

INDIANA LOGGING & FORESTRY BEST MANAGEMENT PRACTICES

2022 BMP Field Guide

DNR
Indiana Department
of Natural Resources



TABLE OF CONTENTS

List of Tables	iii
Acknowledgments	iv
Preface	v
1 PRE-HARVEST PLANNING	1
Best Forest Harvest Planning Practices	1
2 ACCESS ROADS	4
Best Access Road Planning Practices	4
Access Road Construction Guidelines	5
Temporary & Permanent Closeout of Access Roads	7
Access Road Maintenance	7
3 LOG LANDINGS	9
Planning Log Landings	9
Log Landing Use & Maintenance	10
Temporary & Permanent Log Landing Closeout	11
4 SKID TRAILS	13
Best Management Practices: Skid Trails	13
Pole & Log Fords	13
Temporary and Permanent Closing of Skid Trails	14
5 STREAM CROSSINGS	19
General Stream Crossing Guidelines	19
Bridges	20
Culverts	21
Fords	22
6 RIPARIAN MANAGEMENT ZONES AND EPHEMERAL STREAMS	24
RMZ BMP Guidelines	24
Best Management Practices: Ephemeral Streams	27
APPENDIX A: GUIDELINES FOR SEEDING DISTURBED AREAS	28
APPENDIX B: FEDERAL REQUIREMENTS FOR FOREST ROADS IN WATERS OF THE U.S.	31
APPENDIX C: SOURCES OF HELP AND INFORMATION	33
APPENDIX D: KNOWN REGULATIONS	38
GLOSSARY	40

LIST OF TABLES

1	Recommended Maximum Spacing for Drainage Structure	6
2	Waterbars	16
3	Water Diversion Usage	16
4	Culvert Size Guidelines	22
5	Recommended Riparian Management Zone Widths*	26
6	Temporary Species for 1-year Coverage	29
7	Seed Mixes for Wildlife Habitat & Soil Protection	29
8	Mixtures for Bare/Highly Erodible Areas	30
9	Mix for Wet or Poorly Drained Areas	30
10	Pollinator Mix.	30
11	Alternative Native Plants to Replace Suggested Non-native Plants	31

Acknowledgments

These guidelines for logging and forestry best management practices (BMPs) represent the cooperative effort of representatives from the logging, sawmilling, and forestry industries, as well as environmental organizations, academia, regulatory agencies, and other interested groups. The original guidebook published in January 1998 was compiled by the Forest Practices Working Group, which was organized by the Indiana Woodland Steward Institute under a grant from the Indiana Department of Environmental Management. These funds were matched by forest industry and conservation organizations, and public agency contributions. The original guidebook was edited by Purdue Cooperative Extension Service and published by the Indiana DNR Division of Forestry.

The second and third editions of the guidebook, published in 1999 and 2005, made only minor technical changes to the title, water bar spacing, the Fire and Fire Control Lines section, seeding recommendations, and other areas. This fourth edition is a revision of the format that takes advantage of changing technologies and media to allow easier access. It begins to incorporate practices from urban forestry and wildlife management.

The evolution of this field guide has been the result of the efforts of the forest community not only in constructing it, but in constantly referencing it and providing feedback as the technology used in forestry has changed and the practices outlined in the book have been used by the community and evaluated through different processes. Research in BMPs has grown over the decades as well, supporting some guidelines and showing a need to adjust others.

The BMP program is a substantial achievement of the forest community in Indiana and serves as a model for other land uses. We hope others will undertake similar approaches to control soil erosion and non-point source pollution.

Preface

The forest environment is affected in a variety of ways by activities in and around it. The initial focus of these guidelines was the quality of the water flowing from forest lands. Because the reduction in water quality from soil-disturbing activities usually can't be seen flowing from a single source, such as a pipe, the term non-point source (NPS) pollution is used. Forestry is a minor NPS pollution contributor in Indiana. Forests have long been recognized as the best protector of watersheds. The fact that other land uses contribute more to total pollution, is not important when discussing best management practices (BMPs) in forestry and logging. Improvement of water quality requires reduction of NPS pollution from all sources, including forestry.

Additionally, these guidelines consider worker safety, aesthetics, and forest productivity. Over time BMPs have evolved to include not only logging and forestry, but also silviculture, wildlife management, air quality, wildland fire and other related areas. Logging has the greatest impact of the typical forestry activities. Logging is the work done to carry out a prescription to manipulate the micro-environment to meet goals for silviculture, wildlife management and many other natural resource programs. The use of BMPs by loggers, landowners and land managers offers the greatest potential to reduce NPS pollution and reach water-quality and other forest health goals and help protect and enhance wildlife and other parts of the forest ecosystem. The BMPs summarized herein are guidelines that may need some modification to adjust to local woodland, soil, and watershed characteristics. This is not intended to be a set regulatory standard with rigid framework, but a guide to meet a goal of minimizing the impact to water quality.

ORGANIZATION OF THIS GUIDEBOOK

The BMPs contained in sections 1 through 6 have been arranged logically in the sequence of a logging operation: 1) Pre-harvest Planning, 2) Forest Access Roads, 3) Log Landings, 4) Skid Trails, 5) Stream Crossings, and 6) Riparian Management Zones. Each of these aspects of a harvest is discussed from planning to construction to maintenance to closing. The Glossary defines terms employed in this guidebook and the Appendices cover A) Guidelines for Seeding Disturbed Areas, B) Federal Requirements for Forest Roads in Waters of the U.S., C) Sources of Help and Information, and D) Known Regulations.

Color-Coded Subsections

There are green, red, and yellow divisions in each section. Green indicates a recommended practice. Red denotes practices that need caution. Yellow indicates a regulation related to that specific portion of the harvest and indicate the need to proceed with caution, only after researching the regulations listed and determining if they apply to your current situation.

Checks & X's by Pictures

A green check (✓) by a picture indicates a recommended practice or a practice that was well applied in the instance shown. A red X (✗) by a photograph indicates a poorly implemented, not implemented or ineffective practice.

CHAPTER 1

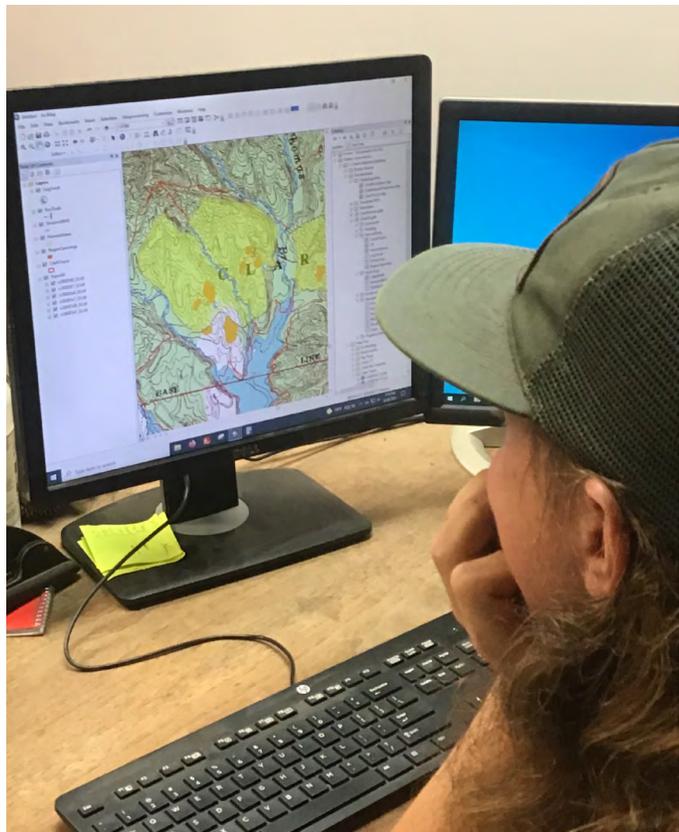
Pre-harvest Planning

Maximize profit and minimize water pollution by pre-harvest planning. Meet with the landowner and/or forester to locate roads and skid trails, and to discuss BMPs to implement. A combination of topographic, Lidar, and soils maps, as well as property tours, is needed.

FOREST HARVEST PLANNING PRACTICES

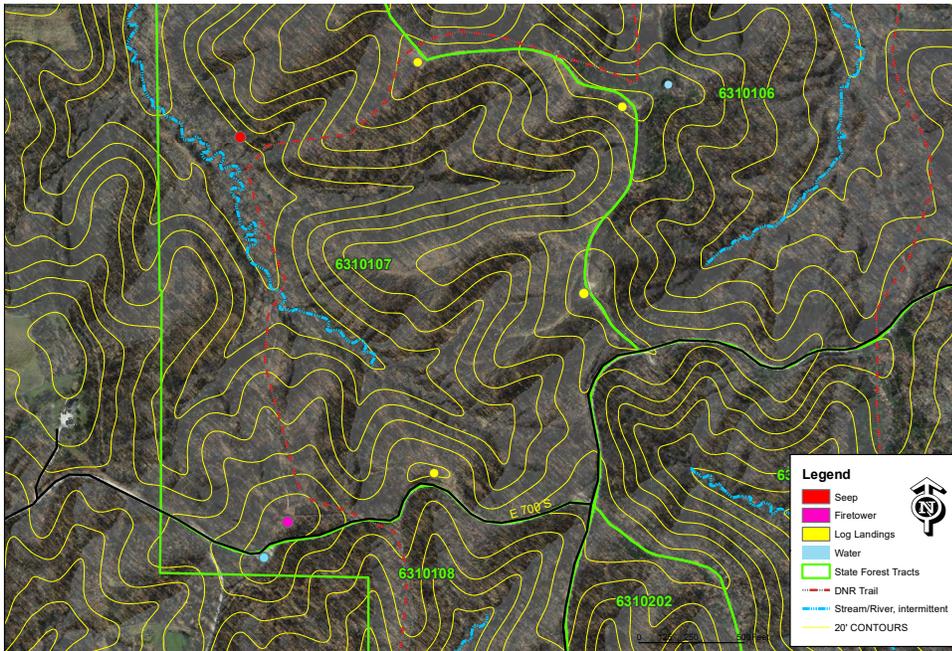
- Determine property boundaries on map and ground and ensure they are well marked.
- Note adjoining land uses and how they could potentially impact the harvest operation and vice versa.
- Note existing infrastructure (roads, landings, trails, crossings) and use if feasible.
- Determine drainage and stream-crossing sites and type of crossing needed.
- Note the volume and distribution of wood being moved in relation to topography.
- Note proposed location of access roads, landings, and skid trails.
- Note specifications of proposed access road and skid trail.
- Note best time of year to harvest site.
- Use soil, topographic, and aerial maps to locate poorly drained, highly erosive, or wet areas to avoid.
- Note harvesting equipment needed.
- Note timber-sale contract requirements.
- Determine what caution signs and barriers are needed along public roads.
- Prepare for any fuel and/or lubricant spills, and plan for trash receptacles on site.
- Determine if site is green-certified and what requirements must be followed if it is.
- Determine if any federal, state, or local regulations apply to the harvest and prepare any notices/permits needed.

