



PROJECT REPORT

# Conservation Biology Funding Priorities in the Upper Skagit Watershed

## Final report to the Skagit Environmental Endowment Commission

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# 1. INTRODUCTION

In 1984, an agreement reached between the province of British Columbia and Seattle City Light led to the establishment of an international fund called the Skagit Environmental Endowment Fund. Administered by the Skagit Environmental Endowment Commission (SEEC), the fund has provided approximately \$300,000 US for environmental and recreational projects in the north Skagit watershed for 20 years. The Commission cooperates with, but is independent from, the agencies and ministries responsible for managing the lands and natural resources in the upper Skagit watershed.

SEEC has suspended its granting cycle for 2004-05 to develop a strategic plan for administering the fund in the coming years. The intent of this strategic planning exercise is to further focus SEEC's vision and associated goals to ensure that projects funded contribute to a desired outcome and to allow SEEC to determine how well they are meeting their vision and associated goals. The current vision, mission and goals for SEEC may be found at [http://www.cityofseattle.net/light/environment/SEEC/ev5\\_Sfgl.htm](http://www.cityofseattle.net/light/environment/SEEC/ev5_Sfgl.htm).

The first step in the process of developing a new strategic plan for SEEC was to do some summarizing and exploratory work on what has been funded and what could be funded in the future by the Commission. Since much of the funding has been focused on environmental research and inventory work in the upper Skagit, the Commission felt it would be useful to summarize the projects funded over the past 20 years, and get some expert advice to determine conservation biology funding priorities within the Upper Skagit watershed. The intent was to have this information summarized in time for a strategic planning exercise scheduled for summer 2005. This document summarizes the information obtained through exploratory work conducted by David Huggard, Pat Robinson, and John Richardson, from the University of British Columbia, in collaboration with Susan Leech from FORREX, to determine funding priorities in the area of conservation biology.

# 2. PROCESS TO DETERMINE FUNDING PRIORITIES IN CONSERVATION BIOLOGY

SEEC asked the successful proponent to summarize information and provide recommendations to address the following questions:

- What influences and trends could affect biodiversity within the upper Skagit watershed in the next ten years?
- What important researchable aspects of biodiversity and conservation biology have not been adequately covered in the upper Skagit Watershed?
- What biodiversity and conservation biology needs and priorities currently exist as viewed from the perspective of the land and resource management agencies involved in the management of the Upper Skagit watershed and also from the perspectives of concerned NGOs?

- What role can and should SEEC play in the future of biodiversity and conservation biology within the watershed?
- How might SEEC prioritize future study needs in the area of biodiversity and conservation biology while balancing the recreational and cultural needs required of the watershed?

As a first step, UBC faculty and staff summarized conservation biology research that has been funded since the inception of SEEC in 1984. This information is summarized both in an Endnote bibliography and a report (Huggard et al. 2005). The authors of the report recommended:

- improving access to results of SEEC projects by making reports available at two central offices and electronically,
- archiving data and meta-data,
- encouraging scientific peer review of research projects, and
- requiring cumulative progress reports for multi-year projects.

Preliminary suggestions for focusing the overall conservation program supported by SEEC included:

- baseline studies for long-term environmental monitoring,
- landscape-scale comparisons of managed versus protected areas,
- compilation of effects of the Ross Dam,
- multidisciplinary projects on specific management issues, and
- a coordinating and synthesizing role for projects in the several adjacent jurisdictions.

Following this report, the next step was to obtain input from managers and experts working in the Upper Skagit watershed on funding priorities in the area of conservation biology. To get this input, SEEC decided to hold three workshops covering one of three topics: monitoring, inventory and research. The intent was to obtain clear input from managers regarding how SEEC could complement their efforts in these areas, and to obtain input from experts detailing specific areas towards which SEEC could direct funding.

### **3. RESULTS FROM MONITORING WORKSHOP**

A workshop on ecological monitoring in the Upper Skagit watershed was held March 23<sup>rd</sup> 2005 at the University of British Columbia in Vancouver, B.C. The goal of this workshop was: to develop a series of questions linking criteria associated with biological integrity<sup>1</sup> to natural and anthropogenic stressors within the watershed, to guide ecological monitoring efforts. The final agenda and minutes for this workshop are attached in Appendix 2.

