Towards measuring the effectiveness of conservation outreach and education: Tools for linking outreach activities to ecological outcomes

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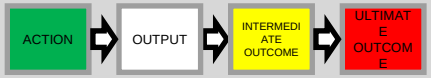
The Problem

Ecologists and conservation professionals often place a high value on education and outreach activities that are intended to communicate information about conservation topics, projects and programs to a broader audience. Substantial resources have been and continue to be invested by conservation organizations and government agencies in education and outreach. With these resources, however, come increased demands for accountability and a general interest in finding ways to link these activities more directly to ecological and environmental outcomes.

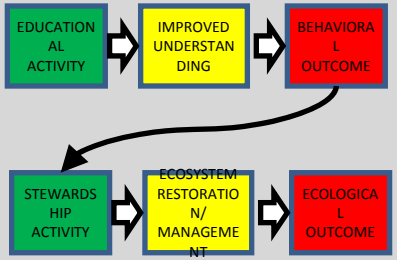
Logic Models: A Tool for Linking Educational and Ecological Outcomes

Logic models (also known as logic chains, causal chains, or results chains) are commonly used in the public health, philanthropic, and social service sectors as part of performance measurement and evaluation systems. These simple models show the anticipated causal links between activities, short-term outputs, intermediate outcomes, and long-term outcomes.



Logic models can be helpful in situations where quantitative models are not available or are difficult to develop. Unlike strictly quantitative approaches, logic models can combine both quantitative and qualitative results (outputs, outcomes) in a single integrated model. They can also be used to combine different types of outcomes (social, educational, economic, environmental, or human health).

This poster reports on our progress in developing logic models that link educational activities with environmental or ecological outcomes. Although logic models have commonly been used to relate educational activities with educational outcomes, and have also been used to link conservation activities with ecological outcomes, we note that it is possible to link educational activities with ecological outcomes in situations where the desired educational outcomes correspond to natural resource management, stewardship, conservation, or restoration activities:

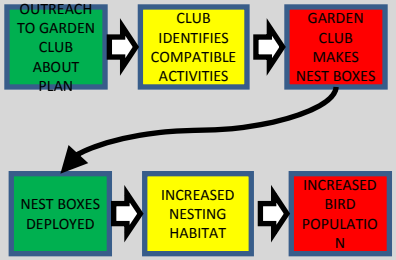


Examples

The following examples are derived from our recent work in developing performance measures for the new State Wildlife Action Plans in the United States.

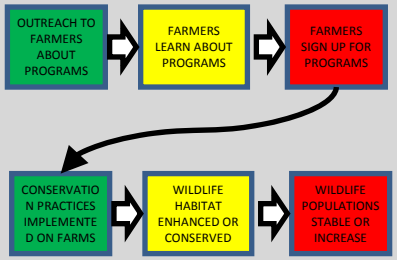
Outreach to a Civic Organization

Each U. S. state wildlife agency is currently conducting outreach to civic organizations and citizens groups that may be able to assist in implementing the new State Wildlife Action Plans. This logic model shows one possible pathway by which outreach activities to a citizens group can lead to direct effects on wildlife populations.



Outreach to Farmers

Many conservation organizations in the United States are engaged in outreach and efforts to farmers and ranchers. These programs seek to educate farmers about conservation programs offered by the U. S. Department of Agriculture. The intermediate goal of this outreach is to increase participation by farmers in these programs, while the ultimate goal is to increase, enhance, and conserve wildlife habitat. This logic model shows one possible pathway by which these outreach and education activities could result in direct benefits to wildlife populations.



In each of these cases, the desired educational outcome is a behavioral shift or change, which results in a stewardship activity that then leads through another logical pathway to an ecological or conservation outcome.

Limitations of Logic Models

Several key limitations of logic models have been identified in the literature and in our conversations with evaluation experts and conservation practitioners:

- **Simple** – reduce complex interactions to a single chain of events.
- **Linear** – do not reflect dynamic or recursive processes.
- **Non-quantitative** – cannot be subjected to quantitative analysis without additional information on process rates and transition probabilities.
- **Attribution is problematic** – do not provide a rigorous framework for testing hypotheses of causality, or for discriminating among multiple causal pathways.

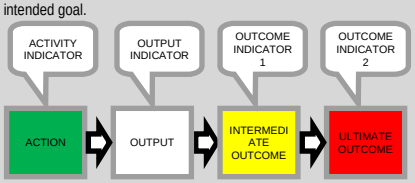
In addition, it can be shown that, for most real-world situations, the longer the logic chain, the lower the probability that the specified action will lead to the desired outcome.

Testing of Logic Models

Given these limitations, it is important to test the basic assumptions of a logic model before using the model in an actual monitoring and evaluation program. Here we describe several of the simpler tests that are available for conservation practitioners.

Indicator Analysis

This approach has been widely recommended in the literature and by various conservation organizations. Starting with the original logic model, identify a potential management indicator for each step in the model. Develop a monitoring program that measures each indicator at the appropriate temporal and spatial scales. As implementation and indicator measurement occur, review the results of the indicator measurements to determine whether the project will likely achieve its intended goal.



Literature Analysis

The existing literature on the science and practice of natural resource management , ecology, and conservation can also provide varying levels of support for the causal pathways that have been proposed in logic models:

- **No support:** Proposed sequence of events has not been previously documented.
- **Weak support**: The sequence of events postulated in the logic model has actually been documented at least once in the real world.
- **Stronger support**: A causal relationship has been demonstrated between the type of action that is being proposed and the intended result.
- **Strongest support:** It has been demonstrated that this exact action will lead to this exact result, with a high degree of probability.

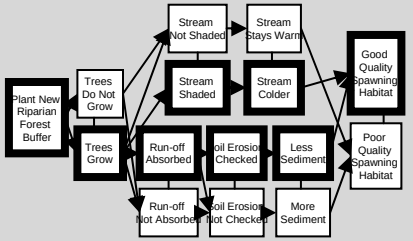
Testing of Logic Models *(continued)*

Logical Analysis

All logic models should be carefully reviewed and the following questions addressed: Do the steps in the model make logical sense? Do the downstream steps follow logically and necessarily from the steps earlier in the chain? Are there any major leaps in the logic or process assumptions that have not been explicitly stated?

Multiple Outcome Analysis

What other outcomes are possible? Arrows and boxes can be used to map these other outcomes, suggesting ways in which the observed results may differ from those in the simple linear model. Here we show a multiple outcome map for a very common conservation activity, the planting of a riparian forest buffer to improve fish habitat in a stream. The boxes outlined in bold are those which would be included in a conventional logic model.



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