

Nomination for Outstanding Resource Waters of Oregon

Rough and Ready Creek, Its Tributaries, Springs and Associated Wetlands

Appendix A - Maps, Google Earth imagery and corresponding photographs

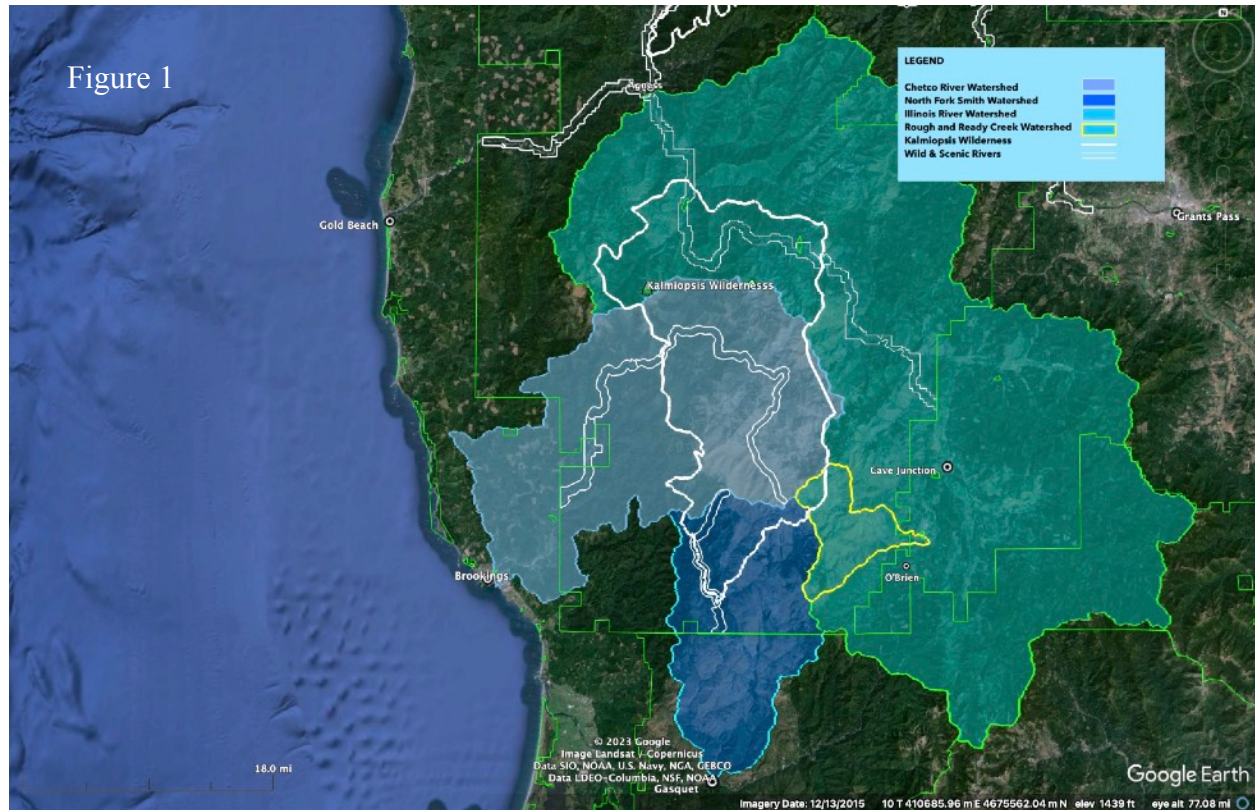


Figure 1 - The Rough and Ready Creek Watershed (outlined in yellow) is shown in context with the Kalmiopsis Wilderness, the Illinois River Basin, the North Fork Smith Watershed, the Chetco River Basin and the Pacific Ocean.

Figure 2 - 96% of the Rough and Ready Creek Watershed is underlain by the stark botanically rich serpentine/ultramafic terrain of the ancient Josephine Ophiolite. The strongly dissected mountainous terrain has a dendritic drainage pattern.

