# Exploring Recreation Impacts on Franklin Island and Collaborative Management Options for Eastern Georgian Bay

By

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Authors Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

# ABSTRACT

This research focuses on recreation impacts and management options for the eastern coast of Georgian Bay, a popular destination for summer tourism. Georgian Bay has a rugged coastline of barren rock islands and wind swept trees – a wilderness setting that attracts cottagers, campers and boaters alike. Franklin Island, close to the town of Parry Sound, represents a microcosm of recreation management problems on the coast of Georgian Bay, including concerns about the ecological capacity for island recreation, social concerns about impacts, and some ongoing governance and management challenges for Crown Lands. This study uses Franklin Island as the site to assess the types and severity of recreation impacts at five different campsites. Vegetation surveys found that vegetation communities at the campsite scale and slightly beyond the campsite do not appear to be significantly altered or affected by the current intensity and types of recreation use.

Since the most visible impacts (e.g., campfires, cut wood, and trampling) found in this study were not at a scale to alter the vegetation patterns and coverage of the area, within the campsite or outside of campsite boundaries, the discussion then distinguishes between various scales and types of impact (ecosystemic, ecological, and aesthetic) to determine whether measured impacts affect broader ecosystem functioning. Overall this study would suggest that these localized impacts are not having a significant impact to the functioning of the Franklin Island ecosystem. However, the mosaic structure of ecosystems in eastern Georgian Bay, with their high level of patchiness and inter-patch diversity, including large areas of barren rock, pose some unique challenges for an ecological assessment of recreation impacts. Some modifications to the sampling approach may assist future assessments of recreation impacts and long-term monitoring.

Recreation on Franklin Island poses a challenge for environmental management because, while it is in the jurisdiction of the Ministry of Natural Resources as a formal Conservation Reserve, there are a number of factors that have contributed to a management vacuum, including limited resources for management, monitoring and enforcement by traditional authorities. As a result, governance for Franklin Island has shifted from formal government-led approaches to informal

partnerships and community-based collaborative approaches. However, it is unclear whether the collaborative governance approach for Franklin Island that undertakes specific management actions (e.g., a volunteer fire ban, latrine construction, site clean-up, etc.) are successfully reducing the potential risks from recreation to Franklin Island's ecosystems.

Using the concept of resilience informed by a systems approach, recreation ecology can be expanded to reflect on how the structure of an ecosystem and the pattern of human behaviours acting within and around an ecosystem work to maintain or alter a system's resilience. In the case of Franklin Island, it would appear that the ecological context helps to create a recreation experience that maintains ecosystem resilience. Furthermore, human behaviours associated with recreation have a strong bearing on the recreation experience itself, what changes to the ecosystem might emerge, and hence the resilience of the ecosystem as a whole. Adoption of a systems approach per Kay et al. (1999) widens recreation management debates to account for broader governance structures and processes, specific management actions and adaptive learning, along with monitoring to anticipate ecosystem change. This research concludes with a number of recommendations for managing recreation on Franklin Island and in eastern Georgian Bay.

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# 1. INTRODUCTION

## 1.1 Introduction and Context

The province of Ontario is in a period of intense urbanization, especially in the Greater Toronto Area. Plans for managing this growth, such as for the Oak Ridges Moraine, the Greenbelt and *Places to Grow* (Government of Ontario, 2006) have all highlighted the challenges of this urbanization to the maintenance of ecosystem services in the southern portion of the province. Population growth has fuelled an expansion of second-home investment and other recreation-based economies in the regions outside these urbanized areas. Tourism and associated service industries are anticipated as a dominant market growth mechanism in many of the rural areas of Ontario.

It is possible that recent provincial legislation for the Greenbelt and Oakridges Moraine will cause developers to move further north ('leap-frogging') creating new development pressures around Lake Simcoe and Georgian Bay. Specifically, the regions of southern Georgian Bay and Muskoka, within 200-300 km of Toronto, have been identified as target areas for both residential and recreational development. Summer resorts and shoreline commercial properties are becoming converted into 'time-share units' and condominiums with higher density development, while a range of marketing programs aim to draw more tourists into the area to stimulate job creation and economic growth. The increased residency and visitation to these areas is predicted to coincide with increasing recreation interest in the semi-wilderness areas of coastal Georgian Bay. Already growth in tourism has resulted in increased visitation to area attractions, parks, and wilderness areas (Promaine pers comm., 2007).

Perhaps in anticipation of such trends, the Province of Ontario released a land use strategy delineating Crown Lands to be established as parks and Conservation Reserves and outlining those Crown Lands available for resource development. This process was driven by concerns for ecological heritage protection and by the desire to provide greater certainty for resource industries. As a result, the *Living Legacy* (OMNR, 1999) established a new and larger protected

areas system in Ontario through the legislated protection of 12% of provincial lands through the creation and expansion of Provincial Parks and the creation of Conservation Reserves.

The culmination of this planning process for the eastern coast of Georgian Bay was the establishment of the *Great Lakes Heritage Coast* (GLHC). This initiative sought to balance the pressures of tourism and recreation growth with the maintenance of the wilderness character and values of the region, through a combination of management plans and economic partnerships. The GLHC began to create a new tourism marketing identity for the region and was also serving to highlight the importance of maintaining high quality environments to support the economy as a whole.

Although public attention to this particular initiative has since waned under a change of provincial government, the newly formed Georgian Bay Littoral Biosphere Reserve, designated by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 2004, may provide a means of continuing to integrate the social, economic and ecological systems represented on Georgian Bay (see Section 2.4).

This thesis explores the challenge of integrating social and ecological systems related to outdoor recreation experiences. It examines ecological impacts caused by recreation activities on unregulated Crown Land,[1] using Franklin Island as a case example for eastern Georgian Bay where many islands of similar status exist. It is one of few studies that attempts to assess the severity of impacts to ecosystems in this region (see also Kutas, 1998 & Jalava et al, 2005) and highlights the current types of management challenges for an ecosystem typified by a rocky barren ecosystem with patchy vegetation.

An important understanding for this type of study is that recreation impacts, and hence management options, range across scales. At a campsite-specific scale, ecological damage tends to be highly localized and management tends to focus on the mitigation of impacts and changing camper behaviour. If cumulative impacts result from continued or intensive uses that affect the

1 Unregulated Crown Lands lack any formal or active recreation planning and management.

structure and function of ecosystems, then the scale of impacts has increased and the management interventions and focus may change.

Influencing the interpretation and reporting of recreation impacts is that human perceptions of what constitutes an impact are wide-ranging, and influence both the recreation experience and the focus of managers in terms of what impacts are to be addressed and how. Social values and cultural constructions of ecological impacts are part of any recreation management challenge. To analyze recreation impacts and management options it is important to distinguish the cultural dimensions of ecological impacts from ecologically significant changes to the site and to the broader landscape or ecosystem scale. To focus the analysis and discussion, management concepts such as ecosystem approach, ecological integrity and resilience are explored at these two scales.

This thesis (1) discerns whether recreation impacts at a campsite level are, or have the potential of, affecting broader ecosystem functioning in the context of the island and Georgian Bay; (2) incorporates a discussion of human perceptions of impacts and their implications for management; and (3) provides recommendations for management and planning directions at the site level for Franklin Island and more broadly for recreation in eastern Georgian Bay.

## 1.2 Research Objectives

The purpose of this thesis is to assess some of the recreation impacts for the eastern coast of Georgian Bay and to explore how increasing recreation pressures might be managed. This is done by assessing the significance of recreation impacts at several individual sites within one case study (Franklin Island) and by outlining some recommendations for effective management (including monitoring and stewardship) of unregulated Crown Lands or areas with limited capabilities for recreation management.

The objectives of this study are:

**1)** To assess current recreation impacts for islands in eastern Georgian Bay, using several different campsites on Franklin Island as a case study;

**2)** To evaluate the severity of recreation impacts at the site-level using the concept of ecological resilience;

**3)** Based on this site-specific assessment of impacts, to provide recommendations for the establishment of an adaptive management framework for the island that:
- considers ecological pressures;
- reflects community values;
- recognizes ecological management objectives; and,
- is responsive to future scenarios

**4)** To provide recommendations for recreation management of unregulated Crown Lands or other areas in eastern Georgian Bay with limited management capabilities.

## 1.3 Justification for Research

Recreation impacts are almost always described as local and severe; yet considering cumulative and combinatory effects, there is potential for shifts in species composition and change beyond the immediate area of impact. Moreover, there does not appear to be a great amount of description of the kinds of pathways or mechanisms creating cumulative impacts. There are a myriad of potential ecological and human impacts that one could expect within any given ecosystem, some of which will be unique to that ecosystem. A general rule in the recreation impact literature follows that the most significant change will occur at relatively low use and that the rate of change will decrease with increased amount of use and time; of course this is not always the case, especially within the context of Georgian Bay ecosystems.

Features unique to the ecosystem are important when considering the potential and existing severity of impacts in individual ecosystems. Equally important are considerations of the types of behaviour exhibited and expected from recreationists. Cumulative pressures on ecosystems

exhibit non-additive influences on an ecosystem and can result in unexpected results in the future; creating an awareness and understanding of these changes may prove vital for understanding ecosystem response and for making appropriate and adaptive management decisions. Overall, the complexity of possible interactions and influences from recreation and other pressures is considerable and the challenge for understanding them in under-studied areas is very real.

Relatively few studies of recreation impacts exist for Georgian Bay islands. An undergraduate thesis was undertaken for the northern islands of Georgian Bay based on campsite recreation impact surveys (Kutas, 1998). In addition, Georgian Bay Islands National Park has done preliminary reporting on various recreation impacts in its campgrounds, although the primary focus is on intensive recreation areas or uses such as group campsites and snowmobile trails. Kutas' research is the only recreation study undertaken in an area of unregulated Crown Lands (on the large Philip Edward Island area adjacent to Killarney Provincial Park). However, under the *Living Legacy* framework, these same islands have now been placed under the jurisdiction of Killarney Provincial Park (OMNR, 1999).

Unregulated lands provide a unique focus for study due to their lack of formal, active recreation planning and management. The Ontario Ministry of Natural Resources has limited capacity to undertake management of recreation on these lands. This is in contrast to the more active management activities that might occur in some Provincial Parks where there are more highly formalized management plans, regulatory frameworks, enforcement staff and full-time management staff to monitor and respond to ecosystem pressures.

This thesis uses recreation impacts at the campsite scale as a starting point but recognizes that the lack of formal management and planning structures requires 'scaling-up' to assess broader management options for the region, such as multi-stakeholder, citizen-based initiatives that draw government authorities into collaborative governance models. This thesis also recognizes some of the limitations to top-down management approaches and explores the role of an adaptive

recreation management framework for Franklin that might be applied to other areas of Georgian Bay.

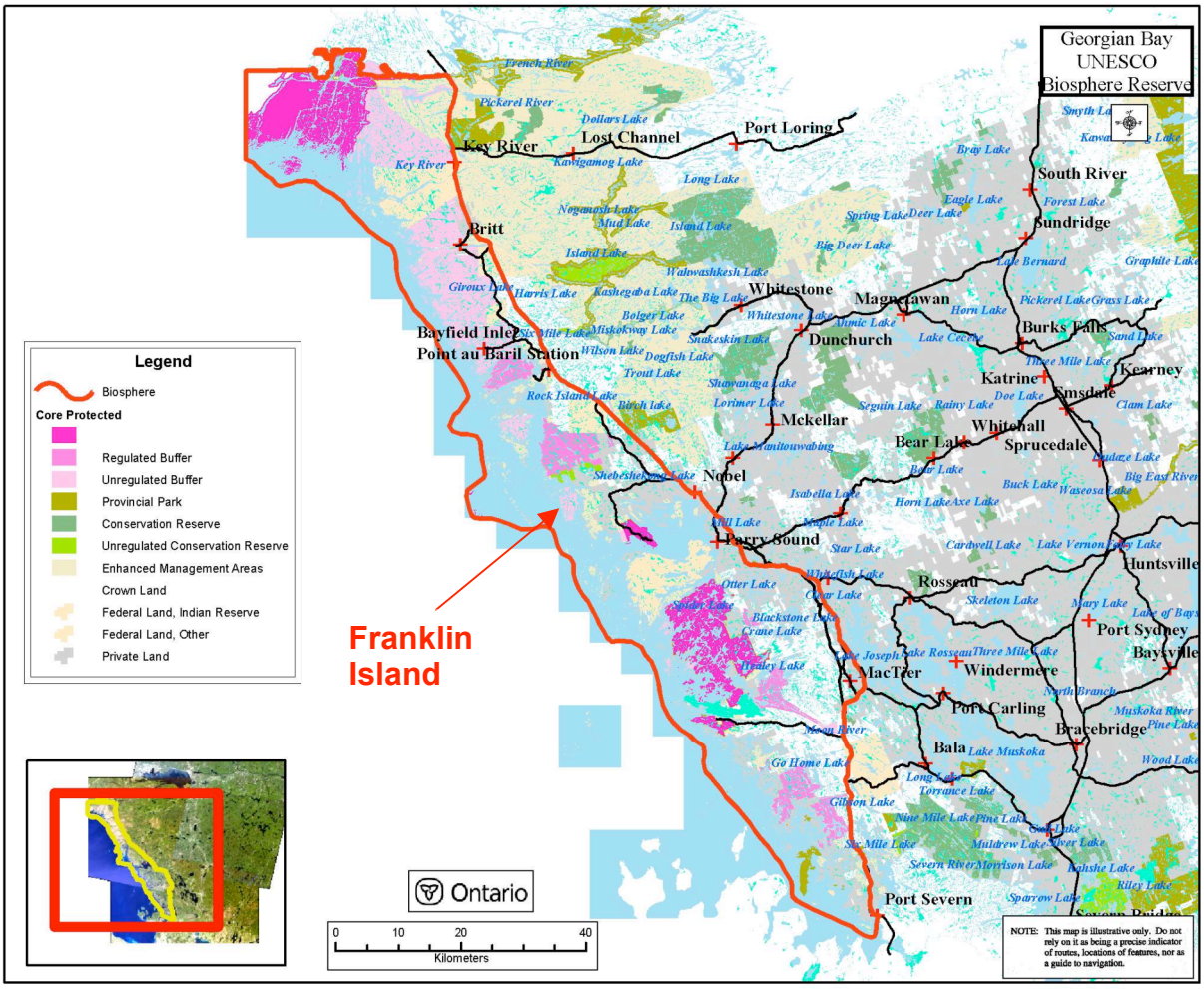
## 1.4 Case Study Description

Figure 1 shows Southern Ontario with Georgian Bay, Lake Huron on its northern edge and with Parry Sound, the largest settlement on the eastern coast. Franklin Island, the focus of this research, is a relatively large island (approximately 8 km long) in close proximity to the Town of Parry Sound (Figure 1) and popular Killbear Provincial Park as shown on Figure 2. It is typical of coastal ecosystems in eastern Georgian Bay: containing forest stands of older aged (90 to 100 years old) white pine on low hills and plains of bare bedrock (OMNR, 1999). It is also typical of many Georgian Bay islands and shoreline in its provision of numerous recreation sites on a single island. Broad plains of bare bedrock provide smooth, flat sites for tenting and the numerous bays and inlets provide protection for boats from heavy prevailing on-shore winds (westerlies) (Jalava et al, 2005).

**Figure 1**: Location of Parry Sound


Source: www.mapquest.ca

**Figure 2**: Map of the Georgian Bay Biosphere Reserve




Source: OMNR, 2007

With regard to vegetation, Franklin Island (as with many of the islands and coastal ecosystems) is best described as a mosaic of several ecosystem types. A land inventory performed for Franklin Island in 2001 identified 40 recognized community types and 10 previously undefined community types (Jalava et al, 2005). The island's bedrock topography is highly variable, with the broad smooth, bedrock plains broken by deep to shallow crevices (some of which collect water in the form of perched bogs), to heavily bouldered areas and highly undulating shorelines. Geological factors (e.g., shallow soils) that influence vegetation and habitat types are expected to

affect the study of recreation impacts, particularly in terms of the discussions about ecological resilience (Section 7).

Overall, the vegetation communities on Franklin Island are diverse and patchy across the island's ecosystem, with greatest patchiness occurring near the shore (where campers land their boats, unload their gear, set up camp, etc.). Near-shore habitats are characterized by open or lichen covered bedrock. The uniqueness of this kind of ecosystem creates interesting challenges for assessing the impacts at a campsite level and determining the existence of cumulative or eco-systemic changes due to recreation activities.

### 1.5 Overview of Methods

This study was designed to assess recreation impacts at five distinct campsites distributed around Franklin Island. Campsites were selected based on a gradient of their perceived use and impacts. Vegetation sampling, the most common form of recreation impact assessment, was adapted for Franklin Island. A series of transects were run from the centre of each campsite and (where possible) to areas well beyond the known boundary of the campsite. Vegetation diversity and abundance was recorded at random quadrats along transects.

Data analysis consisted of in-site analysis of the percent cover of species with distance from the centre of the campsite to explore whether campsite edges could be determined by means of vegetation surveys. Between-site analysis of vegetation communities was used to explore whether vegetation diversity differed between sites of different degrees of usage. Lastly, a basic survey of typical and evident campsite impacts was taken as anecdotal/observational data.

With respect to the management and planning aspects of this thesis, I participated in a number of formal and informal discussions that have occurred since 2000 with various community groups and agency experts respecting the disposition of Crown Lands, management alternatives, and the potential for collaborative management of Franklin island. At various times throughout the study period (2000-2007) I was involved as an adviser to community groups and municipalities, as a

volunteer director of the Georgian Bay Biosphere Reserve, and finally as a municipal planner for a Georgian Bay coastal municipality. This personal and professional involvement has provided me with an opportunity to gain a better understanding of community-agency dynamics with respect to the issues and possibilities for Crown Land management.

## 1.6 Outline of Thesis

Chapter 2 provides a background to the planning and management context of Georgian Bay and Franklin Island through a discussion of growth pressures and tourism demands from changes in southern Ontario. It also presents various responses to Crown Land management from provincial and municipal authorities as well as non-governmental organizations.

Chapter 3 reviews the recreation impact literature to inform the first phase of the research, undertaken in the summer of 2000. Each section of the literature review outlines current understandings of recreation impacts to be applied in the context of the specific geological, ecological and cultural history of Franklin Island, presented in Chapter 4. Selected themes from the literature, presented in the context of eastern Georgian Bay island ecology, help to inform the overall type of recreation assessment and the specific research methods outlined in Chapter 5 that are most appropriate for examining terrestrial 'back country' recreation impacts on Franklin Island.

Results from the ecological assessment of terrestrial recreation impacts are analyzed in Chapter 6 and then the relevance of this data is discussed in Chapter 7. Although the discussion begins at the site level, it recognizes that for any discussion of recreation management, other scales and perspectives are required. Turning to some of the literature on social-ecological systems helps to account for different social values and management perspectives in Georgian Bay. For example, the perception of environmental conditions is affected by different interpretations of what constitutes "ecologically significant" recreation impacts versus those determined by aesthetic preferences. These considerations and others present certain challenges for management of areas like Franklin Island.

Chapter 8 uses this study of recreation impacts to consider social, ecological, and cross-scale dimensions of management to critically assess the management needs for Franklin Island. In light of recent (2005-2007) citizen initiatives that are monitoring and mitigating recreation impacts on Franklin, the discussion highlights the potential for collaborative community-based management approaches. It adopts a broad perspective in the analysis of how decision-making about recreation impacts could occur, and outlines recommendations specifically for Franklin Island, and more generally for eastern Georgian Bay.

# 2. BACKGROUND

This section a broader background context that frames the growth pressures facing the eastern coast of Georgian Bay and Franklin Island in the form of tourism and recreation. Additionally a range of approaches that have been developed or emerged to respond to these pressures from provincial, municipal and non-governmental levels are outlined. Specific details related to Franklin Island are found in Chapter 4 - Case Study.

## 2.1 Growth Pressures and Tourism Demands from Southern Ontario

The province of Ontario is in a period of intense urbanization, specifically around the Greater Toronto Area. Provincial plans from the past decade, such as the *Oak Ridges Moraine Plan*, the *Greenbelt Plan* and *Places to Grow* (Government of Ontario, 2006) have each highlighted the challenges of intense urbanization to the maintenance of ecosystem services in the southern portion of the province. These plans have developed during the emergence of a strong neo-conservative agenda for Ontario; that is a reduction in government resources and central control and a loosening of environmental regulations and a 'freeing' and promoting of the market economy (Environment Commissioner of Ontario, 2007).

Population growth has fuelled an expansion of second-home investment and other recreation-based economies in the regions just beyond these planned expansion areas. Tourism is fast becoming a dominant market growth mechanism in many of the rural areas of Ontario. For example, the province's *Places to Grow: Growth Plan for the Greater Golden Horseshoe* (2006) establishes a vision of growth that extends to the southern portion of Georgian Bay. In it, the vision recognizes that one third of Canadians live in the Greater Golden Horseshoe (GGH) and the plan outlines a number of policies that establish the need to meet a rising population through to 2031.

This type of provincial plan has been dovetailed with the province's *Greenbelt Plan*, and is somewhat reflective of the objectives of *Ontario's Living Legacy Land Use Strategy*, which

seeks to provide a certain degree of protection for some of the province's natural heritage areas. Suffice it to say that population growth in the GGH alone and an increasing interest in recreation will most likely result in increased recreation pressures on natural areas within and outside of southern Ontario.

Indeed, a survey of the importance of nature to Canadians, performed in 1996, revealed both a keen interest in nature-related activities and a significant economic value gained from these activities. Table 1 highlights statistics of involvement and value in nature-related activities in Canada and Ontario. Communities in and around Georgian Bay are feeling the effects of these trends in tourism. The tourism industry in Parry Sound and Port Severn is one of the mainstays of their local economies (OMNR, 2001).

**Table 1**. Prevalence and economic value gained from nature related activities

| **Statistic** | **Canada** | **Ontario** |
|---|---|---|
| Participation in one or more nature-related activity | 20 million (84.6% of the population aged 15 yrs and over) | |
| Visited Park or natural areas | Over half of participants | |
| Spending on nature-related activities | $11 billion ($7.2 in natural areas) | $4.3 billion |
| Camping as primary activity | 18.8% of Canadian sample | 17.3% of Ontario sample |
| Canoeing, kayaking, and sailing as primary activity | 9.9% of Canadian sample | 11.4% of Ontario sample |
| Power boating as primary activity | 9.3% of Canadian sample | 10.1% of Ontario sample |

(DuWors et al, 1999, Duwors et al, 2001).

Specifically, the regions surrounding southern Georgian Bay and Orillia have been highlighted as areas with easy access and opportunities for commercial tourism expansion. Summer resorts north of these areas are becoming converted into 'time-share' and condominiums with higher density 'cottage'-living, while a range of marketing programs aim to draw more tourists into the area to stimulate the economy. Growth in tourism has resulted in increased visitation to area attractions, parks, and wilderness areas.

Although there is limited provincial or regional tourism planning which relates specifically to Georgian Bay, there are a number of local tourism marketing activities that currently encourage tourism. 'Georgian Bay Country', a Community Futures project, is a federally funded initiative under FedNor which seeks to promote all forms of tourism (Georgian Bay Country, 2007). In addition, local efforts have been closely tied to broad tourism campaigns to promote the use of snowmobiles and all-terrain vehicles (ATVs) in the Parry Sound area. In terms of wilderness recreation, Partners in Eco-Adventure Tourism (PEAT) provides a centralized marketing forum for wilderness outfitters and eco-adventure providers (PEAT, 2007). These initiatives and others are encouraging a very broad range of tourism experiences which are directed both at communities along the coast and tourists seeking to explore the coast.

