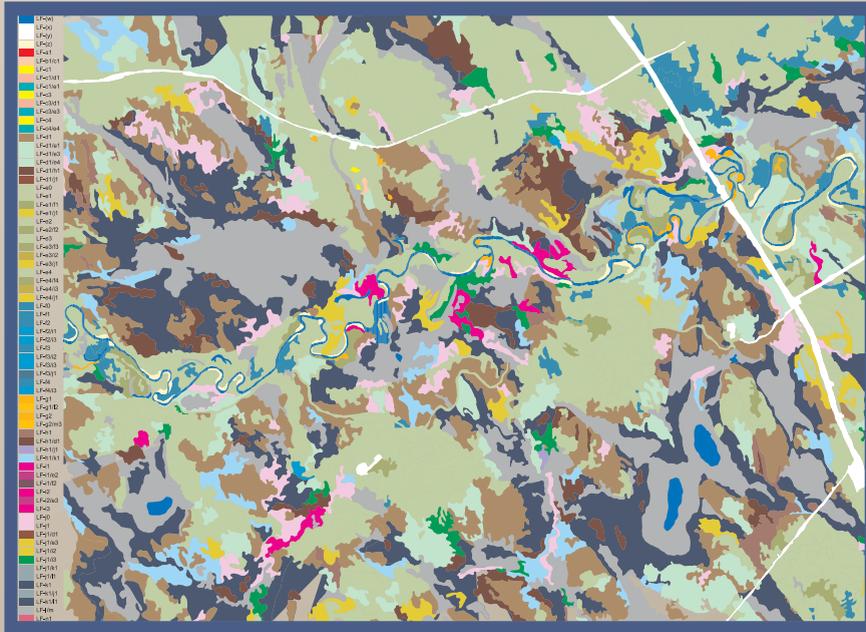




GEOGRAPHIC DYNAMICS CORP.



R1/R2Y ecosite classification within the Drayton Valley Forest Management Agreement (FMA) Area using SiteLogix™

April 2004

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TABLE OF CONTENTS

1.0 INTRODUCTION	1
1.1 Background	1
1.2 Objectives	1
1.3 Scope.....	1
1.4 Study Area	1
2.0 METHODS	3
2.1 Modeling Techniques	3
2.2 Marshybank Ecological Reserve	4
2.3 Area of the 2004 Weyerhaeuser Drayton Valley Ecosite Model	4
3.0 RESULTS	5
3.1 Description of New Map Codes	5
3.2 Model Accuracy	8
4.0 REFERENCES.....	9

1.0 INTRODUCTION

1.1 BACKGROUND

In 1999, a predictive ecosite model for the Drayton Valley Forest Management Agreement (FMA) Area was created by Geographic Dynamics Corp. (GDC) for Weyerhaeuser Canada Ltd. (Weyerhaeuser). In 2004, GDC was asked by Weyerhaeuser to take this existing model and use it to classify portions of the old Edson FMA area, Marshybank Ecological Reserve, R2Y expansion area and parts of FMU R1, that currently make up the new Drayton Valley FMA Area. No new predictive site classification system was created for this new 2004 area, however, the existing model was modified slightly to incorporate new spatial data (*e.g.*, AVI and DEM) where required.

1.2 OBJECTIVES

The objectives identified for this project are to:

- (1) take spatial and attribute data supplied by Weyerhaeuser for selected townships and process them using the existing site classification model (SiteLogix™) for the Drayton Valley FMA Area (GDC 1999);
- (2) refine predicted ecosite map units along the boundaries of different data sources and edge-match all new regions to the old Drayton Valley FMA area;
- (3) produce an addendum report that illustrates the basic methodology used and a brief description of current findings in relation to the Drayton Valley FMA Area report (GDC 1999) to augment ecological information already known about the region; and
- (4) produce a digital Arc/Info E00 format spatial ecosite model and a map of the entire study area.

1.3 SCOPE

Since the existing Drayton Valley FMA Area predictive ecosite model was used for the expansion areas, no new predictive model was created here. Thus, no new site types have been described or new map codes created. Map codes and their respective ecological units are already described in the previous SiteLogix™ summary report (GDC 1999). Only a link file is required to connect units described in this study to those previously described in the Drayton Valley FMA area (GDC 1999).

1.4 STUDY AREA

Ecosite harmonization and edge matching took place in several regions along the existing 1999 Drayton Valley FMA Area map boundary. These regions are identified in Table 1 and Map 1.

