reserve. Clients can then dismount horses and hike into areas of the ecological reserve that does not permit horse use.

- Horseback rides and/or guided hikes into Gladys Lake and Gladys Lake cabin.
- The tour packages into the ER would be educational in focus.
- Tahltans would create a wildlife study program that will document wildlife observations on a long term continual basis.
- Guided visitation allows:
  - Better control over and reporting on number of visitors.
  - Better control over activities, guides can avoid sensitive areas.
  - Less concern about visitor safety issues and visitor satisfaction.
  - Allows for better monitoring (observe, record and report) abilities regarding illegal activities.
  - Provides excellent education and interpretation opportunities to both visitors and guides.
  - Allows for better monitoring (observation cards) regarding wildlife sightings that will be basis for the Nature study and TEK program and scientific studies into wildlife population and habitat.
  - Allows for better monitoring (impact assessments) of possible impacts to natural and cultural resources.
  - Provides visitors with a better understanding of the Tahltan culture.

3. *Stikine and Spatsizi River Rafting Tours*
   - Permit only Tahltan guides to provide rafting tours, which may include day hikes, wildlife photography, culture tours, angle guiding, etc.
   - Could offer single day and multi-day tours.
   - Guardian at Didene Portage can offer services to portage gear (for both guided and non-guided customers) + ferry visitors' vehicle to Stikine River bridge.
4. *Stikine River Jet Boat Tours*
   - Lower and upper Stikine.
   - Day and multi-day tours.
   - Tours may include hiking, wildlife photography, culture tours and angle guiding.
5. *Stikine River – Grand Canyon tours*
   - A Tahltan guide must accompany visitors to this location.
   - Tours can start from Tahltan, Pleasant Camp or the Stikine River Bridge.
   - Day hikes and/or multi-day hikes.
   - Visitors may go on horseback, ATV's or vehicle (on established roadways), or by foot.
6. *Angle guiding*
   - Buckley Lake
     - Buckley Lake offers the Tahltan Nation an excellent opportunity to guide anglers to a world class fishery.
     - Tahltan guides only.
     - Lake should be restocked if required.
     - Great lodge location.
     - Could also offer tours from this location into Mt. Edziza. Tours could include guided hikes, culture tours, wildlife photography, horseback riding, nature study, geological tours and angle guiding.
   - Tahltan River
     - Tahltan guides only for angle guiding.
     - World class wild steelhead fishery.

7. *Kakiddi Lakes Chain – Wilderness Tours*
   - Wilderness tours – may include canoeing, angle guiding, hiking, wildlife photography, horseback riding, and culture tours.
   - Excellent location for a lodge to attract frontcountry visitors to stay a few extra days.
   - Lodge could cater to visitors and businesses (conference area).
   - Businesses may provide both summer and winter activities.
8. *Lodges & Camps*
   - Possible locations include Spatsizi (Coldfish Lake), Stikine River (bridge, Tahltan River, Chuckachida River, Pitman River), Mt. Edziza (Kakiddi Lakes chain, Buckley Lake) Lodge opportunity to base tours in Edziza & Spatsizi.
9. *Obsidian*
   - Harvest obsidian.
   - Craft traditional tools, spears, arrowheads with obsidian.
   - Trade and sell obsidian crafts.
10. *Development of Iskut River Hotsprings*
   - Area presents an excellent opportunity to the Tahltan Nation to develop the site to attract visitors to stop and stay.
   - Area is close to highway 37 making it an ideal location to develop.

PART IX - ACCESS

The Tahltan Nation has unlimited access to any parks and protected areas within Tahltan traditional territory. Tahltans traditionally accessed their traplines and hunting areas by dogsled and will continue to do so, including use of snowmobile and other modes of modern transportation.

Increased access by non-Tahltans to our territory raises many concerns regarding sacred sites, traditional use site have impacts on land, water and wildlife populations. Spiritual and culturally significant areas should be protected and only be accessed by Tahltans. Non-natives must be guided (e.g. culture tours along the Stikine Canyon; Stikine River; historic trails such as the trails from Iskut to Telegraph or Metsantan to Iskut; angle guiding on the Tahltan River, etc).

The Tahltan Nation believes limitations placed on guided-visitor numbers is unreasonable as it hinders the business operators' ability to meet demands and allow their business to change with the times. These limits should be flexible as long as the resources are not being negatively impacted.

Other access issues such as horse use, aircraft, motor vehicles (including ATVs), boats and other conveyances must be discussed and part of the pending co-management agreement.

PART X – TRADITIONAL KNOWLEDGE

The Tahltan Nation wishes to see our traditional knowledge integrated with western science and base management decisions on this collective knowledge. However, before such a mission can be initiated, Tahltan traditional knowledge must first be researched and documented.

The following definition of traditional knowledge has been adapted from: "A Protocol Agreement between the Kaska Nation and The British Columbia and Yukon Chapters of the Canadian Parks and Wilderness Society". Traditional Knowledge means a cumulative body of knowledge, practice,

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and beliefs transforming by adaptive processes and handed down through generations by traditional educational and cultural transmission; about the relationship of human beings with one another and their environment including songs, stories, designs, dances, language, ceremonies and ways of doing things that reflect the Tahltan heritage, history, culture, ethics, creativity, spirituality and sovereignty of Tahltan People in the Tahltan traditional territory.

Denkladia is the spelling on the government maps; it is a mountain above the Spatsizi River. The Tahltan pronounce this place as Denekawladeeya "person walk into spear" this is a mountain with a story about how a part of the mountain was created and the consequences of why you never talk bad about animals or treat them bad. This is a story, like many other Tahltan stories that conceptualise why Indigenous Peoples say we are from the land, we are part of the land and why we must treat the land with respect.

Tahltans have intimate knowledge of our lands as our stories talk about how things came to be. We have our own laws and regulations of when and how people accessed resources. We have our own indicators of when the pressure has been on the land is too great; we have our own techniques of dealing with that pressure. We have our own understanding of what a healthy animal population is, and we have our own resource stewardship.

It is understood that Tahltan knowledge and western science is complementary to each other. To ensure an effective integration of the two knowledge bases, a program of documentation of Tahltan knowledge must be created and plans of action on the best integration approaches must be looked at to incorporation into resource management decision making processes.

PART XI – WILDLIFE MANAGEMENT

The Tahltan people have considerable knowledge of the wildlife in our area. As hunters, we needed to have knowledge about the animals we hunted. Knowledge such as learning about an animals' movements, habitat, their feeding and breeding activities, their denning areas, etc was essential information for a successful hunter. As we depended on harvesting fish and wildlife, we also had to manage our resources carefully. The Tahltan people were excellent resource managers. We had to be as our very survival depended on it.

Population Management

The Tahltan people managed wildlife by managing population numbers as well as managing their habitat. Predators were managed to increase prey populations for harvesting. The Tahltan Nation would like to ensure that active wildlife management actions such as predator management are conducted when there are indicators that the prey species populations are decreasing (i.e. cow-calf ratio).

Habitat Management

Tahltans also managed wildlife habitat by controlling, limiting, and prohibiting wildlife harvest within family hunting grounds. Areas were managed so that they were not over harvested. If an area was accidentally over harvested, harvesting in that area would cease until the resources replenished themselves.

Upon further investigation, it has been determined that Tahltans did use fire to increase berry crops and to increase wildlife populations in the past contrary to written report by Janice Joseph. Tahltans also enhanced wildlife habitat by intentionally setting fire to certain areas. Fires cleared land of brush and trees and allowed grasses and shrubs to revegetate an area, which provided better feeding areas for wildlife. Areas burned in the past that have significantly increased berry production, mushroom production and wildlife populations include Hyland, Beggarly, Tseta, Blackfox and Caribou Hide. Specific sites and instances must be further researched and documented.

The Tahltan Nation would like to ensure that active fire management such as prescribed burning occurs when habitat is degrading to a point where wildlife populations are decreasing.

Other:

- Need to incorporate traditional knowledge of wildlife into management practices.
- Wildlife surveys should be timed to take advantage of opportunities (i.e. surge in population) and incorporate traditional and local knowledge (i.e. where to conduct survey, etc)
- The Tahltan Nation would like to participate in all wildlife surveys.
- Tahltans are concerned about the increasing hunter numbers in Tahltan traditional territory and within the Stikine Country protected Areas.
- Areas of particular concern are the Klappan Rail Grade, Telegraph Creek Road, and the Stikine River.
- Increasing "outside" hunting pressure also impedes Tahltans' hunting for sustenance purposes and infringes on aboriginal rights.
- Tahltan Nation would like to jointly manage total allowable harvest numbers for fish and wildlife within Tahltan traditional territory.

PART XII – FISH MANAGEMENT

Fish is a main staple of the Tahltan diet. We have a long standing relationship with salmon. Salmon are vitally important to our people; salmon is a staple food, one that could be counted on every year. All types of fish are harvested, not just salmon. Our legends and landmarks emphasize our connection with fish and especially the salmon.

The Tahltan Nation will take part in management decisions concerning all fisheries, including steelhead, char, trout and salmon in all waters that lie within Tahltan traditional territory.

The Tahltan Nation wishes to participate in any research, surveys, and enhancement projects conducted within Tahltan traditional territory.

The Tahltan Nation sees an angle-guiding opportunity at Buckley Lake and wishes to pursue this opportunity. If it is determined that Buckley Lake was indeed stocked with rainbow trout, the Tahltan Nation would like to see that stocking continues within this lake to enhance angling opportunities.

The Tahltan Nation will have preferred opportunity for any new angling guide permits and/or additional rod days within Tahltan traditional territory.

The Tahltan Nation will jointly set angling regulations, for waters within Tahltan traditional territory, with the provincial government.

PART XIII – VEGETATION MANAGEMENT

The Tahltan people have harvested vegetation within our lands for sustenance, ceremonial and traditional purposes and will continue to do so.

Tahltans have traditionally used spruce boughs as bedding and will continue to do so.

Specific plants are extremely important to Tahltans, both for well-being of body and mind. Areas identified as being highly productive for these specific plants (i.e. caribou weed) will be protected from development and impacts will be monitored.

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Tahltans will harvest mushrooms within Tahltan traditional territory.

PART XIV - PARK USE PERMITS

Currently, the Tahltan Nation has no say or authority on the issuance of park use permits. Opportunities are being awarded to non-locals and non-native peoples. The Tahltan Nation, through the pending Co-Management Agreement, want to have the right to refuse issuance or limit duration of park use permits – issuance of park use permits for commercial activity should be limited to Tahltans or benefit us in some way.

Park use permits are administratively extinguishing aboriginal rights. Traditionally, our lands and possessions are inherited by our children. Restrictions and conditions placed on park use permits does not allow trapline holders to pass down their traplines to their heirs. Applying park use permits to the Tahltan Nation forces Tahltans to ask permission and pay to practice their traditional rights (i.e. trapping, guiding, and access). These actions are unjust and infringes on aboriginal rights, which are protected and affirmed under the *1982 Constitution Act*. In addition, Tahltans should not have to pay for park use permits – we are simply practising our aboriginal rights.

For all other Park Use Permits issued under the authority of the *Park* Act, the Tahltan Nation wants a portion of these fees and should benefit the Tahltan people in some way.

PART XV – SCIENTIFIC RESEARCH AND MONITORING

The Tahltan Nation wish to incorporate our traditional knowledge with western science.

The Tahltan Nation would like to participate in any scientific research and monitoring projects that are conducted within Tahltan traditional territory.

A copy of all data and reports will be provided to the Tahltan Nation.

PART XVI – ENFORCEMENT

The Tahltan Nation will have their own watchmen to patrol, enforce and monitor wildlife, fish, and park regulations within Tahltan traditional territory. We seek funding from the provincial government to back this initiative.

All Tahltan members employed by BC Parks as a park ranger will display an additional crest on their uniform identifying them as a Tahltan watchman.

