

APPENDIX F

**FEDERALLY LISTED SPECIES WITH
DESIGNATED CRITICAL HABITAT WITHIN
THE CSBF OPERATIONS AREA**

Federally Listed Species with Designated Critical Habitat within the CSBF Operations Area					
Type	Common Name	Scientific Name	Status	States Found	Habitat
Mammal	Mount Graham Red Squirrel	<i>Tamiasciurus hudsonicus grahamensis</i>	E	AZ	Higher elevation (above 3050 m) stands of mature Englemann spruce and corkbark fir; also inhabits Douglas-fir or white fir forests at slightly lower elevations. Prefers to nest in tree cavities, but will also construct leaf nests and even use ground burrows.
	Preble's Meadow Jumping Mouse	<i>Zapus hudsonius preblei</i>	T	CO	Most specimens from Colorado appear to be from tallgrass habitats near water. The subspecies also has been reported from a variety of habitat types in Colorado including plains riparian shrubland, transition zone riparian shrubland, transition zone/plains riparian forest, wetlands surrounded by sagebrush habitat, reclaimed grassland, and dry streamside grassland at the mouth of a foothill canyon.
Bird	Piping Plover	<i>Charadrius melodis</i>	T	CO, KS, OK, TX,	Breeding birds use sandy shorelines around small alkaline lakes, large reservoir beaches, river islands and adjacent sand pits. Suitable breeding habitats are wide beaches (> 20 meters) with highly clumped vegetation, having small amount of overall vegetation cover and/or with extensive gravel. Vegetation cover on nesting islands is generally sparse. Most abundant on expansive sandflats, sandy mudflats, and sandy beach in close proximity; usually in areas with high habitat heterogeneity.
	Southwestern Willow Flycatcher	<i>Empidonax traillii extimus</i>	E	AZ, CO, NM, TX	For nesting, requires dense riparian habitats with microclimatic conditions dictated by the local surroundings. Saturated soils, standing water, or nearby streams, pools, or cienegas are a component of nesting habitat that also influences the microclimate and density of the vegetation component. Habitat not suitable for nesting may be used for migration and foraging.
	Whooping Crane	<i>Grus americana</i>	E	CO, KS, OK, TX,	Nesting occurs in dense emergent vegetation (sedge, bulrush) in shallow (often slightly alkaline) ponds, freshwater marshes, wet prairies, or along lake margins. Habitat during migration and winter includes marshes, shallow lakes, lagoons, salt flats, grain and stubble fields, and barrier islands.
	Mexican spotted Owl	<i>Strix occidentalis lucida</i>	T	AZ, CO, NM, TX	Spotted owls are residents of old-growth or mature forests that possess complex structural components (uneven aged stands, high canopy closure, multi-storied levels, high tree density). Canyons with riparian or conifer communities are also important components. In southern Arizona and New Mexico, the mixed conifer, Madrean pine-oak, Arizona cypress, encinal oak woodlands, and associate riparian forests provide habitat in the small mountain ranges (Sky Islands) distributed across the landscape.

Federally Listed Species with Designated Critical Habitat within the CSBF Operations Area (cont.)					
Type	Common Name	Scientific Name	Status	States Found	Habitat
Reptile	New Mexican Ridge Nosed Rattlesnake	<i>Crotalus willardi obscurus</i>	T	AZ, NM	This is a montane woodland species found in Madrean evergreen woodland and Petran montane conifer forests, using the bottoms of steep, rocky canyons with intermittent streams or talus slopes. Elevations range from 1,500 to 2,500 m, with lower elevation habitats being more arid and less well vegetated. Rock shelters and perennial bunch grasses are used as cover, with rocks, leaf litter, and downed logs also used for concealment. Winter dens (hibernacula) are often in talus slopes or other rocky areas with crevices and holes that protect the snakes from frost.
	Desert Tortoise	<i>Gopherus agassizii</i>	T	AZ	Almost entirely confined to warm creosote bush vegetation characteristic of the Upper Sonoran life zones of the Mojave, Colorado, and Sonoran deserts. Specific habitat associations vary geographically, as do substrate preferences.
	Concho Water Snake	<i>Nerodia paucimaculata</i>	T	TX	This snake inhabits fast-flowing rocky streams and their margins, particularly shallow riffles and where flat, unshaded and unsilted rocks are at or close to the water's edge; it also occupies the shorelines of lakes, ponds, and impoundments.
Amphibian	Houston Toad	<i>Bufo houstonensis</i>	E	TX	Restricted to areas with soft sandy soils; pine forest, mixed deciduous forest, coastal prairie. Extant populations occur in sandy forested areas with pine. When inactive, occupies burrows in soil or seeks refuge in leaf litter or under objects.
	San Marcos Salamander	<i>Eurycea nana</i>	T	TX	Shallow alkaline springs carved out of limestone, with sand and gravel substrate. Associated with water plants and algal mat covering spring pool.
Fish	Beautiful Shiner	<i>Cyprinella formosa</i>	T	AZ, NM	This is a mid-water-column species that inhabits pools or riffles of medium-sized, clear streams, creeks, spring-fed pools, and artesian-fed ditches and, exceptionally, ephemeral lakes, over sand, gravel, or boulder substrate. It remains near but rarely within beds of plants or other cover along pond margins. Streams typically are intermittent and subject to seasonal drying and sudden flooding; individuals survive dry periods in permanent pools.
	Leon Springs Pupfish	<i>Cyprinodon bovinus</i>	E	TX	Shallow saline springs, pools, and outflow streams. Most abundant in quiet water near edges of pools, particularly those with minimal growths of algae.
	Desert Pupfish	<i>Cyprinodon macularius</i>	E	AZ	Adaptable and can survive in aquatic habitats with high temperatures and salinities, although they likely prefer more amenable conditions. Given the opportunity, they will move into areas of lower salinities and temperatures. The desert pupfish was extirpated from Arizona and natural populations remain at the Salton Sea in California, and in Mexico. Reintroductions of desert pupfish have occurred across southern Arizona in small streams, pools, ponds, tanks, and other small aquatic habitats

