Saanich Environmental Mapping Backgrounder

Saanich uses environmental mapping to help identify where important environmental features and ecosystems remain in our communities. This is very important information for environmental planning and protection. Saanich has developed environmental mapping over time using a variety of data sources. This mapping has been evolving as technology and information have allowed.

This backgrounder is for those who are interested in the details of how that environmental mapping has developed over time, including the use of inventories and other mapping sources.

Saanich was one of first municipalities (if not the very first) to produce an atlas of environmental data back in 1999. The purpose of having such an atlas is to:

- display environmental inventories from multiple agencies in a way that is easily accessible to everyone
- provide additional information such as an aerial photo and street names to make the mapping easier to read
- increase awareness of the types of ecosystems and species that occur locally
- flag areas with potential ecological value
- inform stewardship planning and activities

The following outlines the development of Saanich's environmental mapping over time.

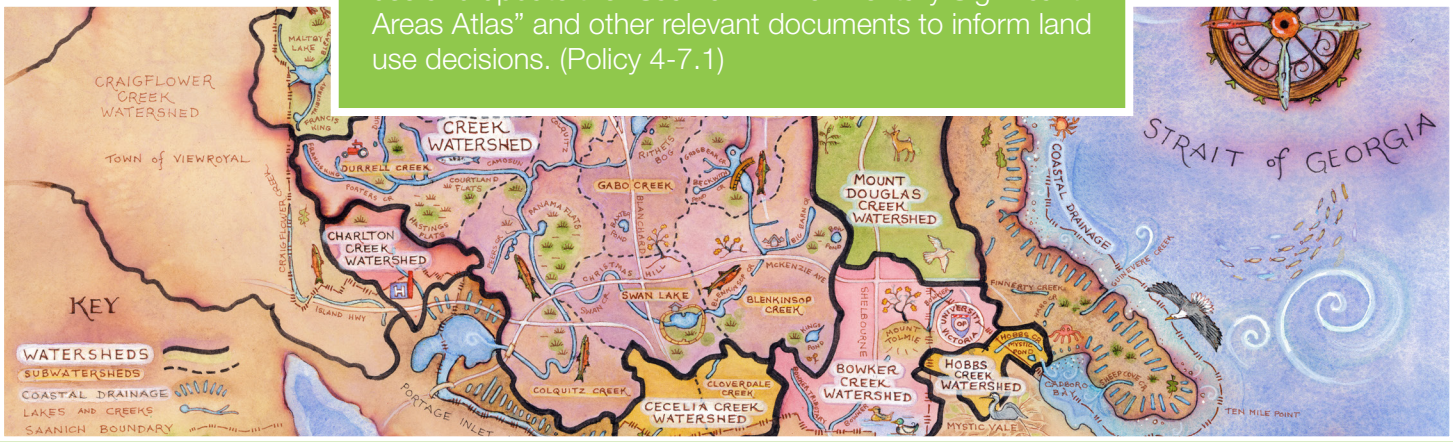
The First Three Editions

The first Environmentally Significant Areas (ESA) atlas included streams, wetlands, riparian areas, floodplains, Conservation Data Centre rare species, and significant native vegetation. The atlas was well-received and was useful for staff and residents alike. The black and white atlas images were small scale so the data was displayed on 23 pages only. The atlas was thick with an appendix of stream data that was collected as part of a Saanich inventory. The first atlas was presented to Council for information. As the atlas does not have any legal connotations and is information only, it does not need to be adopted by Council.

The second edition was produced in 2003 and the third in 2011. The pages followed the Saanich map plate grid system and tripled the number of pages, which made it easier to read and compare with other Saanich map books.

With each new edition, additional data and updates to existing data were included. New technology has allowed for clearer images. Inventories were displayed, unaltered, as produced by the various agencies with the exception of the Conservation Data Centre's (CDC) inventory of rare species and plant associations. The CDC's database includes locations of extirpated populations and historical data that are seen as placeholders for future field work. These were not displayed in the ESA Atlas.

Saanich Official Community Plan (2008): Continue to use and update the "Saanich Environmentally Significant Areas Atlas" and other relevant documents to inform land use decisions. (Policy 4-7.1)



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Introduction of GIS

Beginning in late 2011, Saanich began to display environmental data in the publicly accessible "SaanichMap" (GIS or electronic mapping) on the Saanich website, allowing more people to view the inventories. This also allowed staff and residents to overlay other data, such as culverts, property lines, and contours. GIS allows users to zoom in on areas to see even greater detail. The leap in technology was not necessarily compatible with the technology used to collect and display the original data, which may not have been planned for use at such a large scale.

Unlike a static atlas, GIS can be continually updated. This creates an expectation that the data will be up-to-date. However, it has not been possible (to date) to keep up with all the changes on the landscape (houses are built, streams are channelized, trees are cut). Additionally, much of the data is produced and updated by other agencies as budgets allow. Verifying inventories and mapping on the ground is not possible for much of Saanich because many polygons are located on private property. In addition to this, there were limited staff resources for updating mapping data.

Concerns about the updating of environmental mapping were raised in regards to the former Environmental Development Permit Area. As a result, property owners invited staff to access their property to improve the accuracy of polygon boundaries, and in some cases remove polygons. Due to a lack of adequate GIS resources, the process to make these changes was very slow.

Since the 3rd Edition (2011): The ESA Mapping Initiative

Since the release of the 3rd edition of the ESA Atlas in 2011, staff and consultants have been working to gather more data through the ESA Mapping Initiative. This is now publicly available on the SaanichMap. This initiative within Saanich's Strategic Plan was completed with existing budgets and an external federal grant. The ESA Mapping Initiative was divided into three phases:

- Phase 1: the consultant considered publicly identified sites using priorities and criteria established by a technical committee. Phase one was completed and the results were presented at an open house in July 2012.

