

Prioritization of Conservation Resources



Prioritization tools help land trusts and municipalities make better decisions about where to focus conservation efforts and how to allocate limited resources.

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Introduction

Prioritization tools guide land trusts and municipalities in choosing which conservation projects to pursue, helping them to maximize the impact of their limited resources. Tools rank projects in order of importance based on an organization's values, objectives, resources, and other criteria.

Prioritization provides guidance, but it has its limits. Unusual opportunities can arise. Organizations do encounter potential projects that touch on values and issues not foreseen when a prioritization system was designed – values and issues that may make a project highly desirable, no matter a low priority ranking. Nevertheless, a prioritization system helps ensure that an organization fully understands when it is stepping outside its norms and prompts the organization to be particularly careful to objectively analyze the costs and benefits of an endeavor that the prioritization tool doesn't rank highly.

A wide variety of prioritization and decision-support tools are available, from pen-and-paper ranking systems to software programs that use GIS mapping. Many relate to specific conservation resources; a few attempt to combine many resources in one index or measurement system. This guide includes a sample prioritization method with step-by-step instructions. For information about other tools and systems, see "Featured Library Items" in the online guide.

Informal Prioritization Approaches

Informal prioritization approaches range from reliance on intuition to some structured project rating systems. Under certain circumstances, these methods can be effective. However, they are often compromised by a number of factors, including:

- Misalignment with organizational objectives and priorities
- Flawed logic (e.g., undue attention to the squeaky wheel)
- Difficulty comparing the costs and benefits of different projects objectively
- Inability to revise when circumstances change

As conservation projects become more expensive and the need for cost-effectiveness to remain competitive grows, land trusts benefit from the use of proven, formal prioritization systems.

Formal Prioritization Systems

Formal systems have two primary elements: performance criteria (often in the form of scales) and procedures for applying the criteria. To avoid the failings of informal systems, land trusts and municipalities should employ these elements in mathematically correct, logically consistent methods to ensure valid project rankings. Perhaps most importantly, formal priority systems require an organization to implement systematic review of each project during decision-making process.

Formal priority systems are:

- Aligned with the organization's mission
- Understood by decision-makers (values are measureable)
- Objective
- Transparent
- Replicable
- Defensible (the mathematic logic provides sound reasoning)

The table below outlines the steps to construct and implement a formal priority system, and the benefits of each step.

Step	Description	Benefit
Determine Scope	Define level and breadth of analysis required to address prioritization needs	Solve the correct problem, use resources appropriately, understand issues
Develop Value Hierarchy	Create graphical representation of organizational objectives and performance criteria	Align with organizational goals
Swing Weighting	Assign relative weights to organizational objectives and criteria	Align with organizational values, articulate importance of objectives
Project Identification	List potential projects	Avoid pet projects or projects to address "squeaky wheel"
Specify Performance Measures	Determine measures using scales that indicate the relative performance of projects	Establish precise, structured basis for project evaluation; ensure projects meet organizational goals

	in achieving organizational goals	
Establish Scales	Provide for non-linear accrual of benefits given incremental change in project performance	Avoid logical failures resulting from inadequate consideration of scales of measurement
Score and Rank Projects	Use performance measures to score projects based on criteria	Generate auditable, transparent ranking

One Approach to Prioritization

The following method is one way to rank potential conservation projects. It is only one approach; there are others, including those designed to address only specific resources like watersheds, rare species, or farmland (see “Featured Library Items” for more). This method was developed by the National Audubon Society for Important Bird Areas and has been modified for use by land trusts.