Federally Listed Species with Designated Critical Habitat within the CSBF Operations Area (cont.)					
Type	Common Name	Scientific Name	Status	States Found	Habitat
Fish	Devils River Minnow	<i>Dionda diaboli</i>	T	TX	This species is most abundant in fast-flowing, clear, spring-fed water over gravel. It is a channel inhabitant under normal flow regimes, but may occur in shallow riffles after flooding.
	Fountain Darter	<i>Etheostoma fonticola</i>	E	TX	This fish inhabits springs and spring-fed streams in dense beds of aquatic plants (particularly filamentous algae) growing close to bottom, which is normally mucky. It prefers clear, quiet, warm backwaters.
	San Marco Gambusias	<i>Gambusia georgei</i>	E	TX	Shallow, quiet, mud-bottomed, shoreline areas without dense vegetation in the thermally constant main channel. Formerly common under shade of bridges. Primary habitat requirements appear to be clean, clear water of a relatively stable temperature.
	Humpback Chub	<i>Gila cypha</i>	E	AZ, CO	Humpback chubs inhabit large rivers. Adults use various habitats, including deep turbulent currents, shaded canyon pools, areas under shaded ledges in moderate current, riffles, and eddies.
	Sonora Chub	<i>Gila ditaenia</i>	T	AZ	The chub is a stream-dwelling species that uses shallow (less than 0.5 m deep) pools adjacent to or near areas of fairly swift current over sand and gravel substrates. Although deep pools provide refuge during periods of stream intermittancy, chub do not prefer pools in slower moving water or areas of organic sediments.
	Bonytail Chub	<i>Gila elegans</i>	E	AZ, CO	Warm-water species that appears to favor main-stem rivers regardless of turbidity, usually in or near deep swift water, in flowing pools and eddies just outside the main current. It also has been found in reservoirs.
	Gila Chub	<i>Gila intermedia</i>	E	AZ, NM	Found in pools in smaller streams, cienegas, and artificial ponds ranging in elevation from 600-1,700 meters. Highly secretive, adults prefer deeper, quieter waters in pools and eddies below riffles or runs, often remaining in cover from terrestrial vegetation, boulders, and fallen logs.
	Yaqui Chub	<i>Gila purpurea</i>	E	AZ	Habitat includes deep pools in creeks, springheads, scoured areas of cienegas, and other stream-associated quiet waters ; this fish seeks shade, often near undercut banks or debris; it is often associated with higher aquatic plants.
	Virgin River Chub	<i>Gila seminuda</i>	E	AZ	Habitat of this riverine fish includes rocky runs, rapids, and pools. It is most common in deeper areas where waters are swift but not turbulent, and generally it is associated with boulders, root snags, or other cover.
	Rio Grande Silvery Minnow	<i>Hybognathus amarus</i>	E	NM	This riverine minnow occurs in waters with slow to moderate flow in perennial sections of the Rio Grande and associated irrigation canals. Most often it uses silt substrates (much less often sand) and typically occurs in pools, backwaters, or eddies formed by debris piles; larger individuals use a broad spectrum of habitats, including main and side channel runs, but this species rarely uses areas with high water velocities.

