**A CLASSIFICATION OF NON-FORESTED ECOSYSTEMS
FOR THE LILLOOET FOREST DISTRICT
FROM AERIAL PHOTOGRAPHS AND LANDSAT 7 SATELLITE IMAGERY**

PROJECT META-DATA

A. PROJECT

Citation:

Silvatech Consulting Ltd. and Shamaya Consulting. 2001. A Classification of Non-forested Ecosystems for the Lillooet Forest District from Aerial Photographs and LANDSAT 7 Satellite Imagery. Prepared for the Ainsworth Lumber Company Ltd., Lillooet, BC.

Consultant/Department:

i)   Orthorectification of LANDSAT 7 imagery:

Track 47 (Scenes 24 and 25)   Track 48 (Scenes 24 and 25)

Ministry of Forests   Geographic Data BC
Kamloops Forest Region   Operations Section
515 Columbia Street   Digital Image Applications Unit
Kamloops, BC V2C 2T7   1st Floor – 810 Blanshard Street
                                       (PO Box 9355 STN PROV GOVT)
                                       Victoria, BC V8W 3E1

Contact: Bob Grey   Contact: Dave Minty

ii)   Classification of non-forested ecosystems:

Silvatech Consulting Ltd.   Shamaya Consulting
670 - 11th Street NE (PO Box 1030)   3632 Railway Avenue
Salmon Arm, BC   V1E 4P2   Smithers, BC V0J 2N0

Contact: Graham MacGregor   Contact: Colleen Jones

iii)   Maintenance of data:

Ministry of Environment, Lands and Parks
Environment Regional Office - Southern Interior
1259 Dalhousie Drive
Kamloops, BC V2C 5Z5

Contact: Glenna Boughton

A. PROJECT (continued)

Compilation Scale:

30-meter resolution determined by Landsat 7 pixel size

Period of Content:

Data Type:	LANDSAT 7 Imagery	LANDSAT 7 Imagery
Data Content:	Track 47 (Scenes 24 and 25)	Track 48 (Scenes 24 and 25)
Content Date:	July 12, 1999	September 21, 1999

Period of Compilation:

Data Type:	LANDSAT 7 Imagery	LANDSAT 7 Imagery
Data Content:	Track 47 (Scenes 24 and 25)	Track 48 (Scenes 24 and 25)
Compilation Date:	April 2000	March 2000

B. BASE MAP

Compiling Agency:

Base Map Type:	Classified Non-forested ecosystems
Compiling Agency:	Silvatech Consulting Ltd.
	670 - 11th Street NE (PO Box 1030)
	Salmon Arm, BC V1E 4P2

Year(s) of Compilation: 2001

Projection: UTM 10

Ellipsoid: GRS80

Compilation Method:

Training areas for classification of LANDSAT 7 imagery consisted of characteristic or typical non-forested ecosystems delineated by the project ecologist through visual interpretation of 1:15,000 scale colour aerial photographs for the Lillooet Forest District. Supervised and unsupervised classifications were performed using the ERDAS IMAGINE 8.4 product suite to identify non-forested ecosystems. The raster-based classification of non-forested ecosystems was subsequently compiled to form a seamless, vector-clean polygonal coverage in ARCINFO GIS format.

Datum: NAD83

C. MAPPING CONCEPTS

Mapping Entities: Definitions of mapping entities available for use as Predictive Ecosystem Mapping input data are provided in the project citation provided above.

Map Entities: Definitions of map entities available for use as Predictive Ecosystem Mapping input data are provided in the project citation provided above.

Entity Relationships: A Predictive Ecosystem Mapping knowledge base has yet to be developed for this project. Limited information regarding relationships of mapped entities is provided in the project citation provided above.

D. INVENTORY PROCEDURES

Data Capture

Delineation Method and Criteria:

Training areas for classification of LANDSAT 7 imagery consisted of characteristic or typical non-forested ecosystems delineated by the project ecologist through visual interpretation of 1:15,000 scale colour aerial photographs for the Lillooet Forest District. Ecosystems were delineated as they were encountered on available photographs, though an effort was made to review photographs representing the range of biogeoclimatic conditions within the project area and to limit ecosystem delineation to the largest of units that were observed. Boundaries for classified ecosystems were first established through supervised and unsupervised classifications of LANDSAT 7 imagery that were performed using the ERDAS IMAGINE 8.4 product suite. The resultant raster-based classification was subsequently compiled to form a seamless, vector-clean polygonal coverage using ARCINFO GIS. Further information is presented in the project citation provided above.