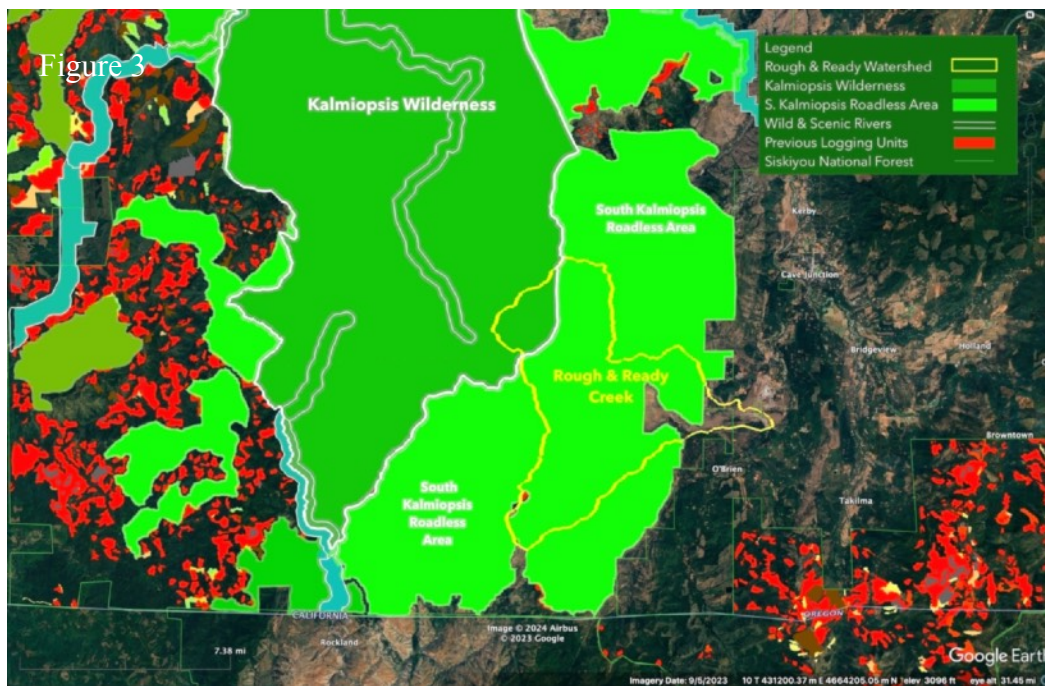


Figure 3 - (left) 81% of the Rough and Ready Creek Watershed is within the South Kalmiopsis Roadless Area and roughly 9% is in the Kalmiopsis Wilderness.

In the lower reach is the Rough and Ready Creek Botanical Area and ACEC. There's 2 timber sale units totaling 108 acres from the 1970s.

Figure 4

Rough and Ready and Baldface Creeks Mineral Withdrawal Proposal Coos Bay District and Medford District

This map prepared at the request of Senator Ron Wyden and Representative Peter DeFazio
January 12, 2015