Forester consults maps to plan upcoming harvest.



CAUTION

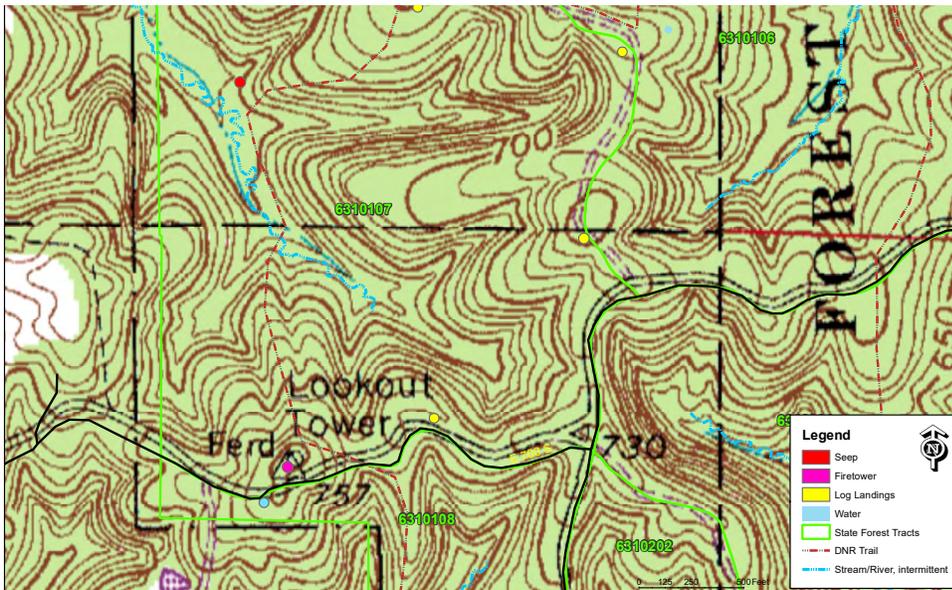
- Minimize placing harvest infrastructure near streams, lakes, wetlands, sinkholes, caves, springs, and other wet or sensitive areas.
- Minimize using steep slopes and poorly drained areas as log-landing locations.
- Minimize work in any predetermined rare-species habitat.
- Avoid historic or prehistoric sites.
- Avoid nesting areas such as heron rookeries or bald eagle nests.
- Avoid any areas deemed off limits by the landowner.



A contour map with Lidar underlay can help to determine site layout before an onsite visit. Locations of bodies property boundaries can also be seen. Areas that need to be avoided can also be added to these maps.



A soil map can help determine the highly erodible and wet areas that need to be avoided or handled carefully during a harvest.



Using a topographic map makes the steepness of the site more visible when preparing for an on-site visit.

CONTACTS FOR REGULATIONS, MAPS & OTHER PLANNING INFORMATION

- DNR Division of Forestry
<https://www.in.gov/dnr/forestry/>
- DNR Division of Water
<https://www.in.gov/dnr/water/>
- Indiana Department of Environmental Management (IDEM) & IDNR Div. of Water
<https://www.in.gov/waterways/>
- Natural Resources Conservation Service (NRCS)
https://www.nrcs.usda.gov/wps/portal/nrcs/in/technical/landuse/forestry/nrcs144p2_031063/
- US Geological Survey (USGS) –Topo & hydrography maps
<https://www.usgs.gov/core-science-systems/national-geospatial-program/topographic-maps>
- Soil Maps
<https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>
- Indiana Aerial, Topo, Soils, and Stream maps, etc.
<https://maps.indiana.edu/>
- Parcel Maps
<https://beacon.schneidercorp.com/>
35 counties in IN use this for parcel maps. Other counties use different hosting sites or have their own system. Search each county's GIS department.
- DNR Maps - 1 mi² watershed streams
<https://indnr.maps.arcgis.com/apps/MapSeries/index.html?appid=f9d2d47776824df09051f4703153b355>

Access Roads

Forest access roads connect a timber harvest to the public road system. Typically, the access road is the road from the log landing to public roads. Access roads generally carry the most traffic and weight of the entire harvest infrastructure. It is important that these roads be properly designed and stabilized. Many of these roads are used after a harvest as access for other forest management, recreational activities, and emergencies. Proper drainage is the most important factor in controlling soil erosion and keeping a road in usable condition.

ACCESS ROAD PLANNING PRACTICES

- Lay out road and drainage system before equipment enters the site.
- Use existing access roads if doing so does not exacerbate an erosion problem. If an old roadbed is causing erosion and cannot be reused, close it and find an alternate route.
- Minimize stream crossings. If needed, cross at 90° angle.
- Provide safe and visible access to public roads.
- Coordinate with utility companies and highway departments.
- Keep grades between 2-10% when possible.
- Maintain buffers between roads, bodies of water, and other sensitive areas (see table 5).
- Grades of up to 15% can be used for distances of up to 300 feet.
- Break road grades frequently with an outslope or side drainage to divert water from road surface onto stable forest floor areas.
- Use naturally stable sites such as ridge crests and well drained sites and contours.
- Mark the locations of outslopes and diversions.
- Consider visual impact of harvest and maintain a visual buffer near residences and roadways.
- Consider volume, haul weight, number of passes, and distribution of wood being moved. Engineer road accordingly.

CAUTION

- Minimize disturbance to high-quality trees.
- Minimize impacts when crossing gullies, seeps, and poorly drained areas.
- Minimize stream crossings, if possible.
- Minimize making the road too wide and clearing too many trees for the road.
- Minimize putting blade on ground when shearing or pushing debris.
- Minimize earth-moving activities before storms or when soils are excessively wet or dry.
- Avoid placing fill material into open sinkholes, waterways, wetlands, floodplains, or other sensitive areas.

ACCESS ROAD CONSTRUCTION GUIDELINES

- If possible construct, stabilize, and seed in advance of use.
- Add geotextile stabilizing fabric under the crushed stone on wet/soft sites where necessary.
- When using existing roads, reconstruct only to the extent necessary to provide adequate drainage and safety.
- Construct all roads to drain well at all times (see Table 1 for recommended diversion spacing).
- Install culverts or other breaks at specified intervals on steep grades, where inside ditches are required (see Table 1).
- Diverted runoff should be directed onto undisturbed forest floor and away from any stream or drainage channels.
- Minimize cut and fill work, and keep slopes at stable angles.
- Maintain an undisturbed buffer between access road and water bodies.
- Install erosion control measures as road sections are completed.
- Install sufficient energy dissipaters, brush, or riprap at culvert drain spouts to prevent erosion and sediment delivery to water course.
- Protect public road drainage system when accessing public roads. Install a properly-sized culvert when necessary (see Table 4). Apply crushed stone to public road access sites to prevent mud from tracking onto road.
- Install a gate or other barricade to keep unwanted traffic off of the forest access road and to prevent dumping, theft, or vandalism.

RELATED REGULATIONS

The state Flood Control Act requires that permanently flowing streams and streams with >1 sq. mi. watershed and their floodways be kept clear of debris and fill. Additional federal, State, and local regulations may also apply, such as Federal Emergency Management Agency flood areas. See Appendix D for known regulations.

