



SECTION 7

Access Roads and Driveway Runoff

Keeping Hauser Lake Clean

Public and Private Residential Roads

Public and private residential roads are all the roads around Hauser Lake that are not associated with timber harvesting. Some of these roads may have been originally built for agricultural uses or logging access and were not constructed for permanent long term residential or recreation use.

Today, roads around the lake mostly provide access for residential and recreational uses. Maintenance of our public roads is done by the Post Falls Highway District and maintenance is dependent on public funding. Homeowners are responsible for the maintenance of their private roads and driveways.

How does a rut form and where does all the soil go?

Most roads and driveways are constructed of compacted native soils. These dirt roads, if not properly managed, can get rutted after just a single storm. If a road is constructed properly, water from a storm event does not get a chance to pick up speed and create a rut. Water runoff is slowed down by control measures and diverted into vegetated drainage areas where the dirt is captured and the water is filtered back into the ground. On the other hand, if a road does not have any runoff control practices in place water runs freely downhill unchecked where it picks up speed and scours away the soil creating those car eating ruts. The runoff carrying suspended sediment (soil) may then flow into either the lake or one of its tributaries. The addition of sediment into water bodies increases the loading of phosphorus, which is the limiting factor of algae production (algae blooms and algae on the rocks), and can cover fish spawning beds in streams. Ruts can also form by driving on dirt roads during spring thaw.

The information and intent of this section is only to **provide general guidelines** on proper road construction as it relates to water runoff and erosion control management on private roads and driveways. With driving safety a foremost consideration, as well as proper knowledge on designing and constructing water drainage structures into a road, the expertise of a

road design engineer or contractor and an experienced heavy equipment operator are essential. In too many cases we have seen private roads constructed by a property owner who has insufficient knowledge and experience in these areas, and consequently either no **Best Management Practices** are installed, or features that are installed fail in the objective of proper water runoff management. The guidelines in this section should help you ensure that contracted road building on your property is done in a proper manner to minimize the impact on the lake, streams, and wildlife. Also offered are several maintenance guidelines which the property owner can undertake for long-term functioning of BMPs.

Developing A Site Plan

The site plan should be based on your long-term objectives and the suitability of the land for these uses, with precautions taken to prevent soil erosion and water pollution. With these considerations in mind, your site plan will optimize the natural beauty and attributes of your property. The site plan can be a one-year, ten-year, or a twenty-five year plan, depending on your resources and time. But remember, the longer you wait, the more difficult and costly it will become to fix erosion problems. Also note that design and permit requirements may vary depending upon your site.

Road Construction BMPs

Many private roads and driveways have significant gullies which form each winter and spring. These gullies can serve as conduits to transport water and sediment directly into streams and Hauser Lake. Normally, plants and trees help hold the soil in place and prevent erosion, especially on steep slopes, but when existing vegetation is removed for road construction the bare soil that is exposed can be easily washed into the lake. Soil erosion can lead to structural damage, reduce soil fertility, and fill in road ditches. It harms the lake by causing excess sedimentation, killing aquatic life, and disrupting spawning. Sediment, with accompanying nutrients, may lead to algae blooms, reduced water clarity and reduced aesthetic appeal. All of these potential

problems are expensive to correct and even more importantly, can be avoided by properly controlling erosion during the construction process.

The following BMPs are used to control erosion during the construction process and for preventing erosion problems in the future.

Construction BMPs:

- Place temporary roads as far as possible away from streams, surface waters or wetlands.
- Construct roads in a manner that prevents debris, overburden, and excess materials from entering streams. Deposit excess materials outside of stream protection zones. See Section #8 *Forest Lot Management* for more information on Stream Protection Zones.
- Construct roads to IFPA plan and design guidelines.
- Provide for drainage, to prevent sediment from entering surface waters.
- Clear drainage ways of all debris, generated during construction or maintenance, that may interfere with drainage or impact water quality.
- When constructing road fills near streams, compact the material to settle it, reduce erosion, and reduce water entry into fill. Minimize snow, ice, frozen soil, and woody debris buried in embankments. Limited slash and debris may be windrowed along the toe of the fill to provide a filter near stream crossings.
- Construct road stream crossings or roads constricting a stream channel in compliance with the **Stream Channel Alteration Law**. Contact the U.S. Army Corps of Engineers for appropriate permits.

