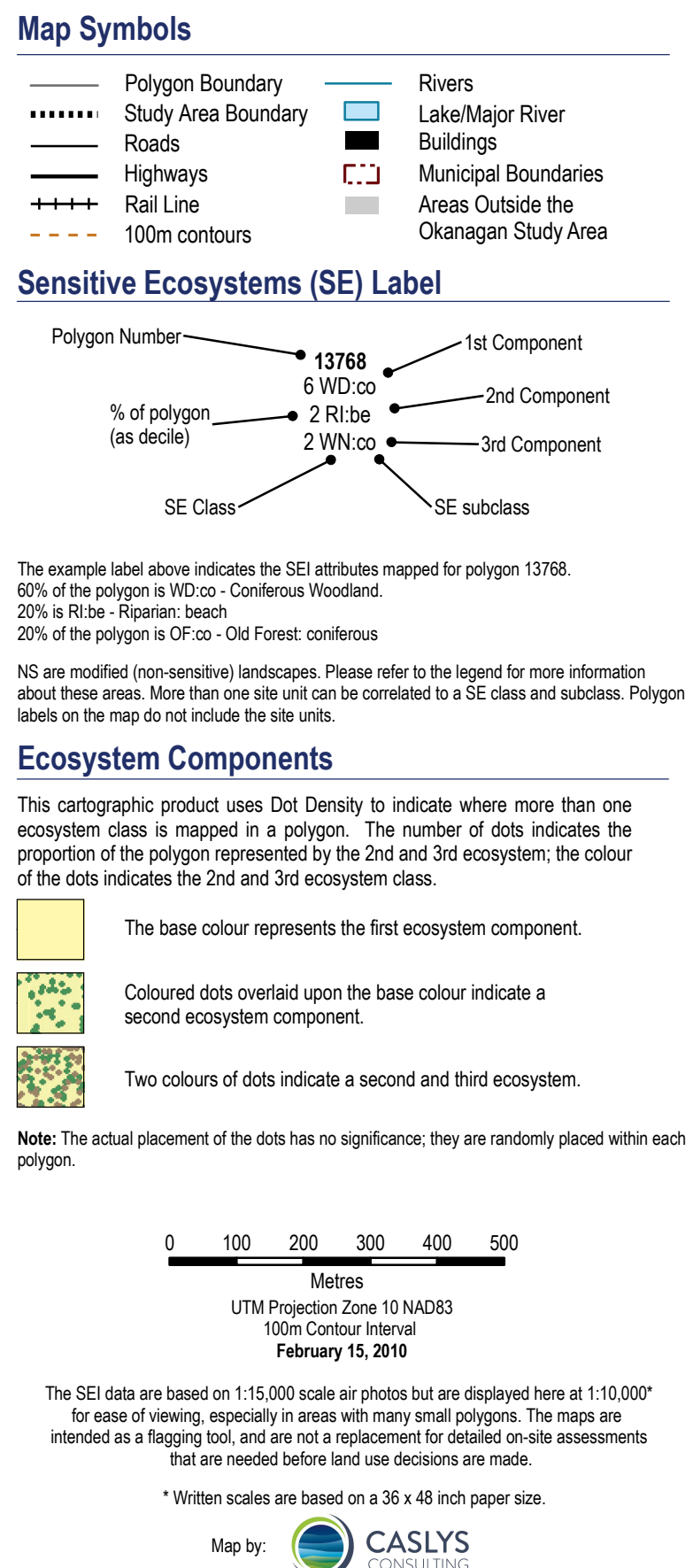


WHAT IS A SENSITIVE ECOSYSTEM?



WHAT IS A SENSITIVE ECOSYSTEM?

For the purpose of this study, an ecosystem is considered to be a portion of the landscape with relatively uniform dominant vegetation.

Sensitive Ecosystems are ecosystems that are ecologically sensitive and/or at risk in the landscape.

Rationale

The Okanagan Valley region covers one of the most rapidly growing population centres of British Columbia, and development pressure is escalating. The area is under intense pressure due to urban and rural human settlement as well as extensive agricultural conversion, and has experienced significant changes ecosystem structure and function through the spread of invasive alien species and fire exclusion. Very high ecological values, combined with the development pressure on the landscape, underscore the need for careful, conservation-based land use decision making throughout the Okanagan Valley.

Regional and municipal governments of the Okanagan Valley and conservation organizations, supported by Environment Canada's Canadian Wildlife Service (CWS), have been working together to develop a comprehensive map of remaining sensitive ecosystems in the Okanagan Valley. The SMI is intended to help guide land use planning and development decisions by local governments, landowners, developers, and other citizens to be involved in protecting, conserving and restoring sensitive ecosystems. The map is a tool to help guide land use planning and development decisions. The growth in the Okanagan continues to cause fragmentation, degradation, and loss of sensitive ecosystems.

