lake Mead in 2007 and often nests at the Salton Sea (FWS 2025e).
Western yellow-billed cuckoo *(Coccyzus americanus)*	BLM AZ, BLM CA, BLM NV, LCR MSCP, Threatened	Woody Riparian	—	X	X	X	Yes, this species occupies dense thickets along streams and marshes and has been observed along the Little Colorado River (Tracy and Squibb 2022).
White-tailed kite *(Elanus leucurus)*	BLM CA	Marsh	—	—	—	X	Yes, this species is present in the analysis area (CDFW 2025a).
Yellow-breasted chat *(Icteria virens)*	CSC	Woody Riparian	—	X	X	X	Yes, this species is found at Lake Mead, the Salton Sea, the Little Colorado River, and throughout the lower Colorado River region (LCR MSCP 2021; Thompson and Eckerle 2022).
Yuma Ridgway's rail *(Rallus obsoletus yumaniensis)*	BLM AZ, BLM CA, BLM NV, LCR MSCP, Endangered	Marsh	—	Historic	X	X	Yes, this species is a year-round resident of the Colorado and Gila River (Audubon 2025d).

Common Name (*Scientific Name*)	Listing Status	Habitat	Lake Powell	Glen Canyon Dam to Lake Mead	Lake Mead	Hoover Dam to SIB	Potential Impact
Mammals							
Allen's big-eared bat *(Idionycteris phyllotis)*	BLM AZ, BLM NV, BLM UT	Woody Riparian	X	X	X	—	Yes, this species inhabits riparian areas above 3,000 feet (Carpenter et al. 2021; NDOW 2025d).
Arizona myotis *(Myotis occultus)*	BLM AZ, CSC	Marsh	X	X	X	X	Yes, while typically found at higher elevations (>1830 m), this species has been found in low elevation reaches of the Colorado and Verde rivers in Arizona (Carpenter et al. 2021; USFS 2014).
Big brown bat *(Eptesicus fuscus)*	BLM NV	Woody Riparian	X	X	X	X	Yes, the analysis area is within the range of this species (Carpenter et al. 2021; NPS 2017).
Big free-tailed bat *(Nyctinomops macrotis)*	BLM NV, CSC	Woody Riparian	X	X	X	X	Yes, the analysis area is within the range of this species (Carpenter et al. 2021; NatureServe 2025b).
Bighorn sheep *(Ovis spp.)*	BLM CA, BLM NV	Woody Riparian	X	X	X	X	Yes, these species utilize the Colorado River and associated reservoirs for water (NDOW 2025e).
California leaf- nosed bat *(Macrotus californicus)*	BLM AZ, BLM NV, LCR MSCP	Woody Riparian	—	X	X	X	Yes, this species can be found in the Colorado River valley (iNaturalist 2025b).
California myotis *(Myotis californicus)*	BLM NV	Woody Riparian	X	X	X	X	Yes, the analysis area is within the range of this species (iNaturalist 2025c).
Canyon bat *(Parastrellus hesperus)*	BLM NV	Woody Riparian	X	X	X	X	Yes, the analysis area is within the range of this species (Carpenter et al. 2021, NABat*).
Cave myotis *(Myotis velifer)*	BLM AZ, BLM NV, CSC	Woody Riparian	X	X	X	X	Yes, however, this species has not been confirmed between Glen Canyon dam and Lake Mead (iNaturalist 2025d).

Common Name (*Scientific Name*)	Listing Status	Habitat	Lake Powell	Glen Canyon Dam to Lake Mead	Lake Mead	Hoover Dam to SIB	Potential Impact
Colorado River cotton rat *(Sigmodon arizonae plenus)*	LCR MSCP	Marsh	—	—	X	X	Yes, this species is often found near rivers and their floodplains and lakes and ponds (NatureServe 2025c).
Dark kangaroo mouse *(Microdipodops megacephalus)*	BLM NV	Woody Riparian	—	—	—	—	No, this species' range is outside of areas affected by any alternatives (NDOW 2025f).
Desert kangaroo rat *(Dipodomys deserti)*	BLM NV	Woody Riparian	—	—	X	X	No, this species is found in upland desertscrub habitat which will not be affected by any alternative (NatureServe 2025d).
Desert pocket mouse *(Chaetodipus penicillatus sobrinus)*	MSCP, BLM NV	Upland	—	—	X	X	Yes, this species occurs most often in soft alluvian, sandy, or silty soils along stream bottoms, desert washes, and valleys (ADW 2025*).
Fringed myotis *(Myotis thysanodes)*	BLM UT, BLM NV	Woody Riparian	X	X	X	—	Yes, this species has been observed in Lake Mead Recreation area (Carpenter et al. 2021; NPSpecies 2011b).
Greater western mastiff bat *(Eumops perotis californicus)*	CSC, BLM NV	Upland	X	X	—	X	Yes, the analysis area is within the range of this species (Carpenter et al. 2021; NatureServe 2025e).
Hoary bat *(Lasiurus cinereus)*	BLM NV	Upland	X	X	X	X	Yes, the analysis area is within the range of this species (Carpenter et al. 2021; NatureServe 2025f).

