MOHAVE DESERT

The Mohave Desert Ecoregion is a transitional region situated between the higher and cooler Great Basin Desert to the north and the warmer Sonoran Desert to the south (Lowe 1985). Arizona contains only the eastern edge of the Mohave Desert Ecoregion, with the remainder in California, Nevada, and Utah. Located in the northwest corner of the State, Arizona's portion of the Mohave Desert covers 3.2 million acres and is dominated by Mohave Desertscrub. This habitat type is intermediate between the Great Basin Desertscrub and the Sonoran Desertscrub habitats. Upper and lower Sonoran habitat types are found along the southwestern border of the ecoregion. It is difficult to distinguish between the Sonoran Desertscrub and the Mohave Desertscrub, since many plant species from both habitat types are present in the southern portion of the ecoregion. Five other habitat types are found in the ecoregion, and are typically associated with mountain ranges and higher elevation basins. The primary mountain ranges of the ecoregion are the Virgin, Black, Cerbat, and Mohave.

Elevation ranges from about 450 to over 8000 feet, averaging 2770 feet. This ecoregion features Basin and Range topography, with broad valleys separated by rugged mountain ranges. Precipitation ranges from about 5 to 11 inches per year, with slightly more winter than summer precipitation.

The Colorado and Virgin rivers are the primary river systems in the ecoregion. The Colorado River has been modified over most of its length with the creation of lakes Mead, Mohave, and Havasu. Recreation activities in the form of boating, fishing, and other water-sports, is prevalent along this entire reach of the Colorado River, especially from Southern California and surrounding population centers. Recreation related impacts are increasing in these areas. Recreation sites/facilities see a tremendous amount of use by boaters and people with personal watercraft. Annual visitation to Lake Mead National Recreation Area, which includes Lake Mead and Lake Mohave, is estimated to be 9 to 10 million visitors. Recreational use is sufficiently high that recreational carrying capacities have been evaluated for these reservoirs (*Lake Mead National Recreation Area General Management Plan* (NPS 1986). Dispersed Camping is allowed along the shores of these reservoirs and provides serious threats to shoreline habitats and species thorough disturbance and destruction of vegetation. Historically, the Colorado River and its associated wetlands, flood plains, and riparian forests, provided habitat for a diverse array of wildlife species and native fish in this otherwise dry habitat. With the exception of the Havasu National Wildlife Refuge, few of these habitats still exist. The Virgin River and the surrounding riparian zone, which bisect the extreme northwest corner of the ecoregion, are also experiencing an increase in recreational pressures from the growing population centers of St. George, Utah and Mesquite, Nevada.

Land ownership is a mixture of federal, state, and private. Private land is primarily checkerboarded with BLM land, although large blocks are present in the Sacramento Valley and on the south side of the Black Mountains. The entire length of the Colorado River north of Bullhead City is contained within the Lake Mead National Recreation Area. Havasu National Wildlife Refuge, which is administered by the USFWS, has a large section of land north of Lake Havasu City along the Colorado River. Small parcels of State Trust land are scattered throughout the ecoregion.

Mining and livestock grazing were historically the primary land uses in the area. This pattern of land use has continued through today. Rich veins of gold, silver, and copper brought many settlers into the region during the latter half of the 19th century. Although there are currently not many active mines, numerous abandoned mines and mining claims are scattered throughout all of the mountain ranges. Livestock grazing is common in the higher precipitation areas, which are typically in the foothills, higher basins and the mountain ranges. Grazing is not common in the hotter low elevation desert but may occur when there is an abundance of ephemeral vegetation following good winter rains.

Over the past few decades, the impact of these historical land uses on wildlife has receded in importance as the ecoregion has experienced explosive growth of human population centers. The attraction of this area lies in its mild winter temperatures and close proximity to recreational opportunities along the Colorado River. Major communities in the ecoregion include Lake Havasu City, Bullhead City, Fort Mohave, Golden Valley, Littlefield, and Dolan Springs. This region is also expected to see increased suburban growth from Las Vegas, Nevada when the Hoover Dam bypass is completed (scheduled for 2008) making commuter traffic viable. Over the past decade, this has been the fastest growing region in Arizona, with a growth rate that is over 3 times the national average (U.S. Census Bureau 2005). Over 160,000 homes have been proposed for construction by developers in Mohave County. If this proposed growth is realized, nearly 400,000 residents would be added to the region making this the third largest urban center in Arizona. Road building and motorized recreation, both of which are associated with increasing urban and rural growth, are causing significant impacts to wildlife and habitat in the region.