Federally Listed Species with Designated Critical Habitat within the CSBF Operations Area (cont.)					
Type	Common Name	Scientific Name	Status	States Found	Habitat
Fish	Yaqui Catfish	<i>Ictalurus pricei</i>	T	AZ	Small to medium rivers; most abundant in larger rivers in medium to slow currents over gravel/sand substrate.
	Little Colorado Spinedace	<i>Lepidomeda vittata</i>	T	AZ	Habitat includes rocky and sandy runs and pools of creeks and small rivers; water ranges from clear to turbid, often cold enough for trout; substrate often sand, gravel, and silt with rock and bedrock. This fish is most common in slow to moderate water currents, over fine gravel bottoms; it often inhabits unshaded pools with rocks or undercut banks and avoids deep, heavily shaded pools and shallow, open areas. During dry periods, these fishes retreat to springs and pools in intermittent streambeds.
	Spikedace	<i>Meda fulgida</i>	T	AZ, NM	Favors permanent, flowing, unpolluted water of low gradient streams having pool, riffle, run, and backwater areas; sand, gravel, and cobble substrates with low to moderate amounts of fine sediment and substrate embeddedness; abundant aquatic insects; natural hydrologic conditions, including recurrent flooding; few or no predatory or competitive non-native species present; a healthy riparian community; and moderate to high bank stability. In larger rivers, spikedace often are found in the vicinity of tributary mouths.
	Arkansas River Shiner	<i>Notropis girardi</i>	T	NM, KS, OK, TX	Typically in turbid waters of broad, shallow, unshaded channels of creeks and small to large rivers, over mostly silt and shifting sand bottom.
	Pecos Bluntnose Shiner	<i>Notropis simus pecosensis</i>	T	NM	Typically in main river channel, often below obstructions, over substrate of sand, gravel, and silt. Young have been found in backwaters, riffles, and pools.
	Topeka Shiner	<i>Notropis topeka</i>	E	KS	This species typically inhabits quiet, open, permanent pools of small, clear, high-quality headwaters and creeks that drain upland prairie areas, including tiny spring-fed pools in headwater streams and larger streams.
	Leopard Darter	<i>Percina pantherina</i>	T	OK	Clear, upland small to medium rivers, usually in shallow pools, 20-80 cm deep over gravel, rubble or boulders, in moderate currents.
	Woundfin	<i>Plagopterus argentissimus</i>	E	AZ, NM	The woundfin occupies seasonally swift, warm, highly turbid, small to medium rivers, with constantly shifting substrates. Adults and juveniles inhabit runs and quiet waters adjacent to riffles with sand and sand/gravel substrates.
	Pikeminnow	<i>Ptychocheilus lucius</i>	E	AZ, CO, NM	Medium to large rivers. Young prefer small, quiet backwaters. Adults use various habitats, including deep turbid strongly flowing water, eddies, runs, flooded bottoms, or backwaters (especially during high flow). Lowlands inundated during spring high flow appear to be important habitats.

Federally Listed Species with Designated Critical Habitat within the CSBF Operations Area (cont.)					
Type	Common Name	Scientific Name	Status	States Found	Habitat
Fish	Loach Minnow	<i>Tiaroga cobitis</i>	T	AZ, NM	Lives on bottom in permanent, flowing, unpolluted creeks and small to medium rivers of low to moderate gradient, low amounts of fine sediment and substrate embeddedness, abundant aquatic insects, and a healthy, intact riparian community with moderate to high bank stability; typically on turbulent riffles, sometimes in association with filamentous algae.
	Razorback Sucker	<i>Xyrauchen texanus</i>	E	AZ, CO, NM	Habitats include slow areas, backwaters, and eddies of medium to large rivers and their impoundments (3 of the 4 remaining populations of greater than 100 individuals are in reservoirs). Flooded lowlands and lower portions of tributary streams presumably served as resting-feeding areas during breeding season in the Green River basin. This fish is often associated with sand, mud, and rock substrate in areas with sparse aquatic vegetation, where temperatures are moderate to warm.
Invertebrate	Pecos Assiminea Snail	<i>Assiminea pecos</i>	E	NM, TX	Occupies springs, seeps, sinkholes and wetlands near Roswell NM, and in Reeves and Pecos Counties in TX.
	Helotes mold Beetle	<i>Batrisodes venyivi</i>	E	TX	Karstic (cave-like) formations of Bexar county, Texas.
	Robber Baron Cave Meshweaver	<i>Cicurina baronia</i>	E	TX	Karstic (cave-like) formations of Bexar county, Texas.
	Madla's Cave Meshweaver	<i>Cicurina malda</i>	E	TX	Cave dweller, found among loose rocks or mud balls. Typically spin their webs underneath rocks and in crevices.
	Braken Bat Cave Meshweaver	<i>Cicurina venii</i>	E	TX	Cave dweller, found among loose rocks or mud balls. Typically spin their webs underneath rocks and in crevices.
	Comal Springs Riffle Beetle	<i>Heterelmis comalensis</i>	E	TX	Inhabits the gravel substrates and shallow riffles in spring runs. Found in headwater springs on hard-packed gravel substrate.
	Ground beetle	<i>Rhadine exilis</i>	E	TX	Karstic (cave-like) formations of Bexar county, Texas. Seldom found near cave entrances - prefers the dark zone deeper in caves.
	Ground beetle	<i>Rhadine infernalis</i>	E	TX	Karstic (cave-like) formations of Bexar county, Texas. The species may be occasionally abundant with ten or more individuals seen in a limited area. At other times, however, it appears to be absent or is extremely rare.

