ȻENIN̲ETEL A,ÍT E TɎE TEN̲EW̲

‘Helping each other take care of the land’

An Ethnoecological Approach to Restoring the Coastal Dune Ecosystem of ȾIX̲EN̲ and Island View Beach

By:

Raymond Glenn Bartley

B.E.S., University of Waterloo, 2005

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of

MASTER OF SCIENCE

In the School of Environmental Studies

ȻENIN̲ETEL A,ÍT E TɬE TEN̲EW̲

‘Helping each other take care of the land’

An Ethnoecological Approach to Restoring the Coastal Dune Ecosystem of ƛIX̲EN̲ and Island View Beach

By

Raymond Glenn Bartley
B.E.S., University of Waterloo, 2005

Supervisory Committee

Dr. Eric Higgs (School of Environmental Studies)
Supervisor

Dr. Valentin Schaefer (School of Environmental Studies)
Co-Supervisor

Dr. Nancy Turner (School of Environmental Studies)
Departmental Member

Robin Gregory (University of Victoria; Adjunct Associate Professor)
Committee Member

Abstract

Supervisory Committee

Dr. Eric Higgs (School of Environmental Studies)
Supervisor

Dr. Valentin Schaefer (School of Environmental Studies)
Co-Supervisor

Dr. Nancy Turner (School of Environmental Studies)
Departmental Member

Robin Gregory (University of Victoria; Adjunct Associate Professor)
Committee Member

This study focuses on the ecological restoration of a coastal dune ecosystem on the east coast of Vancouver Island that supports bird migration. The area is also a part of the traditional homelands of the Tsawout First Nation. Because environmental degradation has impaired the functioning of both ecological and cultural systems, the restoration of this ecosystem requires a distinctive approach. An "ethnoecological" approach to restoration is presented that seeks collaboration between ecological science and traditional ecological knowledge in order to restore the ecological integrity and human connection to this culturally significant landscape. Guided by the values of the Tsawout community, and the practice of good ecological restoration, I make recommendations for short and long term restoration actions. A set of ethnoecological restoration guidelines are presented to help guide future projects with the dual mandate of ecology and culture. Finally, opportunities for making connections between this project and other regional initiatives are explored in an attempt to restore links in the migratory habitat chain.

Key Words: Migratory birds, migratory bird conservation, habitat restoration, First Nations, Tsawout, Saanich, Vancouver Island, British Columbia, ethnoecological restoration.

Table of Contents

Supervisory Committee ii
Abstract iii
Table of Contents iv
List of Tables vi
List of Figures vii
List of Appendices viii
Glossary of Terms ix
SENĆOŦEN Pronunciation ix
Acknowledgements x
Introduction 1
Study Objectives 2
Study Framework 4
Chapter 1: Background and Context 5
1.1 Study Partners 5
1.1.1 The Tsawout First Nation 5
1.1.2 The Capital Regional District 8
1.1.3 The Canadian Wildlife Service 8
1.1.4 Additional Study Partners and Collaborators 10
1.2 Description of ȾIX̱EN̲ and Island View Beach 11
1.2.1 Site Location and General Description 11
1.2.2 Structure and Function of Dune Ecosystems 12
1.2.3 Significance of Dune Ecosystems 17
1.3 Migratory Birds & Migratory Bird Conservation 30
1.3.1 Migratory Birds 30
1.3.2 Avian Migration & The Need for Stopover Sites 31
1.3.3 Declines in Migratory Bird Populations 33
1.3.4 Evidence from the Breeding Bird Survey 34
1.3.5 Reasons for Decline 36
1.3.6 Migratory Bird Conservaion & the Need for Restoration 38
Chapter 2: Ethnoecological Restoration 41
2.1 Characterizing Good Ecological Restoration 41
2.1.1 Defining Ecological Restoration 48
2.2 The Restoration of Culturally Significant Landscapes 49
2.2.1 Traditional Ecological Knowledge (TEK) 49
2.2.2 Comparing TEK & Western Science 50
2.2.3 TEK and Ecological Restoration 52
2.3 An Ethnoecological Approach to Restoration at ȾIX̱EN̲ 56
2.3.1 Defining Ethnoecological Restoration 58
2.3.2 The Foundations of Ethnoecological Restoration 59
Chapter 3: Project Methods 62
3.1 Literature Review and Networking 62
3.2 Ecological Site Inventory 63
3.3 Avian Inventory 65
3.4 Community Interviews and Participation 68
3.5 Analysis and Validity 70
Chapter 4: Results 72
4.1 Community and Working Group Interviews 72

4.2 Inventory of Human Influence 74
4.3 Avian Inventory 74
4.4 Additional Supportive Studies 88
4.4.1 Terrestrial Ecosystem Mapping 88
4.4.2 Rare and Culturally Significant Vegetation Inventory 88
Chapter 5: The Restoration of ʔIXEN and Island View Beach 90
5.1 The Journey towards Restoration 90
5.1.1 Getting Started 97
5.1.2 Identifying Values 100
5.1.3 Taking Action: Preliminary Activities 106
5.2 Guidelines for Ethnoecological Restoration 116
5.2.1 Explanation of Guidelines for Ethnoecological Restoration 119
5.3 Making Connections 124
5.3.1 Community Engagement 125
5.3.2 Regional Connections 134
5.3.3 Global Partnerships for Migratory Birds 140
Chapter 6: Conclusions 143
6.1 Looking Forward: Having a Long-term Vision for the Land 144
6.2 Evaluating the Process of Ethnoecological Restoration at ʔIXEN 150
6.3 Stakeholder Objectives 153
6.4 Recommendations for Future Study 155
Personal Communications 156
References 156

List of Tables

Table 1.1: Rare Plant Species Associated with ȾIX̱EṈ and Island View Beach 19
Table 1.2: Selection of Migratory Birds found at ȾIX̱EṈ and Island View Beach 23
Table 1.3: Five Theories Surrounding the Origin of Migration 32
Table 1.4: Trends from the North American Breeding Bird Survey 35
Table 2.1: Comparing Western Science and Traditional Ecological Knowledge 51
Table 2.2: TEK and Ecological Restoration in Action 55
Table 2.3: Turner's 8 Elements of Eco-cultural Restoration 57
Table 3.1: Explanation of Mapping Categories 65
Table 4.1: Chi Square Results for Killdeer in Three Dune Habitat Areas 75
Table 4.2: Interview Summary Table 76
Table 4.3: Summary of Human Influences 79
Table 4.4: Focal Avian Species 85
Table 4.5: Rare Plant Species Documented at ȾIX̱EṈ and Island View Beach 88
Table 4.6: Culturally Significant Plant Species Documented at ȾIX̱EṈ 89
Table 5.1: Values, Threats and Goals 104
Table 5.2: Preliminary Restoration Actions 110
Table 6.1: Long Term Restoration Actions 145
Table 6.2 Summary of achievements and reflections based on objectives 152

List of Figures

Figure 1.1: Tsawout Traditional Territory 7
Figure 1.2: Map of Study Site 12
Figure 1.3: Typical Sand Dune Cross Section 15
Figure 1.4: Sand Dune Ecosystem at ȾIꞰEN 16
Figure 1.5: Coastal Dune Ecosystems in British Columbia 18
Figure 1.6: Abronia latifolia (Yellow Sand Verbena) 20
Figure 1.7: Ecologically and Culturally Significant Plants of ȾIꞰEN 21
Figure 1.8: Migratory Shorebirds of 25
Figure 1.9: Branta bernicla (Brant) 26
Figure 1.10: Eremophila alpestris (Horned Lark) 26
Figure 1.11: Seabirds of the Sidney Channel 27
Figure 1.12: Nesting Osprey (Pandion haliaetus) 28
Figure 3.1: Avian Monitoring Sections 67
Figure 4.1: Adverse Impacts at ȾIꞰEN and Island View Beach 75
Figure 4.2: Human Influences Map 83
Figure 4.3: Historic Draining and Filling of Island View Beach 84
Figure 5.1: Two Steps Forward – One Step Back 95
Figure 5.2: Expansion of Oceanside RV Resort 96
Figure 5.3: Autogenic Restoration at ȾIꞰEN 105
Figure 5.4: Regulatory Signs at ȾIꞰEN 115
Figure 5.5: Guidelines for Ethnoecological Restoration 118
Figure 5.6: ȾIꞰEN: A Special Place 126
Figure 5.7: Earth Day 130
Figure 5.8: Tsawout Seafood Festival 132
Figure 5.9: Partnership Recognition 133
Figure 5.10: Brant Festival Brochure 137
Figure 5.11: Raincoast Education Society Sign 138
Figure 5.12: Raincoast Education Society Shorebird Materials 139
Figure 6.1: Recommended Restoration Initiatives 149

List of Appendices

APPENDIX A – HREB Certificate of Approval 168
APPENDIX B – Interview Questions.....169
APPENDIX C – HREB Letter of Informed Consent.....170
APPENDIX D – Complete Interview Transcripts.....172
APPENDIX E – Earth Day Handout.....184
APPENDIX F – Times Columnist Newspaper: Earth Day Article 186
APPENDIX G – Complete Results of Avian Inventory 187
APPENDIX H - Management Actions for Rare and Endangered Species.....196
APPENDIX I - Regional and Global Conservation Initiatives 198

Glossary of Terms

BBS - Breeding Bird Survey

BC CDC – British Columbia Conservation Data Center

BC MOE – British Columbia Ministry of Environment

CBC - Christmas Bird Count

CBD - Convention on Biological Diversity

CBSPWG - The Cordova Bay Spit Project Working Group

COSEWIC - Committee on the Status of Endangered Wildlife in Canada

CRD - Capital Regional District

CWS – Canadian Wildlife Service

IBA - Important Bird Area

IVB or IVBRP – Island View Beach Regional Park

PIF – Partners in Flight

SARA - Species at Risk Act

SER - The Society for Ecological Restoration

TEK or TEKW - Traditional Ecological Knowledge and Wisdom

UVic – The University of Victoria

VNHS - Victoria Natural History Society

SENĆOŦEN Pronunciation

ȻENIN̲ETEL A,ÍT E TŦE TEN̲EW – pronounced: “kwuh-ning-utul ey-it uh tthe tung-uwh”

KEXMIN - pronounced: "Kq-uh-kqh-m-i-n"

ƛIX̲EN̲ - pronounced: "th-i-qho-ung"

SENĆOŦEN – pronounced – “sen-choth-en”

Tsawout – pronounced “say-out”

Acknowledgements

It has been an absolute pleasure to work with so many wonderful new friends towards this project. Before I mention some of the individuals who have made this journey such a positive one, I want to first thank the Tsawout community for welcoming me to their territory, sharing their time, knowledge and values, and allowing me the freedom to conduct my research in an unrestricted and adaptive manner.

There is no way that this thesis would have been possible without the tremendous support of, and contributions from, individual members of the Tsawout First Nation and University of Victoria. More specifically I have to thank Ken Cossey for his solid leadership, Gwen Underwood for her wonderful ideas and for putting up with all of my emails, Susan Anderson-Behn for her compassion and for her ongoing support of my research. I want to thank Dan Claxton for his guidance in working within the Tsawout community and for his friendship. I would also like to thank Tom Wood of the Canadian Wildlife Service for introducing me to what has been such a wonderful project. I must also thank the Tsawout Lands Committee and Chief and Council Committee for their support, feedback, and encouragement.

I am very thankful to the members of the Tsawout community who agreed to be interviewed for this project and who took the time to share their knowledge, opinions and values with me. I am especially grateful for the wisdom of Ray Sam, Belinda Claxton and Earl Claxton Jr. who provided continuous guidance for me throughout the journey towards restoration.

I want to recognize the support of the students and staff of the UVic School of Environmental Studies. In particular, a huge thank you goes out to all the volunteers from the school that made Earth Day such a success. We could not have done it without you! I must also thank UVic linguistics student Janet Leonard who helped to provide the SENĆOŦEN translations for this thesis and for the ȾIX̱EN̲ book project.

I am so grateful to the following organizations who provided financial support towards the completion of my studies: Social Sciences and Humanities Research Council, UVic Presidents Research Award, Pacific Century Scholarship, MITACS Partnership Grant (a special thanks to Duncan Phillips), Sarah Spencer Research Award and the Tsawout First Nation Lands Department.

A special thank you goes out to my family for their unwavering support of all my endeavors. Whether chasing birds in the jungles of some far off place, hitting the books at Uvic, or taking on whatever lies ahead I know I can always count on your love.

I could not have asked for a better, or more supportive, graduate committee. Thank you to Robin Gregory for his experience and words of wisdom along the way. Thank you to Nancy Turner for her unwavering kindness, compassion and knowledge. Thank you to my co-supervisor Val Schaefer for keeping me on track, for his positive attitude and for being so free with his boisterous laughter that always makes me smile. Lastly, I would like to thank my supervisor Eric Higgs who helped me to slow down and think about a different approach to ecological restoration. You promised me at the start of this journey that we would have good conversations - indeed we did.

Over the past two years of working on this project I found inspiration and encouragement from so many kind people. To those who I have not mentioned here I would like to thank you all for sharing your knowledge and for having faith in me to use these precious gifts in this thesis.

Finally, I would like to thank the youth of the Tsawout community for caring for ʔIX̱EN̲ long into the future as I know they will.

Introduction

Migratory birds represent one of the truly unifying phenomena in the natural world and exemplify the interconnectedness of the planet that we all share. They also represent one of the most visible indicators of the consequences that we have imposed upon the global environment. They illustrate how our collective human impacts have adversely affected the integrity of ecosystems and how we have threatened global biodiversity (e.g. Chapin et al., 2000, Butchart et al., 2004). In fact, in large part due to their migratory nature, many species of birds have proven especially susceptible to these impacts (e.g. Robbins et al., 1989; Drut & Buchanan. 2000; Morrison, 2001; Butchart et al., 2004; Fernandez et al., 2006). As a result, declines in migratory bird populations have not been limited to a few species, but rather to a multitude of species across a variety of taxonomic groups and ecological habitats. Their common decline throughout the world reminds us of the need to look past political boundaries and work towards making connections for conservation.

The conservation of migratory birds in the Western Hemisphere will require the protection of habitat in breeding and wintering grounds as well as at key stopover points throughout the migratory landscape (e.g. Robinson, 1998). However, in many cases the network of migration stopover sites has become so fragmented that the mere conservation of habitat is no longer a viable option (Stutchbury, 2007). In such situations, the science and practice of ecological restoration offers the potential to heal some of the damage done to natural landscapes and bird migration corridors. Key habitats can be restored so that they may once again effectively support bird migration. In most cases however, site specific efforts alone will not be enough to address the enormity of the migratory bird crisis. Instead, addressing the needs of migratory birds will require collaborative efforts among groups and nations along entire migratory corridors (Carter et al., 2000; Hartasanchez et al., 2005; Blancher et al., 2006; Baxter, 2005, Brackett, 2005; Elliott et al., 2005).

This study focuses on the ecological restoration of a rare coastal dune ecosystem on the east coast of Vancouver Island that supports bird migration. The study site for this project is also considered to be a culturally significant place to the Tsawout First Nation community. Known as ʔIXEN to the Tsawout people, this area has historically been used for gathering foods, medicines and for celebrations. Despite the challenges of living is such close proximity to the city of Victoria, and although certain practices no longer take place or have declined, the traditional Tsawout values associated with ʔIXEN remain strong.

Recognizing that environmental degradation has impaired the functioning of not only ecological systems, but of cultural systems too, I suggest that ecological restoration can restore the ecological integrity of an ecosystem, and in the process, also restore the cultural connection to the landscape. In order to achieve this dual mandate, and to formulate a long-term restoration plan, a distinctive approach to restoration is required. An "ethnoecological approach" to restoration is presented that seeks collaborative, symbiotic partnerships between ecological science and traditional ecological knowledge (TEK) in an effort to restore the ecological integrity and human connection to culturally significant landscapes. An ethnoecological approach to restoration of the Cordova Bay Spit ecosystem offers the potential to revitalize the cultural connection of the Tsawout people to ȾIXEN and to simultaneously restore the ecosystems function as part of the migratory habitat landscape.

Study Objectives

Based on my background in environmental studies, ecological restoration and my passion for birds - my initial goal was to find a habitat area on Vancouver Island that has significance to migratory birds, that has been threatened from adverse impacts, and that was in need of restoration. In January of 2007 I was fortunate to meet a representative from the Canadian Wildlife Service who was initiating a study to work towards the restoration of the Cordova Bay Spit sand dune ecosystem. This ecosystem is located approximately 25km from Victoria on the east side of the Saanich Peninsula and is owned primarily by the Tsawout First Nation and Capital Regional District with a small portion also owned by the Municipality of Central Saanich (see figure 1.2).

The primary objective of this study was to work towards the restoration of the Cordova Bay Spit sand dune ecosystem so that it may support bird migration. Because the ecosystem being studied has traditionally been a culturally used space that has significance to the Tsawout First Nation, it was hypothesized that achieving this objective would require a distinctive approach to ecological restoration. This is because of the special connection to the land that First Nations peoples in Canada have traditionally maintained with their homelands. For example, First Nations ethics often stress an element of reciprocity, connectivity and accountability as well as a commitment to a deep and meaningful engagement between humans and the landscape (Turner, 2008). Embracing these values in an approach to restoration offers the potential to heal not only degraded ecosystems and support migratory birds, but also to revitalize threatened cultures and to heal our sacred

relationships with the land. Based on this, the central research question for this project became: "***In what ways can ecological restoration and the traditional ecological knowledge of First Nations people be integrated to support local ecosystem integrity and consequently improve stopover habitat for bird migration***?"

Based on my values and objective to restore habitat for birds, I wanted to investigate what bird species occupy the site, what are the threats to the habitat and what ecological conditions would improve this area for migratory birds. Determining what course of action to take in order to protect the habitat would require first assessing whether or not some form of ecological restoration was indeed an appropriate model for the Tsawout community. I wanted to explore how to effectively facilitate collaboration among project stakeholders with diverse backgrounds and values. I also wanted to compare the values of the Tsawout First Nation people with the other project stakeholders in an effort to create a set of guiding principles and formulate initial project goals. I hoped to summarize these principles into a set of guidelines based on my experiences, and based on the literature surrounding good ecological restoration techniques, that could assist restoration practitioners working on projects that involve culturally significant landscapes.

Because of the multi-jurisdictional nature of this project, and because of the inherent challenges associated with habitat conservation for migratory species, the success of this project requires collaboration between stakeholders at the local / project level. For this project however, I also wanted to address the question of how knowledge and experiences gained from individual restoration projects can be shared to help facilitate regional habitat networks for migratory birds.

Overall, working towards answering the primary research question of this study involved the following primary and emerging objectives:

PRIMARY OBJECTIVES

- **Work towards the restoration of an ecosystem that supports bird migration.**
- Collect baseline ecological data about the study site and human influences to it.
- Collect baseline data about the present and historic avian composition of the site.
- Make connections with other local, regional and global conservation initiatives.
- Create a user-friendly thesis document that can be used as a resource in future conservation planning for the Cordova Spit sand dune ecosystem.

EMERGING OBJECTIVES

- Assess the cultural significance of the site to the Tsawout First Nation community.
- Determine an appropriate model of conservation or restoration for the Tsawout First Nation community.
- Create a set of guidelines for restoration practitioners who are working towards multi-stakeholder projects in culturally significant landscapes.

Study Framework

Chapter 1 provides background information about the stakeholders involved in this study, about the study site itself and about the present threats towards and state of migratory birds. Chapter 2 examines the present literature on ecological restoration and explores the potential of an ethnoecological approach to restoration. Chapter 3 describes the methods used in working towards the objectives of this project. Chapter 4 summarizes the results of this project including an avian inventory, inventory of human influence, interviews with each of the main stakeholders as well as additional supportive studies. Chapter 5 discusses my journey in working towards the ethnoecological restoration of ȾIX̱EN̲ and Island View Beach, provides guidelines for ethnoecological restoration and discusses ways to make connections among individual restoration projects, regional initiatives and hemisphere-wide approaches. Finally, Chapter 6 looks forward to the future of this ethnoecological restoration project, reflects upon my journey thus far and provides recommendations for future study.

Chapter 1: Background and Context

This chapter introduces the primary stakeholders involved in this project, describes the ecological and cultural significance of the Cordova Spit sand dune ecosystem, and provides background on the need for migratory bird conservation and how ethnoecological restoration can be used as a tool to begin to heal the migratory landscape.

1.1 Study Partners

Throughout this study I have worked collaboratively with a range of stakeholders including local agencies, communities and interest groups in developing restoration management strategies for the Cordova Bay Spit ecosystem. More specifically, this study has been associated with the comprehensive restoration planning exercise and management priorities being conducted by the Tsawout First Nation community, Canadian Wildlife Service (CWS) and Capital Regional District (CRD) to protect and restore the Cordova Bay Spit area, build public support and raise awareness for the coastal dune ecosystem. Collectively this group is known as "The Cordova Bay Spit Project Working Group".

1.1.1 The Tsawout First Nation

The Tsawout First Nation is one of the five bands that make up the Saanich Nation. The other bands include the Tsartlip, Tseycum, Malahat and Pauquachin. Prior to European contact these five bands existed as the Saanich and were fragmented by the establishment of Fort Victoria in 1843, construction of railways, and eventually the construction of road networks and subsequent development that followed. Together with five other bands (Songhees, Semiahmoo, Lummi, Samish and Sooke), the Saanich peoples are a part of the Central Coast Salish peoples of the Northern Straits (Suttles, 1990; Elliott Sr., 1983).

The Tsawout peoples have historically occupied the Saanichton Bay area of Vancouver Island (See figure 1.1) (Rozen, 1977). Traditionally, this area was where the Saanich winter homes and villages were located because the area "provided shelter from the prevailing southeast gales of winter, a year-round source of food, as well as playing an integral role in the Tsawout economic, societal, social, and spiritual life" (Tsawout First Nation Band, 2007). The Tsawout people however were not stationary at Saanichton Bay and were originally spread out over the entire peninsula with villages in almost all of the bays (Rozen, 1977).

The traditional Saanich territory is considered to include the Saanich Peninsula, south to Mount Douglas, across to Mount Finlayson and Goldstream as well as the Southern Gulf Islands, reaching to Point Roberts, and the San Juan Islands (Tsawout First Nation Band, 2007). The Saanich Peninsula has been the home of the Saanich people for as long as 10,000 years (Elliott Sr., 1983).

The Tsawout, as well as the other bands of the Saanich peoples, traditionally spoke the SENĆOŦEN language. SENĆOŦEN is considered by linguists to be a dialect of the North Straits Salish, a Central Coast Salish language (Turner, C., 2007; Leonard, 2007). Alternate dialects of North Straits Salish include: Sooke Songish, Samish, Semiahmoo and Lummi (Leonard, 2007). The residential school system, that consisted of church-run schools for First Nations children operated primarily during the 19th and 20th century, created a large communication gap between the speakers of SENĆOŦEN and their children (Saanich Indian School Board, 2008). Residential schools represented a clear intent to assimilate First Nations into the non-native culture, and promoted the need for First Nations students to become English-speakers and Christians (e.g. Haig-Brown, 1988; Milloy, 1999). As a result, SENĆOŦEN is an endangered language and it is believed that fewer than twenty-five fluent speakers currently exist (all over the age of 50) (Turner, C., 2007; Leonard, 2007). In the late 1970's the late Dave Elliott devised a way to write SENĆOŦEN in an effort to preserve and revitalize the language (Saanich Indian School Board, 2008). Today SENĆOŦEN is taught at the Saanich Tribal School and the font to write SENĆOŦEN is available for download from the "first voices website" (First Peoples' Cultural Foundation, 2007).

Today, the main Tsawout First Nation village (also known as East Saanich IR No. 2) is located approximately 15 minutes north of the City of Victoria and lies on the east side of the Saanich Peninsula. The village has a population of 1600 people (2006 est.) with approximately one third of the population being registered band members (those persons who reported being a member of an Indian Band or a First Nation of Canada) (Tsawout First Nation Band, 2007).

Despite fundamental changes to the traditional Tsawout way of life, the community continues to practice cultural traditions. Celebrations such as the annual seafood festival and tribal journeys canoe races bring together members of the community helping to maintain and carry forward the wisdom of the elders and continue the Tsawout way of life.

Some of the beliefs that the Tsawout Peoples have followed for thousands of years have included the following:

- That XALS (the creator) put us here on this world and gave us the lands around us (ALENENEC) and a language of our own called SENĆOŦEN.
- That the origin of the living things of this world are our ancient relatives, and that they must be treated with respect. These living things can be called upon for help to survive in this life if we speak to them using special words.
- That there must be honour given to life around us, that ceremonies and rituals taught to the youth will perpetuate these from one generation to the next.
- That the KEXMIN, Indian consumption plant, is a good medicine used to clean and open the way for the pure spirits to come near.

(Tsawout First Nation Band, 2007)

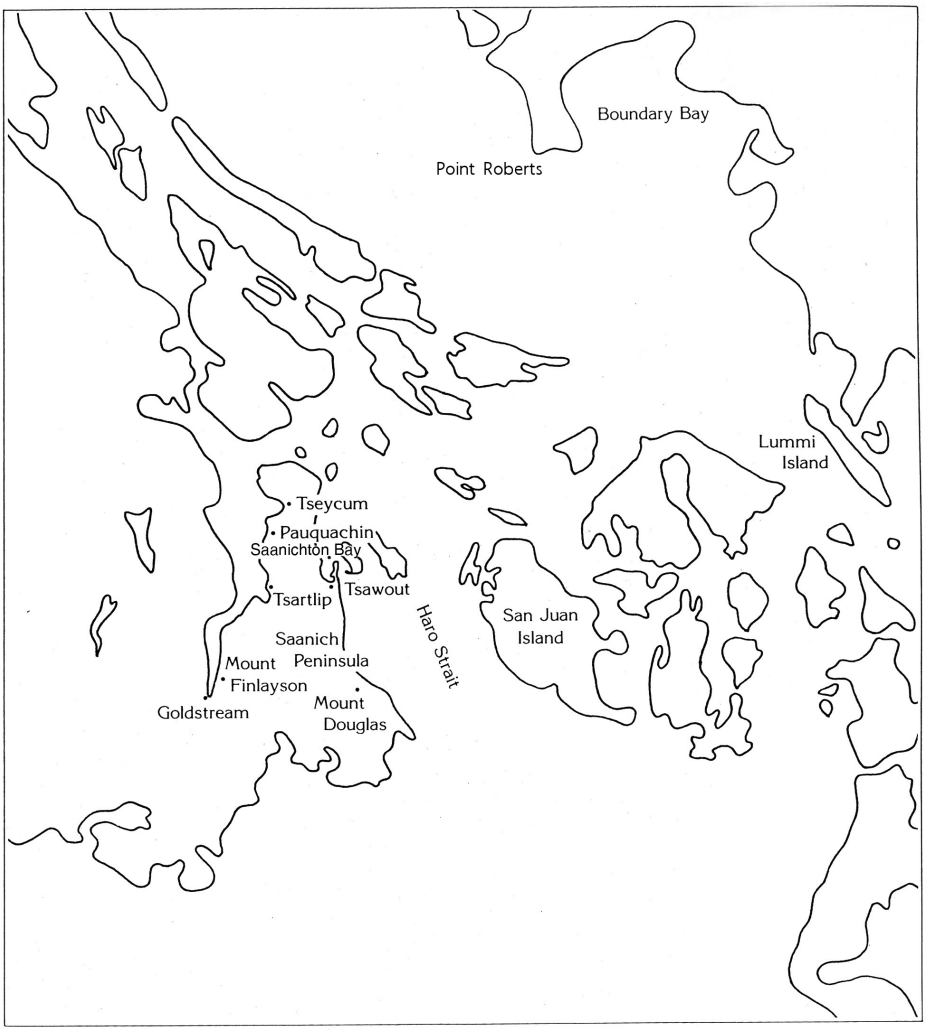


Figure 1.1: Tsawout Traditional Territory

The map above shows the area of Vancouver Island and the Gulf Islands that is considered to be the traditional territory of the Tsawout people (adapted from Elliott Sr., 1983).

1.1.2 The Capital Regional District

The Capital Regional District (CRD) is the regional government for the 13 municipalities and three electoral areas that are located on the southern tip of Vancouver Island. The CRD also includes many of the Gulf Islands, a number of rural municipalities and a vast tract of wilderness that lies along the southwestern coast of Vancouver Island (CRD, 2007). Formed in 1966, the CRD has acted as a governing body for regional issues – including the creation and maintenance of protected natural areas. The CRD Regional Parks system currently protects and manages more than 10,500 hectares of natural areas in 30 regional parks and trails within the Capital Regional District (CRD, 2007). The mandate of CRD Parks is to "establish and protect a network of regional parks in perpetuity that represent and help maintain the diverse range of natural environments in the region; and provide opportunities for outdoor experiences and activities that foster appreciation and enjoyment of, and respect for, the region's natural environments" (CRD, 2007). More specifically, CRD staff are responsible for the delivery of interpretive programs, development and maintenance of park facilities such as information kiosks, and trail signs, educating park visitors about their natural and cultural heritage and for enforcing CRD parks bylaws. Staff is also responsible for collaboration with partner organizations and consultation with the public in order to develop long-term plans (CRD, 2007).

1.1.3 The Canadian Wildlife Service

The Canadian Wildlife Service (CWS) initiated the efforts to protect and restore the coastal dune ecosystem at Island View Beach and the Cordova Spit in 2006. As part of Environment Canada, CWS is the federal agency in Canada responsible for wildlife and habitat matters. These include issues such as the protection and management of significant habitat, endangered species and migratory birds (Environment Canada, 2007).

It was the concern for migratory bird species in the early 1900's that led to the formation of the Canadian Wildlife Service. As migratory birds were observed to be declining in abundance it began to be recognized that there was a responsibility of all provinces and states in North America to regulate hunting and work towards conservation. As a result, in 1916 Canada and the USA signed the Migratory Birds Convention and in 1917 Canada passed the Migratory Birds Convention Act that gave the federal government the responsibility of managing migratory birds (Environment Canada, 2007). In 1947 Canada

created the Dominion Wildlife Service – that would later become the CWS. This organization was formed to bring together public servants with responsibilities for conservation of birds and terrestrial mammals threatened with extinction and also to manage wildlife that crosses international boundaries (Environment Canada, 2007).

At present, CWS conducts a variety of wildlife research, with an emphasis on migratory birds. The goal of this research is to provide the science base for conservation action. In addition to a variety of local conservation projects, research includes national surveys of breeding birds, and the $1.5 billion dollar North American Waterfowl Management Plan (NAWMP) designed to enhance wetland habitat and restore waterfowl populations to the levels of the 1970's.

The CWS plays the prominent role in Canada for working towards the protection of species at risk. In 2003, the CWS began working towards the adoption of the Species at Risk Act (SARA) that seeks to protect species and their habitats from extinction and ensure their recovery (Environment Canada, 2007). Additionally, the CWS is a founding member of the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) which assesses and assigns status and priority to Canada's threatened wildlife. CWS also plays an active role in the Recovery of Nationally Endangered Wildlife Program (RENEW) which aims to bring together various Canadian organizations to work towards threatened species recovery.

Internationally, CWS is involved in projects where there are shared wildlife populations to manage, such as with Lesser Snow Geese (*Chen caerulescens*), which spend the summer in Russia and the winter in Canada near Vancouver (Environment Canada, 2007). Additional international projects include the Western Hemisphere Shorebird Reserve Network and Latin American Program. Through these programs CWS seeks to share research and conservation expertise on migratory birds and their habitats in order to strengthen overall conservation efforts (Environment Canada, 2007).

The CWS has a long history of working with First Nations communities. Currently, part of the CWS mandate is to consult with and assist First Nations groups in conservation objectives – especially in projects where species at risk are involved (Wood, 2000 p.1). The preamble of Bill C-33 (SARA) explicitly states that: "the traditional knowledge of the aboriginal peoples of Canada should be considered in the assessment of which species may be at risk, and in developing and implementing recovery measures" (Environment Canada, 2003). In fact, all major sections of SARA, with the exception of Emergency Orders and Enforcement Measures, specifically mention roles for First Nations peoples (Wood, 2000 p.3).

This objective to conserve Canada's biological diversity, and the ongoing relationship between CWS and First Nations groups in Canada, has evolved a great deal over the past several decades. The official recognition of First Nations and treaty rights in the Canadian Constitution in 1982, followed by Supreme Court cases such as the 1990 R. v. Sparrow case (concerning First Nations fishing rights) and the 1997 R. v. Delgamuukw case (concerning the issue of First Nations land title) caused a major shift in Canada's policy on First Nations rights, and the relationship with First Nations people. Additional Canadian legislation such as the 1998 "Gathering Strength - Canada's Aboriginal Action Plan" (INAC, 2007), commits federal departments to build partnerships with First Nations peoples. Wood (2000) notes that working towards conservation partnerships based on important local priorities are an effective means of meeting this objective. In addition to current Canadian legislation, the 1992 Convention on Biological Diversity (CBD) underlines the role of indigenous peoples in maintaining biodiversity, stresses the importance of a partnership approach focused at the community level, commits signatories to respect indigenous knowledge and share the benefits arising form the use of such knowledge (UNEP, 1992). Initiatives such as this, as well as other changes to Canadian law and policy over the past several decades, mean that the Canadian Wildlife Service will have not only a common law requirement (e.g. R. v. Sparrow) and a statutory requirement under SARA, but also a duty to live up to international commitments under the CBD to meaningfully consult with First Nation groups in conservation projects (Wood, 2000).

1.1.4 Additional Study Partners and Collaborators

In addition to the partners listed above this project has included contributions from and collaboration with:

- **The Municipality of Central Saanich**: Officially owns the northernmost tip of ȾIX̱EN̲ and is therefore a study partner in the overall initiative to protect and restore this ecosystem. It must be acknowledged however that this ownership is highly contentious and is disputed by the Tsawout First Nation.
- **BC Ministry of Environment**: Has provided support by collecting data and completing the Terrestrial Ecosystem Mapping of the entire study site.
- **The Victoria Natural History Society:** Provided historic avian observations recorded at the study site and may be involved in future education initiatives.

1.2 Description of ȾIXEN and Island View Beach

1.2.1 Site Location and General Description

The study site for this project is located at Island View Beach Regional Park (IVBRP) extending north to the Cordova Spit (also known as the Saanichton Spit or by its SENĆOŦEN name ȾIXEN – as will be used in the remainder of this thesis) on the Tsawout First Nation reserve. Situated on the Saanich Peninsula which is on the southeast coast of Vancouver Island (48.35 N / 123.22 W), this multi-jurisdictional project covers a land area of approximately 29 ha (See figure 1.2). Of this area, the majority (18.3 ha) exists on the Tsawout First Nation Reserve, with the adjacent jurisdictions of Captial Regional District Parks and Central Saanich Municipal Parks containing an additional 10.7ha (CRD, 2008) (See Figure 1.2).

The main ecosystem of concern for this study is the coastal dune ecosystem found at ȾIXEN and extending along the beach at IVBRP. This ecosystem type is rare on Vancouver Island – especially on the southeastern portion of the Island (e.g. it is estimated that only 40 ha of sand dunes and spits exist on southeast Vancouver Island) (McPhee et al., 2000).

As noted, approximately two thirds of the study site exists on traditional First Nation's land (See Figure 1.2). This area has been spared much of the destructive impacts that would have been associated with the type and volume of pedestrian or vehicular traffic seen on the public parkland portion of IVBRP. Nevertheless, the Tsawout portion of the study site is subject to vehicular traffic (including the highly destructive use of 4x4 vehicles) as well as disturbances from fires, invasive species and pedestrian traffic.

Island View Beach Regional Park was established in 1966 and contains a total of 49 hectares of land in two parcels. The park is classified as a "Nature Appreciation park" by the CRD and as such recognizes the rare regionally significant accretion beach and sand dune areas, their characteristic flora and rich avifauna (Ussery, 1989). Island View Beach has been extensively modified by human activity. A ditch system, constructed in the 1930's drains the salt marsh and part of the grassland area (See Figure 4.3). An artificial berm has been constructed immediately behind the natural beach berm to preclude water flooding of the park and adjacent farm lands by storm-driven high tides (Ussery, 1989). In addition, park users walk on the rare and fragile dune vegetation. Many of these park visitors use IVBRP to walk their dogs. Unfortunately most do so with their dogs off-leash, which

displaces a variety of migratory shorebirds and waterfowl that use the area as a stopover site during migration periods.

The final landowner for this project is the Municipality of Central Saanich. Based on historic survey methods the municipality owns a very small section of the tip of ȾIXEN. This area is classified as a marine access only park. The area is classified as such because to access the area by land would require crossing through Tsawout private property. The ownership of this land by the Municipality of Central Saanich is highly contentious and has been challenged by the Tsawout First Nation.

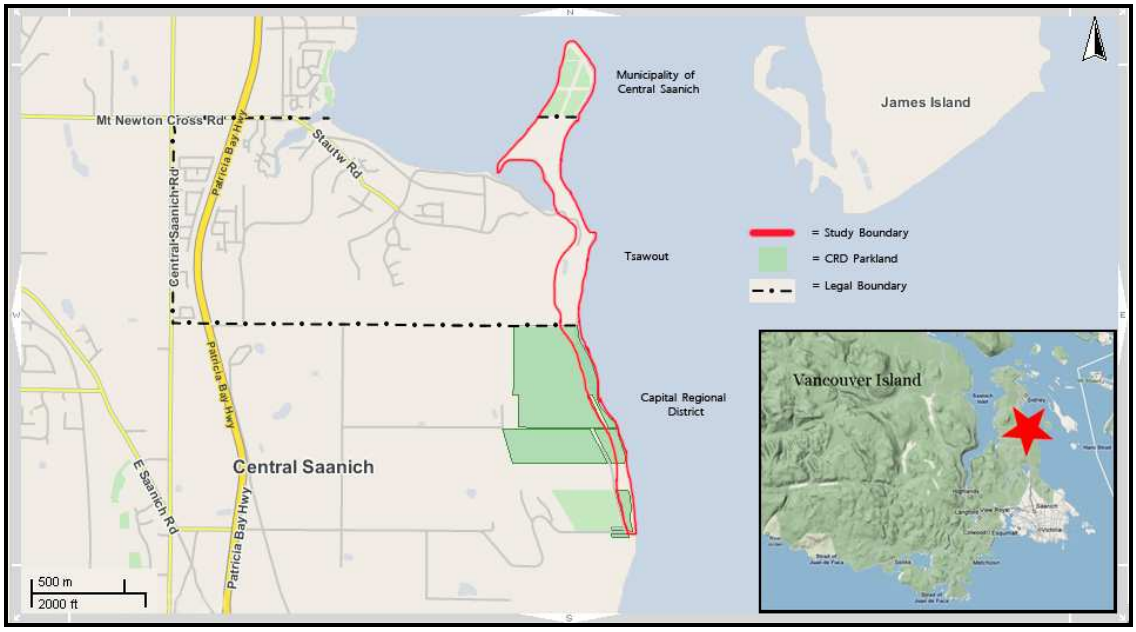


Figure 1.2: Map of Study Site

The map above outlines the boundaries of the study site for this project and also shows legal boundaries between the three land owners (adapted from CRD, 2007).

1.2.2 Structure and Function of Dune Ecosystems

Coastal sand dune ecosystems exist between oceanic and inland forested ecosystems. They are formed through the gradual accretion of sand and gravel (Ward et al., 1998). As sediments are eroded from a source such as a cliff or bluff, this material travels along with ocean currents and waves and in some cases are deposited on shore. Over time such geologic processes can result in the formation of a sand beach, dune or spit (Flynn et al.., 2006; Ranwell, 1972). For example, the beach at IVBRP is classified as an accretion beach,

supplied by sand eroding off Cowichan Head, drifting north with the longshore currents, and depositing at Island View Beach and TIXEN further north along the coast (CRDP, 1992).

The sand dune ecosystems that presently exist on Vancouver Island were created due to geologic processes of deglaciation and isostatic rebound. In the past, the continental land mass has been as much as 200 metres lower than it is at present. As glaciers melted and land masses rose, a legacy of sediments that were originally deposited under water as outwash plains began to become available for erosion and redeposition (Flynn et al.., 2006).

Contemporary sand dune ecosystems on Vancouver Island are characterized by discontinuous vegetation interspersed with bare sand, gravel or exposed bedrock (McPhee et al., 2000). Soils of sand dune ecosystems are made up of unconsolidated sand particles that rarely have a protective organic layer (BC CDC, 2008). Vegetation growth is restricted by such unstable soils as well as the influence of saline conditions, rapid drainage and frequent disturbance from wind and waves (BC CDC, 2008; Ranwell, 1972). Because there are relatively few plant species that can withstand these conditions, sand dune ecosystems support distinct and characteristic communities (Ward et al., 1998).

Sand dunes develop slowly due to a number of natural disturbance processes (McPhee et al., 2000). The most obvious disturbance process is the relentless wave action that is responsible for both shaping the dunes themselves and determining where vegetation is able to grow. Flynn et al.. (2006) point out that both "the front and rear boundaries of sand dune ecosystems are determined by the sea: no vegetation can grow within reach of the salty waves, and tree growth is only possible away from the burning salt spray" (pg.2). A second major source of disturbance is the relentless coastal wind which constantly disturbs the dune sand often burying plants or exposing their roots. In addition to adapting to the sea and the wind, dune plants must also be tolerant of full exposure to the sun. On sunny summer days the surface temperature of sand dunes can reach 50-60℃ and rob the soil of its moisture content. A final challenge to life in dune ecosystems is the fact that available nutrients, from sea spray, windblown seaweed, seabird droppings, or decomposing plant material, are rapidly leached out by the rain.

In order to thrive in this environment dune plants have developed a number of survival mechanisms. These range from "dormancy, to outrunning sand burial by growing up and out, to growing hairy or waxy leaves that reflect burning sunlight, or deep roots that access moister, cooler layers of sand. Some plants swell up with water to dilute effects of harmful salt spray or have special membranes to prevent absorption of salts into their cells" (Flynn et al., 2006). Many dune plants complete their flowering during the spring and spend the

summer in seed form. In order to deal with the shortage of nutrients in these ecosystems, “some plants form symbiotic relationships with nitrogen-fixing soil bacteria or with mycorrhizal fungi to obtain nutrients [while] other plants focus energy resources on seed production rather than vegetative production” (Flynn et al., 2006). There is typically a gradient of disturbance in dune ecosystems from front to back (i.e. ocean to forest) that shapes the development of plant communities (Page, N., 2003).

Typical coastal dunes exhibit an upper beach / berm area where hardy annual species that are tolerant to sand burial and salt spray are able to colonize. For example, fast-growing sea rocket (*Cakile edentula*) with its extensive network of water seeking underground creepers, are able to stabilize the shifting sand. These species lead the way for later arrivals such as sand verbena (*Abronia latifolia)*, big-headed sedge (*Carex macrocephala)*, and beach knotweed (*Polygonum paronychia)* which are all well adapted to the harsh salty and dry soil of the dunes (CRDP, 1992). Behind the upper beach area there is generally a ridge of sand known as the foredune ridge. The foredune ridge is formed when windblown sand accumulates on obstacles such as plants, driftwood, seaweed, etc. which provide a stabilizing function. This area is typically colonized by perennial dune grasses (*Leymus mollis)*. Behind the dune ridge is often a trough (also called the dune slack) that is created when wind sweeps down the back of the foredune (Flynn et al., 2006). This area is often damper than the surrounding areas and provides a nursery for dune plants to germinate and establish themselves. Behind this area generally exist sparsely vegetated rolling plains of sand that culminate in a second ridge (or back dune). Beyond this ridge inland plant and forest species which are tolerant of some salt spray can be found (See Figure 1.3).

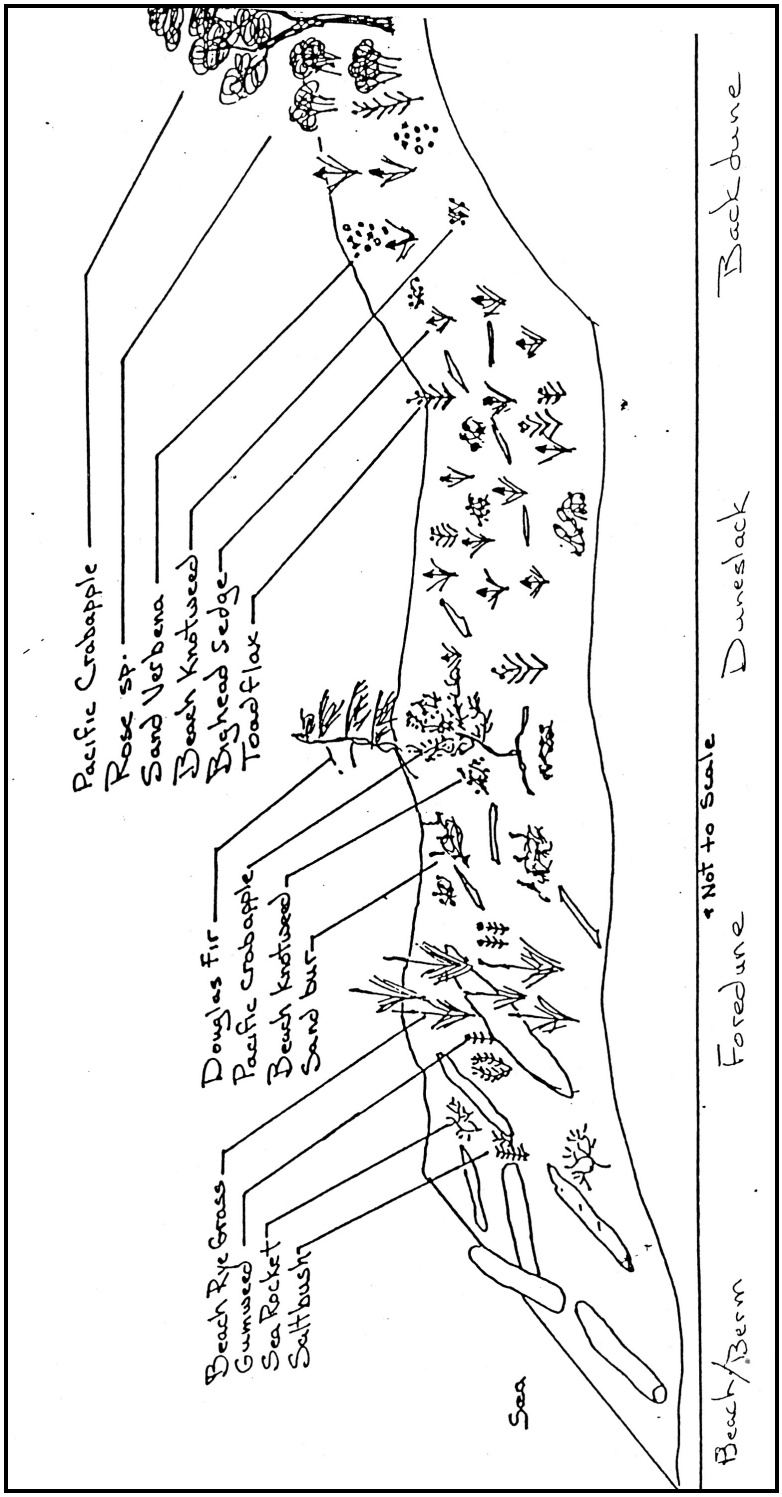


Figure 1.3: Typical Sand Dune Cross Section

The figure above illustrates the 4 major sections of typical sand dune ecosystems (Ussery, 1989).

Beach / Berm

Duneslack

Foredune Ridge

Backdune

Figure 1.4: Sand Dune Ecosystem at ȾIX̱EṈ

Images illustrating the typical sand dune sections at ȾIX̱EṈ.

1.2.3 Significance of Dune Ecosystems

There are a number of factors that make coastal dune ecosystems worthy of conservation attention. The most obvious is that in British Columbia, and especially on eastern Vancouver Island, they are incredibly rare. These ecosystems have never been widespread and those that do exist face threats from development and habitat destruction.

In British Columbia there are three main areas where coastal dune ecosystems occur (see Figure 1.5). The first area is the west coast of Vancouver Island where a number of significant dune systems – including the 16 kilometer Long beach between Tofino and Ucluelet – are scattered along the coastline. The second area, and most significant concentration of dune ecosystems, is on Graham Island in the Queen Charlotte Islands. Finally, the third area includes the southeast coast of Vancouver Island as well as areas on the islands in the Strait of Georgia.

A recent inventory of sensitive ecosystems on eastern Vancouver Island and the Gulf Islands revealed that sparsely vegetated ecosystems (including sand dunes, spits and inland cliffs) are the rarest terrestrial ecosystem within the region (COSEWIC, 2003). The primary reason sand dunes are so rare on eastern Vancouver Island is because of the limited occurrence of coastal areas with sand dominated substrates (Page, N. 2003). McPhee et. al (2000) add that the topography and geology of this region also influences dune occurrence because of the prevalence of steeply sloped coastal bluff areas that generally inhibit dune and spit development. Less than 0.1% of the region is made up of sand dunes and most dunes that do exist occupy only a few hectares each (McPhee et al., 2000; Flynn et al., 2006). One of the largest and most significant examples of an intact coastal dune ecosystem remaining on the southeast coast of Vancouver Island can be found at Island View Beach regional park (10.7 ha) extending to ȾIXEN (18.3 ha) (Ward et al., 1998). Additional sand dune ecosystems within the Capital Regional District include Sidney Spit, James Island spits, Whiffen Spit (Sooke), Albert Head Lagoon Spit, and Witty's Lagoon (Metchosin) (BC CDC, 2008).

Aside from being rare, coastal dune ecosystems are also fragile. These natural systems exist in a harsh and dynamic environment and are easily disturbed and indeed destroyed (CRDP, 1989). Dunes are threatened by stabilization of coast lines which can disrupt natural dune processes, loss of habitat through development or coastal erosion, recreation and other human influences (Ranwell, 1972). Given the extreme rarity, fragility and

ecological importance of dune ecosystems, it is critical that those that remain in the province be protected and managed in a sustainable way.

Dune ecosystems are home to a variety of plant and animal assemblies. Many individuals are listed as at-risk in British Columbia (Flynn et al.., 2006; Fairbarns, 2007). Although species diversity in general may be considered to be low in comparison with other ecosystem types, the specialized dune ecosystems support unique organisms adapted to life in this harsh environment (McPhee et al., 2000). For example, the dune ecosystem at Island View Beach and ȾIXEN is home to the rare yellow sand verbena plant (*Abronia latifolia)* (See Figure 1.6). This plant is the host of a rare species of cutworm, or sand verbena moth (*Copablepharon fuscum*) that lays its eggs and feeds exclusively on this plant (Flynn et al., 2006). Both species occur almost exclusively in sand dune environments. Because shoreline and sand dune ecosystems have been so heavily modified on southern Vancouver Island, those that remain within the region contain remarkable assemblages of rare plants in Canada. (Fairbarns, 2007). Numerous provincially and nationally rare and endangered plant species can be found at Island View Beach and ȾIXEN (CRDP, 1989; Fairbarns, 2007). Several of the rare plant species that are associated with this ecosystem type for this project are listed in Table 1.1 and can be seen in Figure 1.7.

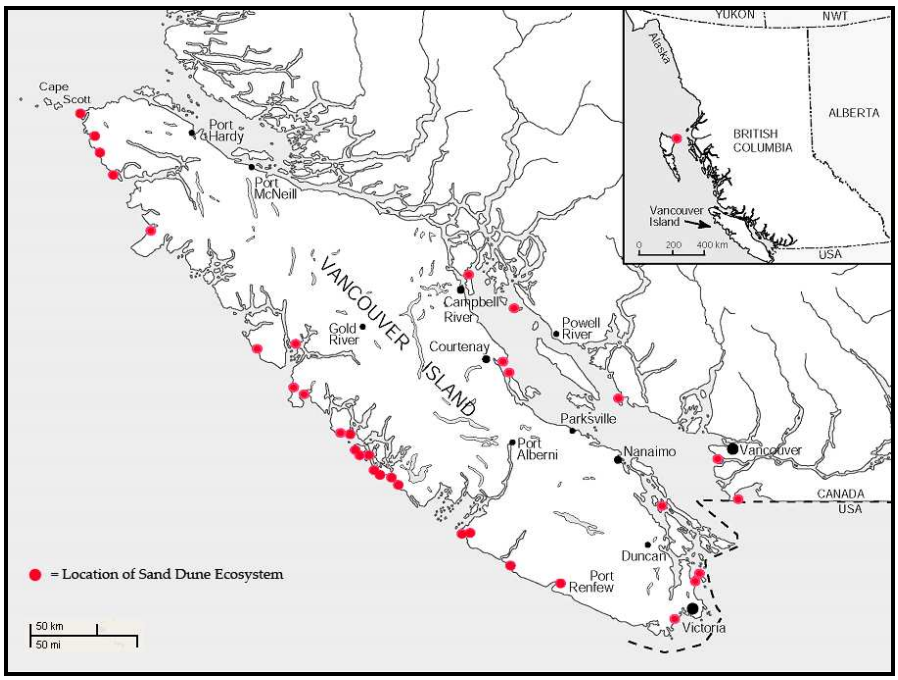


Figure 1.5: Coastal Dune Ecosystems in British Columbia

The map above displays the locations of sand dune ecosystems in British Columbia (Page, 2003)

Table 1.1: Rare Plant Species Associated with TIXEN and Island View Beach

Scientific Name	Common Name	National Status	Provincial Status
Abronia latifolia	yellow sand-verbena		S3 – Blue
Agrostis pallens	dune bentgrass		S3-Blue
Allium amplectens	slimleaf onion		S3-Blue
Alopecurus carolinianus	Carolina meadow-foxtail		S2-Red
Balsamorhiza deltoidea	deltoid balsamroot	Endangered	S1-Red
Camissonia contorta	Contorted-pod evening-primrose	Endangered	S1-Red
Carex tumulicola	foothill sedge	(in progress)	S1-Red
Convolvulus soldanella	beach bindweed		S3 – Blue
Glehnia littoralis ssp. leiocarpa	American glehnia		S3 – Blue
Jaumea carnosa	fleshy jaumea		S2S3-Blue
Lathyrus littoralis	grey beach peavine		S2-Red
Lomatium dissectum var. dissectum	fern-leaved desert-parsley	(in progress)	S1-Red
Lotus formosissimus	seaside birds-foot lotus	Endangered	S1-Red
Lotus unifoliolatus var. unifoliolatus	Spanish-clover		S2S3-Blue
Lupinus densiflorus var. densiflorus	dense-flowered lupine	Endangered	S1-Red
Lupinus lepidus var. lepidus	prairie lupine	Endangered	S1-Red
Lupinus oreganus var. kincaidii	sulphur lupine	(in progress)	SX-Red
Clarkia amoena var. caurina	farewell-to-spring		S3-Blue
Clarkia amoena var. lindleyi	farewell-to-spring		S3-Blue
Piperia candida	white-lip rein orchid	(potential)	S2-Red
Piperia elegans	elegant rein orchid		S3-Blue
Polygonum paronychia	black knotweed		S3 - Blue
Ranunculus californicus	California buttercup	(in progress)	S2-Red
Rupertia physodes	California-tea		S3-Blue
Sanicula arctopoides	bear's-foot sanicle	Endangered	S1-Red
Sanicula bipinnatifida	purple sanicle	Threatened	S2-Red
Toxicodendron diversilobum	poison oak		S2S3-Blue
Trifolium depauperatum var. depauperatum	poverty clover		S3-Blue
Trifolium dichotomum	Macrae's clover		S2S3-Blue
Triteleia howellii	Howell's triteleia	Endangered	S1-Red
Viola howellii	Howell's violet		S2S3-Blue
Viola praemorsa ssp. praemorsa	yellow montane violet	Threatened	S2-Red
Yabea microcarpa	California hedge-parsley	(in progress)	S1-Red

Source: (Fairbarns, 2007)

Note: The B.C. Red list includes any indigenous species that is extirpated, endangered, or threatened while the Blue list includes any indigenous species considered to be of special concern. The provincial status of a species is designated by a letter reflecting the scale of the assessment (G = Global, N = National, and S = Sub-national) followed by a number (1 = critically imperiled, 2 = imperiled, 3 = vulnerable to extirpation or extinction, 4 = apparently secure, 5 = demonstrably widespread, abundant, and secure) (Natureserve, 2008).

