

Long Meadow Report

6/17/13-6/19/13

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Introduction

The Forest Service (USFS) allows many activities on national forest land that are not present in most national parks or designated wilderness areas. One of these activities is cattle grazing, which can affect the environment by changing and reducing vegetation¹. Ranchers receive allotments from the USFS in the Sequoia National Forest on which to graze their livestock. The presence of these animals and the effects of their grazing can have various impacts on wildlife and the landscapes, including meadows. Meadows provide multiple ecosystem services, including maintaining landscape hydrologic functioning, serving as carbon sinks, and supporting distinct plant communities important to wildlife habitat². However, the weight and movement of cattle can render the soil infertile and/or create large depressions in the ground (known as wallows) that have negative impacts on vegetation. Along with the obvious effect of barring plants from growing in the trampled area, wallows can also collect pools of water which can alter the types of plants growing around it. Long Meadow is one such meadow located in the Sequoia National Forest that has been used for cattle grazing. Because of these impacts, the Sequoia ForestKeeper (SFK) team was tasked with the goal of finding signs of excessive cattle grazing in a common grazing site known as Long Meadow.



Figure 1: northern section of Long Meadow showing a species of water-adapted vegetation. The vegetation in (a) grows in the shade while the vegetation in (b) grows in damp soil.

¹ Armour, C. L., Duff, D. A., Elmore, W. 1991 *The Effects of Livestock Grazing on Riparian and Stream Ecosystems*. *Fisheries*, Vol. 16, No. 1, pp. 7-11

² Roche, L., Tate, K., McIlroy, S., Allan-Diaz, M., Lind, A. 2010 *Determining the Effects of Livestock Grazing on Yosemite Toads (*Bufo canorus*) and Their Habitat: An Adaptive Management Study*.

http://rangelandwatersheds.ucdavis.edu/publication%20list%20and%20files/Yosemite%20Toad%20Study%20Final%20Report_A.pdf

Objective

To locate and document any sign of anthropogenic impacts (specifically cattle) on the ecosystem of Long Meadow in Sequoia National Forest.

Equipment

Garmin GPSmap 60CCx GPS units (2)
Colored Flags
Digital Cameras

Methods

The meadow is divided into two sections separated by forest, south and north. The team arrived at the Long Meadow campsite on 6/17/2013, started observation of the North Section on 6/18, and observation of the South Section on 6/19. The team performed visual surveys of the meadow surface, both of the vegetation types and surface depressions, to identify areas of persistent soil moisture, sites of hydrologic erosion, and instances of cattle disturbance. Areas of interest were marked with colored flags, after which a GPS was used to document these points.

Since Long Meadow is part of a grazing allotment for cattle, the team was looking for any obvious sign of cattle intrusion that had significant impact on the meadow's ecosystem. They surveyed the northern and southern sections of the meadow for specific signs of cattle. Signs include trampled areas, wallows, water-logged holes, tracks, stream down-cutting, and manure. Each instance of cattle impact was documented by photo and waypoint on the GPS.

