

Park Management Plan

Say Nuth Khaw Yum / Indian Arm Provincial Park

February 2010



Produced by:
Say Nuth Khaw Yum /
Indian Arm Provincial Park
Management Board



This Plan is dedicated to the memory of

Richard Mervin George

1933 – 2009

Richard was an original Say Nuth Khaw Yum Management Board Director and his vision and passion for this special place shines from the maps and the story that make up the Plan.

Nautsa Mawt.

“Working together as one.”



A Journey to Collaboration

Finding common ground between multiple interests has been the basis of the relationship between the Tsleil-Waututh Nation and the Province of British Columbia. The relationship originally began in conflict, but grew into a collaborative partnership as both parties realized their similar values and interests in protecting and conserving this special place.

In 1995, the Province announced the creation of “Indian Arm Provincial Park” from land surrounding the upper half of Indian Arm. Although the Province had been involved in treaty negotiations with the Tsleil-Waututh Nation since 1994, the decision to create a new park in the traditional territory of the Nation was made without the Nation’s knowledge.

While the Tsleil-Waututh Nation generally agreed that it was necessary to protect such a vital area, it was unacceptable that this decision was made on a unilateral basis without formal consultation. In keeping with a belief that aboriginal title has never been extinguished over their traditional territory, the Tsleil-Waututh Nation initiated legal proceedings to challenge the process by which the Park was created.

After a year of intense discussions, a Management Agreement was signed between the Tsleil-Waututh Nation and the Province of British Columbia on January 16, 1998 (See Appendices).

The Parties built the Management Agreement based on their shared interests in protecting the cultural and natural resources of this important area. The Management Agreement established a Park Management Board with equal representation from the Tsleil-Waututh Nation and the Province for the joint management of the renamed “Say Nuth Khaw Yum / Indian Arm Provincial Park”. The Board is supported by a Joint Technical Committee consisting of staff from the Tsleil-Waututh Nation and the Province.

The Management Agreement was ahead of its time in forging new relationships between First Nations and the Province. It formed the foundation that enabled the Parties to come together in a spirit of cooperation and mutual respect. In this arrangement, both Parties are active participants in the decision-making of all aspects of planning, management, maintenance and operations. The objectives and principles set out in the Management Agreement were used to guide the development of this Plan.

By working together as partners, the Tsleil-Waututh Nation and the Province of BC embarked upon a new journey of reconciliation and cooperation. Today, the Parties are committed to moving forward in the implementation of the Park Management Plan for Say Nuth Khaw Yum / Indian Arm Provincial Park for the benefit of all British Columbians now and in the generations to come.



TSLEIL-WAUTUTH NATION

Children of TAKaya - Wolf Clan
BURREARD INDIAN BAND



Message from Chief Justin George

On behalf of the Tseil-Waututh Nation I am very proud to approve this Park Management Plan for Say Nuth Khaw Yum / Indian Arm Provincial Park. Say Nuth Khaw Yum is at the very heart of Tseil-Waututh territory and is a place of rich and powerful Tseil-Waututh cultural history.

Ten years ago, when the governments of the Tseil-Waututh Nation and the Province of British Columbia agreed to come together and co-manage this park, this Plan was just a vision. A vision of protecting a beautiful coastal fiord, a vision of celebrating and sharing Tseil-Waututh culture, a vision of partnership.

Today we stand together with this vision clearly articulated in a compelling and artistic way. This Park Management Plan for Say Nuth Khaw Yum / Indian Arm Provincial Park is truly one of a kind and represents over a decade of work. I raise my hands to our Elders, community members, and staff that have crafted this extraordinary Plan.

This Plan will not only guide the management and operations of this special place, but will also take Tseil-Waututh a step further on our journey in healing our territory and revitalizing our culture.

Today is a very good day for the Tseil-Waututh Nation.

Sincerely,

Chief Justin George
Tseil-Waututh Nation



Message from the Honourable Barry Penner, Minister of Environment

I am pleased to announce the release of the management plan for Say Nuth Khaw Yum / Indian Arm Provincial Park. This management plan represents the culmination of the collaborative efforts of the Tseil-Waututh First Nation and the Ministry of Environment to develop management direction for this naturally and culturally rich provincial park.

The Say Nuth Khaw Yum / Indian Arm Provincial Park management plan recognises the distinct relationship the Tseil-Waututh Nation has to the lands and waters encompassed within this provincial park since time immemorial. The plan honours the intent of the management agreement signed between the Tseil-Waututh Nation and the Province of British Columbia in 1998 and establishes a new direction for the management of the provincial park, based on a spirit of partnership between BC Parks and the Tseil-Waututh Nation.

I would like to extend my appreciation and sincere thanks to those who contributed to the development of this management plan, including the members of the Park Management Board, Tseil-Waututh Nation's Elders and staff, Port Metro Vancouver staff, and Ministry of Environment staff. It is through your cooperation and dedication that this milestone has been achieved.

Sincerely,

Barry Penner
Minister

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Digital Copy of Say Nuth Khaw Yum / Indian Arm Provincial Park Management Plan

For copies and updates of Say Nuth Khaw Yum / Indian Arm Provincial Park Management Plan, please refer to these websites:

<http://www.twnation.ca>
<http://www.env.gov.bc.ca/bcparks/>

In an effort to conserve paper, appendices are included in this Plan in digital form only.

APPENDIX A
Indian Arm Provincial Park / Say Nuth Khaw Yum Heritage Park Management Agreement

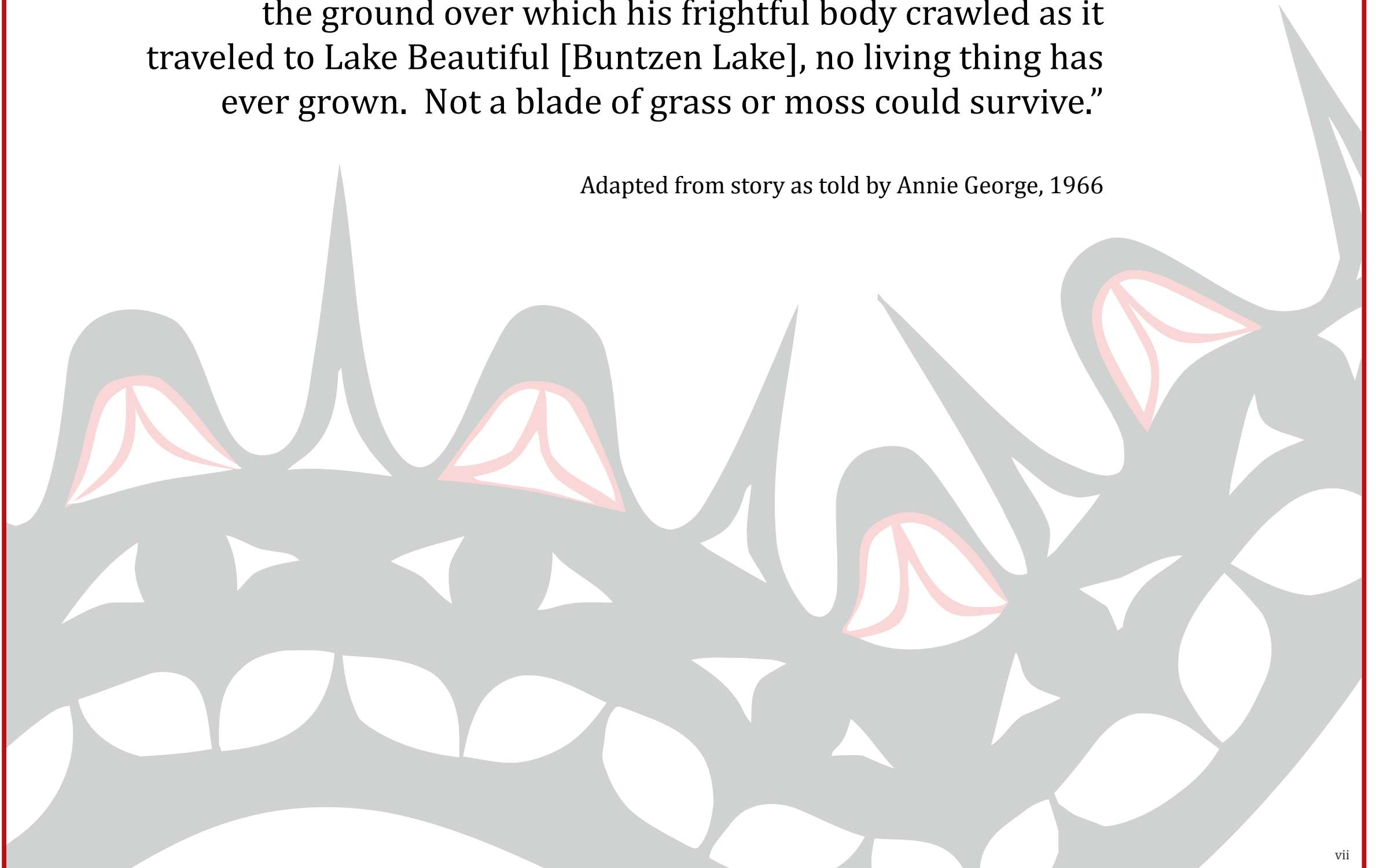
APPENDIX B
BC Parks Goals

APPENDIX C
Public & First Nation Consultation List

APPENDIX D
BC Parks Zoning Descriptions

“A two-headed serpent once lay across the Inlet blocking all that wanted to pass. To paddle up the Inlet, they had to carry their canoes around Say Nuth Khaw. It is said that on the ground over which his frightful body crawled as it traveled to Lake Beautiful [Buntzen Lake], no living thing has ever grown. Not a blade of grass or moss could survive.”

Adapted from story as told by Annie George, 1966



Tsleil-Waututh Declaration

*We are the Tsleil-Waututh First Nation, the People of the Inlet.
We have lived in and along our Inlet since time out of mind.
We have been here since the Creator transformed the Wolf into that first
Tsleil-Wautt, and made the Wolf responsible for this land.*

*We have always been here and we will always be here.
Our people are here to care for our land and water.
It is our obligation and birthright
To be the caretakers and protectors of our Inlet.*

*Our people descended from powerful Hereditary Leaders, Waut-salk and Sla-holt.
We know where we come from and we know who we are.
We respect our heritage and
Nothing can change our history and our truth.*

*Our people traveled far and wide on our traditional territory, they paddled
Our waters and climbed our mountains.
They understood the richness that our traditional territory held, and in
Understanding this, they knew our land.
Our ancestors were responsible for our rivers, streams, beaches and forests
Of our traditional territory.
Our people knew our land well because it was for the benefit of everyone.*

*Our Tsleil-Waututh Nation is moving into our future.
Our children and our land are our future.
Our future will bring enough for our children's children to thrive.
We are looking forward,
We are ready to meet the next millennium.*

*Therefore, be it known far and wide that our Tsleil-Waututh Nation, the
People of the Inlet, are responsible for and belong to our traditional territory.
Let it be known that our Tsleil-Waututh Nation is a Nation unto itself,
Holding traditional territory for its people.*



Acknowledgements

The creation of the Say Nuth Khaw Yum / Indian Arm Provincial Park Management Plan (the “Plan”) could not have been completed without an extraordinary level of teamwork and personal dedication from many individuals. The Park Management Board (the “Board”) would like to recognize and thank everyone for their contribution.

The Board would like to acknowledge the Elders of the Tsleil-Waututh Nation who inspired the creation of the Bioregional Inventory Atlas, and guided us with their vision and wisdom. Tsleil-Waututh Nation Elders generously gave their stories of Say Nuth Khaw Yum (“Serpent’s Land”) to enrich our understanding of the Park and they reminded us of the commitment we all have towards protecting and conserving this unique place.

Special mention goes to Tsleil-Waututh Nation Elders Ernest I. George and Richard George for their countless volunteer hours as Board members. They have been a great source of inspiration.

Special thanks to the Tsleil-Waututh Nation for contributing funds, staff and expertise to complete the Park Management Plan and the Bioregional Inventory Atlas. Micheal George, Pano Skrivanos and Rita Ngan from the Tsleil-Waututh Nation created the images for this Plan with the help and guidance of Dr. Doug Aberley. Dr. Aberley has contributed a great deal of energy, time and advice to the planning process since the creation of the Park. Chris Knight and Evan Stewart were an integral part of the Joint Technical Committee and dedicated many hours of work. Lilian Chau and Jay Forsyth coordinated the park planning process with the Joint Technical Committee and the Board.

Appreciation to the staff of the Tsleil-Waututh Nation for their support: Ed Thomas, Dave Thomas, John Thomas, Henry George, Richard George, Josh George, Damian George, Herb George, Dorothy Hood, Pat Leeson, Margaret Rogers, Beverly Suderman, David Boudinot, and the moral support given by Chief Leah George-Wilson, Leonard George, Marilyn Van Bibber, Erin Kellogg, and David Carruthers.

Great appreciation to the staff of the Province of British Columbia for their tireless efforts in the development of the Plan. Brian Clark, Tom Bell and Jennifer McGuire from the Ministry of Environment dedicated their time and energies and provided guidance as Board members. The commitment of BC Parks staff; Vicki Haberl, Larry Syroishko, Brett Hudson and Ken Morrison must be acknowledged for their contributions as part of the Joint Technical Committee. The Board would also like to thank the efforts of past employees of BC Parks: Ray Peterson, Tom Eng and Mel Turner; past employees of the BC Ministry of Aboriginal Affairs Holly Hofmyer and Peter Nakken; Debbie Sneddon of Fisheries and Oceans Canada; Ian Scott and Siobhan Murphy from Ecotrust Canada; Diana Alexander and Steven Deroy for their contributions to the Bioregional Inventory Atlas.

A special thank you to Mayor Richard Walton who dedicated his time and expertise as the Province of British Columbia Appointee on the Board.

Last but not least, the Board would also like to extend their appreciation to the Port Metro Vancouver for their generous support in the development of this Plan. Special thanks to Mark Griggs, Sharleen Suszezwiez, Mimi Chung and other representatives from the Port Metro Vancouver who greatly assisted the Joint Technical Committee and the Board in the development of this Plan.





**Say Nuth Khaw Yum / Indian Arm
Provincial Park**

Park Management Board

July 15th, 2008

The undersigned members of the Say Nuth Khaw Yum / Indian Arm Provincial Park Management Board have prepared and have reached a consensus agreement on the objectives and strategies that are contained in this Park Management Plan.

The Park Management Plan meets the intent and requirements as set out by the Indian Arm Provincial Park / Say Nuth Khaw Yum Heritage Park Management Agreement signed by the Tsleil-Waututh Nation and the Province of British Columbia on January 16, 1998.

The Board recommends that the Tsleil-Waututh Nation and the Province of British Columbia approve and commit to the expeditious implementation of the Park Management Plan, in the spirit of cooperation and openness that has characterized the long-standing partnership.

Ernest I. George
Tsleil-Waututh Nation Elder

Jennifer McGuire
BC Ministry of Environment

Richard George
Tsleil-Waututh Nation Elder

Richard Walton
Provincial Appointee
District of North Vancouver

Plan Highlights

- The Say Nuth Khaw Yum / Indian Arm Provincial Park Management Plan is the product of a collaborative partnership between the Tsleil-Waututh Nation and the Province of British Columbia.
- The terms of this relationship are governed by the Say Nuth Khaw Yum / Indian Arm Provincial Park Management Agreement (the “Management Agreement”) signed on January 16, 1998.
- The purpose of the Management Agreement and the Park Management Plan are to protect and promote the natural and cultural resources of the Park for conservation and recreational purposes.
- The Plan is for the benefit of all British Columbians, and serves to identify and support cultural, economic and management opportunities for the Tsleil-Waututh Nation.
- First Nations, stakeholders, and the public were consulted in the development of this Park Management Plan.
- A Bioregional Inventory Atlas was created to compile a comprehensive range of biophysical, cultural and recreational information on the Park.
- This is the first time that bioregional inventory maps have been used to provide baseline information needed to develop provincial park management objectives and strategies.
- In order to achieve the purpose of the Plan, four major goals have been identified: collaborative partnership, contemporary cultural expression, integrated stewardship and public recreation. Management objectives and strategies were guided by the four goals of the Plan.
- Land use designations for the Park include: Wilderness Recreation Zone, Nature Recreation Zone, Intensive Recreation Zone, Special Features Zone, and Tsleil-Waututh Management Areas.
- Tsleil-Waututh Management Areas identify locales with significant cultural and/or economic values to be managed by the Tsleil-Waututh Nation in accordance with the 1998 Management Agreement.
- Recommendations for marine area designations were made by the Board for the consideration of agencies and authorities with jurisdiction in the marine area of Indian Arm.
- These recommendations seek to address the Board’s interest in working with marine agencies and authorities on issues of public safety, access, conservation and foreshore protection in Indian Arm.
- Tsleil-Waututh Nation and BC Parks are committed to the expeditious implementation of this Plan. A separate, detailed Implementation Strategy will be developed according to the implementation principles set out in this Plan.



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Introduction

Say Nuth Khaw Yum, meaning “Serpent’s Land,” is located within the core of the traditional territory of the Tsleil-Waututh Nation, and has from time out of mind been an area of great significance to the Tsleil-Waututh people. For millennia, the Tsleil-Waututh Nation has continuously utilized the land, water and resources of the entire area of Indian Arm.

Indian Arm Provincial Park is a Class A park named and described in Schedule D of the Protected Areas of British Columbia Act and is managed under the Park Act. The Board recommends changing the legal name to Say Nuth Khaw Yum Provincial Park as part of the implementation of this Plan.

Due to the Park’s close proximity to urban centres in the Lower Mainland, it has become a popular destination for residents and visitors alike. The distinctive geological, ecological and cultural landscape is also home to an abundance of wildlife and vegetation.

In addition to beautiful scenic views and a wide variety of recreational opportunities, the partnership between the Tsleil-Waututh Nation and BC Parks provides visitors with a unique opportunity to experience Tsleil-Waututh and Coast Salish culture and history in a contemporary manner.

The vision for Say Nuth Khaw Yum / Indian Arm Provincial Park is one based on collaboration, cooperation and openness. The proposed policies and developments seek to celebrate the unique cultural heritage and natural resources of the Park in a manner that is sustainable, consultative and culturally sensitive.

The Plan is required to implement the provisions of the 1998 Indian Arm Provincial Park / Say-Nuth-Khaw-Yum Heritage Park Management Agreement (the “Management Agreement”) that reflect greater Tsleil-Waututh participation in the management, operations, and economic opportunities in the Park.

Over the next 10 to 20 years, the Tsleil-Waututh Nation and BC Parks will continue to translate the vision of Say Nuth Khaw Yum / Indian Arm Provincial Park into a shining example of collaborative park management between First Nations and the Province of British Columbia.





**SAY NUTH KHAW YUM
/ INDIAN ARM
PROVINCIAL PARK
MANAGEMENT PLAN**



MAP A: Regional Context

Say Nuth Khaw Yum meaning "Serpent's Land" is located within the core of the traditional territory of the Tsleil-Waututh Nation, and has from time out of mind been an area of great significance to the Tsleil-Waututh people. For millennia, the Tsleil-Waututh Nation has continuously utilized the land, water and resources of the entire area of Indian Arm.

Say Nuth Khaw Yum / Indian Arm Provincial Park is a Class A Provincial Park located in the Lower Mainland of British Columbia. The Park is situated on the east and west sides of Indian Arm.

Due to the Park's close proximity to urban centres in the Lower Mainland, it has become a popular destination for residents and visitors alike. The distinctive geological, ecological and cultural landscape is also home to an abundance of wildlife and vegetation.



Looking south down Grand Creek towards Indian Arm

Legend

- Say Nuth Khaw Yum Park Legal Boundary
- Tsleil-Waututh Nation Statement of Intent
- River / Stream
- Road
- Say Nuth Khaw Yum Park Lands
- Other Provincial Parks
- Tsleil-Waututh Nation Community

This map is a living document and is intended to be amended and refined over time. It is not an expression of the location of Tsleil-Waututh aboriginal title. The data used to produce this map originates from many sources and are presented without prejudice. This map is the property of the Tsleil-Waututh Nation and may only be reproduced with written permission.

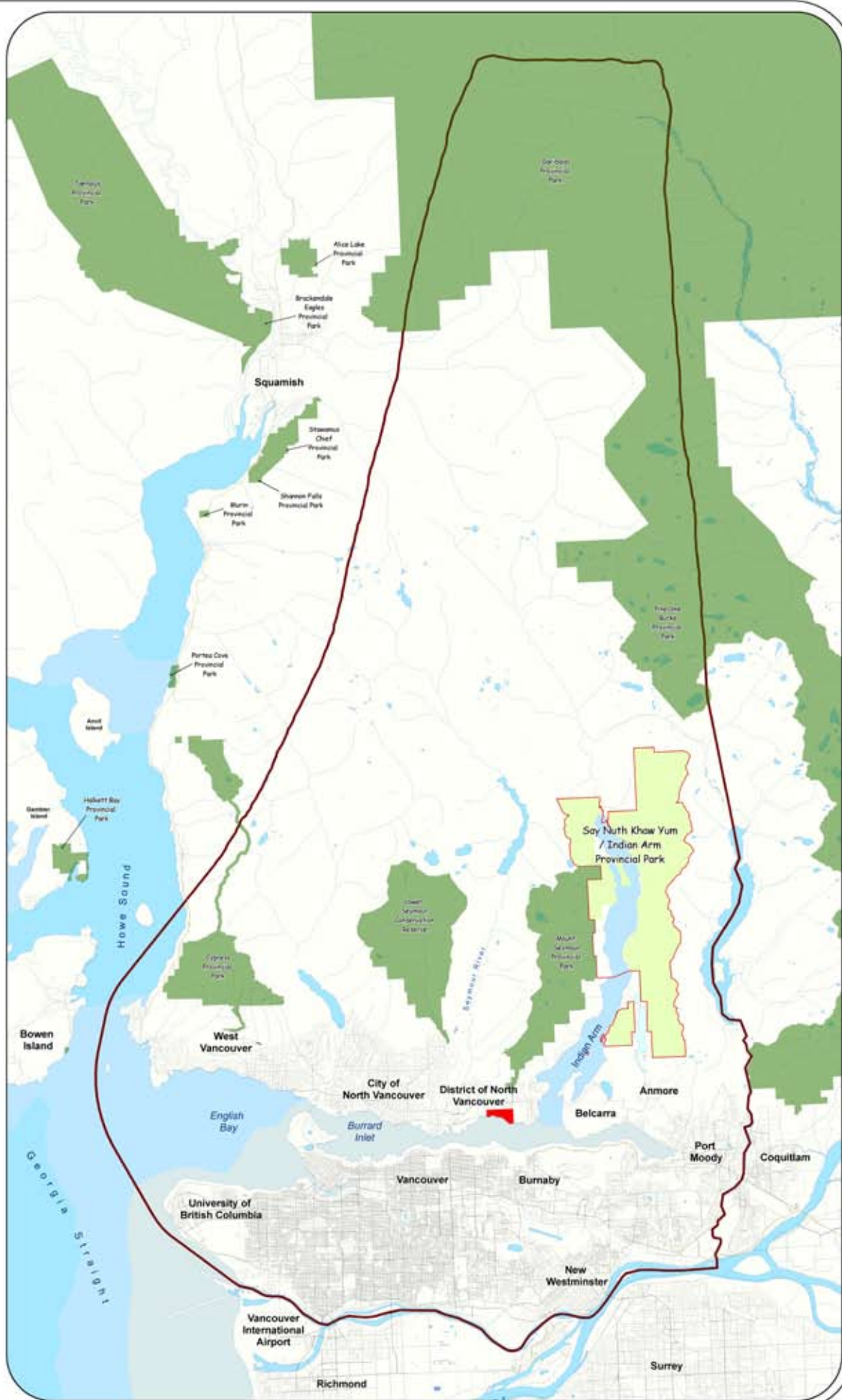
This Park Management Plan only pertains to Provincial Park Lands within the legal boundary of Say Nuth Khaw Yum / Indian Arm Provincial Park.

Base data: Province of British Columbia, Ministry of Environment, Port Metro Vancouver.

Projection: Albers Equal Area, NAD 83, Zone 10

0 2.5 5 10 15
Kilometers

Map Scale 1:300,000
Map edition: August 2008



Introduction

Planning Partners

The development of the Plan was led by the Board as a partnership between the Tsleil-Waututh Nation and BC Parks. Assistance and additional funding was provided by the Port Metro Vancouver to support the work of the Board and the Joint Technical Committee in the development of this Plan.

This section highlights the different perspectives and roles of each planning partner in the management and operation of Say Nuth Khaw Yum / Indian Arm Provincial Park.

Tsleil-Waututh Nation

Since the beginning, the Tsleil-Waututh people have used the land, water, animals and other natural and spiritual resources in the core of their traditional territory, now called Say Nuth Khaw Yum / Indian Arm Provincial Park. Large winter villages were once located around the southern mouth of Indian Arm, and to the north, summer villages and spiritual sites lined every accessible point along the precipitous shores. At the outlet of the Indian River, the fish and wildlife-rich Inlailawatash Estuary supported many generations of Tsleil-Waututh who occupied the village of Inlailawatash, as well as the numerous fishing and hunting camps in the area.

Today, the evidence of continuous land use and occupancy by Tsleil-Waututh ancestors is widely visible in the forests and on the shores of Indian Arm. Pictographs dot a dozen cliff sides, and the archaeological sites scattered throughout the area narrate stories of a dynamic Tsleil-Waututh culture. These physical markings speak to the deep-rooted connections of the Tsleil-Waututh to the living landscape and deep waters of Indian Arm. They resonate with the rich history and identity of the Tsleil-Waututh people.

As stewards of the natural and cultural resources within their traditional territory, the Tsleil-Waututh Nation does not consider the Park as a place to be managed, but a place to be cared for and restored to its original natural abundance and scenic splendor. It is strongly believed that the health of the Park reflects the health of the Nation. Hence, the work to heal and protect the body of the area that is Say Nuth Khaw Yum is a task held closely to the heart of every Tsleil-Waututh.

The Tsleil-Waututh Nation looks forward to helping future generations to establish contemporary connections to the land and waters that have sustained generations before them. It is the hope of the Tsleil-Waututh, that by sharing their culture, history and understanding of Say Nuth Khaw Yum, they can help others to develop a strong sense of respect and care for the air, land, water, and wildlife that sustains us all.

BC Parks

Provincial parks are set aside for the preservation of their natural environments, and for the inspiration, use and enjoyment of the public. The mission of BC Parks, part of the BC Ministry of Environment, is to protect viable, representative examples of the natural

diversity of the Province and to protect areas that have special natural, cultural and recreational features (See Appendices).

In addition, BC Parks manages and provides recreational facilities to the public, with an emphasis on tourism travel routes, outdoor recreation holiday destinations, and back-country and local recreational site networks.

The Province of British Columbia and First Nations have embarked on a journey to develop a “new relationship” based on mutual respect and the principles of recognition and reconciliation. As part of the “new relationship,” BC Parks is committed to working with First Nations to ensure that parks are managed with consideration of First Nations’ interests in the area.

Through the establishment of strong collaborative partnerships with communities like the Tsleil-Waututh Nation, the management of parks is strengthened with additional resources and interest; special features and culturally significant sites can be better protected; and First Nation communities can build capacity to manage significant parks in their traditional territories.

Port Metro Vancouver

Although the Park is primarily accessed through the marine area of Indian Arm, the Park only includes the terrestrial and freshwater components of the land base. The marine area of Indian Arm is federal property managed by the Port Metro Vancouver.

First established in 1913 as the Vancouver Harbour Commission, the Port Metro Vancouver is the federal authority responsible for the management of nearly 600 kilometres of shoreline that extend from Point Roberts at the Canada/U.S. border, through Burrard Inlet to Port Moody and Indian Arm, to the mouth of the Fraser River, eastward to the Fraser Valley, north along the Pitt River to Pitt Lake, and the north and middle arms of the Fraser River. Under the Canada Marine Act, the Port Metro Vancouver is responsible for the administration, management and control of respective harbours, and is mandated to manage marine navigation and safety, security and access, transportation, assets and property, land use, and infrastructure development within its jurisdiction.

While the Port Metro Vancouver is not a member of the Park Management Board, the authority has contributed greatly to the development of the Bioregional Inventory Atlas and to this Plan. Any proposals for new or upgraded marine facilities or other works or activities with impacts to the marine area of Indian Arm will undergo Port Metro Vancouver project review and approval. Furthermore, given that access to the Park recreational areas is predominately by water, the Port Metro Vancouver also has interest in development proposals in the Park as they may have a marine-related impact. Considering this, proposals for development in the Park will be referred to the Port Metro Vancouver for review and comment.



Management Planning Process

The Management Agreement commits the Parties to work towards the development of a Park Management Plan that will set out long-term management objectives and strategies for the conservation, recreation, interpretation and operation of Say Nuth Khaw Yum / Indian Arm Provincial Park. The planning process was divided into three phases: Phase 1: Research; Phase 2: Plan Development and Consultation; and Phase 3: Implementation.

Phase 1: Research

During Phase 1, the Board actively sought funding to complete the broad range of research necessary to gain a comprehensive understanding of the biophysical and cultural identity of the Park. Detailed interviews with Tsleil-Waututh Nation Elders regarding their traditional uses of the Indian Arm area were completed. Archaeological investigations were undertaken in addition to terrestrial ecosystem mapping.

The information collected during these research projects contributed to the development of a unique Bioregional Inventory Atlas designed to provide a visual summary of the data related to the Park area.

During this period, minor upgrades to existing Park infrastructure were completed. The development of all major projects was put on hold pending the completion of the Park Management Plan. On September 12, 2006, the Tsleil-Waututh Nation and BC Parks celebrated the completion of the Bioregional Inventory Atlas and the official completion of Phase 1.

Phase 2: Plan Development and Consultation

Phase 2 of the planning process focused on drafting the Plan and developing a transparent public consultation process to enable First Nations, major stakeholders and the public to participate in the development of the Plan. It was important that First Nations, stakeholders and the public were given sufficient opportunities to provide comments and feedback for the planning of this unique area.

A coordinator was hired to assist the Board in developing the planning process, and to facilitate the relationship between the Tsleil-Waututh Nation, BC Parks, Port Metro Vancouver, First Nations, stakeholders and the public in the drafting of the Plan.

A public information Open House was held on September 28, 2006 to kick-off the plan development and public consultation process. The purpose of the Open House was to provide general information to stakeholders and the public about the park planning process. A short questionnaire was distributed to survey initial interest and comments (See Appendices).

From November 2006 to August 2007, the Board developed the basic framework of the Plan. In September 2007, the Board approved the draft Plan for public review. All First Nations within the consultative boundaries of the Park were provided with the

draft Plan for review and comment as part of the Province of British Columbia's obligation to consult with First Nations, and the Tsleil-Waututh Nation's desire to ensure other First Nations were consulted in a meaningful and respectful manner.

Stakeholders were given the draft Plan for study, and a series of public consultation meetings to review the Plan were held in October 2007 in communities adjacent to the Park: the Tsleil-Waututh Nation, the District of North Vancouver, the Village of Belcarra and the Village of Anmore.

Comments from First Nations, stakeholders and public meetings were considered in the development of the final Park Management Plan. Upon final review, the Board recommended the Say Nuth Khaw Yum / Indian Arm Provincial Park Management Plan for adoption by the Tsleil-Waututh Nation and the Province of British Columbia on June 9, 2008.

Phase 3: Implementation

Phase 3 of the planning process marks the critical stage where the management objectives and strategies proposed in this Plan are implemented in a systematic and practical manner. It is the intention of the Board to develop a separate and detailed implementation strategy to identify resources and priorities.

The Implementation Principles contained in this Plan will help guide the joint technical committee and the Board in the development of the implementation strategy. The Board intends to work with a number of partners and organizations to seek additional funding from external sources in order to expeditiously implement the management objectives and activities outlined in this Plan.



**SAY NUTH KHAW YUM
/ INDIAN ARM
PROVINCIAL PARK
MANAGEMENT PLAN**



MAP B: PARK LOCATION

Say Nuth Khaw Yum "Serpent's Land" embodies the spirit and connection of the Tseil-Waututh Nation to their traditional territory, rich history and contemporary culture. The 6,688 hectare Park protects an ancient fjord surrounded by coastal temperate rainforest and one of the last undeveloped estuaries in the Lower Mainland. The Park also contains four major islands, each with its own unique ecosystem.

The primary access to the Park is through the adjacent marine area of Indian Arm, with road access available only for the lower sections of the Park adjacent to the Buntzen Lake Recreation Area and Belcarra Regional Park. The marine area adjacent to the Park is 1151 hectares (2844 acres) and is under the jurisdiction of Port Metro Vancouver.

Private properties within the legal boundaries of the Park are not under the jurisdiction of BC Parks or the Management Board. The Plan only pertains to Crown land within the legal boundary of the Park.



Head of Indian Arm looking south with Granite Falls and Croker Island in the distance.

Legend

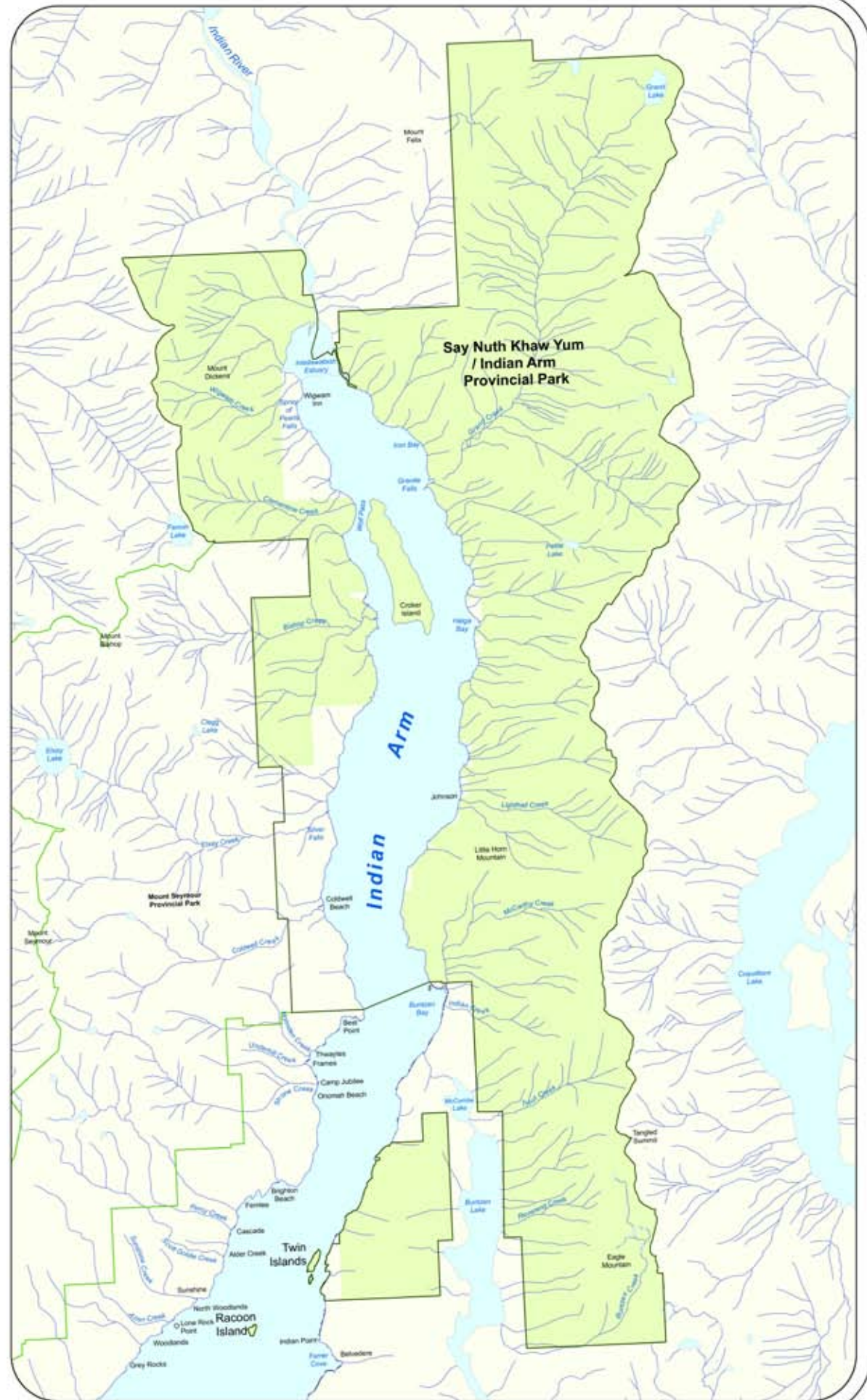
- Say Nuth Khaw Yum Park Legal Boundary
- Say Nuth Khaw Yum Park Lands
- Mount Seymour Provincial Park

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Base data: Province of British Columbia, Ministry of Environment, Port Metro Vancouver.
Projection: Albers Equal Area, NAD 83, Zone 10

Map Scale 1:24,000
Map edition: August 2008



Role of the Park

Provincial and Regional Context

Say Nuth Khaw Yum / Indian Arm Provincial Park is a Class A provincial park located in the Lower Mainland of British Columbia. The 6,688 hectare park is situated on the east and west sides of Indian Arm, adjacent to Mount Seymour Provincial Park and the District of North Vancouver to the west, Buntzen Lake Recreation Area and Coquitlam Watershed Reserve to the east, and Pinecone Burke Provincial Park and private lands held by the Tsleil-Waututh Nation to the north.

The Park is a unique recreational area due to its marine character and close proximity to the urban municipalities of the District of North Vancouver, Port Moody, Coquitlam and the Villages of Belcarra and Anmore. The area also contains sensitive cultural heritage resources with deep connections and significance to the Tsleil-Waututh Nation.

Main access to the Park is through the adjacent marine area of Indian Arm. Road access is available only for the lower sections of the Park adjacent to the Buntzen Lake Recreation Area and Belcarra Regional Park.

The adjacent marine area of Indian Arm is approximately 1,151 hectares and is under the jurisdiction of the Port Metro Vancouver.

Private properties within the boundary of the Park (i.e. inholdings) are not under the jurisdiction of BC Parks or the Management Board. The Plan only pertains to Crown properties within the legal boundary of the Park.

Cultural Heritage Role

Say Nuth Khaw Yum, or “Serpent’s Land,” embodies the spirit and connection of the Tsleil-Waututh Nation to their traditional territory and to their rich history and culture. The Management Agreement and this Plan provide opportunities to promote, celebrate and share the rich cultural heritage of the Tsleil-Waututh Nation with all British Columbians.

In addition to Tsleil-Waututh culture and history, the Park also embodies the pioneer and industrial history of the Lower Mainland during the early days of natural resource extraction and city-building at the turn of the century.

The proposed protection of cultural heritage resources, development of natural and cultural interpretation programs and the training of Tsleil-Waututh youth and community members as cultural guides and rangers will enhance visitors’ experiences and contribute to their understanding of British Columbia’s diverse cultural heritage.

Conservation Role

Say Nuth Khaw Yum / Indian Arm Provincial Park protects an ancient fjord and representative examples of the Mountain Hemlock, Coastal Western Hemlock and Alpine

Tundra biogeoclimatic zones. It also protects a variety of wildlife including a number of species at risk and a largely intact estuary in the Lower Mainland. The Park also contains four major islands, each with its own unique ecosystem.

The Park provides an opportunity to protect wildlife and native vegetation, and to reintroduce previously extirpated species back into the area such as Roosevelt elk. The Inlailawatash Estuary plays an important role in protecting bird habitats and provides a safe haven for endangered species such as the great heron, great blue heron, peregrine falcons and bald eagles.

Given the importance of the adjacent marine area of Indian Arm, the Park is also vital to the protection of inter-tidal and sub-tidal zones for marine life.

Tourism and Outdoor Recreation Role

The Park plays an important role in the BC Parks system by providing a variety of recreational opportunities that are accessible to residents and visitors in the Lower Mainland via trails adjacent to the Buntzen Lake Recreation Area and the marine area of Indian Arm.

Intensive recreation sites, such as Granite Falls and Bishop Creek, will provide visitors with well-developed facilities to accommodate large groups, motorized boaters and natural and cultural interpretive programs.

Other sites will be developed to a moderate level of recreation intensity. Recreation sites, such as Clementine Creek and Big Twin Island, will provide visitors a recreational experience in a natural environment with minimal facilities catering to kayakers and canoe enthusiasts.

Currently, the day-use area of Raccoon Island is easily accessible from popular launch sites in Deep Cove and Belcarra Regional Park. In the future, the Park will also offer opportunities for backcountry hiking and camping experiences to cater to more adventurous visitors.

Economic Opportunities

As the Park is a popular tourist destination, there are a number of economic opportunities available. Eco-tourism operations currently consist of kayaking and group camping outfitters.

Low impact eco-tourism operations that fit with the natural and cultural values of the Park will be encouraged.

The Management Agreement directs the Board to identify commercial, economic, training and employment opportunities for the Tsleil-Waututh Nation in the Park. The Tsleil-Waututh Nation has identified several economic opportunities in the Park that build upon their existing eco-tourism enterprise, Takaya Tours. The opportunity for

Park Attributes

fixed-roof accommodation will be explored in the proposed Tsleil-Waututh Replica Coast Salish Village at Bishop Creek, which will provide both accommodations and cultural programming to visitors.

These proposed economic opportunities will enable the Tsleil-Waututh Nation to continue to be active participants in natural and cultural tourism activities in the Park. Where appropriate, other commercial operators will be encouraged to operate in the Park. All commercial infrastructure and proposed activities will require a Park Use Permit and must be developed according to the natural and cultural values of the Park.

The success of the Plan's vision may ultimately increase the degree of use and the number of users in the Indian Arm and Say Nuth Khaw Yum Park areas. This increased usage will contribute to the need for more marine agency and authority presence to manage, monitor and enforce activities on the water.

Sites of Interest

Sites of interest are distinct from Special Feature Zones as there is no specific management direction deemed necessary for these areas. However, they may be of value as sites of special interest to park visitors.

