

Harvest Planning

why is planning important?

It takes continual vigilance during the harvest operation to control erosion and sedimentation. Keep an eye on potential trouble spots and fix problems as they occur. During harvesting, you can control sedimentation with temporary structures that interrupt the flow of water. This causes sediment to be deposited, trapped and filtered before it reaches a water body. **If you have not met with an attorney to draft a harvest contract, do so immediately!**

Temporary stabilization measures include:

Brush barriers: Slash material placed at the toe of a slope or downhill side of a road or culvert; can accompany water bars or broad based dips.

Burlap or jute material: Dams made of sheet material to entrap sediment and release water through the fabric.

Cribs: A square or rectangular structure built of natural materials (logs) and located below an elevated culvert pipe outlet. The crib is filled with stone or brush to absorb and dissipate the force of falling water.

Silt fence: A plastic sheeting material with the capability of retaining most suspended materials and releasing waters through the fabric. Not recommended for use in permanent flowing streams.

Hay or straw Bales: Bales are placed end to end to form a small check dam, a drainage or pipe outlets. Bales are secured in place with stakes. Not recommended for use in permanent flowing streams or for large diameter culverts.

Grass or vegetation slough way: A sediment trap of heavy grass sod and vegetation into which the water is directed by ditching. This will slow water velocity and trap sediment.

Riprap: Brush, slabs of wood, or rock materials used to absorb or dissipate the forces of concentrated runoff.

Trash dams: Log dams within small gullies to slow the flow of water and trap sediment.

The aforementioned materials should be installed as a system in concert with the following construction methods.

Remember these structures are only as effective as their intended capacity to divert, trap, or slow down water and must be sized appropriately to accomplish water and soil protection.

Following are spacing guidelines for broad based dips, and culvert installation for cross-draining access roads. It makes more sense to properly implement these measures. By doing it right the first time, you'll save money, time, and the headaches of having to stop your operation to fix problems.

If you're not able to be present during the entire harvest, visit it frequently. If you see problems with any aspect of the operation, immediately notify the logger to remedy the situation. Often the logger is very busy trying to complete his/her job on your property and may not notice problem areas. It is much more difficult to get a logger to return to a job once he or she considers it completed.

Forest Buffers aka Streamside Management Zones (smz's)

You have already identified your buffer zones during the PreHarvest planning phase of your harvest operation. Now continue to provide protection to this buffer area during the harvesting operation by observing the following precautionary measures.

harvest operation checklist:

- Restrict harvesting to outside of the buffer area (details on pages A-7 and A-8) to allow for adequate shade, stream bank protection and surface flow filtering capacity.
- Keep debris (slash, garbage) out of the stream.
- Do not skid logs in buffer area.
- Never skid logs down a natural drainage.
- Store fuel and servicing equipment outside of the buffer area.

Forest Access Roads

Your access road will undergo heavy use during the timber-harvesting phase of your land management. However, a properly laid out road will withstand the traffic. It is very important to continually check the road. One day of heavy use can destroy a poorly constructed crossing.

harvest operation checklist:

- Provide for traffic safety.
- Protect the highway and stream(s) or drainage ditch from debris.
- Consider the application of crushed stone over geotextile fabric to prevent deep ruts where soft, wet soil conditions occur.
- Maintain your road surface and keep in good repair. Assure good surface drainage by keeping your drainage structures in good working order.
- Do not skid down your access road, where possible, to protect your drainage structures (cross drains, ditches, broad based dips, water turn outs).



This photo shows a geotextile (or geoweb) installation. Technically a geotextile filter fabric is a synthetic material placed on the flat, under road fill. Its primary use is to keep layers separate, confine the road aggregate and to distribute the weight of the load.

file photo

Stream Crossings

Frequently inspect all stream crossings throughout the operation. These areas are most susceptible to water quality degradation, and more often than not, the source of sedimentation and pollution.

harvest operation checklist:

- Restrict stream crossings to only those vehicles involved in the actual removal and transport of timber.**
- Regularly inspect the stream banks for erosion** and promptly mitigate the problem with straw, hay, geoweb or other measures previously mentioned.
- For Bridges: inspect the bridge surface and remove mud and debris.** This is a safety and an environmental protection measure. Examine stream banks at the crossing for evidence of scour and erosion and fix problem areas immediately.
- For Culverts: inspect the culverts for debris and remove any debris that will possibly plug the culvert.** Check pipe outlets to see if scouring is occurring. If so, remedy the problem, if possible, with large rocks to dissipate the water velocity.

