

APPENDIX A

WATERSHED CONSERVATION PRACTICE STANDARDS

Best Management Practices (BMP's) or "Watershed Conservation Practices" (WCP's) are intended to control non-point source pollutants. Region 2 of the Forest Service established the "Watershed Conservation Practices Handbook" (Forest Service Handbook 2509.25-99-1) to provide direction for the protection of soil, aquatic, and riparian systems on National Forest System lands.

"The watershed conservation practices translate legal provisions and scientific principles onto solid, common-sense stewardship actions. Use of the practices support continued wise resource use. The practices cover five areas: hydrologic function, riparian areas, sediment control, soil productivity, and water purity. Each area has a set of standards. Each standard contains design criteria, as well as monitoring guides and restoration guides.

- ❖ The standards are statements of outcome to ensure that management actions comply with applicable laws and regulations. They are incorporated into each Forest Plan as standards and cannot be deviated from without an amendment to the Forest Plan.
- ❖ The design criteria are specific ways to meet the standard using current knowledge and technology. They may be revised as knowledge and technology improve. They carry the same weight and must be followed to the same degree as Forest Plan guidelines. Other methods may be used if they result in the same outcome directed by the standard, but the NEPA document must tell why these other methods will be as effective.

"Project Specific Required Mitigation" have been developed or compiled on the Forest and are similar to design criteria, but tailored to a specific project or type of project. Project Specific Required Mitigation is intended to provide a stronger link between the Forest Plan Standards/Design Criteria and how the actual project is implemented "on-the-ground". This list is intended to serve as a library of "Project Specific Required Mitigation" or examples which can be selected when appropriate for use on any given project.

Watershed Conservation Practices and BMPs (FSH 2509.25 R2 Amendment 2509.25.96-1).

Applicable Standards	Design Criteria	Project-Specific Required Mitigation
<p>FP Standard: In watersheds containing aquatic TES species, allow activities and uses within 300 feet or the top of the inner gorge (whichever is greatest), of the perennial and intermittent streams, wetlands, lakes (over 1 acre) only if onsite analysis shows that long-term hydrologic function, channel stability, and stream health will be maintained or improved.</p>		<p>Apply Watershed Conservation Practices and limit activities within Critical Upslope distances of streams and wetlands.</p>
<p>11.1 Standard (1) - Manage land treatments to conserve site moisture and to protect long-term stream health from damage by increased runoff.</p>	<p>a. In each 3rd order and larger watershed, limit connected disturbed areas so the total stream network is not expanded by more than 10%. Progress toward zero connected disturbed area as much as feasible. Do not add connected disturbed area to Class III watersheds (FSM 2521).</p>	
	<p>b. Design the size, orientation, and surface roughness of forest openings to prevent snow scour and site desiccation.</p>	
<p>11.2 Standard (2) - Manage land treatments to maintain enough organic ground cover in each land unit to prevent harmful increased runoff.</p>	<p>a. Maintain the organic ground cover of each land unit so that pedestals, rills, and surface runoff from the land unit are not increased.</p>	
	<p>b. Restore the organic ground cover of degraded land units within the next plan period, using certified local native plants as feasible; avoid persistent or invasive exotic plants.</p>	