Although there are no definitive visitation records to the area, estimates of 500,000 non-attached visitors (not second-home/cottage users) to the Parry Sound area have been issued by the Community Business and Development Corporation (CBDC, 2006). This compares to an approximate full-time population of 12 500 for the same area (CBDC, 2006). This number would not include visitors to areas outside of the District of Parry Sound, such as Georgian Bay Township in the District of Muskoka to the south of Georgian Bay and the French River and Killarney areas in northern Georgian Bay.

## 2.2 Characteristics of Tourism and Recreation and Impacts in Eastern Georgian Bay

Environmental impacts of tourism and recreation are generally well documented (as outlined in Chapter 3). Specifically for eastern Georgian Bay, there are few quantitative assessments of recreation impacts and the majority of assessments appear to be survey based and/or observation based. However, the intent of this section is to provide a snapshot of the potential impacts, or those known to the author based on experience.

The majority of tourism and recreation pressure on eastern Georgian Bay would likely be associated with seasonal residents. Because the majority of the eastern coast is inaccessible by

road at all or only on a seasonal basis, private land development consists largely of second home development. The increased concentration of cottage properties, however, also increases the number of recreationists for Crown Land use. Cottagers are likely the most common Crown Land users for picnicking (day use) and to a lesser degree, camping (multi-day uses). The greatest concentration of cottaging exists in the southern portions of the eastern coast between Port Severn and Pointe au Baril with the possible exception of Massasauga Provincial Park just south of Parry Sound. North of Pointe au Baril is dominated by crown lands, predominantly designated as Conservation Reserves.

In addition to cottaging, a number of historic and some modern resorts provide Crown Land camping and picnicking opportunities. It is common for resorts to provide motorboats to their clients to access these lands. Further, the coast of Georgian Bay is recognized as a world-class boating destination for sail and power boats, fishing, kayaking and canoeing. The Crown Lands and park lands on the coast are well used for picnicking and camping by all these user groups. Powerboat density is greatest in southern areas of the eastern coast near Honey Harbour and Midland. Summer resorts and fishing camps are spaced throughout the entire coast.

Potential impacts associated with Crown Land use include: trampling and destruction of vegetation for paths and fires, destruction of wildlife and indirect pressures on wildlife through proximity to humans and associated noises, and indirectly providing alternative food sources for wildlife. Other impacts may include littering, human waste disposal, potential contamination of local water bodies and risk of forest fires. Because of the greater availability of crown lands for camping the dominant location for unregulated camping tends to be in areas north of Parry Sound.

### 2.3 Provincial Approaches to Crown Land Management

One of the key challenges for future planning and development is how to successfully meet the economic goals of recreation and tourism and yet not to compromise the ecological integrity values and social values of the parks and protected areas where the recreation activities are going

to occur (Manning et al., 1996). Adding to the challenge is the drive for 'economic efficiency' to increase revenues through increased tourist visitation while reducing servicing needs (Eagles, 1999). In some respects, environmental managers and planners are to address how much change is tolerable in terms of public values and how much change is possible from an ecological perspective.

In Ontario, shifts in provincial government mandates for parks and protected areas have led to two major changes. First, budget cuts to both the Ontario Ministry of Natural Resources and to Ontario Parks have seen reductions in research, planning and management, and enforcement staff involved with Crown Lands (Environment Commissioner of Ontario, 2007). Second, parks and protected areas have increasingly adopted a business management model as opposed to an ecosystem management model in order to deal with budget reductions and as part of an overall provincial mandate of encouraging corporate enterprise within Ontario. This is part of a fiscal management policy which has Ontario Parks supporting itself through user fees without significant revenues from provincial taxation (Boan, 2006)

These changes have potentially major impacts at various scales. At a provincial scale, for example, through reductions in park and protected areas management capabilities (staffing and resources), there could be a degradation of ecological integrity within the parks system through a lack of focus on ecological principles in planning and management. At a regional scale, Crown Land management is enforced through a combined effort of Conservation Officers and Ontario Provincial Police. However, there are considerable constraints to effective Crown Land management by these government employees due to financial and staffing limitations, not to mention geography and access issues.

At a park scale, increased use at the same time as cuts to science, research, education, and enforcement staff may greatly reduce the ability for parks to meet certain ecological goals and to assure that management goals are not being compromised. However, recent changes to the Provincial Parks Act have provided updated objectives for Provincial Parks and have designated Conservation Reserves. The incorporation of "ecological integrity" (see Section 3 for definition)

into the objectives and the Planning and Management principles for Parks and Conservation Reserves may provide some counter-balance to trends in parks management and provide a renewed focus on ecological principles (Government of Ontario, 2006b).

In terms of protected areas, planning and management is largely the task of provincial and federal authorities. However, these agencies are increasingly soliciting input and engaging communities in areas of influence surrounding the protected areas. In recognition of the identity of the coastal areas, the OMNR in 1999 designated the Great Lakes Heritage Coast (GLHC). This policy statement identified the region for special planning and multiple-use management consideration (OMNR, 1999). In addition to this designation, some park expansions were made and several additional Conservation Reserves were identified.

Considerable energies and public consultations were undertaken in the review, creation and planning of the Great Lakes Heritage Coast (1999-2004) as part of a new land use designation known as an Enhanced Management Area (EMA). The purpose of the EMA is to manage a multitude of land uses, including those with apparent conflicts (i.e., forestry, tourism, and conservation) in a region or landscape; essentially establishing a form of integrated planning and management.

The GLHC provided a framework to address the development of a sustainable economic development strategy concurrent with means to ensure good planning, management, and research related to the ecological values of the coast. Specific to the Great Lakes, the intent of the Great Lakes Coastal Area EMA was to manage the area "to:

- Protect its outstanding scenic beauty and natural ecosystems;
- Promote its recreational and tourism potential through the establishment of a network of parks and protected areas and complementary tourism infrastructure;
- Ensure that only development that is compatible with the overall policy intent for the area is permitted; and,

- Foster cooperation and actively seek partnerships with other levels of governments, Aboriginal communities, and interest groups in the planning and management of this coastal area." (OMNR, 1999)

The work done by the OMNR in the development of the Great Lakes Heritage Coast was effectively creating a new identity for the development and protection of eastern Georgian Bay. The GLHC identified important ecosystems and economic opportunities by creating a new identity for the region and the public. This was one of the first comprehensive exercises in sustainable development planning at the larger landscape scale. However, in 2003 with the change of government, support for the initiative waned, prior to full implementation of the Heritage Coast strategy, likely due to the initiative's strong political ties to the former government.

Although still a technical land use designation, the intent and purpose of the Enhanced Management Area for the Great Lakes Heritage Coast would appear to have been reduced and is no longer a functional concept for planning and management along the coast (O'Donoghue pers comm, 2005). The potential for ecological impacts to affect coastal resources is now greater due to various economic drivers and pressures (i.e., new development, re-development, and recreation) that are growing. Further, neither land use managers nor the public have a discourse or a guiding document for setting directions on how these pressures and potential impacts should be managed throughout the broader region or within the study area of eastern Georgian Bay.

The GLHC introduced the concept of cultural landscape (aesthetic and heritage values) that helped people understand that impacts on the environment could be evaluated based on ecosystem damage as much as on cultural change. Indeed, the quality of a recreation experience is based on the perception of ecological quality (e.g., fishable, drinkable swimable water; healthy forests) as much as on the perception of landscape (aesthetically, spiritually). The GLHC recognized that any future development should be based on the quality of ecosystems and the quality of experience provided by cultural identifications with landscape.

Of course a further challenge is the management of multi-use landscapes. The diversity of uses, ecological impacts, economic values, and perceptions and impressions of those inhabiting and using particular places characterizes multi-use landscapes. Such landscapes are combinations of parks and protected areas, Aboriginal lands and land claims, patent (private) lands, and non-designated Crown Lands. These lands provide additional challenges in: the lack of defined and consistent ecological goals across the landscape, the lack of uniform regulation and enforcement, and the multitude of possible recreation, tourism and resource activities available and present (Noss, 1995).

## 2.4 Municipal Approaches and Responses to Crown Land Use

The east coast of Georgian Bay consists of large tracts of Crown Lands and protected areas (including several provincial and one National Park, numerous Conservation Reserves, etc.), six First Nations plus the Métis, and seven local municipalities and one district municipality.[2] The responsibility for the planning and management of Crown Lands and parks falls to provincial and federal agencies. Planning and management of First Nations lands is directed largely internally by individual First Nations communities and associated federal ministries.

Local municipalities have been afforded greater control over their planning agendas with reduced input from provincial ministries and minimal input from federal authorities. Municipalities are increasingly looked upon by residents as conduits to provincial and federal authorities, as can be seen in the increasing presence of organizations such as the Canadian Federation of Municipalities, the Association of Municipalities of Ontario, and the Great Lakes – St. Lawrence Cities Mayor's Initiative.

However, provincial and federal downloading to municipalities has constrained them in a number of ways. As an example, the federal government has systematically devolved small-craft harbours in the Great Lakes to willing management partners. Municipalities in Georgian Bay

2 First Nations include: Moose Deer Point, Wasauksing, Shawanaga, Magnetewan, Henvey Inlet,
Municipalities include: Town of Killarney, Township of The Archipelago, Carling Township, McDougall

(many of whose local residents and seasonal ratepayers are reliant on these sites for water access) were the obvious choice to take over management and maintenance of these facilities. The result has been a reduction in the availability of access sites with some sites being closed down and others being regulated exclusively for residents of that particular municipality. The social, ecological and economic effects of privatization of formerly public access points to federal waters and Crown Lands are unknown.

In terms of recreation impacts, municipalities are often the first point of contact for citizens expressing their concerns. For example, citizen groups have been actively lobbying their municipal councils along eastern Georgian Bay to address the recreation pressures and threats they perceive on crown islands. Municipal responses vary but frustration exists at a municipal level due to a lack of perceived options and a decline in provincial support to Ministry of Natural Resources for Crown Land management programs. There has been reluctance on the part of municipalities to take on what is thought to be MNR responsibility, also because of the lack of staffing capacity and funding in small rural townships (Carling Township, 2007).

While municipalities may appear to be in a position to address these local issues with relatively informal management structures, there is a political and financial reluctance to take on what is perceived as further downloading. The OMNR has the ability to transfer management control and responsibility of Crown Lands to a third party (e.g., municipality, non-government organization) under the Public Lands Act and the Provincial Parks Act through formalized agreements. Although this option has been discussed with some local municipalities in eastern Georgian Bay there is significant concern with the concurrent shift in liability and cost for which the MNR offers little recompense (Murphy, pers comm.., 2006) These arrangements have not been used to date. Despite initial reluctance, and concurrent with expressions of frustration with provincial authorities, some municipalities are beginning to respond in a variety of manners such as providing some logistic and financial support to NGOs, citizen groups, and businesses. These initiatives will be detailed further in Section 8 as part of the discussion of management alternatives.

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Township, Town of Parry Sound, Seguin Township, Township of Georgian Bay, and the District of Muskoka.

## 2.5 Non-governmental Organizations

Beyond the traditional roles for government in conservation management, non-governmental organizations and citizens' groups have also played important roles for protected areas designation and planning in eastern Georgian Bay. The recent UNESCO designation of the Georgian Bay Littoral Biosphere Reserve recognizes the global ecological significance of the area, current pressures and the potential for tourism management. Spearheaded by the GBA Foundation in 1997 and designated in 2004, the non-profit Georgian Bay Biosphere Reserve Inc. volunteer board includes members from cottagers' associations (seasonal residents), local communities (permanent residents), recreational boaters (sailing, yachting, kayaking, etc.) and First Nations. The primary role of the GBBR Inc. board is to facilitate and coordinate efforts to support conservation, sustainable development, and capacity building (through research, monitoring, education, and information exchange) related to local, national and global issues of conservation and development.

The Georgian Bay Littoral Biosphere Reserve nomination document (GBLBR, 2004: 14-15) highlights the unique ecology and conservation significance of the region:

> *"The geological and hydrologic configuration has resulted in a highly variable mix of open waters, sheltered bays, coastal wetlands, exposed bedrock shores, sandy and cobble beaches, riparian vegetation and upland forests on the mainland and larger coastal islands. These features have been captured in various protected areas along the eastern Georgian Bay coast and has remained as one of the longest and largest corridors of almost continuous protected landscape/waterscape in south central Ontario.*"

In some respects the Georgian Bay Littoral Biosphere Reserve mirrors the planning and management process of the Great Lakes Heritage Coast by bringing local organizations and people together to determine sustainable futures and directions for the management and development of the east coast of Georgian Bay. As a relative newcomer in the governance of the

Bay, the impact of the Biosphere Reserve on protected areas management has yet to be determined. However, research into Biosphere Reserves suggests a promising role for this Biosphere Reserve in helping to shape sustainable agendas and address the challenge of how to enact management and monitoring (Francis, 2004).

The newly created Georgian Bay Biosphere Reserve, the GBA Foundation, the Georgian Bay Association, and the Georgian Bay Land Trust are four NGOs all of which have, at various times, weighed in on Crown Land and parks management directions. These groups often work in collaboration with national or international organizations such as Ducks Unlimited, the Nature Conservancy of Canada and the World Wildlife Fund to achieve conservation goals and help to define a conservation agenda for the coast. Their role in representing and providing credibility to local interests is significant and will likely continue with the declining role of formal government in some of the research and monitoring on the coast and an increased interest in seeing new forms of management and stewardship for Crown Lands.

## 2.6 Collaborative Efforts

Interest in the potential impacts of recreation on Franklin Island has existed among many groups for a number of years. In the mid-1990's, the increasing kayak-camping traffic led a local outfitter (White Squall Paddling Centre) and the Great Lakes Sea Kayak Association (GLSKA) to construct and locate wooden latrines ("thunderboxes") at a number of the higher use sites as a means of addressing problems with human waste. Collaborative efforts also supported an annual Franklin Island clean-up day where refuse was collected. Through time the number of volunteer groups supporting the efforts financially and otherwise expanded so that it became a truly multi-party effort, as described in Section 8.

The Ministry of Natural Resources invited public participation about management of Franklin Island during the *Lands for Life* process (OMNR, 1999), when it was designated a Conservation Reserve with the option for it to be made into a Provincial Park. In 2001 and 2002, the MNR requested that Carling Township provide direction as to their preferred designation (park versus

Conservation Reserve).[3] In response, Carling Township formed an advisory group of its local ratepayers. In 2002, I was employed by Carling Township and assisted the group with its final deliberations respecting the direction to Council and eventual recommendations to the MNR (Carling Township, 2003). In general, the outcome from the advisory group and Council was that neither option appeared suitable because it was felt that Conservation Reserves did not afford adequate management oversight yet the Provincial Park style would result in excessive management and would change traditional access and enjoyment of a popular destination. It was felt that a middle-ground effort could be adopted whereby the MNR, the Township, NGOs and volunteer groups could work together toward a joint solution for stewardship and management.[4]

In the meantime, concern for Franklin Island from user groups had escalated and attempts were made in 2005 and 2006 to formally establish a partnership to implement some form of management and stewardship activity on the island. In the summer of 2006, the partnership between White Squall, GLSKA and West Carling Association employed a summer student to monitor, clean and install latrines. A separate partnership that year between Carling Township, the Eastern Georgian Bay Stewardship Council (Ontario Stewardship), the Georgian Bay Land Trust, the Georgian Bay Biosphere Reserve, White Squall, and West Carling Association installed educational signs at the campsites and encouraged volunteers to monitor and clean campsites and construct additional latrines. It was during these two efforts that the concept of a volunteer campfire ban was adopted.

For the 2007 summer season the GLSKA/White Squall partnership moved to address some of the recreation impacts on other Crown Lands and the second community partnership was formalized under the leadership of Carling Township to employ two summer students and continue education and stewardship activities. These partnerships have successfully raised the profile of low-impact camping techniques in the area and have provided a public face for stewardship in this area of the coast.

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3 See Ontario's Living Legacy, Land Use Strategy, OMNR 1999 and the Public Lands Act and Provincial Parks Act of Ontario for a detailed review of the difference between Conservation Reserves and Provincial Parks.
4 Subsequent to this direction from Carling Township, the MNR has held the disposition of Georgian Bay islands (including Franklin) while the Wikwimekong First Nations Land Claims are resolved. It is anticipated that the

Increasing use of Crown Land islands, along with growing public concern for recreation impacts, but limited governance capacity by traditional authorities, led to the spontaneous organization of collaborative partnerships. However, organization of such partnerships was tentative for some time as few of the participating groups had the capacity to hire and supervise students and some of the stakeholder groups felt that it was strictly the MNR's responsibility and therefore did not want to participate. Questions about liability, financial support, governance capacity, and issue-responsibility continue to be key areas of concern for the future of these partnerships. Chapters 7 and 8 speak to the future of this type of program for Franklin Island and other areas of the coast as adaptive strategies for recreation management.

Hampering a response to the myriad of ecological and social pressures that face protected and Crown Land area decision-makers is often a lack of understanding of the specific impacts on the area, the various conflicts between users, and the variety of governance (regulatory and decision-making) structures and processes involved. Georgian Bay is well suited to a study of recreation management due to the variety of pressures and potential courses of action to address socio-ecological change within the context of decision-making for sustainability.

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MNR will further explore these two options once the land claims are resolved.

# 3. LITERATURE REVIEW

Assessment of recreation impacts is a relatively new field of research and has proven important for creating management strategies and assessing their effectiveness. For a discussion of appropriate management on Franklin Island and other areas lacking formal management arrangements, it is important to first present ideas and approaches from the field of recreation impact assessment. This section of the thesis outlines a case for a scientific/ecological approach as was initially taken in the development of this research. An overview of recreation impacts from the literature helps to point to likely impacts and assessment methods for Georgian Bay and Franklin Island.

## 3.1 Recreation Ecology

Recreation ecology is a relatively new field of ecology beginning in the 1970s (Liddle, 1997). This field of ecology emerged from observations that increasing recreation pressures were harming the values that were drawing recreation, which would in turn affect tourism and local economies (the latter of which did not appear as a concern in original recreation ecology literature). Recreation ecology focuses on what the impacts of recreation are on all aspects of ecosystems including plants, soil, animals, fish, etc. The general practice has been to assess apparent impacts, simulate recreation experiences, and undertake surveys; the focus of most studies is predominantly at the scale of the individual and the site and seldom at the population or larger (e.g., landscape) scales.

Many would also point out that biophysical knowledge is important for determining appropriate ecosystem management action (Lackey, 1998, Szaro et al, 1998, Grumbine, 1994, Mills and Clark, 2001). This idea is well illustrated by the statement that "developing the foundation for ecosystem management will require not only sound science but the 'right' science"(Szaro et al, 1998), furthering the notion within decision making that a correct combination of "facts" from science proffers the "right" path for management. Recreation ecology provides an effective, focused and experienced means of understanding site-level impacts that are important to inform

management strategies which is why this thesis begins with an assessment of recreation impacts on Franklin Island.

The literature establishes two general ways in which recreation impacts are determined. The first is through experimental procedures of starting with an untouched ecosystem, and while maintaining a control, effecting some form of recreation on a similar area. This method is most commonly used to determine the effect of trampling on a specific vegetation type (Cole and Bayfield, 1993) The second method most commonly used is to identify changes to an area after recreation has already occurred. In this method, the amount of recreation use for each site is known at some basic level such that the impacts associated can be correlated to amount of use.

Most commonly within backcountry recreation analysis, management goals are clearly set out by park and protected areas agencies. Management objectives will usually stress the preservation and protection of wilderness lands in their natural condition while minimizing the evidence of human use (Cole, 1992). The Ontario Provincial Park system has been set up, on paper, primarily for preservation with recreation values being integrated to varying degrees depending on the class of the park (Lompart and Riley, 1997). This pre-established goal or intent can be an advantage to recreation ecologists who can then simply determine how recreation is moving an ecosystem away from the known natural state. It can also prove a challenge if these goals of 'natural' are challenged or are not evident.

As mentioned earlier, parks and protected areas usually carry double mandates of preservation and provision of recreation opportunities. Due to this, recreation ecology must respond to both biophysical and social goals for an area and is seen by many as a paradox. For example, Marion and Cole (1996) point out that "recreation impacts compromise the integrity of natural ecosystems and diminish the quality of the recreation experience." It is often suggested for recreation settings that social and ecological goals are complementary. However, in much of the literature, ecological goals often take precedence over an explicit discussion of social goals and values. It is not clearly distinguishable where biophysical goals and social goals diverge or overlap, and this is one area of interest for this thesis.

## 3.2 Recreation Impacts

The recreation impacts reviewed for this research are those associated with wilderness or semi-wilderness recreation. It is focused on those impacts due to wilderness camping in relatively remote settings. Specifically, the literature highlights the impacts regarding campsite creation and use and trampling impacts. The range of possible impacts includes: vegetation loss and shifts in species composition, soil exposure, compaction and erosion, tree and seedling damage, wildlife disturbance, and vandalism (depreciative behaviour) (Leung and Marion, 1999; Green, 1998).

Cole and Landres (1996) categorize the primary ecological impacts due to recreation as follows: physical site alteration and disturbance of biota by trampling; the removal of and redistribution of materials; disturbance of animals; harvesting; and pollution of waters by human waste. Table 2 outlines examples of impacts associated with each of the categories as drawn from the literature.

The impacts listed in Table 2 are highly interrelated: one specific type of impact can lead to the beginning of another impact – the beginnings of cumulative impact analysis addressed later in Section 3.5. Attempts have been made in measurement to determine if there are more significant impacts which could act as indicators of the severity of recreation impacts. Vegetation loss and damage remain the most useful measures of impact (Cole, 1992) in most recreation settings but others are as important when considering the ability for sites to rebound after disturbance. In order to understand if there is an order of significance we need to understand the factors that influence the effects of recreation impacts.

## 3.3 Factors that Influence the Severity of Recreation Impacts

As noted earlier, context in ecology is a very important part of recreation research; few generic ecological theories exist which transcend boundaries without some modification to deal with new

**Table 2**: Types and examples of recreation impacts

| | |
|---|---|
| **Site Alteration and Disturbance** | |
| Vegetation destruction | Soil compaction |
| Shift in species composition | Soil erosion |
| Fire pit creation | Trail creation |
| Tree root exposure | |
| **Animal Disturbance** | |
| Provision of foreign foods | Proximity Disturbance |
| Animal Socialization | Species at risk (interest and sensitivity) |
| Physical harm (fishing and hunting) | Habitat Alteration (edge effects, removal) |
| **Removal and Redistribution of Materials** | |
| built structures | |
| fire wood collection and burning | |
| rock removal and movement for tent sites | |
| **Harvesting of plants and animals** | |
| Species at risk | Tree Damage |
| Fishing, hunting, trapping | Vandalism |
| **Pollution** | |
| Human waste disposal | Food Waste Disposal |
| Litter | Fuel use and spillage |
| Food wastes disposal | |
| Petrochemical fuel consumption and spillage | |

(Cole, 1986; Marion and Cole; 1996, Cole 1992; Speight, 1973; Green, 1998; Kuss, 1986; Theobald et al 1997; Merriam and Smith, 1974; Frissel, 1978; Leung and Marion, 1999; Cole and Landres, 1996; Murcia, 1995; Reid and Marion, 2005)

scales and varying site characteristics. Additionally, social influences often specific to an individual ecosystem add to complexity, hampering prediction of management outcomes across different ecosystems. The following discussion outlines some of the context-specific factors that may affect the severity of impact in a wilderness setting. Depending on the ecological context, these factors may mitigate impacts to varying degrees; they can be grouped into biophysical site characteristics and user characteristics (Marion and Cole, 1996).