This section of the report summarizes information obtained from workshop participants on how SEEC may want to focus their efforts on ecological monitoring in the Upper Skagit watershed. We provide a summary of the key points made by participants, outline the goal and

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<sup>1</sup> Note: biological integrity was initially chosen because it matched SEEC's wording of the goal associated with conservation biology. However, workshop participants agreed that the monitoring program should address *ecological* integrity, so throughout the remainder of this document, the term ecological integrity is used.

purposes for ecological monitoring in the watershed as defined by workshop participants, provide a summary of our discussions on stressors/threats on the watershed, and discuss some of the challenges encountered during this process. The information summarized here is provided in more detail in the workshop minutes (Appendix 1).

### **3.1 Background Information and Workshop Design**

On a global scale, numerous agencies have focused efforts on developing ecological monitoring plans over the past several years. For example, the National Park Service in the US has embarked on an ambitious long-term monitoring program called the Vital Signs Program. In the Pacific Northwest, eight parks (including North Cascades National Park, which encompasses part of the Skagit Watershed) are organized into the North Coast and Cascades Network. This network has recently completed their monitoring plan (Weber & Woodward 2004), using guidelines and resources available through the National Parks Service Inventory and Monitoring website (<http://science.nature.nps.gov/im/index.htm>).

In Canada, national monitoring efforts are being led by the Ecological Monitoring and Assessment Network (EMAN; <http://www.eman-rese.ca/eman/>). Monitoring for ecological integrity is also a key role played by Canada's National Parks (e.g., see the Parks Canada Progress Report on Implementation of the Recommendations of the Panel on the Ecological Integrity of Canada's National Parks [http://www.pc.gc.ca/docs/pn-np/ie-ei/prior/index\\_e.asp](http://www.pc.gc.ca/docs/pn-np/ie-ei/prior/index_e.asp)) and is increasingly being used by provincial parks in British Columbia and elsewhere in Canada.

The SEEC monitoring workshop was designed to draw on the experiences of these and other organizations, to avoid some of the pitfalls that are often made in designing monitoring programs. In particular, the importance of outlining clear goals and objectives or questions which may be answered through ecological monitoring has been highlighted in several documents (e.g., see Atkinson et al. 2001). We thus designed the workshop to ensure that the goals and objectives of the monitoring program would be clearly defined to allow SEEC to build on the information gathered in this workshop. The workshop brought together representatives from management agencies (e.g. North Cascades National Park on the US side, and Manning Park on the Canadian side), scientists and members of SEEC to:

- Obtain input/agreement on SEEC's role in funding ecological monitoring
- Define goal(s) for monitoring in the Upper Skagit Watershed
- Identify key stressors linked to ecological integrity in the Upper Skagit Watershed
- Define a series of questions or objectives which may be addressed through monitoring funded by SEEC

Several background documents were provided to workshop participants, including: a document outlining a potential goal and objectives for monitoring funded through SEEC, a list of potential stressors (both natural and anthropogenic) operating on various scales within the watershed, a list of definitions, and a conceptual diagram showing the interrelationship between monitoring, inventory and research in the Upper Skagit Watershed (Appendix 2). Numerous other resources were also available for workshop participants to use throughout the course of the day.

In addition, three presentations at the beginning of the day provided context to workshop participants. Pete Caverhill (SEEC Canadian Commissioner) was asked to provide a short

presentation describing background information on SEEC, including its vision, mission, as well as goals and objectives associated with the conservation biology funding program, an overview of the Upper Skagit watershed, and an overview of the management activities/agencies working in this area. Dr. John Richardson (UBC Associate Professor Forest Sciences) was asked to summarize the findings of their background report on research funded by SEEC since 1984 (Huggard et al. 2004). Finally, Dr. John Innes (UBC Professor Forest Resources Management) was asked to provide an overview of how to design an ecological monitoring program for biodiversity (presentation attached in Appendix 3).

An ecological monitoring program cannot be designed in one day. If SEEC and workshop participants endorsed the idea of SEEC funding ecological monitoring in the Upper Skagit watershed, it was likely that subsequent workshops would be required in the future to develop a list of indicators, linked to specific management activities or key stressors, which could be used to monitor the state of ecological integrity in the watershed. However, it was hoped that the time spent defining a clear goal for ecological monitoring in the Upper Skagit watershed could be used to frame discussions in the two subsequent workshops planned to address inventory and research funding priorities.

