

# A Case History of Community-Based Involvement in the Management of a Species at Risk: Wintering Bald Eagles in the Squamish Valley

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## ABSTRACT

This paper discusses the results of a research project that examined the wintering bald eagle (*Haliaeetus leucocephalus*) population in the Squamish Valley, British Columbia. It also examines the way in which the community incorporated and modified the recommendations of the research project to suit its needs. The Squamish Valley has long been known as a major wintering ground for bald eagles in North America. The many eagles that come to the valley each winter have attracted attention from all across North America and the world. In recent years there was a groundswell of concern regarding the health of the wintering population as records from midwinter counts suggested a downward trend in eagle numbers. Spurred by this concern, the Nature Conservancy of Canada initiated a research project, later funded by Forest Renewal BC, that explored the distribution and seasonal changes in eagle numbers in the valley over 3 winters. The results demonstrated seasonal shifts in eagle numbers, identified numerous areas of eagle concentration in the valley, identified potential threats to the winter population, and suggested actions to curtail these threats. The citizens of Squamish and Brackendale, with the help of the Nature Conservancy of Canada, adopted many of the recommendations from the research project. These community-based initiatives have attempted to incorporate bald eagle wintering habitat needs with present and future commercial and noncommercial activities.

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**Key words:** bald eagles, community, *Haliaeetus leucocephalus*, Squamish, volunteer.

During October and November each year the freezing of interior waterways (lakes and rivers) drives many bald eagles from their summer habitat to areas with open water and a readily available source of food. Areas in southwestern British Columbia that provide these conditions have long been recognized as major bald eagle wintering habitat (Stalmaster 1987). Of the wintering areas in this region, the Squamish River valley has been known to support the largest documented concentration of eagles (Farr and Dunbar 1988). In the case of the Squamish Valley, this phenomenon is occurring in a region that has, and is undergoing, significant human-induced changes.

The many eagles that come to the valley each winter have attracted attention from all across the world. In recent years, as midwinter counts have suggested a downward trend in eagle numbers, a groundswell of concern arose regarding the health of the wintering population. This concern and others spurred the Nature Conservancy of Canada (NCC) to initiate

a research project, later funded by Forest Renewal BC (FRBC), that explored the distribution and seasonal changes in eagle numbers in the valley. A secondary, and unanticipated, component of this project examined the potential impact and mitigation of eco-tourism on the winter eagle population.

## STUDY AREA

The study was conducted approximately 70 km northwest of Vancouver, B.C. (Fig. 1) and includes three main rivers: Squamish, Cheakamus, and Mamquam. Lowland valley bottoms near the Municipality of Squamish are a combination of private, provincial Crown land, and First Nations reserve lands. Private land and First Nation lands also extend up the Squamish and Cheakamus River valleys. A large portion of the upper Squamish River lies within Tree Farm Licence 36. Forests in both lowland valley bottoms and upland slopes throughout the study area have been harvested considerably. In addition, much of the lowland valley bottom habitat near the communities of Squamish and Brackendale has been converted to residential and commercial uses. An extensive

dike system to control flooding is also maintained along all three major rivers within the Municipality of Squamish. Coho (*Oncorhynchus kisutch*), chum (*O. keta*), pink (*O. gorbuscha*), chinook (*O. tshawytscha*), and sockeye salmon (*O. nerka*) spawn within the bounds of the study area. Several salmon-bearing streams in this system have, and are undergoing, extensive rehabilitation through the Watershed Restoration Program of FRBC. Two hatcheries produce both chum and coho salmon on the Cheakamus River.

## METHODS

### DAYTIME EAGLE CENSUSES

Bald eagles were surveyed along 76 km of river in the study area: 61 km along the Squamish River, 11 km along the Cheakamus River, and 4 km along the Mamquam River.

