APPENDIX B—BEST MANAGEMENT PRACTICES—ALTERNATIVES B, C, AND D

In addition to the road management guidelines in **Appendix F,** Aquatic and Riparian Management Strategy, these best management practices (BMPs) expand and supplement the basic guidelines and minimum requirements of the BLM manual, the Idaho Department of Lands (Forest Practices Regulations), Idaho Department of Water Resources Stream Channel Alteration Regulations, and the Corps of Engineers 404 Regulations. Additional BMPs may be added or existing BMPs can be modified as needed with interdisciplinary review and/or in cooperation with other state and federal agencies. Changes would be noted as an RMP supplement and would be filed with the RMP.

ROAD PLANNING—DESIGN AND LOCATION

1) Plan road standards and specifications that maintain forest productivity, water quality, and fish and wildlife habitat.

2) Ensure that road specifications and plans are consistent with good safety practices.

3) Plan each road to the minimum standards for the intended use. Adapt the plans to the soil materials and terrain to minimize disturbance and damages to forest productivity, water quality, and wildlife habitat.

4) Plan transportation networks to minimize road construction within riparian conservation areas. Leave or reestablish areas of vegetation between roads and streams.

5) Minimize and balance cuts and fills, especially near streams.

6) Plan to dispose of excavated waste material on geologically stable sites and away from Riparian Conservation Areas.

7) Design full-bench roads for slopes over 60 percent. End-haul excess material to a geologically stable site for disposal and away from Riparian Conservation Areas. Use balanced cut-and-fill road construction where practical.

8) Plan natural road cross-drainage by insloping and using relief culverts or outsloping and by grade changes. Plan for effective well-placed dips or water bars.

9) Design relief culverts or roadside ditches to prevent fill erosion or direct discharge of sediment into streams.

10) Minimize the number of stream crossings. Comply with Stream Channel Alteration Law (Title 42, Chapter 38, Idaho Code) and ensure that all Class I stream culvert installations allow fish passage.

11) Emphasize the use of existing roads (through continued use or reconstruction) to minimize new road construction.

12) Consider temporary or permanent road closure for all dead-end roads or roads with an expected duration of use of fewer than five years.

13) For long-term roads, design bridges or culverts for 100-year flood.

14) Design road drainage systems to avoid direct sediment discharge into streams. Use the Forest Service "Guide for Controlling Sediment from Secondary Logging Roads" or equivalent to assist in drainage design.

MINOR ROAD CONSTRUCTION

1) For any repair work in streams occupied by listed fish, instream work will be timed to avoid disturbance of staging adult fish, redds, or gravels with unemerged juveniles where possible. Timing restrictions may be waived in cases of overriding safety concerns or the threat of further severe resource damage.

2) Disturbed areas will be seeded following work, mulch may be applied.

3) Fuel storage and fueling of equipment will not occur within streamside RHCAS.

4) Before working in a stream channel or in a streamside RHCA, all heavy equipment or other machinery will be inspected for hydraulic or other leaks. Fix identified problems before entering areas that drain directly to stream. Clean equipment with accumulations of oil, grease, or other toxic materials prior to use in these areas. An emergency spill containment kit will be located on site during construction activity.

5) Implement erosion and sediment control measures as necessary to prevent sediment from reaching water bodies. Such measures may include sediment fences, sediment traps, mulch, seeding, and placement of woody debris and slash.

ROAD CONSTRUCTION

1) Construct roads in a manner that prevents debris, overburden, and excess materials from entering streams. Deposit excess materials outside of stream protection zones.

2) Construct roads to comply with Idaho Forest Practices Act plan and design guidelines.

3) Provide for quarry drainage to prevent sediment from entering streams.

4) Clear drainage ways of all debris generated during construction or maintenance that may interfere with drainage or affect water quality.

5) When constructing roads near streams, use slash filter windrows to minimize sediment reaching the stream. Minimize the amount of woody debris buried in embankments and minimize the amount of snow, ice, and frozen soil added to embankments.