### 3.3.1 Biophysical site characteristics

An ecosystem's biophysical characteristics affect the types and severity of impacts and the ability of the system to absorb those impacts. This is best seen as an ecosystem's *resistance*; the ability to resist being disturbed (Cole and Landres, 1996, Kuss, 1986) and *resilience:* the ability

to recover from disturbance (Cole and Bayfield, 1993; Cole and Landres, 1996; Kuss, 1986). Factors that contribute to the resistance and resilience of a campsite are:

**Vegetation Density.** Cole (1992) suggests in a model of campsite impacts that the amount of vegetation harmed will be reduced as density decreases but the overall size of the campsite may not change.

**Type of substrate** needs to be considered for both resistance and resilience. The type of soil affects susceptibility to compaction (Green, 1998) and type and extent of vegetation growth (Kuss, 1986). Soil resistance to compaction will be affected by intensity of trampling and duration, moisture content, texture, structure, density and organic matter content (Kuss, 1986, Green, 1998). The amount of compaction of substrate will affect the ability for vegetation to recolonize an area, affecting campsite resilience.

**Type of vegetation**. Vegetation types exhibit various strategies for coping with disturbance and some are more resistant to compaction than others (Kuss, 1986) that will influence resistance to disturbance and some are able to rebound or repopulate after disturbance, thereby contributing to resilience.

Consideration of these three components of biophysical characteristics should not be underestimated when thinking about ecosystem resilience. For example, Kuss (1986) suggests that recovery time of vegetation in some ecosystems may require 50 to 100 years. Understanding the implications of recovery can perhaps help to better locate recreation sites in order to reduce harm to particularly vulnerable or threatened ecosystems.

To demonstrate the importance of biophysical mitigating factors, a review of recreation impacts associated with three distinct ecosystems, yet with similar amounts and types of recreation pressure, are examined in detail. The three case studies demonstrate that while there are general trends across recreation impact studies, the impacts and thus the recommended management aproaches can vary considerably across ecosystems. The following three studies provide

examples of ecosystems and recreation experiences that are in some respect similar to that of Georgian Bay.

**Example 1.** *Grand Canyon – Backcountry Hiking Impacts*

Cole (1986) undertook an assessment of recreation impacts in the Grand Canyon, Arizona. The ecosystem is broadly defined as open pine woodland with an understory of evergeen shrubs (e.g., juniper). Coarse and rocky sandy loam soils predominate and bare soil represents approximately 50% coverage of the sites. In some ways, this soil type mimics the bare strata found on Georgian Bay coastal areas. Recreation pressures occur from hiking and camping where a strong "low-impact" camping ethic prevails. Campsites that are considered high-use experience between 75 and 300 user-nights per year. Associated recreation impacts on them are as follows:

- soil compaction with campsite cores devoid of vegetation
- campsites with well defined core and perimeter and few impacts outside of core area
- no shift in vegetation composition at perimeters
- non-linear impact curves (i.e., low use rates create the most significant impacts and rates of impact decrease with higher usage)
- cores in higher use sites are larger
- pathways to water are highly eroded

**Example 2**. *Boundary Waters Canoe Area – canoe camping impacts*

A study in the Boundary Waters Canoe area (in northern Ontario, west of Lake Superior, along the Canada-U.S. border) by Merriam and Smith (1974) occurred in a boreal forest zone with variable boreal vegetation (aspen, birch, jack pine, spruce-fir, red and white pine and cedar) with thick loamy soils and nearly continuous vegetation cover. Georgian Bay shares some boreal species and is also subject to water-based recreation. Campsite usage was more significant, ranging from 350-700 recreation day-uses per year with a total usage of 12,762 canoeists and 4037 motorboaters over a five-year period. A summary of impacts on these campsites highlight:

- non-linear impact use curves;
- reduced soil depths sufficient to expose tree roots (but little tree mortality);
- considerable campsite core expansion;
- increased coliform bacteria populations in nearby waters at campsite location;
- soils at high use sites were considerably more compacted producing greater run-off and erosion.

**Example 3**. *Central Arizona Riparian Recreation Impacts*

This area, studied by Green (1998), is dominated by ash with cottonwoods and sycamore occurring as subdominants in an area of sand loam and loam soils. Recreation largely occurs through camping and day use picnicking and the recreation area is undeveloped with no formal management structure in place. This area is similar to Franklin Island's day use and lack of formal management. Recreation impacts assessed include:

- soils highly compacted with more run-off and erosion at high use sites (less evident at light or moderate-use sites)
- species composition changed throughout sites to more resistant species
- species richness declined in higher use areas

For Franklin Island and Georgian Bay, the Boundary Waters Canoe Area would likely have the most similar types of recreation use; the Grand Canyon, the most similar vegetation types (pine and juniper); and central Arizona the most similar geology/substrate and lack of active management. The three studies outlined above and other recreation impact and management literature establishes the following axioms of recreation impacts:

1. The magnitude of change is related to the amount of use, the amount of space used by campers, the length of time use has occurred, and the type of ecosystem (Cole and Monz, 2004, Kuss, 1986);

2. Recreation impacts are generally locally intensive and persistent[5] (Cole and Landres, 1996, Leung, and Marion, 1999, Hammit and Cole, 1998); and,
3. A non-linear relationship exists between use and impacts. Impacts rise sharply with initial increases in use, with further increases in impact tapering off at higher use levels (Cole, 1986, Merriam and Smith, 1974, Cole, 1992).

Green's study in Central Arizona, countered the first axiom of recreation impacts; most impacts in that area of Central Arizona seemed to occur not in the early stages of recreation use but later, perhaps indicating an interesting pattern of cumulative effects. Additionally, the Grand Canyon study demonstrated that vegetation did not change between the periphery and core of campsites, perhaps an indication of varying resilience of vegetation. Further, a study by Monz and Twardock (2004) indicate similar patterns for sea kayak campsites in Alaska. These conclusions demonstrate the importance of carefully examining the biophysical and social influences unique to each ecosystem and its subsequent response to recreation pressures.

Recreation impacts can be generalized as having localized and severe impacts on ecosystems depending on the amount of use. These generalizations are somewhat consistent across ecosystems, but as is shown in the three study areas, variations of the extent and type of impacts across ecosystems do occur. In addition, factors that alter how recreationists experience their environment will also affect they type and extent of impacts.

### 3.3.2 Effects of User Characteristics

The type and amount of use on a site significantly affects the types and amount of impacts to an ecosystem. The precise mechanisms and relationships between impact and the amount of use are not well understood but the following list of considerations relates to the severity of recreation impacts. These are factors such as: the amount of use, user demographics, type and amount of

[5] Although at popular recreation destinations (not usually in wilderness settings) more extensive environmental alteration can occur (Marion and Cole, 1996, Cole et al, 1997)

management activity, and activity concentration. They are each described below.

***The amount of use***

The number of users will affect the length of time over which impacts occur and last; and the size and severity of the impacted area. Although as noted earlier, the impacts are generally non-linear in that most impacts occur within earlier stages of use.

***User Demographics***

The type and number of users will significantly influence the type and severity of impact. For example: the use of pack animals in some areas can significantly affect the size of impact area (Green, 1998) and different user groups have been shown to have varying standards and behaviours for recreation activities (Shelby and Schindler, 1992), which is to say that different types of users will have different types of impacts. Understanding user demographics and philosophies is vital to understanding how impacts occur and how management may be best directed.

***Type and Amount of Management Activity***

Management can both directly and indirectly influence the type of recreation impact and user experience. Management can influence recreation behaviour through signage, education programs, regulations, and facilities (e.g., fire pits, outhouses, etc.). Additionally, some management actions will have various types of biophysical impacts (e.g., fire suppression, camp-site hardening, and built structures).

***Activity Concentration***

Activity concentration was proven necessary in Cole's (1992) model of campsite impacts to limit campsite growth. Activity concentration makes intuitive sense: growth of a campsite is limited by the fact that activities are generally focused on a core area of a campsite, such as the fire pit. That is, campsites will continue to expand with size of group and amount of use, but the growth of a campsite is not linear because the focus area of campsite use

remains the same regardless of the size of group (Cole and Monz, 2004).

### 3.4 Cumulative Impacts

Probably the most difficult to assess, yet likely the most important to understand, are the implications of cumulative or combinatory ecological impacts of recreation. These are changes to an ecosystem that create impacts greater than the sum of the parts and are often called synergistic effects. Cumulative effects also represent the common mechanisms by which ecosystem impacts at one scale (e.g., local) are transferred across to other scales (Cole, 2004).

Interestingly, however, is that there does not seem to be a significant coverage of this topic within the recreation impact/management literature. And yet, a significant portion of the severity of recreation impacts and their ability to reduce local resilience of ecosystems can be attributed to cumulative impacts (Liddle, 1997). Awareness of cumulative impacts is not only important from the perspective of understanding the dynamics of change resulting from recreation. It is also necessary to: (1) distinguish 'natural' variation (background noise) from the pressures and impacts being assessed; (2) distinguish impacts due to recreation from impacts from other sources; and (3) determine how recreation threats and other threats combine to create greater and more complex impacts.

The significance of cumulative impacts can be found in Frissel's (1978) description of the evolution of a campsite with increasing use over time. What are embedded within this description are the combination and accumulation of impacts: a significantly larger campsite with highly eroded trails and water-side banks. A generalized version of Frissel's description is as follows:

- first trampling of herbaceous vegetation moving to destruction of vegetation;
- vegetation removal;
- litter layer compaction and removal;
- substrate exposure;
- compaction and removal of soil, large vegetation damage, root exposure and death;

- significant camp site expansion.

These combinatory and cumulative effects result from rapid changes that unravel the local ecosystem through soil plant interactions that potentially result in faster than normal erosion of soils, and result in reduced ability for the local ecosystem to respond. Green (1998) and Kuss (1986) outline the many significant interactions that operate together to maintain the ecosystem and how seemingly inconsequential impacts like trampling and local compaction can lead to impacts beyond the initially trampled site, thus weakening the surrounding area's resistance to further trampling. Conversely responses by vegetation can be seen in the growth and abundance of more resistant plants thereby strengthening the resistance of the local ecosystem (Kuss, 1986, Cole, 2004).

Other examples exist within the literature on impacts to wildlife. Theobald et al (1997) suggest that seemingly benign recreational activities, such as hiking, may cause some species to alter their activities and behaviours. Some examples are energetics spent for flushed animals; altered feeding patterns; increased nest predation and nest abandonment; and changes in animal densities and distribution near high-use areas.

A limitation of much of this literature is the lack of any significant discussion about how recreation impacts and recreation research fit into more recent theoretical discussion of ecological integrity and resilience. The next and last section of this literature review provides a brief review of more contemporary theoretical ecology literature. Emerging from a complex systems perspective, a discussion of ecological impacts becomes a discussion of the coupling of social and ecological systems. This literature effectively provides a transition from the pure ecological perspectives of recreation ecology toward discussions of broader social systems such as management.

### 3.5 Applying complex systems approaches to recreation ecology

In general, recreation ecology appears to have been quite effective at analyzing impacts at the site level but is perhaps lacking in accounting for impacts beyond the site level at other scales. That is, the cross-scale implications of recreation experiences, a hallmark of recent ecosystem management theory, appear to be lacking in the field of recreation ecology. Further, recreation ecology appears to be grounded within a normal scientific approach that utilizes conceptions of equilibrium-based ecosystems wherein stress and response are interpreted in linear, mechanistic fashions. This scientific approach supports social conceptions of ecosystems having a 'normal' or an ideal state that situates impacts within notions of a 'pristine' or 'untouched' ecosystem.

A systems approach to recreation ecology may be challenging because in its current form, recreation ecology focuses primarily on small scales with little attention paid to either larger scale or cumulative impacts. Traditional recreation ecology distinguishes itself as a 'science' free from the subjectivity of the recreation 'experience' which brings social values into the assessment of recreation impacts. Recreation ecology would benefit from insights from the Ecosystem Approach and from a systems approach that locates ecological integrity as an essential component of sustainable development. Attention to multiple perspectives and cross-scale system dynamics might more effectively address the inherent complexity of undertaking scientific research in a field that is so bound to social interaction and experience. However, more recent shifts in ecology recognize the dynamic nature and unpredictability of natural systems and the need for a identifying values and the type of perspective applied in analyzing those systems (Schneider and Kay, 1994).

Somewhat of a response to this by recreation literature may exist within the recreation management literature, which has close ties to recreation ecology. Considerable movement has been made from ecological impact assessments toward research into user motivations and social impact assessments (Porter, 2002). These frameworks include the values and perspectives that recreationists bring to their experience and the influence that these factors have in determining management directions. Examples include the Recreation Carrying Capacity approach, the

Limits of Acceptable Change (Manning et al., 1996) and Visitor Experience and Resource Protection models (McCool and Cole, 1997). Each of these approaches specifically recognizes the social and economic values associated with recreation and applies them in a management framework.

These research and management approaches centre around understanding changes in the environment and how humans perceive these changes. In many ways, ”what constitutes an environmental problem depends in part on popular perception” and “resolution [of environmental problems] depends as much on the power of poetry and art as on economics, while the techniques of carrying out the resolution hinge on applied ecology” (Slobodkin, 1988). In other words, recreationist-centred assessments of ecological impacts are beginning to account for the values that people place on an area and how that affects the overall experience of the recreationist. These kinds of approaches help to understand how human value systems may influence what is deemed to be the relative severity of an ecological impact. Furthermore, it introduces the notion of aesthetic impacts that are distinct, yet related, to the interpretation of ecological and ecosystemic impacts. Thus, the guiding philosophy for these types of planning and management keeps multiple values and goals in mind that are more consistent with broader considerations for sustainable development: ecological, economic, and social.

The main critique of recreationist-centred management frameworks is that they may not adequately address other stakeholder needs and values that are directly and indirectly influenced by both the recreation impacts and the recreation experience. Some would also argue that recreationist-centred frameworks, while successful at introducing values, have shifted emphasis away from ecological values too much (Cole and Stankey, 1997). However, all of these frameworks rely heavily on researching biophysical conditions before a decision can be made. Although recreation impact research has reached considerable consensus on the impacts of recreation on the environment, there is a recognition that decisions cannot be made on theories alone; ecosystem specific understanding must be gained (Cole and Landres, 1998). Recreation ecology, then, still plays an important role within management; in assisting in understanding the dynamics of human-nature interactions as distinct from natural variation.

Ecosystems, the predominant conceptual framework for ecologists, should be seen as highly variable on spatial and temporal scales. This variability is compounded by complex interactions within the existing 'natural' variation and compounded again by human interactions. Indeed, efforts to maintain ecological goals depend on the understanding that ecosystems are complex, connected systems with functional and organization properties inherent in, and particular to, that ecosystem (Slocombe, 1993). Specifically, Schneider and Kay (1994) outline the role of ecologists in ecosystem management:

> "… ecologists as scientists should advise society on ecological interactions and the impact of human activities on natural resources. Ecosystem management is about tradeoffs and the role of the ecologist should be to identify those tradeoffs. Which tradeoff we decide to make is a political decision which environmentalists can seek to influence."

Deciding between the relative merits of an action (disputing tradeoffs) has many implications for recreation ecology and management: for example, could certain ecological impacts be deemed acceptable in order to allow particular recreation experiences to occur? Schneider and Kay make the case that science, especially ecology, plays an integral role in determining our understanding of possible futures especially through diverse landscapes and within diverse social, political, and economic contexts.

The challenge for Franklin Island and Georgian Bay is that the current recreation management frameworks, where they are utilized at all, appear to be focused on recreation in a particular place, rather than the broader system that shapes that place. Essentially most management problems relate to the tensions between social and ecological goals and objectives. The following sections argue in support of a systems approach to understanding recreation on Franklin Island as a complex social-ecological system.

## 3.6 Contemporary ecological concepts for evaluating ecosystems and impacts

Emerging from complex systems, the concepts of scale, resilience and ecological integrity have emerged as important factors in contemplating and evaluating change in intermeshed social and ecological systems. These are introduced here because they provide a potential new direction for the evaluation of recreation impacts. Also, they provide important concepts that place recreation impacts into broader contexts.

### 3.6.1 Scale

The first concept, scale, is generally referred to as being temporal and spatial. Ecologically, an ecosystem can be examined at multiple spatial scales, from the microorganism level through to the global level. There can be large scale processes which exhibit changes or cycles over long time periods and there can be smaller, local scale processes which can exhibit quite rapid changes (Peterson et al, 1998). To minimize recreation impacts, it is useful to consider how the recreationist can behave in ways that allow the processes to continue at their various scales, and/or to ensure that impacts are limited to particular spatial and temporal scale dynamics which often affords more effective and easier management systems. For example, wood gathering for campfires becomes an issue when it intrudes into the spatial scale of the forest ecosystem and/or disrupts the temporal process of forest regeneration, and thus system resilience.

### 3.6.2 Resilience

The second concept that is important for this thesis is resilience. Recreation ecologists have traditionally discussed recreation impacts in terms of resistance and resilience (Section 3.4.1). Typically this body of literature refers to resistance and resilience for an ecosystem as primarily the biophysical characteristics of an ecosystem. Recreation ecologists would explore how Franklin Island's ecosystem and vegetation community structure contribute to its resistance and resilience.

According to Holling et al (1995), resilience has been defined in two very different ways in the literature. One definition of resilience (which encapsulates resistance) is the ability of an ecosystem to maintain its current or "normal" state; that is the ability of the ecosystem to *resist* disturbance and the ability to recover once disturbed (Kuss, 1986). In this form, an ecosystem is thought to be resilient, first if it can maintain its state after various forms of disturbance and, second, if it can recover quickly to its normal or previous state. This form of resilience (and resistance) may be quite useful when examining the dynamics of systems at primarily single scales and within a certain state.

The second definition of resilience stems from a systems approach which looks at the ability of an ecosystem to avoid shifting into fundamentally different and alternative equilibrium states (Berkes and Folke, 1998). This approach to resilience recognizes that ecosystems are in a constant state of flux and rejects the notion that a single "optimum" condition exists in which the ecosystem can function. Resilience in this mode is especially useful when considering how ecosystems interact with each other and across scales. It is of particular value when introducing the importance of human dynamics and multi-scalar stressors.

The former definition of resilience has been positioned within a positivist approach to science in which ecosystems are seen to prefer a stable state and it is deemed possible to predict the ecological outcomes of a particular stressor. Measures of resilience in this paradigm are those that measure the degree of resistance to change and the amount of time for a system to return to its "stable state" (Berkes and Folke, 1998). In this case, climax communities are often touted as the standard steady state to which all systems strive.

Alternatively, using the latter definition of resilience is much like chemical titrations: resilience is the degree of buffering activity that ecosystems have to avoid shifting into alternative steady states. In this case, measures of resilience look at the magnitude or scale of disturbance that can be absorbed by a system before it changes in structure and function, or '*flips'* to an alternative equilibrium (Holling, 1995). Unlike chemical titrations, however, this perspective on resilience should not be interpreted to mean that scientists can accurately delineate the exact buffering

capacity of a given system. Furthermore, this form of resilience recognizes that a system can be quite dynamic and undergo relatively small changes without flipping into dramatically different states. There is no single "normal" or correct state for an ecosystem; shifts between various states of equilibrium may be quite natural, necessary, and unpredictable in a functioning ecosystem.

Both forms of resilience are important. The first version of resilience (i.e., resistance or the ability to withstand change) seems to be the predominant focus for recreation impact literature. It is necessary for understanding some of the mechanistic means by which ecosystems become degraded and for discerning appropriate management practices to mitigate physical impacts when impacts are at highly localized scales. This perspective on resilience provides understanding about how ecosystems respond to particular stressors and about the speed at which they repair themselves within or towards a state that is deemed to be normal. The implications of this perspective will have more to do with structures that exist within the ecosystem and the processes that help to repair/maintain those structures at a given and known state. The second version of resilience speaks to the complex and uncertain nature of any system and limitations of its associated management frameworks.

### 3.6.3 Ecological Integrity

A third concept that is important to consider is that of ecological integrity. Similarly to resilience, ecological integrity is subject to wide interpretation and disparate definitions. Also similarly to resilience, these differences often result from how ecosystems are viewed. Those that view ecosystems in a reductionist fashion would tend to define ecological integrity in a manner which emphasizes all the components of natural systems and focuses on the individual species and populations of species (Leo and Levin, 1997). In this mode, the preservation of biodiversity is seen as the key goal for management of natural system for it is through the assurance that all the biodiversity is maintained that a stable, fully functioning, normal system can exist. This approach is similar to that of the reductionist focus on resilience which focuses more on the components of the system.

An alternative approach to ecological integrity stems from a more holistic or macro level approach. In this approach, there is greater focus on the function of the ecosystem ensuring that energy flows, nutrient recycling and productivity are taken into account as the primary means of assessing the overall health of an ecosystem (Leo and Levin, 1997). A third approach is recognized by Kay and Schneider (1994). In their approach they outline three major ecosystem organizational facets: ecosystem health as the ability to maintain normal operations; second the ability to respond to or absorb stress; and thirdly the ability to self-organize on an ongoing basis in terms of its ability to evolve, develop, and ultimately adapt as needed.

This last approach to ecological integrity is most similar to the discussion of complex systems-based resilience discussed above. Importantly, this third approach emphasizes that ecosystems don't know a normal state. Ecosystems are dynamic and do not necessarily prefer any particular or normal state. In this approach humans define what they expect as a normal state but must also recognize that for ecosystems to have integrity they must be able to adapt to changing contexts that push them into dramatically different ecological states.

This latter approach is likely the most appropriate for recreation ecology. However, it is important to note that the recently adopted Provincial Parks and Conservation Reserves Act (2006) defines ecological integrity as, "the condition in which biotic and abiotic components of ecosystems and the composition and abundance of native species and biological communities are characteristic of their natural regions and rates of change and ecosystem processes are unimpeded". This approach is appropriate for parks and protected areas such as Franklin Island as the general goal of parks and Conservation Reserves is to provide for representative ecosystems. Regardless of the definition, evaluation of ecological integrity and resilience for natural systems or social-ecological systems will require an analysis of the values, both social and ecological, held for a particular area.

Some confusion would appear to exist as both ecological integrity and resilience pose important frameworks to evaluate ecological systems. It could be argued that ecological integrity is a component of resilience or vice versa. It is suggested here, that if the system of focus is just the

natural system and the goals for the natural system have been established, that resilience becomes a component of evaluating the ecological integrity of the natural system. However, if the system of focus is the coupled ecological and recreational system(s) than ecological integrity becomes a component of the broader social ecological systems resilience analysis. Regardless, of your focus, the important difference comes in how the question is defined. As such, Chapter's 5,6 and 7 place more focus on the ecological integrity of the Franklin Island and the role that resilience plays in evaluating integrity. Chapter 8 begins to shift the question away from a focus on the natural systems of Franklin Island and ask about the resilience of the recreation experience on Franklin Island.

