A Canadian Relevé Database:
VPRO, the CNVC, and the Canadian Arctic IPY

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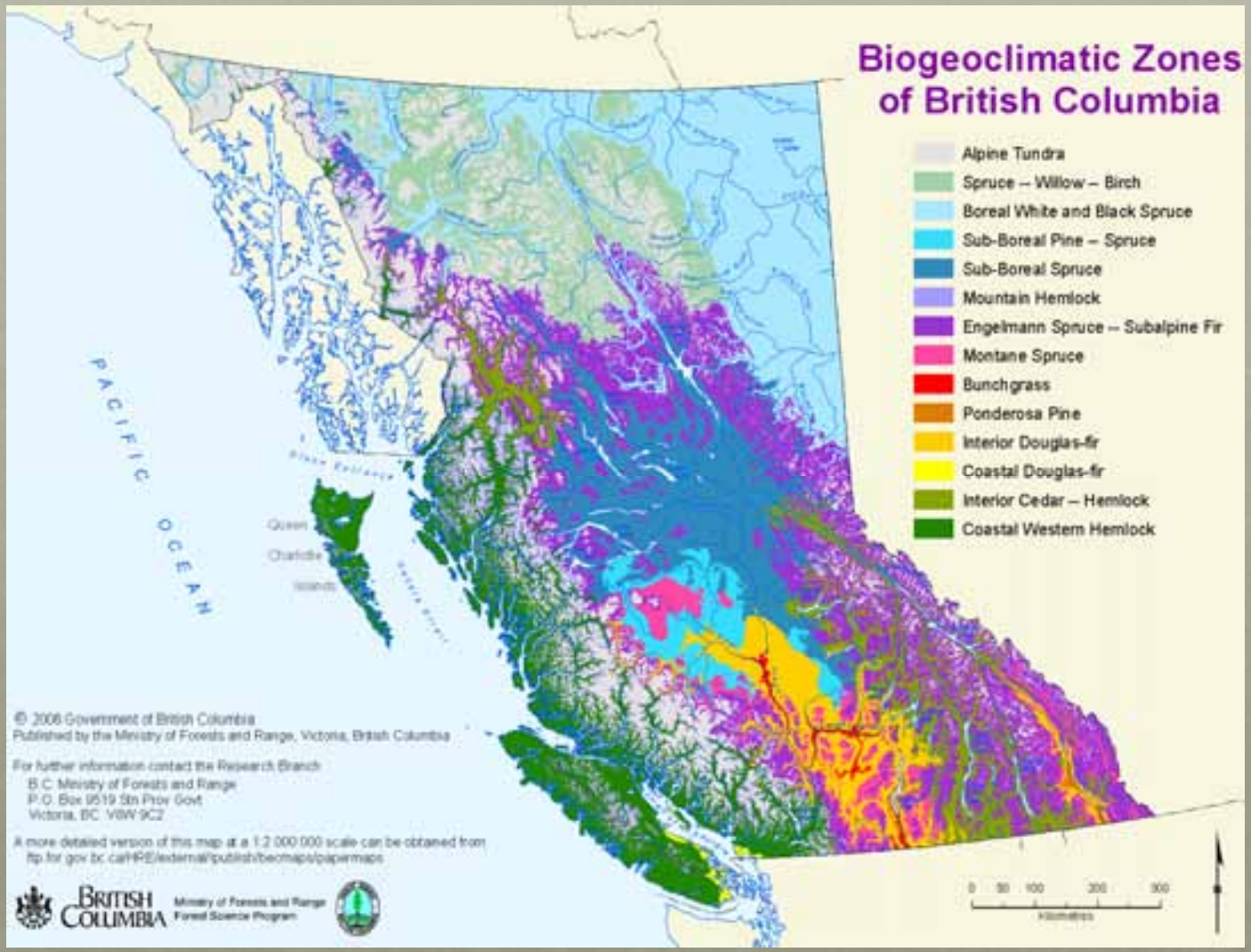
OUTLINE

- VPRO software for plot and classification management
- Some experiences from data compilations
- Arctic data compilation and classification