Off highway vehicle use and uncontrolled recreation traffic represent some of the greatest threats to sensitive elements of the ecoregion such as the desert tortoise and other reptile, amphibian and small mammal populations. North of the Colorado River, the Mohave population of desert tortoise is protected under a recovery plan that contains Desert Wildlife Management Areas (DWMA's) administered by the BLM Arizona Strip District. Stipulations in this plan affect livestock grazing, recreation and development throughout this area. Additional protection from these impacts is provided by the designation of the Beaver Dam Mountains, Paiute and Grand Wash Cliffs as part of the National Wilderness Preservation System. The BLM administers these areas. Unauthorized roads and trails are a serious threat in the southern portion of the ecoregion. Offroad recreational use is increasing and many people travel from adjoining states to participate in these activities. Lowland bajadas near Lake Havasu City and Bullhead City are experiencing some of the most serious impacts.

For an expanded description of each habitat type and characterization of statewide threats to each, see "Statewide Condition of Arizona's Terrestrial and Riparian/Aquatic Habitat Types (Element 2)." See Appendix O for scoring of all stressors in each habitat type. The descriptions provided do not attempt to depict conditions on sovereign tribal lands. The nature of these stressors in Arizona is presented more fully under "Stressors that Impact Wildlife and Wildlife Habitats (Element 3)."

Species of Greatest Conservation Need (Element 1)

For more information on these species, see "Conservation Actions to Address Stressors to SGCN (Elements 3, 4)." A complete list of species, including those of lower conservation priority and of undetermined vulnerability status can be found in Appendix J. For some species in Table 20, this part of their distribution may not represent a key area for conservation actions.

Table 20. Tier 1a and 1b SGCN associated with each habitat type in the Mohave Desert Ecoregion.

		Desertscrub			Grass-land		Woodlands/ Forests				Aquatic & Riparian		
Scientific Name	Common Name	Lower Colorado River Sonoran Desertscrub	Upland Sonoran Desertscrub	Mohave Desertscrub	Semidesert Grassland	Plains & Great Basin Grassland	Interior Chaparral	Great Basin Conifer Woodland	Petran Montane Conifer Forest	Human-dominated Landscapes*	Streams/ Rivers	Wetlands/ Springs	Lakes/ Reservoirs
Amphibians													
Bufo microscaphus	Arizona Toad			X			X				X	X	
Rana onca	Relict Leopard Frog			X							X	X	
Rana yavapaiensis	Lowland Leopard Frog			X									
Birds													
Accipiter gentilis atricapillus	Northern Goshawk						X	X	X			X	
Aechmophorus clarkii	Clark's Grebe									X	X	X	X
Ammodramus savannarum perpallidus	Western Grasshopper Sparrow					X				X			
Ardea alba	Great Egret									X	X	X	X
Botaurus lentiginosus	American Bittern									X	X	X	X
Buteo regalis	Ferruginous Hawk				X	X				X			
Buteogallus anthracinus	Common Black-Hawk										X	X	X
Catharus ustulatus	Swainson's Thrush	X	X	X				X	X	X	X	X	
Ceryle alcyon	Belted Kingfisher									X	X	X	X
Charadrius alexandrinus nivosus	Western Snowy Plover									X	X		X
Coccyzus americanus occidentalis	Western Yellow-billed Cuckoo		X								X	X	X
Contopus cooperi	Olive-sided Flycatcher	X	X	X	X	X	X	X	X	X	X	X	X
Dumetella carolinensis	Gray Catbird										X	X	X
Egretta thula	Snowy Egret									X	X	X	X
Empidonax traillii extimus	Southwestern Willow Flycatcher		X	X						X	X	X	X
Falco peregrinus	American Peregrine	X	X	X	X	X	X	X	X	X	X	X	X

Table 20. Tier 1a and 1b SGCN associated with each habitat type in the Mohave Desert Ecoregion.