Accordingly, this thesis focuses on recreation impacts at a campsite scale, attempting to place these impacts within a broader context of the surrounding ecosystem. It also recognizes that while recreation impacts may be highly localized and relatively inconsequential to broader ecological form and function, human perceptions of ecological impacts may provide powerful motivations for enacting management activities for not only local recreation sites, but for the eastern Georgian Bay coast as a whole.

Chapter 8 argues that recreation management must concern itself with the maintenance of resilient ecological systems and ensure that social systems are similarly understood. It is through an approach that combines social and ecological systems under one conceptual framework that humans can seek to live with, and adapt to, changing ecological conditions such as recreation on Franklin Island and eastern Georgian Bay.

### 3.7 Systems approaches to planning and management

An ecosystem approach provides one framework within which to consider both complex social and ecological dynamics. This approach inherently recognizes the importance of sustainability, ecosystem integrity and resilience and the necessity of considering multiple scales and perspectives. It provides a framework by which resource and environmental problems can be thought about and implemented while overcoming common shortcomings of the traditional

means by which individuals, organizations, and societies tend to interact with nature and resources (Slocombe, 2004). Central to this approach is to integrate concepts of ecological resilience with governance structures that address management needs for the identified ecosystem.

In defining the ecosystem approach, Slocombe (1993) establishes a number of characteristics that are pertinent to management of Franklin Island and recreation on Georgian Bay. These are:

- To include people and their activities in the ecosystem
- To look at different levels/scales of system structure, process and function
- To recognize goals and taking an active, management orientation
- To include actor-system dynamics and institutional factors in the analysis
- To use an anticipatory, flexible research and planning process
- To recognize systemic limits to action – defining an d seeking sustainability

Ecosystem management has largely evolved from a protected areas paradigm (which managed people so as to protect the ecosystem) to a more integrated ecosystem-based approach that examines both social and ecological systems and their linkages in order to understand a wider range of system dynamics, impacts and appropriate management responses. As noted above, it is increasingly recognized that environmental problems require multi-scalar perspectives to properly assess both the impacts themselves and the management interventions required.

The challenge provided by social-ecological systems (SES) is that it requires pulling away from the site level and examining the ecological and social interplay of the whole system that influences the site-level. It is generally thought that such an assessment provides more sustainable and appropriate responses to environmental problems. Gunderson and Holling (2002) and Berkes and Folke (1998) look at problems as complex systems, requiring cross-scale perspectives with a focus on resilience of a coupled social-ecological system.

Accordingly, the ecosystem approach examines the linkages between social and ecological

systems and attempts to find mechanisms by which these linkages can be maintained and built upon to create sustainable interactions. As Berkes and Folke (1998) note, scientific concepts of ecosystems are deficient in their description and analysis of human-in-nature systems and no single, universally accepted way of formulating the linkage between social systems and natural systems exists.

Kay et al. (1999) establish a systems-based framework by which biophysical processes, socio-economic dynamics and governance structures and processes can be described and planned to better address complexity. Their adaptive ecosystem approach recognizes the integration of governance, management and monitoring (Kay et al, 1999). Specifically:

> ***Governance*** is to continue the process of learning, revisioning, resolving tradeoffs, and planning by the parties involved to adapt to unfolding situations and will entail ongoing evolution of governance arrangements.
>
> ***Management*** develops and implements strategies which promotes emergent opportunities in the context of communal visioning and planning. This involves the identification of external changes to contexts, flows into and out of a particular system and influencing feedback loops to the system of interest.
>
> ***Monitoring*** is utilized to continue the collection of and synthesis of information into a narrative of the present and anticipated evolution of the system.

The application of this approach by Kay et al. (1999) will be used in the concluding chapter to guide an adaptive management framework in a manner distinct from that being modeled by Provincial Parks.

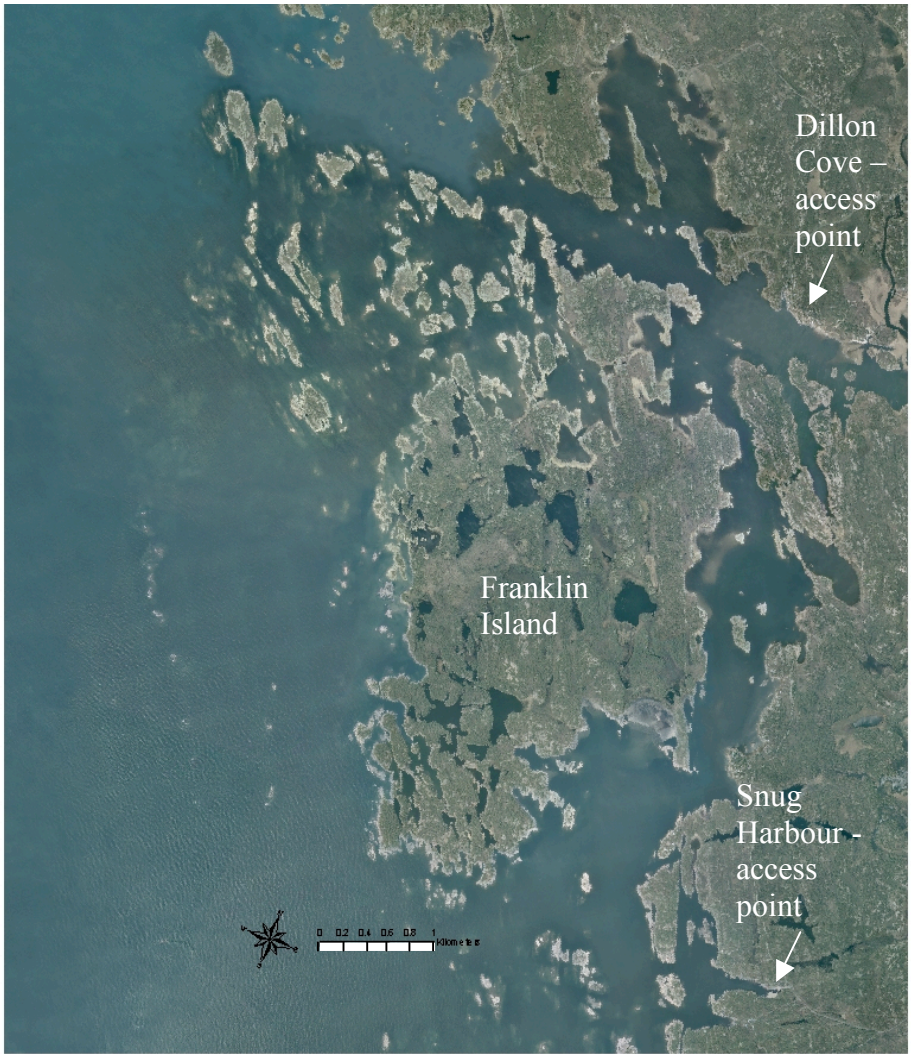
## 4. Case Study

The following discussion introduces the region of eastern Georgian Bay and the geological and ecological features significant to recreation impact studies. It also looks at the broader patterns of the history of recreation and the expansion of tourism in the area. The eastern Georgian Bay coast has been well represented in nationally iconic art by the Group of Seven and it has developed a culture defined by its exposed shorelines and rugged feel (Campbell, 2005). The limitations of archipelago geography and bedrock geology have led to distinct development patterns (of remote coastal towns and island-based cottages) that have traditionally been fairly modest compared to other popular recreation areas in Ontario (e.g., the Thousand Islands, Bruce Peninsula, and Muskoka).

Perhaps because of the perceived semi-wilderness setting of Georgian Bay, many long-term seasonal residents and some visitors tend to have a low tolerance for activities that alter the appearance and enjoyment of their landscape. Franklin Island has long been a popular destination for campers and picnickers because of its safe and easy access and exposed shoreline with pocket beaches typical of Georgian Bay. It is also a site which a number of parties have expressed concern for over perceived recreation impacts and have, over the past 10 years or so enacted various forms of stewardship and volunteer management.

Franklin Island (Figure 3) at 885 hectares, is used in this thesis as the primary focus of the recreation impacts research and provides the study area for examining management implications. However, as indicated above, Franklin Island is only one of many islands that are suitable for recreation and are not actively managed by any government authority. As such, it provides a good place to study campsite scale recreation impacts and reflect on larger scale management efforts and opportunities.

**Figure 3:** Franklin Island on Georgian Bay




Aerial Image Source: West Parry Sound Geography Network www.wpsgn.ca (scale 1:66 000)

## 4.1 Geological & Ecological Description of Eastern Georgian Bay

Jalava et al. (2005) completed an *Ecological Survey of the Eastern Georgian Bay Coast* that is the most recent and most comprehensive ecological survey undertaken for the study area. Eastern Georgian Bay is located in Ecodistrict 5E-7 of Ontario; the littoral subdistrict (#7) in this study is one of the smaller in 5E. The following discussion provides a brief synopsis of this key report and then provides a more detailed analysis of Franklin Island (section 4.3) to set the ecological context for the recreation assessments that follow.

Eastern Georgian Bay is geologically defined by glacially scoured rock that has created numerous islands and inlets. It is best known for its glacially scoured rock, with leaning White Pine (from prevailing west winds) and exposed granite rock barrens. The shorelines and surrounding islands are typified by open rock interspersed with patches of vegetation. Soils are extremely shallow to non-existent, highly organic and acidic due to the high mineral content and low buffering capacity of the bedrock. Vegetation communities are affected by both the amount and type of soil but also by moisture regimes and degree of exposure to prevailing winds. Because of the highly variable terrain, some pockets collect and hold water while others drain. These pockets can consist of: red oaks and red maples in areas protected from winter wind and ice lashing; cedar groves; juniper fields; rock crevices with opportunistic and aggressive species (e.g., blueberry and juniper) (Courtin, *pers. comm.,* 2005).

Jalava et al. (2005) outline that eastern Georgian Bay ecosystems support approximately 150 different vegetation community types, 984 vascular plant taxa, 34 reptile and amphibian taxa, 44 mammal species and 170 breeding bird species. Franklin Island exhibits an ecosystem that could be deemed random or scattered mosaic of vegetation communities. Jalava et al. (2005) describes Franklin Island and much of the Georgian Bay coast as consisting of a rock barrens with a mosaic of interspersed habitat types. Variably sized, interspersed rock ridges and plains with pockets of vegetation dominate this island ecosystem. The inter-patch similarity can be quite high; many patches are indicative of the common vegetation types: white pines, low shrubs (blueberry), and relatively few but abundant herbs (e.g., Canada Mayflower, Wild Sarsaparilla, Grasses, etc.).

Interspersed with this, however, are areas that are often very different in terms of community structure and function (e.g., pocket bogs, cedar groves, Atlantic Coastal Plains communities etc.). Different types of patches could be dense cedar stands with very little undergrowth (light and soil acidity constraints), or dense shrubs in lowland areas (very moist areas) or various shoreline ecosystems (e.g., low wetlands with various emergents and shoreline vegetation species and bare rock areas). The report by Jalava et al. (2005) strongly indicates not only the

diversity of community types on the island – fifty community types in a 903 hectare area – but also the prevalence of the rock barren community and hence a high degree of patchiness.

Community dynamics typical of the coastal environment are characterized by a patchiness created by the relatively infertile and inhospitable rock barrens; geology, to a large extent defines where and to what extent vegetation communities can grow. Undulations in the rock permit the collection of moisture and detritus thereby permitting colonization and succession of vegetation communities. Accordingly, these communities have evolved with species that appear to be well adapted to climatic factors such as drought, frost, ice, and wind damage. However, individual patches of vegetation demonstrate a relatively low resistance to disturbance from more mechanical disturbances, such as human impacts. Despite this, the terrestrial vegetation communities of eastern Georgian Bay have undergone relatively little change since the intensive logging periods and subsequent slash-associated wildfires a century ago (Jalava et al., 2005, Courtin, 2002). Figures 4,5,6 & 7 show communities and ecosystems typical of eastern Georgian Bay.

Franklin Island is also known for thriving populations of the threatened Eastern Massasauga Rattlesnake and the threatened Eastern Fox Snake (OMNR, 1999). These species may partly be at risk from recreation, although extensive studies in nearby Killbear Provincial Park indicate that other than the killing of snakes (purposefully or accidentally), the presence of humans does not appear to negatively affect their use of habitat (Prior and Weatherhead, 1994). Other fauna on Franklin Island is consistent with this region yet few studies have been done to indicate the degree of recreation impacts on area wildlife populations.

Numerous small islands around Franklin Island provide nesting habitats for several species of colonial birds. Studies of nestlings and fledglings have been performed in other areas of the Great Lakes and shown that the presence of visitors via boats can have a significant impact on reproductive success (Gabrielson and Smith, 1995). However, the islands used for nesting are some distance off the shore of Franklin Island (1-3 km) and fledging is usually complete before the major influx of recreation to the area in July and August. Further, the major nesting areas are

**Figures #4, 5, 6 & 7 (**clockwise from top left) Typical eastern Georgian Bay landscape and vegetation communities. Figure 4 shows typical moss communities that emerge out of undisturbed depressions in the rock which collect water. Figure 5 shows the typical open rock barrens ecosystem. Figure 5 demonstrates the shoreline community structure typical of Franklin Island. Figure 6 shows an example of a coastal meadow marsh.

found in much more remote locations, as far off-shore as the Limestone Islands, a provincial nature reserve, 20 km west, that prohibits human presence during breeding season.

It is likely that the perceived fragility of Georgian Bay's terrestrial communities stems from a lack of soil and the potential ease with which vegetation could be damaged and the ecosystem denuded of its vegetation and soil. If so, recreation and tourism needs to be explored with regard to its potential impacts to ecological systems at both local and landscape scales. From a greater understanding of recreation impacts, recommendations can be developed with regard to

recreational behaviours and management practices that would correspond with those specific ecosystem characteristics and pressures.

In terms of landscape disturbance, the predominant natural disturbances in eastern Georgian Bay are:

- climate variability and glaciations;
- wind, snow, ice and water;
- drought;
- wildfire (sometimes associated with forestry practices, campfires and lightning);
- insect infestations;
- water body alteration by beaver;
- natural water level fluctuations and cycles of the Great Lakes (Jalava et al., 2005).

In terms of anthropogenic disturbance, the most significant impact to the coast has been as a result of forestry practices. It is unknown to what extent the islands would have been logged during the intensive logging period at the end of the 19th and into the early 20th century. Courtin (pers comm.., 2000), a Laurentian University ecologist, speculates that it is likely that few islands would have provided merchantable timber due to their small size, poor soil, and exposure. Accordingly, many of the outer islands would have gone untouched by logging practices. Records of logging on some of the larger islands (e.g., Sandy Island) do exist but the extent and impacts from this are unknown. For the study area of Franklin Island, logging records were not evident (nor was a history of fire present at the local MNR office) (Johnson, pers comm.., 1999). Some logging did occurred around 1998 according to Christie (pers comm.., 2002)

It is outside of the scope of this thesis to assess the impacts from these historic developments. Rather, the intent is to assess the impacts from Crown Land camping, which is one prevailing and increasing form of recreation in the region. As outlined in Chapter 3, the recreation impacts of camping and hiking at the site level have been well documented. However, different types of disturbance will impact the unique ecosystems of Georgian Bay in various ways. The purpose of

this study is to examine the recreation impacts to island ecosystems, using Franklin Island as a case study.

## 4.2 Recreation History & Tourism Development

The eastern coast of Georgian Bay is one of the best known "summer playgrounds" in Canada. The region is also known as "the 30,000 Islands." It has relatively little municipal development on its shores giving it a semi-wilderness feeling attractive to cottagers, boaters, campers and other visitors (Campbell, 2005). With its proximity to Canada's largest urban region, Georgian Bay makes for a "highly attractive destination for boaters, cottagers, campers and outdoor enthusiasts" (GBLBR, 2004: 19). Considerable growth and expansion of cottages is evident on the shoreline and many islands and small pleasure boats both large and small ply the main channels and back island passages of this coast. Several small communities, the largest of which is Parry Sound (pop. 6500) are situated on the coast, providing the key points of departure for cottages, cruising, and camping.

Important to the understanding of historical development along the Georgian Bay coast is the relatively unique ecosystem, geography and environment that served to protect it from significant resource extraction and resource use (Campbell, 2005). Although an intense period of logging and fishing occurred at the end of the 19$^{th}$ century and was accompanied by trade corridors for shipping and railways, little other industrial or resource use was established in this region. Due to the inaccessible nature of the archipelago and the lack of timber and mineral resources present, development in this part of Ontario occurred to a much lesser degree than many other areas of the province.

The historic remains of the brief logging and fishing times can still be found along the coast and a few large lodges are the only "living" remnants of this past. These lodges and a few personal cottages were the beginning of yearly incursions of wealthy American and Canadian tourists interested in fishing, sailing, swimming, and boating. Although wilderness camping on its shores has been a part of summer experiences for much of recent history, the number of campers

and size of user groups has steadily increased over the past 20 years or so (Dyer, pers comm.., 2002). The few permanent communities along the coast, originally used for more industrial purposes or trade routes, are now relegated largely to tourism destinations and access points out to Georgian Bay. As such, the economies of the area have shifted significantly toward tourism marketing and services for seasonal residents.

Recreational activities have historically been quite minimal on the coast but have increased significantly since the 1960's. More recently, cottage, marina, and resort development introduces new ecological impacts, especially considering the electric, phone, and road networks which service cottagers. Road development is one of the key threats to resident reptile and amphibian populations, in addition to providing avenues for introduction of invasive and non-native species (Otterbein pers comm.., 2007).

With increased users in the area it is easy to imagine that impacts due to recreation have also increased. Although little in the way of visitor statistics exists for the east coast of Georgian Bay, outdoor recreation and nature activities, in general, are very popular in Canada and Ontario (Table 1 above) and the economic value from recreation is continuing to grow in most nature-related recreation industries. For example, with the increasing interest in outdoor recreation pursuits, a number of wilderness outfitters and guiding services are operating in eastern Georgian Bay. The oldest one, White Squall Paddling Centre, began operation 24 years ago. As the popularity of kayaking and canoe camping on eastern Georgian Bay other guiding companies have started offering trips in the same area. In discussions with the owner of White Squall, it is his estimation that the local kayak-camping industry has not yet peaked and growth potential still exists (Dyer, pers comm.., 2006). Many of these operators offer daytrips and overnight trips to and within the vicinity of Franklin Island.

### 4.3 Franklin Island

Franklin Island is a relatively large island (885 ha) on the eastern coast of Georgian Bay. The island is used for power and sailboat anchoring in two key bays (Regatta Bay at the south end

and Windsor Inlet along the western shore), although sailboats and motor cruisers moor at many different embayments and beaches around the island. The area is used extensively for picnicking by local residents and cottagers and for camping by locals and visitors to the area. The west side of Franklin Island is approximately 4 km from the closest mainland access points of Snug Harbour and Dillon Cove. A number of private marinas exist in the area in addition to these public and municipal launch sites (see Figure 3 ).

Ontario's first Provincial Parks Act in 1913 stated that Crown Land "not suitable for settlement or agriculture" might be set aside

> "as a pubic park and forest reserve, fish and game preserve, health resort and pleasure ground, for the benefit, advantage and enjoyment of people, and for the protection of fish, game and fur-bearing animals therein. Franklin Island, along with forty-two nearby islands, was reserved in 1923 to provide a wildlife sanctuary, a site for "excursion parties,"

and an attractive façade fronting the boat channel. As the first park reserve in Georgian Bay, Franklin exemplified this idea of a park as "pleasure ground" and wildlife preserve. (Campbell, 2005: 174-5).

Franklin Island existed as undeveloped Crown Land for decades with the exception of Camp Franklin, a summer camp that operated for approximately 40 years on the southeast peninsula (Christie, *pers comm..,* 2002*.)* Camp Franklin developed primarily in the location of Burrit Point with a lodge and numerous outbuildings. A trail network was developed for horseback riding and hiking and shoreline excursions were common camp activities. The camp ceased operations in the mid 1930's and little remains of the camp or its trail networks except remnant foundations of buildings, garbage heaps and old flagstone walkways.

More recently, kayaking has become a major portion of the recreation profile for Georgian Bay and specifically for Franklin Island. As an example of the growth of kayaking, a local business has grown from a small fleet of 20 kayaks in 1985 to a rental fleet of approximately 100 kayaks in 2005. They currently offer regular instruction courses, day trips and 4-6 day excursions in the

area. In 1985 this was the only business of its nature on the coast whereas currently there are 3 outfitters on the west coast, and numerous other companies offering guided trips through the Georgian Bay islands.

Statistics on the amount of visitation to Franklin Island are not available, but estimates place visitors at 50-70 per day, with weekend peaks of 100-150 through the core summer tourism periods usually from the beginning of July to mid-August (Dyer, *pers comm...,* 2002). These counts would include picnickers, boaters moored adjacent to the island, and campers. The island's recreation is highly seasonal and is highest during the central six weeks of July and August, peaking again for Labour Day. Use has tended to be sporadic beginning in May and increasing through June (mostly weekends), and with significant declines in use in September and virtually ending by Thanksgiving weekend although there has been consistent increase in these bumper periods in the past 5 years (Dyer, pers comm.., 2002). To provide some comparison to statistics on campsite use in three other backcountry areas offered in Chaper 3, the most popular Franklin Island campsites may receive approximately 300-350 user nights per year with numbers dropping off considerably for smaller or lesser known campsites.[6] It may be important to note that campsites are not marked and are known through local experience/knowledge, are indicated on a tourist 'travel map' of the area, or are found by camper exploration.

The use of Franklin Island extends to a minor extent into the off-season with most camping beginning on the May holiday weekend and ending in October. Weather plays a key role in determining the usability of the island such that some warmer years will see use of the island extend into later October. However, the level of camping at these times of year is quite minimal. Other types of related recreation (some of which require permits) include: hunting, trapping, wood-taking, snowmobiling and skiing, although none of these uses predominate.

6 These are estimates only based on the author's experience as a kayak guide in this area for 15 years and in discussion with the local wilderness outfitter, White Squall Paddling Centre.

Franklin Island was recently set aside as a Conservation Reserve with the option for it to be made into a Natural Environment Class Provincial Park (OMNR, 1999). This designation was made during the *Lands for Life* process which also set the western shore of Georgian Bay aside as part of the *Great Lakes Heritage Coast, Enhanced Management Area* as set out in the *Living Legacy* (OMNR, 1999) and confirmed in the *Plotting the Course* planning document for this heritage coast (OMNR, 2001). However, even the preliminary designation as a Conservation Reserve has been delayed due to the Wikwimekwong First Nations Land Claim for the North Channel and Georgian Bay islands. Land Claims affect all new designations and management planning for Georgian Bay islands (Shaver, pers comm.., 2005).

Franklin Island contains provincially significant representations of older White Pine forest. It exhibits seven provincially rare vegetation community types and habitat for ten provincially significant taxa, of which two are globally rare (Jalava et al, 2005). In many respects, Franklin Island is typical of larger island ecosystems of eastern Georgian Bay in that it contains extensive wetlands and small interior lakes, but is dominated by rock barrens with a mosaic of patchy vegetation communities that vary depending on the undulations of the underlying bedrock.

