Defining "critical habitat"

SARA defines "critical habitat" as habitat that is necessary for the survival or recovery of a listed species and is identified as the species' critical habitat in the recovery strategy or in an action plan for the species.

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We know that every species needs suitable habitat to feed, breed, shelter, and raise young. We also know that habitat loss is the single most important causal factor in our current extinction crisis. But what habitat is critical? How much habitat is enough to ensure an endangered species can persist and recover to healthy population levels? And what do we need to know to designate "critical habitat," a legal requirement of the federal *Species At Risk Act*?

In October 2005, the Columbia Mountains Institute of Applied Ecology organized a two-day workshop in Cranbrook, BC, to look at how recent experiences with critical habitat designation in Canada and the United States might provide some answers to these questions. Attended by over 125 species at risk recovery planners from government, non-profit organizations, and industry, the workshop shed light on two important threads in this discussion: critical habitat policy interpretation and the process of designating critical habitat. This article highlights some of the points covered in these discussions.

The critical habitat policy debate

Like the *American Endangered Species Act* (*ESA*), the Canadian *Species At Risk Act* (*SARA*) requires the designation of critical habitat (see sidebar) for extirpated, endangered, and threatened species listed under the *Act*. As **Dr. Karen Hodges**, UBC Okanagan Assistant Professor, explained in her workshop presentation, designating critical habitat under *ESA* has just not worked. Only 25% of all species listed under this *Act* have critical habitat designated and, since 1997, all designations have been court ordered. Government has strongly resisted designating critical habitat, even though research by Dr. Hodges and others shows that its designation directly benefits the species. Case law has also repeatedly confirmed that the designation of critical habitat is a required step for recovery planning to conform to the *ESA*.

What can we in Canada learn from these experiences?

The American experience with the *ESA* shows us that it is difficult to translate biological data into policy and practice. As Dr. Hodges explained, to facilitate the rapid and defensible designation of critical habitat for listed species, Canada should consider a formal, transparent decision-making process with clearly defined criteria. This approach should reduce the number of lawsuits about critical habitat designation.

The critical habitat biology debate

To persist in a landscape, each species needs a network of usable habitat that is well connected and meets all of its life history requirements. The process of species recovery involves identifying a recovery population target, defining a relationship between the amount of habitat and the abundance of the species, and using these data to estimate the amount and configuration of critical habitat needed to meet the population target. Definition of this habitat depends on the life history of the species in question. For example, species that require different habitat types for different life stages, or that are particularly challenged when it comes to dispersal, will have specific needs requiring detailed knowledge of how they use habitat at multiple scales to breed, feed, shelter, and disperse.

Representatives from several recovery teams shared their experiences with designating critical habitat. Although few recovery teams have actually defined critical habitat, many have used empirical data on species—habitat relationships, expert-based approaches, or a combination of both to map distributions, define suitable habitat and, in some cases, model population viability under different management scenarios. Some challenges to these tasks are noted below.

- **Limited inventory data:** Defining critical habitat often requires inventory data that crosses administrative lines. The provincial government needs to make a commitment to improve inventory and make it more accessible. **Dr. Peter Arcese**, UBC Professor and co-chair of the Centre for Applied Conservation Research, encouraged all participants to lobby the government for inventory data improvements, and suggested exploring the use of remote sensing data for inventory.
- **Limited biological data:** Models of critical habitat should ideally incorporate projections of demographic rates, but in most cases these data are fraught with gaps and uncertainties. One problem with using exclusively data-driven models is that at-risk species are often pushed into marginal habitat. Currently available data on species presence or absence may not accurately reflect their preferred habitat. The use of Traditional Ecological Knowledge,

for species at risk

formal methods of incorporating expert opinion, and models based on functional relationships between species and their habitat may get around some of these issues.