		Desertscrub			Grass-land		Woodlands/ Forests				Aquatic & Riparian		
Scientific Name	Common Name	Lower Colorado River Sonoran Desertscrub	Upland Sonoran Desertscrub	Mohave Desertscrub	Semidesert Grassland	Plains & Great Basin Grassland	Interior Chaparral	Great Basin Conifer Woodland	Petran Montane Conifer Forest	Human-dominated Landscapes*	Streams/ Rivers	Wetlands/ Springs	Lakes/ Reservoirs
anatum	Falcon												
Haliaeetus leucocephalus	Bald Eagle										X	X	X
Laterallus jamaicensis coturnic	California Black Rail										X	X	X
Oreoscoptes montanus	Sage Thrasher	X	X	X	X	X		X		X			
Pandion haliaetus	Osprey									X	X	X	X
Progne subis arboricola	Western Purple Martin										X		X
Rallus longirostris yumanensis	Yuma Clapper Rail										X	X	X
Sphyrapicus nuchalis	Red-naped Sapsucker		X	X			X	X	X	X	X	X	X
Strix occidentalis lucida	Mexican Spotted Owl							X	X				
Fishes													
Agosia chrysogaster	Longfin Dace										X		
Catostomus clarki	Desert Sucker										X		
Catostomus latipinnis	Flannelmouth Sucker										X		
Cyprinodon macularius	Desert Pupfish										X	X	
Gila cypha	Humpback Chub										X		
Gila elegans	Bonytail										X		X
Gila robusta	Roundtail Chub										X		
Gila seminuda	Virgin Chub										X		
Lepidomeda mollispinis mollispinis	Virgin Spinedace										X		
Plagopterus argentissimus	Woundfin										X		
Ptychocheilus lucius	Colorado Pikeminnow										X		
Rhinichthys osculus	Speckled Dace										X		
Xyrauchen texanus	Razorback Sucker										X		X
Crustaceans and Mollusks													
Anodonta californiensis	California Floater										X	X	X
Pyrgulopsis bacchus	Grand Wash											X	

Table 20. Tier 1a and 1b SGCN associated with each habitat type in the Mohave Desert Ecoregion.

Scientific Name	Common Name	Desertscrub			Grass-land		Woodlands/ Forests			Human-dominated Landscapes*	Aquatic & Riparian		
		Lower Colorado River Sonoran Desertscrub	Upland Sonoran Desertscrub	Mohave Desertscrub	Semidesert Grassland	Plains & Great Basin Grassland	Interior Chaparral	Great Basin Conifer Woodland	Petran Montane Conifer Forest		Streams/ Rivers	Wetlands/ Springs	Lakes/ Reservoirs
	Springsnail												
Pyrgulopsis conica	Kingman Springsnail											X	
Pyrgulopsis deserta	Desert Springsnail											X	
Euderma maculatum	Spotted Bat	X	X	X	X	X	X	X	X		X	X	X
Eumops perotis californicus	Greater Western Mastiff Bat	X	X	X		X	X	X	X				X
Lasiurus blossevillii	Western Red Bat			X							X	X	
Macrotus californicus	California Leaf-nosed Bat	X	X	X	X	X	X	X			X	X	
Nyctinomops macrotis	Big Free-tailed Bat	X	X	X	X	X	X	X			X	X	X
Reptiles													
Gopherus agassizii (Mohave Population)	Mohave Desert Tortoise			X			X	X					
Gopherus agassizii (Sonoran Population)	Sonoran Desert Tortoise	X	X	X			X	X					
Uma scoparia	Mojave Fringe-toed Lizard	X		X									

*Human-dominated landscapes here refer to agricultural areas and urban lakes. These habitat types are discussed under "Statewide Condition of Arizona's Terrestrial and Aquatic/Riparian Habitat Types," and in "Stressors to Arizona's Wildlife and Wildlife Habitat" under the stressor "Urban/rural development."

Terrestrial habitat types below are arranged in order of prevalence in this ecoregion. Where patches of uncharacteristic habitat types (not described in this section) occur in this ecoregion, conservation should reflect stressors and species identified in neighboring ecoregions.

Mohave Desertscrub
(82.2% of acreage)

Habitat Condition (Element 2)

At the southern end of the ecoregion, Mohave Desertscrub intergrades with Sonoran Desertscrub making separation of the 2 types difficult. Along the bajadas and sandy plains, creosote bush is the dominant overstory plant. Co-dominants include white bursage, paper bag bush, buckwheat, and Mohave yucca. In hills and washes, Sonoran species such as Palo Verde, catclaw acacia, smoketree, and saguaro are present. The Mohave Desertscrub is rich in ephemeral plants. Cacti are also common within this zone. Hedgehog, beavertail, buckthorn cholla, and barrel cactus are common. In the northern part of this zone, the creosote bush dominated landscapes give way to

blackbrush and Joshua tree dominance. One of the densest old growth stands of Joshua tree forest is found in the area between Dolan Springs and Meadview, Arizona. Plants associated with these areas include galleta grass, bush muhley, white burrobush, ephedra, and banana yucca.

