ON THE BRINK

How Federal Agency Neglect Is Killing Chiricahua Leopard Frogs

Christopher Bugbee • Center for Biological Diversity • December 2020
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Cattle have severely damaged designated critical habitat for threatened Chiricahua leopard frogs in four national forests in Arizona, trampling and defecating in ponds that the frogs depend on for their survival. This report documents recent field surveys by the Center for Biological Diversity of 20 grazing allotments, where frogs were found in less than 10% of the critical habitat ponds visited and nearly all were damaged by cows and their feces.

Many aquatic ecosystems surveyed were so badly trampled by cattle and polluted by cow manure that they cannot possibly function as breeding habitat, let alone as designated critical habitat specifically set aside to recover an imperiled frog. The few isolated exceptions show that it is possible to maintain, improve and recover wetland ecosystems that support Chiricahua leopard frogs as well as a diversity of other native wildlife, but only if cattle are kept out of these areas.

Frogs play a vital role in ecosystems and can serve as “canaries in the coal mine.” These indicator species signal when ecosystems are in trouble because of their sensitivity to changes in aquatic and terrestrial environments. Almost half of all amphibian species worldwide are declining in abundance or distribution, and a third are immediately threatened with extinction, including the Chiricahua leopard frog, which gained protection under the Endangered Species Act in 2002. Like other amphibians, this frog faces ongoing threats that include disease, predation by non-native species, habitat degradation and fragmentation, environmental contamination and climate change. Chiricahua leopard frogs have disappeared from more than 80% of their historical habitat in the United States as a result of extensive loss of wetland habitat.

In 2011 the U.S. Fish and Wildlife Service designated more than 10,000 acres in Arizona and New Mexico as critical habitat for the Chiricahua leopard frog to promote its recovery in accordance with the Endangered Species Act. These ornate southwestern amphibians require permanent or semi-permanent pools to survive and thrive. Breeding ponds must be free from pollutants, have submerged aquatic vegetation and ample shoreline vegetation and be near vegetated streams and upland habitats. These features provide for foraging, breeding and shelter and are essential for the frog’s survival and recovery. According to the Fish and Wildlife Service’s 2007 Chiricahua leopard frog recovery plan, the optimal setting includes a stream or tinaja-studded canyon near suitable breeding pond habitats.

But most remaining Chiricahua leopard frogs occupy manmade ponds, also known as stock tanks, historically built by cattle ranchers who either dammed or bulldozed pits across ephemeral washes and gulleys to catch and hold runoff water for livestock. Some of these ponds were once natural springs that were excavated and permanently altered to serve livestock. Chiricahua leopard frogs now rely on these manmade water features, which have effectively replaced natural stream systems, marshes and cienegas.

The Center’s field surveys of designated Chiricahua leopard frog critical habitat were conducted from Aug. 6 through Nov. 5, 2020. We visited 62 designated critical habitat ponds and walked dozens of miles of critical habitat streams in 20 grazing allotments across the Apache-Sitgreaves, Coconino, Coronado and Tonto national forests. We also surveyed critical habitat on adjacent state land and wilderness areas.

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Few of the streams appeared to be intact, healthy, functioning wetland ecosystems. Of the 62 critical habitat ponds surveyed only five were free of cattle, untrampled and currently supporting Chiricahua leopard frogs. One of these five ponds was a gated, flooded historic quarry with no access for cattle. There were hundreds of leopard frogs at three other sites (Mojonera Tank in the Cross S allotment, Home Ranch Tank in the Deer Creek allotment, and Trail Tank in the Red Lake allotment), but these ponds were severely damaged by cattle and contaminated by cattle feces. It’s likely the frogs were from a captive-breeding program that reintroduces them into critical habitat, but their long-term survival is in serious question given the severe damage cows have inflicted on these sites.

The Fish and Wildlife Service recovery strategy for Chiricahua leopard frogs involves “reducing threats to existing populations” and “maintaining, restoring, and creating habitat that will be managed in the long-term.”

Our field surveys show that the agency has clearly failed to create, restore or even properly maintain habitat designated as critical to keeping Chiricahua leopard frogs from moving closer to extinction, and in fact has systematically mismanaged the frogs’ recovery. As a result of this mismanagement, an iconic Southwest amphibian continues to struggle more than a decade after its recovery strategy was developed.

Under the Endangered Species Act, federal agencies must ensure that any actions they authorize, including issuing grazing permits on public lands, are not likely to jeopardize the continued existence of a listed species, or destroy or harm (“adversely modify”) its designated critical habitat. Our surveys demonstrate that cattle are continually prioritized over native species, even those, like the leopard frogs, with legal protections and designated critical habitat under the Act. As a result, the number of Chiricahua leopard frogs continues to decline as they lose more critical habitat throughout Arizona and New Mexico.

Chiricahua leopard frogs face myriad threats in Arizona, but the one that’s easiest to mitigate is the severe, widespread habitat damage from cattle grazing. Unless the Fish and Wildlife Service and U.S. Forest Service stop turning a blind eye to the rampant habitat destruction grazing is inflicting, the frogs will move closer to extinction in Arizona, and no amount of captive breeding will be able to save them.

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Cattle-free, ungrazed Chiricahua leopard frog critical habitat.
Coronado National Forest, Arizona.
Degraded Chiricahua leopard frog critical habitat.
Coronado and Apache-Sitgreaves National Forests, Arizona.
1.1 CLIFTON RANGER DISTRICT: HICKEY ALLOTMENT

Site Description
Three ponds with Chiricahua Leopard Frog critical habitat designation occur in the southeast corner of the Hickey allotment, connected via a loop of critical habitat stream. One of these ponds, Rattlesnake Gap Tank, is regularly augmented with captive-bred Chiricahua leopard frogs. The flora of the area is characterized by juniper-savanna in the uplands and interior chaparral/ponderosa pine along ephemeral waterways. This allotment was surveyed Aug. 6, 2020.

Cattle Sign and Observations
A minimum of 12 cows were also observed immediately upon arrival to the western pond. A makeshift livestock fence was installed in part of the pond, but this fence was trampled and downed. The back side of the pond was also fenced, but this fence was also down. Pond shorelines were heavily trampled and highly disturbed by cattle. Cattle feces were observed in the water. No amphibian life was observed.

Walking northeast from the first pond, the downstream drainage was largely dry and heavily browsed by cattle, resulting in large stretches of ‘mowed’ streamside vegetation. Cattle sign and feces were abundant in the streambed. A few deeper pools and undercuts remained wet, but there were signs of cattle loafing areas near remaining water. At Buckhorn Tank to the north, no fencing was observed, and cattle sign was abundant. Pond shorelines were also heavily trampled and highly disturbed by cattle, as were uplands. Cow trails and sign were abundant, indicating that these animals were stationed in the immediate area.

Chiricahua Leopard Frog Status
Direct amphibian visual and auditory encounter surveys were conducted at each site. Opportunistic species sampling was also conducted at each site and along access roads into each site. Despite being regularly augmented with captive-bred frogs, no amphibians were observed.

Figure 1.3. Chiricahua leopard frog critical habitat with downed fence on the backside Rattlesnake Gap Tank on the Hickey allotment, Apache-Sitgreaves National Forest. This pond is regularly augmented with captive-bred Chiricahua leopard frogs. Location: 33.09838, -109.16212, Elevation: 5,833’. Observed Aug. 6, 2020.
Figures 1.4- 1.7. Chiricahua leopard frog critical habitat at Rattlesnake Gap Tank on the Hickey allotment, Apache-Sitgreaves National Forest. Pond shorelines were heavily trampled and degraded by cattle, and water was contaminated with feces. This pond is regularly augmented with captive-bred Chiricahua leopard frogs. No amphibians were observed. Location: 33.09838, -109.16212, Elevation: 5,833’. Observed Aug. 6, 2020.
Figures 1.8-1.11. Chiricahua leopard frog critical habitat on southeastern Hickey allotment, Apache-Sitgreaves National Forest. Extensive patches of cattle-mowed vegetation were observed in the streambed, with loafing areas and abundant feces. Observed Aug. 6, 2020.
Figure 1.15. Chiricahua leopard frog critical habitat at Buckhorn Tank in the Hickey allotment, Apache-Sitgreaves National Forest. Pond shorelines were heavily trampled and degraded, and water was fouled with feces and odorous. No amphibians were observed. Location: 33.10586, -109.15565, Elevation: 5,767’. Observed Aug. 6, 2020.
Figures 1.16-1.19. Chiricahua leopard frog critical habitat at Buckhorn Tank in the Hickey allotment, Apache-Sitgreaves National Forest. This pond was heavily impacted by cattle trampling and defecation and was recently augmented with captive-bred Chiricahua leopard frogs. No amphibians were observed. Location: 33.10586, -109.15565, Elevation: 5,767’. Observed Aug. 6, 2020.
Figure 1.20. Uplands area within Chiricahua leopard frog critical habitat near Buckhorn Tank in the Hickey allotment, Apache-Sitgreaves National Forest. Uplands were heavily impacted by cattle through intense browsing, deeply cut trails and extensive defecation. Location: 33.10538, -109.15759, Elevation: 5,830’. Observed Aug. 6, 2020.
1.2 CLIFTON RANGER DISTRICT: BLACKJACK ALLOTMENT

**Site Description**
Coal Creek is designated Chiricahua leopard frog critical habitat in the northeastern corner of the Blackjack allotment within Apache-Sitgreaves National Forest. Vegetation community is predominately Ponderosa pine/oak woodland with interspersed open grassy areas and riparian communities. This creek was surveyed on Aug. 7, 2020.

**Cattle Sign and Observations**
Virtually the entire stretch of critical habitat at Coal Creek was completely dry and heavily impacted by cattle. Extensive cattle feces were observed in the dry streambed throughout the CH designation. Streamside benches and upland areas immediately adjacent to the creek drainage were heavily browsed, trampled, and defecated upon by cattle. The only standing water observed was a single undercut pool with no vegetation present and cattle feces in the direct vicinity. One fence was observed that bisected the Creek, but cattle disturbances were observed in excess on either side of the fence. Off-road vehicle tracks were also observed going from an adjacent road into the bed of Coal Creek.

**Chiricahua Leopard Frog Surveys**
Direct amphibian visual and auditory encounter surveys were conducted at the site. Opportunistic species sampling was also conducted at the site and along adjacent roads. No amphibians were observed.

