Terrestrial Ecosystem Inventory (TEI) Database Updates to BAPID 6522: Mount Maxwell TEM and Ecological Assessment

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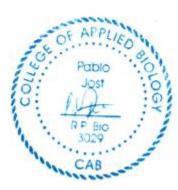| Date	Version	Author	Description of change
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AUTHORSHIP

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LIST OF ACRONYMS

BAPID...Business Area Project Identification Number

BC ....British Columbia

BEC ....Biogeoclimatic Ecosystem Classification

BGC ....Biogeoclimatic

GOERT ....Garry Oak Ecosystem Recovery Team

LMH ....Land Management Handbook

MOECCS...Ministry of Environment and Climate Change Strategy

NBEC.. Biogeoclimatic Ecosystem Classification of Non-forested Ecosystems

QA ....Quality Assurance

TEIS.. Terrestrial Ecosystem Information System

TEM..Terrestrial Ecosystem Mapping

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1   INTRODUCTION

Environmental Dynamics Inc. (EDI) is pleased to present this summary report to the Ministry of Environment & Climate Change Strategy (MOECCS; the Ministry) for the task of updating ecosystem attributes and formatting the Mount Maxwell Terrestrial Ecosystem Mapping (TEM) Project (2003) as per the Terrestrial Ecosystem Information System (TEIS) Digital Standards for incorporation in the TEIS Data systems.

1.1   OBJECTIVES

The Mount Maxwell TEM and Ecological Assessment (Madrone 2003) was not submitted to the TEI unit for curating following completion. Although the project report, field data and other supporting documents are ready for submission, the spatial data requires updating to meet the TEIS digital standards. The objectives for this project are:

- Update the spatial files from e00 format to current ArcGIS spatial files;
- Ensure that the mapping attributes are in the correct format for the TEIS long table;
- Incorporate wetland and NBEC codes as needed;
- Update ecosystem attributes based on Quality Assurance (QA);
- Document the changes made to the projects for incorporation into the provincial data sets; and
- Quality assurance of ecosystem and terrain attributes using Contractor_Package_20151224.zip

1.2   PROJECT DETAILS

The Mt. Maxwell Project mapped the terrestrial ecosystems of the Mount Maxwell Ecological Reserve and adjacent Nature Trust Lands at 1:2,000, classifying them according to both provincial TEM standards (RISC 1998), and to the developing Garry Oak Ecosystem Classification. The project also included a brief assessment of ecological values and some preliminary wildlife habitat interpretations.

Table 1. Mount Maxwell TEM Project Information

Name	Mount Maxwell Terrestrial Ecosystem Mapping and Ecological Assessment
Year	2003
Region	Vancouver Forest Region;
Author	Madrone Environmental Services Ltd.
Size (ha)	345 ha
BGC subzone	CDFmm – Coastal Douglas-Fir Moist Maritime
Guides for Classification	A Field Guide for Site. Identification and Interpretation for the Vancouver Forest Region. Land Management. Handbook 28 (Green and Klinka 1994).
	Higher-Level Physiognomic Vegetation Categories for Garry Oak and Surrounding Ecosystems (Meidinger et al. in progress at time of report completion). Garry Oak Ecosystem Recovery Team (GOERT)

1.3   SPATIAL DATA

The original Project files used to update the spatial data to TEI digital standards, are as follows:

- Mt Maxwell – polygon.csv

    o   Ecosystem and Terrain Attributes

- Mt Maxwell – project.csv

    o   Project Detail Attributes

- Mt Maxwell – user defined.csv

    o   Information for Gary Oak Ecosystem Recovery Team (GEORT) Classification

- ecp.e00

    o   e00 file with TEM polygon spatial data and unique ECP_tag used for joining attribute data to polygons

1.4   STATEMENT OF LIMITATIONS

This report and associated updated TEI datasets were prepared for MOECCS by EDI Environmental Dynamics Inc. The quality of information contained therein are consistent with the level of effort expended and is based on: i) information available at the time of preparation; ii) data and tools supplied by outside sources; and iii) the objectives, set forth in the report. The report is intended to be used by MOECCS or third parties designated by MOECCS.

2 ECOSYSTEM ATTRIBUE UPDATES

The initial update of ecosystem attributes was completed by a professional ecologist using the original Mt Maxwell – polygon.csv file, prior to completion of spatial data updates.