Drought is a major stressor to wildlife and wildlife habitat in this area. Rainfall is often upredictable and some areas may go without measurable precipitation for long periods of time. Year-round grazing by livestock and feral animals (primarily burros) has altered plant composition in many areas. In particular, abundance and diversity of native grasses has been reduced with a subsequent increase in shrub density. Rural and urban development has had dramatic impacts in this region; most development in this ecoregion is occurring within the Mohave desertscrub habitat type. Purchase of land for development and speculation has increased dramatically in recent years. Developers have been buying up large tracts of land and are proposing construction of thousands of new homes within the region. The associated new road and highway construction is causing increased fragmentation of habitat. Recently, fire has caused major impacts within the region. Wildfires fueled by nonnative grasses and weeds have removed many native plant species from large areas of the Black Mountain range. Native plant communities do not appear to be recovering within these areas. The condition of this habitat type will continue to show a decreasing trend due to population growth in the region and associated human impacts.

Major Stressors Affecting Habitat (Element 3)

Stressor Category: **Abiotic resource use**
Groundwater depletion and springhead use
Mining
Stressor Category: **Changes in Ecological Processes**
Soil erosion
Unnatural fire regimes
Habitat fragmentation/barriers
Habitat degradation/shrub invasions
Insect Infestation
Stressor Category: **Climate Change**
Drought
Stressor Category: **Consumptive use of biological resources**
Grazing by ungulates
Stressor Category: **Habitat conversion**
Urban growth
Livestock management
Rural development
Stressor Category: **Invasive species**
Invasive plants
Feral animals
Stressor Category: **Non-consumptive resource use**
Motorized recreation off-trail
Stressor Category: **Transportation and infrastructure**

Telephone lines/cellphone towers
Unauthorized roads & trails
Roads for motorized vehicles
Power lines/wind-harnessing turbines

Great Basin Conifer Woodland
(5.45% of total acreage)

Habitat Condition (Element 2)
This habitat type does not comprise a significant element within the ecoregion. It occurs primarily in scattered pockets within the Black Mountains, in the Cerbat Mountains and in the Azure and Virgin mountains on the North side of the ecoregion. Grazing has changed the composition of understory vegetation in many areas primarily by reducing abundance and composition of native grasses. Drought has killed some juniper trees in fringe areas although some expansion may be occurring in wetter areas. Trends remain static for this habitat type.

Major Stressors Affecting Habitat (Element 3)

Stressor Category: **Abiotic resource use**
Mining
Groundwater depletion and springhead use
Stressor Category: **Changes in Ecological Processes**
Insect Infestation
Soil erosion
Unnatural fire regimes
Habitat degradation/shrub invasions
Stressor Category: **Climate Change**
Drought
Stressor Category: **Consumptive use of biological resources**
Grazing by ungulates
Stressor Category: **Habitat conversion**
Livestock management
Stressor Category: **Invasive species**
Nuisance plants
Stressor Category: **Transportation and infrastructure**
Telephone lines/cellphone towers
Power lines/wind-harnessing turbines

Lower Colorado River Sonoran Desertscrub
(4.8% of acreage)

Habitat Condition (Element 2)
This vegetative type reaches its most northern extent along the southwest border of the ecoregion. Vegetation is dominated by low, open stands of creosotebush and bursage. Ephemeral annuals are abundant following adequate winter rains. Other common species include desert

broom, ocotillo, palo verde, and desert willow. This habitat type falls primarily within jurisdiction of the BLM and Havasu National Wildlife Refuge. A few scattered parcels of private land do occur here which are seeing development pressures due to the close proximity of Lake Havasu City. Recreational use is a major threat in this area, with the primary threat to wildlife and wildlife habitat coming from the associated illegal motorized recreation and wildcat roads. Large numbers of recreationists and winter visitors come to this area every year. Drought and overgrazing by burros are of major concern. The condition of this habitat type is in a downward trend due to human impacts associated with population growth in the area.

