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# Recovery Planning to Achieve Desired Results: Using Principles of Extension to Create Meaningful Behavioral Changes Linked to Overall Recovery Goals

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**Abstract:** The Canadian *Species at Risk Act* requires that recovery strategies be developed under specified time frames for all species and ecosystems that are listed as Threatened, Endangered, or Extirpated. In most cases, recovery teams have been established and charged with developing these recovery strategies. While these groups have tended to focus on the biological aspects of species and ecosystem recovery within their strategies, it is critically important that time and effort is also spent on the human aspects of recovery. The Recovery of Nationally Endangered Wildlife's (RENEW) guiding principle #1 states that "Species recovery ultimately depends on changing human behavior to allow species to maintain self-sustaining populations." *Extension*, or the process of creating change within a specific audience group, is thus an integral part of species at risk recovery.

It is important for recovery teams to firmly integrate these desired changes in human behavior with the biological goals of species and ecosystem recovery. In this paper, we provide recovery teams with an introduction to how they may achieve this integration. Specifically, we introduce the concept of using extension, or nonformal education, to change human behavior. We emphasize that extension should be aimed at specific stakeholders, not the general public, to ensure that these groups have access to the best available information to change their behavior. We then provide an overview of planning tools (Bennett's Hierarchy and the logic model) that are helpful for identifying the human component and connecting it with the biological component of recovery. Finally, we provide a brief explanation of how to write 'SMART' outcome objectives—a critical step for allowing recovery teams to measure the success of their programs in the future. At the end of the paper, we include a list of resources that may be useful to assist recovery teams with this type of planning.

**Key Words:** extension, recovery strategies, Bennett's Hierarchy, logic models, evaluation, species at risk, ecosystems at risk

## 1. Introduction

With the introduction of the *Species at Risk Act*, many new species and ecosystems at risk recovery teams have been formed. Following the *RENEW<sup>1</sup> Recovery Handbook (ROMAN)* guidelines (National Recovery Working Group 2004), these recovery teams are charged with developing recovery strategies and recovery action plans for listed species and ecosystems within a specified time frame depending on the species' status. The process of developing a recovery strategy and recovery action plan for a species or ecosystem at risk is essentially an exercise in strategic planning with a focus on *creating change* to achieve the ultimate goal of species or ecosystem recovery.

As expected, many recovery teams are focusing their planning efforts on identifying required changes in biological condition, monitoring these changes, and filling knowledge gaps. This focus is understandable considering their overall goal; however, it is important to keep in mind that most of these desired changes in biological condition, whether they are changes in population levels, habitat, or some other element, require some sort of intervention related to people's behavior. Habitat loss due to human activity is the most important cause of modern species extinctions (Eldredge 2001); thus, changing human behavior is paramount to the successful recovery of a species or ecosystem in decline. RENEW's guiding principle #1 echoes this idea: "Species recovery ultimately depends on changing human behavior to allow species to maintain self-sustaining populations." *Extension*, or the process of creating change within a specific audience group, is thus an integral part of species at risk recovery.

Often, conservation groups approach the topic of human change by focusing on 'public education'. This type of approach requires substantial resources and often a great deal of time to create meaningful change. Since recovery planning operates in an environment of tight budgets and even tighter time frames, it would seem that targeting specific audience groups whose activities directly impact the species or ecosystems in question would be far more effective. This assertion means targeting extension towards specific stakeholder groups involved in resource management or land/aquatic use activities (e.g., the commercial fishing industry, forest industry, landowners), and ensuring that they have access to the best available information. For example, are recreationists and their associations aware of the impact their activities are having on the species or ecosystems in question? Do they need relevant and timely information to alter their perceptions and attitudes? Do they have the information and tools they need to adjust their activities appropriately? These are all questions that could be addressed through extension.

Extension activities are often delivered in isolation of the main conservation plan. Very rarely is it documented how extension activities are linked to creating specific changes in biological condition. Sometimes this disconnect leads to inappropriate activities that do nothing to further the conservation cause, or if they are appropriate, the contribution of these activities goes unevaluated and undervalued. The success of the extension plan, therefore, hinges on identifying

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<sup>1</sup>Recovery of Nationally Endangered Wildlife

relevant learning objectives for specific audiences and linking them to desired changes in biological condition. By spending some time focusing on the connection between biological objectives and the necessary behavioral changes to reach those objectives, recovery teams can ensure that **effective** extension activities are planned and implemented.

Effectiveness of an extension plan also hinges on whether it lends itself to evaluation. It is important that desired changes in stakeholders' level of knowledge, skill, or practice be measurable. Defining measurable changes in behavior allows you to monitor the success of your extension plan, which thereby helps the team identify specific activities that are not achieving desired results. The plan can then be altered to reestablish program effectiveness in those areas.

This paper presents the topic of extension in the context of species and ecosystems at risk recovery planning, and describes a variety of extension tools that may be of use to recovery teams that are looking for solutions to some of the challenges mentioned above. We will discuss the importance of outcome planning and explore the use of two logical frameworks: Bennett's Hierarchy and the logic model and their implementation. Discussion relating to these frameworks will focus on 'finding the extension' within a recovery strategy and documenting the connections between those extension activities and higher level biological objectives. Finally, we will offer guidance on how to write 'SMART' outcome objectives that include measures for evaluation and which enable recovery planners to confirm that desired results or outcomes are being achieved. Examples based on a fictitious species at risk (the rubber-necked guinea fowl [*Numida elastica*]) will be used throughout this paper to illustrate how these tools might be used.