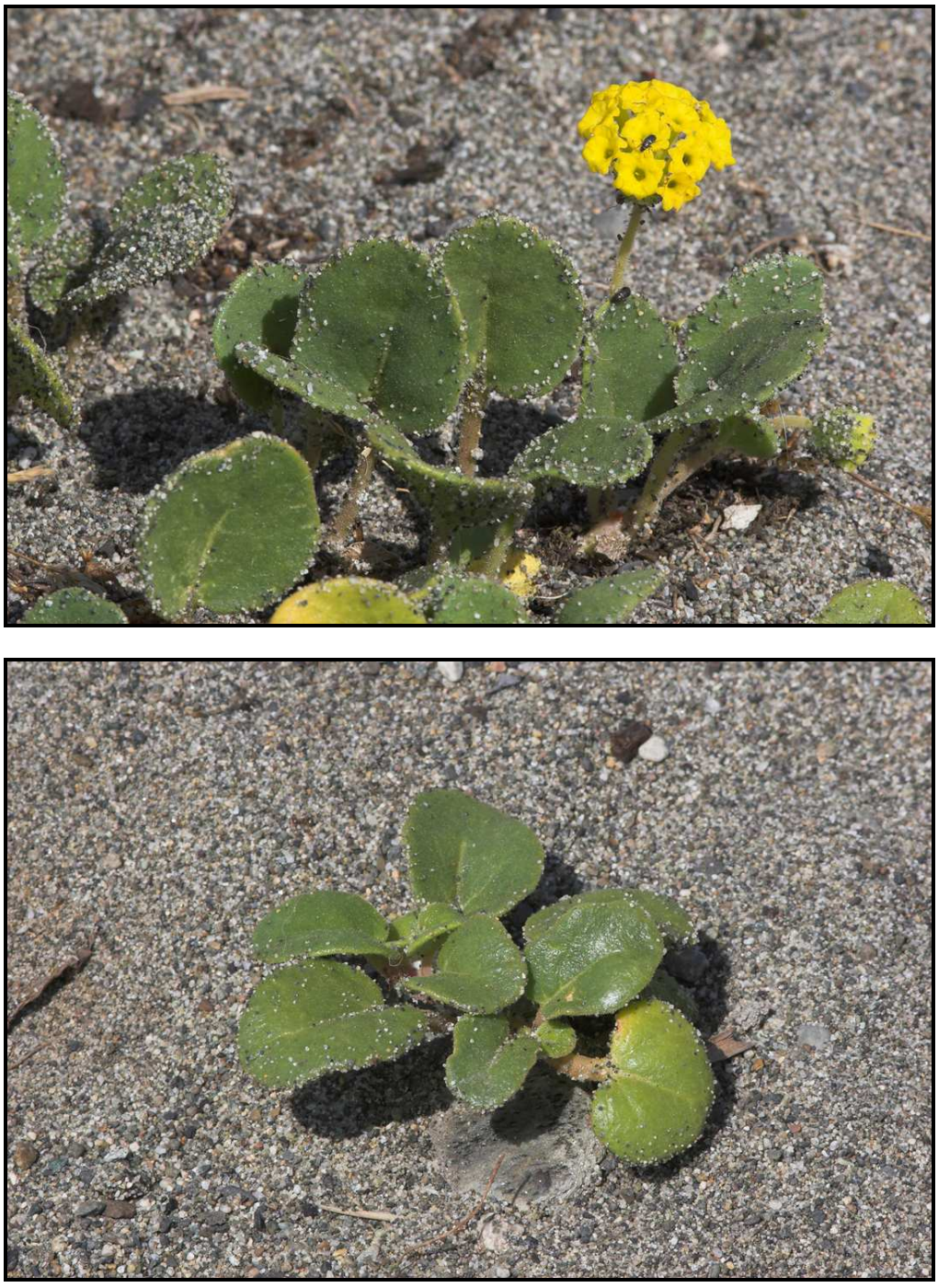
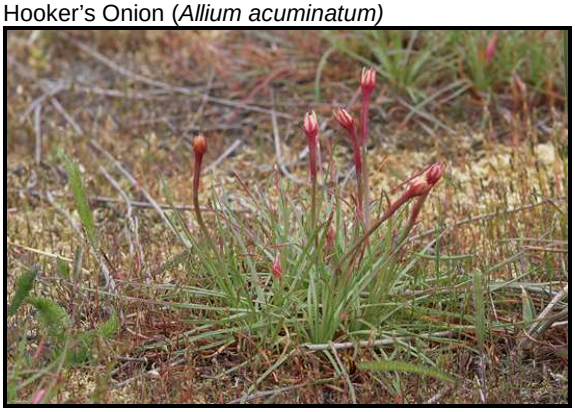


Figure 1.6: *Abronia latifolia* (Yellow Sand Verbena)

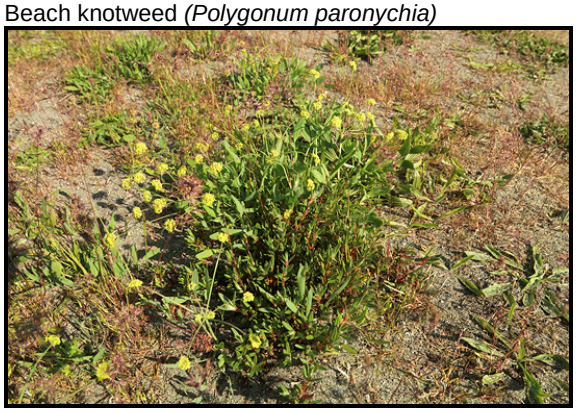
Both images show the B.C. blue listed species Abronia latifolia (Yellow Sand Verbena).

Hooker's Onion (*Allium acuminatum)*

Beach knotweed *(Polygonum paronychia)*

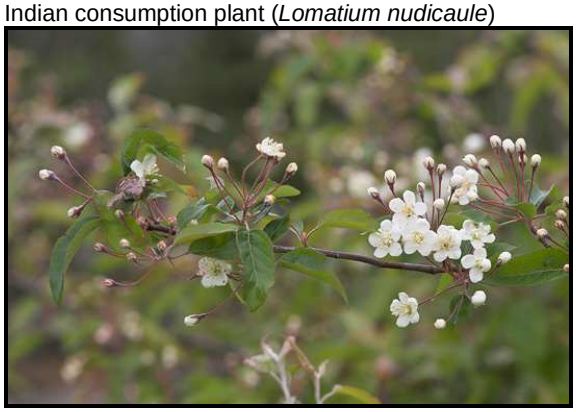


Thrift (*Statice armeria; syn. Armeria maritima*)



Indian consumption plant (*Lomatium nudicaule*)

Glasswort (Salicornia virginica)



Wild crabapple (*Pyrus fusca*)

Beach carrot *(Glehnia littoralis)*

Rugose rose (*Rosa rugosa*)

Figure 1.7: Ecologically and Culturally Significant Plants of ȾIX̱EṈ

In addition to being home to a variety of fauna including garter snakes, butterflies (such as the blue listed common ringlet (*Coenonympha tullia insulana)* and western branded skipper (*Hesperia colorado oregonia*), moths (such as the nationally endangered sand verbena moth (*Copablepharon fuscum*), and a variety of other invertebrate species (such as black widow spiders (*Latrodectus hesperus*)), coastal dune ecosystems act as home or refuge for a large number of resident and migratory birds (see Figure 1.8). The dune ecosystem at Island View Beach and ʔIIX̱EN̲ provides a migratory stopover point for a variety of shorebirds such as Black-bellied Plovers *(Pluvialis squatarola)*, Dunlin *(Calidris alpina)*, Short-billed Dowitcher *(Limnodromus griseus)*, Western and Least Sandpipers *(Calidris mauri and Calidris minutilla)*. During the spring migration months of April and May thousands of Brant geese (*Branta bernicla)* (see Figure 1.9) depend upon the dune systems as well as the associated intertidal habitat for feeding and resting on their long journey north to their breeding grounds (McPhee et al., 2000). Ospreys (*Pandion haliaetus)* have been successfully nesting at ʔIIX̱EN̲ on one of the hydro poles that currently exists (See figure 1.11). Additional migratory birds using the Cordova Bay Spit sand dune ecosystem are listed in Table 1.2. For a comprehensive list of all birds found at ʔIIX̱EN̲ and Island View Beach see Appendix G.

In addition to the birds that presently occupy the coastal dune ecosystem of this study, there exists the additional opportunity to restore this ecosystem for species that may have once inhabited it. This is the case specifically for the Horned Lark, strigata subspecies (*Eremophila alpestris strigata*) that occurred historically in Canada on southeastern Vancouver Island and in the lower Fraser River valley; but has been extirpated (Campbell et al.. 1997; COSEWIC, 2003). Horned larks are birds that inhabit open areas with short, sparse vegetation – such as sand dunes (COSEWIC, 2003) (See Figure 1.10). It has been recognized that “the amount of suitable habitat for the Horned Lark, strigata subspecies in British Columbia is very small and has undoubtedly declined over the last few decades as urbanization and other development has occurred within its breeding range” (COSEWIC, 2003). The Canadian Wildlife Service, in conjunction with regional partners in Washington State, have formed a recovery team for the Horned Lark, strigata subspecies and are currently investigating the restoration and conservation of habitat for this species.

Table 1.2: Selection of Migratory Birds found at ȾIX̱E1̱ and Island View Beach

Scientific Name	Common Name	National Status	Provincial Status
Eremophilia alpestris	Horned Lark	*Strigata* Subspecies is Extirpated	*Strigata* Subspecies is Red
Sterna caspia	Caspian Tern		S3 - Blue
Larus californicus	California Gull		S3 - Blue
Passerculus sandwichensis	Savannah Sparrow		
Zonotrichia atricapilla	Golden-crowned Sparrow		
Anthus rubescens	American Pipit		
Calcarius lapponicus	Lapland Longspur		
Calidris mauri	Western Sandpiper		
Calidris minutilla	Least Sandpiper		
Calidris alpina	Dunlin		
Calidris pusilla	Semipalmated Plover		
Tringa Melanoleuca	Greater Yellowlegs		
Numenius phaeopus	Whimbrel		
Pluvialis squatarola	Black-bellied Plover		
Limnodromus griseus	Short-billed Dowitcher		S2 - Blue
Numenius americanus	Long-billed Curlew	Special Concern	S3 - Blue
Gavia immer	Common Loon		
Anas acuta	Northern Pintail		
Bucephala clangula	Common Goldeneye		
Podiceps auritus	Horned Grebe		
Aechmophorus occidentalis	Western Grebe	Threatened	S1 - Blue
Phalaropus lobatus	Red-necked Phalarope		Blue
Pandion haliaetus	Osprey		
Ardea herodias	Great-blue Heron		S3 - Blue
Chordeiles minor	Common Nighthawk	Threatened	

(Wood et al.. 2006; B.C. Conservation Data Centre, 2008).

Note: The B.C. Red list includes any indigenous species that is extirpated, endangered, or threatened while the Blue list includes any indigenous species considered to be of special concern. The provincial status of a species is designated by a letter reflecting the scale of the assessment (G = Global, N = National, and S = Sub-national) followed by a number (1 = critically imperiled, 2 = imperiled, 3 = vulnerable to extirpation or extinction, 4 = apparently secure, 5 = demonstrably widespread, abundant, and secure) (Natureserve, 2008).

The area immediately offshore from the study site (the Sidney Channel as well as Sidney Island and Spit) is designated as a nationally and globally significant Important Bird Area (IBA) by Birdlife International. This designation is based upon the fact that the area provides essential habitat for breeding and non-breeding birds. As Booth (2001) explains:

> *"the Sidney Channel and the associated lagoon on Sidney Island are well known for the presence of Marbled Murrelets (Brachyramphus marmoratus), Rhinoceros Auklets (Cerorhinca monocerata), cormorants, gulls, and shorebirds in summer. During winter seaducks can be found throughout the area. In the spring they are joined by migrating grebes, loons, Brant (Branta bernicla), and shorebirds. Of particular interest at this site are the globally significant concentrations of Brandt's Cormorants (Phalacrocorax penicillatus) during fall migration, and the nationally significant numbers of Mew Gulls* (Larus canus) *and Brant during spring migration. During fall, winter, and spring, nationally significant numbers of Pigeon Guillemots* (Cepphus columba) *are also present. In addition, nationally significant numbers (20 pairs) of nesting Black Oystercatchers* (Haematopus bachmani) *nest on islets located in the area. Furthermore, numerous (15-50) Great Blue Herons (Ardea herodias fannini) (nationally vulnerable, COSEWIC) are also regularly seen feeding at this site" (Booth, 2001).*

The dune ecosystem at ȾIX̱EN̲ holds tremendous cultural significance to the Tsawout First Nation. One of the main reasons for this is that the area has been used for generations for harvesting traditional foods and medicines. As John Elliott Sr. explains, "we believed that everything that was here was put here for our use. That's why our people respected everything and believed everything had a right to live, just like we did" (Elliott Sr., 1983 p.77). Collectively, the Saanich people are also known as the "saltwater people" because much of their sustenance and way of life is derived from the ocean. ȾIX̱EN̲ has historically been one of the main sources of food for the Tsawout people.

Fishing, especially for salmon using reef nets, likely contributed the greatest amount of food to the Tsawout diet – the inter-tidal area and sand dunes also provided traditional foods. A common saying amongst Tsawout elders used to be that "when the tide is out – the table is set" (e.g. Sam, 2008). This is because the sandy beaches made it easy to find a variety of edible clams and crabs. Nearby areas that have rocky beaches offered mussels, sea urchins and seaweed (Elliott Sr., 1983). ȾIX̱EN̲ was also once an active area for pit cooking and preparing foods for winter storage (Claxton, B. 2008).

Western Sandpiper *(Calidris mauri)*

Least Sandpiper *(Calidris minutilla)*

Black-bellied Plover *(Pluvialis squatarola)*

Long-billed Curlew *(Numenius americanus)*

Whimbrel *(Numenius phaeopus)*

Semipalmated Plover *(Charadrius semipalmatus)*

Dunlin *(Calidris alpina)*

Greater Yellowlegs *(Tringa Melanoleuca)*

Figure 1.8: Migratory Shorebirds of ȾIX̱EṈ and Island View Beach

Figure 1.9: *Branta bernicla* (Brant)

Brant use the inter-tidal habitat at Island View Beach to feed and rest during the spring migration.

Figure 1.10: *Eremophila alpestris* (Horned Lark)

Horned Larks can be found at ȾIX̲E̲N̲ and Island View Beach primarily during the fall migration.

Common Murre *(Uria aalge)*

Surf Scoter *(Melanitta perspicillata)*

Pigeon Guillemot *(Cepphus columba)*

Western Sandpiper (*Aechmophorus occidentalis*)

Rhinoceros Auklet *(Cerorhinca monocerata)*

Pelagic Cormorant *(Phalacrocorax pelagicus)*

Figure 1.11: Seabirds of the Sidney Channel

The Sidney Channel has been designated by Birdlife International as an “important bird area” because of the many species of seabirds that use the area – especially during the winter months.

Figure 1.12: Nesting Osprey *(Pandion haliaetus)*

Both images above show the nesting activities of Ospreys at TIXEN. The top image shows an Osprey carrying nesting material back to the nest. The bottom image shows one of the Ospreys perched on the nest itself.

In addition to gathering seafood, the area has also been used to hunt waterfowl. Saanich elders recall huge flights of ducks, geese and swans that would migrate along the Saanich peninsula during their annual migrations. John Elliot Sr. describes “thousands of ducks [that] came in those days, so many would come that they would darken the sky. They would blot out the sun like a big, dark cloud” (Elliott Sr., 1983 p.44). Traditionally these waterfowl species were hunted using large nets hung between two poles where flocks of birds were known to regularly pass (Suttles, 1990). One of the most sought after species was the “black duck” (Surf Scoter - *Melanitta perspicillata*) that was used to make duck soup.

ȾIX̱EN̲ is an area where edible plants and medicines were traditionally gathered. Suttles (1990) explains that at least 40 plants provided edible sprouts, stems, bulbs and roots, berries and fruits, or nuts to the Saanich people. Many of the important medicines that are still used are made from the Indian Consumption Plant (*Lomatium nudicaule*) and Yarrow (*Achillea millefolium*) – both of which have traditionally flourished at ȾIX̱EN̲.

Many of the traditional activities that once occurred at ȾIX̱EN̲ no longer take place. Clams and crabs are much less abundant at the site. Those that can be found are not harvested by the Tsawout people because of concerns about contamination. Hunting still occurs at the spit for a variety of waterfowl – but is done now using firearms and primarily during the winter months. Many of the traditional plants, such as the KEXMIN (or Indian Consumption Plant), are now harder to find and are often inappropriately or over harvested (Claxton, B. 2007).

The dune ecosystem at ȾIX̱EN̲ has also traditionally been used by the Tsawout community for cultural celebrations and ceremonies, canoe races, as a place to honor ancestors by conducting burnings and as a place of quiet meditation, contemplation and spirituality.

Aside from these ecological and cultural reasons for preserving and enhancing dune ecosystems, there are a variety of socio-economic values associated with dunes. Protected dune ecosystems provide green space in and around urban communities. Dunes offer the potential for passive outdoor recreation opportunities such as wildlife viewing, photography and painting. As evidence of the popularity of dune ecosystems, consider the fact that over a million people a year visit Pacific Rim National Park (Flynn et al., 2006).These rare ecosystems also offer opportunities for ecological research and nature education programs. A final economic incentive for conserving coastal dune ecosystems is that studies have

shown that undeveloped green space significantly increases property values of nearby properties (Meadows, 1999).

1.3 Migratory Birds & Migratory Bird Conservation

Migratory birds are one of the truly unifying phenomena in the natural world. They exemplify the interconnectedness of the world that we all share and their conservation inherently requires collaboration between groups and nations. That migratory birds are declining throughout the Western Hemisphere suggests serious damage to the ecosystems that they depend upon. Although the alarm bell has been ringing for years, the complexity and scope of migratory bird conservation initiatives remains a daunting challenge for conservationists.

1.3.1 Migratory Birds

In total, more than half of the bird species that breed in North America take part in some form of migration (DeGraff & Rappole, 1995). Some of these birds are known as short-distance migrants and migrate only as far as the Southern United States for the winter. The majority however, approximately 350 species in total, migrate from North America to the New World Tropics of southern Mexico, Central and South America and the West Indies (Robinson, 1998). These birds, known as Neotropical migrants, are those "western hemisphere species, all or part of whose populations breed north of the Tropic of Cancer and winter south of that line" (DeGraff & Rappole, 1995 p. 9). The very nature of this migration system means that these birds are not just of importance to North Americans and to North American ecosystems, but also to people, communities and to the health of ecological systems throughout their range.

There are numerous scientific, ecological, economic and logistical reasons for conserving birds. Consider for example that it was Charles Darwin's famous finches which led to an understanding of the theory of evolution. More recently, birds have acted as indicators of the harmful impacts of pesticides such as DDT and "are beginning to tell us about the current and potential future effects of climate change" (Trulio, 2000). Tankersley (2004) believes that "regional shifts in their migration pathways and stopover habitats may highlight locations where environmental condition is beginning to decline and reflect environmental changes across the landscape" (2004 p.59). Furthermore, studies such as the Breeding Bird Survey (BBS), that has been conducted annually for the past 40 years has led to "the

increasing use of songbird populations as more comprehensive "ecological indicators," to the extent that birds reflect the broader health of a habitat or an ecosystem" (Robinson, 1998 p.3).

Ecologically, birds play key roles in ecosystems by functioning as seed dispersers, pollinators and insect eaters (Harder, 2004; Stutchbury, 2007). They also perform vital and little understood roles in food chains that have developed over millions of years. Translating these services into tangible values is often difficult. Nonetheless, some of the ecosystem services that they perform are clear. For example, birds eat up to 98% of budworms and up to 40% of all non-outbreak insect species in eastern forests. These services have been valued at as much as $5,000 annually per square mile of forest (Sterling, 2007). In addition to their effects on the current functioning of ecosystems, avian diversity also influences the resilience and resistance of ecosystems to environmental change (Chapin et al.., 2000). As the diversity–stability hypothesis suggests, diversity provides "a general insurance policy that minimizes the chance of large ecosystem changes in response to global environmental change" (Chapin et al.., 2000 p.238). Furthermore, conserving migratory birds and global biodiversity has cultural, intellectual, aesthetic and spiritual implications that are important to communities and societies around the world.

Bird migration has been called "the one truly unifying natural phenomenon in the world" (Weidensaul, 2000 p.x). Not only can observing migratory birds make connections between people and places, but studying the health of migratory bird populations can indicate whether there are weak links in the overall migratory habitat chain. This fractured network of natural habitat is leading to the crisis that now faces many species of migratory birds. It has been suggested that migratory birds are facing "their greatest challenge ever" (Weidensaul, 2000 p.26). Before examining the threats facing migratory birds, and grappling with migratory bird conservation, I turn to the phenomenon of bird migration.

1.3.2 Avian Migration & The Need for Stopover Sites

The migration of birds from the temperate regions of North America to the Neotropics is regarded as one of the major phenomena of vertebrate ecology and evolution (Cox, 1985; Weidensaul, 2000; Rappole, 1995). Numerous theories on migration have emerged through the years. All of the currently accepted theories share the common theme that if a particular behavior gives certain members of a population an advantage – in this case flying to an alternate breeding location where resources are seasonally more available – then these individuals will be more likely to successfully reproduce and pass on their genes (including

the ones that compel them to migrate) to the next generation. Generation after generation these behaviors have evolved into the vast array of migratory pathways that work their way throughout the world. There are a number of potential selective pressures that may have contributed to such migratory behaviour including extreme weather conditions (such as the ice ages), thermal and photoperiodic regimes, changes in seasonal availability of specific resources, intraspecific and interspecific competition, and predation or parasitism (Cox, 1985; Wilcove, 2008). For migration to make sense, the benefits gained from migration must outweigh the costs associated with the migratory process (e.g. time, loss of occupancy, energy, mortality) (Alerstam et al.. 2003). Table 1.3 describes five recent theories of the origin of migration. Each of these theories recognizes that for migration to evolve, selective advantages must exist for movement in both directions.

Table 1.3: Five Theories Surrounding the Origin of Migration

Increasing Seasonality	As the degree of seasonal differentiation increases, in order to meet its ecological needs, selection may favor behavioral changes, such as reduced site tenacity or a habitat shift over adaptive changes in morphology or physiology.
Optimal Energy Budget	The primary selective advantage of migratory movement to both breeding and non-breeding ranges is a seasonal improvement in the aspects of energy balance related to temperature and photoperiod.
Intraspecific & Interspecific Competition	The concept that migration is the normal consequence of competition operating on mobile animals in a seasonal environment. In such a situation, selection should favor individuals that move into adjacent areas during favorable periods, thereby gaining either increased reproductive success or increased survivorship because of reduced intraspecific competition.
Predation and Food Supply	The idea that nest predation and food competition are the major selective pressures for the evolution of migration. This theory postulates that, on the one hand, the migration to northern breeding areas is favored by a reduction in the risk of nest predation or, less frequently, by a reduced competition for food. The migration southward to non-breeding areas, on the other hand, would be favored by a severe competition for food or possibly for safe roosting sites in the breeding area in the winter.
Time Allocation	This theory is based on the observation that some migrants breeding in the temperate zone realize a lower reproductive success than temperate-zone residents but have a higher survivorship as the result of their movement to a more "benign" winter range. Therefore the major factors favoring the movement of migrants to temperate-zone breeding areas are reduced nest predation and the high productivity of certain foods during the favorable summer period.

Synthesized from: (Cox, 1985; Rappole, 1995; Berthold, 2001; Alerstam et al.. 2003; Pulido, 2007)

It is essential to recognize that migratory birds depend not only upon viable habitat in their temperate and tropical homes, but also on a habitat network of stopover points for use during migration (Fernandez et al., 2006; Moore et al., 2005; Tankersley & Orvis. 2003; Tankersley, 2004; Hutto 2000). For example the Western Sandpiper *(Calidris mauri)* breeds

in Alaska, passes through Vancouver Island and the Fraser River Delta on their northward migration each spring and winters in the Southern United States, Central and South America. Sites such as the Cordova Spit sand dune ecosystem provide essential habitat as these birds migrate. Sand dunes in particular provide ideal habitat for several species of migratory birds that prefer open areas of sparse vegetation (e.g. Horned Lark and Lapland Longspur).

The reason that birds need stopover sites is, of course, because most species of migratory birds cannot store enough energy to make their entire journeys and must therefore stop to feed along the way (Rappole, 1995). While it has been argued that migratory birds are less vulnerable to extinction than resident birds because they have multiple habitat options, the reality is likely the opposite. Certainly it is true that migration does have considerable benefits when it comes to survival and reproduction. However, this behaviour may also expose migrants to a higher likelihood of extinction because of multiple environmental risks and the increasingly fragmented chain of necessary habitats that migrants must confront in an annual cycle. (DeGraff & Rappole, 1995; Rappole, 1995). Successful migration "requires abundant, intact stopovers distributed all along the migratory route at intervals useful to birds making nightly flights" (Tankersley, 2004 p.56). Weidensaul adds that "migration depends upon links – food, safe havens, quiet roost sites, clean water, and a host of other resources, strung out in due measure and regular occurrence along routes that may cross thousands of miles" (Weidensaul, 2000 p.26). There has been increasing concern in recent decades that the cumulative impacts of human influence are beginning to sever those links and are leading to significant declines in the health of migratory bird populations.

1.3.3 Declines in Migratory Bird Populations

Beginning in the 1960's the potential for serious declines in migratory bird populations was starting to be recognized (e.g. Carson, 1962). As concern grew, and as evidence from a variety of local surveys was gathered throughout the 1970's and 1980's, it started becoming clear that the populations of a variety of Neotropical migrants were indeed declining (Robinson, 1998). Early population studies from the 1980's indicated that as many as three quarters of all Neotropical migrants have been declining (Line, 1993). For example, Rappole (1995) indicated that significant declines had been recorded for at least 109 species of Neotropical migrants between 1985 and 1995 and that these declines had been documented using a variety of methods including long term breeding site studies, range

wide breeding bird surveys, studies of transient volume during migration, and regional breeding pair surveys. Additional studies indicated similar trends for particular groups of migratory birds such as shorebirds (*Charadrii*). For example, the Manomet Center for Conservation Sciences (2004) reported that three decades of shorebird surveys were indicating that most shorebird species are in serious decline (i.e. showing statistically significant or persistent declines). A separate study by Morrison et. al (2001) identified nineteen species of shorebirds showing statistically significant or persistent population declines and only one species showing a significant increase. During the 1980's – 1990's, Neotropical migrants attracted a great deal of attention not only because the data that the local surveys were reporting, but also because of the rising awareness about the rate and scale of tropical deforestation. As Robinson points out "it was only logical to make the connection between deforestation in the tropics and declining songbird populations, since the steepest declines were found in the populations of Neotropical migrants - whose homes, in winter, were the very regions of Central and South America where trees were being felled" (Robinson, 1998 p.3). Despite the mounting evidence that was being compiled there was lingering debate in the scientific community (e.g. James, 1996) about how severe the problem was, or if there indeed was a problem at all.

1.3.4 Evidence from the Breeding Bird Survey

The tool that most scientists looked to when trying to assess the state of migratory bird populations was the North American Breeding Bird Survey (BBS). The BBS is an organized, continent-wide census that first began in 1966. The census is conducted by volunteers who count and record songbird numbers along over 3,000 survey routes in Canada and the United States. During each census volunteers drive along a given search line and stop approximately every kilometer for three minutes to record all the birds that they can see or hear. While the BBS does not attempt to count every bird in every location, it is a cost effective method of providing quantitative data regarding regional, continent wide, changes in breeding populations of Neotropical migrant birds (Robbins et al., 1989). The strength of the BBS lies in its geographic scale and its ability to give an estimate of the overall abundance of a given species over hundreds of BBS routes (Stutchbury, 2007).

Although the BBS is an excellent tool for assessing the state of migratory bird populations, a number of concerns have been raised about the statistical methods used to indicate population change, sampling errors, and generalizations made based on limited data. For example, some have argued that the four decades during which the survey has

been conducted is, ecologically speaking, a relatively short period of time and have questioned the degree to which we can distinguish meaningful long-term trends from the fluctuations that arise from naturally dynamic and temporally variable ecosystems (Robinson, 1998; Collins, 2001; Maurer & Villard, 1996). Sauer et al.. (1996) add that "considerable caution is needed in analysis of BBS data [because] the survey differs greatly in consistency of coverage over its range, and many possible sources of bias exist in analyses of the data (p.466). For example, because it is primarily singing birds that are counted, the BBS data may actually overestimate songbird numbers and be slow to reveal decreases that may be occurring (Morton & Greenberg, 1989). In healthy bird populations there are generally more breeding individuals than available habitat and consequently all available habitats will likely be occupied by singing individuals.

A final limitation of the BBS is that it does not in itself reveal anything about the causes of possible population declines. However, this is unavoidable, as it would be impossible to perform controlled, replicated experiments at the scale necessary to address the causes of such continent-wide, decade-long trends (Bohning-Gaese et al.., 1993).

Despite the limitations of the BBS a number of common themes have emerged from the 40 year period of data collection (See Table 1.4).

Table 1.4: Trends from the North American Breeding Bird Survey

Summary of Trends over the Past 40 Years
• The first 15 years of the BBS did not reveal data to suggest systematic declines. • Analysis of the data during the 1970's and 1980's suggested that populations of a variety of species were showing signs of significant decline (as much as 3% per year in some species). • Some forest-dwelling Neotropical migrants have been diminishing steeply in most of the regions in which they are traditionally found. • Birds found in recently disturbed habitats have been declining as fast as or faster than the diminishing forest-dwelling species. • Birds found in grasslands have shown the largest and most consistent decline. • Most declines have been recent (post-1978). • Year-round resident species and generalist "adapter" species, such as chickadees, crows and jays show stable or increasing populations. • Populations of migratory birds are more stable on the Western half of the continent. • While the evidence for overall declines is considered to be conflicting the potential for disaster justifies giving priority status to Neotropical migrants. • The most recent reports (2007) indicate that since 1967 the average population of the most common North American birds has fallen by 70 percent, from 17.6 million to 5.35 million individuals *.

Synthesized from: (Robinson, 1998; Bohning-Gaese et al.., 1993; Robbins et al.. 1989; Sauer et al.., 1996; James, 1996; Holmes & Sherry, 2001; Line, 1993; Butcher, 2007)

*Common birds are species with more than 500,000 individuals worldwide, with a range of more than 385,000 square miles,and that do not qualify for Audubon's WatchList of at-risk species.

1.3.5 Reasons for Decline

While the interpretation of data from the BBS remains somewhat controversial, the most recent studies (e.g. Keller, 2006; Butcher & Niven, 2007) suggest that a decline in several species of migratory species is indeed occurring. The BBS data however does not account for the causes of these trends. There is no widespread consensus among ornithologists or ecologists regarding the reasons why migratory birds are declining. This is because the causes of such declines are complex, multifaceted and variable amongst different species. As Line (1993 p.75) suggests "there could be 20 different reasons why 20 Neotropical migrants are declining". Nevertheless population declines are generally attributed to the impact, or in fact the combined impact, of habitat loss or fragmentation in temperate breeding grounds, tropical wintering grounds and the migratory habitat landscape that connects these areas (Robbins et al., 1989; Morton & Greenberg, 1989; Furness & Greenwood, 1993; Jukofsky, 1995; DeGraff & Rappole, 1995; Schmiegelow & Monkkonen, 2002; Keller, 2006).

Alterations to temperate breeding habitat are believed to be contributing to a decline in migratory bird populations for several reasons. Obviously the direct conversion of pristine habitat, whether it be forest, wetland, grassland, or otherwise, will reduce the amount of suitable breeding habitat and therefore have an adverse impact on the population of a given species or group of species (Tankersley, 2004). Many shorebirds for example are believed to be declining in population because of the direct alteration of the wetlands and coastal areas upon which they depend (Howe & Geissler, 1989). While the direct loss of habitat is certainly a factor, equally concerning is the impact of habitat fragmentation (MacArthur and Wilson, 1987). Habitat fragmentation involves the division of continuous natural habitats into smaller more isolated parcels that exist in an often inhospitable matrix in the surrounding landscape (Robinson, 1998). An inevitable result of fragmentation is an increase in the proportion of what is called edge habitat that exposes breeding birds to a variety of threats from nest predators and nest parasites as well as increased interspecific competition between generalist edge species and specialized interior species (Rappole, 1995; Bohning-Gaese et al.., 1993; Robinson, 1998). As a result, habitat fragmentation and the creation of edge habitat generally leads to reduced reproductive success of birds that breed near edges. As a habitat becomes more and more fragmented this may include nearly the entire extent of a given habitat area and make it unsuitable for certain species.

It is important to acknowledge these impacts are problematic not only on temperate breeding grounds but also throughout the migratory landscape (Robinson, 1998; Tankersley, 2004). As Stutchbury explains, “it is almost impossible for a migratory bird to live out its short life without coming face to face with our modern civilization and all the changes this has brought to the lands we share with them” (2007 p.14-15). For example, at TIXEN and Island View Beach one of the primary threats to migratory birds comes from disturbance from off-leash dog walking (e.g. Banks & Bryant, 2007; Burger 1981; Miller et al.. 2001; Lafferty et al.. 2006). The rapid development of coastal properties as well as any depletion of critical migratory habitats will almost certainly increase mortality for numerous species during migration.

While reductions or alterations to the temperate breeding grounds can affect the success of breeding, similar impacts to the size and quality of tropical wintering habitat can lead to reduced feeding opportunities, which in turn reduces the ability to avoid predators and affects the amount of fat stored by birds for migration and ultimately reduce survival (Robinson, 1998; Keller, 2006). Although some studies have indicated that certain species of migratory birds actually prefer disturbed habitats, the greater majority of species fill specific niches in these tropical ecological communities and will therefore be adversely impacted (Rappole, 1995). This scenario is especially problematic in many Neotropical countries where deforestation rates are amongst the highest in the world (Robbins et al., 1989). Terborgh (1989) points out that in many tropical countries the most pervasive changes and greatest threats to migratory birds are “occurring in conjunction with a massive wave of abusive overexploitation of virgin lands” (p.xiv). This reality has caused many experts to conclude that impacts to tropical wintering ground habitat is the single largest and most probable cause of the decline in migratory birds (Rappole, 1995; Keller, 2006; Robbins et al., 1989; Robinson, 1998).

In recent years climate change has also been identified as having the possibility to adversely impact migratory bird populations (e.g. Sillett et al.., 2000). One reason for this is that during years that are unusually wet or unusually dry the reproduction of certain birds will be diminished (Robinson, 1998). It has been presumed by some that the mobility of bird species would allow them to make a simple distributional shift under climate change scenarios. This however may not be possible, especially if species are already at the edge of their range or if climatic changes are so rapid that the plant species upon which the birds depend for food, nesting or shelter are unable to adapt quickly enough (Furness &

Greenwood, 1993). Thus, the ability of birds to adapt to climate change will largely depend upon the rate and magnitude of change (Morton & Greenberg, 1989).

Several additional causes have been identified as contributing to the decline of Neotropical migratory birds. Pollution – largely in the form of agricultural chemicals still in use in tropical countries – can have direct impacts to migratory species or can impact their reproductive success. Predation from domestic cats has been identified as a major problem in urban areas where cats are believed to be responsible for the deaths of hundreds of millions of birds each year (Robinson, 1998). Man made obstacles such as buildings, lighthouses, wind turbines and radio towers are also believed to kill millions of migratory songbirds each year. Certain species seem to be especially prone to collisions and the collective toll of these obstacles may be significant enough to cause species wide declines (Robinson, 1998). Finally, Brown-headed Cowbirds pose a threat to the survival of many forest dwelling songbirds. Cowbirds are brood parasites that have evolved to lay their eggs in other species' nests in order to stay mobile. The result is that the host bird effectively winds up raising the cowbird offspring – generally at the expense of its own. Studies have shown that more than 200 species of North American birds are affected by the Cowbirds parasitism (Robinson, 1998). While cowbirds have exerted a tremendous impact on the health of many migratory songbird populations, it must be acknowledged that they are naturally occurring edge species and are therefore a symptom of the much larger problem of habitat fragmentation.

The decline of North America's migratory birds is due to a number of causes. Direct habitat impacts throughout the temperate breeding grounds, tropical wintering grounds and migratory habitat landscape are likely to be the primary cause. However, the ecological reality of the situation is that the various causes of population declines are not mutually exclusive and are in many cases cumulative. This is a main reason why the challenge of migratory bird conservation is so great and why restoration initiatives are urgently required.

1.3.6 Migratory Bird Conservaion & the Need for Restoration

Despite continued debate over the causes and severity of declines to migratory bird populations, the threat of an impending crisis is so severe that migratory birds are now the focus of one of the largest conservation efforts - or rather a collection of individual initiatives - ever undertaken in the Western Hemisphere (See Appendix I). This ambitious conservation effort involves virtually every country in North, Central and South America in research, education and habitat protection and will depend upon initiatives at a variety of

scales (Weidensaul, 2000). Such an enormous effort is required because of the sheer scale of the issue as well as the fact that the hundreds of migratory species have unique and individual requirements. Add to this the fact that our knowledge about the life histories and ecological requirements of most of these species is partial at best, and it becomes clear why preserving migratory birds has been called “the most daunting task ever faced by American conservationists” (Line, 1993 p. 71).

It has been increasingly recognized that preserving individual pieces of the migratory whole will not stop the decline of migratory birds (e.g. Jukofsky, 1995). For example, as Robinson suggests, “as the amount of tropical forest continues to shrink, the populations of some species of songbirds that winter chiefly in forest habitats will drop, despite efforts taken here, in temperate North America” (Robinson, 1998 p.11). Instead, the conservation of migratory birds will require Hemisphere-wide collaboration and a collective, inter-state, multi-stakeholder effort to both conserve and restore the migratory habitat network.

The Cordova Spit sand dune ecosystem for example is a part of a larger chain of migration stopover sites along the Pacific flyway of the Western Hemisphere. This flyway is one of the main routes of travel for migratory birds in the Americas from Alaska to Patagonia (Donaldson et al., 2000). Some of the most important sites for the migration of shorebirds along the Pacific Flyway include the Copper River Delta in Alaska, the Fraser River Delta in British Columbia and Gray’s Harbor in Washington (WHSRN, 2008). These sites are all designated as being of hemispheric importance because they support the seasonal migration of over 500,000 shorebirds each. Although the Cordova Spit dune ecosystem does not support the same volume of migrants – it does make up an important part of the migratory chain which has become increasingly fragmented due to habitat loss, pollution and anthropogenic disturbances (Donaldson et al., 2000). Stopover sites that have been degraded, whether they are of hemispheric importance such as the Fraser River Delta, or whether they are of local importance such as the Cordova Spit, are equally in need of conservation efforts.

The good news is that throughout the hemisphere “we have begun to recognize the aesthetic and ecological value of the migratory whole and to work to preserve – in some cases, even restore – the land and resources upon which hundreds of species of migrant birds depend” (Weidensaul, 2000 p.27). Conservationists now realize that confronting the problem of migratory bird declines will involve conservation of temperate breeding ground, tropical wintering grounds, as well as key habitat areas throughout the migratory landscape that persist all along migratory pathways at intervals that are useful to migrants (Robinson,

1998; Tankersley and Orvis, 2003). Tremendous amounts of habitat will have to be protected. This will be a difficult task given the multitude of threats that currently exist.

In addition to habitat conservation, there is also great potential to begin to restore areas that have been identified as key migratory, wintering or breeding habitat. As such conservation and restoration activities occur, it is important to continue to conduct monitoring (such as the BBS or Christmas Bird Counts) in an effort to take stock of the current status of migratory birds. Such restoration and conservation efforts are essential as they may be able to facilitate enhanced learning about the status of migratory species and help to focus efforts to repair damaged links in the migratory habitat chain. It will also be essential to make partnerships and create connections between projects and between ecosystems that serve as migratory stopover sites.

Chapter 2: Ethnoecological Restoration

This chapter examines how the process of ecological restoration offers potential for renewing and supporting biological diversity (including migratory birds), as well as our cultural relationship with the land. Beginning with a review of the current literature surrounding the core principles and theories of "good" ecological restoration I then examine how the process of ecological restoration might differ in landscapes that are especially culturally significant – such as those that have been traditionally used by First Nations communities. Next I consider how the Traditional Ecological Knowledge (TEK) of First Nations peoples compares to western science, and investigate opportunities for merging these two ways of knowing into restoration processes that are more suitable for culturally significant landscapes. After presenting examples of projects that have successfully integrated TEK into restoration planning, as well as an analysis of present terms such as "eco-cultural" and "focal" restoration, I suggest an approach to "ethnoecological" restoration that offers the potential to restore the ecological integrity of ecosystems and return them to their historic trajectory while at the same time re-establishing the cultural connection to those ecosystems.

2.1 Characterizing Good Ecological Restoration

Ecological restoration offers the potential to protect and restore ecosystems that provide habitat for birds during migration. By protecting or re-establishing areas for migrants to feed, rest and find shelter, ecological restoration can therefore help facilitate bird migration. In order to do so, and to achieve the primary goal of this project (facilitating the restoration of an ecosystem that supports bird migration), it is essential to first explore what this means by examining the core values of good ecological restoration.

While many people think of restoration as a largely scientific endeavor, the reality is that good ecological restoration involves so much more than a "normal" scientific approach to the reparation of degraded ecosystems (e.g. Funtowicz & Ravetz, 1994; Jordan, 2003). Some scholars such as Higgs (1994 & 2005) have differentiated between the science of restoration ecology that includes "what we consider typical of a contemporary natural science: hypotheses, conjectures, testing, experiments, field observations, publications, and debate" (2005 p.159) and the overall discipline of ecological restoration that involves restoration ecology as part of "the total set of ideas and practices (social, scientific, economic, political) involved in the restoration of ecosystems" (1994 p.137). When it comes to ecological

restoration efforts, facts may be uncertain or unknowable, values diverse, and there are often a variety of legitimate perspectives to consider. Furthermore, the boundaries between disciplines must be crossed and intertwined. This is especially true in ecosystems with extensive human histories or cultural significance (Turner, 2005; Senos et. al, 2006; Berkes, 1999).

A strict definition of ecological restoration could handicap the discipline by setting ambiguous goals and criteria for success (Hobbs & Norton, 1996). Ehrenfeld (2000) adds that "the diversity of conditions requiring restoration demands much flexibility in goal setting" and that "goals need to be developed appropriately for each project relative to the scope and reasons for the restoration effort" (p.2 & 7). Higgs (2005) explains that rather than adhering to a rigid set of ecological restoration protocols, "good" ecological restoration includes attention to the integrity of the ecosystems, to the extent which they accurately reflect the history of a place, that restoration involves focusing our efforts at things that matter including community engagement and our cultural relationship with the land and that incorporating the core principles of ecological restoration into practice requires carefully designed projects.

Through ecological restoration, key migratory bird habitat areas that have been damaged or destroyed can be restored so that they can once again function as habitat and facilitate migration (Mooney, 2004). But to do so, requires a carefully designed process that focuses first and foremost on ecological integrity. Hobbs (2005) points out that as ecologists, gardeners and landscape architects take stock of what is needed for successful restoration, a transdisciplinary and "post-normal" approach is increasingly turned to as the answer. Higgs (2003) adds that while each discipline "has a different way of approaching problems, of seeing what needs to be done, and of justifying answers…each also has elements that are bound to the concerns of restorationists; they are turning to a prior condition for guidance and are focused to a greater or lesser extent on ecological integrity" (p.91). Acknowledging that ecological integrity is a core principle for all restoration efforts forces the consideration of just what it means to restore an ecosystem to its natural successional trajectory, what values must be considered, and just what is implied by the term "integrity".

While some, such as Hunter (1996) and Katz (1992) consider all human activities to be unnatural, this boundary is problematic. After all, it can be convincingly argued that human impacts have indeed altered every ecosystem on earth. Furthermore, defining a natural ecosystem, or one that has integrity, as one without human influence is incompatible with the core values of ecological restoration as this "reinforces the nature-human division that sees us as somehow separate from nature" (Allison, 2004, p.283). As Higgs (2003, p.21)

writes, restoration “means incorporating human activities and in this way changing our minds about what counts as wilderness”. Nevertheless, it is worth noting that restored ecosystems with integrity will reflect the natural composition, structure, pattern, heterogeneity, function, successional processes and resilience of similar reference ecosystems (Hobbs & Norton, 1996).

By also including cultural practices within the boundaries of ecological restoration we open the door for a new perception of the relationship between people and the environment. This forces us to make value laden choices about what historical reference trajectory we seek to restore and to what level should human activity be considered as part of the landscape. While this is a relatively new notion in North America, it is commonplace in areas of Europe, Asia and Africa (Allison, 2004). Naveh (2005, p.229) believes that defining and achieving restoration goals must be “determined within the broader systems context of its surrounding landscapes and in the context of ecological and socio-economical and cultural functions and land use(s)”. Thus, expanding the boundaries and scope of what should be included in ecological restoration beyond ecological integrity to include a deep historical and cultural connection is critical. For as Higgs (2003, p.22) explains, restoration is “as much about the retrieval of beliefs and practices as it is about the regaining of physical conditions”. By broadening the scope of restoration to include the ecological and cultural and history of a place as part of the overall ecosystem integrity, we can begin to set more meaningful restoration goals and achieve more meaningful restoration practice.

A deep and meaningful engagement with the history of a place is one of the core principles that makes ecological restoration so special. After all, ecological restoration is substantially about bringing back natural ecosystems, processes or trajectories that once existed. Looking carefully at history reminds us of just what we hope to restore, uncovers and contributes to the story of a place and helps us to understand the temporal aspect of ecological and cultural systems.

The importance of history is also vital in ecological restoration for setting goals and evaluating restoration projects. In order to have some benchmark or measure of such success, the concept of reference information has emerged and has been widely used in restoration projects throughout the world. Reference information is used to define a feasible set of site-specific restoration goals, determine the restoration potential of sites, and evaluate the success of restoration efforts (White & Walker, 1997). For example, by collecting baseline data about the extent of adverse ecological impacts, rare plant species and presence or absence of migratory birds at TIXEN and IVB we may be better able to

assess the success of our efforts as restoration proceeds. Furthermore, the in-tact dune plant communities that exist at ȾIXEN can be used as reference information for restoration prescriptions at other areas of this project or at similar sites in the region such as Sidney Spit or James Island.

Incorporating history into ecological restoration is indeed a challenging task. Jordan however recognizes that "what is distinctive about restoration is the commitment it implies to bringing the whole system back to a former condition" (Jordan, 2003 p.22). In order to achieve this goal, a clear understanding of the ecological and cultural history of a landscape is a must. Ecosystems are in constant flux as are our cultural perceptions and interactions with the landscape. Yet by getting familiar with the history of a place, and by examining a variety of reference information throughout time and space, restorationists are more accurately able to set goals and assess the effectiveness of restoration projects (Hall, 1999).

Ecological restoration projects depend upon attention to the ecological integrity and history of an ecosystem, but it must be recognized that these elements are shaped by our cultural perceptions, values and interactions with the landscape. Unfortunately, as we become increasingly disconnected from nature and as our outcome-driven society becomes more and more technological, scientific and fast paced we run the very real risk of losing many of the desirable features and the potential of ecological restoration.

Well designed ecological restoration projects have the potential to restore the cultural connection between man and nature that has been steadily diminishing around the world - including within First Nations communities. This reality highlights the need for a special approach (and a third core principle) to restoration whereby focus is directed beyond ecological integrity to additional things that matter including stakeholder values, traditional knowledge, community engagement and our cultural relationship with the land (Ford & Martinez, 2000; Higgs, 2003; Turner, 2005). While the specific values held will vary between projects and between stakeholders, spending the time to engage with and understand these values is a tremendously worthwhile task in any ecological restoration project.

The discipline of ecological restoration has been evolving from "a singular focus on bringing back ecological integrity to a recognition that both the process and product of restoration can have salutary benefits for people" (Higgs 2003, p.236). As Jordan comments, restoration "is work and it can also be play, a way of communicating with other species and with the landscape, a mode of discovery and a means of self-transformation – a way of both discovering the natural landscape and discovering ourselves in that landscape"

(Jordan, 2003 p.78). Restoration projects can help to strengthen community ties and offer numerous benefits beyond the mere reparation of an ecosystem. For such projects to be effective however, it is essential that cultural values and social relations be included as an integral part of the restoration process. By engaging with local people and enabling opportunities for communal experience, restoration efforts are able to strengthen the bond between people and natural processes and solidify the connection between culture and ecology.

Ecological integrity, history and cultural values are all important elements of ecological restoration projects. It is important to acknowledge however that ecological restoration is, at its core, a design process and "no matter how much we try to attune ourselves to the interests of ecosystems, to bring something back to the way it was, or to honor our relations with natural processes, we end up exerting some of our will" (Higgs, 2003 p.274). A necessary starting point (and final core principle) for any ecological restoration initiative is some form of conscious reflection and clear intention about just what it is we seek to restore.

Choices about restoration design extend far beyond straight forward decisions about the type of ecosystem to be recovered, and the techniques to be used, to value laden choices. These may include deliberations surrounding exactly what historic condition is desirable and to what extent we put the needs of the ecosystems above those of our own. For example, to what extent are we willing to sacrifice the ecological needs of migratory birds in order to maintain cultural celebrations and gatherings at ?IX̲EN̲? Making these decisions forces deep and meaningful consideration from restoration practitioners regarding their intentions – and these issues must be dealt with in the social and cultural realms of decision making (Lackey, 2001).

Through careful and intentional design it is indeed possible to direct our focus at the things that matter most including community engagement, our cultural relationship with the land and the integrity of the ecosystems themselves. Allison (2004) believes that restoration must result in "a deep personal and cultural engagement with the environment or it will not achieve much beyond a temporary patch for the landscape" (p.285). Jordan (2003) reinforces this sentiment by stating that "at least as important as the ecosystems the restorationist gives back to nature is the deepening of understanding, awareness, and caring that is the direct result of this work, when it is carried out thoughtfully and attentively" (p.133). Whether or not we intentionally choose to design restoration efforts around such priorities and whether or not we put the interest of ecosystems above those of our own is a crucial first step in restoration design.

A second step in restoration design is to recognize that the success of ecological restoration projects is dependent as much upon the process of ecological restoration as it is upon the final product. There is a powerful and corrosive force in modern day culture that seeks outcomes, technological quick fixes, and immediate gratification. Higgs however believes that restoration design is "doing well if it can move away from straight forward concern with products – form and function – to the manifold and deep experience of things" (Higgs, 2003 p.282). This is not to say that restoration design and practice cannot embrace efficiency and utilize the best of what modern technology has to offer. Rather, the goal of restoration design should be to ensure that these components do not overshadow or lead to a disconnection from the goals of community interaction and ecological integrity.

Well designed restoration efforts include the values and participation of a variety of appropriate stakeholders, are transdisciplinary and recognize that the true value of restoration is "not only a healthy ecosystem, but a healthy relationship between humans and that ecosystem" (Allison, 2004, p.285). Establishing this relationship requires that cultural values and social relations be included alongside scientific facts as an integral part of restoration design. There are often a diverse range of values that surround a given restoration project. Identifying these, and assessing which values are shared by various groups and which may be different, is an important part of the journey towards ecological restoration.

The Society for Ecological Restoration (SER) highlights the value of a participatory process and the need to incorporate stakeholder values by acknowledging that restoration is a long term commitment requiring careful deliberation and that when decisions are made collectively they are much more likely to be honored and implemented than those made unilaterally (SER, 2002). In addition to designing restoration efforts to embrace participation, the complex and multidimensional nature of restoration projects makes the inclusion of a variety of diverse perspectives from relevant stakeholders an essential component of the process (Higgs, 1997). A diverse group of project participants who share a common goal provides a greater depth of expertise and also allows new knowledge and relationships to develop and flourish between those involved with the restoration project. By designing restoration projects to include engagement with local people and enabling opportunities for communal experience, restoration efforts are able to strengthen the bond between people and natural processes and solidify the connection between culture and ecology. In addition to healing the land, ecological restoration can heal the relationship between modern society and nature.

Recognizing the value of the process of ecological restoration and the people involved within any given project is a crucial element of design. It is also vital not to lose sight of the goal to restore the ecosystem to its successional trajectory and to enable its self-sustaining capacity. While human interaction must be carefully considered in design it is essential that the needs of the ecosystem remain paramount. As Higgs states, "we are not designing for ourselves, articulate clients, or identifiable users, but for the largely silent interests of ecosystems" (Higgs, 2003 p.284). In many ways the most challenging element of restoration design becomes figuring out how "our actions, [and] our designs, can work alongside natural processes" (Higgs, 2003 p.284) and how we can guide ecosystem recovery along a path towards autogenic development along successional paths with little or no future human interference (SER, 2002).

Design decisions can become increasingly challenging when faced with potential trade-offs between ecological integrity and human interactions in shared places. For example, this is a tremendous challenge for the restoration of the coastal sand dune ecosystem in this project where the dual mandate of ecological integrity and recreation opportunities for park visitors and community celebrations often clash. In many situations much of the challenge of design may be to determine where on the scaled continuum of human use the area falls under and how to design efforts to meet ecological needs to the greatest extent possible. By explicitly recognizing and incorporating human experiences into restoration efforts, through the projects creation and establishment, design efforts may lead to long term and committed relationships between people and place.

