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Section 208 and Forestry in Indiana

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The Clean Water Act of 1969 and its amendments are expected to have an important impact on both public and private forest management in the state. This law represents a desire to clean up the nation’s waters, set quality goals, and eliminate water pollution.

Section 208 of the amendments addresses itself to pollution sources and calls for the development of water quality management plans to meet the goals of the law. In Indiana, overall responsibility for these plans rests with the Indiana Stream Pollution Control Board and designated local agencies. Ultimately, every forestry activity which has been identified with pollution will be required to use best management techniques to minimize pollution.

Point and non-point pollution
Water pollution is dealt with according to its source. Point source pollution is that which comes from a readily identifiable activity, while non-point source pollution emanates from natural processes, such as rainfall, drainage, etc.

The term silvicultural point source is defined as those forestry related activities which result in “any discernible, confined and discrete transport related to rock crushing, gravel washing, log sorting or log storage facilities from which pollutants are discharged into the waters of the U.S.” Rock crushing and gravel washing are activities associated with logging road construction, which are important in the west, but which have little application in Indiana. Log sorting areas and log storage facilities may be sources of point source pollution but they are not major sources of pollution and will not be discussed.

The Environmental Protection Agency (EPA) defines non-point source pollution in terms of activities rather than specific instances. Non-point sources of pollution are the result of natural processes, including precipitation, drainage, seepage, percolation, and runoff; or are not traceable to any discrete or identifiable facility. The term silvicultural non-point source includes activities inherent to forest management, which accelerate the effects of natural processes. Such activities include nursery operations, site preparation, reforestation and subsequent culture, thinning, prescribed burning, pest and fire control, harvesting operations, and the construction and maintenance of roads and other transportation systems associated with these activities.

The major problem of forest management deals with non-point source pollution and the activities that might accelerate it.

Most of the physical, chemical, and biological properties which are measured to set water quality standards are also naturally occurring constituents of water. This makes it difficult to distinguish background conditions from man-caused pollution or pollution resulting from forest management activities.

Water quality standards for Indiana have been determined, but not with respect to allowable limits for non-point source pollution. However, on the basis of experience in other states and with the components used for determining point-source pollution, it is reasonable to believe that (1) water temperature, (2) color, (3) turbidity (cloudiness), (4) taste and odor, (5) solids, floating material, and deposits, (6) oil and grease, (7) pH, (8) dissolved oxygen, (9) radioactivity, (10) bacteria, (11) toxic substances, and (12) mineral quality will be monitored.
In terms of forest management activities, water quality indices can serve as sensitive measures for evaluating forest practices. A decline in water quality may signal a degradation of the site, which can result in a lowering of site productivity. It is important, however, to keep in mind that water from forested watersheds is not “pure”. Its quality, in terms of the components listed above, varies with seasonal, climatic, soil, and plant conditions.

Forestry practices that may contribute to stream pollution

a) Harvesting

Of all the forestry activities, the effects of timber harvesting on water quality has probably received the greatest attention. Most research emphasis has been placed on water temperature and water turbidity (as related to erosion and sedimentation). Recently, however, investigations have been expanded to include the effects of cutting, forest fertilization, and vegetation management on nutrient discharges in streamflow.

Research in the northeastern United States and Appalachian areas to the South reveals that erosion and sedimentation generated from timber harvest (including clearcutting) is minimal and shortlived. For example, clearcut areas in West Virginia, on a per acre basis, had an average yearly loss of 0.10 tons of sediment the first year following the clearcut. The sediment loss was back to normal within three years, but even at its highest yearly average (0.10 tons per acre), the loss was below what is termed the “geologic norm” and well below the 1.5 tons/acre/year accepted as tolerable losses for agricultural soils.

Aside from erosion and turbidity increases, timber harvesting can adversely affect the quality of a stream by affecting its temperature. The removal of the forest cover adjacent to stream channels causes the water temperature to rise and increases the differences between the maximum and minimum temperatures. Often these changes in the water conditions cause the death of many of the aquatic organisms, including many native fish species. These water temperature increases can be avoided by leaving a narrow strip of trees or brush along the stream channel.

While water turbidity and stream temperature continue to be water quality problems, nutrient losses following timber harvesting operations are also considered a potential problem. The accelerated loss of nutrients following forest cutting might adversely affect stream water quality and reduce site productivity. Numerous hydrology laboratories in the eastern United States have investigated the effects of clearcutting on the nutrients lost into streams. With the exception of the results from the Hubbard Brook watersheds in New Hampshire, all research reports only small increases in the amounts of nutrients lost into streams, and, in no instance, was the water quality below drinking water standards. The changes that are reported are usually not detectable within two years following logging.