The Tahltan people believe we should monitor and police our own people. We have traditionally done so and we will continue to do so.

PART XVII – CULTURAL HERITAGE

Cultural heritage tells a story, Tahltan culture and heritage tells a story about Tahltans. The Stikine Country Protected Areas management plan should highlight the Tahltans' cultural heritage. The parks and protected areas within our traditional territory will encourage visitor appreciation, understanding and stewardship of the parks and protected areas' natural and cultural heritage.

Parks and protected areas management will protect, preserve, and encourage traditional sustenance, economic, cultural, spiritual and ceremonial activities in the parks and protected areas.

The Tahltan Nation believes that all park maps, brochures, signs, etc. should highlight the Tahltans' cultural heritage and include Tahltan art and design and place names. Tahltan place names should be incorporated into park brochures, park advertisement (web page) maps and signage.

BC Parks must recognize that Tahltan oral history is a valid and relevant form of research.

The Tahltan Nation wishes to develop self-interpretation facilities at strategic locations within the Stikine Country Protected Areas (i.e. Highway 37 Bell Irving to Telegraph Creek Self-Guided Auto Tour).

The Tahltan Nation has created a Tahltan Language and Cultural Committee (TLCC). The TLCC is responsible for: preserving and protecting Tahltan language and culture. Specifically this committee will be researching and documenting cultural and spiritual sites within the Stikine Country Protected Areas; developing a cultural resource management plan; determining which sites must restrict visitor access for the purpose of site protection and to provide exclusive use to Tahltan people; and developing policies for cultural heritage resources.

The Tahltan Nation would like to pursue the possible development of a cultural heritage centre, jointly with BC Parks and other government and non-government agencies.

We would like to jointly create a world class natural and cultural learning experience.

PART XVIII - SUMMARY

The Tahltan Nation has occupied the land in which the Stikine Country Protected Areas system lies, since time immemorial. In the past we have had a tumultuous relationship with the Government of British Columbia. The Tahltan Nation would like to develop a harmonious, long-term co-operative arrangement and process for the planning, operation and management of the parks and protected areas, within Tahltan traditional territory, with the Government of British Columbia.

Together, we can protect the natural resources and our cultural heritage. We can highlight and encourage Tahltan traditional use. We can create and foster economic opportunities and development to benefit the Tahltan Nation and local residents. Above all, together we can protect and preserve the parks and protected areas for all future generations to enjoy.

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6 Managing with the Community

6.1 Local Communities, Stakeholders, Non-governmental Organizations and the Public

Local communities, stakeholders, non-governmental organizations (NGOs) and the public have a strong desire to be involved in the management of the protected areas system. Local communities of Dease Lake, Telegraph Creek and Iskut are seeking a greater say in the management of protected areas and in access to employment, economic development and outdoor recreation opportunities. Although considerable local interest exists about the Stikine Country Protected Areas System, substantial regional, provincial and international interest in the system is also evident.

6.1.1 General Management Direction

Overall Direction

Environmental Stewardship Division will work with communities, stakeholders, NGOs and the public at the local, regional, provincial and international levels to ensure that their interests in protected area management are considered. The Environmental Stewardship Division will also ensure ongoing opportunities for the public to provide input into protected area management, to receive protected area related information updates and to participate in specific protected area planning and management activities.

Objectives and Strategies

To foster communication between Environmental Stewardship Division and communities, stakeholders, NGOs and the public at the local, regional, provincial and international level on management and opportunities in the Stikine Country Protected Areas System.

- Establish a Stikine Country Protected Areas Advisory Committee for an initial 3 year term (subject to renewal) to advise on specific aspects of implementation of the Stikine Country Protected Areas Management Plan. The committee will be advisory to the Regional Manager of Environmental Stewardship Division, voluntary (i.e. without remuneration), and will focus on specific implementation items assigned by the Regional Manager of Environmental Stewardship Division. The committee will consist of representatives of Environmental Stewardship Division, First Nations, local communities, stakeholders and NGOs and will conduct 1 - 2 meetings per year with supporting teleconference calls, as required. Terms of Reference for the committee will be approved by the Regional Manager, Environmental Stewardship Division.
- Host periodic open houses/meetings and information sessions in local communities and regional and provincial centres that increase knowledge and communication while providing an opportunity to resolve identified issues.
- Ensure that updates to strategic planning for Stikine Country Protected Areas are available to the public.
- Ensure that local use and quality outdoor recreation opportunities continue to be available for residents.
- Provide information to local communities about upcoming opportunities for employment and economic development and work with entrepreneurs to ensure that: a) procedures and

rules for gaining access to opportunities are readily available; and b) timing and scope of opportunities, to the extent practical, are consistent with local capacity.

- Meet periodically with commercial operators to review operations and issues related to those operations.

To involve local communities, stakeholders, NGOs and the public in specific protected area management activities and planning.

- Investigate a range of partnerships with local communities, stakeholders, NGOs and the public such as:
  - commercial opportunities providing benefits to the protected areas system;
  - specific volunteer or stewardship projects (e.g. clean up of sites);
  - operation of facilities at Cold Fish Lake; and,
  - trail maintenance.

7 A Place for Cultural Heritage

7.1 Managing Cultural Heritage Values

Stikine Country Protected Areas contain a rich legacy of First Nations and non-aboriginal history and cultural heritage values. For thousands of years, First Nations people fashioned out of the natural surroundings within the Stikine area, a cultural landscape of traditional activities that reflected their interactions with nature. First Nations continue to harvest the area's fish, vegetation and wildlife according to long held beliefs and value systems. Traditionally, obsidian in Mount Edziza Provincial Park was an important commodity for survival and for trade for the Tahltan Nation. First Nations' village sites (Caribou Hide and Metsantan), hunting and fishing camps (aboriginal camp preceding the current Cold Fish Lake camp), trapline and other trails (aboriginal trail preceding the Hyland Post Trail), burial sites, and lithic related/archaeological sites are widespread throughout the Stikine Country Protected Areas System.

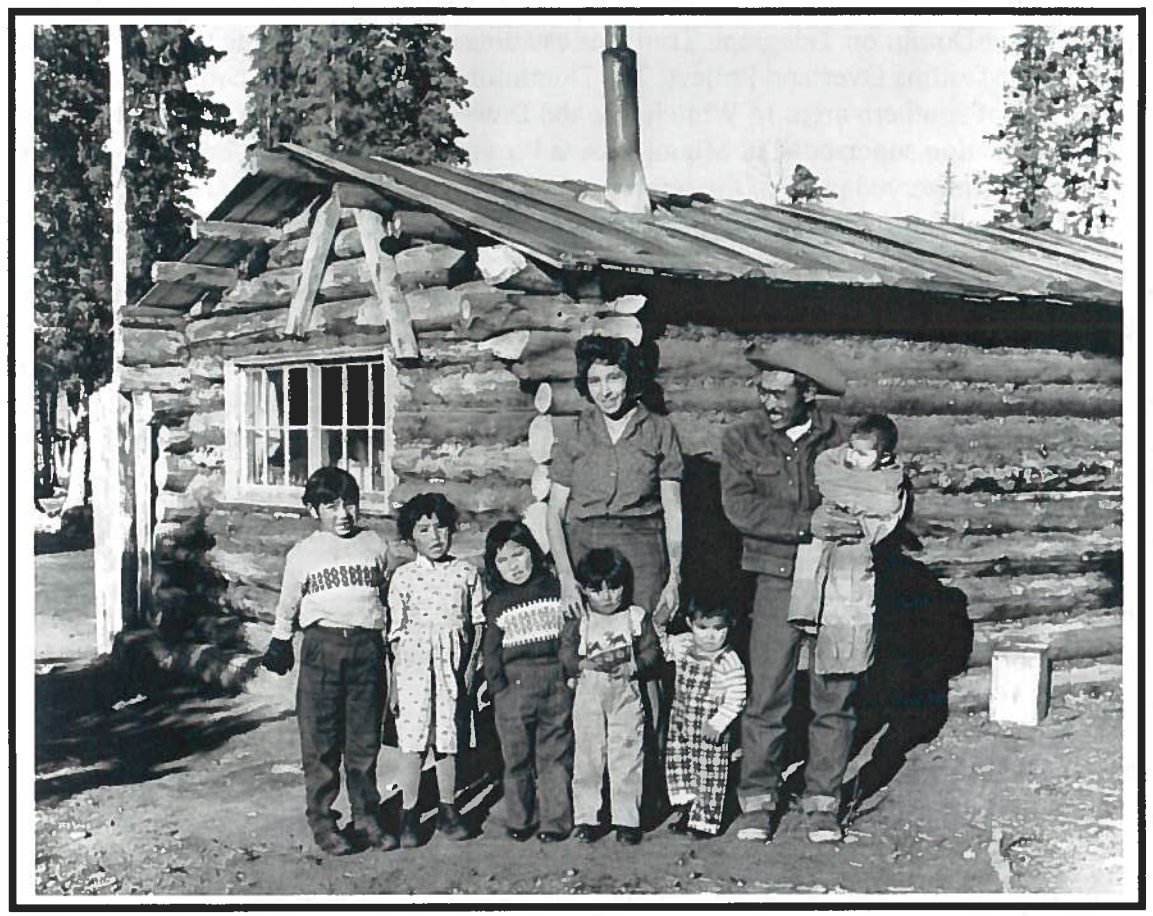

Figure 3. Tahltan family.

Non-aboriginal history began in 1824 with the fur trade. Gold discoveries, guided hunting and telegraph lines followed the fur trade era. In 1861 prospectors discovered gold on the lower Stikine River, leading to exploration of most of the Stikine River drainage by 1878. While

miners found little gold within protected areas, parts of the protected areas lay on travel routes used by people going to gold producing areas.

The Hyland Brothers established Hyland Post on the Spatsizi River in the 1920s. The Hyland brothers used the trading post only for a short period, abandoning it by 1930. Tommy Walker used Hyland Post again in 1948 when he started guiding operations in the area. Hyland Post has been in continuous use ever since. Tommy Walker also set up a permanent camp at Cold Fish Lake. At this time other guide-outfitters set up operations including Love Brothers and Lee whose territory covered the Upper Finlay River including Tatlatui Provincial Park. Hyland Post comprises numerous buildings and, although privately owned, these buildings represent the earliest European settlement in the Spatsizi area. The present owners (Collingwood Bros. Guides and Outfitters) continue to maintain the buildings at Hyland Post.

The route for an overland telegraph line, known as the Collins Overland Project, was surveyed across Mount Edziza in 1866. The intent of the telegraph line was to connect New York to Europe via the Bering Strait. The laying of a trans-Atlantic telegraph cable meant the termination of this telegraph line project before construction took place through the Mount Edziza area. In 1900, the Yukon Dominion Telegraph Trail was established along much the same route as that surveyed by the Collins Overland Project. The Dominion Telegraph Trail connected the telegraph lines of southern areas to Whitehorse and Dawson City, and operated until 1936 when radio communication superseded it. Mount Edziza Provincial Park's Raspberry Pass contains some of the best preserved parts of the line where visitors can still see wire and poles. Gold miners and several cattle drives used the Telegraph Trail as a route to the Yukon Territory.

The Hyland Brothers used the Hyland Post Trail as a route from Caribou Hide to Telegraph Creek. The Tahltan Nation advises that this trail's route followed traditional routes used by aboriginal people. RCMP patrols later followed this trail, and guide-outfitters and backcountry hikers continue to use it now. The Hyland Post Trail is of high historical significance because of its importance as a primary aboriginal trade and travel route in the area, and its use as a route by early non-aboriginal residents and visitors.

7.1.1 General Management Direction

Overall Direction

Protecting aboriginal and non-aboriginal cultural heritage values is an important priority for management of the Stikine Country Protected Areas System.

Objectives and Strategies

To manage and conserve cultural heritage values.

