

WATER

Quality water is a primary benefit of forestland. This water is available in a variety of ways and provides many different uses. Ground water is an important source of drinking water for many rural areas and communities. Lakes and streams provide drinking water and recreational opportunities for people, and important habitat for wildlife. Wetlands are important water filtering systems, and provide habitat for many plant and animal species.

There are many examples nationally where public water supply reservoirs rely on forested watersheds to maintain and enhance water quality. It has been shown that these watersheds can supply this water while still supporting active timber management programs. Forest productivity and health depend upon maintaining stable soils.

During the creation and early expansion of the state forests, thousands of acres of eroding and abandoned farm land were planted to trees. Over time these areas have recovered to a forested condition and soil has stabilized. Other areas, formerly forested in the form of wooded pasture, have developed with the absence of livestock into more stable watersheds with reduced rates of sedimentation.

Current state forest management seeks to minimize the negative impacts of forest management, recreation, and other land use activities on water quality and quantity.

Watersheds

Every portion of every state forest is part of a watershed. The normal geologic rate of erosion in forest land is approximately .1 - .3 tons/acre/year. Management activities on state forests have the potential to minimally increase erosion in a watershed. Timber harvest operations create short term soil disturbance over large areas. Many recreation management activities create long term soil disturbance activities over small, concentrated areas.

Studies have shown timber harvest operations can result in erosion rates of .2 - .5 tons/acre/year for the first year after harvesting over an entire harvest area. Rates at a site within the harvest area will vary depending if it has heavy disturbance, such as a road, or minimal disturbance. A soil loss of 1 ton/acre/year is often cited as the rate at which no loss of soil productivity will occur. In addition to increased erosion, harvest operations may result in increased nutrient flow from the watershed. Timber on state forests is managed at a sustainable level. At this level, about 3% of any state forest is affected by harvest operations in any year. Approximately 10% of any harvest operation may receive heavy soil disturbance such as roads, skidtrails, and log landings.

The effects of harvest operations on erosion and sedimentation can be minimized several ways. Layout, design and marking of areas can be done before the operation actually begins. Landings can be planned for areas with minimal slope. Roads can avoid slopes where possible

and provide for regular water diversion. Skidtrails can be placed on minimal slopes where possible, and allow for water diversion.

After harvest operations are completed, the harvest area should be closed promptly. Water diversions will be installed where appropriate. All major bare soil situations (landings, skidtrails, roads) may be seeded with an appropriate seed mixture to stabilize the soil. Recommended species to seed include non-aggressive annuals and short-lived, non-invasive perennials. Seed should be applied as soon as possible because seed applied after a rain has a difficult time penetrating the crust and can quickly dry out. Mulch, straw or matting, should be used where needed. Less used skidtrails and other areas where disturbance only removes the duff layer and leaves the topsoil with underground plant structures (roots, rhizomes, etc.) intact should not have water diversions installed. In these situations there is sufficient soil bonding, and the existing plant structures will result in rapid regeneration.

All harvest operations will comply with Logging and Forestry BMP'S for Water Quality in Indiana Field Guide.

Pesticides are a water quality concern. Agricultural pesticides regularly find their way into ground and surface water supplies. Pesticides are regularly used on state forest and forest recreation areas to control a variety of pests. While not regularly found in water sampling, pesticides used on forests and in state forest lakes should be applied carefully. All pesticides will be used according to label directions. When applicable, target applied pesticide treatments will be used rather than broadcast treatments. When required, pesticides will only be applied under the direction of a licensed applicator.

The disturbance created by recreational activities will vary depending on the activity. Construction activities create disturbances similar to harvest operations, and require similar efforts to reduce impact. More problematic are long term or continuous disturbances such as heavily used campgrounds, trails, or areas around lakes. Diversions created from soil cannot be maintained, and often seed cannot survive the heavy traffic or soil compaction. In these situations, water diversions may have to be created out of wood using purchased treated lumber or downed logs, or out of other stable material such as stone. Areas may have to be closed periodically to allow ground cover to get established. Heavy traffic areas may require a hardened surface, such as stone, to reduce erosion and funnel the traffic in a smaller area. Other measures may be needed to armor the soil or divert traffic.

Fish and Wildlife habitat development projects often create considerable soil disturbance. However, the scope of the project usually involves having the Fish and Wildlife crew doing the necessary stabilization.

Other soil disturbing activities should be considered on an individual basis, and should be stabilized according to the guidelines for similar disturbances. If in doubt, contact the Property Specialist for recommendations.

Riparian Areas

The riparian areas and floodways along lakes, streams, and rivers, and sinkholes are important for water quality. Alluvial soils tend to be richer and moister than upland soils. These areas may be prone to periodic flooding. This creates rich sites that support many species not found in uplands, and may have special habitats. Site richness makes riparian areas extremely productive areas for growing trees. These areas can be managed for timber if extra care is taken to minimize sedimentation.

Riparian areas, besides being productive for tree growth, produce other important benefits. They often are important for fisheries and other wildlife that prefer these areas. Riparian areas often draw recreational users for water-based activities or for the wildlife that is attracted to these areas.

All harvest operations will comply with Logging and Forestry BMP'S for Water Quality in Indiana Field Guide. In general, tree removal will be limited to no more than seven trees per acre in primary riparian zones, with few, if any, trees to be cut within fifteen feet of any permanent stream. No group selection openings will be made in primary riparian zones. Exceptions to this must be approved by Property Specialist.

Riparian zones can affect recreational and other activities. The wet soils and periodic flooding can affect the quality of trails and the maintenance they require. Trails should be placed outside flood zones whenever possible. Those that must traverse flood zones should be designed and constructed to avoid becoming a channel for water flow. Future recreational facility development will be designed to avoid riparian zones whenever possible. Wildlife openings will not be placed in primary riparian zones, unless otherwise approved by Property Section staff.

For purposes of this section, permanent streams are those indicated by solid blue lines on topographic maps. Dashed blue lines on topographic maps indicate intermittent streams.

Projects that involve work in permanent or intermittent streams and/or floodways of permanent or intermittent streams with over one square mile of upstream watershed should receive a permit from the Division of Water for construction in a floodway. Contact Property Section Staff for these situations.

Wetlands

- Wetlands are transitional lands. They are characterized by
- 1 water tables at or near the soil surface, or covered by shallow water at least 14 days during the growing season
 - 2 the land predominately supports hydrophytic plants, at least periodically; and/or

3 the substrate is predominately undrained hydric soil.

On state forests, wetlands often occur closely adjacent to streams, or in the upper reaches of lakes, and therefore usually fall within riparian management zones. The management in these will follow the guidelines for riparian zones, with extra care to ensure the other benefits and values of these areas.

There are some broader river bottoms that exist beyond the riparian zone specifications, but are forested wetlands by their nature. In addition, there are areas with springs that produce regular (but not stream-size) flows of water. Spring areas often contain small, but unique plant communities. Management activities in these both areas will follow Logging and Forestry BMP'S for Water Quality in Indiana Field Guide. Management activities will avoid direct disturbance to springs.

Springs and Seeps

Major springs and seeps may provide rare habitat for some species. The soil around such sites is saturated most of the year, which makes the soil vulnerable to impacts. Property operations will be managed to have minimal disturbance to these sensitive sites.

Section Bullet Summary

- All harvest operations will comply with Logging and Forestry BMP'S for Water Quality in Indiana Field Guide.
- Some activities along stream flood zones may require permits from the Division of Water.