Table 1 Areas to add to the Drayton Valley Ecosite Map

FMU	TWP	RGE	SECTION	FMU	TWP	RGE	SECTION
R1	41	7	Parts	Edson	47	11	N part
R1	42	7	Parts	Edson	48	9	Parts
R1	43	5	Parts	Edson	48	10	Parts
R1	43	6	Parts	Edson	48	11	Parts
R1	44	5	Parts	Edson	48	12	Parts
R1	42	6	Parts	Edson	48	13	Parts
				Edson	48	14	Parts
R2Y	42	11	North Half	Edson	48	15	Parts
R2Y	42	12	North Half	Edson	49	9	Thin South Slice
R2Y	42	13	North Half	Edson	49	10	Thin South Slice
R2Y	42	14	North Half	Edson	49	11	Thin South Slice
R2Y	42	15	North Half	Edson	49	12	Thin South Slice
R2Y	42	16	North Half	Edson	49	13	Thin South Slice
R2Y	43	11	Parts	Edson	49	14	Thin South Slice
R2Y	43	12	Parts	Edson	49	15	Thin South Slice
R2Y	43	13	Parts	Edson	49	16	Thin South Slice
R2Y	43	14	Parts	Edson	49	17	Thin South Slice
R2Y	43	15	Parts	Edson			
R2Y	43	16	Parts	Marshy Bank	44	19	Parts
R2Y	44	11	Parts	Marshy Bank	44	20	Parts
R2Y	44	12	Parts				
R2Y	44	13	Parts				
R2Y	44	14	Parts				
R2Y	45	12	Parts				

2.0 METHODS

In general, the following steps were taken to create predictive ecosite map calls for the study area:

- (1) de-archive data;
- (2) preprocess existing plot data;
- (3) create topographic derivative models;
- (4) generate landscape units from ELC and/or soil information;
- (5) modify existing ecological classification model;
- (6) create spatial model;
- (7) modify models;
- (8) edge-match new model with previous model; and
- (9) complete summary report and map.

2.1 MODELING TECHNIQUES

The main objective of this project was to generate a classification for the new areas defined in Map 1 and integrate them with existing ecosite classifications. Much of the spatial data processed for this project was new or updated information. A quality control phase was included at the beginning of the project to ensure that all data used in the model conformed to a Universal Transverse Mercator zone 11 NAD83 GRS80 projection. Second derivative topographic models, such as slope length and slope curvature were regenerated using the same parameters from the first series of models. Landform information was also applied as a modeling input according to the stratification used in 1999 for the Drayton Valley ecosite model.

The FMA was divided into broad-level stratifications called “Ecological Management Units” (EMUs) which were developed from the combination of three primary elements: (1) natural subregion boundaries, (2) ecodistrict boundaries, and (3) ecological land classification (ELC) boundaries. In most cases, EMUs were characterized by differences in parent materials, and were further subdivided by natural subregions. As a result, each EMU was described by its landform, topography, parent material, and climate.

The first step in generating the ecosite map for the FMA area was to merge various digital map layers in each of the selected townships. These layers included Alberta Vegetation Inventory (AVI) data, cursory Ecological Land Classification (ELC) data, and a number of attribute layers derived from the digital elevation model (DEM) (*i.e.*, slope, aspect, curvature, and slope length). Raster values in each of the attribute layers of the DEM were assigned a class value based on available literature, 3-D modeling protocols and expert opinion. The classed raster files were then run through smoothing and minimum polygon size filters to limit the resulting polygons to a manageable number. All vector layers were then merged to form a single layer containing several thousand polygons per township. This composite layer—in conjunction with the baseline model—ecological field data, and expert opinion formed the basis for analysis and defining ecological boundaries. The site-level stratification was developed through a preliminary classification of sites based on tree species composition. Each of the site types was further defined based on topographical variables.

In order to create a seamless ecosite classification across the distinct areas identified in Map 1, it was necessary to create a single labeling scheme (*i.e.*, information taken directly from the Edson classification system possessed units that were slightly different from the Drayton Valley system in that they were weighted and reversed in some cases (*e.g.*, LF-k1/j1 *vs.* LF-j1/k1). Please refer to the Edson ecosite report (GDC 2000) for clarification in this northern part of the study area.