Stabilize Road Slopes:

- Where exposed material (excavation, embankment, waste piles, etc.) is erodible and may enter streams, stabilize it before fall or spring runoff by seeding, compacting, riprapping, benching, mulching, or other suitable means.
- Retain *outslope drainage* during or following operations and remove outside edge berms except those protecting road fills.
- Construct *cross drains and relief culverts* to prevent erosion. Minimize construction and installation time. Use riprap, vegetation matter, down spouts, or similar devices to prevent erosion of fills. Install drainage structures on uncompleted roads **before** fall or spring runoff.
- Install a wooden *open-top box culvert* across the

road grade to convey surface runoff and roadside ditch flows to the downslope side. This practice is an excellent substitute for pipe culverts on lightly used unpaved roads on steep grades of 6% or more.

- Install *waterbars* for use as a temporary or permanent drainage practice on light-use, low-maintenance, unpaved roads. Waterbars should be placed above grade changes to prevent water from flowing down steeper portions of roads or skid trails.
- Construct the road with shallow, outward-sloping dips or undulations to collect surface runoff and convey it away from the road surface.
- Care should be taken to maintain trees and shrubs growing at the base of fill slopes.
- Mixing tree stumps and other vegetative debris into the road fill should always be avoided.
- Design roads to balance cuts and fills or use full bench construction where stable fill construction is not possible.

Most forest roads are built by excavating a road surface. Road design and layout on-the-ground show machine operators the proper cut slopes and indicate cut slope steepness. The bulldozer starts at the top of the cut slope, excavating and sidecasting material until the desired road grade and width is obtained. Material from cuts is often pushed or “drifted” in front of the blade to areas where fill is needed. Road fill is used to cover culverts and build up flat areas. Since fill must support traffic, it needs to be spread and compacted in layers to develop strength.

While cut-and-fill construction is common for gentle terrain, full-bench roads are usually built on slopes over 6%. In full-bench construction, the entire road surface is excavated into the hill. The excavated material is pushed or hauled to an area needing fill or to a disposal area.

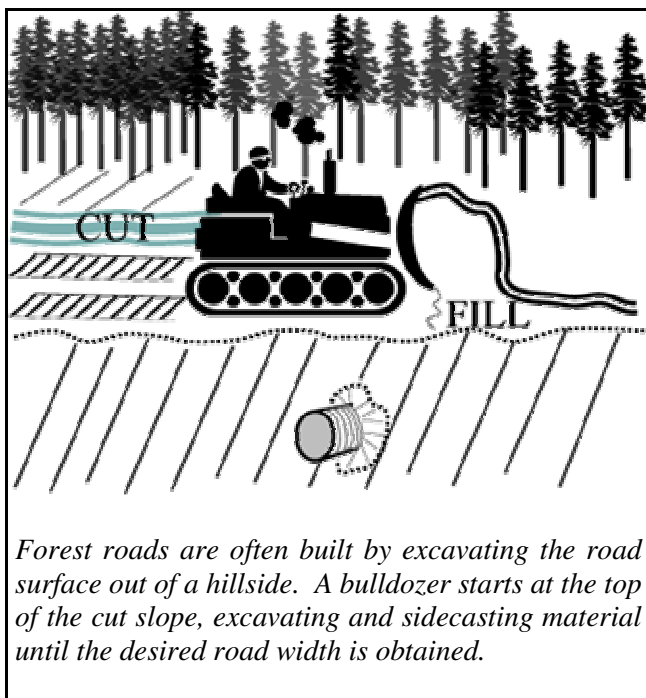
During the process of cut-and-fill, it is critical to avoid letting sidecast or waste material enter streams or placing it on unstable areas where it might erode.

