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## TECHNICAL MEMORANDUM

**To:** Demian Ebert, PacifiCorp  
**From:** Todd McDonnell, E&S Environmental Chemistry, Inc.  
**Date:** November 8, 2023  
**Subject:** Repair of cattle exclusion fence at Spencer Creek, Klamath County, Oregon

### Introduction

The confluence of Spencer Creek with the Klamath River is approximately 5 miles northwest of the town of Keno, Oregon. Spencer Creek currently provides important spawning and rearing habitat for Redband Trout and will provide similar habitat for anadromous fish returning to the upper Klamath River following completion of dam removal activities in 2024. The Klamath Hydroelectric Settlement Agreement (KHSA; as amended on November 30, 2016) includes Interim Measure 7 (J.C. Boyle Gravel Placement and/or Habitat Enhancement), which is intended to improve fish habitat upstream of Copco Reservoir during the interim period leading up to dam removal. With this focus of Interim Measure 7 and the pending removal of the Lower Klamath Project dams, the Interim Measures Implementation Committee has been interested in protecting the riparian habitat along Spencer Creek. Working with the Interim Measures Implementation Committee, repair of cattle exclusion fencing around Spencer Creek was selected as an important project for implementation prior to dam removal. Exclusion fencing is intended to keep free-ranging cattle out of the creek channel and adjacent riparian habitat. Successful exclusion is expected to result in improvements to the riparian habitat, reductions in streamside erosion, and have multiple related benefits to water quality of Spencer Creek.

Most of the property on which the fence is located is owned by Green Diamond Resource Company (Green Diamond). When this project was selected for implementation, PacifiCorp owned the remainder of the property; however, that property transferred to the Klamath River Renewal Corporation on December 1, 2022, along with the Lower Klamath Project. This transfer did not affect the ability to implement this work. PacifiCorp contracted with E&S Environmental Chemistry, Inc. (E&S) to implement this project at three areas along Spencer Creek located between the confluences with Clover Creek and the Klamath River.

### Project Areas

A survey of the fence lines in 2021 (Martin 2021) identified four different areas of fence along the downstream-most 8 miles of Spencer Creek. In coordination with Green Diamond and

Oregon Department of Fish and Wildlife (ODFW), Areas 1, 2, and 4 (hereafter Designated Areas) were identified as the focus of the project (Figure 1). Area 3 includes a separate linear length of fence that does not enclose an area and was therefore excluded from repair work. Area 1 is approximately 1.0 mile of fence that encloses the confluence of Spencer Creek with the Klamath River. Area 2 is approximately 0.6 miles of fence enclosing a relatively small area to the northwest of Area 1. Area 4 is comprised of approximately 2.6 miles of fence that encloses the Dismal Swamp area upstream of Area 1 and Area 2.

