



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2003ME19B

Title: Defining 'natural' reference conditions and indicators to assess cumulative impacts of shoreline development on lakes in Maine

Project Type: Research

Focus Categories: Ecology, Non Point Pollution, Recreation

Keywords: Biomonitoring, bioindicators, aquatic plants, lakes, shore protection

Start Date: 04/01/2003

End Date: 03/31/2005

Federal Funds: \$11134.00

Matching Funds: \$51106.00

Congressional District: 2

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Abstract: Maine shoreland zoning regulations were instituted in 1971 to limit development and land cover alteration within 250 feet of the lakeshore. The standards used in the guidelines for the regulations were developed primarily for water quality protection, not for protection of ecologically important littoral and riparian habitats. Human activities in the riparian area have been shown to significantly affect habitat structure and community composition and productivity of littoral dependant species such as fish and macrophytes. However, three decades after shoreline protection regulations were initiated, we still lack a basic understanding of (1) what constitutes a 'natural' shoreline and littoral zone; (2) what constitutes a deviation from this 'natural' state; and (3) whether shoreline zoning is providing adequate protection of Maine's lake ecosystems. This research proposes to begin to answer these questions by developing a protocol for assessing the cumulative impacts of shoreland development on the ecological condition of lake littoral zones. Our focus will be on (1) identifying and testing in-lake habitat and biotic metrics that are sensitive to the cumulative effects of shoreline development intensity and (2) improving our quantification of shoreline development intensity to better reflect the 'footprint' of alterations of near shore zones by humans. We will initially focus on a common lake type in Maine – small to moderate size, headwater drainage lakes in a relatively uniform geologic area – to limit inter-lake variation. The

results of this research will be used to propose future expansion of protocols to include a wider range of lakes and shoreline pressures; address scenarios of future development pressure on hitherto undeveloped lakes; and assess current shoreline zoning regulations.

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Last Modified: Wed May 28, 2003 4:26 PM

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