Skid Trails

Your proper layout of the skid trails will reduce numerous problems that would have otherwise occurred, but there are always exceptions and instances when skid trails become problem areas. Therefore, periodically check the conditions of your skid trails, especially at stream crossing locations.

harvest operation checklist:

- Avoid operating equipment on stream banks and in the buffer area.**
- Follow the land contour** as much as possible when extracting timber.
- Skid up-slope** when possible.
- Install rolling dips and water turnouts as needed to remove surface water from skid trails.** Turnouts need to empty into filter areas, such as slash, hay bales, straw, etc., and not directly into a stream.
- Cross streams and wet areas only where permanent or temporary crossing structures are installed.**

Log Landings

Your log deck will see the greatest amount of traffic during the harvesting phase. The steps you made during PreHarvest planning will reduce, but not eliminate, potential problems.

harvest operation checklist:

- Maintain adequate soil cover** using logging debris or other suitable material.
- Immediately clean up any petroleum spills** and control leaking fuel or hydraulic hoses.
- Remove trash** every day from the site.
- Inspect surface drainage**, and if needed, construct a berm on the up-slope side of the log deck to keep water from entering the log deck area.
- Have skidders enter the log deck from the down-slope side** to prevent water collection and pooling on the deck.
- Maintain your filter areas** around the perimeter of the log deck.
- Collect and dispose of waste oil, tires, etc.** by delivering them to a recycling/disposal center.

PostHarvest Inspection (Closeout Phase)

why is closing out the operation important? Before any equipment leaves the site, inspect the entire harvest area for quality assurance. If problem areas exist within any locations of the harvest then notify the logger immediately and have him remedy the situation. In the following pages there are checklists for each area—buffer areas, roads, etc. Pay particular attention to sensitive areas (wetlands, sink holes etc.). Double check to make sure no additional timber was accidentally harvested outside of your designated harvest area. Although this is not common, it can take place and should be examined.

If you carefully followed the PreHarvest and harvest guidelines, then the closeout phase should be a fairly simple process. Unfortunately, for those who jump into a harvest operation, this final phase can bring regrettable and costly surprises.

Be vigilant about checking all impacted areas before the logger or forester leaves your property. Once the equipment leaves, there is an even greater cost and headache associated with having the logger come back to mitigate problem areas. This can really present a challenge if they have already gone on to the next job.

Forest Buffers aka Streamside Management Zone

If you properly planned and inspected your SMZ during harvest then the following steps should be trouble free.

PostHarvest inspection checklist:

- Remove any obstruction from perennial or intermittent streams that are present as a result of harvesting.
- Stabilize areas of bare soil with slash, seeding with native grasses or other suitable methods.

Road Closure (if applicable)

There are several steps to take to properly close out temporary and permanent access roads. Roads are expensive to install, so it's fitting that you spend additional time during closeout to either restore the area (temporary road) or make sure the road can be well maintained (permanent road). Again, **take these steps before the logger, forester or any equipment leaves your property.**

PostHarvest inspection checklist:

permanent roads

- Smooth and reshape road grade.
- Stabilize cut banks and fill slopes by establishing grass through hydroseed, geoweb, mulch, or straw.
- Clean out ditches, culverts and water turnouts so they will function properly. Revisit these sites at least twice a season.
- Close your access road to unwanted traffic with gates or other suitable means. You may want to post “no trespassing” signs to further protect against liability.

temporary roads

- Remove culverts or other stream crossing structures.
- Install water bars, on sloping road segments and especially on both sides of areas where stream crossings have been removed. (See water bars). Supplement water bars with vegetative cover, straw or hay to reduce erosion potential and allow seeds to germinate and root.
- Water bars should extend the entire width of the road, placed at 30 degrees from perpendicular and drain the down-slope side of the road.
- Do not confuse water bars with tank traps. A “tank trap” is a poorly constructed water bar where the soil has been pushed up from a berm with no escape route for the water. These berms *will always fail* over time!
- Extra precautions should take place at stream crossings. The more BMPs working as system, the better.
- Make periodic inspections followed up by basic maintenance.
- Close off your retired access road to unwanted traffic, including ATV and four wheel drive vehicles.
- Closed roads make great hiking trails!