Determine Scope

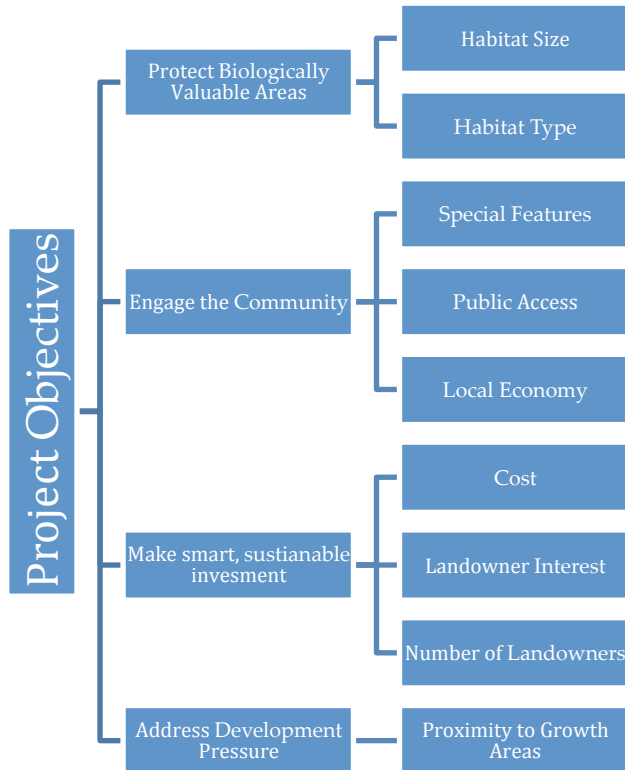
Determining the scope and level of analysis of a prioritization system requires properly framing the decision problem (i.e. what do we need to know in order to make a decision?) and determining the analytical results that will address this problem (i.e. what process will produce that information?). Organizations must address issues such as how projects are defined (by habitat, species, land use, etc.) and whether certain types of projects may be exempted from evaluation due to unique circumstances.

Develop Value Hierarchy

The second step is to develop a value hierarchy, a graphical representation of organizational objectives and the performance criteria used to evaluate achievement of those objectives. To produce valid priority calculations, a hierarchy should contain objectives that are fundamental, non-redundant, and independent. Fundamental objectives are those that define the mission and purpose of the organization. Non-redundancy means that objectives do not address the same or overlapping aspects of organizational performance. Independence ensures that achievement of one objective is not a byproduct of the achievement of another. This way, the benefits assigned to goals in the value hierarchy are cumulative and not double-counted.

A value hierarchy should also display performance criteria for each fundamental objective. While certain fundamental objectives inherently define performance criteria, others do not; performance criteria clearly articulates how fundamental objectives are accomplished.

Sample Value Hierarchy



Weight Objectives

While the objectives and performance criteria identified in the value hierarchy are fundamental, they may not be equally important. Therefore, it is necessary to weight them to reflect their relative importance.

Swing weighting requires particular attention to several details. Weightings cannot be simply a numerical translation of “very important,” “somewhat important,” or “not important.” Rather, the weights assigned to objectives must reflect the desirability of one objective compared to other objectives. If one objective is given more importance, another must be given less importance. See the chart below, where 100 total points are distributed unevenly among objectives.

Because swing weightings reflect policy decisions, formal priority systems require an explicit definition of policy-makers’ values with respect to tradeoffs among objectives. This auditable aspect of formal priority systems can be the most welcome (or unwelcome) feature of the analysis.

Sample Swing Weighting

	Points
Habitat Size	15
Habitat Type	15
Special Features	15
Local Economy	10
Public Access	5
Growth Pressure	10
Number of Landowners	10
Landowner Interest	10

Cost	10
	100

Identify Projects

The process of developing and weighting objectives and criteria may result in revisions to an organization’s list of potential projects. Projects might be added, redefined, or removed altogether. The process also functions as a screening mechanism: requirements for detailed evaluation of potential projects will limit consideration of ill-defined, tenuous, or pet projects.

The closer the projects are in size, the easier it is to evaluate and compare them. For example, comparing projects between five and 10,000 acres is much more difficult than projects between 50 and 500 acres.

Specify Performance Measures

In order to rank potential projects, an organization must establish measures of project performance for each fundamental objective identified in the value hierarchy. These measures may employ natural or constructed scales, both of which must identify the full range of project performance and define the basis for evaluation of potential projects. Scales are usually measured from a rating of zero to 10 points, with 10 being the best. See the section “Scales for a Sample Project Rating System” for more examples.