## 2. What is Extension?

Extension is a system of nonformal education that focuses on three important processes:

1. helping people learn in their own context (including teaching them how to identify and assess their own needs and problems);
2. helping people acquire relevant knowledge and skills required to effectively cope with those needs and problems; and
3. inspiring people to action (Boone 1989).

Extension uses *facilitative strategies* rather than *power strategies* (i.e., rules and regulations) to affect change, and seeks to 'help people learn' as opposed to 'teaching people' (Knowles 1950). The process depends heavily on a two-way feedback loop between the keepers and the users of knowledge, and on the unique skill set of the extension professional. People developing extension programs should be well acquainted with adult learning techniques and principles related to behavioral change. Success in extension hinges on the extension professionals' ability to understand and relate to the context of the learner, maintain a familiarity with the best available information in the topic area, and inspire people to action. As mentioned earlier, extension is critical to the successful recovery of species and ecosystems at risk because it is almost always

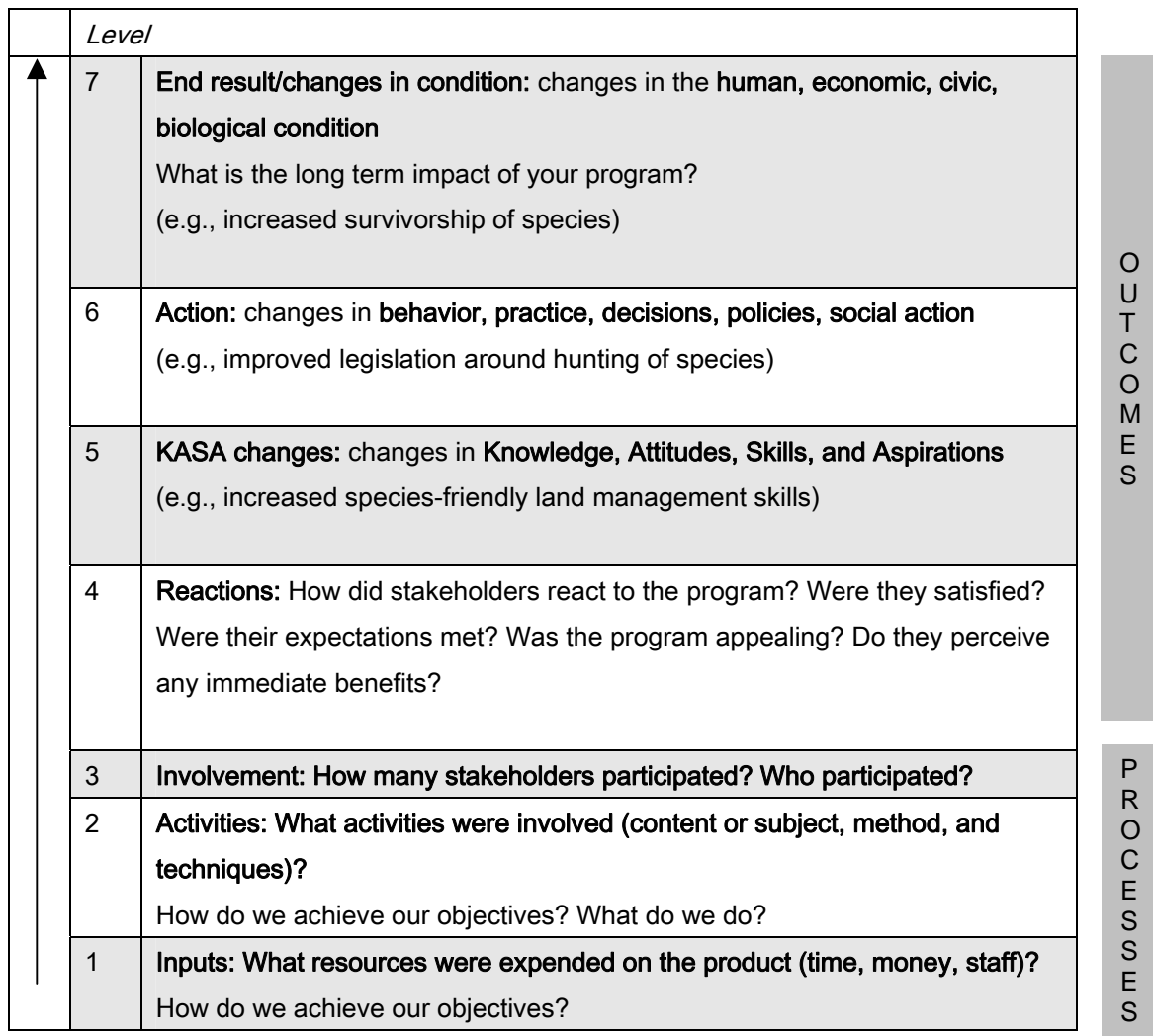
human behavior or action that has lead to a decline in abundance of a species or an ecosystem (Eldredge 2001). Recovery strategies and recovery action plans should, therefore, include objectives related to both creating behavioral changes in specific audiences, and creating desired changes in biological condition of a particular species or ecosystem.