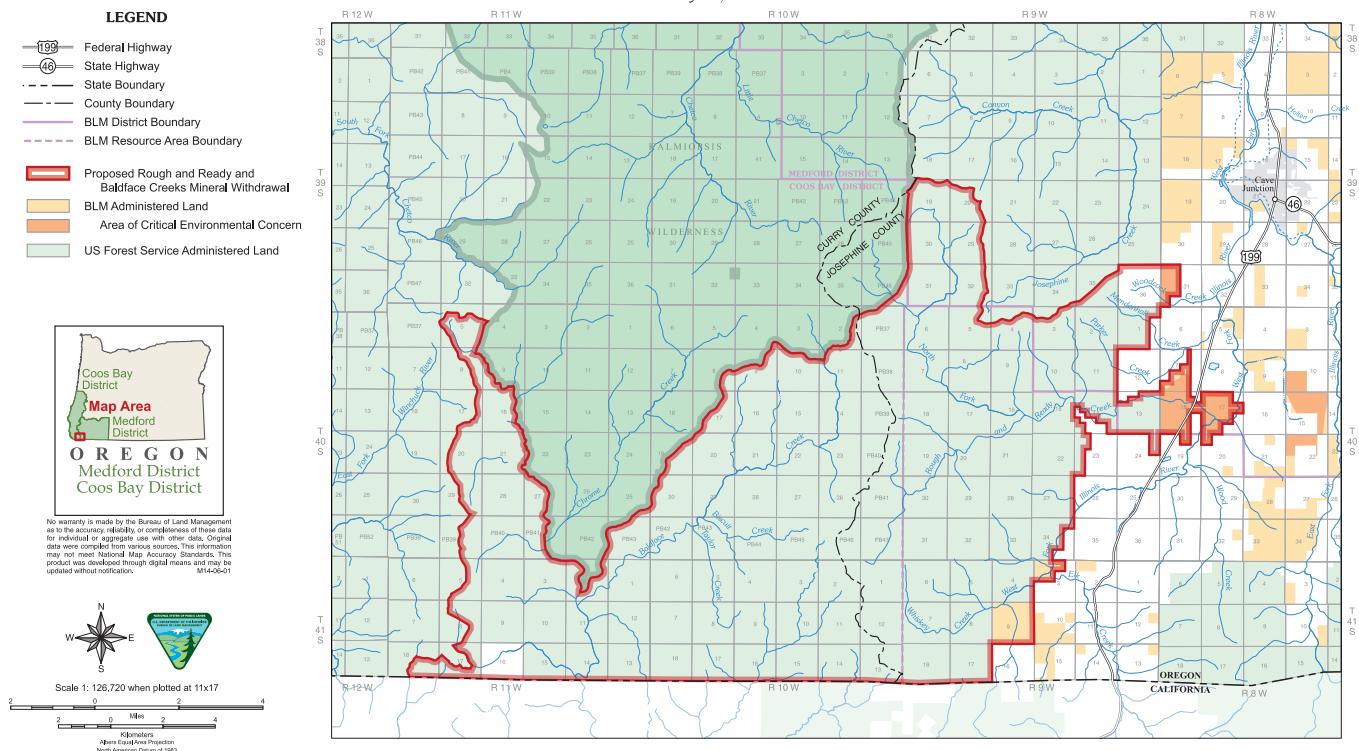


Figure 4 (above) - Map prepared by the Bureau of Land Management for Senator Ron Wyden for the proposed Rough and Ready and Baldface Creeks Mineral Withdrawal Area. The withdrawal area is subject to legislation before Congress and was administratively withdrawn from entry and location under the mining laws of the United States on Dec. 30, 2016 for 20-years by Public Land Order No. 7859, aka Southwestern Oregon Mineral Withdrawal.

Figure 5

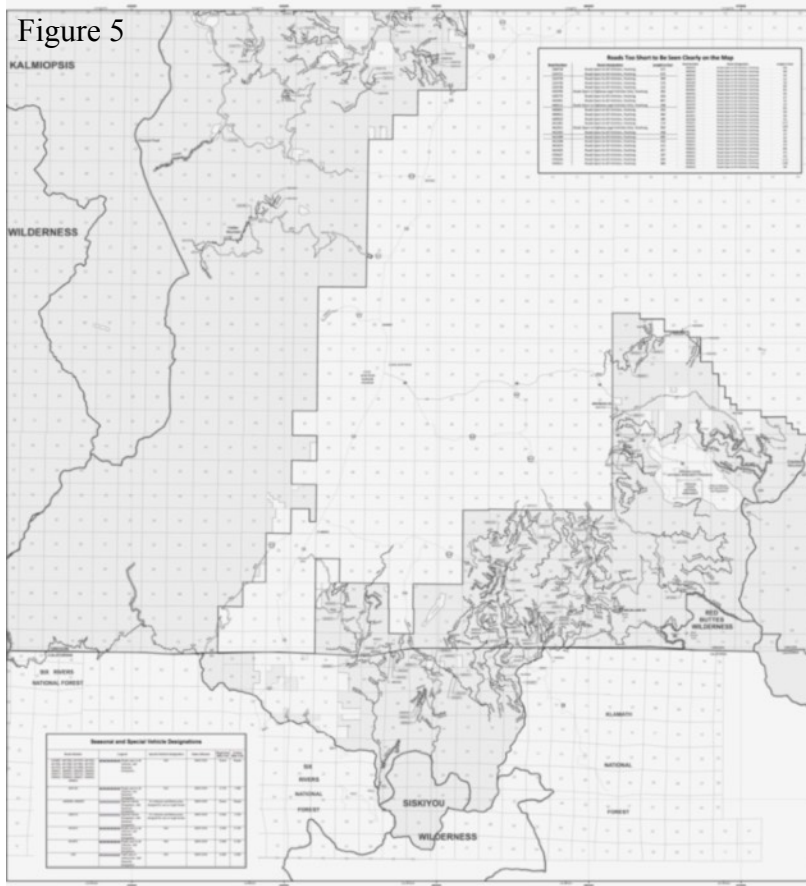


Figure 5 - Excerpt from the 2016 Wild Rivers Ranger District Motor Vehicle Use Map (MVUM). The map shows the National Forest lands of the Wild Rivers Ranger District on the west side of the Illinois Valley and all FS system roads that are open to public motorized travel.

The map demonstrates that within the Rough and Ready Creek watershed there are no roads open to public motorized travel on National Forest land with the exception of FS road 4404-112, which enters the headwaters of the South Fork of Rough and Ready Creek for a short distance.

There are a number of old user-created mining tracks that were inventoried as FS system roads at one time that show on some maps. These are closed to public motorized travel.

