that the land had been listed for sale, marketed as a home site, and sold to a family.

Alarmed by the Corps' decision, the Riverkeeper, again represented by SELC, filed both a CWA citizen suit against the timber company and an Administrative Procedure Act challenge against the Corps. After taking a voluntary remand, during which it obtained information not submitted in the first review, the Corps reversed its prior decision and concluded that the road did not qualify for a forest road exemption. Unwilling to accept this reversal, the timber company fought on.

In finding the timber company liable, the district court held that "the road was not built to support an ongoing silviculture operation and it was not intended to be used solely for silviculture support activities." The court based its determination on the following: the site had been clear-cut recently; the site was regrowing naturally; the road would not be necessary for timber management or harvesting for a number of years; and the property had been sold during the same time the road was being constructed. Furthermore, the timber management plan listed wildlife management as the primary purpose of the road. The court also took note of the Corps' reversal on its exemption ruling.

Although these two cases might appear to the uninitiated to be rather benign, they have created quite a stir within the timber industry and within the government agencies that oversee this industry. For decades, many timber companies and landowners have operated under the assumption that the silviculture and forest road exemptions provide an easy escape hatch from government oversight under §404.

Based on these district court decisions, in order for the silviculture exemption to apply, landowners managing timberlands must produce evidence that the forest proposed to be cut was harvested in the past, has been managed for timber since that harvest, and will be managed for timber in the future. And for the forest road exemption to apply, not only must the forest road be constructed in accordance with best management practices, the area to be served by the road must also be part of an ongoing silviculture operation.

As news of these decisions spreads, timber companies and landowners will be required to seek permits from the Corps for actions they might have considered exempt previously. To further clarify the court decisions, the Corps, in coordination with the U.S. Environmental Protection Agency (EPA), the Georgia Forestry Commission, the Natural Resources Conservation Service, the U.S. Forest Service, the Georgia Environmental Protection Division, and the Georgia Wildlife Protection Division, has issued new guidelines. In addition to providing greater clarity, the guidelines set forth how these agencies will work together to ensure that timber companies and landowners are obtaining §404 permits when they are legally required to do so. The Corps guidelines make it clear that EPA and the Corps are the only entities that can verify whether a silviculture activity is exempt. Furthermore, if a timber company or landowner does not seek such verification, it is operating at its own risk and may be subjecting itself to future enforcement actions.

How quickly the Corps and EPA will craft guidance with a national scope is still unknown, but what is clear is that this new clarity in the §404(f) exemptions for silviculture and forest roads will lead to cleaner water for the citizens of Georgia. ■

-Bill Sapp, Senior Attorney,
Southern Environmental Law Center

CONSERVATION

Hydrologic Connectivity and Wetlands

Wetlands are so-named because they are wet for variable amounts of time; hydrology dictates their formation, development, and continued existence. Over thousands of years (time differs by site), organisms in wetlands have evolved to persist within the hydrologic cycle or hydroperiod that dominates each wetland. When hydrology is altered, wetland habitats are altered and organisms must adapt, move, or perish. Humans have not always recognized the importance of natural hydrologic processes, and in an effort to change habitat characteristics for selected plant and animal species, or to support human infrastructure, they have altered hydrology, often by reducing hydrologic connectivity between wetlands and adjacent water bodies. The results have affected many wetland processes, vegetation changes nearly always occur, and habitat for many fish and wildlife species also changes.

Any list of major objectives for wetland conservation should include restoring hydrologic connectivity and revising operational strategies used by wetland managers and engineers to avoid future losses of connectivity. Recognition of the problem is first required. Dams have long been used for hydropower, flood control, creation of multipurpose reservoirs, and regulation of water levels for shoreline development, shipping, and recreational boating. Reservoir management is a wetland conservation issue unto itself, but dams are widely known to reduce or eliminate the ability of aquatic organisms to traverse between upstream and downstream wetlands. Roadbeds with few, undersized, or no culverts/bridges are widespread but have commanded relatively little attention. Many marine and lacustrine shorelines serve as transportation corridors, with roads and railroads crossing the mouths of streams and rivers where wetlands often occur. Roadbed causeways effectively become dams, and small bridge spans result in reduced hydrologic connectivity, decreased flow rates, increased sediment deposition in upstream wetlands, and water chemistry changes. Inland, roads crossing many wetlands can pond water on the upslope side, leaving telltale signs, such as dead trees and vegetation differences.

