2021

Ecological Reserves Management Issues Gap Analysis Summary

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Friends of Ecological Reserves

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About the Friends of Ecological Reserves (FER) This volunteer-based, not-for-profit charitable organization raises awareness and promotes the interests of ecological reserves in British Columbia (B.C.). FER works to promote and support scientific research, monitoring and reporting in and around ecological reserves, volunteer wardens and the stewardship function within existing ecological reserves, and the nomination, assessment and establishment of worthy new ecological reserves. FER educates the public and government agencies regarding the significance of ecological reserves, the values they contain, and the threats they face. FER welcomes new members. Find more information at the FER website (see https://ecoreserves.bc.ca/about-friends/) and in issues of the FER newsletter, *the Log* (see https://ecoreserves.bc.ca/news/newsletter-archive/).

The Friends of Ecological Reserves recognizes and respects the First Nations within whose traditional territories ecological reserves exist. FER acknowledges that much of British Columbia remains unceded land and appreciates the graciousness of the Indigenous hosts in areas containing ecological reserves. Even though the B.C. *Ecological Reserves Act* does not explicitly address traditional Indigenous use of ecological reserves, FER supports it as long as it does not destroy the values for which the reserve was established. Reconciliation may provide opportunities for additional ecological reserves identified by traditional Indigenous knowledge keepers for their Traditional Ecological Knowledge (TEK) values.

On April 2, 1971, the Government of British Columbia became the first jurisdiction in Canada to pass legislation to protect ecological reserves. May 4, 1971 is the date of the first Order in Council stemming from that Act to legally establish the first 29 ecological reserves. The spring of 2021 marks the 50th anniversary of the *Ecological Reserve Act*. Although the BC government has established 154 ecological reserves, it transferred six to other government jurisdictions in the early 2000s, so the current number of reserves in B.C. is 148. The BC government has not established any new ecological reserves since 2009.

Photo on Front Cover: A view of part of the extensive Garry oak ecosystem in the 390-ha Mount Maxwell Ecological Reserve (ER # 37) on Saltspring Island, South Coast Region, April 1, 2019 (Photo by Jenny Feick)

Photo on Back Cover: Trail through the 7.5 ha Honeymoon Bay Ecological Reserve (ER #113), Vancouver Island, South Coast Region, April 17, 2016 (Photo by Jenny Feick)

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1.0 Introduction

On May 4, 1971, the Government of British Columbia became the first jurisdiction in Canada to pass legislation to protect ecological reserves. May 2021 marks the 50th anniversary of the *Ecological Reserve Act* and regulations and the establishment of B.C.'s first ecological reserves. No new reserves have been established since 2009 and the 2005 assessment of the condition of existing reserves raised "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." (FER 2006) [1]

Despite FER's periodic communications with BC government agencies about worthy candidates, no new ecological reserves have been added as of 2020 and from the reports of volunteer wardens, the state of existing reserves continues to deteriorate. At their November 2019 meeting, the Board of the Friends of Ecological Reserves (FER) decided to make a renewed and concerted effort to encourage BC government officials to establish several new ecological reserves and to address management, conservation and stewardship issues in existing ecological reserves in time for the 50th anniversary of the *Ecological Reserves Act*. FER developed the precursor to this report (and the spreadsheet containing the data used to inform it) to provide background information for a meeting on June 3, 2020 with BC Parks focused on improving the management, conservation and stewardship of existing ecological reserves. This update was prepared to help inform discussion at the next meeting on January 19, 2021 and further refined afterward.

2.0 Methodology

In the spring of 2020, six Board members researched specific information on the BC Parks and FER websites to inform development of an Excel spreadsheet.[2] Information sought included the presence of approved management planning direction documents, the dates of each, and management issues identified in them; the existence, dates and topics of scientific research papers and monitoring reports on the FER website; the existence of ER warden reports on the FER website, which ERs currently have wardens, and whether FER has contact information for them. Ecological reserve wardens described current issues in emails, phone calls or in person.[3] FER members Louise and Fred Beinhauer provided additional information. Rike Moon and Marilyn Lambert collaborated in 2020 to update the information on which ERs have active wardens with current volunteer contracts. Garry Fletcher provided content for a new section on special considerations for marine ERs. For both the original report and the January 2021 update, Ian Hatter led the data entry, quality control

[1] Friends of Ecological Reserves. 2006. *State of British Columbia's Ecological Reserves Report for 2005.* See https://ecoreserves.bc.ca/2006/12/04/state-of-bcs-ecological-reserves-report-for-2006/

[2] Garry Fletcher, ERs#1-25, Mike Fenger ERs#26-50, Jenny Feick, ERs#51-75, Steve Ruttan, ERs#76-100, Rick Page, Ers#101-125, and Marilyn Lambert, ERs#126-154.

[3] Gary Backlund & Katharine Banman, Jim Borrowman, H & J Calson, John Field, Paul Linton, Diane Moran, Rosamund Pojar, Bev & Bill Ramey, Harold Sellers, Amanda Vaughan, Gerry Van der Wolf, and Ken Willies.

and analysis of the spreadsheet data. Jenny Feick wrote the original and updated report based on the original and updated data analysis.

3.0 Establishment Date and Location of Existing ERs in B.C.

The Government of British Columbia established most (66%) of its 154 ecological reserves between 1971, the year it enacted the *Ecological Reserve Act*, and 1981. Ninety-seven percent of the ERs were established by the year 2000. Since 2001, six ERs were transferred to other agencies and four new ERs were established. Det San is the most recently established ER (2009). No ERs have been established since then.

Table 1: Number of Ecological Reserves Established by Decade

Decade	# Established	Cumulative Percentage	# Transferred to Other Agencies
1971-80	101	66%	
1981-90	29	84%	
1991-00	20	97%	
2001-10	4	100%	-6
2011-20	0	97%	
TOTAL	**154**		**148 still under BC Parks jurisdiction**

To help implement the International Biological Program, Dr Vladimir Krajina proposed the concept of ecological reserves to the BC government in the late 1960s. He led the scientific work that informed the development and passage of the *Ecological Reserve Act* by April 2, 1971. His oft-stated goal for the Ecological Reserves System was to protect one per cent of B.C.'s land area in ecological reserves.[4]

The total area for all ERs established by the BC government was 112,632.75 ha. In the mid-2000s, the BC government transferred 521 ha to other agencies with the six ERs it gave away, leaving 112,111.75 ha. With 88.7 million ha of Crown land in the Province of British Columbia, the amount set aside in protected areas comprises 14.2 % (Government of British Columbia 2011).[5] Legal constraints on timber harvesting provide additional protection leading some government officials to claim that 17% of B.C.'s Crown land is protected. Small in size, the land and marine foreshore area protected by the 148 ERs still under provincial jurisdiction comprises 0.13% of B.C.'s Crown land base.[6]

Table 2 on the following page contains the number of current ERs in each region, their areal distribution figures on land and marine foreshore (in ha) with percentages of the total. The figures for the original 154 ERs appears in Table 4 in Appendix A.

[4] See https://ecoreserves.bc.ca/2012/03/12/contributions-of-vladimir-krajina-to-ecological-reserves-in-bc/

[5] See https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/land-water-use/crown-land/crown_land_indicators_statistics_report.pdf

[6] See https://bcparks.ca/about/park-designations.html#ers

Table 2: Distribution of 148 Ecological Reserves in BC Government Administrative Regions

Region	# of ERs	%	Land area (ha)	%	Marine area (ha)	%	Total area (ha)	%
Cariboo	9	6%	5,095	5%	0	0%	5,095	3%
Kootenay Boundary	11	7%	6,348	6%	0	0%	6,348	4%
Northeast	11	7%	7,160	6%	0	0%	7,160	4%
Omineca	15	10%	5,026	4%	6	0%	5,032	3%
Skeena	23	16%	67,523	60%	13,285	26%	80,808	49%
South Coast	16	11%	3,617	3%	8	0%	3,625	2%
Thompson Okanagan	16	11%	4,266	4%	0	0%	4,266	3%
West Coast	47	32%	13,077	12%	38,092	74%	51,169	31%
Total	148	100%	112,112	100%	51,391	100%	163,503	100%

4.0 ER Management Planning Direction Gap Analysis

4.1 ERs with No Management Planning Direction

Out of 154 ERs, 22 (14%) have no management planning direction listed on the BC Parks or FER websites. Of these, six are ERs that BC Parks no longer manages. In the mid-2000s, the BC government transferred five ERs to Parks Canada.[7] ER #74 (UBC Endowment Lands/Pacific Spirit) in the South Coast Region went to Metro Vancouver Regional Parks.

Of the remaining 148 ERs still under BC Parks jurisdiction, 19 (13%) still require management planning direction. Thirteen of the remaining ERs have Overviews[8] so some of the information needed to inform management planning was assembled. However, given the age of these documents, additional updating is needed to adequately inform plans.

[7] Three in the Skeena Region went to Gwaii Hannas National Park Reserve (#44 - East Copper/Jeffrey/ Rankine Islands, #95 – Anthony Island, and #96 – Kerouard Islands) and two in the West Coast Region went to Gulf Islands National Park Reserve (#121 – Brackman Island and #15 – Saturna Island).

[8] ER #3 Soap Lake, ER #6 Buck Hills Road, ER #8 Clayhurst, ER #20 Columbia Lake, ER #21 Skagit River Forest, ER #47 Parker Lake, ER #116 Katherine Tye, ER #131 Stoyoma Creek, ER #133 Gamble Creek, ER #147 Grayling River Hot Springs, and ER #154 Det San.

The list below identifies the ERs in each region that have no management planning direction recorded on either the BC Parks or FER websites (See also Appendix A). The West Coast Region is the only region that has management direction for all remaining ERs. The majority of the gaps are in the Thompson Okanagan and North East regions. While Det San, the newest ER (established in 2009), is among those that lack any management planning direction, 13 of the 18 ERs or 72%) with no management planning direction were established in the 1970s (see Appendix A).

Thompson-Okanagan Region: #3 (Soap Lake), #5 (Lily Pad Lake), #6 (Buck Hills Road), #29 (Tranquille), #77 (Campbell Brown)

North East Region: #8 (Clayhurst), #47 (Parker Lake), #147 (Grayling River Hotsprings), #150 (Rolla Canyon)

Skeena Region: #133 (Gamble Creek), #154 (Det San)

Omineca Region: #78 (Meridian Road), #87 (Heather Lake)

Cariboo Region: #64 (Ilgachuz Range), #65 (Chasm)

South Coast Region: #106 (Skagit Rhododedrons),[9] #131 (Stoyoma Creek), 144 (Yale Garry Oak)[10]

Kootenay Boundary Region: #61 (Upper Shuswap River)

West Coast Region: All remaining ERs have some management direction.

Many of the 12 ERs with management plans approved in the 1990s[11] no longer appear on the BC Parks webpages for those ERs and can only be found using links on the FER website. This suggests that BC Parks no longer considers the previous management direction for these ERs valid. Thus, these gaps in ER management planning also need to be addressed.

4.2 ERs with Purpose Statements

Purpose Statements are four-page documents that describe the roles of a particular ecological reserve, briefly list management issues, answer basic conservation, scientific research, recreation and management information in a checklist format, and provide the date of establishment and area of land and foreshore included in the reserve. They provide very little in terms of management direction. Preparation of these documents does not even appear as a step on the management planning process outlined on BC Parks' website.