It is the steady growth of recreation and lack of research into the impacts that provided the impetus for this study. Franklin Island was selected as the study site for this research because:

1) It is typical of Georgian Bay island and coastal ecosystems; and
2) It receives a larger amount of unregulated and unmanaged recreation use than other areas of Georgian Bay.

Due to its similarity to other Crown Land camping areas in the region, assessing its recreation impacts will be illustrative of the pressures that other islands may also receive. Additionally, because Franklin Island receives the highest levels of recreation in the region (with campers exploring or being displaced to other islands), it potentially provides an 'early warning' of Georgian Bay recreation impacts to other islands.

## 4.4 Recreation Research on Georgian Bay

There is little directly relevant literature on recreation impacts to Georgian Bay ecosystems, yet there are three studies that help to inform this paper. The first is an ecosystem conservation plan for Georgian Bay Islands National Park which outlines recreation impacts such as: damage to coastal vegetation in sensitive beach areas; compaction, trampling, and pollution resulting from snowmobiling; and, introduction of exotic species (Nelson et al, 1997).

A second study undertaken adjacent to Killarney Park (the greater park ecosystem) surveyed campsite impacts and suggested that impacts due to recreation were quite severe on some Georgian Bay sites (Kutas, 1998). These impacts included: fire pits, litter, cut vegetation, campsite furniture, and disposal of human waste. This study indicated that issues such as overcrowding and recreation impacts contributed to a declined recreation experience.

The third recreation assessment was compiled during the completion of an ecological survey of the east coast of Georgian Bay (Jalava et al, 2005).[7] The types of recreation impacts identified by this research team are similar to those reported by Kutas (1998) and the extent of impacts was provided in qualitative form. It is assumed that Jalava et al. based their comments on a qualitative visual assessment and survey as no quantitative figures or survey techniques were mentioned.

A key challenge of ecological research, especially of recreation ecology, is determining what constitutes a significant change, or what degree of impact represents what level of severity. Much of the recreation impact research is based on an assumption that 'pristine' ecosystems are the optimum or most ideal ecosystem state to be reached (More, 2000). This socially-constructed idea of ecosystem ideals can have significant impacts on park and protected area management goals and can also be a source of research bias. For this reason, the impact research undertaken as part of this thesis can only be taken as a preliminary assessment, description and discussion of existing ecological dynamics.

7 This study was completed after the field work for this thesis was completed.

To fully assess the meaning of change to these ecosystems resulting from recreation is outside the scope of this study and would require consideration of at least the three following factors:

1. An identification of values as they pertain to desired ecological states for Franklin Island and Georgian Bay;
2. Future research to act as a comparison to this research; and
3. A more comprehensive examination of potential cumulative impacts with regard for impacts other than to vegetation communities.

The coast of Georgian Bay has had limited exposure to typical forms and patterns of development. While it had considerable forestry and fishing activity it has really been the boom in second home investment and tourism that has brought people and the potential for impacts to the coast of Georgian Bay. The characteristic wind swept pines and glacially scoured rocks, so classically captured by artists such as the Group of Seven, typify the coastal ecosystem. The rock barren ecosystem with its mosaic of vegetation is globally significant and is an international draw for tourism.

This unique ecosystem creates a challenge for defining recreation impact assessment methods as is discussed in Chapters 5 and 6. Franklin Island, a typical eastern coast Georgian Bay island, receives a significant amount of recreation pressure. Some of the areas of Georgian Bay are planned for and managed as parks but many of the areas remain outside the purview of traditional forms of planning and management. It provides an appropriate venue to discuss how recreation use can be planned for and managed where traditional forms of management, such as exist in provincial or federal parks, are lacking.

# 5. RESEARCH METHODS

The purpose of this chapter is to review recreation impact assessment procedures, including survey techniques, sampling methods, site selection, and other elements of research design. Because there is limited 'classical' recreation impact assessment work on Georgian Bay ecosystems and a limited number of methods available for determining ecological impacts on terrestrial Georgian Bay ecosystems, the work is somewhat exploratory. The following sections highlight the various approaches to vegetation community sampling relevant to determining recreation impacts. The chapter ends with a detailed outline of the sampling methodologies used on Franklin Island campsites including campsite selection, and vegetation sampling techniques.

## 5.1 Review of Recreation Impact Assessment Procedures

Methods for assessing recreation impacts fall into three general categories: recreation impact surveys, soil and vegetation sampling, and trampling experiments. The primary focus of this work is on impacts on terrestrial ecosystems, and in particular, vegetation communities. Vegetation community sampling was chosen primarily due to the single available field season so as to assess changes in vegetation communities in and around campsites on Franklin Island. Vegetation has been chosen as the primary focus of assessment because of its prevalence in the recreation impact literature and the ease with which vegetation studies can be replicated in monitoring situations. Most importantly, vegetation appears to be the most affected aspect of ecosystems from recreation use. Franklin Island also poses certain contextual issues which during initial stages of planning the research made vegetation surveys the most appropriate choice. These contextual issues are lack of significant soil and lack of definitive campsite boundaries.

### 5.1.1 Surveys

Surveys are the easiest method for assessing ecological impacts; they are also the oldest. Frissell (1978) developed a series of classes by which, using visual criteria such as trampled vegetation,

bare ground, exposed roots, etc., campsites and other recreation impacts can be situated within a class, allowing judgments for site closure or remediation to be made. The argument here is that highly visible impacts are indicative of more complex impact behaviours (Frissel, 1978; Merriam and Smith, 1974).

One advantage of surveys is that they can be completed relatively quickly allowing researchers to survey a whole park or natural area in a relatively short period of time. The main difficulty with these techniques is that they are subjective and imprecise (Leung and Marion, 1999) and are difficult to replicate. Judgments are required about the severity of individual impacts and about the accumulation of individual impacts into conglomerate classes. Such judgments are deemed to be subjective and thus have significant variation between individuals, throughout the period of assessment (even within individuals), and between ecosystem types.

Furthermore, survey techniques have not been well linked to underlying ecological changes and hence it is often difficult to assess the mechanisms behind campsite degradation. This underlying information is vital to understanding which of the visual assessments is meaningful in terms of significant ecological change. In other words, a survey created for one ecosystem may not be accurate in assessing impacts in a different ecosystem.

More sophisticated survey classification schemes have been developed (e.g., multiple-indicator assessments) which attempt to combine broader judgments with more discrete classifications that combine multiple indicators into distinct categories, rating systems, and decision matrices (Leung and Marion, 1999). These approaches take advantage of efficient assessment procedures and reduce the degree of subjectivity. The multiple-indicator approach provides more objective data on individual impact indicators (e.g. campsite size, soil exposure) that can then be aggregated into summary impact indices. The indicator assessments can be performed using a system of discrete ratings, such as campsite size or area or soil exposure categories, or actual measurements (Leung and Marion, 1999).

However, limitations of the multiple-indicator approach are that:

- Using several indicators brings in to question the efficiency of use for sampling and on-going monitoring (i.e., could any indicator be omitted and still get the necessary response?) (Leung and Marion, 1999);
- Interrelationships among indicators and similarities among campsites have not been well considered. Accordingly, the efficacy of this approach may be questionable; and,
- Mathematical appropriateness of some summation methods in which campsite impact indices are constructed by averaging and adding ordinal scale measurements (Marion, 1995).

Surveys are very efficient methods for aggregating multiple indicators into a classification of severity of recreation impacts. However, individual ecosystems require classification systems of their own. Initial assessment of each indicator is required within each ecosystem to determine linkages between them, and effectiveness for providing conclusions of severity of impact. Surveys remain helpful in all cases for determining recreation campsite impacts such as number of tent-sites, number of trails, amount of exposed human waste, etc. As a result of this, a walk of the south shore of Franklin Island was completed to determine where campsites were located and to provide visual clues (e.g., firepits, refuse, cut trees, exposed human waste, etc.) of the amount of use at each site. From this survey, a range of sites was selected for the study.

### 5.1.2 Vegetation and Soil Sampling

A more objective determination of change than utilizing visual surveys can often be gained by measurements of vegetation and soil change. Vegetation sampling procedures assess soil and vegetation community characteristics in quadrats along transects usually running from the centre of the campsite to some distance beyond the campsite boundary (Marion, 1995; Cole, 1986; Hammit and Cole, 1998). Marion (1995) created the variable transect method for determining campsite size. In this method, a permanent central reference point and numerous boundary points were flagged with distance and azimuth from the reference point to each flag, measured to derive campsite size and boundary (Leung and Marion, 1999).

From the central reference point, sample quadrats are placed either randomly or non-randomly

from the central point to the campsite perimeter and beyond (Cole, 1986, Green, 1998). Campsite perimeters are defined by pronounced changes in vegetation cover, vegetation height/disturbance, vegetation composition, surface organic litter, or, more rarely, topography (Marion, 1995). Most commonly soil properties such as type, moisture content, and bulk density are measured and herbaceous and shrubby vegetation is sampled using counts or percent cover (Green, 1998; Cole, 1986; Leung and Marion, 1999).

If campsites are stratified by amount of use then comparisons of level of *impacts versus use* are the common method by which severity of impact is determined. In addition, several researchers have used reference sites by sampling in untrammeled or unused areas with similar vegetation coverage and soil properties and then comparing than to trampled areas (Cole, 1986). The referenced sites can be returned to year after year to examine changes to both the site and the control area. Sampling and measurements in this method provide comprehensive descriptions of changes to soil and vegetation properties due to recreation. Indeed, measuring cumulative effects of recreation impacts at the site and the potential effects beyond the campsite areas is very difficult without the use of quadrat sampling. In the case of Franklin Island, where campsite boundaries are difficult to ascertain, a random quadrat sampling technique may be the only means of determining approximate campsite boundaries.

### 5.1.3 Trampling Experiments

Trampling experiments are most commonly used for two reasons: 1) to determine vegetation resistance (ability to withstand impact) and 2) to determine vegetation resilience (ability to recover from impact). The most common approach is to start with an untouched vegetation plot and apply varying degrees of trampling (number of passes through time) (Cole and Bayfield, 1993). Other methods are to design stratified experiments in a trail system looking at the variation in degree of impact with amount of use. Impact indicators are highly variable but include: amount and type of damage to vegetation, amount of time to expose soil, amount of soil erosion, time required for plants to recover, and changes to species composition on and/or near the trail or trampled area (Cole and Bayfield, 1993). These studies are often held over several

seasons to determine recovery between seasons and after removal of recreation. Due to this, trampling procedures were not used in this study.

## 5.2 Sampling Design for Franklin Island

Franklin Island and Georgian Bay ecosystems provide interesting challenges for using the methods described above. The islands exhibit patchy, non-uniform vegetation across the islands with near shore rock barrens common to most campsites. Vegetation type is highly diverse between patches and patches are of variable size. Since there has been no collection of visitor data for the island to date it is difficult to compare amount of use with amounts of impact.

Therefore, the methods described below are designed to address these challenges and to enable measurement of local scale (campsite) impacts and beyond-campsite impacts. In the process, the study will assess whether campsite boundaries can be determined and, if so, by what criteria.

### 5.2.1 Site Selection

Franklin Island provides a range of user intensity on one island with relatively homogenous shoreline ecosystems among different campsites and a range of usage types and intensity between campsites which makes it appropriate to focus the efforts of this study on only one island. Five campsites were chosen along the south coast of Franklin Island for detailed vegetation studies (Figure 8). These sites were chosen to approximate various amounts of user levels, given the researcher's personal experience in these areas. From west to east they are:

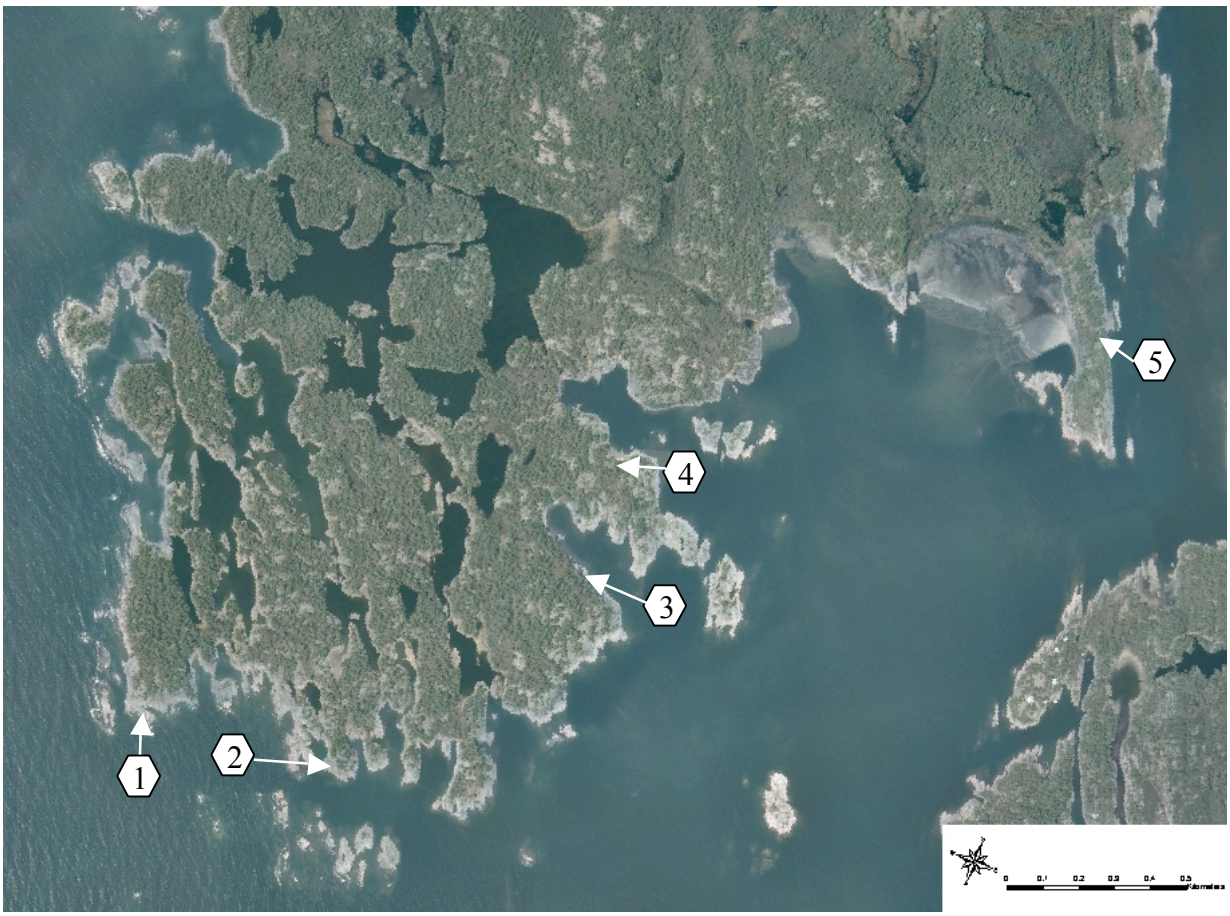
1. **Henrietta Point (HP)** represents the highest use campsite by small craft boats (e.g. kayaks and canoes). This site is a popular destination for campers but is limited in the types of watercraft that can use it because of the lack of sheltered bays to tie up motorboats or sailboats. The site is one of the most elevated off the water with the centre of the campsite being some distance (approximately 40 metres from the landing spot) due to the limited number of trees providing shelter from the wind and the location of flat campsites. A

significant area of dense hardwood shrubs lies in a north-south area to the east of the campsite which provides one limit for the campsite core although some paths cross this area to access latrine sites;

2. **Savage Rocks (SR)** is used to a lesser extent by the same user group. This site is used to a lesser extent than Henrietta and seems to be primarily used be kayak and canoe campers. Because it isn't as exposed as Henrietta and because the terrain undulates more there is a greater density of vegetation throughout the site. The site is located on a broad peninsula which narrows toward the north where a dense cedar grove is located;
3. **Horsley Island Bay (HIB)** is the least used of all sites by the same user group. This site is the least used site of the five and has one of the highest densities of vegetation. Additionally, vegetation at this site comes closest to the shore of any of the sites, likely because it faces east and has the least exposure to wind and waves;
4. **Regatta Bay (RB)** is used by power and sailboats and is the most heavily used of all sites. This site is the most popular and well used site by day users and picnickers but limited camping because of the adjacent boating bay which can at its peak contain 35 – 40 motor yachts and sailboats. It has broad expanses of open bedrock in a number of locations but also areas of significant vegetation density and soil accumulation;
5. **Burritt Point (BP)** is located at the site of old Camp Franklin (operational in the early 1900's) and was chosen for the possibility it gave for comparing regeneration on Franklin Island. Areas of this site are well used by campers and there are areas of typical open rock barren scattered throughout and patches of denser vegetation in areas of soil accumulation throughout the middle of the point.

A control site was not chosen because all appropriate sites for a control would not have provided a comparable ecosystem to typical campsites. Franklin Island was selected because it was more likely to have established campsite boundaries than other islands due to its size (which supports more vegetation) and the amount of use it receives relative to other islands. Sampling on smaller islands would be complicated and require time-series analysis to assess impacts since a 'before recreation' assessment could not be undertaken.

**Figure 8** South shore of Franklin Island showing camp site locations.




Aerial Image Source: West Parry Sound Geography Network www.wpsgn.ca

Whereas on Franklin Island, it was hoped that if the length of transects was pushed an extra distance away from the campsite to reach areas where impact was highly unlikely, then either a campsite boundary might be discerned through analysis of the data or the outer portions of the longest transects could be used in lieu of control sites. Notably, replication of this study was not undertaken on another island because few in the area are of the same size as Franklin Island to provide similar enough ecosystem features and hence be comparable to the Franklin Island sites.

### 5.2.2 Sampling Procedures

While most campsites are readily identifiable by easy landing sites and the existence of flat areas for tenting, campsite boundaries on Georgian Bay islands are not readily identifiable using visual

clues. This eliminates the ability to use methodologies that randomly sample within and outside campsite boundaries to allow examination of differences in vegetation types/cover etc.

It was decided for this study to perform random sampling of the vegetation along transects which would be placed in a circle from the approximate centre of the campsite. As a result, most central points were at least 30 meters from water. Twelve transects were created from the central point taken every 30 degrees from a randomly chosen first bearing. The length of these transects was determined either at 200 meters, by reaching water, or by reaching a significantly different ecosystem type which would not traditionally be used as part of a campsite (e.g., bog, swamp, etc.).

Quadrats (1 $m^2$) were randomly placed along these transects in order that 15% of the transect length would be sampled for vegetation. Figure 9 shows close-up aerial imagery of Henrietta, indicating the central point from which the twelve transects were measured. (The centre points of the other four sites are shown in Appendix A). It is important to note the variation in ecosystem types and the degree of patchiness at each of the sites. It is also important to note that this aerial imagery has only become available in recent years and was not available at the time of sampling.

At each sampling point along the transect, counts of all herbaceous and shrubby species were taken within a one meter square quadrat to enable determination of species abundance and species diversity. Percent cover of herbaceous species and ground cover under a height of 30 cm was taken using visual estimates. Researchers have shown some concern about visual estimates of cover due to subjectivity; however, Brackenheilm and Qinghong (1995) compared three methods of estimating vegetation cover and concluded that visual estimates provided the most accurate and consistent measures.

Originally, soil sampling was going to be undertaken, as soil density is often a strong indicator of recreation impacts. However, it was quickly decided that soil samples would prove inappropriate for concluding severity of recreation impact since there was a distinct lack of soil in significant quantities throughout the sites to provide a meaningful measure of recreation

**Figure 9 Example of transect sampling pattern – Henrietta Point**


Aerial Image Source: West Parry Sound Geography Network www.wpsgn.ca

impact on these sites.

Diameter at breast height (DBH) measurement (of greater than 10 cm) was recorded for trees using the wandering point quarter method (Brower et al., 1997). The initial bearing was gained by taking the longest transect starting at shore and running through the centre reference point. Sampling was stopped at the tree which was roughly parallel to the end of the transect used for the vegetation sampling (or after 25 trees). DBH was chosen as a consistent means of describing dominant canopy cover throughout the sites and was used to determine degree of similarity of ecosystems between sites as one possible variable affecting the vegetation counts.

In summary, five campsites were selected to provide a range of recreation usage. At each of these sites, a visual estimate of the approximate centre of the campsite was used to establish transects along bearings. Along these transects random quadrats were located across a supposed impact gradient (centre to periphery) and vegetation counts were undertaken to determine species abundance and diversity among the sites and per cent cover was recorded to assess the

significance of any impact gradients at the campsites. Additionally, a canopy survey was undertaken to provide a synopsis of the ecosystem type at each of the five sites.

# 6. ANALYSIS OF RESULTS

This section presents and reviews the ecological implications of the Franklin Island vegetation sampling. Specifically, in-site and between-site comparisons are presented which together describe a negligible recreation impact at the Franklin Island and campsite scales. A discussion of the results is provided as it relates specifically to the interpretation of recreation impacts.

Most recreation impact research will examine a 'before' and 'after' state or will compare in-site changes with a background or control site (outside-site changes). In this study, the outside-site was gained by extending transects well beyond the obvious campsite boundary. Table 3 indicates the number of species found at each site and the number of transects; sampling was done to achieve 15% coverage for each transect. Appendix B provides a list of vegetation species found at each site.

Analysis of the data was performed by seeking out trends in vegetation counts against distance from the approximate campsite centre. The data for each campsite was divided into long (> 60 m) and short (≤ 60m) transects. Keeping in mind that this distance represents a radius, 60m was chosen based on visual observations of how campsites were generally shaped given a general configuration of landing, kitchen, latrine, and tent sites. To add a further dimension of analysis, sites were selected based on the degree of use.

**Table 3** Summary of Vegetation Sampling

| SITE | # of Vegetation Species | Number of 1 $m^2$ Quadrats | Number of Transects | Average Transect Length (m) |
|---|---|---|---|---|
| **Henrietta Point** | 40 | 179 | 12 | 96 |
| **Savage Rocks** | 29 | 129 | 12 | 69 |
| **Horsley Island Bay** | 39 | 136 | 12 | 85 |
| **Regatta Bay** | 34 | 245 | 12 | 152 |
| **Burritts Point** | 40 | 149 | 12 | 83 |

## 6.1 In-Site Comparison

Correspondence Analysis (CA) provides a means of relating species coverage (herbaceous) along a distance gradient. This is a form of ordination, the aim of which is to detect the main pattern in the relationships between species and the observed environment. In this case, all of the transects were grouped together so that distance became the environmental variable.

Correspondence Analysis is useful for ecological data sets where a linear model does not fit due to gradients and a unimodal (normal) response is more typical (McCune and Grace, 2002). Franklin Island exhibits a typical Georgian Bay island with limited vegetation near shore and increased sizes of vegetation patches as you move away from water. Accordingly, the shorter distances would typically reveal less vegetation with increasing vegetation abundance (though not necessarily diversity) away from shoreline areas.

Each of the five campsites was assessed using CA to determine if species frequency correlated with distance from campsite centre, essentially determining whether a campsite boundary can be determine as distinguished by amount and type of vegetation. A further division of the data for each site was made by separating the long transects (>60 metres) from the short transects (<60 metres) and CA was similarly performed on these two subsets of data.