Common Name (*Scientific Name*)	Listing Status	Habitat	Lake Powell	Glen Canyon Dam to Lake Mead	Lake Mead	Hoover Dam to SIB	Potential Impact
Houserock Valley chisel- toothed kangaroo rat *(Dipodomys microps leucotis)*	BLM AZ	Upland	—	—	—	—	No, this species utilizes dry and desert habitat types for foraging; these will not be affected by any alternative (NatureServe 2025g).
Inyo shrew *(Sorex tenellus)*	BLM NV	Woody Riparian	—	—	—	—	No, this species' range is outside of areas affected by any alternative (NatureServe 2025h).
Kawich pocket gopher *(Thomomys bottae brevidens)*	BLM NV	Upland	—	—	—	—	No, this species' range is outside of areas affected by any alternative (GBIF Secretariat 2024).
Kit fox *(Vulpes macrotis)*	BLM UT	Upland	X	X	X	X	Yes, this species has been observed at Lake Mead (NPSpecies 2011c).
Little brown bat *(Myotis lucifugus)*	BLM NV	Woody Riparian	X	X	X	X	Yes, this species feeds in woody riparian habitats and the analysis area is within its range (Carpenter et al. 2021; Lausen et al. 2008).
Long-eared myotis *(Myotis evotis)*	BLM CA, BLM NV	Woody Riparian	X	X	—	X	Yes, this species is primarily found at higher elevations but has been detected along the Colorado River corridor (Carpenter et al. 2021; NatureServe 2025i).
Long-legged myotis *(Myotis volans)*	BLM NV	Upland	—	—	—	—	No, this species is found in coniferous forests which will not be affected by any alternative (NatureServe 2025j).
Merriam's shrew *(Sorex merriami)*	BLM NV	Upland	—	—	—	—	No, this species inhabits upland grasslands and desertscrub which will not be affected by any alternative (NatureServe 2025k).

Common Name (*Scientific Name*)	Listing Status	Habitat	Lake Powell	Glen Canyon Dam to Lake Mead	Lake Mead	Hoover Dam to SIB	Potential Impact
Mexican free- tailed bat *(Tadarida brasiliensis)*	BLM NV, CSC	Woody Riparian	X	X	X	X	Yes, this species is present at Lake Mead Recreation Area (Carpenter et al. 2021; NatureServe 2025l).
Mexican long-tongued bat *(Choeronycteris mexicana)*	BLM AZ	Upland	—	—	—	—	No, this species' range is outside of areas affected by any alternatives (BCI 2025a).
Pallid bat *(Antrozous pallidus)*	BLM NV, CSC	Woody Riparian	X	X	X	X	Yes, the analysis area is within the range of this species (Carpenter et al. 2021; NatureServe 2025m*).
Palm Springs pocket mouse *(Perognathus longimembris bangsi)*	BLM CA	Upland	—	—	—	—	No, this species' range is outside of areas affected by any alternatives (NatureServe 2025n).
Palm Springs round-tailed ground squirrel (*Xerospermophilus tereticaudus chlorus*)	BLM CA	Upland	—	—	—	—	No, this species' range is outside of areas affected by any alternatives (NatureServe 2025o).
Panamint kangaroo rat *(Dipodomys panamintus)*	BLM NV	Upland	—	—	—	—	No, this species' range is outside of areas affected by any alternatives (NatureServe 2025p).
Pocketed freetail bat *(Nyctinomops femorosaccus)*	CSC	Woody Riparian	—	—	—	X	Yes, this species may utilize woody riparian habitats along the Little Colorado River to feed (ADW 2025*).

