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Resilient Saanich Technical Committee

Saanich Environmental Mapping

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Agenda

- Verification definitions
 - Verification levels of ESA inventories
 - CDF TEM modified for Saanich
 - Ecosystem losses
 - Urban Forest/landcover mapping
 - Additional questions from the Mapping Working Group
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Data Verification Summary

All spatial data ecosystem inventories in our GIS system have been verified to varying degrees. There are many different levels of verification that occur with the highest level being a full ecosystem plot and the lowest being airphoto interpretation from more than five years ago. In a few very rare cases, level of verification is unknown.

In an effort to improve understanding of the levels of verification behind each polygon, verification type, date, and source is in the process of being added to the metadata (and will eventually be accessible through public GIS)

We are also making a continuous effort to improve the level of verification of each dataset over time.

Verification Levels

- **E: Ecosystem Plot.** A biologist has visited the site and completed a full evaluation.
- **G: Ground inspection.** The site has been visited by a biologist and checked for accuracy; usually noting dominant species and invasive species cover.
- **V: Visual Inspection.** The site has had a visual inspection without data collection, usually from an nearby vantage due to a lack of access.
- **O: Other.** Less common methods of verification and combinations such as soil surveys, drive by, or personal knowledge (from original SEI).
- **P (< 5 years): Orthophoto Review.** The site has been compared against orthophoto imagery in the last five years to remove obvious impervious surfaces such as houses and roads.
- **P (> 5 years): Orthophototo Review.** The site has been compared against orthophoto imagery that is more than five years old to remove obvious impervious surfaces such as houses and roads.
- **U: Unknown:** Verification level unknown.

Percentages of highest level of verification of each inventory

Note: The stats are for the published inventory, we have already removed some via filtering and verification

Inventory	E	G	V	O	P <5 yrs	P >5 yrs	U
SEM	43%	0%	0%	0%	0%	57%	1%
SEI	17%	9%	11%	21%	42%	0%	0%
CDF*	1%	4%	7%	0%	4%	84%	0%
TOTAL	13%	5%	7%	7%	15%	53%	0%

*review in progress therefore numbers are draft for CDF

How many polygons should be verified in the field?

Survey Intensity Levels and Map Scales

Objective	Percentage of Polygon inspections	Ratio of Full Plots: Ground Inspection: Visual Checks	Suggested Scales
Local government and use planning (zoning, OCP, DPs, and growth strategies), greenways and park planning, element occurrence mapping, medium scale pre-planning for energy, housing or other developments (e.g. Neighbourhood plan or rezoning)	51-75%	6:24:70	1:10k to 1:20K
Landscape level land use planning, land acquisition priorities, habitat mapping and habitat protection, element occurrence mapping.	26-50%	6:24:70	1:10k to 1:50K
Land use planning, conservation priorities, SOE reporting.	15-25%	5:20:75	1:10k to 1:50K

How does Saanich measure up?

	Standard	SEI	CDF	SEM
Percentage of Polygon inspections	51-75%	37%*	12%*&**	43%
Ratio of Full Plots: Ground Inspection: Visual Checks	1:4:12 (6:24:70)	1:1:1*	1:4:7*	1:0:0
Suggested Scales	1:10k to 1:20K	1:20K	1:15 - 1:15K	Orthophotos and LiDAR

- *The stats are for the published inventory, we have already removed some via filtering and verification;
- ** expected to increase once Nicole completes her analysis

Methods for SEI cleanup

- The original dataset was digitized using airphotos from 1984-1992.
- The provincial government analyzed SEI loss in southern Vancouver Island in a report published in 2004. In the CRD we lost 137.4 ha and 865.9 ha of SG and FS
- In this analysis polygons were updated using 1:10,000 colour orthophotos taken in 2002
- The 2021 SEI cleanup exercise was based on methodology outlined in a report done by a consultant in 2003 but using 2019 orthophotos

SEI lost to disturbance or improved GIS analysis

Data Set Date	Methodology	Area in ha	Loss due to Cleanup	Loss due to Disturbance
1993-1997	Original	1261	-	-
2002	Axys updates spatial coverage using 2002 airphotos. Capital Region lost 137.4 ha plus 865.9 ha of SG & FS to disturbance.	1229	-	-32.4
2017	Polygons removed by council	1224	-4.6	-
2018	Saanich staff publish revised polygon boundaries based on ES staff field work collected through the EDPA.	1185	-39.1	-
2020	Nicole does a review of all SEI polygons using 2019 orthophotos.	1148	-26.1	-10.8
2022	Current SEI dataset	1148	-	-
Total Loss (ha):		113	69.8	43.2



Insight gained from the SEI cleanup exercise

- During the SEI cleanup exercise in 2020, 270 pieces (36.9 ha) were identified and removed from the published dataset.
- These polygons all still exist (unpublished) and contain detailed info on why and when disturbance occurred.
- This information is useful for tracking overall disturbance of sensitive areas within Saanich over time.



