CANADA'S THREATENED ATLANTIC COASTAL PLAIN WETLANDS: HABITAT CHARACTERISTICS AND CONSERVATION CONCERNS

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SUMMARY

Canada's coastal plain vegetation, which includes 22 nationally or globally significant plant taxa, occurs only in southwestern Nova Scotia and in the Georgian Bay area of Ontario. The species occur primarily in sheltered, infertile wetlands and/or on lakeshores exposed to seasonal flooding or wave wash. Coastal plain plants seem well suited to such areas as they have many characteristics of stress tolerant plants. They appear to be restricted to these habitat types by competitively superior plants which occupy more fertile and less disturbed shorelines. The rarity or these species is therefore due to limited habitat, so conservation strategies should emphasize the preservation of remaining habitat and the maintenance of existing levels of infertility, flooding and exposure to waves.

1. INTRODUCTION

1.1 Flora status and Range

Atlantic coastal plain species occur in low lying areas along the eastern seaboard of North America and are particularly abundant in moist or wet habitats (1). Their range extends from the Gulf of Mexico to New England, with disjunct populations occurring in the Great Lakes Basin and in Southern Nova Scotia. Throughout this range, habitat destruction or alteration is reducing population sizes and at least 22 members of the flora are of either global or national significance (1,2).

1.2 Disjunct Canadian Populations

In Canada, populations of coastal plain species are found in only two provinces. In Ontario, the flora occurs only in the south, along lakeshores near Lake Huron (3, Figure 1). There are 23 different coastal plain taxa in this region, 6 of which are nationally significant (2,3). In Nova Scotia, coastal plain plants are more abundant (4,5, Figure 2) with larger population sizes and greater diversity. There are at least 18 nationally or globally significant members of the flora in Nova Scotia, including one endemic (*Euthamia galetorum*) (2).

2. HABITAT CHARACTERISTICS

2.1 Sand and Gravel Lakeshores

One kind of wetland in which coastal plain species are found, has gently sloping sand and gravel lakeshores that experience frequent floods or that are exposed to wind and wave disturbance (6, Figure 3). These disturbances prevent shrubs from invading the shorelines and keep soil fertility low (1,7). Coastal plain lakeshores are infertile, as is evident from measures of soil nutrients (8), from the low levels of standing crop that occur (6,9) and from the abundance of carnivorous plants (4,6,9), a group of species which indicate infertility (10). Members of the coastal plain flora that occur along lakeshores include *Euthamia*