An ecosystem, for the purpose of this inventory, is a portion of the landscape with relatively uniform vegetation and soils. Sensitive ecosystems are those that are ecologically fragile and/or scarce. Criteria for ecological sensitivity include: (1) the degree of rarity of the ecosystem; (2) the degree of sensitivity to hydrological changes; sensitivity to the introduction and spread of invasive plants; and sensitivity to recreational activity and other human disturbance. The map is a tool to help guide land use planning and development decisions. The map is determined by the B.C. Conservation Data Centre (CDC), a member program of the International NatureServe network. The CDC list of Ecosystems is a tool to help guide land use planning and development decisions. The map is determined by the B.C. Conservation Data Centre (CDC), a member program of the International NatureServe network. The CDC list of Ecosystems is a tool to help guide land use planning and development decisions.

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Ecological Significance

The Okanagan Valley is characterized by a complex landscape of rugged steep, rocky terrain and gently sloping terraces. These formations result from glacial lakes and the movement of materials by melting ice during the retreat of the last glaciers. The complex terrain, combined with a moderated semi-arid climate, supports diverse ecosystems and organisms. Open ponderosa pine forests, grasslands, cliffs and talus slopes, and a diversity of riparian wetland ecosystems often occur in close proximity to one another. The wetland and riparian ecosystems are a focal point in the landscape for many species.

The Valley is a region of nearly unparalleled ecological and biological diversity within British Columbia and the rest of Canada. Its home to many native

[illegible]

The services they provide, such as climate regulation, water filtration, pollution control, carbon sequestration, nutrient cycling, pollination, wildlife habitat and erosion control, are essential to the health of the planet's terrestrial landscape, which includes other ecosystems that also contribute to ecosystem services.

Study Area

The Chongqing Valley Life Project is comprised of a number of individual SEI sites located in the Chongqing Valley Region, Central Chongqing City; of Kailashan Nationality Ethnic Township, Southwest Chongqing City; of Golden Mountain - Vermilion and South Chongqing. For more information about these projects and the methods used, please refer to the References section below.

Data Limitations

The SEI Information is intended to aid local and regional decision-makers toward the preservation of sensitive and other important ecological and sociocultural resources. However, it does not replace the need for on-site assessment or detailed analysis in areas where land-use changes are proposed. The accuracy of polygons representing the boundaries of the various types of land cover in the study area of Kailashan which was based on 1:10,000 digital aerial photography and digital

[illegible]

Most Oceanian Species Groups were developed by first understanding 'Terrestrial' Terrestrial Resource Management (TRM) sections in the National project area where the SESI was implemented. The TRM sections are the primary source of information that provided the foundation for the SESI thematic mapping, and the TRM units within the TRM sections were grouped using the Ecosystem-based Resource Management (ERM) table (Table 1) to identify the appropriate SESI units. The TRM units were then mapped to the SESI units. If the mapped TRM unit is included in an at-risk ecological community as defined and listed by the DDC, or if it ecologically sensitive, the unit was mapped to the SESI unit. If the TRM unit is not included in an at-risk ecological community and is not ecologically sensitive, the unit was mapped to the SESI unit. The TRM unit was mapped to the SESI unit where a given ecosystem falls into more than one class, it is always assigned to the more sensitive class (see Table 1).

Threatened 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 Amendment Act will protect their populations and habitats on provincial lands. Protection of Species at Risk and their important habitats on private lands is primarily achieved through careful land use planning and municipal bylaws.

Acknowledgements

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Ministry of Forests, Kamloops, BC: 1:20,000 Maps.

Vernon – Commonage: Iverson, Kristi. 2005. Sensitive Ecosystems Inventory: Vernon Commonage 2005. 1:20,000 maps.

Bella Vista – Goose Lake Range: Iverson, K. and J. Shyplika. 2002. *Territorial Ecosystem Mapping Of the Bella Vista – Goose Lake Range* 1:20,000 maps.

Financial or in-kind support for the projects 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 Conservation Trust Fund, the Habitat Stewardship Program, Greater Vernon Services Commission, Regional District of Central Okanagan, Regional District of the North Okanagan, Regional District of the Okanagan Similkameen, Allan Brooks Nature Centre, City of Vernon, District of Lake Country, Weyerhaeuser Canada Ltd., District of Coldstream, City of Kelowna, and B.C. Conservation Inventory: Coldstream - Vernon. 120,000 maps.

Kelowna: Iverson, K. and P. Uunila. 2008. Sensitive Ecosystems Inventory: City of Kelowna. 120,000 maps.

South Okanagan: Iverson, K. and A. Haney. 2009. Refined and updated ecosystem mapping for the South Okanagan and lower Similkameen River. Unpub. report prepared for the Regional District of the Okanagan - Similkameen.

Cartography: Lisa Zeiterberg and Ann Blyth (Caslys Consulting Ltd.) for Jan Kirkby, Environment Canada (Canadian Wildlife Service). Thanks to Allison Haney, Mike Sarell, Kristi Iverson, Carmen Cadin, Jo-Anne Stacey, and Kim Everett for their assistance in developing the map text.

