State of British Columbia's Ecological Reserves

Report for 2005

Sponsored by the Friends of Ecological Reserves
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and the University of Victoria Co-op Program

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It is with the greatest of appreciation that we honour, through the report, the Wardens and the managers who have been working to maintain the ecological integrity of the ecological reserve system in British Columbia.

The Friends of Ecological Reserves Board

Cover photo: *Sarcosphaera crassa* taken by Pam Jansen from her fungi study on Saturna Island. Research supported by FER.

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CANADA

EXECUTIVE SUMMARY

There are currently 147 ecological reserves in British Columbia set aside under the Ecological Reserves Act to preserve representative and special natural ecosystems, plant and animal species, features and phenomena.

The British Columbia Ministry of Environment (the Ministry) is responsible for managing the ecological reserves as part of the Province's Protected Areas System. Eighty of the ecological reserves have volunteer Wardens who assist in their management and protection.

In 2003 The Friends of Ecological Reserves (FER), a not-for-profit organization that exists to promote the interests of the ecological reserves in British Columbia, decided that a review of the state of the ecological reserves was needed so that the organization could set appropriate goals and priorities.

This document reports the findings of that study which was carried out in the winter of 2004 - 2005.

Information about each ecological reserve was gathered through a telephone survey of the Wardens and Ministry staff and a review of the Ministry files available at headquarters in Victoria. On site visits with Wardens were carried out to reserves near Victoria such as Race Rocks, Honeymoon Bay, Mount Tuam, Mount Tzouhalem, Oak Bay Islands Group, Trial Island, and Mount Maxwell ecological reserves.

While there remain gaps in the data that the study was able to gather, sufficient information was obtained to identify trends in the ecological condition of the reserves and to identify issues related to their management.

The overall results of the study indicate that the system of ecological reserves in British Columbia has a number of important strengths:

- There are significant number of areas (147) around the province covering a total of166,918 ha that are protected as ecological reserves;
- Many (80) of the reserves have volunteer wardens who assist the ministry with stewardship of the reserves. Race Rocks Ecological Reserve in particular provides an exemplary model of joint stewardship; and
- A number of ecological reserves (e.g., Robson Bight, Haley Lake, Checleset Bay, Drizzle Lake ecological reserves) have provided the opportunity for important, long term ecological research projects.

The results of the study also indicate that there is work to be done to rebuild the Ecological Reserves Program so that this important public asset is maintained

and capitalized upon. In particular the study raises concerns that the ecological values of many individual reserves are at significant risk and a more proactive approach to managing the reserves is required to reverse this trend. The results show for example that:

- Poor to very poor ecological information is available for 69% of the ecological reserves;
- 27% of the ecological reserves appear to be in poor to very poor condition with a further 23% in fair condition and in need of restoration; and
- 45% of the ecological reserves do not have a volunteer Warden and there appear to be insufficient resources available for Ministry staff to adequately manage the ecological reserves and support the Wardens.

There is clearly an opportunity for FER to work in partnership with the Ministry to strengthen the system of ecological reserves. The report offers six specific recommendations related to:

- improving the availability of information for each reserve;
- addressing the issue of deteriorating ecological condition; and
- building on our partnership with the Ministry to improve the management of the program.

Summary of Recommendations from the Study

Recommendation 1: That the Ministry of Environment maintain a centralized information system for ecological reserves that is comprehensive and accessible.[1]

Recommendation 2: That the Ministry and FER partner to develop and implement, a baseline inventory and monitoring program for ecological reserves by March 2007.

Recommendation 3: By March 2007, FER and the Ministry partner on a five year research strategy to address key knowledge gaps related to:

a. understanding threats and degradation factors and assessing their relative significance to the condition or ecological reserves;
b. identifying management techniques to reverse degradation and improve ecological condition;

[1] We understand from ministry staff that they plan to develop, by 2008, an information management system entitled PLUS (Protected Land Unified System) for all protected areas.

c. determining the long term contribution that ecological reserves can make to conserving biological diversity; and
d. understanding the factors that affect the contribution of ecological reserves to conservation of biological diversity.

Recommendation 4: That the Ministry increase its presence, management and enforcement activities to ensure that ecological reserves are protected.

Recommendation 5: That the Ministry formalize and adequately resource a Warden Program that is characterized by:
a. A true partnership with the Wardens and FER;
b. Joint setting of annual management goals, activities, performance measures and targets for each reserve;
c. Clear, agreed upon expectations for the roles and responsibilities of Wardens in the management of the reserves;
d. Clear, agreed upon expectations and processes for staff-Warden communications;
e. Warden training, annual Warden-staff meetings and financial support for Wardens to travel to remote reserves or reserves where access is difficult;
f. Provincial coordination of the Wardens; and
g. A recruitment strategy to ensure there is a Warden for every ecological reserve in the province by March of 2007.

Recommendation 6: That FER reach out to the Ministry to determine how we can best support it to protect and maximize the benefits of our ecological reserves.

Race Rocks Ecological Reserve, the only ecological reserve that appears to have up-to-date, standardized inventory information, is an excellent example of partnerships and active support for on-going research. For more information visit http://www.racerocks.com/

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INTRODUCTION

Overview of Ecological Reserves

Ecological reserves are permanent sanctuaries located throughout British Columbia set aside to:

- Preserve representative examples of British Columbia's ecosystems;
- Protect rare and endangered plants and animals in their natural habitat;
- Preserve unique, rare or outstanding botanical, zoological or geological phenomena;
- Provide examples of ecosystems that have been modified by humans and offer an opportunity to study the recovery of natural ecosystems; and
- Ensure ecosystems in their natural state are available for scientific research and education.

There are currently 147 ecological reserves in British Columbia including wetland, marine, forested, grassland, and alpine ecological reserves. The ecological reserves cover approximately 166,918 hectares and 29% of this area is marine.

The British Columbia Ministry of Environment (the Ministry) is responsible for managing the Ecological Reserves Program as part of the Province's Protected Areas System. The Ministry is assisted in the protection and management of ecological reserves by volunteer Wardens. Wardens contribute their knowledge, enthusiasm for conservation and their natural history expertise to the protection of specific ecological reserves.

The Friends of Ecological Reserves

The Friends of Ecological Reserves (FER) is a volunteer based, not-for-profit organization that exists to promote the interests of the Ecological Reserves Program in British Columbia. FER has focused its efforts on raising public awareness of ecological reserves and raising funds to support research and educational activities associated with ecological reserves. For more information about FER go to http://www.ecoreserves.bc.ca.

At a planning workshop in November 2003, FER recognized the need to better understand the current state of the ecological reserves so that the organization

could set appropriate goals and priorities. As a result FER embarked on a project to review the state of the ecological reserves in the province.

The results reported here provide a snapshot in time of the status of the Province's ecological reserves. The report provides information about the management and condition of the ecological reserves and where research and inventory are needed. This information should be of interest not only to FER but also to government as it recognizes the importance of protected areas, such as ecological reserves, as benchmarks for research and protection of species and habitat.

Haynes' Lease Ecological Reserve with Osoyoos Lake in the background

BACKGROUND

History of the Ecological Reserves Program

In the late 1960's and early 1970's there was a growing recognition by the scientific community of the need for a worldwide system of representative ecosystems. Encouraged by the late Dr. Vladimir Krajina, a professor at the University of British Columbia, and other scientists, the Province of British Columbia established an Ecological Reserves Committee in 1968 to advise on the selection of potential reserve sites in British Columbia.

In 1971, the Legislature approved the *Ecological Reserves Act* to formalize and give permanent protected status to ecological reserves. On May 4, 1971, the first 29 reserves were created by Order-in-Council.

A full-time ecological reserves coordinator was hired in 1974 and regulations relating to the use and protection of the reserves were established by 1975. All consumptive resource uses, such as tree cutting, hunting, fishing, mining, domestic grazing, camping, lighting of fires and removing materials, plants or animals, and the use of motorized vehicles were prohibited in ecological reserves. By 1980 a volunteer Warden Program, with a dedicated coordinator, was put into place to help watch over the reserves.

The Ecological Reserves Committee remained active until 1985. After that time resources for managing the Ecological Reserves Program and the Warden Program declined and staff were slowly redirected to other duties.

Current Status of the Ecological Reserves Program

The Ecological Reserves Act is currently administered by the Environmental Stewardship Division of the Ministry of Environment as part of the Parks and Protected Areas. To see current government information about ecological reserves go to http://www.env.gov.bc.ca/bcparks/eco_reserve/ecoresrv/ecoresrv.html. To see the Ecological Reserves Act and associated regulations go to http://www.qp.gov.bc.ca/statreg/list_statreg_e.htm).

There are 55 Area Supervisors located in nine provincial regions who are responsible for overseeing the management of ecological reserves in their area. They, with the help of their ranger staff, are responsible for the day-to-day operations related to the ecological reserves. There is a staff person located at headquarters in Victoria who has taken on the responsibility of responding to questions about ecological reserves and liaising with FER. There is, however, no

formal Ecological Reserves Program, i.e., there is no strategic/business plan or overall management plan for the provincial system of ecological reserves.

In the past few years the Ministry has made efforts to ensure that all protected areas, including ecological reserves, have management documents on file. There are three types of management documents:

1. A purpose statement is the least detailed management document and provides a description of the values of the ecological reserve to be protected.
2. A management statement provides a description of the values as well as information about the management issues.
3. A management plan is the most comprehensive document and usually involves public consultation. It outlines the values, management issues and management strategies.

The Role of Ecological Reserves

The key role of ecological reserves is to contribute to the maintenance of biological diversity and the protection of genetic materials. Research and educational functions are the primary uses of ecological reserves, provided these uses do not damage or alter the ecological values of the reserve. Ecological reserves are not created for outdoor recreation and should not be confused with parks or other recreational areas.

As many ecological processes are as yet poorly understood, today's scientists cannot predict some of the questions that will require research in unaltered ecosystems. Ecological reserves keep our options open for the future. Ecological reserves provide a "genetic data bank" which may hold the key to new discoveries in forestry, ecology, agriculture and medicine. Because ecological reserves are permanent sites, they are suited to long-term research, or longitudinal studies, where permanent plots or observation stations can be established, allowing the scientist or researcher to return, often, over time. Furthermore, sites with an established baseline of data can provide a valuable foundation upon which new research activities can be built.

Ecological reserves also offer opportunities for a wide range of educational activities ranging from simple observation and nature interpretation to the teaching of complex ecological processes. Under permit, all levels and institutions of education may visit all but a few very sensitive ecological reserves. As surrounding environments are progressively altered by human activities, ecological reserves assume an ever increasing significance for the demonstration and study of original ecosystems and as benchmarks against which change can be measured.

