Okanagan TSA Predictive Ecosystem Mapping (PEM) Compilation Project
Final Report

FIA Project # SOTSA229059002

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For the three individual PEM projects that were compiled over the Okanagan TSA we would like to re-iterate the following acknowledgements;

Field personnel for the Okanagan Dry Belt PEM sampling project were Grant Burns, Jennifer Shypitka, Tedd Robertson, Cory Bird, Keyes Lessard, Gareth Kernaghan, Mary Searchfield, Donna Ross, and Rayanne MacKay. Vicky Lipinski, Donna Ross and Catherine Littlewood of JMJ Holdings Inc. entered field PEM data into VENUS 4.2 and patiently corrected the data base after internal and external review of the plot data. Dr. Steve Wilson, Ecologic Research undertook the statistical analysis of the SIBEC and PEM model building data.

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that it was JMJ's last big field sampling project. Thank you to everyone for your friendship, hard work and top notch data collection over the years!

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Reference: Okanagan TSA Predictive Ecosystem Mapping (PEM) Roll Up Final Report

Dear Glen;

Please accept this final report for the above-mentioned project.

Thank you, it has been a pleasure working with you.

Yours truly,

Maureen V. Ketcheson M.Sc. R.P.Bio
Ecology Manager, Victoria Branch Office.
TIMBERLINE NATURAL RESOURCE GROUP LTD.

EXECUTIVE SUMMARY

The Okanagan TSA PEM was completed over a period of eight years. There were three separate projects, the Dry Belt PEM completed in 2002. Wet Belt PEM completed in 2006, revised in 2008 and the Very Dry Belt PEM completed in 2009. The Dry and Wet Belt PEMs passed external accuracy assessment tests and have been deemed suitable for use in Timber Supply Review (TSR). The Very Dry Belt PEM model was not tested for accuracy externally because the area has low timber values and will not be used for TSR. The Very Dry Belt PEM modeled areas that had not been TEM mapped, and the TEM mapping was included in the final result.

The ecological classification for the Okanagan TSA was under revision concurrent to the implementation of the Dry and Wet Belt PEM projects. The classification has stabilized and the site series predicted within these projects have been brought up to the version of the BEC classification posted on the BC Ministry of Forests ftp site listed below.

http://www.for.gov.bc.ca/ftp/rsi/external/!publish/Dennis_Lloyd_BEC_Materials/.

The Biogeoclimatic subzone and variant mapping has also evolved over the period of this project and the results of each individual PEM model have been re-calibrated to reflect the BGC line work version known as BEC7. The final compiled PEM predictions do not include woodland, parkland or alpine BGC variants. The BEC7 data is described and can be obtained from the following link.

https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?recordUID=4294&recordSet=ISO19115

Twenty-six BGC variants are represented in the compiled PEM projects, within them 399 map entities were predicted.

The spatial data represented in the final output for the Okanagan TSA reflects the most up to date classifications of subzone variants and site series. The methods used to predict these result are documented in detail in the individual project reports which have been updated, streamlined and submitted as separate files as part of the standard PEM data submission. A list of all the files submitted as the standard documentation (Ecological Data Committee,2000, Ministry of Sustainable Resource Management, 2004, RIC, 1999, RISC 2004) for the compiled Okanagan TSA PEM is presented in the meta data file submitted with this report (**pem_5511_mta.csv**). These files include field data in three separate data bases, knowledge bases, meta data, spatial data, data bases and project documentation. Spatial data is presented as a single coverage in raster, vector and RISC 2004 format representing the site series listed in this project report.

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1.0 Introduction

The Okanagan TSA covers 2.22 million hectares and includes the communities of Penticton, Vernon, Kelowna and Salmon Arm. The Okanagan Innovative Forestry Society (OIFS) is a registered non profit Society made up of forest companies and two First Nations Tribal Councils. The OIFS acts as a legal Society for identifying and implementing investment opportunities into the 1.6 million hectares of public forest lands of the Okanagan Timber Supply Area in British Columbia Canada. The Okanagan TSA is a diverse area with a broad range in climates, ranging from the south, where the some of the driest climates in British Columbia occur, to the north, where some of the wettest climates occur.

Between 2001 and 2010 the OIFS invested heavily into the completion of ecological mapping to support innovative forest practices in the Okanagan TSA using a predictive model approach. This type of ecological inventory is called Predictive Ecosystem Mapping (PEM) and has been completed in several TSA's in the Southern Interior Region, they include Invermere, Cranbrook, Arrow, Boundary and Revelstoke.

1.1 The History of Predictive Ecosystem Models in the Okanagan TSA

PEM in the Okanagan TSA was initiated in 2001 in the BEC variants of the Dry Belt (Ketcheson et al 2002). It was completed in 2002. This PEM project used an innovative, raster based approach to prediction. The knowledge base that linked spatial input data to the site series classification used a "scoring" approach to determination of the site series. A cumulative score was calculated and the "winning" site series was attributed to the raster. Concurrent to the Dry Belt PEM project an inventory of terrain, using the bioterrain approach, was completed. The bioterrain data was an important part of the predictive model. Intensive field sampling was completed using a stratified random sampling design. The Dry Belt model was tested independently for accuracy using the Meidinger (2003) protocol and after some modifications was passed and deemed suitable for use in Timber Supply Analysis. Concurrent to PEM field data collection the OIFS also collected ecological and site index data to calibrate Provincial SIBEC data and local tree productivity data.

Between 2003 and 2006 the BEC variants of the Okanagan Wet Belt (Ketcheson et al 2006) were modeled using a raster based approach, but in this project the spatial input data was queried for specific attributes rather than using a scoring approach. This project also utilized bioterrain data as an important input to the model. The Wet Belt model was independently assessed for accuracy in 2007 using the Moon (2005) protocol, based on that result some revisions were made to the model, and ultimately the result was approved for use in Timber Supply Analysis.

In 2008 and 2009 a field sampling program was initiated in the Very Dry climatic belt of the Okanagan TSA (Timberline 2009). The intention was to sample ecosystem, site and terrain relationships in areas where Terrestrial Ecosystem Mapping (TEM) with Sensitive Ecosystem Inventories (SEI) by Iverson et al (2001, 2003, 2006) had not been completed over the past several years and to use PEM modeling techniques to fill the gaps in the ecological inventory. The Very Dry Belt is a critically important area of the Okanagan TSA supporting unique biodiversity, species at risk and rare ecosystem values. In 2009 a PEM was completed in the Very Dry Belt where TEM was lacking. The PEM was joined to the TEM

coverage to complete a spatial depiction of site series for that area. The PEM was not tested for accuracy because the ecosystems would not be areas subject to timber harvest. The TEM and SEI was also not tested independently for accuracy, so the reliability of this part of the model is only reported within the Very Dry Belt PEM final project report using data collected to build and calibrate the model. Field data was used to train the PEM model and its relationship to the Very Dry PEM model output was reported in Timberline (2009).

In 2007 BGC variant delineation by MOF Research Branch personnel was completed in the Okanagan TSA (Lloyd 2007). Changes to BGC variant lines and stabilization to changes to the BEC site series classification meant that revisions to the predictions of both the Dry and Wet Belt models were now necessary to bring them up to date. BGC lines were reapplied to the results of the Dry and Wet Belt PEMs, site series were updated where necessary using a cross-walk table that identified dated nomenclature from both the Dry and Wet Belt and the predictions updated. Knowledge bases for the Dry and Wet Belt PEMs were also updated to reflect the most up to date site series nomenclature. The updated Dry and Wet Belt models were then joined to the Very Dry Belt model, whose classifications and line work were current, and this single coverage and its associated documentation are what is represented in this compilation project.

2.0 Objectives of the Okanagan TSA PEM Compilation Project

1. To compile the original Dry Belt, Wet Belt and Very Dry Belt PEM projects into a single spatial coverage for the Okanagan TSA

2. To apply the most up to date BGC lines to the single PEM coverage of the Okanagan TSA

3. To compile the PEM site series predictions into a single legend using the most up-to-date BEC site series.

4. To calibrate the original site series predictions from the 2002 Dry Belt PEM to the most up-to-date BEC site series

5. To compile standard documentation from all three PEM projects into a standard MOE digital data warehouse format and nomenclature

6. To upload the data as a single PEM project under it own unique BAPID number pem_5511 to the MOE digital data warehouse.

3.0 Methods

3.1 Re-allocation of Map Entities Where BGC Variants Changed

The results of each PEM model after external accuracy assessment and subsequent modifications were compiled into a single spatial coverage in raster format. A unique sort of predicted map entities were generated within each 2007 BGC variant's boundaries for all variants excluding woodland, parkland and alpine for the compiled PEM areas. This list documents areas where the BGC variant boundaries have changed between the original PEM date of completion and the final BGC from BEC7. The changes in variants between 2002 and 2007 primarily affected the result of the Dry Belt PEM, although there were some slivers where BEC7 boundaries had shifted within the Wet Belt PEM as well. The Very Dry Belt PEM used BEC7 line work and did not have to be adjusted.

A cross-walk table was developed to re-allocate a map entities between variants. This table can be found in Appendix 1. The result was applied to the compiled PEM.

3.2 Final BEC Classification

The final classification for the compiled Okanagan TSA PEM is presented in Table 1. Nomenclature and site series names are from Lloyd 2005 Guides to Site Identification housed under the following link:

http://www.for.gov.bc.ca/ftp/rsi/external/!publish/Dennis_Lloyd_BEC_Materials/

The map codes housed in the PEM data base are also listed in Table 1. All map entities were approved by Dennis Lloyd (Dry Belt, Wet Belt) or Mike Ryan (Very Dry Belt), MOF Research Branch, Southern Interior Region.

Table 1. Map Entities List for the Okanagan TSA Compiled PEM Projects.

Subzone	Site Series Number	Map Code	Site Series Name
All BEC		RO	Rock
All BEC		TA	Talus
All BEC		LA	Lake
All BEC		ME	Meadow
All BEC		OW	Open Shallow Water
All BEC		PD	Pond
All BEC		RE	Reservoir
All BEC		UR	Urban
All BEC		WE	Wetlands
All BEC		FE	Graminoid dominated fen
All BEC		MA	Marsh
All BEC		AV	Avalanche path
All BEC		GB	Gravel bar
ESSFdc1	01	01	Bl-Rhododendron - Valerian
ESSFdc1	02	02	Pl-Juniper-Kinninnick
ESSFdc1	03	PP	Pl-Grouseberry-Cladonia Lichens
ESSFdc1	04	04	Pl-Pinegrass-Grouseberry
ESSFdc1	01/04/05.1/05.2	BX	Bl-Rhododendron – Valerian/ Pl-Pinegrass-Grouseberry/Bl-Rhododendron-Grouseberry-Bl-Grouseberry-Five-leaved Bramble
ESSFdc1	07	07	Bl-Valerian/Arrow-leaved groundsel
ESSFdc1	09/10	FS	Se-Horsetail/Se-Bluejoint
ESSFdc1	06/07/08	BV	Bl-Trapper's tea-Feathermoss/ Bl-Valerian/Arrow-leaved groundsel/Pl-Trapper's tea-Peatmoss
ESSFdc1	Wf,Wm	WE	Wetlands
ESSFdc1	Ww	PD	Pond-lilly
ESSFdc2	Ro05/02	ZP	Juniper-Kinninnick/Pl-Juniper-Kinninnick

Subzone	Site Series Number	Map Code	Site Series Name
ESSFdc2	03/04	PG	Pl-Grouseberry/Pl-Falsebox-Pinegrass
ESSFdc2	01/06.1/06.2	BG	Bl-Rhododendron –Valerian/Bl-Crowberry-Valerian (typic and rhododendron variation)
ESSFdc2	04/05.1/05.2/01/06.1/06.2	XP	Pl-Falsebox-Pinegrass/Bl-Huckleberry-Grouseberry/Bl-Rhododendron-Grouseberry/Bl-Gooseberry –Valerian typic and rhododendron
ESSFdc2	07	SH	Se-Horsetail
ESSFdc2	08	BB	Se-Trapper's tea - Crowberry
ESSFdc2	07/08	XC	Se-Horsetail/Se-Trapper's tea- Crowberry
ESSFdc2	Sc03	AS	Barclay's Willow- Arrow-leaved Groundsel
ESSFdc2	Am30	VM	Valerian-Hellebore-Groundsel
ESSFdc3	Ro05/02	ZP	Juniper-Kinninnick-Subalpine fir/Pl-Juniper-Cladonia Lichens
ESSFdc3	03	PG	Pl-Juniper-Pinegrass
ESSFdc3	01,01ys	01	Bl-Rhododendron -Valerian
ESSFdc3	01/04/05	XP	Bl-Rhododendron –Valerian/Bl-Huckleberry-Feathermoss/Bl-Rhododendron-Feathermoss
ESSFdc3	06	06	Bl-Gooseberry-Valerian
ESSFdc3	01/06	BG	Bl-Rhododendron –Valerian/ Bl-Gooseberry-Valerian
ESSFdc3	07	07	Se-Horsetail
ESSFdc3	07/08	XC	Se-Horsetail/Se-Bluejoint
ESSFvc	01	01	BlHm – Rhododendron – Oak fern
ESSFvc	02	02	BlHm – Huckleberry – Clad lichens
ESSFvc	73/02	JP	BlHm – Huckleberry – Clad lichens
ESSFvc	03	03	BlHm – Huckleberry – Heron's-bill moss
ESSFvc	04	04	BlHm – Rhododendron – Heron's-bill moss
ESSFvc	05	05	BlHm – Valerian – Oak fern
ESSFvc	06	06	BlHm – Lady fern – Spiny wood fern