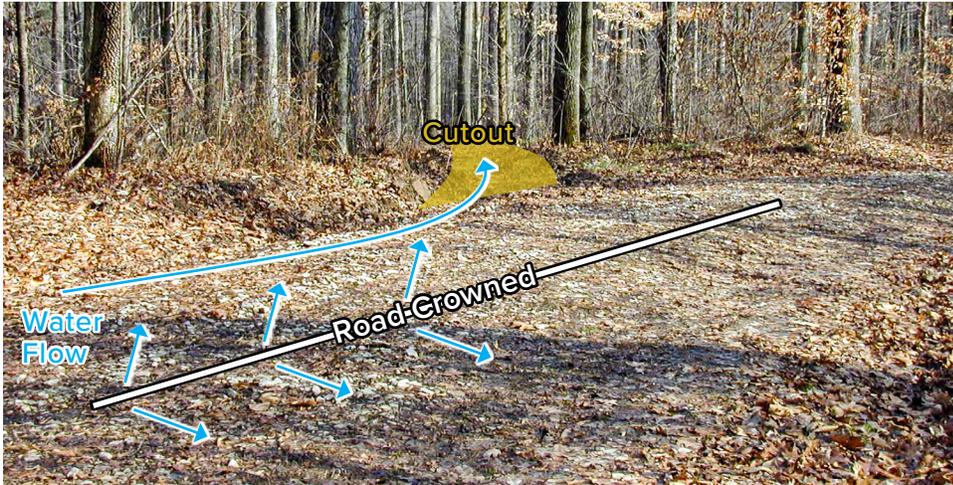


TABLE 1

RECOMMENDED MAXIMUM SPACING FOR DRAINAGE STRUCTURE

Slope %	Broad-based Dip & Culverts (ft)	Turnout & Waterbars (ft)
2	300	250
5	180	125
10	140	80
15	125	60
20	120	40
25	115	30



TEMPORARY & PERMANENT CLOSEOUT OF ACCESS ROADS

- Stabilize forest roads and smooth water channeling ruts and outside berms as soon as possible.
- Ensure that all erosion control and water management measures (e.g., water bars, drainage dips, culverts, and ditches) are working. See spacing recommendations in Table 1.
- Seed road areas prone to erosion that will not quickly re-vegetate naturally, applying fertilizer and lime where needed. All unsurfaced roads exceeding 5% in grade should be seeded. See Appendix A for recommended seeding mixtures and fertilizer and lime rates.
- Mulching may be necessary to re-establish ground cover on some difficult areas.
- Properly placed logging slash can help break the flow of water. It must be limbed to achieve good contact with the road surface.
- Forest owner should periodically revisit the site to determine if repair or maintenance is needed.
- Determine post-harvest usage of road and install appropriate diversions. See Table 3.
- Install visible traffic barriers to off-road vehicle use and other undesired disturbances to recently stabilized areas.

ACCESS ROAD MAINTENANCE

Water diversions must be maintained in order to work.

- Road maintenance should be done regularly. It usually can be performed with logging equipment, farm tractors, and hand tools. Frequently inspect and maintain erosion control and water diversions. Your maintenance responsibility includes public road ditches affected by your activity. Make sure this maintenance is done even during periods of work shutdown.

Using BMPs before and during operations will minimize the cost of closing.

Your operations will be judged by what you leave behind. Roads should be stabilized when the job is stopped for the season, as well as when logging is completed. If a logging area is to be inactive for 30 days or more, forest roads and skid trails should be temporarily shut down.

The main purpose of closing forest roads is to prevent erosion. A properly closed forest road will improve aesthetics while providing access for recreation, wildlife and forest management, fire control, and other activities. Closure should be accomplished as soon as the use of each section of the forest road is completed.



This multi-use trail acts as a harvest access while also providing hiking opportunities.



A cutout is diverting some runoff off of this access road.



However, there is still some runoff continuing down the access. Cleanout of the head of the cutout could increase the effectiveness of this practice.

CHAPTER 3

Log Landings

Well-planned and managed log landings will minimize impacts to the site, protect water quality, enhance visual quality, and often increase operation efficiency and safety. They also can be attractive, long-term assets to a property.

PLANNING LOG LANDINGS

- Keep the number and size of landings to the minimum needed to operate safely and efficiently.
- Consider timber volume & distribution when planning landing size, number and location.
- Choose a site that will hold up under anticipated use by heavy equipment.
- Maintain an undisturbed buffer strip between log landings and sensitive areas.
- Locate landings on slightly sloping ground where soil and site characteristics facilitate drainage and minimize erosion.
- Design landings to provide safe access and visibility onto highway when next to public roads.
- Consider aesthetics when planning log landings next to roadways, trails and other visually sensitive areas.
- Notify appropriate utility companies before locating landings near overhead and underground utilities.
- Specify designated areas for fueling, material storage, and maintenance. These areas should not be near any sensitive areas.
- To avoid compaction (and thus temporary reduction of yield) on farm fields, find other landing sites if available.
- If cropland must be used, use a high and dry area during dry or frozen conditions and, if possible, establish a deep-rooted cover crop or perennial before tree harvest.



LOG LANDING USE & MAINTENANCE

- Restrict fueling and maintenance activities to designated areas of the landing. Handle all fuels and lubricants with care to avoid spills.
- Avoid use of the landing when conditions may lead to soil movement off site or when extensive rutting can occur and affect site and water quality.
- Apply coarse stone or other stabilizing cover as needed in extreme conditions.
- Leave log cutoffs in the woods or a designated area of the landing to minimize work hazards and improve landing efficiency and appearance.
- Keep the public roadbeds clean of mud and debris and maintain the public road drainage system.
- Maintain water diversion and erosion control measures to manage runoff into and from the landing.
- Minimize soil compaction, rutting, and logging debris on agricultural and other non-forest lands.



CAUTION

- Avoid runoff going onto forest trails and roads from landing.
- Avoid runoff from trails going onto landing.
- Minimize placing landings near streams, RMZs, or other sensitive areas.



This landing was not smoothed and seeded after closeout. It is now collecting runoff, making it unusable for future landings and/or tree regeneration.

TEMPORARY & PERMANENT LOG LANDING CLOSEOUT

- Remove all trash, containers and equipment.
- Leave the landing in a usable condition, free of large ruts and logging debris.
- Do not block drainages with log cutoffs or other landing debris.
- Cut standing snags and unsightly treetops in visually sensitive areas. Visually sensitive areas may include landings next to roadways, residences, and property access points.
- Seed and mulch landings where there is significant erosion or aesthetic concern. Lime and fertilizer may be needed on some landings to achieve adequate and rapid revegetation. See seeding mixtures and lime and fertilizer rates in Appendix A.
- Install appropriate traffic barriers where needed to prevent off-road vehicle damage to recently stabilized areas and other conservation efforts.
- Cropland landings can be planted with deep-rooted cover crops or perennials after tree harvest, allowing them to be grow until compaction is alleviated, which may take more than 1 year.



This landing was smoothed and seeded after closeout. Doing so allows the area to heal so it can either regenerate to forest or be used in the future for forest management operations.

RELATED REGULATIONS

- Report all fuel, lubricant and hazardous material spills exceeding one pound or one pint that enter waters of the state, including groundwater, and that cause a sheen or create damage to water quality. Report within 2 hours to IDEM 1-888-233-7745.
- Also report spills near well heads, spills of operating fluids exceeding 55 gallons, spills that may damage water quality, spills that exceed your cleanup capabilities, and any spill where there is doubt or technical clarification or assistance is needed. Any spill not cleaned up is reportable. (IAC2-6-4) Indiana Spill Rule
- Provide a spill kit and instructions and receptacle. Kits should include shovels, plastic sheeting, containers to hold contaminated materials, 2 bags of an absorbent (e.g., kitty litter, peat moss, sawdust, etc.)
- For more information on reporting spills see the IDEM [Emergency Response Quick Reference](#).



Two years after seeding and smoothing at closeout, this landing is well vegetated and trees are growing.

Skid Trails

Plan skid trails to reduce damage to the residual stand, reduce erosion and stream sedimentation, and provide an economical method for skidding products.

MANAGEMENT PRACTICES: SKID TRAILS

- Only use steep grades for short distances and when adequate water diversions are in place.
- Skid at an angle to the slope, not straight up and down a hill.
- Minimize the overall number, length and width of skid trails.

Skidding across streams

- Cross as near to a right angle as possible.
- Use temporary bridges, mats, or culverts when practical.
- Remove temporary crossings as soon as completed.
- Fords may be used where banks and bed are stable and don't cause excessive soil movement into the stream. ALWAYS divert water off the trail before crossings.*
- See stream crossing section.

**Failing to do so can cause bank erosion and potentially large sediment delivery to the stream.*

CAUTION

- Avoid skidding in streams, springs, seeps, sinkholes, or other wet areas.
- Minimize long, steep straight grades of >20% for >200'.

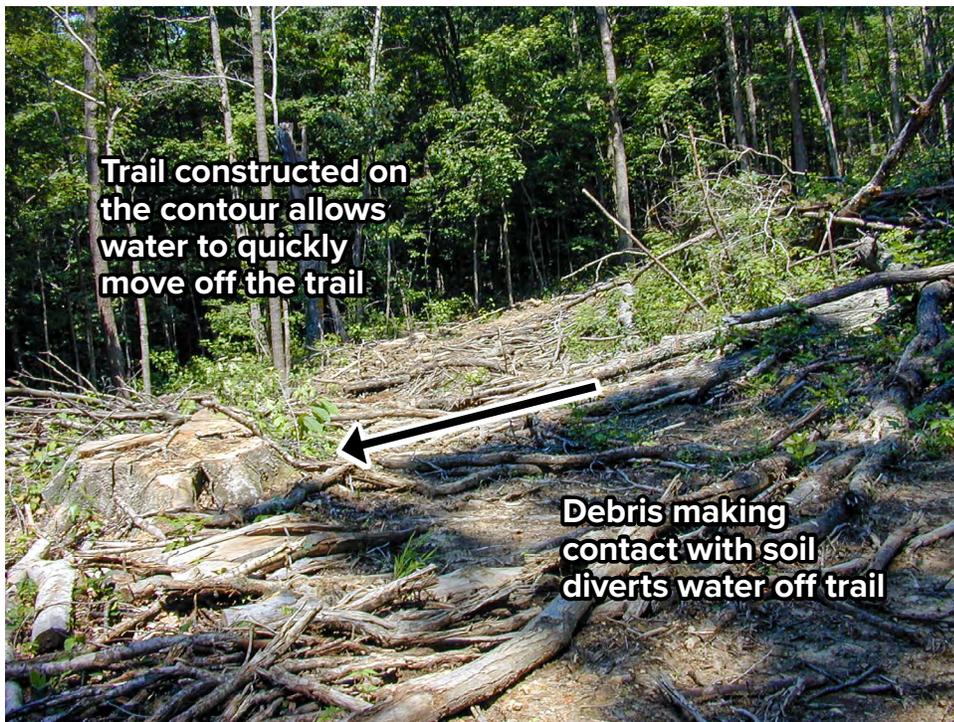
POLE & LOG FORDS

If necessary, install temporary crossings in small intermittent and ephemeral streams by placing logs or poles side by side in the stream-bed. Do so only if:

- Soils aren't introduced into stream.
- Stream flow is not blocked or diverted.
- Woody material is removed immediately after use.