- Protect archaeological sites and other significant aboriginal and non-aboriginal cultural heritage sites or traditional use sites in their natural state and condition.
- Work with First Nations to develop and share cultural heritage inventories and assess the significance of cultural heritage sites and potential for damage from public and commercial recreation.
- Develop protocol arrangements with First Nations on the sharing of cultural heritage inventories and other cultural information.
- Develop and implement strategies to reduce or eliminate adverse impacts to cultural heritage sites in conjunction with First Nations and user groups.

- Establish management protocols/strategies for important aboriginal and non-aboriginal sites and trails (e.g. Caribou Hide village sites, Metsantan Village site, Cold Fish Lake Camp, Hyland Post Trail, Telegraph Trail, etc.). Determine the need for site or trail restoration.
- Work cooperatively with the owners of the private property at Hyland Post to encourage management of cultural heritage values on their private property consistent with their importance with respect to aboriginal and non-aboriginal history.
- Establish an Initial Attack Zone for fire suppression around Metsantan village.

To facilitate the exercise of existing traditional uses and reconnection of First Nations to the Stikine Country Protected Areas System.

- Work with First Nations to facilitate the exercise of existing traditional uses and development of programs/initiatives to introduce First Nations youth to the Stikine Country Protected Areas System.

To increase public and visitor awareness of the rich cultural heritage of the Stikine Country Protected Areas System.

- In conjunction with First Nations and others, develop education and information materials to share with the public and protected area users on the nature, significance and fragility of cultural heritage values and ways to respect cultural heritage values.

8 A Place for Nature – Managing Natural Values

8.1 Introduction

Stikine Country Protected Areas conserve a diversity of natural features including:

- geological features such as the Mount Edziza volcano complex and the Grand Canyon of the Stikine River;
- a boreal vegetation landscape largely unaltered by management intervention;
- special rainbow trout (*Oncorhynchus mykiss*) only fish systems and contiguous streams;
- contiguous large rivers, streams and lakes believed to support blue-listed bull trout in the full diversity of its life histories;
- diverse large mammal predator-prey systems that include caribou, Stone's sheep, mountain goat, moose, deer, grizzly bear, black bear, wolverine, wolf and coyote (*Canis latrans*); and,
- some birds, plants, and plant communities at risk.

Because of northern British Columbia's remote location and relatively unroaded character, Stikine Country Protected Areas contain a vast expanse of primarily pristine wilderness relatively unaffected by management practices common in more accessible southerly locations. These protected areas are internationally renowned for their wildlife and wilderness. As the second largest system of adjoining protected areas in British Columbia, the Stikine Country Protected Areas System provides an excellent opportunity to manage large mammal predator-prey systems and large-scale natural disturbances in a natural setting within its boundaries. Conservation of natural and cultural features is the management priority in the Stikine Country Protected Areas System.

Hunting, fishing and trapping were important sustenance activities for the First Nations prior to contact. These activities continue to be important for First Nations and for other non-aboriginal people.

This section of the management plan describes natural features in Stikine Country Protected Areas, the general management direction and management objectives and strategies required to conserve those natural features.

The goal for applying ecosystem management in Stikine Country Protected Areas is to manage natural features and processes in the protected areas within the Mount Edziza Greater Ecosystem and the Spatsizi Greater Ecosystem so they remain in a largely natural state with minimal influence from human management and outdoor recreation activities.

8.2 Land and Geology

Stikine Country Protected Areas lay in the north central part of British Columbia in the Interior System of the Canadian Cordillera physiographic region (Holland 1976). Stream erosion, glaciation, and volcanic activity shaped most of the landforms in the Stikine region. Stream erosion produced deeply incised canyons and provided most of the relief throughout the plateaus.

Glaciers completely covered the area during the Pleistocene Age and they eroded upland surfaces and deposited a veneer of drift over most of the area. As the glaciers receded, characteristic U-shaped valleys formed and high elevation glaciers shaped most of the jagged ridges and mountain peaks. Volcanic activity occurred predominantly in the Mount Edziza area, both prior to and since the last Ice Age.

In the west, Mount Edziza Provincial Park and Mount Edziza Protected Area (proposed) are found in the Tahltan Highland. The highland is a transitional zone between the Coast Mountains and the plateaus to the east with relief primarily caused by the major rivers and streams. Mount Edziza and the Spectrum Range rise to an average elevation of 2100 metres with adjacent valley floors between 150 and 600 metres. Mess Creek forms a deep, narrow canyon near its confluence with the Stikine River. The Klastline River forms a canyon as it flows north to its confluence with the Stikine River. Glacial history is evident in drumlin formations in the Mowdade Lake area.

The Mount Edziza volcanic complex is an internationally significant feature. The complex comprises the Mount Edziza volcano, a series of smaller satellite cones surrounding the main volcano, and dissected domes of the Spectrum Range. A rolling upland plateau, bounded by escarpments and cut by a steep canyon, surrounds the main peaks of Mount Edziza (2787metres) and Ice Peak. Post-glacial cinder cones (e.g. Eve Cone, Coffee Crater, Cocoa Crater) and fields of blocky lava and pumice cover most of the north slope and western plateau. The lower lying valleys of Mess Creek to the west, the Stikine River to the north, and the Klastline and Iskut rivers to the east, border the Mount Edziza complex. The Arctic Plateau lies adjacent to the south part of the Mount Edziza complex.

Figure 4. Lava flow, Mount Edziza Provincial Park.

Mount Edziza is a composite shield volcano with most of its mass made up of older sedimentary and volcanic rocks. The "recent" flows form a layer on top. The geological history of Mount Edziza comprises a series of volcanic activity periods and spans several periods of glacial advance and retreat. The Spectrum Range is older than Mount Edziza and its brightly coloured slopes are the eroded remnants of the original rhyolite dome complex.

The western portion of Stikine River Provincial Park lies within the Tanzilla Plateau on the north side of the Stikine River and the Klastline Plateau on the south side. Low topographic relief incised by the Stikine and Klappan rivers characterize both plateaus. One of the most significant features of this area is the Grand Canyon of the Stikine River. River erosion carved the steep incised lava walls up to 300 metres deep after the likely diversion of the Stikine River from its original path by Mount Edziza lava flows during and since the Pleistocene Age.

The Skeena Mountains include Gladys Lake Ecological Reserve and the southwestern portions of Spatsizi Plateau Wilderness and Tatlatui provincial parks. Mountain ranges and valleys run predominantly in a northwest trend with serrated and jagged peaks formed by alpine glaciation. The complex folding throughout Spatsizi Plateau Wilderness Provincial Park, Gladys Lake Ecological Reserve and Tatlatui Provincial Park is the best example of exposed folds in British Columbia other than in the Canadian Rocky Mountains, and is especially evident on the slopes at the western end of Kitchener Lake. Ammonite fossils have been found throughout the Eaglenest Range and have aided in understanding the complex geology of the area. The mountainous area rises from about 900 metres in elevation in the valleys to 2350 metres at Nation Peak in the Eaglenest Range in Spatsizi Plateau Wilderness Provincial Park and to 2350 metres at Melanistic Peak in Tatlatui Provincial Park. Spatsizi Mountain, with its red-coloured slopes, is a significant feature along the Spatsizi River in this area. The Tahltans named the mountain Spatsizi (which means "red goat") after the mountain goats that roll in the mountain's red-coloured soil.

The northeastern portions of Stikine River Provincial Park, Spatsizi Plateau Wilderness Provincial Park and Tatlatui Provincial Park lie within the Spatsizi Plateau. Gently rolling uplands and wide drift-filled valleys characterize the area with elevations from 900 metres in valley bottoms to 2200 metres on higher peaks on the plateaus. Most of the upland plateaus lie between 1400 and 2000 metres in elevation.

Pitman River Protected Area and Chukachida Protected Area extend east into the Swannell Ranges of the Omineca Mountains and the Stikine Ranges of the Cassiar Mountains. These protected areas lie largely within the wide U-shaped valley bottoms in this region.

8.2.1 Significant Physical Features

Significant physical features of Stikine Country Protected Areas include the Mount Edziza volcanic complex, the Grand Canyon of the Stikine River, fossils and complex folding (Appendix 6).

Numerous significant geological and landform features in the Mount Edziza area result from extensive volcanic activity (Appendix 6). The Mount Edziza area contains extensive deposits of obsidian, which is formed by the rapid cooling of molten lava or some liquid fraction of molten lava. Most obsidian occurs at relatively high elevations from about 1800 to 1900 metres. First Nations people used the Mount Edziza area as an important source of obsidian. The Mount Edziza area contains two exposed columnar basalt formations: the Tahltan Eagle at the

confluence of the Tahltan and Stikine rivers, and Pipe Organ Mountain along the boundary between Mount Edziza Provincial Park and Mount Edziza Resource Management Zone (formerly the Mount Edziza Recreation Area). Both formations display radiating columns of basalt. The Tahltan Nation considers the Tahltan Eagle to have significant spiritual and cultural importance. The appropriate name and cultural significance of Pipe Organ Mountain to the Tahltan people is unknown.

The Mount Edziza area contains four hot springs at Elwyn Creek, Taweh Creek, Mess Lake and Mess Creek. Three of the springs (Elwyn, Taweh, Mess Lake) are the only hot springs known in Canada that appear to be related to recent volcanic activity. Mess Creek hot springs lie on a major fault bounding the west side of Mess Creek Valley and may be part of a deeply circulating hydraulic system. The hot springs, diluted with varying amounts of cooler water from creeks and runoff, range in temperature from 25° to 45° Celsius. Elwyn Creek, Taweh Creek and Mess Lake exhibit tufa deposits. The Elwyn Creek springs consists of six springs (two warm, four cold) forming three large pools at the head of the creek with tufa formations in mounds and terraced benches along the creek valley. Taweh Creek has extensive tufa formations along a 650-metre stretch of the creek. Mess Creek consists of two principal vents at the base of a 20-metre cliff that form a pool approximately 200 m^2 and one metre deep. The Mess Lake hot springs have produced tufa deposits that cascade down gentle hill slopes and through lowlands covering over 120 hectares. Deposits around recent vents indicate that discharge likely took place as a geyser. One of the fossil vents stands approximately 10 metres high. In 1965, the Mess Lake hot springs exhibited vigorous flow. By 1974 the discharge rate was a trickle and by 1983 both the vents and adjacent terrace pools were dry. In 1999, some of the terrace pools contained water but the main vents remained dry.

8.2.2 General Management Direction

Overall Direction

The landforms and geologic features of the Stikine Country Protected Areas provide the structural definition that shapes the Spatsizi Greater Ecosystem and the Mount Edziza Greater Ecosystem. Conservation of significant geologic features will focus on interpretation and protection from physical disturbance by humans.

Objectives and Strategies

To protect the integrity of significant and fragile geological features from human disturbance.

- Provide recreation users and commercial operators with information about the significance of geological features, their vulnerability to human disturbance and appropriate activities next to and within these areas.
- Monitor the effects of outdoor recreation use on significant geologic features and designate routes, or prohibit activities on those features where required.

To gain further knowledge of the structure and function of geological features in Stikine Country Protected Areas.

- Encourage low-impact scientific research about the geology of Stikine Country Protected Areas and specific geological features.

8.2.3 Protected Area-Specific Management Direction

Mount Edziza Provincial Park and Proposed Mount Edziza Protected Area - Objectives and Strategies

To protect cinder cones and calcite deposits in Mount Edziza Provincial Park.

- Manage access on volcanic cones and, if necessary, restrict access to designated trails or prohibit all outdoor recreation activities on cones.
- Provide information to protected area visitors about the fragility of volcanic cones and specific direction about how to avoid damage to the cones.
- Restrict access on Eve Cone to the designated trail.
- Assess the Mess Creek hot springs for location and extent of plants and plant communities at risk.
- Manage access at the Mess Creek hot springs to allow for some access while avoiding disturbance to the calcite deposits.
- Provide information to provincial park visitors about the vulnerability of calcite deposits at Mess Creek hot springs to human disturbance and establish clearly marked trails to avoid damage to sensitive areas.
- Maintain the ban on helicopter landings on all cinder cones.
- Prohibit helicopter landings on calcite deposits, associated plant communities or other associated features at all the hot springs.

