# SUMMARY: LANDSCAPE SPECIES APPROACH

August 2008

*A wildlife-based strategy for conservation developed by the Living Landscapes Program of the Wildlife Conservation Society*

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Wildlife conservation activities occur within a complex mix of biological, social and economic constraints that influence the ecological integrity of an area. While there are multiple threats to address, there is often little money available to address them. The Landscape Species Approach (LSA), developed by the Wildlife Conservation Society's Living Landscapes Program, can help conservationists focus their conservation efforts on those activities likely to have the greatest positive impact on wildlife populations and their habitat. This requires that we have a clear understanding of the ecological needs of wildlife species, as well as the human activities that impinge on them. The LSA provides both a coherent framework and the necessary tools to guide site-based conservation by defining ecologically meaningful conservation areas that account for the complexity of the local biological and social landscape. The objectives of the approach are to: define the extent of the landscape; identify important landscape elements for protection; conserve a suite of Landscape Species (in order to provide an effective umbrella for all the biodiversity at your site); identify areas of conflict, and the causes of this conflict, in order to target interventions; and produce an explicit and effective measure of conservation success. The assumption underlying the approach is that conservation of a suite of Landscape Species leads to conservation of not only those species, but all biodiversity in the landscape.

The LSA involves a series of independent tools that can build upon one another, including:

1. **Conceptual Models** for clearly defining a program's goals and objectives;
2. a participatory approach for **prioritizing and mapping human activities** that are threats to the landscape (and the wildlife within it);
3. a process for selecting **a complementary suite of Landscape Species** that, if conserved, will help protect all of the biodiversity sheltered under their collective conservation canopy;
4. a process for setting **Population Target Levels** that quantify how many individuals of each Landscape Species a project aims to conserve;
5. procedures for creating maps that help projects decide where to work: **Biological Landscapes** (the distribution of Landscape Species), **Human Landscapes** (those human activities that affect their distribution), and **Conservation Landscapes** (the possible impacts of conservation activities);
6. a participatory process for **prioritizing and strategically planning interventions**; and
7. methods for building effective **Monitoring Frameworks**.

The Living Landscapes Program also offers guidelines for conducting Livelihoods Surveys of the households living in your landscape.

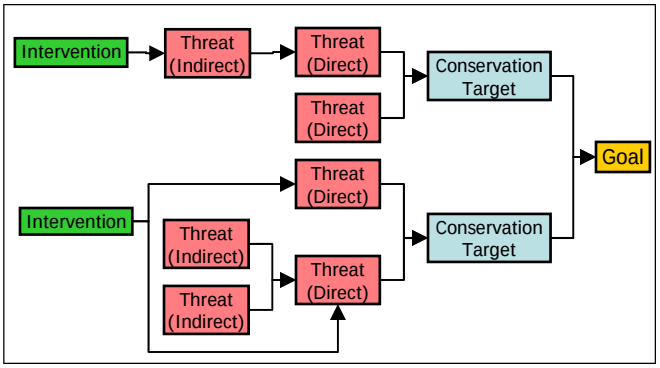
To determine which steps of the LSA are most appropriate for your landscape, please consult the LLP Bulletins, Technical Manuals and online guidance documents. These are available via email (conservationsupport@wcs.org).

## Step One: Design a Conceptual Model for your Site

Think of a Conceptual Model as "mental map" of the information stored in a conservation project manager's head. It is a visual representation of the factors that are having an adverse impact on plant and animal communities at the project site, and how conservation actions will be implemented to address these threats and help achieve the project's desired outcomes. Conceptual Models allow project managers to represent visually what may otherwise be difficult to communicate to others (e.g., government officials or donors), allowing people outside the project to better understand what field staff often know implicitly. Although Conceptual Models are useful at the outset of a project, they are an effective entry point into thinking strategically about a project *at any stage* of its development and implementation. It can be helpful to complete your Conceptual Model as a team, inviting input from a larger group of people with insight into the situation at your site.

A Conceptual Model:

1. explicitly defines those specific components of biodiversity that you are trying to conserve as a result of your project's interventions (your **conservation targets**);
2. defines and prioritizes the human activities that are **threats** to your landscape, those factors that, either *directly* or i*ndirectly*, result in negative impacts on the species and/or areas that you want to conserve;
3. visually represents how the threats that you identify cause these undesirable effects;
4. demonstrates that your **interventions** have been strategically chosen to reduce key threats and attain your conservation targets;
5. provides a framework that can eventually be used to direct your monitoring efforts to strategically assess project effectiveness and to adapt project actions (see Step Seven); and
6. offers a clear structure for reviewing and revising project assumptions and activities as conditions change over time.




