Biodiversity Conservation at the Landscape Scale

A Program of the Wildlife Conservation Society
Supported by the USAID/Global Conservation Program

Coordination Unit, New York, USA
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April 2002 – September 2002

I. Summary of Activity Status and Progress

a. Introduction/Summary

The Biodiversity Conservation at the Landscape Scale (BCLS) Program is designed to develop and test an integrative, landscape-level approach to biological conservation across multiple sites. Accordingly, the program encompasses a diverse array of land-use categories and resource-use issues, in addition to a variety of approaches to site-based management. In order to facilitate work among these sites and capture the synergistic benefits from diverse experiences, a New York-based Coordination Unit is charged with managing the BCLS Program. This unit guides the three field sites as the landscape approach to conservation is developed and tested, assists in the design and development of sound monitoring programs at these sites, promotes cross-site learning, and ensures communication among the sites, WCS staff (central and field), USAID (Global Conservation Program (GCP) and country missions), and the larger conservation community. In addition, the Coordination Unit assesses and promotes opportunities for application of the Landscape Approach to new sites, with complementary funding from USAID and/or other sources.

In the second half of FY 2002, the Coordination Unit accomplished most of its planned programmatic, technical, and administrative goals. For the core sites, in collaboration with field staff, we continued to refine the landscape approach to site-based conservation with particular progress regarding the construction of 'biological' and 'human' landscapes. We continued to develop the landscape species approach as a tool for site-based conservation to the degree that it is now being adopted, in part or in whole, by other WCS projects as a framework for their efforts. We continued to produce communications materials for use within WCS, for distribution to field staff, and for external audiences. Furthermore, we have become engaged with several GCP partners on addressing conservation issues in monitoring and area targets for wide-ranging species.

b. Highlights

- A visit was conducted to the Bolivia site by the landscape ecologist and biological monitoring specialist to provide technical assistance in the landscape species analysis for the Northwestern Bolivian Andes Landscape. Some of this information was

incorporated into the Madidi National Park Management Plan and in WCS's plans for future interventions in the region.

- A visit to the Congo site was conducted by the biological monitoring specialist to assist in the completion of biological landscape models for each landscape species, and a human landscape model to make threats to conservation across the Ndoki-Likouala landscape spatially explicit. During this visit the biological monitoring specialist also provided technical assistance in monitoring, sampling design and data analysis.
- WCS and WWF took the lead in organizing a meeting of the GCP Conservation Measures Group while attending the Society for Conservation Biology meeting in July. As part of the background information leading up to the working group's meeting a poster was developed and presented by the socio-economic monitoring specialist (in collaboration with TNC and WWF) on "Reconciling Investments in Threats Abatement and Monitoring" at the Society of Conservation Biology meeting in July. As a result of the meeting the group came to a consensus on the need to develop mutually agreed upon 'standards' and protocols for measuring and reporting effectiveness, and to begin the process for developing these standards at a follow-up meeting in Washington DC scheduled for November.
- WCS and other GCP partners initiated collaborative work on the topic of 'area requirements for wide-ranging species'. Identifying area requirements for wide-ranging species remains a priority for all three organizations, but with no resources available to follow up on this interest, significant progress has been delayed while support is sought. A presentation was given on this topic by the landscape ecologist at the Society for Conservation Biology meeting in July (titled: "Using a Spatially-Structured Harvest Model to Set Targets for Reserve Areas"). The method presented provides a framework for evaluating the severity of particular threats based on their spatial extent and propensity to create population-wide declines for the species being evaluated.
- Completion of the design and development of software to facilitate the landscape species selection process by the biological monitoring specialist, and used to aid in the selection of landscape species in WCS Cambodia, Adirondacks and Greater Yellowstone.
- Presentations on the Landscape Species Approach for a variety of audiences including the WCS regional meetings of the North America, Latin America and Asia Programs. Other audiences included a meeting of Western Lowland Gorilla experts.
- A total of 177 CDs Living Landscape Program Resource CDs and 7000 Living Landscapes Program Bulletins were produced and distributed to WCS field staff, donors and conservation community colleagues.
- Bulletin 3 ("The Role of Landscape Species in Site-based Conservation") and Bulletin 4 ("Selecting Landscape Species") were printed and distributed in English, French and Spanish.
- Bulletin 5 ("Using Conceptual Models to Set Conservation Priorities"), Bulletin 6 ("Monitoring Conservation Project Effectiveness") and Bulletin 7 ("Setting Priorities: Threats Reduction or Monitoring Effectiveness") were written, printed and distributed.
- Outreach activities, highlighted above, have resulted in use of landscape species tools and concepts by a growing number of WCS projects, by TNC and the Moore Foundation, and interest has been shown by other conservation organizations.

c. Table of Activity Status

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Obj. 1	**Guide development and testing of the Landscape Species Approach**		
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Obj. 2	**Provide technical and monitoring assistance to BCLS field implementation**		
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II. Detailed Description of Progress

a. Key program objectives for this reporting period (April 2002 – September 2002)

In addition to continued development of the Landscape Species Approach and ensuring effective functioning of the program, our objectives for the second half of FY 2002 included: producing preliminary models of the human landscape and biological landscapes for the landscape species at two of the core sites; further elaboration of monitoring frameworks for each of the sites; providing a tool for facilitating landscape species selection; continuing writing and printing of the Bulletin series; critical assessment of additional sites for Program expansion; and widespread communication regarding the program and the approach through many different forums (Resource CDs, Bulletins, Powerpoint presentations, meeting representation, and published papers).

b. Activity Description

Objective 1: Guide development and testing of the Landscape Species Approach.

Activity 1.1. Landscape Species Approach Design
On track

Coordination Unit and BCLS field staff continued to disseminate the Landscape Species Approach to the wider conservation community. The manuscript detailing the landscape species selection criteria and how they were applied and refined in two core sites (Northwestern Bolivian Andes and Ndoki-Likouala) was resubmitted to *Biological Conservation* following a favorable initial review by the journal.

The biological monitoring specialist completed the design and development of user-friendly computer software to facilitate the landscape species selection process. The program implemented in Visual Basic is based on the work completed at the Bolivia, Congo and Ecuador sites, and a beta version has already been used for sites in Cambodia, the Adirondack Mountains of New York, and the Greater Yellowstone area. The software program continues to be refined as it is utilized, and an accompanying online help file is being written. Automating data entry and selection of landscape species will continue to ease the further dissemination of the approach to other projects within WCS and other conservation organizations.

Substantive progress was made on general protocols for 'building' biological and human landscapes and the process of combining them into 'conservation landscapes', especially with the Bolivia site (see Activity 2.1).

A talk given by the landscape ecologist on the topic of "Ecologically Functioning Populations (EFP)" was hosted by WWF in April with attendance by many GCP partners. This led to two immediate contacts by staff at TNC, and opened a discussion with WWF about potential collaborative work with WCS in Tanzania and Mozambique. In addition, the landscape ecologist gave another presentation on this issue in Bozeman, MT with particular emphasis on the importance of this topic within the Greater Yellowstone Ecosystem.

WCS and other GCP partners initiated collaborative thinking on the topic of 'area requirements for wide-ranging species'. Identifying area requirements for wide-ranging species remains a priority for all three organizations, but with no resources available to follow up on this interest, significant progress has been delayed while support is sought. A meeting in October is scheduled to further identify means of collaborative thinking on this topic.

The landscape ecologist and biological monitoring specialist developed a model designed to help define the area requirements for landscape species: this is a tool for investigating the sustainability of wildlife populations that undergo subsistence or commercial harvest. The model was presented at the July meeting of the Society for Conservation Biology as, "Using a Spatially-Structured Harvest Model to Set Targets for Reserve Areas".

The Alaska chapter of TNC requested the landscape species selection criteria and used them to evaluate their ecoregional planning process, an interesting application that had not been anticipated by the program. In addition, the Adirondack Chapter of TNC has shown interest in collaborating on landscape species planning in northern New York State. These are indications of the general utility of the approach we have been developing, and the beginning of its use beyond WCS. The approach has generated substantial interest within the conservation community, and in order to describe and promote its use, we continue to document anecdotal feedback on the concept and its application from additional audiences (see Appendix 8).

Activity 1.2. Threats Assessments
Completed

As detailed in the last report, threats assessments have been completed in conjunction with staff at each of the three core sites. During this reporting period, threats assessments continued to be refined in conjunction with staff from the two North American sites of Adirondacks and Greater Yellowstone. Periodic reassessment and refinement of threats are an important part of applying the Landscape Species Approach at each site.

Activity 1.3. Cross-site Analyses
On track

BCLS monitoring specialists engaged with a GCP working group with the initial intention to come up with a decision tool for allocation of scarce resources to either threats reduction or monitoring effectiveness (see Appendix 7). The group's first meeting included members of UK organizations and donors developing tools for cost effective monitoring at different spatial scales. The meeting was held both to share information on the present state of measuring effectiveness within the conservation community and to map out how we might efficiently work together to develop tools to measure the effectiveness of our conservation efforts at different scales. As a result of the meeting the GCP monitoring working group called 'The Conservation Measures Group' came to a consensus on the need to develop mutually agreed upon 'standards' and protocols for measuring and reporting effectiveness, and to begin the process for developing these standards at a follow-up meeting in Washington DC scheduled for November. As part of the background information leading up to the working group meeting a poster was developed and presented by the socio-economic monitoring specialist (in collaboration with TNC and WWF) on

"Reconciling Investments in Threats Abatement and Monitoring" at the Society of Conservation Biology meeting (see Appendix 9).

The socio-economic monitoring specialist also began his involvement with The Nature Conservancy's "Measures and Audit" team, which is working both at the site and ecoregion scales to develop tools for assessing conservation effectiveness. These two parallel processes demonstrate WCS's resolve to find ways to collaborate with other conservation organizations to develop cost-effective tools for measuring the success of our conservation investments.

The program director and socio-economic specialist have begun a cross-site analysis of ways to engage communities in the conservation of wildlife and wildlands. This analysis will focus on a learning portfolio of sites to document and compare a range of conservation strategies adopted with local communities, and characterize the conditions (socio-economic, political, and biological) under which different approaches are undertaken and appear most applicable. The projects represented within the assessment are intended to span a range of degrees of threat, sources of power, forms of tenure, and biological attributes.

Objective 2: Provide technical and monitoring assistance to BCLS Field Implementation.

Activity 2.1. Project Design and Monitoring
On track

Progress was made by the monitoring specialists with integrating the conceptual models, conservation actions and monitoring frameworks for each site. This is an iterative process as sites progressively and more systematically adopt the new strategic planning and adaptive management tools being developed through GCP funding. The biological monitoring specialist continued to work with many WCS field staff in reviewing and redesigning existing sampling methods in landscape species research. Landscape analyses were continued for the Bolivia, Congo and Ecuador core sites. The landscape ecologist and biological monitoring specialist visited the Bolivia site in late April and assisted with the completion of biological landscapes for all six landscape species (jaguar, white lipped peccary, surubi, spectacled bear, Andean condor and vicuña). These were combined with a human landscape model based on a spatial representation of the number and intensity of threats across the landscape. The analysis provided information on the areas of Madidi's major habitat types (as represented by the landscape species for each), and threats affecting each. These data revealed that the highland portion of the Madidi landscape has less area 'captured' in each habitat type and that a larger proportion of each is threatened than in the lowlands. Staff are currently engaged in setting priorities among identified threats to focus future action on the most pressing threats among the areas of intersection between human and biological landscapes (see Appendix 10). This information was incorporated in the Madidi Management Plan and in WCS's plans for future interventions in the region.

In August, the biological monitoring specialist worked closely with Congo staff in the completion of preliminary biological landscape models for elephant, chimpanzee, forest buffalo, bongo and dwarf crocodile and a human landscape model. The human landscape makes those same threats to conservation, identified during the threats assessment and incorporated into the

landscape species selection process, spatially explicit across the landscape. Further progress will be reported in the next fiscal year.

The biological monitoring specialist provided technical assistance to the BCLS program staff at the Congo site, which was a great opportunity for capacity building. She assisted with a design of a study to investigate ape densities and identify the rate of chimpanzee and gorilla nest decay in the Goualogo Triangle region of the Ndoki-Likouala landscape. Statistical and GIS feedback was given for the treatment of a dataset from a large mammal and human impact survey of 5700 km^2 of the Ndoki-Likouala landscape. In addition, she assisted in modifying methods for calculating the area of influence with regard to wildlife off-take around certain population centers in the landscape. Field staff were also given exposure to the Distance 4 software used in the design of distance sampling studies and analysis of such data. The biological monitoring specialist and Paul Elkan (the Director of WCS' program in the forestry concessions in the Ndoki-Likouala Landscape) discussed aspects of potential study designs and options for data analysis, which impact the monitoring of landscape species and conservation threats across the landscape.

Activity 2.2. Project Needs Assessment
On track

The director and other programmatic staff continue to assess the technical needs of the core sites by maintaining regular contact with field staff and Coordination Unit staff. This resulted in site visits to the Bolivia and Congo core sites (see Activities 2.1 and 3.1).

In addition, an internal assessment of the Living Landscapes Program was initiated in May to identify areas for improvement in the technical aspects of the program and in its implementation across the field programs of WCS. The internal review was conducted primarily to 1)assess the strengths and weaknesses of the program and 2)determine how well the program is understood and communicated, as well as implemented across WCS International.

Activity 2.3. Application of Living Landscapes Approach to New Sites
On track

The Landscape Species Approach is being extended to additional WCS long-term project sites via several mechanisms. Coordination Unit staff continued to work closely with WCS Regional programs to identify WCS sites for the potential application of the landscape tools and the Landscape Species Approach, both within the context of the upcoming GCP Phase II proposal and beyond.

To spread awareness within WCS of the Living Landscapes Framework and its applications to site based conservation, the landscape ecologist and director attended the Latin America, North America and Asia Regional meetings (the Africa and Marine Regional Meetings fall in the next reporting period). This helped to disseminate the tools and ideas generated by the Living Landscapes Program and allowed face-to-face consultations with field personnel.

During this reporting period, there was continued consultation with the WCS Cambodia program as they apply the Landscape Species Approach in the Northern Plains of Cambodia. The

approach forms the central framework for a Global Environment Facility "PDF B" activity that begins this year. Technical assistance by the BCLS staff included working with WCS staff Colin Poole and Joe Walston to select landscape species for the site.

There was continued momentum in the implementation of the Landscape Species Approach in two sites in the USA (independent of USAID funding): the Greater Yellowstone region (MT, WY and ID) and the Adirondack Park (NY). During this reporting period, program staff worked closely with the WCS North America Program, as well as potential partners in both regions, to refine threats assessments and proceed with landscape species selection.

The landscape ecologist conducted a site-assessment visit to Tanzania and northern Mozambique, examining the Rungwa-Ruaha area, the southern Selous, and Niassa Reserve, in N. Mozambique, to evaluate the opportunities and need for establishing a site-based program in these areas. After visiting all three areas and preliminary consultations with TANAPA (Tanzania National Park Authority), Wildlife Division and local stakeholders, the Rungwa-Ruaha landscape was provisionally selected as an area for a WCS site-based conservation program. The USAID Mission in Tanzania and many of the stakeholders within the Rungwa-Ruaha landscape indicated strong interest in the development of a WCS program in the area.

Beyond the WCS realm, members of the Living Landscapes Program are involved in planning the "Linkages in Landscapes" stream for the World Parks Congress (WPC) in Durban (Sept. 2003). The Landscape Ecologist held one meeting with the stream organizer and planned one other follow up workshop. The WPC will allow WCS and our colleagues to present policy makers and managers with an up-to-date set of tools for site based planning, analysis and management. More importantly than just assembling this set though, the WPC will provide the opportunity to compare these tools and identify the best fit for each situation.

Finally, program staff outlined and begun writing a "Living Landscapes Manual, that will describe the tools developed by the Living Landscapes Program and how each can be applied to site-based conservation. A preliminary draft of the manual should be available by summer 2003, and it will be updated periodically to incorporate changes and new developments in the Living Landscapes Framework.

Activity 2.3. (from FY 2001). Wildlife Health Research
On track

Note: Although this activity was included in the FY 2001 Implementation Plan and not in the FY 2002 Implementation Plan, carryover funds continued to be used during this fiscal year and are therefore reported below.

During this reporting period, the Field Veterinary Program hired Dr. Steven Osofsky to fill the position of Senior Policy Advisor for Wildlife Health. The creation of this position is indicative not only of a continued commitment to the realization of the USAID wildlife health guidelines but also of a new focus for the program and WCS at large. Dr. Osofsky, a veterinarian with extensive field experience and expertise in health issues at the human/wildlife/livestock interface revised the draft wildlife health guidelines, based on feedback from several USAID offices including Environment and Science Policy and Natural Resource Management. A future

meeting will be held with Dr. Osofsky, Dr. Karesh (FVP Department Head) and Dr. Robert Cook (VP-Health Sciences) at USAID offices in Washington D.C. to pinpoint specific needs of evaluators in regards to using the manual as a organization-wide resource for wildlife health information. The final document will include discussion of wildlife health "hotspots", concise current examples of the impacts of disease and the relevance of these issues to USAID development work. The wildlife health guidelines, now with the working title " A Proactive Screening Protocol for Assessing Potential Impacts of USAID Assistance on Wildlife, Livestock and Landscape Health: A Practical Primer for USAID Officers Evaluating Proposals and Projects" is scheduled for completion in the spring of 2003.

Objective 3: Ensure coordination and communication services for the Program.

Activity 3.1. Project Consultation/Site Visits
On track

In April, the landscape ecologist and biological monitoring specialist conducted a visit to the Bolivia site, where they assisted with the production of preliminary biological and human landscape models, and provided technical assistance to the BCLS program staff (see Activity 2.1). The landscape ecologist also visited the Greater Yellowstone Ecosystem in June, to assist in their implementation of the Landscape Species Approach, and to meet with local partners.