Subzone	Site Series Number	Map Code	Site Series Name
ESSFvc	07	07	BlHm – Devil's Club – Lady fern
ESSFvc	08	08	BlHm – Arrow-leaved groundsel - Valerian
ESSFvc	09	09	BlHm - Horsetail
ESSFvc	72	72	Rocktripe lichens – Rock-moss
ESSFvc	73	73	Rock-moss – Clad lichens
ESSFwc1	01	01	Bl – Rhododendron – Oak fern
ESSFwc1	02	02	PlBl – Rock moss – Clad lichens
ESSFwc1	03	03	PlBl – Huckleberry – Haircap moss
ESSFwc1	03/01	XI	PlBl – Huckleberry – Haircap moss/ PlBl – Huckleberry – Haircap moss
ESSFwc1	04	04	Bl – Rhododendron – Five-leaved bramble
ESSFwc1	05	05	Bl – Oak fern - Foamflower
ESSFwc1	06	06	Bl – Lady fern - Foamflower
ESSFwc1	07	07	Bl – Devil's club – Lady fern
ESSFwc1	08	08	Bl - Horsetail
ESSFwc1	72	72	Red raspberry - Feathermoss
ESSFwc1	Wetlands	TP	Swamp wetland
ESSFwc2	01	01	Bl – Azalea – Oak fern
ESSFwc2	02	02	Bl-Huckleberry-Heron's bill moss
ESSFwc2	03	03	Bl – Rhododendron – Heron's-bill moss
ESSFwc2	04	04	Bl – Valerian – Oak fern
ESSFwc2	05	05	Bl – Devil's club – Lady fern
ESSFwc2	06	06	Bl – Lady fern – Oak fern
ESSFwc2	07	07	Bl – Valerian – Arrow-leaved groundsel
ESSFwc2	08/09/10 (Wb)	XA	Pl – Dwarf blueberry – Peat-moss/ Bl – Horsetail – Peat-moss/ Bl - Bluejoint
ESSFwc2	72	72	Rocktripe lichens – rock-moss
ESSFwc2	73	73	Huckleberry – Rock-moss

Subzone	Site Series Number	Map Code	Site Series Name
ESSFwc2	74/77/78	XB	Alder – Showy sedge/ Valerian – Showy sedge/ Bluejoint - Fireweed
ESSFwc2	75/76/79	XC	Alder – Lady fern/ Willow – Mitrewort/ Lady fern - Hellebore
ESSFwc2	92	92	Valerian – Subalpine daisy
ESSFwc2		GB	Gravel bar
ESSFwc2		OW	Open shallow water
ESSFwc2		MA	Marsh
ESSFwc2		TP	Treed Swamp Wetland
ESSFwc2		UR	Urban
ESSFwc2		WE[1]	Non-specified wetland
ESSFwc4	01	01	Bl – Rhododendron – Oak fern
ESSFwc4	02	02	Bl – Huckleberry – Heron's bill moss
ESSFwc4	03	03	Bl – Rhododendron – Heron's bill moss
ESSFwc4	03/01	XI	Bl – Rhododendron – Heron's bill moss/ Bl – Rhododendron – Oak fern
ESSFwc4	04	04	Bl – Valerian – Oak fern
ESSFwc4	05	05	Bl – Lady fern – Oak fern
ESSFwc4	06	06	Bl – Valerian – Arrow-leaved groundsel
ESSFwc4	07	07	Bl - Horsetail
ESSFwc4	08	08	Bl-Valerian-Subalpine daisy
ESSFwc4	72	72	Rocktripe lichens – Rock-moss
ESSFwc4	74,75,76	JO	Rock-moss – clad lichens/ Huckleberry – Rock-mo Alder – Lady fern/ Valerian – Arrow-leaved groundsel,
ESSFwc4		TP	Treed Swamp wetland

[1] WE was used to classify wetlands that were not identified as swamps (treed fens) or marshes (not treed fen or marsh) by TRIM and a wetland was noted from bioterrain mapping that could not be classified into a category based on dominant vegetation.

Subzone	Site Series Number	Map Code	Site Series Name
ESSFxc1	Ro05	JP	Juniper-Kinninnick-Subalpine fir
ESSFxc1	02/Ro10	JL	Pl-Juniper-Grouseberry/Grouseberry-Clad lichens
ESSFxc1	83	BB	Bluebunch wheatgrass- Junegrass
ESSFxc1	82/84	JY	Juniper-Junegrass/Pinegrass-Kinninnick
ESSFxc1	03/04	PP	Pl-Grouseberry – Lupine/Pl-Pinegrass-Grouseberry
ESSFxc1	01/05/06/07	BX	Bl-Grouseberry-Arnica/Pl/Trapper's tea-Feathermoss/Bl/Rhododendron-Grouseberry/Se/Trapper's tea-Horsetail
ESSFxc1	08	BG	Bl-Valerian-Globeflower
ESSFxc1	09	SH	Se-Bluejoint
ESSFxc2	Ro05	JP	Juniper-Kinninnick-Subalpine fir
ESSFxc2	02/Ro10	JL	Pl-Juniper-Grouseberry/Grouseberry-Clad lichens
ESSFxc1	03/04	PP	Pl-Grouseberry – Lupine/Pl-Pinegrass-Grouseberry
ESSFxc2	01/05/06/07	BX	Bl-Grouseberry-Arnica/Pl/Trapper's tea-Feathermoss/Bl/Rhododendron-Grouseberry/Se/Trapper's tea-Horsetail
ESSFxc2	08	BG	Bl-Valerian-Globeflower
ESSFxc2	09	SH	Se-Horsetail
ICHmk1	01	01	CwSxw - Falsebox
ICHmk1	01 - YC	01YC	CwSxw nudum
ICHmk1	01 - YS	01YS	$At – Thimbleberry - Snowberry
ICHmk1	02	02	FdPl – Juniper - Pinegrass
ICHmk1	03	03	FdPl - Falsebox
ICHmk1	04/05	SD	SxwPl – Grouseberry – Twinflower/ CwSxw - Falsebox
ICHmk1	05/01	XP	FdPl Falsebox Pinegrass/CwSxw – Falsebox/
ICHmk1	05/01-MS	XN	FdPl Falsebox Pinegrass/$Pl – Alder - Feathermoss
ICHmk1	05/01 -YS	XQ	FdPl Falsebox Pinegrass/$At – Thimbleberry -

Subzone	Site Series Number	Map Code	Site Series Name
			Snowberry
ICHmk1	06	06	HwCw - Feathermoss
ICHmk1	07	07	CwSxw – Thimbleberry - Feathermoss
ICHmk1	07/08/09	SE	CwSxw – Thimbleberry – Feathermoss etc
ICHmk1	10 (11,12,13)	JL	Sxw – Horsetail, etc.
ICHmk1	72	72	Juniper – Shrubby penstemon
ICHmk1	73 +RO	73	Juniper – Clad lichens, Rock
ICHmk2	01	01	CwSxw – Falsebox – Knight's plume
ICHmk2	01 - YS		$AtEp - Twinflower
ICHmk2	02/72/73	XO	FdPl Pinegrass-KinninnickHeron's bill moss-Cld lichens – Juniper Kinninnick
ICHmk2	03	03	FdPl – Falsebox – Pinegrass/ FdPl – Falsebox - Pinegrass
ICHmk2	04	04	FdPl – Falsebox - Feathermoss
ICHmk2	03/04	XY	FdPl – Falsebox – Pinegrass/ FdPl – Falsebox – Pinegrass/ FdPl – Falsebox - Feathermoss
	04/05	TD	FdPl Falsebox Feathermoss/ CwSxw- Oakfern-Bunchberry
ICHmk2	05	05	CwSxw – Oak fern – Bunchberry/ CwSxw – Oak fern - Bunchberry
ICHmk2	05/01	XX	CwSxw – Falsebox – Knight's plume/ CwSxw – Oak fern – Bunchberry/ CwSxw – Oak fern - Bunchberry
ICHmk2	06	06	CwSxw – Devil's Club – Oak fern
ICHmk2	07	07	Sxw – Horsetail
ICHmw2	01	01	HwCw – Falsebox - Feathermoss
ICHmw2	01 - MS	01MS	$FdHwCw – Falsebox - Twinflower
ICHmw2	01 - YC	01YC	$FdHwCw - Nudum
ICHmw2	02	02	FdPl – Falsebox - Pinegrass

Subzone	Site Series Number	Map Code	Site Series Name
ICHmw2	03	03	FdCw – Falsebox – Prince's pine
ICHmw2	04	04	CwHw – Oak fern
ICHmw2	05	05	CwHw – Lady fern – Oak fern
ICHmw2	06	06	CwHw – Devil's club – Lady fern
ICHmw2	07/08	XF	Act – Devil's club/ Act – Thimbleberry - Sarsaparilla
ICHmw2	09	09	CwHw - Horsetail
ICHmw2	09/10	XR	CwHw – Horsetail/ CwHw – Skunk cabbage
ICHmw2	10	10	CwHw – Skunk cabbage
ICHmw2	72	72	Rocktripe lichens – Rock-moss
ICHmw2	73	73	Huckleberry - Kinnikinnick
ICHmw2		TP	Willow Sedge Fen
ICHmw2	74/75/76/82	JJ	Rock etc
ICHmw3	01/05	JI	HwCw – Falsebox – Feathermoss/ FdPl – Falsebox - Feathermoss
ICHmw3	01 MS	01MS	$CwHwFd-Falsebox
ICHmw3	02	02	Fd – Juniper - Kinnikinnick
ICHmw3	04	04	FdPl – Falsebox - Pinegrass
ICHmw3	06	06	CwHw – Oak fern
ICHmw3	07	07	CwAct – Thimbleberry – Sarsparilla
ICHmw3	08	08	CwHw – Devil's club – Lady fern
ICHmw3	09	09	Act – Dogwood - Horsetail
ICHmw3	10/11/13	JH	CwHw - Horsetail/ CwHw – Skunk cabbage/ Sb – Labrador tea – Peat-moss
ICHmw3	72	72	Awned haircap moss – Clad lichens
ICHmw3	73	73	Rock-moss – Clad lichens
ICHmw3	82	82	Oatgrass - Kinnikinnick
ICHmw3	Wetlands	TP	Treed Swamp wetland

Subzone	Site Series Number	Map Code	Site Series Name
ICHwk1	01	01	CwHw – Oak fern
ICHwk1	03	03	HwCw – Falsebox - Feathermoss
	02/03	SF	HwCw – Azalea – Feathermoss/ HwCw – Falsebox - Feathermoss
ICHwk1	04	04	CwHw – Lady fern – Oak fern
ICHwk1	05	05	CwHw – Devil's club – Lady fern/Sxw-Deil's club-Lady fern
ICHwk1	06	06	BlSxw – Thimbleberry - Oakfern
ICHwk1	08	08	Act – Dogwood - Thimbleberry
ICHwk1	09/10/07	XU	CwHw – Horsetail/ CwHw – Skunk cabbage/Sxw-Devil's club-Ladyfern
ICHwk1	72/73	XG	Rocktripe lichens – Rock-moss/ Cedar - Feathermoss
ICHwk1	74	74	Rock-moss – Clad lichens
ICHwk1	75	75	Alder-Hooker's fairybells
ICHwk1	76		Alder – Lady fern
ICHwk1c	01	01	CwHw – Oak fern
ICHwk1c	02	02	HwCw – Azalea - Feathermoss
ICHwk1c	03	03	HwCw – Falsebox - Feathermoss
ICHwk1c	04	04	CwHw – Lady fern – Oak fern
ICHwk1c	05	05	CwHw – Devil's club – Lady fern
ICHwk1c	06/07	JE	BlSxw – Thimbleberry – Oakfern/ Swx-Devil's Club-Lady Fern
ICHwk1c	08	08	Act – Dogwood - Thimbleberry
ICHwk1c	09/10	XT	CwHw – Horsetail/ CwHw – Skunk cabbage/
ICHwk1c	72/73	XH	Rocktripe lichens – Rock-moss/ Cedar - Feathermoss
ICHwk1c	74	74	Rock-moss – Clad lichens
ICHwk1c	76	76	Alder – Lady fern

Subzone	Site Series Number	Map Code	Site Series Name
ICHvk1	01	01	HwCw – Devil's club – Lady fern
ICHvk1	02	02	HwCw - Feathermoss
ICHvk1	03	03	HwCw – Azalea - Feathermoss
ICHvk1	04	04	CwHw – Oak fern
ICHvk1	05	05	CwHw – Spiny wood fern – Oak fern
ICHvk1	06	06	Sxw – Thimbleberry – Oak fern
ICHvk1	07	07	Sxw – Devil's club
ICHvk1	08	08	Sxw – Dogwood - Horsetail
ICHvk1	09	09	CwHw – Skunk cabbage
ICHvk1	10	10	Sxw - Bulrush
ICHvk1	72	72	Rocktripe lichens – Rock-moss
ICHvk1	73	73	Rock-moss – Clad lichens
ICHvk1	74	74	Dogwood - Thimbleberry
ICHvk1	76	76	Alder – lady fern
ICHvk1	77	77	Devil's club – Oak fern
IDFdk1	82	GD	Bluebunch wheatgrass - Junegrass
IDFdk1	81/83	GM	Rough fescue/Idaho fescue Bluebunch -
IDFdk1	72	TA	Juniper – Rocktripe Lichens
IDFdk1	73/02	JP	Selaginella Clad lichens- Fd-Juniper -Kinninnick
IDFdk1	03/04	FB	Fd- Bluebunch wheatgrass – Pinegrass/ Fd Bluebunch wheatgrass - Kinninnick
IDFdk1	06ES/YS/07	AK	At – Kentucky bluegrass/ Aspen- Snowberry – Rose/ActSwx-Dogwood
IDFdk1	01/05	FX	FdPl-Pinegrass_feathermoss/FdPl-Pinegrass-Grouseberry
IDFdk1	06	FF	SwxFd-Gooseberry-Feathermoss
IDFdk1	07	SG	ActSw-Dogwood
IDFdk1	08	SH	Sxw-Horsetail
IDFdk1		WE	Wetlands