Short transects are those transects that have bearings that directed them quickly to water. As such, the vegetation at the end of the short transect would likely be different than the same distance quadrats of longer transects. Separating these two types of transects would allow the potential illustration of vegetation gradients in the groups of quadrats most likely to be similar. Examining the longer transects alone was done to see if a terrestrial boundary to the campsite would be indicated by the analysis. Other studies have selected the lengths of transects based on a distance that was clearly demarcated from recreation use. This approach may work where vegetation is uniform or vegetation coverage is complete; it is less appropriate in highly patchy and non-uniform areas such as Franklin Island exhibited. No clear delineation of a campsite boundary existed for the Franklin Island campsites and so generous estimates were made.

Table 4 provides the Correspondence Analysis results for each campsite and provides the results for the grouped data and for the short and long transects respectively. As is shown, none of the sites show any significant correlation for the grouped data. This, in some respects, is not surprising because of the marked difference in vegetation at 60 metres of the short transects versus the vegetation at the same distance of long transects. Similarly, none of the sites show significant correlation between distance and species counts for the short transects. This may be explained through the characteristics of the campsite in the nearshore area (relatively sparse vegetation) and the inner (high-use) campsite area.

Two of the sites show significant correlation between species count and distance in the analysis of the long transects. Savage Rocks and Burrit Point sites indicate a correlation for their long transects. Savage Rocks had only one long transect (>60m) and there was some degree of patchiness that would create a correlation between distance and amount/type of vegetation cover. Specifically, the long transect bisected a dense cedar vegetation patch. These two factors (only one long transect and a distinct patch of uniform vegetation at distance) combine to question the validity of the positive response as an indicator of recreation impact. This patchiness will be discussed in greater detail as it relates to Franklin Island's resistance to recreation impacts and with regard to how it influences methodologies.

Burrit Point had several long transects and though the correlation was significant, there may be reasons for possible correlations which are likely unrelated to recreation use of the sites and more likely associated with the more varied tree cover (see Table 6). It is difficult to determine if any correlation is a function of historical impacts or ecosystem structure in this area of Franklin Island but preliminary results would indicate that little change to vegetation coverage and counts associated with recreation impacts has occurred at these sites.

**Table 4** Summary of Correspondence Analysis comparing distance with vegetation counts

| **A. Total – All Transects** | **Correlation** | **Chi Square** | **d.f.** | **Sig.** |
|---|---|---|---|---|
| Henrietta Point | 0.288 | 3432 | 19840 | 1 |
| Savage Rocks | 0 | 1560 | 23103 | 1 |
| Regatta Bay | 0.003 | 5778 | 24747 | 1 |
| Burrit Point | 0.205 | 2070 | 40670 | 1 |
| Horsley Island | 0.377 | 2345 | 10170 | 1 |
| | | | | |
| **B. Short Transects (< 60 m)** | **Correlation** | **Chi Square** | **d.f.** | **Sig.** |
| Henrietta Point | 0.157 | 220 | 1104 | 1 |
| Savage Rocks | 0.014 | 858 | 9240 | 1 |
| Regatta Bay | 0.015 | 165 | 4692 | 1 |
| Burrit Point | 0.223 | 368 | 8100 | 1 |
| Horsley Island | 0.005 | 759 | 6365 | 1 |
| | | | | |
| **C. Long Transects ( > 60 m)** | **Correlation** | **Chi Square** | **d.f.** | **Sig.** |
| Henrietta Point | 0.052 | 2924 | 19468 | 1 |
| Savage Rocks | **0.986** | 255 | 5880 | 1 |
| Regatta Bay | 0.228 | 5985 | 24747 | 1 |
| Burrit Point | **0.81** | 2881 | 40670 | 1 |
| Horsley Island | 0.272 | 1595 | 9379 | 1 |

## 6.2 Between-Site Comparison

The second type of analysis is between-site comparisons of vegetation. The campsites were originally chosen to represent a spectrum of the amount of use they receive. The campsites, in order of increasing amount of use, are: Regatta Bay, Henrietta Point, Burritt Point, Savage Rocks, and Horsley Island Bay. Between-site comparisons were performed to see if sites with higher use were significantly different from sites with lower use. Community coefficient indices were used to compare the degree of similarity between the various sites. These coefficients are useful to compare ecosystems based on vegetation abundance alone but are not useable for comparison of 'relative' abundance between sites (Brower et al., 1998). They are useful for this study as the relative abundance is less important due to the natural patchiness and significant

rock cover of the sites.

Values shown in Table 5 indicate that some of the sites have higher degrees of similarity than others, however none of these correlate with those sites determined to have higher use. Jackard's Community Coefficient (CCj) is known to accentuate the similarity between samples because it does not take into consideration relative abundances; per cent similarity is the better measure in this case and is not influenced as much by different sample sizes (Brower et al., 1998). Instead, it would appear that any differences are more likely due to natural differences between the campsite ecosystems.

**Table 5** Between-site comparison of vegetation abundance

| | | Burrits Point | Regatta Bay | Horsley Island Bay | Savage Rocks | Henrietta Point |
|---|---|---|---|---|---|---|
| **CCj Percent–Similarity** | Regatta Bay | 0.49<br>42.9 | 0 | | | |
| | Horsley Island Bay | 0.51<br>47.91 | 0.521<br>63.71 | 0 | | |
| | Savage Rocks | 0.447<br>51.6 | 0.43<br>57.5 | 0.417<br>71.9 | 0 | |
| | Henrietta Point | 0.51<br>49.22 | 0.49<br>74.42 | 0.51<br>76.3 | 0.53<br>70.4 | 0 |

CCj - Jackard's Community Coefficient

The Jackard's Community Coefficients and Percent-Similarity results do not indicate a strong similarity between any of the sites when all the numbers are taken together. However, when looking at only Percent Similarity, the larger sites (Henrietta Point and Regatta Bay) and the smaller sites (Savage Rocks and Horsley Island Bay) would appear to be more comparable with each other, while Burritts Point shows a distinct lack of similarity to the other sites. These sites were intentionally chosen to represent a range of recreation-use intensity. Variation between the sites therefore could be due to variation in intensity of recreation usage, natural variation in vegetation community structure, or a combination of both. Given the results of the "in-site" analyses provided above (Table 4), it is unlikely that much of the variation between the sites (i.e., lack of similarity) is due to intensity of recreation use and is more likely associated with differences in the vegetation communities at each site.

## 6.3 Canopy Coverage Analysis

Similarly, Table 6 below, which provides a summary of relative canopy coverage, demonstrates that while there are some differences between the various sites in terms of dominant vegetation coverage, the general structure of each site is somewhat similar with a white pine, red oak dominance. As noted earlier, Burrits Point has the greatest diversity of tree coverage perhaps indicating the greatest variation of community structure shown in the Correspondence Analysis. Much of this is confirmed by Jalava et al.'s (2005) characterization of the vegetation communities on Franklin Island.

**Table 6 Relative Coverage of Canopy Vegetation**

| Species | Henrietta | Savage Rocks | Horsley | Regatta Bay | Burrits Point |
|---|---|---|---|---|---|
| White Pine | 0.78 | 0.66 | 0.51 | 0.79 | 0.6 |
| Red Oak | | | 0.45 | 0.18 | 0.15 |
| Red Maple | 0.11 | 0.04 | 0.04 | 0.03 | 0.03 |
| White Cedar | 0.11 | 0.3 | | | 0.17 |
| White Birch | | | | | 0.03 |
| Large Tooth Aspen | | | | | 0.02 |

The lack of significant correspondence between distance and frequency of vegetation counts at any of the sites and the lack of distinction between sites of higher use versus lower use may be attributed to several considerations. These are:

1) There is no significant impact to vegetation structure due to recreation impacts;
2) The sampling strategy does not match the scale of impact; and/or:
3) The structure of Franklin Island ecosystem; specifically vegetation community structure.

Given these various possibilities, the results indicating negligible large-scale vegetation impacts due to recreation are very similar to those outlined in the recreation impacts literature. Indeed, recreation impacts do not generally exhibit large-scale impacts at nominal levels of use and the results from this study's 2000 field season are further corroborated by Jalava et al.'s visual assessment of recreation impacts in 2001. Jalava et al. (2005:) state that:

> Most of Franklin Island shows little or no evidence of recent human disturbance. This island retains qualities of the pristine Georgian Bay landscape of the past, with abundant wildlife and the ecological integrity and aesthetic qualities associated with wilderness areas…. Most of the current human impacts on the island occur along the shorelines and adjacent waters, and are related to recreational activities…. Serious impacts were not noted during the 2001 survey, but coverage was limited to select portions of the island.

From the recreation ecology literature, Sun and Walsh (1998) remind us that most recreation studies focus on the short-term effects of recreational use and are limited in their assessment at larger more regional scales. While some studies noted changes to abundance and diversity of species at the site, the assessments were not carried to a larger scale. The results of this study would seem to indicate that if there are any impacts to vegetation, they are not altering the structure or function of the ecosystem at the campsite scale or at a scale beyond the campsite.

### 6.4 Ecosystem Considerations

The results of this study are likely a combination of at least three major factors. First, the characteristics of the ecosystem influence the potential of the area to be affected by recreation. Second, it is difficult in certain types of ecosystems to determine where the boundaries of campsites are and therefore measure impacts over time. Third, patchy landscape and inter-patch diversity make the development of an appropriate sampling methodology to detect changes to community structure very difficult without a background comparison on the same site.

As noted earlier, the rock barrens-dominated ecosystem establishes a highly patchy mosaic of vegetation communities interspersed between large areas of rock or lichen and moss barrens. Further, depending on the topography, soil accumulation, moisture availability, exposure, and so on, there is a significant amount of inter-patch diversity. While the overall island ecosystem is dominated by white pine and oak canopy, the small individual patches of vegetation may have neither of these species and yet be relatively large in size (i.e., 20 – 30 m radius).

Accordingly, the results of this research are likely applicable to other islands and mainland areas where the ecosystem structure and vegetation community make-up are similar to those studied. That is, where camp sites are located in areas of rock barrens or areas with high patchiness the recreation impacts will likely tend to be quite minimal from an ecological function standpoint. These results may not be transferable in other types of vegetation communities (e.g., where Atlantic Coastal Plains' species predominate in the shoreline area or where areas of significant soil deposition result in more uniform canopy coverage). As discussed in the concluding sections of the thesis, more work will be needed on small island ecosystems to determine the replicability and transferability of the findings of this research.

## 6.5 Campsite Considerations

Most studies of campsite impacts indicate that defining boundaries is a relatively easy task (Cole, 1992, Leung and Marion, 1999) and this is clearly not the case for the island ecosystems in this study. Some alterations to sampling may help to reveal campsite boundaries. Given the amount of barren rock with moss and lichen covering, a sampling procedure which described and analyzed the types and abundance of lichen, moss species relative to bare rock may provide a detailed ecological means of determining both campsite boundaries and the extent of in-site/out-of-site impacts. However, these would likely prove impractical to measure as a monitoring technique and its relevance to the overall functioning of the Franklin Island ecosystem given the small scale of campsite/recreation impacts and the amount of space between campsites.

Cole's (1992) concept of campsite concentration which associates the core use of a campsite (fires for cooking, heat, etc.) with limited growth of a campsite may support the management decision to encourage campsite centralization (e.g., create tent pads, plant hardy species along campsite perimeters, etc). This may be a prudent response for campsites that have consistent vegetation cover across the extent of a campsite. In areas that are more open (such as in Georgian Bay) campsite centralization may not be required, as campsites spread on rock may have negligible impacts. Contrary to Cole's concept, perhaps recreation on Georgian Bay should

be encouraged to occur on open rock areas and not within dense vegetation patches.

In future, detailed analysis might find a means of accounting for the amount, extent, and geo-spatial patterning of rocks relative to vegetation communities in the campsites. Community analysis using aerial imagery would provide a researcher with a better means of determining potential variations due to broad vegetation units. A photo assessment through time, tied to a GIS tracking of changes to vegetation communities may provide the sensitivity needed to pinpoint specific impacts to individual vegetation patches. This would enable a more thorough exploration of the patches of vegetation relative to recreation activities on-site. In short, to assess recreation impacts more thoroughly on Franklin Island ecosystems, an analysis of the vegetation patches needs to be tied to observations of how sites are used. The challenge is that this approach may not be practical from a management or monitoring perspective, as will be discussed in further sections.

Importantly, neither the site visits nor the vegetation analysis established definable boundaries for the five campsites. This may be due to the lack of impact or the lack of clear patterns of use for the campsites. The work done here demonstrates that historic and current recreation pressures are not resulting in an ecological shift to the structure, shape, or type of vegetation communities present on Franklin Island. This is not to say that recreation impacts do not exist on Franklin Island; rather that they do not yet exist at a scale deemed to be significant to the island's ecosystem.

## 6.6 Characterizing Local Impacts

Impacts on Franklin such as fire pits, cut trees, trampling, trails, etc. are observable but are highly localized. Figures 10, 11, 12 and 13 show images of typical localized impacts found on Franklin Island. These types of recreation impacts were well documented by the Kutas study (1998) on Phillip Edward Island where it was deemed that recreation impacts were significant. Further, anecdotal evidence and conversations with various user groups reveals the perception that recreation impacts on Franklin Island are significant, if not severe, despite the findings in

this study.

Visual evidence of these impacts, as seen in the figures below, could be interpreted as a limitation of the sampling design to detect impacts, or it could be that the scale of these impacts does not equate to a meaningful or relevant alteration to the ecosystem. Changes to the sampling design to collect more samples around campsite cores might have resulted in detection of these changes. However, altering the sample design in this manner could result in a false positive (i.e., impacts are detected that are not significant to the functioning of the island ecosystem).

**Figure 10** – Worn Trail through Juniper

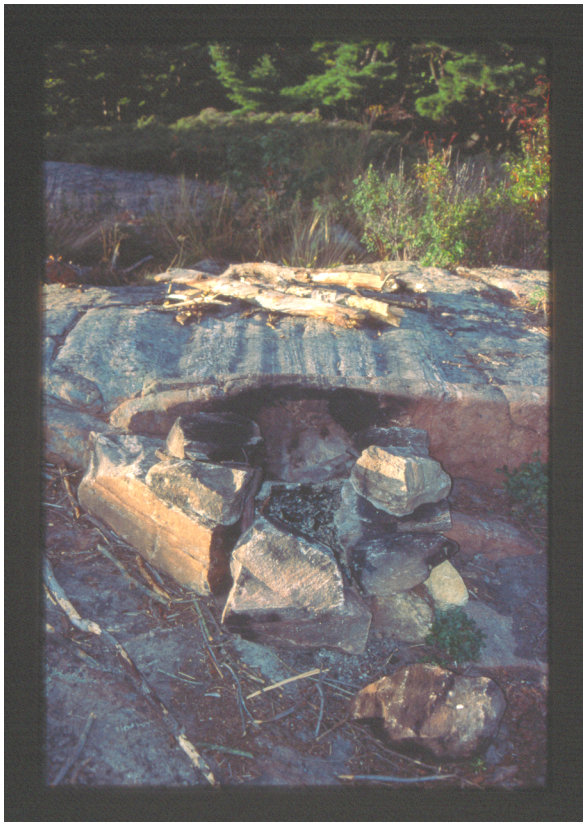


**Figure 11** – Typical Campfire ring

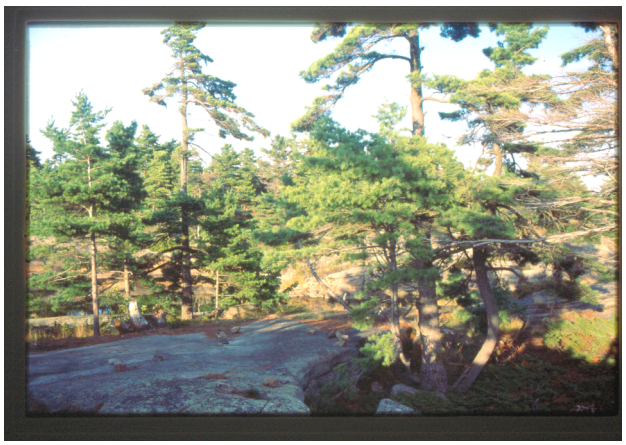


**Figure 12** – Trees limbed for firewood

**Figure 13** – Unburied human waste

It is important to note that while the analysis in this chapter suggests that ecological impacts due to recreation are largely negligible, this in no way detracts from the concerns of residents and users about the impacts of recreation on Franklin Island. What the results may highlight is the sensitivity of people to any degree of change in what they perceive as a 'pristine' or 'natural' system such as Franklin Island.

Hence, it is possible that statements about Franklin Island as 'ecologically damaged' or as being 'harmed' may be a reflection of the change in rates of use and a reflection of largely aesthetic concerns. These comments and observations are important and may provide an early warning that too much recreation is occurring; subsequent management rationales for limiting recreation would then account for both social values and ecological impacts.

## 6.7 Summary of Recreation Impacts on Franklin Island

The results of this study should be viewed as an exploratory assessment of recreation impacts to the ecosystem of Franklin Island. They reveal statistically insignificant degrees of impact to the vegetation community structure in and around campsites given the present amount of recreation use. This result differs from studies done in other areas with similar recreation types and intensity (Cole 1986; Merriam and Smith, 1974, Green, 1998) where early stages and low intensities of recreation use resulted in the greatest intensity of recreation impacts. This thesis

helps to emphasize the importance of understanding recreation impact data for different ecosystems prior to making management decisions for recreation impacts.

The following are key points respecting recreation on Franklin Island:

1. Vegetation communities do not appear to be significantly impacted by current recreation types and intensity of use.

2. It is apparent that the biophysical structure of a typical campsite dictates how campsites are used. No campsite boundary is discernible visually or through sampling techniques.

3. Where camping occurs in vegetation groves, impacts can be locally severe leading to stress and eventual death of adjacent trees. The ability of these groves to resist trampling impacts is quite low and continual use results in severe compaction and soil erosion. Soil erosion from these sites is consequential given the geologic timelines for soil recovery and vegetation growth.

4. Human behaviour as it affects use of a campsite is vital to understanding recreation impacts and possible management strategies.

5. Perceptions of recreation impacts are important drivers of management. Various user groups may perceive impacts in different ways and demand management responses at different levels of impacts. This may result in a highly contested discussion of what impacts exist, their relative severity, and best management responses.

# 7. A Discussion of Scale and Resilience for Recreation Impacts

As shown in the results, the current extent of recreation use of Franklin Island is not providing sufficient stress to alter the function of Franklin Island at or immediately beyond the campsite scale. Concepts of scale and resilience are useful to our understanding of the relative importance of ecological impacts at various spatial scales but also in understanding how recreationists can mitigate their own impacts. The following chapter builds on the previous chapter's results with a discussion of how ecological impacts can be understood in terms of scale and resilience. It also demonstrates how human behaviour can be framed in terms of contributing to the resilience of the Franklin Island ecosystem.

## 7.1 Scale and Resilience of Recreation on Franklin Island

For Franklin Island, there was a primary concern about the effects of recreation at the campsite scale (i.e., relatively local) as it may affect the functioning of the island ecosystem (i.e., a slightly larger scale). Taking the concepts of scale and resilience together, the focus on Franklin Island campsites can be transcended to explore how recreation as a social and economic system interplays with the natural ecosystems of Georgian Bay. That is, recreation management will have to consider means of contributing to resilience beyond those techniques that exist for mitigating impacts at a campsite scale.

Because the recreation impacts found on Franklin Island are largely occurring at a small scale and have not been found to manifest themselves at multiple scales, the first interpretation of resilience as resistance or buffering is useful. However, the problem with this interpretation is that once recreation impacts become cumulative to the point of triggering a 'flip' to an alternate state, ecological impacts are better interpreted through a systems analysis. A systems perspective on resilience is sensitive to the dynamics of ecosystems across scales.

The focal system in this research is Franklin Island and it is useful to think of the island as being nested within a hierarchy of scalar influence. Further reviews of the concept of resilience as

defined by multiple equilibrium states would reveal the magnitude of uncertainty and the resulting lack of predictability in ecosystem management (Gunderson and Holling, 2002). An edited volume by Berkes and Folke (1998) points to the necessity of understanding the dynamics of both the function of biophysical systems and social systems for maintaining and building resilience. Essential to management of systems is the recognition that people exist within ecosystems and are not endogenous to them. They highlight the role of social mechanisms (e.g., social institutions, norms, and behaviours) in maintaining resilience of social-ecological systems.

Future research might explore the resilience dimensions of recreation on Georgian Bay and examine the processes by which the ecosystem evolves and how recreation both contributes to and adapts to these changes. For the purposes of this thesis on ecological impacts due to recreation, attention to the concepts of resilience and scale are complementary and emphasize also the role of the recreationist in the ecosystem. In other words, a focus on physical (or mechanical) impacts is important, but consideration of what the recreationist desires for the ecosystem and what behaviours maintain or detract from the desired state is equally important.

## 7.2 How resilience might be maintained on Franklin Island

The following discussion outlines two broad categories of factors that affect resilience: ecosystem factors and social behaviour factors.

### 7.2.1 Ecological Factors

As noted above, the ability of an ecosystem to withstand change can be categorized roughly into first, its ability to withstand physical disturbance and second, its ability to recover from being damaged. It should also be noted that for Franklin Island and Georgian Bay little in the way of experimentation on vegetation disturbance and recovery has been undertaken. The following discussion is based on the literature and speculation from ecological observers: including the author and ecologists that have become familiar with Georgian Bay. It is important to note that

the literature may have limited value (having been performed in a variety of different ecosystems) and the observations are as yet untested for Georgian Bay.

Ecological factors that influence the extent of recreation impacts have already been discussed in the literature review, particularly in the context of vegetation surveys. They include: vegetation type and density; soil type and amount slope and relief, etc. Factors that contribute to resistance are mainly structural in nature (i.e., plant structure). As noted, Franklin Island exhibits a mosaic of vegetation communities within a matrix of coastal plains - rock barrens.

Kuss (1986) establishes that responses to the mechanical effects of trampling appear to be strongly associated with the morphological characteristics of plants. Broadly speaking, Franklin Island ecosystems are naturally resistant due to the high quantity of rock such that human use patterns can easily avoid vegetation communities. The impacts to lichen communities were not directly assessed by this study. It is probable that lichen communities are impacted in the core areas and primary launch sites of campsites depending on the intensity of use.

The visual survey undertaken on the south shore of Franklin Island did indicate areas of trampling from trails and from tent sites. Certain communities were more prone to impact and use than others, likely dictated by the type and extent of vegetation. Vegetation communities that exist around a standard Franklin Island campsite would consist of the following:

- shoreline vegetation (shallow water emergents) and barren rock/cobble/sand areas
- near-shore shrub patches
- inshore tree groves (predominantly pine, with juniper, blueberry shrub layer)
- inshore barren rock areas
- inshore moss/lichen covered areas
- inshore lowland areas (deeper soils, deeper moss layers)

Most commonly, near shore vegetation patches consist of ponding areas and associated vegetation communities; white pine groves with moss, juniper, and blueberry underbrush; hardy

shrub (alder, willow thickets); dogwood, and spirea. Common to all of these areas is the lack of soil build-up. The lack of abundant vegetation communities on Georgian Bay may highlight the importance of ensuring some degree of protection for them.