- Minimize sediment production from borrow pits and gravel sources through proper location, development, and reclamation.
- Place debris, overburden, and other waste materials associated with construction and maintenance activities in a location to avoid entry into streams. Include these waste areas in soil stabilization planning for the road.

Please refer to Section #6, *Landscape and New Construction*, for more best management practices on controlling erosion during the construction process.

Table 1. Road grade and open-top culvert distances.

Road Grade (percent)	Spacing Between Open-Top Culverts, (feet)
2 to 5	300 to 500
6 to 10	200 to 300
11 to 15	100 to 200
16 to 20	<100



BMP Design and Construction

Knowing which BMP to use is half the battle; the other half is designing, constructing and installing the BMP. The following guidelines were taken from the **State of Idaho Catalog of Storm Water Best Management Practices**. A copy is available at the Kootenai County Library, Kootenai County Building & Planning Dept., and DEQ. Please refer to that manual when doing any new construction.

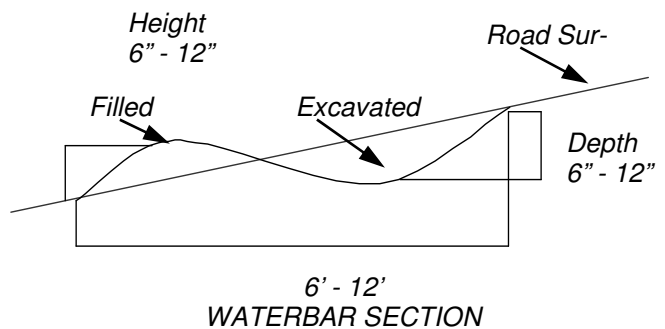
Open-Top Box Culvert: Construct a box-like frame (three-sided, open-topped) of logs; lumber; discarded guardrail; or commercial, corrugated steel. Install it flush with the road surface skewed at an angle down-grade across the roadway. The inflow end should extend 6-12 inches beyond the surface of the roadbed

and should be directed onto vegetated ground or rip-rap or into another erosion control structure such as a sediment trap or catch basin. Install relief open-top box culverts with a minimum cross drainage grade of 2 percent.

Spacing between culverts should be in accordance with recommended cross drainage spacing in Table 1. Where recommended spacing is less than 33 ft, the road should be paved with gravel or crushed rock.

Water bar: A cut and berm built at a downward angle across the roadway, extending from the cutbank to the opposite fill shoulder. Waterbars reduce erosion by diverting storm water runoff from the road surface and directing it to a safe discharge area.

- Construct low enough for traffic to pass over and angle across road to direct runoff flow off the road.
- Berm 6-12 inches high with cut 6-12 inches deep, skewed at angle of 30° to 40° across road.
- Spacing between bars: Use Table 1, for recommended cross drain spacing on low to relatively moderately steep topography.
- Discharge: Runoff should not be directed onto fill material without proper energy dissipation and drainage away from the fill.



Road Sloping: Used as a drainage measure to divert surface water off the entire road surface so that water does not concentrate in any specific location.

- A rounded slope with the high point being the middle of the road with an approximate 1 to 2 percent grade from the middle outward.
- Berms on the outside of the road should be limited or removed to allow water to flow off the road surface.
- Provide sediment collection or erosion control measures at the toe of the fill slope to prevent excessive erosion and sediment transport.

Rolling Dip: Used as a runoff diversion measure to prevent erosion of the road surface. Rolling dips are effective on long inclines to keep storm water from flowing directly down the road where it may cause gullying and other damage to the road surface and grade.

- Rolling dips are not suitable on road grades steeper than 5 percent. Road must be at least 150 feet long.
- The dip should be 1 foot below the road surface. The upgrade approach to the bottom of the dip should be approximately 66 feet long. The down grade approach to the bottom of the dip should be approximately 23 feet long.

