Rapid Assessment of Cattle Impacts in Riparian Critical Habitat on the Gila National Forest

One of more than one hundred cows found grazing and browsing freely within designated critical habitat on the Laney allotment. San Francisco River, Gila National Forest.

Prepared by the Center for Biological Diversity
August, 2021

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BACKGROUND

Federal public lands in the Southwest harbor incredible biological diversity, including many threatened or endangered species dependent on healthy riparian habitat. Preservation of these species and protection of these federal lands is of significant public interest. Since our founding, the Center for Biological Diversity has led efforts to reform overgrazing on public lands, particularly as it relates to the health of critical habitat. One of our significant court challenges was a 1997 suit which argued that the Forest Service had failed to consider the effects of grazing on seven imperiled species including the Southwestern Willow Flycatcher (SWWF), the Mexican Spotted Owl, the Spikedace, and the Loach Minnow. In 1998, a settlement agreement emerged from this legal challenge, *Southwest Center for Biological Diversity v. U.S. Forest Service* (D. Ariz. CV-97-TUC-JMR), resulting in an order to remove cattle from hundreds of stream miles, including 23 allotments in the Gila.

The settlement commitments made by the Forest Service resulted in the placement of extensive exclosure fencing and agreements with permittees to remove cattle from these areas. Early assessment showed the rapid recovery of streamside herbaceous vegetation, cottonwood saplings in flood channels, willow recruitment along the river's edge and improved bank stability and integrity. This resulted in an on-going process of restoration in many miles of critical riparian habitat. Within the past several years, however, there has been a noticeable increase in trespass and feral cattle in areas within grazing exclosure areas.

Subsequently, surveys were done on 27 allotments in 2017, 9 allotments were spot checked in 2018, and 30 allotments were surveyed in 2019, including additional allotments with new listed species and proposed or final critical habitat (Table 1). Each of these surveys showed large percentages of moderate to significant impacts from grazing where there should be none. In 2017, 72.5% of the 105 miles surveyed, in 2018, 61%of the miles surveyed and in 2019, 65% of the 134 miles surveyed were moderately to significantly impacted. Cattle were observed and documented on many of the allotments surveyed.[1,2]

[1] Rapid Assessment of Cattle Impacts in Riparian Exclosures on the Gila National Forest Rapid, Center for Biological Diversity, March, 2018.
[2] Rapid Assessment of Cattle Impacts in Riparian Exclosures and Critical Habitat on the Gila National Forest, Center for Biological Diversity, January, 2020.

Because of the lack of progress by the Forest Service in removing trespass and feral cattle a third comprehensive survey was conducted in 2021 for allotments expected to have continuing problems. The results of that 2021 assessment are included in this report. Twenty-three allotments in total were selected for surveys on the Gila, including one allotment, Harden Cienega, which was surveyed for the first time this year. Some progress appears to have been made but there significant grazing impacts persist on many allotments.

Table 1. SPECIES WITH FINAL CRITICAL HABITAT (FCH) OR PROPOSED CRITICAL HABITAT (PCH) IN THE GILA NATIONAL FOREST	
Chiricahua leopard frog	**FCH**
Gila chub	**FCH**
Loach minnow	**FCH**
Narrow-headed garter snake	**PCH**
Northern Mexican garter snake	**FCH**
Southwest willow flycatcher	**FCH**
Spikedace	**FCH**
Yellow-billed cuckoo	**FCH**

ASSESSMENT OVERVIEW

To determine if actions taken by the Gila National Forest have resulted in improvements in the health of riparian critical habitat, and to assess whether trespass or feral cattle are still accessing exclosure areas containing critical habitat, a rapid assessment survey was completed for 117.1 miles on 22 allotments. The specific objectives of this rapid assessment were to determine if cattle are present within riparian areas purportedly excluded from grazing on certain allotments and any areas containing critical habitat for the 8 species listed above in the Gila National Forest. The specific purpose is to document the extent, frequency and intensity of impacts attributed to cattle across hydroriparian, mesoriparian, and xeroriparian habitats. Further objectives were to quantitatively evaluate these impacts in six specific categories using a rapid assessment survey, document these data with georeferenced photographs, and map the overall impact levels of cattle throughout the allotment drainages (Figure 1.).

This report contains a summary of results for all allotments surveyed, individual descriptions and maps for each allotment, and hyperlinked photos to specific cattle impacts observed. All the data is stored in a GIS database containing hundreds of additional photographs. A thorough explanation of survey methods is included at the end of the report (Table 4 & Table 5.).

RESULTS SUMMARY

In all six districts there exists significant negative cattle impacts. Overall, significant, negative cattle impacts continue to exist on over 70% of the surveyed miles-or 82.9 of the 117.1 miles of the riparian habitat included in the study. While there has been some decrease in the number of miles with current cattle sign and positive signs of vegetative regrowth in areas without current sign, more than 50% of the allotments still had stock roaming within critical habitat-ten allotments with cows and two allotments with horses. Overall, 82.9 miles showed significant impact, 13.8 miles showed moderate impact, 10.6 miles showed light impact, and 9.8 miles were absent of any impact (Table 2 & Table 3.).

TABLE 2. OVERALL SURVEY MILES OF CATTLE IMPACTS ON THE GILA NATIONAL FOREST BY DISTRICT

District	Miles/Absent	Miles/Light	Miles/Moderate	Miles/ Significant	Total/Surveyed
Black Range		.3		.5	.8
Glenwood	5.7		1.4	27.0	35.7
Quemado	3.9	2.6	2.2	10.7	19.4
Reserve	.2	4.1	3.6	31.3	39.2
Silver City			0.8	7.2	8.0
Wilderness		3.6	5.8	6.2	15.6
Total	**9.8**	**10.6**	**13.8**	**82.9**	**117.1**

*See methods section for specific grazing impact category descriptions and weighting table used to calculate overall level of impact ratings.

TABLE 3. GILA NATIONAL FOREST DISTRICTS AND MILES OF CATTLE IMPACTS IN INDIVIDUAL ALLOTMENTS

District	Allotment	Drainage	Absent	Light	Moderate	Significant	Total
Black Range	**Corduroy**	Beaver Creek		.3		**.5**	.8
Glenwood	Alma	San Francisco River				**1.9**	1.9
	Cienega	San Francisco River				**3.5**	3.5
	Citizen/Roberts Park	San Francisco River				**2.4**	2.4
	Devil's Park	San Francisco River				**3.5**	3.5
	Harden Cienega	Harden Cienega Creek	4.6		1.4	**5.9**	11.9
	Harve Gulch	San Francisco River				**4.1**	4.1
	Kelly	San Francisco River Saliz Canyon	1.1			**9.3**	10.4
Quemado	Laney					**7.3**	7.3
	Luna	Dry Blue Creek, Pace Creek San Francisco River	3.9	2.6	2.2	**3.4**	12.1
Reserve	Alexander	Tularosa River	.2	.9			1.1
	Cienega	San Francisco River				**3.5**	3.5
	Corner Mountain	South Fork Negrito Creek				**2.5**	2.5
	Deep Canyon	Tularosa River			1.3	**1.3**	2.6
	Eagle Peak	Negrito Creek		1.3		**5.1**	6.4
	Frisco Plaza	San Francisco River				**7.5**	7.5
	Govina	Tularosa River		.2	.4	**.3**	.9
	Negrito-Yeguas	South Fork Negrito Creek, Deep Creek, Burro Canyon		1.7	1.9	**11.1**	14.7
Silver City	Gila River	Gila River			.8	**7.2**	8.0
Wilderness	Diamond Bar	Diamond Creek		1.4	1.5	**2.3**	5.2
	Jordan Mesa	East Fork Gila River		1.7	2.5	**2.6**	6.8
	Taylor Creek	Beaver Creek				**1.4**	1.4
	XSX	East Fork Gila Black Canyon		.6	1.8		2.4
Total Gila NF Surveyed Stream Miles (2021)			**Absent**	**Light**	**Moderate**	**Significant**	**Total**
			9.8	**10.6**	**13.8**	**82.9**	**117.1**

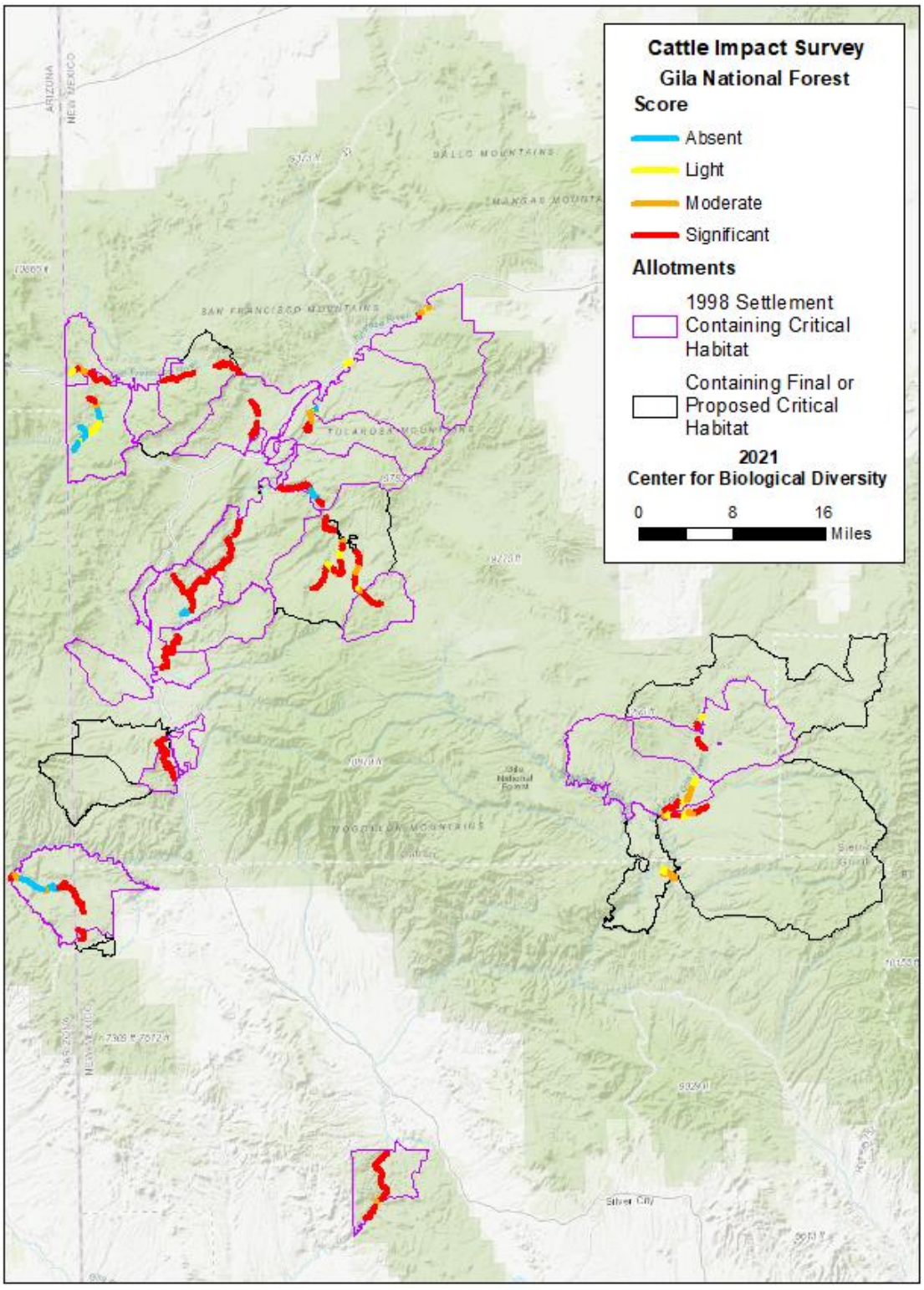
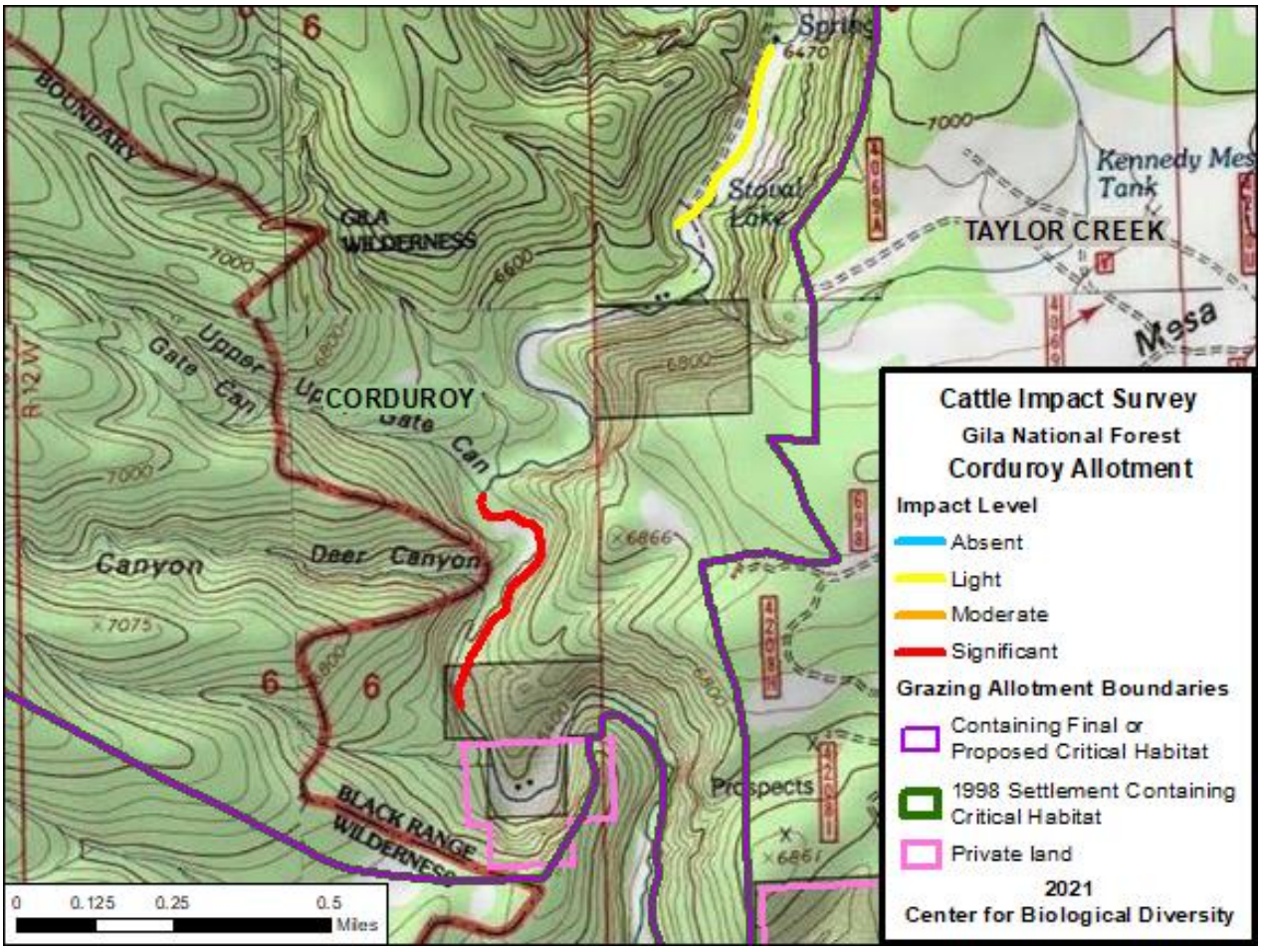


