A System for Urban Wildlife Habitat Restoration

Marshall Buchanan, M.Sc.F., R.P.F.

Neighbourhood Environmental Science & Technology (NEST)

ABSTRACT

NEST is an environmental consulting firm which specializes in community oriented forest science. Clients include non-profit environmental groups such as Grassroots Albany, the Association for Community Educational Resources (ACER), Thomas Simpson Secondary School, N.W.T, Gwich'in Renewable Resources Board, Inuvik, N.W.T. and the Eastern Ontario Model Forest. Typical government clients include the Rouge Park, Environment Canada, the Regional Municipailty of York and the Ontario Forest Research Institiute. NEST also devotes considerable effort to provide forestry expertise to owners of small privately owned forests (10 acres) to large private resorts such as the Domain of Killien (5,000 acres). Conservation is the cornerstone of our philosophy. NEST is an active member of Canada's Environmental Monitoring and Assessment Network (EMAN).

The lack of habitat structure in urban greenspaces landscapes severely limits opportunities for wildlife to successfully forage, breed, and seek shelter. Recent research suggests that landscape structure may be more important to wildlife than the presence of a particular species of plant. NEST has therefore attempted to create a holistic approach to urban restoration by combining revegetation with habitat structures such as coarse woody debris, snake hibernacula, cavity snags, and raptor roosts. Together these habitat components provide an immediate network of sheltering and feeding opportunities for wildlife at both lower and upper positions in the food web. Functional habitat is created in this holistic approach to restoration because landscape structure is integrated with revegetation. From an educational point of view, this system provides and excellent model for teaching students about forest dynamics and the importance of decomposition to forest renewal and the cycle of life.

Introduction

After working on community reforestation projects for 10 years in the Rouge Park, NEST has developed a system for improving the immediate and long-term benefits of community restoration projects to wildlife. This holistic approach combines community based revegetation with a set of landscape structures to provide habitat for a hierarchy of wild fauna. The intent is to restore habitat features which support wildlife at different trophic levels to create functional, effective and self-sustaining wildlife habitat. This approach has been applied to 3 different locations in the Rouge Park , most recently in an abandonned farm field 500 metres south of Steeles Avenue on the east side of Sewells Road in Scarborough.

Habitat Features

Vegetation

The re-vegetation strategy followed the "nucleation" technique. Circular patches (20 - 25 metres in diameter) were plowed and then tilled with a tractor mounted rotary tiller. Pioneer species such as poplar were planted at high densities within these patches. The roto-tilling greatly improved the quality of the planting job performed by volunteers. Plowing without tilling usually leaves furrows which can flood and drown seedlings. On tilled

patches, the planters dug large holes with relative ease and they packed the loosened soil around seedling roots without leaving the air spaces that cause root desiccation. Roto-tilling also improved short-term weed control and provided a level surface for the placement of cardboard brush mats. Approximately 150 bales of straw were spread over the brush mats and exposed mineral soil to enhance weed control and reduce moisture stress. Native wildflowers were hand seeded directly to roto-tilled soil in designated meadow areas such as the hydro and oil pipeline right-of-way.

Cavity Snags

Snags (standing dead trees) were installed at the center of selected nuclei (see map next page). The intensive reforestation of these patches will quickly shelter the snag and enhance the habitat it provides. They provide vertical structure to the landscape and provide nesting and foraging structures for birds. Two or three cavities (2" in diameter) were excavated in the snags at different orientations and heights to provide nesting and foraging opportunities for birds such as tree swallows, wrens, bluebirds, shrikes, red-headed woodpeckers, flickers, etc. So far tree swallows and wrens are the most frequent nesters in the cavity snags although bluebirds and flickers have been observed "investigating" the cavities.

As the planted seedlings grow around the snags, interior forest habitat will be created which will provide opportunities for different birds and small mammals such as flying squirrels. The snags also provide unique visual appeal. The sight of fourteen snags standing in the regenerating area helps one imagine the forest that previously dominated the landscape.

