



Environmental Management Areas Strategy

Adopted by Council May 26, 2008

Environmental Management Areas Strategy

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1. Environmental Management Areas Strategy

The beautiful Okanagan valley setting of Vernon is characterized by forested hillsides to the south and east and arid, semi-desert hillsides to the north and west. Lakes, rivers and ponds dominate the landscape and provide easily accessible recreational opportunities. These unique characteristics contribute to the attractiveness of Vernon as a beautiful place to live and vacation for tourists and seasonal and permanent residents. Vernon's hillsides, natural features and unique ecosystems are valuable scenic and recreational resources, and contribute environmental services which enhance the high quality of life enjoyed by residents and visitors alike.

Unlike so many other cities, which are working to reclaim and reinstate ecosystems and natural features, the city of Vernon has the unique and enviable opportunity to grow into a beautiful, balanced and sustainable city. There are many challenges in this process, and changes will need to be made, but these challenges and changes are not beyond what can be achieved. The protection of the natural beauty of the city's setting, Vernon's most valuable asset, will ensure Vernon remains a highly livable, attractive and memorable place to live, work or play.

The City of Vernon has the opportunity to learn from the choices made by cities around us with similar challenges, so we can build on the experience of others. As a result, the City of Vernon is poised to move forward and rise to the challenges ahead.

Environmental management is not just about ecosystem protection, although this is a central component of the Environmental Management Areas (EMA) Strategy. Many features of a livable and well designed city can both enhance and impact the natural areas on which a city is built. As part of the OCP review process, public consultation was held which resulted in the identification by Vernon residents of several environmental management priorities, as well as the nine Guiding Principles which direct the OCP and its implementation.

The environmental management priorities include air and water quality, the protection of natural areas and wildlife habitat, alternative energy and alternative transportation. Of these, all but alternative energy and transportation are addressed in the EMA Strategy. Alternative energy and transportation will be addressed in the Sustainability and Transportation sections of the OCP. Of the nine Guiding Principles, two in particular have guided the development of this strategy: to protect and preserve green spaces and sensitive areas and to create a culture of sustainability. Under these directives as identified by Vernon residents and endorsed by Council, the EMA strategy has been developed.

The EMA Strategy is intended to provide an effective, transparent and biophysically appropriate strategy to provide guidance in land use decision making in the City of Vernon. This comprehensive goal of the EMA Strategy is intended to apply across all management areas, and is not restricted in its applicability to any specific management area or area of concern.

To accomplish this goal, the following objectives have been identified:

- to protect open spaces, environmentally sensitive areas and access to natural amenities which support and facilitate the high quality of life found in Vernon;
- to manage development in such a way as to avoid negative impacts on the natural features and environmentally significant areas which ensure ecosystem resilience;
- to support the reduction, prevention and mitigation of pollution and its sources in the air, water and soils of Vernon; and
- to protect, conserve, restore and enhance natural areas.

The EMA Strategy identifies key critical ecosystems and natural features essential to the quality of life and attractiveness of Vernon. This strategy provides guidelines aimed at the protection, maintenance and enhancement of the beauty of the area that provides the natural physical foundation for Vernon while acknowledging the need to accommodate growth.

Sensitive ecosystems, significant natural features, recreation, municipal infrastructure, housing, accessibility, employment and the provision of environmental services for residents and visitors are all

interconnected. To ensure that Vernon's livability continues to grow with the community, the connections between the environment in which the city has been built and the services provided to all who enjoy Vernon are supported. Through ridgeline protection and steep slope management, viewscales are protected, recreational opportunities are maintained, water quality and availability are protected, and agricultural lands and wildlife habitat areas are protected. These connections are intrinsic to the quality of life in Vernon, and through the protection and enhancement of significant natural features and ecosystems, a high quality of life will continue to grow with the community.

The Environmental Management Areas were chosen to act as an overlay to work in coordination with other zoning and development guidelines and procedures. The EMA strategy has been developed to provide clear direction of the treatment of existing natural area features, significant habitats and protected areas on an environmental management area basis. This management area approach is intended to simplify the process of identifying the areas which contain sensitive ecosystems and natural features, and to clarify expectations for environmental surveys, habitat assessments and land use requirements to be conducted as part of the development permit process for each management area.

Environmentally Sensitive Areas are defined by the presence of key natural features. These features are outlined below by Management Area (Table 1). The presence or proximity of one or more key natural features triggers the need for area specific environmental assessment as outlined in Appendix 5 of this document, *Draft EMA Implementation Guidelines*.

The following table provides a general outline of the natural features and sensitive ecosystems identified as requiring consideration in each Management Area.

| Key Natural Features | Area 1 | Area 2 | Area 3 |
|--|---------------|---------------|---------------|
| Creek, Stream, River | X | X | X |
| Fish Habitat | X | X | X |
| Wildlife and Bird Habitat | X | X | X |
| Heritage Trees | X | X | X |
| Migratory Bird Habitat | X | X | X |
| Lakeshore | | X | X |
| Wetland, Pond | | X | X |
| Ravines | | X | X |
| Threatened or Endangered Species Habitat | | X | X |
| Steep Slopes | | X | X |
| Sensitive and Significant Ecosystems | | X | X |
| Ridgelines | | | X |
| Hill Tops | | | X |

Table 1: Natural Features and Sensitive Ecosystem Types by Management Area

Environmental Management Areas are outlined on the *EMA Strategy Map* in Appendix 1. The Sensitive Ecosystem Inventory (SEI) polygon areas provide the foundation for the strategy, supported by municipal bylaws and provincial and federal regulations and guidelines, as applicable. The applicable regulations, guidelines and bylaws are summarized in Appendix 5, *EMA Issues and Related Regulatory Implications*.



2. Environmental Development Permit Areas and the Local Government Act

The *Local Government Act* allows municipalities to designate Development Permit Areas for the protection of the natural environment, its ecosystems and biological diversity. The EMA Strategy sets out guidelines and management strategies to achieve these goals in accordance with the Development Permit Areas to be set out in the OCP. These DP areas have been established to follow the three district areas which are identified in the land use plan.

To streamline the permitting process, and to provide clear and consistent implementation of the EMA Strategy, environmental permitting will be undertaken as part of the development permit process, to varying degrees of intensity by district. Instead of requiring separate Riparian Development Permits and Environmental Development Permits, site appropriate environmental requirements will be built into a single streamlined, development permit process.

To ensure that environmental requirements do not impede development permit application processing, environmental requirements will be separated by application type, as appropriate, based on natural features onsite and the stage of development currently underway.

Proposed EMA Strategy implementation and inclusion of environmental requirements in the development permitting process are discussed in more detail in Appendix 6, *Environmental Management Areas Strategy Implementation Guidelines*.



3. Management Area Approach to Conservation and Ecosystem Service Protection Issues

Sensitive Ecosystem Inventory (SEI) mapping data from the three SEI projects (Bella Vista – Goose Lake Range, Vernon Commonage, and Coldstream – Vernon) were provided to the City of Vernon, as coordinated by the Allen Brooks Nature Centre. These SEI projects were undertaken under the direction and with the funding of the following organizations: the Okanagan Indian Band, the Ministries of Environment and Sustainable Resource Management, the City of Vernon, Greater Vernon Services Commission, the Allen Brooks Nature Centre, Okanagan University College, FORECON Consulting Service and the Real Estate Foundation.

The SEI map provided in Appendix 1, *EMA Strategy Map*, identifies ecosystem areas of low, moderate and high ecosystem sensitivity, and the EMA maps show how the management areas correspond with the existing development pattern, slope conditions and sensitive ecosystem areas. These maps have been compared to other biophysical inventories, zoning and land use maps of Vernon to determine appropriate EMA areas and corresponding strategies. Analysis of the background information and ecological data, including the SEI data and sensitivity polygon maps, the development history of the city, and the management challenges facing the City of Vernon, resulted in the identification of three management areas which cover all land use areas in the city of Vernon.

Each Management Area is characterized by a different proportion of identified low, moderate and high sensitivity ecosystem polygons, with the proportions reflecting different levels of significance for conservation and protection emphasis, and each having increasing implications for development. High sensitivity polygons (red polygons) would require highly detailed development permit applications, and would restrict development or increase environmental management demands based on site specific inventories and SEI inventories.