FIGURE 1. CATTLE IMPACTS WITHIN RIPARIAN AREAS WITH CRITICAL HABITAT IN GILA NATIONAL FOREST

ALLOTMENT SURVEY DESCRIPTION

District: **Black Range**
Allotment: **Corduroy**
Critical Habitat: **Chiricahua leopard frog**
Drainage: **Beaver Creek**
Surveyed: **4/28/2021**
Cattle Seen: **No**

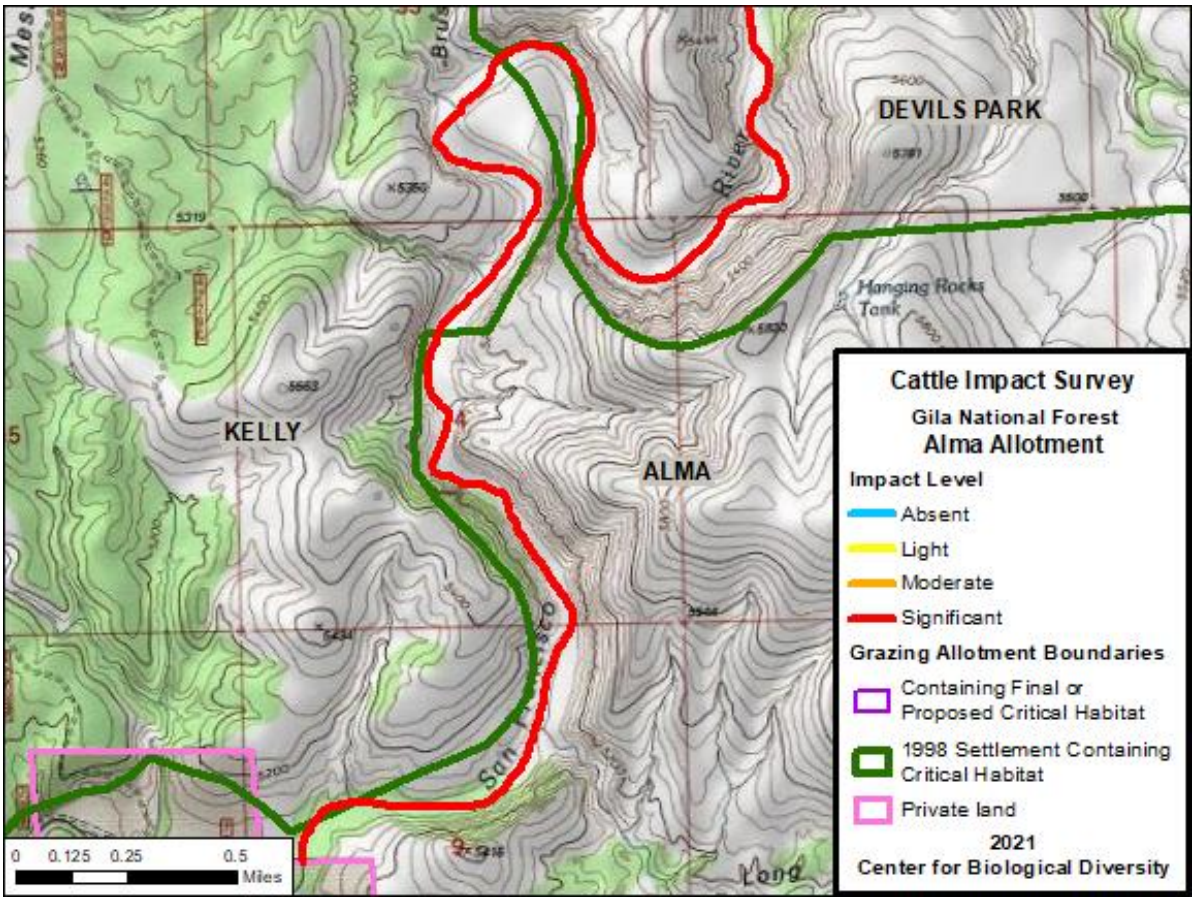
In a 2019 survey, cattle sign was current. In 2021, there was no current sign of grazing, trailing, or feces and some areas are recovering vegetation (photo.). However, cattle damage is still significant, and severe and pervasive grazing impacts on soils persist (photo).



Absent	Light	Moderate	Significant	Total
	.3 miles		**.5 miles**	.8 miles

District: **Glenwood**
Allotment: **Alma**
Critical Habitat **Loach minnow, Narrow-headed garter snake (PCH), Southwestern willow flycatcher, Spikedace, Yellow-billed cuckoo**
Drainage: **San Francisco River**
Surveyed: **5/18/2021**
Cattle Seen: **Yes**

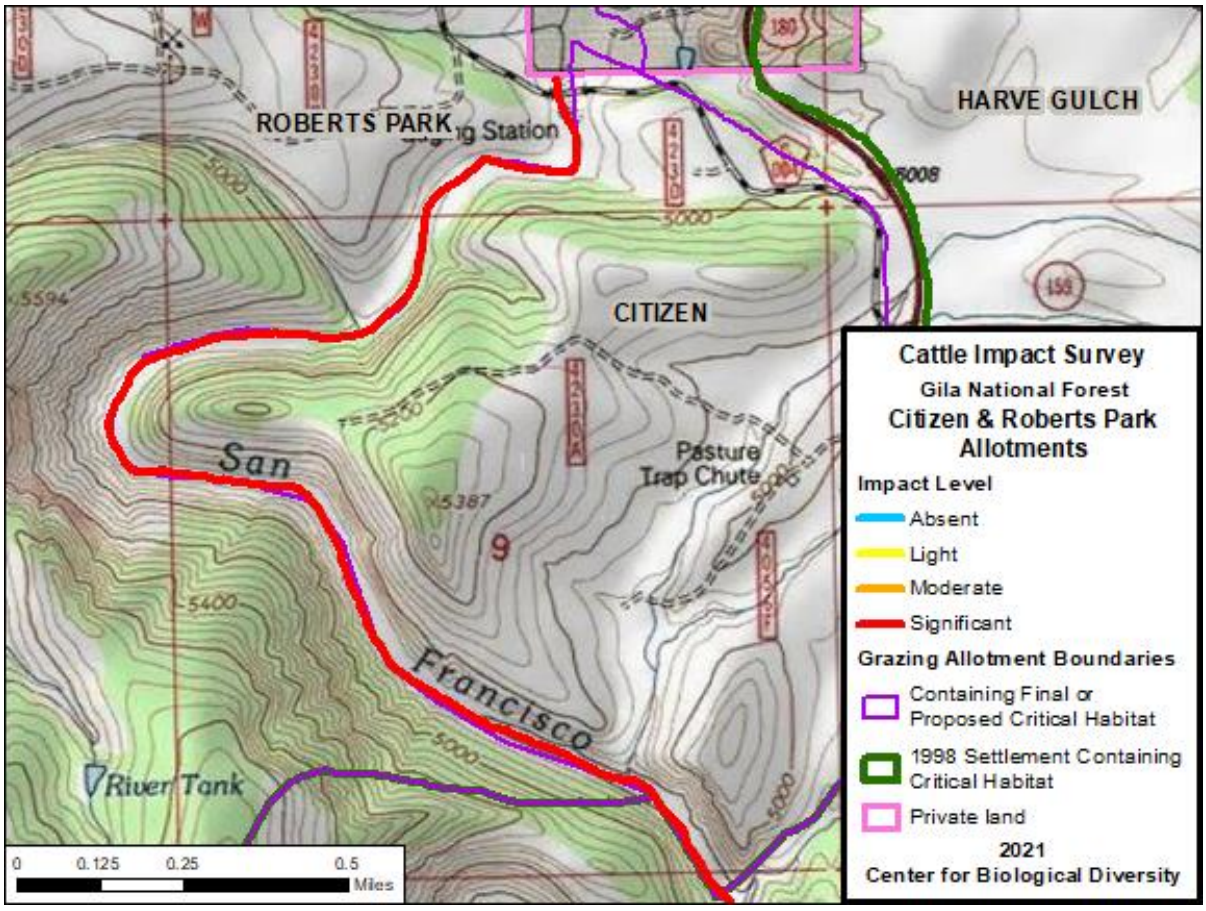
Fresh cattle sign was seen throughout the allotment. Banks were consistently sheared, and woody regeneration was browsed in most areas. Cows are utilizing streamside areas and entering the water (photo). Trails are evident throughout but along the river, and inland. Where the Alma allotment meets both the Kelly and Devils Park allotment boundaries, a bull ran through into the Alma allotment through holes in the exclosure fencing.



Absent	Light	Moderate	Significant	Total
			1.9 miles	1.9 miles

District: **Glenwood**
Allotment: **Citizen/Roberts Park**
Critical Habitat **Loach minnow, Narrow-headed garter snake (PCH), Southwestern willow flycatcher, Spikedace, Yellow-billed cuckoo.**
Drainage: **San Francisco River**
Surveyed: **5/18/2021**
Cattle Seen: **No**