### 3. Planning Focused on Outcomes

The field of extension is focused on creating change through education; therefore, it relies heavily on outcome or results-based planning. This is consistent with the recent shift in focus within the broader field of program planning. Stemming from a demand to show accountability for dollars spent, program planners are being asked by funding agencies and other stakeholders to demonstrate what difference their program has made, thus shifting focus from ‘what we do’ to ‘what results are achieved through the program’. This type of results-based planning (also called performance or outcome planning) is particularly applicable to recovery planning because it focuses on identifying the specific changes that contribute to transition from an ‘existing state’ to a ‘desired state’ or *the transition from a species at risk to a self-sustaining population*. Documenting outcomes is critical to extension planning and involves identifying desired changes in your audiences’ knowledge and skills in an effort to create desired changes in behavior, changes in practices, and ultimately, changes in state (i.e., an improved environmental condition).

### 4. Defining Meaningful Change using Bennett’s Hierarchy: the Link to Evaluation

Bennett’s Hierarchy (Bennett 1977) (Fig. 1) is an effective framework for describing levels of measurable change that can result from an extension program. It is the early foundation for what is now known as the logic model, which we will discuss in the next section. Originating within the field of extension, Bennett’s Hierarchy is a helpful tool to use when trying to plan or evaluate the **effectiveness** of your extension program. The tool is designed as a ladder where changes become more meaningful as you move up the scale from changes related to your resources and activities (levels 1, 2, and 3) through changes in knowledge, behaviors, policies, and, ultimately, conditions (levels 4, 5, 6, and 7). The levels in this ladder clearly illustrate how changing human knowledge and behavior ultimately leads to changes in biological condition. It is helpful to consider this tool in two parts: changes that are **internal** to your program and changes that are **external** to your program.



**Figure 1. Bennett's Hierarchy of Evidence (Bennett 1977).** This figure shows the flow of program impacts or changes from those that are 'internal' to the program (levels 1–3) to those that are 'external' to the program (levels 4–7). It provides a useful framework for organizing activities and outcomes in a way that makes it easier to evaluate the success of your program.

Levels 1 to 3 identify changes that are largely **internal** to the program and describe levels of change related to 'what we did'. These first three levels of the ladder include

- the resources that were expended (level 1);
- the nature of the activities that were implemented (level 2); and
- the number and type of participants (level 3).

During the process of evaluation, program coordinators often focus on these levels of the hierarchy, which can be useful to demonstrate, for example, how many people were reached through a particular program. However, it is important to remember that measuring the number of

workshops, workshop participants, or distributed brochures only demonstrates the efficiency of your program, **not** its effectiveness.

To plan an extension program that truly creates meaningful change, outcome objectives should be included in your recovery strategy. These should identify desired changes at levels 4–7 of the hierarchy—i.e., changes that are **external** to the program but which are within its influence. Levels 4–7 in Bennett’s Hierarchy include the following:

- people’s reactions to your program (level 4);
- changes in participants’ knowledge, attitudes, skills, or aspirations (level 5);
- changes in behavior, practice, decisions, policies, and social action—e.g., a change in forest management practices to help protect or recover a particular species or ecosystem (level 6); and
- changes in state (level 7). This level refers to the overall impact of your program, and includes the biological changes that most recovery teams have included in their recovery strategies (e.g., attaining the goal of a stable, self-sustaining population of a particular species).

By measuring and documenting changes related to levels 4–7 of Bennett’s Hierarchy, the resulting evaluation is likely to be more effective in convincing others of the value of the recovery program. Evaluating at these levels also provides much more information about which activities are useful and contribute to the overall recovery goal, and which activities are less effective; thus, the results can be used in an adaptive management framework to alter or refocus your resources on particular activities. It is important to remember, however, that it is very difficult to show that your program has been solely responsible for an observed change in state. It is much more realistic to evaluate the success of your program based on observed changes in people’s knowledge, attitudes, skills, or aspirations (level 5), and even observed changes in practice (level 6) over a longer time frame.

## 5. The Logic Model: a Tool for Linking Your Goals and Objectives to Your Activities

As mentioned earlier, the progression of change that is documented from levels 1 through 7 in Bennett’s Hierarchy illustrates the early footprints of a logical framework or ‘logic model’. The original logic model was developed by members of the evaluation field to encourage a form of program development that integrated measures for evaluation and accountability. The logic model is an excellent tool for recovery teams to document how ‘what they do’ links to their desired results. By clearly documenting the changes that your program is trying to address in a cause-and-effect manner, evaluation is already built in. The model also documents the recovery plan in enough detail to enable an adaptive management approach, and it provides a ‘road map’ to stakeholders and funding agencies to demonstrate progress towards change. Figure 2 shows the main components of the logic model, which are described in more detail below.

