# SECTION 6
# NEW CONSTRUCTION

This fact sheet addresses the impacts new construction activities can have on water quality and how *you* can make a difference with *Best Management Practices (BMPs).* BMPs are actions you can take to protect our natural resources. **The ultimate goal of this information is to prevent negative impacts to water quality.**

1. Read the facts and information in the following pages.
2. Fill out the Risk Assessment Worksheets in order to analyze your individual situation.
3. Fill out the Action Worksheet, then **take action!**

## Construction Concerns

The Environmental Protection Agency (EPA) has identified construction activities as one of the most common sources of water pollution. The process of constructing a new home, structure, or landscaping will inevitably require soil and plant disturbance, hardscape installation, wastewater system installation or the use of hazardous materials. If not done correctly, these land use activities can have many negative effects on water quality. Concerns include

- **Nutrients from Fertilizers and Sediments**
- **Stormwater Runoff Pollutants**
- **Wastewater System Failures**
- **Building too Close to the Shoreline**
- **Loss of Riparian Habitat**
- **Erosion**

### Nutrients from Fertilizers and Sediments

Nitrogen and phosphorus which are found in soil and fertilizers, contribute to aquatic plant and algae growth. The proximity of many new construction and landscape projects to the lakeshore increases the risk that these materials will enter the water and cause problems. When there is an excess of aquatic vegetation, oxygen in the water can be depleted causing negative impacts to water quality, recreation , and aesthetics (Figure 6-1).

**Figure 6-1** *Waterfront with abundant aquatic vegetation.*

### Stormwater Runoff

Stormwater runoff is the flow of water from rain, irrigation or melting snow that does not soak into the ground. Under natural, forested conditions, much of the water is absorbed into the ground. As an area becomes developed or altered with structures, roads, and driveways less water seeps into the soil increasing the amount of water coming off the site. Increased runoff also increases erosion due to the volume and velocity of water moving across land. Pollutants such as sediment, fertilizers, pesticides, heavy metals, and hazardous waste products become a greater concern. You can find detailed information on stormwater runoff in Section 1: Stormwater.

**Figure 6-2** *Improper erosion/sediment controls allow sediment to enter surface water.*

### Wastewater Treatment Failures

If your home is near the waterfront it is particularly important to have a properly functioning septic system. Surface water contaminated with septic waste is extremely hazardous to the health of humans, wildlife, and our natural resources. Many septic systems are either old, unmaintained, or located too close to lakes, rivers, and streams. A properly designed, constructed, and maintained system can effectively treat wastewater for many years. Please refer to Section 4: Household Wastewater Treatment for detailed information on this subject.

## Building too Close to the Shoreline

The primary concerns with building too close to lakes, rivers, and streams are loss of riparian habitat, pollution from stormwater runoff, erosion, wastewater spills, and property damage due to flooding. When lawns, driveways, parking lots, garages, and roads are located very close to the water, the runoff from rain and irrigation will take pollutants from these hard surfaces and quickly send them into nearby water (Figure 6-3). Common pollutants include lawn fertilizers and pesticides, sediment, oils, grease, metals, dirt, salts, and other toxic materials.

Allowing a building setback of at least 40 feet is recommended (Figure 6-4). This will allow protection of existing shoreline vegetation, which holds the soil and serves as wildlife habitat. This vegetation will help protect your valuable property from flooding, filter potential pollutants, and decrease chances of property loss due to erosion. Refer to your county's planning website for specific land use ordinances and requirements.

**Figure 6-3** *Building project does not provide an adequate setback from surface water.*

**Figure 6-4** *An adequate building setback with preserved native vegetation protects property and water quality.*

## Loss of Riparian Habitat

The plants growing along the shoreline are referred to as *riparian habitat* or *vegetative buffers* and they are one of the features that make this area so beautiful. These plants are home to an enormous variety of wildlife, which also contributes to the scenery we enjoy here.

