



Great Lakes Environmental Indicators

EPA STAR EaGLe

Amphibians as Indicators of Great Lakes Basin Condition

Amphibians are relatively new tools in the indicator toolbox, but they are important because they integrate larger scale ecosystem condition, incorporating both adjacent upland and within wetland parameters. We used standardized North American amphibian monitoring protocol to survey calling frogs in over 200 coastal wetlands across the Great Lakes. Our objective was to develop a suite of indicators from these data that could be used to document and assess the condition of coastal wetlands of the Great Lakes. Wetlands were randomly selected and then sampled along a pre-determined disturbance gradient that was defined by physical, chemical and biological stressor data from the study area. We defined the relative condition of coastal wetlands by developing indicators at a variety of spatial scales that were based on either hydrologic models or local land-use surrounding the wetlands at several scales. We found that frogs were more often associated with larger-scale landscape variables than wetland breeding birds. Both groups are therefore useful as indicators of ecological stress because they provide information from different geographic scales. We conclude that the condition of coastal wetlands can be ascertained and annual change can be monitored with national monitoring protocol for calling frogs.

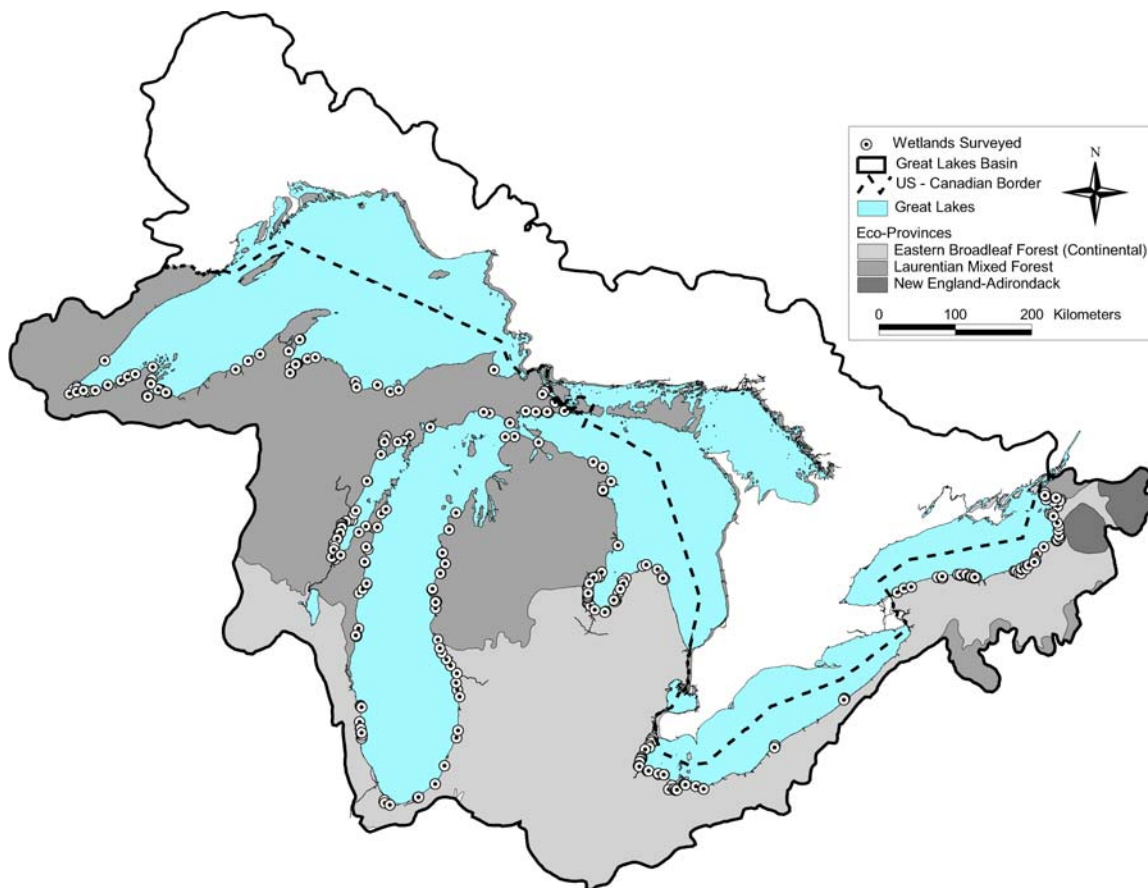


Figure 1. Location of coastal wetlands sampled for amphibians in the Great Lakes.

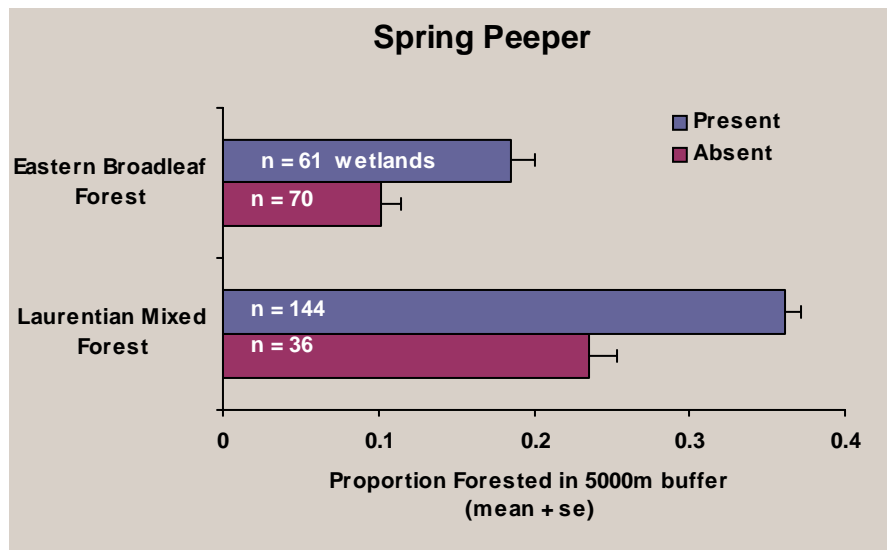


Figure 2. Presence and absence of the spring peeper in Great Lakes coastal wetlands in the Eastern Broadleaf and Laurentian Mixed Forest Provinces relative to the proportion of forest land cover in a 5000 m buffer surrounding the wetland. The spring peeper, which requires upland forest habitat for overwintering, was absent from a wetland when the proportion of forest in the surrounding landscape was less than 12% in the Eastern Broadleaf Forest Province and less than 25% in the Laurentian Mixed Forest Province.

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