6) Construct road stream crossings or roads constricting on a stream channel in compliance with the Stream Channel Alteration Law (Title 42, Chapter 38, Idaho Code).

7) Before fall or spring runoff, stabilize slopes where exposed material (such as excavation, embankment, waste piles) may erode and enter streams by seeding, compacting, riprapping, benching, mulching, or other suitable means.

8) Construct stream culverts, cross drains, or relief culverts to prevent erosion. Use riprap, woody debris, downspouts, or similar devices to prevent erosion of fills. Culverts in natural drainage ways would be oriented to minimize fill slope erosion or to carry water beyond fills. Install drainage structures on roads before fall or spring runoff.

9) Install relief culverts with a minimum drain grade of two percent.

10) Design roads to balance cuts and fills or use full bench construction where stable fill construction is not possible.

11) Minimize sediment production from borrow pits and gravel sources through proper location, development, and reclamation.

12) Place debris, overburden, and other waste materials associated with construction and maintenance where they will not enter streams. Include these waste areas in soil stabilization planning for the road.

13) In rippable materials, construct roads with no overhanging banks.

ROAD DRAINAGE

1) Provide adequate drainage from the surface of all roads by using outsloped or crowned roads, drain dips, or insloped roads with ditches and cross-drains or relief culverts.

2) Vary road grades to reduce concentrated flow in road surface, ditches, and culverts and on fill slopes and road surfaces.

3) Size drainage structures appropriately to handle anticipated flow during normal runoff or storms.

4) Outsloped Roads: Outsloped roads provide means of dispersing water in a low-energy flow from the road surface. Outsloped roads are appropriate when fill slopes are stable, drainage will not flow directly into stream channels, and transportation safety considerations can be met.

5) Insloped Roads: For insloped roads, generally design ditch gradients to be between two and eight percent to prevent sediment deposition and ditch erosion. The higher gradients may be suitable for more stable soils; use the lower gradients for less stable soils.

6) Drain Dips: Construct drain dips deep enough into the subgrade so that traffic will not obliterate them. Dips should be angled 20 to 45 degrees perpendicular to the road and have a drainage grade of two to eight percent.

7) Prevent downslope movement of sediment by using sediment catch basins, drop inlets, changes in road grade, headwalls, recessed cut slopes, slash filter windrows, or other design features.

8) Where possible, install relief culverts at the gradient of the original ground slope; otherwise armor outlets with rock or anchor downspouts to carry water across the fill slope.

9) Skew relief culverts 20 to 30 degrees toward the inflow from the ditch to improve inlet efficiency. Develop the catch basin at sufficient size to prevent the culvert inlet from plugging.

10) Provide energy dissipaters (for example, rock piles and logs) where necessary to reduce the erosion energy of the emerging water.

11) Prevent cross drains, culverts, water bars, dips, and other drainage structures from discharging onto erodible soils or fill slopes without outfall protection.

12) Design roads for minimal disruption of drainage patterns.

13) Route road drainage through vegetative filtration fields, slash windrows, or other sediment settling structures. Install road drainage features above stream crossings to route discharge into filtration zones before entering a stream.

ROAD MAINTENANCE

1) Maintain erosion control features through periodic inspection and maintenance, including cleaning dips and cross-drains, repairing ditches, marking culvert inlets to aid in location, and clearing debris from catch basins and culverts.

2) Avoid using roads during wet periods if such use would damage the road drainage features.

3) Apply dust abatement or other surface stabilizing chemicals to prevent entry into streams. Do not place in road ditches, and do not allow pooling on the road surface.

4) Evaluate all bridges and culverts on roads to be closed to determine the need for removal or periodic maintenance.

5) Inspect roads after major runoff events and intense or prolonged rainstorms, placing priority on roads in municipal watersheds.

6) Design stream channel crossings as near to a right angle with the stream as possible to minimize disturbance to banks and existing channels.

