GLOSSARY OF TERMS

Above ground biomass — Above-ground biomass is the living vegetation above the soil, including stem, stump, branches, bark, seeds, and foliage. It is expressed as tonnes of biomass or carbon per hectare. Above-ground biomass is the most important and visible carbon pool, and the dominant carbon pool in forests and plantations.

Below ground biomass — Below-ground biomass is defined as the entire biomass of all live roots, although fine roots less than 2 mm in diameter are often excluded because these cannot easily be distinguished empirically from soil organic matter. Since below-ground biomass could account for 20-26% of the total biomass, it is important to estimate this pool for most carbon mitigation as well as other land-based projects.

Biogeoclimatic Zone and Site Series (BEC) — BEC is a hierarchal classification system that uses climax vegetation communities to infer the combined ecological effects of climate and soil. At the highest level, the regional level, the province is divided into 14 biogeoclimatic zones. These zones are large geographic areas with relatively uniform climate, i.e. similar regional or macroclimate. Zones are usually named after one, two or three of the dominant climax species. The names can also include another general distinguishing feature of the area such as geographic location (interior, coastal,) or climate (subboreal, boreal, montane).
A Biogeoclimatic Zone can be presented at three levels; Zone, Subzone and Variant. To describe these three levels concisely a code is used, for example;

- Ecological Community – Douglas-fir / dull Oregon-grape has a code of CDFmm/01
- Biogeoclimatic Zone – CDF = Coastal Douglas-fir Zone
- Biogeoclimatic Subzone – mm = moist maritime

Biogeoclimatic Variant/Site Series – 01 = Fd-Salal - *Pseudotsuga menziesii - Gaultheria shallon*

Broad Ecosystem Mapping and Inventory — **Description:** The Broad Ecosystem Mapping and Inventory provides a high level approach to ecosystem mapping. It draws on two mappable units – Ecoregions of BC Classification and Biogeoclimatic Ecosystem Classification. The Ecoregions are on a provincial scale and take into account climate, physiogeography, broad animal and plant distribution. This is the broadest unit of mapping. Biogeoclimatic Ecosystem Classification is on a regional scale and looks at climate, vegetation and site characteristics.

Uses – These maps are likely to be most useful to decision makers working at a provincial scale.

Limitations – The scale of the mapping limits their use at a local government level.

Example classification: Ecoregions = COM – Coast and Mountains Ecoprovince, ED Georgian Depression Ecoprovince etc. Biogeoclimatic Zones – Coastal Douglas-fir, Coastal Western Hemlock etc.

Cumulative Effects Framework (CEF) Disturbance Mapping — **Description:** Combined data extracted from various provincial spatial layers to show recent disturbance including urban, recreational, agricultural, mining and extraction, forest harvesting, oil and gas activities. Disturbance was classified as current (within 20 years of 2021) or historical (pre-2001).

Uses: strategic level cumulative effects analysis; identifying landscape level disturbance

	Limitations: only meant for coarse GIS analysis, summarized by large areas such as BC's landscape units. Dataset has varying levels of quality, accuracy and completeness, and should not be used for site-specific analysis.
CDC	Conservation Data Centre - collects and shares scientific data and information about wildlife and ecosystems in B.C. It is part of the BC Provincial government.
Climatic niche	The climatic niche reflects the set of temperature and precipitation conditions where a species can occur.
Climate refugia	Areas buffered from contemporary climate change over time that enable persistence of valued physical, ecological, and sociocultural resources.
Ecosystem/Species at Risk	An extirpated, endangered or threatened ecosystem/species or an ecosystem/species of special concern (formerly called vulnerable). The Federal Species at Risk Act governs the conservation of species at risk.
Element Occurrence Mapping	**Description:** Element occurrences are mapping units used by the Conservation Data Centre to indicate the verified (by CDC staff) presence of species and ecological communities at risk. A species element occurrence often corresponds to a local population, while an ecological community element, may represent a stand or patch or a cluster of patches. **Uses:** Decision makers can access maps through the BC Species and Ecosystems Explorer and CDC iMap to prevent the loss or degradation of species and ecological communities at risk during planning. **Limitations:** Element Occurrence mapping does not represent all the areas in which species and ecological communities at risk occur or are likely to occur. The mapping is highly skewed toward areas which have undergone terrestrial mapping and/or have been more intensively surveyed (typically public lands in easily accessible areas). In addition, small patches of ecological communities may not be represented as they do not meet the CDC's criteria (e.g. too small, isolated etc.)
Freshwater Atlas	**Description:** The Atlas presents watershed boundaries, streams/rivers, lakes, wetlands, obstructions and coastal bays and inlets. This information is mapped from 1:20,000 scale topographic base maps. The Atlas allows the user to connect a stream to its tributaries and the watershed associated with it. LINK to localtion **Uses:** decision makers can use the maps to understand how their policies or management approaches would impact on the freshwater environment. **Limitations:** doesn't highlight all hydrologically sensitive ecosystems (e.g. forested wetland) that have an important role in water management. Scale also means that small features would not be presented.
Land Cover Inventory & Mapping	**Description:** Land cover mapping is typically derived from remote sensing. Pixel sizes are often 20-30m pixels, because this is the satellite imagery that is now available for free. Land cover classes describe the physical surface of the ground and include the make-up of vegetation, urban infrastructure, water, and bare soil. **Uses:** Tracking environmental change, climate change impacts and cumulative effects of human activities; planning, monitoring, and evaluation of development, industrial activity,