### **3.2 Workshop Results**

A number of important results were articulated by participants at the March 23<sup>rd</sup> workshop; these results are summarized in detail in this section of the report. In the next section, we build on these results to show how SEEC can use them to focus their conservation biology funding efforts.

#### ***3.2.1 Key points on SEEC's involvement in ecological monitoring***

Before we began discussing a goal for ecological monitoring in the Upper Skagit watershed, we had a group discussion about whether SEEC should play a role in funding ecological monitoring, and how they can best focus their limited funds to be effective in this area. Most participants thought it would be useful to SEEC to play a role in ecological monitoring, particularly in complementing the work of other agencies, maintaining data, and applying pressure on management agencies where needed. The main points raised during this session are noted below:

- In an overarching sense, SEEC has a role to catalyse, leverage and lead where possible. SEEC wants to fund things that are practical, applied and proactive. These points should be used to guide where funding may be allocated in the area of conservation biology.
- SEEC should consider integrating monitoring in the Upper Skagit with National Park Service monitoring program in US and provincial parks monitoring in British Columbia.
- SEEC could potentially function as a bridge between Canada and the US on various common issues. Participants suggested that SEEC could look at how other agencies are doing this (e.g. the Georgia Basin Action Plan. See [http://www.pyr.ec.gc.ca/georgiabasin/index\\_e.htm](http://www.pyr.ec.gc.ca/georgiabasin/index_e.htm)). There is the potential for improved collaboration across the border on monitoring for key issues of concern.
- Participants asked: how can SEEC influence decision-making? It was acknowledged that there was a need to engage management agencies, build partnerships, have a long term commitment to monitoring, and possibly partner with other groups or foundation to ensure adequate money is available for comprehensive monitoring. Participants felt

that it was important for SEEC to remain arms length from management agencies to be able to influence/challenge management in the area (within a collaborative context). SEEC has a role to play in advocacy within the Upper Skagit watershed.

- Participants did not clearly articulate whether SEEC should look at developing a comprehensive, stand alone monitoring program, or whether it would make more sense to focus monitoring on key issues of concern (complementing monitoring efforts being undertaken by other management agencies in the watershed) and summarize this information to use it to influence management. SEEC members need to decide which approach is preferable. The latter approach to monitoring seems more feasible, given SEEC's role within the watershed and limited funding for conservation biology activities.
- Representatives from management agencies suggested that SEEC needs to direct some money towards action if a negative trends if found – i.e. restoration or whatever is appropriate.
- Participants noted the importance of having a clear vision of the desired future state of the watershed. What kind of trend would signal a need for management actions to change or restoration to occur? In addition, the time frame for monitoring and the scope (within watershed, in area surrounding, etc.) needs to be decided upon.

### **3.2.2 Goals and purposes of monitoring**

After obtaining agreement from the group for SEEC to fund ecological monitoring in the Upper Skagit watershed, we move to defining goal(s) and purposes for monitoring in the area. This discussion was framed using the draft document: “Ecological Monitoring in the Upper Skagit watershed” (Appendix 2). Participants amended the goals from this document to reflect discussions held during the workshop, as outlined below:

**Goal:** To promote and assist in the acquisition of scientifically sound information on the current status and long-term trends in the ecological integrity of the Upper Skagit watershed

#### **Purposes or uses of the information:**

- To influence and/or challenge management
- To advocate for the long-term ecological integrity of the watershed
- To facilitate inter-border collaboration

### **3.2.3 Key stressors/influences and impacts on ecological integrity**

Many different stressors/impacts were noted during a brainstorming session at the workshop. These were re-organized into categories and voted upon to obtain the “top five” list of priority stressors/impacts. Participants highlighted consumptive recreation use, human commercial/industrial use, climate change, non-native flora and fauna, and natural disturbance as the top five stressors or influences within the watershed. Additional key points made regarding these stressors are noted below:

- Many of these overarching stressors (particularly climate change, natural disturbance and non-native species) are being addressed differently on both sides of the border. The importance of SEEC's role in facilitating cross-border communication on these issues was clearly articulated: no one is currently filling this role. Participants made

reference to the SEEC-funded project called “Nature has no Borders” and suggested that SEEC consider funding something similar in the future.