Moderate sensitivity polygons (yellow polygons) would limit development to a lesser degree, responding to property specific conditions and the presence or absence of key natural and habitat features, but also requiring conservation, protection and mitigation planning as part of development permit application materials.

Low sensitivity polygons (green polygons) would require the lowest level of conservation and protection planning, but would require property specific environmental information to contribute to the environmental management strategies developed as part of the development process.

While protection of critical areas is important to quality of life in Vernon, allowing reasonable use of land is also important. Maintaining the livability of Vernon requires balancing the protection of sensitive and significant areas with the provision of development opportunities. The Environmental Management Areas Strategy is designed to ensure these sensitive and significant ecosystem and natural features are protected and enhanced while continuing to provide reasonable potential for development when taking into account the entire property.

Each Management Area has its own unique challenges, while sharing a number of overlapping key natural features and sensitive ecosystems. Regardless of which Management Area a proposed development occurs in, EMA considerations and permitting requirements will be triggered by the presence or proximity of one or more key natural features, as outlined in Appendix 6, *Environmental Management Areas Strategy Implementation Guidelines*. To continue to ensure ongoing environmental resilience and overall quality of life, the precautionary principle will be used in the absence of complete site condition information accompanying a development application, limiting development and land use activities until the uncertainty is sufficiently resolved.

4. Environmental Management Area 1 – City Centre District

Management Area 1 (MA1) is an area of significance for downtown revitalization and urban redevelopment where there are few significant environmental challenges. The Sensitive Ecosystem Inventory (SEI) study coordinated by the Allen Brooks Nature Centre did not identify any high sensitivity ecosystems within the area of MA1. This does not mean that there are no environmental challenges to be managed in this area. The challenges are those of reclamation, enhancement and environmental quality improvements.

Environmental challenges identified in MA1 include stormwater management and water quality mitigation, xeriscaping and landscaping choices, creek reclamation and enhancement, heritage and street tree protection, and the enhancement of urban green spaces throughout the downtown area.

The goal and objectives for MA1 reflect the challenges and opportunities of specific relevance in this management area.

Goal To identify opportunities to protect and enhance environmentally significant features and to encourage the rehabilitation of previously impacted natural areas.

Key Issues Environmental management issues in MA1 are limited to riparian area protection, enhancement and reclamation; stormwater management; landscaping and tree protection; and the creation and maintenance of parks and green space.

Sensitive Areas to be Protected
There are no SEI identified high sensitivity ecosystem areas identified in MA1.

Management Area 1 Challenges, Objectives and Proposed Implementation

| Challenge | Objective | Implementation |
|--|--|--|
| Improve green spaces and habitat in the City Centre District | Drought Tolerant and Native Landscaping | Promote the use of native, drought tolerant plants in City landscaping, public streets and outdoor open spaces |
| | | Encourage the use of native, drought tolerant species and xeriscaping in public spaces created through development |
| | Protect trees and enhance urban forest cover | Encourage retention of trees outside of development footprint immediately prior to and during development and redevelopment |
| | | Promote planting of native tree species to provide shade and rainwater and snowmelt retention and infiltration within the City Centre District |
| | Community Garden and Public Recreation Space | Promote the creation of community gardens |
| | | Encourage public/private green space creation during redevelopment |
| Ecosystem | Enhance, daylight, and | Ensure redevelopment includes riparian area |

| Challenge | Objective | Implementation |
|-------------|---|---|
| enhancement | conserve riparian areas | <p>enhancement and native species planting to enhance previously impacted watercourses within property boundaries</p> <p>Encourage conservation covenant use to protect riparian buffers</p> <p>Promote creation of public trails adjacent to riparian buffer areas to provide continuous trail system connections</p> |
| | Ensure stormwater management and water quality protection in Vernon and BX Creeks | <p>Promote stormwater quality protection through storm drain marking program</p> <p>Promote awareness of relationship between stormwater, rainfall and snowmelt to lakes, ponds and wetlands throughout Vernon</p> <p>Promote onsite recharge and infiltration through a to maintain hydrologic conditions and protect water quality and quantities draining into Vernon and BX Creeks</p> <p>Ensure new development and redevelopment address stormwater quality, quantity, reuse and infiltration</p> |
| | Conserve and improve avian habitat | <p>Promote tree planting activities throughout the City Centre District to ensure multi species avian habitat resilience</p> |

5. Environmental Management Area 2 - Neighbourhood District

Environmental Management Area 2 (MA2) includes the established neighbourhoods and developed areas of Vernon. This area is significant for its neighbourhood enhancement and community development opportunities, while containing a limited number of environmental challenges.

The SEI study identified riparian areas as sensitive ecosystems of concern in MA2. In this area, riparian areas include creeks, streams, lake shore habitats and wetlands. This does not mean that there are no other environmental challenges to be managed in this area. The challenges are those of reclamation, enhancement and environmental quality improvements.

The goal and objectives for MA2 reflect the challenges and opportunities of specific relevance in this management area. The goals and objectives of MA1 also apply to MA2, as appropriate.

Goal To identify opportunities to protect, conserve and enhance environmentally significant features and to encourage environmental stewardship and awareness throughout established Vernon neighbourhoods.

Key Issues Environmental management issues identified in MA2 consist of wildlife habitat and corridor conservation; gully protection; lake shore and wetland enhancement and protection; moderate sensitivity ecosystem management; moderate slope protection; and management of the interface between residential, agricultural and park lands.

In addition, all of the environmental management issues identified for MA1 require management and careful consideration in MA2. These shared management issues include riparian area protection, enhancement and reclamation; stormwater management; landscaping and tree protection; and the creation and maintenance of parks and green space.

Sensitive Areas to be Protected

SEI identified sensitive ecosystems in MA2 include riparian areas, consisting of streams, creeks, wetlands, and lakeshore areas, as well as all associated wildlife habitats and potential wildlife corridor areas.

Management Area 2 Challenges, Objectives and Proposed Implementation

| Challenge | Objective | Implementation |
|--------------------------------------|---|---|
| Ecosystem enhancement and protection | Conserve and protect avian habitat | Promote tree planting activities throughout the Neighbourhood District to ensure multi species avian habitat resilience |
| | Conserve and protect wildlife habitat and corridors | Promote awareness of wildlife habitat within the city |
| | | Encourage local property owners to include native plants in their gardens |
| | | Promote awareness of wildlife needs for water access and sites of likely wildlife corridors in neighbourhoods |

| Challenge | Objective | Implementation |
|--|---|--|
| | Protect sensitive ecosystems including moderate sensitivity SEI areas | <p>Identify sensitive ecosystems within the Neighbourhood District</p> <p>Promote increased awareness of the significance of sensitive ecosystems and habitats within the Neighbourhood District</p> |
| Aquatic habitat protection and enhancement | Ensure stormwater management and water quality protection into Okanagan Lake and Vernon and BX Creeks | <p>Promote the retention of hydrologic conditions onsite to maintain predevelopment conditions</p> <p>Promote stormwater quality protection through storm drain marking program</p> <p>Promote awareness of relationship between stormwater, rainfall and snowmelt to lakes, ponds and wetlands throughout Vernon.</p> <p>Ensure new development addresses stormwater quantity, quality, reuse and infiltration.</p> |
| | Creek, pond and wetland protection and habitat enhancement | <p>Ensure redevelopment includes riparian area enhancement and native species planting to enhance previously impacted watercourses within property boundaries</p> <p>Encourage community stewardship initiatives and support programs which raise community awareness of riparian area protection</p> <p>Encourage daylighting and recovery of channelized and piped sections of Vernon and BX Creeks</p> |
| | Lakeshore Protection and Enhancement | <p>Promote awareness of lakeshore habitat sensitivities and methods for protecting the lakeshore</p> <p>Ensure that shoreline habitat mapping is used in dock siting and RAR assessments for lakeshore properties</p> |
| Conserve and enhance previously disturbed and impacted areas | Drought Tolerant Landscaping | <p>Promote the use of native, drought tolerant plants in landscaping and gardens throughout the Neighbourhood District.</p> <p>Promote the use of native, drought tolerant species and xeriscaping in green and public spaces created through development</p> |
| | Protect trees and enhance urban forest cover | Encourage retention of trees outside of development footprint immediately prior to and during development and redevelopment |

| Challenge | Objective | Implementation |
|-----------|-----------|----------------|
|-----------|-----------|----------------|

Promote planting of native tree species to provide shade and rainwater and snowmelt retention and infiltration within the Neighbourhood District

6. Environmental Management Area 3 – Hillside Residential and Agricultural District

Management Area 3 (MA3) is the largest management area in Vernon, with the most diverse landscapes, the greatest biodiversity, most expansive views and the most greenfield lands. As a result, MA3 has the greatest number of environmental management opportunities and challenges.

