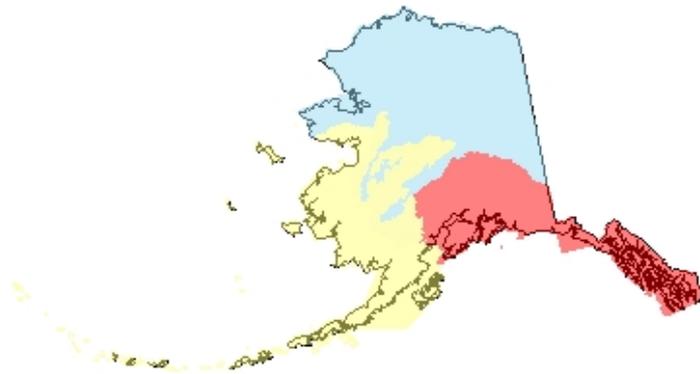


ESD Process and Automated ESD for Initial Soil Survey in Alaska

Mark Clark Alaska Region MO-17



Rick Strait
Michelle Schuman
Darrell Kautz

ESDs ...The Alaska Challenge

- Only 20% of Alaska SSURGO Survey
- All of the current projects are initial
- Natural systems with little existing information
- Collect and manage a large volume of point data
- Staggering number of ESDs to develop
- New and small staff with two disciplines
- 85% of the State is remote