Most of the sites are within the boundaries of the Park. However, Silver Falls is located on private lands but is visible from the adjacent marine area of Indian Arm and is culturally significant to the Tsleil-Waututh Nation.

Management Issues

Since the Park was created in 1995, there has been no management plan to help guide the development of the Park. Recreational activities have occurred throughout this period and some problems have arisen due to the lack of a comprehensive plan for the Park. This section provides a summary of the management issues this Plan seeks to address.

Protecting Natural Values

Due to the Park's natural topography, much of the area is inaccessible to visitors. This helps limit the human impacts on natural and cultural values. However, more accessible areas, such as fragile island sites, have been negatively impacted by intensive recreational use, illegal camp fires and the cutting of trees. There is a lack of vegetation and wildlife species inventories, and crucial habitat areas requiring protection are not known. Identifying areas of research regarding ecosystem health and biodiversity restoration is a priority.

Protecting Cultural Values

Increasing recreational use in the Park has resulted in negative impact on some significant cultural areas and archaeological resources. The lack of understanding and

awareness, or the lack of respect by some visitors has resulted in significant degradation of important cultural sites.

Proposed educational signage and interpretive programs would help to educate visitors about the historical and cultural significance of the Park, and to encourage the protection of important cultural resources.

Defining Appropriate Levels of Recreational Use

There is a wide variety of potential recreational uses in the Park, including marine activities, camping, backcountry hiking, eco-tourism and cultural tourism. Identifying access and the types of facilities that should be made available at each site will help limit the impacts of recreational uses on natural and cultural resources and reduce the levels of conflict between different users. The types of uses identified will be based on needs that are compatible with the natural and cultural values of the Park.

Public Safety

Industrial logging and mining activities from an era prior to the Park's creation have caused disturbance to natural vegetation. The impacts of old clear cuts and unstable roads have contributed to landslides in the Park and potential rock-fall dangers. Restoration and mitigation of these hazards is required to safeguard public safety, residents, and facilities.

Illegal backcountry trails pose safety concerns, especially as they are not sanctioned or maintained by BC Parks. There are no accurate maps of these trails to aid Tsleil-Waututh, BC Parks or search and rescue personnel in case of emergencies.

In addition, the steep topography and close proximity to utility infrastructure within the Park poses safety risks when conducting activities such as recreational hunting. The Board is aware that monitoring and enforcement is crucial to ensuring the safety of visitors and the protection of natural and cultural resources.

Park Boundary

The existing Park boundary was established to protect known values at the time of designation. This Plan only pertains to Crown lands that are within the legal boundary of the Park and does not apply to any private lands.

Some land within the Indian Arm watershed is protected within Mount Seymour Provincial Park and Pinecone Burke Provincial Park. However, the established boundaries do not follow natural boundaries. In order to manage the natural resources of the Park in a holistic manner, it is recommended that adjustments to Park boundaries be considered to more closely reflect natural watershed boundaries.



Adjacent Areas

The development, use and management of the foreshore and marine resources of Indian Arm have a direct impact on the Park. Therefore, although BC Parks and the Board have no jurisdiction in the adjacent marine area of Indian Arm, this Plan makes recommendations to Fisheries and Oceans Canada, Environment Canada, Transport Canada, Port Metro Vancouver and other authorities regarding the use and monitoring of the marine area.

Recommendations for the adjacent marine area of Indian Arm are described in Section 6.0. In order to take a more holistic approach to planning and management, the Port Metro Vancouver was invited to participate and to support the planning process. In collaboration with the Port Metro Vancouver, marine values have been considered in the development of this Plan.

The Plan also recognizes the importance of the cumulative impacts of private properties, provincial forests and regional parklands contiguous to Say Nuth Khaw Yum / Indian Arm Provincial Park. Coordination with agencies and authorities, such as BC Hydro and Metro Vancouver, regarding adjacent uses has been considered accordingly and has helped to inform the Plan.

In particular, the Indian River Watershed Plan being conducted by the Tsleil-Waututh Nation and the Integrated Land Management Bureau (ILMB) of the Province of British Columbia provides an opportunity to harmonize the recreational, cultural and conservation values within the contiguous area of the Park and the Indian River Watershed.



**SAY NUTH KHAW YUM
/ INDIAN ARM
PROVINCIAL PARK
MANAGEMENT PLAN**



Map C : Sites of Interest

Sites of Interest are distinct from Special Features because specific management direction is not provided for these areas. They are features of the Park that may be of interest to visitors.

★ Spray of Pearl Falls

The Spray of Pearl Falls is located above the historic Wigwam Inn at the north-western end of Indian Arm. The Wigwam Inn, a heritage structure now maintained by the Royal Vancouver Yacht Club, was a popular hiking spot for visitors at the turn of the twentieth century. A tragic love story is attached to the Falls, where a young man dies in an untimely manner just before his new bride is to join him at their homestead in the area near Wigwam Inn. The bride later passes away due to a broken heart. According to the legend, when she died the string of pearls which she wore broke and fell down the cliff and gave the Falls its name. In a less romantic version a newspaper editor claimed to have named the Falls during the early 1900s for the way the water seemed to bounce down the mountain like a spray of pearls.

★ Granite Falls

Granite Falls is a spectacular and, at times, powerful feature where fresh water cascades down a weathered granite slope. The site has attracted visitors since the late nineteenth century for its scenic views and industrial potential. The area around the Falls was used as a gravel quarry beginning in 1891, a shingle bolt flue, and a small-scale hydro penstock. Later, a portion of the site was redeveloped as a lodge. By the mid twentieth century the site lay dormant, with tons of industrial waste and garbage scattered in and around the area. A major clean-up was completed after the creation of the Park and it remains an important goal of the Board to protect and restore this popular scenic feature to its former beauty.

★ Silver Falls

Silver Falls is located north of Coldwell Creek on the west side of Indian Arm. The land around Silver Falls is currently privately owned. It is an area with significant cultural importance to the Tsleil-Waututh Nation. Tsleil-Waututh Elders recall their parents warning them not to look at the Falls because it was a place of bad omens with the power to cause blindness or bring bad luck. Today, Tsleil-Waututh members continue to respect the power of the Falls and warn anyone traveling in Indian Arm to heed the words of their ancestors.

Legend

- Say Nuth Khaw Yum Park Legal Boundary
- Say Nuth Khaw Yum Park Lands

This map is a living document and is intended to be amended and refined over time. It is not an expression of the location of Tsleil-Waututh aboriginal title. The data used to produce this map originates from many sources and are presented without prejudice. This map is the property of the Tsleil-Waututh Nation and may only be reproduced with written permission.

This Park Management Plan only pertains to Provincial Park Lands within the legal boundary of Say Nuth Khaw Yum / Indian Arm Provincial Park.

Base data: Province of British Columbia, Ministry of Environment, Port Metro Vancouver.
Projection: Albers Equal Area, NAD 83, Zone 10

1 0.5 0 1
Kilometers

Map Scale 1:24,000
Map edition: August 2008



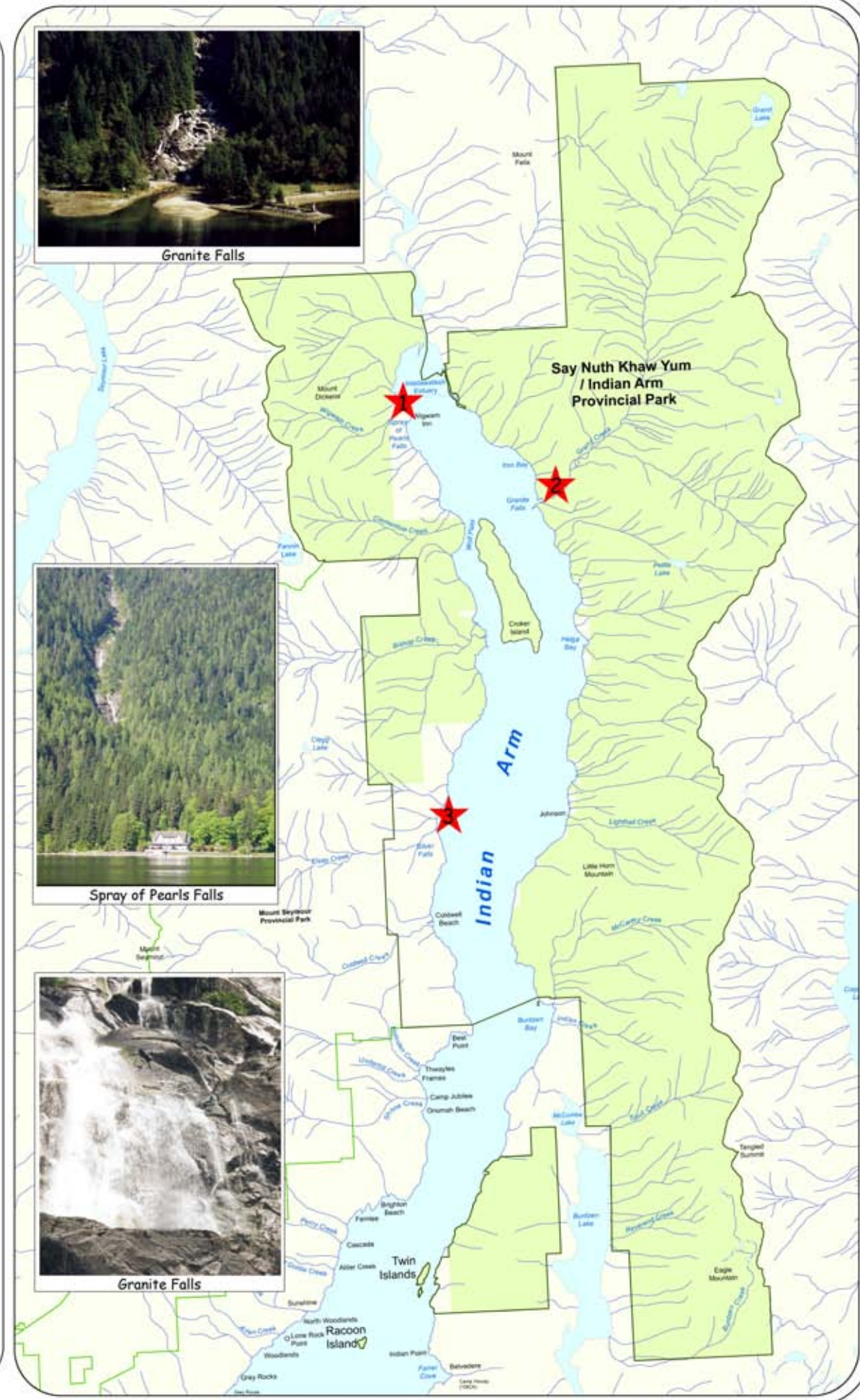
Granite Falls




Spray of Pearls Falls




Granite Falls



Bioregional Inventory Atlas



**SAY NUTH KHAW YUM
/ INDIAN ARM
PROVINCIAL PARK
BIOREGIONAL ATLAS**



Map 1. Introduction

Introduction

The Say Nuth Khaw Yum / Indian Arm Provincial Park Bioregional Inventory Atlas brings together information from a variety of sources in order to create a comprehensive biophysical and cultural inventory of the Park. The Atlas provides the basic information necessary to inform ongoing planning, development and stewardship processes in the Park.

Bioregional mapping is a particular mapping tool used to describe the physical, biological, and cultural characteristics of any bioregion. Bioregional mapping can assist in approaching planning in a holistic, integrated and transparent manner. This method of map making, research and conveyance of information is rooted in the theory of bioregionalism. As a living document, these bioregional maps can be updated and revised from time to time as new information is uncovered. It is a common planning tool used by the Tsilil-waututh Nation to conduct many of their community-based planning processes in their traditional territory.

Over the years, the Tsilil-waututh Nation has refined bioregional mapping techniques by using a combination of Geographic Information System (GIS) technology, traditional knowledge and scientific research to convey a story. In addition, the text, photos, tables and charts shown throughout the Say Nuth Khaw Yum / Indian Arm Provincial Park Inventory Atlas provides a greater level of detail than typically shown on map images. The result of this mapmaking process is a series of bold and colourful images that are designed to tell the story of the Park from the ground up, across time and space. Given their accessibility to a wide variety of audiences, the maps can easily be translated into park signage, interpretative displays and programming. The Atlas was created in the offices of the Tsilil-waututh Nation in collaboration with BC Parks.

The Say Nuth Khaw Yum / Indian Arm Provincial Park Bioregional Inventory Atlas consist of a total of 30 maps. It includes 17 maps describing a range of biophysical characteristics, 9 maps describing aspects of cultural or human activities, and 3 maps identifying existing recreational uses and facilities in the Park.



Indian River Estuary

Legend

Say Nuth Khaw Yum Park Legal Boundary	Transmission Line
Say Nuth Khaw Yum Park Lands	Gravel Road
Mount Seymour Provincial Park	Paved Road
Rivers and Streams	

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Base data: TRIM, B.C. Ministry of Sustainable Resource Management, 1996.
Projection: Albers Equal Area, NAD 83, Zone 30



1 0.5 0 1 Kilometers
Map Scale 1:24,000
Map produced September 2006 and updated August 2008

This map was produced by the Tsilil-waututh Nation with the financial support from Fisheries and Oceans Canada and B.C. Parks, and technical assistance from Ecotrust Canada.




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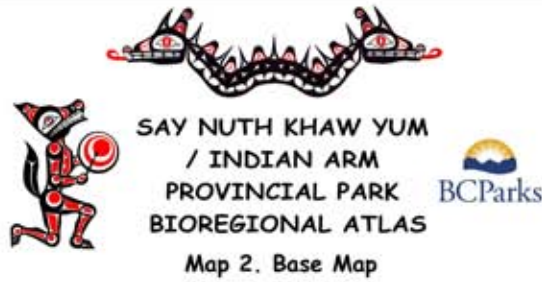
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Bioregionalism

Bioregionalism is a theory of planning that suggests that the organization of human cultures and societies is best based within the context of distinctive physical and cultural landscapes. A "bioregion" or "life place" is usually defined by watersheds, areas of common landform or vegetation, or the territories of Aboriginal or region-based human societies. According to Dr. Doug Aberley, a Bioregionalist, bioregions are the physical spaces within which regional populations of humans most identify; and they are natural containers for our efforts to create sustainable and just societies. The bioregional theory of "living-in-place" parallels the Tsilil-waututh Nation values of holistic natural resource stewardship, and the desire to reconnect what has been separated; the land, water, animals, culture, economy, and people.



Introduction

In October 1996, BC Premier Glen Clark announced the creation of 23 new parks and protected areas covering 136,000 hectares in BC's Lower Mainland region. Considering the rapid growth and subsequent development of the area, the government has worked to protect 14 per cent of Crown land in the region. The 1997 Park Amendment Act legislated park status for 12 of the 23 areas, including Say Nuth Khaw Yum / Indian Arm Provincial Park. The BC Ministry of Water, Air and Land Protection continues to cooperate with other government ministries and local governments in the completion of the originally proposed 'Lower Mainland Nature Legacy Program.'

The protected area designations in the Lower Mainland will have positive effects on a wide variety of wildlife habitat and fragile ecosystems. The completed protected area network will accomplish such things as providing security for bald eagle wintering sites, saving old growth Douglas fir and western red cedar forests, the preservation of pristine watersheds, and protecting natural corridors for grizzly bears and other vulnerable species. Along with protecting areas throughout the lower mainland, the government of BC has also adopted a mitigation strategy that provides funding for workers and natural resource harvest industries to undertake new initiatives in training, habitat restoration and timber supply enhancement projects. This strategy maintains a provincial commitment to continue fostering job creation and economic stability in lower mainland communities.

General Description

Location: The Park is situated on the east and west sides of Indian Arm, adjacent to Mount Seymour Provincial Park and North Vancouver in the west, Buntzen Lake Recreation Area and Coquitlam Watershed Reserve to the east, and lands held by the Tsleil-Waututh Nation to the north.

Size: 6,821 hectares / 16,855 acres

Map Data

The data displayed in this Atlas are gathered from a variety of sources. Base map data originates from the Terrain Resource Information Management (TRIM) program. Other data was gathered from multiple government agencies including the BC Ministry of Forests, the BC Ministry of Environment, the BC Ministry of Sustainable Resource Management, Environment Canada, Port Metro Vancouver, the Department of Fisheries and Oceans and Metro Vancouver. Additional information was gathered from historical maps and books. Most importantly, each map contains input from Tsleil-Waututh community members who possess an intimate knowledge of the Park and surrounding areas. All Atlas maps are produced using the BC Equal Albers projection and NAD 83 datum. The Atlas was produced by the Tsleil-Waututh Nation.

Legend

Say Nuth Khaw Yum Park Legal Boundary	Transmission Line
Say Nuth Khaw Yum Park Lands	Gravel Road
Mount Seymour Provincial Park	Paved Road
Rivers and Streams	

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Base data: TRIM, B.C. Ministry of Sustainable Resource Management, 1996.
Projection: Albers Equal Area, NAD 83, Zone 10

Map Scale 1:24,000
Map produced September 2006 and updated August 2008

This map was produced by the Tsleil-Waututh Nation with the financial support from Fisheries and Oceans Canada and B.C. Parks, and technical assistance from Ecotrust Canada.



Values Cited as Important in the Creation of Say Nuth Khaw Yum / Indian Arm Provincial Park...

Value: Conservation

Say Nuth Khaw Yum / Indian Arm Provincial Park protects the shores of the most southerly fiord on the British Columbia mainland. It also protects old-growth forests, several alpine lakes, a waterfall 90-metres in height, two large alluvial fans, numerous creeks and the estuary of the Indian River. The Indian River supports five species of salmon, and its estuary is vital habitat for prawns, crab and many species of waterfowl. Harbour seals are frequent visitors to the area.

Value: Recreation

Indian Arm is a popular area for boating of all kinds, kayaking in particular.

Three yacht club outstations are located on private holdings that are surrounded by the Park. The area also offers opportunities for hiking, SCUBA diving and recreational fishing.

Value: Cultural Heritage

Indian Arm is the core area of the traditional territory of the Tsleil-Waututh Nation. Evidence of First Nation use of the area is found in the form of pictographs, archaeological sites, and sites where a wide range of current traditional use activities take place.

Non-First Nation use of the Park area has included mining, quarrying, industrial logging, and cottage development. The historic Wigwam Inn, near the head of Indian Arm, was at one time a luxury resort that attracted customers who were brought from Vancouver by steamship up Indian Arm. Numerous cottages continue to be located on lands either within, or surrounded by, the Park.

Value: Access

The Park is primarily accessed by water, however, there is also logging road access from Squamish via the Indian River Forest Access Road. This route is typically closed in winter, and is often impassable in the Fall and Spring due to avalanches and landslides. Due to changes in BC Ministry of Forests policy regarding maintenance of Forest Service Access Roads there is uncertainty regarding whether road access into Say-Nuth-Khaw Yum / Indian Arm Provincial Park will continue to be maintained.

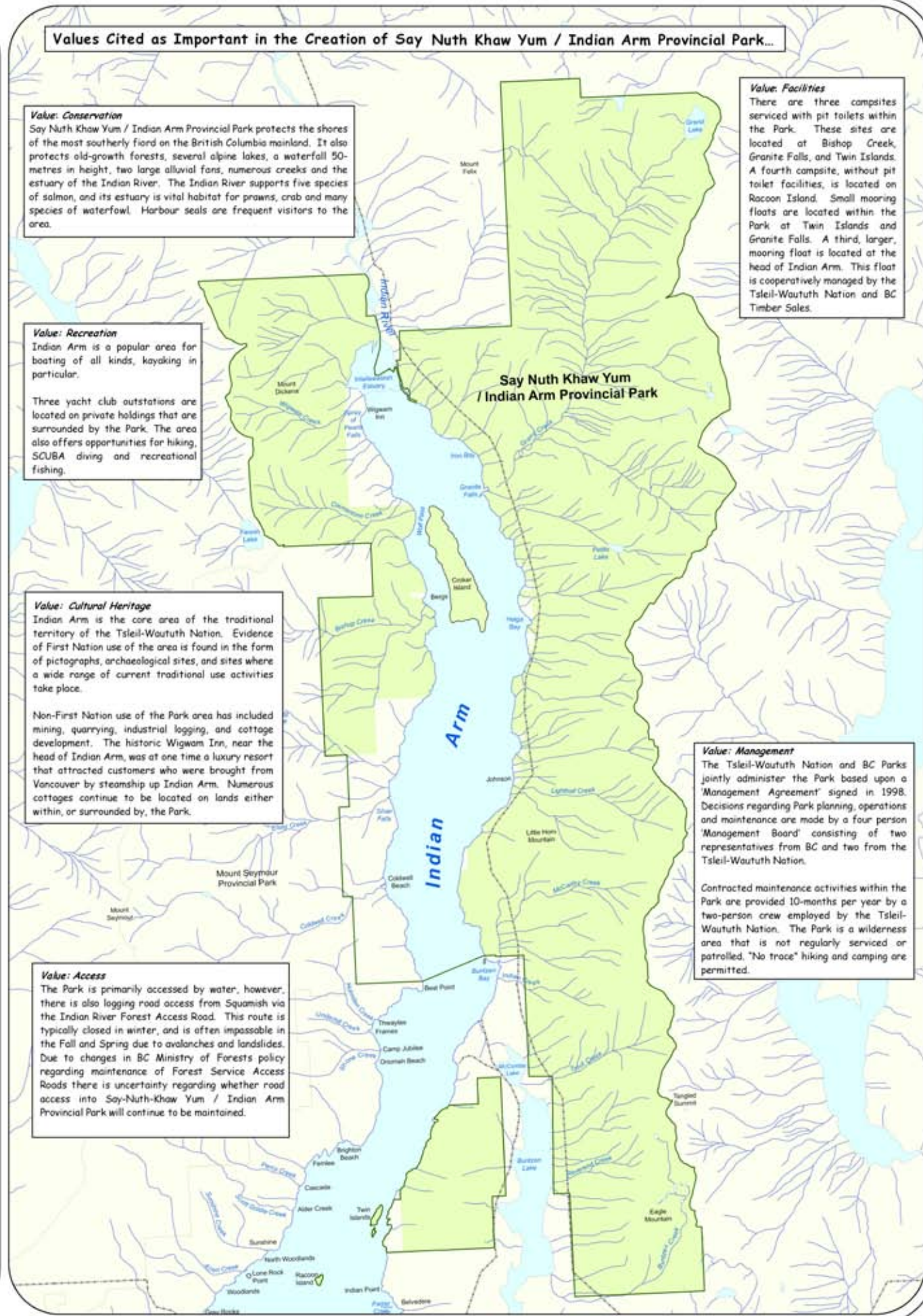
Value: Facilities


There are three campsites serviced with pit toilets within the Park. These sites are located at Bishop Creek, Granite Falls, and Twin Islands. A fourth campsite, without pit toilet facilities, is located on Racoon Island. Small mooring floats are located within the Park at Twin Islands and Granite Falls. A third, larger, mooring float is located at the head of Indian Arm. This float is cooperatively managed by the Tsleil-Waututh Nation and BC Timber Sales.

Value: Management

The Tsleil-Waututh Nation and BC Parks jointly administer the Park based upon a 'Management Agreement' signed in 1998. Decisions regarding Park planning, operations and maintenance are made by a four person 'Management Board' consisting of two representatives from BC and two from the Tsleil-Waututh Nation.

Contracted maintenance activities within the Park are provided 10-months per year by a two-person crew employed by the Tsleil-Waututh Nation. The Park is a wilderness area that is not regularly serviced or patrolled. "No trace" hiking and camping are permitted.





**SAY NUTH KHAW YUM
/ INDIAN ARM
PROVINCIAL PARK
BIOREGIONAL ATLAS**

Map 3. Biophysical Series: Bedrock Geology

Introduction

Geology is a broad science that encompasses the study of bedrock geology. Information about bedrock geology may be gathered for direct economic interests (e.g., mineral potential) or safety and public health (e.g., terrain stability). Geology inventories of the Say Nuth Khaw Yum / Indian Arm Provincial Park area have been prepared by the Geological Survey of Canada (Natural Resources Canada) and the Geological Survey and Mineral Titles Branches of the BC Ministry of Energy and Mines.

The two primary sources of information related to bedrock geology are 1) maps and reports generally that show either the local or regional nature or distribution of bedrock (e.g., areas of granite, areas of shale and sandstone) and provide a summary of geologic history, and 2) maps that describe geomorphic features (e.g. ancient glacial features and, on a few maps, landslides). These types of geologic data are collected by fieldwork combined with remote sensing data, especially aerial photo interpretation. The amount of mapped detail varies with map scales ranging from 1:50,000 to 1:250,000. These inventories date from the late 1800s and are expanded as funding allows. Between 1993 and 1996, the provincial government compiled all existing bedrock mapping in British Columbia from government, industry and academic sources. The inventories were then compiled at a 1:250,000 scale.

Geology

Indian Arm and the Indian River valley are located in the southern portion of the Coast Plutonic Complex. Plutons are formed when molten rock deep in the earth solidifies into massive blocks that through various means rise to the surface. The Indian River valley hosts Jurassic- and Cretaceous-era portions of the Coast Plutonic Complex that are 100 to 180 million years old. The dominant rock type in this complex is granodiorite with hornblende and biotite.

In the upper Indian River Valley plutonic rocks are overlain by older sedimentary and igneous rocks of the Gambier Group. When this layer of rocks came in contact with the rising pluton they were metamorphosed, or transformed by intense heat, into amphibolite and gneiss. This top layer has been highly eroded over time, so that only portions of it remain as "roof pendants." It is in the zone of contact between the Coast Plutonic Complex and the Gambier Group that mineralisation including gold, silver, molybdenum, lead, copper, and zinc occurs.

Legend

- Say Nuth Khaw Yum Park Legal Boundary
- Bedrock Geology**
- 1 TW2H ISLAND GROUP hornblende-granulite, amphibolite, gneiss, schist, conglomerate, quartzite, meta-arkose, lime-silicate rock, migmatite
- 11 Alluvial, marine and glacial deposits
- B1 Granite (biotite is the only mafic mineral present in appreciable amounts)
- b2 Granodiorite (biotite is more abundant than hornblende)
- b3 Quartz diorite (biotite is more abundant than hornblende)
- b4 Quartz diorite (hornblende is the only mafic mineral present in appreciable amounts)
- b5 Diorite (hornblende is the only mafic mineral present in appreciable amounts)
- b6 Granodiorite (hornblende is more abundant than biotite)
- b7 Quartz diorite (hornblende is more abundant than biotite)
- b8 Diorite (hornblende is more abundant than biotite)
- b9 Migmatite (hornblende is more abundant than biotite)

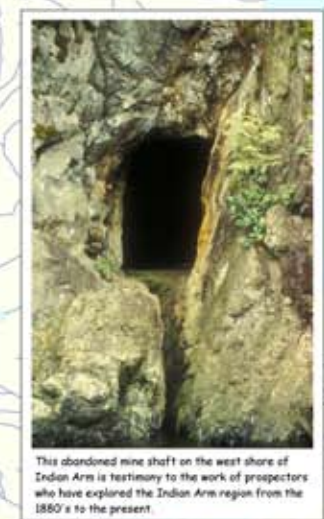
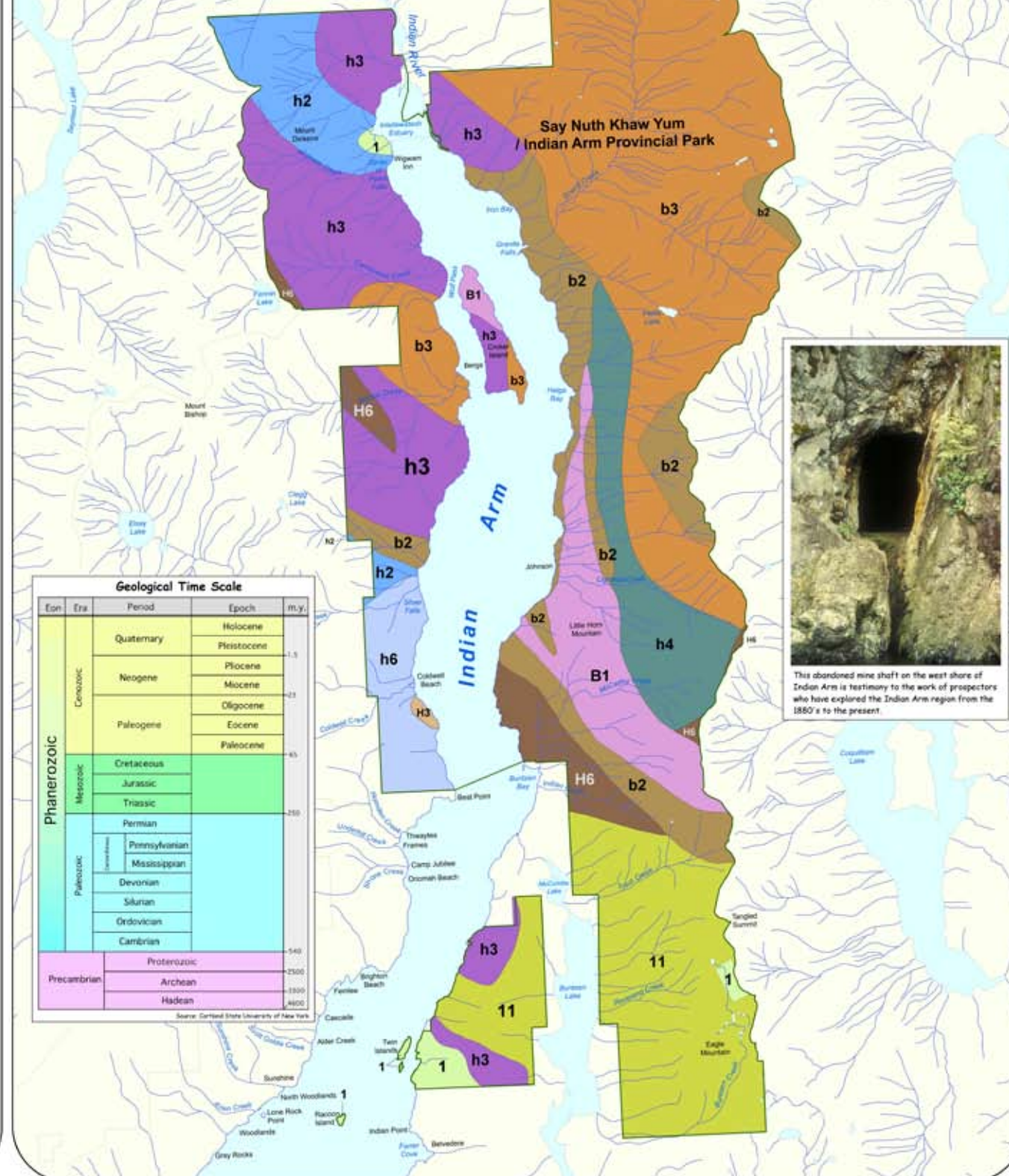
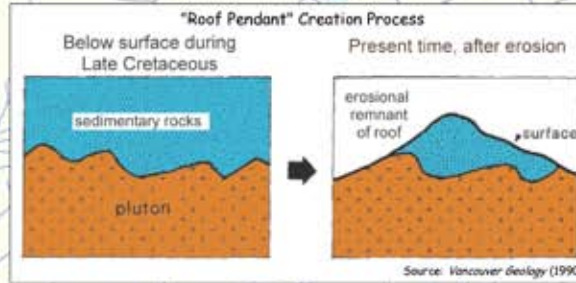
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Base data: TRIM, B.C. Ministry of Sustainable Resource Management, 1996.
Projection: Albers Equal Area, NAD 83, Zone 10

0 0.5 1 Kilometers

Map Scale 1:24,000
Map produced: September 2006 and updated August 2008



This map was produced by the Tsleil-Waututh Nation with the financial support from Fisheries and Oceans Canada and B.C. Parks, and technical assistance from Ecotrust Canada.


Geological Time Scale

eon	Era	Period	Epoch	m.y.
Phanerozoic	Cenozoic	Quaternary	Holocene	0
			Pleistocene	1.3
		Neogene	Pliocene	2.1
			Miocene	23
		Paleogene	Oligocene	45
			Eocene	65
	Mesozoic	Cretaceous		145
			Jurassic	200
		Triassic		250
			Permian	250
Paleozoic	Carboniferous	Permian	250	
		Mississippian	300	
	Devonian		360	
		Silurian	440	
		Ordovician	440	
Precambrian	Proterozoic	Cambrian	540	
		Archean	2500	
		Hadean	4600	

Source: Canadian State University of New York

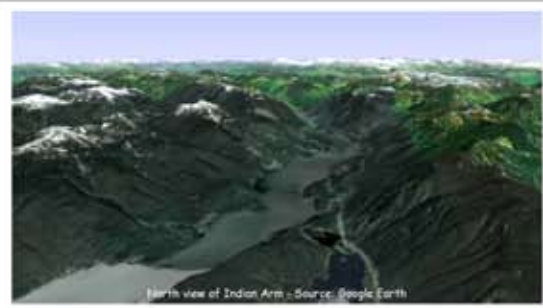
**SAY NUTH KHAW YUM
/ INDIAN ARM
PROVINCIAL PARK
BIOREGIONAL ATLAS**



Map 4. Biophysical Series: Topography & Soils

Introduction

The topography of the Indian Arm region is generally extremely steep. The area of Say Nuth Khaw Yum / Indian Arm Provincial Park is dominated by a classic U-shaped glacial valley and fjord cut during the last ice age. From mountain peaks topping 1500 metres cliffs drop precipitously to sea level and beyond to ocean depths of over 200 metres. Although the entire area is treed, soils are shallow and subject to erosion from extreme rainfall or any type of human disturbance. Short watercourses that drop directly into Indian Arm drain most of the Park area. In two locations longer streams drain larger basins. The Indian River, which flows into the head of Indian Arm, drains a narrow valley approximately 180 square kilometres in size. Tributaries of the Indian River, all located north of the Park boundary, include Mesilloet, Brandt, Forestry and Hixon Creeks. The Grand River, which culminates in scenic Granite Falls at its outfall into Indian Arm, is the largest watershed that is contained entirely within Park borders.



Soil Types

Soils within Say Nuth Khaw Yum / Indian Arm Provincial Park are dominantly 'Podzolic'. Soils of the 'Podzolic Order' form under coniferous forests in temperate and wet or in cold and moist climates. Podzols are typically well drained and coarse textured and undergo intense leaching of clay, organic matter, iron and aluminum from upper to lower mineral horizons. Podzols dominate most of the coastal region and mountain systems of British Columbia. Two subgroups of the Podzolic 'great group' are found in Indian Arm area.






Fero-Humic Podzol

Accumulations of organic matter, iron plus aluminum. These soils occur under humid coniferous forest conditions where there is often a thick ground cover of moss. This soil type typically occurs above 500 metres in elevation.

Humo-Ferric Podzol

Accumulations of iron plus aluminum and little organic matter. These soils occur in less humid or cooler areas at elevations typically lower than 500 metres.

Legend

-  Say Nuth Khaw Yum Park Legal Boundary
-  Say Nuth Khaw Yum Park Lands
-  100 Meter Contour
-  20 Meter Contour
-  Mountain Peak

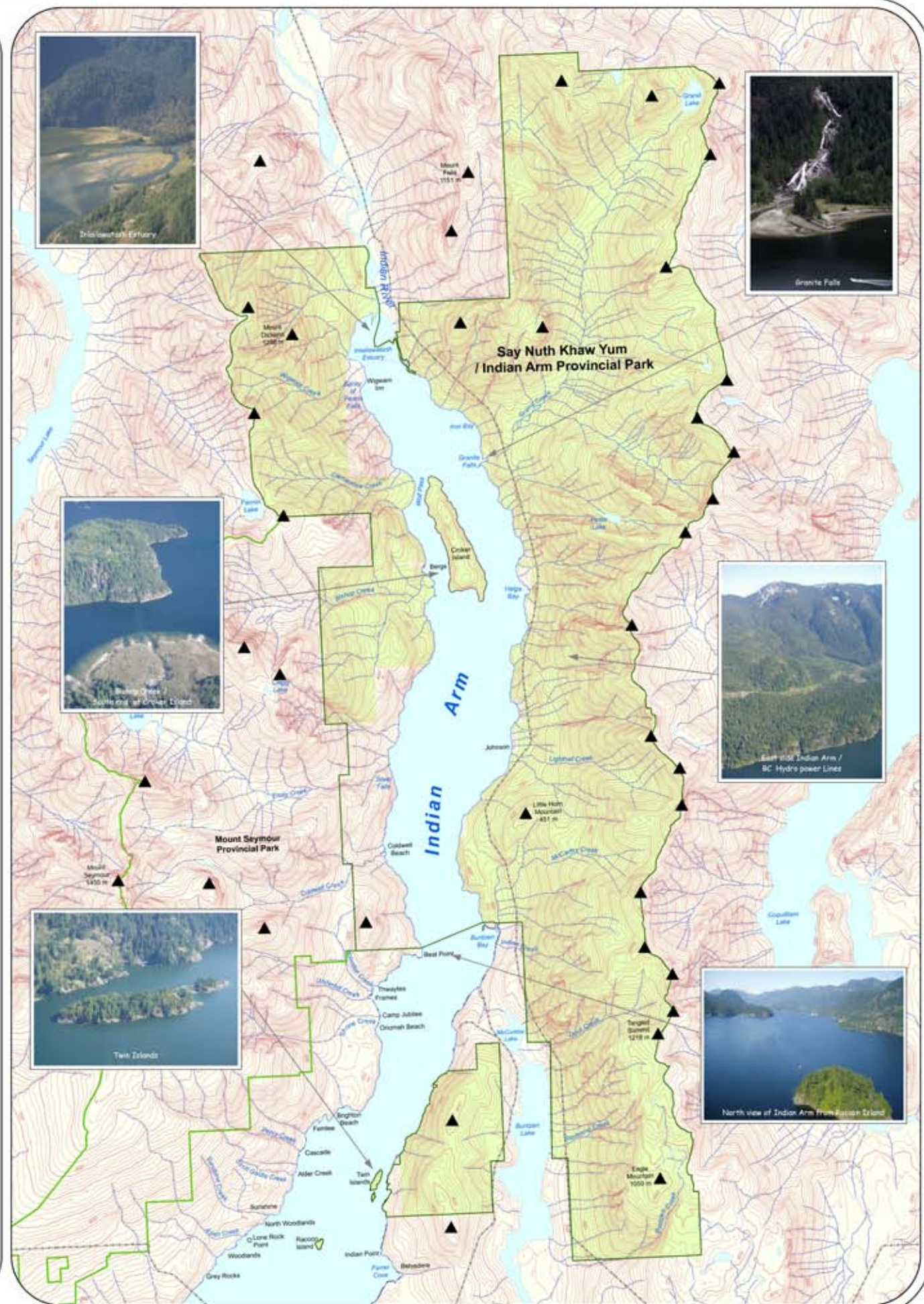
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Base data: TRIM, B.C. Ministry of Sustainable Resource Management, 1996.
Projection: Albers Equal Area, NAD 83, Zone 10

Map Scale 1:24,000
Map produced September 2006 and updated August 2008



This map was produced by the Tsilhqan'wam'ayem Nation with the financial support from Fisheries and Oceans Canada and B.C. Parks, and technical assistance from Ecotrust Canada.





**SAY NUTH KHAW YUM
/ INDIAN ARM
PROVINCIAL PARK
BIOREGIONAL ATLAS**



**Map 5: Biophysical Series: Bathymetry
/ Physical Oceanography**

Introduction

Indian Arm is a narrow body of water that is 18 kilometres long and 1.5 kilometres wide. It was carved over thousands of years from hard granite by the slow movement of a massive volume of compressed ice. Indian Arm is a typical fjord in that its upper end hosts a shallower zone where gravels and sediment from the Indian River have created an estuary. The middle portion of Indian Arm deepens to a depth of over 200 metres. Near to the point where Indian Arm joins Burrard Inlet there is a sill that marks the point of furthest glacial advance. This feature rises to within 30 metres of the surface and significantly restricts the circulation of water into, and out of, Indian Arm.

Indian Arm's estuarine circulation is characteristic of most West Coast fjords, consisting of a two-layer system in which a thin layer of brackish water at the surface overlies a more saline water mass below. Estuarine circulation is driven by inflows of freshwater from Indian River and the Buntzen Lake hydroelectric plant. This inflowing freshwater creates a pressure gradient that drives brackish water out of the system, with compensating subsurface tidal inflows of salty water from Burrard Inlet. This characteristic pattern of circulation results from freshwater being appreciably lighter than salt water, leading freshwater runoff to make its way down-inlet as a shallow surface layer. Entrapment of underlying saline water into the outflow out of Indian Arm generates a compensating flow of saline water at depth.

Water Temperature

Water temperature in Indian Arm is influenced by four factors: solar heating, air temperature, water temperature in Burrard Inlet, and to a lesser degree the volume of freshwater inflow. For the seven winter months of the year, air temperatures are less than that of the water surface. During the remaining five months, air temperatures exceed water temperatures, with minor levels of heating taking place. In general, air and water temperatures do not differ by more than a few degrees Celsius.

Deep-water temperature is determined by quasi-periodic intrusions of water from outside the fjord. Following such an exchange, deep-water temperature is influenced by both the temperature of the source water and the amount of mixing that occurs during its transit through Burrard Inlet and down the slope to the bottom of Indian Arm. Once in the basin, the temperature will change as a result of the process of diffusion, or as the result of another inflow event. The effects of winter cooling do not reach the deep water.

Dissolved oxygen concentration is high near the surface and decreases with depth in Indian Arm. Deep-water dissolved oxygen levels exhibit periodic increases followed by steady decreases. Increases are a result of inflows of dense near-surface water from outside the system, while decreases occur between such events. Because of these quasi-periodic intrusions, anoxic conditions have not been observed in Indian Arm. In general, the levels of dissolved oxygen cycle seasonally and reach a maximum in the spring with a smaller peak in the fall.