**Figures 1.21- 1.22.** Chiricahua leopard frog critical habitat in Coal Creek, northeastern Blackjack allotment, Apache-Sitgreaves National Forest. This creek segment was completely dry. Location: 33.10417, -109.06272, Elevation: 5,644.3’. Observed Aug. 7, 2020.
Figures 1.27- 1.30. Chiricahua leopard frog critical habitat in Coal Creek, northeastern Blackjack allotment, Apache-Sitgreaves National Forest. Streamside benches and upland areas immediately adjacent to Coal Creek drainage were heavily browsed, trampled, and defecated upon by cattle. Observed Aug. 7, 2020.
Figure 1.31. Chiricahua leopard frog critical habitat in Coal Creek, northeastern Blackjack allotment, Apache-Sitgreaves National Forest. The only standing water observed was a single undercut pool with no vegetation present and cattle feces in the direct vicinity. No amphibians were observed. Location: 33.10727, -109.06607, Elevation 5,629.0'. Observed Aug. 7, 2020.

Figure 1.32. Chiricahua leopard frog critical habitat in Coal Creek, northeastern Blackjack allotment, Apache-Sitgreaves National Forest. Off-road vehicle tracks observed going from an adjacent road into the bed of Coal Creek. Location: 33.10857, -109.06597, Elevation: 5,624.9 ft. Observed Aug. 7, 2020.
Site Description
Critical habitat on the Seven Lazy T allotment is characterized by seven ponds, each connected by various predominately ephemeral waterways (i.e. Boulder Canyon), and several overland dispersal corridors. This network of critical habitat can be found on the southern end of Mud Tanks Mesa, centered on Buckskin Hills in the Fossil Creek watershed. The flora of the area is characterized by juniper-savanna in the uplands and interior chaparral/ponderosa pine along ephemeral waterways. Pockets of riparian vegetation can be found alongside infrequently occurring perennial water within Boulder Canyon. This allotment was surveyed Aug. 31, 2020.

Cattle Sign and Observations
Five of the seven ponds contain cattle exclosures, which exclude cattle from approximately 1/2 – 1/3 of the pond. These ponds include: Sycamore Basin Tank, Walts Tank, Buckskin Tank and two unnamed ponds in Boulder Canyon. Generally, exclosures are stout and effective, constructed with heavy steel cables, sturdy steel posts, and fencing extending completely across the water; however, both unnamed stock ponds along Boulder Canyon show transient evidence of cattle breaches. The exclosure fencing at an unnamed pond upstream of Boulder Canyon has two breaches large enough for cows to pass through. Numerous examples of cow feces within this exclosure are apparent and documented. The exclosure at the second, unnamed pond downstream in Boulder Canyon appears intact, however numerous cattle disturbances occur inside the fence. Relatively new hardware was observed on the fence, indicating recent maintenance.

Generally, the juxtaposition of conditions within and outside of the exclosures was stark. Where cows are permitted, ponds and their immediate surroundings show severe signs of bank degradation, ground disturbance, compaction, and grazing. Within cattle exclosures, conditions improve greatly.

Four segments of predominately ephemeral Boulder Canyon and one segment of a minor, ephemeral tributary were surveyed. Impacts within these segments were many months old and infrequent. Impact extent became increasingly infrequent as Boulder Canyon became increasingly incised moving downstream. Several large pools of water can be found along Boulder Canyon.

Chiricahua Leopard Frog Status
Direct amphibian visual and auditory encounter surveys were conducted at the site. Opportunistic species sampling was also conducted at the site and along adjacent roads. No Chiricahua leopard frogs were observed.
Figure 2.1- 2.4. Chiricahua leopard frog Critical habitat in Sycamore Basin Tank, Seven Lazy T/ Fossil Creek allotment, Coconino National Forest. Sycamore Basin Tank exhibited a solid cattle exclosure with no breaches. Older cattle impacts of moderate intensity were observed outside of exclosure. No Chiricahua leopard frogs were observed. Location: 34.49172, -111.64163, Elevation: 5,560’. Observed Aug. 31, 2020.
Figure 2.5-2.8. Chiricahua leopard frog critical habitat in an unnamed pond in the Seven Lazy T/Fossil Creek allotment, Coconino National Forest. The exclosure at this pond was mostly intact; note two photo showing potential opening. Significantly more cattle impacts were observed outside of the exclosure with a stark vegetation change between the exclosed area and the open area. Location: 34.47301, -111.62462, Elevation: 5,730’. Observed Aug. 31, 2020.
Figure 2.9- 2.12. Chiricahua leopard frog critical habitat in an unnamed pond, Seven Lazy T/ Fossil Creek allotment, Coconino National Forest. The exclosure at this pond was intact, however there were still cattle impacts inside. Outside of the exclosure is heavily trampled, degraded, browsed, and cattle feces littered the waterline. Location: 34.46299, -111.62362, Elevation: 5,595’. Observed Aug. 31, 2020.
Figure 2.13-2.15. Chiricahua leopard frog critical habitat in at Buckskin Tank, Seven Lazy T/Fossil Creek allotment, Coconino National Forest. The exclosure at this pond was intact with no breaches. Outside of the exclosure is heavily trampled, degraded, browsed, and cattle feces littered the waterline. Note the juxtaposition of wetland conditions on either side of the exclosure. Location: 34.46489, -111.64468, Elevation: 5,808’. Observed Aug. 31, 2020.
Figure 2.16-2.19. Chiricahua leopard frog critical habitat in an unnamed pond, Seven Lazy T/ Fossil Creek allotment, Coconino National Forest. Cattle exclosure at this pond were nonexistent, and a shabby fence was left open near the water source. The pond showed heavy previous cattle use and resulting degradation. Cattle feces littered the surrounding areas. Location: 34.46358, -111.63345, Elevation: 5,900’. Observed Aug. 31, 2020.
Figure 2.20-2.25. Chiricahua leopard frog critical habitat at Walt’s Tank, Seven Lazy T/ Fossil Creek allotment, Coconino National Forest. The exclosure at this pond was solid and intact with no breaches. Outside of the exclosure is heavily trampled, degraded, browsed, and compacted by cattle although no recent impacts were observed. Location: 34.45636, -111.63860, Elevation: 5,560’. Observed Aug. 31, 2020.
Site Description
Chiricahua leopard frog critical habitat on the Hackberry/Pivot Rock allotment consists of one stock pond, known at Partnership Tank. This pond can be found to the south of Mud Tanks Mesa, to the west of the Buckskin Hills in the Fossil Creek watershed. The flora of the area is characterized by juniper-savanna woodland. This allotment was surveyed Aug. 31, 2020.

Cattle Sign and Observations
No cattle exclosure fencing exists on this pond, therefore livestock have free range with no habitat protected for the Chiricahua leopard frog. The entire area shows a history of heavy cattle use in the form of grazing, bank degradation, and ground disturbance and compaction. Impacts indicate chronic cattle presence at this site. This allotment was surveyed Aug. 31, 2020.

Chiricahua Leopard Frog Status
Opportunistic amphibian visual and auditory encounter surveys were conducted at the site and along adjacent drainages. No Chiricahua leopard frogs were observed.

Figure 2.26-2.27. Chiricahua leopard frog critical habitat at Partnership Tank, Hackberry/ Pivot Rock allotment, Coconino National Forest. This wetland was heavily trampled, degraded, browsed, and compacted by cattle, with both old and recent feces at the shoreline and in the water. Location: 34.45232, -111.64619, Elevation: 5,765’. Observed Aug. 31, 2020.
3.1 NOGALES RANGER DISTRICT: OAK TREE ALLOTMENT

Site Description
The Oak Tree Allotment in Coronado National Forest contains two reaches of designated Chiricahua leopard frog critical habitat, one in Los Posos Gulch and one in Louisiana Gulch to the south. The biotic community is Madrean evergreen woodland and the landscape is a matrix of oak-pinyon-juniper forest interspersed with open grassy areas and ephemeral streams. This allotment was surveyed on Sept. 1, 2020.

Cattle Sign and Observations
Both stretches of Chiricahua leopard frog critical habitat on the Oak Tree Allotment are completely dry and alarmingly impacted by cattle. Extensive cattle feces were observed through both stream segments of critical habitat, neither of which contained any standing water. Immediate creek drainages and adjacent areas throughout the width of both gulches were heavily disturbed, trampled and defecated upon by cattle. The stream at Louisiana Gulch contained no water for miles and exhibited an incredibly high concentration of cow flops. The critical habitat “pond” in Louisiana Gulch consists of a single metal cattle trough that stands between 2 to 3 feet off the ground, situated within a fenced cattle corral. In Los Posos Gulch, both the stream and stock pond were highly contaminated with cattle excrement and ground disturbances.

Chiricahua Leopard Frog Status
Direct amphibian visual and auditory encounter surveys were conducted at the site. Opportunistic species sampling was also conducted at the site and along adjacent roads. No amphibian life was observed. The critical habitat ponds on the Oak Tree Allotment are currently not suitable to sustain amphibian populations.
Figure 3.1-3.4. Chiricahua leopard frog critical habitat at an unnamed pond at Los Posos, Oak Tree allotment, Coronado National Forest. Pond shorelines were heavily trampled and degraded. Water was eutrophic, odorous and extremely fouled with cattle feces. No aquatic life was observed. Location: 31.76846, -110.73159, Elevation: 5180 ft. Observed Sept. 1, 2020.
Figure 3.5-3.7. Chiricahua leopard frog critical habitat at an unnamed pond at Los Posos Gulch, Oak Tree allotment, Coronado National Forest. Pond shorelines and a huge swath of surrounding area was negatively impacted by cattle. Cattle feces were ubiquitous and the air across the entire area was odorous. Location: 31.76846, -110.73159, Elevation: 5180 ft. Observed Sept. 1, 2020.
Figure 3.8- 3.13. Chiricahua leopard frog critical habitat streams at Los Posos, Oak Tree allotment, Coronado National Forest. The entire area was overbrowsed and blanketed with cattle feces. The air was odorous. Observed Sept. 1, 2020.
Figure 3.14- 3.19. Chiricahua leopard frog critical habitat streams at Los Posos, Oak Tree allotment, Coronado National Forest. Ground disturbance impacts were ubiquitous across the entire area. Cattle feces were in ultra-high concentrations, consistently, for miles. Observed Sept. 1, 2020.
Figure 3.20- 3.23. Chiricahua leopard frog critical habitat “pond” at Louisiana Gulch, Oak Tree allotment, Coronado National Forest. The water source consists of two metal stock drinkers in a cattle holding pen, surrounded by an area blanketed with cattle feces. Location: 31.74862, -110.72803, Elevation: 5,055’. Observed Sept. 1, 2020.
3.2 NOGALES RANGER DISTRICT: GREATERVILLE ALLOTMENT

Site Description
The Greaterville allotment in Coronado National Forest contains two stretches of designated Chiricahua leopard frog critical habitat, one in Ophir Gulch and another less than 1 mile north in an unnamed drainage northwest or Greaterville. The biotic community is Madrean evergreen woodland and the landscape is a matrix of oak-pinyon-juniper forest interspersed with open grassy areas and ephemeral streams. This allotment was surveyed on Sept. 1, 2020.