The design of restoration projects begins with good intentions, and is dependent upon a participatory process, but culminates with the tangible product of a restored ecosystem. There are of course many paths that can be followed to achieve this goal, and the products of restoration projects may vary considerably. Nevertheless, the design of restoration efforts ultimately depends upon creating the conditions necessary for an ecosystem to flourish and determining the nature and extent of human interactions with the ecosystem. Jordan observes that "restoration can be hard work. But in the end it is mostly stepping back, letting be, listening, waiting for the system to respond and go about its business" (Jordan, 2003 p.77). Some degree of human intervention is generally required in ecological restoration projects. Key processes in restoration include identifying and addressing the actions leading to degradation in the first place, determining realistic goals and measures of success, developing methods for implementing the goals, and monitoring the restoration in order to assess its success (Hobbs & Norton, 1996). While most restoration designs start with a

common theme of analyzing the history of a place, thereafter they generally follow quite unique paths towards a final product. Some of the more challenging and recurring design themes include finding ways to develop harmonious interactions between humans and ecosystems, determining how to maintain focus on process, and ultimately how to restore ecosystems to their successional trajectory and a self sustainable path.

Careful design in restoration projects implies intention, makes us think about the past and future and can lead to engagement between people and the land. While the ultimate goal of ecological restoration design for this project is to restore an ecosystem to its natural trajectory and to restore its function as habitat for migratory birds, the design of restoration projects is as much about process as it is about the final product. Recognizing this through design offers greater potential for community building, enhanced relationships between people and natural spaces as well as increased opportunities for educational, recreational and scientific benefits. By intending to restore ecosystems through thoughtful, participatory, and transdisciplinary processes, and through a fusion of science and culture, restoration design is able to facilitate a humble dialogue and meaningful experiences between people and natural processes.

2.1.1 Defining Ecological Restoration

When it comes to good ecological restoration there is no one recipe for success. There are as many types and scales of ecological restoration projects as there are ecosystems, each of which is dynamic and on a continuously altering trajectory (Hobbs & Harris, 2001; Jordan, 2003). In characterizing good ecological restoration, a satisfying definition must be inclusive and tolerant of a wide variety of potential scenarios yet still give structure to the discipline as a whole. While many definitions have been presented the most widely acceptable ideas can be synthesized into the following:

> *Ecological restoration is a process that includes the complete set of ideas and practices (social, scientific, economic, political, etc.) involved in the recovery of the integrity of an ecosystem that has been degraded, damaged or destroyed and attempts to return an ecosystem to its historic trajectory (Synthesized from Higgs, 2003 & SER Primer, 2002).*

While the boundaries and definitions surrounding ecological restoration, as well as our values about nature, are likely to continue to evolve, it is likely that the core principles of ecological restoration – including ecological integrity and a commitment to history - will prevail. Equally important is recognition that ecological restoration projects focus on the things that matter most to a given community, culture or group of stakeholders. Accurately

incorporating these core principles of ecological restoration into practice requires carefully designed projects with clear goals about just what it is we hope to restore, how we are going to do so, and finally conscientious design of restored ecosystems that are ecologically accurate and ultimately self sufficient.

2.2 The Restoration of Culturally Significant Landscapes

Environmental degradation has impaired the functioning of not only ecological systems, but of cultural systems too (Apostol & Sinclair, 2006). This connection between culturally significant landscapes and ecological integrity is especially important for First Nation's communities who maintain a close relationship with their homelands (e.g. Turner, 2005). Despite this, the traditional ecological knowledge (TEK), values and interests of First Nation peoples have typically not been adequately considered in ecological restoration projects (Senos et al., 2006). First Nations ethics often stress an element of reciprocity, connectivity and accountability as well as a commitment to a deep and meaningful engagement between humans and the landscape (Turner, 2008). Embracing such a compassionate approach to restoration offers the potential to heal not only degraded ecosystems and support migratory birds, but also to revitalize threatened cultures and to heal our sacred relationships with the land. To employ these ethics in ecological restoration requires that we incorporate a wider and more holistic view of science – one that incorporates the TEK of local peoples.

2.2.1 Traditional Ecological Knowledge (TEK)

Traditional ecological knowledge can generally be defined as the unique body of local knowledge, beliefs and practices built up by First Nations or local communities through generations of living in close contact with nature (Johnson, 1992; Grenier, 1998; UNEP, 1992; Kimmerer, 2002). TEK is however more than merely this body of knowledge. It also includes the physical and spiritual experiences and relationships with the land and emphasizes the practical application of skills and knowledge (Berkes, 1999, Turner, 2005; McGregor, 2007; IPRN, 2007).

TEK is stored in peoples' memories and activities and is transmitted orally from generation to generation in the form of stories, songs, folklore, proverbs, dances, myths, cultural values, beliefs, rituals, community laws, local language, taxonomy, agricultural practices, equipment, materials, plant species and animal breeds (UNEP, 1992; Grenier, 1998). TEK tends to be collectively held and possessed to some degree by all members of

a community (UNEP, 1992; Grenier, 1998). This is because as Kimmerer states “traditional knowledge is woven into and is inseparable from the social and spiritual context of the culture” (2002 p.434).

While the roots of TEK are rooted firmly in the past, TEK is both cumulative and adaptive. TEK is cumulative as it represents generations of experiences and careful observations handed down by cultural transmission (Berkes et al.. 2000; Ford and Martinez, 2000). In addition to being cumulative, TEK is also considered to be adaptive and dynamic because it builds upon the experience of earlier generations and because it adapts to new technological and socio-economic changes (Johnson, 1992; Grenier, 1998). When viewed from a Western perspective, TEK may include empirical knowledge of population biology, resource assessment and monitoring, fluctuation in climate, species interactions, sustainable harvesting, adaptive management as well as a system of self-management that governs resource use (Johnson, 1992; Kimmerer, 2002; IPRN, 2007). Yet while there are similarities between TEK and Western science it is important to acknowledge that these two ways of knowing are distinct.

2.2.2 Comparing TEK & Western Science

Traditional ecological knowledge and western science share a number of basic similarities yet are also very different in several important ways. These similarities and differences are highlighted in Table 2.1. It is important to realize that there are a variety of TEK systems throughout the world as well as a variety of different traditions in Western science – many of which (including the discipline of ecological restoration) now embrace a trans or interdisciplinary approach (IPRN, 2007). It should also be noted that these two world views are not in opposition. The best restoration projects will be those that incorporate both ways of knowing into their conception, planning and design.

Table 2.1: Comparing Western Science and Traditional Ecological Knowledge

Similarities	
• Both are based on an accumulation of observations. • Both are cumulative and dynamic processes and bodies of knowledge that build upon collective wisdom, practical experience and adaptation to change over time. • Both have been transmitted generation to generation within their respective cultures. • Both yield detailed empirical information of natural phenomena and relationships. • Both recognize the accelerating loss of animal and plant species and of habitats as a major ecological problem and seek to sustain or increase biodiversity and productivity. • Both knowledge systems embrace beliefs in a self-regulating biosphere (e.g. Gaia hypothesis).	
Differences	
Western Science	**Traditional Ecological Knowledge**
• Uses the written word and formal peer dissemination.	• Has traditionally been recorded and transmitted orally.
• Is learned in a situation often abstracted from the applied context.	• Is learned through observation and hands-on experience.
• Enables humans with the right to control nature for their own interests at the expense of other life-forms.	• Does not view human life as superior to other animate and inanimate elements: all life-forms are interdependent.
• Is reductionist and breaks down data into smaller elements to understand whole and complex phenomena.	• Is holistic - all elements are viewed as interconnected and not understandable in isolation.
• Strives to expand its ability to measure and quantify observations in an attempt to verify its hypothesis on a global basis.	• Is place based and largely dependent on local social mechanisms.
• Is analytical emphasizing abstract reasoning and the need to separate oneself from that being observed and to learn about it through replicable measurements.	• Emphasizes emotional involvement and subjective certainty of understanding.
• Is mainly quantitative, generalized and synchronic (i.e. short term observations from a range of sites).	• Is qualitative, specific and diachronic (i.e. observations from a single locale over a long period of time). The knowledge base is highly localized. This makes traditional knowledge particularly applicable to restoration design, which is also site specific.
• Employs methods of generating, testing, and verifying hypotheses and establishes theories and general laws as its explanatory basis.	• TEK explanations of environmental phenomena are often spiritual and based on cumulative, collective experience.
• Researchers are often not community members and not intimately connected to place.	• Observers tend to be the resource users themselves – the hunters and gatherers whose harvesting success is inextricably linked to their ecological observations.
• Is hierarchically organized and vertically compartmentalized. Managers are distinct from harvesters; authority becomes centralized and flows from the top down.	• Is rooted in a social context where the world is seen in terms of social and spiritual relations between all life-forms. Relations are based on reciprocity and obligations toward community members and other life-forms.
• Prides itself on data that is “value free” and completely objective.	• Is woven into and inseparable from the social and spiritual context of the culture. • May also extend its explanatory power beyond the strictly empirical. • Includes an ethic of reciprocal respect between humans and the nonhuman world.

Adapted from: (IPRN, 2007; CSSP, 2005; Kimmerer, 2000 & 2002;; Berkes et al.. 2000; Johnson, 1992; Grenier, 1998)

2.2.3 TEK and Ecological Restoration

Western science is a vital element of restoration efforts. This knowledge however is limited and is incapable, in itself, of understanding the complexity of ecological, social, cultural, economic and political challenges that confront conservationists (Gadgil et. al, 1993; Grenier, 1998; Kimmerer, 2000). Higgs adds that science also "gives more weight than it should to our particular view of things, instead of understanding this view as historically and culturally contingent" (Higgs 2003, p.201). As Kimmerer (2002) points out, "the complex issues of environmental sustainability require a diversity of intellectual approaches and can benefit from a thoughtful consideration and incorporation of traditional ecological knowledge" (p.434). TEK has the potential to be complementary to western science, help facilitate biodiversity conservation and lead to more successful ecological restoration projects that restore not only ecosystems and habitat for migratory birds, but also cultural traditions, languages and knowledge. This inclusion of TEK is especially important in the ecological restoration of culturally significant landscapes.

Interest in TEK has been growing in recent years in recognition of its fundamental importance in the conservation and management of local resources (Berkes et al.. 2000; Turner et al., 2000). Turner et al. (2000) emphasize that the "practices of aboriginal peoples to maintain and enhance their lands, waters, and living resources are derived from generations of experimentation and observation, leading to an understanding of complex ecological and physical principles" (p.1276). These practices, and the knowledge entrenched within them, are now being seen as having the potential to work harmoniously with the traditional sciences – such as ecological restoration (see Table 2.2).

The incorporation of TEK offers the potential for new solutions to restoration projects and also may present different questions that would not otherwise be posed (Apostol & Sinclair, 2006). Perhaps the greatest underlying theme to be embraced from TEK systems is "the notion of respect for all life forms and for the land itself" (Turner et al., 2000 p.1279). This traditional ethic provides a basis for considering restoration "as a process of engagement with nature, a way to sustain or repair relations with the living world [and to] develop viable cultural, economic, and ecological practices that support and nurture our shared environment" (Apostol & Sinclair, 2006 p.398). As Turner et al.. (2000) explain, in TEK systems the environment is seen as a whole:

> *All the parts are interconnected in a seamless web of causes and effects, actions and outcomes, behaviors and consequences. People, animals, plants, natural objects, and supernatural entities are not separate and distinct. Rather, they are all linked to each other and to the places where they reside through cultural traditions and interactive, reciprocal relationships. Because of the integration of the secular with the spiritual, of the past with the present, and of all parts of the living universe, people have a sense of spiritual and practical respect for their lands, waters, and all the environmental components that they recognize. The spirituality of these elements, and their power to influence the success and well-being of humans, has been an integral part of traditional cultures (Turner et al., 2000 p.1279).*

Another aspect of TEK that is especially conducive to restoration projects, is the fact that TEK embraces the concept of local, experiential knowledge of species and ecosystems – a component that is often overlooked in western scientific approaches (Grenier, 1998; Berkes et al.. 2000). TEK recognizes the "different strengths of multiple understandings and explicitly incorporates the cultural experience of the observer into interpretation of the natural world (Kimmerer, 2002 p.435). By valuing the contributions of the community and of resource users themselves in the restoration process, ecological restoration projects are much more likely to achieve their goals (Geist and Galatowitsch, 1999).

The TEK worldview incorporates reciprocal relationships between humans and ecosystems that underlie the caretaking traditions of First Nations peoples (Kimmerer 2000; McGregor, 2007). For example, in many communities First Nations elders remind the youth that they need to watch over and take care of life-sustaining resources to ensure that they will be available for future generations (Long et al.., 2003).

TEK has the potential to be enormously valuable in restoration planning and design. It should be troubling then that it is not only the many species around the world that face extinction, but also the cultural diversity, language, and knowledge systems of First Nations peoples that are threatened. Threats to TEK and First Nations cultures have come from a variety of sources including: rapid population growth, growth of international market economies, coercive educational systems such as the former Canadian residential school system, environmental degradation that has threatened traditional ways of living, and insensitive development processes that have forced rapid modernization and cultural homogenization (Grenier, 1998; Turner et al., 2000). While the impacts have varied amongst communities, Turner (2000) believes that "traditional knowledge among younger generations, in most indigenous groups, has inevitably diminished as assimilation and environmental change have escalated" (p.1276). Because much of the past deterioration of TEK was likely the result of an inability, to hand down important knowledge to younger generations it is important to seek out opportunities for the expression of this knowledge such as through ecological restoration projects.

One of the challenges that stands in the way of the use of TEK is the fact that many of the First Nations languages – within which this knowledge is held – are rapidly being lost. The impact of such a loss to both present and future generations and the role in which language plays in the transmission of TEK can not be understated. For example, many of the younger members of an First Nations community may be unfamiliar with all of the subtleties of the First Nations language making it difficult for complete knowledge transmission to occur (Johnson, 1992). First Nations languages "describe ecological conditions and processes, cultural-ecological relationships, and a way of understanding the environment" that can greatly complement western science and restoration practitioners (Apostol & Sinclair, 2006 p.422). Furthermore, traditional languages create a link between the conservation of biological diversity and the conservation of cultural diversity (Kimmerer, 2000; Brush & Stabinsky, 1996, Senos et al.. 2006). It is vital to recognize that in order for TEK to survive and be applied to modern restoration projects, so too must the language in which it was originally embedded (IPRN, 2007).

The TEK of First Nations peoples, having co-evolved with the very ecosystems that we as restoration practitioners seek to conserve, provides a strong foundation for ecological restoration (LaDuke 1994, Kimmerer 2000, Turner et al.. 2000). Thoughtful efforts to incorporate both Western science and TEK can lead to a new approach to restoration that incorporates the best of both systems of knowledge, extending the scope of "natural" sciences into the realm of human "cultural" interactions with the natural world. (Kimmerer, 2002; Long et al.., 2003; Ford & Martinez, 2000; Higgs, 2003; Senos et al., 2006). In culturally significant landscapes such as ȾIX̱EN̲, an "ethnoecological" approach to restoration that is guided by the TEK of local peoples offers great potential to restore the ecological integrity of ecosystems, support biodiversity conservation (including that of migratory birds), as well as revitalize cultural relationships, traditions and connections to the land.

Table 2.2: TEK and Ecological Restoration in Action

Huckleberry Crop Management	• Huckleberry crops have traditionally been important foods for First Nation communities in the Pacific Northwest. These crops were managed with fire and pruning to ensure optimal production. These practices have ceased in recent years and production of crops has declined. • In Oregon, the U.S. Forest Service has been working with local indigenous tribes to incorporate TEK with forestry practices and silvicultural treatments to enhance the productivity of huckleberry crops. By understanding and incorporating traditional management practices into forest restoration practices the partnership has been able to restore production of the crops and restore the mosaic of shifting successional patches within the forest.
Wildlife Crossing Design	• In Montana, U.S. Highway 93 runs through the Flathead Indian Reservation. This road was considered to be one of the most dangerous in the country and it was proposed that it needed to be widened. The existing highway already impeded wildlife migration, disrupted hydrologic flow and had negative impacts on the traditional values that local indigenous communities associated with the area. • Rather than haphazardly widen the road, the local Montana Department of Transportation partnered with indigenous communities, landscape architects and engineers to produce a more preferred alternative. • This process respected the cultural and social values of the local peoples and recognized that the origin stories for these communities were tied to this place. The road was treated as a visitor to the landscape and the design was altered from a four lane highway to a variable lane road that avoided sensitive areas (as identified through the TEK of local peoples). In addition to altering the roadway design, the process also led to the restoration of ecosystems that had been damaged by the original Highway 93. Wildlife crossings were designed an installed at locations identified based on evidence from TEK (such as that of hunters) and ecological research. The result was a project that respected the cultural and ecological values of the area while simultaneously enhancing the safety of Highway 93.
Camas Harvesting	• First Nation communities around the world have suffered from the effects of a “nutrition transition”. Diverse, healthy diets of local foods have been replaced by less nutritious processed foods. This has resulted in health concerns as well as contributed to a loss of cultural identity. • On Vancouver Island the Songhees Nation has been working to revitalize the traditional practice of harvesting the bulbs of the camas plant. These bulbs were once a staple part of the Songhees diet but had not been eaten, nor had the patches where they grow been tended to, in decades. Furthermore, many of the areas that once supported camas on southern Vancouver Island have been altered by grazing, invasive species, fire suppression and the encroachment of forest. • The Songhees desired to revitalize this traditional food as well as the associated practices of tending to the crops. In conjunction with students and professors from the University of Victoria, areas of land that once supported camas were burned and camas seed was spread. Traditional pit cooks were held to celebrate the harvesting of the camas. By incorporating the TEK of Songhees elders into the design of restoration practice – this project has been able to restore traditional management practices, enhance community participation and once again utilize the landscape in a way that is sustainable to both people and ecosystems.

Examples from Senos et al., 2006

2.3 An Ethnoecological Approach to Restoration at ȾIXEN

While defining “ethnoecological” restoration it should be noted that there are also other terms (notably “eco-cultural” and “focal” restoration) that have been used in the literature surrounding restoration projects that embrace this dual mandate of ecology and culture. Emerging from the discipline of ethnoecology, the term ethnoecological restoration was chosen for this project because it emphasizes both elements (ecology and culture) that are involved in the process in an equal way – thus maintaining focus on each element of the overall restoration effort.

The term eco-cultural restoration has been widely used in the literature. The theories and wisdom presented by scholars such as Rogers-Martinez (1992), Berkes (1999), Turner (2005) and Senos et al.. (2006) surrounding eco-cultural restoration are tremendously insightful. For example Turners 8 elements of eco-cultural restoration (presented in table 2.3) bring clear guidance to restoration practitioners working on culturally significant landscapes and provide significant support for the restoration of ecosystems and cultural practices (Turner, 2005). The term “eco-cultural” restoration rolls smoothly off the tongue and absolutely brings insight to restoration practitioners working on culturally significant landscapes. What is concerning however, is that both the term itself, as well as the literature surrounding the term, places focus unevenly on the cultural side of the pendulum – treating the “eco” portion with less attention than the “cultural” and less than the equal attention it deserves. Furthermore, the very notion of cultural restoration is troubling in itself. For can a culture actually be restored to something that it once was? Or is it more appropriate to recognize that cultures are continually evolving and adapting?

Another term that offers guidance for the restoration of culturally significant landscapes, and encourages many of the elements that should be included in an ethnoecological approach to restoration, is that of “focal” restoration (Higgs, 2003). A focal approach to restoration highlights the importance of directing attention towards exactly what it is that we seek to restore and understanding how it fits within the broader ecological, cultural and social setting. Focal practice extends beyond important things to important practices. It is therefore as interested in the process of restoration as it is in the end products. Focal practices often include the “challenging, skillful, sometime tedious activities required to keep something of value alive” (Higgs, 2003 p.244) that are often pushed to the side in conventional restoration projects. Certainly a focal approach to restoration promotes good ecological restoration and suggests that we must look beyond merely the ecosystems

Table 2.3: Turner's 8 Elements of Eco-cultural Restoration

Humans with Nature	Humans are an integral part of their habitat, their home place, rather than being apart from Nature, or superior to and in control of Nature.
Rooted Cultures	When a person's cultural identity is closely linked to their ancestral lands they have a high incentive to care for them.
Elders Wisdom & Experience	Recognizing the wisdom and experience of community elders. Knowing the past is crucial in any restoration effort. In eco-cultural restoration projects, which incorporate culture and human history as an integral component of ecosystem restoration, the elders – the people who have lived the longest in a place – are the best sources of such traditional knowledge, oral history, language and cultural protocol. The elders' guidance is therefore vital in developing a sustainable future.
Youth & Education	It is the youth who will carry forward the knowledge and values of the project for future generations. Eco-cultural restoration may require continued – even indefinite – monitoring and investment of time, attention and skill. This can only take place if today's youth recognize the value of ongoing involvement and learn how to contribute and to commit themselves to the projects' continuing development and success.
Local languages	Using local language is an integral component of each initiative. Languages mould themselves to a particular place; their vocabulary and cadences harmonize with the surrounding landscapes, often embodying unique nuances and reflecting meanings incapable of translation.
Ceremonial Recognition	Recognizing in ceremony – songs, rituals, dances, feasts – people's relationships with each other, across families, clans, communities and generations, as well as with their other relatives – the animals, fish, trees and all the other elements of creation.
Diversity	The best possible success will be achieved when the contributions and skills of many people, both within the culture and outside it, are incorporated.
Patience & Persistence	"Go slow; make no mistakes" – It doesn't mean that one should not take action, but rather should carefully consider all of the aspects and potential pitfalls, and then make the best possible choices. Initiatives that are aimed at enhancing eco-cultural systems must anticipate a long time frame, extending far beyond a single lifetime. Benefits of the steps we take today to restore and enhance our ecosystems may not be fully realized for many years, and we have to instill patience and persistence in our outlooks. Only patience and education will win others over to a gentler treatment of the earth.

Adapted from: (Turner, 2005)

themselves to the broader cultural systems with which they interact. However, the restoration of culturally significant landscapes poses distinctive challenges and necessitates a term and corresponding set of guidelines that are more precise than those delivered by focal restoration practices.

The restoration of culturally significant landscapes, such as those used by First Nations communities, demands that equal focus be placed upon the ecosystems and cultural relationships to such ecosystems. These projects necessitate and deserve specific guidance and are also deserving of a term that encourages the dual mandate of restoring the integrity of ecosystems through good ecological restoration and also nurturing the

cultural connection to these paces through the use of TEK and the incorporation of traditional community values.

2.3.1 Defining Ethnoecological Restoration

Ethnoecological restoration projects are those that seek collaborative, symbiotic partnerships between ecological science and traditional ecological knowledge (TEK) in an effort to restore the ecological integrity of culturally significant landscapes. Such approaches therefore begin to answer the call from numerous restoration scholars for a wider, more holistic approach to restoration that overcomes the discordance between natural and cultural landscapes (e.g. Higgs 2005; Naveh, 1998; Long et al.., 2003). This connection between biological diversity and cultural diversity – between people and the landscape – is vital to the success of many restoration projects. For example, during the 1995 meeting of the First Nations Peoples Restoration Network it was stated that:

> *Ecological restoration is inseparable from cultural and spiritual restoration, and is inseparable from the spiritual responsibilities of care-giving and world renewal. Collectively and individually, these indigenous spiritual values must be central to the vision of ecological restoration. Western science and technology…is a limited conceptual and methodological tool; the "head and hands" of restoration implementation. Native spirituality is the "heart" that guides the head and hands (SER, 1995).*

Higgs (2003) places a strong emphasis on the need to reestablish human relationships with the land being restored, to engage people at the community level and to seek to restore more than just the natural environment. These principles all resonate strongly in the practice of ethnoecological restoration. Kimmerer (2000) adds that in an ethnoecological restoration project "restoring a relationship to land is given equal weight with restoring the structure and function of the ecosystem" (p.6). For many First Nations communities ethnoecological restoration projects offer the ability to use the tools of ecological restoration to enhance the survival of culture and language and to incorporate traditional knowledge into models of ecosystem management (SER, 1995). This ability to integrate the cultural practices and TEK of First Nations communities with the restoration of ecological systems and processes in a mutually reinforcing manner is what makes an ethnoecological approach to ecological restoration especially inspiring (SER, 2002).

The success of ethnoecological projects depends upon empowering local First Nations communities. Local peoples should be involved throughout the life cycle of the restoration project, should be recognized for this contribution and treated with equal authority and

respect (Johnson, 1992). By supporting and working to revitalize cultural traditions, ethnoecological restoration projects are more likely to sustain the collective action needed for successful restoration work by "providing a vision for restoration, a sense of place and community, and guidance for decision-making" (Long et al.., 2003 p.10). This concept is extremely important for restoration projects, which often rely upon long-term commitment and participation of local people.

As is the case with all restoration projects there are a tremendous variety of ethnoecological restoration projects and a wide range of possibilities for incorporating TEK into restoration practice. As a result there is no one recipe for success. However the following are principles that are encouraged by good ethnoecological restoration practice:

- Recognition of the longstanding spiritual connection of First Nations peoples to their homelands and that ecological and cultural integrity are inseparable in many landscapes.
- Emphasis of the need to start slowly and build relationships between project participants as well as the need for a humble, patient, determined, sensitive, flexible, creative, unconventional, open minded and cautious approach to restoration (Grenier, 1998).
- Understanding of the importance of keeping an open mind in terms of restoration design and not starting out with a predetermined vision.
- Incorporation of the best practices of ecological restoration – those that recognize that ecological integrity and a commitment to the historical trajectory remain paramount.
- Respect for the knowledge and involvement of a diversity of stakeholders.
- Commitment to define exactly what matters most to the various stakeholders – understanding community values and designing restoration intent, process and products to be harmonious with these cultural foundations.
- Engages with the wisdom and experience of local community members including elders, youth, men and women – for it is these people who have the greatest knowledge and incentive to care for the land (Turner, 2005).
- Is guided by a process that explicitly encourages the revitalization or awakening of TEK, cultural practices and engagement with the landscape such as through celebrations, art, gathering of traditional foods and medicines, and language.

2.3.2 The Foundations of Ethnoecological Restoration

In order to facilitate an ethnoecological approach to restoration it is necessary that project participants respect and value TEK. Throughout the history of ecological restoration this has not been the case. For example, Higgs (2005) raises the concern that "although both forms of knowledge are important [TEK and Western science], typically only scientists are considered experts" (p.162). Many Western scientists have expressed significant skepticism about the current value of and applicability of TEK systems that have been depleted over the past several generations (IPRN, 2007; Johnson, 1992). Yet while there has certainly been significant erosion of the wealth of traditional knowledge that once existed, we must

recognize that TEK is adaptive. The foundations and essential principles of First Nations knowledge systems remain and are evolving, not dying (Johnson, 1992; Deur & Turner, 2005; Berkes & Turner, 2006).

Skepticism also surrounds the role that ritual, myth and spirituality can play in confronting "real world", objective environmental problems (Carter, 1993). Western science tends to adhere to a rigidly defined, solitary and inflexible set of institutions. However, Higgs points out that science alone is "ill equipped to deal with thorny moral questions, matters of spirit, ineffable phenomena that lie beyond direct observation" (2005 p.162). Because of this, many environmental scientists reject TEK as "anecdotal, non-quantitative and amethodical" (Johnson, 1992). As a result of these judgments "TEK still does not command respect as a separate valid or equal knowledge system among the general population of scientists and rarely are indigenous peoples with this knowledge included in decision-making processes beyond the local (or token) level" (IPRN, 2007). Equally concerning is the fact that, even among the scientists who do acknowledge TEK systems, they generally apply familiar scientific categories, methodologies and terminology that may be inappropriate or may inaccurately reflect the sometimes subtle knowledge conveyed through First Nations language and practices. Because of this, as Johnson (1992) explains, some of the insight traditional knowledge may have to offer about First Nations plants, animals, and elements may be "lost in translation". At present, it seems that while TEK is becoming more familiar in the Western scientific community, there is still not a widespread acceptance of First Nations knowledge or the desire to embrace a wider view of science.

What many scientists who have questioned the spiritual nature of TEK have failed to recognize is that such beliefs often conceal deep and meaningful insights about ecological concerns, management practices and conservation strategies. As Johnson (1992, pg.11) explains, the spiritual aspect of TEK does not in any way detract from the ability to make appropriate decisions but "merely indicates that the system exists within an entirely different cultural experience and set of values, one that paints no more and no less valid a picture of reality than the one that provides its own frame of reference". Turner (2000) emphasizes the importance of the spiritual component of TEK in stating that "in order for TEKW to be incorporated appropriately into current ecosystem-based management strategies, the complete context of TEKW, including its philosophical bases, must be recognized and respected" (p.1275). When it comes to facilitating ethnoecological restoration projects "mutual understanding requires mutual respect, an investment of time, and a willingness on

the part of Western scientists to accept that TEK is grounded in moral, ethical, and spiritual world views" (Ford and Martinez ,2000 p.1249).

An ethnoecological approach to restoration explicitly seeks collaboration between the natural and cultural sciences. In order to achieve this goal, ethnoecological endeavors must include a willingness to understand First Nations beliefs, consider and contextualize this content, and incorporate each of the two knowledge systems in their entirety so that they may effectively complement each other. For example, one way to embrace First Nations knowledge, empower local communities and encourage participation in ethnoecological restoration is through ceremony and celebration (Berkes et al.. 2000; Kimmerer, 2000). Because much of TEK does not exist on paper, a great deal of ecological knowledge is embedded in ceremonies and other social institutions. TEK must be formally recognized as an essential part of the project and that the bearers of this wisdom are included in the local decision making and management process (Grenier, 1998; IPRN, 2007; Johnson, 1992; Apostol & Sinclair, 2006). This will enable the integration and collaboration between the two knowledge systems to more meaningfully occur.

This chapter has introduced the elements of good ecological restoration, acknowledged that in certain culturally significant landscapes require a distinctive approach to restoration that includes the TEK of First Nations peoples, and has examined how to harmoniously incorporate TEK and Western science. An ethnoecological approach to restoration has been presented and the foundations necessary for facilitating such an approach have been discussed. Effectively facilitating an ethnoecological restoration project poses a number of distinctive challenges to restoration practitioners. It is a difficult, yet tremendously worthwhile task. Among the many benefits of embracing an ethnoecological approach to restoration is that such projects can create meaningful opportunities to restore habitats and support biological diversity (including migratory birds) while at the same time creating opportunities to revitalize cultural practices and languages, empower local communities and facilitate collaboration between TEK and Western science. Respect for TEK provides the foundation for facilitating an ethnoecological approach. Supported by the literature surrounding eco-cultural restoration such as Turners 8 steps, and by the principles of good ecological restoration, Chapter 5 proceeds from this point and discusses the journey towards the ethnoecological restoration of ȾIȽEN as well as introduces a set of guidelines for ethnoecological restoration practice.

Chapter 3: Project Methods

In this chapter I describe the methods used to answer the research objectives of this thesis. Research for this thesis was conducted from September 2006-April 2008 using a variety of quantitative and qualitative research techniques. The main procedures included a literature review and process of networking, an avian inventory, an inventory of human influence, and a series of interviews with members of the project working group as well as Tsawout First Nation community members.

3.1 Literature Review and Networking

Early in my research, prior to becoming involved with the project at ȾIXEN and Island View Beach, I conducted an initial review of the literature underpinning topics such as: habitat networks, approaches to habitat conservation, conservation partnerships, conservation strategies for migratory species, bird migration, neotropical migratory birds, habitat fragmentation, and ecological restoration. This involved a thorough search of journals, books, web sources and other students' theses. An additional and invaluable source of information was having conversations with local people who are involved in areas related to my initial thesis topic. Several people were able to send me additional literature or refer me to other people who were involved with bird conservation or habitat restoration. I met with a number of different individuals from local conservation groups, the Victoria Natural History Society, Gulf Islands National Park as well as professors from the University of Victoria, the University of British Columbia and Simon Fraser University. This networking process was ultimately how I made contact with the Canadian Wildlife Service and became a member of Cordova Bay Spit Project Working Group (CBSPWG).

The CBSPWG consists primarily of representatives from the Tsawout First Nation, SENĆOŦEN Alliance, Canadian Wildlife Service, Capital Regional District, University of Victoria (including myself) as well as representatives from the British Columbia Conservation Data Center, Municipality of Central Saanich, Tsawout Tribal Schools, and a variety of other interested parties on occasion. This working group would meet every 2 to 3 months at the Tsawout First Nation administration building to discuss the status of the project, current initiatives, funding for the project, etc.

As my project evolved and took shape it became clear that my study focus was expanding to include an ethnoecological approach to conservation and habitat restoration.

This led to an expanded literature review that included the themes of community based research, working with TEK, ethnoecological approaches to restoration as well as social science research methods for conducting interviews and the relevant literature surrounding working with First Nations communities.

3.2 Ecological Site Inventory

In order create an overall restoration plan it is an essential first step to understand the present and historic state of this ecosystem. A detailed assessment of the ecosystem types, ecological characteristics, species present, and adverse impacts must, by necessity, precede any restoration planning or action (SER, 2002; Parks Canada, 2008).

At the start of this project very little existed in terms of ecological data for the study site. The area had been identified in the 1995 CWS sensitive ecosystems inventory (McPhee et al., 2000) but few details about the ecosystem had been recorded. Similarly, while it was known that a number of rare plant and animal species inhabited the ecosystem, the specific locations and status of these populations was largely unknown. In terms of avian data, very little existed in part because the area falls between two Christmas Bird Count (CBC) zones and much of the study site is First Nation property.

One of the initial tasks of the Cordova Bay Spit Project Working Group (CBSPWG) was to begin to document and assemble this missing baseline ecological data. Much of this work was carried out or facilitated by the CWS and CRD. For example, a rare plant specialist was hired the spring of 2007 to find and document all rare, BC listed or nationally endangered plants located at the site. The rare plant study also identifies threats to rare biota and makes recommendations for priority conservation actions (see Appendix H). Ethnobotanist Dr. Nancy Turner also volunteered her time to document many of the culturally significant plant species in May of 2007. In addition, a broad ecosystem mapping exercise was carried out during the summer of 2007 by the BC Conservation Data Center (CDC) (according to Provincial standards for Terrestrial Ecosystem Mapping) on behalf of the CWS and CRD. This initially involved delineating bio-terrain features within the landscape and subsequently subdivided based on vegetation features. Additional attributes that were mapped included structural stage, soil drainage and disturbance. A final report was prepared by the CDC in August of 2008 that included descriptions of all ecosystems mapped with a list of dominant vegetation and physical attributes of the site where the ecosystems occurs.

In addition to these activities, it was also necessary to document all known areas where undesirable impacts to the ecosystem have occurred. In some cases these impacts are

very obvious, such as areas where 4x4 vehicles have driven. However, in order to identify all adverse impacts it was essential to uncover the history of human influences to this site.

As part of my field work I documented all areas where the landscape was known to be altered by human disturbance. The first step in this process was obtaining recent (2005) and detailed (1:1500) air photos from the CRD Natural Areas Atlas web site (CRD, 2007). A series of high resolution maps of the entire study site were downloaded and merged into a composite map using Adobe Photoshop CS3. This allowed for a single map to be created that showed a high level of detail of the study site. The resulting high resolution map was printed in 15 12x18inch sections to be used in the field.

Mapping the contemporary human influences to the study site involved 6 field visits during the summer of 2007 where the locations and types of impacts were drawn on to the printed map sections. This included “heavily impacted areas”, “moderately impacted areas”, “invasive species”, “buildings”, as well as unique landscape alterations such as the construction of a berm (See Table 3.1). Due to the high resolution of the printed maps, and the fact that the entire study site was mapped over the course of a two week period, it was possible to comprehensively document the locations of these impacts with a high level of spatial and temporal accuracy (error range of less than one meter). Upon completion of this mapping exercise, the data was turned into a multi-layer map using Adobe Photoshop CS3. Each of the impacts was turned into a separate layer that can be overlaid on to the high resolution composite air photo. I chose not to use a GIS system for this field work because of my lack of experience in this area and because the BC CDC informed me that due to the high level of detail and the limited geographic area that the map would be able to be overlaid onto the Terrestrial Ecosystem Mapping that they were conducting without the use of GIS.

In addition to this field work, I also spoke with the CRD parks staff member who had been in charge of the operations of IVBRP since the early 1980’s, and who was extremely knowledgeable about the history of this area. Additional information was synthesized from a variety of sources including historic photos, survey notes, maps, air photos and conversations with long-term park users (encountered while conducting inventory). Collectively this material was assembled into chart form and/or added to the high resolution map (See table 4.3 and Figure 4.2).

Table 3.1: Explanation of Mapping Categories

Mapping Category	Explanation
Heavily impacted areas	These areas have natural vegetation that had been highly altered by human influences. Often these areas are established or former roads, trails or areas where the sand dunes show obvious and well established vehicular or pedestrian traffic.
Moderately impacted areas	These areas have natural vegetation that is obviously modified from its original status – but that was still present. These areas may have been undergoing a natural process of recovery.
Invasive species	Invasive species included most commonly Scotch Broom, Gorse and non-native blackberries. In areas with modest invasions individual plant locations were mapped. Intensive invasion areas are delineated by larger polygons.
Other categories	Other categories that were mapped included any buildings or man made structures, the large berm that has been created, as well as current restoration sites.

3.3 Avian Inventory

The second component of my field work was to provide a comprehensive list of avian species that inhabit the study site including comments about migration timing, habitat areas used and relative abundance. Such baseline ecological data will help to guide management decisions and provide a reference to which any future changes to the avian composition of the area can be assessed (Terborgh, 1989).

Data were collected during 61 site visits throughout the year (April 16, 2007 - April 9, 2008). Site visits generally took place during the morning between 6:30 and 8:00. This time window during the mornings was selected as the ideal time to monitor because this is when birds are generally the most active and therefore easy to find and identify. This time window also allowed for there to be sufficient light to spot and identify birds. Any later in the mornings and the birds would have been less active and therefore more difficult to detect. Monitoring sessions were timed to correspond with major avian phenological events including spring and fall migration as well as breeding and wintering seasons. The timing of field visits was based on information found in the Victoria Natural History Society's bird checklist. I identified optimal windows for spring and fall migrants based on the times of year that migratory species are most common in Victoria (April 16 – June 5 and August 3 – September 26).

Rather than utilizing standard point count methodologies (e.g. as used in Easton and Martin, 1998 or Ralph et al., 1993) for monitoring the avian inventory I chose to do a more comprehensive inventory that sampled birds from the entire study site. The rationale for doing this was that the study site was small enough that it was possible to walk through the entire area each session. Because I was primarily interested in identifying as many species

as possible I was concerned that adhering to standard point count methodologies could mean that I would miss species that did not fall within the range of my scheduled point counts.

During each monitoring session I walked a pre-determined route that systematically worked its way through the study site. I broke the habitat up into eleven separate areas at the spit and four areas along Island View Beach (see figure 3.1). I did this so that I could identify and record more specific locations for each of the avian observations. I proceeded to walk through each of these sections in order during each monitoring session. Dividing the habitat up in this way would also later allow me to analyze whether there was any statistically significant preference for any of the exclusive dune habitat areas over another.

Each monitoring session took approximately two to three hours from start to finish. I recorded all birds that were identified (by sight or sound), the number of birds present and the location of each sighting. Additional observations included any nesting activities observed, typical habitats used by each species and any disturbances to the birds (e.g. from site visitors, dogs or ATV's). In addition to site visits, records were kept of all additional avian observations documented by the local birding community (e.g. from the Victoria Natural History Society, on rare bird alerts and local birding websites). Once the data were collected they were summarized into tabular format and presented to the Victoria Natural History Society for additional sightings (See Appendix G).

In addition to the current species list I compiled a list of species formerly observed at the site or species whose numbers have apparently declined. This information was compiled from a variety of sources including the local birding community (the Victoria Natural History Society, B.C. Conservation Data Center and regional Christmas bird counts). The results from these data are intended to add an additional component of ecological understanding at this site and contribute towards the overall restoration plan for the area.

Once I had collected all of the avian data I performed a Chi Square analysis for killdeers - one of the "dune specialist" bird species. I selected to perform this test on Killdeers because they were often found using the dune habitat areas – including a nest site in the summer – and would therefore be an appropriate species to illustrate how this type of statistical test could be used for other species. I selected killdeers instead of other dune specialists because they are found throughout the year and were observed regularly at the study site (as opposed to other species that were only observed on a few occasions during a small time window).

The Chi square test is used to compare the difference between relative frequency of observed events to the frequency expected based on the assumption that is to be tested (i.e. whether two variables are statistically dependent or not). This test determines how closely experimental observed values for a given bird species (e.g. the number of killdeer found in a given habitat area) fit theoretical expected values (those that would be expected if the variables in question were statistically independent). The purpose of this test was to see if killdeers showed any statistically significant preference for any of the exclusive dune habitat areas over another (areas 5, 6 or 7 as shown in figure 3.1).

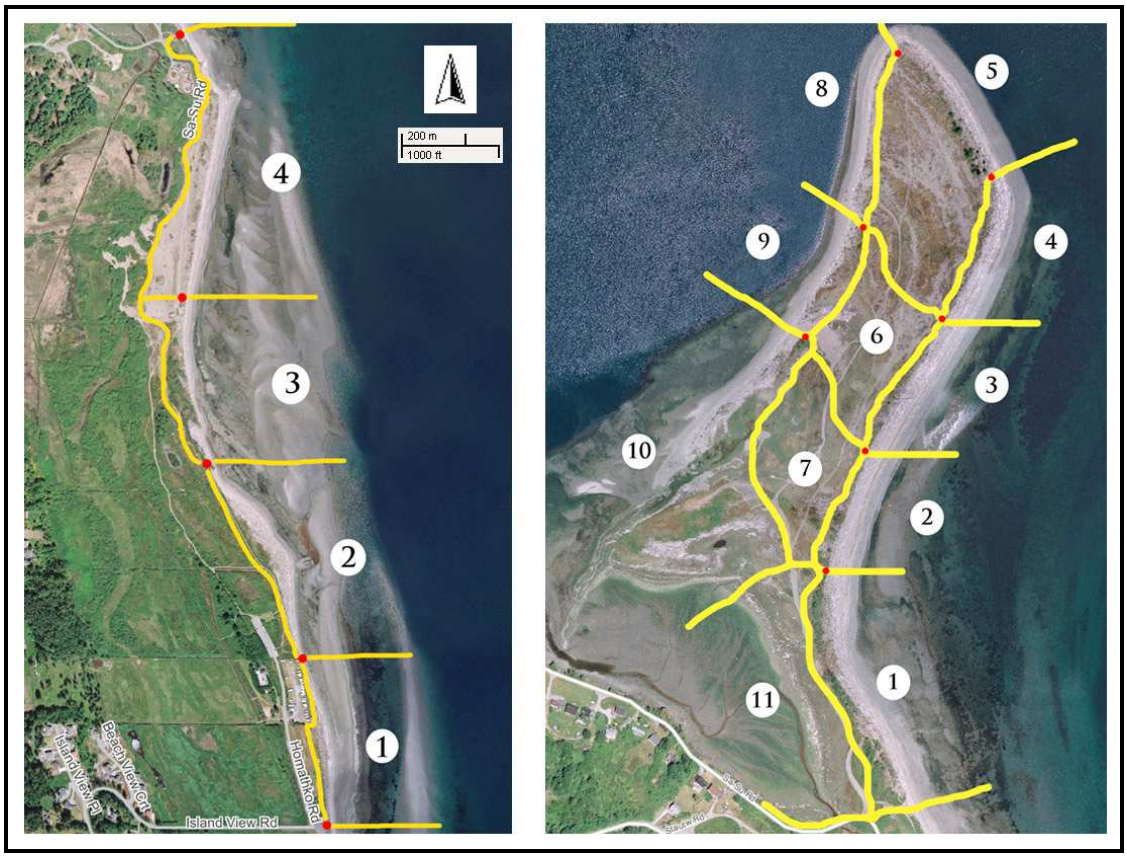


Figure 3.1: Avian Monitoring Sections
The image above shows the four sections at Island View Beach and the eleven sections at TIXEN.

3.4 Community Interviews and Participation

In addition to ecological field work and the knowledge necessary to construct an adequate restoration plan for this project, as my project evolved, it became essential to include social science methodologies in the form of formal interviews in order to better understand the values and beliefs of the Tsawout First Nation community and also to obtain additional input from the CRD and CWS (Grenier, 1998). Throughout this study, I have attempted to gain a greater understanding of the history and cultural significance of the ȾIXEN dune ecosystems for the Tsawout community. Much of this initial learning took place during my field visits to the study site where I was often joined by members of the local community. More formal engagement with Tsawout community members as well as CRD and CWS representatives occurred during a series of semi-structured interviews held between November of 2007 and February of 2008.

The primary goals of the interview process were to enhance Tsawout community involvement in the restoration planning exercise, and to conduct a values assessment within the community. I also wanted to interview representatives from the other two major stakeholders in this project (CWS & CRD) in order to understand how their organizations values compared to those of the Tsawout community.

A semi-structured interviewing and listening technique was chosen for its open framework and ability to elicit focused, unthreatening, two-way conversation between the interviewer and interviewee (Corbett, 2003). This interview technique involves using open ended questions that can be modified or expanded upon as the interview occurs. As such, semi-structured interviewing generally does not adhere to a rigid set of questions. Instead the interviewer uses some form of interview guide or "key themes" to provide a framework for the interview. An advantage of this approach is that it allows both the interviewer and the interviewee the flexibility to respond to and probe specific areas of concern or interest as the interview develops (Davis-Case, 1990; Grenier, 1998; Corbett, 2003). One of the difficulties associated with a semi-structured interviewing approach is to find the balance between maintaining an informal interview while still covering the essential information in order to answer my questions.

One of the challenges of conducting research in First Nations communities is the fact that researchers often are seen as outsiders, scientists, or "government-like" individuals. As such there is often a lack of trust between the researcher and community. While it is certain

that I remained an outsider to the community I made my research participatory and adapted my work to changing needs and circumstances in the community. I kept my methods and intentions open and ensured my visibility in the community. I believe that this helped me gain entrée into the community to a greater extent than would have been possible if I had conducted my study from the outset as a data gathering exercise. As Apostol and Sinclair (2006) explain, "restoration specialists coming into a community need to foster social relationships and be as inclusive as possible while working in the community members who hold the resident knowledge (p.421). This delay in the interview process also made logistical sense as it coincided with the publication of results from the various baseline ecological data studies. Interviews were conducted primarily on a one-on-one basis and interviewees had the option of maintaining confidentiality in an attempt to discourage any influence from other community members and elicit the most accurate responses possible. While interviews were held in an informal manner, the primary questions were designed to gain an understanding of:

- The history of the site, how it has been used and how it may have changed.
- The most important values associated with the site.
- The notion of habitat destruction and ecological restoration.
- Futures possible – revealing expectations and desires (Boulding, 1988; Grenier, 1998).
- The significance of birds.
- The idea of collaboration and community participation.

Interviews were conducted between November 28, 2007 and January 18, 2008 and generally lasted between 30 minutes to one hour. The general steps involved in the semi-structured interviews were as follows:

- Identify initial list of key individuals - community members with local knowledge about the social, cultural, ecological characteristics of the study site. These people were identified by other members of the community who I had come in contact with during the first year of the study. Additional participants were identified using the "snowball technique" whereby each interviewee was asked if they could suggest any other community member with whom I should speak (Faugier and Sargeant, 1997). Interviewees included men and women of all age groups. A special significance was given to community elders who hold much of the TEK. Representatives from the CWS and CRD were also interviewed using many of the same questions as members of the First Nations community in order to compare values.
- Obtain permission from Tsawout Chief and Council to conduct interviews and review themes and interview framework with Tsawout director of operations, Chief and council and community researcher Dan Claxton.
- Potential interviewees were contacted by Dan Claxton, a well known community member, and asked if they would like to participate in the study.
- Prior to each interview informants were informed verbally of how the information from the interviews would be used, that they had rights regarding the use of this information and their confidentiality and that the interview would only occur if they

wished to proceed. A signature was obtained on the human research consent form (see appendix C). Interview protocols were approved by the University of Victoria Human Research Ethics Committee (See Appendix A).

- At the start of each interview one or two "warm up" questions were asked in an effort to set the tone for the interview and allow the interviewee to relax and begin to feel comfortable with the interview procedure. Interviews then proceeded according to a guiding framework (see Appendix B).
- Interviews were recorded on cassette (with permission) so that I could focus on the questioning and discussion.
- The interviews were held at locations that were comfortable and convenient to the participant (Grenier, 1998). This included the Tsawout Administration building, The CRD main office, the study site itself and at participants homes.
- For most of the interviews community researcher Dan Claxton was also present. This helped to make the interviewees feel more comfortable and was also extremely helpful when certain cultural issues needed additional explanation. Having Dan present helped to bridge the gap between myself (a non-indigenous academic researcher) and Tsawout elders who were sometimes unfamiliar with the terms and concepts that were being discussed.
- All interview tapes were transcribed directly into a Microsoft Word document.

3.5 Analysis and Validity

Once the semi-structured interview process was complete and the interviews were transcribed word-for-word into a Microsoft Word document the interview results were analyzed in an attempt to determine common themes, values, and community desires for the conservation and restoration of the ecosystem. Analysis techniques included re-reading the interviews and organizing the responses into categories with similar themes (Ristock & Pennell, 1996; Patton, 1990). Once the data were organized into these categories it was possible to compare the respondents' statements and identify similarities and common values. This technique also made it easier to compare the values between the Tsawout, CRD and CWS interviewees.

Responses were categorized into the following categories and sub-categories:

- Changes and Concerns
- Traditional Values
- Habitat Conservation
  - Participation and Education
  - Celebration
  - Access Restriction
  - Language
  - Signs
  - By-Laws
  - Restoration

In order to use the results from the semi-structured interview process it was important to confirm that the information gathered was valid. Without the rigorous statistical tests that are generally applied to quantitative data some are concerned that qualitative or ethnographic data are too “soft” to be used as the basis of policy making. It is therefore important to establish the validity of research findings using non-quantitative methodologies from the social sciences.

In this project I used the concept of triangulation to verify that the values and opinions that I was documenting from the Tsawout community was not out of line. I compared the main findings from the interview process with my own written notes and accounts from the duration of the study and also to the values and key themes surrounding ethnoecological restoration from the literature (see section 2.2). I found that the community values and recommendations obtained from the interview process were largely compatible with suggestions that had been made to me by members of the Tsawout administration, Lands Committee and Chief and Council Committee.

Maintaining the validity of the recommendations that would emerge from the interview process also meant acknowledging my own bias as a researcher. For me, this meant being aware of my own desires for this avian restoration project (largely focused on ecological integrity and preservation of migratory birds) and understanding that the desires of the community may or may not reflected my own. For example, I had to acknowledge that this ecosystem is also a place for community gatherings, celebrations and is a socially active space.

As a final test to the validity of my interpretation of the data I presented the key themes and recommendations from the interviews to both the Tsawout Lands Committee and Chief and Council Committee for their review.

Chapter 4: Results

This chapter presents the results of fieldwork carried out between April 2007 and April 2008. It includes results from the community and working group interviews, the inventory of human influence and the avian inventory. It also includes additional results from supportive studies carried out by the Canadian Wildlife Service and Capital Regional District parks department.

4.1 Community and Working Group Interviews

Between November 28, 2007 and January 18, 2008 I conducted a series of semi-structured interviews with representatives from each of the major stakeholders (CWS, CRD and Tsawout First Nation). The majority of these interviews were conducted with adult members of the Tsawout community (especially elders). In total I conducted 14 interviews (12 with Tsawout members, 1 with the CRD and 1 with the CWS). The complete transcripts of these interviews can be found in appendix D.

When it came to understanding the values of the three primary stakeholders what I heard was that there were indeed shared values among the three main stakeholders and that these centered largely on the preservation of the ecological and cultural integrity of the area. For the CRD the primary values included the protection of natural environment and native species as well as the need to ensure recreational opportunities for park visitors. For the CWS the preservation of biodiversity was listed as the primary value associated with the project. Members of the Tsawout community did not necessarily express their values as conservation objectives (as was the case with the CRD and CWS). Instead interview respondents mentioned valuable practices that took place at the spit. The most commonly mentioned of which was the ability to harvest traditional foods and medicines such as the KEXMIN plant (e.g. Sam, R.; Claxton, B. & Edzel, S., 2007). Additional values included the use of the area for cultural celebrations, for honoring ancestors, the scenic beauty of the area and the simple fact that this place has belonged to the Tsawout people for generations.

The interviews also revealed that there was concern within the Tsawout community about the present status of the ecosystem and that there were threats to the values that are held. Ray Sam (2007) recalled that “as a youngster it was a really private, quiet place – now there are always people out there walking dogs”. Ray Sam also stated that “when I go out there my eyes see that it’s a dumping ground” and that “we have to keep the area cleaner”. Gwen

Underwood was concerned that “the area is being disrespected and that trespassers are coming from Island View Beach park” because “few people realize really how precious the area is” (2008). Several Tsawout community members expressed concern about the use of all-terrain vehicles and the impacts that the use of these vehicles has to the sensitive dune ecosystem. For example, Earl Claxton Jr. explained to me that “our people always went out there to collect specific medicines [and] they have become less and less available due to the degradation occurring from ATV use. “It is destroying the area for no reason at all” (Claxton, E., 2008).

During the interviews specific actions regarding the future of ȾIXEN were suggested by members of the Tsawout community. The most common recommendations included the need for educational signs, a designated parking area that would be delineated by a fence and for education to be the foundation of any activities that take place. For example, Tsawout Chief Allan Claxton (2007) told me that “we need to educate all of our people about what is out there and what the traditional uses were and then let this information and knowledge grow. Education is the starting point”. Samantha Edzel (2007) expressed to me that “we are the stewards of the land but we have to own that and be responsible and accountable to it too. And if there is no knowledge of that then you are not going to have many people that are going to take care of it”. In order to work towards protecting ȾIXEN, and to bring respect back to the land, Rhonda Underwood believes that there is a “need to share knowledge, history and traditions with young people” and that “visual hands on and oral learning is key” (2007). Another sentiment that was clearly expressed to me in the interviews was that any actions that take place must be community driven. For example, Lou Claxton told me that “if people had input – the respect would be there” but “if you go out and just say “don’t step on that” then the opposite would happen”. Sentiments such as this one were echoed over and over during the interviews that I held and reinforced to me the need for a community driven, hands on and visual approach to the restoration of this ecosystem.

In order to compare values the interview responses were organized into a summary chart (see table 4.2). This chart was created primarily to consolidate the answers provided by the three stakeholder groups and includes the distinctive statements made during the interviews. Table 4.2 provides the information I used to identify the primary threats to stakeholder values, establish what is considered to be a desirable future, and begin to shape a vision for restoration (Chapter 5).

4.2 Inventory of Human Influence

The Cordova Bay Spit sand dune ecosystem area has been degraded by a number of direct and indirect human influences. On Southern Vancouver Island the primary threat to dune ecosystems is destruction for waterfront development. As a result of such destruction the dune ecosystems that remain in this area are largely within protected areas such as Island View Beach Regional Park and the lands of the Tsawout First Nation reserve. However, despite these areas being shielded from development, they continue to face threats from a variety of human influences (both historic and contemporary).