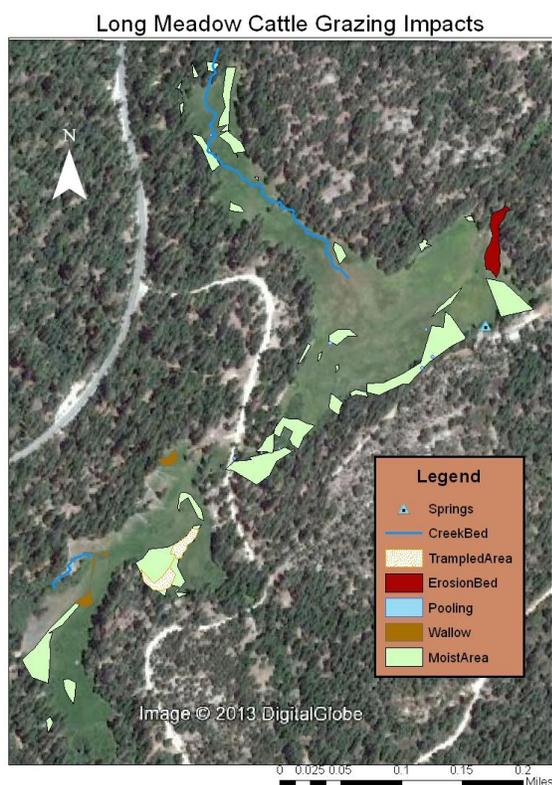


Figure 2: map of Long Meadow showing the creek bed and cattle grazing impacts

Results

The wet-adapted vegetation began at the northern edge of the north section of the meadow and ran south, then southeast approximately 1.6 km before becoming inconspicuous. Wet-adapted vegetation areas were found close to the tree line and near the creek bed in the north section and were found near wallows and trampled areas in the south section.

Signs of cattle intrusion were pervasive throughout both sections of the meadow. A number of wallows and cattle tracks were documented in the south section, of the meadow (Fig. 3a). Water adapted vegetation surrounded the wallows, which had damp soil and were waterlogged (Fig. 3b). In the eastern edge of the north section, a large eroded portion of the meadow, approximately 2 m deep and an area of 500 m² that showed evidence of cattle presence acted as a reservoir for a nearby spring (Fig. 3c). Cattle dung was prevalent in both sections.



Figure 3: instances of vegetation type conversion around cattle trampling, one near wallows (a) one near moist soil (b), and a large erosion bed 2 m deep (c).

Discussion

The Giant Sequoia National Monument Hydrology Report, dated 7/10/12, by Forest Hydrologist, Terry Kaplan-Henry, says, “Long Meadow has several large headcuts at the base of the meadow ranging from approximately two to ten feet in vertical drop. A small vegetative area in the lower portion of the meadow is shifting towards dryer species. Meadow condition is functioning at risk.” “Human-caused impacts include roads, residences, recreation, grazing, stock use, and vegetation management.”

While the intern team found clear evidence of grazing livestock in Long Meadow, the Hydrology Report does not mention that livestock grazing takes place in Long Meadow.

There was very little water in the eroded bed in the north section, which could be caused by a low water table, creating a shift in the vegetation in the meadow at large. The presence of wallows also contributes to vegetation type conversion. Water adapted vegetation surrounds any area that has standing water and moist soil.

As the water table continues to drop, the meadow will dry at an accelerated rate, and the surrounding forest will begin to out-compete the graminoids and forbs which currently dominate the site. The meadow will also begin to be down-cut by seasonal water flow through the establishing creek bed.

Grazing livestock can cause down-cut stream channels whether they are stable or unstable stream channels. Stable-Sensitive channels are relatively flat riparian areas that are easily influenced by

land management activities (like grazing). These stream channel types are typically channels within mountain meadows and high elevation meadows without defined channels. Unstable-Sensitive-Degraded channels result from severe alteration of the Stable-Sensitive type. Gullies and altered (down-cut) meadows make up the bulk of these types on the Forest. Recovery usually requires active restoration measures³. At the very least removal of the cause of the severe alteration to meadows, which in most cases is livestock, is the best long-term solution for restoring meadows. Sites with more resilient substrate in less delicate areas should be considered for future cattle allotments.

References

Armour, C. L., Duff, D. A., Elmore, W. 1991 *The Effects of Livestock Grazing on Riparian and Stream Ecosystems. Fisheries*, Vol. 16, No. 1, pp. 7-11

Roche, L., Tate, K., McIlroy, S., Allan-Diaz, M., Lind, A. 2010 *Determining the Effects of Livestock Grazing on Yosemite Toads (*Bufo canorus*) and Their Habitat: An Adaptive Management Study*.

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Giant Sequoia National Monument Hydrology Report, dated 7/10/12, by Forest Hydrologist, Terry Kaplan-Henry http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5398914.pdf

³ Giant Sequoia National Monument Hydrology Report, dated 7/10/12, by Forest Hydrologist, Terry Kaplan-Henry http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5398914.pdf