To protect obsidian and obsidian quarry sites.

- Continue to protect information on the location of obsidian quarry sites.
- Provide information to protected area visitors that stresses the cultural importance of the obsidian deposits to the Tahltan Nation, and that the removal of obsidian for recreational or commercial use is prohibited under the *Park Act* and the *Park and Recreation Area Regulation*. The Tahltan Nation asserts an aboriginal right to collect obsidian and advises that its members may choose to exercise this claimed right.

To communicate the significance of the Tahltan Eagle for travellers along the Telegraph Creek Road.

- Work with the Tahltan Band Council, the Iskut First Nation and the Ministry of Transportation to assess a possible pullout for viewing the Tahltan Eagle.
- Work with the Tahltan Band Council and Iskut First Nation to develop an interpretive package for the Tahltan Eagle.

To protect Pipe Organ Mountain.

- Work with the Tahltan Band Council, the Iskut First Nation, the Ministry of Energy and Mines and the mining industry to protect Pipe Organ Mountain.

Spatsizi Plateau Wilderness Provincial Park - Objectives and Strategies

To protect Denkladia Mountain.

- Work with the Tahltan Band Council and the Iskut First Nation to protect Denkladia Mountain by considering limiting access to the area.

8.3 Water

The Stikine River and its tributary systems that flow in a generally westward direction to the Pacific Ocean dominate the hydrology of the Stikine Country Protected Areas System. The Stikine River forms the main part of Stikine River Provincial Park, which includes the lower elevation areas surrounding the Pitman and Chukachida tributaries. Spatsizi Plateau Wilderness Provincial Park contains the headwaters of the Stikine River and the river drains most of the larger lakes in the park including Happy, Tuaton, Laslui, Hotlesklwa and Chapea lakes. Buckinghorse and Klahowya lakes drain into the Spatsizi River, which converges with the Stikine River just north of Hyland Post. Gladys, Cold Fish, Blackfox and Bug lakes drain into Mink Creek, which empties into the Spatsizi River.

On the east side of Mount Edziza Provincial Park and Mount Edziza Protected Area (proposed), Mowdade, Mowchilla, Kakiddi and Nuttlude lakes form a chain of lakes that are emptied by Kakiddi Creek, which flows into the Iskut River. The waters of Buckley Lake on the north slope of the Edziza Plateau drain into the Klastline River, which flows northwest and joins the Stikine River. Mess Lake on the west side of Mount Edziza drains into the Stikine River via Mess Creek.

The waters of Tatlatui Provincial Park are the only waters in Stikine Country Protected Areas that are not part of the Stikine River system. All the major lakes in Tatlatui Provincial Park (i.e. Tatlatui, Hoy, Trygve, Kitchener and Stalk) feed into the Firesteel River, which eventually flows through the Finlay River into the Peace River and the Arctic Ocean.

8.3.1 General Management Direction

Overall Direction

Water quality, quantity and flow will continue to be regulated by natural events. Outdoor recreation and commercial use in the protected areas system will be managed to protect and maintain natural water quality.

Objectives and Strategies

To protect and maintain the natural quality, quantity and flow of rivers, creeks and lakes in Stikine Country Protected Areas within their natural range of variability.

- Develop indicators and baseline measures for water quality monitoring.
- Monitor water quality in the most heavily used areas (e.g. Cold Fish Lake, Stikine River at the bridge, Tuaton Lake, Fountain Rapids, Buckley Lake) and at permanent facilities, and implement strategies to offset, remediate or eliminate impacts from outdoor recreation or commercial activities if necessary.
- Assess and manage commercial and public use to ensure proper disposal of human waste and handling of fuel, batteries and other potentially hazardous waste products capable of harming the environment and aquatic systems.
- Develop a water quality monitoring strategy for other water bodies that considers outdoor recreation and commercial use levels.
- Ensure commercial and public users employ best practices for management and storage of human generated waste, fuel, hazardous products and other substances that are capable of harming the environment.
- Ensure sanitary facilities are properly designed and located.

- Work with other agencies to ensure that potential commercial activities adjacent to protected areas have minimal effects on natural water quality, quantity and flow of waters within the protected areas.
- Work with other agencies to follow Cassiar Iskut-Stikine LRMP management direction for water quality.
- Develop appropriate action plans to deal with known historic impacts on water quality.

8.3.2 Protected Area-Specific Management Direction

Mount Edziza Provincial Park and Proposed Mount Edziza Protected Area - Objectives and Strategies

To maintain natural water quality, quantity and flow in the Kakiddi Lakes chain.

- Monitor water quality in the Kakiddi Lakes chain prior to and after development if mining road access is required to Mount Edziza Resource Management Zone (formerly the Mount Edziza Recreation Area).
- Work with the Ministry of Energy and Mines and with the mining industry to minimize and mitigate impacts of mining activities on water quality, quantity and flow within Mount Edziza Provincial Park and the proposed Mount Edziza Protected Area if a mining road is developed through the proposed Mount Edziza Protected Area or if other mining activities occur adjacent to Mount Edziza Provincial Park or the proposed Mount Edziza Protected Area.

Pitman River Protected Area – Objectives and Strategies

To maintain natural water quality, quantity and flow in the Pitman River within Pitman River Protected Area.

- Monitor water quality in the Pitman River prior to and after development if a bridge/road is required across the Pitman River.
- Work with the Ministry of Energy and Mines and the mining industry to minimize and mitigate impacts on water quality, quantity and flow within the Pitman River Protected Area if bridge/road access is developed across the Pitman River or if other mining activities occur adjacent to the Pitman River Protected Area.

Chukachida Protected Area – Objectives and Strategies

To maintain natural water quality, quantity and flow in the Chukachida River within Chukachida Protected Area.

- Monitor water quality in the Chukachida River prior to and after development if a bridge/road is required across the Chukachida River.
- Work with the Ministry of Energy and Mines and the mining industry to minimize and mitigate impacts on water quality, quantity and flow within the Chukachida Protected Area if bridge/road access is developed across the Chukachida River or if other mining activities occur adjacent to the Chukachida Protected Area.

Stikine River Provincial Park– Objectives and Strategies

To maintain natural water quality, quantity and flow in the Stikine River and its tributaries within Stikine River Provincial Park.

- Monitor water quality in the Stikine River and affected tributaries prior to and after proposed forest harvesting north of the park.

- Work with the Ministry of Forests to minimize and mitigate impacts of forest harvesting practices and associated road building adjacent to the park on water quality, quantity and flow within the park.

8.4 Vegetation

Stikine Country Protected Areas comprise primarily boreal, subalpine and alpine vegetation. Vegetation features are diverse ranging from dry grassland slopes at 300 metres in Stikine River Provincial Park to lichens and hardy alpine plants at elevations over 2000 metres in Mount Edziza, Spatsizi Plateau Wilderness and Tatlatui provincial parks and Gladys Lake Ecological Reserve. Forests of white spruce (*Picea glauca*) and lodgepole pine (*Pinus contorta*) cover lower elevations, with subalpine fir (*Abies lasiocarpa*) dominating at higher elevations. Cold winters, short growing seasons and poorly developed soils affect the distribution and composition of vegetation communities within the protected areas. With the exception of low elevation coastal influenced vegetation ecosystems along the Stikine and Iskut rivers in the west, vegetation features in Stikine Country Protected Areas are representative of vegetation features in the larger Cassiar Iskut-Stikine Region.

Five biogeoclimatic zones occur within Stikine Country Protected Areas (Appendix 3). The Boreal White and Black Spruce (BWBS) Zone consists primarily of spruce and pine forests and occupies low elevation areas within the Stikine Country Protected Areas System. The Spruce-Willow-Birch (SWB) Zone is found above the Boreal White and Black Spruce Zone and extends from spruce dominated forests at lower elevations to subalpine fir forests and open woodlands and finally to mixed deciduous and coniferous shrubs at upper elevations. Above the Spruce-Willow-Birch Zone, the Alpine Tundra (AT) Zone consists of shrubs less than one metre in height at lower elevations. The shrubs gradually disappear higher up the mountain slopes where grasses, forbs and lichens become dominant. The Engelmann Spruce-Subalpine Fir (ESSF) Zone occurs below the Alpine Tundra Zone in the southern half of Mount Edziza Provincial Park. This zone consists of subalpine fir forests at low elevation, which change into open subalpine fir parkland further upslope. Below the Engelmann Spruce-Subalpine Fir Zone, the Sub-Boreal Spruce (SBS) Zone occupies low elevation valley bottoms along Mess and Kakiddi creeks.

A wide array of natural disturbance factors have influenced and shaped the ecosystems of Stikine Country Protected Areas. The ecosystem patterns that a person sees on the landscape today are the result of large scale and small-scale ecosystem processes. Large-scale events such as glaciation, volcanic activity, snow avalanches and landslides have contributed to both the physical and biological make up of the protected areas. Fire, another large-scale event, is the most significant disturbance factor that has created the landscape's current vegetation pattern. In Stikine Country Protected Areas, the effects of forest insects and windthrow are variable but tend to shape the vegetation mosaic at small to moderate scales. Processes such as forest diseases and solifluction contribute to the variability of vegetation patterns at a much smaller scale.

With a high degree of diversity in climate, terrain and vegetation, some plants and plant communities at risk occur in Stikine Country Protected Areas. However, only the Gladys Lake Ecological Reserve and parts of Mount Edziza Provincial Park have experienced even a moderate level of vegetation field investigations within their boundaries. Further vegetation exploration within Stikine Country Protected Areas will undoubtedly uncover additional plant species and ecosystems at risk and their associated localities.

Little is known about exotic or introduced plants and their effects on vegetation communities in Stikine Country Protected Areas. However, some degree of invasion by exotic species is likely, because of the history of human use in the area.

Forest cover mapping exists for Stikine Country Protected Areas but area summaries of forest cover types have not yet been compiled.

Figure 5. Spruce-Willow-Birch and Alpine Tundra biogeoclimatic zones, Laslui Lake area, Spatsizi Plateau Wilderness Provincial Park.

8.4.1 Natural Disturbance Factors

Fire is the most significant natural disturbance factor that has shaped the recent vegetation mosaic of Stikine Country Protected Areas. Many of the forest stands are of fire origin and still have not reached the climax stage of succession because of the frequency of fire events.

Fire occurs most often in the Boreal White and Black Spruce (BWBS) Biogeoclimatic Zone within Stikine Country Protected Areas (Appendix 3). Fires can reach thousands of hectares in size and are larger than fires in the other zones. In the Spruce-Willow-Birch (SWB) and Engelmann Spruce-Subalpine Fir (ESSF) zones, fires occur less frequently with some sites not experiencing fire for 500 years. Fires in the ESSF tend to be small and often limited by topography or lack of fuel because of rock ridges, scree slopes, or less flammable vegetation. Fires in both the SWB and ESSF may originate in the zone itself or be driven into it from lower elevations. Fires in the Alpine Tundra (AT) Zone are relatively infrequent, small and of low intensity. Larger fires in this zone likely originate at lower elevations.

Human-caused fires appear to have had a greater impact than wildfires in Stikine Country Protected Areas especially in the area around the Grand Canyon of the Stikine River. The Grand

Canyon area of the Stikine River experienced some large human-caused fires in the 1950s and 1960s (Cichowski and de Groot 2000). The Wildlife Branch used prescribed fire to enhance Stone's sheep habitat at some sites within Stikine Country Protected Areas. Although Tahltan history has not been well documented, recent information indicates that the Tahltan people may have used fire for enhancing wildlife habitat or berry production, or as an aid for hunting.