Collectively these impacts (as identified through interviews and the gathering of historic information) are listed into table 4.3. Each human influence is described and includes a brief description of the potential for restoration (to be expanded upon in Chapter 5).

The primary contemporary human influences to the sand dune ecosystem are from the collective impacts of vehicular and pedestrian traffic, as well as the spread of invasive plant species. The spatial extent of each of these influences can be seen in figure 4.1.

4.3 Avian Inventory

The year long avian inventory allowed for a substantial list of avian species observed through intensive year round observation (see Appendix G). 104 species were recorded during 61 monitoring sessions. An additional 11 species were reported online from members of the local birding community. Appendix G also lists 40 additional species that have either historically been reported or are believed to inhabit the area. Table 4.4 lists species that have been identified as focal species for this ecosystem. These include the two major groups of migratory species using the study site (shorebirds and waterfowl), as well as dune specialist birds, offshore species, species that have been identified as being threatened in BC or nationally by COSEWIC, and birds that are found in relatively few other areas within the region or that use the area for nesting. Table 4.4 is intended to help guide restoration priorities for this project as they relate to the needs of avian species.

The results from the Chi Square analysis for Killdeers revealed that because the Chi Square value of 0.43 was less than the 5.99 needed for the 0.5 level of significance there was no correspondence of Killdeer for any of the specific dune sites at ȾIXEN (see table 4.1). This suggests that, of the three dune sites tested, the Killdeers did not show a preference to any one area. It does not indicate that the dune habitat is unimportant for Killdeers. Instead it merely suggests that there is no one area that is more or less important. Future analysis

of the results of the avian inventory for different species could reveal that certain areas are especially significant and therefore should receive higher conservation priority.

Table 4.1: Chi Square Results for Killdeer in Three Dune Habitat Areas

	Area 5	**Area 6**	**Area 7**
Observed	8	10	4
Expected	7.3	7.3	7.3

$$X^2 = \sum \frac{(O-E)^2}{E}$$

$$X^2 = \sum \frac{(8-7.3)^2 + (10-7.3)^2 + (4-7.3)^2}{E}$$

$$X^2 = 0.426$$

Figure 4.1: Adverse Impacts at TIXEN and Island View Beach

The image on the right illustrates the impact of vehicles driving on the dune ecosystem. The image on the left illustrates the most prevalent invasive species at the study site - Scotch Broom (*Cytisus scoparius*) which in some areas is the dominant vegetation type.

Table 4.2: Interview Summary Table

Tsawout	CRD	CWS
What is most valuable about this area?		
• Harvesting foods - Elders used to say - "When the tide is out the table is set" - At one point that place was one of our main sources of food. • Harvesting medicines (e.g. Kexmin) • Canoe races, seafood celebration. • Scenic beauty. • For honoring ancestors (30 people buried out there), for burnings, bathing and initiation into the big house. • "Being ours".	• #1 mandate is protection of natural environment and native species. • #2 mandate is to ensure recreational opportunities for park visitors. • A difficult balance between these two mandates. • Conservation should be the guiding value to direct any other activities within the park • CRD objective of conservation, preservation and protection.	• Preservation of biodiversity (including migratory birds). • Conservation of the landform and maintaining the rare biodiversity elements that are part of that ecosystem. • Working towards minimizing further impacts and maintaining the integrity of the area that is restored. • Building partnerships (especially with First Nations) and making them work to achieve conservation objectives. • Public education of the values of the area, outreach to the larger community and into the First Nation community.
What are the threats to this area? Concerns?		
• The site used to be a private, quiet place – now there are always people out there walking dogs. • The area used to be an area for children and families - a lot of families are not going down there as much because the area is used more as a place to drink. This really hurts the families and the elders. • Many concerns about the contamination and availability of seafood. • The reduced availability of certain medicines due to ATV use, inappropriate harvesting techniques. • Concerns about the destructive impacts of 4x4 use and general vehicular traffic. • The water used to be really clear and the shore was clean - Now many people treat the area as a dumping ground. • Wood being removed for firewood and may lead to erosion. • A loss of respect for the land and a loss of traditional values (not being passed on anymore). "Its all about respect – we are the protectors of the land – its so easy to say that but to actually live it and do it is a different thing"	• CRD considers this an area that requires restoration. • The environment has been degraded to a state that is not acceptable. • Invasive species are a large concern. • The ability to maintain self sustaining populations of the rare and endangered species that currently inhabit the area. • That some of the natural processes have been altered – e.g. by the creation of the berm. • Concerns about being able to achieve restoration goals - there is a long history of restoration attempts that were supposed to have occurred but have been delayed – for lots of different reasons including funding. • Public will have an influence if decisions are not what they would expect – are not in line with their values (i.e. dog walkers and off-leash rules).	• Appropriate access control and management - Need to do so before Indigenous Games

Tsawout	CRD	CWS
How to pursue conservation?		
• PARTICIPATION / EDUCATION • Need to educate our people about what is out there and what the traditional uses were and then let this information / knowledge grow. Education is the starting point. • Sharing knowledge, history and traditions with young people – visual hands on and oral learning is key – to bring the respect back. • If people understand what is being done then conservation can be done in a respectful way – they want and need to be involved. • Community driven and very visual – show people the possibilities and where we would like to be in the future – get people excited about what the future could be. • All families have different things that they contribute to the community – so facilitating restoration might need to include key people from a number of families. • Elders would give the information and knowledge • Create opportunities for youth to be involved – they should be involved in the implementation of the restoration actions. • Get volunteers from committee to help with enforcement and implementation of restoration goals. • Need to let people know what is acceptable. • ACCESS RESTRICTION • Restricting access past the canoe race area. Make sure to clearly let people know why this is being done. • We need to have a designated parking area – this should be at the area where the canoe races are normally held and no vehicles should be allowed past this area. • Perhaps open up other areas for special events.	• Invasive species mgmt action plan. • Protection of known rare plants from current threats • Access management or visitor management to be partnered with education so that people respect new boundaries. • These could lead to "quick wins" so that the public can see results and start to work towards changed behaviors (use – trampling, off trail, dogs under control and on leash to minimize wildlife disturbance). • Must recognize that efforts to protect the culture are as important as the ecosystem. • Need to incorporate TEK – knowledge of culturally significant plants, stories of migration, recognize interconnection between Tsawout and the land. • Interconnections should be linked together with ecologically and culturally significant species in the conservation plan and there may be opportunities for interpretive / educational materials.	• Seek to restore the natural ecosystem to the fullest extent possible – including the cultural values for the First Nations. • Mitigate the damage already done and protect against further impacts that degrade it • Understanding the cultural aspects of a landscape is vital. • The Tsawout Nation is an integral part of that landform – an essential part of a functioning ecosystem Cultural and Biological must be considered when evaluating what a restored ecosystem might look like. • First Nations people have a special connection to the land, their sense of place is different and they need to be involved in management of the territories that they have lived on for centuries – we need to take extra efforts to make sure that they can take part in management of ecosystems that are on their land. • Scientists too often have a narrow view of what a restored landscape should look like.

Tsawout	CRD	CWS
How to pursue conservation? (continued)		
• SIGNS • Signs need to come first –to stop people coming from IVB. • No Trespassing – but need to decide who this applies to? • Message for IVBRP sign – need to be clear re. access rights and what is a violation • Douglas treaty sign at IVBRP – travel at own risk. • BY-LAWS AND ENFORCEMENT • Need by-laws and officer to prosecute trespassers. • Nude sunbathers are a problem – need to be stopped as it deters families from using the area. • If people are going to be on the reserve they need to sign in or register – permit system? • RESTORATION • Common Goal - To preserve and restore the area back to its natural state (naturally occurring plants and animals used as medicine and foods) for Tsawout people. • Plant some of the plants out there at the spit and then keep people off of the area. "It's too precious of an area to let go. If we can't stand up and protect it…." • Get the youth involved with site clean-up and invasive species removal as well as plantings at a later date. • Possibility of putting a permanent structure out at the canoe race area to keep people in one area. • Need to stop dumping – working together to keep it clean. • CELEBRATION • The canoe races are an essential part of our culture. • LANGUAGE • Conserving the land and the language – "when you talk about our SENĆOŦEN language its built in it (conservation) because SENĆOŦEN is who we are, its our identity, SENĆOŦEN is how we govern ourselves and when you speak of having values and traditions its in there, its all in there – its all built in it. Everything is in our language".	•	•

IMPACT	TIME	DESCRIPTION	CONSERVATION / RESTORATION PRESCRIPTION
		DIRECT IMPACTS	
ATV & human traffic	Present	One of the largest impacts to ƫIXEN and Island View Beach area is damage and destabilization resulting from all-terrain vehicles as well as human traffic. Although the impact of individual footprints may seem insignificant, it is important to remember that these are highly fragile ecosystems and that any damage that occurs can take a long time to heal.	Access management in sensitive dune ecosystem areas.
Encroaching development	Present	On the Tsawout reserve lands adjacent to the coastal dune ecosystems are experiencing increasing development pressure from land owners and tenants. The greatest potential adverse impact comes from a trailer park operation that holds a long term lease to the land just south of ƫIXEN. Significant encroachment has already occurred (over the summer/fall of 2007). Further plans call for additional expansion of the existing trailer park facilities extending all the way through sensitive wetland and culturally significant ecosystems to the beach.	Identify and evaluate future plans of "Oceanside RV Park". Determine if plans have been subjected to CEA process. Work towards agreement between Tsawout Lands Manager and private land owner.
Dogs harassing migratory birds	Present	Dogs harassing migratory birds as they feed along the shoreline in an adverse impact at the study site. For many species of shorebirds as well as Brant geese that depend upon stopover sites to rest and feed being flushed by dogs can have a potentially disastrous effect. The impacts of off-leash dog walking on migratory bird populations have been well documented in scientific literature. For example: • Even dogs restrained on leads can disturb birds sufficiently to induce displacement and cause a depauperate local bird fauna. Our results therefore support the long-term prohibition of dog walking from sensitive conservation areas. (Banks & Bryant, 2007). • Habituated species are less likely to be flushed than species that rarely interacted with humans (e.g. migratory species). Migratory species also flush at greater distances than resident species (Burger 1981). • Recreational use away from trails can lead to displacement of wildlife (Miller et al.. 2001). • Recreational disturbance (from dogs) can degrade habitat for shorebirds (Lafferty et al.. 2006)	Work towards interpretive signage at both IVB and ƫIXEN. Engage with the VNHS to promote education and the conservation of migratory species. The Tsawout First Nation is working towards the establishment of bylaws and a permit system that may act as an effective way of keeping dogs on-leash during sensitive migratory windows.

Table 4.3: Summary of Human Influences

IMPACT	TIME	DESCRIPTION	CONSERVATION / RESTORATION PRESCRIPTION
DIRECT IMPACTS (continued)			
Invasive plants	Present	Broom has become a dominant plant species at Island View Beach and threatens to become equally dominant at the spit as well. Additional invasive species found at the study site include gorse and Himalayan blackberry. Other potential invasive plants that coastal sand dunes are susceptible to include European beach grass that is a plant that was "deliberately introduced to North America in the early 1900s to stabilize dunes that were threatening to engulf waterfront property and infrastructure. This plant builds up tall and stable foredune ridges that cut off the landward movement of sand, while at the same time crowding out native dune grasses" (Flynn et al., 2006).	At Island View Beach the CRD has attempted broom removal in the past and has not been successful. The areas in the south end of the park that have been filled in and are no longer subjected to salt water are overrun with broom and have such a well established seed bank that removal is not a viable option. In the north end of the park – where most of the in-tact dune ecosystem remains – and extending north into the Tsawout reserve an ongoing invasive species removal campaign should be pursued. As was demonstrated in April, 2008 at Earth Day – invasive species removal is possible and has a host of salutary effects for the community. The participatory nature of invasive species removal can bring people from all ages and all backgrounds together around a common goal and help to restore the connection to the land.
Dumping of garbage	Present	Has the potential to undermine the restoration efforts currently underway at the site is the dumping of garbage at the site. ȾIXEN in particular seems to be highly susceptible to this behaviour.	At ȾIXEN continuing to promote the area as a culturally and ecologically significant place through signs, education campaigns and celebrations. Continue to remove the accumulated garbage that currently exists at the site to discourage future misuse.

IMPACT	TIME	DESCRIPTION	CONSERVATION / RESTORATION PRESCRIPTION
DIRECT IMPACTS (continued)			
Fires and removal of firewood	Present	As identified by several interview participants, ȾIXEN has become a place that is used for beach parties and bonfires. There are concerns that removal of the driftwood at ȾIXEN could lead to erosion of the spit. Furthermore the use of this area for such activities has prevented it from being used by families, elders and young people as was once the case.	Signs and bylaw banning or controlling fires at the site. Establishing areas where fires are allowed (away from sensitive vegetation). Access management will also help to prevent vehicles from driving out to the sensitive areas of the spit.
Contamination of aquatic ecosystem and of seafood.	Present	Although outside of the goals for this terrestrial restoration project – it is important to recognize the impacts of a variety of aquatic contamination sources that surround the Cordova Bay. Agricultural runoff from surrounding farms, as well as a sewage treatment plant installed by the municipality of Central Saanich, have compromised the aquatic health of the Cordova Bay so much that the Tsawout – the saltwater people – can no longer eat the seafood from their traditional territory (including that which would have been harvested at ȾIXEN.	No viable restoration recommendation within the mandate of this project.
Protection of rare species	Present	In September, 2007 the CRD installed fencing to restrict access to an area of Island View Beach park that contains a population of the endangered Contorted Pod Evening Primrose plant (see location in figure 4.2)	Monitor this area to ensure that the population remains viable. Remove invasive species in this area.
INDIRECT IMPACTS			
Global warming	Present / Future	The sand dune ecosystem at ȾIXEN exists in a harsh and dynamic environment. Certain areas of the spit are flooded at high tide – especially in the winter months. If sea levels rise (as predicted under most global warming scenarios) there could be dramatic changes to the structure and ecological integrity of the spit.	No viable restoration recommendation within the mandate of this project.

IMPACT	TIME	DESCRIPTION	CONSERVATION / RESTORATION PRESCRIPTION
HISTORIC IMPACTS			
Proposed tourist development	1935	Proposed roadways, playgrounds, swimming pools and leveling / filling of land for camping, concessions and playgrounds. Such historic planning may have helped foster the current misconception of many that ȾIX̱EṈ is a public place or park that is open to the public.	Work to educate public (especially those entering the Tsawout reserve from IVB) that ȾIX̱EṈ is not a park and is private land.
Draining and filling of salt marsh at Island View Beach	1936	In 1936 the district of Saanich in cooperation with the Department of Indian Affairs carried out work to drain the salt marsh areas at Island View Beach. The rationale for this decision was to combat "the enormous number of mosquitoes". Additional landfill occurred during the 1980's – prior to the CRD owning much of the park – when the former landowner filled in much of the land that was a salt marsh (Gollmer, 2007). (See figure 4.3)	CRD has long term vision to restore salt marsh. Vital to purchase surrounding lands to control / restore drainage characteristics. If restored may need to spray insecticides to control mosquitoes?
Creation of berm	1950's?	The current berm was already in place when CRD acquired the park. It was created by the Municipality of Central Saanich at the request of the Moswalds (farmers). In addition to the berm, a dam and series of dykes was established in the 1950's to assist in agricultural production (Gollmer, 2007). During the 1990's a break in the berm caused flooding to the surrounding agricultural farmland and CRD faced legal threats from farmers (Gollmer, 2007). As a result CRD has elected to keep the current berm in place and maintain this structure for the time being.	CRD could remove the current berm. This would be only viable as part of a much larger effort to restore the natural structure and function of the sand dune ecosystem and saltwater marsh at Island View Beach.
Shoreline alteration / sand supply	1960's	Shoreline stabilization south of the park took place in the 1960's because of concerns by the land owner about erosion (Gollmer, 2007). This shoreline stabilization has reduced the flow of sediments to the beach and caused the former beaches to be scoured away (Gollmer, 2007).	CRD could negotiate with current landowner to the south of Island View Beach park the restoration of natural shoreline erosion processes. This would be only viable as part of a much larger effort to restore the natural structure and function of the sand dune ecosystem and saltwater marsh at Island View Beach.

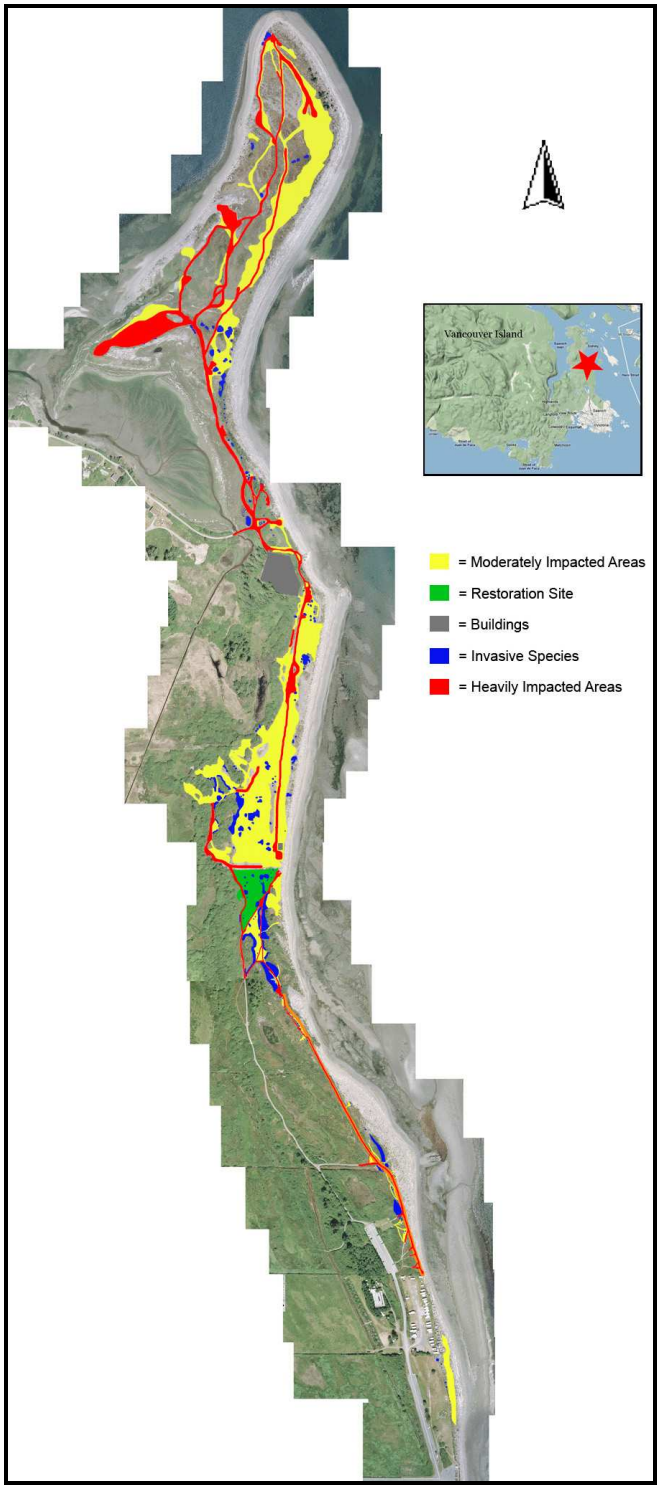


Figure 4.2: Human Influences Map

The map above illustrates human impacts to the study site including areas that have been heavily or moderately modified and locations of invasive species, buildings and a designated restoration area within Island View Beach Park.

Figure 4.3: Historic Draining and Filling of Island View Beach

In 1936 the district of Saanich in cooperation with the Department of Indian Affairs carried out work to drain the salt marsh areas at Island View Beach (images courtesy of Saanich Archives, 2008).

Species	Status	Time of Year	Habitats	COSEWIC/ BC Status	Conservation / Restoration Notes
Shorebirds					
Black-bellied Plover	C	Winter/Spring	Mudflat, shoreline		○ Migratory shorebird species depend primarily on two habitat areas at ȾIX̱EN and IVBRP – the large lagoon or mudflat at ȾIX̱EN and the shoreline that extends along the perimeter of the study site. ○ Most of these species use this ecosystem as a stopover site for only a short period of time during the spring and fall migration. They use the area to feed and rest and must be allowed to continue to do so. ○ Conservation actions should focus on removing the stressors to these birds during the migratory windows (March 1 – Oct 15). ○ The primary stressor to shorebirds is from off leash dog walking. ○ It is suggested that altering this behaviour will require education, signs, an altered bylaw and enforcement from both the CRD and a Tsawout bylaw officer. ○ The lagoon habitat provides an exceptional source of food for migrating shorebirds. The ecological integrity of this habitat feature must be preserved.
American Golden Plover	U	Fall migration	Mudflat, shoreline		
Semipalmated Plover	C	Spring / Fall migration	Mudflat, shoreline		
Killdeer	C	Year Round	Mudflat, shoreline		
Black-bellied Plover	C	Winter/Spring	Mudflat, shoreline		
Black Turnstone	C	Fall through Spring	Mudflat, shoreline		
Dunlin	C	Winter / Spring migration	Mudflat, shoreline		
Short-billed Dowitcher	C	Spring / Fall migration	Mudflat, shoreline	Blue	
Long-billed Dowitcher	C	Fall migration	Mudflat, shoreline		
Western Sandpiper	C	Spring / Fall migration	Mudflat, shoreline		
Least Sandpiper	C	Spring / Fall migration	Mudflat, shoreline		
Baird's Sandpiper	U	Fall migration	Mudflat, shoreline		
Semipalmated Sandpiper	U	Fall migration	Mudflat, shoreline		
Pectoral Sandpiper	C	Fall migration	Mudflat, shoreline, wetland		
Sanderling	C	Fall migration	Mudflat, shoreline		
Long-billed Curlew	R	Spring Migration	Mudflat, shoreline	Special Concern / Blue	
Whimbrel	U	Spring / Fall migration	Mudflat, shoreline		
Sanderling	FC	Fall through Spring	Mudflat, shoreline		
Greater Yellowlegs	C	Year Round	Mudflat, shoreline		
Lesser Yellowlegs	C	Fall migration	Mudflat, shoreline		
Red-necked Phalarope	C	Fall migration	Mudflat, shoreline, open ocean	Blue	

Table 4.4: Focal Avian Species

Species	Status	Time of Year	Habitats	COSEWIC/ BC Status	Conservation / Restoration Notes
Migratory / Wintering Waterfowl					
American Wigeon, Northern Pintail, Northern Shoveller, Bufflehead, Common Goldeneye	C	These species are all found at the study site in Winter	These species all use the mudflat, shoreline and ocean habitats.	The population of each of these species is considered stable.	○ Populations of waterfowl species that winter at the site should be monitored to ensure that over-hunting does not occur. ○ The "take only what you need" ethic should be promoted.
Dune Specialists					
Savannah Sparrow	C	Spring through Fall	Brushy and Open Areas		○ These dune specialists depend upon the sparsely vegetated sand dune ecosystem primarily during their fall migration when they feed on the seeds of low-lying dune vegetation. Protecting and restoring dune plant communities by reducing vehicle access and promoting the planting and autogenic restoration of dune vegetation is recommended.
Western Meadowlark	FC	Fall migration through Spring	Open areas and Grasslands		
American Pipit	C	Spring / Fall migration	Open Areas		
Lapland Longspur	FC	October	Open Areas		
Horned Lark	FC	Fall migration	Open Areas	Blue *Strigata* Subspecies is Extirpated / Red	
Offshore Species					
Pigeon Guillemot	FC	Year Round	Open ocean		○ Although outside of the boundaries of this terrestrial study, based on the Birdlife International designation that the Sidney Channel is an "Important Bird Area" conservation of these offshore species should be promoted. This may include limiting the number of birds that are harvested for food (e.g. Black Duck soup).
Common Loon	C	Winter	Open ocean		
Pacific Loon	C	Winter	Open ocean		
Double-crested Cormorant	C	Year Round	Open ocean	Not at Risk / Blue	
Pelagic Cormorant	C	Year Round	Open ocean	Red	
Rhinoceros Auklet	C	Spring through Summer	Open ocean		
Western Grebe	C	Fall and Winter	Open ocean	Threatened / Blue	
Common Murre	C	Summer through Spring	Open ocean	Red	
Surf Scoter	C	Winter / Spring	Open ocean	Blue	

Species	Status	Time of Year	Habitats	COSEWIC/ BC Status	Conservation / Restoration Notes
Additional Focal Species					
Brant	C	Spring migration	Shoreline		Brant : ○ Use this ecosystem as a stopover site for only a short period of time during the spring (Mar-May). They use the area to feed and rest and must be allowed to continue to do so. ○ Conservation actions should focus on removing the stressors (off-leash dogs) to these birds during the migratory window. Osprey: ○ Brace the hydro pole currently used for nesting. Common Nighthawk: ○ Because Nighthawks are believed to have once nested at the site – it is important to reduce the impact of vehicle and pedestrian traffic from the in-tact portions of TIXEN. This can be achieved by building a fence to restrict vehicle access.
Osprey	FC	Summer	Widespread		
Great Blue Heron	C	Year Round	Shoreline, Wetland	Blue	
Common Nighthawk	FC	Summer	Widespread	Threatened	
Heerman's Gull	C	Fall	Open ocean / Shoreline		
California Gull	FC	Spring / Fall migration	Open ocean / Shoreline	Blue	
Caspian Tern	R - U	Summer	Open ocean / Shoreline	Not at Risk / Blue	
Northern Shrike	U	Winter	Widespread	Special Concern / Blue	
Short-eared Owl	R - U	Winter	Grasslands, Agricultural, Sand dunes	Special Concern / Blue	
Peregrine Falcon	R – U	Winter	Widespread	Special Concern / Red	
Barn Swallow	R	Summer	Feeding over water of lagoon	Blue	

C=Common, FC=Fairly Common, U=Uncommon, R=Rare

4.4 Additional Supportive Studies

4.4.1 Terrestrial Ecosystem Mapping

A terrestrial ecosystem mapping exercise was carried out between August 2007 and August 2008 by the BC Conservation Data Center (CDC) (according to Provincial standards for Terrestrial Ecosystem Mapping) on behalf of the CWS and CRD. This study provides baseline ecological data and spatial locations of the ecosystem types, structural stages and bio-terrain attributes as well as information on vegetation, soils and terrain, and disturbance at the study site. The study also discusses the post-glacial development and ecological importance of the area and discusses the disturbance regimes (natural and man-induced). It provides an additional source of information in order to create a long term restoration plan for the study area.

4.4.2 Rare and Culturally Significant Vegetation Inventory

Adding to the background ecological data for this study was a rare plant inventory that was carried out by a local consultant (Matt Fairbarns) in August of 2007. This inventory identified a list of rare plants that are associated with this ecosystem type (See Table 1.4.3) and documented the presence and specific locations for eight of these species (See table 4.5). Additionally, this report identifies the primary threats to these rare plant populations and suggests both broad (ecosystem) and specific (species) recovery prescriptions.

Culturally significant plant species were identified by Nancy Turner, Belinda Claxton and Ray Sam (See table 4.6). Certain species, such as KEXMIN, were also identified by members of the Tsawout community during the interview process.

Table 4.5: Rare Plant Species Documented at ȾIȽEN and Island View Beach

Scientific Name	English Name	National Status	Provincial Status
Abronia latifolia	yellow sand-verbena		S3 - Blue
Camissonia contorta	Contorted-pod evening-primrose	Endangered	S1-Red
Convolvulus soldanella	beach bindweed		S3 - Blue
Glehnia littoralis ssp. leiocarpa	American glehnia		S3 - Blue
Jaumea carnosa	fleshy jaumea		S2S3-Blue
Lathyrus littoralis	grey beach peavine		S2-Red
Polygonum paronychia	black knotweed		S3 - Blue
Triteleia howellii	Howell's triteleia	Endangered	S1-Red

Source: (Fairbarns, 2007)

Table 4.6: Culturally Significant Plant Species Documented at ȾIXEN

Scientific Name	English Name	SENĆOŦEN Name	Traditional Use
Fritillaria lanceolata	Chocolate lily	Recorded as *ts'áliqw* by Suttles	The Saanich formerly ate the bulbs, as did a number of other First Nations.
Lomatium nudicaule	Indian celery, Indian consumption plant	KEXMIN	KEXMIN is a powerful and important medicine and spiritual plant. The seeds are chewed for colds, coughs, and sore throats, or can be made into a tea. Smoke from burning the seeds is an incense, inhaled for headaches, and used ceremonially. Burning the seeds is said to protect people from illness and death.
Pyrus fusca	Wild crabapple	Fruit: KA΄,EW Tree: KA΄,EW ŁC΄	The small, clustered crabapples are ready to pick in August and September. Elsie Claxton and Violet Williams recalled that people used to harvest and eat these tart little fruits in large quantities in late summer and fall. They can be picked on the green side, and will ripen within a day or so. Some people put them in large crocks with just water, to soften and sweeten over time. Crabapple wood is very hard and was used for tool handles. It was also sometimes used as a fuel for smoking fish (red alder wood preferred). Crabapple bark is considered a good medicine.
Leymus mollis	American dune grass	SŁE,QA'I	The tough, bluish-green leaves were wrapped around the side and bottom of the loads of the reef-net, according to Dave Elliott and Earl Claxton, Sr. Dave Elliott noted that the grass twisted and shone under the water and kept fish from leaving the lead. The moving grass also camouflaged the lines of the lead.
Abronia latifolia *Rosa nutkana*	Yellow sand verbena Wild rose	*No known SENĆOŦEN name* Fruit or hips: KILEK Bush: KELKE ŁC΄	The deep taproots may have been cooked and eaten long ago, as they were apparently by the Makah of the Olympic Peninsula. Traditional use: The tender young shoots were sometimes peeled and eaten in the spring and that the fruits. The outer rind of the hips can be eaten or used for tea (but don't eat inside part; the seeds are covered with irritating hairs). Wild rose roots were peeled and boiled, and used along with gooseberry and cedar roots in the making Saanich reef nets. A solution of the branches was used for eye medicine.
Achillea millefolium	Yarrow	TELIK΄ ELP	The leaves are used to treat sore throats and colds. They are chewed and the juice swallowed. The roots can be used to treat a tooth ache, and the plant has many other medicinal uses.
Salicornia virginica	Glasswort	*No known SENĆOŦEN name*	Some people harvest and eat these greens as "sea asparagus".
Allium acuminatum *Amelanchier alnifolia*	Hooker's onion Saskatoonberry	SKEX OR ȻEXIEC΄ Berries: SC'I,SEN Bush: SC'I,SEN ILC΄	Some people used to harvest the bulbs of this species from ȾIXEN, to be cooked in soups and stews. Saskatoonberries ripen in early summer, and were eaten whenever they could be harvested. The bark is used in medicinal preparations.

Source of traditional use information and SENĆOŦEN names: (Turner & Hebda, 2008)

Chapter 5: The Restoration of ʔIXEN and Island View Beach

In this chapter I discuss the journey towards ethnoecological restoration. I outline how we - The Cordova Bay Spit Project Working Group (CBSPWG) have pursued the restoration of the coastal dune ecosystem at ʔIXEN and Island View Beach, what we have learned in the process, what we have accomplished and what we hope to achieve as the project continues to move forward. A set of ethnoecological restoration guidelines are presented that emphasize an approach to restoration that embraces the complementary nature of TEK and western science. Finally, opportunities for making connections between this project and other regional and global initiatives are explored.

5.1 The Journey towards Restoration

I became involved with this restoration project because it was clear that the coastal dune ecosystem at ʔIXEN and Island View Beach has unique ecological significance and that it is also a migratory stopover site for numerous species of birds. My interest was in trying to protect and restore the habitat so that it could continue to function as part of the migratory landscape for birds. These core concepts have not changed. But the way in which this project has evolved, and the way that restoration has been pursued has been unlike anything I could have imagined at the start of this journey.

Given the multiple stakeholders involved with this project, it became clear early in the process that there were a variety of values represented. As I have mentioned, my values (and those of the CWS) were largely concerned with the ecological integrity of the area and its function as migratory habitat for birds. The CRD values were split between protecting the natural environment and ensuring recreational opportunities for park visitors. Early indications suggested that the values of the Tsawout First Nation focused more on the ability to harvest traditional foods and medicines and to be able to use the area for traditional celebrations and activities.

Each of the stakeholders came to the table representing their values. The question for me, and what would become the primary research question for this thesis was - in what ways can ecological restoration and traditional ecological knowledge (TEK) be integrated to create and implement an effective ethnoecological restoration plan? I wanted to know what would be an appropriate way to pursue restoration on the Tsawout Reserve and how to get people from the community interested and involved. I wanted to know what types of TEK

existed and how this could be used to help facilitate this project. I wondered how such an ethnoecological approach to restoration would differ from a more conventional approach. Based on existing literature surrounding this topic, and based upon what I would learn from a more thorough values assessment exercise, I attempted to answer these questions and also work towards the practical implementation of the ethnoecological restoration of ȾIX̱EN̲ and Island View Beach.

In working towards the objectives for this project I encountered a variety of challenges and barriers. The first of which surrounded my efforts to incorporate TEK into restoration planning activities. On the surface, engaging with TEK seems to be a simple enough concept. I assumed that I could take the appropriate measures to set up interviews with a variety of community elders, ask them what they think, and include this information in my thesis. Having no prior experience in working with First Nation communities, I also assumed that there would be a fairly univocal voice present – one that would guide how restoration should occur. All I would have to do as a researcher was tap into this voice and report on my findings. I was not totally naïve, or overly aggressive, in my approach to community engagement. In fact, I spent over a year working with the overall project team, meeting and getting to know Tsawout community members, and conducting my avian inventory on the reserve prior to attempting a single interview. Once I had made connections within the community and felt comfortable seeking out interview participants I began working towards identifying TEK and trying to understand how restoration might take place.

It immediately became clear to me that this task was going to be much more difficult, and much more time consuming, than I originally thought. My early attempts to set up interviews were unsuccessful. Even people who I had met and who seemed interested in the project were unwilling to commit to sitting down to be interviewed. After a month of making phone calls and writing emails I decided that I needed to try a different strategy.

One of the members of the Tsawout community who I had become closest to was Dan Claxton. I asked if he would be willing to help facilitate setting up the interviews by contacting community members who had shown an interest in the project or who had been identified as having knowledge or familiarity about the area. Thankfully Dan agreed to help with this task.

Observing how Dan successfully arranged these interviews was a tremendous eye-opener for me. I realized that my way of organizing and scheduling in advance was not necessarily what works best in this community. Rather than pre-arrange these meetings

Dan simply asked me to meet him at a given time and then, without any prior notice, would begin calling community members from our list. Whoever agreed to show up and at whatever time they came was almost always a surprise. Nevertheless, after a few weeks of working with Dan I had interviewed twelve community members and learned a great deal about why ʔIXEN is so valued and how to best proceed.

The interview process made me very aware that there were few issues in which there was consensus within the community and that stakeholder knowledge and opinions were far from homogenous. Each interview respondent had a slightly different point of view and slightly different set of values relating to ʔIXEN. Nevertheless, there were many shared values and certain trends began to emerge.

Many of the interviews were held at the Tsawout administration building. As community members observed the interviews taking place some asked if they too could be part of the interview process as they wanted to have their opinions heard as well. This made me much more aware of the power and importance of the interviews that I was conducting. I realized that my intention to understand and incorporate TEK and values was also in some ways fostering local empowerment. Those community members who had been identified to me were given the opportunity to have their voices heard. Others who were not identified to me would not have a chance to voice their opinions. To attempt to combat this problem I tried to be as open and inclusive as possible by listening to the recommendations from the Tsawout Chief and Council committee about who should be interviewed. Also I asked as a final question in each interview if there was anyone else who I should speak with.

I was also confronted with the question of whether or not I properly understood the sentiments that I was hearing and was accurately reflecting them in my recommendations. In many ways I felt like an outsider to the community looking in and was cognizant of the cross-culture distortions that could occur. In addressing these concerns I attempted to take a precautionary approach where I would validate what I was hearing, or the way in which I interpreted what I had heard, with the interviewee themselves or with the Tsawout Chief and Council committee.

I found the process of trying to incorporate TEK to be more challenging than I originally anticipated. However, much like restoration itself, I believe that it is the process that is as valuable as the final product. As Grenier (1998 p.46) accurately suggests, the challenges of working with TEK “call for researchers to be a little more humble, patient, determined, sensitive, flexible, creative, unconventional, open minded, critical, and cautious”. As a

researcher developing these skills of community engagement has been a tremendous learning experience.

The journey towards restoration followed a bumpy road and was absolutely full of setbacks. It seemed like every time some progress was made there would be an "unfortunate incident" that would challenge our efforts and test our patience. Perhaps the most poignant example of this came early in 2008 when on the same day we experienced great pride and joy of installing signs at ȾIXEN (See figure 5.4), a portion of the spit that contained a small, but unique, wetland area was filled in for a parking lot. Before we could do anything to stop the destruction it was too late (See Figure 5.1). This incident also made me more aware of the complex political and social landscape that ȾIXEN is.

Other incidents included the expansion of a trailer park on the land immediately next to ȾIXEN that resulted in the conversion of a wetland area into additional recreational vehicle sites (see figure 5.2), the discovery of more than a dozen Common Murres that had been killed and dumped at ȾIXEN (See figure 5.1), and the creation of a large parking lot at ȾIXEN (approximately 0.65 ha) which not only altered a portion of the sand dunes, but also was located within 5 meters of a historic grave site.

The frustrations of working towards conservation extended beyond the Tsawout reserve boundaries and into the Island View Beach portion of the study site. Based on my values for protecting migratory birds, I had high hopes of being able to work with CRD parks staff towards extending the off-leash restrictions at Island View Beach and in working towards an educational campaign for dog-walkers who use the park. I was unaware of the tremendous political barriers that would stand in the way of achieving this goal. Because Island View Beach is one of the only parks in the CRD where off leash dog walking is permitted, and because there is a highly motivated and organized group of dog-walkers (Citizen K-9) who are committed to maintaining the current practice of off-leash dog walking, working towards restricting off-leash practices during the crucial migratory time period will be a difficult and slow process. CRD parks staff and biologists are sympathetic to the needs of migratory birds. However, when faced with threats from enraged dog-walkers, and a board of directors that does not seem willing to ruffle the feathers of the voting public or their superiors, achieving these initiatives is a difficult task. I am extremely hopeful that an educational campaign will be implemented at Island View Beach and that the current practice of off leash dog-walking will be reduced or eliminated during key migration windows. Nevertheless, I now realize that this will take time and will likely have to be built into a formal

management plan for the park before the CRD is willing and able to take steps towards this goal.

These setbacks were challenging for myself and all of the members of the restoration team. As we continue our journey towards restoration I am certain that there will be more setbacks along the way. However, if we “stay the course” I am equally certain that we can achieve our goal of protecting and restoring the ethnoecological integrity of ȾIX̱EṈ.

Figure 5.1: Two Steps Forward – One Step Back

Top image illustrating dead Common Murre's found at ƬIX̲EN̲. Bottom image illustrating the destruction of a wetland area at ƬIX̲EN̲.

Figure 5.2: Expansion of Oceanside RV Resort

Images of the expansion of Oceanside RV park from the spring of 2007.

5.1.1 Getting Started

Work towards a restoration plan for the sand dune ecosystem at ȾIXEN and Island View Beach began in January of 2007. It was at this time that the first meeting of the "Cordova Spit Working Group" was held. Those in attendance included a diverse range of stakeholders from the Tsawout First Nation administration and community, Canadian Wildlife Service, Capital Regional District parks department, University of Victoria, and the SENĆOŦEN Alliance. The composition of this group was in itself a fortunate starting point for this project. As Nancy Turner outlines in her elements of eco-cultural restoration, "the best possible success will be achieved when the contributions and skills of many people, both within the culture and outside it, are incorporated" (Turner, 2005). The Society for Ecological Restoration adds that "when decisions are made collectively they are much more likely to be honored and implemented than those made unilaterally" (SER, 2002). The notion of collaboration is of utmost importance to ecological restoration projects – especially those that inherently involve communities or stakeholders from different cultural backgrounds.

At this first meeting it quickly became evident that there were a number of different opinions and views about how and why to move forward with the conservation of the coastal dune ecosystem (e.g. the ability to harvest foods or medicines, recreation opportunities, preservation of biodiversity). At this stage in the project there was also a sense that there were shared values among the various stakeholders and that there was indeed a common goal of conservation. This goal seemed to center largely around the idea of preserving the ecological and cultural integrity of the area. What exactly this involved for each of the stakeholders however was not clear at this point. It was also not clear at this stage of the study whether or not ecological restoration was indeed what the Tsawout community desired or whether or not this was a culturally appropriate prescription for the land. Nevertheless, the common goal of conserving the sand dune ecosystem would become the collective foundation for all of the members of the CBSPWG. Over the many months that would follow, and during the times when specific discrepancies between stakeholders would arise, this common goal acted as a unifying force between the group members and helped to regain focus at what mattered most to us all - protecting the ecological and cultural integrity of this special place.

Because this first meeting was initiated by the Canadian Wildlife Service, and also because a large portion of the working group was made up of non-indigenous members with similar world views and approaches to conservation, it was important to ensure that the Tsawout community members had direct input into defining the early research and conservation goals. As Battiste & Henderson (2005) suggest, to have acted otherwise would have been "to repeat that familiar pattern of decisions being made for Indigenous people by those who presume to know what is best for them" (p.132). This message was one that was constantly present with me as I conducted my research and carried out my role as a part of the larger working group. For me, it became important to present each idea, goal or option to the Tsawout Chief and Council and/or Tsawout Lands Committee before proceeding. For my research, I attempted to follow the guidelines for ethical research involving First Nations peoples set out by the Canadian Research Councils (NSERC, SSHRC, and Medical Research Council). In their list of good practices the CRC states that:

> *"The councils considered it good practice for researchers to respect the culture, traditions, and knowledge of the Aboriginal group; to conceptualize and conduct research in partnership with the Aboriginal group; to consult members of the group who have relevant expertise; to involve the group in the design of the project; to examine how the research may be shaped to address the needs and concerns of the group; and to make best efforts to ensure that the emphasis of the research, and the ways chosen to conduct it, respect the many viewpoints of different segments of the group in question" (Battiste & Henderson, 2005 p.140).*

As a working group we collectively decided that the initial goal of the project was to collect baseline ecological and cultural data about the study site in order to make informed decisions about the need for, and best approach to, conservation. The collection of this data was also collaborative in nature. The British Columbia Conservation Data Center worked towards completing a mapping exercise that described the bio-terrain features of the site. The CRD hired a botanist specializing in rare plants to complete a rare plant inventory for the entire sand dune ecosystem (including that existing on the Tsawout reserve). Nancy Turner of the University of Victoria as well as Belinda Claxton of the Tsawout First Nation assisted with the identification of culturally significant plant species. As part of an ongoing study, the Tsawout First Nation worked towards collecting archaeological information about the study site. My contribution to this stage of the project was to conduct a census of the bird species that inhabit the area throughout the year (see section 4.3). I also worked towards a comprehensive inventory of human influence for the study site. This included mapping the contemporary impacts to the site, identifying stressors and also attempting to gather as much historical information about the site as possible (see section 4.2).

It was also during this initial phase of the study that the CBSPWG began to look for ways to get members of the Tsawout First Nation interested and involved with the project. There were a variety of reasons that engaging with the community early in the project was desirable. To begin with, letting community members know that there was a project underway and that their opinions and contributions were welcome was very important. After all, it seemed logical that the people who owned the land, lived closest to the site and had a historic tie to the land would have a lot to contribute to the project and would likely be interested in its conservation. This community focused approach was also harmonious with Nancy Turner's Eight Elements of Eco-cultural Restoration which state that "when a person's cultural identity is closely linked to their ancestral lands they have a high incentive to care for them" (Turner, 2005). Creating opportunities for participation and being visible within the Tsawout reserve was also important to ensure that any conservation actions were not viewed as coming from outside of the community or being imposed upon the Band. By creating opportunities for involvement and input early in the project it was hoped that we would be able to prevent or minimize any future conflicts that could arise.

As a researcher, becoming visible on the reserve was essential to gaining entry into the community and to the success of the interviews that I would later conduct. One of the opportunities that presented itself was to have a well respected member of the Tsawout First Nation (Dan Claxton) accompany me during my morning avian census sessions. I believe that my association with Dan early in the study gave me credibility and a certain degree of respect from other community members. It certainly helped to develop a relationship with someone from Tsawout and to gain a greater insight into the desires and cultural traditions of the Tsawout people. As the overall project progressed, Dan himself became a vital member of the study team. When it came to facilitating the interviews that I would conduct with Tsawout elders and community members I know that I would not have received the same number of willing participants nor would I have received the same level of candid answers that I did had Dan not been present. Furthermore, although I tried to word interview questions with culturally appropriate terminology, there were times when it was necessary for Dan to help to explain exactly what I was asking in a more appropriate way. Meeting Dan, getting to know him, and having his help to arrange and carry out the interviews was essential for the success of this study.

A second opportunity that emerged early in this study was to take part in a summer field course for local First Nations students entitled "Learning from Place". I made arrangements to take the students from this course, as well as a handful of Tsawout elders, to the study

site during one of my morning avian census sessions. As we walked around the sand dunes that morning looking for birds and learning from each other I mentioned that there was a study underway to look at ways of conserving this place. I also suggested that if anyone was interested in joining the study team that they would be welcome to do so. We were fortunate that one of the students became very interested in the project and became an important member of the larger working group.

Much of the first year of this study was spent building relationships with individual members of the Tsawout community and establishing a diverse and committed study team. This was something that could not be rushed or forced. First Nation communities have a long history of being taken advantage of by scientists, researchers and government personnel. As a result it should not be unexpected that there is a certain amount of skepticism or restraint that is inherently present when these groups engage in partnerships. I believe that it is extremely important for researchers entering in to conservation or restoration partnerships with First Nations to reflect upon exactly what it is that they seek to achieve, ensure that they are genuinely perceived as someone who is trying to **give** and not **take**, and above all always keep the desires of the community as guidelines for any actions that take place.

5.1.2 Identifying Values

Eric Higgs' principles of focal restoration dictate that the focus of restoration should be directed at the things that matter most such as the integrity of the ecosystems, community engagement and our cultural relationship with the land (Higgs, 2003). In order to achieve this goal, and in order to create a clear vision for conservation, it was necessary to clarify exactly what the values of the various stakeholders were. To do so I conducted a series of interviews with the three major stakeholders for the project - Tsawout, CWS, and CRD (See section 4.1). The primary goal of the interview process was to identify what the main values for each stakeholder were, determine if these values were compatible, and, together with the background ecological data that were compiled, formulate restoration goals and objectives. A second goal of the interviews was to determine what changes had occurred to the study site and to gain a greater sense of the history of the study site. If restoration was deemed to be appropriate at this site understanding the history of the site in the most complete sense as possible would be necessary.

The interview process was also an excellent opportunity to incorporate the wisdom and experience of Tsawout elders into the restoration plan. It is these members of the

community who hold the greatest knowledge of the history of the site, are the greatest sources of traditional knowledge and also would be the best people to ask what form of conservation would be most appropriate for the Tsawout band (Turner, 2005). For this project, and any ethnoecological restoration project, engaging with the community elders and seeking their guidance is an essential part of working towards a sustainable future (Turner, 2005).

The interviews revealed that there were indeed common values among the three main stakeholders. Although expressed in different ways, it became clear that each stakeholder seemed to have values that centered on the preservation of the ecological and cultural integrity of the area.

For the CRD the primary values included the protection of natural environment and native species as well as the need to ensure recreational opportunities for park visitors. The CRD acknowledged the inherent challenges associated with promoting both conservation and recreation. When these two values became incompatible, the CRD stated that conservation should be the guiding value to direct any other activities within the park.

For the CWS the preservation of biodiversity was listed as the primary value associated with the project. Additional values included the conservation of the landform, building functional partnerships (especially with First Nations) as well as public education and outreach to the larger community (both park users and the First Nation community).

Members of the Tsawout community did not necessarily express their values as conservation objectives (as was the case with the CRD and CWS). Instead interview respondents mentioned valuable practices that took place at the spit. The most commonly mentioned of which was the ability to harvest traditional foods and medicines. Additional values included the use of the area for cultural celebrations, for honoring ancestors, the scenic beauty of the area and the simple fact that this place has belonged to the Tsawout people for generations.

Many of the stakeholder values were revealed when interview participants were asked to step outside of the constraints of reality and describe a desirable future condition. Such “visioning” exercizes were aimed at revealing the expectations and desires of the various stakeholders (Boulding, 1988; Grenier, 1998). For example, Samantha Etzel hoped for a future where “it would still be healthy to harvest any food from the site, it would also be abundant [and] all the natural processes would be occurring for the kids to see (Etzel, S., 2008). In Daphne Harvy’s vision of the ideal future she stated that “all the plants and wildlife would be back down there” (Harvy, D., 2008).

Another important aspect of the interview process was to determine what type of conservation activity would be appropriate for the Tsawout community. More specifically I wanted to assess whether or not some form of ecological restoration was appropriate. As one would expect, ecological restoration as practiced by contemporary restoration practitioners was not an activity that was traditionally carried out by the Tsawout people. However, the ethic of conservation was inherent in the Tsawout system of beliefs and practices. As Belinda Claxton explained to me, it was "Xals the creator [that] created us and taught us to respect the land and the water and the animals" (B. Claxton, 2008). Rhonda Underwood reinforced this traditional ethic by stating that "We need to take care of it (the land) like it's a living part of ourselves because the land and the water and everything around there has given us so much" (Underwood, R., 2008).

The idea of revitalizing the ecology and the cultural practices associated with the spit was strongly supported by the community members that I spoke with. For example, Rhonda Underwood expressed the need to "restore the area to its original condition and its natural state [and to] see it as a beautiful, sacred, respected place where families could go [with] kids and visitors and learn about the site" (Underwood, R., 2008). Most of the elders that I spoke with were very positive about the opportunities for restoration at the spit. However there were a variety of responses regarding the need for human intervention as opposed to simply stopping the destructive actions currently occurring at the site. For example, 89 year old Ray Sam expressed to me that "we need to leave it like how it was". Ray wanted the site to return to the way it was when he was young but was implying that this would naturally occur. Indeed, based on examining areas of past disturbance at ȾIXEN, autogenic restoration (where ecosystem functions and processes are self-renewing without assistance from restorationists) of many of the dune plant communities may be a viable prescription (see figure 5.3) (SER, 2002).

Overall, the interviews with members of the Tsawout community suggested that some form of ecological restoration was indeed appropriate. An ethnoecological restoration prescription for this site would mean incorporating the TEK of the Tsawout community members. In addition to the knowledge of traditionally used plant species and ecosystem characteristics this knowledge also dictated the way in which restoration would be appropriate. Over and over I heard that to successfully achieve our collective conservation goals within this community meant involving young people, seeking out opportunities to engage with the community, and provide hands on opportunities for people to learn about the site and work together for its conservation. Tsawout Chief Allan Claxton told me that

when it came to restoration, “the first step is to educate people and get people to respect what we have out there” (Claxton, A., 2008). He added that the process should be collaborative and should involve community members, people with expertise as well as the young people within the community.

The interviews also re-affirmed to me the sometimes forgotten concept that TEK is adaptive. Although ecological restoration was not traditionally practiced by the Tsawout people, many respondents saw the opportunity to protect a part of their traditional territory and also to restore cultural practices that are in danger of being lost. During one of the CBSPWG meetings Belinda Claxton enthusiastically embraced what she viewed as an opportunity for the Tsawout to be the first Band on the Saanich Peninsula to begin working to protect their land in this way.

Based on the results of the interviews I created a list of the main values that were identified by the three stakeholders. In Table 5.1 I then identified the primary threats to these values as well as what the stakeholders viewed to be a desirable future (as identified in the inventory of human influence, interviews and background ecological studies). This enabled the formulation of a primary list of goals that could be used to create a more specific action plan.

Table 5.1: Values, Threats and Goals

Value	Primary Threats	Desired Future	Goals
Resident and migratory birds • Migration • Spirituality • Hunting • Biodiversity	• Dogs (off-leash) • Habitat disturbance from vehicles • Invasive species • Expanding development • Feral cats	• Functional migratory stopover point • Preserve avian diversity of site	• Educate dog walkers • Signs • Bylaws • Access control and management • Invasive species action plan
Dune ecosystem • Traditional uses (food, medicine) • Rarity • Unique ecosystem • Endangered plants and animals	• Vehicle use • Invasive species • Pedestrians • Loss of traditional values • Alteration of natural processes (berm, shore stabilization) • Sewer treatment plant • Expanding development	• Self sustaining populations of rare vegetation • Ability to harvest traditional plants and medicines • Natural processes restored to greatest extent possible	• Access control and management • Restoration of rare and culturally significant plant communities • Restoration of cultural practices • Protect sensitive areas against future damage • Invasive species action plan
Cultural Celebration • Honoring Ancestors • Family gathering • Traditional role of FN community as caretakers of land	• Trespassing, loss of ownership • Inappropriate use (drinking, fires, sunbathing) • Dumping waste • Loss of traditional values	• A place for community gatherings and events (e.g. seafood festival, canoe races, Earth Day)	• Stop negative uses • Access control and management • Restoration of cultural practices • Education and sharing of TEK
Recreation • Passive recreation • Fishing • Hunting	• Inappropriate use (drinking, fires, sunbathing) • Dumping waste • Trespassing • Off-leash Dogs • Horses	• Ecologically and culturally responsible recreation • IVB – educated park users • Tsawout – a safe place that is for use by the community (not a public space)	• Work towards visible and positive conservation priorities to gain support for larger restoration goals. • Enforcement of bylaws • Stop negative uses • Access control and management
Partnerships, Education & Outreach	• Loss of traditional knowledge • Inappropriate planning and design • Lack of political support and funding	• Revitalizing SENĆOŦEN • Project partners working together for conservation • Educate broader community about eco-cultural values	• Educate youth about the site and traditional uses. • Community involvement. • Send message to all users of the area about what is acceptable. • Let community know what is being done and why

Figure 5.3: Autogenic Restoration at TIXEN

Areas that have been impacted by vehicle use can recover through autogenic restoration - where ecosystem functions and processes are self-renewing without assistance from restorationists (both images).

5.1.3 Taking Action: Preliminary Activities

Once the main values of the stakeholders had been identified, and a list of primary goals had been established, we could begin to work towards more specific restoration planning. The challenge that presented itself was to do so in a way that incorporated what was most valuable to each stakeholder while simultaneously restoring the ecological integrity of the land and revitalizing the cultural connection of the Tsawout people to the site. Furthermore, it was essential to ensure that any planning or activities that took place were carried out in a manner that was harmonious with the Tsawout culture.