Common Name (*Scientific Name*)	Listing Status	Habitat	Lake Powell	Glen Canyon Dam to Lake Mead	Lake Mead	Hoover Dam to SIB	Potential Impact
Silver-haired bat *(Lasionycteris noctivagans)*	BLM NV	Woody Riparian	X	X	X	X	Yes, this species has been documented in Lake Mead and along the Colorado River (Carpenter et al. 2021; NPSpecies 2011d).
Spotted bat *(Euderma maculatum)*	BLM AZ, BLM NV, BLM UT	Woody Riparian	X	X	X	X	Yes, this species has been identified along the Little Colorado River and occurs throughout the river corridor from Glen Canyon to Lake Mead (Carpenter et al. 2021; Luce and Keinath 2007).
Townsend's big-eared bat *(Corynorhinus townsendii)*	BLM AZ, BLM CA, BLM NV, BLM UT, LCR MSCP	Woody Riparian	X	X	X	X	Yes, the analysis area is within the range of this species (Carpenter et al. 2021; NPS 2020). This species uses woody riparian habitats, desert washes, and upland habitats (LCR MSCP 2018a).
Western red bat *(Lasiurus blossevillii)*	BLM NV, BLM UT, LCR MSCP	Woody Riparian	X	X	—	—	Yes, this species has been recorded in riparian habitats dominated by cottonwoods, oaks, sycamores, and walnuts, including riparian restoration sites along the lower Colorado River (Carpenter et al. 2021; Pierson et al. 2026).
Western small- footed myotis *(Myotis ciliolabrum)*	BLM CA, BLM NV	Woody Riparian	X	X	X	X	Yes, this species is present within Grand Canyon (Carpenter et al. 2021; NatureServe 2025q).
Western yellow bat *(Lasiurus xanthinus = Dasypterus xanthinus)*	LCR MSCP	Woody Riparian	—	—	X	X	Yes, the analysis area is within the range of this species (BCI 2025b).
Yuma hispid cotton rat *(Sigmodon hispidus eremicus)*	LCR MSCP	Marsh	—	—	—	X	Yes, this species is known to inhabit areas near the Colorado River in the analysis area (NatureServe 2025r).

Common Name (*Scientific Name*)	Listing Status	Habitat	Lake Powell	Glen Canyon Dam to Lake Mead	Lake Mead	Hoover Dam to SIB	Potential Impact
Yuma puma *(Felis concolor browni)*	ASC, CSC	Woody Riparian	—	—	—	X	No, there are few to no breeding female lions, a lack of prey, and a lack of suitable habitat within the reported range of this population (Kucera 1998).
Yuma myotis *(Myotis yumanensis)*	BLM CA, BLM NV, CSC	Woody Riparian	X	X	X	X	Yes, this species is present throughout the Upper and Lower Colorado River basins (LCR MSCP 2018b; Carpenter et al. 2021; NatureServe 2025s).
Reptiles and Amphibians							
Arizona striped whiptail *(Aspidoscelis arizonae)*	BLM AZ	Upland	—	X	—	—	No, this species is isolated to a small region in southeastern Arizona and prefers upland habitats (Brennan et al. 2023a).
Arizona toad *(Anaxyrus microscaphus)*	BLM UT, BLM NV	Marsh	—	—	X	X (3)	Yes, this species may be present in the analysis area and lays eggs in calm, shallow areas along streams (NDOW 2025g).
Banded Gila monster *(Heloderma* suspectum cinctum)	BLM NV	Woody Riparian	—	—	X	X (2)	Yes, this species has been documented in the Colorado River Basin (Stebbins 2003).
Coast horned lizard *(Phrynosoma blainvillii)*	BLM CA	Upland	—	—	—	—	No, this species range is outside of areas affected by any alternatives (Stebbins 2003).
Colorado River toad *(Bufo alvarius=Incilius alvarius)*	LCR MSCP	Woody Riparian	—	—	X	X	Yes, this species is often near permanent water but is also found near temporary water laying eggs in ponds or slow-moving streams (NatureServe 2025t).
Common chuckwalla *(Sauromalus ater)*	BLM NV	Upland	X	X	X	X (2,3)	No, this species is primarily found upland desertscrub habitat which will not be affected by any alternatives (Brennan et al. 2023b).

Common Name (*Scientific Name*)	Listing Status	Habitat	Lake Powell	Glen Canyon Dam to Lake Mead	Lake Mead	Hoover Dam to SIB	Potential Impact
Coronado skink *(Plestiodon skiltonianus interparietalis)*	BLM CA	Woody Riparian	—	—	—	—	No, this species' range is outside of areas affected by any alternatives (CA Herps 2025a).
Couch's spadefoot *(Scaphiopus couchii)*	BLM CA	Marsh	—	—	X	X (3, 4)	Yes, this species has been documented in Lake Mead and along the Colorado River (iNaturalist 2025e).
Desert box turtle *(Terrapene ornata luteola)*	BLM AZ	Upland	—	—	—	—	No, this species' range is outside of areas affected by any alternatives (CA Herps 2025b).
Desert iguana *(Dipsosaurus dorsalis)*	BLM NV	Woody Riparian	—	X	X	X	Yes, this species has been observed at Lake Mead Recreation Area (NPS 2011).
Desert rosy boa *(Lichanura trivirgata gracia)*	CSC	Woody Riparian	—	—	—	X (7)	Yes, this species is attracted to intermittent and permanent water and its range overlaps with the analysis area (SWCHR 2023).
Mojave desert tortoise *(Gopherus agassizii)*	BLM NV, LCR MSCP, Threatened	Upland	—	—	X	X (2, 4)	Yes, the analysis area is within the range of this species (CA Herps 2025c).
Sonoran desert tortoise *(Gopherus morafkai)*	AZ SSS, CCA	Upland	—	—	X	X (4)	Yes, the habitat range for this species includes Lake Mead, Lake Mohave, and the eastern shore of the Colorado River (FWS 2025f).
Flat-tailed horned lizard *(Phrynosoma mcallii)*	BLM AZ, LCR MSCP	Upland	—	—	X	X (7)	Yes, the analysis area is within the range of this species (CDFW 2025b).
Foothill yellow-legged frog (south coast DPS) *(Rana boylii)*	BLM CA	Woody Riparian	—	—	—	—	No, this species range is outside of areas affected by any alternatives (FWS 2025g).

