May 12, 2017

Hydrology Report
Limestone/Silver Vegetation Management Project

The Limestone/Silver Vegetation Management Project is located in the Flume Creek, Pewee Creek, North Fork Deep Creek, Cedar Creek, and Pend Oreille River subwatersheds. The project's objectives are to improve forest resilience to insect and disease infestation, as well as reduce the likelihood of catastrophic wildfire within the wildland-urban interface. About 2,995 acres within the project area (comprising between 2 to 3 percent of each subwatershed) are slated for treatments designed to reduce overcrowded stands to more historical densities and decrease hazardous fuel levels. Proposed treatments include commercial and non-commercial timber harvesting, as well as fuel reduction methods using mechanical thinning, prescribed burning, and post-timber harvest pile burning.

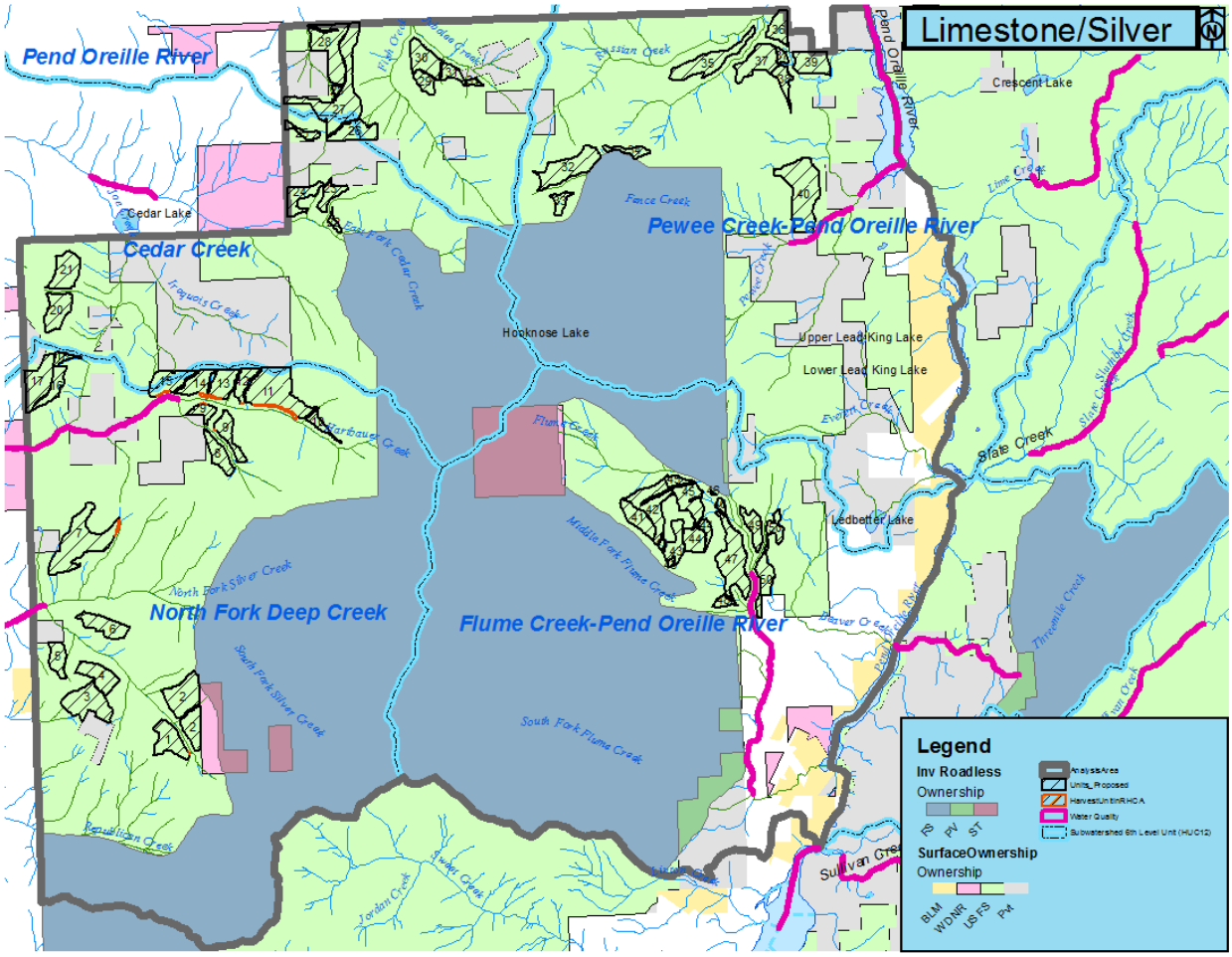

Figure 1. Project Vicinity Map

*Project area map with analysis area, subwatershed boundaries, water quality impairments, inventoried roadless area, proposed units, and designated Riparian Habitat Conservation Area management zones identified.

The stands are located on slopes with gradients ranging between 10 and 70 percent. Temporary road construction would be limited to less than 0.5 mile and would be located on existing road templates (where previous roads had existed). Project field data was collected in summer 2012 and 2015. Proposed temporary road locations were field reviewed on Nov. 22, 2016, by the District hydrologist. One stream crossing on an existing road prism was observed. This crossing was not functioning properly and would need to be modified for the use of the temporary road. Post-harvest activities would entail removing all crossing structures from temporary and closed roads used during project treatments. Temporary road prisms would be fully decompacted to a minimum of 18 inches, contoured to surrounding topography, covered with slash and debris, and planted. Closed roads would be decompacted and covered with slash once culverts were pulled and stream channels restored to pre-disturbance conditions.

All but 12 acres (less than 1 percent of the project total) are outside riparian habitat conservation area management zones. Those treatment areas within the riparian habitat conservation management zone were generally located in upland areas above a National Forest System open road. They also only comprised a fraction of the unit, averaging two acres or less. All units that had acres within the riparian habitat management zone were reviewed by the District hydrologist and determined to not present an adverse effect to the hydrological resource.

