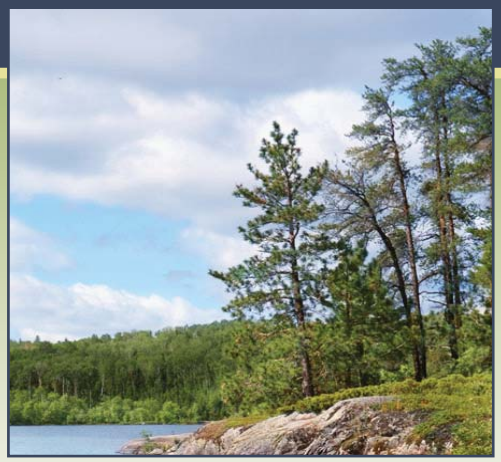
A BIODIVERSITY CONSERVATION ANALYSIS FOR THE NORTH AND CENTRAL OKANAGAN REGION



January 2013

Prepared by:

CASLYS CONSULTING

A BIODIVERSITY CONSERVATION ANALYSIS FOR THE NORTH AND CENTRAL OKANAGAN REGION

Submitted to:

Okanagan Collaborative Conservation Program
Kelowna, B.C.

Submitted by:

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1.0 INTRODUCTION

1.1 Background

A biodiversity conservation strategy is an environmental policy framework that sets priorities for identifying, preserving and restoring important natural areas. The strategy promotes a 'big-picture' landscape view of the region and provides a framework for considering conservation options for entire ecosystems and watersheds that go beyond municipal or rural boundaries. Various jurisdictions throughout North America have prepared biodiversity strategies as a response to increasing urban and rural development pressure. The development of a strategy for the Central and North Okanagan Regional Districts is timely as the combined population is projected to increase by more than 1.5% per year to reach in excess of 348,000 people by 2031 (104,233 for RDNO; 244,173 for RDCO)(RDNO, 2011 and RDCO, 2012).

A conservation strategy provides a 'road map' for coordinated efforts to manage land and water of ecological value in a region. The strategy identifies natural area values and provides a template, at a landscape level, for land use decision-making for public agencies, local governments and conservation groups to work together. Strategies are an important tool for local governments; they facilitate the incorporation of habitat information and sustainability considerations into community and neighbourhood plans, park and recreation master plans, and development bylaws. Land conservancies and conservation NGOs use the strategies to direct their stewardship and acquisition efforts. The concept of a Biodiversity Conservation Strategy was endorsed by the Okanagan Collaborative Conservation Program (OCCP) partners at the 2010 Annual General meeting.

The Okanagan is a unique region of Canada, recognized provincially and nationally as a biodiversity hotspot and for the richness and rarity of species and habitats. Central and North Okanagan represent the northern part of the region's important ecological corridor between the arid U.S. Great Basin to the south and the grasslands of the Central Interior Plateau of British Columbia. The strategy development is a consultative process, guided by a steering committee of partners, and initiated under the banner of the Okanagan Collaborative Conservation Program (OCCP). Thirty-five organizations including local, regional and senior governments; and, national, provincial and local non-government agencies, work within the OCCP partnership to achieve shared environmental and sustainability objectives. The strategy will cover areas within the Regional District of North Okanagan (RDNO) and the Regional District of Central Okanagan (RDCO). Threats to biodiversity include habitat loss, invasive species and pollution. Added to these issues are the potential effects of climate change on the biodiversity of the region. Four cities, four major municipalities, a township and a village are located within the valley area in the study area. This relatively high level of urbanization presents additional challenges related to protecting the biodiversity of the region including:

- expanding urban populations;
- increasing demands for land, infrastructure, and services;
- urban and resort encroachment into natural areas and agricultural lands;
- agricultural expansion into natural areas;
- economic development pressures;
- limited opportunities for park acquisition due to the high cost of land;

- lack of fine-scaled data about urban ecosystems; and
- lack of data on the social and economic benefits of biodiversity.

1.2 Goals of the North and Central Okanagan Biodiversity Strategy

The goals of strategy are:

- To maintain and improve ecosystem health and resiliency throughout the Okanagan through the establishment of a network of protected and managed natural habitat areas across all jurisdictions and land tenures.
- To conserve and enhance sensitive ecosystems, habitat reserves and corridors so that the widest range of plant and animal species — including species which are important on a provincial, regional, and local scale – will survive and prosper.
- To make recommendations and provide decision-support tools to local, senior and First Nations governments and agencies on conservation priorities and opportunities.
- To identify opportunities for residents and visitors to access, appreciate and enjoy natural areas and special places.

1.3 Study Area

The North and Central Okanagan regional districts are located in British Columbia's southern interior (Figure 1). The study area has a population of 264,000 residents within the cities of Kelowna, Vernon, Armstrong and Enderby; the municipalities of Peachland, West Kelowna, Lake Country, Coldstream; the Village of Lumby; the Township of Spallumcheen; and surrounding rural areas of both the North and Central regional districts. The study area is approximately 1,162,235 ha (11,622 km^2), consisting of large lakes, urban and agricultural land, and natural habitats (Table 1).

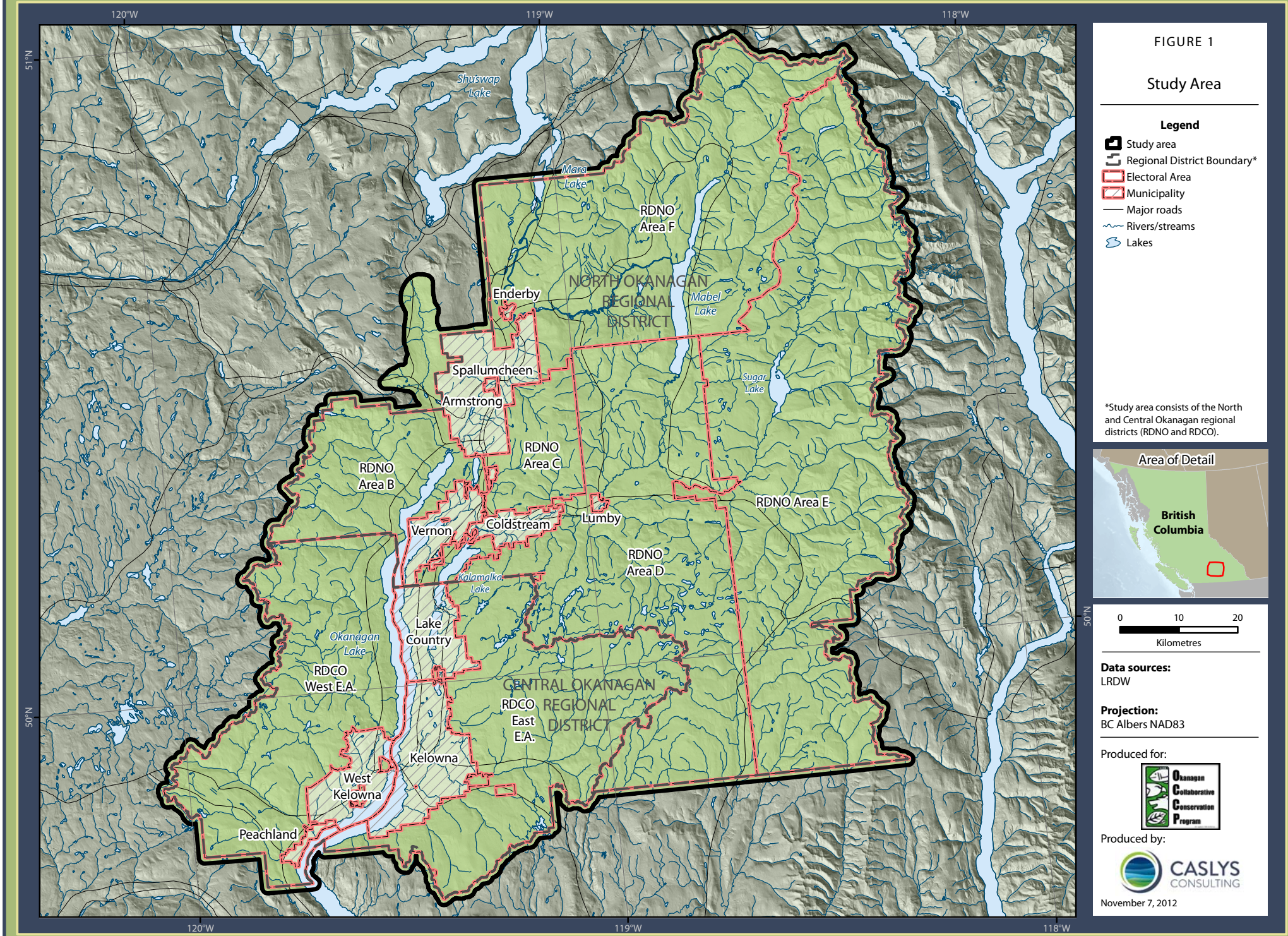


FIGURE 1

Study Area

Legend

- Study area
- Regional District Boundary*
- Electoral Area
- Municipality
- Major roads
- Rivers/streams
- Lakes

*Study area consists of the North and Central Okanagan regional districts (RDNO and RDCO).

0 10 20
Kilometres

Data sources:
LRDW

Projection:
BC Albers NAD83

Produced for:
Okanagan Collaborative Conservation Program

Produced by:
CASLYS CONSULTING

November 7, 2012

Table 1 – Areas of Land and Water Features in the Study Area

Feature	Area (ha)*
Land	1,114,536
Large lakes	42,224
Small lakes	3,643
Rivers	1,833
Total	**1,162,235**

*Area values between this table and subsequent tables may vary slightly due to scale and rounding issues.

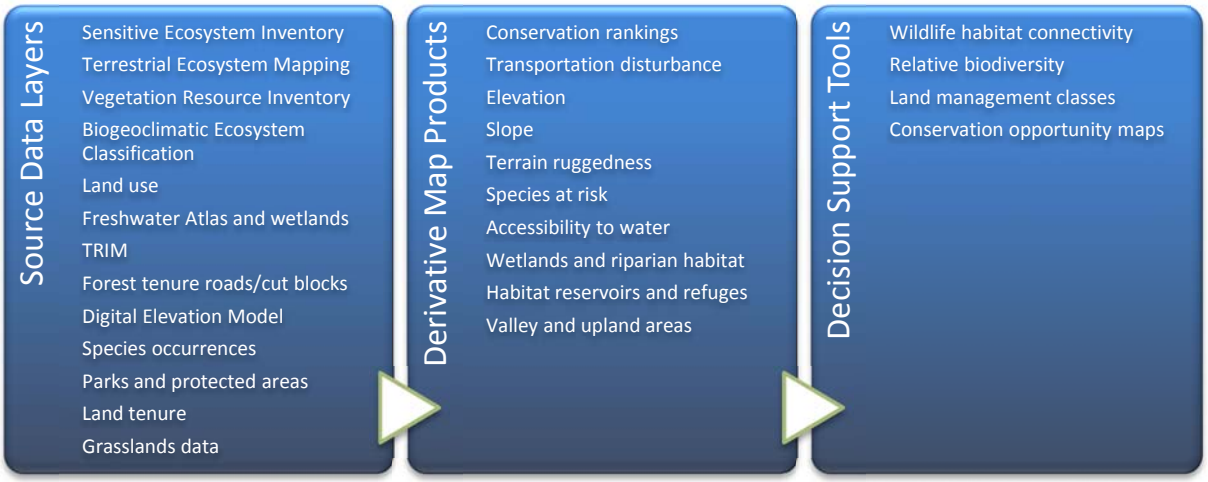
1.4 Overview

The Biodiversity Conservation Analysis integrates a variety of regional scale environmental and land tenure data together with their associated attributes. The result is a series of derivative layers and maps that depict habitat connectivity and the relative biodiversity of the region. The land base has been assigned to various management classes that specify the degree of protection from potential urban or more intensive land uses. When these land management classes are combined with the relative biodiversity and habitat connectivity layers, biodiversity 'hot spots' can be identified. Ultimately, these hot spots, and other significant habitats, can be targeted for appropriate biodiversity conservation efforts (e.g., restoration, park acquisition) and will be used to guide the development of a conservation strategy for the region.

2.0 METHODS

The following sections detail the technical approach taken to develop the various derivative datasets developed for the study area. The analysis work was conducted in ESRI's ArcMap. The raster-based components of the analysis were conducted using ArcMap's Spatial Analyst extension. Figure 2 summarizes the various source data layers, derivative map products and the resultant decision support tools.

Figure 2. Biodiversity Conservation Analysis Overview



2.1 Source Data Layers

The following datasets, each clipped to a polygon defining the extent of the study area, represent the source data layers used in the analysis:

2.1.1 Sensitive Ecosystem Inventory (SEI)

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. The inventory was developed by the province as a conservation tool for planning and sustainable development. Sensitive ecosystems in the study area include: antelope-brush steppe; sagebrush steppe; grasslands; sparsely vegetated areas; old forest; broadleaf woodlands; coniferous woodlands; riparian; wetlands; alpine; seasonally flooded agricultural fields; and mature forest. The SEI dataset is only available for a portion of the study area (Figure 3).

Purpose:	Where available, the SEI was used to help assign Conservation Rankings. In addition, the dataset was used to identify wetland habitats.
Source:	EcoCat and RDCO
Date:	Source imagery 1994-2007, field updates through 2011
Scale:	1:20,000

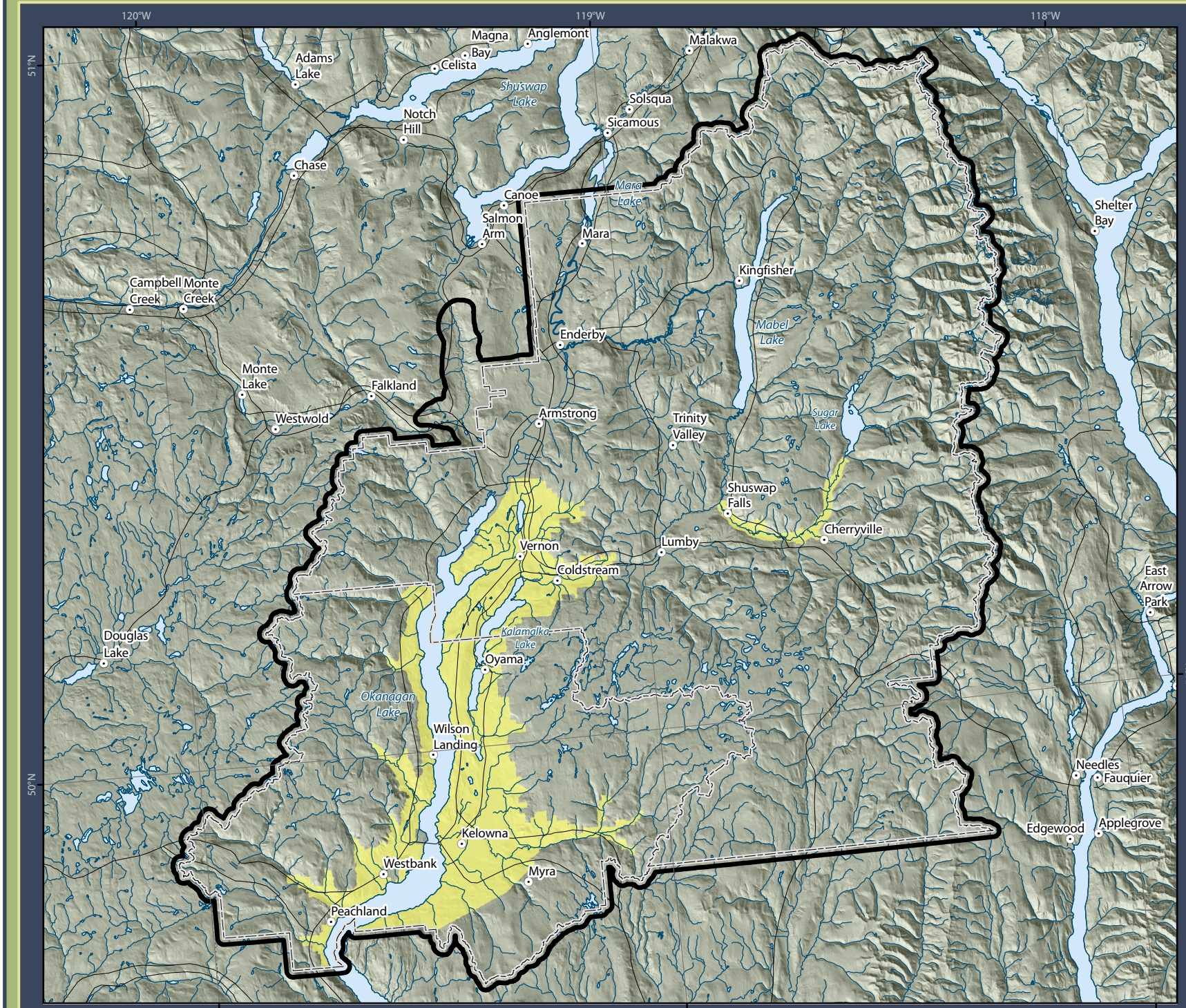


FIGURE 3

Sensitive Ecosystem Inventory Data Availability

Legend

- City/Town
- Regional District Boundary
- Study area
- Major roads
- Rivers/streams
- Lakes
- SEI Coverage

0 10 20
Kilometres

Data sources:
LRDW

Projection:
BC Albers NAD83

Produced for:
Okanagan Collaborative Conservation Program

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CASLYS CONSULTING

August 21, 2012

2.1.2 Terrestrial Ecosystem Mapping

Terrestrial Ecosystem Mapping (TEM) is based on air photo interpretation of ecosystem attributes. It stratifies the landscape based on climate, physiography, surficial material, bedrock geology, soil and vegetation.

Purpose: Where available, the TEM was used to assign Conservation Rankings. In addition, the dataset was used to identify wetland habitats.
Source: EcoCat
Date: Source imagery 1994-2006, field updates through 2011
Scale: 1:20,000 scale photography

2.1.3 Vegetation Resource Inventory

The 1:20,000 scale Vegetation Resource Inventory (VRI) from the Land and Resource Data Warehouse (LRDW). This dataset has detailed information related to species composition, crown closure, stand age and height, and descriptions of non-productive habitats (e.g., swamps).

Purpose: Outside of the area covered by the SEI (Figure 3), the VRI was used to assign Conservation Rankings.
Source: B.C. Land and Resource Data Warehouse
Date: late 1990s
Scale: 1:20,000

2.1.4 Biogeoclimatic Ecosystem Classification

The Biogeoclimatic Ecosystem Classification (BEC) is a land classification system that groups together ecosystems with similar climate, soils and vegetation. This classification is widely used as a framework for resource management as well as for scientific research in B.C. Table 2 and Figure 4 summarize the biogeoclimatic zones in the study area. Figure 5 maps the locations of the zones in the study area.

Purpose: Used to identify valley and upland areas.
Source: B.C. Land and Resource Data Warehouse
Date: 2011
Scale: 1:250,000

2.1.5 Land Use

Data supplied by various municipalities and the regional districts were augmented by the most recent land tenure data available from provincial datasets available in the LRDW (e.g., Crown Land, parks and protected areas, Indian reserves).

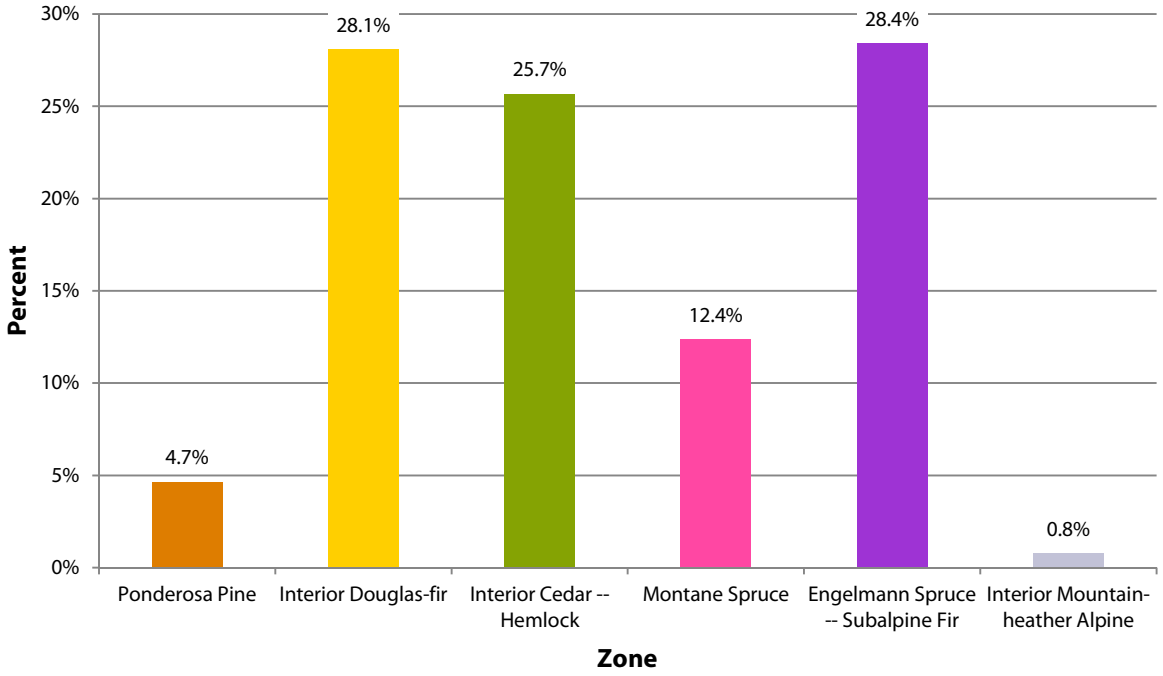
Purpose: Used to develop the management classes and to identify private and agricultural land.
Source: B.C. Land and Resource Data Warehouse, municipal datasets
Date: 2012
Scale: various

Table 2 – Biogeoclimatic Zones Summary

Biogeoclimatic Zone	Area (ha)	% of Study Area
Ponderosa Pine ▪ Consists of ponderosa pine forests, grasses and wetlands. ▪ Occurs in very dry portions of the Okanagan Valley –areas surrounding Kelowna and Peachland.	54,069	4.7%
Interior Douglas-fir ▪ Rolling hills and valleys covered by dry grasslands and open forests ▪ Present at low to mid elevations throughout the study area	326,637	28.1%
Interior Cedar-Hemlock ▪ Productive coniferous forest consisting of a variety of species ▪ Present in lower slopes and valley bottoms in the eastern half of the study area	298,464	25.7%
Montane Spruce ▪ Predominantly forested with lakes, wetlands and meadows. ▪ Occurs in a narrow, mid-elevation band in mountains and plateaus.	143,804	12.4%
Engelmann Spruce - Subalpine Fir ▪ Steep mountain sides blanketed with old-growth spruce and subalpine fir forests. Snowy conditions for 5-7 months of the year. ▪ Occurs in the highest forested elevations in mountainous areas in the study area.	330,417	28.4%
Interior Mountain-heather Alpine ▪ Area above tree line, characterized by harsh weather, rocky substrate and limited, low vegetation. ▪ Occurs in small area of mountain peaks in the northeast portion of the study area.	8,843	0.8%

*Areas and percentages include large (>50 ha) and small (≤50 ha) lakes. Area statistics between tables may vary slightly due to scale and rounding issues.

Figure 4. Biogeoclimatic Zone Summary



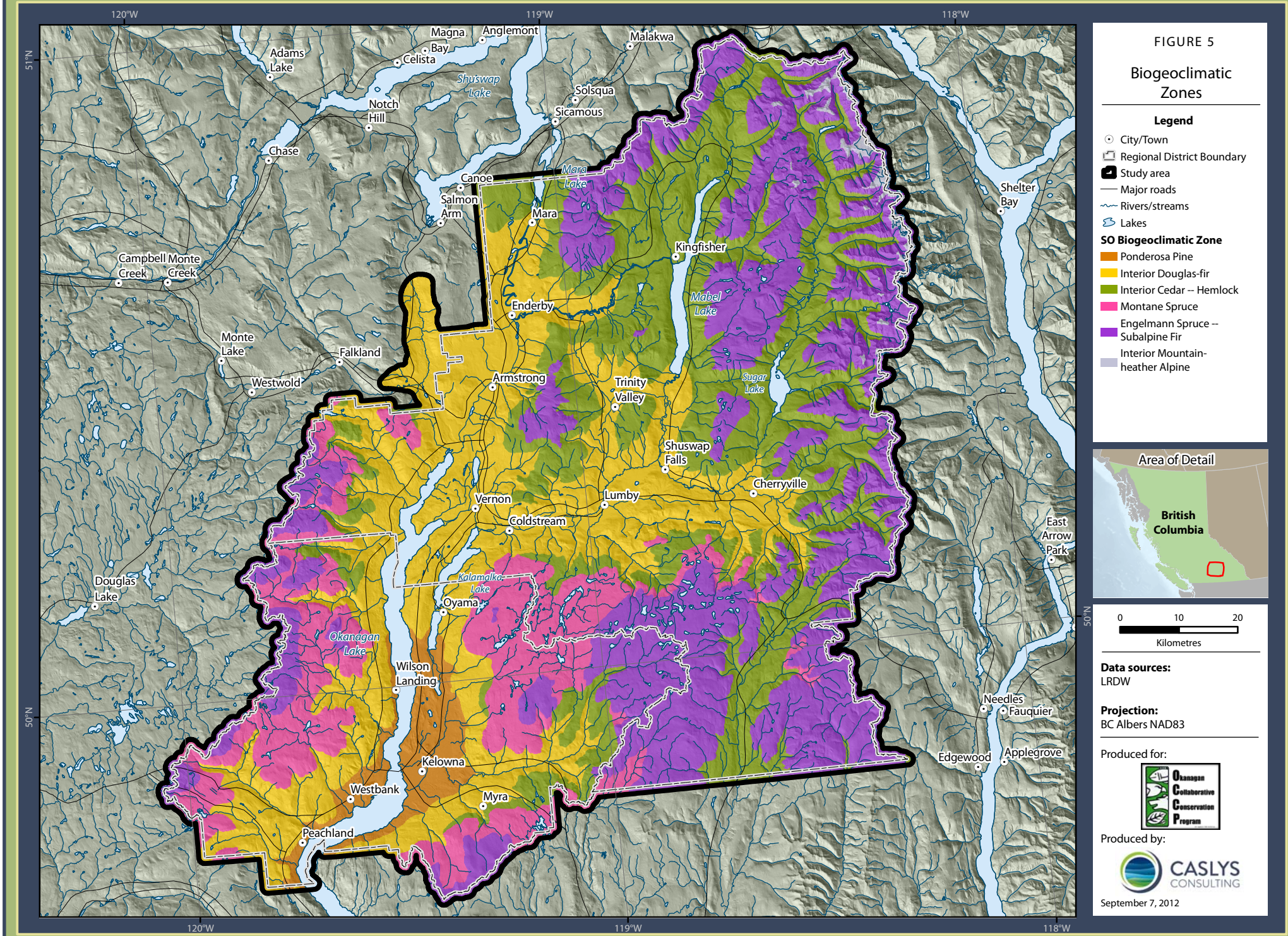


FIGURE 5

Biogeoclimatic Zones

Legend

- City/Town
- Regional District Boundary
- Study area
- Major roads
- Rivers/streams
- Lakes

SO Biogeoclimatic Zone

- Ponderosa Pine
- Interior Douglas-fir
- Interior Cedar -- Hemlock
- Montane Spruce
- Engelmann Spruce -- Subalpine Fir
- Interior Mountain-heather Alpine

0 10 20
Kilometres

Data sources:
LRDW

Projection:
BC Albers NAD83

Produced for:
Okanagan Collaborative Conservation Program

Produced by:
CASLYS CONSULTING

September 7, 2012

2.1.6 Freshwater Atlas and Wetlands

The Freshwater Atlas (FWA) is a standardized dataset for mapping the province's hydrological features. It is derived from the province's 1:20,000 scale topographic base maps (TRIM). The atlas defines watershed boundaries by height of land and provides a connected network of streams, lakes and wetlands. Wetland features identified in the SEI dataset were integrated with the FWA data. The Sensitive Habitat Inventory Mapping (SHIM) and Wetland Inventory Mapping (WIM) were not included because there were numerous features with 'non-natural' attributes (e.g., road runoffs, ditches and channelized streams). A review of the results of the riparian model (see Section 2.2.7) indicated that the vast majority of wetland features were captured by the model when used in conjunction with the SEI and Freshwater Atlas datasets.

Purpose:	Used to model riparian habitat, identify wetlands and for cartographic display.
Source:	B.C. Land and Resource Data Warehouse, SEI
Date:	2011
Scale:	1:20,000

2.1.7 Terrain Resource Inventory Management

Terrain Resource Inventory Management (TRIM) data were obtained from the province's Land and Resource Data Warehouse to facilitate the identification of human disturbance. This includes information delineating buildings, built-up areas, mines and other extraction sites, hydro-related features, and transportation features (e.g., airports, ferry routes, rail lines, roads and trails). In addition, the TRIM dataset contains polygonal features mapping the locations of various land covers including nurseries, orchards and vineyards.

Purpose:	Human disturbance and cartographic display.
Source:	B.C. Land and Resource Data Warehouse
Date:	The majority of TRIM data is based on mid 1990s photography it has been updated with more recent photography (i.e., 2002 and 2006) for portions of the study area.
Scale:	1:20,000

2.1.8 Forest Tenure Roads and Cut Blocks

Forest tenure roads and cut blocks are mapped by the Ministry of Forests, Lands and Natural Resource Operations (MFLNRO). These data layers were incorporated into the project dataset to reflect recent disturbance on the landscape.

Purpose:	Human disturbance – used to update the VRI and the road network.
Source:	B.C. Land and Resource Data Warehouse
Date:	2011
Scale:	1:20,000

2.1.9 Digital Elevation Model

The digital elevation model (DEM) was extracted from the B.C. Terrain Resource Information Mapping (TRIM) data. This is a provincial mapping program that provides base mapping at scales of 1:20,000 and 1:250,000. TRIM topographical features include contour lines, mass elevation points and breaklines.

Purpose: A terrain model was developed from the DEM to derive slope, aspect and elevation coverages. In addition, the DEM was used as an input to the riparian habitat analysis.
Source: B.C. Land and Resource Data Warehouse
Date: late 1990s
Scale: 1:20,000

2.1.10 Parks and Protected Areas

The province's parks and protected area designation is designed to protect significant ecological and cultural values (Figure 6).

Purpose: Used to develop the management classes and for statistical summary.
Source: B.C. Land and Resource Data Warehouse (LRDW) and regional parks from the RDCO and RDNO
Date: 2012
Scale: 1:20,000

2.1.11 Land Tenure

Land tenure information, obtained from the LRDW, municipalities, and regional districts, included community watersheds; the Agricultural Land Reserve (ALR); and various ownership attributes.

Purpose: Used to develop the management classes and for statistical summary.
Source: B.C. Land and Resource Data Warehouse, municipalities, North & Central Okanagan regional districts
Date: 2012
Scale: 1:20,000

2.1.12 Grasslands Conservation Council Data

The Grasslands Conservation Council has mapped the locations of grasslands throughout the study area (Figure 7). This dataset was used to refine the Conservation Rankings.

Purpose: Used to assign Conservation Rankings to areas outside SEI coverage.
Source: GCC
Date: 2010
Scale: unknown (~1:20,000)

2.1.13 Digital Imagery

In addition to the datasets listed above, imagery such as air photos (from a variety of sources including RDCO, RDNO, and the cities of Kelowna and Vernon), SPOT and LandSat scenes available in the province's image warehouse were compiled to help verify the data.