Common Name (*Scientific Name*)	Listing Status	Habitat	Lake Powell	Glen Canyon Dam to Lake Mead	Lake Mead	Hoover Dam to SIB	Potential Impact
Gilbert's skink *(Plestiodon gilberti rubricaudatus)*	BLM NV	Woody Riparian	—	—	—	X (2)	Yes, this species prefers to be near water and makes burrows which could be affected by inundation (Brennan et al. 2023c).
Goode's Horned Lizard *(Phrynosoma goodei)*	AZGFD	Upland	—	—	—	X (7)	Yes, this species is within the range of areas affected by alternatives (AZGFD 2025ra).
Greater short- horned lizard *(Phrynosoma hernandesi)*	BLM NV	Upland	X	X	—	—	No, this species utilizes upland habitat which will not be affected by any alternative (NDOW 2025h).
Great Plains toad *(Anaxyrus cognatus)*	BLM NV	Marsh	—	—	—	X(2, 4, 5)	Yes, this species is within the range of areas affected and is known to use margins of reservoirs (NDOW 2025i).
Lowland burrowing treefrog *(Smilisca fodiens)*	BLM AZ	Upland	—	—	—	—	No, this species' range is outside of areas affected by any alternatives (AZGFD 2025b).
Lowland leopard frog *(Rana yavapaiensis)*	BLM AZ, BLM CA, LCR MSCP	Marsh	—	X	X	X	Yes, this species has a highly isolated population in one side canyon in western Grand Canyon (AZGFD 2025c).
Mohave fringe- toed lizard *(Uma scoparia)*	BLM AZ, BLM NV	Upland	—	—	—	X(4)	No, this species is primarily found in sand dunes and is not known to occur in riparian habitats (NDOW 2025j).
Northern leopard frog *(Lithobates [=Rana] pipens)*	BLM AZ, BLM NV	Marsh	X	—	—	—	Yes, although functionally extirpated along the river corridor from Glen to Mead (NDOW 2025k).
Northern Mexican gartersnake *(Thamnophis eques megalops)*	LCR MSCP, Threatened	Marsh, Woody Riparian	—	—	—	X(3)	Yes, this species may occur around Havasu National Wildlife Refuge and could be affected by alternatives (FWS 2025h).

Common Name (*Scientific Name*)	Listing Status	Habitat	Lake Powell	Glen Canyon Dam to Lake Mead	Lake Mead	Hoover Dam to SIB	Potential Impact
Relict leopard frog *(Rana onca)*	BLM AZ, BLM NV, LCR MSCP	Marsh	—	—	X	X (2)	Yes, this species has been observed above and below Hoover Dam (Rorabaugh and Brennan 2023).
Resplendent Shovel-nosed Snake *(Chionactis annulata)*	AZGFD	Upland	—	—	—	X (7)	Yes, the analysis area is within this species' range (CAHerps 2025d).
Ring-necked snake *(Diadophis punctatus)*	BLM NV	Woody Riparian	—	X	—	—	Yes, this species has been observed within Grand Canyon (NDOW 2025l).
Rosy boa *(Lichanura orcuttii)*	BLM NV	Woody Riparian	—	—	—	X(7)	Yes, the analysis area is within the range of this species (AZGFD 2022; CA Herps 2025e).
Sinaloan narrow-mouthed toad (are now known as the Mazatlan Narrow-mouthed Toad) *(Gastrophryne mazatlanensis)*	BLM AZ	Marsh	—	—	—	—	No, this species' range is outside of areas affected by any alternatives (NatureServe 2025u).
Sonoran green toad *(Bufo retiformis)*	BLM AZ	Upland	—	—	—	—	No, this species' range is outside of areas affected by any alternatives (NatureServe 2025v).
Two-striped Gartersnake *(Thamnophis hammondii)*	BLM CA	Woody Riparian	—	—	—	—	No, this species range is outside of areas affected by any alternatives (CA Herps 2025f).
Western pond turtle *(Emys marmorata)*	BLM CA	Marsh	—	—	—	—	No, this species' range is outside of areas affected by any alternatives (CA Herps 2025g).

