

## Biological Landscapes



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### 1. What is the tool?

**Biological Landscapes:** A process for mapping the spatial distribution of Landscape Species. The resulting Biological Landscape reflects information on abundance and density of each species, and the habitat quality.

The most common version of a Biological Landscape is a map of the *potential distribution of the species in the absence of human-mediated threats*. This type of potential Biological Landscape is based on information about the ecological requirements of species taken from literature, expert opinion, or empirical data. The tool can also be used to generate current and future Biological Landscapes that incorporate past and expected future threats, respectively.

### 2. What will this tool do for your project (or what conservation challenges will using this tool help you solve)?

#### Direct benefits

- ♦ It provides a powerful visual representation of the potential distribution of Landscape Species (if the population could recover from past threats and if future threats could be mitigated).
- ♦ It can also provide a visual representation of the present distribution of a Landscape Species given the impact of past threats.

It could, furthermore, provide a picture of the expected distribution of a Landscape Species given the likely impact of future threats.

- ♦ It allows for a comparison of current, future and potential Biological Landscapes to clearly demonstrate the severity of human impacts on the natural world; and “resets the baseline” of what conservation can and should achieve.
- ♦ It helps organize critical spatial information on the species and the landscape.
- ♦ It can help you to understand gaps in knowledge and help you to focus your future research and monitoring efforts.

#### Indirect benefits

- ♦ It can allow you to interact with other scientists and experts on each species, and to build a species information network.
- ♦ It can be used to involve stakeholders in landscape-scale conservation, and to build agreement and confidence in the spatial products.
- ♦ Using the tool in a participatory manner opens dialog with other stakeholders.
- ♦ It can raise public awareness of the state of the species (current, future and potential).

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## Material products

- ♦ The following **maps**, which show the distribution of each species:
  - ♦ The distribution of a species in the absence of threats (a potential Biological Landscape)
  - ♦ The distribution of a species after accounting for the past impacts of threats (current Biological Landscape)
  - ♦ The distribution of a species if threats continue or new threats appear (future Biological Landscape)
- ♦ Relative or numerical estimates of the potential and current abundance of each species. (See Manual 6 for information and examples.)
- ♦ A list of experts on the ecology and distribution of each of the Landscape Species.
- ♦ A list of data sources for your Landscape Species.
- ♦ Models used to generate Biological Landscapes (i.e., rules for constructing Biological Landscapes from available data).
- ♦ All of the GIS data collected in the construction of these models, and their metadata.

## The Landscape Species Approach

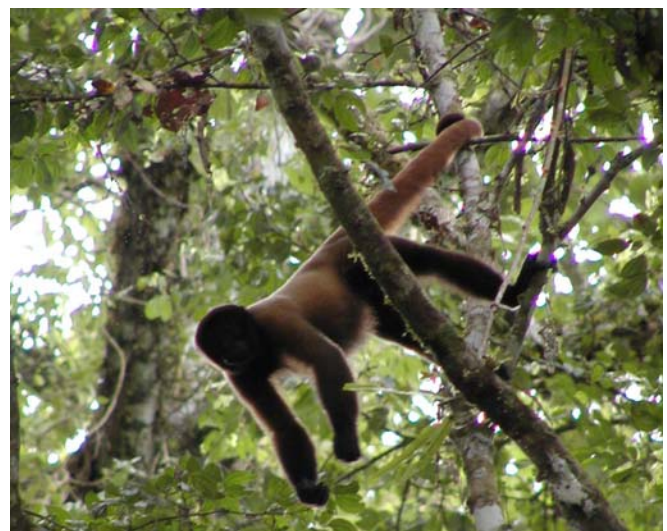
The Landscape Species Approach is a wildlife-based strategy to define ecologically meaningful conservation areas, recognizing the complexity of the biological and social landscape in which conservation occurs (see **Living Landscapes Bulletin 2**). The Landscape Species Approach depends on selecting a set of species with complementary ecological needs (a suite of Landscape Species which collectively represents the biodiversity of the landscape as a whole) (see **Living Landscapes Bulletin 3**). The goal of the approach is for conservation of the suite of Landscape Species to lead to conservation of not only those species, but of all biodiversity in the landscape.

## Field examples

Building Biological Landscapes can be difficult, especially as it requires you to make some “leaps of faith” and best guesses based on your knowledge of each Landscape Species and their requirements.