Sampling Design:

The selective sampling design used to develop remote sensing training areas was as described above. The location and number of non-forested ecosystems delineated by the project ecologist is presented in the project citation provided above.

Sampling Methods:

Sampling methods used to develop remote sensing training areas and classify LANDSAT 7 satellite imagery were as described above.

Sampling Frequency:

Training areas were delineated through visual interpretation of 1:15,000 scale colour aerial photographs. The number of units delineated for each non-forested ecosystem type is detailed in the project citation provided above.

D. INVENTORY PROCEDURES

Data Capture *(continued)*

Attribution:

Non-forested ecosystems were identified through a combination of supervised and unsupervised classification, as described in the ERDAS Field Guide and ERDAS IMAGINE 8.4 online documentation.

Quality Assurance

Validation Method:

Validation of inferred entities consisted of a comparison of ecosystem classifications arrived at through aerial photograph interpretation and LANDSAT 7 image classification. Comparisons were completed for up to 50 random points within each of six 10 by 10 km sections of the project area. Validation areas were selected based on availability of aerial photographs to the project team.

Validation Criteria:

The sole criterion used to verify inferred entities was whether ecosystem classifications arrived at through aerial photograph interpretation and LANDSAT 7 image classification were identical. However, ecosystem definitions employed during entity validation were those arrived at through image classification rather that training area definitions developed by the project ecologist because some training area ecosystem types could not be resolved.

Validation Design:

Validation of inferred entities was completed using a stratified random sampling design that was applied independently to each of the 10 by 10 km sections of the project area selected for quality assurance. Ecosystem definitions arrived at through image classification served as the basis of stratification. Random sample points were allocated to each ecosystem using ERDAS IMAGINE 8.4 classification accuracy assessment routines.

Validation Results:

Overall classification accuracy ratings for assessed sections of the project area were as follows:

Area 1	54.00%
Area 2	63.27%
Area 3	62.50%
Area 4	66.00%
Area 5	54.17%
Area 6	52.00%

D. INVENTORY PROCEDURES (continued)

Quality Control

Correlation Procedures:

i)   Taxonomy: Not Applicable (project specific taxonomy and classification)

ii)   Attributes: Not Applicable (project specific attribute definition)

Map Production: Not Applicable (classified imagery was compiled in digital form only)

Edge Matching: Not Applicable (full scene remote sensed imagery)

Line Edit: Not Applicable (full scene remote sensed imagery)

Symbol Edit: Not Applicable (full scene remote sensed imagery)

Attribute Edit: Not Applicable (full scene remote sensed imagery)

Legend Edit: Not Applicable (classified imagery was compiled in digital form only)

E. INPUT MAP COMPILATION QUALITY CONTROL

Edge Matching: Not Applicable (full scene remote sensed imagery)

Edge Matching Error: Not Applicable (full scene remote sensed image)

Attribute/Label Matching: Not Applicable (full scene remote sensed image)

Raster Size: 30 meters

Spatial Reconciliation:

i)   Spatial Check Table:

	Linear Features	
	Track 47 (Scenes 24 and 25)	Track 48 (Scenes 24 and 25)
Count or Average Length (m)	5838	5183
Minimum Shift (m)	0.00	10.00
Average Shift (m)	13.13	32.50
Maximum Shift (m)	35.00	66.25

Spatial check statistics relative to TRIM I topographic data are based on three measurements taken along eight linear features within the coverage area of each of Tracks 47 and Track 48. Collected measurements always included the maximum shift value along assessed features. Spatial check plots are provided within the project reference cited above.

