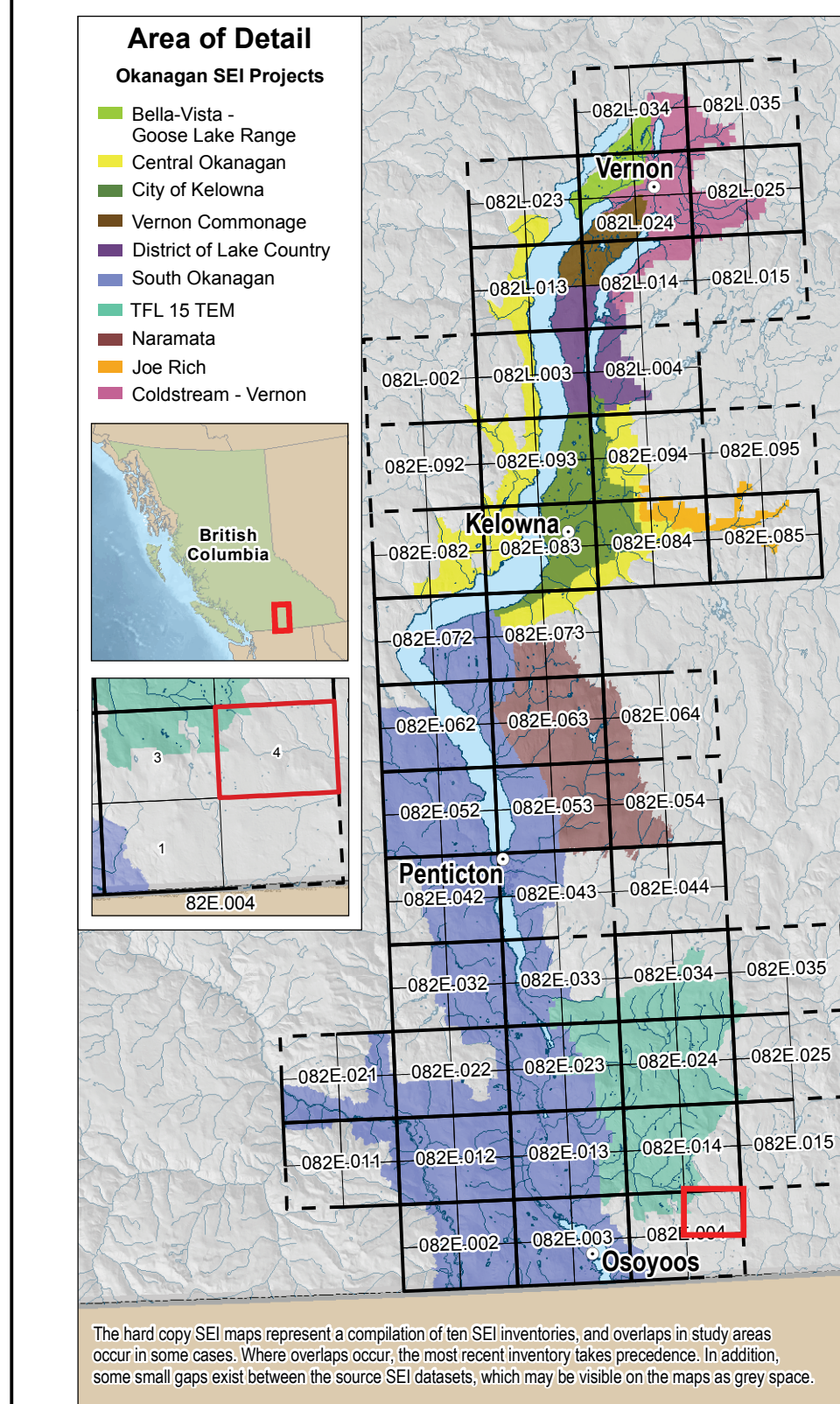


82E.004.4



Map Symbols

- Polygon Boundary
- Study Area Boundary
- Rivers
- Control Okanagan
- City of Kelowna
- Vernon Community
- City of Vernon
- South Okanagan
- YHL 10 TEM
- Naramata
- Joe Rich
- Coldstream - Vernon

Sensitive Ecosystems (SE) Label

- Polygon Number
- 1st Component
- 2nd Component
- 3rd Component
- SE Class
- SE Subclass

The example label above indicates the SE attributes reported for polygon 13788. 80% of the polygon is 1023a - Coniferous Woodland. 20% is the polygon 07 - Old Forest coverline. NS are modified (non-sensitive) landscapes. Please refer to the legend for more information about these areas. Note that the line can be correlated to a SE class and subclass. Polygon labels on the map do not include the SE label.