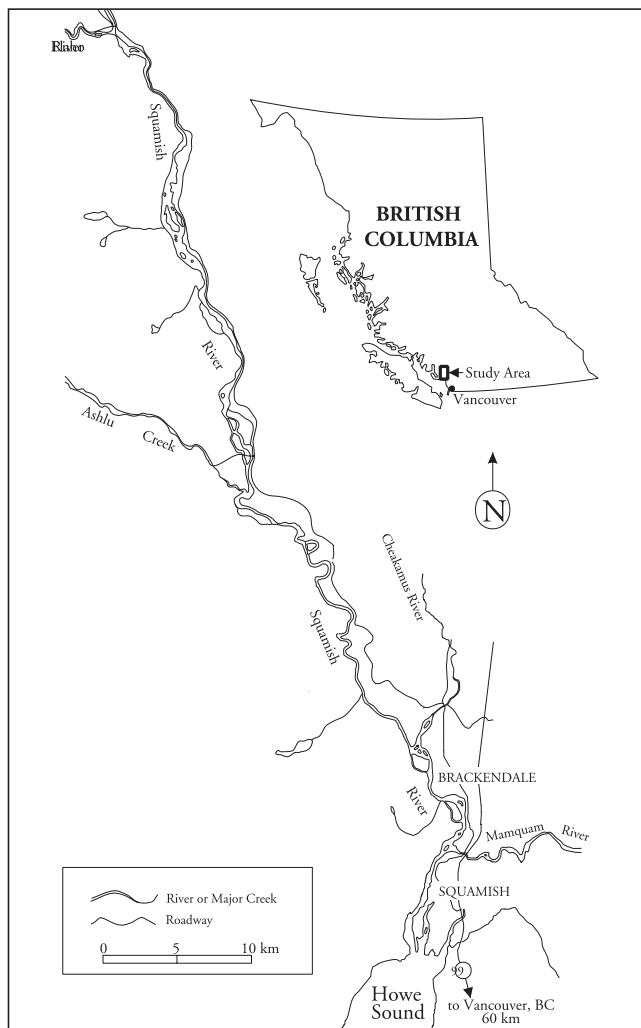


Figure 1. Location of Squamish Valley wintering bald eagle study.

Surveys were conducted on foot and from helicopter, canoe, and commercially guided river rafts. During each census the number and location of eagles relative to the main channel of the river were recorded on data sheets consisting of maps traced from recent aerial photographs.

To examine the change in eagle distribution within years, we divided the rivers surveyed into kilometre sections. We then summed the number of eagles that occurred within each kilometre section in each survey week. Eagle numbers occurring in each kilometre section were plotted within 7 eagle density classes (number of eagles/km): 1–10, 11–25, 26–50, 51–100, 101–200, 201–400, >400 for the entire study area.

## RESULTS

### POPULATION DYNAMICS

Bald eagles wintered in the Squamish Valley from mid-November to mid-February. Eagle counts ranged from 363 to 2,575 in 1996–97 and from 518 to 3,976 in 1996–97. Eagle numbers were typically low early in the survey season, peaked in mid-December, and then declined towards the end of the survey season (Fig. 2). Our peak counts of eagles in both 1995–96 and 1996–97 far exceed wintering eagle populations in the lower 48 U.S. states (Stalmaster et al. 1979, Lingle and Krapu 1986, Isaacs and Anthony 1987, Isaacs et al. 1996, Stalmaster and Kaiser 1997) and all other known areas in southwestern British Columbia (Farr and Dunbar 1987). These numbers indicate that the Squamish Valley represents an extremely important bald eagle wintering area in the southwestern region of British Columbia and the U.S. Pacific Northwest.