Although ecological reserves are not created to provide recreational opportunities, all but the most sensitive ecological reserves are open to the public for non-consumptive observational uses, such as nature appreciation, wildlife viewing, bird watching and photography. Parks and ecological reserves, although serving somewhat different purposes, complement one another. Together they provide a wide range of opportunities for people to experience and learn from the natural world.

Ponderosa Pine at its northern limit in the Chasm Ecological Reserve

OBJECTIVES

This report has three main objectives:

1. To assess the effectiveness of the partnership between volunteer Wardens and the Ministry for protecting and managing the ecological reserves throughout the province.
2. To identify those ecological reserves which are maintaining their ecological integrity and those where improvements are needed.
3. To identify inventory (baseline and monitoring), research, management planning and restoration needs for ecological reserves.

Gladys Lake Ecological Reserve

APPROACH

Information about the ecological reserves was gathered during the winter of 2004 - 2005 by:

1. a telephone survey of Area Supervisors and Wardens, and
2. a review of Ministry files.

The Survey

Two versions of the survey questionnaire were developed –one for the Wardens (Appendix 1) and one for the Area Supervisors (Appendix 2). Both quantitative and qualitative questions were used.

Warden Questionnaire

The Warden questionnaire sought information from the Warden's on:

1. The management of the Warden Program. Wardens were asked to identify what was working well and where improvements could made.
2. The level of threat to individual ecological reserves for which they were Wardens. Wardens were asked to identify both external and internal threats[2] and to rate the threats as 'H' high, 'M' moderate, or 'L' low, relative to persistence, degree and extent of change, and irreversibility. The definitions used for the threat categories are described in Appendix 1.
3. The overall condition of individual ecological reserves and related management needs. Wardens were asked to rate each ecological reserve using a rating system from one to five, where five represented the highest rating.

Area Supervisor Questionnaire

The Area Supervisors completed a shorter version of the questionnaire to make most efficient use of their time (Appendix 2.) They were not asked to rate the threats to individual ecological reserves because they had provided information on individual ecological reserves for the Ministry's Conservation Risk Assessment and this information was made available to FER for the review.

[2] Those identified as external ecological threats were confined to an area immediately surrounding the reserve (within one to two kilometers around the boundary of the reserve). Internal threats were those that directly affected the integrity of the reserve within its boundaries.

The Area Supervisor questionnaire sought information on:

1. The management of the ecological reserves including Area Supervisor's management activities related to the ecological reserves as well as the management of the Warden Program.
2. The overall condition of individual ecological reserves and related management needs. Area Supervisors were asked to rate each ecological reserve using a rating system from one to five, where five represented the highest rating.

Administering the Questionnaire

Contact information for the Area Supervisors was provided by the central office of Ministry and the Ministry sent a short e-mail to all Area Supervisors to notify them of the review of ecological reserves and to request their input. Membership of the FER, which includes all active Wardens, were made aware of the project in the fall issue of the LOG, the Friends Newsletter. An article entitled "Introducing Morgan McCarl" encouraged Wardens to participate. Contact information for Wardens was provided by FER.

When contacting Wardens and Area Supervisors by phone, multiple calls were placed, and after a couple of messages were left without response, no more attempts were made. As a result not all of the Wardens and Area Supervisors' input was included in the results. Some Area Supervisors and Wardens wanted to participate but due to busy and conflicting schedules were unable to complete the questionnaire. Some of the contact information was out of date; for example, several of the Wardens' phone numbers were no longer valid and some of those contacted were no longer active Wardens. The list of Area Supervisors provided by government was also slightly out of date. Some Area Supervisors switched regions, and some of the reserves not being accounted for in the list of Area Supervisors.

All information gathered from the Wardens' and Area Supervisors' questionnaires was recorded in a questionnaire Excel spread sheet.

File Review

The Ministry provided access to ecological reserve files located at headquarters including:

- Conservation Risk Assessments (CRAs);
- Annual Management Plans (AMPs) for each ecological reserve;
- the Ecological Reserve Research Catalogue, which contains a summary of completed research within the ecological reserves;

- files[3] on individual reserves which contained information on inventories and research that had been completed for each reserve.

The information from Ministry files was summarized in a "State of" database along with the information obtained through the survey. Each column in this database has been explained and the sources of data referenced in Appendix 3.

The files provided key information, especially for those reserves that had no Warden or where neither a Warden nor an Area Supervisor could be contacted. However, it was not possible to do a complete review of the files because not all ecological reserve files have duplicate files housed at headquarters.

Analysis

Based on the data collected in the questionnaires and file review, individual reserves were given two FER ratings (Appendix 4) – an information rating and an ecological condition rating.

The information rating for each reserve was scored out of six and considered:

- the absence, presence and length of intended service of a Warden;
- the existence of a baseline inventory;
- whether there was up-to-date inventory information;
- the existence of other records such as field notes or photographs;
- whether research related to the reserve has been conducted; and
- the status of management planning.

A score of six out of six indicates a reserve has a Warden, an up-to-date inventory done to standard that provides a baseline for monitoring, research has been conducted on the reserve, there are other field records, and there is an up to date management plan in place. Scores of less than 6 indicate short-comings regarding the information and management of the ecological reserve.

The second rating, the ecological condition rating, is intended to reflect the overall ecological integrity of the reserve. The ecological condition rating was based on combining the available ecological integrity ratings that the Area Supervisors and the Wardens gave for each ecological reserve, and the three related ratings contained within the Conservation Risk Assessments or, when the Conservation Risk

[3] The information obtained about ecological reserves-related inventory and research is not complete for each reserve because a few years ago ecological reserve files were moved from a centralized filing system at headquarters to files kept in each of the nine regional offices. Copies of the files were not always kept in headquarters after that time. Due to time and budget constraints, the review was limited to the files available at headquarters and therefore the information is incomplete for some reserves.

Assessment ratings were not available, the Annual Management Plans. The Conservation Risk Assessment ratings included a rating for external threats, internal threats and a cumulative rating. The Annual Management Plans gave a rating for overall conservation management, ongoing recreation management and recreation use threats to ecological values.

Because there were many gaps in the available data, the ecological integrity rating is expressed as a fraction of the number of sources of information used. For example, if a Warden rating, an Area Supervisor rating and the three Conservation Risk Assessment ratings were all available then the rating would be expressed as a fraction of 5. In this example if all five ratings were high then the score would be 5/5. For comparison purposes the fraction would be converted to a percentage which in this example would be 100%. If only one rating was available it would be expressed as a fraction of 1. In this latter example if again the rating was high the score would be 1/1 or 100%.

Calavaria fumosa image taken by Pam Jansen in her study of fungi in an ecological reserves on Saturna Island. This ecological reserve is now within a National Park and is no longer part of the ER system.

RESULTS

Information Sources

Some form of information was obtained, either through the survey, or the file review, for all but one of the ecological reserves - Roila Canyon. Information was obtained through the survey for 112 of the ecological reserves. However, only 30 of these had information provided by both the Warden and Area Supervisor. In 34 cases the information is based solely on files.

Area Supervisors

Twenty Area Supervisors out of 55 were interviewed, which resulted in information on 77 out of a possible 147 (or 52%) reserves being covered. The average length of time an Area Supervisor reported being in their position was 8 years, with the longest at 21 years and the shortest at less than one year. The Area Supervisors interviewed oversee between 1 and 8 ecological reserves each.

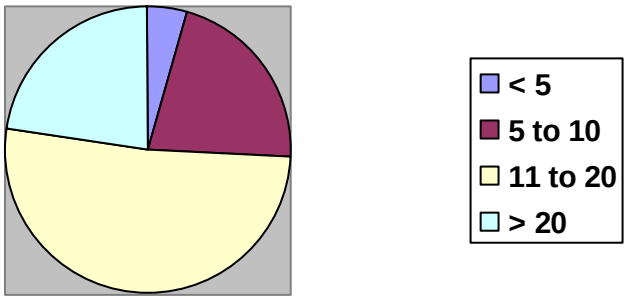
Wardens

Eighty of the 147 ecological reserves (55%) have a volunteer Warden. In total there are 56 Wardens with some Wardens overseeing more than one ecological reserve. Forty-five of the Wardens (80%) were interviewed regarding 66 (45%) of the ecological reserves. One of the Wardens interviewed one is no longer the Warden for the Gladys Lake Ecological Reserve but provided information from the time he was the Warden for that reserve.

The Wardens have many years of combined experience. Almost all Wardens (95%) have over 5 years of experience, 80% have over 10 years of experience and 40% have over 20 years experience. The average Warden has been active for over 15 years. The longest active Warden has been in service for 32 years, while the shortest term of service was one year. Twenty Wardens, or 39%, began their service within five years of the establishment of the first ecological reserves. This indicates the Warden program has been a success in terms of retaining Wardens over long periods. It also indicates that there is a significant amount of historic knowledge amongst the Wardens.

Warden Years of Experience

(45 Wardens Interviewed for 66 ERs)



Unfortunately, and predictably, eighteen of the Wardens interviewed (40%) plan on stepping down from their reserve responsibilities for one reason or another within the next five years. Of these eighteen Wardens, 10 have a replacement in mind. Several of these proposed replacements are members of the same naturalist club as the Warden. There is a growing need to create an awareness of these volunteer positions.

Files

The files and data kept at the Ministry's headquarters office were reviewed. However the files available in Victoria were not complete nor likely up to date because there is no longer a central filing system for ecological reserves in the Ministry. Some information pertaining to Conservation Risk Assessments or Area Management Plans was available through the file review for 132 of the ecological reserves. Eighteen or 12% of the ecological reserves do not have their inventory and research information summarized due to regional filing that was not accessed for this report.

It is acknowledged that the addition of regional information could affect the results. Staff and Wardens contacted, however, noted that, in general, there has been little new research, inventory and management activity in recent years that would substantively change the status of an ecological reserve.