Align the dip across the road at nearly a 90-degree angle and slope it outward 5 percent. Rolling dips are built into the road, during construction, following the natural contours of the land. Install erosion and sediment measures at the low point of the dip (drainage outfall to fill slope) before final grading to direct storm water discharge from the dip. Outflows should be kept free of debris to prevent ponding.

BMPs for Ditches

Ditches are constructed to convey water from storm runoff to an adequate outlet without causing erosion or sedimentation. A good ditch needs to be shaped and lined using the appropriate vegetative or structural material.

Ditches are efficient in the removal of runoff from the road, helping preserve the road bed and banks. Well designed ditches provide an opportunity for sediments and other pollutants to be removed from runoff water before it enters surface waters. A ditch achieves this by controlling, slowing and filtering the water through vegetation or structures. In addition, a ditch must be stable so as not to become an erosion problem itself.

Construction Guidelines:

- Locate ditches on the up slope side of the road to prevent water from flowing onto the road from uphill.
- Size ditches so they are large enough to handle runoff from the drainage area.
- Design and grade ditch and bank side slopes at a maximum 2:1 ratio of slope.
- Excavate a ditch deep enough to drain the road base: 1.5 to 2 feet deep.

Machine maintenance in the forest can result in water contamination. Dispose of used oil, filters, and parts responsibly!

- The ditch bottom should be parabolic-shaped or at least flat and a minimum of 2 feet wide to help slow and disperse water.
- Seed ditches which have less than 5% slope with grass in order to filter sediments.
- Line ditches which have a greater than 5% slope with 2-6 inch diameter rock.
- All ditches need outlets; standing water weakens roads.

Cleaning and Maintenance:

- Clean ditches when they become clogged with sediments or debris to prevent overflows and washouts.
- Check ditches after major storm events for obstructions, erosion, or bank collapse.
- Re-grade ditches only when absolutely necessary and line with vegetation or stone as soon as possible.

Culvert BMPs

Use fish friendly culverts at stream crossings. Culvert installation should not change the conditions in the stream that existed prior to the installation. Trout and other species need to move upstream and downstream to spawn and meet other habitat requirements.

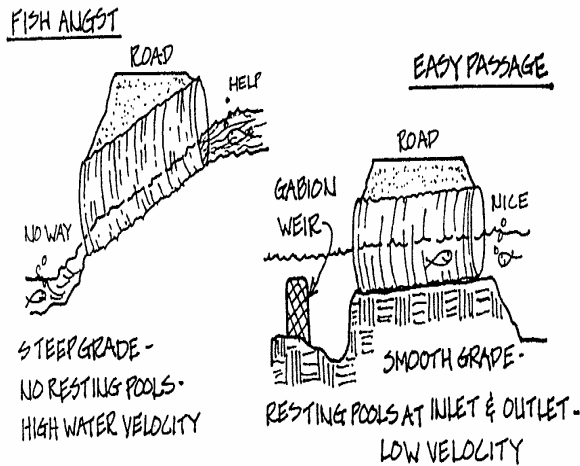
Culverts can impede fish passage by creating the following conditions:

- Excessive water velocities.
- Vertical barrier-fish must jump too high.
- Inadequate water depth.
- Icing and debris problems.
- Culvert design does not accommodate the size and species of fish passing through the structure.

The following BMPs are for a fish friendly culvert:

- When crossing a stream, select the culvert site so that there is no sudden increase or decrease in gradient and there is a 50 foot straight alignment of the stream channel directly above the crossing.
- Use bridges, bottomless arches or partially buried culverts in areas where fish passage is an important consideration.

- Design culverts so that water velocities passing through the pipe are equal to water velocities in the stream.
- Provide resting pools at culvert inlet and outlet for culverts installed in streams with high gradients.
- Place riprap securely at upstream culvert end to avoid dislodging that may result in lower culvert capacity, higher velocity flows and reduced inlet efficiency.



