Wetland Mitigation in Michigan's Upper Peninsula:
Compliance with Site Monitoring and Invasive Plant Species Standards

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Abstract

Michigan's wetland mitigation process is supervised by the state's Department of Environmental Quality (DEQ), as outlined by the 1972 Clean Water Act. Mitigation permittees are responsible for site monitoring and annual submission of monitoring reports to the DEQ for 5 years after construction. Mitigation sites must also feature a 10% maximum total cover of invasive plant species. I examined mitigation cases in the U.P. for compliance with both monitoring and invasive species standards to determine if site monitoring is related to the extent of invasive species at mitigation sites.

Minimal invasive species at MDOT's Tioga mitigation site (Baraga County).

Natural forested wetlands adjacent to MDOT's US-2 mitigation site (Iron County).

Background

The United States has lost about half its wetland acreage since European settlement. Wetlands have historically been drained or filled for the development of farms, cities, and roads. The management philosophy of "No Net Loss" of wetlands was introduced in 1988, with the goal of maintaining total areal amounts of wetlands nationwide. The total acreage of U.S. wetlands has recently increased after decades of decline.

Section 404 of the 1972 Clean Water Act requires permits for wetland alteration. Permittees are required to compensate for wetland damages by constructing new "mitigation" wetlands.

In Michigan, permits are required for impacts to any wetlands that are within 1000 feet of a Great Lake, within 500 feet of any other water body, greater than 5 acres in size, or deemed ecologically critical by the DEQ. Requirements for mitigation size are determined by the type of wetlands impacted by the permitted activity. Typically the required ratio of mitigation wetlands to original wetlands ranges from 1.5:1 to 10:1.

Literature Review

The ecological quality of mitigation wetlands is often inferior to natural wetlands, as mitigation wetlands often do not provide the same values or functions as the original wetlands lost. For example:

- Construction deficiencies often result in insufficient wetland acreage at mitigation sites (Cole and Shafer 2002; Morgan and Roberts 2003; Stolt et al 2000).
- Hydrology at mitigation sites is frequently unsuitable for wetland development (Brown and Veneman 2001; Cole and Shafer 2002; Stolt et al 2000).
- Soils properties at mitigation sites are often too low in organic matter or too high in bulk density (Campbell et al 2002).
- Invasive plant species tend to be problematic at mitigation sites (Balcombe et al 2005; Cole and Shafer 2002; Moore et al 1999; Spieles 2005; Spieles et al 2006).

In addition to these types of site problems, previous research indicated low compliance rates regarding the submission of site monitoring reports to the DEQ by mitigation permittees in the Western U.P. (Hornyak and Halvorsen 2003).

Focus Area

I examined all 69 mitigation permit files issued in the U.P. between 2003 and 2006. Combined, these permits resulted in the loss of 71.15 acres of natural wetlands and the creation of 185.45 acres of mitigation wetlands.

I also examined all 11 mitigation sites constructed by road agencies in the Western U.P. between 2003 and 2006.

Phragmites australis at MDOT's Portage Marsh mitigation site (Delta County).

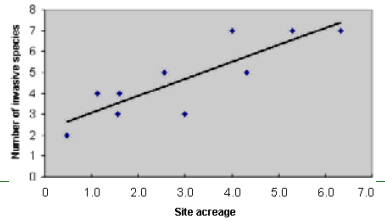
Results
Monitoring Report Compliance

- 54% of the U.P.'s mitigation files were in compliance with monitoring report requirements. Compliance rates for road agencies were highest for MDOT (90%) and lowest for the combined county road commissions (30%).

Results
Invasive Species Compliance

- 5 of 11 (45%) road agency mitigation sites in the Western U.P. were in compliance with DEQ standards for total invasive cover.
- 100% of compliant sites were constructed adjacent to natural wetland ecosystems.
- 80% of non-compliant sites were constructed adjacent to upland forests ecosystems.
- Mitigation site acreage was correlated with both the density and total number of invasive species.

Factor	Compliant sites	Non-compliant sites
Average site acreage	1.8	4.2
Average number of invasives	3.6	5.8
Average density of invasives	6.2%	21.6%



- There were no relationships between invasive species and the age of mitigation sites or their proximity to roads.

Conclusions

- Rates of monitoring report compliance have not improved since similar previous research was conducted in 2003. Site monitoring also appears unrelated to levels of invasive species.
- Most wetland acreage gained through mitigation was created in sites that are not meeting the DEQ's performance standards. As was found by others, it seems "No Net Loss" is resulting in diminished overall quality of wetlands.
- U.P. wetland policy efforts should include greater emphasis on the creation of mitigation sites adjacent to natural wetland ecosystems.

References available by request.

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