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[9] ER #106, Skagit Rhododendrons, has a one-page management statement dated 1990 with no approval page that must be used "in conjunction with the descriptive text and map pages supplied in the 'Guide to Ecological Reserves in British Columbia'" (Ministry of Environment, Lands, and Parks 1992, see https://ecoreserves.bc.ca/1992/11/15/guide-to-ecological-reserves-in-bc/).

[10] ER #144, Yale Garry Oak, has a draft Purpose Statement and a draft Management Plan, both dated 2002, so much of the work has been done and it should be fairly easy to update.

[11] The approval dates for management plans for the following ERs are in the 1990s: #9 Tow Hill (1999), #10 Rose Spit (1999), #17 Canoe Islets(1990), #18 Rose Islets(1990), #48 Bowen Island (1990), #76 Fraser River (1990), #88 Skwaha Lake (1996), #89 Skagit River Cottonwoods (1990), #92 Skahist (1996), #99 Pitt Polder (1990), #110 McQueen Creek (1996), and #117 Haley Lake (1995).

Ninety-four ERs (63%) have approved purpose statements on the BC Parks website. The range in dates for when these purpose statements were approved is 1972-2013, with several in the 1980s, 1990s and early 2000s. The Purpose Statements for four ERs have been superseded by other management planning documents, including those for ER #38 (Takla Lake), ER #102 (Charlie Cole Creek), ER #104 (Gilnockie Creek), and ER #115 (Gingietl Creek). See Appendix C for the details.

ERs with purpose statements lack the level of direction and guidance provided by management direction statements or management plans.

4.3 ERs with Management Plans or Management Direction Statements

Forty-eight (32%) of the 148 ERs managed by BC Parks have approved management guidance in the form of management plans (29) or approved management direction statements (19) posted on the BC Parks website. The range in dates for when these management guidance documents were approved is 1990-2017, with many in the period 2002-2004 (when Nancy Wilkin was ADM of MoE). Management direction for the following ERs is imbedded in the planning documents for other protected areas: ER #9 (Tow Hill), ER#10 (Rose Spit), ER #64 (Ilgachuz Range), ER #68 (Gladys Lake), and ER #153 (Francis Point). Four of the ERs with approved management plans also have Overview documents, including ER #20 (Columbia Lake), ER #21 (Skagit River Forest), ER #22 (Ross Lake), and ER #116 (Katherine Tye). See Appendix B for the details.

> *"A management plan is a document that outlines the vision and direction for a protected area. This will include direction on the types, location and threshold of uses and activities appropriate within different parts of a protected area including appropriate levels of visitor use and facility development. A management plan is the result of a management planning process and is developed with First Nations, local governments, the public and other interest groups."* (BC Parks website – https://bcparks.ca/planning/).

Only twenty percent (29) of the ERs currently have approved management plans. The most recent of these is the *Mackinnon Esker Ecological Reserve Management Plan*, approved in 2017 (see https://bcparks.ca/eco_reserve/macesker_er.html). Most of the plans were completed in the early 2000s or in the 1990s. The BC Parks website no longer provides links to the older documents. For example, nothing shows up under management planning on the BC Parks website for ER #92, Skihist except the message, "Online management planning information for this Ecological Reserve is not available at this time". The only way to see the *Management Plan for Skihist Ecological Reserve* approved in November 1996 is via the FER website links – https://bcparks.ca/planning/mgmtplns/skihist_er/skihist_er_mp.pdf?v=1610484264695 Although a management plan for Skihist Provincial Park was approved in 2018, it contains nothing on the ER.

An additional 13% (20) of ERs have management direction statements. The following description appears in most of these documents.

"Management direction statements (MDS) provide strategic management direction for protected areas that do not have an approved management plan. Management direction statements also describe protected area values, management issues and concerns; a management strategy focused on immediate priority objectives and strategies; and, direction from other planning processes. While strategies may be identified in the MDS, the completion of all these strategies is dependent on funding and funding procedures. All development associated with these strategies is subject to the Parks and Protected Areas Branch's Impact Assessment Policy."

While not full management plans, these shorter documents contain enough useful information to provide management direction for ecological reserves. Unlike the older management plans produced in the 1970s through 1990s, they include issues such as First Nations interests and climate change, which gained greater attention in the 2000s. The Skeena Region has the majority of the management direction statements for ERs.

5.0 Monitoring and Research Reports and Other Information on ERs

FER attempts to provide corporate memory for the system of ecological reserves in British Columbia by acquiring and maintaining a repository of information about each ER on its website. This resource is made freely available to researchers and the public to facilitate the use of ERs as living laboratories to study environmental change. The inclusion of monitoring and research reports in ERs plays a key role in this effort. In addition, the FER website also includes links to BC Parks monitoring protocols, BC Parks iNaturalist Project images and other photographs, maps, ER warden reports, and various unpublished and published reports and articles about ERs. Each ER has its own webpage on the FER website with categories such as Warden Reports, Management Issues, Research Archive, Reports, Photos, iNaturalist Photos, Species Lists, and All reports for this site.

5.1 Monitoring Reports

Out of the 148 ERs still managed by BC Parks, 48 (32%) have some type of monitoring report listed on the FER website. Sixty-eight percent of the ERs (100/148) have no monitoring reports listed on the FER website. The FER website still shows monitoring reports for the ERs that were transferred to other government agencies.

The date range for the most recent monitoring report for a particular ER is 1971-2020. The median date is 2000. The average is 1997. The most common topics of these most recent monitoring reports are the results of surveys of: vertebrate fauna, especially birds, vegetation (vascular, non-vascular plant species), management issues/state of the ER, ecology/general natural history, invasive plants, hydrology, invertebrates, marine environment and wildfire impact.

5.2 Research Reports

Out of 148 ERs still managed by BC Parks, 45 (30%) have research reports listed on the FER website. The FER website still contains links to research reports for the ERs that were transferred to other government agencies. Seventy percent of the ERs (103/148) have no research reports listed on the FER website.

ERs have served as study sites for numerous Masters theses and PhD dissertations, which are listed in the Research Archive section on the applicable ER webpage on the FER website. One of many examples includes the 1992 University of California PhD dissertation in Biology, *Social Dynamics of Male Killer Whales, Orcinus orca in Johnstone Strait, British Columbia*, by Naomi Anne Rose, which focused on Robson Bight (ER #111). Many relevant articles in peer-reviewed journals, textbooks, and unpublished research reports have resulted from studies in particular ERs. Anne Vallee Triangle Island (ER #13) has spawned over 35 papers from Simon Fraser University and more than 20 from other institutions. ERs have provided opportunities for significant longitudinal research. For example, research on the Drizzle Lake ecosystem started in 1975. The University of Victoria's Dr Tom Reimchen, the principle researcher, says "a conservative estimate of the research investment is between $120,000 to $150,000 in the Drizzle Lake ER" (#52). Another is the research on the demography of Vancouver Island marmots centered on Haley Lake (ER #117). The Royal B.C. Museum and the B.C. Conservation Data Centre use ERs as study sites for biodiversity and species at risk. For example, the Williams Creek (ER #114) serves as a study area for dragonfly diversity, range, and distribution.

The date range for the most recently posted research report for an ER is 1976-2015. Research that took place prior to the enactment of the *Ecological Reserve Act* in 1971, often informed why certain sites became ERs and some of these studies are noted on the FER webpages for individual ERs. For example, IBA research for many of the seabird colonies on the coast extends back to 1951 and the first study of yellow pine took place in 1961 at what became ER#27, Whipsaw Creek in the Thompson Okanagan Region. The median date for the most recent research report posted on the FER website is 2002. The average is 1998. Recent research includes innovation applications of LIDAR technology at ER #84 (Aleza Lake) near Prince George in the Omineca Region and how climate change affects phenology in ER # (Bowser) on Vancouver Island in the West Coast Region.

6.0 ER Wardens

In 2020, BC Parks and FER worked together to reconcile their respective lists of volunteer ER wardens. An analysis of the resulting list revealed the following information. Of the 148 ERs still managed by BC Parks (six having been transferred to other agencies), 81 (55%) have ER wardens. Some wardens look after more than one ER. There used to be volunteer wardens at the five reserves that were transferred to Parks Canada and the one transferred to Metro Vancouver.

Sixty-seven of the 148 ERs (45%) have vacancies in ER warden positions. Although Columbia Lake ER #20 is included among the ERs with a vacancy, BC Parks and the Ktunaxa Nation are discussing the Ktunaxa taking on the stewardship of this reserve.

FER has contact information for ER wardens at 61 (41%) of the existing 148 ERs still managed by BC Parks. BC Parks has contact information for wardens with whom they have a current active contract at an additional 21 ERs (14%). The contact information can only be provided to FER by the individual warden due to federal and provincial privacy laws. Thus 14% of the current volunteer ER wardens do not receive FER's newsletter, (called *The LOG*), or other information and support from FER.

Table 3 displays the regional distribution of ER wardens. The Thompson Okanagan remains the only region with no vacancies. Despite the larger number of ERs in the West Coast Region, just six percent are vacant. However, nearly 90% of the ERs in the Caribou Region have vacancies and over 80% of the ERs in both the Kootenay Boundary and Northeast regions have vacancies. Skeena has 65% of its ER warden positions vacant, the Omineca has 47%, and the West Coast 37%. Skeena and the Northeast regions have smaller overall human populations, less road access, and vaster distances. Some of the vacancies in other regions are in ERs with extremely challenging access. Creative solutions, including collaborations with Indigenous and other partner organizations, could ensure the warden's stewardship function in these areas.

Table 3: Distribution of ER Wardens by BC Government Administrative Region

Region	# ERs	# Wardens	# Vacant	% Vacant
Cariboo	9	1	8	89%
Kootenay-Boundary	11	2	9	82%
Northeast	11	2	9	82%
Omineca	15	8	7	47%
Skeena (lost 3 ERs)	23	8	15	65%
South Coast (lost 1 ER)	16	15	1	6%
Thompson-Okanagan	16	16	0	0%
West Coast (lost 2 ERs)	47	30	17	36%
Totals	**148**	**82**	**66**	**45%**