- Some of the stressors discussed are legal on one side of the border but not on the other side. Also, some (such as commercial recreation) are more of an issue on one side than the other. There is a critical need to understand the different legal and management contexts on either side of the border, and the influence of having an international border through the Skagit watershed.

Based on these results, we broke into smaller groups to discuss the top 5 stressors and how they impact or influence ecological integrity. The goal of this session was to define some key questions which could be addressed through monitoring in the Upper Skagit watershed. Group 1 was asked to discuss human commercial/industrial use, group 2 tackled climate change and natural disturbance, while group 3 focused on non-native flora and fauna and consumptive recreation use. The groups were balanced as much as possible to ensure some representation of researchers, managers, and SEEC members in each group.

It became apparent during the breakout session that groups were not ready to identify key questions without knowing more about the stressors themselves. For example, group 1 noted that they needed more information on the current status of industrial use in the watershed, and that they needed more background information on what datasets were already available and could be built upon. Group 2 pointed out that they needed comprehensive information on the ecosystem. Despite these limitations, some important recommendations came out of each group. These are summarized below:

- Group 1: There was some discussion about monitoring for cause and effect vs. long term monitoring to detect trends, and a suggestion that SEEC might want to focus on monitoring trends, which could then be reported through a “state of the environment” type report on the Upper Skagit watershed. A few points were made about the importance of defining current management activities and mapping them out on a GIS database, as well as getting a better picture of current inventories/data sets available which could be built upon in the future. Group members suggested that it might be useful to monitor the impact of drawdown/fluctuation in the lake level on terrestrial and aquatic systems.
- Group 2: In terms of natural disturbance, group 2 noted a variety of questions which could be examined in more detail, either through monitoring or research. It would be useful to have an inventory of pre-existing conditions to understand what we might be trying to maintain or restore; perhaps something could be assembled through historical aerial photography or inventories. Regarding climate change, the group noted that climate change was a global phenomenon beyond the scope of SEEC to impact, but they also noted a number of potential research and monitoring questions which could be addressed through SEEC funding.
- Group 3: The discussions in this group focused primarily on further elucidation of the recreational uses in the Upper Skagit watershed and how these recreational uses might

result in impacts on the ecosystem. The linkage between spread of non-native flora and fauna and recreation use was noted.

### **3.2.4 Summary of Key Results**

In this section, we use the five questions posed by SEEC at the outset of this process to re-organize the information gathered in at the March 23<sup>rd</sup> workshop.

- What influences and trends could affect biodiversity within the Upper Skagit watershed in the next ten years?

Workshop participants highlighted a number of important influences within the Upper Skagit watershed. These are summarized in detail in the minutes of the meeting (Appendix 1). According to workshop participants, the top five stressors are: consumptive recreation use, human commercial/industrial use, climate change, non-native flora and fauna, and natural disturbance.

- What important researchable aspects of biodiversity and conservation biology have not been adequately covered in the upper Skagit Watershed?

This question has been addressed in Huggard *et al.* 2004, although it was noted by workshop participants that a more comprehensive summary of existing research in the Upper Skagit watershed would be useful. The report by Huggard *et al.* does include a number of non-SEEC funded research in the Upper Skagit, but the authors note that it was beyond the scope of their project to summarize all research funded by other agencies in the area.

- What biodiversity and conservation biology needs and priorities currently exist as viewed from the perspective of the land and resource management agencies involved in the management of the Upper Skagit watershed and also from the perspectives of concerned NGOs? What role can and should SEEC play in the future of biodiversity and conservation biology within the watershed?

Managers in attendance at the March 23<sup>rd</sup> workshop highlighted the potential role for SEEC to play in facilitating cross-border communication on various overarching ecosystem stressors. In terms of priorities, the group suggested that SEEC should focus on complementing existing monitoring programs and answering some of the key research questions associated with management activities occurring in the Upper Skagit watershed. Participants also mentioned the possibility of SEEC funding a retrospective study of the watershed, perhaps through aerial photography or other inventories. SEEC has a role to play in cataloguing and summarizing existing information in the Upper Skagit watershed, for use both by management agencies and non-governmental organizations. The perspectives presented at the March 23<sup>rd</sup> workshop are summarized in a more logical format in section 5 of this report.