### EAGLE DISTRIBUTION PATTERNS

Eagle distribution throughout the valley showed consistent patterns between years (Fig. 2). Early aggregations of eagles occurred at the confluence of the Squamish and Cheakamus rivers, and the Mamquam and Squamish rivers in both winters. As winter progressed, eagle numbers increased near the confluence of the Squamish and Cheakamus rivers in both years. Congregations of eagles were also noted at the confluence of the Squamish River and Ashlu Creek and areas along the upper-Squamish particularly at the mouth of Shovelnose Creek. During the peak survey period (Survey #3 in both years) eagles reached extremely high densities along a 10-km stretch near the confluence of the Squamish and Cheakamus rivers. Other areas of eagle concentration were near the Ashlu Creek/Squamish River confluence, as well as the confluence of the Mamquam and Squamish rivers. A relatively long section of the Squamish River (between the confluence with Ashlu Creek and the Cheakamus River) rarely supported significant numbers of eagles.

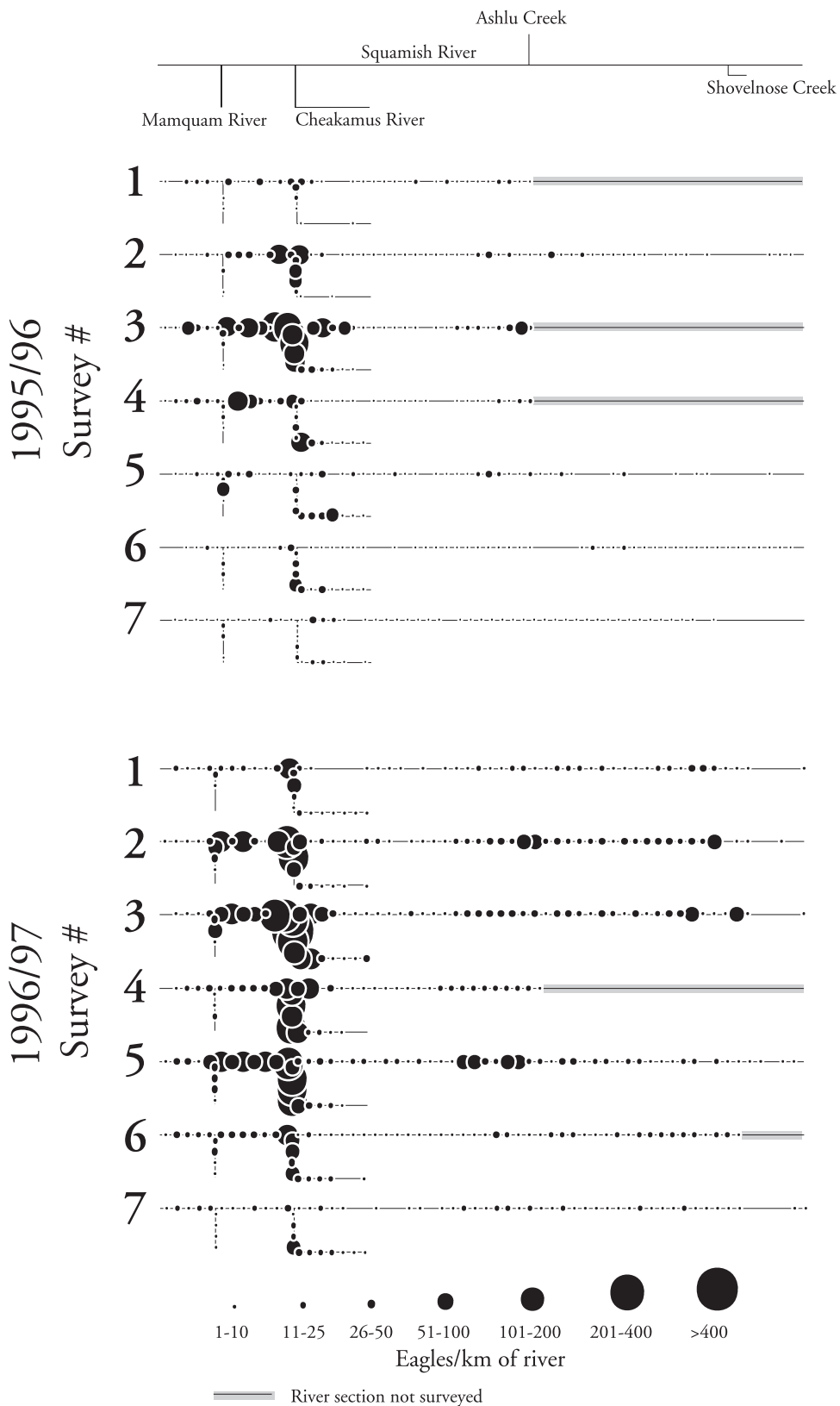


Figure 2. Number of bald eagles counted during each survey week in the Squamish Valley during the winters of 1995/96 and 1996/97.

#### EFFECTS OF DISTURBANCE FROM THE EAGLE-VIEWING PUBLIC

During our field research we encountered numerous disturbance events in which a significant number of feeding and perching eagles flushed in response to human activity. We also noted distinct differences in the distribution of eagles in response to human disturbance. During periods of high human disturbance (usually some weekends), eagles often avoided areas that supported numerous eagles during times of low human disturbance (generally weekdays). We documented disturbance from commercial river rafting, kayaking, and walking tours; individuals or groups watching the eagles by car and by foot; anglers; and local residents jogging or walking both with and without dogs. Of concern was that these events often occurred in areas of high eagle activity, particularly feeding areas (gravel bars). Human access to gravel bars and riverside deciduous perching habitat is possible by the network of dikes along the Squamish and Mamquam rivers, and along a stretch of railway track along the Cheakamus River.

### DISCUSSION

#### EAGLE POPULATION

Results from our study clearly showed that extremely large congregations of bald eagles were centred around a relatively small stretch of river. This is due largely to the extensive network of gravel bars along a 10-km stretch of river near the confluence of the Squamish and Cheakamus rivers. This network of gravel bars represents focal points for the deposition of salmon carcasses from wild runs and the numerous enhancement activities along the Cheakamus