When shoreline vegetation is removed it decreases the aesthetic beauty of the area, displaces wildlife, increases water temperature, and increases the chance for erosion. The most effective and efficient action you can take to protect surface water from landscaping and new construction activities is to preserve or add a native vegetative buffer along the shoreline. This buffer will help prevent soil erosion/property loss and absorb nutrients and chemicals from shoreline land use practices.

**Figure 6-5** *This project removed existing vegetation near the shoreline and exposed bare soil to stormwater and wind.*

**Figure 6-6** *An example of preserved shoreline vegetation that still allows for access and views.*

## Erosion

Any time existing native vegetation is removed, in order to make room for structures or landscaping, bare soil is exposed and easily washed into surface water. Excess soil (sediment) in the water promotes algal blooms and aquatic plant growth, covers spawning beds, and muddies the water. Erosion such as this also leads to structural damage and property loss. All of these potential problems are expensive and difficult to correct but easy to avoid. You will find detailed information on erosion prevention on the following pages.

### Erosion vs. Sedimentation

*Erosion* is when soil is dislodged due to rain drop impact and stormwater. *Sedimentation* is what happens when this eroded soil is deposited elsewhere. **The ultimate goal is to prevent erosion so sedimentation does not occur.** There is a big difference between preventing erosion and managing for sedimentation.

BMPs for erosion prevention include pre-construction site planning, preserving vegetation, avoiding long steep slopes, mulching or roughing bare soil, timing construction, and hiring a professional trained in erosion prevention. To protect surface water from sedimentation, should erosion occur, BMPs include silt fences, fiber rolls or straw wattles, inlet protection, and sediment basins. BMPs for both erosion and sedimentation are continuously being improved, and there is abundant information available online for homeowners looking for site specific solutions.


**Figure 6-7** *Image showing the difference between erosion and sedimentation.*

# Pre-Construction Site Planning

Site planning is the first and most essential tool in protecting your property and preventing pollution. Planning ahead will save you time and money in the long run. Begin with a site assessment that includes existing vegetation, soil type, location of bedrock, slope gradient, sun exposure, and existing drainage structures. Make a simple map that documents all these features. Then draw a rough map that includes the location of future structures and features.

## Planning and Design

- Structures should be at least 40 feet from surface water.
- Septic drainfield will need to be should be 100-300 feet from surface water.
- Drinking well should be at least 100 feet from drainfield and septic tank.
- Driveways, walks, and yard edges should follow level contours and a slope gradient of 10% or less.
- Consider permeable (water can penetrate) materials for driveways, walkways, parking lots, and patios). See Section 1: Stormwater for more information on permeable pavers.
- All water draining off hard surfaces should lead away from surface water and into a stabilized area with vegetation, mulch, or rock.
- Water should not be allowed to flow directly downhill. This gives it maximum speed and cutting power for erosion.
- Only remove vegetation for access and building foundations.
- Confirm that your design or building professional is trained in erosion/sediment control and has the same goals for proper land use management as you.
- Time construction activities in the dry season. In our area, the recommended time frame is between May 1 thru October 1.
- Preserve cultural resources. If you discover or suspect you may have a cultural resource on your property (arrowhead, pottery, historic cabin, etc.) please notify the Idaho State Historical Society *http://history.idaho.gov/*.

# During Construction

**Erosion prevention** is the first step in preventing costly stormwater damage. Measures such as, timing of construction, preserving existing vegetation, clearing limits, mulching, erosion control blankets, and slope roughening are very effective at preventing erosion and preserving valuable top soil.

## Timing is Everything

Construction work and erosion prevention measures should be scheduled during dry, low runoff periods when erosion is lowest. May 1 through October 1 is the recommended construction window. Also, if your construction project is very large, consider phasing the project so you are only clearing small areas at a time.

## Preserve Existing Vegetation


This practice is the least expensive and most effective erosion control practice there is. Save as many trees and shrubs as possible; it will save you a lot of time, money, and top soil. You paid for them with the purchase of your property, and these plants have tremendous value both aesthetically and environmentally. The average cost to landscape a home is 20% of the purchase price. Also, young plants purchased at a nursery will take many years to mature. The vegetation on your shoreline should be kept in place. It acts like a filter to keep the water clear and it doesn't cost you a thing. Keep at least 25' of vegetation (not lawn) between the water's edge and land disturbance.