7) For road segments that parallel stream courses, consider the need for stream shade along with safety considerations during brushing operations. This may necessitate hand brushing, partial brushing, or limbing, with consideration for providing growth for future shade.

8) When removing down logs in the road which extend into a stream, any material on the fill slope and in the stream will not be removed to provide for woody debris recruitment, except in cases where the retention of this material would result in a safety concern (i.e., downstream facilities).

ROAD MAINTENANCE PRECAUTIONS

1) Grade road surfaces only as often as necessary to maintain a stable running surface and to retain the original surface drainage.

2) Avoid cutting the toe of cut slopes when grading roads or pulling ditches.

3) Place all excess material removed by maintenance operations in safe disposal sites and stabilize these sites to prevent erosion. Avoid locations where erosion will carry materials into a stream.

4) Avoid sidecasting material where these materials may be introduced into a stream, or where the placement of these materials will contribute to destabilization of the slope.

SNOW REMOVAL

1) Snow will not be completely removed. In general, a minimum two inches of snow must be left on the roadway during plowing operations to protect the surface of the road.

2) Prevent plugging ditches and culverts during snow plowing operations.

3) Sidecast material will not include dirt and gravel.

4) Snow berms will not be left on the road or shoulder unless drainage holes are opened and maintained. Drainage holes will be spaced as required to obtain satisfactory surface drainage without discharge on erodible fills.

5) Damage from, or as a result of snow removal, will be restored in a timely manner.

TIMBER HARVESTING

1) Stabilize or reclaim landings and temporary roads on completion of use. Landings and temporary roads should be deep ripped a minimum of 18 inches to improve site productivity, infiltration, and reduce overland flow. Preferred seed mixes would include native species and if needed annual rye (or similar species) to provide for faster establishment of ground cover. Sites should have a light layer of mulch to prevent erosion. Placement of woody debris and slash (generally 1 to 12 inches in diameter) should be placed over approximately 50 percent of the site.

2) For each landing, skid trail, or fire trail, provide and maintain a drainage system to control the dispersal of water and to prevent sediment from entering streams. Timely implementation is important; refer to the spacing chart below.

3) When natural revegetation is inadequate to prevent accelerated erosion before the next growing season, apply seed or construct cross-ditches on skid trails, landings, and fire trails. A light ground cover of slash or mulch will retard erosion.

4) Follow-up evaluation of stabilization measures should be conducted to insure that restoration measures are adequate for revegetation, soil productivity, and stabilization.

5) Timber harvest on frozen ground should have a minimum snow cover of one foot and should be stopped during periods of thawing or other wet periods. If any rutting of native surface roads occur, winter logging activity and hauling should be stopped during these periods.

Table B-1
Recommended Cross-Ditch Spacing Distance for Roads and Skid Trails

Grade of Road or Trail	Unstable Soils (High Erosion Hazard)	Stable Soils (Low Erosion Hazard)
2 percent	135 feet	170 feet
5 percent	100 feet	140 feet
10 percent	80 feet	115 feet
15 percent	60 feet	90 feet
20 percent	45 feet	60 feet
25+ percent	30 feet	40 feet

US ENVIRONMENTAL PROTECTION AGENCY REGION 10 SOURCE WATER PROTECTION BEST MANAGEMENT PRACTICES FOR FOREST SERVICE AND BLM

Introduction

The following pages include a listing of BMPs. Some are required by Forest Service and BLM management plans or by state administrative code. Others are recommendations or are informed by a legal decision. This list represents an initial effort to compile BMPs from a host of sources to assist in protection of drinking water sources. The first two sections define "Conservative Riparian Reserve Widths" and "Riparian Habitat Conservation Areas." The third, "Watershed Management Planning," pertains generally to all actions undertaken by the Forest Service or BLM. The remaining sections pertain to more specific types of activities, facilities, or structures on Forest Service or BLM lands, such as roads, recreational facilities, and fire suppression activities.