In August, the biological monitoring specialist conducted a site visit to Congo to construct with the site staff biological and human landscape models, and provided technical assistance to the BCLS program staff on a variety of issues including, monitoring, sampling design and data analyses (see Activity 2.1).

Activity 3.2. Annual Meetings
Delayed

The annual meeting of the Living Landscapes Program was not held during this reporting period and associated (WCS) funds were carried over into the next fiscal year. This decision was based on the current economic climate, the fact that no driving issue necessitated discussion within the all-inclusive Living Landscapes group, and because during this fiscal year site visits were conducted to each of the three core sites for site-specific needs. During FY 2003, representatives from USAID, relevant NGOs and governmental agencies, staff from the core sites and Coordination Unit will likely meet in small working groups to address key issues in site-based conservation that are deemed timely and necessary by WCS field and NY staff.

Activity 3.3. Budget and Administration
On track

During this reporting period, all USAID reporting deadlines were met in a timely fashion. Semi-annual reports and Implementation Plans were written by field staff, and submitted by the program officer. Quarterly accounting reports were submitted to GCP by the program officer in April and July. The program officer, director and landscape ecologist participated in a quarterly GCP meeting in April, and the program officer and director participated in a second quarterly meeting in July.

Finally, during this reporting period BCLS staff (especially the director and program officer) were engaged with a GCP evaluation that began in July with a meeting with the consultant conducting the evaluation in New York, participation in a GCP roundtable in July, and substantial staff time on aspects of the evaluation process, the questionnaire and the analysis of results.

Activity 3.4. Communications and Informational Packets
On Track

BCLS staff continued significant outreach activities during this time period. Staff gave presentations about the Living Landscapes Program and the Landscape Species Approach throughout this reporting period. The director attended the North America Program regional meeting in April and the Latin America program regional meeting in August in order to increase awareness of the Approach and its potential utility for site-based programs within WCS. The landscape ecologist attended the Asia Program regional meeting in May for the same purpose, and also gave a presentation during a site visit to the Greater Yellowstone ecosystem in July. Another audience was members of a meeting of Western Lowland Gorilla experts in Germany in May.

Living Landscapes Program Bulletin 3 ("The Role of Landscape Species in Site-based Conservation") and Bulletin 4 ("Selecting Landscape Species") (printed during the last reporting period) were translated into French and Spanish and delivered to field sites for in-country distribution (See Appendices 1-4). During this reporting period, Bulletin 5 ("Using Conceptual Models to Set Conservation Priorities"), Bulletin 6 ("Monitoring Conservation Project Effectiveness") and Bulletin 7 ("Setting Priorities: Threats Reduction or Monitoring Effectiveness") were printed and distributed (See Appendix 5-7).

To date, distribution of the Bulletins in all three languages has been widespread, with over 7000 copies distributed. Over half to two thirds of the Bulletins printed have been distributed to date to WCS staff and associates, interested members of the press and other media, GCP partners, foundations, as well as to other interested individuals. In addition, the Bulletins are all available on the Living Landscapes Program website (www.wcslivinglandscapes.org), as well as on the multi-institutional online resource Conserve Online (www.conserveonline.org). Bulletins 5-7 were also featured in the USAID Development Experience Clearinghouse email newsletter (www.dec.org).

The creation of the Living Landscapes Program Resource CD has proven a popular and useful resource for WCS and other colleagues. The CD contains information useful for site-based conservationists, with specific information for the Landscape Species Approach its implementation and supporting documentation including scientific literature, freeware for natural resource management and analysis, and information on approaching host country USAID Missions under the aegis of the Leaders with Associate Award. During this reporting period, a total of 177 Resource CDs and over 7000 Bulletins were produced and distributed via WCS regional meetings, to WCS communications for media use, to WCS Development for dissemination to potential donors, other GCP partners, foundations, and interested individuals.

III. Success Stories and Appendices

The refinement of the Landscape Species Approach continues with our core BCLS sites and with more recently incorporated WCS project sites in Cambodia and North America. The first three years of the Living Landscapes program have resulted in widespread WCS internal interest and participation in the approach by a diverse set of sites and personnel. Several unexpected and interesting applications of the Landscape Species Approach and its concepts included the use of the landscape species selection process by the Alaska chapter of TNC to evaluate their ecoregional planning process, initial discussions of collaborative work on landscape species with the Adirondack Chapter of TNC, and the use of the landscape species concept by the Moore Foundation on their website.

The Living Landscapes Program continues to play an important role within the GCP, participating in all quarterly and annual meetings, engaging in the intensive evaluation conducted during this reporting period, and coordinating each of two working groups that originated at the GCP annual meeting held in the first half of the fiscal year. The 'monitoring' group and the 'wide-ranging species' group have worked to engage members of GCP partner organizations in collaborative work on two critical issues facing the conservation community.

Appendices

1. Bulletin 3 French ("Les Roles des Espèce-Paysages dans la Conservation sur le Terrain")
2. Bulletin 3 Spanish ("Los Papeles que Cumplen las Especies Paisaje en la Conservación basada en el Sitio")
3. Bulletin 4 French ("Selectionner les Especes-Paysages")
4. Bulletin 4 Spanish ("La Selección de Especies Paisaje")
5. Bulletin 5 ("Using Conceptual Models to Set Conservation Priorities")
6. Bulletin 6 ("Monitoring Conservation Project Effectiveness")
7. Bulletin 7 ("Setting Priorities: Threats Reduction or Monitoring Effectiveness")
8. Living Landscapes comments documented
9. "Reconciling Investments in Threats Abatement and Monitoring" poster presented at the Society for Conservation Biology meetings in July
10. Outputs from landscape species analyses in Madidi Landscape.
11. Living Landscapes Program Resource CD (mailed to USAID/EGAT on 1/15/02)

WILDLIFE CONSERVATION SOCIETY

PAYSAGES VIVANTS BULLETIN 3

MAY 2002

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Le programme Paysages Vivants est une initiative de la Wildlife Conservation Society visant à identifier, tester et mettre en place des stratégies basées sur des espèces pour conserver des écosystèmes étendus et sauvages intégrés dans des paysages sous influence humaine.

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LES ROLES DES «ESPECE-PAYSAGES» DANS LA CONSERVATION SUR LE TERRAIN

L'approche «espèce-paysage»

L'approche «espèce-paysage» est une stratégie basée sur les faunes sauvages permettant de définir des zones de conservation ayant une justification écologique, d'identifier où et pourquoi des conflits existent entre l'homme et les espèces sauvages, de concevoir et de mettre en place des actions de conservation pour limiter ou arrêter ces conflits, de suivre l'évolution de ces programmes et d'adapter les actions de conservation à la lumière des résultats. Nous pensons qu'en observant la complexité des paysages à travers les yeux des espèces sauvages – en comprenant les besoins variés et étendus des espèces-paysages – il est possible de définir des zones de conservation et des priorités de gestion qui assureront un avenir pour une faune et une flore abondante et diversifiée dans un monde de plus en plus dominé par l'homme.

Caractéristiques des espèces-paysages

Les espèces-paysages utilisent des zones étendues et écologiquement variées, et ont un impact significatif sur la structure et le fonctionnement des écosystèmes naturels. Leurs besoins en habitat dans le temps et dans l'espace les rendent particulièrement vulnérables aux pratiques d'utilisations et d'exploitation des terres par l'homme. L'identification des besoins écologiques des espèces-paysages permet d'orienter la gestion de paysages étendus pour la conservation de la biodiversité. Elle permet également d'évaluer si les actions de lutte contre les menaces pour la biodiversité sont efficaces. En répondant aux besoins en habitats des espèces-paysages et en supprimant les menaces qui pèsent sur elles, on constitue une base solide pour préserver la biodiversité et l'intégrité écologique des grandes régions sauvages dans le monde.

Concepts clés:

Répondre aux besoins en habitats des espèces-paysages et supprimer les menaces qui pèsent sur elles constitue un cadre biologique explicite pour conserver la biodiversité et l'intégrité écologique des grandes régions sauvages dans le monde.

Les espèces-paysages peuvent jouer différents rôles: espèces-parapluies; évaluation de l'échelle du paysage; évaluation des menaces; conservation des régions sauvages; fonctions écologiques; suivi des changements.

Les besoins en habitats d'un ensemble complémentaire d'espèces-paysages permettent d'identifier les zones nécessaires à la protection de la diversité animale et végétale d'une région sauvage. De plus, choisir des espèces complémentaires en termes de menaces assure que l'ensemble des menaces clés pour la biodiversité est pris en compte.

Les espèces-paysages ne constituent pas forcément des espèces indicatrices au sens écologique classique, et ne sont pas necessairement globalement menacées ou endémiques. Elles ne permettent pas de justifier aveuglément la conservation de grandes régions, mais attirent plutôt l'attention sur les zones nécessaires à une conservation efficace à l'échelle du paysage.

Rôles des espèces-paysages pour la gestion

Les espèces-paysages, qu'elles soient prises seules ou combinées avec d'autres, constituent un outil puissant de planification de la conservation. Elles jouent des rôles multiples dans la conception et la mise en place des stratégies de conservation. Pour être caractérisée comme une espèces-paysage, une espèce doit répondre à un ou plusieurs des critères suivants :

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Espèce-parapluie

Les meilleures espèces-parapluies sont celles qui ont besoin d'étendues les plus importantes possibles et d'habitats les plus variés possibles. Par exemple, en Asie, la diversité et la biomasse en ongulés les plus importantes se rencontrent dans les zones hétérogènes de prairies et de forêts. Ces paysages sont également ceux où les densités en tigres sont les plus élevées. Comme une population saine de tigres nécessite un espace étendu et une quantité de proies adéquate, un programme de conservation efficace pour les tigres seuls doit protéger la majorité de ces ongulés et l'habitat dont ils ont besoin. Les tigres jouent un rôle d'espèces-parapluies, car leur conservation implique celle de nombreuses autres espèces avec des territoires plus restreints et des besoins moindres.

Reconnaître les besoins des espèces est un pas essentiel pour la mise en place des priorités de conservation, mais il est impossible de trouver une seule espèce dont les besoins couvrent ceux de toutes les espèces vivant dans une communauté diversifiée. Le parapluie le plus robuste et le plus complet est donc constitué d'un ensemble d'espèces ayant des besoins en habitats différents et complémentaires.

Echelle du paysage

Toutes les espèces doivent avoir accès à des zones où elles peuvent trouver nourriture, abri et partenaires. La taille, la composition et l'organisation spatiale des habitats nécessaires à une espèce dépendent de son régime alimentaire, de sa taille et de la répartition temporelle et spatiale des ressources disponibles. Comprendre les besoins d'une espèce-paysage dans le temps et dans l'espace aide à caractériser un paysage ayant une signification biologique pour cette espèce. En cartographiant la composition, la quantité et la répartition des types d'habitats nécessaires pour une population saine et dynamique d'une espèce-paysage, on définit explicitement quel paysage est nécessaire à sa survie à long terme, ce qui détermine l'échelle appropriée pour la gestion et la conservation.

Evaluation des menaces

L'homme a un impact sur les populations d'espèces sauvages; il les exploite pour les manger ou les vendre, il détruit ou réduit des habitats ou des ressources importantes et tue les individus considérés comme un danger pour sa vie ou ses moyens d'existence. Une espèce-paysage constituera un outil efficace pour mesurer l'intensité et la répartition des menaces pour la faune et ses habitats si elle est elle-même sensible aux pratiques d'utilisation des terres et des ressources constituant les menaces. Les espèces petites, discrètes, adaptées aux lisières ou généralistes et peu menaçantes pour le bien-être humain se développent généralement bien dans les paysages dominés par l'homme et ne constituent donc pas de bons évaluateurs des menaces. Au contraire, les grandes espèces d'oiseaux, de mammifères et de reptiles sont particulièrement menacées, car elles sont recherchées comme sources de nourriture et de revenus, car elles peuvent être de grands ravageurs des cultures ou des prédateurs du bétail, car elles ont des besoins importants en nourriture et en habitats, se rencontrent rarement en fortes densités et ont

généralement des taux de reproduction relativement peu élevés. Leurs populations ont donc tendance à interagir, voire à entrer en conflit plus souvent avec les hommes, et sont donc plus significativement touchées par les perturbations d'origine humaine. Rarement toutefois, une seule espèce-paysage sera sensible à toutes les pratiques d'utilisation des terres et des ressources. Il est donc nécessaire de choisir un ensemble d'espèces-paysages complémentaires pour identifier et classer les menaces clés pour la conservation des espèces sauvages et de leurs habitats dans une région donnée.

Conservation de régions sauvages

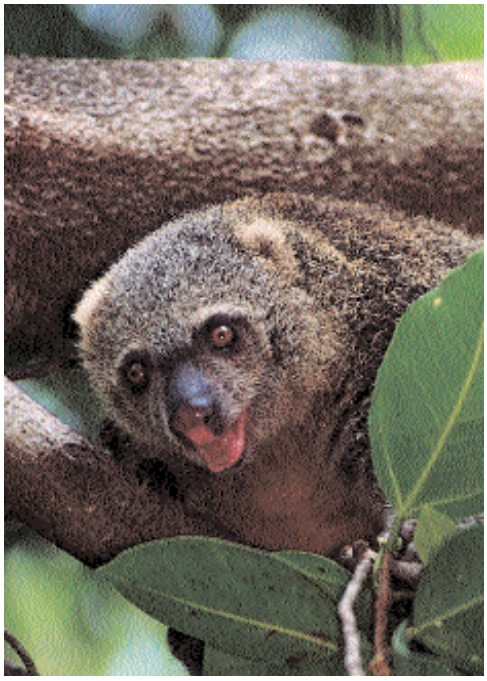
Peu d'espèces ont besoin de zones réellement vierges pour survivre. La plupart tolèrent un certain degré de perturbations. Cela étant, l'homme accepte rarement que les espèces sauvages quittent les zones qui leur ont été attribuées. Cela est particulièrement vrai pour les grands herbivores qui détruisent les cultures et pour les carnivores qui tuent le bétail et les animaux domestiques, ou dépendent des espèces chassées par l'homme. Les espèces comme les éléphants, les ours, les jaguars ou les léopards ne peuvent se refugier des humains que si les zones sauvages sont assez étendues. Pour conserver de telles espèces, qui sont souvent en conflit avec l'homme ou avec l'utilisation des terres par l'homme, il est nécessaire de sauvegarder des zones sauvages suffisamment étendues.

Fonction écologique

Au sein des écosystèmes, les disséminateurs de graines, les consommateurs de graines, les architectes du milieu (par exemple castors ou éléphants), les fixateurs de nutriments (par exemple saumons anadromes, figuiers), les prédateurs et les pollinisateurs jouent souvent des rôles importants dans la structure, la productivité et la résilience des écosystèmes. Les mouvements de ces espèces pivots peuvent lier différents types d'habitats ou régions dans un paysage. L'élimination des espèces-paysages peut détruire ces liens et conduire à des changements en cascade dans les communautés, et même provoquer la disparition d'habitats et de mécanismes au sein des écosystèmes, puis celle d'autres espèces, de communautés et du paysage dans son ensemble.

Espèce-parapluie	La conservation d'espèces paysages ayant des besoins en habitats importants et diversifiés implique la conservation de la plupart des autres plantes et animaux occupant les mêmes habitats ou dépendant des mêmes processus écologiques.
Echelle du paysage	Les besoins en habitats des populations d'espèces-paysages définissent explicitement un paysage étendu et diversifié nécessitant une gestion pour la conservation adaptée à cette échelle.
Evaluation des menaces	L'approche "espèce-paysage" apporte un cadre transparent et explicite dans l'espace pour évaluer les menaces potentielles dans les paysages sauvages et à leur proximité.
Conservation de régions sauvages	La dépendance des espèces-paysages envers les zones sauvages aide à orienter les efforts de conservation vers des zones sauvages les plus importantes.
Fonction écologique	Les espèces-paysages créent ou maintiennent la condition, la configuration et/ou la structure de l'habitat pour d'autres espèces.
Suivi des avancées	L'approche "espèce-paysage" permet de proposer des objectifs de conservation explicites et de suivre des témoins permettant d'évaluer clairement le succès ou l'échec des actions de conservation.

Rôles des espèces-paysages pour la gestion



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Suivi des progrès

Suivre l'efficacité des efforts de conservation n'est possible que si on dispose de témoins explicites permettant d'évaluer les progrès. Cibler les investissements de la conservation sur la réduction des menaces directes et indirectes envers des espèces-paysages et leur habitat permet de dégager les objectifs explicites nécessaires pour suivre les progrès. Par exemple, en suivant les changements de la fréquence à laquelle les ours à lunettes tuent du bétail dans des ranchs proches d'un parc national, ainsi que les changements d'abondance relative des ours eux-mêmes, les gestionnaires peuvent contrôler les progrès vers l'objectif de réduction de 70% de la prédation sur le bétail, évaluer l'efficacité du maintien des vaches au centre des pâturages, et juger l'impact de la diminution des conflits sur la remontée de la population d'ours. On développe ainsi des objectifs de conservation spécifiques et on suit des témoins permettant d'évaluer précisément le succès ou l'échec des actions de conservation.