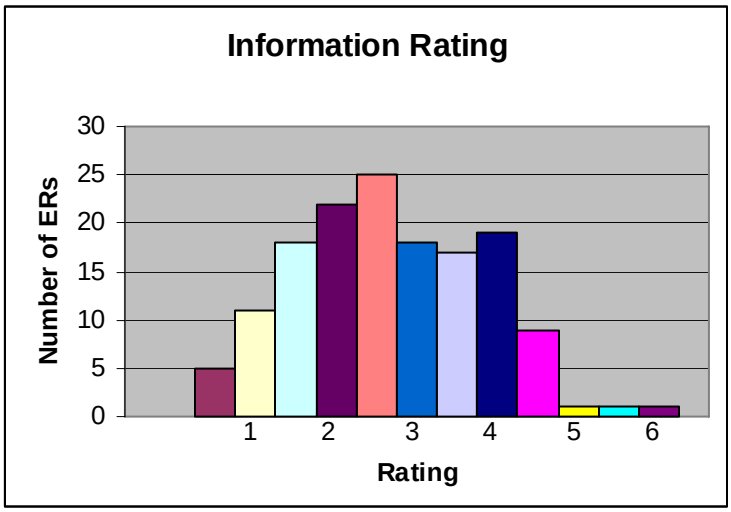
Information for Management

All available information collected regarding inventory, research, Warden, and management documents for each ecological reserve was summarized for the 147 ecological reserves in a spreadsheet. (Appendix 4)

Each of the 147 ecological reserves was given an information rating to indicate the relative amount of information available for each reserve (Appendix 5). Out of a total possible score of six, the average score was 2.7. Thirty-four ecological reserves (23%) had information ratings less than two meaning there is little to no information available for the ecological reserve. Sixty-five or 44% had a rating from two to three which means these ecological reserves would have poor information coverage. Thirty-six (24%) ecological reserves were rated from three and a half to four and therefore a moderate amount of information is available for them. Twelve ecological reserves (8%) received a rating greater than four meaning they have a relatively good amount of information available. One reserve received a full score of six.

A score of 6 indicates:

- a baseline inventory and a recent re-inventory done and thus the possibility to report on trends;
- presence of an active Warden that plans to be a Warden for more than 5 years, and that the Wardens notes are on file and available for information;
- a significant amount of research has been done in the ecological reserve; and,
- a recent management plan or management direction statement are developed, approved and shown on the web.



0<2 means little or no information
2-3 means poor information coverage
>3-4 means a fair amount of information
>4-6 means good information coverage.

The only ecological reserve that appears to have up to date, standardized inventory information is Race Rocks Ecological Reserve; in this case stewardship and inventory work is done in association with Pearson College of the Pacific and it is exemplary. Most of the ecological reserves appear to have some kind of preliminary baseline inventory information collected 20 to 30 years ago. However, there does not appear to be any regular ecological monitoring carried out and 99% of the reserves do not appear to have been inventoried recently, i.e., since 2000.

The research that has been carried out is sporadic and ranges from studies of soils and hydrology, to plant and animal communities, to species specific work. Eight ecological reserves have 10 or more research papers related to them. There have been several particularly noteworthy and comprehensive studies associated with ecological reserves including: Robson Bight (Cetaceans), Haley Lake (Vancouver Island marmots), Checleset Bay (sea otters), Anne Vallee [Triangle Island] (marine birds and mammals) and Drizzle Lake (sticklebacks). Overall there appears to have been little research directed towards assessing, maintaining and restoring ecosystem integrity.

Management planning related documentation was located for 104 ecological reserves. The majority of these (i.e. 70 ecological reserves) had a purpose statement. In addition, 35 ecological reserves had a management direction statement or management plan. Most purpose and management statements had been made within the past five years.

Wardens are considered an important source of information as well as a valuable management resource. As noted above 55% of the ecological reserves have a Warden at present.

Ecological Reserve Management Activities

Visits to Ecological Reserves

The Area Supervisors reported that they, or the rangers whom they supervise, visited ecological reserves from once every few years up to 48 times per year with a median of 1 visit per year. Those ecological reserves with more difficult access were visited less frequently while ecological reserves with particular management challenges were visited more often, e.g., the Chilliwack River Ecological Reserve was reportedly visited 48 times in one year. The average annual time spent per reserve (field and office time included) was 17 hours (2.4 days) and the median was nine hours (1.3 days). The time spent ranged from, a maximum effort of 97 hours or nearly 14 days in a year in a single reserve, to a minimum of 0 hours. The total annual hours that the 20 Area Supervisors reported spending on ecological reserve duties for the 77 ecological reserves

was estimated at 1357, based on the reported number of visits, the number of hours spent per visit, plus the hours spent on additional reserve related activities.

The number of visits Wardens reported making to their reserve each year ranged from 192 for Mt. Maxwell, a relatively accessible reserve, to zero visits for Satellite Channel, an underwater marine reserve. The median number of visits to ecological reserves was one and the average was nine. Wardens of reserves that are difficult to access, i.e. reserves requiring helicopter or boat access, frequently reported that they were not able to visit the reserve on an annual basis.

The time Wardens reported spending on a visit to a reserve ranged from 336 hours to one hour; the median was eight hours. In addition to the time spent visiting ecological reserves, Wardens reported spending from zero to 1000 additional volunteer hours each year on related ecological reserve activities; the median was two hours. The extremely high number of hours reported by several of the Wardens is because these Wardens are involved in research studies at the reserve.

The total annual volunteer hours that the 45 Wardens spend on ecological reserve duties for the 66 ecological reserves was estimated at 6130, based on the reported number of visits, the number of hours spent per visit, plus the hours spent on additional reserve related activities. The median number of annual volunteer hours spent per reserve was 16 hours and the average was 93 hours. Based on a seven hour day the median is equivalent to 2.3 days. Based on these data a rough estimate of the total volunteer time being directly invested into the 80 ecological reserves with Wardens each year is 184 days.

Monitoring and Record Keeping

Area Supervisors reported that when they visit an ecological reserve they are interested in the status of a variety of things including:

- signage,
- invasive species,
- fire damage,
- trespassing and vandalism,
- boundary integrity including fencing,
- beetle infestation,
- signs of predation in sea bird colonies,
- signs of erosion,
- inappropriate recreational use including vehicle damage,
- illegal activities such as logging inside the reserve, and
- livestock grazing.

Forty-seven percent of the Area Supervisors reported that they usually kept some form of record of their visit to an ecological reserve. The records kept

varied from a detailed record of their actions and observations, to a simple record of the date of the visit. A number of Area Supervisors use photographs to record their visits.

When Wardens visit their ecological reserve they also look for signs of disturbance. Sixty percent of the Wardens interviewed reported doing some kind of biological inventory or monitoring work. This varies from observing established monitoring plots set up by Parks and Protected Areas staff, to recording species of plants and animals and taking pictures to document changes in environmental conditions, such as fluctuations in water levels. In addition, a majority of Wardens (79%) report that they focus on, or incorporate into their observations, human disturbances resulting from recreation activities, vandalism and harvesting of species in the reserve. Wardens also keep an eye out for disturbance from cattle grazing in and around the reserve. Seventeen percent of Wardens report that they have fixed fences around the reserve to keep out grazers or they have documented the effects of cattle if there is not a fence in place. A number of ecological reserves have invasive species problems and some Wardens reported that they assist with weed removal.

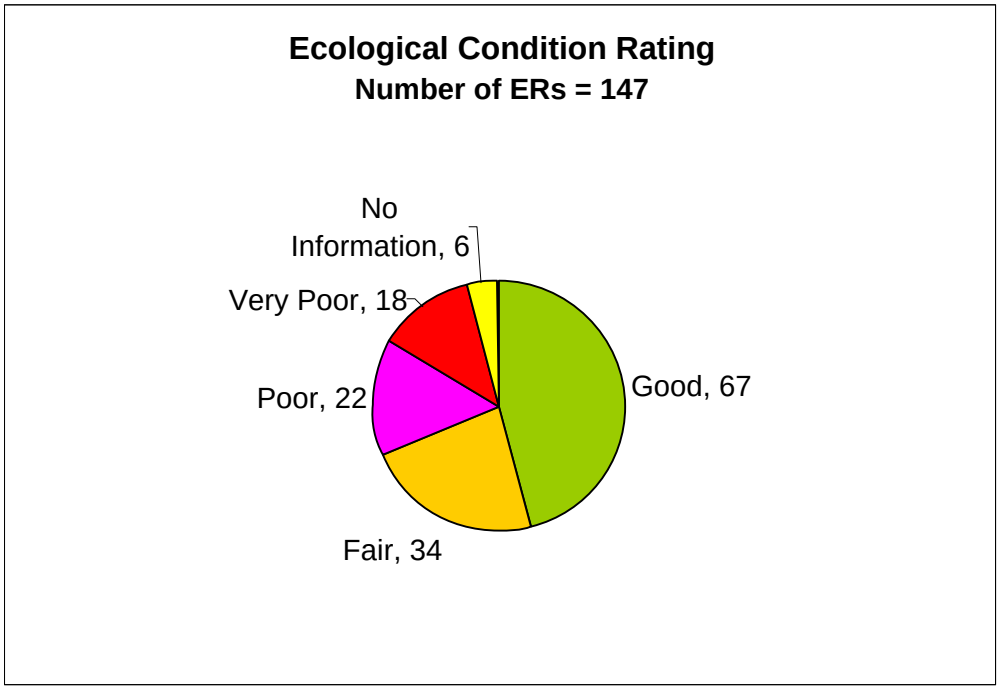
Seventy-nine percent of the Wardens interviewed for the 66 ecological reserves reported that they keep records of their observations. Of the Wardens interviewed, 30% reported sending annual warden reports to their regional office and 9% reported sending visitation reports.

Ecological Condition of the Reserves

Based on the qualitative information regarding ecological integrity obtained from the Wardens, Area Supervisors and the Conservation Risk Assessments or Area Management Plans, 141 ecological reserves were given an ecological condition rating (Appendix 5). Six ecological reserves (4%) did not receive a rating because there was no information available. Ninety-five, or 67%, of the rated ecological reserves were rated using at least four sources of information. However, the information was notably inconsistent among information sources for a number of the reserves.

Sixty-seven (46%) of the ecological reserves obtained a score of greater than 75% and can be considered in good to excellent condition. Thirty-four (23%) ecological reserves scored a rating of between 51% and 75% and can be considered in fair condition. The remaining 46 ecological reserves, which is almost one third of the ecological reserves, rated below 51% and can be considered in poor to extremely poor condition; 22 or 15% of the ecological reserves rated between 30% and 50% and 18 ecological reserves (12%) rated less than 30%.

Rose Spit Ecological Reserve, Queen Charlotte Islands



A wide range of disturbances were reported to be affecting the ecological condition of the ecological reserves. Easily accessible ecological reserves were frequently reported to have damage from recreation uses. Invasive species (e.g. scotch broom, raccoons predating seabird colonies) were repeatedly raised as a significant concern for many ecological reserves and several forested ecological reserves in the interior are being affected by the mountain pine beetle outbreak. Cattle grazing in ecological reserves and logging adjacent to ecological reserves is often raised as a problem. In particular it was reported a number of times that the small size of the ecological reserves and the absence of an adequate buffer around ecological reserves has resulted in adjacent development disturbing the reserve through changes in hydrology, etc.

Both Area Supervisors and Wardens were asked whether they thought the ecological reserves had appropriate signage. The Area Supervisors reported that they considered 53% of their reserves to have appropriate signage and the Wardens considered that 57% of their reserves had appropriate signage. There were a number of reports however about the need to raise public awareness of the purpose of ecological reserves and the kinds of activities that lead to ecological damage.

