

# Botanical Program Progress: 2013 Studies

Technical Workgroup Meeting  
June 14, 2013

Prepared by: **ABR, Inc.**

Prepared for: **Alaska Energy  
Authority**



*Melilotus officinalis*  
(Photograph by Nanna Borchardt)

*Potamogeton robbinsii* (Photograph by  
C. B. Hellquist)

# Five Botanical Studies

## *Initiated in 2012:*

- Vegetation and Wildlife Habitat Mapping Study in the Upper and Middle Susitna Basin
- Wetland Mapping Study in the Upper and Middle Susitna Basin
- Riparian Vegetation Study Downstream of the Proposed Susitna-Watana Dam

## *Studies added in 2013:*

- Rare Plant Study
- Invasive Plant Study



# Wetland and Wildlife Habitat Studies: 2013 Activities

June

- Field season preparation:
- increase staffing
  - select transect locations
  - request necessary permits/permissions
  - request project logistic support
  - revise database interface
- Ongoing work:
- wetlands/vegetation mapping

July

- Field deployment, July 1-12:
- 8 scientists, teams of 2
  - goal: complete 40 transects
  - Only non-ANCSA lands will be accessed
- Ongoing work:
- data QA/QC
  - wetlands/vegetation mapping

August

- Field deployment, July 29-Aug 9:
- 8 scientists, teams of 2
  - goal: complete 40 transects
  - Only non-ANCSA lands will be accessed
- Ongoing work:
- data QA/QC
  - wetlands/vegetation mapping

Sept

- Field season wrap-up:
- data QA/QC
  - hyperlink photos in GIS
- Ongoing work:
- wetlands/vegetation mapping



# Current Status, Botanical Studies

## *Wetland and Vegetation/Wildlife Habitat Mapping Studies*

- Classification and mapping of image blocks
  - ❖ A total of 70,970 acres have been mapped to date
  - ❖ HGM classes include depressional, lacustrine (and lacustrine fringe), and slopes (dominant class)
  - ❖ Mapping has been confined to areas with high-resolution (0.3- to 1-ft pixels) imagery
  - ❖ Polygon attributes include:
    - ✓ NWI and HGM classes
    - ✓ Physiography, Surface Form
    - ✓ Viereck Level IV vegetation class
    - ✓ Disturbance class, if applicable



# Current Status, Botanical Studies

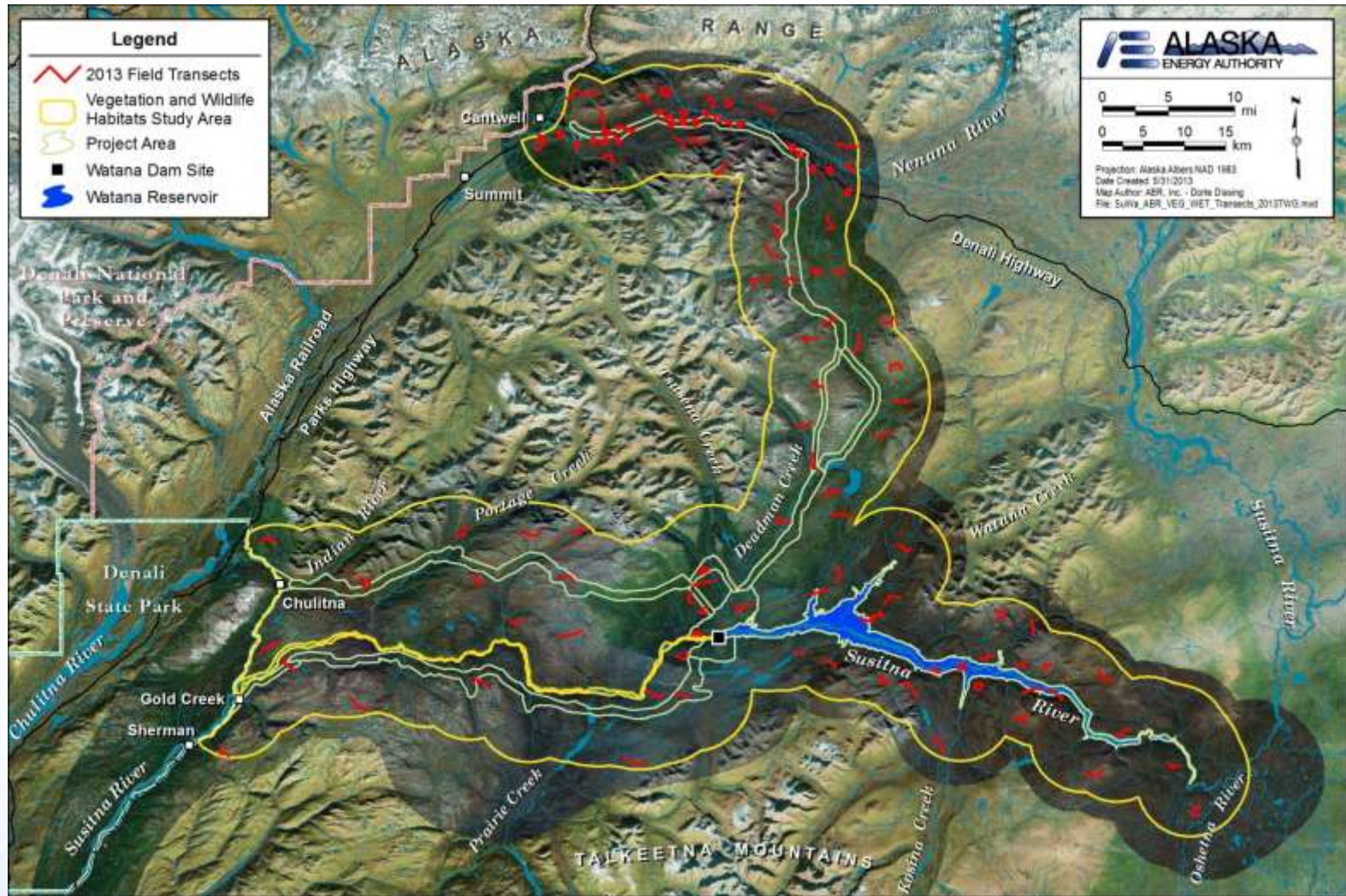
## *Wetland and Vegetation/Wildlife Habitat Mapping Studies (continued)*