- **Issues of scale, both temporal and spatial:** Even those species that are constrained to a habitat that covers a relatively small area are affected by landscape-scale activities. For example, the distribution of the Banff Springs snail, which is restricted to a few streams originating from hot springs in Banff National Park, may be influenced by changes in landscape-scale drainage patterns.
- **Climate change:** Many participants highlighted climate change as one consideration that seems to be missing from our current definition of critical habitat. One solution may be to apply a dynamic, landscape-level view of critical habitat rather than relying on fixed site-level reserves.
- **Choosing appropriate population targets:** The *SARA* asks recovery teams to define the amount of habitat needed for survival and recovery of the species. Survival habitat can be difficult to identify, particularly in cases where available data show the population declining drastically. Defining recovery habitat requires clear population targets, which are often difficult to establish.
- **Co-ordinating overlapping recovery teams:** The ranges of many species at risk overlap. To avoid stakeholder burn-out and encourage management that maintains habitat for all species, a co-ordinated approach to defining critical habitat would be useful.

"No data is no excuse"

Biological data gaps were highlighted as an important challenge at the Columbia Mountains Institute workshop, but most presenters emphasized that a lack of data was no excuse for inaction. Although scheduling additional studies is crucial, other solutions were proposed, such as using quantitative tools to incorporate expert opinion about species' habitat use where data are lacking, and building simple population viability analysis (PVA; see sidebar) models to establish a link between habitat and species persistence. As **Dr. Janelle Curtis**, postdoctoral fellow with the UBC Centre for Applied Conservation Research, explains, "PVAs can be really simple or complex, depending on the quantity and quality of the data. For example, a simple PVA might synthesize presence/absence data over 20 sites and a few years, allowing a recovery team to evaluate population viability and trade-offs. It's also a valuable approach to formalize the problem, identify gaps in knowledge, help prioritize research (e.g., in a schedule of studies), and make assumptions explicit."

Budget constraints

Many recovery teams have small budgets, and some speakers suggested that focussing on liaison with stakeholders to improve habitat management may be more cost effective than concentrating too much effort on the designation of critical habitat. This type of stewardship is vital to the recovery of species and ecosystems at risk.

However, the American experience cautions against avoiding critical habitat designation. With the first court case under the *SARA* pending (filed against Canada's Minister of Environment for failing to protect habitat for the northern spotted owl), we will see how similar cases will be treated in Canada.

Population viability analysis

- *A general overview of PVAs:* ***http://www.ramas.com/pva.htm***
- *Keedwell, R. J. 2004. Use of population viability analysis in conservation management in New Zealand. Science for Conservation 243. Available on-line at:* ***http://www.doc.govt.nz/Publications/004~Science-and-Research/Science-for-Conservation/PDF/SfC243.pdf***

Critical habitat

- *Federal discussion paper on critical habitat:* ***http://www.sararegistry.gc.ca/virtual_sara/files/policies/Critical%20Habitat%20Discussion%20Paper%5Fe%2Epdf***
- *Research by Dr. Karen Hodges on critical habitat: Hagen, A.N. and K.E. Hodges. [2006]. Resolving critical habitat designation failures: Can we reconcile law, policy, and biology? Conservation Biology. In press. TAvailable on-line for a fee at:* ***http://www.blackwell-synergy.com/toc/cbi/0/0***
- *Dr. Hodges' Web site:* ***http://www.ubc.ca/okanagan/biophgeo/faculty/khodges***

Columbia Mountains Institute Critical Habitat Workshop overview: ***http://www.cmiae.org/conferences-past.htm#Identifying_Critical_Habitat2005***

What is a population viability analysis?

A PVA is a useful quantitative tool for species at risk recovery planning. It encompasses a process of identifying threats faced by a species and evaluating the likelihood that the species will persist for a given time into the future. A PVA provides a framework for synthesizing biological information and integrating it with socio-economic information. The end result is a transparent decision-making process that shows how available data were used to draw conclusions and choose management approaches. Monitoring is critical to their success: to be effective, PVAs need to be continually adapted and updated based on new species-specific data that become available. For more information, see: ***http://www.ramas.com/pva.htm*** and ***http://www.doc.govt.nz/Publications/004~Science-and-Research/Science-for-Conservation/PDF/SfC243.pdf***