South Okanagan-Similkameen Conservation Program: A Multi-partnered, Multi-species, Multi-scale Approach to Conservation of Species at Risk

ANDY BEZENER[1,2], MICHAEL DUNN[3], HOWIE RICHARDSON[1], ORVILLE DYER[4], ROB HAWES[5], AND TRISH HAYES[4]

[1]Okanagan University College, 583 Duncan Avenue W., Penticton, BC, V1A 8E9, Canada, email howie@vip.net
[2]Partners In Flight BC/Yukon, 583 Duncan Avenue W., Penticton, BC, V1A 8E9, Canada
[3]Canadian Wildlife Service, Pacific Wildlife Research Centre, RR1, 5421 Robertson Road, Delta, BC, V4K 3N2, Canada
[4]British Columbia Ministry of Water, Land and Air Protection, 102 Industrial Place, Penticton, BC, V2A 7C8, Canada
[5]South Okanagan-Similkameen Conservation Program, 102 Industrial Place, Penticton, BC, V2A 7C8, Canada

Abstract: The South Okanagan and Similkameen Valleys in the southern interior of British Columbia have one of the highest levels of biodiversity and concentrations of species at risk in Canada. Conservation in the area is coordinated by the South Okanagan-Similkameen Conservation Program, an alliance of 32 government departments, conservation groups, universities, and other partners. Their activities are directed by the South Okanagan-Similkameen Landscape Recovery Strategy, and are implemented by six teams: science, traditional ecological knowledge, stewardship, outreach, securement, and sustainable land use. The South Okanagan-Similkameen Conservation Program originally used four major ecosystems (wetlands, grasslands, dry forests, and rugged terrain) to organize its efforts. A fifth group, lakes and rivers, was added later.

The short-term goals of the Landscape Recovery Strategy are to understand and conserve the distributional patterns of topographical features, species, and habitat types across the landscape. This entails (1) establishing recovery plans and implementation groups for all species listed by the Committee on the Status of Endangered Wildlife in Canada, (2) establishing the distribution of various habitat types prior to European settlement, which by comparison to current distributions identifies those that have suffered the greatest reduction and are, therefore, of high priority for recovery, and (3) amending the South Okanagan-Similkameen Conservation Program's organizational structure to incorporate the species-specific requirements of the federal *Species at Risk Act*. The aim is to produce a hierarchical structure that can eliminate redundancy from multiple, single-species plans while ensuring that the unique needs of single species are not lost in the larger scheme.

The short-term goals of the Landscape Recovery Strategy would effectively result in a multi-species plan. The long-term goals are to incorporate broader ecosystem functions and changes that might occur on a time scale that is truly long term. Although the difficulties imposed by considering conservation on this expanded scope and time scale are considerable, they would also need to be similarly addressed, in many cases, by single-species plans. For the South Okanagan-Similkameen, a landscape-level recovery plan is the only practical plan, and it can be realized

through the combined efforts and organizational structure of the South Okanagan-Similkameen Conservation Program.

Key Words: landscape-level planning, species at risk, species recovery, British Columbia, South Okanagan-Similkameen Conservation Program

Introduction

The South Okanagan-Similkameen region of British Columbia (B.C.) is one of the most endangered and biologically diverse areas in Canada. Its climate, geological history, and geography have resulted in a landscape that is unique in terms of richness, rarity, and risk. Five major ecosystems—riparian/wetland, grassland/shrub-steppe, dry low-elevation forest, rugged terrain, and open water—are intermingled on the valley bottom and adjacent slopes creating a biodiversity hotspot (Scudder 2005). The area supports or supported 42 species listed as Extirpated, Endangered, Threatened, or of Special Concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and over 250 animals, plants, and plant communities on the B.C. Conservation Data Centre's Red and Blue Lists. The valley bottom also provides the only low-elevation corridor between the deserts to the south and the grasslands of central British Columbia to the north, and hence, may be of strategic importance as our climate warms.