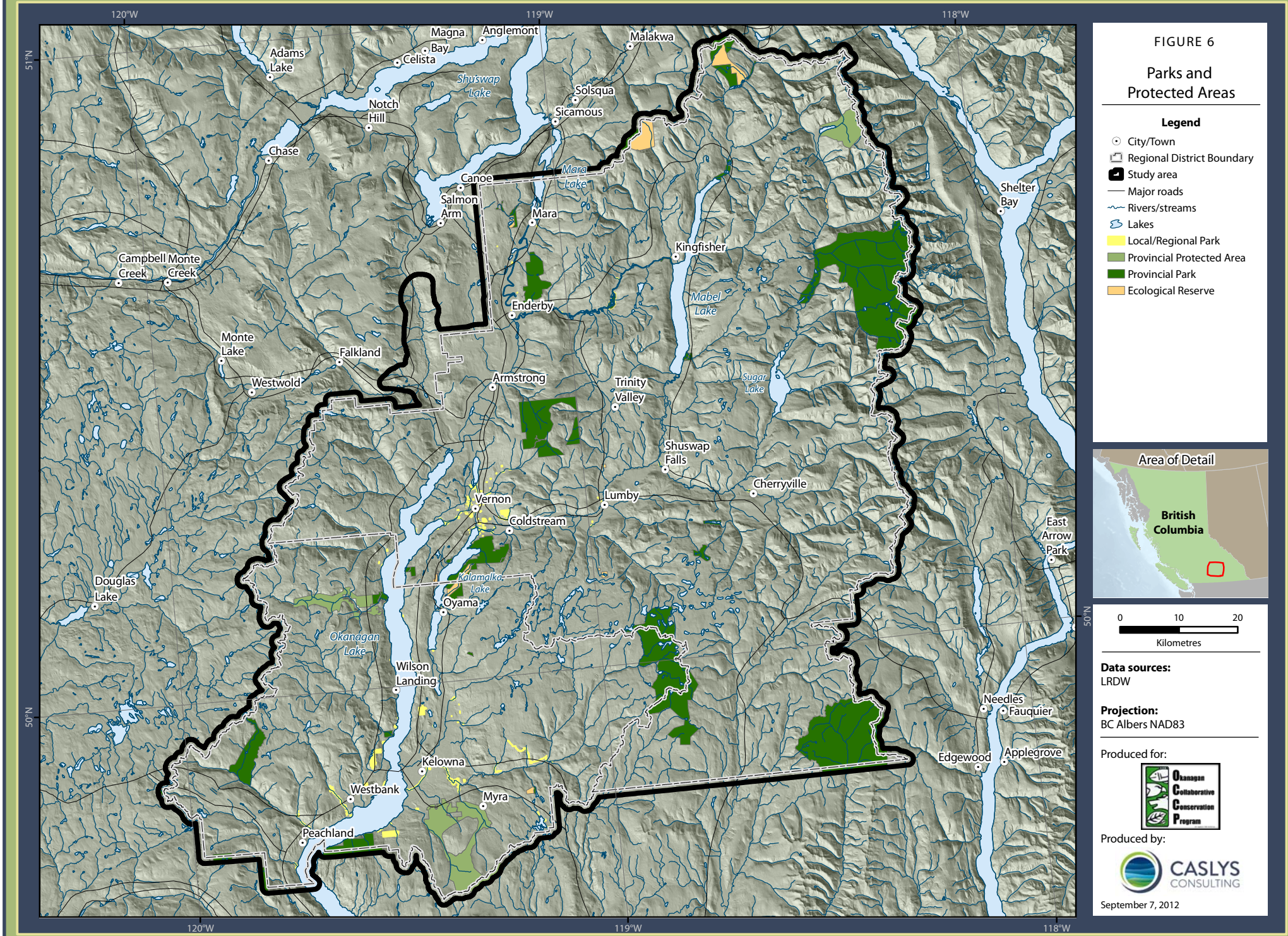


FIGURE 6

Parks and Protected Areas

Legend

- City/Town
- Regional District Boundary
- Study area
- Major roads
- Rivers/streams
- Lakes
- Local/Regional Park
- Provincial Protected Area
- Provincial Park
- Ecological Reserve

0 10 20
Kilometres

Data sources:
LRDW

Projection:
BC Albers NAD83

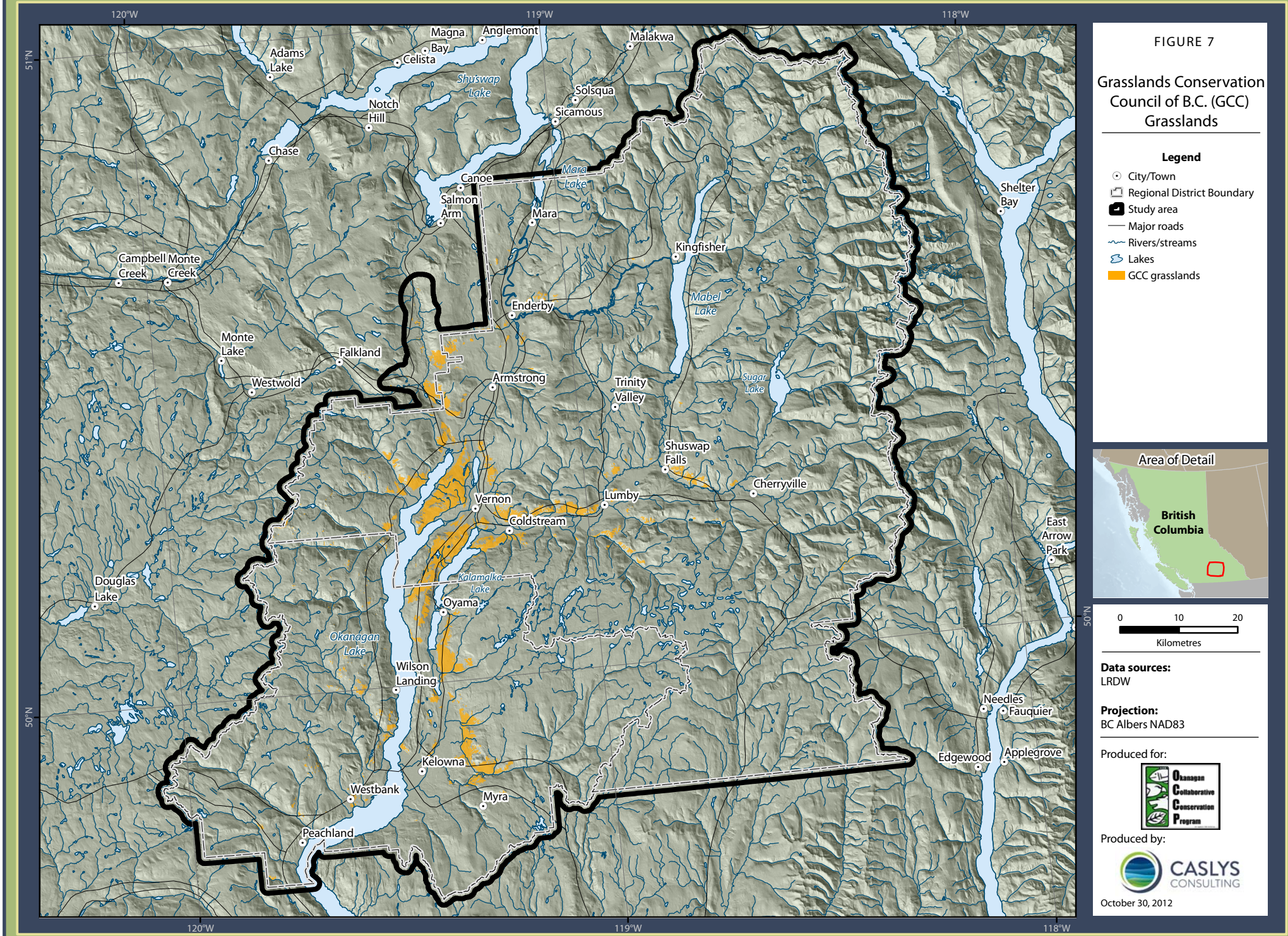
Produced for:

Okanagan Collaborative Conservation Program

Produced by:

CASLYS CONSULTING

September 7, 2012


120°W
119°W
118°W
51°N
50°N
Magna Bay
Anglemont
Malakwa
Adams Lake
Celista
Shuswap Lake
Solsqua
Notch Hill
Sicamous
Chase
Canoe
Mara Lake
Salmon Arm
Mara
Shelter Bay
Kingfisher
Campbell Creek
Monte Creek
Mabel Lake
Enderby
Monte Lake
Falkland
Westwold
Armstrong
Trinity Valley
Sugar Lake
Shuswap Falls
Cherryville
Vernon
Lumby
Coldstream
East Arrow Park
Douglas Lake
Kalamalka Lake
Oyama
Okanagan Lake
Wilson Landing
Needles
Fauquier
Edgewood
Applegrove
Kelowna
Westbank
Myra
Peachland
FIGURE 7
Grasslands Conservation Council of B.C. (GCC) Grasslands
Legend
City/Town
Regional District Boundary
Study area
Major roads
Rivers/streams
Lakes
GCC grasslands
Area of Detail
British Columbia
0
10
20
Kilometres
Data sources:
LRDW
Projection:
BC Albers NAD83
Produced for:
Okanagan Collaborative Conservation Program
Produced by:
CASLYS CONSULTING
October 30, 2012

2.2 Derivative Map Products

2.2.1 Conservation Rankings

Source data layers: Terrestrial Ecosystem Mapping, Sensitive Ecosystem Inventory, Vegetation Resource Inventory, wetlands and riparian features, grasslands, and elevation and aspect based on the TRIM DEM.

Where Terrestrial Ecosystem Mapping (TEM) or Sensitive Ecosystem Inventory (SEI) data were available, they were used to determine the conservation rankings. For areas outside the extent of the TEM data, the Vegetation Resource Inventory (VRI) data were used.

2.2.1.1 Applying Conservation Rankings to TEM/SEI Polygons

TEM crosswalk methods:

All units mapped in the TEM were linked to the appropriate ecosystem in the Conservation Framework[1]. These linkages were often made using BEC site series or ecosystem name. When this was not possible, linkages were made by cross-walking the ecosystem concept provided in the expanded legend. Several mapped units did not have equivalent ecosystems in the Conservation Framework (CF). Such units included non-vegetated units (e.g., talus or cliffs) or very rare ecosystems that are not included in the provincial ecosystem assessments completed by the Conservation Data Centre (CDC).

Once the initial link was made between the mapped TEM units and the CF ecosystems, the CF data were filtered to ensure the greatest applicability to this project. Focus was given to ecosystems scoring high under the goals of 'proactive conservation' and 'maintaining B.C.'s native biodiversity'. The decision was made not to include ecosystems scoring under the goal 'global responsibility' due to a lack of data availability stemming from difficulty in measuring the global extent of ecosystems at the scale used in this project.

SEI rank reconciliation and incorporation of wildlife values:

All CF priorities were reviewed by a group of ecology and wildlife experts and the ranking converted to a four point scale to correlate with the Sensitive Ecosystem Ranks (SER) that had been done in the area. When the SER and the CF priorities differed, a group of experts agreed upon a reconciled rank. These reconciliations were done consistently across the project area and the rationale behind these decisions are documented in a cross-reference table (available in MS-Excel format). Wildlife values were incorporated into this process based on expert opinion with priorities being adjusted slightly up or down, depending on the significance of the ecosystem to wildlife. When the ecosystem did not occur in the CF the Sensitive Ecosystem rank was assigned, this was most often the case for non-vegetated units that provide high valued wildlife habitat (e.g., cliffs, talus).

Weighted average:

Each TEM polygon may consist of varying proportions of up to three different ecosystem types. For each polygon, the attribute table stores a weighted average determined by multiplying the conservation ranking associated with the ecosystem type by its relative proportion. For example, if a polygon consists of 50% of a conservation rank 10 ecosystem type, 30% of a conservation rank 5.0 and 20% of a conservation rank 1.0, the weighted average would be calculated as follows:

[1] The Conservation Framework is B.C.'s approach for maintaining the biodiversity of the province. The framework provides a set of science-based tools for conserving species and ecosystems by setting clear priorities for conservation action.

Weighted Average = (0.5 * 10) + (0.3 * 5.0) + (0.2 * 1.0) = 6.7

A polygon with a weighted average of 10 would consist entirely of ecosystem types with a conservation ranking of 10 (i.e., entirely sensitive ecosystems). A polygon with a weighted average of 1.0 would consist of predominantly urban/residential land uses with a small percentage of a more sensitive ecosystem type. The weighted averages were then grouped into four classes as per Table 3.

Table 3 – Conservation Rankings Map Classes

Class	Class range*
Very high (Class 1)	7.0 – 10.0
High (Class 2)	3.0 – 6.9
Moderate (Class 3)	0.067 – 2.9
Low (Class 4)	0 – 0.066

*Based on the weighted rank.

2.2.1.2 Applying Conservation Rankings to VRI Polygons

Where TEM and SEI data were not available, the conservation ranking was based on the attributes present in the VRI and other datasets. Riparian areas were modeled from the TRIM DEM and Freshwater Atlas hydrological features. Wetlands were also derived from the Freshwater Atlas. All wetland and riparian polygons received a conservation rank of 1 (very high). All grasslands from the GCC grassland mapping were assigned a conservation rank of 1 to factor in the relative rarity of these ecosystems (e.g., BGxh, PPxh and IDFxh) in the province. Within each biogeoclimatic variant, the conservation rank of non-riparian forested polygons was assigned based on leading tree species and age. The conservation rank(s) of the group of ecosystems that could be included within each forest type was cross-walked with the TEM conservation ranks. Non-forested and non-vegetated polygons were assigned a rank based on the biogeoclimatic variant and land cover code cross-walked with the TEM units. Low shrub, tall shrub, and herb were assigned a conservation rank depending on harvesting history (i.e. cutblocks compared to natural shrublands or grasslands). Aspect derived from the TRIM DEM also affected the ranks for bedrock, talus, and rock/rubble, as per the TEM ranks. Table 4 summarizes the distribution of conservation ranking classes in the study area and Figure 8 illustrates the results. In addition the conservation rankings were summarized for both of the regional districts - Table 5 and Figure 9 provide details about the Regional District of Central Okanagan (RDCO), and Table 6 and Figure 10 summarize the Regional District of North Okanagan (RDNO). Figure 11 presents a map of the conservation rankings for the entire study area.

The results indicate that the RDCO contains a larger proportion of the Low (Class 4) values – 10,084 ha (3.5%) as compared to 3,396 ha (0.5%) in the RDNO. In terms of absolute area, the RDNO has 48,750 ha of the Very High (Class 1) areas compared to 18,899 ha in the RDCO, however, these areas represent 6.5% of both regional districts. The RDNO has a slightly higher percentage of High (Class 2) values than the RDCO – 48.9% versus 41.9%.

Table 4 – Summary of Conservation Rankings by Class in the Study Area

Conservation Ranking	Area (ha)	% of Study Area
Low (Class 4)	13,514	1.2%
Moderate (Class 3)	512,253	45.7%
High (Class 2)	520,755	46.5%
Very high (Class 1)	73,487	6.6%

*Areas and percentages exclude large lakes (>50 ha).

Figure 8. Percent of Study Area by Conservation Ranking Class

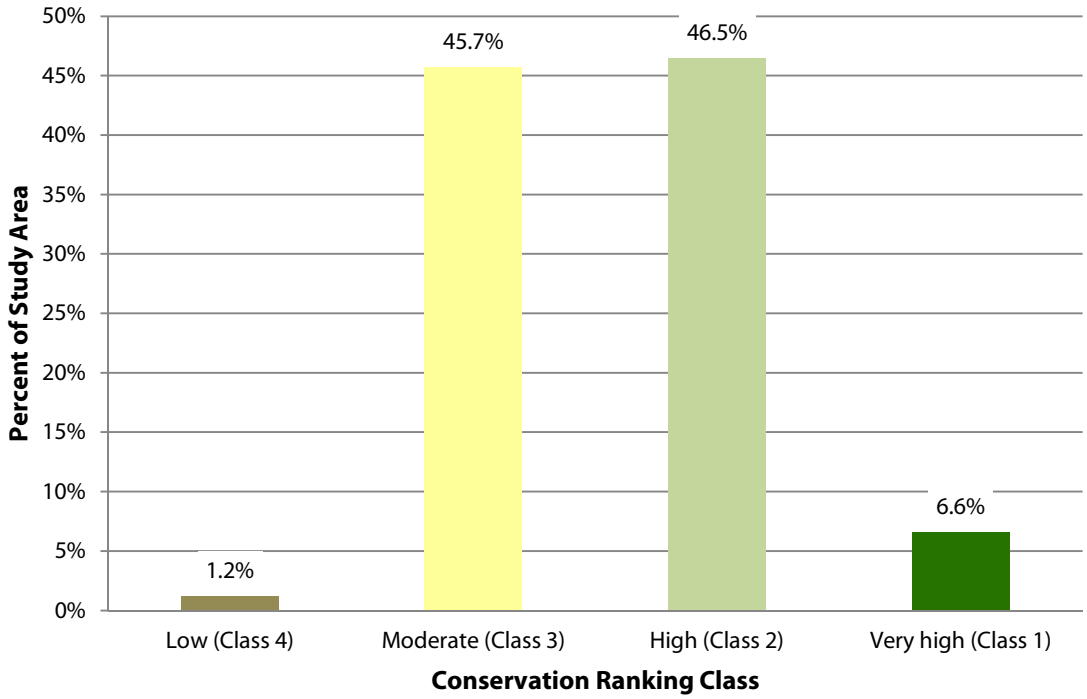


Table 5 – Summary of Conservation Rankings by Class in the Regional District of Central Okanagan

Conservation Ranking	Area (ha)	% of Study Area
Low (Class 4)	10,084	3.5%
Moderate (Class 3)	140,135	48.2%
High (Class 2)	121,748	41.9%
Very high (Class 1)	18,899	6.5%

*Areas and percentages exclude large lakes (>50 ha).

Figure 9. Percent of the Regional District of Central Okanagan by Conservation Ranking Class

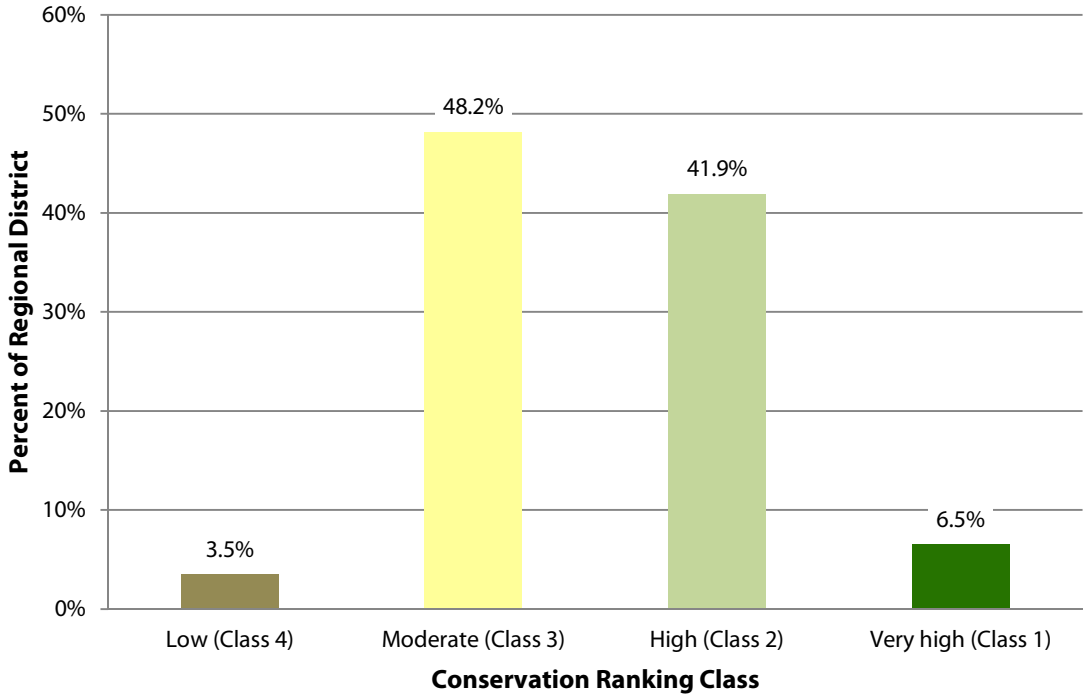
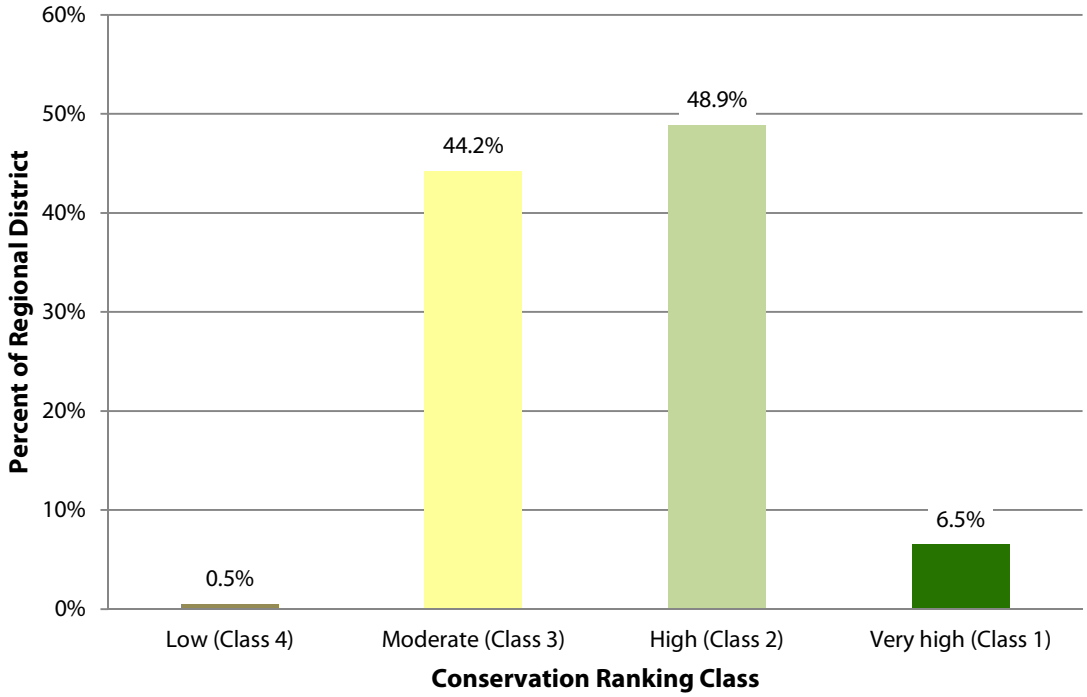


Table 6 – Summary of Conservation Rankings by Class in the Regional District of North Okanagan

Conservation Ranking	Area (ha)	% of Study Area
Low (Class 4)	3,396	0.5%
Moderate (Class 3)	333,090	44.2%
High (Class 2)	368,209	48.9%
Very high (Class 1)	48,750	6.5%

*Areas and percentages exclude large lakes (>50 ha).

Figure 10. Percent of the Regional District of North Okanagan by Conservation Ranking Class



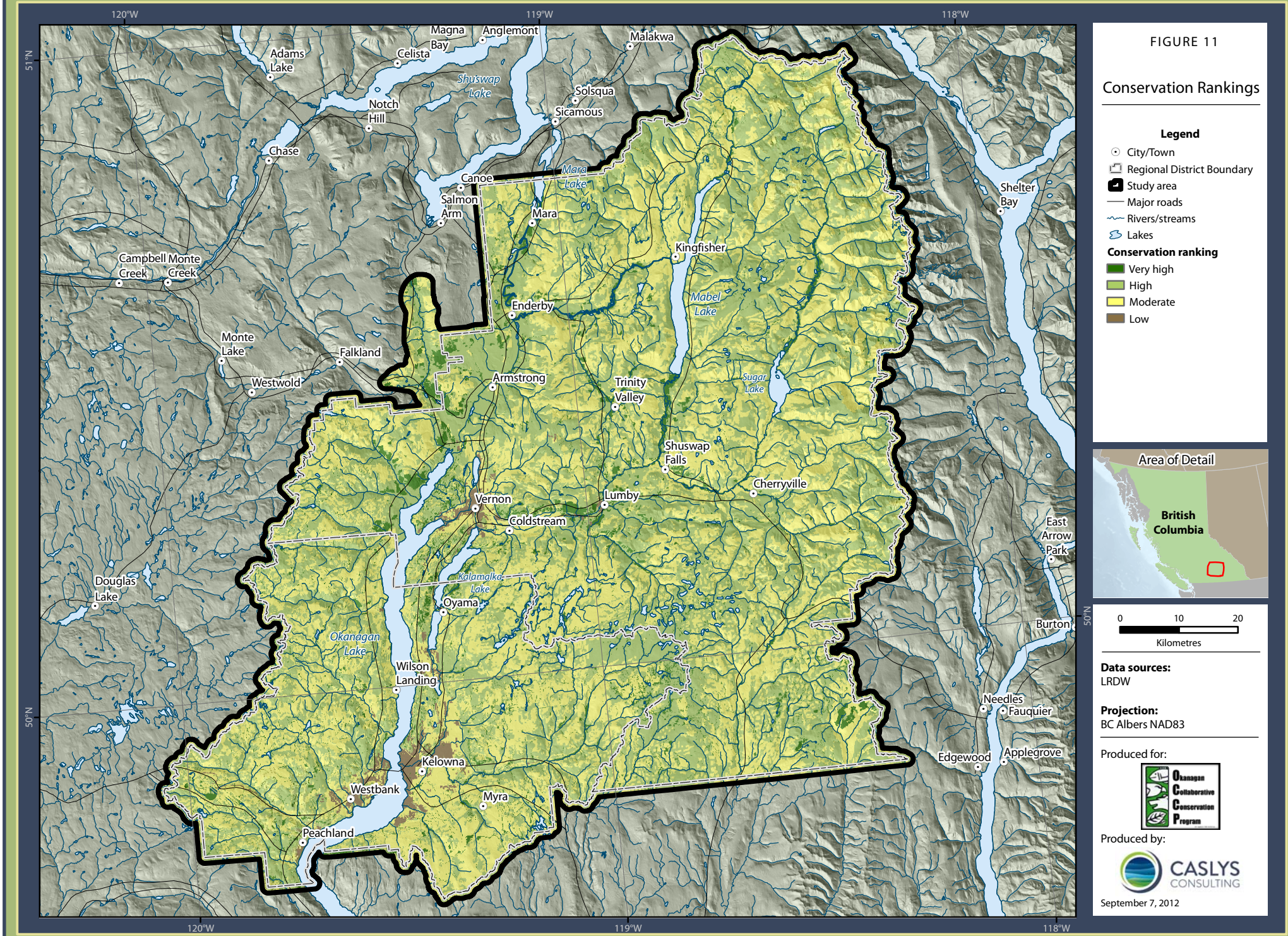


FIGURE 11

Conservation Rankings

Legend

- City/Town
- Regional District Boundary
- Study area
- Major roads
- Rivers/streams
- Lakes

Conservation ranking

- Very high
- High
- Moderate
- Low

0 10 20
Kilometres

Data sources:
LRDW

Projection:
BC Albers NAD83

Produced for:
Okanagan Collaborative Conservation Program

Produced by:
CASLYS CONSULTING

September 7, 2012

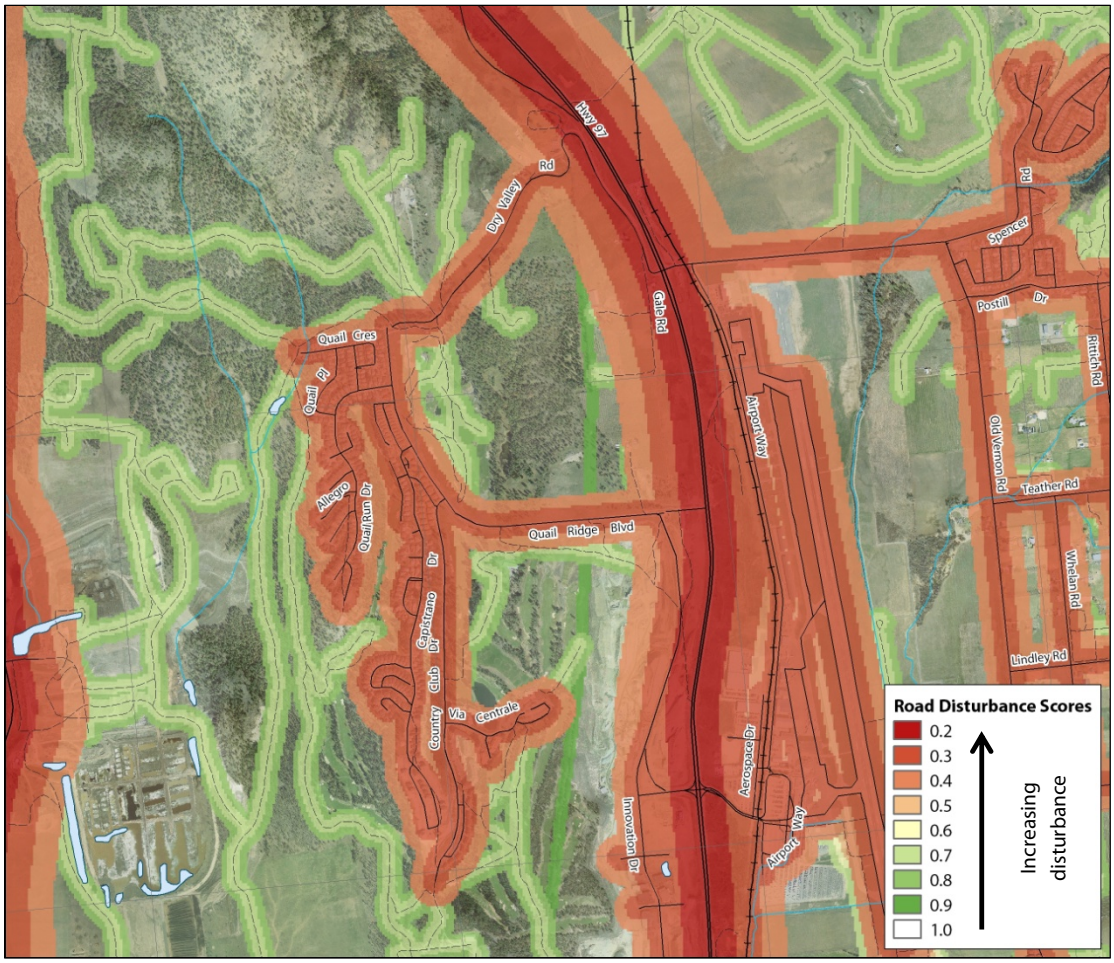
2.2.2 Transportation Disturbance

Disturbance buffers were generated around linear transportation features to quantify the level of human disturbance and its impact on surrounding habitat. Table 7 details the buffer widths applied to each feature type. An example of the resultant map product is illustrated in Figure 12.

Table 7 – Transportation Feature Disturbance Buffers

Feature type	Buffer widths (m)	Scores
Pipeline/Power line RoW	25	0.9
Railroad	25	0.7
Gravel - 1 lane	0-25	0.7
	25-50	0.8
Gravel - 2 lanes	0-25	0.5
	25-50	0.6
	50-75	0.7
Paved road	0-50	0.3
	50-100	0.4
Major arterial	0-100	0.2
	100-200	0.3
	200-300	0.4
Highway	0-100	0.2
	100-200	0.3
	200-300	0.4

Figure 12. Transportation Disturbance Example



2.2.3 Elevation

An elevation map was derived from the TRIM digital elevation model. Elevations in the study area range from 337 to 2,870 metres. Figure 13 presents an elevation map of the study area. Elevation values were one of the variables used to model habitat connectivity.

2.2.4 Slope

Slope was derived from the TRIM DEM. Figure 14 displays a slope map of the study area. Slope was one of the variables used to model habitat connectivity.

2.2.5 Terrain Ruggedness

Terrain ruggedness was also derived from the TRIM DEM. A neighbourhood analysis was conducted to examine the variability in terrain: terrain with less variability (i.e., smoother terrain) received higher scores in the habitat connectivity analysis. Figure 15 displays the results of the analysis.

2.2.6 Accessibility to Water

The landscape was rated according to how accessible a given location is to water. The analysis results were used in the habitat connectivity analysis as a surrogate to identify stream and valley corridors. The derivative dataset was derived from the TRIM DEM and the Freshwater Atlas hydrological features. Intermittent streams were not considered in the analysis.

2.2.7 Wetlands and Riparian Habitat

Wetlands identified in the SEI datasets were integrated with wetlands data in the Freshwater Atlas. In addition, the locations of riparian habitat were based on the development of a cost-weighted distance surface that determined the cost water would pay to flow or permeate through the surrounding terrain. The source data layers were: Freshwater Atlas hydrological feature and the TRIM 1:20,000 scale DEM. A cost-weighted distance analysis calculates a value for each raster cell based on the least accumulated cost of travelling from each cell to the source (in this case the streams or lakes). Distances are not in geographic units but rather determined in cost units. The surface was developed by calculating a cost-weighted distance to determine the difficulty (the cost) of the streams to move through the surrounding terrain. A slope map was used as the terrain component of the model – flatter terrain (lower slopes) offer less resistance and therefore have a lower associated cost, whereas steeper slopes have a higher cost. Riparian habitat surrounding a stream will, therefore, be more extensive in flatter areas and narrower in steeper terrain. The resulting raster dataset is based on the slope coverage, derived from the 25 metre cell size TRIM DEM, and therefore, its spatial accuracy is 25 metres. An example of the results is presented in Figure 16.

The output of the analysis is a raster dataset in which each cell is assigned a cumulative cost to the closest source cell. The resulting raster dataset was subsequently converted to a polygonal coverage. This approach generates a more accurate representation of real-world conditions than the use of static corridor widths because:

- The inclusion of terrain data allows streams having otherwise identical characteristics to be differentiated from one another.
- In areas of steep terrain, it yields narrow riparian corridors because the cost of travelling through steep terrain is higher.
- It captures the headwaters of streams in flatter terrain more realistically.

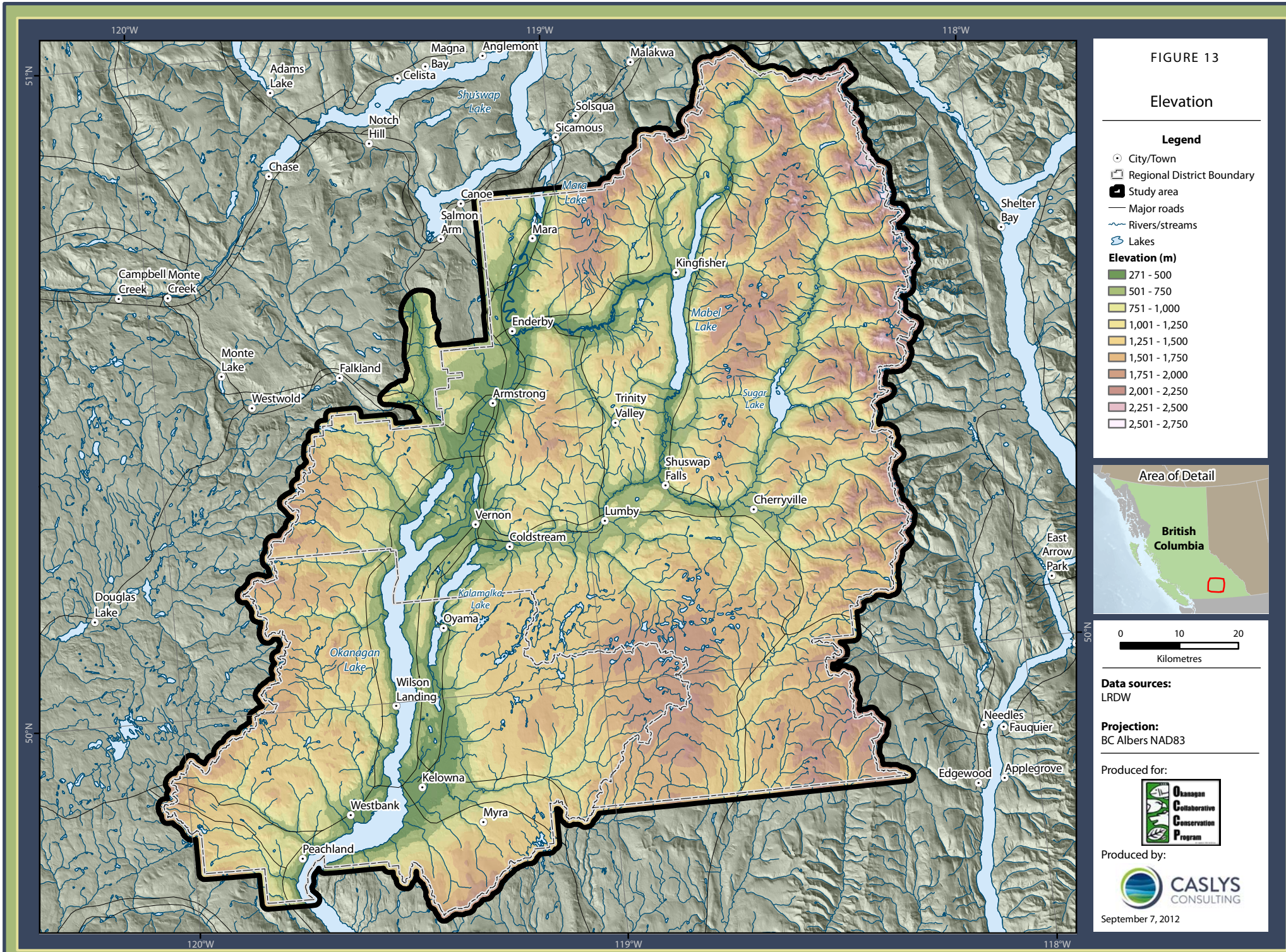


FIGURE 13

Elevation

Legend

- City/Town
- Regional District Boundary
- Study area
- Major roads
- Rivers/streams
- Lakes

Elevation (m)

- 271 - 500
- 501 - 750
- 751 - 1,000
- 1,001 - 1,250
- 1,251 - 1,500
- 1,501 - 1,750
- 1,751 - 2,000
- 2,001 - 2,250
- 2,251 - 2,500
- 2,501 - 2,750

0 10 20
Kilometres

Data sources:
LRDW

Projection:
BC Albers NAD83

Produced for:
Okanagan Collaborative Conservation Program

Produced by:
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September 7, 2012