Major Stressors Affecting Habitat (Element 3)

Stressor Category: **Abiotic resource use**
Groundwater depletion and springhead use
Mining
Stressor Category: **Changes in Ecological Processes**
Soil erosion
Stressor Category: **Climate Change**
Drought
Stressor Category: **Habitat conversion**
Livestock management
Urban growth
Stressor Category: **Invasive species**
Nuisance plants
Feral animals
Stressor Category: **Non-consumptive resource use**
Motorized recreation off-trail
Stressor Category: **Transportation and infrastructure**
Roads for motorized vehicles
Power lines/wind-harnessing turbines
Unauthorized roads & trails
Telephone lines/cellphone towers

Semidesert Grassland
(3.7% of acreage)

Habitat Condition (Element 2)
This habitat type primarily occurs in the Hualapai Valley. It was historically dominated by perennial bunch grasses interspersed by low shrubs and bare ground. Characterized by lower precipitation than other grasslands, it is very susceptible to changes brought on by overgrazing and fire suppression. These factors have compromised the condition of these grasslands by reducing bunch grasses across the valley and contributing to their replacement with annual grasses, forbs, scrubby trees, and shrubs. In climax communities, three-awn and tobosa together with grama species are the dominant grasses. Galleta, bush muhley, fluffgrass, vine mesquite, and hairy tridens may also be present. Other common species in this zone include acacias, prickly pear cactus, cholla, and yucca. Precipitation ranges from 10 -11 inches in this zone with

approximately equal portions falling in winter and summer. This habitat type has seen major downward trends due to drought and overgrazing. Native grass communities have been reduced or eliminated over most of the valley and nonnative grasses and weeds have become dominant. On the southern end of the valley near Kingman, much of the habitat has been lost to development. Many large developments are planned throughout the Southern Valley. Groundwater depletion is becoming a concern because of the exponential population growth and future population projections. This habitat type is showing a downward trend due to continued year-long grazing, nonnative plant encroachment, losses to urbanization and rural development, and associated human impacts.

Major Stressors Affecting Habitat (Element 3)

Stressor Category: **Abiotic resource use**
Groundwater depletion and springhead use
Stressor Category: **Changes in Ecological Processes**
Habitat fragmentation/barriers
Unnatural fire regimes
Soil erosion
Habitat degradation/shrub invasions
Stressor Category: **Climate Change**
Shift to warmer climate
Drought
Stressor Category: **Consumptive use of biological resources**
Grazing by ungulates
Stressor Category: **Habitat conversion**
Urban growth
Livestock management
Rural development
Stressor Category: **Invasive species**
Nuisance animals
Nuisance plants
Stressor Category: **Non-consumptive resource use**
Motorized recreation off-trail
Non-motorized recreation off-trail
Stressor Category: **Pollution**
Contaminants from waste water and runoff
Stressor Category: **Transportation and infrastructure**
Unauthorized roads & trails
Telephone lines/cellphone towers
Roads for motorized vehicles
Power lines/wind-harnessing turbines

Interior Chaparral
(2.4% of acreage)

Habitat Condition (Element 2)

This habitat type is present at mid to high elevations in the Hualapai, Cerbat, and Virgin mountain ranges. Shrub live oak is the dominant shrub over much of this area, but is usually in mixed stands with other shrubs such as birchleaf mountain mahogany, skunkbrush sumac, Wright's silktassel, and desert ceanothus. Historically, wildfire kept this zone in various stages of succession with variable shrub densities and abundant herbaceous vegetation in the younger stages. Fire suppression has resulted in much of this type being in older dense stands of shrubs. The condition of this habitat type is therefore considered degraded. Because of the typically rough topography and primary BLM ownership, this habitat type is not being impacted heavily by development. Grazing is common within this zone and year-long grazing is standard on many allotments. Trends within this zone are static. Fire is being utilized in adjacent areas by the BLM to improve habitat conditions for wildlife and livestock and to reduce the potential for catastrophic wildfire.

Major Stressors Affecting Habitat (Element 3)

Stressor Category: **Abiotic resource use**
Mining
Groundwater depletion and springhead use
Stressor Category: **Changes in Ecological Processes**
Soil erosion
Unnatural fire regimes
Habitat degradation/shrub invasions
Stressor Category: **Climate Change**
Drought
Stressor Category: **Consumptive use of biological resources**
Grazing by ungulates
Stressor Category: **Habitat conversion**
Livestock management
Rural development
Stressor Category: **Invasive species**
Nuisance plants
Stressor Category: **Transportation and infrastructure**
Telephone lines/cellphone towers
Power lines/wind-harnessing turbines

Upland Sonoran Desertscrub
(1.3% of acreage)

Habitat Condition (Element 2)

The Upper Sonoran desertscub is found only in a small patch at the southern end of the ecoregion. Palo Verde, mesquite, cat-claw acacia, and crucifixion thorn are the common tree species. Saguaro cactus and other succulents such as ocotillo, cholla, barrel cactus, and prickly-pear are well represented. Other common species include creosote bush, brittlebush, ratany, desert broom, and desert willow. This habitat type is in relatively intact condition. Primary

threats are from increased motorized off-road recreation in the area. Illegal roads and off-trail travel are major threats. Drought is a major stressor because range conditions and wildlife populations are directly linked to annual precipitation. Future trends are expected to show a slight decline in condition due to increased human impacts and recreational damage.

