



Technical WorkGroup Meeting *Q4 2013 TWG*

Botanical Study Program Updates

November 6, 2013

Prepared by ABR, Inc.

Botanical Studies – Presentation Overview

- *Q4 2013 status updates for the five Project botanical studies:*
 - *RSP 11.5: Vegetation/wildlife habitat mapping study*
 - *RSP 11.6: Riparian vegetation study (downstream of proposed Project dam site)*
 - *RSP 11.7: Wetland mapping study*
 - *RSP 11.8: Rare plant study*
 - *RSP 11.9: Invasive plant study*



RSP 11.5 and RSP 11.7: Vegetation/Habitat and Wetland Mapping – Aerial Imagery Update

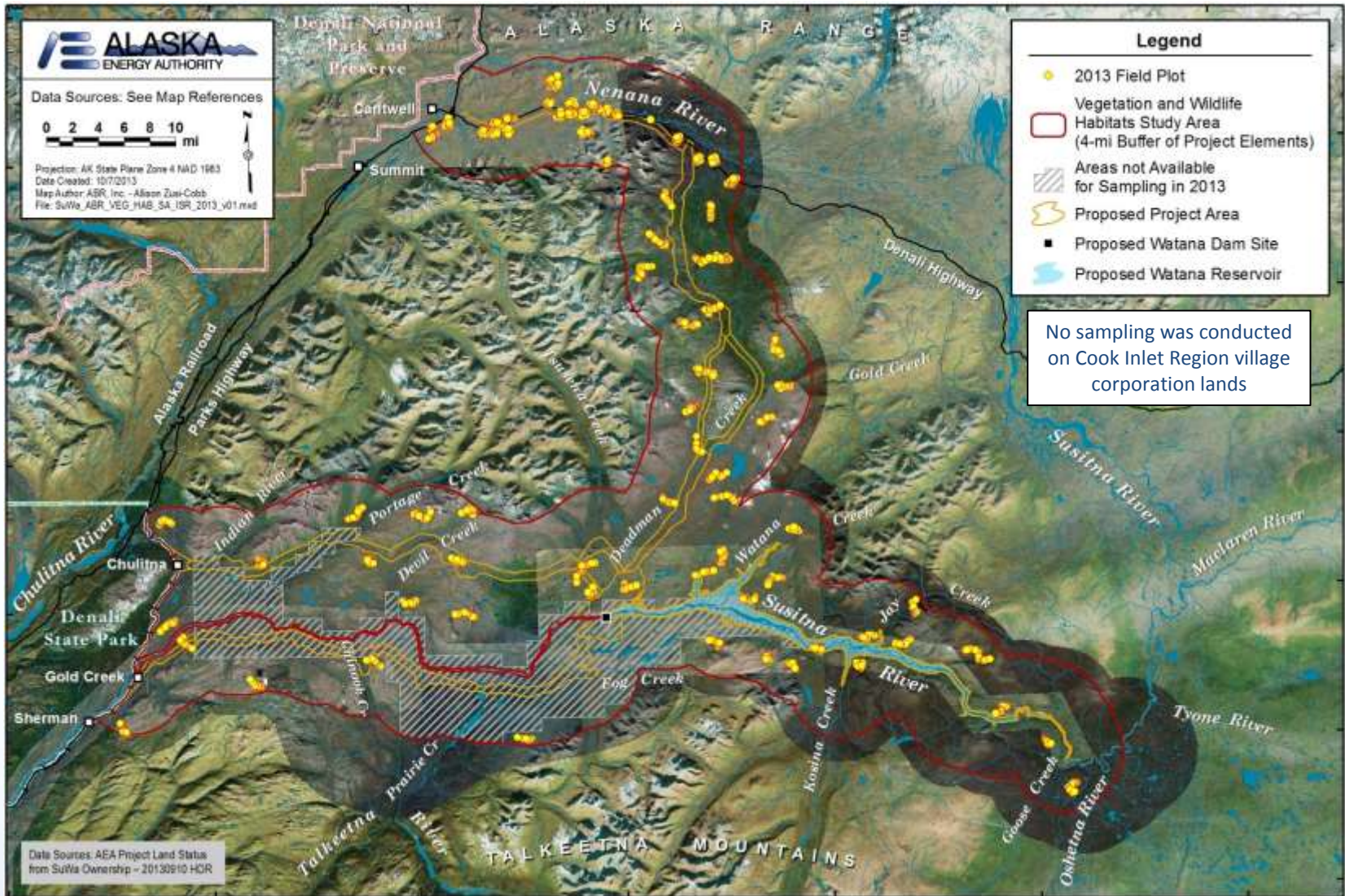
- *Digital aerial photography for the remaining portions of the vegetation/wildlife habitat and wetland mapping study areas was acquired in July 2013 and was delivered to GINA and ABR in mid-October*
- *Current, high-resolution imagery is now available for all portions of the mapping study areas for all botanical studies*
- *Important because the mapping from these studies will facilitate quantitative impact assessments for vegetation and wetlands, and habitat-loss assessments for wildlife (in the License Application)*