Water quality concerns within the five subwatersheds of the project area are very limited. Only Pewee Creek is listed as impaired for pH and dissolved oxygen. Because treatment areas are predominantly outside the riparian habitat conservation management zone, and those inside the management zone were determined to be safely situated, it is highly improbable the proposed action would result in adverse effects to water quality.

No new stream crossings would be needed for this project. Existing crossings of access roads are functioning and would be evaluated pre- and post-implementation for appropriate function. This would provide an opportunity to repair any existing damaged crossings that yield road sediment to the streams. With ground-based equipment restricted from yarding and no fuel treatment operations within riparian habitat management zones (except as previously identified), no inputs of sediment to the streams are expected.

Ground-based equipment should generally operate in the dry season, usually from May through October, unless otherwise restricted by other resource concerns or waived by Forest Service personnel. Equipment should be limited to pre-designated skid trails.

Additional activities associated with the proposed action which could impact hydrological resources include two stewardship provisions for road decommissioning:

1) Proposed temporary road for unit 45 is an existing prism that would be fully obliterated post-harvest for about 0.5 miles. The end of obliteration would occur at the point of self-obliteration, just prior to the old crossing site on Flume Creek.
2) Non-Forest Service System road (7078300-0.02R), located along the southern edges of units 12, 13, and 14 and located within three acres of the riparian habitat management zone, is scheduled for obliteration post-harvest.

The District hydrologist has reviewed these sites and has determined the level grade of the site and distance from bodies of water make it unlikely that these decommissioning projects would have any adverse effects on hydrologic resources. Further mitigating measures to be employed to ensure no negative impacts include:

- Restricting decommissioning to dry seasons or during periods of dry weather.
- Scatter weed free straw or implement other similar erosion-control efforts or both where slash cover is insufficient.
- Cover with slash to further minimize erosion and replant the decompacted road areas with conifer species per Rx treatment criteria.