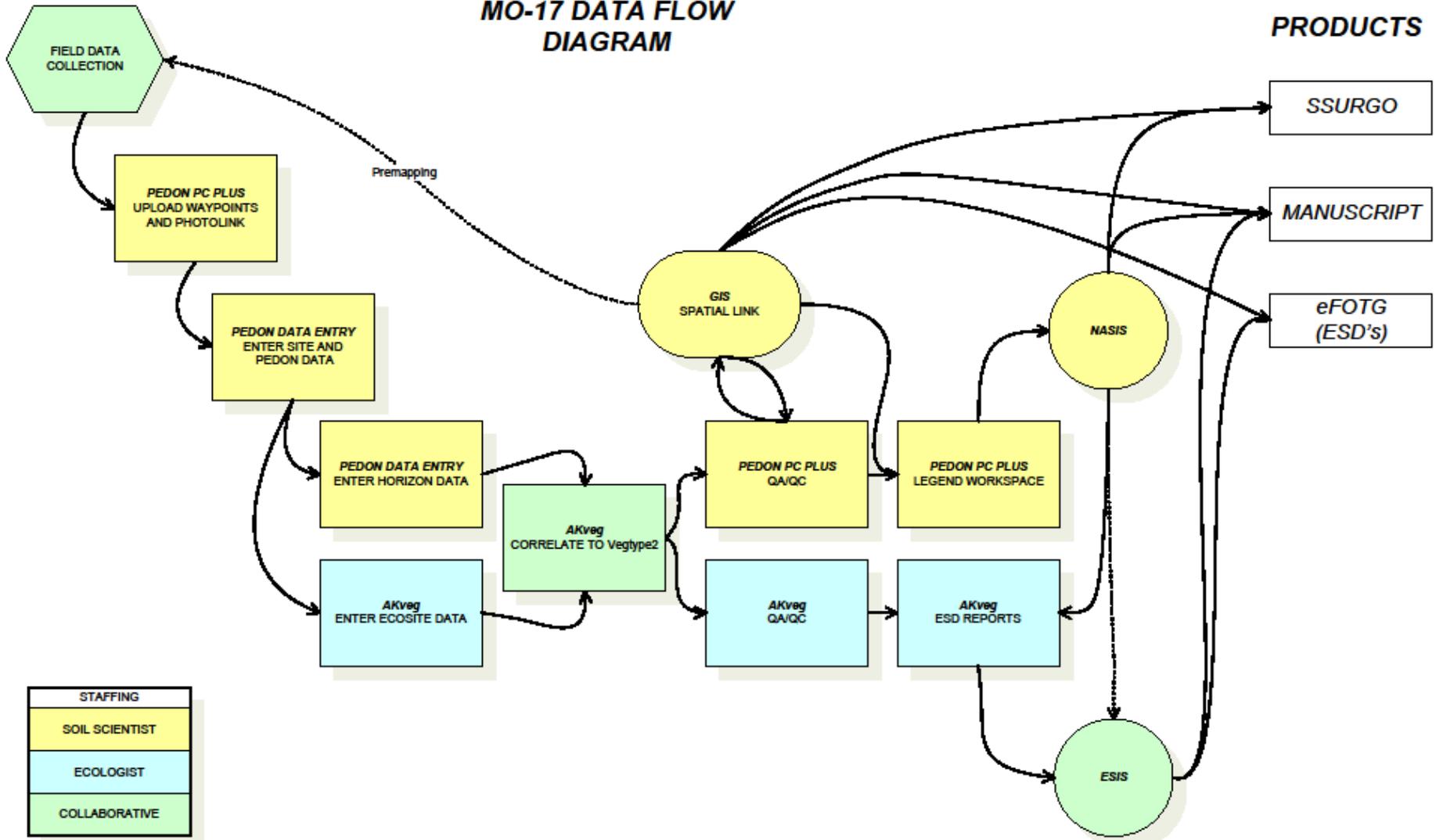
ESI Strategy MO-17

- Develop Component/Ecological Site landscape keys by MLRA for all projects (deliverable)
- Staff two person field crews consisting of a Soil Scientist and Biotech or Ecologist
- Collect complete documentation at all field stops
- Provide tech note support for every aspect of the process with standard terminology
- Design an automated method to report ESDs until a national report is developed that can handle and synthesize point data

Ecological Site Inventory Process

**MO-17 DATA FLOW
DIAGRAM**

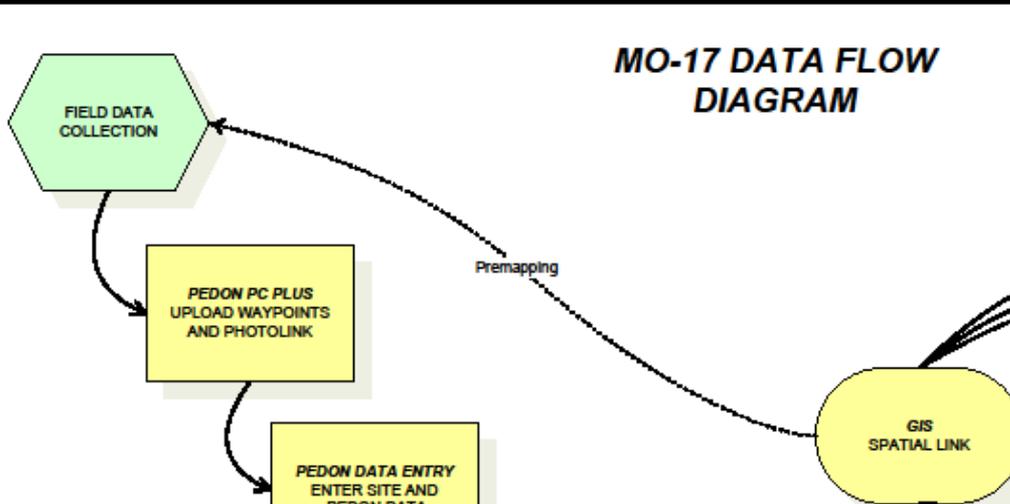
PRODUCTS



STAFFING
SOIL SCIENTIST
ECOLOGIST
COLLABORATIVE

Ecological Site Inventory Process

DATA PHASE



STAFFING
SOIL SCIENTIST
ECOLOGIST
COLLABORATIVE

- Pre-mapping
 - Initial Component/Ecosite Key Development
- Testing of the key through field documentation
 - Soil/Ecologist Team-Collaborative Effort
 - Establish standard landscape description terminology
- Point data collection
 - Soils-Pedon_PC_Plus
 - Plant community information-AK SITE
- Complete documentation at each field stop

MLRA-231 Soil Component/Ecological Site Key

Common Ground Between Soil Scientist and ESIS

MLRA 231

1. Upland

A. Alpine

I. Limestone lithology

i. All slopes (all positions)