The South Okanagan-Similkameen region has one of the fastest growing human populations in Canada. Agriculture, recreation, tourism, forestry, and urban development are increasing rapidly and leading to loss and fragmentation of natural habitat. For example, the area of antelope-brush-needle-and-thread grass habitat that has been destroyed in any single year between 1995 and 2003 is twice what was lost in any single year between 1935 and 1995 (Dyer and Lea 2003). Additionally, habitat is being degraded by both human activity and the invasion of aggressive introduced weeds. The potential effects of global warming, changing fire regimes, forest ingrowth, altered hydrology, and other large-scale ecosystem phenomena have not been well studied. These threats have resulted in intense pressure on the landscape and a dire need for conservation actions. An unpublished analysis of the threats to, and losses of, habitat in the South Okanagan-Similkameen (Cannings et al. 1998), and the *Habitat Atlas for Wildlife at Risk* (B.C. MOELP 1998), which mapped suitable habitat for 29 red- and blue-listed vertebrates, were important documents that helped set the course of conservation in the South Okanagan-Similkameen.

The South Okanagan-Similkameen has long been recognized as a special place (the commonly accepted translation of Penticton is "a place to live for ever"), and one requiring special attention. Organizations such as the Okanagan-Similkameen Parks Society and the South Okanagan Naturalists Club have toiled for nearly half a century to protect areas of ecological and æsthetic value. As human pressure on the land increased and the job of conservation grew, it

became evident that the activities of the various conservation groups in the region needed to be coordinated (Hlady 1993). The latest and most inclusive cooperative came together in 2000 as the South Okanagan-Similkameen Conservation Program (SOSCP). The original 13 government and nongovernment partners were supplemented by 19 other partners, and now include federal and provincial government departments; First Nations; national, regional, and local conservation groups; museums; and academic institutions. Their common aim is to conserve the biodiversity of the region through cooperation, stewardship, and outreach.

To define its conservation targets, the SOSCP initially used the four ecosystem types (wetlands, grasslands, dry forests, and rugged terrain) identified in the *Habitat Atlas for Wildlife at Risk* (B.C. MOELP 1998). Note here that conservation of lakes and streams traditionally centered around management of sport fisheries, and had been distinct from the conservation of terrestrial ecosystems. Note also that the terms 'ecosystem' and 'habitat' are used here only to indicate levels of complexity and not as strictly defined ecological terms. Enactment of the federal *Species at Risk Act* in 2002 presented a problem for the SOSCP's two largest partners, the Canadian Wildlife Service, and the B.C. Ministry of Water, Land and Air Protection. Their mandates became distinctly species focused while that of the SOSCP remained ecosystem oriented. The South Okanagan-Similkameen Landscape Recovery Strategy was developed in response to that problem. A constant theme of the strategy is that species recovery and landscape recovery are not alternatives but are necessarily complementary. The aim of this presentation is to show that conservation in the South Okanagan-Similkameen *must* be done at the landscape level, and that many of the problems that have been identified in existing landscape plans are also inherent in species recovery.

Why a Landscape-level Recovery Strategy?

We separate the reasons for creating a landscape recovery strategy into two levels: proximate and ultimate. The proximate reasons stem from the immediate problems of trying to recover almost 250 listed species at once. This alone would force adoption of a multi-species recovery plan for there are neither sufficient funds nor people to deal with all of these species independently (Franklin 1993; Tear et al. 1995). The fact that the geographic distributions of some of the species are congruent, and that they share common threats and common habitats means time and effort can be saved by coordinating their recovery. By contrast, there will be cases where recovery of one species will pose threats to another (e.g., Roemer and Wayne 2003). All recovery plans require statements about such inter-specific interactions. The Landscape Recovery Strategy merely combines all such statements into a single document. Several grassland birds provide an excellent example of the need for coordinated recovery planning. For example, long-billed curlews (*Numenius americanus*) prefer open grasslands with short vegetation, lark sparrows (*Chondestes grammacus*) prefer tall shrubs in open grassland, Brewer's sparrows (*Spizella breweri*) are found in extensive areas of sagebrush with abundant native forbs, and sage

thrashers (*Oreoscoptes montanus*) need dense patches of antelope-brush (*Purshia tridentata*) and big sagebrush (*Artemisia tridentata*) large enough to support and conceal their heavy nests (B.C. MOELP 1998). One of the major influences on grassland ecology is livestock grazing, hence its management will be a significant tool for recovery of such species and their habitats. Areas such as the White Lake Basin where two or more of these bird species are found will require carefully planned management of grazing and other potential threats to optimize multi-species recovery.