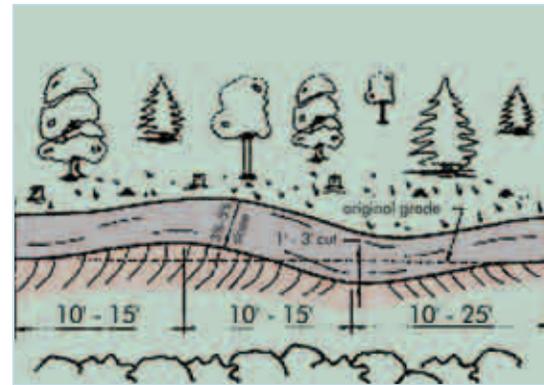
photo: Ed Christopher

Protect yourself from trespassers and unnecessary impact by blocking your access road with a gate. Reseed as soon as possible.

water bars:

Water bars should be installed after harvest activities are completed. It's recommended to install water bars at the end of the road or skid trail first. Work your way toward the beginning of the road to avoid unnecessarily crossing over installed bars. To supplement water bars, plant grass or use slash on the roads that will be closed. Make sure the ends of the water bars are open to keep water from accumulating.

water bars	
road grade (%)	distance between dips (in feet)
2-5	180
5-10	150
10-15	135
15+	120



seeding bare soil with native plants

After harvest, reseed your log deck, skid trails, access road, and stream crossings with a mixture of native plant seed. Seeding with native grasses (such as Big Bluestem, Switchgrass, Eastern gamagrass) not only reduces erosion potential, but it nourishes wildlife, too.

Native plants of Appalachian Kentucky will establish better because they are already adapted to the local soil and climate conditions. Native plant seed can be applied to bare soil areas through broadcast spreading or hydroseeding. Hydroseeding is a process whereby seed, fertilizer and wood fiber mulch are mixed together to form a slurry that is applied by using a machine to form a uniform application over the soil. Broadcast spreading is the least expensive option, but hydroseeding may produce better plant establishment in a shorter amount of time.

It is important to note that seeding with native plants reduces the spread of invasive plant species. Invasive plant species (such as Tree of Heaven and Multiflora Rose) have a detrimental effect on local wildlife populations and will out- compete existing native plant communities for nutrients and sunlight. For more information on invasive plant species in Kentucky visit: <http://www.exoticpestplantcouncil.org/ky/index.htm>.

Talk with a local professional before selecting a native seed mixture to ensure proper regeneration. A local professional will know when to apply and which reseeded mixtures/methods work best. Check with your local Fish and Wildlife agent to see if free native grass seed is available.

Stream Crossings

If stream crossings are not closed out properly, they have the potential to continually degrade water quality. By conducting proper stream crossing inspections, you'll limit potential damage, save on costly repairs and the benefits will be long lasting.

PostHarvest inspection checklist:

permanent stream crossings

- Permanent stream crossings (bridges, culverts) should be cleaned of mud and cleared debris.
- Inspect the structure(s) and repair damage to make them serviceable to protect water quality.
- Seed, with native grass seed, all bare soil areas including application of mulch, straw, or hay to reduce rainfall impact until the grass has established itself.
- Frequently visit these structures to ensure that they are functioning properly, especially after storms.

temporary stream crossings

- Temporary crossing structures should be removed and channels reshaped to PreHarvest conditions.
- Construct water diversions across approaches on both sides of the channel to divert water into filter strips. See illustration in the PreHarvest section, Forest Access Roads.
- Use native grass seed on all bare soil areas including the approaches and water diversions. Apply sufficient seed with mulch, straw or hay for protection from storm events until grass is established.



photo: Ed Christopher

Notice how the natural vegetation and re-seeding helps return this water diversion to its natural state.

Skid Trails

All skid trails should be considered temporary. If you followed the PreHarvest and during Harvest checklist, you've already reduced the potential for erosion and sedimentation. That said, it is still important to walk the entire length of all skid trails and target problem areas that may need immediate attention. Remember to use straw when you reseed and use filter strips for water diversions.