Regional and municipal governments of the Okanagan Valley and conservation organizations, assisted by Environment Canada's Canadian Wildlife Service and the B.C. Ministry of Environment, have completed regional and local Sensitive Ecosystems Inventory mapping projects as a means to identify the remaining sensitive ecosystems in the Okanagan Valley. The SEI is intended to provide a tool that uses scientific information and mapping to encourage local governments, landowners, developers, and other citizens to become involved in protecting, conserving, and restoring sensitive ecosystems. Conservation of these ecosystems is increasingly important as rapid population 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 at risk. Criteria for ecological sensitivity include the presence of shadow soils, susceptibility to soil erosion, vulnerability to hydrological changes, sensitivity to the introduction and spread of invasive plants, and sensitivity to recreational activity and other human disturbances. Within the province, at-risk status for species and ecological communities is determined by the B.C. Conservation Data Centre (CDC), a member program of the International NatureServe network. The CDC list of Ecological Communities can help to determine if a particular ecosystem is representative of an at-risk ecological community.

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 on during the retreat of the last glaciers. The complex terrain, combined with a moderate semi-arid climate, supports diverse ecosystems and organisms. Open ponderosa pine forests, grasslands, dunes and talus slopes, and a diversity of riparian and 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 highly unparallelled ecological and biological diversity within British Columbia and the rest of Canada. It is home to many at-risk

WHAT IS A SENSITIVE ECOSYSTEM?

For the purpose of the 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 to 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, assisted by Environment Canada's Canadian Wildlife Service and the B.C. Ministry of Environment, have completed regional and local Sensitive Ecosystems Inventory mapping projects as a means to identify the remaining sensitive ecosystems in the Okanagan Valley. The SEI is intended to provide a tool that uses scientific information and mapping to encourage local governments, landowners, developers, and other citizens to become involved in protecting, conserving, and restoring sensitive ecosystems. Conservation of these ecosystems is increasingly important as rapid population growth in the Okanagan continues to cause fragmentation, degradation, and loss of sensitive ecosystems.

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The Valley is a region of highly unparallelled ecological and biological diversity within British Columbia and the rest of Canada. It is home to many at-risk

species and ecological communities, including some ecosystems unique to Canada. Broadleaf woodlands, antelope-brush steppe, sagebrush steppe, wetlands and old forest ecosystems, each well-represented in the Okanagan Valley, have become rare. Historical ecosystem mapping (1890s to present) shows losses of greater than 90% of some ecosystem types in the Okanagan Valley.

Healthy, functioning natural ecosystems play an important role in adapting to and mitigating the impacts of climate change. Climate change adaptations such as reducing stressors, improving ecosystem resilience, and landscape connectivity contribute to ecosystem resilience and adaptive capacity in the future. The ecosystems mapped in this project are ecologically significant because of their rarity and fragility and also for the important ecosystem services they provide, such as climate regulation, water filtration, productive soil, carbon sequestration, nutrient cycling, pollination, wildlife habitat and more. Sensitive ecosystems must be considered in the context of the overall landscape, which includes other factors that also contribute to ecosystem services. The services and benefits SEs provide and the wildlife species they support are critically important to the quality of life in the Okanagan. With so few at-risk and fragile ecosystems remaining, it is essential that each site be carefully considered and all land use options be fully evaluated prior to initiating any changes in these areas.

The SEI information is intended to alert local and regional decision-makers to the presence of sensitive and other important ecosystems and ecological features. The SEI mapping does not replace the need for on-site assessments in areas where land use changes are proposed. The accuracy of polygon boundaries is limited by the scale (1:50,000) for all projects except the City of Kelowna which was based on 1:10,000 digital aerial photography and the use of aerial photographs on which the sites are delineated (i.e., changes may have taken place since the photos were taken). It is recommended that digital data not be enlarged significantly beyond the scale of the photos, as this may result in unacceptable distortion and faulty registration with other datasets. The ability to use specific distances (e.g., invasive plants) is limited when interpreting air photos, and field sampling is needed to supplement the interpretation. It can also be difficult to delineate small sensitive ecosystems. In many cases these ecosystems are captured as a small component of a larger polygon that is dominated by another ecosystem. It is important to remember that a polygon may contain a complex, or mosaic, of ecosystems, and sensitive ecosystems may only occupy a portion of that polygon.