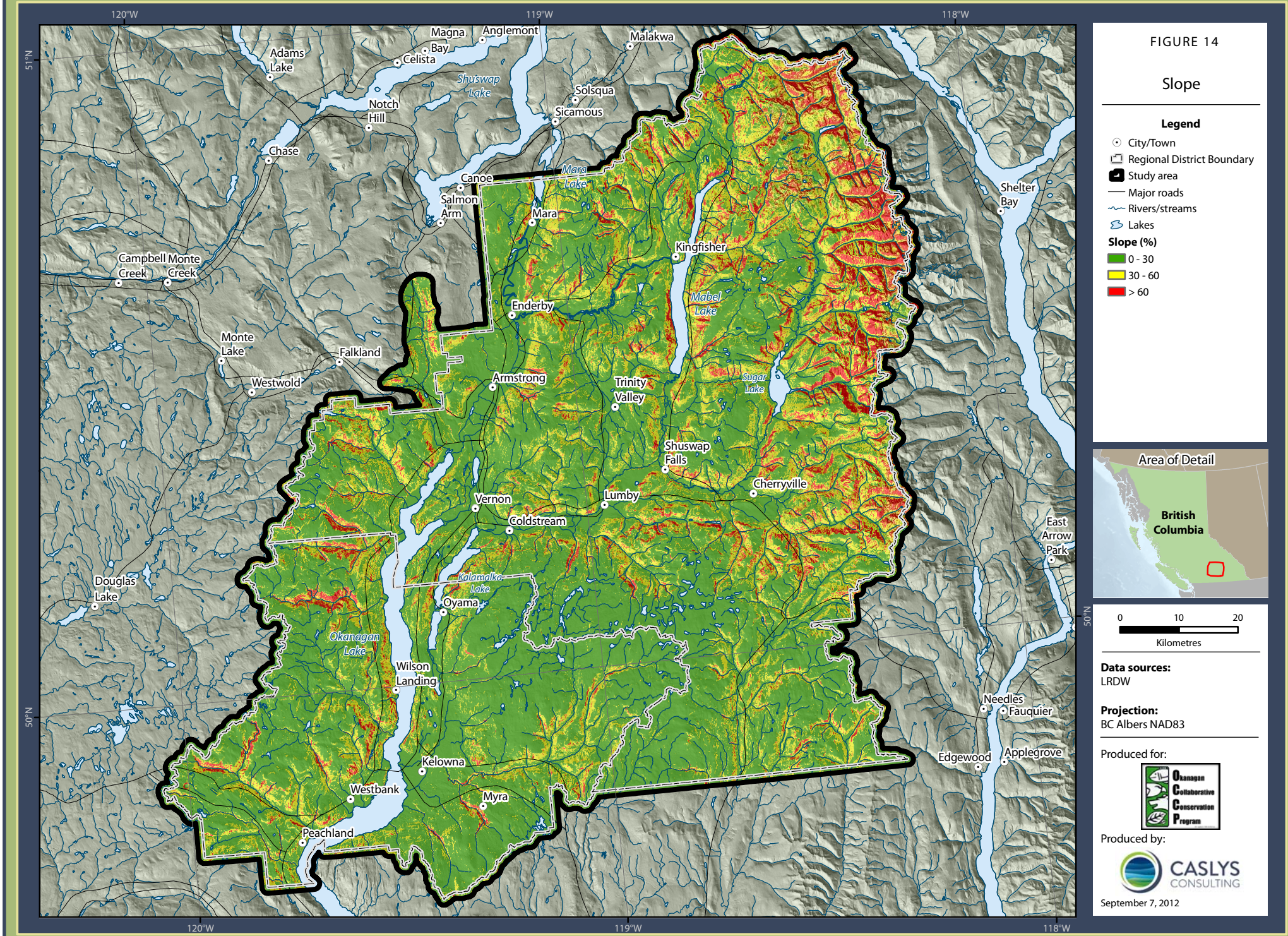


FIGURE 14

Slope

Legend

- City/Town
- Regional District Boundary
- Study area
- Major roads
- Rivers/streams
- Lakes

Slope (%)

- 0 - 30
- 30 - 60
- > 60

0 10 20
Kilometres

Data sources:
LRDW

Projection:
BC Albers NAD83

Produced for:
Okanagan Collaborative Conservation Program

Produced by:
CASLYS CONSULTING

September 7, 2012

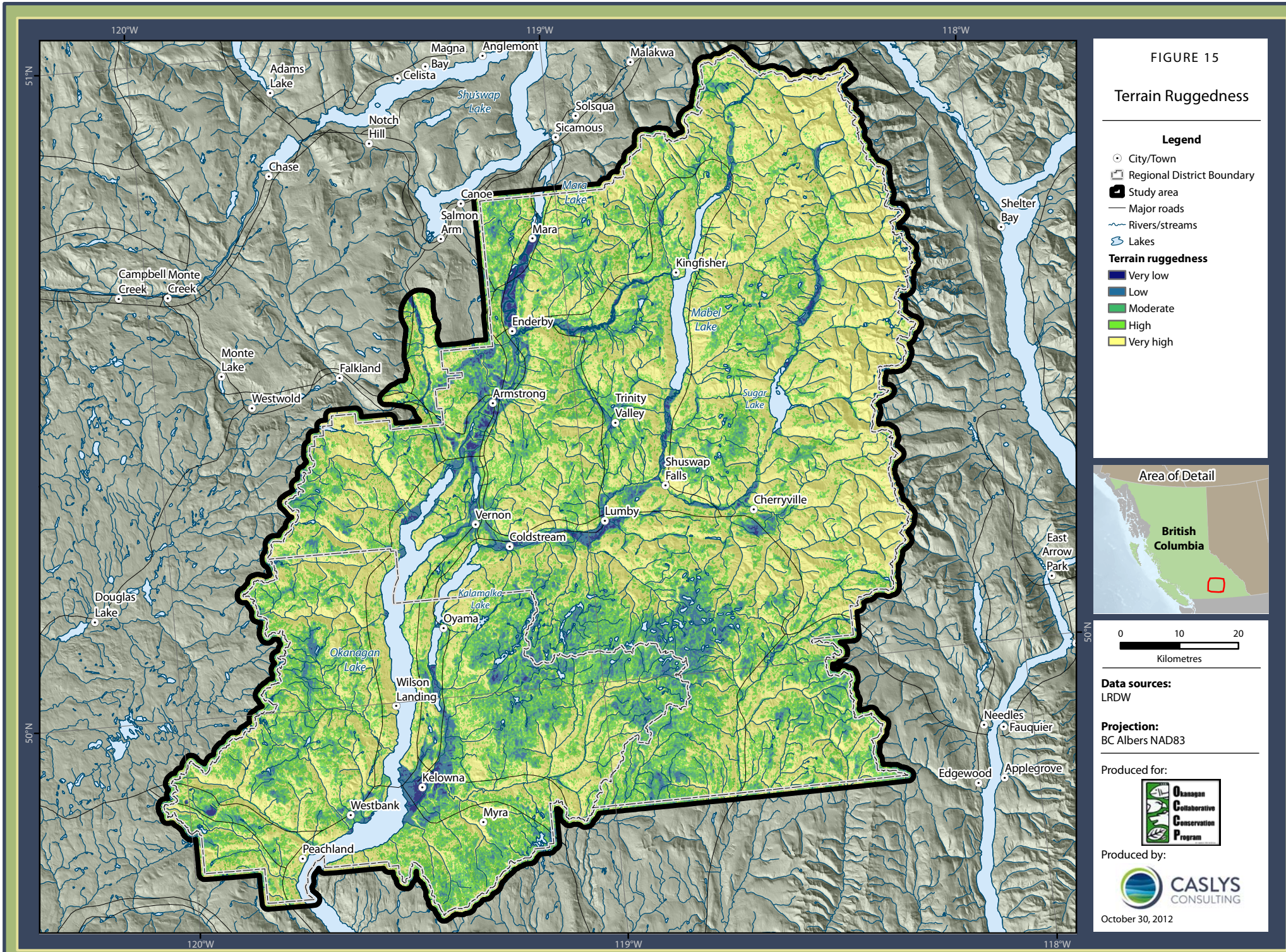

120°W
119°W
118°W
51°N
50°N
Magna Bay
Anglemont
Malakwa
Adams Lake
Celista
Shuswap Lake
Solsqua
Notch Hill
Sicamous
Chase
Canoe
Mara Lake
Salmon Arm
Mara
Shelter Bay
Kingfisher
Campbell Creek
Monte Creek
Mabel Lake
Enderby
Monte Lake
Falkland
Westwold
Armstrong
Trinity Valley
Sugar Lake
Shuswap Falls
Cherryville
Vernon
Lumby
Coldstream
East Arrow Park
Douglas Lake
Kalamalka Lake
Oyama
Okanagan Lake
Wilson Landing
Needles
Fauquier
Edgewood
Applegrove
Kelowna
Westbank
Myra
Peachland
FIGURE 15
Terrain Ruggedness
Legend
City/Town
Regional District Boundary
Study area
Major roads
Rivers/streams
Lakes
Terrain ruggedness
Very low
Low
Moderate
High
Very high
Area of Detail
British Columbia
0
10
20
Kilometres
Data sources:
LRDW
Projection:
BC Albers NAD83
Produced for:
Okanagan Collaborative Conservation Program
Produced by:
CASLYS CONSULTING
October 30, 2012

FIGURE 16

Example of the Riparian Habitat Model Results

Legend

- City/Town
- Stream
- Intermittent stream
- Lakes/Major rivers
- Regional District Boundary
- Potential riparian habitat
- Study area

Transportation

- Gravel road
- Paved road
- Arterial road
- Railroad
- Highway

0 0.25 0.5
Kilometres

Data sources:
LRDW

Projection:
BC Albers NAD83

Produced for:
Okanagan Collaborative Conservation Program

Produced by:
CASLYS CONSULTING

October 30, 2012

2.2.8 Habitat Reservoirs and Refuges

Human settlement in the region, particularly in the valley area, has led to the creation of more isolated fragments of wildlife habitat. In the Okanagan it is increasingly difficult to attain larger patch sizes in bunchgrass habitats (e.g., BGxh1), urban areas, or in heavily fragmented landscapes. The size of habitat patches throughout the region was determined by conducting a patch size analysis to identify areas of contiguous habitat (i.e., habitat not fragmented by features such as roads and urban development). Potential habitat was defined as anything having a conservation ranking of three or less. The analysis was not differentiated by habitat type and therefore, all polygons meeting the conservation ranking criteria were treated equally in the analysis.

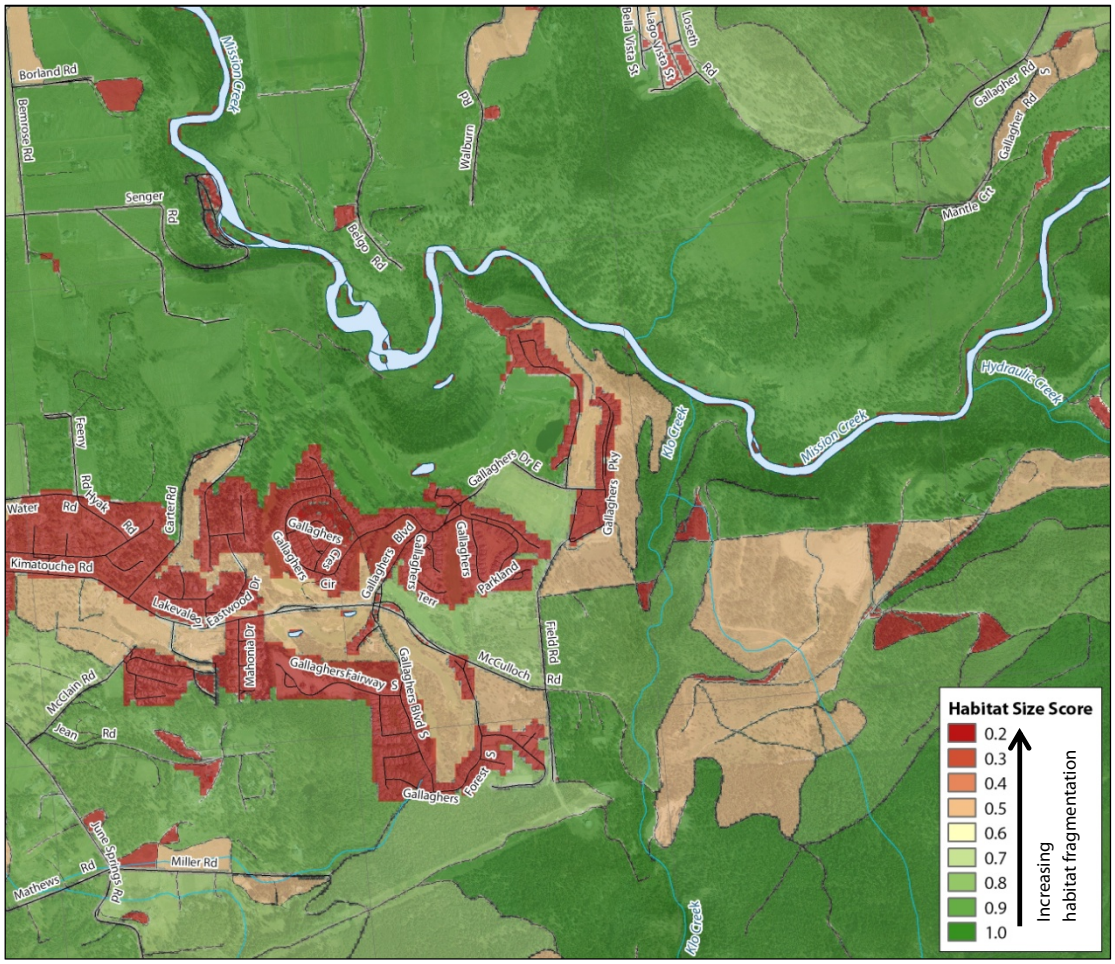
Larger patches of unfragmented habitat are referred to as 'habitat reservoirs' or 'habitat refuges'. A habitat reservoir is a large area of relatively natural habitat that has sufficient size and ecological integrity to support a range of native species, including species that need interior habitats. The size of habitat reservoir depends on the species being managed (WLAP 2004). A habitat refuge is defined as a small patch of habitat that provides food, shelter and/or other needs for wildlife. It may include human-modified ecosystems. They are not generally large enough to maintain the genetic diversity of a population but may act as important 'stepping stones' to habitat reservoirs for species and for maintaining ecological functions in the regional biodiversity system (GVRD, 2006). This is not to say that smaller patches of habitat do not contribute to biodiversity, however, these smaller patches receive slightly lower scores in the model than unfragmented habitats.

The biodiversity model applied the same habitat patch sizes as those used in the Greater Vancouver study (GVRD, 2006) to define the sizes for both habitat reservoirs and refuges:

- major habitat reservoir - patch size >200 ha
- habitat reservoir - patch size = 30-200 ha
- major habitat refuge - patch size = 20-30 ha
- habitat refuge - patch size = 2-20 ha

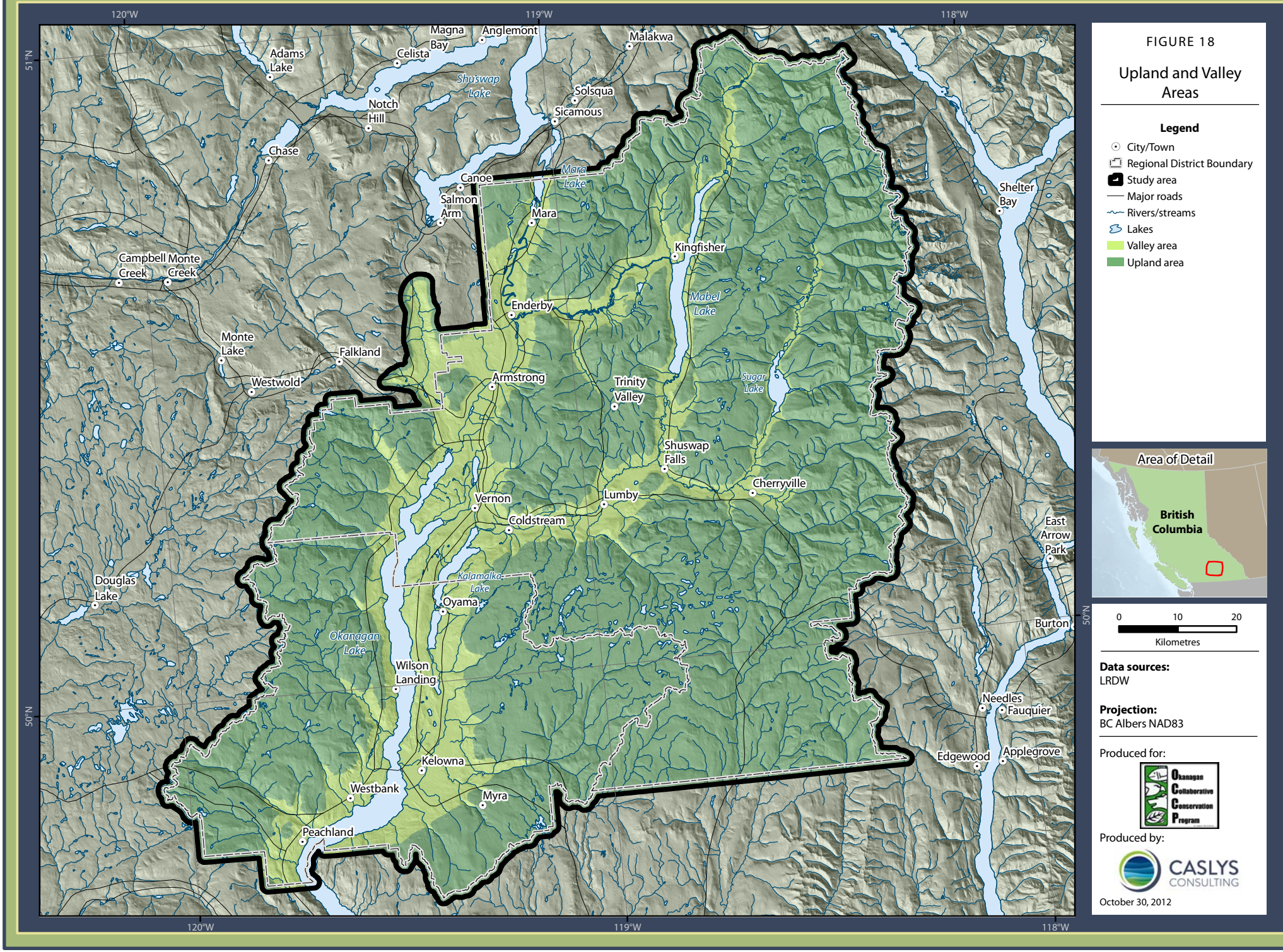
An example of the results of the analysis is displayed in Figure 17.

Figure 17. Habitat Reservoirs and Refuges Example



2.2.9 Valley and Upland Areas

The study area's lake and river valleys are subject to significant pressure from human settlement and agricultural activities. The biogeoclimatic ecosystem subzones and variants were used to distinguish between valley and upland areas: the Valley Area was based on a selection of BEC classes that represented xeric valley bottom habitat in the study area. The zones selected were: BGxh1; IDFxh1; IDFxh1a; PPxh1; and PPxh1a. The Okanagan Shuswap Land and Resource Management Plan recognized the relative biodiversity importance of these lower elevation grasslands and open forests in terms of past land use practices and provides management direction for the future (see OSLRMP: NDT4 and Crown lands). To capture valley areas in the moister northern part of the study area, the 700 metre elevation contour was used as an upper limit – elevations less than 700m were included in the Valley Area. The Upland Area consists of the remainder of the study area. Figure 18 illustrates the extent of each of the two areas.


120°W
119°W
118°W
51°N
50°N
Magna Bay
Anglemont
Malakwa
Adams Lake
Celista
Shuswap Lake
Solsqua
Notch Hill
Sicamous
Chase
Canoe
Mara Lake
Salmon Arm
Mara
Shelter Bay
Kingfisher
Campbell Creek
Monte Creek
Mabel Lake
Enderby
Monte Lake
Falkland
Westwold
Armstrong
Trinity Valley
Sugar Lake
Shuswap Falls
Cherryville
Vernon
Lumby
Coldstream
East Arrow Park
Douglas Lake
Kalamalka Lake
Oyama
Burton
Okanagan Lake
Wilson Landing
Needles
Fauquier
Edgewood
Applegrove
Kelowna
Westbank
Myra
Peachland
FIGURE 18
Upland and Valley Areas
Legend
City/Town
Regional District Boundary
Study area
Major roads
Rivers/streams
Lakes
Valley area
Upland area
Area of Detail
British Columbia
0
10
20
Kilometres
Data sources:
LRDW
Projection:
BC Albers NAD83
Produced for:
Okanagan Collaborative Conservation Program
Produced by:
CASLYS CONSULTING
October 30, 2012

2.3 Decision Support Tools

The various source layers and derivative analyses were combined to generate four different decision support tools:

- Wildlife habitat connectivity
- Relative biodiversity
- Land management classes
- Conservation opportunity maps

The following sections detail how the decision support datasets were developed. It should be noted that these products were based on the best data available at the time of this study. As with any data, there are associated inaccuracies and temporal issues that should always be considered when using the resultant maps. In addition, the habitat connectivity and relative biodiversity maps are the results of models designed as decision support tools. The results offer a regional scale perspective and should be interpreted as probability maps rather than taken literally. When developing biodiversity management strategies, these products should be used in conjunction with other data, for example, field studies, community consultation or local scale datasets.

2.3.1 Wildlife Habitat Connectivity

Habitat connectivity describes the degree to which different habitats (or ecosystem types) are linked to one another to form an interconnected network. This network provides opportunities for wildlife movement through habitat corridors. The degree of interconnectedness and the characteristics of the linkages vary in natural landscapes based on topography and natural disturbance regime. Breaking of these linkages results in ecosystem fragmentation and thus potentially reduces the biodiversity of a region, as ecosystem functions may be impaired and species unable to fulfill their needs for food, shelter and reproduction in their habitats (WLAP, 2004).

A GIS-based analysis was used to model habitat connectivity in the study area (Figure 19). This model integrated a series of parameters to identify connected and potentially fragmented habitats. The model was not specific to a particular species. The goal was to identify portions of the landscape offering a higher opportunity for wildlife movement at a regional scale. The following parameters were used to model connectivity corridors:

- Elevation – Lower elevations (i.e., the valley) receive higher scores.
- Slope – Steep slopes receive lower scores.
- Terrain Ruggedness – Terrain with less variability receive higher scores.
- Accessibility to water – Areas that are more readily accessible to water receive higher scores.
- Urban areas – Urban areas and roads (areas with a maximum conservation ranking of 4) were not considered to provide connectivity. Agricultural areas have been included but receive lower scores.

The specific scores assigned to each of the parameters and their associated classes are documented in Table 8. The total score for each cell was summed and the assigned numeric values indicate relative connectivity – the higher the numeric value the higher the connectivity.

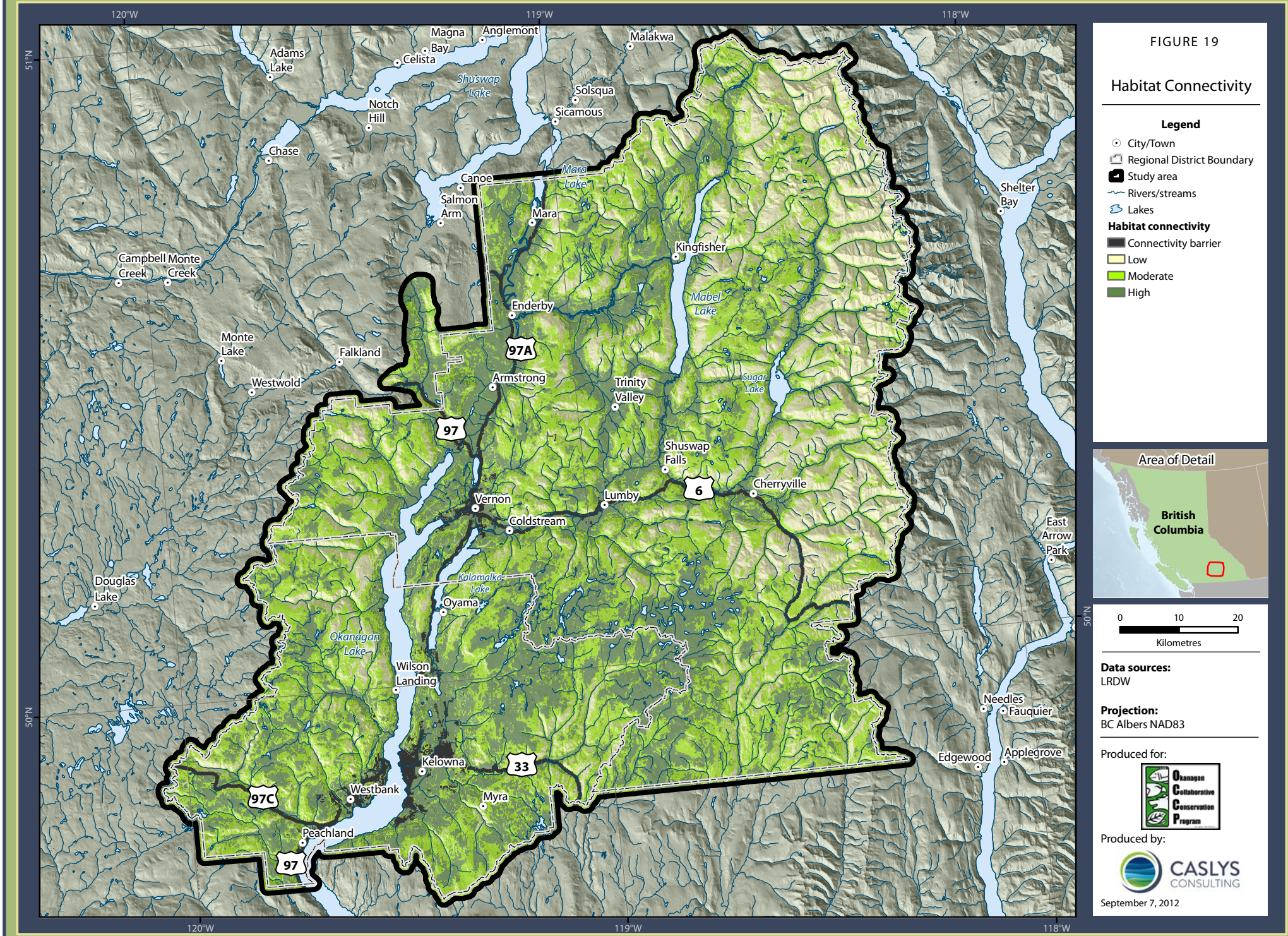


FIGURE 19

Habitat Connectivity

Legend

- City/Town
- Regional District Boundary
- Study area
- Rivers/streams
- Lakes

Habitat connectivity

- Connectivity barrier
- Low
- Moderate
- High

Data sources:
LRDW

Projection:
BC Albers NAD83

Produced for:

Okanagan Collaborative Conservation Program

Produced by:

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September 7, 2012

Table 8 – Habitat Connectivity Model Parameters, Classes and Scores

Parameters	Data Source	Classes	Score
Elevation (m)	TRIM 1:20,000 scale DEM	270-500	1
		501-750	0.8
		751-1000	0.6
		1001-1500	0.2
		>1501	0.1
Slope (%)	TRIM 1:20,000 scale DEM	0-30	1
		30-60	0.5
		>60	0.1
Terrain ruggedness	TRIM 1:20,000 scale DEM	Very low	1
		Low	0.8
		Moderate	0.6
		High	0.4
		Very High	0.1
Accessibility to water	Freshwater Atlas streams, polygonal rivers and lakes	Very high	1
		High	0.8
		Moderate	0.6
		Low	0.2
		Very Low	0.1
Topography (Valley – elevation <500 m)	TRIM 1:20,000 scale DEM	Yes	1
		No	0.8
Conservation Ranking	TEM/SEI/VRI	non sensitive - Conservation rank 4	removed
Agriculture	TEM (SITEMC_S1 = Cultivated field (CF), Orchard/Vineyard (CO) or CV) or Rural Area (RW)	Y	0.1
		N	1
Hydrology	Freshwater Atlas	polygonal lakes and rivers	removed

2.3.2 Relative Biodiversity

The relative biodiversity map is based on a model designed to identify the areas of greatest ecological and biodiversity significance. The result is a decision support tool that identifies biodiversity 'hotspots' at a regional scale in the study area. The relative biodiversity model considers the following parameters:

- Conservation ranking – Polygons with higher conservation rankings receive higher scores. The majority of the score came from the conservation ranking.
- Wetlands – Due to the importance of wetland habitats in this region, wetlands receive a higher score.
- Antelope brush – antelope brush habitat receives a higher score
- Potential riparian habitat – Potential riparian habitat areas receive a higher score
- Habitat patch size (i.e., whether the area falls within a habitat reservoir or refuge) – Larger habitat patches receive higher scores.
- Distance to roads – Habitat areas in close proximity to roads receive slightly lower scores.

The specific scores assigned to each of the parameters and their associated classes are documented in Table 9. The total score for each cell was summed and the assigned numeric values indicate relative biodiversity values – the higher the numeric value the higher the relative biodiversity.

Table 9 – Biodiversity Model Parameters, Classes and Scores

Parameters	Data Source	Classes	Buffer width (m)	Score
Wetlands	SEI (WN) and Freshwater Atlas (wetlands) datasets	Yes		1
Potential Riparian	Freshwater Atlas streams and water features - excludes intermittent streams	Yes		1
Antelope brush	TEM data	AS or SA dominant		1
		AS or SA secondary		0.8
		AS or SA tertiary		0.5
Linear disturbance features	TRIM data and resource roads	Outside road buffers		1
		Pipeline/Power line RoW	25	0.9
		Railroad	25	0.7
		Gravel - 1 lane	0-25, 25-50	0.7, 0.8
		Gravel - 2 lanes	0-25, 25-50, 50-75	0.5, 0.6, 0.7
		Paved road	0-50, 50-100	0.3, 0.4
		Major arterial	0-100, 100-200, 200-300	0.2, 0.3, 0.4
		Highway	0-100, 100-200, 200-300	0.2, 0.3, 0.4
Conservation rankings	SEI/TEM/VRI data	Very high - 4		4
		High - 3		3
		Moderate – 2		2
		Low - 1		1
Patch size	Roads and urban features. Classes and ratings based on the Metro Vancouver standards.	Urban (not habitat)		0
		< 2 ha		0.2
		Habitat refuge (2-20 ha)		0.5
		Major habitat refuge (20-30 ha)		0.8
		Habitat reservoir (30-200 ha)		0.9
		Major habitat reservoir (>200 ha)		1

To generate the cartographic map product (Figure 20) the dataset was themed (based on the Value field) into five classes based on a Natural Breaks classification. Table 10 details the classes used to generate the relative biodiversity thematic map.

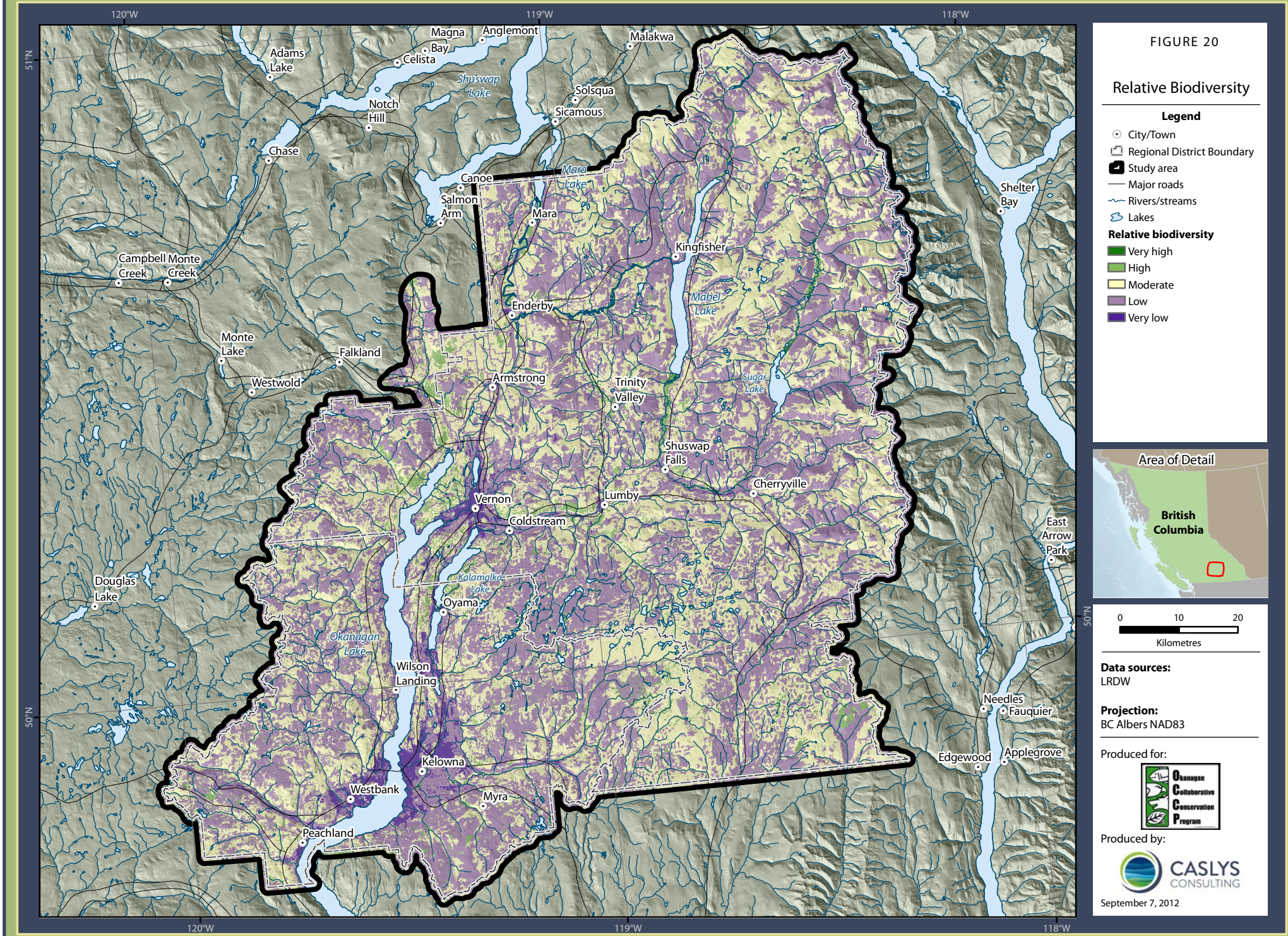


FIGURE 20

Relative Biodiversity

Legend

- City/Town
- Regional District Boundary
- Study area
- Major roads
- Rivers/streams
- Lakes

Relative biodiversity

- Very high
- High
- Moderate
- Low
- Very low

0 10 20
Kilometres

Data sources:
LRDW

Projection:
BC Albers NAD83

Produced for:
Okanagan Collaborative Conservation Program

Produced by:
CASLYS CONSULTING

September 7, 2012

Table 10 – Relative Biodiversity Map Classes

Class	Class range	Description
1	12 - 29	Very low
2	29 - 44	Low
3	44 - 56	Moderate
4	56 - 71	High
5	71 - 90	Very high

The analysis has been conducted in a raster format with a cell size of 10 metres. As a result, as with any raster dataset, 'steps' are apparent when you zoom in.

2.3.3 Land Management Classes

The land management classes vary in the degree of protection of lands from potential urban or more intensive uses (based on the variety of potential land uses allowed within each class). Conservation Lands (Class 1) represent the most protected land management class, whereas Class 4 (Agriculture and Crown Leases) offer the least opportunity for protection of the four classes.

Class 1 – Conservation Lands

Conservation Lands have the highest degree of protection for biodiversity conservation. This management class consists predominantly of publicly-owned conservation lands and may include:

- Migratory bird sanctuaries
- Wildlife management areas
- Provincial parks and protected areas
- Regional parks (special preservation or natural environment)
- Ecological reserves
- Federal Crown conservation lands
- Crown lands designated for environmental protection/conservation (Section 16)
- Private conservation lands
- Canadian Wildlife Service (CWS) National Wildlife Areas

Class 2 – Dedicated Open Space

These are lands that are currently protected as green space due to their land use designation. They are more heavily impacted by human disturbance than Conservation Lands (Class 1) areas and may not have long-term protection. Dedicated Open Space may include:

- Regional parks (outdoor recreation or park services)
- Municipal parks
- Crown recreation and research lands
- Forest tenure recreation areas
- Provincial recreation areas
- Lands surrounding reservoirs zoned for conservation purposes (e.g., RDCO CL8 zoning)

Class 3 – Resource Lands

Resource Lands (Class 3) are predominantly forested crown lands. These are areas where urban expansion will be unlikely to occur, however, these lands are not protected to the same degrees as classes 1 and 2. For example, they may be designated for potential timber harvest. Class 3 land use designations include:

- Crown land
- Community watersheds
- Municipal lands zoned for forestry or grazing

Class 4 – Agriculture and Crown Leases

Class 4 lands are agricultural lands and crown leases. The agricultural lands are predominantly privately owned, however, for this map's purpose, they are considered a management class.