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Rôles non joués par les espèces-paysages

Il est presque aussi important de connaître les rôles que ne jouent pas les espèces-paysages que ceux qu'elles jouent. Tout d'abord, bien que les espèces-paysages puissent permettre d'identifier et de classer les menaces pour les autres espèces et leurs habitats, elles sont rarement utiles comme indicateurs du niveau de ces menaces. Pour qu'une espèce soit un bon indicateur des fluctuations de la qualité et de la quantité d'un habitat, son abondance doit être étroitement liée à la disponibilité de cet habitat. Par définition, une espèce-paysage utilise une grande variété d'habitats, donc la dégradation ou la perte d'un type d'habitat risque peu d'influencer son abondance - ce qui en fait de mauvais indicateurs des menaces. A l'inverse, d'autres espèces constituent de bons indicateurs des niveaux de menaces directes telles que la chasse, lorsque leurs effectifs correspondent à l'importance de ces menaces et que l'on peut évaluer ces effectifs de façon fiable et peu chère. Les espèces-paysages au contraire sont généralement discrètes et se déplacent beaucoup; il est donc difficile d'évaluer leurs effectifs. Etant donné ces deux raisons, les espèces-paysages constituent rarement de bons indicateurs des menaces pour les espèces sauvages et leur habitat.

D'autre part, bien que leur comportement les rende susceptibles d'extinctions locales, les espèces-paysages sont rarement menacées globalement. De nombreuses espèces menacées globalement sont des endémiques ayant des aires de répartition très restreintes et des besoins en habitats très particuliers. Au contraire, les espèces-paysages sont typiquement des espèces à large aire de répartition occupant une grande variété d'habitats. Bien qu'on puisse choisir de protéger une espèce globalement menacée, répondre aux besoins en termes d'habitat et de ressources pour cette espèce peut ne pas être suffisant pour protéger les espèces sympatriques. La sélection d'un ensemble d'espèces-paysages exigeant de grandes surfaces constitue une stratégie robuste pour protéger des paysages fonctionnels étendus. Enfin, les espèces-paysages ne constituent pas un "chèque en blanc" pour justifier de plus grandes aires protégées. De fait, un principe central de cette approche est de spécifier les besoins en taille d'habitat pour obtenir des populations écologiquement fonctionnelles. L'approche espèce-paysage peut conduire les conservationnistes à travailler dans des zones-clés en-dehors de réserves ou même à consolider le travail dans une aire protégée. Les espèces-paysages aident donc à cibler les actions lorsqu'il y a des besoins pour la conservation et des bénéfices à en tirer, en se basant sur des fondements biologiques solides.

Prochains bulletins

Sélectionner une espèce-paysage

Utiliser des modèles conceptuels pour mettre en place des priorités

Contrôler l'efficacité des projets

Mettre en place des priorités: réduction des menaces ou contrôle de l'efficacité ?

Gérer l'utilisation des espèces sauvages

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WILDLIFE CONSERVATION SOCIETY

PAISAJES VIVIENTES BOLETIN 3

MAYO 2002

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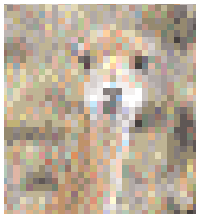
El Programa Paisajes Vivientes es una iniciativa de la Wildlife Conservation Society que identifica, prueba e implementa estrategias basadas en la vida silvestre para conservar grandes ecosistemas silvestres integrados dentro de paisajes más amplios que están bajo influencia humana.



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LOS PAPELES QUE CUMPLEN LAS ESPECIES PAISAJE EN LA CONSERVACIÓN BASADA EN EL SITIO

El Enfoque Especies Paisaje

El Enfoque Especies Paisaje es una estrategia basada en la vida silvestre, y es utilizada para definir áreas de conservación ecológicamente justificadas, identificar dónde y porqué ocurren conflictos humano–vida silvestre, diseñar y llevar a cabo esfuerzos de conservación para limitar o detener esos conflictos, monitorear la efectividad del programa, y adaptar los esfuerzos de conservación de acuerdo a los resultados. Nosotros creemos que si miramos la complejidad de paisajes a través de los ojos de la vida silvestre - mediante la comprensión de la variedad y la extensión de las necesidades de las especies paisaje – podremos definir las tierras a conservar y el manejo de prioridades que asegurarán un futuro para comunidades de vida silvestre diversas y abundantes en un mundo cada vez más dominado por humanos.

Características de las Especies Paisaje

Las especies paisaje usan áreas grandes y ecológicamente diversas y tienen impactos significativos sobre la estructura y la función de ecosistemas naturales. Sus requerimientos del hábitat en tiempo y espacio las hacen particularmente vulnerables a las prácticas humanas de uso de la tierra y cosecha de recursos. La identificación de los requerimientos ecológicos de las especies paisaje orienta el diseño y el manejo de grandes paisajes para conservación de la biodiversidad. También nos ayudan a evaluar si las acciones para mitigar las amenazas a la biodiversidad tienen éxito. La satisfacción de las necesidades de hábitat y la eliminación de las amenazas a las especies paisaje construyen un fundamento fuerte para conservar la biodiversidad y la integridad ecológica de las grandes tierras silvestres del mundo.

Conceptos Clave:

El satisfacer las necesidades de hábitat y el remover las amenazas a las especies paisaje, proveen un marco biológico específico para conservación de la biodiversidad y la integridad ecológica de los grandes paisajes silvestres del mundo.

Especies paisaje pueden jugar distintos papeles: de sombrilla de conservación, en el paisaje, de evaluación de amenazas, de conservación de regiones silvestres, de función ecológica y de monitoreo del progreso.

Los requerimientos de hábitat de un grupo complementario de especies paisaje se usan para identificar las tierras que se requieren para proteger la diversidad de plantas y animales de un área de tierras silvestres. Además, al elegir especies que se complementan entre sí, en términos de las amenazas que afectan a cada una, asegura que se abordará el espectro completo de amenazas clave a la biodiversidad.

Las especies paisaje no sirven como buen indicador en el sentido ecológico clásico, y no necesariamente están globalmente en peligro ni son endémicas. Ellas no justifican a ciegas la conservación de tierras silvestres más grandes, pero en cambio dirigen el foco hacia las tierras que se requieren específicamente para una conservación efectiva a nivel de paisaje.

Papeles de Manejo de las Especies Paisaje

Las especies paisaje, ya sea individualmente o en combinación con un grupo complementario, son una herramienta poderosa para la planificación de la conservación. Ellas juegan múltiples papeles en el diseño e implementación de las estrategias de conservación. Para ser caracterizada como especie paisaje, una especie silvestre tiene que servir uno o más de los siguientes papeles:

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Papel de sombrilla de conservación

Las mejores especies sombrilla son aquéllas que requieren las áreas más grandes y tienen los más diversos requerimientos del hábitat (i.e., la variedad más grande de tipos de hábitats). Por ejemplo, en Asia, la diversidad y biomasa más grande de ungulados se encuentra en áreas heterogéneas compuestas de praderas y bosques. En estos paisajes es también donde la densidad de tigres es más alta. Ya que una población sana de tigres requiere vastas áreas y un número adecuado de presas, un plan efectivo de conservación para tigres solamente, deberá proteger a la mayoría de estos ungulados y el hábitat que necesitan para su supervivencia. Por esto, tigres juegan el papel de especie sombrilla, protegiendo muchas otras con ámbitos más pequeños y menos requerimientos de recursos.

El reconocimiento de las necesidades de la vida silvestre es un paso esencial para sentar las prioridades de conservación, pero los requerimientos de una sola especie probablemente no cubran las necesidades de todas las especies de una comunidad de vida silvestre diversa. Por lo tanto, la más amplia, robusta sombrilla de conservación es un conjunto de especies que tienen requerimientos de hábitat diferentes y complementarios.

Papel a nivel del paisaje

Toda vida silvestre debe tener acceso a áreas donde puede encontrar comida, refugio y pareja. El tamaño, composición, y patrón espacial de hábitats que una especie requiere son funciones de la dieta, tamaño corporal y la irregularidad espacial y temporal de la disponibilidad de recursos. La comprensión de los requerimientos del hábitat en tiempo y espacio de una especie paisaje nos ayudará a caracterizar el paisaje que es biológicamente significativo para esa especie. Mediante el mapeo de la composición, cantidad y configuración espacial de las parcelas de hábitats que requiere una población sana y funcional de una especie paisaje, definimos explícitamente el paisaje necesario para su supervivencia a largo plazo, y de ese modo determinar el nivel adecuado de manejo de conservación.

Papel en la evaluación de amenazas

El ser humano afecta las poblaciones de vida silvestre por la caza para alimentación o comercio, por la destrucción o la reducción importante del hábitat o recursos y por la matanza de individuos que son percibidos como una amenaza a la vida o a los medios de vida. Para que especies paisaje sirvan como una herramienta efectiva para clasificar la intensidad y el patrón de las amenazas a la vida silvestre y a su hábitat, ellas mismas deben ser sensibles a las prácticas humanas de uso de la tierra y recolección de recursos que constituyen las amenazas. Generalistas pequeños, adaptados a las márgenes, que habitan en malezas, y que rara vez son una amenaza al bienestar humano, a menudo prosperan en paisajes dominados por humanos, de modo que no son buenos como evaluadores de amenazas. Por el contrario, aves grandes, mamíferos, y reptiles están particularmente expuestos al riesgo, porque son buscados como fuente de alimentos e ingresos, pueden ser peste aguda para las cosechas y depredadores del ganado, tienen grandes requerimientos de hábitat y nutricionales, raramente se hallan en altas

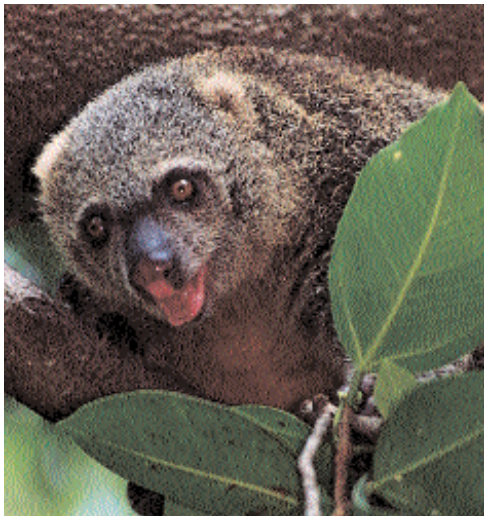
densidades y tienden a tener tasas bajas de reproducción. Por eso, sus poblaciones tienden a interactuar y chocar con gente más a menudo y están más significativamente afectadas por perturbaciones humanas. Raramente, sin embargo, una sola especie paisaje será susceptible a todas las prácticas humanas de uso de la tierra y uso de recursos. De modo que, la selección de un conjunto de especies paisaje complementarias es central para la identificación y clasificación de amenazas clave contra la vida silvestre y para la conservación de tierras silvestres en un sitio dado.

Papel en la conservación de tierras silvestres

Pocas especies "necesitan" tierras silvestres para sobrevivir. Muchas toleran cierto grado de perturbaciones humanas. Dicho esto, muchas veces la gente no está dispuesta a vivir con vida silvestre que escapa de sus áreas reservadas. Esto es particularmente cierto de los grandes herbívoros que destruyen las cosechas de los agricultores, y los carnívoros que depredan el ganado o las mascotas y dependen de muchas de las mismas especies buscadas por los cazadores humanos. Sólo cuando las regiones silvestres son grandes, especies como el elefante, el oso pardo, el jaguar y el leopardo encuentran refugio de los humanos. El enfoque en especies como éstas, que frecuentemente entran en conflicto con humanos, o con el uso humano de la tierra, requiere la protección de grandes, esenciales áreas silvestres.

Papel de monitor del progreso

El monitoreo de la efectividad de los esfuerzos de conservación es posible sólo si tenemos metas explícitas contra las cuales podemos seguir el progreso. El enfoque de las inversiones de conservación en la reducción de las amenazas directas e indirectas a especies paisaje individuales y a sus hábitats nos provee de los objetivos explícitos que necesitamos para monitorear el progreso. Por ejemplo, la documentación del cambio en la frecuencia con que osos de anteojos matan ganado en haciendas adyacentes a parques nacionales, así como los cambios en la abundancia relativa de los osos mismos, permite a los administradores monitorear el progreso hacia la meta de una reducción del 70 % en las depredaciones de ganado, evaluar la efectividad de acorralar las vacas en el centro del pastoreo y juzgar el impacto de la reducción del conflicto sobre la recuperación de la población de osos. De esta manera podemos desarrollar objetivos de conservación específicos y metas de monitoreo que nos permitan evaluar claramente el éxito o fracaso de nuestras acciones de conservación.



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Papel ecológico funcional

Dentro de ecosistemas, especies dispersadoras de semillas, predadores de semillas, ingenieros ecológicos (i.e., castores, elefantes), monopolistas de nutrientes (i.e., salmón anadromous, higueras), predadores, y polinizadores a menudo juegan papeles significativos en la estructura, productividad y capacidad de recuperación del ecosistema. Los movimientos de estas especies centrales pueden conectar funcionalmente diferentes tipos de hábitats o regiones dentro de un paisaje. La eliminación de especies paisaje puede minar estas conexiones funcionales y llevar a un torrente de cambios en comunidades ecológicas y hasta pérdida de hábitats y de funciones críticas en el ecosistema para la persistencia de otras especies, comunidades y el paisaje más amplio.

Papel de Sombrilla	La conservación de especies paisaje que tienen requerimientos del hábitat diversos y extensos resulta en la conservación de muchas otras plantas y animales que ocupan los mismos hábitats o dependen de los mismos procesos ecológicos.
Papel en el Paisaje	Los requerimientos del hábitat de poblaciones de especies paisaje definen explícitamente paisajes grandes, diversos que requieren manejo de conservación coordinados en esa escala.
Papel de Evaluación de Amenazas	El enfoque en especies paisaje provee un marco de trabajo transparente, espacialmente explícito para evaluar posibles amenazas dentro o cerca de paisajes silvestres.
Papel en las Tierras Silvestres	La dependencia en tierras silvestres de las especies paisaje ayuda a guiar los esfuerzos de conservación hacia áreas silvestres críticas.
Papel Funcional	Las especies paisaje crean o mantienen las condiciones, configuración y/o estructura del hábitat para otras especies.
Papel de Monitor del Progreso	El enfoque en especies paisaje nos permite desarrollar objetivosexplícitos de conservación y metas de monitoreo que nos permiten evaluar claramente el éxito o fracaso de nuestras acciones de conservación.

Papeles de Manejo de las Especies Paisaje

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Papeles que las Especies Paisaje No Cumplen

Es casi tan importante como saber qué papeles cumplen las especies paisaje, saber qué papeles estas especies no cumplen. Primero, aún cuando las especies paisaje pueden ayudarnos a identificar y clasificar las amenazas a la vida silvestre y sus hábitats, raramente son útiles como indicadores del cambio en el nivel de tales amenazas. Para que una especie sea un buen indicador de cualidad y cantidad de hábitat, su abundancia debe estar fuertemente ligada a la disponibilidad de ese hábitat. Por definición, especies paisaje usan una variedad de hábitats, de modo que la pérdida o degradación de un tipo de hábitat es poco probable que tenga influencia en su abundancia - lo cual las hace indicadores pobres. Así mismo, algunas especies son útiles como indicadores de cambios en el nivel de una amenaza directa como la caza, dado que sus números se corresponden con el grado de amenaza y pueden ser estimados con confianza y económicamente. Las especies paisaje, sin embargo, tienden a ser relativamente escasas y con rangos amplios: por eso es típicamente difícil estimar sus números. Dados estos dos grupos de factores, raramente las especies paisaje son buenos indicadores. Seguidamente, aun cuando los atributos del historial de vida de las especies paisaje las han hecho propensas a la extinción local, raramente se hallan globalmente amenazadas. Muchas especies globalmente en peligro son endémicas con rangos altamente precisos y requerimientos de hábitat especializados. Las especies paisaje, por el contrario, son especies que típicamente cubren amplias distancias que se corresponden con grandes extensiones geográficas. Aunque si nosotros decidiéramos proteger una especie globalmente amenazada o endémica, satisfacer los requerimientos de área y recursos precisos para esa especie puede no ser suficiente para proteger especies que ocupan la misma área geográfica. La selección de un grupo de especies paisaje que demandan un área, provee una estrategia robusta para proteger grandes paisajes funcionales. Finalmente, las especies paisaje no son un "cheque en blanco" para justificar la protección de grandes áreas. En efecto, uno de los principios centrales del enfoque es especificar los requerimientos de área de poblaciones ecológicamente funcionales. De manera que el enfoque en las especies paisaje puede llevar a conservacionistas a trabajar en áreas claves fuera de las reservas, o sorprendentemente, consolidar los esfuerzos de conservación dentro de las áreas protegidas. Las especies paisaje, por lo tanto, ayudan a enfocar las acciones específicamente dónde la conservación es necesaria y beneficiosa, en base a un fuerte fundamento biológico.

Próximos Boletines:

Selección de Especies Paisaje

El Uso de Modelos Conceptuales para Sentar Prioridades

El Monitoreo de la Efectividad del Proyecto

Sentar Prioridades: ¿Disminución de Amenazas o Monitoreo de la Efectividad?

El Manejo del Uso de la Vida Silvestre

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WILDLIFE CONSERVATION SOCIETY

PAYSAGES VIVANTS BULLETIN 4

MAY 2002

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Le programme Paysages Vivants est une initiative de la Wildlife Conservation Society visant à identifier, tester et mettre en place des stratégies basées sur des espèces pour conserver des écosystèmes étendus et sauvages intégrés dans des paysages sous influence humaine.

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SELECTIONNER LES ESPECES-PAYSAGES

L'approche «espèce-paysage»

L'approche «espèce-paysage» est une stratégie basée sur les faunes sauvages permettant de définir des zones de conservation ayant une justification écologique, d'identifier où et pourquoi des conflits existent entre l'homme et les espèces sauvages, de concevoir et de mettre en place des actions de conservation pour limiter ou arrêter ces conflits, de suivre l'évolution de ces programmes et d'adapter les actions de conservation à la lumière des résultats. Nous pensons qu'en observant la complexité des paysages à travers les yeux des espèces sauvages – en comprenant les besoins variés et étendus des espèces-paysages – il est possible de définir des zones de conservation et des priorités de gestion qui assureront un avenir pour une faune et une flore abondante et diversifiée dans un monde de plus en plus dominé par l'homme.