Source: Lerch and Symington: August 2000.

Legend

- Say Nuth Khaw Yum Park Legal Boundary
- Say Nuth Khaw Yum Park Lands
- Bathymetric Contours (meters)

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Base data: TRIM, B.C. Ministry of Sustainable Resource Management, 1996.
Projection: Albers Equal Area, NAD 83, Zone 10

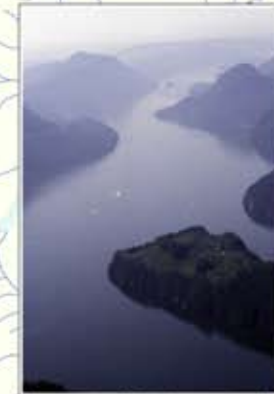


Map Scale 1:24,000
Map produced September 2006 and updated August 2008

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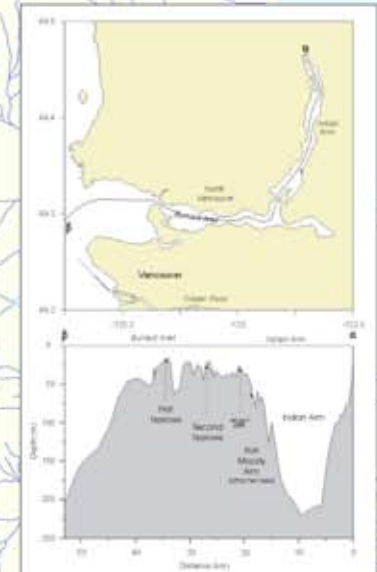
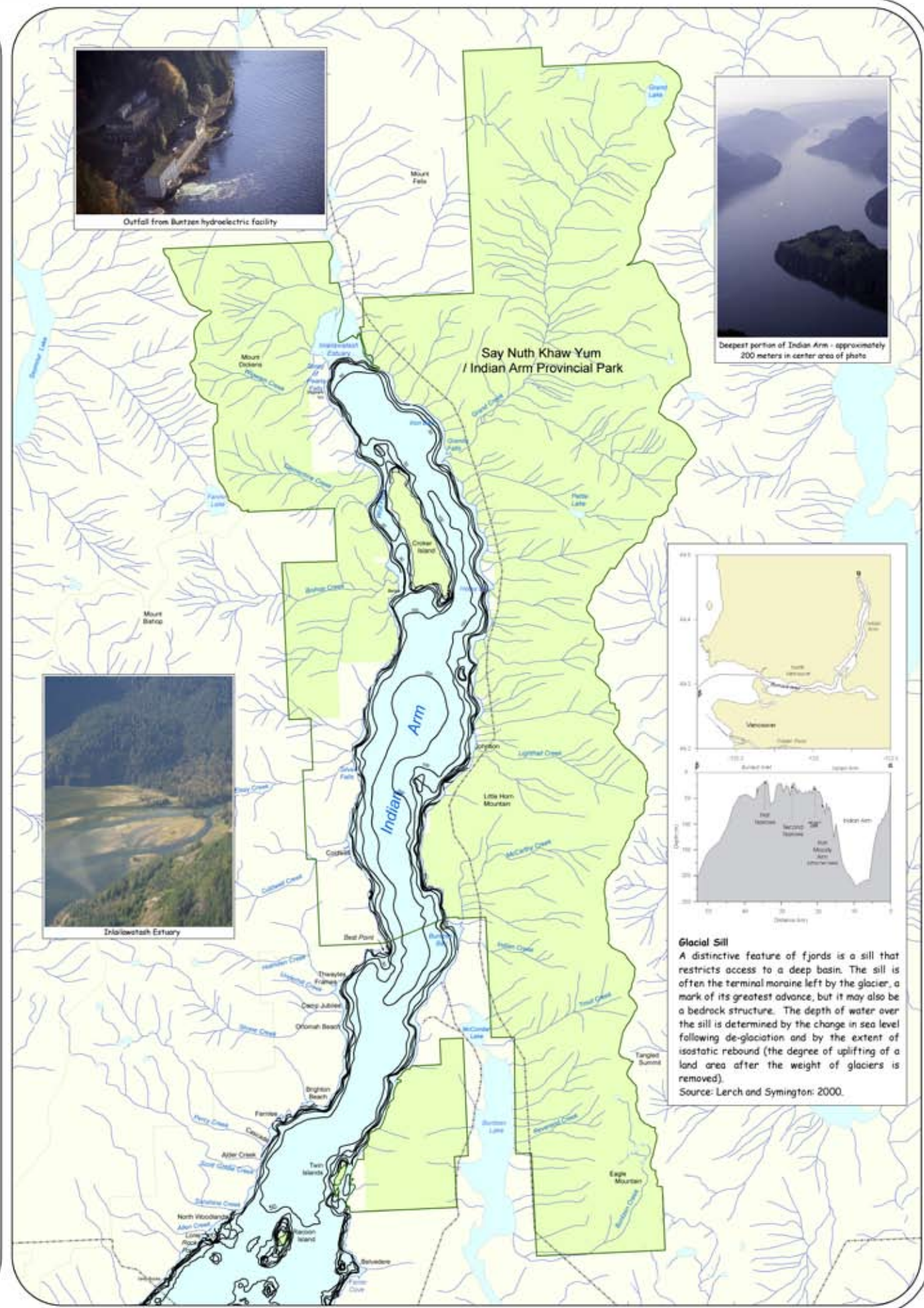
Outfall from Buntzen hydroelectric facility



Deepest portion of Indian Arm - approximately 200 meters in center area of photo



Inlawwath Estuary



Glacial Sill
A distinctive feature of fjords is a sill that restricts access to a deep basin. The sill is often the terminal moraine left by the glacier, a mark of its greatest advance, but it may also be a bedrock structure. The depth of water over the sill is determined by the change in sea level following de-glaciation and by the extent of isostatic rebound (the degree of uplifting of a land area after the weight of glaciers is removed).
Source: Lerch and Symington: 2000.



SAY NUTH KHAW YUM / INDIAN ARM PROVINCIAL PARK BIOREGIONAL ATLAS

Map 6. Biophysical Series: Drainage Patterns

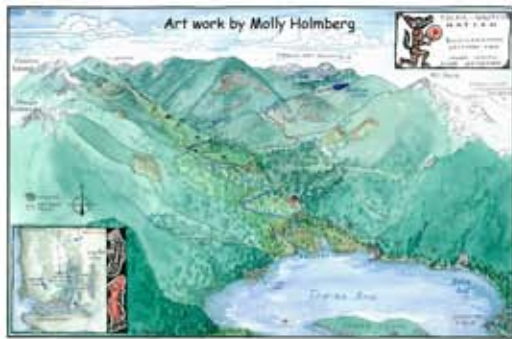
Introduction

Water is a primary force of landscape creation and change within in the Indian Arm region. Upwards of 30 metres of rain can annually fall on the area of Say Nuth Khaw Yum / Indian Arm Provincial Park. As the continental shelf undergoes uplift through tectonic activity, water in the form of rain, creeks, rivers, snow and ice works to wear down the slowly rising mountain peaks. By far the most potent of these forces has been ice in the form of glaciers. Indian Arm itself was created by a massive outflow of ice from the interior to the sea. Since the retreat of the glacier approximately 12,000 years ago ice has worked in a less dramatic way to erode the hard granite of the Coast Mountains. Water freezes in even the tiniest cracks and fissures, exerting tremendous force to separate large and small pieces of rock. Snowslides, moving water, and gravity eventually move this material down into fast flowing streams. As streams enter Indian Arm they deposit this material either into the depths of Indian Arm, or in several cases into unstable flood prone zones called alluvial fans that build up into rare areas of relatively flat waterfront land.

Freshwater Inflow

The total annual freshwater inflow in Indian Arm averages 42 m³/s. Most of this inflow comes from the Buntzen Lake hydroelectric plant (23 m³/s) with the majority of the remainder originating from Indian River (12 m³/s). Less than 15% of the total inflow is from peripheral streams or direct precipitation. Indian Arm is classified as a low runoff inlet. Because the runoff to surface area ratio is small, estuarine circulation is relatively weak.

Indian Arm's freshwater surface layer is 1.5-2.5 m thick, with a strong halocline between 2.5 m and 5 m. Salinity gradually increases at depths below 5 m. Surface salinity varies between 0 - 25 parts per million (‰) depending upon location and time of year, while bottom salinity is approximately 27 ‰. It appears that the thin surface layer acts independently from deeper tidal circulation patterns.



Art work by Molly Holmberg

Legend

- Say Nuth Khaw Yum Park Legal Boundary
- Say Nuth Khaw Yum Park Lands
- Rivers and Streams

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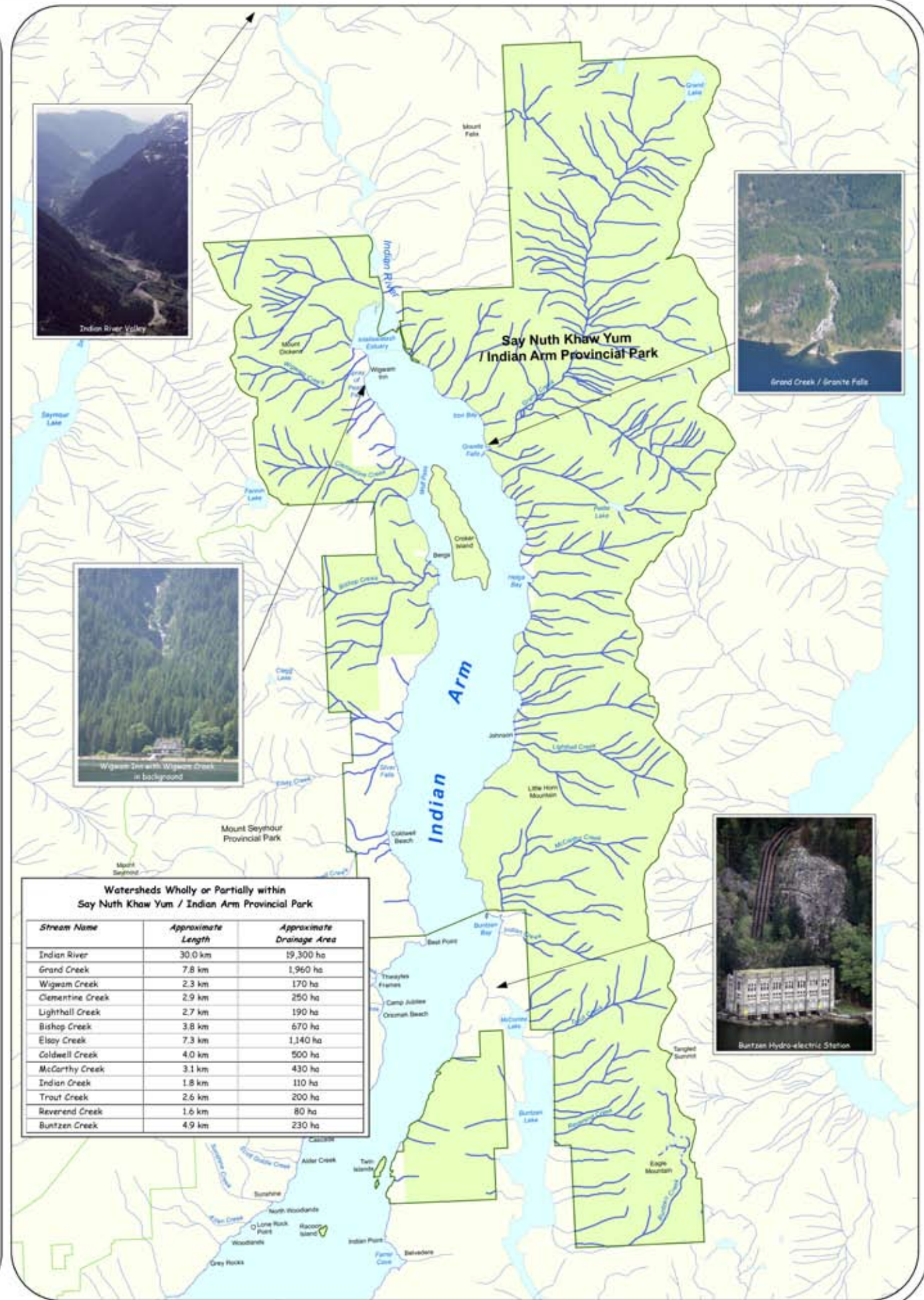
Base data: TRIM, B.C. Ministry of Sustainable Resource Management, 1996. Projection: Albers Equal Area, NAD 83, Zone 10

1 0.5 0 1 Kilometers

Map Scale 1:24,000

Map produced September 2006 and updated August 2008

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Watersheds Wholly or Partially within Say Nuth Khaw Yum / Indian Arm Provincial Park

Stream Name	Approximate Length	Approximate Drainage Area
Indian River	30.0 km	19,300 ha
Grand Creek	7.8 km	1,960 ha
Wigwam Creek	2.3 km	170 ha
Clementine Creek	2.9 km	250 ha
Lighthall Creek	2.7 km	190 ha
Bishop Creek	3.8 km	670 ha
Elsay Creek	7.3 km	1,140 ha
Coldwell Creek	4.0 km	500 ha
McCarthy Creek	3.1 km	430 ha
Indian Creek	1.8 km	110 ha
Trout Creek	2.6 km	200 ha
Reverend Creek	1.6 km	80 ha
Buntzen Creek	4.9 km	230 ha



SAY NUTH KHAW YUM / INDIAN ARM PROVINCIAL PARK BIOREGIONAL ATLAS



Map 7. Biophysical Series: Watershed Units

Introduction

Say Nuth Khaw Yum / Indian Arm Provincial Park is drained by scores of large and small streams. For the purposes of long-term resource stewardship, two levels of management activity are required to be maintained within the Park. First, broad management goals will be developed for the entire Park at a conceptual planning level by this Management Plan. Second, there is a need to implement the broad goals of the Park Management Plan at a more site specific operational level. To aid this process it is proposed to group stream basins in particular geographic sections of the Park into 'watershed units.' These areas form natural 'containers' within which biophysical and cultural information can be most efficiently collected and analyzed, and Park development and maintenance activities organized. The day-to-day focus of these types of management activities will most efficiently be organized within these smaller management units.

It is important to note that all the watershed management units that have been identified include land areas that are outside of the boundaries of Say Nuth Khaw Yum / Indian Arm Provincial Park. On the western side of the Park, the upper limits of many watersheds are within Mount Seymour Provincial Park. While BC Parks will have full jurisdiction over the portions of watershed management units that fall within Say Nuth Khaw Yum / Indian Arm Provincial Park and Mount Seymour Provincial Parks, activities within these units that occur in surrounding jurisdictions will require development of coordinated and collaborative planning regimes.

Eight watershed units have been identified. These management areas include 1) Indian Arm Northwest, 2) Indian Arm Northeast, 3) Indian Arm Southwest, 4) Indian Arm Southeast, 5) Grand Creek, 6) Lower Indian River, 7) Crocker Island, and 8) Raccoon/Twin Islands.

Streamflow Data

A very limited amount of stream flow data has been collected for watershed units within Say Nuth Khaw Yum / Indian Arm Provincial Park. Oddly, the motivation for collecting these data was to assess the capacity of the Indian River to support the profitable construction of a large dam and an associated hydroelectricity generation station. Happily, this particular development proposal, first studied in 1912, never came to fruition. Later interest in stream flow information has been related to activities including salmonid habitat restoration, salmonid hatchery feasibility planning, small-scale hydro generation feasibility assessment, and eco-forestry planning.

Due to the importance of the Indian River as a contributor of fresh water to Indian Arm, and as a pathway for migrating salmonids, it has been proposed that a permanent stream flow recording station be installed somewhere near the northern boundary of the Park. Data from this station would contribute toward the better understanding of freshwater inputs into Indian Arm, and would also allow salmonid management activities to be adjusted as required to support the greatest level of survival of wild pink, coho, and chum stocks.

Legend

- Say Nuth Khaw Yum Park Legal Boundary
- Hydrometric Stations
- Watershed Units**
- Lower Indian River
- Seymour River
- Grand Creek
- Crocker Island
- Indian Northwest
- Indian Arm Northeast
- Indian Arm Southwest
- Indian Arm Southeast
- Raccoon and Twin Islands
- Coquitlam River

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Base data: TRIM, B.C. Ministry of Sustainable Resource Management, 1996. Projection: Albers Equal Area, NAD 83, Zone 10



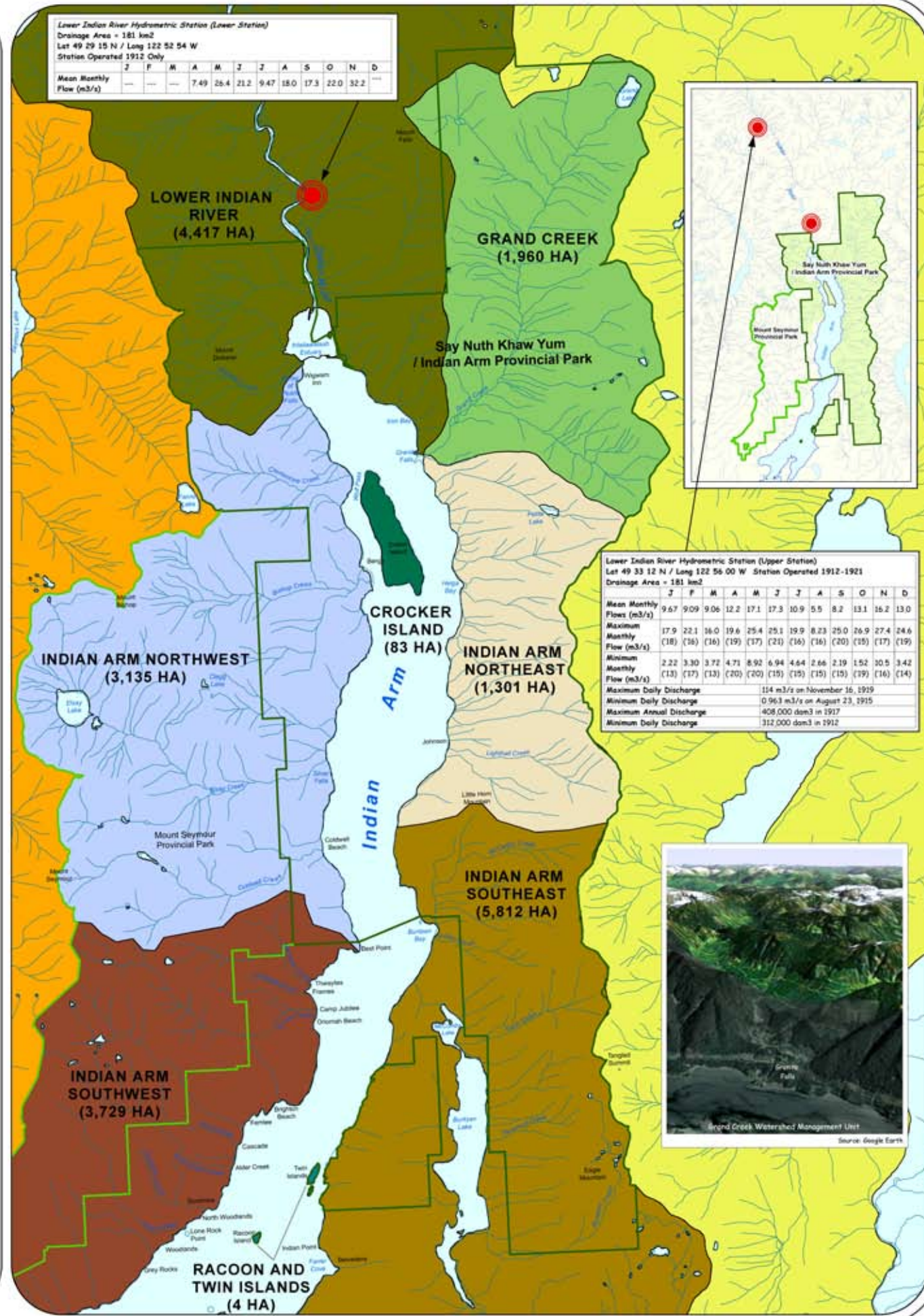
Map Scale 1:24,000
Map produced September 2006 and updated August 2008

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Lower Indian River Hydrometric Station (Lower Station)
Drainage Area = 181 km²
Lat 49 29 15 N / Long 122 52 54 W
Station Operated 1912 Only

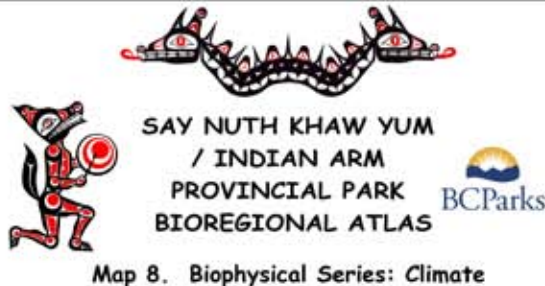
	J	F	M	A	M	J	J	A	S	O	N	D
Mean Monthly Flow (m ³ /s)	---	---	---	7.49	26.4	21.2	9.47	18.0	17.3	22.0	32.2	---



Lower Indian River Hydrometric Station (Upper Station)
Lat 49 33 12 N / Long 122 56 00 W Station Operated 1912-1921
Drainage Area = 181 km²

	J	F	M	A	M	J	J	A	S	O	N	D
Mean Monthly Flows (m ³ /s)	9.67	9.09	9.06	12.2	17.1	17.3	10.9	5.5	8.2	13.1	16.2	13.0
Maximum Monthly Flow (m ³ /s)	(17.9)	(22.1)	(16.0)	(19.6)	(25.4)	(25.1)	(19.9)	(8.23)	(25.0)	(26.9)	(27.4)	(24.6)
Minimum Monthly Flow (m ³ /s)	(13)	(17)	(13)	(20)	(20)	(15)	(15)	(15)	(15)	(19)	(16)	(14)
Maximum Daily Discharge	114 m ³ /s on November 16, 1919											
Minimum Daily Discharge	0.963 m ³ /s on August 23, 1915											
Maximum Annual Discharge	408,000 dam ³ in 1917											
Minimum Daily Discharge	312,000 dam ³ in 1912											





SAY NUTH KHAW YUM / INDIAN ARM PROVINCIAL PARK BCParks

Map 8. Biophysical Series: Climate

Introduction

The climate of Indian Arm and the Indian River Valley is dominated by often heavy precipitation that falls approximately 180 days per year. The rainy season begins in September and runs through May. Although rain falls routinely, it most often is in small amounts. On an average of only 5-6 days per month does rainfall exceed 25 mm. On occasion, upwards of 300 mm of rain can fall in a single day, events that often lead to landslides in areas with steep slopes or where logging activity has occurred. Due to the high level of precipitation, maintenance of forest and other vegetative cover in the Indian Arm and Indian River valley areas is essential to protecting soil stability.

Temperatures are relatively mild in winter, with higher summer temperatures common in the period June thru September. Sea level temperatures in the area generally fluctuate, a mean average of less than 20 degrees centigrade annually. Winds that funnel up Indian Arm from the outer coast, or down Indian Arm from the BC Interior, can cause greater extremes of heat or cold.

Although snow plays less of a role in the climate of the area, snowfall occurs on the average of 10 days per year near sea level, and over 50 days per year at higher elevations. At sea level snowfall is recorded in the months of November, December, January and February. The mean maximum single day snowfall recorded at sea level is in the 10 cm range. On Mount Seymour at nearly 1500 metres, this daily figure can reach more than 25 centimetres. Seymour at nearly 1500 metres this daily figure can reach more than 25 centimetres.

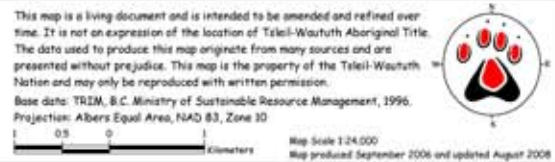
This map contains selected climate data from the five weather stations that have historically been located in the Indian Arm region.

Indian Arm and Vicinity Climate Station Profile Comparisons

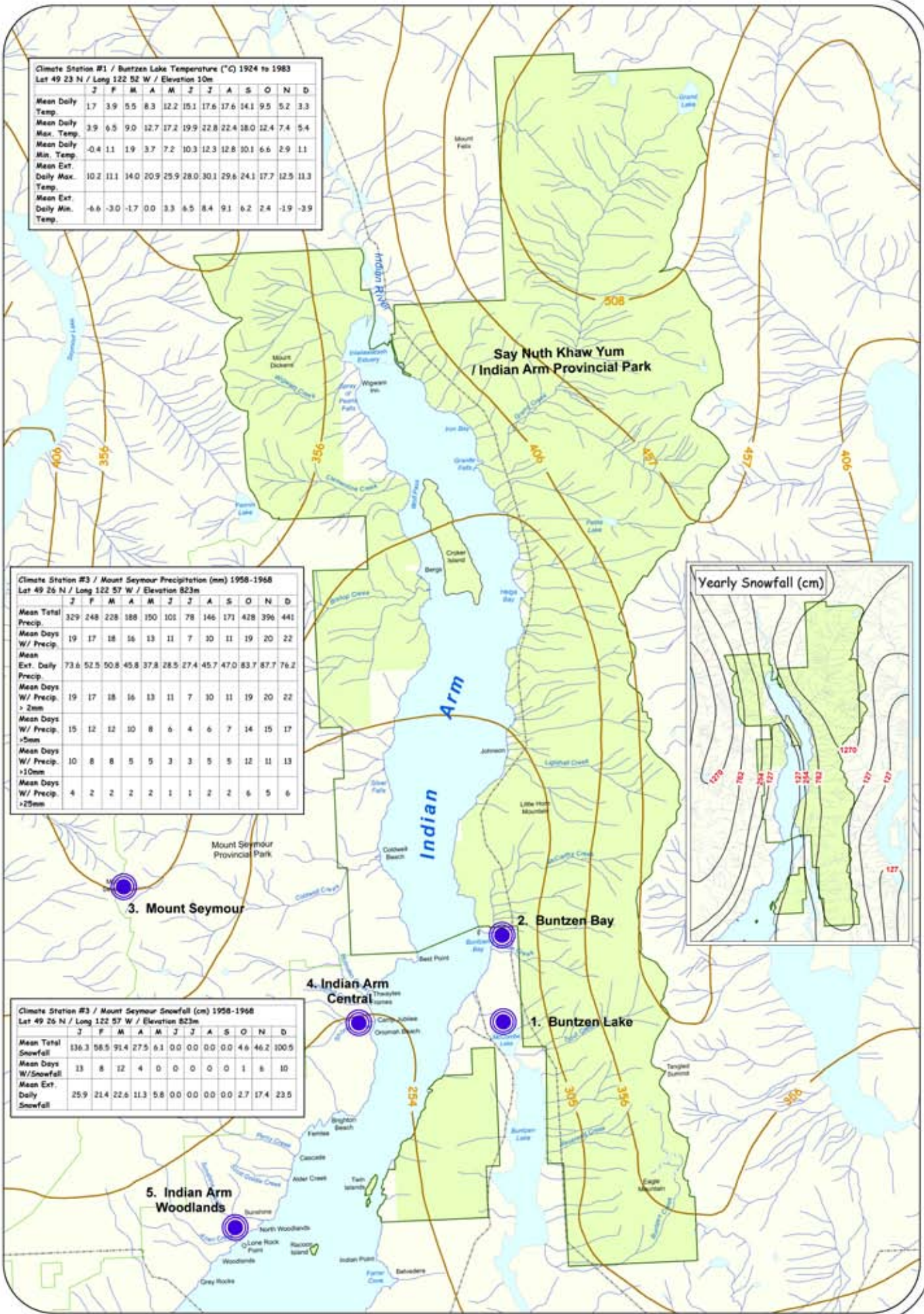
	Station #1 Buntzen Lake	Station #2 Buntzen Bay	Station #3 Mount Seymour	Station #4 Indian Arm Central	Station #5 Indian Arm Woodlands
Mean Daily Temperature	9.5 °C	-----	-----	6.7 °C	-----
Mean Daily Maximum Temperature	13.1 °C	-----	-----	13.8 °C	-----
Mean Daily Minimum Temperature	5.8 °C	-----	-----	6.7 °C	-----
Mean Total Annual Precipitation	2761.3 mm	2969.8 mm	2903.8 mm	2726.4 mm	2200.2 mm
Mean Total Annual Rainfall	2691.4 mm	2882.9 mm	2454.4 mm	2698.3 mm	2141.9 mm
Mean Annual Days With Precipitation	186	163	183	187	181
Mean Annual Days With Snowfall	10	11	53	8	11

Legend

- Say Nuth Khaw Yum Park Legal Boundary
- Say Nuth Khaw Yum Park Lands
- Yearly Precipitation (cm)
- Weather Stations

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 Base data: TRIM, B.C. Ministry of Sustainable Resource Management, 1996.
 Projection: Albers Equal Area, NAD 83, Zone 10


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Climate Station #1 / Buntzen Lake Temperature (°C) 1924 to 1983
 Lat 49 23 N / Long 122 52 W / Elevation 10m

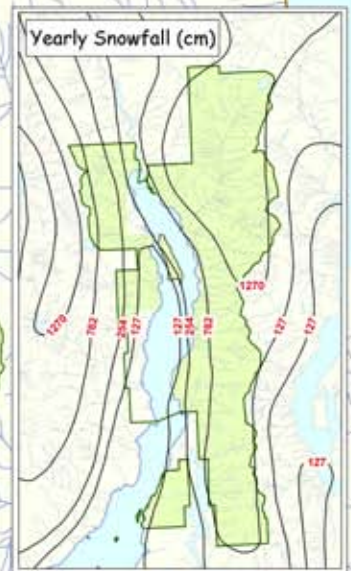
	J	F	M	A	M	J	J	A	S	O	N	D
Mean Daily Temp.	1.7	3.9	5.5	8.3	12.2	15.1	17.6	17.6	14.1	9.5	5.2	3.3
Mean Daily Max. Temp.	3.9	6.5	9.0	12.7	17.2	19.9	22.8	22.4	18.0	12.4	7.4	5.4
Mean Daily Min. Temp.	-0.4	1.1	1.9	3.7	7.2	10.3	12.3	12.8	10.1	6.6	2.9	1.1
Mean Ext. Daily Max. Temp.	10.2	11.1	14.0	20.9	25.9	28.0	30.1	29.6	24.1	17.7	12.5	11.3
Mean Ext. Daily Min. Temp.	-6.6	-3.0	-1.7	0.0	3.3	6.5	8.4	9.1	6.2	2.4	-1.9	-3.9


Climate Station #3 / Mount Seymour Precipitation (mm) 1958-1968
 Lat 49 26 N / Long 122 57 W / Elevation 823m

	J	F	M	A	M	J	J	A	S	O	N	D
Mean Total Precip.	329	248	228	188	150	101	78	146	171	428	396	441
Mean Days W/ Precip.	19	17	18	16	13	11	7	30	11	19	20	22
Mean Ext. Daily Precip.	73.6	52.5	50.8	45.8	37.8	28.5	27.4	45.7	47.0	83.7	87.7	76.2
Mean Days W/ Precip. > 2mm	19	17	18	16	13	11	7	30	11	19	20	22
Mean Days W/ Precip. > 5mm	15	12	12	10	8	6	4	6	7	14	15	17
Mean Days W/ Precip. > 10mm	10	8	8	5	5	3	3	5	5	12	11	13
Mean Days W/ Precip. > 25mm	4	2	2	2	2	1	1	2	2	6	5	6


Climate Station #3 / Mount Seymour Snowfall (cm) 1958-1968
 Lat 49 26 N / Long 122 57 W / Elevation 823m

	J	F	M	A	M	J	J	A	S	O	N	D
Mean Total Snowfall	136.3	58.5	91.4	27.5	6.1	0.0	0.0	0.0	4.6	46.2	100.5	
Mean Days W/ Snowfall	13	8	12	4	0	0	0	0	1	6	10	
Mean Ext. Daily Snowfall	25.9	21.4	22.6	11.3	5.8	0.0	0.0	0.0	2.7	17.4	23.5	





**SAY NUTH KHAW YUM
/ INDIAN ARM
PROVINCIAL PARK
BIOREGIONAL ATLAS**



Map 9. Biophysical Series: Forest Cover

Introduction

Say Nuth Khaw Yum / Indian Arm Provincial Park is blanketed by a forest that is typical of the southern BC coast. The ancient old growth forest that existed prior to the arrival of Euro Canadians is long gone. Giant western redcedar and Douglas fir were cut first, and were utilized for ship spars and milled to make lumber of a quality that cannot be matched today. Later, hemlock and balsam were felled in much larger volumes. From 1960 to the 1980's tens of thousands of these lesser value trees were cut, sorted and sent to either pulpmills or dimensional lumber sawmills.

The result of 230 years of exploitation is a patchwork landscape made up of forests of different age and species composition. The old growth forest that remains exists at higher elevations in areas that could not be accessed by logging roads. Many of these small clusters of remaining ancient trees are now being extracted by helicopter. Trees of over 200 years of age are now growing in parts of the valley that were first harvested in the 1800s. Areas where the youngest forests exist include drainages that were accessed in the several decades before the Park was created. Example areas within this zone include Clementine and Grand Creeks, each of which hosts a mix of thick deciduous and young conifer forests that have naturally re-established on large clear-cuts. The entire Park area remains a rich tree growing ground.

Tree and Shrub Species Native to Say Nuth Khaw Yum / Indian Arm Provincial Park

- | | |
|--|--|
| <ul style="list-style-type: none"> anabilis fir arbutus bigleaf maple bitter cherry black cottonwood Douglas fir mountain hemlock red alder subalpine fir western hemlock western redcedar yellow-cedar | <ul style="list-style-type: none"> <i>Abies amabilis</i> <i>Arbutus menziesii</i> <i>Acer macrophyllum</i> <i>Prunus emarginata</i> <i>Pseudotsuga menziesii</i> <i>Tsuga mertensiana</i> <i>Alnus rubra</i> <i>Abies lasiocarpa</i> <i>Tsuga heterophylla</i> <i>Thuja plicata</i> <i>Chamaecyparis nootkatensis</i> |
| <ul style="list-style-type: none"> alaskan blueberry black huckleberry bog cranberry copperbush dwarf blueberry false azalea kinnikinnik oval-leaved blueberry Pacific rhododendron red huckleberry salal saskatoon western tea-berry western trumpet honeysuckle white-flowered rhododendron white mountain heather | <ul style="list-style-type: none"> <i>Vaccinium alaskaense</i> <i>Vaccinium membranaceum</i> <i>Oxycoccus oxycoccus</i> <i>Cladophamnus pyraliflorus</i> <i>Vaccinium caespitosum</i> <i>Menziesia ferruginea</i> <i>Arctostaphylos uva-ursi</i> <i>Vaccinium ovalifolium</i> <i>Rhododendron macrophyllum</i> <i>Vaccinium parvifolium</i> <i>Gaultheria shallon</i> <i>Amelanchier alnifolia</i> <i>Gaultheria ovatifolia</i> <i>Lonicera ciliosa</i> <i>Rhododendron albiflorum</i> <i>Cassiope mertensiana</i> |
- Source: Pajor and Mackinnon, 1994, 53-96

Legend

Say Nuth Khaw Yum Park Legal Boundary

Forest Cover (Leading Species)

- | | |
|--|--|
| | |
| | |
| | |
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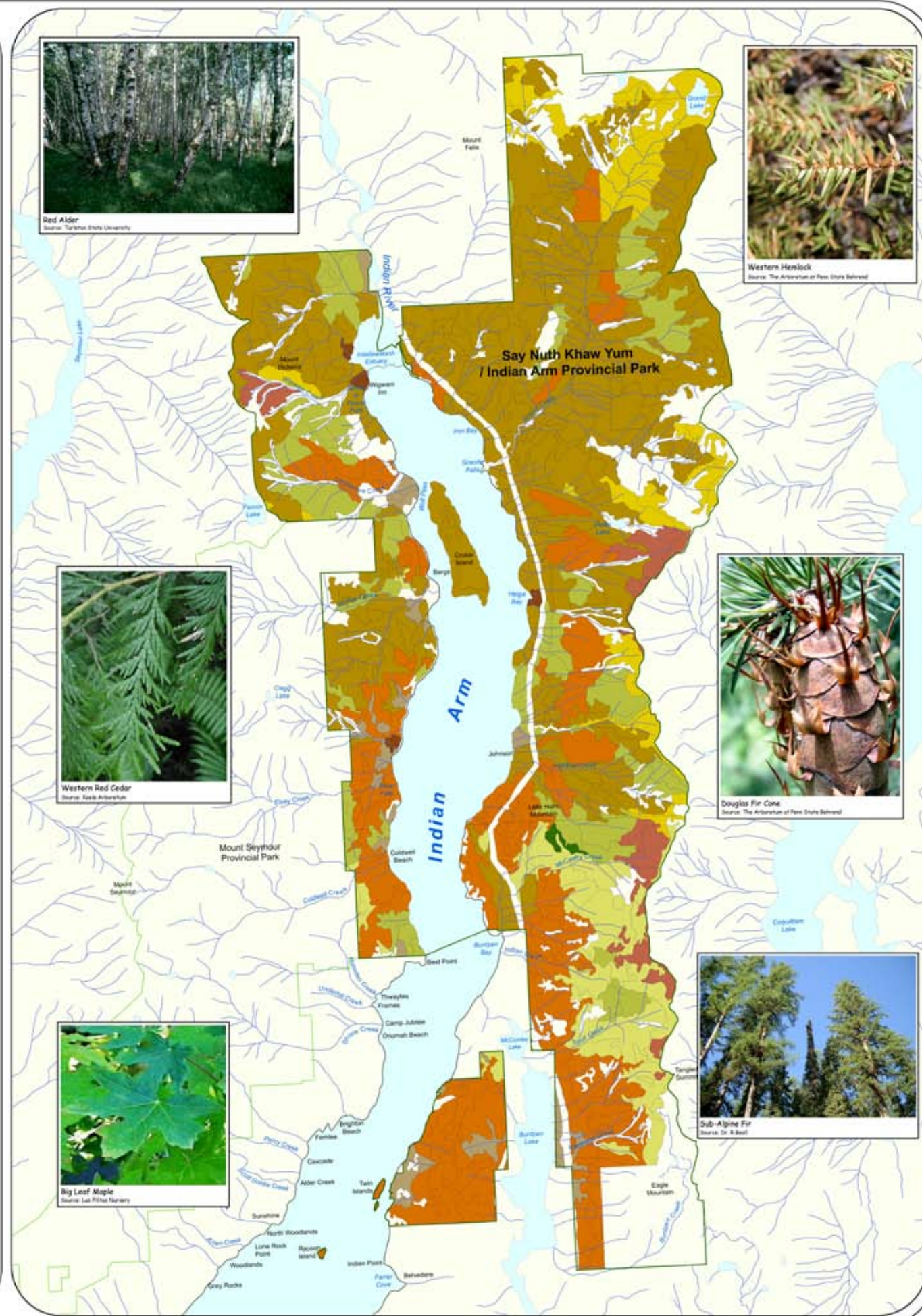
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Projection: Albers Equal Area, NAD 83, Zone 10



Map Scale 1:24,000
Map produced September 2006 and updated August 2008

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Red Alder
Source: Tarleton State University



Western Hemlock
Source: The Arboretum of Park State Behind



Western Red Cedar
Source: Rick Anderson



Douglas Fir Cone
Source: The Arboretum of Park State Behind



Big Leaf Maple
Source: Las Pintas Nursery



Sub-Alpine Fir
Source: Dr. S. Bond

**SAY NUTH KHAW YUM
/ INDIAN ARM
PROVINCIAL PARK
BIOREGIONAL ATLAS**

Map 10. Biophysical Series: Terrestrial Species

Introduction

It is easy to think of Say Nuth Khaw Yum / Indian Arm Park only in terms of its location immediately adjacent to the northern boundary of metropolitan Vancouver. When considering the topic of wildlife management, it is the Park's location on the edge of several very large wilderness areas that is arguably more important. Animal species living within the Park have access to the east and west to Seymour and Coquitlam watersheds. These coastal river basins are maintained in a near wilderness state, and supply potable water to Lower Mainland communities. To the north is a much larger expanse of relative wilderness that is comprised of the Indian and Mamquam River valleys, and Garibaldi Provincial Park. The result of this abundance of habitat is that the movement of wildlife species within and around the Park is only partially constrained by urban development. The opportunity to view terrestrial wildlife in and adjacent to the Park is high, and will likely increase as the economic value of non-consumptive wildlife viewing supersedes benefits derived from hunting.

Several wildlife species are emblematic of the Park. The abundance of these species, which include mountain goat, black bear, black-tailed deer, and beaver, are indicative of the similar abundance of a much wider range of wildlife species. Elk must now also be included on this list. Although elk were hunted to extinction in the Indian Arm Area in the early 1900s, this species has recently been reintroduced back into the Indian River watershed. Animals from quickly growing elk herds in the Sunshine Coast were relocated within Say Nuth Khaw Yum / Indian Arm Provincial Park in January 2006.

Large Animal Species

Carnivore Species

black bear
Canada lynx
Canadian river otter
cougar
coyote
fisher
grizzly bear
martens
mink
red fox
short-tailed weasel
striped skunk
wolf

wolverine

Pinniped Species

harbour seal

Artiodactyl Species

moose
mountain caribou
mountain goat
mule deer

Ursus americanus kermodei
Lynx canadensis
Lutra canadensis
Felis concolor missouliensis
Canis latrans inoulatatus
Martes pennanti columbiana
Ursus arctos horribilis
Martes americana caurina
Mustela vison
Vulpes fulva abietorum
Mustela erminea richardsoni
Mephitis mephitis
Canis lupus fuscus
Canis lupus columbianus
Gulo luscus luscus

Phoca vitulina richardi

Alces alces
Rangifer tarandus montanus
Oreamnos americanus
Odocoileus hemionus hemionus
Odocoileus hemionus sikhensis

Legend

— Say Nuth Khaw Yum Park Legal Boundary

■ Say Nuth Khaw Yum Park Lands

Roosevelt Elk Black Bear Beaver
 Mountain Goat Black-Tailed Deer Cougar

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Base data: TRIM, B.C. Ministry of Sustainable Resource Management, 1996
Projection: Albers Equal Area, NAD 83, Zone 10

1 0.5 0 1 Kilometers

Map Scale 1:24,000

Map produced September 2006 and updated August 2008

This map was produced by the Tsleil-Waututh Nation with the financial support from Fisheries and Oceans Canada and B.C. Parks, and technical assistance from EcoTrust Canada.