A Conceptual Model also requires you to determine the major overarching **goal** of your project, which is ideally something both visionary and inspiring.

The model that this process produces will be a simplified model of the situation at your site, intended to guide your choice of interventions, communicate your ideas clearly, and optimize the effectiveness of your strategy. Therefore, you should try to be specific, simplify your model as much as possible, and focus on only those threats believed to be the most influential within your landscape. A Participatory Threats Assessment Workshop (Step Two) can help identify the most important threats in your landscape. Remember that the first draft of a Conceptual Model will likely be revised over time as threats change; each version should represent the best *current* understanding of what is important at the site. LLP provides more detailed instructions on how to build a Conceptual Model in **LLP Technical Manual 2.**



*Using a "sticky tarp" to construct a Conceptual Model.*

## What is a "Landscape"?

An area sufficient in size, composition, and configuration to support at least one ecologically functional population of all conservation features (species, communities, functions, etc.) for the long-term.

## Step Two: Conduct a Participatory Threats Assessment Workshop for your Landscape

A multi-stakeholder threats workshop allows project managers to solicit input on the human activities that are most likely to impact the biodiversity at their site. Workshop participants identify threats, generating a comprehensive list, and then rank them in order of perceived importance. This workshop can also occur *before* you develop a Conceptual Model, as it provides a list of the important local Direct and Indirect Threats which can then be input directly into your model. Detailed instructions on how to plan for and conduct this type of workshop are provided in **LLP Technical Manual 1**.

The workshop should provide consensus from participating experts on the most important threats to biodiversity at your site, as well as information on:

- where the threats to biodiversity occur;
- when these threats occur during the year;
- whether threats have changed in intensity over time;
- the perceived severity of each threat;
- how long the system might take to recover if a particular threat were removed; and
- how urgent it is to address each threat.

This type of workshop can be invaluable as it brings together stakeholders whose opinions may be at odds and introduces your project's mission and objectives to a larger audience. Approached correctly, it can build a foundation of trust and respect with people who may be important partners in future conservation actions. (See **WCS Working Paper 28** for more on working with local conservation actors.)



## Step Three: Select a Suite of Landscape Species

Conservation targets, such as Landscape Species, are those elements of biodiversity on which a project will focus its time and energy. The purpose of the selection process is to find a effective and efficient suite of wildlife that collectively represent the entire landscape, forming an effective "conservation umbrella" for all the biodiversity in the landscape including other species, ecosystems, and ecosystem services (e.g., clean water). A well-chosen suite will help a project define the size and spatial configuration of the landscape. **LLP Technical Manual 5** provides instructions for using LLP's Landscape Species Selection software as a tool to help select a suite of Landscape Species. Ideally, field biologists, management personnel and others with local expertise and/or knowledge of the species being evaluated will provide input during the Landscape Species selection process.

## What are "Landscape Species"?

Landscape Species are a type of conservation target whose purpose is to help projects use wildlife to define and conserve functional landscapes. They use large, ecologically diverse areas and often have significant impacts on the structure and function of natural ecosystems. Their requirements in time and space make them particularly susceptible to human alteration and use of natural landscapes.

Landscape Species: are **area-demanding**, require **habitat heterogeneity**, are **vulnerable to threats** from human activities, perform important **ecological functions**, and are **socio-economically important.** A well-chosen suite of Landscape Species will efficiently represent all important habitats, management zones, and threats present in the landscape.

## Step Four: Set Population Target Levels for your Landscape Species

One objective of the Landscape Species Approach is to conserve populations of Landscape Species to a certain level—what we call a Population Target Level (PTL). But what is the best way to determine an appropriate PTL? In other words, how many animals do we need in our landscape?