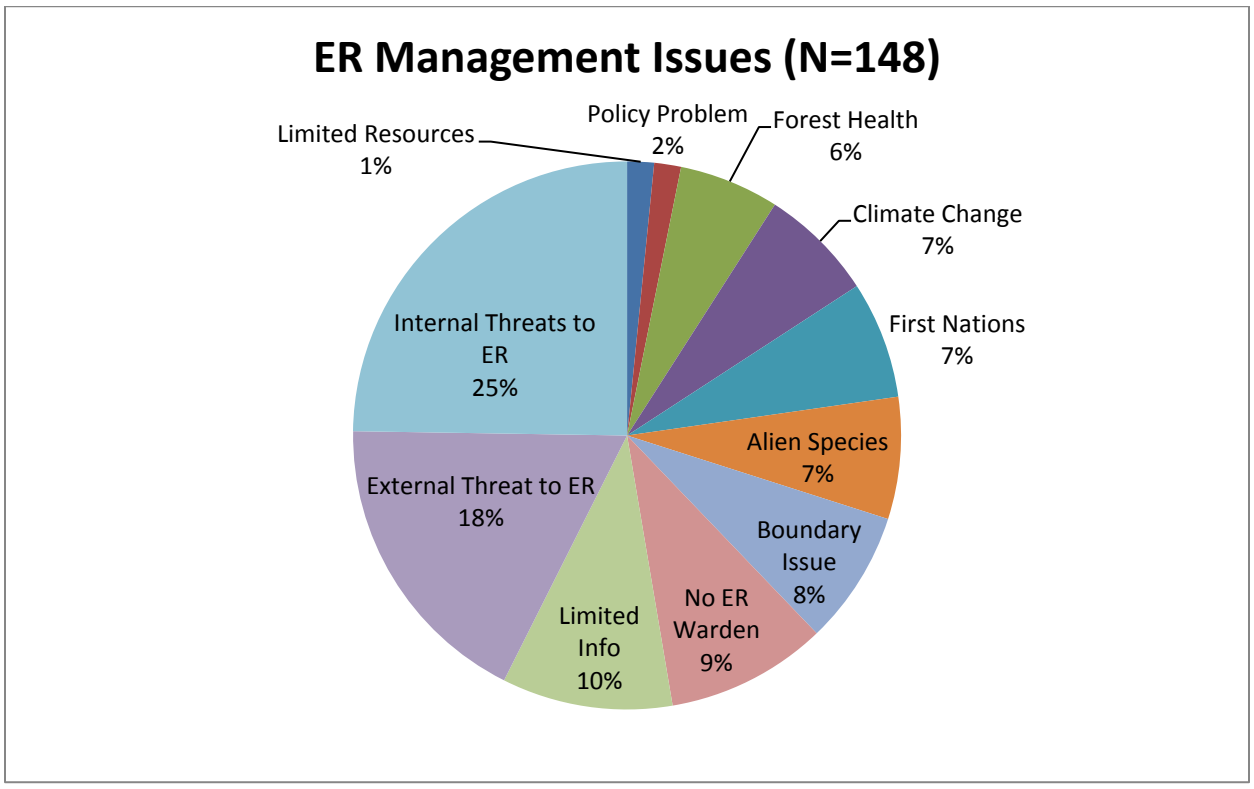
Out of 148 ERs, 38 (26%) have ER warden reports listed on the FER website. Thus, 110 ERs (74%) lack any posted warden reports. Of these warden reports, the date range of the most recent report breaks down as follows: 1981-90: 8, 1991-00: 3, 2001-10: 5, 2011-20: 22.

7.0 Management/Conservation/Stewardship Issues in Existing ERs in B.C.

7.1 Management/Conservation/Stewardship Issues in Management Planning Documents

In most cases, management planning documents listed on the BC Parks website contain a section that identifies management issues for the ecological reserve. In some cases, the ER is included with an adjacent protected area with no issues identified for the ER. Issues fall into eleven categories. Ten issues were ranked based on the number of times they were identified in ER management planning documents. One category (no ER warden) was updated based on January 2021 data. For the 148 ERs under BC Parks jurisdiction, Figure 1 shows the relative number of times issues were identified in BC Parks management planning documents. The top five are internal threats, external threats, limited information, boundary issues and alien species, followed closely by First Nations issues and climate change. Limited resources and policy problems were occasionally mentioned.

Figure 1: Management Issues Identified in BC Parks Management Planning Documents for 148 Ecological Reserves Under BC parks Jurisdiction in 2021



Issue #1 (mentioned 172 times) Internal Threats: Examples of internal threats included inappropriate activities, i.e. recreational use such as illegal camping, hunting, trapping, cattle grazing, physical trespass and vandalism, access and damage from linear developments like roads, railways, transmission lines, and pipelines. It is alarming how much commercial harvesting of shellfish, fish, trees for firewood, and non-timber forest products (mushrooms, moss, horsetails, salal, etc.) takes place in ERs and how many ERs

get used as refuse dumps by local communities. Authorized visitor use was noted when numbers were high and increasing and damage (trampling of native plant species, disturbance of seabirds and other wildlife, erosion of or damage to sensitive geological features) was evident.

Issue #2 (mentioned 124 times) External Threats: The most common external threats are adjacent developments, especially logging operations, urban development (residential subdivisions, expansion of water treatment plant), roads and other linear developments (hydro lines, transmission lines, pipelines, seismic lines), as well as disturbance from nautical (motor boats, canoes, kayaks, rafts) and air traffic (helicopters and airplanes), agriculture (primarily cattle grazing but also vineyards), mines, oil and gas developments, risk of oil spills on marine ERs, boat noise and effluent from commercial fishing operations and tourism operators, and recreational developments such as ski areas. It is sad to note how many ERs are now either tiny fragments of old-growth forest completely surrounded by clear cuts on Crown land or other natural vegetation communities ringed by private forest, urban, or agricultural land.

Issue #3 (mentioned 70 times) Limited Information: BC Parks planners identified as a significant issue the lack of baseline environmental data for an ER (natural features, plant and animal species inventories, species at risk surveys, plant communities, as well as hydrologic regimes) and the paucity of monitoring data. They also noted limitations in information about cultural and archaeological resources, particularly those of significance to First Nations. Visitor use data is also lacking in many ERs. There is little information about many ERs for use by BC Parks, other government agencies, First Nations, and the public. Information in most ER management planning documents is out of date (most documents were approved in 2003) and hence some information is no longer correct (i.e., usually, what was a potential threat of an adjacent development has now happened).

Issue #4 (66 vacancies) No ER Warden: While this was mentioned frequently in management planning documents as an issue, this number represents the actual number of vacancies in ER warden positions in January 2021 according to BC Parks records. Without an ER warden, there is virtually no stewardship or monitoring function in an ER. This greatly reduces the effectiveness of an ER in achieving its legislated purpose.

Issue #5 (mentioned 55 times) Boundary Issues: ER management planning documents tended to highlight the lack of boundary demarcation, the lack of signs around the border of the reserve, the decrepit state of fences, and the lack of mapped coordinates on brochures. The absence of posted notices promoting the ER's values and level of protection was also cited. Several reserves identified that the boundaries need adjustment because of shifts in ER values related to natural fluvial and climate-change induced hydrologic, landscape and species range changes or because the size of the reserve combined with external threats renders it ineffective in protecting species at risk or other ER values. In a few instances, boundaries appear to be disputed by neighbouring landowners and trespass is an issue (e.g. Big White Ski Area incursions into the Big White ER). Disappointing to read is the lack of apparent awareness of the presence, location, and values of an ER, not only by members of the public, but also by BC government employees, resulting in authorization of

non-conforming uses of an area (e.g. road development, trapping, and commercial hunting by guide-outfitters).

Issue # 6 (mentioned 50 times) Alien Species: Alien species within an ER are an internal threat resulting from the external threat of adjacent land use, and were separated out as a specific issue. Most of the times when alien species were mentioned, they were invasive plants. Specific examples included baby's breath, broom, carpet burweed, dandelion, Himalayan blackberry, holly, hound's-tongue, ivy, knapweed (diffuse, meadow, and Russian), long-spine sandbur, puncture vine, reed canary grass, sulphur cinquefoil, thistle (Canada and Scotch), toadflax (bastard and Dalmatian). However, a significant number of animal species were also identified. These included fish (introduced bass and trout), amphibians (American bullfrogs), and mammals. Cattle, feral goats and sheep, rabbits were among the domestic mammals identified. In certain ERs on small coastal islands, non-native rats and raccoons threaten native seabird populations. At ER# 52, Drizzle Lake, and near Haida Gwaii, non-native black-tailed deer consumed native vegetation and introduced beaver changed littoral environments supporting spawning areas for native sticklebacks.

Issue # 7 (mentioned 48 times) First Nations: First Nations issues encompass a broad range of topics such as opening up a conversation and establishing a relationship with First Nations in the vicinity of the ER, interest in ensuring Indigenous rights are respected, the need to conduct inventories of cultural resources of significance to First Nations and to document First Nations values and Indigenous use in an ER, the effect on the ER of land use decisions made by First Nations adjacent to it, co-management proposals and opportunities, and assertions from individual First Nations for the exclusive use of land, control of Indigenous archaeological resources, research permit process, and land-use.

Issue #8 (mentioned 47 times) Climate Change: Climate change was sometimes mentioned without elaboration and other times management planning documents described the specific effects of climate change on the ER. Of greatest concern were climate change effects on moisture regimes, hydrology, extreme events (winter storms, floods, drought, and catastrophic wildfire), sea level rise, and rising ocean temperatures, and the subsequent effects these environmental changes have on species survival, distribution, range, and ecosystem composition. Sometimes the issue was the lack of management direction to protect rare plants undergoing impacts from climate change. Several ERs set aside to protect specific species at the edge of their range appear to be ideally situated to study the effect of climate change on shifting distribution as climate envelopes move north and up in elevation in response to global warming. For example, Cinema Bog (ER #82) in the Cariboo Region is the most southern limit for that vegetation type. Sea level rise could eliminate the land portion of coastal island ERs.

Issue # 9 (mentioned 41 times) Forest Health: Mountain pine beetle infestations, effects of forest fire suppression (fuel build-up) and wildfire, shifts in species composition related to disruption to natural disturbance regimes, fire suppression, changed moisture regimes, warming climate, and tree removal comprised the main forest health issues mentioned.

While two issues were mentioned only 11 times each (tying for 10th place), they were nevertheless important in the context of a particular ER. The main **Policy Problems** noted were the adverse effects of the Initial (Wildfire) Attack and Fire Suppression policies on Forest Health, as well as decisions on non-conforming uses (usually linear development bisecting an ER) and ER boundaries being inadequate to safeguard biological features. Similar to Lack of an ER warden, **Limited** (BC Parks) **Resources** resulted in having little to no staff presence at the ER. The resulting lack of stewardship, monitoring, compliance and enforcement actions exacerbates internal and external threats, with negative consequences for the ecological integrity of the ER.

7.2 Regional Variations in Management Issues

Management issues varied across the administrative regions of BC Parks. Regional variations in management issues can be seen in Figures 2 to 9 in Appendix F.

While the management planning documents in most regions identified examples of internal threats as the primary issue facing ecological reserves, the West Coast identified external threats more often than internal threats and the Skeena Region identified limited information about their ecological reserves ahead of internal and external threats. In the Northeast Region the lack of volunteer wardens was just ahead of internal and external threats whereas this isn't an issue at all in the Thompson Okanagan Region where all ERs have volunteer wardens. Forest health was the second most often mentioned issue in the Omineca Region and yet never mentioned in any of the management planning documents in the Kootenay Boundary Region. Alien species were the second most often identified issue in the Thompson Okanagan and yet never mentioned in the Northeast Region. Boundary issues was the third most frequently mentioned issue in the West Coast Region and was in the top five or six issues in all other regions. Climate change was the third most often mentioned issue in both the Omineca and South Coast regions but mentioned as an issue for one ecological reserve (ER#19, Mount Sabine) in the Kootenay Boundary Region. Issues related to First Nations interests and cultural heritage were mentioned most often in the management planning documents of the Skeena and the West Coast regions, and not at all in the Thompson Okanagan Region.