Fire suppression has likely had little influence on the forest mosaic in Stikine Country Protected Areas because of the remoteness and efficiency of fire suppression in the area (Parminter 1983). The vegetation landscape is therefore likely almost identical to what would have occurred without fire suppression intervention.

Fire management plans for existing protected areas guide current fire suppression activities. In general, full suppression occurs only where fires threaten existing structures and facilities and prescribed fire may be allowed to enhance wildlife habitats and rejuvenate vegetation succession. Gladys Lake Ecological Reserve is also currently under full suppression. Some updating of fire management plans is required to include additions and changes to protected areas, and to update and standardize fire management strategies.

Forest insects and windthrow have had limited effects on the vegetation landscape in Stikine Country Protected Areas. Forest insects, such as mountain pine beetle (*Dendroctonus ponderosae*) and spruce beetle (*Dendroctonus rufipennis*), do not appear to have significantly altered the forest mosaic in the region. Although they may occur at extremely low endemic levels in the forests of Stikine Country Protected Areas, outbreaks are unlikely because of the cold northern climate. Balsam bark beetles (*Dryocoetes confuses*) likely have the most significant presence in the area, as they are prevalent throughout northern British Columbia. Little information is available on forest insects in Stikine Country Protected Areas. The most recent aerial survey in the area was conducted in 1994 and but was restricted to the area west of Highway 37. That survey detected balsam bark beetle as the most common forest insect.

Climatic conditions appear to limit the extent of most forest insect activity in Stikine Country Protected Areas. If long-term climate conditions in the Stikine Country Protected Areas region become warmer and drier, increased levels of forest insect activity may result.

Other disturbances such as wind and forest diseases affect the vegetation landscape at a smaller scale. Currently no information exists about the extent and distribution of windthrow in Stikine Country Protected Areas and little is known about forest diseases. Disturbances caused by forest diseases provide small openings in the forest canopy and do not have the same potential for creating landscape level disturbances in Stikine Country Protected Areas as do other disturbance factors.

Recently, global warming has resulted in increased average temperatures in Canada. In British Columbia, the greatest increase in temperatures during the last 10 years appears to have occurred in the northwestern part of the province. These changes, if they continue, could result in changes in natural disturbance frequency and severity.

8.4.2 Plants and Plant Communities at Risk

Three red-listed and 22 blue-listed vascular plant species are known to occur within Stikine Country Protected Areas (Appendix 3). Most of the red and blue-listed vascular plants occur in subalpine and alpine habitats. An additional 25 plant species of taxonomic or distributional interest have been recorded in Gladys Lake Ecological Reserve (Appendix 3) and 11 rare plant communities are known to occur within Stikine Country Protected Areas (Appendix 3). All of the rare plant communities are associated with either steep, dry slopes or mineral springs. Extensive grazing pressure affects many of the dry steppe plant communities found in the Stikine River Canyon area outside of the protected areas.

Figure 6. Surveys for plants and plant communities at risk, Gladys Lake Ecological Reserve.

Because of the harsh environmental conditions present within Stikine Country Protected Areas, many plant communities are highly susceptible to physical damage. Plants at risk are often associated with extreme conditions such as extremely dry or exceptionally wet sites, which are among the most prone to damage. In addition, lichens, an important food source for caribou, are also highly sensitive to physical disturbance and are especially vulnerable to damage during summer when they are dry. Because they grow extremely slow, lichen recovery following disturbance could take 50 - 100 years.

In the Spruce-Willow-Birch Biogeoclimatic Zone, dry scrub birch/lichen, dry trembling aspen and plant communities on south and west-facing slopes are vulnerable to disturbance. In the Alpine Tundra Zone, the mesic Altai fescue, dry lichen and moist sedge-moss plant communities are sensitive. These plant communities are common on the alpine plateaus. Plant communities

colonizing relatively recent lava flows in Mount Edziza Provincial Park and areas where glaciers recently receded are living under harsh conditions and are extremely vulnerable.

8.4.3 Human Influences

Historically, First Nations inhabited the Stikine Country Protected Areas System. However, during the last 50 - 100 years, much of the area's human use has been from outdoor recreation users or from commercial operators, who provide recreational guiding services, primarily guided hunting and angling. Human influence on the vegetation landscape includes: direct disturbance to plants and plant communities at heavily used and/or sensitive sites; introduction of non-native plants; horse use and grazing; and accidental or deliberate human-caused fires.

The *Park Act* prohibits the destruction or removal of protected area natural resources, including vegetation, except for protected area management purposes or unless specifically permitted to do so. In Stikine Country Protected Areas, vegetation has been altered for habitat management, trail maintenance and campsite establishment. Some guide-outfitters are permitted to provide firewood for camps.

8.4.4 General Management Direction

Overall Direction

Natural disturbances such as fire, forest insects, wind, and forest diseases are considered essential ecosystem components contributing to the vegetation landscape and the function of natural ecosystems. The Stikine Country Protected Areas System is large enough to accommodate natural disturbance events within the system. Vegetation management will focus on maintaining natural disturbance events and minimizing the impacts of human activities.

Objectives and Strategies

To maintain and monitor naturally occurring vegetation patterns and natural disturbance events within the range of natural variability.

- Allow natural disturbance events to continue driving the dynamics of the vegetation landscape.
- Consider vegetation manipulation using tools based on natural disturbances (e.g. fire) to restore natural ecosystem structure and function if necessary.
- Assess long-term climatic conditions to determine potential changes in natural disturbance patterns.
- Conduct periodic monitoring for forest insect disturbances and, if consistent with management intent of the plan, or to protect values outside the protected areas system, manage forest insects with fall and burn or prescribed fire.
- Develop a vegetation management plan that addresses current vegetation patterns, natural disturbance management and climate change. Key elements should include:
  - ➢ knowledge base:
    - ⇨ biogeoclimatic zone/ecosection descriptions;
    - ⇨ forest cover mapping interpretations;
    - ⇨ ecosystem mapping (if available) interpretations;
    - ⇨ current and historic natural disturbance patterns;
    - ⇨ First Nations relationship to vegetation and vegetation management;

- ⇨ human use influences on vegetation including site degradation and introduction of non-native species.
- ➢ historic management activities and their effects:
  - ⇨ fire suppression;
  - ⇨ forest insect and disease management;
  - ⇨ prescribed burning;
  - ⇨ vegetation management activities on adjacent lands.
- ➢ vegetation management zones;
- ➢ appropriate levels of natural disturbance;
- ➢ appropriate types and levels of vegetation management activities;
- ➢ effects of protected area vegetation management policies on vegetation on adjacent lands; and,
- ➢ information needs.

- Assess the current state of knowledge of vegetation features in Stikine Country Protected Areas and determine further information needs including information on species at risk.
- Revise fire management plans to include additions and changes to protected areas, and to update and standardize fire management strategies to reflect vegetation management direction in this plan.
- Maintain Initial Attack zones for fire suppression in current fire management plans.
- Consider habitat manipulation for:
  - ➢ wildlife populations or portions of populations that are significantly declining because of deteriorating habitat conditions resulting from human disturbance or intervention;
  - ➢ species that are at risk or sensitive species if populations are threatened; or,
  - ➢ local populations that are at risk of becoming extirpated or that are in marked decline (i.e. >50% of baseline population).

  Habitat manipulation will not be considered for the primary purpose of maintaining or enhancing wildlife populations for recreation purposes such as hunting or wildlife viewing. Habitat manipulation will be conducted using only tools based on natural disturbances (e.g. fire). Consider whether outdoor recreation activities (consumptive and/or non-consumptive) should be removed in the area where habitat manipulation is conducted, until the population has recovered.
- Ensure that protected area management strategies do not establish or maintain unnatural ecological conditions.

To manage vegetation features and disturbances within a larger regional context.

- Work with other agencies and First Nations in vegetation management planning exercises on adjacent lands (i.e. landscape unit planning) within the Spatsizi Greater Ecosystem and Mount Edziza Greater Ecosystem to promote compatibility of vegetation management objectives with those for Stikine Country Protected Areas, while respecting management regimes outside the protected areas system.
- Consider management objectives on adjacent lands in vegetation management activities within Stikine Country Protected Areas.
- Continue to work with the Ministry of Forests Protection Branch to achieve protected area fire management objectives.
- Manage fires and forest insects near protected area boundaries in consideration of values next to the protected area.

- Establish an Initial Attack Zone for fire suppression on the north side of the Stikine River near the McBride River to minimize impacts from fires originating in the protected areas system on commercial forest values in the adjacent McBride River area.
- Manage natural disturbances within the group of Stikine Country Protected Areas in the Spatsizi Greater Ecosystem and Mount Edziza Greater Ecosystem rather than in individual protected areas.

To protect plants and plant communities at risk.

- Identify and map known localities of plants and plant communities at risk, and sensitive plants and plant communities (Appendix 3).
- Protect known localities of plants and plant communities at risk and sensitive plants and plant communities from public use and commercial disturbance. Develop and implement a strategy to prevent disturbance if necessary.
- Assess the new areas added to the protected areas system (Mess, Klastline, Metsantan, Stikine River, Pitman, and Chukachida) for plants and plant communities at risk, and sensitive plants and plant communities.
- Assess all Stikine Country Protected Areas for rare and sensitive plants and plant communities (e.g. use air photos to identify potential locations).
- Conduct further assessments of existing protected areas for plants and plant communities at risk and sensitive plants and plant communities.

To minimize human disturbance to native plants and plant communities.

- Conduct vegetation assessments prior to development or relocation of facilities or trails.
- Inventory and assess already established facilities and trails for damage to native plants and plant communities.
- Monitor the effects of existing grazing activities on native plants and plant communities. Develop and implement a strategy to reduce those impacts if necessary.
- Assess the distribution and extent of non-native plants within Stikine Country Protected Areas and determine their impacts on natural vegetation features.
- If necessary, develop guidelines to reduce the current distribution and extent of non-native plant species, and/or to reduce potential future introductions.
- Identify and eliminate "noxious weeds" with low impact techniques such as removal by hand, and low intensity burns as required.
- Develop a firewood management strategy that includes an assessment of supply and demand and strict guidelines on the removal of vegetation for supplying firewood.
- Monitor the demand for and use of firewood/heating fuel and restrict consumption if necessary.

8.4.5 Protected Area-Specific Management Direction

Although some protected area-specific management objectives focus on protecting specific plant and plant communities at risk, other plants and plant communities at risk occur in other protected areas and are addressed under general management direction for the system.

Mount Edziza Provincial Park and Proposed Mount Edziza Protected Area - Objectives and Strategies

To protect terrestrial lichen and plant communities at risk on volcanic cones.

- Manage access to volcanic cones and, where needed, restrict access to designated trails or prohibit all outdoor recreation activities on cones.
- Provide information to provincial park visitors about the sensitivity of lichen and plant communities growing on volcanic cones.
- Restrict visitor access to Eve Cone to the designated trail.

To minimize impacts of natural disturbances originating in Mount Edziza Provincial Park and the proposed Mount Edziza Protected Area on commercial forest values adjacent to the eastern boundaries in the Willow Creek area.

- Continue to implement initial attack on fires originating on the east side of Mount Edziza Provincial Park.
- Monitor forest insects in the park and protected area and conduct fall and burn operations on the east side of Mount Edziza Provincial Park and the proposed Mount Edziza Protected Area if necessary.

To protect plant communities at the Mess Creek and other hot springs.

- Assess the Mess Creek hot springs and other hot springs for location and extent of plants and plant communities at risk and sensitive plants and plant communities.
- Manage access at the Mess Creek hot springs and other hot springs by providing designated trails while avoiding disturbance to plants and plant communities at risk and sensitive sites. The Cassiar Iskut-Stikine LRMP provides the following direction for the Mess Creek hot springs area (Cassiar Iskut-Stikine LRMP 2000): "*Provide designated trails to minimize damage to calcite deposits*".
- Provide information to protected area visitors about the vulnerability of plants and plant communities at Mess Creek hot springs.