Applicable Standards	Design Criteria	Project-Specific Required Mitigation								
<p>12.1 Standard (3) - In the water influence zone next to perennial and intermittent streams, lakes and wetlands, allow only those land treatments that maintain or improve long-term stream health and riparian ecosystem condition.</p>	<p>a. Allow no action that will cause long-term change to a lower stream health class in any stream reach. In degraded systems, progress toward robust stream health within the next plan period.</p>	<p>Recommendations for application of critical upslope vegetation buffers for riparian area protection are summarized for suitable ground as follows:</p> <table border="0"> <tr> <td>Slope</td> <td>Critical Upslope Distance</td> </tr> <tr> <td>0-20 %</td> <td>100 feet</td> </tr> <tr> <td>20-30%</td> <td>180 "</td> </tr> <tr> <td>30-40 %</td> <td>280 "</td> </tr> </table>	Slope	Critical Upslope Distance	0-20 %	100 feet	20-30%	180 "	30-40 %	280 "
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	<p>b. Allow no action that will cause long-term change away from desired condition in any riparian or wetland vegetation community. In degraded systems, progress toward desired condition within the next plan period.</p>									
	<p>c. Keep heavy equipment out of streams, swales, and lakes, except to cross at designated points, build crossings, or do restoration work, or if protected by at least 1 foot of packed snow or 2 inches of frozen soil. Keep heavy equipment out of streams during fish spawning, incubation and emergence periods.</p>									
	<p>d. Ensure at least one-end log suspension in the WIZ. Fell trees in a way that protects vegetation in the WIZ from damage. Keep log landings and skid trails out of the WIZ, including swales.</p>									
	<p>e. Locate new concentrated-use sites outside of the WIZ if feasible and outside riparian areas and wetlands always. Harden or reclaim existing sites in the WIZ to prevent detrimental soil and bank erosion.</p>									



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	<p>f. Exclude livestock from riparian areas and wetlands that are rated as Not Functioning by the PFC protocol, and where livestock grazing would impede improvement.</p>	
	<p>g. Keep stock tanks, salt supplements, and similar features out of the WIZ if feasible and out of riparian areas and wetlands always. Keep stock driveways out of the WIZ except to cross at designated points. Harden water gaps and designated stock crossings where needed and feasible.</p>	
	<p>h. Remove livestock from riparian areas and wetlands when the average stubble height of Carex species reaches 3-4 inches in spring-use pastures and 4-6 inches in summer/autumn use pastures.</p>	
	<p>i. Avoid season-long grazing in riparian areas and wetlands. Apply short-duration grazing as feasible (generally less than 20 days) to provide greater opportunity for regrowth and to avoid utilization of woody species. Avoid livestock grazing, as feasible, during the hot season (mid-to-late summer) when livestock are more likely to concentrate in riparian areas and wetlands and to utilize woody species.</p>	
	<p>j. Do not excavate earth material from, or store excavated earth material in, any stream, swale, lake, wetland, or WIZ.</p>	
	<p>k. Maintain the extent of stable banks in each stream reach at 80% or more of reference conditions. Consider degree of livestock trampling on stream banks, by stream</p>	



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	type, when timing livestock moves between units. As a general rule, stream banks can receive a maximum of 20-25% alteration and still maintain their integrity.																													
	l. Adjust management in riparian areas and wetlands to remedy detrimental soil compaction whenever it occurs.																													
	m. Do not excavate earth material from, or store excavated earth material in, any stream, swale, lake, wetland, or WIZ.																													
<p>12.2 Standard (4) - Design and construct all stream crossings and other instream structures to provide for passage of flow and sediment, withstand expected flood flows, and allow free movement of resident aquatic life.</p>	<p>a. Install stream crossings to meet Corps of Engineers and State permits, pass normal flows, and be hardened to withstand flood flows as follows:</p> <table border="0"> <tr> <td>Design Life</td> <td>1</td> <td>2</td> <td>5</td> <td>10</td> <td>20</td> <td>50</td> </tr> <tr> <td>(years)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Design Flood</td> <td>10</td> <td>10</td> <td>25</td> <td>50</td> <td>100</td> <td>225</td> </tr> <tr> <td>(years)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Design Life	1	2	5	10	20	50	(years)							Design Flood	10	10	25	50	100	225	(years)							
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	b. Size culverts and bridges to pass debris. Engineers work with hydrologists on site design.																													
	c. Install stream crossings on straight and resilient stream reaches, as perpendicular to flow as feasible, and to provide passage of fish and other aquatic life.																													
	d. Install stream crossings to sustain bankfull dimensions of width, depth, and slope and keep stream beds and banks resilient. Favor hardened fords and bridges on streams with flood plains, and bottomless arches instead of pipe culverts.																													



