

## Lesson Plan 17.

### Ranch Roads

#### Goals/Overview:

Explain ranch road hydrology and common management practices so attendees can assess their roads and even trails for erosion potential and understand options to reduce maintenance and improve water quality.

#### Learning Objectives:

1. Understand chronic versus episodic sediment sources.
2. Gain ability to evaluate stream crossings for culvert upgrades.
3. Understand how roads can interrupt natural hydrology or overland flow.
4. Explain specifications of “debris flow orienters,” or single-post trash rack design adapted from urban areas, to keep culverts from plugging during large storm events.
5. Compare and contrast grant-funded approaches to road improvement versus options and techniques that take more time, such as installing rolling dips at the top of eroding sections, which often require annual maintenance and grading.

#### Introduction/Hook:

- Share example of sediment sources from ranch road failures during large storm events and common causes. Explain how avoiding smaller failures is mutually beneficial for ranch operations and water quality management.

#### Materials/Speakers:

- Historical aerial photos of watershed, region, and/or ranch comparing circa 1970s to present. Google Earth often has comparable imagery from the 1990s.
- Invited speaker and facilitator of discussion would be someone with knowledge in rangeland and watershed management from UCCE, NRCS, RCD, or other relevant organization.

- Instructional video: “Ranch Road Storm-Proofing” (25 minutes).
- Water Board staff available to review and further explain regulations and history.
- Bring copies of the [RWQP Template](#) and extra copies of [Pasture Assessment—Worksheet 4](#), [Stream Assessment—Worksheet 5](#), [Completed Projects—Worksheet 6](#), [Future Water Quality Projects—Worksheet 7](#), and [Monitoring—Worksheet 10](#).
- Provide attendees handouts of pertinent resources.

#### Time Allocated:

Allow 2 to 4 hours, including lunch (40 minutes for presentations, 30 minutes for question/answer, 10 minutes for reviewing regulations, 20 minutes for traveling within ranch, 30 minutes for lunch, and 1 to 2 hours for discussing sites).

#### Procedures/Activities/Strategies/Questions:

- Visit the host ranch, preferably with the rancher and invited speakers, several days prior to the field tour to plan site visit, discussion points, and the tour progression/flow.
- Welcome; attendees introduce themselves if there are some newcomers. Introduce and thank the landowner for hosting.
- Discuss observations of landowner for historical erosion patterns such as when certain sections of road or crossings unraveled and eroded during previous years' rainfall events.
- Review ranch maps for how to document future water quality projects planned to improve ranch roads. Review how to use [Pasture Assessment—Worksheet 4](#), [Stream Assessment—Worksheet 5](#), [Completed Projects—Worksheet 6](#), [Future Water Quality Projects—Worksheet 7](#), and [Monitoring—Worksheet 10](#) from the [RWQP Template](#).

- Review Pasture Assessment—Worksheet 4 regarding how to assess sources of erosion from ranch roads, such as estimating continuous road length producing runoff.
- If an indoor venue is available for video presentation, present video: “[Ranch Road Storm-Proofing](#).”
- Discuss potential treatments of problem areas during walking tour and workshop’s concluding remarks.
- Complete the Session Evaluation Form (appendix A).

### Conclusion/Self-assessment:

- Reflect upon the rainfall-runoff process from compacted road surfaces and where runoff goes during large storm events—directly to waterway or alternatively to a buffer.
- Reflect on road sediment sources from your ranch and which are the high-priority sources to fix. Consider where road locations may be potential chronic sources of sediment or other pollution on your ranch. Consider locations where ranch roads need annual maintenance, such as regrading or filling in ruts, and estimate time working on them. Are techniques discussed applicable to your ranch in order to reduce maintenance time or costs and reduce sediment delivery?

### Resources:

5C Program. n.d. Addressing road sedimentation, a video presentation. <http://www.5counties.org/video1.htm>

Kocher, S. D., J. M. Gerstein, and R. H. Harris. 2007. Rural Roads: A Construction and Maintenance Guide for California Landowners. Oakland: UC Agriculture and Natural Resources Publication 8262. <https://anrcatalog.ucanr.edu/pdf/8262.pdf>

Nunamaker, C., J. LeBlanc, G. Nakamura, and Y. Valachovic. Forest Roads. 2007. Forest stewardship series 17. Oakland: UC Agriculture and Resources Publication 8247. <https://anrcatalog.ucanr.edu/pdf/8247.pdf>

Pacific Watersheds Associates. 2020. Typical drawings of road upgrades and treatments. <http://www.pacificwatershed.com/>

Weaver, W., E. Weppner, and D. Hagans. 2015. Handbook for Forest, Ranch, and Rural Roads. Arcata, California: Pacific Watershed Associates. [http://www.pacificwatershed.com/sites/default/files/roadsenglishbookapril2015b\\_0.pdf](http://www.pacificwatershed.com/sites/default/files/roadsenglishbookapril2015b_0.pdf)

### Next Steps/Future Lessons:

- Ask participants to consider if and where runoff from ranch roads connects to a waterway or stream. Are the stream channels or banks unstable where this occurs? How and where do ranch roads alter normal overland flow, and are these alterations causing erosion problems?