Major Stressors Affecting Habitat (Element 3)

Stressor Category: **Abiotic resource use**
Groundwater depletion and springhead use
Mining
Stressor Category: **Changes in Ecological Processes**
Soil erosion
Stressor Category: **Climate Change**
Drought
Stressor Category: **Habitat conversion**
Livestock management
Stressor Category: **Invasive species**
Nuisance plants
Stressor Category: **Non-consumptive resource use**
Motorized recreation off-trail
Stressor Category: **Transportation and infrastructure**
Telephone lines/cellphone towers
Power lines/wind-harnessing turbines
Unauthorized roads & trails

Great Basin Desertscub
(0.8% of acreage)

Habitat Condition (Element 2)
This habitat type occurs only in the northern portion of the ecoregion on the edges of the Virgin Mountains. The desert landscape consists mostly of scattered low shrubs. Sagebrush and shadscale dominate, with blackbrush, greasewood, and rabbitbrush common in some areas. This is a minor component within the ecoregion and trends are static. Patches of this habitat type occur where it borders the same habitat type in the Colorado Plateau ecoregion. The following major stressors were assessed for this habitat type in the Colorado Plateau.

Major Stressors Affecting Habitat (Element 3)

Stressor Category: **Abiotic resource use**
Groundwater depletion and springhead use
Stressor Category: **Changes in Ecological Processes**
Habitat fragmentation/barriers
Management for game animals and sport fish
Unnatural fire regimes
Soil erosion

Loss of keystone species
Habitat degradation/shrub invasions

Stressor Category: **Climate Change**
Shift to warmer climate
Drought

Stressor Category: **Consumptive use of biological resources**
Grazing by ungulates
Harvesting/collecting animals

Stressor Category: **Habitat conversion**
Livestock management
Rural development

Stressor Category: **Invasive species**
Disease/pathogens/parasites
Nuisance plants
Nuisance animals

Stressor Category: **Non-consumptive resource use**
Motorized recreation off-trail

Stressor Category: **Transportation and infrastructure**
Unauthorized roads & trails
Right-of-way fencing along roadways
Roads for motorized vehicles
Power lines/wind-harnessing turbines

Montane Conifer Forest
(0.1% of acreage)

Habitat Condition (Element 2)
This habitat type is only found in very small patches at the highest elevations of the Cerbat and Virgin mountains. Ponderosa pine is the dominant tree species, with stands that are generally open with scattered shrubs or herbaceous vegetation. These small patches are bordered by either interior chaparral or great basin conifer and share elements with each of these zones. This habitat type falls entirely on public lands and receives relatively few human impacts. Drought is a large stressor in this habitat type because in this part of their range, ponderosa pines are already on the edge of their precipitation tolerance. Lack of low intensity fires in the understory and adjacent habitats also dramatically increases the risk of loss in this habitat type from catastrophic wildfires. Patches of this habitat type are similar to that found in the Colorado Plateau ecoregion. The following major stressors were assessed for this habitat type in the Colorado Plateau.

Major Stressors Affecting Habitat (Element 3)

Stressor Category: **Abiotic resource use**
Groundwater depletion and springhead use
Mining

Stressor Category: **Changes in Ecological Processes**
Insect Infestation

Habitat degradation/shrub invasions
Unnatural fire regimes
Soil erosion

Stressor Category: **Climate Change**

Drought

Stressor Category: **Consumptive use of biological resources**

Grazing by ungulates

Stressor Category: **Habitat conversion**

Livestock management

Stressor Category: **Invasive species**

Nuisance plants

Stressor Category: **Transportation and infrastructure**

Power lines/wind-harnessing turbines
Telephone lines/cellphone towers

Riparian and aquatic systems in the Mohave Desert Ecoregion include:

Wetlands/Springs/Seeps

Habitat Condition (Element 2)

Most of the riparian habitat in this ecoregion formerly occurred along the Colorado River corridor. Large backwaters and other marshes were common along the river due to annual flooding from snowmelt in the upper drainages. Dredging and impoundment of the river destroyed nearly all of the marshes and cottonwood gallerys associated with the river. Springs and seeps are relatively common in the major mountain ranges. Many have been developed for livestock use and are currently grazed. This affects abundance and composition of native vegetation. Drought has a major effect on springs and seeps, so that many either disappear or flow duration and quantity are reduced. Groundwater depletion is also of concern due to increased demands from population growth in adjacent areas. Major efforts are underway to restore some wetland areas along the Colorado River for wildlife habitat. In general, trends are downward in this habitat type.