Other proximate reasons for adopting a landscape-level approach stem from an obligation, both moral and organizational, to consider species that are not listed by either COSEWIC or the B.C. Conservation Data Centre. Morally, no conservationist should be willing to fix his or her efforts on a few designated species to the detriment of others which have not yet been identified as being threatened, or which are common but have particular ecological roles or cultural significance. From an organizational perspective, several of the SOSCP's partners do not have conservation of threatened species as their prime stated goal. Ducks Unlimited, The Nature Trust of Canada, Okanagan University College, and Partners in Flight BC/Yukon, among others, have interests in conserving the South Okanagan-Similkameen, and all serve important roles in doing so, but their visions of conservation are much broader than those defined under the *Species at Risk Act*.

The ultimate reasons for creating a landscape recovery strategy are those pertaining to landscapes as something more that an interacting set of species locked in time and space. Perhaps it is pertinent here to define a landscape. As an ecological concept, the term originated in Europe and clearly encapsulated a level of landscape modification that had resulted from a 1000 years of human activity. The South Okanagan-Similkameen has a much briefer history of intense human activity, but we have quickly caught up in terms of modifying our surroundings. Urban et al. (1987) defined a landscape as "a mosaic of heterogeneous land forms, vegetation types, and land uses". The South Okanagan-Similkameen is a landscape. Definitions of landscape ecology have included references to "structure, function, and change" (Holl et al. 2003) and "patterns and processes" (Forman and Godron 1986). These definitions help us evaluate the need for a landscape-level recovery strategy and what is required to implement one.

Structure and pattern concern the distribution of habitats and species within the landscape. Relative to many other areas with conservation concerns, the South Okanagan-Similkameen is information rich. More inventory is always recommended in recovery plans, but the long line of able natural historians and conservationists who have operated in the South Okanagan-Similkameen have left a record, good for some taxa, less so for others, of the distribution of species and habitats (see for example Cannings et al. 1987; Harper et al. 1993; B.C. MOELP 1998).

Process or function refers to ecosystem functions, an ill-defined term often invoked when discussing the anthropic value of the landscape. There is a significant body of theory on the genetics of small populations, metapopulations, nutrient and energy flows through ecosystems, fire ecology, and hydrodynamics. Maintenance of ecosystem functions is assumed to be crucial

for the future of all species (including humans) within the South Okanagan-Similkameen, but little of the theory has been applied to conservation in the area.

Change, particularly over the long term, has to be incorporated into recovery whether it is at the species level or the landscape level. There is great concern among ecologists in the South Okanagan-Similkameen over the long-term changes to the environment that might be wrought by global warming, weed invasions, tree encroachment, changing fire regimes, and increasing habitat loss and fragmentation. In planning to recover a single species, such as Behr's hairstreak (*Satyrium behrii*), it is just as pertinent to ask what the landscape will be like 100 or 200 years from now as it is when planning on a broader scale.

Setting Short-term Goals

The Landscape Recovery Strategy identifies three short-term goals: completing recovery plans for all designated species at risk, developing a plan to ensure that the patchwork of habitat types that characterized the South Okanagan-Similkameen in the past are conserved, and developing an organizational structure to implement recovery plans in the most efficient manner possible.

The first goal has essentially been met in that there are recovery teams and draft recovery strategies or plans for all COSEWIC-listed species. All species recovery plans are appended to the Strategy. A desired future scenario is that as species are added to the COSEWIC lists their recovery plans will not be written as separate documents but as integrated additions to the existing landscape plan.