MA3 contains all of the remaining agricultural, forested, wildlife habitat and greenfield lands within the City of Vernon limits. The Sensitive Ecosystem Inventory (SEI) identified moderate and high sensitivity areas throughout MA3, which, in combination with infrastructure expansion costs, hillside development challenges and seasonal residential resort use patterns, increase both the requirement for excellence in responding to the environmental challenges and the provision of profound opportunities for unique, innovative solutions which could become characteristic of development and sensitive ecosystem protection throughout this area.

The goal and objectives for MA3 reflect the challenges and opportunities of specific relevance in this management area. The goals and objectives of MA1 and MA2 also apply to MA3 as appropriate.

Goal To protect and conserve sensitive ecosystem areas and environmentally significant features and to encourage the rehabilitation of previously impacted natural areas.

Key Issues Environmental management issues have been identified as unique to this area, necessitating site specific management adaptations to be created in response to specific site conditions and proposed land use. Those environmental management issues identified specifically for this area include steep slope management; ridgeline and hilltop protection; grassland and rangeland management and protection; invasive species management; protection of biodiversity; maintenance of ecosystem function; forest land and fire protection; ALR – residential interface areas management; reclaimed water use; moderate and high sensitivity ecosystem protection and management; and hazard land exclusions from use.

In addition to the environmental management issues identified specifically for MA3, those issues identified in MA1 and MA2 will also require consideration, with management strategies adapted to the site conditions present on proposed development sites. All identified environmental management issues are outlined, with reference to relevant regulations, bylaws, policies and guidelines in Appendix 5, *EMA Issues and Related Regulatory Implications*.

Sensitive Areas to be Protected

The SEI identified sensitive ecosystem areas in MA3 include riparian areas of all types, grassland and disturbed grassland ecosystems, forested ecosystems, and sparsely vegetated ecosystems. In addition to those areas identified by SEI analysis, MA3 contains natural features of interest including ridgelines, hilltops, and steep slopes.

Management Area 3 Challenges, Objectives and Proposed Implementation

| Challenge | Objective | Implementation |
|--------------------------------|---|---|
| Sensitive Ecosystem Protection | Greenfield ecosystem mapping and environmental assessment | Ensure verification of SEI polygon rankings and site conditions through ground truthing and mapping at a 1:5000 scale. Encourage awareness of significance of identified ecosystem and habitat sensitivities |

| Challenge | Objective | Implementation |
|--|--|---|
| | | <p>Promote voluntary conservation and protection of sensitive and critical ecosystems and habitats</p> <p>Promote awareness and education of grassland, rangeland and forest ecosystems as appropriate for site conditions</p> <p>Ensure that areas set aside for conservation, protection and enhancement are supported through interpretive signage and ecosystem information including tools for living in and around sensitive habitats and ecosystems.</p> |
| | Conserve and protect wildlife habitat and corridors | <p>Ensure new development protects habitat for sensitive and protected species identified during environmental assessment process</p> <p>Ensure new development provides habitat connectivity through the creation of wildlife corridors</p> <p>Ensure wildlife habitat areas are not sited so as to create conflicts between wildlife and residents</p> |
| Forest Ecosystem Conservation | Forest stand protection | <p>Encourage the conservation of forest stands outside of development footprints in collaboration with fire interface regulations</p> <p>Promote the protection of forest habitats through the maintenance of canopy cover, multi-story stands and maintenance of understory plants and debris</p> <p>Ensure forest habitat connectivity</p> |
| Riparian Areas Protection | Creek, pond and wetland protection and habitat enhancement | <p>Ensure development includes riparian area enhancement and native species planting to enhance conserve predevelopment riparian habitat function.</p> <p>Ensure riparian buffers are established and protected through the development phase and long term use of the development.</p> |
| | Lakeshore protection and enhancement | <p>Promote awareness of lakeshore habitat sensitivities and methods for protecting the lakeshore</p> <p>Ensure that shoreline habitat mapping is used in dock siting and RAR assessments for lakeshore properties</p> |
| Greenfield Development Impact Mitigation | Develop appropriate stormwater, drainage and groundwater onsite management plans | Ensure onsite stormwater, groundwater and snowmelt management plans are created to maintain predevelopment site hydrology for new development and redevelopment |

| Challenge | Objective | Implementation |
|-----------|-----------|----------------|
|-----------|-----------|----------------|

| | | |
|--|---|--|
| | | <p>Promote the use of pervious surfaces, infiltration measures and protection of landscape level drainage patterns.</p> <p>Promote awareness of relationship between stormwater, rainfall and snowmelt to lakes, ponds and wetlands.</p> <p>Promote the maintenance of landscape level hydrology through limited irrigation use and drought resistant landscaping.</p> |
| | Native species and drought tolerant landscaping | <p>Promote the use of native, drought tolerant plants in landscaping, residential yards and shared green spaces</p> <p>Encourage the protection of conservation and natural areas through the use of native, drought tolerant species and site appropriate xeriscaping.</p> <p>Encourage retention of trees outside of development footprint immediately prior to and during development and redevelopment</p> <p>Promote planting of native tree species to provide shade and runoff retention and infiltration within new developments</p> |
| | Protect wildlife habitats and corridors | <p>Promote awareness of wildlife habitat and corridors</p> <p>Encourage local property owners to include native plants in their gardens</p> <p>Promote awareness of wildlife needs for water access and sites of likely wildlife corridors in resorts, estates and neighbourhoods</p> <p>Promote awareness of conservation and protected areas within and adjacent to resort, estate and neighbourhood properties</p> <p>Promote stewardship and environmental awareness among new residents in greenfield developments</p> |

7. Environmentally Sensitive Areas and Natural Features

Environmentally sensitive areas (ESAs), critical ecosystems and natural features have been identified as those areas which are at greatest risk for high impacts to ecosystem functioning, habitat and ecosystem service¹ removal or disruption, or are at risk of not being successfully compensated or mitigated. These areas include ridgelines, hilltops, ravines, riparian areas and rangelands/grasslands.

ESAs and functional ecosystems are fundamental to Vernon's high quality of life. Some natural features are critical to protect as they act to prevent potential hazards to public health and safety (such as erosion control through vegetated ground cover), some due to the environmental services they provide, such as drinking water quality protection as a result of stormwater infiltration and in soil filtration, and others because of the sensitive habitats and significant areas they contain, such as rattlesnake hibernacula.

Areas with critical sensitive habitats and ecosystems require management to protect species at risk, rare and sensitive ecosystems, water quality and availability, air quality, soil retention and the unique beauty of the Vernon area. All of these attributes contribute to quality of life for current Vernon residents and are essential for the ongoing sustainability of the region. Although there are many areas which may not be considered sensitive natural areas, these areas all contribute important ecosystem services and should be managed with equivalent care to ensure that ecological functions, biodiversity and area livability are not jeopardized over time.

The EMA Strategy will need to evolve to ensure that policies, programs and best management practices implemented by the City continue to adapt and change in response to changing environmental conditions and pressures and the needs of the community.

The critical ecosystems and natural features related to the Vernon SEI polygons displayed on the EMA Strategy Map (Appendix 1) are described and discussed in Appendix 3, *Methods used to derive Conservation Values based on Sensitive Ecosystems Inventories*. The proposed implementation approaches outlined in each management area discussion are intended to act as a starting point in the creation of a long term EMA Strategy implementation plan undertaken in coordination with City of Vernon bylaws and development permit areas, as well as provincial and federal regulations.