Sélectionner les espèces candidates

La première étape pour obtenir une série d'espèces-paysages est d'identifier un ensemble d'espèces candidates à partir duquel la série sera construite. En théorie, toutes les espèces devraient être considérées, mais cela rendrait le processus de sélection trop onéreux en pratique. Nous suggérons plutôt que l'ensemble initial soit constitué de toutes les espèces ayant une chance raisonnable d'être sélectionnées. Ainsi, toutes les espèces répondant de façon significative à un ou plus des cinq critères devront être considérées. Il est également important d'inclure des espèces occupant tous les types d'habitat, quels que soient leurs modes d'utilisation par l'homme dans le paysage visé, même si elles ne possèdent pas toutes les caractéristiques des espèces-paysages au plus haut degré. Cela est important car la série d'espèces-paysages est construite sur leur complémentarité: des espèces classées plus bas mais utilisant un autre habitat ou une autre forme d'utilisation des terres peuvent être choisies du fait de leur complémentarité.

Concepts clés:

Planifier les stratégies de conservation pour répondre aux besoins d'une série d'espèces-paysages implique d'identifier la surface, les conditions et la configuration des habitats nécessaires pour assurer les besoins écologiques à long terme de la plupart des espèces rencontrées dans une zone sauvage.

Les espèces-paysages sont choisies à partir d'un ensemble d'espèces candidates d'après la surface qu'elles utilisent, l'hétérogénéité des habitats utilisés, la vulnérabilité à l'utilisation des terres par l'homme, la fonctionnalité écologique et l'importance socio-économique.

La série d'espèces-paysages est obtenue à partir des espèces répondant le mieux aux critères ci-dessus et étant complémentaires en termes de distribution spatiale (habitats et utilisation de l'espace différents) et d'exposition aux différentes menaces.

Comme les espèces-paysages sont sélectionnées d'après les caractéristiques d'un site particulier et en fonction des autres espèces présentes, la série d'espèces-paysages peut varier selon les sites même si les mêmes espèces se rencontrent dans les deux sites.

Critères pour le choix des espèces-paysages

Quand les espèces candidates ont été sélectionnées, l'étape suivante consiste à identifier les espèces possédant le plus de caractéristiques des espèces-paysages, et au plus haut degré. Pour cela, on utilise des données obtenues sur le terrain et les connaissances d'experts locaux (voir "conditions requises pour les données" plus bas). Ces caractéristiques sont groupées en cinq catégories.

Surface

On note les besoins en surface des espèces candidates selon quatre facteurs: le domaine vital des individus, leur distance de dispersion, la proportion du paysage considéré utilisée, et si les besoins en surface d'une population écologiquement fonctionnelle nécessitent des connections entre des parcelles d'habitat et/ou des unités de gestion dans le paysage visé. Le domaine vital est la surface utilisée par un individu au cours de son cycle annuel (ou inter-annuel). Nous savons par expérience que les espèces ayant de grands domaines vitaux sont plus sujettes aux extinctions locales. En protégeant des zones suffisamment étendues pour les espèces à grands domaines vitaux, on protège également des surfaces suffisantes pour des espèces à plus petits domaines vitaux. Ce concept est appelé « effet parapluie » : répondre aux besoins de l'espèce-parapluie permet effectivement de protéger de nombreuses autres espèces. Les distances de dispersion sont considérées car les mouvements des individus peuvent réellement lier différentes parties du paysage, ce qui requière potentiellement une gestion à une plus grande échelle. On considère ensuite la proportion du paysage occupée par l'espèce. Il est évident que répondre aux besoins d'une espèce qui peut occuper 95% d'un paysage aura une fonction de parapluie beaucoup plus importante que pour une espèce n'en occupant que 5%.

Hétérogénéité

Pour certaines espèces, des surfaces importantes ne suffisent pas. En général, elles ont besoin d'habitats et de types de végétation variés pour se reproduire, se nourrir, se disperser ou survivre pendant les périodes défavorables. Les zones homogènes, quelle que soit leur taille, ne répondent pas forcément aux besoins de ces espèces. Pour les protéger, on évalue la composition des types d'habitat dans le paysage pour que toutes les ressources dont elles ont besoin soient incluses et effectivement protégées.

De plus, il ne suffit pas que ces différents types d'habitat soient présents, ils doivent également être connectés pour permettre aux animaux d'aller de l'un à l'autre. En d'autres termes, une configuration particulière du paysage peut être nécessaire pour l'espèce. La sélection d'espèces paysages ayant des besoins en habitats hétérogènes aide à identifier la composition et la configuration des types d'habitat nécessaires à la conservation effective d'un paysage diversifié. Une autre raison pour sélectionner des espèces utilisant des zones hétérogènes est qu'il faudra moins d'espèces pour « couvrir » une zone sauvage que si l'on utilise un plus grand nombre d'espèces spécialistes. Moins d'espèces signifie moins de recherches, de planification et de suivi et donc une conservation plus efficace.

Il faut également tenir compte de l'hétérogénéité en termes d'utilisation des terres. Les espèces sauvages ne reconnaissent pas les frontières légales ou juridiques. En une journée, un éléphant peut passer d'une réserve forestière à un parc national, traverser une frontière internationale et arriver dans une exploitation villageoise, le tout dans un type d'habitat. Les décisions de gestion dans chacune de ces zones influeront sur la conservation des éléphants dans les autres. Cela est important car les connections entre les unités politiques ou de gestion sont aussi cruciales que les connections entre types d'habitats. De fait, de petites unités légales ou juridictionnelles peuvent être gérées avec succès pour un seul type d'activité ou d'utilisation des terres, mais sans une stratégie globale sur l'ensemble de ces unités, la conservation risque d'échouer..

Vulnérabilité

Pour sélectionner les espèces-paysages, il faut également considérer toutes les menaces qui pèsent sur elles et leur importance. Les menaces peuvent être caractérisées par leur gravité, leur imminence, leur probabilité d'occurrence et la zone qu'elles touchent. Pour chaque espèce candidate, on dresse la liste des types d'utilisation des terres auxquelles elles sont confrontées puis on les note en fonction de leur effet sur l'espèce-paysage (gravité), de l'échelle de temps concernée (imminence), de la durée nécessaire à un rétablissement après la menace (temps de récupération), de leur probabilité (probabilité d'occurrence) et de l'importance de l'aire de répartition locale de l'espèce-paysage affectée (surface). On combine alors ces notations pour obtenir un seul indice de vulnérabilité pour chaque espèce candidate.

Fonctionnalité écologique

Certaines espèces jouent un rôle particulièrement important dans la structure et le fonctionnement des écosystèmes. Les castors créent des marais en barrant les cours d'eau, les tapirs et les éléphants dispersent les graines et ouvrent le sous-bois, les grands prédateurs contrôlent l'abondance et la composition des communautés de proies. Etant donné ces effets importants sur les autres espèces, le maintien de populations saines de ces espèces clés aide à la conservation de communautés et d'écosystèmes sains. Pour quantifier la signification écologique des espèces candidates, on considère le nombre de fonctions écologiques qu'elles remplissent et leur importance.

Importance socio-économique

Le dernier critère de sélection des espèces-paysage est leur importance socio-économique. Il existe énormément d'exemples montrant que l'environnement social dans et autour des aires protégées peut avoir un impact énorme sur les résultats de la conservation. Comme elles se déplacent beaucoup et rencontrent un grand nombre d'habitats et de modes d'utilisation des terres, les espèces-paysages risquent particulièrement d'entrer en contact avec les hommes ou leurs activités. Les espèces sauvages peuvent provoquer des conflits parce qu'elles détruisent les cultures, parce qu'elles tuent le bétail, parce qu'elles transmettent des maladies aux animaux domestiques ou à l'homme, ou enfin parce qu'elles sont en compétition avec l'homme pour les ressources. Elles peuvent également avoir un impact positif important, par leur valeur culturelle ou religieuse, en constituant une partie significative du régime alimentaire des populations humaines, comme les pécaris à lèvres blanches en Amazonie, ou en étant des sources de revenus par l'écotourisme. Pour évaluer l'importance socio-économique, il convient de lister tous les impacts, positifs comme négatifs, pour chaque espèce candidate.

Etablir un ensemble d'espèces-paysages complémentaires

Après avoir évalué toutes les espèces candidates pour les cinq critères, chaque indice est ramené entre 0 et 1, puis les cinq indices sont combinés pour obtenir un indice global pour chaque espèce. Il faut ensuite sélectionner l'ensemble des espèces-paysages pour le site. L'espèce ayant le plus fort indice est choisie comme première espèce paysage. Les autres espèces sont choisies une par une dans les cinq espèces candidates ayant les indices les plus élevés. A chaque étape, l'espèce identifiée comme la plus complémentaire à celles déjà sélectionnées est ajoutée. La complémentarité est déterminée par un chevauchement spatial minimal des besoins en habitats et par des menaces aussi différentes que possible. Un caractère trophique ou taxonomique unique peut jouer pour des espèces ayant des distributions spatiales similaires.

Site	Espèces
Nouabalé-Ndoki, Congo	Eléphant de forêt (*Loxodonta africana cyclotis*) Bongo (*Tragelaphus eurycerus*) Chimpanzé (*Pan troglodytes*) Crocodile nain (*Osteolaemus tetraspis*) Buffle de forêt (*Syncerus caffer nanus*)
Yasuní-Napo, Equateur	Pécari à lèvres blanches (*Tayassu pecari*) Tapir terrestre (*Tapirus terrestris*) Caiman noir (*Melanosuchus niger*) Ara macao (*Ara macao*) Loutre du Brésil (*Pteronura brasiliensis*)
Madidi-Tacana, Bolivie	Pécari à lèvres blanches (*Tayassu pecari*) Jaguar (*Panthera onca*) Condor des Andes (*Vultur gryphus*) Ours à lunettes (*Tremarctos ornatus*) Surubi (*Pseudoplatystoma* spp.) Vigogne (*Vicugna vicugna*)

Séries d'espèces-paysages pour les trois premiers sites du programme Paysages Vivants

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Combien faut-il d'espèces-paysages ?

On ajoute des espèces à la série jusqu'à ce que les besoins de l'espèce candidate la plus complémentaire (celle qui sera ajoutée ensuite) soient déjà remplis par la série constituée d'espèces-paysages. La série est donc complète quand les besoins des espèces candidates restantes sont couverts par le « parapluie » des espèces comprises dans la série. D'après les résultats préliminaires des trois premiers sites du programme Paysages Vivants, les séries varient de 3 à 6 espèces selon la diversité des habitats et des espèces sur un site donné.

Les espèces-paysages sont-elles les mêmes sur tous les sites ?

Non. Les espèces-paysages sont sélectionnées d'après les caractéristiques d'un site et en fonction des autres espèces présentes sur place. Cela signifie qu'une espèce ayant le plus fort indice sur un site peut ne même pas être sélectionnée comme espèce-paysage sur un autre. Par exemple, lorsqu'ils sont seuls, les pécaris à collier peuvent être des espèces-paysages car ils ont une importance économique et écologique, et franchissent souvent les limites d'habitat et de types d'utilisation des terres. S'ils sont sympatriques avec les pécaris à lèvres blanches, qui se déplacent beaucoup plus et peuvent avoir une plus grande importance économique et être plus sensibles à la chasse, les pécaris à collier ne seront probablement pas sélectionnés comme espèces-paysages.

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Conditions requises pour les données

De façon idéale, toutes les données considérées dans le processus de sélection devraient être collectées sur le site en question. En réalité, on ne connaît jamais tout sur toutes les espèces dans un paysage donné. Il est essentiel de savoir quelle confiance on peut avoir envers les informations utilisées à toutes les étapes du processus de sélection. Pour cela, toutes les données quantitatives sont notées en fonction de leur rigueur statistique et méthodologique et en fonction de leur adéquation au site visé. Reconnaître les limites des connaissance est important pour deux raisons: 1) cela implique de rester honnête et permet à d'autres d'évaluer la validité des décisions, et 2) cela permet de mettre en place des priorités de recherche. Un taux relativement élevé d'incertitude pour une espèce n'empêche pas sa sélection comme espèce-paysage mais suggère que des recherches supplémentaires sont nécessaires pour valider la sélection et les hypothèses sous-jacentes à cette sélection. Un bulletin à venir discutera du problème des conditions requises pour les données dans une analyse complète des espèces-paysages.

Aide à la sélection des espèces-paysages

Une description plus détaillée des critères est disponible auprès du programme Paysages Vivants sur demande (LLP@wcs.org). Le programme a produit un logiciel permettant d'automatiser le processus de sélection. Ce logiciel est disponible en ligne sur le site du programme Paysages Vivants (http://www.WCSLivingLandscapes.org).

A qui est destiné ce bulletin?

Ce bulletin est un outil de gestion évolutive destiné au personnel du programme Paysages Vivants de WCS, un moyen d'apprendre fondé sur les actions et la recherche pour les acteurs et les financeurs de la conservation, et un rapport transparent des activités du programme pour le personnel de WCS, les donateurs et l'ensemble de la communauté de conservation.

Prochains bulletins:

Utiliser des modèles conceptuels pour mettre en place des priorités

Contrôler l'efficacité des projets

Mettre en place des priorités: réduction des menaces ou contrôle de l'efficacité ?

Gérer l'utilisation des espèces sauvages

Partenariat ONG/secteur privé

Conservation basée sur les communautés locales

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WILDLIFE CONSERVATION SOCIETY

PAISAJES VIVIENTES

BOLETIN 4

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El Programa Paisajes Vivientes es una iniciativa de la Wildlife Conservation Society que identifica, prueba e implementa estrategias basadas en la vida silvestre para conservar grandes ecosistemas silvestres integrados dentro de paisajes más amplios que están bajo influencia humana.

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LA SELECCIÓN DE ESPECIES PAISAJE

El Enfoque en Especies Paisaje

El Enfoque en Especies Paisaje es una estrategia basada en la vida silvestre utilizada para definir áreas de conservación con significado ecológico, identificar dónde y porqué ocurren conflictos humano–vida silvestre, diseñar y llevar a cabo esfuerzos de conservación para limitar o detener tales conflictos, monitorear la efectividad del programa y adaptar los esfuerzos de conservación de acuerdo a los resultados. Nosotros creemos que si miramos la complejidad de paisajes a través de los ojos de la vida silvestre - mediante la comprensión de la variedad y la extensión de las necesidades de las especies paisaje – podremos definir las tierras a conservar y el manejo de prioridades que asegurarán un futuro para comunidades de vida silvestre diversas y abundantes en un mundo cada vez más dominado por humanos.

Selección del Grupo de Especies Candidatas

El primer paso para construir un conjunto de especies paisaje es identificar un grupo de especies candidatas a partir de las cuales se formará el conjunto. Teóricamente, cualquier especie podría ser considerada, pero en la práctica, esto haría excesivamente oneroso el proceso de selección. En cambio, nosotros sugerimos que el grupo inicial de candidatas consista en todas las especies que tengan una probabilidad razonable de ser seleccionadas. Por lo tanto, todas las especies que exhiban en grado significativo uno o más de los cinco criterios, deberían ser consideradas. Es importante incluir también especies que ocupen el total del ámbito del hábitat y los tipos uso de la tierra en el paisaje objeto del programa, aún cuando no exhiban todas las características de especie paisaje, o no las demuestren en alto grado. Esto es significativo porque el conjunto de especies paisaje está formado en base a complementariedad (ver más abajo), de modo que especies con una clasificación baja en la escala, que usan otro hábitat y que su uso de la tierra sea de otro tipo, podrían ser incluidas en virtud de su complementariedad.

Conceptos Clave:

La planificación de estrategias de conservación para satisfacer las necesidades de un conjunto de especies paisaje, identifica el área necesaria, la condición y configuración de hábitats para satisfacer los requerimientos ecológicos de la mayoría de las especies que ocurren en un paisaje silvestre.

Las especies paisajes son elegidas de un grupo de especies candidatas, en base a sus requerimientos de área, heterogeneidad en el uso del hábitat, vulnerabilidad al uso humano de la tierra, funcionalidad ecológica y significado socio–económico.

El conjunto de especies paisaje se forma a partir de un grupo de especies que están colocadas alto en la clasificación, de acuerdo a los criterios mencionados más arriba y que se complementan entre sí en su distribución espacial (en hábitats y uso de la tierra diferentes) y expuestas a diferentes amenazas.

Ya que las especies paisaje se seleccionan de acuerdo a las características de un sitio en particular y en relación a otras especies que se encuentran en él, el conjunto de especies paisaje puede variar entre dos sitios distintos aún cuando alguna de las mismas especies puede ocurrir en ambos sitios.