Coarse Woody Debris

Approximately 40,000 pounds of culled hardwood logs from Tembec Inc. (Huntsville Division) were used as a source of coarse woody debris for this project. Fallen trees and decaying logs play an important role in forest ecosystems. Within the food web, they represent both the end and the beginning. Decaying logs enrich the soil while providing food for many organisms near the bottom of the food web. Organisms such as fungi, invertebrates, arthropods and insects occupy this trophic level. At the same time, deadwood provides nesting and foraging areas for amphibians and small mammals such as weasels, mice and meadow voles. The coarse woody debris was positioned to create travel corridors between planted patches and to create small log piles suitable for shelter, mating displays, and feeding. Eastern bluebirds were observed foraging for insects on the ground and then crushing the exoskeletons of their prey on the hard surfaces of downed logs.

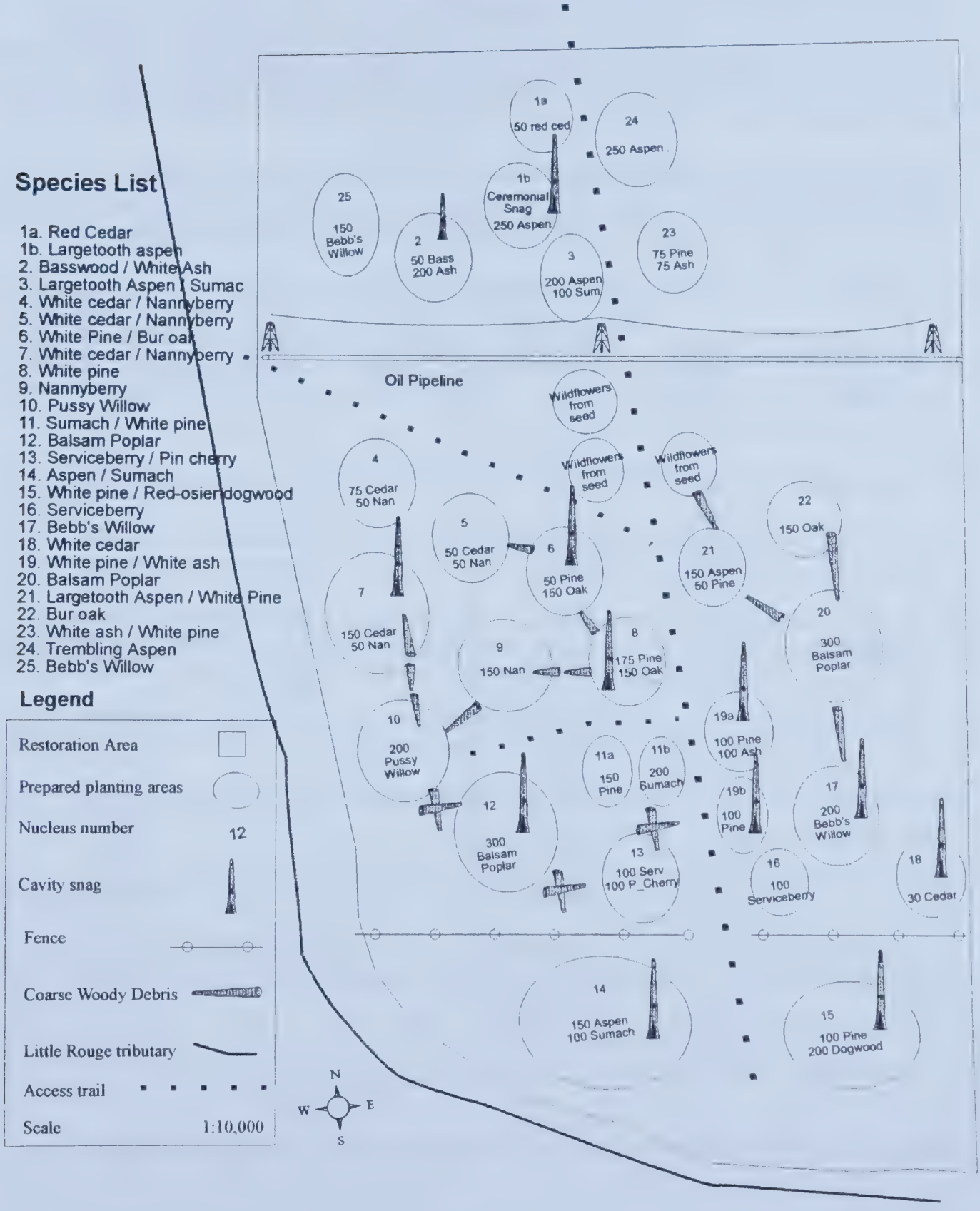
Snake Hibernaculum

Snakes are probably the most important reptiles in old field ecosystems. During the summer, these ground level predators will directly benefit from the habitat and food generated by the coarse woody debris. During the winter however, snakes are in danger of dehydrating and/or freezing. As a result, a snake hibernaculum was built on the site. The structure is a stone and wood complex which allows snakes to overwinter underground in a moist environment protected from freezing temperatures. The temperature and moisture level within the hibernaculum can be monitored through a plastic tube installed in the structure.