¹ Ecosystem services are the benefits people obtain from ecological systems such as fresh water, timber, water flow regulation, pollination, recreation and protection from natural hazards. Millennium Ecosystem Assessment, World Resources Institute, Washington, DC (www.wri.org/biodiv/project_description2.cfm?pid=72)

8. Indicators and Reporting

Indicators of progress and achievement of the goals set out in each of the EMA areas are essential to determine the success of policy implementation throughout the life of the OCP. The indicators proposed below have been chosen to track the progress and overall effectiveness of the strategy and to help identify policies that may need to be amended to realize the intent of the strategy.

The following indicators have been selected to ensure measurability, ease of collection, credibility and validity of the measures and to set a starting point for tracking change. The indicators outlined below may change over time as goals are achieved, new goals are set and policies evolve.

Proposed Indicators

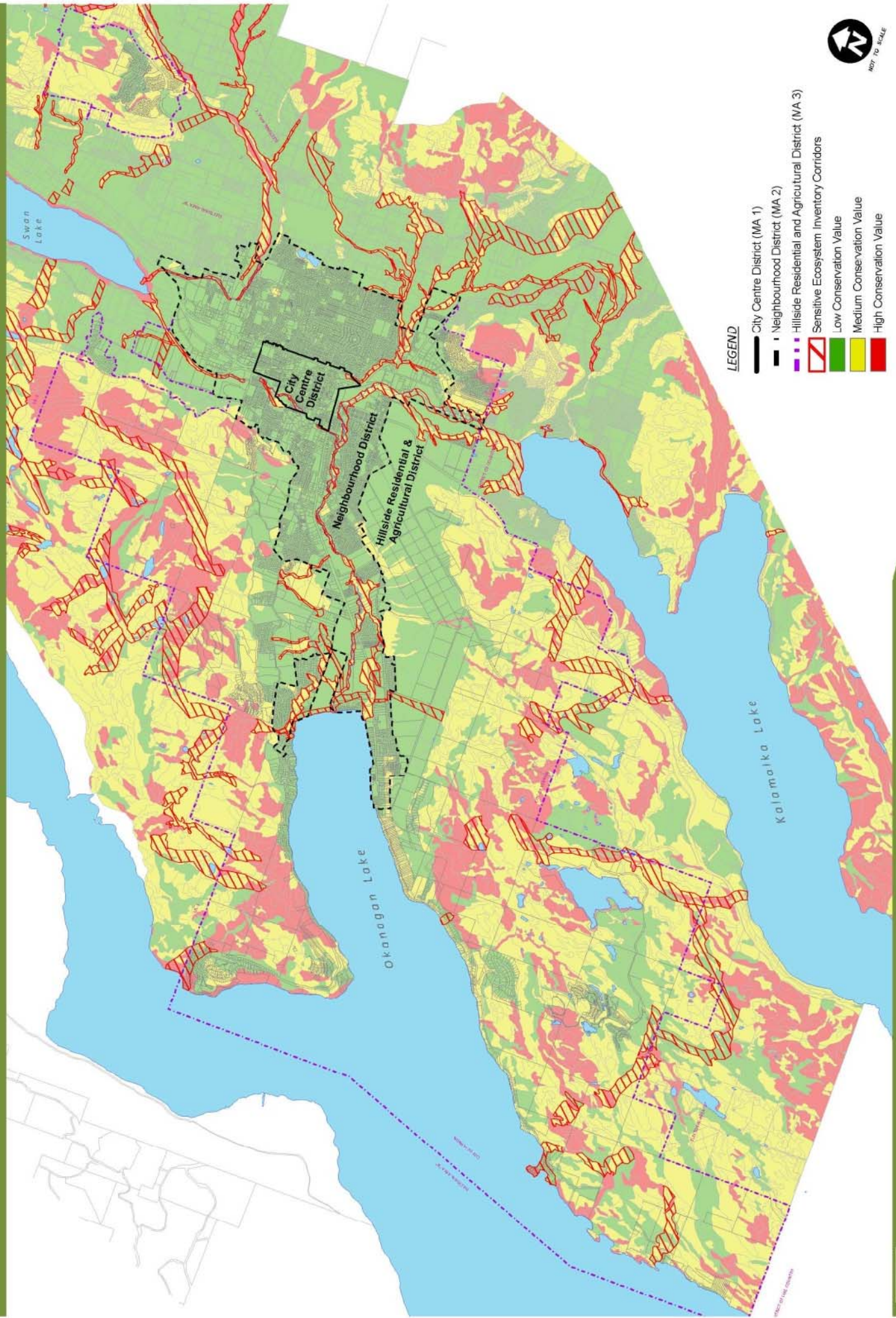
- Habitat Conservation and Protection
 - Acres of high sensitivity ecosystem lands protected in development areas
 - Acres of natural areas and sensitive ecosystems mapped and monitored for long term viability following development
 - Acres of covenant, rehabilitation, enhancement or compensation habitat areas completed
- Urban forest cover
 - Number of trees planted, and removed, both on municipal lands and as a result of development and redevelopment in MA1 and MA2
 - Acres of forest retained and removed in MA3 due to new development but not including commercial forestry activities
- Water Quality Protection
 - Creek water quality monitoring and reporting to assist in the creation of baseline water quality data aimed at the protection of aquatic habitat, drinking and recreational uses of lake water
 - Number of infiltration and site drainage plans submitted and implemented
- Stewardship
 - Number of stewardship events and initiatives occurring in Vernon by year and by group, including those organized by citizen groups and by the City of Vernon

These indicators are intended to be measured throughout the life of the OCP and will be reexamined during the next OCP review. Initially, existing conditions throughout the city will be measured to provide a glimpse into where Vernon is now. Each year following adoption of the OCP, summaries are to be created to measure where changes are occurring. The proposed indicators apply to all members of the community in as much as their activities impact habitat conservation and protection, urban forest cover, water quality protection and stewardship, including the City, businesses, investors and residents of Vernon.

Appendix 1

EMA Strategy Map

(SEI Polygons and Management Areas)



LEGEND

- City Centre District (MA 1)
- Neighbourhood District (MA 2)
- Hillside Residential and Agricultural District (MA 3)
- Sensitive Ecosystem Inventory Corridors
- Low Conservation Value
- Medium Conservation Value
- High Conservation Value



Note:
 This drawing has been produced by the City of Vernon's Geographic Information System. Data provided from this system is derived from a variety of sources with varying levels of accuracy. The City of Vernon disclaims all responsibility for the accuracy or completeness of the information contained herein.

Last Update: August 23, 2008

Produced by: The City of Vernon GIS



Official Community Plan 2008

Appendix 2

Sensitive Ecosystems Identified through SEI Mapping

Sensitive ecosystems identified through the SEI mapping process are considered to be ecologically significant due to their rarity and fragility, as well as the diversity of species, including many rare and endangered species, which are supported by these ecosystems. Sensitive ecosystems identified in the Vernon area through SEI mapping include old forests, broadleaf woodland, and coniferous woodland ecosystems; grassland ecosystems; riparian and wetland ecosystems; and sparsely vegetated ecosystems.

Significant ecosystems are those which are considered to not be as sensitive as sensitive ecosystems, but which provide important ecosystem services and habitats which support the proper functioning of the sensitive ecosystems. Significant ecosystems identified through SEI mapping include mature forests and disturbed grassland ecosystems.

Old Forest Ecosystems: These areas are dominated by large, old trees. Logging, fire exclusion and development have impacted these systems. In the Vernon area few old forest ecosystems remain. Old forests provide significant habitat for many species of owls, deer and woodpeckers.

Broadleaf Woodland Ecosystems: These areas are dominated by trembling aspen. These systems tend to be shrubby, and include broad, moist basins in grassland areas. Broadleaf woodland ecosystems provide habitat many species.

Coniferous Woodland Ecosystems: These ecosystems are similar to old forests, but have less uniform canopy structure and may consist of sparse, clustered tree cover. These ecosystems have been impacted by invasive species encroachment, growth of other tree species in canopy gaps, and development.

Mature Forest Ecosystems: These ecosystems tend to be composed of mature trees which buffer old or newly reestablishing forest systems. Mature forests provide habitat for many species and can grow into old forest ecosystems over time.

Grassland Ecosystems: These ecosystems are dominated by bunchgrasses, and forb species. These systems have been impacted by agricultural practices, development, invasive species encroachment, alteration of area hydrology, or other forms of land alteration. Grassland ecosystems provide essential habitat to a wide range of species, many of which are protected.