While most of the vegetation communities listed above exhibit a high resistance to disturbance from wind, drought and icing, these communities will be sensitive to activities that compact vegetation and soils and contribute to their loss. Water retention in these soils buffers the larger vegetation communities from the summer droughts. Hence, soil loss will contribute significantly to stress in these ecosystems.

Of particular concern to impacts will be the smaller patches of vegetation communities dominated by white pine. These areas are easily degraded during summer months when the moss communities and soils are driest. Because there is a relatively low diversity of species, re-colonization is possible, provided soil is retained. If soil is lost, a shift to a different vegetation community that can grow in limited soils is likely and a cycle of soil regeneration to support higher-order vegetation would ensue.

From this discussion, user characteristics and social behaviours become very important. If users stay away from wooded areas and place campsites on rock and follow rock paths as opposed to through vegetation, the level of ecological impacts will be greatly reduced. Further study into inter-patch connectivity could be undertaken. From a vegetation perspective, impact in one patch will likely have little impact on another patch of vegetation with the exception of potential loss of screening from weather events. However, from a faunal perspective, patchy habitats may serve an important function in terms of forage patterns, mating, and shelter. In particular, life cycle patterns of certain reptiles (e.g., Fox Snake) are noted to strictly use the patchy near-shore habitats of Georgian Bay.

Recreation impacts on vegetation communities on typical campsites of Franklin Island would appear to be somewhat insignificant at current levels and type of use. Jalava et al. (2005) similarly noted that Franklin Island exhibited little or no evidence of recent human disturbance.

However, this study only examined typical campsites: those with significant rock coverage, and patchy vegetation communities. Other more sensitive community types may be used for vegetation surveys and impacts to these communities should be similarly addressed in terms of relative resilience. Additionally, a study of recreation impacts on smaller islands would help to broaden our understanding of recreation impacts throughout the range of typical Georgian Bay islands. As one of the larger islands in the area, Franklin has a greater pool of vegetation from which to re-vegetate disturbed areas, and this too may allow for a different recreation intensity.

From both social and scientific perspectives, ecological resistance to human disturbance may be deemed quite high as most human use is concentrated in rocky plain areas. Conversely, impacts to the patches of vegetation may result in considerable loss of vegetation within that patch and hence vegetation communities may be deemed to have low resistance to human disturbance. Management activities and research should thus be directed at determining the significance of vegetation loss from patches and at directing human use primarily outside these patches.

### 7.2.2 Human Behaviour and Recreation Impacts

The behaviours of people using an area will greatly influence the type and extent of impact. This can be seen from several perspectives. First, the type of recreation will cause varying degrees of impacts on an ecosystem. Hikers will have a certain degree of impact different from that of off-road vehicles. Because Franklin is a Crown Land island, there are limits to the types and extent of impacts that exist from watercraft and boaters. For the most part, recreation that occurs on Franklin Island is apt to be focused on the shoreline with most impacts around the water; currently, there appears to be very little use of the interior of the island.

Second, different types of recreation are associated with different types and degrees of impact. For example, kayaking may be the primary mode of remote travel, but kayaking is likely only to occur for a few hours per day. Related activities will entail aspects of camping such as: location of tent site, location of latrine, swimming, hiking/exploring, photography, and meal preparation. Thus kayakers participate in a certain set of activities that have associated impacts. These may

(or may not) be quite different than the impacts associated with sailboats or powerboats. For example, the use of personal watercraft is more likely to be associated with large motor yachts and cottages than with canoes and kayaks and even sailboats.

It is relatively easy to stereotype various user groups, but it becomes quite difficult to assess their relative impacts without adequate research to allocate certain types and extent of impacts to each user group. Without such research, the discussion about management of user groups and behaviours becomes very political and based on social perceptions. This study has focused on the impacts associated with kayak and canoe-based camping and to a lesser extent the impacts associated with picnicking. It would be helpful for a future study to attribute different types of impacts to specific user groups, if only to help identify those groups to which educational campaigns could be directed.

Third, the type and severity of recreation impacts will also be influenced by users' campsite preferences. Several factors may contribute to campsite selection:

1) **Location of appropriate landing spots:** the rocky terrain limits where boats are able to pull up or remove their watercraft from the water.
2) **Number and size of flat spots:** for setting up a tent(s) or having a BBQ/picnic (much of the terrain that is vegetated is not flat enough, or is thickly vegetated with shrubs and/or tall herbaceous species.
3) **Proximity to water:** water is the feature that draws people to this landscape. As such, the focus of recreation tends to be at the waterfront area. The recreation that moves inland tends to be for personal hygiene and to a lesser extent for firewood gathering, and also for occasional hikes.
4) **Fear of wildlife:** The presence of snakes on the islands, for example, may provide a motivation to stay in areas with greater visibility. The amount of bare rock allows people to choose open paths around the campsite and along the shore, thereby avoiding areas that might be perceived to harbour wildlife. Thus, as was indicated by the shoreline survey, some trampling of vegetation for trails exists but the extent of

damage may be limited by the decision of users to take the shortest path between bare rock patches.

5) **Availability of latrine sites** - some attempts have been made to erect pit privies (also known as "thunderboxes") on the higher use sites on Franklin Island. This may result in a reduction in the number of trails required to access deep enough to dig individual latrine sites but may also result in the intensification of particular campsites and trails.

These user preferences illustrate that the structure of an ecosystem also influences human behaviours in that system. People choose and use sites based on the biophysical characteristics presented to them.

Related to these types of social behaviours is research that looks at the social limits to environmental change. These research models (e.g., Limits of Acceptable Change in Manning et al, 1996) look at human preferences for certain degrees of recreation use. The desirability of an area will depend on the types and amounts of use that are associated with it. As for this, it would be interesting to see if a social capacity level exists at which people choose to go elsewhere because they hold the perspective that an area is overused.

Perhaps there is a use level that exists on Franklin Island at which users would choose to go elsewhere. The difficulty with this type of analysis is that certain user groups will have different tolerance levels for other users, whether a wilderness experience or a social outing is the focus. The question then becomes one of management deciding whose tolerance levels are to be considered. Statements about environmental quality and impact are relative: they include a subjective analysis of how the aesthetics of the camping experience are perceived. For the management of Franklin Island, the inclusion of aesthetic considerations is key to an understanding of the broader questions about recreation and resilience.

For example, one of the major aesthetic preferences associated with camping is the desire for fire. This aspect of camping is one of the main behaviours that will continue to have impacts on Georgian Bay ecosystems. Specifically, it may be interesting to examine Franklin Island's

capacity for firewood production and the related impacts of these activities to various ecosystems. Georgian Bay shoreline areas may be particularly susceptible to vegetation removal due to the scarcity of soil and the limited density of vegetation worthy of collection for firewood. Certainly it is accepted in the literature that woody debris has a function in ecosystems, particularly in the creation and stabilization of soils. The use of fires may be decreasing in association with camping on Georgian Bay due to education campaigns; however, further means of reducing the use of fire may be needed, concurrent with some encouragement of the use of stoves for cooking (Dyer *pers comm.,* 2003*)*.

Additionally, at a scale beyond Franklin Island, it is important to consider how the area is marketed for tourism and how the delivery of recreation opportunities is carried out. How an area is marketed may affect the numbers of people visiting, the types of recreation that people seek in an area and the types of behaviours people exhibit when they visit an area. For example, kayak outfitters who undertake marketing may result in more people coming to an area, thus increasing the potential for recreation impacts. However, the marketing and education associated with the delivery of an experience may also result in behaviours that accommodate recreation with relatively limited ecological impact.

Another example would be the marketing of All Terrain Vehicle experiences, that often depicts riders running through a wetland, thereby creating a demand for that type of activity in that kind of sensitive habitat. Certainly recreation experiences on Georgian Bay have been well marketed. An analysis of how the marketing and eventual delivery of experiences is undertaken could aid significantly in establishing a recreation experience that contributes to the resilience of recreation experiences and ecological communities on Georgian Bay and specific areas like Franklin Island.

### 7.3 Linking Ecological and Social Factors for Management

Taken together, ecological and social factors that contribute to the notion of ecological resilience are important for management. However, they also present a considerable challenge to determining appropriate management strategies. Using the recreation impact literature as a guide,

it appears that recreation impacts rarely create significant ecosystemic changes beyond a localized scale. However, the use of a systems perspective on resilience suggests that cumulative effects and ecosystem change often manifest in non-linear fashions. That is, what appears to be an insignificant level of recreation impact at current usage may result in significant ecosystem changes with a seemingly small increase in usage.

From a social-ecological systems perspective, a second important consideration is how people perceive and tolerate relative impact levels. Recreationist's notions of place will influence how they behave in that place and their expectations for how that place ought to be managed. Accordingly, the discussion below distinguishes between ecosystemic impacts, ecological impacts, and aesthetic impacts. Ecosystemic impacts are those that fundamentally alter the form and function of an ecosystem and become stressors at multiple scales. This research would tentatively indicate that current patterns of Crown Land camping contribute little or no ecosystemic changes to the island ecosystem of Franklin Island.

Ecological impacts are those that affect individual components of an ecosystem, but in and of themselves are not (possibly as yet) influencing the dynamics of the local ecosystem. For instance, trampling and cutting of trees are physical damages to the ecosystem but do not appear to be altering the function of the local ecosystem (i.e. at a campsite scale). If severe or cumulative, ecological impacts may lead to ecosystemic impacts (i.e. that are cross-scalar). From this study, ecological impacts are evident on Franklin Island in the form of trampling, physical damage to trees, localized soil erosion etc. However, as mentioned above, the intensity of these impacts does not appear to affect larger scale processes.

Aesthetic impacts are those that cause an affront (or emotional reaction) to recreationists. These impacts may be ecological impacts or they may be of limited ecological concern. Aesthetic impacts are largely visual in nature but certainly can be auditory and psychological in nature. For instance, the presence of toilet paper likely has a minimal ecological or ecosystemic impact, yet it can greatly influence the attitudes and experiences of users of a given campsite. Also, all ecological impacts may not necessarily be aesthetic in nature; users may not be aware of the

inherent linkages between some types of impacts.

Smith (2003) rejects notions that a pristine nature exists intrinsically and suggests that the concept of nature is a social construction. Accordingly, ethical and aesthetic arguments can be made and can have great force. Humans give nature value by discovering or creating meaning for it. In terms of management, how recreationists perceive impacts (aesthetic impacts) may become important drivers of monitoring and management. In responding to aesthetic concerns, however, people may be missing the important ecological linkages driving ecosystemic change. All three types of impacts noted above are important for managers to consider. Variable perceptions of an impact will greatly alter how it is managed. Moreover, variation in the perception of an impact between user groups requires that managers adopt a social analysis of impacts in order to discern the motivation behind management and hence the most appropriate strategies for management.

The dilemma of ensuring that cumulative impacts and ecosystemic changes are not occurring without some forewarning and how to respond to variable perceptions of impacts is addressed in the following sections, specifically through a possible monitoring approach. The following section elaborates on the concept of social-ecological systems (Berkes and Folke, 1998 and Gunderson and Holling, 2002). A systems perspective on Franklin Island suggests that if people can learn to utilize areas (recreate) in a manner which adjusts their norms and practices to better fit with particular ecosystem types and scalar dynamics, then recreation impacts can be effectively reduced and recreation experiences can maintain resilience.

In summary, the concept of resilience in recreation impacts research forces us to combine our knowledge of the physical system with an understanding of how humans currently behave and what other behaviours might be encouraged. Resilience as a complex systems concept, also forces us to acknowledge that the human perspective in defining what types of ecosystem states are desired is important. Linking ecological and human factors provides and important context for recreation management.

# 8. CONCLUSIONS AND RECOMMENDATIONS

The purpose of this chapter is to apply what has been discussed about recreation ecology to develop recommendations for the governance, management and monitoring of Franklin Island. Reflecting on the research objectives, Chapter 6 has provided an analysis of the severity of the most common and likely types of recreation impacts on Franklin Island. The analysis suggests that while some localized impacts exist they do not appear to be affecting the overall form or function (i.e., ecological integrity) of Franklin Island's ecosystem. Chapter 7 placed the known or potential impacts into a social-ecological framework that examines how the characteristics of Franklin Island and the recreation experiences that occur on Franklin Island contribute to the resilience of Franklin Island ecosystems.

This final chapter seeks to build on these two broad findings and contribute to the third objective of contributing to the conceptualization of an adaptive management framework for Franklin Island and similar areas of Georgian Bay. Based on site-specific assessments of impacts, one of the research objectives of this study (section 1.2) was to develop a management framework that considers ecological pressures, reflects community values, recognizes ecological management objectives, and is responsive to future scenarios. Each of these themes is addressed in the concluding discussion and accompanying recommendations.

## 8.1 Broader context for management of Franklin Island

The central question for management on Franklin Island is: "how can Crown Land islands be managed successfully?" There are many perspectives on this question, including what constitutes "successful" management. The following three sets of considerations inform the broader context for practical management on Franklin Island.

### 1) ROLE OF GOVERNMENT

a) The traditional roles of provincial and federal agencies over the past twenty years in

the management of the environment and Crown Lands have changed. There is currently a greater focus on policy and less on field applications (e.g., research, monitoring and enforcement). This is challenging as the poor or nonexistent data collection limits the ability to assess the effectiveness of policies.

b) A greater emphasis has been placed on the need for public consultation and an interest in partnerships has permeated planning and management cultures of the relevant agencies. This can be seen in public documents like the Charting the Course document for the Great Lakes Heritage Coast. However, there is also a need to discern between the rhetoric of public consultation and the application of its outcomes.

c) There is less financial capital being made available for active environmental management (e.g. Conservation Officers in the Parry Sound District had no additional fuel budget for vehicles or boats by September 2006).

## 2) NATURE OF RECREATION

a) Recreation and leisure activities have increased steadily, specifically in terms of active outdoor recreation in response to a number of factors (e.g., tourism marketing, shifting demographics, disposable income, affordability and accessibility). This is best demonstrated locally in Parry Sound area by the continued growth in companies offering guided trips.

b) Those recreationists seeking wilderness areas in remote or semi-remote settings tend to be well-informed and willing to shape their behaviours into an 'environmentally-sensitive' mode which is likely unique to Ontario and Canadian experiences.

c) Recent polling has clearly demonstrated a high level of interest in the environment although it is unclear whether this translates to better recreation behaviours.

## 3) PERSPECTIVES ON ENVIRONMENT & ECOSYSTEMS

a) Our notions of what constitutes our environment and what we perceive as impacts to

ecosystems are highly subjective;

b) Traditional science has tended to oversimplify explanations of the environment predominantly into modes of linear causality (as per post-normal critiques).
c) How ecosystems are analyzed, interpreted and explained is dramatically affected by the scale(s) and the perspectives (lenses) used (as per systems thinking).
d) It is now widely accepted that citizens can contribute valuable knowledge to managers and have a significant role to play in setting the priorities for ecosystem management in areas with high collaborative potential such as Franklin Island.

## 8.2 Governance on Franklin Island

Franklin Island represents a microcosm of recreation management "problems" on the coast of Georgian Bay. These problems are broadly considered to be issues of ecological capacity, social concerns, and governance and management challenges. Governance is defined as the structures and processes of "…collective decision-taking and action in which government is one stakeholder among others" (Knight et al., 2002:131) and is expressed through networks and partnerships among all three sectors of society - government, business, and civil society - for solving complex problems in a collaborative manner. Characteristics of this form of governance would include citizen engagement, adaptive management, and collaborative approaches and partnerships, all of which have been demonstrated in the case of Franklin Island.

Franklin Island is formally governed under the jurisdiction of the provincial Ministry of Natural Resources; the island is designated a Conservation Reserve under the Public Lands Act. Conservation Reserves are designated in order to protect representative natural areas and special landscapes and are provided management direction through the establishment of Statements of Conservation Interest. Essentially, Conservation Reserves are to retain existing uses provided they pose little threat to their natural ecosystems and special features (OMNR, 1999).

This thesis argues that although quite useful for large areas of Crown Land, Conservation Reserves are limited by the types and extent of management activities available to them. Mainly,

this stems from a lack of monitoring and enforcement capacity. Like other Crown Lands, Franklin Island receives little active management (e.g., signage, patrolling, restoration, monitoring, infrastructure development, etc.). Continued designation as a Conservation Reserve represents maintenance of the *status quo* in terms of how Franklin Island is used; however both rising pubic concern and continued or increased recreation usage poses a risk to Franklin Island's ecological integrity.

Several important actors that have a major stake in the governance of Crown Lands in eastern Georgian Bay have expressed concerns about both ecological and aesthetic impacts from recreation. These include the Georgian Bay Association (an umbrella organization for individual cottagers' associations), the associated GBA Foundation, the Georgian Bay Land Trust, local recreation outfitters (e.g., White Squall Paddling Centre) and their non-profit associates, such as the Great Lakes Sea Kayak Association, and local municipalities and ratepayers' associations (e.g., the Carling Ratepayers Association). First Nations communities are another significant stakeholder for planning and management of eastern Georgian Bay, given their extensive historic use of the area and their ongoing land claim processes.

Interestingly, the management of Conservation Reserves is now included under the Provincial Parks Act. This newly adopted legislation has emphasized that the goal for protected areas will be the maintenance of ecological integrity. The concept of ecological integrity, similar in many respects to resilience, provides a more holistic approach to management and offers greater potential for successful stewardship and management of Conservation Reserves. Franklin Island is one of nine Conservation Reserves designated along the east coast of Georgian Bay. In addition, seven Provincial Parks and one National Park combine to create a comprehensive system of protected areas in the region. Accordingly, a strategy developed for management of Franklin Island has potential usage in other Conservation Reserves and interstitial Crown Lands.

As noted earlier, the Ontario Living Legacy provided an opportunity for Franklin Island to be considered for conversion to a Provincial Park in 1999. When an area is designated as a park, a new rule set is established and a larger set of management activities and tools is made available.

Some of the concern with Provincial Parks is that there is usually a set pattern to how a park is developed despite community involvement in the planning process. A decision in favour of Provincial Park status may represent a "buy-in" to a set package of ideas about how areas should be managed. Further, there is some question about the effectiveness of Provincial Parks to curtail ecological damage; although parks offer the greatest potential for protection of ecological integrity; this may not always be realized. Designation as a park represents a new regime with a potentially considerable shift away from how Franklin Island is traditionally used, raising questions about the effectiveness of management tools for maintaining Franklin Island's ecological integrity and values.

The closest mainland municipality, Carling Township, was invited to facilitate public comment on the possibility of a new park on Franklin. The resulting process highlighted the level of concern by area residents and other users of Franklin Island. The consultation committee recorded the following concerns (Carling Township, 2002):

- Detrimental impacts to the Franklin Island ecosystem by recreation users;
- Differences between management styles of Provincial Parks versus Conservation Reserves;
- Local infrastructure requirements and impacts due to increased and/or continued recreation use of Franklin Island;
- Overuse of campsites as a threat to traditional uses and accessibility (e.g., picnics); and,
- Displacement of impacts to other areas if Franklin Island designated as a Provincial Park.

The results of this consultation made clear that people shared a deep sense of concern about the patterns of usage on Franklin Island and were unclear about the implications of a new management regime (i.e., Provincial Park). However, without undertaking a park management planning process, it is difficult to say how management of a Provincial Park would unfold in the case of Franklin Island. The concerns expressed by Carling Township respecting either a Conservation Reserve or Provincial Park designation for Franklin are not surprising. The choice is between two rigid types of governance arrangements, neither of which appear to meet the needs of the various groups who use and enjoy and are affected by the decisions respecting

Franklin Island.

From a government perspective, it is hard to discern whether there is potential interest and presumably resources for a park style of management or whether there are in fact only limited resources available and only passing interest in management. From the public perspective there is intense interest in seeing something done for Franklin Island and concern about recreation impacts but attitudes prevail that this 'something' is the work of the government. Tied to this is the tension between a perspective that unregulated "Crown Lands belong to nobody" rather than a perspective that they are held in common for everyone.[8]

At the time of writing no final decision has been made respecting the choice between Park and Conservation Reserve for Franklin Island. The Wikwimekong First Nations Land Claim has caused land use decisions respecting island Crown Lands (including Conservation Reserves) to be held in abeyance pending the resolution of this claim. First Nations' claims aside, the resolution of Park versus Conservation Reserve will doubtless involve much more consultation with the public. Likely the concerns initially expressed by the Carling Township community will also be raised by other stakeholders and the list of concerns and issues will expand.

An opportunity now exists on eastern Georgian Bay to redefine recreation management using an approach that directly engages multiple stakeholders in a collaborative approach. Traditional forms of management (i.e. Provincial Parks) are not seen to be desirable but neither is the status quo. Moreover, traditional management models for Franklin Island would appear to be unnecessary given the current severity of recreation impacts on the ecology of Franklin Island as determined by this study.

Collaboration and partnerships are often seen as the norm in addressing complex problems. In part, partnerships can be seen as a response to declining financial and human resources in

8 A conversation overheard between two students about where to go camping on a long weekend. One perspective among some local residents is that the MNR is an "absent landlord" or relatively ineffectual custodian of public lands, rather than the perspective among some campers that access to public lands is a privilege tied to a civic duty or stewardship ethic.

agencies such as the Ministry of Natural Resources; however, collaborative governance also facilitates citizen engagement and can be key to ensuring full community support for stewardship initiatives.

### 8.3 Management on Franklin Island

Multi-stakeholder collaboration currently supports relatively informal management on Franklin Island and several surrounding islands. Since 1998, informal efforts organized by community members and local businesses contributed to building and maintaining pit privies or 'thunderboxes' on Franklin Island. The activities also involved volunteer clean-ups and informal monitoring of recreation impacts. These initiatives have been largely spontaneously self-organized and multi-stakeholder (with inclusion from citizens, local ratepayer associations, businesses, NGOs, local government, the MNR, and the local Ontario Stewardship Council).

In 2004, White Squall Paddling Centre (the local outfitter that initiated the first clean-ups in the mid-1990s) paid their summer staff to undertake weekly clean-ups of campsites. They received donations from customers and local cottagers to facilitate the work. Another partner, the Great Lakes Sea Kayak Association (based in Toronto), approached the Georgian Bay Biosphere Reserve board for support in formalizing an arrangement to implement a stewardship initiative for Franklin Island.

In 2006, the Great Lakes Sea Kayak Association and White Squall together sponsored the first summer student position for stewardship on Franklin. A memorandum of understanding between multiple parties was also signed that year to initiate campsite clean-up, signage, and recreation use monitoring. In 2007, these two initiatives combined under one umbrella with an expanded network of stakeholders, resulting in employment of two summer students to carry out stewardship activities. Primary duties were to "be the face of stewardship efforts and community concern," to educate campers and picnickers about low-impact recreation, to clean campsites where necessary, dismantle fire pits, and move thunder boxes to new locations.

One key initiative was to implement a volunteer fire ban, discouraging the use of fires on Franklin Island, as it is fire that is deemed to be the largest recreation threat to ecosystem health. While voluntary, the efforts of the stewards, the local outfitter and the educational signs (Figure 14) installed at water-access points, all appear to have fostered changes in recreation behaviours.

