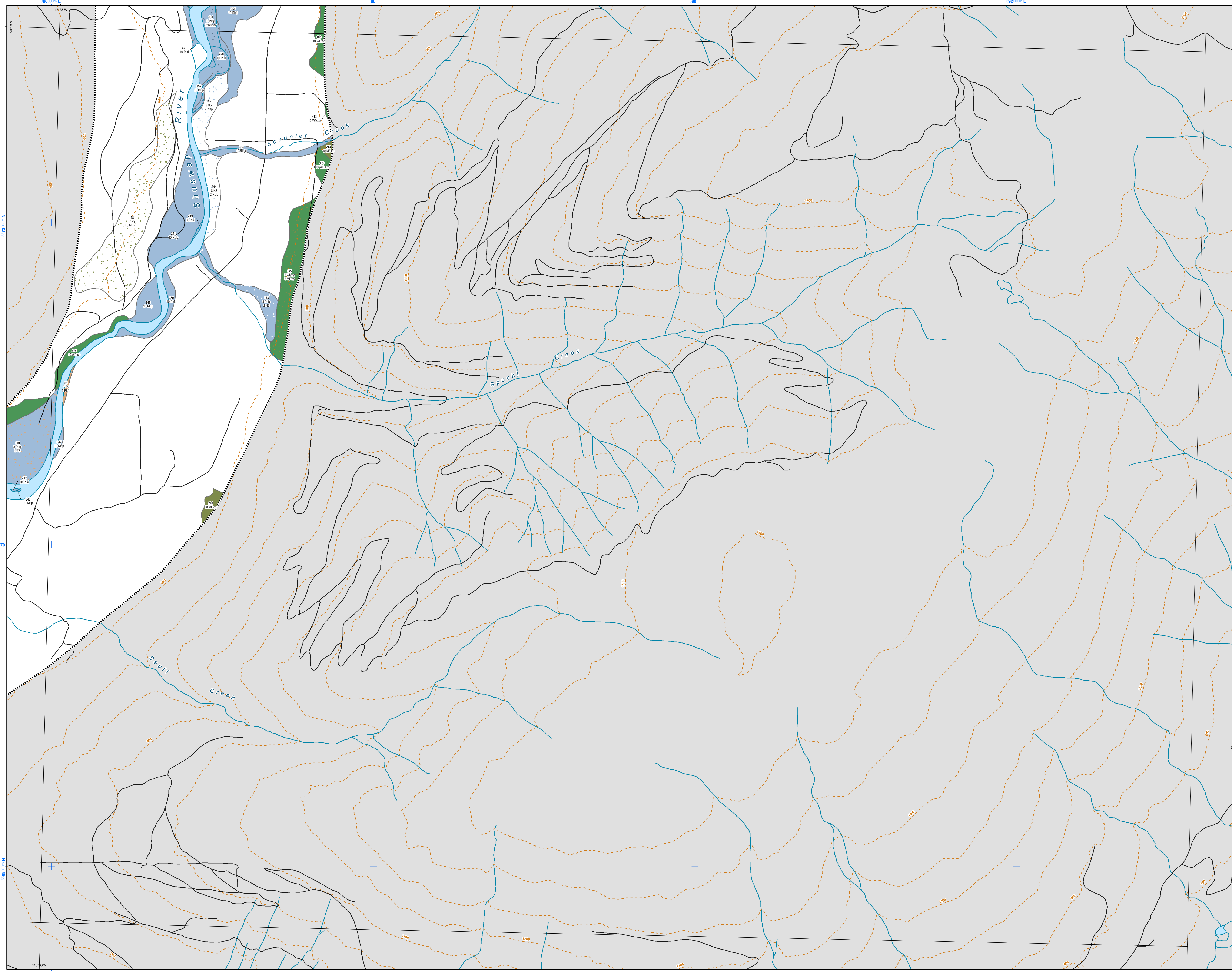




Sensitive Ecosystems Inventory: Middle Shuswap River - 2011



82L.028.3

- Map Symbols**
- Polygon Boundary
 - Study Area Boundary
 - Rivers
 - Lake/Major River
 - Roads
 - Areas Outside the Study Area
 - 100m contours