Context and Background

The Forest Service and BLM have a long history of using BMPs related to timber harvest, grazing, mining, and other land management activities to reduce adverse impacts to water quality. Forest and range land management activities generate diffuse sources of pollution known as nonpoint sources. Assessments of water quality completed at the national level and at the watershed scale have consistently demonstrated that nonpoint sources of pollution (agriculture, mining, construction, forestry, etc.) are the primary cause of water quality impairment. Point sources of pollution, such as wastewater treatment facilities and factories, are required to treat effluent to meet water quality standards consistent with state or federally issued discharge permits. Nonpoint sources require a different approach. BMPs are the primary management mechanism for preventing or reducing impacts to water quality from nonpoint sources. Many states have designated the Forest Service and BLM as the management agencies for implementing BMPs on lands they manage to ensure that water quality standards are met.

Forest Service and BLM lands, usually located in the upper portion of a watershed, capture a significant portion of the precipitation that ends up as drinking water for millions of people in the Pacific Northwest. The Safe Drinking Water Act required states to delineate source water areas for every public drinking water system and assess risks of potential contamination within those areas. Infrastructure and activities of the Forest Service and BLM are included among many identified potential sources of contamination to drinking water supplies. Careful planning and implementation can mitigate the risks of contamination from Forest Service and BLM operations and activities.

The effectiveness of BMPs applied on federal lands affects the quality of water entering drinking water wells and intakes on both federal lands and downstream nonfederal lands. Providing the highest quality water possible to the drinking water intakes should be an overriding goal of BMPs. BMPs cover a full spectrum of active and passive measures and can be applied during assessment, planning, project implementation, and monitoring activities. The following BMPs are an initial draft starting point for helping to ensure that public health is protected and that water treatment and facility operation and management costs are minimized. This list is intended to serve as a menu from which appropriate BMPs can be selected for a specific plan or project. It is not a comprehensive list. Additional BMPs may be appropriate depending on the project.

These BMPs come from a variety of sources, some of which pertain to specific geographic regions. As best management practices, they can be applied in other geographic regions as well. Some of them are clearly designed to protect water quality for fish and other aquatic life. They are appropriately included in this list because good water quality also benefits drinking water supplies.

BEST MANAGEMENT PRACTICES

Watershed Management Planning

1) Employ Watershed Restoration Projects where appropriate to repair degraded watershed conditions and improve water quality and soil stability.

2) Avoid, where possible, the long- and short-term adverse impacts to water quality associated with the occupancy and modification of floodplains.

3) Avoid destruction of wetlands.

4) Prevent contamination from accidental spills.

   - An Oil and Hazardous Substance Spill Contingency Plan is a predetermined organization and action plan to be implemented in the event of a hazardous substance spill.

   - A Spill Prevention Control and Countermeasures (SPCC) Plan is required if the total amount of oil products on site in above-ground storage exceeds 1320 gallons, or if a single container exceeds a capacity of 660 gallons.

5) Ensure activities conducted under Special Use Permits are protective of source waters.

6) Conduct water quality monitoring to determine the effects of land management activities on the beneficial uses of water, and to ensure the health and safety of water users.

7) Minimize the amount of erosion and sedimentation at developed sites. (Source: General Water Quality Best Management Practices, Pacific Northwest Region, November 1988.)

8) Take active measures, if necessary, to avoid any activity within 300 yards of a spring used as a source of drinking water. (Source: US EPA Region 10 recommendations.)

Hardrock Mining

Concern for: Surface water, groundwater

Contaminants: Metals (e.g., lead, selenium, cadmium, copper, zinc, arsenic, mercury), acidity (low pH), cyanide, sulfate, turbidity.

Both the Forest Service and BLM have extensive internal guidance on mine permitting and reclamation requirements.

