

Appendix H – Watershed Conservation Practices Handbook Design Criteria (Best Management Practices)

Table of Contents

11 - HYDROLOGIC FUNCTION.....	1319
11.1 - Management Measure (1).....	1319
11.2 - Management Measure (2).....	1319
12 - RIPARIAN AREAS AND WETLANDS.....	1319
12.1 - Management Measure (3).....	1320
12.2 - Management Measure (4).....	1321
12.3 - Management Measure (5).....	1322
12.4 - Management Measure (6).....	1322
12.5 - Management Measure (7).....	1322
12.6 - Management Measure (8).....	1324
13 - SEDIMENT CONTROL	1325
13.1 - Management Measure (9).....	1325
13.2 - Management Measure (10).....	1326
13.3 - Management Measure (11).....	1326
13.4 - Management Measure (12).....	1327
14 - SOIL QUALITY.....	1328
14.1 - Management Measure (13).....	1328
14.2 - Management Measure (14).....	1328
15 - WATER PURITY.....	1328
15.1 - Management Measure (15).....	1329
15.2 - Management Measure (16).....	1329
15.3 - Management Measure (17).....	1330

This appendix contains a summary of the management direction that is included in the 2509.25 Watershed Conservation Practices Handbook. The handbook direction is referenced in the Forest Plan and the design criteria in the handbook are incorporated into all project decisions to which they apply. This summary of that direction is attached to the EIS to provide context to the discussion on watershed effects analysis.

Management measures are environmental goals to protect soil, aquatic, and riparian systems. Design criteria are specific practices to attain the management measures using current knowledge and technology. Notes following the design criteria cite the effectiveness of the design criteria. The five areas covered are hydrologic function, riparian areas and wetlands, sediment control, soil quality, and water purity.

A 1985 agreement between the Forest Service and the Environmental Protection Agency mandated the Water Resource Evaluation of Nonpoint Silvicultural Sources (WRENSS) as official guidance to control nonpoint sources of water pollution. Its controls were used to construct many management measures and design criteria. Others are adapted from Federal and State BMPs and work of other Regions and agencies. “Best Management Practices” are, by definition, the most effective, practicable means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals (CDPHE 2001; WY DEQ 2001).

11 - HYDROLOGIC FUNCTION

Hydrologic function is the ability of a watershed to infiltrate precipitation and naturally regulate runoff so streams are in dynamic equilibrium with their channels and floodplains. Management measures and design criteria to protect hydrologic function apply to all actions that may impact the "sponge and filter" qualities of watersheds. Hydrologic function is protected by maintaining good vegetation and ground cover and by minimizing connected disturbed areas.

11.1 - Management Measure (1)

Manage land treatments to conserve site moisture and to protect long-term stream health from damage by increased runoff.

1. Design Criteria.

- a. In each watershed containing a 3-rd order and larger stream, 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 practicable. Where it is impossible or impracticable to disconnect a particular connected disturbed area, minimize the areal extent of the individual connected disturbed area as much as practicable. In watersheds that contain stream reaches in diminished stream health class, allow only those actions that will maintain or reduce watershed-scale Connected Disturbed Area.
- b. Design the size, orientation, and surface roughness (that is, slash and other features that would trap and hold snow on site) of forest openings to prevent snow scour and site desiccation.

11.2 - Management Measure (2)

Manage land treatments to maintain enough organic ground cover in each activity area to prevent harmful increased runoff.

1. Design Criteria.

- a. Maintain the organic ground cover of each activity area so that pedestals, rills, and surface runoff from the activity area are not increased. The amount of organic ground cover needed will vary by different ecological types and should be commensurate with the potential of the site.
- b. Restore the organic ground cover of degraded activity areas within the next plan period, using certified local native plants as practicable; avoid persistent or invasive exotic plants.