Stikine River Provincial Park - Objectives and Strategies

To protect dry steppe plant communities at risk along the Stikine River.

- Identify and map known localities of plants and dry steppe plant communities at risk along the Stikine River.
- Protect the known localities of dry steppe plant communities at risk from human disturbance.

To minimize impacts of natural disturbances originating in the park on commercial forest values adjacent to the north in the McBride River area.

- Establish an Initial Attack Zone for suppression of fires originating on the north side of the Stikine River in the vicinity of the McBride River.
- Monitor forest insects in the park and conduct fall and burn operations in the vicinity of the McBride River if necessary.

Tatlatui Provincial Park– Objectives and Strategies

To assess potential northern migration of forest insects into the Stikine Country Protected Areas System.

- Assess and verify reports of mountain pine beetle attack near Tatlatui Lake.
- Develop a strategy for managing any mountain pine beetle attacked sites.

Spatsizi Plateau Wilderness Provincial Park and Stikine River Provincial Park (in Spatsizi Greater Ecosystem) – Objectives and Strategies

To monitor and rehabilitate heavily used campsites and trails along the Stikine River.

- Rehabilitate heavily used campsites along the Stikine River canoe route (e.g. Fountain Rapids) and designate camping areas, if needed, to prevent further damage.
- Discourage firewood collection at Fountain Rapids. Provide visitors with information (in the brochure; at the information shelter at Tuaton Lake; as part of an information package to be distributed by aircraft charter companies) to collect firewood prior to arriving at Fountain Rapids.
- Rehabilitate and improve the portage trail at Fountain Rapids to avoid damage to wet areas.
- Continue to monitor the condition of campsites and trails and implement strategies to rehabilitate damaged areas and to avoid further impacts.
- Assess the extent and impacts of unauthorized camps (e.g. along the Stikine River downstream from the mouth of the Spatsizi River) and develop site plans as needed. If necessary, remove some sites and designate formal camping areas.
- Assess horse impacts at guide-outfitter camps and develop strategies to reduce and prevent impacts in consultation with guide-outfitters.

To protect Metsantan Village from fire disturbance.

- Establish an Initial Attack Zone for fire suppression surrounding the Metsantan Village site.

8.5 Wildlife

The Stikine Country Protected Areas System is renowned for its variety and abundance of wildlife, especially large mammals. Caribou, Stone's sheep, mountain goat, moose, grizzly bear, black bear and wolf all inhabit both the Spatsizi Greater Ecosystem and the Mount Edziza Greater Ecosystem. Although the Stikine Country Protected Areas System is large enough to accommodate most habitat and life cycle requirements for most of those species, animals frequently move beyond protected area boundaries and some require large areas to maintain minimum viable populations. Numerous smaller wildlife species are also present. For those species the Stikine Country Protected Areas System provides all necessary life cycle requirements and is large enough to maintain viable populations.

Human activities such as hunting, trapping, outdoor recreation and commercial activities, and land management practices beyond protected area boundaries influence wildlife numbers and behaviour in the Stikine Country Protected Areas System. Although the Stikine Country Protected Areas System was the focus of some inventories and research studies since the 1960s, basic information on some species and recent inventory information still is lacking.

8.5.1 Large Mammal Predator-prey System

One of the most outstanding biological features of Stikine Country Protected Areas is the diverse large mammal predator/prey ecosystem that exists in a relatively undisturbed natural setting. The four main species of ungulates that live in northwestern British Columbia – Stone's sheep, mountain goat, caribou and moose - exist in all four large provincial parks (i.e. Mount Edziza, Spatsizi Plateau Wilderness, Stikine River and Tatlatui provincial parks) and in the Gladys Lake

Ecological Reserve. Mule deer, which occur infrequently in northern British Columbia, live in pockets of habitat in Spatsizi Plateau Wilderness Provincial Park, Mount Edziza Provincial Park and the Stikine Canyon area of Stikine River Provincial Park. Wolf, grizzly bear and black bear are the main predators of these ungulates found in Stikine Country Protected Areas. Other predators such as wolverine, lynx, coyote and golden eagle kill extremely young ungulates and may kill adults to a lesser extent.

Two main predator-prey systems operate within Stikine Country Protected Areas: one centred in the Mount Edziza Greater Ecosystem, which includes Mount Edziza Provincial Park, the proposed Mount Edziza Protected Area, and Stikine River Provincial Park west of Highway 37; and one centred in the Spatsizi Greater Ecosystem, which includes Spatsizi Plateau Wilderness Provincial Park, Gladys Lake Ecological Reserve, Tatlatui Provincial Park, Stikine River Provincial Park east of Highway 37, Pitman River Protected Area and Chukachida Protected Area.

Figure 7. Moose, Spatsizi Plateau Wilderness Provincial Park.

The Mount Edziza Greater Ecosystem, although not large enough to support self-sustaining predator populations, appears to support annual habitat and life cycle requirements for caribou, Stone's sheep and mountain goat. Those ungulates appear to exist in a mainly "closed" system where immigration and emigration is low. The moose population, however, is likely dependent on a larger area and is contiguous with other moose populations. The diversity of ungulate species in a relatively closed system is a significant feature of the Mount Edziza Greater Ecosystem. Because of the lack of information on large mammal predators, the status of the predator-prey ecosystem in the Mount Edziza Greater Ecosystem is unknown.

The protected areas within the larger Spatsizi Greater Ecosystem are more capable of supporting a naturally functioning predator-prey ecosystem; however, combined, they still may not be large enough to support a self-sustaining population of grizzly bear or wolf. The Spatsizi Greater Ecosystem appears to meet the majority of habitat and life cycle requirements for all the other species. Although little information exists about the large mammal predators in the Spatsizi Greater Ecosystem, minimal human disturbance and development and low levels of hunting suggest that the predator-prey system is likely functioning in a near natural state.

The dynamics of such diverse predator-prey ecosystems are complex. Fluctuations in the numbers of each species can either directly or indirectly affect population numbers of other species in the system. Generally, in ecosystems where predators live, prey populations survive at

lower numbers than would be the case if predators were absent and food availability limited prey populations. In the Stikine Country Protected Areas System, predators are the most important factor regulating ungulate population size. Historical prey population fluctuations and distribution, and management efforts have played a significant role in the current structure of species numbers and distribution. Two of the most significant events contributing to changes in wildlife populations in the recent past include the expansion of moose into northwestern British Columbia in the late 1800s (with a subsequent increase in wolf numbers by the late 1930s), and a large scale wolf poisoning program conducted in British Columbia from 1949 to 1962. Ungulate populations increased following wolf control until about 1968 then declined again in the 1970s.

Coincident with moose expansion into British Columbia has been a reduction in numbers and range of caribou in southern British Columbia. Caribou used to occupy much of the interior portion of the southern half of British Columbia. Now, however, only isolated populations of caribou exist in west central British Columbia and the mountainous areas of southeastern British Columbia. A similar dramatic reduction in caribou numbers and range does not appear to have occurred in northern British Columbia, including Stikine Country Protected Areas. Therefore, the Stikine Country Protected Areas System is provincially significant in contributing to woodland caribou conservation in British Columbia. Recently, the Cassiar Iskut-Stikine LRMP added significant areas of caribou winter range north of the Stikine River to Stikine River Provincial Park.

The Stikine Country Protected Areas System is the largest contiguous protected areas system supporting the diverse caribou/moose/Stone's sheep/mountain goat/wolf/grizzly bear/black bear predator-prey system in British Columbia. These landscapes are internationally significant, providing representation of a large mammal predator-prey system in the British Columbia protected area system that ranks it as among the most important in the world.

8.5.1.1 General Management Direction

Overall Direction

The priority for wildlife management in Stikine Country Protected Areas is to maintain healthy and viable representative large-mammal predator-prey systems, allowing for natural fluctuations in wildlife populations. Two large mammal predator-prey systems are recognized within Stikine Country Protected Areas: one centred in the Spatsizi Greater Ecosystem; and one centred in the Mount Edziza Greater Ecosystem.

Objectives and Strategies

To maintain naturally occurring, healthy and viable large mammal predator-prey systems in Stikine Country Protected Areas.

- Manage the caribou/Stone's sheep/mountain goat/moose/wolf/grizzly bear/black bear populations in protected areas in the Mount Edziza Greater Ecosystem (Mount Edziza Provincial Park, Mount Edziza Protected Area (proposed) and Stikine River Provincial Park – west of Highway 37) as the Mount Edziza predator-prey system, recognizing the connectivity and linkage between this area and the Spatsizi Greater Ecosystem, and the relatively "closed" nature of the caribou, Stone's sheep and mountain goat populations.
- Manage the caribou/Stone's sheep/mountain goat/moose/wolf/grizzly bear/black bear populations in protected areas within the Spatsizi Greater Ecosystem (Spatsizi Plateau Wilderness Provincial Park, Gladys Lake Ecological Reserve, Stikine River Provincial

Park – east of Highway 37, Chukachida Protected Area, Pitman River Protected Area, and Tatlatui Provincial Park) as the Spatsizi predator-prey system, recognizing the more "open" nature of most large mammal populations.
- Work with First Nations, other agencies and the public to minimize the impacts of activities outside protected areas on the large mammal predator-prey system centred in protected areas within the Mount Edziza Greater Ecosystem and the Spatsizi Greater Ecosystem.
- Allow natural fluctuations in large mammal populations to occur as part of healthy and dynamic predator-prey systems.
- Develop and provide information on the significance and functioning of the two Stikine Country Protected Areas' predator-prey systems to visitors.

8.5.2 Habitat Management

Although habitat and food do not regulate prey populations where predators exist, they are basic requirements and must be available in sufficient quantity. Habitat requirements for each prey species are a function of food preferences, environmental conditions and predator avoidance tactics. Both mountain goat and Stone's sheep avoid predators by escaping into precipitous terrain (e.g. cliffs, rocky slopes) where they are far more agile than the predators. Their foraging areas are therefore restricted to areas close to escape terrain. Moose and caribou avoid predators by running and to a lesser degree by defending themselves and thus select habitats based more on food preferences and environmental conditions. Caribou also avoid predators by maintaining distance from other prey and predators, especially during calving.

Detailed information on wildlife habitat is lacking for Stikine Country Protected Areas. Currently, habitat capability maps are available only at a 1:250,000 scale and general areas of aggregation defined from surveys and studies of radio-collared animals.

8.5.2.1 Caribou

Woodland caribou that live in Stikine Country Protected Areas have been recently blue-listed by the British Columbia Conservation Data Centre, and designated as "Special Concern" by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Stikine Country Protected Areas protect a significant part of the region's caribou habitat. During winter, caribou in these areas feed primarily by digging through the snow to obtain terrestrial lichens either on lower elevation forested plateaus or at high elevations on windswept alpine slopes. Winter feeding strategy varies between years and between winter months depending on snow conditions. Caribou also feed on arboreal lichens during winter although the extent of arboreal lichen feeding varies with snow conditions. In spring, female caribou may travel extensive distances to calving areas. Cows calve in early June in all habitat types but many caribou calve at high elevations, forgoing nutritious forage at low elevations to avoid predation on their calves. Usually only one calf is produced. During summer, caribou use a variety of habitats and feed on emerging vegetation. In the fall, most of the caribou populations move into alpine and subalpine habitat to rut although rutting also occurs below treeline.