River. A similar situation exists near the mouth of the Mamquam River where it meets the Squamish River. The gravel bars at the mouth of the Mamquam River, and those farther downstream along the Squamish River, receive salmon carcasses that are washed down from several small side channels and salmon enhancement areas along the Mamquam River. Areas of eagle congregation in the upper Squamish River are associated with side channels and areas with extensive salmonid enhancement activities.

#### HUMAN DISTURBANCE

Our study suggested that a visitor management program should be instituted to mitigate the disturbance that the eagle-viewing public was having on the wintering bald eagle population. We believed that it was necessary to initiate such a program due to the evidence collected in other wintering areas showing that wildlife viewing, as well as other human activities, can negatively affect wintering bald eagles (Stalmaster and Newman 1978, Skagen 1980, Stalmaster et al. 1991). In some areas of the western United States where human disturbance has been deemed excessive, the timing and extent of human traffic in eagle wintering areas have been restricted.

From our observations, and research elsewhere, we developed a management plan to reduce or mitigate the amount of human disturbance in the area. We identified 4 points of action:

- identifying foot and vehicle access points that need eagle-viewing information signs;
- identifying areas that could benefit from eagle-viewing platforms or kiosks;
- developing one or more types of eagle interpretative signs (i.e., “do not enter” signs and “view with care” signs); and
- considering a volunteer bald eagle warden program whereby local residents patrol high eagle use areas and provide information on eagle biology and viewing ethics.

#### RESPONSE TO RESEARCH RECOMMENDATIONS

##### *Eagle Watch Volunteer Interpretative Program (EW)*

In response to our recommendations, the NCC approached some members of the communities of Squamish and Brackendale, particularly the Squamish Estuary Conservation Society (SECS), to determine if sufficient interest existed within the community to initiate a volunteer interpreter program. In the winter of 1995–96, the Eagle Watch Volunteer Interpreter Program (EW) was established to educate the viewer about eagle biology and viewing ethics; inform visitors about community services; monitor the number of eagle viewers; and provide information about the proposed Eagle Reserve (Porter 1996). Starting in 1996, EW positioned volunteer interpreters from 0900 to 1500 hours during the weekends of January and February near one of the best and least disruptive sites for viewing eagles in the Squamish Valley. Since then, EW has started in mid-December and has run to mid-February.