Common Name (*Scientific Name*)	Listing Status	Habitat	Lake Powell	Glen Canyon Dam to Lake Mead	Lake Mead	Hoover Dam to SIB	Potential Impact
Western spadefoot *(Spea hammondii)*	BLM CA	Upland	—	—	—	—	No, this species range is outside of areas affected by any alternatives (CA Herps 2025h).
Western toad *(Anaxyrus boreas)*	BLM NV	Marsh	—	—	—	—	No, this species' range is outside of areas affected by any alternatives (CA Herps 2025i).
Yuman desert fringe-toed lizard (*Uma rufopunctata*)	BLM AZ	Upland	—	—	—	—	No, this species' range is outside of areas affected by any alternatives (CA Herps 2025j).
Invertebrates							
Amargosa tryonia *(Tryonia variegata)*	BLM NV	Woody Riparian	—	—	—	—	No, the analysis area is outside the documented range of this species (FWS 2025i).
Amargosa miloderes weevil *(Miloderes amargosensis)*	BLM NV	Upland	—	—	—	—	No, the analysis area is outside the documented range of this species (NatureServe 2025w).
Amargosa Valley darkling beetle *(Lariversius sp.)*	BLM NV	Upland	—	—	—	—	No, the analysis area is outside the documented range of this species (NPS 2016).
Apache plume fairy bee *(Perdita fallugiae)*	BLM NV	Upland	—	—	—	—	No, this species is found throughout Clark County, NV in dry mountain washes where Apache Plume exists (Griswold et al. 2004).
Apache springsnail *(Pyrgulopsis arizonae)*	BLM AZ	Marsh	—	X	X	X	No, this species is only known from a few locations that will not be influenced by project operations (FWS 2025j).
A perdita bee *(Perdita stephanomeriae)*	BLM NV	Upland	—	X	X	—	Yes, this species has been documented near Lake Mead (NatureServe 2025x).

Common Name (*Scientific Name*)	Listing Status	Habitat	Lake Powell	Glen Canyon Dam to Lake Mead	Lake Mead	Hoover Dam to SIB	Potential Impact
Ash Meadows alkali skipper *(Pseudocopaeodes eunus alinea)*	BLM NV	Upland	—	—	—	—	No, the analysis area is outside the range of this species (FWS 2025k).
Ash Meadows dune scorpion *(Paruroctonus arenicola arenicola)*	BLM NV	Upland	—	—	—	—	No, the analysis area is outside the range of this species (NatureServe 2025y).
Ash Meadows naucorid *(Ambrysus amargosus)*	BLM NV, Threatened	Woody Riparian	—	—	—	—	No, the analysis area is outside the range of this species (FWS 2025l).
Ash Meadows pebblesnail *(Pyrgulopsis erythropoma)*	BLM NV	Woody Riparian	—	—	—	—	No, the analysis area is outside the range of this species (FWS 2025m).
Atomic tarantula *(Aphonopelma atomicum)*	BLM NV	Upland	—	—	—	—	No, this species is limited to Death Valley National Park and Amargosa Desert (NatureServe 2025z).
Big-headed perdita *(Perdita cephalotes)*	BLM NV	Upland	X	—	—	X (1)	Yes, this species specializes on *Chrysothamnus spp.* which is present in the analysis area. This species is presumed to nest in the soil and could be affected by alternatives (Griswold et al. 2004).
Carole's fritillary *(Argynnis coronis ssp. carolae)*	BLM NV	Upland	X	X	X	X	No, the analysis area is outside of the range of this species and does not contain suitable habitat (NatureServe 2025aa).
Crystal springsnail *(Pyrgulopsis crystalis)*	BLM NV	Woody Riparian	—	—	—	—	No, the analysis area is outside the range of this species (FWS 2025n).