- Classification and mapping of image blocks
  - ❖ Cook Inlet Basin wetland classes (Gracz) will be developed using a crosswalk to ABR Wetland Ecotypes after mapping is complete
- 2013 Field Survey
  - ❖ 4 survey teams of 2 will perform wetland determinations and vegetation/ habitat assessments 1–10 July and 29 July–9 August
  - ❖ In addition to the 80 primary transects selected, 27 secondary transects were selected in the event that safety concerns (weather, landing zones, wildlife) preclude sampling any of the primary 80 transects





# Wetland and Wildlife Habitat Studies: 2013 Transect Locations



# Current Status, Botanical Studies

## *Wetland and Vegetation/Wildlife Habitat Mapping Studies (continued)*

- Wetland Functional Assessment—Database structure is being developed for refining field data collection



# Wetland and Wildlife Habitat Studies: Functional Assessment Data Collection

SW13_T999_01		Site
project_id	*	13-174.2.4
plot_id	*	SW13_T999_01 <input type="button" value="clear"/>
date	*	2013-05-30 09:26:03 <input type="button" value="new"/>
observer_env	*	SLI
observer_veg	*	EKJ
plot_type	*	T
plot_radius	*	10m radius
slope	*	7 (%)
aspect	*	270 (degrees)
GPS		
<input type="checkbox"/> GPS on	*	<input type="text" value="61.218056"/> <input type="text" value="-149.900278"/> <input type="text" value="0"/> (m) <input type="text" value="43000"/> (m)
Physiography		
physiog	*	u (Upland)
HGM	w	Slope
micro_relief	*	15-45cm
Hydrography		
water_ph_value	w	6.5
water_ec_value	w	50
ph_range	w	Circumneutral (5.5-7.4)
mg_water_reg	w	Dry (seasonally flooded, saturated)
surf_water_fluct	w	Low
freq_overbank_flood	w	No overbank flooding
surf_geol_deposits	w	High permeability stratified deposits
basin_topo_gradient	w	Low (<2%) gradient
out_restrict	w	No outflow
sedimentation	w	No evidence observed
seeps_springs	w	No evidence



# Wetland and Wildlife Habitat Studies: Functional Assessment Data Collection

Hydrography	
water_ph_value	W 6.5
water_ec_value	W 50
ph_range	W Circumneutral (5.5-7.4)
mg_water_reg	W Dry (seasonally flooded, saturated)
surf_water_fluct	W Low
freq_overbank_flood	W No overbank flooding
surf_geol_deposits	W High permeability stratified deposits
basin_topo_gradient	W Low (<2%) gradient
out_restrict	W No outflow
sedimentation	W No evidence observed
seeps_springs	W No evidence



# Wetland and Wildlife Habitat Studies: Functional Assessment Data Collection

Vegetation	
veg_lacking	* <input type="checkbox"/> Yes
disturb_class	* a
veg_class4	* fnwbs
cutpoint	* fnwbs
number_layers	* 7
%cover_submergents	* absent
%cover_floating	* absent
%cover_mosslichen	* >50%
%cover_short_herb	* 0-15%
%cover_tall_herb	* absent
%cover_dwarf_shrub	* 30-50%
%cover_short_shrub	* 30-50%
%cover_tall_shrub	* 0-15%
%cover_sapling	* 0-15%
%cover_tree	* 30-50%
dom_wet_type	W Forested - evergreen - needle-leaved
veg_density_dom	W High density (60-80%)
veg_interspersion	W High (small groupings, diverse and interspersed)
cover_water_interspersion	W <25% scattered or peripheral
cover_distribution	W Continuous