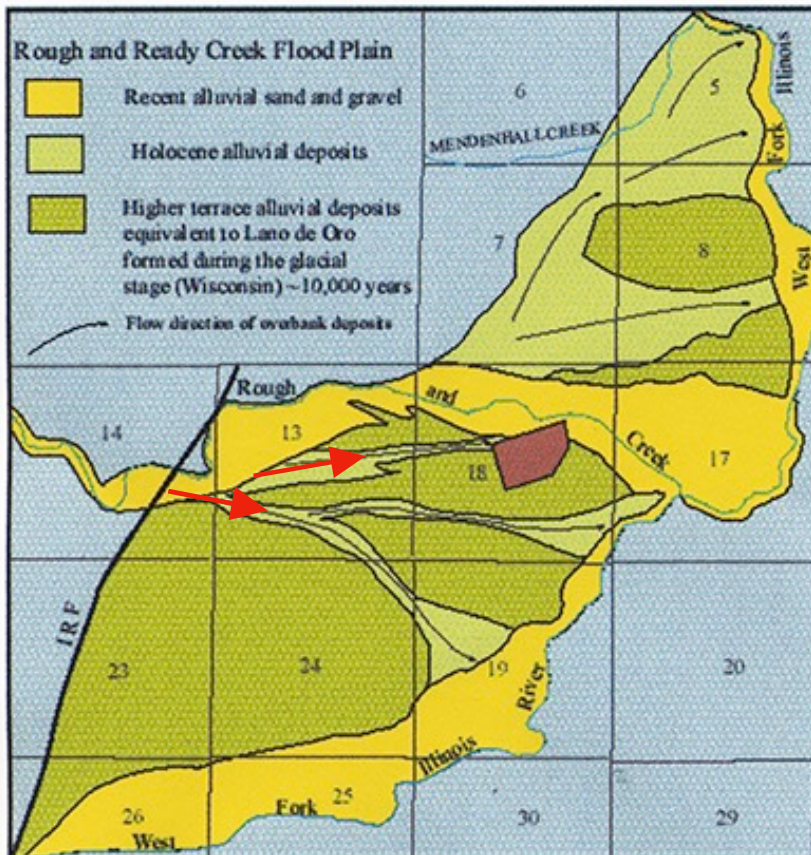


Figure 6 (left) - The Rough and Ready Creek flood plain as mapped by Dr. Robert Coleman in 1998 to help inform the U.S. Forest Service's Environmental Impact Statement for the Nicore Mining Plan of Operations.

The Holocene alluvial deposits south of Rough and Ready Creek that Dr. Colman has mapped correspond in shape and general location with what appear on Google Earth to be ancient stream channels created by torrential flooding. These are marked with red arrows on **figures 6 & 7**.

The Holocene alluvial deposits to the north of Rough and Ready Creek, in the Parker and Mendenhall creeks watersheds are extensive wetland on private property. The wetlands are some of the best beaver habitat in the area.