Subzone	Site Series Number	Map Code	Site Series Name
IDFdk1a	81/83	GM	Rough fescue/Idaho fescue Bluebunch -
IDFdk1a	82	GD	Bluebunch wheatgrass - Junegrass
IDFdk1a	73/02	JP	Selaginella Clad lichens- Fd-Juniper -Kinninnick
IDFdk1a	03/04	FB	Fd- Bluebunch wheatgrass – Pinegrass/ Fd Bluebunch wheatgrass - Kinninnick
IDFdk1a	01/05	FX	FdPl-Pinegrass_feathermoss/FdPl-Pinegrass-Grouseberry
IDFdk1a	07	SG	ActSw-Dogwood
IDFdk1a	06	FF	SwxFd-Gooseberry-Feathermoss
IDFdk1a	08	SH	Sxw-Horsetail
IDFdk1b	81/83	GM	Rough fescue/Idaho fescue Bluebunch -
IDFdk1b	82	GD	Bluebunch wheatgrass - Junegrass
IDFdk1b	03/04	FB	Fd- Bluebunch wheatgrass – Pinegrass/ Fd Bluebunch wheatgrass - Kinninnick
IDFdk1b	01/05	FX	FdPl-Pinegrass_feathermoss/FdPl-Pinegrass-Grouseberry
IDFdk1b	07	SG	ActSw-Dogwood
IDFdk1b	06	FF	SwxFd-Gooseberry-Feathermoss
IDFdk1b	08	SH	Sxw-Horsetail
IDFdk2	72	TA	Aspen – Rocktripe Lichens
IDFdk2	73/02	JP	Penstemon – Clad lichens/FdPy- Bluebunch wheatgrass - Pinegrass
IDFdk2	74	BF	Bluebunch wheatgrass- Penstemon
IDFdk2	02	FB	FdPy- Bluebunch wheatgrass - Pinegrass
IDFdk2	03	FP	Fd- Pinegrass
IDFdk2	01/05	PP	FdPl-Pinegrass – Twinflower/FdPl-Pinegrass-Feathermoss
IDFdk2	04	SF	Pl-Pinegrass_Grouseberry

Subzone	Site Series Number	Map Code	Site Series Name
IDFdk2	03YS	AB	$AtFd-Pinegrass
IDFdk2	01/05YS	AP	FdPl-Pinegrass-Twinflower/FdPl-Pinegrass-Feathermoss
IDFdk2	06YS	AD	$At-Snowberry-Rose
IDFdk2	06/07	ZG	SwFd-Dogwood-Grouseberry/Swx Dogwood-Oakfern
IDFdk2	08	SW	Sxw-Horsetail
IDFdk2		WE	Wetlands
IDFdk2b	73/02	JP	Penstemon – Clad lichens/FdPy- Bluebunch wheatgrass - Pinegrass
IDFdk2b	02	FB	FdPy- Bluebunch wheatgrass - Pinegrass
IDFdk2b	03	FP	Fd- Pinegrass
IDFdk2b	01/05	PP	FdPl-Pinegrass – Twinflower/FdPl-Pinegrass-Feathermoss
IDFdk2b	04	SF	Pl-Pinegrass_Grouseberry
IDFdk2b	06/07	ZG	SwFd-Dogwood-Grouseberry/Swx Dogwood-Oakfern
IDFdk2b	08	SW	Sxw-Horsetail
IDFdm1	02/72	SB	Awned haircap moss- clad lichens/FdPy Bluebunch wheatgrass -pinegrass
IDFdm1	82/83/84	BJ	Big sage –Bluebunch wheatgrass/Bluebunch wheatgrass- oatgrass/ Bluebunch wheatgrass - junegrass
IDFdm1	03/04	FY	Fd- Pinegrass-Penstemon/Fd – Pinegrass-Kinninnick
IDFdm1	01	FT	FdPl-Pinegrass-Twinflower
IDFdm1	05	SF	FdSwx – Feathermoss
IDFdm1	01/YS	AS	$At-Rose- Pinegrass
IDFdm1	06/07	SD	SxwFd – Dogwood – Grouseberry/Sxw - Oakfern
IDFdm1	08/09	SH	Sxw Horsetail/Sxw – Gooseberry-Bluejoint
IDFdm1		WE	Wetlands

Subzone	Site Series Number	Map Code	Site Series Name
IDFmw1	01	01	CwFd – Falsebox – Prince's pine
IDFmw1	01 - YC	01 - YC	$CwFd - Nudum
IDFmw1	01 - YS	01 - YS	$AtEp – Thimbleberry - Snowberry
IDFmw1	02	02	FdPy – Bluebunch wheatgrass - Pinegrass
IDFmw1	03	03	FdPl – Pinegrass - Kinnikinnick
IDFmw1	04	04	Fd – Snowberry – Birch-leaved spirea
IDFmw1	05	05	FdPl – Falsebox - Pinegrass
IDFmw1	05/01	JB	FdPl – Falsebox – Pinegrass/ CwFd – Falsebox – Prince's pine
IDFmw1	06	06	CwFd - Feathermoss
IDFmw1	07/08	JD	CwFd – Gooseberry - Thimbleberry
IDFmw1	09	09	SxwCw – Soft-leaved sedge
IDFmw1	07/08/09	SH	
IDFmw1	52	52	Snowbrush - Pinegrass
IDFmw1	72	72	Juniper – Clad lichens
IDFmw1	73/82	JC	Penstemon – Sidewalk moss/ Rock
IDFmw1	Wetlands	TP	Treed Swamp wetland
IDFmw2	01/04	JA	CwFd – Falsebox – Prince's pine/ Fd - Feathermoss
IDFmw2	01 - YS	01 - YS	$EpAt – Thimbleberry - Snowberry
IDFmw2	02	02	Fd – Bluebunch wheatgrass
IDFmw2	01	01	CwFd – Falsebox – Prince's pine
IDFmw2	03	03	Fd – Falsebox - Pinegrass
IDFmw2	05	05	CwFd – Thimbleberry - Sarsaparilla
IDFmw2	06	06	CwSxw – Devil's club – Oak fern
IDFmw2	09	09	Sxw – Alder – Water sedge

Subzone	Site Series Number	Map Code	Site Series Name
IDFmw2	07/08/09	XK	Cw – Horsetail/SxwCw-Soft-leaved Sedge/ Sxw – Alder – Water sedge
IDFmw2	72	72	Pelt lichens – Clad lichens
IDFmw2	73+RO	73	Selaginella – Bluebunch wheatgrass/RO
IDFmw2	Wetlands	TP	Treed Swamp wetland
IDFxh1	01	01	FdPy – Pinegrass
IDFxh1	02	02	FdPy – Juniper – Pinegrass
IDFxh1	03	03	FdPy – Mock orange – Bluebunch wheatgrass
IDFxh1	04	04	FdPy – Bluebunch wheatgrass – Balsamroot
IDFxh1	05	05	FdPy – Bluebunch wheatgrass – Pinegrass
IDFxh1	06	06	Fd – Feathermoss
IDFxh1	07, 07-YS	07	FdPy – Snowberry/ $At – Snowberry – Kentucky bluegrass
IDFxh1	08-YS	08-YS	$At – Snowberry – Rose
IDFxh1	09	09	CwFd – Gooseberry – Sarsaparilla
IDFxh1	10	10	$ActEp – Snowberry – Douglas maple
IDFxh1	11	11	$Act – Dogwood – Snowberry
IDFxh1	12	12	SxwFd – Dogwood – Snowberry
IDFxh1	13	13	Sxw – Horsetail
IDFxh1	72	72	Saskatoon – Sidewalk moss
IDFxh1	73	73	Selaginella – Clad lichens
IDFxh1	Wf01, Wm01, Wm05,Wm06, Wm07, Wm08	WM	Water sedge – Beaked sedge/ Beaked sedge – Water sedge/ Cattail/ Great bulrush/ Baltic rush/ Sharp bulrush
IDFxh1	82	82	Bluebunch wheatgrass – Parsnip-flowered buckwheat
IDFxh1	83, 84, 84-ES, 84-MS	84	Stiff needlegrass – Red three-awn/ Bluebunch wheatgrass – Balsamroot/ $Needle and thread grass – Cheatgrass/ $Big sage – Bluebunch wheatgrass
IDFxh1	85, 85-MS	85	Bluebunch wheatgrass – Idaho fescue/ $Big sage – Idaho fescue
IDFxh1	86, 86-MS	86	Rough fescue/ $Bluebunch wheatgrass – Rough

Subzone	Site Series Number	Map Code	Site Series Name
			fescue
IDFxh1	81, 81-ESa, 81-ESb, 81-MS	81	Idaho fescue/ $Kentucky bluegrass – Stiff needlegrass/ $Big sage – Kentucky bluegrass/ $Bluebunch wheatgrass – Kentucky bluegrass
IDFxh1	52/53	52	Snowberry – Kentucky bluegrass/ Snowberry – Pinegrass
IDFxh1	54	54	Snowberry – Hawthorn
IDFxh1	55	55	Dogwood – Rose
IDFxh1a	01	01	FdPy – Pinegrass
IDFxh1a	02	02	FdPy – Juniper – Pinegrass
IDFxh1a	03	03	FdPy – Mock orange – Bluebunch wheatgrass
IDFxh1a	04	04	FdPy – Bluebunch wheatgrass – Balsamroot
IDFxh1a	05	05	FdPy – Bluebunch wheatgrass – Pinegrass
IDFxh1a	06	06	Fd – Feathermoss
IDFxh1a	07, 07-YS	07	FdPy – Snowberry/ $At – Snowberry – Kentucky bluegrass
IDFxh1a	08-YS	08-YS	$At – Snowberry – Rose
IDFxh1a	09	09	CwFd – Gooseberry – Sarsaparilla
IDFxh1a	11	11	$Act – Dogwood – Snowberry
IDFxh1a	12	12	SxwFd – Dogwood – Snowberry
IDFxh1a	13	13	Sxw – Horsetail
IDFxh1a	52/53	52	Snowberry – Kentucky bluegrass/ Snowberry – Pinegrass
IDFxh1a	54	54	Snowberry – Hawthorn
IDFxh1a	55	55	Dogwood – Rose
IDFxh1a	82	82	Bluebunch wheatgrass – Parsnip-flowered buckwheat
IDFxh1a	83, 84, 84-ES, 84-MS	84	Stiff needlegrass – Red three-awn/ Bluebunch wheatgrass – Balsamroot/ $Needle and thread grass – Cheatgrass/ $Big sage – Bluebunch wheatgrass
IDFxh1a	85, 85-MS	85	Bluebunch wheatgrass – Idaho fescue/ $Big sage –

Subzone	Site Series Number	Map Code	Site Series Name
			Idaho fescue
IDFxh1a	86, 86-MS	86	Rough fescue/ $Bluebunch wheatgrass – Rough fescue
IDFxh1a	81, 81-ESa, 81-ESb, 81-MS	81	Idaho fescue/ $Kentucky bluegrass – Stiff needlegrass/ $Big sage – Kentucky bluegrass/ $Bluebunch wheatgrass – Kentucky bluegrass
IDFxh1a	72	72	Saskatoon – Sidewalk moss
IDFxh1a	73	73	Selaginella – Clad lichens
IDFxh1a	Wf01, Wm01, Wm05,Wm06, Wm07, Wm08	WM	Water sedge – Beaked sedge/ Beaked sedge – Water sedge/ Cattail/ Great bulrush/ Baltic rush/ Sharp bulrush
IDFxh1a	Wf01, Wm01, Wm05,Wm06, Wm07, Wm08	WM	Water sedge – Beaked sedge/ Beaked sedge – Water sedge/ Cattail/ Great bulrush/ Baltic rush/ Sharp bulrush
IDFxh2	01	01	Fd – Pinegrass – Feathermoss
IDFxh2	02	02	FdPy – Selaginella – Bluebunch wheatgrass
IDFxh2	03	03	FdPy – Bluebunch wheatgrass – Balsamroot
IDFxh2	04	04	FdPy – Rough fescue – Bluebunch wheatgrass
IDFxh2	05	05	FdPy – Bluebunch wheatgrass – Pinegrass
IDFxh2	06	06	Fd – Feathermoss
IDFxh2	07	07	Fd – Snowberry - Pinegrass
IDFxh2	09	09	SxwFd – Hairbent grass
IDFxh2	10-YS	10-YS	$At – Snowberry – Rose
IDFxh2	11	11	SxwEp – Hairbent grass
IDFxh2	12	12	Sxw – Horsetail
IDFxh2	52	52	Water birch – Northern bedstraw
IDFxh2	82, 82-MS	82	Bluebunch wheatgrass – Sandberg's bluegrass/ $Big sage – Bluebunch wheatgrass
IDFxh2	83	83	Rough fescue – Bluebunch wheatgrass
IDFxh2	81, 81-ESa, 81-ESb, 81-YS, 81-MS	81	Rough fescue, $Big sage – Kentucky bluegrass, $Kentucky bluegrass – Silky lupine, $Kentucky bluegrass – Needlegrass, $Kentucky bluegrass –

