



Additional Environmentally Significant Areas Mapping Project Phase 3

Prepared for:
The Corporation of the District of Saanich

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1. INTRODUCTION

1.1. Background

The Additional Significant Areas (ESA's) Mapping project project was developed by Saanich Environmental Services aided by a Specialists' Working Group in 2012. The ESA Mapping project was initiated to fulfill initiatives C4b and C4f of the 2011-2015 Saanich Strategic Plan:

C4b. "Establish an Environmentally Significant Areas Development Permit Area to protect and enhance sensitive ecosystems, species at risk and the marine shoreline. Increasing development pressure adds to the need to protect natural ecosystems and the habitat of rare plants and animals at a level similar to the existing protection for riparian areas."

C4f. "Expand the inventory and mapping of sensitive ecosystems in Saanich to include smaller environmentally significant areas (ESA's), remnant rare and endangered ecosystems, and linkages between these areas. The current inventory is incomplete and many important and smaller ESA's are unmapped. Better mapping will assist in identifying potential greenways based on biodiversity."

The overall objective of the project was to identify and map remaining environmentally significant areas, including smaller sensitive, rare and endangered ecosystems, species at risk sites, as well as buffers and linkages between these areas. The project was initially to be carried out in two phases:

- In Phase 1, new environmentally significant areas were to be identified and mapped through the evaluation of sites proposed by the general public or Saanich staff.
- In Phase 2, a complete aerial photo analysis of the District of Saanich was to be carried out to investigate new potential ESA sites. The analysis was to include potential new Sensitive Ecosystems Inventory (SEI) sites, buffers, ecosystem linkages and wildlife corridors. Identified sites were prioritized, assessed and selected for ground-truthing. Field checked sites were then evaluated for inclusion in the ESA Atlas.

Through Phases 1 and 2 of the ESA Mapping initiative, sixty-two new sites, plus ten wildlife tree sites, were identified and recommended as new ESA's. However, there were approximately 151 additional sites identified as potential ESA candidates, which due to budget limitations and lack of owner's permission had only been listed and marked on the Atlas. In consequence, Phase 3 of the project was developed to assess potential ESA remaining sites through airphoto interpretation in preparation for the publication of 2015 ESA Atlas and the Environmental Development Permit Areas (EDPA) Atlas. This approach was supported by the public feedback gathered at the end of Phase 1. Property owners who gave permission for property access as part of the project felt it was very important that the properties that were not visited continued to be assessed as potential ESAs.

This report recounts the completion of Phase 3, including the methodology and results. The recommendations inform the District of Saanich of potential new sites for the Environmentally Significant Areas Atlas. **It is**

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important to note that ESA's are not necessarily suitable for Council's future consideration as proposed additions to the Environmental Development Permit Area Atlas.

1.2. Phase 3 Project Objectives

The overall objective of this phase of the project was to assess and map remaining potential ESA sites identified in Phase 2, as well as any newly identified sites with potential merit, including smaller undeveloped rights-of-way (r-o-w). The analysis should take into account potential environmentally significant sites such as missed Sensitive Ecosystem (SEI) types and other natural sites (Urban Forest, altered SEI sites) that due to their location would be of value to Parks and/or sensitive areas such as linkage corridors or buffers.

Sites mapped in the Coastal Douglas-Fir (CDF) Terrestrial Ecosystem Mapping (TEM) project (Madrone 2008), by the Garry Oak Ecosystem Recovery Team (GOERT) and SEI were to be excluded from the mapping so as to not duplicating efforts. The goal was to digitize and map up to 100 yet unmapped sites in the District. Those found with relevant ecological or strategic value for conservation were to be recommended for inclusion in the ESA Atlas.

1.3. Phase 3 vs Phases 1 and 2

Compared to Phases 1 and 2, Phase 3 contributed to a more intense mapping of the remaining natural sites in the District. Yet due to the exclusive use of orthophoto analysis, detailed site information obtained through field work (for example abundance of invasive species or presence of typical species for the ecosystem) was not available. Thus a site's evaluation procedure was adapted to data feasible to obtain through orthophoto interpretation: SEI type, site's area, site's function (buffer or connectivity link), naturalness or fragmentation, and land ownership. Sites in Phase 3, as in previous phases, were assessed under four scoring priority conservation categories.