TEMPORARY AND PERMANENT CLOSING OF SKID TRAILS

- Smooth ruts that channel water.
- Install appropriately spaced waterbars and/or other diversions as each harvest section is completed or shut down, including temporary shutdowns due to weather or other factors.
- Install water diversion's outlet to stable forest floor.
- Seed skid trails that are prone to erosion and not regrowing naturally.
- Mulch and fertilize seeded areas when necessary.
- Return disturbed recreation trails to pre-harvest conditions or better.
- Harvest debris used in combination with other water diversions can be placed on skid trails for erosion control if the debris is making direct contact with the soil. Limbing may be necessary.



Armoring bare soil with debris after a harvest allows the soil to stay in place until vegetation can be established.



**Embedded trail
with no diversions
channelling runoff
directly to stream**

STREAM

**Debris in
Stream**



The unnecessary excavation of this trail created a channel down the hill for water to flow straight into the stream with no possibility of diversion.



The closeout of this trail is excellent. Well-timed seeding allowed grass to establish quickly. Well-spaced and constructed waterbars are keeping runoff from eroding the trail.

TABLE 2 WATERBARS

To properly construct a waterbar, you must consider waterbar location, angle, spacing, size, and outlet.

Skid Trail Grade %	Approximate Distance Needed Between Waterbars (ft.)
1–2	500–250
3–5	250–125
5–10	125–80
11–15	80–60
16–20	60–40
21–30+	40–30



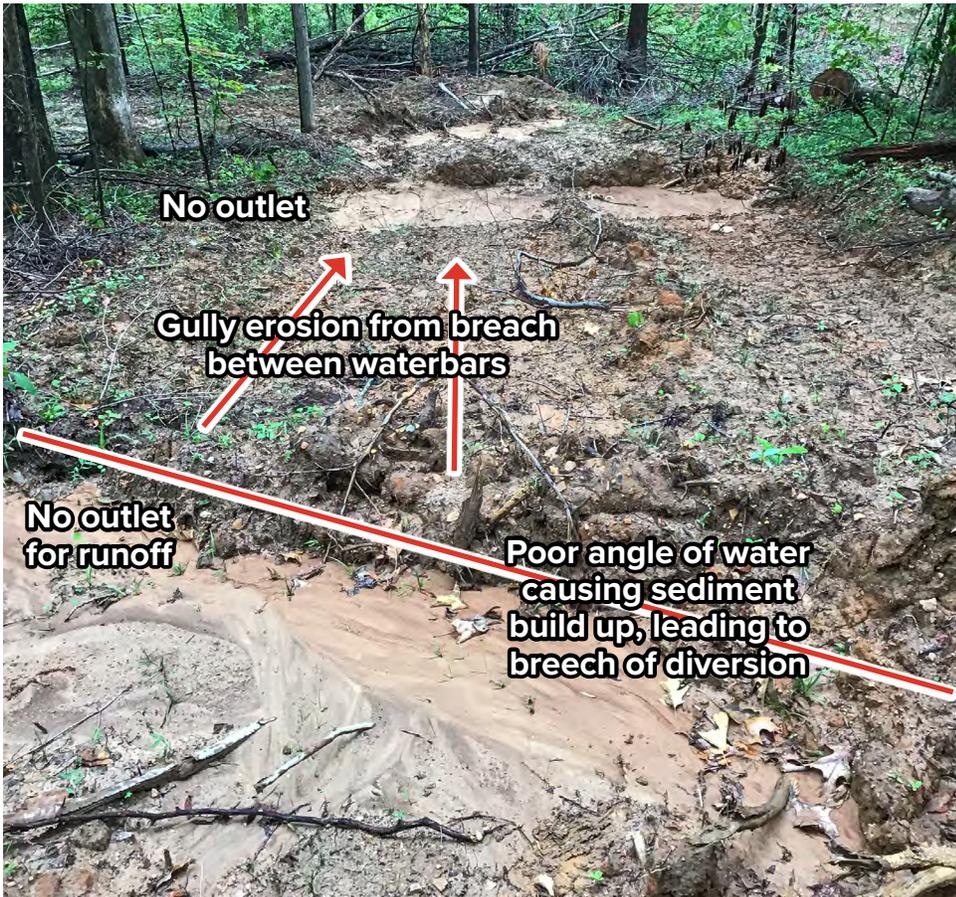
Waterbar diverting runoff onto the forest floor where the runoff will quickly percolate into the soil.

TABLE 3 WATER DIVERSION USAGE

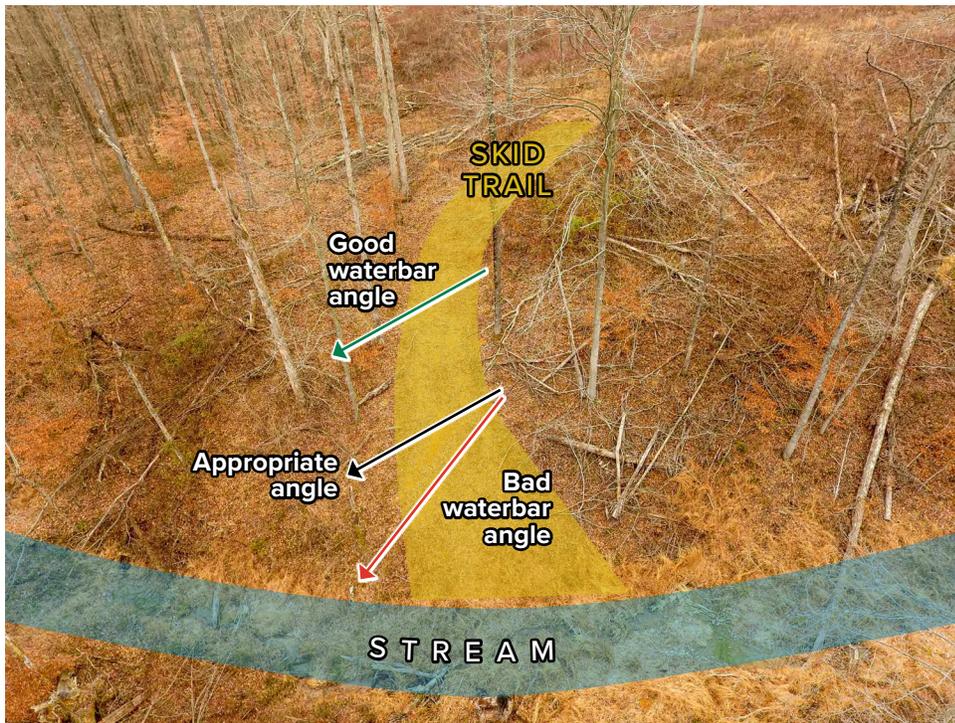
Water Diversion	Access, Skid or Both	Usage after closeout	Limitations
Waterbar	Both	Hiking	No vehicles or horses
Broad-based Dip	Both	Horses, vehicular traffic, hiking	Too large slope could allow higher energy water to bypass diversion
Harvest Debris	Skid Trail	None	No vehicles, hiking, or horses
Cutout/Berm Cut with Crowning and Rock	Access	Horses, vehicular traffic, hiking	None
Box Drain	Access	Vehicular traffic, hiking	None, but will need to be cleaned out regularly
Conveyor Belt Diversion	Both	Horses, vehicular traffic, hiking	None
Culverts	Both	Horses, vehicular traffic, hiking	Correct sizing and periodic clean out required
Outslope	Both	Horses, vehicular traffic, hiking	None



Skidding through a stream can negatively impact a stream for years to come.



Poor waterbar construction (poor angle, no outlet) allowed runoff to breach the waterbars and continue down the trail.



The first waterbar coming down the hill is well done and gets runoff off of the trail and into the forest duff layer.



The waterbar before the stream is at too sharp of an angle and is sending runoff directly into the stream.

Stream Crossings

GENERAL STREAM CROSSING GUIDELINES

- Cross at a right angle and a point where streambed is straight and uniform as practicable.
- Limit construction activity to low or normal stream flow times.
- Minimize excavation and fill at stream crossings and other disturbances to stream banks and channels.
- Use materials that are clean, non-erosive, and non-toxic.
- Divert runoff from roads and trails leading to stream crossings into undisturbed vegetation. Avoid directing runoff directly into streams, including ephemeral drains.
- Construct bridge, culvert, or pole crossing at elevations higher than the road approach.
- If necessary, stabilize road and trail approaches to stream crossings with aggregate or other suitable material.
- Stabilize exposed soil as soon as practicable.
- Maintain crossings in safe, functional condition.
- Close temporary crossings by removing culverts, poles, portable bridges, and other obstructions as soon as crossings are no longer needed.

CAUTION

- Minimize stream crossings when possible.
- Avoid prolonged activity in salmon streams during spawning periods (March 15-June 15 & July 15-Nov. 30).
- Avoid using soil as fill except when installing culverts.
- Avoid altering stream flow.
- Avoid filling wetlands.

RELATED REGULATIONS

- Streams with watershed of more than 1 sq. mi. may need permit from DNR Division of Water.
- May require a permit on FEMA regulated watercourses. Local city or county planning typically issue these.



This stream was crossed with a bridge; however, no closeout/ water diversions were constructed on the trail leading to the crossing, resulting in trail erosion and sediment-laden runoff directly entering the stream.