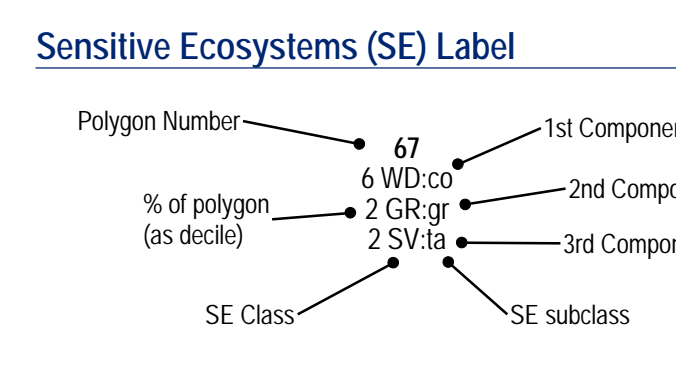
WHAT IS A SENSITIVE ECOSYSTEM?

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 Middle Shuswap River valley contains extensive riparian floodplain habitats, areas of coniferous woodlands, grasslands, mature forests, and sparsely vegetated ecosystems. The area is under pressure from agricultural and residential development, logging, recreation, and intensive domestic grazing. High ecological values, combined with human pressure on the landscape, underscore the need for careful, conservation-based land use decision making.



The example label above indicates the SE attributes mapped for polygon 64, 20% of the polygons in WD.co - Coniferous Woodland, 20% of the polygons in S.VI.a - Sparsely Vegetated talus slope.

NO are modified (non-sensitive) landscapes. Please refer to the legend for more information about these areas. More than one use unit can be combined by a SE class and subclass.

Ecosystem Components

This cartographic product uses Dot Density to indicate where more than one ecosystem class is mapped in a polygon. The number of dots indicates the proportion of the polygon represented by the 2nd and 3rd ecosystem. The colour of the dots indicates the 2nd and 3rd ecosystem class.

The base colour represents the first ecosystem component. Coloured dots overlaid upon the base colour indicate a second ecosystem component. Two colours of dots indicate a second and third ecosystem.

Note: The actual placement of the dots has no significance; they are randomly placed within each polygon.

The soils that support plant communities within the study area vary in thickness. The thicker soils tend to occur on gentler terrain and on lower slopes. Soils tend to become thinner on the upper slopes and where slopes are steeper. There are scattered rock outcrops throughout the study area. Soil texture varies throughout the study area where common textures include sand, silt and gravel, mixed sand, silt and gravel, and a combination of silt, fine sand and clay.

The Middle Shuswap River valley is both ecologically and biologically diverse and is home to many at-risk species and ecological communities. Upland old forest ecosystems, once well-represented, have been eliminated from the study area.

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 ecosystems that also contribute to ecosystem services. Healthy, functioning natural ecosystems play an important role in adapting to, and mitigating the impacts of climate change.

Study Area

The Middle Shuswap River SEI project covers a swath varying from about 200 m to over two kilometers on either side of the Shuswap River between the Wiley and Sugar Lake (Peery) dams and approximately two kilometers up Cherry, Fory, and Woodward creeks, and some areas below Wiley Dam.

The services and benefits SEs provide and the wildlife species they support are critically important to the quality of life in the Shuswap River valley. With so few at-risk and fragile ecosystems remaining, it is essential that such sites be carefully considered and all land use options be fully evaluated prior to initiating any changes in these areas.

Data Limitations

The SEI information is intended to alert local and regional decision-makers to the presence of sensitive and other important ecosystems and ecological values. 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 (1:15,000) and date of the orthophotos (2007) used for the final mapping (i.e., change may have taken place since the photos were taken). It is recommended that digital data not be enlarged beyond the scale of the photos, as this may result in unacceptable distortion 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.

Species at Risk

The large variety of ecosystems in the Middle Shuswap River valley provide for diverse habitat needs of many wildlife and plant species, including a number of at-risk animal species. Many of these species rely on the habitat values found only in the at-risk and sensitive ecosystems of the valley.

Nationally, at-risk species are ranked by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as Endangered, Threatened, or of Special Concern. Endangered species face imminent extirpation or extinction. Threatened species may become endangered if limiting factors are not reversed. Species of Special Concern are particularly sensitive to human activities or natural events. Endangered or Threatened species that have been included in Schedule 1 of the Species at Risk Act are afforded protection on federal lands, and the 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. For more information on Species at Risk, see Species at Risk section in Related Publications and Links.