FISH ANGST vs. EASY PASSAGE

BMP Maintenance

The best management practices listed previously must be regularly maintained to control erosion. Periodic inspection and maintenance will extend the life of the BMP and keep road maintenance costs down.

- Mark road culverts to aid in location and clean regularly.
- Clean and repair box culverts on a regular basis. Keep water bars and box culverts free of debris and sediment for optimum performance.
- Avoid using roads during wet periods if such use would likely damage the road drainage features.
- Grade road surfaces only as often as necessary to maintain a stable running surface and to retain the original surface drainage.
- Rolling dips and other outflows should be kept free of debris to prevent ponding.

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.

Culvert Maintenance and Inspection Chart

Problem	Cause	Solution
Ponded/puddled water	Invert is too high. Ditch grade is too flat.	Reset the pipe to match the invert to the channel bottom. Regrade ditch to maintain correct flow.
Dented/crushed ends	Traffic/snow plows are hitting the ends.	Fix pipe ends; use flared inlets and outlets; mark and protect.
Heavy corrosion	Water flowing through the culvert is acidic.	Install a sleeve of PVC in the existing pipe or replace the steel pipe with non-corrosive material (PVC, polyethylene, aluminum, concrete).
Piping around the outlet	Pipe is incorrectly installed, resulting in water flowing outside the pipe.	Reinstall pipe with proper bedding and compaction; install headwall or antiseep diaphragm.
Sediment build-up	Not enough slope.	Reinstall pipe with proper bedding and compaction; install headwall or antiseep diaphragm.
Sediment build-up	Not enough slope.	Reinstall pipe with a slope of at least 1/4 inch per foot.
Objects blocking the pipe	Debris traveling from the ditch to the culvert.	Remove blockage; install check dams upstream of culvert.
Sagging bottom	Foundation material has settled or has low bearing capacity.	Reinstall pipe with suitable and properly compacted foundation material.
Crushed top	Not enough cover. Soil around walls not compacted. Traffic loads are too heavy.	Add cover. Reinstall pipe deeper and/or with suitable and properly compacted bedding material.

Recommended Reading:

Copies of the following material on water quality may be obtained for free from the DEQ or the Idaho Department of Lands Coeur d'Alene offices.

Forestry for Idaho: BMP's - Forest Stewardship Guidelines for Water Quality

An excellent color pamphlet with many photographs displaying and explaining proper and improper uses of forest practice BMPs, along with forest ecology and water quality concepts.

Rules and Regulations Pertaining to the Idaho Forest Practices Act, Title 38, Chapter 13, Idaho Code ("IFPA")

State of Idaho Catalog of Storm Water Best Management Practices for Idaho Cities and Counties

A comprehensive landowner and contractors BMP guide for the control and treatment of storm water, erosion, and sedimentation. You may examine this Catalog at the DEQ office in Coeur d'Alene. Also, it is best to use a professional when designing and installing BMPs.

Local industry professionals or anyone can obtain training or even become certified through the Panhandle SEEP Program (**Stormwater and Erosion Education Program**) provided by Panhandle Area Council (PAC).

For more information visit
<http://www.plrcd.org/SEEP/index.htm>

For SEEP details contact:
Panhandle Area Council
11100 N. Airport Drive
Hayden, ID 83835
208-772-0584

For More Information

Call, write or visit...

Idaho Dept. of Lands
3780 Industrial Ave South
Coeur d'Alene ID 83815
(208)769-1525

Idaho Department of Environmental Quality
2110 Ironwood Parkway
Coeur d'Alene, ID 83814
(208) 769-1422

City of Hauser
11837 N. Hauser Lake Rd.
Hauser, ID 83854
(208) 777-9315

Kootenai County Building and Planning Dept.
451 Government Way
Coeur d'Alene, ID 83814
(208) 446-1070

Idaho Department of Water Resources
7600 Mineral Drive, Suite 100
Coeur d'Alene, ID 83815
(208) 762-2800

See Resource Directory (Appendix B) for additional agency contacts.

Notes: