



BC PROTECTED AREAS RESEARCH FORUM

BOOK OF ABSTRACTS, LIST OF POSTERS AND INDEX

Please Note: this document is arranged in the same order as the forum's agenda, and includes an index at the back.

ABSTRACTS OF PRESENTATIONS & SPECIAL SESSIONS:

Community Perspectives and Protected Areas (Part 1)

Adam Chafey - *Residents' Perceptions of Pacific Rim National Park*

There is a great deal of debate as to whether protected area should be managed primarily for conservation or as tools to promote social and economic development. Regardless of which goals are pursued, the people living in and around protected areas often experience a number of costs and benefits related to protected area establishment and management decisions. To date few studies have examined the costs and benefits received by North American communities located near protected areas. This paper investigates how residents of Tofino and Ucluelet, British Columbia perceive they benefit, or are subject to costs, from living near Pacific Rim National Park Reserve (PRNPR). The results of this paper suggest that residents perceive they receive a range of economic, environmental, and social costs and benefits as a result of living near PRNPR.

Rob Ferguson & Terry Dorward-Seitcher - *Tourism, Protected Areas and Community: Investigating the Role of Tribal Parks in Fostering Cultural Identity and Socio-Economic Sustainability*

The potential growth for indigenous tourism development within Canada has been noted by several authors (Dearden and Langdon, 2009; Higgins-Desbiolles, 2009; Notzke, 2004; Zeppel, 2002). The growing demand for what Higgins-Desbiolles (2009:157) characterises as 'indigenous cultural-ecological tourism' illustrates the complementary tourism values of indigenous cultural and nature based attractions, epitomized by protected areas such as the Pacific Rim National Park Reserve and the Ha'uukmin Tribal Park. These areas have long been recognized as having economic value as a tourism resource; however this claim takes on greater significance for Aboriginal communities whose potential for generating income is limited and is located within, or on the periphery of Protected Areas (Rollins and Dearden, 2009). Goodwin has commented that indigenous people and local communities 'add exotic flavor' and can be considered 'objects of tourism' yet they have not conventionally been seen as stakeholders in tourism planning (2007:87). There has also been increasing criticism of Protected Areas and related tourism forms in their capacity as an economic development tool for local communities (Zeppel, 2006). Mason further contends that, interaction between tourists and Aboriginal hosts can also provide a means for either to 'exercise agency, be self – determining and challenge or assert cultural representations' (2008:233). Indigenous tourism seen in this context then becomes an arena for the discursive negotiation of contested meanings, identities and histories for both host and guest alike. This presentation shares research in progress and strives to advance the conversation on benefit flows derived from protected areas beyond the economic arena by discussing the complex socio-cultural dynamics underway within affected communities.

Brianne Labute & Ashley Coulter - *Perceived benefits and sacrifices of a community resource management area in West Africa*

The purpose of this research was to identify the perceived benefits and sacrifices expressed by community members in relation to the creation of a protected area in Northern Ghana. Weichau Community Hippo Sanctuary (WCHS) is a model of community-based natural resource management working to protect endangered hippopotami along the Black Volta River. This research was conducted for Protected Areas and Poverty Reduction (PAPR), a research alliance with partners in British Columbia, Ghana, and Tanzania. In-depth interviews and focus groups were used as a methodology to explore community member's perceptions of benefits and sacrifices. These were explored on an individual, family, and community level. Overall, the benefits of the community resource management area greatly outweighed the sacrifices with creation of new sustainable livelihoods

including eco-tourism and extraction of non-timber forest products. The results of this research can be beneficial to community conservation efforts in a Canadian context and other developing countries.

Erin Heeney & Rick Rollins - *Perceived Impacts of Protected Areas on Nearby Communities in Canada, Ghana, and Tanzania*

The examination of the relationship between conservation and local communities is important since protected areas may subject neighbouring communities to substantial costs that may lead to erosion of support for conservation. This theme is the focus of an international comparative study between Tanzania, Ghana and Canada. In Canada, residents in Tofino and Ucluelet have been the focus of study in relation to their opinions surrounding Pacific Rim National Park. However, little is known about the opinions of residents on the south border of the park in Port Renfrew, BC. Door-to-door surveys conducted in 2011 will increase understanding of the impacts of Pacific Rim National Park on the residents of Port Renfrew. In understanding community perceptions, our research seeks to entangle the processes that might contribute to increasing community benefits and support for national park conservation objectives in all three countries.

Climate Change and Protected Areas (Part 1)

Gregory Kehm - *Muskwa-Kechika Management Area Conservation Assessment: Opportunities for Maintaining Ecological Integrity in a Climate Changed Future*

This conservation assessment and outreach project was conceived to help face challenges in the future management of the Muskwa-Kechika Management Area (M-KMA). The conservation assessment provides a variety of tools to strengthen conservation measures in light of climate change, evaluate land and resource use proposals, and gain further public and community understanding about the biodiversity values of the M-KMA. This study builds upon previous work such as the Conservation Area Design for the M-KMA (completed in 2004) with the addition of new information and analyses. These include physical diversity analysis, focal species linkage modelling and mapping the projected degree of ecological upheaval.

Pamela Wright - *Field staff perspectives on managing climate change impacts in parks and protected areas*

Within protected areas, the impacts of climate change have been the subject of discussion for over two decades. Reported impacts included changes to: species and habitat distributions; sea level rise; glaciation and snow packs; hydrologic processes; and disturbance patterns. As part of a project to develop a long-term ecological change monitoring program for BC Parks with a specific focus on climate change we conducted a series of focus group interviews and an electronic survey of parks' field staff. Field staff throughout the province reported observing a wide range of ecological and social impacts from climate change currently with projected increases in the future. Support for climate change management was strong particularly for monitoring and for direct interventions such as invasive species removals. Findings illustrate the need for clarified policy and planning direction; habitat and species vulnerability assessments; education and experimentation with various mitigation and adaptation techniques; and implementation of a comprehensive monitoring program.

Cameron Eckert - *Ecological monitoring during a time of rapid change in Yukon Parks*

The Yukon's protected area system includes four natural environment parks, one wilderness preserve, and two ecological reserves. Yukon parks protect wild and naturally functioning ecosystems across vastly different landscapes including the southern boreal forests of Agay Mene, Kusawa, and Coal River Springs parks; the taiga and tundra

habitats of Tombstone Park; the globally significant glacial features of Asi Keyi; the unique karst features of Fishing Branch; and the Arctic ecosystems of Herschel Island. The primary goal of Yukon Parks' inventory, monitoring, and research program is to ensure the ongoing protection of ecological values and the maintenance of ecological integrity. This paper will outline the program with examples of three very different monitoring projects underway in Yukon parks; tufa pond dynamics at Coal River Springs Ecological Reserve; terrain stability and weather at Kusawa Lake Territorial Park; and Black Guillemot population and nesting success at Herschel Island—Qikiqtaruk Territorial Park.

Rod Davis - *Evaluating Social Dimensions of Wildlife Ecosystem Intervention Strategies to Adapt to Climate Change Impacts*

There is evidence that recent climate change resulting from greenhouse gas emissions has impacted ecosystems, and scientific consensus suggests there will be more significant disruptive impacts in the near future. As well, there is emerging consensus on a range of conservation measures that are needed to promote ecological resilience to such impacts. However, the social dimensions relating to implementing these strategies are not well explored. Effectively responding to climate change impacts on ecosystems is problematic because communities have competing values and interests in land and resources, have significant social capital invested in current land uses, and lack an understanding of new and pressing issues related to climate change impacts. Research is required that assesses opportunities and barriers relating to conservation actions by engaging the community and decision-makers in a process of deliberation and learning, and finding collaborative and sustainable solutions to our future.

Special Session: Restoration Strategy for Critical Marine Habitat in Protected Areas

Nikki Wright and Judith Arney - *Eelgrass Restoration in BC Parks Protected Areas: A Pilot within Howe Sound*

Log booms in BC were historically situated in the shallow waters of protected estuaries and bays. These sites are potentially highly productive habitats (eelgrass, *Zostera marina* and kelp, *Nereocystis* spp.) and are among the most rapidly disappearing ecosystems on earth. The United Nations has estimated we are losing approximately 15% of our seagrasses globally each year as a result of human activities. Restoration efforts to restore eelgrass habitats within Howe Sound in the last few years have emphasized the need to increase the level of protection of eelgrass test plots as shore development expands. A planning strategy will be proposed and discussed for habitat mapping and restoration of marine ecosystems within BC Parks protected areas. Research questions related to the value and issues of nearshore habitats will be suggested.

Community Perspectives and Protected Areas (Part 2)

Howard Harshaw - *British Columbians Attitudes Towards Parks and Outdoor Recreation: Guidance for an uncertain future*

This presentation draws upon the results of two recent studies to better understand what British Columbians think of BC's parks and protected areas, and to better understand outdoor recreation behaviours and trends. The results of a provincial survey (n = 1,326) provides the basis for an examination of British Columbians' attitudes towards parks and protected areas in relation to the management of other natural resource values; provincial patterns of outdoor recreation participation are also described. An examination of Lower Mainland residents' outdoor recreation characteristics (n = 800) provides a basis for understanding demands on regional parks, and of the potential for growth of outdoor recreation participation in this populous region. A synthesis of these two studies will suggest how the management of BC's parks and protected areas might continue to provide meaningful outdoor experiences to people in an environment change (i.e. increases in population, demands on natural resources, and uncertainty).

Lynn Wilson – *“High Expectations: Public values and desires for regional parks and trails in the Capital Regional District”*

CRD Regional Parks recently undertook a strategic planning process to set the direction of regional parks and trails over the next ten years. As part of the process, Regional Parks provided regional residents with opportunities to contribute their ideas into the preparation of the strategic plan. The input received during the consultation process has provided CRD Regional Parks with a wealth of information about public values and expectations for their regional park system. This presentation examines some of the key messages to emerge from the public consultation and it highlights how this information has influenced the preparation of the (Draft) Regional Parks Strategic Plan. This presentation will be of interest to academics and practitioners interested in exploring the linkage between urban/suburban populations and natural areas systems. The presentation highlights a number of key topic areas which warrant further investigation and discussion.

Carleigh Randall and Rick Rollins - *Influences on marine visitor attitudes towards a voluntary no fishing policy in Pacific Rim National Park Reserve: Some findings*

This presentation highlights some findings of a study conducted to reveal marine visitors' level of support for a voluntary no fishing policy adopted in the Broken Group Islands, Pacific Rim National Park Reserve. Analysis of the data from 699 kayakers reveals visitors' underlying positive and negative beliefs surrounding a voluntary management policy. Further, findings indicate that visitors' intention to support such a policy is more heavily influenced by their own personal attitude toward the policy rather than social group pressure to conform or not to the policy. However, not all visitors felt the same way and analysis of the variability in responses suggest that kayak guides may have an influential role in shaping attitudes, beliefs and intentions of guided visitors to national parks.

Shannon West and Terry Dorward-Seitcher - *Benefits and Costs Associated with Living In and Around the Pacific Rim National Park to the Esowista First Nation of Tofino, BC*

This study was conducted as part of an international project examining the flow of benefits and costs between protected areas and nearby communities. The Canadian part of this project includes research examining the First Nations experience with Pacific Rim National Park, in order to insert the First Nation experience and voice. The study was undertaken in partnership with the Esowista First Nation Community Coordinator. Information gathered was based on usage, park benefits, park concerns, access to the park, and thoughts about the “tribal parks” concept. Previous research shows that for positive, supportive and sustainable change to occur, aboriginals need to have a much larger presence and authority in protected area management. This notion was explored with a survey undertaken with 30 community members, ranging from approximately 15 to 70 years of age. Results indicate a mix of responses, with a number of benefits and concerns identified.

Benchmarks and Monitoring

Ian Geisbrecht, Andy MacKinnon, and Sari Saunders - *Learning from protected ecosystems: understory light and vegetation in two floodplain forests in coastal British Columbia*

Structural diversity of BC's coastal, old growth, floodplain forests has implications for biodiversity conservation and riparian management. In 1992-3, researchers established four long-term plots of 0.25 ha in coastal floodplains. Live trees, snags and logs were mapped and measured. We compared the structure of these stands with that of other coastal temperate floodplain systems, and examined relative roles of stand age, disturbance, climate, and site features on structure. We anticipated that frequently-disturbed

stands would have fewer, larger pieces of downed wood and lower densities of standing live and dead trees. We further expected tree size to be inversely related to latitude and stand age. Measures of old growth structure for these stands were similar to those published for the Pacific Northwest. These data establish a baseline for riparian management and restoration. Additionally, these protected, long-term plots provide opportunities for evaluating temporal dynamics of structure, including the effects of climate change.

Pamela Wright and Tory Stevens- *Designing a Long-term Ecological Change Monitoring Program for BC Parks*

Global climate changes are impacting the entire landscape and although intended as ecological reservoirs and refugia, parks and protected areas are not immune to these changes. Provincially, BC Parks' staff identify stressors and threats in conservation risk assessments and have identified myriad challenges amplified by climate change. The role of monitoring in protected areas management in general, and with respect to climate change in particular, is identified as central to most assessment and adaptation strategies. This paper describes our work in the development and implementation of a province-wide long-term ecological change monitoring (LTEM) program that can be conducted using a hybrid scientific/citizen-science model. The intent is to help understand a) the state of ecological integrity of BC Parks on a provincial scale and b) long-term ecological change of which climate change is one of the leading causes. Although still in the preliminary stages of implementation, we reflect on some of the lessons we are learning along the way from discussions with field staff, scientists and managers in the protected areas field.

Patrick Graillon and Claire Ducharme - *Parcs Quebec's Ecological Integrity Monitoring Program*

Since 2003, Parcs Quebec is actively monitoring with the use of indicators diverse ecological and human parameters with the goal of identifying changes in ecological integrity level of the parks. The presentation summarizes how this program was conceived and what choices were made in order to implement it in an operational way and still have a scientific background strong enough to efficiently help managers take better decisions in order to preserve the parks natural resources. In this budget restriction era, through the choices it made, Parcs Quebec was able to realize all of this with minimal resources and still assure the perpetuity of the program. A first "State of the parks" report is planned for 2013.

Chris Lemieux - *Last Chance Tourism in Parks and Protected Areas: Emerging Ethical Issues and Management Considerations*

Stay tuned for abstract.

Special Session: Society for Ecological Restoration: ER in Protected Areas

Eric Higgs - *Tracking long-term ecological change in the mountain National Parks using repeat photography*

In 1998 university researchers and land-based managers began working with a large collection of systematic and comprehensive historical survey photographs in western Canada to assess historical conditions and to understand landscape change through repeat photography. The historical collections cover most of the mountainous regions of Alberta, British Columbia, and the Yukon (including the Yukon/Alaska boundary), which of course covers most parks and protected areas. Comprising the work of dozens of topographic and geological survey teams working from 1888 to 1958, we have uncovered to date more than 140,000 large-format images. Over nine field seasons we have completed 5,000 repeat images that show a wide variety of landscape change phenomena, including human activity, fluvial change, rockslide, glacial recession, vegetation

succession and disturbance patterns. Following an overview of the Mountain Legacy Project (www.mountainlegacy.ca), we will highlight several studies focusing on vegetation change and upward shifts in treeline ecotone, and examine prospects for ecological restoration in an era of rapid environmental change.

Jeff Ralph - *Mount Trematon Restoration Project, Lasqueti Island, BC*

Mount Trematon Nature Reserve is the highest point on Lasqueti Island (330m). Managed by the Islands Trust Fund (ITF), the 57 ha. property features red-listed plant species, rocky outcrops, and old growth forest. Heavy grazing by feral sheep has severely impacted the vegetation and greatly damaged tree saplings. (*Pseudotsuga menziesii*, *Thuja plicata*, *Arbutus menziesii*, *Taxus brevifolia*, *Acer glabrum*, *Acer macrophyllum* and *Prunus emarginata*) In 2009, a small project was initiated by the Gordon family to protect 18 tree saplings using stakes and stucco wire to form protective cages. The project grew into two further ITF/community restoration events that helped protect over 200 saplings. In 2011, with the help of the community school, 200 trees were planted and protected. The Mount Trematon Nature Reserve Restoration project was designed to: (1) limit grazing by feral sheep on tree saplings; (2) engage and educate the community about ecological restoration; and (3) determine the most effective tree sapling protection method against feral sheep without using fencing. Research plots were also established to measure tree growth using different treatments: (a) saplings with protective cages; (b) saplings without protective cages; (c) saplings with protective cages (planted); (d) saplings treated with deer repellent (Plantskydd®); and (e) saplings treated with deer repellent Plantskydd® (planted). The final results from the study will lead to an understanding of the best practices for managing feral sheep in nature reserves without using fencing.

Randy Moody and Michael Keefer - *Limber Pine Restoration in SE BC*

The blue-listed limber pine (*Pinus flexilis*) is likely one of the rarest tree species in British Columbia. Its range is restricted to the Rocky Mountains south of Golden to the US border and within this range it is typically restricted to calcareous soils and limestone outcrops. Only a limited number of limber pine populations occur within provincial protected areas though several do occur on land held by land trusts. Although it is only rarely harvested or impacted by humans, many limber pine populations are in need of restoration efforts due to the negative effects of white pine blister rust. In 2010 we initiated a restoration program designed to identify new populations, improve recruitment within existing populations and initiate new populations on suitable habitat within the range.

David F. Polster - *Retaining the Flower Meadows: Douglas-fir Removal at Mount Tzuhalem Ecological Reserve*

Mount Tzuhalem Ecological Reserve (#112) was dedicated in 1984 to preserve outstanding Garry oak – wildflower stands. At that time it was believed that all that was needed for the preservation of these ecosystems was to put a fence around them and prevent the housing developments that were moving up the hill beside the reserve from paving over the beautiful meadows. However, with the housing developments came the Scotch Broom and invasive grasses and within a decade the reserve was covered by broom. Fortunately, the Cowichan Valley Naturalists Society led by reserve warden Syd Watts, recognized the degradation caused by the broom and mounted a counter-attack. Over the next 10 years, Syd and his dedicated crew of volunteers removed most of the broom from the meadows. The flower meadows, including the species at risk, thrived and the show of spring wildflowers is spectacular. Behind the beautiful meadows, another threat was lurking. Timber harvesting in the area of the reserve in the 1940's as well as a lack of landscape level fires has resulted in the establishment of dense stands of second growth Douglas-fir. This paper describes the treatments that have been developed to address this issue.

Don Eastman - *Ecological restoration in designated wildlife areas in British Columbia: activities, opportunities and challenges*

Abstract: The purpose of this presentation is to explore the significance of ecological restoration in those protected areas specifically aimed at wildlife conservation. We cover three topics. First, we describe and characterize the various kinds of special areas that can be set aside for wildlife, using provincial legislation. Then we describe, generally, and with case studies, the nature and extent of ecological damage in these areas, and summarize restoration activities that have been undertaken to address these problems. Finally, we offer comments on changing management perspectives with respect to ecological restoration in these protected areas, and discuss the opportunities and challenges these areas face in the future.

Thomas Munson - *Restoration in City of Victoria Parks*

The City of Victoria has been undertaking restoration of the natural areas of their park lands since 2005. Of the approximately 450 acres of City parks, more than one third is regarded as 'natural areas', with remaining native vegetation. One of the most recent restoration projects involved recovering a section of parking area along a Garry oak camas meadow in the middle of Beacon Hill Park. An area approximately 10m x 80m, which had been used for roadside parking along Camas Drive, was dug up in the fall of 2010. The compacted mineral soil was removed from the site and an old drain was removed. New mineral soil was then brought onto the site, and re-covered with topsoil. Grass plugs of a number of native species (*Festuca idahoensis* var. *roemeri* - Roemer's fescue, *Danthonia californica* - California oat grass, *Elymus glaucus* - Wild rye, etc.) were planted along pathways through the restored site, a native grass seed mix was applied to the entire site, and native plant seeds from the nearby camas meadow (*Indian consumption plant* - *Lomatium nudicale*, *Yellow rattle* - *Rhinanthus minor*, *Slender cinquefoil* - *Potentilla gracilis*) were spread over the site in the winter of 2011. The restored area was fenced to prevent pedestrian traffic through the replanted areas. Grass cover returned to a large part of the site, and the barer areas will be replanted in the winter of 2012. Orchard grass, chickweed and other invasive species were also removed from the site. More seeds from native plant species of the Garry oak meadow will be added this winter, and topsoil added to protect the seeds from herbivores.

June Pretzer - *Creating Small Wetland Ponds as a Strategy for Controlling *Glyceria Maxima* and Restoring Biodiversity at Swan Lake Christmas Hill Nature Sanctuary*

Swan Lake Christmas Hill Nature Sanctuary is located in the District of Saanich on Lower Vancouver Island. The lands belong to the District of Saanich and have been managed for the past thirty five years by the SLCHNS Society as a non-profit organization. Two important and distinct ecosystems, a Garry Oak Douglas Fir forest on Christmas Hill and Swan Lake and wetlands make up the Sanctuary. The site is an important recreational source in an urban area with over 60,000 visitors annually. A comprehensive trail system provides year round access to recreational users including joggers, walkers, birders, and school groups who attend environmental education programs at the Nature House. The trail system is therefore an integral and important piece of the sanctuary. A series of footbridges throughout the wetland area gives visitors access but was failing and becoming unsafe. A grant from Mountain Equipment made possible the replacement of a deteriorating twenty meter footbridge. In the same location, a population of Manna Grass, *Glyceria maxima* was identified as a highly invasive wetland species by the new site manager in 2009 and consequently designated as a noxious weed in BC in 2011. Replacement of the footbridge was coupled with plans to remove the manna grass, establish sedges/rush and wetland forest and to capture storm drain flow in ponds in the removal area. The Evergreen Foundation of Canada approved a ten thousand grant for native plant materials, the Vancouver Island Equipment Operators Association and contractor Walter Langer, who owns and operates a "spider" excavator, donated their time and equipment for the project. The soil surface was scraped and two wetland ponds and 30 meter connecting stream were established: an adjacent ninety meter square area was cleared of reed canary grass. Soils and debris were stockpiled at the site for decomposition. At the beginning of the project only a monoculture of manna grass with minimal wildlife and biodiversity existed in the restoration area. Since establishment of the wetland area,

wildlife such as shorebirds, diving ducks, small mammals, and pond invertebrates have appeared in great abundance attracted to the pools and stream. Numerous plant species, including some considered extirpated from the sanctuary, have appeared through natural regeneration indicating that the seed bank is still viable. The restoration area has involved many volunteers and students in weeding, planting, and research providing a place to learn and to develop stewardship. Data collection and monitoring will provide site management with information to apply to further restoration projects at the Lake when funds arise. Results of the project are beyond our expectations and are encouraging as we plan further work.

Robert C. Walker - Eco-cultural Restoration of Fire in the Gulf Islands National Park Reserve

Parks Canada has a nation-wide history of using prescribed fire to meet ecological restoration objectives. In the recently established Gulf Islands National Park Reserve there are fire-maintained ecosystems that evolved with very frequent aboriginal fire use. These “Garry oak” ecosystems were historically home to a tremendously diverse plant community. After many decades with little or no fire disturbance, many of those plant species are provincially and/or federally-listed as a result of their rarity and landscapes within the park reserve are dramatically altered. Fire use is seen as a key element of an overall ecological restoration plan for the park reserve and Parks Canada is working with other agencies, stakeholders and First Nations communities in an approach to restoring these former eco-cultural landscapes using a variety of methods, including prescribed fire.

Dimensions of Recreation Use

Steven Kux - Winter Recreational User Group Conflict in Chilkoot Trail National Historic Site – A comparison of motorized and non-motorized users

Since 1998, Simon Fraser University in association with Parks Canada has periodically attempted to assess the ongoing conflict between motorized and non-motorized winter users of Chilkoot Trail National Historic Site (CTNHS) in northern BC with a recreational use survey. The 2011 instalment of this survey aimed to assess the long-term effectiveness of attempts to alleviate tension between user groups through the establishment of non-motorized and multi-use weekends. Results demonstrate that non-motorized users still feel that motorized users detract from their enjoyment of the area and suggest that skiers are actively attempting to avoid contact with snowmobilers, despite the implementation of several management measures over the past few years. The present study will summarize the results of the 2011 CTNHS Winter Recreational Use Survey with particular attention paid to differences in use patterns between motorized and non-motorized users. It will also provide longitudinal comparisons to assess past management decisions and provide guidance for future initiatives.

Brian Dyck, Phil Dearden, and Rick Rollins - Towards the Development of New Mixed Mode Methodology for a Provincial Park Camper Survey in British Columbia

For 24 years, BC Parks has conducted an annual paper survey in about 30 campgrounds throughout the province to obtain visitor profiles, visitor satisfaction with park services and visitors views on policy issues. Due to budget constraints, a new mixed mode methodology (face-to-face/web response) was developed and tested during the summer of 2010. This presentation will describe this methodology and two methodological experiments that were undertaken to help develop it. The first experiment was conducted at Goldstream Provincial Park. It included 801 interviews and was designed to compare response rates, non-response bias and item non-response between a paper and web survey. The second experiment involved 3,704 interviews at 12 campgrounds throughout the province. It was designed to examine the effect of the number of follow-ups on response rates and non- response bias. Both the experience and challenges of implementing this new approach will be discussed.

Mathew Kellow - The Role of the Sea Kayak Tour Guide and Marine Protected Areas: Exploration into the Guides' Perspective

This study examines the phenomenon of sea kayak tour guiding in order to identify how natural tourism guides recognize, understand, and utilize the opportunity to deliver interpretation to clients. The study population consists of sea kayak guides who are members of the Sea Kayak Guides Alliance of British Columbia (SKGABC). Results demonstrate that sea kayak guides believe themselves to be facilitating opportunities for environmental and cultural learning and behavioral change within their clients; however, the field observations did not completely support the survey results, highlighting a difference between what sea kayak guides self reported compared to actual guides in the field. Many popular commercial sea kayaking destinations are located within National and Provincial Parks. The results of this research offer new insights into how sea kayak guides build environmental understanding and the educational opportunities that exist between marine parks and sea kayak guides.

Sandra Warren - Tourist preferences for whale watching and conservation of breeding grounds in Baja California: the case of whale watchers in Tofino

With the continued growth of the whale watching industry, many studies have focused on the impacts of whale watching on the whales. However, few have measured tourists' preferences for tour attributes and none have assessed their willingness to pay for distant habitat protection. This case study surveyed whale watchers in Tofino, British Columbia. Tofino sits at the entrance of Clayoquot Sound, a recently designated Biosphere Reserve, and north of Pacific Rim National Park. The results of this study suggest that tourists differ in their preferences for tour characteristics, including the type of education received, the degree of crowding, tour cost, and the number and type of whale species observed. The study also suggests that whale watchers are willing to pay an additional fee to preserve grey whale breeding habitat in Baja California, Mexico. Understanding human preferences and values can assist in the future management of this growing industry.

Sarah Poirier, Rosaline Canessa and Rick Rollins - Sea Otter Tourism in British Columbia: the Effects of Interpretation on the Conservation Attitudes and Behavioural Intentions of Boat-based Visitors

Visitation to marine wildlife viewing tours has increased steadily in the last few decades. Despite concerns over negative impacts, one of the anticipated benefits to wildlife viewing is increased visitor support for marine conservation. In this study, sea otters were used as a case study to determine how wildlife viewing may alter visitor attitudes and behavioural intentions towards marine conservation. In particular, the effects of the inclusion of interpretation in marine wildlife observation were analysed. This study used a questionnaire addressing the experiences of marine wildlife visitors to boat-based tours in Tofino, on the west coast of Vancouver Island. The most significant difference in the promotion of conservation attitudes and behaviours was when the observation of sea otters was coupled with interpretation. Thus, marine wildlife tourism can increase overall visitor support for marine conservation through affecting attitudes and behaviours.

Coastal Douglas Fir and Garry Oak Communities

Jenny McCune - The long history of Garry oak ecosystems on Vancouver Island: using historical ecology and phytoliths to fill in the gaps

The Garry oak savannahs of southern Vancouver Island have declined drastically in area since the mid-1800s, with the remaining savannahs threatened by fragmentation, disturbance, and introduced species. Managers of protected areas are faced with the challenge of maintaining and restoring savannahs in the face of these modern threats. While the decline in savannah area is clear, the range and variability of Garry oak savannahs prior to European settlement is much foggier. Quantitative data on the degree of

change in the last few decades of urban expansion are also scarce. My research aims to fill these gaps using plant microfossils called phytoliths preserved in soil, and re-surveys of vegetation plots originally surveyed in the late 1960s. A better understanding of the range of variability of Garry oak ecosystems in the past can help us to predict how they might respond to changing conditions in the future.

Carmin Cadrin - Ecosystem conservation in the Coastal Douglas-fir zone

Although it is the smallest of the climatic zones of the province, the Coastal Douglas-fir (CDF) Biogeoclimatic Zone has the highest proportion of ecosystems at risk, and the highest proportion of land, wetlands and riparian area converted to anthropogenic uses. This presentation summarizes the current status of ecosystems in the CDF, conservation actions in recent decades, and options for the future.

J.Lucas and T. Lacourse - A Paleoecological Perspective on Forest Resilience in the Gulf Islands National Park Reserve, British Columbia

Paleoecological studies can provide high resolution records of forest dynamics over long temporal scales that can help inform management and conservation of protected areas, particularly in relation to vegetation responses to changing climate and fire regimes. A 9 m lake sediment core was collected from Roe Lake on North Pender Island to document long-term changes in forest composition and fire regime using fossil pollen and charcoal analyses in combination with radiocarbon dating. Preliminary data from pollen analyses indicate that forests on North Pender Island have been dominated by Douglas-fir and red alder, along with western hemlock and western red cedar, for the last 10,000 years, suggesting substantial resilience to changing climate over this period. Charcoal analyses on the same sediments will reveal the island's long-term fire history and provide a fire return interval that could aid management of the dry forests of southwestern British Columbia.

Richard Schuster - Restoring Old Growth Forests of the Pacific Coast

Conservation planners often focus on identifying and protecting 'ecologically intact' habitats with little human influence, but this approach is not feasible where all historic habitat has been lost or degraded, such as in BC's densely populated Georgia Basin, where just 0.3% of old-growth Coastal Douglas fir forests remain. We used >500 replicated point counts in a 1,560 km² study area and remote-sensed data to develop habitat occupancy maps for 18 native bird species. We then used expert elicitation to rank all species as old-forest indicators, and used these rankings to produce a composite map of habitats most likely to support forest-reliant bird communities and thus likely to be suitable for the restoration of old-growth stands. We offer a repeatable method to prioritize forest-reliant bird communities and habitats that, in combination with carbon 'off-set' programs, could be used to identify cost-effective targets for old-growth restoration in mostly privately owned landscapes.

Alejandra Orozco-Quintero, Rosaline Canessa and Leslie King – Environmental Change in Coastal Protected Areas: Exploring the Role of Institutions, Knowledge and Multilevel Governance in Adaptive Capacity

Ongoing transformations of the world's ecosystems speak of the centrality of developing capacity to adapt to change in the pursuit of sustainability. The creation of PAs has been a major strategic component of many environmental governance regimes and a cornerstone in this pursuit. Research suggests PAs can play a critical role in building capacity for adaptation to both climatic and livelihood change. Similar, other findings connect knowledge and learning production to adaptation. Being aware of how the dominant approach to PAs has had mixed results because of factors such as governance design and inability to operate within and connect to the wider socio-economic and institutional frameworks, we present some elements of an alternative way of conceptualizing PA governance and doing so in relation to the role of institutions in the

mobilization of knowledge and the role of knowledge mobilization in the performance of institutions. These remain conceptually and methodologically novel areas in need of further research and this paper lays a conceptual foundation for such research.

Special Session: Starting the Conversation – Climate Change Mitigation in Canada’s Protected Areas

Panelists: Thomas Rodengen, Wolfgang Haider, Marlow Pellatt, Donald McLennan and Eva Riccius

With this session we would like to initiate a discussion about the role(s) of protected areas in climate change mitigation, which is an important solution within a larger portfolio of climate change solutions. The session will begin with short background presentations on the current understanding of climate change mitigation from the perspective of the panelists. The subsequent discussion goals are to define climate change mitigation as it relates to protected areas, identify where protected area agencies fit into larger climate change strategies, frame objectives of climate change mitigation in protected areas, and, if time permits, prioritizing climate change management options. Follow up communication will be available with interested participants.

Special Session: Fossil Resources and Protected Areas (Convenor: Bruce Archibald)

Potential Participants: Scott McMillan (BC Parks, Smithers), Dr. Richard Hebda (Royal BC Museum), Dr. Tom Cockburn (BC Paleontological Alliance), Dr. Jim Haggart (Geological Survey of Canada), Lisa Buckley (Tumbler Ridge Museum) and Richard McCrea (Tumbler Ridge Museum)

Stay tuned for abstract.

Community Perspectives and Protected Areas (Part 3)

Leslie King and Grant Murray - *First Nations Values and Protected Area Governance*

We present findings of research into the extent to which protected area governance can reflect community values and produce desired outcomes. There is increasing attention paid to 'shared' forms of governance and the creation of new protected areas that are designed to address 'non biological' goals and values. In British Columbia, a number of First Nations are asserting increasing control over existing protected areas, as well as establishing new protected areas (managed exclusively by a First Nation) and designing governance systems that deliver outcomes consonant with cultural beliefs, values and goals. We present an in-depth case study examination of the Tla-o-qui-aht Tribal Parks and the Pacific Rim National Park Reserve. Specifically, we examine how values are (or are not) reflected in the governance of these two PAs, whether desired outcomes are being achieved, and what role (if any) governance systems may have played in those outcomes.

Joe Pavelka - *Why people migrate to nature-based communities: A push-pull perspective*

What is it about everyday life that drives people to migrate specifically to nature-based communities in or near our parks and protected areas? This session will draw upon original research and other sources to examine the ever-changing push/pull dynamic of amenity-lead migration. The session will offer insights to why people migrate to such areas and what they are seeking.

Climate Change and Protected Areas (Part 2)

Heather Kharouba - *Just passing through: Global change and the conservation of biodiversity in protected areas*

Climate and land-use changes are expected to cause many species to shift into or beyond the boundaries of protected areas, leading to large turnover in species composition. Here, we tested whether long-established protected areas in Canada were more robust to such climate change impacts than areas with no formal protection by measuring changes in modeled butterfly species distributions (n = 139) within them. We compared rates of butterfly species richness and composition change in two epochs (1900–1930 and 1960–1990) within protected areas against distributions of randomly selected, ecologically similar, but non-protected, areas. Change in species richness and composition within protected areas were, for the most part, the same as changes observed among random areas outside protected area boundaries. These results suggest that existing protected area networks in Canada have provided little buffer against the impacts of recent climate change on butterfly species richness.

Mathew Wheatley et al - *Exploring changes in mountain biodiversity using historical-survey photographs: The CLIMB Project*

Changes in biodiversity from shifting climate are expected to be more evident in higher-elevation mountain systems where species are pushed to the limit of their environmental tolerances. The inherent heterogeneity of mountain landscapes makes it difficult to predict future species-habitat shifts under different climate-change scenarios, primarily because ecotypes will not change simultaneously, and each ecotype has a different suit of biodiversity. Here we merge two current research programs to overcome these limitations in predictive modeling; the Mountain Legacy Project, and the Willmore Biodiversity Research Project. Using historical (c. 1924) boundary-survey photography and current repeat (2011-12) landscape photographs of the Willmore Wilderness Area and the adjacent Mt. Robson Provincial Park, we are developing imaging techniques to quantify habitat-level changes in a mountain landscape. We are then integrating detailed biodiversity data from the same area to explore how both habitats and their inherent biodiversity have changed, and how these might continue to change as climate shifts over time.

Marlow Pellatt et al - *Protected Areas and Climate Change: Mitigation and Adaption Activities in Canada's Protected Areas*

Parks Canada is developing policy that incorporates ecosystem-based adaptation as a key component in its approach to climate change adaptation. Protected areas represent a long-term commitment to the conservation of species, ecological processes and, in many cases, associated cultural values and resources. They are often accorded legal recognition, have agreed-upon management and governance approaches, and are supported by management planning and capacity. It is these qualities that make investments in protected area establishment and management cost-effective in the context of climate change adaptation. Climate change impacts on biodiversity and the role of protected areas as conservation tools in a changing “greenhouse” world are only beginning to be examined at the extent necessary for successful adaptation. An integrated approach to biodiversity adaptation using protected areas involves the development of bio-climate envelope models, empirical and observational information, and process models. As the Agency examines how its programs can adapt to climate change, it is also identifying policy options to enhance the potential role of protected area establishment, monitoring and restoration in supporting Canada’s resilience and adaptive capacity more broadly. While maintaining a focus on protected areas’ contribution to climate change adaptation, Parks Canada is also evaluating potential synergies between actions that contribute both to climate change adaptation and mitigation through, for example, carbon storage and sequestration. Dialogue and cooperation among conservation professionals needs to be applied to the development of best practices for protected area managers and scientists.

Special Session: Ecological Reserve – Knowledge of the Elders & Where do we go from here? (Convenor: Rick Page, Friends of Ecological Reserves)

Stay tuned for abstract.

Marine and Dune Restoration

Karin Bodtker - *BCMCA products as marine planning tools and our approach to collaborative Marxan analysis*

Marine spatial planning (MSP), acknowledged as an effective way of planning for the use of ocean space, relies on best-available spatial data. Project Team members of the British Columbia Marine Conservation Analysis project (BCMCA, www.bcmca.ca), including representatives from federal and provincial governments, academics, environmental non-governmental organizations, aboriginal organizations and human user groups, saw MSP in the future of the Canadian Pacific and collaborated to assemble the best-available spatial data for the region. We collated ecological and human use data and published the Marine Atlas of Pacific Canada in print and online. The BCMCA also ran Marxan analyses to illustrate areas of conservation value (ecological hotspots) and areas of importance to human users (human use hotspots). These products including assembled data, metadata, atlas pages, and results of Marxan analyses - solutions for a range of “what-if” planning scenarios – are tools designed specifically to be used in marine planning processes.

Jordan Eamer - *Dynamic dune restoration in Pacific Rim National Park Reserve: a geomorphic perspective on an inherently interdisciplinary practice*

Recently, there has been a shift from restoring coastal dunes as stabilized ecosystems to more dynamic systems that are geomorphically diverse, more resilient to erosion, and that offer greater ecosystem diversity, particularly for pioneering (and often endangered) species. This paper presents results from a large-scale dynamic restoration program implemented by Parks Canada to remove invasive marram grasses (*Ammophila* spp.) from a foredune-transgressive dune complex in Pacific Rim National Park Reserve. The program goal is to restore habitat for endangered Pink Sandverbena (*Abronia umbellata*) as required by the Species at Risk Act (SARA). Results show sediment stores delivered via bar welding and berm development in the winter are transported into the foredune and transgressive dune plain in the spring. This promotes rapid recovery of the seaward slope of the foredune and localized depositional lobe development in the dune plain, re-creating ideal habitat for the target species of the restoration.

Philip Lee et al - *Changes to Coastal Dune Plant Communities Caused by the Introduction of Non-Native Beachgrasses to Pacific Rim National Park Reserve and Their Subsequent Restoration*

This study examines the impact of beachgrass (*Ammophila* spp.) invasion on a coastal dune complex within Pacific Rim National Park Reserve, British Columbia. Using a series of historical aerial photographs and field sampling, a retrospective record was constructed of the vegetation changes that have occurred. This includes the 1) Development of a dominant primary dune ridge, 2) Encroachment of Sitka spruce and other forest species over the dunes, 3) Loss of native grasslands and associated species, and 4) Loss of rare and at risk species including; yellow sand verbena, *Abronia latifolia*, grey peavine, *Lathyrus latifolia*, and beach morning glory, *Convolvulus soldana*, and beach carrot, *Glehnia littoralis*. We also present results of the current restoration program to remove *Ammophila* spp and tree islands by hand and using heavy machinery. As of the end of 2011, the dune complex is set to be restored to pre-1930 levels of *Ammophila* spp. coverage.

Barb Faggetter - *Eelgrass Research at the Lucy Islands Conservancy*

The Lucy Islands Conservancy, located in Chatham Sound, is a nationally listed important bird area, supporting populations of rhinoceros auklets, pigeon guillemots, glaucous winged gulls, and black oystercatchers. An unmapped subtidal eelgrass bed within the conservancy was studied using a variety of traditional and novel methodologies, including video and both side scan and multibeam sonar. The purpose of the study was to investigate the productivity, ecological roles, and impacts of climate change and human activities on eelgrass in northern B.C. Eelgrass abundance varied seasonally in response to changing insolation and wave-driven seasonal sand migration. High species richness in invertebrates, fish, and birds was observed during the spring and summer, and was correlated with high eelgrass density. Since the site is located at the Lucy Islands trailhead, it was recommended that some type of fixed anchor system be put in place at the site to protect the eelgrass bed.

Management of Protected Areas

Amy Thede and Murray Rutherford - *In the Zone: An Examination of the Zoning Policy and Practices of the Parks Canada Agency*

This project examines the current zoning system used by the Parks Canada Agency (PCA) by investigating its application on the strategic policy level and the park planning level. The analysis is based on interviews with thirteen employees from the PCA as key informants. Most staff felt that zoning generally achieves its goals, but also suggested a number of improvements. Zoning could be updated to reflect and advance the overall mandate and policy direction of the PCA. On the park level zoning should include specific targets towards a desired future state or vision of each area being zoned. A tool for site-level evaluation of zoning would be helpful in assessing existing zoning during management plan reviews. This research provides an external perspective on the role of zoning in Canada's national parks and how zoning could be enhanced to more directly address the PCA's mandate.

Norm Sloan - *Science Supporting Gwaii Haanas Marine Management*

Bourne of civil disobedience and based upon a commitment made in 1988 to create a land-and-sea protected area around southern Haida Gwaii, Gwaii Haanas National Marine Conservation Area Reserve (NMCAR) was established in 2010. Besides representing a number of precedent-setting governance arrangements, the NMCAR has interesting technical challenges for supporting the innovative management partnership. Foremost among these are embarking upon ecosystem-based marine management and linking land and sea together as a management continuum.

Rick Rollins and Grant Murray - *How Employees of BC Parks Perceive Management Issues, the Relevance of Research in Addressing Management Issues, and the Role of University Researchers*

The purpose of this study was to identify how employees of BC Parks perceive (1) management issues, and (2) the role of research, and (3) the role of university researchers. An email survey in 2010, obtained a 70% response rate, and generated the following findings: (1) most important conservation issues were: restoring degraded areas, increasing compliance with regulations, and engaging volunteers; (2) most important visitor management issues were: providing more interpretation, restoring aging infrastructure, and reducing visitor impacts; (3) most important information sources were: advice from BC Parks staff, and advice from MOE experts (academic journal articles were the least important); (4) more attention should be given to collaborating with universities, because: low cost, increased information, cutting edge perspective, eagerness, and unbiased

perspective. Concerns include: effort to supervise, at times low quality, and results not always useful. Although research is perceived as important, accessing relevant findings is a challenge.

Kyle Hilsendager - *Tasmania's Private Forest Reserve Program and Potential Applications for British Columbia*

Compared to other Australian states, Tasmania has a high proportion of land reserved in protected areas. However, many ecosystems are under-represented within public reserves. To address this, numerous Private Forest Reserve Program (PFRP) sites have been established throughout Tasmania. This research evaluated management effectiveness for IUCN category VI sites within the PFRP. It also evaluated whether land uses within PFRP sites are consistent with IUCN category VI management prescriptions. Lastly, suggestions were made about how to improve management within the program. Overall, the study found that PFRP sites were managed effectively, according to IUCN objectives. Highlights include extensive management documentation and long-term site protection. It's likely that a similar program could provide benefits to BC at a minimal cost to taxpayers. For example, improvement of wildlife corridors and strengthening of buffer zones around protected areas are just a few ways that such a program could improve ecological sustainability in BC.

Healthy by Nature & Species and Protected Areas

Becs Hoskins and Eva Riccius - *Healthy by Nature: Key Concepts, Evidence and Management Implications for Human Health Benefits of Nature*

Stay tuned for abstract.

Soren Bondrup-Neilsen - *Are species a reasonable focal point for conservation?*

Parks and protected areas largely exist as a result of competing interests; humanity needs resources for their economy while conserving biodiversity. These competing interests create the necessity for political and legal processes, which traditionally have been based on fixed definitions of natural processes and subsequently codified. A frequent approach to conservation and management in protected areas is to focus on species. This is based on a commonly held belief that we can define a species and, having done that, can prioritize conservation and management actions. The problem is that definitions of species are static, but the species is a product of a dynamic system. This presentation will explore the conflicts between resource use and protection and the use of fixed definitions in managing dynamic processes. Ultimately we need legal definitions that are themselves dynamic.

Dani McIntosh - *Wildlife Viewing in the Mountain National Parks*

Understanding the nature of wildlife viewing experiences is an important but little researched element of wildlife tourism. As a result little is known about the actual demand for non-consumptive wildlife tourism. Conducted in the Canadian mountain national parks in 2009, this research addresses the experiential aspects of wildlife viewing from the visitor perspective. This research was derived from a combination of on-site questionnaires and in-depth interviews. It presents a broad context of what contributes to a meaningful experience and the impacts of those experiences on the visitor.

Special Session: Adapting to change to facilitate the unique but in peril Whitebark pine ecosystem (Convenor Judy Millar)

Joyce Gould - Conservation of endangered five-needled pines in Alberta Parks

Whitebark and limber pine are listed as endangered in Alberta and both are well represented within the Alberta Parks system. Conservation of these 5-needled pines is a challenge and requires collaboration with a number of agencies and individuals and priority actions for conservation are outlined in their recovery plans. Particular challenges for us in Alberta Parks system include management of suites of endangered species such as whitebark pine and mountain caribou, the needs of which may differ and delineation and characterization of critical habitat. Ten years ago Alberta Parks knew very little about the extent of whitebark and limber pine in provincial protected areas but we are currently developing and implementing a rigorous collaborative conservation program with other members of the Recovery Team. Such conservation efforts include monitoring health, collecting cone, and fostering research on a variety of topics including grizzly bear utilization, climate change and characterization of regeneration sites. This talk will summarize conservation and research activities within Alberta Parks while highlighting information in the recovery plans for these endangered species.

Randy Moody - Whitebark pine Ecosystem Foundation (Canadian Chapter), Current Status in BC, Ecology and Current Projects

Alana Clason - Adapting to Climate Change in WBP Restoration Projects

Michael Murray - Park Operations for Protecting Whitebark pine in the USA: should we look to have a US National Park Service person?

Stay tuned for other abstracts.

Special Session: Indigenous Peoples and Community Conserved Areas and Territories (ICCAs) (Convenor Francois Depey)

Indigenous Peoples and local communities have for millennia played a critical role in conserving a variety of natural environments and species. They have done this for a variety of purposes, economic as well as cultural, spiritual and aesthetic. There are today many thousand Indigenous and Community Conserved Areas (ICCAs) across the world, including forests, wetlands, and landscapes, village lakes, water catchment, rivers and coastal stretches and marine areas. The history of conservation and sustainable use in many of these areas is much older than for government-managed protected areas, yet they are often neglected or not recognized in official conservation systems. Many of them face enormous threats. It is nothing new in what is now known as British Columbia and Canada, however ICCAs now benefit from the support of a worldwide network.

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Washington Wildlife Habitat Connectivity Working Group - *Analyzing to ensure connections for wildlife in a changing climate in Washington and neighboring habitats*

Whitebark Pine Ecosystem Foundation of Canada - *Outreach activities poster about the active restoration such as planting, caging, Parks 100 (Judy Millar)*

Whitebark Pine Ecosystem Foundation of Canada (Joanne Vinneage and Randy Moody) – *General Whitebark Pine Ecosystem poster*

Whitebark Pine Ecosystem Foundation of Canada – *Assisted Migration*

Rachel White - *Yahgudang dljjuu: a respectful act. Restoring the land and honouring the history of Tllg Kun Gwaayaay – Athlii Gwaii (Lyell Island)*