Cattle Sign and Observations
Overall, both stretches of Chiricahua leopard frog critical habitat on the Greaterville allotment were completely dry. Disturbances from cattle were observed in both stream segments, but much more so in Ophir Gulch opposed to the stream to the north. The larger critical habitat pond northwest of Greaterville had no apparent cattle impacts and was in excellent condition. Shorelines were fully vegetated, and the wetland was occupied by dozens of leopard frogs, songbirds and volant insects. The creek downstream from the pond was dry but was unbrowsed and thickly vegetated and for about 1/3 mile with only older, transient cattle sign present. Continuing downstream towards private property, increasing cattle impacts become apparent but mostly older and transient. Both the stream and pond in Ophir Gulch were completely dry and appeared to be a popular hangout for cows (based on scat and ground disturbance) prior to the absence of standing water.

Chiricahua Leopard Frog Status
Direct amphibian visual and auditory encounter surveys were conducted at the site. One critical habitat pond on the Greaterville allotment is heavily occupied by leopard frogs and appeared a healthy, functioning wetland ecosystem. This pond is in excellent shape and should represent the standard of Chiricahua leopard frog pond habitat. The other pond is completely dry and void of amphibian life. The Chiricahua leopard frogs in the Greaterville allotment have no apparent dispersal options based on the condition of other critical habitat features in the surrounding area.
Figure 3.24-3.26. Chiricahua leopard frog critical habitat at an unnamed pond near Morningstar Mine in Ophir Gulch, Greaterville allotment, Coronado National Forest. This wetland was completely dry. Location: 31.76088, -110.76011, Elevation: 5,345’ Observed Sept. 1, 2020.

Figure 3.27-3.28. Chiricahua leopard frog critical habitat near an unnamed pond near Morningstar Mine in Ophir Gulch, Greaterville allotment, Coronado National Forest. Previous pond shoreline was trampled and browsed by cattle. This pond appeared to be a popular area for cattle before the water dried out. Location: 31.76088, -110.76011, Elevation: 5,345’ Observed Sept. 1, 2020.
Figure 3.29- 3.30. Chiricahua leopard frog critical habitat near an unnamed pond north of Ophir Gulch, Greaterville allotment, Coronado National Forest. No cattle impacts were observed here. The pond appears to be a healthy, functioning ecosystem occupied by hundreds of Chiricahua leopard frogs. Location: 31.76750, -110.75969. Elevation: 5,332’. Observed Sept. 1, 2020.

Figures 3.31- 3.33. Chiricahua leopard frog critical habitat just downstream an unnamed pond north of Ophir Gulch, Greaterville allotment, Coronado National Forest. Few older cattle impacts were observed in this critical habitat stream. Stream vegetation is intact but very little standing water remained. Location: 31.76741, -110.75768, Elevation: 5,300’. Observed Sept. 1, 2020.
Figures 3.34-3.35. Chiricahua leopard frog critical habitat downstream an unnamed pond north of Ophir Gulch, Greaterville allotment, Coronado National Forest. Cattle impacts increased downstream towards the private property line. Both fresh and older cattle sign and feces were present. Observed Sept. 1, 2020.
Site Description
Critical habitat on the Pena Blanca allotment is characterized by the mostly ephemeral Alamo Canyon, three ponds, and Alamo Spring. The flora of the upland areas is characterized by oak and mesquite woodlands interspersed with open grasslands. Madrean shrubs/interior chaparral species occur frequently as well, while Platanus wrightii, Salix spp., Populus fremontii, Fraxinus velutina, and Acer negundo characterize waterways. The streambed in Alamo Canyon is characterized by broad floodplains with wide terraces. This allotment was surveyed Sept. 28, 2020.

Cattle Sign and Observations
A major watershed feature, Alamo Canyon, was surveyed in multiple locations. An unnamed pond along Ruby Road was severely impacted by cattle, showing recent and historic evidence. Another pond north of Alamo Canyon was also decimated by cattle that were present at the time of the survey. An upper segment, located roughly between Tinker and Coyote Tanks, showed no evidence of cattle impacts. All ponds were full of water. Alamo Spring is found along this segment and was still providing limited surface water.

A roughly 2-mile segment of lower Alamo Canyon was also surveyed. Several small herds of livestock were seen along this segment. Cattle impacts were predominately severe and appeared to be both recent and several months old, indicating non-transient herds. Impacts were found throughout but most concentrated nearest surface water. Several sections of this segment contained flowing surface water. Cattle impacts continued downstream of this segment, outside of the allotment boundary and leading to Pena Blanca Lake.

Chiricahua Leopard Frog Status
Opportunistic amphibian visual and auditory encounter surveys were conducted at the site and along adjacent drainages. No Chiricahua leopard frogs were observed.
Figures 3.36-3.40. Chiricahua leopard frog critical habitat stream in Alamo Canyon, Pena Blanca allotment, Coronado National Forest. Cattle impacts were severe in the stream bed with feces and ground disturbances. Fresh and older cattle feces were present. Observed Sept. 28, 2020.
Figures 3.41- 3.43. Chiricahua leopard frog critical habitat stream in Alamo Canyon, Pena Blanca allotment, Coronado National Forest. Cattle impacts were severe in the stream bed and adjacent riparian benches, with feces, mowed grasses and severe ground disturbances. Fresh and older cattle feces were present. Location: 31.38639, -111.10410, Elevation: 3,945’. Observed Sept. 28, 2020.
Figures 3.44- 3.46. Chiricahua leopard frog critical habitat stream in Alamo Canyon, Pena Blanca allotment, Coronado National Forest. Cattle impacts were severe in the streambed and adjacent riparian benches, in the form of feces, mowed grasses and severe ground disturbances. Fresh and older cattle feces were present. Location: 31.38603, -111.10668, Elevation: 3,968’. Observed Sept. 28, 2020.
Figures 3.47-3.49. Chiricahua leopard frog critical habitat stream in Alamo Canyon, Pena Blanca allotment, Coronado National Forest. Cattle impacts were severe surrounding any and all remaining pools of standing water. Fresh and older cattle feces were present. Cows were observed and photographed. Location: 31.38790, -111.10033, Elevation: 3,937’. Observed Sept. 28, 2020.
Figures 3.50- 3.52. Chiricahua leopard frog critical habitat pond along Ruby Road, Pena Blanca Allotment, Coronado National Forest. Cattle impacts were severe including overbrowsing, soil compaction, and rampant defecation. Fresh and older cattle feces were present. No Chiricahua leopard frogs were observed. Location: 31.38852, -111.11814, Elevation: 4,140’. Observed Sept. 28, 2020.
Chiricahua leopard frog critical habitat at Coyote and Tinker Tanks, Alamo Spring, and nearby associated streams in the Pena Blanca allotment, Coronado National Forest. No evidence of cattle impacts were observed at these locations, however no Chiricahua leopard frogs were observed. Observed Sept. 28, 2020.
3.4 NOGALES RANGER DISTRICT: BEAR VALLEY ALLOTMENT

Site Description
Critical habitat on the Bear Creek allotment is characterized by mostly ephemeral drainages in the Sycamore Canyon watershed, a segment of Sycamore Canyon itself, six ponds, and Horse Pasture Spring. The flora of the upland areas is characterized by oak and mesquite woodlands interspersed with open grasslands. Madrean shrubs/interior chaparral species occur frequently as well, while *Platinus wrightii*, *Salix spp.*, *Populus fremontii*, *Fraxinus velutina*, and *Acer negundo* characterize waterways. Larger waterways (i.e. Sycamore, Penasco, Atascosa canyons) are intermittently craggy, and in some areas extremely narrow slot canyons. This sort of geology generally excludes cattle. This allotment was surveyed Sept. 27, 2020.

Cattle Sign and Observations
Sycamore, Atascosa and Penasco Canyons were surveyed within the Bear Valley allotment. In Sycamore Canyon, cattle were observed during the survey, but landscape impacts overall appeared transient. Minus the live cattle, the same can be said about Penasco Canyon. Atascosa Canyon showed evidence of historic heavier use and degradation; impacts were not recent. Live cattle were seen at Bear Valley Ranch just upstream.

The six stock ponds within the Bear Valley allotment varied in cattle impact severity. Cattle impacts were severe across the board at Yank Tank and at Summit Reservoir. There are two ponds named “Mesa Tank.” The Mesa Tank nearest Rattlesnake Tank (upper Penasco Canyon) is completely dysfunctional and dry; its impoundment appears to have blown out in a flood and it is overgrown with mesquite trees. Older cattle impacts can be found throughout the area. To the north, the other Mesa Tank is completely dry. Cattle clearly congregated here during wetter times, however no recent impacts were observed. Horse Pasture Spring, and the waterway leading to it from Penasco Canyon, showed evidence of moderate use by cows, but no impacts were recent. Little water was present at the spring.