Criterios para Especies Paisaje

Una vez que el grupo de especies candidatas ha sido seleccionado, el próximo paso es identificar la especie que demuestre tener características de especie paisaje en mayor número y en más alto grado. Esto se logra utilizando datos de estudios de campo y el conocimiento de expertos locales (ver más abajo "Requisitos de los Datos"). Estas características se agrupan en cinco categorías:

Área

Nosotros clasificamos los requerimientos de área de las especies paisaje en base a cuatro factores: el tamaño del ámbito de hogar de individuos, sus distancias de dispersión, la proporción del paisaje objetivo que la especie ocupa y si los requerimientos de área para una población ecológicamente funcional de esa especie necesitan conexión entre parcelas de hábitat y/o unidades de manejo en el paisaje objetivo. Por ámbito de hogar queremos significar el área que un individuo ocupa durante su ciclo anual (o inter–anual). Sabemos por experiencia que especies con ámbito de hogar grandes son más vulnerables a la extinción local. Mediante la protección de áreas suficientemente grandes para las especies con ámbitos de hogar amplios, protegeremos áreas suficientemente grandes para otras especies que demandan menos área. Este proceso se llama "efecto sombrilla" ya que otras especies son efectivamente conservadas mediante la safisfacción de las necesidades de una especie sombrilla. Las distancias de dispersión son consideradas porque el movimiento de individuos puede conectar efectivamente las diferentes partes del paisaje, y potencialmente requerir manejo a escalas más grandes. El siguiente punto a considerar es la proporción del paisaje objetivo ocupado por la especie. Obviamente, la satisfacción de las necesidades de una especie que podría ocupar el 95 % de un paisaje silvestre, tendrá una función sombrilla mucho más amplia que una especie que ocupa sólo el 5 %.

Heterogeneidad

Algunas especies requieren más que simplemente áreas grandes. En muchos casos, la vida silvestre necesita una variedad de hábitats y tipos de vegetación para la reproducción, forraje, dispersión y super vivencia en años desfavorables. Áreas homogéneas, no importa cuán grandes sean, pueden no satisfacer los requerimientos de estas especies. La planificación para estas especies nos obliga a evaluar la composición de los tipos de hábitats dentro del paisaje de modo que todos recursos que ellas requieren sean incluídos y efectivamente protegidos. Es más, estos diferentes tipos de hábitats no sólo tienen que estar presentes, sino que deben estar conectados efectivamente para permitir el movimiento de individuos entre ellos. En otras palabras, una configuración en particular del paisaje puede ser necesaria para la especie. La selección de especies paisaje con requerimientos de hábitat heterogéneos ayudará a identificar la composición y configuración de tipos de hábitats necesarios para la conservación exitosa de diversos paisajes. Otra razón para seleccionar especies que usan áreas heterogéneas es que se requerirán menos especies para "cubrir" un área silvestre que si hubiéramos seleccionado un número más grande de especialistas de hábitat. El enfoque en menos especies significa menos obligaciones de investigación, planificación y monitoreo, y conservación más eficiente.

Otro contexto en el que consideramos heterogeneidad es con respecto a los usos de la tierra. La vida silvestre no reconoce límites legales o jurisdiccionales. En un solo día un elefante puede caminar desde una reserva forestal a un parque nacional, a través de una frontera internacional y hasta una granja en una villa, todo dentro de un sólo tipo de hábitat. Las decisiones administrativas en cada una de estas áreas, afectará la conservación de elefantes en las otras. Esto es significativo porque las conexiones entre administraciones o unidades políticas pueden ser tan importantes como las conexiones entre tipos de hábitats. Efectivamente, unidades jurisdiccionales legales más pequeñas pueden ser manejadas con éxito para un sólo uso de tierras o una sola actividad, pero sin una estrategia que entienda cómo estas unidades encajan entre sí, la conservación de vida silvestre probablemente fracasará.

Vulnerabilidad

Otra consideración en la selección de especies paisaje es el número y severidad de las amenazas que las afectan. Amenazas pueden ser clasificadas de acuerdo a su severidad, urgencia, probabilidad de ocurrencia y el área que afectan. Para cada especie candidata hacemos una lista de los usos de la tierra que encuentran y clasificamos cada uno de acuerdo a su efecto sobre la especie paisaje (severidad), en cuánto tiempo va a ocurrir (urgencia), cuánto tiempo necesitará para recuperarse de la amenaza (tiempo de recuperación), su probabilidad (probabilidad de ocurrencia) y la porción afectada de la distribución local de la especie paisaje (área). A continuación combinamos estas medidas en un sólo "índice de vulnerabilidad" para cada especie candidata.

Funcionalidad ecológica

Algunas especies tienen efectos particularmente fuertes en la estructura y función de ecosistemas naturales. Castores crean pantanos al construir diques en los ríos, tapires y elefantes distribuyen semillas y reducen el estrato intermedio y depredadores mayores pueden controlar la abundancia y composición de las comunidades de presas. Dados estos fuertes efectos sobre otras especies, el mantenimiento de poblaciones saludables de estas especies ecológicamente fundamentales ayudará a conservar comunidades y ecosistemas saludables. Para cuantificar la importancia ecológica de especies candidatas consideramos el número de funciones ecológicas en la que están involucradas y su importancia en cada una.

Importancia socioeconómica

El último criterio para la selección de especies paisaje es su importancia socio – económica. Innumerables ejemplos demuestran que el ambiente social dentro y en los alrededores de las áreas protegidas puede afectar drásticamente los resultados de la conservación. Debido a que las especies paisaje recorren grandes extensiones y encuentran una variedad de hábitats y de tipos de uso de tierras, es muy probable que tengan contacto con gente y su uso de la tierra. La vida silvestre puede chocar con gente porque arrasan cosechas, depredan el ganado, transmiten enfermedades a animales domésticos y a gente, o compiten por los recursos. Vida silvestre puede también tener importantes beneficios positivos, como servir como potente ícono cultural o totémico, o ser una porción significativa de la dieta de la gente, como los pecaríes de labios blancos para mucha de la gente del Amazonas, o proveer oportunidades de generar ingresos a través del ecoturismo. Para asignar un valor a la importancia socioeconómica, tabulamos el número de contextos, tanto negativos como positivos, en que cada especie paisaje está involucrada.

Construcción de un Conjunto Complementario de Especies Paisaje

Una vez que hemos clasificado todas las especies paisaje candidatas de acuerdo a cada uno de los cinco criterios, ponemos cada valor en una escala de 0 – 1 y luego combinamos los valores normalizados en un sólo índice agregado. La tarea siguiente es seleccionar el conjunto de especies paisaje para el sitio. Para hacer esto, la especie con el valor agregado más alto es seleccionada como la primera especie paisaje. Despues las especies son seleccionadas una por una de las siguientes cinco especies candidatas con los valores más altos. A cada paso se agrega la especie identificada como la más complementaria al conjunto ya existente. Complementariedad se define como la mínima superposición espacial en requerimientos del hábitat y diferencias en las amenazas encontradas. Exclusividad en posición trófica y taxonomía pueden ser consideradas para especies con distribución espacial similar.

Sitio	Especie
Paisaje Nouabalé-Ndoki, Congo	Elefante de bosque (Loxodonta africana cyclotis Bongo (Tragelafus euryceros) Chimpancé (Pan troglodytes) Cocodrilo enano (Osteolaemus tetraspis) Búfalo de bosque (Syncerus caffer nanus)
Paisaje Yasuní-Napo, Ecuador	Pecarí de labios blancos (Tayassu pecari) Tapir (Tapirus terrestris) Caimán negro (Melanosuchus niger) Guacamaya roja (Ara macao) Nutria gigante de río (Pteronura brasiliensis)
Paisaje Madidi-Tacana, Bolivia	Pecarí de labios blancos (Tayassu pecari) Jaguar (Panthera onca) Cóndor (Vultur gryphus) Oso de anteojos (Tramarctos ornatus) Surubí (Pseudoplatystoma spp.) Vicuña (Vicugna vicugna)

Conjunto de Especies Paisaje de los tres sitios iniciales del Programa Paisajes Vivientes

¿Cuántas Especies Paisaje Necesitamos?

Se agregan especies al conjunto hasta que las necesidades de la mayoría de las especies candidatas complementarias (i.e., la especie siguiente a ser agregada) ya han sido satisfechas por las especies paisaje en el conjunto formado. De modo que el conjunto está efectivamente "cerrado" cuando los requerimientos de las especies candidatas restantes quedan bajo la sombrilla de aquéllas ya incluidas en el conjunto de especies paisaje. En base a resultados preliminares de los tres sitios iniciales del Programa Paisajes Vivientes, el tamaño de los conjuntos aparenta variar de 3 a 6 especies dependiendo de la diversidad de hábitats y de las especies que están en un sitio particular.

¿Son las Mismas Especies en Todos los Sitios?

No. Las especies paisajes son elegidas en base a las características de un sitio y en relación a las otras especies que se hallan en él. Esto significa que una especie que es la especie paisaje con clasificación más alta en un sitio, puede no haber sido ni tan siquiera seleccionada como especie paisaje en otro. Por ejemplo, los pecaríes de collar, cuando ocurren solos pueden ser una especie paisaje, ya que son ecológica y económicamente significativos y a menudo cruzan fronteras de hábitats y de uso de tierras. Pero, cuando ocurren en la misma área geográfica que pecaríes de labios blancos que tienen un radio de acción mucho más amplio y pueden ser económicamente más significativos y más vulnerables a la caza, pecaríes de collar pueden no ser seleccionados como una especie paisaje.

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Requisitos de los Datos

Idealmente, todos los datos considerados en el proceso de selección serían rigurosamente recolectados en el sitio en consideración. En realidad, no sabemos todo lo que debiera saberse acerca de todas las especies en un paisaje dado. Es esencial que registremos el grado de confianza que tenemos en la información que utilizamos en todos las etapas del proceso de selección. Para no perder de vista esta incertidumbre, registramos todo dato cuantitativo de acuerdo con todo rigor estadístico y metodológico y su aplicabilidad al sitio objetivo. Reconocer los límites de nuestra comprensión es importante por dos razones: 1) nos mantiene honestos y permite a otros apreciar la validez de nuestras decisiones; y 2) nos provee de un índice para sentar prioridades para investigación. Un "grado de incertidumbre" relativamente alto de una especie silvestre no previene su selección como una especie paisaje, pero sugiere que se requiere investigación adicional para validar la selección y las presunciones subyacentes que llevaron a ella. En un futuro Boletín discutiremos los requisitos de los datos para un análisis completo de las especies paisaje.

Recursos para la Selección de Especies Paisaje

Una descripción más detallada de estos criterios se halla disponible a pedido en el Programa Paisajes Vivientes (LLP@wcs.org). El Programa ha producido también un programa de software para automatizar el proceso de selección y este software está disponible online en el sitioweb del Programa Paisajes Vivientes (http://www.WCSLivingLandscapes.org).

¿Para Quién es el Boletín?

El Boletín es un instrumento adaptable de manejo para el personal del Programa Paisajes Vivientes; una herramienta de aprendizaje de acción - investigación para los practicantes y donantes de la conservación, y un registro evolutivo y transparente para otro personal de la WCS, donantes y la comunidad conservacionista en general.

Próximos Boletines:

El uso de Modelos Conceptuales para Sentar Prioridades

El Monitoreo de la Efectividad del Proyecto

Sentar Prioridades: ¿Reducción de Amenazas o Monitoreo de la Efectividad?

El Manejo del Uso de Vida Silvestre

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WILDLIFE CONSERVATION SOCIETY

LIVING LANDSCAPES BULLETIN 5

JUNE 2002

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USING CONCEPTUAL MODELS TO SET CONSERVATION PRIORITIES

What is a Conceptual Model?

At almost every conservation project site, the manager has a mental map of what the project hopes to achieve in terms of better conservation, what factors are having an adverse impact on plant and animal communities at the project site and are thus threats to conservation, and how the conservation actions initiated will address these threats and result in the outcomes wanted. A conceptual model is, at its simplest, a printed representation of the mental map inside the head of each and every conservation site manager.

Why are Conceptual Models Useful?

A conceptual model, based on local site conditions, makes explicit the project goals, conservation objectives, causal network of threats, and priority conservation interventions. It allows others to "see" inside the head of the site manager, creates a permanent record should the manager leave, and most importantly, allows others to contribute their expertise to define the objectives of a project, characterize the threats, and identify key interventions.

Conceptual models are extremely useful conservation planning tools because they force us to:

1) explicitly define what we want to influence or change as a result of project interventions (i.e., the conservation objectives);

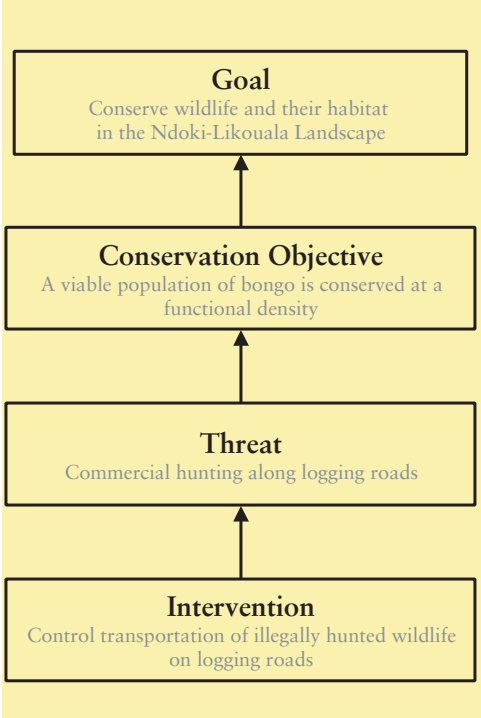
2) characterize and prioritize the factors that directly or indirectly result in undesirable impacts on the species or landscape we want to conserve (i.e. the threats);

3) graphically represent how these threats, individually or in combination, cause the undesired changes in the species or landscape that we want to conserve; and

4) demonstrate that the interventions we choose are clearly focused on reducing key threats and attaining our objectives.

Key Concepts:

- Conceptual models help us to be explicit about project goals, conservation objectives, and threats to wildlife and their habitats.
- Conceptual models serve as the basis for strategic planning in a project or program.
- These models cause us to think critically about how various threats interact and influence one another- an important step in planning effective interventions.
- Ranking direct threats identified within a conceptual model is an essential step in establishing priorities for the actions we will take.
- A conceptual model is only as good as the information used to create it.
- Monitoring is one way to test the conceptual model and revise and improve it over time. This provides a basis for adaptive management.



A simple illustrative conceptual model with one conservation objective, threat and intervention.

Components of a Conceptual Model

Conceptual models can range from being exceedingly simple to being highly complex. Regardless, within the Living Landscapes Program all are typically composed of four interconnected elements: goals, conservation objectives, threats, and interventions.

Overall project or program goals are visionary, relatively general and brief, statements of intent (e.g., "Conserve the full complement of wildlife and their habitat in the Yasuní-Napo landscape over the long term"). In contrast, conservation objectives are specific statements defining the state or condition of a species or landscape that the conservation project wants to achieve through some interventions. An example of a conservation objective within the Living Landscapes Program might be "Maintain current white-lipped peccary density within existing habitat of the Madidi-Tacana landscape".

Conservation objectives that are phrased in terms of a species or a habitat imply the existence of one or more threats that adversely affect species numbers and habitat and the need to take action to halt or mitigate those threats.

Threats are land-use practices and policies that have direct or indirect effects on the species or habitats that we want to conserve. Direct threats such as hunting, fishing, logging, and farming are land-use practices that physically result in undesirable changes in species numbers or distribution, or in the quality and extent of their habitat. Indirect threats, such as market and land-tenure policies, for example, alter species' numbers and habitat by influencing one or more of the direct threats. Within that interdependent set of direct and indirect threats, some are exogenous in that they are outside our control (e.g., weather and solar flares). Including exogenous threats in our conceptual models when their effects are pronounced can be important as it makes us acknowledge what we can and cannot change.

Identifying threats and then deciding which ones are the most significant is an important exercise when building a conceptual model. However, conceptual modeling also requires us to decide how the indirect and direct threats link together to form a causal chain or network. Understanding not only the range of threats but also how they interact and influence one another is critical. This enables us to articulate clearly our vision of why we need to take certain actions to conserve a particular species or habitat. It also allows us to pinpoint where and why our interventions are likely to have the most success and the greatest conservation payoffs.

Lastly, interventions are actions linked directly and explicitly to halting or mitigating key threats and are thus targeted to achieve specific conservation objectives. Clearly, all interventions must be feasible in terms of project staff and resources, and appropriate in terms of site-specific cultural and biological norms. When developing interventions to address specific threats, project staff should ask both why and how the intervention would have an impact. If all project managers and staff responsible for implementing the intervention cannot easily answer this question, it is doubtful that the proposed intervention is directly linked to mitigating an important threat or that the investment in this intervention will help achieve the desired conservation objective.

Creating a Conceptual Model

In 'Measures of Success: Designing, Managing, and Monitoring Conservation and Development Projects' (Island Press, 1998), Richard Margoluis and Nick Salafsky suggest a group process for developing a conceptual model, with group composition varying according to the stakeholders implicated in resource degradation and conservation. The group first defines the conservation objective or objectives, then lists all direct and indirect threats that are thought to affect the conservation objective. Then the direct and indirect threats are arranged to show how each relates to one another and to the conservation objective. In this way, a chain or network of threats and interactions can be created that shows graphically how individual threats influence one or more additional threats (see example on p.4).

Once the "universe" of indirect and direct threats is mapped onto the

conservation objective as a network of interconnections, the next step is to rank the direct threats. This is a necessary prelude for identifying where the project is going to intervene and take action to reduce the adverse influence of these factors on the conservation objective. Because indirect threats only influence our conservation objective through their effects on direct threats, we do not rank them.

Ranking Direct Threats

To rank threats we first need to develop criteria against which each threat is assessed. Within the Living Landscapes Program, we strongly advocate that criteria assess only the level of threat and not the feasibility of intervention. This ensures that we focus on the factors that are most likely to jeopardize the conservation of wildlife and wild places, rather than those that are easiest to address. We would also suggest adopting the same criteria used to rank the sensitivity of landscape species to human disturbance. These are severity, urgency, recovery time once the threat is abated, proportion of the area affected, and the probability that the threat will occur.