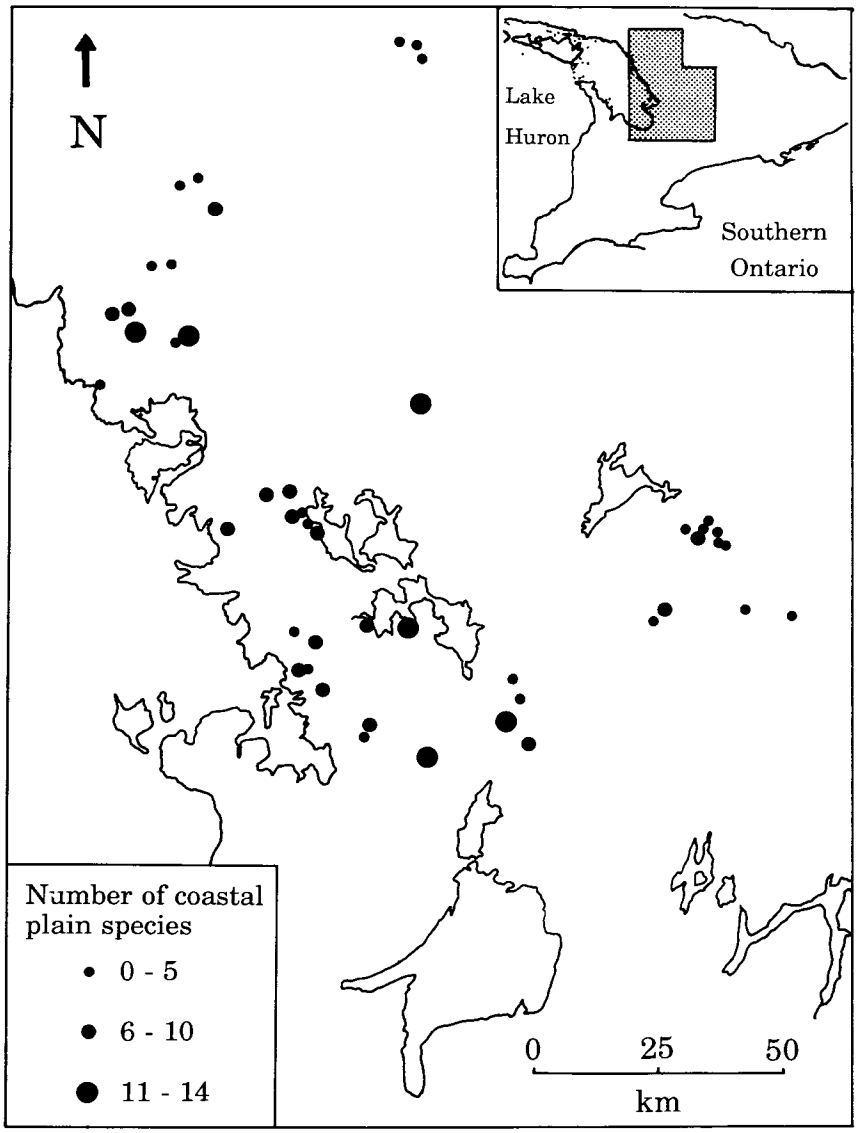

Figure 1. The distribution of Atlantic coastal plain species in Ontario.
After Keddy and Sharp, 1989 (3)

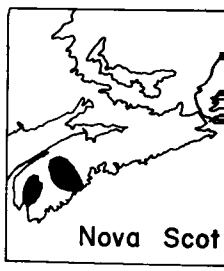

Figure 2. Atlantic coastal plai
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2.2 Peat and Grassy Sw

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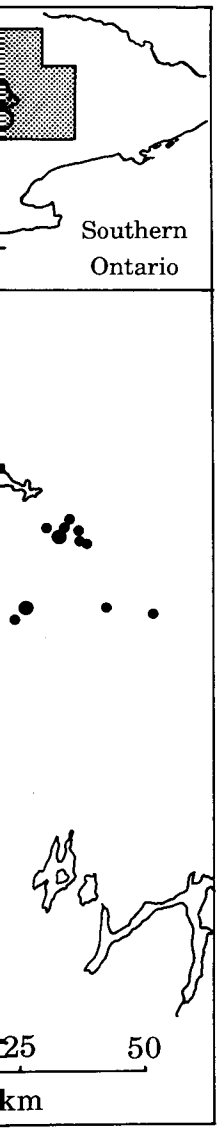