Disturbed Grassland Ecosystem: These ecosystems develop following the disturbance of grassland ecosystems, and no longer consist of climax species typical of undisturbed grasslands. These systems differ from grassland ecosystems due to the presence of noxious weed species (10 – 50%). Many of the species who inhabit grassland ecosystems can also find habitat in disturbed grassland ecosystems, and many rare, endangered and protected species are found in these areas.

Sparsely Vegetated Ecosystems: These ecosystems are dominated by exposed bedrock and rocks, with limited areas of vegetative growth. Due to the limited area of vegetative growth, as well as the presence of shallow, coarse soils the vegetation tends to be composed of rare species, highly sensitive to disturbance. These ecosystems provide habitat for highly sensitive species.

Riparian Ecosystems: Ecosystems identified by the proximity of streams, gullies with ephemeral or permanent creek flow, fringes of lakes and ponds, as well as sites with significant seepage. These systems provide habitat for a wide range of species and provide hydrologic ecosystem services including water quality improvements including temperature control, pollutant filtration, rainfall water retention and delayed release, and the prevention of stream bank erosion.

Wetlands: These ecosystems are dominated by aquatic vegetation and the presence of slow flowing surface waters, and permanently saturated soils. These systems are rare in the Okanagan, and are sensitive to disturbance and hydrologic alteration. Wetlands provide habitat for a range of species, including amphibians, fish, insects, birds, mammals, and aquatic plants. Wetlands also provide water quality improvement, water retention and gradual rainfall release into receiving waters, supporting downstream creeks, ponds and lakes.

Appendix 3

Methods used to derive Conservation Values based on Sensitive Ecosystems Inventories

Methods used for Sensitive Ecosystem Ranking based on Sensitive Ecosystems Inventories:

Bellavista – Goose Lake Range, Coldstream – Vernon and Vernon Commonage

(S. Runyan, A. Haney and K. Iverson, August 2008)

Background on TEM and SEI

Terrestrial Ecosystem Mapping (TEM) describes the landscape based on climate, terrain, soils, and the resulting vegetation communities. TEM polygons are delineated using stereo air photos and field assessment of sample plots, with the intent to minimize variation of site characteristics within each polygon (e.g., terrain – slope, aspect, landscape or slope position; soils – drainage, texture, depth; vegetation – community, structure, and age, etc.). Up to three ecosystems are described within each TEM polygon, with each ecosystem component representing a proportion of the polygon (decile). The location of each ecosystem within the TEM polygon is not specified. TEM is done at a scale of 1:20,000.

Sensitive Ecosystem Inventory (SEI) identifies sensitive and important ecosystems occurring in TEM, based on rarity in the province and local landscape, sensitivity to disturbance, quality/condition (how disturbed it currently is), and habitat value to selected rare species of wildlife.

Both TEM and SEI have provincially-set standards, which were followed in all four of these mapping projects in the Okanagan Valley.

Overview of the SER Process

Relative conservation values were derived based on the SEI mapping, using the following methodology (more details are provided in following sections):

1. A rating scheme was developed to prioritize sensitive ecosystems mapped in each Sensitive Ecosystems Inventory. Each of the three sensitive ecosystems within each TEM polygon was assigned an SEI Value from 0 -10 representing the relative provincial and local rarity and ecological sensitivity of each sensitive ecosystem.
2. These values were then adjusted based on the estimated ecological quality² and condition³ of each site.
3. Wildlife habitat values were assigned based on the importance of the habitats within the polygon to the most important life requisites of selected species at risk whose habitats were mapped.
4. Sensitive ecosystem and wildlife habitat values were combined into a single Conservation Value giving a two to one weighting of ecosystems to wildlife⁴.
5. The highest Conservation Values for each of the three ecosystem components in the TEM polygon was taken to produce a single Conservation Value for the polygon.
6. Thresholds for the Conservation Values were then developed to determine three Sensitive Ecosystem Ranking (SER) categories to indicate High (7-10), Medium (3-6.9) and Low (0-2.9) ecosystem sensitivity and value.

The conservation values are not intended to be “absolute” values, but provide a means of ranking the relative ecological value of each polygon. Because the highest Conservation Value is used to assign the rank of the polygon, the Conservation Values and SER values can be used as a flagging tool to indicate which polygons contain sensitive ecosystems and should be further evaluated in the field.

As described below, conservation values of 0-2.9 are assumed to have little or no inherent ecological value or importance as wildlife habitat, so were assigned SER 3. Values of 3-6.9 (SER 2) have moderate ecological importance based on ecosystem rarity and sensitivity and/or value to rare wildlife. In some

² Quality is an estimation of how similar the specific occurrence of an ecosystem is to typical examples of the ecosystem including size, vegetation, and environmental conditions.

³ Condition is an estimation of how similar the ecosystem is to what it would be without any human influences. It considers the presence and influence of invasive plants, in-growth and encroachment of trees, grazing, logging and other disturbances.

⁴ There is little guidance in scientific literature to determine the appropriate weighting. We found that there was considerable overlap between conservation priorities for ecosystems and wildlife, and maps produced with different weighting would be very similar.

cases, non-sensitive ecosystems may have moderate conservation values because of importance to wildlife, such as agricultural areas that may be significant foraging areas or corridors, depending on location. Conservation values of 7-10 are locally and provincially significant ecosystems, and are of critical importance to rare wildlife species, and have been assigned SER 1.

SEI Value

SEI Value is the relative ecosystem value based on SEI category, incorporating sensitivity, rarity, and very general condition and wildlife values.

- assign value for each component, or decile (SEIval_1, SEIval_2, SEIval_3), based on the following table:

| SEI category | SEI sub-category | Relative SEI Value | Rationale (% of Commonage study area) ⁵ |
|--|-------------------------|---------------------------|--|
| Not a Sensitive or Other Important Ecosystem | | 0 | Not sensitive (55%) |
| Mature Forest (Other Important Ecosystem) | Coniferous | 2 | Rare, but less sensitive (1%) |
| | Mixed | 2 | Rare, but less sensitive (0.01%) |
| Broadleaf Woodland | Aspen Copse | 6 (BV, Com) or 7 (CV) | Sensitive & rare within the study area (3%) |
| Grassland | Grassland | 9 | Very Sensitive & provincially rare; moderately distributed in the study area (5%) |
| | Disturbed Grassland | 6 | Disturbed but provide values for many grassland species including many rare and endangered species (13%) |
| | Shrubland | 9 | Very Sensitive & provincially rare; very rare in the study area (1%) |
| Old Forest | Coniferous | 10 | Very sensitive, very important wildlife habitat, very rare (0.7%) |
| Riparian | Fluvial Fringe | 10 | Very sensitive, very important wildlife habitat, very rare (0.8%) |
| | Gully | 10 | Very sensitive, very important wildlife habitat, rare (2%) |
| Sparsely Vegetated | Cliff | 10 | Sensitive, very important wildlife habitat, very rare (0.1%) |
| | Rock | 8 | Sensitive, important wildlife habitat, uncommon (3%) |
| | Shrub | 10 | Sensitive, very important wildlife habitat, uncommon (2%) |
| | Talus | 10 | Sensitive, important wildlife habitat, very rare (0.4%) |
| Woodland | Coniferous | 6 | Sensitive, very important wildlife habitat, common (13%) |
| Wetland | Marsh | 10 | Very sensitive, very important wildlife habitat, very rare (0.4%) |
| | Shallow Water | 10 | Very sensitive, very important wildlife habitat, very rare (1%) |

⁵ Occurrence varies slightly between the three projects, Vernon Commonage SEI used as example

Quality/Condition Value

Quality and Condition values adjust ecosystem values downwards for disturbed conditions.

- assign value for each decile (QCval_1, QCval_2, QCval_3), based on the following table:

| Quality and Condition Rating | Assigned Value |
|-------------------------------------|-----------------------|
| Excellent (1) | 1 |
| Good (2) | 0.8 |
| Marginal (3) | 0.5 |
| Poor (4) | 0.1 |

Wildlife Habitat Value

Wildlife Habitat Values provide detailed habitat ratings for the most important life requisites of selected rare species⁶.