Subzone	Site Series Number	Map Code	Site Series Name
			Rough fescue
IDFxh2	72	72	Juniper – Sidewalk moss
IDFxh2	73	73	Selaginella – Clad lichens
IDFxh2	Wf01, Wm01, Wm03, Wm04, Wm05, Wm06, Wm07, Wm08	WM	Water sedge – Beaked sedge/ Beaked sedge – Water sedge/ Awned sedge/ Common spike-rush/ Cattail/ Great bulrush/ Baltic rush/ Sharp bulrush
IDFxh2a	01	01	Fd – Pinegrass – Feathermoss
IDFxh2a	04	04	FdPy – Rough fescue – Bluebunch wheatgrass
IDFxh2a	06	06	Fd – Feathermoss
IDFxh2a	09	09	SxwFd – Hairbent grass
IDFxh2a	83	83	Rough fescue – Bluebunch wheatgrass
IDFxh2a	81, 81-ESa, 81-ESb, 81-YS, 81-MS	81	Rough fescue, $Big sage – Kentucky bluegrass, $Kentucky bluegrass – Silky lupine, $Kentucky bluegrass – Needlegrass, $Kentucky bluegrass – Rough fescue
IDFxh2a	Wf01, Wm01, Wm03, Wm04, Wm05, Wm06, Wm07, Wm08	WM	Water sedge – Beaked sedge/ Beaked sedge – Water sedge/ Awned sedge/ Common spike-rush/ Cattail/ Great bulrush/ Baltic rush/ Sharp bulrush
MSdm1	Ro04/02	JP	Juniper-Kinninnick-Haircap Moss/FdPl-Juniper-Kinninnick
MSdm1	82/83/84	BS	Vasey's sedge-Idaho Fescue/Bluebunch wheatgrass – Idoho Fescue/FdPl-Juniper-Kinninnick
MSdm1	03	FP	Pl-Grouseberry-Kinninnick
MSdm1	04	LP	FdPl-Pinegrass-Kinninnick
MSdm1	03/04/05	XL	Pl-Grouseberry-Kinninnick/ FdPl-Pinegrass-Kinninnick/Pl-Trapper;'s Tea-Grouseberry/ Pl-Trapper;'s Tea-Grouseberry
MSdm1	01/05/06	ZF	Sxw-Falsebox-Feathermoss/ Pl-Trapper;'s Tea-Grouseberry/Sxw-Trapper's tea-Gooseberry
MSdm1	07/08	ZG	Sxw-Gooseberry/PlSxw-Ladyfern-Oakfern

Subzone	Site Series Number	Map Code	Site Series Name
MSdm1	09/10	SH	Sxw-Horsetail-Glow moss/ Sxw-Soft-leaved Sedge
MSdm1	07/08ES	AB	Aspen
MSdm1		WE	Wetlands
MSdm2	Me01	SJ	Selaginalla-Bluebunch Wheatgrass
MSdm2	Rt07/Rt08	TA	Aspen-Juniper/Juniper-Kinninnick
MSdm2	82	BJ	Bluebunch wheatgrass-Idaho fescue
MSdm2	83/02	JP	Pinegrass-Kinninnick/FdPl/Juniper/Kinninnick
MSdm2	03	FF	FdPl-Pinegrass-Kinninnick
MSdm2	04/05ES	AP	Pl/Pinegrass/Grouseberry/FdPl-Falsebox-Pinegrass
MSdm2	04/05	LP	Pl-Pinegrass-Grouseberry/FdPl-Falsebox-Pinegrass
MSdm2	01/06/07	ZH	Sxw-Falsebox-Feathermoss
MSdm2	08/09	SM	Sxw-Gooseberry/ Sxw-Devil's Club-Oak fern
MSdm2	10	SH	Sxw-Horsetail-Glow moss
MSdm3	03	LP	FdPl-Falsebox-Pinegrass
MSdm3	01	ZH	Sxw-Falsebox-Feathermoss
MSdm3	04/05	SM	Swx-Gooseberry/Sxw-Devil's club-oak fern
MSdm3	06	SH	Sxw-Horsetail – Glow moss
MSxk1	82/83/84/85	GL	Vasey's sage-Bluebunch wheatgrass/Bluebunch wheatgrass/Pinegrass-Kinninnick/Vasey's sage-Pinegrass
MSxk1	Rt07	TA	Aspen-Juniper
	Ro10/02	JP	Grouseberry-Cladonia lichens/FdPl-Juniper-Kinninnick
MSxk1	02/Ro04	RO	FdPl-Juniper-Kinninnick /Juniper-Kinninnick-Haircap moss
MSxk1	03	LJ	Pl-Grouseberry-Kinninnick
MSxk1	04	FP	Pl-Pinegrass-Kinninnick

Subzone	Site Series Number	Map Code	Site Series Name
MSxk1	05/06ES	AP	Pl-Grouseberry-Feathermoss/Pl-Trapper's tea-Grouseberry
MSxk1	05/06/01/07	LX	Pl-Grouseberry-feathermoss/Pl-Trapper's tea-Grouseberry/Pl-Pinegrass-Grouseberry/Sxw-Trapper's tea-Gooseberry
MSxk1	08/09	SH	Sxw-Gooseberry/Sxw-Horsetail-Glow moss
MSxk1	10/11/12	SB	Sxw-Soft-leaved Sedge/Sxw-Bluejoint/Sxw-Mountain Sedge
PPxh1	01/01ms	01	Py – Bluebunch wheatgrass – Fescue/ $Py – Bluebunch wheatgrass
PPxh1	02	02	FdPy – Selaginella
PPxh1	03	03	Py – Red three-awn
PPxh1	04	04	Py – Bluebunch wheatgrass
PPxh1	05	05	FdPy – Pinegrass
PPxh1	06	06	Fd – Snowberry
PPxh1	06ysa, 06ysb	06ys	$Ep – Snowberry – Maple/ $At – Snowberry – Saskatoon
PPxh1	07	07	ActEp – Maple
PPxh1	08	08	Act – Dogwood
PPxh1	82/83	82	Antelope-brush – Red three-awn/ $Antelope-brush – Bluebunch wheatgrass
PPxh1	84, 84ms	84	Bluebunch wheatgrass/ $Big sage – Bluebunch wheatgrass
PPxh1	85, 85ms	85	Idaho fescue – Bluebunch wheatgrass/ $Big sage – Idaho fescue
PPxh1	Rt01	TA	Saskatoon – Bluebunch wheatgrass
PPxh1	Ro02	RO-2	Bluebunch wheatgrass – Selaginella
PPxh1	Ro03	RO-3a	Antelope-brush – Red three-awn
PPxh1	Wm01, Wm05, Wm06, Wm07, Wm08, Gs01	WM	Beaked sedge – Watersedge/ Cattail/ Great bulrush/ Baltic rush/ Sharp bulrush/ Saltgrass
PPxh1a	01	01	Py – Bluebunch wheatgrass – Fescue
PPxh1a	02	02	FdPy – Selaginella

Subzone	Site Series Number	Map Code	Site Series Name
PPxh1a	03	03	Py – Red three-awn
PPxh1a	04	04	Py – Bluebunch wheatgrass
PPxh1a	05	05	FdPy – Pinegrass
PPxh1a	06	06	Fd – Snowberry
PPxh1a	06ysa, 06ysb	06ys	$Ep – Snowberry – Maple/ $At – Snowberry – Saskatoon
PPxh1a	07	07	ActEp – Maple
PPxh1a	08	08	Act – Dogwood
PPxh1a	82/83	82	Antelope-brush – Red three-awn/ $Antelope-brush – Bluebunch wheatgrass
PPxh1a	84, 84ms	84	Bluebunch wheatgrass/ $Big sage – Bluebunch wheatgrass
PPxh1a	85, 85ms	85	Idaho fescue – Bluebunch wheatgrass/ $Big sage – Idaho fescue
PPxh1a	Rt01	TA	Saskatoon – Bluebunch wheatgrass
PPxh1a	Ro02	RO-2	Bluebunch wheatgrass – Selaginella
PPxh1a	Ro03	RO-3a	Antelope-brush – Red three-awn
PPxh1a	Wm01, Wm05, Wm06, Wm07, Wm08, Gs01	WM	Beaked sedge – Watersedge/ Cattail/ Great bulrush/ Baltic rush/ Sharp bulrush/ Saltgrass
PPxh2	01	01	Py – Bluebunch wheatgrass – Rough fescue
PPxh2	02	02	PyFd – Selaginella – Clad lichen
PPxh2	03	03	Py – Red three-awn
PPxh2	04a	04a	Py – Bluebunch wheatgrass – Junegrass (cool phase)
PPxh2	04b	04b	Py – Bluebunch wheatgrass – Junegrass (warm phase)
PPxh2	06	06	Fd – Pinegrass – Feathermoss
PPxh2	07	07	ActFd – Dogwood – Douglas maple
PPxh2	08	08	SxwFd – Horsetail
PPxh2	Fl30	Fl30	Water birch – Dogwood
PPxh2	82, 82ls	82	Bluebunch wheatgrass – Sandberg's bluegrass/

Subzone	Site Series Number	Map Code	Site Series Name
			$Big sage – Bluebunch wheatgrass
PPxh2	83, 83ls	83	Rough fescue – Bluebunch wheatgrass/ $Big sage – Rough fescue
PPxh2	84, 84es	84	Rough fescue/ $Big sage – Kentucky bluegrass
PPxh2	Rt01	TA	Saskatoon – Bluebunch wheatgrass
PPxh2	Ro01	RO-3a	Bluebunch wheatgrass – Sidewalk moss
PPxh2	Ro02	RO-2	Bluebunch wheatgrass – Selaginella
PPxh2	Wm01, Wm05, Wm06, Wm07, Wm08, Gs01	WM	Beaked sedge – Water sedge/ Cattail/ Great bulrush/ Baltic rush/ Sharp bulrush/ Saltgrass

3.3 Final Knowledge Bases

3.31 Site Series Knowledge Bases

Knowledge bases for the three PEM projects were harmonized with the final BEC classification map codes and saved in their original format under a single excel file;

pem_5511_kb.xls

a rich text file

pem_5511_kb.rtf

and 26 individual csv files (as per standards) named;

pem_5511_kb01.csv through **pem_5511_kb26.csv.**

Because the Lloyd BEC classification for the Okanagan TSA is still considered interim by the MOF and not final we prepared lists of the map entity names, as well as elements of the bioterrain that are non-standard and housed it in the "user defined file", there is a single user defined file.

pem_5511_userdefined.csv

3.32 Structural Stage Knowledge Base

Structural stage was predicted as a separate coverage for the Wet Belt only.

pem_5511_sts.rtf

3.4 Input Data Quality Assessment

Input Data Quality Assessment reports were completed for each PEM project and submitted individually at each project's completion. They have been compiled into a single report housing the information for all three PEMs and saved as;

pem_5511_idq.rtf

The original spatial data used for the combined PEM is described in two files;

pem_5511_inp.csv and **pem_5511_inp.rtf** .

3.5 Field Data

Field data was collected for all three projects in the form of transects and ground inspection plots. The plot data is housed in non spatial files derived from the VENUS data base. The three original projects have been kept separate and have been named using the following convention for the VENUS data bases.

pem_5511_eci_drybelt.mdb
pem_5511_eci_drybeltsibec.mdb
pem_5511_eci_wetbelt.mdb
pem_5511_eci_verydry07.mdb
pem_5511_eci_verydry08.mdb

Field transect data is stored in non RIC standard excel files they are;
pem_5511_drybeltpem_transects.xls
pem_5511_verydrypem07_transects.xls
pem_5511_verydrypem08_transects.xls
pem_5511_wetbelt_transects.xls

4.0 Results

The PEM was completed and what follows is the summary by BEC variant of the results, please refer to Table 1 to interpret the map codes. Table 2 reports the results of the PEM in hectares. The PEM result is provided as both a polygon coverage and in raster coverage. These files are named;

pem_5511_ecp.e00 (spatial) and **pem_5511_ecp.csv** (data base) Polygon
pem_5511_ecp_attributes_attached.e00 Raster

The PEM map entity predictions provide a description of up to three map entities per polygon, or pixel in the former Dry and Wet Belt PEM's because an important input layer was derived from bioterrain mapping, which reports proportional data within the bioterrain polygon. Features like rock outcrops, avalanche paths, wetlands etc. were described as proportional data within the original bioterrain polygon. The bioterrain polygons were rasterized and each raster retained the proportional information, consequently predictions also retained the proportions reflected by the bioterrain data, even if the final result is reported in raster format.