Diking of wetlands to enhance habitat for selected organisms, especially waterfowl, became a popular wetland management alternative when funding was

"Any list of major objectives for wetland conservation should include restoring hydrologic connectivity and revising operational strategies used by wetland managers and engineers to avoid future losses of connectivity. Recognition of the problem is first required."

made available in the 1930s through the Works Progress Administration, Migratory Bird Hunting Stamp Act, Civilian Conservation Corps, and Pittman-Robertson Wildlife Restoration Act. Private duck-hunting clubs also diked wetlands to gain control of water levels. When dikes isolate wetlands from adjacent water bodies, wetland values, such as flood conveyance, sediment control, and improvement of water quality, are lost. Habitat for waterfowl and certain other animals may be improved in the short term by diking. However, shorebirds and many less common plants and animals lose the habitat supported by natural hydroperiods that continually change the boundary between land and water. Moreover, in the long term, these habitats often become unsuitable for ducks. In addition, fish and invertebrates not capable of overland travel do not have access to diked wetlands and lose valuable habitat. Fish larvae pumped into diked wetlands during filling operations cannot leave and are thus lost to the outside population. Dikes have also been constructed for other purposes. In marine coastal areas in Louisiana, they were built to maintain freshwater wetlands that would otherwise receive salt water due to subsidence and increasing sea levels. Along parts of the Atlantic Coast, they were built to manage mosquito populations and cultivate rice.

In recent years, efforts have been made to inform wetland managers about the effects of loss of hydrologic connectivity (see Euliss et al., 31 Nat'l Wetlands Newsl. (Jan.-Feb.) 1 (2009), as well as Smith et al., 31 Nat'l Wetlands Newsl. (May-Jun.) 4 (2009)). On the land, some actions have already taken place, including dam removal, replacement of road culverts and bridges, and reconnection of wetlands to adjacent waters. My experience on this subject has been focused on western Lake Erie in Ohio, where most coastal wetlands were diked as part of hunting clubs or state and federal refuges. An innovative approach was taken for functional restoration of the barrier beach at Metzger Marsh, which had been lost to the combined effects of erosion and lack of sediment supply along an armored shoreline. A dike was constructed, but it includes a water-control structure to allow hydrologic connectivity with Lake Erie. Unfortunately, that structure has been closed much of the time since the U.S. Army Corps of Engineers permitting period ended, due to differing management strategies among state and federal co-managers. However, lessons learned at Metzger Marsh resulted in a water-control structure now being installed to reconnect a nearby diked wetland on the federal refuge with Lake Erie.

A drowned river mouth wetland in Betsie River along the eastern shore of Lake Michigan, where water flows must pass under both a railroad bridge and highway bridge before reaching the downstream lake. Photo courtesy of Doug Wilcox.

Future priorities regarding hydrologic connectivity should include the continued education of managers and the development and testing of techniques to maintain hydrologic connections, while meeting other objectives. New designs are needed for structures and flow regulators that allow ingress/egress of organisms. More impact analyses are needed, including effects of hydrologic connectivity on water flow, sedimentation, basin morphology, and geochemistry. Although site-specific studies have documented effects of the loss of hydrologic connectivity on wetland biota, broader studies are needed that encompass community composition, productivity, and especially invasive species. Finally, the cumulative effects of all these factors should be assessed further. ■

-Douglas A. Wilcox, Empire Innovation Professor of Wetland Science, The College at Brockport–State University of New York