Two documents available on the US EPA Region 10 website provide detailed information that should be reviewed when addressing mining issues:

US EPA and Hardrock Mining: A Source Book for Industry in the Northwest and Alaska, US EPA Region 10, January 2003 http://yosemite.epa.gov/r10/water.nsf/59f3b8c4fc8c923988256b580060f5d9/e4ba15715e97ef2188256d2c00783a8e!OpenDocument

Inactive Mine Site Characterization and Cleanup Handbook, US EPA 910-8-00-001, US EPA, August 2000 http://yosemite.epa.gov/R10/CLEANUP.NSF/9f3c21896330b4898825687b007a0f33/f4724f10ccdc2f4d8825699a007861dd?OpenDocument

BLM Districts in Idaho should consult: *Best Management Practices for Mining in Idaho*, prepared by the Idaho Department of Lands, in conjunction with other state and federal agencies through the Idaho Mining Advisory Committee, 1992.

Grazing

Concern for: Surface water

Contaminants: Pathogens (E. coli, cryptosporidium, viruses, giardia lambia), sediment, turbidity, phosphate, nitrates, coliform, sulfate.

Sources: Drinking Water from Forests and Grasslands: A Synthesis of Scientific Literature, United States Department of Agriculture Forest Service, General Technical Report SRS-39, September 2000, pp. 153-156. Potential Sources of Drinking Water Contamination Index, US EPA. www.epa.gov/safewater/swp/sources1.html.

Best Management Practices:

1) Manage the timing and intensity of grazing to:

   - enhance, or at a minimum, prevent the degradation of, riparian vegetation;
   - enhance infiltration of surface water into the ground; and
   - ensure stream banks are protected.

2) Manage the timing and intensity of grazing to within source water protection areas. Sheep grazing is preferable over cattle because sheep tend to graze in upland areas while cattle tend to spend time in the streams.

3) The exclusion of cattle from areas where cryptosporidium may be a concern (such as Source Water Areas) should be considered. If this is not feasible, livestock younger than four months should be kept out of the watershed, because calves have not yet developed resistance, and shed greater numbers of oocysts than older animals. (Source: Drinking Water from Forests and Grasslands: A Synthesis of Scientific Literature, United States Department of Agriculture Forest Service, General Technical Report SRS-39, September 2000, pp. 153-156.)

4) Locate new livestock handling and/or management facilities outside Riparian Reserves. For existing livestock handling facilities inside the Riparian Reserve, ensure that Aquatic Conservation Strategy objectives are met. Where these objectives cannot be met, require relocation or removal of such facilities. (Source: Aquatic Conservation Strategy, Attachment A to the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within Range of the Northern Spotted Owl, pp. C-33.)

5) Manage livestock numbers and season of use to maintain and protect soil and water resources.

6) Construct fences or other barriers to keep livestock out of sensitive areas where loss of vegetative cover, soil compaction, or riparian impairment could adversely impact water quality. (Source: General Water Quality Best Management Practices, Pacific Northwest Region, US Forest Service, November 1988.)

Landfills

Concern for: Groundwater, surface water

Contaminants: Volatile organic compounds, heavy metals, pesticides, nitrates and nitrites, semi-volatile organic compounds.

Source: Potential Sources of Drinking Water Contamination Index, US EPA. www.epa.gov/safewater/swp/sources1.html

Best Management Practices:

1) Site new landfills outside of source water protection areas if possible. If not possible, site them where they are unlikely to pose a threat to ground water or surface waters.

2) For historic landfills located in source water protection areas, examine existing data to determine whether they may pose a threat to the drinking water source. If a landfill may pose a threat, collect additional data to determine whether it does. If it does, plan and implement appropriate mitigative action. (Source: US EPA Region 10 recommendations.)

Recreation Sites

Concern for: Groundwater, surface water

Contaminants: Turbidity, sedimentation, fecal material, household cleansers and detergents, garbage and other floatables, cooking grease and oil, antifreeze, motor oil, illegal dumping of hazardous materials.