Table 2. Area of PEM Map Entities Predicted

BEC:mapcode	Ha predicted
ESSFdc1:BX	39,495.417
ESSFdc1:BV	11,956.370
ESSFdc1:RO	7,670.394
ESSFdc1:WE	1,852.939
ESSFdc1:PP	811.450
ESSFdc1:TA	313.730
ESSFdc1:UR	244.502
ESSFdc1:PD	113.917
ESSFdc1:LA	101.599
ESSFdc1:FS	81.979
ESSFdc1:RE	0.939
ESSFdc2:BG	9,560.315
ESSFdc2:BB	7,019.740
ESSFdc2:PG	3,775.809
ESSFdc2:XC	2,149.756
ESSFdc2:ZP	2,045.874
ESSFdc2:WE	529.092
ESSFdc2:VM	252.550
ESSFdc2:UR	224.352
ESSFdc2:PD	106.734
ESSFdc2:TA	58.688
ESSFdc2:RO	41.453
ESSFdc2:SH	15.352

BEC:mapcode	Ha predicted
ESSFdc2:XP	14.514
ESSFdc2:AS	6.102
ESSFdc2:OW	0.604
ESSFdc3:BG	1,204.569
ESSFdc3:XC	1,072.634
ESSFdc3:PG	509.040
ESSFdc3:ZP	215.793
ESSFdc3:WE	23.937
ESSFdc3:ME	4.337
ESSFdc3:07	3.957
ESSFdc3:06	2.635
ESSFdc3:PD	1.141
ESSFdc3:XP	1.039
ESSFvc:01	11,892.809
ESSFvc:03	5,155.460
ESSFvc:05	3,138.598
ESSFvc:04	2,025.244
ESSFvc:AV	1,851.265
ESSFvc:08	1,104.288
ESSFvc:02	800.464
ESSFvc:72	701.869
ESSFvc:73	424.043
ESSFvc:06	371.845
ESSFvc:GB	317.783
ESSFvc:07	167.216
ESSFvc:09	160.821
ESSFvc:FE	66.224
ESSFvc:UR	31.578
ESSFvc:MA	15.619
ESSFvc:OW	9.567
ESSFvc:WE	0.925
ESSFwc1:04	6,183.650
ESSFwc1:01	3,337.353
ESSFwc1:06	1,005.036
ESSFwc1:03	795.010
ESSFwc1:05	688.342
ESSFwc1:02	183.845
ESSFwc1:UR	53.154
ESSFwc1:FE	50.122

BEC:mapcode	Ha predicted
ESSFwc1:07	45.044
ESSFwc1:GB	38.171
ESSFwc1:08	22.031
ESSFwc1:MA	17.692
ESSFwc1:OW	16.891
ESSFwc1:AV	1.582
ESSFwc1:72	0.550
ESSFwc1:TP	0.407
ESSFwc2:01	34,586.351
ESSFwc2:04	12,762.432
ESSFwc2:03	6,563.906
ESSFwc2:07	5,257.396
ESSFwc2:06	2,795.847
ESSFwc2:05	1,759.459
ESSFwc2:XA	1,534.338
ESSFwc2:XB	1,263.111
ESSFwc2:02	537.679
ESSFwc2:GB	328.768
ESSFwc2:72	241.746
ESSFwc2:73	217.591
ESSFwc2:WE	148.342
ESSFwc2:92	56.769
ESSFwc2:UR	19.444
ESSFwc2:XC	7.171
ESSFwc2:OW	5.414
ESSFwc4:01	35,703.166
ESSFwc4:XI	25,695.084
ESSFwc4:03	8,339.811
ESSFwc4:04	7,700.764
ESSFwc4:05	6,033.671
ESSFwc4:08	4,395.368
ESSFwc4:02	2,395.883
ESSFwc4:06	994.842
ESSFwc4:FE	726.241
ESSFwc4:72	466.090
ESSFwc4:07	432.651
ESSFwc4:GB	406.905
ESSFwc4:RO	229.516
ESSFwc4:MA	175.268

BEC:mapcode	Ha predicted
ESSFwc4:UR	41.710
ESSFwc4:TP	3.571
ESSFwc4:AV	0.194
ESSFwc4:ME	0.100
ESSFxc1:BX	14,719.078
ESSFxc1:BG	5,603.237
ESSFxc1:PP	1,763.563
ESSFxc1:RO	705.553
ESSFxc1:WE	682.106
ESSFxc1:JL	351.149
ESSFxc1:JP	312.017
ESSFxc1:BB	190.252
ESSFxc1:TA	138.581
ESSFxc1:JY	93.846
ESSFxc1:LA	58.693
ESSFxc1:SH	47.442
ESSFxc1:UR	43.711
ESSFxc1:PD	7.991
ESSFxc1:OW	2.238
ESSFxc2:BX	26,665.994
ESSFxc2:BG	5,045.699
ESSFxc2:WE	3,867.506
ESSFxc2:PP	1,276.907
ESSFxc2:RO	1,123.407
ESSFxc2:JL	225.895
ESSFxc2:PD	112.526
ESSFxc2:SH	75.885
ESSFxc2:TA	46.729
ESSFxc2:ME	28.624
ESSFxc2:JP	26.083
ESSFxc2:UR	23.785
ESSFxc2:OW	2.500
ICHmk1:01	48,824.307
ICHmk1:SD	14,276.429
ICHmk1:07	7,946.589
ICHmk1:01ys	4,525.440
ICHmk1:03	2,371.045
ICHmk1:02	1,860.241
ICHmk1:06	1,678.080

BEC:mapcode	Ha predicted
ICHmk1:GB	718.830
ICHmk1:73	540.719
ICHmk1:JL	501.760
ICHmk1:UR	453.102
ICHmk1:WE	181.599
ICHmk1:72	164.973
ICHmk1:SE	112.721
ICHmk1:OW	107.063
ICHmk1:MA	100.130
ICHmk1:XP	65.521
ICHmk1:RO	5.201
ICHmk1:TA	0.439
ICHmk2:01	11,721.058
ICHmk2:04	2,039.582
ICHmk2:06	1,048.282
ICHmk2:05	1,041.578
ICHmk2:03	744.794
ICHmk2:XO	423.167
ICHmk2:01ys	119.905
ICHmk2:XY	62.756
ICHmk2:TD	44.833
ICHmk2:GB	42.401
ICHmk2:OW	42.220
ICHmk2:FE	22.045
ICHmk2:MA	21.038
ICHmk2:07	20.163
ICHmk2:UR	3.063
ICHmk2:RO	1.578
ICHmw2:01	65,142.342
ICHmw2:01ms	43,352.022
ICHmw2:03	19,525.652
ICHmw2:01yc	16,450.323
ICHmw2:05	15,810.487
ICHmw2:04	5,145.180
ICHmw2:02	4,801.477
ICHmw2:GB	2,660.324
ICHmw2:UR	2,082.354
ICHmw2:06	1,851.923
ICHmw2:OW	625.612

BEC:mapcode	Ha predicted
ICHmw2:XR	446.751
ICHmw2:73	353.076
ICHmw2:FE	320.418
ICHmw2:MA	293.466
ICHmw2:JJ	242.596
ICHmw2:XF	136.603
ICHmw2:72	52.678
ICHmw2:TP	27.826
ICHmw2:09	0.275
ICHmw3:JI	57,028.512
ICHmw3:01ms	16,243.004
ICHmw3:08	5,955.539
ICHmw3:06	3,232.737
ICHmw3:GB	2,232.249
ICHmw3:UR	1,351.444
ICHmw3:02	648.946
ICHmw3:07	601.511
ICHmw3:JH	516.116
ICHmw3:09	217.332
ICHmw3:MA	158.755
ICHmw3:73	109.744
ICHmw3:04	104.557
ICHmw3:82	96.003
ICHmw3:AV	70.904
ICHmw3:72	63.814
ICHmw3:TP	44.846
ICHmw3:OW	13.918
ICHvk1:01	19,331.341
ICHvk1:03	8,195.950
ICHvk1:04	3,780.766
ICHvk1:05	2,837.514
ICHvk1:77	2,439.850
ICHvk1:02	1,693.079
ICHvk1:10	1,446.554
ICHvk1:76	817.116
ICHvk1:06	808.426
ICHvk1:GB	597.719
ICHvk1:08	412.359
ICHvk1:73	339.533

BEC:mapcode	Ha predicted
ICHvk1:72	306.955
ICHvk1:07	300.432
ICHvk1:74	235.325
ICHvk1:OW	110.255
ICHvk1:UR	96.179
ICHvk1:MA	80.366
ICHvk1:09	35.449
ICHvk1:FE	15.647
ICHwk1:01	52,729.939
ICHwk1:03	44,203.908
ICHwk1:05	7,922.972
ICHwk1:04	7,391.200
ICHwk1:GB	1,458.847
ICHwk1:SF	1,431.884
ICHwk1:06	1,113.475
ICHwk1:XU	1,048.505
ICHwk1:76	849.206
ICHwk1:74	421.135
ICHwk1:UR	403.292
ICHwk1:FE	255.170
ICHwk1:75	242.602
ICHwk1:XG	174.611
ICHwk1:MA	144.480
ICHwk1:08	6.241
ICHwk1:02	0.069
ICHwk1:01ms	0.056
ICHwk1:01yc	0.050
ICHwk1c:01	481.527
ICHwk1c:JE	292.272
ICHwk1c:UR	131.528
ICHwk1c:GB	116.257
ICHwk1c:04	109.275
ICHwk1c:03	94.602
ICHwk1c:XT	58.763
ICHwk1c:FE	11.778
ICHwk1c:05	7.427
ICHwk1c:XH	4.463
ICHwk1c:MA	3.245
ICHwk1c:OW	2.932

BEC:mapcode	Ha predicted
ICHwk1c:74	1.088
ICHwk1c:02	0.675
ICHwk1c:08	0.213
ICHwk1c:76	0.063
IDFdk1:FX	15,340.200
IDFdk1:FF	4,533.227
IDFdk1:FB	4,450.357
IDFdk1:RO	3,648.129
IDFdk1:SG	2,533.317
IDFdk1:JP	945.865
IDFdk1:AK	561.178
IDFdk1:GD	472.117
IDFdk1:GM	298.901
IDFdk1:UR	285.034
IDFdk1:WE	236.000
IDFdk1:TA	120.028
IDFdk1:SH	77.333
IDFdk1:RE	28.471
IDFdk1:PD	27.792
IDFdk1:OW	4.735
IDFdk1a:RO	513.998
IDFdk1a:FB	410.943
IDFdk1a:FF	338.216
IDFdk1a:JP	280.584
IDFdk1a:GM	161.688
IDFdk1a:GD	131.123
IDFdk1a:SG	106.161
IDFdk1a:TA	10.708
IDFdk1a:WE	5.342
IDFdk1a:SH	3.063
IDFdk1a:PD	1.953
IDFdk1a:FX	0.569
IDFdk1b:FB	676.531
IDFdk1b:JP	280.407
IDFdk1b:FF	84.921
IDFdk1b:SG	71.183
IDFdk1b:GD	44.615
IDFdk1b:RO	23.321
IDFdk1b:GM	16.507

BEC:mapcode	Ha predicted
IDFdk1b:TA	13.536
IDFdk1b:SH	4.545
IDFdk1b:FX	0.829
IDFdk2:SF	16,955.564
IDFdk2:PP	7,945.168
IDFdk2:RO	5,234.261
IDFdk2:ZG	4,450.200
IDFdk2:FP	3,354.499
IDFdk2:FB	1,737.405
IDFdk2:AP	1,050.932
IDFdk2:JP	889.307
IDFdk2:SW	506.025
IDFdk2:WE	205.452
IDFdk2:AB	202.420
IDFdk2:TA	198.610
IDFdk2:LA	137.918
IDFdk2:PD	101.846
IDFdk2:AD	71.347
IDFdk2:BF	32.730
IDFdk2:RE	29.605
IDFdk2:OW	2.027
IDFdk2b:PP	171.848
IDFdk2b:FP	136.558
IDFdk2b:FB	127.092
IDFdk2b:RO	67.985
IDFdk2b:JP	43.517
IDFdk2b:SF	22.039
IDFdk2b:ZG	18.137
IDFdk2b:RE	8.628
IDFdk2b:WE	4.624
IDFdk2b:SW	4.465
IDFdm1:FY	8,036.810
IDFdm1:SD	6,459.581
IDFdm1:FT	4,334.989
IDFdm1:SF	2,324.636
IDFdm1:SB	2,014.294
IDFdm1:FB	1,826.142
IDFdm1:SH	282.413
IDFdm1:TA	237.198

BEC:mapcode	Ha predicted
IDFdm1:WE	121.884
IDFdm1:AS	116.965
IDFdm1:UR	64.432
IDFdm1:PD	48.724
IDFdm1:BJ	20.150
IDFdm1:RO	4.770
IDFmw1:JB	77,534.118
IDFmw1:01	30,487.487
IDFmw1:JD	15,092.966
IDFmw1:05	5,579.121
IDFmw1:04	5,075.471
IDFmw1:03	4,661.979
IDFmw1:06	3,885.588
IDFmw1:01yc	3,560.746
IDFmw1:UR	3,230.431
IDFmw1:JC	961.113
IDFmw1:OW	959.843
IDFmw1:02	607.522
IDFmw1:01ys	595.325
IDFmw1:SH	383.462
IDFmw1:MA	221.067
IDFmw1:FE	166.408
IDFmw1:09	108.380
IDFmw1:72	83.220
IDFmw1:TP	19.007
IDFmw1:GB	3.113
IDFmw1:52	0.250
IDFmw1:ME	0.037
IDFmw1:RO	0.020
IDFmw1:TA	0.013
IDFmw2:JA	21,313.152
IDFmw2:05	7,474.993
IDFmw2:03	3,581.565
IDFmw2:01	2,746.155
IDFmw2:XK	2,386.316
IDFmw2:01ys	1,193.678
IDFmw2:UR	1,091.393
IDFmw2:02	254.751
IDFmw2:72	183.057

BEC:mapcode	Ha predicted
IDFmw2:73	109.910
IDFmw2:FE	71.354
IDFmw2:OW	61.516
IDFmw2:06	61.457
IDFmw2:09	49.390
IDFmw2:MA	36.297
IDFmw2:TP	1.256
IDFmw2:RO	0.029
IDFmw2:GB	0.019
IDFmw2:ME	0.014
IDFxh1:01	11,929.275
IDFxh1:05	7,773.082
IDFxh1:02	2,793.948
IDFxh1:04	2,725.532
IDFxh1:06	1,793.391
IDFxh1:07	1,706.122
IDFxh1:03	1,208.706
IDFxh1:81	1,042.779
IDFxh1:09	983.601
IDFxh1:84	763.583
IDFxh1:73	695.038
IDFxh1:82	474.281
IDFxh1:85	322.800
IDFxh1:86	235.457
IDFxh1:LA	148.452
IDFxh1:UR	131.121
IDFxh1:72	118.093
IDFxh1:12	90.301
IDFxh1:13	50.719
IDFxh1:RI	46.984
IDFxh1:08ys	40.360
IDFxh1:52	38.352
IDFxh1:WM	22.875
IDFxh1:RO	14.044
IDFxh1:11	12.085
IDFxh1:55	10.348
IDFxh1:54	7.438
IDFxh1:07ys	3.062
IDFxh1:TA	0.538