# Wetland and Wildlife Habitat Studies: Functional Assessment Data Collection

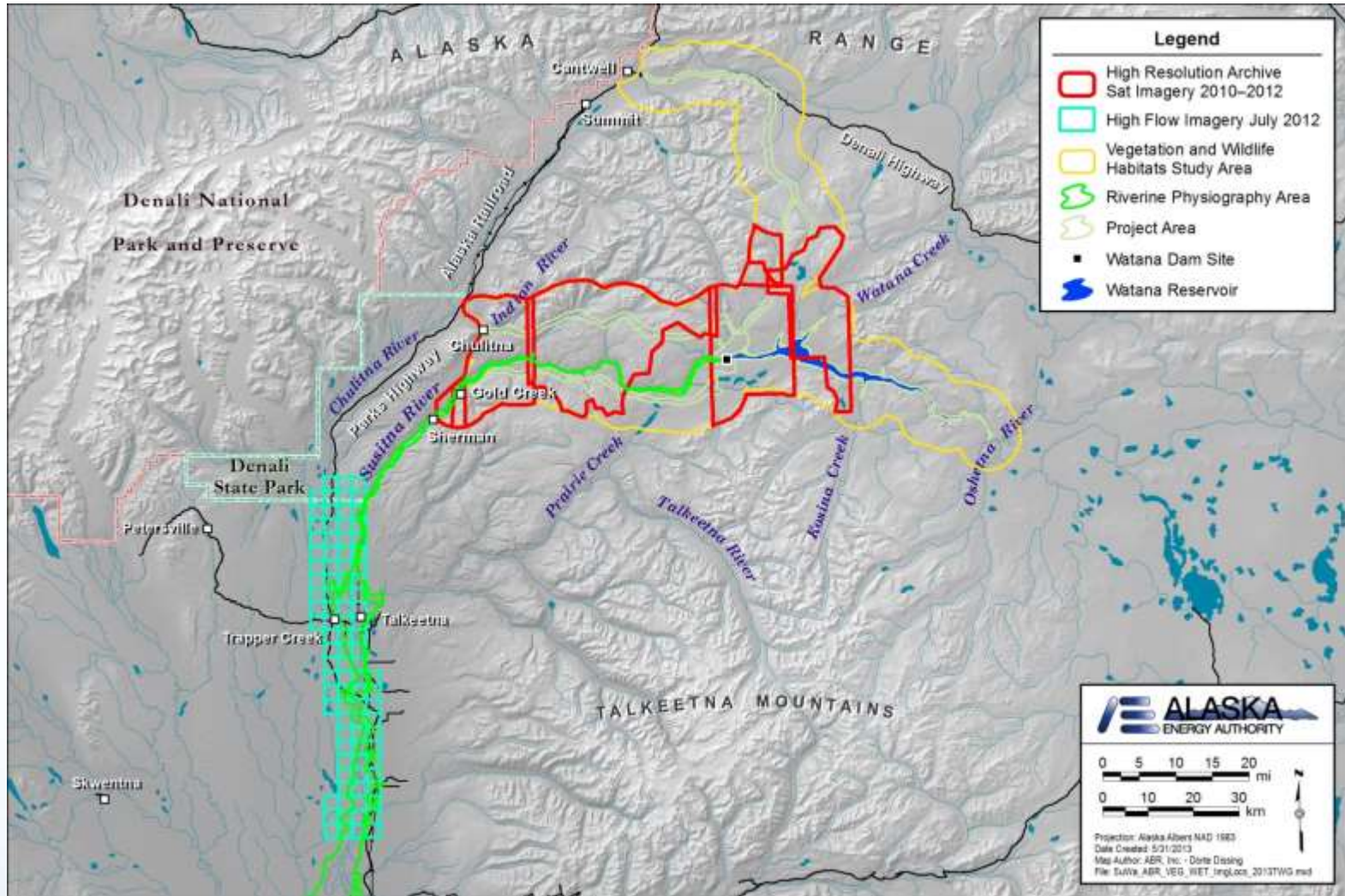
Landscape	
site_size	W large (>100 acres) ▾
juxt	W Connected upstream and downstream ▾
Social	
rec	+ <input type="checkbox"/> hiking <input type="checkbox"/> camping <input type="checkbox"/> skiing <input type="checkbox"/> boating
subsistence	+ <input type="checkbox"/> hunting <input type="checkbox"/> fishing <input type="checkbox"/> trapping <input type="checkbox"/> foraging
Wildlife	
wildlife_use	+ <input type="checkbox"/> nest <input checked="" type="checkbox"/> browse <input checked="" type="checkbox"/> scat <input type="checkbox"/> sighting
wildlife_sightings	+ <input type="text" value="moose browse and scat observed within wetland. numerous well-developed game trails in area."/>
Notes	
notes	+ <input type="text" value="fnwbs protb wetland with scattered pools of water in interhummock depressions."/>
Validate and submit	
<input type="button" value="submit"/>	
Local database stats	
Plot count:	1
<a href="#">[ show ]</a>	
Administration	
<input type="button" value="upload to server"/>	
<input type="button" value="text version"/>	