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Inventory Results

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Acknowledgements

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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), the Allan Brooks Nature Centre, Regional District of Okanagan Similkameen, Regional District of Central Okanagan, City of Kelowna, City of Vernon, District of Lake Country, Weyhehauer Canada Ltd., District of Coldstream, City of Kelowna, and B.C. Conservation Foundation.

Cartography: Lisa Zetsering and Ann Birt (Calyx Consulting Ltd.) for Jan Krutky, Environment Canada (Canadian Wildlife Service). Thanks to Alison Haney, Mike Savel, Kristi Vernon, Carmen Castro, Jo Anne Stacey, and Kim Cowell for their assistance in developing the map file.

References

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

SEI Report: Hanson, K. E., D.L. Curran, T.L. Fleming, and A.L. Hanson. 2008. Sensitive Ecosystems Inventory - Okanagan Valley: Vernon to Osoyoos, 2007-2007. Methods, Ecological Descriptions, Results and Conservation Tools. Technical Report Series No. 695. Canadian Wildlife Service, Pacific and Yukon Region, British Columbia.

Naramata: Dalziel, Rod. 2006. Naramata Sensitive Ecosystems Inventory. 1:20,000 map.

Central Okanagan (including south slopes): Haney, A. and K. Hanson. 2009. Conservation analysis and updated ecosystem mapping for the Central Okanagan valley. Central Okanagan, South Slopes, Kelowna, Eftson and Joe Rich project areas. Unpub. report prepared for the Okanagan Collaborative Conservation Program.

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Sensitive Ecosystems Legend

Sensitive ecosystems are fragile and/or rare, or are ecologically important because of the diversity of species they support and the ecosystem services they provide. Some at-risk wildlife and plant species are associated with Sensitive Ecosystems, and are listed below. Species at Risk are those species which are considered Endangered, Threatened or of Special Concern. Please note that the map of the species listed in this map can be found in other sensitive ecosystems as well as non-sensitive ecosystems found throughout the Okanagan Valley.

Note: Information on Species at Risk is included in the map legend to highlight the species habitat values of the sensitive ecosystems. This map series does not include the actual mapping of species locations. For information on species location mapping see the B.C. Conservation Data Centre reference below.

Antelope-brush Steppe (AS):

Antelope-brush communities are dryland ecosystems characterized by abundant shrub dominated by antelope-brush. These communities occur in the southern portion of the Okanagan Valley, on sandy soils in the warm, dry valley bottoms. They commonly occur on sites that are very amenable to development, primarily for vineyards and housing. Overuse by domestic livestock and the introduction and spread of invasive plants threaten this ecosystem. Antelope-brush ecosystems are recognized as one of the four most endangered ecosystems in Canada. Antelope-brush Steppe ecosystems are dominated by antelope-brush and bunchgrasses. AS (a) and disturbed antelope-brush steppe dominated by antelope-brush and invasive alien plants (AS (b)).

Antelope Brush Steppe Ecosystems provide the following services:

- Carbon storage
- Nutrient cycling and maintenance of productive soils
- Sediment retention
- Pollination
- Pest regulation
- Food production

Some species associated with Antelope-brush Steppe Ecosystems are:

- Great Basin Spadefoot
- Night Snake
- Belt's Henshaw
- Pacific Bat
- Peregrine Falcon
- Nuttall's Cottontail

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- Great Basin Spadefoot
- Night Snake
- Belt's Henshaw
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Sagebrush Steppe (SS):

Sagebrush Steppe ecosystems are dryland ecosystems characterized by abundant big sagebrush. These communities occur on similar sites to grassland ecosystems, where conditions are too warm and dry for trees to establish. This ecosystem is mostly found in the southern reaches of the study area, where they are dominated by bunchgrasses with scattered forbs and a soil crust dominated by mosses and lichens. These ecosystems commonly occur on sites that are amenable to urban or agricultural development, where livestock stamping and invasive plants threaten remaining Sagebrush Steppe ecosystems. Sagebrush Steppe are generally steppe ecosystems dominated by big sagebrush and bunchgrasses (SS (a)), steep, shallow soil antelope-brush steppe (SS (b)), and disturbed sagebrush steppe dominated by big sagebrush and invasive alien plants (SS (c)).