The second goal of the Landscape Recovery Strategy has been met in part. The South Okanagan-Similkameen has been mapped quite extensively, and it has been possible to reconstruct a habitat map of the region as it was when the first European settlers arrived. By mapping the historical extent of each habitat type it was possible to identify those types which have been most impacted by human activity (Dyer et al. 2005). The Landscape Recovery Strategy has set a target of conserving a minimum of 40% by area of the historical coverage of 50 habitat types. Combining information on the distribution of threatened species and threatened habitats will provide a powerful tool for directing stewardship and recovery activities. The problem with mapping and inventory is that it is dated. Evaluating the effectiveness of the recovery plan will require some way of tracking the numbers, distribution, and, ideally, the degree of inbreeding of all endangered and threatened species and selected other species which might be approaching that state. This is a tall order but efforts to devise a sufficient, cost-effective, long-term monitoring program must be set in motion without delay.

The third short term-goal of the Landscape Recovery Strategy is to modify the existing organizational structure of the SOSCP to coordinate implementation of individual species recovery plans. The proposed changes to this structure are described in more detail below.

Integration of Organization

The goals of the SOSCP were first outlined in a brief prospectus that became the guiding statement in constructing a more detailed strategic plan. Six teams were involved in implementing the plan. The science and traditional ecological knowledge teams ensured that the most comprehensive knowledge base and accepted set of principles were applied to recovery. Four teams were designed to deal with the problem that much of the threatened habitat was under private ownership or subject to the vagaries of public decision making. The outreach team educated the public on conservation matters, the Ecologically Sustainable Land Use Team provided conservation information to public planning processes, the habitat securement team worked toward identifying and securing conservation lands, and the stewardship team encouraged and helped landowners use their land in ways that maximized its conservation value. This system has worked well as long as there is dialogue among the teams and sufficient, qualified personnel to work in the teams.

A second, more informal level of organization below the six teams developed in an *ad hoc* fashion. Because of the great threats to grassland (particularly antelope bitterbrush) and riparian habitats, much of the conservation work became concentrated in these habitats, and focal working groups were established to coordinate those efforts. Conservation of sports fisheries and game animals, particularly California bighorn sheep[1] (*Ovis canadensis californiana*) was, for a variety of reasons, done in semi-isolation from the SOSCP structure. The *Species at Risk Act* then added recovery teams to the mix, and these drew on essentially the same human resources as the SOSCP recovery teams. The Landscape Recovery Strategy was born out of the need to reduce this organizational mess, and the need for employees from the Canadian Wildlife Service and the B.C. Ministry of Water, Land and Air Protection to reconcile their mandate for species recovery with the ecosystem approach of the SOSCP.

The Landscape Recovery Strategy is now the strategic plan for the SOSCP, and its implementation will be overseen by a separate Recovery Implementation Group. The SOSCP executive and steering committees continue to be the main avenues for developing strategy and raising funds, and the six teams are still the vehicles for carrying out recovery actions. The Landscape Recovery Implementation Group, the focal ecosystem working groups, and the individual species Recovery Implementation Groups will form a nested hierarchy of planning teams. It is hoped that once the protocol for developing recovery plans is well established, the species recovery teams will be ephemeral in nature. They will determine the recovery requirements for the species and identify possible conflicts with other species. Then, wherever possible, their activities will be subsumed under the broader umbrella of a focal ecosystem working group, with the species Recovery Implementation Group reduced to a representative on that working group. The ecosystem working groups will ensure the coordinated recovery of all

the species within a given habitat; however, their efforts will not be restricted to listed species but rather will tend to focus on the overall ecological health of the ecosystem. The Landscape Recovery Implementation Group will ensure that no recovery requirements fall through the gaps between the ecosystem working groups. Species Recovery Implementation Groups could be activated at any time to update the plan or evaluate progress, but in reality, many individuals fill seats at all levels of the hierarchy. Again, since recovery plans are required to comment on the effects of conservation efforts on other species, this nested hierarchy is necessary where many species at risk coexist. The riparian ecosystem serves as a good example of how this system should work. Western screech-owls (*Otus kennicottii macfarlanei*), yellow-breasted chats (*Icteria virens*), and northern leopard frogs (*Rana pipiens*) are all COSEWIC-listed species that depend on riparian habitats, as do many of the listed plant species, but each species has slightly different habitat needs. The chat requires dense rose thickets for nesting; the screech-owl needs old cottonwoods for nesting and roosting, and adjacent open grassland or dry woodlands for foraging; and the frog needs open, shallow wetlands and marshlands with concealing shoreline vegetation. It is the job of the riparian working group to account for the disparate needs of these species.