7.3 Current Management/Conservation/Stewardship Issues Identified by ER Wardens

From time to time, ER wardens contact FER to highlight important issues they face in the management, conservation and stewardship of the ecological reserve(s) they voluntarily care for. FER informed wardens with known contact information about the upcoming meeting with BC Parks and asked if they could identify their top three to five issues. These letters were collated and analyzed.[12] The issues most mentioned in the communications (email, phone call, in person) received by FER between December 2019 and May 2020 include:

1. Boundary Issues (lack of defined boundaries, shifting boundaries, unmaintained fence and lack of signage, need for boundary adjustments or buffers to protect ERs

[12] The collated letters were provided to the entire FER Board in June 2020 and to BC Parks in January 2021.

from shifting boundaries due to natural processes and adjacent land use) – mentioned eight times

2. Invasive Plants threatening natural vegetation – mentioned six times
3. Issues with BC Parks – mentioned five times (lack of knowledge of the purpose of ERs, of natural and cultural resources in existing ERs), the need for better compliance and enforcement, specifically addressing the inability of rangers to issue tickets for violation of the Ecological Reserve Regulations, the need for more resources for BC Parks to support ERs; and improved transmission of monitoring information from BC Parks to volunteer ER wardens.)
4. Internal Threats – mentioned four times (garbage dumping, tree cutting and other; vandalism, illegal camping; helicopter training landings and recreational fixed winged planes landings, shore use by Indigenous peoples and the public)
5. External Threats: – mentioned three times (e.g., boat traffic, build-up of debris washing down from the upper road; feral domestic animals)
6. Forest Health – mentioned three times (fire and pine beetle damage)

Other issues mentioned once include: Climate change effect on rare plants; the need for updated monitoring (e.g. an updated review of rubbing beach use by orcas)

7.4 Specific Issues Identified for Marine ERs

Oil pollution and petrochemical spills are already a significant external threat in marine coastal ERs (see Figure 2 on page 14). Proposed expansion of tanker traffic poses additional concerns.

In April 2014, during the NEB Hearings for the Trans-Mountain Pipeline, FER was granted intervenor status. FER identified 19 coastal ERs that have marine shoreline along the proposed route of tankers from Vancouver past the southern part of Vancouver Island.[13] One of the issues FER brought forward is the lack of contingency planning for those ERs with marine frontage in the event of a catastrophic oil spill.
See https://ecoreserves.bc.ca/2018/12/06/neb-trans-mountain-reconsideration/. Sub-tidal and foreshore is not included as protected area in 11 of these coastal ERs.[14] Nevertheless, a storm blowing against a shoreline will carry aerosols of hydrocarbons far inland as has happened in past oil spills. The main danger from any chemical spill is always

[13] These include Cleland Island (ER #1), Lasqueti Island (ER #4), Mount Tuam (ER #16) Canoe Islets (ER #17), Rose Islets (ER #18), Baeria Rocks (ER #24), Ambrose Lake (#28), Mount Maxwell (ER #37), Ten Mile Point (ER #66), Satellite Channel (ER #67), Oak Bay Islands (ER #94), Race Rocks (ER #97), Megin River (ER #105), Trial Islands (ER #132), Hudson Rocks (ER #137), San Juan River Estuary (ER #141), Ballingall Islets (ER #151), and Francis Point (ER #153), plus Brackman Islands (former ER #121), which was transferred to Parks Canada for the Gulf Islands National Park Reserve in April 2004. See details in Table 35, Appendix G, page 35.

[14] Cleland Island (ER #1), Lasqueti Island (ER #4), Mount Tuam (ER #16) Canoe Islets (ER #17), Rose Islets (ER #18), Ambrose Lake (#28), Mount Maxwell (ER #37) Megin River (ER #105), Trial Islands (ER #132), Ballingall Islets (ER #151), and Francis Point (ER #153).

at the interface of land and sea, and thus the spray zone is always vulnerable. In a 50-knot wind from the south west, most of Trial islands' rare plants would probably be affected very badly, for instance. Since B.C. owns to the high tide zone of all their shorelines, any ER with marine shoreline can be adversely affected by an oil spill.

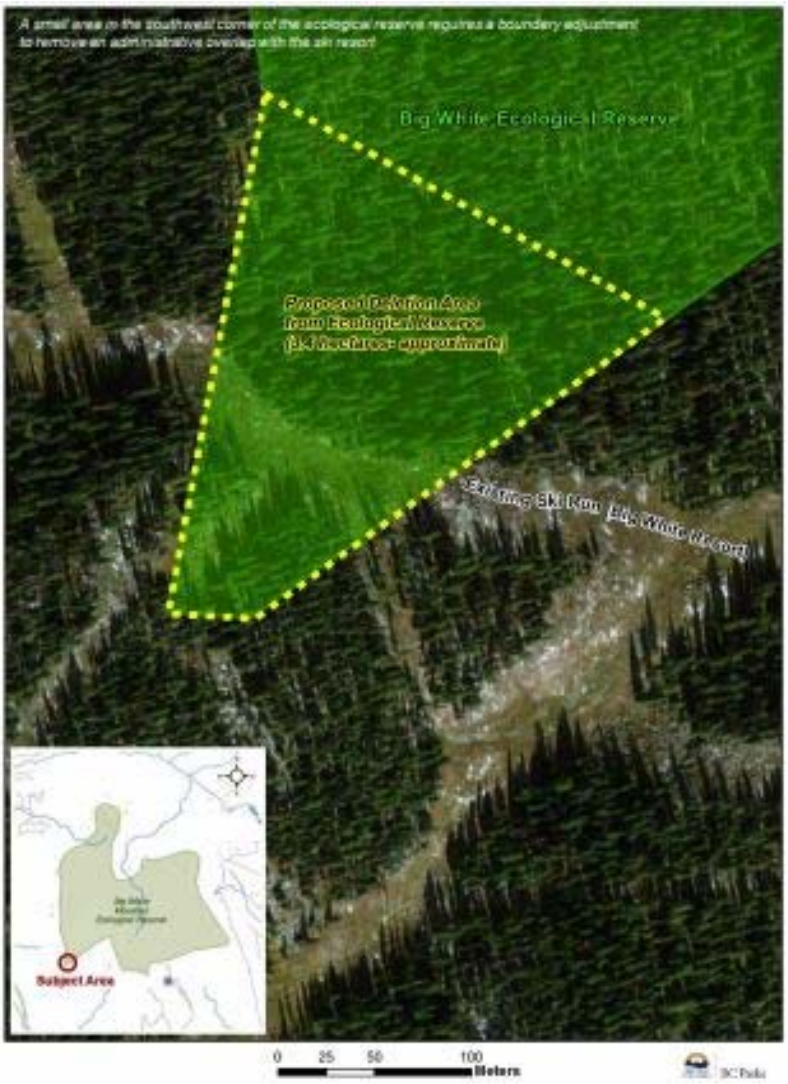
During the time period of the NEB hearings on the TMX pipeline (2012-2019), the Western Canada Marine Response Corporation (WCMRC) plans excluded any reference to planning for the protection of sensitive coastal ecological areas such as ERs. Since then (2020/21), the WCMRC has produced plans with some level of mitigation for some parts of the ecological reserves and other sensitive ecosystems. (e.g., Race Rocks and part of the Oak Bay Islands ecological reserves). The reality is that there are a high number of days each year when deploying booms and oil capture techniques are impossible due to adverse weather conditions. This along with the presence of strong tides in some areas affects the vulnerability of the 19 marine ecological reserves to massive catastrophic impacts when an accident happens in the shipping lanes.

Figure 2: Tar ball on Griffin Island beach within Oak Bay Islands ER #94, July 2019 (Photo by Marilyn Lambert)

7.5 Prioritized List of Management, Conservation and Stewardship Issues

FER recommends that priority be given to addressing the following issues in existing ERs:

Figure 3: BC Parks Poster on Boundary Conflict at Big White ER #34



1. **Solve Boundary Issues**, including confirming GPS coordinates, installing signs, repairing fences, removing alien species in areas adjacent to ERs, and addressing shifting natural boundaries (e.g. Fraser River ER #76, Katherine Wye ER #116, and San Juan Estuary ER #141). Addressing boundary issues helps address many internal and external threats to ERs.

2. **Address Internal Threats**, including trespass (building roads, dumping garbage), illegal activities (camping, hunting, harvesting shellfish, fishing, woodcutting, etc.) and removing invasive alien species (plants and animals)

3. **Address External Threats by** negotiating with the Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD) and other government agencies (federal, provincial, regional district, municipal) as well as organizations such as the Western Canada Marine Response Corporation (WCMRC), and private businesses (development corporations, logging companies, ski resorts, etc.) on mitigation measures to decrease adverse effects on ERs from adjacent development, including establishing buffer zones, replacing land deleted from an ER with an equivalent or greater amount of land, applying erosion-prevention techniques, sound barriers, etc.

4. **Fill Information Gaps** for specific ERs (species at risk, biodiversity, Indigenous interests, cultural resources, geological features)

5. **Address First Nations Interests** (explore co-management opportunities, rename ERs, document FN interests, values, cultural resources, recruit and support FN wardens/guardians)
6. **Enhance BC Parks Stewardship Actions** (fill vacancies in volunteer warden positions, establish partnerships, monitoring & reporting, communications, information sharing, compliance & enforcement, complete management direction statements for ERs with no effective management planning direction, identify gaps in BEC representation in the ER system, meaningfully commemorate 50th anniversary of *Ecological Reserve Act*).

Appendix A: Distribution of All 154 Ecological Reserves by BC Government Administrative Regions

Nearly one-third of the original 154 ERs were established in the West Coast administrative region of the BC government. The Skeena Region had 17% of the ERs. The South Coast had 11%. The Omineca and Thompson-Okanagan each had ten percent, and the Kootenay-Boundary and Northeast regions each had seven percent. The Cariboo Region had six percent of the ERs in B.C. ERs that were transferred to other government agencies came from the Skeena, South Coast, and West Coast regions.

Table 4: Number, Areal Extent and Distribution of 154 Ecological Reserves in BC Government Administrative Regions (includes 6 transferred ERs)

Region	ERs	%	Land area (ha)	%	Marine area (ha)	%	Total area (ha)	%
Cariboo	9	6%	5,095	5%	0	0%	5,095	3%
Kootenay Boundary	11	7%	6,348	6%	0	0%	6,348	4%
Northeast	11	7%	7,160	6%	0	0%	7,160	4%
Omineca	15	10%	5,026	4%	6	0%	5,032	3%
Skeena	26	17%	67,818	60%	13,600	26%	81,418	50%
South Coast	17	11%	3,707	3%	8	0%	3,715	2%
Thompson Okanagan	16	10%	4,266	4%	0	0%	4,266	3%
West Coast	49	32%	13,213	12%	38,117	74%	51,330	31%
Total	154	100%	112,633	100%	51,731	100%	164,364	100%

Appendix B: List of ERs by BC Parks Administrative Region Lacking Any Management Planning Direction

The only region where BC Parks has some form of management direction for all of its existing ERs is the **West Coast Region** (two ERs were transferred to Parks Canada).