12 - RIPARIAN AREAS AND WETLANDS

Vegetation next to water bodies plays a major role in sustaining the long-term integrity of aquatic systems (Hynes 1970; Odum 1971). Values provided include shade, bank stability, fish cover, woody debris input, storage and release of sediment, surface-ground water interactions, and habitat for terrestrial and aquatic plants and animals. Riparian zones and wetlands must be managed with care to protect these values.

12.1 - Management Measure (3)

In the water influence zone next to perennial and intermittent streams, lakes, and wetlands, allow only those actions that maintain or improve long-term stream health and riparian ecosystem condition.

1. Design Criteria.

- a. Allow no action that will cause long-term change to a lower stream health class in any stream reach. In degraded systems (that is At-risk or Diminished stream health class), progress toward robust stream health within the next plan period.
- b. Allow no action that will cause long-term change away from desired condition in any riparian or wetland vegetation community. Consider management of stream temperature and large woody debris recruitment when determining desired vegetation community. In degraded systems, progress toward desired condition within the next plan period.
- 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.
- 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.
- e. Locate new concentrated-use sites outside the WIZ if practicable and outside riparian areas and wetlands. Armor or reclaim existing sites in the WIZ to prevent detrimental soil and bank erosion.
- f. Manage livestock use through control of time/timing, intensity, and duration/frequency of use in riparian areas and wetlands to maintain or improve long-term stream health. Exclude livestock from riparian areas and wetlands that are not meeting or moving towards desired condition objectives where monitoring information shows continued livestock grazing would prevent attainment of those objectives.
- g. Keep stock tanks, salt supplements, and similar features out of the WIZ if practicable and out of riparian areas and wetlands always. Keep stock driveways out of the WIZ except to cross at designated points. Armor water gaps and designated stock crossings where needed and practicable.
- h. Manage dry meadow and upland plant communities, including Kentucky bluegrass types, that have invaded into wetland/riparian areas in a manner that will contribute to their replacement over time by more mesic native plant communities to the extent practicable. Develop site-specific riparian stubble height standards or use the following default levels for carex and juncos species: 3-4 inches in spring-use pastures and 4-6 inches in summer or autumn use pastures; to leave adequate residual stubble height to retain effective ground cover.
- i. Do not allow livestock grazing through an entire growing season in pastures that contain in riparian areas and wetlands. Apply short-duration grazing as practicable (generally less than

20 days) to minimize re-grazing of individual plants, to provide greater opportunity for regrowth and to manage utilization of woody species and reduce soil compaction. During the hot season (mid-to-late summer) manage livestock herds to avoid concentrating in riparian areas and wetlands. Apply principles of the Grazing Response Index to livestock management (USFS 1996a).

j. Design grazing systems to limit utilization of woody species. Where woody species have been historically suppressed, or where the plant community is below its desired condition and livestock are a key contributing factor, manage livestock through control of time/timing, intensity, and duration/frequency of use so as to allow for riparian hardwood growth extension and reproduction. Manage woody species in riparian areas to provide for stream temperature, bank stability and riparian habitat.

k. Maintain the extent of stable banks in each stream reach at 74% or more of reference conditions. Consider degree of livestock trampling and riparian vegetation utilization on or immediately adjacent to stream banks when timing livestock moves between units.

l. Adjust management in riparian areas and wetlands to improve 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.

n. Emphasize natural stabilization processes consistent with the stream type and capability (Rosgen and Proper Functioning Condition processes) when restoring damaged stream banks. Use native vegetation for stream bank stabilization whenever practicable.

12.2 - Management Measure (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.

1. Design Criteria.

a. Install stream crossings to meet Corps of Engineers and State permits, pass normal flows, and be armored to withstand design flows.

b. Size culverts and bridges to pass debris. Engineers work with hydrologists and aquatic biologists on site design.

c. Install stream crossings on straight and resilient stream reaches, as perpendicular to flow as practicable, 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 streambeds and banks resilient. Favor bridges, bottomless arches or buried pipe-arches for those streams with identifiable flood plains and elevated road prisms, instead of pipe culverts. Favor armored fords for those streams where vehicle traffic is either seasonal or temporary, or the ford design maintains the channel pattern, profile and dimension.