# Current Status, Botanical Studies

## *Wetland and Vegetation/Wildlife Habitat Mapping Studies (continued)*

- Imagery Acquisition Update
  - ❖ Received high resolution archived satellite imagery (growing season views from 2010 through 2012). Coverage ranges from Gold Creek up to river mile 206.5
  - ❖ Received high resolution aerial photography (Aerometric) from July through September 2012 for the lower Susitna. Covers a large portion of the riverine corridor used in the Riparian study
  - ❖ Aerometric has been contracted to provide aerial photography (summer 2013) for the remaining portions of the wetlands and vegetation and wildlife habitat study areas

# Available Project Ortho-photography





# Current Status, Botanical Studies

## *Riparian Vegetation Study Plan*

FERC follow-up requests:

- Determine ratio of sample-intensive ELS plots to the less sample-intensive Integrated Terrain Unit (ITU) plots
  - Refine sampling design for each focus area, including the stratification factors and basis for the number of plots within and outside the focus areas
  - Include rare habitats in sampling scheme to ensure adequate coverage of all riparian habitats
- ❖ **These issues are being resolved in collaboration with the Instream Flow Study (R2)**



# Riparian Mapping Study: 2013 Activities

April–  
June

- Field season preparation:
- increase staffing
  - refine sampling scheme and select transect locations
  - request necessary permits/permissions, logistical support
  - revise database interface
  - collaborate with Riparian Instream Flow Working group (R2) for sample design (May and June field trips)

July

- Field deployment, June 17- Jul 13
- 7 scientists, teams of 2 plus data technician
  - goal: target Upper and Middle River Focus and Non-Focus areas for intensive sampling; initiate Integrated Terrain Unit (ITU) transect sampling in Upper and Middle River corridor
- Ongoing work:
- data QA/QC

August

- Field deployment, July 20-Aug 9:
- 4 scientists, teams of 2
  - goal: target Upper and Middle River Focus areas for intensive sampling; initiate ITU in Lower River
- Ongoing work:
- data QA/QC
  - soil laboratory analysis

Sept

- Field season wrap-up:
- data QA/QC
  - hyperlink photos in GIS
  - Ongoing work:
  - ITU Mapping verification and updates using field data
  - data analysis



# Current Status, Botanical Studies

## *Riparian Vegetation Study (continued):*

- Focus Areas - Point-intercept sampling
  - ❖ Stratified, random sampling plan
    - ✓ Ecotype from ITU mapping as strata unit
    - ✓ Ecotype = local scale ecosystems (incl. vegetation and environment in comprehensive classification)
    - ✓ Strata weighted by ecotype area (acres) within each focus area from preliminary ITU Mapping
    - ✓ # Plots per focus area = 1 plot/ 20 acres + 1.5\* the total # of ecotypes in a focus area; 118 total plots
    - ✓ # Random Plots per Ecotype = % total ecotype area within a focus area\*total number of Focus Area plots