BEC:mapcode	Ha predicted
IDFxh1:10	0.437
IDFxh1:08	0.316
IDFxh1:WE	0.069
IDFxh1:PD	0.041
IDFxh1a:81	283.600
IDFxh1a:84	214.016
IDFxh1a:82	99.144
IDFxh1a:01	52.212
IDFxh1a:85	47.000
IDFxh1a:86	31.874
IDFxh1a:05	27.670
IDFxh1a:52	15.060
IDFxh1a:02	9.738
IDFxh1a:07	9.187
IDFxh1a:03	8.357
IDFxh1a:04	8.124
IDFxh1a:09	3.145
IDFxh1a:RI	2.499
IDFxh2:01	2,730.187
IDFxh2:03	1,540.908
IDFxh2:04	1,438.033
IDFxh2:05	690.932
IDFxh2:06	645.430
IDFxh2:02	551.191
IDFxh2:07	476.566
IDFxh2:LA	234.198
IDFxh2:09	196.274
IDFxh2:81	135.486
IDFxh2:83	133.774
IDFxh2:73	73.143
IDFxh2:82	47.683
IDFxh2:UR	46.497
IDFxh2:1*	44.395
IDFxh2:11	15.660
IDFxh2:72	7.873
IDFxh2:WM	5.867
IDFxh2:RI	2.375
IDFxh2:RO	1.183
IDFxh2a:81	17.748

BEC:mapcode	Ha predicted
IDFxh2a:83	1.312
IDFxh2a:UR	0.875
IDFxh2a:01	0.625
IDFxh2a:09	0.562
IDFxh2a:06	0.250
IDFxh2a:04	0.188
MSdm1:ZF	65,185.310
MSdm1:LP	26,850.307
MSdm1:XL	12,653.573
MSdm1:ZG	6,855.480
MSdm1:RO	6,516.985
MSdm1:FP	3,446.632
MSdm1:WE	3,333.356
MSdm1:LA	1,256.739
MSdm1:JP	975.966
MSdm1:SH	952.928
MSdm1:PD	653.183
MSdm1:AB	366.724
MSdm1:UR	264.367
MSdm1:TA	234.400
MSdm1:OW	2.295
MSdm2:ZH	38,332.210
MSdm2:LP	14,499.163
MSdm2:SM	11,904.813
MSdm2:WE	5,322.642
MSdm2:RO	3,510.515
MSdm2:UR	972.586
MSdm2:FF	714.608
MSdm2:AP	657.303
MSdm2:SJ	613.987
MSdm2:JP	517.634
MSdm2:PD	306.704
MSdm2:LA	206.271
MSdm2:SH	152.135
MSdm2:BJ	101.535
MSdm2:TA	97.433
MSdm2:RE	87.974
MSdm2:OW	3.593
MSdm3:ZH	1,776.870

BEC:mapcode	Ha predicted
MSdm3:LP	1,235.333
MSdm3:SM	658.510
MSdm3:RO	142.617
MSdm3:ME	101.871
MSdm3:WE	9.092
MSdm3:SH	6.293
MSdm3:TA	1.277
MSxk1:LX	23,808.482
MSxk1:SB	6,956.546
MSxk1:WE	2,463.403
MSxk1:LJ	1,503.618
MSxk1:FP	1,425.351
MSxk1:RO	1,317.268
MSxk1:GL	632.829
MSxk1:JP	292.686
MSxk1:UR	230.035
MSxk1:PD	210.854
MSxk1:LA	203.824
MSxk1:SH	88.194
MSxk1:TA	62.486
MSxk1:AP	34.863
MSxk1:OW	7.142
PPxh1:01	468.420
PPxh1:04	245.333
PPxh1:84	95.798
PPxh1:05	68.301
PPxh1:06	51.429
PPxh1:02	48.179
PPxh1:LA	32.619
PPxh1:03	20.059
PPxh1:82	14.874
PPxh1:RO	8.312
PPxh1:85	5.187
PPxh1:TA	4.813
PPxh1:WM	2.999
PPxh1:UR	2.375
PPxh1:06ys	1.000
PPxh1a:84	109.731
PPxh1a:85	19.121

BEC:mapcode	Ha predicted
PPxh1a:01	16.310
PPxh1a:LA	16.060
PPxh1a:04	11.123
PPxh1a:82	10.436
PPxh1a:06	6.124
PPxh1a:RO	5.062
PPxh1a:05	4.187
PPxh1a:02	0.937
PPxh1a:06ys	0.188
PPxh2:UR	7.374
PPxh2:01	5.124

5.0 Discussion and Sources of Error

The Okanagan TSA PEM compilation project gathered PEM from three projects. It does not cover woodland or parkland/alpine variants, although a portion of the Wet Belt did have predictions in the woodland, those variants were not assessed for accuracy. The classification evolved between 2002 and 2005 for the Dry Belt BEC variants, the two classifications were cross-walked so that the original Dry Belt PEM could be brought up to date. The cross-walk could be a source of error for some units. The original Dry Belt PEM was assessed for accuracy by external parties. Crosswalk may have a small effect on that accuracy. The BEC classification of the Wet Belt and Very Dry Belt PEM's remained unchanged in the Okanagan TSA compilation data, but BGC linework did change, resulting in the predictions for an area becoming out of date with BEC7. The cross-walk table allocated map entities between variants and there could be a source of error there as well.

References Cited

Ecological Data Committee 2000. Ecosystem Mapping (TEM) Digital Data Capture in British Columbia; Ecosystem Technical Standards and Database Manual. Version 3.0. Province of British Columbia Resources Inventory Committee.

Iverson et al. 2001. Terrestrial Ecosystem mapping of the Central Okanagan with a Sensitive Ecosystem Inventory (SEI).

Iverson, K and A. Haney. 2006. An Updated Terrestrial Ecosystem Map (TEM) for the Southern Okanagan Valley (with Sensitive Ecosystems Inventory – SEI).

Iverson, K. and J. Shypitka. 2003. Sensitive Ecosystem Inventory (SEI) based on Terrestrial Ecosystem Mapping: Bella Vista – Goose Lake Range.

Ketcheson, M., et al. 2002. Okanagan Dry Belt PEM and SIBEC Project Final Report. Unpublished report to Okanagan Innovative Forestry Society.

Ketcheson, M. et al. 2006. Okanagan Wet Belt PEM Project Final Report. Unpublished report to Okanagan Innovative Forestry Society.

Lloyd, D. 2007. Revisions to Lloyd et al. (2006). Long Floristic Tables- Draft BC Ministry of Forests and Range, Kamloops BC.

Meidinger, D. 2003. Protocol for Accuracy Assessment of Ecosystem Maps. BC Ministry of Forests, Forest Sciences Program Technical Report 011.

Ministry of Sustainable Resource Management 2004. Standards for Terrestrial Ecosystem Mapping Digital Data Capture in British Columbia, Version 3.0 (2000) Errata No.1.0

Moon, D. 2005. A Protocol for Assessing Thematic Map Accuracy Using Small-area Sampling. BC Ministry of Forest, Forest Science Program Technical Report 023

Resource Inventory Committee. 1999. Standards for Predictive Ecosystem Mapping – Inventory Standards, TEM Mapping Alternative Task Force, Victoria BC.

Resources Inventory Standards Committee (2004) . Standards for Predictive Ecosystem Mapping (PEM) Digital Data Capture in British Columbia. Errata No.1.0. Ministry of Sustainable Resource Management. Resource Information Branch.

Timberline Natural Resource Group. 2009. Very Dry BEC Variants of the Okanagan TSa Predictive Ecosystem Mapping (PEM) Final Report. Unpublished report to the Okanagan Innovative Forestry Society.

APPENDIX 1.

CROSS-WALK TABLE TO RE-ALLOCATIE MAP ENTITIES TO BEC7 WHERE VARIANTS HAD CHANGES

OldBEC:SS - BEC7	Total #	Final MapCode	2005 site series
MSxk:XO - MSxk1	537	LX	05/06/01/07
MSxk:WL - MSxk1	201,624	WL	WE
MSxk:WL - MSdm2	24,853	WL	WE
MSxk:WL - ESSFxc1	3	WL	WE
MSxk:UR - MSxk1	15,675	UR	UR
MSxk:UR - MSdm2	2,289	UR	UR
MSxk:TA - MSxk1	3,746	TA	Rt07
MSxk:SH - MSxk1	7,553	SH	08/09
MSxk:SH - MSdm2	2,873	SH	08/09
MSxk:SB - MSxk1	470,681	SB	10/11/12
MSxk:SB - MSdm2	208,555	WE	11/12/WE
MSxk:SB - IDFdk2	3	SW	08
MSxk:SB - IDFdk1	112	SG	07
MSxk:SB - ESSFxc1	53	BG	08/09
MSxk:RO - MSxk1	70,060	RO	RO
MSxk:RO - MSdm2	39,559	RO	RO
MSxk:RO - IDFdk1	8	RO	RO
MSxk:RO - ESSFdc2	53	RO	RO
MSxk:PD - MSxk1	11,712	PD	PD
MSxk:PD - MSdm2	2,890	PD	PD
MSxk:OW - MSxk1	1,087	OW	OW
MSxk:OW - MSdm2	88	OW	OW
MSxk:LX - MSxk1	612,836	LX	05/06
MSxk:LX - MSdm2	235,981	ZH	01/06/07
MSxk:LX - IDFdk2	3	PP	01/05
MSxk:LX - IDFdk1b	16	FX	01/05
MSxk:LX - IDFdk1a	11	FX	01/05
MSxk:LX - IDFdk1	112	FX	01/05
MSxk:LX - ESSFxc1	55	BX	01/05/06
MSxk:LX - ESSFdc2	26	BG	01/06
MSxk:LJ - MSxk1	102,783	LJ	03
MSxk:LJ - MSdm2	4,898	FF	03
MSxk:LJ - IDFdk1b	13	FB	03/04
MSxk:LJ - IDFdk1	8	FB	03/04
MSxk:LJ - ESSFdc2	1	PG	03/04
MSxk:LA - MSxk1	7,072	LA	LA
MSxk:JP - MSxk1	12,154	JP	02/RO

MSxk:JP - MSdm2	4,847	JP	83/02
MSxk:JP - ESSFdc2	31	ZP	02/RO
MSxk:GL - MSxk1	30,560	GL	82/83/84/85
MSxk:GL - MSdm2	4,417	JP	83/02
MSxk:GL - IDFdk1a	11	JP	73/02
MSxk:FP - MSxk1	87,521	FP	04
MSxk:FP - MSdm2	29,583	FF	03
MSxk:FP - IDFdk1b	13	FB	03/04
MSxk:FP - IDFdk1	120	FB	03/04
MSxk:FP - ESSFdc2	29	PG	03/04
MSxk:AP - MSxk1	2,174	AP	05/06ES
MSxk:AP - MSdm2	5,871	AP	04/05ES
MSdm2:ZH - MSxk1	16	LX	05/06/01/07
MSdm2:ZH - MSdm3	59,549	ZH	01
MSdm2:ZH - IDFmw2	64	JA	01/04
MSdm2:ZH - IDFmw1	1,354	JB	05/01
MSdm2:ZH - IDFdk2	49	AP	01/05
MSdm2:ZH - IDFdk1	12	FX	01/05
MSdm2:ZH - ICHmk2	250	XX	01/05
MSdm2:ZH - ICHmk1	57	XP	01/05
MSdm2:ZH - ESSFxc2	23	BX	01/05/06/07
MSdm2:ZH - ESSFxc1	34	BX	01/05/06
MSdm2:ZH - ESSFdc3	324	BG	01/05
MSdm2:ZH - ESSFdc2	46	BG	01/06
MSdm2:XN - MSdm3	228	ZH	01/06/07
MSdm2:XN - IDFdk2	21	FX	01/05
MSdm2:WL - MSxk1	15	WL	WE
MSdm2:WL - MSdm3	521	WL	WE
MSdm2:WL - ICHmk1	7	WL	WE
MSdm2:WL - ESSFxc2	6	WL	WE
MSdm2:WL - ESSFdc2	4	WL	WE
MSdm2:UR - MSxk1	1	UR	UR
MSdm2:UR - ICHmk1	1	UR	UR
MSdm2:TA - MSdm3	26	TA	TA
MSdm2:TA - IDFmw1	2	TA	TA
MSdm2:SM - MSxk1	16	SB	'10/11/12
MSdm2:SM - MSdm3	44,018	SM	04/05
MSdm2:SM - IDFmw2	59	06	06
MSdm2:SM - IDFmw1	758	JD	07/08
MSdm2:SM - IDFdk2	37	ZG	06/07