The rationale for animal conservation may be economic, cultural, aesthetic, and/or spiritual. Each of these motivations may suggest a different PTL, with a different set of guidelines and analytical methods needed to determine it. Because conservation is typically an incremental process with conservation goals that must be adaptively managed as circumstances change, you may find it useful to think incrementally about your population goals using the "DEAP" approach. Moving through these criteria may lead to higher target levels at each step (**D**emography < **E**cological integrity < **A**llowance for consumption < **P**ast history), but this is not always the case. The approach's four levels are:

1. **Demographic Sustainability:** a reasonable *Minimum Viable Population* for each species.
2. **Ecological Integrity:** a level which allows the population to interact with its ecosystem, evolve over time, and express its social dynamics and natural behavior.
3. **Allowance for Consumptive Use:** a level which considers traditional and/or economic uses which are compatible with the ecological integrity of the population. Some uses may be acceptable, or even desired, especially if they enhance conservation of the species or the landscape. *Maximum (or Optimum) Sustainable Yield* can be applied as long as it is calculated so as to maintain the ecological functions and integrity of the population, and not just baseline survival, of the population.
4. **Past (or Historical) Levels:** such levels provide long-term resilience against regular disturbance and catastrophic events while addressing concerns about the huge influence that people have on wildlife today.

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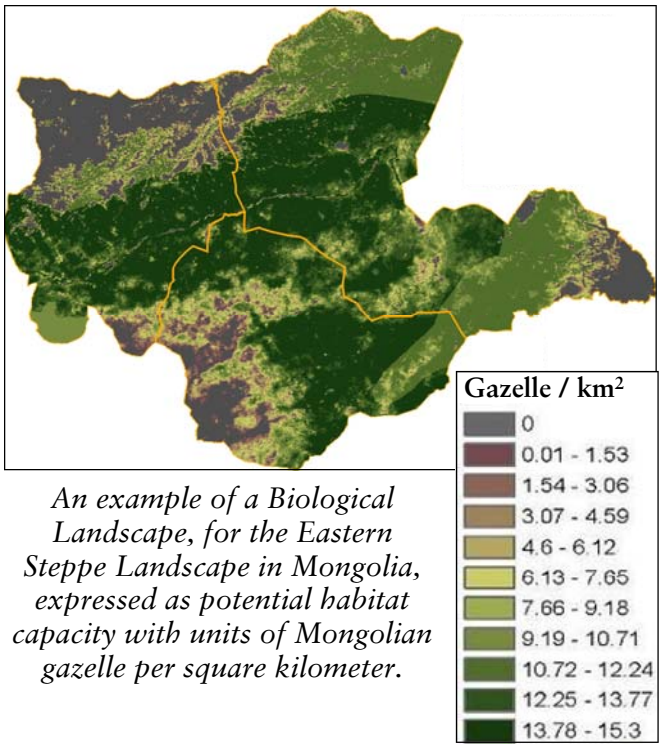
Projects should strive, at minimum, to conserve "ecologically functional" populations of Landscape Species in the long-term, ensuring that the habitats that these species represent and the ecosystem functions that they perform are also conserved. For a more in-depth description of the various types of PTLs and how to determine them, please see **Bulletin 8**.

## Step Five: Consider where to work by making Biological, Human, and Conservation Landscapes

Effective wildlife conservation requires that conservation efforts focus on those areas and activities that will have the greatest positive impact on wildlife populations. For those sites that wish to invest in spatially-explicit conservation planning and have the necessary expertise and data, mapping and modeling can supply significant insights into where you might best invest your scarce resources. The utility of Biological Landscapes (maps of habitat quality for Landscape Species) and Human Landscapes (maps of the impacts of human-caused threats) is greatly enhanced if you have already set Population Target Levels for your Landscape Species (see Step Four).

The spatially explicit parts of the LSA have several objectives: to illustrate current and potential distributions of Landscapes Species and to put some numbers to these distributions (via **Biological Landscapes**); to show where important human-mediated threats are occurring and how these impact species (via **Human Landscapes**); to show where conservation can have its biggest impacts by reducing threats (via **Conservation Landscapes**); and, using the information conveyed by all of these maps, to help you prioritize where you

might work in the short– and long-term. Below we briefly describe the three types of spatially explicit conservation planning critical to the LSA (see **LLP Technical Manuals 6 and 7** for more detailed information).




*An example of a Biological Landscape, for the Eastern Steppe Landscape in Mongolia, expressed as potential habitat capacity with units of Mongolian gazelle per square kilometer.*

## Biological Landscapes

Biological Landscapes are maps that show what the distribution of a Landscape Species would be if your conservation was successful. In other words, they are maps of "potential habitat capacity"- the ability of various areas to support each species throughout its life cycle *in the absence of the threats that your project can address*. Biological Landscapes help you to understand and express the ecological needs of your species in models and maps, allowing you to envision what long-term success might look like.