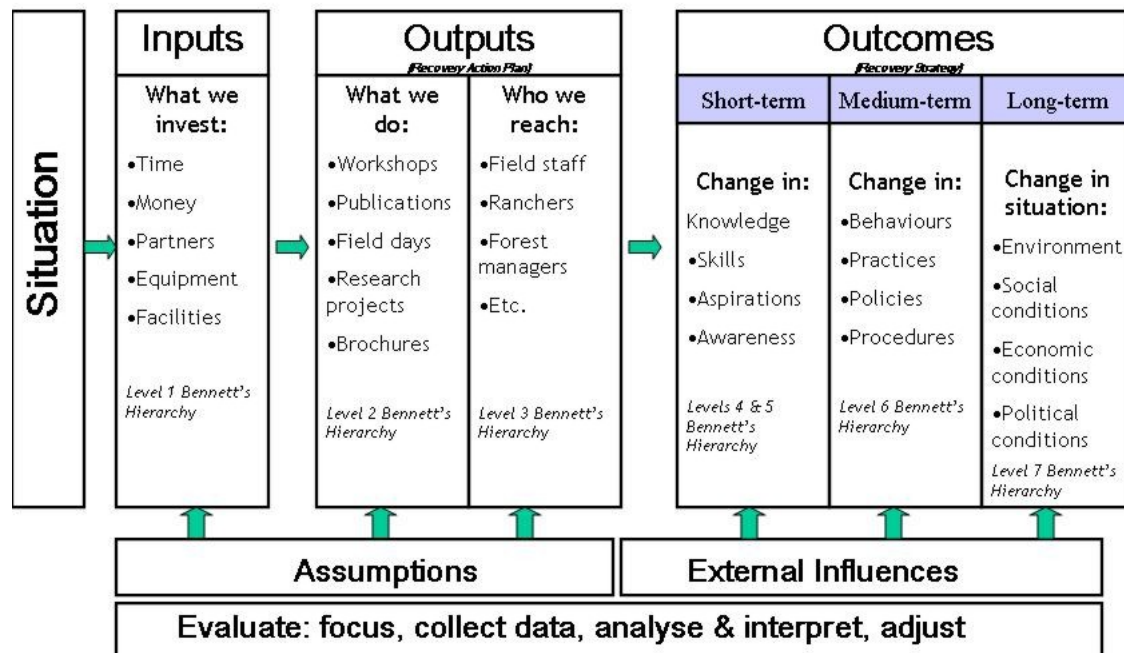


Figure 2. Diagram showing the main elements of the logic model framework. As noted in the diagram, the outcomes would generally be documented within the recovery strategy, whereas the outputs or activities would generally be documented within the recovery action plan (based on University of Michigan Extension 2002).

Logic models consist of six main elements that can be linked back to Bennett's Hierarchy:

1. **Situation:** the problem or issue that the program is to address
2. **Inputs:** the resources, contributions, and investments that are provided in response to the situation
3. **Outputs:** the activities, services, events, and products that reach people and users. As noted in Figure 2, these outputs would generally be recorded within a recovery action plan for a species at risk.
4. **Outcomes:** the results or changes for individuals, groups, agencies, communities, and/or systems. It is important to include multiple levels of outcomes in your logic model, as short- and medium-term outcomes serve as mental stepping stones that link your activities to your long-term outcomes. As noted in Figure 2, outcomes are strategic in nature and would generally be documented within a recovery strategy for a species at risk.
  - a) *Short-term outcomes* include
    - changes in reactions. How did participants react to your activity?
    - changes in learning: KASA changes, which are changes in knowledge, attitudes, skills, and aspirations, as well as changes in awareness, opinions, and motivations

- b) *Medium-term outcomes* include
  - changes in action: behavior, practice, decisions, policies, and social action
- c) *Long-term outcomes* include
  - changes in condition: human, economic, environment. These outcomes can also be called program impacts.

Influencing each of these elements are the following two factors which also should be considered in your logic model:

- 5. **Assumptions:** beliefs and values we have about the program, the people, the environment, and the way we think the program will work
- 6. **External influences:** environment in which the program exists—includes a variety of external factors that interact with and influence the program action (University of Michigan Extension 2002)

The main elements of the logic model are connected through a series of ‘if-then’ relationships:

- **IF** resources are available to the program, **THEN** program activities can be implemented;
- **IF** program activities are implemented, **THEN** certain outputs and outcomes can be expected.

Figure 3 illustrates an example of an ‘if-then’ outcome chain for our hypothetical species, the rubber-necked guinea fowl. This species at risk is introduced in Section 7 of this paper, where we go through an example of how the logic model can be used in recovery planning to ‘find the extension’ within your program.



<p><b>Situation:</b> Private landowners are managing their land in a way that is harmful to the rubber-necked guinea fowl (RNGF); a solution is found that works for the audience.</p> <p><b>Desired Long-term Outcome:</b> increased suitable habitat exists for the RNGF</p> <p><b>IF</b> we invest some staff time and funding in this program (INPUTS), <b>THEN</b> we will hold a series of field tours for private landowners on RNGF-friendly land management practices (ACTIVITIES).</p> <p><b>IF</b> we deliver these field tours (ACTIVITIES), <b>THEN</b> private landowners will <u>know</u> how to manage their land more appropriately (SHORT-TERM OUTCOME).</p> <p><b>IF</b> private landowners <u>know</u> how to manage their land more appropriately (SHORT-TERM OUTCOME), <b>THEN</b> private landowners <u>will manage</u> their land more appropriately (MEDIUM-TERM OUTCOME).</p> <p><b>IF</b> private landowners <u>manage</u> their land better (MEDIUM-TERM OUTCOME), <b>THEN</b> the amount of suitable habitat for the RNGF will increase (LONG-TERM OUTCOME).</p>
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**Figure 3. An example of an ‘if-then’ outcome chain for the rubber-necked guinea fowl (RNGF).**

## 6. Using the Logic Model in Planning

In the past, most program planning has focused on ‘what activities we do’ instead of ‘what results from our activities’; however, the logic model is best used by focusing first on the long-term outcomes or changes being sought as a result of the program, and then proceeding through medium- and short-term outcomes to activities and inputs. If you plan in the other direction, starting with activities and inputs, you run the risk of justifying current activities which may not actually fit within the long-term changes being sought by your group (Millar et al. 2001). Beginning your planning by focusing on what outcomes you are trying to achieve will give you more flexibility in developing appropriate and creative ways of achieving your objectives.