Major Stressors Affecting Habitat (Element 3)

Stressor Category: **Abiotic resource use**

Mining
Water diversion/water catchments
Groundwater depletion and springhead use

Stressor Category: **Changes in Ecological Processes**

Habitat fragmentation/barriers
Soil erosion
Habitat degradation/shrub invasions
Management for game animals and sport fish
Insect Infestation

Stressor Category: **Climate Change**

Drought
Stressor Category: **Consumptive use of biological resources**
Grazing by ungulates
Stressor Category: **Habitat conversion**
Rural development
Livestock management
Dams/reservoirs/impoundments
Stressor Category: **Invasive species**
Nuisance animals
Nuisance plants
Disease/pathogens/parasites
Stressor Category: **Non-consumptive resource use**
Non-motorized recreation off-trail
Stressor Category: **Pollution**
Contaminants from waste water and runoff
Lead shot/fishing line
Illegal dumping/littering
Stressor Category: **Transportation and infrastructure**
Roads for motorized vehicles
Trails for foot, bike, or equine use
Telephone lines/cellphone towers
Power lines/wind-harnessing turbines

Streams/Rivers

Habitat Condition (Element 2)
The Colorado and Virgin are the major rivers within this ecoregion. The Colorado River has been severly impacted by formation of Lake Mead, Lake Mohave, and Lake Havasu. River flows and water quality have been severely impacted. Allocation of water in the system is divided among 6 Western states. Increased demands for power generation and water use have severely impacted the ability to manage water flows. Drought is a major contributor to this problem. These reservoirs and the river itself receive extremely high recreation use, which contributes to problems from contaminants and littering. Lake Havasu City, Bullhead City, and Laughlin (Nevada) are also growing rapidly along the river. General trends are static to decreasing for this habitat element.

The Virgin River, a major tributary of the Colorado River which crosses the very northwest corner of the State, has been severely impacted in most of its course by over allocation of its waters for municipal, recreational and mining/industrial uses. The remaining flows are sporadic and seasonal flooding complicates management of water quality and in-stream flow issues. Much of the native aquatic species diversity of the watershed has been compromised by introduction of nonnative species. Most of the stream course north of the Arizona-Utah state line flows through a mixed federal-private-municipal ownership which has complicated efforts to effect recovery efforts. The outlook for improvement of condition of this stream in Arizona is improving with

major interstate and inter-agency cooperative efforts underway to ensure the needs of sensitive aquatic species are considered in the management of the area's resources.

Stressors described below reflect resulting changes in ecological process as well as impacts related to a trend to a warmer climate and an increased dependence of the human population on resources supplied by this ecoregion.

Major Stressors Affecting Habitat (Element 3)

Stressor Category: **Abiotic resource use**
- Mining
- Water diversion/water catchments
- Groundwater depletion and springhead use

Stressor Category: **Changes in Ecological Processes**
- Soil erosion
- Management for game animals and sport fish
- Insect Infestation
- Habitat degradation/shrub invasions
- Streambank alteration/channelization
- Habitat fragmentation/barriers
- Altered river flow regimes

Stressor Category: **Climate Change**
- Drought

Stressor Category: **Consumptive use of biological resources**
- Grazing by ungulates

Stressor Category: **Habitat conversion**
- Dams/reservoirs/impoundments
- Livestock management
- Rural development

Stressor Category: **Invasive species**
- Nuisance plants
- Nuisance animals
- Disease/pathogens/parasites

Stressor Category: **Non-consumptive resource use**
- Non-motorized recreation off-trail
- Watercraft operation

Stressor Category: **Pollution**
- Contaminants from waste water and runoff
- Illegal dumping/littering

Stressor Category: **Transportation and infrastructure**
- Trails for foot, bike, or equine use
- Telephone lines/cellphone towers
- Roads for motorized vehicles
- Power lines/wind-harnessing turbines

Lakes/Reservoirs

Habitat Condition (Element 2)

Lakes Havasu, Mohave, and Mead are the primary reservoirs in the ecoregion. Lake Havasu was formed with the completion of Parker Dam in 1938 and is the smallest of the three reservoirs in this ecoregion. The reservoir is about 45 miles long and can store nearly 211 billion gallons of water. This water is used for generation of hydroelectric power, but the primary purpose of Lake Havasu is to provide reservoir storage for water to be pumped into the Colorado River and Central Arizona Project Aqueducts.