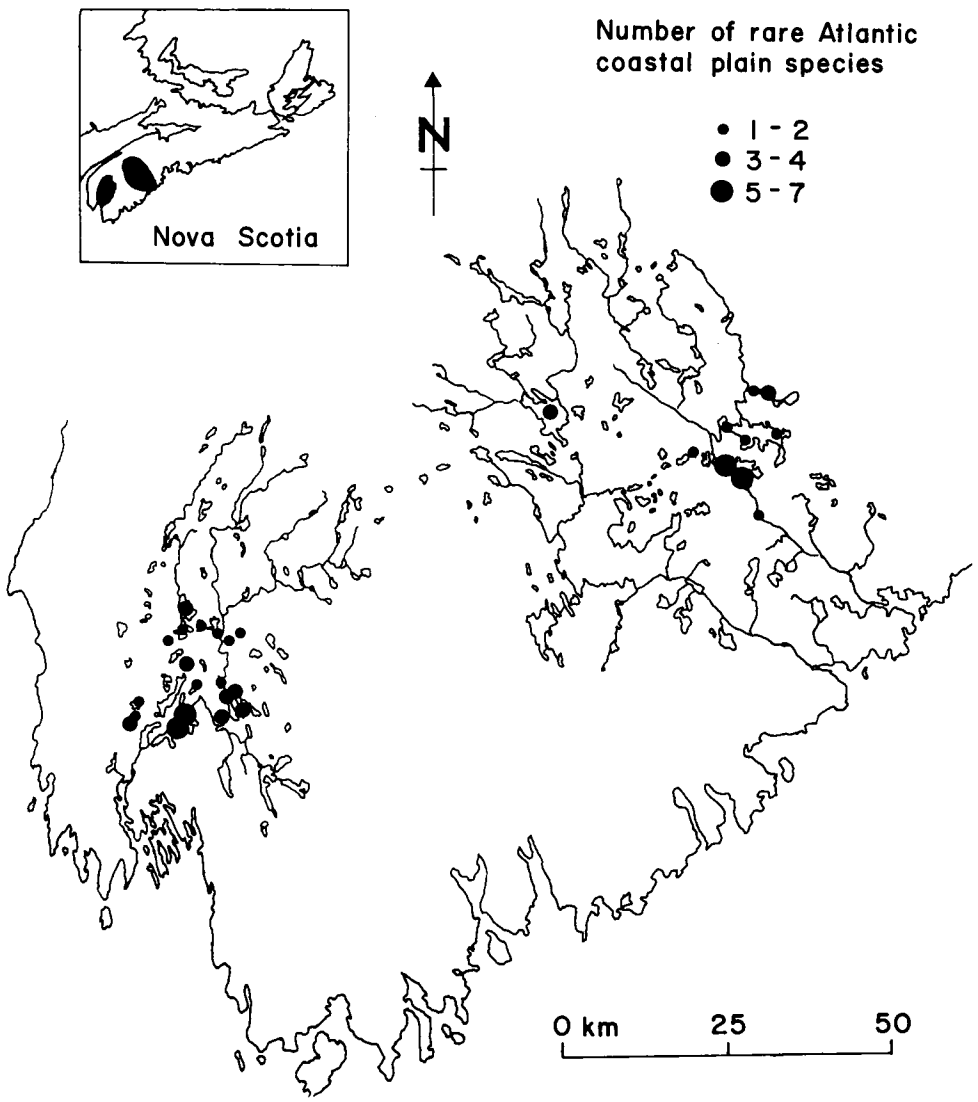

Figure 2. Atlantic coastal plain species in Nova Scotia are most abundant along the Tusket and Medway River systems. After Wisheu et al. (submitted) and Hill and Keddy (accepted) (4,5)

galetorum, *Rhexia virginica*, *Lachnanthes caroliana*, *Sabatia kennedyana* and *Coreopsis rosea*. In Ontario, most known occurrences of coastal plain vegetation are from sand and gravel lakeshores.

2.2 Peat and Grassy Swales

A second kind of coastal plain habitat are sheltered peaty areas, either lakeshores, grassy swales or bogs (Figure 4). These are infertile areas, as indicated by the presence of carnivorous plants (10). Infertility appears to be maintained by periodic flooding, but fire

and/or muskrat grazing may also act to remove organic matter (11). Coastal plain species that occur in peaty or grassy regions include *Drosera filiformis*, *Scirpus longii*, and *Lophiola aurea*. The last species also occurs along open lakeshores.

3. THE COASTAL PLAIN FLORA

3.1 Stress tolerance

Members of the coastal plain flora seem to be especially suited to the infertile and frequently flooded habitats in which they occur. Most of the species are small plants and they often grow as rosettes — a shape and size that make them resilient to wave wash (12). Also, their adaptations for slow growth rates and their evergreen or carnivorous habits facilitate survival during long periods of submergence or in nutrient-poor soil (6). Species with these same characteristics have previously been classified as stress tolerators (13,14).