BRIDGES

- Bridges are effective ways to keep equipment out of flowing streams.
- Use bridge design that will provide safe access and minimize disturbance to stream bank, channel, and riparian management zone.
- Use temporary or portable bridges instead of culverts to access areas where permanent structures are not needed.
- Place temporary bridges so as not to unduly constrict stream channels or impede floodwaters.
- Anchor temporary bridges at one end with a cable or other device so they do not float away during high water.
- Install temporary bridges so they can quickly and easily be removed when no longer needed.



Metal grate bridge.

CULVERTS

- Use 12-inch minimum size culvert that is large enough to pass flood flows. (See Table 4.)
- Use arch culverts where it is important to retain the natural stream bottom and minimize impacts to aquatic life and their movements.
- Both ends should extend at least one foot beyond the edge of the fill material.
- Place in line with the natural stream course.
- Install at or slightly less than the natural stream slope.
- Compact fill material firmly around culverts, particularly on the bottom half to prevent water seepage around culvert.
- Cover the top of culverts with fill to a depth of one-third of the pipe diameter or at least 12 inches, whichever is greater, to prevent crushing.
- When possible, use one large culvert rather than multiple culverts. If using multiple culverts, make sure they are temporary and will be removed immediately after forest management activities end.
- Hollow logs can be used in very small channels if they are adequate for flows. Remove them immediately after harvest activities end.
- Keep culverts cleaned out and free of obstructions.
- Flared-end culverts or riprap should be used where needed to protect culvert inlet from erosion.
- Remove culverts immediately after job is complete or as soon as no longer needed.



Hollow logs can make a great temporary culvert.

TABLE 4 CULVERT SIZE GUIDELINES

Acres Drained	Culvert Diameter (in.)								
	Light Soils (Sands)			Medium Soils			Heavy Soils (Clays)		
	Flat	Mod.	Steep	Flat	Mod.	Steep	Flat	Mod.	Steep
	0-5%	5-15%	15%+	0-5%	5-15%	15%+	0-5%	5-15%	15%+
5	18	18	18	18	18	21	21	21	24
10	18	18	18	21	24	27	27	27	36
20	18	18	18	24	27	36	36	36	42
30	18	18	18	27	30	36	36	42	48
40	18	18	18	27	36	42	42	48	—
50	18	18	18	30	36	48	48	48	—
75	18	21	21	36	42	—	—	—	—
100	21	21	24	36	48	—	—	—	—
150	21	24	24	42	—	—	—	—	—
200	24	30	30	48	—	—	—	—	—
250	27	30	30	—	—	—	—	—	—
300	30	36	36	—	—	—	—	—	—
350	30	36	42	—	—	—	—	—	—
400	36	36	42	—	—	—	—	—	—

Source: Texas Forestry Best Management Practices for Silviculture, Texas Forestry Association.

FORDS

- Select fording sites with gentle approaches, low banks, and hard and stable streambeds.
- Construct to conform as closely as possible to the original streambed to minimize water flow restrictions.
- Stabilize the streambed and approaches where necessary. Stabilizing material may include corduroy mats, reinforced concrete planks, crushed rock, riprap, rubber mats or metal grates.
- Pole fords should be used carefully to maintain water flow. Ideally, they should only be used in ephemeral or no- to low- flow intermittent streams.
- Remove pole fords immediately after job is completed.

CAUTION

- Minimize use of fords if possible, especially in areas of significant water quality concerns.
- Avoid depositing soil in the stream during construction and use.
- Avoid use of fords during high water.
- Minimize use of fords on perennial streams.



**Rutted trail,
no diversions,
water flowing
down trail in
the stream.**

**Logs used to cross
stream not removed.**



The lack of diversions is allowing runoff to create a gully down this trail, depositing sediment-laden runoff directly into the stream. The corduroy logs placed in the stream for a temporary crossing were not removed after the harvest was completed.



This metal grate bridge was used to armor a streambank for a ford crossing.

Riparian Management Zones and Ephemeral Streams

Riparian Management Zones (RMZs) are natural buffer areas between logging and forestry activities and waterways. An RMZ starts at the watercourse bank or sinkhole opening and extends inland. Trees may be harvested within an RMZ. The goal is to maintain a stable forest floor to filter sediment and other pollutants before runoff enters the main watercourse.

RMZ BMP GUIDELINES

- Make RMZs as wide as practical. See Table 5 for recommended RMZ widths based on site characteristics.
- When harvesting trees in the RMZ, minimize disturbance of the forest floor, exposure of mineral soils, and degradation of stream banks. Leave adequate tree stocking to shade stream.
- Locate roads, skid trails and landings outside of RMZ except where necessary for stream crossings.
- Minimize mechanical disturbance to the forest floor by using directional felling away from the watercourse and winching to skid trails outside an RMZ when necessary.
- Remove felled tops and logging debris from the channels of perennial and mapped intermittent streams and situate so they cannot move into the channel over time.
- Place felled tops and debris a sufficient distance away from the watercourse to prevent flood impediments.
- Protect the forest floor to allow sediment to be filtered out before reaching the watercourse.
- Expose no more than 10% of bare mineral soils throughout the RMZ.
- Divert forest road and skid trail runoff onto stable areas before it enters the RMZ.
- Stabilize all roads, skid trails, and other disturbed areas in the RMZ as soon as possible after construction and use.
- Retain at least 50% well-distributed canopy cover in the primary RMZ on perennial waters.



Logging debris is blocking flow of this stream and causing a buildup of woody and leaf debris. This can lead to increased streambank erosion. As the water finds a way around the obstruction it will cut a new path.

RELATED REGULATIONS

The Indiana Flood Control Act (IC 14-28-1) applies to all streams with a watershed greater than one square mile (640 acres) and prohibits the placement of treetops in stream channels and their floodways, which may unduly restrict its flood-carrying capacity. Additional federal, state and local regulations may also apply (e.g., Federal Emergency Management Agency flood areas). See Appendix D for known regulations.

NOTE: If operating in a wetland, follow the **ADDITIONAL** federal wetland guidelines in Appendix B.

CAUTION

- Minimize locating equipment and material storage sites, maintenance sites, and log landings within an RMZ.
- Minimize operating wheeled or tracked equipment in an RMZ and watercourses except on designated roads and crossings.
- Avoid broadcast spray of pesticides or fertilizers within the RMZ.
- Minimize piling of slash, fill, or debris.
- Avoid locating roads or skid trails on pond dams.



This drainage was cleared of logging debris to allow unencumbered flow.

TABLE 5 RECOMMENDED RIPARIAN MANAGEMENT ZONE WIDTHS*

Watercourse Characteristics	0-5% slope	5-10% slope	10-20% slope	20-40% slope	40+% slope	Primary RMZ
Perennial 40 ft. wide	200	200	200	200	200	200
Perennial 20-40 ft. wide	75	75	75	105	105-165	75
Perennial 20 ft. wide	50	50	65	105	105-165	35
Intermittent	25	45	65	105	105-165	N/A
Sinkhole/Cave openings	25	45	65	105	105-165	N/A
Water supply reservoirs & their perennial streams	75	90	130	210	210-165	75
Other lakes, ponds, wetlands	35	45	65	105	105-165	35

Note:

Local modification of RMZ widths may be necessary to reflect landowner objectives or unique conditions (e.g., soil type, flood hazard, vegetation present, cold water fisheries, season of use, scenic quality, and importance of intermittent stream to municipal water supply.)

*Widths in feet on each side of watercourse.



Avoid sinkholes. If possible, a 25-foot minimum riparian management zone is recommended around all sinkholes.

Ephemeral Streams

Ephemeral streams generally occur in the upper reaches of a watershed and generally only flow after heavy rains, snow melt, or when soils are saturated.

MANAGEMENT PRACTICES: EPHEMERAL STREAMS

- Minimize soil disturbance, crossings, and channel blockages.
- Remove channel blockages and stabilize erosive areas after use.

CAUTION

- Avoid broadcast applications of pesticides and fertilizers if water is present.
- Avoid diverting runoff from skid trails and forest roads into ephemeral stream channels.
- Avoid using ephemeral channels as skid trails.



Exposing bare soil near a stream allows sediment to move into the stream.



This poplar top split, dropped across a stream, and fell into the channel. It is now collecting debris and altering the stream bank and beds.

Guidelines for Seeding Disturbed Areas

Site Preparation: It may be necessary to loosen compacted sites before seeding. This may include scarification of the site with a disc, rake, subsoiler, etc. to a depth of at least 3 inches. Steep slopes/highly erodible soils should be avoided since loosened soil can easily be washed off site.

Lime and fertilizer: Be cautious when using. Fertilizing may encourage the growth of exotic weed species and should be avoided where adequate nutrients occur naturally. A soil test is recommended to determine lime and fertilization needs. When a soil test is not practical but poor soil fertility is anticipated, the following minimums can be used: 2 tons of agricultural lime and 1,000 pounds of 6-12-12 fertilizer per treated acre.

Seeding: Several seed mixtures can do the job. Choose a mixture that is the least or non-invasive, yet provides the desired soil stabilization and other benefits. Seeding with an annual plant can often provide adequate cover for the critical first year and allows natural vegetation to further stabilize the site. Additionally, some sites will require perennial seed mixtures for long term protection, while others may require no seed at all and rely only on natural re-vegetation. Refer to the seeding chart for recommended seed mixtures.

Mulching: Mulch materials may be needed to prevent surface compaction; hold seed, lime and fertilizer in place; reduce runoff and soil erosion; and prevent drying of seeds and seedlings. Uniformly spread mulch to cover 80-90% of the treated area. (Small grain straw or hay can be used as mulch at a rate of 1-1 1/5 bales per 1,000 square feet, or 50-65 bales per treated acre. Wood or bark mulch at a rate of 1,500 pounds per acre may also be used.) In some cases, mulch alone may be sufficient to allow natural re-vegetation and stabilization.