Created in 1953, Lake Mohave is the second largest reservoir in Arizona and backs up 67 miles of the Colorado River above Davis Dam. This reservoir was created primarily for flood regulation and water storage. Davis Dam is also used for hydroelectric generation.

Lake Mead is the largest reservoir in the United States, backing up 110 miles of the Colorado River behind Hoover Dam. Water capacity is about 28 million acre feet which is approximately 2 years of average Colorado River flow. The reservoir was originally created to control flooding along the Colorado River, provide water storage, and for hydroelectric generation.

All of these reservoirs are man-made and have had significant impact to the natural landscapes and wildlife in the ecoregion. These flood-control impoundments significantly influence the river's dynamics, including flows, sediment transport, water quality, and wildlife habitat characteristics of the Colorado River. Complete alteration of flow, temperature and nutrient cycling regimes occurred with associated impacts to native wildlife. These altered aquatic conditions shifted the dynamics of associated riparian systems as well, so that today invasive nonnative plant species such as salt cedar predominate. The likelihood that the impacts will be mitigated in the near future is very low. Rapidly expanding urban areas guarantee that demands on water stored in these reservoirs will continue to increase, except to the extent that they are offset by retirement of agricultural lands. However, the long range outlook for mitigation of impacts is fairly optimistic due to technological advances in hydro-electric generators, water column variable intakes, tempering valves, etc.

Currently, these lakes are important for sportfishing and other water-based recreation. Millions of visitors use these reservoirs annually. Ecosystem impacts from dam construction have been compounded by recreational use of the reservoirs. The largest recreational impact has come from introduction of nonnative fish, crustaceans, and amphibians. In addition, discharge and spills from boats and personal watercraft affect water quality. As the region continues to grow, pressures from recreational use are expected to increase.

Habitat and wildlife communities were changed dramatically with creation of these reservoirs. New habitats have been created along shorelines and are now providing some habitat for wildlife. The utility of these habitats is compromised however, as water levels fluctuate with user demands and drought. Increasing human activity is also negatively affecting habitat and wildlife through disturbance, destruction of habitat, and introduction and spread of nonnative plants and animals.

Major Stressors Affecting Habitat (Element 3)

Stressor Category: **Abiotic resource use**
Water diversion/water catchments
Groundwater depletion and springhead use
Mining

Stressor Category: **Changes in Ecological Processes**
Streambank alteration/channelization
Habitat degradation/shrub invasions
Insect Infestation
Management for game animals and sport fish
Altered river flow regimes
Soil erosion

Stressor Category: **Climate Change**
Drought

Stressor Category: **Habitat conversion**
Dams/reservoirs/impoundments

Stressor Category: **Invasive species**
Nuisance plants
Nuisance animals

Stressor Category: **Non-consumptive resource use**
Watercraft operation

Stressor Category: **Pollution**
Contaminants from waste water and runoff

Stressor Category: **Transportation and infrastructure**
Telephone lines/cellphone towers
Power lines/wind-harnessing turbines

Stressors that do not have habitat-level impacts in this ecoregion but may have large species-level impacts on specific SGCN in this ecoregion (Element 3)

In some cases, a stressor may have significant impacts to individual SGCN, but impacts are not felt throughout the habitat. Regardless of the extent of ecosystem-wide impacts, in any habitat type where these stressors act on SGCN, the appropriate conservation actions apply (see "Conservation Actions to Address Stressors to SGCN (Elements 3, 4)"). The following stressors do not have significant ecosystem-level impacts any habitat type in this ecoregion, but where they act, they will negatively affect the associated SGCN in the habitat types in the Mohave Desert where these species occur. Note that for wide-ranging species, impacts from some stressors may be quite significant, but may not act on the species throughout its range.

Stressors that rated high for these SGCN, but not for any of the habitats in Mohave Desert in which these species occur.			
Stressor Category	Stressor	Scientific Name	Common Name
Habitat conversion			
	Wetland filling for mosquito control		
		Ardea alba	Great Egret
		Coccyzus americanus occidentalis	Western Yellow-billed Cuckoo
		Egretta thula	Snowy Egret
Transportation and infrastructure			
	Railroads		
		Gopherus agassizii (Mohave Population)	Mohave Desert Tortoise
		Gopherus agassizii (Sonoran Population)	Sonoran Desert Tortoise