2.1 SITE SERIES AND MAP CODE UPDATES

2.1.1 ISSUES

- No Site Series Number of Ecosystem Component (Site_S)
- Non-vegetated/sparsely vegetated unit (rock outcrop) map code to old standard
- Database field for GOERT classification (GOERT_Class) not compatible with TEIS long table format

2.1.2 METHODS USED TO UPDATE

- A new polygon.csv file was created with the standard TEIS long table headings. Project ecosystem and terrain attributes from the original file were incorporated into the new file under the applicable TEIS standard field headings.
- An updated map legend for all map units was developed, containing Site Series and Map code (refer to Appendix A). Using the sort function in Microsoft Excel, Site Series attributes were added to the updated polygon.csv based on Map Code (Site_MC).
- Previously standard, non-vegetated/sparsely vegetated map code for rock outcrop (RO) updated to new NBEC group/class code (Ro).
- GOERT classification units included in 'Polygon Comments' (Poly_Com) field.

2.2 REALM, GROUP AND CLASS UPDATES

2.2.1 ISSUE

- No Realm, Group or Class attributes (Realm_; Group_; Class_)

2.2.2 METHODS USED TO UPDATE

- An updated Map legend for all map units was developed, including Site Series, Map code, Unit Name, Unit Description, Realm, Group and Class (Refer to Appendix A). Map unit descriptions were referenced from the Mount Maxwell TEM Legend (Mt.MaxML.rtf) and the Mount Maxwell TEM Final Report (Mount Maxwell TEM Final Report.doc).
- Designation of Realm, Group and Class attributes followed the Biogeoclimatic Ecosystem Classification of Non-forested Ecosystems (NBEC) of British Columbia (MacKenzie 2012).

- Using the sort function in Excel, Realm, Group and Class attributes were added to the updated polygon.csv based on Map Code (Site_MC).

The rational for Realm, Group and Class attribution to project-specific map units are outlined below:

Fescue – Camas (FC)

Rational	Update
00 (FC) Fescue - Camas	
Report map unit description: found on very shallow mineral soil veneers over gently rolling to moderately steep rock outcrops; medium-textured soils; non-forested sites dominated by grasses and herbs. The Fescue – Camas (FC) map unit contains considerable variation in species composition and soil depth (refer to use across projects). Further classification is required to separate out variation within the map unit. As the current map code incorporates more than one NBEC group/class designation, only a realm attribute is applied at this time.	Incorporated Terrestrial Realm attribute

	Realm	Group	Class	Site Series	Map Code
Original					FC
Updated to	T			00	FC

Garry oak – Ocean spray (GO)

Rational	Update
00 (GO) Garry oak – Ocean spray	
Report map unit description: Upper slope to crest position; very dry to moderately dry moisture regime and poor to medium nutrient regimes; found on shallow mineral soil, and on moderate to moderately steep slopes; Garry Oak is leading tree species. The GO unit mapped concurrently with three GOERT units, forested (>50% trees); woodland (between 10-50% trees) and savanna (<10% trees). Only one polygon attributed as savanna, therefore map code treated as 'forested' unit. Terrestrial Realm attribute applied. NBEC group and class not applicable.	Incorporated Terrestrial Realm attribute

	Realm	Group	Class	Site Series	Map Code
Original					GO
Updated to	T			00	GO

Cladina – Wallace's selaginella (SC)

Rational	Update
00 (SC) Cladina – Wallace's selaginella	
Report map unit description: found on ridge crests and upper slopes; extremely shallow, medium textured soils on rock outcrops in forest openings; dominated by lichens, mosses and herbs. Map unit well described by NBEC rock outcrop group (bluffs and knobs of bedrock with limited soil development; drought-tolerant cryptogams are often prominent).	Incorporated Realm, Group and Class attributes; Terrestrial Realm, Rock Group, outcrop class

	Realm	Group	Class	Site Series	Map Code
Original					SC
Updated to	T	R	o	00	SC

3   SPATIAL FILE UPDATES

Spatial data updates were completed to TEIS digital standards, following the *Terrestrial Ecosystem Information Digital Data Submission Standard – Draft for Field Testing* (RISC 2015).

3.1.1   ISSUES

- Spatial files are currently in ArcINFO interchange (e00) format which required conversion to current coverage and then into ArcGIS geodatabase format used in Contractor Package.
- Attribute data (refer to Section 2) separate from polygons.

3.1.2   METHODS USED TO UPDATE

- Import from E00 tool used. This is the standard tool used that imports ArcInfo interchange files;
- Coverage reviewed for unique identifier and completeness;
- Coverage polygons imported into temporary geodatabase feature class;
- Updated attributes table joined to polygons using ECP_Tag; and
- Final polygon and attribute data added to Operational_data.gdb for QA.