- Phase 2: the consultant considered sites identified through existing inventories, data, and aerial photo analysis. Permission was granted by some landowners to access private properties to complete the inventory. All landowners were invited to a presentation of the results.

- Phase 3: was initiated as a result of public feedback. Phase 3 gave the consultant an opportunity to evaluate identified sites without additional field work. The goal was to identify 100 sites (based on the available budget) that had not been previously mapped and included smaller sites.

Phase 1 Outcomes	Phase 2 Outcomes	Phase 3 Outcomes
• 23 Sensitive Ecosystems • 1 isolated watercourse • 1 Bald Eagle nest • 4 undeveloped Right-of-ways • 2 wildlife tree areas • 5 veteran tree areas • 4 older second growth forests	• 30 Sensitive Ecosystems • 2 isolated wetlands • 6 undeveloped right-of-ways • 7 wildlife tree areas • 6 veteran tree areas	• 55 Sensitive Ecosystems (or additions to) • 68 undeveloped public right-of-ways • 1 connecting site • 1 riparian buffer

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Results of the ESA Mapping Initiative

The results of the ESA Mapping Initiative have been compiled into one GIS layer called the Saanich Ecosystem Mapping (SEM). Although it uses a very similar methodology to SEI, there were differences such as setting priorities for target ecosystems and not using a minimum size threshold.

Staff and consultants have also been working over the past several years to develop a GIS layer based on the provincial Coastal Douglas-fir (CDF) Terrestrial Ecosystem Mapping (TEM) product which has also been published on SaanichMap (our website GIS mapping). Unlike the other three inventories that display rare plant associations (SEI, CDC, and SEM), the objective of this product is to identify the climax ecosystems of the entire landscape using a variety of biophysical factors. Even highly developed urban areas are included in the mapping (as non-vegetated polygons incapable of supporting ecosystems). Areas that may have sparse vegetation but still have the capacity to fill in with native vegetation are mapped as such. Saanich presents the CDF TEM inventory so it can be easily compared to other ecosystem mapping. Some field work was also conducted. This mapping product overlaps with some of the polygons that were almost completely removed from Saanich mapping through a Council process.

Overview of ecosystem-based inventories:

Inventory	Origin	Purpose	Standard
CDC	Provincial	Maps locations of ecosystems that are at risk of being lost to assist in the conservation of biodiversity in BC.	Standard for Terrestrial Ecosystem Mapping in British Columbia & Condition Evaluation Form
CDF	Provincial	Maps ecosystems according to climate, physiography, surficial material, bedrock geology, soil, and vegetation to support interpretations for various land management activities.	Standard for Terrestrial Ecosystem Mapping in British Columbia
SEI	Provincial/ Federal	Maps ecological communities sensitive to disturbance and listed as special concern, threatened, or endangered by the British Columbia Conservation Data Centre (CDC) together with the abiotic and ecological processes at a particular site.	Standard for Mapping Ecosystems at Risk in British Columbia
SEM	Municipal (Saanich)	Mapping of smaller sites.	Modified SEI

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Current Mapping

The draft fourth edition of the Atlas is currently being reviewed by the Resilient Saanich Technical Committee (RSTC). The atlas has been renamed the **Environmental Reference Atlas** in recognition of the breadth of inventories, their variable accuracy, and the different purposes of the inventories.

Before the 4th edition of the Atlas is published, further refinement of SEI polygon boundaries based on air photo interpretation (to remove impervious surfaces, logged areas, etc.) will be updated.

Saanich Environmental Services now has a part-time Environmental GIS Analyst and is able to actively make changes to the layers on SaanichMap. This will allow the inventories to be updated on a regular basis. A few of the current tasks include:

- Publish further refinements to the SEI mapping
- Add information about the level of verification for each polygon in each inventory
- Consolidate inventory databases to better track mapping updates as they move through the process
- Refine CDF TEM polygon boundaries (to remove impervious surfaces)
- Update the CDC layer based on newly published data from the provincial government

As per the Resilient Saanich Terms of Reference, a 5th edition of the ERA Atlas will be produced at the conclusion of the project. The Atlas will reflect the work of the RSTC, consultants, other government agencies, and the Environmental GIS Analyst. The Atlas will continue to be a reference and flagging tool, not a legal document.

A note on accuracy

There are many factors which can affect the accuracy of environmental inventories:

- Purpose, objectives, and criteria of the inventory
- Adequate resources such as staff, budget, and technology
- Jurisdiction, origins, or ownership of the data
- Methods and standards of the inventory
- Changes in the landscape since the data was collected
- Access to the land/land ownership
- Scale of original inventory vs scale of display
- Differences of opinion on value
- Misinterpretation of data and purposes of the inventories
- Skills of the people who collected the information, mapped the information, stored the information, digitized the information, etc.

There are different levels of mapping/ polygon verification. Inventories normally begin with aerial photograph interpretation of the dominant vegetation and boundary. Depending on some of the factors listed above, verification ranges from a targeted percentage of polygons to every polygon. Verification may occur on the ground or by viewing the polygon or feature from a distance. This means the verification may be minimal or detailed. Overall, Saanich's data meets most verification targets.

More information about Saanich's environmental mapping is available on the website at: https://www.saanich.ca/EN/main/community/natural-environment/environmental-planning/environmental-reference-atlas.html

Questions?

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