To create Biological Landscapes, you will need to survey the scientific literature for each of your Landscape Species, noting home range size as well as important ecological factors such as habitat and food requirements, location of water sources, movement, and potential competitors and predators. Observations from your actual site are important supplements to the literature review; they help you to build a Biological Landscape and to test whether your modeling is accurate. Note that if you've completed the Landscape Species Selection process, you have probably already compiled much of this information.

After you compile all the necessary information, we recommend these 8 steps for building a Biological Landscape (see also **Technical Manual 6**):

1. List important natural factors that impact the distribution of your focal species.
2. List anthropogenic factors that you can't or won't do anything about (these will be included in the Biological Landscape).
3. Identify the relevant GIS layers needed to build the model.
4. Clearly state how you will measure each factor, including units.
5. Relate, by graph or table, each factor that affects habitat capacity.
6. Make a flow chart that shows calculations and factors interactions and weights.
7. Build the model in ArcGIS.
8. Translate the model into abundance units (see **Technical Manual 7** for more detail on this).

## Human Landscapes

A Human Landscape, sometimes also called a Threat Landscape, is a map of human-mediated activity that has a negative impact on biodiversity. Typically these maps show where particular human activities occur and the intensity of the activities, irrespective of how those activities impact particular species (e.g., how many hunters access particular areas rather than the decrease in the population caused by hunters). A Human Landscape can have a "past" version which shows the distribution through present time, or a "future" version showing how the distribution of the activity may change in the future.

Much of the data for Human Landscapes will come from the maps and data collected during the Human Activities Assessment (Step Two), the Landscape Species Selection process (Step Three), and discussions with species experts and other experts working in the area.

To create your Human Landscapes, we recommend the following 7 steps (see Technical Manuals 6 and 7 for more detail):

1. Identify the human activities to be modeled for one Landscape Species.
2. List the important variables that affect the intensity of each activity (e.g., distance from a road, town size, etc.).
3. Identify the relevant GIS layers.
4. Clearly state how you will use the GIS layers to measure each variable, including the units that you will use.
5. Relate, by graph or table, each variable to the intensity of the activity.
6. Make a flow chart showing your calculations.
7. Repeat for the next activity.