A final, but important step in converting the original SOSCP strategic plan into a true landscape plan will be to meld the activities of terrestrial ecologists, limnologists, and fisheries biologists, and to extend the cooperation beyond the rather arbitrary boundaries of the South Okanagan-Similkameen. There are already several exciting projects that are forcing this amalgamation: the restoration of the Vaseux marshes, the recreation of more natural flow regimes to the Okanagan River by adding riffles between flow control structures, and the Proof-of-Concept Project that will see a one-kilometer stretch of the Okanagan River dyke set back for an experimental re-establishment of natural meanders and riparian habitat along a canalized section of the river. There is great interest in the Proof-of-Concept Project down river in Washington State.

Setting Long-term Goals

It is easy to formulate broad statements of goals but much more difficult to make these precise. For instance, the term ‘recovery’ implies a return to some defined point in the past: but what point? Similarly, goals for recovery are often posed in terms of viable populations but without reference as to how long they must be viable. If we think of our activities lasting only five, ten, or twenty years, it is hard to justify the expense and effort. On the other hand, if we talk about stability over 100 or 200 years, we have not yet established if this rather static view of conservation is either desirable or achievable. Changes in the distribution of species due to global climate changes are already discernable (Parmesan and Yohe 2003; Root et al. 2003; Thomas et

[1] According to the BC Species and Ecosystem Explorer (September 2004) and NatureServe Explorer (version 4.0, July 2004), recent taxonomic changes do not recognize the subspecies California bighorn sheep (*Ovis canadensis californiana*). It is now referred to as bighorn sheep (*Ovis canadensis*).

al. 2004). Do we still persist in our recovery efforts when climate change has rendered our area unsuitable for some of the current inhabitants? Conversely, if destruction of native habitat is essentially complete 50 years from now, do we need to consider global warming?

The South Okanagan-Similkameen recovery plan will only be a landscape-level plan when we are capable of addressing all the possible threats to our environment. We will stress again, however, that these are not questions restricted to conservation on the broad scale, but will presumably have to be a component of recovery planning for single species such as the night snake (*Hypsiglena torquata*), the northern leopard frog, and Lyall's mariposa lily (*Calochortus lyallii*), and others.

The White Lake area contains land administered by the B.C. Ministry of Water, Land and Air Protection, Environment Canada, and the Nature Trust of Canada. It offers an ideal site for a wide variety of research on such issues as weed invasion and removal, coordination of multi-species recovery, and the use of fire and grazing as restoration tools. The recent establishment of the White Lake Grassland Working Group was an important step toward maximizing this research potential and elevating the South Okanagan-Similkameen recovery effort to a landscape level.

Conclusions

The complexity of the conservation needs of the South Okanagan-Similkameen are such that at the very least they must be carried out as a coordinated, multi-species effort. The information on the density and distribution of species and habitats is currently adequate for recovery at this level, but will not be in the near future. A viable, long-term monitoring program must be established to continue effective planning and to track the effectiveness of recovery efforts. The organizational structure of the existing South Okanagan-Similkameen Conservation Program can be modified to deal with multi-species planning that is efficient and lacks redundancy; however, before the current strategy can truly be considered a landscape plan it must incorporate a broader set of ecosystem functions and account for change over a period extending into the next century rather than the next decade.

References

British Columbia Ministry of Environment, Lands and Parks (B.C. MOELP). 1998. Habitat atlas for wildlife at risk: South Okanagan and Lower Similkameen. British Columbia Ministry of Environment, Lands and Parks, Victoria, British Columbia.