- How might SEEC prioritize future study needs in the area of biodiversity and conservation biology while balancing the recreational and cultural needs required of the watershed?

It was noted during the workshop that SEEC needs to decide on an appropriate balance between conservation and recreation. Deciding on this balance is an important precursor to prioritizing funding proposals aimed at conserving the watershed vs. increasing recreation in the area. SEEC also needs to decide how they want to affect changes in management activities occurring within the watershed.

### **3.3 Challenges Encountered**

It is worth noting the problems or issues that were raised throughout the course of developing this workshop on monitoring for ecological integrity. These challenges included:

- A decision needed to be made about whether SEEC was interested in funding monitoring to detect general ecological trends, or whether monitoring should focus on the impacts of particular management activities and provide feedback to management on how activities should change.
- Workshop participants needed comprehensive information on the threats or stressors in the watershed, particularly the management activities and how these may impact the ecological integrity of the watershed.
- The workshop required a full representation of management agencies working in the area. For monitoring in the Upper Skagit watershed to affect change in management of the area, managers need to be fully engaged in the process from the outset to be able to direct monitoring to areas for which more information is needed. A large number of managers and researchers working in the area were invited to this workshop, but many were unable to attend, possibly due to insufficient lead time prior to the workshop or the timing of the workshop (which corresponded with fiscal year-end in British Columbia).
- Participants needed more information on what had been funded by SEEC in the past and on what other studies have been done in the Upper Skagit. This information would have been particularly useful for discussions on which indicators may be chosen (which was beyond the scope of this workshop but could be addressed at future workshops if SEEC decides to fund monitoring the Upper Skagit watershed).
- It probably would be useful for SEEC to hold a workshop for their members to develop an overarching goal for the conservation biology funding program. Workshop participants could have more easily worked with this goal to determine how monitoring could be focused to achieve the goal defined by SEEC.

### **3.4 Future Direction**

Despite these challenges, much information was gathered both through the March 23<sup>rd</sup> workshop and the summary report (Huggard et al. 2004) which SEEC can use to further focus their conservation biology funding envelope. We explore these options in detail in section 4 of this report.

## **4. RECOMMENDATIONS FOR FUTURE WORK**

This section of the report describes how SEEC can build on the information collected to date to define a clear goal or desired long term outcome for the Upper Skagit Watershed, and link this goal to activities that they may fund through the conservation biology funding envelope. We also provide some criteria which SEEC may wish to use to better evaluate whether funding proposals will meet their desired goals or outcomes.

## 4.1 Outcome-based planning using a logic model framework

Strategic planning to ensure that programs are effective is becoming increasingly important in conservation biology, as planners and program managers are challenged to solve increasingly complex problems with fewer resources. To ensure that resources are being spent wisely, program managers must ensure that the activities they fund or enact are clearly linked to desired outcomes. Defining the outcomes you are trying to achieve through a program makes it far clearer what activities should be funded or enacted and which activities fall outside of the mandate of your program.

The field of extension has been focused on “outcome-based” planning for many years, as a means both of linking activities to overall program goals and of evaluating how well you are achieving program goals by assessing whether intermediate outcomes have been achieved. The approach focuses on defining the program goal, then defining long term, medium term and short term outcomes which are necessary to achieve the goal, and finally identifying potential activities and resources needed to achieve the short term outcome. Because your short term outcome is clearly linked to your long term goal, appropriate activities should always be funded or enacted. An simple example might be:

**Situation:** Private landowners are managing their land in a way that is harmful to the RNGF.

**Desired Long Term Outcome (Goal):** Increased suitable habitat

**IF**, we invest some staff time and funding into this program (INPUTS), **THEN**, we will hold series of field tours for private landowner on RNGF-friendly land management practices (ACTIVITIES).

**IF**, we deliver these field tours (ACTIVITIES), **THEN** private landowners will know how to manage their land more appropriately (SHORT TERM OUTCOME).

**IF** private landowners know how to manage their land more appropriately (SHORT TERM OUTCOME), **THEN** private landowners will manage their land more appropriately (MEDIUM TERM OUTCOME).