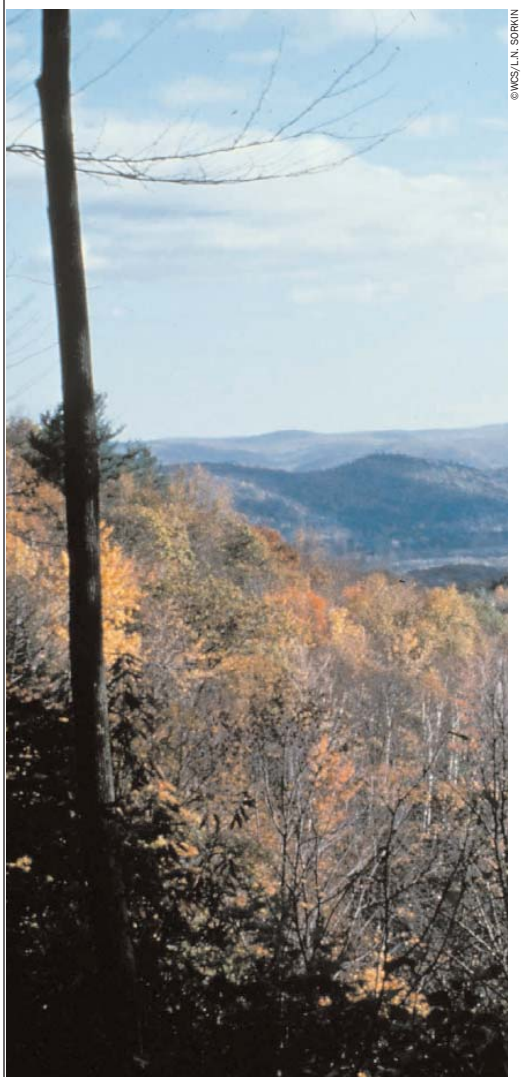
Once we have chosen the criteria for assessing the severity of threats and/or feasibility of addressing them, the next step is to rank them. Using the Living Landscapes Program's criteria and ranking system, we calculate the total score for each threat using the equation [(Urgency + Recovery) *x* Severity *x* Proportion of Area affected *x* Probability], rank the threats according to their scores, and identify the most important threats to conservation at the site. Margoluis and Salafsky provide an alternative approach to ranking threats based on stakeholder perceived importance, area affected, intensity (i.e., likely to destroy the resource or only cause minor damage or degradation), urgency (i.e., is the threat occurring now or will it likely occur at sometime in the future), political feasibility of attempting to address the threat, social desirability of addressing the threat, and management capacity to address the threat. These criteria include both measures of the scale of the threat, and of our ability to reduce the threat. To rank order the threats they suggest drawing a matrix with criteria along the top as the columns and each threat as a row. Then working progressively through each criterion, rank ordering the threats with the greatest threat receiving a score equal to the total number of direct threats in the matrix, and the least severe threat with respect to the criterion under consideration receiving a score of one. Once the rank order for each threat is entered into the matrix for each criterion, it is simply a matter of summing the ranks in each row to determine the cumulative importance of each threat order. These sums can then be converted to rank order.

	Severity (0-3)	*Urgency (0-3)*	*Area (0-4)*	*Recovery (0-3)*	*Probability (0-1)*	TOTAL	RANK
Habitat fragmentation	*1*	*1*	*3*	*2*	*.25*	**2**	**3**
Hunting for medicines	*3*	*2*	*3*	*3*	*1*	**45**	**1**
Hunting prey species	*2*	*3*	*3*	*1*	*1*	**24**	**2**
	TOTAL = (Urgency + Recovery) x Severity x Area x Probability						

An illustrative example ranking three threats using the Living Landscapes Program threats criteria and ranking system.

SEVERITY	
none or positive	0
measurable effect on density or distribution	1
substantial effect but local eradication unlikely	2
local eradication a possibility	3
URGENCY	
won't happen in >10 yrs	0
could happen between 3-10 years	1
could (or will) within 1-3 years	2
threat is occurring must act now	3
PROPORTION OF LOCAL AREA AFFECTED	
0	0
1-10%	1
11-25%	2
26-50%	3
>50%	4
RECOVERY TIME	
immediate	0
1-10 yrs recovery	1
11-100 yrs recovery	2
100+ yrs or never	3
PROBABILITY	
	0-1

Criteria used by the Living Landscapes Program to assess threats.



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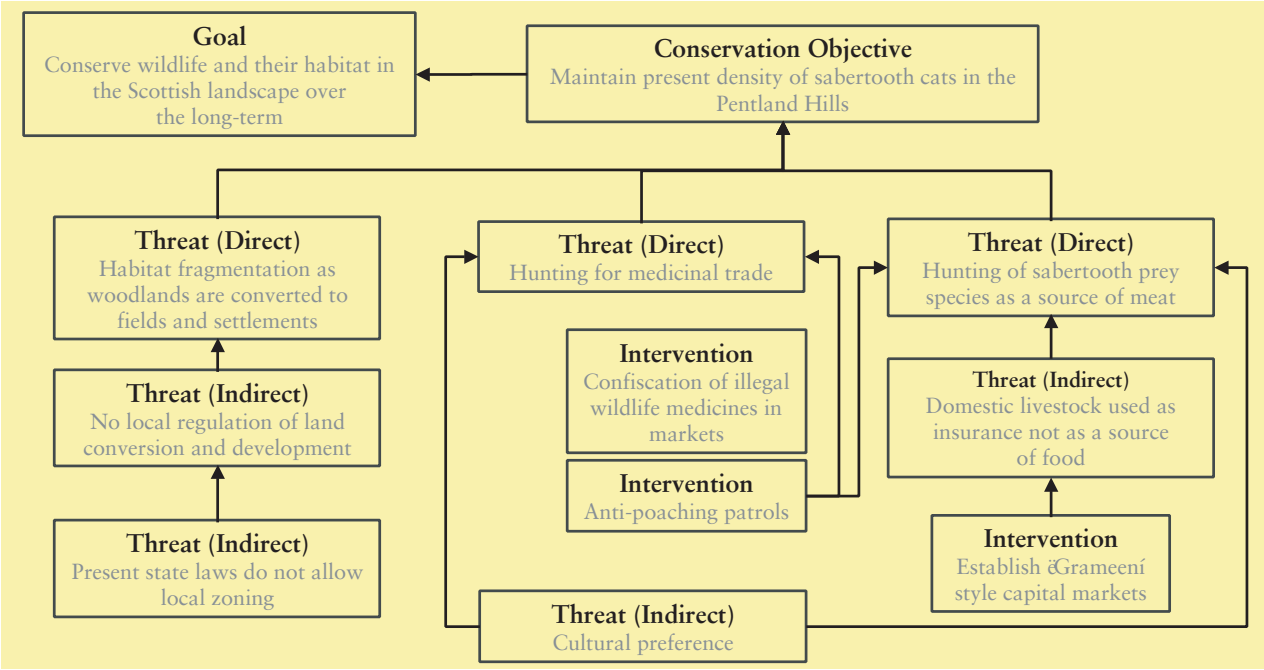

A more complex illustrative conceptual model, showing one conservation objective and a network of several direct and indirect threats and interventions.

Choosing Where and How to Intervene

Given that personnel and money are always limited we should allocate these scarce resources to reducing the highest ranked threats first. Starting with the highest ranked direct threat, we can use the conceptual model to review what indirect factors are believed to cause this direct threat to have such an important adverse impact on the conservation objective.

Understanding how the indirect threats alone and together influence the factor that directly impacts biodiversity is critical: it helps us to determine where we should, or can, intervene to have the greatest success in reducing impacts on wildlife and their habitat. If an indirect threat like 'weak capacity' links to more than one direct threat, then we may need to provide more detail and identify separate indirect threats linked to a single direct threat. For example, if we identified cultural preference as an indirect threat that links to hunting sabertooth cats for both medicinals and food, we could specify cultural preference as: 1)preference for medicinals and, 2)preference for wildlife as food. This way, if we decide to intervene to alter cultural preference, we make clear which preference we hope to change. Margoluis and Salafsky suggest that we describe what we plan to do to reduce each high-ranked threat, and argue that the intervention should be: impact oriented (resulting in a desired change in the threat), measurable, time limited (achievable within a specific period of time), and practical given available staff and financial resources. Once we have defined how we intend to address each ranked threat, we can determine how many threats we can afford to address given available resources.

The Need for Monitoring

Our conceptual model and the threats-reducing actions we decide to implement are a hypothesis that is only as good as the information we have. Monitoring is thought of as an essential tool for conservationists to determine whether or not our actions are effective and our efforts are successful in improving the conservation status of wildlife and their habitats. However, monitoring is also the tool we use to assess whether or not our conceptual model truly reflects what is happening at the site. By monitoring impacts, we can test if our assumptions were correct in regard to the factors that influence wildlife conservation at our site ,and whether or not we should focus our conservation efforts on a different set of direct and indirect threats.

Upcoming Bulletins:

Monitoring Project Effectiveness

Setting Priorities: Threats Reduction or Monitoring Effectiveness?

Managing Wildlife Use
NGO/Private Sector Partnerships

Community-based Wildlife Conservation

Threats Analysis and Coalition Building - Rationale and Practice

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WILDLIFE CONSERVATION SOCIETY

LIVING LANDSCAPES BULLETIN 6

JUNE 2002

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MONITORING CONSERVATION PROJECT EFFECTIVENESS

Why do we need to Monitor?

Monitoring conservation outcomes is universally recognized as a vital, yet challenging task. Monitoring is a core component of the Living Landscapes Program because it helps us:

1) determine whether or not a project is meeting its objectives and having a positive conservation effect;

2) identify which actions lead to the success or failure of a particular conservation strategy;

3) evaluate and revise our conceptual model of why and where conservation efforts are needed; and

4) ensure that all participants in the project from international NGOs to government staff and local residents learn from the experience and can improve their implementation of future conservation programs.

Without monitoring, we run the risk of pouring considerable resources into ineffective activities that do not succeed in conserving wildlife and wildlands.

Monitoring is not Surveillance

It is important to distinguish between surveys, surveillance, and monitoring. A survey is a one-time event that can be used to provide baseline or current status information, such as chimpanzee density in a given area, the average household consumption of fish in a village, or the spatial distribution and pattern of palm forest within a reserve. Surveillance is essentially a series of repeated surveys to measure things that change over time, such as hunter captures, rainfall, crop production, elephant locations, or the number of bottles of cola in the pantry. Monitoring is repeated, like surveillance, but with an important difference - using baseline quantitative or qualitative information as a benchmark, it is designed to assess progress towards a specific desired state or condition. For example, counting the frequency of dynamite fishing within a marine reserve over time is surveillance, comparing changes in frequency relative to an 80% reduction target set by the project constitutes monitoring.

Key Concepts:

- Monitoring is critical to effective wildlife conservation because it helps us assess whether or not our conservation interventions are working.
- Monitoring allows us to test if conceptual models and assumptions about why and where conservation efforts are needed are correct.
- Ideally, we should monitor at three different levels: the results of our conservation interventions, the reduction of threats, and progress in achieving our stated objectives.
- Monitoring that does not lead to an assessment of management effectiveness, and an improvement in management practices has little conservation value.
- Serious tradeoffs exist when allocating limited resources between threats-reduction efforts and monitoring the effectiveness of such efforts.

How can Monitoring be Useful and Economical?

Monitoring is useful if it leads to better management decisions and improved management actions. Managers must have a clear and explicit understanding of how the monitoring information they are planning to obtain is going to help them make wildlife management decisions and influence their conservation actions. In other words, we need to have thought about what our management response will be if monitoring shows, for example, that the total weight of fish landings at the local port approaches or recedes from, our conservation objective over time.

Developing a Monitoring Plan

WCS conservation projects are typically designed and implemented to reduce the pressure of human land and resource uses on wildlife and their habitats. Our conservation monitoring is therefore designed to measure and evaluate over time the consequences of human actions on biological systems and the success or failure of efforts to reduce these impacts. Using the project's conceptual model as a guide for identifying what key information would be needed to track project progress is a good place to start when developing a monitoring plan.

Monitoring at all Levels

To have the greatest confidence that our conservation investments are effective, we must track changes in the extent and quality of wildlife habitat and the density, population size, and functions of wildlife. That said, field experience tells us that the scale of the threat and the number of exogenous factors outside our control (i.e., floods, disease, drought) may affect the "natural" variation in wildlife populations and habitat quality. This will determine the intensity and duration of monitoring required to detect trends in the changing status of wildlife populations, and their habitats, that we are sure result from human land- and resource - uses. Frequently, we may need to continue monitoring for 10–20 years before we can detect such trends. Although improved status of wildlife populations and their habitats are the ultimate outcomes that we strive for in our conservation projects, assessing progress requires a long-term-commitment that extends far past typical donor funding cycles. However, if we are to ever truly evaluate the effectiveness of our conservation actions and investments, we must put in place such long-term monitoring systems.

To measure conservation success during the short- to mid-term, we must identify outcome measures that are likely to change rapidly and that act as proxies for the changing status of wildlife and their habitats. Within the Living Landscapes Program, the proxy outcome measures we monitor are the threats and our interventions (i.e., the activities we implement). When we decide to use proxy measures we are aware of the trade-offs. The time frame to seeing results and the costs of monitoring decline as we move from directly monitoring changes in wildlife and their habitats to monitoring reduction in threats, to monitoring whether or not our interventions were implemented as planned. However, using proxies that change within short time frames also lowers our level of confidence in whether the information tells us anything meaningful about our conservation success (see p.4).

To obtain the most information for evaluating the effectiveness of our actions, we ideally want to monitor at all three levels: the interventions, the threats, and the conservation objectives themselves. We monitor our interventions to make sure that they are being implemented as we planned. As our interventions were chosen to reduce levels of threat to wildlife and their habitat, we monitor our success in reducing threats to assess whether or not our interventions were effective. Lastly, we need to verify that the status of the wildlife species or habitats that are the foci of our conservation objectives does indeed improve when our interventions are implemented successfully and threats are reduced.

Setting Priorities and Allocating Scarce Resources to Monitoring

Given limited personnel and funding, rarely do we have the luxury of monitoring every intervention, threat, and conservation objective at the same time. At present, the only realistic way to approach the challenge of deciding what to monitor and what not to monitor is to bring together knowledgeable field staff. Then, using a "Delphi process" (i.e., an expert group's best guess), we decide what monitoring information the project requires and must allocate resources to, and what information would be useful but is, in reality, a luxury. The Living Landscapes Program is in the process of developing a more formal decision-making tool to help staff deal with this challenge in a systematic and objective way.

Components of a Monitoring Framework

Once we have decided what we need to monitor, the next step is to develop a monitoring framework that explicitly defines the targets against which our conservation progress will be measured, the trend data that we will use to measure our progress over time, the information gathering activities that we need to put in place to obtain the monitoring information, and the indicators we are going to use to quantify change over time. In the Living Landscapes Program, whether we are monitoring interventions, threats, or conservation objectives, the components of our monitoring framework remain the same: targets, trend data, monitoring activities, and indicators.

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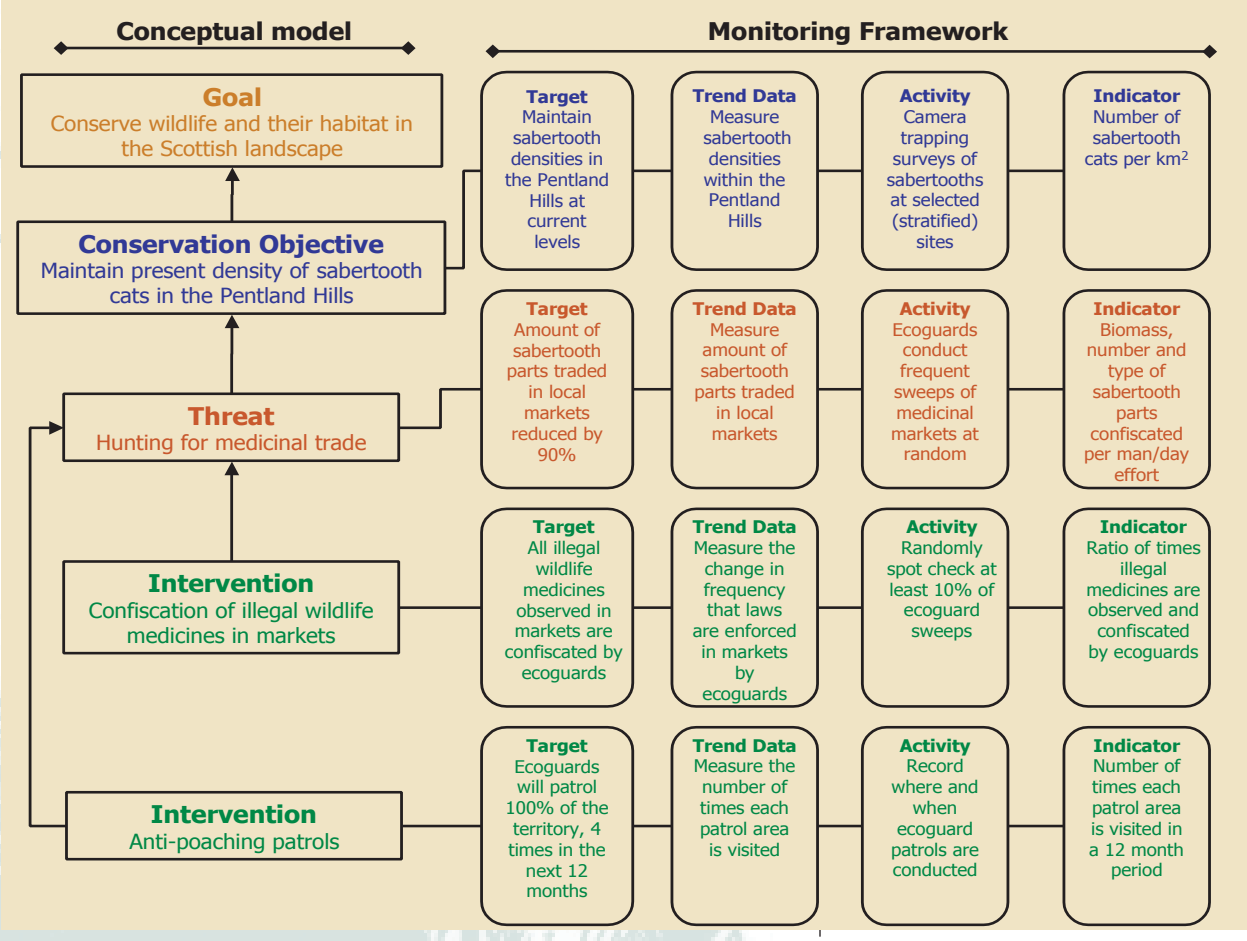
Targets