Two main populations of caribou live within Stikine Country Protected Areas: the Spatsizi population, which consists of about 2700 caribou, and the Mount Edziza population, which consists of about 100 caribou. The Spatsizi caribou population range is located in the Spatsizi Greater Ecosystem, which includes Spatsizi Plateau Wilderness Provincial Park, Gladys Lake

Ecological Reserve, Stikine River Provincial Park east of Highway 37, Pitman River Protected Area, Chukachida Protected Area and Tatlatui Provincial Park. Caribou range throughout the Spatsizi Greater Ecosystem in summer. Major wintering areas include mature pine forests along the Stikine River between the McBride and Pitman rivers, and along the lower Spatsizi River. During some winters caribou extensively use windswept alpine slopes mostly on the Spatsizi Plateau, between the Ross and Spatsizi rivers, and in the Eaglenest Range and Gladys Lake Ecological Reserve north of Mount Will. Important rutting areas include the Spatsizi Plateau, the Tomias Mountain Plateau and Edozadelly Mountain. Caribou live in Tatlatui Provincial Park primarily during spring, summer and fall and are mostly absent from the park in winter because of the deep snow pack.

The Mount Edziza caribou population inhabits the Mount Edziza Greater Ecosystem, spending summer throughout Mount Edziza Provincial Park with some rutting aggregations occurring on the plateau west of Mount Edziza Peak. During winter, caribou sign is found below treeline in the Buckley Lake area; however little information is available on winter distribution of caribou. During some winters caribou may be found on the plateau. The Cassiar Iskut-Stikine LRMP recommended forest harvesting in management zones adjacent to Mount Edziza Provincial Park; caribou winter habitat quality and use in those areas remains unknown.

Figure 8. Caribou, Mount Edziza Provincial Park.

8.5.2.2 Stone's Sheep

Stone's sheep live throughout Stikine Country Protected Areas, except the lower elevation portions of Stikine River Provincial Park, Pitman River Protected Area and Chukachida Protected Area. Stone's sheep are generally associated with steep slopes, grassy knolls and adjacent cliffs for escape terrain. During winter, Stone's sheep primarily use south or west facing alpine and subalpine slopes where snow accumulations are low and where they can forage on grasses, sedges and other ground vegetation. For the snow free part of the year, Stone's sheep may use a wider variety of habitats that are close to escape terrain. For most of the year, rams

and ewes generally occupy separate ranges except during the rut in November and December. Lambs (usually one) are born in late May and early June.

In the Spatsizi Plateau Wilderness Provincial Park area, Stone's sheep primarily inhabit the northern part of the Eaglenest Mountains, the Gladys Lake Ecological Reserve and the Spatsizi Plateau along Marion Creek and the south facing slopes near Hyland Post. Some small bands of Stone's sheep exist south of the Spatsizi River west of the Dawson River, east of the Ross River, and in the Duti River area at the southeast end of the park; however status of those bands is difficult to assess because of the low numbers observed. Tatlatui Provincial Park is home to scattered small bands of Stone's sheep but numbers are likely limited by habitat availability and winter snow accumulation.

In Stikine River Provincial Park, Stone's sheep inhabit primarily the north side of the river in the mountains between Beggerlay Creek and the Kehlechoa River. Stone's sheep live throughout Mount Edziza Provincial Park with the greatest concentrations along the south and west facing cliffs on the west side of the plateau.

8.5.2.3 Mountain Goat

Like Stone's sheep, mountain goats exist throughout Stikine Country Protected Areas except for the low elevation portions of Pitman River Protected Area and Chukachida Protected Area. Mountain goats inhabit Spatsizi Plateau Wilderness Provincial Park, Gladys Lake Ecological Reserve, Tatlatui Provincial Park, and Mount Edziza Provincial Park in association with precipitous slopes and cliffs. In Stikine River Provincial Park, mountain goat habitat is limited and mountain goats live mainly along the Stikine River Canyon and in the mountains between Beggerlay Creek and the Kehlechoa River.

Mountain goats are highly agile climbers and forage in habitats close to precipitous slopes and cliffs that they use for escape terrain. They inhabit terrain similar to but often steeper and more precipitous than Stone's sheep. Mountain goats are more restricted than Stone's sheep in their movements away from escape terrain but forage on a wider variety of vegetation including grasses, forbs, shrubs and subalpine fir. During winter, mountain goats must often forage on vegetation immediately adjacent to escape terrain, which may be limited to subalpine fir. Like Stone's sheep, mountain goats prefer south facing slopes with low snow accumulations in winter but are also found on all aspects and in deep snow areas. Mountain goats use a wider variety of habitats in the summer when movements are less restricted by snow but still rely on cliffs for escape terrain. Kids are born in late May and nannies may produce one or two and occasionally three kids.

Figure 9. Mountain goat.

8.5.2.4 Moose

Moose are found throughout all Stikine Country Protected Areas. During winter, moose typically inhabit low elevation valley bottoms feeding primarily on shrubs, grasses and sedges in forested and wetland habitats, but also inhabit mid-elevations and subalpine habitat. In spring, female moose may move considerable distances to calving areas mostly below treeline although some cows also calve in subalpine habitats. Calving occurs in late May to early June and females may give birth to one or two calves. During summer, moose are found in all habitat types but mostly those below treeline and in the fall they favour upland scrub and subalpine habitat.

High quality moose habitat occurs in most Stikine Country Protected Areas. Significant wetland habitat along the Chukachida and Pitman rivers, and old burns near Hyland Post and along the Stikine River (both east and west of Highway 37), provide high quality moose winter habitat. Although little information is available for Tatlatui Provincial Park, moose primarily use the park for summer range because of deep winter snow accumulation.

8.5.2.5 Grizzly Bear

Grizzly bears in British Columbia are blue-listed by the British Columbia Conservation Data Centre. In 1995, the provincial government developed a Grizzly Bear Conservation Strategy that included implementing Limited Entry Hunting for all hunted grizzly bear populations, developing Grizzly Bear Management Areas, and initiating a Grizzly Bear Scientific Panel to review grizzly bear management in British Columbia (British Columbia Ministry of Environment, Lands and Parks 1995). The Grizzly Bear Scientific Panel recently released their final report, which includes a number of recommendations such as refining methods for estimating grizzly bear numbers, addressing access issues, and implementing the provision in the Grizzly Bear Conservation Strategy to establish Grizzly Bear Management Areas in each bioclimatic region in the province (Peek *et al.* 2003).

Grizzly bears and grizzly bear habitat exist throughout all Stikine Country Protected Areas. The highest quality habitat occurs along valley bottoms on the Stikine, Spatsizi, Chukachida, Pitman and Klappan rivers. Other than some research conducted by the Spatsizi Association for Biological Research, little information is available on grizzly bear in Stikine Country Protected Areas.

In general, bears feed on emerging vegetation during spring, especially on avalanche chutes. During summer, bears continue to feed on emerging and growing vegetation and then on berries later in the summer and fall. Throughout the year bears may supplement their diet by feeding on carrion, hunting marmots and ground squirrels in the alpine and hunting larger wildlife. In some areas, grizzly bears are significant predators of newborn ungulates. Grizzly bears with access to salmon spawning streams feed on salmon in late summer and fall. In the Stikine Country Protected Areas region, the Stikine River Canyon prevents the movement of salmon upstream so only grizzly bears in the Mount Edziza Provincial Park area potentially have access to salmon streams.

8.5.2.6 Other Wildlife Species

Wolves live throughout all Stikine Country Protected Areas and are an important predator in the Spatsizi Greater Ecosystem and the Mount Edziza Greater Ecosystem, feeding on moose, caribou, Stone's sheep, mountain goat and other smaller mammals. Prey abundance and social

behaviour (i.e. wolf packs, territories) naturally regulate wolf numbers. Wolves patrol and defend territories thereby limiting the number of wolves in an area. Because of the diversity of ungulates and small mammals in Stikine Country Protected Areas, population fluctuations of individual prey species may have little impact on wolf numbers as wolves switch to other prey when one prey species declines. Research by the Spatsizi Association for Biological Research on radio-collared wolves in the Spatsizi Plateau Wilderness Provincial Park area indicated that one wolf pack territory was centred in the Spatsizi Plateau area and another in the Eaglenest Range. Although moose were abundant in valley bottoms, it appeared that those two wolf packs primarily hunted caribou and Stone's sheep.

Mule deer are near their northern range limit and are found primarily in small bands along the Klastline River, along the Spatsizi River near Hyland Post and scattered on south facing slopes along the Stikine River mostly west of Highway 37. Winter snow accumulation primarily limits the distribution of mule deer in the area.

All medium to large predators (e.g. black bear, wolverine, coyote, lynx [*Lynx canadensis*], red fox [*Vulpes vulpes*], fisher, river otter [*Lontra americanus*], mink [*Mustela vison*], marten [*Martes americana*]) and smaller mustelids (short-tailed weasel [*Mustela erminea*], least weasel [*Mustela nivalis*]) are expected to occur in all Stikine Country Protected Areas.

Snowshoe hare (*Lepus americanus*), porcupine (*Erethizon dorsatum*), beaver (*Castor canadensis*), hoary marmot (*Marmota caligata*), muskrat (*Odantra zibethica*), bushy-tailed wood rat (*Neotoma cinerea*), red squirrel (*Tamiasciurus hudsonicus*) and least chipmunk (*Eutamias minimus*) all occupy habitats throughout the Stikine Country Protected Areas System. Records confirm the occurrence of some mice, voles, shrews, bats and amphibians but little information is available on those animals (Appendix 7).

Pikas (*Ochotona* sp.) and melanistic chipmunks were reported on the south slope of Melanistic Peak and at the west end of Tatlatui Lake in Tatlatui Provincial Park, and a pika call was heard in a rockslide above Trygve Lake. Although pikas exist in the southern half of British Columbia and in the Yukon, they are not known to occur in the northern part of the province. Therefore, verification of the observations in Tatlatui Provincial Park will result in changes in known distribution of pikas in British Columbia.

In the combined Stikine Country Protected Areas, confirmed sightings of 170 species and unconfirmed sightings of two species of birds have been reported (Appendix 7). Little information exists about amphibians and invertebrate animals in Stikine Country Protected Areas.

8.5.2.7 Prescribed Burning

The Skeena Region Fish and Wildlife Branch carried out a series of small prescribed burns in Stikine Country Protected Areas between 1986 and 1991 as part of a larger Stone's sheep habitat enhancement program. The objective of the burns was to reduce shrub and young forest growth to re-establish more Stone's sheep habitat. Burns could also benefit other wildlife; lower elevation areas within the burns were expected to be especially beneficial for moose. The Fish and Wildlife Branch conducted seven burns within the six-year period. The largest and most successful burn took place along the McBride River in what is now Stikine River Provincial Park. In Mount Edziza Provincial Park, 150 hectares were burned along the Klastline River in

1990 and a further 672 hectares were burned the following year to increase the size of the burned area.

A prescribed burn for Stone's sheep habitat was proposed for the old burn area at Hyland Post for the spring of 1999; however, unfavourable conditions prevented any burning. Another burn was conducted in June 2000 when over 11,000 hectares burned during an attempt to create a firebreak; however, most of the burned area lay outside of the targeted area. Since pre and post-burn monitoring plots were established in the targeted area, none of those plots burned during the June 2000 fire.

8.5.2.8 General Management Direction

Overall Direction

Vegetation in the Stikine Country Protected Areas System exists in a largely natural state; therefore, natural disturbances will be the main processes driving wildlife habitat dynamics. Habitat management for individual species will be secondary to management of an overall natural wildlife habitat mosaic. Acquiring more information on distribution and quality of wildlife habitat throughout the system is a high priority.

Objectives and Strategies

To manage wildlife habitat as part of a natural vegetation mosaic driven by natural disturbances.

- Allow natural disturbance processes to be the primary driver of wildlife habitat dynamics.
- Consider habitat manipulation for:
  - wildlife populations or portions of populations that are significantly declining because of deteriorating habitat conditions resulting from human disturbance or intervention;
  - species that are at risk or sensitive species if populations are threatened; or,
  - local populations that are at risk of becoming extirpated, or that are in marked decline (i.e. >50% population decline).