The interview process revealed three key principles that would become guiding themes (what Higgs might call focal values) for the restoration planning and design process. These themes included: the need to focus on community participation, youth and education; the importance of the SENĆOŦEN language; and the acknowledgement that both ȾIX̱EN̲ and Island View Beach are culturally used places.

5.1.3.1 Community Participation, Youth and Education

When discussing the possibility of restoration with Tsawout community members it was expressed to me over and over that community participation and education would be vital. Tsawout Chief Allan Claxton told me that he believed the project should involve not only Tsawout community members but also people from outside the community who had expertise in restoration (Claxton, A. 2007). He also expressed to me that the best way to get the Tsawout community involved was to design the project so that it could be a “hands on approach” (Claxton, A. 2007). Samantha Etzel explained to me that within the Tsawout band “all families have different things that they contribute to the community – so facilitating restoration might need to include key people from a number of families” (Etzel, S. 2007). During an interview with community elder Lou Claxton he expressed to me that “if people had input – the respect would be there – if you go out and just say ‘don’t step on that’ then the opposite would happen” (Claxton, L. 2007). Promoting participation to encourage compliance with any restoration prescription is a valid reason to do so.

For the Island View Beach portion of the study site the CRD did not make explicit reference to involving park visitors in any conservation or restoration initiatives. Nevertheless finding opportunities to engage with park users, and to make them care about the ecosystem and its inhabitants, is an effective way to promote the project and enhance

the chance of successful outcomes. In any restoration project if people are involved in what is taking place and know why things are happening they will be much more likely to support the initiatives.

Participation is important in restoration projects not only as a means of ensuring compliance, but also because participatory approaches can facilitate community building and can create, revitalize or enhance the cultural engagement with the environment. Restoration has the potential to be "a vehicle for reconnecting with place" (Apostol & Sinclair, 2006 p.421). However this can only occur if the project is designed in a way that creates opportunities for the transmission of cultural beliefs, knowledge and practices. For the restoration practitioner, achieving the cultural aspect of ethnoecological restoration requires diligently and creatively seeking ways for participation and education to occur.

The interview process revealed that cultural restoration and education was indeed a priority for the Tsawout First Nation. During one of our conversations Earl Claxton Jr. explained to me that "our people have been yanked away from our culture and many of us are trying to get it back" (Claxton, E. Jr. 2007). Earl went on to highlight the importance of education and the transmission of TEK by saying that "one of the ways (to promote cultural restoration) is to learn about the medicines and return them to our people" (Claxton, E. Jr. 2007).

One of the greatest challenges with ethnoecological restoration projects is that very often much of the TEK that remains within a given culture is held by a small number of people (usually the community elders) and is, in many cases, at risk of being lost forever. Consequently, one of the goals of this project is to provide opportunities (through restoration initiatives) for the transmission of this knowledge between elders and youth. This is important because, as Nancy Turner (2005) states in her eight elements of eco-cultural restoration, "it is the youth who will carry forward the knowledge and values of the project for future generations". This focus on passing on knowledge between generations and of reciprocal relationships was also identified during the interview process by Daphne Harry who suggested that it would be the elders that would contribute the information and the knowledge and the youth who would work towards the restoration implementation (Harry, D. 2007).

Community-based restoration "may be a mutually beneficial activity whereby people develop stronger relations with each other and their local environment in the process of restoring place" (Apostol & Sinclair, 2006 p.421). For this project a carefully designed ethnoecological restoration program has great potential to contribute towards the restoration

of cultural practices and transmission of TEK while simultaneously repairing and restoring a damaged landscape. Apostol and Sinclair (2006) state that "as indigenous people reclaim their sovereignty, their land base and their culture, restoration may assist the recovery of interrelated ecological, social, and cultural systems" (p.422). For this to occur however, First Nations communities must be involved throughout the various stages of the project.

5.1.3.2 The SENĆOŦEN Language

In addition to promoting participation and education, a second "focal value" for this project was to find opportunities to incorporate and revitalize the SENĆOŦEN language whenever possible. Like many languages around the world, SENĆOŦEN has declined in the number of people who actively speak it (Leonard, 2007).. For some, the conservation of a language may seem like a distant priority in the grand scheme of an ecological restoration project. For this ethnoecological restoration project however it was recognized to be extremely important. I only realized how important language revitalization was when Belinda Claxton explained to me the connection between Tsawout traditional values and SENĆOŦEN. She told me that "when you talk about our SENĆOŦEN language it's built in it (conservation) because SENĆOŦEN is who we are, it is our identity, SENĆOŦEN is how we govern ourselves and when you speak of having values and traditions it is in there, its all in there – its all built in" (Claxton, B. 2007). Battiste and Henderson (2005) recognize such sentiments and add that "indigenous languages offer not just a communication tool for unlocking knowledge, they also offer a theory for understanding that knowledge and an unfolding paradigmatic process for restoration and healing" (p.133). In order for ethnoecological restoration to occur, and in order to integrate the TEK of the Tsawout people, the SENĆOŦEN language would have to be an integral part of restoration planning.

5.1.3.3 Culturally Used Places

A third guiding principle for this project was the acknowledgement that both ȾIXEN and Island View Beach are culturally used places. ȾIXEN has been historically used by the Tsawout people for food gathering and preparation and as a part of their economic, societal, social, and spiritual life (The Tsawout First Nation Band, 2007). The site is now used annually by the community for celebrations and ceremonies such as the Tsawout canoe races and during Tribal Journeys. While some restoration practitioners still believe that the only ecosystems with integrity are those that are free of human interaction, in this project the

history of human use is to be honored and celebrated. Acknowledging this, one of the goals of this restoration project is to facilitate opportunities for traditional ceremonies and celebrations as a way of restoring the cultural connection to the land.

Island View Beach also has a long history of human use. Furthermore, one of the primary values identified by the CRD was the need to ensure recreational opportunities for park visitors. Although the current use of Island View Beach park is not one that could be considered as "traditional" – the area is now a culturally used space. Furthermore there is no option to decommission the park, to change its physical design or to reduce the number of users in any way. Based on these facts the design of this project must find ways to integrate the restoration of the sand dune ecosystem with environmentally responsible recreation opportunities at Island View Beach park.

5.1.3.4 Taking Action

For each of the values identified in table 5.1 the preliminary actions required involved stopping negative activities from occurring and promoting education. Although many would categorize these actions as a form of conservation rather than restoration, it is important to recognize that these initial actions are part of the process of ethnoecological restoration, and also ultimately what will enable the ecological restoration of the ecosystem to occur. Table 5.2 takes the goals from Table 5.1 and provides a list of preliminary activities that are intended to work towards the overall goal of the restoration of the cultural and ecological integrity of this ecosystem. The chart also provides rationale for why the activity was deemed appropriate and notes on how to implement each conservation action.

Table 5.2: Preliminary Restoration Actions

Dune Ecosystem		
Goals	**Preliminary Action**	**Rationale / Implementation**
Protect sensitive areas against future damage	Access control and management	• In sand dune ecosystems activities such as riding mountain bikes, horses, and motorized, off-road vehicles (trail bikes and all-terrain-vehicles) are inappropriate and can result in damage to soils and vegetation. Even foot traffic can seriously disturb these ecosystems (McPhee et al., 2000). • Fairbarns (2007) recommends the use of fencing to direct vehicle traffic away from the sand dune environments (on the Tsawout reserve) and to direct walkers away from rare species populations in (Island View Beach Park). • On the Tsawout reserve the primary negative impact and threat to the integrity of the ecosystem is the operation of motorized vehicles. Fencing off the northernmost portion of the spit will avoid future damage and allow autogenic as well as assisted ecological restoration to occur. • Note that access control and management has benefits not only for the sensitive dune vegetation but also for bird species such as killdeer and common nighthawk that nest (or have nested) at the site (McPhee et al., 2000). • Restoration measures must identify and reverse the processes causing the degradation otherwise the degrading influences will continue to operate and work against restoration efforts (Hobbs & Norton, 1996). **Implementation:** • On the Tsawout reserve a well established road runs from the base of the spit to a "parking area". This area is used for cultural gatherings such as the canoe races, seafood festival, etc. It is recommended that the east side of the road leading from the base of the spit to the parking lot be fenced off using 3 rail high cedar fencing. The fence should block vehicle access beyond this point and be accompanied by appropriate signage. It is recommended that the fence does not need to be placed on both sides of the road as the west side of the road is bordered by the lagoon and therefore is not likely to be impacted by vehicle use. • Additionally, as identified during the interview process, a burial site exists on the spit just east of the parking area. To avoid further damage to this sacred site fencing should be installed around its perimeter. • Fencing should be installed prior to the North American Indigenous Games (August 2008) to attempt to avoid the potentially catastrophic impacts of up to 5000 visitors to the site. • At Island View Beach Park one large area has been fenced off (September, 2007) to avoid impacts to an endangered population of contorted pod evening primrose. • Additional areas (on the Tsawout reserve or at Island View Beach) may be evaluated for similar fencing. Fairbarns recommends monitoring levels of activity in the vicinity of the rare plant populations to determine if a other access management actions are required in the future (2007).
Restoration of rare and culturally significant plants	Identify priority areas where restoration treatments are appropriate.	• Once the negative impacts (i.e. vehicle and pedestrian trampling) have been addressed opportunities for restoration treatments can be explored. • Some of the areas may experience autogenic restoration. Others will require deliberate restoration efforts. **Implementation:** • Areas where rare and endangered plant communities exist (as identified by Fairbarns, 2007) should be evaluated based on the need/potential for restoration. • Engage with Tsawout youth group / UVic summer studies course to undertake and initial/experimental restoration treatment. • Autogenic restoration is also viable in many areas. This however may need to be assisted by restricting access to certain areas, decommissioning former roads, and preparing heavily compacted sites so that they may be colonized by native dune vegetation.

Goals	Preliminary Action	Rationale / Implementation
Invasive species action plan	Remove invasive species from in-tact portions of the sand dune ecosystem	• Protecting the ecological integrity of the sand dune ecosystem will require the control of invasive species such as Scotch broom, Gorse, Himalayan Blackberry and potentially various non-native grasses (McPhee et al., 2000). • These invasive species must be managed through aggressive removal campaigns early in the project. Monitoring and continued removal of invasive species in certain areas will likely be required indefinitely. • Some rare plant communities have been damaged or have disappeared from portions of the study area. The recovery and restoration of damaged populations is not possible in locations where these invasive species continue to dominate (Fairbarns, 2007). • It is recommended to remove exotic shrubs in order to improve the quality of potential habitat into which rare species may expand on their own or by transplanting and direct seeding (Fairbarns, 2007). • The removal of invasive species (and subsequent conservation of the sand dune ecosystem) will also have beneficial effects for dune specialist birds that rely upon either the native dune flora as a source of food (especially during their southward fall migration when a number of the dune plants are at seed), as well as for birds that rely upon such open areas for hunting and nesting. **Implementation:** • The CRD has a policy to remove invasive species such as broom in ecologically significant or rare ecosystems (such as the study site for this project). However, the CRD is also reluctant to proceed with invasive species removal due to the likelihood of reinvasion. • These concerns are well founded and supported in the literature. As Zavaleta et al.. (2001) note management will have impacts on ecosystems that must be considered - off-target effects of removal, reinvasion, ecosystem altered but not repaired after invasive is managed, ecosystem altered after (or by) removal of one invasive facilitates or increases another. • Because the ecological integrity of much of the Island View Beach portion of the study site has been heavily modified (drained, filled and hydrology altered) and because the area is already heavily infested with Scotch Broom – invasive species removal in this portion of the study site is not a viable recommendation. • In portions of the study site that have in-tact dune vegetation communities and rare plants invasive species management should be pursued. • In April 2008 an Earth Day invasive species removal project took place at TIXEN. Nearly all of the living broom and gorse was removed. • It is recommended that a similar campaign be scheduled for Earth Day 2009 and that the focus of this campaign be the area of the Tsawout reserve just south of the water treatment plant. Subsequent years could continue to manage the inevitable re-invasions that are certain to occur.

Education & Outreach		
Goals	**Preliminary Action**	**Rationale / Implementation**
Educate community (especially youth) about the site and traditional uses	Facilitate community involvement in project. Revitalize SENĆOŦEN language through printed materials and events.	• Fist Nations communities have, for a variety of reasons as discussed in section 2.2.3, been separated from their traditional language and cultural practices. As a result the younger generations have lost much of the traditional knowledge, connection and in some cases respect for the land. • Earl Claxton Jr. (2007) told me that within the Tsawout community "the younger people have had a disconnect with nature. They are playing video games and watching TV all day. We have to force them outside. We need to get them outside more and show them these things and teach them about the significance of the plants and their SENTOTEN names". • John Etzel (2007) suggested that as this project moves forward it should "get involved with the summer programs and get students engaged – do tours of the area and discuss the values. Ask them questions and see how they feel about it and what they want for conservation. They have really good ideas but are just never asked". **Implementation:** • Involve the Tsawout community in all aspects of this restoration project (planning and design, implementation, education). • Provide relevant interpretative signage (in both English and SENĆOŦEN) at key locations in the study area. • Provide relevant natural history hikes for Tsawout community members (led by experts and community elders). • Continue to pursue public outreach campaign for this project. This should include regular reporting to the Tsawout Lands Committee as well as Chief and Council as well as reports to the community as a whole (published in the monthly Tsawout community newsletter). • Promote the SENĆOŦEN language through interaction with community elders and speakers. • Partner with Saanich Tribal School and summer courses to begin restoration treatments at site. • Create an educational book to be given to members of the Tsawout community about the ecological and cultural significance of this site. The book should include messages from community members and incorporate the SENĆOŦEN language.
Cultural Celebration		
Goals	**Preliminary Action**	**Rationale / Implementation**
Restoration of cultural practices	Promote celebrations, educational materials and the SENĆOŦEN language	• ȾIXEN is a culturally significant place and has been used by the Tsawout people for generations. • The beach area was traditionally used for pit cooking as well as smoking food for winter storage (Claxton, B, 2007). • The site is used for the canoe races which are part of the Tsawout culture (Claxton, L, 2008). • The site is also used to harvest a variety of traditional plants as well as for fishing and hunting (ducks). • The interactions that the Tsawout First Nation has had with the landscape have been steadily eroded (especially over the past two generations). • Many of the negative impacts that occur (e.g. driving of 4x4 vehicles over the sensitive vegetation and dumping of garbage) may be preventable if the cultural connection to the land was restored. **Implementation:** • Promote and support cultural and educational events at the site such as the canoe races, seafood festival and earth day cleanup. • Promote the significance of the ecosystem in an educational resource book to be provided to the entire community. • Focus on creating opportunities for Tsawout youth to learn from elder members of the community about the cultural significance of the site.

Recreation		
Goals	**Preliminary Action**	**Rationale / Implementation**
Stop negative uses and gain support for larger restoration goals.	Educate all users about acceptable use of area. Work towards long term conservation priorities. Publish conservation protocol agreement.	• Many of the activities that are causing damage to the area require conservation actions that can not happen all at once (for a variety of political and financial and logistical reasons). • For example, addressing the impacts of off-leash dog walking likely will require a sequential process of education, signage and ultimately bylaw amendment and enforcement. Unfortunately the CRD Parks department is unwilling to proceed with signs or education campaigns due to the contentious nature of the issue. Community groups such as "Citizen K-9" have a great deal of political influence and the ability to intimidate parks staff and politicians into maintaining the status quo. Working towards the conservation goals of this project will require strategic and sequential actions. • Other activities that have become entrenched in the behaviour of current users of the area will take time to modify (e.g. trespassing on to Tsawout reserve, nude sunbathing, etc.). • Working towards the long term conservation of this ecosystem will require a solid foundation of preliminary conservation actions (e.g. documenting rare plants, signs on the Tsawout reserve, celebrating the cultural significance of ȾIXEN, etc.). These initial activities will set the stage for future actions such as extended off-leash dog restrictions and the creation and enforcement of such bylaws. • As Higgs states - "most of the emphasis must be on designing experience for the visitors and dwellers that emphasize[s] long-term responsibility, respectful action, and contribution, material or otherwise, to the flourishing of ecosystems" (2005). **Implementation:** • At Island View Beach promote ecologically and culturally responsible recreation – educate users about the sensitive species at the site as well as the boundaries of the park. If CRD Parks is unwilling to facilitate such measures – look for creative ways to do so through groups such as the Victoria Natural History Society. • Install additional signs that discourage Island View Beach park visitors from trespassing onto the Tsawout reserve. • On the Tsawout portion of the study site continue to promote the significance of the ecosystem through celebrations (e.g. Earth Day) as well as educational materials (ȾIXEN book). • Access management at Tsawout will discourage inappropriate use of the spit (e.g. drinking, fires). • Work towards by-laws that allow for enforcement of fines for dumping garbage, off-leash dogs, etc.

Resident and Migratory Birds		
Goals	**Preliminary Action**	**Rationale / Implementation**
Educate dog walkers about migratory birds	Public awareness campaign	• A first step towards avian conservation may be to promote public appreciation of the local avifauna, the incredible journeys that migratory birds make, the nature of the threats they face, and the ways in which these threats can be reduced and/or mitigated. • The value of visitor education to reduce the incidences of inappropriate behavior and minimize environmental impacts on natural ecosystems has been widely recognized (e.g. Papageorgiou, 2001; Rome & Romero, 1998). • There is a growing awareness that environmental education techniques, programs and strategies "may be used as "instruments" through which the ultimate goal of the sound management of environmental resources may be achieved" (Filho, 1997 p.133). • Jacobson (1991) suggests conservation education to be a time and labor-intensive but cost-effective means of effecting behavioral changes. • Establishing educational programs and management strategies may lead to a foundation upon which additional conservation efforts can be built. **Implementation:** • The CRD has political constraints surrounding this highly contentious issue and may not be able to be the lead agency in this initiative. • It may be possible to engage with the local Victoria Natural History Society to provide educational bird walks during the spring and fall migration. This may help to foster a greater appreciation for the birds and begin to set the stage for signs and bylaw amendment surrounding off-leash dog walking. • Note that education/awareness campaigns should also incorporate the dune ecosystem as a whole – including the rare and culturally significant plant species.
	Signs on Tsawout Reserve	• The conservation of sparsely vegetated ecosystems requires control of access to sensitive areas – including restrictions to off-leash dog walking (McPhee et al., 2000). • The conservation strategy for this ecosystem should provide relevant interpretative signage at key locations in the study area. **Implementation:** • Initial signs have already been installed at the Tsawout portion of the study site (see figure 5.4). • Future opportunities exist to install additional interpretive/educational signs at Tsawout.

Figure 5.4: Regulatory Signs at ȾIXEN

Both images above illustrate regulatory signs that were installed at ȾIXEN in the spring of 2008.

5.2 Guidelines for Ethnoecological Restoration

Within the existing ecological restoration literature a variety of guideline documents exist. These reference materials tend to outline the basic planning stages of a restoration project and are largely focused on the scientific knowledge and techniques necessary to achieve physical restoration (e.g. SER, 2002; BC MOE, 2008). These documents however generally offer little guidance to restoration practitioners about **how** to engage with stakeholders who may be from a different cultural background or **how** to understand and engage with the values of these groups. For example the Ecological Restoration Guidelines for British Columbia (BC MOE, 2008) dedicates less than one page to stakeholder involvement.

One of the most recent attempts at creating guidelines for ecological restoration was published by Parks Canada in the spring of 2008 (Parks Canada, 2008). This document effectively achieves its goal by setting out a framework for working towards ecological restoration in protected areas. Much like its predecessors though, it offers limited guidance for practitioners working in First Nation communities towards **how** to work towards ethnoecological approaches to restoration.

One of the essential ingredients to facilitating an effective ethnoecological restoration project is to ensure that both science, as well as local knowledge and values, are meaningfully incorporated into decision making (Failing et al.., 2007; Light & Higgs, 1996; Kimmerer, 2002; Ford & Martinez, 2000; Long et al.., 2003; Senos et al., 2006). This fact has been widely recognized and documented. Yet as Karl et al.. (2007) identify, “it has become increasingly clear that established mechanisms and institutional frameworks, dominated by adversarial approaches that pit science against politics and interest group against interest group, are inadequate to achieve such an integration of sciences, values, and interests” (p.22). Failing et al. (2007), add that “while it is generally acknowledged that both facts and values are needed to inform a policy making process, the inclusion of value judgments in the domain of what is called “knowledge” is controversial, particularly in the western science community” (p.50). Effective ethnoecological approaches to restoration will include a balance of inputs from scientific fact (what is) and from community stakeholder values (what ought) (Failing et al., 2007). The identification of community values, and the inclusion of these values in the decision making process, must be systematically incorporated into the guiding framework for ethnoecological restoration.

Although it has become popular to “include” TEK in decision making, this often involves extracting from local communities only the information that fits neatly into preconceived

moulds of restoration science. A more meaningful approach to ethnoecological restoration would require that "local beliefs, values, and practices themselves - not merely the abstract forms affixed to them - be accepted as a valid basis for action" (Nadasdy, 1999 p.13). Furthermore, the trajectory of a restoration project, the activities that are carried out, and the final product of the restoration project must remain undetermined by the restoration practitioner until meaningful consultation with the local community has taken place.

The guidelines documents that currently exist tend to make broad statements suggesting the need to "incorporate stakeholder values" (e.g. SER, 2002; BC MOE, 2008). Some may even go so far as to acknowledge the value of TEK. However, scholars such as Gregory (2007) and Failing (2007) accurately point out however that much of what has been written to date focuses on the organizational issues surrounding consultation without any substantive effort to address **how** to actually conduct meaningful stakeholder deliberations and value assessments (Gregory et al.., 2007;Failing et al.., 2007). As Gregory et al. explain, "what's missing to date is guidance on what to do once the parties are at the table, and how they are to develop a management plan that is respectful of, and responsive to, the various interests" (2008, p.36).

Figure 5.5 presents a set of guidelines – specifically designed for ethnoecological restoration projects. These guidelines are adapted directly from the current set of best practices (Parks Canada, 2008), but emphasize the need for, and tools to achieve, meaningful stakeholder involvement early in the restoration planning process. Drawing from my experiences in working towards the ethnoecological restoration of ȾIXEN, these guidelines include examples for how to incorporate traditional values into restoration planning and also highlight potential pitfalls that may occur. Overall, they emphasize an approach to restoration that embraces the complementary nature of TEK and western science by identifying stakeholder values and encouraging an ethnoecological restoration process that is adaptive, respectful and community driven. Perhaps most importantly the guidelines encourage a framework for restoration that specifically attempts to find opportunities for TEK to awaken, emerge, evolve and be applied.

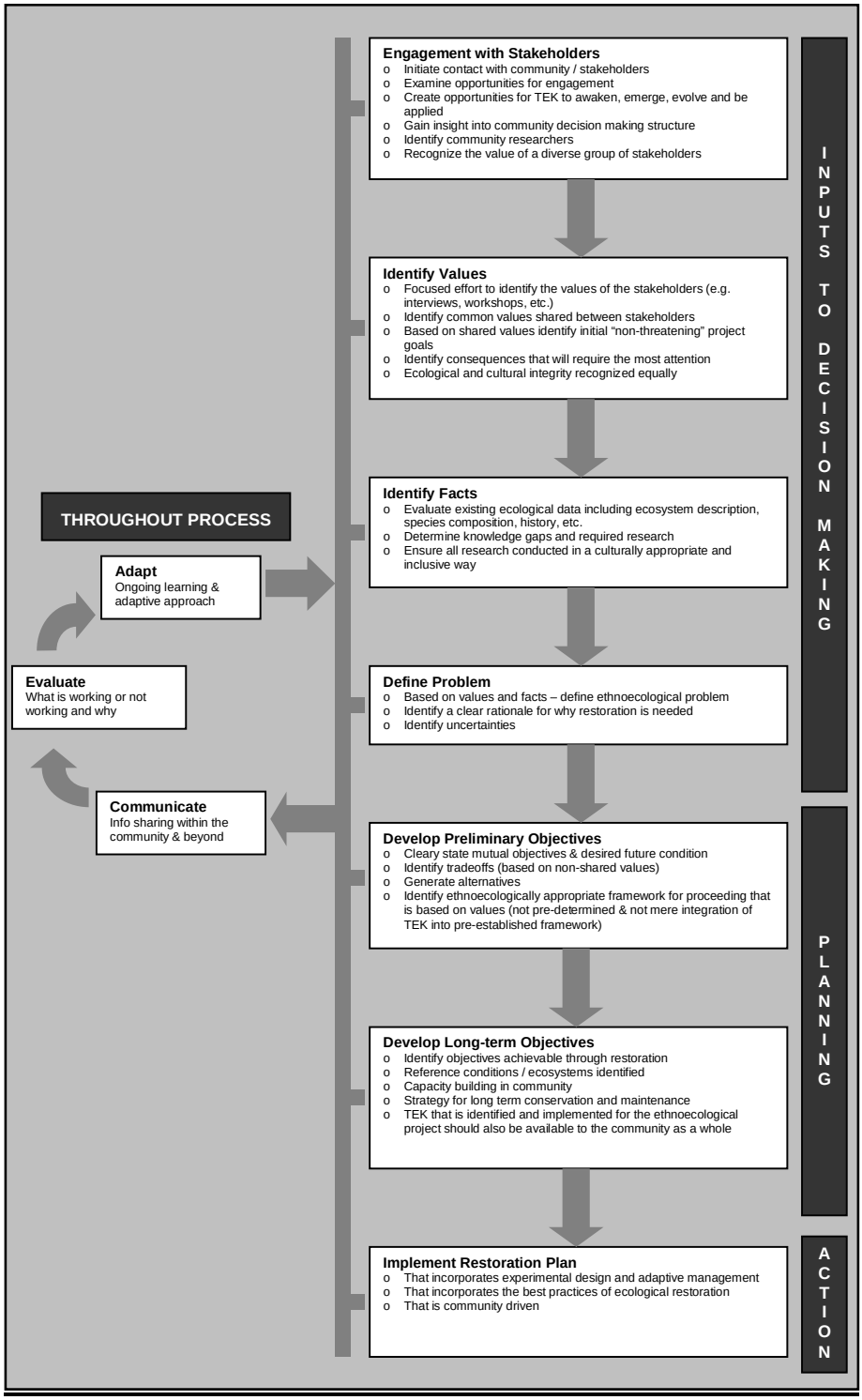


Figure 5.5: Guidelines for Ethnoecological Restoration

Adapted from: (Parks Canada, 2008)

5.2.1 Explanation of Guidelines for Ethnoecological Restoration

Engagement with Stakeholders:

Rationale:

Any good ethnoecological project must begin with the process of community engagement. Getting to know the stakeholders and establishing a relationship built on trust and mutual interests is paramount to the long-term success of the restoration project. I believe that as a practitioner it is essential to enter in to such multi-stakeholder relationships involving First Nations communities with the honest intention of trying to ***give*** something back to the community and not merely a researcher looking to ***take*** something away (i.e. TEK, ecological data, or the achievement of preconceived project goals or agendas).

While engagement with stakeholders is listed as the first step in the process, it should be recognized that in reality this process extends throughout the life of the project. As Turner et al.. explain, "ultimately, a goal of all good community-based decision making is to allow people to voice and represent their concerns, to convey what matters, and to express their views in a manner that renders them understandable to decision makers" (2008, p.11). Achieving this goal will require the restoration practitioner to be patient, respectful and focused on the achievement of a community driven project.

Methods:

It must be acknowledged that community engagement takes time and cannot be rushed. Earning the trust and establishing a relationship between project stakeholders that may have very different backgrounds can be a slow process. This certainly poses concerns for many restoration practitioners who may feel pressure to provide deliverables early on in the life of a restoration project. Nevertheless, it is essential that this important aspect of ethnoecological restoration is not rushed as it will provide the foundation for all future initiatives.

During this initial phase of ethnoecological restoration, practitioners should provide multiple opportunities for participation from the widest range of stakeholders possible. It is important to focus on finding culturally appropriate and appealing ways for participants to become involved in the project, to learn from each other, to converse and to begin to plan for the future. Making contacts within the First Nations community and attempting to engage with and identify interested parties should be the primary goal during this phase of the study.

Pitfalls:

I use the term “engagement with stakeholders” and not the often used term of “consultation” in this section for reason. For many First Nations communities the term “consultation” is no longer one that is looked upon favorably. Past negative experiences with practitioners who have failed to truly seek out collaboration, or who have failed to incorporate community desires, have left many First Nations communities highly skeptical of the word “consultation”.

The goal of community engagement is to find ways to form a positive working relationship and also ways to get the community involved in the project and to give the community a sense of ownership over its results. With this in mind it is important to ensure that the “power” over the direction of the project and over decision making remains with the local community and is not concentrated in the hands of western scientists of project practitioners. This statement applies throughout the lifespan of the project. From initial engagement to project design, implementation and dissemination of information and results – all must remain community focused.

A final consideration for restoration practitioners working towards ethnoecological restoration projects is to be cognizant of the fact that within most First Nations communities there will be a range of values, opinions and desires rather than a univocal voice. Many communities have complicated local circumstances and political realities that the practitioner is unlikely to fully comprehend. Because of this, I believe that it is important to try to understand the political and decision making structure of the local community to the greatest extent possible and conform to the existing decision making protocols.

Identify Values and Facts

Rationale

Identifying values in addition to facts is an especially important exercise in ethnoecological restoration projects. Facts about the ecosystem of concern are of course essential. Background ecological studies that identify the baseline data, ecological and cultural history of the place, as well as historic and contemporary threats to the ecosystem are all necessary to create a restoration plan.

In addition to these fact-based inputs, practitioners need to understand what matters to the people who interact with the ecosystem. As Turner et al.. (2008) state, “recognizing that values are part of knowledge means that there must be space for value-based discussions in any decision-making process whose intention is to restore the voice of Aboriginal

communities in the management of resources" (p.10). Such investigations may reveal surprising or hidden values that would have otherwise gone unnoticed and unaccounted for. Gregory (2000, p.36) points out that by identifying stakeholder values we are able to "identify what matters to participants and, in turn, highlight the consequences that require most careful attention and the tradeoffs that matter most".

Another benefit of identifying stakeholder values is that this process can lead to the formation of early project goals. These initial project goals can create opportunities for engagement opportunities and "team building" between the various stakeholders. By spending the time to carefully listen to community values the practitioner may be able to suggest a mutually beneficial, and non-threatening, project deliverable that will begin to form a foundation of trust as well as have value to the community. For example, during the ethnoecological restoration of ȾIXEN I proposed working towards an educational book to celebrate the ecosystem of concern. This project was able to highlight several of the key community values as well as provide opportunities for collaboration between myself and community members.

Methods

Several options for identifying values may exist within a given project. Formal engagement through semi-structured interviews may be an effective way to incorporate the values of a large number of interested stakeholders. Visioning exercises that focus on desirable futures (e.g. Boulding, 1988; Grenier, 1998) may be included as part of the interviews or as a separate activity with individuals or as a group activity. What is most important is that the practitioner attempts to identify what matters most to the affected stakeholders in a culturally sensitive manner (i.e. incorporates local languages and concepts) (e.g. Gregory et al.. 2007; Failing et al.., 2007; Turner et al.. 2008). Environmental, social and cultural values that are identified during such initial consultations can be analyzed to identify shared values between stakeholders, threats to these values, areas where tradeoffs may be required as well as lead to the formulation of initial goals and objectives of the ethnoecological restoration project.

Pitfalls

As a researcher or restoration practitioner one of the most dangerous pitfalls may be oversimplifying information that is conveyed during interviews or conversations to conform to a preconceived notion of restoration. It is important for the restoration practitioner to be aware of his/her own biases when attempting to identify values. To validate the findings of such value-focused research, it is important to report back to the community decision

makers. For example, over the course of this study, I regularly attempted to validate my interpretation of what I was hearing with both the Chief and Council Committee and Lands Committee of the Tsawout First Nation.

Define Problem

Rationale

Given that the ethnoecological integrity of a place is under stress from certain threats, or from a combination of threats, it is important to articulate exactly what these are so that they can be prevented.

Methods

Use background ecological studies as well as the results of value-focused research to identify threats to the ecosystem and any negative human influences that have occurred or are ongoing (i.e. use facts and values).

Pitfalls

Identifying exactly what the threats to the eco-cultural system are may or may not be a simple process. What some stakeholders perceive as a threat (e.g. hunting of migratory waterfowl) may be perceived by others as a traditional value. Consensus may not be possible and tradeoffs may need to be made. What is important is that any tradeoffs that are made are felt equally by all of the stakeholders involved and that the process of identifying threats is guided by the desires of the community. For as Slovic (2006) suggests, those who define the problem also define the solution.

Develop Preliminary & Long-term Objectives

Rationale

The success of ethnoecological restoration projects depends upon meaningful engagement throughout the process – including during the development of preliminary and long-term objectives. During these phases of ethno ecological restoration, participants should work together to "mutually explore and learn about the options and their consequences, deal with the uncertainty and complexity inherent in resource management, and systematically and constructively address difficult tradeoffs in order to become informed about what course of action they prefer" (Gregory et al., 2008 p.37).

Methods

A variety of decision making tools exist for structured decision making and the generation of preliminary and long-term objectives (e.g. Failing et al.. 2007). The specific tools that are

utilized will depend upon the stakeholders involved and the expertise of the restoration practitioner. Each of these processes should involve some form of alternative analysis based upon the evaluation of consequences and risk. The most important aspect of such decision making is to identify an ethnoecologically appropriate framework for proceeding that is based on values of the First Nations community and to ensure that the project continues to have its roots firmly embedded within the culture. As Grenier (1998) suggests, "research should be interactive and participatory, should use local languages and use a variety of culturally appropriate techniques".

Pitfalls

During the development of project objectives it is important to eliminate preconceived notions, plans or frameworks for how the process should proceed. These frameworks for restoration may not be culturally appropriate for all First Nations communities. Instead a flexible approach that maintains focus on the key values identified earlier in the ethnoecological restoration process should be employed.

During this phase it is once again important that any tradeoffs that are made are felt equally by all of the stakeholders involved.

Implement Restoration Plan and Adaptive Management

Rationale

Working towards restoring the ecological and cultural integrity of an ecosystem will be a distinctive process each and every time. However all ethnoecological approaches to restoration should embrace community driven approaches that are adaptive throughout the restoration process as the project evolves. All research and decision making should be shared within the community to gain feedback and guidance throughout the process. For example, during the process of restoration at TIXEN, the results of baseline ecological studies, interviews and the development of objectives have been presented to the Chief and Council and Lands Committees for feedback on a regular basis.

Pitfalls

One objective that is often overlooked is the need to leave something behind in the community once the project is over. Capacity building within the community may include training for the restoration implementation, education initiatives and an ethic of respect for the land, as well as tools to achieve a desired future and a sustainable restoration trajectory (as identified in the values assessment).

5.3 Making Connections

Throughout this project I have attempted to work towards a collaborative approach to restoration and conservation. Effectively conserving migratory species that cross jurisdictional boundaries and depend upon a network of stopover, breeding and wintering sites necessitates such an approach. Locally I have attempted to create a collaborative and welcoming atmosphere in the Tsawout community whereby community members are aware of the ongoing restoration project, know how to become involved with conservation initiatives, and help to foster a greater appreciation for the coastal dune ecosystem and the birds that inhabit it. This goal has been effectively achieved by incorporating conservation and education into local celebrations such as the annual seafood festival, creating new events such as the Earth Day, and by publishing a book entitled "ȾIX̱EṈ: A Special Place" to celebrate the ecological and cultural significance of the site.

In addition to making local connections, I have attempted to find meaningful ways to collaborate with other conservation initiatives within the region. The migratory nature of birds, and the boundaries that they must cross, can indeed be symbolic of multiple conservation efforts working together to achieve their conservation goals. For example I have attempted to make connections with the annual Brant Festival in Parksville, BC to learn about how they have protected this sensitive migratory species during its migration. Similarly I have made connections with the Raincoast Education Society in Tofino, BC to learn about their attempts at public outreach and education surrounding migratory shorebirds. In addition to identifying approaches to education and migratory bird conservation I have engaged with the newly formed BC Coastal Dune Recovery Team so that they may learn from our project and also to identify similar ecosystems in the region that may benefit from the approaches to restoration that our project has implemented.

Finally, I have attempted to contextualize this project with global conservation efforts for migratory birds and examine the potential for cross-jurisdictional, multi-nodal ecological restoration projects throughout habitat corridors. This final section of my discussion (5.3.3) has primarily involved a literature review. I also participated in the 2008 Partners in Flight conference in McAllen, Texas where the theme was "Tundra to Tropics: Connecting Birds, Habitats and People" – a theme shared with International Migratory Bird Day for 2008.

5.3.1 Community Engagement

One of the primary ways in which I have attempted to accomplish the goal of community based conservation, awareness and support is through the creation of an educational resource book entitled "ȾIXEN: A Special Place" (see Figure 5.6). The notion behind the book is to provide each Tsawout household with this resource so that they can learn, or be reminded about the ecological significance and the traditional uses of the site. As discussed in section 2.2.3 many members of the Tsawout First Nation have been detached from their traditional practices, language and culture. I believe that one of the first steps towards the ethnoecological restoration of ȾIXEN is to get the community interested in the site and to give them information about not only its ecological significance, but also about how the area was traditionally used. The book also invites community members to get involved with the ongoing effort towards the restoration of the land and culture.

The book highlights the ecological significance of sand dune ecosystems, the rare and culturally significant plants that inhabit the area, the birds that utilize the area, the importance of the SENĆOŦEN language, and the traditional celebrations that take place at ȾIXEN. The book also embraces the role of youth and education for a desirable future and finally highlights the conservation work that has taken place thus far and presents plans for the ongoing ethnoecological restoration of the site.

I believe that this book will be an effective and appropriate method of gaining community support and input for the project. The interviews revealed to me that members of the Tsawout community want to find ways to educate community members about the ecosystem and its traditional use, that sharing knowledge (especially with the younger generation) is needed, that the best approach to doing so is in a way that is community driven, visual and hands on, and that people need to know what is taking place at the site so that they can get involved. The accessibility of an illustrated and informative book has great potential to achieve these goals.

Rather than producing the entire book myself, I attempted to gain contributions from members of the Tsawout community who had been involved in the project or who I had met over the course of my study. After all, I was told during my interviews that it was the elders who should be the ones to give the information and traditional knowledge. My desire was to incorporate TEK into the book – and this was not something that I could do by myself. Furthermore, the production of a book and the opportunity for this type of community

collaboration opened a new door for certain community members to get involved with the overall project. This was beneficial because, as Bicker et al.. explain, certain people "transfer much knowledge through practical experience" (2004, p.2).

Some of the book contributors drafted sections on their own and sent them to me for inclusion in the book. Other sections became collaborations between myself and certain members of the band who I had identified as having an interest or having expertise in a given area.

The interview process made me aware of the importance of attempting to revitalize the SENĆOŦEN language. With this in mind I attempted to provide the SENĆOŦEN names for as many of the species mentioned or illustrated in the book. I also worked with community members and students in the University of Victoria department of linguistics to include a section on the importance of SENĆOŦEN as well as an introductory SENĆOŦEN lesson.

Ultimately, the goal of this book is to share the initial results of this study within the Tsawout community as widely as possible. By publicizing and gaining support for the project it is hoped that we will be able to foster the kind of sustainable and enduring commitment that restoration projects inherently require.

Figure 5.6: ȾIXEN: A Special Place

The cover of a book created to celebrate the ecological and cultural significance of ȾIXEN (illustration by Doug LaFortune).

A second opportunity for community engagement and the ethnoecological restoration of ȾIXEN came in the spring of 2008 when I helped to facilitate an educational site clean-up and invasive species removal campaign. Such an event had been on my to-do list for some time. However it was not until a well known community activist (Briony Penn) suggested the possibility of having the event on Earth Day that I and other members of the CBSPWG began to organize the Earth Day event.

The goal of the Earth Day event was to invite students from the Saanich Tribal School to the site for a day of learning from elders, invasive species removal and to clean up some of the garbage that had accumulated at the site.

The interviews that I conducted suggested that there had indeed been a loss of traditional values and respect within the younger generations and that in many families TEK was no longer being passed on. I was told that in working towards the ethnoecological restoration of ȾIXEN – education would have to be the starting point and that finding visual and hands on approaches to share knowledge, history, traditions and the SENĆOŦEN language with the younger generations was the key to bringing this traditional respect back. Many interview respondents expressed to me that it would be important to create opportunities for the youth to engage with their elders and to be directly involved in the restoration actions. These consistent sentiments are also echoed in Turners 8 steps to eco-cultural restoration (Turner, 2005).

Listening to the desires of the community, the Earth Day event was designed to facilitate interaction between students and elders and also to find hands on ways to get the students involved in the restoration of the site.

Prior to Earth Day, Briony Penn and I visited each of the classrooms at the Saanich Tribal School that would be participating in the event. In total we would have approximately 50 students visiting the site on Earth Day. We wanted to prepare the students and get them excited about the day. We also wanted to give them some information about the sand dune ecosystems and the animals that they could expect to see. Finally we wanted to let them know why we were targeting certain undesirable invasive species for removal and why we were so interested in preserving others. At the end of our presentation each student was given a handout to take home and read (See Appendix E) and assigned to one of four groups.

I knew that successfully achieving our Earth Day goals would require volunteer support. We needed people to help prepare lunch, to escort the student groups as they traveled between stations, to oversee the broom removal, and accompany the community elders.

We also needed support to remove the garbage and broom from the site once the day was over. Fortunately the event coincided nicely with the end of classes and exams at The University of Victoria. I was able to invite and receive strong support from students in the ethno-ecology and restoration courses. I also engaged with three graduate students in the department of linguistics with an interest in language revitalization. Some of these students were already working on the SENĆOŦEN language and already knew some of the elders in the Tsawout community. At the request of the Tsawout community the linguistics students recorded the SENĆOŦEN language that was spoken at the cultural plants and animals stations and also provided a video recording of the day. These recordings were then digitized, put onto CD and DVD and donated to the community. The Uvic students were an essential part of Earth Day and the event would not have been possible without them.

Earth Day received additional support from the School of Environmental Studies and the CRD parks department – both of which loaned tools for the invasive species removal. The municipality of Central Saanich generously offered to remove the invasive species biomass from the site and dispose of it off site. A delegate from the Canadian Wildlife Service also came out for the day to help with the removal of invasive species. One of the things that made Earth Day such a special event was that each of the stakeholders in the CBSPWG were able to participate in some way.

On Earth Day we created four stations at ȾIXEN (cultural plants, animals, invasive species removal and site clean-up). Each station had at least one Tsawout community elder who would lead the station activities. At the cultural plants and animals stations we also had SENĆOŦEN speakers who spoke to the students in their traditional language. At the animals station I created cards that had images of common bird species found at ȾIXEN. Each card had the English and SENĆOŦEN names written on them. Students were able to see the birds and to practice the SENĆOŦEN pronunciations with Tsawout elder Ray Sam. At the plants station students were able to learn about identifying the plants that were traditionally used for foods and medicines. In addition to the four groups of students we were also able to create a dedicated broom removal team that was led by Brenda Beckwith (UVic School of Environmental Studies). This team was given print outs of the locations of invasive species (as identified in the inventory of human influence and figure 4.2). Throughout the day they were able to remove the satellite populations of invasive species that exist on the spit.

The student groups rotated through each of the four stations, learned a great deal from their elders, and seemed to have an enjoyable time in the process. At the end of the day we

all re-grouped for a final message from some of the Tsawout elders. The elders spoke of respect for the land, about respect for ourselves as individuals, and about taking steps towards a more desirable future. It was a wonderful message for the students to take home.

After the Tribal School students left for the day the remaining team of UVic volunteers spent an additional two hours removing invasive species and cleaning up garbage. By the end of the day I was astonished at how much we had accomplished. Nearly all of the living broom, gorse and Himalayan blackberry plants had been removed. So much invasive biomass was removed that it took the Municipality of Central Saanich three trips to the site to remove it all. Collectively, the students also collected an enormous amount of garbage that was removed from the site later that day.

The event received very positive feedback from members of the Tsaowut community and administration. We were also pleased to gain exposure for the ongoing ethnoecological restoration project in both the Victoria Times Columnist newspaper and Channel 11 news (See Appendix F).

Overall, the Earth Day event was a huge success (see Figure 5.7). We were able to achieve ecological outcomes such as the removal of the majority of the invasive species at the site and also a large amount of garbage. We also made strides towards cultural restoration by creating a way for the youth to learn from their elders about traditional ethics, the history of the site and the SENĆOŦEN language. The Earth Day event is now planned to be an annual occurrence at ȾIXEN and there is potential to work with the Saanich Tribal School towards more formal curriculum about the site and its ethnoecological significance.

Figure 5.7: Earth Day

Images of the 2008 Earth Day Celebration held at ȾIX̱EN̲.

A third opportunity for community engagement occurred at the Tsawout Seafood Festival in June of 2008. This event is held annually to celebrate the traditional seafood that was once the staple of the Tsawout people's diet. Cultural restoration in inherent in this celebratory day and a variety of foods (including salmon, clams, oysters, mussels, sea urchins and kelp) are prepared in traditional ways. Pit cooking, as was once practiced at ȾIXEN, takes place along the beach. There were speeches from community leaders and elders, a first salmon ceremony took place as well as an educational beach walk led by Dr. Nancy Turner (see figure 5.8).

Because a large number of Tsawout community members were present at the seafood festival the conservation working group took advantage of the opportunity to inform those in attendance about the accomplishments of the study to that date as well as plans for future conservation and ethnoecological restoration initiatives. At the 2008 Seafood Festival there was also a special effort to formally recognize the partnership that had been formed between the Tsawout First Nation, CRD, CWS, Municipality of Central Saanich with additional support from the University of Victoria and Environment Canada (see figure 5.9).

Figure 5.8: Tsawout Seafood Festival

Images of the 2007 and 2008 Tsawout Seafood festival held at ȾIXEN.

Figure 5.9: Partnership Recognition

Tsawout Chief Allan Claxton recognizes the conservation partnership with Barry Smith of the CWS (above) and Dr. Val Schaefer of the University of Victoria (below).

5.3.2 Regional Connections

In addition to the importance of making connections within the Tsawout Community, there were also tremendous benefits to engaging with other regional conservation and restoration initiatives. Throughout this project I have actively sought out opportunities to learn from, and share experiences with, other similar projects within this region. In doing so, I was able to make connections with projects that had experience working with migratory bird conservation and education campaigns, with conservationists interested in preserving sand dunes for particular migratory species and also to engage with a larger effort to begin to integrate conservation efforts for sand dune ecosystems across coastal British Columbia.

As discussed in section 1.4.5, one of the primary threats to migratory birds using the coastal sand dunes at ȾIXEN and Island View Beach comes from the practice of off-leash dog walking. During the key shorebird and Brant migration periods the high number of dogs walking off-leash and harassing migratory birds causes them to repeatedly be flushed. This disturbs the birds from feeding and resting and almost certainly is a detriment to the birds' health during this phase of their life cycle (e.g. Lafferty et al.. 2006; Banks & Bryant, 2007). During the course of this study two opportunities presented themselves to make connections and learn from the experiences of other conservation initiatives that faced similar challenges.

For nearly two decades, the annual Brant Wildlife Festival in Parksville, British Columbia has been celebrating the arrival of Black Brant Geese (*Branta bernicla nigricans*) that migrate from Mexico and California to Alaska. After flying essentially non-stop from their wintering grounds these birds arrive along the shores of Parksville in search of rest and rich inter-tidal feeding grounds. Unfortunately, Brant numbers are decreasing. Scientists believe that this is due to human-related disturbances, climate change and loss of crucial habitat, especially around migration stopovers (Nature Trust of British Columbia, 2008, Environment Canada, 2008). The Parksville festival works to ensure that the Brant Geese have the opportunity to rest and feed by attempting to limit disturbances from humans and dogs. Regulatory signs have been installed at most beaches and educational campaigns seek to inform residents and visitors about the sensitive needs of this species during this crucial stage in their life cycle.

Because Brant Geese are one of the focal migratory species at ȾIXEN and Island View Beach, there was a terrific opportunity to try to learn from the experiences of the Parksville

Festival. Speaking with long time members of the Brant Wildlife Festival conservation team revealed that Brant are an excellent indicator of not only habitat quality, but also of habitat "usability". Researchers in Parksville have found that even in "protected" areas with high quality habitat, if human presence isn't curtailed, or managed in some way, Brant will not be able to make use of that habitat (Martin et al., 1996). If disturbance becomes too great, the Brant could be forced into less favorable habitat which might affect their ability to build up fat reserves (Environment Canada, 2008). This likely indicates problems for most of the other avian species needing to use these habitats as well.

The research conducted in Parksville and the presence of high levels of human and canine disturbance at Island View Beach makes it seem likely that the inter-tidal eel grass habitat at Island View Beach is being under-used. Based on conversations with conservationists in the Parksville area, as well as the results of the avian inventory (see Appendix G), the current regulations regarding off-leash dog walking at Island View Beach are inadequate to protect most migratory species (including Brant) and should be changed. The current policy at Island View Beach is to prevent off-leash dog walking between June 1 and September 15. However, by June 1 nearly all avian migration in this region is complete. Furthermore, migratory shorebirds continue to be found at ȾIXEN and Island View beach until at least the end of September. In comparison the beaches around Parksville restrict dog walking between March 1 and October 15 to more accurately coincide with the needs of migratory birds.

While extending the off-leash restrictions at Island View Beach may seem like a straight forward decision, there are several obstacles preventing this from taking place. Island View Beach is one of the last areas in the Greater Victoria area that allows off-leash dog walking. The dog walking community is very protective over what they perceive to be their right to continue this behaviour. Dog walking at Island View Beach is a highly politicized issue. Any changes in regulations – especially those that restrict off-leash dog walking – will be met with tremendous opposition. Faced with this situation the CRD has elected to maintain their current policies and not adjust the off-leash restrictions. Nevertheless, even if the off-leash restrictions were extended to mirror those of the Parksville area, there are difficulties in enforcement and maintaining government support of such policies.

Given that the CRD is currently unwilling to implement and enforce regulatory strategies to limit disturbances to migratory species an alternate approach is to work towards educating park visitors about the needs of migratory birds and the impacts of their behaviour. In Parksville this approach has included the publication of an educational

handout (see figure 5.10) as well as eco-tours and viewing stations for visitors. In Tofino, British Columbia the Raincoast Education Society has also focused on educating beach users about the needs of migratory birds in an effort to alter behaviour. In addition to signs that have been strategically placed along popular beaches (See figure 5.11), the Raincoast Education Society has worked to create educational bookmarks and magnets that have been distributed to beach goers and dog walkers (see figure 5.12). These educational strategies could serve as models for the CRD parks department in working towards an educational campaign at Island View Beach.

Each of these initiatives has been attempting to use signs and educational material to help protect migratory birds. It seems that given the reality of inadequate funding and political will for enforcement of migratory bird conservation, that education may be the only tool available towards this achieving this goal. The scenario at Island View Beach and ȾIXEN is much the same. With limited funding, and with the CRD parks department unwilling to stand up against a well organized and politically motivated group of dog walkers, it seems that the only short-term option is to work towards educating park users about migratory birds and hope for compliance. The educational materials produced by these two initiatives can act as guidelines for similar initiatives for this project.

In addition to learning from the experiences of the Brant Festival and Raincoast Education Society, there is also the potential to make connections with scientists or conservation specialists who are working towards creating regional habitat networks for migratory birds. During the course of this study two such opportunities presented themselves. The first of which involved becoming part of a coast-wide initiative to identify and conduct status reports of all coastal dune ecosystems in British Columbia. This recent initiative is currently gaining support from several layers of government. Once underway there is great potential to incorporate the work and background ecological studies that have been conducted through this project with this regional initiative.

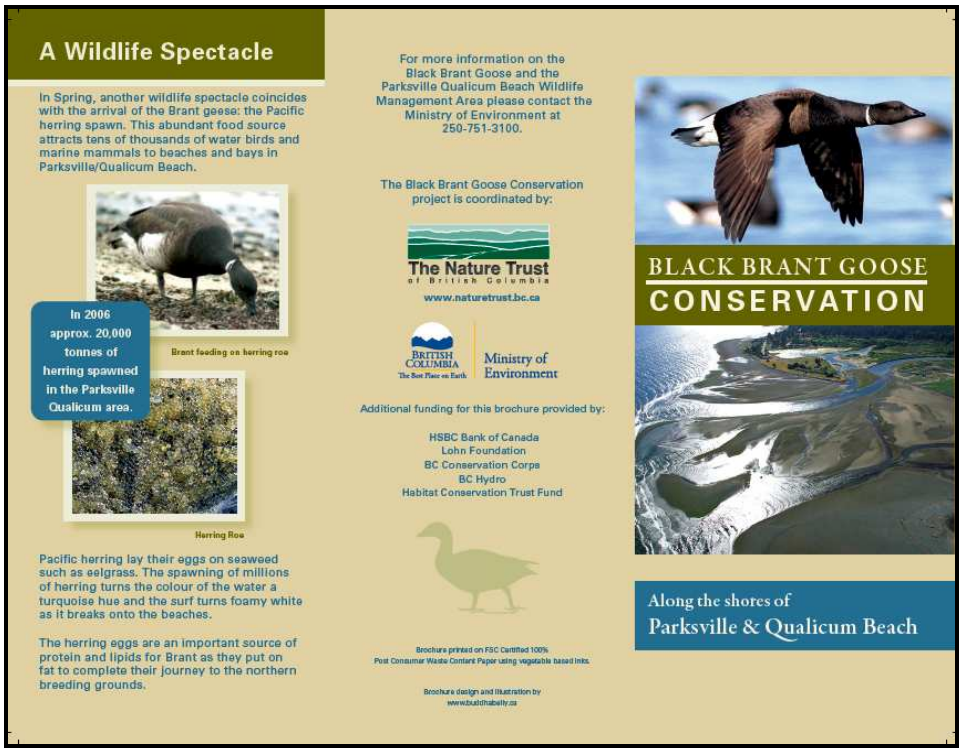


Figure 5.10: Brant Festival Brochure

The brochure produced for the Brant Festival in Parksville provides information to visitors about Brant conservation and the need for migration stopover sites (Nature Trust of British Columbia, 2008).