Black Bear
Length: 1.4-1.8 m
Shoulder Height: 90-110 cm
Sexual Maturity: 2 to 5 years
Tail Length: 8-18 cm
Number of Young: 1 to 5, usually 2 to 3
Birth Weight: 200-450 g
Fully Grown Weight: 40-270 kg
Lifespan: Up to 30 years, usually 10



Beaver
Length: 90-120 cm
Tail Length: 28-53 cm
Sexual Maturity: @2 years
Number of Young: usually 4
Birth Weight: 340-650 g
Fully Grown Weight: 16-30 kg
Lifespan: 10-20 years



Cougar
Length: 1.5-2.75 m
Shoulder Height: 56-78 cm
Tail Length: 53-92 cm
Sexual Maturity: @2.5 years
Number of Young: 1 to 6 every other year
Birth Weight: 400 g
Fully Grown Weight: 34-125 kg
Lifespan: 12-13 years

Small Animal Species

Insectivores Species

cinereus shrew
little brown myotis
navigator shrew
wandering shrew
yuma myotis

Lagomorph Species

varying hare

Rodent Species

American beaver
American porcupine
boreal redback vole

flying squirrel

long-tailed vole

marmot

meadow jumping mouse

muskrat

northern bog lemming

northwestern chipmunk

red squirrel

white-footed mouse

western jumping mouse



Red squirrel

Little brown Myotis

Sorex cinereus

Myotis lucifugus alascensis
Sorex palustris navigator
Sorex vagrans longicauda
Myotis yumanensis saturatus

Lepus americanus

Caster canadensis belgae
Erethizon dorsatum
Clethrionomys gapperi caurinus
Clethrionomys gapperi saturatus
Glaucomys sabrinus zaphaeus
Microtus longicaudus littoralis
Marmota flaviventris
Zapus hudsonius hudsonius
Ondatra zibethica asoyosensis
Synaptomys borealis wrangeli
Synaptomys borealis dali
Eutamias amoenus
Tamiasciurus hudsonicus picatus
Peromyscus maniculatus
Zapus princeps saltator



Mountain Goat
Length: 1.2-1.5 m
Shoulder Height: 90-120 cm
Tail Length: 9-14 cm
Sexual Maturity: @2.5 years
Number of Young: 1 (75% of time), sometimes 2
Birth Weight: 3-4 kg
Fully Grown Weight: 45-135 kg
Lifespan: Up to 18 years



Black-tailed Deer
Length: 1.4-1.7 m
Shoulder Height: 90-105 cm
Tail Length: 12-22 cm
Sexual Maturity: @ 1.5 years
Number of Young: 1 to 3, usually 2
Birth Weight: 3.5-3.9 kg
Fully Grown Weight: 30-210 kg
Lifespan: 10 years



Elk
Length: 2-2.5 m
Shoulder Height: 1.2-1.5 m
Tail Length: 12-18 cm
Sexual Maturity: @2 years
Number of Young: 1
Birth Weight: @15 kg
Fully Grown Weight: 180-500 kg
Lifespan: 15-20 years



Elk herd being barged up Indian Arm for release on January 6, 2006



**SAY NUTH KHAW YUM
/ INDIAN ARM
PROVINCIAL PARK**
BIOREGIONAL ATLAS

Map 11. Biophysical Series: Bird Species

Introduction

A great variety of bird species live in, breed in, or transit through, Say Nuth Khaw Yum / Indian Arm Provincial Park. Due to the diligence of members of the Vancouver Natural History Society, as well as research undertaken by organizations including the Burrard Inlet Environmental Action Program, a relatively good idea of avifauna found in the Park exists. The following summaries provide a brief description of the bird species that utilize Indian Arm and surrounding areas in different seasons of each year.

Summer Species (May through July): The breeding birds associated with Indian Arm utilize the cliffs, marshlands, creeks, lakes and forests surrounding the fjord for nesting sites. The marsh areas in the Indian River estuary provide suitable habitat for mallard, godwall, bufflehead, hooded merganser, Canada goose, green heron, song and Virginia rails, spotted sandpipers and killdeer. The range of species found feeding in the estuary waters and nesting upriver or by one of the mountain lakes are many and varied. They include common mergansers, Harlequin ducks, common loons, belted kingfishers, great blue herons and American dipper. Non-breeding horned grebe, surf scoter, common and Barrow's goldeneye also spend summers in the estuary.

Pelagic cormorants and glaucous-winged gulls feed around the arm while nesting on the cliffs at the south end of Croker Island. Also utilizing the cliffs for nesting are about ten pairs of pigeon guillemot, a species which may also nest in some of the other cliff and rock boulder beach areas. At least one pair of peregrine falcons may nest on the cliff sites, with a pair of osprey utilizing the surrounding lakes. Bald eagles, red-tailed hawk, Cooper's hawk and merlin nest in the forest around Indian Arm. Creek outwash fans provide habitat for spotted sandpipers, mallard, godwall, Canada goose, hooded and common mergansers. A small number of marbled murrelets feed on the open waters of the Arm and fly to their nesting sites in the remaining old growth forests (Vancouver Natural History Society 1995).

Fall Migration (August through October): The Indian Arm-Indian River valley provides a corridor from the lower mainland through the mountains north to Squamish for migratory birds. More than 45 species of birds pass through this region during their fall migration.

Wintering Species (November through February): The Indian River estuary is a winter home for horned, red-necked and western grebe, red-throated and common loons, double-crested and pelagic cormorants, mallard, godwall, green-winged teal, surf scoter, greater scaup, common and Barrow's goldeneye, bufflehead, common mergansers, great blue heron, belted kingfisher, dipper, mew and glaucous-winged gulls. Major species in Indian Arm include Barrow's goldeneye (approximately 2200), surf scoter (approx. 1100), western grebe (approx. 550), and glaucous-winged gulls (approx. 1000). The greatest diversity of species is found at the south end of Indian Arm in bays, or in the open waters over the shallow sill where birds dive for food.

Spring Migration (March through May): In the spring, the numbers of scoter, goldeneye, scaup, grebes and loons increase until they migrate northwards. Most migration is over by the end of May, once the shorebirds have passed northwards.

Source: Lerch and Symington: 2000; Vancouver Natural History Society 1995.



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Base data: TREM, B.C. Ministry of Sustainable Resource Management, 1996.
Projection: Albers Equal Area, NAD 83, Zone 30
Map Scale 1:24,000
Map produced September 2006 and updated August 2008

This map was produced by the Tsleil-Waututh Nation with the financial support from Fisheries and Oceans Canada and B.C. Parks, and technical assistance from Ecotrust Canada.



Seabirds Indigenous to Say Nuth Khaw Yum / Indian Arm Provincial Park

Birds of Prey

bald eagle	<i>Haliaeetus leucocephalus</i>
osprey	<i>Pandion haliaetus</i>
red-tailed hawk	<i>Buteo jamaicensis</i>
turkey vulture	<i>Cathartes aura</i>
peregrine falcon	<i>Accipiter cooperii</i>

Cormorants
Brandt's cormorant *Phalacrocorax penicillatus*
Double-crested cormorant *Phalacrocorax auritus*
pelagic cormorant *Phalacrocorax pelagicus*

Ducks - Dabblers

American wigeon	<i>Anas americana</i>
Eurasian wigeon	<i>Anas penelope</i>
Godwall	<i>Anas strepera</i>
green-winged teal	<i>Anas crecca</i>
mallard	<i>Anas platyrhynchos</i>
northern pintail	<i>Anas acuta</i>
northern shoveler	<i>Anas clypeata</i>

Ducks - Divers

Barrow's goldeneye	<i>Bucephala islandica</i>
black scoter	<i>Melanitta nigra</i>
bufflehead	<i>Bucephala albeola</i>
canvasback	<i>Aythya valisineria</i>
common goldeneye	<i>Bucephala clangula</i>
common merganser	<i>Mergus merganser</i>
greater scaup	<i>Aythya marila</i>
harlequin duck	<i>Histrionyx histronicus</i>
hooded merganser	<i>Lophodytes cucullatus</i>
lesser scaup	<i>Aythya affinis</i>
oldsquaw	<i>Clangula hyemalis</i>
red-breasted merganser	<i>Mergus serrator</i>
ring-necked duck	<i>Aythya collaris</i>
surf scoter	<i>Melanitta perspicillata</i>
white-winged scoter	<i>Melanitta fusca</i>

Geese and Swans

Canada goose	<i>Branta canadensis</i>
mute swan	<i>Cygnus olor</i>
trumpeter swan	<i>Cygnus buccinator</i>

Grebes and Loons

common loon	<i>Gavia immer</i>
horned grebe	<i>Podiceps nigricollis</i>
Pacific loon	<i>Gavia pacifica</i>
pie-billed loon	<i>Podilymbus podiceps</i>
red-necked grebe	<i>Podiceps grisegena</i>
red-throated loon	<i>Gavia stellata</i>
western grebe	<i>Aechmophorus occidentalis</i>

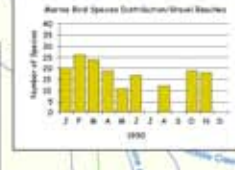
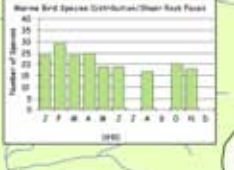
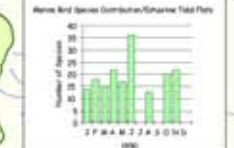
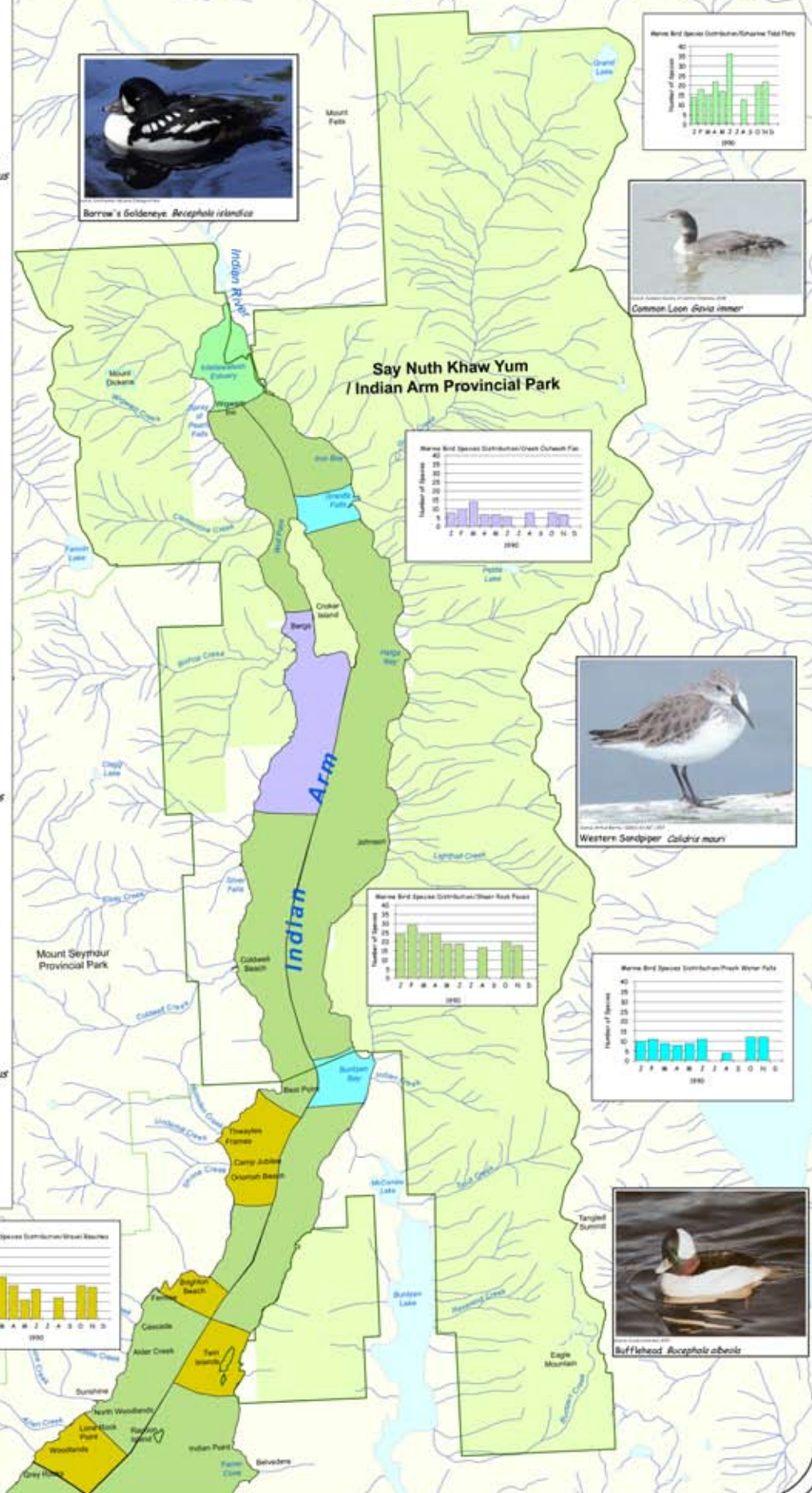
Gulls

Bonaparte's gull	<i>Larus philadelphia</i>
California gull	<i>Larus californicus</i>
glaucous-winged gull	<i>Larus glaucescens</i>
herring gull	<i>Larus argentatus</i>
mew gull	<i>Larus canus</i>
ring-billed gull	<i>Larus delawarensis</i>
Thayer's gull	<i>Larus thayeri</i>
Western gull	<i>Larus occidentalis</i>

Shore and Seabirds

black oystercatcher	<i>Haematopus bachmani</i>
black turnstone	<i>Arenaria melanocephala</i>
common tern	<i>Sterna fuscata</i>
dunlin	<i>Calidris alpina</i>
greater yellowlegs	<i>Tringa melanoleuca</i>
killdeer	<i>Charadrius vociferus</i>
marbled murrelet	<i>Brachyramphus marmoratus</i>
pigeon guillemot	<i>Cephus columba</i>
red-necked phalarope	<i>Phalaropus lobatus</i>
surfbird	<i>Aphriza virgata</i>
western sandpiper	<i>Calidris mauri</i>
green heron	<i>Butorides striatus</i>
great blue heron	<i>Ardea herodias</i>

(Source: Watts and Breault, 1996, 58; Campbell et al., 1990, 404-439)





**SAY NUTH KHAW YUM
/ INDIAN ARM
PROVINCIAL PARK
BIOREGIONAL ATLAS**



Map 12. Red & Blue Listed Species

Introduction and Acknowledgements

Say Nuth Khaw Yum / Indian Arm Provincial Park contains a rich and wide diversity of wildlife, marine life and plant species. However, some of these species are being threatened due to human impacts and loss of habitat. Without a concerted effort to conserve and protect the natural resources in the Park, some of these species will become extinct.

In BC, species and natural plant communities are assigned to one of three lists, based on their assessed degree of conservation risk. The biological groups assessed provincially include mammals, birds, amphibians, reptiles, freshwater fish, freshwater molluscs, butterflies, dragonflies, vascular plants and mosses. The data is updated each year by the Conservation Data Centre (CDC) of the Ministry of Environment.

Red-listed species are considered Extirpated, Endangered or Threatened. Extirpated meaning the species is no longer found in the province or country but still exists elsewhere in the world. The Red list includes species that have been legally designated as Endangered or Threatened under the *Wildlife Act*. If factors causing the decline in the species are not reversed, it is likely the Red-listed species will become extinct or extirpated.

Blue-listed species are considered Vulnerable. They are not considered immediately threatened but they are of concern because they may have characteristics that make them particularly sensitive to human activities or natural events. These characteristics may include low reproduction rates, and high sensitivity to habitat changes.

Yellow-listed species are considered secure, and may include uncommon, common, declining and increasing species, and all those that are not included in the Red or Blue lists.

Say Nuth Khaw Yum / Indian Arm Provincial Park, considered part of the Chilliwack Forest District has 4 species that are Red-listed: the White and Green Sturgeon, Marbled Murrelet and Peregrine Falcon (*anatum* subspecies). There are 8 species on the Blue list: Cutthroat Trout, Dolly Varden, Double-crested Cormorant, Great Blue Heron, Green Heron, Peregrine Falcon (*pealei* subspecies), Grizzly Bear & Wolverine.

Information for this map was gathered from the Ministry of Environment

Ecosystems Branch, BC Species and Ecosystem Explorer and Environment Canada Species at Risk Database.

Chart of Red and Blue Listed Species for Say Nuth Khaw Yum / Indian Arm Provincial Park

Scientific Name	English Name	BC Status	Kingdom
<i>Acipenser transmontanus</i> pop. #	White Sturgeon (Lower Fraser River populations)	Red	Fish
<i>Acipenser medirostris</i>	Green Sturgeon	Red	Fish
<i>Oncorhynchus clarkii clarkii</i>	Cutthroat Trout, <i>clarkii</i> subspecies	Blue	Fish
<i>Salvelinus malma</i>	Dolly Varden	Blue	Fish
<i>Brachyramphus marmoratus</i>	Marbled Murrelet	Red	Bird
<i>Falco peregrinus anatum</i>	Peregrine Falcon, <i>anatum</i> subspecies	Red	Bird
<i>Falco peregrinus pealei</i>	Peregrine Falcon, <i>pealei</i> subspecies	Blue	Bird
<i>Phalacrocorax auritus</i>	Double-crested Cormorant	Blue	Bird
<i>Ardea herodias fannini</i>	Great Blue Heron, <i>fannini</i> subspecies	Blue	Bird
<i>Butorides virescens</i>	Green Heron	Blue	Bird
<i>Ursus arctos</i>	Grizzly Bear	Blue	Mammal
<i>Gulo gulo luscus</i>	Wolverine, <i>luscus</i> subspecies	Blue	Mammal

Legend

- Say Nuth Khaw Yum Park Legal Boundary
- Say Nuth Khaw Yum Park Lands

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Base data: TRIM, B.C. Ministry of Sustainable Resource Management, 1996. Projection: Albers Equal Area, NAD 83, Zone 10

Scale: 0 0.5 1 Kilometers
Map Scale 1:24,000
Map produced September 2006 and updated August 2008

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Peregrine Falcon
Fastest animal in the world at 300 km/h, may live to 20 years
Habitat: coastal estuaries, large cliffs beside major rivers and wetlands in the interior and beside the ocean, nests in cliff ledges on steep cliffs
Threats: pesticides, specifically DDT, loss of habitat for food supply of colonial seabirds, introduction of alien predators



Grizzly Bear and cub
Habitat: open prairie, brushlands, riparian woodlands, and semidesert scrub
Threats: human-caused mortality and loss of effective habitat



Green Heron
80% of BC's coastal subspecies lives in the Georgia Basin
Habitat: deciduous trees, but can also be found in oak forest and mixed woodlands
Threats: very sensitive to environmental contamination and this can lead to breeding failure, human activity causes the birds leave their nests, making the young vulnerable to predators



Double-crested Cormorant
Habitat: protected offshore rocks and islands
Threats: impacts to aquaculture, sport and commercial fisheries, natural habitats, bioaccumulated toxins in fish and other avian species



Cutthroat Trout
Habitat: estuaries with good forest canopy cover. In-stream woody debris provide valuable habitat
Threats: poor ocean conditions and habitat-related problems due to land development pressures



Dolly Varden
Habitat: rivers and streams
Threats: vulnerable to overharvest, vulnerable to shrub and tree-cutting which increases sedimentation, reduces cover and raises water temperature



White Sturgeon
Green Sturgeon
Largest freshwater fish species in Canada, live to more than 100 years
Habitat: large pools in main channel of rivers, side channels and sloughs, estuaries and bays, return to freshwater to spawn
Threats: change in spawning grounds, over-fishing, hydro-electric dams, water diversions, introduced species, reduced water quality and loss of habitat due to various land-use practices



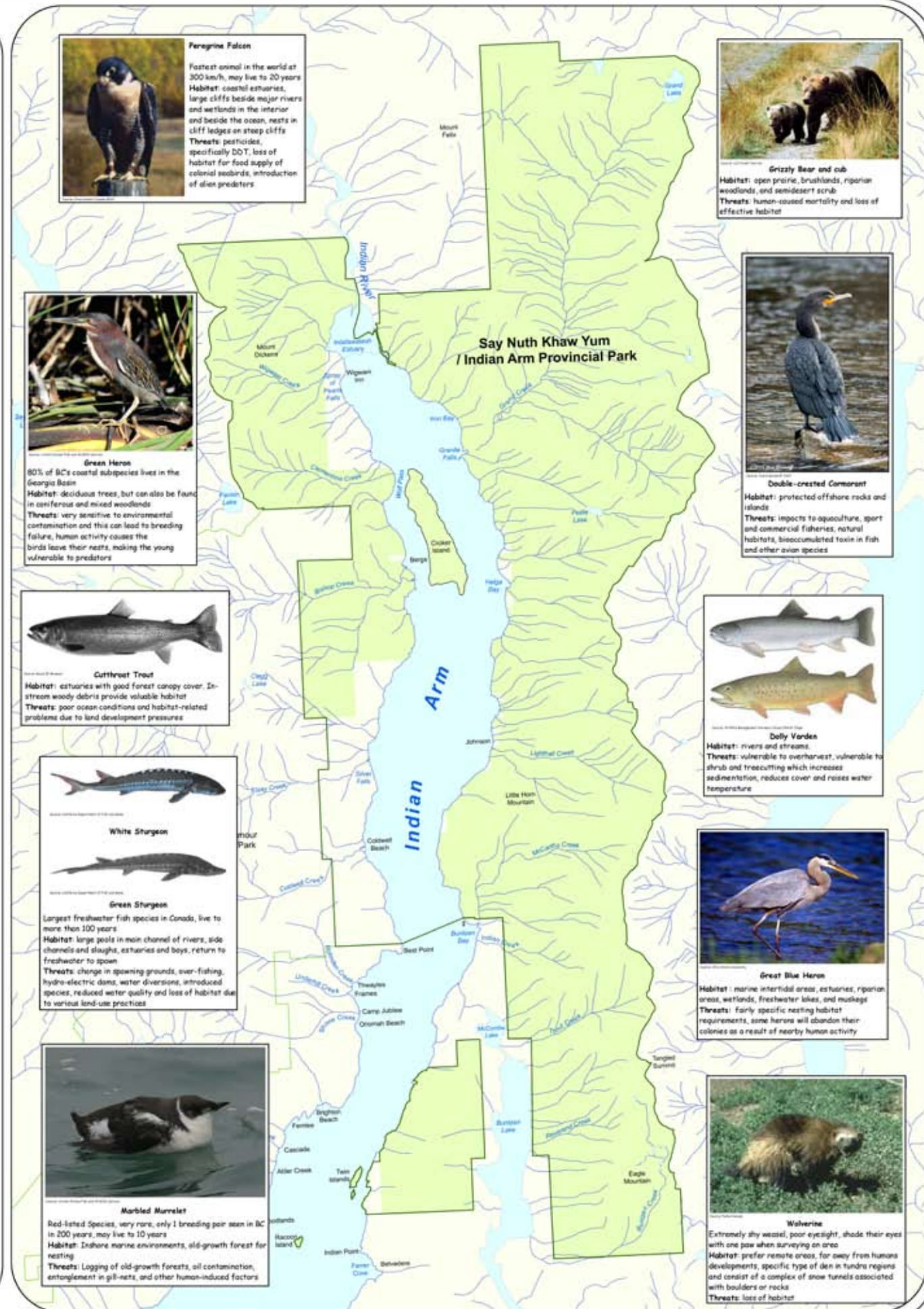
Great Blue Heron
Habitat: marine intertidal areas, estuaries, riparian areas, wetlands, freshwater lakes, and muskegs
Threats: fairly specific nesting habitat requirements, some herons will abandon their colonies as a result of nearby human activity



Marbled Murrelet
Red-listed Species, very rare, only 1 breeding pair seen in BC in 200 years, may live to 10 years
Habitat: Inshore marine environments, old-growth forest for nesting
Threats: Logging of old-growth forests, oil contamination, entanglement in gill-nets, and other human-induced factors



Wolverine
Extremely shy weasel, poor eyesight, shade their eyes with one paw when surveying an area
Habitat: prefer remote areas, far away from humans developments, specific type of den in tundra regions and consist of a complex of snow tunnels associated with boulders or rocks
Threats: loss of habitat



SAY NUTH KHAW YUM / INDIAN ARM PROVINCIAL PARK BIOREGIONAL ATLAS

Map 13. Biophysical Series: Intertidal and Subtidal Zone Habitat and Species

Introduction

The intertidal zone is the shoreline area that is either regularly or infrequently exposed by the cycling of tides. The intertidal zone is arguably the most rich, and sensitive, ecosystem within the borders of Say Nuth Khaw Yum / Indian Arm Provincial Park. Organisms that live within this remarkable environment must be able to tolerate a wide variety of conditions, including being wet or dry, being able to survive extreme wave action, being exposed to extremes of heat and cold, being accessible to marine and terrestrial predators, and having to adapt to rock, sand, mud, or cobble substrates.

The intertidal realm is often broken up into subcategories defined by elevation above the low tide mark. The 'spray' or 'splash' zone is the highest part of wetted shore that is never fully covered by the sea. The 'upper intertidal zone' is only covered by higher tides that occur seasonally. Organisms in this zone must be able to withstand long periods of exposure to the open air. The 'middle intertidal zone' is covered half of any day by saltwater. Animals in this zone must be equally adapted to survival in saltwater and dry conditions. The 'lower intertidal zone' is exposed to open air only at seasonal low tides.

The subtidal zone is a realm that remains covered by the sea at all times, but that is influenced by light that regularly filters down to influence the habitat and life of marine plant and animals.

Belcarra Regional Park Intertidal and Subtidal Inventory

In December 1985, the Metro Vancouver, together with Douglas College and Employment and Immigration Canada, undertook an intertidal and subtidal biophysical inventory of Belcarra Regional Park. This protected area is located immediately south of Say Nuth Khaw Yum / Indian Arm Provincial Park, and can be assumed to host a similar range of resident marine species. The inventory of benthic flora and fauna identified within Belcarra Regional Park is summarized in the following table:

Belcarra Regional Park Intertidal and Subtidal Survey (1985)		
Depth	Total Invertebrate Species	Total Algal Species
Intertidal-0 to +6m	8	6
0 to -6m	54	25
-6m to -12m	51	27
-12m to -18m	49	18

Text boxes on the adjacent map image represent groupings of subtidal and intertidal species found in Indian Arm.

Legend

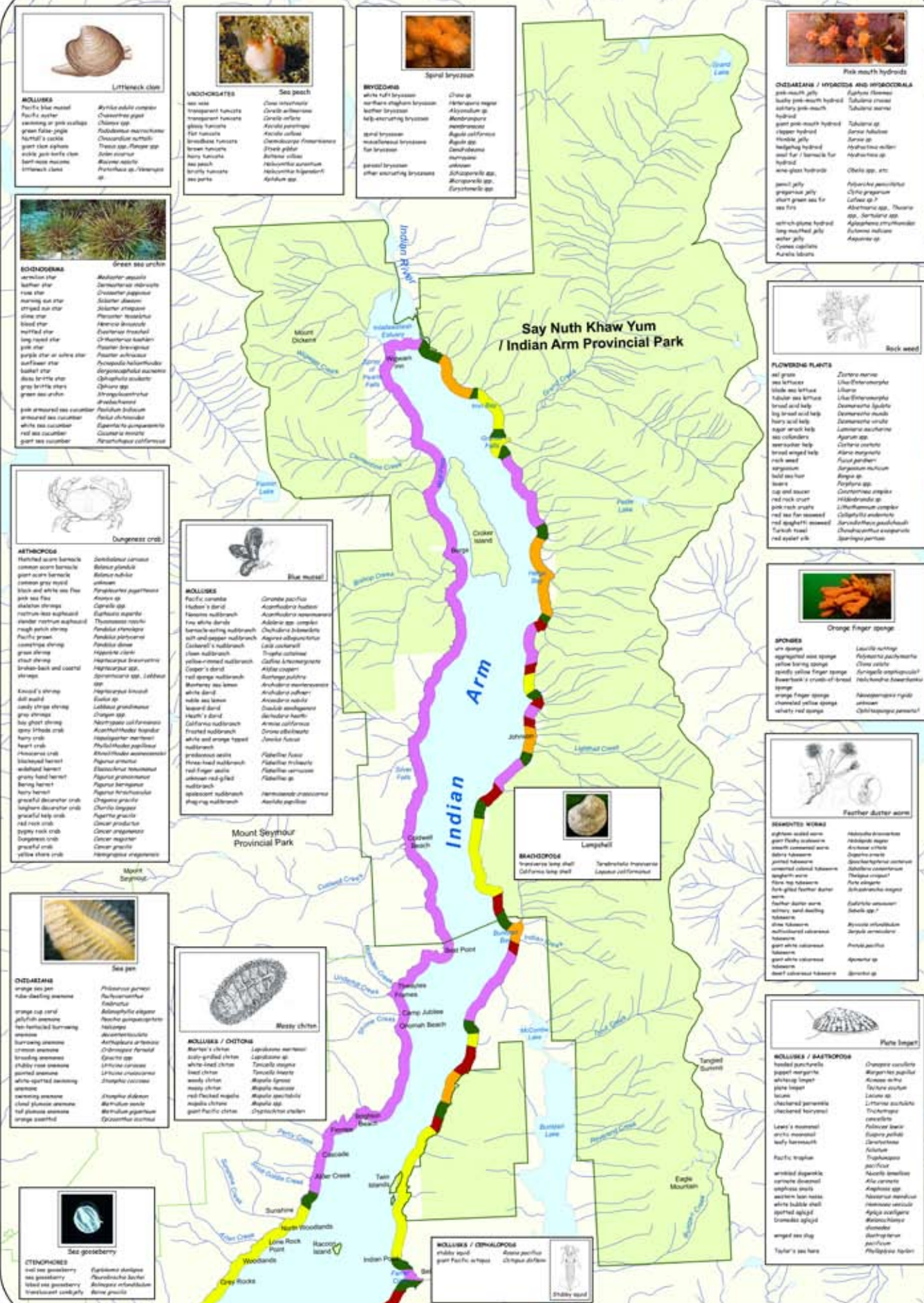
- Say Nuth Khaw Yum Park Legal Boundary
- Say Nuth Khaw Yum Park Lands
- Intertidal and Subtidal Biota Zones
- Barnacles
- Fucus
- Mussels
- Green Algae
- Red Algae

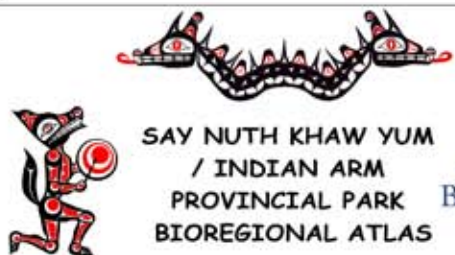
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Base data: TRIM, B.C. Ministry of Sustainable Resource Management, 1996. Projection: Albers Equal Area, NAD 83, Zone 30

Map Scale 1:24,000
Map produced September 2006 and updated August 2008

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SAY NUTH KHAW YUM / INDIAN ARM PROVINCIAL PARK BIOREGIONAL ATLAS

Map 15. Biophysical Series: Fresh Water Species

Introduction

The Indian River is a 36-kilometre long flow of water that rises at an elevation of 720 metres and flows generally in a southeasterly direction to an outlet at the head of Indian Arm. It is the largest watershed that drains into Indian Arm, and provides by far the greatest area of habitat for freshwater and anadromous fish species. The final two kilometers of the Indian River flow through the most northerly portion of Say Nuth Khaw Yum / Indian Arm Provincial Park.

The Indian River system supports spawning populations of five Pacific salmon species: pink (*Oncorhynchus gorbuscha*), chum (*O. keta*), coho (*O. kisutch*), and chinook (*O. tshawytscha*). Spawning escapements are dominated by chum and pink salmon. Pink salmon spawn almost exclusively in the main stem of the lower 6 kilometres of the Indian River. Chum salmon make extensive use of sloughs, side channels, and tributaries over a larger 9 kilometre section of the lower Indian River.

Very small populations of chinook salmon have been observed in the river since 1977, and may well be the result of transplants made by Fisheries and Oceans Canada staff in 1966 and 1981. Similarly a very small sockeye run in the Indian River may be the result of strays from the adjacent Fraser River system. Habitat restoration efforts undertaken by the Tsleil-Waututh First Nation, Fisheries and Oceans Canada, BC Hydro and other agencies have focused on improvement of coho habitat in natural and constructed side channels on the lower portion of the River. The results of this work have been encouraging.

Indian River Salmonid Spawning Escapements

Escapement records have been maintained for the period 1934 to 1958, 1960 to 1985, and 1999 to the present. Indian River salmonid stocks generally declined over the years, but have recently shown evidence of recovery. Until the 1950s, over 100,000 salmon spawned annually in the Indian River during the dominant odd-year pink salmon runs. During this period, annual escapements averaged 85,000 odd-year pink salmon, 17,600 chum, 1,500 coho, and 100 winter- and summer-run steelhead. Pink, chum and coho escapements began to decline in the 1960s. For the period between 1971 to 1985, mean annual escapements dropped to approximately 26,300 pinks, 490 coho, and 19,000 chum. However, chum and pink numbers have since recovered dramatically. For example a record return of 258,328 chum salmon was recorded in 2005.

The general decline of Indian River salmonid stocks is partly due to intensive local and off-shore fisheries, as well as presumed increases in poaching during the spawning season. Degradation of the Indian River watershed from extensive logging during the 1970s, and clearing of a BC Hydro right-of-way in 1968 and its subsequent maintenance, are also probable causes of escapement declines. Wild pink and chum salmon populations have rebounded nicely in the last 20 years, a period that coincides with a near total decline in industrial logging activities within the Indian River system.

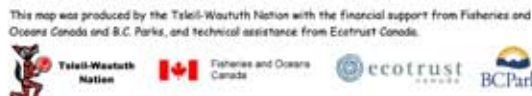
Legend

-  Say Nuth Khaw Yum Park Legal Boundary
-  Say Nuth Khaw Yum Park Lands
-  Major Salmon Spawning Ground
-  Salmon Bearing System
-  Salmon Spawning Location

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Base data: TRIM, B.C. Ministry of Sustainable Resource Management, 1996. Projection: Albers Equal Area, NAD 83, Zone 30

Map Scale: 1:24,000
Map produced September 2006 and updated August 2008



- Indian River Salmonid Enhancement Activity**
- 1961 Pink salmon eggs transplanted to Quilicum and Robertson Creeks.
 - 1965 Pink salmon eggs transplanted to Quilicum and Robertson Creeks.
 - 1966 Chinook salmon eggs unsuccessfully transplanted from Quilicum River.
 - 1972 Groundwater sources investigated and found not suitable for hatchery needs.
 - 1973 Pink salmon eggs transplanted to Mamquam River.
 - 1979 Pilot chinook and coho salmon hatchery operated 6.0 kilometres from mouth of river.
 - 1985 Pink salmon eggs taken to Robertson Creek.
 - 1987 Fish weir spawning-channel constructed to support pink salmon.
 - 1987 Weldwood spawning-channel constructed to support chum and coho salmon.
 - 1988 Brandt Creek spawning-channel constructed to support chum and coho salmon.
 - 1988 Hixon Creek spawning-channel constructed to support chum and coho salmon.
 - 2000 Conversion of big leaf maple/alder forest areas to western redcedar.
 - 2001 Placement of willow wands immediately upriver from Twin Bridges.
 - 2003 Reconstruction of Forestry Creek side channel.

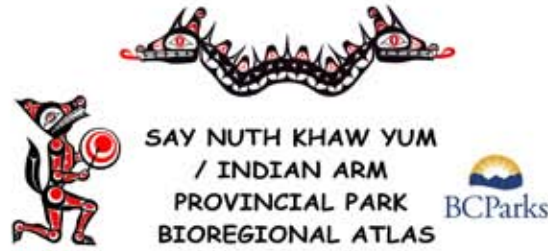


Salmonid Species	Maximum Escapement / Yr.	Minimum Escapement / Yr.	Run Timing (1965-1985 Only)
Sockeye	75 / 1975	0 / 1953-68, 1976, 1982	Start / Aug. 15 Peak / 15 Sept. End / 15 Oct.-15 Nov.
Coho	3500 / 1955, 1961, 1964	200 / 1975, 1976	Start / 15 July-15 Sept. Peak / 15 Sept.-15 Nov. End / 15 Oct.-
Pink	200,000 / 1963	0 / Even Years	Start / 15 July-15 Sept. Peak / 15 Sept. End / 15 Oct.
Chum	250,000 / 2004	3500 / 1953, 1956	Start / 15 Sept.-15 Oct. Peak / 15 Oct.-15 Nov. End / 15 Nov.-15 Dec.
Chinook	200 / 1985	0 / 1953-75	Start / 1 Sept.-15 Sept. Peak / 30 Sept.-30 Oct. End / 15 Oct.-1 Dec.
Steelhead	400 / 1953-57, 1959-60, 1962-63, 1965, 1968	0 / 1985	No Information.



- Fresh Water Fish Species Resident Within Say Nuth Khaw Yum / Indian Arm Provincial Park**
- Anadromous Fish Species**
- chinook salmon *Oncorhynchus tshawytscha*
 - chum salmon *Oncorhynchus keta*
 - coastal cutthroat trout *Salmo clarki clarki*
 - coho salmon *Oncorhynchus kisutch*
 - Dolly Varden trout *Salvelinus malma (marine)*
 - green sturgeon *Acipenser medirostris*
 - longfin smelt *Spirinchus thalichthys*
 - pink salmon *Oncorhynchus gorbuscha*
 - river lamprey *Lamprocyba clypeata*
 - steelhead trout *Salmo gairdneri (freshwater)*
 - white sturgeon *Acipenser transmontanus*
- Affluvial Fish Species**
- Dolly Varden trout *Salvelinus malma (freshwater)*
 - largescale sucker *Catostomus macrocheilus*
 - longnose sucker *Catostomus commersoni*
 - rainbow trout *Salmo gairdneri (freshwater)*
 - white sucker *Catostomus commersoni*
- Fluvial-Lacustrine Fish Species**
- western brook lamprey *Lampetra richardsoni*
 - longnose dace *Rhinichthys cataractae*
 - redside shiner *Richardsonius balteatus*
 - threespine stickleback *Gasterosteus aculeatus*
 - coastrange sculpin *Cottus aleuticus*
 - prickly sculpin *Cottus asper*
 - peamouth *Myoxocheilus caninus*
 - mountain whitefish *Prosopium willsoni*
 - lake trout *Salvelinus namaycush*
 - burbot *Lota lota*





**SAY NUTH KHAW YUM
/ INDIAN ARM
PROVINCIAL PARK
BIOREGIONAL ATLAS**

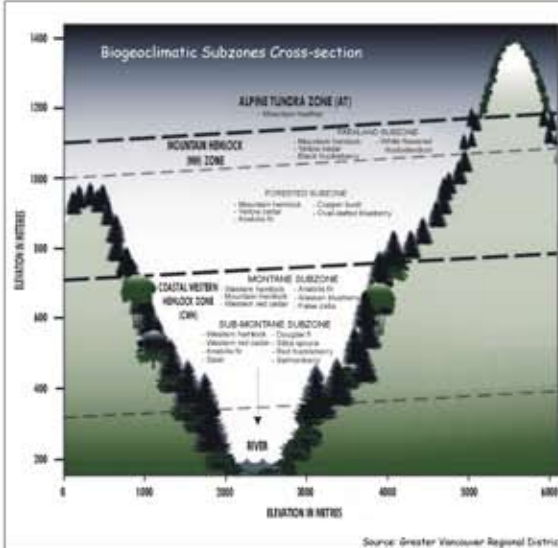
**Map 17. Biophysical Series:
Biogeoclimatic Subzones and Variants**

Introduction

A biogeoclimatic subzone has a distinct climax, or near climax, plant association on zonal sites. A subzone thus consists of unique sequences of geographically related ecosystems in which climax ecosystems are members of the same zonal plant association. Such sequences are influenced by one type of regional climate.

Subzones contain considerable variation, for which categories of biogeoclimatic variance can be identified. Variants reflect finer differences in regional climate and are generally recognized for areas that are slightly drier, wetter, snowier, warmer, or colder than other areas in the subzone. These climatic differences result in corresponding differences in vegetation, soil, and ecosystem productivity. The differences in vegetation are evident as a distinct climax plant association. They can also be manifested as changes in the proportion and vigour of certain plant species, or as variations in successional development or the overall pattern of vegetation over the landscape.