## 3. What will this tool NOT do for your Project?

- ♦ Will not provide perfect replications of reality; but, rather, maps that are models of reality. They help inform our conservation decisions but are simply best approximations that can be improved with better information in the future.
- ♦ Modeling Biological Landscapes is not a replacement for field work.
- ♦ The accuracy or precision of Biological Landscape models is difficult to estimate rigorously.
- ♦ The potential Biological Landscapes are difficult to validate as it is impossible to travel back to a time when human threats did not exist at your site.



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Living Landscapes Program—Building Biological Landscapes

## 4. What are the requisites for using this tool?

### Project type and stage of development

- ♦ To warrant spending the time and energy incurred in making the biological landscapes, you should be committed to the project over the long-term.
- ♦ The tool is most useful at the beginning of project development, when it can be used to clarify goals and help set priorities.
- ♦ The tool is also useful for advanced projects, to validate the project's current work, point out potential gaps, and justify project activities to local stakeholders and to donors.
- ♦ To use the tool, there must be broad consensus about the initial boundary of the landscape (although this often changes as the modeling progresses).

### Information and data

- ♦ Basic information about species biology and spatial data on the environment, across the entire area of interest (see Technical Manual 6 for more information about what types of data are needed).
  - ♦ If these data have not already been compiled, be aware that this will require significant staff time and effort.
- ♦ Empirical data, expert opinion, or information from the literature and other sources that are relevant for your site.
- ♦ Please note that the best products are generated by incorporating a wide range of resources (empirical, expert opinion, and literature), and are enhanced by stakeholder input.

### Technical staff skills

- ♦ Moderate to expert GIS skills
- ♦ Wildlife Ecology expertise
- ♦ Habitat modeling skills
- ♦ Please note: these technical skills can be found in one person or a group of people

### LLP tools

- ♦ Completion of a Conceptual Model is useful but not essential. (However, the project needs to, at the very least, have a clear goal and have selected conservation targets.)
- ♦ Selection of Landscape Species is useful but not essential.
- ♦ Setting Population Target Levels for each Landscape Species is useful not requisite.

## 5. How to use the tool:

- ♦ Read LLP Technical Manual 6.
- ♦ Consult Sanderson E. W., K.H. Redford, A. Vedder, P.B. Coppolillo, and S.E. Ward. 2002. **A conceptual model for conservation planning based on landscape species requirements.** *Landscape & Urban Planning* 58:41-56.

## 6. Who should be involved in using the tool, and why?

Development of Biological Landscapes might occur in three stages and should involve these stakeholders:

1. Model Development – Involve species experts and local experts (who have knowledge of the landscape and species), as well as project staff.
2. Model Review – Initial review by experts and involvement of the local authorities (to ensure buy-in).

3. Validation of your Model – In addition to eliciting a final review by experts, involve local authorities in this step as well.

## 7. How long will it take?

### *Data compilation:*

If you do not have all the information on hand, collecting or compiling all the information might take 6 to 12 months (if data are available in the literature), or even years (if data are not available and have to be generated through fieldwork).

### *Landscape modeling:*

After the spatial data are compiled and the literature review has been completed, it takes approximately 1 week per species to complete a first draft of the potential Biological Landscape. Production of the current Biological Landscape typically depends on the completion of the potential landscape and threat landscapes. Expect that maps of current distribution can be completed for all Landscapes Species in approximately 1-3 weeks after completing the potential Biological Landscape.



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## Living Landscapes Program Manuals

WCS-International saves wildlife and wildlands by understanding and resolving critical problems that threaten key species and large, wild ecosystems around the world. Simply put, our field staff make decisions about what causes the needs of wildlife and of people to clash, and take action with their partners to avoid or mitigate these conflicts that threaten wildlife and their habitat. Helping our field staff to make the best decisions is a core objective of the Living Landscapes Program.

We believe that if conservation projects are to be truly effective, we must: (1) be explicit about what we want to conserve, (2) identify the most important threats and where they occur within the landscape, (3) strategically plan our interventions so we are confident that they will help abate the most critical threats, and (4) put in place a process for measuring the effectiveness of our conservation actions, and use this information to guide our decisions. The Living Landscapes Program is developing and testing, with our field programs, a set of decision support tools designed to help field staff select targets, map key threats, prepare conservation strategies, and develop monitoring frameworks.

We describe the application of these tools in a series of brief technical manuals which are available by email from [llp@wcs.org](mailto:llp@wcs.org).

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