With that in mind, the procedure we introduce for using the logic model to plan recovery strategies begins with a situational analysis. We then move to the right side of the logic model, and identify the long-term outcomes of your program. These outcomes should support the overall goal of your recovery strategy. If already developed, recovery strategy goals may be rewritten as outcome statements (see Sections 7 and 8 for more information on writing outcome statements). Planning then flows from right to left within the framework to identifying medium-term and short-term outcomes, deciding on activities or outputs, and determining resource or input needs. By beginning with the broad picture of your desired long-term outcomes, you can easily see whether certain activities actually fit within the long-term changes you are trying to achieve.

It is important to remember that the logic model can be used at any stage of program development as a tool to organize goals and outcome objectives and activities, and to identify activities that are most likely to achieve your program goals. The process is extremely helpful for verifying proposed activities, pinpointing priorities for funding (i.e., those that are most likely to achieve desired results), and identifying inappropriate activities or gaps in logic (i.e., proposed activities that do not logically link to desired behavioral and biological outcomes). Linking your

extension objectives to the biological objectives in your recovery strategy will ensure that any activities you initiate will contribute to identified biological objectives. On-line resources are available to assist groups with developing logic models (e.g., The Innovation Network 2002–2004). FORREX extension specialists are also developing an extension basics manual for recovery teams (Sutherland et al., in preparation), which will be available at [www.forrex.org/emcb](http://www.forrex.org/emcb).

## 7. An Illustration of Recovery Planning Using the Logic Model

To illustrate how the logic model can be used in recovery planning, we have developed a detailed example using a hypothetical species at risk, the rubber-necked guinea fowl (RNGF). In this section, we introduce the RNGF (Fig. 4), analyze the problem or situation facing the species, and describe desired long-term, medium-term, and short-term changes that will ultimately lead to recovery of the species. This example is summarized from FORREX's *Extension and Evaluation Planning Handbook: A Working Manual for Species and Ecosystems at Risk Recovery Teams Delivering Education and Outreach* (Sutherland et al., in preparation).

Although most people believe that guinea fowl are native only to Africa and Madagascar, a little known species called the rubber-necked guinea fowl (*Numida elastica*) (RNGF) calls British Columbia home. The rubber-necked guinea fowl is a forest-dependent species whose nesting habitat is threatened by disturbances to old-growth forests, and whose ability to forage successfully depends on an abundant availability of native grasses. RNGF are extremely good runners and use this method, rather than flying, to escape from predators. Their ability to successfully escape from predators depends on an abundance of coarse woody debris (CWD) on the forest floor, which they use to hide behind once they have successfully evaded an approaching predator. RNGF get their name from a peculiarly 'elastic' neck which allows them to peer around large pieces of CWD in old-growth forests as they scan for potential predators. Loss of CWD is cited as a major factor in the decline of the species. Other significant factors in their decline include increased seeding of nonnative grass species within managed forests, and pressure from hunters, who treasure the guinea fowl for their gamey flesh. As the population of RNGF has plummeted over the last several years, COSEWIC has recently revised the status of the bird from Threatened to Endangered. A recovery team has been established to review threats to the species and develop a recovery strategy and recovery action plan to reverse the trend in the population decline of this rare and special bird.

**Figure 4. Biological description of the rubber-necked guinea fowl (RNGF). This hypothetical example was created for the purposes of illustrating how recovery planning using the logic model can work.**

### ***Step 1: Describe the Context of Your Program***

Whether you are developing a new recovery strategy or reviewing an existing one, it is important that the context of the program be well documented. This section provides a brief overview of how to describe the context of your program.

#### *a) Situation Analysis—What State are You in?*

The **Situation** includes the problem being addressed by the recovery effort *and* the socio-economic, political, or environmental conditions in which it exists. It forms the foundation of the logic model and the overall recovery, and is, therefore, worth focusing some time on to ensure a thorough understanding of the situation is achieved. It can also be useful for communicating with those individuals who are external to the recovery team. A thorough situational analysis can be accomplished by addressing the following questions:

- What is the problem?
- What causes the problem?
- Who is involved in the problem?
- Who has a stake in seeing the problem resolved?
- What do existing research and experience say?

To illustrate how each of these questions can be addressed, we have included an example of a situation statement for the rubber-necked guinea fowl (Fig. 5).

Populations of rubber-necked guinea fowl (RNGF) have declined to numbers that are not sustainable, and the species has now been designated as Endangered by both federal and provincial governments. In the face of increasing urbanization, native grassland habitat (used by rubber-necked guinea fowl for foraging) is being lost at a rapid rate. In addition, insufficient large Douglas-fir trees in adjacent forested areas are available to RNGF for nesting/roosting. RNGF also use native grass species within dry forest ecosystems for foraging, but these areas are increasingly being converted to nonnative grasslands through both intensive grazing of cattle and hydroseeding of nonnative grass species. In addition, RNGF are highly sought after as game species, and significant illegal poaching of the bird still occurs.

Government agencies at both the federal and provincial level have created new legislation to protect species at risk, including the RNGF. This legislation has resulted in the creation of a recovery team that is charged with developing a recovery strategy and recovery action plan for the RNGF.

Within the context of the RNGF, those who may be affected by this new legislation include

- urban developers;
- forest companies harvesting within the IDF (Interior Douglas-fir) biogeoclimatic zone;
- ranchers; and
- hunters.