Best Management Practices:

1) Wastewater from sanitation facilities can contaminate surface and groundwater with bacteria, nutrients, and chemicals. Sanitation facilities (ranging from pit toilets to treatment plants) will be planned, located, designed, constructed, operated, inspected, and maintained to minimize possibilities of water contamination. All activities related to location, design, inspection, operation, and maintenance will be performed by trained, qualified personnel.

2) Refuse disposal will be managed to protect surface and subsurface soil and water resources from contamination by nutrients, bacteria, and chemicals.

3) Prohibit discharges and disposal of human and animal waste, petroleum products, and other hazardous substances in or near streams in recreation areas. Educate the public to conduct their activities in ways that will not degrade water quality.

4) Avoid degradation of water quality by locating pack and riding stock facilities at safe locations away from springs, streams, lakes, wet meadows, and other surface waters. (Source: General Water Quality Best Management Practices, Pacific Northwest Region, Forest Service, November 1988.)

5) RV sewage waste should not be disposed of in septic system drainfields given the potential for chemicals in the sewage waste to kill the microorganisms that drainfields need to function. (Source: US EPA Region 10 recommendation.)

Timber Management

Concern for: Surface water

Contaminants: Turbidity, decreased dissolved oxygen, pathogens, nitrogen.

Best Management Practices:

1) Plan, supervise, and implement forest projects that will minimize soil compaction and soil disturbance.

2) Maintain as much ground cover as possible to reduce surface runoff and erosion.

3) Minimize site disturbance.

4) Reestablish vegetation as soon as practicable.

5) Keep pesticides and fertilizers out of surface waters. (Source: Drinking Water from Forests and Grasslands: A Synthesis of Scientific Literature, United States Department of Agriculture Forest Service, General Technical Report SRS-39, September 2000, pp. 108-113.)

6) Prevent downstream water quality degradation by the timely identification of areas.

7) Use mitigative measures to reduce the impacts of erosion, and subsequent sedimentation, on log landings.

8) Ensure that constructed erosion control structures are stabilized and working.

9) Prevent pollutants such as fuels, lubricants, bitumens, raw sewage, wash water and other harmful materials from being discharged into or near rivers, streams, and impoundments or into natural or man-made channels leading thereto. (Source: General Water Quality Best Management Practices, Pacific Northwest Region, Forest Service, November 1988.)

Fire Management

Concern for: Surface water

Contaminants: Sediment and turbidity, nitrates, nitrites, sulfate, pH, TDS, chloride, iron, phosphate, taste/color/smell.

Forest Service Emerging Contaminant: fire retardant.

Best Management Practices:

1) Avoid spraying fire retardant in or near drinking water streams, if practicable.

2) Utilize Burn Area Emergency Rehabilitation in appropriate circumstances.

3) During fire suppression efforts, avoid watershed damage in excess of that which would be caused by the fire itself. Avoid heavy equipment operation on fragile soils and steep slopes when possible. Project fires should use a Resource Advisor and watershed specialists to advise the Incident Commander on resource values during the suppression effort.

4) Stabilize all areas that have had their erosion potential significantly increased or their drainage pattern altered by wildfires or by suppression related activities. Treatments include, but are not limited to:

    - installing water bars and other drainage diversions in fire roads, fire lines, and other cleared areas;

    - seeding, planting and fertilizing to provide vegetative cover;

- spreading slash or mulch to protect bare soil;
- repairing damaged road drainage facilities;
- clearing stream channels of structures or debris that is deposited by suppression activities;
- installing log erosion barriers (contour-felled and anchored trees);
- installing channel stabilization structures;
- installing trash racks above road drainage structures; and
- installing debris-retention structures.

5) Provide for water quality protection in formulating prescribed fire prescriptions. Prescription elements include fire weather, slope, aspect, soil moisture, and fuel moisture. These elements influence the fire intensity and thus have a direct effect of whether or not a desired ground cover remains after burning, and whether or not a water repellent layer is formed. The amount of remaining ground cover and extensiveness of water repellant soil can significantly affect erosion rates.