Edge matching of the Edson, R1/R2Y and Marshybank areas to the 1999 Drayton Valley ecosite model was achieved through a careful alignment of common features such as the Pembina River in the north and vegetation inventory linework along the R2Y boundary in the south. All areas were aligned using techniques in Arcedit to smooth arcs that met GDC's 25 metre tolerance for vector line shifts. All input and output spatial data were verified using rigorous quality assurance procedures by performing topology builds and label error tests. The spatial data file "Ecosph_2004.e00" has no label errors and is ready for immediate use in a GIS.

2.2 MARSHYBANK ECOLOGICAL RESERVE

The Marshybank Ecological Reserve had been previously classified within the Drayton Valley FMA Area, but had been taken out by GDC in 1999, as it had been identified as an excluded area at that time. The classification was re-integrated back into the model using techniques available in Arcedit.

2.3 AREA OF THE 2004 WEYERHAEUSER DRAYTON VALLEY ECOSITE MODEL

The area of the model, after all components were integrated into a single ARC/INFO formatted coverage file, came to be 543,100 hectares. The area excludes the O'Chiese Indian Reserve.

3.0 RESULTS

3.1 DESCRIPTION OF NEW MAP CODES

Map Units of the Lower Foothills Natural Subregion (LF)

Mapcode	Map Unit Description
LF-(w)	water
LF-(x)	unclassified
LF-(y)	anthropogenic
LF-(z)	mineral
LF-a1	shrubby grassland ecosite phase
LF-b1/c1	bearberry/lichen PI and hairy wild rye PI complex
LF-c1	hairy wild rye PI ecosite phase
LF-c1/d1	hairy wild rye PI and Labrador tea–mesic PI-Sb complex
LF-c1/e1	hairy wild rye PI and low-bush cranberry PI complex
LF-c3	hairy wild rye Aw-Sw-PI ecosite phase
LF-c3/d1	hairy wild rye Aw-Sw-PI and Labrador tea–mesic PI-Sb complex
LF-c3/e3	hairy wild rye Aw-Sw-PI and low-bush cranberry Aw-Sw-PI complex
LF-c4	hairy wild rye Sw ecosite phase
LF-c4/e4	hairy wild rye Sw and low-bush cranberry Sw complex
LF-d1	Labrador tea–mesic PI-Sb ecosite phase
LF-d1/e1	Labrador tea–mesic PI-Sb and low-bush cranberry PI complex
LF-d1/e3	Labrador tea–mesic PI-Sb and low-bush cranberry Aw-Sw-PI complex
LF-d1/e4	Labrador tea–mesic PI-Sb and low-bush cranberry Sw complex
LF-d1/h1	Labrador tea–mesic PI-Sb and Labrador tea–subhygric Sb-PI complex
LF-d1/j1	Labrador tea–mesic PI-Sb and Labrador tea/horsetail Sb-Sw complex
LF-e0	low-bush cranberry ecosite (canopy cleared)
LF-e1	low-bush cranberry PI ecosite phase
LF-e1/f1	low-bush cranberry PI and bracted honeysuckle PI complex
LF-e1/j1	low-bush cranberry PI and Labrador tea/horsetail Sb-Sw complex
LF-e2	low-bush cranberry Aw ecosite phase
LF-e2/f2	low-bush cranberry Aw and bracted honeysuckle Aw-Pb complex
LF-e3	low-bush cranberry Aw-Sw-PI ecosite phase
LF-e3/f3	low-bush cranberry Aw-Sw-PI and bracted honeysuckle Aw-Sw-PI complex
LF-e3/i2	low-bush cranberry Aw-Sw-PI and horsetail Pb-Sw complex
LF-e3/j1	low-bush cranberry Aw-Sw-PI and Labrador tea/horsetail Sb-Sw complex
LF-e4	low-bush cranberry Sw ecosite phase
LF-e4/f4	low-bush cranberry Sw and bracted honeysuckle Sw complex
LF-e4/i3	low-bush cranberry Sw and horsetail Sw complex
LF-e4/j1	low-bush cranberry Sw and Labrador tea/horsetail Sb-Sw complex
LF-f0	bracted honeysuckle ecosite (canopy cleared)
LF-f1	bracted honeysuckle PI ecosite phase
LF-f2	bracted honeysuckle Aw-Pb ecosite phase
LF-f2/i1	bracted honeysuckle Aw-Pb and horsetail Aw-Pb complex
LF-f2/i3	bracted honeysuckle Aw-Pb and horsetail Sw complex
LF-f3	bracted honeysuckle Aw-Sw-PI ecosite phase