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<p>12.3 Standard (5) - Conduct actions so that stream pattern, geometry, and habitats are maintained or improved toward robust stream health.</p>	<p>a. Add or remove rocks, wood, or other material in streams or lakes only if such action maintains or improves stream and lake health. Leave rocks and portions of wood that are embedded in beds or banks to prevent channel scour.</p>	
	<p>b. Install fish migration barriers only if needed to protect endangered, threatened, sensitive or unique native aquatic populations, and only where natural barriers do not exist.</p>	
	<p>c. Do not relocate natural stream channels if avoidable. Return flow to natural channels where feasible. Construct channels and floodways with natural stream pattern and geometry and stable beds and banks.</p>	
<p>12.4 Standard (6) - Maintain long-term ground cover, soil structure, water budgets, and flow patterns of wetlands to sustain their ecological function, per 404 regulation..</p>	<p>a. Keep ground vehicles out of wetlands unless protected by at least 1 foot of packed snow or 2 inches of frozen soil. Do not disrupt water supply or drainage patterns into wetlands.</p>	
	<p>b. When feasible, keep roads and trails out of wetlands. If roads or trails must enter wetlands, use bridges or raised prisms with diffuse drainage to sustain flow patterns. Set crossing bottoms at natural levels of channel beds and wet meadow surfaces. Avoid actions that may dewater or reduce water budgets in wetlands.</p>	
	<p>c. Avoid long-term reduction in organic ground cover and organic soil layers in any wetland (including peat in fens).</p>	



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	<p>d. When feasible, keep buried utility and pipe lines out of wetlands. If such a line must enter a wetland, use measures that sustain long-term wetland function.</p>	
	<p>e. Avoid any loss of rare wetlands such as fens and springs.</p>	
	<p>f. Do not build firelines in or around wetlands unless needed to protect life, property, or wetlands. Use hand lines with minimum feasible soil disturbance. Use wetland features as firelines if feasible.</p>	
<p>12.5 Standard (7) - Maintain enough water in perennial streams to sustain existing stream health. Return some water to dewatered perennial streams when needed and feasible.</p>	<p>a. For existing dams and diversion on naturally perennial streams, obtain bypass flows at the point of diversion or storage that support a healthy, self-sustaining community of aquatic life having all regionally-expected species and population dynamics at permit reissuance. Bypass flows must exceed the native median flow of the lowest winter month for the fall-winter seasons, and the native median flow of the lowest summer month for the spring-summer seasons.</p>	
	<p>b. For NEW dams and diversions, obtain bypass flows at the point of diversion or storage that protect stream processes, aquatic and riparian habitats and communities, and recreation and aesthetic values. Include base flows and a range of high flows that bracket bankfull discharge, as needed to support these uses.</p>	
	<p>c. Obtain instream flow water rights under federal and state law to protect stream processes, aquatic and riparian habitats and communities, and recreation and</p>	



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	aesthetic values. Top priority is to protect imperiled native species.	
<p>12.6 Standard (8) - Manage water-use facilities to prevent gully erosion of slopes and to prevent sediment and bank damage to streams.</p>	<p>a. Design all ditches, canals, and pipes with at least an 80% chance of passing high flows and remaining stable during their life.</p>	
	<p>b. Do not flush or deposit sediment from behind diversion structures into the stream below. Deposit sediment in a designated upland site.</p>	
	<p>c. Mitigate water imports so that the extent of stable banks in each receiving stream reach is at least 80% of reference conditions.</p>	
<p>13.1 Standard (9) - Limit roads and other disturbed sites to the minimum feasible number, width, and total length consistent with the purpose of specific operations, local topography, and climate.</p>	<p>a. Construct roads on ridge tops, stable upper slopes, or wide valley terraces if feasible. Stabilize soils onsite. End-haul soil if full-bench construction is used. Avoid slopes steeper than 70%.</p>	
	<p>b. Avoid soil-disturbing actions during periods of heavy rain or wet soils. Apply travel restrictions to protect soil and water.</p>	
	<p>c. Install cross drains to disperse runoff into filter strips and minimize connected disturbed areas. Make cuts, fills, and road surfaces strongly resistant to erosion between each stream crossing and at least the nearest cross drain. Revegetate using certified local native plants as feasible; avoid persistent or invasive exotic plants.</p>	