Chiricahua Leopard Frog Status
Opportunistic amphibian visual and auditory encounter surveys were conducted at the site and along adjacent drainages. No Chiricahua leopard frogs were observed.
Figures 3.57-3.59. Chiricahua leopard frog critical habitat pond at Horse Pasture Spring in the Bear Valley allotment, Coronado National Forest. The site showed moderate use by cattle but use was not recent. Little water remained. No Chiricahua leopard frogs were observed. Location: 33.140707, -111.18462, Elevation: 3,976’. Observed Sept. 27, 2020.
Figures 3.60- 3.62.  Chiricahua leopard frog critical habitat pond at Summit Reservoir in the Bear Valley allotment, Coronado National Forest. The site was severely impacted by cattle and cattle were actively using the water source. Severe eutrophication of water from cattle feces is apparent. No Chiricahua leopard frogs were observed. Location: 31.39652, -111.14113, Elevation: 4,530’ Observed Sept. 27, 2020.
Figures 3.63- 3.66. Chiricahua leopard frog critical habitat pond at Summit Reservoir in the Bear Valley allotment, Coronado National Forest. The site was severely impacted by cattle through overbrowsing, bank degradation, soil compaction and rampant defecation on and near the water. No Chiricahua leopard frogs were observed. Location: 31.39652, -111.14113, Elevation: 4,530’ Observed Sept. 27, 2020.
Figures 3.67- 3.70. Chiricahua leopard frog critical habitat pond at an unnamed pond in the Bear Valley allotment, Coronado National Forest. The site was severely impacted by cattle including overbrowsing, bank degradation, soil compaction and rampant defecation, both older and recent, on and near the water. No Chiricahua leopard frogs were observed. Location: 31.41349, -111.17686, Elevation: 4,075’ Observed Sept. 27, 2020.
Figures 3.71- 3.73. Chiricahua leopard frog critical habitat pond at Rattlesnake Tank in the Bear Valley allotment, Coronado National Forest. No recent cattle impacts were observed, but quantities of old feces and grown-in cattle trails remained. No Chiricahua leopard frogs were observed but Sonoran mud turtles were present. Location: 31.40075, -111.16349, Elevation: 4,180’. Observed Sept. 27, 2020.

Figures 3.74- 3.76. Chiricahua leopard frog critical habitat pond Mesa Tank (#1) in the Bear Valley allotment, Coronado National Forest. The site was moderately to severely impacted by cattle including overgrazing, soil compaction and rampant defecation. This pond was completely dry. No Chiricahua leopard frogs were observed. Location: 31.41566, -111.16748, Elevation: 4,213’. Observed Sept. 27, 2020.
Figures 3.77-3.79. Chiricahua leopard frog critical habitat pond Mesa Tank (#2) in the Bear Valley allotment, Coronado National Forest. The site exhibited older signs of severe cattle impacts but the pond was completely dry, cannot hold water and was overgrown. No Chiricahua leopard frogs were observed. Location: 31.40692, -111.16460, Elevation: 4,171’. Observed Sept. 27, 2020.
Figures 3.80- 3.81. Chiricahua leopard frog critical habitat pond at Yank Tank in the Bear Valley allotment, Coronado National Forest. The site was severely impacted by cattle and cattle were actively using the water source. No Chiricahua leopard frogs were observed. Location: 31.42525, -111.18317, Elevation: 4,110’. Observed Sept. 27, 2020.
Figures 3.82- 3.85. Chiricahua leopard frog critical habitat pond at Yank Tank in the Bear Valley allotment, Coronado National Forest. The site was severely impacted by cattle through overbrowsing, bank degradation, soil compaction and rampant defecation on and near the water. Water quality was noticeably horrible and odorous. No Chiricahua leopard frogs were observed. Location: 31.42525, -111.18317, Elevation: 4,110’. Observed Sept. 27, 2020.
3.5 NOGALES RANGER DISTRICT: CROSS S ALLOTMENT

Site Description
Critical habitat on the Cross S allotment is characterized by mostly ephemeral Mojonera Canyon, a small section of Sierra Canyon and Alamo Wash, and Bonita Canyon. A total of six critical habitat ponds are on this allotment: Mojonera Tank, two ponds labelled as Sierra Tanks and a third called Sierra Well, Upper Turner Tank and Bonita Tank at the terminus of the critical habitat stream in Bonita Canyon. The flora of the upland areas is characterized by oak and mesquite woodlands interspersed with open grasslands. Madrean shrubs/interior chaparral species occur frequently as well, while Platinus wrightii, Salix spp., Populus fremontii, Fraxinus velutina, and Acer negundo characterize ephemeral waterways. This allotment was surveyed Nov. 5, 2020.

Cattle Sign and Observations
Mojonera Canyon was heavily impacted by cattle with clear signs of long-term use. The entire water course was severely overgrazed/overbrowsed and littered with cattle feces, trails, wallows and ground disturbances. Large concentrations of cattle feces were observed on riparian denuded riparian benches. This area was one of the most extreme examples of overgrazing observed in the Coronado National Forest. Pervasive cattle sign was old and recent, indicating a prolonged presence in the area. Cattle were also observed during survey. Critical habitat in Bonita Canyon showed similar impacts to Mojonera Canyon and was severely degraded by cattle.

The six ponds within the Cross S allotment all showed severe degradation and contamination from cattle use. No exclosure fences were observed at any pond in this allotment. Abundant cattle feces surrounded the shoreline of all six ponds. Surrounding areas were denuded of vegetation through severe grazing/browsing in the pond vicinity. A strong stretch of feces permeated the air at all locations. The two ponds known as the Sierra Tanks were completely dry and were heavily overburdened by cattle presence. Not a single inch of ground was ungrazed or untrampled. Waterways leading to ponds were heavily used and degraded by cattle. Upper Turner Tank in Alamo wash was heavily used/disturbed by cattle. Remaining water in this pond was heavily contaminated by cattle feces. No understory vegetation remained in the surrounding area and multiple heavily used trails leading to stock pond. A dead coyote was observed at Sierra Well. This individual was assumed to be poisoned based on its good body condition, no apparent external injuries and the fact that it died near water.

Chiricahua Leopard Frog Status
Opportunistic amphibian visual and auditory encounter surveys were conducted at the site and along adjacent drainages. Hundreds of Chiricahua leopard frogs were observed in Mojonera Tank with some in the immediate stream vicinity. This occupied pond was contaminated with cattle feces, showed severe grazing/browsing pressure along the shoreline, and a strong stretch of cattle feces permeated the air. This pond may have been augmented with captive-bred Chiricahua leopard frogs. No frogs were observed elsewhere on the allotment and they had no uncontaminated habitat option. These conditions do not support recovery.
Figures 3.86-3.89. Chiricahua leopard frog critical habitat stream in Mojonera Canyon in the Cross S allotment, Coronado National Forest (CNF). The site was severely overgrazed and showed clear signs of heavy sustained cattle use. The entire canyon was odorous, had very little understory vegetation and was among the worst examples of overgrazing observed in CNF. Observed Nov. 5, 2020.
Figures 3.90- 3.92. A Chiricahua leopard frog critical habitat stream in Mojonera Canyon in the Cross S allotment, Coronado National Forest. Overgrazing was severe, streamside benches were obliterated, and cow trails and wallows were pervasive. Location: 31.44630, -111.34132, Elevation: 3876’. The entire canyon was odorous with cattle feces. Observed Nov. 5, 2020.
Figures 3.93–3.94. A Chiricahua leopard frog critical habitat stream in Mojonera Canyon in the Cross S allotment, Coronado National Forest. Cattle sign observed was both older and recent, indicating a sustained heavy presence of cattle in the area. Live cattle were observed at the time of the survey. Location: 31.45051, -111.33722, Elevation: 3,900’. Observed Nov. 5, 2020.
Figures 3.95-3.98. A Chiricahua leopard frog critical habitat stream in Mojonera Canyon in the Cross S allotment, Coronado National Forest. Cattle impacts were concentrated and severe where standing water remained. No streamside vegetation remained, and water was fouled with feces. Chiricahua leopard frogs were observed occupying contaminated water and degraded shorelines. The nearby pond may have been augmented with captive-bred Chiricahua leopard frogs. Location: 31.46365, -111.32071, Elevation: 4,050’. Observed Nov. 5, 2020.
Figures 3.99- 3.101. Chiricahua leopard frog critical habitat pond in Mojonera Canyon in the Cross S allotment, Coronado National Forest. The pond above the dam was densely populated with Chiricahua leopard frogs, which may have been captive-bred releases. Multiple cattle trails and wallows led to the feces-contaminated water. Streamside vegetation was mowed and a mineral lick for cattle was observed on site. Frogs on this allotment had no uncontaminated habitat option. Location 31.464116, -111.320286. Elevation: 4,075’. Observed Nov. 5, 2020.
Figures 3.102- 3.103. Chiricahua leopard frog critical habitat pond in Mojonera Canyon in the Cross S allotment, Coronado National Forest. Photos show cattle feces on the pond edge and in the water with threatened Chiricahua leopard frogs present in the background. No exclusion fences were present. Location 31.464116, -111.320286. Elevation: 4,075’. Observed Nov. 5, 2020.

Figures 3.104- 3.105. Chiricahua leopard frog critical habitat pond (Sierra Tanks) in the Cross S allotment, Coronado National Forest. These ponds were dry and severely degraded by cattle. The area surrounding ponds was inundated with cattle feces, tracks, and wallows and heavily burdened vegetation. Location 31.435413, -111.335022. Elevation: 3,870’. Observed Nov. 5, 2020.
Figures 3.106-3.109. Chiricahua leopard frog critical habitat pond (Sierra Tanks) in the Cross S allotment, Coronado National Forest. Ponds were dessicated and severely degraded by cattle. The whole area was heavily overburdened by cattle and not a single inch of ground was ungrazed or untrampled. No sign of native fauna was found. Location 31.435413, -111.335022. Elevation 3,870’. Observed Nov. 5, 2020.
Figures 3.110-3.112. Chiricahua leopard frog critical habitat pond (Sierra Well) in the Cross S allotment, Coronado National Forest. The pond and surrounding area were inundated with cattle use. Feces were observed in the water and no understory vegetation remained in surrounding area. A dead coyote was observed at this pond, likely poisoned and possible contaminating the water. Location 31.433030, -111.334621. Elevation 3,824’. Observed Nov. 5, 2020.
Figures 3.113-3.114. Chiricahua leopard frog critical habitat pond (Upper Turner Tank) in the Cross S allotment, Coronado National Forest. This pond was almost dry and was severely degraded by cattle. Remaining water was surrounded and contaminated by cattle feces. No understory vegetation occurred in the surrounding area. Wallows and trails were ubiquitous. Location 31.429792, -111.317956. Elevation 4,000’. Observed Nov. 5, 2020.
Figures 3.115-3.118. Bonita Tank, a Chiricahua leopard frog critical habitat pond in Bonita Canyon in the Cross S allotment, Coronado National Forest. This pond was heavily degraded by cattle. Shorelines were disturbed, denuded, and water was contaminated by cattle feces. Multiple heavily used trails surround pond. Location 31.437385, -111.305976. Elevation 4,036’. Observed Nov. 5, 2020.
Site Description
The biotic community of the Middlemarch allotment consisted of Madrean pinyon-juniper interspersed with Madrean encinal and areas of open granitic outcrops. The first critical habitat “pond” feature is a flooded, unnamed historic quarry surrounded by areas of heavy historic mining and grazing impacts. The second is an unnamed pond adjacent to Stronghold Canyon. No water was observed in the vicinity of Cochise Spring. Finally, Halfmoon Tank is a critical habitat pond located within the granitic boulders and oak-dominated drainages. This allotment was surveyed Aug. 31, 2020.