Wardens were asked to comment on the external threats facing the ecological reserves. Recreation, grazing and invasive species were frequently mentioned as external threats. Twenty five or 55 % of the responses also indicated that some form of external development was threatening the ecological integrity of the reserve; forestry development was most frequently cited and others threats included oil and gas, transportation corridors, and urban and rural development.

The Warden Program

Both the Area Supervisors and Wardens were asked for specific suggestions on how the Warden Program could be improved. The comments received supported the results obtained through related questions and focused on three topics:

1. communication,
2. coordination and involvement, and
3. resources and commitment.

Communication

Over half of the Wardens interviewed made specific comments about the need to improve communication between the Ministry staff and the Wardens. Three Area Supervisors likewise commented on the need for better communication. Examples of the range of comments include:

More communication, someone to phone him and show some concern for the reserve, annual meetings to cover workshops, presentations, issues and concerns.

More communication and more of a partnership presence in caring for the reserve. More response to problems… more action

Regular communication, Warden meetings with workshops and individual Warden presentations

Need to be informed of who's in charge / where.

Recognition through meetings

Improve the manual

Area Supervisors were asked how often they contacted the Wardens of their ecological reserves. Of the 52 Area Supervisors that reported having an ecological reserve with a Warden, ten or 19% noted that they never contacted the Warden. Communication was simpler in two cases where the Warden was the Area Supervisor's spouse and in three cases the Area Supervisor also volunteers as the Warden. Those Area Supervisors that did contact their Wardens during the course of their work reported doing so from rarely to monthly. The average number of contacts was three times per year and the median contact was once per year.

Wardens were asked whether they provide annual reports to the Ministry. Of the Wardens that send reports, including those that had previously submitted reports, a majority (16/27 or 59%) say that they received some sort of acknowledgement for the report from their Area Supervisor. Twenty-four percent of Wardens that have a history of handing in reports no longer send in reports to their Area Supervisor, six of these Wardens (25%) reported that they stopped writing reports after they repeatedly received no acknowledgement from their Area Supervisors. Other reasons cited for no longer sending in reports included: uncertainty whether the information was being filed; and uncertainty whether the report was made available to assist government decisions on the ecological reserve.

Both Area Supervisors and Wardens were asked whether they would like more meetings with each other. Sixty-five per cent of the Area Supervisors and 84% of the Wardens reported that they would like to meet more often. They were also asked what form of communication they would like. Thirty per cent of the Area Supervisors and 56% of the Wardens indicated they would like an annual meeting with staff and Wardens to promote information exchange. The idea of a regional meeting was frequently mentioned.

Regional Warden meetings - exchange ideas and views so ministry stays updated.

Regional annual training and work plan meetings.

A regional meeting once a year at beginning of season for Warden presentations and work plan development.

A regional meeting at least once a year for open discussion.

One-on-one communication was also considered an important form of communication by 40% of the Area Supervisors and 29% of the Wardens. Some individuals reported that phone and e-mail contact was helpful while many other reported that they prefer site visits. Examples from the conversations are:

More contact over the phone and a joint visit.

Annual one on one visit to the reserve.

One on one time to go through the reserve. Once a year.

Would like to see one on one meetings with ranger or area supervisor and warden at least once a year.

Area Supervisors and Wardens were asked whether they would attend another provincial meeting like the one held in Kamloops in September 2003. Thirty per cent of the Area Supervisors and 84% of the Wardens reported that they would attend another meeting.

Coordination and Involvement

The Area Supervisors and Wardens made numerous comments relating to the need to better plan and coordinate the Warden Program so that Wardens were more involved and ecological reserve management was more effective.
Examples of comments provided include:

There needs to be more sharing of information. Wardens need to be informed of what is going on in their reserve and have a say.

Coordination with Wardens, better communication, develop work plan for every Warden.

Better working relationship between Wardens and Area Supervisors. More planning involvement and more training.

Annual meetings to discuss a work plan for the upcoming season. This would entail what work the reserve needs and how much the Warden is willing and able to do, and how often they plan to visit. This will help the Warden structure ecological reserve priority and time. Also would like to see a more quantitative monitoring through the use of monitoring plots that can be left and revisited annually.

A coordinator in Victoria who would be available for prospective Wardens and could organize meetings and provide infrastructure for the system. And additional seasonal rangers to assist the AS in their territory would free up time for meeting the Wardens and co-visiting the reserves.

Time, there needs to be someone to coordinate the Wardens.

Need someone to take initiative in parks for setting up trips, budget accounts to pay for trips.

Two pervasive themes were the need for an ecological reserve coordinator and the need for a more structured work plan approach to management.

It was reported that an ecological reserve extension officer or coordinator would ensure that the overall Warden Program was coordinated, new Wardens were recruited, annual meetings and other Warden support workshops were undertaken and generally a more consistent approach to building Warden partnerships was facilitated.

The idea behind work plans, mentioned by a couple Area Supervisors, is to make communication and warden effort in the field efficient and effective. Involving the Warden in establishing what work the reserve needs, how much the Warden is willing and able to do, and what the government can commit to would help the Wardens and Area Supervisors structure reserve priority and time and improve the partnership. This approach is seen as a means to implement priorities such as maintenance (e.g., fencing, cattle guards, and signs), inventory, research, education and restoration and to have Wardens involved in or lead efforts.

It should be noted that since the survey was carried out the Ministry has produced the Ecological Reserves Warden Handbook (May 2005), which is an excellent start to addressing some of the concerns Wardens raised in the study regarding a more structured approach to the Ministry – Warden partnership.

Resources and Commitment

The third theme raised by the Area Supervisors and Wardens related to the need for more resources and commitment to the Warden Program. Comments focused on the need for resources to increase the staff time available to visit ecological reserves and work with the Wardens, deal with issues, and provide some reimbursement of travel costs to Wardens. Examples of the range of suggestions are:

Need more staff and resources to fulfill Area Supervisors duties properly

More people, and more coordination i.e., extension officer

More ranger staff to allow more visits, better reporting

Access to funding i.e. Inventory

Reimbursement for fuel and any substantial costs.

Available Warden contact like extension officer, more people on the job. Being able to give the Wardens some equipment, phones and some identification.

More rangers on the trail in uniforms. A warning ticket book

Needs leadership, recognition, regular meetings, funding, reimbursement for field time.

In addition to an increase in resources it became apparent from the survey that there was a lack of confidence in the degree of commitment and priority being placed on managing ecological reserves and the Warden Program. One Area Supervisor felt that Area Supervisors and government staff in general have not been properly informed on the importance of the reserves nor on the role that Wardens perform and their purpose. Another Area Supervisor felt that reserves and their Wardens needed more of a profile, something that would be accepted and noticed by the public. Related comments included:

Create position to educate AS regarding ecological reserves, Wardens and Warden program as well as Warden recruitment.

Support from Parks. Ecological reserves need to be integrated through communities

There needs to be a commitment from both sides and a sense of priority.

DISCUSSION AND RECOMMENDATIONS

Ecological reserves are established to protect representative and special examples of biodiversity and to ensure that they function in their natural state and are available for scientific research and education.

The overall results of this study indicate that the system of ecological reserves in British Columbia has a number of important strengths.

- There are 147 areas around the province totally 166,918 ha that are protected as ecological reserves.
- Many (80) of the reserves have volunteer wardens to assist the ministry to fulfill its stewardship role. Race Rocks Ecological Reserve in particular provides an exemplary model of joint stewardship.
- A number of ecological reserves (e.g., Robson Bight, Haley Lake, Checleset Bay, Drizzle Lake ecological reserves) have important, long term ecological research studies.

The results of the study also indicate that work must be done to rebuild the Ecological Reserves Program so that these important assets are maintained and capitalized upon. In particular the study raises concerns that the ecological values of many individual reserves are at significant risk. For example:

- Ecological information available for 67% of the ecological reserves is poor to very poor;
- Based on the ratings of Area Supervisor and Wardens and Ministry management documentation available to us, 27% of the ecological reserves appear to be in poor to very poor condition and a further 23% are in fair condition and need restoration; and
- 45% of the ecological reserves do not have a volunteer Warden and Ministry staff appear to be unable to adequately manage the ecological reserves themselves or the Warden Program.

Below we discuss the results and provide recommendations for both FER and the Ministry of Environment to consider. The Discussion and Recommendations focus on three themes:

1. Improving the information available for each reserve;
2. Addressing the issue of deteriorating ecological condition; and
3. Building a partnership to improve the management of the program.

Availability of Information

Recommendation 1: That the Ministry of Environment maintain a centralized information system for ecological reserves that is comprehensive and accessible.[4].

The information about each ecological reserve that was compiled through the file review was incomplete because there is no longer central access to all files. Fortunately, the information obtained from the files combined with that obtained through the survey of ministry staff and volunteer wardens provided a somewhat more complete picture of the strengths and weaknesses of the Program.

It would increase efficiency if the file information was up-to-date and accessible to both headquarters and regional staff as well as Wardens etc.

The State of the Ecological Reserves database, created as part of this project, provides a good opportunity for the Ministry and FER to partner to refine and maintain a database for reporting on the status of the Ecological Reserves Program activities. That database could also be used to set priorities for long and short term management including research, inventory and monitoring for ecological reserves.

Recommendation 2: That the Ministry and FER partner to develop and implement, a baseline inventory and monitoring program for ecological reserves by March 2007.

Only one ecological reserve has comprehensive up-to-date inventory information available. As protected areas are dedicated to representation, preservation, education and scientific research, it is important to be able to quantitatively document changes in individual reserves and take appropriate management actions. Without a standardized, quality assured, baseline inventory and regular monitoring it is impossible to determine if the reserve is serving its purpose or to learn what trends are taking place, and there is no basis for accountability.

The approach adopted to inventorying and monitoring individual ecological reserves must be sufficiently robust to provide information over the long term on the changes to specific ecological values. It is also important that the approach adopted:

- Require inventories where appropriate to follow Resource Inventory Committee standards http://srmwww.gov.bc.ca/risc/standards.htm;.
- Encourage partnerships with educational institutions to carry out the baseline inventory work;
- Involve provision of training for Wardens so they can participate in the inventory and to be responsible for the ongoing monitoring in the ecological reserves;

[4] We understand from ministry staff that they plan to develop, by 2008, an information management system entitled PLUS (Protected Land Unified System) for all protected areas.

- Ensure that ecological reserve related information is readily accessible and available in a timely manner to support management and research activities; and
- Establish priorities for carrying out the inventory and monitoring work based on both the condition rating and the information rating.