Base Terrestrial Ecosystem Mapping

Poly Umlia, P. Cox (Plan Geosystems Ltd.) and Kristi Vernon, R.P. Bio, Iverson & MacKenzie Biological Consulting Ltd., with draft ecosystem mapping by John Grods (Makins Consulting Ltd.).

Sensitive Ecosystems Theme: Ratings tables were developed by Kristi Vernon.

Base Mapping Data: selected digital layers are from the Terrain Resources Information Management (TRIM) Program, Base Mapping and Geomatics Services Branch, Integrated Land Management Bureau, Ministry of Forests, Lands, and Natural Resource Operations.

GIS: Ben Lee, Baseline Geomatics Inc., Victoria, B.C., with Arcview and Google Earth digitizing also completed by Poly Umlia, Allison Haney, and Kristi Vernon.

Photographs: A number of local photographers have allowed the use of their photos for this project. Credits are provided beside each photo. See also the electronic atlas for links in B.C. at the following website: www.fsa.ca/bcca

References

Full report on this SEI project: Iverson, K. E. 2011. Sensitive Ecosystems Inventory: Middle Shuswap River, 2011. Methods, Ecological Descriptions, Results and Conservation Tools. Available at www.gov.bc.ca/cecoloc (type in SEI Shuswap as a keyword).

This map can be cited as: Iverson, K. and P. Umlia. 2011. Sensitive Ecosystems Inventory: Middle Shuswap River. 1:10,000 maps.

Project partners include: The Okanagan Collaborative Conservation Program, BC Hydro Fish and Wildlife Compensation Program Coastal (on behalf of its program partners BC Hydro, the Province of B.C., and Fisheries and Oceans Canada who work together to conserve and enhance fish and wildlife impacted by the construction of BC Hydro dams); Regional District of the North Okanagan; and the Splishan First Nation.

Financial or in-kind support for the projects was provided by: The Okanagan Collaborative Conservation Program, BC Hydro Fish and Wildlife Compensation Program Coastal, Regional District of the North Okanagan, Village of Lumby, Splishan First Nation, Alan Brooks Nature Centre Society, SEI Environmental Consulting, and the Ministry of Forests, Lands and Natural Resources Operations.

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

This comprehensive document is designed to provide municipal and regional governments with practical tools for protecting the green infrastructure within their jurisdictions.

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 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 many of the species listed in the map can be found in other sensitive ecosystems as well as non-sensitive ecosystems found throughout the Middle Shuswap River 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.

Grasslands (GR):



Grassland ecosystems occupy areas that are generally too hot and dry for forests to establish, and are dominated by bunchgrasses (GR.gr), low shrubs (shrubland) and disturbed grasslands dominated by invasive alien plants (GR.ig). Given the very limited extent of 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
- Nutrient cycling and maintenance of productive soils
- Pollination
- Pest regulation
- Food production
- Erosion control
- Sediment retention

Some at-risk species associated with Grassland ecosystems are:

- Western Skink
- Northern Rubber Boa
- American Badger
- Lesser Woodpecker
- Lawson's Woodpecker
- Common Nighthawk

Sparsely Vegetated (SV):



Sparsely Vegetated ecosystems are sites where rock (angular rock fragments) limits vegetation establishment, vegetation cover is discontinuous and interspersed with boulders or blocks of rock. Sparsely vegetated ecosystems are subdivided into Talus Slope (SV.ta) and Rock Outcrop (SV.ro) ecosystems. The coarse or shallow soils of these ecosystems make them sparsely to disturbed and soil erosion.

Sparsely Vegetated ecosystems provide the following services:

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

Some at-risk species associated with Sparsely Vegetated ecosystems are:

- Northern Rubber Boa
- Western Skink

Coniferous Woodlands (WD):



Coniferous Woodlands are open stands of Douglas fir, sometimes with ponderosa pine (WD.co), often on shallow soils, with grass and shrub-dominated understoreys. They most commonly occur on steep warm slopes and on rocky knolls with very shallow soils. Numerous sites have been altered by forest harvesting, growth of trees associated with fire exclusion, domestic livestock grazing, and other human disturbances.