## Establish and Mark Clearing Limits

The areas of vegetation to be preserved should be identified early during the planning stage and be clearly marked in the field before any work on-site begins. This can be done with orange fencing or similar material. Communicating with all construction crew members regarding where the clearing limits are and the overall plan is crucial. Put measures in place to protect trees and shrubs from heavy equipment.

## Mulching – Keep All Bare Soil Covered!

Mulch is an immediate, effective, and inexpensive means of controlling erosion and dust. Use organic or natural materials such as straw, wood chips, forest duff, erosion control blankets, or hydromulching to cover all disturbed areas. Mulches can be spread by hand or with machines. Consistent coverage is important, so ensure soil is not visible through the mulch. Once installed, inspect regularly and repair as needed. Consider working only in a small area and stabilizing that site before disturbing another. Mulching allows vegetation to re-establish, reduces soil crusting, reduces evaporation, and decreases fluctuations in soil temperature. If you are planning on seeding the site for permanent stabilization, mulching would be applied after seeding.

Temporary soil stockpiles from construction activity should be completely covered with a tarp, mulch, or seed to prevent piles from eroding. If the soil stockpile will not be used within the construction window, it should be seeded. The purpose of re-vegetating stockpiled soil is to reduce the potential of soil loss from erosion during the wet season. *Cut-and-fill slopes* associated with private roads can also be mulched, reducing the chance for road damage, lack of access, and water pollution. Cut-and-fill areas should be evaluated on a case-by-case basis to determine the most effective form of stabilization.

**Figure 6-8** *Bare soil mulched with straw.*

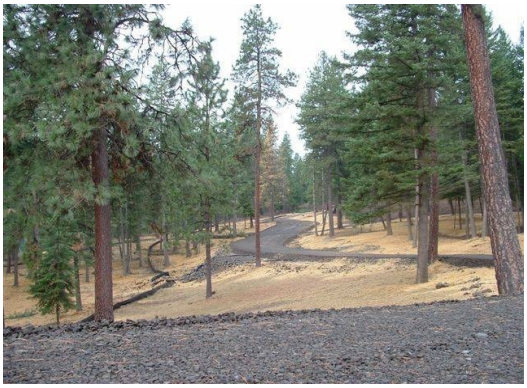


**Figure 6-9** *This development preserved vegetation, mulched bare soil with straw and graveled the*

## Erosion Control Blankets

These blankets come in many different fabrics and are rolled over the soil surface to protect valuable top soil from erosion. They are useful due to the fact that they stay in place, where loose mulches may blow away or become dislodged. Erosion control blankets are also very useful in establishing vegetation. Proper installation is crucial to success (Figure 6-11).

**Figure 6-10** *Erosion control blanket installation on shoreline slope.*

- Smooth soil surface.
- Anchor blanket to the top of the slope in a 6 in trench.
- Backfill and tamp anchored ends.
- Roll blanket from top to bottom.
- Do not stretch blankets.
- Overlap sides at least 4 inches.
- Overlap uphill/downhill edges by 3 feet.
- Securely staple per instructions on blankets.