**IF**, private landowners manage their land better (MEDIUM TERM OUTCOME), **THEN**, suitable habitat for the RNGF will increase (LONG TERM OUTCOME). (Leech et al. 2005)

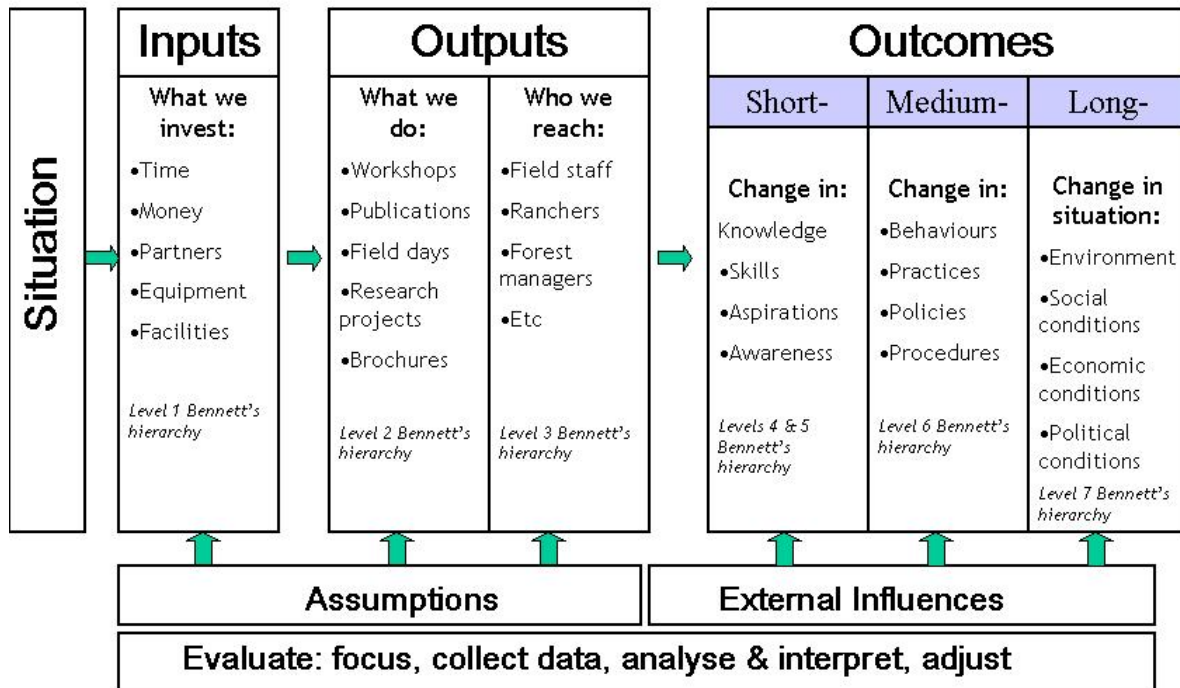
This type of outcome-based strategic planning is used by many conservation agencies, including The Nature Conservancy (e.g. see [http://conserveonline.org/2003/06/b/en/Strategy\\_Guidelines\\_ver6\\_03.pdf](http://conserveonline.org/2003/06/b/en/Strategy_Guidelines_ver6_03.pdf)) to ensure that project dollars are used most efficiently to achieve desired outcomes.

The field of extension has used a framework called the **logic model** to organize this information into a logical framework linking program goals to desired activities. The model has its roots in a seven-step evaluation framework called “Bennett’s hierarchy” which has been used by extension evaluators to pinpoint how progress to a desired goal may be evaluated (Bennett 1977). As such, a logic model is a useful tool both for ensuring that appropriate activities are being undertaken and for illustrating how programs may be evaluated to ensure that desired outcomes are being achieved.

Below is a diagram showing the basic outline of a logic model. Thousands of references and guidelines for developing logic models are available on-line (see, for example

<http://www.uwex.edu/ces/pdande/progdev/index.html>, <http://www.innonet.org>, Millar *et al.* 2001, and [www.uidaho.edu/extension/LogicModel.pdf](http://www.uidaho.edu/extension/LogicModel.pdf)). If SEEC is interested in pursuing the developing of a logic model based on information collected to date, they should consider hiring a professional facilitator with experience in this area to guide them through the process.

Figure 1: Basic outline of a logic model. From [www.uidaho.edu/extension/LogicModel.pdf](http://www.uidaho.edu/extension/LogicModel.pdf).