While much is known about RNGF habitat needs, significant information gaps still exist, including the following:

- How many large Douglas-fir must be left within forest habitat?
- What kinds of native grasses are most important?
- Is it possible to use native grasses in hydroseeding within RNGF habitat?

Therefore, an important group to engage in this process will also be the research community.

Many local groups are interested in the recovery of this species at risk, including members of the municipal governments, nongovernment organizations working in the area, First Nations, members of regional provincial government offices (e.g., regional Ministry of Water, Land and Air Protection and Ministry of Forests staff), members of fish and game groups, local forest companies, local ranchers, and urban developers. These groups will be involved in developing recovery action plans for this species.

**Figure 5. Situation statement for the rubber-necked guinea fowl (RNGF). This figure illustrates how each component of the situation statement should be addressed.**

#### b) *Identifying Assets*

This step is a simple process of inventorying the existing assets of members of the recovery teams, their associated organizations, and the stakeholder groups. As resources are limited for species and ecosystems at risk recovery, it can be an extremely valuable exercise to document these potential ‘in-kind’ contributions to your recovery plan.

#### c) *Identifying Assumptions—Was Your Logic Correct?*

Assumptions include your beliefs and values about the recovery strategy and how and why you think it will work. They are based on the principles and ideas that are guiding the program. Assumptions are validated with research and experience and should be reevaluated often. All assumptions should be documented when a logic model is being developed for reference during

the evaluation phase. Often programs fail because of inaccurate or overlooked assumptions, so it is important to be able to refer to them while you are evaluating and adjusting your program.

d) *External Influences*

Often referred to as the environment in which the program exists, external factors will inevitably influence the recovery strategy. These variables, over which the program normally has little control, can often have a positive or negative effect on the success of a program. They include factors such as the climate, the biophysical environment, the political environment, and the background and experiences of stakeholders, and socio-economics, global markets, media influences, and/or changing policies and priorities. It is important to remember that your strategy operates within this environment and is constantly vulnerable to its effects. Documenting these factors will help the team understand how they are influencing the recovery efforts. For example, intense media focus can affect the willingness of stakeholders to participate in recovery efforts, which may in turn influence any activities that involve engaging the stakeholder.

To understand and be proactive about a changing environment, the recovery team must be ready to adapt its program to changing external factors. Although the team does not have a lot of influence over factors such as government policy, funding levels, and pressures faced by various industry groups, the recovery process should be flexible enough that it can respond to external factors that influence the program's results. Socio-economic assessments can be a useful tool for identifying external influencing factors. By identifying and adapting to these factors in the planning and implementation stages of recovery, the recovery itself will be more effective.

The following questions may be used as a guide for identifying external influences:

- What external factors are likely to influence the recovery program?
- How will these factors affect program implementation and results? (positively and negatively)
- Can these factors be manipulated?
- Do alternative strategies need to be put into place to mitigate impacts due to the effect of external factors?

***Step 2: Describe the Desired Results of the Program***

After describing the context of your program, it is important to focus on your desired results before you consider activities and resources. By describing these temporal milestones, opportunities to measure the success of your program emerge.

Recovery teams may want to begin this process by identifying threats to the relevant species or ecosystem and rewriting them as outcome statements (see Table 1 for an example of threats to the rubber-necked guinea fowl). These statements should consist of the desired result you are looking to achieve and how it differs from the current state. For example, if highway mortality is an identified threat, adding a change word (e.g., increase, decrease, maintain) would convert it

into an outcome statement. At some point in the effort of documenting these outcome statements, they should also be rewritten to ensure that they are ‘SMART’ (see Section 8).

**Table 1. An example of how threats against a species or an ecosystem at risk may be turned into desired outcome statements using our hypothetical species the rubber-necked guinea fowl (RNGF).**

<i>Defined threat</i>	<i>Desired outcome statement</i>
Urbanization	Increased native grassland habitat
Harvesting of nesting/roosting habitat	Increased nesting/roosting habitat
Grazing in RNGF habitat	Decreased grazing in RNGF habitat
Hunting	Decreased catch of RNGF
	Increased population of RNGF

*Prioritizing* these threats is also an important component of planning species recovery, particularly when deciding how to use limited resources to choose appropriate activities; however, we recommend that this step be carried out after the logic model has been developed. By waiting to prioritize threats, teams will be able to develop a complete picture of what is needed to attain species recovery goals, and will better understand what activities are being compromised due to funding or time constraints. We provide a framework for prioritizing threats in Tables 2 and 3. This framework was developed by FORREX Extension Assistant Kym Welstead to help the Northern Goshawk Recovery Team with its action planning.

**Table 2. Proposed framework for prioritizing threats to species at risk. This table was developed by Kym Welstead as a means of prioritizing threats during action planning for the Northern Goshawk Recovery Team. The ‘score’ is calculated using the scheme outlined in Table 3.**

<i>Threat</i>	<i>Effect on recovery</i>	<i>Likelihood of success (biological and technical)</i>	<i>Score</i>
e.g., habitat loss			
e.g., competition from alien species			
e.g., low fecundity			
etc.			