Table 5: ERs Lacking Management Guidance in the Caribou Region (1 out of nine ERs - 11%)

ER#	Name	Date Est.	Location	Purpose
65	Chasm	1975	N of Clinton	ponderosa pine community at its northern limit

Table 6: ERs Lacking Management Guidance in the Kootenay-Boundary Region (1 out of 11 ERs - 9%)

ER#	Name	Date Est.	Location	Purpose
61	Upper Shuswap River	1975	E of Mabel Lake	Western red cedar community in the inland rainforest

Table 7: ERs Lacking Management Guidance in the Northeast Region (4 out of 11 ERs – 36%)

ER#	Name	Date Est.	Location	Purpose
8	Clayhurst (has an Overview)	1971	S of Clayhurst	eroding bluffs with Peace River parklands
47	Parker Lake (has an Overview)	1973	W of Fort Nelson	extensive bog habitat with pitcher plant (*Sarracenia purpurea*)
147	Grayling River Hot Springs (has an Overview)	2000	67 km NE of Muncho Lake	protects a nationally significant hot springs site and related natural values
150	Rolla Canyon (has an Overview)	1993	Near Dawson Creek	Incised sandstone canyon along Pouce Coup River that protects geological (paleoentological) and biological features, plus cultural heritage and recreational features

Table 8: ERs Lacking Management Guidance in the Omineca Region (2 out of 15 ERs – 13%)

ER#	Name	Date Est.	Location	Purpose
78	Meridian Road (Vanderhoof)	1977	S of Vanderhoof	Engelmann spruce-subalpine fir-lodgepole pine forest communities
87	Heather Lake	1978	NW of Mackenzie	Excellent example of a trembling aspen stand

Table 9: ERs Lacking Management Guidance in the Skeena Region (2 out of the remaining 26 ERs after 3were transferred – 8%)

ER#	Name	Date Est.	Location	Purpose
133	Gamble Creek (has an Overview)	1977	E of Prince Rupert	north coast forest bog complex, occurrence of Pacific silver fir near the northern limit
154	Det San (has an Overview)	2009	NW of Mackenzie	Excellent example of a trembling aspen stand

Table 10: ERs Lacking Management Guidance in the South Coast Region (2 out of 17 ERs after one was transferred – 12%)

ER#	Name	Date Est.	Location	Purpose
131	Stoyoma Creek (has an Overview)	1990	Near Boston Bar	meeting of three biogeoclimatic (BEC) zones; to conserve special seed provenances
144	Yale Garry Oak*	2000	E of Yale	protects the most easterly isolated Garry oak ecosystem (also near north end of the range for *Quercus garryana* species)

*Note: ER #144 has a draft Purpose Statement and a draft Management Plan both dated 2002.

Table 11: ERs Lacking Management Guidance in the Thompson Okanagan Region (5 out of 16 ERs – 31%)

ER#	Name	Date Est.	Location	Purpose
3	Soap Lake (has an Overview)	1971	S of Spence's Bridge	saline lake and grassland community of the dry interior
5	Lily Pad Lake	1971	S of Lumby	undisturbed highland forest
6	Buck Hills Road (has an Overview)	1971	S of Lumby	a stand of old-growth Western larch
29	Tranquille	1971	W of Kamloops	ponderosa pine and sagebrush communities
77	Campbell Brown (Kalamalka Lake)	1977	SW of Vernon	ponderosa pine, bunchgrass and rattlesnake denning site

Appendix C: List of ERs with Approved Management Plans or Management Direction Statements

The types of management planning guidance documents identified in these tables include the following: provincial park management plans or protected area management plans in which direction for the ER is included (PPMP or PAMP), management plans specific to the ER (MP), management direction statements (MDS), and management statements (MS).

Table 12: ERs with Approved Management Plans in the Caribou Region (1 out of 9 ERs - 11%)

ER#	Name of ER	Approval Date	Type of Plan	Document Name/Comments
64	Ilgachuz Range	2003	PPMP	*Itcha Ilgachuz Provincial Park and Ilgachuz Range Ecological Reserve Management Plan 2002*

Table 13: ERs with Approved Management Plans in the Kootenay Boundary Region (3 out of 11 ERs - 27%)

ER#	Name of ER	Approval Date	Type of Plan	Document Name/Comments
20	Columbia Lake	2004	MDS	Also has an Overview Statement
30	Vance Creek	2006	MP	
104	Gilnockie Creek	2003	MDS	Also has a Purpose Statement (2000)

Table 14: ERs with Approved Management Plans in the Northeast Region (1 out of 11 ERs – 9%)

ER#	Name of ER	Approval Date	Type of Plan	Document Name/Comments
46	Sikanni Chief River	2006	MDS	

Table 15: ERs with Approved Management Plans in the Omineca Region (1 out of 15 ERs – 7%)

ER#	Name of ER	Approval Date	Type of Plan	Document Name/Comments
36	MacKinnon Esker	2017	MP	

Table 16: ERs with Approved Management Plans in the Skeena Region (19 out of 26 ERs - 73%)

ER#	Name of ER	Approval Date	Type of Plan	Document Name/Comments
9	Tow Hill	1999	PPMP	Within the *Naikoon Provincial Park Management Plan*
10	Rose Spit	1999	PPMP	Within the *Naikoon Provincial Park Management Plan*
25	Dewdney and Glide Islands	2003	MDS	Also has an Overview
38	Takla Lake	2005	MP	Also has an Approved Purpose Statement (1972)
45	Vladimir J. Krajina (Port Chanal)	2004	MDS	
52	Drizzle Lake	2004	MDS	
57	Chickens Neck Mountain	2003	MDS	
58	Blue/Dease Rivers	2003	MDS	
59	Ningunsaw River	2003	MDS	
63	Skeena River	2003	MDS	
68	Gladys Lake	2003	PAMP	Within *Stikine Country Final Protected Areas Management Plan*
73	Torkelsen Lake	2003	MDS	
81	Morice River	2003	MP	
93	Lepas Bay	2004	MP	
102	Charlie Cole Creek	2003	MDS	Also has an Approved Purpose Statement (2000)
114	Williams Creek	2004	MDS	
115	Gingietl Creek	2000	MDS	Also has an Approved Purpose Statement (2000)
145	Burnt Cabin Bog	2001	MDS	
146	Catherine Creek	2003	MDS	

Table 17: ERs with Approved Management Plans in the South Coast Region (13 out of 16 ERs - 81%)

ER#	Name of ER	Approval Date	Type of Plan	Document Name/Comments
21	Skagit River Forest	1990	MDS	Also has an Overview
22	Ross Lake	2006	MP	Also has an Overview

ER#	Name of ER	Approval Date	Type of Plan	Document Name/Comments
48	Bowen Island	1990	MP	
69	Baynes Island	2012	MP	
76	Fraser River	1990	MP	
89	Skagit River Cottonwoods	1990	MP	
92	Skihist	1996	MP	
98	Chiliwack River	2000	MP	
99	PittPolder	1990	MP	
106	Skagit Rhododendrons	1990	MS	To be used in conjunction with the 1992 'Guide to Ecological Reserves in British Columbia'
116	Katherine Tye	1990	MDS	
143	Liumchem	2001	MDS	Also has an Overview
153	Francis Point	2008	PPMP	Within *Francis Point Provincial Park and Ecological Reserves Management Plan*

Table 18: ERs with Approved Management Plans in the Thompson Okanagan Region (3 out of 16 ERs - 19%)

ER#	Name of ER	Approval Date	Type of Plan	Document Name/Comments
7	Trout Creek	2016	MP	
88	Skwaha Lake	1996	MP	
110	McQueen Creek	1996	MP	

Table 19: ERs with Approved Management Plans in the West Coast Region (6 out of 47 ERs - 13%)

ER#	Name of ER	Approval Date	Type of Plan	Document Name/Comments
16	Mount Tuam	2012	MP	
17	Canoe Islets	1990	MP	
18	Rose Islets	1990	MP	
37	Mount Maxwell	2012	MP	
97	Race Rocks	2002	MP	
117	Haley Lake	1995	MP	

Appendix D: List of ERs with Approved Purpose Statements

Table 20: ERs with Approved Purpose Statements in the Caribou Region (7 out of 9 ERs - 78%)

ER#	Name	Approval Date
35	Westwick Lake	2003
53	Narcozi Lake	2003
55	Cardiff Mountain	2003
70	Mount Tinsdale	2003
82	Cinema Bog	2003
101	Doc English Bluff	1987
127	Big Creek	2003

Table 21: ERs with Approved Purpose Statements in the Kootenay-Boundary Region (8 out of 11 ERs – 73%)

ER#	Name	Approval Date
19	Mount Sabine	2000
26	Ram Creek	2000
31	Lew Creek	2003
32	Evans Lake	2003
43	Mount Griffin	1972
49	Kingfisher Creek	1972
56	Goosegrass Creek	2003
104	Gilnockie Creek	2000

Table 22: ERs with Approved Purpose Statements in the Northeast Region (6 out of 11 ERs - 55%)

ER#	Name	Approval Date
50	Cecil Lake	2000
62	Fort Nelson River	2006
80	Smith River	2006
107	Chunamun Creek	1990
148	Kotcho Lake	2006
149	Portage Brulé Rapids	2006

Table 23: ERs with Approved Purpose Statements in the Omineca Region (13 out of 15 ERs – 87%)

ER#	Name	Approval Date
39	Sunbeam Creek	1972
41	Tacheeda Lakes	2005
60	Drywilliam Lake	2003
71	Blackwater Creek	2003
72	Nelchako Lake	2003
78	Meridian Road	2003
79	Chilako River	2003
84	Aleza Lake	2003
85	Patsuk Creek	2003
86	Bednesti Lake	2003
91	Raspberry Harbour	2005
134	Ellis Island	2003
152	Ospika Cones (also has a Zoning Plan)	2005

Table 24: ERs with Approved Purpose Statements in the Skeena Region (6 out of 23 ERs - 26%)

ER#	Name	Approval Date
9	Tow Hill	2000
23	More/McKenney/ Whitmore Islands	2013
38	Takla Lake	1972
102	Charlie Cole Creek	2000
103	Byers/Conroy Islands	2003
115	Gingietl Creek	2000

Table 25: ERs with Approved Purpose Statements in the South Coast Region (1 out of 16 ERs – 6%)

ER#	Name	Approval Date
28	Ambrose Lake	2003

Table 26: ERs with Approved Purpose Statements in the Thompson Okanagan Region (9 out of 16 ERs – 56%)

ER#	Name	Approval Date
27	Whipsaw Creek	2007
33	Field's Lease	2005
34	Big White Mountain	2007
42	Mara Meadows	1972
51	Browne Lake	2005
77	Campbell Brown (Kalamalka Lake)	2005
100	Haynes' Lease	2005
108	Cougar Canyon	2005
130	Mahoney Lake	2006

Table 27: ERs with Approved Purpose Statements in the West Coast Region (45 out of 47 ERs – 96%)

ER#	Name	Approval Date
1	Cleland Island	2003
2	East Redona Island	2003
4	Lasqueti Island	2003
11	Sartinme Island	2003
12	Beresford Island	2003
13	Anne Vallée Triangle Island	2003
14	Solander Island	2003
15	Mount Tuam	2003
17	Canoe Islets	2003
18	Rose Islets	2003
24	Baeria Rocks	2003
37	Mount Maxwell	2003
40	Kingcome River/Atlatzi River	2003
54	Nitinat Lake	2004
66	Ten Mile Point	2004
67	Satellite Channel	2004
75	Clanninick Creek	2003
83	San Juan Ridge	2003
90	Sutton Pass	2003

ER#	Name	Approval Date
94	Oak Bay Islands	2003
105	Megin River	1987
109	Checleset Bay	2003
111	Robson Bight	2003
112	Mount Tzuhalem	2003
113	Honeymoon Bay	2003
118	Nimpkish River	2003
119	Tahsish River	2003
120	The Duke of Edinburgh Pine Storm Tree Islands	2003
122	Tsitika Mountain	2003
123	Mount Derby	2003
124	Tsitika River	2003
125	Mount Elliott	2003
126	Claude Elliott Creek	2003
128	Galiano Island	2004
129	Klashkish River	2003
132	Trial Island	2004
135	Bowser	2003
136	Comox Lake Bluffs	2003
137	Hudson Rocks	2004
138	Klanawa River	2004
139	Yellowpoint Bog	2004
140	Misty Lake	2003
141	San Juan River Estuary	2004
142	Woodley Range	2004
151	Ballingal Islets	2004

Appendix E: List of ERs by BC Parks Administrative Region Lacking an ER Warden (as of January 2021)

The only region with no ER volunteer warden vacancies is the **Thompson Okanagan Region**.