1.4. Background Material

Background material in the form of Geographic Information System (GIS) layers and data sets from other projects (permission granted), as well as orthophoto and satellite imagery (2013) were provided by the District of Saanich: TEM of the Coastal Douglas-fir Biogeoclimatic Zone (Madrone 2008), Garry Oak Ecosystems mapping (GOERT 2012), SEI, and environmental and Saanich base layers (parks and protected areas, significant trees, Conservation Data Centre (CDC) species- at-risk records, property boundaries, and digital elevation models).

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2. METHODS

2.1. Site Selection

During the preliminary orthophoto analysis in Phase 2, a total of 259 sites were identified, of which 79 were undeveloped rights-of-way. After completion of Phase 2, 154 sites and 68 undeveloped rights-of-way remained to be investigated. Of these remaining sites, 99 were included in TEM or SEI mapping.

One of the recommendations of Phase 2 was to expand the interconnection plan designed at the start of that phase to include important ecological areas in the District such as Cuthbert Holmes -Tillicum Park, Knockan Hill Park and Cedar Hill Park. These areas were included in the overall site identification and selection procedure (Figure 1, Table 1).

TABLE 1. Major Areas of Conservation and Biodiversity Value

Urban area	Rural area
Mount Douglas Park	Elk and Beaver Lakes Park
Mount Tolmie Park - Cedar Hill Park	Observatory Hill
Konukson Park - Harowoods	Bear Hill Park
Brodick Park - Bow Park	Gowland Tod – Mount Work Parks
Swan Lake and Christmas Hill Nature Sanctuary	Glendale Lands, Quick Bottom’s Park, Viaduct flats
Rithet’s Bog Conservation Area	Maltby Lake, Calvert and Logan Parks
Colquitz River Park	Layritz Park
Knockan Hill Park	Francis King Regional Park
Cuthbert Holmes Park - Tillicum Park	Prospect Lake - Petworth Dr and surroundings

Since the objective in Phase 3 was to assess any unmapped sites identified during Phase 2 analysis, sites associated to TEM or SEI polygons were mostly excluded. The only exceptions were SEI sites that may require to have their boundary extended or redrawn, and sites of special interest. Undeveloped rights-of-way, however, were assessed for their ecological and location merits whether or not they were part of a CDF polygon. Selection criteria for mapping consisted of high ecological values such as SEI class, larger parcels, high naturalness (low disturbance) and location.

2.2. Air Photo Analysis

The air photo analysis used the District of Saanich’s GIS Map Service 2013 air photos and layers. The analysis focused on previously identified unmapped sites during Phase 2, marked in the airphoto atlas, including undeveloped rights-of-way, and excluding SEI and CDF mapped sites. Sites within a CDF polygon were disregarded. Maps created by the District of Saanich based on the CDF TEM (Madrone 2008), and on Garry oak woodlands mapping done by GOERT were also consulted, with the purpose of not duplicating sites.

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The connection strategy initiated in Phase 2, which aimed at connecting major conservation sites within the District, was expanded to include Cuthbert Holmes Park-Tillicum Park, Knockan Hill Park and Cedar Hill Park. Areas adjacent to Parks or SEI sites were scrutinized as potential buffers or additions, and undeveloped r-o-w with high naturalness, which could function as linkage corridors or buffers were explored.

Capital Regional District and Federal Parks, as well as Saanich P4 Parks, were mainly excluded from the analysis, according to the same criteria used in phases 1 and 2. However, when an identified site's ecosystem extended into a Park, the delineation of the site was continued into the Park.

Data was obtained mainly by airphoto interpretation, but other methods for ecosystem interpretation, such as LIDAR imagery, were explored. With the cooperation of District of Saanich staff Nigel Hughes, standard orthophoto interpretation was supported with LIDAR imagery on forested sites. Data captured included Sensitive Ecosystem Inventory (SEI) class, Biogeoclimatic Unit, Site Series, Structural Stage, naturalness (or degree of disturbance), connectivity function and ownership.

The assignment of Sensitive Ecosystem classes and subclasses followed the SEI classification used in the Southern Vancouver Island and Gulf Islands Inventory (Canadian Wildlife Service 2000). By using the same criteria, all sites identified by a certain code would be equivalent to the sites already mapped, particularly Older Forests, which were identified as "conifer dominated forests with an average tree age of 100 years or greater" in the original inventory. The new Sensitive Ecosystem Codes classes and subclasses are described in the Standard for Mapping Ecosystems at Risk in British Columbia (B.C. Ministry of the Environment 2006).

However, as in the previous two phases, the minimum area requirement of 0.5 ha for any of the classes (due to mapping constraints of the SEI 1998), and of 25 ha for Older Second Growth Forests was not followed in this project,. Therefore, no minimum size was established for any of the SEI classes in this project, although a higher conservation priority was placed on larger sites.