Using Native Plants: While using all native seed to reestablish cover after soil disturbance in a woodland setting is ideal, it is not always feasible or practical. In areas with high erosion potential, quickly establishing cover is the main goal and native plants don't always do that job well. Sourcing native seed is sometimes difficult and generally costly due to limited availability as well as collection and preparation methods needed. Non-native plants suggested below are more widely available and cost effective. Attention has been paid to using plants that under forested conditions, should not become invasive and spread outside of the disturbed area, but also perform well as a ground cover. We do highly suggest using native plants over non-native plants. Non-native plants that have a potential to become invasive have a double asterisk. An alternative list of native plants to replace the asterisked non-native plants is found in Table 11.

GENERAL GUIDELINES

- Loosen compacted soil except on steep slopes or areas of highly erodible soils.
- If soil fertility is known to be poor, use 2 tons ag. lime and 1,000 lbs. 6-12-12 fertilizer per acre.
- Use mix of annual plants to allow natural vegetation to come in after first year.
- In severe conditions, use perennial mix.
- If required, mulch with 6 bales per 5,000 sq. ft. or 50-65 bales per acre. Use 1,500 lbs. wood or bark mulch per acre.

TABLE 6 TEMPORARY SPECIES FOR 1-YEAR COVERAGE

Common Name	Scientific Name	Seeding Rates (lbs/ac)	Seeding Dates
Late Season			
Winter Wheat	Triticum aestivum	120 (2 bu)	Sept. 15 – Oct. 30
Cereal Rye**	Secale cereale	112 (2 bu)	Sept. 15 – Oct. 15
Annual Rye	Lolium multiflorum	15	Aug. 1-Sept. 15
Early Season			
Spring Oats	Avena sativa	96 (3 bu)	March 1 – May 1
Cow Peas**	Vigna unguiculata	40	May 1 – July 1
Pearl Millet**	Pennisetum glaucum	10	May 1 – June 15

Choose one and use alone or with a perennial seed mix.

TABLE 7 SEED MIXES FOR WILDLIFE HABITAT & SOIL PROTECTION

Common Name	Scientific Name	Seeding Rates (lbs/ac)	Seeding Dates
A. Wheat** or Spring Oats <i>with:</i> Switchgrass Indiangrass Big Bluestem Partridge Pea	Triticum aestivum or Avena sativa Panicum virgatum Sorghastrum nutans Andropogon gerardii Chamaecrista fasciculata	25 5 8 6 1	March 1 – June 1
B. Perennial Wild Rye (Virginian or Canada) <i>with:</i> Red Top** Partridge Pea	Elymus virginicus or Elymus canadensis Agrostis gigantea Chamaecrista fasciculata	10 10 4	March 1 – June 30
C. Orchard Grass** <i>with:</i> Timothy** Ladino Clover** Red Clover**	Dactylis glomerata Phleum pratense Trifolium repens Trifolium pratense	8 4 2 6	March 1 – Sept 15

**This species is non-native and may be designated as invasive species elsewhere in the US. See list of alternative native plants to replace if available & affordable.

TABLE 8 MIXTURES FOR BARE/HIGHLY ERODIBLE AREAS

Common Name	Scientific Name	Seeding Rates (lbs/ac)	Seeding Dates
Sun & Partial Shade Mix			
White Clover**	Trifolium repens	8	Aug. 1 – Sept. 1
Perennial Rye (Virginia & Canada Wild Rye)	Elymus virginicus & Elymus canadensis	5	Apr. 1 – June 30, Aug. 1 – Oct. 30, Dec. 1 – Feb. 30
Annual Rye	Lolium multiflorum	8	Aug. 15 – Sept. 15
Switchgrass	Panicum variegatum	5	Apr. 1 – June 30, Aug. 1 – Oct. 30, Dec. 1 – Feb. 30
Creeping Red Fescue**	Festuca rubra	10	March 1 – May 1
Orchard Grass**	Dactylus glomerata	10	March 1 – June 1
Red Top**	Agrostis gigantea	2	March 1 – Sept. 15
Partridge Pea	Chamaecrista fasciculata	1	Mar. 1- May 30, Sept. 15 – Oct. 30
Bluegrass**	Poa pratensis	10	Mar. 1- May 30, Sept. 15 – Oct. 30
KY 31 Fescue*	Festuca arundinacea	10	March 1 – May 1
Full & Partial Shade Mix			
Creeping Red Fescue**	Festuca rubra	2	March 1 – May 1
White Clover**	Trifolium repans	4	Aug. 1 – Sept. 1
Wild Senna	Senna hebecarpa	2	Apr. 1 – June 30, Aug. 1 – Oct. 30, Dec. 1 – Feb. 30

TABLE 9 MIX FOR WET OR POORLY DRAINED AREAS

Common Name	Scientific Name	Seeding Rates (lbs/ac)	Seeding Dates
Red Top**	Trifolium pratensis	2	March 1 – June 1
Alsike Clover**	Trifolium pratensis	4	March 1 – June 1
Wild Senna	Trifolium pratensis	2	Apr. 1 – June 30, Aug. 1 – Oct. 30, Dec. 1 – Feb. 30

TABLE 10 POLLINATOR MIX

Common Name	Scientific Name	Seeding Rates (lbs/ac)	Seeding Dates
Virginia Wild Rye	Elymus virginicus	5	Dec-June, Aug-June 15
Switchgrass	Panicum virgatum	3	Dec-Feb, April-June
Purple Coneflower	Echinacea purpurea	0.19 (3 oz/ac)	Dec-Feb, April-June
New England Aster	Symphotrichum novae-angliae	0.02 (0.25 oz/ac)	Dec-Feb, April-June
Wild Bergamont	Monarda fistulosa	0.02 (0.25 oz/ac)	Dec-Feb, April-June
Partridge Pea	Chamaecrista fasciculata	0.25 (4 oz/ac)	Dec-Feb, April-June
Orange Butterflyweed	Asclepias tuberosa	0.06 (1 oz/ac)	Dec-Feb, April-June
Spiderwort	Tradescantia ohiensis	0.06 (1 oz/ac)	Dec-Feb, April-June
Downy Woodmint	Blephilla cillata	0.03 (0.5 oz/ac)	Dec-Feb, April-June
Showy Ticktrefoil	Desmodium canadense	0.06 (1 oz/ac)	Dec-Feb, April-June

*KY 31 Fescue is an invasive non-native species that should only be used in extreme cases where soil stability is needed quickly and there is a high probability that natural revegetation will be able to outcompete it in the shade.

**This species is non-native and may be designated as invasive species elsewhere in the US. See list of alternative native plants to replace if available & affordable.

TABLE 11 ALTERNATIVE NATIVE PLANTS TO REPLACE SUGGESTED NON-NATIVE PLANTS

Common Name	Scientific Name
Grasses/Sedges	
Broomsedge bluestem	Andropogon virginicus
Big Bluestem	Andropogon gerardii
Hairy Woodland Brome	Bromus pubescens
Common Woodland Sedge	Carex blanda
Short-Headed Bracted Sedge	Carex cephalophora
Graceful Wood Sedge	Carex gracillima
Troublesome Sedge	Carex molesta
Common Oak Sedge	Carex pensylvanica
Curly Wood Sedge	Carex rosea
Bur-Reed Sedge	Carex sparganioides
Northern Sea Oats	Chasmanthium latifolium
Beak Grass	Diarrhena americana
Bottle Brush Grass	Elymus hystrix
Riverbank Wild Rye	Elymus riparius
Silky Wild Rye	Elymus villosus
Nodding Fescue	Festuca Subverticillata
Nimblewill	Muhlenbertia schreberi
Forbs	
White Snakeroot	Ageratina altissima
Wild Columbine	Aquilegia canadensis
Sweet Joe-Pye Weed	Eutrochium purpureum
Woodland Sunflower	Helianthus divaricatus
False Sunflower	Heliopsis helianthoides
Path Rush	Juncus tenuis
Round-leaf Ragwort	Packera obovata
Wood Betony	Pedicularis canadensis
Smooth Penstemon	Penstemon calycosus
Foxglove Beardtongue	Penstemon digitalis
Virginia Mountain-Mint	Pycnanthemum virginianum
Blue-Stemmed Goldenrod	Solidago caesia
Heart-Leaved Blue Wood Aster	Symphyotrichum cordifolium
Side-Flowering Aster	Symphyotrichum lateriflorum
Short's Aster	Symphyotrichum shortii

Federal Requirements For Forest Roads In Waters of the U.S.

The following 15 BMPs must be implemented to qualify for the silvicultural exemption from a federal Clean Water Act (CWA) section 404 permit when building a temporary or permanent road or skid trail in or near waters of the United States (Title 40 CFR part 232.3). The silvicultural exemption is only applicable when the primary purpose of the road is for normal silvicultural purposes (CWA Section 404 (f)). This listing below explains the 15 BMPs in lay language. The exact language of the law may be obtained from the Army Corps of Engineers or USEPA. This list is subject to change in correlation with changes to the law.

A wetland/waterbody may not be under federal jurisdiction by the Army Corps of Engineers if it is isolated from waters of the United States. Contact the Army Corps of Engineers and IDEM to see if the wetland you are preparing to harvest is under federal or state jurisdiction and laws.

1. Limit the number, length, and width of roads and skid trails to the minimum necessary to accomplish the landowner's objective.
2. Locate roads outside riparian management zones, except at stream crossings. For more information, see Chapter 6: Riparian Management Zones and Ephemeral Streams.
3. Road fill must be bridged, culverted, or otherwise designed to prevent restriction of expected flood flows.
4. Properly stabilize and maintain road fill during and after road construction to prevent erosion.
5. Discharges of dredged or fill material into waters of the United States to construct a road fill should be done in a way that minimizes the encroachment of trucks, tractors, bulldozers, or other heavy equipment within waters of the United States (including adjacent wetlands) that lie outside the lateral boundaries of the fill location.
6. Minimize disturbance of vegetation while designing, constructing, and maintaining roads.
7. Correctly design, construct, and maintain wetland road crossings to avoid disrupting the migration or movement of fish and other aquatic life.
8. Use fill from upland sources whenever feasible.
9. Place fill in a way that does not take or jeopardize the continued existence of a threatened or endangered species (as defined under the Endangered Species Act) or adversely modify or destroy the critical

habitat of such species.