LF-f3/i2	bracted honeysuckle Aw-Sw-PI and horsetail Pb-Sw complex
LF-f3/i3	bracted honeysuckle Aw-Sw-PI and horsetail Sw complex
LF-f3/j1	bracted honeysuckle Aw-Sw-PI and Labrador tea/horsetail Sb-Sw complex
LF-f4	bracted honeysuckle Sw ecosite phase
LF-f4/i3	bracted honeysuckle Sw and horsetail Sw complex
LF-g1	shrubby meadow ecosite phase
LF-g1/l2	shrubby meadow and shrubby poor fen complex
LF-g2	forb meadow ecosite phase
LF-g2/m3	forb meadow and graminoid rich fen complex
LF-h1	Labrador tea–subhygric Sb-PI ecosite phase
LF-h1/d1	Labrador tea–subhygric Sb-PI and Labrador tea–mesic PI-Sb complex
LF-h1/j1	Labrador tea–subhygric Sb-PI and Labrador tea/horsetail Sb-Sw complex
LF-h1/k1	Labrador tea–subhygric Sb-PI and treed bog complex
LF-i1	horsetail Pb-Aw ecosite phase
LF-i1/e2	horsetail Pb-Aw and low-bush cranberry Aw complex
LF-i1/f2	horsetail Pb-Aw and bracted honeysuckle Aw-Pb complex
LF-i2	horsetail Pb-Sw ecosite phase
LF-i2/e3	horsetail Pb-Sw and low-bush cranberry Aw-Sw-PI complex
LF-i3	horsetail Sw ecosite phase
LF-j0	Labrador tea/horsetail ecosite (canopy cleared)
LF-j1	Labrador tea/horsetail Sb-Sw ecosite phase
LF-j1/d1	Labrador tea/horsetail Sb-Sw and Labrador tea–mesic PI-Sb complex
LF-j1/e3	Labrador tea/horsetail Sb-Sw and low-bush cranberry Aw-Sw-PI complex
LF-j1/i2	Labrador tea/horsetail Sb-Sw and horsetail Pb-Sw complex
LF-j1/i3	Labrador tea/horsetail Sb-Sw and horsetail Sw complex
LF-j1/k1	Labrador tea/horsetail Sb-Sw and treed bog complex
LF-j1/l1	Labrador tea/horsetail Sb-Sw and treed poor fen complex
LF-k1	treed bog ecosite phase
LF-k1/j1	treed bog and Labrador tea/horsetail Sb-Sw complex
LF-k1/l1	treed bog and treed poor fen complex
LF-l1	treed poor fen ecosite phase
LF-l1/m1	treed poor fen and treed rich fen complex
LF-l2/m2	shrubby poor fen and shrubby rich fen complex
LF-l2/m3	shrubby poor fen and graminoid rich fen complex
LF-m1	treed rich fen ecosite phase
LF-m3	graminoid rich fen ecosite phase
LF-n1	marsh ecosite phase

Map Units of the Upper Foothills Natural Subregion (UF)

Mapcode	Map Unit Description
UF-(w)	water
UF-(x)	unclassified
UF-(y)	anthropogenic
UF-(z)	mineral
UF-a1	shrubby grassland ecosite phase
UF-b1/c1	bearberry/lichen PI and hairy wild rye PI complex