MSdm2:SM - ICHmk2	212	06	06
MSdm2:SM - ICHmk1	52	JL	10/11/12/13
MSdm2:SM - ESSFxc2	17	BG	08
MSdm2:SM - ESSFxc1	34	BG	08/09
MSdm2:SM - ESSFdc3	195	06	06
MSdm2:SM - ESSFdc2	51	BG	01/06
MSdm2:SJ - MSdm3	3,964	ME	02
MSdm2:SJ - IDFmw2	5	ME	02
MSdm2:SJ - IDFmw1	2	ME	02
MSdm2:SJ - ICHmk1	8	ME	02
MSdm2:SH - MSdm3	735	SH	06
MSdm2:RO - MSdm3	6,356	RO	RO
MSdm2:RO - IDFmw1	148	RO	RO
MSdm2:RO - IDFdk2	11	RO	RO
MSdm2:RO - ICHmk2	4	RO	RO
MSdm2:RO - ICHmk1	13	RO	RO
MSdm2:PD - IDFdk2	1	PD	PD
MSdm2:LP - MSdm3	49,044	LP	03
MSdm2:LP - IDFmw2	32	03	03
MSdm2:LP - IDFmw1	1,428	05	05
MSdm2:LP - IDFdk2	69	SF	04
MSdm2:LP - IDFdk1	12	FB	03/04
MSdm2:LP - ICHmk2	251	03	03
MSdm2:LP - ICHmk1	53	03	03
MSdm2:LP - ESSFxc2	17	PP	04/03
MSdm2:LP - ESSFxc1	34	PP	04/03
MSdm2:LP - ESSFdc3	421	PG	03/04
MSdm2:LP - ESSFdc2	61	PG	03/04
MSdm2:JP - MSdm3	618	RO	02/Ro04
MSdm2:JP - IDFdk2	21	JP	73/02
MSdm2:JP - ICHmk2	4	XO	02/72/73
MSdm2:FF - MSdm3	538	LP	03
MSdm2:FF - ICHmk1	6	03	03
MSdm2:BJ - MSdm3	34	RO	02/Ro04
MSdm2:AP - MSdm3	15,324	LP	03 es
MSdm2:AP - IDFmw2	34	03	03 es
MSdm2:AP - IDFmw1	847	03	03 es
MSdm2:AP - ICHmk2	3	03	03 es
MSdm2:AP - ICHmk1	7	03	03 es
MSdm2:AP - ESSFdc3	41	PG	03/04

MSdm1:ZG - IDFmw1	1	JD		07/08
MSdm1:ZG - ICHmk1	41	06		06
MSdm1:ZG - ESSFxc2	740	BG		08
MSdm1:ZG - ESSFdc1	2,292	BV		06/07/08
MSdm1:ZF - IDFmw1	33	JB		01/05
MSdm1:ZF - IDFdm1	11	FT		01
MSdm1:ZF - ICHmk1	220	XP		05/01
MSdm1:ZF - ESSFxc2	2,533	BX		01/05/06/07
MSdm1:ZF - ESSFdc1	7,373	BX		01/04/05
MSdm1:XL - IDFmw1	22	JB		05/01
MSdm1:XL - IDFdm1	47	FY		03/04
MSdm1:XL - ICHmk1	135	02		02
MSdm1:XL - ESSFxc2	1,961	PP		04/03
MSdm1:XL - ESSFdc1	2,470	PP		03
MSdm1:WL - ICHmk1	15	WL		WE
MSdm1:WL - ESSFxc2	477	WL		WE
MSdm1:WL - ESSFdc1	507	WL		WE
MSdm1:UR - ICHmk1	19	UR		UR
MSdm1:SM - IDFmw1	1	JD		07/08
MSdm1:SM - ICHmk1	47	SE		07/08/09
MSdm1:SM - ESSFxc2	765	BG		08
MSdm1:SM - ESSFdc1	971	BV		06/07/08
MSdm1:SH - ICHmk1	13	JL		10/11/12/13
MSdm1:SH - ESSFxc2	167	SH		09
MSdm1:SH - ESSFdc1	55	FS		09/10
MSdm1:RO - IDFdm1	143	RO		RO
MSdm1:RO - ICHmk1	35	RO		RO
MSdm1:RO - ESSFdc1	1,730	RO		RO
MSdm1:LP - IDFmw1	41	03		03
MSdm1:LP - IDFdm1	27	FY		03/04
MSdm1:LP - ICHmk1	180	SD		04/05
MSdm1:LP - ESSFxc2	941	PP		04/03
MSdm1:LP - ESSFdc1	7,200	PP		03
MSdm1:JP - ICHmk1	12		73	73/Ro
MSdm1:JP - ESSFdc1	81	RO		RO/02
MSdm1:FP - IDFmw1	29	03		03
MSdm1:FP - IDFdm1	154	FY		03/04
MSdm1:FP - ICHmk1	63	03		03
MSdm1:FP - ESSFdc1	3,541	PP		03
MSdm1:AB - ICHmk1	1	SE		07/08/09 ES

IDFdm1:XK - MSdm1	2,552	LP	04
IDFdm1:XK - IDFxh1	1,322	03	03
IDFdm1:XK - ICHmk1	1,410	03	03
IDFdm1:UR - IDFxh1	9	UR	UR
IDFdm1:TA - IDFxh1	3	TA	TA
IDFdm1:SH - IDFxh1	18	13	13
IDFdm1:SF - MSdm1	271	ZF	01/05/06
IDFdm1:SF - IDFxh1	217	06	06
IDFdm1:SF - ICHmk1	1,099	06	06
IDFdm1:SB - MSdm1	989	JP	Ro04/02
IDFdm1:SB - IDFxh1	295	02	02
IDFdm1:SB - ICHmk1	80	73	Ro/73
IDFdm1:FT - MSdm1	1,685	ZF	01/05/06
IDFdm1:FT - IDFxh1	856	01	01
IDFdm1:FT - ICHmk1	551	XP	05/01
IDFdm1:FP - MSdm1	2,234	FP	03
IDFdm1:FP - IDFxh1	833	01	01
IDFdm1:FP - ICHmk1	1,320	XP	05/01
IDFdm1:FK - MSdm1	577	ZF	01/05/06
IDFdm1:FK - IDFxh1	120	01	01
IDFdm1:FK - ICHmk1	302	XP	01/05
IDFdm1:FB - MSdm1	1,166	JP	02/Ro04
IDFdm1:FB - IDFxh1	1,017	02	02
IDFdm1:FB - ICHmk1	167	02	02
IDFdm1:AS - IDFxh1	10	07	07YS
IDFdk2:ZG - MSdm2	62	SH	09/10
IDFdk2:ZG - IDFxh2	33	12	12
IDFdk2:ZG - IDFxh1	147	13	13
IDFdk2:ZG - IDFmw2	83	XK	07/08/09
IDFdk2:ZG - IDFmw1	30	SH	07/08/09
IDFdk2:ZG - IDFdk2b	2,143	ZG	06/07
IDFdk2:ZG - ICHmk1	2	JL	10/11/12/13
IDFdk2:WL - IDFxh1	7	WL	WE
IDFdk2:WL - IDFdk2b	462	WL	WE
IDFdk2:TA - MSdm2	14	TA	Rt07
IDFdk2:TA - IDFxh1	1	TA	TA
IDFdk2:TA - IDFmw1	3	TA	TA
IDFdk2:TA - IDFdk1	1	TA	TA
IDFdk2:SW - IDFxh1	7	13	13
IDFdk2:SW - IDFdk2b	131	SW	08

IDFdk2:SF - MSxk1	4	09	09
IDFdk2:SF - MSdm2	179	10	10
IDFdk2:SF - IDFxh2	39	12	12
IDFdk2:SF - IDFxh1	214	13	13
IDFdk2:SF - IDFmw2	183	XK	07/08/09
IDFdk2:SF - IDFmw1	34	SH	07/08/09
IDFdk2:SF - IDFdk2b	1,229	SF	04
IDFdk2:SF - IDFdk1	1	FB	03/04
IDFdk2:SF - ICHmk2	3	XY	03/04
IDFdk2:SF - ICHmk1	2	03	03
IDFdk2:RO - MSdm2	53	RO	RO
IDFdk2:RO - IDFxh2	8	RO	RO
IDFdk2:RO - IDFxh1	210	RO	RO
IDFdk2:RO - IDFmw2	24	RO	RO
IDFdk2:RO - IDFmw1	15	RO	RO
IDFdk2:RO - IDFdk2b	2,446	RO	RO
IDFdk2:RO - IDFdk1	1	RO	RO
IDFdk2:RO - ICHmk2	3	RO	RO
IDFdk2:RO - ICHmk1	2	RO	RO
IDFdk2:RE - IDFdk2b	248	RE	RE
IDFdk2:PP - MSdm2	27	ZF	01/05/06
IDFdk2:PP - IDFxh2	17	01	01
IDFdk2:PP - IDFxh1	221	01	01
IDFdk2:PP - IDFmw2	14	01	01
IDFdk2:PP - IDFmw1	14	01	01
IDFdk2:PP - IDFdk2b	7,506	PP	01/05
IDFdk2:PD - IDFxh1	2	PD	PD
IDFdk2:LA - IDFmw1	4	LA	LA
IDFdk2:JP - IDFxh1	79	02	02
IDFdk2:JP - IDFdk2b	1,501	JP	73/02
IDFdk2:FP - MSxk1	4	JP	Ro04/Ro10/02
IDFdk2:FP - MSdm2	36	FF	03
IDFdk2:FP - IDFxh2	13	03	03
IDFdk2:FP - IDFxh1	214	03	03
IDFdk2:FP - IDFmw2	36	03	03
IDFdk2:FP - IDFmw1	8	03	03
IDFdk2:FP - IDFdk2b	6,724	FP	03
IDFdk2:FB - MSxk1	4	LJ	03
IDFdk2:FB - IDFxh2	16	03	03
IDFdk2:FB - IDFxh1	174	03	03

IDFdk2:FB - IDFmw1	6	03	03
IDFdk2:FB - IDFdk2b	6,326	FB	03
IDFdk2:BF - IDFxh1	4	82	82
IDFdk2:AP - MSdm2	18	ZH	01/06/07 YS
IDFdk2:AP - IDFxh2	2	07	07YS
IDFdk2:AP - IDFxh1	13	07	07YS
IDFdk2:AP - IDFmw2	22	01	01YS
IDFdk2:AD - IDFxh1	2	08	08YS
IDFdk2:AB - MSdm2	18	FF	03YS
IDFdk2:AB - IDFxh2	2	03	03YS
IDFdk2:AB - IDFxh1	1	03	03YS
IDFdk2:AB - IDFmw2	17	03	03YS
IDFdk1:XH - IDFxh2	10	12	12
IDFdk1:XH - IDFxh1	73	13	13
IDFdk1:XH - IDFdk1b	358	SH	08
IDFdk1:XH - IDFdk1a	116	SH	08
IDFdk1:WL - MSdm2	12	WL	WE
IDFdk1:WL - IDFxh2	6	WL	WE
IDFdk1:WL - IDFxh1	9	WL	WE
IDFdk1:WL - IDFdk1a	398	WL	WE
IDFdk1:UR - MSdm2	19	UR	UR
IDFdk1:UR - IDFxh1	94	UR	UR
IDFdk1:TA - IDFxh1	53	TA	TA
IDFdk1:TA - IDFdk1b	371	TA	TA
IDFdk1:TA - IDFdk1a	381	TA	TA
IDFdk1:SH - IDFxh1	6	13	13
IDFdk1:SH - IDFdk1b	58	SH	08
IDFdk1:SH - IDFdk1a	158	SH	08
IDFdk1:SG - IDFxh2	96	11	11
IDFdk1:SG - IDFxh1a	4	11	11
IDFdk1:SG - IDFxh1	439	11	11
IDFdk1:SG - IDFmw2	28	XK	07/08/09
IDFdk1:SG - IDFdk1b	3,510	SG	07
IDFdk1:SG - IDFdk1a	6,418	SG	07
IDFdk1:RO - MSxk1	9	RO	RO
IDFdk1:RO - IDFxh2	73	RO	RO
IDFdk1:RO - IDFxh1a	7	RO	RO
IDFdk1:RO - IDFxh1	783	RO	RO
IDFdk1:RO - IDFdk1b	1,616	RO	RO
IDFdk1:RO - IDFdk1a	14,377	RO	RO

IDFdk1:PD - IDFxh1	3	PD	PD
IDFdk1:PD - IDFdk1a	73	PD	PD
IDFdk1:JP - IDFxh2	37	02	02
IDFdk1:JP - IDFxh1a	3	02	02
IDFdk1:JP - IDFxh1	408	02	02
IDFdk1:JP - IDFdk1b	2,519	JP	81/83
IDFdk1:JP - IDFdk1a	4,063	JP	81/83
IDFdk1:GM - IDFxh2	4	02	02
IDFdk1:GM - IDFxh1a	6	81	81
IDFdk1:GM - IDFxh1	205	03	03
IDFdk1:GM - IDFdk1b	993	GM	81/83
IDFdk1:GM - IDFdk1a	10,173	GM	81/83
IDFdk1:GD - IDFxh1a	10	82	82
IDFdk1:GD - IDFxh1	319	03	03
IDFdk1:GD - IDFdk1b	1,112	GD	82
IDFdk1:GD - IDFdk1a	6,082	GD	82
IDFdk1:FP - MSdm3	17	LP	03
IDFdk1:FP - MSdm2	31	FF	03
IDFdk1:FP - IDFxh2	298	03	03
IDFdk1:FP - IDFxh1a	6	03	03
IDFdk1:FP - IDFxh1	1,152	03	03
IDFdk1:FP - IDFmw2	7	03	03
IDFdk1:FP - IDFdk1b	13,768	03	03
IDFdk1:FP - IDFdk1a	8,923	FB	03
IDFdk1:FJ - MSxk1	11	JP	Ro/02
IDFdk1:FJ - MSdm3	3	RO	02/Ro
IDFdk1:FJ - MSdm2	19	JP	83/02
IDFdk1:FJ - IDFxh2	272	02	02
IDFdk1:FJ - IDFxh1a	15	81	81
IDFdk1:FJ - IDFxh1	1,103	02	02
IDFdk1:FJ - IDFmw2	8	02	02
IDFdk1:FJ - IDFdk1b	12,945	JP	83/02
IDFdk1:FJ - IDFdk1a	12,039	JP	83/02
IDFdk1:FF - MSxk1	20	SH	08/09
IDFdk1:FF - MSdm3	14	SM	04/05
IDFdk1:FF - IDFxh2	104	09	09
IDFdk1:FF - IDFxh1a	2	09	09
IDFdk1:FF - IDFxh1	750	09	09
IDFdk1:FF - IDFmw2	32	05	05
IDFdk1:FF - IDFdk1b	3,872	FF	06