D31-Alpine scrub gravelly limestone cryoturbated slopes

R231XY105AK Alpine dwarf scrub- lichen mosaic gravelly slopes, basic

Soil Component

Ecosite

II. Summits/Shoulders (low slopes, <10%)

i. Micro-features

a. Active sorted circles

D31-Alpine scrub gravelly gneiss residual slopes

R231XY134AK Alpine dwarf scrub- lichen mosaic gravelly, circles

b. Earth Hummock, gravelly

D31-Alpine scrub gravelly granite residual slopes

R231XY101AK Alpine dwarf scrub- lichen mosaic gravelly hummock

c. Polygon

D31-Alpine tussock-scrub organic cryoturbated slopes

R231XY115AK Alpine lichen loamy polygon

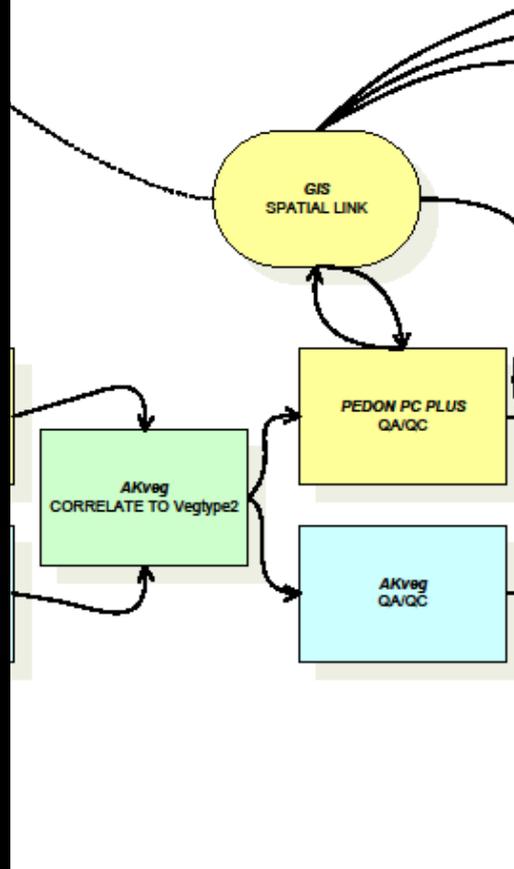
III. Backslopes (steeper slopes, >20%)

i. Micro-features

a. Solifluction Lobes, nonfrozen

D31-Alpine low scrub loamy colluvial slopes

MO-17 DATA FLOW DIAGRAM



FORMAL CORRELATION PHASE

- Component/Ecosite Key and databases
 - Correlation tools-Point Data
 - AKSITE correlation tools
 - Spatial tools PEDON_PC & ArcMap
- Goal
 - Revision of the Key
 - Clean databases

MO-17 DATA FLOW DIAGRAM

Ecological Site Queries

ECOLOGICAL SITE QUERIES

Select parameters for your query using the drop-down lists. Any combination of selections is allowed. "(All)" is a wildcard. Be careful not to restrict your parameters beyond the limits of the data you have entered. For example, if you select an Ecosite and a Soil and the Soil has not previously been assigned to the Ecosite you selected, your query will not have any results.

After you've selected your query parameters, use the buttons below to run your queries. Remember, A query with no results means that you need to review your parameters, review your data, or both.

ECOSITE: (All) VEGTYPE 1: (All) ROSGEN: (All)
ECOSTAT: (All) SOIL: (All) NWI: (All)

Vegetation

Structure and Cover - Short Form Species Cover Production by Stratum Tree Measurements
Structure and Cover - Long Form Stratum Cover Production by Species Tree Basal Area
Fire History Species Richness Notable Plants Non-native Plants Wetland Plants Use

Soils

Geomorphology with Vegetation Geomorphology with Cover
Water Features Soil Texture and Parent Material
Rosgen and NWI

Ecological Site Charts Create Point Table for GIS References Quality Assurance/Quality Control