UF-c1	hairy wild rye PI ecosite phase
UF-c2	hairy wild rye Aw ecosite phase
UF-c3	hairy wild rye Aw-Sw-PI ecosite phase
UF-c4	hairy wild rye Sw ecosite phase
UF-d1	Labrador tea–mesic PI-Sb ecosite phase
UF-d1/e1	Labrador tea–mesic PI-Sb and tall bilberry/arnica PI complex
UF-d1/h1	Labrador tea–mesic PI-Sb and Labrador tea–subhygric Sb-PI complex
UF-e0	tall bilberry/arnica ecosite (canopy cleared)
UF-e1	tall bilberry/arnica PI ecosite phase
UF-e1/i1	tall bilberry/arnica PI and Labrador tea/horsetail Sb-Sw complex
UF-e2	tall bilberry/arnica Aw-Sw-PI ecosite phase
UF-e2/f3	tall bilberry/arnica Aw-Sw-PI and bracted honeysuckle Pb-Sw-PI complex
UF-e2/i1	tall bilberry/arnica Aw-Sw-PI and Labrador tea/horsetail Sb-Sw complex
UF-e3	tall bilberry/arnica Sw ecosite phase
UF-e3/f4	tall bilberry/arnica Sw and bracted honeysuckle Sw complex
UF-e3/i1	tall bilberry/arnica Sw and Labrador tea/horsetail Sb-Sw complex
UF-e4	tall bilberry/arnica Fa ecosite phase
UF-f2	bracted honeysuckle Pb ecosite phase
UF-f2/j1	bracted honeysuckle Pb and horsetail Sw complex
UF-f3	bracted honeysuckle Pb-Sw-PI ecosite phase
UF-f3/j1	bracted honeysuckle Pb-Sw-PI and horsetail Sw complex
UF-f4	bracted honeysuckle Sw ecosite phase
UF-f4/j1	bracted honeysuckle Sw and horsetail Sw complex
UF-g1	shrubby meadow ecosite phase
UF-g2	forb meadow ecosite phase
UF-h1	Labrador tea–subhygric Sb-PI ecosite phase
UF-h1/k1	Labrador tea–subhygric Sb-PI and treed bog complex
UF-h1/i1	Labrador tea–subhygric Sb-PI and Labrador tea/horsetail Sb-Sw complex
UF-i1	Labrador tea/horsetail Sb-Sw ecosite phase
UF-i1/j1	Labrador tea/horsetail Sb-Sw and horsetail Sw complex
UF-j1	horsetail Sw ecosite phase
UF-k1/i1	treed bog and treed poor fen complex
UF-l1	treed poor fen ecosite phase
UF-l1/m1	treed poor fen and treed rich fen complex
UF-l2/m2	shrubby poor fen and shrubby rich fen complex
UF-l3/m3	graminoid poor fen and graminoid rich fen complex
UF-m1	treed rich fen ecosite phase
UF-m3	graminoid rich fen ecosite phase

Map Units of the Subalpine Natural Subregion (SA)

Mapcode	Map Unit Description
SA-(w)	water
SA-(y)	anthropogenic
SA-(z)	mineral
SA-a1	shrubby grassland ecosite phase
SA-b1/c1	bearberry/lichen PI and hairy wild rye PI complex

SA-c1	hairy wild rye PI ecosite phase
SA-c3	hairy wild rye Se ecosite phase
SA-d0	rhododendron–mesic ecosite (canopy cleared)
SA-d1	rhododendron–mesic PI ecosite phase
SA-d2	rhododendron–mesic Se ecosite phase
SA-d2/g1	rhododendron–mesic Se and horsetail Se complex
SA-d3	rhododendron–mesic Fa ecosite phase
SA-e1	shrubby meadow ecosite phase
SA-f1	rhododendron–subhygric PI ecosite phase
SA-f2/g1	rhododendron–subhygric Se-Fa and horsetail Se complex
SA-g1	horsetail Se ecosite phase
SA-h1	treed bog ecosite phase
SA-h1/i1	treed bog and treed fen complex
SA-i3	graminoid fen ecosite phase

Map Units of Unclassified Regions (XX)

Mapcode	Map Unit Description
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XX-(w)	water
XX-(x)	unclassified

3.2 MODEL ACCURACY

The 2004 Weyerhaeuser Drayton Valley ecosite model is expected to be as accurate as the 1999 model at 78.6% for the southern portion. The northern portion adapted from the 2000 Weyerhaeuser Edson ecosite model is expected to be 81.1% accurate. These results are a function of the number of ecological polygons that were assigned the same ecosite label given by the ecologist in the field, stratified by the total area occupied by each ecosite over the entire FMA area by natural subregion.

4.0 REFERENCES

- Geographic Dynamics Corp. 1999. Ecological classification of the Drayton Valley Forest Management Agreement (FMA) Area using SiteLogix: Summary report. Prepared for Weyerhaeuser Canada Ltd., Drayton Valley, Alberta by Geographic Dynamics Corp., Edmonton, Alberta.
- Geographic Dynamics Corp. 2000. Ecosite classification of the Weyerhaeuser Edson FMA Area. Prepared for Weyerhaeuser Canada Ltd., Alberta Division, Edson, Alberta by Geographic Dynamics Corp., Edmonton, Alberta.

Map 1. Combined Areas of the 2004 Weyerhaeuser Drayton Valley Ecosite Model