- e. Install or maintain fish migration barriers only if needed to protect endangered, threatened, sensitive, or unique native aquatic populations, and only where natural barriers do not exist.

12.3 - Management Measure (5)

Conduct actions so that stream pattern, geometry, and habitats maintain or improve long-term stream health.

1. Design Criteria.

- 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 and maintain natural habitat complexity.
- b. Do not relocate natural stream channels if avoidable. Return flow to natural channels where practicable. Where reconstruction of stream channels is necessary, construct channels and floodways with natural stream pattern and geometry, stable beds and banks and provide habitat complexity.

12.4 - Management Measure (6)

Maintain long-term ground cover, soil structure, water budgets, and flow patterns of wetlands to sustain their ecological function.

1. Design Criteria.

- 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.
- b. Keep roads and trails out of wetlands unless there is no other practicable alternative. 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.
- c. Avoid long-term reduction in organic ground cover and organic soil layers in any wetland (including peat in fens).
- d. When practicable, keep buried utility and pipelines out of wetlands. If such a line must enter a wetland, use measures that sustain long-term wetland function.
- e. Avoid any loss of rare wetlands such as fens and springs.
- 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 practicable.

12.5 - Management Measure (7)

Manage stream flows under appropriate authorities to minimize damage to scenic and aesthetic values, fish and wildlife habitat, and to otherwise protect the environment.

1. Design Criteria.

a. Cooperate with water users and other interested parties to evaluate how to operate existing water use facilities to meet resource goals.

b. Obtain stream flows under appropriate federal and state, legal and regulatory authorities to protect stream processes, aquatic and riparian habitats and communities, and recreation and aesthetic values. Top priority is to protect imperiled native species. Generally, this will include a range of flows to support desired uses and values.

c. Upon issuance of special use authorizations for new or existing water use facilities, include permit conditions at the point of diversion or storage, if needed, to minimize impacts to water dependent resources and values. One or more of the following circumstances may be present in any given project. Water dependent resources and values not included on this list may require additional consideration.

(1) When managing for physical stream processes, including channel maintenance, evaluate each stream on which a project is planned to ascertain what flows represent the amounts and timing needed to sustain these functions. Essential attributes of a properly functioning self-maintaining channel include providing for flows to achieve the following:

(a) Move the mass and sizes of alluvial sediment supplied to the channel.

(b) Maintain channel capacity by preventing terrestrial vegetative growth in the bed of the channel.

(c) Protect and sustain channel banks and the floodplain by maintaining healthy streamside vegetation.

(d) Maintain processes that sustain the relationship between the channel and the floodplain.

(2) When managing for aquatic biota and their habitat, evaluate each stream upon which a project is planned to ascertain what flows represent the amounts and timing needed to sustain viability of existing populations of native and desired non-native vertebrate species. Essential flow related attributes of sustainable habitat should achieve the following:

(a) Maintain the physical, biological, and chemical processes necessary for all life-history stages of identified species and communities.

(b) Minimize the impact of dams and diversion structures on the interaction between populations.

(c) Return flows to historic habitat where reintroduction potential exists.

(3) When managing for riparian habitat and communities, evaluate each stream upon which a project is planned to ascertain what flows and timing are needed to maintain or improve riparian habitat and community structure and function. These flows should be adequate to:

- (a) Maintain the physical, biological, and chemical processes necessary to ensure the sustainability and ecological integrity of identified species and communities.
 - (b) Maintain the magnitude, variability, and frequency of disturbance processes that affect community structure and function.
- (4) When managing for aesthetic and recreational values, evaluate each stream upon which a project is planned to ascertain what flows and timing represent the amounts and period needed to sustain these values. These flows should be adequate to:
- (a) Support flow dependent recreation uses (for example, rafting, kayaking, swimming).
 - (b) Maintain desired populations of fish species to provide for appropriate recreational experiences.
 - (c) Provide water for aesthetic enjoyment.
 - (d) Support special designations, including Wild and Scenic Rivers, where flowing water is critical to the purpose and quality of the designation.
- d. Obtain water rights under federal and state law to protect stream processes, aquatic and riparian habitats and communities, and recreation and aesthetic values. Top priority is to protect imperiled native species.