#### 4.2 The Seeds of a Logic Model for SEEC's Conservation Biology Funding Program

In this section, we use information gathered at the March 23<sup>rd</sup> workshop to define some potential medium-term and short-term outcomes for SEEC's Conservation Biology Funding Program, linked to potential activities which would meet these objectives. The information is summarized at the end of this section in a table showing how SEEC's long term goal or outcome links to potential activities which could be undertaken.

The following Goal and Purposes of monitoring in the Upper Skagit watershed were defined at the March 23<sup>rd</sup> workshop:

**Goal:** Promote and assist in the acquisition of scientifically sound information on the current status and long-term trends in the ecological integrity of the upper Skagit Watershed

**Purposes:**

- To influence and/or challenge management
- To advocate for the long term ecological integrity of the watershed

- To facilitate inter-border collaboration

It is possible to use the above goal and purposes to frame priorities for the whole conservation biology funding program. The “current status” referred to in the goal statement represents inventory, and “long-term trends” may be determined through monitoring and research. As such, this goal can be used as the starting point for a logic model to clearly develop the program strategies. (Note: the connections between research, monitoring, inventory and the goal for the conservation biology funding program are shown in the conceptual drawing in Appendix 2.)

The defined purpose of collecting information *to influence and/or challenge management* suggests that monitoring and research should be directed towards collecting information on management activities within the watershed, to determine where management is failing to maintain ecological integrity. To meet this need, SEEC could develop a medium-term outcome in their conservation biology funding envelope to “increase the availability of information on ongoing management activities within the Upper Skagit Watershed as a whole.” While many activities could be proposed to fill this need, one simple possibility is for SEEC to fund a “state of the environment” report for the Upper Skagit Watershed on a regular basis (e.g. every 5 years). This report could be used to provide the status of numerous “things of interest” in the watershed, including area of forest harvested, area of road by road type, population census for deer, population census for different types of fish, etc. The information that should be covered in this report could be gleaned from an existing State of the Environment report and tailored to meet the needs of management agencies in the Upper Skagit watershed. It would be useful to engage management agencies in the area to determine if this type of report would be useful to help inform their management practices, or whether some other activity would be more useful to fill this purpose.

SEEC may wish to consider partnering with a non-profit organization to develop this report. The partnering organization would be able to complete the upfront work, compile data from existing and new sources (as commissioned by SEEC) and provide information management services. They would also be able to fill the role of “goosing” or advocating for changes in practice to the relevant government agency or industry.

Because the focus of the March 23rd was on monitoring, we did not specifically discuss research objectives. However, one of the messages that came from this workshop was that SEEC wants to fund projects that are practical, applied and focused. With that in mind, it seems logical that research efforts should focus on management questions that directly relate to activities going on in the Upper Skagit Watershed. For example:

- How does the drawdown from the dam affect terrestrial flora and fauna, as well as aquatic flora and fauna?
- How are specific ecological processes affected by the drawdown?
- How does fire suppression in the watershed impact ecological processes?
- An assessment of the cumulative impacts of management within the watershed and what that means for areas downstream.
- How might recreation be better managed to maintain ecological integrity?

Funding research activities is another way of meeting the medium-term outcome defined above of “increasing the availability of information on ongoing management activities within the Upper Skagit Watershed as a whole.”

The defined purpose of collecting information on ecological integrity in the Upper Skagit watershed *to facilitate inter-border collaboration* suggests a role for SEEC in bringing together management agencies working on key issues on both sides of the border to encourage collaboration and harmonization of approaches. The key issues mentioned during the March 23<sup>rd</sup> workshop included: climate change, invasive species, and air pollution. To meet this need, SEEC could establish an objective in their conservation biology funding envelope to “increase cross-border collaboration between management agencies on climate change, invasive species and air pollution (and other issues as identified by managers in the area) in the Upper Skagit watershed”. Again, numerous activities could be proposed to fill this need, but we are suggesting that SEEC could fund a regular (yearly) forum in the Upper Skagit watershed that would bring together researchers and managers working in the area (perhaps encompassing a larger scope than just the Upper Skagit). The results of these forums could be used by management agencies on both sides of the border to provide a mechanism for developing common ground indicators on particular “overarching” stressors, and to improve our ability to manage these ecosystems holistically.