6) Maintain soil productivity, minimize erosion, and prevent ash, sediment, nutrients, and debris from entering water bodies during prescribed fires. Some of the techniques used to prevent water quality degradation include:

- maintaining the integrity of the Stream Management Unit or stream course; and
- planning prescribed fires with intensities that will not result in soils becoming hydrophobic.

Source: General Water Quality Best Management Practices, Pacific Northwest Region, Forest Service, November 1988.

Pesticides

Concern for: Groundwater, surface water

Contaminants: Organic and inorganic chemicals

Best Management Practices:

1) Only use US EPA registered pesticides and comply with all label directions for use.

2) Ensure proper transportation, handling and application according to the label.

3) Do not apply during or right before significant weather events, such as heavy rainfall, which will cause runoff of pesticides.

4) Store pesticides according to label directions so that spills and loss are prevented.

5) Mix and load pesticides on impermeable surfaces where any accidental spills would not enter surface waters or potentially impact drinking water supplies.

6) Contain and clean up spills immediately; report spills to appropriate regulatory agency.

7) Dispose of containers properly; recycle if possible. (Sources: Drinking Water Academy, Managing Large-Scale Application of Pesticides to Prevent Contamination of Drinking Water, EPA-916-F-01-030, July 2001, and WAC Chapter 222-38.)

8) Notify downstream water systems so the appropriate operational changes can be made prior to spraying to utilize appropriate filtration or switch to ground water sources.

9) Consider alternatives to pesticide and herbicide use including biological controls, prescribed fire, mechanical treatments, and silvicultural management systems which minimize or eliminate the need for chemical use (uneven aged management, single and group tree selection, etc.). (Source: US EPA Region 10 recommendations.)

Fertilizers

Concern for: Groundwater, surface water

Contaminants: Nitrogen and phosphorous, and other nutrients.

Best Management Practices:

1) Apply fertilizers at appropriate agronomic rates so that no ground water pollution will occur below the root zone.

2) Do not apply fertilizer during or right before significant weather events, such as heavy rainfall, which will cause runoff of pesticides.

3) Storage and loading areas should be located where accidental spills will not enter surface waters and should not be located near wellheads.

4) Follow label directions for storage, mixing, and disposal.

5) Prevent fertilizers from entering streams with drinking water intakes.

6) Contain and clean up all spills immediately; report to appropriate regulatory agency.

Source: Drinking Water from Forests and Grasslands: A Synthesis of Scientific Literature, United States Department of Agriculture Forest Service, General Technical Report SRS-39, September 2000, pp. 113-115, WAC Chapter 222-38.

Underground Injection Control Class V (Shallow) Wells

Underground injection control Class V wells are shallow subsurface fluid distribution systems that are designed to place fluids directly below the ground surface. Examples of Class V wells include septic system drainfields, storm water wells, drywells, industrial or commercial disposal wells, aquifer

remediation wells, abandoned drinking water wells. Ditches and trenches may be classified as underground injection control wells. Hazardous waste injection through shallow wells is prohibited.

Concern for: Groundwater

Contaminants: Various – may include storm water, solvents, hydrocarbons, motor vehicle fluids, nitrate, bacteria, viruses, septage, and others.

Best Management Practices:

1) US EPA and state regulations apply to the registration, operation, maintenance, and closure of underground injection control wells. Information is available on the US EPA underground injection control website: http://www.epa.gov/safewater/uic/index.html. Please contact the appropriate regulatory agency for information about the rules that apply to your well: Idaho: John Sharkey, Idaho Department of Water Resources 208-287-4934.

Septic Systems

Concern for: Groundwater

Contaminants: Nitrates, bacteria, viruses, septage

Best Management Practices:

1) Septic systems designed for more than 20 people per day, fall under state or US EPA underground injection control Class V regulations. If septic systems are designed for fewer than 20 people per day, then other state or local regulations may apply.