3.2   ADDITIONAL UPDATES

3.2.1   ISSUES

- Invalid values not picked up in QA contractor package process. This generally occurs where there is a combination of valid values and null values.

3.2.2   METHODS USED TO UPDATE

- Data was set to the standard "No Data" value <Null> for numeric values and "" (empty string) for text values.

4 DATABASE UPDATE SUMMARY

The Mount Maxwell TEM was not submitted to the TEI unit for curating following completion in 2003 and required updating to meet the TEIS digital standards. Spatial files were updated from e00 format to current ArcGIS spatial files, spatial attributes were entered in the correct format for the TEIS long table, and quality assurance of ecosystem and terrain attributes were completed using the contractor package. Additionally, an updated project map legend was developed which documents updates to the project that were completed to reflect changes in the BEC system, specifically NBEC Realm, Group and Class updates. The rational for attribution of Realm, Group and Class codes of project specific units were outlined for future users of the dataset.

5   REFERENCES

Green, R.N., and K. Klinka. 1994. A Field Guide to Site Identification and Interpretation for the Vancouver Forest Region. Ministry of Forests Research Program, Ministry of Forests, Victoria, BC. Land Management Handbook 28.

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APPENDIX A.   MT. MAXWELL
(BAPID 6522)
UPDATED MAP LEGEND 2018

Mount Maxwell TEM Project (BAPID 6522) – Updated Map Legend 2018. This map legend represents a cross walk from the map legend submitted with the original mapping data in 2003, documenting the updates to the project that have been done to reflect changes in the BEC system.

CDFmm – Coastal Douglas-Fir Moist Maritime

Project Working Legend – CDFmm					Updated Legend						
Site Series[1]	Map Code	Name	Description	GOERT unit Classification[2]	Realm	Group	Class	Site series	Map code	Reference	Comment(s)
01	DS	Douglas-fir – Salal	mid to upper slope position; medium textured soils; subxeric – mesic.	Conifer forest (CFFd) and Mixed Conifer / Broadleaf forest types (MCFdAr, MCFdMb, MCFdQg)	T			01	DS	Tr068, LMH 28	
02	DA	Douglas-fir – Lodgepole pine - Arbutus	upper slope to crest position; medium textured soils; xeric.	Conifer forest (CFFd); Mixed Conifer / Broadleaf forest types (MCFdAr, MCFdMb, MCFdQg); Conifer woodland (CWFd); Mixed woodland types (MCFdAr, MCFdMb, MCFdQg).	T			02	DA	Tr068, LMH 28	
04	DG	Douglas fir – Grand fir – Oregon grape	deep, medium textured soil; middle to upper slope position; richer nutrient regime; subxeric – mesic.	Conifer forest (CFFd) and Mixed Conifer / Broadleaf forest types (MCFdAr, MCFdMb, MCFdQg)	T			04	DG	Tr068, LMH 28	
00	FC	Fescue – Camas	coastal bluffs and forest openings. Open, non-forested sites dominated by grasses and herbs. Found on extremely shallow mineral soil veneers over gently rolling to moderately steep rock outcrops.	Grass Communities (GC)	T			00	FC	Tr068; Mt. Maxwell Report	Fescue – Camas (FC) unit contains considerable variation in species composition and soil depth (variable use across different projects). Further classification needed to separate out variation within map unit. Only realm attribute applied at this time.
00	GO	Garry oak – Ocean spray	upper slope to crest position. Shallow soil depths (15 cm and 1 m). very dry to moderately dry moisture regime and poor to medium nutrient regimes. Garry oak is leading tree species. Grass and forb layer diverse.	Broadleaf forest (BFQg); Broadleaf woodland (BWQg); Broadleaf savannah (BSQg)	T			00	GO	Tr068; Mt. Maxwell Report	Forested and Woodland GEORT classification units are dominant; one polygon attributed as broadleaf savannah (<10%) trees.
00	SC	Cladina – Wallace's selaginella	typically on ridge crests and upper slopes; very shallow, medium textured soils on rock outcrops in forest openings	Grass Communities (GC); Mixed Moss / Lichen Communities (MLrc)	T	R	o	00	SC	Tr068; Mt. Maxwell	
00	RO	Rock outcrop	gentle to steep, bedrock escarpment or outcropping, with little soil development and sparse vegetative cover.	N/A	T	R	o	00	Ro	Tr068; MoECCS 2018	

1 Original Project Polygon Excel file did not have Site Series attributes; Associated report Working Legend had site series attributes.

2 GOERT classification units retained in Polygon comments field (POLY_COM)

3 Site series and map codes for final legend checked against the government provided Upland and Wetland Map code standard list (MoECCS 2017)