Cattle Sign and Observations
No active cattle grazing is occurring here. Transient, older cow sign was observed on drainage benches. Some adjacent areas showed evidence of moderate to severe ground disturbances, but while the scars of overgrazing were still present in some places these were not recent. Overall, the area appeared to be an ecosystem in recovery from cattle impacts. However, drought conditions have rendered all creek beds in the Middlemarch allotment completely dry.

Chiricahua Leopard Frog Status
Direct amphibian visual and auditory encounter surveys were conducted at the site. The first critical habitat pond is a flooded excavation pit that is heavily occupied. The second critical habitat pond on the Middlemarch allotment is also heavily occupied by hundreds of Chiricahua leopard frogs. This pond was without cattle impacts and appeared to be in good condition. The second pond at Halfmoon Tank is unoccupied.
Figure 3.119- 3.120. Chiricahua leopard frog critical habitat at Halfmoon Tank, Middlemarch allotment, Coronado National Forest. No cattle impacts observed. No Chiricahua leopard frogs were present and the pond is currently unoccupied. Location: 31.91243, -109.97801, Elevation: 5,708’. Observed Aug. 31, 2020.

Figure 3.121- 3.122. Chiricahua leopard frog critical habitat at an unnamed pond in the Middlemarch allotment, Coronado National Forest. No cattle impacts were observed. The pond is heavily occupied with hundreds of Chiricahua leopard frogs. This is an example of what critical habitat should look like with proper livestock management. Location: 31.90622, -109.95860, Elevation: 5,320’. Observed Aug. 31, 2020.
**Site Description**
Critical habitat on the Cave Creek allotment consists of an upper and lower segment of Cave Creek. Upper Cave creek for the most part has perennial flow and several large human-altered pools. The Critical habitat “ponds” are parking lots and campsites. Lower Cave Creek had relatively little water remaining. The biotic community of the Cave Creek allotment consisted of Madrean pinyon-juniper interspersed with Madrean encinal and relatively expansive areas of desert riparian woodland. This allotment was surveyed on Oct. 3, 2020.

**Cattle Sign and Observations**
The area is ungrazed with no signs of cattle use, however human activity is heavily concentrated here. In upper Cave Creek the stream is running with several deep pools. Riparian benches are intact with no signs of cattle use, but heavy human impact. The lower creek bed was largely dry, but a few isolated pools remained.

**Chiricahua Leopard Frog Status**
Extirpated since 1997. Opportunistic amphibian visual and auditory encounter surveys were conducted at the site and along adjacent drainages. No Chiricahua leopard frogs were observed, no amphibians were observed.
Figure 3.123- 3.125. Both Chiricahua leopard frog critical habitat “pond” features at Cave Creek in the Cave Creek allotment, Coronado National Forest are a parking lot and a campground, respectively. These features are of no value to a frog. Location: 31.87284, -109.23485, Elevation: 5,850 ft. Observed Oct. 3, 2020.
Figure 3.126-3.127. Chiricahua leopard frog critical habitat stream at Cave Creek, nested within the Cave Creek allotment in Coronado National Forest. No cattle grazing impacts occurred in this riparian area, however human use is heavy, and trash was commonly encountered. Note the floating beer cans in the first picture. No frogs were observed. Location 31.87367, -109.23311. Elevation 5,796’. Observed Oct. 3, 2020.

Figure 3.128-3.129. Chiricahua leopard frog critical habitat stream at Cave Creek, Coronado National Forest. No grazing impacts occur in this riparian area, however water levels are very low and no leopard frogs were present. Observed Oct. 3, 2020.
3.8 DOUGLAS RANGER DISTRICT: PELONCILLO ALLOTMENT

Site Description
The biotic community of the Peloncillo allotment (formerly the Walnut Canyon allotment) consisted of Madrean pinyon-juniper and oak woodland interspersed with expansive areas of open grass. Chiricahua leopard frog critical habitat on the Peloncillo allotment consists of two unnamed ponds, an unnamed spring, and several sections of the historic Cloverdale Cienega. The bulk of the designated critical habitat is situated in between the Peloncillo and Clanton/Cloverdale allotments, but no boundary fences were observed that would restrict cattle movement across allotments. Within the historic cienega, the lower creek has been impacted by the channelization of the upper creek and the installation of the levees. This has resulted in less water from flood events being stored in the ciénegas and creek system. Combined with past and present heavy livestock grazing, this has resulted in a moderately incised channel that starts at approximately 10-feet deep and ends with a 1- to 2-foot incision at the bottom. This incision has disconnected the creek from its floodplain and the adjacent lower ciénega, and the wetland has dried extensively. This allotment was surveyed from Nov. 1-2, 2020.

Cattle Sign and Observations
One of the two ponds, closest to the historic Cienega, was severely degraded and contaminated by cattle. The other pond, further removed and at a higher elevation, was untrampled but also unoccupied by Chiricahua leopard frogs. In the historic Cienega, there were clear signs of heavy cattle use and browsing throughout the channel that cuts through the center of large critical habitat area. Cattle feces were abundant in the stream bed and stream banks were heavily eroded. Cattle impacts were intense and pervasive throughout surrounding grassland. Feces, trails, and wallows were abundant. Cows were present during the survey. No standing water was found in the historic cienega.

Chiricahua Leopard Frog Status
Opportunistic amphibian visual and auditory encounter surveys were conducted at the site and along adjacent drainages. No Chiricahua leopard frogs were observed.
Figure 3.130-3.133. Chiricahua leopard frog critical habitat in the historic Cloverdale Cienega on the Peloncillo allotment, Douglas Ranger District. Cattle impacts were severe with pervasive wallows, trails, feces, and stream bank degradation. No standing water and no boundary fencing were observed in this area. Observed Nov. 2, 2020.
Figure 3.134-3.137. Chiricahua leopard frog critical habitat in the historic Cloverdale Cienega on the Peloncillo allotment, Douglas Ranger District. Cattle impacts were severe with pervasive wallows, trails, feces, and stream bank degradation. No standing water and no boundary fencing were observed in this area. Observed Nov. 2, 2020.
Figure 3.138- 3.141. Chiricahua leopard frog critical habitat in the Peloncillo allotment, Douglas Ranger District. Cattle feces and shoreline disturbances were pervasive, with numerous cattle tracks and trails surrounding the pond. Water was contaminated with feces and odorous. No frogs were observed. Location 31.44920, -108.98685, Elevation 5,417’. Observed Nov. 2, 2020.
Figure 3.142-3.144. Chiricahua leopard frog critical habitat at Geronimo Tank in the Peloncillo allotment, Douglas Ranger District. No sign of cattle presence was observed around the entire pond and healthy aquatic plants surrounded pond edges. No Chiricahua leopard frogs were observed. Location 31.520727, -109.016850, Elevation 5616’. Observed Nov. 1, 2020.
Site Description
The biotic community of the Clanton/Cloverdale allotment consisted of Madrean pinyon-juniper and oak woodland interspersed with large expanses of grass. While the majority of the historic Cloverdale Cienega occurs on the adjacent Peloncillo allotment, a small section of section of this former wetland occurs within the boundaries of the Clanton/Cloverdale allotment. No standing water was observed on this allotment. This allotment was surveyed on Nov. 2, 2020.

Cattle Sign and Observations
Cattle impacts were prevalent throughout the designated critical habitat on this allotment. Feces, tracks, trails, walls, and grazing impacts were ubiquitous. No boundary fences were observed between this allotment and the Peloncillo allotment.

Chiricahua Leopard Frog Status
Opportunistic amphibian visual and auditory encounter surveys were conducted at the site and along adjacent drainages. No Chiricahua leopard frogs were observed.
Figure 3.145-3.147. A segment of Chiricahua leopard frog critical habitat in the historic Cloverdale Cienega on the Clanton/Cloverdale allotment, Douglas Ranger District. Cattle impacts were severe through overgrazing and ground disturbances. No standing water and no boundary fencing were observed in this area. Location 31.44637, -108.97938. Elevation 5,403’. Observed Nov. 2, 2020.
3.10 DOUGLAS RANGER DISTRICT: GERONIMO ALLOTMENT

Site Description
The biotic community of the Geronimo allotment consisted of Madrean pinyon-juniper and oak woodland interspersed with areas of open grass. Chiricahua leopard frog critical habitat in the Geronimo allotment consists of one unnamed pond. This allotment was surveyed on Nov. 1, 2020.

Cattle Sign and Observations
From the road there are many well-used cattle trails meandering towards the pond. Heavy cattle use was surrounding the water source was obvious. Cattle feces were abundant along the pond shoreline and surrounding the pond complex. Ground disturbances from cattle were severe in the pond vicinity and understory/ground cover vegetation was largely denuded.

Chiricahua Leopard Frog Status
Opportunistic amphibian visual and auditory encounter surveys were conducted at the site and along adjacent drainages. No Chiricahua leopard frogs were observed.
Figure 3.148- 3.152. An unnamed Chiricahua leopard frog critical habitat pond south of Cottonwood Creek on the Geronimo allotment, Coronado National Forest. The pond shoreline and surrounding areas were characterized by extensive cattle feces, ground disturbances and wallows. Vegetation surrounding the pond was largely denuded. No frogs were observed. Location 31.498648, -109.046028. Elevation 5,615’. Observed Nov. 1, 2020.
Site Description
The biotic community of the Lone Mountain allotment consisted of Madrean pinyon-juniper and oak woodland interspersed with areas of open grass. Three unnamed springs occur near the northeast terminus of the critical habitat. The first was mostly dry and contained little if any standing water, but wetland plants were present and robust. This spring was fully fenced, and the fence was intact. The second and third ponds were in proximity. One (Peterson Ranch Pond) was a large, deep spring that was fully fenced and contained deep, clear water and lush vegetation. This was a truly unique and exceptional site that appeared well-protected. Another pond was located just below the larger spring. This feature was unfenced but showed no signs of cattle use. This allotment was surveyed Sept. 17, 2020.