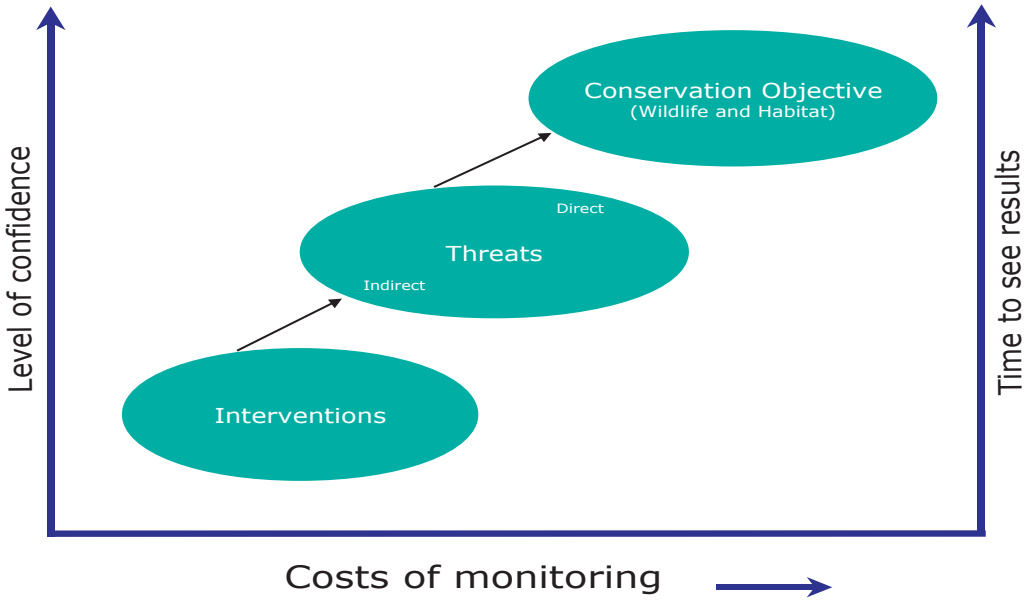
Targets are specific statements detailing the desired accomplishment or outcomes of a conservation program. According to Richard Margoluis and Nick Salafsky in 'Measures of Success: Designing, Managing, and Monitoring Conservation and Development Projects' (Island Press, 1998) a target should be:

1) impact oriented – represent desired changes in a threat;
2) measurable – definable in relation to some baseline and along some standard scale;
3) time limited – achievable within a specific period of time;
4) specific – clearly defined and understood by all involved in the project; and
5) practical – feasible given available cash, time, and skills.

For example, if the illegal trapping of macaws were a threat, then the target might be to reduce illegal trapping of macaws by 50% within five years. In this case, a target for achieving the conservation objective might be a specified density of macaws in a named national wildlife reserve.



A monitoring framework with explicitly defined targets, trend data, monitoring activities and indicators for a simple conceptual model with one goal, one conservation objective, one threat and two interventions.



Tradeoffs in costs, time and level of confidence when monitoring project interventions, threats to wildlife and habitats, and the project conservation objective.

Trend data

Trend data are used to make the comparisons needed to determine whether the change we are seeing is or is not related to our actions. Comparisons can be within the project over time (i.e., change in snare encounters over time as anti-poaching efforts are implemented) or between the project site and a non-project location (i.e., difference in snare encounters between the project site with anti-snare hunting efforts and the control site where no anti-poaching efforts are in place). The descriptions of trend data needed often start with the phrases, "Measure the change…" or "Measure the difference…".

Monitoring Activities

Monitoring activities describe the information gathering process that will be conducted to collect the required trend data used to make the defined comparisons. Activities can be patrols, roadblocks, training sessions, radiotelemetry, household surveys, informant interviews, etc. When developing these activities, it is always useful to write down how it will be carried out, who will be responsible for implementation, when and where the activity will take place, and what resources are needed for the activity to take place.

Indicators

Indicators are the actual measurement units that we use to quantify the impact of our conservation efforts. Examples of indicators might include the number of snares found per person/day of patrolling or the number of protected animal species found at roadblocks per person/day. Wildlife Conservation Society, in collaboration with Conservation International and Foundations of Success, is developing a decision tree and indicator dictionary to help practitioners pick the suite of indicators that would provide the most cost-effective assessment of project performance.

Upcoming Bulletins:

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WILDLIFE CONSERVATION SOCIETY

LIVING LANDSCAPES BULLETIN 7

JUNE 2002

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SETTING PRIORITIES: THREATS REDUCTION OR MONITORING EFFECTIVENESS?

The Importance of Monitoring

For years the conservation community and donors have been lauding the virtues of monitoring project effectiveness. We would all likely agree that unless we monitor the outcomes of our conservation investments, we will never know whether or not they have been successful, and we will never learn what actions lead to the success or failure of a particular conservation strategy or approach. Without monitoring we run the risk of pouring considerable resources into ineffective activities that do little if anything to reduce threats and conserve wildlife and wildlands. That said, deciding how much to allocate to threats reduction and to monitoring effectiveness is a challenge most often met by simply neglecting the latter and spending exclusively on the former. Wildlife conservation projects are all designed to reduce the pressure of human land and resource uses on animal populations and their habitats. Conservation monitoring is therefore an attempt to measure and evaluate, over time, the consequences of human actions on biological systems, and the success or failure of efforts to reduce undesired effects.

A Real-World Dilemma

The conservation community has developed tools to rank threats and set priorities for taking action to reduce threats. We also have a growing understanding of how to assess the trade-offs associated with monitoring our conservation objectives directly or through proxies (i.e., threats and interventions). However, we do not at present have a tool for helping us decide how much of our perennially scarce resources to allocate to reducing threats and monitoring effectiveness. In the real world of resource conservation where money is limited, we are faced with a non-trivial task – how to decide when to spend money on monitoring rather than reducing a threat further or tackling the next threat.

Key Concepts:

- The conservation community has developed tools to rank threats and set priorities for taking action to reduce threats.
- The conservation community also understands that monitoring is essential if we are to learn whether or not we are reducing threats and understand which interventions are effective and which are not effective.
- When personnel and finances are limited, we must decide how much to allocate to threats abatement and how much to allocate to monitoring.
- In the absence of a decision-making tool to "objectively" allocate resources to abating threats and to monitoring our success, we most often simply neglect the latter and spend exclusively on the former.

Do we decide to address only threats for which we have the resources for both abatement activities and outcome monitoring? And if so, what percentage of available resources do we allocate to reducing and monitoring a particular threat? If two threats are equally ranked in conservation importance but one is much more costly to abate than the other, do we preferentially monitor the former because of its higher opportunity costs? Is saying that an intervention works when it does not a more serious mistake if the intervention is expensive? Do we care if monitoring indicates that an intervention is not working when it is? If one threat is inexpensive to abate but expensive to monitor with confidence and another threat is expensive to abate but cheap to monitor, how do we choose between the two dyads if money is limited? If we can assess effectiveness within a few months in relation to one threat and at the same cost in a few years for another, should we first invest in the threat that can be most quickly monitored?

Deciding which threats to abate and which threats to monitor is not simple, even for a geographically limited and highly focused conservation effort, such as managing the harvest of chewing sticks in a village woodlot. These questions become much more complex, and even less trivial to solve, when the scale of conservation expands to the landscape level and the number of threats and the costs of monitoring increases significantly. In an ideal world without personnel and financial constraints, we would tackle all threats and monitor the implementation of our interventions, the reduction of threats, and our progress toward attaining our conservation objectives. In the absence of a decision-making tool to "objectively" allocate resources to abating threats and to monitoring our success, we have, in the past, dealt with this dilemma simply by focusing most, if not all, of our resources on threats reduction and paying lip service to monitoring.

Allocating Scarce Resources - An Unclear Example

Using a little imagination, we can conjure up an example that shows how complex this priority setting challenge is. Let's assume that we are trying to conserve wildlife within a forest in West Africa. Let's also assume that we can rank threats according to an accepted set of criteria and that we can estimate the costs of abatement and of monitoring – all of which requires considerable knowledge or significant guesswork. Lastly, let's assume that we have 200 units of available resources to abate threats and monitor outcomes. Using three different scenarios for resource allocation, we can show how difficult it is to prioritize allocation of resources to abate and monitor threats. We could attempt to abate all threats and monitor just the implementation of our interventions – total cost 197. Alternatively, we could abate and comprehensively monitor just the top two ranked threats – total costs 196. That said, we almost have the resources to abate the first three threats and monitor implementation and threats reduction – total cost 201. So how do we decide? Do we implement everything perfectly or do we skimp on some activities to save money? Does skimping carry its own costs?

	Threat reduction		Monitoring cost (time x unit cost)				
Threat	Rank	Abatement cost (time x unit cost)	Implementation	Threat	Objective	Monitor All	Total Cost
Commercial hunting	1	25	6	11	65	82	107
Timber harvesting	2	48	3	3	35	41	89
Forest clearing for agriculture	3	84	13	8	10	31	115
Sand mining in wetlands	4	12	6	6	21	33	45
TOTAL		**169**	**28**	**28**	**131**	**187**	**356**

197 201 196

An example showing the difficulty in allocating resources to reducing threats and monitoring effectiveness when available resources (200 units) are insufficient to cover all costs (356 units).

To help answer these questions, the Living Landscapes Program is leading a collaborative effort with the Nature Conservancy, the World Wildlife Fund, and other partners within the USAID-supported Global Conservation Program, to develop a resource allocation decision-making tool. We propose that an experts group, over the next 6 to 9 months, explore approaches to reconciling how conservationists might objectively prioritize the allocation of scarce resources to abating threats and monitoring the effectiveness of such actions.

The experts group will, at the end of this process, have developed a prototype expert system (e.g., decision tree) that site-based conservationists can use to help them allocate their staff and funding resources to reduce threats and monitor success.

Upcoming Bulletins:

Managing Wildlife Use
NGO/Private Sector Partnerships

Community-based Wildlife Conservation

Threats Analysis and Coalition Building - Rationale and Practice

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Appendix 8

A selection comments/statements of interest concerning the Living Landscapes approach.

External sources:

- Mohammed Bakkar (Conservation International, CABS): "WCS is clearly in the lead at the landscape level."

- Tim Barnett (former Exec. Dir., TNC Adirondack Chapter) commented on the promise that the WCS landscape species approach could bring to a conservation group like ANC: to find focus in a landscape scale program, using landscape species to do so. (in talking about mentioned the participation of the Adirondacks Nature Conservancy in the Oswegatchie Round Table, organized by WCS North America Program and focused on the Landscape Species Approach)

- Nigel Dudley (WWF-International/ IUCN forestry unit: developed their landscape perspective): would like to explore the possibility of meshing the WWF landscape perspective with the WCS landscape species approach. Sees them as complementary.

- Wayne T. Gilchrist (Chair of the Subcommittee of Fisheries Conservation, Wildlife and Oceans) expressed interest in, and requested further information on the Landscape Species Approach following Dr. John Robinson's testimony before this committee of the House of Representatives.

- Julie Wormser (The Wilderness Society: Director, New England Regional Program) solicited LLP presentation at the annual meeting of the Northern Forest Alliance. Her comments especially noted the significance of our multi-species approach, saying a suite of species is preferential to single species because some may be too conflict-ridden. Focusing on a suite allows you to de-emphasize one but still incorporate it in your thinking.

- Roger Sayer (TNC: International Conservation Science) said that the landscape species approach works at a scale which bridges a sometimes difficult gap between site conservation planning and ecoregional planning. (after hearing Pete Coppolillo give a presentation in D.C.)

- Jim Leape (Packard Foundation: Director, Conservation Programs) "is well acquainted with the LLP, and thinks highly of the approach".

- Bob Lambeck (CSIRO-Australia): "this is a big bold idea…" (concerning the Landscape Species Approach)

Measuring our Conservation Success

Laura Valutis (Landon), The Nature Conservancy; Sarah Christiansen, World Wildlife Fund; David Wilkie, Wildlife Conservation Society

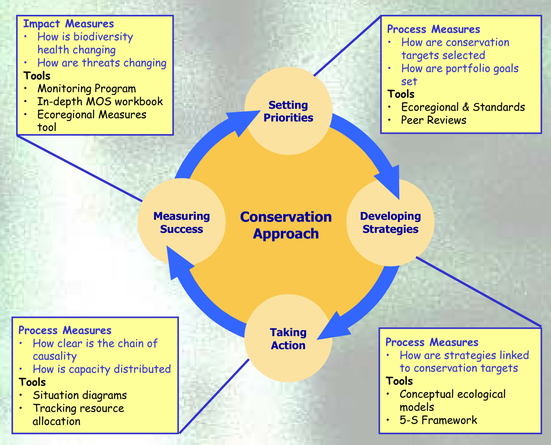
THE PROBLEM

International conservation organizations such as TNC, WCS, WWF, and others share a common global mission to conserve the diversity of life on earth. Though each organization brings different strengths in methods and approaches, they share similar fundamental components. This includes 1) setting geographical priorities for conservation, 2) developing strategies to conserve conservation priority areas, 3) taking direct conservation action at multiple spatial scales and 4) measuring conservation success. These organizations continually refine and advance the steps and methods of the first three components of this conservation quartet. However, measuring our conservation success, has seldom been adequately developed nor effectively implemented at appropriate spatial and temporal scales.

CURRENT NGO APPROACHES

The Nature Conservancy

TNC employs an integrated Conservation Approach comprised of four fundamental components: 1) Setting Priorities through ecoregional planning to identify a portfolio of conservation areas that collectively represent the biodiversity of the ecoregion; 2) Developing Strategies at single and multiple conservation areas to abate threats and improve biodiversity health of the conservation targets (species, communities, & ecological systems); 3) Taking direct conservation action; and 4) Measuring conservation success This approach translates the Conservancy's broadly stated mission into a unifying articulation of common purpose and direction — a compass bearing to align the organization in taking the most effective conservation action to achieve tangible, lasting results.



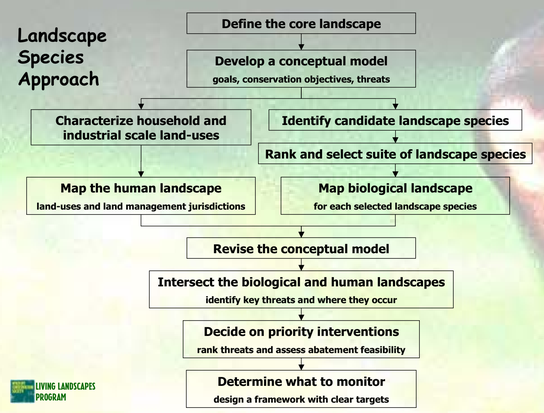
The first three steps in the Conservation Approach have defined methods, tools, and application. In the fourth step, TNC employees a framework that allows us to measure conservation success at a single conservation areas (i.e., site conservation planning). Single conservation areas measures include 1) *biodiversity health* that represents the aggregate viability of the conservation targets at a site based on three factors of size, condition and landscape context to characterize the long term viability of conservation targets; 2) the *threat status* that measures the seriousness of threats at the site based on the stresses to conservation targets and the sources of those stresses; and 3) and *conservation capacity* as an indication of TNC's existing capabilities to play a significant part in the conservation of targets at a site. Despite the significant progress of measuring conservation success at the single conservation areas, we still lack a comprehensive & scientifically rigorous system to measure success at the ecoregional scale. Measures are needed at this scale if we are to understand if our overall conservation approach is an appropriate strategy. To address this need, a team within TNC (Measures & Audit Team) has been tasked to develop and test a new system for objectively measuring and reporting on conservation progress at an organization-wide scale. This emergent system will include process measures (e.g., meeting planning standards, plan externally and internally peer-reviewed) and impact measures (abating threats, improving biodiversity status) that will be used organization-wide for self-assessment coupled with independent verification. Such a system once deployed will not only lead to greater efficiencies and innovation but will also will lead to sustained investments in conservation.