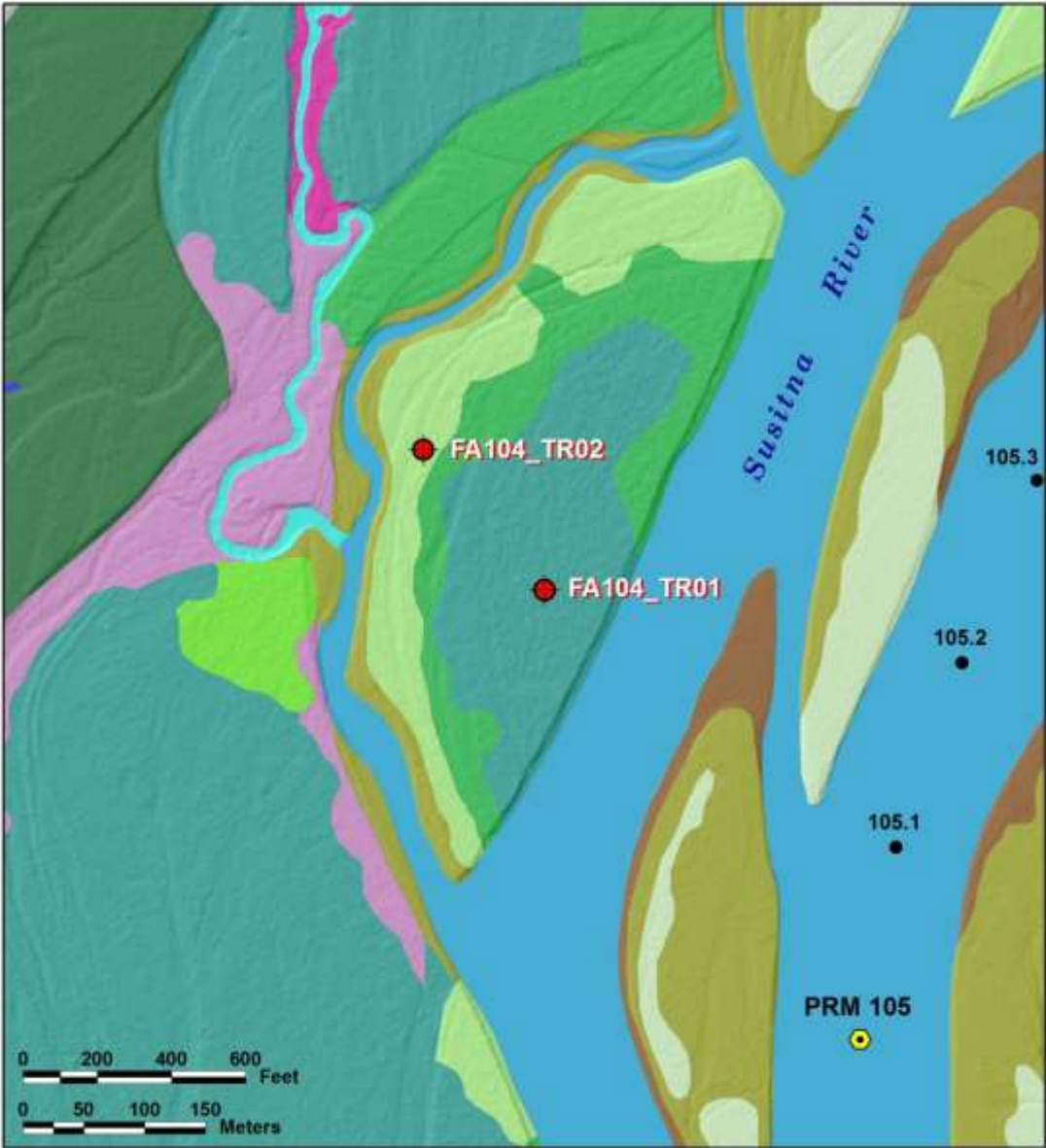
# Current Status, Botanical Studies

## *Riparian Vegetation Study (continued):*

- Non-Focus Areas - Point-intercept sampling
  - ❖ Targeted sampling to ensure underrepresented ecotypes in Focus Areas are sufficiently sampled (e.g., Herbaceous)
  - ❖ For herbaceous types we targeted for sampling at least 75% of the ITU polygons of each of the herbaceous ecotypes.
  - ❖ For all other underrepresented ecotypes added 1 to 3 plots outside of focus areas in order to increase the total sample size across the entire middle river to at least 3.
  - ❖ 94 total plots
- ITU Transects – Ocular cover estimates
  - ❖ Rapid mapping verification transects
  - ❖ Primarily Lower Susitna River for 2013
  - ❖ Approximately 60 transects



