

species and ecological communities, including some ecosystems unique to Canada. Broadleaf woodlands, arctic-alpine tundra, sagebrush steppe, and grasslands are some of the ecosystems that are found in the Peace Valley. have become rare. Historical ecosystem mapping (1800s to present) has shown that greater than 50% of some ecosystem types in the Canadian Prairie Provinces have been lost.

Healthy, functional natural ecosystems play an important role in adapting to and mitigating the impacts of climate change. Climate change adaptations such as flood and drought risk reduction, water conservation, and improved connectivity contribute to ecosystem resilience and adaptive capacity in the future. The ecosystems mapped in this project are ecologically significant and provide important ecosystem services. Ecosystems provide services they provide, such as climate regulation, water filtration, productive soil, carbon sequestration, nutrient cycling, pollination, wildlife habitat and recreation, and aesthetic value. The ecosystems mapped in this project are part of the landscape, which includes other ecosystems that also contribute to ecosystem services.

Study Area

The Okanagan Valley SEI project is comprised of a number of individual SEI sub-projects. The sub-projects include: Central Okanagan City of Kelowna; Vernon Community; District of Lake Country; Joe Roth, TFL 15; Nanaimo, Colangelo; and the South Okanagan. For more information about the project and the methods used, please refer to the Technical section on this map.

The purpose of the SEI Okanagan Valley project is to combine all of the various SEI sub-projects that have been completed in the Okanagan Valley from 1990 to 2020. The project is a collaborative effort between the British Columbia Ministry of Environment and Climate Change, the British Columbia Ministry of Forests, Land and Natural Resources, and the British Columbia Ministry of Agriculture and Food. The project is a collaborative effort between the British Columbia Ministry of Environment and Climate Change, the British Columbia Ministry of Forests, Land and Natural Resources, and the British Columbia Ministry of Agriculture and Food. The project is a collaborative effort between the British Columbia Ministry of Environment and Climate Change, the British Columbia Ministry of Forests, Land and Natural Resources, and the British Columbia Ministry of Agriculture and Food.

Sensitive Ecosystems Inventory Methods

Sensitive Ecosystems Inventory was developed as a conservation tool. It is flexible and can be completed in a short time with limited funding when the project is completed. The project is a collaborative effort between the British Columbia Ministry of Environment and Climate Change, the British Columbia Ministry of Forests, Land and Natural Resources, and the British Columbia Ministry of Agriculture and Food. The project is a collaborative effort between the British Columbia Ministry of Environment and Climate Change, the British Columbia Ministry of Forests, Land and Natural Resources, and the British Columbia Ministry of Agriculture and Food.

Most Okanagan SEI projects were developed by first undertaking Terrestrial Ecosystems Mapping (TEM), assigned in the Nanaimo project where the SEI polygons were mapped from air photos using a bottom-up approach. The project is a collaborative effort between the British Columbia Ministry of Environment and Climate Change, the British Columbia Ministry of Forests, Land and Natural Resources, and the British Columbia Ministry of Agriculture and Food. The project is a collaborative effort between the British Columbia Ministry of Environment and Climate Change, the British Columbia Ministry of Forests, Land and Natural Resources, and the British Columbia Ministry of Agriculture and Food.

Inventory Results

Many of the sites identified by the SEI are at high risk of conversion to other land uses or further degradation. Within the study area, 47% was mapped as high risk of conversion. The project is a collaborative effort between the British Columbia Ministry of Environment and Climate Change, the British Columbia Ministry of Forests, Land and Natural Resources, and the British Columbia Ministry of Agriculture and Food. The project is a collaborative effort between the British Columbia Ministry of Environment and Climate Change, the British Columbia Ministry of Forests, Land and Natural Resources, and the British Columbia Ministry of Agriculture and Food.

Risk Limitations

The project is a collaborative effort between the British Columbia Ministry of Environment and Climate Change, the British Columbia Ministry of Forests, Land and Natural Resources, and the British Columbia Ministry of Agriculture and Food. The project is a collaborative effort between the British Columbia Ministry of Environment and Climate Change, the British Columbia Ministry of Forests, Land and Natural Resources, and the British Columbia Ministry of Agriculture and Food. The project is a collaborative effort between the British Columbia Ministry of Environment and Climate Change, the British Columbia Ministry of Forests, Land and Natural Resources, and the British Columbia Ministry of Agriculture and Food.