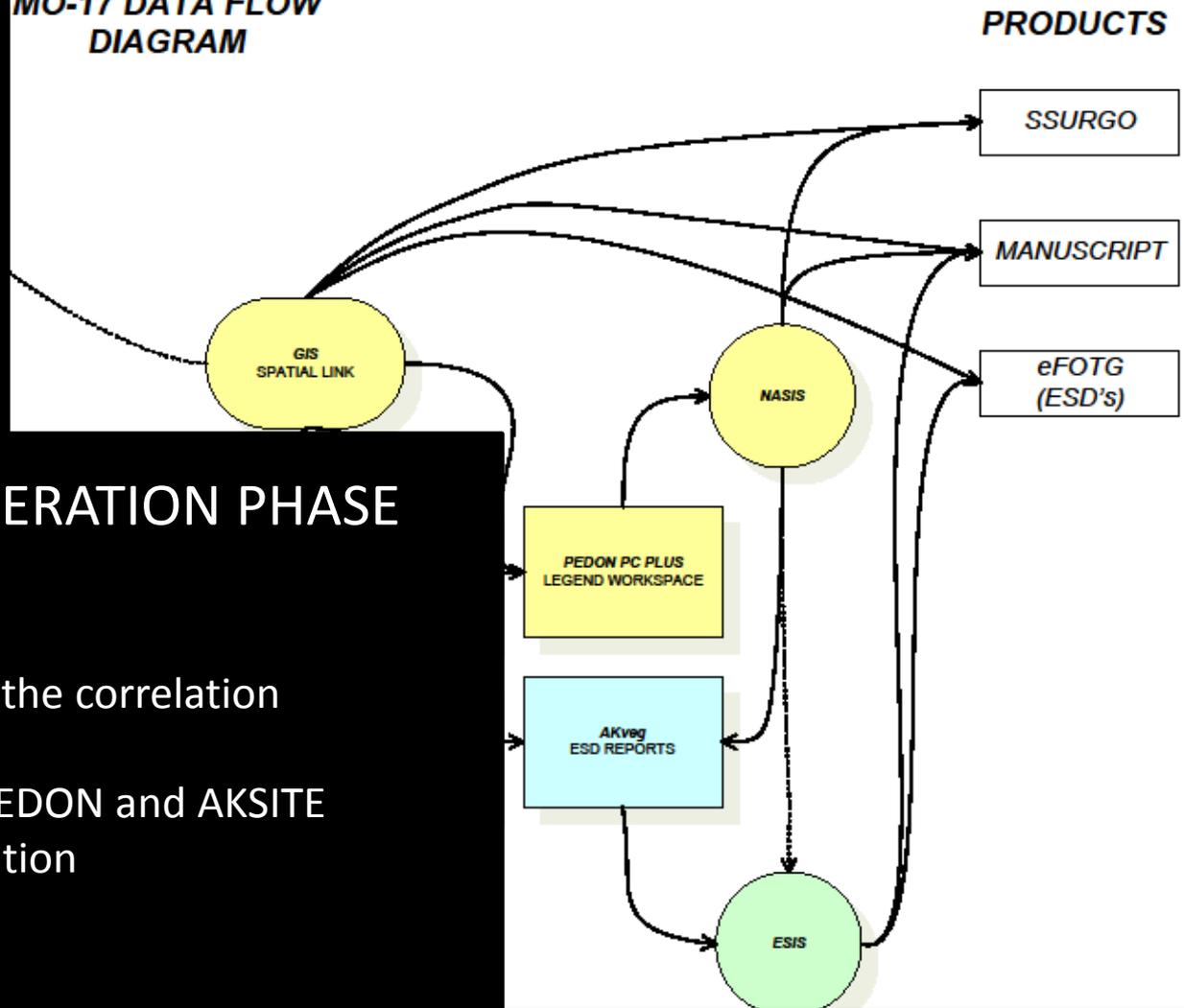
Review Reports

➤ Clean databases

ases

rcMap

**MO-17 DATA FLOW
DIAGRAM**



QA AND REPORT GENERATION PHASE

- Goal
 - Final Key serve as the correlation document (QA)
 - NASIS sync with PEDON and AKSITE
 - ESD report generation

Automated ESD

- Web based application developed by Virginia Tech (CESU)
- Follows ESIS format plus dynamic soil properties extracted from PEDON
- Files and databases are loaded onto the VT ftp site
- Application assembles the files into the report
- Allows for periodic update based on additional data collection and modification to the documents