**Focus Area 104 – Directed ITU  
Intensive Sample Locations  
May 2013**



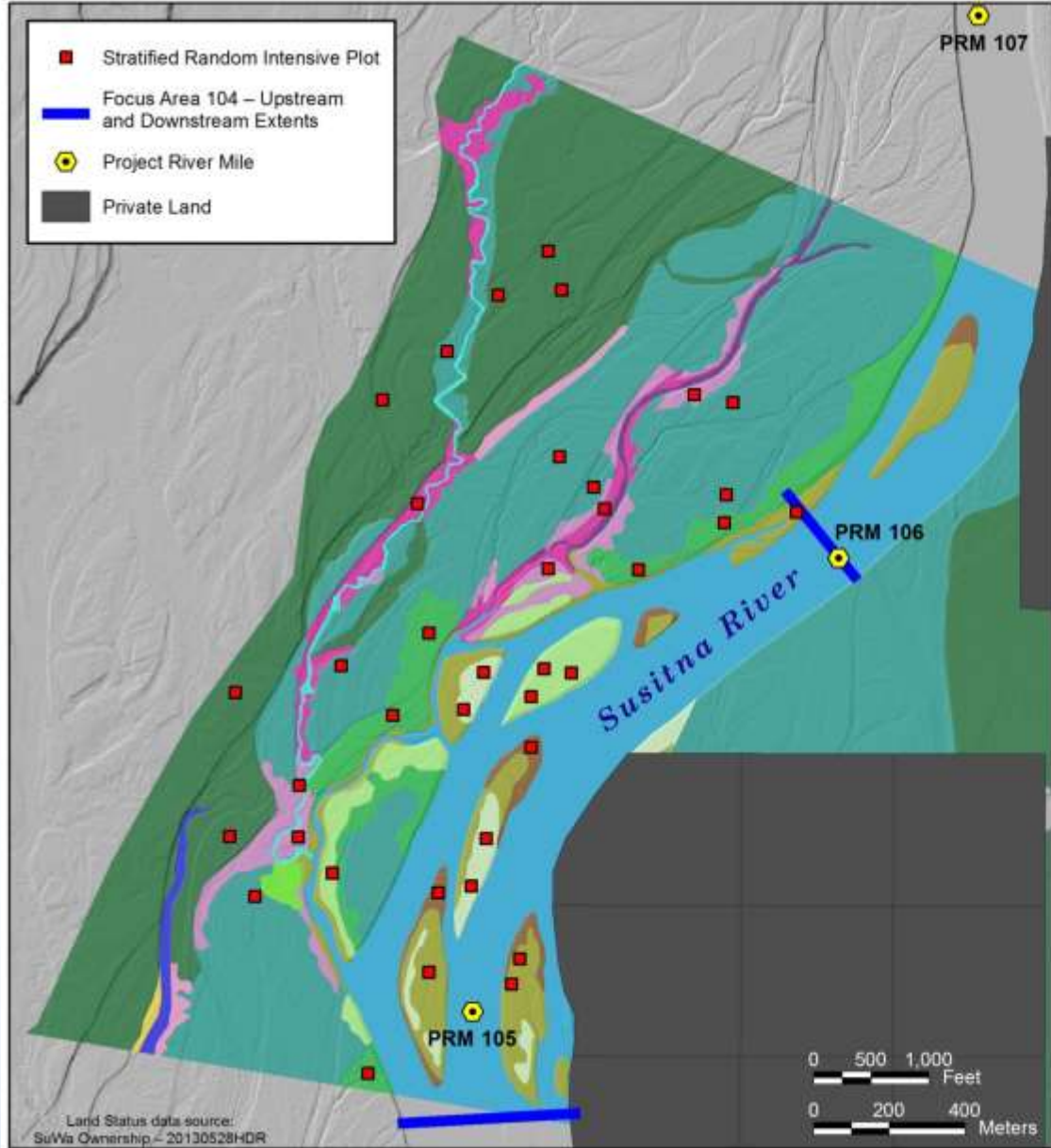
**Ecotype**

-  Lowland Headwater Stream
-  Riverine Circumneutral Beaver Pond
-  Riverine Circumneutral Glacial River
-  Riverine Gravelly Wormwood-Horsetail Barrens and Partially Vegetated
-  Riverine Loamy Ostrich Fern Meadow
-  Riverine Sandy Bluejoint-Herb Meadow
-  Riverine Sandy Balsam Poplar Sapling-Alder-Willow Tall Shrub
-  Riverine Sandy Pole-sized Balsam Poplar Forest
-  Riverine Sandy Timber-sized Balsam Poplar Forest
-  Riverine Sandy-Loamy Balsam Poplar Large Tree Forest
-  Riverine Sandy-Loamy Spruce-Balsam Poplar Forest
-  Riverine Loamy Spruce-Birch Forest
-  Upland Loamy Spruce-Birch Forest





# Focus Area 104 – ITU Stratified Random Intensive Sampling Locations



# Current Status, Botanical Studies

## *Riparian Vegetation Study (continued):*

- Early-Season Field Investigations (ABR & R2):
  - ❖ April 30th–May 3rd, 2013
    - ✓ Vegetation Community Type Verification (Viereck Level 3)
    - ✓ Surficial Geomorphology Verification
  - ❖ May 19th – May 22nd, 2013
    - ✓ Two soil trenches excavated to original cobble bed layer
    - ✓ soil stratigraphy
    - ✓ Samples collected for isotope and sieve analysis
    - ✓ Map verification in Whisker’s Slough area