BRITISH COLUMBIA BIOCLIMATIC DIVERSITY



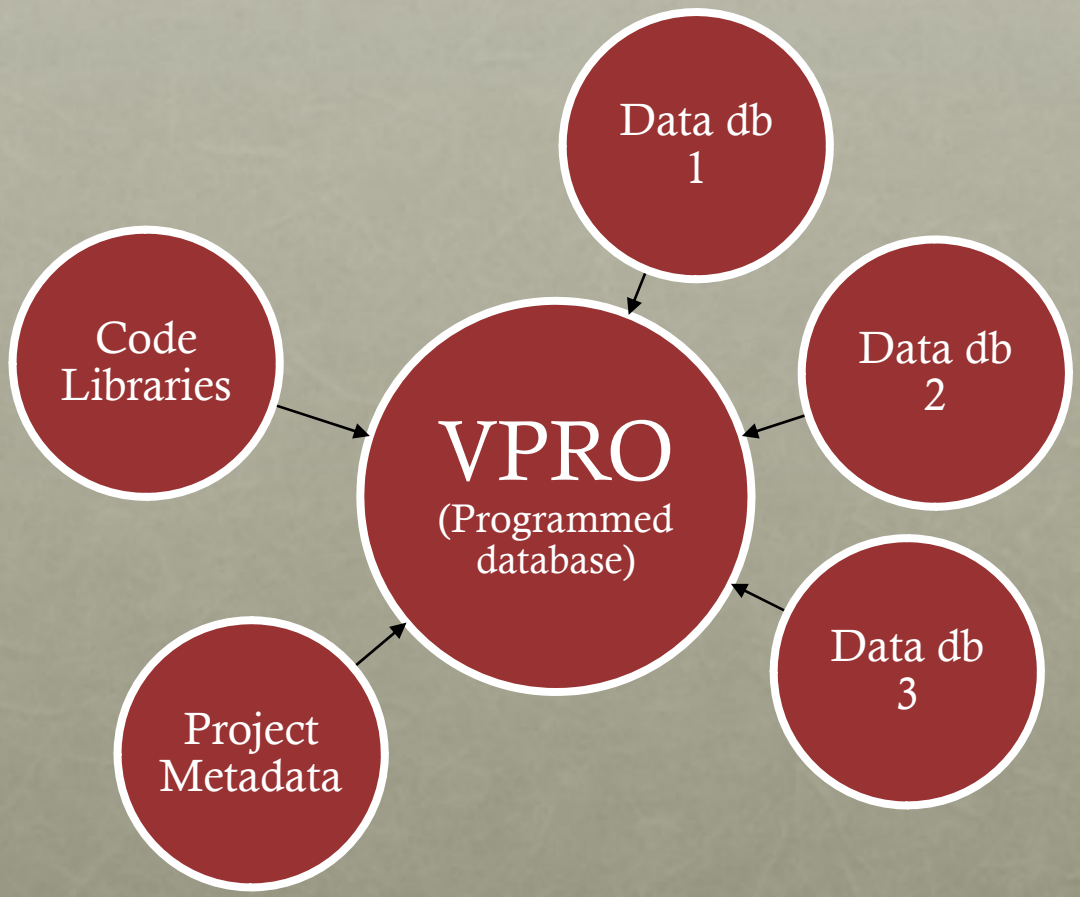
VPRO HISTORY

- British Columbian Biogeoclimatic Ecosystem Classification (BEC) developed to deal with high levels of bioclimatic and site diversity
- Based on Braun-Blanquet methods
- European phytosociologists - Vladimir Krajina at UBC
- BEC system adopted by provincial government for guiding forestry, conservation and resource management - late 1970s
- 1970s and 80s data managed through UBC mainframe program(VTAB) - failing by 1990s
- Development of new data management system based on relational databases architecture :VPRO (1994-).

VPRO (MACKENZIE AND KLASSEN)

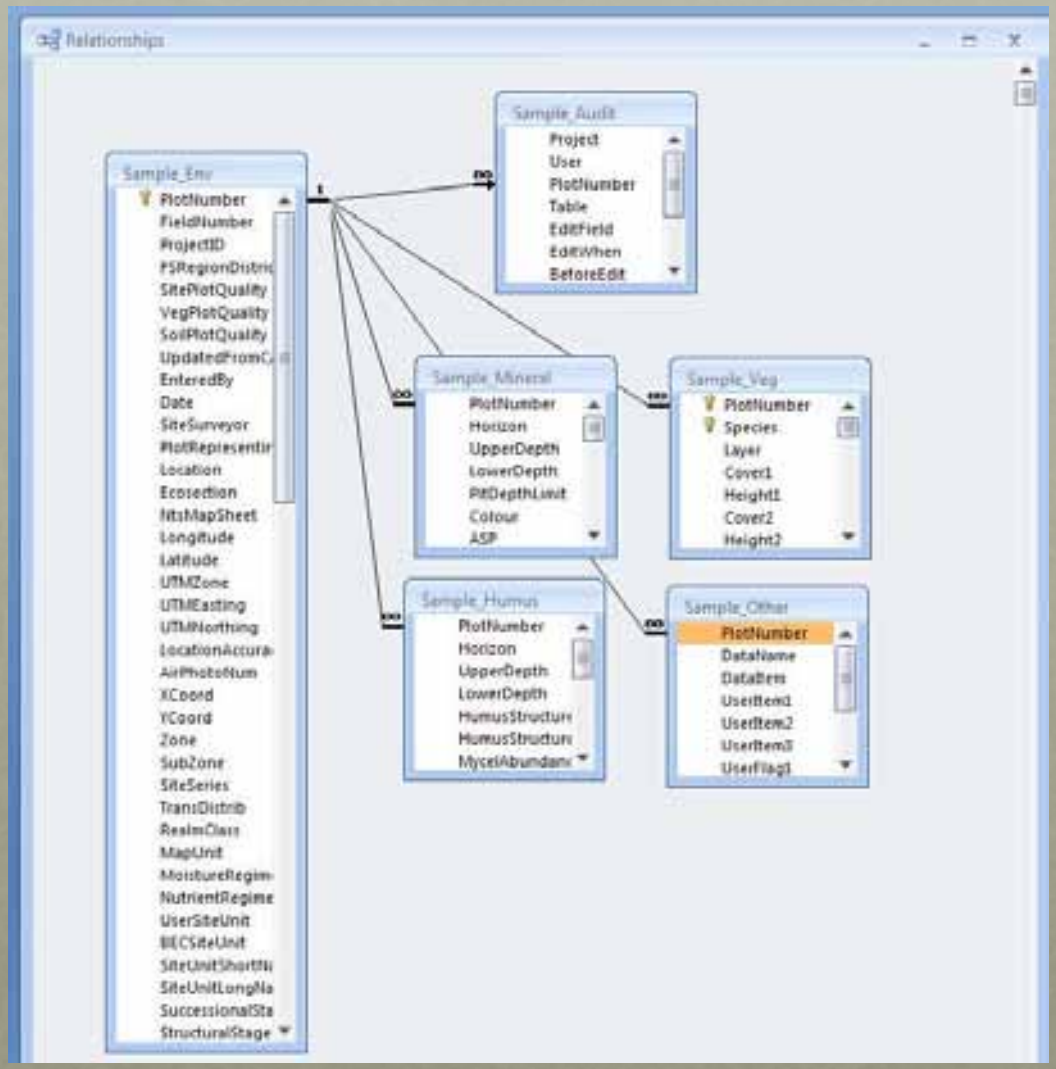
- Programmed Microsoft ACCESS database
- Data stored in relational tables
  - Site-Environment
  - Vegetation
  - Soils/humus horizon and mensuration tables
- Linked taxonomic, environment code libraries and metadata
- Manages hierarchical classification structures
- Reports generated in Excel
- Exports data to various data forms
- Some analysis tools