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	<p>d. Where feasible, construct roads with rolling grades instead of ditches and culverts.</p>	
	<p>e. Retain stabilizing vegetation on unstable soils. Avoid new roads or heavy equipment use on unstable or highly-erodible soils.</p>	
	<p>f. Use existing roads unless other options will produce less long-term sediment. Reconstruct for long-term soil and drainage stability.</p>	
	<p>g. Avoid ground skidding with blades lowered or on highly erodible slopes steeper than 40%. Conduct logging to disperse runoff as feasible.</p>	
	<p>h. Designate, construct, and maintain recreational travelways for proper drainage and harden their stream crossings as needed to control sediment.</p>	
<p>13.2 Standard (10) – Construct roads and other disturbed sites to minimize sediment discharge into streams, lakes and wetlands.</p>	<p>a. Design all roads, trails, and other soil disturbances to the minimum standard for their use and to "roll" with the terrain as feasible.</p>	
	<p>b. Use filter strips, and sediment traps if needed, to keep all sand sized sediment on the land and disconnect disturbed soil from streams, lakes and wetlands. Disperse runoff into filter strips.</p>	
	<p>c. Key sediment traps into the ground. Clean them out when 80% full. Remove sediment to a stable gentle upland site and revegetate.</p>	



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	<p>d. Keep heavy equipment out of filter strips except to do restoration work or build hardened stream or lake approaches. Yard logs up out of each filter strip with minimum disturbance of ground cover.</p>	
	<p>e. Build firelines outside filter strips unless tied into a stream, lake, or wetland as a firebreak with minimal disturbed soil. Retain organic ground cover in filter strips during prescribed fires.</p>	
	<p>f. Design road ditches and cross drains to limit flow to ditch capacity and prevent ditch erosion and failure.</p>	
<p>13.3 Standard (11) – Stabilize and maintain roads and other disturbed sites during and after construction to control erosion.</p>	<p>a. Do not encroach fills or introduce soil into streams, swales, lakes, or wetlands.</p>	
	<p>b. Properly compact fills and keep woody debris out of them. Revegetate cuts and fills upon final shaping to restore ground cover, using certified local native plants as feasible; avoid persistent or invasive exotic plants. Provide sediment control until erosion control is permanent.</p>	
	<p>c. Do not disturb ditches during maintenance unless needed to restore drainage capacity or repair damage. Do not undercut the cut slope.</p>	
	<p>d. Space cross drains, from no more than 120 feet in highly erodible soils on steep grades, to no more than 1,000 feet in resistant soils on flat grades. Do not divert water from one stream to another.</p>	



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	<p>e. Empty cross drains onto stable slopes that disperse runoff into filter strips. On soils that may gully, armor outlets to disperse runoff. Tighten cross-drain spacing so gullies are not created.</p>	
	<p>f. Harden rolling dips as needed to prevent rutting damage. Ensure that road maintenance provides stable surfaces and drainage.</p>	
	<p>g. Where berms must be used, construct and maintain them to protect the road surface, drainage features, and slope integrity while also providing user safety.</p>	
	<p>h. Build firelines with rolling grades and minimum downfill convergence. Outslope or backblade, permanently drain, and revegetate firelines immediately after the burn. Use certified local native plants as feasible; avoid persistent or invasive exotic plants.</p>	
<p>13.4 Standard (12) – Reclaim roads and other disturbed sites when use ends, as needed to prevent resource damage.</p>	<p>a. Site-prepare, drain, revegetate, and close temporary and intermittent use roads and other disturbed sites within one year after use ends. Provide natural drainage that disperses runoff into filter strips and maintains stable fills. Do this work concurrently. Use native vegetation as feasible.</p>	<p>Ways would be obliterated within sight distance of main roadways, remainder would be ripped and seeded. All existing "ways" used for timber sale access will be fully recontoured to approximate natural topography; natural stream courses will be reestablished; sites will be returned to productivity. Drainage structures would be removed on all ways, including from portions of ways beyond the timber sale access, which would no longer be accessible due to closures/obliteration activities through this sale.</p>