A number of Wardens expressed willingness to learn how to do standardized inventory and monitoring, if such training was made available. Training Wardens to participate in this work would provide means of gathering data and improving the monitoring of ecological reserves. It would also meaningfully add to the importance and value of volunteering.

Ecological Condition

Recommendation 3: By March 2007 FER and the Ministry partner on a five year research strategy to address key knowledge gaps related to:

a. understanding threats and degradation factors and assessing their relative significance to the condition or ecological reserves;
b. identifying management techniques to reverse degradation and improve ecological condition;
c. determining the long term contribution that ecological reserves can make to conserving biological diversity; and
d. understanding the factors that affect the contribution of ecological reserves to conservation of biological diversity.

The most disturbing result of the study is the ecological degradation that has occurred in so many of the province's ecological reserves and the high incidence of reported external threats. The ability of small reserves to maintain ecological integrity without a protective buffer zone even under the best management scenarios is questionable and requires study. Because the *Ecological Reserves Act* limits management to the area within the boundaries of the ecological reserve, the Ministry's ability to influence activities (even very harmful activities) affecting the integrity and functioning of the ecological reserve is limited.

Recommendation 4: That the Ministry increase its presence, management and enforcement activities to ensure that ecological reserves are protected.

Clearly the deteriorating condition of reserves needs to be addressed with proactive management including restorative measures to help reverse the trend. Currently, the value placed on ecological reserves and recognition of their importance varies widely from region to region. Clear policies, improved information and better training and direction for staff may help to improve management and reduce disparities across the regions. There is also an urgent need to inform local governing

authorities about the importance of ecological reserves so that land use planning can consider the maintenance of buffers around them.

Building a Partnership

Recommendation 5: That the Ministry formalize and adequately resource a Warden Program that is characterized by:

a. A true partnership with the Wardens and FER;
b. Joint setting of annual management goals, activities, performance measures and targets for each reserve;
c. Clear, agreed upon expectations for the roles and responsibilities of Wardens in the management of the reserves;
d. Clear, agreed upon expectations and processes for staff-Warden communications;
e. Warden training, annual Warden-staff meetings and financial support for Wardens to travel to remote reserves or reserves where access is difficult;
f. Provincial coordination of the Wardens; and
g. A recruitment strategy to ensure there is a Warden for every ecological reserve in the province by March of 2007.

The concept of a partnership between government and volunteer Wardens was initiated in the 1970's soon after the first ecological reserves were created. The volunteer program has been a success in terms of longevity, i.e. the existence of 30 year veterans. This is also a tribute to those who initiated the Warden Program and the Wardens who have participated through the decades. The involvement of so many volunteers over a long period is especially noteworthy, because the Warden Program has not formally existed as a government program since the mid-1980's.

The results of the survey show that the combined experience the Area Supervisors and Wardens are currently bringing to the Ecological Reserves Program is impressive. In particular Wardens have many years of field experience with their ecological reserves and provide extremely useful insights into the condition of reserves and their management.

However, Area Supervisors indicated that they are unable to provide enough time, and as a result Wardens are being neglected and loosing their sense of purpose and initiative. Valuable biological observations and ecological reserve maintenance is being offered but its potential is not being realized. In addition many (45%) of the ecological reserves do not have Wardens and many of the existing Wardens have indicated they will be retiring in the next few years. Rebuilding the Warden Program as a partnership between the Ministry and the volunteer Wardens would go a long way to improving the management of the Ecological Reserve Program.

It is noteworthy that partnerships are currently being espoused as a way of doing business. New partnerships are being sought between the province and the private sector and non-government organizations. The Ministry Business Plan (objective 3) indicates a desire to continue partnerships in statements such as *"Partnerships will be a crucial mechanism in the Ministry's shift from being sole protector of the environment to promoting a shared stewardship approach. Key strategies include: working to establish and maintain relationships with First Nations, communities, academia, environmental organizations and industry to undertake activities to conserve species and habitats, and providing standards, guidelines and best management practices to private landowners to develop and implement sustainable stewardship practices."*

A true partnership and formalized Warden Program would help address the strongly held views reported by the Wardens including:

- The need to involve Wardens in setting priorities and work plans;
- The need to ensure there is regular and more frequent communication between staff and Wardens on a one-on-one basis; and,
- The need to provide opportunities for Wardens to get together annually to exchange ideas and best practices.

In addition, Area Supervisors have noted the importance of formally recognizing the Wardens for the hundreds of volunteer days they give to the Program every year as watchdogs and educators.

Some recent progress has been made in this direction with the release of the Ministry's newly revised *Ecological Reserves Warden Handbook* (May 2005). In addition, the working partnership that has developed in the Okanagan involving a joint effort between Wardens and Area Supervisors offers a good model for addressing these issues in practice. In the Okanagan there is a biannual/annual meeting that includes an informal recognition lunch and a field trip so that Wardens can see reserves other than those they have responsibility for and discuss issues. There is also some one-on-one time so Area Supervisors and Wardens can review and amend plans for the next year and discuss education or other needs.

Support by the Ministry for a provincial Wardens' meeting in Kamloops in 2003 was greatly valued by the Wardens. The Ministry has also contributed funding for special projects such as this review and it supports distribution of the FER newsletter "the Log" to the Wardens and Area Supervisors. In addition it facilitated the distribution of clothing to Wardens, such as vest hats and t-shirts, so they could be identified as Parks volunteers. For all this support FER and the Wardens are grateful. However, it is clear from the results that additional ongoing funding is needed if a Warden Program is to function effectively. Funds need to be provided for program coordination, recruitment of wardens for the 45% of the reserves that do not have a Warden and for reserves where Wardens are about to retire, for training and for travel to remote and difficult to access reserves. Such an investment by the Ministry will maximize the benefits provided by these volunteer land stewards.

A recruitment strategy for new volunteer Wardens should include clear expectations for the role and responsibilities of a Warden and should focus first on attracting Wardens for ecological reserves with low condition ratings. In developing this strategy some consideration should be given to the idea raised in the survey that ecological reserves have more than one Warden so that the reserve can be attended to without putting all of the responsibility on a single person. Several Wardens commented that when a reserve is close to a community there is a greater need and opportunity for community education and involvement. Multiple Wardens may help facilitate community awareness and involvement and provide mentoring and support among Wardens.

Recommendation 6: That FER reach out to the Ministry to determine how we can best support it to protect and maximize the benefits of our ecological reserves.

The reader will note that several of the above recommendations include FER assisting/supporting the Ministry. For the past several years the Ministry has regularly stated that it is committed to shared stewardship and partnerships. Such a commitment by the Ministry requires innovative approaches and resources. The Race Rocks Ecological Reserve is clearly exemplary from a shared stewardship, ecological protection, public education and applied research perspective. If we are to act as true partners with the Ministry in achieving the goals of the Ecological Reserves Program we should take the initiative in assisting the Ministry to fulfill its mandate. The first step in the process requires that we ask the Ministry what FER can do to help it be more successful. Hopefully then we can join forces and move forward as true partners in protecting and maximizing the benefits achievable from these valuable resources.

Anne Vallee (Triangle Island) Ecological Reserve

Anne Vallee Ecological Reserve supports the largest seabird and sea lion colonies in the province

FRIENDS OF ECOLOGICAL RESERVES
BOX 8477, VICTORIA, B.C. V8W 3S1
CANADA

APPENDIX 1 – Wardens' Questionnaire

Part One: Questions Related to Managing Ecological Reserves

1. What is the name of the reserve we are talking about?
2. What year did you start being a Warden?
3. What year did you start being a Warden at this ecological reserve?
4. Was there a Warden at this reserve before you? If there was, who was it?
5. What year do you think you may step down from being a Warden?
6. Do you have anyone in mind that would take over this Warden position?
7. How often during a one year period do you visit the ecological reserve?
8. How many hours do you spend per visit including travel and preparation?
9. In addition to visiting reserves how many hours a year do you spend with reserve related activities?
10. What do you look for when you visit the reserve?
11. Do you keep records of your visits?
12. If yes, what do you record?
13. Is there appropriate signage for this ecological reserve?
14. When did you last contact your Area Supervisor?
15. When were you last contacted by your Area Supervisor?
16. What improvements would you like to see to the Warden program?
17. Where do you think the Warden program lacks the most and why?
18. Do you complete annual Warden reports?
19. If no, did you ever complete Warden reports?
20. Has your Area Supervisor acknowledged your Warden reports?
21. Are there regular meetings between Warden and the ministry staff in your region?
22. Would you like more contact between Warden and Ministry Staff in your region?
23. How often and what form of communication would you like to see between Warden and Ministry staff?
24. Would you attend a provincial Wardens meeting like the Kamloops meeting in 2003?

Part Two: Questions Related to Rating the State of an Ecological Reserve

1. What are the main threats[5] to the area surrounding the reserve?
2. What are the threats acting within the reserve?

[5] Threat categories are modified from Table 5 in the Ministry report by Holt, Utizg, Carver, and Booth, 2003, *Biodiversity Conservation in B.C.: An Assessment of Threats and Gaps. Final Report.* Over arching global threats, such as climate change, affect all reserves. Wardens were asked to focus on reserve specific threats. They were given the list of threat categories (see table following), but could provide their own, more specific, category if none seemed applicable.

Categories of Threats

Persistence
High - The threat is current and definitely increasing
Moderate - Current, but uncertain about future
Low - Past only, threat ceased

Degree and extent of ecosystem change surrounding the ecological reserve
High - eliminates the functions of the surrounding ecosystem (degree of change)
Moderate - Significantly reduced functions of ecosystem
Low - Minor, not really significant to the surrounding ecosystem

Irreversibility
High - Impact are non reversible within a century
Moderate - Decades to restore requires moderate investment
Low - Likely to recover naturally in a short period

External Threat Rating High, Moderate, Low			**Threat Types**	**Internal Threat Rating** High, Moderate, Low		
Persistence	Extent	Reversibility		Persistence	Extent	Reversibility
			Agriculture			
			Aquaculture			
			Dams			
			Forestry (Crown)			
			Forestry (Private)			
			Grazing			
			Harvest			
			Industry			
			Mining			
			Non-native Species			
			Oil and Gas			
			Rural Development			
			Recreation			
			Transportation Corridors			
			Urban Development			

3. Comments on the external and internal threats of the ecological reserve.

4. Given external and internal threats to this reserve what would be your first choice/choices of management/communication/zoning actions be?

5. Rate the state of the reserve. Based on a rating system from 1 to 5 where 5 is the best and 1 is the poorest. Please provide evidence to support your rating and recommend management to improve the integrity.