- Agricultural Land Reserve (ALR)
- Crown leases

It should be noted that a given parcel may fall into more than one land management class. In most cases, the parcel is assigned to the most protected class (e.g., a Regional Park on agricultural land would be in both classes 2 and 4, but would be assigned to Class 2). The only exception is with crown leases; even though they are crown land (and would normally belong to Class 3) these surveyed lands are given the lower Class 4 designation due to their exclusive and long term land use.

The Land Management Class map identifies private lands and Indian Reserves, however, apart from where these lands fall within the ALR, they are not considered within the land management classes.

It should be noted that private ALR properties are allowed to develop subject to the Agricultural Land Commission and local government bylaws. This map does not imply that there is any level of conservation commitments attached to the Class 4 designation of private lands.

It may be that private or reserve lands do offer protection through, for example, covenants, development permit areas, or zoning; however as each government would have different bylaws or regulations, private or reserve land protection mechanisms have not been taken into account at this scale of mapping.

Figure 21 illustrates the results of the land management classification.

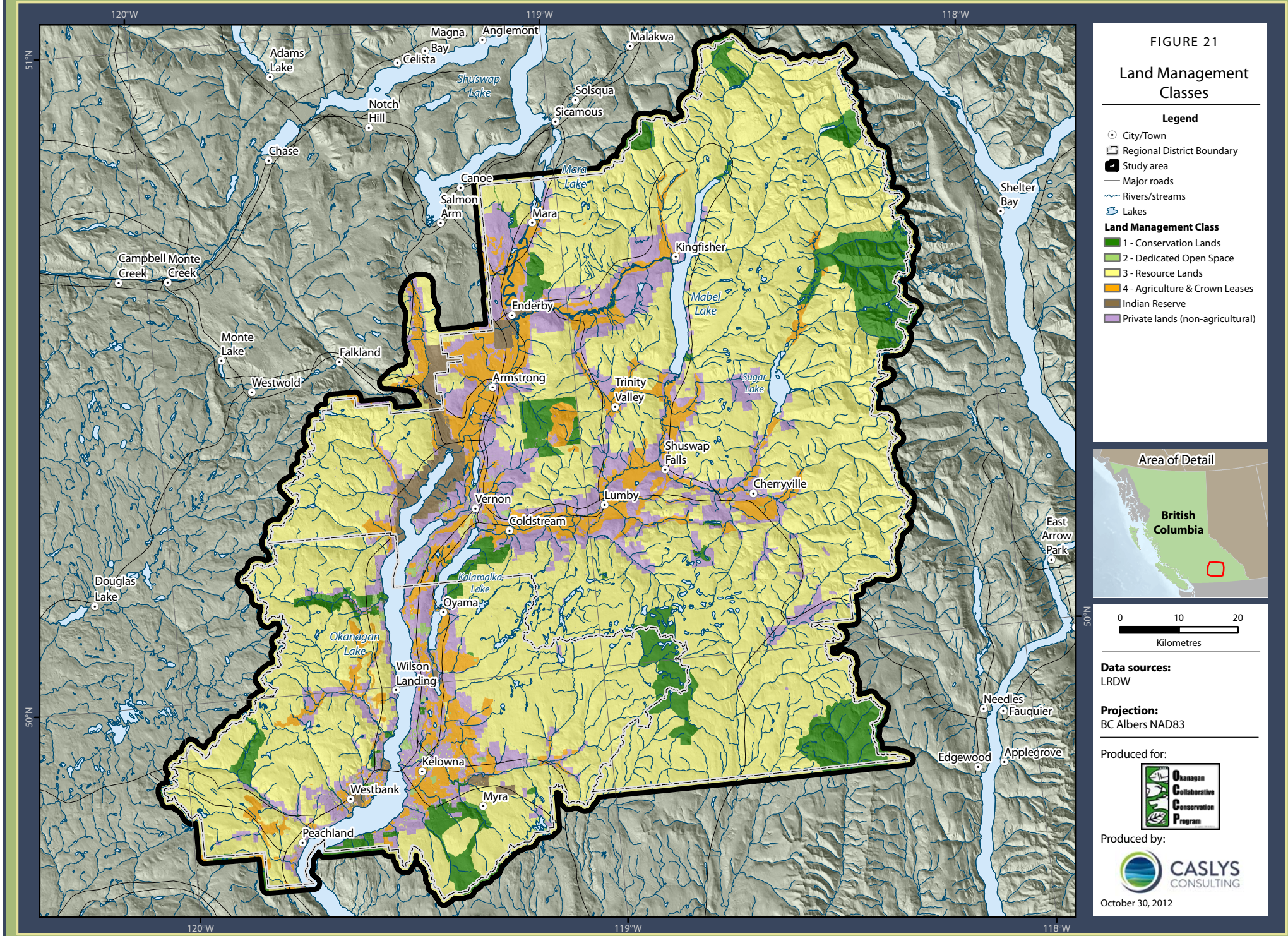


FIGURE 21

Land Management Classes

Legend

- City/Town
- Regional District Boundary
- Study area
- Major roads
- Rivers/streams
- Lakes

Land Management Class

- 1 - Conservation Lands
- 2 - Dedicated Open Space
- 3 - Resource Lands
- 4 - Agriculture & Crown Leases
- Indian Reserve
- Private lands (non-agricultural)

0 10 20
Kilometres

Data sources:
LRDW

Projection:
BC Albers NAD83

Produced for:
Okanagan Collaborative Conservation Program

Produced by:
CASLYS CONSULTING

October 30, 2012

3.0 SUMMARY STATISTICS

The following sections present an overview of the results summarized for the entire study area. Appendix A provides a detailed breakdown of the results for each electoral area and municipality in the study area.

3.1 Relative Biodiversity in the Study Area

To fully understand the results of the relative biodiversity analysis it is not only important to consider the proportion of the study area falling within each class but also where in the study area both high and low relative biodiversity habitats are located. Because of the intense urban and agricultural pressures in the Valley Area, the data have been summarized to differentiate between valley and upland areas (Table 11).

Table 11 – Relative Biodiversity in Valley and Upland Areas (Study Area)

Relative Biodiversity Class	Area (ha)	% of Study Area	Valley Area (ha)	% of Valley Area	% of Biodiversity Class in the Valley Area	Upland Area (ha)	% of Upland Area	% of Biodiversity Class in the Upland Area
Very high	3,267	0.3%	1,175	0.5%	36.0%	2,092	0.2%	64.0%
High	67,230	6.0%	29,184	12.7%	43.4%	38,047	4.3%	56.6%
Moderate	494,937	44.2%	86,250	37.7%	17.4%	408,687	45.9%	82.6%
Low	523,665	46.8%	90,841	39.7%	17.3%	432,824	48.6%	82.7%
Very low	30,910	2.8%	21,454	9.4%	69.4%	9,456	1.1%	30.6%
Total	**1,120,009**		**228,904**	**20.4%**		**891,106**	**79.6%**	

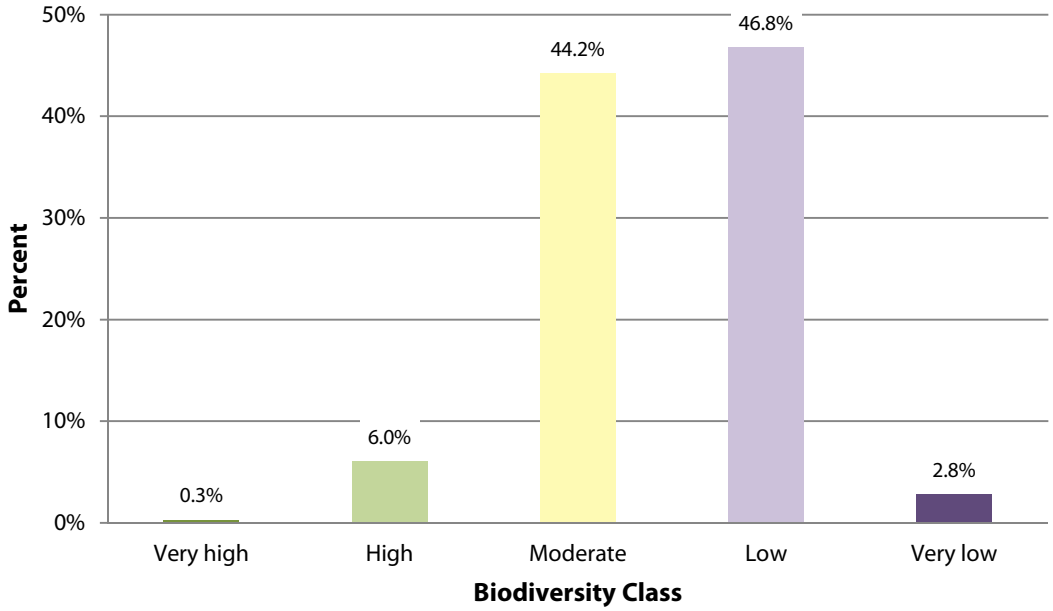
*Areas and percentages exclude large lakes (>50 ha).

When we examine the entire study area, the results in Table 11 identify the following:

- The Valley Area represents approximately one fifth of the study area (20.4%) with the remainder of the study area (79.6%) consisting of the Upland Area (see Section 2.2.9).
- 0.3% (3,267 ha) of the study area falls into the very high relative biodiversity class and 6.0% (67,230 ha) into the high class.
- The very low class represents 2.8% (30,910 ha) of the study area.
- The majority (91.0%) of the study area consists of the moderate (494,937 ha or 44.2%) and low (523,665 ha or 46.8%) relative biodiversity classes.

Figure 20 depicts the results of the relative biodiversity analysis and Figure 22 illustrates the distribution of the classes throughout the study area.

Figure 22. Percentage of Biodiversity Classes in the Study Area



An examination of how the classes are distributed between the Valley versus Upland areas indicates that the very high, high and very low classes are over-represented in the Valley Area and under-represented in the Upland Area:

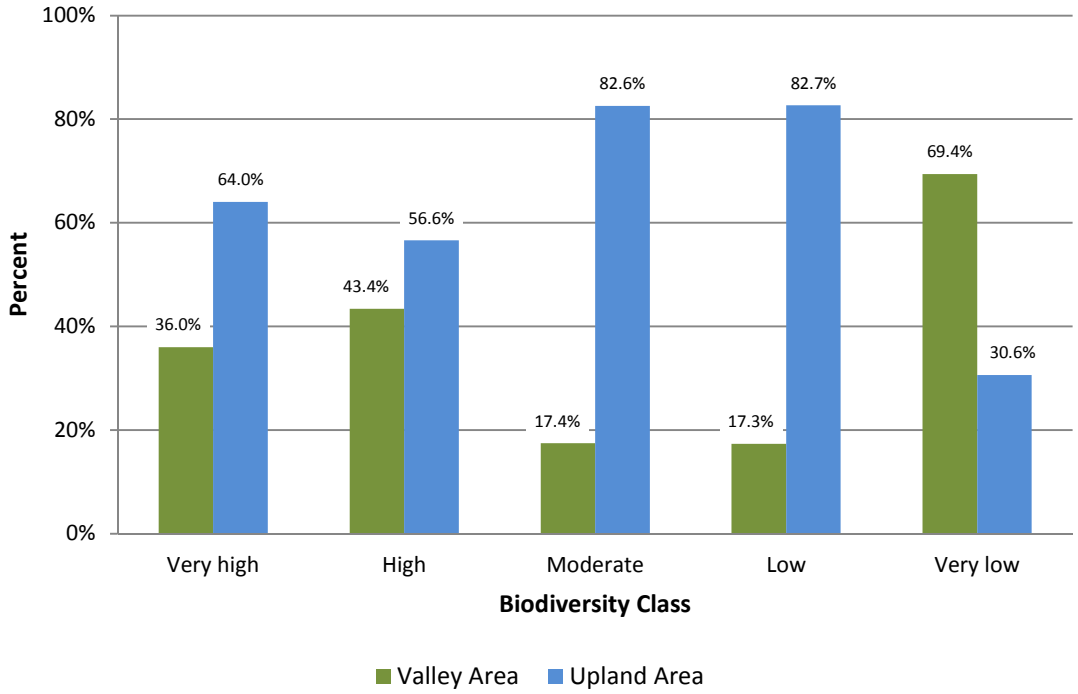
- As mentioned above, the Valley represents approximately one fifth (20.4%) of the study area, however, over a third of the very high (36.0%) and close to half of high (43.4%) value habitats are found in the Valley.
- The Valley contains 69.4% of the very low class. This is because most of the human settlement occurs within the Valley Area and urban areas and roads are a significant component of the very low class.

The moderate and low relative biodiversity class is distributed relatively evenly between the Valley and Upland areas:

- The majority of the moderate class (82.6%) falls within the Upland Area, however, as this area represents 79.6% of the study area, the distribution is proportionate.
- The majority of the low class (82.7%) falls within the Upland Area, however as this area again represents 79.6% of the study area, the distribution is proportionate.

Figure 23 illustrates how each class is distributed between in the Valley and Upland areas. If the relative biodiversity classes were evenly distributed between the two areas we would expect the proportion of each class to be roughly 20% in the Valley and 80% in the Upland, however, the figure clearly shows this is not the case for the other four classes.

Figure 23. Comparison of Relative Biodiversity in the Upland and Valley Areas



From these results, we can conclude that while both the Valley and Upland areas contain important habitats, management of the Valley Area is critical to maintaining biodiversity in the region because a greater proportion of the higher biodiversity habitats are located in the Valley along with a greater proportion of the human settlement and activity (typically habitats falling into the very low class).

The data were also summarized for each of the regional districts. In the RDCO the results (present in Table 12 and figures 24 and 25) indicate the following:

- The RDCO has 17,732 ha of the very low relative biodiversity habitats, 14,385 ha (81.1%) of which is located in the Valley Area.
- The high, moderate and low classes are distributed proportionately between the Valley and Upland areas (i.e., the Valley Area represents approximately one quarter of the regional district and approximately a quarter of each class falls in the Valley with the other three quarters in the Upland Area).
- A slightly lower proportion of the very high class (16.3%) is found in the Valley Area.

Table 12 – Relative Biodiversity in Valley and Upland Areas (Regional District of Central Okanagan)

Relative Biodiversity Class	Area (ha)	% of Regional District	Valley Area (ha)	% of Valley Area	% of Biodiversity Class in the Valley Area	Upland Area (ha)	% of Upland Area	% of Biodiversity Class in the Upland Area
Very high	919	0.3%	150	0.2%	16.3%	769	0.4%	83.7%
High	17,498	6.0%	5,223	6.8%	29.8%	12,275	5.7%	70.2%
Moderate	114,583	39.4%	23,239	30.4%	20.3%	91,344	42.6%	79.7%
Low	140,134	48.2%	33,393	43.7%	23.8%	106,741	49.8%	76.2%
Very low	17,732	6.1%	14,385	18.8%	81.1%	3,346	1.6%	18.9%
Total	**290,866**	**100.0%**	**76,390**	**26.3%**		**214,475**	**73.7%**	

*Areas and percentages exclude large lakes (>50 ha).

Figure 24. Percentage of Biodiversity Classes in the Regional District of Central Okanagan

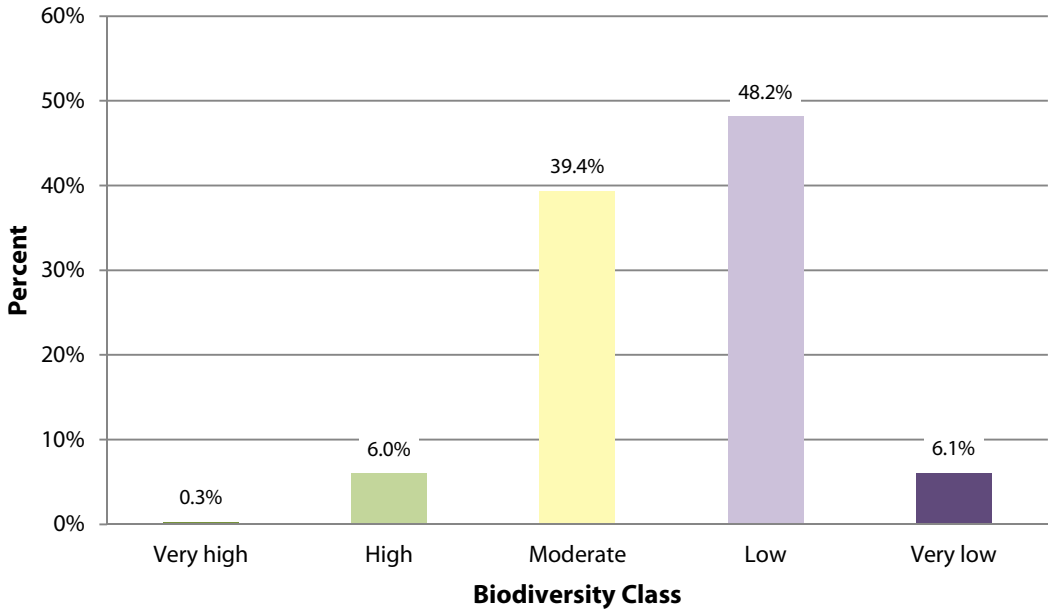


Figure 25. Comparison of Relative Biodiversity in the Upland and Valley Areas in the Regional District of Central Okanagan

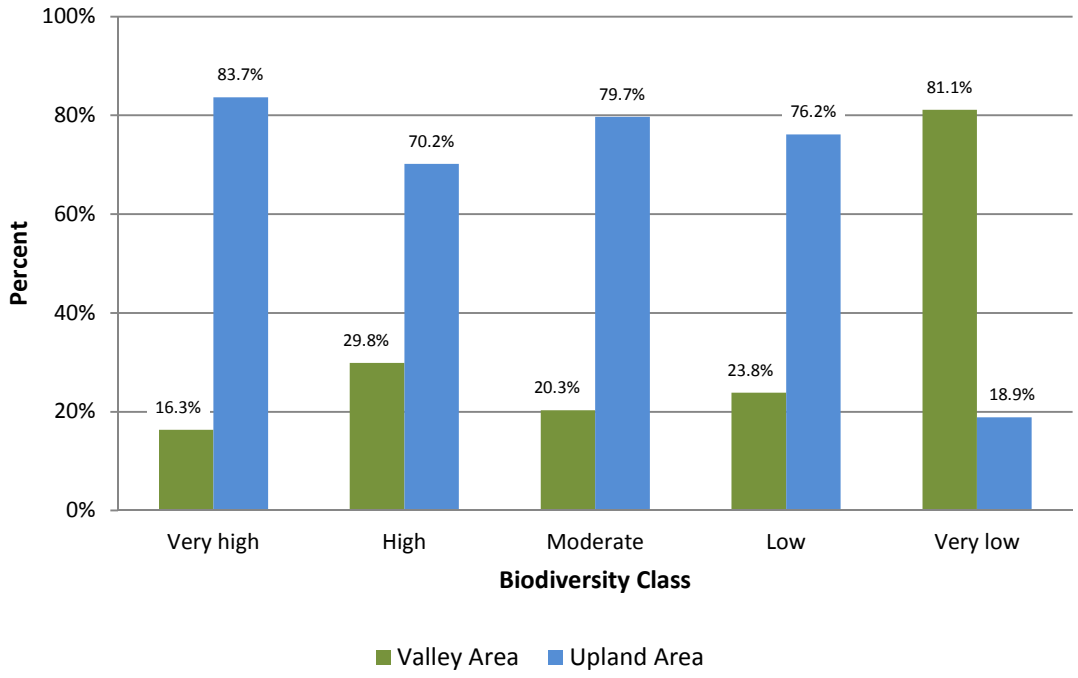


Table 13 and figures 26 and 27 summarize with Valley and Upland areas for the RDNO. An examination of the results indicates:

- The RDNO has 12,385 ha of the very low relative biodiversity habitats splits across the Valley and Upland areas – 55.4% and 446% respectively. However, because the Valley Area represents only 18.5% of the regional district this class is over-represented in the Valley Area.
- The low and moderate classes are proportionately distributed across the Valley and Upland areas.
- Higher proportions of the very high and high classes are found in the Valley Area – 47.0% and 48.2% respectively while the Valley Area represents only 18.5% of the regional district.

Table 13 – Relative Biodiversity in Valley and Upland Areas (Regional District of North Okanagan)

Relative Biodiversity Class	Area (ha)	% of Regional District	Valley Area (ha)	% of Valley Area	% of Biodiversity Class in the Valley Area	Upland Area (ha)	% of Upland Area	% of Biodiversity Class in the Upland Area
Very high	2,114	0.3%	994	0.7%	47.0%	1,119	0.2%	52.9%
High	44,462	5.9%	21,416	15.4%	48.2%	23,047	3.8%	51.8%
Moderate	351,321	46.6%	57,017	41.0%	16.2%	294,304	47.9%	83.8%
Low	343,163	45.5%	52,906	38.0%	15.4%	290,257	47.3%	84.6%
Very low	12,385	1.6%	6,866	4.9%	55.4%	5,520	0.9%	44.6%
Total	**753,445**	**100.0%**	**139,199**	**18.5%**		**614,247**	**81.5%**	

*Areas and percentages exclude large lakes (>50 ha).

Figure 26. Percentage of Biodiversity Classes in the Regional District of North Okanagan

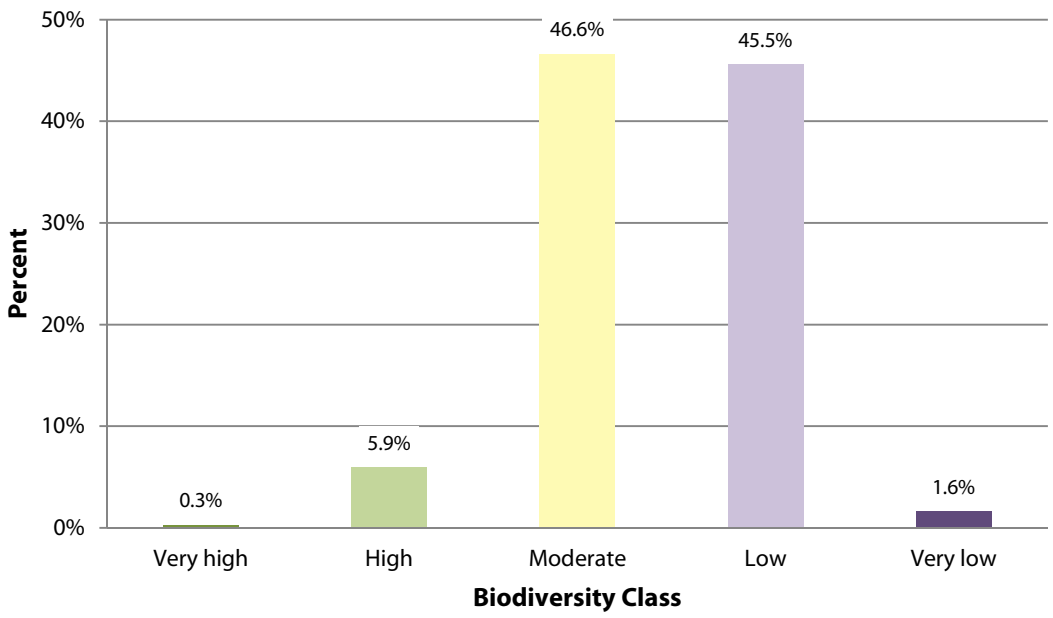


Figure 27. Comparison of Relative Biodiversity in the Upland and Valley Areas in the Regional District of North Okanagan

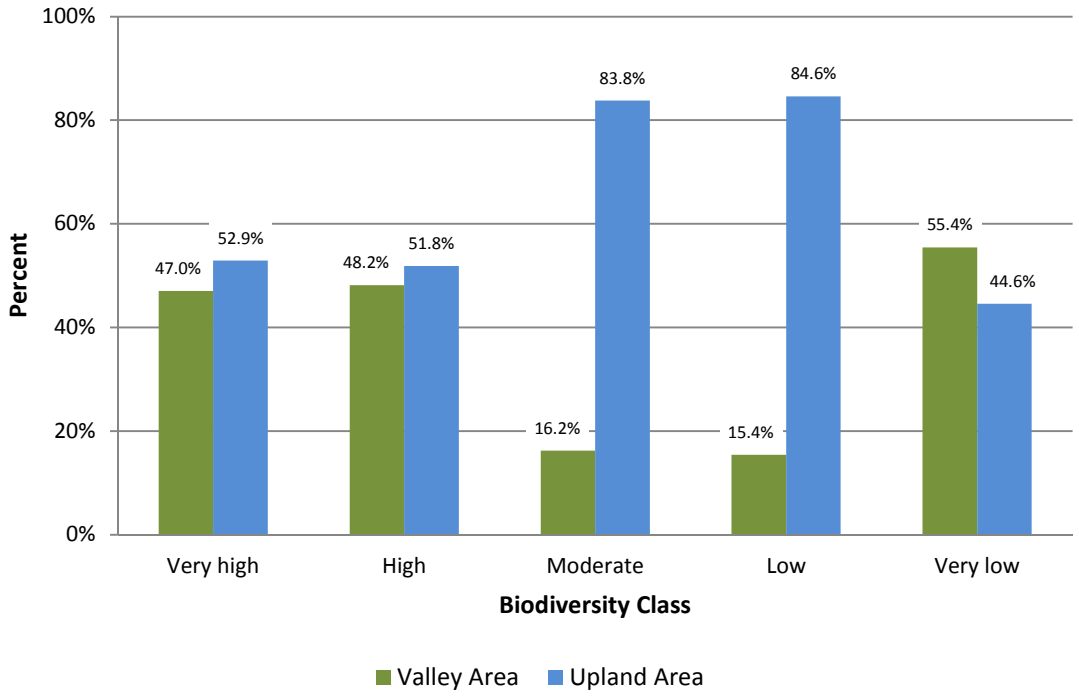


Figure 28 maps the results of the biodiversity analysis for the Valley Area.

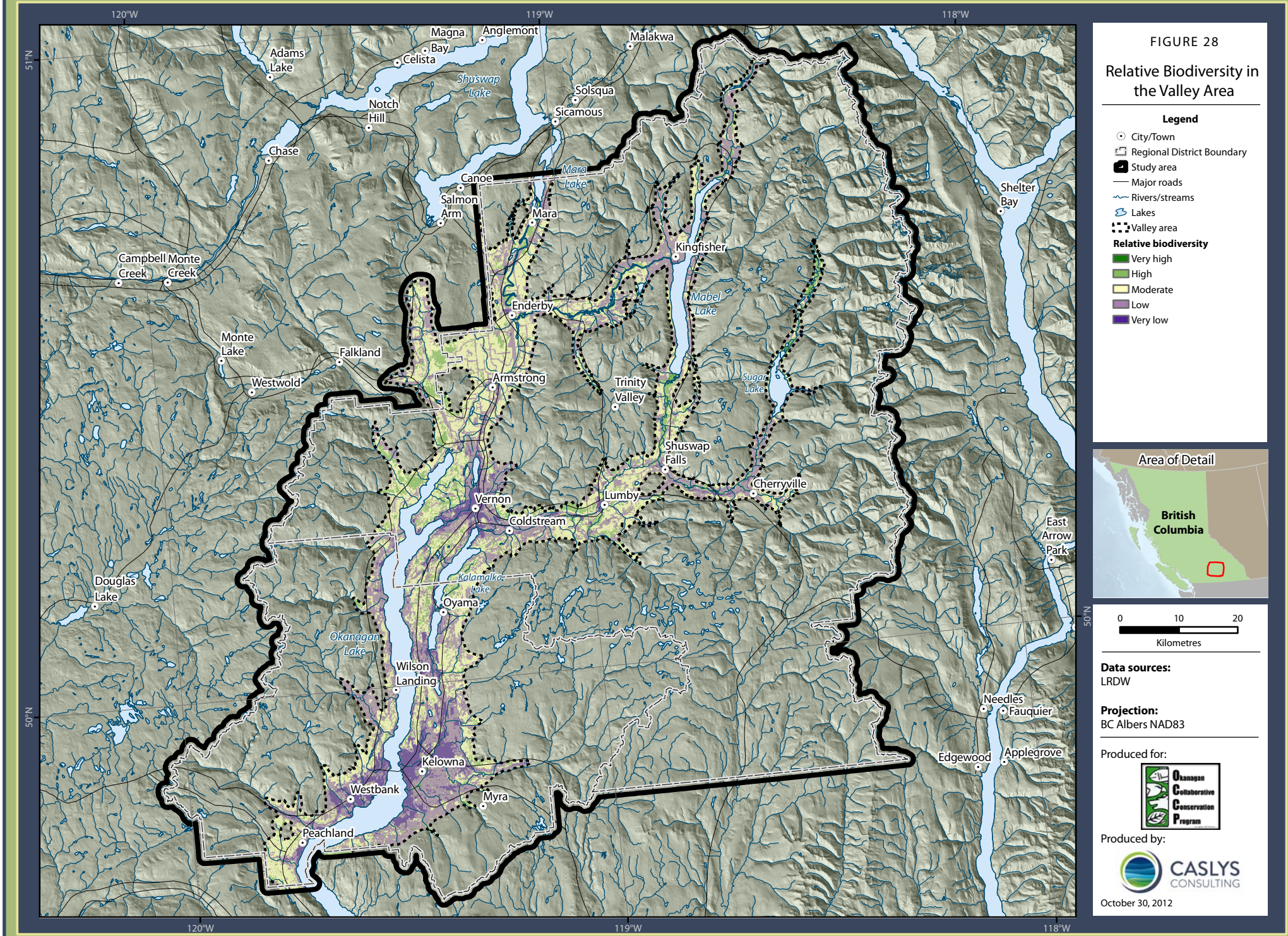


FIGURE 28

Relative Biodiversity in the Valley Area

Legend

- City/Town
- Regional District Boundary
- Study area
- Major roads
- Rivers/streams
- Lakes
- Valley area

Relative biodiversity

- Very high
- High
- Moderate
- Low
- Very low

0 10 20
Kilometres

Data sources:
LRDW

Projection:
BC Albers NAD83

Produced for:
Okanagan Collaborative Conservation Program

Produced by:
CASLYS CONSULTING

October 30, 2012

3.2 Relative Biodiversity by Municipalities and Electoral Areas

Relative biodiversity was summarized for each municipality and electoral area in the region (Appendix A). To examine the data both in the context of the jurisdiction itself and in the context of the larger study area the data were summarized in two ways:

1. Table 14 summarizes the relative biodiversity classes by municipality and electoral area based on the area of the municipality or electoral area. The percentage values in this table provide a breakdown of the relative biodiversity values present within each jurisdiction. For example, 34.8% of Kelowna is habitat falling into the very low relative biodiversity class. These numbers allow us to compare a given jurisdiction to the study area as a whole. For example, Figure 29 indicates that Kelowna contains a much higher percentage of very low relative biodiversity habitat than that found in the study area as a whole. This is to be expected because this is an urban area. It also indicates that the city contains a lower proportion of habitat falling in the moderate class (15.7% versus 44.2% in the entire study area). Figures 24 and 25 illustrate the results presented in Table 14
2. Table 15 also summarizes the relative biodiversity data by municipality and electoral area but examines the classes in the context of the entire study area. This table identifies those municipalities or electoral areas containing the highest percentages of each class, relative to the entire study area. For example, the amount of habitat in the very high relative biodiversity class in Kelowna is 3.0% of the total of this biodiversity class for the entire study area. Figures 26 and 27 illustrate the results presented in Table 15.

Figure 29. Percentage of each Relative Biodiversity Class in Kelowna versus the Study Area

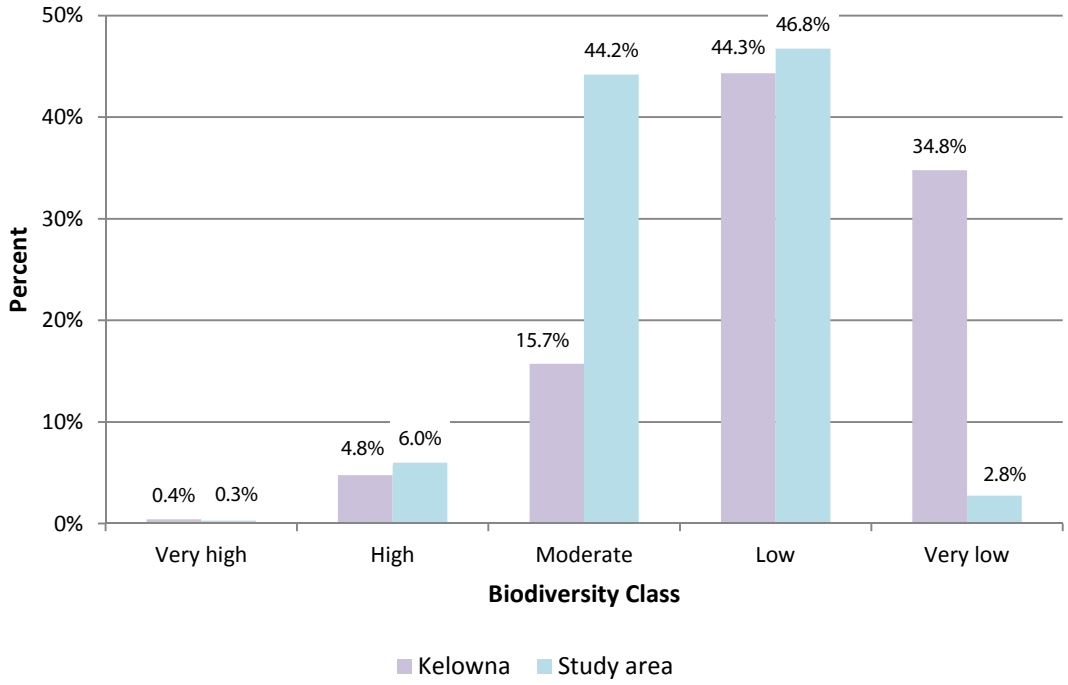


Table 14 – Relative Biodiversity Summarized by Municipality/Electoral Area (based on percent of municipal/electoral area land area)

	Biodiversity class									
	Very high		High		Moderate		Low		Very low	
Municipality/ Electoral Area	Area (ha)	% of Municipality/ Electoral Area	Area (ha)	% of Municipality/ Electoral Area	Area (ha)	% of Municipality/ Electoral Area	Area (ha)	% of Municipality/ Electoral Area	Area (ha)	% of Municipality/ Electoral Area
Armstrong	0	0.0%	77	14.7%	76	14.5%	186	35.6%	184	35.2%
Coldstream	13	0.2%	759	11.4%	1,394	20.9%	3,370	50.6%	1,129	16.9%
Enderby	0	0.0%	63	15.0%	130	31.2%	113	27.1%	111	26.6%
Kelowna	92	0.4%	1,010	4.8%	3,343	15.7%	9,420	44.3%	7,388	34.8%
Lake Country	26	0.2%	1,122	9.3%	4,401	36.4%	5,003	41.4%	1,534	12.7%
Lumby	0	0.0%	97	16.1%	202	33.5%	142	23.5%	162	26.9%
Peachland	0	0.0%	47	2.9%	317	19.9%	630	39.5%	602	37.7%
RDCO East	613	0.5%	8,322	6.7%	48,819	39.4%	63,871	51.6%	2,255	1.8%
RDCO West	182	0.2%	6,321	5.4%	52,320	44.6%	56,174	47.8%	2,426	2.1%
RDNO Area B	182	0.3%	4,962	8.6%	25,426	44.0%	26,020	45.0%	1,261	2.2%
RDNO Area C	29	0.1%	1,034	3.5%	13,800	46.2%	14,266	47.7%	761	2.5%
RDNO Area D	643	0.4%	13,457	7.4%	84,258	46.6%	80,316	44.4%	2,242	1.2%
RDNO Area E	627	0.2%	11,040	4.2%	123,111	47.1%	124,413	47.6%	2,312	0.9%
RDNO Area F	555	0.3%	9,388	5.2%	86,112	47.9%	82,247	45.8%	1,316	0.7%
Spallumcheen	9	0.0%	2,246	8.7%	13,980	54.2%	9,168	35.6%	372	1.4%
Vernon	57	0.6%	1,340	13.8%	2,832	29.2%	2,922	30.2%	2,535	26.2%
West Kelowna	4	0.0%	510	4.2%	4,874	39.9%	4,246	34.7%	2,588	21.2%
TOTAL	3,031		61,794		465,395		482,506		29,178	

*Area statistics exclude large lakes (>50ha) and areas of no data. Due to scale differences between the municipal, electoral area and regional district boundaries, and a 1km buffer of the RDCO/RDNO boundary, portions of the study area are not assigned to a municipality or electoral area. As a result, the total area values vary slightly between the tables.