While there are timber harvesting activities occurring on state and private lands within the Limestone/Silver project vicinity, it is unlikely that the proposed actions will add to any adverse cumulative effects. Between riparian habitat conservation management zones and standard operating procedures that minimize ground disturbance, it is unlikely that the proposed action will result in any adverse effects to the area. In fact, decommissioning roads within riparian management zones will contribute to long-term positive effects as the roadways become vegetated, return to forest productivity, and resume being a part of the natural landscape.
In addition to restricting treatment activities outside all but 12 acres of riparian habitat conservation areas, the guidelines established in the 2012 Guide for Water Quality Management on National Forest System Lands will be incorporated within the project design, including:

Road reconstruction (p. 110)
- Provide a Storm Water Implementation Plan
- Create and maintain stable fills
- Identify stable areas for waste sites prior to start of operations
- No sidecasting within riparian habitat conservation areas (referred to as Aquatic Management Zones in the guide.)
- Prevent and control invasive species
- Use suitable measures when pioneering during reconstruction phase to mitigate adverse effects to water quality, soils, and riparian resources
- Reconstruct roads with appropriate drainage for adequate protection to resources and safety

Road operations and maintenance (p. 111)
- Designate appropriate use periods, vehicle class and type to minimize adverse effects to water quality, soils, and riparian resources
- Ensure drainage features are fully functional upon completion of seasonal operations
- Develop and implement maintenance plans during project period

Temporary road construction (p. 114)
- Locate on stable geology and fit the terrain, follow natural contours, and limit need for excavation
- Minimize the number of waterbody crossings to the extent possible and avoid inner gorges, overly steep slopes, and unstable landforms
- Monitor for proper implementation, proper function, and appropriate maintenance of erosion and storm water controls
- Return the area to resource production after access is no longer needed

Road storage (p. 115)
- Stabilize for hydrologic and soil concerns

- Remove culverts, fill material that present risk to aquatic and soil resources
- Reshape channel to up and down stream characteristics
- Outslope road template for adequate drainage

Equipment refueling and servicing (p. 123)

- Develop or use existing fuel and chemical management plans, e.g. emergency spill response plan
- Provide locations for fueling and servicing outside riparian habitat conservation areas

Erosion prevention and control (p. 131)

- Develop or use existing erosion control and sediment plan for all project activities
- Operate equipment when soil compaction, displacement, erosion, and sediment runoff would be minimized

Aquatic Management Zones (p. 132)

- Clearly delineate riparian habitat conservation locations and boundaries in the project area
- Vegetation treatments in the riparian habitat conservation areas are limited to conditions that are suitable for achievement of long-term desired conditions and management objectives
- Locate transportation facilities outside riparian habitat conservation areas (e.g. roads, landings, skid trails) to the extent practical. Consult with Aquatic staff (hydrologist, fish biologist, and soils specialist) when conditions are not conducive to locating outside riparian habitat conservation areas.
- Monitor and document compliance of mitigation and prescription requirements during operation activities within riparian habitat conservation areas

Ground-based skidding and yarding operations (p. 134)

- Use existing roads and skid trails when available
- Use measures during felling and skidding operations to minimize disturbance to soils and waterbodies to the extent practicable

Cable yarding operations (p. 135)

- Fully suspend logs when yarding over riparian habitat conservation areas and streams
- Postpone operations when soil moisture levels are high and unacceptable soil disturbance and erosion are occurring

Landings (p. 136)

- Design roads and trails to minimize overland flow entering the landing
- Re-use existing landings to the extent practicable
- Reshape and mitigate soil compaction after use

Winter logging (p. 137)

- Clearly mark riparian habitat conservation areas boundaries to be visible in heavy snow conditions
- Mark all culvert locations before plowing, hauling, or yarding operations begin to avoid damage from plowing or logging machinery

- Avoid leaving slash in streams or riparian habitat conservation areas from project activities

This project is consistent with Colville National Forest Plan direction and guidance with regard to maintaining or improving water quality and quantity from existing levels.

/s/ Rob Lawler
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