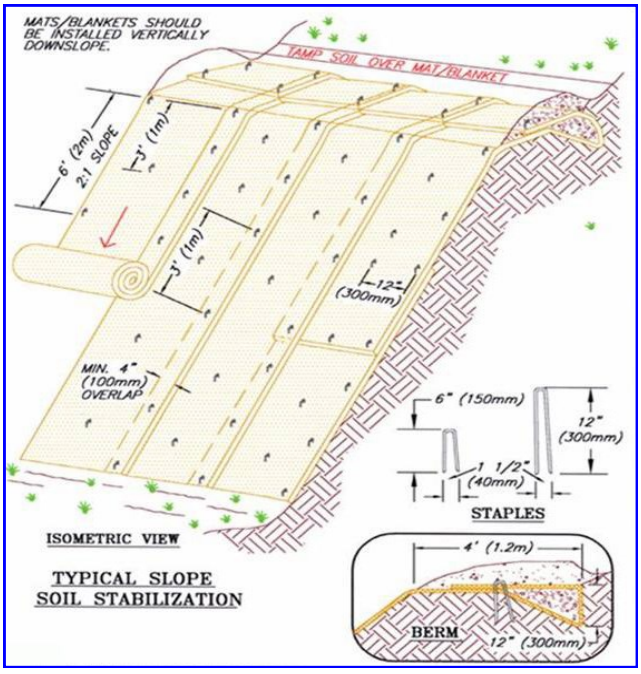



**Figure 6-11** *Proper erosion control blanket*

## Hydromulching

This is a mulching technique where wood fiber, grass, hay, or straw are applied with water and tacktifier ( a glue-like substance). Hydromulch can cover a large area quickly. For effective erosion protection, make sure the slope is roughened before mulch application. Inspect regularly for consistent coverage, and repair as needed.

## Hydroseeding

Hydroseeding is typically a mix of seed, water, fertilizer, and tacktifier, although all of these components can be customized. Any number of seed mixtures are available, including native grasses and wildflowers. It is essential that the slope be roughened and irrigation be available for successful germination of seed mixture. If irrigation is unavailable to the site during the hottest months, hydromulch or another form of mulch would be a more effective option.

## Slope Roughening

A roughened surface is an easy and inexpensive way to slow the speed of runoff, encourage the growth of vegetation, increase water infiltration, and trap sediment. Groves, furrows, or depressions are made by driving a crawler tractor up and down the slope or using a front end loader with disks, harrows, or teeth across the slope (Figure 6-12). The main objective is to create ruts across the slope to intercept water as it runs downhill.

**Figure 6-12** *Slope roughening.*

# Sediment Control-Sedimentation

As a precaution, it is usually a good idea to install sediment controls in case erosion controls were inadequate or not properly installed. However, it is very important not to use sediment controls in place of erosion control (Figure 6-13). Sediment controls are not designed to hold back large amounts of soil or water. They are designed to catch what little sediment might come off a site. Remember, erosion has already been prevented upland. Several techniques are available for sediment control: silt fences, fiber rolls or straw wattles, vegetated buffers, swales, inlet protection, and sediment basins.

**Figure 6-13** *A situation where erosion prevention was not adequate and a silt fence is trying to hold back too much weight. This blew out moments after picture was taken.*

### Swale/Inlet Protection

Most swales and inlets lead to surface water. It is important to keep sediment and other pollutants out of these system, not only to protect water quality, but to prevent flooding caused by clogged systems. There are many site specific tools available for this type of protection (Figures 6-14).

**Figure 6-14**
*Weighted fiber roll (top left), fiber drop inlet (top right), "witch hat" drop inlet protection (bottom).*

### Fiber Rolls

A fiber roll or straw wattle consists of straw or similar material bound into a biodegradable tubular plastic. Wattles are used to interrupt slope or shorten slope length. They trap and filter sediments and they release water as *sheet flow,* which prevents erosion. Wattles are placed across a slope in direct contact with soil and staked in a shallow trench.

Sediment must be removed behind roll when it reaches 1/2 the height of the roll and must be inspected before storms and during rain events. Fiber rolls are biodegradable and can be left in place once the site is stabilized.

### Installation Guidelines

- Install on contour perpendicular to flow (Figure 6-15).
- Place in 3-4 inch trench (Figure 6-17).
- Stake ends and along roll 4 feet on center or staggered along sides.
- Overlap ends (Figure 6-16).
- Place at intervals downslope at 10 foot space
- Turn final ends uphill in a smiley face to prevent water and soil from going around (Figure 6-17).