Federally Listed Species with Designated Critical Habitat within the CSBF Operations Area (cont.)					
Type	Common Name	Scientific Name	Status	States Found	Habitat
Invertebrate	Peck's cave Amphipod	<i>Stygobromus pecki</i>	E	TX	Primary habitat is a zone of permanent darkness in the underground aquifer feeding the springs. Above ground, individuals are easy prey for predators, but they usually take shelter in the rock and gravel crevices and may succeed in reentering the Spring orifice.
	Comal Springs Dryopid Beetle	<i>Stygoparnus comalensis</i>	E	TX	This aquatic beetle has only been collected in several outlets of Comal Springs which forms the headwaters of the Comal River. It is unknown whether the center of the population resides further underground in the aquifer, or just below the surface. This beetle is the first member of the family Dryopidae reported from subterranean waters.
	Cokendolpher Cave Harvestman	<i>Texella cokendolpheri</i>	E	TX	Karstic (cave-like) formations of Bexar county, Texas.
Plant	Zapata Bladderpod	<i>Lesquerella thamnophila</i>	E	TX	Zapata bladderpod occurs in thorn shrublands and is often associated with blackbrush acacia, cenizo, and calderona, among other species.
	Colorado Butterfly Plant	<i>Gaura neomexicana</i> var. <i>coloradensis</i>	T	CO	Occurs on subirrigated, alluvial soils on level or slightly sloping floodplains and drainage bottoms at elevations of 5,000-6,400 feet. Colonies are often found in low depressions or along bends in wide, meandering stream channels, a short distance upslope of the actual channel. Populations are usually found in areas that are intermediate in moisture between wet, streamside communities dominated by sedges, rushes, and cattails, and adjacent dry, upland shortgrass prairie.
	San Francisco Peaks Groundsel	<i>Senecio franciscanus</i>	T	AZ	Alpine tundra areas on sparsely vegetated loose talus slopes, at ,3350-3,750 m; usually just above southwestern montane spruce-fir or bristlecone pine forests.
	Holmgren Milk-vetch	<i>Astragalus holmgreniorum</i>	E	AZ	Warm desert shrub communities on gravelly clay hills at 820-850 m elevation, at the upper elevational limit of the creosote bush zone.
	Todsen's Pennyroyal	<i>Hedeoma todsenii</i>	E	NM	Steep gravelly north- and east-facing hillsides with gypseous limestone soils at about 2,000 m elevation. The surrounding plant community is an open pinyon-juniper woodland.
	Navajo Sedge	<i>Carex specuicola</i>	T	AZ	Moist, sandy to silty soils of shady seep-spring pockets or alcoves with somewhat limited soil development. 1,740-1,830 m elevation.
	Huachuca Water-umbrel	<i>Lilaeopsis schaffneriana</i> var. <i>recurva</i>	E	AZ	Requires backwaters, cienegas, springs systems or side channels with perennial flow and gentle gradients in areas that are not subject to frequent or intense floods. Does not tolerate crowding by other plant species, so some flooding is needed to keep other vegetation levels low. Generally found along the margins of these habitats, in 5-15 cm of water and in shaded or unshaded sites. Elevation of known populations is between 1,210-1,970 meters

Federally Listed Species with Designated Critical Habitat within the CSBF Operations Area (cont.)					
Type	Common Name	Scientific Name	Status	States Found	Habitat
Plant	clay-loving Wild-buckwheat	<i>Eriogonum pelinophilum</i>	E	CO	Whitish, alkaline clay soils on Mancos shale. Vegetation is a sparse salt desert shrub community. 1,580-1,950 m elevation.
	Gypsum Wild-buckwheat	<i>Eriogonum gypsophilum</i>	T	NM	Open, gypsum in grama grassland, at about 1500 m; semi-arid.
	Texas Wild-rice	<i>Zizania texana</i>	E	TX	A clear, flowing waters of spring origin with a relatively constant year-round temperature of 21-25 degrees C. The plants grow in gravelly, sandy to silty clays in relatively shallow water (<2 m deep).

Source: USFWS 2009b; NatureServe 2009; Edwards Aquifer 2009

Notes: T=Threatened; E=Endangered