EXTERNAL DATA LINKED TO VPRO

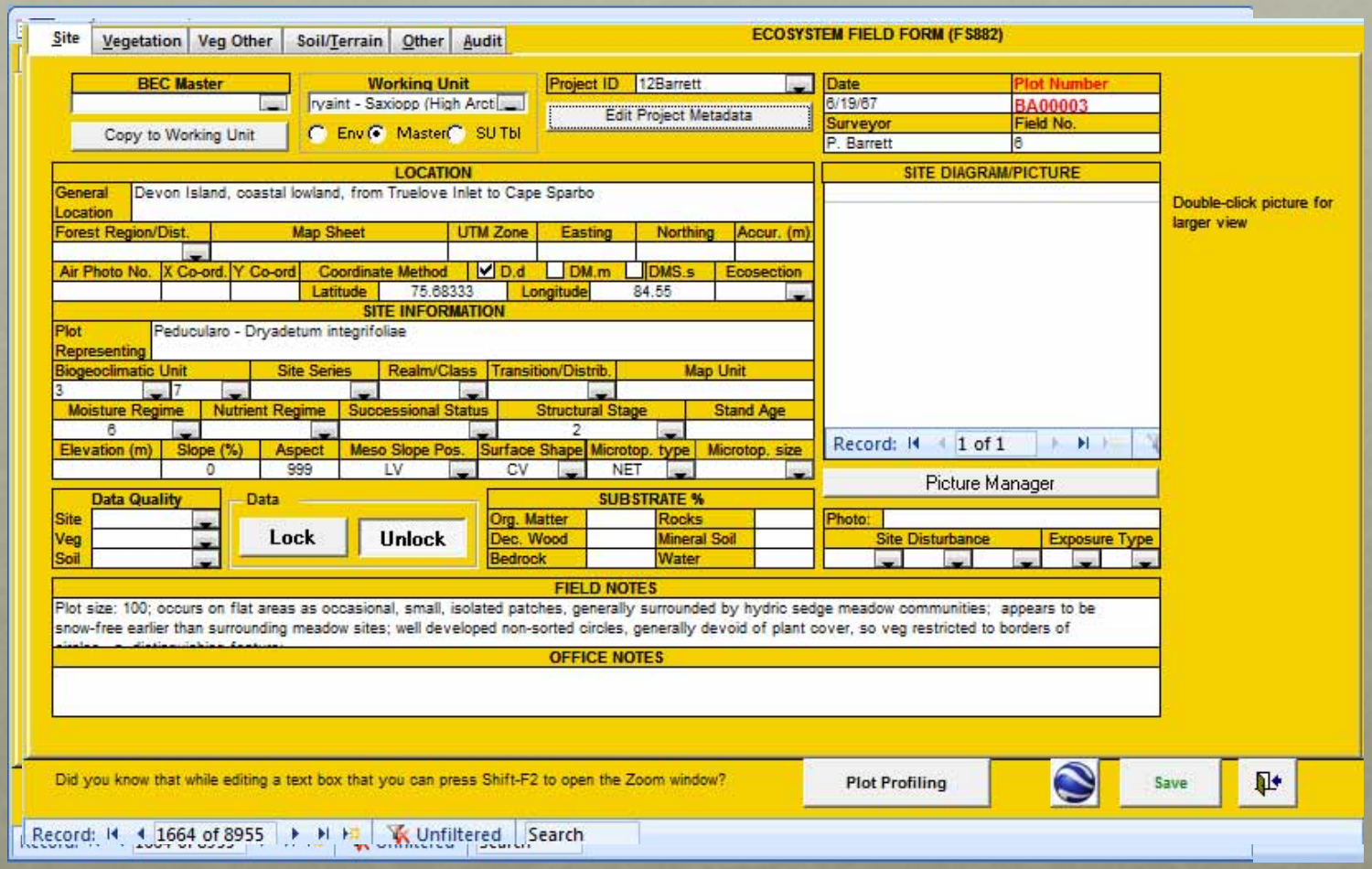


RELATIONAL TABLES

- Data managed in related table sets called PROJECTS
- Changes in relational databases ‘cascade’ through related tables

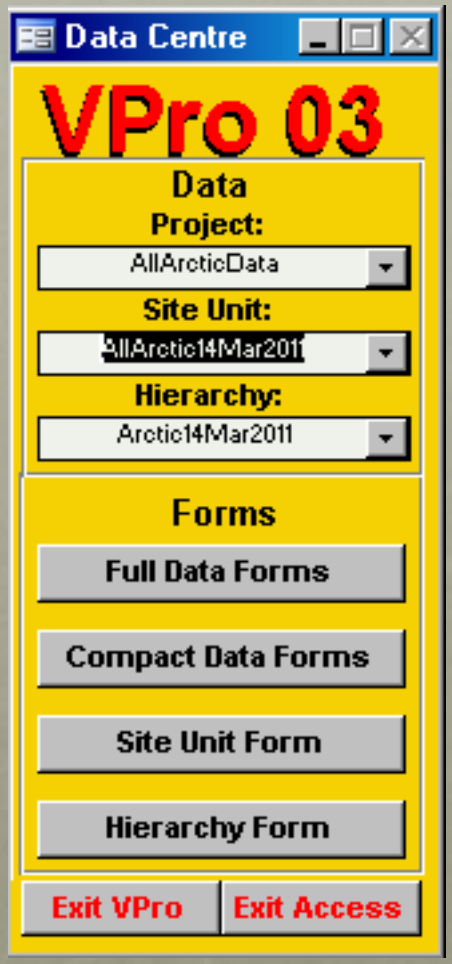


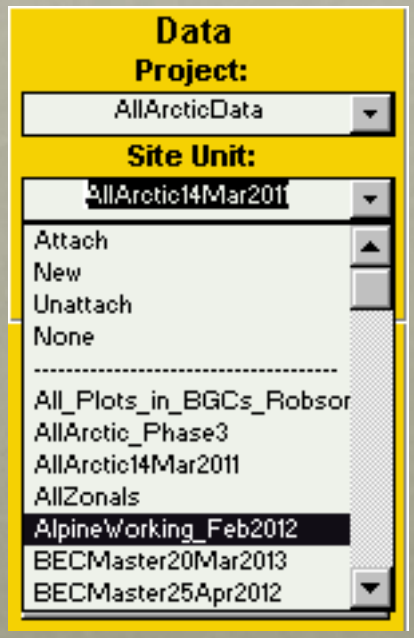
DATA FORMS


Site
Vegetation
Veg Other
Soil/Terrain
Other
Audit
ECOSYSTEM FIELD FORM (FS882)
BEC Master
Working Unit
ryaint - Saxiopp (High Arct
Copy to Working Unit
Env
Master
SU Tbl
Project ID
12Barrett
Edit Project Metadata
Date
6/19/67
Plot Number
BA00003
Surveyor
P. Barrett
Field No.
6
LOCATION
General Location
Devon Island, coastal lowland, from Truelove Inlet to Cape Sparbo
Forest Region/Dist.
Map Sheet
UTM Zone
Easting
Northing
Accur. (m)
Air Photo No.
X Co-ord.
Y Co-ord
Coordinate Method
D.d
DM.m
DMS.s
Ecosection
Latitude
75.68333
Longitude
84.55
SITE INFORMATION
Plot Representing
Peducularo - Dryadetum integrifoliae
Biogeoclimatic Unit
Site Series
Realm/Class
Transition/Distrib.
Map Unit
3
7
Moisture Regime
Nutrient Regime
Successional Status
Structural Stage
Stand Age
6
2
Elevation (m)
Slope (%)
Aspect
Meso Slope Pos.
Surface Shape
Microtop. type
Microtop. size
0
999
LV
CV
NET
SITE DIAGRAM/PICTURE
Record: 1 of 1
Double-click picture for larger view
Picture Manager
Data Quality
Site
Veg
Soil
Data
Lock
Unlock
SUBSTRATE %
Org. Matter
Rocks
Dec. Wood
Mineral Soil
Bedrock
Water
Photo:
Site Disturbance
Exposure Type
FIELD NOTES
Plot size: 100; occurs on flat areas as occasional, small, isolated patches, generally surrounded by hydric sedge meadow communities; appears to be snow-free earlier than surrounding meadow sites; well developed non-sorted circles, generally devoid of plant cover, so veg restricted to borders of
OFFICE NOTES
Did you know that while editing a text box that you can press Shift-F2 to open the Zoom window?
Plot Profiling
Save
Record: 1664 of 8955
Unfiltered
Search