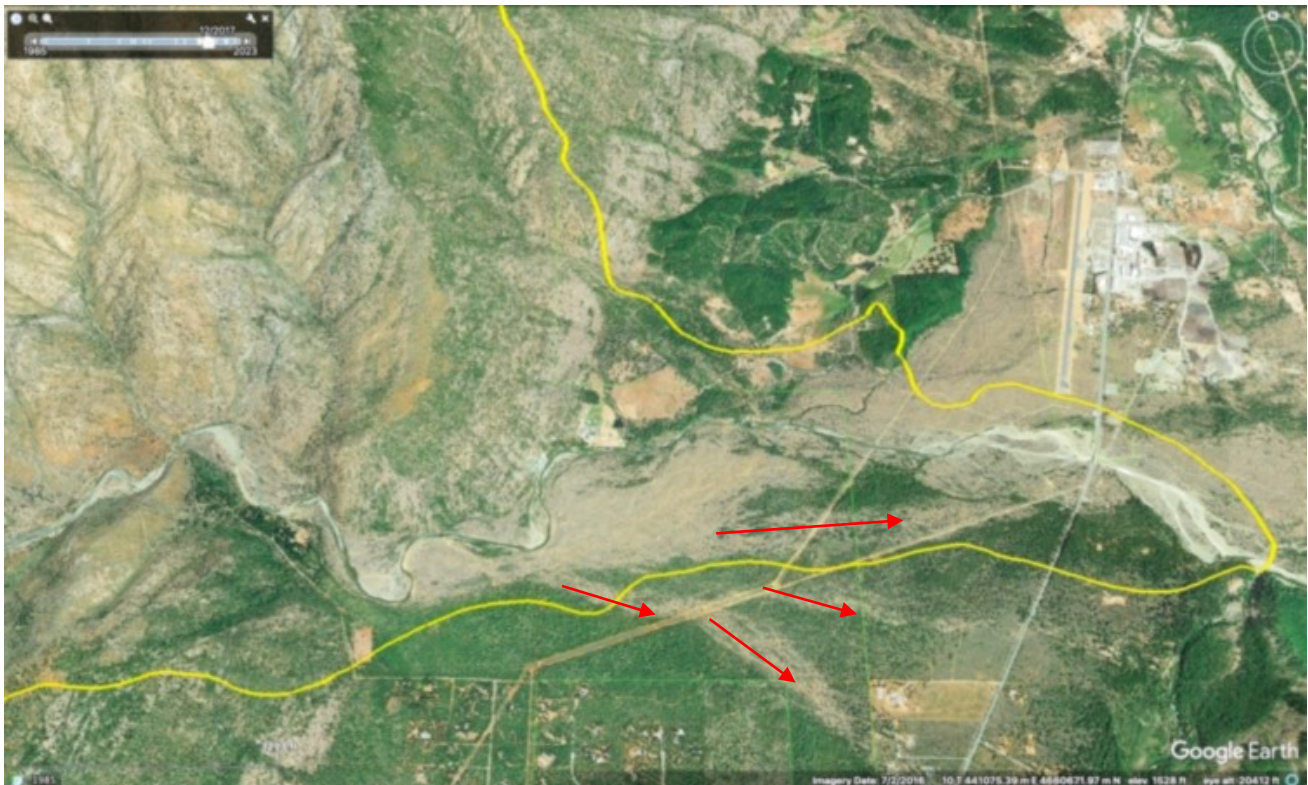


Figure 7 (above) - Rough and Ready Creek's watershed boundary (yellow line) overlaid on Google Earth. To the south of Rough and Ready Creek, on the terraces above the current floodplain, can be seen ancient river channels (marked with red arrows) from torrential flooding that occurred thousands of years ago. See **figure 6**.



Figure 8 (above) is Google Earth imagery from July 7, 2016 showing the section of Rough and Ready Creek between Seats Dam (the last water diversion) and the Redwood Highway Bridge over Rough and Ready Creek. It shows streamflow below the Seats dam increasingly being lost to the hyporheic zone and local aquifer in the area that **figure 6** maps as “recent alluvial sand and gravel.” However, upstream there’s other reaches of Rough and Ready Creek braided channels where surface flow is also lost to the aquifer.



Figure 9 (above) From a little downstream of the Redwood Highway to its confluence with the West Fork Illinois River Rough and Ready Creek is now entirely subsurface except for a pool a short distance from the river. Note - we chose the 7/7/2016 Google Earth imagery because its higher resolution than other years. Timing when Rough and Ready Creek loses surface flow likely varies.



Figure 10 (above) A closer view of the reach above the highway using imagery dated 6/7/2013, showing more surface flow and more of the multiple channels with stream flow alternately surface and subsurface.

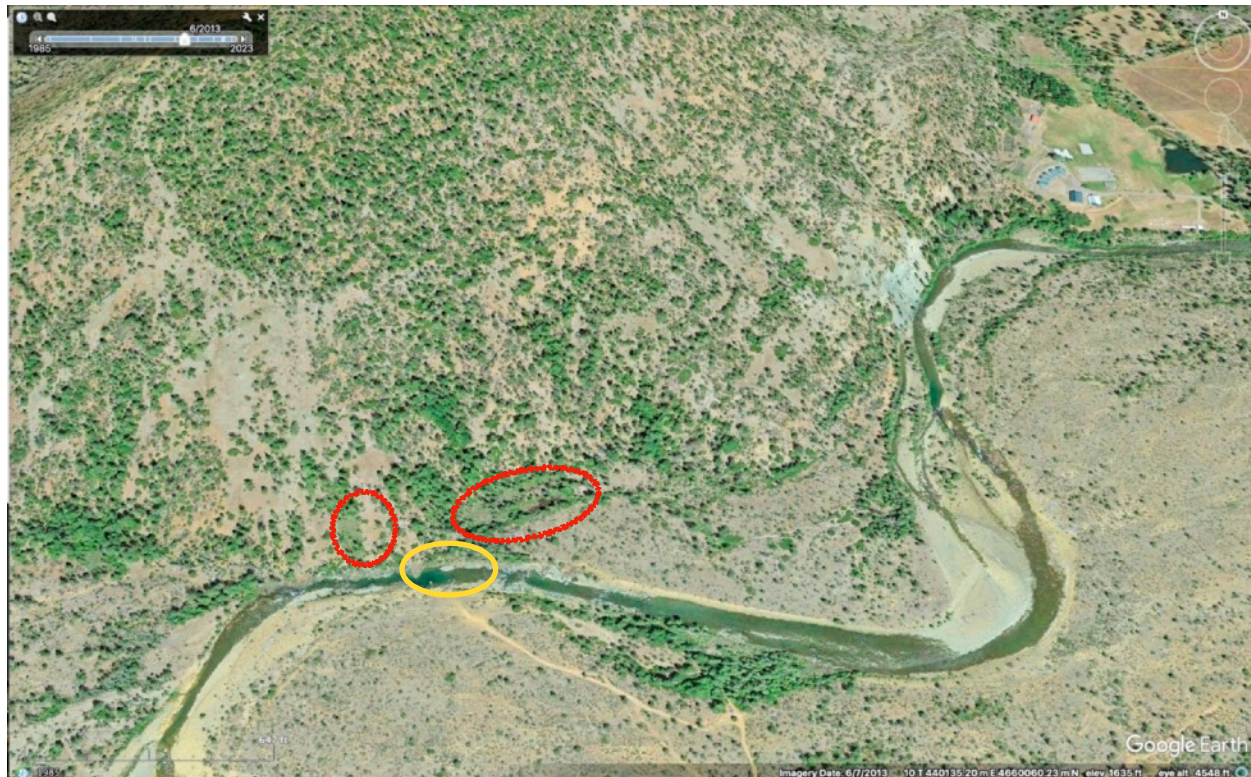


Figure 11-a (above) This is the first of a series of 3 images of the same area. They show part of a fascinating section of Rough and Ready Creek upstream of the alluvial floodplain and Seats Dam.