Table 28: ER Warden Vacancies in the Caribou Region (8 vacancies out of 9 ERs)

ER#	Name	Land Area (plus Marine Foreshore) in ha	Location	Purpose
35	Westwick Lake	27 (0)	S of Williams Lake	shoreline grassland community surrounding an interior Chilcotin lake
53	Narcosli Lake	1098 (0)	Btwn Coglistiko & Baezaeko rivers	waterfowl breeding grounds with well-developed aquatic communities
55	Cardiff Mtn	65 (0)	W of Taseko River	lava plateau, basalt columns and crater lake
64	Ilgachuz Range	2914 (0)	N of Anahim Lake	subalpine vegetation on the east side of the coast mountains
65	Chasm	195 (0)	N of Clinton	ponderosa pine community at its northern limit
70	Mt. Tinsdale	419 (0)	ESE of Barkerville	representative alpine and subalpine communities
82	Cinema Bog	68 (0)	NNE of Quesnel	lowland black spruce and sphagnum bog
101	Doc English Bluff	52 (0)	SE of Williams Lake	limestone cliffs, rare plants; colony of white throated swifts

Table 29: ER Warden Vacancies in the Kootenay Boundary Region (9 vacancies out of 11 ERs)

ER#	Name	Land Area (plus Marine Foreshore) in ha	Location	Purpose
19	Mt Sabine	7.9 (0)	N of Canal Flats	mixed conifer forest community with montane climate east of Rocky Mountain Trench
20	Columbia Lake	32 (0)	East side of Columbia Lake	flora associated with limestone soils

ER#	Name	Land Area (plus Marine Foreshore) in ha	Location	Purpose
30	Vance Creek	49 (0)	N of Lumby	Douglas-fir and Englemann spruce forests and riparian communities
31	Lew Creek	896 (0)	E of Upper Arrow Lake	represents elevational transect of the inland rain forest
32	Evans Lake	185 (0)	Valhalla Provincial Park	subalpine forest including a rare stand of yellow cedar
49	Kingfisher Creek	1495 (0)	Hunters Range, ESE of Sicamous	represents forest and subalpine communities of the Monashee Mountains
56	Goosegrass Creek	2185 (0)	W of Columbia Reach, Kinbasket Lake	a drainage basin with an elevational gradient representing inland rainforests
61	Upper Shuswap River	70 (0)	E of Mabel lake	Western red cedar community in the inland rainforest
104	Gilnockie Creek	58 (0)	E of Kingsgate	mature western larch, seral lodgepole pine, small wetland

Table 30: ER Warden Vacancies in the Northeast Region (9 vacancies out of 11 ERs)

ER#	Name	Land Area (plus Marine Foreshore) in ha	Location	Purpose
8	Clayhurst	316 (0)	S of Clayhurst	eroding bluffs with Peace River parklands
46	Sikanni Chief River	2401 (0)	Headwaters of Sikanni Chief River	Engelmann spruce at the northern edge of its range and subalpine lichens
47	Parker Lake	259 (0)	W of Fort Nelson	extensive bog habitat with pitcher plant (*Sarracenia purpurea*)
62	Ft Nelson River	148 (0)	N of Fort Nelson and Muskwa rivers	productive white spruce and alluvial black cottonwood stands
80	Smith River	1326 (0)	Near junction with Liard River	representative of boreal black and white spruce communities

ER#	Name	Land Area (plus Marine Foreshore) in ha	Location	Purpose
107	Chunamon Creek	344 (0)	NE of Germanson Landing	two small drainages; Engelmann and white spruce
147	Grayling River Hot Springs	1421 (0)	67 km NE of Muncho Lake	protects a nationally significant hot springs site and related natural values
148	Kotcho Lake	49 (0)	100 km ENE of Fort Nelson	fresh water nesting colony of Herring, Mew and Bonaparte Gulls unique in B.C.
149	Portage Brulé Rapids	724 (0)	110 km SE of Watson Lake	unique hot spring, river bank, and forest environments along the Liard River

Table 31: ER Warden Vacancies in the Omineca Region (7 vacancies out of 15 ERs)

ER#	Name	Land Area (plus Marine Foreshore) in ha	Location	Purpose
71	Blackwater Creek	243 (0)	NW of Mackenzie	boreal forest and portions of extensive lowland moor
85	Patsuk Creek	554 (0)	N of Mackenzie	paper birch and other seral forest communities
86	Bednesti Lake	139 (0)	W of Prince George	kettle lake wetland successional sequence
87	Heather Lake	2914 (0)	NW of Mackenzie	excellent example of an aspen stand
91	Raspberry Harbour	143 (0)	Willisten Lake NW of Finlay Forks	high quality lodgepole pine stand for the benefit of forest research
134	Ellis Island	.6 (6)	W of Vanderhoof on Fraser Lake	inland breeding colony of Herring and Ring-billed Gulls
152	Ospika Cones	1282 (0)	50 km ENE of the N end of Williston Lake	protects fragile cones built by calcium rich springs; wildlife mineral lick

Table 32: ER Warden Vacancies in the Skeena Region (15 vacancies out of 23 ERs; 3 transferred to other agencies)

ER#	Name	Land Area (ha)	Location	Purpose
23	Moore/McKenney/ Whitmore Islands	185 (21)	Eastern Hecate Strait	seabird colony of approximately 100,000 birds primarily Rhinoceros Auklet
25	Dewdney and Glide Islands	3326 (370)	Eastern Hecate Strait	seabird colony and extensive bog and fen ecosystems of outer coastal islands
38	Takla Lake	240 (0)	E of Hazelton	most northerly occurrence of Douglas-fir in the BC interior
57	Chicken's Neck Mountain	680 (0)	N of Dease Lake	climax stand of white spruce and subalpine fir
58	Blue/Dease Rivers	777 (0)	W of Lower Post	represents terrestrial and aquatic communities in a boreal forest
59	Ningunsaw River	2372 (0)	SE of Bob Quinn Lake	coastal western hemlock near its northern limit
63	Skeena River	91 (0)	Near mouth of Exchamsiks River	mature black cottonwood stands on an alluvial floodplain
68	Gladys Lake	44,098 (0)	Spatsizi Plateau Wilderness Provincial Park	the largest ER protecting alpine and subalpine habitat for Stone's sheep, mountain goat and caribou
93	Lepas Bay	3.6 (0)	Off NW corner of Graham Island, Haida Gwaii	seabird colony of predominantly Fork-tailed and Leach's Storm-Petrels
102	Charlie Cole Creek	162 (0)	S of Teslin Lake	unique cone-shaped cold-water mineral springs used by ungulates as salt licks
103	Byers/Conroy/ Harvey/Sinnett Islands	215 (11,708)	Hecate Strait, NW of Bella Bella	important sea bird and marine mammal breeding area
114	Williams Creek	700 (0)	SE of Terrace	representative coastal Western hemlock forest and outstanding terraced bogs
115	Gingietl Creek	2,873 (0)	Upstream of mouth of the Nass River	undisturbed watershed in coastal western hemlock forest
133	Gamble Creek	1,026 (0)	E of Prince Rupert	north coast forest bog complex, occurrence of Pacific silver fir near the northern limit

ER#	Name	Land Area (ha)	Location	Purpose
146	Catherine Creek	45 (0)	12 km SE of Hazelton	represents an old growth western red cedar forest in the Interior Cedar Hemlock moist cold subzone

Table 33: ER Warden Vacancies in the South Coast Region (1 vacancy out of 16 ERs; 1 transferred to another agency)

ER#	Name	Land Area (ha)	Location	Purpose
144	Yale Garry Oak Islands	11.65 (0)	E of Yale	protects the most easterly isolated Garry oak ecosystem

Table 34: ER Warden Vacancies in the West Coast Region (17 vacancies out of 47 ERs; 2 transferred to other agencies)

ER#	Name	Land Area (ha)	Location	Purpose
2	East Redonda Island	6212 (0)	N end of Georgia Strait, Northern Vancouver Island	represents elevational transect in the coastal forests of the Gulf Islands
11	Sartine Island	30 (1,061)	part of Scott Islands, Northern Vancouver Island	seabird colony supporting approximately 3/4 of a million sea birds
12	Beresford Islands	13 (412)	part of Scott Islands, Northern Vancouver Island	seabird colony supporting over 150,000 sea-birds and 6,000 sea lions
13	Anne Vallee (Triangle Island)	119 (861)	outermost of Scott Islands, Northern Vancouver Island	B.C.'s largest seabird and sea lion colony estimated to support one million birds
14	Solander Island	7.7 (0)	W of Brooks Peninsula, Southern Vancouver Island	seabird colony in excess of 100,000 birds primarily Cassin's Auklet
17	Canoe Islets	.6 (0)	Near S end of Valdes Island, Northern Vancouver Island	seabird colony originally established for cormorants and sea mammal haul out
18	Rose Islets	1 (0)	N of Reid Island, Southern Vancouver Island	originally established for a cormorant colony, still used by seabirds

ER#	Name	Land Area (ha)	Location	Purpose
40	Kingcome River/Atlatzi River	414 (0)	Near head of Kingcome Inlet, Northern Vancouver Island	rich alluvial valley bottom swamp community in coastal forest
67	Satellite Channel	0 (340)	N of Saanich Peninsula, Southern Vancouver Island	subtidal marine ecosystems
105	Megin River	50 (0)	NW of Tofino, Northern Vancouver Island	typical west coast alluvial and upland forest
118	Nimpkish River	19 (0)	N of Vernon Lake, Northern Vancouver Island	representative sample of Canada's tallest Douglas-fir
119	Tahsish River	56 (31)	S of Port McNeill, Northern Vancouver Island	pristine west coast estuary
120	Duke of Edinburgh (Pine/Storm/Tree Islets)	125 (535)	NW of Port Hardy, Northern Vancouver Island	seabird colony – largest in Queen Charlotte Strait
122	Tsitika Mountain	554 (0)	S of Port McNeill, Northern Vancouver Island	alpine communities, wet subalpine forest, unusual terraced fen and small lake
129	Klaskish River	92 (40)	SW of Port Alice, Northern Vancouver Island	estuary and alluvial forest in Coastal Western Hemlock Zone, native oysters
138	Klanawa River	90 (0)	20 km SE of Banfield, Southern Vancouver Island	Marbled Murrelets, as well as redwood sorrel and other rare plants
151	Ballingal Islets	.5 (0)	7 km NNE of Ganges, Saltspring Island, Southern Vancouver Island	established to protect sea bird nesting colonies; Glaucous-winged Gulls, Double-crested Cormorants and Pigeon Guillemots

Appendix F: Regional Variation in Management Issues in Ecological Reserves

Figure 4: Management Issues in BC Parks Management Planning Documents for Ecological Reserves in the Cariboo Region