No field work was carried out during this phase of the ESA Mapping project.

2.3. GIS Mapping

The sites were identified and delineated on 2011 and 2013 orthophotos. Data capture was done by heads up digitizing. A polygon feature class was created containing the digitized site location as well as area and perimeter. All sites were linked to the database by the unique code identifier.

A geodatabase was created in ArcGIS following the standards provided by the District of Saanich containing the information obtained through orthophoto interpretation and GIS calculations. Each site was linked to the database with the following attributes when applicable: SEI class, CDF TEM Code, Victoria Natural History Society (VNHS) Code, BGC Code and Site Series, Structural Stage, a site's brief Description and Notes. The metadata associated to GIS mapping indicates that the newly mapped sites were produced from orthophoto interpretation.

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2.4. Evaluation of Sites' Conservation Priority

The evaluation criteria was adjusted to the data acquisition methodology used on Phase 3, which was based solely on orthophoto interpretation, whereas in Phases 1 and 2 was based on a combination of field work and orthophoto interpretation. Even though the evaluation criteria changed, the four scoring priority conservation categories were maintained: Low, Medium, High and Very High. The conservation priority of each site was assessed according to five criteria obtained through air photo interpretation: SEI class, Naturalness (degree of disturbance), ecological function (connecting link or protective buffer), size and ownership (Table 2).

Table 2. Evaluation of Site's Conservation Priority

Score	SEI Class	Naturalness (degree of disturbance)	Function	Size ¹	Ownership
0	None	Extensive alteration	None	<2000 m ²	Several private properties
1	-Older second growth -Seasonally flooded	Some alteration	1 function: link or buffer	2000 - 7000 m ²	Mainly one private property
2	All other SEI classes	Not observed alteration	More than one function: link, buffer, CDC species at risk record, wildlife trees, unprotected water course	>7000 m ²	Public property

1: When a site was composed of three or more polygons and at least one of them was close to or larger than 2000 m² the following scores were applied:

- ▲ Site's total size 2000 - 7000 m²: scored 1
- ▲ Site's total size > 7000 m²: scored 2

The Naturalness criteria was assessed from air photos taking into consideration the location and potential disturbance due to landscaping and other activities in the vicinity of the site. As this parameter was sometimes difficult to assess, caution was exercised to give the highest rating.

The threshold for the size criteria was established by 1) the consideration of a minimum area valuable for conservation and 2) analyzing the range of areas of the identified sites and undeveloped r-o-w. The median was determined for sites and undeveloped r-o-w and used to determine the evaluation thresholds. In the case of adjacent sites, such as a rock outcrop next to a woodland site, the area was considered to be the sum of the two sites. Undeveloped r-o-w found within a larger site were assessed under the Size criteria by its own merit.

The sites were assessed for their conservation priority by the sum of the scores and classified under four conservation priority categories:

- SCORE 7 and higher: Very High
- SCORE 5-6: High
- SCORE 3-4: Medium
- SCORE 1-2: Low

As in Phases 1 and 2, and with the information available, sites scoring Medium and higher are considered as ESA's.

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3. RESULTS

3.1. Air Photo Analysis

From the list of Phase 2 originally identified sites and undeveloped r-o-w, as well as other potential sites in the same general area, a total of 69 sites and 31 undeveloped rights-of-way were identified, delineated and mapped. Details and description of the sites are shown in Appendix I.

The largest proportion of the areas mapped, including sites and undeveloped rights-of-way, were woodlands (WD) (31%) followed by older second growth (SG) (23%) and woodland - herbaceous terrestrial associations (WD / HT) (13%). Three sites were wetlands, one of them with a riparian component due to the presence of a small water course (14MG055). The breakdown of the various types is shown in Table 2.

TABLE 2 - Breakdown of Ecosystem Types

SEI Class: Subclass (original codes) ¹	% of Sites
WD	31
WD/HT	13
SG	23
HT	9
OF	9
RI	4
WN	2
Complexes	7
Non - SEI	2
TOTAL	100

1. For Sensitive Ecosystem Types Codes see Canadian Wildlife Service, 2000.

Most of the undeveloped r-o-w were woodlands (25.8%) and woodland - rock outcrop mix (19.4%). However long undeveloped r.o.w were often a mix of ecosystem types, as they traversed various sites (i.e. older second growth forest and rock outcrop, woodland and riparian, seasonally flooded field and riparian, or wetland and old forest).