**Figure 6-15** *Fiber rolls installed perpendicular to flow.*

**Figure 6-16** *Overlapped ends.*

**Figure 6-17** *Turn ends uphill and place in trench.*

## Silt Fence

A silt fence is a filter fabric that is entrenched or attached to supporting poles. The purpose of the silt fence is to detain sediment-laden water on-site and prevent soil loss. A common application for a silt fence is along the perimeter of the lot or around a temporary soil pile area. Silt fences are also practical along streams or creek channels. However, they should not be installed within the channel itself or anywhere there is a concentrated flow. **Silt fences are temporary. They need to be removed once a site has been stabilized.** They have a life of approximately six months. Silt fences that are not removed are aesthetically unappealing, disrupt wildlife corridors, and become a pollutant.

**Installation guidelines include:**

- Install on a level contour with ends turned up hill in a "smiley face" (Figure 6-18).
- Key fabric into a 6 inch x 6 inch trench (Figure 6-19). Otherwise sediment and water will flow right under the silt fence, defeating the purpose
- Place stakes 6 –10 feet apart.
- When connecting several fences, wrap ends together to prevent a gap where water and soil can sneak through (Figure 6-20).
- Allow an area in front of fence for the ponding and settling of runoff and sediment, as well as equipment access in order to remove sediment that accumulates.
- Conduct weekly or periodic inspection of the silt fence to repair tears and remove sediment that reaches 1/3 the height of the fence (Figure 6-21).