The large nutrient losses reported for the Hubbard Brook watersheds are believed to have resulted for several reasons. Unlike normal clearcutting harvests, the timber that was cut was not removed and herbicides were used repeatedly to prevent any revegetation of the site. These conditions promoted accelerated decomposition of the organic matter and prevented the absorption of the newly available nutrients by plants. Under such conditions, the amounts of nutrients leaching to the streams increased.

b) Logging

Logging roads deserve special attention. They are unquestionably the source of most of the soil lost from non-channel portions of managed forest land in the East. Large amounts of soil are lost from poorly constructed and ill-designed logging roads and skid trails. Reports indicate that during and immediately following logging and during periods of peak precipitation as much as 40 tons of soil per acre of logging road may be lost. Methods of averting such erosion are well known and revegetation usually terminates accelerated erosion within a year or two after road use ceases.
c) Chemicals

Chemical losses into the streams of Indiana from forest fertilization or the aerial application of pesticides to forest land are essentially non-existent. While these practices are presently not being used, awareness of their potential problems and of the regulations governing their use are important because either or both of these practices may be important in the future, and both can have a negative impact on water quality. The preliminary results of nitrogen fertilization in West Virginia forests indicated that, shortly after an application of fertilizer, the nitrate-nitrogen concentration in the stream during peak stream flow was 10 times the normal concentration. These high concentrations of nitrate-nitrogen occurred for only a short duration and were for a yearly average below the public health limit.

The use of herbicides as a forest management tool may also cause water quality problems. In all cases, when herbicides were aerially applied in forested areas traversed by streams, some herbicide was found in the stream channel. Peak concentration occurred shortly after application, but residues did not persist for more than a few days, or, at most, a month. Most of the contamination was a result of direct application or drift to the surface waters.

How will forestry activities be affected by 208 planning?

The process of achieving clean water under the 1972 Act is called the Water Quality Management Program. Under this program, Indiana has identified forestry activities that may cause water pollution. Agencies under the auspices of the Stream Pollution Control Board are addressing the problem. The goals of the agencies are

- Identify water quality problems
- Identify pollution sources
- Recommend guidelines for locally developed Best Management Practices to curb pollution from identified sources
- Recommend regulatory programs as needed
- Recommend state and local agencies needed for implementing long-term Water Quality Management Programs.

The Stream Pollution Control Board or the local responsible area agency must identify needs and select programs to reduce pollution from all sources. The non-point program will center on the Best Management Practices (BMP). This means that forestry activities identified with pollution problems associated with runoff will need to use the best management techniques to minimize pollution, or the activities may be prohibited altogether. If the activity is not causing pollution problems, then it will not be affected.

The Best Management Practices (BMP) for forestry are aimed at maintaining the productive potential of the land and may include some conservation practices which have been used for years, along with some new practices that have just come about or are still in development stage.

The Indiana Department of Natural Resources, Division of Forestry, is presently developing BMP guidelines for Indiana. A conservation plan will not be required for every forestry activity or operation. The state or area Water Quality Management Program (WQMP) will determine what is required.

At present all State owned and all private forest lands are included under the Water Quality Management Program (WQMP). An Advisory Committee, to be set up in the near future, will determine the minimum acreage that will be affected under WQMP. Under this program, the Stream Pollution Control Board will identify all sources of pollution within a region. Priorities will be determined, methods of control and implementation at the local level will be given full consideration. Specific problems will be addressed in specific ways in terms of local conditions.

One of the major components of the 1972 law is the decision-making role of the citizen in the planning and recommendations for the Water Quality Management Program. Private forest landowners, forestry organizations, and forest industries should get involved in the early stages of the planning process. Since all forest lands will be included in an agency plan, it is the best interest of everyone involved with forestry to be informed of the water quality problems in the area and their potential effects.

Assistance and information related to “208” can be obtained from any of the following agencies:

1) Environmental Protection Agency
   Region V
   230 S. Dearborn
   Chicago, Illinois 60604

2) Indiana Division of Natural Resources—Division of Forestry
   Bill Schrand, Assistant State Forester
   613 State Office Building
   Indianapolis, Indiana 46204
   Phone: (317) 633-6517

3) Indiana Cooperative Extension Service
   Phil Pope, Department of Forestry and Natural Resources
   Purdue University
   West Lafayette, Indiana 47907
   Phone: (317) 494-8871

4) Soil Conservation Service
   Robert V. Bollman, Assistant State Conservationist
   SCS, 5610 Crawfordsville Road, Suite 2200
   Indianapolis, Indiana 46224
   Phone: (317) 269-6516

5) Stream Pollution Control Board
   Rex Jones or Ken Kemp
   State Board of Health
   1330 W. Michigan Street
   Indianapolis, Indiana 46206
   Phone: (317) 633-5446

6) Non-designated Area Leaders
   Obtained by calling Rex Jones or Ken Kemp

A more in depth review of forestry activities and their potential impact on water quality can be obtained on request from the Indiana Agricultural Experiment Station, West Lafayette, Indiana 47907.