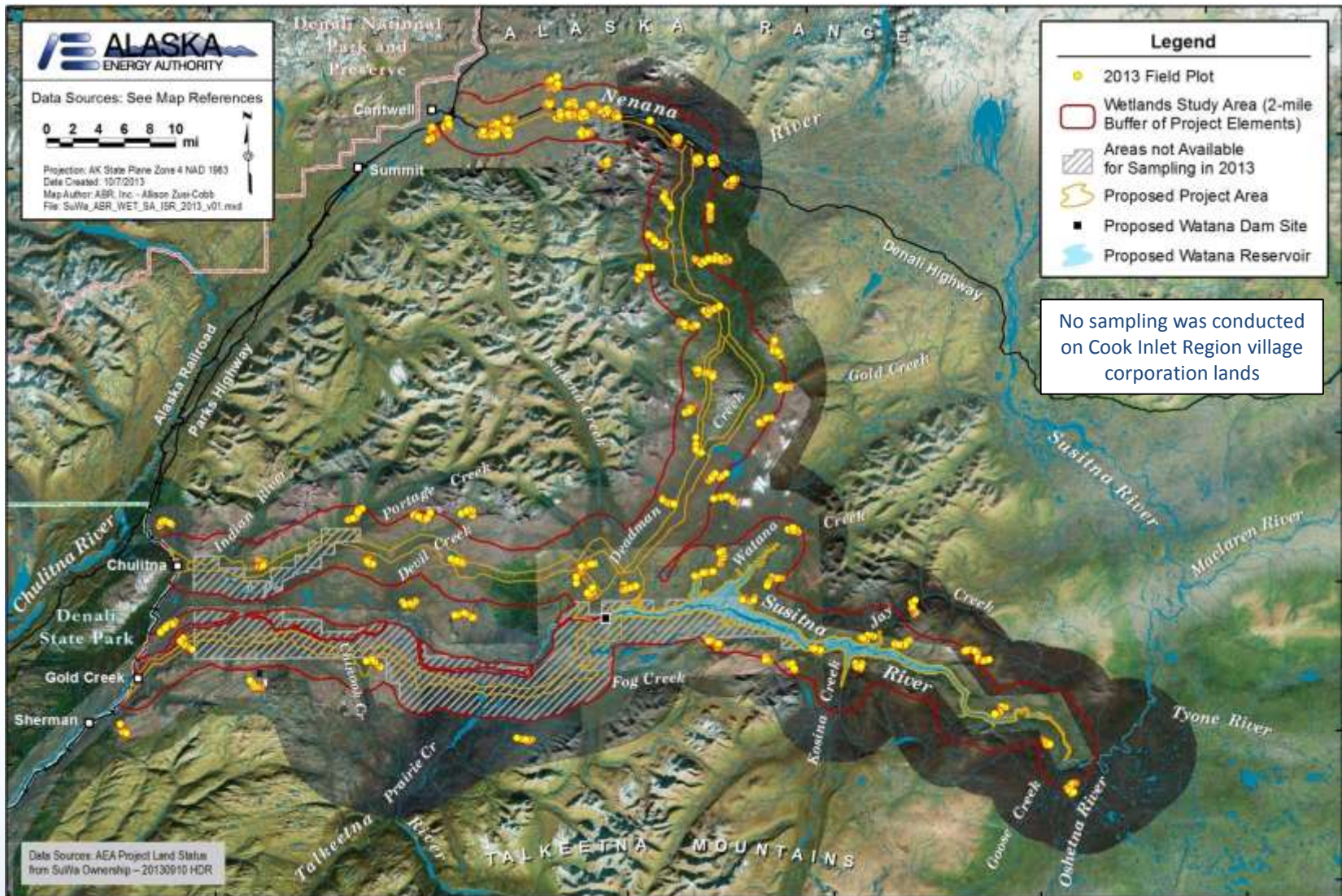
RSP 11.5 and RSP 11.7: Vegetation/Habitat and Wetland Mapping – 2013 Field Update

- *Field ground-reference surveys were completed as planned in two field efforts (July 1–11 and July 30–August 8, 2013):*
 - *77 transects, with a variable number of full study plots and verification plots on each, were surveyed*
 - *612 full study plots were sampled; data collected on these plots included plant cover, soils information, landscape and site variables, wetland functional assessment data, plus recreation, subsistence, and wildlife use information; formal wetland determinations were conducted at each of these plots*
 - *290 rapid map-verification plots also were sampled; primarily vegetation data for dominant species were recorded; verification plots are used to provide additional field documentation of aerial image-signatures*





