Addressing Erosion at SSU's Fairfield Osborn Preserve

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Introduction

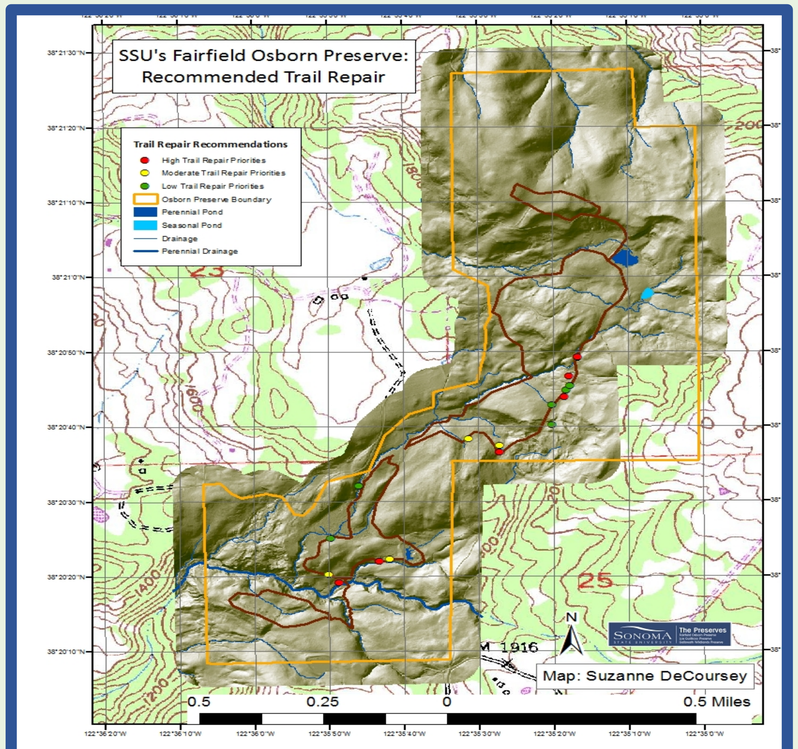
At Sonoma State University's Fairfield Osborn Preserve, active hydrological processes compounded by abnormally high levels of rainfall have continued to pose problems on many trails, causing soil erosion, trail degradation, and overall water contamination. As such degradation continues, visitors to the Preserve attempt to avoid deteriorated areas by stepping off trail, causing further erosion and destruction of surrounding vegetation. In early April of 2017, we teamed up with the current Center for Environmental Inquiry land management interns and stewards to create and implement a treatment plan for a section of trail near the Preserve's famed Turtle Pond. Due to the unusually wet Winter season, water flows running directly along the trail have caused trail incision and abnormally high levels of erosion at our site. We believe the installation of a drainage ditch as well as the addition of rocks and a boardwalk to particularly slurried sections of trail will both aid in the diversion of water flows off-trail and encourage visitors of the Preserve to stay on-trail. Due to the nature of our project and the time frame provided for this presentation, we are unable to observe fully both the short and long-term effects of our plan on the trail. However, we hope that the implementation of our plan will yield positive results and provide insight for future land management practices on the Preserve.

Purpose

The purpose of this land management plan was to both ascertain the condition of the trails at the Preserve following the particularly active rainy season and apply a treatment to a section of trail. The atypical, hydrological conditions can have severe effects on the health of both trails and their associated environment, including, but not limited to:

- On-trail erosion, creating incised trails that, if not addressed, carry exponential amounts of sediment off-trail and into nearby waterways, affecting water quality and biotic habitat
- Transmission of Sudden Oak Death via:
  - Trail runoff into proximal waterways
  - Boots of hikers who pass through trail areas with standing water
- Further trail degradation due to Preserve visitors stepping off trail to avoid areas of standing water on-trail

Through the application of a site-specific management plan, it is possible to alleviate the symptoms associated with intense hydrology. Furthermore, the pinpointing of other problem areas subject to similar issues will allow for future land managers of Fairfield Osborn Preserve to more easily locate and address problems before they occur.



Data Collection and Site Treatment

Preserve management interns began the process of data collection by splitting into two groups and walking the the upper and lower halves of the Preserve. Any trail area affected by abnormal hydrological forces (abnormal meaning those atypical to each site) was noted and its location marked utilizing a handheld GPS. These points have been collected and displayed on the above map, and the severity of conditions at each has been assigned a color based on its repair priority (green = low, yellow = moderate, red = high). By collecting information about problem areas around the whole preserve, future land management efforts will be better informed about locations on the Preserve which require more immediate attention.

Work then began on a section of trail measuring a total of 100 feet just northeast of the Preserve's Turtle Pond on what is known as the Woodland Trail. Transect tape was used to measure the section of trail being restored, as well as the nearby "pseudo" trail (39 feet long) created by hikers moving off-trail in order to avoid the muddied conditions. Standing water was found on-trail, in some places 4 inches deep, and the middle incision of the trail was measured at 2 inches below the outer edges of trail.

To address flowing water and slurried sections on trail, stewards and interns:

- Installed water bars at four points along the trail, utilizing trenching shovels and pick mattocks to create ditches in which to place the bars.
- Dug a small drainage ditch up-trail from each water bar in order to encourage water flows off trail.
- Placed a total of 13 large rocks at upper curve of trail in order to provide stable footing for thoroughfare.
- Located and assigned a pre-existing boardwalk to be installed at a later date (when ground has dried) over section of trail in worst condition.
- Increased the size of a drainage ditch on a higher section of trail that opened into a gently-sloping tear drop shape. McLeods and loppers were used to clear away poison oak and Himalayan blackberry shrubs downhill from the drainage location. After clearing the area to allow water flow, a trenching shovel and McLeod were used to define a lightly sloped, miniature "flood plain" to encourage redirection of flows, which measured roughly 11 feet long and 4.5 feet wide.

Conclusion

Since completing the installment of our treatment plan, we have had a short period of time to observe any substantial outcomes at the site. Despite this, we have witnessed some positive results. At first, some of the rocks added to areas of the site were unstable, and hikers had even created a new and undesirable, off-trail footpath to avoid the area altogether. We attempted to discourage the use of the newly-made "trail" through the use of dead vegetation cover, and adjusted the rocks to allow for more firm placement. Now that the rocks are sitting solidly in place, it is visibly noticeable that visitors to the Preserve have become more encouraged to stay on trail rather than venture off course; surrounding vegetation is less tamped-down and the structural integrity of the soil seems to have improved. In addition, it appears that some water has been diverted from the trail and into the drainage ditch. As time progresses, we look forward to seeing any changes that occur at our site as a result of our treatment. We are not conducting research, rather we are hoping that the methods used in mitigating trail issues at our site will serve as a reference for future land management practices at Fairfield Osborn Preserve.

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