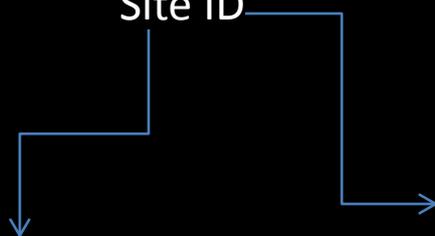
Automated ESD Components

- Pedon_PC_Plus database
 - Soil static and dynamic properties
- AKSITE database for community phase data
- Plant Community Phases (doc)
 - STMs
 - Community phase narrative and photos
- Interpretations (doc)
- Range Health (doc)

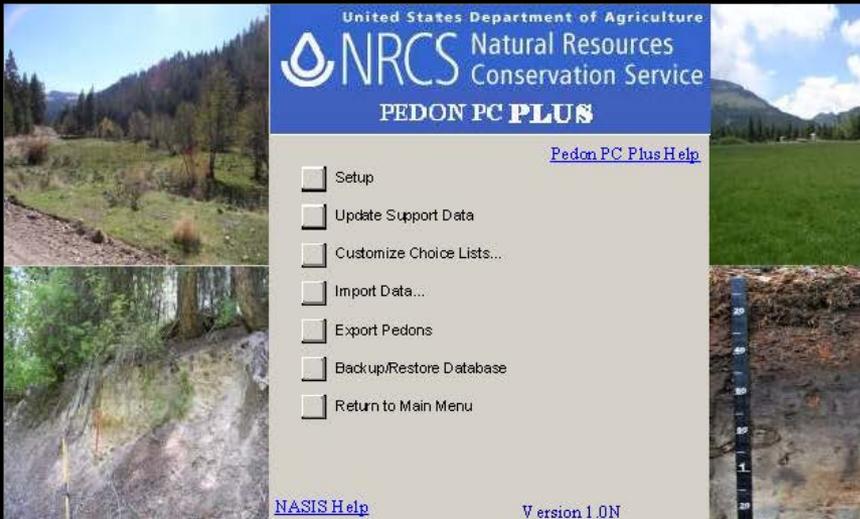
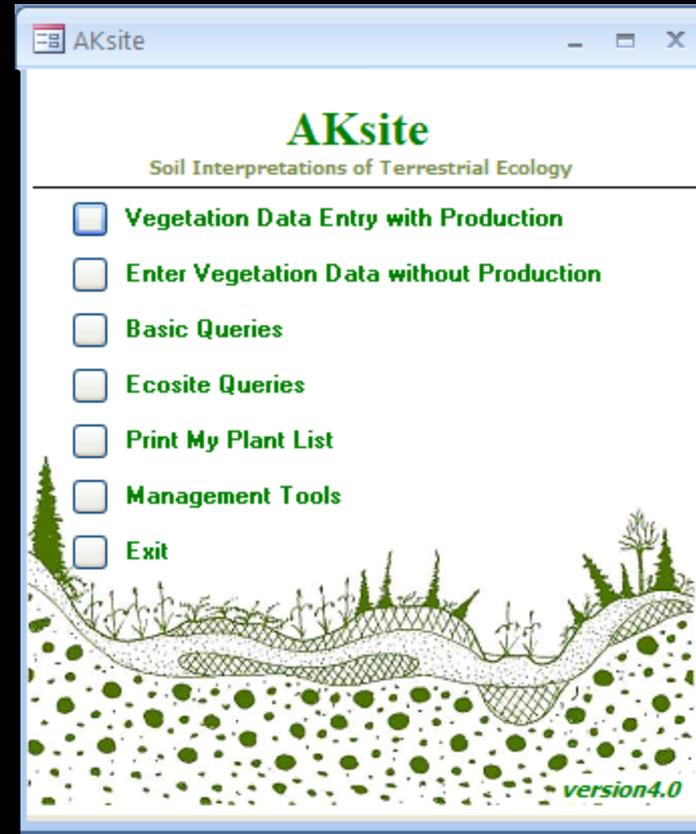
Database Derived Parts