PostHarvest inspection checklist:

- Place logging debris (slash) throughout the skid trail to reduce erosion potential. Target the skid trail areas with the steepest grades.
- Construct water diversions on all skid trails. Water bar outlets should drain into filter strips of slash, hay bales, or silt fence to minimize runoff.
- Stabilize critical areas (stream crossings, steep slopes) by seeding and mulching in conjunction with water bars to reduce erosion and sedimentation potential.
- Fill and smooth ruts if they offer any potential to create gullies.
- Remember, skid trails can make great hiking trails!

Log Decks

Log decks receive the greatest amount of traffic which compacts soils. If soils are heavily compacted, it's possible that seeds may not be able to root and grow. To avoid this problem, rip the soil with a plow to break apart the compacted soils. This will help encourage the seeding and sprouting of the native grasses you apply.

PostHarvest inspection checklist:

- Provide ground cover on bare soil using grass vegetation as well as slash with mulch, straw, or hay.
- If needed, construct berms to redirect the surface water's flow away from the deck.
- Provide drainage on log decks to reduce the pooling potential of water.
- Collect all trash and dispose of it properly. Collect and deliver used oil to a recycling center or approved automotive garage.



photo: Ed Christopher

The compacted soils on this log deck had to be “ripped” before the area could be reseeded.



photo: Ed Christopher

Once ripped, seeds begin to sprout and revegetate the log deck.

Pesticide Application

The long-term management of your forest includes a commitment to sustain the forest landscape for future generations. The condition of the tract, the desired species you wish to regenerate, water quality and soil productivity should all be imperative components of your management plan. You can regenerate your harvested area by either creating a plantation style forestry operation or by promoting natural regeneration. Plantation forests involve intensive site preparation that prepares the land for tree planting. A plantation forest requires commitment, intensive operation and often costly management. Natural regeneration is the common practice in most Appalachian forests. It occurs through coppice regeneration and natural seed dispersion. Coppice regeneration is the sprouting of new tree stems from the trunk of a cut hardwood. Seed regeneration depends upon several site-specific variables and may require intermittent management. Typically, the Appalachian region has enough species diversity that natural regeneration provides optimal results.

If you choose natural regeneration, you also reduce the need for pesticide application.

If you choose to apply chemicals, then you should take strict precautions to protect your water, soils and wildlife. A forester or other natural resource professional can help you conduct soil tests to determine fertilizer needs. This will prevent you from over-applying fertilizer and save you money.

pesticide application checklist:

- Apply only according to the label directions, using the minimal rate to accomplish the desired results.
- Do not apply directly to surface waters, wetlands, and sinkholes.
- Do not broadcast apply in buffer areas; **completely avoid any application in Riparian zones.**
- Comply with the federal and state regulations for filter strips along roads, skid trails, residences, schools, etc.
- Mix chemicals and clean tanks only where spills will not enter streams, lakes, ponds, wetlands, or sink holes.
- Immediately report accidental spills of pesticides or fertilizers into surface waters to Kentucky's Department of Environmental Quality.
- Dispose of containers according to label instructions and state laws.
- If hiring a contractor, require a written contract and proof of appropriate licenses, insurance and bonding.
- If using aerial application, do not apply chemicals if wind speeds exceed 6 miles per hour or temperatures are over 90°.
- Use only pesticides approved by the U.S. Environmental Protection Agency for Kentucky. Follow package instructions carefully.

Parting advice

After a site disturbance like timber harvesting, it's very important to permanently stabilize any bare soils with vegetative cover. This is especially true of stream crossings, roads, skid trails, and log decks. These areas should be inspected at least once a season to keep them in good working order until nature has reclaimed the land.

Use skid trails and retired access roads for your hiking and biking enjoyment. Not only do they provide an area for exercise, but they also make great wildlife viewing habitat, especially if you seeded these areas with desirable wildlife feed. Also, stream crossing areas provide an uncluttered location for a great fishing spot.

There are several state agencies in Kentucky that can help you manage your forest and it is greatly encouraged that you meet with these people and get their expert advice. Their advice can only improve your management plan and your happiness with the outcome. See a complete listing in the Handbook index.

Remember, harvesting timber is just one step of land stewardship. Frequent your property. Take pride in your accomplishment and the fact that you are taking steps to perpetuate your legacy to your family and all of Appalachia.

Now that you are aware of the many key steps to take in proper forest management, map out your plan, follow it and enjoy.