Common Name (*Scientific Name*)	Listing Status	Habitat	Lake Powell	Glen Canyon Dam to Lake Mead	Lake Mead	Hoover Dam to SIB	Potential Impact
Death Valley june beetle *(Polyphylla erratica)*	BLM NV	Upland	—	—	—	—	No, the analysis area is outside the range of this species (FWS 2025o).
Devils Hole warm sring riffle beetle *(Stenelmis calida calida)*	BLM NV	Woody Riparian	—	—	—	—	No, the analysis area is outside the range of this species (NatureServe 2025bb).
Distal-gland springsnail *(Pyrgulopsis nanus)*	BLM NV	Woody Riparian	—	—	—	—	No, the analysis area is outside the range of this species (FWS 2025p).
Dune honey ant *(Myrmecocystus arenarius)*	BLM NV	Upland	—	X	X	X	Yes, this species is found within the Mojave and Sonoran deserts and utilizes washes (NatureServe 2025cc).
Eastern desert snail *(Eremarionata rowelli)*	BLM NV	Woody Riparian	—	—	—	—	No, this species is isolated to springs in the Amargosa River Basin (NatureServe 2025dd).
Elongate-gland springsnail *(Pyrgulopsis isolata)*	BLM NV	Woody Riparian	—	—	—	—	No, the analysis area is outside the range of this species (FWS 2025q).
Fairbanks springsnail *(Pyrgulopsis fairbanksensis)*	BLM NV	Woody Riparian	—	—	—	—	No, this species is endemic to Fairbanks Spring in Ash Meadows, located within Amargosa Valley (FWS 2025r).
Gila tyronia *(Tryonia gilae)*	BLM AZ	Marsh	—	X	X	X	No, this species is only known from a few locations that will not be influenced by project operations (FWS 2025s).
Giuliani's dune scarab *(Pseudocotalpa giulianii)*	BLM NV	Upland	—	—	—	—	No, the analysis area is outside the range of this species (NatureServe 2025ee).

Common Name (*Scientific Name*)	Listing Status	Habitat	Lake Powell	Glen Canyon Dam to Lake Mead	Lake Mead	Hoover Dam to SIB	Potential Impact
Grand wash springsnail *(Pyrgulopsis bacchus)*	BLM NV	Upland	—	X	X	X	No, this species is only found in a watershed feeding Lake Mead; this watershed will not be influenced by project operations (AZGFD 2025d).
Grated tryonia *(Tryonia clathrata)*	BLM NV	Woody Riparian	—	—	—	—	No, this species occurs in spring fed habitats and there is no observational data of this species occurring south of Moapa, NV (FWS 2025t).
Gypsum booklouse *(Speleketor flocki)*	BLM NV	Upland	—	—	—	—	No, this species is only known to occur within Ash Medows, NV, Big Gypsum Valley, CO, and the Tucson Mountains, AZ (NatureServe 2025ff).
Interior tiger beetle *(Parvindela terricola continua)*	BLM NV	Marsh	—	—	—	—	Yes, this species is known to occur within southern California along alkaline or saline soils and salt lake margins (NatureServe 2025gg).
Inyo Mountains blue *(Euphilotes bernardina inyomontana)*	BLM NV	Upland	—	—	—	—	No, this species is only known to occur within Inyo and eastern Kern Counties (Davenport 2018).
Kingman springsnail *(Pyrgulopsis conica)*	BLM AZ	Woody Riparian	—	X	X	X (2, 3, 4, 5)	Yes, this species is found in the Colorado River (AZGFD 2025e).
Knight's aegialian scarab *(Aegialia knighti)*	BLM NV	Upland	—	—	—	—	No, this species occurs in sandy substrates and records indicate presence within Moapa and north of Moapa, NV (NatureServe 2025hh).
Large aegialian scarab *(Aegialia magnifica)*	BLM NV	Upland	—	—	—	—	No, this species is only known to occur in Nye County, NV (NatureServe 2025ii).
Las Vegas fairy bee *(Perdita cracens)*	BLM NV	Upland	—	—	X	—	No, little is known about this species and its range (Griswold et al. 2004).

Common Name (*Scientific Name*)	Listing Status	Habitat	Lake Powell	Glen Canyon Dam to Lake Mead	Lake Mead	Hoover Dam to SIB	Potential Impact
Leaf beetle sp. *(Trirhabda gurneyi)*	BLM NV	Upland	—	—	—	—	No, this species inhabits upland weedy fields and brushy areas (Iowa State University 2025).
MacNeill's sooty-winged *skipper* (Hesperopsis gracielae)	BLM NV, LCR MSCP	Upland	—	—	X	X (4, 5)	Yes, this species occurs along the Colorado River from southwest Utah through southern Nevada, western Arizona, and California (LCR MSCP 2017, 2018c; NatureServe 2025).
May beetle sp. *(Phyllophaga benwaneri)*	BLM NV	Woody Riparian	—	—	—	—	No, this species is adapted to sand dune habitats (Warner 2021)
Median-gland springsnail *(Pyrgulopsis pisteri)*	BLM NV	Woody Riparian	—	—	—	—	No, this species is found within thermal systems and spring fed streams and has only been observed within Ash Meadows and Amargosa Valley (FWS 2025u).
Mercury miloderes weevil *(Miloderes mercuryensis)*	BLM NV	Upland	—	—	—	—	No, this species is limited to the Amargosa Valley, NV (NatureServe 2025jj).
Moapa fairy bee *(Perdita fulvescens)*	BLM NV	Upland	—	—	—	—	No, this species is endemic to the Moapa, NV area (Griswold et al. 2004).
Moapa mydas fly *(Rhaphiomidas moapa)*	BLM NV	Woody Riparian	—	—	—	—	No, this species has only been recorded in one wash in Clark County, NV (NatureServe 2025kk).
Moapa pebblesnail *(Pyrgulopsis avernalis)*	BLM NV	Woody Riparian	—	—	—	—	No, this species is endemic to springs in Moapa Valley (FWS 2025v).
Moapa Valley pyrg *(Pyrgulopsis carinifera)*	BLM NV	Woody Riparian	—	—	—	—	No, this species is endemic to springs in Moapa Valley (FWS 2025w).

