

Dragonflies as Indicators of Habitat Integrity in Treed Bogs

Final Report

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Submitted by
Scott Hubley and Tom Herman
Acadia University
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Context

In Nova Scotia, not all wetlands are afforded similar protection from adjacent forestry activity under the Nova Scotia Habitat and Watercourse Protection Regulations. Treed bogs, which are sphagnum-based climax communities dominated by black spruce, do not have inflowing watercourses and as a result are not protected under forest buffer regulations. Little is known about treed bog biodiversity and the effect of adjacent forestry on this diversity.

Project Goals

The goals of this project were to assess the impacts of adjacent forestry on diversity and movements of odonates (dragonflies and damselflies) in treed bogs and to better evaluate odonates as indicators of wetland health in treed bogs.

Work Completed

Surveys for adult odonates took place between June 20 and August 30, 2005 and between May 29 and August 19, 2006. 1745 adult odonates representing 54 species were encountered during surveys of 26 treed bogs located in interior southwest Nova Scotia. This sample comprised ~47% of all known mainland Nova Scotia species, including a number of rare and specialized ones. On average, 11.54 species were found per study site, with richness ranging from 3 and 21 species.

In order to understand the relationship between odonate diversity (species richness, species presence/ absence, species evenness and Shannon-Weiner diversity) and physical bog characteristics (including adjacent forestry activities), various measures were calculated for analysis. These included bog area and perimeter, surface pH and calcium levels, nutrient regimes (poor fen/ true bog), tree density, and measures of forest harvesting and roads.

Canonical Correspondence Analysis (CCA), using the multivariate software CANOCO, was used to determine the influence of particular variables on species presence/ absence.

Multiple logistic models and generalized linear models were employed to generate habitat selection functions for species of odonates where samples sizes

permitted. These statistical methods were used to obtain a finer level of resolution on the impacts of forestry on species that were provided by CCA.

Results

As the results of this project have not been published in a peer-reviewed journal, they will be provided at a later date. Copies of published manuscripts will be provided to the fund when available.

Assessment of Achievements

Due to financial/ resource restraints, odonate movement patterns were not examined in this study. However, the first project goal was extensively explored in the analysis. A better understanding of the effects of forestry (both forest harvesting and road building) on odonate diversity patterns has been reached.

In terms of the second project goal, each individual species was not examined for its utility as an indicator of wetland health, but rare and specialized bog species were examined in the CCA. These species were related with specific physical bog characteristics and disturbance regimes. While not fully explored for all species, the second project goal can be better examined in future analyses with the data collected.

Scientific Communications

- Scott Hubley successfully completed an Honours Thesis at Acadia University entitled "Odonate diversity in treed bogs in Southwest Nova Scotia" in April 2007
- Currently, two articles are being prepared for submission to peer-reviewed journals (expected submission in late 2007)

Recommendations for Future Study

To further inform management decisions, future research should explore the mechanisms through which forest harvesting and roads influence biological diversity in treed bogs. Also, experimental research, using baseline data and trends discovered by this project, is needed to examine the role of forest buffers in mitigating the effects of disturbance on biological diversity and wetland function in treed bog systems.

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