Figure 30. Relative Biodiversity by Electoral Area (based on percent of electoral area land area)

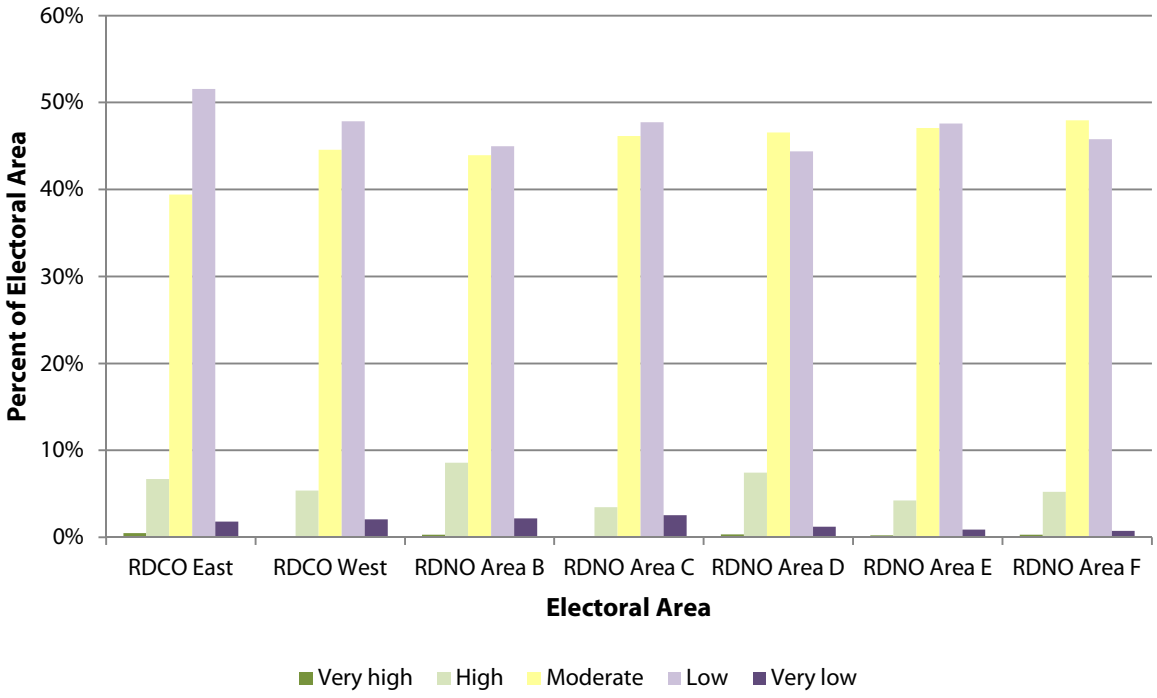


Figure 31. Relative Biodiversity by Municipality (based on percent of municipality land area)

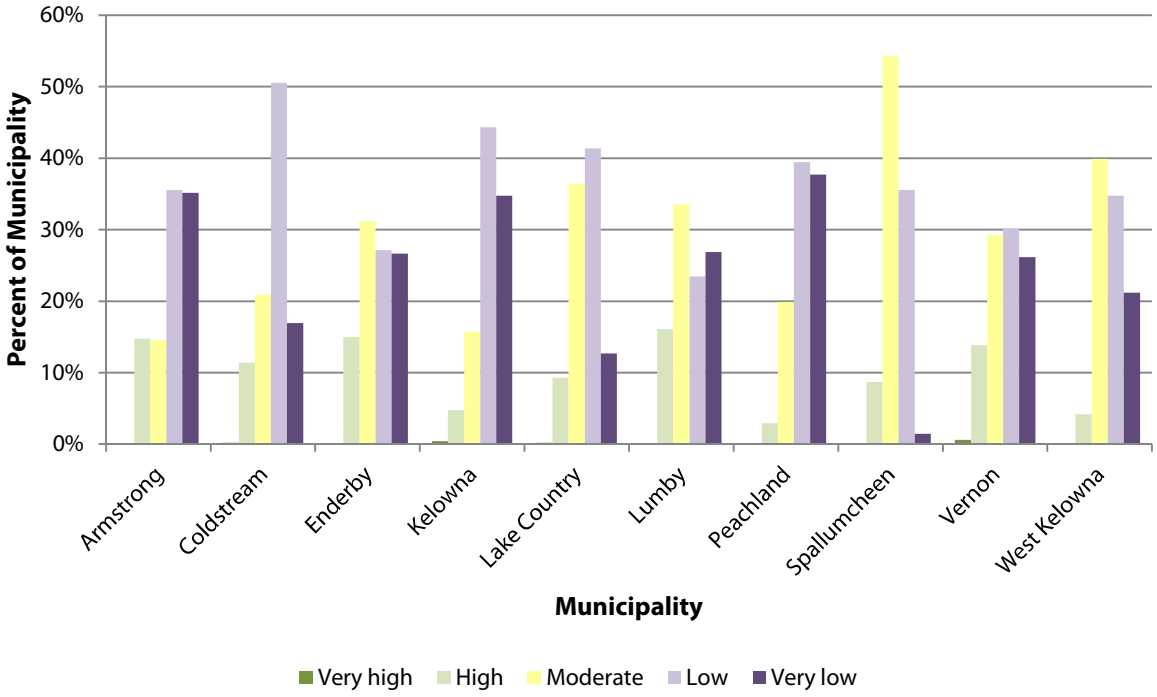


Table 15 – Relative Biodiversity by Municipality/Electoral Area (based on percent of study area class total)

	Biodiversity class									
	Very high		High		Moderate		Low		Very low	
Municipality/ Electoral Area	Area (ha)	% of Very High in Study Area	Area (ha)	% of High in Study Area	Area (ha)	% of Moderate in Study Area	Area (ha)	% of Low in Study Area	Area (ha)	% of Very Low in Study Area
Armstrong	0	0.0%	77	0.1%	76	0.0%	186	0.0%	184	0.6%
Coldstream	13	0.4%	759	1.2%	1,394	0.3%	3,370	0.7%	1,129	3.9%
Enderby	0	0.0%	63	0.1%	130	0.0%	113	0.0%	111	0.4%
Kelowna	92	3.0%	1,010	1.6%	3,343	0.7%	9,420	2.0%	7,388	25.3%
Lake Country	26	0.9%	1,122	1.8%	4,401	0.9%	5,003	1.0%	1,534	5.3%
Lumby	0	0.0%	97	0.2%	202	0.0%	142	0.0%	162	0.6%
Peachland	0	0.0%	47	0.1%	317	0.1%	630	0.1%	602	2.1%
RDCO East	613	20.2%	8,322	13.5%	48,819	10.5%	63,871	13.2%	2,255	7.7%
RDCO West	182	6.0%	6,321	10.2%	52,320	11.2%	56,174	11.6%	2,426	8.3%
RDNO Area B	182	6.0%	4,962	8.0%	25,426	5.5%	26,020	5.4%	1,261	4.3%
RDNO Area C	29	0.9%	1,034	1.7%	13,800	3.0%	14,266	3.0%	761	2.6%
RDNO Area D	643	21.2%	13,457	21.8%	84,258	18.1%	80,316	16.6%	2,242	7.7%
RDNO Area E	627	20.7%	11,040	17.9%	123,111	26.5%	124,413	25.8%	2,312	7.9%
RDNO Area F	555	18.3%	9,388	15.2%	86,112	18.5%	82,247	17.0%	1,316	4.5%
Spallumcheen	9	0.3%	2,246	3.6%	13,980	3.0%	9,168	1.9%	372	1.3%
Vernon	57	1.9%	1,340	2.2%	2,832	0.6%	2,922	0.6%	2,535	8.7%
West Kelowna	4	0.1%	510	0.8%	4,874	1.0%	4,246	0.9%	2,588	8.9%
TOTAL	3,031		61,794		465,395		482,506		29,178	

*Area statistics exclude large lakes (>50ha) and areas of no data. Due to scale differences between the municipal, electoral area and regional district boundaries, and a 1km buffer of the RDCO/RDNO boundary, portions of the study area are not assigned to a municipality or electoral area. As a result, the total area values vary slightly between the tables.

Figure 32. Relative Biodiversity by Electoral Area (based on percent of study area class total)

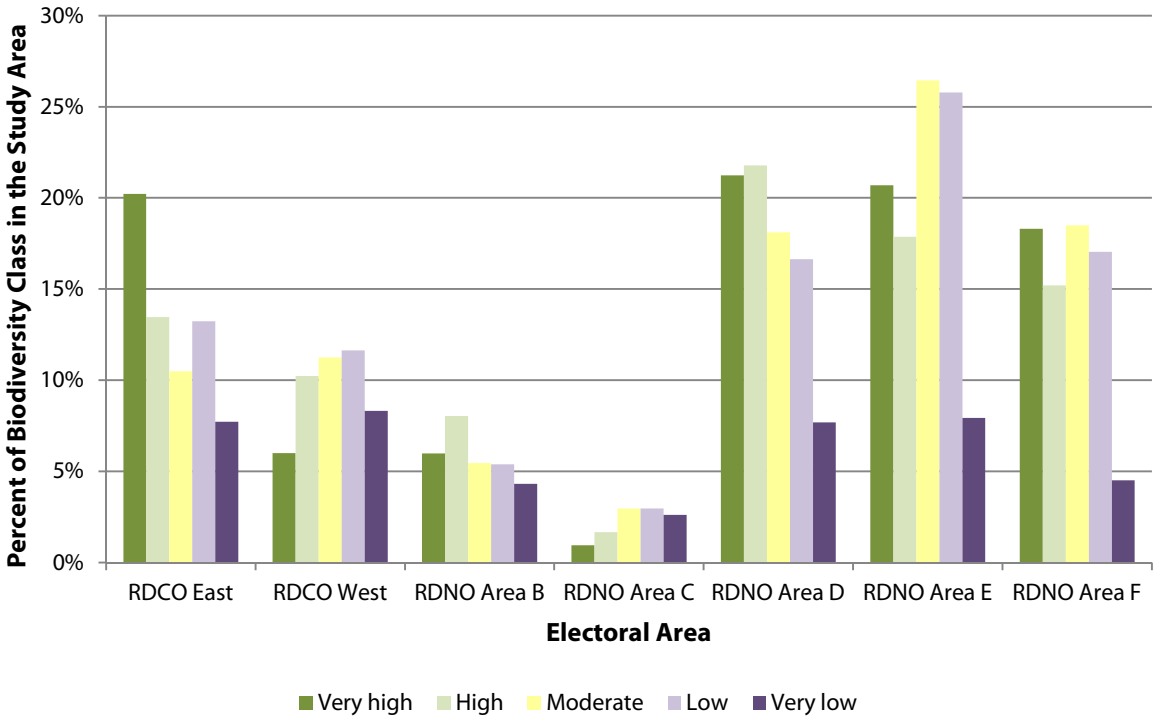
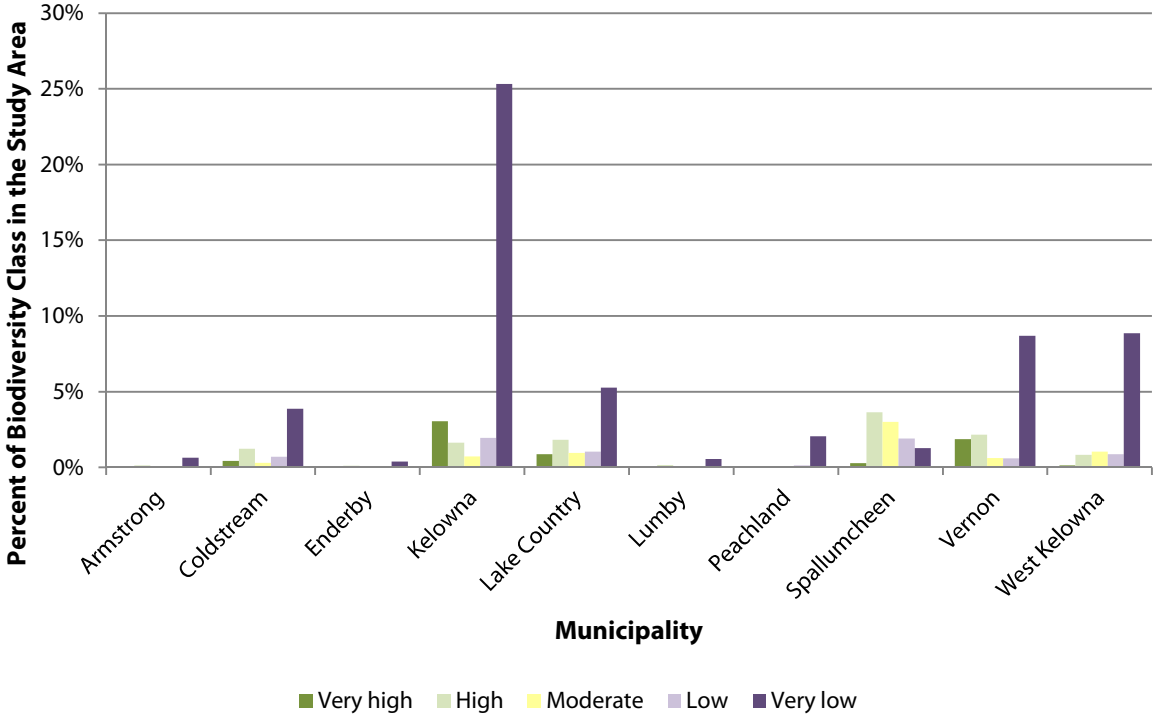


Figure 33. Relative Biodiversity by Municipality (based on percent of study area class total)



The data allows the composition of each of the electoral areas and municipalities to be examined, however, it is important to consider the total area and the percentages in the context of the size of the jurisdiction. For example, RDNO Electoral Area E represents over one quarter of the total study area so it naturally will contain large area values. Peachland is the municipality with the largest proportion of very low biodiversity habitat (37.7%) (Table 14), however, it is also one of the smaller municipalities. The municipal boundary does not extent much beyond the urban centre and therefore the amount of very low habitat is highly concentrated. The results indicate that the larger, more rural electoral areas contain a higher amount of the region's very high relative biodiversity habitats: RDCO EA East and RDNO areas D, E, and F contain 80.4% (Table 15). Also important to consider are those areas where the amount of habitat in a given class represents a small proportion of the jurisdiction as this indicates the potential rarity of the habitat. This is particularly important when assessing the smaller municipalities; for example if Coldstream were to lose 10 ha of its very high habitat, it would represent a loss of over 80% of the district's total, whereas if 10 ha were removed in RDNO Electoral Area B, the percent reduction would be only 1.6% (Table 15).

3.3 Land Management Classes

As outlined in Section 2.3.3, four different land management classes were developed to help identify the potential actions required to maintain or enhance the biodiversity within the study area (Table 16). Examining the relative biodiversity in relation to the land management classes facilitates the identification of important biodiversity conservation areas falling both in and outside the various management areas.

Table 16 – Management Class Descriptions

Class	Description	Land Tenure Status
Class 1 - Conservation Lands	Lands with the highest degree of protection for biodiversity conservation.	▪ Migratory bird sanctuaries ▪ Wildlife management areas ▪ Provincial parks and protected areas ▪ Regional parks (special preservation or natural environment) ▪ Ecological reserves ▪ Federal Crown conservation lands ▪ Crown lands designated for environmental protection/conservation (Section 16) ▪ Private conservation lands ▪ Canadian Wildlife Service (CWS) National Wildlife Areas
Class 2 – Dedicated Open Space	Lands that are currently protected as greenspace due to their land use designation.	▪ Regional parks (outdoor recreation or park services) ▪ Municipal parks ▪ Crown recreation and research lands ▪ Forest tenure recreation areas ▪ Provincial recreation areas ▪ Lands surrounding reservoirs zoned for conservation purposes (e.g., RDCO CL8 zoning
Class 3 – Resource Lands	Predominantly forested crown lands.	▪ Crown land ▪ Community watersheds ▪ Municipal lands zoned for forestry or grazing

Class	Description	Land Tenure Status
Class 4 – Agriculture and Crown Leases	Agricultural Land Reserve and crown leases	▪ Agricultural Land Reserve (ALR) ▪ Crown leases o Agriculture o Alpine skiing o Commercial o Commercial recreation o Communication o Community o Grazing o Industrial o Institutional o Quarrying o Recreational residential o Rural residential o Utility
Private land (excluding ALR private lands)		
Indian Reserve		

Table 17 and Figure 34 summarize the land management classes in the study area. The majority of the study area (69.0%) consists of Resource Lands followed by Private Land (12.7%) and then by Conservation Lands at 7.9%.

Table 17 – Summary of Land Management Classes in the Study Area

Land Management class	Area (ha)	% of Study Area
Class 1 - Conservation Lands	88,091	7.9%
Class 2 - Dedicated Open Space	5,910	0.5%
Class 3 - Resource Lands	772,275	69.0%
Class 4 - Agriculture and Crown Leases	95,109	8.5%
Private Land (excluding ALR private lands)	141,783	12.7%
Indian Reserve	16,840	1.5%

Figure 34. Percentage of each Land Management Class in the Study Area

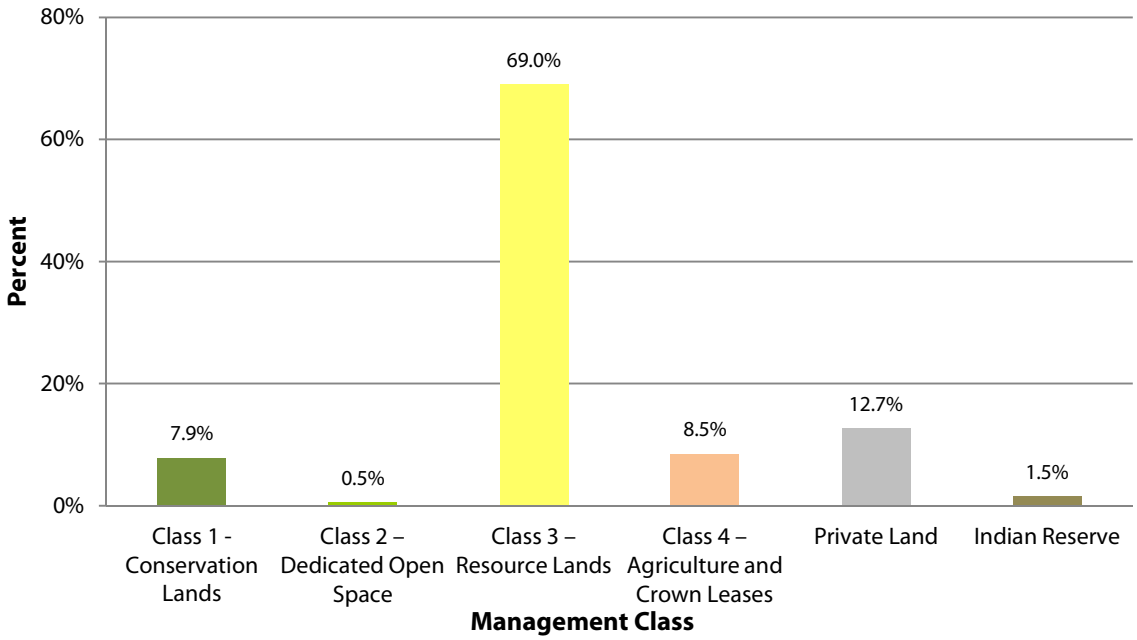
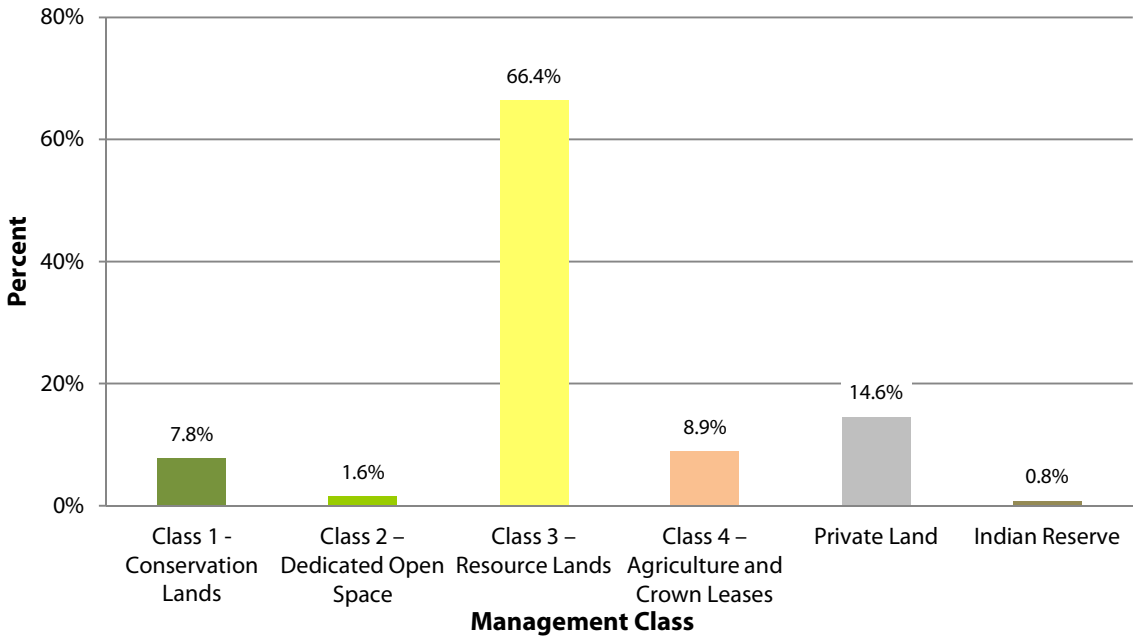


Table 18 and Figure 35 summarize this information for the RDCO. As in the entire study area, the majority of the regional district falls into Resource Lands (66.4%), followed by Private Land (14.6%). In the RDCO the third highest class is Agriculture and Crown Leases (8.9%).

Table 18 – Summary of Land Management Classes in the Regional District of Central Okanagan

Land Management class	Area (ha)	% of Regional District
Class 1 - Conservation Lands	22,639	7.8%
Class 2 - Dedicated Open Space	4,509	1.6%
Class 3 - Resource Lands	193,205	66.4%
Class 4 - Agriculture and Crown Leases	25,786	8.9%
Private Land (excluding ALR private lands)	42,452	14.6%
Indian Reserve	2,274	0.8%

Figure 35. Percentage of each Land Management Class in the Regional District of Central Okanagan



In the RDNO the majority of the district falls in the Resource Lands (69.2%) class (Table 19 and Figure 36), followed by Private Land (12.7%) and then Agriculture and Crown Leases (8.5%).

Table 19 – Summary of Land Management Classes in the Regional District of North Okanagan

Land Management class	Area (ha)	% of Regional District
Class 1 - Conservation Lands	59,319	7.9%
Class 2 - Dedicated Open Space	1,398	0.2%
Class 3 - Resource Lands	521,435	69.2%
Class 4 - Agriculture and Crown Leases	64,208	8.5%
Private Land (excluding ALR private lands)	95,830	12.7%
Indian Reserve	11,254	1.5%

Figure 36. Percentage of each Land Management Class in the Regional District of North Okanagan

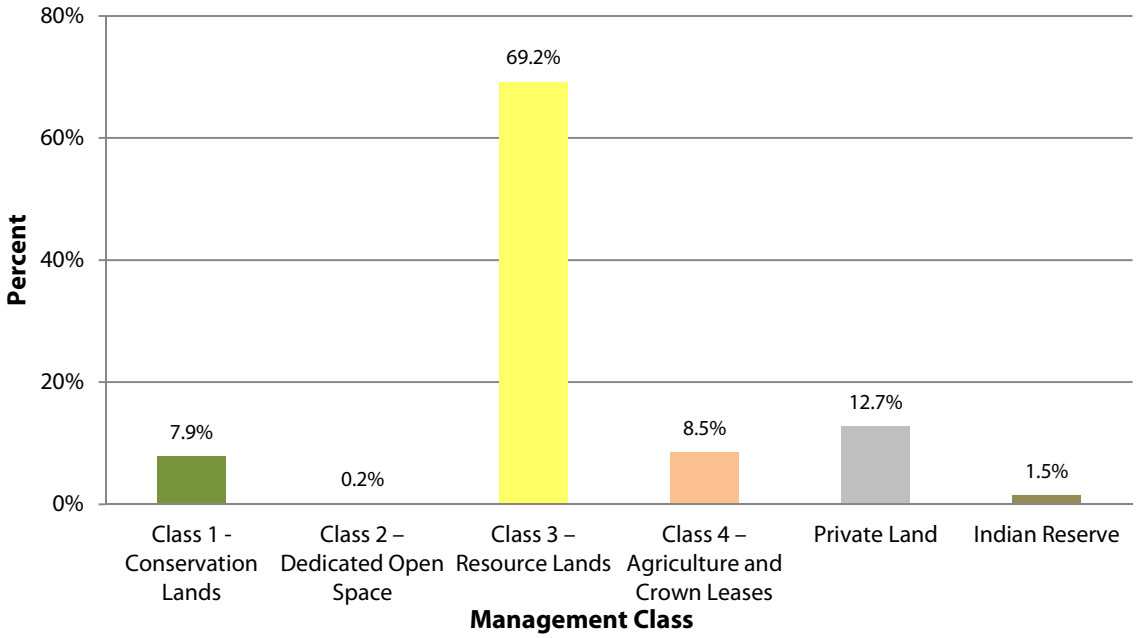


Table 20 summarizes the relative biodiversity classes by each of the land management classes. It is important to consider the total area of the land management class when interpreting these statistics. The percentage values in this table provide a breakdown of the composition of the relative biodiversity values present within each management class. The table and the associated graph (Figure 37) indicate that:

- With the exception of Indian Reserves, the top two biodiversity classes in each land management class are moderate and low. In all of the management classes, when combined, the moderate and low biodiversity classes represent over two thirds of the total area: ranging from 67.3% (31.2% + 36.1%) in Class 2 (Dedicated Open Space) to 95% (45.2% + 49.8%) in Class 3 (Resource Lands).
- Indian Reserves have the highest proportion of very high and high biodiversity habitats (25.2%) followed by Class 2 (21.1%), Class 4 (13.1%), Class 1 (10.2%), Private Lands (10.1%), and lastly Class 3 (3.7%).

Table 20 – Relative Biodiversity by Land Management Class (based on percent of management class land area)

	Biodiversity class									
	Very high		High		Moderate		Low		Very low	
Land Management Class	Area (ha)	% of Very High in Management Class	Area (ha)	% of High in Management Class	Area (ha)	% of Moderate in Management Class	Area (ha)	% of Low in Management Class	Area (ha)	% of Very Low in Management Class
Class 1 - Conservation Lands	536	0.6%	8,460	9.6%	46,675	53.0%	32,244	36.6%	175	0.2%
Class 2 - Dedicated Open Space	64	1.1%	1,184	20.0%	1,842	31.2%	2,133	36.1%	687	11.6%
Class 3 - Resource Lands	1,882	0.2%	27,249	3.5%	349,021	45.2%	384,801	49.8%	9,322	1.2%
Class 4 - Agriculture and Crown Leases	316	0.3%	12,213	12.8%	37,925	39.9%	40,554	42.6%	4,101	4.3%
Private Land (excluding ALR private lands)	399	0.3%	13,955	9.8%	51,572	36.4%	60,250	42.5%	15,606	11.0%
Indian Reserve	69	0.4%	4,168	24.8%	7,902	46.9%	3,683	21.9%	1,019	6.0%
TOTAL	3,267		67,230		494,937		523,665		30,910	

*Area statistics exclude large lakes (>50ha) and areas of no data. Due to data gaps in the source layers used to develop the land management classes (i.e., associated with features such as road allowances) portions of the study area are not assigned to a land management class. As a result, the total area values vary slightly between the tables.

Figure 37. Relative Biodiversity by Land Management Class (based on percent of management class land area)

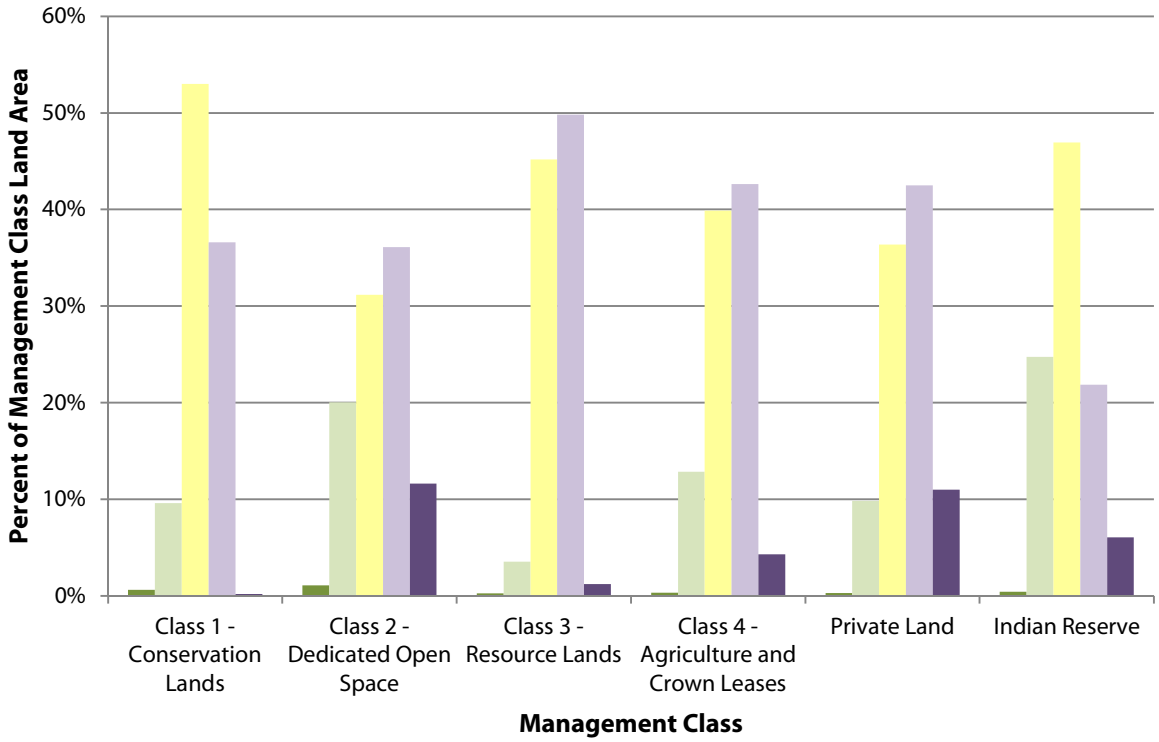


Table 21 and Figure 38 examine the distribution of the relative biodiversity classes throughout the various land management classes relative to the entire study area.

- As to be expected (with the exception of the very low class), the majority of each relative biodiversity class is found on Resource Lands (Class 3), primarily due to the fact that this land management class represents 70% of the study area.
- The majority of very low biodiversity habitats (50.5%) are found on Private Lands. The remainder are found predominantly in Class 3 (Resource Lands) (30.2%).
- Class 3 (Resource Lands) contains 57.6% of the very high biodiversity habitats. The remainder are located in Class 1 (Conservation Lands) (16.4%), Private Land (12.2%), Class 4 (Agriculture and Crown Leases) (9.7%), Indian Reserves (2.1%), followed lastly by Class 2 (Dedicated Open Space) at 2.0%.

Table 21 – Relative Biodiversity by Land Management Class (based on percent of study area class total)

	Biodiversity class									
	Very high		High		Moderate		Low		Very low	
Land Management Class	Area (ha)	% of Very High in Study Area	Area (ha)	% of High in Study Area	Area (ha)	% of Moderate in Study Area	Area (ha)	% of Low in Study Area	Area (ha)	% of Very Low in Study Area
Class 1 - Conservation Lands	536	16.4%	8,460	12.6%	46,675	9.4%	32,244	6.2%	175	0.6%
Class 2 - Dedicated Open Space	64	2.0%	1,184	1.8%	1,842	0.4%	2,133	0.4%	687	2.2%
Class 3 - Resource Lands	1,882	57.6%	27,249	40.5%	349,021	70.5%	384,801	73.5%	9,322	30.2%
Class 4 - Agriculture and Crown Leases	316	9.7%	12,213	18.2%	37,925	7.7%	40,554	7.7%	4,101	13.3%
Private Land (excluding ALR private lands)	399	12.2%	13,955	20.8%	51,572	10.4%	60,250	11.5%	15,606	50.5%
Indian Reserve	69	2.1%	4,168	6.2%	7,902	1.6%	3,683	0.7%	1,019	3.3%
TOTAL	3,267		67,230		494,937		523,665		30,910	

*Area statistics exclude large lakes (>50ha) and areas of no data. Due to data gaps in the source layers used to develop the land management classes (i.e., associated with features such as road allowances) portions of the study area are not assigned to a land management class. As a result, the total area values vary slightly between the tables.

Figure 38. Relative Biodiversity by Land Management Class (based on percent of study area class total)

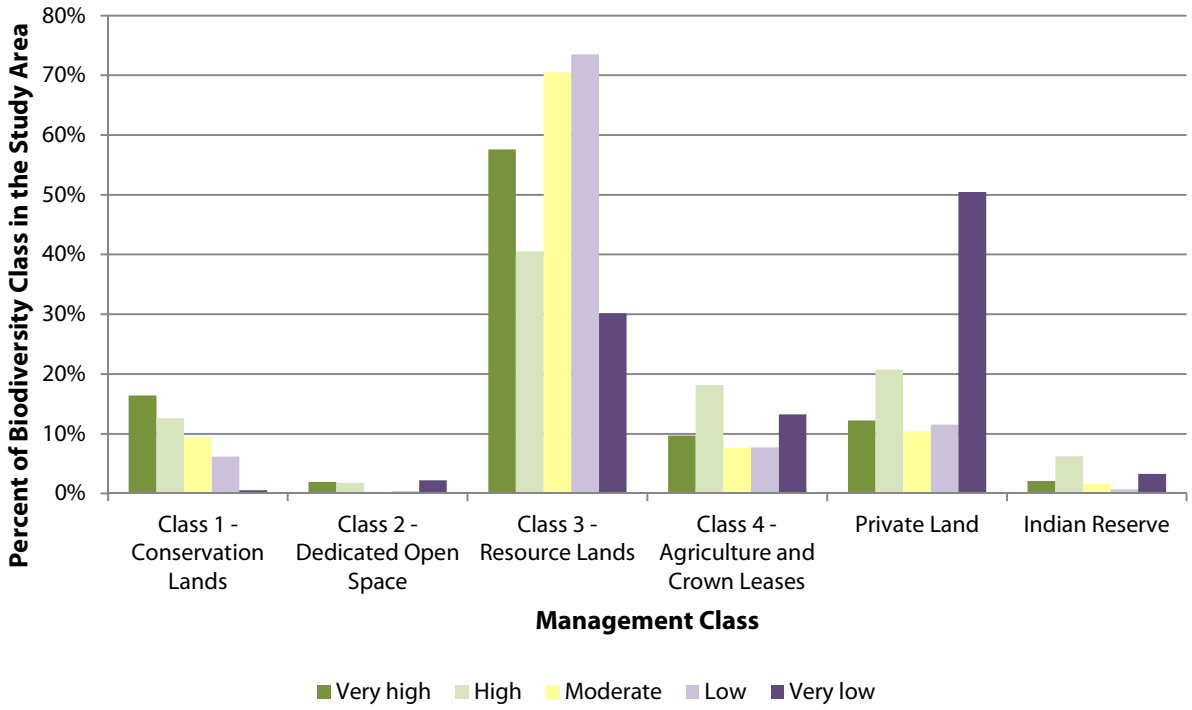


Table 22 and Figure 39 provide a similar summary for the RDCO. The results indicate the following:

- As in the entire study area, the majority of each relative biodiversity class is found on Resource Lands due to the fact that it represents 66.4% of the RDCO (Table 18).
- The majority of the very low relative biodiversity habitats (57.3%) are found on Private Lands, with the remainder found on Resource Lands (20.7%, followed by Agriculture and Crown Leases (13.7%).
- 62.7% of the very high relative biodiversity habitats are found on Resource Lands with 12.2% on Conservation Lands, 10.0% on Agriculture and Crown Leases and 9.3% on Private Land.