References

Information and access to full reports and map products for the Okanagan Valley SEI projects are available at EcoCat: www.env.gov.bc.ca/ecocat/ (type in SEI Okanagan Valley or the project area name as a keyword).

Related Publications and Links

British Columbia Conservation Data Centre (CDC). Ecosystems of BC Ministry of Environment. www.env.gov.bc.ca/cdc/

SEI Report: Iversen, K. E., D.L. Curran, T.I. Fleming, and A.L. Haney. 2008. *Sensitive Ecosystems Inventory - Okanagan Valley: Vernon to Osoyoos, 2000 - 2007. Methods, Ecological Descriptions, Results and Conservation Tools*. Technical Report Series No. 495, Canadian Wildlife Service, Pacific and Yukon Region, British Columbia.

This map can be cited as:
Environment Canada. *Sensitive Ecosystems Inventory - Okanagan Valley: Vernon to Osoyoos, 2000-2007*. 120,000. Vancouver, BC: Canadian Wildlife Service, Pacific and Yukon Region. 2009.



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Develop with Care: Environmental Guidelines for Upland and Rangeland Development in British Columbia. BC Ministry of Environment
www.env.gov.bc.ca/wild/documents/bmp/develop/care2002/develop_with_care.htm

Tracking Nature's Pulse: The Status of Biodiversity in British Columbia Austin, M.A., D.A. Bucker, D.J. Nicolson, G.G. Scudder and V. Steves (eds). 2004. *Tracking Nature's Pulse: The Status of Biodiversity in British Columbia*. Biodiversity BC. Victoria, BC. 268 p. Available at: www.biodiversitybc.org

Alpine (AP): Alpine ecosystems are high-elevation alpine and parkland ecosystems including **herbaceous** ecosystems dominated by forbs or graminoid vegetation (AP.hp), **parkland forests** where trees occur in distinct clumps (AP.pr), and **alpine** ecosystems dominated by dwarf shrubs such as heather (AP.sh). Alpine ecosystems are found at higher elevations in the South Okanagan (TFL 15) where there is significant snow cover for some parts of the year. Conifers are the dominant disturbance agents in alpine ecosystems and can incorporate their snow storage into the landscape.


	<p>Alpine Ecosystems provide the following services:</p> <ul style="list-style-type: none"> • Erosion control • Fresh water • Climate regulation • Nutrient cycling and maintenance of productive soils 	<p>Some species associated with Alpine Ecosystems are:</p> <ul style="list-style-type: none"> • American Badger • Peregrine Falcon • Wolverine 	<p>American Badger <i>Taxidea taxus</i> (mammal) (Mammals, Ecosystems) Photo by Peter Gansdale W. Lynch</p>	
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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,




Seasonally Flooded Agricultural Fields Ecosystems provide the following services:

- Flood control
- Drought recovery
- Carbon storage
- Maintenance of productive soils




Some species associated with Seasonally Flooded Agricultural Fields are:

- Great Basin Sparrowfoot
- Long-billed Curlew




Great Basin Sparrowfoot
Great Basin Sparrowfoot
(Angeles, Tricolored)
Photos by Gary Madsen
CaliforniaWetlands.com

<ul style="list-style-type: none"> Storm protection Drainage and natural irrigation Fresh water 	<ul style="list-style-type: none"> Recreation Pest regulation Food production 	<ul style="list-style-type: none"> Recreation American Badger Great Basin Gophersnake Western Rattlesnake 	 <p>Peregrine Falcon <i>Falco peregrinus anatum</i> (Bald, Spread, Common)</p>
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Mature Forest (MF):


Mature Forest ecosystems are dominated by mature trees, including **broadleaf** (MF-bf) forests, **coniferous** (MF-co) forests, and **mixed** (MF-mx) 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.

<p>Mature Forest Ecosystems provide the following services:</p> <ul style="list-style-type: none"> • Climate regulation • Carbon storage • Air quality • Water storage • Pollination • Erosion control 	<p>Some species associated with Mature Forest Ecosystems are:</p> <ul style="list-style-type: none"> • Lyall's Mariposa Lily • Wolverine • Williamson's Sapsucker • Western Screech Owl • Flammulated Owl
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Wheat (*Triticum aestivum*)

- Sediment retention
- Nutrient cycling and maintenance of productive soils
- Food production



Western Rattlesnake
Crotalus oreganus



Western Rattlesnake
Crotalus oreganus

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-influenced features or disturbances that dominate the landscape. Disturbed rural areas can be interspersed with range, farmland and native vegetation, or cultivated crops. Young forests are cone-dominated stands with an age range between 10 and 80 years. Non-sensitive landscapes are shown in white in the areas that are not designated by a sensitive ecosystem. In addition, many sensitive polygons close to urban or disturbed areas may have a modified landscape (interspersed with the sensitive ecosystem), in which the sensitive ecosystems are too small to map individually. These modified

Western's Spectator
Spectator (*Spectator*)

Photo by David Hobbs