Source: Meldinger and Pojar, 1991. Ecosystems of British Columbia, British Columbia Ministry of Forests



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Base data: TRIM, B.C. Ministry of Sustainable Resource Management, 1996. Projection: Albers Equal Area, NAD 83, Zone 10



Map Scale 1:24,000
Map produced September 2006 and updated August 2008

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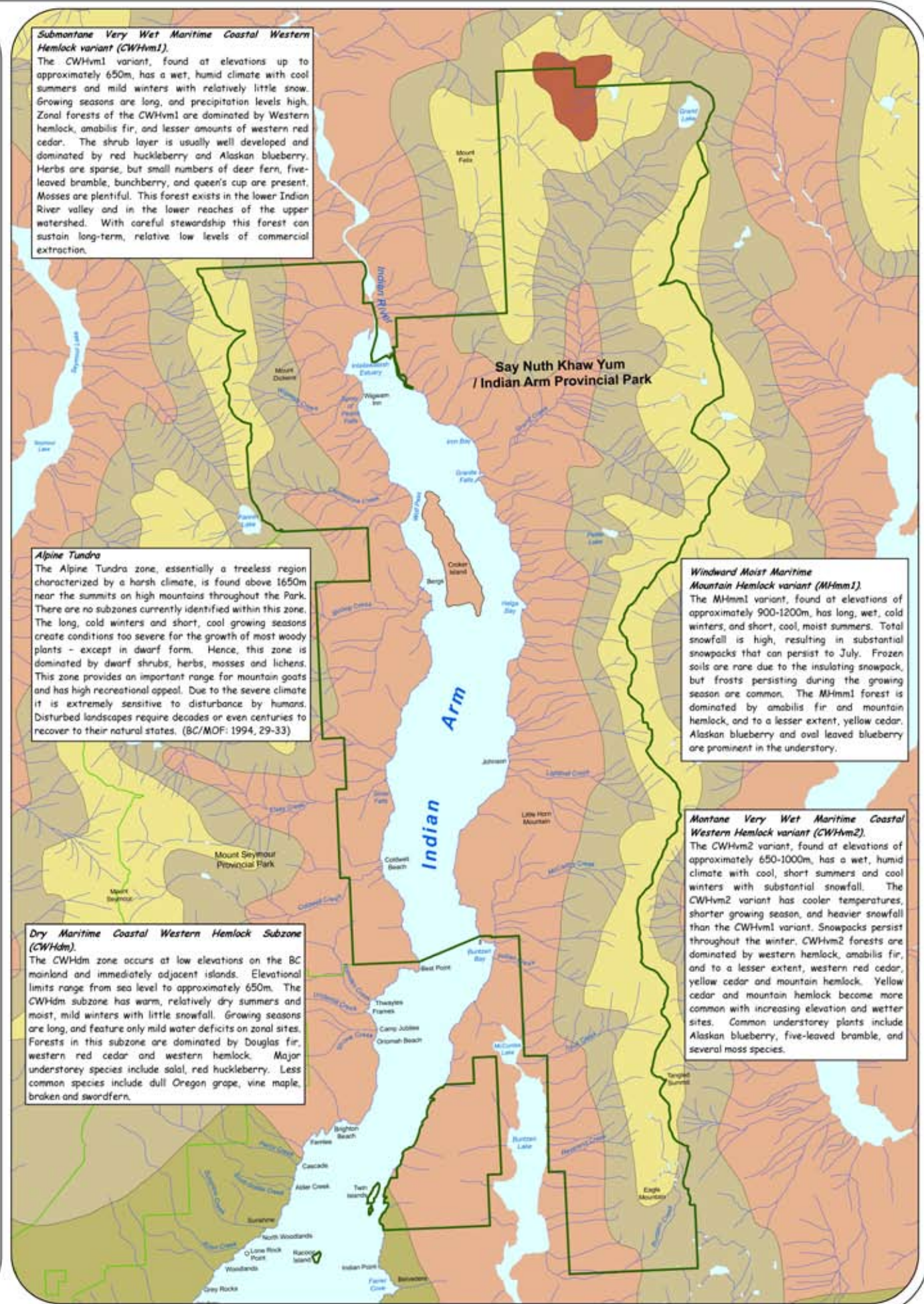
Submontane Very Wet Maritime Coastal Western Hemlock variant (CWHm1).
The CWHm1 variant, found at elevations up to approximately 650m, has a wet, humid climate with cool summers and mild winters with relatively little snow. Growing seasons are long, and precipitation levels high. Zonal forests of the CWHm1 are dominated by Western hemlock, amabilis fir, and lesser amounts of western red cedar. The shrub layer is usually well developed and dominated by red huckleberry and Alaskan blueberry. Herbs are sparse, but small numbers of deer fern, five-leaved bramble, bunchberry, and queen's cup are present. Mosses are plentiful. This forest exists in the lower Indian River valley and in the lower reaches of the upper watershed. With careful stewardship this forest can sustain long-term, relative low levels of commercial extraction.

Alpine Tundra
The Alpine Tundra zone, essentially a treeless region characterized by a harsh climate, is found above 1650m near the summits on high mountains throughout the Park. There are no subzones currently identified within this zone. The long, cold winters and short, cool growing seasons create conditions too severe for the growth of most woody plants - except in dwarf form. Hence, this zone is dominated by dwarf shrubs, herbs, mosses and lichens. This zone provides an important range for mountain goats and has high recreational appeal. Due to the severe climate it is extremely sensitive to disturbance by humans. Disturbed landscapes require decades or even centuries to recover to their natural states. (BC/MDF: 1994, 29-33)

Dry Maritime Coastal Western Hemlock Subzone (CWHdm).
The CWHdm zone occurs at low elevations on the BC mainland and immediately adjacent islands. Elevational limits range from sea level to approximately 650m. The CWHdm subzone has warm, relatively dry summers and moist, mild winters with little snowfall. Growing seasons are long, and feature only mild water deficits on zonal sites. Forests in this subzone are dominated by Douglas fir, western red cedar and western hemlock. Major understorey species include salal, red huckleberry. Less common species include dull Oregon grape, vine maple, broken and swordfern.

Windward Moist Maritime Mountain Hemlock variant (MHm1).
The MHm1 variant, found at elevations of approximately 900-1200m, has long, wet, cold winters, and short, cool, moist summers. Total snowfall is high, resulting in substantial snowpacks that can persist to July. Frozen soils are rare due to the insulating snowpack, but frosts persisting during the growing season are common. The MHm1 forest is dominated by amabilis fir and mountain hemlock, and to a lesser extent, yellow cedar. Alaskan blueberry and oval leaved blueberry are prominent in the understorey.

Montane Very Wet Maritime Coastal Western Hemlock variant (CWHm2).
The CWHm2 variant, found at elevations of approximately 650-1000m, has a wet, humid climate with cool, short summers and cool winters with substantial snowfall. The CWHm2 variant has cooler temperatures, shorter growing season, and heavier snowfall than the CWHm1 variant. Snowpacks persist throughout the winter. CWHm2 forests are dominated by western hemlock, amabilis fir, and to a lesser extent, western red cedar, yellow cedar and mountain hemlock. Yellow cedar and mountain hemlock become more common with increasing elevation and wetter sites. Common understorey plants include Alaskan blueberry, five-leaved bramble, and several moss species.





**SAY NUTH KHAW YUM
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PROVINCIAL PARK
BIOREGIONAL ATLAS**



**Map 18. Biophysical Series:
Environmental Quality Hotspots**

Introduction

The intensive, long-term human use of any area leads to degradation of environmental quality in a variety of ways. Many of these impacts are highly localized and have only a short-term negative effect. A small opening created in a forest for cottage construction may have a very limited impact on even a local environment. Other impacts are more persistent in nature, and lead to environmental degradation with negative effects that can cascade through local or regional ecosystems. Clear-cut logging within a creek or river basin can destroy salmon habitat, displace wildlife species, can be accompanied by small or large spills of hydrocarbons, or result in unwise use of herbicides and fertilizers. Although the area included in Say Nuth Khaw Yum / Indian Arm Provincial Park has by no means escaped the impacts of environmental degradation, the current overall quality of environment health within the Park is generally considered to be 'good.'

Environmental Degradation in the Indian Arm Region

Plant and Animal Populations

- Marine resources depletion caused by commercial over-fishing;
- Marine resources depletion caused by recreational over-fishing;
- Salmonid stock depletion caused by habitat destruction related to industrial logging and transmission tower construction;
- Wildlife depletion caused by hunting and poaching;
- Bird population depletion caused by use of lead shot by hunters;
- Past and possible future destruction of forests caused by human caused fires;
- Impacts on fish, forest, and wildlife habitats and populations caused by global warming.

Chemicals

- Pollution caused by application of chemical fertilizers, herbicides and pesticides by home and cottage owners, BC Hydro and the forest industry;
- Possible pollution caused by spills of chemicals, hydrocarbons and other substances.

Water Pollution

- Water pollution caused by sewage outfall from recreation residential settlements;
- Water pollution caused by leakage of Metro Vancouver sewage systems;
- Possible water pollution caused by transfers of contaminated water from Burrard Inlet to Indian Arm;
- Water pollution caused by deposition of bark, cables and related debris into Indian Arm and the Inlialawatash Estuary by logging operations;
- Water pollution caused by Metro Vancouver storm drain outflows containing toxic heavy metals and fecal coliforms;
- Water pollution caused by bilge tank pumping in recreational vessels.

Air Pollution

- Air pollution caused by commercial vessel traffic;
- Air pollution caused by increasing levels of commuter and commercial vehicle traffic in the Lower Mainland region.

Soil Degradation

- Siltation caused by landslides and debris torrents resulting from failure of old logging roads (Clementine Creek in 1998);
- Destruction of Inlialawatash Estuary clam beds caused by soil erosion and siltation generated by industrial logging operations;
- Salmonid habit destruction caused by improper use of all-terrain vehicles;
- Soil compaction and related impacts caused by overuse of camping and shore facilities;
- Soil erosion caused by wakes from commercial and recreational boat traffic and by rising sea levels.

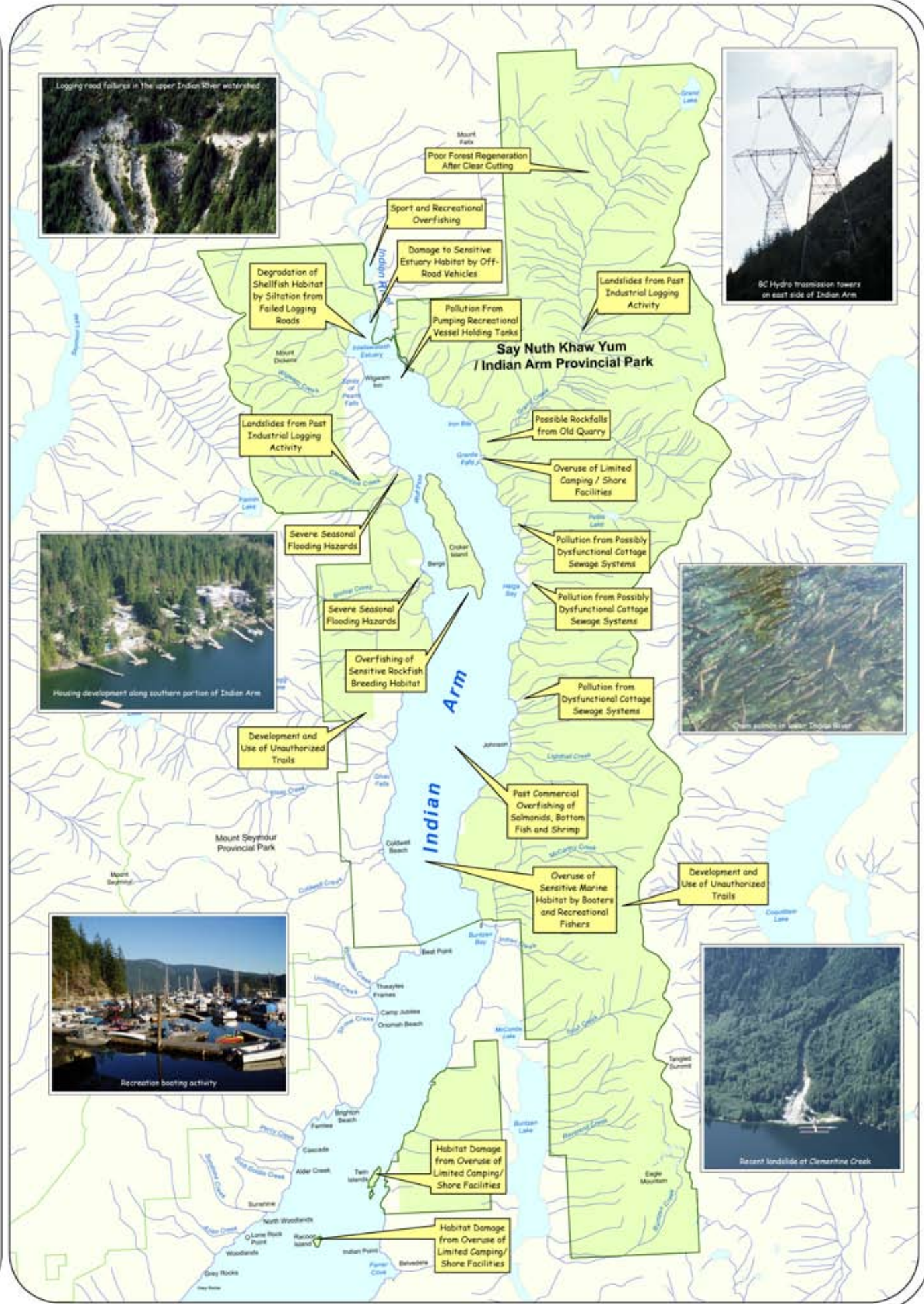
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Base data: TRIM, B.C. Ministry of Sustainable Resource Management, 1996.
Projection: Albers Equal Area, NAD 83, Zone 10




Map Scale 1:24,000
Map produced September 2006 and updated August 2008

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**SAY NUTH KHAW YUM
/ INDIAN ARM
PROVINCIAL PARK
BIOREGIONAL ATLAS**



**Map 19. Cultural Series:
Registered Archaeological Sites**

Introduction

Relatively little archaeological work has been conducted within the northern portion of Tseil-Waututh Nation territory. This lack of research may be attributed to the steepness of inland terrain, destruction caused by industrial logging, the occupation of most flat areas by urban or industrial development, and the modification of shoreline areas by land filling. Despite the fact that the area within and adjacent to the Park has been occupied by the Tseil-Waututh for thousands of years, only twenty-two archaeological sites have been reported on the shores of Burrard Inlet and Indian Arm. These include eleven settlement sites, ten pictograph sites, and one lithic (rock) scatter. Archaeological information on the use of adjacent inland areas is virtually nonexistent, with only two inland sites having been recorded.

The archaeological evidence suggests a high potential for the location of additional archaeological sites along the shoreline zone. These sites would include shell middens associated with settlements, pictographs, and lithic scatters. The current lack of archaeological work in inland areas makes it difficult to estimate the potential sites for identification in these areas. The results of archaeological investigations in neighbouring First Nation territories has demonstrated that there is extremely high potential for discovery of a great number of high elevation camps, hunting blinds and spiritual sites.

Archaeological Investigations Within Say Nuth Khaw Yum / Indian Arm Provincial Park

In 1996 a preliminary archaeological overview assessment of the Park was completed. As part of this study the potential of any area within the Park to host archaeological sites was projected on mylar overlays at a scale of 1:20,000 (DAHLSTROM, 1996). Raccoon and Twin Islands were not included in this assessment. Recent archaeological field reconnaissance within the Park has been conducted primarily by the Tseil-Waututh Nation. To date, this work has been focussed on two areas: (1) the former village of Inlailwatash located at the mouth of Indian River, and (2) the approximately 25 km of shoreline within the Park boundaries. Localities that were judged to have the highest potential for hosting archaeological sites were examined on foot. Portions of each island located within Indian Arm, and seven other localities along the shoreline, were examined. Shoreline localities that were investigated included Buntzen Bay, lands near the mouth of Grand, Clementine, and Bishop Creeks, and areas adjacent to the outfalls of three smaller unnamed creeks. Four new sites were discovered during the field reconnaissance.

One of the primary goals of the Inlailwatash survey was to establish the location and extent of the historic village and fishing camp at the head of Indian Arm. The reconnaissance was successful in locating the village site, which contained evidence of at least three structures in the form of posts, postholes, and levelled platforms. The site also contained early 1900s historic artefacts, such as shoes, dishes, bottles, a china figurine, and square-headed nails. Other historic material included bricks, window glass, an oar lock and lead net weights. Also found was evidence of prehistoric occupations, attesting to the long-term use of the area by the Tseil-Waututh. The prehistoric material included stone flakes, and a ground nephrite adze blade.

Legend

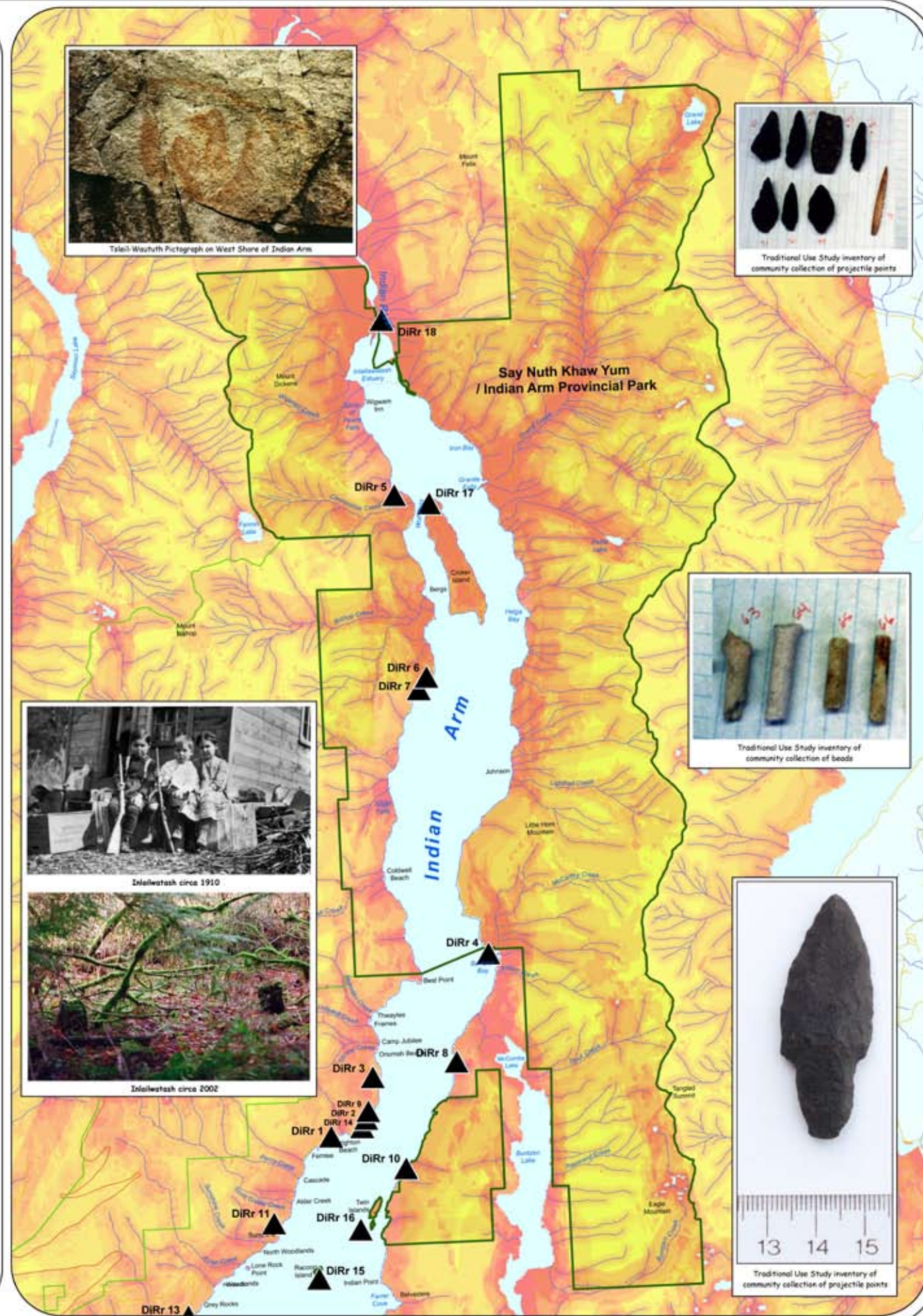
- Say Nuth Khaw Yum Park Legal Boundary
- Registered Archaeology Sites
- Archaeological Potential Zones
 - High
 - Low


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Base data: TRIM, B.C. Ministry of Sustainable Resource Management, 1996. Projection: Albers Equal Area, NAD 83, Zone 10

Map Scale 1:24,000
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**SAY NUTH KHAW YUM
/ INDIAN ARM
PROVINCIAL PARK** 
BIOREGIONAL ATLAS
**Map 20. Cultural Series:
Traditional Use Activity Patterns**

Introduction

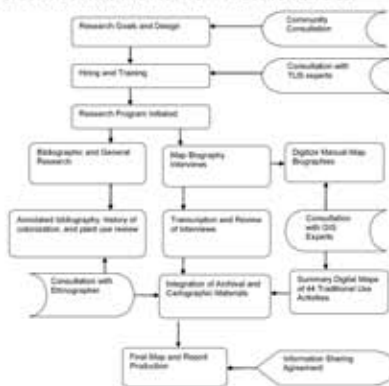
The Tseil-Waututh have occupied the land and water areas now incorporated within the Park since time immemorial. For 10,000 years Tseil-Waututh men, women and children have traveled by canoe to every beach on Indian Arm, have cut and maintained trails to every surrounding mountain peak, and have harvested a wide variety of food and other resources from scores of niche terrestrial and marine ecosystems. The age-old relationship that exists between the Tseil-Waututh and their home territory has resulted in the creation of an incredibly complex body of songs, lore, stories, myths and legends that describe what natural resources exist, and how they should be managed. This extremely detailed body of information, which represents the collective cultural experience of place, is commonly described as 'traditional knowledge.'

The Yearly Round

For thousands of years an annual cycle of land use saw Tseil-Waututh community members move from their Winter villages on Burrard Inlet up Indian Arm to a score or more of Summer camps. Forays were continuously made from these temporary settlements to hunt ducks and land animals, to fish, to dig shellfish, and to pick plants and berries. In July a migration was made to the Fraser River to fish for sockeye. In the Fall many of these family groups congregated at the mouth of the Indian River to catch pink and chum salmon. The last heat of the Fall was used to dry fish and berries, which were then transported back down Indian Arm to the Winter village sites. Virtually every inch of Indian Arm and the surrounding land area was used at the particular time that any prized food item was most abundant or accessible. The text boxes located on the adjacent map image describe traditional practices maintained by the Tseil-Waututh primarily in the 1920s and 1930s.

Traditional Land Use and Occupancy Research

Over 90 Tseil-Waututh community members have contributed confidential information to traditional use studies that have been supported with funding from a variety of sources. Traditional land use and occupancy research carried out by the Tseil-Waututh has identified over ten thousand locations where forty four separate traditional activities have occurred. The following model describes how this research has been structured.



Legend

- Say Nuth Khaw Yum Park Legal Boundary
- Say Nuth Khaw Yum Park Lands
- Tseil-Waututh Tradition Use 1.5 km Buffer

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Base data: TRIM, B.C. Ministry of Sustainable Resource Management, 1996.
Projection: Albers Equal Area, NAD 83, Zone 30

Map Scale 1:24,000
Map produced September 2006 and updated August 2008

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Traditional Uses / Inlailawatash Estuary
The most heavily used part of the Park was at the mouth of the Indian River, a location known as Inlailawatash. Every Fall Tseil-Waututh families would travel by canoe or boat to their primary salmon-fishing camp, located just above the river's mouth. In 1909, at least three, and possibly as many as six, cabins were located there. Both historic and prehistoric artefacts were found on the site of Inlailawatash during recent archaeological surveys.

A single-point harpoon or a gaff-hook, and, in more recent times, small gill-nets were used to catch pink, coho, then chum salmon. The salmon were sometimes salted or smoked in smokehouses. A year's supply of salmon for an extended family consisted of as many as 600 fish. A supply of 300 fish could be caught in a little as one or two days.

Deer, and to a lesser extent, bear, were also hunted in the area. Ducks and geese were also hunted near the river. Huckleberries, blueberries, salmon berries, devil's club, wild parsnip, wild onions, and nettles were gathered upstream from Inlailawatash. This hunting and plant gathering took place in the Spring and early Summer, or during the Fall salmon runs.



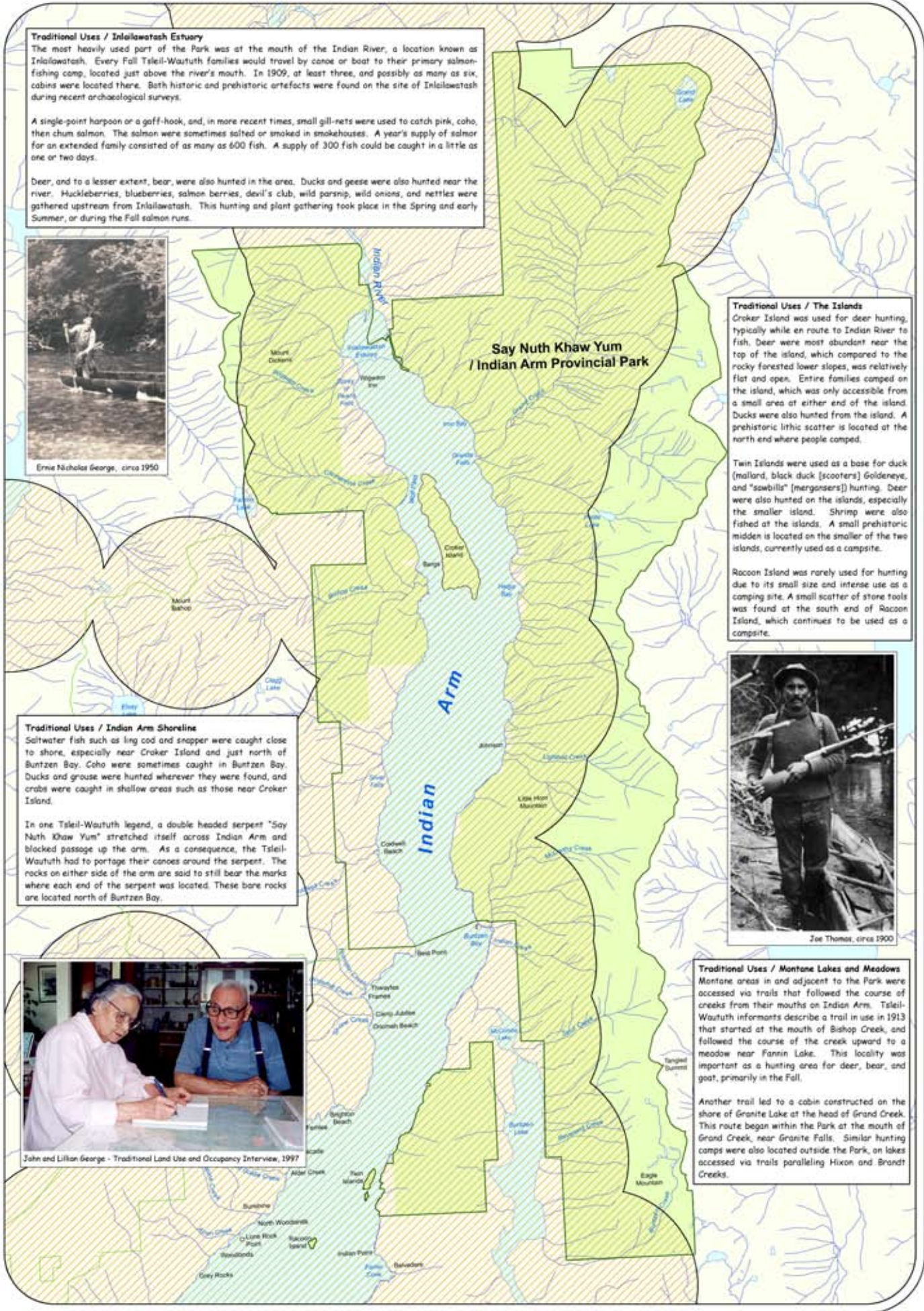
Ernie Nicholas George, circa 1950

Traditional Uses / Indian Arm Shoreline
Saltwater fish such as ling cod and snapper were caught close to shore, especially near Croker Island and just north of Buntzen Bay. Coho were sometimes caught in Buntzen Bay. Ducks and grouse were hunted wherever they were found, and crabs were caught in shallow areas such as those near Croker Island.

In one Tseil-Waututh legend, a double headed serpent "Say Nuth Khaw Yum" stretched itself across Indian Arm and blocked passage up the arm. As a consequence, the Tseil-Waututh had to portage their canoes around the serpent. The rocks on either side of the arm are said to still bear the marks where each end of the serpent was located. These bare rocks are located north of Buntzen Bay.



John and Lilian George - Traditional Land Use and Occupancy Interview, 1997



Traditional Uses / The Islands
Croker Island was used for deer hunting, typically while en route to Indian River to fish. Deer were most abundant near the top of the island, which compared to the rocky forested lower-slopes, was relatively flat and open. Entire families camped on the island, which was only accessible from a small area at either end of the island. Ducks were also hunted from the island. A prehistoric lithic scatter is located at the north end where people camped.

Twin Islands were used as a base for duck (mallard, black duck [scooters] Goldeneye, and "sawbills" [mergansers]) hunting. Deer were also hunted on the islands, especially the smaller island. Shrimp were also fished at the islands. A small prehistoric midden is located on the smaller of the two islands, currently used as a campsite.


Raccoon Island was rarely used for hunting due to its small size and intense use as a camping site. A small scatter of stone tools was found at the south end of Raccoon Island, which continues to be used as a campsite.




Joe Thomas, circa 1900

Traditional Uses / Montane Lakes and Meadows
Montane areas in and adjacent to the Park were accessed via trails that followed the course of creeks from their mouths on Indian Arm. Tseil-Waututh informants describe a trail in use in 1913 that started at the mouth of Bishop Creek, and followed the course of the creek upward to a meadow near Fannin Lake. This locality was important as a hunting area for deer, bear, and goat, primarily in the Fall.

Another trail led to a cabin constructed on the shore of Granite Lake at the head of Grand Creek. This route began within the Park at the mouth of Grand Creek, near Granite Falls. Similar hunting camps were also located outside the Park, on lakes accessed via trails paralleling Hixon and Brandt Creeks.



**SAY NUTH KHAW YUM
/ INDIAN ARM
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Map 21. Cultural Series: Pioneer History

Introduction

It is impossible to represent over 200 years of the complex history of the Indian Arm area within the confines of a single map. The goal of this image is simply to demonstrate that the area now encompassed by Say Nuth Khaw Yum / Indian Arm Provincial Park is a physical stage upon which many human dramas have been played. An aboriginal culture thrived here. Colonizers arrived, and began successive phases of natural resource exploitation. Trees located immediately on the shoreline were harvested first. Prospectors who attempted to locate precious metal mines were successful only in developing a number of commercial rock quarries. Wild game was harvested for sale in the growing urban settlements ringing Burrard Inlet. Forests on relatively flat land farther back from the sea were liquidated next. Ultimately, the very mountains that contain Indian Arm were tunneled to allow the generation of hydroelectricity required by the growing settlement of Vancouver.

Over time, what had been the thriving centre of independent First Nations and pioneer cultures also became a prized recreational area for those living in surrounding urban areas. Sites that had once been proposed for pulp mills, or that had hosted quarries, became resorts. Homesteads were subdivided into small recreation lots that were aggressively marketed for cottage development. Near the mid-point of the 20th century the area within, and adjacent to, Say Nuth Khaw Yum / Indian Arm Provincial Park hosted a settlement pattern made up of a mix of industrial and recreation land uses.



Early 18th century explorers in Burrard Inlet

Source: Vancouver 1792, by Jim McKenzie

Legend

- Say Nuth Khaw Yum Park Legal Boundary
- Say Nuth Khaw Yum Park Lands
- Historical Event Location

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Projection: Albers Equal Area, NAD 83, Zone 10

1 0.5 1 Kilometers

Map Scale 1:24,000
Map produced September 2006 and updated August 2008

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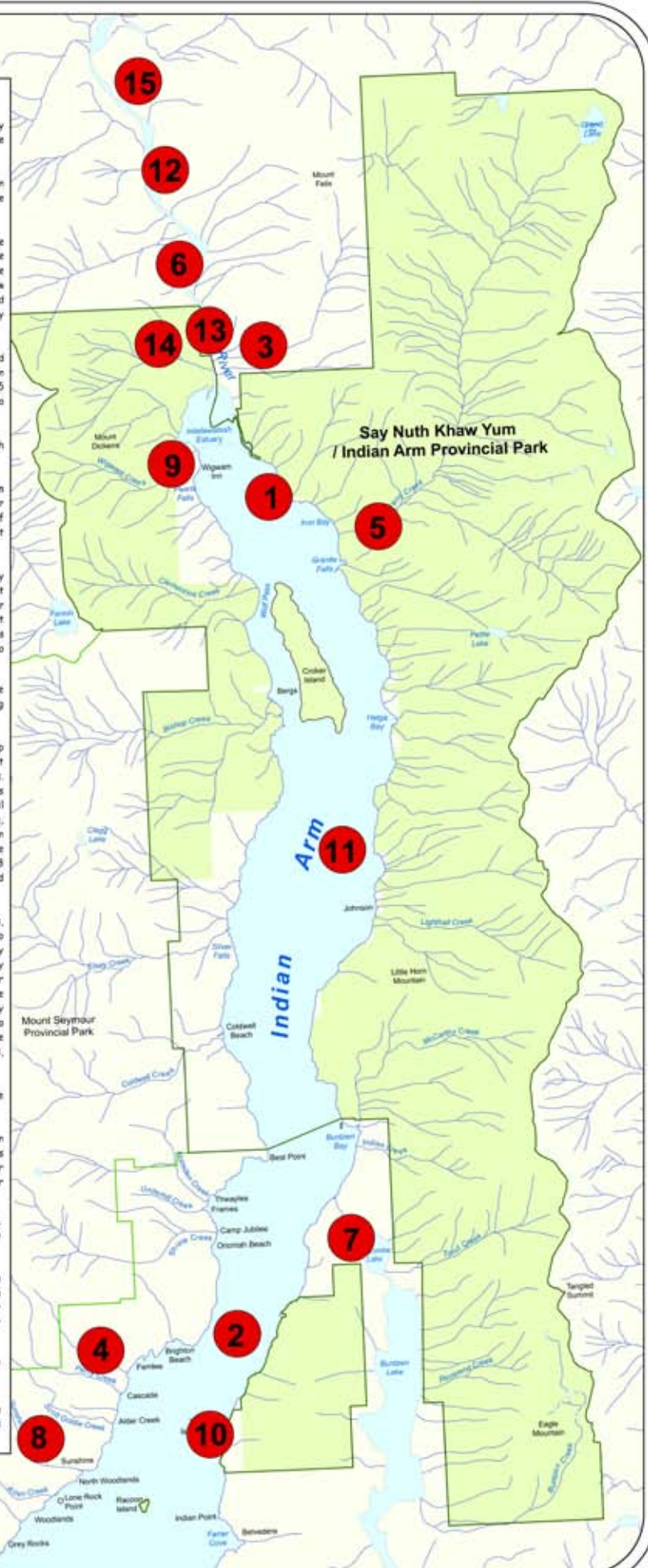



Pioneer History (1792-1947)

- 1792** - Spanish explorers Valdez and Galiano sail longboats up Indian Arm. They meet members of the Tsilil-Waututh Nation who are fishing at the mouth of the Indian River.
- 1859-60** - The British ship *HMS Plumper* makes the first detailed European survey of Indian Arm. Many landscape features in the region are named after the ship's crew, as well as their friends and family members.
- 1877** - Inlilawtash Indian Reserve No. 4 is established by the Joint Reserve Commission. It consists of 37-acres located on the east side of the mouth of the Indian River. In 1927 all but the northwest 2,500 square feet of 37-acre Inlilawtash Indian Reserve No. 4 is sold to Brittenhagan and Young Co. Ltd. of New Westminster. In return, Tsilil-Waututh Nation members receive \$10,000 in cash and \$500 worth of lumber. A number of cabins are burned by the new owners shortly after completion of the purchase agreement.
- 1886** - John Rainy pre-empt 245-acres and develops a model homestead and mining claims. His first mine "Lottie" assayed \$3 to the ton gold and \$9.37 to the ton silver. His second claim, "No Surrender," came in at \$10.95 per ton gold and \$2.45 per ton silver. After Rainy died in 1913 his son sells the property to developers who subdivide it for camp and recreational cottage development.
- 1891** - Captain Williams has started quarrying at Granite Falls. Thomas Ralph Nickerson, who forms Coast Quarries Ltd., buys out the operation.
- Early 1900s** - A number of small-scale logging operators are active in Indian Arm and the lower Indian River valley. These companies boom hand sawn logs for water transport to sawmills located on the shore of Burrard Inlet. In 1913 the owners of Hastings Mill on Burrard Inlet locate a logging camp in the lower Indian River valley at the confluence of the Indian River and Hixon Creek.
- 1903** - The Vancouver Power Company, a subsidiary of the BC Electric Railway Company, begins construction of the Buntzen Hydroelectric facility. A 12,775 foot tunnel is constructed to drop water from Coquitlam Lake to Buntzen Lake. The water is moved through three hydroelectric generators designed to supply the first renewable source of electric power to the growing city of Vancouver. The facility is operational in 1905. In 1913 a second bank of hydroelectric generators is added to the Buntzen Hydroelectric facility.
- 1905** - Hugh Middleton purchases "Sunshine" and surveys a 50-lot cottage subdivision. The Harbour Navigation Company supplies ferry service to the growing number of cottagers who develop properties on the lower portion of Indian Arm.
- 1906** - Benjamin Frank Dickens purchases 200-acres on the west side of the top end of Indian Arm. The goal of his Vancouver Springs Indian River Co. is to construct a lodge designed around an "Indian" theme large enough to accommodate 100 guests. To finance the scheme Dickens plans to sell recreational cottage lots located on his surrounding acreage. In 1908 lack of cottage lot sales causes the project to fail before the lodge is completed. The name "Indian Arm" is first promoted at this time, eventually replacing "North Arm" as the preferred name for the fjord. In 1910 Baron Constantine Gustav Alvo von Alvensleben purchases the unfinished resort. He completes construction of the "Wigwam Inn" in June 1910 at a reported cost of \$3 million. The Indian River Park Company opens the Inn with a party for 600 guests and operates profitably for four years as a "fresh air resort."


In 1914, while von Alvensleben is in Germany to raise capital for his many BC ventures, World War I breaks out. Fearing internment in Canada, Von Alvensleben returns to the US, where he is detained as an enemy alien. In 1915 the Wigwam Inn is seized by the Canadian government. It is later purchased from the Custodian of Enemy Property by E. J. Young, owner of a large forest acreage in the lower Indian River valley. In 1917 Young also purchases the Wigwam Inn property from Dickens. The facility is operated profitably in association with the Harbour Navigation Company until the late 1950s, after which the Inn slowly deteriorates as it passes through a succession of owners. In 1986 the Vancouver Yacht Club purchases the property. The derelict lodge is restored and operated as a private outstation with banquet facilities, a caretakers suite, and 11 rooms.

- 1907** - Twin Islands are first pre-empted by Thomas Alfred Osler. The property is later subdivided into 17 waterfront lots.
- 1908** - The New Brighton Ferry Company begins regular ferry service up Indian Arm. The company is later renamed the Harbour Shipping Company. The business is purchased by Captain Stalker in 1920, who changes its name to the Harbour Navigation Company. From 1920 to 1971 the Harbour Navigation Company runs regular year-round ferry schedule that includes a unique floating post office service.
- 1908** - E. J. Young and Fred Norton, entrepreneurs from the United States, purchase several thousand acres of land at the head of Indian Arm. Their plan to construct a large sawmill on the site is never realized.
- 1912** - A streamflow measuring station is installed near the mouth of the Indian River by the Dominion Hydrographic Survey. The station, one of 10 established in 1912-13 in the Indian River drainage, was designed to assess the hydroelectric power production potential of the Indian River system. The proposal to dam the Indian River is never realized.
- 1912** - Commercial gravel dredges are licensed to operate in the estuary of the Indian River.
- 1941** - A 9-kilometre long shake-block flume is constructed beside the Indian River from the Falls to the river's mouth. The flume is operated by Japanese loggers until shut down at outbreak of WW II.





**SAY NUTH KHAW YUM
/ INDIAN ARM
PROVINCIAL PARK
BIOREGIONAL ATLAS**



**Map 22. Cultural Series:
Post - War History (1948-Present)**

Introduction

After the conclusion of World War II the Indian Arm area continued to experience development pressures. Early in this period, many of the steeper, smaller creeksheds bordering Indian Arm were logged. Later in this period, the pace of industrial logging accelerated dramatically as virtually every accessible portion of the Indian River valley was clear-cutted. A 100-man logging camp, barge ramp, log dump and shake mill were developed as logs were delivered to the mouth of the Indian River via a 200-kilometre network of logging roads. As a direct result of this development activity the incidence of landslides increased, with millions of tons of silt, gravel and debris being transported into both the estuary of the Indian River and Indian Arm. Later, Indian Arm and the Indian River valley were identified as convenient corridors for hydroelectricity transmission lines and gas lines. The impacts of hydro transmission line construction were especially damaging to wild salmon populations.

As the availability of accessible timber declined, the transition from an industrial to recreational land use pattern started. Logging and quarry operations largely ceased. New recreational subdivisions were located in the upper reaches of Indian Arm. It was at this point that efforts to mitigate the impacts of development were initiated. Salmon habitat was restored and logging roads deactivated. Local opposition blocked the development of a highway proposed to connect Vancouver and Squamish via a roadbed that would have been blasted into the east side of Indian Arm.

Today, the transition to a cottage-based land use pattern is nearly complete. Many of the larger parcels on Indian Arm have been purchased for protected areas or land conservancy purposes. In 2004 the local school district ceased water taxi service to the 30 students living in Indian Arm, arguably completing the change from a 'working' to recreation based landscape.



International Forest Products Limited logging operation in the Indian River Valley 2004

Legend

-  Say Nuth Khaw Yum Park Legal Boundary
-  BC Hydro Aqueduct and Penstock
-  Say Nuth Khaw Yum Park Lands
-  Historical Location Events

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Base data: TR2M, B.C. Ministry of Sustainable Resource Management, 1996, Projection: Albers Equal Area, NAD 83, Zone 10



Map Scale 1:24,000
Map produced September 2006 and updated August 2008

This map was produced by the Tsilil-waututh Nation with the financial support from Fisheries and Oceans Canada and B.C. Parks, and technical assistance from Ecotrust Canada.