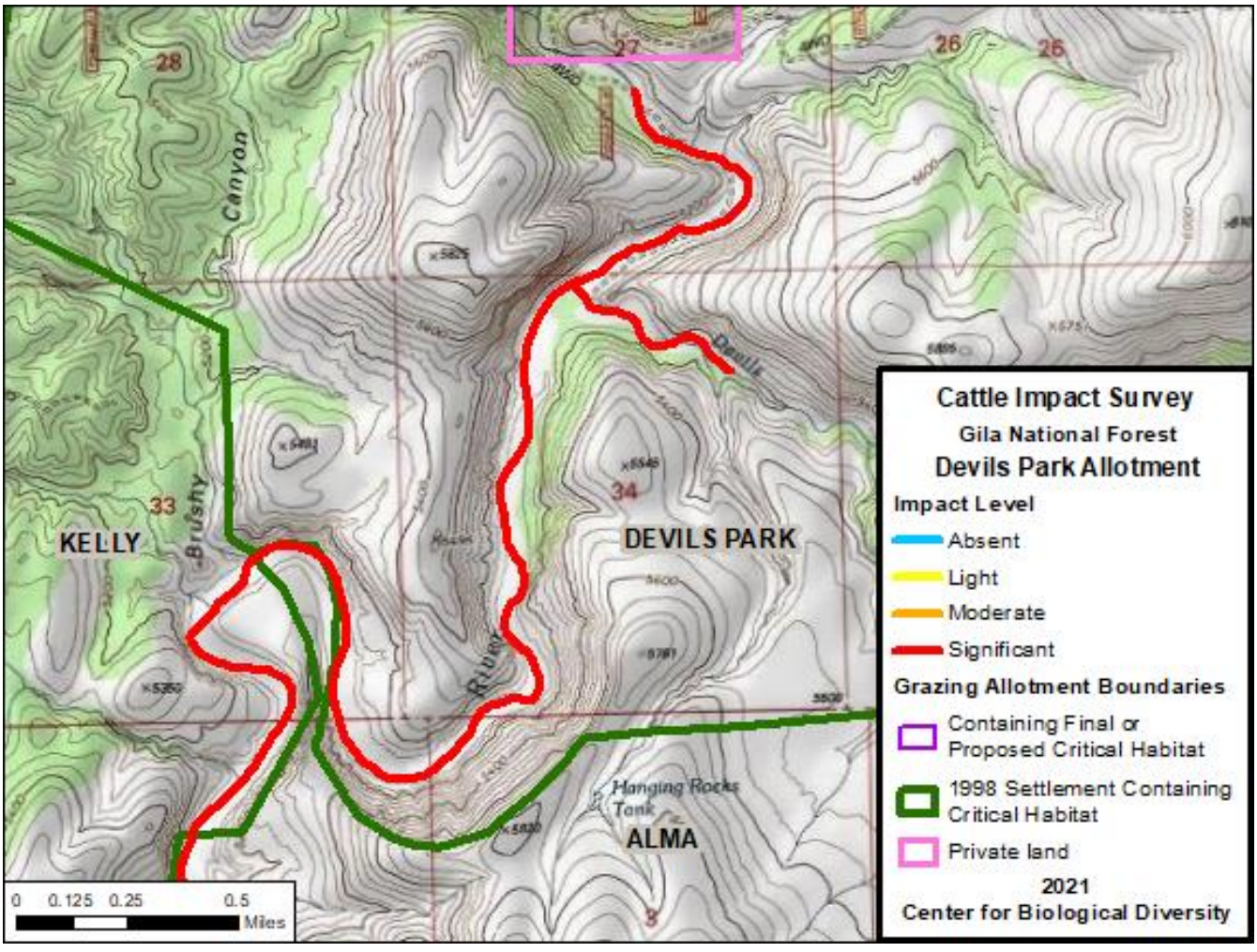
Surveys of this allotment in 2017 and 2019 saw evidence of current cattle use. In 2021, no current sign was seen, but streamside areas are still significantly impacted from past grazing and there are large segments of this allotment completely devoid of vegetation with completely denuded soils (photo). Equine sign is fresh and horses appear to be currently grazing within exclosures (photo).



Absent	Light	Moderate	Significant	Total
			2.4 miles	2.4 miles

District: **Glenwood**
Allotment: **Devils Park**
Critical Habitat: **Loach minnow, Narrow-headed garter snake (PCH), Spikedace**
Drainage: **San Francisco River**
Surveyed: **5/16/21**
Cattle Seen: **Yes**

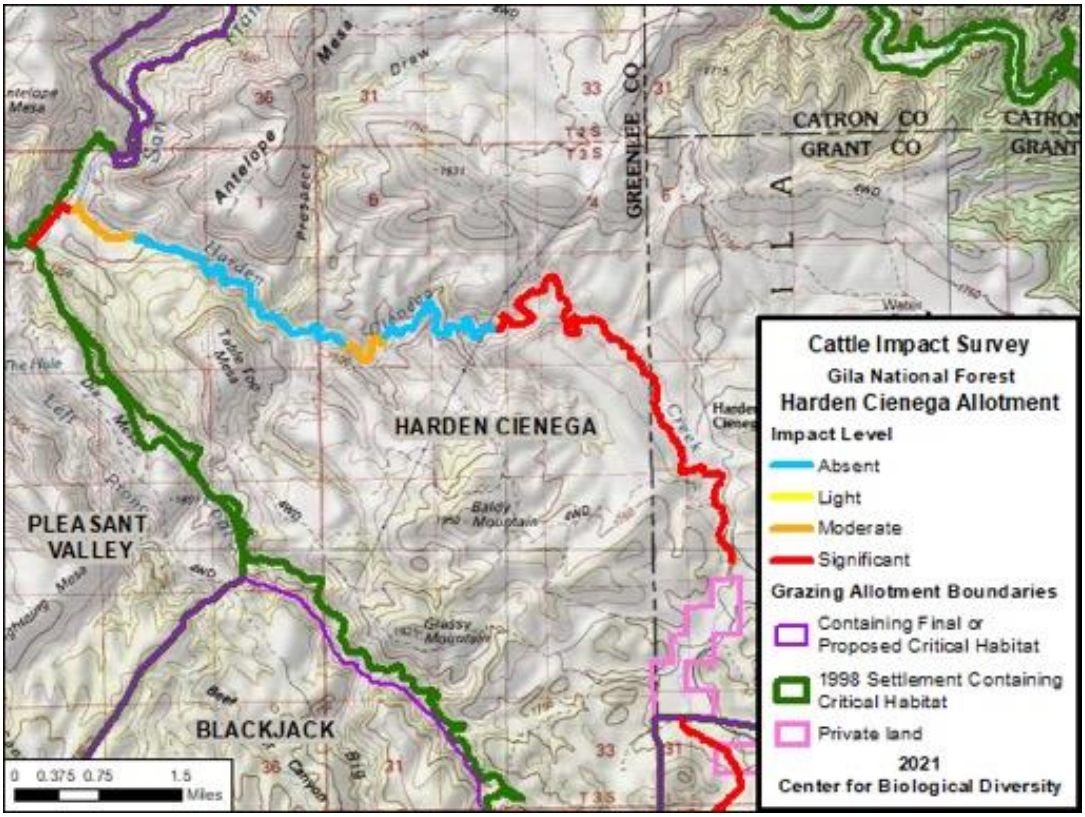
Old cattle impacts are severe, pervasive, and sustained. Current cattle sign also exists with upland wallows and denuded soils (photo). Cattle trails are well worn and interconnected with ten to fifteen head of cattle observed at the time of survey (photo).



Absent	Light	Moderate	Significant	Total
			3.5 miles	3.5 miles

District: **Glenwood**
Allotment: **Harden Cienega/Tennessee**
Critical habitat: **Gila chub, Loach minnow, Southwestern willow flycatcher, Spikedace**
Drainage: **San Francisco River, Harden Cienega Creek**
Surveyed: **5/04/21**
Cattle Seen: **No**

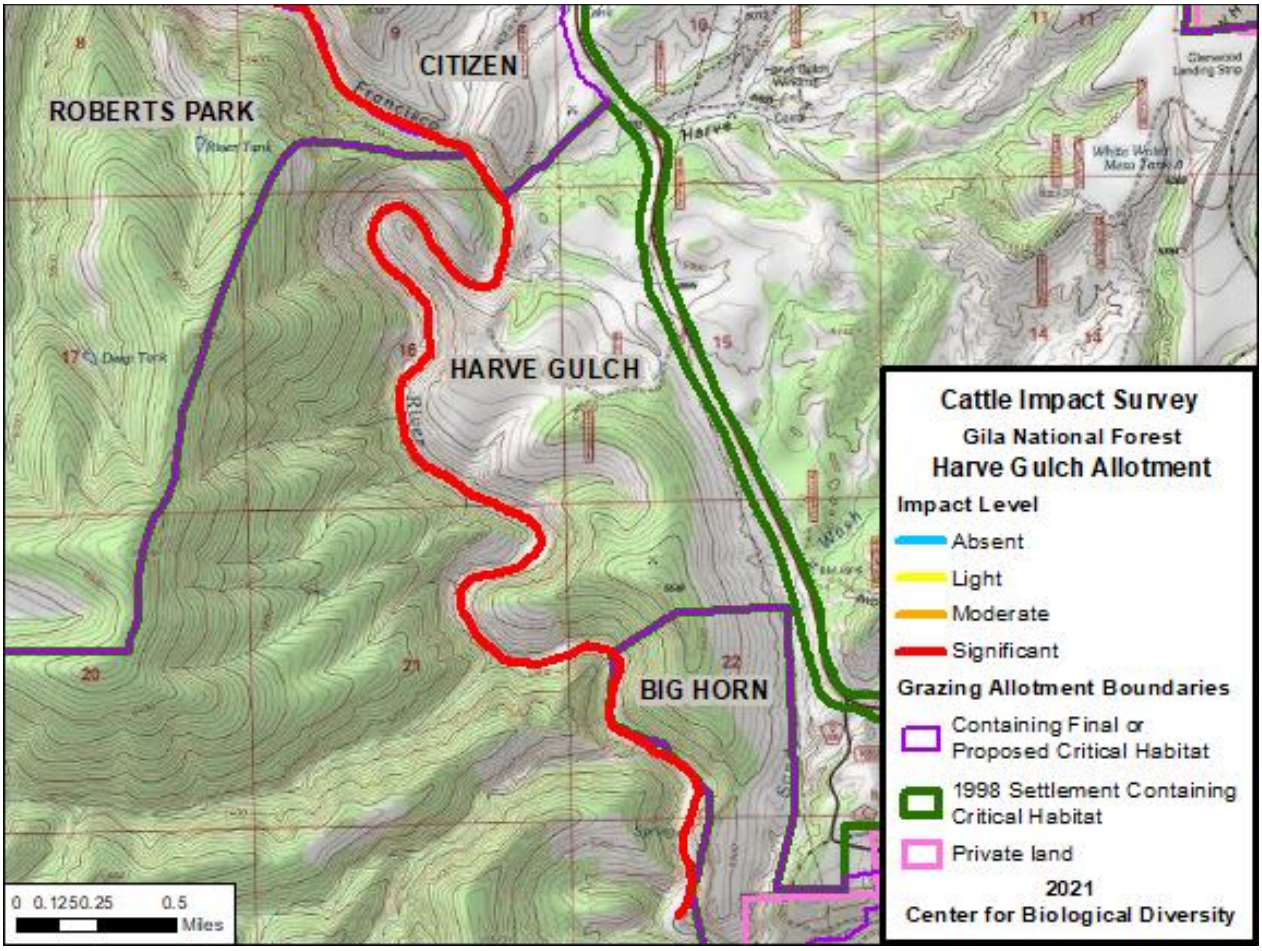
On the upstream, NM portion of Harden Cienega Creek, the vegetation is grazed down to rock and bare soil (photo). Grazing impact was severe, and widespread just down canyon from the private property at the NM/AZ border where there was no fencing. Moving downstream, cows continue to enter the canyon at accessible areas to graze. In the slot canyon, ground water appears, vegetation is thick and there is no cattle impact. As the creek enters the San Francisco flood plain, moderate to severe cattle impacts reappear and persists to the allotment boundary.



Absent	Light	Moderate	Significant	Total
4.6 miles		1.4 miles	**5.9 miles**	11.9 miles

District: **Glenwood**
Allotment: **Harve Gulch**
Critical Habitat: **Loach minnow, Narrow-headed garter snake (PCH), Southwestern willow flycatcher, Spikedace, Yellow-billed cuckoo**
Drainage: **San Francisco River**
Surveyed: **5/18/2021**
Cattle Seen: **Horses-Yes**

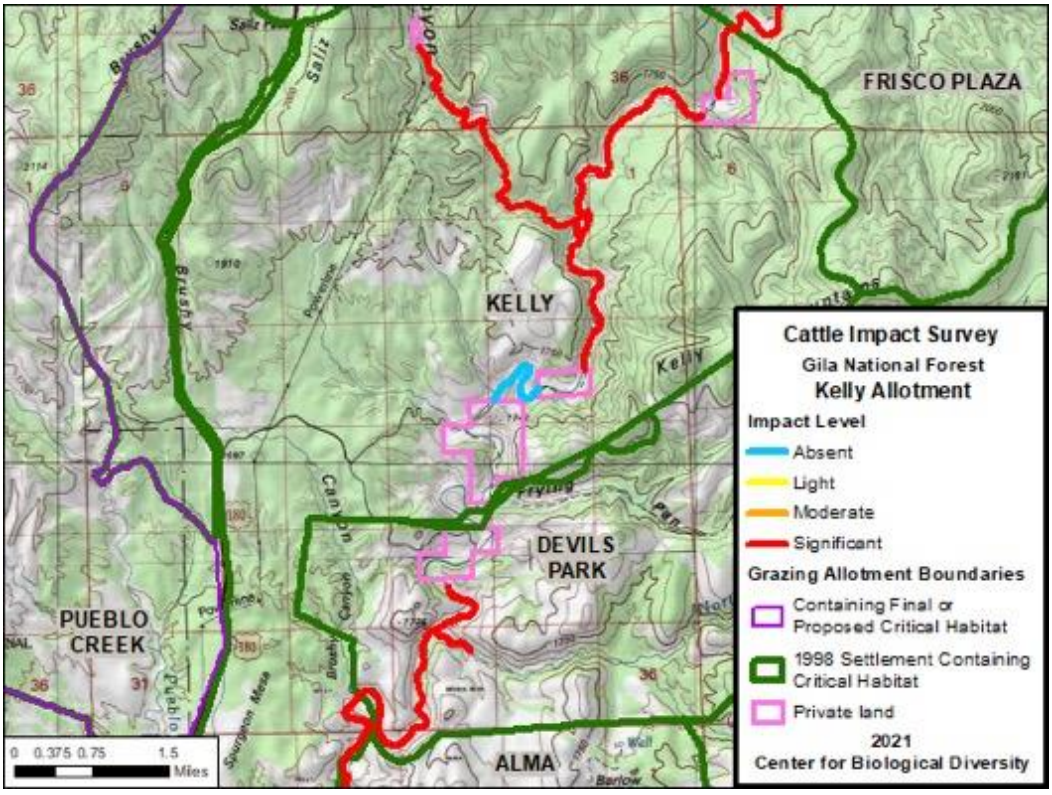
At the upstream end of the allotment, banks are completely denuded. While there is no new cattle sign, grazing damage persists and much of the landscape is degraded (photo). Three horses were seen in the canyon and are causing bankside soil erosion. (2 black) (1 brownish red) were in the canyon and have caused considerable damage (photo).