- convert wildlife ratings to values (High=10, Moderate=5, Low=1, Nil=0) for each decile, for all life requisites listed in the following table:

| Species | Species Code | Map Theme | Rating Code |
|-------------------------------|---------------------|---|--------------------|
| Great Basin Spadefoot | A-SPIN | Breeding | RE |
| Painted Turtle ⁷ | R-CHPI | General Living (foraging and overwintering) | LIA |
| Western Rattlesnake | R-CROR | General Living (basking and denning) | LIA |
| Gopher Snake | R-PICA | Egg-laying | RE |
| Swainson's Hawk | B-SWHA | Nesting | RE |
| Long-billed Curlew | B-LBCU | Nesting | RE |
| Western Screech-owl | B-WSOW | Nesting | RE |
| Yellow-breasted chat | Y-YBCH | General Living (nesting and foraging) | LIG |
| Brewer's Sparrow ⁸ | B-BRSP | Nesting | RE |
| Grasshopper Sparrow | B-GRSP | General Living (nesting and foraging) | LIG |
| Spotted Bat ⁹ | M-EUMA | Breeding/roosting | RB |
| Badger | M-TATA | General Living (denning and foraging) | LIA |

- assign highest value of all wildlife values for each decile (WLhv_1, WLhv_2, WLhv_3)

Conservation Value

Conservation Value combines ecosystem (SEI Value and Quality/Condition) and Wildlife Habitat Values, with a weighting of two to one for ecosystem values. Condition may lower conservation values, while

⁶ Each SEI used 10 species, but the species varied slightly between projects, depending on the range/distribution.

⁷ This species modelled for Coldstream - Vernon SEI only.

⁸ This species modelled for Bellavista-Goose Lake Range SEI only.

⁹ This species modelled for Vernon Commonage SEI only.

wildlife ratings may raise conservation values (e.g. little or no ecosystem value due to condition, but may be important for at least one rare species), or lower them (e.g. due to slope, aspect or soil depth).

- multiply SEI value by QC value for each decile
- add SEI/QC value and wildlife value, with a weighting of 2 to 1 for SEI/QC, for each decile ($Cons_1 = 2 [SEIval_1 * Qcval_1] + WLhv_1$)
- assign conservation rating value to polygon based on highest value of all components ($Cons_val = [HV\ of\ Cons_1, Cons_2\ and\ Cons_3] / 3$)

Conservation Values have been used to create both Conservation Zone maps for landscape-level planning, and Sensitive Ecosystem Ranking maps for preliminary identification of sensitive areas that should be ground-assessed within the framework of an environmental assessment prior to disturbance.

Sensitive Ecosystem Ranking

As described briefly above, Sensitive Ecosystem Ranking (SER) simplifies the Conservation Value mapping into three ranked levels:

- Low (SER3) = Conservation Value 0 to 2.9
- Medium (SER2) = Conservation Value 3 to 6.9
- High (SER1) = Conservation Value 7 to 10

Conservation values of 0-2.9 are assumed to have little or no inherent ecological value or importance as wildlife habitat, so were assigned SER 3.

Values of 3-6.9 (SER 2) have moderate ecological importance based on ecosystem rarity and sensitivity and/or value to rare wildlife. In some cases, non-sensitive ecosystems may have moderate conservation values because of importance to wildlife, such as agricultural areas that may be significant foraging areas or corridors, depending on location. The lower limit of 3 was set for Medium SER based on the recognized value of habitat such as disturbed grasslands, old fields and other green spaces. While these ecosystems do not provide an example of native plant species assemblages, they have habitat value to animals such as snakes, raptors and badgers because often abundant weed seeds provide forage for rodents which in turn feed animals higher on the food chain.

Conservation values of 7-10 are locally and provincially significant ecosystems, and are of critical importance to rare wildlife species, and have been assigned SER 1. The lower limit of 7 for High SER delineates high ecological value, generally indicating natural areas with native species assemblages. Evaluation is based on rarity, fragility/sensitivity, habitat suitability for ten species at risk, quality, and condition as per the calculation of Conservation Values.

Appendix 4

Impacts of Concern

Adapted from Sensitive Ecosystems Inventory: Bella Vista – Goose Lake Range 2002 Volume 1: Methods, Ecological Descriptions, Results and Management Recommendations. Kristi Iverson, Iverson & MacKenzie Biological Consulting Ltd.

The following discussion of impacts of concern was chosen for inclusion in this report as it was developed as part of the Sensitive Ecosystems Inventory: Bella Vista –Goose Lake Range report which was reviewed by the Okanagan Indian Band, the Ministries of Environment and Sustainable Resource Management, the City of Vernon, Greater Vernon Services Commission, the Allen Brooks Nature Centre, Okanagan University College and FORECON Consulting Service. All activities result in impacts to the landscape. Some activities improve or mitigate previous impacts while others create new impacts. This discussion is included to provide a general overview of the types of impacts commonly created as a result of building and development, recreational uses and all other anthropogenic activities. The following discussion has been modified slightly to reflect the applicability of these impacts beyond the Bella Vista-Goose Lake Range.

Impacts of Concern

Human settlement pressures represent the greatest threat to sensitive ecosystems in the study area. Large-scale landscape concerns, which affect all ecosystems, include landscape fragmentation, disruption of natural disturbance regimes, edge effects and invasive species introductions.

Landscape fragmentation

Fragmentation of the landscape often affects the functioning of ecosystems by disrupting connections between different ecosystems (e.g. between uplands and wetlands, resulting in changing water movement and water table levels). In addition, disconnected islands of natural ecosystems often cannot provide the necessary habitat values for wildlife species, which may require a number of different ecosystems for breeding, wintering, and foraging. A network of corridors that connect habitats will help to maintain habitat access, gene dispersal, and the potential distribution for wildlife species.

Habitat fragmentation

Habitat fragmentation occurs when pieces of intact habitat are separated by sub-optimal habitat and is related to increased mortality of many wildlife species due to a wide range of causes such as road mortality, increased predator success along the edges of the habitat, decreased hiding areas deep within the habitat, and many other causes noted in the ecological literature. Increased mortality due to habitat fragmentation can be enough to send a sensitive species into decline.

Disruption of Natural Disturbance Regime

The exclusion and suppression of natural fire has changed grassland and forest ecosystems in the study area. Ecosystems and species of the Okanagan Valley have evolved with natural fire as a major factor in ecosystem and habitat distribution. Frequent surface fires maintained open forests with largely grassy and shrubby understories. Fires likely limited the amount of sagebrush in grassland ecosystems. Fire exclusion has resulted in dense forests ingrown with Douglas-fir and ponderosa pine, and encroachment of these trees onto grasslands. Fire exclusion has affected both ecosystem processes and wildlife habitat values.

Invasive Species

Both the deliberate and accidental introduction of invasive non-native plant species has significantly altered the species composition of some ecosystems in the study area. The northern and lower slope portions of the study area are the areas that have been most altered by invasive plants. Some invasive animal species such as European starlings have altered wildlife populations by displacing native cavity nesting birds.

Invasive plant species reduce diversity by displacing native plant species, and reducing vegetation diversity and soil stabilization. Invasion of non-native plants can also result in loss of forage for domestic animals, domestic livestock and wildlife. Recreation vehicles such as all terrain vehicles (ATVs), bicycles, and people can all spread weeds. Many weeds have seeds that can survive in the soil for decades; consequently, weed control must always be considered to be a long-term process.

Grasslands, old forests, coniferous woodlands, and sparsely vegetated ecosystems are vulnerable to invasion by cheatgrass (*Bromus tectorum*) and other annual bromes (*Bromus* spp.), diffuse knapweed (*Centaurea diffusa*), or sulphur cinquefoil (*Potentilla recta*). Disturbed grasslands are very vulnerable to takeover by invasive plant species if they are disturbed further. Riparian ecosystems and broadleaf woodlands are vulnerable to invasion by common hound's-tongue (*Cynoglossum officinale*) and common burdock (*Arctium minus*). Wetland ecosystems can be completely altered if purple loosestrife (*Lythrum salicaria*) becomes established.