Common Name (*Scientific Name*)	Listing Status	Habitat	Lake Powell	Glen Canyon Dam to Lake Mead	Lake Mead	Hoover Dam to SIB	Potential Impact
Moapa warm spring riffle beetle *(Stenelmis moapa)*	BLM NV	Woody Riparian	—	—	—	—	No, this species prefers habitats with warm springs (83-96 deg F) and is endemic to the Moapa Valley (FWS 2025x).
Mojave gypsum bee *(Andrena balsamorhizae)*	BLM NV	Marsh	—	—	X	—	Yes, this species is associated with rare plant species in gypsum soils around Lake Mead and could be affected by inundation to full pool if vegetation expands into the lake during lower elevation years (NatureServe 2025ll).
Mojave Mountain fairy bee *(Perdita vicina)*	BLM NV	Woody Riparian	—	—	X	—	Yes, this species is endemic to Clark County, NV and is a specialist on Apache Plume which could be affected by inundation (NatureServe 2025mm).
Mojave poppy bee *(Perdita meconis)*	BLM NV	Upland	—	—	X	—	Yes, this species is associated with rare plant species in gypsum soils around Lake Mead and could be affected by inundation to full pool if vegetation expands into the lake during lower elevation years (Griswold et al. 2004).
Mojave twilight bee *(Perdita celadona)*	BLM NV	Upland	—	—	X	—	Yes, this species makes burrows which could be affected by full inundation (NatureServe 2025nn).
Monarch butterfly *(Danaus plexippus plexippus)*	BLM NV, Proposed Threatened	All	X	X	X	X (2, 3, 4, 5, 6, 7)	Yes, this species is present during migration and over wintering along the Little Colorado River. It has been documented in cottonwood-willow, and mesquite and marsh habitats (NatureServe 2025oo).

Common Name (*Scientific Name*)	Listing Status	Habitat	Lake Powell	Glen Canyon Dam to Lake Mead	Lake Mead	Hoover Dam to SIB	Potential Impact
Neartic riffle beetle *(Stenelmis occidentalis)*	BLM NV	Woody Riparian	—	—	—	—	No, this species has not been observed near the analysis area (iNaturalist 2025f).
Nevada admiral *(Limenitis weidemeyerii nevadae)*	BLM NV	Woody Riparian	—	—	—	—	No, the only known population of this subspecies is west of Las Vegas near Charleston Peak (NatureServe 2025pp).
Northern Mojave blue *(Euphilotes mojave virginensis)*	BLM NV	Upland	—	X	X	X	Yes, this species is associated with buckwheat which is present in the analysis area (NatureServe 2025qq).
Nye County army ant *(Neivamyrmex nyensis)*	BLM NV	Upland	—	X	—	—	No, verry little is known about this species (NatureServe 2025rr).
Nye County pyrg *(Pyrgulopsis licina)*	BLM NV	Upland	—	—	—	—	No, this species is endemic to Ash Meadows (NatureServe 2025ss).
Pahranagat naucorid bug *(Pelocoris biimpressus shoshone)*	BLM NV	Woody Riparin	—	—	—	—	No, the subspecies *shoshone* has not been observed near the Colorado River (NatureServe 2025tt).
Point of Rocks tryonia *(Tryonia elata)*	BLM NV	Woody Riparian	—	—	—	—	No, the analysis area is outside the range of this species. Only known species locations are in springs near Nye and Clark County, west of Mercury, NV (FWS 2025y).
Prodigious fairy bee *(Perdita prodigiosa)*	BLM NV	Upland	—	—	—	—	No, the habitat for this species is unknown (NatureServe 2025uu).
Red-tailed blazing star bee *(Megandrena mentzeliae)*	BLM NV	Upland	—	—	X	—	Yes, this species is ground nesting and has been observed within the analysis area (iNaturalist 2025g).