In terms of size, the sites varied in size from 500 m² of a small undeveloped r-o-w to 9 ha of a large WD / HT polygon in Petworth Drive. However, the majority of sites (excluding the undeveloped r-o-w) were between 1500 m² and 8000 m² (64%). Twelve sites (17%) were smaller than 1500 m², and 13 sites (19%) were larger than 8000 m². On the other hand, a large proportion (42%) of undeveloped r-o-w were less than 2000 m².

The sites also varied in the number of properties involved, from one property to more than twenty, as in the area surrounding Doumac Park.

Images of each of the sites are shown under Figures. These images, unless specified at the bottom, are based on 2011 orthophotos.



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3.2. Evaluation of the Sites

The evaluation of the sites resulted in a total of 38 sites with Very High priority, 54 with High priority and 8 with Medium priority. The list of the sites and their corresponding evaluations is shown in Appendix II.

Within the Very High priority sites, 13 achieved the highest score. These are listed below:

Thirteen Highest Priority Score Sites:

14MG054: undeveloped section of Holland Ave along Durrell Creek and SEI seasonally flooded site.

14MG065: older second growth forest on undeveloped section of Mountain Rd and west end of Kynaston Rd.

14MG066: wetland and old forest on undeveloped section of Viaduct Rd.

14MG077: old mixed forest adjacent to marine back-shore at Cormorant Point.

14MG078: shrub swamp wetland on large property Prospect Lake Rd.

14MG080: mature forest along Goward Springs A on undeveloped Green Mountain Rd east end.

14MG081: undeveloped north end of Mountain Rd, part of a woodland SEI site.

14MG090: woodland and rock outcrop ridge with arbutus and Garry oaks on Petworth Drive.

14MG092: second growth forest next to Mount Work Regional Park on undeveloped north end of Wildview Cres.

14MG093: undeveloped west end of Lohr Rd on woodland and forest slopes of rocky knoll

14MG095: mature forest and rock outcrops on undeveloped lane connecting to Mount Work Regional Park.

14MG096: old mixed forest on undeveloped north end of Forest Hill Rd, close to Elk and Beaver Lake Regional Park.

14MG100: four hundred meters long lane through SEI woodlands, rock outcrops and mature forest connecting Bear Hill and Elk and Beaver Lake Regional Parks.

Other Very High Priority Sites:

14MG002: riparian undeveloped r-o-w next to Swan Lake Darwin Rd.

14MG006: woodland and rock outcrop undeveloped r-o-w Bridgeport Place next to Playfair Park.

14MG007: woodland undeveloped r-o-w Cumberland Rd next to Playfair Park.

14MG011: woodland rock outcrop undeveloped r-o-w at Willerton Rd and Pike St, close to Cedar Hill Park SEI site.

14MG013: undeveloped r-o-w Tattersall Drive part of a SEI woodland next to Cedar Hill Park.

14MG014: undeveloped r-o-w Cranbrook Place next to Cedar Hill Park.

14MG015: forest along riparian ravine at undeveloped r-o-w Hobbs St.

14MG016: mature mixed forest at Sheret Place.

14MG021: mature forest and creek crossing on undeveloped southwest end of Little Rd.

14MG028: mature forest partly on large property and partly on Swan Creek Park.

14MG029: rocky knoll woodland on residential property at McKenzie Ave.

14MG040: Garry oak woodland and related ecosystems on five undeveloped properties and a undeveloped right-of-way at Gregory Place.

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14MG042: woodland on on rocky knoll slopes mostly within one large strata property at Oakwinds Place.

14MG043: herbaceous terrestrial ecosystem on southwest slopes of rock outcrop at Oakwinds Place.

14MG047: mature Garry oak woodland on undeveloped r-o-w between Gordon Head Rd and Ansel Rd.

14MG056: extension to SEI woodland, mostly on two large properties at Quadra St.

14MG058: riparian site along Blenkinsop Creek on undeveloped section of Cumberland Rd.

14MG073: mossy steep slopes rocky knoll at Gardenwood Court.

14MG082: undeveloped end of Quayle Rd with various sections: woodland and riparian along Goward Springs C.

14MG084: old forest patch with wildlife trees on Cordova Bay Rd.

14MG085: rocky knoll with sparse Garry oaks on Cordova Bay.

14MG089: mixed forest of oaks and firs on undeveloped end Miramar Dr.

14MG091: two rocky knolls with herbaceous and woodland components on Wildview Crescent.

14MG097: arbutus - Garry oak woodland with some firs next to Bear Hill Regional Park.