As EW has grown, so have the materials that it has used as instructional aids. In the first year, EW interpreters used portable educational signs in their interpretative duties. Since then a permanent structure has been built that houses educational materials regarding eagle biology as well as shelters for interpreters and the eagle-viewing public. Additional signs have also been constructed that outline the relationship of the Squamish Nation to bald eagles and other aspects of the natural history of the region. All of the interpretative signs and the shelter were designed in the community.

##### *Make-Up of EW Participants and EW Accomplishments*

The EW program is made up of volunteers from the local community. EW also includes 1 or 2 paid coordinator(s) annually. Initially most of the volunteers were members of the SECS. Since the first year, volunteers have come from both the SECS and the general public. Volunteer participation has increased significantly since the inception of the program (29 volunteers in year 1, 40 volunteers in year 3). The rate of return has also been a high—in fact almost 100% of the volunteers in year 3 returned to volunteer in year 4. This increase in public participation, largely due to an aggressive

recruitment drive by EW coordinators, has included numerous incentives from locally based businesses (e.g., discounts at local businesses, complimentary rafting trips). In addition, EW coordinators have used innovative approaches to attract volunteers. During one winter season volunteers came to the EW via a youth program that allowed students to work in the community (EW) in exchange for financial credits toward post-secondary education.

For the 3 years that data are available, EW interpreters have directly contacted over 8,500 eagle viewers. The Squamish Nation has also acknowledged the role that EW has played in directing excessive eagle-viewing traffic away from one of their more populated reserves.

#### **PROJECT SUPPORT: POLITICAL AND FINANCIAL**

##### *Nature Conservancy of Canada*

The NCC has played a pivotal role in the formation and persistence of the EW program. It has provided direct financial support and augmented financial input to the EW program via fundraising both within and outside the community. Major accomplishments by the NCC include constructing the eagle-viewing shelter and its associated interpretative materials, negotiating the transfer of the shelter to the District of Squamish (DoS), and making direct financial contributions to the day-to-day operations of EW. The NCC has also commissioned additional eagle interpretative signs for specific locations within the Squamish Valley. While the NCC has contributed immensely to the EW program, it has always believed that the community should retain ownership and control of the project.

##### *Squamish Nation*

Individuals from the Squamish Nation have not directly participated in the EW interpretative program. The Squamish Nation has, however, participated in EW in different and important ways. Carvers from the Squamish Nation joined with students from Howe Sound Secondary School to produce carvings later used in the EW shelter. In addition, members of the Squamish Nation have contributed interpretative information for signs that depict First Nations' relationship with eagles. Individuals from the Squamish Nation, including elders, have also addressed training sessions for interpreters to pass on the knowledge and wisdom of the relationship between the eagles and the Squamish Nation to coordinators and volunteers. Blessing ceremonies have also been conducted for the EW shelter and its carvings. Recently, the Squamish Nation has been involved in a literacy project that incorporates components of the EW program. An educational book and CD-ROM are a planned part of this endeavour.

##### *Provincial Government*

Neither the Ministry of Environment, Lands and Parks, nor the Ministry of Forests has directly participated in the EW program.

In contrast, the U.S. Forest Service in Washington State provides a direct financial contribution, as well as support staff in a cooperative program with the North Cascade Institute in a similar interpretative program on the Skagit River.

