CHAPTER 1.0
INTRODUCTION

1.0 INTRODUCTION

1.1 The State of Natural Areas Project

The City of Edmonton's Office of Natural Areas has been steadily working towards a comprehensive conservation plan focusing on protection of Natural Areas within the City boundaries. In early 2006, the Office of Natural Areas launched the Integrated Natural Areas Conservation Plan, a project designed to provide the information, support and tools necessary to accomplish that goal. The project comprises three sequential components that will create a plan based on the best available science, comprehensive public involvement, and an informed and involved Council and administration. This strategic conservation plan will consider Edmonton's Natural Areas in the regional context and, importantly, includes development of a companion implementation plan. In February 2006, the Office of Natural Areas released a Request for Proposals for Component 1 of that overarching project: The State of Natural Areas Project. The City of Edmonton retained Spencer Environmental Management Services Ltd. to prepare Component 1 of the Integrated Natural Areas Conservation Plan.

The State of Natural Areas Project was intended to provide a solid foundation of information, analysis and presentation materials for future conservation planning components. The deliverables from this project will be used directly in a wide variety of settings including administration meetings and at public fora, during subsequent conservation planning components and beyond. The products must, therefore, be flexible in format and appeal to a broad spectrum of Edmontonians. The State of Natural Areas project was divided into three main objectives, each of which will be summarized in a stand-alone report describing the resulting products and analyses:

- Objective 1: Conservation Mapping Using Existing Data Sources
- Objective 2: Landscape Linkages/Connectivity Analysis
- Objective 3: Natural Areas Systems Analysis.

This report documents the materials and methods used to prepare the Geographical Information Systems (GIS) map products related to Objective 2, and interprets the results of subsequent analyses on them. While Objective 1 updated the Natural Areas mapping for the City, resulting in one integrated system of the identified Natural Areas occurring throughout the City, including the river valley, this part of the study assessed the extent to which the Natural Areas and other forms of greenspace currently form a connected ecological network. Mapping in Objective 1 indicated that Edmonton's Natural Areas, particularly those on the tablelands, are typically small patches (with some very large exceptions) within a relatively developed landscape. Their sustainability will depend on their connections to each other and to other, larger Natural Areas outside of the City, i.e. the connectivity of Edmonton's landscape. Understanding the status of the network as it currently exists, the degree of connectivity, and the opportunities for restoration or enhancement will be critical to maintaining ecologically viable Natural Areas within the City.

1.2 Goals of Objective 2

The City of Edmonton, in its approach to development of a Conservation Plan recognizes that landscape patterns that promote connectivity for species, communities and ecological processes are a key element of nature conservation in environments modified by human impacts (Bennett 2003). As an intermediate step to that end, the goal of Objective 2 of this project was to analyze the landscape linkages and connectivity within the City of Edmonton and identify and map an ecological network for Edmonton. Hilty *et al.* (2006) concisely point out that an ecological network is a potential means to achieve connectivity.

Connectivity is a measure of the extent to which plants and animals can move between Habitat Patches (Hilty *et al.* 2006). Put slightly differently, it is the degree to which the landscape facilitates or impedes movement among resources patches (Taylor *et al.* 1993). Landscapes are perceived differently by different species and there is great variability in species requirements for movement, their abilities to move and the strategies employed to do so. Thus, what represents high connectivity for one species (or process such as dispersal) may be moderate or low connectivity for another. In assessing connectivity, it is critical to acknowledge that connectivity is related to a particular process or species of focus (Hilty *et al.* 2006).

There are two main components that influence potential connectivity for a particular species, community or process - a structural component and a behavioral, or functional, component (Bennett 1990a *in* Bennett 2003). The structural component is determined by the spatial arrangement of different types of habitat in a landscape. The functional component of connectivity relates to the behavioral response of individuals and species to the physical structure of the landscape. Ultimately, for animals, functional connectivity relates to the choices species make in selecting travel routes based on their unique behavioral requirements. While the City's request for proposals indicated it was most interested in the structural component, our proposal put forward means of addressing both. Our functional connectivity analysis recognized that many wildlife species appear to have a "gap crossing tolerance" that allows them to cross open areas separating patches of suitable habitat. The use of gap tolerances allowed us to model functional connectivity for several indicator species representative of a larger suite of species with similar requirements.

This report outlines the methods and background information used to analyze connectivity, to identify Edmonton's Ecological Network and to develop the associated map products. Lastly, it provides interpretation of the analysis results in the context of future management opportunities.

1.3 Report Organization

The report presents an overview of the broader study context of the State of Natural Areas project, and more specific goals of this second objective of the project (Chapter 1). The methods used to conduct the connectivity analyses are outlined in Chapter 2. The

results of these analyses follow in Chapter 3, with some discussion on the interpretation and limitations of the analyses. Chapter 4 concludes with recommendations relevant to the overall Integrated Natural Areas Conservation Plan. References cited in the report are supplied in Chapter 5 and supporting information relevant to analyses is provided in three supporting Appendices, one of which includes a glossary of terms used in this report.