43.2 ha of
sensitive ecosystems
lost to disturbance

An area nearly the size of
Saanich's 3rd largest park
(Swan Lake, 47 ha)



Other verification improvements in progress

CDF

The CDF dataset is currently undergoing a similar cleanup exercise (using 2019 orthophoto imagery). As a result, all features in the dataset will soon have a verification of $P < 5$ as the minimum.

-216 ha removed from dataset (out of 3518 ha total)

-Currently differentiating removed polygons as disturbance vs cleanup

SEM

The SEM dataset is set to undergo a similar cleanup exercise soon.

How we modified CDF TEM

Legend	Description	GIS Definition Query
Older Forest (OF)	Mature and Old Forest of any density (over 80 years old) Coniferous and mixed	Structural stages=6 and 7 (does not have to be in dominate layer)
Wetland (WN)	All types of wetlands, mudflats, ponds, shallow open water, active floodplains	All wetland site codes All site codes LS, MU, PD, OW All site modifier a
Woodland (Garry Oak) (WD)	Garry Oak and associated ecosystems	Site codes FC, GO, OM, OR, QB, RA, SC, RO Structural Stage 1b (moss dominated)
Young Forest (YF)	Pole/Sapling, Young Forest (40-80 years old)	Structural stage=4, 5 Size equal or greater than 100 ha and some riparian areas
Shrub (SH)	Tall shrub, low shrub dominant	Individually selected (based on size, connectivity, known diversity, riparian areas, or habitat values)
Excluded	Logged areas, golf courses, gravel pits, urban/suburban areas, active fields, vineyards, & orchards	Filter out polygons with: Disturbance Modifiers: L Site Codes: CF, CO, CV, GC, GP, UR
No shows	Trembling Aspen-Slough Sedge ecosystems	

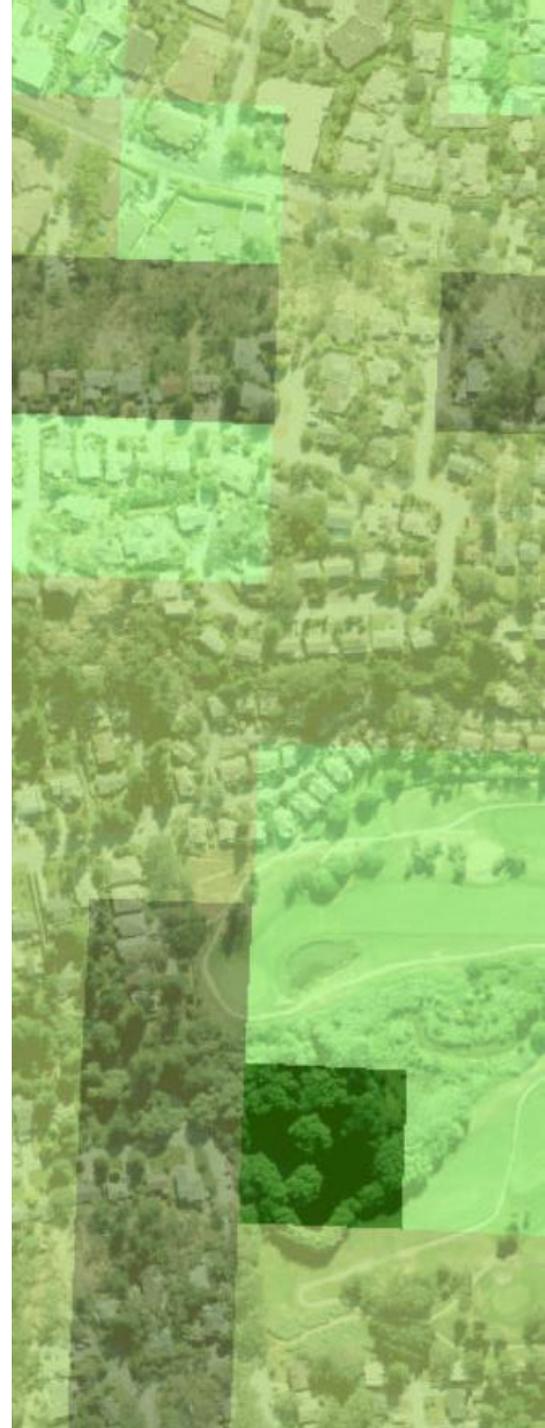
Urban Forest Land Cover Mapping for the Capital Region

- 1986 baseline
- 2005 comparison (published 2008)
- 2009 (Saanich Parks)
- 2011 comparison (published 2013)
- 2019 comparison (to be published imminently)
- Uses LiDAR so many more categories, such as deciduous vs coniferous



Data in the reports...