Post-World War II History (1948-Present)

- 1948** - A flood washes out homes located near the outfalls of many creeks flowing into Indian Arm.
- 1959** - Fisheries and Oceans Canada begins a salmonid transplant program on the Indian River. During 1959, 1961, and 1963 pink salmon eggs are transplanted to Robertson Creek on Vancouver Island.
- 1959** - Canadian Collieries Limited, which later becomes Weldwood of Canada Ltd., constructs a 10-kilometre long logging road which originates at tidewater along the east bank of the Indian River. Intensive logging of the Indian River valley is coordinated from a logging camp located near tidewater. In 1969 Canadian Colliery Resources operates a shake manufacturing plant on a landfill pushed into the Indian River estuary. Industrial logging activities virtually cease in 1989 after all merchantable timber is extracted. In 1994 Weldwood of Canada Ltd. sells its forest licenses in the Indian River valley to International Forest Products Limited.
- 1960s** - The Harbour Navigation Company purchases Granite Falls and the site is redeveloped as a recreational cruise destination. Fred and Kathy Roach purchase Granite Falls in 1983. In 1993 they sell the property to Metro Vancouver, which assembles a number of parcels in Indian Arm for eventual regional park creation purposes.
- 1961** - Fisheries and Oceans Canada constructs a fish counting facility 2 kilometres upstream from the mouth of the Indian River. These works are partially washed out by high water in 1963, and are totally removed in 1973.
- 1969** - BC Hydro begins construction of a 500 KW transmission line that is located down the centre of the Indian River valley and on the east side of Indian Arm. The power line originates at W. A. C. Bennett Dam on the Peace River, and ends in Coquitlam. Poor construction methods common in this period cause severe loss of salmonid habitat in the lower portion of the Indian River. The line is charged in 1971.
- 1974** - Over 8,000 yearling coho salmon from the Capilano River Hatchery are released at Buntzen Powerhouse. In later years ten of the tagged fish are caught, five in Bedwell Bay.
- 1987** - Active exploration occurs for copper in upper reaches of the Indian River valley. Although only samples of ore are taken, speculation is rife that the rich Britannia Mine ore body extends through the region.
- 1991** - The Vancouver Island natural gas pipeline is constructed by Pacific Coast Energy Corporation. The pipeline enters the Indian River valley from the east at the top of the Hixon Creek drainage, travels west to the Indian River, then turns north to the top of the valley. The pipeline follows a circuitous route to eventually cross the Strait of Georgia to a landfill on Vancouver Island.
- 1995** - As part of the Lower Mainland Nature Legacy Initiative, the government of British Columbia proclaims "Indian Arm Provincial Park." The Tsilil-waututh Nation challenges the right of BC to create a park within its traditional territory without consultation. In early 1997, after sustained negotiations, the Province of British Columbia and the Tsilil-waututh Nation sign a "Management Agreement" to cooperatively manage Indian Arm Provincial Park. In the spirit of the agreement the protected area is renamed "Say Nuth Khaw Yum / Indian Arm Provincial Park."
- 1998** - A large landslide in the upper reaches of Clementine Creek discharges a large volume of silt and wood debris into Indian Arm. The Burrard Yacht Club outstation, located at the mouth of the creek, is seriously damaged.



BC Hydro 500 KV transmission line



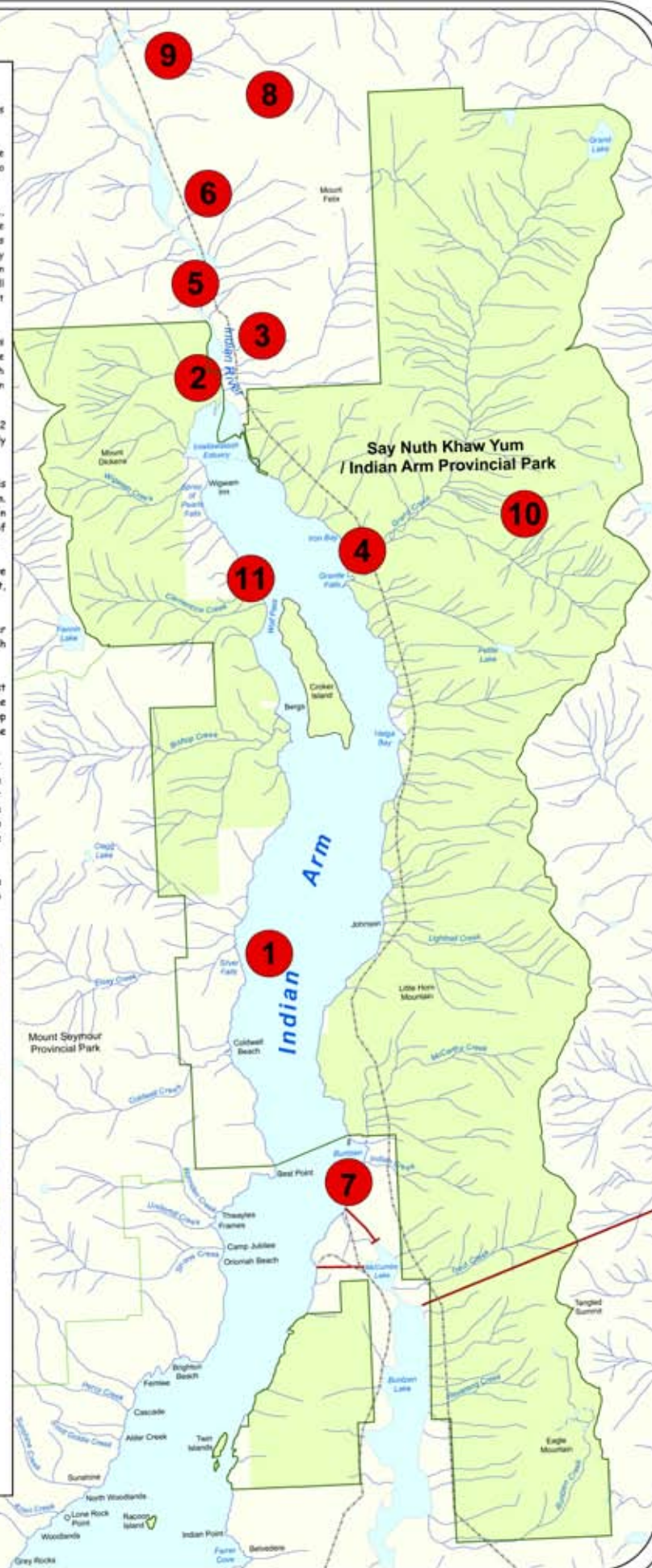
Salmon enhancement activities in Indian River

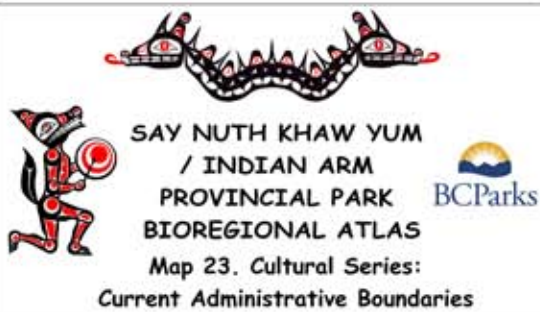


Abandoned Weldwood of Canada logging camp



Indian Arm cottage development





**SAY NUTH KHAW YUM
/ INDIAN ARM
PROVINCIAL PARK** BCParks
BIOREGIONAL ATLAS
Map 23. Cultural Series:
Current Administrative Boundaries

Introduction

The area within and adjacent to Say Nuth Khaw Yum / Indian Arm Provincial Park is overlaid by a complex network of government and other jurisdictions. Each of these jurisdictions is a legal entity that is either 1) a sovereign First Nation, 2) an entity directly controlled by the government of Canada or British Columbia, 3) a corporate entity that was created by Canada or BC and granted some level of autonomous control over delivery of a particular type of service. Some of these jurisdictions have more legislative or legal power than others. For instance, the Tsleil-Waututh Nation is an independent indigenous government with powers equal to those of the government of Canada. Conversely, the Port Metro Vancouver (PMV) is a federal authority with significantly more power than a local municipality created under the BC Local Government Act and Community Charter (LGA & CC).

To give readers an idea of the administrative mixture of the area, some of the governments, agencies and authorities with jurisdictions and interests in or adjacent to the Park are listed below:

Name	Date Established	Legal Jurisdiction
Tsleil-Waututh Nation Independent Indigenous Nation	~10,000 Years Before Present	Section 35 Canadian Constitution
Province of BC	1871	Confederation
Port Metro Vancouver	1913	Canada Marine Act
BC Parks	1936	BC Park Act
Say Nuth Khaw Yum / Indian Arm Provincial Park	1998	BC Parks Act
Mount Seymour Provincial Park	1936	BC Parks Act
BC Hydro & Buntzen Lake Recreation Area	1962	BC Hydro & Power Authority Act
District of North Vancouver	1891	LGA & CC
Village of Anmore	1987	LGA & CC
Village of Belcarra	1979	LGA & CC
Metro Vancouver & Electoral Area A	1967	LGA & CC

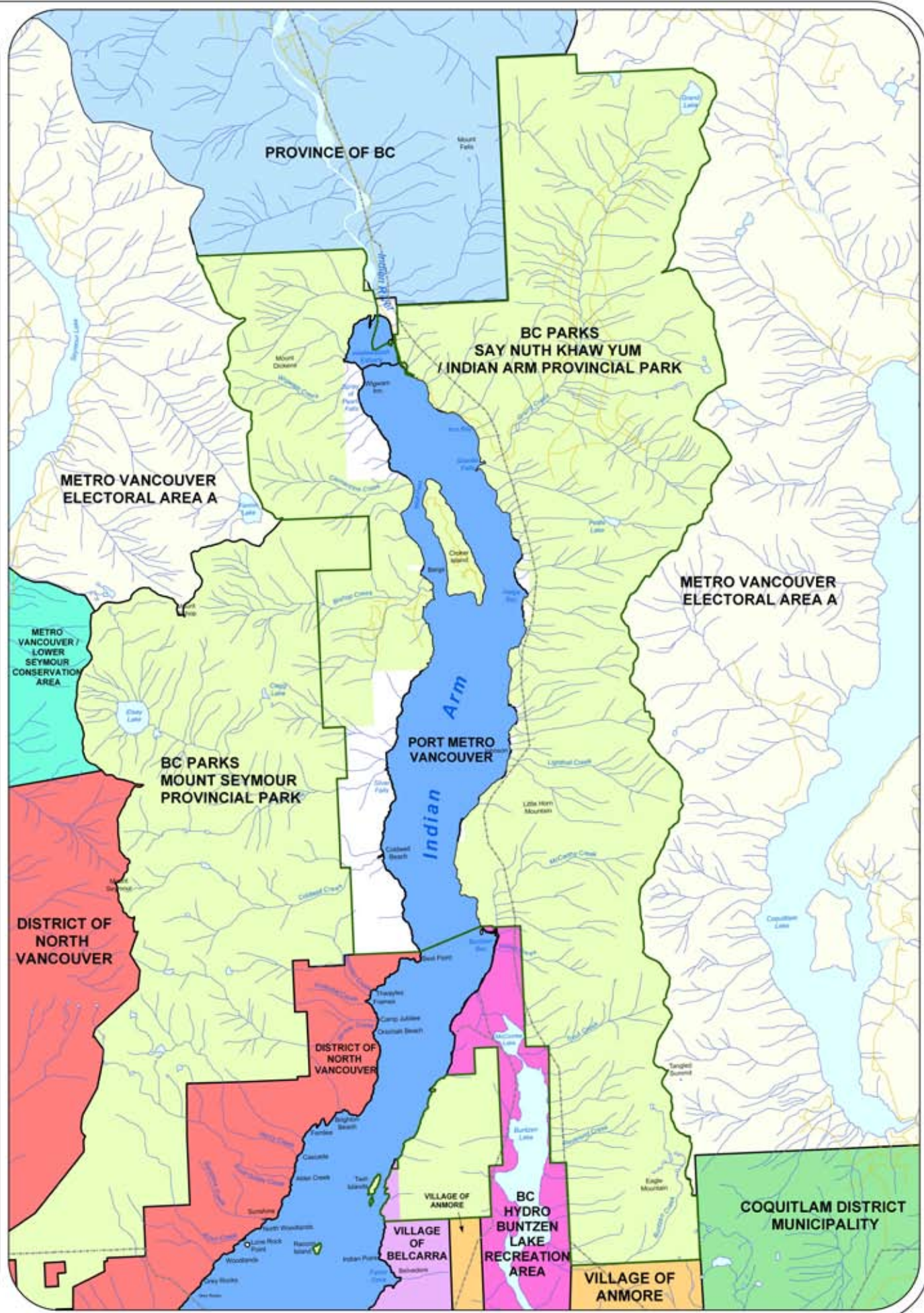
Legend


- Say Nuth Khaw Yum Park Legal Boundary
- Say Nuth Khaw Yum Park Lands
- Province of BC
- GVRD Lower Seymour Conservation Area
- Port Metro Vancouver
- District of North Vancouver
- Coquitlam District Municipality
- Village of Anmore
- Village of Belcarra
- BC Hydro Buntzen Lake Recreational Area

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Base data: TRIM, B.C. Ministry of Sustainable Resource Management, 1996.
Projection: Albers Equal Area, NAD 83, Zone 10

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**SAY NUTH KHAW YUM
/ INDIAN ARM
PROVINCIAL PARK
BIOREGIONAL ATLAS**

Map 24. Cultural Series: Current
Generalized Land Use

Introduction

The land area included within Say Nuth Khaw Yum / Indian Arm Provincial Park has historically been utilized for a variety of industrial and recreational land use purposes. In the late 1890s mineral prospecting activity predominated. In the early- to mid-1900s quarrying, forestry, hydroelectricity production, and resort development activities flourished. In the mid- and late 1900s natural resource extraction activities declined, and were replaced by accelerating rates of recreational cottage development and protected area designations. This map image represents the key elements of the land use pattern that now exists in the early part of the new millennium.

Recreational Cottage Subdivisions

In the period between 1960 and 1980 the Province of British Columbia offered wilderness residential properties for lease in several locations in upper Indian Arm. These lots, all with waterfront, are either owned on a fee-simple basis, or are leased from BC Parks. In addition, a number of older privately subdivided cottage development areas are located adjacent to the Park on either side of the southern portion of Indian Arm.

Residential and cottage development within, or surrounded by, Say Nuth Khaw Yum / Indian Arm Provincial Park

	Estimated Number of Subdivided Lots	Estimated Number of Dwellings
West Side Indian Arm		
Wigwam Inn	4	1 Coretakers suite, 11 lodge units
Clementine Creek	11	1
Bergs / Bishop Creek	4	1
Coldwell Beach	30	8
East Side Indian Arm		
Helgo Bay	34	24
Johnsons	40	31
Burtnen Bay	14	12
TOTAL	137	88



Joint Tseil-Waututh Nation-BC Ministry of Forest land use planning meeting - 2004

Legend

Say Nuth Khaw Yum Park Legal Boundary	BC Hydro Transmission Line
Say Nuth Khaw Yum Park Lands	Cadastral Boundaries
BC Hydro Aqueduct and Penstock	

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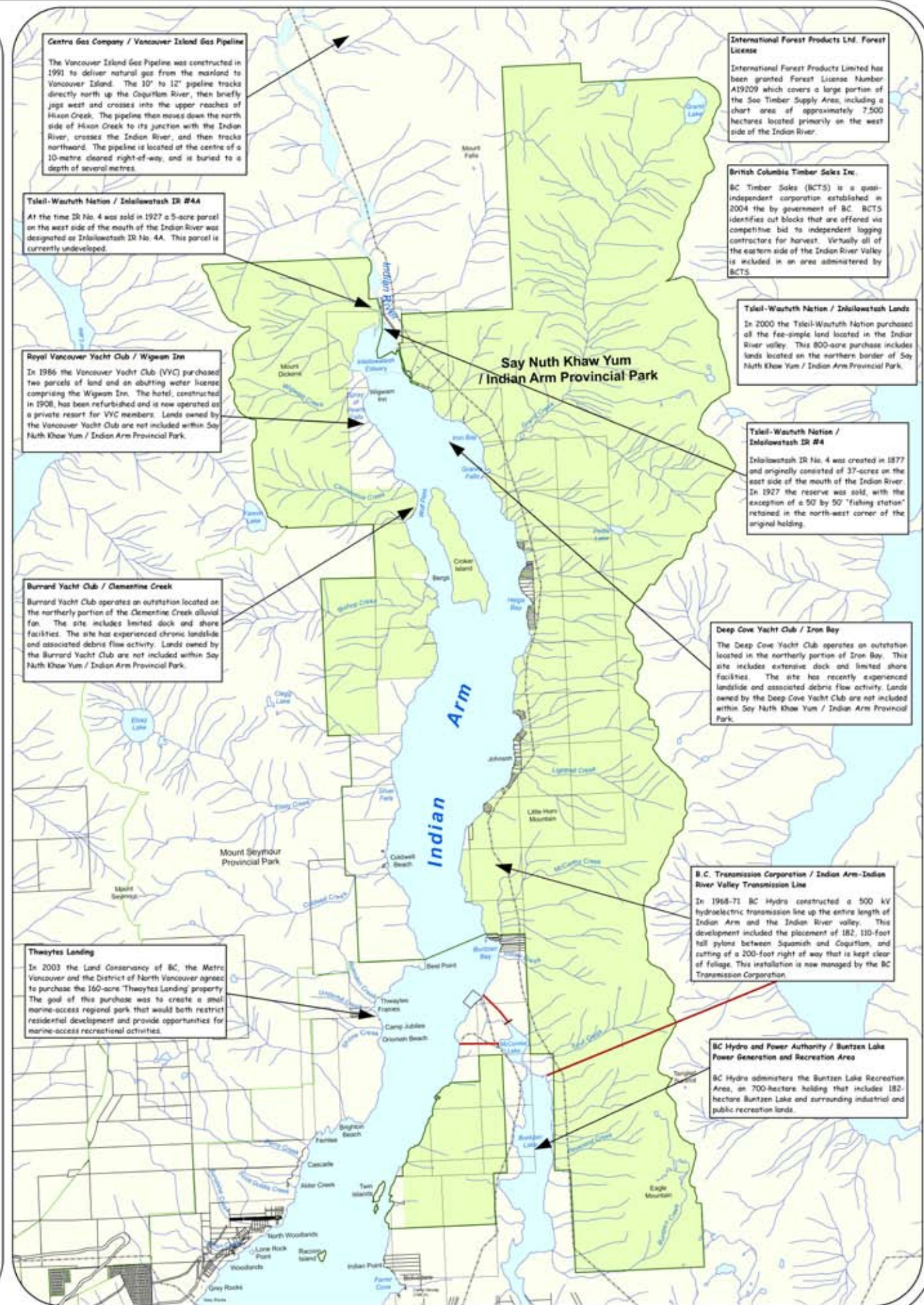
Base data: TRIM, B.C. Ministry of Sustainable Resource Management, 1996.
Projection: Albers Equal Area, NAD 83, Zone 10

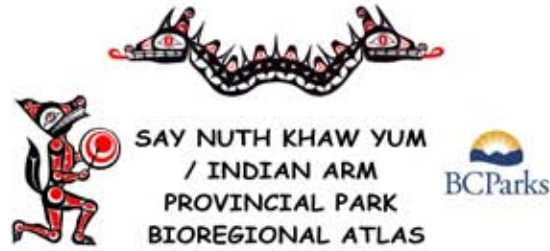
1 0.5 0 1
Kilometers

Map Scale 1:24,000

Map produced September 2006 and updated August 2008

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SAY NUTH KHAW YUM / INDIAN ARM PROVINCIAL PARK BIOREGIONAL ATLAS
Map 25. Cultural Series: Law Enforcement / Search and Rescue Jurisdictions

Introduction

The Royal Canadian Mounted Police (RCMP), on contract with the Province of British Columbia and individual municipal governments, is primarily responsible for supplying police services within Say Nuth Khaw Yum / Indian Arm Provincial Park. Due to the remote location of the Park, three different RCMP detachments are responsible for different portions of Indian Arm and vicinity. The North Shore Detachment covers the west shore of Indian Arm, the Coquitlam Detachment covers the east side of Indian Arm, and the Indian River valley is the jurisdiction of the Squamish Detachment.

Other law enforcement agencies with responsibilities in the Park area include the Vancouver Police Department, Marine Squad, the enforcement branch of Fisheries and Oceans Canada, and BC Park Rangers who are deployed from a base in Mt. Seymour Provincial Park in the District of North Vancouver. In addition, several search and rescue organizations cover Indian Arm and vicinity as part of their operation areas. North Shore Search and Rescue has established pre-determined access routes to a number of areas within the western portion of the Park. These routes lead to areas where hikers are known to have been stranded, and are accessed by either helicopter or vessel. Coquitlam Search and Rescue maintains similar capability in the eastern portion of the Park.

Marine rescue activities are primarily maintained by the Deep Cove Lifeboat Society, a volunteer body that maintains an aluminum rescue vessel in Deep Cove. The Canadian Coast Guard, BC Parks, the Vancouver (Harbour) Police, the Tsleil-Waututh Nation and the Coquitlam Detachment of the RCMP all maintain vessels that are also utilized for marine access to the Park area.



RCMP Marine patrol vessel

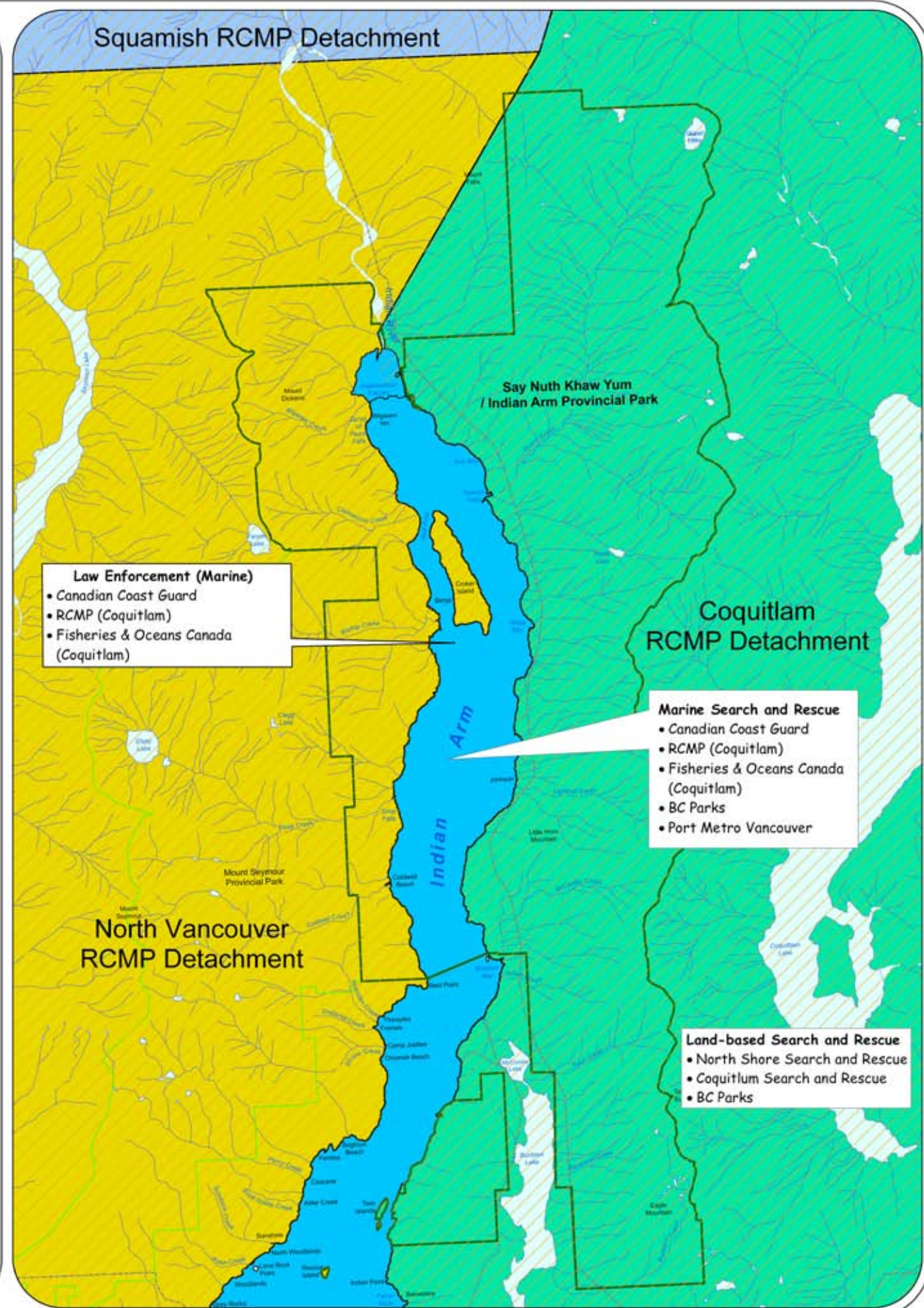
Legend

- Say Nuth Khaw Yum Park Legal Boundary
- North Shore Search and Rescue
- Coquitlam RCMP Detachment
- North Vancouver RCMP Detachment
- Squamish RCMP Detachment
- Port Metro Vancouver

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 Projection: Albers Equal Area, NAD 83, Zone 10

Map Scale: 1:24,000
 Map produced September 2006 and updated August 2008



Law Enforcement (Marine)

- Canadian Coast Guard
- RCMP (Coquitlam)
- Fisheries & Oceans Canada (Coquitlam)

Coquitlam RCMP Detachment

Marine Search and Rescue

- Canadian Coast Guard
- RCMP (Coquitlam)
- Fisheries & Oceans Canada (Coquitlam)
- BC Parks
- Port Metro Vancouver

Land-based Search and Rescue

- North Shore Search and Rescue
- Coquitlam Search and Rescue
- BC Parks



**SAY NUTH KHAW YUM
/ INDIAN ARM
PROVINCIAL PARK
BIOREGIONAL ATLAS**



Map 26. Cultural Series:

Forest Economy Timber Extraction History

Introduction

From the early 1900s the Indian Arm and Indian River valley areas have been continuously exploited for forest resources. Early harvest activities targeted extraction of high value Douglas fir that was utilized for ship spars. Later, cedar was selected for extraction and used for shingles and shakes. The level of industrial logging increased dramatically in the 1960s when balsam and hemlock were extracted in massive quantities for conversion to dimensional lumber and pulp. This activity led to developments including the construction of over 200 kilometres of logging roads, operation of a 100-person logging camp in the lower Indian River valley between the late 1960s and the 1980s, and location of a government log sort and booming grounds adjacent to and within the estuary of the Indian River.

The extent of environmental impacts associated with industrial logging in the Indian River valley cannot be overstated. A survey of portions of the valley conducted by SNC Lavalin for the BC Ministry of Forests and International Forest Products Ltd. in late 1997 identified more than 60 major landslides sites associated primarily with failure of logging roads. Each of these landslides has to a greater or lesser degree delivered silt into the Indian River or its tributaries. As a result the Indian River has been clogged with successive waves of silt and gravel that are propelled through the system by annual severe storm events. Salmon populations have been negatively impacted to these changes in river morphology. As well, traditional cultural sites utilized by Tsilil-Waututh community members for many centuries have been similarly degraded by severe erosion or gravel deposition.

Virtually every portion of Soy Nuth Khaw Yum / Indian Arm Provincial Park shows evidence of industrial logging activity. Extensive logging road networks were constructed in the Bishop, Clementine and Grand Creek drainages. Dry-land log sorting areas were bulldozed into alluvial fans at Bishop and Clementine Creeks. The remnants of log skids can be observed at Lighthall Creek and on Croker Island. Abandoned logging equipment is located in the Grand Creek drainage, at several locations in the lower portion of the Indian River valley, and on the shore of Iron Bay.



Log dump and booming ground in Indian River Estuary - 2004

Legend

— Soy Nuth Khaw Yum Park Legal Boundary

Forest Age Class - As of 1998

- Stand Age 1 to 40 years
- Stand Age 41 to 80 years
- Stand Age 81 to 120 years
- Stand Age 121+ years

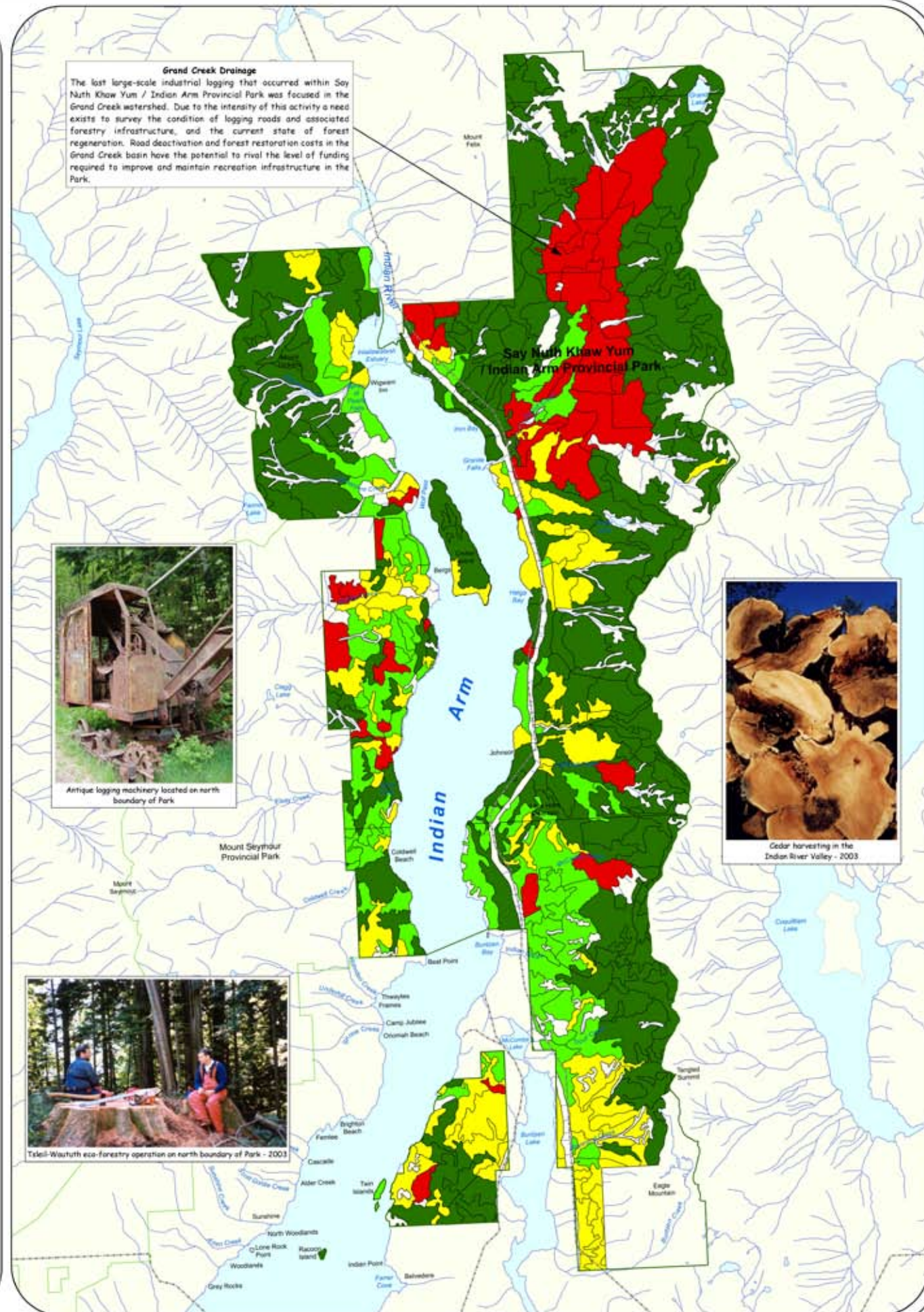
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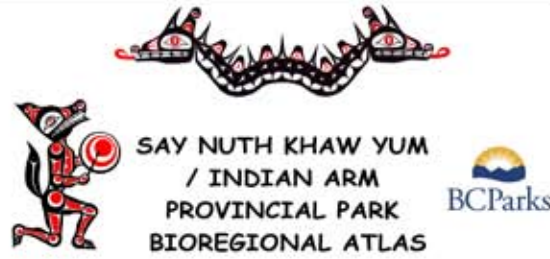
Base data: TRIM, B.C. Ministry of Sustainable Resource Management, 1996.
Projection: Albers Equal Area, NAD 83, Zone 10



Map Scale 1:24,000
Map produced September 2006 and updated August 2008

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**SAY NUTH KHAW YUM
/ INDIAN ARM
PROVINCIAL PARK
BIOREGIONAL ATLAS**

**Map 27. Cultural Series:
Mining Economy - Mining History**

Introduction

Prospectors were among the earliest non-First Nation visitors to the area now encompassed by Say Nuth Khaw Yum / Indian Arm Provincial Park. These explorers first were looking for gold, then later expanded their activities to search for copper, lead, zinc, and other deposits. Mineral exploration activity in the Indian Arm and Indian River valley reached an early peak with discovery of the Britannia Mining Camp in 1898. This area of intense exploration and mine development is located in the mountain range that divides the Indian River valley from Howe Sound to the west. Between 1905 and 1974 mines in the Britannia Camp produced 55 million tons of ore grading 1.1% copper, .65% zinc, .2 oz./ton of silver and .02 oz./ton of gold.

The discovery of the Britannia Camp sparked three phases of a prospecting activity in the Indian River valley. Potential copper deposits were staked in the 1908 to 1911 period, lead-zinc deposits were located in the 1970s, and in the 1980s copper-gold deposits were identified. There are currently 12 active mining claims in the Indian River valley.

Mining Claims in the Indian River Valley

Minfile Number	Claim Name	Location	Status	Minerals
92G NW014	Belle	49 37 31 / 123 00 46	Showing	CU, AG, ZN, PB
92G NW028	A.B.C.	49 38 22 / 123 01 28	Showing	CU, ZN
92G NW036	Maggie	49 38 03 / 123 01 32	Developed Prospect	AU, AG, CU, ZN, PB
92G NW041	Christina	49 38 55 / 123 00 41	Showing	CU, AG, ZN, PB, AU
92G NW042	War Eagle	49 38 34 / 123 01 46	Prospect	CU, ZN, PB, AG
92G NE001	Roy	49 36 34 / 122 58 33	Showing	CU, AG
92G NE007	Bullandale	49 36 27 / 122 59 21	Showing	CU
92G NE015	RWS	49 31 37 / 122 54 41	Showing	CU, AG
92G NE017	London	49 36 46 / 122 58 51	Prospect	MO, ZN, CU
92G NE018	Caledonia	49 35 27 / 122 56 57	Showing	CU
92G NE023	Princess	49 35 55 / 122 58 05	Showing	CU
37G NE037	Fred	49 34 40 / 122 55 02	Showing	CU, AG, ZN, PB

Although mineral exploration activity also extended into the Indian Arm area, mining activity was limited to the development of a number of rock quarries that supplied material to developments in the Lower Mainland region. These quarries are now all closed. The location and history of these developments are represented on the adjacent map image. As Say Nuth Khaw Yum / Indian Arm Provincial Park is a Class A Park, mining activities are not allowed.

Legend

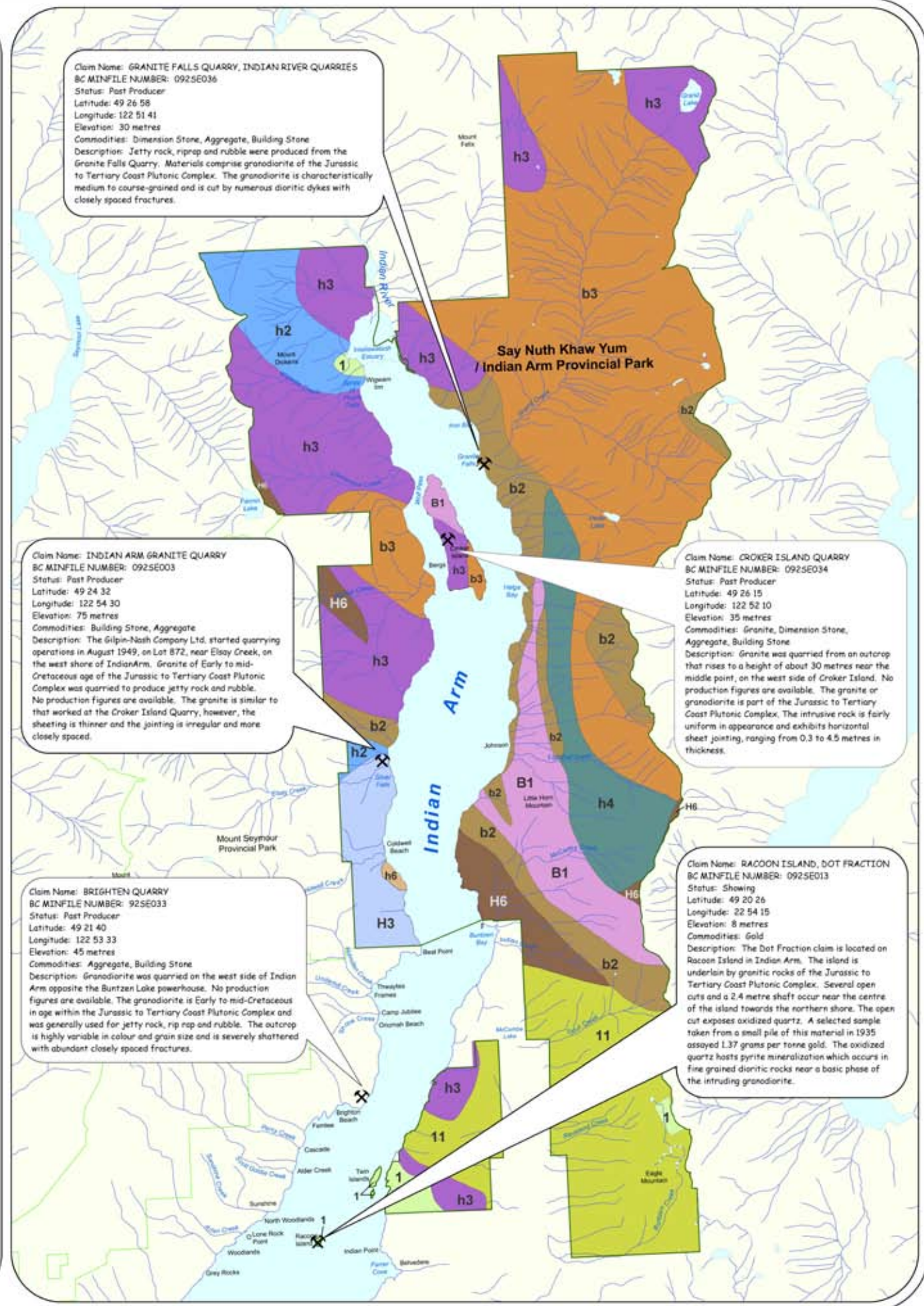
- Say Nuth Khaw Yum Park Legal Boundary
- Mine Location
- Bedrock Geology**
- 1 TWIN ISLAND GROUP: hornblende-granite, amphibolite, gneiss, schist, conglomerate, quartzite, meta-arkose, lime-silicate rock, migmatite
- 11 Alluvial, marine and glacial deposits
- B1 Granite (biotite is the only mafic mineral present in appreciable amounts)
- B2 Granodiorite (biotite is more abundant than hornblende)
- B3 Quartz diorite (biotite is more abundant than hornblende)
- B4 Quartz diorite (hornblende is the only mafic mineral present in appreciable amounts)
- B6 Diorite (hornblende is the only mafic mineral present in appreciable amounts)
- H3 Granodiorite (hornblende is more abundant than biotite)
- H4 Quartz diorite (hornblende is more abundant than biotite)
- H6 Diorite (hornblende is more abundant than biotite)
- 10 Wignatite (hornblende is more abundant than biotite)

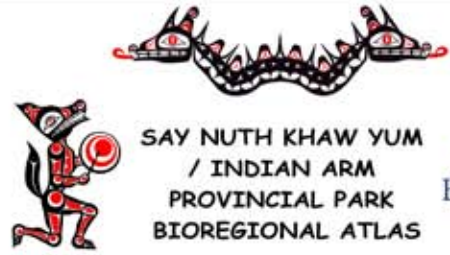
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**SAY NUTH KHAW YUM
/ INDIAN ARM
PROVINCIAL PARK
BIOREGIONAL ATLAS**



**Map 28. Cultural Series:
Existing Park and Marine Recreation Facilities**

Introduction

Recreation infrastructure located within Say Nuth Khaw Yum / Indian Arm Provincial Park has been developed to a basic level only. Access has been improved to sites developed for use by different segments of the recreational user community. The most intensively developed sites are Twin Islands and Granite Falls. Each of these locations has been developed with a mooring float, ramp, and shoreline sanitation and camping facilities that are designed to serve private boat owners, kayakers, and large groups of campers.

Sites with moderate infrastructure development include Bishop Creek and the Infallawatash Estuary. Bishop Creek has no mooring float, but hosts amenities to support kayak-based camping. The Indian River estuary has a mooring float and ramp, but no shoreline facilities.

Finally, a low-use site has been established for kayakers at Raccoon Island. While no landing or other facilities exist here, the Island is regularly maintained by park maintenance crews.