Edge effects

Fragmentation of ecosystems combined with adjacent development contributes to the creation of 'edges' where there is an abrupt rather than natural, gradual change from one ecosystem type to another. This edge effect can alter the habitat value of the original ecosystem by creating changes in microclimate elements such as air temperature, light level, and humidity. Direct biological effects result when specific species cannot tolerate human activity nearby, or they are exposed to predation by other species. Increased non-native species invasion and competition for habitat are examples of indirect biological edge effects.

Direct Impacts

Direct impacts to ecosystems are those which occur on site, and which have the most immediate and visible effects. Vegetation removal or damage, and soil removal or compaction are examples of immediate and visible effects. Ditching, diking, draining and filling of wetlands and riparian areas are visible effects which also result in long-term indirect effects on water movement and water levels. Disturbances to wildlife species, particularly during the breeding season can directly impact their survival. Although it may seem like large rural lots have the potential to retain many natural values, many owners choose to remove native vegetation and natural features, and intensely graze domestic animals (e.g., horses). Fragmentation associated with these lots also leaves them more vulnerable to weed invasion. All of these possible changes reduce the ecological integrity and natural values of these areas.

Indirect Impacts

Activities that occur adjacent to or at some distance from the ecosystem result in indirect impacts. Hydrological changes due to roads, buildings, deforestation, removal of vegetation, invasive plant species, increased impervious road surfaces, soil compaction and agricultural practices can all result in reduced groundwater infiltration and summer soil moisture, increased annual runoff, disrupted drainage patterns, and reduced soil moisture holding capacity. These hydrological changes can change the water quality and function, structure, and wildlife habitat values of adjacent wetlands and riparian areas.

Water pollution from both point and non-point sources contributes to reduced water quality, potential outbreaks of water-borne disease, and impacts to wildlife populations through the loss of habitat and disruption of the food chain. The use of pesticides associated with agriculture and landscaping has also caused degradation of natural ecosystems and wildlife habitat.

The presence of humans and their pets, even on private property can cause disturbances to wildlife. Recreational activities involving all terrain vehicles (ATVs), dirt bikes, off-road vehicles, and mountain bikes, create soil disturbances that allow rapid invasion and spread of invasive plant species. They can also disturb wildlife, and cause soil erosion and damage to plants.

The Importance of Wildlife Corridors

Isolated populations can become locally extinct or decline for a variety of reasons including inbreeding, random impacts to the population or lack of food, habitat or mates. Therefore, after defining core areas for protection and putting buffers around them, it is important to define connective wildlife corridors between them. Less obvious species, such as plants or invertebrates also need connectivity to be able to adapt to changing local conditions and for genetic exchange between populations.

Appendix 5

EMA Issues and Related Regulatory Implications

Management Area 1: Issues, Sensitive Ecosystems Identified and Related Existing Bylaws, Regulations, Policies and Guidelines.

| Management Issue | Action | Existing Bylaws, Regulations, Policies and Guidelines |
|---------------------------|---|---|
| Stormwater | Management Mitigation | Stormwater Management Policies and Design Manual Drainage Systems Management |
| Landscaping | Irrigation Plant Choice Pesticide Use | Landscape Standards Landscape Maintenance Landscape Restoration City Boulevards |
| Creeks | Daylighting Habitat Enhancement | Riparian Areas Regulation Fish Protection Act Creek Channels: Maintenance of Trees and Creek Banks Work in or About a Stream |
| Heritage and Street Trees | | Tree Removal Public Lands Bylaw Tree Protection Bylaw |

Management Area 2: Issues, Sensitive Ecosystems Identified and Related Existing Bylaws, Regulations, Policies and Guidelines.

| Management Issue | Action | Existing Bylaws, Regulations, Policies and Guidelines |
|--------------------------------|---|--|
| Stormwater | Management Mitigation Retention Treatment | Stormwater Management Policies and Design Manual Drainage Systems Management Snow and Ice Control Bylaw |
| Landscaping | Irrigation Plant Choice Pesticide Use | Landscape Standards Landscape Materials Selection Guide Landscape Maintenance Landscape Restoration City Boulevard |
| Creeks | Protection Habitat Enhancement Protection | Riparian Areas Regulation Fish Protection Act Creek Channels: Maintenance of Trees and Creek Banks Work in or About a Stream Water Act |
| Wildlife Corridors | Protection Creation | Species at Risk Act Migratory Bird Convention Act Canada Wildlife Act Wildlife Act Identified Wildlife Management Strategy Forest and Range Practices Act |
| Tree Protection | Urban forest management Heritage tree conservation | Tree removal Public Lands Bylaw Tree Protection Bylaw Migratory Bird Convention Act |
| Wetland | Protection Enhancement | Riparian Areas Regulation Fisheries Act CEAA/ Navigable Waters Protection Act |
| Lakeshore | Protection, Enhancement | Riparian Areas Regulation Fish Protection Act Water Act Navigable Waters Protection Act CEAA |
| Reclaimed Water Use | | Reclaimed Water Use Bylaw |
| Moderate Sensitivity Ecosystem | Conservation | Species at Risk Act Wildlife Act Identified Wildlife Management Strategy Forest and Range Practices Act |

Management Area 3: Issues, Sensitive Ecosystems Identified and Related Existing Bylaws, Regulations, Policies and Guidelines.

| Management Issue | Action | Existing Bylaws, Regulations, Policies and Guidelines |
|--|--|---|
| Stormwater | Management Mitigation Retention Treatment | Stormwater Management Policies and Design Manual Drainage Systems Management Services Beyond City Boundaries Snow and Ice Control Bylaw |
| Landscaping | Irrigation Plant Choice Pesticide Use | Landscape Standards Landscape Maintenance Landscape Restoration City Boulevard |
| Creek | Protection Enhancement | Riparian Areas Regulation Fish Protection Act Creek Channels: Maintenance of Trees and Creek Banks Work in or About a Stream |
| Lakeshore | Protection Enhancement | Riparian Areas Regulation Fish Protection Act |
| Steep Slope | Management | Steep Hillside Development Permit Guidelines |
| Ridgeline Hilltop | Protection | Species at Risk Act Canada Wildlife Act Wildlife Act Identified Wildlife Management Strategy Forest and Range Practices Act Biodiversity Strategy |
| Wildlife Habitat Corridors Ravines | Protection Management | Species at Risk Act Canada Wildlife Act Migratory Bird Convention Act Wildlife Act Identified Wildlife Management Strategy Forest and Range Practices Act Biodiversity Strategy |
| Grassland Rangeland | Management Conservation | Canada Wildlife Act Species at Risk Act Wildlife Act Biodiversity Strategy |
| Forest Systems | Management Conservation | Forest and Range Practices Act |
| Reclaimed water use in domestic, landscaping irrigation | | Reclaimed Water Use Bylaw |
| High, Moderate, Low Sensitivity Ecosystem Protection | | Species at Risk Act Canada Wildlife Act Migratory Bird Convention Act Wildlife Act Identified Wildlife Management Strategy Forest and Range Practices Act Biodiversity Strategy |
| Tree Protection | | Tree Removal Public Lands Bylaw Tree Protection Bylaw Migratory Bird Convention Act Wildlife Act |
| ALR Protection | | Agricultural Land Reserve Use, Subdivision and Procedure Regulation |

Appendix 6

Environmental Management Areas Strategy Implementation Guidelines

Environmental Management Areas Strategy Implementation

Implementation of the Environmental Management Areas Strategy will occur throughout the life span of the Official Community Plan. Overall objectives, guidelines and environmental permitting requirements are the first step, with bylaw review and the development of programs to promote environmental action and sustainability to follow. As well, the creation of Environmental Indicators, as discussed in Section 7 of the Environmental Management Areas Strategy, will provide the tools through which to track the progress and success of the EMA Strategy as it is implemented.

EMA Objectives for Environmental Management Areas

The EMA Strategy is intended to address issues of conflict between the priorities of development, community sustainability and ecosystem protection in Vernon. Based on the foundation of Sensitive Ecosystem Inventory mapping, implementation of the EMA Strategy looks to balance these interests by including clear environmental guidelines, policies and bylaws in the development process to protect and conserve the natural features and significant habitats which contribute to the quality of living in Vernon.