Rating System for State of the Reserve

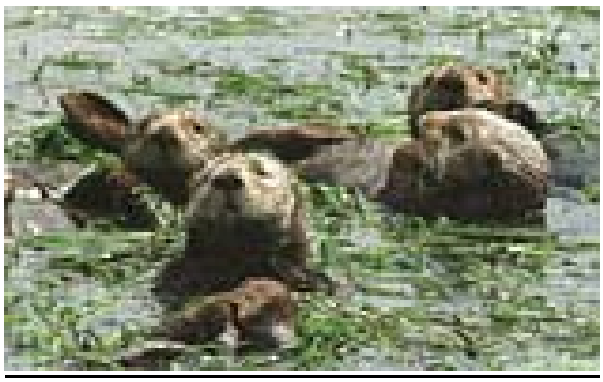
5 - Very High Ecological integrity
The reserve likely requires no management intervention in the next 5 to 10 years. Purpose for which the reserve was established is being fully met.

4 - High Ecological integrity
The reserve is in good condition but can be improved through increased management intervention.

3 - Moderate Ecological Integrity.
The reserve really needs to be restored through efforts such as ….

2 - Poor Ecological Integrity
The reserve is in poor condition and needs significant immediate management to restore its integrity through efforts such as ….

1 - Very Poor Ecological Integrity
The reserve is in poor condition and requires a significant sustained effort to restore it to meet the ecological objectives for which it was established. Efforts such as….



Sea Otters have been studied in the
Checleset Bay Ecological Reserve,
North Vancouver Island

APPENDIX 2 - Area Supervisors' Questionnaire

Part One: Questions Related to Managing Ecological Reserves

First of all, to make sure that my records are accurate what ecological reserves are you responsible for?

1) What year did you start being an Area Supervisor at these ecological reserves?
2) How often during a one year period do you visit the ecological reserves?
3) What year did you start being an Area Supervisor?
4) How many hours do you spend per visit including travel and preparation?
5) In addition to visiting reserves how many hours a year do you spend with reserve related activities?
6) What do you look for when you visit the reserves?
7) Do you keep records of your visits?
8) What do you record?
9) Is there appropriate signage for this ecological reserve?
10) What reserves have Wardens?
11) When did you last contact these Wardens?
12) When were you last contacted by your Wardens?
13) What improvements would you like to see to the Warden program?
14) Where do you think the Warden system lacks the most and why?
15) Do your Wardens complete annual Warden reports?
16) Did they ever complete Warden reports?
17) Do you acknowledge Warden reports?
18) Are there regular meetings between Warden and the Ministry staff?
19) Would you like more contact between Warden and Ministry Staff?
20) How often and what form of communication would you like to see between Warden and Ministry staff?
21) Would you attend a provincial Wardens meeting like the Kamloops meeting in 2003?

Part Two: Questions Related to Rating the State of an Ecological Reserve

1) Comments on any threats to the ecological integrity of the ecological reserve.

2) Rate the state of each reserve. Please take into account internal as well as external (up to 1 to 2 km from the reserve boundary) threats. Based on a rating system from 1 to 5 where 5 is the best and 1 is the poorest. Please provide evidence to support your rating and recommend management to improve the integrity.

Rating System for State of the Reserve

5 - Very High Ecological integrity
The reserve likely requires no management intervention in the next 5 to 10 years. Purpose for which the reserve was established is being fully met.

4 - High Ecological integrity
The reserve is in good condition but can be improved through increased management intervention.

3 - Moderate Ecological Integrity.
The reserve really needs to be restored through efforts such as ….

2 - Poor Ecological Integrity
The reserve is in poor condition and needs significant immediate management to restore its integrity through efforts such as ….

1 - Very Poor Ecological Integrity
The reserve is in poor condition and requires a significant sustained effort to restore it to meet the ecological objectives for which it was established. Efforts such as….

3) Given external and internal threats to these reserves what would be your first choice/choices of management? i.e. Communication / education …

APPENDIX 3 – State of Database Legend

The State of Database is located at http://www.ecoreserves.bc.ca.

A. **Ecological Reserve Number**
B. **Ecological Reserve Name**
C. **Active Eco-Warden** –There are reserves that have a Warden named but FER was unable to contact them for this report.
D. **Ecosection**
E. **Biogeoclimatic Zone**
F. **Biological Inventories / Dates / Level of Detail** – The information for this section was taken from the Ecological Reserve Report Catalogue and the individual reserve files found in the Ministry of Water, Land and Air Protection. However, these sources were replaced by a regional filing system a couple years ago, and this new information has not been summarized in this section.
G. **Research Completed / Number and focus of papers** – This information was taken from the Ecological Reserve Report Catalogue and may need to be updated.
H. **Status of Management Planning** – This information was taken from the BC Parks website. The level of the management is as follows:
    - Management Plan - BC Parks prepares management plans to guide how a protected area will be managed over the next ten to twenty years. The plan sets out objectives and strategies for conservation, development, interpretation and operation of a protected area. A management plan relies on current information relating to such subjects as natural values, cultural values, and recreation opportunities within a protected area and resource activities occurring on surrounding lands.
    - Management Direction Statements – Are simple documents that describe protected area values, management issues and concerns, and provide strategic management direction to deal with immediate priority objectives and strategies. Management direction statements do not negate the need for future, more detailed plans.
    - Purpose statement/zoning plan – Is a brief document that identifies the purpose of a protected area, provides a high level overview of protected area values and their significance, documents key known management issues and interim management direction and sets out a zoning plan. Purpose statement/zoning plans do not negate the need for future, more detailed plans.
    - Background reports – Are documents prepared to provide background information on a protected area. These reports present information on natural and cultural values, land tenure, occupancy rights and resource uses, outdoor recreation opportunities and facilities, visitor use and trends, and known management issues.

I. **Threats to Reserve (Area Supervisor)** – This is taken from the Area Supervisors' questionnaire. They were asked to list any threats to the reserve's ecological integrity.
J. **External Threats to the Reserve (Warden)** – Information taken from the Wardens' questionnaire. Wardens were asked to list any ecological threats to the area within 1-2 kilometres of the reserve.
K. **Internal threats to the reserve (Warden)** - Information taken from the Wardens questionnaire. Wardens were asked to list any ecological threats to the area within the reserve.
L. **Warden rating** – This rating (State of the Reserve) is taken from the Wardens questionnaire (see Appendix 1.
M. **Warden comments** – These comments are taken from the Wardens' questionnaire. They add detail about the condition of the reserve and why the Warden chose the rating they did.
N. **Area Supervisor Rating** - This rating (State of the Reserve) is taken from the Area Supervisor questionnaire and is the same rating system shown in Appendix 2.
O. **Area Supervisor Comments** - These comments, taken from the Area Supervisor questionnaire, add detail about the condition of the reserve and why they chose the rating they did. If an Area Supervisor couldn't be contacted for the reserve the threats summarized in the Annual Management Plans or Conservation Risk Assessments have been used here.
P. **External CRA (Conservation Risk Assessment**– The overall cumulative impact rating (VL=very low, L=low, M=moderate, H=high) from all external stressors on the reserve. This information was obtained from Ministry files.
Q. **Internal CRA (Conservation Risk Assessment) -** The overall cumulative impact rating (VL=very low, L=low, M=moderate, H=high) from all internal stressors on the reserve. This information was obtained from Ministry files.
R. **Cumulative CRA** (**Conservation Risk Assessment)** - The overall cumulative impact (VL=very low, L=low, M=moderate, H=high) from all stressors (external and internal) on the reserve. This variable assesses the overall significance of the cumulative impacts, from all sources, that the reserve faces. The cumulative impact is not the result of a tally of the individual stressor assessments but is a separate assessment. This information was obtained from Ministry files.
S. **AMP (Annual Management Plan) Overall Ongoing <u>Conservation</u> Management** This is an averaged ranking of management need (scale 1-4 where 1= high and 4=low) from conservation rankings involving:
    - Maintaining/Obtaining Knowledge
    - Monitoring
    - Management Actions
    - Liaison
    - Extension

T. **AMP (Annual Management Plan) Overall Ongoing Recreation Management** - This is an averaged ranking from recreation management need rankings (scale 1-4 where 1= high and 4=low) involving:
   - Presence
   - Facilities
   - Permits and Events
   - Liaison
   - Extension

U. **AMP (Annual Management Plan) Recreation Use Threats to Values** – A management need rating (scale 1-4 where 1= high and 4=low) based on the threats to the ecological values of the reserve due to recreation pressure on the area.

V. **Ecological Reserve Information Rating** (out of 6) – This is a combined rating based on available research and inventory information, presence of an active Warden and management documentation. It is described in Appendix 4.

W. **Ecological Reserve Condition Rating** – This is a combined rating based on combining the available ecological integrity ratings that the Area Supervisors and the Wardens gave for each ecological reserve, and the three related ratings contained within the Conservation Risk Assessments. When the Conservation Risk Assessment ratings were not available, the Annual Management Plan ranking was used. It is described in Appendix 4.

X. **Gaps in inventory** – Summary assessment of gaps based on the information collected about the availability of inventory data (see “F” above.)

Y. **Gaps in research** – Summary assessment of gaps based on the information collected about research completed (see “G” above.)

Z. **Obvious Management Suggestions and Other Comments** – Summary assessment of needs for each reserve.

APPENDIX 4 - A Description of the Ratings

Ecological Reserve Information Rating

This rating combines a number of factors to a single rating.
A score of 6 indicates:

- a baseline inventory and a recent re-inventory have been done, and it is possible to report on trends;
- presence of an active Warden that plans to be a Warden for at least 5 more years, and the Wardens notes are on file and available for information;
- a significant amount of research has been done in the ecological reserve; and
- a management direction statement or management plan are developed, approved and shown on the Ministry web site.

Scores of less than 6 indicate some short comings. The lower the score the greater the need for attention.

Scoring was done by the following points:

Is there a current Warden?
Yes = 1
Not visited in 5 years or stepping down in less than 5 years = 0.5 (Note: if this information was not available but there was an active Warden then 1 point was given)
No = 0

Is there a baseline inventory at any point in time? (Note that if a summary of the regional files was not available a score of 0.5 was given)
Yes = 1
Incomplete inventory but some inventory data = 0.5
No = 0

Is there a recent inventory (since 2000) carried out to a known standard?
Yes = 1
Incomplete = 0.5
No = 0

Do Wardens and/or Area Supervisors keep records (e.g., field notes, photographs)? (Note: if this information was not available but there was an active Warden then 1 point was given)
Yes = 1
No = 0

Has a significant amount of scientific research been conducted that is related to the reserve?