Raptor Nesting Snag

One 22 foot snag suitable for nesting raptors (i.e. buteos, accipiters, harriers, ospreys) was also erected on the site. Passerines have also been seen roosting on this snag during hot afternoons. They perch facing into the wind, perhaps trying to stay cool.

Planting and Habitat Structure Plan



Education/Research/Monitoring

Long term monitoring of wildlife activity on the site will generate feedback concerning the success of this initiative. Birds are a popular group of species and many volunteers enjoy watching and recording their movements on restoration areas. The variety of birds observed during preliminary surveys of this site are listed in Table 1 below. Pitfall traps have been installed on the site to sample populations of ground fauna. Due to the the addition of the coarse woody debris and the concentration of tree planting in circular patches, we expect to detect differences in the diversity and abundance of arthropods on the site.

By combining the installation of these habitat features with the 10,000 Trees for the Rouge planting event, approximately 1,000 members of the general public learned about some of the specific characteristics of a forest that are essential to the survival of salamanders, snakes, frogs, woodpeckers, songbirds and raptors.

Order	Family	Common Name	Order	Family	Common Name
Ciconiiformes	Ardeidae *(Herons)*	Great blue heron	Passeriformes (continued)	Mimidae *(Mimic thrushes)*	Gray catbird
Anseriformes	Anatidae *(Waterfowl)*	Canada goose		Turdidae *(Thrushes)*	Robin
		Mallard duck			Eastern bluebird
Falconiformes	Cathartidae *(Vultures)*	Turkey vulture		Bombycillidae *(Waxwings)*	Cedar waxwing
	Buteoninae *(Buteos)*	Red-tailed hawk		Sturnidae *(Starlings)*	European Starling
Columbiformes	Columbidae *(Pigeons, Doves)*	Mourning dove		Parulidae *(Wood warblers)*	Common Yellowthroat
Piciformes	Picidae *(Woodpeckers)*	Common flicker		Icteridae *(Blackbirds)*	Bobolink
		Downy woodpecker			Eastern Meadowlark
Passeriformes	Tyrannidae *(Flycatchers)*	Eastern kingbird			Red-winged blackbird
		Alder flycatcher			Baltimore oriole
	Hirundinidae *(Swallows)*	Tree swallow			Common grackle
	Corvidae *(Jays, Crows)*	Blue jay			Brown-headed cowbird
		American Crow		Fringillidae *(Finches)*	American goldfinch
	Paridae *(Titmice)*	Black-capped Chickadee			Savannah sparrow
	Troglodytidae *(Wrens)*	House wren			Song sparrow

Table 1. Partial list of birds observed on the restoration site during preliminary monitoring surveys.

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Canadian Land Reclamation Association
Box 61047, Kensington P.O.
Calgary, Alberta
T2N 4S6

Society for Ecological Restoration, Ontario Chapter
Environmental and Resource Studies Program
Trent University
Peterborough, Ontario K9J 7B8

ISSN 0705-5927

Reclamation and Restoration of Settled Landscapes

September 27th – 30th, 1998
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The is report may be cited as;

Reclamation and Restoration of Settled Landscapes, 1998. Proceedings of the 23rd Annual Meeting, Canadian Land Reclamation Association in association with the Society for Ecolgocial Restoration Ontario Chapter, Markham, Ontario.

ACKNOWLEDGEMENTS

The Society for Ecological Restoration Ontario Chapter and the Canadian Land Reclamation Association would like the acknowledge the assistance of Sir Sandford Fleming College in the production of these proceedings.

The Associations would also like to thank the companies and associations that generously sponsored the conference:

Aggregate Producers' Association of Ontario
Aquaphyte Remediation
Beak International
Dufferin Aggregates
Environment Canada
Ecological Services Group
J.C. Duff Limited Sand and Gravel
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