Cannings, R.A., R.J. Cannings, and S.G. Cannings. 1987. Birds of the Okanagan Valley, British Columbia. Royal British Columbia Museum, Victoria, British Columbia.

Cannings R.J., E. Durrrance, and L.K. Scott. 1998. South Okanagan recovery plan: scientific assessment. Unpublished report. British Columbia Ministry of Environment, Lands and Parks, Penticton, British Columbia.

Dyer, O., and E.C. Lea. 2003. Status and importance of the antelope-brush–needle-and-thread grass plant community in the South Okanagan Valley, British Columbia. Pages 13–18 in R. Seaton, editor. Proceedings of the symposium on ecosystems at risk: antelope-brush restoration. Brinkman Associates, New Westminster, British Columbia.

Dyer, O., T. Lea, H. Richardson, G.G.E Scudder, and L. Warman. 2005. Setting conservation targets in the South Okanagan-Similkameen. In T.D. Hooper, editor. Proceedings of the Species at Risk 2004 Pathways to Recovery Conference. March 2–6, 2004, Victoria, British Columbia. Species at Risk 2004 Pathways to Recovery Conference Organizing Committee, Victoria, British Columbia.

Forman, R.T.T., and M. Godron. 1986. Landscape ecology. Wiley, New York.

Franklin, J.F. 1993. Preserving biodiversity: species, ecosystems, or landscape. Ecological Applications **3**:202–205.

Harper, W.L., E.C. Lea, and R.E. Maxwell. 1993. Biodiversity inventory in the South Okanagan. Pages 249–262 in M.A. Fenger, E.H. Miller, J.A. Johnson, and E.J.R. Williams, editors. Our living legacy: proceedings of a symposium on biological diversity, 1986. Royal British Columbia Museum, Victoria, British Columbia.

Hlady, D.A. 1993. South Okanagan Conservation Strategy. Pages 307–310 in M.A. Fenger, E.H. Miller, J.F. Johnson, and J.E. Williams, editors. Our living legacy: proceedings of a symposium on biological diversity. Royal British Columbia Museum, Victoria, British Columbia.

Holl, K.D., E.E. Crone, and C.B. Schultz. 2003. Landscape restoration: moving from generalities to methodologies. BioScience **53**:491–502.

Parmesan, C., and G. Yohe. 2003. A globally coherent fingerprint of climate change impacts across natural systems. Nature **421**:37–42.

Roemer, G.W., and R.K. Wayne. 2003. Conservation conflict: the tale of two endangered species. Conservation Biology **17**:1251–1261.

Root, T.L., J.T. Price, K.R. Hall, S.H. Schneider, C. Rosenzweig, and A. Pounds. 2003. Fingerprints of global warming on wild animals and plants. Nature **421**:57–60.

Scudder, G.G.E. 2005. Rareness and richness hotspots in British Columbia. In T.D. Hooper, editor. Proceedings of the species at risk 2004 pathways to recovery conference. March 2–6, 2004, Victoria, British Columbia. Species at Risk 2004 Pathways to Recovery Conference Organizing Committee, Victoria, British Columbia.

Tear, T.H., J.M. Scott, P.H. Hayward, and B. Griffith. 1995. Recovery plans and the Endangered Species Act: are criticisms supported by data? Conservation Biology **9**:182–192.

Thomas C.D., A. Cameron, R.E. Green, M. Bakkenes, L.J. Beaumont, Y.C. Collington, B.F.N. Erasmus, M.F. de Sigueira, A. Granger, L. Hannah, L. Hughes, B. Huntley, A.S. van Jaarsveld, G.F. Midgley, L. Miles, M.A. Ortega-Huerta, A.T. Peterson, O.L. Phillips, and S.E. Williams. 2004. Extinction risk from climate change. Nature **427**:145–148.

Urban, D.L., R.V. O'Neill, and H.H. Shugart. 1987. Landscape ecology. BioScience **37**:119–127