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	<p>b. Remove all temporary stream crossings (including all fill material in the active channel), restore the channel geometry, and revegetate the channel banks using native revegetation as feasible.</p>	
<p>14.1 Standard (13) - Manage land treatments to limit the sum of severely burned and detrimentally compacted, eroded, and displaced land to no more than 15% of any land unit (FSH 2509.18)</p>	<p>a. Restrict roads, landings, skid trails, concentrated-use sites, and similar soil disturbances to designated sites.</p>	
	<p>b. Operate heavy equipment for land treatments only when soil moisture is below the plastic limit, or protected by at least one foot of packed snow or 2 inches of frozen soil.</p>	
	<p>c. Conduct prescribed fires when soil, humus, and large fuels are moist.</p>	
<p>14.2 Standard (14) - Maintain or improve long-term levels of organic matter and nutrients on all lands.</p>	<p>a. On soils with topsoil thinner than 1 inch, topsoil organic matter less than 2%, or effective rooting depth less than 15 inches, retain 90% or more of the fine (less than 3 inches in diameter) logging slash in the stand after each clearcut and seed-tree harvest, and retain 50% or more of such slash in the stand after each shelterwood and group-selection harvest, considering existing and projected levels of fine slash.</p>	
	<p>b. If machine piling of slash is done, conduct piling to leave topsoil in place and to avoid displacing soil into piles or windrows.</p>	



Applicable Standards	Design Criteria	Project-Specific Required Mitigation
<p>15.1 Standard (15) - Place new sources of chemical and pathogenic pollutants where such pollutants will not reach surface or ground water.</p>	<p>a. Put pack and riding stock sites, sanitary sites, and well drill-pads outside the water influence zone (WIZ).</p>	
	<p>b. Put vehicle service and fuel areas, chemical storage and use areas, and waste dumps and areas on gentle upland sites. Do mixing, loading, and cleaning on gentle upland sites. Dispose of chemicals and containers in State-certified disposal areas.</p>	
<p>15.2 Standard (16) - Apply runoff controls to disconnect new pollutant sources from surface and ground water.</p>	<p>a. Install contour berms and trenches around vehicle service and refueling areas, chemical storage and use areas, and waste dumps to fully contain spills. Use liners as needed to prevent seepage into ground water.</p>	
	<p>b. Reclaim each mine waste dump when its use ends, using certified local native plants as feasible; avoid persistent or invasive exotic plants. Stabilize waste dumps and tailings in non-use periods to prevent wind and water erosion. If non-use will exceed one year, perform concurrent reclamation.</p>	
	<p>c. Use lined ponds below waste dumps and tailings to contain all inflow. Build tailings dams with a 95% chance of containing floods over their design life. Permanently stabilize dams at final shaping.</p>	
	<p>d. Clean waste water from concrete batching and aggregate operations before returning the water to streams, lakes, or wetlands.</p>	



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	<p>e. Inspect chemical equipment daily for leaks. If leaks or spills occur, report them and install emergency traps to contain them and clean them up.</p>	
<p>15.3 Standard (17) - Apply chemicals using methods which minimize risk of entry to surface and ground water.</p>	<p>a. Favor pesticides with half-lives fo 3 months or less. Apply at lowest effective rates as large droplets or pellets. Follow the label. Favor selective treatment. Use only aquatic-labeled chemicals in the WIZ.</p>	
	<p>b. Use nontoxic, nonhazardous drilling fluids when feasible.</p>	