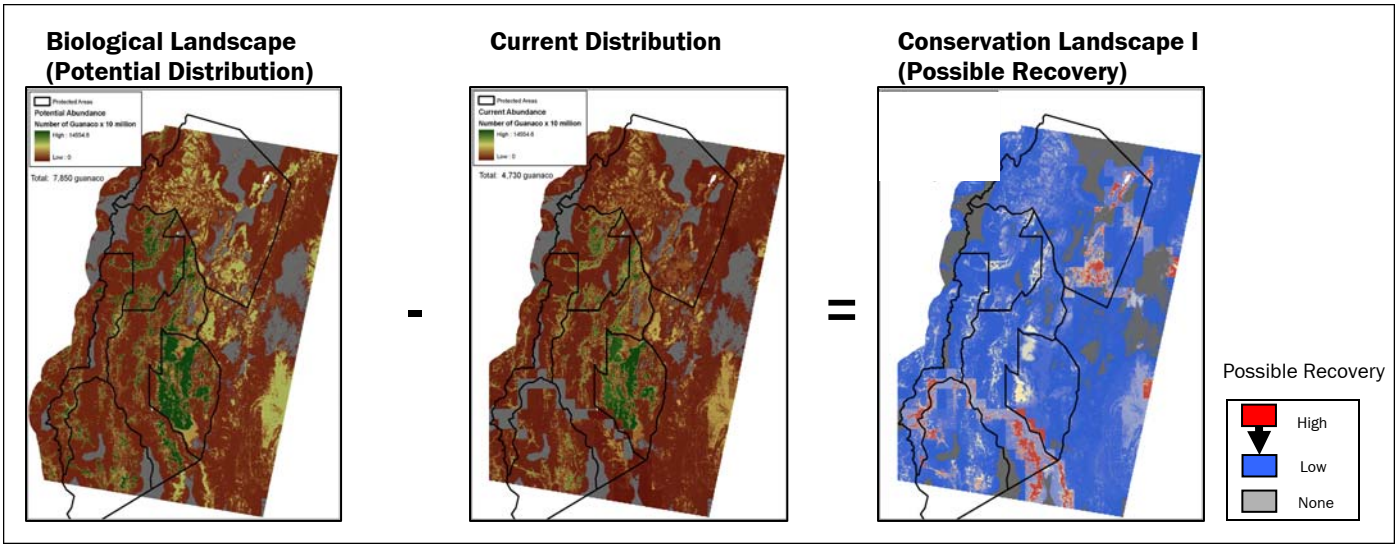
## Conservation Landscapes

Conservation Landscapes are maps that show the potential impact of conservation activities. These maps enable you to see where your conservation impact will be higher (or lower) so that you can make decisions about where you will invest your resources and what kind of interventions will be most effective. There are two versions of Conservation Landscape: one showing the possible impacts of conservation in terms of *population recovery*, and another in terms of *preventing future declines* in the population. Comparing your Conservation Landscapes with Population Target Levels (see Step Four), the potential costs of acting, and several other factors is the first step in guiding informed decisions about where you should focus your work.

To make a Conservation Landscape, you will:

1. Categorize each Human Landscape according to how it affects the species (either by directly removing individuals from the population or through habitat alteration) and what exactly the map represents (either the relative *intensity* of the activity or the *mortality* it causes to the species or habitat component).
2. Convert each Human Landscape to a Threat Impact Map that shows the net impact that the threat has on the population of the Landscape Species or its habitat component.
3. Combine the Biological Landscape with these Impact maps to produce a current (or future) distribution map.
4. Calculate the Conservation Landscape by subtracting the current (or future) distribution from the potential distribution as represented in the Biological Landscape (see below).

**LLP Technical Manual 7** describes the process for building Conservation Landscapes in greater detail.




*One way to make a Conservation Landscape (potential for recovery). This example is for guanaco in the Madidi Landscape of Bolivia.*

## Step Six: Utilize a Participatory Process to Prioritize your Areas and Interventions

In the same way that you used a multi-stakeholder workshop to generate a comprehensive list of the human activities that are likely to impact the landscape, you can utilize a participatory process to prioritize and strategically plan your interventions. A workshop soliciting input from local stakeholders can occur either before or after you develop your Conceptual Model. The purpose of this type of workshop will be to obtain consensus from the participating experts on the most important conservation activities that could be undertaken to mediate the threats to biodiversity at your site. It also provides you with another opportunity to build trust among the stakeholders in your landscape and yet another chance to disseminate your project's mission and objectives to a larger audience. By allowing local stakeholders to add their input on potential conservation interventions, you build crucial ties with those who may become important future partners in the implementation of these actions.

If your landscape is just too big for you to work across its entire extent, you may also want to consider where your spatial priorities lie. You can develop a workshop which integrates conservation planning software (e.g, Marxan, C-plan, or Zonation), your landscape maps, and input from stakeholders to build consensus about where limited conservation resources should be invested first, or where new protected areas should be created.

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## Step Seven: Develop a Monitoring Framework for your Landscape

To ensure that your program runs at full efficiency, you will need to monitor the effectiveness of your conservation actions over time. A well-designed monitoring program will enable you to optimize the efficiency of your response to changing conditions or revise actions which are not achieving the desired results. If you do not monitor the impact of your actions and assess your progress, you risk pouring considerable resources into ineffective activities that do not succeed in conserving wildlife. Although monitoring can be a daunting task, it is very important and should not be overlooked. A well-designed monitoring system will help you to determine whether your conservation actions are effectively reducing threats and conserving wildlife.