Treated species that have been included in Schedule 1 of the Species at Risk Act are afforded protection on federal lands, and the new B.C. Wildlife Act will extend protection to private lands and habitats or riparian areas. Protection of Species at Risk and their important habitats on private lands is primarily achieved through careful land-use planning and mitigation by the landowner.

Acknowledgments

Project partners include: the Ministry of Environment, Environment Canada and the British Columbia Ministry of Forests, Lands, Natural Resource Development and Agriculture; the Allyn Brooks Nature Centre, Regional District of Okanagan Similkameen, Regional District of Central Okanagan, City of Kelowna, City of Vernon, District of Lake Country, and the Regional District of North Okanagan;

Financial or in-kind support for the project was provided by: The B.C. Ministry of Environment (B.C. Conservation Data Centre), Environment Canada (Canadian Wildlife Service), Real Estate Foundation of B.C., Habitat for Humanity, and First Fund, the Habitat Stewardship Program, Canadian Services Commission, Regional District of Central Okanagan, Regional District of Okanagan Similkameen, Regional District of Bulkley-Nechako, Allyn Brooks Nature Centre, City of Vernon, District of Lake Country, Weyerhaeuser Canada Ltd., District of Colubsen, City of Kelowna, and B.C. Conservation Data Centre.

Cartography: Julia Zetserman and Ann Bylin (Cady's Consulting Ltd.). Thanks to Jan Kirkby, Environment Canada (Canadian Wildlife Service). Thanks to Allison Hawke, Mike Sarski, Kristin Ineson, Carmen Castan, Jo Anne Stacey, and Kim Everslett for their assistance in developing the map products.

References

Information and access to full reports and map products for the Okanagan project are available at EcoWatch: www.env.gov.bc.ca/okanagan/ (the link to the Okanagan Valley or the project area name as a keyword).

SBI Report:

Iverson, K.H., D.L. Curran, L.J. Fleming, and A.L. Haney. 2008. *Sensitive Ecosystems Inventory: Okanagan Valley*. British Columbia Wildlife Service, 2009-2007 Methods, Ecological Descriptions, Results and Conservation Tools. Technical Report Series No. 495. Canadian Wildlife Service, Pacific and Yukon Region.

This map can be cited as:
Environment Canada. Sensitive Ecosystems Inventory - Okanagan Valley. Vancouver to Coquihalla Wildlife Corridor. 2006-2007. 1:200,000. Vancouver, BC: Canadian Wildlife Service, "The Great Bear Rainforest".

Namata: Dzibist, R.O. 2006. *Namata Sensitive Ecosystems Inventory*, 1:200,000 maps.

Central Okanagan (including south) study: Iverson, K. and K. P. Umlach. 2008. *Sensitive Ecosystems Mapping of the Central Okanagan Valley*. Prepared for the Regional District of Central Okanagan valley: Central Okanagan, South Slopes, Kelowna, Ellison and the City of Vernon. Unpublished report, prepared for the Okanagan Collaborative Conservation Program.

Iverson, K. and C. Ewin. 2001. 2002. *Ecosystem Mapping of Portions of the Pelly and Inuvik in the Central Okanagan*. Prepared for the Regional District of Central Okanagan and the Ministry of Sustainable Resources Management. 1:200,000 maps.

Lake Country: Iverson, K. and P. Umlach. 2006. *Sensitive Ecosystems Inventory: Lake Country*. 2005. 1:200,000 maps.

Similkameen: Iverson, K. and P. Umlach. 2006. *Sensitive Ecosystems Inventory: Similkameen*. 2006. 1:200,000 maps.

Bella Vista – Coose Lake Watershed: Iverson, K. and J. Shipkita. 2002. *Sensitive Ecosystem Mapping of the Bella Vista – Coose Lake Watershed*. 1:200,000 maps.

Coldestream – Vernon: Iverson, K. and P. Umlach. 2006. *Sensitive Ecosystems Inventory: Coldestream*. 2006. 1:200,000 maps.

Kelowna: Iverson, K. and P. Umlach. 2008. *Sensitive Ecosystems Inventory: City of Kelowna*. 1:200,000 maps.

South Okanagan: Iverson, K. and A. Haney. 2009. *Refined and updated Sensitive Ecosystem Mapping of the South Okanagan Valley*. Unpublished report, prepared for the Regional District of the Okanagan - Similkameen.