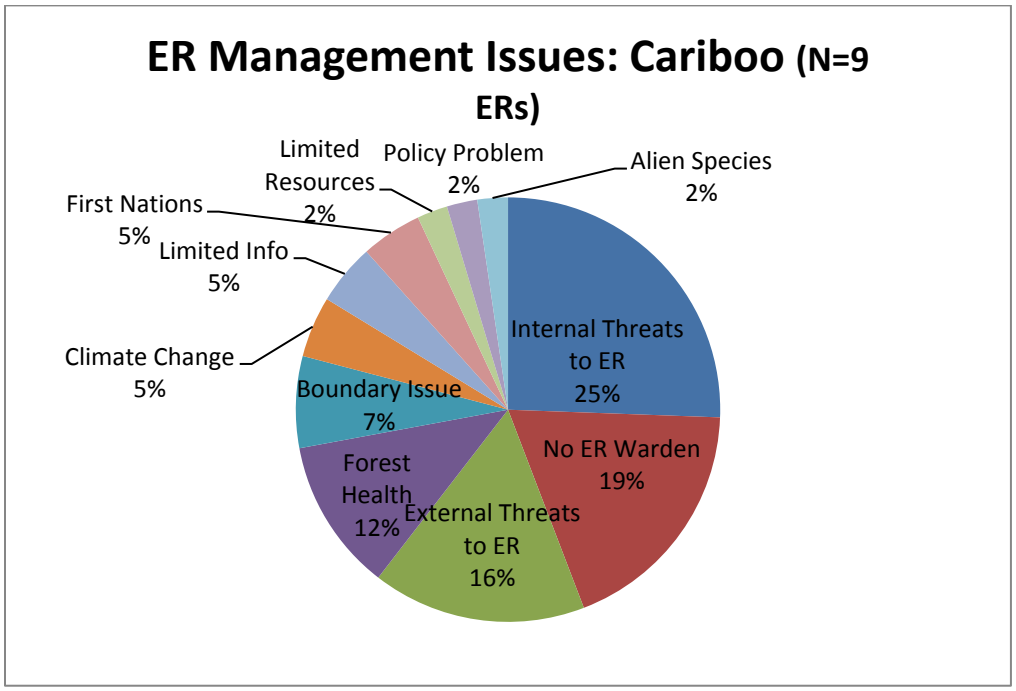


Figure 5: Management Issues in BC Parks Management Planning Documents for Ecological Reserves in the Kootenay Boundary Region

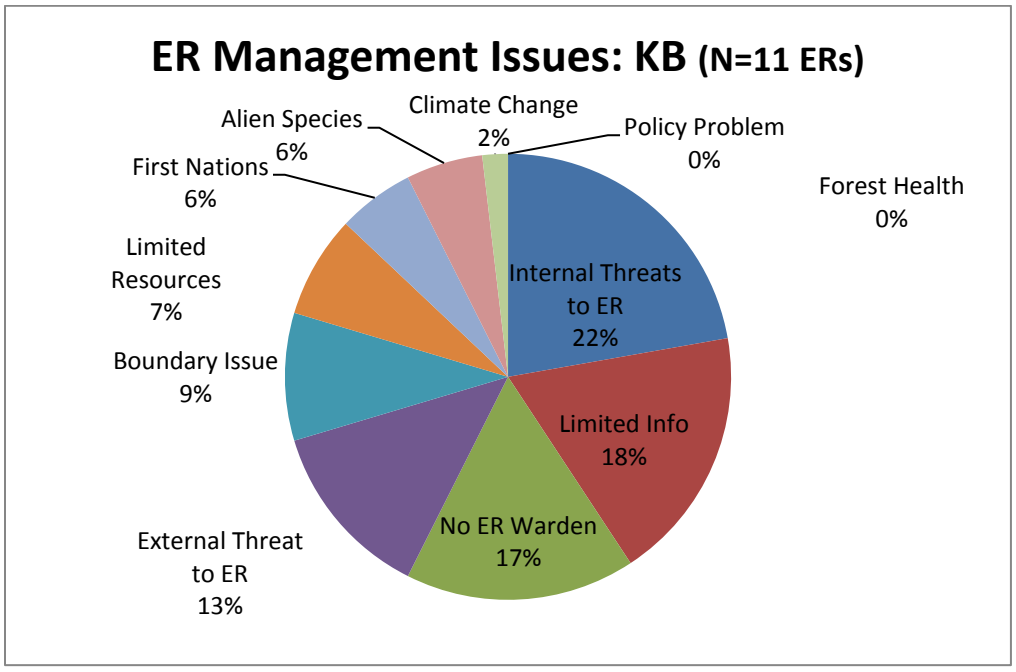


Figure 6: Management Issues in BC Parks Management Planning Documents for Ecological Reserves in the Northeast Region

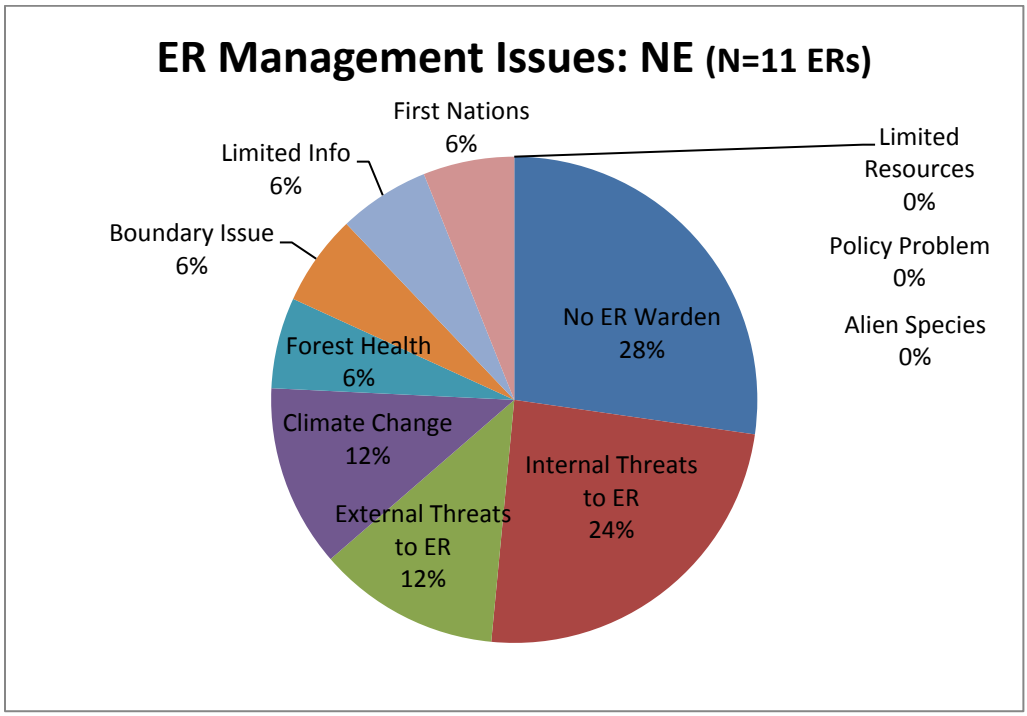


Figure 7: Management Issues in BC Parks Management Planning Documents for Ecological Reserves in the Omineca Region

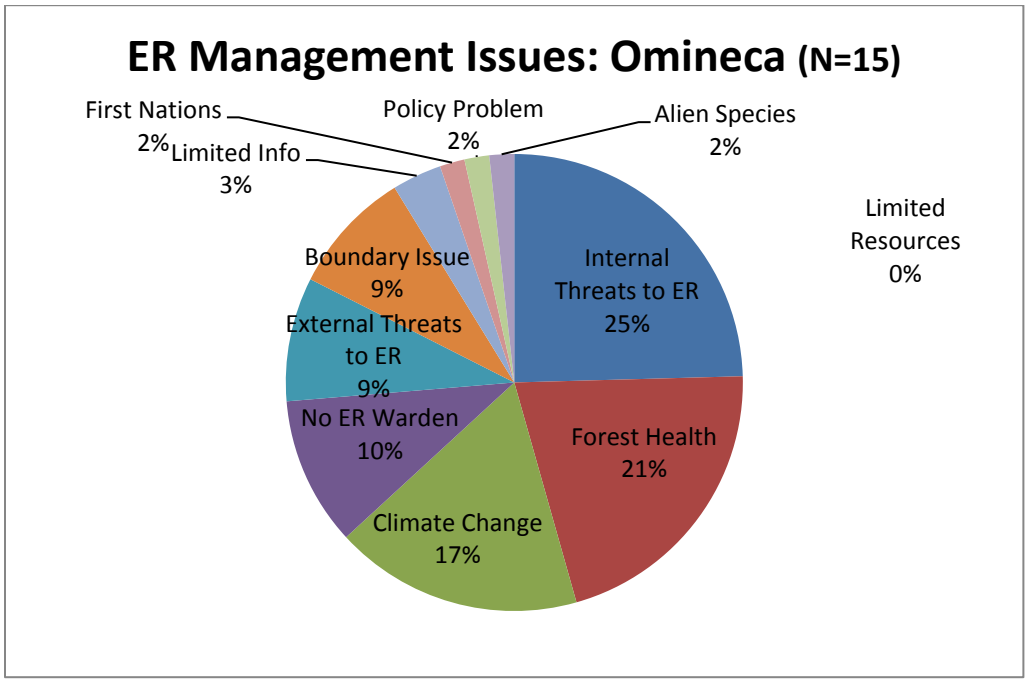


Figure 8: Management Issues in BC Parks Management Planning Documents for Ecological Reserves in the Skeena Region

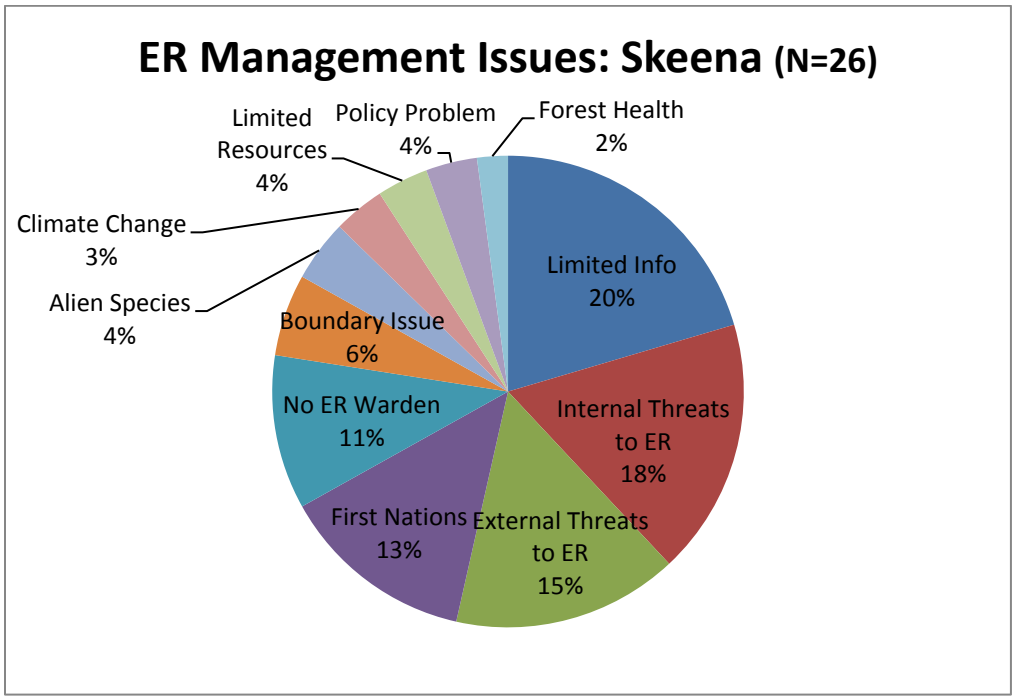


Figure 9: Management Issues in BC Parks Management Planning Documents for Ecological Reserves in the Thompson Okanagan Region

