

Project Summary:

The Piquett Creek Project proposes to conduct an improvement harvest in portions of 6th code hydrologic units 170102050305 (Lower West Fork Bitterroot watershed) and 170102050303 (Piquett Creek watershed) on the West Fork Ranger District. In addition to commercial timber harvest, noncommercial thinning of trees up to 7" DBH would occur followed by pile burning and prescribed fire. The purpose of this proposal is to reduce fuels and improve timber stand health. Harvest would occur using ground based and skyline yarding systems with hauling occurring on existing roads. Improvements in the form of gravel and installation of dips would occur on FR 49 and haul routes where there is moderate to high risk of sediment leaving the road prism and entering streams. Any wetlands within units or riparian areas would be marked with RHCA (Riparian Habitat Conservation Area) buffers and excluded from treatment. Slash would be piled where needed (outside RHCA's) or scattered and burned after harvest completed. Prescribed fire would not be ignited within 50 feet of streams or wetlands but would be allowed to back into wetlands or RHCA's.

Watershed Discussion:

Stream surveys were conducted on Violet, Piquett and East Piquett creeks to determine how stable each stream currently is, and to determine how resilient those streams would be to withstand future increases in streamflow without channel adjustments. The table below lists channel stability ratings or CSR, (Pfankuch, 1974) for the surveyed reaches; the streamtype at the survey site; and the CSR rating related to that streamtype (Rosgen, 1996) which helps to identify sensitivity. Table 1 displays the results of the stream surveys.

Table 1. Stream Survey Results

Reach Name	Channel Stability Rating	Stream Type	Overall Rating (Rosgen 1996)
Lower Violet Creek	90	A5	Good
Mid Violet Creek	68	A4	Good
Piquett above 5720 Bridge	72	A4	Good
Piquett below 5720 Bridge	69	B4	Fair trending towards Good
East Piquett 300' above USFS boundary	81	C4	Good
East Piquett 400' above USFS boundary	83	B4	Fair trending towards Good

The survey site on Piquett Creek is located below the bridge on FR 5720. Table 1 identifies the numerical rating for Piquett at this location in the upper edge of the "Fair" rating due to high percentage of sand in the substrate. Bank stability, flood plain accessibility and other stream characteristics used in

the CSR are in the "Good" or "Excellent" category. As a result, this stream is considered at the "Good" condition. Between this reach and the forest boundary Piquett Creek flows through a spruce forest with multiple channels, deep undercut banks, large amounts of large wood, and highly complex fish habitat (refer to fisheries report). Due to those factors, the CSR is not an appropriate tool for channel evaluation in that area. The portion of Piquett Creek between the FR 5720 bridge and the forest boundary is considered to be in good condition due to the high complexity of its fish habitat.

Two surveys were conducted on East Piquett Creek. The lower survey site is located on a B reach and was rated as "Fair", while the survey reach located slightly upstream on a more sensitive C reach was rated as "Good".

To summarize, the stream surveys indicate that Piquett and East Piquett creeks are in good condition and could withstand minor increases in water yield.

Direct and Indirect Effects:

In this project, treatments within the project area would be identified that would thin forest stands to improve upland health. An ECA (equivalent clearcut area) analysis was conducted as part of this effects analysis. The ECA analysis indicates that existing levels of ECA in the Piquett and East Piquett watersheds are approaching 25%. Most of this ECA was caused by wildfires that have occurred since 2000. In the small watersheds of Violet and Pine creeks, past harvest contributes to moderate ECA levels in the teens. Research indicates that below 20% ECA, measurable increases in water yield are not observed (Stednick, 1996, Hibbert, 1979, Follitt and Brooks, 1988, Bosch and Hewlett, 1992, MacDonald and Stednick, 2003). As current levels of ECA in the project area are approaching or have exceeded the 20% level, additional analysis would occur when final units are identified to ensure that ECA levels would not exceed 25% in each 6th code hydrologic unit.

Based upon stream visits and channel stability ratings, project area streams are stable or at the lower end of the stable range, and would be able to withstand minor increases in water yield without affecting channel stability, increasing bank erosion, or degrading water quality. Because channels are stable, an increase in ECA up to 25% in area watersheds is acceptable and stream channel conditions would be maintained. A limit of up to 25% ECA in the Piquett hydrologic unit (170102050303) would be used as a design feature.