14MG098: extension to SEI rock outcrop - woodland boundary on private property adjacent to Bear Hill Regional Park.

3.3. GIS Mapping and Associated Data

Maps were created for each of the one hundred sites included in the report. A polygon feature class included in a geodatabase was created with ArcGIS v.10.1. The polygon layer contains attribute information for each site: a unique Site Code, Saanich Plate Number, area (in square meters), perimeter (in meters), and general description and notes. When appropriate, information on SEI Class, BGC Code, CDF TEM polygon and Structural Stage were included. Metadata containing additional information on the created features was also edited in accordance with District of Saanich standards.



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4. DISCUSSION AND RECOMMENDATIONS

The overall objective of this project was to advance the knowledge of ESAs that remained unmapped within the District of Saanich. Although ESA's are usually associated with the presence of Sensitive Ecosystems (Canadian Wildlife Service 2000), other natural sites may play an important role in an urban - rural landscape within a natural habitats and wildlife conservation plan (i.e., the connectivity or buffer functions provided by non-sensitive ecosystems such as young forests). Therefore, in some cases the identification of sites included non-sensitive ecosystems and altered ecosystems such as can be found in urban forests, undeveloped right-of-ways, old fields, and urban properties. Altered sensitive ecosystem sites, such as Garry oak woodlands in urban residential neighbourhoods and in undeveloped right-of-ways, were identified and mapped. These sites were evaluated under the same methodology as were woodlands in rural areas in a more pristine state.

The interconnection strategic plan, designed at the start of Phase 2 to guide site identification, was expanded in this phase to include some important conservation and biodiversity areas in the District which had not been contemplated previously: Cuthbert Holmes -Tillicum Park, Knockan Hill Park and Cedar Hill Park (Table 2). An active plan for alien invasive species control needs to be a crucial part of this strategy in order to avoid the spread of noxious species to pristine areas.

One hundred potential ESA's, including undeveloped r-o-w of ecological value, were identified in this phase of the project. **All one hundred sites identified achieved *Very High to Medium* conservation priority scores, therefore all are recommended to become new ESAs: 98 as part of the SEI inventory, one (14MG059) as a valuable site for connectivity next to Blenkinsop Lake, and one (14MG067) as buffer to Brydon Creek. Among the proposed sites, six are extensions to existing SEI polygons which were enlarged and redefined (see Appendix I and Appendix II).**

Sixty percent of the *Very high* priority sites were undeveloped r-o-w. The main criteria responsible for the higher assessment of these sites is public ownership (i.e. higher protection potential). In addition, identified undeveloped r-o-w often scored high as potential buffers, link corridors, additions to Parks or SEI sites and sensitive ecosystems cover.

Six sites were assessed of *Medium* priority for conservation. These sites show a general pattern consisting of a small isolated patch within an urban landscape and formed by several residential properties. The small size, potentially altered condition and various owners are the main criteria responsible for their lower assessment for conservation. The six sites that scored as *Medium* priority should be visited to further refine its condition.

Of the six sites recommended for investigation on the ESA Phase 2 report, two were examined and recommended as ESA's during this phase of the project (Gardenwood Court area and Del Monte Ave surroundings to Doumac Park). The remaining four sites (Donwood Park surrounding forest and wetland, Kerryview Drive forested area, Prospect Lake Rd and West Saanich Rd-Matterhorn Drive and surroundings), as well as other potential valuable sites, are included in the CDF TEM project (Madrone 2008). These remaining potential ESA sites will be examined over the next phase and assessed under the District's conservation strategy.

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5. REFERENCES

Madrone Environmental Services, 2008. Terrestrial Ecosystem Mapping of the Coastal Douglas-Fir Biogeoclimatic Zone. Dossier 07.0359.

B.C. Ministry of Environment. 2010. Field Manual for Describing Terrestrial Ecosystems. 2nd Ed. Land Management Handbook 25.

B.C. Ministry of Environment. 2006. Standard for Mapping Ecosystems at Risk in British Columbia. Available at: http://www.env.gov.bc.ca/fia/documents/standards_for_mapping_ear_version1.pdf

Canadian Wildlife Service. 2000. Sensitive Ecosystems Inventory: East Vancouver Island and Gulf Islands 1993 - 1997. Volume 2: Conservation Manual. Pacific and Yukon Region. Technical Report Series No. 345.

Available at:

http://a100.gov.bc.ca/appsdata/acat/documents/r2124/SEI_4206_rpt2_1111099716576_7025110f245d45_caa101abdef711671d.pdf

VNHS Greenways Inventory, 1999.