Table 22 – Relative Biodiversity by Land Management Class (based on percent of Regional District of Central Okanagan class total)

	Biodiversity class									
	Very high		High		Moderate		Low		Very low	
Land Management Class	Area (ha)	% of Very High in RDCO	Area (ha)	% of High in RDCO	Area (ha)	% of Moderate in RDCO	Area (ha)	% of Low in RDCO	Area (ha)	% of Very Low in RDCO
Class 1 - Conservation Lands	112	12.2%	2,173	12.4%	12,004	10.5%	8,252	5.9%	98	0.6%
Class 2 - Dedicated Open Space	52	5.7%	912	5.2%	1,352	1.2%	1,669	1.2%	525	3.0%
Class 3 - Resource Lands	576	62.7%	9,465	54.1%	82,876	72.3%	96,619	68.9%	3,668	20.7%
Class 4 - Agriculture and Crown Leases	92	10.0%	1,377	7.9%	7,323	6.4%	14,559	10.4%	2,436	13.7%
Private Land (excluding ALR private lands)	85	9.3%	3,421	19.5%	10,532	9.2%	18,262	13.0%	10,152	57.3%
Indian Reserve	1	0.2%	151	0.9%	497	0.4%	773	0.6%	852	4.8%
TOTAL	919		17,498		114,583		140,134		17,732	

*Area statistics exclude large lakes (>50ha) and areas of no data. Due to data gaps in the source layers used to develop the land management classes (i.e., associated with features such as road allowances) portions of the study area are not assigned to a land management class. As a result, the total area values vary slightly between the tables.

Figure 39. Relative Biodiversity by Land Management Class (based on percent of Regional District of Central Okanagan class total)

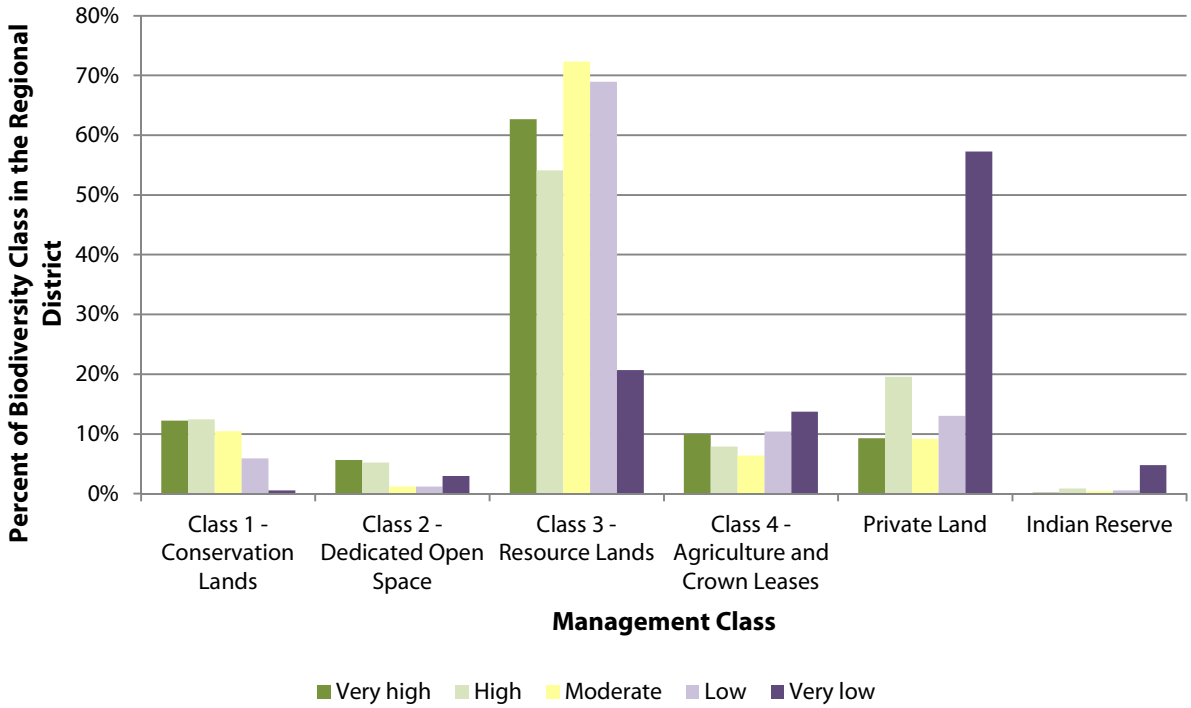


Table 23 and Figure 40 summarize the relative biodiversity data by management class for the RDNO. The results indicate the following:

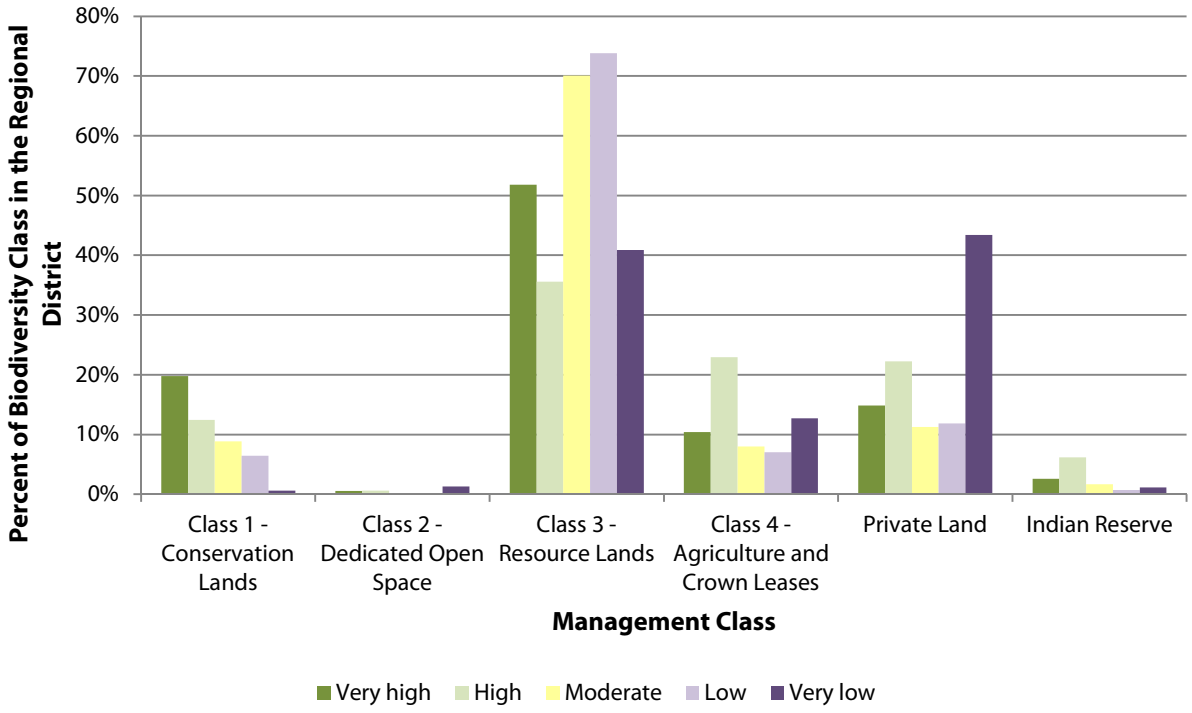
- With the exception of the very low class, the majority of each relative biodiversity class is found in Resource Lands however, this is to be expected because Resource Lands represent 69.2% of the regional district (Table 19).
- The highest proportion of the very low relative biodiversity class falls on Private Lands however, 40.9% of this class falls on Resource Lands.
- 51.8% of the very high class falls on Resource Lands, followed by 19.8% on Conservation Lands, 14.8% on Private Land, and 10.4% on Agriculture and Crown Leases.

Table 23 – Relative Biodiversity by Land Management Class (based on percent of Regional District of North Okanagan class total)

	Biodiversity class									
	Very high		High		Moderate		Low		Very low	
Land Management Class	Area (ha)	% of Very High in RDCO	Area (ha)	% of High in RDCO	Area (ha)	% of Moderate in RDCO	Area (ha)	% of Low in RDCO	Area (ha)	% of Very Low in RDCO
Class 1 - Conservation Lands	418	19.8%	5,529	12.4%	31,122	8.9%	22,174	6.5%	76	0.6%
Class 2 - Dedicated Open Space	12	0.6%	271	0.6%	489	0.1%	464	0.1%	162	1.3%
Class 3 - Resource Lands	1,095	51.8%	15,819	35.6%	246,136	70.1%	253,324	73.8%	5,060	40.9%
Class 4 - Agriculture and Crown Leases	220	10.4%	10,202	22.9%	28,141	8.0%	24,071	7.0%	1,574	12.7%
Private Land (excluding ALR private lands)	314	14.8%	9,897	22.3%	39,523	11.2%	40,724	11.9%	5,374	43.4%
Indian Reserve	55	2.6%	2,745	6.2%	5,909	1.7%	2,406	0.7%	140	1.1%
TOTAL	2,114		44,462		351,321		343,163		12,385	

*Area statistics exclude large lakes (>50ha) and areas of no data. Due to data gaps in the source layers used to develop the land management classes (i.e., associated with features such as road allowances) portions of the study area are not assigned to a land management class. As a result, the total area values vary slightly between the tables.

Figure 40. Relative Biodiversity by Land Management Class (based on percent of Regional District of North Okanagan class total)



The land management classes can be applied a number of ways. For example, in the development of a biodiversity management strategy, higher biodiversity lands falling outside conservation lands and dedicated open space might offer opportunities for acquisition. Figure 41 illustrates the location of these potential sites. The amount of habitat meeting these criteria can also be quantified: Table 24 indicates that only 18.4% of the very high and 14.4% of the high biodiversity habitats are within land management classes 1 and 2. The largest proportion of both very high (57.6%) and high (40.5%) biodiversity habitats fall within resource lands (Class 3). These results are also illustrated in Figure 42.

Table 24 – Summary of High and Very High Relative Biodiversity by Land Management Class in the Study Area

	Relative Biodiversity Class			
	Very high		High	
Management Class	**Area (ha)**	**% of Very high**	**Area (ha)**	**% of High**
Class 1 - Conservation lands	536	16.4%	8,460	12.6%
Class 2 - Dedicated open space	64	2.0%	1,184	1.8%
Class 3 - Resource lands	1,882	57.6%	27,249	40.5%
Class 4 - Agriculture and crown leases	316	9.7%	12,213	18.2%
Private land (excluding ALR private lands)	399	12.2%	13,955	20.8%
Indian reserve	69	2.1%	4,168	6.2%
TOTAL	**3,267**		**67,230**	

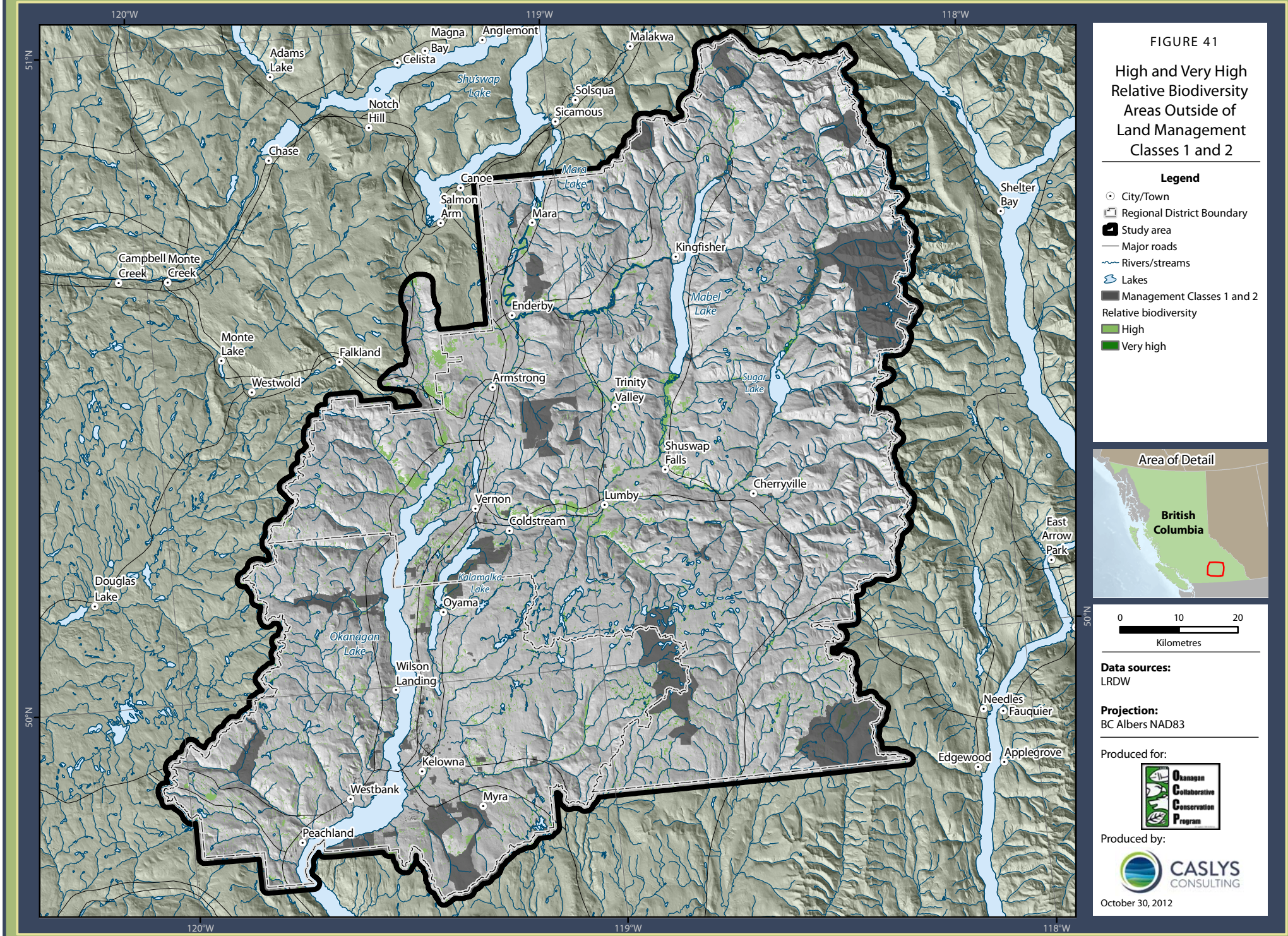


FIGURE 41

High and Very High Relative Biodiversity Areas Outside of Land Management Classes 1 and 2

Legend

- City/Town
- Regional District Boundary
- Study area
- Major roads
- Rivers/streams
- Lakes
- Management Classes 1 and 2

Relative biodiversity

- High
- Very high

Data sources:
LRDW

Projection:
BC Albers NAD83

Produced for:

Okanagan Collaborative Conservation Program

Produced by:

CASLYS CONSULTING

October 30, 2012

Figure 42. High and Very High Relative Biodiversity Areas by Land Management Class in the Study Area

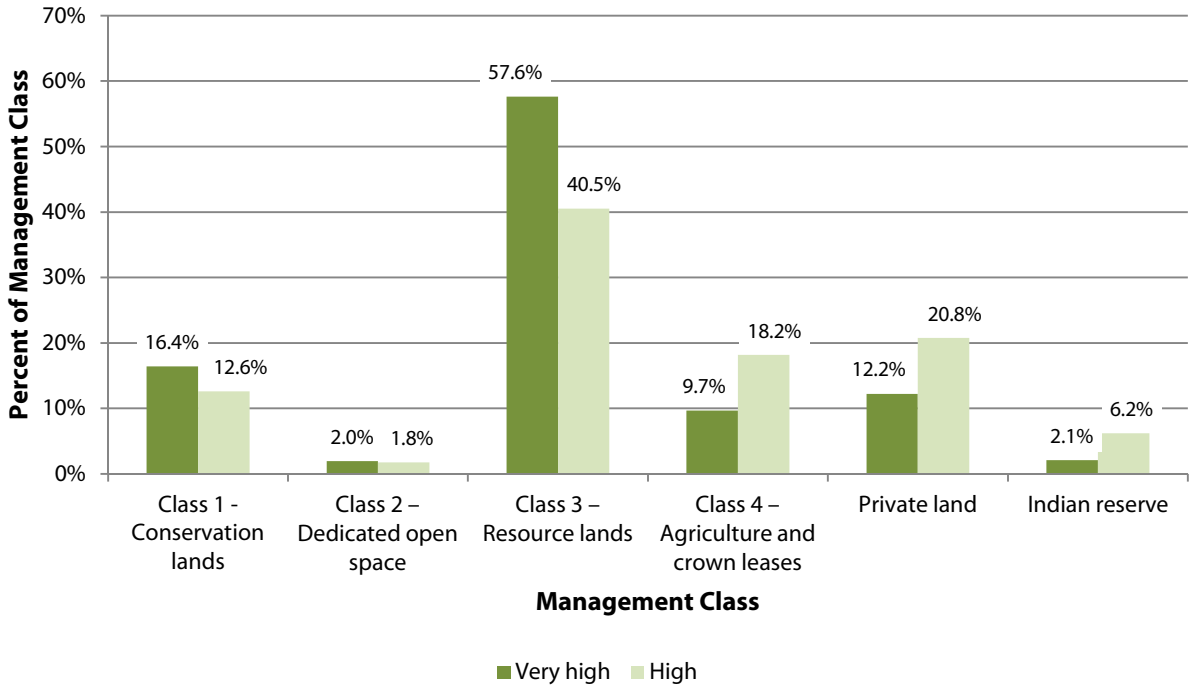


Table 25 and Figure 43 summarize the very high and high relative biodiversity habitats by land management class for the RDCO. The results indicate the following:

- 17.9% of the very high and 17.6% of the high relative biodiversity habitats are within land management classes 1 (Conservation Lands) and 2 (Dedicated Open Space).
- The largest proportion of both the very high (62.7%) and high (54.1%) classes fall within Resource Lands (Class 3).

Table 25 – Summary of High and Very High Relative Biodiversity by Land Management Class in the Regional District of Central Okanagan

	Relative Biodiversity Class			
	Very high		High	
Management Class	**Area (ha)**	**% of Very high**	**Area (ha)**	**% of High**
Class 1 - Conservation lands	112	12.2%	2,173	12.4%
Class 2 - Dedicated open space	52	5.7%	912	5.2%
Class 3 - Resource lands	576	62.7%	9,465	54.1%
Class 4 - Agriculture and crown leases	92	10.0%	1,377	7.9%
Private land (excluding ALR private lands)	85	9.3%	3,421	19.5%
Indian reserve	1	0.2%	151	0.9%
TOTAL	919	100.0%	17,498	100.0%

Figure 43. High and Very High Relative Biodiversity Areas by Land Management Class in the Regional District of Central Okanagan

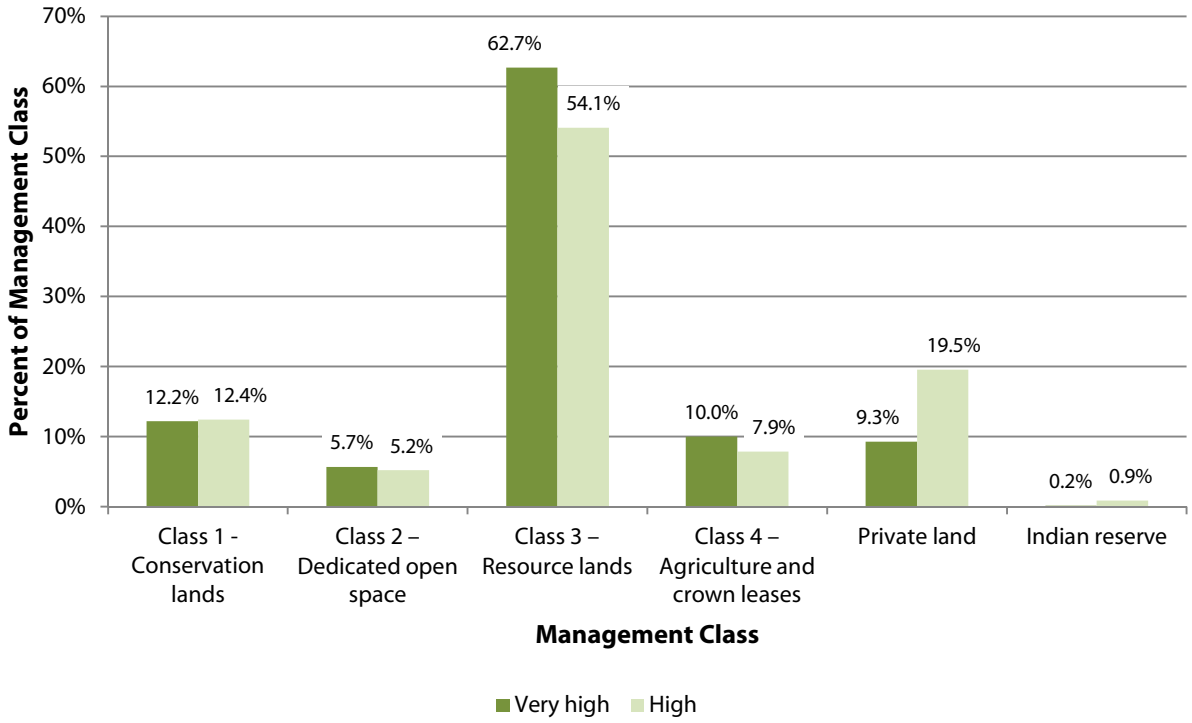


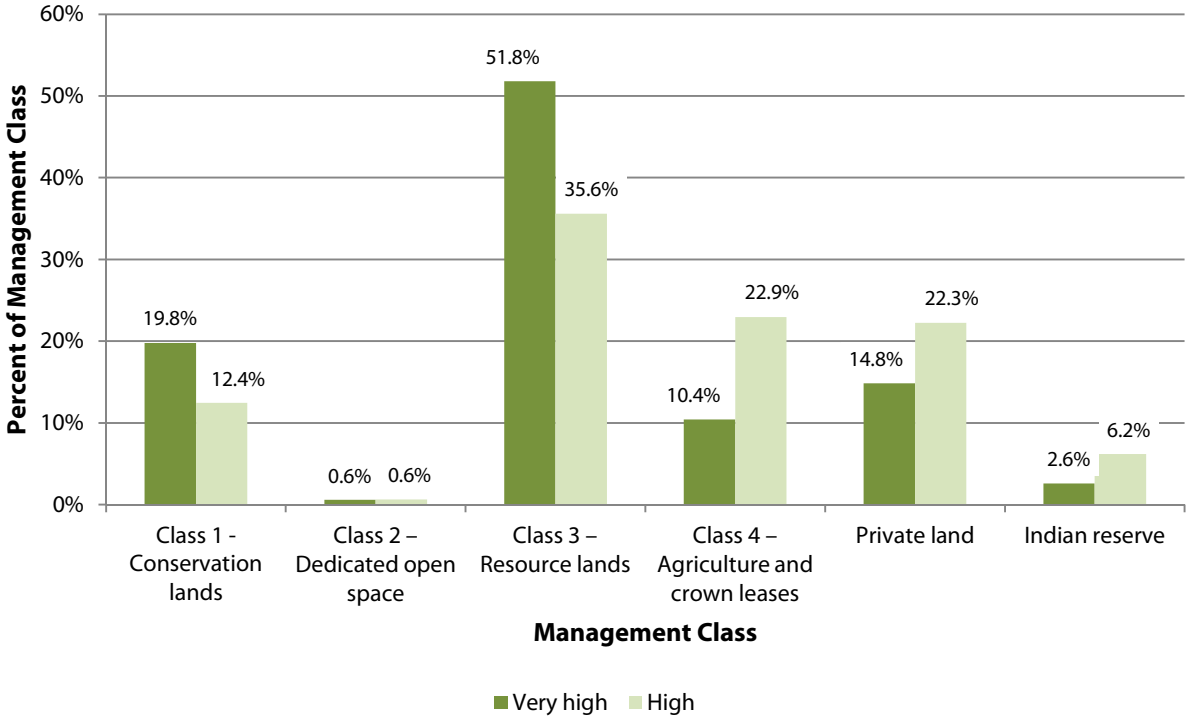
Table 26 and Figure 44 provide a summary of the very high and high relative biodiversity habitats by land management class for the RDNO. The results indicate the following:

- In the RDNO, 20.4% of the very high and 13.0% of the high relative biodiversity habitats are within land management classes 1 (Conservation Lands) and 2 (Dedicated Open Space).
- 51.8% of the very high habitats are found on Resource Lands
- The high relative biodiversity habitats are more evenly distributed among the other management classes – 35.6% in Resource Lands, 22.9% on Agriculture and Crown Leases, 22.3% on Private Land and 6.2% on Indian Reserves.

Table 26 – Summary of High and Very High Relative Biodiversity by Land Management Class in the Regional District of North Okanagan

	Relative Biodiversity Class			
	Very high		High	
Management Class	**Area (ha)**	**% of Very high**	**Area (ha)**	**% of High**
Class 1 - Conservation lands	418	19.8%	5,529	12.4%
Class 2 - Dedicated open space	12	0.6%	271	0.6%
Class 3 - Resource lands	1,095	51.8%	15,819	35.6%
Class 4 - Agriculture and crown leases	220	10.4%	10,202	22.9%
Private land (excluding ALR private lands)	314	14.8%	9,897	22.3%
Indian reserve	55	2.6%	2,745	6.2%
TOTAL	2,114	100.0%	44,462	100.0%

Figure 44. High and Very High Relative Biodiversity Areas by Land Management Class in the Regional District of North Okanagan



As mentioned above, the land management classes represent groupings of similar land uses. We can also examine the composition of parks and protected areas within the study area. Table 27 summarizes the area of the different types of parks in the study area. The summary indicates that 8.0% of the study area falls within lands designated as parks, with the vast majority of this (7.5%) consisting of Provincial parks and protected areas. Figure 6 maps the location of the various park types.

Table 27 – Parks and Protected Areas in the Study Area

Park Type	Area (ha)	% of Study Area
Municipal/Regional Parks	1,652	0.1%
Provincial Parks	70,040	6.3%
Protected Areas	13,490	1.2%
Ecological Reserves	3,952	0.4%
Total	**89,134**	**8.0%**

Table 28 summarizes the relative biodiversity classes by the type of park. The percentage values in this table provide a breakdown of the composition of the relative biodiversity values present within each park type. It is important to consider both the typical size of the park type and the location of the park when interpreting these statistics. The table and the associated graph (Figure 45) indicate that:

- Municipal and regional parks consist of small proportions of very high (0.6%) value habitat, with relatively high proportions of high value habitat when compared to the study area as a whole (19.6% versus 6%). These are combined with low (33.4%) and very low (11.1%) biodiversity habitats. This is probably because they are typically located in the valley area which has a larger proportion of very high biodiversity habitat relative to the entire study area. Because these types of parks often incorporate recreation areas (i.e., playgrounds and sports fields), they will have part of the property set aside for parking facilities and manicured lawns (i.e., low and very low biodiversity habitats).
- Provincial parks consist of slightly more very high, high and moderate biodiversity habitats when compared to the study area as a whole (0.6% vs. 0.3%; 10.0% vs. 6.0%; and 53.3% vs. 44.2% respectively) and less low habitat (36.0% in Provincial parks versus 46.8% in the study area).
- Provincial parks have significantly less very low value habitat in comparison to the study area (0.1% versus 2.8%).
- Protected areas have virtually the same proportions of each relative biodiversity class as the study area, with the exception of much less very low value habitats (0.4% versus 2.8%).
- Ecological reserves have much higher proportions of very high, high, and moderate value habitats when compared to the study area (3.0% vs. 0.3%; 15.1% vs. 6.0%; and 68.5% vs. 44.2% respectively). Ecological reserves have significantly less low and very low habitats in comparison to the study area proportions (13.3% vs. 46.8%; and 0.1% vs. 2.8% respectively).

Table 28 – Relative Biodiversity Summarized by Park Type (based on percent of park type land area)

	Biodiversity class									
	Very high		High		Moderate		Low		Very low	
Park Type	Area (ha)	% of Park Type	Area (ha)	% of Park Type	Area (ha)	% of Park Type	Area (ha)	% of Park Type	Area (ha)	% of Park Type
Municipal/Regional	9	0.6%	324	19.6%	585	35.4%	551	33.4%	183	11.1%
Provincial	376	0.5%	7,003	10.0%	37,345	53.3%	25,212	36.0%	104	0.1%
Protected Areas	38	0.3%	711	5.3%	6,296	46.7%	6,384	47.3%	61	0.4%
Ecological Reserve	120	3.0%	595	15.1%	2,708	68.5%	524	13.3%	5	0.1%
TOTAL	**543**		**8,632**		**46,935**		**32,672**		**353**	

Figure 45. Relative Biodiversity by Park Type (based on percent of park type land area)

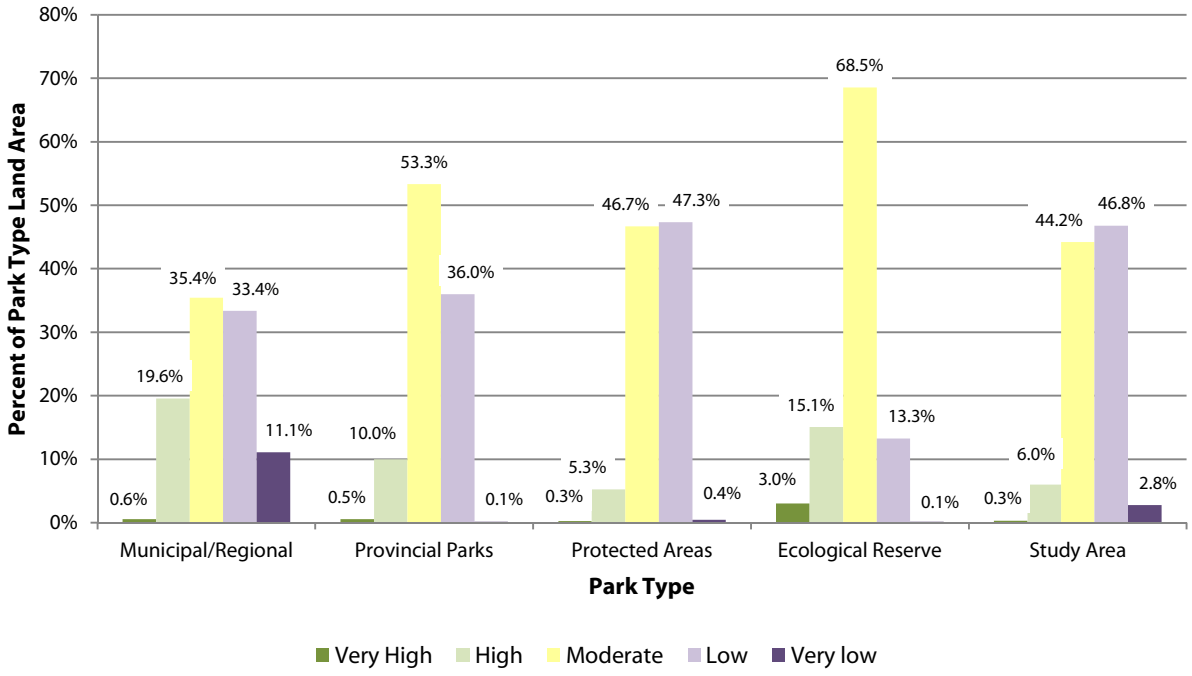
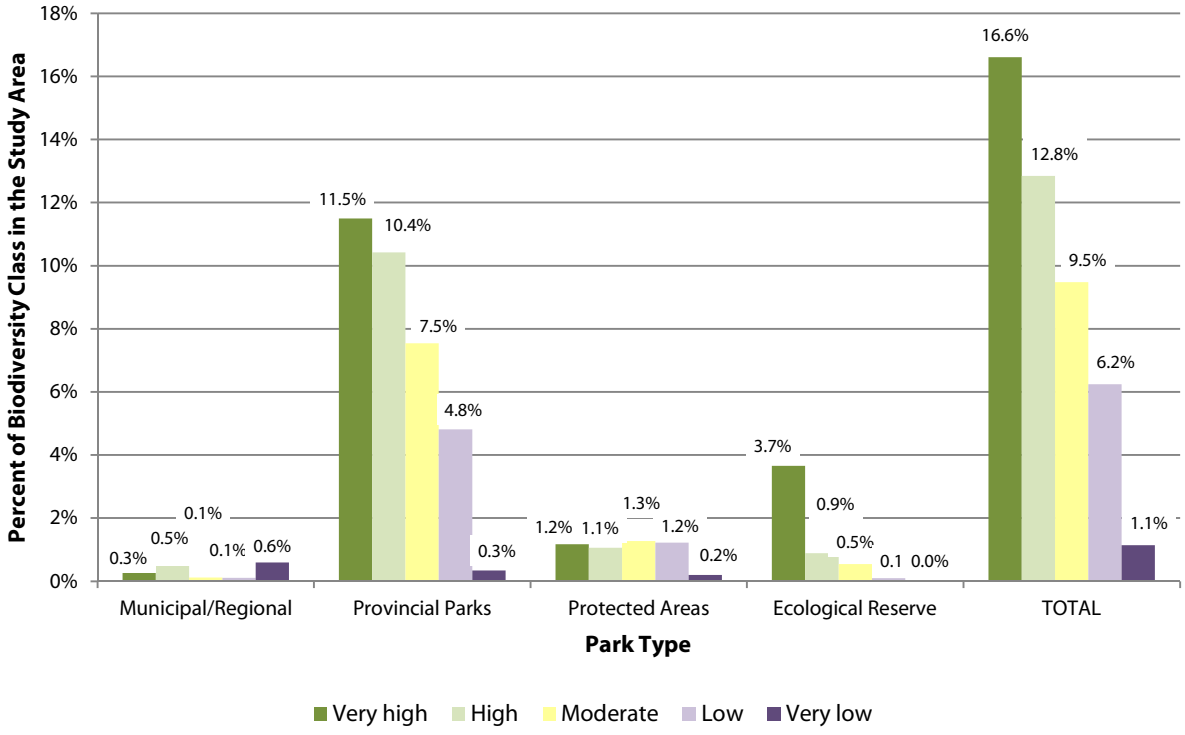


Table 29 and Figure 46 summarize how much of each relative biodiversity class is being protected by each of the different park types. The results indicate that the four different park types combined protect just 16.6% of the study area's very high, and 12.8% of the study area's high biodiversity habitats.