Absent	Light	Moderate	Significant	Total
			4.1 miles	4.1 miles

District: **Glenwood**
Allotment: **Kelly**
Critical Habitat: **Loach minnow, Narrow-headed garter snake (PCH), Southwestern willow flycatcher, Spikedace, Yellow-billed cuckoo**
Drainage: **San Francisco River, Saliz Canyon**
Surveyed: **5/17/2021**
Cattle Seen: **Yes**

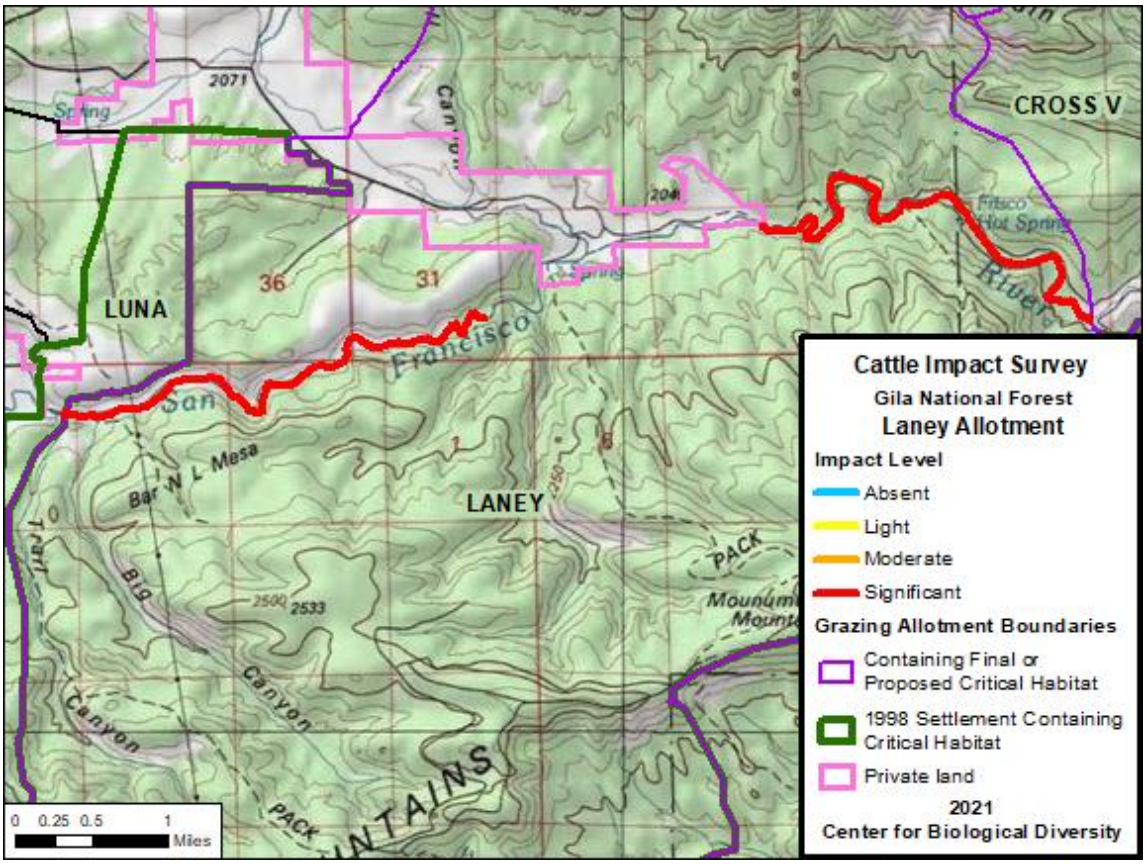
In surveys in 2017 and 2019, extensive cattle sign was documented on the San Francisco portion of the allotment. In 2021, no recent cattle sign was seen on the San Francisco. However, there is still extensive habitat damage from past grazing and impacts still rate severe and pervasive throughout and ground disturbances are still extensive (photo). In Saliz canyon, which was untrammeled and clear of cattle in past surveys, cattle impacts are now pervasive and severe in all impact categories-grazing, ground disturbance, trailing, and browsing on woody vegetation was extensive (photo). Four cows and two calves were seen with Kelly ranch tags **(**photo).



Absent	Light	Moderate	Significant	Total
1.1 miles			**9.3 miles**	10.4 miles

District: **Quemado**
Allotment: **Laney**
Critical Habitat: **Narrow-headed garter snake (PCH), Southwestern willow flycatcher**
Drainage: **San Francisco River**
Surveyed: **5/24/2021**
Cattle Seen: **Yes-100 head**

The San Francisco River on the Laney allotment is divided in half by private property. West of the private property a total of nineteen cows were seen, most with no ear tags. Cattle are grazing down to soil level (photos). East of the private property, seventy-two cows were seen- some with identifiable brands (photo). The impacts were severe and pervasive with extensive streamside damage (photo). The river is almost completely devoid of woody vegetation. On the eastern side of the private property, fences were down, allowing cattle unlimited access to the river downstream.



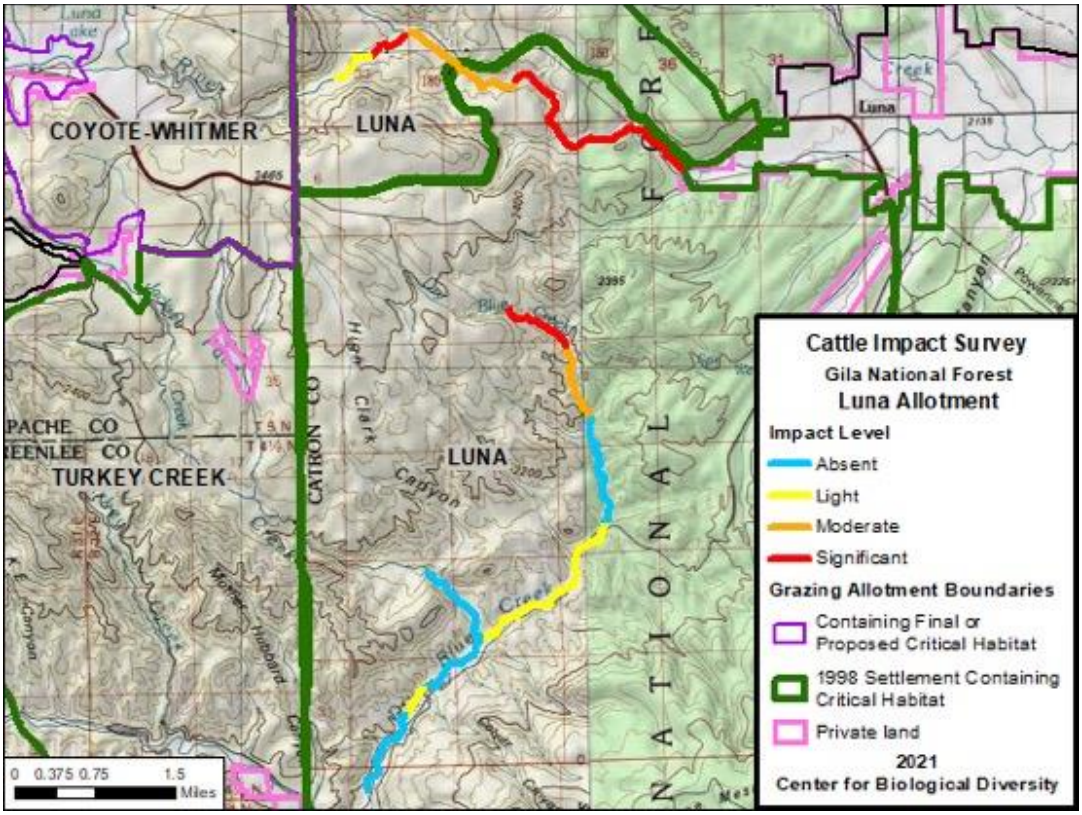
Absent	Light	Moderate	Significant	Total
			7.3 miles	7.3 miles

Extensive grazing and trampling damage on the San Francisco River within the Laney allotment.

Denuded soils and degraded landscape on the San Francisco River on critical habitat in the Luna allotment.

District: **Quemado**
Allotment: **Luna**
Critical Habitat: **Loach minnow, Narrow-headed garter snake (PCH), Southwestern willow flycatcher, Spikedace**
Drainage: **San Francisco River**
Surveyed: **5/24/21**
Cattle Seen: **Yes**

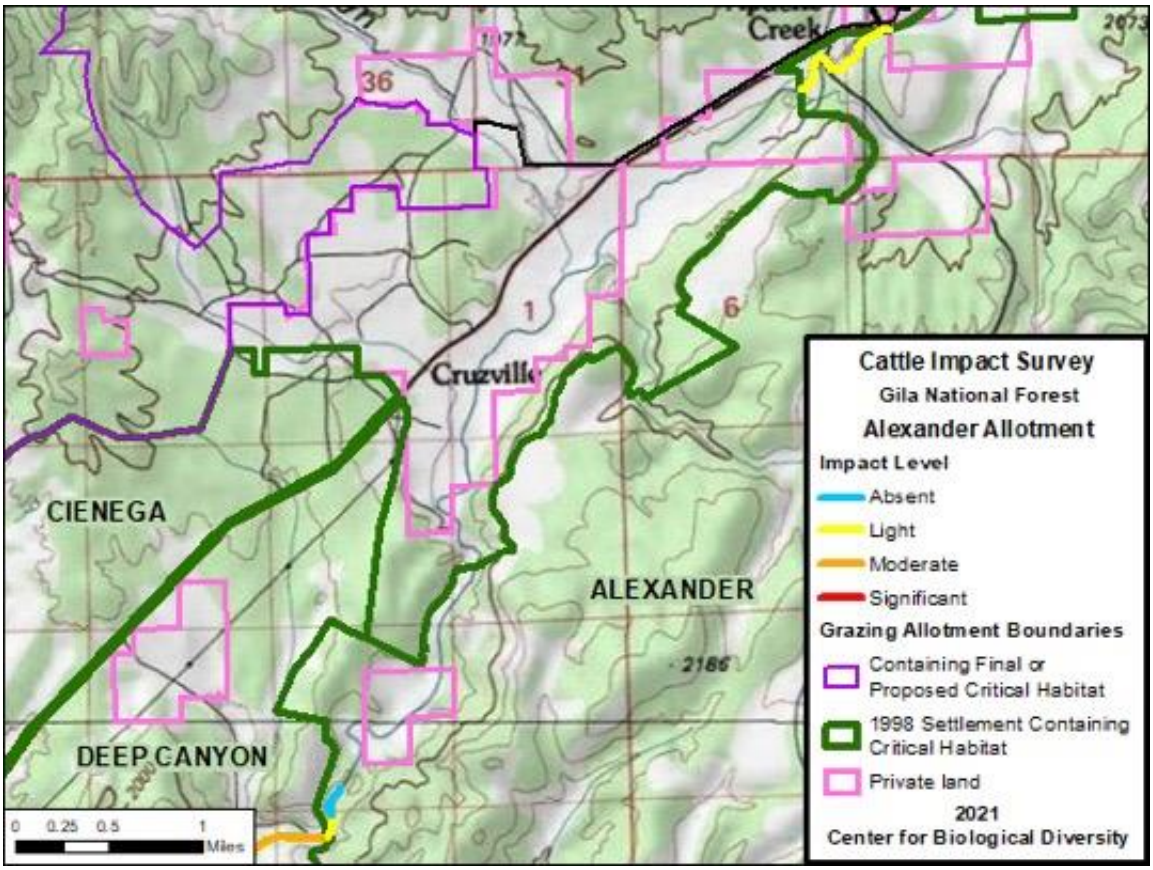
Dry Blue Creek was clear of sign on the southern end. On the very northern end, the last two sections before the waterfall stopping point there was a bull seen trampling and degrading the watered areas. On the San Francisco stretch, ten cows and /calves were seen east of the campground and ten west of the campground. One ear tag read Spur Ranch and some calves had brands (photo). The river was severely degraded, grazed and trampled down to bare and denuded soil (photo) (photo). Woody vegetation was chewed and busted. Impacts lessened on the upstream end of the allotment but returned to severe closer to the bridge.