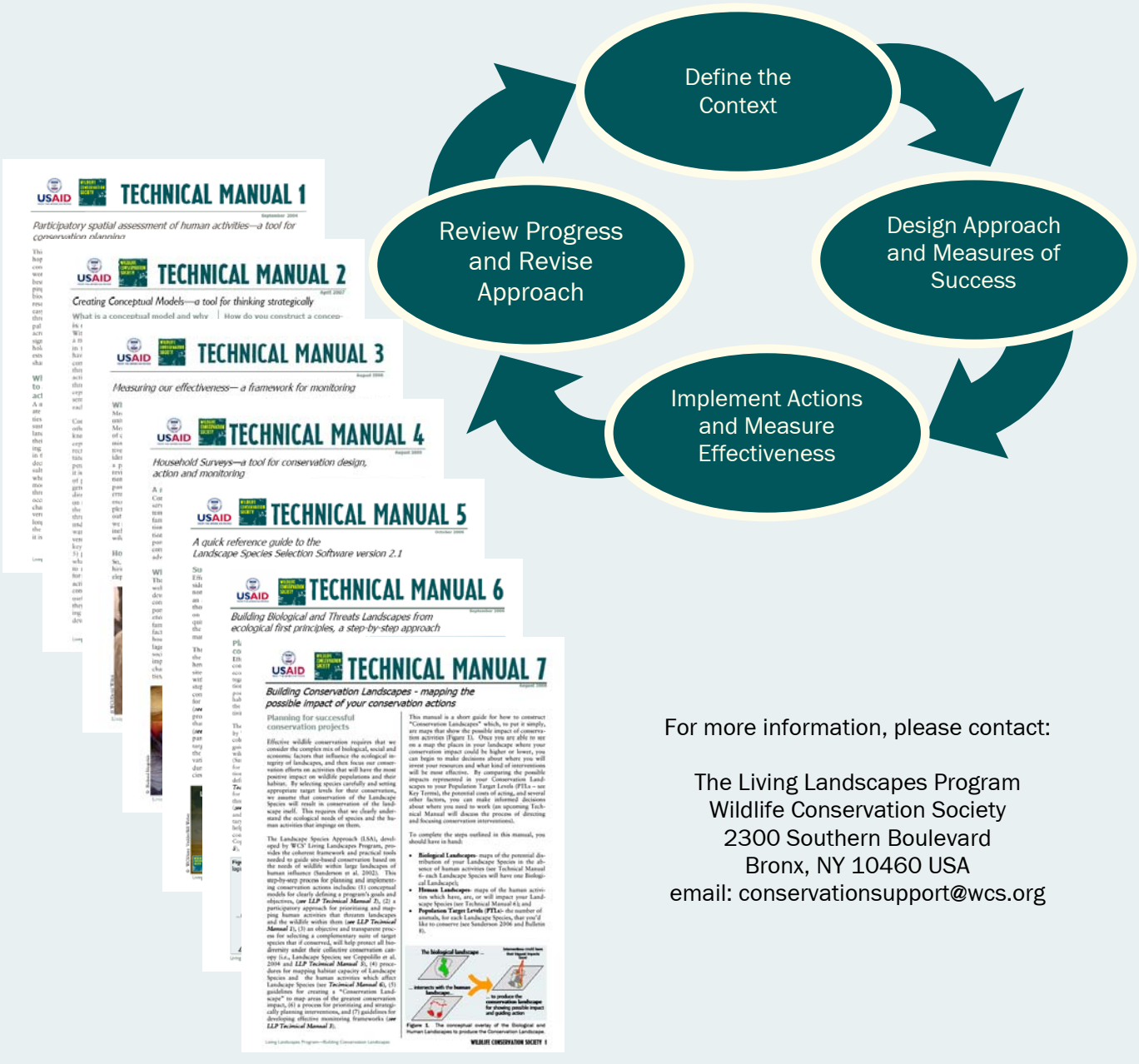
Thinking about the causal linkages between your actions, the prevailing threats in the landscape, and your conservation targets will provide a clear framework for measuring and demonstrating the effectiveness of your conservation activities. The goal will be to determine how each intervention has changed someone's behavior or improved their capacity to reduce one or more threats to the wildlife and wildlife habitat that you are trying to conserve.

Since it is virtually impossible to monitor all aspects of your system (due to restrictions in staff time and money available), you must make some decisions about how best to allocate your resources to monitoring activities. **LLP Technical Manual 3** describes the creation of a monitoring framework table and helps you to think about the tradeoffs in cost, precision and confidence associated with different qualitative and quantitative approaches to collecting monitoring information. As always, obtaining the consensus of a group of experts can help you to make these decisions with confidence.

During this process, it will become clear how monitoring at each level (target, threat, and intervention) can be directly linked to your project's Conceptual Model. By viewing trends over time, you can begin to see the effects of your actions.

# The Living Landscapes Program

WCS-Global field staff identify what causes the needs of wildlife and of people to clash and then take action, with their partners, to avoid or mitigate these conflicts that threaten wildlife and their habitat. The Living Landscapes Program endeavors to help them to make the best decisions possible. 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. With our field programs, we have developed and tested a set of decision support tools designed to help field staff worldwide select targets, map key threats, prepare conservation strategies, and develop monitoring frameworks. These steps are described in our LLP Bulletins and Technical Manuals.

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