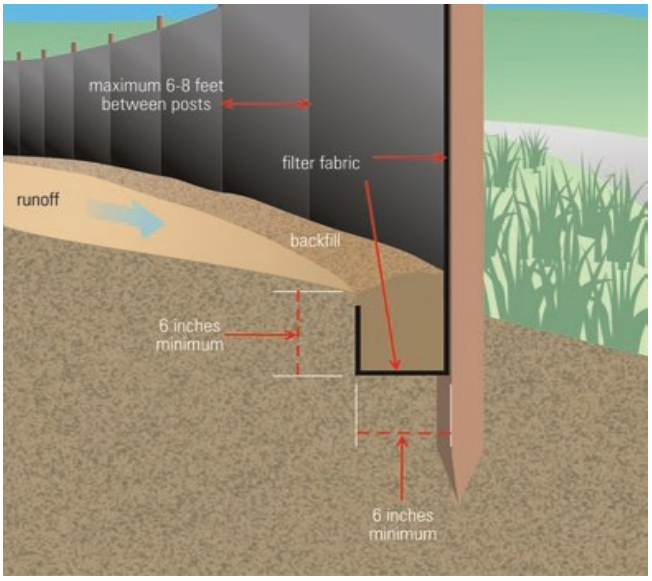



**Figure 6-19** *Filter fabric embedded into 6" x 6" trench. Posts installed 6-10 feet apart.*

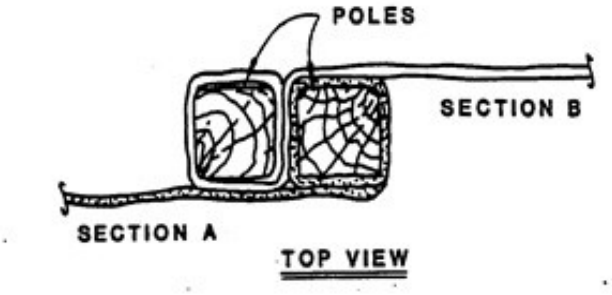



**Figure 6-20** *End joints are rolled together to form a tight seal preventing water from moving*

**Figure 6-18** *Ends turned up into "smiley face" and room is left in front of fence to remove sediment.*

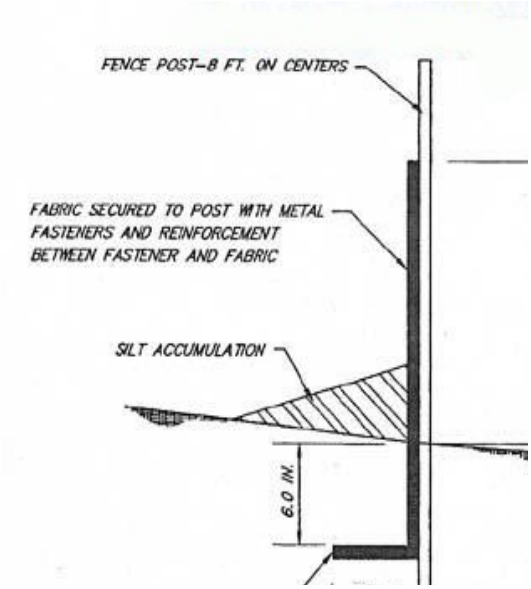


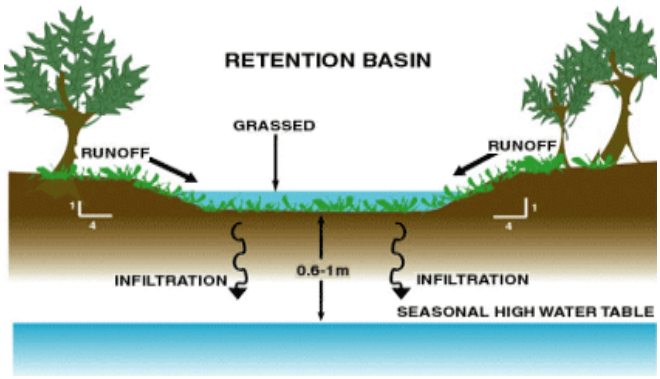

**Figure 6-21** *Silt/sediment that accumulations behind fence needs to be removed when 1/3 the height of fence.*

### Sediment Traps/Basins

Sediment basins are essentially large depressions that are designed to collect large amounts of stormwater runoff in order to let sediment settle out. There are many types of sediment basins and traps. **Please contact a design professional for site specific requirements.** Basins should be installed before land disturbance begins, and they should be stabilized with vegetation, so the basin itself doesn't become a source of sediment.

*Image showing a sediment basin/trap.*

*Image showing a sediment basin/trap.*




*General design guideline for a sediment retention basin*

### Grass Infiltration Systems (Grassy Swales)

These infiltration systems are typically are smaller than a sediment trap or basin and are usually used as on-site treatment for residential or parking lots. The purpose for these grassy swales is to remove pollutants from stormwater prior to infiltrating into the ground. They act as a bio-filtration system for treating runoff. Grassy swales often have gradually sloping sides and can easily be mowed as part of routine lawn maintenance. They are an aesthetically pleasing solution for small lots. Grass infiltration systems can replace curbs, gutters, and stormdrains.

*Curb inlet allows street stormwater to flow into grass infiltration system.*

*Grassy swale in residential neighborhood treats runoff from driveways, roads, and roofs.*

# Resource Directory

**Stormwater Erosion Education Program (SEEP)**
www.panhandleseep.org

**Bonner County Planning and Building**
1500 Highway 2, Suite 208
Sandpoint, ID 83864
(208) 265-1458
www.co.bonner.id.us

**Idaho Department of Environmental Quality (IDEQ)**
2110 Ironwood Parkway
Coeur d'Alene, ID 83814
(208) 769-1422
www.deq.idaho.gov/

## Suggested Reading:

**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.
www.idahoforests.org/bmp.htm

**State of Idaho Catalog of Storm Water Best Management Practices for Idaho Cities and Counties.**
A comprehensive landowner & contractors BMP guide for the control and treatment of stormwater, erosion, and sedimentation. It is best to use a professional when designing and installing BMPs.
www.deq.idaho.gov/media/622263-Stormwater.pdf
(2005 update).