Absent	Light	Moderate	Significant	Total
3.9 miles	2.6 miles	2.2 miles	**3.4 miles**	12.1 miles

District: **Reserve**
Allotment: **Alexander**
Critical Habitat: **Chiricahua leopard frog, Loach minnow, Narrow-headed garter snake (PCH)**
Drainage: **Tularosa River**
Surveyed: **7/19/2021**
Cattle Seen: **No**

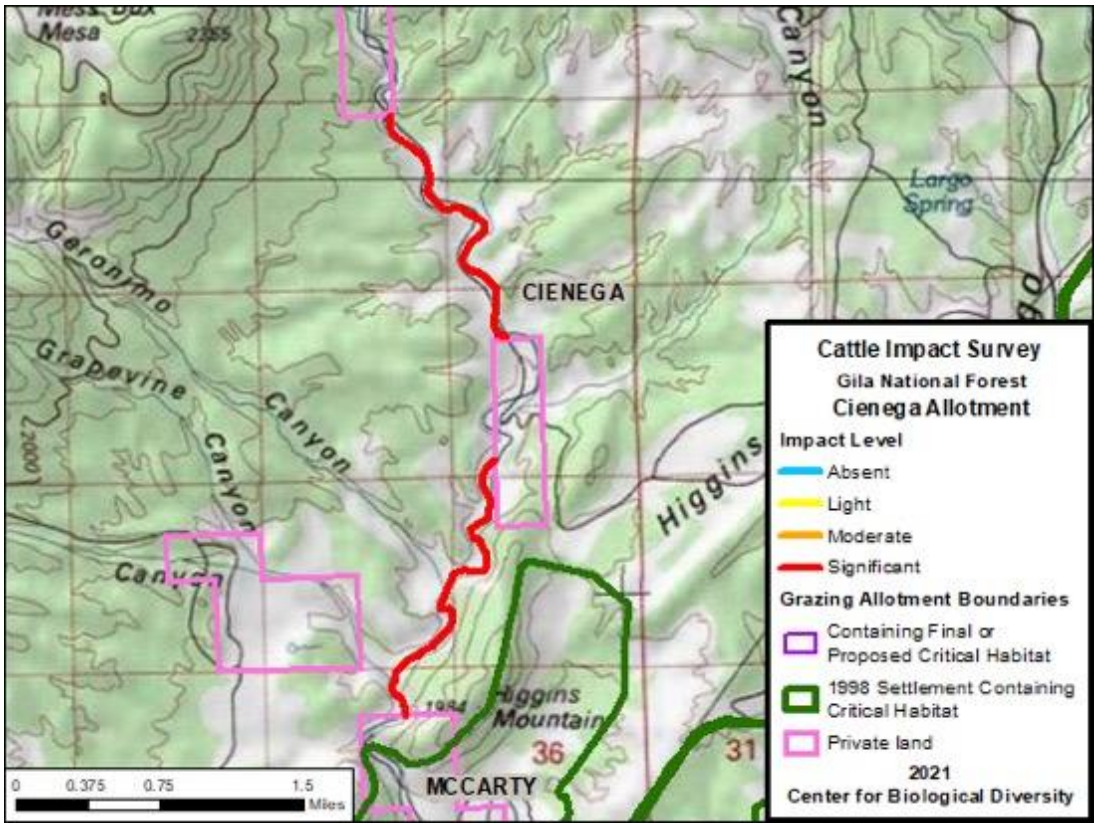
The upstream section surveyed is within the Apache Creek campground area and is recovering from fire, with no current cattle sign or impact. The downstream segment surveyed has some transient cattle use and current sign and impact which may be from the allotment at the downstream boundary. The upstream portion of this segment boxes up quickly and is robust with vegetation and has no cattle sign (photo).



Absent	Light	Moderate	Significant	Total
.2 miles	.9 miles			1.1 miles

District: **Reserve**
Allotment: **Cienega**
Critical Habitat: **Chiricahua leopard frog, Loach minnow, Narrow-headed garter snake(PCH)**
Drainage: **San Francisco River**
Surveyed: **5/12/21**
Cattle Seen: **Yes**

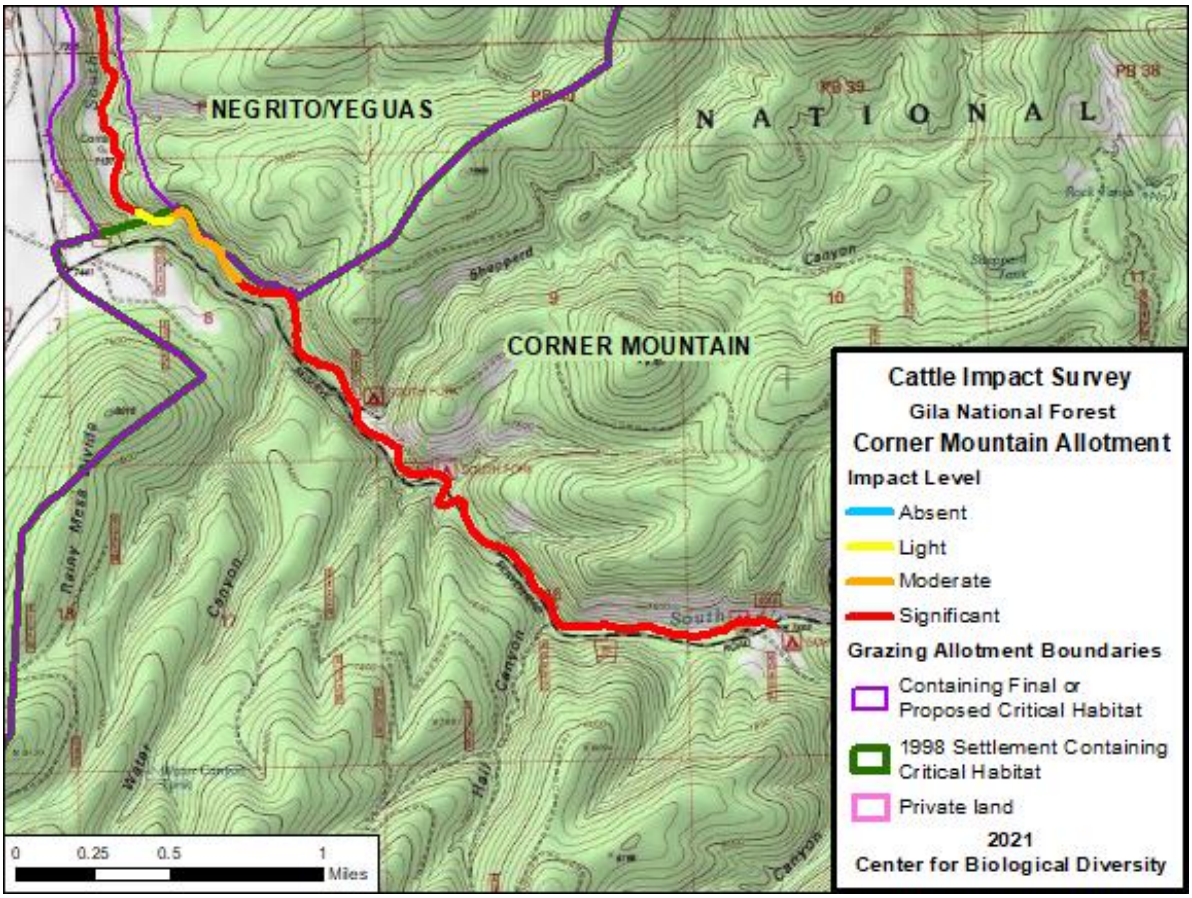
This allotment exceeded the rating scale of the surveyor-all cattle impact categories ranked the most severe and pervasive. In the upstream sections, river banks were sheared and denuded (photo), giving the area a "wasteland" appearance (photo). A small group of cattle were seen being herded into the critical habitat exclosure area near the southern property boundary of the centrally located property in the survey area. Severe impacts to woody regeneration continue down the length of the reach (photo).



Absent	Light	Moderate	Significant	Total
			3.5 miles	3.5 miles

District: **Reserve**
Allotment: **Corner Mountain**
Critical Habitat: **Narrow-headed garter snake PCH**
Drainage: **Negrito Creek**
Surveyed: **5/11/2021**
Cows Seen: **No**

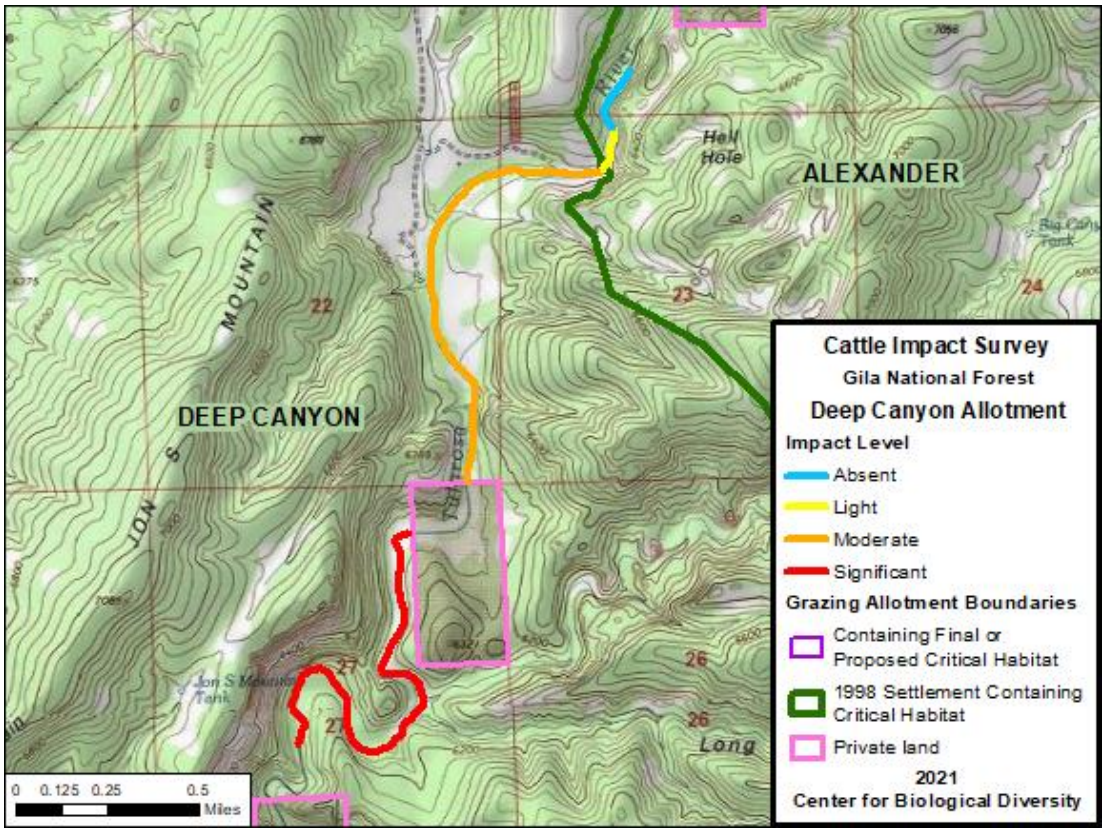
Cattle impact is varied throughout this reach, with some un-grazed sections, thick with willow growth (upstream) and other sections with severe and pervasive stream bank degradation between the two campgrounds. In this area, cattle are trampling the banks to enter the riparian area to water (photo). This area is rich with natural springs which are muddied with cow feces (photo) similar to the condition when last in 2019. At the downstream end, impacts moderate, with mixed new and old cattle sign.



Absent	Light	Moderate	Significant	Total
			2.5 miles	2.5 miles

District: **Reserve**
Allotment: **Deep Canyon**
Critical Habitat: **Chiricahua leopard frog, Loach minnow, Narrow-headed garter snake PCH**
Drainage: **Tularosa River**
Surveyed: **7/19/21**
Cattle Seen: **No**