Cattle Sign and Observations
The creek in Scotia Canyon contained standing water in several places, including some deep pools that contained fish and tadpoles. Large segments of the riparian area contained lush riparian vegetation. Older cow flops observed on benches. Limited browse impacts were noted and grasses were largely un-grazed. Throughout the stream segment grazing and browsing evidence was generally light and transient, with the exception of recent cow/calf tracks and feces. Some areas showed evidence of moderate to severe ground disturbances, but while cattle impacts were still apparent, they were not recent. Older cattle tracks and feces were observed throughout the stream. The scars of overgrazing were still present on adjacent riparian benches. However, riparian grasses were largely intact and annual grasses on benches were grown and seeded. Overall, the area appeared to be an ecosystem in recovery.

Chiricahua Leopard Frog Status
A single Chiricahua leopard frog was observed at the pond below the large spring at the northeast terminus of the critical habitat. This is occupied habitat. An unidentified garter snake was observed in the large spring. Downstream in the canyon, tadpoles (Hyla arenicolor) were observed in some of the deeper pools along with fish and an occasional Sonoran mud turtle.
Chiricahua leopard frog critical habitat stream at Scotia Canyon in the Lone Mountain Allotment, Coronado National Forest. Only isolated examples of recent cattle activity was observed, but older cattle impacts were evident on riparian-adjacent benches and stream crossings. No grazing impacts occur in this riparian area, however water levels are very low and no leopard frogs were observed. Observed Sept. 17, 2020.
Figures 3.157- 3.159. Chiricahua leopard frog critical habitat pond adjacent to Scotia Canyon in the Lone Mountain allotment, Coronado National Forest. This isolated wetland was fully fenced, but no standing water was observed. Cattle activity was moderate to severe, but not recent. No leopard frogs were observed. Location: 31.45337, -110.39930, Elevation: 6,100’. Observed Sept. 17, 2020.
Figures 3.160- 3.162. Chiricahua leopard frog critical habitat stream in Scotia Canyon in the Lone Mountain allotment, Coronado National Forest. Stream vegetation intact and several deep pools remained in stream. Cattle sign is generally limited to benches and is not recent. Two Sonoran mud turtles were observed along the stream but no Chiricahua leopard frogs. Observed Sept. 17, 2020.

Figures 3.164- 3.167. Two Chiricahua leopard frog critical habitat ponds (Peterson Ranch Pond) adjacent to Scotia Canyon in the Lone Mountain allotment, Coronado National Forest. A lower, smaller pond was unfenced with no cattle sign. The upper pond was fenced, undisturbed, with relatively deep clear water. Location: 31.45736, -110.39748, Elevation: 6,200’. Observed Sept. 17, 2020.
3.12 SAFFORD RANGER DISTRICT: DEER CREEK ALLOTMENT

Site Description
Chiricahua leopard frog critical habitat on the Deer Creek allotment consists of a mostly ephemeral portion of Oak Creek, a large stock pond named Home Ranch Tank, another unnamed pond which exists on the USFS/State Trust Land boundary, and several short stretches of intermittent, dry desert wash dispersal corridors. This area located in the eastern Galiuro Mountains in the Aravaipa Creek watershed. Cow-blasted mesquite/juniper-savanna characterizes the uplands, and Madrean oak woodlands along with facultative-riparian species such as Platinus wrightii, Juglans major, and Celtis reticulata characterize the waterways. Salix spp. and Populus fremontii occur intermittently. The upstream segment of Oak Creek contained about 30 feet of surface water nearby Oak Spring and several small pools in tinajas. This allotment was surveyed Sept. 4, 2020.

Cattle Sign and Observations
Cattle impacts were generally old and transient but were found throughout the survey. The overall terrain is not the best terrain for cattle. Moving downstream in Deer Creek, the waterway becomes more canyon-esque and seems to naturally exclude cattle. Home Ranch Tank lies in the upper Deer Creek watershed near a private inholding owned by the Deer Creek Ranch. This pond is considerably large and created by a substantial concrete dam. Heavy use by native ungulates is evident and Chiricahua leopard frogs are present. No recent cattle impacts were observed, however old impacts are abundant all around the pond. There is no cattle exclosure within the pond; excluding cows could only be accomplished by utilizing the barbwire fencing surrounding the entire pond. However, these gates had been left open.

Chiricahua Leopard Frog Status
Opportunistic amphibian visual and auditory encounter surveys were conducted at the site and along adjacent drainages. Hundreds of Chiricahua leopard frogs were observed in Home Ranch Tank, and none were observed elsewhere on the allotment. This pond may have been augmented with captive-bred Chiricahua leopard frogs.
Figures 3.168- 3.171. An unnamed Chiricahua leopard frog critical habitat pond in the Deer Creek allotment, Coronado National Forest, on the USFS/State Trust boundary. This site is severely impacted by cattle and holds little water. Impacts in the vicinity are severe across the board and there are no cattle exclosures. Location: 32.67139, -110.26508, Elevation: 4,846’. Observed Sept. 4, 2020.

Figures 3.174-3.175. Chiricahua leopard frogs in Home Ranch Tank, a critical habitat pond in the Deer Creek allotment, Coronado National Forest. The site showed moderate to severe cattle impacts and may have been augmented with captive-bred Chiricahua leopard frogs. The adjacent creek was completely dry. Location: 32.65694, -110.27447, Elevation: 5,070’. Observed Sept. 4, 2020.
4.1 PLEASANT VALLEY RANGER DISTRICT: GENTRY MOUNTAIN ALLOTMENT

Site Description
Chiricahua leopard frog critical habitat on the Gentry Mountain allotment consists of portions of two ephemeral/perennial waterways (Crouch and Cherry creeks) as well as Rock and Cunningham Springs. These areas are located east of Young, Ariz., and west of the boundary of Apache Sitgreaves/Tonto national forests. Ponderosa pine/ Madrean oak woodlands interspersed with interior chaparral characterize the flora of the area. This allotment was surveyed Sept. 3, 2020.

Cattle Sign and Observations
Boundary fencing along the Red Lake/Gentry Mountain and Gentry Mountain/Crouch Mesa allotment interfaces was dysfunctional and allows cows to pass seamlessly from allotment to allotment. Fence lines are down/non-existent, and cattle impacts exist on both sides of these boundaries. Impacts along Cherry Creek were several months old and at a moderate frequency and severity. Little ephemeral water was found on this stretch of the waterway. Impacts along Crouch Creek were variable. A quarter mile of Crouch Creek lies in a deep gorge with a 50’ waterfall on one end; this section excludes cattle. A significant portion of Crouch Creek is very scruffy, tight, and rocky; this terrain is not favorable to cows. Nonetheless, evidence of old, transient impacts are found throughout. Moving downstream, the terrain opens up and impacts are more widespread. However, they are generally older. Despite travelling to their supposed coordinates, Rock and Cunningham springs were not located.

Chiricahua Leopard Frog Status
Opportunistic amphibian visual and auditory encounter surveys were conducted at the site and along adjacent drainages. No Chiricahua leopard frogs were observed.
Figures 4.1- 4.3. A Chiricahua leopard frog critical habitat stream in Crouch Creek in the Gentry Mountain allotment, Tonto National Forest. This site is broadly impacted by cattle and holds little water. Riparian vegetation is heavily grazed and cattle feces were documented with varying severity throughout the creek, depending on topography. Location 34.11277, -110.85229. Elevation 5,562’. Observed Sept. 3, 2020.
Figures 4.4- 4.5. A Chiricahua leopard frog critical habitat riparian habitat along Cherry Creek in the Gentry Mountain allotment, Tonto National Forest. Cattle impacts along Cherry Creek were several months old and at a moderate frequency and severity. Little ephemeral water was found on this stretch of this waterway. Location 34.15253, -110.84918. Elevation 6,065’. Observed Sept. 3, 2020.
4.2 PLEASANT VALLEY RANGER DISTRICT: RED LAKE ALLOTMENT

Site Description
Chiricahua leopard frog critical habitat on the Red Lake allotment consists of portions of three ephemeral/perennial waterways (Crouch, Cherry, and West Prong creeks), a pond named Trail Tank, one unnamed stock pond and two springs (Bottle and Carroll springs). These areas are located east of Young, Ariz., immediately west of the boundary of Apache Sitgreaves/Tonto national forests. Ponderosa pine/ Madrean oak woodlands characterize the flora of the area. Evidence of stand-replacing wildfire is evident at the unnamed stock pond at the headwaters of Parallel Canyon. This allotment was surveyed on Sept. 3, 2020.

Cattle Sign and Observations
The fence line separating Red Lake and Gentry Mountain allotments along Cherry Creek is down. Cows move seamlessly between these two allotments along Cherry Creek. Cattle impacts along Crouch, Cherry and Prong Creeks vary throughout each creek’s respective reach. Cherry Creek is predominately ephemeral and rocky, with several small pools and very short stretches of perennial flow. Two cow herds were seen in the upland surrounding the creek and no fencing exists that would keep them from the creek bed. Bank degradation and soil compaction is most severe near remaining surface water. However, evidence of grazing and ground disturbance can be found throughout. Impacts along this portion of Crouch Creek are predominately several months old. However, historic heavy use is evident in the form of cow trails, feces, and scattered instances of bank degradation. Cattle exclosure fencing is found on Crouch Creek at Carroll Spring.

Ground disturbances and bank degradation are found throughout Prong Creek. It was mostly dry, with several small puddles remaining. Heavily grazing impacts and major chiseling and bank degradation were observed at small pools that still held water. Many cow wallows were found in the floodplain and adjacent creek benches. Approximately twenty cows were observed here. West Prong Creek contained a significant stretch of perennial flow and showed transient recent evidence of cattle use. There was also substantial evidence of heavy use by elk, which compounds with cattle impacts. Some instances of severe streambank degradation seemed to be caused by elk. The upper half-mile of critical habitat along West Prong contains what appears to a large elk exclosure, but it is cut open in one location and completely down where it crosses the creek.

No perennial water is found at Bottle Spring; it exists within a concrete vault. A short transect was surveyed within its vicinity and shows impacts that were several months old. Trail Tank has no cattle exclosure fencing and is severally impacted. It shows evidence of heavy cattle use in the forms of grazing, bank degradation, and ground disturbance. Another unnamed pond near Bottle Spring is heavily impacted by cattle. An unmaintained, completely dysfunctional exclosure can be found there.