4+ research papers = 1
1-3 papers = 0.5
0 papers = 0

State of Management Information

Management Plan = 1
Management Direction Statement = 1
Purpose Statement = 0.5
No management document = 0

Ecological Reserve Condition Rating

The ecological condition rating given to each reserve was based on combining the available ecological integrity ratings that the Area Supervisors and the Wardens gave for each ecological reserve, and the three related ratings contained within the CRAs. In the absence of the CRA, the Annual Management Plan (AMP) information was used. The CRA ratings include a rating for external threats, internal threats and a cumulative rating. The AMPs give a rating for overall conservation management, ongoing recreation management and recreation use threats to ecological values.

The ecological condition rating is shown both as a fraction and a percentage. The maximum rating is 5/5 (100%) meaning that the reserve is in pristine condition and does not require any active management based on the available information. When all five data sources are available more confidence can be placed in the resulting ecological condition rating. It should be noted that the availability of inventory and research information are not part of the ecological condition rating and it would be possible for the reserve to be rated as 100% yet have no supporting research or baseline inventory.

Scoring was done by the following points:

Warden ecological integrity rating of 5 or 4 = 1
Warden ecological integrity rating of 3 = .5
Warden ecological integrity rating of 2 or less = 0

Area Supervisor ecological integrity rating 5 or 4 = 1
Area Supervisor ecological integrity rating 3 = 0.5
Area Supervisor ecological integrity rating of 2 or less = 0

CRA External Threats rating of L/VL =1
CRA External Threats rating > L/VL =0

CRA Internal Threats rating of L/VL = 1
CRA Internal Threats rating > L/VL =0

CRA Cumulative rating of L/VL = 1
CRA Cumulative rating > L/VL =0

AMP Overall Ongoing Conservation Management rating >3=1
AMP Overall Ongoing Conservation Management rating <3=0

AMP Overall Ongoing Recreation Management rating >3=1
AMP Overall Ongoing Recreation Management rating <3=0

AMP Recreation Use Threats to Values rating >3=1
AMP Recreation Use Threats to Values rating <3=0

APPENDIX 5 – Ecological Reserve Information and Condition Ratings

Ecological Reserve #	Ecological Reserve Name	Active Warden	Ecological Reserve Information Rating / 6	Ecological Reserve Condition Rating (%)
1	Cleland Island Ecological Reserve, Clayoquot Sound, W of Tofino	No Current Warden	2.5	2/3 = 67%
2	East Redonda Island Ecological Reserve, N end of Georgia Strait	Yes	2	4/4 = 100%
3	Soap Lake Ecological Reserve, S of Spences Bridge	Yes	4.5	3/5 = 60%
4	Lasqueti Island Ecological Reserve, Strait of Georgia, N of Parksville	No Current Warden	2	No ecological information available
5	Lily Pad Lake Ecological Reserve, S of Lumby	Yes	4	1.5/5 = 30%
6	Buck Hills Road Ecological Reserve, S of Lumby	Yes	4	4.5/5 = 90%
7	Trout Creek Ecological Reserve, SSW of Summerland	Yes	3.5	1/5 = 20%
8	Clayhurst Ecological Reserve, S of Clayhurst	Yes	2.5	4/5 = 80%
9	Tow Hill Ecological Reserve	No Current Warden	2.5	1/3 = 33%%
10	Rose Spit Ecological Reserve, NE point of Graham Island	No Current Warden	3	2/4 = 50%
11	Sartine Island Ecological Reserve, part of Scott Islands	Yes	4	3.5/4 = 87.5%
12	Beresford Island Ecological Reserve, part of Scott Islands	Yes	4	3.5/4 = 87.5%

Ecological Reserve #	Ecological Reserve Name	Active Warden	Ecological Reserve Information Rating / 6	Ecological Reserve Condition Rating (%)
13	Anne Vallee (Triangle Island) Ecological Reserve, outermost of Scott Islands	Yes	4	2/4 = 50%
14	Solander Island Ecological Reserve, W of Brooks Peninsula	Yes	3.5	3.5/4 = 87.5%
15 (now part of National Park)	Southern Ridge of Saturna Island	N/A	N/A	N/A
16	Mount Tuam Ecological Reserve, Saltspring Island	Yes	3.5	3.5/4 = 87.5%
17	Canoe Islets Ecological Reserve , near S end of Valdes Island	No Current Warden	2	2/3 = 67%
18	Rose Islets Ecological Reserve, N of Reid Island	No Current Warden	2	2/3 = 67%
19	Mount Sabine Ecological Reserve, N of Canal Flats	No Current Warden	2	3/4 = 75%
20	Columbia Lake Ecological Reserve, East side of Columbia Lake	No Current Warden	2	.5/4 = 12.5%
21	Skagit River Forest Ecological Reserve, Skagit Valley Recreation Area	Yes	4.5	4/5 = 80%
22	Ross Lake Ecological Reserve, Skagit Valley Recreation Area	Yes	4	4/5 = 80%
23	Moore/McKenny/Whitmore Islands Ecological Reserve, eastern Hecate Strait	Yes	4	2/4 = 50%
24	Baeria Rocks Ecological Reserve, Barkley Sound	No Current Warden	2.5	2/3 = 67%
25	Dewdney and Glide Islands Ecological Reserve, eastern Hecate Strait	Yes	4	3/3 = 100%
26	Ram Creek Ecological Reserve, SE of Canal Flats	Yes	2.5	0/4 = 0%
27	Whipsaw Creek Ecological Reserve, SW of Princeton	No Current Warden	1	1/4 = 25%

Ecological Reserve #	Ecological Reserve Name	Active Warden	Ecological Reserve Information Rating / 6	Ecological Reserve Condition Rating (%)
28	Ambrose Lake Ecological Reserve, Sechelt Peninsula	Yes	2	3/4 = 75%
29	Tranquille Ecological Reserve, W of Kamloops	Yes	4.5	3/5 = 60%
30	Vance Creek Ecological Reserve, N of Lumby	Yes	2.5	1.5/4 = 37.5%
31	Lew Creek Ecological Reserve, E of Upper Arrow Lake	No Current Warden	1.5	1/3 = 33%
32	Evans Lake Ecological Reserve, Valhalla Provincial Park	No Current Warden	1.5	.5/1 = 50%
33	Field's Lease Ecological Reserve, W of Osoyoos Lake	Yes	3.5	3/4 = 75%
34	Big White Mountain Ecological Reserve, E of Kelowna	Yes	2.5	3.5/4 = 87.5%
35	Westwick Lake Ecological Reserve, S of Williams Lake	No Current Warden	2.5	3/3 = 100%
36	Mackinnon Esker Ecological Reserve, NW of Prince George	Yes	3	3.5/4 = 87.5%
37	Mount Maxwell Ecological Reserve, Saltspring Island	Yes	3.5	1.5/4 = 37.5%
38	Takla Lake Ecological Reserve, E of Hazelton	Yes	2.5	3.5/4 = 87.5%
39	Sunbeam Creek Ecological Reserve, N of McBride	Yes	3.5	3/4 = 75%
40	Kingcome River/Atlatzi River Ecological Reserve, near head of Kingcome Inlet	Yes	3	2.5/3 = 83%

Ecological Reserve #	Ecological Reserve Name	Active Warden	Ecological Reserve Information Rating / 6	Ecological Reserve Condition Rating (%)
41	Tacheeda Lakes Ecological Reserve, N of Prince George	Yes	2.5	3.5/4 = 87.5%
42	Mara Meadows Ecological Reserve, E of Salmon Arm	Yes	3.5	4/5 =8%
43	Mount Griffin Ecological Reserve, N of Mabel Lake	Yes	3	1/4 = 25%
44 (now part of National Park reserve)	E. Copper, Jeffery, Rankine Islands	N/A	N/A	N/A
45	Vladimir J. Krajina (Port Chanal) Ecological Reserve, W coast of Graham Island	Yes	4	2/5 = 40%
46	Sikanni Chief River Ecological Reserve, headwaters of Sikanni Chief River	Yes	2	4.5/5 = 90%
47	Parker Lake Ecological Reserve, W of Fort Nelson	No Current Warden	2	2.5/4 = 62.5%
48	Bowen Island Ecological Reserve, W of Apodaca Provincial Park	Yes	4.5	4/4 = 100%
49	Kingfisher Creek Ecological Reserve, Hunters Range, ESE of Sicamous	Yes	3	4/5 = 80%
50	Cecil Lake Ecological Reserve, NE of Fort St. John	No Current Warden	1.5	3.5/4 = 87.5%
51	Browne Lake Ecological Reserve, E of Kelowna	Yes	3	1/4 = 25%
52	Drizzle Lake Ecological Reserve, SE of Masset	Yes	5	3/3 = 100%
53	Narcosli Lake Ecological Reserve, between Coglistiko and Baezaeko rivers	No Current Warden	2	3/3 = 100%

Ecological Reserve #	Ecological Reserve Name	Active Warden	Ecological Reserve Information Rating / 6	Ecological Reserve Condition Rating (%)
54	Nitinat Lake Ecological Reserve, E shore of Nitinat Lake	Yes	4	3/4 = 75%
55	Cardiff Mountain Ecological Reserve, W of Taseko River	Yes	2.5	3/3 = 100%
56	Goosegrass Creek Ecological Reserve, W of Columbia Reach, Kinbasket Lake	Yes	3.5	1/4 = 25%
57	Chickens Neck Mountain Ecological Reserve, N of Dease Lake	No Current Warden	3.5	4/4 = 100%
58	Blue/Dease Rivers Ecological Reserve, W of Lower Post	No Current Warden	3.5	.5/4 = 12.5%
59	Ningunsaw River Ecological Reserve, SE of Bob Quinn Lake	No Current Warden	2	2/4 = 50%
60	Drywilliam Lake Ecological Reserve, S of Fraser Lake	No Current Warden	2.5	3.5/4 = 87.5%
61	Upper Shuswap River Ecological Reserve, E of Mabel lake	Yes	3	4/5 = 80%
62	Fort Nelson River Ecological Reserve, N of Fort Nelson and Muskwa rivers	No Current Warden	2	3.5/4 = 87.5%
63	Skeena River Ecological Reserve, near mouth of Exchamsiks River	Yes	3	1/4 = 25%
64	Ilgachuz Range Ecological Reserve, N of Anahim Lake	No Current Warden	1.5	No ecological information available
65	Chasm Ecological Reserve, N of Clinton	Yes	2.5	2/5 = 40%
66	Ten Mile Point Ecological Reserve, Victoria	Yes	3.5	1.5/4 = 37.5%