# RISK ASSESSMENT WORKSHEETS
## New Construction

**Assessment Sheet 1: Construction Concerns**
The assessment table below will help you identify potential environmental risks related to how you manage new construction on your property. For each question indicate your risk level in the right-hand column. Some choices may not correspond exactly to your situation. Choose the response that best fits. When finished turn to the **Action Worksheet** on page 6-12, and record your medium and high-risk practices. Your goal is to lower your risks. Use the BMP recommendations in Section 6: New Construction to help you decide how to best reduce pollution.

| | LOW RISK | MEDIUM RISK | HIGH RISK | YOUR RISK |
|---|---|---|---|---|
| **Building setbacks** | House and garage are over 75' from the lake, and our lot has a gentle slope with native vegetation. | House is 40' from the lake, but there is a thick vegetative buffer. | House was designed to be 25' from the water so we could be as close as possible. | ☐ Low<br>☐ Medium<br>☐ High |
| **Nutrient loading** | Our landscape is all native and doesn't require any maintenance | Our soil is tested annually and fertilizer is only applied once a year when needed. | Our landscape has a steep slope made up of plants that are fertilized often. | ☐ Low<br>☐ Medium<br>☐ High |
| **Riparian habitat** | Kept all the plants that were growing along the shore to keep the water and fish cool and to prevent erosion. | | Removed the native vegetation along the shoreline was removed so we could install a lawn. | ☐ Low<br>☐ Medium<br>☐ High |
| **Stormwater runoff control** | Stormwater is diverted into vegetated swale that is located 100' from surface water. A vegetative buffer runs along the shoreline. | There is a vegetative buffer on the shoreline, but sloping lawn above that is fertilized regularly. | Steep paved driveway runs straight down to lake. Oil is visibly running toward lake. | ☐ Low<br>☐ Medium<br>☐ High |
| **Wastewater/Septic** | Septic tank is 100' upland from surface water and is inspected annually. Septic drainfield is 100-300 feet from surface water based on soil type. | Septic tank is old and 50' from surface water, but it is inspected annually and is functioning properly. | House was built on a steep slope with septic tank installed about 25' from surface water. It is an old system that has not be inspected in years. Drainfield les than 100 feet from surface water. | ☐ Low<br>☐ Medium<br>☐ High |

**Assessment Sheet 2: Erosion and Sediment Control**
When finished turn to the **Action Worksheet** on page 6-12 and record your medium and high-risk practices. Your goal is to lower your risks.

| | LOW RISK | MEDIUM RISK | HIGH RISK | YOUR RISK |
|---|---|---|---|---|
| **Site plan** | A site plan has been developed by a professional trained in erosion prevention. | | No site plan has been developed for making clean water a priority. | ☐ Low<br>☐ Medium<br>☐ High |
| **Topography, slope of site from potential pollution source toward the lake or a stream** | 0-2% slope | 3-4% slope | 5% and above | ☐ Low<br>☐ Medium<br>☐ High |
| **Timing of construction** | Construction work and erosion prevention applications are scheduled for optimal conditions; dry, low runoff periods when erosion is lowest. | Construction work is performed during the wet season, but erosion prevention BMPs are used to help reduce runoff. | Construction work is performed during the wet season, and no erosion prevention BMPs are used. | ☐ Low<br>☐ Medium<br>☐ High |
| **Erosion control** | Existing vegetation was kept, except for building foundation and access. Areas of bare soil are seeded and topped with a layer of mulch or straw. | Soil is left bare during a construction project, but natural features slow and treat most runoff. | Entire lot was cleared for new home. Bare soil is exposed. | ☐ Low<br>☐ Medium<br>☐ High |
| **Sediment control** | Erosion controls were implemented and are inspected regularly. Silt fence was installed as secondary protection for sedimentation. | Construction site is protected by natural vegetation, but no man-made sediment control devices are used. | Construction site was cleared, and in order to save money we didn't install erosion or sediment controls. | ☐ Low<br>☐ Medium<br>☐ High |

# ACTION WORKSHEET
## New Construction

| **Write all high and medium risks below.** | **What can you do to reduce the risks?** | **Set a target date for action.** |
|---|---|---|
| *Sample:* Runoff from construction activities runs directly into a stream or the lake. | Cover all bare soil with mulch immediately, slow concentrated runoff with fiber rolls and install a silt fence above surface water. | Today |
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