- % tree cover and % impervious surface cover over the one-hectare grid cells
- Tree canopy density
- Impervious cover density
- Comparisons between years and between municipalities
- Maps
- A riparian habitat potential model (new)
- Tree planting potential (new)



Questions from the Mapping Working Group:

Q We would be interested to know how Saanich interprets the criterion of *relatively unmodified*, when identifying and designating sensitive ecosystems and mapping them.

A Mostly we refine existing polygons to create more accurate boundaries. We also refer to M. Grau, 2012 (next slide) for guidance.

Additional ESA Mapping Project Report Phase 2

TABLE 3. Criteria for Assessment of Ecological Integrity

Landscape context (L)	
Excellent – Score 4	The surrounding landscape has <25% fragmentation due to roads, urban areas and rural settlements, and no recent industrial activity. Site occurs within a larger landscape with some formal protection status or is protected by conservation covenants.
Good – Score 3	Up to 50% of the surrounding landscape is fragmented. The larger landscape context provides some protection from anthropogenic disturbance, although changes to natural disturbance regimes exist (fire suppression, flooding control).
Fair – Score 2	More than 50% of the surrounding landscape is fragmented and affected by anthropogenic influences. Development may affect the ecosystem's existence.
Poor – Score 1	Less than 15% of the surrounding landscape consists of natural or semi-natural vegetation, or the ecosystem is completely isolated from natural and protected areas.
Condition (C)	
Excellent – Score 4	Typical species for the ecosystem form the vegetation cover in all layers. Minor cover of exotic species occur in the site (<10%). Forested ecological communities consist of climax vegetation. The community may have minor internal fragmentation (<5%). Wetland and riparian communities have natural hydrology regimes. No artificial structures occur on the site.
Good – Score 3	Typical species for the ecosystem form the majority of the vegetation cover in all layers. Some cover of exotic species (10 - 40%). Forested ecological communities may be late seral vegetation. Wetland and riparian communities have largely natural hydrology regimes. There may be moderate internal fragmentation (<25%).
Fair – Score 2	Typical species for the ecosystem form the canopy layer and are present in the understory, although if in the latter, do not compose the majority cover. Significant cover of exotic species (40 - 75%). Forested ecological communities typically are young seral vegetation regenerated after anthropogenic disturbance. There may be significant alterations of the hydrology regime in wetlands and riparian ecological communities. There is moderate internal fragmentation (<25%).
Poor – Score 1	Typical species for the ecosystem form the canopy layer but have disappeared from the shrub or herbaceous layers. Exotic species dominate a vegetation layer or may total >75%. Significant anthropogenic disturbance, such as removal of soil material or vegetation. There are significant alterations to the hydrology regime in wetlands and riparian ecosystems. High internal fragmentation (>25%), presence of artificial structures or barriers.
Restoration potential (R)	
Excellent – Score 4	The natural species, soils and disturbance regime are mostly intact, only minor control of invasive species is needed.
Good – Score 3	The natural species, soils and disturbance regime are present, but sustained invasive species control is needed to achieve restoration.
Fair – Score 2	Alterations to the natural disturbance regime require major work. The removal of invasive species will leave major portions of exposed soil, requiring planting. Many years of work will be needed to achieve a completely natural appearance.
Poor – Score 1	Soils and vegetation were removed, and site is dominated by alien invasive species. Site may be affected permanently.

Questions from the Mapping Working Group:

Q We find, looking through various reports and the OCP, that Environmentally Significant Area (ESA), and Environmentally Sensitive Area (ESA), tend to be used interchangeably. What do you see as the technical difference between these terms, and are they mapped differently?

A **Sensitive** areas are rare and fragile (sensitive to development and do not recover well). **Significant** areas are any ecosystem or habitat feature that has been captured in an inventory.

Questions from the Mapping Working Group:

Q Can the GIS specialist do small jobs without needing a motion from the RSTC?

A How small is small? Can ask Adriane for an estimate for how long it would take to answer a request and take it from there.