##### *Municipal Government*

The DoS has provided logistical and in-kind support to EW. It has facilitated the provision of parking near a permanent visitor shelter and issued permits for construction of the EW shelter. The DoS has also accepted responsibility for the maintenance of the shelter, constructed an on-site toilet, and provided secretarial support for EW report writing. The DoS has not made direct financial contributions to EW. The lack of direct financial support is due to several reasons: the community is experiencing financial difficulties; district council does not believe that EW attracts significant business to the local area during the winter season; and council has not been satisfied that EW has the support of the entire community. The result is that the DoS does not believe that EW merits financial support from the local government. The local chamber of commerce (COC) has voiced a similar sentiment. As a result, the DoS and the COC have indicated that future financial contributions or assistance in long-term planning will not be forthcoming.

##### *Local Businesses*

Little direct financial support for EW has come from the small business community. Rather, some of the local businesses in the Squamish area have contributed to the EW program by providing in-kind support (e.g., river raft trips and discounts at local shops for EW volunteers, production of promotional material). The lack of direct support may be due to an economic downturn in the area; competition for a limited pool of charitable dollars (e.g., local businesses have a large demand placed upon them by various community groups); and the perception that EW does not have broad community support.

##### *Corporate Support*

EW coordinators have secured financial contributions from several large corporations or businesses. With one exception, funding has been a one-time donation. At present no one business has made a long-term commitment to the EW program.

#### **LONG-TERM OUTLOOK FOR EW**

The continued existence of the EW program in its present form is uncertain. Much of the financial support for EW has come from NCC. This financial support has always been viewed as temporary and has now ended. As a result, financial solvency of the program will become the full responsibility of the community. Efforts for more community assistance with program operations have been somewhat successful. Some businesses view the program as an independent organization. As a result, it has not garnered broad support from

the local business community. In addition, the program has not secured long-term financial commitment from any one, or group of, corporations. Furthermore, the responsibility for the continued existence of this program appears to rest in the hands of a few individuals within the community.

The long-term survival of EW will hinge on a variety of circumstances. It has been made relatively clear that EW will not gain additional support from the business community if it remains as a stand alone program that functions as an independent organization. To achieve the support of the community as a whole, EW must embrace the community more closely. One option is to incorporate the EW program with other programs that presently exist within the community. Plans to develop a winter festival that highlights more than just eagles have been discussed.

The EW program can increase local government and business support by demonstrating that tangible economic benefits are derived from the services that EW provides for the community in general. The EW program has taken steps this year to address this concern. EW volunteers have administered questionnaires designed to document the spending habits of the eagle-viewing public.

Long-term financial support may come from larger corporations. However, outside corporate support may be less desirable from a community perspective. Community ownership of the program could be diminished if financial support is derived from outside sources.

The EW program represents an ambitious project that has attempted to bring together a wide variety of community members for a common purpose. The project has struggled financially since its inception, but has achieved considerable success. Its enthusiastic volunteers have had contact with thousands of eagle watchers; it has demonstrated tangible results, especially in reducing eagle-viewing traffic within Squamish Nation reserve lands; it has incorporated First Nations participation; and it has partial local government and business support, and some financial support from larger corporations. EW, despite its problems, represents an important project that has implications for other similar programs.

## CONCLUSION

### LESSONS FROM EW APPLICABLE TO OTHER COMMUNITY-BASED PROJECTS

- Long-term funding is a priority and funding can be difficult. Partnerships with non-governmental organizations, such as the NCC, have been valuable in providing seed money and expertise that may not be present in every community.
- A program such as this needs widespread community support (local government, chamber of commerce, local businesses). From this support, funding from within the community has a greater chance of success.
- For a program to have widespread support within the community, it may need to be associated with other events in the community. One challenge will be to maintain an

independent identity for the program should it become associated with other events.

- Support for such a program may also have to demonstrate a clear economic benefit to the community.
- Corporate funding may be welcome but concerns about community ownership being usurped should be considered.
- Alternative approaches to raising funds should be considered (e.g., approaching foundations, considering endowments).
- Volunteers are essential and must remain happy and willing to return. Ensure that volunteers are not overworked, and that their work is appreciated.

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