Coniferous Woodland ecosystems provide the following services:

- Climate regulation
- Air quality
- Erosion control
- Sediment retention
- Carbon storage
- Fresh water
- Nutrient cycling and maintenance of productive soils
- Pollination
- Food control
- Storm protection
- Food production

Some at-risk species associated with Coniferous Woodland ecosystems are:

- Northern Rubber Boa
- Oliv-sided Flycatcher
- Lawson's Woodpecker
- Flammulated Owl
- Common Nighthawk

Riparian (RI):



Riparian ecosystems are rivers, streams, diverse and gully ecosystems or sites with significant seepage, includes ecosystems on floodplains and benches along creeks and rivers (bench, RI.b), ecosystems in gullies, often with creeks (gully, RI.g), fringe ecosystems associated with significant seepage (fringe, RI.fr), and the river bed of large systems (river, RI.r). These sites frequently form natural corridors through the landscape, connecting other ecosystems and providing passages for animals. Damming and diversions have seriously affected many riparian ecosystems.

Riparian ecosystems provide the following services:

- Fresh water
- Flood control
- Drought recovery
- Storm protection
- Drainage and natural irrigation
- Fresh water
- Nutrient cycling and maintenance of productive soils
- Climate regulation
- Soil and nutrient deposition
- Pollination
- Food production

Some at-risk species associated with Riparian ecosystems are:

- Western Painted Turtle
- Western Skink
- Grassy Owl
- Mountain Caribou (Historically)

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.ms) and shallow open water (WN.w). Wetland ecosystems are typically associated with old back channels of the Shuswap River. They are extremely important because of their natural riparian values and are critically important ecosystem services they provide.

Wetland ecosystems provide the following services:

- Drought recovery
- Flood control
- Storm protection
- Drainage and natural irrigation
- Fresh water
- Filtration and pollution control
- Nutrient cycling and maintenance of productive soils
- Silt storage
- Climate regulation
- Pollination
- Food production

Some at-risk species associated with Wetland ecosystems are:

- Western Painted Turtle
- Western Skink

Other Important Ecosystems

Seasonally Flooded Agricultural Fields (FS):



Seasonally Flooded Agricultural Fields ecosystems are cultivated fields that flood most years, 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 floodplains that have been tilled and planted. In some cases, these areas could be restored to Wetland or Riparian ecosystems if rural field regimes and vegetation are re-established.

Seasonally Flooded Agricultural Fields provide the following services:

- Flood control
- Drought recovery
- Storm protection
- Drainage and natural irrigation
- Fresh water
- Carbon storage
- Maintenance of productive soils
- Pest regulation
- Food production

Some at-risk species associated with Seasonally Flooded Agricultural Fields are:

- Western Toad
- Barn Swallow
- Common Nighthawk
- American Badger

Mature Forest (MF):



Mature Forest ecosystems are dominated by mature trees, including coniferous (BF.co) forests and mixed (BF.m) deciduous and coniferous forests, however it includes mature riparian forests, and mature coniferous woodlands. Mature Forests are important buffers to sensitive ecosystems. They provide recruitment for Old-Forest ecosystems which have been eliminated from the upland portion of the study area. Mature forest ecosystems have many important structural attributes, including some remaining large, old trees.

Mature Forest ecosystems provide the following services:

- Climate regulation
- Air quality
- Erosion control
- Sediment retention
- Nutrient cycling and maintenance of productive soils
- Flood control
- Pest regulation
- Pollination
- Food production

Some at-risk species associated with Mature Forest ecosystems are:

- Oliv-sided Flycatcher
- Western Skink
- Flammulated Owl
- Grassy Owl
- Western Toad
- Mountain Caribou (Historically, in old-growth)

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 or other important ecosystems. They include disturbed natural landscapes, agricultural areas and young forests. Disturbed natural areas can be interpreted as range, farmland and native vegetation, or cultivated crops. Young forests have an age range between 0 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 ecosystem polygons, close to urban or disturbed areas, may have a modified landscape interspersed with the sensitive ecosystem(s). In such cases, the sensitive ecosystem(s) are depicted as NS (non-sensitive) on the map.