The 25% level was chosen because:

- Literature review supports that below 20% ECA measurable changes in streamflow are unlikely to occur. During wet periods there may be measurable increases, but during dry periods measurable increases do not occur. The project area is relatively dry.
- Precipitation in the project area is estimated to be between 20 and 27 inches per year depending on the model used. This is a relatively low precipitation zone and residual vegetation is likely to utilize all soil moisture, thus reducing the risk of increased runoff to area streams.
- Runoff grids indicate the project area is generally water deficit, meaning that limited soil moisture is available during the growing season.
- Existing stands of timber are likely more dense than they historically were due to fire suppression and conifer encroachment on grasslands and density of understory vegetation. It is likely that at the current density, stands are moisture stressed compared to historical stand

stocking/composition. Thinning treatments would return treated areas to a more historical condition.

- Kendall (2018) has documented that since 1965 total water yields have decreased in northwest Montana and attributes that change to climate change. Other areas of western Montana may be experiencing similar changes.
- Project area streams are in “good” condition, capable of carrying minor increases streamflow without causing channel instability, bank erosion and degradation of water quality.

No more than 25% ECA would be allowed in area watersheds. Final ECA estimates would be calculated when treatment units and types of harvest are identified. This additional analysis would determine the ECA for a given treatment unit, and how that contributes to the total ECA of a watershed. When 25% ECA in the 6th code hydrologic unit is reached, no additional harvest would be allowed in the watershed until additional vegetation recovery occurs. This limit is identified because at greater than 25% ECA:

- the risk of channel changes increases and could include bank erosion,
- sediment deposition in pools may increase,
- downcutting may occur in steeper reaches and deposition in low gradient reaches from low/moderate to moderate/high.
- Increases in ECA above the 25% level could violate the Clean Water Act.

Due to workload and other forest priorities, the implementation team should provide 2-3 weeks to allow for confirmation that proposed units are within the ECA limit of 25%. In other words, the project hydrologist will need time to assess and calculate ECA prior to final identification of units.

Prescribed fire would be included in this proposal. The prescribed fire treatments are unlikely to cause increases in ECA because they generally do not result in more than isolated and limited tree torching (mortality). This type of low severity burning does not measurably contribute to increases in ECA.

Several design features are included in the project that would greatly minimize the risk of sediment from treatment units entering streams. These design features include:

- Disturbed soils would not be continuous or widespread as skid trails and skyline corridors would be spaced appropriately with vegetated areas separating disturbed areas and would be water barred and slashed following use.
- No treatment INFISH buffers would provide a vegetated filter zone that would prevent sediment from crossing RHCAs and entering streams.
- The use of BMP's in project design and implementation would provide additional protections such as exclusion from wet areas, season of operation and appropriate oversight.
- Monitoring of recent harvest as reported in Forest Plan Monitoring Reports between 2008 and 2015 has not found any cases where erosion from harvest units entered stream channels when design features and BMP's are applied.

For the above reasons, sediment from treatment areas has very low risk of entering stream channels.

Gravel would be applied to reduce road erosion and dips installed or improved to divert water from roads at locations away from stream channels and reduce sediment contributions to area streams to the extent possible. Hauling would occur only during dry road conditions with hauling being suspended during wet periods and not allowed during the winter or snow months. The number of loaded trucks

operating on FR 49 would be limited to 500 truckloads. These design features would reduce the risk of sediment contributions to Piquett Creek during hauling periods and reduce the contribution of sediment to area streams in the longer term.

Evaluation of Extraordinary Circumstances for Watershed Resource:

Concern	Degree of Effect	Discussion
Wetlands	None	Wetlands would be protected with 50-foot wide INFISH buffers. The buffers would be marked prior to implementation, and no treatments would be allowed within the buffers, including the entry of vehicles. These INFISH buffers would prevent any sediment from harvest or prescribed fire activities from entering wetlands. Refer to the Lower West Fork Vegetation Management Project FEIS, Meadow Vapor Environmental Analysis for documentation of WEPP model results for similar activities and refer to Forest Plan Monitoring Reports 2008-2015 for documentation of monitoring for similar implemented projects.
Floodplains	None	INFISH buffers would exclude treatment in floodplains. Buffers would capture any sediment from harvest or prescribed fire activities from entering floodplains. Refer to the Lower West Fork Vegetation Management Project FEIS, Meadow Vapor Environmental Analysis for documentation of WEPP model results for similar activities and refer to Forest Plan Monitoring Reports 2008-2015 for documentation of monitoring results on similar project.
Municipal watersheds	None	None in the project area.