**Table 3. Proposed scheme for scoring threats recorded in Table 2.**

		<i>Likelihood of reducing the threat</i>			
		<i>high (3)</i>	<i>medium (2)</i>	<i>low (1)</i>	<i>no (0)</i>
<i>Effect on species recovery</i>	<i>high (3)</i>	6	5	4	0
	<i>medium (2)</i>	5	4	3	0
	<i>low (1)</i>	4	3	2	0
	<i>no (0)</i>	0	0	0	0

Once you have converted all your threats to outcome statements, try to identify what kind of outcome they are—i.e., long-term, medium-term, or short-term. Most should be long-term changes in condition. It is important that these long-term outcomes relate to problem solving and not to program capacity (e.g., increased funding, decreased information gaps). Although these issues are important, in a ‘theory of change’ or outcomes logic model, they belong in the ‘input’ or resources section of the logic model.

a) *Long-term Outcomes or Changes in Condition*

The next step involves brainstorming to identify other changes in condition that would be necessary to achieve the overall recovery goal. Figure 6 illustrates one variation of how a logic model can be depicted for our hypothetical species, the rubber-necked guinea fowl. It shows the relationships among long-term outcomes and, ultimately, their cause and effect. During this step, the group may point out uncertain assumptions that require more information. Many of these will be research needs and should be documented for further development into a research plan. Identifying research questions in this framework clearly illustrates the value of research in achieving desired change.

Short-term outcomes	Medium-term outcomes	Long-term outcomes		Overall recovery goal
Ranchers have increased knowledge about grazing in RNGF habitat and desire to change practices to help conserve critical RNGF habitat	Decreased grazing in critical grassland habitat	Increased protection of existing critical native grassland habitat	Increased native grassland habitat	Within 20 years, RNGF are present throughout their historical range in the southern interior of British Columbia at a population level of N breeding individuals
Legislators have increased knowledge about grazing in RNGF habitat				
Municipal governments understand where critical RNGF habitat is located	Decreased urbanization in critical grassland habitat			
Urban developers have increased knowledge about how development may proceed without impacting RNGF habitat	Improved retention of RNGF habitat during urban development			
	Decreased grazing in degraded critical grassland habitat	Increased restoration of degraded native grassland habitat		
Forest managers have increased knowledge about benefits of hydroseeding with native grass seed species	Increased hydroseeding with native grass seed*			
	Improved legislation with regards to maintaining large Douglas-fir within managed forests	Increased retention of critical RNGF nesting/roosting habitat	Increased nesting/roosting habitat	
		Increased recruitment	Increased population of RNGF	
	Decreased catch of RNGF	Increased survivorship		

\* Knowledge gap: potential research question

**Figure 6.** An example of a partially-completed logic model for the rubber-necked guinea fowl (RNGF). Note that not all of the medium-term and short-term outcomes have been filled in; many more potential outcomes may be identified for these time frames.



### b) *Medium-term Outcomes*

Once long-term outcomes have been identified, the brainstorming should begin around medium-term outcomes—i.e., the results you can achieve 4–7 years after a program activity is started. These correspond to levels 5 and 6 in Bennett’s Hierarchy and include changes in human actions like behavior, practices, decisions, policies, and/or social action.

At this stage, it may be useful to test your logic by using the ‘if-then’ series of questions. An example of an if-then outcome chain, based on the long-term and medium-term outcomes outlined in Figure 6 is as follows:

- **IF** forest managers use native grass seed for hydroseeding in dry forests, **THEN** increased restoration of native grassland habitat will result
- **IF** hunters decrease their catch of RNGF during hunting, **THEN** increased survivorship of RNGF will result
- **IF** Ministry of Forest staff improve legislation with respect to retention of Douglas-fir in RNGF habitat, **THEN** increased retention of critical RNGF habitat will result
- **IF** municipalities increase regulation with respect to conversion of RNGF habitat to urban habitat, **THEN** increased protection of critical native grassland habitat will result
- **IF** urban developers change practices to improve retention of RNGF habitat during development, **THEN** increased protection of critical native grassland habitat will result

### c) *Short-term Outcomes*

What kind of changes in learning would be required to achieve each medium-term outcomes? These *learning outcomes*, or short-term outcomes, are results that you can see in 1–3 years. They correspond to level 5 in Bennett’s Hierarchy, and are changes in knowledge, attitudes, skills, aspirations, awareness, motivation, and opinions.

When defining short-term outcomes, it may become apparent to which audience the learning outcomes would apply. This information is critical as it forms the basis of an eventual extension plan for recovery of the species or ecosystem in question, and is an important contributor to ‘finding the extension’ within your recovery plan.

## ***Step 3: Defining Activities and Resources***

This step builds on the documentation of results by connecting them to contributing activities and resources and can be organized by laying outcomes out in a tabular form and lining them up with appropriate activities and resources. This information should be included in the recovery action planning document along with research, monitoring, and evaluation activities.

a) *Activities*

Activities should be defined based on the desired changes that have been documented in Step 2. Figure 7 illustrates how potential activities link to the short-term outcomes defined in Figure 6. By beginning with long-term outcomes and working logically through to desired short-term outcomes, all activities should contribute effectively to your overall recovery goal.