2) Siting: locate septic systems far enough from drinking water sources to avoid potential contamination (minimum setback distances are typically defined by state or local governments that have oversight of underground injection control or septic programs).

3) Septic tanks and drainfields must be of adequate size to properly treat the volume of wastewater.

4) Design should be completed by a licensed engineer.

5) Proper operation and maintenance are imperative.

6) Pump septic tanks every two to five years.

7) Hazardous chemicals should be taken to a hazardous waste collection site rather than disposed into a septic system.

Source: Drinking Water Academy Bulletin, Managing Septic Systems to Prevent Contamination of Drinking Water, July 2001, EPA-816-F-01-

Abandoned Wells

Concern for: Groundwater

Contaminants: Various – they serve as conduits for any pollutants; typical contaminants are storm water, solvents, nitrates, bacteria, viruses, phosphates, hydrocarbons, pesticides, and others.

Source: Potential Sources of Drinking Water Contamination Index, US EPA. www.epa.gov/safewater/swp/sources1.html.

Best Management Practices:

1) Survey property to locate wells.

2) Properly remove or seal and abandon identified wells following state rules or procedures.

Source: Drinking Water from Forests and Grasslands: A Synthesis of Scientific Literature, US Department of Agriculture Forest Service, General Technical Report SRS-39, September 2000, pp. 68-69.

Parking Lots

Concern for: Groundwater, surface water

Contaminants: Oil, gasoline, automotive fluids.

Source: Drinking Water Academy Bulletin, Managing Storm Water Runoff to Prevent Contamination of Drinking Water, EPA 816-F-01-020, July 2001.

Drywells are underground injection control Class V wells. If drywells are used to manage parking lot runoff, then state and US EPA underground injection control Class V rules apply to proper registration, operation, maintenance, and closure of these wells.

Best Management Practices:

1) Design to manage runoff appropriately – grassy swales, vegetated filter strips are options.

2) Design to allow infiltration – permeable pavement such as concrete grid pavement is a good option.

3) Sweep up litter and debris, especially around storm drains or other direct connections to surface water.

Sources: Drinking Water Academy Bulletin, Managing Storm Water Runoff to Prevent Contamination of Drinking Water, EPA 816-F-01-020, July 2001. After the Storm: A Citizen's Guide to Understanding Storm Water, EPA 833-B-03-002, January 2003.

Aboveground Storage Tanks

Concern for: Surface water

Contaminants: Petroleum hydrocarbons, heating oil, other chemicals.

Refer to state and local rules and regulations to determine whether the state in which the aboveground storage tank is located has an aboveground storage tank regulatory program. If a regulatory program exists, follow appropriate rules and guidance.

A Spill Prevention Control and Countermeasures Plan is required if the total amount of oil products on site in aboveground storage exceeds 1,320 gallons, or if a single container exceeds a capacity of 660 gallons.

Best Management Practices:

1) Aboveground storage tanks should have spill and overfill prevention and leak detection.

2) Secondary containment should be designed to contain the entire volume of the materials that can be stored in the aboveground storage tank.

3) Tanks should be protected from corrosion.

4) Aboveground storage tanks should be protected from physical damage and vandalism through use of guard posts and fencing, as necessary.

5) Aboveground storage tanks should be operated, maintained, and closed appropriately.

Source: New Mexico Environment Department Aboveground Storage Tank Program.

Underground Storage Tanks

Concern for: Groundwater, downgradient surface water

Contaminants: diesel, gasoline, heating oil, other chemicals.

US EPA and state regulations apply to the registration, operation, maintenance, and closure of underground storage tanks. Please contact the appropriate regulatory agency for information about the rules that apply to your tank: Idaho: Erik Sirs, Environmental Protection Agency Region 10 208-378-5762, or sirs.erik@epa.gov.