Figure 5.11: Raincoast Education Society Sign

In Tofino educational signs have been strategically placed along popular beaches (Raincoast Education Society, 2008)

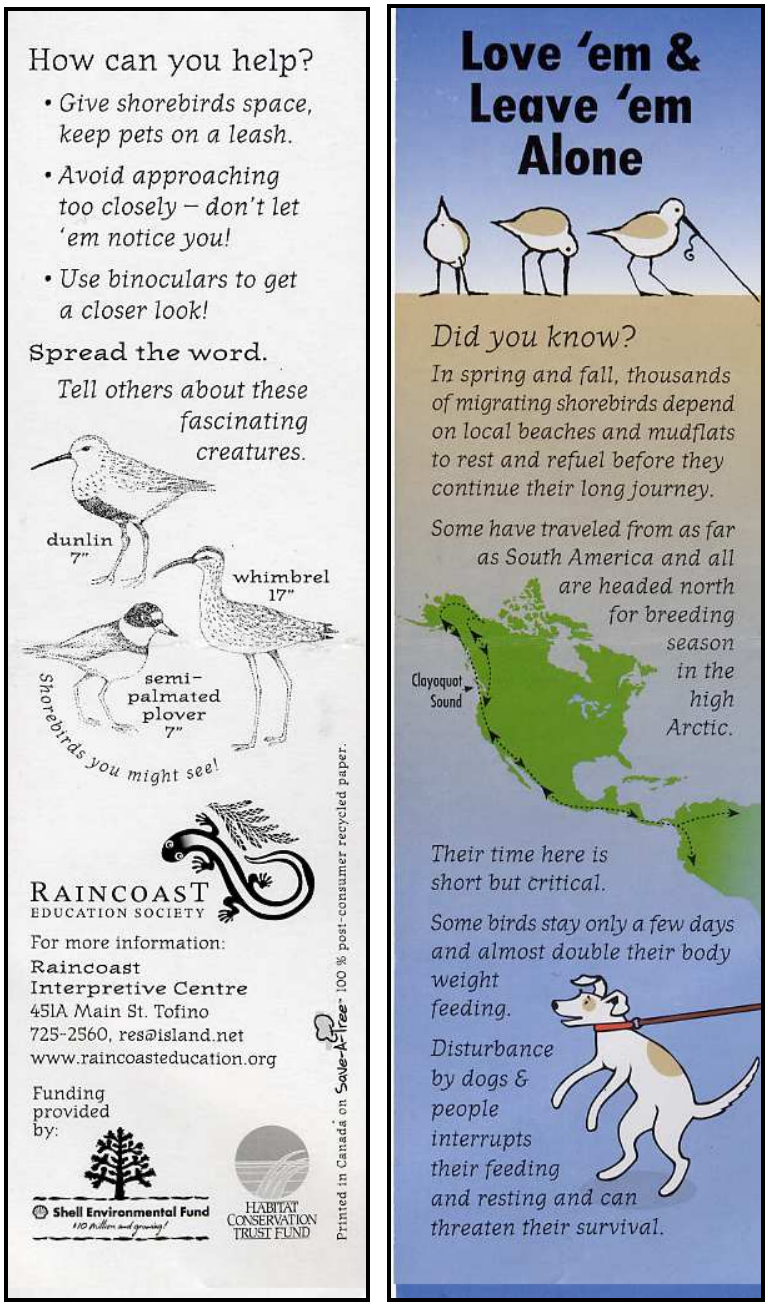


Figure 5.12: Raincoast Education Society Shorebird Materials

In Tofino beach goers are given educational materials during the annual shorebird festival that promote migratory bird conservation (Raincoast Education Society, 2008).

A second opportunity to work towards regional habitat networks involved engaging with members of the Canadian Wildlife Service who have been working towards a recovery strategy for an extirpated sub-species of Horned Lark (*Eremophila alpestris strigata*). Members of CWS have been working to revise the current recovery strategy and have been attempting to identify critical habitat that may be suitable for this species. By identifying potential habitat for this species, such as ȾIXEN, the CWS hopes to generate implementation priorities for conservation and potentially re-introduction of this species. This strategy, and the enforcement of implementation priorities under Canada's Species at Risk Act (SARA) has the potential to lead to enhanced conservation efforts, not only at ȾIXEN and Island View Beach, but also at nearby coastal dune sites such as James Island and Sidney Island.

Making connections with additional conservation groups and programs allows for information sharing as well as greater benefits and opportunities for this project. Making connections is also necessary if the results from individual restoration projects are to extend beyond project specific boundaries and contribute towards creating the habitat linkages that migratory bird conservation ultimately requires.

5.3.3 Global Partnerships for Migratory Birds

The migratory nature of many bird species explicitly means that for conservation to be effective - it must be a priority for nations throughout their global range. By providing a visual and identifiable connection between communities and nations in both the north and the south, migratory birds may be able to engage people and communities in disjointed places and offer the possibility for transnational linkages to be made. Although the potential for these connections to be made is great, they will not happen automatically. Opportunities for engagement between individual projects (such as the restoration of ȾIXEN) and between conservation groups in separate countries, or even continents, must actively be sought out.

The need for connectivity between conservation projects was the focus for the 2008 Partners in Flight conference held in February in McAllen, Texas. This four day event brought together hundreds of participants from across the Americas to focus on addressing the hemispheric theme of "Tundra to Tropics: Connecting, Birds, Habitats and People". The emphasis of the conference was on acknowledging the need to connect people – to each other, to the habitats that birds depend upon, and to the birds themselves. For when it comes to migratory bird conservation, no matter how important our research and monitoring

results and scientific accomplishments are, we cannot succeed in our collective goal without making these connections.

For me, two key themes emerged from the conference. These included the need for making connections through education, and the need to engage local communities in conservation efforts. It was not until I sat down to write this thesis that I realized the parallels between these conference themes and the statements that I heard from Tsawout elders during my interviews. What I now believe is that the success of conservation initiatives – whether they be local restoration projects or hemisphere-wide conservation networks - depends upon community participation, youth and education.

During the opening ceremony for the PIF conference keynote speaker Dr. Yossi Lesham (from the International Center for the Study of Bird Migration) discussed his experiences in making "people to people" connections in his home of Israel. He spoke of the innovative ways that he worked to connect projects between conservation groups and the Israeli air force and also between Israelis, Jordanians and Palestinians. By studying migration patterns and peak movements using a variety of interdisciplinary tools, Dr. Lesham has been able to reduce the number of bird-aircraft strikes in the region by 70 percent and has saved National Governments 700 million dollars in the process (PIF, 2008). Additionally, through this project he has worked to develop a variety of educational projects, multimedia displays and eco-tourism opportunities – all surrounding the theme of avian conservation. For example, using the infrastructure that was set up to monitor the migration patterns of birds and avoid bird-aircraft strikes, Dr. Lesham's organization has also been able to get Israeli youth involved by creating a website entitled "Migrating Birds Know No Boundaries" where students can track the progress of birds on their annual migrations (see – ICSBM, 2008).

When it comes to education, if people become aware of the needs of migratory species, the incredible journeys that they make and the necessity for the conservation of habitat throughout their range, they are more likely to support such initiatives. Aware of this, Dr. Lesham worked to create opportunities for engagement for, not only local school children, but also Government officials in Israel, Palestine and Turkey. His work demonstrates the importance of making connections for conservation.

The theme of promoting education was echoed over and over again throughout the conference. Dr. Rick Bonney of the Cornell Laboratory of Ornithology spoke of creating a National Strategy for Bird Conservation through Education (Council for Environmental Education, 2008). Well known natural history author Kenn Kaufman discussed ways in

which to work towards a more “bird literate and bird conservation oriented society”. It seems that, as Tsawout Chief Allan Claxton told me, when it comes to restoration projects or international conservation efforts “education is the starting point” (Claxton, A., 2008).

In order to disseminate the information and outcomes of the PIF conference, the organizers are working to produce a bird conservation needs assessment. This document is to be based on suggestions from conference participants throughout the sessions. During the session entitled “Building Bridges for Bird Conservation: The Successes and Challenges of Linking Birds and People from Tundra to Tropics” I suggested the opportunity for the PIF group to work towards a community engagement handbook. This idea was warmly received by the participants of that workshop and it is my hope that such a document will be produced in the near future. As one way of making global connections through the restoration of ȾIXEN, I plan to share my “guidelines for ethnoecological restoration” (Section 5.2) document with the PIF working group. Together with contributions from other conference participants this could lead to a set of guidelines for conservationists seeking guidance on the invaluable practice of community engagement.

The overarching theme from my experience working with the Tsawout community, working with the partners of our restoration project and attending the PIF conference is that migratory bird conservation requires making connections between groups and bringing people together around a collective goal. These connections need to happen at a variety of scales. From the local level of community engagement and education, to creating regional connections for habitat networks, to linking global initiatives and forming partnerships between geographically separated communities.

Chapter 6: Conclusions

ʔIXEN is an area that has been valued by the Tsawout and Saanich peoples for generations. The area has been used for harvesting traditional foods and medicines, for preparing foods using methods such as pit cooking, as a place of spiritual reflection, to honor ancestors and as a place for celebration. The sand dune ecosystem that is found at ʔIXEN and extends along IVBRP also hosts a variety of rare plants and animals and provides an important stopover site for migratory birds. The combined effects of negative human influences such as the reckless use of 4x4 vehicles, the introduction of invasive species and the large number of off-leash dogs that occupy the area have threatened the ecological integrity of the area. Furthermore, as a result of a variety of imposed regulations on First Nations communities (most prominently the residential schools system) the younger generations of the Tsawout community have become detached from their language and the traditional practices that once occurred at ʔIXEN. This project has sought out to restore the cultural connection to the land, protect the sensitive dune ecosystem and create a plan for ongoing restoration that embraces the ecological and cultural integrity of this unique and special place.

Primary research for this project included the collection of baseline scientific information about the coastal dune ecosystem, carrying out a year round avian inventory, conducting interviews and a values assessment, and compiling an inventory of the human influences to the study site. This data led to the formulation of several short and long term goals that would guide conservation and ethnoecological restoration actions. Much of the focus of this project has been on restoring the cultural connection of the Tsawout community to the site through education, celebration and by promoting the SENĆOŦEN language. There has also been a strong focus placed upon protecting the ecosystem from future damage – both by physical means as well as through education. These actions have "set the stage" for continued ethnoecological restoration initiatives as outlined in table 6.1. By working together, and embracing a community based approach to restoration, the Cordova Bay Spit Working group has made tremendous strides towards restoring this important ecological and cultural landscape.

This final chapter looks forward towards an ongoing vision of ethnoecological restoration of ʔIXEN and IVBRP. This chapter is also intended to evaluate the process that has

occurred thus far and address the success of answering the primary research question and additional objectives of this thesis. Finally, recommendations for the continued success of this project, as well as for future study, are provided.

6.1 Looking Forward: Having a Long-term Vision for the Land

Over the past two years the team working towards the restoration of the study site for this project has accomplished a great deal. We have carried out the necessary background ecological studies, identified the values and goals of the various stakeholders and formally created a partnership that will work towards the goal of ethnoecological restoration. Collectively we have engaged community members, including both the youth and elders of the Tsawout community around this common goal, integrated TEK with Western science and worked towards a variety of preliminary restoration activities (as described in table 5.2). By taking a patient and persistent approach we have been successfully able to set the stage for continued restoration efforts. Such patience is important in all restoration projects – but especially so in projects with the additional desire for cultural restoration. Nancy Turner (2005) states in her 8 steps to eco-cultural restoration that "initiatives that are aimed at enhancing eco-cultural systems must anticipate a long time frame, extending far beyond a single lifetime [and that the] [b]enefits of the steps we take today to restore and enhance our ecosystems may not be fully realized for many years". An additional virtue of taking a patient approach to restoration is recognized by Long et al.. who state that before proceeding with a restoration project "the land must have demonstrated its willingness to be healed to the practitioner" (2003 p.5). Long and his colleagues describe the realization of this willingness as "having a vision for the land" (2003 p.5). As this project moves forward, and as the negative impacts that have caused the devastation to this ecosystem and its inhabitants are halted, it is essential that we also have a long term vision for land and for how restoration should proceed. Table 6.1 outlines a variety of long-term restoration actions that are recommended for ȾIXEN and IVBRP. Additionally, Figure 6.1 illustrates the location of potential restoration prescriptions for ȾIXEN and IVBRP.

Table 6.1: Long Term Restoration Actions

Resident and Migratory Birds		
Goals	**Action**	**Rationale / Implementation**
Protect migratory birds from negative human influences	Education Signs By-law and Enforcement	• Building upon the foundation of education and awareness it is important to strive to protect the interests of migratory birds at this site. Ultimately this means reducing the impact of park visitors and other dog walkers as well as maintaining the ecological integrity of the site to the greatest extent possible (discussed below). **Implementation:** • Signs at Island View Beach will require the political support of the CRD. CRD staff should work towards installing signs that extend the off –leash dog walking restrictions through both the spring and fall avian migration windows (Mar 1 – Oct 15). • Based on the history of public backlash in response to such restrictions it is advisable to work towards education of park users through an awareness campaign (as described in table 5.2 and in figure 5.12) as well as through initial interpretive signs. • Once signs are installed that designate extended off–leash dog walking restrictions it will be necessary to enforce these regulations. A by-law may need to be created or amended. In addition the enforcement of this regulation could be enforced under the mandate of the Migratory Bird Convention Act.
Education & Outreach		
Goals	**Action**	**Rationale / Implementation**
Education	Design curriculum for Saanich Tribal School	• In addition to the continuation of the preliminary activities towards education listed in table 5.2 there are opportunities to formally entrench such educational components in curriculum at the Saanich Tribal School. **Implementation:** • In conjunction with teachers from the Saanich Tribal School work towards the development of educational curriculum that could act as a precursor to educational events at ȾIXEN (such as the Earth Day event). • Curriculum should be appropriate for students between grade 5 and 9. • Develop educational posters about traditional foods, pit-cooking as well as local flora and fauna to be displayed at the Saanich Tribal School. These materials should incorporate the SENĆOŦEN language.
Public Outreach	Communicate restoration plans and accomplishments	• If local community members of all ages are aware of conservation initiatives and how to be involved there will be a better success rate. **Implementation:** • Create a newsletter, write in the local newspaper and have open house meetings about the project • Send out a survey asking people from the community what they want to see happen to the site,
Interpretive Signs	Design and install interpretive signs about dune ecosystems, species and cultural use.	• With a series of appropriate interpretive signs visitors to ȾIXEN throughout the year may be able to learn about the dune ecosystem, the plants and animals that inhabit the area and the traditional uses and celebrations that take place. **Implementation:** • Establish what messages would be desirable for the community (discuss with Chief and Council and Lands Committee). • Design a series of educational signs (e.g. plants, birds, traditional use, etc.) • Contract CRD sign shop to create and install signs.

Cultural Celebration		
Goals	**Action**	**Rationale / Implementation**
Create opportunities for cultural uses of the site.	Promote celebrations, educational materials and the SENĆOŦEN language Youth engagement with Elders Celebrations such as Seafood Fest, Earth Day.	• Finding opportunities for Tsawout community members of all ages to engage with the landscape and the traditional activities that were practiced at the site should remain a primary goal of this ethnoecological restoration effort. **Implementation:** • Continue to celebrate the annual events that have been carried out for the past two years (e.g. Seafood Festival and Earth Day). • Look for opportunities to incorporate the conservation of the ecosystem with other cultural events. • Incorporate the SENĆOŦEN language into any and all programs that take place.
Recreation		
Goals	**Action**	**Rationale / Implementation**
Facilitate opportunities for eco-sensitive recreation	Explore opportunities for recreation infrastructure near parking facility (e.g. picnic tables, shelter, fire pits, etc). Promote IVBRP as a designated nature appreciation park.	• Because TIXEN is a culturally used space it makes sense to embrace this aspect of the site and create ecologically sensitive opportunities for recreation. Many people who use the area would likely focus their impacts on the already disturbed parking / canoe race area if there was a shelter, picnic tables and a fire pit in this location. • IVBRP is designated as a "nature appreciation park" by the CRD and as such recognizes the rare regionally significant sand dune areas and their characteristic flora and rich avifauna (Ussery, 1989). **Implementation:** • If approved by Tsawout Chief and Council and Lands Committee install 2-4 picnic tables at the parking area. • Determine if bylaws allow for any fires at the site. If so - attempt to focus these fires in a designated area by creating fire pits. • Investigate with community members and councils if a permanent structure at the canoe race area is desirable. • Opportunities for education through interpretive signs and educational campaigns at IVBRP should be promoted by the CRD. This could include initial signs at the interpretive kiosk already located at IVBRP. Further opportunities to develop and install educational materials that promote appreciation and conservation of the sensitive flora and fauna should be actively pursued.
Identify and protect sensitive species.	Ensure conservation of rare plant and migratory bird species is considered during management and planning activities.	• Planning and management decisions that occur for Island View Beach Park should consider the rarity of this ecosystem as a whole as well as the needs of migratory bird species and the protection of nationally and provincially endangered species. **Implementation:** • Train staff from CRD Parks. Central Saanich Parks and Tsawout First Nation to use the map of rare plant species in the study area. • Provide staff with field and classroom-based training on issues related to the management of rare plants and migratory birds in parks. • Work towards new management plan for Island View Beach park that recognizes the needs of migratory birds and rare plant communities.

Dune Ecosystem		
Goals	**Action**	**Rationale / Implementation**
Protect and restore dune areas that have been degraded.	Design and implement long-term restoration plan	• Effective management of sparsely vegetated ecosystems requires an understanding of their rarity, fragility, and exceptional vulnerability to all types of human disturbance (McPhee et al., 2000). • The design of restoration efforts ultimately depends upon creating the conditions necessary for an ecosystem to flourish and determining the nature and extent of human interactions with the ecosystem. • The restoration of degraded systems depends on the removal of the influences leading to degradation. Often, however, the system will not respond directly to the removal of the degrading or stressing influence and will need some other intervention to facilitate restoration. In other words, removal of the degrading influence may often be necessary but not sufficient to promote restoration (Hobbs & Norton, 1996 p.98). • It is also vital to restore the ecosystem to its successional trajectory, maintain natural processes and native species, and to enable the ecosystems self-sustaining capacity (Flynn et al., 2006). • The wild design approach to such planning involves understanding the nature of the ecosystem including what conditions it needs to flourish, and then designing restoration efforts to meet these needs. **Implementation:** Implementation Planning • Appoint a Restoration Practitioner & Restoration Team • Preparation of Project Budget • Identify Reference Ecosystems & Historical Reference State • Assess Potential Restoration Methods and Strategies • Establish Liaison with Public Agencies Restoration Planning • Schedule Restoration Tasks o Develop an implementation plan to accomplish the goals. Identify and schedule tasks, specify methods, estimate material costs and labor for each management unit. • Design a monitoring program to evaluate the success of the restoration. • Obtain Equipment, Supplies, and Biotic Resources. Implementation Tasks • Repair ATV Impacted Areas • Site Preparation for Plantings. • Plant Collection and Propagation • Restoration Plantings
		Post-implementation Tasks • Protection of the Restoration Site (e.g. inappropriate use, vandals, herbivory). • Perform Post-implementation Maintenance • Perform Monitoring to Measure Treatment Success as well as success of invasive species management • Implement Adaptive Management o Because nature directs recovery - may not plan a full course of treatment until observing how a site responds. o Evaluate the program by incorporating new information and ideas, revising goals, and modifying and tasks. • Evaluation and Publicity o Determine if ethnoecological Project Goals were met and conduct an ecological evaluation of the completed project. o Document & Publicize the Completed Project.

Dune Ecosystem (continued)		
Goals	**Action**	**Rationale / Implementation**

Restoration of rare and culturally significant plants (second phase)	Establish new sub-populations or expand range of rare plant species	• Preliminary actions have attempted to protect rare and culturally significant plant species. Future actions should focus on restoring populations that have been damaged by vehicle use or out competed by invasive species.
		Implementation:
		• Establish new subpopulations or expand the existing one by:
		  ○ Develop restoration plan that addresses horticulture, experimental design, ecology, genetics and rehabilitation components.
		  ○ Identifying priority sites for reintroduction and removing invasive species from these sites (Fairbarns, 2007).
		• Establish experimental re-introduction plots and monitor them to determine population dynamics of re-introduced populations.
		• Autogenic restoration is viable in many areas. This may need to be assisted by restricting access to certain areas, decommissioning former roads, and preparing compacted sites so that they may be colonized by native dune vegetation.
		• For additional and species specific prescriptions see Appendix H

Invasive species action plan	Remove invasive species from in-tact portions of the sand dune ecosystem	• Scotch broom is an invasive that is so prevalent on Vancouver Island that its removal is likely impossible. Recognizing this suggests that the process of invasive species removal is more important than the product. Removal campaigns such as the Earth Day event of 2008 can create a way for people to engage with the landscape while achieving a positive ecological task. • Because of the benefits of both the process and product of invasive species management it is recommended to pursue consistent attempts to manage its growth in this unique and sensitive ecosystem. **Implementation:** • Each season (prior to removal) the locations of invasive species should be identified and mapped. This task will not only help to facilitate removal – but also act as a record of treatment success and assist in long term monitoring. • On the Tsawout reserve an initial removal campaign was carried out in April 2008 on the northern portion of the sand dune ecosystem (the spit) as part of an Earth Day clean-up event. It is recommended that this become an annual event and that the southern portion of the Tsawout reserve (south of the water treatment plant) be targeted for 2009. In 2010 the focus of the campaign could return to the northern portion of the reserve to remove any invasive species that have grown back. • Based on CRD policy, past attempts at removal, as well as the high density of broom in the majority of Island View Beach park, a comprehensive invasive species removal campaign is not feasible. Instead the northernmost portion of the park (that has been designated as sensitive habitat) should have invasive species removed.

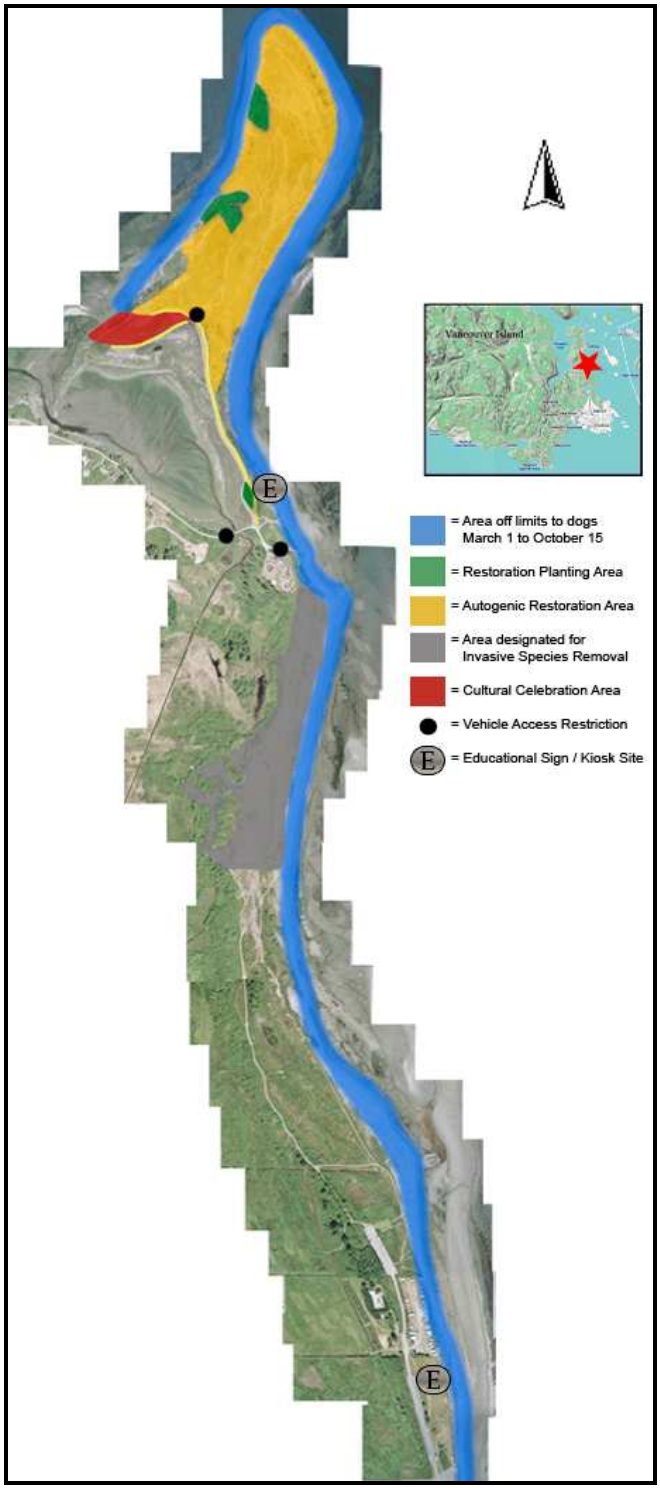


Figure 6.1: Recommended Restoration Initiatives

The map above illustrates some of the recommended options for ethnoecological restoration of ȾIXEN and Island View Beach.

6.2 Evaluating the Process of Ethnoecological Restoration at ʔIXEN

This project has attempted to answer the question: In what ways can ecological restoration and “TEK” be integrated to create and implement an effective ethnoecological restoration plan? The process of answering this question has involved a community based approach to identifying values and ecological facts, to setting goals and to revitalizing the cultural connection to the landscape. My role, as assigned to me by members of the Tsawout community, has been to assist in facilitating this process by listening to the desires of community members and presenting them as values from which goals and objectives could be generated. I have also attempted to create partnerships and opportunities for Elders to engage with youth, to recognize the importance of the SENĆOŦEN language, and encourage participation in the ethnoecological restoration process through cultural ceremonies and celebrations

This was an adaptive process that was constantly evolving based on the input from individual Tsawout community members as well as the Chief and Council and Lands Committees. Like all restoration projects, there is no one ethnoecological prescription that can simply be applied to any culturally significant landscape. Nevertheless, based on my experiences in working towards the restoration of ʔIXEN, I do believe that there is a great benefit to creating and sharing guidelines for restoration practitioners faced with similar projects aimed at integrating TEK and Western Science.

It is important to clarify that integrating TEK and Western Science does not mean merely trying to make TEK conform to a western model of restoration. Instead, ethnoecological approaches must create a process for restoration that is guided by the community and fits with traditional practices and cultural beliefs. Doing so means finding and creating ways for members of First Nations communities to express themselves and either contribute to, or guide, not only the product of restoration efforts, but the process of working towards such an end. Such contributions could be by way of formal involvement in meetings or interviews or through a variety of alternative means that may be less intimidating and more culturally appropriate (e.g. in this project as a speaker at Earth Day or by contributing to the ʔIXEN book project). I believe that one of the most important elements of a successful ethnoecological restoration project is to create these opportunities for traditional knowledge to be awakened, to emerge and to be applied. I also believe that it is essential to ensure

that the traditional knowledge that has been communicated to the researcher or restoration practitioner is made accessible to the rest of the community (e.g. Nadasdy, 1999).

In this thesis I have attempted to document the process of working towards ethnoecological restoration. As part of this documentation I believe that it is important to reflect upon the achievements of the process to date as well as make recommendations as to what elements could have been approached differently. It is my hope that the assessment presented in Table 6.2, as well as the guidelines for ethnoecological restoration (Section 5.2), will be beneficial resources for future restoration efforts.

Feedback from the Tsawout community surrounding the process thus far has been largely positive. The initiatives that have been carried out over the past two years have provided early project success stories and have set the stage for the long-term restoration of this ecosystem. That the initiatives to date have been largely successful has begun to foster the type of sustained commitment to conservation within the Tsawout community that is needed for all restoration projects. Annual conservation goals and celebrations have been established and new initiatives that seek to propagate native dune species for restoration plantings as well as programs to expand educational outreach into the Saanich Tribal School are underway. The future for conservation of ȾIXEN and Island View Beach does indeed look promising.

Reflecting upon the two years that I have spent working on this project I am filled with fond memories and pride surrounding my role as a part of the Cordova Bay Spit Project Working Group. The journey towards restoration, and towards learning about the process of ethnoecological restoration, has taken a path that I never could have imagined and yet one that I am grateful to have walked. Having the opportunity to learn from and share experiences with a community that holds unique values and beliefs from my own has been a wonderful experience. Seeing the conservation actions such as educational signs and the installation of cedar fencing take place was truly rewarding. Finding a creative way to share the ecological facts and community values with a wider audience through my book project was equally gratifying. Yet perhaps the greatest achievement for me has been simply helping to foster connections and raise awareness about the significance and value of this very special place. I leave this project knowing that collectively we are now truly ‘helping each other take care of the land’.

Table 6.2 Summary of achievements and reflections based on objectives

Objective	Achievements and Reflections
Contribute towards the restoration of a habitat area that facilitates avian migration. • Collect baseline ecological data and any human influences. • Foster immediate & long-term conservation of this ecosystem.	• I have attempted to create a "user friendly" thesis to be used as a resource for future land-use and conservation planning for the sand dune ecosystem. • Ecological data and TEK needed to create a restoration plan has been collected (Chapter 4). • Human influences have been identified and mapped (Figure 4.2). • Based on this information preliminary conservation/restoration goals have been established (Table 5.2). • Adverse ecological impacts have been reduced through education and physical barriers to vehicle use. • Awareness has been raised about the ethnoecological significance of the site. • Restoration of the cultural connection of the Tsawout community to ȾTX̱EN has been initiated through celebrations and the creation of an educational book (Section 5.3.1). • Based on my experiences, I have created a guiding framework for restoration practitioners who are working towards multi-stakeholder, ethnoecological restoration projects (Section 5.2).
Assess if ethnoecological restoration is appropriate for the Tsawout community. • Assess the unique significance of this site to the Tsawout First Nation community.	• Based on interviews conducted with Tsawout community members, conversations with the Tsawout Chief and Council Committee and Lands Committee, and my own observations I believe that ethnoecological restoration is indeed an appropriate methodology within the Tsawout community. • The significance of the site to the Tsawout community has been established primarily through a series of interviews, conversations with the Tsawout Chief and Council Committee and Lands Committee, and my own observations over the course of this two year study.
Assess how to facilitate collaboration among diverse stakeholders.	• By conducting interviews and a values assessment exercise I have been able to identify shared values amongst the stakeholders of this project. This has allowed for a number of preliminary restoration initiatives to take place. These early project successes have been effective at setting the foundation for future initiatives and have strengthened the partnership between project stakeholders (Table 4.2). • One aspect of this process that could have been improved was to make more of an effort early in the process to ensure that the key stakeholders from within the community were engaged in the process. • Based on my experiences, I have created a guiding framework for restoration practitioners who are working towards multi-stakeholder, ethnoecological restoration projects (Section 5.2).
Determine what ecological conditions would improve habitat for migratory birds.	• Ecological data about the avian composition and migration timing has been collected (Section 4.3). • Based on this data I have been able to make recommendations for restoration/conservation such as appropriate dates for off-leash dog restrictions and areas of the sand dune ecosystem that should be protected from the impacts of vehicular use (Tables 5.2 & 6.1).
Share knowledge to facilitate regional habitat networks for migratory birds.	• I have made connections with other regional initiatives for migratory bird conservation to learn from their experiences (Section 5.3.2). • I have also engaged with current initiatives to identify coastal dune ecosystems as part of a coast wide initiative to form a coastal dune recovery strategy. • I have also made efforts to share the recommendations for stakeholder engagement and collaboration with the Hemisphere-wide Partners in Flight working group (Section 5.3.3).

6.3 Stakeholder Objectives

In addition to evaluating the success of this project based on my own objectives, it is essential to acknowledge the objectives of the three main stakeholders in this project (Tsawout First Nation, C.W.S. and C.R.D.). Evaluating the success or completion of an ecological restoration project can be a challenging task. After all, when do we know that an ecosystem has been fully restored? Certainly the success of a project is likely to depend upon the concepts of good ecological restoration as discussed in section 2.1. For example, the success of this project will depend upon paying close attention to the integrity of the Cordova Spit ecosystem and to ensuring that the restoration initiatives stay true to the ecological and cultural history of this special place. To be successful in this challenge will certainly require a carefully designed process (such as the one presented in figure 5.5) that focuses on engagement with stakeholders and understanding community values. For this ethnoecological restoration project, and indeed most others, the ultimate reference point upon which success will be judged will be based upon the ecological and cultural integrity of the ecosystem. However, evaluating the effectiveness of an ecological restoration endeavor also depends upon whether or not the outcomes of the project have met the objectives of the associated stakeholders.

Assessing what the three main stakeholders believe to be the objectives for this project requires returning to the values assessment (section 4.1) and attempting to articulate what it is that each of the groups envisioned as a desirable future. For the Canadian Wildlife Service this included first and foremost the conservation of the sand dune landform and maintaining the rare biodiversity elements that are part of the ecosystem. The goal of the CWS from the start of this project was to work towards ensuring the integrity of the ecosystem and minimizing further negative impacts. A secondary objective emphasized building partnerships and making these partnerships work to achieve conservation objectives. Therefore for this project to be successful from the CWS perspective it seems that the result must be a collaborative process between stakeholders that leads to the restoration of the integrity of the dune system to the greatest extent possible (including the cultural values of the Tsawout First Nation) and that protects against further negative impacts to the system.

For the Capital Regional District Parks Department the primary values were twofold: to protect the natural environment and native species, and to ensure recreational opportunities

for park visitors. Therefore for this project to be successful from the CRD perspective it seems that activities and outcomes must find a balance between conservation and recreation. It should be noted however that the CRD mandate suggests that for this nature appreciation park conservation should be the guiding value that directs all of the activities that take place. Specific restoration goals include working towards establishing self sustaining populations of all of the rare and endangered species that currently inhabit the area (e.g. Contorted-pod evening-primrose), facilitating restoration activities that lead to a functioning dune ecosystem with natural processes occurring in an unobstructed way, and working to maintain Island View Beach as a place that people can go and connect with nature while minimizing their footprint on the area.

For the Tsawout First Nation the main values include protection of the medicinal plants, the maintenance of the area for cultural celebrations such as the Tribal Journeys canoe races, and the passing on of traditional values and the SENĆOŦEN language. Therefore for this project to be successful from the Tsawout perspective it seems that the primary outcomes must include the cessation of degradation to the dune ecosystem and medicinal plants from ATV use, the passing on of traditional values through hands on interaction with the landscape, the establishment of a designated cultural use area, to have the SENĆOŦEN language built in to restoration process, and finally, to have families and kids once again using the area as they have for generations.

As this project moves forwards each of these stakeholder objectives seem entirely attainable. The foundation for good ecological restoration in this project is strong. Partnerships between these three stakeholders are now well established. Together the Cordova Bay Project Working Group seems poised to achieve all of these objectives as well as others that have emerged, and will continue to emerge, as this project carries on.

6.4 Recommendations for Future Study

The following recommendations are based on my experiences with this project and through consultations with members of the Cordova Bay Spit Project Working Team:

Future initiatives at ȾIXEN should continue to be guided by the desires of the Tsawout community: The success of this project thus far has been a direct result of the community focused approach. The initiatives listed in Table 6.1 should be carried out either directly by, or in collaboration with, the Tsawout First Nation.

A Comprehensive management plan for IVBRP must be developed that incorporates the ecological significance of the sand dune ecosystem (especially relating to rare plants and migratory species) into management planning: The political nature of the CRD dictates that many conservation actions or goals need to be entrenched in management planning. Initiatives such as the installation of educational or regulatory signs must be supported in a park management plan that is grounded in scientific data.

The Tsawout community should continue to create meaningful opportunities for youth to learn from elders and engage with their traditional territory: It is important that events such as Earth Day and the Seafood Festival continue to occur and that the younger generation within the community continues to have opportunities to engage with their elders and their traditional lands.

Opportunities for formal education and the Saanich Tribal school should be developed: In addition to learning that occurs on site at ȾIXEN, there exists the opportunity to create educational materials that can become a part of the curriculum at the Saanich Tribal School. This could include learning about the culturally significant plant species, birds that inhabit the area as well as the practice of pit cooking and the harvesting of traditional medicines. There also may be an opportunity to install a camera in the nest of the Ospreys that inhabit ȾIXEN and create a website where students could regularly monitor the progress of nesting activities.

Personal Communications

Claxton, B. Tsawout First Nation. Personal Communication. Nov 28, 2007.

Claxton, E Jr. Tsawout First Nation. Personal Communication. Jan 18, 2008.

Claxton, L. Tsawout First Nation. Personal Communication. Nov 28, 2007.

Claxton, A. Tsawout First Nation. Personal Communication. Nov 28, 2007.

Etzel, J. Tsawout First Nation. Personal Communication. Jan 18, 2008.

Etzel, S. Tsawout First Nation. Personal Communication. Nov 28, 2007.

Gollmer, R. CRD Parks Staff. Personal Communication. September 26, 2007.

Harry, D. Tsawout First Nation. Personal Communication. Jan 18, 2008.

Harry, V. Tsawout First Nation. Personal Communication. Jan 18, 2008.

Psyllakis, J. CRD Parks Staff. Personal Communication. Nov 14, 2007.

Sam, R. Tsawout First Nation. Personal Communication. Nov 28, 2007.

Underwood, G. Tsawout First Nation. Personal Communication. Jan 18, 2008.

Underwood, R. Tsawout First Nation. Personal Communication. Nov 28, 2007.

Wood, T. Canadian Wildlife Service. Personal Communication. Nov 14 and 16, 2007.

Wood, T. Canadian Wildlife Service. Personal Communication. Nov 16, 2007.

References

Aidley,D.J. (ed). 1981. Animal Migration. Cambridge University Press: Cambridge. 264 pp.

Alerstam, T., Hedenstrom, A & Akesson, A. 2003. Long Distance Migration: Evolution and determinants. Oikos, Vol. 103: 247-260.

Allen, E. B. 2003. New directions and growth of restoration ecology. Restoration Ecology, Vol. 11: 1-2.

Allison, S.K. 2004. What Do We Mean When We Talk About Ecological Restoration? Ecological Restoration, Vol. 22(4): 281-286.

Andren, H. 1994. Effects of Habitat Fragmentation on Birds and Mammals in Landscapes with Different Proportions of Suitable Habitat: A Review. Oikos, Vol. 71(3): 355-366.

Andrén H, Delin A & Seiler A (1997) Population responses to landscape changes depends. on specialization to different landscape elements. Oikos, Vol. 80: 193–196.

Apostol, D and Sinclair, M. editors. 2006. Restoring the Pacific Northwest: The Art and Science of Ecological Restoration in Cascadia. Island Press.

Aronson, J. & Le Floc, E. 1996. Vital landscape attributes: missing tools for. restoration ecology. Restoration Ecology, Vol. 4: 377-387.

Bani, L., Baietto, M., Bottoni, L. & Massa, R. 2002. The Use of Focal Species in Designing a Habitat Network for a Lowland Area of Lombardy, Italy. Conservation Biology, Vol. 16(3): 826–831.

Banks, P.B. & Bryant, J.V. 2007. Four-legged friend or foe? dog walking displaces native birds from natural areas. Biology Letters (published online 5 September 2007)

Bart, J., Ralph, C.J., 2005, Suggestions for establishing a network of landbird migration monitoring sites In Ralph, C.J., Rich, T., eds., Proceedings of the Third International Partners in Flight Symposium: Gen. Tech. Rep. PSW-GTR-191, Albany, CA, US Forest Service, Pacific Southwest Research Station, p. 701-704.

Battiste, M. & Henderson, J.Y. 2005. Protecting Indigenous Knowledge and Heritage: A Global Challenge. Purich Publishing, Saskatoon.

Baxter, C.K. 2005. Defining the Demands and Meeting the Challenges of Integrated Bird Conservation. In: Ralph, C.J. and T.D. Rich, (eds.). Bird conservation implementation and integration in the Americas: Proceedings of the Third International Partners in Flight conference, Volume 2, March 20-24, 2002, Asilomar, California. Gen. Tech. Rpt. PSW-GTR-191. Albany, CA: U.S. Forest Service, Pacific Southwest Research Station. p. 7-12.

B.C. Conservation Data Centre. 2008. BC Species and Ecosystems Explorer. B.C. Ministry of Environment. Victoria, BC. http://www.env.gov.bc.ca/cdc/.

Berkes, F. 1999. Sacred Ecology: Traditional Ecological Knowledge and Resource Management. Taylor and Francis, Philadelphia.

Berkes, F., J. Colding, and C. Folke. 2000. Rediscovery of traditional ecological knowledge as adaptive management. Ecological Applications, Vol. 10:1251-1262.

Berkes, F. & Turner, N.J. 2006. Knowledge, learning and the evolution of conservation practice for social-ecological system resilience. Human Ecology, Vol. 34:479-494.

Berthold, P., Bauer H. & Westhead, V. 2001. Bird Migration: A General Survey. Oxford University Press, New York.

Bicker, A., Sillitoe, P. & Pottier, J. 2004. Development and Local Knowledge: New approaches to issues in natural resources management conservation and agriculture. Routledge, London.

Birdlife International. 2004. Important Bird Areas of Canada. http://www.ibacanada.com/index.html

Birdlife International. 2007. Working Together for Birds and People. http://www.birdlife.org/index.html

Blancher, P.J., B. Jacobs, A. Couturier, C.J. Beardmore, R. Dettmers, E.H. Dunn, W. Easton, E.E. Iñigo-Elias, T.D. Rich, K.V. Rosenberg and J.M. Ruth. 2006. Making Connections for Bird Conservation: Linking States, Provinces & Territories to Important Wintering and Breeding Grounds. Partners in Flight Technical Series No.4.

Böhning-Gaese, K., Taper, M.L. & Brown, J.H. 1993. Are Declines in North American Insectivorous Songbirds Due to Causes on the Breeding Range? Conservation Biology, Vol. 7(1): 76–86.

Booth, B.P. 2001. Southern Vancouver Island Marine Waters and Seabird Islands Important Bird Areas Conservation Plan. Canadian Nature Federation.

Borgmann, A. 1995. The Depth of Design. In R. Buchanan and V. Margolin, eds., Discovering Design: Explorations in Design Studies, 17. 13-22. Chicago: University of Chicago Press.

Boulding, E. 1988. Building a Global Civic Culture: Education for an Interdependent World. Syracuse University Press.

Brackett, D. 2005. Bird Conservation as a Flagship for Global Diversity Conservation. In: Ralph, C.J. and T.D. Rich, (eds.). Bird conservation implementation and integration in the Americas: Proceedings of the Third International Partners in Flight conference, Volume 2, March 20-24, 2002, Asilomar, California. Gen. Tech. Rpt. PSW-GTR-191. Albany, CA: U.S. Forest Service, Pacific Southwest Research Station. p. 13-14.

British Columbia Ministry of Environment. 2008. Ecological Restoration Guidelines for British Columbia. http://www.env.gov.bc.ca/wld/fia/TERP_eco_rest_guidelines/intro/

Brush, S.B & Stabinsky, D. 1996. Valuing Local Knowledge: Indigenous People and Intellectual Property Rights. Island Press, Washington D.C.

Burger, J. 1981. The effect of human activity on birds at a coastal bay. Biological Conservation, Vol. 21: 231-241.

Butchart SHM, Stattersfield AJ, Bennun LA, Shutes SM, Akc¸akaya HR, et al.. 2004. Measuring global trends in the status of biodiversity: Red List Indices for birds. Biology, VOl. 2(12): 2294-2304.

Butcher, G. 2007. Common Birds in Decline: A state of the Birds Report Summer 2007. Audubon.

Butcher, G.S & Niven, D.K. 2007. Combining Data from the Christmas Bird Count and the Breeding Bird Survey to Determine the Continental Status and Trends of North America Birds. National Audubon Society, Ivyland, PA.

Cabin, R.J. 2007. Science-Driven Restoration: A Square Grid on a Round Earth? Ecology, Volume 15(1): 1-7.

Capital Regional District. 2007. About the CRD. http://www.crd.bc.ca/about/index.htm

Capital Regional District Parks. 1989. Island View Beach Regional Park: Management Plan. CRD Parks. Victoria.

Capital Regional District Parks. 1992. Island View Beach Regional Park: Interpretive Plan. CRD Parks. Victoria.

Capital Regional District. 2008. Natural Areas Atlas. http://www.crd.bc.ca/maps/natural/atlas.htm

Capp, J.C. & Mehlman, D. 2005. A New Conservation Partnership: Conserving the Migratory Birds of the Americas. In: Ralph, C.J. and T.D. Rich, (eds.). Bird conservation implementation and integration in the Americas: Proceedings of the Third International Partners in Flight conference, Volume 2, March 20-24, 2002, Asilomar, California. Gen. Tech. Rpt. PSW-GTR-191. Albany, CA: U.S. Forest Service, Pacific Southwest Research Station. p. 1138-1142.

Carbonell, M. & Nathai-Gyan, N. 2005. Nariva Swamp Ramsar Site, Trinidad and Tobago (West Indies). Wetland Habitat Restoration Initiative. In: Ralph, C.J. and T.D. Rich, (eds.). Bird conservation implementation and integration in the Americas: Proceedings of the Third International Partners in Flight conference, Volume 2, March 20-24, 2002, Asilomar, California. Gen. Tech. Rpt. PSW-GTR-191. Albany, CA: U.S. Forest Service, Pacific Southwest Research Station. p. 446-449

Carson, R. 1962. Silent Spring. Houghton Mifflin, Boston.

Carter, D. 1993. Recognizing Traditional Environmental Knowledge. IDRC Reports , April 1993.

Carter, M. F., W. C. Hunter, D. N. Pashley, and K. V. Rosenberg. 2000. Setting conservation priorities for landbirds in the United States: the Partners in Flight approach. The Auk, Vol. 117: 541-548.

Chapin, F.S., et al.. 2000. Consequences of changing biodiversity. Nature, Vol. 405: 234-242.

Chapin, F.S. III, E.S. Zavalets, V.T. Eviner, R.L. Naylor, P.M. Vitousek, H.L. Reynolds, D.U. Hooper, S. Lavorel, O.E. Sala, S.E. Hobbie, M.C. Mack, and S. Diaz. 2000. Consequences of Changing Biodiversity. Nature, Vol. 405(6783): 234-242.

Clayoquot Sound Scientific Panel. 2005. First Nations' Perspectives Relating to Forest Practices Standards in Clayoquot Sound.

Cody, M.L. 1985. Avian Ecology: Habitat Selection in Birds. Review author[s]: Raymond J. O'Connor. Science, Vol. 230(4728): 933.

Collins, S.L. 2001. Long-term research and the dynamics of bird populations and communities. The Auk, July 2001.

Corbett, J. 2003. Empowering Technologies? Introducing Participatory Geographic Information and Multimedia Systems in two Indonesian Communities. Phd Thesis. University of Victoria.

COSEWIC. 2003. COSEWIC assessment and update status report on the Horned Lark *strigata* subspecies *Eremophila alpestris strigata* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 23 pp.

Council for Environmental Education. 2008. Bird Conservation through Education. http://www.birdeducation.org/

Cox, G.W. 1985. The Evolution of Avian Migration Systems between Temperate and Tropical Regions of the New World. The American Naturalist, Vol. 126(4): 451-474.

Capital Regional District. 2007. Natural Areas Atlas. Available at: http://www.crd.bc.ca/maps/natural/atlas.htm

Davis, M.A. & Slobodkin, L.B. 2004. The Science and Values of Restoration Ecology. Restoration Ecology. Vol. 12(1): 1-3.

Davis-Case, D'A. 1990. The Community's toolbox: The idea, methods and tools for participatory assessment, monitoring and evaluation in community forestry. Community Forestry Filed Manual 2. Rome: Forestry Department, FAO.

DeCarlo, D. 2004. Ecological Restoration: British Columbia Style. Ecological Restoration, Vol. 22(2): 86-91.

DeGraff, R.M., Rappole, J.H., 1995. Neotropical Migratory Birds: Natural History, Distribution, and Population Change. Cornell University Press, Ithaca, NY.

Department of Justice Canada. 1994. Migratory Birds Convention Act. Government of Canada.

Deur, D. & Turner, N.J. (eds.). 2005. Keeping It Living, Traditions of Plant Use and Cultivation on the Northwest Coast of North America. Vancouver: UBC Press and Seattle: University of Washington Press.

Donaldson,G., Hyslop, C., Morrison, G., Dickson, L. and Davidson, I. 2000. Canadian Shorebird Conservation Plan. Canadian Wildlife Service, Hull, Quebec.

Drechsler,M. & Wissel,C. 1998, Trade-offs between Local and Regional Scale Management of Metapopulations. Biological Conservation, Vol. 83: 31-41.

Drut, M. S., and J. B. Buchanan. 2000. U.S. national shorebird conservation plan: Northern Pacific Coast Working Group regional management plan. Unpublished report submitted to Manomet Center for Conservation Sciences, Manomet, MA.

Dunn, E.H., Hussel, D.J.T. & Welsh, D.A. 1999. Priority-Setting Tool Applied to Canada's Landbirds Based on Concern and Responsibility for Species. Conservation Biology, Vol. 13(6): 1404-1415.

Easton, W. E., and K. Martin. 1998. The effect of vegetation management on breeding bird communities in British Columbia. Ecological Applications, Vol. 8: 1092-1103.

Ehrenfeld, J.G. 2000. Defining the Limits of Restoration: The Need for Realistic Goals. Restoration Ecology, Vol. 8(1): 2-9.

Elliott Sr., D. 1983. Saltwater People: A Resource Book for the Saanich Native Studies Prograom. Saanich District Native Education. Saanich, BC.

Elliott, G., B. Altman, W. Easton, R. Estrella, G. Geupel, M. Chase, E. Cohen, and A. Chrisney. 2005. Integrated bird conservation along the Pacific coast of North America: An action agenda. In: Ralph, C.J. and T.D. Rich, (eds.). Bird conservation implementation and integration in the Americas: Proceedings of the Third International Partners in Flight conference, Volume 2, March 20-24, 2002, Asilomar, California. Gen. Tech. Rpt. PSW-GTR-191. Albany, CA: U.S. Forest Service, Pacific Southwest Research Station. p. 107-111.

Environment Canada. 2003. Species at Risk Act: A Guide. Government of Canada.

Environment Canada. 2007. Canadian Wildlife Service: National Site. http://www.cws-scf.ec.gc.ca/index_e.cfm

Environment Canada. 2008. Black Brant: An Indicator of Wildlife Sustainability in the Georgia Basin. http://ecoinfo.org/env_ind/region/brantgeese/brantgeese_e.cfm

Fahrig L. 2001. How much habitat is enough? Biological Conservation, Vol. 100:65-74.

Failing, L., Gregory, R. & Harstone, M. 2007. Integrating science and local knowledge in environmental risk management: A decision-focused approach. Ecological Economics, Vol. 64(1): 47-60.

Fairbarns, M. 2007. Island View Beach and Tsawout Reservation: Inventory and Management Recommendations for Rare Plants. Aruncus Consulting.

Faugier J. & Sargeant, M. 1997. Sampling hard to reach populations. Journal of Advanced Nursing, Vol. 26(4): 790-797.

Fernández, G., N. Warnock, D. L. Lank, and J. B. Buchanan. 2006. Conservation Plan for the Western Sandpiper, version 1.0. Manomet Center for Conservation Science, Manomet, Massachusetts.

Filho, W.L. 1997. Integrating environmental education and environmental management. Environmental Management and Health, Vol. 8(4): 133–135.

First Peoples' Cultural Foundation. 2007. Language Archives Celebrating World Indigenous Cultures. http://www.firstvoices.com/

Flynn, S., Cadrin, C. & Filatow, D. 2006. Coastal Sand Dune Ecosystems in British Columbia. Conservation Data Center. British Columbia Ministry of Environment.

Ford, J., and D. Martinez. 2000. Traditional ecological knowledge, ecosystem science, and environmental management. Ecological Applications, Vol. 10(5): 1249-1250

Franklin, J. F. 1993. Preserving biodiversity: species, ecosystems or landscapes? Ecological Applications, Vol. 3(2): 202-205.

Funtowicz S. and Ravetz J.R., 1994: The Worth of a Songbird: Ecological Economics as a Post-normal Science. Ecological Economics, Vol. 10(3):197-207.

Furness, R.W. & Greenwood, J.J.D. (eds). Birds as Monitors of Environmental Change. Chapman & Hall: London, 1993.

Gadgil, M., Berkes, F. & Folke C. 1993. Indigenous Knowledge for Biodiversity Conservation. Ambio, Vol. 22(2-3): 1151-155.

Geist, C., and SM Galatowitsch. 1999. Reciprocal models for meeting ecological and human needs in restoration projects. Conservation Biology, Vol. 13(5):970-979.

George, T. Luke & Zack, Steve. 2001. Spatial and Temporal Considerations in Restoring Habitat for Wildlife. Restoration Ecology, Vol. 9(3): 272-279.

Gregory, R., Failing, L., & Harstone, M. 2008. Meaningful resource consultations with first peoples. Environment, Vol. 50(1): 34-45.

Gregory, R. D., Noble, D., Field, R., Marchant, J., Raven, M. and Gibbons, D. W. 2003. Using birds as indicators of biodiversity. – Ornis Hung, Vol. 12(13): 11-24.

Gregory, R. 2000. Using Stakeholder Values to Make Smarter Environmental. Management Decisions. Environment, Vol. 42: 34-44.

Grenier, L. 1998. Working with Indigenous Knowledge: A Guide for Researchers. International Development Research Centre, Ottawa.

Haig-Brown, C. 1988. Resistance and renewal: Surviving the Indian residential school. Vancouver: Tillicum Press.

Hall, M. 1999. American Nature, Italian Culture: Restoring the Land in Two Continents. Unpublished doctoral dissertation, Institute for Environmental Studies, University of Wisconsin-Madison.

Hannon, S.J., and Schmiegelow, F.K.A. 2002. Corridors may not improve the conservation value of small reserves for most boreal birds. Ecological Applications, Vol. 12(5): 1457-1468.

Harder, B. 2004. The birds are falling: avian losses could hit ecosystems hard. Science News – Dec 18, 2004.

Hartasanchez, I., DeGroot, K., Breault, A. & Butler, R. 2005. Bird conservation planning and implementation in Canada's intermountain region. In: Ralph, C.J. and T.D. Rich, (eds.). Bird conservation implementation and integration in the Americas: Proceedings of the Third International Partners in Flight conference, Volume 2, March 20-24, 2002, Asilomar, California. Gen. Tech. Rpt. PSW-GTR-191. Albany, CA: U.S. Forest Service, Pacific Southwest Research Station. p. 181-183.

Herkenrath, P. 2002. Birds and the Convention on Biological Diversity: can ornithologists and bird conservationists make a difference? Bird Conservation International, Vol. 12:99–106.

Higgs, E. 1994. Expanding the scope of restoration ecology. Restoration Ecology, Vol. 2:137–146.

Higgs, E. 1997. What is Good Ecological Restoration. Conservation Biology, Vol. 11(2): 338-348.

Higgs, E. 2003. Nature by Design: People, Natural Process, and Ecological Restoration. MIT Press, Cambridge, Mass.

Higgs, E. 2005. The Two Culture Problem: Ecological Restoration and the Integration of Knowledge. Restoration Ecology. Vol. 13(1): 159-164.

Higgs, E.S. 2006. Restoration Goes Wild: A Reply to Throop and Purdom. Restoration Ecology, Vol. 14(4): 500-503.

Hobbs, R.J. 2005. The Future of Restoration Ecology: Challenges and Opportunities. Restoration Ecology, Vol. 13(2): 239-241.

Hobbs, R. J., and D. A. Norton. 1996. Towards a conceptual framework for restoration ecology. Restoration Ecology, Vol. 4: 93–110.

Hobbs, R.J. & Harris, J.A. 2001. Repairing the Earth's Ecosystems in the New Millennium. Restoration Ecology, Vol. 9: 239-246.