Sagebrush Steppe Ecosystems provide the following services:

- Carbon storage
- Erosion control
- Sediment retention
- Nutrient cycling and maintenance of productive soils
- Pollination
- Pest regulation

Some species associated with Sagebrush Steppe Ecosystems are:

- Great Basin Spadefoot
- Western Skink
- Pacific Bat
- Peregrine Falcon
- Nuttall's Cottontail
- Half-moon Hawk

Some species associated with Sagebrush Steppe Ecosystems are:

- Great Basin Spadefoot
- Western Skink
- Pacific Bat
- Peregrine Falcon
- Nuttall's Cottontail
- Half-moon Hawk

Grasslands (GR):

Grassland ecosystems occupy areas that are generally too hot and dry for forests to establish, and are dominated by bunchgrasses (grassland, GR (a)), steep slope grasslands (GR (b)), steep, shallow grasslands (GR (c)), and disturbed grasslands dominated by invasive alien plants (GR (d) or GR (e)). Large areas of grasslands have been lost to agricultural and urban development and degraded by invasive alien plants. Most of the remaining grasslands have become wild or disturbed grasslands through partial invasion by noxious weeds. Given the very limited extent of remaining grasslands, these are important sites for grassland restoration, soil conservation, and maintenance of many other grassland values, including habitat for many at-risk and endangered species.

Grassland Ecosystems provide the following services:

- Carbon storage
- Erosion control
- Nutrient cycling and maintenance of productive soils
- Pollination
- Pest regulation
- Food production

Some species associated with Grassland Ecosystems are:

- Night Snake
- Pacific Bat
- Peregrine Falcon
- Nuttall's Cottontail
- Tiger Salamander
- Columbian Carpet Moss

Some species associated with Grassland Ecosystems are:

- Night Snake
- Pacific Bat
- Peregrine Falcon
- Nuttall's Cottontail
- Tiger Salamander
- Columbian Carpet Moss

Sparsely Vegetated (SV):

Sparsely vegetated ecosystems are sites where rock or talus (angular rock fragments) limits vegetation establishment; vegetation cover is discontinuous and interspersed with bedrock or blocks of rock. Sparsely vegetated ecosystems are subdivided into four sub-categories: shrub, talus, cliff, and rock outcrop ecosystems. Cliff (SV (a)), grassy or un-vegetated Rock Outcrop (SV (b)), Shrubby Rock Outcrop (SV (c)), and Talus Slope (SV (d)). Many of these ecosystems are at risk, and their coarse or shallow soils make them sensitive to disturbance and soil erosion.

Sparsely Vegetated Ecosystems provide the following services:

- Erosion control
- Nutrient cycling and maintenance of productive soils
- Pollination
- Soil formation

Some species associated with Sparsely Vegetated Ecosystems are:

- Great Basin Spadefoot
- Western Skink
- Pacific Bat
- Peregrine Falcon
- Nuttall's Cottontail
- Rubber Bo

Some species associated with Sparsely Vegetated Ecosystems are:

- Great Basin Spadefoot
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- Rubber Bo

Old Forest (OF):

Old Forest Ecosystems are dominated by large, old trees, usually greater than 150 years of age. Most of these forests have been lost to selective logging of larger trees, ingrowth of dense trees resulting from the exclusion, and development. Only small remnants of these forests remain today. These old forests continue to provide important habitat for many species including many woodpeckers, owls, and mule deer. Old Forest ecosystems include old-growth woodlands (OF (a)) and old-growth woodlands (OF (b)).