Chiricahua Leopard Frog Status
Opportunistic amphibian visual and auditory encounter surveys were conducted at the site and along adjacent drainages. Trail Tank is occupied by hundreds of Chiricahua leopard frogs. This pond may be part of the captive-breeding program. Frogs were also observed at Carrol Spring, which has perennial water and where riparian fencing is 100% effective at excluding cattle.
Figures 4.6-4.9. Chiricahua leopard frog critical habitat riparian habitat along Cherry Creek in the Red Lake Allotment, Tonto National Forest. Evidence of grazing and ground disturbance can be found throughout this portion of Cherry Creek. Observed Sept. 3, 2020.
Figures 4.10-4.12. Chiricahua leopard frog critical habitat stream in Cherry Creek in the Red Lake allotment, Tonto National Forest. The creek is mostly dry with several small puddles remaining. Heavy grazing, ground disturbances and bank degradation is found throughout. Bank degradation, shearing and chiseling common near areas that hold water. Cows were present at the time of survey. Location 34.16015, -110.83441. Elevation 6,234’. Observed Sept. 3, 2020.
Figures 4.13-4.16. Chiricahua leopard frog critical habitat pond in the Red Lake allotment, Tonto National Forest. Trail Tank has no cattle exclosure fencing and showed evidence of heavy cattle use in the form of grazing, bank degradation, and ground disturbance. It is severally impacted by cattle and Chiricahua leopard frogs were present. This pond may have been augmented with captive-bred Chiricahua leopard frogs. Location: 34.17625, -110.81234, Elevation: 6,545’. Observed Sept. 3, 2020.
Figures 4.17-4.18. Chiricahua leopard frogs in Trail Tank, Red Lake Allotment, Tonto National Forest. This site has no cattle exclosure fencing and showed severe impacts of cattle use in the form of grazing, bank degradation, and ground disturbance. This pond may have been augmented with captive-bred Chiricahua leopard frogs. Location: 34.17625, -110.81234, Elevation: 6,545’. Observed Sept. 3, 2020.

4.3 PLEASANT VALLEY RANGER DISTRICT: CROUCH MESA ALLOTMENT

**Site Description**
Chiricahua leopard frog critical habitat on the Crouch Mesa allotment consists of segments of two ephemeral/perennial waterways, Crouch Creek and the Pine Spring drainage. These areas are located east of Young, AZ just west of the boundary of Apache Sitgreaves/Tonto national forests. Ponderosa pine/madrean oak woodlands and riparian vegetation characterize the flora of the area. Crouch Creek on the Crouch Mesa allotment is characterized by what appears to be perennial flow. Surface water was abundant in addition to riparian vegetation. This allotment was surveyed on Sept. 3, 2020.

**Cattle Sign and Observations**
Both cow and elk impacts are frequent and severe throughout this stretch of Crouch Creek. The lower 300 feet of the Pine Creek drainage holds water and is impacted by cattle, however impacts are infrequent and old heading upstream until the allotment boundary. Evidence of cows passing seamlessly through the Crouch Mesa/Gentry Mountain and Crouch Mesa/Catholic Peak allotment interfaces was documented. Fence lines are downed and/or non-existent, and cattle impacts exist on both sides of these boundaries.

**Chiricahua Leopard Frog Status**
Opportunistic amphibian visual and auditory encounter surveys were conducted at the site and along adjacent drainages. No Chiricahua leopard frogs were observed.
Figures 4.27- 4.30. A Chiricahua leopard frog critical habitat stream and adjacent riparian benches in Crouch Creek in the Crouch Mesa allotment, Tonto National Forest. This site is broadly impacted by cattle with heavy grazing, ground disturbances, bank shearing and abundant cattle feces. Observed Sept. 3, 2020.
Site Description
Chiricahua leopard frog critical habitat on the Catholic Peak allotment consists of Pine Spring and its associated drainage. This area is carved in the northwestern slope of Gentry Mountain east of Young, Ariz., and just west of the boundary of Apache Sitgreaves/Tonto national forests. Ponderosa pine/madrean oak woodlands characterize the flora of the area. However, approaching Pine Spring the waterway become perennial and a more densely vegetated riparian zone. This allotment was surveyed on Sept. 3, 2020.

Cattle Sign and Observations
The Pine Spring drainage is severally trampled and grazed by cows. Streambanks are severely degraded, riparian vegetation is severely grazed and browsed, and streamside benches are compacted. Cattle feces are in the water. Pine Spring itself is especially disturbed and degraded by cows. One lone cow was observed along the drainage to Pine Spring and ran upstream towards and beyond Pine Spring. Elk impacts are here too, however the impacts are clearly predominately caused by cattle. The downstream half of this stretch’s cattle impacts are infrequent and old, similar to those found just downstream on the Crouch Mesa allotment. No boundary fencing was encountered between the Crouch Mesa and Catholic Peak allotments.

Chiricahua Leopard Frog Status
Opportunistic amphibian visual and auditory encounter surveys were conducted at the site and along adjacent drainages. No Chiricahua leopard frogs were observed.

Figures 4.32- 4.35. Chiricahua leopard frog critical habitat stream in the Catholic Peak allotment, Tonto National Forest. Streambanks of the Pine Spring drainage are severely degraded, riparian vegetation is severely grazed and browsed, and streamside habitat is compacted. Abundant cattle feces can be found in the water. Location: 34.09575, -110.85612, Elevation: 5,680’. Observed Sept. 3, 2020.
5.1 EASTERN GALIURO MOUNTAINS

Site Description
This Chiricahua Critical habitat area continues from the immediately adjacent designated streams and ponds in the Deer Creek Allotment, Coronado National Forest. Cow-blasted mesquite/juniper-savanna characterizes the uplands.

Cattle Sign and Observations
All the ponds here are severely impacted by cattle and none are fitted with functioning cattle exclosures. Only one pond exhibited the remains of an exclosure and four were completely dry.

Chiricahua Leopard Frog Status
Opportunistic amphibian visual and auditory encounter surveys were conducted at the site and along adjacent drainages. Two Chiricahua leopard frogs were observed in the only pond that still held some water. This pond was severely impacted by cattle and water was fouled with feces. This was the only habitat option for Chiricahua leopard frogs in the vicinity.

Figures 5.1- 5.2. Chiricahua leopard frog critical habitat pond in the Deer Creek watershed on State Trust Land adjacent to the Deer Creek allotment, Coronado National Forest. This pond is severely impacted by cattle and holds very little water. Cattle impacts in the broad vicinity are severe. Two Chiricahua leopard frogs were observed here as this was their only available wetland option in the area. Location 32.67688, -110.26199. Elevation 4,769’. Observed Sept. 4, 2020.
Figures 5.3-5.6. Chiricahua leopard frog critical habitat ponds in the Deer Creek watershed on State Trust Land adjacent to the Deer Creek allotment, Coronado National Forest. All four ponds were disturbed by cattle and void of water. Cattle impacts in the broad vicinity are severe. Observed Sept. 4, 2020.
6.1 NOGALES RANGER DISTRICT: SYCAMORE CANYON/ PAJARITA WILDERNESS

Site Description
Chiricahua leopard frog critical habitat occurs in Sycamore Canyon within the Pajarita Wilderness. This designated wilderness is adjacent to the Bear Creek allotment but is supposed to be closed to grazing with livestock excluded from this area. Cows were observed here opportunistically during allotment surveys. They are considered ‘trespass cattle’ as they were found outside of authorized grazing areas.

Cattle Sign and Observations
Heavy grazing pressure and severe degradation impacts were observed and documented in the Pajarita Wilderness along Sycamore Creek. Four live cattle were observed. No allotment fencing was found at the Wilderness/Bear Valley allotment boundary. Impacts are severe and appear to be primarily recent and non-transient. Only occasional pools of water remained in the creek bed. Observed on Sept. 26, 2020.

Chiricahua Leopard Frog Status
Opportunistic amphibian visual and auditory encounter surveys were conducted at the site and along adjacent drainages. Several Chiricahua leopard frogs were observed along this stretch of canyon wilderness.

Figures 6.1-6.2. Chiricahua leopard frog critical habitat stream in Sycamore Canyon, Pajarita Wilderness, Coronado National Forest. Grazing impacts, ground disturbances and cattle feces were found throughout this wilderness designation. Trespass (unauthorized) cows were present at the time of the survey. Observed 26 Sept. 26, 2020.
Figures 6.3- 6.5. Chiricahua leopard frog critical habitat stream in Sycamore Canyon, Pajarita Wilderness, Coronado National Forest. Fresh cattle feces and ground disturbances were found throughout this wilderness designation. Trespass (unauthorized) cows were present at the time of the survey. Observed Sept. 26, 2020.
Figures 6.6- 6.9. Chiricahua leopard frog critical habitat stream in Sycamore Canyon, Pajarita Wilderness, Coronado National Forest. Severe cattle grazing, trails, wallows and other ground disturbances were found throughout this wilderness designation. Location 31.42141, -110.19437. Elevation 3,988'. Observed Sept. 26, 2020.
Figures 6.10-6.11. Chiricahua leopard frog critical habitat stream in Sycamore Canyon, Pajarita Wilderness, Coronado National Forest. Severe cattle impacts were observed in and around the riparian area, including fecal deposits directly into remaining surface water. Observed Sept. 26, 2020.
Site Description
Pena Blanca Lake, a reservoir with camping facilities maintained by Coronado National Forest, is designated Chiricahua leopard frog critical habitat and is not part of a grazing allotment. The area is popular with bird watchers and hikers and is surrounded by Forest Service lands that support a variety of recreational opportunities. This lake is adjacent to, but separate from, the Pena Blanca grazing allotment. Cows were observed here opportunistically during allotment surveys. They are considered ‘trespass cattle’ as they occurred outside of authorized grazing areas.

Cattle Sign and Observations
The western shore of Pena Blanca Lake was opportunistically surveyed. Heavy grazing pressure and severe degradation impacts were observed and documented in the Pena Blanca Lake vicinity. Transient, infrequent impacts were found north of the Coronado NF Day-Use fee area. However, south of the fee area severe, recent livestock evidence was documented. Continuing south of the lake and upstream on Alamo Canyon, it is evident that these cows are coming from the Pena Blanca allotment. Observed on Sept. 26, 2020.