Ecological Reserve #	Ecological Reserve Name	Active Warden	Ecological Reserve Information Rating / 6	Ecological Reserve Condition Rating (%)
67	Satellite Channel Ecological Reserve, N of Saanich Peninsula	Yes	3.5	3/4 = 75%
68	Gladys Lake Ecological Reserve, Spatsizi Plateau Wilderness Provincial Park	No Current Warden	4	3.5/5 = 70%
69	Baynes Island Ecological Reserve, Squamish River	No Current Warden	2	2/3 = 67%
70	Mount Tinsdale Ecological Reserve, ESE of Barkerville	Yes	3	4/4 = 100%
71	Blackwater Creek Ecological Reserve, NW of Mackenzie	No Current Warden	1.5	1/1 = 100%
72	Nechako River Ecological Reserve, W of Prince George	Yes	3	3.5/4 = 87.5%
73	Torkelsen Lake Ecological Reserve, W of Babine Lake	No Current Warden	2.5	2/3 = 67%
74	UBC Endowment Lands Ecological Reserve, Pacific Spirit Park	No Current Warden	2	No ecological information available
75	Clanninick Creek Ecological Reserve, N of Kyuquot	No Current Warden	1.5	2.5/3 = 83%
76	Fraser River Ecological Reserve, N of Chilliwack	No Current Warden	3.5	1/1 = 100%
77	Campbell Brown (Kalamalka Lake) Ecological Reserve, SW of Vernon	Yes	4	3/5 = 60%
78	Meridian Road (Vanderhoof) Ecological Reserve, S of Vanderhoof	Yes	3.5	4.5/5 = 90%
79	Chilako River Ecological Reserve, S of Vanderhoof	Yes	3.5	5/5 = 100%
80	Smith River Ecological Reserve, near junction with Liard River	No Current Warden	2	3/4 = 75%

Ecological Reserve #	Ecological Reserve Name	Active Warden	Ecological Reserve Information Rating / 6	Ecological Reserve Condition Rating (%)
81	Morice River Ecological Reserve, SW of Houstcn	No Current Warden	2	3/3 = 100%
82	Cinema Bog Ecological Reserve, NNE of Quesnel	No Current Warden	1.5	4/4 = 100%
83	San Juan Ridge Ecological Reserve, E of Port Renfrew	No Current Warden	1.5	3/3 = 100%
84	Aleza Lake Ecological Reserve, NE of Prince George	No Current Warden	1.5	3/4 = 75%
85	Patsuk Creek Ecological Reserve, N of Mackenzie	No Current Warden	1.5	3.5/4 = 87.5%
86	Bednesti Lake Ecological Reserve, W of Prince George	No Current Warden	2.5	3.5/4 = 87.5%
87	Heather Lake Ecological Reserve, NW of Mackenzie	No Current Warden	1	3.5/4 = 87.5%
88	Skwaha Lake Ecological Reserve, N of Lytton	Yes	4	4/5 = 80%
89	Skagit River Cottonwoods Ecological Reserve, Skagit Valley Recreation Area	Yes	4.5	2.5/5 = 50%
90	Sutton Pass Ecological Reserve, W of Port Alberni	Yes	3.5	1/1 = 100%
91	Raspberry Harbour Ecological Reserve, Willisten Lake NW of Finlay Forks	No Current Warden	1	3/4 = 75%
92	Skihist Ecological Reserve, NE of Lytton	Yes	4	4/5 = 80%
93	Lepas Bay Ecological Reserve, off NW corner of Graham Island	Yes	4	1/3 = 33%
94	Oak Bay Islands Ecological Reserve, E of Victoria	Yes	4.5	1/4 = 25%

Ecological Reserve #	Ecological Reserve Name	Active Warden	Ecological Reserve Information Rating / 6	Ecological Reserve Condition Rating (%)
95, 96 (now part of National Park Reserve)	Anthony, Kerouard Islands	NA	N/A	N/A
97	Race Rocks	Yes	5	2/4=50%
98	Chilliwack River	No Current Warden	1.5	2.5/5 = 50%
99	Pitt Polder Ecological Reserve, S of Pitt Lake	Yes	4.5	2.5/5 = 50%
100	Haynes' Lease Ecological Reserve, N end of Osoyoos Lake	Yes	4	1/4 = 25%
101	Doc English Bluff Ecological Reserve, SE of Williams Lake	Yes	4	1/1 = 100%
102	Charlie Cole Creek Ecological Reserve, S of Teslin Lake	No Current Warden	2.5	4/4 = 100%
103	Byers/Conroy/Harvey/Sinnett Islands Ecological Reserve, Hecate Strait, NW of Bella	Yes	3.5	3/4 = 75%
104	Gilnockie Creek Ecological Reserve, E of Kingsgate	Yes	2	1/4 = 25%
105	Megin River Ecological Reserve, NW of Tofino	No Current Warden	2	2.5/3 = 83%
106	Skagit River Rhododendrons Ecological Reserve, Skagit Valley Recreation Area	Yes	4	3.5/5 = 70%
107	Chunamon Creek Ecological Reserve, NE of Germanson Landing	No Current Warden	1	3/4 = 75%
108	Cougar Canyon Ecological Reserve, E Side of Kalamalka Lake	Yes	2.5	5/5 = 100%
109	Checleset Bay Ecological Reserve, NW of Kyuquot	No Current Warden	2.5	.5/3 = 16%

Ecological Reserve #	Ecological Reserve Name	Active Warden	Ecological Reserve Information Rating / 6	Ecological Reserve Condition Rating (%)
110	McQueen Creek Ecological Reserve, N of Kamloops	Yes	4	4/5 = 80%
111	Robson Bight (Michael Bigg) Ecological Reserve, Tsitika Valley, Johnston Strait	Yes	4.5	1/4 = 25%
112	Mount Tzouhalem Ecological Reserve, NW of Duncan	Yes	2	4/4 = 100%
113	Honeymoon Bay Ecological Reserve, Cowichan Lake	Yes	3	3/4 = 75%
114	Williams Creek Ecological Reserve, SE of Terrace	Yes	2.5	3.5/4 = 87.5%
115	Gingietl Creek Ecological Reserve, upstream of mouth of the Nass River	Yes	2.5	No ecological information available
116	Katherine Tye (Vedder Crossing) Ecological Reserve, SE of Chilliwack	No Current Warden	2.5	2.5/4 = 62.5%
117	Haley Lake Ecological Reserve, SW of Nanaimo	Yes	5	3/4 = 75%
118	Nimpkish River Ecological Reserve, N of Vernon Lake	Yes	4.5	2.5/4 = 62.5%
119	Tahsish River Ecological Reserve, S of Port McNeill	No Current Warden	2	2.5/3 = 83%
120	Duke of Edinburgh (Pine/Storm/Tree Islands) Ecological Reserve, NW of Port Hardy	No Current Warden	2	2.5/3 = 83%
122	Tsitika Mountain Ecological Reserve, S of Port McNeill	Yes	3	3.5/4 = 87.5%
123	Mount Derby Ecological Reserve, S of Port McNeill	No Current Warden	1	2.5/3 = 83%
124	Tsitika River Ecological Reserve, S of Port McNeill	Yes	3	1.5/2 = 75%

Ecological Reserve #	Ecological Reserve Name	Active Warden	Ecological Reserve Information Rating / 6	Ecological Reserve Condition Rating (%)
125	Mount Elliott Ecological Reserve, S of Port McNeill	No Current Warden	1	2.5/3 = 83%
126	Claud Elliott Creek Ecological Reserve, NE Vancouver Island	Yes	2.5	2.5/4 = 62.5%
127	Big Creek Ecological Reserve, SW of Williams Lake	Yes	2.5	3/3 = 100%
128	Galiano Island Ecological Reserve, N end of Galiano Island	Yes	3	2/3 = 67%
129	Klaskish River Ecological Reserve, SW of Port Alice	No Current Warden	1.5	2.5/3 = 83%
130	Mahoney Lake Ecological Reserve, S of Okanagan Falls	Yes	3	2/5 = 40%
131	Stoyoma Creek Ecological Reserve, near Boston Bar	No Current Warden	0.5	1/1 = 100%
132	Trial Islands Ecological Reserve, S of Oak Bay	Yes	3	.5/4 = 12.5%
133	Gamble Creek Ecological Reserve, E of Prince Rupert	No Current Warden	1.5	3/3 = 100%
134	Ellis Island Ecological Reserve, W of Vanderhoof on Fraser Lake	No Current Warden	2	3.5/4 = 87.5%
135	Bowser Ecological Reserve, 15 km N of Parksville	Yes	2.5	No ecological information available
136	Comox Lake Bluffs Ecological Reserve, 8 km SW of Courtenay	Yes	2.5	1/2 = 50%
137	Hudson Rocks Ecological Reserve, 25 km N of Newcastle Island	Yes	3	3/4 = 75%
138	Klanawa River Ecological Reserve, 20 km SE of Bainfield	No Current Warden	1	2/3 = 67%

Ecological Reserve #	Ecological Reserve Name	Active Warden	Ecological Reserve Information Rating / 6	Ecological Reserve Condition Rating (%)
139	Ladysmith Bog Ecological Reserve, 10 km S of Nanaimo	No Current Warden	1	0/3 = 0%
140	Misty Lake Ecological Reserve, 12 km NW of Port McNeill	No Current Warden	1	2.5/3 = 83%
141	San Juan River Estuary Ecological Reserve, 5 km NE of Port Renfrew	Yes	3	0.5/1 = 50%
142	Woodley Range Ecological Reserve, 2 km N of Ladysmith	No Current Warden	1	0/3 = 0%
143	Liumchem Ecological Reserve, 16 km S of Chilliwack	No Current Warden	1.5	2.5/4 = 62.5%
144	Yale Garry Oak Ecological Reserve, E of Yale	No Current Warden	0.5	2/2 = 100%
145	Burnt Cabin Bog Ecological Reserve, 15 km SE of Smithers	No Current Warden	1.5	0/3 = 0%
146	Catherine Creek Ecological Reserve, 12 km SE of Hazelton	No Current Warden	1.5	1/3 = 33%
147	Grayling River Hot Springs Ecological Reserve, 67 km NE of Muncho Lake	No Current Warden	0.5	1/1 = 100%
148	Kotcho Lake Ecological Reserve, 100 km ENE of Fort Nelson	No Current Warden	0.5	3.5/4 = 87.5%
149	Portage Brule Rapids Ecological Reserve, 110 km SE of Watson Lake	No Current Warden	1.5	1/1 = 100%
150	Rolla Canyon Ecological Reserve, near Dawson Creek	No Current Warden	0.5	No ecological information available
151	Ballingall Islets Ecological Reserve, 7 km NNE of Ganges	No Current Warden	1	2/3 = 67%

Ecological Reserve #	Ecological Reserve Name	Active Warden	Ecological Reserve Information Rating / 6	Ecological Reserve Condition Rating (%)
152	Ospika Cones Ecological Reserve, 50 km ENE of the N end of Williston Lake	No Current Warden	0.5	1/1 = 100%