12.6 - Management Measure (8)

Manage water-use facilities to prevent gully erosion of slopes and to prevent sediment and bank damage to streams.

1. Design Criteria.

- a. Design all ditches, canals, and pipes with at least an 80% chance of passing high flows and remaining stable during their life.
- b. Do not flush or deposit sediment from behind diversion structures into the stream below. Deposit sediment in a designated upland site. Vegetate or otherwise stabilize spoil piles.
- c. Mitigate water imports and water disposal (including reservoir releases) so that the extent of stable banks, channel pattern, profile and dimensions maintain or improve long-term stream health in each receiving stream reach.
- d. Maintain and operate water conveyance ditches and pipelines to carry their design volumes of water with appropriate freeboard. Keep ditches clear of vegetation, debris or other obstructions to minimize potential for ditch failures.
- e. Conduct snow management, including snowmaking and snow-farming, in such a manner that prevents slope failures and gully erosion on the hillslopes and prevents adverse impacts, such as bank erosion and excessive sediment, in receiving streams.

13 - SEDIMENT CONTROL

Most sediment delivered from slopes to streams comes from roads and similar disturbed sites. Management measures and design criteria to control sediment come from Clean Water Act Section 404 mandatory BMPs (33 CFR 323.4), EPA and State BMPs, and WRENSS controls. The goal is antidegradation and no impairment.

13.1 - Management Measure (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.

1. Design Criteria.

- a. Construct roads on ridge tops, stable upper slopes, or wide valley terraces if practicable. Stabilize soils onsite. End-haul soil if full-bench construction is used. Avoid slopes steeper than 70%.
- b. Avoid soil-disturbing actions during periods of heavy rain or wet soils. Apply travel restrictions to protect soil and water.
- 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 practicable; avoid persistent or invasive exotic plants.
- d. Construct roads where practicable, with outslope and rolling grades instead of ditches and culverts.
- e. Retain stabilizing vegetation on unstable soils. Avoid new roads or heavy equipment use on unstable or highly erodible soils.
- f. Use existing roads unless other options will produce less long-term sediment. Reconstruct for long-term soil and drainage stability.
- g. Avoid ground skidding on sustained slopes steeper than 40% and on moderate to severely burned sustained slopes greater than 30%. Conduct logging to disperse runoff as practicable.
- h. Designate, construct, and maintain recreational travelways for proper drainage and armor their stream crossings as needed to control sediment.
- i. During and following operations on outsloped roads, retain drainage and remove berms on the outside edge except those intentionally constructed for protection of road grade fills.
- j. Locate and construct log landings in such a way to minimize the amount of excavation needed and to reduce the potential for soil erosion. Design landings to have proper drainage. After use, treat landings to disperse runoff and prevent surface erosion and encourage revegetation.

13.2 - Management Measure (10)

Construct roads and other disturbed sites to minimize sediment discharge into streams, lakes, and wetlands.

1. Design Criteria.
 - a. Design all roads, trails, and other soil disturbances to the minimum standard for their use and to "roll" with the terrain as feasible.
 - 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.
 - c. Key sediment traps into the ground. Clean them out when 50% full. Remove sediment to a stable, gentle, upland site and revegetate.
 - d. Keep heavy equipment out of filter strips except to do restoration work or build armored stream or lake approaches. Yard logs up out of each filter strip with minimum disturbance of ground cover.
 - 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.
 - f. Design road ditches and cross drains to limit flow to ditch capacity and prevent ditch erosion and failure.