IDFdk1:FF - IDFdk1a	13,668	FF	06
IDFdk1:FB - MSxk1	20	FP	04
IDFdk1:FB - MSdm3	17	LP	03
IDFdk1:FB - IDFxh2	206	03	03
IDFdk1:FB - IDFxh1a	1	03	03
IDFdk1:FB - IDFxh1	1,185	03	03
IDFdk1:FB - IDFmw2	3	03	03
IDFdk1:FB - IDFdk1b	14,797	FB	03/04
IDFdk1:FB - IDFdk1a	15,060	FB	03/04
IDFdk1:AK - IDFxh2	10	08	08YS
IDFdk1:AK - IDFxh1	45	08	08YS
IDFdk1:AK - IDFmw2	3	05	05YS
IDFdk1:AK - IDFdk1a	139	08	08YS
IDFdk1:AB - IDFxh1	16	55	55
IDFdk1:AB - IDFdk1b	51	AB	06ES
ESSFxc:XG - ESSFxc2	72	BX	01/05/06/07
ESSFxc:XG - ESSFxc1	96	BX	01/05/06
ESSFxc:XG - ESSFdc2	59	BX	01/04/05
ESSFxc:XF - ESSFxc1	1,504	BG	08/09
ESSFxc:XE - MSdm1	68	ZG	07/08
ESSFxc:XE - ESSFxc1	296	SH	07
ESSFxc:XE - ESSFdc1	225	FS	09/10
ESSFxc:WL - MSxk1	1	WL	WE
ESSFxc:WL - MSdm1	10,573	WL	WE
ESSFxc:WL - ICHmk1	124	WL	WE
ESSFxc:WL - ESSFxcw	3,561	WL	WE
ESSFxc:WL - ESSFxc2	186,399	WL	WE
ESSFxc:WL - ESSFxc1	57,005	WL	WE
ESSFxc:WL - ESSFdcw	84	WL	WE
ESSFxc:WL - ESSFdc2	176	WL	WE
ESSFxc:WL - ESSFdc1	50,137	WL	WE
ESSFxc:UR - MSdm2	14	UR	UR
ESSFxc:UR - MSdm1	1,750	UR	UR
ESSFxc:UR - ESSFxcw	1,782	UR	UR
ESSFxc:UR - ESSFxc2	2,427	UR	UR
ESSFxc:UR - ESSFxc1	5,296	UR	UR
ESSFxc:TA - MSdm1	1,770	TA	TA
ESSFxc:TA - ICHmk1	304	TA	TA
ESSFxc:TA - ESSFxcw	269	TA	TA
ESSFxc:TA - ESSFxc2	932	TA	TA

ESSFxc:TA - ESSFxc1	7,790	TA	TA	
ESSFxc:TA - ESSFdc1	2,090	TA	TA	
ESSFxc:SH - MSdm1	3,631	SH	09/10	
ESSFxc:SH - ICHmk1	615	JL	10/11/12	
ESSFxc:SH - ESSFxc2	9,165	SH	09	
ESSFxc:SH - ESSFxc1	4,102	SH	07	
ESSFxc:SH - ESSFdc2	283	SH	07	
ESSFxc:SH - ESSFdc1	3,074	FS	09/10	
ESSFxc:RO - MSxk1	18	RO	RO	
ESSFxc:RO - MSdm1	14,989	RO	RO	
ESSFxc:RO - ICHmk1	3,082	RO	RO	
ESSFxc:RO - ESSFxcw	4,384	RO	RO	
ESSFxc:RO - ESSFxcp	1,342	RO	RO	
ESSFxc:RO - ESSFxc2	26,399	RO	RO	
ESSFxc:RO - ESSFxc1	43,047	RO	RO	
ESSFxc:RO - ESSFdcw	23	RO	RO	
ESSFxc:RO - ESSFdc2	2,028	RO	RO	
ESSFxc:RO - ESSFdc1	36,476	RO	RO	
ESSFxc:PP - MSdm1	25,659	FP	03	
ESSFxc:PP - ICHmk1	1,386	03	03	
ESSFxc:PP - ESSFxcw	13,812	03	03	
ESSFxc:PP - ESSFxcp	3,829			NO pem IN pARKLAND
ESSFxc:PP - ESSFxc2	106,220	PP	03/04	
ESSFxc:PP - ESSFxc1	163,938	PP	03/04	
ESSFxc:PP - ESSFdc2	6,105	PG	03/04	
ESSFxc:PP - ESSFdc1	41,916	BX	01/04/05	
ESSFxc:PD - MSdm1	1,207	PD	PD	
ESSFxc:PD - ICHmk1	141	PD	PD	
ESSFxc:PD - ESSFxc2	3,909	PD	PD	
ESSFxc:PD - ESSFxc1	976	PD	PD	
ESSFxc:PD - ESSFdcw	101	PD	PD	
ESSFxc:PD - ESSFdc1	1,174	PD	PD	
ESSFxc:OW - ESSFxc2	379	OW	OW	
ESSFxc:OW - ESSFxc1	355	OW	OW	
ESSFxc:LA - ESSFxc1	1,287	LA	LA	
ESSFxc:JY - ESSFxc1	7,533	JY	82/84	
ESSFxc:JP - MSdm1	552	JP	Ro/02	
ESSFxc:JP - ICHmk1	121	02	02	
ESSFxc:JP - ESSFxcw	1,599	02	02	

ESSFxc:JP - ESSFxcp	96			NO pem IN pARKLAND
ESSFxc:JP - ESSFxc2	1,364	JP	RO05	
ESSFxc:JP - ESSFxc1	13,609	JP	RO05	
ESSFxc:JP - ESSFdc2	526	ZP	RO/02	
ESSFxc:JL - MSdm1	2,035	JP	RO04/02	
ESSFxc:JL - ICHmk1	787	02	02	
ESSFxc:JL - ESSFxcw	2,221	02	02	
ESSFxc:JL - ESSFxcp	611			NO pem IN pARKLAND
ESSFxc:JL - ESSFxc2	1,708	JL	Ro/02	
ESSFxc:JL - ESSFxc1	19,867	JL	RO/02	
ESSFxc:JL - ESSFdc2	235	ZP	Ro05/02	
ESSFxc:JL - ESSFdc1	487	RO	Ro05/02	
ESSFxc:BX - MSxk1	19	LX	05/06/01/07	
ESSFxc:BX - MSdm2	39	ZH	01/06/07	
ESSFxc:BX - MSdm1	71,735	ZF	01/05/06	
ESSFxc:BX - ICHmk2	1	01	01	
ESSFxc:BX - ICHmk1	12,255	01	01	
ESSFxc:BX - ESSFxcw	26,958	01	01	
ESSFxc:BX - ESSFxcp	5,011			NO pem IN pARKLAND
ESSFxc:BX - ESSFxc2	365,118	BX	01/05/06/07	
ESSFxc:BX - ESSFxc1	381,836	BX	01/05/06	
ESSFxc:BX - ESSFdcw	264	01	01	
ESSFxc:BX - ESSFdc2	12,001	BG	01/06	
ESSFxc:BX - ESSFdc1	156,692	BX	01/04/05	
ESSFxc:BG - MSxk1	1	SB	10/11/12	
ESSFxc:BG - MSdm2	39	SM	08/09	
ESSFxc:BG - MSdm1	60,496	ZG	07/08	
ESSFxc:BG - ICHmk1	11,734	SE	07/008/09	
ESSFxc:BG - ESSFxcw	22,522	07	07/08/09	
ESSFxc:BG - ESSFxcp	3,148			NO pem IN pARKLAND
ESSFxc:BG - ESSFxc2	314,284	BG	08	
ESSFxc:BG - ESSFxc1	320,744	BG	08/09	
ESSFxc:BG - ESSFdcw	251	07	07	
ESSFxc:BG - ESSFdc2	10,167	BB	08	
ESSFxc:BG - ESSFdc1	129,401	BV	06/07/08	
ESSFxc:BB - ESSFxc1	12,474	BB	83	

ESSFdc2:ZP - ESSFxc2	5,226	JL	02/Ro10
ESSFdc2:ZP - ESSFdcw	52	02	02/Ro
ESSFdc2:ZP - ESSFdc3	6,312	ZP	02/RO
ESSFdc2:XP - ESSFdc3	163	XP	04/05/01/06/09
ESSFdc2:XD - ESSFxc2	107	BX	01/05/06/07
ESSFdc2:XC - MSdm3	55	SM	08/09
ESSFdc2:XC - MSdm2	9	SM	08/09
ESSFdc2:XC - ESSFxc2	21,826	BG	08
ESSFdc2:XC - ESSFdcw	262	08	08
ESSFdc2:XC - ESSFdc3	19,073	XC	11/07/08/10
ESSFdc2:XB - MSdm3	71	SM	04/05
ESSFdc2:XB - MSdm2	20	SM	08/09
ESSFdc2:XB - ESSFxcw	52	07	07
ESSFdc2:XB - ESSFxc2	44,012	BX	01/05/06/07
ESSFdc2:XB - ESSFxc1	8	BX	01/05/06
ESSFdc2:XB - ESSFdcw	547	07	07
ESSFdc2:XB - ESSFdc3	44,820	XB	01/06/08
ESSFdc2:WL - ESSFxc2	2,271	WE	WE
ESSFdc2:WL - ESSFdc3	1,419	WE	WE
ESSFdc2:VM - ESSFxc2	1,632	ME	08/ME
ESSFdc2:VM - ESSFdc3	206	ME	ME
ESSFdc2:TA - ESSFdcw	15	TA	TA
ESSFdc2:SH - ESSFdc3	356	SH	07
ESSFdc2:PG - MSdm3	16	LP	03
ESSFdc2:PG - MSdm2	20	FF	03
ESSFdc2:PG - ESSFxcw	35	03	03
ESSFdc2:PG - ESSFxc2	26,308	PP	04/03
ESSFdc2:PG - ESSFxc1	8	PP	03/04
ESSFdc2:PG - ESSFdcw	516	03	03
ESSFdc2:PG - ESSFdc3	28,482	PG	03/04
ESSFdc2:PD - ESSFdc3	31	PD	PD
ESSFdc2:BB - MSdm3	55	SM	08/09
ESSFdc2:BB - MSdm2	11	SM	08/09
ESSFdc2:BB - ESSFxcw	52	08	08
ESSFdc2:BB - ESSFxc2	32,544	BG	08
ESSFdc2:BB - ESSFxc1	8	BG	08/09
ESSFdc2:BB - ESSFdcw	565	08	08
ESSFdc2:BB - ESSFdc3	40,332	XC	11/07/08/10
ESSFdc2:AS - ESSFdcw	83	AS	Sc03
ESSFdc1:XA - MSdm1	9,899	ZG	07/08

ESSFdc1:XA - ICHmk1	34,007	SE	07/08/09	
ESSFdc1:XA - ESSFxc2	73,463	BX	01/05/06/07	
ESSFdc1:XA - ESSFdcw	10,711	XA	06/07/08	
ESSFdc1:XA - ESSFdcp	34			NO pem IN pARKLAND
ESSFdc1:WL - MSdm1	97	WL	WE	
ESSFdc1:WL - ICHmk1	354	WL	WE	
ESSFdc1:WL - ESSFxc2	110,887	WL	WE	
ESSFdc1:WL - ESSFdcw	5,726	WL	WE	
ESSFdc1:UR - MSdm1	204	UR	UR	
ESSFdc1:UR - ESSFdcw	857	UR	UR	
ESSFdc1:UR - ESSFdcp	48	UR	UR	
ESSFdc1:TA - ICHmk1	3,319	TA	TA	
ESSFdc1:TA - ESSFxc2	3,101	TA	TA	
ESSFdc1:TA - ESSFdcw	66	TA	TA	
ESSFdc1:RO - MSdm1	3,148	RO	RO	
ESSFdc1:RO - ICHmk1	20,174	RO	RO	
ESSFdc1:RO - ESSFxc2	33,087	RO	RO	
ESSFdc1:RO - ESSFdcw	7,395	RO	RO	
ESSFdc1:RO - ESSFdcp	223	RO	RO	
ESSFdc1:PP - MSdm1	1,921	FP	03	
ESSFdc1:PP - ICHmk1	15,627	03	03	
ESSFdc1:PP - ESSFxc2	12,174	PP	03/04	
ESSFdc1:PP - ESSFdcw	776	03	03	
ESSFdc1:PD - ESSFxc2	1,002	PD	PD	
ESSFdc1:PD - ESSFdcw	30	PD	PD	
ESSFdc1:OW - ESSFdcw	405	OW	OW	
ESSFdc1:FS - MSdm1	582	SM	08/09	
ESSFdc1:FS - ICHmk1	1,297	SE	07/08/09	
ESSFdc1:FS - ESSFxc2	8,809	BG	08	
ESSFdc1:BX - MSdm1	12,575	ZF	01/05/06	
ESSFdc1:BX - ICHmk1	47,079	XP	05/01	
ESSFdc1:BX - ESSFxc2	199,603	BX	01/05/06	
ESSFdc1:BX - ESSFdcw	18,462	BX	01/05/06	
ESSFdc1:BX - ESSFdcp	218			NO pem IN pARKLAND
ESSFdc1:BV - MSdm1	5,680	ZG	07/08	
ESSFdc1:BV - ICHmk1	11,752	SE	07/08/09	
ESSFdc1:BV - ESSFxc2	113,457	BX	01/05/06/07	

ESSFdc1:BV - ESSFdcw	8,747	BV	01/05/06/07	
ESSFdc1:BV - ESSFdcp	7			NO pem IN pARKLAND