OTHER RELATED TABLES

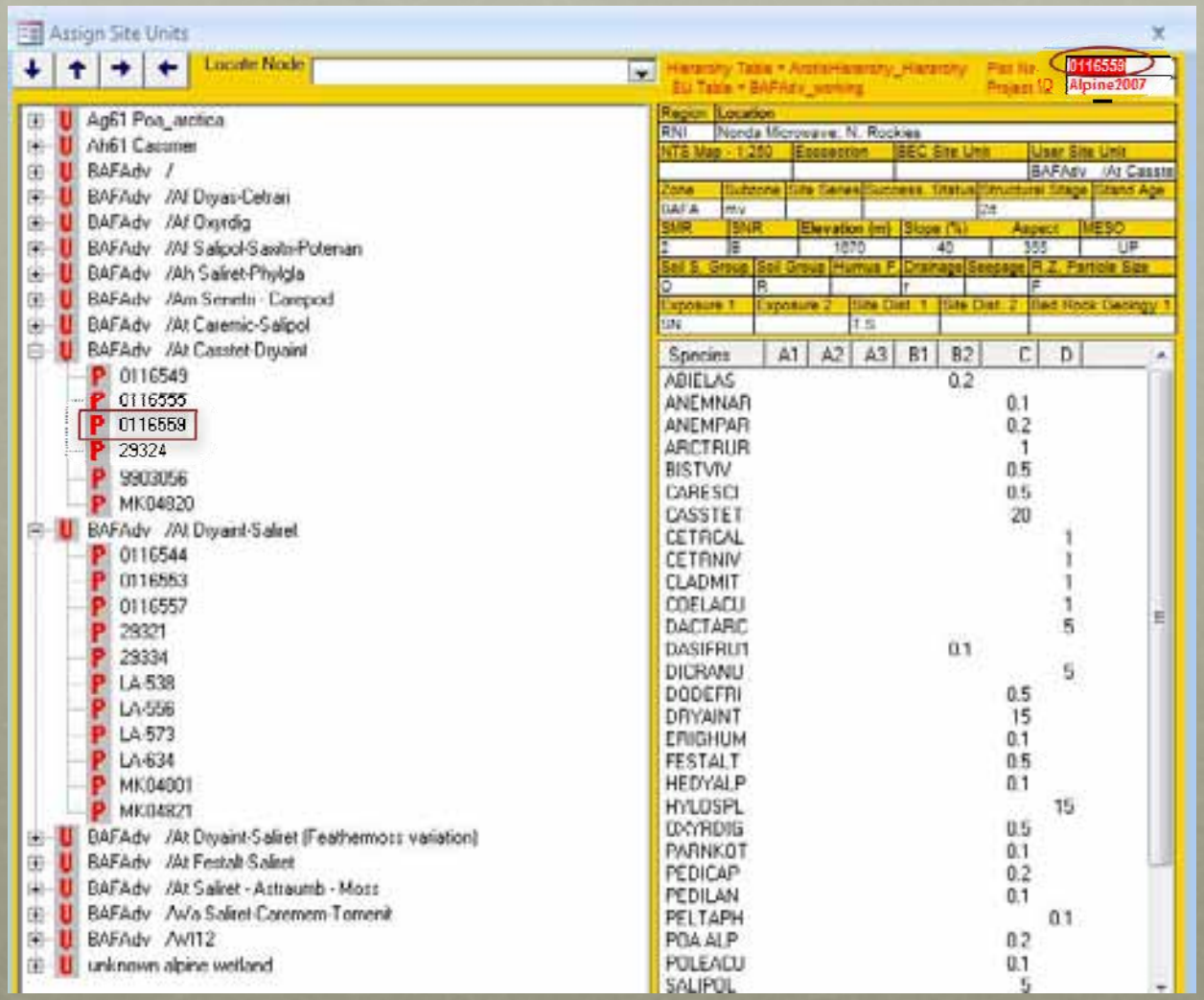
- Site Unit (SU) table
  - dynamic subsets of project data
  - First order classification
- Hierarchy Tables
  - Multi-level, parent-child relationships between SUs