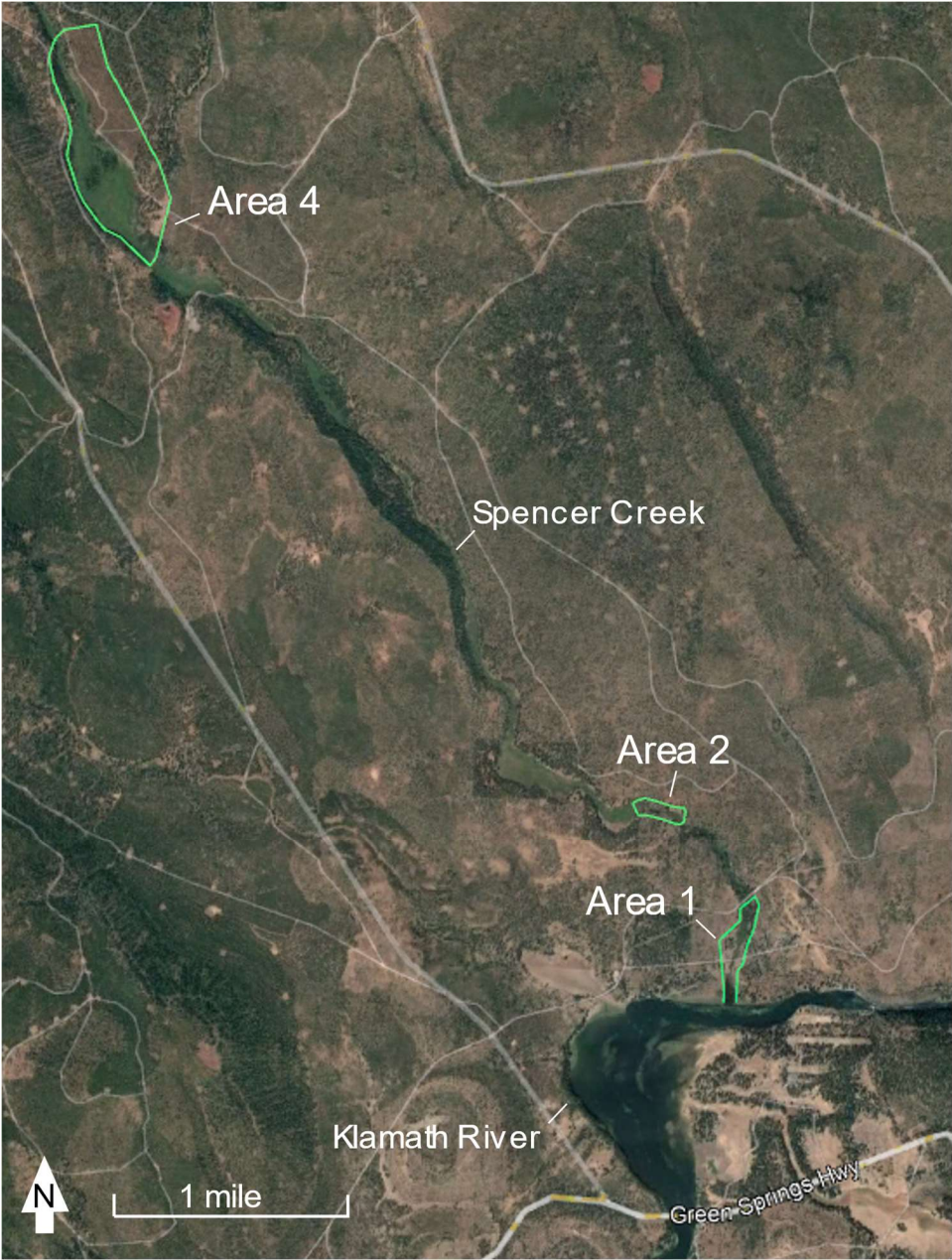


Figure 1. Approximate locations and extents of cattle exclusion fences along Spencer Creek. (Notes: Area 3 was excluded from the work. Source Google Earth satellite image.)

**Wildlife-Friendly Fence Design**

A wildlife-friendly fence design (Figure 2) was used to replace the pre-existing five-strand barbed wire fence for lengths of fence in need of replacement. Fencing specifications were developed in coordination with ODFW using Natural Resource Conservation Service (NRCS) documentation (NRCS 2010). The goal of the fence design was to exclude free-ranging cattle from entering the creek while allowing wildlife unimpaired access to the exclusion areas. These designs include wildlife-friendly features such as an elevated and smooth lower wire to allow for passage of small animals underneath the fence, a smooth top wire spaced accordingly from the second wire to prevent animals from getting caught in the fence while traversing, and white vinyl markers to increase fence visibility.