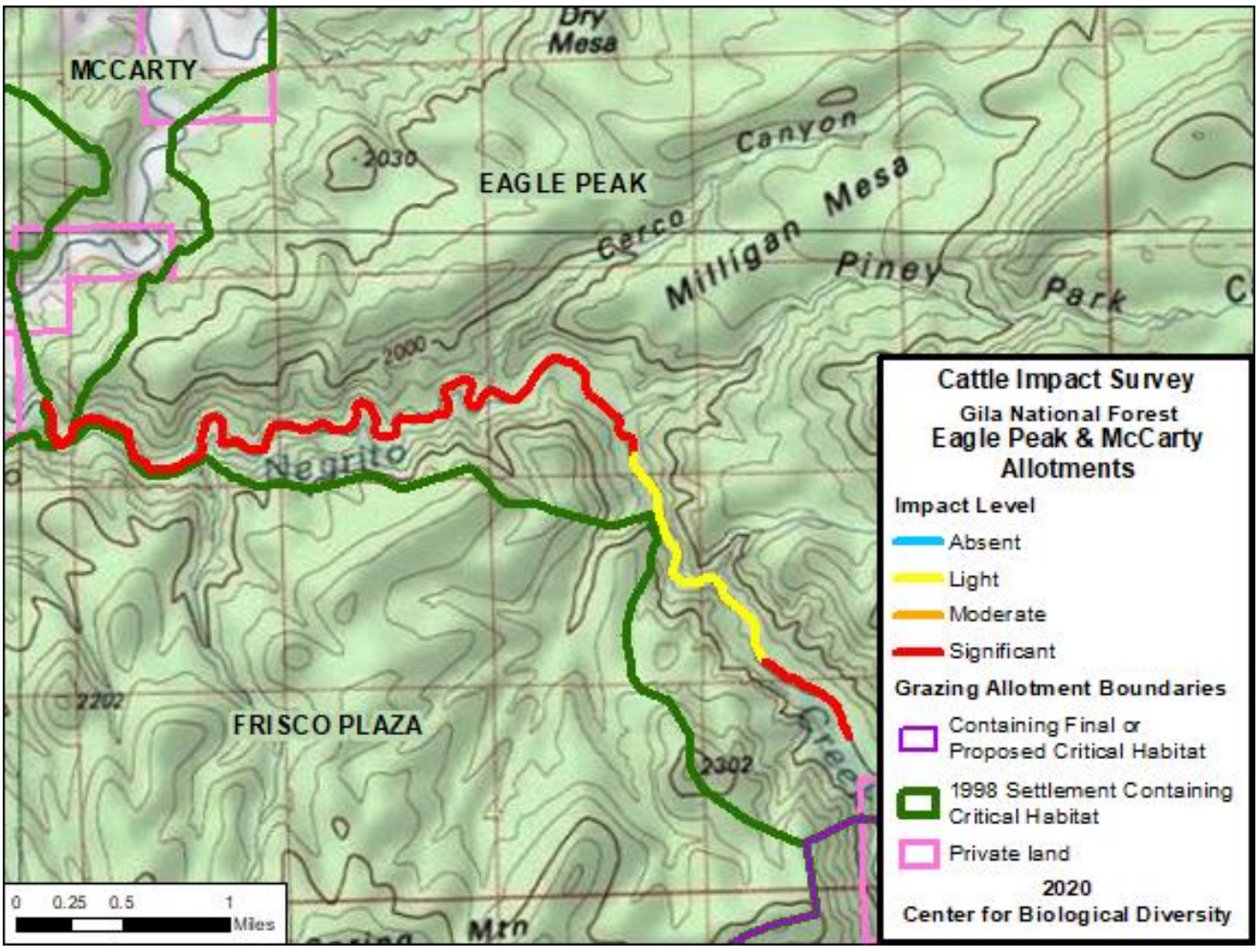
At the upstream end of the allotment, impacts are old, and the landscape is recovering. Closer to the private property boundary, localized impacts increase in frequency. Downstream of the private property boundary, cattle sign is very recent, and grazing pressure has mowed some areas down to soil (photo). There are multiple cattle trails crossing the canyon as it narrows and pervasive bank shearing and trampling (photo). While cows were not seen, sign indicated current use (photo).



Absent	Light	Moderate	Significant	Total
		1.3 miles	**1.3 miles**	2.6 miles

District: **Reserve**
Allotment: **Eagle Peak**
Type: **1998 Settlement**
Drainage: **Tularosa**
Surveyed: **9/11/2020**
Cows Seen: **Yes**

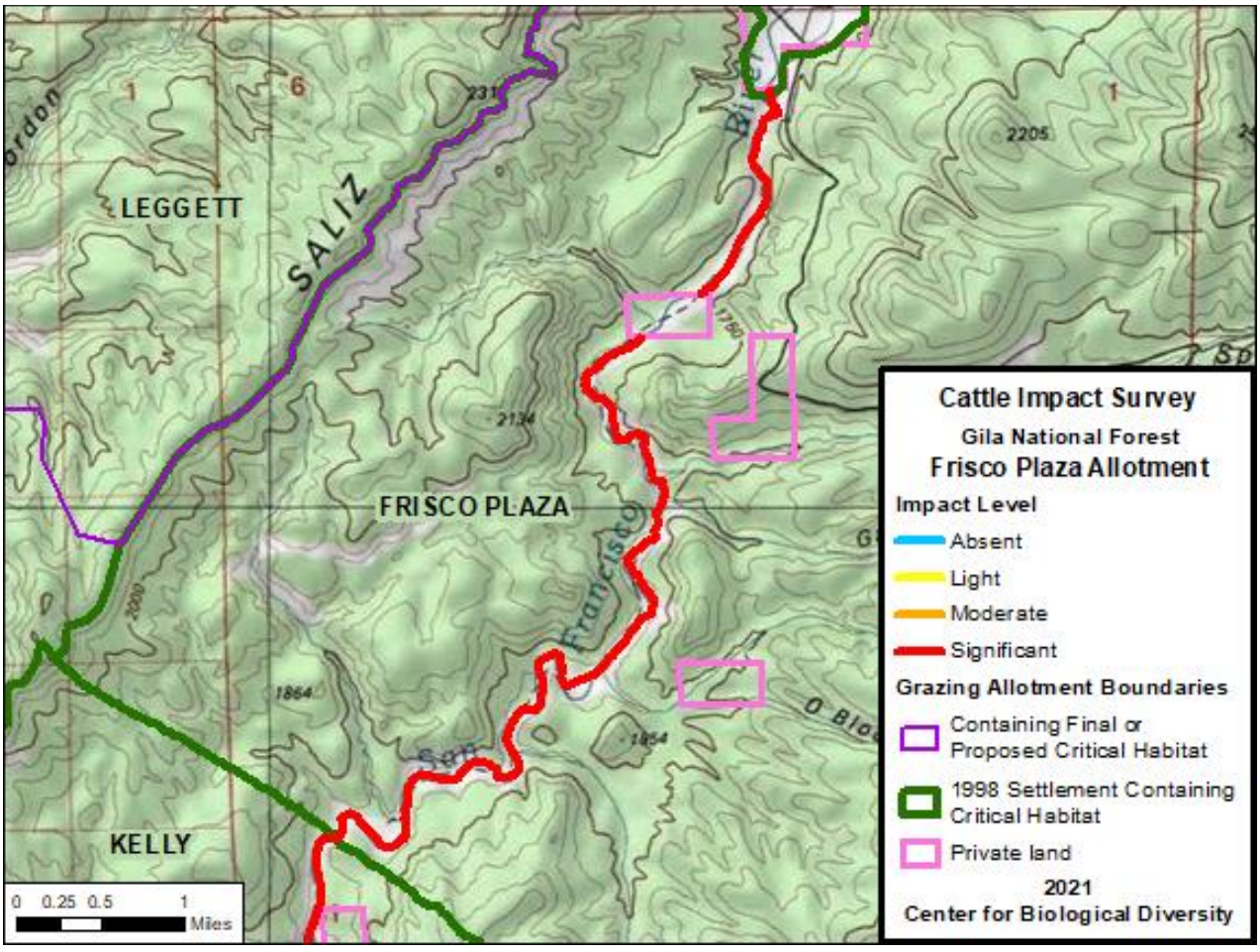
On the eastern, upstream end of the allotment, grazing intensity is severe and pervasive and cows are trampling stream edges (photo). At the downstream end of the allotment and into the McCarty allotment, impacts continue and large upland wallows and denuded soils were frequent (photo**).** Midway into allotment, approximately a dozen cows were seen.



Absent	Light	Moderate	Significant	Total
	1.3 miles		**5.1 miles**	6.4 miles

District: **Reserve**
Allotment: **Frisco Plaza**
Critical Habitat: **Loach minnow FCH, Narrow-headed garter snake (PCH), Spikedace**
Drainage: **San Francisco River**
Surveyed: **5/30-31/2017**
Cattle Seen: **Yes**

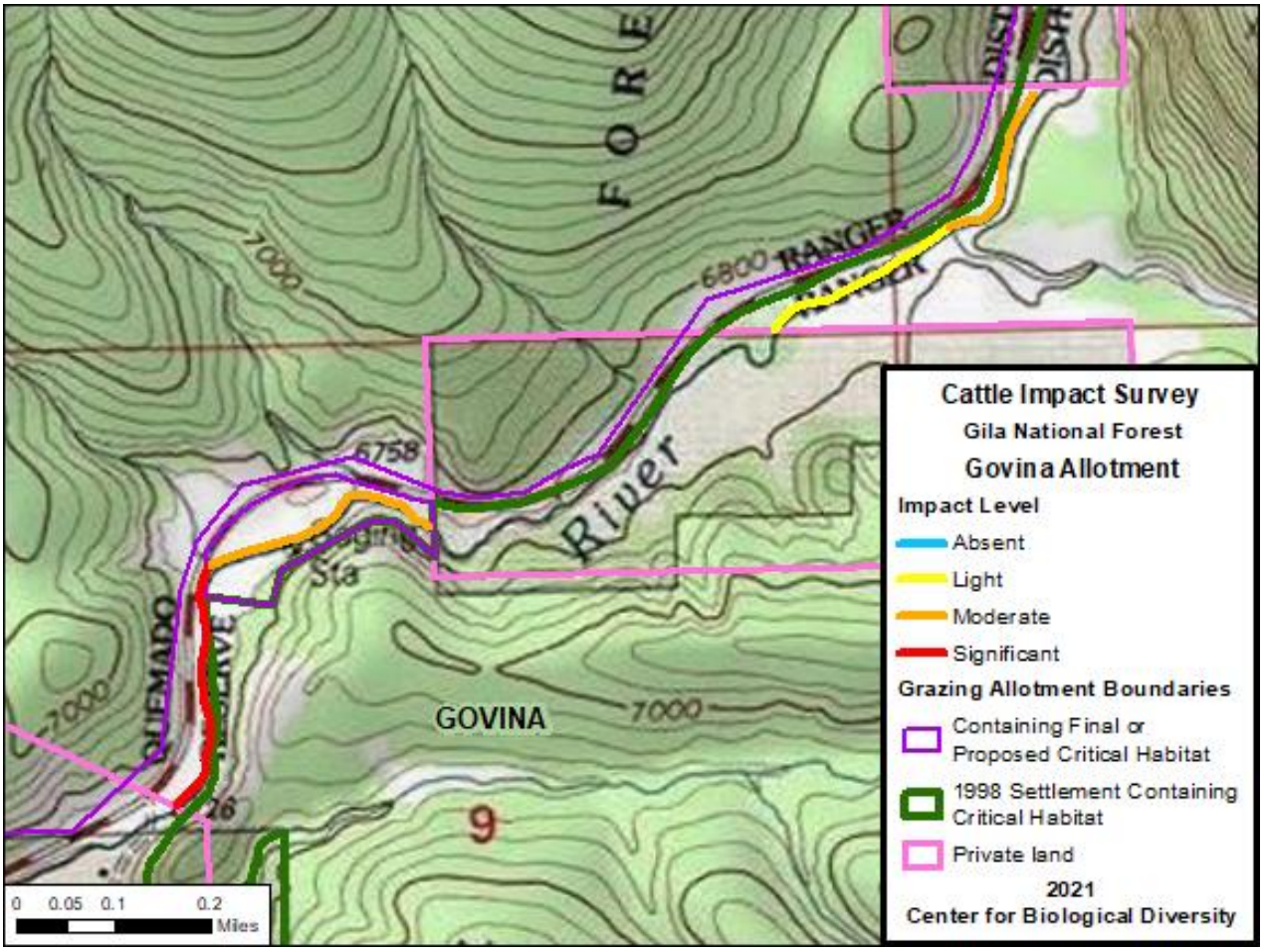
At the upstream end of the allotment, little current impact was seen. While impacts still rate severe from past degradation, vegetation is recovering in areas (photo). Downstream, impacts become more recent and current sign shows cattle entering the water inside exclosure (photo). Midway down the allotment, two cows were seen.



Absent	Light	Moderate	Significant	Total
			7.5 miles	7.5 miles

District: **Reserve**
Allotment: **Govina**
Critical Habitat: **Chiricahua leopard frog**
Drainage: **Tularosa River**
Surveyed: **7/10/2021**
Cattle Seen: **No**

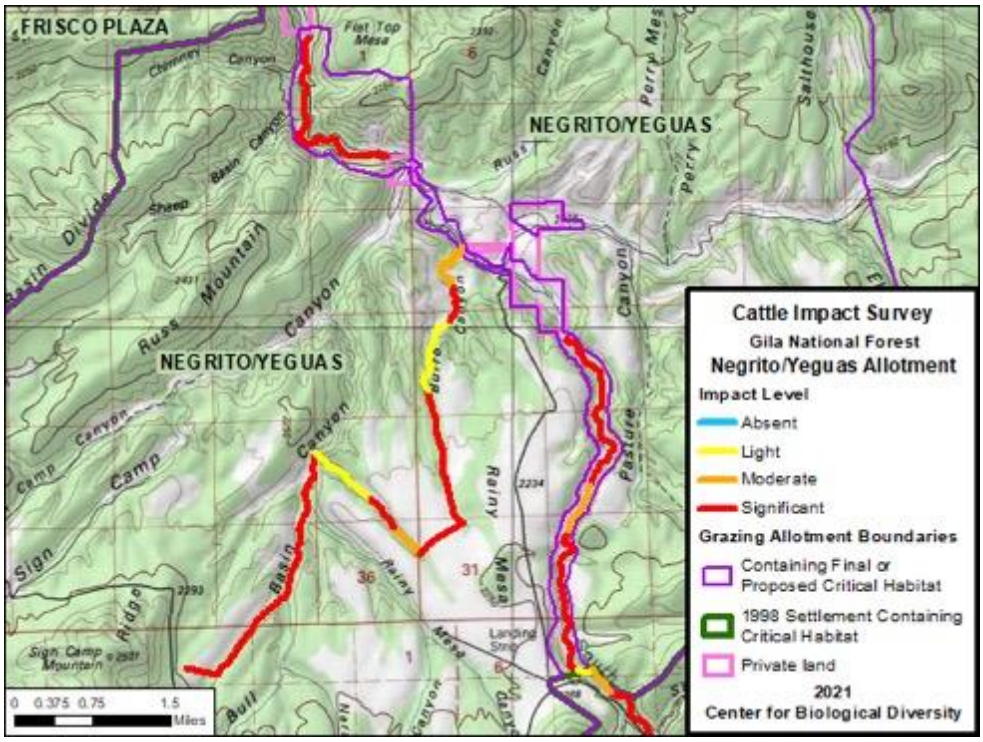
There is no current use within the excluded areas and fencing appears repaired. However, the fencing has been placed very close to the water's edge so degradation and cattle impacts can still come within critical habitat (photo). Much of the area is still highly degraded and streamside vegetation has not recovered from past grazing and trampling (photo).