Map Products:

2008-2005. *Territorial Ecosystems Mapping South Okanagan (This is an update to Leach, E. and M. Russell, 1995. Biophysical Habitat Values of the South Okanagan)*. 1:200,000 maps.

Rich Columbia: Iverson, K. and P. Umlach. 2005. *Sensitive Ecosystems Inventory: Rich Columbia*. 2005. 1:200,000 maps.

British Columbia Conservation Data Centre (CDC): Ecosystems Branch. B.C. Ministry of Environment. www.env.gov.bc.ca

Related Publications and Links

Green Bylaws Toolkit for Conserving Sensitive Ecosystems and Green Infrastructure: www.greenbylaws.ca

The Toolkit contains detailed examples of bylaw provisions currently in use in municipalities across the province. Regional Growth Strategies and Official Community Plans, Development Permit Areas, Zoning, Tax Exemptions, and other regulatory tools are also discussed. The Toolkit includes regulatory tools. It includes several examples and case studies of successful green infrastructure projects and bylaws.

Climate Change: Wilson, S. and R.H. Helms. *Mitigating and Adapting to Climate Change through the Conservation of Wetlands*. Available at: www.ec.gc.ca/wetlands.

Develop with Care: Environmental Guidelines for Urban and Rural Land Development in British Columbia: BC Ministry of Environment. www.env.gov.bc.ca/bcdev/guidelines/bwdev/bwdev2006/devolve_with_care_jrnl.pdf

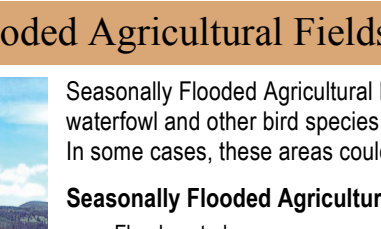
Taking Nature's Pulse: The Status of Biodiversity in British Columbia: Austin, M.A., D.A. Buffett, D.J. Nicolson, G.G.E. Soudner and V. Stevens (eds.) 2008. Taking Nature's Pulse: The Status of Biodiversity in British Columbia. Biodiversity Council of BC. Victoria, BC. 208 pp. Available at: www.biodiversitycouncil.org

Alpine (AP):

Alpine ecosystems are high-elevation alpine and parkland ecosystems including **herbaceous** ecosystems dominated by forbs or graminoid vegetation (APG), **parkland forests** where trees occur in distinct clumps (AP₂), and **shrub ecosystems** dominated by dwarf shrubs such as heather (AP₃). Alpine ecosystems are found at higher elevations in the South Okanagan (TR, 15) where there is significant snow cover for large parts of the year. Alpine ecosystems are sensitive to disturbance, as the shallow soils and cold temperatures slow vegetation recovery.

Alpine Ecosystems provide the following services:

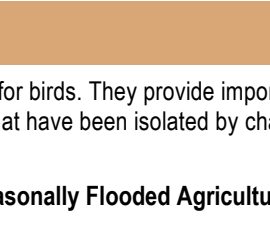
<ul style="list-style-type: none"> Erosion control Fresh water Climate regulation Nutrient cycling and maintenance of productive soils 	<ul style="list-style-type: none"> Pollination Food production Soil formation
--	--



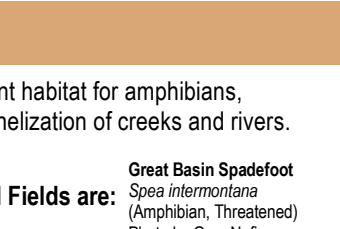
Some species associated with Alpine Ecosystems are:

- American Badger
- Pennine Fox
- Wolverine

Amoleur Badger
Landscape in alpine forest
Photo by Parks Canada W. Lynch



Pennine Fox
Cott. pin. forest
(Marine-Spauld County)
Photo by Parks Canada W. Lynch



Seasonally Flooded Agricultural Fields (FS):

Seasonally Flooded Agricultural Fields ecosystems are cultivated fields that flood annually, providing important migration and wintering habitat for birds. They provide important habitat for amphibians, waterfowl and other bird species, small mammals, and many types of predators. They are located along low-lying areas or former floodplains that have been isolated by channelization of creeks and rivers. In some cases, these areas could be restored to Wetland or Riparian ecosystems if natural flood regimes and vegetation are re-established.