Bedrock Geology for Lillooet Forest District in support of PEM.
Simple geology grouping coverage from 9 digit geological survey label

PROJECT META-DATA

A. PROJECT

Citation:

The geology of the Thompson - Okanagan Mineral Assessment Region was compiled by P. Schiarizza and N. Church. Ministry of energy and mines

The geology was compiled as a series of ten projects. Each project had slightly different legends and mapcodes. For this reason we have prefixed the mapcode for each region with a region designator. Over time, with revisions these regional differences will be removed. Some 1:250 000 mapsheets contain portions of 2 or more regions and digital information will reside in several files for these sheets. So if you are missing information for a portion of a sheet check other regions for that sheet as well.

http://www.em.gov.bc.ca/mining/Geolsurv/General/ArcviewIndexes/arcviewindex.htm

Consultant/Department:

i)   Grouping of geology data

       Silvatech Consulting Ltd.   Shamaya Consulting
       670 - 11th Street NE (PO Box 1030)   3632 Railway Avenue
       Salmon Arm, BC   V1E 4P2   Smithers, BC   V0J 2N0

       Contact: Kevin Stehle   Contact: Colleen Jones

iii)   Maintenance of data:

       Ministry of Energy and Mines

Contact: **P. Schiarizza and N. Church.**

Compilation Scale: 1 : 250000

Period of Content:
Content ranges from various geology studies in the 90's. Mineral survey was last updated in 1997

Period of Compilation:
July 1999 was the period of compilation for the data sets.

B. BASE MAP

Compiling Agency: BC Ministry of Energy and Mines

Year(s) of Compilation: 1997

Projection: Albers

Ellipsoid: GRS80

Compilation Method:

Datum: NAD83

C. MAPPING CONCEPTS

Mapping Entities: See PEM Knowledge Base or Knowledge Base evaluation
Also please reference

9 digit code with pem groupings.xls: This used the 6th digit to group rock types for use in PEM.

BC_codes.xls: Shows relationship of geology code in ARC/INFO coverage to 9 digit code.

This shows how codes were grouped and simplified to a usable form for input into PEM. Grouping classifications are in Red

Map Entities: See PEM Knowledge Base or Knowledge Base evaluation

Entity Relationships: See PEM Knowledge Base or Knowledge Base evaluation

D. INVENTORY PROCEDURES

Data Capture

Delineation Method and Criteria: MOEM Geology classification standards (Coverage sanctioned by MOEM)

Sampling Design: MOEM Geology classification standards (Coverage sanctioned by MOEM)

Sampling Methods: MOEM Geology classification standards (Coverage sanctioned by MOEM)

Sampling Frequency: MOEM Geology classification standards (Coverage sanctioned by MOEM)

D. INVENTORY PROCEDURES

Data Capture (continued)

Attribution:
Information was captured to various standards of geological mapping and then standardized to linking 9digit code tables. These tables have been provided to undersatand geological data set.

9 digit code with pem groupings.xls: This used the 6th digit to group rock types for use in PEM.

BC_codes.xls: Shows relationship of geology code in ARC/INFO coverage to 9 digit code.

Quality Assurance

Validation Method: Not Applicable (Coverage sanctioned by MOEM)

Validation Criteria: Not Applicable (Coverage sanctioned by MOEM)

Validation Design: Not Applicable (Coverage sanctioned by MOEM)

Validation Results: Not Applicable (Coverage sanctioned by MOEM)

Quality Control

Correlation Procedures:

i)   Taxonomy: Not Applicable (project specific taxonomy to geology studies)

ii)   Attributes: Not Applicable (project specific to geology studies)

Map Production: Not Applicable ()

Edge Matching: Not Applicable (information was matched as is. entities between study boundaries did differ slightly)

Line Edit: Not Applicable

Symbol Edit: Not Applicable

Attribute Edit: Not Applicable All information in GIS coverage linked to provided MOEM tables to extract geology information. The Lillooet PEM will use only a small portion of the geology attributes and bedrock type is grouped to further simplify the information.

Legend Edit: Not Applicable)

E. INPUT MAP COMPILATION QUALITY CONTROL

Edge Matching: Coverages were joined together and matched as best as possible.

Edge Matching Error: information was matched as is. Entities between study boundaries
did differ slightly

Attribute/Label Matching: Not Applicable

Raster Size:

Spatial Reconciliation:

i)   Spatial Check Table:

	Linear Features	
	Track 47 (Scenes 24 and 25)	Track 48 (Scenes 24 and 25)
Count or Average Length (m)		
Minimum Shift (m)		
Average Shift (m)		
Maximum Shift (m)		

No Spatial check was concluded for this coverage. General checking was done over the coverage to see if water features in Geology generally fit well to TRIM. The Lake features between the data sets matched quite well even though geology was produced at 1:250000. Shifts cannot be quantified on this coverage, but general positioning can be assessed.