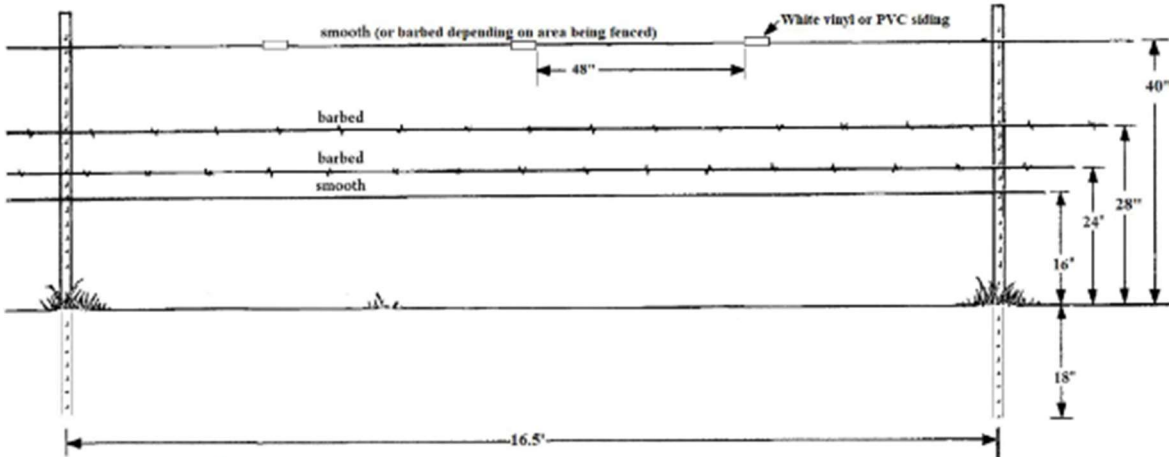


Figure 2. Schematic of wildlife-friendly fence (modified after Page 2012).

**Implementation**

Because of increased wildfire risk, fence repair work started on September 27, 2023. All work was completed on October 19, 2023. In most areas, the existing fence was repaired and re-tensioned (e.g., Figure 3 and Figure 4). New steel corner braces were installed where necessary (Figure 5). In areas where the fence needed to be completely replaced, the wildlife-friendly fence design (Figure 2) was installed. In addition to fence repair and replacement, a new drive-through gate was installed on the Area 4 fence where the old fence had been cut and posts removed (Figure 6), creek crossings were improved (Figure 7), and additional hog paneling was installed along the Area 1 fence at the confluence with the Klamath River.

E&S conducted an inspection of the completed work on October 20, 2023, and confirmed that the fence was repaired as intended for the purposes of excluding cattle from the Designated Areas of Spencer Creek. The same visit confirmed that all debris generated by this work had been removed from the site and the contractor had fully demobilized.



Pre-project



Post-project



Figure 3. Fallen tree damage in Area 1. A fallen tree was removed from the fence and fence wires were reattached to T-posts and retensioned.



Pre-project



Post-project



Figure 4. View of the northern intersection of Area 1 fence with Spencer Creek. Fence wires spanning the creek were reattached to T-posts and retensioned.



Pre-project



Post-project



Figure 5. View of the northeastern corner of Area 2 fence. The aged wooden corner brace was replaced with steel pipe and the wires were retensioned and reset. New wildlife-friendly fence was installed leading to the northwestern crossing of Area 2 with Spencer Creek (visible at left side of the post-project photo).



Pre-project



Post-project



Figure 6. Location of new drive-through gate in southwestern portion of Area 4. Pre-project fence had been torn down to allow for passage on logging road; new drive-through gate with steel pipe bracing was installed allowing for vehicle access.



Pre-project



Post-project



Figure 7. View of the southern intersection of Area 4 fence with Spencer Creek. H-braces were repaired and the cable was retensioned to establish proper hog fence positioning; new steel pipe bracing was installed on the far bank).



## **Acknowledgements**

This report was prepared by E&S Environmental Chemistry, Inc. under contract with PacifiCorp. E&S subcontracted with Hepper Construction to complete the fence repair work. M. Ottman and R. Raymond assisted with documentation and field efforts. T. Wise, B. Ramirez, M. Hereford and B. Tinniswood of ODFW were consulted during the planning stages for input on the wildlife-friendly fence design, among other considerations. J. Davis, R. Douglas, and C. Chapel of Green Diamond Resource Company assisted with coordinating site visits and providing site access.

## **References**

- Martin, J.M. 2021. Spencer Creek Fence Study. Conducted by To The Point Land Surveying, LLC, September.
- NRCS. 2010. Wildlife-Friendly Wire Fence - Conservation Practice 382 - Job Sheet. Natural Resources Conservation Service, Oregon.
- Page, C. 2012. A Landowner's Guide to Wildlife Friendly Fences. Private Land Technical Assistance Program - Montana Fish, Wildlife, and Parks, Helena, MT.