ABR, Inc. & R2 Staff

# Current Status, Botanical Studies

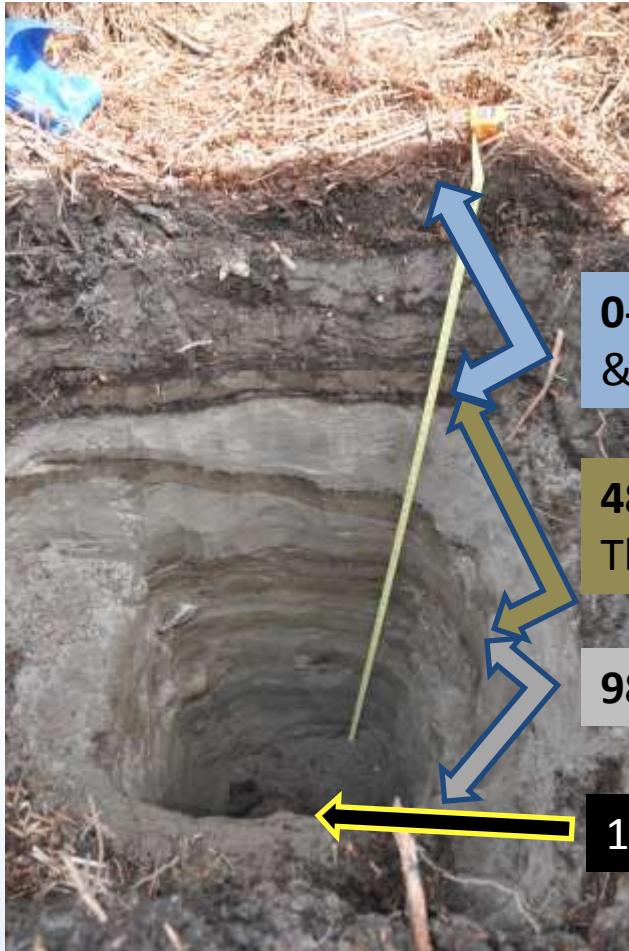
## Riparian Vegetation Study (continued)

Whisker's Slough

Focus Area 104

### Riverine Loamy Spruce-Birch Forest Ecotype

Sampled May 20, 2013



#### General Soil Stratigraphy

**0-48cm** Surface Organic Mat & Loamy Mantle

**48-98cm** Stratified Sands & Thin Buried Organic Horizons

**98-183cm** Stratified Sands

**183cm+** Gravel & Cobble Bed

#### General Site History

4th – Forest Establishment; Infrequent Flooding

3rd- Vegetation Establishment; Frequent Flooding

2nd – Island Formation; Very Frequent Flooding

1st – Original River Bed; Permanent Flooding

# Current Status, Botanical Studies

## *Invasive Plant Survey*

- 21 species have been identified in surveys associated with the Alaska Exotic Plant Information Clearinghouse (AKEPIC) database
- Invasive ranking scores range from Very Weakly Invasive (< 40) to Extremely Invasive (> 80), with most species falling within the Weakly (40–49) to Modestly (50–59) Invasive categories



# Invasive Plant Study: 2013 Activities

May–July

- Field season preparation:
- review records extracted from AKEPIC database
  - select sample locations
  - review herbarium specimens for target species
  - request necessary permits/permissions

August

- Field deployment, August 19–30:
- 2 scientists, based out of Cantwell
  - focus on infestations along the Denali and Parks highways, heavily-used trails that enter the Project area