Holmes, R.T. & Sherry, T.W. 2001. Thirty-year bird population trends in an unfragmented temperate deciduous forest: importance of habitat change. The Auk, Vol. 118(3):589–609.

Howe, M.A. & Geissler, P.H. 1989. Population trends of North American shorebirds based on the International Shorebird Survey. Biological Conservation, Vol. 49(3): 185-199.

Hunter, M. 1996. Benchmarks for managing ecosystems: Are human activities natural? Conservation Biology Vol. 10: 695-697.

Huntington, H.P. 2000. Traditional Ecological Knowledge: Using Traditional Ecological Knowledge in Science: Methods and Applications. Ecological Applications, Vol. 10: 1270-1274.

Hutto, Richard L. 1988. Is Tropical Deforestation Responsible for the Reported Declines in Neotropical Migrant Populations? American Birds, Vol. 42(3):375-9.

Hutto, R. L. 2000. On the importance of en route periods to the conservation of migratory landbirds. Studies in Avian Biology, Vol. 20:109–114.

Indian and Northern Affairs Canada. 2007. Gathering Strength: Canada's Aboriginal Action Plan. http://www.ainc-inac.gc.ca/gs/chg_e.html

Indigenous Peoples' Restoration Network. 2007. Traditional Ecological Knowledge. Society for Ecological Restoration International. http://www.ser.org/iprn/tek.asp

International Center for the Study of Bird Migration. 2008. Migrating Birds Know No Boundaries. http://www.birds.org.il/show_item.asp?levelid=457

Inventory, Monitoring, and Assessment Program. 2001. Avian Inventory and Monitoring Protocols. California State Parks.

Jacobson, S. K. 1991. Evaluation model for developing, implementing and assessing conservation education programs: Examples from Costa Rica and Belize. Environmental Management, Vol. 15:143–150.

James, F.C. 1996. New approaches to the analysis of population trends in land birds - Special Feature - Neotropical Migratory Birds. Ecology – Jan 1996.

Johnson, M. 1992. Lore: capturing traditional environmental knowledge. Ottawa, IDRC.

Jordan, W. R. 2003. The sunflower forest: ecological restoration and the new communion with nature. University of California Press, Berkeley.

Jukofsky, D. 1995. Silent skies: migratory bird populations decline worldwide. The Environmental Magazine – Feb 1995.

Karl, H. A., Susskind, L. E. & Wallace, K. H. 2007. A Dialogue, not a Diatribe: Effective Integration of Science and Policy through Joint Fact Finding. Environment, Vol. 49(1): 20–34.

Katz, E. 1992. The big lie: Human restoration of nature. Research in Philosophy and Technology, Vol. 12: 231-241.

Keller, G.S. 2006. Declines of Migratory Songbirds: Evidence for Wintering-ground Causes. Northeastern Naturalist – August 2006.

Kimmerer, R.W. 2000. Native Knowledge for Native Ecosystems. Journal of Forestry. Vol. 98(8): 4-9.

Kimmerer, R.W. 2002. Weaving traditional ecological knowledge into biological education: a call to action. BioScience, Vol. 52:432-438

Knudtson, P. & Suzuki, D. 1992. Wisdom of the Elders. Stoddart Publishing. Toronto.

Lackey, R. T. 2001. Values, policy, and ecosystem health. Bioscience Vol. 51: 437-443.

LaDuke, 1994 Traditional Ecological Knowledge and Environmental Futures," Colorado Journal of International Environmental Law and Politics - Endangered Peoples: Indigenous Rights and the Environment. Niwot, CO: University Press of Colorado, 1994, pp. 127-48.

Lafferty, K. 2001. Disturbance to wintering western snowy plovers. Biological Conservation, Vol. 101:315-325.

Lafferty, K., Goodman, D. & Sandoval, C. 2006. Restoration of Breeding by Snowy Plovers Following Protection from Disturbance. Biodiversity and Conservation, Vol. 15(7): 2217-2230.

Lambeck, R.J. 1997. Focal species: a multi-species umbrella for nature conservation. Conservation Biology, Vol. 11(4): 850-856.

Lambeck, Robert J. 2002. Focal Species and Restoration Ecology: Response to Lindenmayer et al.. Conservation Biology, Vol. 16(2): 549-551.

Leonard, J. 2007. A Preliminary Account of Stress in SENĆOŦEN (Saanich/North Straits Salish). Northwest Journal of Linguistics 1.4:1–59

Light. A. and Higgs, E. 1996. The politics of ecological restoration. Environmental Ethics, Vol. 18: 227-247.

Lindenmayer, DB, et al.. 2002. The Focal-Species Approach and Landscape Restoration: a Critique. Conservation Biology, Vol. 16:338-345.

Line, L. 1993. Silence of the Songbirds. National Geographic Society.

Long, J., Tecle, A. & Burnette, B. 2003. Cultural foundations for ecological restoration on the White Mountain Apache Reservation. Conservation Ecology, Vol. 8(1): 4.

MacArthur, R.H. 1964. Environmental Factors Affecting Bird Species Diversity. The American Naturalist, Vol. 98(903): 387-397.

MacArthur, R. H. and MacArthur, J. W. 1961: On bird species diversity. Ecology, Vol. 42: 594-599.

Manomet Center for Conservation Sciences 2004. International Shorebird Surveys. http://shorebirdworld.org/template.php?g=13&c=11, September 10, 2004.

Martin, T., E. Nygren, N.K. Dawe, & Jamieson, G. 1996. Effects of disturbances on spring staging Brant (Branta bernicla nigricans) in the Parksville-Qualicum Beach area of south-east Vancouver Island, B.C. Unpublished Report, Canadian Wildlife Service, Pacific and Yukon Region.

Master, L. 1991. Assessing threats and setting priorities for conservation. Conservation Biology, Vol. 5(4):559-563.

Maurer, B.A. & Villard, M. 1996. Continental Scale Ecology and Neotropical Migratory Birds: How to Detect Declines amid the Noise. Ecology, Vol. 77(1):1-2.

McGregor, D. 2007. Traditional Ecological Knowledge and Sustainable Development: Towards Coexistence. The International Development Research Centre. http://www.idrc.ca/en/ev-64525-201-1-DO_TOPIC.html

McIntyre, S. & Hobbs, R. 1999. A Framework for Conceptualizing Human Effects on Landscapes and Its Relevance to Management and Research Models. Conservation Biology, Vol. 13(6): 1282-1292.

McPhee, M., P.Ward, J. Kirkby, L.Wolfe, N. Page, K. Dunster, N. K. Dawe and I. Nykwist. 2000. Sensitive Ecosystems Inventory: East Vancouver Island and Gulf Islands, 1993 - 1997. Volume 2: Conservation Manual. Technical Report Series No. 345, Canadian Wildlife Service, Pacific and Yukon Region, British Columbia.

Meadows, D. H. 1999. Society's myths about urban growth. Victoria Times Colonist. May 27, 1999, Page A13.

Melinchuk, R. 1995. Ducks Unlimited's Landscape Approach to Habitat Conservation. Landscape and Urban Planning, Vol. 32: 211-217.

Melles, S., S. Glenn, and C. Martin. 2003. Urban bird diversity and landscape complexity: species–environment associations along a multiscale habitat gradient. Conservation Ecology, Vol. 7(1):5.

Miller, S.G., Knight, R.L. & Miller, C.K. 2001. Wildlife Responses to Pedestrians and Dogs. Wildlife Society Bulletin, Vol. 29: 124-132.

Milloy, J.S. 1999. A national crime: The Canadian government and the residential school system, 1879-1986. Winnipeg: The University of Manitoba Press.

Mooney, P. 2004. The Use of Ecological Restoration Techniques to Manage Urban and Urban Fringe Sites for Avian Diversity. Proceedings of the Sixteenth International Conference for the Society of Ecological Restoration, August 24-26, 2004, Victoria, Canada.

Moore, F. R., M. S. Woodrey, J. J. Buler, S. Woltmann, T. R. Simons. 2005. Understanding the stopover of migratory birds: a scale dependent approach. In Ralph CJ, Rich TD, editors. Bird conservation implementation and integration in the Americas: Proceedings of the Third International Partners in Flight conference, Volume 2, March 20-24, 2002, Asilomar, California. Gen. Tech. Rpt. PSW-GTR-191. Albany, CA: U.S. Forest Service, Pacific Southwest Research Station. p. 684-689.

Morrison, R . I. G., Aubry,Y ., Butler,R .W., Beyersbergen, G.W., Donaldson G.M., Gratto-Trevor, C.L., Hicklin, P.W., Johnston, V.H. & Ross, R . K. 2001. Declines in North American shorebird populations. Wader Study Group Bulletin, Vol. 94: 34- 38.

Morton, E. S. & R. Greenberg. 1989. The Outlook for Migratory Songbirds: "Future Shock" For Birders. American Birds, Vol. 43:178-83.

Hartasanchez, I., DeGroot, K., Breault, A. & Butler, R. 2005. Bird conservation planning and implementation in Canada's intermountain region. In: Ralph, C.J. and T.D. Rich, (eds.). Bird conservation implementation and integration in the Americas: Proceedings of the Third International Partners in Flight conference, Volume 2, March 20-24, 2002, Asilomar, California. Gen. Tech. Rpt. PSW-GTR-191. Albany, CA: U.S. Forest Service, Pacific Southwest Research Station. p. 181-183.

Morrison, R.I.G. 2001. Shorebird population trends and issues in Canada: an overview. Bird Trends, Vol. 8:1-5, Canadian Wildlife Service, Ottawa.

Myers, J.P., R.I.G. Morrison, P.Z. Antas, B.A. Harrington, T.E. Lovejoy, M. Sallaberry, S.E. Senner and A. Tarak. 1987. Conservation strategy for migratory species. American Scientist, Vol. 75:19-26.

Nadasdy, P. 1999. The Politics of TEK: Power and the “Integration” of Knowledge. Arctic Anthropology, Vol. 36(1-2):1-18.

Nature Trust of British Columbia. 2008. The Brant Wildlife Festival: A Celebration of Nature. http://www.brantfestival.bc.ca/about_festival.php

Natureserve. 2008. Natureserve Explorer: An Online Encyclopedia of Life. http://www.natureserve.org/explorer/index.htm

Naveh, Z. 2005. Toward a Transdisciplinary Science of Ecological and Cultural Landscape Restoration. Restoration Ecology. 13(1): 228-234.

Naveh, Z. 1998. Ecological and Cultural Landscape Restoration and the Cultural Evolution towards a Post-Industrial Symbiosis between Human Society and Nature. Restoration Ecology, Vol. 6(2): 135-143.

Noss, R. F. 1983. A regional landscape approach to maintain diversity. Bioscience, Vol. 33:700-706.

Padoa-Schioppa, E., Baietto, M., Massa, R. and Bottoni, L. 2006. Bird communities as bioindicators: The focal species concept in agricultural landscapes. Ecological Indicators, Vol. 6: 83-93.

Page, N.A. 2003. Community and regional scale patterns of native and exotic plant species in sand beaches of Vancouver Island, British Columbia. Unpublished master of science thesis in the Institute of Resources, Environment, and Sustainability, University of British Columbia. 79 pp.

Papageorgiou, K. 2001. A combined Park Management Framework Based on Regulatory and Behavioral Strategies: Use of Visitors’ Knowledge to Assess Effectiveness. Environmental Management, Vol. 28(1): 61–73.

Parks Canada. 2008. Principles and Guidelines for Ecological Restoration. National Parks Directorate. Gatineau, Quebec.

Partners in Flight. 2006. Partners in Flight: British Columbia and Yukon. http://www.pifbcyukon.org.

Partners in Flight Science Committee. 2006. Making Connections for Bird. Conservation: Linking States, Provinces & Territories to Important Wintering and Breeding. Grounds. Partners in Flight

Partners in Flight. 2008. Tundra to Tropics: Connecting, Birds, Habitats and People. Conference Agenda and Information Booklet.

Patton, M. Q. 1990. Qualitative Evaluation and Research Methods (2nd ed.). Sage Publications, Inc., Newbury Park, CA.

Pulido, F. 2007. The Genetics and Evolution of Avian Migration. Bioscience, Vol. 57(2): 165-174.

Raincoast Education Society. 2008. Love ‘em and Leave ‘em Alone. Educational Handout Material.

Ralph, C. John; Geupel, Geoffrey R.; Pyle, Peter; Martin, Thomas E.; DeSante, David F. 1993. Handbook of field methods for monitoring landbirds. Gen. Tech. Rep. PSW-GTR-144. Albany, CA: Pacific Southwest Research Station, Forest Service, Department of Agriculture; 41 p.

Ranwell, D.S. 1972. Ecology of Salt Marshes and Sand Dunes. Chapman and Hall, London.

Rappole, J.H. 1995. Ecology of migrant birds: a neotropical perspective. Smithsonian Institution Press, Washington, D.C.

Ristock, J.L. & Pennell, J. 1996. Community Research as Empowerment: Feminist Links, Postmodern Interruptions. Oxford University Press, USA.

Robbins, C.S., Sauer, J.R. Greenberg, R.S. & Droege, S. 1989. Population Declines in North American Birds that Migrate to the Neotropics. Proceedings of the National Academy of Sciences of the United States of America, Vol. 86, No. 19. (Oct. 1, 1989), pp. 7658-7662.

Robinson, S. 1998. The Case of the Missing Songbirds. Consequences, Vol. 3: 1-15.

Rogers-Martinez, D. 1992. The Sinkyone Intertribal Park project. Restoration and Management Notes, Vol. 10:64–69.

Rome, A. and B. Romero. 1998. Enhancing Conservation Education Opportunities in Nature Reserves in Tropical Countries: A case study in Belize. The Journal of Environmental Education, Vol. 30:34 –37.

Roth, R. R. 1976. Spatial heterogeneity and birds species diversity. Ecology, Vol. 57: 773-782.

Rozen, D. 1977. Some Aspects of Life in Ancient Times. The Saanich Review Newspaper.

Ruiz-Jaen, M.C & Aide, T.M. 2005. Restoration Success: How Is It Being Measured? Restoration Ecology, Vol. 13(3): 569–577

Saanich Archives. 2008. Historic Photographs of Island View Beach.

Saanich Indian School Board. 2008. SENĆOŦEN: Language of the Saanich People. http://www.sisb.bc.ca/sencoten.html

Sallabanks, R., Christoffersen, N.D., Weatherford, W.W. & Anderson, R. 2005. Restoring high priority habitats for birds: aspen and pine in the Interior West. In: Ralph, C.J. and T.D. Rich, (eds.). Bird conservation implementation and integration in the Americas: Proceedings of the Third International Partners in Flight conference, Volume 2, March 20-24, 2002, Asilomar, California. Gen. Tech. Rpt. PSW-GTR-191. Albany, CA: U.S. Forest Service, Pacific Southwest Research Station. p. 391-396

Sauer, J.R. Pendleton, G.W. & Peterjohn, B.G. 1996. Evaluating Causes of Population Change in North American Insectivorous Songbirds. Conservation Biology, Vol. 10(2): 465-478.

Saunders, D. A., R. J. Hobbs, and C. R. Margules. 1991. Biological consequences of ecosystem fragmentation: a review. Conservation Biology, Vol. 5(1): 18-32.

Sanders, F. and Murphy, T. Migratory Shorebird Guild. South Carolina Department of Natural Resources

Schaefer, V. 2006. Science, stewardship, and spirituality: the human body as a model for ecological restoration. Restoration Ecology, Vol. 14(1):1–3.

Schmiegelow, F.K.A. & Mönkkönen, M. 2002. Habitat Loss and Fragmentation in Dynamic Landscapes: Avian Perspectives From the Boreal Forest. Ecological Applications, Vol. 12(2): 375-389.

Senos, R., Lake, F.K., Turner, N. & Martinez, D. 2006. Traditional Ecological Knowledge and Restoration Practice in Restoring the Pacific Northwest: The Art and Science of Ecological Restoration in Cascadia, D. Apostol and M. Sinclair (eds.), Society of Ecological Restoration International/Island Press. Chapter 17 Pages: 393-426.

Slovic, P. 2006. Trust, Emotion, Sex, Politics, and Science: Surveying the Risk-Assessment Battlefield. Risk Analysis, Vol. 19(4): 689-701.

Society for Ecological Restoration. 1995. Proceedings of the meeting of the indigenous peoples restoration network. Seattle.

Society for Ecological Restoration International. 2002. The SER primer on ecological restoration. Society for Ecological Restoration, Science and Policy Working Group. www.ser.org.

Sillett, S.T., Holmes, R.T. & Sherry, T.W. 2000. Impacts of a Global Climate Cycle on Population Dynamics of a Migratory Songbird. Science, Vol. 288(5473): 2040-2042.

Skagen, S.K., S. Brown, and R. Johnson. 2005. Implications of different shorebird migration strategies for habitat conservation. In: Ralph, C.J. and T.D. Rich, (eds.). Bird conservation implementation and integration in the Americas: Proceedings of the Third International Partners in Flight conference, Volume 2, March 20-24, 2002, Asilomar, California. Gen. Tech. Rpt. PSW-GTR-191. Albany, CA: U.S. Forest Service, Pacific Southwest Research Station. p. 680-683.

Skelton, T. 2001. "Cross-cultural research: issues of power, positionality and 'race'" in M. Limb and C Dwyer (eds). Qualitative Methodologies for Geographers: Issues and Debates. London. Arnold. pp. 87-100.

Society for Ecological Restoration International Science & Policy Working Group, 2004. The SER international primer on ecological restoration. http://www.ser.org.

Stutchbury, B. 2007. Silence of the Songbirds. HarperCollins Canada, Toronto

Suttles, W.. 1990. Central Coast Salish. Pages 453-474 in W. Suttles (ed). Handbook of North American Indians: Northwest coast. U. S. Government Printing Office, Washington, D. C., USA.

Tankersley, Jr., R.D. and K. Orvis. 2003. Modeling the geography of migratory pathways and stopover habitats for neotropical migratory birds. Conservation Ecology, Vol. 7(1): 7.

Tankersley, Jr., R.D. 2004. Migration of birds as an indicator of broad-scale environmental condition. Environmental Monitoring and Assessment, Vol. 94:55-67

Terborgh, J., 1989. Where Have all the Birds Gone? Princeton University Press, Princeton, New Jersey.

The Tsawout First Nation Band. 2007. Welcome to the Tsawout First Nation. http://www.tsawout.ca

Turner, C.K. 2007. The SENĆOŦEN Resultive Construction. Northwest Journal of Linguistics 1.3:1–92.

Turner, N.J., Boelscher Ignace, M. and Ignace, R. 2000. Traditional Ecological Knowledge and Wisdom of Aboriginal Peoples in British Columbia. Ecological Applications, Vol. 10(5): 1275-1287.

Turner, N.J. 2005. The Earth's Blanket: Traditional teachings for sustainable living. University of Washington Press.

Turner, N.J. 2008. "We are only a strand": Indigenous Peoples as Stewards of Bio-cultural Diversity. Resurgence Magazine, Sept/Oct, 2008.

Turner, N. J., R. Gregory, C. Brooks, L. Failing, and T. Satterfield. 2008. From invisibility to transparency: identifying the implications. Ecology and Society, Vol. 13(2): 1-14.

Turner, N.J. & Hebda, R. 2008. Unpublished manuscript from the teachings of the late Elsie Claxton of Tsawout, Violet Williams of Pauquachin, Christopher Paul of Tsartlip and David Elliott of Tsartlip, with appreciation to their families.

Twedt, D.J. 2005. An Objective Method to Determone an Area's Relative Significance for Avian Conservation. In: Ralph, C.J. and T.D. Rich, (eds.). Bird conservation implementation and integration in the Americas: Proceedings of the Third International Partners in Flight conference, Volume 2, March 20-24, 2002, Asilomar, California. Gen. Tech. Rpt. PSW-GTR-191. Albany, CA: U.S. Forest Service, Pacific Southwest Research Station. p. 71-77.

UNEP. 1992. The Convention on Biological Diversity.

Ussery, J.G. 1989. A Preliminary Assessment of the Effects of Recreational Use on the Landscape Types within Island View Beach Regional Park. A proposal submitted to the Capital Regional Parks Department.

Ward, P., Radliffe, G., Kirkby, J., Illingworth, J. & Cadrin, C. 1998. Sensitive Ecosystems Inventory: East Vancouver Island and Gulf Islands 1993 – 1997. Canadian Wildlife Service Environmental Conservation Branch.

Western Hemisphere Shorebird Reserve Network. 2008. WHSRN Sites. http://www.whsrn.org/network/sites.html

White, P.S. & Walker, J.L. 1997. Approximating Nature's Variation: Selecting and Using Reference Information in Restoration Ecology. Restoration Ecology Vol. 5: 338-349.

Willson, M.F. 1974. Avian community organization and habitat structure. Ecology, Vol. 55:1017-1029.

Watson, J., Freudenberger, D. & Paull, D. 2001. An Assessment of the Focal-Species Approach for Conserving Birds in Variegated Landscapes in Southeastern Australia. Conservation Biology, Vol. 15(5): 1364–1373.

Weidensaul, S. 1999. Living on the Wind: Across the Hemisphere with Migratory Birds. North Point Press, New York.

Wilcove, D.S. 2008. No Way Home: The Decline of the World's Great Animal Migrations. Island Press, Washington, DC.

Wood, T., Ford, S. & Donovan, M. 2006. Proposal Biodiversity and Cultural Inventory - Tsawout First Nations Lands – Cordova Bay Spit. Canadian Wildlife Service.

Wood, T. 2000. CWS - PYR Discussion Paper - Draft - December 22, 2000. The Canadian Wildlife Service.

Zavaleta, E.S., Hobbs, R.J. & Mooneya, H.A.. 2001. Viewing invasive species removal in a whole-ecosystem context. Trends in Ecology & Evolution, Vol. 16(8): 454-459.

APPENDIX A – HREB Certificate of Approval

Human Research Ethics Board
Office of Research Services
University of Victoria
Technology Enterprise Facility, Room 218
Tel (250) 472-4545 Fax (250) 721-7836
Email ethics@uvic.ca Web www.research.uvic.ca

University of Victoria

Human Research Ethics Board
Certificate of Approval

Principal Investigator	Department/School	Supervisor
Glenn Bartley **Master's Student**	**ENVI**	**Dr. Eric Higgs**

Co-Investigator(s):

Dr. Eric Higgs, University of Victoria
Dr. Val Shaefer, University of Victoria
Dr. Nancy Turner, University of Victoria
Mr. Tom Wood, Canadian Wildlife Service

Project Title: **Restoring the Coastal Dune Ecosystem at Cordova Spit and Island View Beach Park**

Protocol No.	Approval Date	Start Date	End Date
07-157	**18-Jun-07**	**18-Jun-07**	**17-Jun-10**

Certification

This certifies that the UVic Human Research Ethics Board has examined this research protocol and concludes that, in all respects, the proposed research meets appropriate standards of ethics as outlined by the University of Victoria Research Regulations Involving Human Subjects.

Dr. Richard Keeler
Associate Vice-President, Research

This Certificate of Approval is valid for the above term provided there is no change in the procedures. Extensions or minor amendments may be granted upon receipt of a "Research Status" form.

07-157 Bartley, Glenn

APPENDIX B – Interview Questions

Key Themes & Concepts:

- Cultural patterns of use and processes of recovery
- Restoration
- Collaboration / Participation
- Significance of birds
- Understanding the Tsawout history of the place to understand the ecosystems, and in turn help them achieve their interests?
- Is there a univocal voice of the Tsawout, or is it divided along particular lines?

Interview Questions:

THE SITE

- What are your earliest memories of this place? When were these?
- What did the site used to be like? How has it changed?
  - E.g. have any trees been planted? Died? Invasive species?
- How has the site traditionally been used?
  - Are there any seasonal events that occur?
  - Food gathering? Plant use? Celebration?
  - Negative uses? E.g. ATV, Fire, etc.
  - How do Tsawout people think about the dune ecosystems?

HABITAT ALTERATION

- What do you think "habitat destruction" means to the Tsawout community?
  - What Tsawout values do you think may be threatened as a result of habitat destruction?
- What would ecological restoration mean to the Tsawout community?
  - How do you think it would change the way the site is used? Valued?
  - What is embedded in the Tsawout culture that would promote restoration or conservation – what would this process look like?

BIRDS

- How do Tsawout people think about the birds in general?
  - Have you noticed any changes to the numbers of birds in the area or the timing of their arrival?
- Are there any birds that are of significance at this site? For food? Celebration? Art? In stories?
  - Has this changed at all that you can remember?

BOOK

- Would you be able to contribute to the book project I am working on? This could be a story, art, etc?

ADDITIONAL INTERVIEWS

- Is there anyone else in this community that you feel I should speak with?

APPENDIX C – HREB Letter of Informed Consent

Restoring the Coastal Dune Ecosystem at Cordova Spit and Island View Beach Park

You are being invited to participate in a study entitled Restoring the Coastal Dune Ecosystem at Cordova Spit and Island View Beach Park. The purpose of this project is to work in collaboration with Tsawout community members, the Canadian Wildlife Service and a variety of stakeholders to research and prepare a restoration plan for the study area. This will include identifying and documenting the traditional uses and values of plants, birds and the study site itself by the Tsawout community.

This research project is part of my master's degree research at the University of Victoria in the school of Environmental Studies. You may contact me at (250) 412-2904 or rgbartley@gmail.com if you have any questions about this study.

As a graduate student, I am required to conduct research as part of the requirements for a degree in Environmental Studies. This research is being conducted under the supervision of of Dr. Eric Higgs and Dr. Val Schaefer. You may contact my supervisors at ehiggs@uvic.ca (250) 721-7354 or schaefer@uvic.ca 250-472-4387.

My research has been approved by the Tsawout Director of Operations Marc Jinnouchi and the Tsawout Chief Allan Claxton.

My research is part of a larger project being conducted by an interdisciplinary group from the Canadian Wildlife Service, Municipality of Central Saanich, Tsawout community and the University of Victoria. If you have any questions about this study you may contact Tom Wood of the Canadian Wildlife service at (250)-477-1682, or by email at Tom.Wood@ec.gc.ca.

The purpose of this research project is to examine transdisciplinary ecological restoration options, including the implications of landscape-scale conservation efforts, for management of one of British Columbia's most threatened natural areas. Locally, I plan to determine the historic landscape state and species composition of the Cordova Spit area, assess how this landscape and its avian composition has changed, and provide recommendations for how the area could be restored to potentially reintroduce former species composition. Recommendations made will also recognize the unique cultural connection of the Tsawout peoples to the site. Regionally, I plan to investigate the possibilities for conservation partnerships as well as what procedures may be required for conflict resolution in developing restoration plans. In doing so I hope to explore the potential for future restoration and conservation initiatives that could lead to regional and perhaps global habitat networks.

Research of this type is important because the destruction of habitat and alteration of the migratory landscape has led to the fact that over half of the migratory species of birds in North America now show a declining population trend. In order to halt this trend it is essential that the habitat areas that remain are adequately preserved and expanded throughout the migratory habitat landscape.

You are being asked to participate in this study because you are known as a specialist in your community in knowledge relating to plants, birds, culture, language and environment. You may be asked to participate in one or more interviews of one to two hours in length at an outdoor field site in your community, at your home, or other places within your community. The number, length and location of interviews are up to you, and other family or community members may be present if you choose.

Participation in this study may cause some inconvenience to you, as the time you take to participate in interviews may infringe on time usually spent fulfilling other duties and responsibilities.

There are some potential risks to you by participating in this research. Some of your relatives or community members may not wish for you to participate in this study. To prevent or reduce this risk, you are absolutely free to decide your level of participation, and you may cease or limit participation at any time or stage of this study. You may also decline to answer particular questions as they arise, or indicate that some information you share should remain confidential at the time of your interview or

when you review transcripts or notes from your interview. you may also consult with members of your community including marc jinnouchi if you wish to do so prior to our meeting.

The possibility of physical injury in visits to a field site does exist. to minimize this risk any site visits will occur only under appropriate weather conditions. We will also be working in the field with at least three people, will inform others of our destination, expected departure and expected return time. Please advise me if you have any known allergies or medical conditions such as diabetes so that appropriate medication can be taken on the trip.

The potential benefits of your participation in this research include having your knowledge recorded, and recognition for your knowledge and its inclusion in educational and environmental projects in your community and others.

Your participation in this research must be completely voluntary. If you do decide to participate, you may withdraw at any time without any consequences or any explanation. If you do withdraw from the study your data will be used in the study analysis ONLY if you agree.

To make sure that you continue to consent to participate in this research, we will discuss your participation on each occasion that we request an interview and you will be given full opportunity to withdraw from the study, without question. If at any time you feel uncomfortable, ill at ease, or if medical conditions are impacted during the proceedings, we will take immediate steps to remedy the situation, including stopping the interview.

Your anonymity will be protected if you request it. If you request anonymity, your confidentiality and the confidentiality of the data will be protected by identifying you only by a fictitious name, or by coded initials, as you wish. As well, any identifying information will be removed from the outcomes of the study. This data may also be included in ongoing and future ecological restoration, ethnobotanical and ethnoecological studies, with your permission. Data from this study will be destroyed ONLY if you request it. All data including interview transcripts will be archived in the personal files of Glenn Bartley (researcher) and at the Tsawout administration building.

It is anticipated that the results of this study will be shared with others, in one or more of the following ways: directly with you; in published articles; in presentations to the Tsawout community, or at scholarly meetings; and in my master's thesis project. The data will be maintained in perpetuity.

In addition to being able to contact the researcher and research supervisor at the above phone numbers, you may verify the ethical approval of this study, or raise any concerns you might have, by contacting the Associate Vice-President, Research at the University of Victoria (250-472-4545).

Your signature below indicates that you understand the above conditions of participation in this study and that you have had the opportunity to have your questions answered by the researchers.

1. I ❑ do ❑ do not give permission for my contributions to this research project to be acknowledged.

_____	_____	_____
Name of Participant	*Signature*	*Date*

A copy of this consent will be left with you, and a copy will be taken by the researcher.

APPENDIX D – Complete Interview Transcripts

Tsawout Interviews - Transcripts from interviews – Nov 28, 2007 to Jan 18, 2008

- Lou Claxton
- Belinda Claxton & Ray Sam
- Ray Sam
- Rhonda Underwood
- Allan Claxton
- Sam Edzel
- Daphne Harry
- Earl Claxton Jr.
- John Edzel
- Vernon "Buster" Harry
- Gwen Underwood

THE SITE

- **What are your earliest memories of this place? When were these? How has it changed?**

Lou Claxton - Nov 28, 2007

- The site has not changed much – Concerns about the site being washed away – wood being removed from site for firewood.
- E.g. Sidney spit – part now under water at high tide – did not used to be like that.

Belinda Claxton & Ray Sam - Nov 28, 2007

- Ray – As a youngster it was a really private, quiet place – now there are always people out there walking dogs – it used to be so quiet.
- Ray – we used to go fishing a lot for Coho and that has faded a lot
- Ray - Clams used to be there and now they are not – they are contaminated? They are green now and not a very tasty clam. We used to go out there – even at red tide – because the water is so swift there. But now – with the sewer outflows – its not good.
- Ray – One of these days the area is just going to wash away
- Belinda – it used to be so wide – its getting smaller and smaller
- Ray – gradual change – your late cousin Vic used to plant trees out there – the spray from the salt water has killed many of them
- Ray – when I go out there my eyes see that it's a dumping ground – we have to keep the area cleaner – e.g. for the races this summer.
- Ray - Most of the people who use the area are non-natives
- Ray - To stop people from dumping – working together to keep it clean – and a sign

Rhonda Underwood - Nov 28, 2007

- I always spent time down there as a child, burnings, bathing – more recently for initiation into the big house – I know that there is a real importance for a number of reasons seasonally.
- The water used to be really clear and the shore was clean – in the last few years you really see the erosion – you can tell that the water is unhealthy – you never used to see that unhealthy color – I think it has affected a lot of the ocean wildlife – e.g. crabs – and they used to be plentiful – now you don't see them or people harvesting them (30 yrs ago).

Allan Claxton - Nov 28, 2007

- It hasn't changed a whole lot – but there are more 4x4 trails now – and they go all over the place – its our own members as well as non-members. With the swift tides there is a loss of sand – its getting smaller. We used to be able to only drive about ¾ out.

Sam Edzel - Nov 28, 2007

- Summer place, canoe races, fishing
- More roads now – People should just walk out – they don't need to drive out – this could lead to less usership but more respect for the site.
- Our generation lost a lot and missed out on a lot of teachings
- Any initiatives need to be community driven

Earl Claxton Jr. – Jan 18, 2008

- Have seen lots of changes
- Land was removed from the reserve in 1935 when they put the CIL factory at James Isl (military access). The land was to be returned to the band – but when the time came – this was overlooked and the land was sold – the land should never have been removed from the reserve site – it should be returned – its still a part of the reserve. Central Saanich should have no say on that land.
- Re. Plants – Our people always went out there to collect specific medicines – they have become less and less available due to the degradation occurring from ATV use. "Its destroying the area for no reason at all. Our people have been yanked away from our culture and many of us are trying to get it back. One of the ways is to learn about the medicines and return them to our people"
- Earl is trying to grow the traditional plants in a greenhouse
- It would be necessary to plant some of the plants out there at the spit and then keep people off of the area. "It's too precious of an area to let go. If we can't stand up and protect it…."

- **How has the site traditionally been used? Food gathering, Plant use, Celebration? Seasonal events?**

Belinda Claxton & Ray Sam - Nov 28, 2007

- Ray – We really honored that area – we have some 30 people buried out there buried from Pender – They are our gran-elders – what got them was the small pox – they left the gulf islands to come and get registered – but they never returned
- Belinda – with my mom we always used the beach for pit cooking – my mom would prepare all her clams and get them all ready for the winter to dry the food for winter and smoke it. It was an active area for pit cooking. Then it got lost not too long ago after. I would like to bring that back.
- Dan – each part of the spit used to have a different species of clams – I remember it quite well because I used to have to carry them home.
- Belinda – the onions were used for flavoring, the kelp used in pit cooking, the guk-min used for colds, medicinal purposes, respiratory illness, pneumonia,

Rhonda Underwood - Nov 28, 2007

- Plants used for medicinal purposes, a number of flowers and green plants could be used

Allan Claxton - Nov 28, 2007

- Lots of the knowledge is difficult to access – this is because it was held by only a few certain people – and certain families had certain roles.

Sam Edzel - Nov 28, 2007

- Harvesting the guk-min, collecting sea asparagus, duck hunting in the winter, the long house is down there.
- As well as cultural uses – baths etc.

John Edzel – Jan 18, 2008

- Fishing, duck hunting
- Used to be hundreds of surf scoters around.
- Scenic beauty

Gwen Underwood – Jan 18, 2008

- Special place in the Claxton family – clam digging and family gatherings at the site. Lately it has not been – its been used more for partying
- Elders used the area for guk-min
- The damage being done really affects the elders – but also everyone else
- Damage being done by first nations people as well – from the other side of the peninsula
- To the community – the end of the spit was taken away from Tsawout – without consent

- The area is being disrespected and trespassers coming from IVB – few people realize really how precious the area is
- There is still hunting occurring and there is a fear that people may take things into their own hands using firearms
- Dogs and even organized dog walkers use and abuse the area
- A lot of families are not going down there as much because the area is used more as a place to drink. This really hurts the families and the elders.
- We need to have a designated parking area – this should be at the area where the canoe races are normally held and no vehicles should be allowed past this area. Perhaps open up other areas for special events.
- The 2008 games are going to be a major problem – could use Sidney spit or McDonald Park near Shoal Harbor.
- Maybe need to register the canoes in order to gauge the impact?
- Need to get up signs and fencing this spring
- Need to spend time educating the community – starting with the committee – so that any signs, fences, etc. will be accepted. Get volunteers from committee to help with enforcement and implementation.
- In favor of permits for people wanting to visit the spit.
- Plan to have a part time bylaw enforcement officer in the next year – could help with enforcement.
- Tsawout working to official land use plan including mapping sensitive areas and environmental management plan. (12-24mo)
- To get the message out there – start with the land committee, then hold a specific meeting about this issue and the entire project, get an article in the Sidney review or chek TV / SHAW. Get the project more in the public eye.
- The more people we get on our side the better
- We need to make sure to protect people when there are hunters down there. With the new trailer park this could be more of an issue. The main hunting is in the winter when the lagoon freezes (Dan).
- People have also been illegally dumping down at the spit and in the wetland.
- Glenn – your role is to facilitate what the community wants and use your expertise to make recommendations.

- **Negative uses? E.g. ATV, Fire, etc.**

Lou Claxton - Nov 28, 2007
- Fires – “people absolutely destroy the place” – not our band members
- 4x4 use – people are complaining about this behavior – Lou stated that it was not Tsawout band members.
- Need to draw up some laws to stop this behavior – a gate didn’t work – signage might help – “images of the birds to show the community would show the people here something and they would finally realize how important it is t and they would help to keep people out of it”

Rhonda Underwood - Nov 28, 2007
- Since I’ve moved back home in 1998 I notice that the care for the water and the land has changed – there is lots of garbage all over the place – when people are using an area the disposal of carcasses has changed and is now not done in a respectful way – there is not enough care and attention – almost a lazy mentality – its not everyone.
- Dan – today there is a lack or respect and a lot of traditional values have been lost – we don’t pass on those traditional values.
- Wasteful practices – a lot of it has to do with how we prepared food in our homes – the whole fast food mentality – no one ever sits down anymore and has gatherings

Allan Claxton - Nov 28, 2007
- Over the years the young people have been driving out and drinking – then nothing is really important – fires are set and left going. “Its all about respect – we are the protecters of the land – its so easy to say that but to actually live it and do it is a different thing”
- To improve this we need to delineate certain areas that are accessible and are roads and let people know what is acceptable. There should be one road that extends to the ¾ area.

Daphne – Jan 18, 2008
- ATV use and truck flipping over
- Re. harvesting gukMin – all picked over and damaged by ATV use
- Sea asparagus also used to be harvested
- We cant find the medicines because they are all torn up – it is very hard to find them now – people are taking more than they are supposed to – people are coming in from other communities and over harvesting
- We don't know if the seafood down there is good or bad anymore – and there are a lot fewer clams.

John Edzel – Jan 18, 2008
- 4x4ing – in the main area where Guk-min is harvested
- Maybe need to define roads that are usable and de-commissioning others.
- People have been driving out there for years
- In favor of natural looking fencing to fence off sensitive areas
- Some might be upset about this – but would get over it in time
- Would be difficult to restrict access the other side of the treatment plant – it is privately owned land and they want to keep access open.
- Possibility of putting a permanent structure out at the canoe race area to keep people in one area and restrict access out further.
- Cultural uses will be coming back so it is important to have an area to use for cultural purposes. Can use these areas to put up signage about the area to the local community – info shelters on the side.

Vernon "Buster" Harvy – Jan 18, 2008
- ATV use
- Many of the plants that used to be found out there are harder to find or may be gone

VALUES & THE FUTURE

- **What do you think are the most important elements of this place to the Tsawout community?**

Lou Claxton - Nov 28, 2007
- Canoe races, seafood celebration
- Left for Tsawout people and Tsawout people only
- "Just leave it the way it is, undamaged, that's what we want to see"

Belinda Claxton & Ray Sam - Nov 28, 2007
- Ray – now used for sports and celebration – but I still honor my gran-elders that are buried out there.

Rhonda Underwood - Nov 28, 2007
- Re. the need to restore the area to its original condition and its natural state – ecological integrity – this also involves the responsibility and caring of the local community. "We need to take care of it like it's a living part of yourself because the land and the water and everything around there has given us so much".
- The key is respect for the land – re. the need for signs – letting people know that restoration is occurring – education – "respect this area because…"
- Need to share knowledge, history, traditions with young people – visual hands on and oral learning is key – to bring the respect back

Allan Claxton - Nov 28, 2007
- We need to educate all of our people about what is out there and what the traditional uses were and then let this information / knowledge grow. Education is the starting point.

Sam Edzel - Nov 28, 2007
- "Being ours" - it doesn't feel this way sometimes anymore – and we don't have control
- The Indian consumption plant and as a place of spirituality, burnings,
- "We are the stewards of the land but we have to own that and be responsible and accountable to it too. And if there is no knowledge of that then you are not going to have many people that are going to take care of it"

Daphne – Jan 18, 2008
- Being out there is sacred – "there are always ancestors around us when we are down there to protect us"
- "Seeing the eagles is medicine for everyone"
- "just to go down there and meditate, just to be down there by the water, listening to the ocean, listening to the birds – that's a healing process for me – to be able to just sit there and be myself and not do anything, or think about everything and just relax. That's a big healing process for anybody to be able to do. You cant do that when there are cars and motorbikes and everything ripping up the point and the beach too".

Earl Claxton Jr. – Jan 18, 2008

- Our people practice their treaty rights out there – hunting ducks, casting for salmon, digging clams, raking crabs. The clams are now polluted because of the treatment plant. This is an infringement on our rights. I don't eat those anymore.
- Elders used to say - "When the tide is out the table is set"

Vernon "Buster" Harvy – Jan 18, 2008
- Waterfowl – widgeons, mallards, pintails, sawbills – need to protect the lagoon
- At one point that place was one of our main sources of food
- The spit is shrinking – due to the removal of wood and currents

- **In a perfect world – What would this place look like in 50 years?**

Lou Claxton - Nov 28, 2007
- We'd like to see it stay the same – it hasn't changed much.

Belinda Claxton & Ray Sam - Nov 28, 2007
- Ray – we want to keep it the same way as when we were young people – we all have that reason to protect it and to leave it as is
- Belinda – there was plenty of shellfish and salmon – and now it is much harder to catch them
- Ray – its still there – but we might be getting lazy
- Ray – we need to leave it like how it was (Ray is 89yrs old) and wants to see it how he remembers it.

Rhonda Underwood - Nov 28, 2007
- The need to restore the place – to see it as a beautiful, sacred, respected place where families could go, kids and visitors and learn about the site. We could hold classes or cultural teachings could occur. There are opportunities to partner with UVic, etc.

Sam Edzel - Nov 28, 2007
- It would still be healthy to harvest any food from the site, it would also be abundant, al the natural processes would be occurring for the kids to see.
- I would want my kids to be able to do the same things I can do today – to be able to live off of the land and get our food from our backyard.
- "Being able to take care of ourselves again and having that respect for each other"

Daphne – Jan 18, 2008
- All the plants and wildlife would be back down there – to have our traditional plants back is the main thing and to have them be undamaged

HABITAT ALTERATION / ECOLOGICAL RESTORATION

- **Do you think "habitat destruction" has occurred? (explain)**

Lou Claxton - Nov 28, 2007
- It's getting hard to find our medicines – "if it gets damaged and we cant find the stuff we used to use – I don't know what would happen? I don't know where we'd go to get it? We have to leave it alone – We have to keep the outsiders out. We have to keep it going. Keep it living."

Belinda Claxton & Ray Sam - Nov 28, 2007
- Belinda – a lot of it is because people do not respect the land or the plants or animals – e.g. people just pulled the guk-min up by the roots – we should have signs up telling people how to harvest the guk min.

Rhonda Underwood - Nov 28, 2007

- It takes away from the food and the natural process of wildlife, it doesn't look good and we know that it is wrong.
- Re. a beach cleanup and education day – having staff and community involved.

- **What Tsawout values do you think may be threatened as a result of habitat destruction?**

Lou Claxton - Nov 28, 2007
- Used to dig clams and go out fishing – but we cant do that – people were using drugs out there – not our band members – I wouldn't bring kids out there.

Allan Claxton - Nov 28, 2007
- We may have lost some already – that's why we need education.

Sam Edzel - Nov 28, 2007
- Financially – developing a community in a certain way (for financial stability) but is not necessarily in the best interest of all members of the community.

- **If ecological restoration were to occur:**
  - **How do you think it would change the way the site is used? Valued?**
  - **What is embedded in the Tsawout culture that would promote restoration or conservation – what would this process look like?**
  - **Are there any approaches to conservation or restoration that you think would be most appropriate for this place?**
  - **Who do you think should be involved in the process? (local, youth, scientists, etc?)**

Lou Claxton - Nov 28, 2007
- If restoration was done in the proper manner – I think it would work – planting stuff that might be fading away would be a good idea – it has to be done right – we have to realize that it is used for the canoe races which are part of our culture – it its treated right then it works – we have to make sure people still have access to the site.
- Restricting access past the canoe race area would probably be respected if you let people know why – to protect the medicines
- "If people had input – the respect would be there" – "if you go out and just say "don't step on that" then the opposite would happen".
- It would be good to get the youth involved
- We can also include input from people like yourselves – "when they know about it – then they will respect that area there"

Belinda Claxton & Ray Sam - Nov 28, 2007
- Ray – people would respect this
- Belinda – it would be good to plant the Guk-min – perhaps work with Earl Jr.
- Ray – work with Dan and the fisheries department, young people – teach them, But you have to keep the sporting area open
- Belinda – re. traditional value systems – Xals the creator created us and taught us to respect the land and the water and the animals so that it will be good for us all – "when you talk about our SENĆOŦEN language its built in it (conservation) because SENĆOŦEN is who we are, its our identity, SENĆOŦEN is how we govern ourselves and when you speak of having values and traditions its in there, its all in there – its all built in it" – To saanich people that's how we made sure that there was plenty of clams an ducks – we didn't over harvest – that's how everybody used to live. Everything is in our language – its all built in.
- Belinda – re. deer – "you have to respect the animals …..because they were once people at one time our creator said"
- Belinda – re. how many people speak SENĆOŦEN – not too many fluent – but we are trying to get more people to get the curriculum into the SENĆOŦEN tribal school so that our young kids learn how to speak our language – but when they go home the parents don't speak the language – and we cant use the internet because not all people have computers – but that's what governs us – its very important.

Rhonda Underwood - Nov 28, 2007
- People would be grateful for restoration and education initiatives.

- Sacredly people belong to different groups within the community – if they understand what is being done then it can all be done in a respectful way – they need to be involved – they want to be involved and to know. Community driven and very visual – show people the possibilities and where we would like to be in the future – get people excited about what the future could be.

Allan Claxton - Nov 28, 2007

- The first step is to educate people and get people to respect what we have out there – just saying not to do something will not work.
- Community members and people with the expertise as well as youth – this should be a hands on approach.

Sam Edzel - Nov 28, 2007

- All families have different things that they contribute to the community – so facilitating restoration might need to include key people from a number of families.

Daphne – Jan 18, 2008

- Elders would give the information and knowledge
- Youth would implement the restoration - need to get the youth chief involved
- The SENĆOŦEN group can help to label the plants and help to share the traditional SENĆOŦEN names of the plants
- Re. restricting access – it's a seasonal thing – need access at certain times for canoe races – but keep people on the roads

Earl Claxton Jr. – Jan 18, 2008

- Signage – the area should be closed – access only to those that know what they are doing and respect the area
- I am against public access.
- There should be no roadway at all out there – no reason why you can't walk out.
- In favor of decommissioning roads and signage.
- Excellent idea to get the youth involved with invasive removal and plantings. Very enthusiastic about this.
- Earl can help with the technique of broom removal – cut it off as low as possible.
- The younger people have had a disconnect with nature – they are playing video games and watching TV all day – we have to force them outside. We need to get them outside more and show them these things and teach them about the significance of the plants and their SENĆOŦEN names.
- Young people want to get involved but are sometimes not sure of who to see or how to get involved.

John Edzel – Jan 18, 2008

- Get involved with the summer programs and students engaged – do tours of the area and discuss the values. Ask them questions and see how they feel about it and what they want for conservation. They have really good ideas but are just never asked.

Vernon "Buster" Harvy – Jan 18, 2008

- Its hard to find a happy compromise on the reserve – there are many viewpoints on the reserve
- Signage
- No Trespassing – but need to decide who this applies to? Other bands?
- Signage needs to come first – especially to stop people coming from IVB
- A gate is needed
- Message for IVB sign – need to be clear re. access rights and what is a violation
- Need by-laws under land code to be able to prosecute trespassers.
- Nude sunbathers are a problem – need to be stopped – this is inappropriate and deters families from using the area.
- If people are going to be on the reserve they need to sign in or register.
- Douglas treaty sign at IVB – travel at own risk.

BIRDS

- **How do Tsawout people think about the birds in general?**

Lou Claxton - Nov 28, 2007
- There is more respect for birds now than ever – Owls are very respected.
- It would be very interesting to see the pictures of the birds

Belinda Claxton & Ray Sam - Nov 28, 2007
- Snipe, killdeer, eagle, raven, kingfisher
- Ray – They are all important
- Belinda – there used to be so many but now I don't see that many
- Ray – It's the raccoons and the crows – there didn't used to be that many!
- Ray – "when the ravens come around they say its going to be a cold winter".

Rhonda Underwood - Nov 28, 2007
- Eagles, the numbers of birds have decreased

Allan Claxton - Nov 28, 2007
- There are more scavengers – seagulls and crows – and not as many other species (e.g. kingfisher, black duck, mergansers)

- **Are there any birds that are of significance at this site? For food? Celebration? Art? In stories?**

Allan Claxton - Nov 28, 2007
- Eagle, heron,

Sam Edzel - Nov 28, 2007
- Owls are very sacred, eagles, seagulls (eggs), ravens, osprey, ducks (black ducks)

Daphne – Jan 18, 2008
- Ducks, eagles (spiritual) – we would be lost without seeing the eagles – it gives me strength to se them
- Hunting ducks – take what you need not more

John Edzel – Jan 18, 2008
- The osprey is nice to have back. They were gone for a long time and now they are back nesting
- The eagles are also coming back
- The heron
- I like to show the boys the different kinds of birds that are down there.

CRD Interview - Transcript from interview with Jennifer Psyllakis – Nov 14, 2007

VALUES

- **Why is this project important – CRD / CWS perspective?**

o #1 mandate is protection of natural environment and native species and that they are protected.
o #2 mandate to ensure recreational opportunities for park visitors – aesthetically pleasing, natural enjoyment of environment
o a difficult balance between these two mandates – difficult to measure and find a balance
o for this area – CRD considers it an area that requires restoration – environment has been degraded to a state that is not acceptable

- **What are the most valuable elements of this project from the CWS/CRD perspective?**

o Visitors come to parks for different reasons – In this case all project participants have a similar goal to conserve ecosystems - Same underlying objective of conservation, preservation and protection.
o Conservation should be the guiding value to direct any other activities within the park – in reality there is a long history of restoration attempts that were supposed to have occurred but have been delayed – for lots of different reasons including funding.
o Public will have an influence if decisions are not what they would expect – are not in line with their values.

- **What are the goals and objectives from the CWS/CRD perspective?**

- **In a perfect world – What would this place look like in 50 years?**

o An improvement – invasive species under control or eradicated, self sustaining populations of all of the rare and endangered species that currently inhabit the area, as a place that people can go and connect with nature while minimizing their footprint on the area, a functioning dune ecosystem with natural processes occurring in an unobstructed way – e.g. the burm being removed.

THE PROJECT / SITE

- **What is the CRD / CWS history of working with First Nations communities?**

o We have worked with FN in the past, but currently are much more active in partnering and discussing projects especially when it comes to park aquisition and zoning within new Parks. Otherwise, we partner with projects that have mutual benefits for all parties. If you need more info, Jeff Ward would be best to speak on the history of working with FN as he has been here the longest.

- **Regarding an Ethnoecological approach to conservation – Do you think it is necessary?**

o It is important – a part of the cultural history of the area and any efforts to protect the culture are as important as the ecosystems – we often forget about the long history of human habitation on the coast and have underestimated the roles that these communities have played.
o How to best incorporate TEK – knowledge of culturally significant plants, stories of migration, recognize interconnection between Tsawout and the land. Interconnections are linked together with ecologically and culturally significant species in the conservation plan and may be opportunities for interpretive / educational materials.

- **At this point – what actions / recommendations / re. conservation, management, restoration do you think would be appropriate?**

o Invasive species mgmt action plan, protection of known rare plants from current threats, access mgmt or visitor mgmt to be partnered with education so that people respect new boundaries.

- These could lead to “quick wins” so that the public can see results and start to work towards changed behaviors (use – trampling, off trail, dogs under control and on leash to minimize wildlife disturbance).

BIRDS

- **Precedent of migratory bird conservation?**

COLLABORATION

- **Existing partnerships that could help to achieve the project goals?**
- VNHS – Group of interested and motivated individuals with similar values and a wealth of knowledge and historical information.
- **What opportunities for collaboration do you think exist?**
- Protected areas research network – national network – lead at UNBC – Learning from this other group.

CWS Interview - Transcript from interview with Tom Wood – Nov 14, 2007

VALUES

- **Why is this project important – CRD / CWS perspective?**

o The value of the biodiversity – the conservation of the landform and maintaining the rare biodiversity elements that are part of that ecosystem and working towards ensuring the integrity of the ecosystem, minimizing further impacts and maintaining the integrity of the area is restored.
o Conservation on biodiversity

- **What are the goals and objectives from the CWS/CRD perspective?**

o Partnership of various jurisdictions – particularly First Nations
o Building partnerships and making them work to achieve conservation objectives

- **In a perfect world – What would this place look like in 50 years?**

o To restore that natural ecosystem with as may of the natural elements as possible, mitigate the damage already done and protect against further impacts that degrade it – to see the natural ecosystem restored to the fullest extent possible – including the cultural values for the First Nations. The Tsawout Nation is an integral part of that landform – an essential part of a functioning ecosystem Cultural and Biological must be considered when evaluating what a restored ecosystem might look like.

THE PROJECT / SITE

- **What is the CRD / CWS history of working with First Nations communities?**

o Mandate to assist First Nations in conservation objectives – especially with species at risk.
o CWS has been around in one form or another since 1916, when the Migratory Birds Convention was signed with the US. Its modern form probably emerged after the second war. I've worked with a number of old boys who were hired in the late forties-early fifties, as demobbed service men who went back to university and began working for the Dominion Wildlife Service. Farley Mowatt was a summer student for one of these for one summer. Never Cry Wolf is loosely based on his experience in northern Saskatchewan and the NWT. CWS used to be THE wildlife authority in the north, with a lot of early work done on caribou, muskoxen, bears, as well as migratory birds.
o CWS has played a prominent part in negotiating northern land claim agreements, starting with James Bay, in which ducks and geese are important food species. The Branch continues to be significant crafters of land claims policies and agreements both the North, and through the modern treaty processes in BC and Atlantic.
o The official recognition of aboriginal and treaty rights in the Constitution in 1982, followed by the Supreme Court cases in Sparrow, Delgamuukw and others, caused a major shift in Canada's policy on aboriginal rights, and the relationship with aboriginal people. As I noted, the MBC was finally amended in 1996, to be consistent with aboriginal sustenance practices.
o SARA brought a whole new approach to working with aboriginal people. Attached is an analysis which I prepared a few years ago. It's pretty dated, but I think it pretty much summarizes the direction CWS in BC has been trying to take.
o We're into the business of building relationships with FNs, and seriously engaging them on recovery initiatives.