The above image shows where there's multiple channels and Rough and Ready Creek loses surface flow to the local aquifer. Upstream of this, Rough and Ready Creek its a gaining fluvial system. In the latter, is one of the creek's cherished swimming holes (yellow oval). On the slope above the deep clear pool is a series of springs that form Serpentine *Darlingtonia* Wetlands (red ovals). These wetlands don't appear to have been surveyed.

Figure 11-b (below) Again, the yellow oval is the above described swimming hole. The red ovals show the two wetlands. The pool had been described as being 20 ft. deep with water so clear it's possible to see a lost silver ear ring on its bottom.



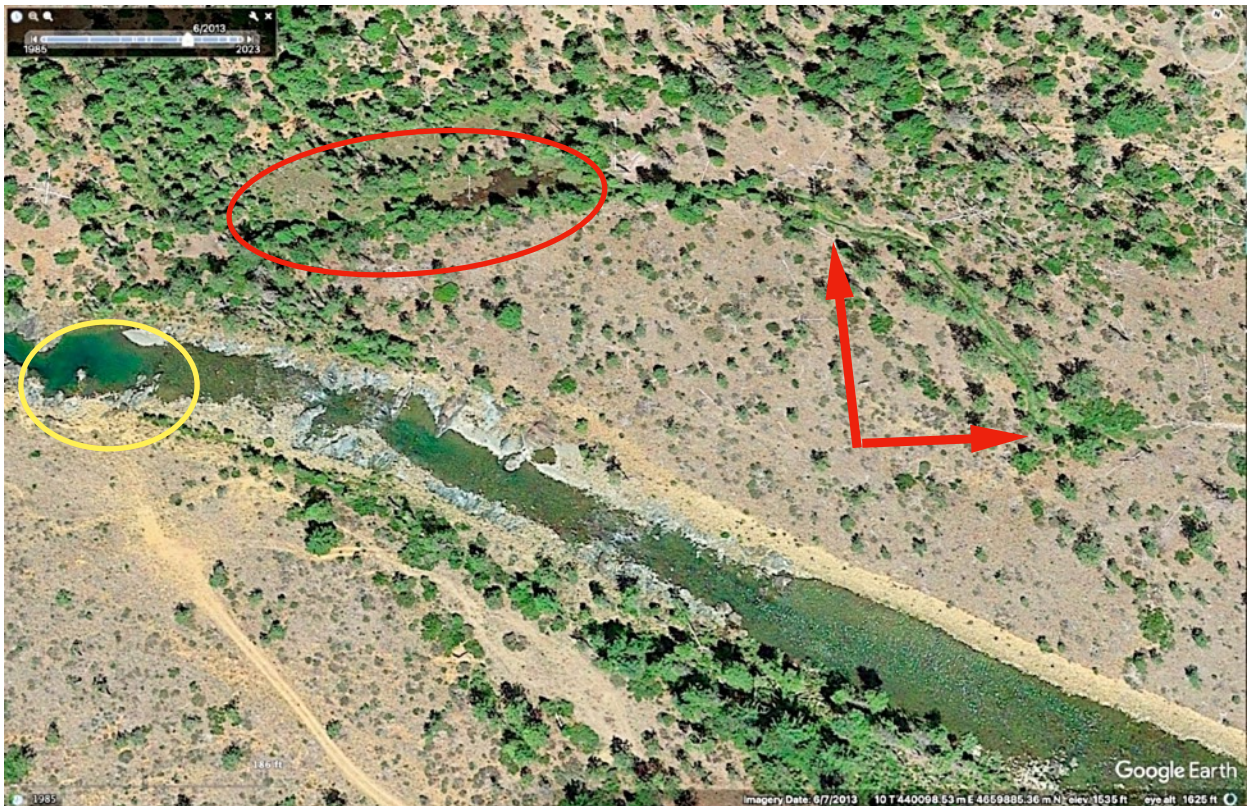


Figure 11c (above) shows the area of the Rough and Ready Creek swimming hole (yellow oval) from a different angle than **figure 10**. It also provides a little clearer view of the larger of the two likely serpentine wetlands (red oval). The wetland appears to be a wetland complex with some open water and an outlet stream (red arrows). The dirt tracks seen in the above are user created routes in the Forest Service's Rough and Ready Creek Botanical Area.

It's likely that there's substantial subsurface connections between the wetlands and Rough and Ready Creek below them.