10. Avoid placing fill in breeding and nesting areas for migratory waterfowl, spawning areas, and wetlands, if practical alternatives exist.
11. Fill shall not be placed near a public water supply intake.
12. Fill shall not be placed in areas of concentrated shellfish production.
13. Fill shall not be placed in bodies of water or on land regarded as part of the National Wild and Scenic River System.
14. Use fill free from toxic pollutants in toxic amounts.
15. Completely remove all temporary fills and restore the area to its original elevation.

Sources of Help and Information

DNR Division of Forestry

The Division of Forestry provides training and technical assistance to forest landowners, forest industries, and natural resources managers. Forestry division staff also administer the 1) Licensed Timber Buyers Law, 2) Classified Forest & Wildlands program on private lands, and 3) management of State Forest lands.

DNR Division of Forestry

402 West Washington, Room W296
Indianapolis, IN 46204
317-232-4105
Fax: 317-233-3863
Website: on.IN.gov/forestry

District Forester Offices

To find the District Forester in your area, go to <https://www.in.gov/dnr/forestry/private-forestland-management/district-foresters/>

For a list of Indiana's State Forests, go to <https://www.in.gov/dnr/forestry/properties>

DNR Division of Water

The Division of Water administers the requirements of the Indiana Flood Control Act, which restricts construction and fill activities in Indiana floodway areas. Permits for stream crossings or other floodway construction activities are issued through the DNR Division of Water.

State Office:

DNR Division of Water

402 West Washington, Room W264
Indianapolis, IN 46204
317-232-4160
Fax: 317-233-4579
Website: on.IN.gov/water

DNR Division of Law Enforcement

The DNR Division of Law Enforcement's conservation officers enforce the state's conservation laws, including the Flood Control Act, Licensed Timber Buyers Law, Clean Water Act, and fish and game laws as well as all other laws.

State Office:
DNR Division of Law Enforcement
402 West Washington, Room W255 D
Indianapolis, IN 46204
317-232-4010
Fax: 317-232-8035
Website: on.IN.gov/lawenfor

IN State Department of Agriculture Division of Soil Conservation

The Department of Agriculture Division of Soil Conservation provides technical and financial assistance for soil conservation practices.

State Office:
ISDA Division of Soil Conservation
150 West Market Street, Suite 414
Indianapolis, IN 46204
317-232-8770
Fax: 317-232-1362
Website: <https://www.in.gov/isda/divisions/soil-conservation/>

DNR Division of Fish & Wildlife

The DNR Division of Fish & Wildlife administers the state's fish, wildlife and wetland programs.

State Office:
DNR Division of Fish & Wildlife
402 West Washington, Room W273
Indianapolis, IN 46204
317-232-4080
Website: wildlife.IN.gov

DNR Division of Historic Preservation and Archeology

For information on the protection and conservation of historic and archeological resources.

State Office:
DNR Division of Historic Preservation and Archeology
402 West Washington, Room W274
Indianapolis, IN 46204
317-232-1646
Website: on.IN.gov/dhpa

Indiana Department of Environmental Management (IDEM)

IDEM administers programs and regulations dealing with point and non-point source pollution. They deal with water quality issues. Report spills of toxic and other reportable substances to IDEM.

Emergency spill hotline:
(24 hour toll free): 888-233-7745; 888-233-SPIL
317-233-7745

Website: idem.IN.gov

Indiana State Chemist Office

For information on pesticide handling, regulation, training, and licensing, contact the Indiana State Chemist's office.

State Office:
Office of the Indiana State Chemist
1154 Biochemistry Building
Purdue University
West Lafayette, IN 47907-1154
765-494-6271

To report spills:
765-494-1583 (pesticides)
765-494-1548 (fertilizers)

Website: <https://www.oisc.purdue.edu/>

Natural Resources Conservation Service (NRCS) (formerly Soil Conservation Service)

This agency of the U.S. Department of Agriculture provides technical and financial assistance in many soil conservation practices, including forestry best management practices. There are NRCS offices in every county in cooperation with the county Soil and Water Conservation District.

State Office:
Natural Resources Conservation Service
6013 Lakeside Blvd.
Indianapolis, IN 46278
317-290-3220
Website: <https://www.nrcs.usda.gov/wps/portal/nrcs/in/home/>

Indiana Hardwood Lumbermen’s Association (IHLA) and Industrial Foresters

IHLA is a forest industries association that conducts or sponsors logger training and workmen’s compensation insurance and represents the forest industry on a variety of issues. Industrial foresters are professional foresters employed by an industry for the procurement of timber or other forestry management services.

State Office:

Indiana Hardwood Lumbermen’s Association (IHLA)

12574 Promise Creek Lane, Suite 100

Fishers, IN 46038

800-640-4452

Website: <https://www.ihla.org>

Consultant Foresters

Consultant foresters are independent professional foresters whose services are available to anyone on a fee or contractual basis. Their services are also available for a fee or other considerations. For a directory of consultant and industry foresters published by the Indiana Forestry and Woodland Owners Association, go to <https://www.findindianaforester.org/>.

Purdue University Department of Forestry and Natural Resources

Purdue University—Department of Forestry and Natural Resources is the only accredited forestry degree program in Indiana and source of scientific and technical information on a variety of forestry and natural resources issues. Natural resources training programs and educational materials are also available through the Purdue Cooperative Extension Service.

Purdue University

Department of Forestry and Natural Resources

West Lafayette, IN 47907

765-494-3590

Website: <https://ag.purdue.edu/fnr/>

Purdue Extension County Directory

Website: <https://extension.purdue.edu/index.html>

FINANCIAL ASSISTANCE FOR FOREST MANAGEMENT

Cost Sharing Programs

The DNR and other sources encourage the protection of natural resources during forest management activities by providing technical assistance and cost-share funding to owners of private forestlands. Contact the DNR Division of Forestry for cost-share program information. Practices that may be eligible for cost sharing include:

1. Development of forest stewardship and logging access plans
2. Tree planting for reforestation and windbreaks
3. Timber stand improvement
4. Wildlife habitat enhancement
5. Soil and water protection and improvement

Classified Forest & Wildlands Program

Indiana's Classified Forest & Wildlands program allows landowners to dedicate their land as Classified Forest & Wildlands and receive property tax reductions, technical assistance, and educational materials at little or no cost to them. In return, landowners agree to take care of their forest in a stewardship manner for timber production, watershed protection, and related benefits. The use of forestry BMPs protects the landowners' obligations under this program. For more information, visit <https://www.in.gov/dnr/forestry/programs/classified-forest-and-wildlands/>.

Known Regulations

There are many laws, ordinances, and other rules (regulations) throughout the country and state that can affect logging on a harvesting site in Indiana. Many of these regulations begin to address one specific issue but evolve and change over time. Change has been continuous in the 30 years since the beginning of the Forestry BMP program in Indiana. The first editions of the field guide outlined the regulations and who enforced them. With new rule proposals and adoptions over the years, information has been difficult to keep up to date. A summary of the known regulations and ways to reference the most updated edition of each follows.

It is the responsibility of every landowner, forester, timber buyer, and logger to look up and know the regulations in their area.

SUMMARY OF STATE AND LOCAL FORESTRY REGULATIONS IN INDIANA AFFECTING TIMBER HARVESTING

(Note: This listing may not include all existing regulations affecting forestry operations.)

Federal Regulations

Clean Water Act – 33 U.S.C. is the law passed in 1972 that reorganized a law passed in 1948. Since 1972 there have been a few amendments. One included nonpoint source (NPS) pollution, and another changed the definition of the waters covered from “navigable waters” to “waters of the US”. The law and the definitions within it continue to evolve.

State Regulations

Classified Forest Act (IC 6-1.1-6) – Requires landowners to follow an approved forest management plan. Owner must sustain the watershed protection and timber production benefits of forest land. Failure to comply can force removal from the program and tax penalties. This law is administered by the Division of Forestry.

Indiana Flood Control Act (IC 14-28) – Deals with construction and permitting activities in floodway areas. Examples of forestry activities that may trigger this law are constructing stream crossings and leaving fill such as logging debris in regulated streams or their floodway. This Act primarily pertains to streams and rivers with a drainage area 1 sq. mi. or larger. This law is administered by the DNR Division of Water.

Licensed Timber Buyers Law (IC 25-36.5) – Requires all those negotiating for or buying timber to be licensed by the state and bonded. This law is administered by the Division of Forestry.

Right to Practice Forestry (IC 32-30-6-11) – Protects loggers and landowners from nuisance lawsuits on private and public lands as long as they meet criteria outlined in the law and follow “generally accepted forestry management practices”.

State Regulated Wetlands (IC 13-18-22) – The forestry exemptions are similar to those for federal wetlands; however, the root ball of trees must not be removed from state regulated waters. Doing so is considered “regulated activity” (dredge or fill).

County Regulations

Road Bonding

Several counties have local ordinances requiring the posting of road bonds. You should look up and know the counties that require road bonding. Some of these may be above the normal spring hauling restrictions found in nearly all counties. These regulations are administered by county government offices (e.g., plan commissions, highway departments).

County Logging Ordinances

Monroe County: Logging Ordinance is under the Zoning ordinances that require all logging sites within the county to get a permit.

Logging Permit Checklist

https://www.co.monroe.in.us/egov/documents/1547127841_00469.pdf

Brown County: Logging ordinance is under the Highway Department and requires all loggers in the county to get a logging permit and logger identification card to be renewed annually. The proper form can be obtained from the Brown County Highway Department.