Table 29 – Relative Biodiversity Summarized by Park Type (based on percent of study area class total)

	Biodiversity class									
	Very high		High		Moderate		Low		Very low	
Park Type	Area (ha)	% of Very High in Study Area	Area (ha)	% of High in Study Area	Area (ha)	% of Moderate in Study Area	Area (ha)	% of Low in Study Area	Area (ha)	% of Very Low in Study Area
Municipal/Regional	9	0.3%	323.59	0.5%	585	0.1%	551	0.1%	183.2	0.6%
Provincial	376	11.5%	7,003	10.4%	37,345	7.5%	25,212	4.8%	104.06	0.3%
Protected Areas	38	1.2%	711	1.1%	6,296	1.3%	6,384	1.2%	60.63	0.2%
Ecological Reserve	120	3.7%	595	0.9%	2,708	0.5%	524	0.1%	5.28	0.0%
TOTAL	**543**	**16.6%**	**8,632**	**12.8%**	**46,935**	**9.5%**	**32,672**	**6.2%**	**353.17**	**1.1%**

Figure 46. Relative Biodiversity by Park Type (based on percent of study area class total)



3.4 Wildlife Habitat Connectivity

3.4.1 Regional Scale Connectivity

Habitat connectivity describes the degree to which different habitats (or ecosystem types) are linked to one another to form an interconnected network. This network provides opportunities for wildlife movement through habitat corridors. It is crucial for biodiversity because it facilitates the migration of species and genetic material and enhances ecological function.

The map of habitat connectivity developed for the study area (Figure 19) identifies significant barriers to wildlife movement. These include urban areas and the major highways that cross the study area. The valley area and those areas of less rugged terrain located throughout the central portion of the study area offer the best potential for wildlife movement.

The Okanagan Valley represents a north-south corridor, facilitating wildlife movement between the U.S. Great Basin and the grasslands of the Central Interior Plateau of B.C. Human settlement and the associated transportation network represent barriers to movement. In addition, roads and railways increase mortality rates associated with wildlife-vehicle collisions. As illustrated in Figure 19, highways 97 and 97A impede east-west movement and highways 6, 33 and 97C have potential impacts on north-south movement.

3.4.2 Local Scale Connectivity

In portions of the study area more detailed species-specific data are available depicting the location of wildlife movement corridors. The results of the habitat connectivity analysis can be used in conjunction with these datasets to examine conditions at a local scale. For example, potential 'pinch points' can be identified where, due to terrain and/or human disturbance, wildlife corridors narrow. This information could be used to guide acquisition, protection, enhancement or restoration initiatives.

4.0 DATA LIMITATIONS

The following limitations are associated with the various source and derivative data layers:

- The data layers used to develop the conservation rankings came from a variety of sources and time periods. The data were verified against 2009 air photos; however, a comprehensive review of land cover was beyond the scope of the current project. As a result, there may be temporal issues associated with the data. For example, the data may not reflect all development post 2009.
- The data were developed for regional scale assessment purposes. The scale limitations with the data should be considered if they are to be used for local scale applications.
- The accuracy of the riparian dataset is a function of the accuracy and scale of the source DEM and the stream network.
- In some of the tables there may be slight differences between the statistical summaries. These are a function of scale and rounding errors.
- The biodiversity analysis focuses on terrestrial habitats. As a result, large lakes (which have high biodiversity values) have been excluded from the analysis and the resulting statistical summaries.

5.0 LITERATURE CITED

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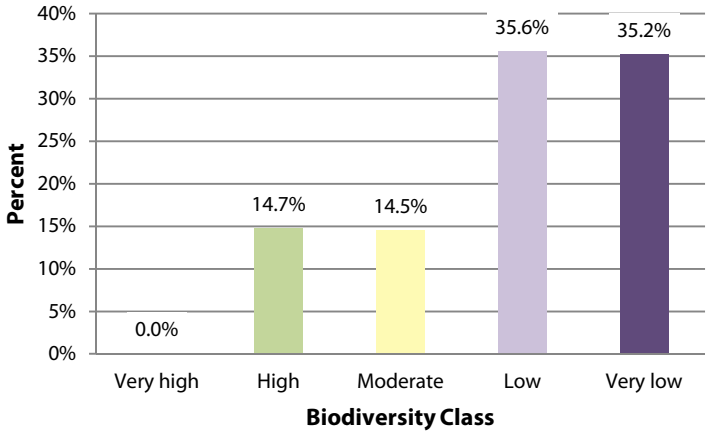
Appendix A
Municipal and Electoral Area Summaries

Armstrong

Biodiversity Class Summary

Biodiversity class	Area (ha)*	% of Armstrong
Very high	0	0.0%
High	77	14.7%
Moderate	76	14.5%
Low	186	35.6%
Very low	184	35.2%
Total	**524**	

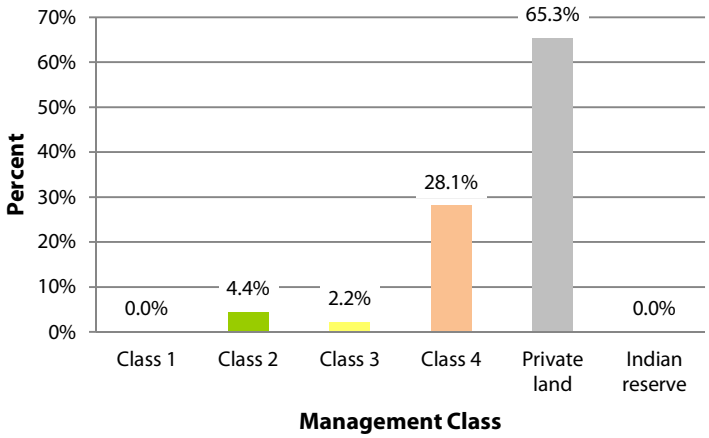
*area statistics exclude large lakes (>50ha)



Management Class Summary

Management class	Area (ha)*	% of Armstrong
Class 1 - Conservation Lands	0	0.0%
Class 2 - Dedicated Open Space	23	4.4%
Class 3 - Resource Lands	11	2.2%
Class 4 - Agriculture & Crown Leases	147	28.1%
Private land	342	65.3%
Indian reserve	0	0.0%
Total	**524**	

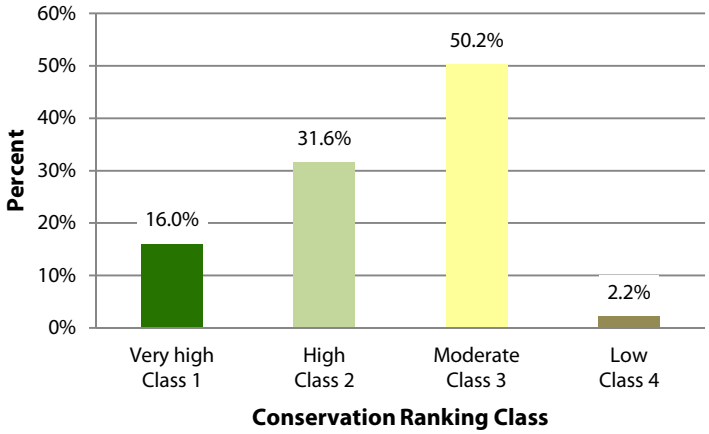
*area statistics exclude large lakes (>50ha)



Conservation Ranking Summary

Conservation ranking	Area (ha)*	% of Armstrong
Very high - Class 1	84	16.0%
High - Class 2	165	31.6%
Moderate - Class 3	263	50.2%
Low - Class 4	12	2.2%
Total	**524**	

*area statistics exclude large lakes (>50ha)

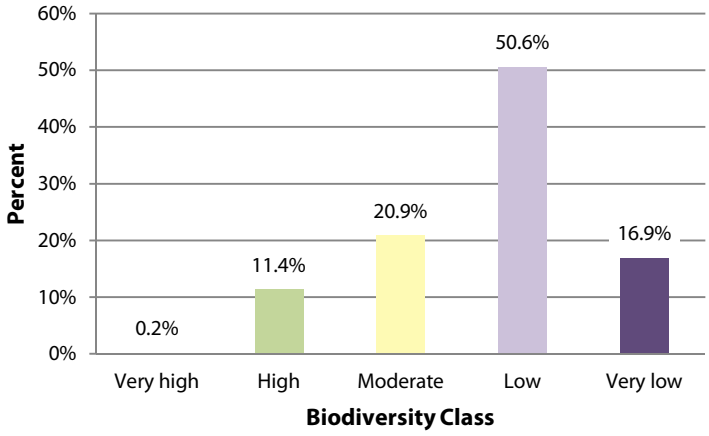


Coldstream

Biodiversity Class Summary

Biodiversity class	Area (ha)*	% of Coldstream
Very high	13	0.2%
High	759	11.4%
Moderate	1,394	20.9%
Low	3,370	50.6%
Very low	1,129	16.9%
Total	**6,665**	

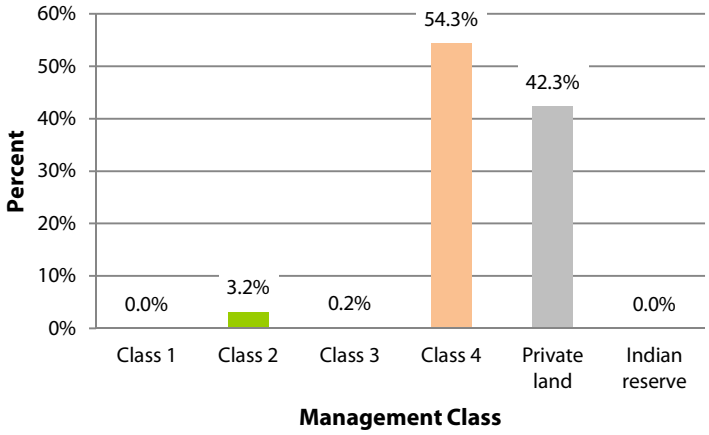
*area statistics exclude large lakes (>50ha)



Management Class Summary

Management class	Area (ha)*	% of Coldstream
Class 1 - Conservation Lands	1	0.0%
Class 2 - Dedicated Open Space	211	3.2%
Class 3 - Resource Lands	12	0.2%
Class 4 - Agriculture & Crown Leases	3,620	54.3%
Private land	2,823	42.3%
Indian reserve	0	0.0%
Total	**6,665**	

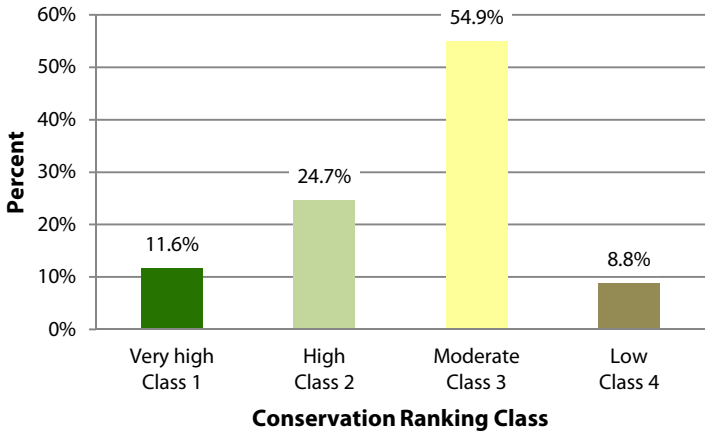
*area statistics exclude large lakes (>50ha)



Conservation Ranking Summary

Conservation ranking	Area (ha)*	% of Coldstream
Very high - Class 1	773	11.6%
High - Class 2	1,647	24.7%
Moderate - Class 3	3,660	54.9%
Low - Class 4	586	8.8%
Total	**6,665**	

*area statistics exclude large lakes (>50ha)

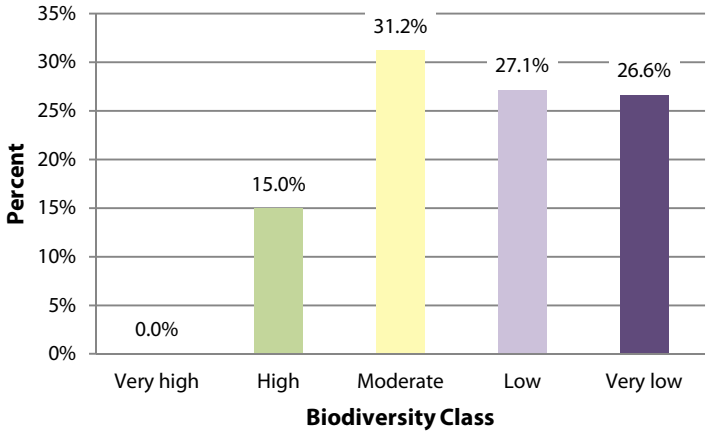


Enderby

Biodiversity Class Summary

Biodiversity class	Area (ha)*	% of Enderby
Very high	0	0.0%
High	63	15.0%
Moderate	130	31.2%
Low	113	27.1%
Very low	111	26.6%
Total	**417**	

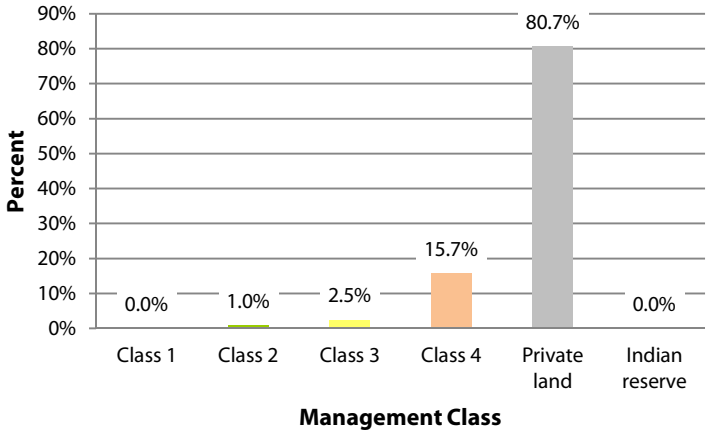
*area statistics exclude large lakes (>50ha)



Management Class Summary

Management class	Area (ha)*	% of Enderby
Class 1 - Conservation Lands	0	0.0%
Class 2 - Dedicated Open Space	4	1.0%
Class 3 - Resource Lands	10	2.5%
Class 4 - Agriculture & Crown Leases	66	15.7%
Private land	336	80.7%
Indian reserve	0	0.0%
Total	**417**	

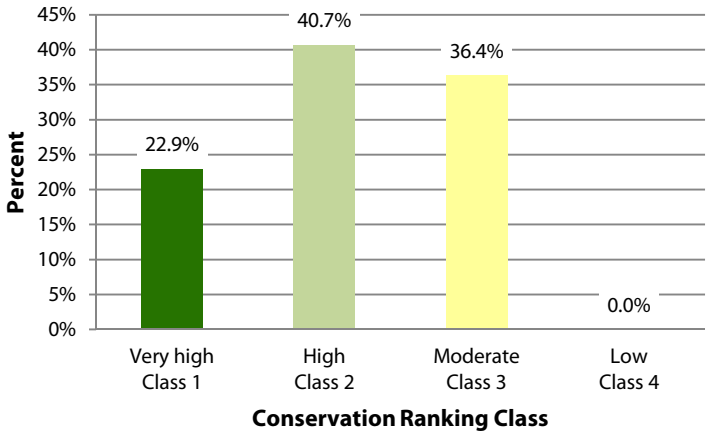
*area statistics exclude large lakes (>50ha)



Conservation Ranking Summary

Conservation ranking	Area (ha)*	% of Enderby
Very high - Class 1	96	22.9%
High - Class 2	170	40.7%
Moderate - Class 3	152	36.4%
Low - Class 4	0	0.0%
Total	**417**	

*area statistics exclude large lakes (>50ha)

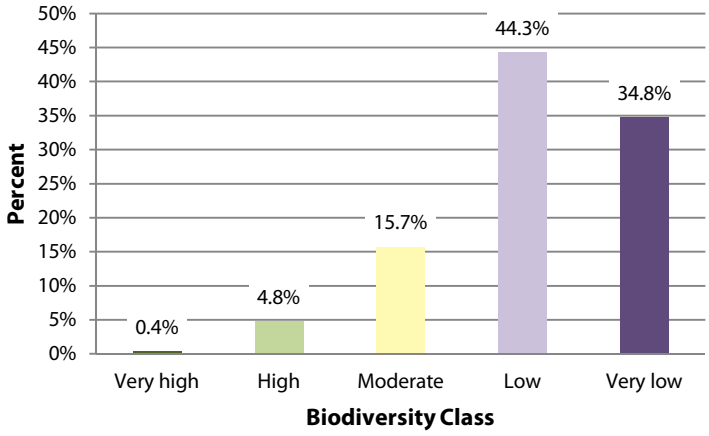


Kelowna

Biodiversity Class Summary

Biodiversity class	Area (ha)*	% of Kelowna
Very high	92	0.4%
High	1,010	4.8%
Moderate	3,343	15.7%
Low	9,420	44.3%
Very low	7,388	34.8%
Total	**21,253**	

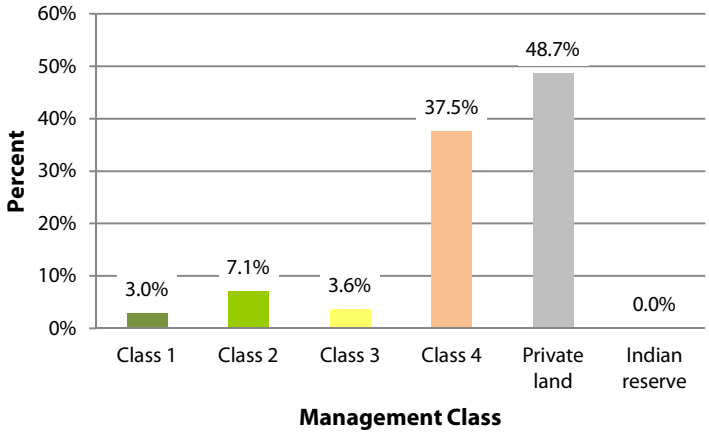
*area statistics exclude large lakes (>50ha)



Management Class Summary

Management class	Area (ha)*	% of Kelowna
Class 1 - Conservation Lands	630	3.0%
Class 2 - Dedicated Open Space	1,519	7.1%
Class 3 - Resource Lands	776	3.6%
Class 4 - Agriculture & Crown Leases	7,976	37.5%
Private land	10,351	48.7%
Indian reserve	2	0.0%
Total	**21,253**	

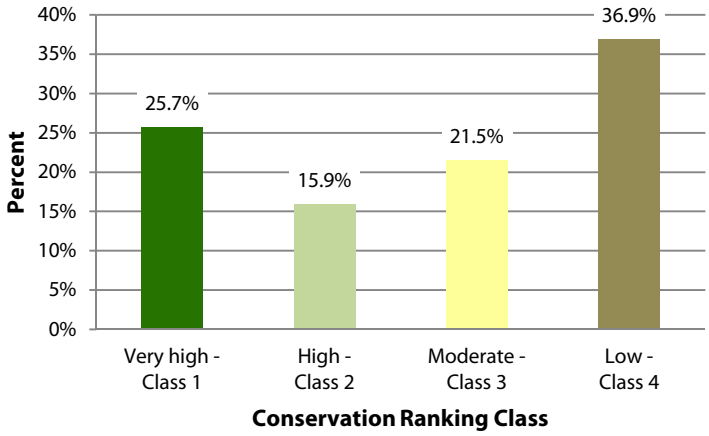
*area statistics exclude large lakes (>50ha)



Conservation Ranking Summary

Conservation ranking	Area (ha)*	% of Kelowna
Very high - Class 1	1,152	5.4%
High - Class 2	4,592	21.6%
Moderate - Class 3	9,905	46.6%
Low - Class 4	5,603	26.4%
Total	**21,253**	

*area statistics exclude large lakes (>50ha)

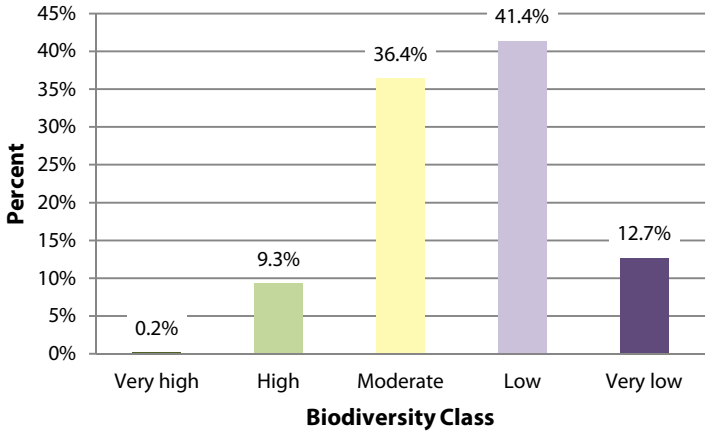


Lake Country

Biodiversity Class Summary

Biodiversity class	Area (ha)*	% of Lake Country
Very high	26	0.2%
High	1,122	9.3%
Moderate	4,401	36.4%
Low	5,003	41.4%
Very low	1,534	12.7%
Total	**12,086**	

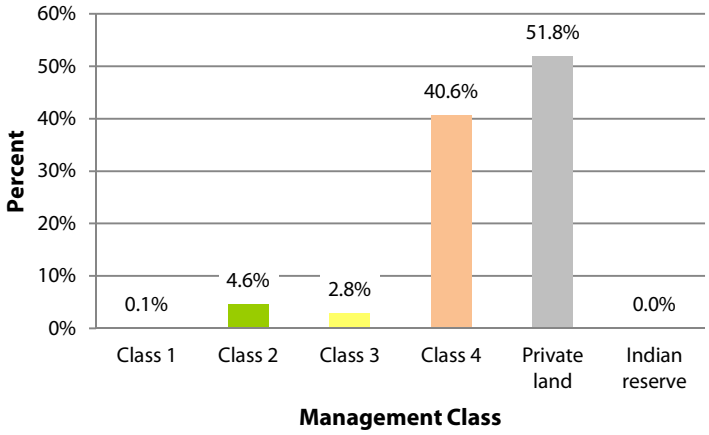
*area statistics exclude large lakes (>50ha)



Management Class Summary

Management class	Area (ha)*	% of Lake Country
Class 1 - Conservation Lands	8	0.1%
Class 2 - Dedicated Open Space	556	4.6%
Class 3 - Resource Lands	344	2.8%
Class 4 - Agriculture & Crown Leases	4,912	40.6%
Private land	6,266	51.8%
Indian reserve	0	0.0%
Total	**12,086**	

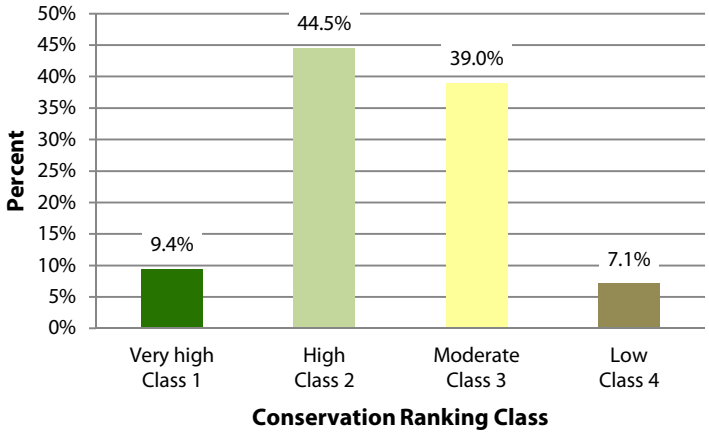
*area statistics exclude large lakes (>50ha)



Conservation Ranking Summary

Conservation ranking	Area (ha)*	% of Lake Country
Very high - Class 1	1,136	9.4%
High - Class 2	5,380	44.5%
Moderate - Class 3	4,709	39.0%
Low - Class 4	861	7.1%
Total	**12,086**	

*area statistics exclude large lakes (>50ha)

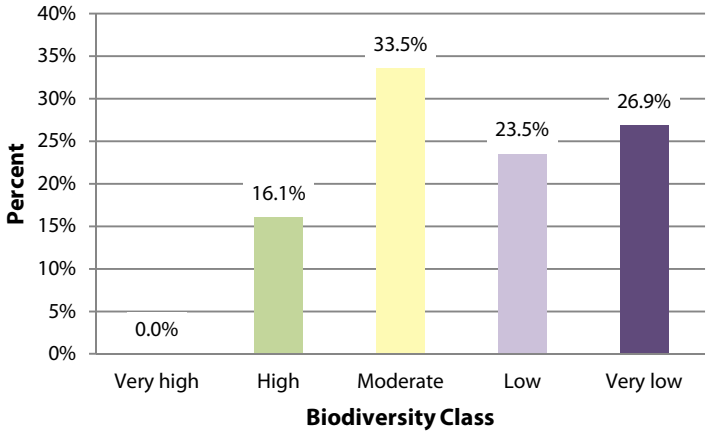


Lumby

Biodiversity Class Summary

Biodiversity class	Area (ha)*	% of Lumby
Very high	0	0.0%
High	97	16.1%
Moderate	202	33.5%
Low	142	23.5%
Very low	162	26.9%
Total	**603**	

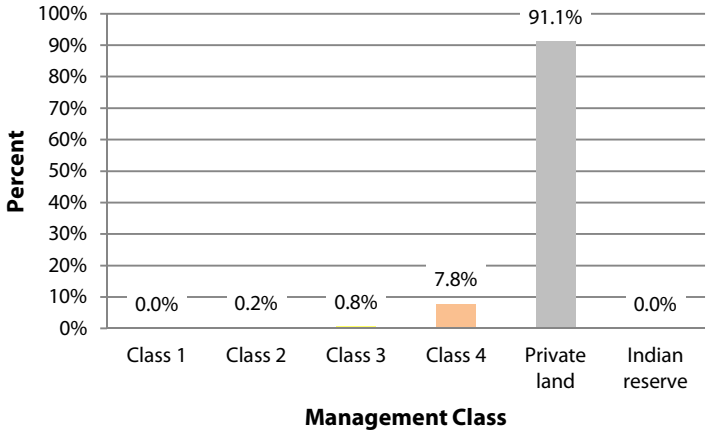
*area statistics exclude large lakes (>50ha)



Management Class Summary

Management class	Area (ha)*	% of Lumby
Class 1 - Conservation Lands	0	0.0%
Class 2 - Dedicated Open Space	1	0.2%
Class 3 - Resource Lands	5	0.8%
Class 4 - Agriculture & Crown Leases	47	7.8%
Private land	549	91.1%
Indian reserve	0	0.0%
Total	**603**	

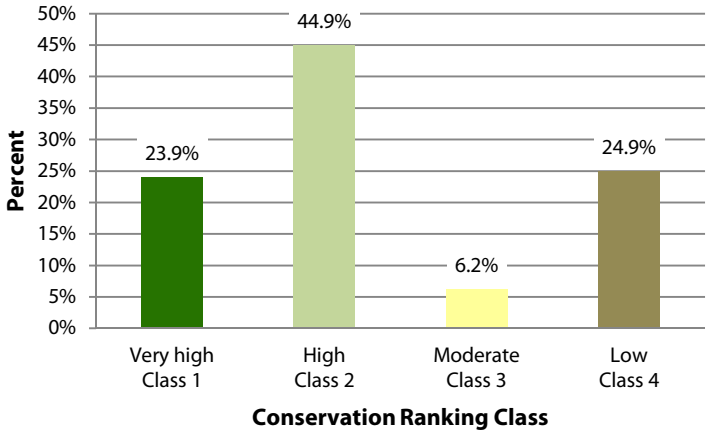
*area statistics exclude large lakes (>50ha)



Conservation Ranking Summary

Conservation ranking	Area (ha)*	% of Lumby
Very high - Class 1	144	23.9%
High - Class 2	271	44.9%
Moderate - Class 3	37	6.2%
Low - Class 4	150	24.9%
Total	**603**	

*area statistics exclude large lakes (>50ha)

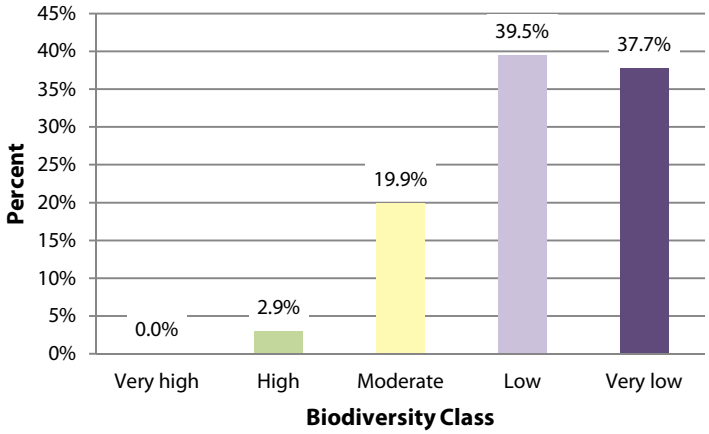


Peachland

Biodiversity Class Summary

Biodiversity class	Area (ha)*	% of Peachland
Very high	0	0.0%
High	47	2.9%
Moderate	317	19.9%
Low	630	39.5%
Very low	602	37.7%
Total	**1,596**	

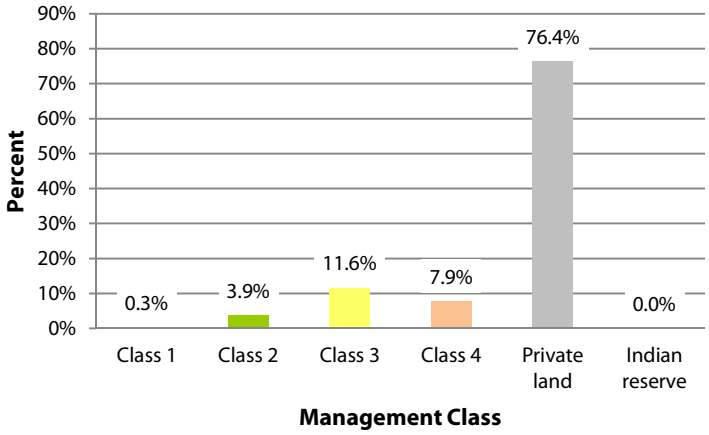
*area statistics exclude large lakes (>50ha)



Management Class Summary

Management class	Area (ha)*	% of Peachland
Class 1 - Conservation Lands	4	0.3%
Class 2 - Dedicated Open Space	62	3.9%
Class 3 - Resource Lands	185	11.6%
Class 4 - Agriculture & Crown Leases	125	7.9%
Private land	1,219	76.4%
Indian reserve	0	0.0%
Total	**1,596**	

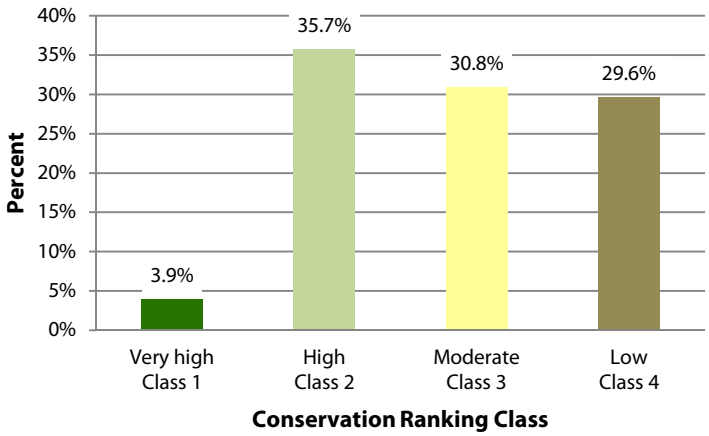
*area statistics exclude large lakes (>50ha)



Conservation Ranking Summary

Conservation ranking	Area (ha)*	% of Peachland
Very high - Class 1	62	3.9%
High - Class 2	569	35.7%
Moderate - Class 3	492	30.8%
Low - Class 4	472	29.6%
Total	**1,596**	

*area statistics exclude large lakes (>50ha)

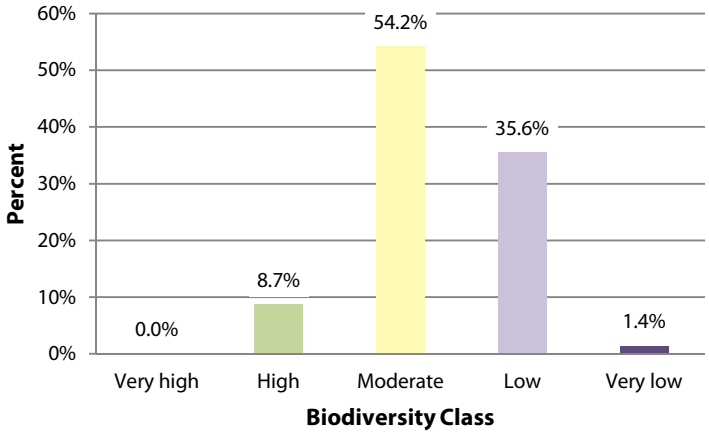


Spallumcheen

Biodiversity Class Summary

Biodiversity class	Area (ha)*	% of Spallumcheen
Very high	9	0.0%
High	2,246	8.7%
Moderate	13,980	54.2%
Low	9,168	35.6%
Very low	372	1.4%
Total	**25,774**	

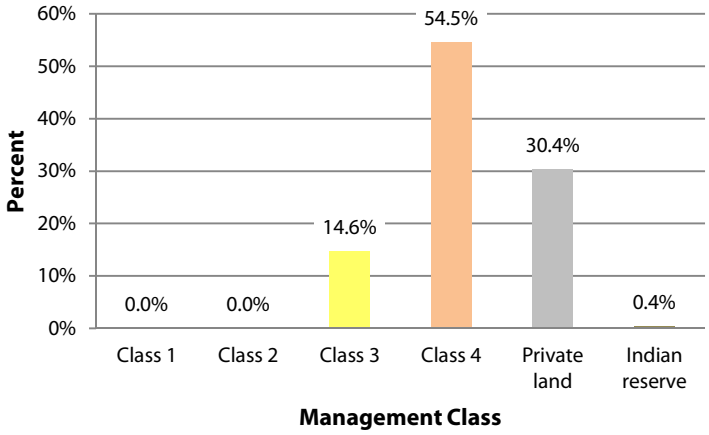
*area statistics exclude large lakes (>50ha)



Management Class Summary

Management class	Area (ha)*	% of Spallumcheen
Class 1 - Conservation Lands	0	0.0%
Class 2 - Dedicated Open Space	0	0.0%
Class 3 - Resource Lands	3,775	14.6%
Class 4 - Agriculture & Crown Leases	14,059	54.5%
Private land	7,834	30.4%
Indian reserve	106	0.4%
Total	**25,774**	

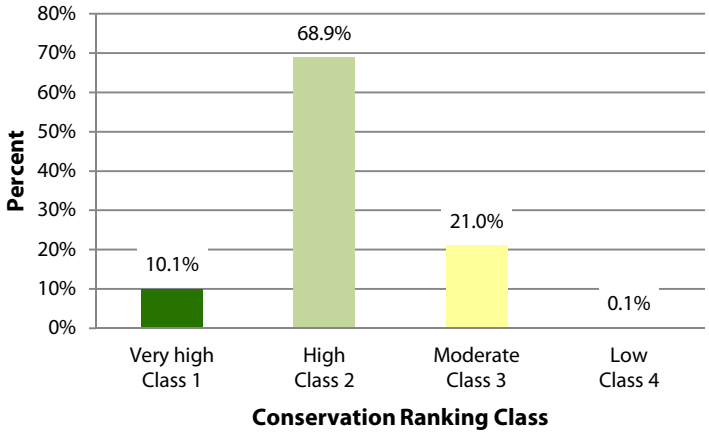
*area statistics exclude large lakes (>50ha)



Conservation Ranking Summary

Conservation ranking	Area (ha)*	% of Spallumcheen
Very high - Class 1	2,591	10.1%
High - Class 2	17,756	68.9%
Moderate - Class 3	5,406	21.0%
Low - Class 4	21	0.1%
Total	**25,774**	

*area statistics exclude large lakes (>50ha)