- **Regarding an Ethnoecological approach to conservation – Why so important?**

o First Nations traditional management of landscapes – an essential part of many ecosystems.
o Scientists too often have a narrow view of what a restored landscape should look like.
o Understanding the cultural aspects of a landscape is vital.
o Aboriginal people have a special connection to the land, their sense of place is different and they need to be involved in management of the territories that they have lived on for centuries – we need to take extra efforts to make sure that they can take part in management of ecosystems that are on their land.

- **At this point – what actions / recommendations / re. conservation, management, restoration do you think would be appropriate?**

o Appropriate access control / management, public education of the values of the area, outreach to the larger community and into the first nation community and what might be the appropriate management actions to take.
o E.g. Need to do so before Indigenous Games

BIRDS

- **Precedent of migratory bird conservation?**

o CWS around since 1916 when MBC was signed – most of the years involved with management of harvestable species. No working towards broad conservation of migratory habitats that have significance to migratory birds.
o A key priority to CWS – MBCA and SARA – give CWS additional responsibility to make sure that species do not continue to go extinct.
o CWS is going to have a hard time living up to the goals set out in SARA.

COLLABORATION

- **Existing partnerships that could help to achieve the project goals?**

o CWS achieves virtually all its conservation projects through partnerships – e.g. NAWMP, Ducks Unlimited, NABCI, other non-waterfowl focused initiatives – "we couldn't accomplish anything except through partnerships".
o Partnerships with Provinces and Territories
o MBCA amended to respect First Nations hunting rights
o We depend upon those partnerships with NGO's e.g. Nature Conservancy of Canada to implement conservation programs, secure habitat, etc. for migratory birds.

- **What opportunities for collaboration do you think exist?**

o The main partners that we need are already committed – we just need to follow through now.

- **Additional opportunities**

o Additional partners could include - Kevin Fort, Jan Kirkby (ecosystems specialist, partnerships between various levels of government).

THREATS TO TIXEN

Coastal dune ecosystems are very fragile places. These areas are easily destroyed if not treated with respect. Unfortunately, this special place is threatened by a number of human influences. One of the largest threats is damage resulting from 4x4's, all-terrain vehicles and human traffic. Dogs harassing migratory birds, and messing all over the medicinal plants and clam beds also has a negative impact upon the spit.

Another factor which threatens the ecological integrity of the Cordova Spit and Island View Beach area is the presence of invasive plants such as Scotch Broom. Broom has become a dominant plant species at Island View Beach and threatens to become equally dominant at the spit as well.

RESPECTING THE LAND

Thank you for joining us to celebrate this special place and work towards healing some of the damage that has been done. By working together and learning about the land we can conserve this ecosystem for generations to come. As John Elliot Sr. wisely said:

"We must all learn to follow the ways of our ancestors. If we bring back a deep respect for nature we can be an example to everyone and prevent our beautiful land from being destroyed".

For more information please contact Ken or Gwen at the Land's office (250)652-9101.

TIXEN

EARTH DAY CELEBRATION

April 22, 2008

TSAWOUT FIRST NATION

TIXEN (the Cordova Spit) has been a very special place to our people for many generations. It is a place where many of our families have used for clam digging, fishing, water sports, family gatherings, duck hunting, and medicinal plant gathering.

TIXEN also acts as a home to a variety of rare plant and animal species – many of which are at risk in British Columbia.

This type of Sand Dune ecosystem is very rare. Over 75% of all dune ecosystems remaining on eastern Vancouver Island can be found right here at TIXEN and along Island View Beach.

Thank you for joining us today to help protect this special place.

PLANTS OF TIXEN

TIXEN is home to a number of very rare plants. Many of these species can be found in only a few places on Vancouver Island. For example the yellow sand verbena is a plant that is found only in this type of sand dune ecosystem.

Some of the plants found at TIXEN have been used for generations as food and in our traditional medicines. The Guk-min plant is used for treating respiratory problems, used in teas and for spiritual and cleansing purposes.

ANIMALS OF TIXEN

Many birds use this ecosystem as a year round home or as a place to stop and rest during migration. Many species of shorebirds stop here during migration including Black-bellied Plovers, Western Sandpipers and Dunlin (seen below). During the months of April and May thousands of Brant geese depend upon the dune systems and shoreline for feeding and resting on their long journey north to their breeding grounds.

Our Elders used to say "when the tide is out – the table is set". This is because we used to harvest much of what we ate from the ocean. The swift waters at the end of the spit were a good place to catch salmon and the beaches of TIXEN were once a great place to harvest clams and crabs.

APPENDIX F – Times Columnist Newspaper: Earth Day Article

TIMES COLONIST

THE CAPITAL

Cordova Spit gets Earth Day cleanup

JUDITH LAVOIE
Times Colonist

Precious healing plants and unique eco-systems are being chewed up by ATVs and motorbikes, tromped and messed on by dogs and horses and buried under piles of garbage on Tsawout territory adjacent to Island View Beach.

But, as part of Earth Day celebrations, young people from Lau,Welnew Tribal School, elders, University of Victoria students and Capital Regional District staff joined yesterday at Cordova Spit — called Tixen by First Nations — to give the expanse of sand, scrub and wetland a cleanup.

Piles of broom were pulled yesterday and the mounds of garbage carted away included tires, Styrofoam, computers and endless beer cans.

Signs have gone up warning people to stay off the fragile habitats and, in the near future, the spit area will be fenced off, along with old burial grounds.

A parking lot and a dog and horse ban are also in the works.

"People can take their dogs to Bazan Bay. It's not good when they mess over our medicinal plants," said Gwen Underwood.

It's a matter of education, both for First Nations and non-aboriginal people who use the area, said Belinda Claxton, whose knowledge of medicinal plants was passed down from her mother.

"It is so sad we are trampling all over it. People are doing wheelies and destroying the native plants out here," said Claxton, explaining that the area should be seen as a free medicine cabinet.

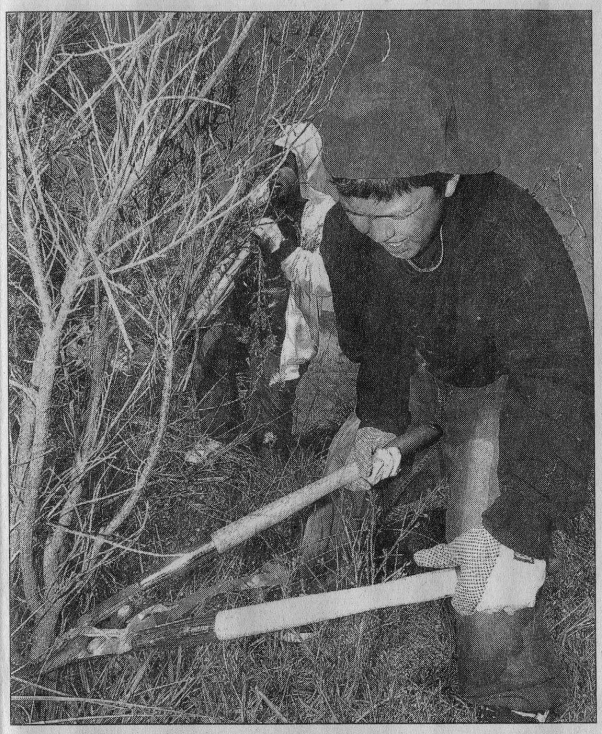
"This is plantain — bed of the frog — you put it on open wounds and sores," she said, pointing to the new green leaves poking through the sandy soil.

The kexmin — Indian celery — is used as a tea for colds, sore throats and as an air freshener, said Anne Jimmy, shaking the seeds loose.

It's good to learn the traditions, said 13-year-old Cheyenne Julien. "Some people just don't get taught these things."

Veronica Adams, 14, was struck by the toxins and pollution in the ocean, an area formerly used to harvest clams and crabs, while Caroline Underwood, 13, was interested in the insects.

"There are black widow spiders, but they only bite people when you start poking them or something," she said.



ADRIAN LAM

Eugene Baker chops Scotch broom at Cordova Spit yesterday.

Glenn Bartley, a UVic graduate student, has photographed plants and birds on the spit and wants to see more protection.

"This is a coastal sand dune eco-system and that's extremely rare on Vancouver Island," he said.

More than 75 per cent of sand dune eco-systems on eastern Vancouver Island are found on the spit and at Island View Beach, he said.

Many of the plants, animals and 120 species of birds which use the area are endangered or threatened, Bartley said.

"One of the really rare plants is the sand verbena — a listed species — and the sand verbena moth only feeds on this plant," he said.

One of the dog problems is they chase migrating birds which use the spit as a resting and feeding ground, Bartley said.

jlavoie@tc.canwest.com

APPENDIX G – Complete Results of Avian Inventory

Spring Inventory

Summary Information

- 66 species observed
- 16 site visits (11 @ Spit / 5 @ IVB)
- April 16, 2007 – June 5, 2007

Avian Group	Species Name	Frequency	Date Range	Relative Abundance	Most common Habitat Area	Notes / Behaviour
Ducks & Geese	American Wigeon	1/11 Spit -0/5 IVB	April 22	Common winter resident	Lagoon	In lagoon at low tide
	Canada Goose	4/11 Spit - 0/5 IVB	April 16 – May 2	Common	On spit near lagoon	Nesting at spit in late April
	Brant	3/11 Spit - 3/5 IVB	April 16 – May 3	Common migrant in April and Early May	Feeding on eelgrass along shoreline at IVB Flying over to James Isl. or Sidney Spit	Often observed being flushed by dogs and dogwalkers
	Bufflehead	8/11 Spit - 0/5 IVB	April 16 – May 11	Common winter resident	Open ocean and lagoon	Large numbers seen at times (30+)
	Hooded Merganser	3/11 Spit - 0/5 IVB	April 16 – May 2	Common winter resident	Open ocean and lagoon	
	Common Merganser	6/11 Spit - 4/5 IVB	April 16 – May 11	Common	Open ocean	
	Northern Pintail	6/11 Spit - 0/5 IVB	April 16 – May 6	Common	Lagoon	
	Mallard	9/11 Spit - 3/5 IVB	April 16 – May 17	Common	Lagoon, wetland	Nest found at spit – May 6
	Surf Scoter	2/11 Spit - 0/5 IVB	April 22 - 23	Winter resident	Open ocean	
	Lesser Scaup	0/11 Spit - 1/5 IVB	April 26	Winter resident	Open ocean	
	Blue-winged Teal	1/11 Spit - 0/5 IVB	May 17	Spring migrant	Lagoon	
Shorebirds	Black-bellied Plover	3/11 Spit - 0/5 IVB	April 16 – May 11	Winter resident and spring migrant	Lagoon	
	Killdeer	2/11 Spit - 1/5 IVB	April 16 – May 14	Spring and summer resident	Sparsely vegetated areas of spit and dunes	Likely at least one pair nesting at spit
	Greater Yellowlegs	5/11 Spit - 0/5 IVB	April 18 – May 11	Common	Lagoon or along shoreline	
	Whimbrel	2/11 Spit - 0/5 IVB	April 22 – May 17	Spring migrant	Shoreline	
	Black Oystercatcher	1/11 Spit - 5/5 IVB	April 26 – June 5	Year round resident	Shoreline	
	Wilson's Snipe	0/11 Spit - 1/5 IVB	April 26	Uncommon	Wetland area	
	Western Sandpiper	2/11 Spit - 1/5 IVB	April 26 – May 17	Spring migrant	Lagoon at low tide, shoreline	Observed being flushed by dogs and dogwalkers
	Dunlin	2/11 Spit - 1/5 IVB	April 26 – May 17	Spring migrant	Lagoon at low tide, shoreline	Observed being flushed by dogs and dogwalkers
	Long-billed Curlew	1/11 Spit - 0/5 IVB	May 2	Very rare spring migrant	Lagoon	
	Short-billed Dowitcher	1/11 Spit - 0/5 IVB	May 11	Spring migrant	Lagoon	
	Long-billed Dowitcher	1/11 Spit - 0/5 IVB	May 11	Spring migrant	Lagoon	
Raptors	Bald Eagle	3/11 Spit - 4/5 IVB	April 18 – May 8	Year round resident	Flying over area or perched in trees	
	Osprey	10/11 Spit - 1/5IVB	April 18 – June 5	Summer resident	Flying over area searching for food or at nest	
	Northern Harrier	1/11 Spit - 0/5 IVB	April 22	Rare in winter	Flying over area searching for food	
	Turkey Vulture	1/11 Spit - 1/5 IVB	April 22 – April 30	Common in Summer	Flying over area searching for food	

	American Kestrel	1/11 Spit - 0/5 IVB	May 2	Rare	Flying over area searching for food or perched	
	Sharp-shinned Hawk	1/11 Spit - 0/5 IVB	May 31	Year round resident	Flying over area searching for food or in shrubs	
Gulls	Glaucus-winged Gull	11/11 Spit - 5/5IVB	April 16 – June 5	Year round resident	Shoreline	
	Mew Gull	3/11 Spit - 1/5 IVB	April 16 – May 2	Common in Winter and Spring	Shoreline	
	Caspian Tern					
Passerines	Mountain Bluebird	1/11 Spit - 0/5 IVB	April 16	Rare spring migrant	Perched in shrubs	Perching exclusively in shrubs on spit.
	Northwestern Crow	11/11 Spit - 5/5IVB	April 16 – June 5	Year round resident	All areas	
	Raven	0/11 Spit - 1/5 IVB	April 26	Year round resident	All areas	
	European Starling	11/11 Spit - 0/5IVB	April 16 – June 5	Summer resident	All areas	
	Savannah Sparrow	11/11 Spit - 5/5IVB	April 16 – June 5	Year round resident	In shrubs or dune grasses	
	Spotted Towee	8/11 Spit - 5/5 IVB	April 18 – June 5	Summer resident	In shrubs	
	Song Sparrow	2/11 Spit - 5/5 IVB	April 18 – June 5	Summer resident	In shrubs	
	American Robin	3/11 Spit - 5/5 IVB	April 18 – June 5	Summer resident	Perched in shrubs or on ground	
	Red-winged Blackbird	1/11 Spit - 5/5 IVB	April 18 – June 5	Summer resident	Perched in shrubs or in wetland area	
	Northern Rough-winged Swallow	2/11 Spit - 2/5 IVB	April 18 – June 5	Summer resident	Flying over area searching for food	
	Violet-green Swallow	1/11 Spit - 2/5 IVB	April 26 – May 3	Summer resident	Flying over area searching for food	
	Barn Swallow	4/11 Spit - 2/5 IVB	May 2 – June 5	Summer resident	Flying over area searching for food	
	Chestnut-backed Chickadee	1/11 Spit - 0/5 IVB	April 23	Year round resident	Perched in shrubs	
	Bushtit					
	White-crowned Sparrow	1/11 Spit - 2/5 IVB	April 23 – May 3	Common in spring and summer	Perched in shrubs	
	Golden-crowned Sparrow	0/11 Spit - 4/5 IVB	April 26 – May 8	??	Perched in shrubs	
	Orange-crowned Warbler	1/11 Spit - 1/5 IVB	April 23 – May 8	Spring migrant	In shrubs	
	Common Yellowthroat	2/11 Spit - 5/5 IVB	April 26 – June 5	Summer resident	In shrubs	
	Bewick's Wren	0/11 Spit - 5/5 IVB	April 26 – June 5	Year round resident	In shrubs	
	American Goldfinch	1/11 Spit - 1/5 IVB	April 30 – May 14	Summer resident	In shrubs	
	House Finch	0/11 Spit - 2/5 IVB	April 30 – May 8	Summer resident	In shrubs or trees	
	Purple Finch	0/11 Spit - 1/5 IVB	May 8	Summer resident	In shrubs or trees	
	Brown-headed Cowbird	0/11 Spit - 2/5 IVB	April 30 – June 5	Summer resident	In shrubs or trees	
	Swainson's Thrush	0/11 Spit - 1/5 IVB	June 5	Summer resident	In woods	Heard only in woods behind beach.
	Cedar Waxwing	0/11 Spit - 1/5 IVB	June 5	Summer resident	In shrubs or trees	
Ocean Birds	Pigeon Guillemot	2/11 Spit - 0/5 IVB	April 18 – April 27	Winter	Open ocean	
	Common Loon	1/11 Spit - 0/5 IVB	April 16	Spring migrant	Open ocean	
	Pacific Loon	1/11 Spit - 0/5 IVB	May 17	Spring migrant	Open ocean	

	Pelagic Cormorant	7/11 Spit - 0/5 IVB	April 18 – May 17	Year round resident??	Open ocean	
	Double-crested Cormorant	2/11 Spit - 0/5 IVB	April 18 – April 23	Year round resident??	Open ocean	
	Rhinoceros Auklet	3/11 Spit - 0/5 IVB	April 27 – May 27	Winter and spring	Open ocean	
Herons	Great Blue Heron	11/11 Spit - 3/5IVB	April 16 – June 5	Year round resident	Lagoon or shoreline	
Kingfishers	Belted Kingfisher	5/11 Spit - 0/5 IVB	April 22 – June 5	Summer resident	Perched near lagoon or stream	
Hummingbirds	Anna's Hummingbird	0/11 Spit - 3/5 IVB	April 26 – May 8	Year round resident	In shrubs	
	Rufous Hummingbird	0/11 Spit - 2/5 IVB	May 3 – May 8	Summer resident	In shrubs	
Woodpeckers	Northern Flicker	1/11 Spit - 0/5 IVB	May 6	Year round resident	In trees	
Game Birds	California Quail	2/11 Spit - 0/5 IVB	May 6 – May 17	Year round resident	In shrubs	

Summer Inventory

Summary Information

- 36 species observed (6 new)
- 5 site visits (3 @ Spit / 2 @ IVB)
- June 20, 2007 – July 9, 2007

Avian Group	Species Name	Frequency Observed	Date Range	Relative Abundance	Most common Habitat Area	Notes / Behaviour
Ducks & Geese	Mallard	1/3 Spit - 0/2 IVB	June 20	Common	Lagoon	
Shorebirds	Killdeer	1/3 Spit - 0/2 IVB	June 20	Year round resident	Lagoon	
	Western Sandpiper	1/3 Spit - 0/2 IVB	July 9	Fall migrant	Lagoon at low tide, shoreline	
Raptors	Bald Eagle	1/3 Spit - 1/2 IVB	June 29 – July 8	Year round resident	Flying over area searching for food or perched in trees	
	Osprey	3/3 Spit - 0/2 IVB	June 20	Summer resident - nesting	Flying over area searching for food or at nest	
	Turkey Vulture	1/3 Spit - 0/2 IVB	June 29	Common in Summer	Flying over area searching for food	
Gulls	Glaucus-winged Gull	3/3 Spit - 2/2 IVB	June 20, – July 9	Year round resident	Shoreline	
	Caspian Tern	3/3 Spit - 2/2 IVB	June 20, – July 9	Summer visitor	Shoreline	
Passerines	Northwestern Crow	3/3 Spit - 2/2 IVB	June 20, – July 9	Year round resident	All areas	
	European Starling	3/3 Spit - 2/2 IVB	June 20, – July 9	Year round resident	All areas	
	Savannah Sparrow	3/3 Spit - 2/2 IVB	June 20, – July 9	Year round resident	In shrubs or dune grasses	
	Spotted Towee	3/3 Spit - 2/2 IVB	June 20, – July 9	Year round resident	In shrubs	
	Song Sparrow	1/3 Spit - 1/2 IVB	June 20, – July 8	Summer resident	In shrubs	
	American Robin	0/3 Spit - 1/2 IVB	July 8	Summer resident	Perched in shrubs or on ground	
	Red-winged Blackbird	0/3 Spit - 1/2 IVB	July 8	Summer resident	Perched in shrubs or in wetland area	
	Northern Rough-winged Swallow	0/3 Spit - 1/2 IVB	July 6	Summer resident	Flying over area searching for food	
	Violet-green Swallow	1/3 Spit - 1/2 IVB	July 8 - July 9	Summer resident	Flying over area searching for food	
	Barn Swallow	2/3 Spit - 1/2 IVB	June 29 - July 9	Summer resident	Flying over area searching for food	
	Chestnut-backed Chickadee	2/3 Spit - 1/2 IVB	June 20 – July 9	Year round resident	Perched in shrubs	
	Bushtit	2/3 Spit - 1/2 IVB	June 29 – July 9	Year round resident	Perched in shrubs	
	House Sparrow	1/3 Spit - 1/2 IVB	July 8 - July 9	Year round resident	Perched in shrubs	
	Orange-crowned Warbler	1/3 Spit - 1/2 IVB	July 8 - July 9	Summer resident	In shrubs	
	Common	0/3 Spit - 2/2 IVB	July 6 - July 8	Summer resident	In shrubs	

	Yellowthroat					
	Bewick's Wren	1/3 Spit - 1/2 IVB	July 8 - July 9	Year round resident	In shrubs	
	American Goldfinch	2/3 Spit - 1/2 IVB	June 20, – July 9	Summer resident	In shrubs	
	House Finch	1/3 Spit - 1/2 IVB	July 8 - July 9	Summer resident	In shrubs or trees	
	Brown-headed Cowbird	1/3 Spit - 0/2 IVB	July 9	Summer resident	In shrubs or trees	
	Cedar Waxwing	1/3 Spit - 2/2 IVB	July 6 - July 9	Summer resident	In shrubs or trees	
	Warbling Vireo	0/3 Spit - 1/2 IVB	July 8	Summer resident	Perched in shrubs	
	Cassins Vireo	0/3 Spit - 1/2 IVB	July 8	Summer resident	Perched in shrubs	
	Willow Flycatcher	1/3 Spit - 0/2 IVB	July 9	Summer resident	Perched in shrubs	
	Northwestern Crow	3/3 Spit - 2/2 IVB	June 20, – July 9	Year round resident	All areas	
Ocean Birds	Pelagic Cormorant	1/3 Spit - 0/2 IVB	June 29	Year round resident	Open ocean	
Herons	Great Blue Heron	3/3 Spit - 2/2 IVB	June 20, – July 9	Year round resident	Lagoon or shoreline	
Kingfishers	Belted Kingfisher	1/3 Spit - 1/2 IVB	June 20, – July 6	Summer resident	Perched near lagoon or stream	
Woodpeckers	Northern Flicker	1/3 Spit - 0/2 IVB	June 29	Year round resident	In trees	
Game Birds	California Quail	1/3 Spit - 0/2 IVB	June 29	Year round resident	In shrubs	
Fall Inventory						
Summary Information • 69 species observed (20 new) • 23 site visits (15 @ Spit / 8 @ IVB) • Aug 3, 2007 – September 26, 2007						
Avian Group	**Species Name**	**Frequency Observed**	**Date Range**	**Relative Abundance**	**Most common Habitat Area**	**Notes / Behaviour**
Ducks & Geese	Canada Goose	9/15 Spit - 3/8 IVB	Aug 3 – Sept 26	Common	On spit near lagoon	
	Hooded Merganser	1/15 Spit – 0/8 IVB	Sept 26	Common fall/winter resident	Open ocean and lagoon	
	Common Merganser	1/15 Spit - 0/8 IVB	Sept 26	Common	Open ocean	
	Mallard	5/15 Spit - 0/8 IVB	Aug 3 – Sept 26	Common	Lagoon, wetland	
	Surf Scoter	0/15 Spit - 1/8 IVB	Sept 2	Winter resident	Open ocean	
Shorebirds	Black-bellied Plover	1/15 Spit - 0/8 IVB	Sept 14	Winter resident and fall migrant	Lagoon	
	Semipalmated Plover	1/15 Spit - 2/8 IVB	Aug 13– Sept 14	Fall migrant	Shoreline	
	Killdeer	3/15 Spit - 0/8 IVB	Aug 16- Sept 26	Spring and summer resident	Sparsely vegetated areas of spit and dunes	
	Greater Yellowlegs	0/15 Spit - 1/8 IVB	Aug 10	Common	Lagoon at low tide, shoreline	
	Whimbrel	4/15 Spit - 0/8 IVB	Sept 9– Sept 26	Fall migrant	Shoreline	
	Black Turnstone	2/15 Spit – 0/8 IVB	Aug 9 - Aug 16	Common	Shoreline	
	Western Sandpiper	8/15 Spit - 3/8 IVB	Aug 3– Sept 11	Fall migrant	Lagoon at low tide, shoreline	
	Least Sandpiper	10/15Spit – 4/8IVB	Aug 3– Sept 11	Fall migrant	Lagoon at low tide, shoreline	
	Semipalmated Sandpiper	5/15 Spit - 2/8 IVB	Aug 6– Sept 2	Fall migrant	Lagoon at low tide, shoreline	
	Baird's Sandpiper	3/15 Spit - 0/8 IVB	Aug 16– Sept 4	Fall migrant	Shoreline	
	Sanderling	2/15 Spit - 0/8 IVB	Sept 9– Sept 26	Fall migrant	Shoreline	
Raptors	Bald Eagle	1/15 Spit - 2/8 IVB	Aug 9 – Aug 21	Year round resident	Flying over area searching for food or perched in trees	
	Osprey	14/15Spit - 0/8 IVB	Aug 3– Sept 26	Summer resident	Flying over area searching for food or at nest	Still building nest Aug 9, young first seen Aug 16

	Northern Harrier	2/15 Spit - 2/8 IVB	Aug 3– Sept 19	Rare in winter	Flying over area searching for food	
	Turkey Vulture	1/15 Spit - 1/8 IVB	Aug 16 – Aug 21	Common in Summer	Flying over area searching for food	
	Cooper's Hawk	2/15 Spit - 1/8 IVB	Aug 16– Sept 26	Common	Flying over area or perched searching for food	
	Peregrine Falcon	3/15 Spit - 3/8 IVB	Aug 10 – Aug 21	Rare fall visitor	Flying over area or perched searching for food	Most frequently seen during shorebird migration
	Merlin	1/15 Spit - 0/8 IVB	Sept 26	Rare fall visitor	Flying over area or perched searching for food	
Goatsuckers	Common Nighthawk	3/15 Spit - 0/8 IVB	Aug 3 - Aug 16	Rare fall migrant – possibly nesting at the spit	Perched in dune vegetation or on logs	Possible nesting activity, definitely a key area for daytime roosting
Gulls	Glaucus-winged Gull	15/15 Spit - 6/8IVB	Aug 3– Sept 26	Year round resident	Shoreline	
	Mew Gull	14/15 Spit - 5/8IVB	Aug 6– Sept 26	Common in Winter and Spring	Shoreline	
	Heerman's Gull	12/15 Spit - 6/8IVB	Aug 3– Sept 26	Common in fall	Shoreline and open ocean	
	California Gull	2/15 Spit - 1/8 IVB	Aug 9 – Aug 21	Common fall visitor	Shoreline and open ocean	
	Caspian Tern	2/15 Spit - 1/8 IVB	Aug 9 – Aug 21	Common fall visitor	Shoreline and open ocean	
Passerines	Northwestern Crow	15/15 Spit - 5/8IVB	Aug 3– Sept 26	Year round resident	All areas	
	Raven	0/15 Spit - 1/8 IVB	Sept 26	Year round resident	All areas	
	European Starling	7/15 Spit - 1/8 IVB	Aug 3– Sept 14	Summer resident	All areas	
	Savannah Sparrow	13/15 Spit - 2/8IVB	Aug 3– Sept 26	Year round resident	In shrubs or dune grasses	
	Spotted Towee	7/15 Spit - 4/8 IVB	Aug 3– Sept 26	Summer resident	In shrubs or trees	
	Song Sparrow	2/15 Spit - 2/8 IVB	Aug 9– Sept 2	Summer resident	In shrubs or trees	
	American Robin	0/15 Spit - 2/8 IVB	Aug 10– Sept 26	Summer resident	Perched in shrubs or on ground	
	Barn Swallow	7/15 Spit - 5/8 IVB	Aug 3– Sept 2	Summer resident	Flying over area searching for food	
	Chestnut-backed Chickadee	1/15 Spit - 6/8 IVB	Aug 3– Sept 26	Year round resident	In shrubs or trees	
	Bushtit	0/15 Spit - 3/8 IVB	Aug 3– Sept 2	Year round resident	In shrubs or trees	
	White-crowned Sparrow	0/15 Spit - 3/8 IVB	Aug 14– Sept 2	Common in spring and summer	In shrubs or trees	
	White-throated Sparrow	0/15 Spit - 1/8 IVB	Sept 26	Fall migrant	In shrubs or trees	
	Golden-crowned Sparrow	0/15 Spit - 1/8 IVB	Sept 26	Common in fall and winter	In shrubs or trees	
	House Sparrow	0/15 Spit - 1/8 IVB	Aug 10	Year round resident	In shrubs or trees	
	Orange-crowned Warbler	0/15 Spit - 3/8 IVB	Sept 2– Sept 26	Summer resident and Fall migrant	In shrubs or trees	
	Common Yellowthroat	0/15 Spit - 3/8 IVB	Aug 3 – Aug 21	Summer resident	In shrubs or trees	
	Bewick's Wren	4/15 Spit - 4/8 IVB	Aug 3– Sept 24	Year round resident	In shrubs or trees	
	American Goldfinch	2/15 Spit - 2/8 IVB	Aug 14– Sept 17	Summer resident	In shrubs or trees	
	House Finch	3/15 Spit - 6/8 IVB	Aug 3– Sept 26	Summer resident	In shrubs or trees	
	Brown-headed Cowbird	2/15 Spit - 0/8 IVB	Aug 3	Summer resident	In shrubs or trees	

	Cedar Waxwing	1/15 Spit - 6/8 IVB	Aug 3– Sept 26	Summer resident	In shrubs or trees	
	Cassin's Vireo	0/15 Spit - 1/8 IVB	Sept 2	Summer resident and Fall migrant	In shrubs or trees	
	Mourning Dove	0/15 Spit - 2/8 IVB	Aug 10– Sept 26	Common in summer (increasing?)	In shrubs, trees or on ground	
	Western Meadowlark	1/15 Spit - 0/8 IVB	Aug 16	Fall migrant	In shrubs or trees	
	American Pipit	4/15 Spit – 0/8 IVB	Sept 11– Sept 26	Fall migrant	On ground in dune vegetation	
	Lapland Longspur	1/15 Spit – 0/8 IVB	Sept 19	Fall migrant	On ground in dune vegetation	
	Horned Lark	1/15 Spit - 0/8 IVB	Sept 19	Fall migrant	On ground in dune vegetation	
Ocean Birds	Pigeon Guillemot	7/15 Spit - 0/8 IVB	Aug 3– Sept 26	Winter	Open ocean	
	Common Loon	2/15 Spit - 3/8 IVB	Aug 14– Sept 26	Fall migrant	Open ocean	
	Pacific Loon	0/15 Spit - 1/8 IVB	Aug 21	Fall migrant	Open ocean	
	Western Grebe	1/15 Spit - 0/8 IVB	Sept 19	Infrequent offshore	Open ocean	
	Pelagic Cormorant	8/15 Spit - 2/8 IVB	Aug 3– Sept 24	Year round resident	Open ocean	
	Double-crested Cormorant	10/15 Spit - 5/8IVB	Aug 3– Sept 26	Year round resident	Open ocean	
	Rhinoceros Auklet	7/15 Spit - 0/8 IVB	Aug 3– Sept 26	Winter and spring	Open ocean	
	Common Murre	9/15 Spit - 2/8 IVB	Aug 3– Sept 26	Common offshore in fall through winter	Open ocean	
Herons	Great Blue Heron	15/15 Spit -2/8 IVB	Aug 3– Sept 26	Year round resident	Lagoon or shoreline	
Kingfishers	Belted Kingfisher	8/15 Spit - 0/8 IVB	Aug 9– Sept 26	Summer resident	Perched near lagoon or stream	
Hummingbirds	Anna's Hummingbird	0/15 Spit - 1/8 IVB	Sept 26	Year round resident	In shrubs or trees	
Woodpeckers	Northern Flicker	2/15 Spit - 1/8 IVB	Aug 16– Sept 26	Year round resident	In trees	
Game Birds	California Quail	1/15 Spit - 1/8 IVB	Aug 13 - Aug 14	Year round resident	In shrubs or trees	
Winter Inventory						
Summary Information • 59 species observed (12 new) • 17 site visits (11 @ Spit / 6 @ IVB) • November 21, 2008 – April 9, 2008						
Avian Group	**Species Name**	**Frequency Observed**	**Date Range**	**Relative Abundance**	**Most common Habitat Area**	**Notes / Behaviour**
Ducks & Geese	American Wigeon	3/11 Spit -0/6 IVB	March 1 – April 9	Common winter resident	Lagoon	
	Canada Goose	1/11 Spit -06 IVB	Nov 21	Common	On spit near lagoon	
	Brant	0/11 Spit -3/6 IVB	March 19 – April 3	Common migrant in April and Early May	Feeding on eelgrass along shoreline at IVB	
	Bufflehead	11/11 Spit -6/6 IVB	Nov 21 – April 9	Common winter resident	Open ocean and lagoon	
	Hooded Merganser	4/11 Spit -0/6 IVB	Nov 21 – March 13	Common winter resident	Open ocean and lagoon	
	Common Merganser	3/11 Spit -2/6 IVB	February 8 – March 22	Common	Open ocean	
	Red-necked Grebe	1/11 Spit -0/6 IVB	Nov 21	Rare winter resident		
	Northern Pintail	8/11 Spit -0/6 IVB	Nov 21 – April 9	Common	Lagoon	
	Mallard	11/11 Spit -0/6	Nov 21 – April 9	Common	Lagoon, wetland	

		IVB				
	Surf Scoter	1/11 Spit -2/6 IVB	March 7 – March 20	Winter resident	Open ocean	
	Lesser Scaup	2/11 Spit - 2/6 IVB	March 19 – March 22	Winter resident	Open ocean	
	Green-winged Teal	1/11 Spit -0/6 IVB	March 1	Spring migrant	Lagoon	
	Common Goldeneye	7/11 Spit -5/6 IVB	January 7 – April 9	Common winter resident		
	Northern Shoveller	2/11 Spit -0/6 IVB	Nov 21 – January 9	Spring Migrant		
	Harlequin Duck	0/11 Spit -1/6 IVB	January 21	Year round resident		
	Long-tailed Duck	0/11 Spit -1/6 IVB	February 4	Winter resident		
Shorebirds	Killdeer	0/11 Spit -1/6 IVB	April 3	Spring and summer resident	Sparsely vegetated areas of spit and dunes	
	Greater Yellowlegs	1/11 Spit -06 IVB	April 9	Common	Lagoon or along shoreline	
	Least Sandpiper	1/11 Spit -0/6 IVB	March 1	Spring and Fall Migrant		
	Black Oystercatcher	011 Spit -2/6 IVB	March 7 – April 3	Year round resident	Shoreline	
	Black Turnstone	1/11 Spit -/6 IVB	January 7	Year round resident		
Raptors	Bald Eagle	9/11 Spit -1/6 IVB	Nov 21 – April 9	Year round resident	Flying over area searching for food or perched in trees	
	Osprey	1/11 Spit - 0/6 IVB	April 9	Summer resident	Flying over area searching for food or at nest	
	Coopers Hawk	1/11 Spit -0/6 IVB	February 4	Year round resident		
Gulls	Glaucus-winged Gull	11/11 Spit -6/6 IVB	Nov 21 – April 9	Year round resident	Shoreline	
	Mew Gull	5/11 Spit -4/6 IVB	Nov 21 – April 3	Common in Winter and Spring	Shoreline	
	Ring-billed Gull	1/11 Spit -0/6 IVB	January 7			
	California Gull	0/11 Spit -2/6 IVB	March 7 – March 22			
Passerines	Northwestern Crow	11/11 Spit - 6/6IVB	November 21 – April 9	Year round resident	All areas	
	Raven	6/11 Spit -2/6 IVB	Nov 21 – March 7	Year round resident	All areas	
	European Starling	5/11 Spit -4/6 IVB	Nov 21 – April 3	Summer resident	All areas	
	Savannah Sparrow	1/11 Spit -0/6 IVB	April 9	Year round resident	In shrubs or dune grasses	
	Spotted Towee	6/11 Spit -2/6 IVB	Nov 21 – March 13	Summer resident	In shrubs	
	Song Sparrow	3/11 Spit -2/6 IVB	Nov 21 – April 3	Summer resident	In shrubs	
	American Robin	1/11 Spit -4/6 IVB	January 7 – April 9	Summer resident	Perched in shrubs or on ground	
	Red-winged Blackbird	2/11 Spit -1/6 IVB	January 7 – March 22	Summer resident	Perched in shrubs or in wetland area	
	Violet-green Swallow	1/11 Spit - 0/6 IVB	March 19	Summer resident	Flying over area searching for food	
	Chestnut-backed Chickadee	0/11 Spit - 1/6 IVB	March 19	Year round resident	Perched in shrubs	
	Bushtit	1/11 Spit - 2/6 IVB	March 13 – March 22			
	Golden-crowned Kinglet	0/11 Spit -2/6 IVB	January 21 – March 13	Winter		
	Golden-crowned Sparrow	4/11 Spit -3/6 IVB	Nov 21 – April 3	Year round resident?	Perched in shrubs	

	Fox Sparrow	2/11 Spit -0/6 IVB	Nov 21 – Jan 17	Winter		
	Bewick's Wren	4/11 Spit -4/6 IVB	Nov 21 – April 3	Year round resident	In shrubs	
	Marsh Wren	3/11 Spit -0/6 IVB	January 7 – March 1	Winter		
	House Finch	1/11 Spit -1/6 IVB	Nov 21-January 21	Summer resident	In shrubs or trees	
	Rock Dove	3/11 Spit -0/6 IVB	January 17 – March 4	Year round resident		
	Western Meadowlark	4/11 Spit -0/6 IVB	February 4 – March 13	Spring migrant and winter resident		
	Northern Shrike	1/11 Spit - 0/6 IVB	March 13	Winter		
Ocean Birds	Pigeon Guillemot	3/11 Spit - 0/6 IVB	March 4 – April 9	Winter	Open ocean	
	Common Loon	4/11 Spit -0/6 IVB	Nov 21 – March 28	Spring migrant and winter resident	Open ocean	
	Pacific Loon	2/11 Spit -2/6 IVB	January 7 – Feb 4	Spring migrant and winter resident	Open ocean	
	Pelagic Cormorant	4/11 Spit -0/6 IVB	Nov 21 – March 20	Year round resident	Open ocean	
	Double-crested Cormorant	6/11 Spit -1/6 IVB	Nov 21 – March 20	Year round resident	Open ocean	
	Rhinoceros Auklet	2/11 Spit - 0/6 IVB	March 13 – March 20	Year round resident	Open ocean	
	Common Murre	1/11 Spit -0/6 IVB	Nov 21	Year round resident		
Herons	Great Blue Heron	5/11 Spit -0/6 IVB	February 4 – March 28	Year round resident	Lagoon or shoreline	
Kingfishers	Belted Kingfisher	5/11 Spit -06 IVB	Nov 21 – April 9	Year round resident	Perched near lagoon or stream	
Hummingbirds	Anna's Hummingbird	1/11 Spit - 0/6 IVB	Nov 21	Year round resident	In shrubs	
Woodpeckers	Northern Flicker	7/11 Spit -3/6 IVB	Nov 21 – April 3	Year round resident	In trees	

Additional Birds Reported by birding community

Cordova Spit

Aug 7, 2007 - Red-necked Phalarope
Oct 16, 2007 – Rock Sandpiper
Pacific Golden Plover
October 22, 2007 – Snow Bunting
December 26, 2007 – Black Scoter

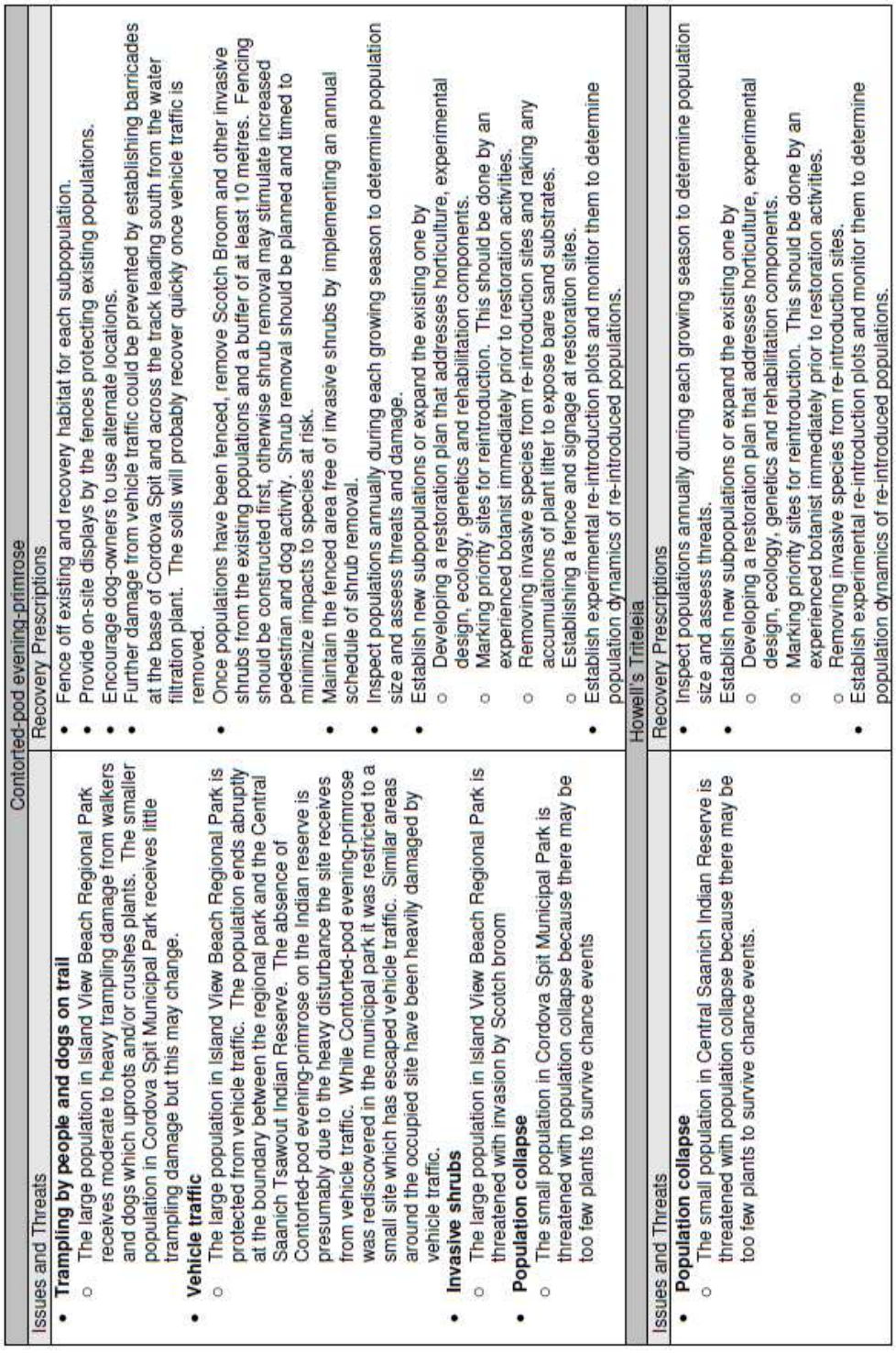
Island View Beach

March 29, 2008 – Yellow-rumped Warbler
July 3, 2007 – Cliff Swallow
August 27, 2007 – Bank Swallow
October 14, 2007 – Short-eared Owl
November 5, 2007 – Townsend's Solitaire
February 9, 2008 – American Tree Sparrow

Additional Historically known species

1. Sharp-tailed Sandpiper
2. Pectoral Sandpiper
3. Upland Sandpiper
4. Hudsonian Godwit.
5. Bar-tailed Godwit
6. Swamp Sparrow
7. Lincoln's Sparrow
8. Brewers Blackbird
9. Hermit Thrush
10. Ruby-crowned Kinglet
11. Rock Wren
12. Say's Phoebe
13. Band-tailed Pigeon
14. Hutton's Vireo
15. Lewis's Woodpecker
16. Downy Woodpecker
17. Hairy Woodpecker
18. Greater White-fronted Goose
19. Mute Swan
20. Trumpeter Swan
21. Gadwall
22. Eurasian Wigeon
23. Greater Scaup
24. Spectacled Eider
25. White-winged Scoter
26. Barrow's Goldeneye
27. Parasitic Jaeger
28. Bonaparte's Gull
29. Thayer's Gull
30. Western Gull
31. Common Tern
32. Red-throated Loon
33. Yellow-billed Loon
34. Horned Grebe
35. Eared Grebe
36. Brandt's Cormorant
37. Sora
38. Virginia Rail
39. Marbled Murrelet
40. Ancient Murrelet

APPENDIX H - Management Actions for Rare and Endangered Species



Contorted-pod evening-primrose	
Issues and Threats	Recovery Prescriptions
• **Trampling by people and dogs on trail** ○ The large population in Island View Beach Regional Park receives moderate to heavy trampling damage from walkers and dogs which uproots and/or crushes plants. The smaller population in Cordova Spit Municipal Park receives little trampling damage but this may change. • **Vehicle traffic** ○ The large population in Island View Beach Regional Park is protected from vehicle traffic. The population ends abruptly at the boundary between the regional park and the Central Saanich Tsawout Indian Reserve. The absence of Contorted-pod evening-primrose on the Indian reserve is presumably due to the heavy disturbance the site receives from vehicle traffic. While Contorted-pod evening-primrose was rediscovered in the municipal park it was restricted to a small site which has escaped vehicle traffic. Similar areas around the occupied site have been heavily damaged by vehicle traffic. • **Invasive shrubs** ○ The large population in Island View Beach Regional Park is threatened with invasion by Scotch broom • **Population collapse** ○ The small population in Cordova Spit Municipal Park is threatened with population collapse because there may be too few plants to survive chance events	• Fence off existing and recovery habitat for each subpopulation. • Provide on-site displays by the fences protecting existing populations. • Encourage dog-owners to use alternate locations. • Further damage from vehicle traffic could be prevented by establishing barricades at the base of Cordova Spit and across the track leading south from the water filtration plant. The soils will probably recover quickly once vehicle traffic is removed. • Once populations have been fenced, remove Scotch Broom and other invasive shrubs from the existing populations and a buffer of at least 10 metres. Fencing should be constructed first, otherwise shrub removal may stimulate increased pedestrian and dog activity. Shrub removal should be planned and timed to minimize impacts to species at risk. • Maintain the fenced area free of invasive shrubs by implementing an annual schedule of shrub removal. • Inspect populations annually during each growing season to determine population size and assess threats and damage. • Establish new subpopulations or expand the existing one by ○ Developing a restoration plan that addresses horticulture, experimental design, ecology, genetics and rehabilitation components. ○ Marking priority sites for reintroduction. This should be done by an experienced botanist immediately prior to restoration activities. ○ Removing invasive species from re-introduction sites and raking any accumulations of plant litter to expose bare sand substrates. ○ Establishing a fence and signage at restoration sites. • Establish experimental re-introduction plots and monitor them to determine population dynamics of re-introduced populations.
Howell's Triteleia	
Issues and Threats	Recovery Prescriptions
• **Population collapse** ○ The small population in Central Saanich Indian Reserve is threatened with population collapse because there may be too few plants to survive chance events.	• Inspect populations annually during each growing season to determine population size and assess threats. • Establish new subpopulations or expand the existing one by ○ Developing a restoration plan that addresses horticulture, experimental design, ecology, genetics and rehabilitation components. ○ Marking priority sites for reintroduction. This should be done by an experienced botanist immediately prior to restoration activities. ○ Removing invasive species from re-introduction sites. • Establish experimental re-introduction plots and monitor them to determine population dynamics of re-introduced populations.

Grey Beach Peavine	
Issues and Threats	Recovery Prescriptions

• **Status assessment**
  ○ Currently, Grey beach peavine is only known from about sites in Canada (and some of these locations were transient populations which were probably wiped out by winter storms in the year following discovery). Recent surveys of suitable habitat along the west coast of Vancouver Island, from Port Renfrew to Nuchatlitz Inlet have failed to discover new populations. These data suggest the species may be a strong candidate for national assessment, likely warranting "Threatened" status. Determination of the species national status would allow land managers in the study area to determine the appropriate degree of conservation action.
• **Vehicle traffic**
  ○ Both subpopulations (in Central Saanich Tsawout Indian Reserve and Cordova Spit Municipal Park) are subjected to significant disturbance from vehicle traffic. Similar areas around the occupied sites have been heavily damaged by vehicle traffic which suggests that the existing plants may be remnants of what was once a much larger population.
• **Population collapse**
  ○ The small subpopulations in Central Saanich Indian Reserve and Cordova Spit Municipal Park may be threatened with population collapse because there may be too few plants to survive chance events.
	• Form a partnership with Parks Canada and the BC Ministry of Environment to conduct surveys in remaining "gap areas" and prepare a COSEWIC status report on the species.
	• Barricades proposed to protect Contorted-pod evening-primrose (see above) would also prevent further damage to sites supporting Grey beach peavine. This may be sufficient for the populations to expand without additional augmentation actions.
	• Inspect populations annually during each growing season to determine population size and assess threats and damage.
	• Periodically assess the need for population augmentation based on monitoring results.

Source: Fairbarns, 2007

APPENDIX I - Regional and Global Conservation Initiatives

Organization	Description
Canadian Wildlife Service	• Mission statement to "conserve wildlife and the ecosystems of which they are a part, with a particular focus on migratory birds and species at risk. • The Migratory Birds Conservation Division of CWS provides scientific advice on the conservation of Canada's migratory birds to CWS management, to the Government of Canada, to wildlife agencies in Canada and other countries, and to the public. The Migratory Birds Conservation Division also coordinates the substantive input to the implementation of the Migratory Birds Convention.
BirdLife International	• BirdLife International is a global Partnership of conservation organizations that operates in over 100 countries around the world striving to conserve birds, their habitats and global biodiversity, and work with people towards sustainability in the use of natural resources. • BirdLife's primary goals are to: - Prevent the extinction of any bird species. - Maintain and improve the conservation status of all bird species. - Conserve, improve and enlarge sites and habitats important for birds. - Help, through birds, to conserve biodiversity and to improve the quality of people's lives. - Integrate bird conservation into sustaining people's livelihoods.
Bird Studies Canada	• Bird Studies Canada is a not-for-profit conservation organization dedicated to advancing the understanding, appreciation and conservation of wild birds and their habitats, in Canada and elsewhere. • Bird Studies Canada and Nature Canada are the Canadian co-partners of BirdLife International.
North American Bird Conservation Initiative (NABCI)	• Established to facilitate the conservation of native North American birds by increasing the effectiveness of existing and new bird conservation initiatives, enhancing coordination, and fostering greater cooperation among the nations and peoples of the North American continent.
Partners in Flight	• Initiated by the National Fish and Wildlife Foundation in 1991 in response to observed declines in migratory birds. • Involves many partner agencies throughout the Hemisphere including the Canadian Wildlife Service, U.S. Fish and Wildlife Service as well as many private and non- governmental organizations, including the Audubon Society and the Nature Conservancy. • Partners in Flight's primary goals are to: - Help Species at Risk - Species must be conserved before they become imperiled. - Keep Common Birds Common - These species comprise the core of our avian diversity and are integral to the integrity of the ecosystems of which they are a part. - Create Voluntary Partnerships for Birds, Habitats and People - Partnerships must be formed with others who are working for conservation on the same landscapes as well as those who depend on those landscapes for their economic and social well-being.
IUCN Red List Program	• Widely recognized as the most objective and authoritative listing of species that are globally at risk of extinction (Butchart et al.., 2004) • Currently overseen by four partner organizations: the IUCN Species Survival Commission, BirdLife International, Nature-Serve, and the Center for Applied Biodiversity Science at Conservation International
Convention on Biological Diversity (CBD)	• Adopted on 22 May 1992 in Kenya and opened for signature at the United Nations Conference on Environment and Development in order to achieve a significant reduction in the current rate of loss of biological diversity by 2010. • The CBD covers a wide array of issues connected with biological diversity including protected areas, restoration of ecosystems, invasive alien species, traditional knowledge of indigenous and local communities, *ex situ* conservation, incentive measures, research, training, public education, impact assessment, access to genetic resources, biotechnology and financial resources. (Herkenrath, 2002)..

Western Hemisphere Shorebird Reserve Network (WHSRN)	• A voluntary, non-regulatory coalition that identifies and promotes conservation of crucial sites for shorebirds, no matter whether they are used in the breeding, migratory, or "winter" season. • Mission is to conserve shorebird species and their habitats across the Americas through a network of key sites. • WHSRN'S four goals are to: - Use the best available scientific and other information. - Implement shorebird conservation at sites throughout the Americas. - Create and maintain informed, involved, empowered and interconnected human communities at Network sites. - Become the strongest network of sites possible.
Important Bird Areas Program	• The purpose of the Important Bird Areas Program is to identify and protect a network of sites to help maintain naturally occurring bird populations for which a site-based approach is appropriate. • Important Bird Areas (IBAs) are places of significance for the conservation of birds across multiple landscape scales. • The biological rationale for IBAs is that some sites are exceptionally important for bird conservation, and the consequences of the loss of any one of them may be disproportionately large.
Smithsonian Migratory Bird Center (SMBC)	• Dedicated to fostering greater understanding, appreciation, and protection of the grand phenomenon of bird migration. • SMBC aims to improve: - Understanding - Clarifying the causes for declines in migratory bird populations before the situation becomes desperate. - Appreciation - Raising awareness of migratory birds and the need to protect their habitats through a variety of outreach programs. - Protection - Protecting habitats that are crucial to the annual pilgrimage of migratory birds in the Western Hemisphere.
American Bird Conservancy (ABC)	• American Bird Conservancy (ABC) is a not-for-profit organization, whose mission is to conserve wild birds and their habitats throughout the Americas. • ABC believes adequate resources exist to overcome the many threats facing birds in the Western Hemisphere, and that unifying people, organizations, and agencies around common approaches to priority issues is the key to success. • The ABC's Bird Conservation Alliance is a network of organizations connecting millions of birdwatchers and concerned citizens with conservation professionals, scientists, and educators to benefit bird conservation efforts. • The Alliance's goals are to: - Prevent further bird extinctions - Reverse declines in bird populations - Assure the protection and management of sufficient habitat to effectively conserve populations of the full range of native, wild bird species for the future.
The Nature Conservancy	• The mission of The Nature Conservancy's Migratory Bird Program is to protect critical habitats for birds of conservation concern throughout the Western Hemisphere.
North American Waterfowl Management Plan (NAWMP)	• The North American Waterfowl Management Plan is an international action plan to conserve migratory birds throughout the continent. • The Plan's goal is to: - Return waterfowl populations to their 1970s levels by conserving wetland and upland habitat.
U.S. Shorebird Conservation Plan	• Partners from state and federal agencies and non-governmental organizations from across the country pooled their resources and expertise to develop a conservation strategy for migratory shorebirds and the habitats upon which they depend. • The main goals of the plan are to: - Ensure that adequate quantity and quality of shorebird habitat is maintained at the local level - Maintain or restore shorebird populations at the continental and hemispheric levels.