  Habitat manipulation will not be considered for the primary purpose of maintaining or enhancing wildlife populations for recreation purposes such as hunting or wildlife viewing. Habitat manipulation will be conducted using only tools based on natural disturbances (e.g. fire). Consider whether outdoor recreation activities (consumptive and/or non-consumptive) should be removed in the area where habitat manipulation is conducted, until the population has recovered.
- Monitor and report on the effectiveness of any habitat manipulation activities.
- Monitor natural disturbances and evaluate recent disturbances for wildlife habitat value and use.

To identify significant wildlife habitat.

- Delineate known ungulate winter and summer ranges based on research conducted by the Spatsizi Association of Biological Research on radio-collared animals, and on inventories.
- Conduct wildlife habitat capability and suitability mapping at 1:50,000 or 1:100,000 scale for protected areas in the Spatsizi Greater Ecosystem and Mount Edziza Greater Ecosystem for caribou, Stone's sheep, mountain goat, moose, grizzly bear and species at risk.

- Use the wildlife habitat map to determine overall wildlife habitat condition and to identify critical or sensitive habitat.
- Identify known areas of important habitat outside protected area boundaries.

To protect critical or sensitive habitat from human disturbance.

- Encourage visitors and commercial operators to avoid areas of known critical or sensitive habitat. If necessary, limit access to those areas.
- Provide visitors and commercial operators with information on the significance of critical or sensitive habitat and impacts caused by human disturbance.

To protect habitat for species at risk from human disturbance.

- Encourage visitors and commercial operators to avoid areas of known habitat for species at risk. If necessary, limit access to those areas.
- Provide visitors and commercial operators with information on the significance of species at risk and their habitat and impacts caused by human disturbance.

To maintain important caribou ranges to contribute to conservation of caribou in British Columbia.

- Delineate known caribou winter range and identify winter range characteristics based on existing information.
- Establish and monitor long-term monitoring plots to investigate terrestrial lichen availability and dynamics in the caribou winter range along the Stikine River.
- Monitor the effects of natural disturbances on caribou winter habitat.
- Identify known summer ranges of the Mount Edziza caribou population based on existing information.
- Conduct a study using radio-collars for caribou in Mount Edziza Provincial Park to determine winter habitat use and important wintering areas.

To incorporate First Nations traditional knowledge in wildlife habitat management.

- Work with First Nations to identify historical and currently used important habitats and migration routes.
- Identify and assess traditional habitat management activities.

8.5.2.9 Protected Area-Specific Management Direction

Spatsizi Plateau Wilderness Provincial Park - Objectives and Strategies

To monitor the Hyland Post burn.

- Establish long-term vegetation monitoring plots at the recent Hyland Post burn to monitor wildlife habitat quality.
- Conduct surveys of Stone's sheep in the Marion Wildlife Inventory Zone to determine effects of the burn on lamb recruitment and population numbers.
- Consider conducting a prescribed burn near Hyland Post, to fulfil management objectives of the original prescribed burn, subject to consultation with the Tahltan Nation and affected stakeholders.

8.5.3 Population management

Population information for large mammals is often costly and difficult to obtain. Population estimates for Stone's sheep, mountain goat and caribou are based on surveys conducted in non-forested (usually alpine) habitat. For other species, population estimates are more difficult to obtain. Biologists use stratified random block surveys to estimate moose numbers, and in British Columbia, government estimates of grizzly bear numbers in most areas are inferred based on habitat capability and disturbance factors.

For Stikine Country Protected Areas, biologists conducted large mammal inventories irregularly during the last 20 years. Because of the area's vast size and difficulty in counting some species, few recent reliable population estimates are available. The most recent counts include a mountain goat and Stone's sheep survey in the Mount Edziza Provincial Park area in 1996, and Stone's sheep and caribou surveys in the Spatsizi Plateau Wilderness Provincial Park area (Spatsizi Plateau Wilderness Provincial Park, Stikine River Provincial Park, Gladys Lake Ecological Reserve) in 1993 and 1994 (Table 3). For most species, population estimates are over 10 years old. A wildlife survey for Stone's sheep was conducted in March 2003 in the Spatsizi Plateau Wilderness Provincial Park area along with incidental inventories of mountain goats and caribou.

In the Spatsizi Greater Ecosystem and Mount Edziza Greater Ecosystem, the protected areas and adjacent areas are divided into Wildlife Inventory Zones for inventory purposes. Some species inhabit only portions of those protected areas during different seasons. Therefore, wildlife inventory zones are useful in reporting general distribution patterns and changes in population numbers at a more geographically specific level than at the protected area or ecosystem level. Some zones include areas outside of the protected areas within the Spatsizi Greater Ecosystem and Mount Edziza Greater Ecosystem to incorporate biologically based boundaries.

Although surveys can provide population estimates for wildlife species, population status and trends (e.g. whether populations are increasing or decreasing) are more difficult to assess. Biologists can use juvenile recruitment to infer population status for the year of the survey. Most of the surveys suggest that juvenile recruitment is likely adequate to compensate for adult mortality; therefore, most of the populations were likely at least stable at the time of the survey. Comparing population estimates from successive surveys can also be used to infer population trends. However, few of the populations have more than one or two reliable population estimates, making it difficult to assess trends. Of particular concern is the lack of current reliable inventory information.

For Mount Edziza Provincial Park, the last caribou survey was conducted in October 1983 when 66 caribou were counted in rutting groups on the west side of the park. Calf recruitment appeared to be low; however, low calf recruitment may have been a function of the small sample size. Attempts to conduct caribou population surveys since 1983 have been unsuccessful because of the lack of caribou in alpine habitat during the surveys. Anecdotal observations in 1996 suggest that the population may have increased since 1983 and incidental observations during a caribou capture in November 2002 reported about 70 animals. However, because of the lack of current inventory information, the status of the Mount Edziza caribou population is unknown.

Table 3. Population Status of Wildlife in Stikine Country Protected Areas.

	Mount Edziza Provincial Park	Mount Edziza Protected Area (proposed)	Mount Edziza RMZ[1]	Stikine River Provincial Park West	Stikine River Provincial Park East	Pitman River Protected Area	Chukachida Protected Area	Spatsizi Plateau Wilderness Provincial Park	Gladys Lake Ecological Reserve	Tatlatui Provincial Park
Caribou										
Survey year	October 1983			No data	March 1994					
Number observed	66				2145					
Population estimate					2681					
Calf recruitment (% calves)	10.6				15.8					
Stone's sheep										
Survey year	March 1996			Mostly absent	March 1994		No data	No data	March 1994	July 1985
Number observed	136				74				479	19
Population estimate	170				92				599	
Lamb recruitment (% lambs)	16.2				6.8				16.5	26.3
Mountain goats										
Survey year	March 1996		September 1979	No data		No data	No data		July 1984 and 1985	July 1989
Number observed	168		255						630	320
Population estimate	210		316							
Kid recruitment (% kids)	15.5		18.4						24.8	27.5
Moose										
Survey year	No data				February 1990					No data
Number observed										
Population estimate					1912					
Calf recruitment (% calves)					17.6					

[1] Mount Edziza Resource Management Zone

Stone's sheep surveys in Spatsizi Plateau Wilderness Provincial Park in March 1993 and 1994 yielded a population estimate of 599 Stone's sheep, which was similar to the 1988 survey suggesting that the population is stable; however, distribution of Stone's sheep was slightly different between the two surveys. The population at Marion Creek and Hyland Post is considered somewhat isolated from the larger population in the Eaglenest Range. The number of Stone's sheep counted during surveys in the Marion Creek and Hyland Post area decreased from 125 Stone's sheep in 1988 to 63 Stone's sheep in 1999 indicating a decline.

Figure 10. Stone's sheep, Mount Edziza Provincial Park.

The number of Stone's sheep counted in Tatlatui Provincial Park in 1985 is likely not a good indicator of the actual population size since scientists counted Stone's sheep incidentally during a mountain goat survey. Stone's sheep numbers in Tatlatui Provincial Park are likely limited by habitat availability and winter snow accumulation.

Stone's sheep numbers reported for Stikine River Provincial Park (east of Highway 37) include only the Mount Sister Mary and McBride areas. Sheep remain unsurveyed in the northern addition to Stikine River Provincial Park.

Although wildlife scientists have conducted few recent surveys for mountain goats in Stikine Country Protected Areas, population numbers and kid recruitment from those surveys appeared adequate for maintenance of at least stable populations in most of the protected areas. However, the most recent adequate survey of mountain goats in the Stikine River Canyon conducted by scientists in September 1979 yielded an estimate of 316 mountain goats. A few surveys have been attempted in the area since then (as recently as March 1996); however, low numbers observed during those flights were believed to be a function of poor viewing conditions.

Two areas in Stikine Country Protected Areas were surveyed for moose using the stratified random block moose survey method. The surveys were conducted in the Level Mountain area in February 1988 and 1990 and in Spatsizi Plateau Wilderness Provincial Park and Stikine River Provincial Park east of Highway 37 in February 1990. Although the Level Mountain survey was conducted north of the Stikine River, the 1990 density estimate of 470 moose/1000 km^2 is a good indicator of moose density for the northern portion of Mount Edziza Provincial Park and Stikine River Provincial Park west of Highway 37. The Spatsizi Plateau Wilderness Provincial Park survey included wintering areas in Gladys Lake Ecological Reserve, Spatsizi Plateau Wilderness Provincial Park, Stikine River Provincial Park east of Highway 37, Pitman River Protected Area and Chukachida Protected Area. The population for the area was estimated at 1912 ± 392 moose with a density of 558 moose/1000 km^2, slightly higher than the density estimate for the Level Mountain area. Calf recruitment levels in both surveys suggest that calf recruitment is adequate to compensate for adult mortality. Results from the radio-collared moose study conducted by the Spatsizi Association for Biological Research for 1990 and 1991 also suggested that calf recruitment was adequate to compensate for adult mortality. The bull to cow ratios (Spatsizi: 69 bulls/100 cows; Level Mountain: 68 bulls/ 100 cows) indicate a high proportion of bulls in the population.

Although no direct inventories of grizzly bears exist for Stikine Country Protected Areas, the Wildlife Branch developed a method of estimating grizzly bear numbers based on habitat capability and human developments and disturbance. Wildlife Branch estimated grizzly bear numbers based on habitat capability (Fuhr and Demarchi 1990) then reduced the numbers based on degree of habitat alteration, disturbance, and human caused mortalities. Park specific estimates were derived in 1999 for Spatsizi Plateau Wilderness Provincial Park, Gladys Lake Ecological Reserve and the former Stikine River Recreation Area east of Highway 37 combined (113 bears), for Mount Edziza Provincial Park and the proposed Mount Edziza Protected Area combined (28 bears), and for Tatlatui Provincial Park (25 bears). Stikine River Provincial Park west of Highway 37 was too small for an individual population estimate and was included in the population estimate for the Wildlife Management Unit. Actual population status of grizzly bear populations in Stikine Country Protected Areas is unknown.

Inventory information for species other than caribou, Stone's sheep, mountain goat and moose is lacking. One of the most significant inventory information gaps is wolf numbers and distribution. Other than information collected by the Spatsizi Association for Biological Research in the early 1990s on two to three radio-collared wolf packs, most observations are anecdotal and are insufficient to draw conclusions about wolf packs, numbers and dynamics.

8.5.3.1 Research, Inventory and Monitoring

The Stikine Country Protected Areas System was the focus of several wildlife inventories and research studies since the 1960s including:

- research on Stone's sheep behaviour in the Gladys Lake area in the 1960s;
- wildlife surveys upstream of Telegraph Creek along the Stikine River in the late 1970s and early 1980s for the proposed Stikine Iskut Hydroelectric Project;
- extensive ground surveys in Spatsizi Plateau Wilderness Provincial Park and Tatlatui Provincial Park in 1975;
- research in the Spatsizi area on caribou habitat use, behaviour and population dynamics from 1980 to 1987 and on moose, wolf and grizzly bear habitat use, behaviour and