Say Nuth Khaw Yum / Indian Arm Provincial Park

Existing Infrastructure

Twin Islands

- Existing Development
- Large mooring float and ramp
 - 2 pit toilets
 - 6 raised cedar tent pads
 - Information kiosk
 - Internal trail network
 - Marine Park sign/emblem

Raccoon Island

- Existing Development
- None

Granite Falls

- Existing Development
- Small mooring float and ramp
 - 4 pit toilets
 - 10 raised gravel tent pads
 - Internal trail network
 - Information kiosk

Bishop Creek

- Existing Development
- 4 pit toilets
 - Internal trail network
 - Information kiosk
 - Informal camping sites

Clementine Creek

- Existing Development
- None

Trail System

- Existing Development
- None

Infallawatash Estuary

- Existing Infrastructure (on Timber Sales BC water lease)
- Large mooring float and ramp

Park Interpretation

- Existing
- BC Parks brochure
 - BC Parks website
 - Information kiosks at Twin Islands, Granite Falls and Bishop Creek

Park Maintenance

- Existing
- TWN year-to-year term contract for 50+ annual boat trips to four locations in Park (Raccoon Island, Twin Islands, Bishop Creek, Granite Falls)



Legend

- Say Nuth Khaw Yum Park Legal Boundary
- ▭ Say Nuth Khaw Yum Park Lands
- Park Development Node
- Existing Trail
- ▲ Campsite
- ℹ Information
- ⚓ Mooring Float
- ♻️ Privy
- ⚓ Yacht Club

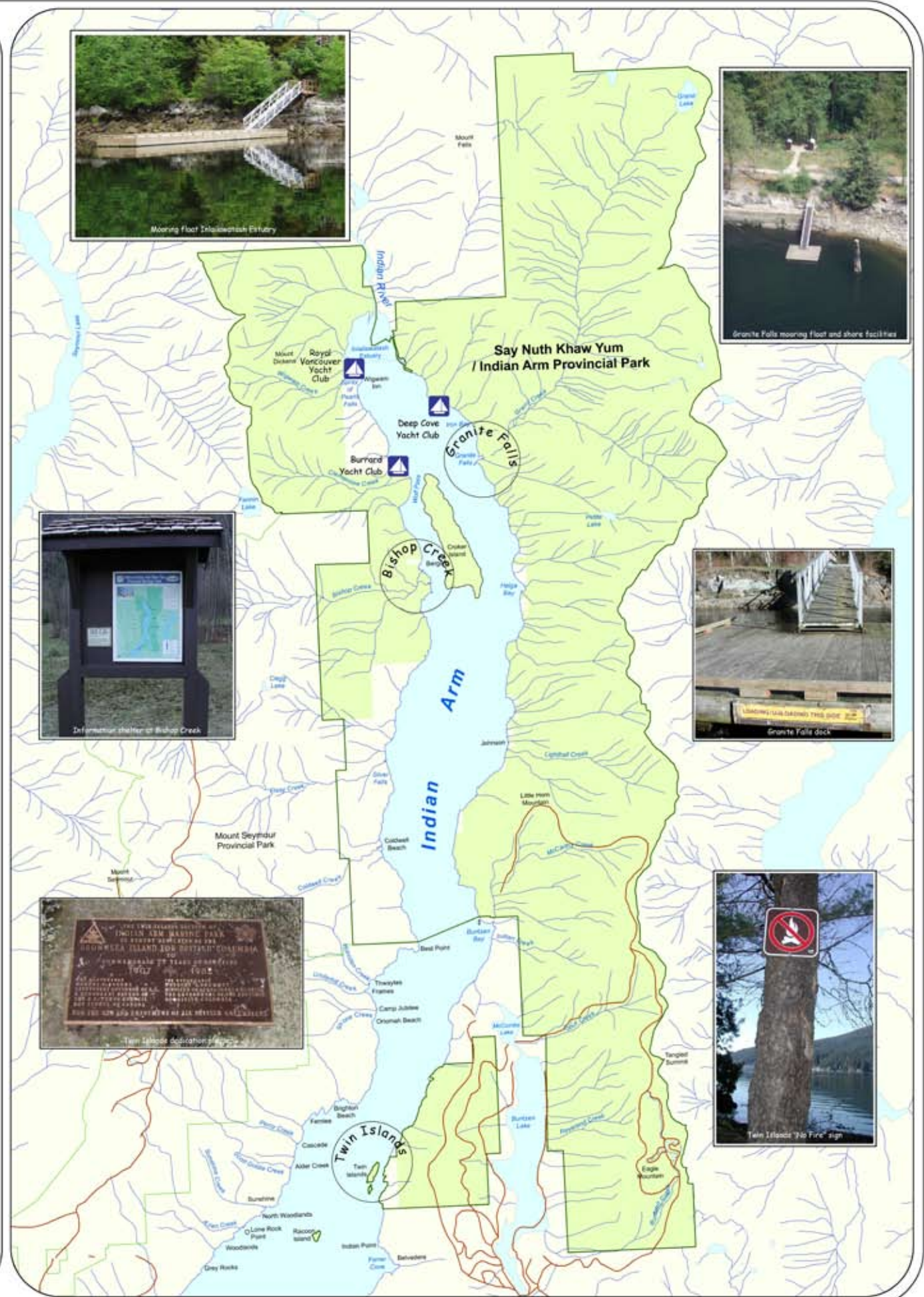
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Projection: Abers Equal Area, NAD 83, Zone 10

Scale: 0 0.5 1 Kilometers

Map Scale: 1:24,000
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**SAY NUTH KHAW YUM
/ INDIAN ARM
PROVINCIAL PARK**



**Map 29. Recreation Series:
Existing Marine Recreation Use Patterns**

Introduction

Indian Arm is a relatively narrow waterway that hosts a great variety of marine traffic. This activity falls into several general categories, including commercial traffic, resident traffic, recreation traffic to existing yacht clubs, and marine traffic directly accessing Park facilities. In considering issues related to marine access to the Park it will be necessary to maintain awareness of the following marine user groups and their use patterns:

- Commercial freighters that move in and out of anchorages located at the intersection of Indian Arm and Burrard Inlet.
- Commercial tour boat operators that offer day tours, dinner cruises, and party boat excursions that typically move north to Granite Falls, visit Silver Falls, then return to ports in Burrard Inlet and False Creek.
- Vessels that deliver construction, natural resource management, logging, road maintenance and other crews to job sites on Indian Arm or in the Indian River valley.
- Approximately 50 commuter vessels owned by permanent residents of marine access cottages. These vessels move up and down Indian Arm on a daily, year-round basis.
- Approximately 50 recreational vessels that are utilized on a part time basis by owners of marine access cottages.
- Large yachts that transit Indian Arm to and from three 'outstations' located at the head of Indian Arm. The facilities are operated by the Royal Vancouver, Deep Cove and Burrard Yacht Clubs.
- Kayakers who move singly and in small and large groups primarily to campsites at Granite Falls and Bishop Creek.
- Sports fishers who utilize Indian Arm for access to salmon and rockfish stocks.
- Commercial fishers who utilize Indian Arm primarily for seasonal crab and prawn trap fisheries.
- Sports divers who access nine primary dive sites identified on the adjacent map image.
- Submersible testing maintained by Can-Dive Services Ltd.
- Recreational boaters utilizing personal or rental vessels for day and weekend excursions.
- Members of the transient live-aboard and houseboat community that seasonally tie up at a variety of points in Indian Arm.



Wigwag Inn / Royal Vancouver Yacht Club

Legend

- Say Nuth Khaw Yum Park Legal Boundary
- Say Nuth Khaw Yum Park Lands
- ▲ Marine Access Campsite
- Scuba Diving Areas
- ▲ Yacht Clubs
- Mooring Float and Ramp

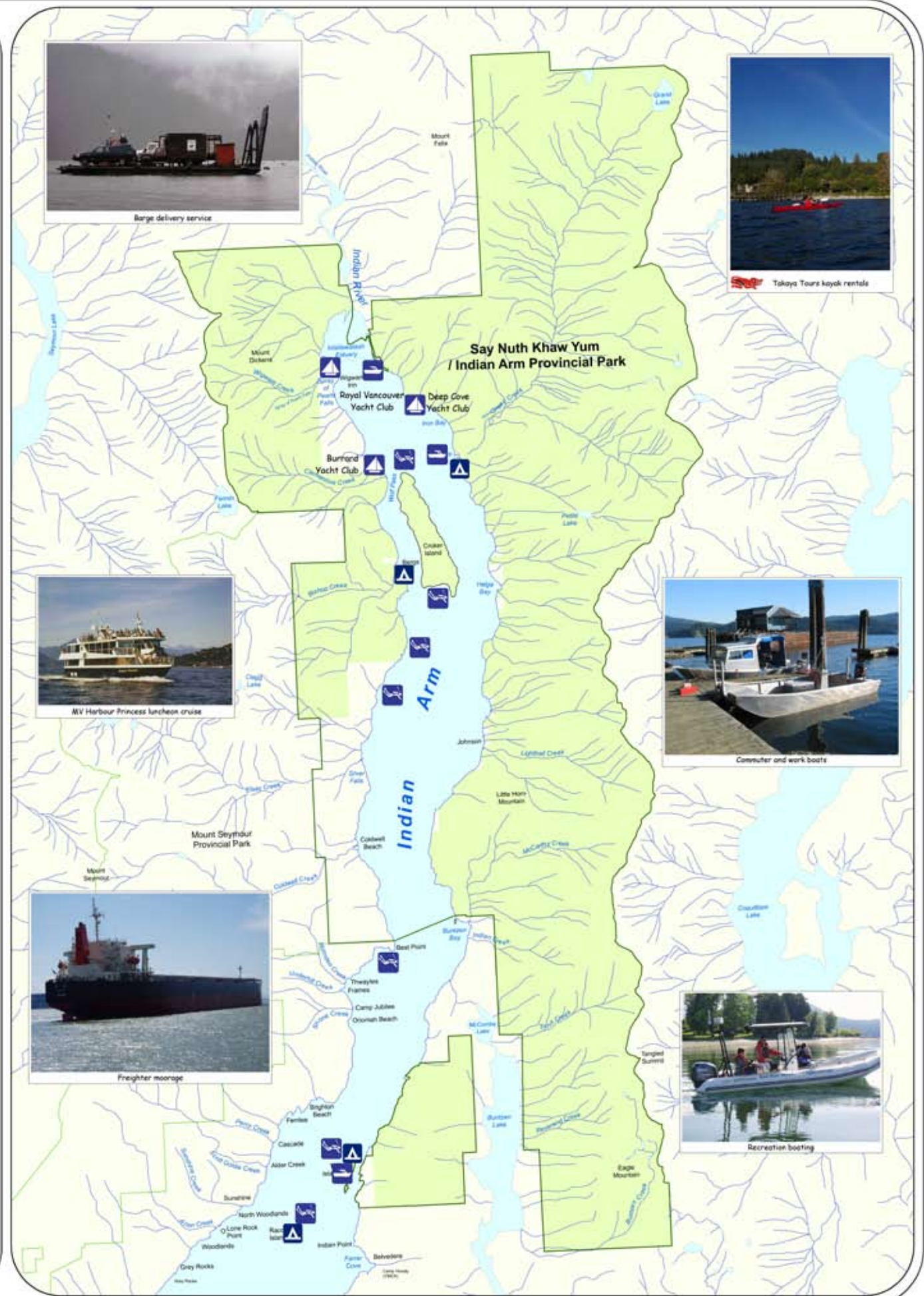
This map is a living document and is intended to be amended and refined over time. It is not an expression of the location of Tseil-Waututh Aboriginal Title. The data used to produce this map originate from many sources and are presented without prejudice. This map is the property of the Tseil-Waututh Nation and may only be reproduced with written permission.

Base data: TRIM, B.C. Ministry of Sustainable Resource Management, 1996.
Projection: Abers Equal Area, NAD 83, Zone 10

1 0.5 0 1
Kilometers

Map Scale 1:24,000
Map produced September 2006 and updated August 2008

This map was produced by the Tseil-Waututh Nation with the financial support from Fisheries and Oceans Canada and B.C. Parks, and technical assistance from Ecotrust Canada.



Barge delivery service



Takaya Tours kayak rentals



MV Harbour Princess luncheon cruise



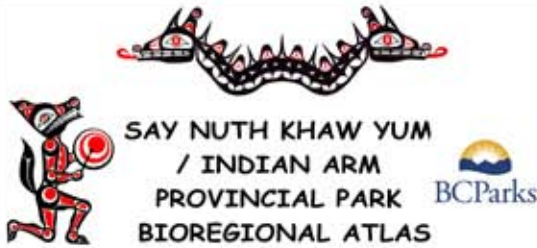
Commuter and work boats



Freighter moorage



Recreation boating



Map 30. Recreation Series: Existing Dive Sites

Introduction

Scuba diving and snorkeling are two of the more unique recreation opportunities available in Say Nuth Khaw Yum / Indian Arm Provincial Park. Long known as a destination for divers, Indian Arm provides relatively sheltered waters with several locations where a great variety of sea life can be viewed in water that has up to 30 meters of winter visibility. Species that can be viewed include small dahlia anemones, green urchins, burrowing cucumbers and painted greenlings. Lingcod, rockfish, small shrimp and hairy lithode crabs are also in abundance. Descriptions of several well known dive sites in the Park area are provided on the map image.

As with all recreational activities you must be prepared to dive in the cold, open waters of the north Pacific. Divers must be certified by either the Professional Association of Diving Instructors (PADI) or National Association of Underwater Instructors (NAUI). Basic open water diving certification from either association involves land-based review of training materials, approximately ten hours of pool training, and five supervised ocean dives. It is also possible to obtain higher levels of training within both the PADI and NAUI certification systems.

Once certified, divers must either rent or purchase equipment (see below) that can cost upwards to \$2,000. Once equipped, divers must maintain high levels of both safety and situation awareness at all times. Effort must especially be made to watch for motorized vessel traffic, to understand the interaction of water temperature, tides and currents, and to avoid contact with species such as the red jellyfish which can cause painful stings.

Required Diving Gear

Mask	Appropriate wet or dry suit	C-card and logbook
Snorkel	Fins	Mitts and Hood
Repair kits, First aid kits and oxygen kits	BCD (Buoyancy Control Device)	Weight belt and enough weights
Boots	Tanks (checked and filled)	Dive tables
Regulator with an octopus (alternate second stage), low-pressure inflator hose, and submersible pressure gauge	Any potentially needed items for specialty equipment like lights and cameras	Secondary accessories like knives, a sheath, collection bag, dive float, dive flag



Diver / photo by Dave Dillabough



Fuzzy crab / photo by Rob Ross

Legend

- Say Nuth Khaw Yum Park Legal Boundary
- Say Nuth Khaw Yum Park Lands
- Existing Dive Site

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Projection: Albers Equal Area, NAD 83, Zone 10

Scale: 1:24,000
Map produced September 2006 and updated August 2008

This map was produced by the Tsleil-Waututh Nation with the financial support from Fisheries and Oceans Canada and B.C. Parks, and technical assistance from Ecotrust Canada.



Map Location #1 - Diving at Croker Island

Description: Croker Island has two good dive locations, Croker Island South (the Fishbowl), and Croker Island North.

The Fishbowl provides an interesting setting with a controlled environment great for exploration and training. The bowl is approximately 300 meters in diameter. The raised rim is 15 to 25 feet deep and fringed with large rocks. Inside the bowl is an abundance of life.

The north tip is similar to other dives in northern Indian Arm. The dull grey-brown bottom makes the colours of the resident animals jump out. The bottom of Croker Island is steep-sloped mud and silt down to 50 to 60 feet. From there a medium slope runs to 100 feet or more, with silt-covered rocky outcroppings popping up in spots. No one creature is found in profusion, but a great variety of life can be easily found.

Hazards: Occasional boat traffic, red jellyfish. Depth at the north tip.

Access: Boat dive.

Location: Croker Island is 1.9 km (1 nautical mile) south of the mouth of the Indian River in northern Indian Arm. The Fishbowl is at the southeastern tip of the island. The tip is marked by a white circular tower with a white light on top, which flashes after dusk. The north dive site is at the northern most tip of the island. Anchorage is available at the north tip with good holding ground.

Map Location #3 - Diving at Powell Bay

Description: Powell Bay is a deep dive with interesting geography. The bay appears to have been carved out by a creek long ago. Underwater, an impressive drop-off is punctuated by small rocky ledges, a fissure, and a large overhang that is just big enough to allow a diver to wriggle in up to his or her head and shoulders. You can go deep in a hurry at this site or enjoy the view from a shallower depth when the visibility is good.

Since the site is compact, a leisurely dive allows you to enjoy the geography and the marine life scattered on the rock. Two unexpected inhabitants of this rocky area are sole and clams.

Hazards: Depth.

Access: Boat dive.

Location: Powell Bay is located 1.3 km (7 nautical miles) southwest of the southern tip of Croker Island in northwestern Indian Arm. The bay is a small steep-sided indentation in the coastline immediately south of Rockfish Wall. Anchorage is difficult even for small boats, because the bottom slopes away at a very steep angle. A tended boat is advised.

Map Location #5 - Diving at Racoon Island

Description: Racoon Island is a bright dive that is perfect for those who like to cover a lot of territory while under water. Shallow or deep, it holds many interesting sights. The medium to steep bottom drops to 300 feet or more and alternates between sand/crushed shell bottom and craggy, sometimes jagged, rock formations. Most of the marine life lies in 80 feet or less. There is a good mix of invertebrates spread out over a large area. Focus on the bottom at the southeastern tip and you'll notice that it seems to move as thousands of colourful shrimp dart about the sand and rock.

Hazards: Boat traffic, depth and red jellyfish.

Access: Boat dive.

Location: Racoon Island is located 1.5 km (8 nautical miles) northwest of Bedwell Bay in southern Indian Arm. The dive site is located along the entire length of the eastern side of the island.

Map Location #7 - Diving at Rockfish Wall

Description: Rockfish Wall allows divers to hang weightless in the water while viewing a vertical world of sea creatures. The wall has an impressive flat face similar to its above-water extension, with a large boulder stream ledge in 50 to 60 feet on the northern section. The base of the wall runs to 100 feet or more before meeting a steep sand bottom. Cracks and crevices are present and bear investigation.

Rockfish Wall is an awesome sight on days with good visibility. You can see from top to bottom and recognize some of the marine life from far off. Rockfish are everywhere. If you look out in the open, in crevices, or even under rocks, you are likely to spot quillbacks and coppers on their own or in small groups.

Hazards: Depth.

Access: Boat dive.

Location: Rockfish Wall is 9 km (5 nautical miles) southwest of Croker Island light in northwest Indian Arm. To find the dive site, look for the first large vertical wall southwest of Croker Island with large splashes of yellow high above the waterline.

Map Location #4 - Diving at Best Point

Description: Best Point is a fun site to explore because of its changing geography. It is a world of walls, ledges, and steep slopes with interesting non-made and natural attractions.

In addition to its natural attractions, Best Point has some man-made objects, including a bicycle, a couple of barrels, some rusty cables that are slowly being covered by grey plumose anemones and mussels, and several unidentifiable rusting metal lamps.

Hazards: Depth, red jellyfish and float lines.

Access: Boat dive.

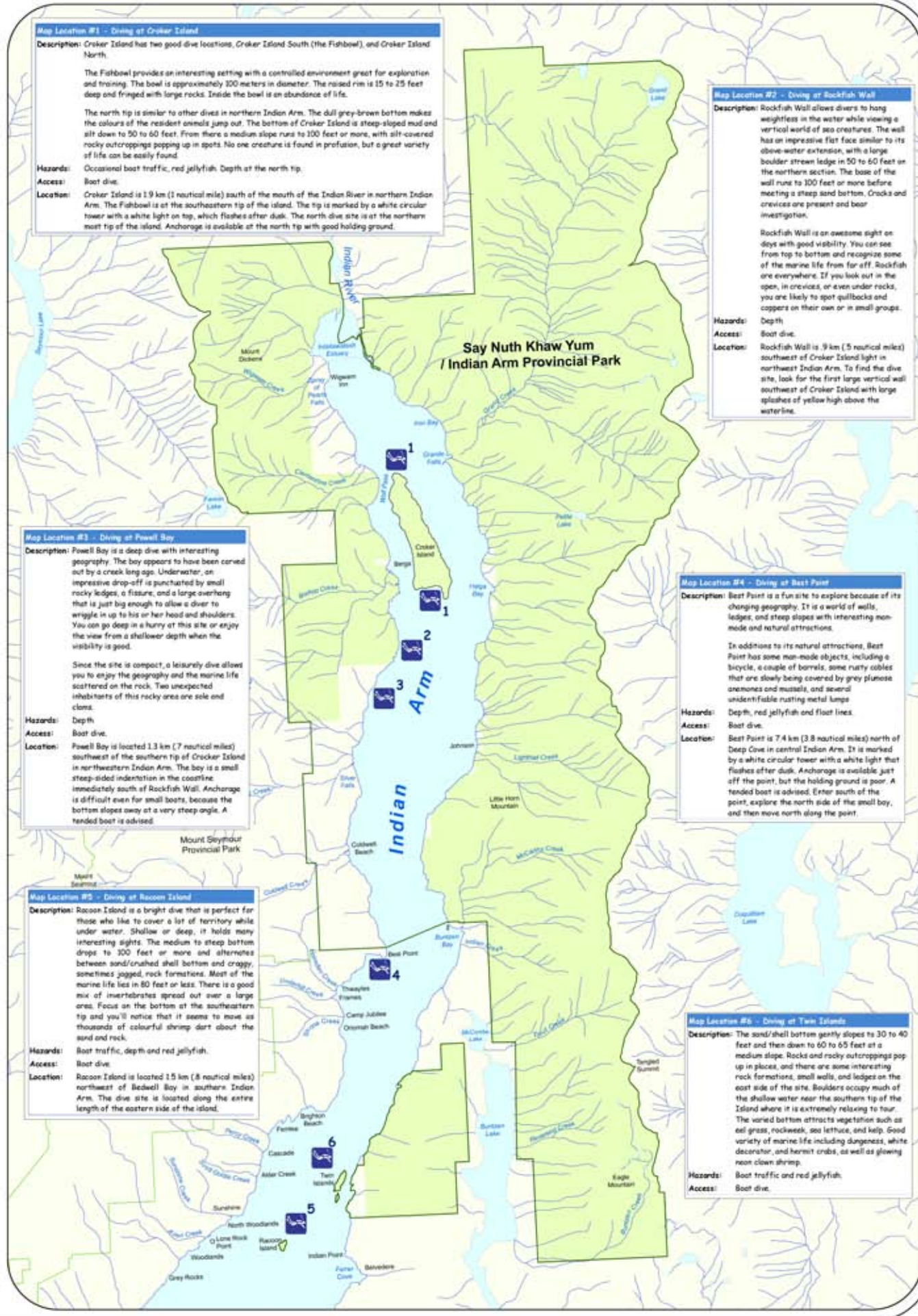
Location: Best Point is 7.4 km (3.8 nautical miles) north of Deep Cove in central Indian Arm. It is marked by a white circular tower with a white light that flashes after dusk. Anchorage is available just off the point, but the holding ground is poor. A tended boat is advised. Enter south of the point, explore the north side of the small bay, and then move north along the point.

Map Location #6 - Diving at Twin Islands

Description: The sand/shell bottom gently slopes to 30 to 40 feet and then down to 60 to 65 feet at a medium slope. Rocks and rocky outcroppings pop up in places, and there are some interesting rock formations, small walls, and ledges on the east side of the site. Boulders occupy much of the shallow water near the southern tip of the Island where it is extremely relaxing to tour. The varied bottom attracts vegetation such as eel grass, rockweed, sea lettuce, and kelp. Good variety of marine life including dugessens, white decorator, and hermit crabs, as well as glowing neon clown shrimp.

Hazards: Boat traffic and red jellyfish.

Access: Boat dive.



Plan Goals

The Park Management Plan has four main goals: Collaborative Partnerships, Cultural Expression, Integrated Stewardship and Public Recreation. These goals help guide the development of management objectives and strategies.

Goal 1: Collaborative Partnerships

To collaborate with stakeholder agencies, authorities and organizations to achieve the effective implementation of the objectives and strategies proposed in this Plan.

The Board recognizes that a broad collaborative management approach is required to coordinate the many agencies and authorities that currently service the Park. In particular, forming partnerships with organizations that currently have jurisdiction and enforcement authority within the boundaries of the Park and adjacent areas will assist the Board in ensuring public safety, monitoring recreational activities, and protecting natural and cultural resources.

Goal 2: Contemporary Cultural Expression

To protect, celebrate and share the richness of Tsleil-Waututh connections to Say Nuth Khaw Yum from the past and present.

The Park provides an immense opportunity for the Tsleil-Waututh Nation and the Province to highlight the significant cultural heritage of the area to all British Columbians. It is important to ensure that Tsleil-Waututh culture and traditions are recognized as a key requirement for the long-term, sustainable stewardship of the Park.

The Plan includes management direction for the use of Tsleil-Waututh design and Coast Salish cultural motifs and narratives in signage, facilities, and interpretive programming.

The protection of cultural and archaeological resources sacred to the Tsleil-Waututh Nation is paramount.

The Plan also identifies Tsleil-Waututh economic opportunities in the Park.

Goal 3: Integrated Stewardship

To effectively manage and protect the natural and cultural resources of the Park in a holistic and integrated fashion, while respecting cultural, economic, and recreational values.

The Board will use an Integrated Stewardship approach in the management of the Park. The Integrated Stewardship approach combines Tsleil-Waututh principles of bioregional planning and holism with BC Parks' ecosystem-based management approach. The Tsleil-Waututh approach is based upon maintaining deep knowledge of the interactions between biophysical and cultural landscapes.

BC Parks focuses on the interrelationships of ecosystem components for long-term large-scale planning.

The use of an Integrated Stewardship approach also speaks to the importance of collaborating with agencies, authorities and organizations that have jurisdiction and interests in and around the Park.

Goal 4: Public Recreation

To provide safe, accessible and diverse opportunities for marine, land, and backcountry recreation in a manner consistent with the natural and cultural values of the Park.

The Park currently provides basic recreational infrastructure for hiking, day-use, overnight camping, and motorized and non-motorized boating activities. One of the main goals of the Plan is to develop an outdoor recreation site network that would enhance existing uses, provide a number of new recreational opportunities for a variety of users and encourage greater public appreciation of the natural and cultural resources of the Park.

The Board aims to provide safe and accessible public recreation opportunities that are balanced by an Integrated Stewardship approach to ensure that proposed recreational activities will have minimal impacts on the natural and cultural values.



Left to Right: TWN staff Ed Thomas, BC Parks Ranger Kelly Diamond, and TWN staff Evan Stewart



Management Direction

To assist the Board in implementing the overall goals of this Park Management Plan, a comprehensive range of detailed management objectives and strategies has been developed based on an analysis of all current information available and in accordance with the 1998 Management Agreement.

These management objectives and strategies have been organized under five summary headings:

Natural Values
Cultural Values
Outdoor Recreation
Visitor Services
Land Development

The management objectives identify the important values that require management direction, while the proposed management strategies identify the specific tasks required to implement each objective.



Vegetation in the Park is vulnerable to natural and human impacts, and invasive species.

Natural Values

Freshwater

Objective:

- 1.0 Maintain water quality within the Park for ecological, conservation, aesthetic, and health considerations.

Strategies:

- 1.1 Ensure natural processes such as river erosion and sediment deposition are allowed to continue unimpeded, except for developments that protect infrastructure and facilities from flooding or erosion.
- 1.2 Protect freshwater habitat for fish and other species.
- 1.3 Develop and maintain all existing and future sanitary facilities to standards that prevent contamination of surface and sub-surface water resources.
- 1.4 Ensure recreational activities do not degrade the quality of surface and sub-surface water resources.
- 1.5 Promote the sustainable use of freshwater resources by all facilities, recreation users, park use permit holders and adjacent land owners through educational materials and outreach.
- 1.6 Work cooperatively with agencies and authorities to manage water in a low-impact and sustainable manner.

Vegetation and Forests

Objective:

- 2.0 Protect and re-establish the full diversity of native vegetation species and habitats that existed in the Park prior to 1900.

Strategies:

- 2.1 Prepare a Vegetation Management Plan which includes strategies for:
 - Fire management
 - Disease and insect infestation
 - Invasive plants
 - Hazard trees
 - Vegetation restoration
 - Visual quality
 - Protection of Red & Blue listed species
- 2.2 Retain wildlife trees and snags for use by various bird and animal species except where they pose a hazard to people or facilities.
- 2.3 Assess, monitor and control noxious weed and invasive plant populations through mechanical means.



Inlailwatash estuary is home to a variety of bird and marine species.

- 2.4 Construct recreational facilities in a manner that limits impacts to natural vegetation and visual quality.

Objective:

- 3.0 Strive to avoid the use of chemical pesticides in the Park.

Strategies:

- 3.1 Work cooperatively with agencies, authorities and organizations to adopt environmentally friendly and non-chemical methods of pest management in the Park.

Fish and Wildlife

Objective:

- 4.0 Maintain the natural diversity, distribution and population of animal, bird and fish communities and habitats.

Strategies:

- 4.1 Prepare a Wildlife Management Plan which includes strategies for:
- Inventory and monitoring of keystone species, Red and Blue listed species and other selected species.
 - Restoration and protection of a range of wildlife and riparian habitats particularly for salmon.
 - Managing transboundary wildlife issues.
 - Wildlife recovery programs such as the Roosevelt elk recovery program.

Objective:

- 5.0 Minimize the impacts of recreation and development activities on wildlife and wildlife habitats.

Strategies:

- 5.1 Ensure all developments are properly located, designed and managed to minimize impacts on wildlife and wildlife habitats including riparian and marine fish habitat areas.
- 5.2 Identify areas with potential for wildlife-human conflict and determine appropriate measures to avoid and mitigate those impacts.
- 5.3 Develop informational materials to educate the public on wildlife-human interactions.
- 5.4 Consult with appropriate stakeholders respecting a proposal to prohibit recreational hunting and trapping in the Park due to public safety and conservation concerns.

Objective:

- 6.0 Work cooperatively with all agencies and authorities in wildlife and fisheries management and conservation.

Strategies:

- 6.1 Support the work of the Tsleil-Waututh Nation and other organizations engaged in fisheries and wildlife restoration work in the Indian River watershed and in areas adjacent to the Park.



Land Stability

Objective:

7.0 Mitigate and minimize the occurrence of landslides due to human impacts.

Strategies:

7.1 Prepare a Landslide Mitigation Plan which includes:

- Inventory of landslides
- Landslide risk assessment
- Restoration Plan
- Educational materials

7.2 Work cooperatively with agencies and relevant organizations, to decommission abandoned logging roads and restore the area to its natural state.

7.3 Conduct geotechnical studies as part of the environmental impact assessment process for all proposed developments.



Aerial view of Raccoon Island and Twin Islands

Objective:

8.0 Limit soil erosion from Park activities.

Strategies:

8.1 Ensure any recreation development and maintenance activities related to trails and other infrastructure minimizes erosion of surface materials into creeks, streams, lakes, the estuary, foreshore and Indian Arm.

Climate Change

Objective:

9.0 Develop an understanding of the effects of climate change on Park values and consider the impacts to management objectives and strategies over the short and long-term.

Strategies:

9.1 Create flexible management strategies to be responsive to changes caused by climate change.



Aerial view of Inlailawatash Estuary and Croker Island.

Management Direction

- 9.2 Support research and long-term studies to increase the understanding of how natural resources have changed over time, using a combination of scientific research and traditional knowledge.
- 9.3 Support long-term studies, such as the Tsleil-Waututh Nation Marine Stewardship Program, that contribute to understanding of the impacts of climate change in the area.
- 9.4 Develop educational materials related to the effects of climate change on wild life, habitats, ecosystems and cultural resources.

Cultural Values

Objective:

- 10.0 Preserve and safeguard cultural and archaeological resources in their natural setting and condition.

Strategies:

- 10.1 Develop a Cultural Resources Management Plan to assess, monitor, protect and manage all cultural and archaeological resources.
- 10.2 Restrict public access to sites deemed physically or culturally sensitive by such methods as maintaining the confidentiality of sites, rerouting trails, and issuing permits.
- 10.3 Conduct archaeological reviews on any development activities in the Park and where necessary, undertake Archaeological Impact Assessments.

Objective:

- 11.0 Respect the Tsleil-Waututh Nation's exclusive authority for the management and interpretation of Tsleil-Waututh culture and cultural resources per the Management Agreement.

Strategies:

- 11.1 Work with the Tsleil-Waututh Nation, agencies, authorities and other organizations to educate the public about cultural resources and to enforce the Heritage Conservation Act.
- 11.2 Incorporate Tsleil-Waututh place names into Park sites and features.
- 11.3 Provide opportunities for the public to experience and learn about Tsleil-Waututh history and culture.

Cultural Heritage Resources

Objective:

- 12.0 The Plan will not hinder the aboriginal rights of First Nations to conduct



Ernest N. George in a canoe on the Indian River circa 1920.

traditional use activities and to harvest any natural resources for sustenance, ceremonial or medicinal use.

Strategies:

- 12.1 First Nations will be consulted prior to any actions that may have an impact on cultural or archaeological resources and aboriginal rights and title.

Natural & Cultural Programming

Objective:

- 13.0 Promote a greater understanding and appreciation of the natural and cultural values of the Park.

Strategies:

- 13.1 Recommend changing the legal name of the Park to "Say Nuth Khaw Yum Provincial Park".
- 13.2 Tsleil-Waututh Nation will develop a Natural and Cultural Interpretation and Guiding Program to communicate the themes and messages that highlight special ecological and cultural aspects of the Park in partnership with BC Parks.
- 13.3 Tsleil-Waututh Nation will develop appropriate cultural and natural interpretation materials in partnership with BC Parks.





Leah George-Wilson speaking on behalf of the Tsleil-Waututh Nation

- 13.4 Include Tsleil-Waututh design and Coast Salish motifs on park signage to provide information on topics such as environmental stewardship, cultural heritage, navigational maps, and health and safety.
- 13.5 Develop a Communications Strategy to ensure information is accessible to all users and to promote the natural and cultural uniqueness of the Park.
- 13.6 Tsleil-Waututh Nation will develop a cross-cultural orientation workshop for BC Parks staff, and others to facilitate cross-cultural communication and greater understanding of the collaborative management arrangement between the Tsleil-Waututh Nation and the Province of British Columbia.

Research Activities

Objective:

- 14.0 Compile and maintain a comprehensive data set for the Park.

Strategies:

- 14.1 Identify data gaps and initiate research studies to fill those gaps.
- 14.2 Update the Bioregional Inventory Atlas as required.

Objectives:

- 15.0 Encourage the use of traditional knowledge and aboriginal ways of knowing in research studies.

Strategies:

- 15.1 Encourage researchers to develop joint projects and establish research protocols with the Tsleil-Waututh Nation.

Objective:

- 16.0 Ensure all research is designed in a manner that reflects the natural, cultural and recreational values expressed in this Plan.



Little Twin Island has one of the most fragile ecosystems in the Park.



Camping at Granite Falls.

Strategies:

- 16.1 Research projects will be reviewed by the Board. The Board will make recommendations on the approval of any research project proposal, as well as, the terms and conditions of required permits and protocols.
- 16.2 All reports and documents produced from any research conducted in the Park will be submitted to the Board for review and will be added to the Park data sets.

Outdoor Recreation

Public Recreation

Objective:

- 17.0 Provide a variety of recreational opportunities and facilities for visitors with minimal impact on natural and cultural resources.

Strategies:

- 17.1 Manage uses according to the land use designation scheme adopted in this Plan to minimize user conflicts and impacts to recreational sites.
- 17.2 Locate and design all new facilities in harmony with the surrounding area and according to provisions specified in this Plan.

Objective:

- 18.0 Ensure public health and safety.

Strategies:

- 18.1 Guardian posts may be established for Tsleil-Waututh and BC Park Rangers at sites where deemed necessary to monitor and assist recreational users during the peak season, and to undertake compliance and enforcement activities when appropriate.
- 18.2 Coordinate with the RCMP, Transport Canada and Search and Rescue organizations to ensure plans are in place to respond to individuals and parties that are lost, injured or otherwise in distress.

Hiking & Backcountry Recreation

Objective:

- 19.0 Provide a variety of safe and unique hiking and backcountry recreation opportunities with minimal impacts on natural and cultural resources.

Strategies:

- 19.1 Develop trail systems appropriate for day-hikers at designated recreational sites.
- 19.2 Develop a high elevation trail system (Indian Arm Trail Network) with basic hut to hut accommodations linked by a passenger shuttle service to provide a continuous backcountry hiking route.
- 19.3 Construct hiking trails and backcountry facilities with minimal impacts to the natural and cultural resources, with special attention to preventing soil erosion.
- 19.4 Work cooperatively with private landowners, agencies, authorities, and organizations in planning proposed trail networks.
- 19.5 The construction and use of informal and illegal trails will be actively discouraged and strictly monitored, and will be subject to appropriate compliance and enforcement actions.
- 19.6 Access to the backcountry may be limited during winter months, and during extreme weather or fire hazard periods as deemed necessary.
- 19.7 Provide information kiosks and signs at trailheads and other appropriate locations deemed necessary for safety and navigation purposes.



Camping

Objective:

- 20.0 Provide a variety of camping opportunities for individuals and groups with minimal impact on natural and cultural resources.



Kayak rental kiosks are envisioned for Bishop Creek and Granite Falls.

Strategies:

- 20.1 Conduct feasibility and impact studies for all proposed camping facilities.
20.2 Construct camping pads where possible to minimize the impacts on natural and cultural resources.
20.3 Designate appropriate camping sites for large groups and commercial groups, and restrict these groups to those areas.
20.4 Provide visitors with information about low-impact camping and the necessary supplies and gear required for different recreational activities.
20.5 Enforce and monitor campfire restrictions closely to avoid fire hazards and destruction of natural and cultural resources.
20.6 Explore the feasibility of seasonal campfires in particular areas of the Park.
20.7 Explore the feasibility of using the current BC Parks camping reservation system to improve recreational services to visitors.

Mountain Biking & Horseback Riding

Objective:

- 21.0 Provide mountain biking and horseback riding opportunities with minimal impacts to natural and cultural resources.

Strategies:

- 21.1 Designate the Lakeview Trail that begins from the Buntzen Lake Recreation Area as a multi-use trail for mountain biking, horseback riding and hiking.
21.2 Provide signage that clearly identifies the Lakeview Trail as a mountain biking, horseback riding and hiking route with connections to the Buntzen Lake Recreation Area.
21.3 Assess and monitor all existing and proposed trails for environmental impacts and compatibility of uses. Where required, trails may be closed to mountain biking and/or horseback riding to minimize impacts to the environment and public safety.

Commercial Activities

Objective:

- 22.0 Support Tsleil-Waututh economic opportunities as per the Management Agreement.

Strategies:

- 22.1 Support identified Tsleil-Waututh Nation commercial activities such as, but not limited to:
•Tsleil-Waututh Nation Longhouse Interpretation Centre at Granite Falls
•Replica Coast Salish Village at Bishop Creek
•Kayak rental kiosks at Bishop Creek and Granite Falls
•Passenger shuttle services at Bishop Creek and Granite Falls
22.2 Reference Tsleil-Waututh economic operations in communications and promotional materials.

Objective:

- 23.0 Support existing commercial recreational uses, and encourage appropriate future opportunities.

Strategies:

- 23.1 Where feasible, designate areas for commercial operations to avoid conflict with public recreation.
23.2 Encourage commercial operators to develop joint projects and establish operational partnerships with the Tsleil-Waututh Nation.

Management Direction

- 23.3 Applications for commercial activities in the Park will be reviewed by the Board. The Board will make recommendations on the approval of any such application, as well as the terms and conditions of park use permits and protocols.

Objective:

- 24.0 Ensure commercial facilities and activities do not negatively impact natural and cultural resources.

Strategies:

- 24.1 Require feasibility and impact studies for new and/or expanded commercial ecotourism facilities at proposed sites.

Visitor Services

Access Management

Objective:

- 25.0 Provide safe and appropriate access to public recreation areas.

Strategies:

- 25.1 Develop visitor information kiosks at appropriate access points, with maps, natural and cultural interpretation, safety and security, and low-impact hiking and camping information.
- 25.2 Where possible, provide kayakers and other non-mechanized boaters with the most accessible areas for embarking and disembarking at recreational sites.
- 25.3 Develop an Emergency Management Plan with adjacent jurisdictions and relevant organizations.

Objective:

- 26.0 Secure public access to recreational areas through private and/or publicly owned lands and marine areas where necessary.

Strategies:

- 26.1 Work cooperatively with adjacent jurisdictions and relevant organizations to provide opportunities for public access to the Park.
- 26.2 Work cooperatively with BC Hydro to maintain trailheads in the Buntzen Lake Recreation Area.
- 26.3 Work cooperatively with the Port Metro Vancouver to ensure marine facilities are adequate and appropriate for accessing marine recreational sites. Comply with Port Metro Vancouver development guidelines.



RCMP Patrol Boat

Objective:

- 27.0 Manage the use of trails and access points for minimal impacts to natural and cultural resources.

Strategies:

- 27.1 Monitor access to recreational areas to ensure that sites are not over-used or damaged. Temporary closures may be imposed in order to protect sites from damage and to permit regeneration.
- 27.2 Motorized vehicles are prohibited, except for specific management purposes.
- 27.3 Horses and mountain bikes are prohibited, except on designated trails.
- 27.4 Restrictions on aircraft access will be considered. Consultation with appropriate stakeholders is required.

Monitoring and Enforcement

Objective:

- 28.0 Protect the safety of visitors and the integrity of Park facilities and structures.

Strategies:

- 28.1 Develop a Monitoring and Enforcement Plan that safeguards facilities,



recreation sites, park values and activities. The Plan may include strategies for:

- Regular monitoring to enforce appropriate levels of use.
- Guardian Posts at appropriate recreation sites to provide monitoring and enforcement.
- Work with local residents and recreational users to supplement monitoring activities through an “observe, record, report” system.

Objective:

29.0 Increase the role of the Tsleil-Waututh Nation in operational activities including monitoring and enforcement.

Strategies:

29.1 Assess methods for increasing the role of the Tsleil-Waututh Nation in monitoring and enforcement in the Park. Methods could include the expansion of operational contracts, training, and integration with other Tsleil-Waututh projects and initiatives.