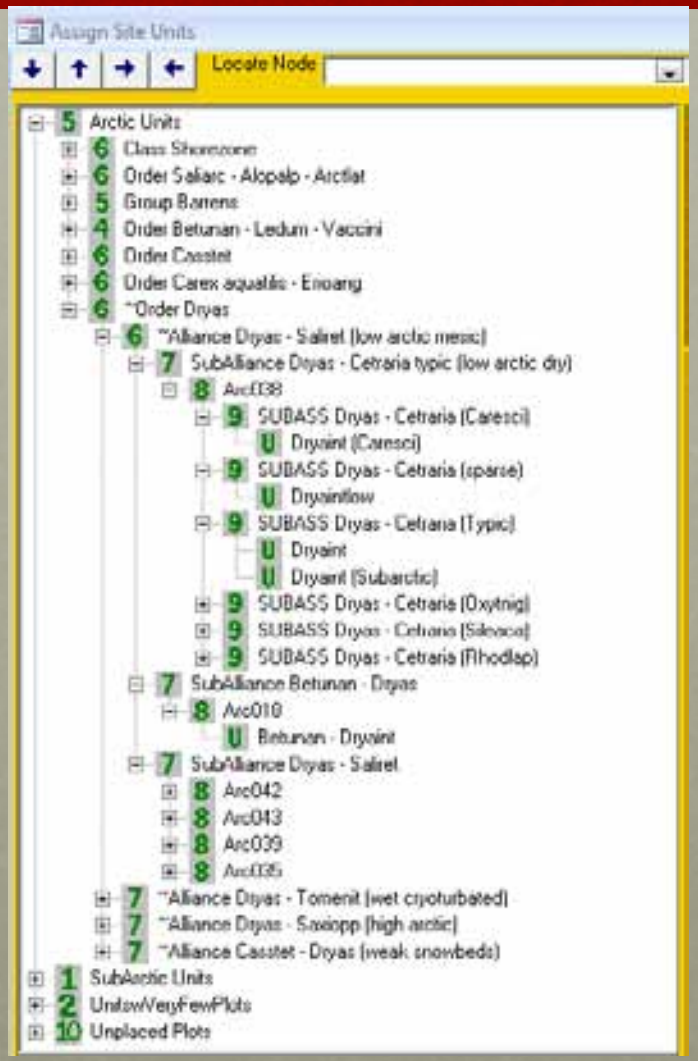
SINGLE LEVEL CLASSIFICATION

- Simple 2-column table
- Use tree control for display
- Linked to plot data



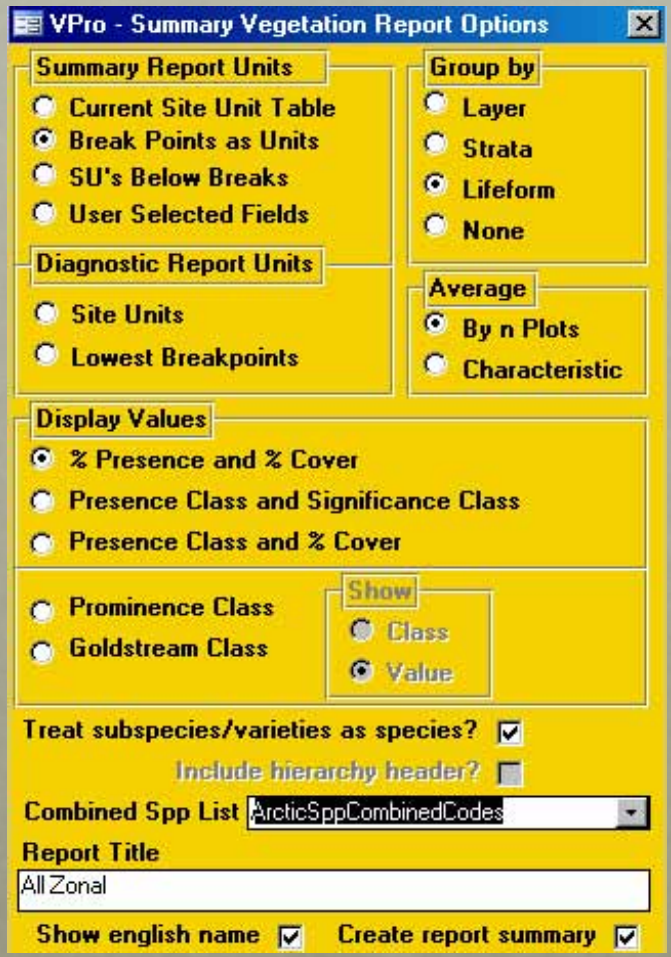
HIERARCHICAL CLASSIFICATION

- Base units are organized into hierarchical structures
- Reports and exports can be based on the hierarchy (~)

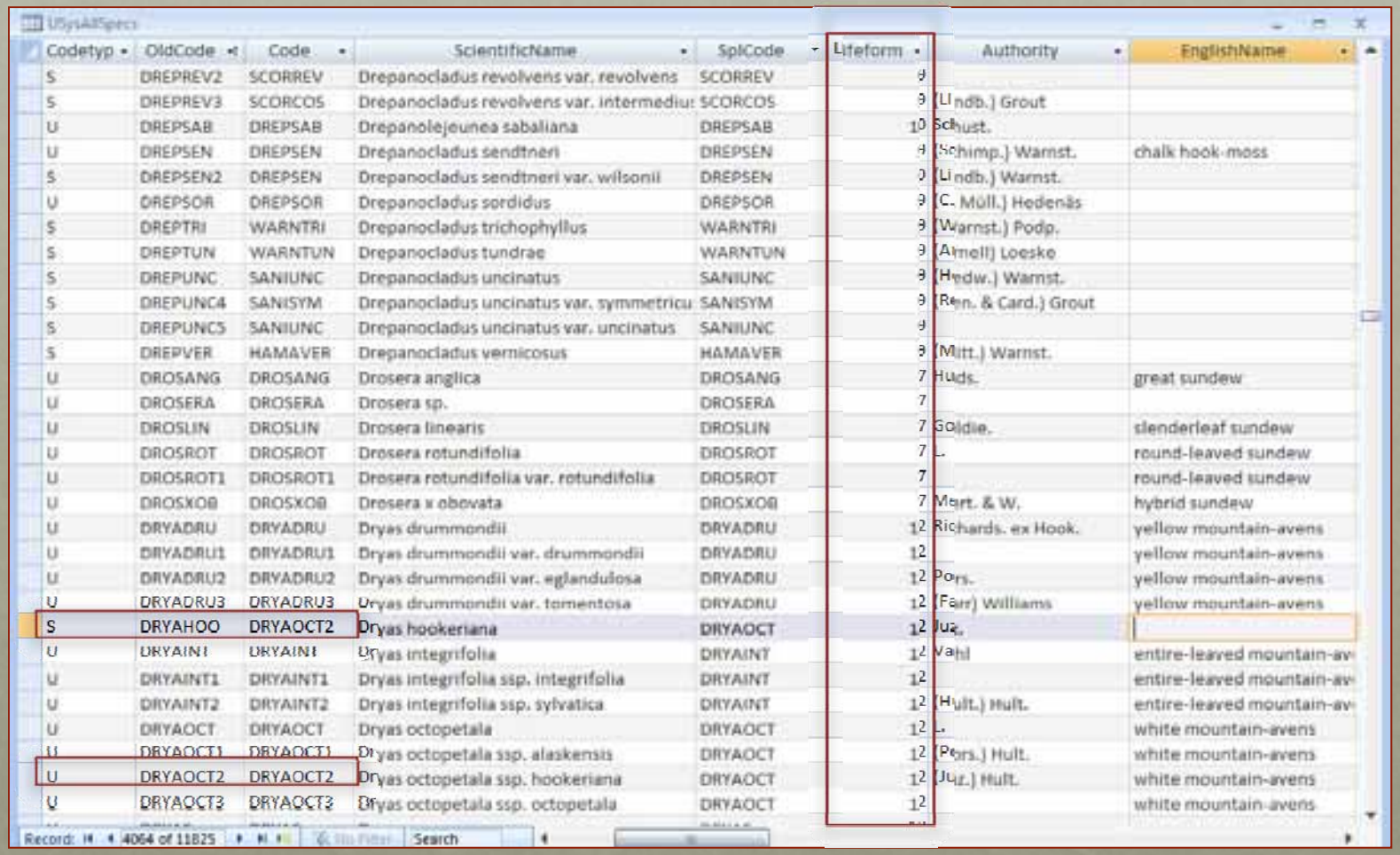


VEGETATION REPORT OPTIONS

- Plot reports (grouped by..) for (Site, Vegetation or both)
- Summary vegetation reports grouped by:
  - Field attributes
  - Lowest Unit
  - Any higher level hierarchical unit
  - Diagnostic report (B-B)
- Options on summary values, strata, combine species, etc