Conservation Area Name	Biodiversity Health	Threat Status	Conservation Capacity
Lower San Pedro	Good	High	Low
LRGV: Chihauhua Woods	Good	High	Medium
LRGV: Southmost	Poor	Very High	High
Middle Niobara Valley	Good	High	Very High
Mimbres River	Fair	Medium	Medium
Moses Coulee	Fair	Very High	High
Nanticoke River	Fair	Very High	Medium
Neversink	Good	Very High	Very High

The Wildlife Conservation Society

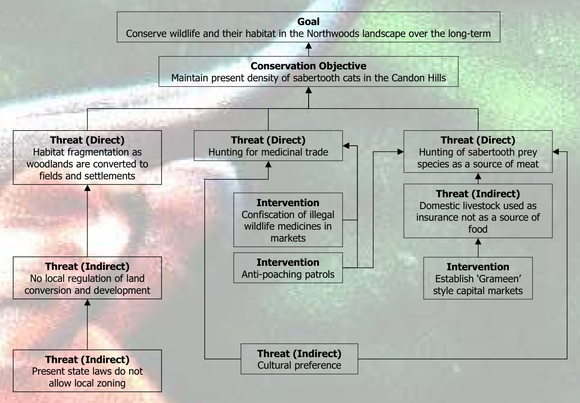
As people around the world continue to expand into wilderness areas, and as we successfully conserve healthy wildlife populations, the needs of people and the needs of wildlife will increasingly clash. The Wildlife Conservation Society's Living Landscapes Program is developing the 'Landscape Species Approach' to prevent or minimize human-wildlife conflicts, allowing people and wildlife to share the earth's living landscapes, and ensure the long term survival of wildlife and wildlands. By focusing on the needs of a suite of landscape species this approach to conservation forces us to explicitly: 1) define ecologically meaningful management areas, 2) identify where and why human-wildlife conflicts occur, 3) target conservation actions to curb or resolve such conflicts, 4) monitor conservation effectiveness, and 5) adapt our actions to changing conditions over time.

As a central component of the Landscape Species Approach the Living Landscapes Program is exploring the use of conceptual models to help site managers formalize what is in their heads, and make explicit their conservation objectives, and the threats to wildlife. Conceptual models are extremely useful conservation planning tools because they force us to: a) define what we want to influence or change as a result of project interventions (i.e., the conservation objective); b) characterize and prioritize the factors that directly or indirectly result in undesirable impacts on the species or landscape we want to conserve (i.e., the threats); c) graphically represent how these threats individually or in combination cause the undesired changes in the species or landscape that we want to conserve; and d) demonstrate that the interventions we choose are clearly focused on reducing key threats and achieving our conservation objectives.

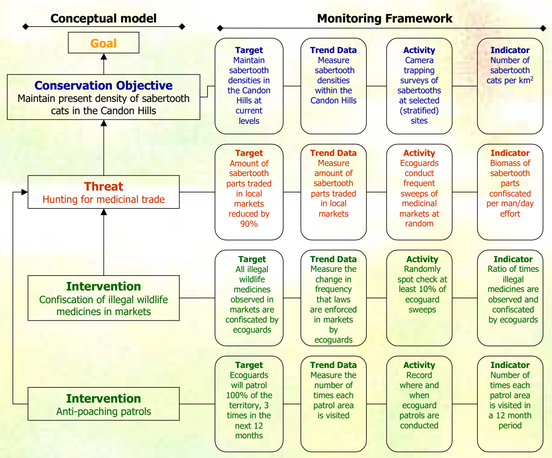


Conceptual models are also the first step in designing a framework for monitoring the effectiveness of conservation actions. To obtain the most information to evaluate the effectiveness of our actions, we ideally want to monitor the interventions, the threats and the conservation objectives themselves. We monitor our interventions to make sure that they are being implemented as we planned. As our interventions were chosen to reduce levels of threat to wildlife and their habitat, we monitor our success in reducing threats to assess whether or not our interventions were worthwhile. Lastly, we need to verify that the status of the wildlife species or habitat that are the foci of our conservation objectives does indeed improve when our interventions are implemented successfully, and threats are reduced.

Conceptual model



In the Living Landscapes Program regardless of whether we are monitoring interventions, threats or conservation objectives the components of our monitoring framework remain the same: targets, trend data, activities and indicators. Targets are specific statements detailing the desired accomplishment or outcomes of a conservation effort. For example, if the illegal trapping of Macaws were a threat, then the target might be to reduce illegal trapping of Macaws by 50% within five years. Trend data are used to track progress towards specific targets over time. Activities describe the methods that will be used to collect the required trend data. Activities can be patrols, roadblocks, training sessions, radio-telemetry, household surveys, informant interviews, etc. And lastly, indicators are the actual measurement units that are used to quantify the impact of conservation efforts. Examples of indicators might include: the number of snares found per person/day of patrolling, or the number of protected species found at roadblocks per person/day.

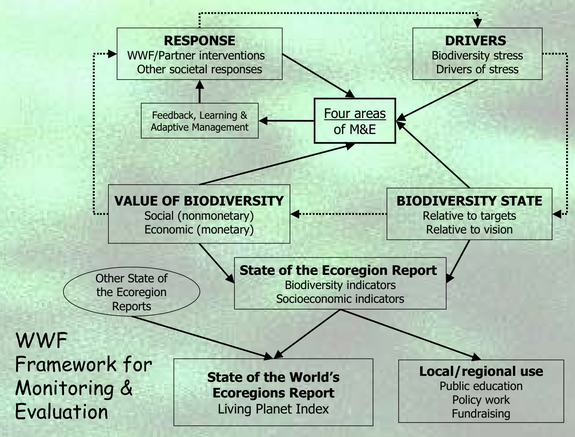


The World Wildlife Fund

To achieve global conservation, WWF is investing efforts in achieving conservation in Global 200 ecoregions[1]. Ecoregion Action Programs rely on the key elements of 1) a biodiversity vision that sets biological targets based on representation of species, communities and habitats; large enough areas/connectivity to maintain resilience to disturbances and change; protection of viable populations of all native species; and maintenance of key ecological processes; 2) socioeconomic analyses to understand conservation threats and opportunities; and 3) a strategy and action plan that reflects adaptive learning over the short, medium, and long term. Monitoring and evaluation (M&E) are crucial components of Ecoregion Action Programs if WWF and its partners are to track progress toward the biodiversity vision, demonstrate and communicate the effects of ecoregion conservation on biodiversity, and constantly improve our plans and actions. M&E has been developed at site, project and sometimes ecoregion scales for different purposes but few ecoregions have a comprehensive framework for measuring conservation impact. Over the next year, WWF is working with field staff and partners to develop and test M&E frameworks to provide guidance for ecoregion action programs globally.

One of the frameworks WWF has already and will continue to test is the "Pressure-State-Response" (PSR) model and various versions of it. The basic concept is that a set of carefully selected indicators allows one to track changes in (1) human activities that affect the environment (the "pressure" or "driving force"), (2) the condition of the environment (the "state"), and (3) how society or some segment of society is responding in a way that changes the driving force (the "pressure"). We are also exploring adding a fourth set of indicators where necessary to measure 4) how biodiversity affects the welfare of society both within and beyond the ecoregion in both monetary and nonmonetary terms [the "socioeconomic value"].

This model helps to reflect the complexity of relationships in the causal chain - particularly at larger scales - yet is not without formidable challenges. With targets that reflect long-term viable biological functioning and representation,



WWF Framework for Monitoring & Evaluation

there is a need to track indicators that measure maintenance of biodiversity as well as the socioeconomic pressures or conditions that influence sustainability. Identifying and tracking socioeconomic indicators in particular – such as the state of governance or institutional capacity – in the conservation context remains a significant challenge. Questions such as these are critical to ask, revisit and where feasible, rigorously test to increase our confidence in determining what specific or combination of actions impact pressures that will make a difference to the state of biodiversity.

Using these tools, this biodiversity monitoring scheme could be a two-account system, one account being the biodiversity ledger and one the socioeconomic ledger. The biodiversity ledger would track indicators of how well the primary conservation targets are being met and, more broadly, progress toward the ecoregion's biodiversity vision. The socioeconomic ledger would track the social and economic values or benefits of these biodiversity features. This information could be compiled into an annual or bi-annual "State of the Ecoregion Report" for each ecoregion where WWF is working. Such a report will be useful for public education, policy work, and fundraising. Collectively, these reports could be synthesized into a "State of the World's Ecoregions," such as a variation of WWF's Living Planet Index.

[1] The second fundamental approach is "Target Driven Programs" which address specific threats and areas that have global reach (i.e. freshwater, forests, marine, species, climate change, and toxics). Together these large-scale conservation approaches seek to provide the geographic and thematic/cross-cutting efforts needed to achieve global conservation.

WHAT ARE THE OUTSTANDING ISSUES?

What to monitor?

To measure conservation success during the short- to mid-term we must identify outcome measures that are likely to change rapidly and that act as proxies for the changing status of wildlife and their habitats. Within conservation organizations the proxy outcome measures we most often monitor are: a) threats, and b) our interventions – i.e., the activities we implement. When we decide to use proxy measures we are aware of the tradeoffs. The time frame to seeing results and the costs of monitoring typically decline as we move from directly monitoring changes in wildlife and their habitats, to monitoring reduction in threats and whether or not our interventions were implemented as planned. However, using proxies that change within short time frames also lowers our level of confidence in whether the results inform us meaningfully about our conservation success.

Tracking progress at different scales

As we move from individual conservation sites to larger ecological, regional and global scales the reasons we track conservation progress change. At the site scale we typically want to evaluate progress and modify management practices that influence direct threats to plant and animal populations and communities. At larger spatial scales we more often want to track progress to raise awareness and understand how to influence policies that change land uses practices and consumption patterns that indirectly affect the conservation sites we care about. Though we understand the need to track progress at different scales we are still struggling to identify the most appropriate conservation targets and progress indicators for local to regional to global scales.

Allocating scarce resources

As money for conservation is limited we are faced with a non-trivial task of deciding when to spend money on monitoring or on reducing a threat. Do we decide to only tackle threats for which we have the resources for both abatement activities and outcome monitoring? And if so what percentage of available resources do we allocate to: a) reducing and b) monitoring a particular threat? If two threats are equally ranked in conservation importance but one is much more costly to abate than the other, do we preferentially monitor the former because of its higher opportunity costs? Is saying that an intervention works when it does not a more serious mistake if the intervention is expensive? If we can assess effectiveness within a few months in relation to one threat and at the same cost in a few year for another – should we first invest in the threat that can be most quickly 'monitored?'

	Threat reduction		Monitoring cost (time * unit cost)				
Threat	Rank	Abatement cost (time * unit cost)	Implementation	Threat	Objective	Monitor All	Total Cost
Commercial hunting	1	25	6	11	65	82	107
Timber harvesting	2	48	3	3	35	41	89
Forest clearing for agriculture	3	84	13	8	10	31	115
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TOTAL		169	28	28	131	187	356

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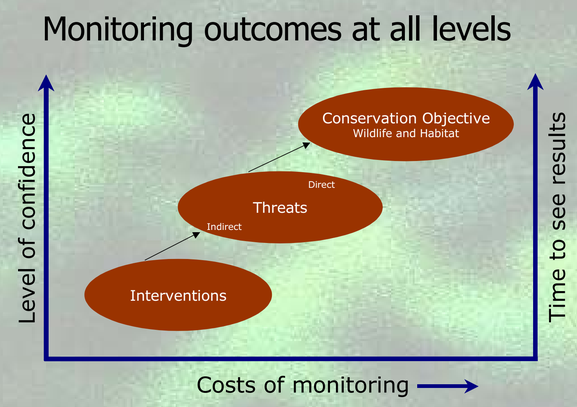


Using a little imagination we can conjure up an example that shows how complex is this priority setting challenge. Let's assume that we are trying to conserve wildlife within a forest in west Africa. Let's also assume that we can rank threats according to their severity and that we can estimate the costs of abatement and of monitoring – all of which requires considerable knowledge or significant guesswork. Lastly, let's assume that we have 200 units of available resources to abate threats and monitor outcomes. Using three different scenarios we can show how difficult it is to prioritize allocation of resources between abatement and monitoring of threats. We could attempt to abate all threats and monitor just the implementation of our interventions – total cost 197. Alternatively we could abate and comprehensively monitor just the top two ranked threats – total costs 196. That said, we almost have the resources to abate the first three threats and monitor implementation and threats reduction – total cost 201. So how do we decide? Do we implement everything perfectly or do we skimp on some activities to save money? And if we skimp what do we risk?

WHERE MIGHT WE GO NEXT?

Building a decision tool for managers

TNC, WWF and WCS are working together to explore approaches to reconciling how conservationists might objectively prioritize the allocation of scarce resources to abating threats and monitoring the effectiveness of such actions. One approach to making the process of resource allocation more systematic and replicable is to develop a prototype expert system that combines both quantitative and qualitative parameters to optimize spending on threats reduction and monitoring.

Rethinking our accounting practices to help reconcile conservation spending

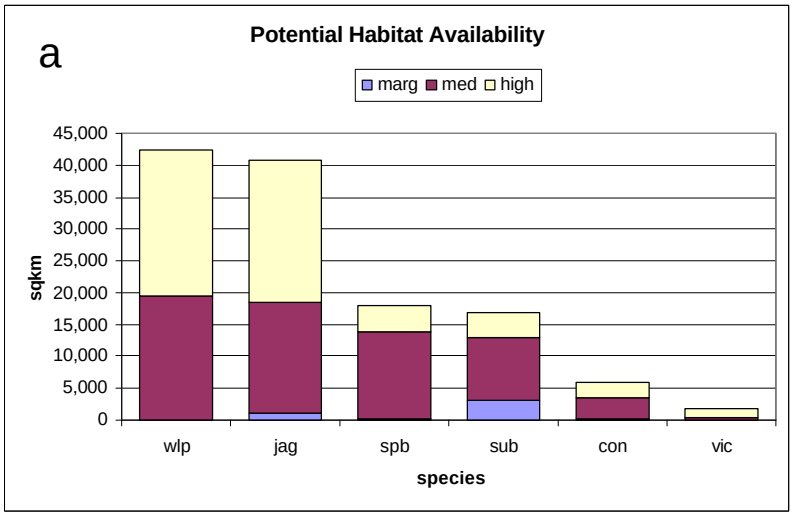
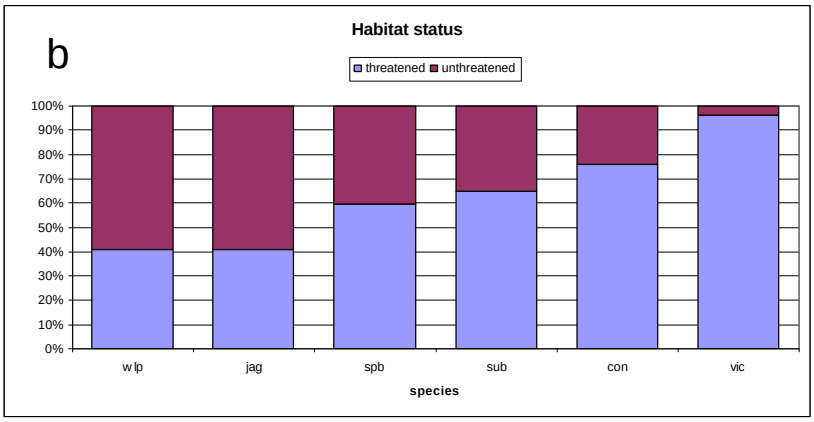
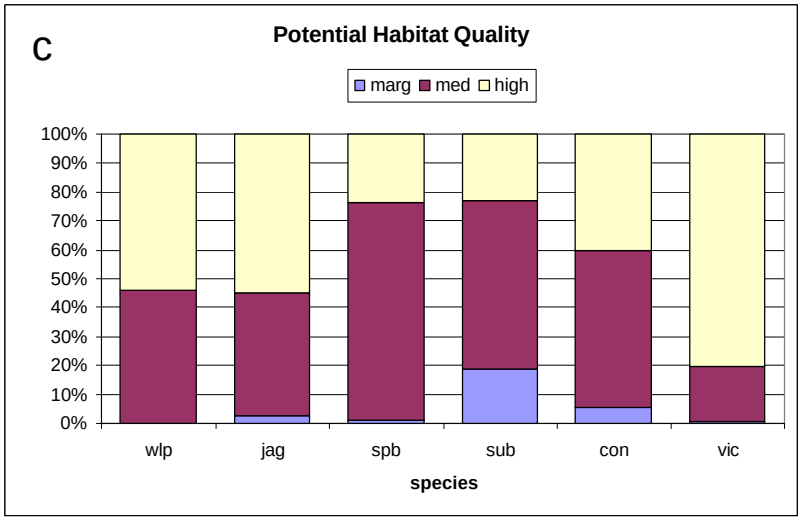
In practical terms, at present, there is no way to reconcile how much to spend on abating the next threat relative to how much we spend on monitoring our effectiveness unless we change the way that we account for our conservation spending. Today, not a single conservation organization structures their accounting practices on explicitly keeping track of what they spend on each threat abatement intervention nor do we systematically record spending on efforts to monitor the effectiveness of these interventions. Until we shift our accounting practices from keeping track of salaries, domestic and international travel, office supplies and postage, to attributing spending to specific threats abatement and monitoring activities we will never be able to rationally prioritize our conservation investments.

Approaching a common language

Today each conservation organization seems to have its own language for describing how we are measuring our conservation success. When the tools and words differ it is a challenge to compare the conservation status of two sites and almost impossible to aggregate the status of a multitude of sites within regional landscapes let alone at globally. By disseminating working documents, inviting outsiders to sit in on technical meetings, and collaborating on the development of monitoring tools, conservation NGOs will speed the evolution of a common language for measuring success.

This publication has been made possible by means of support provided by the Global Bureau of USAID. The opinions expressed in this document are those of the authors and they do not reflect necessarily the points of view of USAID.

Measuring our Conservation Success

Appendix 10
Information generated by the Landscape Species Analysis for the Northwestern Bolivian Andes Landscape (Madidi)

The landscape species analysis for Madidi highlighted spatially explicit areas for new conservation actions. Looking more broadly across the landscape, the analysis revealed that significantly less suitable habitat area is available for the hightland species (most notably Andean Condor and Vicuña) in Madidi (Chart A) and that a larger proportion of their suitable habitat is threatened (Chart b). Fortunately, a large proportion of all landscape species' potential habitat is medium or high quality (Chart c), so management possibilities are less constrained than they might otherwise be. A full report on this analysis is forthcoming as a WCS working paper and in a peer-reviewed journal.