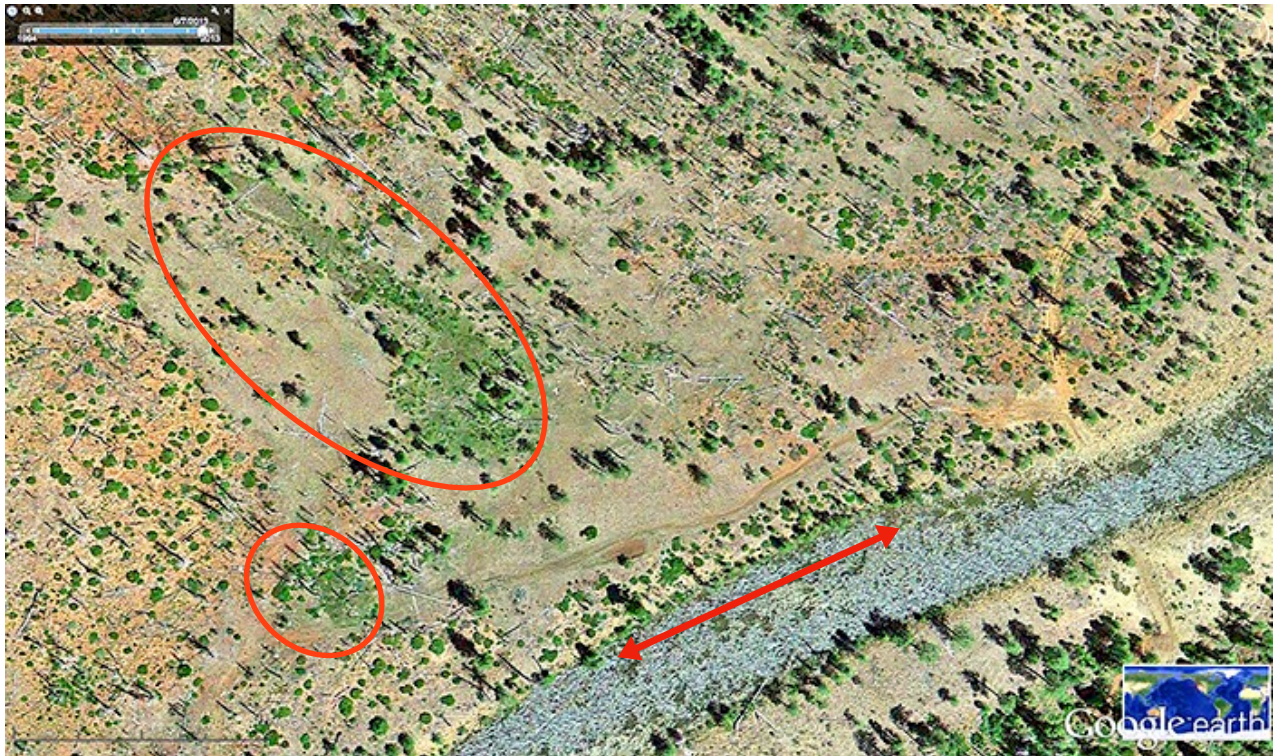


Figure 12 (above) - Google Earth image of Rough and Ready Creek and Serpentine *Darlingtonia* Wetland #81 (T40S, R9W, sec. 15). The serpentine wetland is indicated by the large red oval. A smaller serpentine wetland is adjacent (smaller oval). Both are surrounded by a xeric appearing Jeffrey pine savanna.

Below the wetlands, springs emerge from Rough and Ready Creek's bank to form a long linear streamside *Darlingtonia* wetland. The red arrow indicates the estimated area of the streambank with the *Darlingtonia* and other rare plants.

While there's no visible surface flow between the hillslope wetland and the linear streamside wetland, there's a very high likelihood that there's a significant subsurface nexus between the two.

The presence of the *Darlingtonia* and the rare plants associated with the wetlands indicate there's a consistent perennial source of water in the form of a spring or springs.

This is another example of the connectivity between the Serpentine *Darlingtonia* Wetlands in the Rough and Ready Watershed and the creek itself.



Figure 13 (above) An unmapped wetland (red oval) in the headwaters of the North Fork Rough and Ready Creek at approximately 2,730 ft. elevation. It can be seen using Google Earth but there's been no field surveys to confirm species composition and other characteristics. However, boaters reported and photographed a number of areas in this part of the watershed where there's *Darlingtonia* wetlands. Again the occurrence of *Darlingtonia* indicate the presence of perennial springs or seeps.



Figure 14 (left) Boater passing by a small *Serpentine Darlingtonia* Wetland on the long hike in to run the North Fork of Rough and Ready Creek.

Estimated elevation at this point, using Google Earth, is 3,700 feet.

Note - Boaters packing in to run the North Fork Rough and Ready Creek in mid-winter and early spring have provided photographs and important insights into this wild and mostly unexplored watershed.