SPECIES LIBRARY



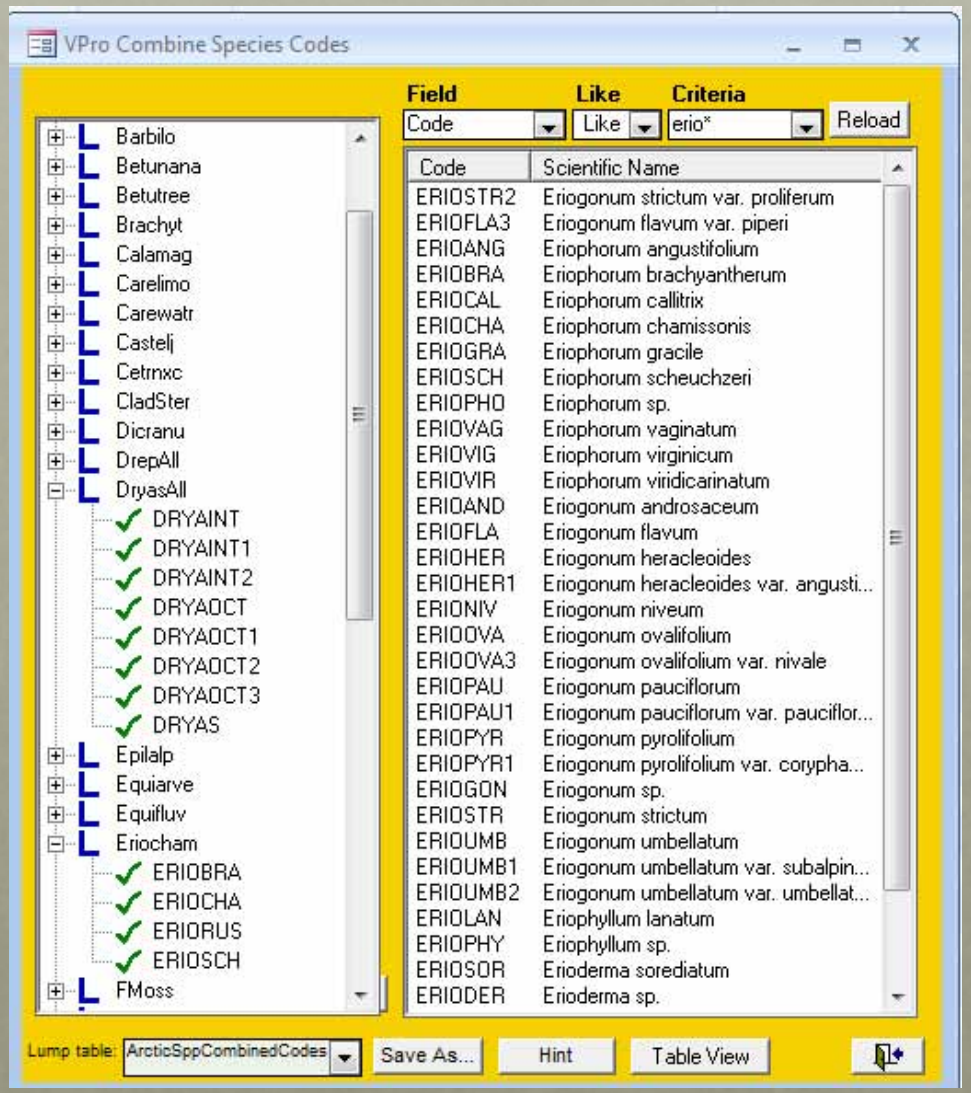
USysAllSpecs

Codetyp	OldCode	Code	ScientificName	SplCode	Lifeform	Authority	EnglishName
S	DREPREV2	SCORREV	Drepanocladus revolvens var. revolvens	SCORREV	9		
S	DREPREV3	SCORCOS	Drepanocladus revolvens var. intermediu	SCORCOS	9	(Lindb.) Grout	
U	DREPSAB	DREPSAB	Drepanolejeunea sabaliana	DREPSAB	10	Schust.	
U	DREPSEN	DREPSEN	Drepanocladus sendtneri	DREPSEN	9	(Schimp.) Warnst.	chalk hook-moss
S	DREPSEN2	DREPSEN	Drepanocladus sendtneri var. wilsonii	DREPSEN	9	(Lindb.) Warnst.	
U	DREPSOR	DREPSOR	Drepanocladus sordidus	DREPSOR	9	(C. Müll.) Hedenäs	
S	DREPTRI	WARNTRI	Drepanocladus trichophyllus	WARNTRI	9	(Warnst.) Podp.	
S	DREPTUN	WARNTUN	Drepanocladus tundrae	WARNTUN	9	(Arnell) Loeske	
S	DREPUNC	SANIUNC	Drepanocladus uncinatus	SANIUNC	9	(Hedw.) Warnst.	
S	DREPUNC4	SANISYM	Drepanocladus uncinatus var. symmetricu	SANISYM	9	(Ren. & Card.) Grout	
S	DREPUNC5	SANIUNC	Drepanocladus uncinatus var. uncinatus	SANIUNC	9		
S	DREPVER	HAMAVER	Drepanocladus vernicosus	HAMAVER	9	(Mitt.) Warnst.	
U	DROSANG	DROSANG	Drosera anglica	DROSANG	7	Huds.	great sundew
U	DROSERA	DROSERA	Drosera sp.	DROSERA	7		
U	DROSLIN	DROSLIN	Drosera linearis	DROSLIN	7	Goldie.	slenderleaf sundew
U	DROSROT	DROSROT	Drosera rotundifolia	DROSROT	7	L.	round-leaved sundew
U	DROSROT1	DROSROT1	Drosera rotundifolia var. rotundifolia	DROSROT	7		round-leaved sundew
U	DROSXOB	DROSXOB	Drosera x obovata	DROSXOB	7	Mert. & W.	hybrid sundew
U	DRYADRU	DRYADRU	Dryas drummondii	DRYADRU	12	Richards. ex Hook.	yellow mountain-avens
U	DRYADRU1	DRYADRU1	Dryas drummondii var. drummondii	DRYADRU	12		yellow mountain-avens
U	DRYADRU2	DRYADRU2	Dryas drummondii var. eglandulosa	DRYADRU	12	Pors.	yellow mountain-avens
U	DRYADRU3	DRYADRU3	Dryas drummondii var. tomentosa	DRYADRU	12	(Farr) Williams	yellow mountain-avens
S	DRYAHOO	DRYAOCT2	Dryas hookeriana	DRYAOCT	12	Juz.	
U	DRYAINT	DRYAINT	Dryas integrifolia	DRYAINT	12	Vahl	entire-leaved mountain-av
U	DRYAINT1	DRYAINT1	Dryas integrifolia ssp. integrifolia	DRYAINT	12		entire-leaved mountain-av
U	DRYAINT2	DRYAINT2	Dryas integrifolia ssp. sylvatica	DRYAINT	12	(Hult.) Hult.	entire-leaved mountain-av
U	DRYAOCT	DRYAOCT	Dryas octopetala	DRYAOCT	12	L.	white mountain-avens
U	DRYAOCT1	DRYAOCT1	Dryas octopetala ssp. alaskensis	DRYAOCT	12	(Pors.) Hult.	white mountain-avens
U	DRYAOCT2	DRYAOCT2	Dryas octopetala ssp. hookeriana	DRYAOCT	12	(Juz.) Hult.	white mountain-avens
U	DRYAOCT3	DRYAOCT3	Dryas octopetala ssp. octopetala	DRYAOCT	12		white mountain-avens