A small, spring-fed pond upstream of Pena Blanca Lake on the edge of the Pena Blanca allotment is fenced off from cattle to protect Chiricahua leopard frog habitat. No cattle impacts were observed here.

Chiricahua Leopard Frog Status
Opportunistic amphibian visual and auditory encounter surveys were conducted at the site and along adjacent springs and drainages. No Chiricahua leopard frogs were observed.
Figures 6.18-6.20. Chiricahua leopard frog critical habitat stream and shoreline at Pena Blanca Lake, Coronado National Forest. Severe cattle impacts were observed in and around lake, including bank shearing and fecal deposits directly into the water. Cattle are not transient as impacts were old and new. Location 31.40012, -111.08923. Elevation 3,870’. Observed Sept. 26, 2020.
Figures 6.21-6.22. Chiricahua leopard frog critical habitat stream between Pena Blanca Lake and Pena Blanca Spring, Coronado National Forest. Severe cattle impacts were observed broadly around lake including heavy grazing, ground disturbance and fecal deposits. Cattle are not transient as impacts were old and new. Location 31.39842, -111.08971. Elevation 3,839’. Observed Sept. 26, 2020.

Figures 6.23. A view from a Chiricahua leopard frog critical habitat pond at Pena Blanca Spring, Coronado National Forest. Severe cattle impacts were observed all around, but the spring itself exhibited secure exclosure fencing with no immediate impacts. Location 31.38884, -111.09229. Elevation 3,935’. Observed Sept. 26, 2020.
CONCLUSIONS

The U.S. Fish and Wildlife Service has identified cattle as a key threat to threatened Chiricahua leopard frogs and their critical habitat and their prospect of recovery. The Center for Biological Diversity’s field surveys in four national forests in Arizona show that federal agencies have systematically mismanaged federally required restoration efforts, allowing widespread and severe habitat damage from cattle grazing, including water pollution and potential spread of a fungus responsible for amphibian die-offs worldwide. These threatened frogs were absent from more than 90% of the ponds surveyed in their designated critical habitat, where nearly all ponds were trampled and contaminated with cow feces.

Frogs are critical to the health of ecosystems, occupying different ecological niches throughout their lifecycle from herbivorous aquatic larvae to carnivorous terrestrial adults. Both life stages provide important food sources for numerous wetland predators including mammals, birds, reptiles, fish and invertebrates. Removing frogs from the essential food web can have cascading results throughout the ecosystem. As an indicator species, the Chiricahua leopard frog reveals when aquatic and terrestrial environments are out of balance.

These leopard frogs, like other amphibians, face many ongoing and escalating threats, including climate change, drought, invasive species, predation from non-native predators, pathogens and habitat loss. Of all these threats, habitat degradation by livestock is the easiest and least costly to manage and mitigate — simply by excluding cattle from wetlands with a critical habitat designation. No amount of Chiricahua leopard frog reintroductions or population augmentations from captive-breeding efforts will be successful if fully restored and maintained high-quality wetland habitat is not available.

Chiricahua leopard frogs require breeding habitat that consists of standing bodies of fresh water with pollutants absent or minimally present. They also require submerged aquatic vegetation to attach eggs and provide food for tadpoles, and shoreline vegetation for adults to forage on insects. Cattle grazing has eliminated these habitat characteristics that the Fish and Wildlife Service describes as essential to the conservation and recovery of Chiricahua leopard frogs.

It is long past time to reevaluate the threat of poor grazing practices to this iconic southwestern species. As this report shows, federal agencies must immediately ban grazing in critical habitat or risk pushing this threatened animal over the brink to extinction.

Although the status of Chiricahua leopard frogs in Arizona was considered “roughly stable” with no evidence of decline between 2002 and 2009, the population has been heavily augmented with captive-reared frogs and translocations of egg masses for at least 25 years. This year, the Phoenix Zoo celebrated the release of 25,000 captive-reared frogs and tadpoles into the wild since 1995. Without these conservation efforts, Chiricahua leopard frogs might well already have disappeared across much of their residual natural range. A review of range-wide Chiricahua leopard frog population trends has not been conducted since 2009.

The first goal in recovering the species is to reduce or eliminate threats in areas needed for recovery. According to the Fish and Wildlife Service, “although significant progress has been made, particularly in regard to establishing or reestablishing populations, if on-going recovery actions are interrupted, drought worsens, or other threats intensify, the status of the species could easily deteriorate.” Thus, in most cases, the threats to the

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4 Federal Register Vol. 77 No. 54. Listing and Designation of Critical Habitat for the Chiricahua Leopard Frog; Final Rule (2012).
Chiricahua leopard frogs have not been adequately addressed. And the key land-management usage impeding recovery of the frogs remains unaddressed and unresolved: cattle grazing.

The Fish and Wildlife Service is required to complete five-year reports on the status of Chiricahua leopard frogs but hasn’t published a report since 2011. In the 2011 review, livestock grazing was not even mentioned as a threat. Yet the practice has long been known to damage Chiricahua leopard frog habitat or eliminate it entirely, as documented by the Center’s field surveys. Our surveys clearly demonstrate damage to shoreline habitat, water pollution and scouring of breeding ponds from intense livestock grazing in designated critical habitat. The Endangered Species Act requires federal agencies to ensure that their actions do not destroy or adversely modify critical habitat — a legally binding duty that rests with the Fish and Wildlife Service and the U.S. Forest Service.

In addition to promoting recovery of suitable riparian and wetland habitat, removing cattle from critical habitat ponds will reduce water pollution harmful to frogs and other wildlife. Cattle grazing worsens water quality because cow manure contaminates these important bodies of water. This organic pollution introduces harmful microorganisms and provides nutrients which result in harmful algal blooms in mountain ponds and streams. Our report shows that water bodies in the frog’s critical habitat have been heavily polluted with cattle feces and that water quality has been degraded due to intense livestock use.

According to the National Academy of Sciences, eutrophication of water promotes parasite infection and amphibian disease risk. Furthermore, studies have shown that in watersheds where cattle have grazed, 96% of surface water samples contain significant indicator levels of E. coli, placing these waters at high risk for harboring a large variety of harmful microorganisms.

The Chiricahua leopard frog recovery plan says water fouled by cattle was the culprit in the species’ extirpation from the its namesake locality, the Chiricahua Mountains. “In June 1994, a die off of Chiricahua leopard frogs occurred at a stock tank in the Chiricahua Mountains, Arizona, that reduced the frog population from 60-80 adults to fewer than 10 (Sredl et al. 1997). Analysis of dead and moribund frogs and water from the tank indicated that disease was unlikely to be the cause of the die off; however, levels of hydrogen sulfide were high enough to be toxic to wildlife. The authors suspected that high detritus loads (including cattle feces), low water levels, high water temperature, and low concentrations of dissolved oxygen created a suitable environment for sulphur-producing bacteria that produced toxic levels of hydrogen sulfide.”

In addition to degrading water quality, cattle can spread spores of Batrachochytrium dendrobatidis, the fungus linked to global amphibian die-offs. Scientists and managers who study or release Chiricahua leopard frogs must follow strict decontamination protocols to avoid spreading chytrid fungus from one water source to another. But cattle regularly wander between water sources, acting as potential vectors to transmit infective pathogens between frog populations — yet another compelling reason cattle should be excluded from ponds designated as critical habitat for Chiricahua leopard frogs.

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11 Chiricahua Leopard Frog Final Recovery Plan (2007) at 34.
According to the 2007 Chiricahua leopard frog Final Recovery Plan, the species “requires permanent or semi-permanent pools for breeding” and “water characterized by low levels of contaminants.” In ponds that have been intensely fouled by cattle, as documented in this report, Chiricahua leopard frogs may be one drought year away from extirpation as they were in the Chiricahua Mountains. It defies ethics and science for the Forest Service and Fish and Wildlife Service to authorize cattle grazing knowing that cows are trampling and defecating throughout the frogs’ designated critical habitat.

Our surveys also highlighted examples of conservation and management success. The Peterson Ranch Pond in Scotia Canyon in the Lone Mountain allotment was fully fenced, completely intact with shoreline and emergent vegetation and was occupied by Chiricahua leopard frogs. One pond in the Greaterville allotment had no cattle damage and was an intact and fully functioning wetland, with hundreds of leopard frogs as well as birds and insects. The same was true of the pond on the Middlemarch allotment. At these sites, downstream riparian vegetation was also ungrazed and intact. These examples from the Coronado National Forest are proof that it’s possible to restore once-grazed habitat and support leopard frog recovery by excluding cattle grazing.

While these populations may have been augmented by captive-breeding initiatives, the measure is necessary given the dire state of the frogs and their habitat. Most importantly, augmentation must be used in conjunction with habitat protection and restoration. Chiricahua leopard frog recovery will not be successful if captive-bred frogs are introduced into habitat that is degraded and contaminated.

The Coronado had some of the best and worst examples of Chiricahua leopard frog critical habitat. Critical habitat in the Bear Valley allotment holds much potential value for the frog’s recovery. Canyon pools have persisted even after the end of an extreme summer 2020 drought. Combined with nearby ponds, this allotment has great potential to support a functioning Chiricahua leopard frog metapopulation. Unfortunately, cattle have trampled and defecated throughout the area and destroyed this critical habitat for the frogs.

2020 was the hottest year on record in Arizona, with summer rainfall at one-third of the seasonal average. These environmental conditions are becoming more frequent and more severe. A vital first step to safeguarding threatened and endangered species like the Chiricahua leopard frog from further loss of available habitat is to ban cattle completely from wetlands designated as critical habitat. Anything less will likely doom the Chiricahua leopard frog to becoming locally and functionally extinct.

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Figure C.1. An example of an ungrazed vs. grazed Chiricahua leopard frog critical habitat pond in the Greaterville and Oak Tree allotments, respectively. The first pond was full of Chiricahua leopard frogs, songbirds, and volant insects. The second was fouled with cattle feces, had no shoreline grasses or nearby understory vegetation, and was eutrophic and odorous. These ponds are approximately 1.6 miles apart, and the cattle-impacted pond represents the only dispersal option for resident Chiricahua leopard frogs. Thus, intense livestock grazing in designated Critical habitat has reduced the likelihood that frogs could move among subpopulations in a metapopulation, which in turn has decreased the viability of the metapopulation and its component local populations. Both photos were obtained on 1 September 2020.
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