RSP 11.7: Wetland Mapping Study – 2013 Field Plot Locations



RSP 11.5 and RSP 11.7: Vegetation/Habitat and Wetland Mapping – 2013 Mapping Update

- *77,890 acres in the study area have been mapped to date*
- *A team of 7 dedicated mappers is working on the mapping task*
- *Integrated Terrain Unit (ITU) attributes recorded for each map polygon include:*
 - *NWI wetland class*
 - *HGM wetland class*
 - *AVC (Level IV) vegetation class*
 - *Physiographic type*
 - *Surface form type*
 - *Disturbance type, when applicable*



RSP 11.5 and RSP 11.7: Vegetation/Habitat and Wetland Mapping - Variances

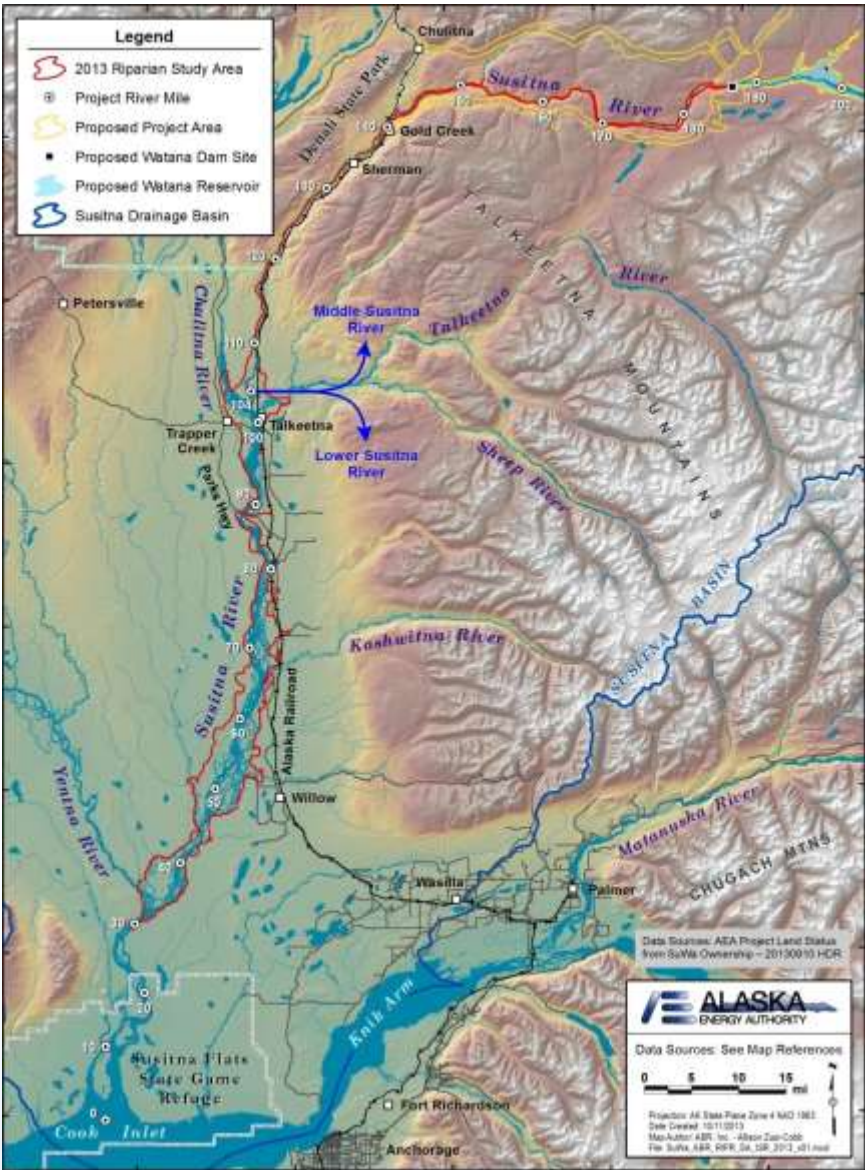
- *There were no variances from the FERC-approved study plan*



RSP 11.5 and RSP 11.7: Vegetation/Habitat and Wetland Mapping – Plans for 2014

- *Preliminary wildlife habitat and wetland classes will be presented In the Initial Study Report (due to FERC on February 3, 2014)*
- *Continue ITU mapping in the two study areas through June 2014*
- *Collect ground-reference survey data, as needed, for vegetation, habitat, and wetland types that need additional documentation (e.g., unique image-signatures located on Cook Inlet Region village corporation lands)*
- *Conduct map-verification surveys, as needed, to validate the mapping completed*
- *Finalize the ITU mapping based on the 2014 field data*
- *Derive final wildlife habitat and wetland types in coordination with Project wildlife researchers and the riparian vegetation study team*
- *Conduct final wetland functional assessment analyses*