Common Name (*Scientific Name*)	Listing Status	Habitat	Lake Powell	Glen Canyon Dam to Lake Mead	Lake Mead	Hoover Dam to SIB	Potential Impact
Robber fly sp. *(Stackelberginia cerberus)*	BLM NV	Upland	—	—	—	—	No, this species has only been observed in the Amargosa desert (iNaturalist 2025h)
Sanchez pyrg *(Pyrgulopsis sanchezi)*	BLM NV	Woody Riparian	—	—	—	—	No, this species is endemic to the Amargosa River basin (NatureServe 2025vv).
Sin City scorpion *(Pseudouroctonus peccatum)*	BLM NV	Upland	—	—	—	—	No, the analysis area is outside the range of this species (Tate et al. 2013).
Sonoran talussnail *(Sonorella magdalenensis)*	BLM AZ	Upland	—	X	—	—	No, this species occurs in upland habitats and will not be affected by any alternatives (NatureServe 2025ww).
Southwest Nevada pyrg *(Pyrgulopsis turbatrix)*	BLM NV	Woody Riparian	—	—	—	—	No, this species has not been observed within the analysis area (NatureServe 2025xx).
Southwest viceroy butterfly *(Limenitis archippus obsoleta)*	BLM NV	Woody Riparian	—	X	—	—	Yes, this species feeds on trees in the willow family which may be affected by alternatives (NatureServe 2025yy).
Sportinggoods tryonia *(Tryonia angulata)*	BLM NV	Woody Riparian	—	—	—	—	No, the analysis area is outside the range of this species (FWS 2025z).
Spring Mountains dark blue early form *(Euphilotes ancilla purpura)*	BLM NV	Upland	—	—	—	—	No, the analysis area is outside the range of this species (NatureServe 2025zz).
Spring Mountains dark blue late form *(Euphilotes ancilla cryptica)*	BLM NV	Upland	—	—	—	—	No, the analysis area is outside the range of this species (NatureServe 2025aaa).

Common Name (*Scientific Name*)	Listing Status	Habitat	Lake Powell	Glen Canyon Dam to Lake Mead	Lake Mead	Hoover Dam to SIB	Potential Impact
Spring Mountains forestfly *(Malenka murvoshi)*	BLM NV	Upland	—	—	—	—	No, the analysis area is outside the range of this species (NatureServe 2025bbb).
Spring Mountains sagebrush checkerspot *(Chlosyne acastus robusta)*	BLM NV	Woody Riparian	—	—	—	—	No, the analysis area is outside the range of this species (NatureServe 2025ccc).
Spring Mountains springsnail *(Pyrgulopsis deaconi)*	BLM NV	Woody Riparian	—	—	—	—	No, the analysis area is outside the range of this species (McKelvy et al. 2020).
Spring Mountains undescribed pyrg 1 *(Pyrgulopsis sp. 1)*	BLM NV	Woody Riparian	—	—	—	—	No, the analysis area is outside the range of this species (McKelvy et al. 2020).
Spurge-loving perdita *(Perdita euphorbiae)*	BLM NV	Upland	—	—	—	—	No, no known populations exist within the areas affected by any alternatives (NatureServe 2025ddd).
Thorne's hairstreak *(Callophrys thornei)*	BLM CA	Woody Riparian	—	—	—	—	No, this species relies on Tecate cypress, which will not be affected by any alternative (NatureServe 2025eee).
Tiquilia fairy bee *(Perdita exusta)*	BLM NV	Woody Riparian	—	X	X	—	Yes, this species relies on *Tiquilia hispidissima*, which has been observed along the Colorado River (Griswold et al. 2004).
Two-tone Fairy Bee *(Perdita bipicta)*	BLM NV	Unkn	—	—	—	—	No, the habitat for this species is unknown habitat (Griswold et al. 2004).
Virgin River perdita *(Perdita crotonis caerula)*	BLM NV	Unkn	—	—	—	—	No, the analysis area is outside the range of this species (Griswold et al. 2004).

Common Name (*Scientific Name*)	Listing Status	Habitat	Lake Powell	Glen Canyon Dam to Lake Mead	Lake Mead	Hoover Dam to SIB	Potential Impact
Virgin River tiger beetle *(Eunota praetextata pallidofemora)*	BLM NV	Woody Riparian	—	—	X	—	No, this species has not been observed in the analysis area (iNaturalist 2025i).
Virgin River twighlight bee *(Perdina vespertina)*	BLM NV	Upland	—	—	—	—	No, this species is found within sandy washes, dunes, and creosote dominated basins in the Mohave Desert (NatureServe 2025fff).

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