3.2 Low competitive abilities

Coastal plain species occur on infertile substrate, but transplant experiments in Ontario have indicated that they need not be restricted to such areas (15,16). When transferred to fertile soil, both *Xyris difformis* and *Rhexia virginica* grew larger. Coastal plain plants are able to grow in fertile areas, but they are restricted from doing so apparently because they are unable to co-exist with competitively superior species which normally inhabit fertile regions. In a recent screening of the competitive abilities of 44 different wetland plants, coastal plain species and the species with which they co-occur were found to have very low competitive abilities (17,18).

4. CONSERVATION CONCERNS

4.1 Eutrophication

If eutrophication were to increase the fertility of coastal plain habitat, then competitively superior species that normally occupy fertile sites would invade and outcompete the smaller, slower growing coastal plain plants. This invasion by dominant non-native species following eutrophication has already been observed in coastal plain wetlands in the New Jersey Pine Barrens (19). Agricultural and residential development has enriched the wetlands, and there has been an increase in nutrient-demanding, competitively dominant non-native species and a decrease in carnivorous and native coastal plain plants (19, Table 1).

TABLE 1

Numbers of plant species in pristine and enriched Atlantic coastal plain wetlands in the Pine Barrens, New Jersey. From Ehrenfeld, 1983 (19)

	No. of species	% carnivorous	% non-native	% nutrient-demanding, woody
Pristine site	26	12	12	0
Enriched site	72[1]	0	96	12

[1] Actual count was 73. One species was unidentifiable as to being native or non-native.

Figure 3. Wilsons lake, a
of Atlantic coastal plain

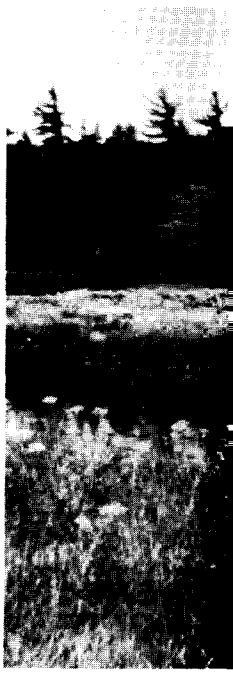

Figure 4. A large popu

Figure 3. Wilsons lake, a sand and gravel lakeshore in the Tusket River system, supports large populations of Atlantic coastal plain plants. (Reprinted with permission from Wisheu and Keddy 1989 (6)).

Figure 4. A large population of *Lophiola aurea* occurs in a peat bog at Fancy Lake, Nova Scotia.

4.2 Water stabilization

In both Ontario and in Nova Scotia, coastal plain habitat is often maintained by exposure to wind and waves or by fluctuating water levels. Waves and high water periods wash out organic matter and kill invading shrubs, which would eventually outcompete the rare coastal plain plants (7,16). Low water periods allow the flora to regenerate from seed, a phenomenon that is critical in Ontario and New Jersey (20,21), but of lesser importance in Nova Scotia (22). The strong relationship between large fluctuations in water levels and the occurrence of coastal plain plants has been documented repeatedly (1,5). It can be predicted then, that either eutrophication or the stabilization of water levels would further decrease the already endangered populations of Atlantic coastal plain species.

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SUMMARY

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1. INTRODUCTION

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Our research focuses
in isolated patches and we
review the conservation s
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2. ALVAR VEGETATIO

2.1 Definition

An alvar is an area wi
vegetation (3,4), ranging f
of mixed forest where the
naturally maintained by a
Owing to poor drainage,
drought only a few month

2.2 Distribution

Alvars have a limited
in the Eastern United Sta
Sweden) alvars are large a
occurs in New York (6) ar
known as cedar glades. I
Ontario (Fig. 1) in three
Peninsula region near Lak