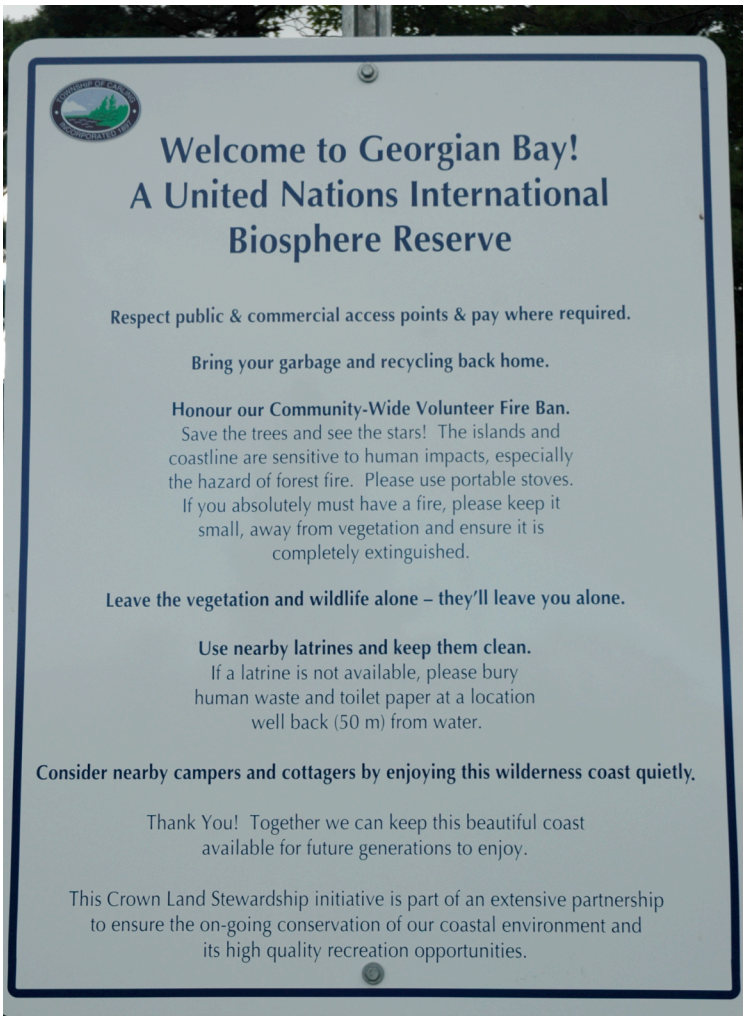



**Figure 14** Franklin Island Stewardship Sign

While the standard issues with this kind of program exist (i.e., financing, staffing and supervision), it has been fascinating to note the level of support with which money has been provided from multiple groups with relatively little burden on any one group. All parties have recognized the importance of collaborative action rather than simply continuing conversations

about concerns or placing the burden on some other party, such as the MNR. Interest in the program has escalated so that the concept of having student stewards on Georgian Bay beyond Franklin Island is now an annual objective. The challenge remains on how best to resource these types of programs with appropriate levels of supervision and finances. A number of NGOs are exploring how to fund these types of summer student programs on a long-term basis.

### 8.4 Monitoring on Franklin Island

Monitoring is an integral component of most planning processes and one that is traditionally inadequately addressed. There is a tendency to place great emphasis on the process of planning and on outcomes without considering how to assess whether goals have been achieved. For stewardship planning, there is a need to focus on both the social aspect and the ecological aspect individually and as they are intermeshed.

In the approach proposed by Kay et al. (1999), the planning process would begin with a definition of values and goals. By doing this, it becomes clear that this is a social process that is defining desired outcomes for a particular ecological context. The ecosystem approach attempts in both specific and indirect manners to adapt to shifts in the multiple perspectives on an issue and to emerging phenomenoa in social and ecological systems. Accordingly, monitoring plays a further role by alerting managers to these changes and allowing for shifts in management approaches.

For the proposed stewardship management approach for Franklin Island, monitoring will be important from a social perspective to ensure that stakeholders are content with the actualization of the stewardship/management design. The experimental nature of a stewardship-based approach has already been addressed and the need to be able to respond to changing pressures and to respond with shifts in stewardship/management styles is requisite to ensure that social and ecological goals are met in the long term.

Presumably ecological considerations of recreation impacts will be one of the defined goals for the stakeholders. Accordingly, a monitoring program for recreation impacts would have to be created to provide a means of evaluating changes due to recreation. The research on recreation impacts above highlights two broad areas of impact: ecological and aesthetic. Both are key considerations and require that ecological and social tolerance levels for changes be defined.

Additionally, basic user information would be very useful for Franklin Island. If a formalized stewardship approach is adopted, it is recommended that efforts be made to create a visitor database that would include: group sizes, trip lengths, and campsite locations. It may be possible to partner with local businesses and outfitters to include surveys at storefronts and/or in rental agreements. A range of approaches for monitoring is outlined by Cessford and Muhar (2003). These include more technical approaches (motion sensing) as well as less formalized approaches that provide reasonable estimates but not necessarily accurate numbers. The latter approaches may be combined into a task for summer students.

In terms of learning and adapting, monitoring remains a very important component of the governance approach for Franklin Island. The range of components that need to be monitored include: user information, ecological values, and recreationist values. How this information is to be gathered and the desired accuracy are issues to be explored in the development of a stewardship strategy.

## 8.5 Recommendations

The following recommendations build from the previous discussions on governance, management and monitoring, and fulfill the final objective of this study. They outline an approach to stewardship for Franklin Island that is partially in place and is continuing to evolve. These recommendations, specific to Franklin Island, are applicable to other areas of Crown Land where there is no formalized management structure in place. In this Franklin Island is useful as a pilot study area for others on the eastern coast of Georgian Bay. With some minor modifications to monitoring design and governance approaches, the learning that occurs, as one outcome of the

experiences on Franklin Island could well be used in adjacent areas with similar challenges and opportunities. It should be emphasized that the implementation of this approach is largely dependant on the various communities and stakeholders that have an interest in an area like Franklin Island.

**Recommendation 1 Enhancement of a Stewardship Partnership for Franklin Island**

As indicated by developments over the past five years, there is great potential for a collaborative stewardship arrangement for Franklin Island. The current partnership should be enhanced through the broader involvement of the local municipality (Carling Township) with support from the Georgian Bay Land Trust and the GBA Foundation. Additionally, because Franklin Island has numerous mooring bays, efforts should be made to include the boating community. Such partnerships with boating organizations may result in increased stewardship among the boating communities while also increasing the quality of boater facilities in the area. By broadening the range of stakeholder engagement, increased awareness of the values held for an area is created. Further, involving more partners builds awareness of the common and divergent values held for an area and may aid in the development of consensus respecting the best management approaches.

**Recommendation 2 Engagement of citizens in the design and implementation of a stewardship strategy**

As noted previously, citizen engagement is a key aspect of the ecosystem approach and adaptive management. Citizen engagement is meant to generate social capital and trust network, while collaboration then is typically engendered through public participation models - typical of government-led consultations as utilized by the Ministry of Natural Resources and often by local governments. Citizen engagement demands greater legitimacy, transparency and authentic engagement in addressing problems. It often leads to delayed implementation but to more effective outcomes. It is important that groups wishing to have an integral role in the design and authorship of a stewardship strategy be given a role. In line with the literature on collaborative

management, this role need not be equal between all the groups involved but involvement should be transparent, open, and recognized.

**Recommendation 3 Facilitation of a the Stewardship Partnership for Franklin Island**

Since some groups and individuals may not have the capacity or interest to be involved, facilitators of the stewardship initiative should ensure that efforts are made to communicate strategies and plans to the public in an open forum. The Ministry of Natural Resources might be in the best position to conduct an initial public consultation since it is in their jurisdiction to do so and may lend some credence to the process and ensure that consultation is broad-based. Additionally, it would seem that the MNR may be the best suited to initiate and explore discussions with First Nations and build bridges in a formal capacity between the local community and local First Nation's and/or those with land claims on Franklin Island and other areas of Georgian Bay. However, there are other possible facilitators of such a partnership. There is an excellent opportunity for the Georgian Bay Biosphere Reserve, a relatively neutral organization, to facilitate the multi-stakeholder discussions required to design an effective stewardship initiative.

**Recommendation 4 Adopting an adaptive approach for stewardship and management**

An adaptive approach for Franklin Island would recognize a gradient of policy and management intervention options and apply them as the need arose. Currently, multiple groups recognize the need for some form of intervention but are expressing concern about a 'park style' form of management. An option exists at this time to establish a community stewardship initiative for Franklin Island that adopts "soft" management approaches (e.g., campsite clean-up, latrine construction) but which can expand to other management approaches as the need arises.

Currently, there may not be an ecological need or a community desire for a park style management. If this need cannot be staved through community stewardship programs then requests from the community could be made in the future to create more formal and

interventionist management strategies or have the area designated as a park. An advantage of an adaptive approach at this time is that it allows greater involvement of the community in defining management directions and approaches for the area.

**Recommendation 5 Formalizing arrangements with MNR and Ontario Parks**

Because the MNR has formal jurisdiction, yet limited capacity, for management of Franklin Island, it is advisable that the MNR publicly recognize and support the stewardship activities being led by the community. Additionally, MNR staff have some expertise to help design and implement management strategies and the MNR's Conservation Officer enforces the public lands act under which flagrant abuses to Crown Land can be controlled. Establishing clear communication strategies between the local communities and the Conservation Officer should be developed.

Furthermore, the stewardship activities and the adaptive approach should be acknowledged in the creation of a "Statement of Conservation Interest" (SCI). In this form, the community vision for Franklin Island would be encapsulated in a formal management document that would receive public scrutiny. One further option would be to have the MNR facilitate the creation of the SCI by the involved public further lending credence to the role of the public in the future of Franklin Island.

Additionally, because of the potential for community groups to contribute to the ongoing assessment and maintenance of ecological integrity within protected areas, as per the Parks Act, these types of arrangements could contribute to MNR's new responsibilities for ecological integrity reporting in its Conservation Reserves and Provincial Parks, including monitoring both ecological values and social values of a particular protected area and a system of protected areas such as the Great Lakes Heritage Coast.

**Recommendation 6 Exploration of a photo-monitoring approach**

Specific to recreation impact monitoring on Franklin Island, it is recommended that a photographic approach be established for vegetation monitoring and that a survey approach, implemented by volunteer stewards be utilized for ongoing assessment of impacts at campsite locations. A photographic approach is the simplest mechanism for addressing historic changes to shrubs and tree vegetation cover and may also be useful for tracking soil erosion and campsite utilization (O'Connor and Bond, 2007; Pickard, 2002)

The approaches for assessing impacts used for this research and elsewhere are relatively time consuming and/or leave much to subjective evaluation. As such, consideration should be given to the development of a spatially explicit photo assessment approach. This approach would include taking photographs of campsites and picnic sites throughout the campsite at specified and duplicated locations. This could easily be tied into digital mapping to allow for time series tracking of campsite impacts.

With the use of aerial imagery, the extent of vegetation loss or gain at a given campsite would be possible using the repeat photography approach (Marion et al, 2006). In the development of the photo approach, it may be useful to undertake a formal study that may include detailed vegetation sampling like that used in this thesis. This type of study should be done only to ensure that the photo assessment is indeed cataloguing landscape change in terms of ecological integrity.

Because an ecosystem approach requires a detailed understanding of social values and perceptions respecting recreation impacts, it is essential that this approach be combined with an upfront assessment of stewardship and management goals to make the social values and objectives around campsite condition explicit prior to the beginning of monitoring. A study which surveyed visitors and local residents and cottagers about the use of Franklin Island, its important features, and issues of concern would be of great value to the establishment of a stewardship strategy and in goal-setting for the Conservation Reserve. Then, the results of a photo assessment can more clearly speak to the specific values held for an area.

**Recommendation 7 Undertake Governance Monitoring**

Because this approach to governance suggests an adaptive and evolutionary approach to the management and stewardship of Franklin Island, it is important that the governance approach is assessed on a periodic basis. Hence, it is important that a means of assessing recreation use in terms of type and intensity be found. Additionally, an ongoing assessment of the social factors motivating the management and stewardship approaches is needed. Lastly, it would be important to understand the roles and contributions of the various groups to the governance approach and to track how these roles change through time. The ultimate goal of this kind of monitoring would be to assist with any transitions to other forms of management and to allow us to learn from this type of collaborative approach.

## 8.6 Conclusions

This thesis began with an exploration of recreation impacts on Franklin Island because it is a popular destination for wilderness campers and day users, yet no recreation assessment had ever been undertaken to assess the types and severity of impacts. Vegetation surveys (i.e., relative diversity and abundance) found that vegetation communities at the campsite scale and slightly beyond the campsite do not appear to be significantly altered or affected by the current intensity and types of recreation use. These conclusions recognize that certain physical changes to vegetation have indeed occurred, as observations showed, but that these occur in very localized areas with specific physical and aesthetic, as opposed to ecological, impacts (e.g., tree cutting, trail trampling). Overall this study would suggest that these localized impacts are not having a significant impact to the functioning of the Franklin Island ecosystem.

It is important to note that the mosaic structure of Franklin Island's ecosystem with its high level of patchiness and inter-patch diversity, including large areas of barren rock, pose some unique challenges for an ecological assessment of recreation impacts. Some modifications to the sampling approach may assist future assessments of recreation impacts and long-term monitoring. However, several caveats are worth noting. First, any survey or pictorial approach

(as per Recommendation 6 above) should explicitly outline the values that are used to define what constitutes a recreation impact. Second, research across scales is critical for distinguishing between local (site-level) and landscape scale changes or between ecological and ecosystemic impacts. Third, long-term research into whether particular sets of impacts or cumulative impacts might result in a loss of system resilience and at what scale should be undertaken. And finally, despite their higher degrees of subjectivity, these approaches to sampling are potentially very useful in assessing both ecological and aesthetic impacts, which are often seen as dual motivators for formal recreation management.

Using the concept of resilience informed by a systems approach, recreation ecology can be expanded to reflect how the structure of an ecosystem and the pattern of human behaviours acting within and around an ecosystem work to maintain or alter a system's resilience. In the case of Franklin Island, it would appear that the mosaic pattern of vegetation communities and rock barrens assists in establishing a recreation experience that maintains ecosystem resilience. Further, human behaviours associated with recreation have a strong bearing on the recreation experience itself, what changes to the ecosystem might emerge, and hence the resilience of the ecosystem as a whole. Adoption of a systems approach as per Kay et al. (1999) widens recreation management debates to account for broader governance structures and processes, specific management actions and adaptive learning, along with monitoring to anticipate ecosystem change.

Franklin Island poses a challenge for environmental management because, while it is in the jurisdiction of the Ministry of Natural Resources as a formal Conservation Reserve, there are a number of factors that have contributed to a management vacuum, including limited resources for management, monitoring and enforcement by traditional authorities. As a result, governance for Franklin Island has shifted from formal government-led approaches to informal partnerships and community-based collaborative approaches. The multi-stakeholder partnerships that have emerged over the past ten years may actually result in a more appropriate management framework for Franklin Island, since they are based on a sense of community responsibility and stewardship ethic, and bring multiple perspectives and resources to the table from across civil

society, government, and businesses. The MNR and Ontario Parks should examine the governance arrangements that have evolved in response to recreation on Franklin Island to determine how they might support these approaches both locally and in similar cases elsewhere in eastern Georgian Bay and the Great Lakes.

It is unclear whether the collaborative governance approach for Franklin Island that undertakes specific management actions (e.g., a volunteer fire ban, latrine construction, site clean-up, etc.) is successfully reducing the potential risks from recreation to Franklin Island's ecosystems. However, it is clear that these approaches are addressing a number of the concerns within the surrounding community and stakeholder groups. Because of the current Conservation Reserve status and the possibility of conversion to a Provincial Park, the relatively informal management of Franklin Island may be formalized under park style management. If this becomes the case, yet collaborative governance arrangements are maintained, they should be publicly recognized by the MNR in a Statement of Conservation Interest. Moreover, monitoring of recreation impacts, the amount of use, and the outcomes of collaborative management should be undertaken to allow for more effective adaptation of the governance approach.

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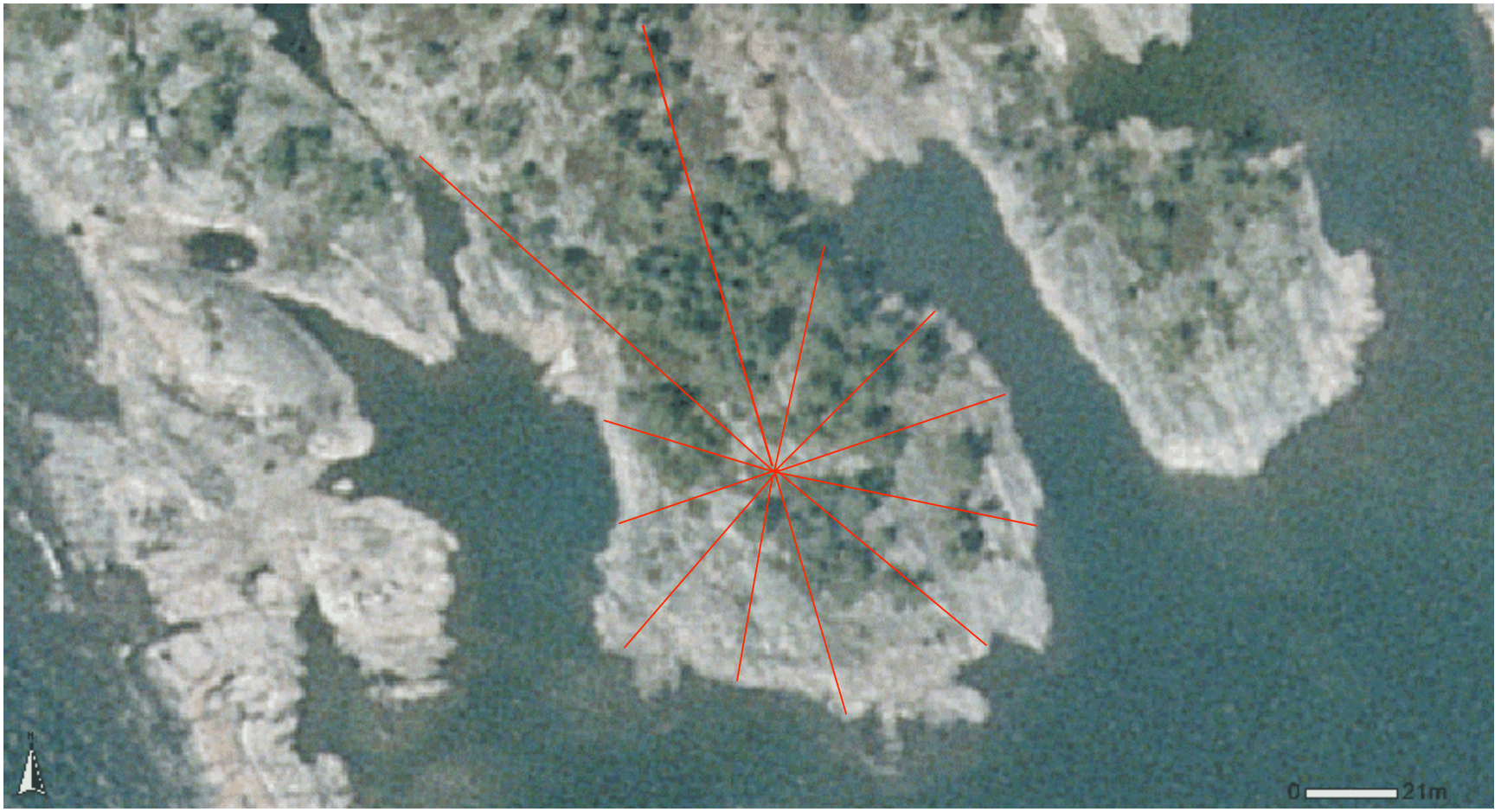
**APPENDIX A – Sample Sites and sampling transects**




**Savage Rocks Site**

**APPENDIX A – Sample Sites and sampling transects**


**Horsley Island site**

**APPENDIX A – Sample Sites and sampling transects**


**Regatta Bay site**

**APPENDIX A – Sample Sites and sampling transects**


**Burrit's Point site**

## APPENDIX B – Species List for each sample site

| Common Name | *Latin Name* | Horsley Island | Henrietta | Regatta Bay | Burrit Point | Savage Rocks |
|---|---|---|---|---|---|---|
| Aster (general) | *Aster spp* | | x | x | x | x |
| Boneset | *Europatorium perfoliatum* | | x | x | x | x |
| Brackenfern | *Pteridium aquilinum* | x | x | x | x | x |
| Bristly sarsaparilla | *Aralia hispida* | | x | x | x | x |
| Bush honysuckle | *Diervilla Lonicera* | x | x | x | x | x |
| Canadian mayflower | *Maianthemum canadense* | x | x | x | x | x |
| Eastern white cedar | *Thuja occidentalis* | | x | x | x | x |
| Black chokeberry | *Pyrus melanocarpa* | | | x | x | x |
| Christmas fern | *Polystichum acrostichoides* | x | x | x | x | x |
| Common polypody | *Polypodium virginianum* | x | x | x | x | x |
| Common St. John's Wort | *Hypericum perforatum* | | | x | x | x |
| Cow wheat | *Melampyrum lineare* | x | x | x | x | x |
| Goldenrod (general) | *Solidago spp* | | x | x | x | x |
| Indian pipe | *Monotropa uniflora* | x | x | x | x | x |
| Common juniper | *Juniperus common* | x | x | x | x | x |
| Kalm's St John's Wort | *Hyperium kalmianum* | x | x | x | x | x |
| Low sweet blueberry | *Vaccinium angustifolium* | x | x | x | x | x |
| Marginal wood fern | *Dryopteris marginalis* | x | x | x | x | x |
| Meadowsweet | *Spirea alba* | x | x | x | x | x |
| Mossy stonecrop | *Cedum acre* | | | | | x |
| Northern comandra | *Geocaulon lividum* | | | x | x | x |
| Northern wild raisin | *Viburnum cassinoides* | x | x | x | x | x |
| Oval leafed bilberry | *Vaccinum ovalifolium* | x | x | x | x | x |
| Pale pink corydalis | *Corydalis sempervirens* | x | x | x | x | x |
| Raspberry | *Rubus idaeus* | x | x | x | x | x |
| Red maple | *Acer rubrum* | x | x | x | x | x |
| Red oak | *Quercas rubra* | x | x | x | x | x |
| Salix (general) | *Salix spp* | x | x | x | x | x |
| Smooth service berry | *Amelanchier laevis* | x | x | x | x | x |
| Smooth gooseberry | *Ribes hirtellum* | x | x | x | x | x |
| Smooth wild rose | *Rosa Blanda* | x | x | x | x | x |
| Solomons seal | *Mainthemum racemosum* | | x | x | x | x |
| Starflower | *Trientalis borealis* | x | x | x | x | x |
| Strawberry | *Fragaria virginiana* | | x | x | x | x |
| Striped maple | *Acer pensylvanicum* | x | x | x | x | x |
| Sumac | *Rhus glabra* | | | x | x | x |
| Sweet gale | *Myrica gale* | x | x | x | x | x |
| Velvet leafed blueberry | *Vaccinum myrtilloides* | x | x | x | x | x |
| White pine | *Pinus strobus* | x | x | x | x | x |
| Wild sarsaparilly | *Aralia nudicaulis* | x | x | x | x | x |
| Yarrow | *Achillea Millifoleum* | | x | x | x | x |