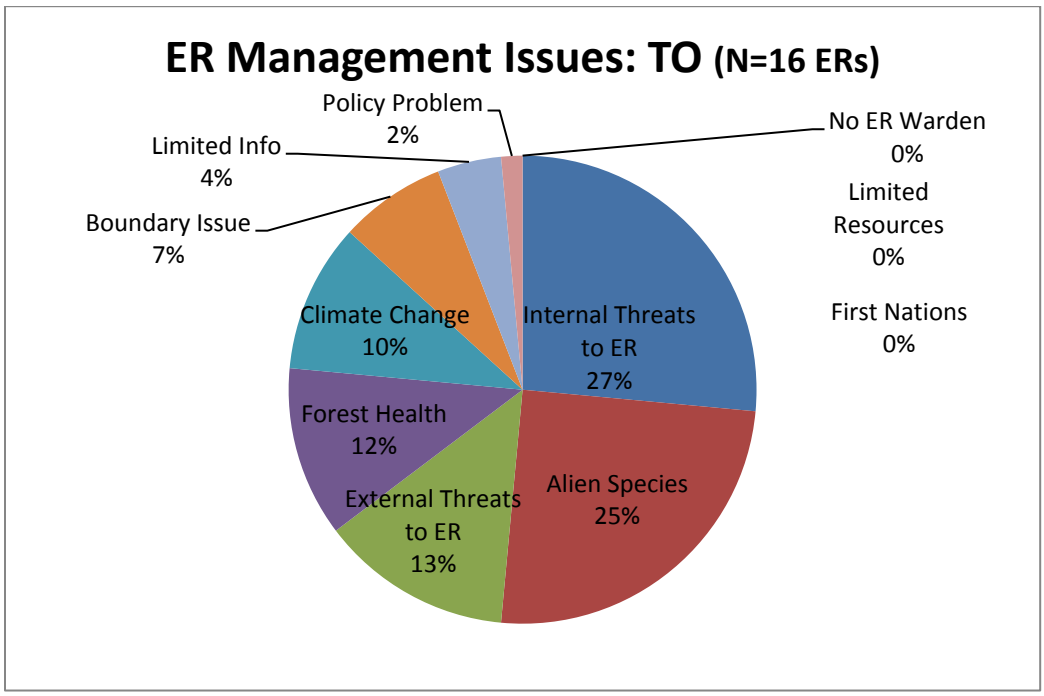


Figure 10: Management Issues in BC Parks Management Planning Documents for Ecological Reserves in the South Coast Region

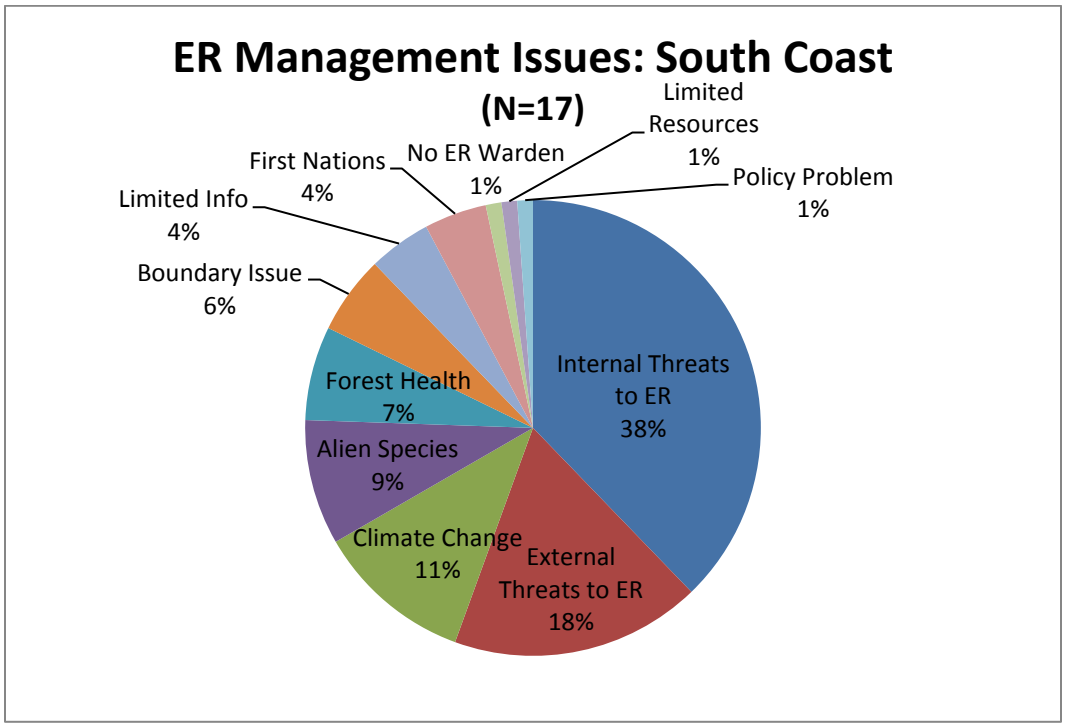
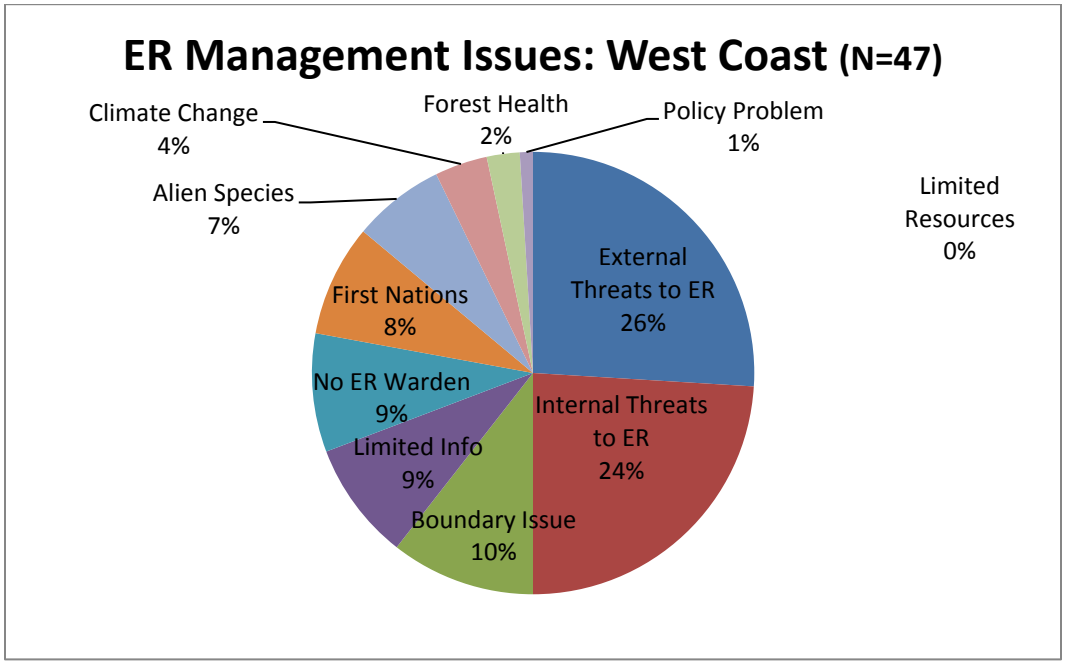


Figure 11: Management Issues in BC Parks Management Planning Documents for Ecological Reserves in the West Coast Region



Appendix G: Coastal Marine Ecological Reserves with Marine Shoreline Under Threat from Tanker Traffic associated with the TransMountain Pipeline

Table 35: Marine Ecological Reserves near the Proposed Tanker Route from Vancouver Past Southern Vancouver Island

ER #	Reserve Name	Main Purpose	Land Area (plus Marine Foreshore) in ha	Year Esta-blished
1	Cleland Island	protects breeding populations of over eleven species of seabirds and 1.8 km of marine shoreline	7.7 (0)	1971
4	Lasqueti Island	protects vegetation and fauna characteristic of the dry subzone of the Coastal Douglas-fir Zone and 2.5 km of marine shoreline	201 (0)	1971
16	Mount Tuam	protects an Arbutus, Douglas-fir community and 1.3 km of marine shoreline	362 (0)	1971
17	Canoe Islets	protects nesting double-crested cormorants and gulls and 2.5 km of marine shoreline	0.6 (0)	1971
18	Rose Islets	protects nesting seabirds and 1.5 km of marine shoreline	1 (0)	1971
24	Baeria Rocks	protects nesting seabirds, rich intertidal and subtidal communities and 1.2 km of marine shoreline	2 (138)	1971
28	Ambrose Lake	protects coastal western hemlock forests and a coastal bog/lake complex and 2 km of marine shoreline	228 (0)	1971
37	Mount Maxwell	Protects a large Garry oak stand in the Gulf Islands and 3.5 km of marine shoreline	390	1972
66	Ten Mile Point	provides an undisturbed, intertidal and subtidal study area accessible by car in the Greater Victoria area and 1 km of marine shoreline	1 (14)	1975
67	Satellite Channel	conserves rich benthic communities typical of fine grained, level bottom environments in the southern Gulf of Georgia	0 (340)	1975
94	Oak Bay Islands	protects vulnerable nesting seabirds and meadow communities, with rare spring wildflowers, and has representative shallow-water marine habitats and 5.3 km of marine shoreline	11 (221)	1979
97	Race Rocks	protects intertidal and subtidal communities, and islands that are extremely rich in biodiversity as a result of strong tidal currents; has 4 km of marine shoreline	2 (225)	1980

ER #	Reserve Name	Main Purpose	Land Area (plus Marine Foreshore) in ha	Year Esta-blished
105	Megin River	protects typical west coast alluvial and upland forest and 4 km of marine shoreline	50 (0)	1981
132	Trial Islands	protects the most outstanding known assemblage of rare and endangered plant species in B.C.; has 1.8 km of marine shoreline	23 (0)	1991
137	Hudson Rocks	protects a nationally significant breeding population of pelagic cormorants (no longer present) and 1.5 km of marine shoreline	2 (48)	1996
141	San Juan River Estuary	conserves a representative sample of the lower alluvial forest communities on the San Juan River flood plain; protects Tooth-leaved monkey flower, a rare plant known from nowhere else in Canada; has 2.5 km of marine shoreline	185 (16)	1996
151	Ballingall Islets	protects nesting colonies of glaucous-winged gulls, double-crested cormorants and pigeon guillemots and 1.3 km of marine shoreline	0.5 (0)	2001
153	Francis Point	represents biogeoclimatic variants (CWH xm1), sensitive mosses and lichens on the shallow-soiled coastal bluffs and 4 km of marine shoreline	9 (0)	2004
121	Brackman Island (trans-ferred to GINPR)	protects ungrazed Gulf Island vegetation, includes marine buffer and 1.3 km of marine shoreline	5 (25)	1989-2004