This information has been used to define the beginnings of a logic model for SEEC’s conservation biology funding program. The logic model as it currently stands is shown in Table 1. SEEC could build upon this initial framework to develop a more comprehensive logic model for the program, before deciding on what activities it could fund through the conservation biology funding envelope.

Table 1: Draft Logic Model for SEEC's Conservation Biology Funding Program

Target audience	Activity	Short term outcome	Medium term outcome	Long term outcome or program goal
Management agencies, ENGOs, policy-makers in the area	State of the Environment Report	Increased availability of information on management activities within the Upper Skagit Watershed as a whole	Improved management to maintain ecological integrity within the Upper Skagit Watershed	Scientifically sound information on the current status and long-term trends in the ecological integrity of the upper Skagit Watershed exists
Management agencies (e.g. forest companies, BC Timber Sales, Seattle City Light, commercial recreation providers, etc.) and policy-makers	Research linking impacts of specific management activities to ecological integrity in the Upper Skagit watershed	Increased knowledge of impacts of specific management activities within the Upper Skagit watershed on ecological integrity		
Researchers and managers working in the Upper Skagit watershed (and possibly further afield)	Yearly international forum on key overarching stressors in the Upper Skagit watershed	Increased cross-border collaboration between management agencies on overarching stressors in the Upper Skagit Watershed	Improved inter-border communication on overarching stressors	

## 4.2 Importance of data management

SEEC needs to consider an information management system to ensure that the information collected to answer research and monitoring questions is compiled appropriately and can be easily accessed in the future. The importance of using standardized inventory methods for collecting information has been noted (Huggard et al. 2004). Again, it may be useful for SEEC to partner with another organization (e.g. an ENGO or one of the adjacent parks) whose staff could be dedicated to maintaining the database. SEEC may also consider funding a 10 year “state of the research” report which could pull together all of the information gathered on management activities within the watershed to discuss cumulative impacts within the watershed.

## 4.3 Criteria for evaluating research proposals

SEEC may wish to consider developing a more detailed application process for evaluating research proposals. The current application form (available at [http://www.cityofseattle.net/light/environment/SEEC/ev5\\_Sfgl.htm](http://www.cityofseattle.net/light/environment/SEEC/ev5_Sfgl.htm)) requires that applicants provide the following information:

- Abstract of the project

- Goal(s) or objectives of your project. How do these goals relate to the Mission and Goals of the Skagit Environmental Endowment Commission?
- What do you propose to do: Give the Scope of work, activities and proposed work schedule. Include how project will benefit the Skagit watershed upstream from Ross Dam.
- A list of Key personnel, their role in this project and their qualifications:
- A detailed budget including tasks, salaries, and other expenses.
- The location(s) of each element of the project, marked on a map of the Skagit watershed upstream of Ross Dam

The application form also requires that applicants demonstrate their communication with the appropriate land agency if the project will be carried out on land under their management.

We recommend that the conservation biology funding program develop its own application form for applicants. Along with the information listed above, the applicants should be required to provide the following information:

- A description of how a particular project will address the outcomes presented in the SEEC Conservation Biology Funding Program's strategic plan. The project activities should clearly link to one of the desired outcomes elucidated in the program logic model. For example, projects should:
  - Increase the availability of information on management activities within the Upper Skagit Watershed as a whole
  - Increase the knowledge of impacts of specific management activities within the Upper Skagit watershed on ecological integrity, or
  - Increased cross-border collaboration between management agencies on overarching stressors in the Upper Skagit Watershed
  - This list could be tailored depending on other outcomes articulated through the process of developing a logic model.
- For research projects, applicants should be required to provide information on the experimental design and how the data will be analysed and applied to answer a specific research question. Applicants should be required to demonstrate that their research will be scientifically defensible.
- To ensure that information gathered through projects funded by SEEC is incorporated by management, applicants should be required to describe the extension activities related to the project being undertaken and demonstrate support or collaboration from management agencies, through letters of support. If SEEC wants to ensure that projects funded are focused on the information needs of management agencies, they could consider prioritizing applications that include a monetary or in-kind contribution from an appropriate management agency.

The application form should also include a description of the requirements of successful proponents. For example, if a specific inventory need is identified through the process of developing a State of the Environment Report for the Upper Skagit watershed, successful proponents should be required to follow the accepted protocol and submit all data to SEEC for