Absent	Light	Moderate	Significant	Total
	.2	.4	**.3**	.9

District: **Reserve**
Allotment: **Negrito/Yeguas**
Critical Habitat: **Chiricahua leopard frog, Narrow-headed garter snake (PCH)**
Drainage: **Negrito Creek, Burro Canyon, Shogun Canyon**
Surveyed: **5/10/21**
Cattle Seen: **Yes**

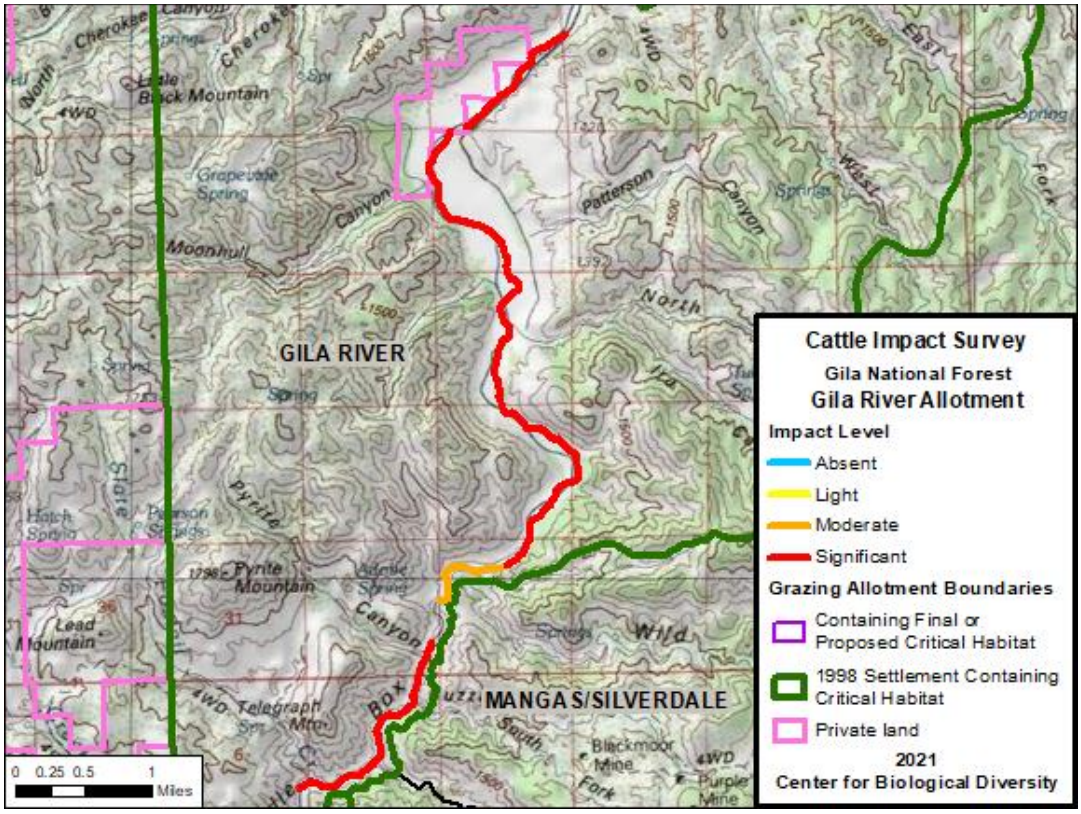
At the north end of the allotment, the waterway is mostly devoid of streamside vegetation and stream edges are continuously chiseled and trampled (photo). Impacts are pervasive and severe across all categories and damage is extreme. Four cows were seen in West Sign Camp Canyon crossing into the riparian area. Seventeen more cows were seen in area between private property boundaries, north-west of Sign Camp Canyon (photo). In Shogun canyon, cattle impact was limited in the canyon. As the canyon widened, large areas were grazed down to within a centimeter, and sign was current.



Absent	Light	Moderate	Significant	Total
	1.7 miles	1.9 miles	**11.1 miles**	14.7 miles

District: **Silver City**
Allotment: **Gila River**
Critical Habitat: **Loach minnow, Narrow-headed garter snake (PCH), Southwestern willow flycatcher, Spikedace, Yellow-billed cuckoo**
Drainage: **Gila River**
Surveyed: **4/26 & 4/28-2021**
Cattle Seen: **No**

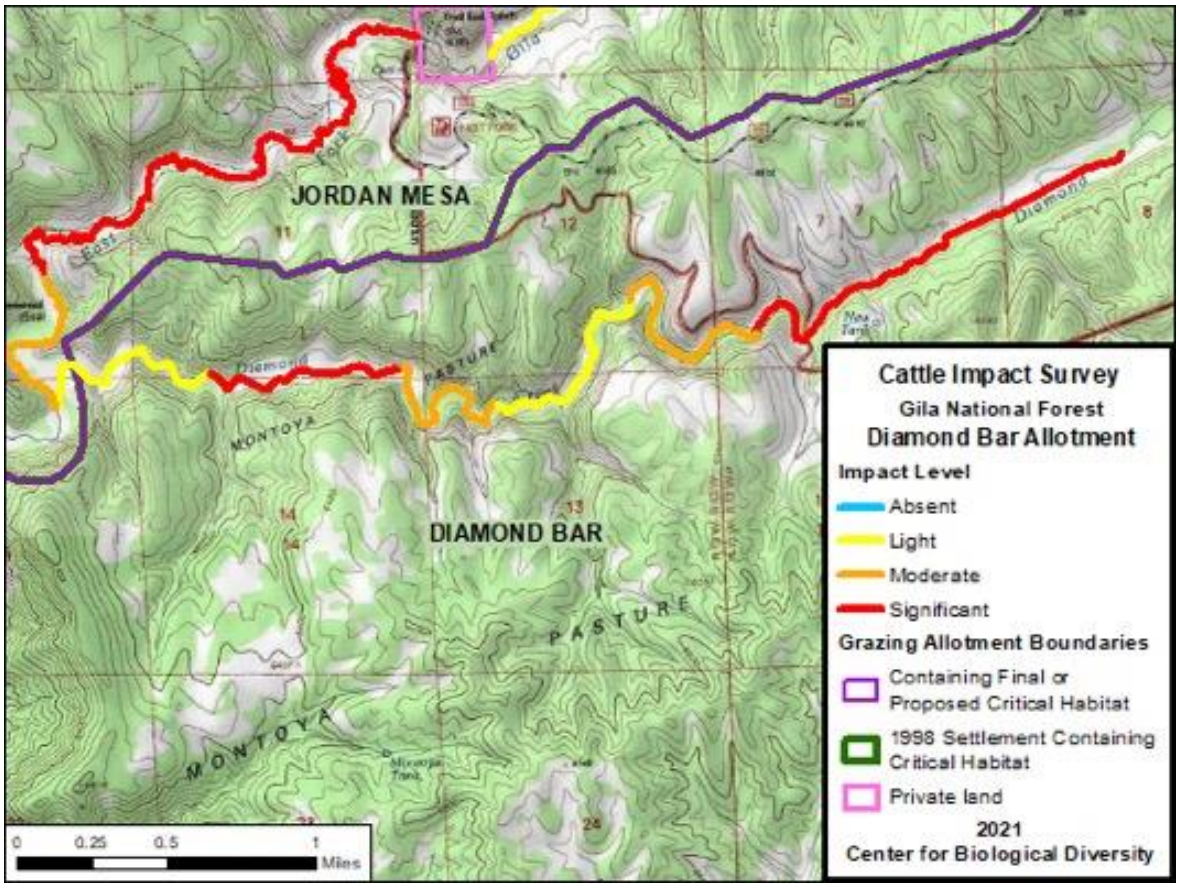
Recent sign was seen on the upstream, north end of the allotment and along the east side of the river. There were moderate to severe stream bank degradation with patchy areas of chiseling and rutted banks (photo). Down river, sign decreased but trailing and trampling increases at the furthest downstream end of the survey and cattle are moving freely up and down the canyon. Current cow impacts go further downstream (past South Fork canyon) than previously seen in 2017 and 2019. While use appears intermittent, severe impacts remain on the landscape from past grazing (photo).



Absent	Light	Moderate	Significant	Total
		.8 miles	**7.2 miles**	8.0 miles

District: **Wilderness**
Allotment: **Diamond Bar**
Critical Habitat **Chiricahua leopard frog, Loach minnow, Narrow-headed garter(PCH) snake PCH, Spikedace**
Drainage: **Diamond Creek**
Surveyed: **4/27 & 4/28/2021**
Cattle Seen: **Horses-Yes**

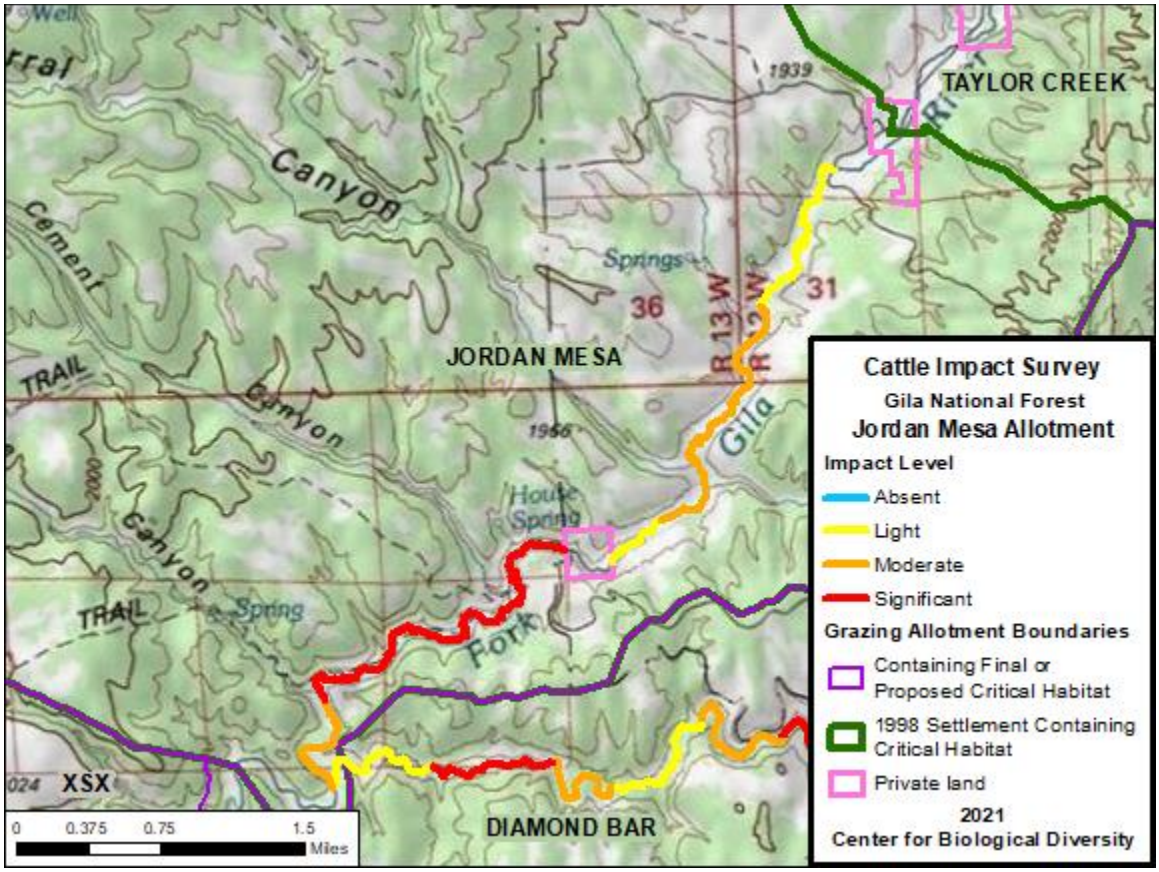
At the upstream end of the survey-near the private property ranch-seven horses were seen grazing within critical habitat (photo). Along this severely impacted section, streamside vegetation is mostly absent, and there are multiple stock trails leading down into the creek (photo). Downstream, impacts decrease in severity, and then increase again in historically heavily grazed pasture. Recent cow sign is limited.