<i>Short-term outcomes</i>	<i>Potential activities</i>
Ranchers have increased knowledge about grazing in rubber-necked guinea fowl (RNGF) habitat and desire to change practices to help conserve critical RNGF habitat	Develop a strategy for educating ranchers about keeping cattle away from critical RNGF habitat
Legislators have increased knowledge about grazing in RNGF habitat	Provide feedback to government re: critical habitat needs of RNGF
Municipal governments understand where critical RNGF habitat is located	Work with municipal governments and other recovery teams to ensure best management practices are followed with respect to development within RNGF habitat
Urban developers have increased knowledge about how development may proceed without impacting RNGF habitat	Develop training module for urban developers to explain why and how they should maintain RNGF habitat during development
Forest managers have increased knowledge about the benefits of hydroseeding with native grass seed species	Develop education program for forest managers about hydroseeding with native grass species
	Partner with other organizations to provide information to forest managers about native grass seeding alternatives

**Figure 7. An illustration of potential activities to address short-term outcomes for the rubber-necked guinea fowl (RNGF). By beginning with long-term outcomes and working logically through to desired short-term outcomes, all activities should contribute effectively to your overall recovery goal.**

b) *Inputs (Resources)*

Once you have documented what type of activities you will carry out to attain your desired results, it is important to identify the resources your program will require to achieve those activities. It may also be useful to describe influencing factors that will support the implementation of activities.

## 8. The Final Step: Making Sure Your Desired Outcomes are ‘SMART’

A critical component of writing outcome objectives is to consider how the success of your program will be evaluated in the future. One way to do this is to ensure that the outcome objectives included in the recovery strategy are ‘SMART’—Specific, Measurable, Achievable and Ambitious, Relevant and Results-based, and Time-bound. Below are detailed examples of how statements should be written according to ‘SMART’ principles.

**SPECIFIC**—Identify a specific event, action or result that will take place. Make the outcome statement concrete and use action verbs. Avoid using vague words such as encourage, support, etc., which are difficult to describe and even more difficult to measure.

Example:

- Original outcome objective: Collaboration among landowners has increased.
- **Specific** outcome objective: As a result of our activities, landowner activities involving multiple landowners in the Kootenay region have increased.

**MEASURABLE**—Quantify the amount of change to be achieved. It can be numeric or descriptive and may include quantity, quality, or cost.

Example:

- Original outcome objective: The use of native grass seeding in hydroseed operations has increased.
- **Measurable** outcome objective: The amount of native grass seed used in hydroseeding operations has increased by 20%.

**ACHIEVABLE** and **AMBITIOUS**—Ensure that outcomes are realistic given available resources and plans for implementation yet challenging enough to accelerate program efforts.

Example:

- Original outcome objective: Eliminate communication barriers between policy makers and researchers.
- **Achievable** outcome statement: The number of opportunities for collaboration between policy makers and researchers has increased by 50% over the current year.

**RELEVANT** and **RESULTS-BASED**—Ensure that outcomes are logical and relate back to the program's goals.

Example:

- Original outcome objective: Increase participation in the annual RNGF workshop by 50% during the next year.
- Relevant outcome objective: Fifty percent of workshop participants will have applied one new RNGF management technique over the next 12 months.

**TIME-BOUND**—Specify a time by which the objective will be achieved.

Example:

- Original outcome objective: Persecution of RNGF will have decreased by 50%.
- **Time-bound** outcome objective: Persecution of RNGF will have decreased by 50% by 2007.

Including the appropriate level of change as described in Bennett's Hierarchy in a 'SMART'ly written outcome objective will improve your ability to evaluate the success of your extension program.

## 9. Summary

As Canada's most biologically diverse province, British Columbia is faced with a large number of species and ecosystems at risk. While focusing some resources on researching and monitoring related to these species and ecosystems continues to be important, it is equally important to focus resources on creating change in human behaviors and actions. Rather than focusing on public education, these resources need to be focused on creating change within specific groups of people whose activities and/or decisions impact the recovery of a species or ecosystem. Efforts in this area may include extending best available information and new skills to groups such as land managers, recreational groups, or tourism operators. As explained in this paper, using principles of extension to consider the needs and situation of the learner and to involve them in creating their own solutions is critical to the success of recovery planning and implementation.

A successful extension plan focuses heavily on achieving desired results, from changes in the knowledge and skill sets of a particular audience to eventual changes in policy, practices, or even environment or state. Planning tools such as Bennett's Hierarchy and the logic model improve our ability to document how 'what we do' links to 'what results from our program' and illustrates a logical 'if-then' flow of causal relationships from inputs and activities through short-, medium-, and long-term outcomes, which are critical to creating change. These tools can help link desired behavioral and biological changes outlined in the recovery strategy to the activities proposed in the recovery action plan. The result will be a tighter relationship between the strategy and the action plan, which will ensure that any actions initiated are strongly linked to the desired outcomes and will contribute to the overall recovery goal.

Effectiveness is a word that is used frequently in this climate of accountability and focus on performance. Recovery teams will be required to show progress towards their goals and objectives. This type of effectiveness evaluation can be easily integrated into the recovery planning phase by ensuring that any objectives that are written, whether they focus on creating human change or ecological change, are measurable. Writing 'SMART' objectives will support the effort to be as effective as possible and will minimize the perceived burden to demonstrate progress.

Over the past five years, FORREX staff have had the opportunity to assist recovery teams with their planning efforts. Our experience has shown us that extension tools and processes hold considerable value for recovery efforts in this province. With human change being at the heart of recovery success for so many species and ecosystems at risk, there is a need to include extension from the beginning of the strategic planning process. Planning for these necessary changes in

human behavior up front will help ensure our success in recovering species and ecosystems at risk in this province.

**Note:** Significant sections of this paper were taken from Sutherland et al. (in preparation). This manual will be available through [www.forrex.org/emcb](http://www.forrex.org/emcb).

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