Clean Water Act Compliance:

The Piquett Creek project is located in the Piquett Creek 6th code hydrologic unit or HUC (170102050303), and in the Lower West Fork Bitterroot River HUC (170102050305). The West Fork Bitterroot River is listed as water quality limited for sediment and a TMDL has been developed and is documented in the Water Quality Restoration Plan and Total Maximum Daily Loads for the Bitterroot Headwaters (2006). The table below displays the status of the West Fork:

Waterbody Name	Sediment Pollutant Listing	Causes of Impairment	Impaired Use

West Fork Bitterroot River	Sedimentation/Siltation	Forest roads, fires of 2000, timber harvest	Aquatic life, cold water fish
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The TMDL for sediment in the West Fork Bitterroot River includes a 57% reduction in sediment from unpaved forest roads. That reduction is defined in the TMDL document as what sediment reductions could be attained by application of BMP's that reduce total sediment contributing length on stream crossings to 200 feet and to 500 feet for each parallel road segment. Since 2012, over 20 miles of road have been decommissioned and over 13 miles of road stored with culverts removed, entrances blocked and revegetated in the Piquett Creek watershed, which is tributary to the West Fork. This current project would include gravel surfacing on portions of roads near stream crossings to reduce erosion of the road surface and potential sediment contributions to streams. Other BMP's would be applied to the log hauling portion of the project such as restricting the season of haul, limiting the number of log trucks, monitoring road conditions during the haul, installing straw bale check dams on the outlets of ditch relief culverts, and installing dips in appropriate locations to divert water from roads and into buffer zones. The application of BMP's has been shown to reduce sediment contributions to streams. For example, the application of BMP's in 2004 to the Meadow Creek road (FR 725) substantially reduced sediment delivery from that streamside road and was a major contributing factor in the delisting of Meadow Creek for sediment in 2014.

Other supporting evidence for BMP effectiveness includes (1) monitoring reported in the Forest Plan Monitoring Reports (2008-2015) and (2) modeling using the WEPP (Water Erosion Prediction Project model) for recent Bitterroot National Forest projects (e.g. Darby Lumber Lands Phase II and Gold Butterfly projects). For those projects, the WEPP model was used to estimate sediment contributions before and after implementation of BMPs on forest roads. The model predicted that: (1) sediment contributions from forest roads would be reduced during the post-haul period; and (2) because of the installation of BMP upgrades prior to commencing log haul, sediment contributions during the log haul would be slightly reduced from the existing condition at most sites. Similar effects are expected with this project. Refer to the watershed report in the Gold Butterfly DEIS (2018), and DLL Phase II EA (2019) for further discussion.

BMP's would be applied to haul routes and to harvest operations and would comply with the Clean Water Act (DEQ, 2011). Reduction of sediment contributions from unpaved forest roads would meet the intent of the TMDL.

Summary:

In summary, the vegetation management and fuels treatments that occur in the Piquett and West Fork hydrologic units should not result in measurable increases of sediment or water yields for the following reasons:

- Monitoring over several years of similar vegetation management has shown that design features and harvest BMP's are effective in preventing harvest related sediment from crossing buffers and entering streams channels.
- Haul routes would be upgraded with BMP's prior to receiving log truck traffic. This would limit haul-related sediment contributions and comply with the Clean Water Act.

- BMP's (gravel and drainage structures) applied at stream crossings would limit sediment delivery during hauling to levels that are near the existing condition and would reduce delivery levels after the hauling is completed.
- Watershed ECAs would be limited to a maximum of 25%. With this restriction, water yields should be maintained due to the low precipitation zone that treatments occur in and the presence of residual stands of timber.
- The residual stands would utilize any increased soil moisture created by timber harvest.
- Floodplains and wetlands would have no impact from this proposal due to the use of INFISH buffers that create no-treatment zones around them.
- There are no municipal watersheds in the project area.

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