The objectives of the EMA Strategy are:

1. To balance the demands of natural areas protection and development opportunities through application of SEI mapping to identify moderate and high sensitivity ecosystems through consistently applied processes throughout the City of Vernon;
2. To protect sensitive ecosystem areas through the use of comprehensive environmental permitting requirements and environmental management guidelines.
3. To identify conservation, protection and enhancement areas in both greenfield and infill development areas;
4. To protect open spaces, environmentally sensitive areas and access to natural amenities which support and facilitate the high quality of life found in Vernon;
5. To support the reduction, prevention and mitigation of pollution and its sources in the air, water and soils of Vernon.

Guidelines for all Environmental Management Area Districts

The following guidelines are intended to apply to all EMA Districts and to be implemented in response to specific site conditions, sensitivity and value of ecosystems potentially impacted, and to the intensity of development or alteration of the landscape proposed at the time of permit application.

1. An environmental assessment is to be prepared by qualified professionals as deemed necessary for properties found in EM 2 and MA3, to address site conditions and identified sensitive ecosystems and habitats on a property by property basis.
2. Environmental assessments are to be done *prior* to the initiation of site clearing, infrastructure installation and construction initiation on greenfield sites
3. Environmental assessments are to be done prior to demolition or other site preparation disturbance activities on properties which have been previously developed and also contain active habitat or sensitive ecosystems.
4. Land clearing, disturbance, construction or ongoing human impacts within and immediately adjacent to high sensitivity ecosystems and significant natural features is discouraged.
5. Buffers, conservation areas, setbacks and covenants to provide a commitment to conservation and protection of high sensitivity ecosystems and identified key natural features as determined by environmental assessment are to be implemented.
6. Functional habitats, corridors and connections which ensure that habitat islands are not created in greenfield development are to be maintained. This includes the protection and conservation of viable corridors to connect ecosystems and habitats to necessary landscape features including access to water, appropriate food sources and habitat niches.
7. Protection and expansion of urban forest areas as appropriate are promoted to help to ensure that tree cover is not removed without replacement planting.

8. Protection of water quality for recreational, drinking water and aquatic habitat including those waters of regional lakes, creeks, streams, ponds and wetlands.
9. Promote the use of native plants in landscaping and the control of invasive species within city green spaces.
10. Erosion and sediment control measures are to be implemented throughout the city.
11. Nesting sites, hibernacula, breeding areas and other critical habitats are to be protected so that ongoing reproductive habitat is available to ensure the viability of protected and endangered species living in the Vernon area.

Environmental Permitting

Environmental permitting will be undertaken as part of the development permit process, to varying degrees of intensity by district. Instead of requiring separate Riparian Development Permits and Environmental Development Permits, site appropriate environmental requirements will be built into a single streamlined, development permit process.

To ensure that environmental requirements do not impede development permit application processing, environmental requirements will be separated by application type, as appropriate, based on natural features onsite and the stage of development currently underway.

For example, at the point of subdivision, environmental requirements will consist of site surveys, preparation of site maps and the identification of significant features which may require protection.

The proposed environmental requirements for use in City of Vernon permitting are outlined by district as follows.

Permitting Requirements by District (DP Area)

City Centre District – MA 1

1. Identification of natural features on property
2. Tree identification and inclusion on site plan
3. Creek identification, and Riparian Areas Regulation assessment if necessary
4. Identification of stormwater drainage and percentage of impervious surfaces
5. Landscaping requirements i.e. irrigation demand, landscaping type
6. Sustainability Scorecard

Neighbourhood District – MA2

1. Identification of natural features on property
2. Tree identification and inclusion on site plan
3. Wildlife corridor identification as appropriate
4. Presence of interface between residential and agricultural, park, or greenfield lands
5. Creek, lake, pond or wetland identification, and Riparian Areas Regulation assessment if necessary
6. Identification of stormwater drainage and percentage of impervious surface
7. Landscaping requirements i.e. irrigation demand, landscaping type
8. Sustainability Scorecard

Hillside Residential and Agricultural District – MA 3

1. Identification and survey of natural features on property
2. Identification and mapping of land forms (ridgelines, steep slopes, hilltops, ravines)
3. Tree identification, or forest mapping and inclusion on site plan
4. Wildlife habitat and corridor identification based on SEI polygon data (as available on COV website and at the end of this document)
5. Identification and mapping of previously disturbed areas and likely activities of disturbance.
6. Presence of interface between residential and agricultural, park, or greenfield lands
7. Creek, lake, pond or wetland identification, and Riparian Areas Regulation assessment if necessary
8. Identification of stormwater drainage and percentage of impervious surfaces
9. Landscaping requirements i.e. irrigation demand, landscaping type
10. Sustainability Scorecard

Proposed Environmental Requirements by Permit Type

Within each management district, environmental permitting requirements will respond to the level of activity proposed and the natural features of the relevant properties in submitted applications.

Rezoning

1. Description and diagram of existing site conditions and natural features

Site Prep Permit

1. A complete site survey, with 1:5000 mapping to identify natural features, sensitive habitats, landforms, water features based on SEI polygon data. Surveys are to be performed as seasonally appropriate to reflect those habitats or site conditions identified in the SEI mapping.
2. Description and diagram of existing site condition.
3. Arborist report addressing tree condition or a professional forest stand survey and inclusion of onsite trees on site plan
4. Identification of potential setbacks, protected areas, and high sensitivity habitat and natural features onsite
5. Identification of areas which may require protection or which will require permits from Ministry of Environment, Fisheries and Oceans Canada, Integrated Land Management Bureau or other senior government agencies as necessary.

Subdivision

1. MA1 and MA2: Description and diagram of existing site condition
2. MA3: A complete site survey, with 1:5000 mapping to identify natural features, sensitive habitats, landforms, water features. Surveys are to be performed as seasonally appropriate to reflect those habitats or site conditions identified in the SEI mapping.
If a complete site survey was undertaken for rezoning or site prep permit applications, then a general confirmation of site condition will be needed
3. MA1, 2 and 3: Tree, or forest survey and inclusion of trees on site plan
4. MA1, 2 and 3: Identification of setbacks, protected areas, covenant areas and high sensitivity habitat and natural features onsite
5. MA1, 2 and 3: Identification of areas to be protected or which will require permits from Ministry of Environment, Fisheries and Oceans Canada, Integrated Land Management Bureau or other senior government agencies as necessary.

Development Variance Permit

1. Description and diagram of existing site condition
2. Confirmation of site survey undertaken for rezoning, site prep, or subdivision applications. If no site survey undertaken previously then a site survey and mapping to identify natural features, sensitive habitats, landforms, water features as necessary. Surveys are to be performed as seasonally appropriate to reflect those habitats or site conditions identified in the SEI mapping.
3. Tree, or forest survey and inclusion of trees on site plan.
4. Identification of setbacks, protected areas, covenant areas and high sensitivity habitat and natural features onsite.
5. Initiation of applications, reports or assessments necessary to satisfy the permitting and notification requirements of the Ministry of Environment, Fisheries and Oceans Canada, Integrated Land Management Bureau or other senior government agencies.

Development Permit

1. Description and diagram of existing site condition
2. Confirmation of site survey undertaken for rezoning/subdivision application. If no site survey undertaken previously then a site survey and mapping to identify natural features, sensitive habitats, landforms, water features as necessary.
3. Tree, or forest survey and inclusion of trees on site plan
4. Identification of setbacks, protected areas, covenant areas and high sensitivity habitat and natural features onsite
5. Identification of wildlife corridors and accommodation of wildlife corridor protection as necessary.
6. Stormwater management plan to address impervious surfaces, drainage management and the protection of receiving waters (creeks, lakes, ponds, wetlands which provide stormwater mitigation at the end of drainage pipes throughout the city)
7. Tree and land clearing plan, including timing, map of areas to be cleared and coordination of clearing plan with protected areas, wildlife protection windows (i.e. fisheries window, nesting season avoidance)
8. Initiation of applications, reports or assessments necessary to satisfy the permitting and notification requirements of the Ministry of Environment, Fisheries and Oceans Canada, Integrated Land Management Bureau or other senior government agencies.

On those occasions when an applicant is applying for more than one permit at a time, or has previously undertaken the steps involved in an earlier application process, site surveys and inventories will not need to be redone. Instead, a confirmation of continued site condition, or one which illustrates alterations to the site since the first submission will be needed.