Old Forest Ecosystems provide the following services:

- Climate regulation
- Carbon storage
- Air quality
- Erosion control
- Sediment retention
- Nutrient cycling and maintenance of productive soils

Some species associated with Old Forest Ecosystems are:

- Williamson's Sapsucker
- White-headed Woodpecker
- Black-sided Flycatcher
- Western Screech Owl
- American Badger
- Yell's Mariposa Lily
- Shore Pine

Some species associated with Old Forest Ecosystems are:

- Williamson's Sapsucker
- White-headed Woodpecker
- Black-sided Flycatcher
- Western Screech Owl
- American Badger
- Yell's Mariposa Lily
- Shore Pine

Broadleaf Woodlands (BW):

Broadleaf Woodland ecosystems are often dominated by trembling aspen which occur in depressions and moist areas (Aspen Copse, BW (a)) in grassland areas, and aspen steppe (BW (b)) slopes, however it excludes old forests. Broadleaf Woodlands are susceptible to changes in the water table. They are unusual in dry landscapes and their moist soils are sensitive to disturbance. Old Broadleaf Woodlands are included in the Old Forest category.

Broadleaf Woodland Ecosystems provide the following services:

- Climate regulation
- Drought recovery
- Fresh water
- Flood control
- Storm protection
- Nutrient cycling and maintenance of productive soils

Some species associated with Broadleaf Woodland Ecosystems are:

- Yellow-breasted Chat
- Western Rattlesnake
- Western Screech Owl
- Great Basin Spadefoot
- Lewis's Woodpecker
- Rubber Bo

Some species associated with Broadleaf Woodland Ecosystems are:

- Yellow-breasted Chat
- Western Rattlesnake
- Western Screech Owl
- Great Basin Spadefoot
- Lewis's Woodpecker
- Rubber Bo

Coniferous Woodlands (WD):

Coniferous Woodlands are open stands of Douglas-fir or ponderosa pine (WD (a)), open on shallow soils, with grassy understorey, old Coniferous Woodlands are part of the Old Forest category. They most commonly occur in the drier climates of the Okanagan Valley, on sites with limited moisture, on rocky knolls and on warm south-facing slopes. Numerous sites have been lost to development and altered by impacts of trees associated with the fire exclusion, weed encroachment, and other human disturbances.

Coniferous Woodland Ecosystems provide the following services:

- Climate regulation
- Carbon storage
- Air quality
- Erosion control
- Sediment retention
- Nutrient cycling and maintenance of productive soils

Some species associated with Coniferous Woodland Ecosystems are:

- Williamson's Sapsucker
- White-headed Woodpecker
- Black-sided Flycatcher
- Western Screech Owl
- American Badger
- Yell's Mariposa Lily
- Shore Pine

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Riparian (RI):

Riparian ecosystems are streamside and lakeside ecosystems or sites with significant seepage, includes ecosystems on floodplains and benches along creeks and rivers (bench, RI (a)), shrub-dominated floodplains and lakeshore (bench, RI (b)), ecosystems in gulches, often with significant seepage (bench, RI (c)), and riparian ecosystems in floodplains and benches along creeks and rivers (bench, RI (d)). The river bed of large systems (river, RI (e)), and beaches on lakeshore (beach, RI (f)). These sites frequently form natural corridors through the landscape, connecting other ecosystems and providing passageways for animals. Damming, diversions, channelization, draining, and pollution have seriously affected many riparian ecosystems.

Riparian Ecosystems provide the following services:

- Fresh water
- Flood control
- Drought recovery
- Storm protection
- Damage and natural irrigation
- Nutrient cycling and maintenance of productive soils

Some species associated with Riparian Ecosystems are:

- Yellow-breasted Chat
- Western Painted Turtle
- Western Screech Owl
- Columbia Mottled Sculpin
- Giant Helleborine
- Purple Spikeweed
- Scarlet Amaranth
- Toucan Meadow-lark
- Small Flowered Locoweed
- Western Rattlesnake

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Wetlands (WN):

Wetland ecosystems occur on sites where the water table is at, near, or above the soil surface for a sufficient period of time to influence soil and vegetation development; includes marshes (WN (a)), swamps (WN (b)), wet meadows (WN (c)), and shallow open water (WN (d)). Wetlands are extremely important because of their natural rarity in this area and the critical ecosystem services they provide. Many Wetlands have been lost to development. It is estimated that 85% of the original wetland habitat in the Southern Okanagan has disappeared.

Wetland Ecosystems provide the following services:

- Flood control
- Storm protection
- Damage and natural irrigation
- Fresh water
- Filtration and pollution control
- Nutrient cycling and maintenance of productive soils

Some species associated with Wetland Ecosystems are:

- Western Tadpole
- Northern Leopard Frog
- Western Rattlesnake

Some species associated with Wetland Ecosystem