13.3 - Management Measure (11)

Stabilize and maintain roads and other disturbed sites during and after construction to control erosion.

1. Design Criteria.
 - a. Do not encroach fills or introduce soil into streams, swales, lakes, or wetlands.
 - 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 practicable; avoid persistent or invasive exotic plants. Provide sediment control until erosion control is permanent.
 - c. Do not disturb ditches during maintenance unless needed to restore drainage capacity or repair damage. Do not undercut the cut slope.
 - d. Space cross drains according to road grade and soil type as indicated below: (ex. 01). Do not divert water from one stream to another.
 - 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.

- f. Armor rolling dips as needed to prevent rutting damage to the function of the rolling dips. Ensure that road maintenance provides stable surfaces and drainage.
- 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.
- h. Build firelines with rolling grades and minimum downhill convergence. Outslope or backblade, permanently drain, and revegetate firelines immediately after the burn. Use certified local native plants as practicable; avoid persistent or invasive exotic plants.
- i. Use the minimum amount of sand, salt, and/or other de-icing substances (Mag-Chloride) as necessary to provide safe winter travel conditions. Design paved roads and parking lots to facilitate sand removal (that is curbs or paved ditches). Use filter strips or other trapping methods to reduce movement of de-icing materials into near-by water bodies. Do not deposit sediment into streams or on streambanks along roads.
- j. During winter operations, maintain roads as needed to keep the road surface drained during thaws and break-ups. Perform snow removal in such a manner that protects the road and other adjacent resources. Do not use riparian areas, wetlands or streams for snow storage or disposal. Remove snow berms where they result in accumulation or concentration of snowmelt runoff on the road or erodible fill slopes. Install snow berms where such placement will preclude concentration of snowmelt runoff and will serve to rapidly dissipate melt water.
- k. On roads with high/heavy traffic use, require maintenance agreements and/or use of road surface stabilization practices and dust abatement supplements. See FSH 7709.56 and FSH 7709.58.

13.4 - Management Measure (12)

Reclaim roads and other disturbed sites when use ends, as needed, to prevent resource damage.

1. Design Criteria.

- a. Site-prepare, drain, decompact, revegetate, and close temporary and intermittent use roads and other disturbed sites within one year after use ends. Provide stable drainage that disperses runoff into filter strips and maintains stable fills. Do this work concurrently. Stockpile topsoil where practicable to be used in site restoration. Use certified local native plants as practicable; avoid persistent or invasive exotic plants.
- b. Remove all temporary stream crossings (including all fill material in the active channel), restore the channel geometry, and revegetate the channel banks using certified local native plants as practicable; avoid persistent or invasive exotic plants.
- c. Restore cuts and fills to the original slope contours where practicable and as opportunities arise to re-establish subsurface pathways. Use certified local native plants as practicable; avoid persistent or invasive exotic plants. Obtain stormwater (402) discharge permits as required.
- d. Establish effective ground cover on disturbed sites to prevent accelerated on-site soil loss and sediment delivery to streams. Restore ground cover using certified native plants as practicable to meet revegetation objectives. Avoid persistent or invasive exotic plants.

14 - SOIL QUALITY

Soil quality determines vegetation growth capability in all terrestrial ecosystems. Soil depth, structure, organic matter, and nutrients are critical to sustaining this potential. Management measures and design criteria to protect soil quality apply to all actions that may impact these soil qualities.

14.1 - Management Measure (13)

Manage land treatments to limit the sum of severely burned soil and detrimentally compacted, eroded, and displaced soil to no more than 15% of any activity area.