	or reclamation. **Limitations:** Land cover classifications vary widely between projects. Variable standards and accuracy. Limited ability to accurately determine vegetation species composition. Accuracy may require ground verification and/or human interpretation.
LIDAR data	**Description:** Light detection and ranging (lidar) data are collected from aircraft using sensors that detect the reflections of a pulsed laser beam. The reflections are recorded as millions of individual points, collectively called a "point cloud," that represent the 3D positions of objects on the surface including buildings, vegetation, and the ground. **Uses:** enables accurate measurement of elevation for different ground surface types based on the light pulses reflected from the earth. LIDAR systems produce large volumes of 3D point cloud data which can be analyzed to map different surface types and their elevation. Can be used to derive models reflecting different aspects of the earth's surface (see examples below). **Limitations:** Publicly available lidar data is limited and expensive to acquire. Data intensive, can be challenging to store and process.
LIDAR derived Digital Elevation Models (DEM)	**Description:** Digital elevation models (DEMs) are one of many products that can be derived from lidar data, though they can also be derived from other sources. DEMs are digital representations of the earth's topographic surface. They're a "bare-earth" product because they do not include surface features like buildings and vegetation. A high-resolution DEM can be derived from lidar point-cloud data by stripping away the surface features and sampling the ground elevation in uniform increments to produce a bare earth model. **Uses:** DEMs are used to make high resolution topographic models. They are useful in helping identify small watercourses (especially those under forest), wetlands, floodplains and watershed boundaries. **Limitations:** Not as effective for identifying watercourses in flat areas with limited topography; in these cases (e.g. Fraser Valley) water courses can be difficult to distinguish from ditches and roads.
LIDAR derived Digital Surface Models (DSM)	**Description:** Lidar digital surface models (DSMs) encompass more points than just the bare earth. Other surface feature such as vegetation, buildings and manmade structures are included. **Uses:** DSMs can be used to determine forest canopy height and vegetation structure. At finer resolutions they can distinguish individual trees **Limitations:** On their own, DSMs have limited ability to determine vegetation species composition.
LIDAR derived Canopy Height Model (CHM)	**Description:** a high-resolution raster layer uses lidar point cloud data to map the tree height as a continuous surface. Each pixel in the CHM represents the tree overstory height above the underlying ground topography. The accuracy and quality of a CHM improves with higher point density LIDAR data.