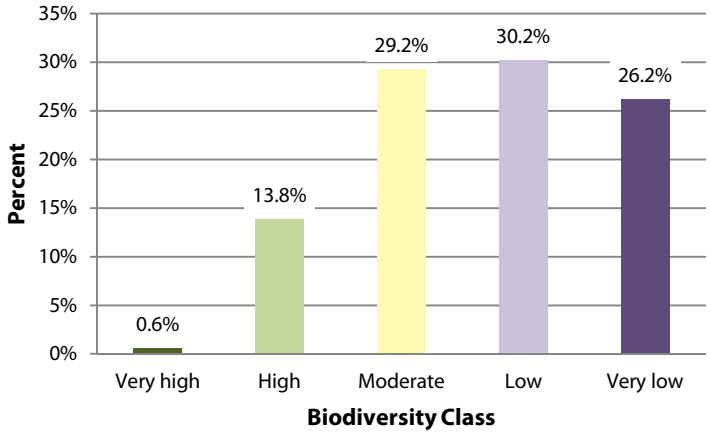


Vernon

Biodiversity Class Summary

Biodiversity class	Area (ha)*	% of Vernon
Very high	57	0.6%
High	1,340	13.8%
Moderate	2,832	29.2%
Low	2,922	30.2%
Very low	2,535	26.2%
Total	**9,685**	

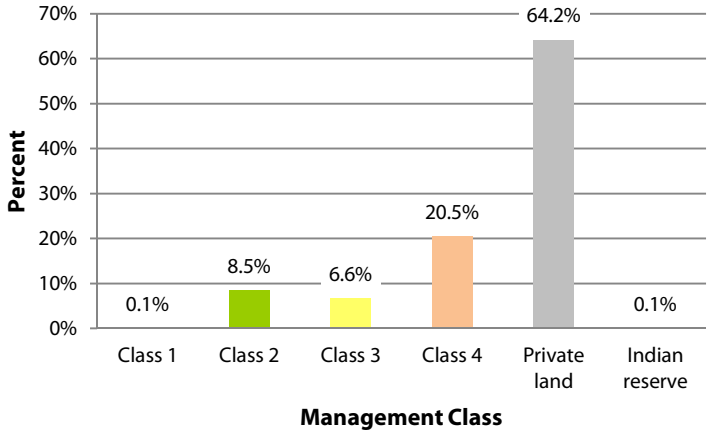
*area statistics exclude large lakes (>50ha)



Management Class Summary

Management class	Area (ha)*	% of Vernon
Class 1 - Conservation Lands	6	0.1%
Class 2 - Dedicated Open Space	826	8.5%
Class 3 - Resource Lands	644	6.6%
Class 4 - Agriculture & Crown Leases	1,983	20.5%
Private land	6,220	64.2%
Indian reserve	7	0.1%
Total	**9,685**	

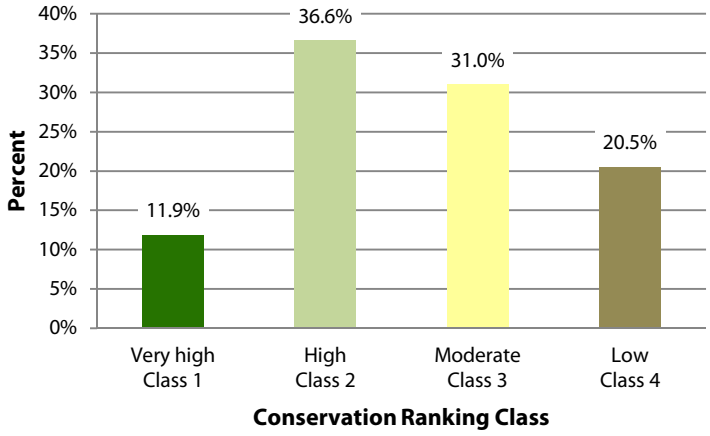
*area statistics exclude large lakes (>50ha)



Conservation Ranking Summary

Conservation ranking	Area (ha)*	% of Vernon
Very high - Class 1	1,150	11.9%
High - Class 2	3,541	36.6%
Moderate - Class 3	3,007	31.0%
Low - Class 4	1,987	20.5%
Total	**9,685**	

*area statistics exclude large lakes (>50ha)

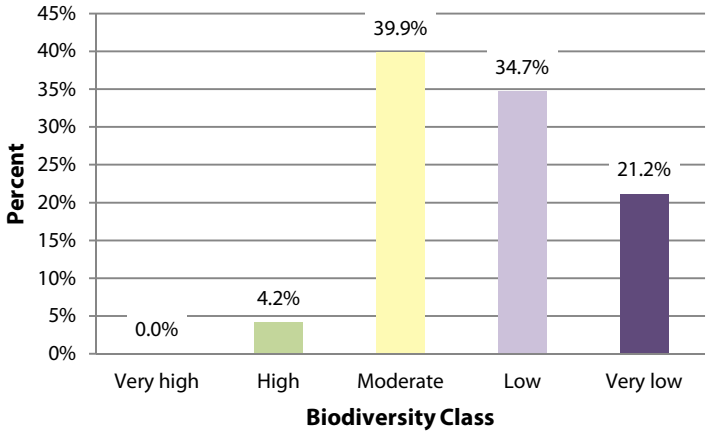


West Kelowna

Biodiversity Class Summary

Biodiversity class	Area (ha)*	% of W. Kelowna
Very high	4	0.0%
High	510	4.2%
Moderate	4,874	39.9%
Low	4,246	34.7%
Very low	2,588	21.2%
Total	**12,221**	

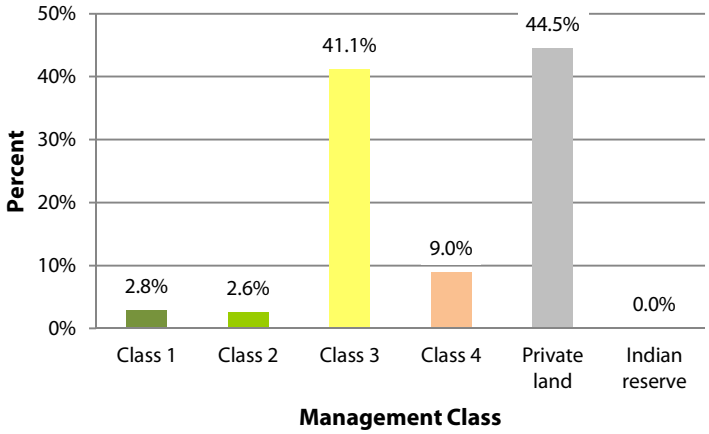
*area statistics exclude large lakes (>50ha)



Management Class Summary

Management class	Area (ha)*	% of W. Kelowna
Class 1 - Conservation Lands	348	2.8%
Class 2 - Dedicated Open Space	314	2.6%
Class 3 - Resource Lands	5,027	41.1%
Class 4 - Agriculture & Crown Leases	1,095	9.0%
Private land	5,435	44.5%
Indian reserve	2	0.0%
Total	**12,221**	

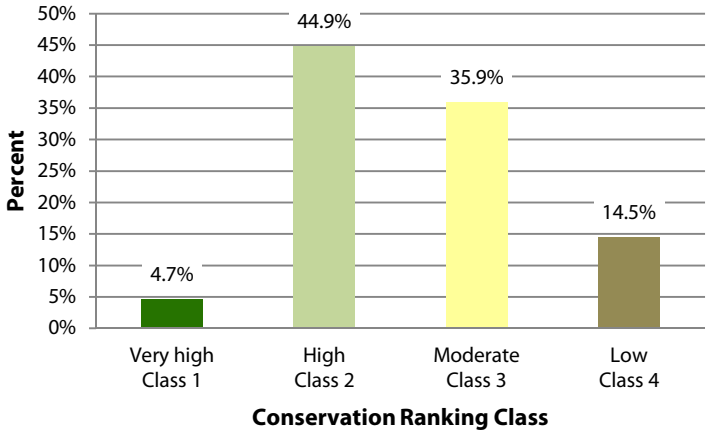
*area statistics exclude large lakes (>50ha)



Conservation Ranking Summary

Conservation ranking	Area (ha)*	% of W. Kelowna
Very high - Class 1	574	4.7%
High - Class 2	5,482	44.9%
Moderate - Class 3	4,390	35.9%
Low - Class 4	1,776	14.5%
Total	**12,221**	

*area statistics exclude large lakes (>50ha)

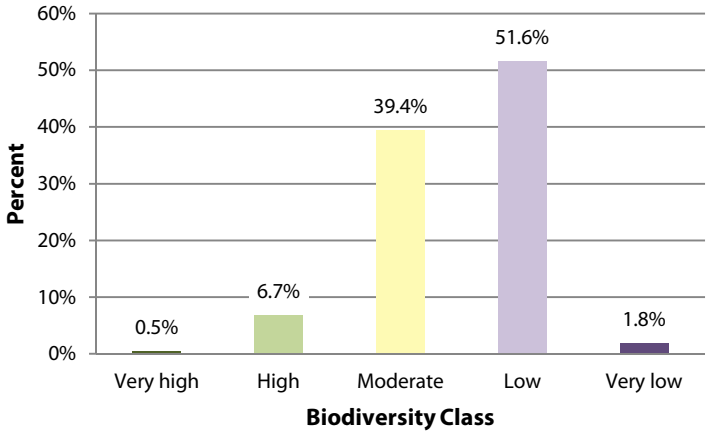


RDCO East Electoral Area

Biodiversity Class Summary

Biodiversity class	Area (ha)*	% of RDCO East
Very high	613	0.5%
High	8,322	6.7%
Moderate	48,819	39.4%
Low	63,871	51.6%
Very low	2,255	1.8%
Total	**123,879**	

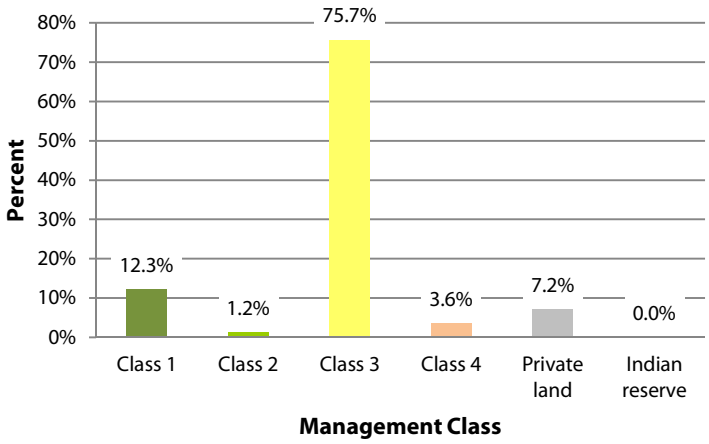
*area statistics exclude large lakes (>50ha)



Management Class Summary

Management class	Area (ha)*	% of RDCO East
Class 1 - Conservation Lands	15,237	12.3%
Class 2 - Dedicated Open Space	1,540	1.2%
Class 3 - Resource Lands	93,764	75.7%
Class 4 - Agriculture & Crown Leases	4,441	3.6%
Private land	8,891	7.2%
Indian reserve	6	0.0%
Total	**123,879**	

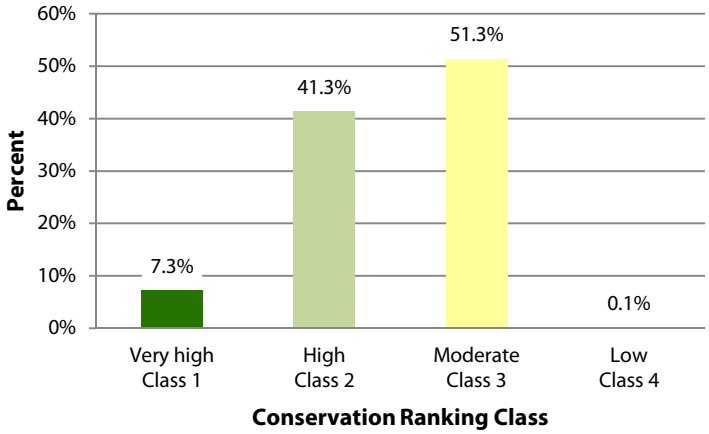
*area statistics exclude large lakes (>50ha)



Conservation Ranking Summary

Conservation ranking	Area (ha)*	% of RDCO East
Very high - Class 1	8,986	7.3%
High - Class 2	51,149	41.3%
Moderate - Class 3	63,611	51.3%
Low - Class 4	133	0.1%
Total	**123,879**	

*area statistics exclude large lakes (>50ha)

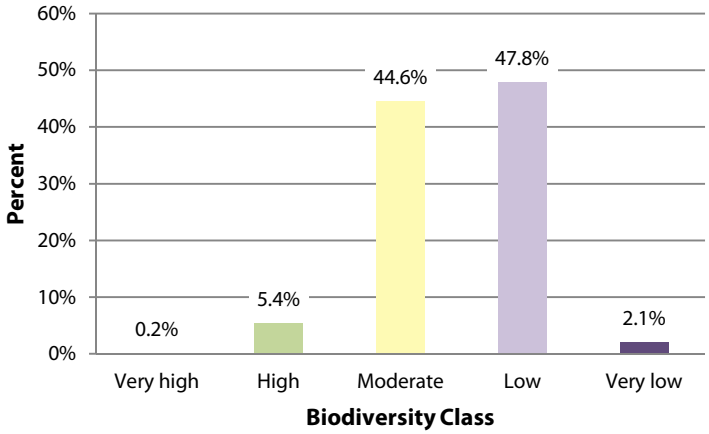


RDCO West Electoral Area

Biodiversity Class Summary

Biodiversity class	Area (ha)*	% of RDCO West
Very high	182	0.2%
High	6,321	5.4%
Moderate	52,320	44.6%
Low	56,174	47.8%
Very low	2,426	2.1%
Land Base Total	**117,423**	

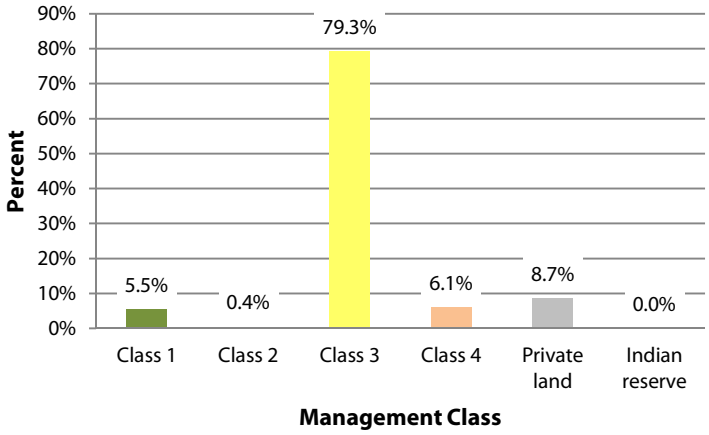
*area statistics exclude large lakes (>50ha)



Management Class Summary

Management class	Area (ha)*	% of RDCO West
Class 1 - Conservation Lands	6,412	5.5%
Class 2 - Dedicated Open Space	519	0.4%
Class 3 - Resource Lands	93,085	79.3%
Class 4 - Agriculture & Crown Leases	7,142	6.1%
Private land	10,266	8.7%
Indian reserve	0	0.0%
Land Base Total	**117,423**	

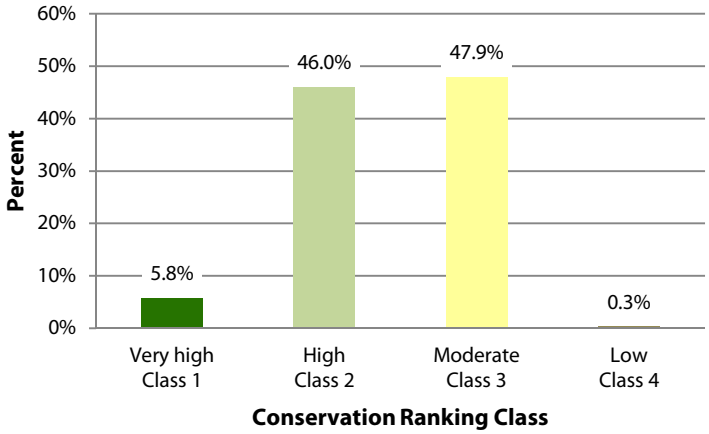
*area statistics exclude large lakes (>50ha)



Conservation Ranking Summary

Conservation ranking	Area (ha)*	% of RDCO West
Very high - Class 1	6,780	5.8%
High - Class 2	53,986	46.0%
Moderate - Class 3	56,288	47.9%
Low - Class 4	369	0.3%
Land Base Total	**117,423**	

*area statistics exclude large lakes (>50ha)

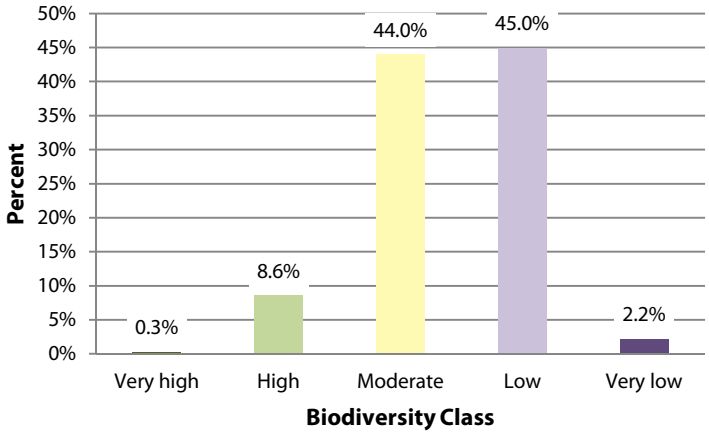


RDNO Electoral Area B

Biodiversity Class Summary

Biodiversity class	Area (ha)*	% of RDNO Area B
Very high	182	0.3%
High	4,962	8.6%
Moderate	25,426	44.0%
Low	26,020	45.0%
Very low	1,261	2.2%
Total	**57,850**	

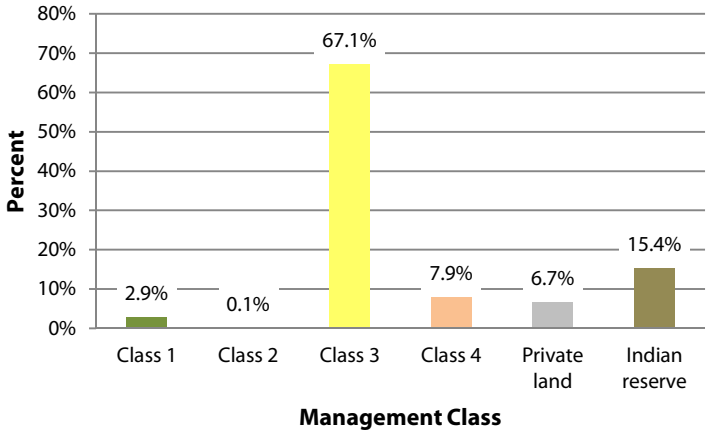
*area statistics exclude large lakes (>50ha)



Management Class Summary

Management class	Area (ha)*	% of RDNO Area B
Class 1 - Conservation Lands	1,665	2.9%
Class 2 - Dedicated Open Space	59	0.1%
Class 3 - Resource Lands	38,820	67.1%
Class 4 - Agriculture & Crown Leases	4,550	7.9%
Private land	3,851	6.7%
Indian reserve	8,905	15.4%
Total	**57,850**	

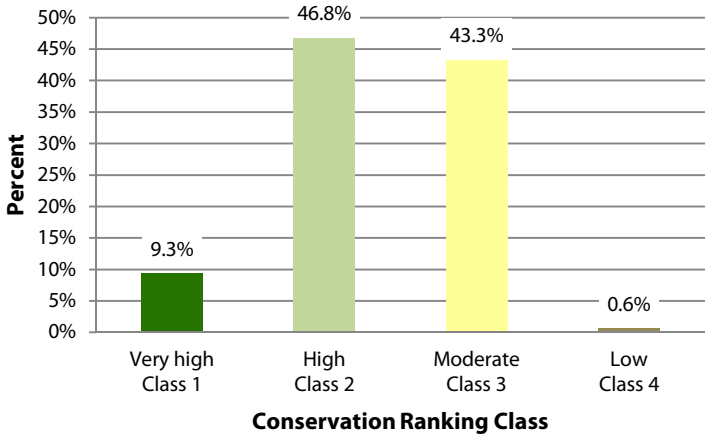
*area statistics exclude large lakes (>50ha)



Conservation Ranking Summary

Conservation ranking	Area (ha)*	% of RDNO Area B
Very high - Class 1	5,381	9.3%
High - Class 2	27,072	46.8%
Moderate - Class 3	25,027	43.3%
Low - Class 4	370	0.6%
Total	**57,850**	

*area statistics exclude large lakes (>50ha)

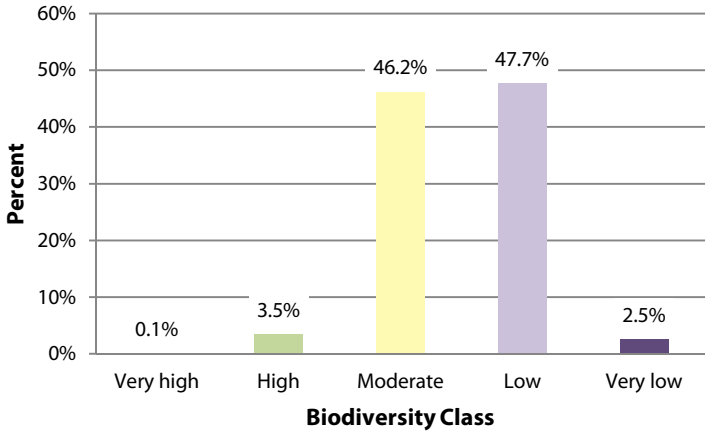


RDNO Electoral Area C

Biodiversity Class Summary

Biodiversity class	Area (ha)*	% of RDNO Area C
Very high	29	0.1%
High	1,034	3.5%
Moderate	13,800	46.2%
Low	14,266	47.7%
Very low	761	2.5%
Total	**29,889**	

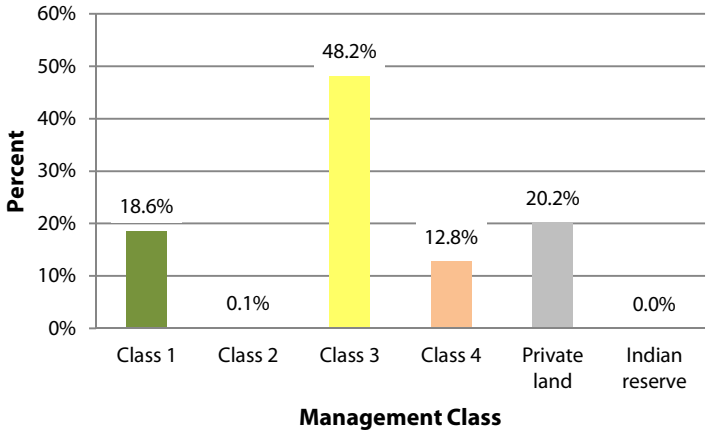
*area statistics exclude large lakes (>50ha)



Management Class Summary

Management class	Area (ha)*	% of RDNO Area C
Class 1 - Conservation Lands	5,574	18.6%
Class 2 - Dedicated Open Space	38	0.1%
Class 3 - Resource Lands	14,396	48.2%
Class 4 - Agriculture & Crown Leases	3,836	12.8%
Private land	6,046	20.2%
Indian reserve	0	0.0%
Total	**29,889**	

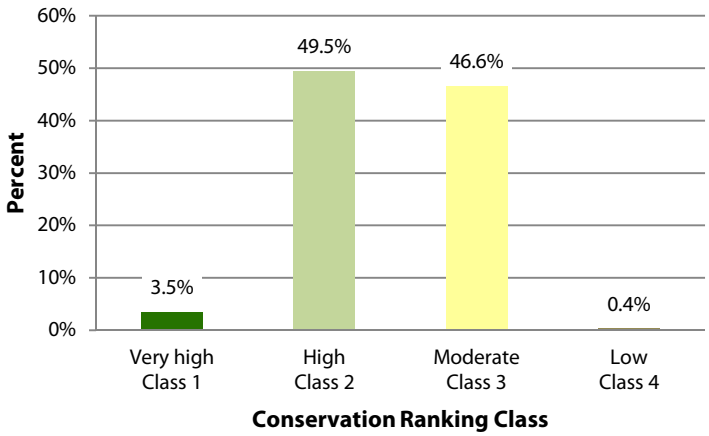
*area statistics exclude large lakes (>50ha)



Conservation Ranking Summary

Conservation ranking	Area (ha)*	% of RDNO Area C
Very high - Class 1	1,046	3.5%
High - Class 2	14,799	49.5%
Moderate - Class 3	13,924	46.6%
Low - Class 4	120	0.4%
Total	**29,889**	

*area statistics exclude large lakes (>50ha)

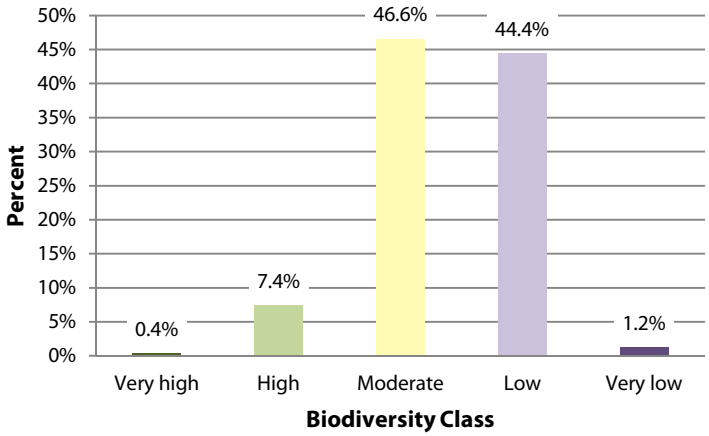


RDNO Electoral Area D

Biodiversity Class Summary

Biodiversity class	Area (ha)*	% of RDNO Area D
Very high	643	0.4%
High	13,457	7.4%
Moderate	84,258	46.6%
Low	80,316	44.4%
Very low	2,242	1.2%
Total	**180,915**	

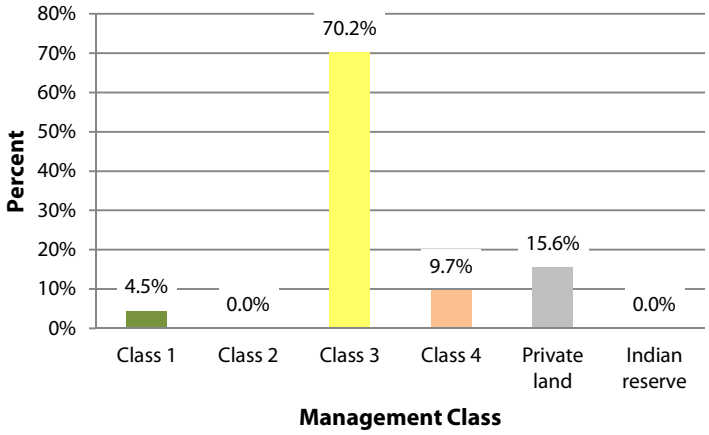
*area statistics exclude large lakes (>50ha)



Management Class Summary

Management class	Area (ha)*	% of RDNO Area D
Class 1 - Conservation Lands	8,128	4.5%
Class 2 - Dedicated Open Space	6	0.0%
Class 3 - Resource Lands	127,030	70.2%
Class 4 - Agriculture & Crown Leases	17,517	9.7%
Private land	28,234	15.6%
Indian reserve	0	0.0%
Total	**180,915**	

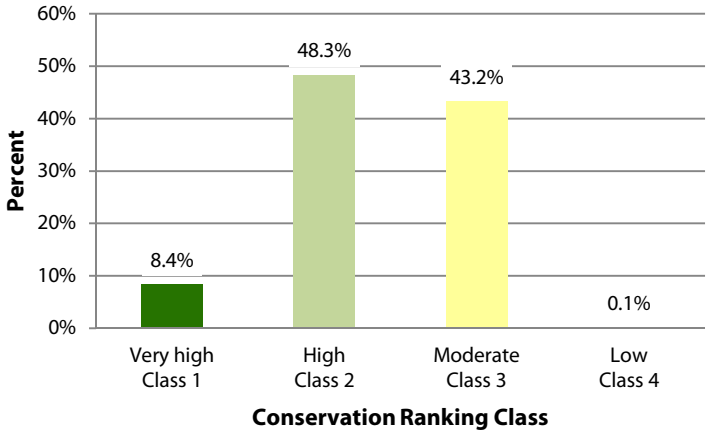
*area statistics exclude large lakes (>50ha)



Conservation Ranking Summary

Conservation ranking	Area (ha)*	% of RDNO Area D
Very high - Class 1	15,202	8.4%
High - Class 2	87,436	48.3%
Moderate - Class 3	78,168	43.2%
Low - Class 4	109	0.1%
Total	**180,915**	

*area statistics exclude large lakes (>50ha)

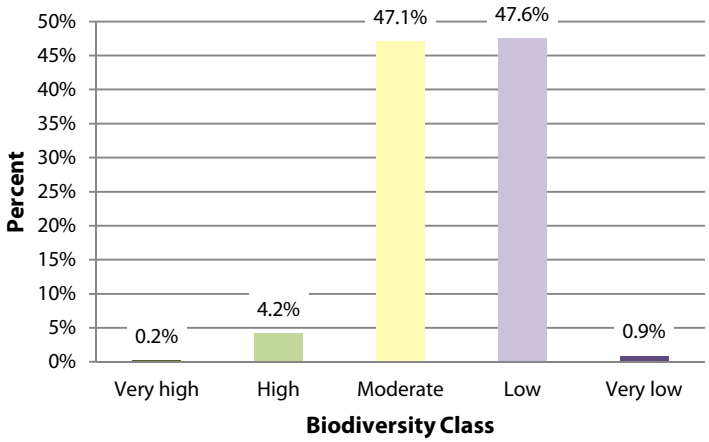


RDNO Electoral Area E

Biodiversity Class Summary

Biodiversity class	Area (ha)*	% of RDNO Area E
Very high	627	0.2%
High	11,040	4.2%
Moderate	123,111	47.1%
Low	124,413	47.6%
Very low	2,312	0.9%
Total	**261,503**	

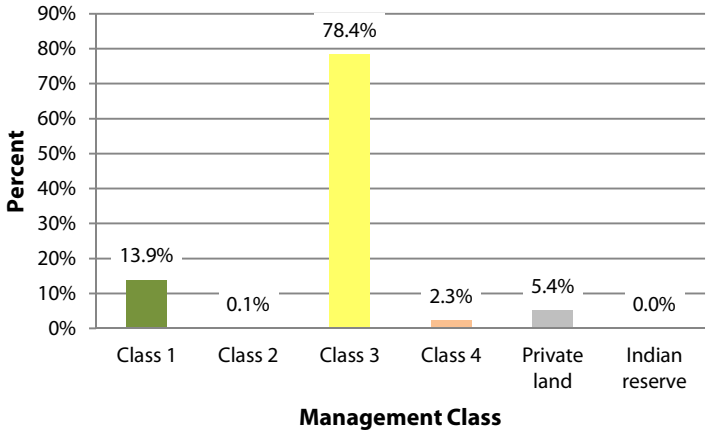
*area statistics exclude large lakes (>50ha)



Management Class Summary

Management class	Area (ha)*	% of RDNO Area E
Class 1 - Conservation Lands	36,296	13.9%
Class 2 - Dedicated Open Space	208	0.1%
Class 3 - Resource Lands	204,982	78.4%
Class 4 - Agriculture & Crown Leases	6,014	2.3%
Private land	14,002	5.4%
Indian reserve	0	0.0%
Total	**261,503**	

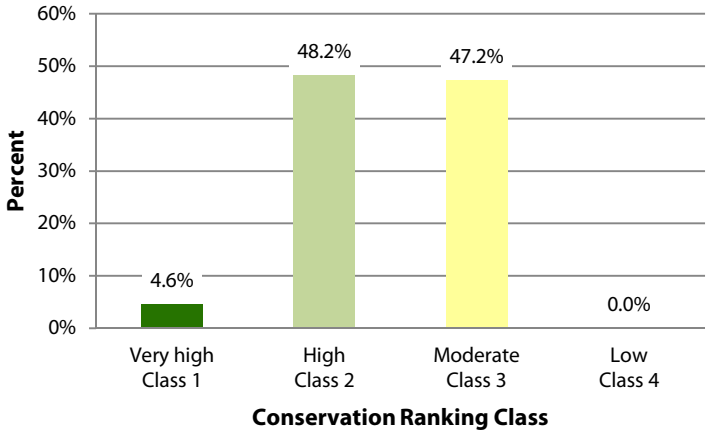
*area statistics exclude large lakes (>50ha)



Conservation Ranking Summary

Conservation ranking	Area (ha)*	% of RDNO Area E
Very high - Class 1	11,955	4.6%
High - Class 2	125,998	48.2%
Moderate - Class 3	123,512	47.2%
Low - Class 4	38	0.0%
Total	**261,503**	

*area statistics exclude large lakes (>50ha)

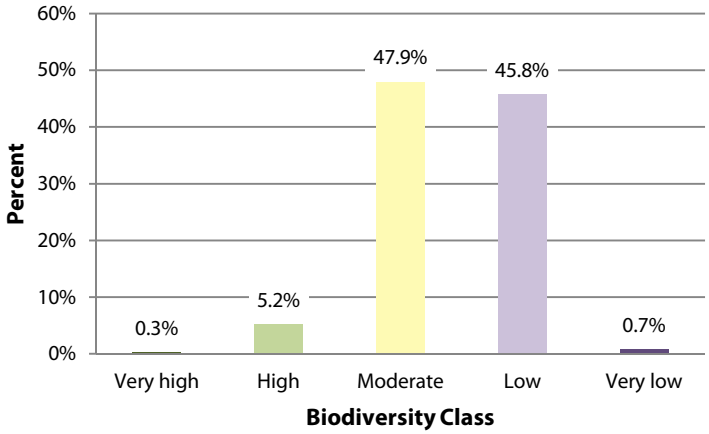


RDNO Electoral Area F

Biodiversity Class Summary

Biodiversity class	Area (ha)*	% of RDNO Area F
Very high	555	0.3%
High	9,388	5.2%
Moderate	86,112	47.9%
Low	82,247	45.8%
Very low	1,316	0.7%
Total	**179,618**	

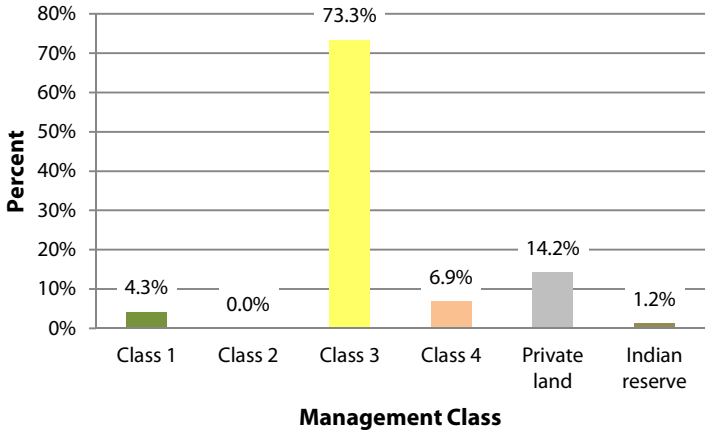
*area statistics exclude large lakes (>50ha)



Management Class Summary

Management class	Area (ha)*	% of RDNO Area F
Class 1 - Conservation Lands	7,649	4.3%
Class 2 - Dedicated Open Space	23	0.0%
Class 3 - Resource Lands	131,750	73.3%
Class 4 - Agriculture & Crown Leases	12,369	6.9%
Private land	25,593	14.2%
Indian reserve	2,235	1.2%
Total	**179,618**	

*area statistics exclude large lakes (>50ha)



Conservation Ranking Summary

Conservation ranking	Area (ha)*	% of RDNO Area F
Very high - Class 1	10,327	5.7%
High - Class 2	89,354	49.7%
Moderate - Class 3	79,934	44.5%
Low - Class 4	2	0.0%
Total	**179,618**	

*area statistics exclude large lakes (>50ha)