Absent	Light	Moderate	Significant	Total
	1.4 miles	1.5 miles	**2.3 miles**	5.2 miles

District: **Wilderness**
Allotment: **Jordan Mesa**
Critical Habitat: **Loach minnow, Narrow-headed garter snake (PCH), Spikedace**
Drainage: **Gila River, East Fork**
Surveyed: **4/27/2021**
Cattle Seen: **No**

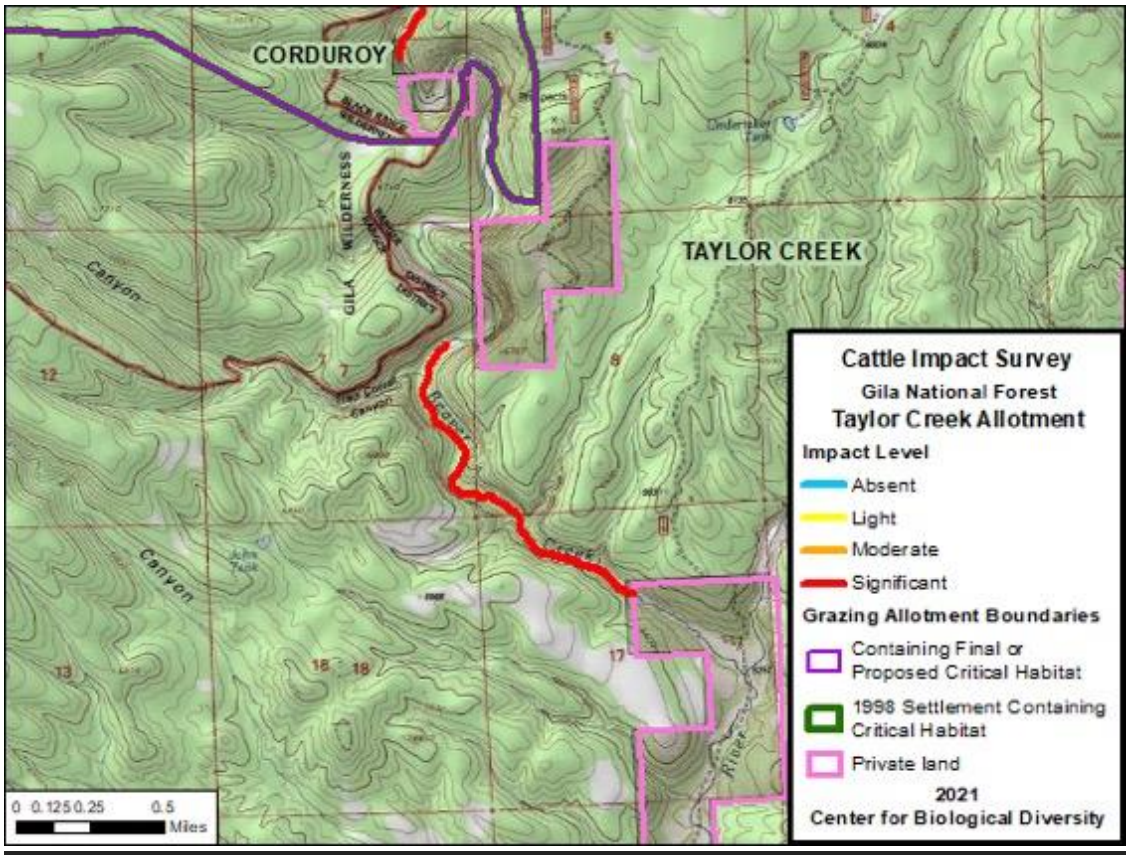
There was substantial cattle sign in the upstream section but it appeared at least a year or two old. Below Trails End Ranch, sign becomes recent and impacts more severe. Long term grazing and browsing impacts have led to highly degraded areas with no vegetation (photo). Cattle are coming down rutted trails off the hillsides and canyons into this area. There were several spots with very recent grazing and rutted and sheared stream banks where cows are entering and crossing the water (photo).



Absent	Light	Moderate	Significant	Total
	1.75 miles	2.5 miles	**2.6 miles**	6.8 miles

District: **Wilderness**
Allotment: **Taylor Creek Allotment**
Critical Habitat: **Chiricahua leopard frog, Loach minnow, Spikedace**
Drainage: **Gila River, East Fork Headwaters**
Surveyed: **4/27/2021**
Cattle Seen: **Yes**

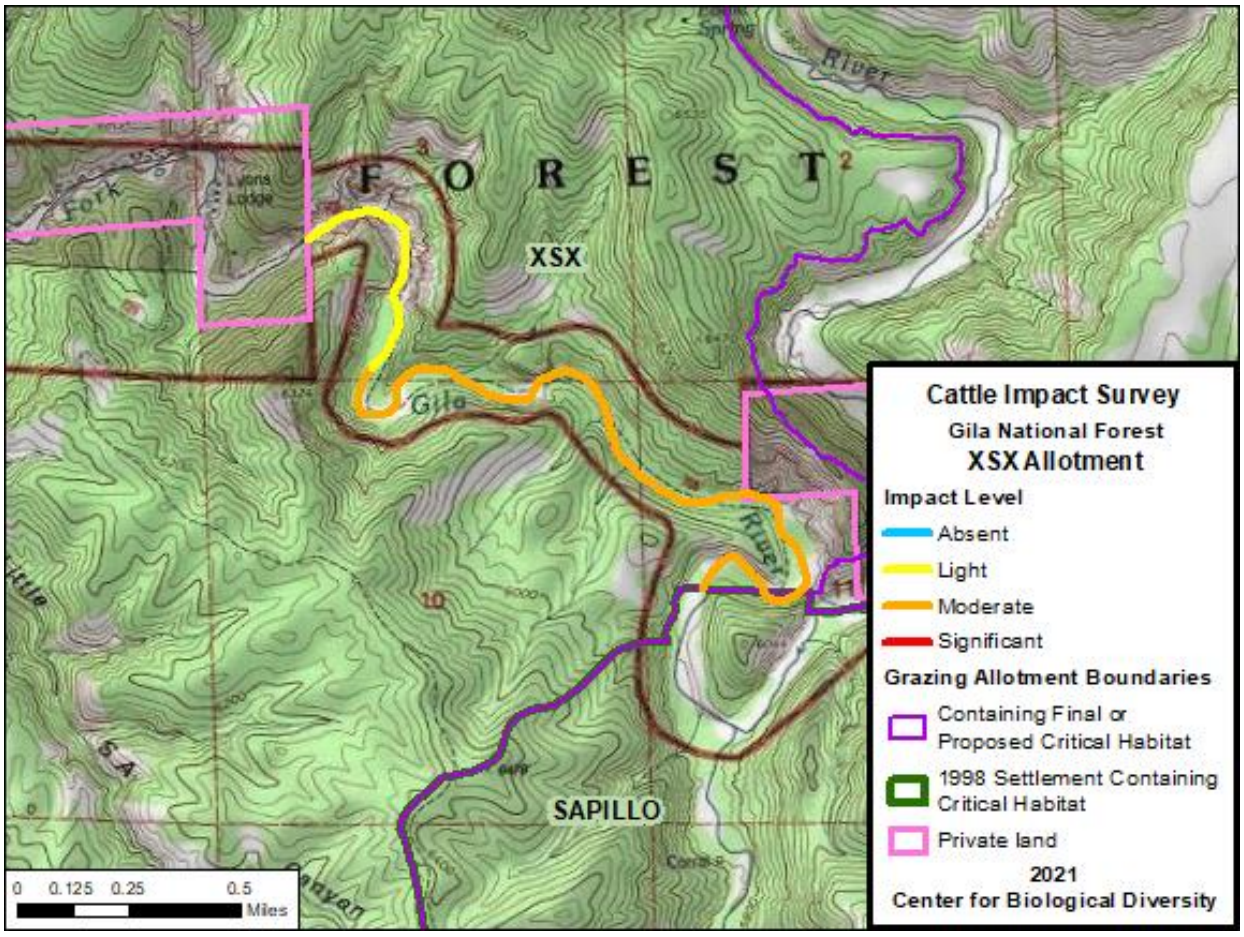
This allotment was surveyed in 2017 and 20197 and cattle were seen just inside the exclosure with open and broken fence line at the private property boundary. The conditions in 2021 are exactly the same with a large hole in the fence line and seven cows with calves were seen grazing inside the critical habitat exclosure (photo). Damage is extreme throughout the allotment surveyed with little to no woody stems streamside and banks sheared from entry (photo). Cow feces cover the denuded and severely grazed landscape (photo).



Absent	Light	Moderate	Significant	Total
			1.4 miles	1.4 miles

District: **Wilderness**
Allotment: **XSX**
Critical Habitat: **Loach minnow, Narrow-headed garter snake (PCH), Spikedace**
Drainage: **East Fork Gila River**
Surveyed: **4/15/2021**
Cattle Seen: **No**

Light to moderate impacts were noted from the boundary of the Werber property to Black Canyon, where they appear to dissipate. Cattle had been seen a week prior within the Werber property and was reported as trespass. Recent sign showed cattle are creating some trails to upland areas where there are recent, shallow wallows. The source of these cattle is unclear.



Absent	Light	Moderate	Significant	Total
	.6 miles	1.8 miles		2.4 miles

METHODS

Data on cattle impacts in riparian areas of exclosure were collected for a total of more than 150 segments on the Gila National Forest, each ¼ to I mile in length. Approximately 1117 miles of riparian habitat were surveyed. Surveyors used the ARC-GIS compatible COLLECTOR tablet software to collect field data. An interactive database of georeferenced photo-points and segment impact data was created. Several hundred photos documenting cattle impacts are available within this database.

Surveyors walked the stream reaches of excluded allotments and recorded the level of impact in the following six categories:

- Grazing impacts on herbaceous vegetation and grasses
- Browsing impacts on multiyear stems and near channel woody regeneration
- Ground disturbances from trailing, trampling, and wallowing
- Extent and pervasiveness of ground disturbances in exclosure reaches
- Intensity of streambank degradation
- Extent and pervasiveness of streambank erosion levels in exclosure reaches from cattle.

For each of the six categories of cattle impact, detailed condition descriptors were determined based on pre-survey sample areas and field observations. Each level of condition was then assigned a severity level of 1-4 (Table 4, next page).

Table 4. Condition descriptors and severity scores for six cattle impact categories

Category	Condition: 1	Condition: 2	Condition: 3	Condition: 4
GRAZING EVIDENCE ON GRASSES AND HERBACEOUS GROWTH	**LIMITED** Less than 1% of the grasses impacted.	**LIGHT** Few to some patches of grazed area or selective grazing in patches.	**MODERATE** Multiple grass patches grazed, more than 20% of grass impacted in patches.	**SEVERE/HEAVY** Multiple patches grazed, low grass heights less than 1 inch. More than 30% grazed in patches
BROWSE PRESSURE/WOODY Stems	**LIMITED** Less than 1% of woody stems impacted	**LIGHT** Browsing limited to multiyear stems	**MODERATE** Browse pressure on near channel woody recruitment	**HEAVY/SEVERE** Multiple green-line or near channel recruitment browse
GROUND COVER DISTURBANCE/INTENSITY	**LIMITED** Limited to transient evidence of use.	**LOW** Isolated trailing and cow trails developing.	**MODERATE** Multiple trails and the presence of wallows and rutting areas. Some bare soils.	**SEVERE** Trails, plus wallows, rutting and compaction leading to denuded ground and larger areas of bare soils.
GROUND COVER DISTURBANCE/EXTENT	**LIMITED** Few examples of disturbance.	**SCATTERED** Trails or disturbances in more than one location in segment.	**MODERATE** Trails meander through entire segment and there are multiple moderate level disturbances (see above).	**PERVASIVE** Multiple locations of disturbance and multiple types of disturbances, including severe moderate and low (see above).
STREAMBANK DEGRADATION/INTENSITY	**LIMITED** No visible signs, but other cattle impact on both sides of river that evidence crossing.	**LOW** Trails leading to streambank and water's edge.	**MODERATE** Trailing and trails creating unstable banks, some chiseling, or in low relief banks-muddy compaction	**SEVERE** Trailing leading to shearing and removal of a portion of the streambank leaving vertical surfaces.
STREAMBANK DEGRADATION/EXTENT	**LIMITED** Isolated example of streambank entry.	**SCATTERED** Bank degradation of any intensity in more than one location.	**MODERATE** Multiple examples of low and moderate bank degradation (see above).	**PERVASIVE** Multiple examples of low, moderate, and severe degradation (see above).

At each segment endpoint a score was determined for each impact. A segment was rated 0 for a particular category if no evidence of impact was seen. Subsequent to the field survey, each segment was then rated for its overall impact level based on a cumulative and weighted score of the six impact categories. Overall impact levels were categorized as absent, light, moderate, or significant, based on these scores. Each survey segment was color coded for its overall impact level (see Table 5). Segments were linked together across the riparian miles. Based on these coded segments, a series of maps was made for each allotment surveyed.

Table 5. Weighting table for *overall impact levels* of stream reach segments based on condition scores (0-4) from six categories of cattle impacts

ABSENT	LIGHT IMPACT	MODERATE IMPACT	SIGNIFICANT IMPACT
ALL ZEROS	ANY COMBINATION OF ONE'S & TWOS & ZEROS	AT LEAST (5) TWOS WITH ANY OTHER NUMBER	ANY TIME THERE ARE (3) THREES WITH ANY OTHER COMBINATION OF NUMBERS
		ANY COMBINATION OF TWOS, THREES, AND ONE'S	ANY COMBINATION OF NUMBERS WITH AT LEAST (1) FOUR
	(UNLESS (5) TWOS-` then moderate)	*(UNLESS (3) THREES-then significant)*	
BLUE	***YELLOW***	***ORANGE***	***RED***

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