Visual Quality

Objective:

30.0 Maintain and, where possible, enhance the visual quality of natural and culturally important viewscales within the Park.

Strategies:

30.1 Identify natural and culturally important viewscales in the Park.

30.2 Work cooperatively with agencies, authorities, and other relevant organizations to restore visual quality of important viewscales.

30.3 Work cooperatively with park use permit holders, adjacent land owners, private business interests and others to ensure that any development preserves natural and cultural visual quality values.

30.4 Work cooperatively with agencies, authorities and other organizations to minimize visual impacts of past resource development activities in areas adjacent to the Park.

Facilities Development

Objective:

31.0 Construct and maintain appropriate visitor facilities that minimize impacts on natural and cultural resources.

Strategies:

31.1 All new facility developments will require appropriate assessments and approvals, which may include environmental, archaeological, geotechnical, or marine impact assessments.

31.2 Ensure any new developments are appropriate to the type and level of recreational use.

31.3 Ensure any developments on land are properly located, designed and managed to minimize impacts, particularly to foreshore erosion and contamination of the marine environment.

31.4 Construct facilities using principles of sustainability where feasible, with goals to achieve green building and Leadership in Energy and Environmental Design standards (LEED).

Objective:

32.0 Ensure facilities are consistent with the cultural values of the Park.

Strategies:

32.1 Where appropriate, facilities will be designed with contemporary expressions of Tsleil-Waututh design and Coast Salish motifs.

Management Direction

- 32.2 Ensure any proposed development is aesthetically pleasing and blends in with the natural environment.
- 32.3 Facilities will meet BC Parks standards.

Objective:

- 33.0 Minimize the incidences of vandalism and misuse of recreational facilities.

Strategies:

- 33.1 Design and construct facilities using resilient materials and safety conscious designs.
- 33.2 Monitor the use of moorage floats and buoys for public access, health and safety.

Waste Disposal

Objective:

- 34.0 Ensure the proper disposal of sanitary and other wastes with minimal impacts to natural and cultural resources.

Strategies:

- 34.1 Feasibility and impact studies will be conducted on the design and location of sanitary facilities.



Private residences are a common sight along the west and east sides of Indian Arm adjacent to the Park.

Land Development

Utility Infrastructure Developments

Objective:

- 37.0 Ensure public safety and minimize the impacts to natural, cultural and visual resources from utility infrastructure (hydro lines, gas lines, pipelines etc.).

Strategies:

- 37.1 Work cooperatively with utility corporations to limit public access and recreational uses in and around right-of-ways.
- 37.2 Educate the public and residents on safety in and around utility right-of-ways.
- 37.3 Conduct feasibility studies on the expansion of telecommunications infrastructure in the Park to improve management and to increase public safety.
- 37.4 Work cooperatively with utility corporations, such as BC Hydro, BC Transmission Corporation (BCTC), and Terasen Gas, to ensure new and existing development and maintenance activities have minimal impacts on natural, cultural and visual values.
- 37.5 Work cooperatively with utility corporations to ensure the use of non-chemical vegetation management techniques in right-of-ways.



Existing Tenures

Objective:

- 36.0 Manage park use permits in a manner that is consistent with the natural and cultural values of the Park.

Strategies:

- 36.1 Work cooperatively with park use permit holders to ensure that all permit conditions are met and are consistent with Park values. Park use permits that are not in compliance with the terms and conditions of the permit may be cancelled.
- 36.2 If park use permits currently issued for any Park properties are cancelled, future management direction and zoning will be considered on a site-by-site basis.
- 36.3 Develop materials to communicate development guidelines.
- 36.4 Maintain regular communications with park use permit holders, adjacent land owners, and agencies and authorities to coordinate park management activities and adjacent uses.

Park Boundaries and Adjacent Planning Process

Objective:

- 38.0 Adjust Park boundaries to follow the natural boundaries of watershed units.

Strategies:

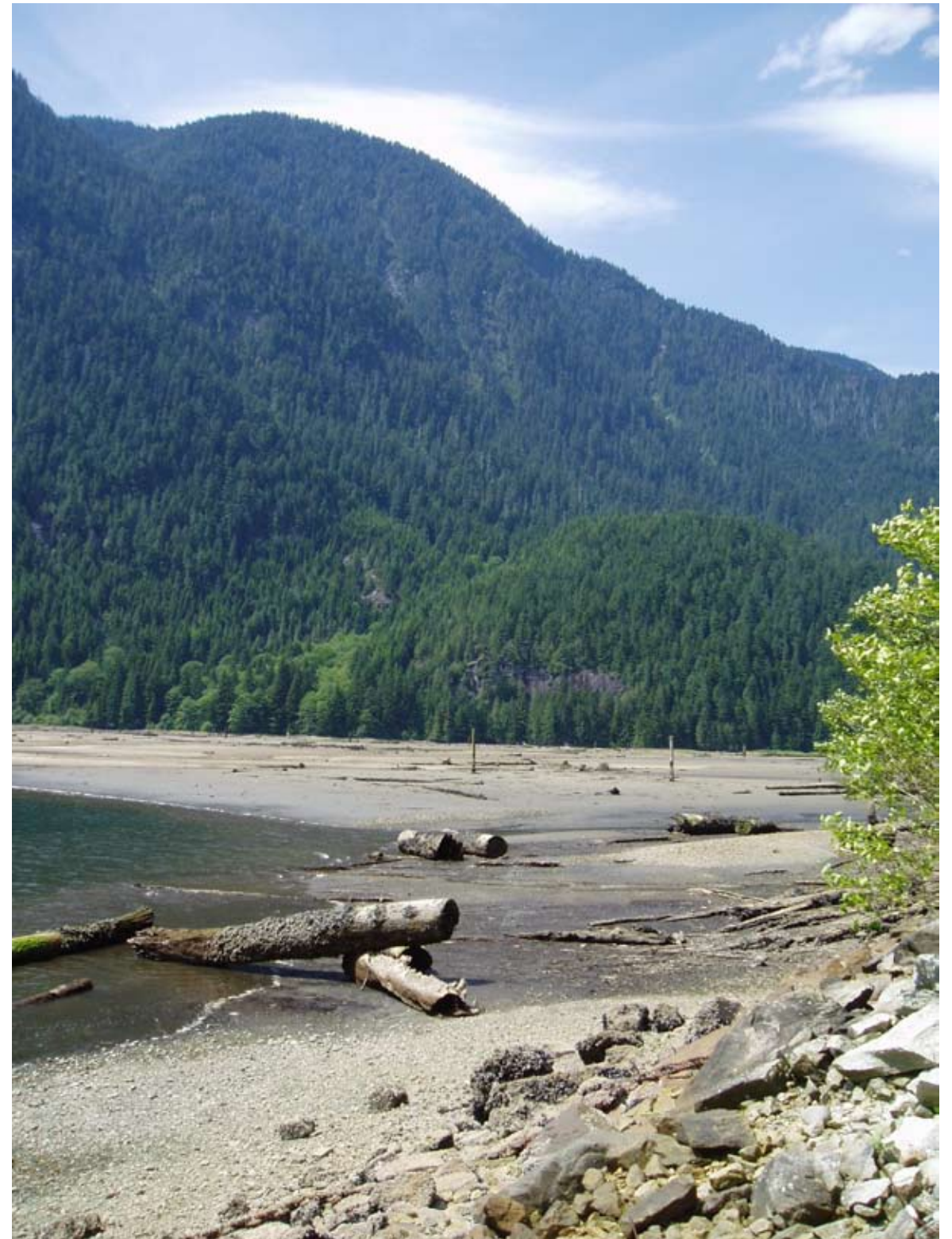
- 38.1 Consider opportunities for park acquisitions that would align the Park boundary with natural watershed boundaries.
- 38.2 Where feasible, Crown or fee-simple properties that are important for the protection and conservation of natural, cultural and recreational values will be acquired for Park expansion purposes.
- 38.3 Consider wildlife movement and habitat requirements in park boundary adjustments.

Objective:

- 39.0 Coordinate Park management goals and objectives with adjacent planning processes and management plans.

Strategies:

- 39.1 Work cooperatively with agencies and authorities in the development and implementation of adjacent plans (i.e. Indian River Watershed Plan and Whey-ah-Wichen/Cates Park Master Plan).





**SAY NUTH KHAW YUM
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Map D: Outdoor Recreation Site Network



Buntzen Lake recreation site



Kayaks at Bishop Creek

Legend

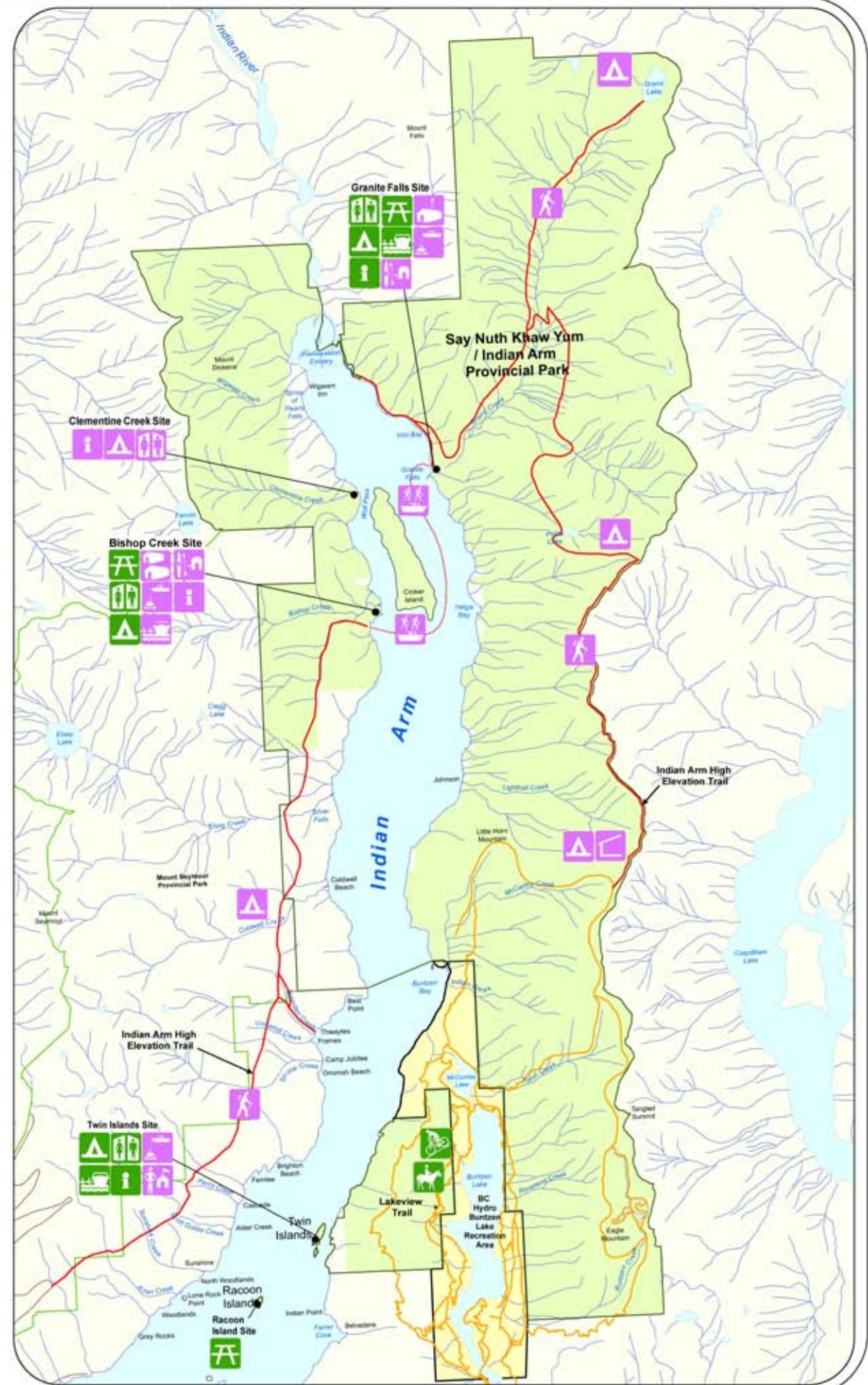
- | | | | |
|--|---|--|---|
| | Camping | | Longhouse |
| | Coast Salish Villiage | | Mooring |
| | Dock | | Mountain Biking |
| | Guardian | | Passenger Shuttle Service |
| | Hiking / Backpacking | | Picnic |
| | Horseback Riding | | Shelter |
| | Information | | Washrooms |
| | Kayak Rental | | |
| | Existing Facilities | | Proposed Facilities |
| | Say Nuth Khaw Yum Park Legal Boundary | | Regional Trails |
| | Say Nuth Khaw Yum Park Lands | | Paved Road |
| | Proposed Passenger Shuttle Service | | BC Hydro Buntzen Lake Recreational Area |
| | Proposed Indian Arm High Elevation Trails | | |

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Projection: Albers Equal Area, NAD 83, Zone 10

Scale: 0 0.5 1 Kilometers
Map Scale 1:24,000
Map edition: August 2008





LAND USE DESIGNATIONS

Land use designations are used to assist in the planning and management of parks by dividing the area into logical spatial units. Each land use designation indicates the appropriate level of management and development, based on the values identified for the Park. The designations reflect the desired and allowable land uses, the existing and projected patterns of access, and the intended degree of human use. All development improvements contemplated in the zones are subject to a review and approval process to meet Plan objectives and strategies.

The land use designations identified for this Plan are the result of merging the distinctive planning approaches of the Tsleil-Waututh Nation and BC Parks. The Tsleil-Waututh Nation's land use decisions are based on a holistic vision of sustainability that takes into account cultural, social, economic and ecological values for the stewardship of their traditional territory over time. BC Parks' land use decisions consider the recreation and conservation values to ensure representative and unique areas are protected across the Province (see Appendices).

As a result of this collaborative effort, the Board used both planning approaches to create land use designations that reflect the complexity of cultural, natural, recreational, public access and safety values of the Park.

A total of five land use designations have been identified for Say Nuth Khaw Yum / Indian Arm Provincial Park to provide guidance on the appropriate activities, facilities and management level for specific areas:

- Wilderness Recreation Zone
- Nature Recreation Zone
- Intensive Recreation Zone
- Special Features Zone; and
- Tsleil-Waututh Management Areas

For detailed descriptions of the appropriate activities and facilities for each land use designation, please refer to the *Table of Appropriate Activities and Facilities* on page 71.

Wilderness Recreation Zone

The Wilderness Recreation Zone protects remote, undisturbed, natural landscapes and provides opportunities for backcountry recreation dependant on a pristine environment. It is intended for areas normally greater than 5,000 hectares. A minimal level of facilities and structures helps to limit access and minimize human presence.

Land Use Designations

In this zone, motorized access on trails and unmarked areas may be restricted. In areas identified for backcountry recreation, basic trail and camping facilities may be provided. Most of the Park is zoned Wilderness Recreation, including Raccoon Island and the south-east portions of the Park adjacent to BC Hydro's Buntzen Lake Recreation Area. The zone also includes the proposed Indian Arm High Elevation Trail, which would provide visitors with backcountry hiking and camping opportunities.



Nature Recreation Zone

The Nature Recreation Zone provides recreational opportunities in areas that are mainly accessible by non-motorized vessels with limited access for motorized boaters. Recreational facilities such as camping pads, pit toilets, interpretive signage and moorage facilities will be provided to accommodate kayakers, a limited number of motorized boaters and other users for day and overnight uses. Areas zoned for Nature Recreation are intended to accommodate a moderate number of visitors for overnight camping and day-use activities.

Two areas in the Park are zoned for Nature Recreation: Big Twin Island for mainly non-motorized boaters, due to its close proximity to the southern Deep Cove and Whey-ah-Wichen / Cates Park launch sites. The Nature Recreation Zone at Clementine Creek is intended to provide an exclusive recreational site for kayakers and other non-motorized boaters at the northern end of the Park.

Intensive Recreation Zone

The Intensive Recreation Zone provides visitors with well-developed recreational facilities and services. Historically, recreational activities in the Park have been concentrated on the Twin Islands, Raccoon Island and Granite Falls. However the current level of use has caused unacceptable impacts to the natural and cultural resources of some of these intensively used areas.

In order to protect sensitive areas from further damage, intensive recreation uses will be directed to appropriate sites that can sustain the intended level of use. Natural and cultural interpretation programs are recommended for these areas to help educate the high number of visitors about important conservation issues and the cultural significance of the Park. Two locations have been identified for Intensive Recreation: Bishop Creek and Granite Falls.

At Bishop Creek, moorage, overnight camping, hiking trails and other day-uses would be augmented by a Tsleil-Waututh Replica Coast Salish Village providing visitors with a cultural experience and improved overnight accommodations.

At Granite Falls, existing moorage, camping and hiking facilities would be improved. In addition, a traditional longhouse would be constructed to serve as a cultural interpretive centre, kayak rental depot, and locale for Tsleil-Waututh cultural activities.

As both Bishop Creek and Granite Falls have been intensively used for industrial purposes in the past, additional impacts to the natural environment would likely be minimal. Therefore, it is appropriate that Intensive Recreation Zones would be concentrated at these two sites rather than in other more ecologically or culturally sensitive areas of the Park

Special Feature Zone

The Special Feature Zone protects sites with significant natural or cultural features. Special Feature Zones are often sites of interest to visitors for their scenic quality, historical, cultural or archaeological values. In Say Nuth Khaw Yum / Indian Arm Provincial Park, a Special Feature Zone is designated for a site that illustrates the natural splendor of the area or holds special cultural significance to the Tsleil-Waututh Nation.

To protect Special Feature Zones in their natural state, public access may be restricted to those with permits. Special Feature sites will be monitored regularly to ensure significant cultural and natural values are protected and conserved. One Special Feature Zone is identified in the Park: Tsleil-Waututh Salmon Fishing Rock.

Tsleil-Waututh Salmon Fishing Rock

The site of the ancient Tsleil-Waututh Fishing Rock is located just south of Bishop Creek on the west side of Indian Arm. Tsleil-Waututh Elders speak of a special rock that sat on a small ledge high up on a distinctive cliff that was visible from the water. The movement of this special rock would indicate the quality and quantity of salmon runs in the Indian River.



When the rock was on the edge of its ledge, there were many salmon in the Indian River. When the rock was towards the wall of the cliff, there would be no salmon in the River.

Tsleil-Waututh Elders remember seeing this rock during their travels up Indian Arm. Unfortunately, the fishing rock no longer exists today due to vandalism.

Tsleil-Waututh Management Areas

Provisions in the 1998 Management Agreement recommended that the Management Plan identify lands which may be used by Tsleil-Waututh Nation on an exclusive or priority basis. Currently, five sites have been identified by the Tsleil-Waututh Nation for conducting cultural activities, stewardship and economic opportunities.

Future sites may be identified by the Tsleil-Waututh Nation in discussion with the Park Management Board and BC Parks. Public access may be seasonally restricted in these areas due to sensitive cultural activities. The Tsleil-Waututh Nation will have priority in operating commercial activities in these areas.

Five sites have been designated as Tsleil-Waututh Management Areas:

Inlailawatash Estuary
Granite Falls Long House and Interpretive Centre
Bishop Creek Replica Coast Salish Village
Croker Island
Little Twin Island

Specific management plans will be prepared by the Tsleil-Waututh Nation for each of these sites as part of the implementation process of the Park Management Plan.

Inlailawatash Estuary

The Tsleil-Waututh connection to the Inlailawatash Estuary is both ancient and contemporary. For thousands of years, Tsleil-Waututh families gathered in fishing villages at the mouth of the Indian River during the salmon season. Tsleil-Waututh Elders describe the abundance of marine life, waterfowl and other animals they once hunted and harvested in the estuary. To the north of the estuary is Inlailawatash Indian Reserves No. 4 and 4A where remnants of Tsleil-Waututh house posts and other artifacts from the turn of the century are still visible.

Protection of the fragile estuarine habitat, strengthening of contemporary connections to Tsleil-Waututh cultural history, and restoration of the area to a state where the Tsleil-Waututh can once again practice traditional activities are the main management priorities in this area.

Granite Falls Longhouse and Interpretive Centre

The Tsleil-Waututh longhouse tradition is an important part of Coast Salish cultural practice and spiritual rejuvenation. This area includes the future location of a

longhouse structure that will primarily be used as a staging centre for cultural and natural interpretation programs and ecotourism activities.

During specific times of the year, the longhouse will be closed to the public, and will be used exclusively by Tsleil-Waututh for cultural and spiritual ceremonies. The Granite Falls Longhouse and Interpretive Centre would also provide kayak rentals and the operation of a passenger shuttle that would transport visitors to and from Bishop Creek.

Bishop Creek Replica Coast Salish Village

The Tsleil-Waututh Management Area at Bishop Creek includes development and operation of a replica Coast Salish village. The Tsleil-Waututh will provide visitors with cultural programming and overnight accommodations as well as kayak rentals and operation of a passenger shuttle that would transport visitors to and from Granite Falls. During specific times of the year, the replica Coast Salish village would be closed to the public, to allow Tsleil-Waututh to practice cultural and spiritual activities.

Croker Island

Croker Island is a highly significant cultural site to the Tsleil-Waututh Nation. The Island was a popular deer hunting and camping area for Tsleil-Waututh who were en route to the Indian River for salmon fishing and other traditional activities.

The marine area surrounding Croker Island is also an important rockfish breeding location that has been protected under Fisheries and Oceans Canada regulations as a Rockfish Conservation Area (RCA).

The purpose of this management area is to enable the Tsleil-Waututh to be stewards of this culturally sensitive site, an important part of their responsibility towards their traditional territory. Public access will be prohibited at all times.

Little Twin Island

Little Twin Island is an important cultural site to the Tsleil-Waututh Nation. It has also been a popular day-use site for visitors and tour operators. However, due to its small size and extreme sensitivity to soil and foreshore erosion, the high-intensity use has had a detrimental impact on the cultural and natural resources. The Island requires rehabilitation and special protection to allow the area to regenerate to its natural state.

The main purpose of a Tsleil-Waututh Management Area at Little Twin Island is to ensure the protection of cultural values through stewardship by the Tsleil-Waututh Nation. Public access will be prohibited at all times.



SAY NUTH KHAW YUM
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Map E: Land Use Designations

Land use designations assist in the planning and management of parks by dividing the land base into logical spatial units. Each land use designation indicates the appropriate level of management and development, based on the values identified for the Park. The designations reflect the desired and allowable land uses, the existing and projected patterns of access, and the intended degree of human use. All developments will be subject to a review and approval process to ensure it meets Plan objectives and strategies.

A total of five land use designations have been identified for Say Nuth Khaw Yum / Indian Arm Provincial Park to provide management direction on the appropriate activities, facilities and management level for specific areas:

- **Wilderness Recreation Zone** - Protects remote, undisturbed, natural landscapes and provides opportunities for backcountry recreation that is dependant on a pristine environment.
- **Nature Recreation Zone** - Provides recreational opportunities in areas that are mainly accessible by non-motorized vessels with limited access for motorized boaters.
- **Intensive Recreation Zone** - Provides visitors with well-developed recreational facilities and services.
- **Special Features Zone** - Protects sites with significant natural or cultural features. They are often sites of interest to visitors for their scenic quality, historical values, cultural values or archaeological values.
- **Tsleil-Waututh Management Area** - Identifies lands which may be used by Tsleil-Waututh Nation on an exclusive or priority basis for conducting cultural activities, stewardship and economic opportunities.

Legend

— Say Nuth Khaw Yum Park Legal Boundary

Zoning

- Wilderness Recreation Zone
- Nature Recreation Zone
- Intensive Recreation Zone
- Special Feature Zone

Tsleil-Waututh Management Areas

- 1 Inlailawatash Estuary
- 2 Granite Falls
- 3 Croker Island
- 4 Bishop Creek
- 5 Little Twin Island

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0 0.5 1 Kilometers

Map Scale 1:24,000
Map edition: August 2008

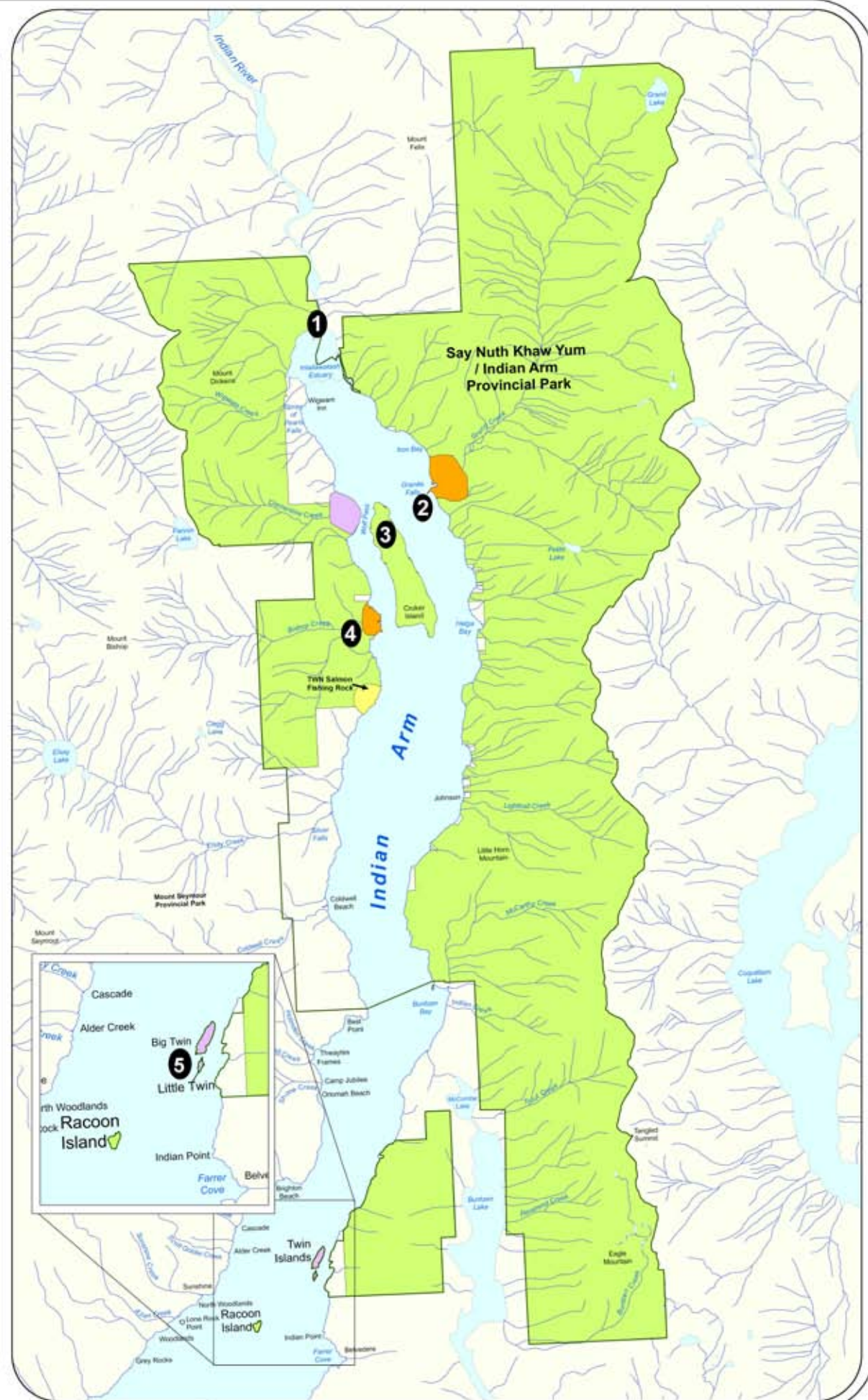


Table of Appropriate Activities and Facilities

Table of Appropriate Activities and Facilities

Legend

Y	Appropriate
N	Not appropriate
N1	Not appropriate except for expressed management purposes as identified in the Management Plan
N2	Not appropriate, but if the specific activity or facility existed at the time of establishment of the protected area, it is normally appropriate for it to continue
M	May be appropriate
N/A	Not applicable

* This Plan proposes a regulatory change to prohibit recreational hunting and trapping in the Park due to public safety and conservation concerns.

Facilities	Appropriate in Intensive Recreation Zone	Appropriate in Nature Recreation Zone	Appropriate in Wilderness Recreation Zone	Appropriate in Special Features Zone
Administrative Buildings and Compounds	Y	N	N	N
Backcountry Huts and Shelters	Y	Y	Y	N
Docks	Y	N ²	N ²	N
Camp sites and Picnic Areas	Y	Y	Y	N
Communication Sites	N ¹	N ¹	N ¹	N ¹
Fixed Roof Accommodation	Y	N	N	N
Interpretation and Information Buildings	Y	N	N	N
Roads and Parking Lots	N	N	N	N
Trails (hiking, cross-country skiing, mountain biking, horse)	Y	Y	Y	N
Utility Corridors (power/transmission lines and other rights-of-way)	N ²	N ²	N ²	N ²
Water Control Structures	N ¹	N ¹	N ¹	N ¹
Activities	Appropriate in Intensive Recreation Zone	Appropriate in Nature Recreation Zone	Appropriate in Wilderness Recreation Zone	Appropriate in Special Features Zone
Aircraft Access	N	N	N ¹	N
Angle Guiding	Y	Y	Y	N
Beach Activities (e.g. swimming)	Y	Y	Y	N
Boating (power)	Y	N ²	N	N
Boating (non-power)	Y	Y	Y	Y

Camping - backcountry	N/A	Y	Y	N
Camping - boat accessible	Y	N ²	M	N
Commercial Recreation (facility-based)	Y	N	N	N
Commercial Recreation (no facilities)	Y	Y	Y	N
Exotic Insect/Disease Control	Y	Y	Y	Y
Filming (commercial)	Y	Y	Y	Y
Fire Management (prevention)	Y	Y	Y	Y
Fire Management (suppression)	Y	Y	Y	Y
Fishing	Y	Y	Y	N
Fish Stocking and Enhancement	Y	Y	Y	Y
Forest Insect/Disease Control	Y	Y	M	Y
Guiding (Hiking)	Y	Y	Y	M
Heli-hiking	N	N	N	N
Hiking/Backpacking/Walking	Y	Y	Y	N
Horse/Non-Exotic Pack Animal Use	N ²	N ²	N ²	N
Hunting*	N	N	N	N
Mountain Biking	N ²	N ²	N ²	N
Activities	Appropriate in Intensive Recreation Zone	Appropriate in Nature Recreation Zone	Appropriate in Wilderness Recreation Zone	Appropriate in Special Features Zone
Motorized Off-road Access (i.e., 4x4, motorcycles)	N	N	N	N
Noxious Weed Control	Y	Y	Y	Y
Rock-climbing	N	N	Y	N
Scientific Research	Y	Y	Y	M
Skiing (self propelled, not groomed)	Y	Y	Y	N
Snowmobiling	N	N	N	N
Trapping	N	N	N	N



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**Map F: Recommended Marine Area
Designations**

The Indian Arm Marine Area is bounded by Say Nuth Khaw Yum / Indian Arm Provincial Park and is the gateway for visitors to access the Park facilities and to enjoy marine recreational activities in the area.

Given the importance of the adjacent marine area of Indian Arm to the goals and operations of the Park, the Board has made recommendations for this marine area of to respective agencies and authorities. These marine area recommendations include:

- Creation of a Fisheries Conservation Area (Area A)
- Extensions to existing Rockfish Conservation Areas (Area B).
- Creation of a Rockfish Nursery Area (Area C).
- Establishment of a No-Wake Areas (Area A and D)



Proposed No-Wake zone along Wolf Pass between Bishop Creek and Croker Island.

Legend

Say Nuth Khaw Yum Park Legal Boundary	Recommended Marine Area Designations
Say Nuth Khaw Yum Park Lands	Area A
Existing Rockfish Conservation Area	Area B
	Area C
	Area D

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Scale: 0 0.5 1 Kilometers
Map Scale: 1:24,000
Map edition: July 2008



Area A Recommendation

Prohibit all commercial fishing, particularly prawn and crab commercial fishing for conservation purposes. Create a No-Wake area between the west side of the Park and Croker Island to limit the impacts of erosion and to improve the safety of non-motorized boaters (kayakers).

Area B Recommendation

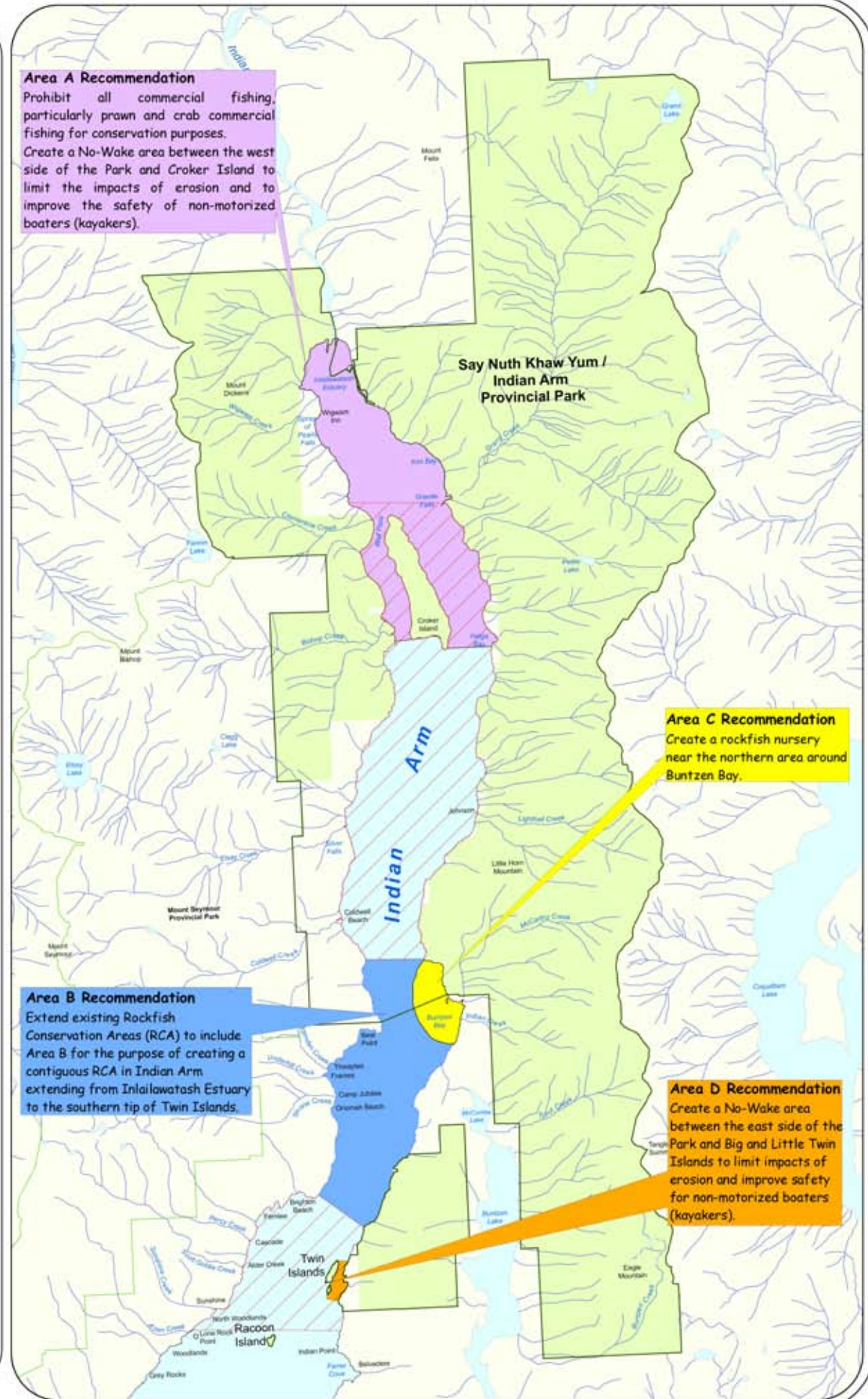
Extend existing Rockfish Conservation Areas (RCA) to include Area B for the purpose of creating a contiguous RCA in Indian Arm extending from Inailawatash Estuary to the southern tip of Twin Islands.

Area C Recommendation

Create a rockfish nursery near the northern area around Buntzen Bay.

Area D Recommendation

Create a No-Wake area between the east side of the Park and Big and Little Twin Islands to limit impacts of erosion and improve safety for non-motorized boaters (kayakers).



Recommended Marine Area Designations

RECOMMENDED MARINE AREA DESIGNATIONS

The Indian Arm Marine Area is bounded by Say Nuth Khaw Yum / Indian Arm Provincial Park and is the gateway for visitors to access park facilities and to enjoy marine recreational activities in the area. However, the management objectives and strategies identified in this Plan only extend to the terrestrial portions of the Park where the Board and BC Parks have jurisdiction.

Given the importance of the adjacent marine area of Indian Arm to the goals and operations of the Park, the Board decided to make specific recommendations to respective agencies and authorities on a number of issues.

The following Board-recommended marine area objectives and strategies and marine area designations will be forwarded for the review and consideration by agencies and authorities with management and enforcement authority in Indian Arm, such as Fisheries and Oceans Canada (DFO), Transport Canada, Royal Canadian Mounted Police (RCMP) and the Port Metro Vancouver.

It is the intention of the Board to work collaboratively with respective marine agencies and authorities towards an integrated management of the adjacent marine area of Indian Arm and terrestrial areas of the Park.



Recommended Marine Management Objectives & Strategies

Objective:

- 40.0 Maintain the natural diversity, distribution and population of marine life and habitats in Indian Arm.

Strategies:

- 40.1 Support the work of the Tsleil-Waututh Nation to monitor the health of Indian Arm (i.e. TWN Marine Stewardship Program).
- 40.2 Ban all commercial fishing, particularly prawn and crab commercial fishing, in Area A for conservation purposes.
- 40.3 Extend the existing Rockfish Conservation Area to include Area B, for the purpose of creating a contiguous Rockfish Conservation Area in Indian Arm extending from the Inlailawatash Estuary to the southern tip of the Twin Islands.
- 40.4 Establish a rockfish nursery in Area C, near the northern area around Buntzen Bay to encourage regeneration.

Objective:

- 41.0 Coordinate activities with marine authorities and agencies such as Fisheries and Oceans Canada, Coast Guard, RCMP and the Port Metro Vancouver.

Strategies:

- 41.1 Communicate the Board's interest in monitoring and enforcement of marine regulations and policies such as the Pleasure Craft Sewage Pollution Prevention Regulations (PCSPPR) under the Canada Shipping Act.
- 41.2 Communicate the Board's interest in collaborating with agencies, authorities and organizations to:
- Coordinate information, research, and policies for the marine area of Indian Arm.
 - Develop a contingency plan to address accidental spills in the marine area of Indian Arm.
 - Assist and resolve marine-related conflicts.

Objective:

- 42.0 Promote and support a safe and accessible marine environment for visitors, residents and commercial users.

Recommended Marine Area Designations

Strategies:

- 42.1 Communicate the Board's interest in collaborating with agencies, authorities and organizations to:
- Support uses that are compatible with the spirit and intent of the Plan.
 - Discourage the use of personal water crafts (Skidoos, jet skis) to limit noise and disturbance to visitors and residents.

- Create a No-Wake Area D between the west side of the Park and around Croker Island to limit impacts of erosion and improve safety of non-motorized boaters (kayakers).
- Create a No-Wake Area E between the east side of the Park and Big and Little Twin Islands to limit impacts of erosion and improve safety of non-motorized boaters (kayakers).



IMPLEMENTATION

One of the legacies of the collaborative management partnership between Tsleil-Waututh and the Province of British Columbia will be the effectiveness with which the Say Nuth Khaw Yum / Indian Arm Provincial Park Management Plan is implemented.

This section will set out the principles to guide the development of a separate and detailed Implementation Strategy. The principles will also guide the process by which the Tsleil-Waututh Nation and BC Parks will engage to complete the Implementation Strategy.

The Implementation Strategy will identify specific activities, projected costs and various approaches to resourcing the objectives and strategies identified in this Plan. Terms of reference for the development of the Implementation Strategy will be completed within one year of Plan approval. The terms of reference will analyze the Plan and determine a list of long-term priorities versus short-term “achievable activities” that can be undertaken with available resources.

It is important that implementation activities begin as soon as possible following approval of the Plan. It is the intention of all Parties to expedite the implementation of this Plan through decisive and effective action.



Left to right: Richard George, Leonard George, Damian George and Tom Bell of BC Parks at the Bioregional Inventory Atlas Celebration, September 12, 2006.

Implementation Principles

Joint Development

The Implementation Strategy will build upon the spirit of cooperation, mutual understanding and experience developed by the Board during the Park Management Plan process. In doing so, the implementation activities will be jointly developed by the Tsleil-Waututh Nation and BC Parks.

Tsleil-Waututh Participation

As set out in the Management Agreement, the Tsleil-Waututh Nation and BC Parks have been working to increase Tsleil-Waututh participation in management and operations of the Park. To further this goal, the Implementation Strategy will include specific recommendations for the Tsleil-Waututh Nation to assume maintenance and operation of the Park.

Resourcing

The successful implementation of this Plan will require the Tsleil-Waututh Nation and BC Parks to engage the broader corporate and non-governmental community in providing financial and in-kind support. The Implementation Strategy will include a detailed resourcing approach to achieve this goal.

Jurisdictional Coordination

The Board will engage agencies and authorities with jurisdictional authority associated with the marine environment and adjacent terrestrial areas with the objective of improving coordination and cooperation efforts in the implementation of this Plan and for the ongoing maintenance and operations of the Park.

One of the unique characteristics of the Park is the interconnection between the land and marine area of Indian Arm. It also poses challenges related to coordinating jurisdictions between the Tsleil-Waututh Nation, BC Parks, Port Metro Vancouver, Metro Vancouver, Fisheries and Oceans Canada and other agencies and authorities with interests and jurisdiction in the area.

Successful implementation of this Plan requires the cooperation and coordination between all Parties with interest in protecting and promoting this special place.

Contact Information

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