Record: 4064 of 11825 | No Filter | Search

COMBINE SPECIES

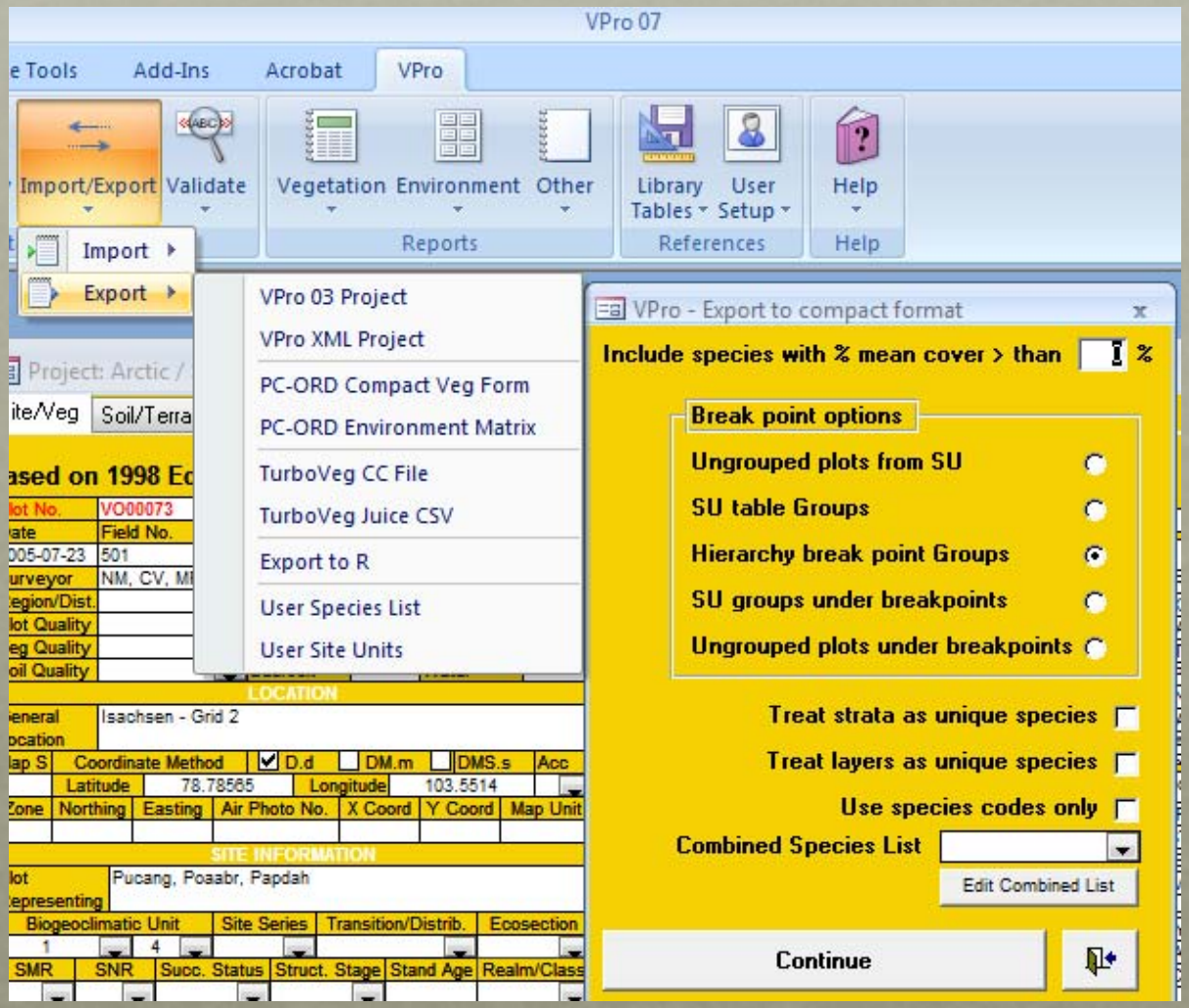
- Simple 2-column table
- Displayed in Tree control
- Codes selected from Species Library