Natural vs. Constructed Scales

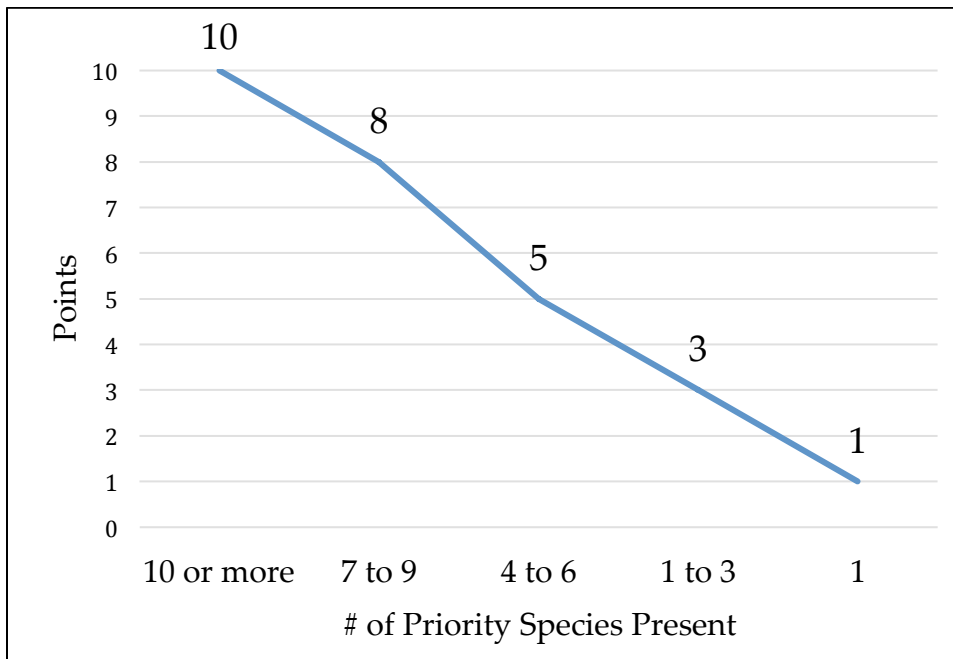
Natural scales are effective when direct numerical data on project performance is available. For example, a natural measure of forest value is total acreage—the bigger, the better. Constructed scales, in contrast, are effective when numerical data is not available or applicable. These scales must provide precise, unambiguous definitions of project performance, usually in the form of descriptions pertaining to specific criteria. One example is landowner interest, where project performance could range from “landowner is committed to conservation” (10 points) to “landowner has no interest” (0 points).

Non-Linear Benefits

Sometimes benefits do not accrue linearly; measurement scales should reflect this.

In the sample scale below, notice how the change in points awarded between “1 to 3” and “4 to 6” is smaller than the change between “4 to 6” and “7 to 9.” Though the difference in each case is an additional one to three priority species, the scores reflect a non-linear increase in biological value resulting from the additional priority species (i.e. seven or more priority species provide benefits not provided when only six species are present).

Sample Species Present Scale



Sample Project Rating Scales

This section consists of hypothetical project rating scales for an imaginary land trust with the value hierarchy described above (see “Sample Value Hierarchy”) and the following mission statement and protocol.

- **Mission Statement:** “Enriching the lives of all citizens by maintaining our rural character and local economy through preserving, protecting, and enhancing natural systems and encouraging land stewardship to ensure quality water and water supply, sustainable habitats, flood protection, carbon sequestration, and all forms of sportsmen activities, wildlife watching, and outdoor recreation.”
- **Protocol:** This scoring system is to be used by the board and staff to rank potential projects and assist in deciding the dollar amount to offer a landowner for a conservation easement.”