Sept

- data QA/QC
- process specimens collected

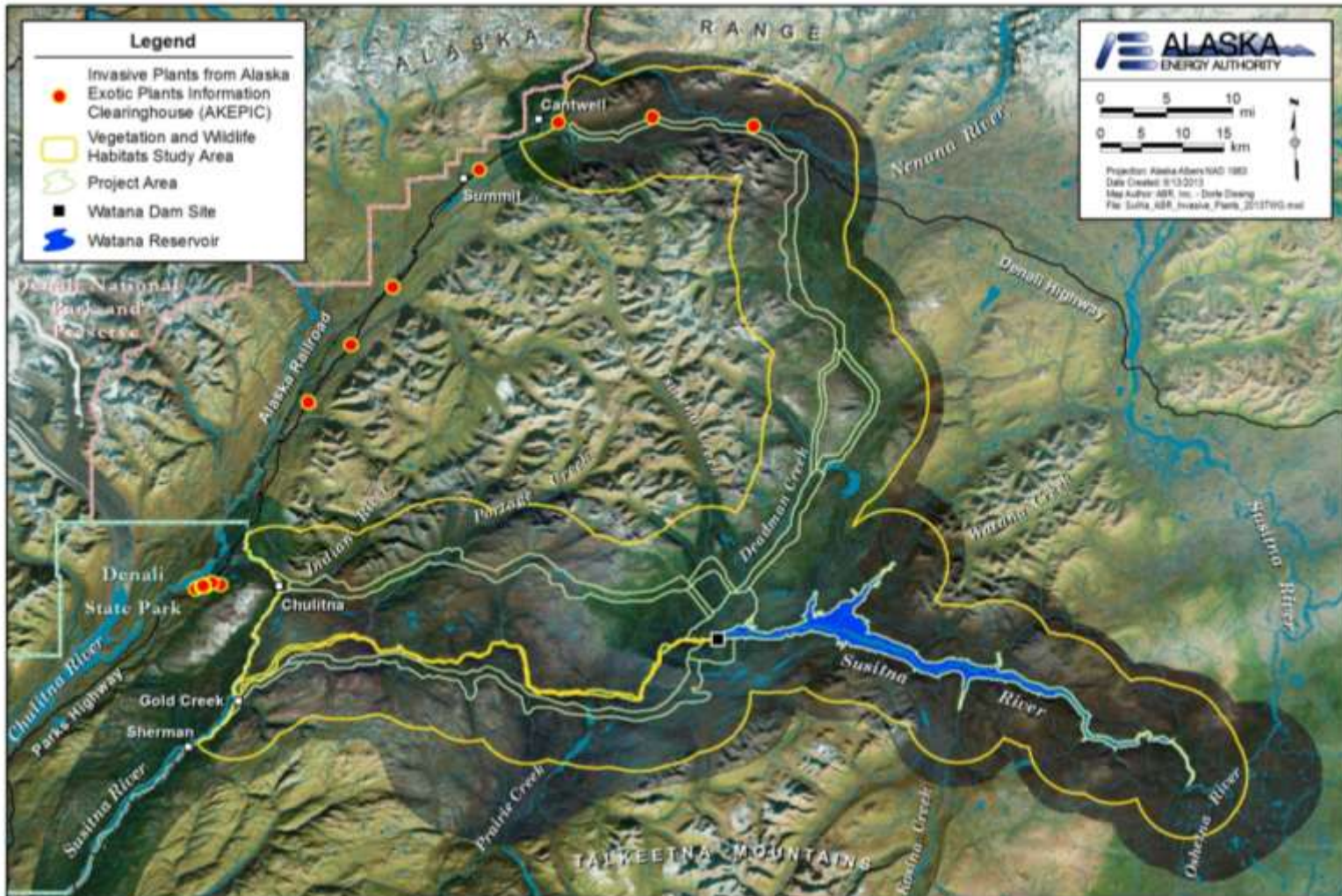
Oct–Nov

- ITR Preparation:
- data QA/QC
  - hyperlink photos in GIS
  - prepare maps of invasive plant locations, level of infestation, number of invasives found





# AKEPIC Invasive Plant Locations for Project Vicinity



# List of Invasive Species in Vicinity of Project Area

Scientific Name	Common Name	Invasiveness Rank
<i>Bromus inermis</i> Leyss.	smooth brome	62
<i>Bromus tectorum</i>	cheatgrass	78
<i>Crepis tectorum</i>	narrowleaf hawkbeard	56
<i>Galeopsis tetrahit</i>	brittlestem hempnettle	50
<i>Hordeum jubatum</i>	foxtail barley	63
<i>Leontodon hirtus</i>	rough hawkbit	ND
<i>Matricaria discoidea</i>	pineappleweed	32
<i>Melilotus officinalis</i>	yellow and white sweetclover	81
<i>Phleum pratense</i>	timothy	69
<i>Plantago major</i>	common plantain	54
<i>Poa annua</i> L.	annual bluegrass	44
<i>Poa pratensis</i>	spreading bluegrass or Kentucky bluegrass	46
<i>Polygonum aviculare</i>	prostrate knotweed	52
<i>Sonchus asper</i>	spiny sowthistle	45
<i>Tanacetum vulgare</i>	common tansy	46
<i>Taraxacum officinale</i>	common dandelion	60
<i>Trifolium hybridum</i>	alsike clover	58
<i>Trifolium repens</i>	white clover	57
<i>Tripleurospermum inodorum</i>	scentless false mayweed	59
<i>Vicia cracca</i>	Bird vetch	48



# Current Status, Botanical Studies

## *Rare Plant Survey*

- Focus on rare plant species with S1, S2, S1S2, and S2S3 rankings
- Received list of 13 species within the S1–S2S3 rankings
- Other species may be considered, based on literature review and habitat information in the Alaska Rare Plant Field Guide



# Current Status, Botanical Studies

## *Rare Plant Survey (continued)*

- Rank Definitions (assigned by NatureServe):
  - S1: Critically imperiled within the state; at very high risk of extirpation because of very few occurrences, declining populations, or extremely limited range and/or habitat
  - S2: Imperiled within the state; at high risk of extirpation because of few occurrences, declining populations, limited range, and/or habitat
  - S3: Rare within the state; at moderate risk of extirpation because of restricted range, narrow habitat specificity, recent population decline, small population sizes, a moderate number of occurrences
  - S1S2, S2S3: Status of species within a region is best described as a range between two ranks





# Rare Plant Study: 2013 Activities

April–  
June

Field season prep:

- review list of rare plant species from AKNHP
- add additional species, if needed, based on literature review
- select survey locations
- review herbarium specimens for target species
- request necessary permits/permissions
- request project logistic support

July

Field deployment, July 1-9:

- 2 scientists
- process specimens collected
- field preparation for late July survey

August

Field deployment, July 29-Aug 9:

- 2 scientists
- process specimens collected

Sept

Field season wrap-up:

- data QA/QC
- hyperlink photos in GIS
- prepare maps of rare plant locations, if species found
- compile habitat information





# AKNHP Rare Plant Locations for Project Vicinity