	Uses: Evaluating tree shade, tree metrics, fuel load and fire risk, logging, forest recovering, forest condition, wildlife habitat suitability, forest inventory, big tree locations. **Limitations:** Doesn't provide information about forest understory or species composition.
LIDAR derived Digital Elevation Models (DEM)	**Description:** Digital elevation models (DEMs) are one of many products that can be derived from lidar data, though they can also be derived from other sources. DEMs are digital representations of the earth's topographic surface. They're a "bare-earth" product because they do not include surface features like buildings and vegetation. A high-resolution DEM can be derived from lidar point-cloud data by stripping away the surface features and sampling the ground elevation in uniform increments to produce a bare earth model. **Uses:** DEMs are used to make high resolution topographic models. They are useful in helping identify small watercourses (especially those under forest), wetlands, floodplains and watershed boundaries. **Limitations:** Not as effective for identifying watercourses in flat areas with limited topography; in these cases (e.g. Fraser Valley) water courses can be difficult to distinguish from ditches and roads.
Predictive Ecosystem Mapping (PEM)	**Description:** Predictive Ecosystem Mapping (PEM) is a model for mapping ecosystem site series (refer to definition above). It was developed to support forestry management and is currently being reviewed/updated to take advantage of new technology (LiDAR) and information (TEM, Terrain etc.). The Province is currently aiming to produce a predicted site series map for the province. **Uses:** PEM has been used for Forestry Management. The potential advantages to the PEM model is that it could provide coverage for the whole province. It could be updated regularly and the cost would be lower than repeating TEM and SEI. **Limitations:** Currently being updated and it is unknown how this tool will be used in relation to TEM and SEI. TEM collects very detailed information about habitat e.g. structure/age. This information may not be available with PEM. **Example Classification:** CDFmm/01 - Douglas-fir / dull Oregon-grape, *Pseudotsuga menziesii - Gaultheria shallon*
Sensitive Ecosystem Inventory	**Description:** The purpose of the Sensitive Ecosystem Inventory (SEI) is to identify remnants of rare and fragile terrestrial ecosystems and to encourage land-use decisions that will ensure the integrity of these ecosystems (RISC, 2006). To produce an SEI map, a mapper will review satellite imagery and then visit a percentage of the sites on the ground to verify their classification. The location of sensitive ecosystems can also be derived from Terrestrial Ecosystem Mapping. The ecosystem types identified vary from region to region according to the natural ecosystems found there. **Uses:** Decision makers use this information when they want to determine the location of rare and fragile terrestrial ecosystems and protect it through policy (e.g. Official Community Plans) and during their operations (e.g. forestry). This system of classification is used a lot because people are familiar with it and find it easy to interpret. **Limitations:** The SEI bcomes out of date as forests mature in the interim between SEI

surveys (which is sometimes decades). The SEI does not consider the role that ecosystems play even though they are not classified as rare/fragile habitats, e.g. habitat connectivity, carbon storage and this means that those ecosystems can be undervalued by decision makers. For the study area, most SEI mapping does not extend beyond the CDF and CWHxm BEC subzones.

Example Classification: Old Forest (>250yrs), Mature Forest (>80 yrs), Woodland, Herbaceous, Riparian, Wetland etc.

Species Range Maps

Description: Species range maps created using BC CDC methods. The species ranges are based on Ecosections which are defined according to their physical, oceanographic, and biological characteristics; Ecosections tend to affect species distribution within a bio-geographic region. Input data (observations) were obtained from a variety of data sources, including the BC Conservation Data Centre Element Occurrences database, iNaturalist, museum databases, Wildlife Species Inventory, Survey and Incidental Observations, and contributions from subject matter experts. Ecosection polygons where the species was known to be present, or expected to be present, were highlighted. See link here: https://bcreptilesandamphibians.trubox.ca/range-maps/

Uses: Shows where a species at risk can potentially occur, when the right habitat is present.

Limitations: Doesn't distinguish actual habitat features used by the species.

Terrestrial Ecosystem Mapping (TEM)

Description: To produce a Terrestrial Ecosystem Map (TEM) a mapper will look at the vegetation and landform within a satellite image. They will draw a polygon around vegetation that is similar in nature and assign codes to describe the ecosystem, soil and terrain. The mapper will then visit a percentage of the polygons to determine if their classification was correct and to collect additional information about the nature of the habitat type. Each polygon may have more than one ecosystem defined within it due to the presence of small pocket ecosystems e.g. wetlands with a forest.

Uses: The TEM collects very detailed information which means that it can have a number of applications, for example, Sensitive Ecosystem Inventory classifications can be extracted, age/structural information for a forest can be captured, the Conservation Data Centre can identify the location of ecological communities at risk.

Limitations: TEM can be difficult for someone who is not familiar with the methodology and codes to access all the information stored in this mapping approach.

Example Classification: CDFmm/01 - Douglas-fir / dull Oregon-grape, *Pseudotsuga menziesii - Gaultheria shallon*

Vegetation Resource Inventory (VRI) / BC Land Cover Classification Scheme

Description: The Vegetation Resource Inventory is intended to cover the whole province irrespective of ownership. Photo/Satellite Imagery is used to estimate the vegetation characteristics in an area (polygon). Ground sampling is then undertaken. The polygons are described by the BC Land Cover Classification Scheme (refer to definition). The polygons are assigned a description which included information on site location, ecological information, species composition, age of leading species, height of leading species.

Uses: Main use is by the forestry sector to monitor timber supply. Often used for ecosystem mapping and modelling where information on structural stage and stand composition are needed.

Limitations: the product can be old and therefore inaccurate due to land use change.

Example classifications: Broadleaf Forest, Coniferous Forest, Parkland, Shrubs, Wetland, Burnt Area, Gravel Pit etc.