Regulations of Other Entities

Scenic Rivers – IC 14-29-6 – Segments of the rivers under the scenic river designation may restrict tree cutting and other activities along its corridor. Permits may be needed before harvesting trees in these areas. This law is administered by the individual commissions, such as the Wildcat Creek, Cedar Creek, and Blue River commissions.

Great Lakes Commission – The Great Lakes Commission, in its NPS Pollution Control Program Findings for the Indiana Coastal Nonpoint Program document, states that there is “sufficient justification to support a categorical exclusion of forestry from its coastal nonpoint program.

Glossary

aesthetics: The visual appearance of a site. See viewshed.

archeological area: An area with evidence of previous human activity as indicated by the presence of one or more artifacts (i.e., any object made, used, and/or modified by humans) or features (non-portable evidence of human occupation such as a well or foundation). Common site types include isolated finds, refuse scatters/dumps, homesites, farmsteads, camps, villages, workshops, quarries, cemeteries, etc., and may date from precontact into the 20th century.

arch culvert: Culvert with arched upper portion, but flat bottom.

berm: Fill preventing movement of water off the road surface; or, a low earth fill constructed, typically inadvertently, in the path of flowing water, causing accumulation beside the road, instead of directing water off the road as desired.

best management practice (BMP): A practice determined to be the most practicable means of preventing or reducing non-point source pollution to help achieve water quality goals, and, more generally, of protecting and conserving forest resources and forestland productivity.

broad based dip: A surface drainage structure specifically designed to drain water from a forest road while vehicles maintain normal travel speeds. Also known as a rolling dip.

buffer (filter) strip: A barrier of permanent vegetation established or left undisturbed downslope from disturbed forest areas to filter out sediment from runoff before it reaches a watercourse. Also known as a filter strip.

cistern: A receptacle for catching, holding and storing liquid, especially rainwater.

corduroy: Logs placed over a wet area to minimize the risk of rutting.

culvert: A metal, concrete, plastic, or log pipe through which water is carried. A structure that allows water to flow under a road, trail, or similar obstruction from one side to the other. Culverts are typically embedded to be surrounded by soil.

cut and fill: A process of moving earth by excavating part of an area and using the excavated material for adjacent embankments or fill areas. Constructing a road or trail whereby the amount of material from the cut roughly matches the amount of fill needed to make nearby embankments, thus minimizing the amount of construction labor.

diversion: A surface drainage structure designed to drain water from forest roads and trails. There are several types of diversions, including broad-based dips, water bars, and turnouts.

duff: The partially decayed organic matter on the forest floor. Economic damage is avoided, and adverse side effects are minimized when duff layer is left in place.

energy dissipater: Any type of diversion that slows the energy of moving water.

ephemeral stream: A watercourse, generally without a well-defined channel, that flows only in response to rainfall or snowmelt. Ephemeral streams, generally, flow for less than 20% of the year during normal rainfall.

erosion: The loosening and movement of soil particles. The action of surface processes that removes soil, rock, or dissolved material from one location, and then transports it to another location. These solutes may be transported just a few feet or for thousands of miles. Water erosion can take the form of splash, sheet, rill, and gullies.

FEMA: Federal Emergency Management Agency.

fill: Any solid material added to or redeposited in an area. It could alter the hydrological characteristics or obstruct the flow patterns where deposited.

flared end culverts: Culvert with sloped protruding ends to accommodate backfill.

flood: A periodic overflowing of water onto land that is normally dry.

ford: A natural or reinforced stream crossing suitable for shallow streams with stable bottoms. A shallow place with good footing where a river or stream may be crossed by wading or by driving a vehicle through it. A ford may occur naturally or be built and may be impassable during high water.

forest floor (litter layer): All dead organic matter at various stages of decomposition above the mineral soil surface in the forest, including litter and duff. Also known as the O horizon.

forestation: All types of tree planting, whether conversion of open land or after a harvest.

geotextile fabric: A product used as a soil reinforcement agent and as a filter medium. It is made of synthetic fibers manufactured in a woven or loose non-woven manner that stabilizes loose soil and prevents erosion.

grade: The slope or steepness of a road or trail, usually expressed as a percent, e.g., a 10-foot rise in a skid trail over a 100-foot horizontal distance equals a 10% slope. Can also be called percent grade.

grade break: A decrease in the steepness of a road or trail accomplished with a broad-based dip, switchback or other diversion.

gully: An eroded channel that was originally worn in the earth by running water and has been deepened to the point that it cannot be removed by tillage.

intermittent stream: Watercourse with a well-defined channel through which water generally flows for 20-90% of the year. Can be unmapped or mapped. When mapped, they are shown on USGS maps as dashed blue lines.

invasive species: Generally, a non-native species that, if introduced to a site, may spread and/or displace native plants or animals.

IPM (Integrated Pest Management): An ecological approach to pest management in which all available necessary techniques are consolidated into a unified program so that pest populations can be managed in such a manner that use of chemicals is minimized.

log landing: A place where trees and logs are gathered in or near the forest for further processing and transport.

low water crossing: Allows crossing a river or stream when water is low but may be covered by deep water when the water is high. Can be a ford, bridge, culvert, or other type of crossing.

mulching: Using organic residues (such as grass, straw, or wood fibers) or commercially available alternatives as a covering for exposed forest soil. It serves to control erosion and facilitates revegetation.

natural regeneration: The regeneration of a forest that either uses existing trees as a source of seed or encourages sprouting from stumps or roots.

Non-point source pollution (NPS): Pollution that is 1) induced by natural processes, including precipitation, seepage, percolation, and runoff; 2) not traceable to any discrete or identifiable facility; and 3) controllable through the use of best management practices (BMPs).

NRCS: Natural Resources Conservation Service, an agency of the U.S. Department of Agriculture.

outsloping: A roadbed along a slope constructed so that water will flow across the road toward its downhill side.

perennial stream: A stream that generally maintains water in its channel throughout the year. They are typically indicated by solid blue lines on USGS maps.

pesticide: Any substance, either liquid or granular, that is used to manage undesirable insects, disease, vegetation, animals, and other organisms.

Examples are herbicides, insecticides, fungicides, and nematicide.

practicable: Capable of being put into practice. Affected, accomplished, executed or feasible. Capable of being done with consideration of costs, existing technology, and logistics, in coordination with project purposes.

prescribed fire: The application of fire to wildland fuels under specified environmental conditions to eliminate unincorporated organic matter or low, undesirable vegetation.

rill: Narrow and shallow channels eroded from soils. They are easily visible but are smaller than gullies.

riparian: An area next to a body of water, such as the bank of a river, pond, or small lake. Transitional area between aquatic and adjacent terrestrial ecosystem.

riparian management zone (RMZ): A buffer strip next to a river, stream, lake, pond, sinkhole opening or any other sensitive body of water. RMZs filter impacts of land uses and protect the aquatic resources.

riprap: Rock fragments (4 – 24 inches in size) often placed to protect from the erosive forces of flowing water or to stabilize an area for equipment traffic.

runoff: Surface flow of water occurring on the ground surface when excess water from any source cannot sufficiently infiltrate the soil profile.

sediment: Naturally occurring material such as soil and rock that is broken down by weathering and erosion and is subsequently transported by the action of wind, water, or ice or by gravity. It can also be defined as the matter that settles to the bottom of a liquid.

seep: A place where groundwater flows slowly to the surface, often forming a saturated soil area; a small spring.

sensitive area: Unique area to be given special consideration to prevent or minimize disturbance that may alter the site's uniqueness.

silt fence: Plastic strips or straw bales used as a fence to catch soil washing from an area of bare soil.

sinkhole: A natural depression in a land surface connecting with a subterranean passage generally occurring in limestone regions and formed by solution or by collapse of a cavern roof. Sinkholes can be open or closed.

sinkhole opening: Occurs when the roof of the sinkhole has collapsed and is open, creating a direct path to the underground water source.

site preparation: A forest activity to remove unwanted vegetation and

other material to cultivate or prepare the soil for reforestation.

skid trail: A temporary pathway for dragging felled trees or logs to a landing for processing.

slash: The unwanted, unused, and generally unmarketable accumulation of woody material such as limbs, tops, cull logs, and stumps that remains in the forest as residue after timber harvesting. Also known as detritus.

soil compaction: The process of reducing the space between soil particles, thus increasing soil density, which often causes overland flow.

spill kit: A kit containing materials and instructions for cleaning spills of hazardous or potentially hazardous materials.

spring: A flowing source of water originating underground.

stream channel: A channel between defined banks that is created by the action of surface water and is characterized by the lack of terrestrial vegetation or by the presence of a bed, devoid of topsoil, containing waterborne deposits or exposed parent material or bedrock.

streambank: The terrain along the bed of a river, creek, or stream. The bank consists of the sides of the channel between which the normal flow is confined.

streambed: The channel bottom of a stream or river, i.e., the physical confine of the normal water flow.

viewshed: The geographical area that is visible from a specific location. It includes all surrounding points that are in the line of sight with that location and excludes points that are beyond the horizon or obstructed by terrain and other features.

waterbar: A ditch and a hump across a trail or road at a 30-degree angle to the slope that are tied into the uphill side for the purpose of carrying water off the road on the downhill side in order to slow down overland flow and move it onto stable areas of the forest floor.

watercourse: The channel that a flowing body of water follows. Can be a stream, river, or any channel of water. Can also include bodies of open water and subterranean (underground) waterways.

watershed: A watershed is an area of land that drains all the streams and rainfall to a common outlet such as the outflow of a reservoir, mouth of a bay, or any point along a stream channel.

wildfire: Uncontrolled fire occurring in forestland, grassland, or brush land.

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