Biological Value

Habitat size (15 points)

- Large parcels of woodland over 1,000 acres or wetlands over 10 acres = 10
- Four or more wooded areas over 250 acres within 100 yards of one another or wetlands between five and 10 acres = 8
- Single wooded areas over 500 acres or three to five acres of wetlands = 5
- Single wooded areas over 250 acres or two to three acres of wetlands = 3

Species present (15 points)

- 10 or more priority species = 10
- Seven to nine priority species = 8
- Four to six priority species = 5
- Two to three priority species = 3
- One priority species = 1

Public Interest

Special features (15 points)

- Groundwater protection = 10
- Adjacent to stream = 8.5
- Scenic value = 7.5
- Meadow = 4

Local economy (10 points)

- Fishing, hunting, wildlife watching = 10
- Hiking, biking, kayaking = 7
- Camping = 1

Public access (5 points)

- 1,000 feet of road frontage = 10
- 500-1,000 feet of road frontage = 8
- 499 or less of road frontage = 6
- No road frontage = 1

Threat

Proximity to major growth area/water and sewer infrastructure (10 points)

- Adjacent to major growth area = 10
- Within a half mile of major growth area = 6
- Within one mile of a major growth area = 4

Feasibility

Number of landowners (10 points)

- one = 10
- two = 8
- three = 3
- four or more = 0

Landowner interest (10 points)

- Landowner is committed to land protection and an easement = 10
- Landowner is interested = 8
- Landowner might be interested = 4
- Landowner has no interest = 0

Cost (10 points)

- Bargain sale = 10
- Market = 8
- Above market = 1

Score and Rank Projects

Once each of these elements of the priority system is constructed, the physical process of project prioritization is relatively straightforward:

1. Score each project on its performance on each objective in the value hierarchy.
2. Multiply each score by the objective weight to produce criteria scores.
3. Sum the criteria scores to produce a total score.
4. Rank projects based on total score.

Generally, these results provide clear guidance on the relative merits of candidate projects. After compiling the scores, organizations may want to verify that the project rankings do indeed reflect organizational objectives and values, and make any adjustments to account for factors not addressed by the ranking system.

Sample Score Calculation

Project	Habitat Size	Habitat Type	Special Features	Local Economy	Public Access	Growth Pressure	Number of Landowners	Landowner Interest	Cost	Total
Big Creek	9(x15)=135	3.5(x15)=52.5	6(x15)=90	9(x10)=90	6(x5)=30	1(x10)=10	3(x10)=30	6(x10)=60	10(x10)=100	597.5
Little Creek	3(x15)=45	7.5(x15)=112.5	10(x15)=150	9(x10)=90	10(x5)=50	3(x10)=30	2(x10)=20	8(x10)=80	10(x10)=100	677.5
Green Hill	9(x15)=135	2.5(x15)=37.5	10(x15)=150	10(x10)=100	10(x5)=50	1(x10)=10	6(x10)=60	8(x10)=80	10(x10)=100	722.5
Bill's Swamp	8(x15)=120	5(x15)=75	8(x15)=120	9(x10)=90	7(x5)=35	5(x10)=50	10(x10)=100	7(x10)=70	10(x10)=100	760
Diane's Lane	10(x15)=150	7(x15)=105	8(x15)=120	9(x10)=90	6(x5)=30	6(x10)=60	10(x10)=100	7(x10)=70	4(x10)=40	765
Kickapoo Ridge	9(x15)=135	8(x15)=120	8(x15)=120	9(x10)=90	6(x5)=30	3(x10)=30	8(x10)=80	6(x10)=60	8(x10)=80	745
Blueberry Hill	6(x15)=90	2.5(x15)=37.5	6(x15)=90	10(x10)=100	6(x5)=30	1(x10)=10	5(x10)=50	6(x10)=60	8(x10)=80	547.5
Hawk Watch	10(x15)=150	10(x15)=150	10(x15)=150	10(x10)=100	8(x5)=40	8(x10)=80	8(x10)=80	10(x10)=100	10(x10)=100	950

Resources at ConservationTools.org

To find experts and other resources, see the right column of the on-line edition at <http://conservationtools.org/guides/61>.

Submit Comments

Help improve the next edition of this guide. Email your suggestions to the Pennsylvania Land Trust Association at aloza@conserveland.org. Thank you.

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