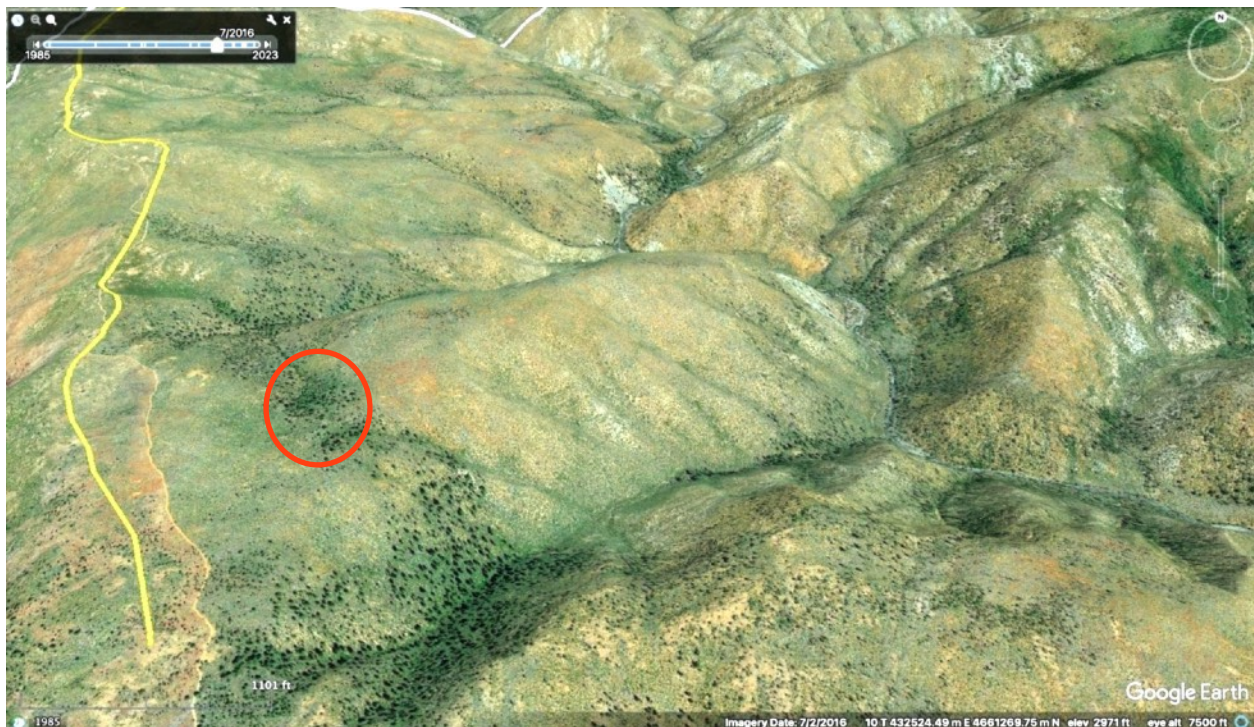


Figure 15 (above) Google Earth image of watershed divide (yellow line indicates watershed boundary) between Baldface Creek and North Fork of Rough and Ready Creek in the South Kalmiopsis Roadless Area. The red oval indicates a headwaters tributary of Rough and Ready Creek that begins at a high elevation spring. **Figure 16** below is what area looks like on the ground.

Figure 16 (below) On March 14, 2015, boaters hiking into run the North Fork discovered this headwaters tributary of Rough and Ready Creek. Species present include Port Orford cedar, *Darlingtonia*, Labrador tea and other wetland plants. Using Google Earth we roughly estimated the elevation to be around 3,400 feet. The approximate elevation of the watershed divide at this point is 3,620 feet. Again, the presence of the *Darlingtonia* indicates a there's perennial water source.





Figure 17 (above) The headwaters tributary below the area shown in **figure 16**. The streamside conifer is Port Orford cedar. The cedar plays a keystone role in riparian areas where its found, especially for streams flowing through serpentine terrain where it is often the only conifer present.

Figure 18 (below) Showing part of the broad watershed divide between the South Fork of Rough and Ready Creek) and Baldface Creek that's an ancient erosional remanent of the Klamath Peneplain. The ancient rounded plateau appears to act as an aquifer recharge area, especially for the Rough and Ready Creek Watershed. There's a number of springs along the watershed divide or a little below it especially within the Rough and Ready Creek watershed. Area of watershed divide pictured below is approximately 3550 feet elevation.





Figure 19 (above) Rough and Ready Lake is an amphibian lake in the Kalmiopsis Wilderness and the the headwaters of the North Fork of Rough and Ready Creek. It's elevation is ~ 3645 feet. The green line is the Wilderness boundary. The yellow line is the watershed divide between Rough and Ready Creek and Baldface Creek and the Wild & Scenic Chetco River. Elevation of the divide at this point is ~ 4000 feet.



Figure 20 (above) The yellow line in the above Google Earth image represents approximately .2 miles along the North Fork Rough and Ready Creek where there's areas of Port Orford cedar and *Darlingtonia*. Some is associated with the tributary in the upper left corner but there's areas where seeps or small springs emanate from the bank of the creek directly below the xeric bench.