1. Design Criteria.

- a. Restrict roads, landings, skid trails, concentrated-use sites, and similar soil disturbances to designated sites.
- b. Operate heavy equipment for land treatments only when soil moisture is below the plastic limit, or protected by at least 1 foot of packed snow or 2 inches of frozen soil.
- c. Conduct prescribed fires to minimize the residence time on the soil while meeting the burn objectives. This is usually done when the soil and duff are moist.
- d. Allow dispersed winter motorized recreation when snow depths are sufficient to protect soils. Specify a minimum unpacked snow depth of 12 inches unless a site-specific analysis shows a different snow depth is adequate to protect soils. Allow use of snowcats or grooming machines when unpacked snow depths equal or exceed 18 inches. Evaluate special use permit conditions on a site specific basis.

14.2 - Management Measure (14)

Maintain or improve long-term levels of organic matter and nutrients on all lands.

1. Design Criteria.

- a. On soils with surface soil (A-horizon) thinner than 1 inch, topsoil organic matter less than 2%, or effective rooting depth less than 15 inches, retain 80 - 90% of the fine (less than 3 inches in diameter) post treatment logging slash in the stand after each clearcut and seed-tree harvest. Consider need for retention of coarse woody debris slash in each activity area to balance soil quality requirements and fuel loading concerns.
- b. If machine piling of slash is done, conduct piling to leave topsoil in place and to avoid displacing soil into piles or windrows.

15 - WATER PURITY

Chemicals and pathogens impact water purity. Management measures and design criteria to protect water purity intend to avoid contamination of all waters.

15.1 - Management Measure (15)

Place new sources of chemical and pathogenic pollutants where such pollutants will not reach surface or ground water.

1. Design Criteria.

- a. Locate pack and riding stock sites (for example corrals and loading areas), sanitary sites, and well drill-pads outside the water influence zone (WIZ).
- b. Locate vehicle service and fuel areas, chemical storage and use areas, and waste dumps and areas on gentle upland sites. Mix, load, and clean on gentle upland sites. Dispose of chemicals and containers in State-certified disposal areas.
- c. Locate temporary labor, spike, logging and fire camps such that surface and subsurface water resources are protected. Consideration should be given to disposal of human waste, wastewater and garbage and other solid wastes.

15.2 - Management Measure (16)

Apply runoff controls to disconnect new pollutant sources from surface and ground water.

1. Design Criteria.

- 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 to ground water. Prepare Spill Prevention Control and Countermeasure Plan per the requirements of 40 CFR 112.
- b. Reclaim each mine waste dump when its use ends, using certified local native plants as practicable; 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. Require removal or encapsulation of waste material as necessary to prevent contamination of nearby water bodies before operator abandons site or reclamation is accepted as final.
- c. Prevent contaminated runoff from waste dumps and/or tailings from reaching surface and/or ground water. Potential techniques include use of lined ponds to catch runoff, diversion ditches or other runoff controls to divert runoff around waste dumps/tailings piles, capping or treating waste piles on site or off-site disposal of waste as appropriate. If ponds are used, build tailings dams with a 95% chance of containing floods (100-year event) over their design life. Permanently stabilize dams at final shaping.
- d. Clean wastewater from concrete batching and aggregate operations before returning the water to streams, lakes, or wetlands.
- e. Inspect equipment used for transportation, storage or application of chemicals daily during use period for leaks. If leaks or spills occur, report them and install emergency traps to contain them and clean them up. Refer to FSH 6709.11, chapter 60 for direction on working with hazardous materials.

f. Report spills and take appropriate clean-up action in accordance with applicable state and federal laws, rules and regulations. Contaminated soil and other material shall be removed from NFS lands and disposed of in a manner according to state and federal laws, rules and regulations.

15.3 - Management Measure (17)

Apply chemicals using methods that minimize risk of entry to surface and ground water.

1. Design Criteria.

- a. Favor pesticides with half-lives of 3 months or less when practicable to achieve treatment objectives.. Apply at lowest effective rates as large droplets or pellets. Follow the label directions. Favor selective treatment. Use only aquatic-labeled chemicals in the WIZ.
- b. Use non-toxic, non-hazardous drilling fluids when practicable.