POST PROCESSING IN EXCEL

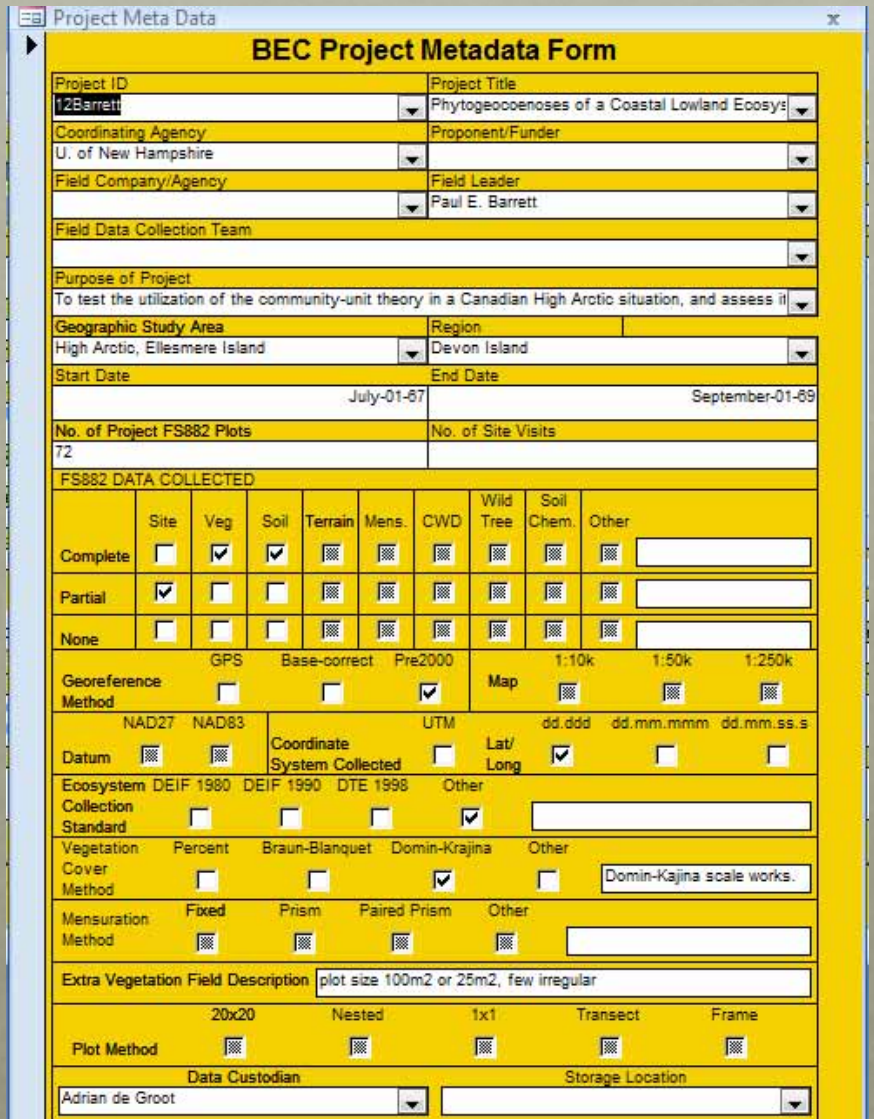
1	**Dryas Alliances**							
2	Vegetation Table							
3	Vegetation was lumped using CombinedSpp_Lump table							
4			n Plots	136	321	192	38	
5	LifeForm	Spp	Order	Casstet - Dryas (weak snowbeds)	Alliance Dryas - Saliret (low arctic mesic)	Alliance Dryas - Saxiopp (high arctic)	Alliance Dryas - Tomenit (wet cryoturbated)	Common Name
6	12	Cassiope tetragona	1.0	■■■■■			■■	four-angled mountain-heather
7	12	Salix reticulata	1.0	■■■	■■■		■■■	net-veined willow
8	11	Cetrnxc	0.9	■■■	■■		■■	
9	12	DryasAll	1.0	■■■■■	■■■■■	■■■■	■■■■	
10	12	Salix arctica	1.0	■■	***	■■■	■■■	arctic willow
11	07	Saxifraga oppositifolia	0.8	**		■■■		purple mountain saxifrage
12	06	Carex bigelowii	1.0				■■■■	Bigelow's sedge
13	09	FMoss	0.9				■■■■	
14	09	Tomentypnum nitens	1.0				■■■■	golden fuzzy fen moss
15	06	Eriophorum angustifolium	0.9				■■■	narrow-leaved cotton-grass
16	05	Equiarve	0.7				■■	

EXPORTING DATA



PROJECT METADATA

- Field project metadata characterized in Vpro tables.



Project Meta Data

BEC Project Metadata Form

Project ID: 12Barrett	Project Title: Phytogeocoenoses of a Coastal Lowland Ecosys
Coordinating Agency: U. of New Hampshire	Proponent/Funder:
Field Company/Agency:	Field Leader: Paul E. Barrett
Field Data Collection Team:	
Purpose of Project: To test the utilization of the community-unit theory in a Canadian High Arctic situation, and assess it	
Geographic Study Area: High Arctic, Ellesmere Island	Region: Devon Island
Start Date: July-01-67	End Date: September-01-69
No. of Project FS882 Plots: 72	No. of Site Visits:

FS882 DATA COLLECTED

	Site	Veg	Soil	Terrain	Mens.	CWD	Wild Tree	Soil Chem.	Other
Complete	☐	☑	☑	▩	▩	▩	▩	▩	▩
Partial	☑	☐	☐	▩	▩	▩	▩	▩	▩
None	☐	☐	☐	▩	▩	▩	▩	▩	▩

Georeference Method	GPS ☐	Base-correct ☐	Pre2000 ☑	Map	1:10k ▩	1:50k ▩	1:250k ▩
Datum	NAD27 ▩	NAD83 ▩		Coordinate System Collected	UTM ☐	Lat/Long	dd.ddd ☑	dd.mm.mmm ☐	dd.mm.ss.s ☐
Ecosystem Collection Standard	DEIF 1980 ☐	DEIF 1990 ☐	DTE 1998 ☐	Other ☑					
Vegetation Cover Method	Percent ☐	Braun-Blanquet ☐	Domin-Krajina ☑	Other ☐	Domin-Kajina scale works.				
Mensuration Method	Fixed ▩	Prism ▩	Paired Prism ▩	Other ▩					

Extra Vegetation Field Description: plot size 100m2 or 25m2, few irregular

Plot Method	20x20 ▩	Nested ▩	1x1 ▩	Transect ▩	Frame ▩

Data Custodian: Adrian de Groot	Storage Location:

DATA COMPILATIONS IN VPRO

- British Columbia Wetlands (1994 – 1998) [8000 plots]
- Biogeoclimatic ecosystem classification BEC (1999 - ongoing) [55,000]
- Canadian National Vegetation Classification CNVC (2003 - ongoing) [additional 50,000]
- International Correlation w/US (incomplete)
  - Coastal (50,000?)
  - S.Interior (2007) [30,000]
- Canadian Arctic and SubArctic (2009 - 2011) [15,000]

Lessons Learned from Data Compilations #1

- Actual database used is not important but unequal data field characteristics is a problem
- The more consistent/standardized the datasets are, the easier to compile.
- Unique plot number as key field leads to less problems with plot duplication
- Table data is less likely to lose meaning overtime when it is interpretable without reference to data codes

LESSONS LEARNED #2

- Environmental attributes:
  - Good georeferencing is very important for most purposes
  - Quantitative variables are not a problem
  - Categorical data based more challenging in some cases
- Vegetation
  - Taxonomy options: Convert or combine codes using synonym list
  - The list of taxonomic challenges for classification species is short
  - Data collected in strata/layers defined differently
  - Categorical conversion to Percentile data

LESSONS LEARNED #3

- Project Metadata essential
- Working with ‘dynasets’ of a single Master database very useful model
- Some additional fields very useful for exploring /filtering the data
  - E.g. Data quality, administrative area, bioclimatic area, species lifeform

VPRO POSITIVES/NEGATIVES

+ Active fully integrated data sets (not an archive)
+ Management and use of hierarchical classifications
+ Wide array of reporting/exporting functions and options desirable for BB-style classifications
+ Commercial relational database functionality
– Tied to commercial software (Bill Gates)
– Single dataset limited to 2Gb (about 250k records though multiple sets can be linked)

END