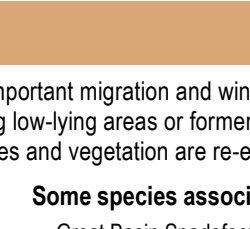
Seasonally Flooded Agricultural Fields ecosystems provide the following services:

<ul style="list-style-type: none"> Flood control Drought recovery Storm protection Drainage and natural irrigation Fresh water 	<ul style="list-style-type: none"> Carbon storage Maintenance of productive soils Pollination Peel regulation Food production
---	--


Some species associated with Seasonally Flooded Agricultural Fields are:

- Great Basin Spardeed
- Long-billed Curlew
- Pennine Fox
- American Badger
- Great Basin Gophersake
- Western Redstartake

Great Basin Spardeed
Great Spardeed
(Kootenai County)
Photo by Gary Hells
Calderwells.com



Pennine Fox
Pin. forest
(Brit. Spaul County)
Photo by Parks Canada



Mature Forest (MF):

Mature Forest ecosystems are dominated by mature trees, including **broadleaf** (MF₁) deciduous, **coniferous** (MF₂) conifers, and **mixed** (MF₃) deciduous and coniferous forests; however it excludes mature riparian forests, and mature coniferous and broadleaf woodlands. Mature Forests are an important buffer to sensitive ecosystems. They provide some of the same values associated with Old Forest ecosystems and can also be important recruitment sites for Old Forests. Mature forest ecosystems have many important structural attributes, including some remaining large, old trees.

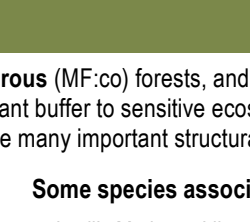
Mature Forest Ecosystems provide the following services:

<ul style="list-style-type: none"> Climate regulation Carbon storage Air quality Erosion control Sediment retention Nutrient cycling and maintenance of productive soils 	<ul style="list-style-type: none"> Flood control Pest regulation Pollination Pollution control Food production
--	---

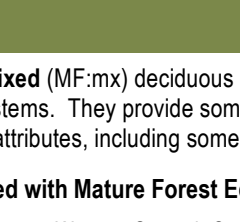
Some species associated with Mature Forest Ecosystems are:

- Lyell's Marposa Owl
- Wolverine
- Wilkinson's Spayouker
- Olive-sided Flycatcher
- Shaw Phoe
- Western Redstartake

Lyell's Marposa Owl
Owl (Marposa)
Photo by Parks Canada W. Lynch



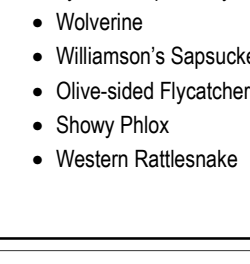
Wolverine
Shaw Phoe
(Brit. Spaul County)
Photo by Parks Canada



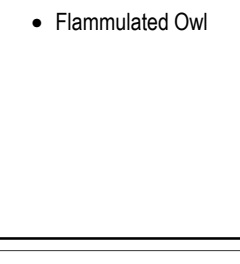
Some species associated with Mature Forest Ecosystems are:

- Lyell's Marposa Owl
- Wolverine
- Wilkinson's Spayouker
- Olive-sided Flycatcher
- Shaw Phoe
- Western Redstartake

Lyell's Marposa Owl
Owl (Marposa)
Photo by Parks Canada W. Lynch



Wolverine
Shaw Phoe
(Brit. Spaul County)
Photo by Parks Canada



Non-sensitive Landscapes (NS): (Areas not mapped as sensitive or other important ecosystems are depicted in white)

Non-sensitive Landscapes are modified areas not occupied by sensitive ecosystems, and include urban areas, disturbed rural landscapes, and young forests. Urban areas have human-induced features or disturbances that are dominant across the landscape. Disturbed rural areas can be the interspersed with forest, farmland and native vegetation, or cultivated crops. Young forests are cone-dominated stands with an age range between 10 and 50 years. Non-sensitive landscapes are shown in white in the areas that are not designated by a sensitive ecosystem. In addition, many sensitive ecosystems are polygons close to urban or disturbed areas which have a modified landscape interspersed with the sensitive ecosystem(s), in which the sensitive ecosystem(s) are too small to map individually. These modified