Site Properties
Static and Dynamic
Soil Properties

Site ID



Ecological Site
Ecological State
Community Phase



Documents -STM

Plant Community Phases

Ecological Site Description ID:	F231XY110AK		
Ecological Dynamics of the Site:			
<p>This boreal ecological site occurred on steep south facing escarpment slopes (i.e. slopes averaged 65%). Soils had mixed lithology, were well-drained, and were considered more stable than ecological site R231XY109AK. While ecological site F231XY181AK was similar, F231XY110AK lacked a thick organic mat and abundant moss ground cover. Previously mentioned differences were attributed to the site occurring on a warmer and drier landscape position.</p> <p>Fire was a disturbance regime that resulted in 4 documented phases. Fire is a natural and typically unmanaged disturbance regime. The typical fire return interval for coniferous forests of interior Alaska is approximately 100 years.</p>			
State and Transition Diagram:			
<pre> graph TD 10["1.0 Reference State White spruce-russet buffaloberry-common juniper-kinnikinnick forest"] 11["1.1 Mixed white spruce/aspen-prickly rose-mixed grass-forest"] 12["1.2 Aspen-mixed shrub-mixed herbaceous-forest"] 14["1.4 Regenerating aspen-prickly rose-mixed ericaceous scrub-scrubland"] 10 -- 1.1a --> 11 11 -- 1.2b --> 12 12 -- 1.3b --> 14 14 -- 1.4a --> 12 14 -- 1.3a --> 10 11 -- 1.2a --> 14 </pre>			
State ID Number:	1	State Name:	Reference
State Narrative:	Phases within the reference state were grouped on the structure and dominance of deciduous and coniferous trees which was believed to directly relate to time		

Documents

- Community phase narrative
- Interpretations
- Range health

Photo 1.2			
Community Phase Number:	1.2	Community Phase Name:	Mixed white spruce/aspens-prickly rose-mixed grass-forest
Community Phase Narrative:			
<p>The dominant form of vegetation was a mixture of tall and medium sized trees. While <i>Populus tremuloides</i> and <i>Picea glauca</i> were the dominant tree species present (combined ~35% cover), <i>Betula neoalaskana</i> was also observed. Shrub cover (combined ~40% cover) primarily occurred in the low shrub stratum and the most common species was <i>Rosa acicularis</i>. Graminoids and forbs were abundant (combined ~30% cover). Common graminoids were <i>Calamagrostis canadensis</i> and <i>Calamagrostis purpurascens</i>. Forb diversity was high but no species had abundant cover. Feathermoss was commonly observed as a ground cover. This phase had 7 observations.</p>			
Community Pathways			
Pathway Number	Pathway Name & Description		
1.2a	High-intensity fire (see 1.1a above). For this phase, white spruce and aspen were codominate trees. The fire return interval was presumed to be shorter than community phase 1.1 but longer than community phase 1.3.		

Individual Files Stored on the Alaska NRCS Shared Drive Loaded onto the Virginia Tech ftp site

Address  S:\Service_Center\AK_NRCS\Ecological Site Description Reports\224 Cook Inlet Lowlands\Plant Community Phases\Ecosite ID

Folders	Name	Size	Type
<ul style="list-style-type: none">[-] Ecological Site Description Reports<ul style="list-style-type: none">[-] 220 Alexander Arch. Gulf Coast<ul style="list-style-type: none">[-] Interpretations<ul style="list-style-type: none">[-] Ecosite ID[-] Photos<ul style="list-style-type: none">[-] Ecosite ID[-] Plant Community Phases<ul style="list-style-type: none">[-] Ecosite ID[-] Range_EcoHealth Sheet<ul style="list-style-type: none">[-] Ecosite[+] 221 Kodiak Arch[+] 222 SouthAK Coastal Mtns[+] 223 Cook Inlet Mtns[-] 224 Cook Inlet Lowlands<ul style="list-style-type: none">[+] Interpretations[+] Photo[-] Plant Community Phases<ul style="list-style-type: none"> Ecosite ID[+] Range_EcoHealth Sheet[+] 225 Southern AK Peninsula Mtns[+] 226 Aleutian Is-West AK Penin[+] 227 Copper River Basin[+] 228 Interior Mtn[+] 229 Interior AK Lowlands[+] 230 Yukon-Kuskokwin Highlands[+] 231 Interior AK Highlands[+] 232 Yukon Flats Lowlands[+] 233 Upper Kobuk_Koyukuk Hills[+] 234 Interior Brooks Range Mtns[+] 235 Northern AK Penin Mtns[+] 236 Bristol Bay North AK Pen Mtns[+] 237 Ahklun Mtns	 R224XY200AK.docx	50 KB	Micro

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UNITED STATES DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE

ECOLOGICAL SITE DESCRIPTION

- Report Navigation
 - [Ecological Site Characteristics](#)
 - [Physiographic Features](#)
 - [Climatic Features](#)
 - [Plant Growth Curve](#)
 - [Representative Soil Features](#)
 - [Plant Communities](#)
 - [Supporting Information](#)

R228XY177AK

Ecological Site Characteristics

Ecological Classification Type Name: NRCS Rangeland Site
Ecological Classification Name: Loamy Frozen Slopes, High Elevation

Example: Dynamic Soil Properties section



Dynamic Soil Properties within Representative Rooting Depth

Community Phase: HCPC

Rooting Depth (cm): 22 - 41 - 70

Restrictive Features: None

Drainage Class: Excessively drained,

Water Table Duration: None

Water Table Depth: None

Surface Layer Thickness (cm): 2 - 15.6 - 21

Surface Layer Textural Modifiers:

Surface Layer Textures:

Permeability: rapid to rapid

AWC (cm/cm): 0.3 - 0.3 - 0.3

pH: 3 - 3.7 - 4

Effective CEC (me/100g): 30 - 30 - 30

CEC (me/100g): 60 - 60 - 60

Organic Matter (%): 80 - 80 - 80

Bulk Density:

Subsurface Layer Thickness (cm): 2 - 10.5 - 28

Subsurface Layer Textural Modifiers:

Subsurface Layer Textures:

Permeability: moderately slow to moderately rapid

AWC (cm/cm): 0.2 - 0.3 - 0.3

pH: 3 - 4.3 - 6

Effective CEC (me/100g): 2 - 7.9 - 35

CEC (me/100g): 5 - 19.6 - 80

Organic Matter (%): 1 - 9.3 - 70

Bulk Density: 0.8 - 1.21 - 1.65

Plant Communities

No Plant Community Phase document available

Community Phase: HCPC
 Influencing Water Features:
 Rosgen Classification:
 Structure and Cover:
 Ground Cover (%)

Example: Community Phase data

Lichens	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1"	Bare Soil	Surface Rock Fragments	Surface Bedrock	Surface Water
0 - 30	5 - 90	0 - 30	0 - 10	0 - 0	0 - 0	0 - 0	0 - 0

Percent Canopy Cover by Height Class and Type:

STRATUM CODE	Grasses/Grasslike	Forbs	Shrubs	Trees
FD (<4 inches)	-	0.1 - 3	-	-
FM (4-24 inches)	-	0.1 - 5	-	-
FT (>24 inches)	-	0.1 - 0.1	-	-
GM (4-24 inches)	0.1 - 7	-	-	-
GT(>24 inches)	0.1 - 5	-	-	-
SD (<8 inches)	-	-	0.1 - 5	-
SL (8-36 inches)	-	-	0.1 - 7	-
SM (3-10 feet)	-	-	0.1 - 2	-
TR (<15 feet)	-	-	-	0.1 - 0.1
TS (<15 feet)	-	-	-	0.1 - 0.1

Plant Species Canopy Cover (%), Constancy (%), and Occurrence Index

Stratum: FD (<4 inches)

Symbol	Scientific Name	% Cover	Constancy	Occurrence Index
PEFR5	Petasites frigidus	0.1 - 1.1 - 3	40	6.5
RUCH	Rubus chamaemorus	0.1 - 0.4 - 1	30	3.5
ACDE2	Aconitum delphinifolium	1 - 1 - 1	10	3.2
SOMU	Solidago multiradiata	1 - 1 - 1	10	3.2
POBIP	Polygonum bistorta var. plumosum	0.1 - 0.1 - 0.1	50	2.2
PELA	Pedicularis labradorica	0.1 - 0.1 - 0.1	40	2
COCA13	Cornus canadensis	0.1 - 0.1 - 0.1	30	1.7
GEROR	Geum rossii var. rossii	0.1 - 0.1 - 0.1	30	1.7
LYAN2	Lycopodium annotinum	0.1 - 0.1 - 0.1	30	1.7

Advantages:

- Add new data and update DSP, plant community data
- Relies on database not static data summaries
- Good for initial soil survey where comprehensive data is being collected

Disadvantages:

- Can't store ESDs in ESIS
- Not advantageous for updates where only summarized data is available