RSP 11.6: Riparian Vegetation Study

2013 Study Area

Lateral extent: riverine physiography
Downstream extent: proposed Project dam site to RM 29.5

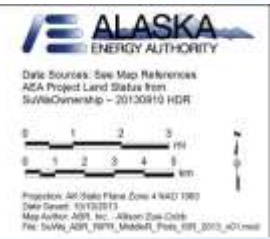
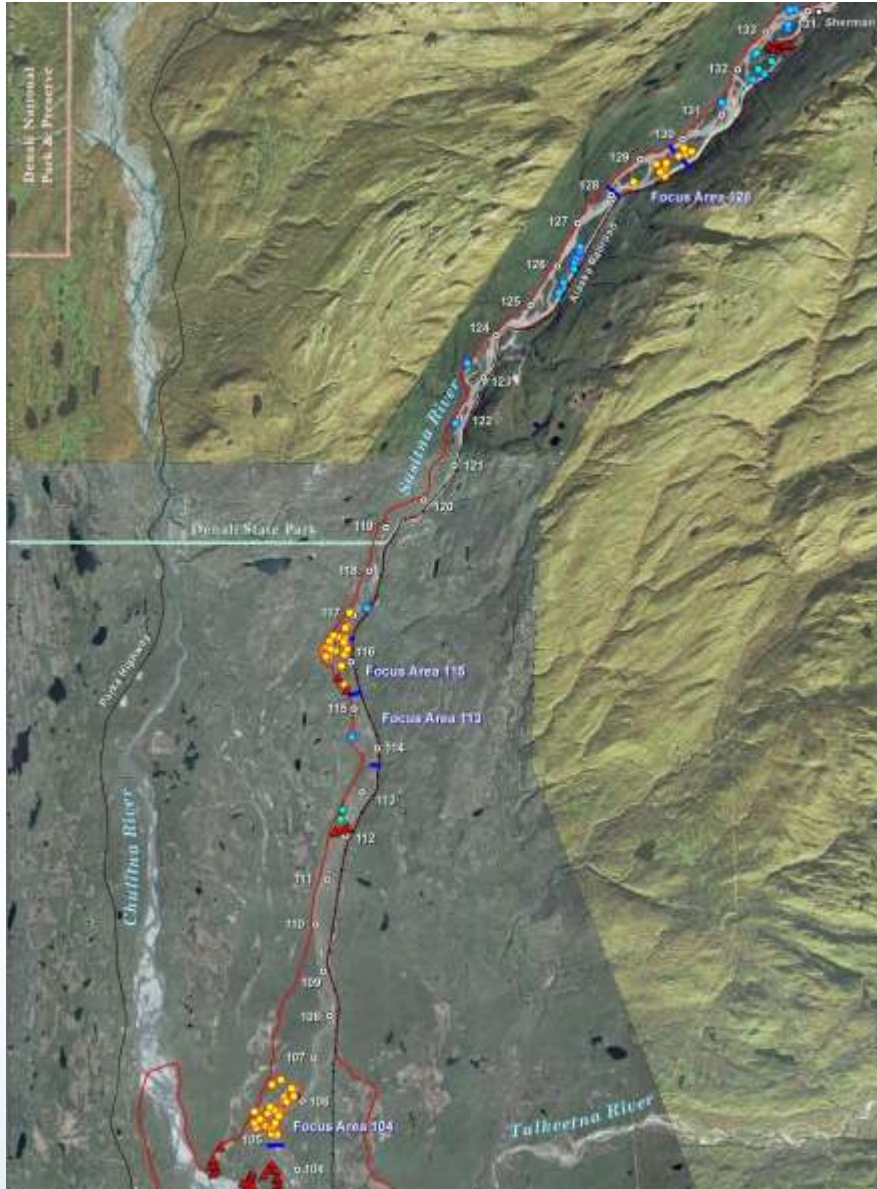
RSP 11.6: Riparian Vegetation Study – 2013 Field Update

- *Field surveys completed as planned in four survey periods (April 30–May 3, May 19–22, June 17–July 10, July 24 –August 12):*
 - *April–May: AVC Level III and surficial geomorphology verification*
 - *May: soil trenching and soil core sampling trials*
 - *June–August: 62 intensive, permanent ELS plots were established and sampled; vegetation composition and soils data and dendrochronology and forest structure data were collected; ELS plots are designed to serve as long-term monitoring plots*
 - *June–August: 214 ITU plots along 35 transects were sampled; the ITU transects span a number of floodplain features and the sample plots were placed in distinct vegetation types; vegetation and soils data were collected at the ITU plots, which are designed primarily to support the mapping of riparian vegetation*



RSP 11.6: Riparian Vegetation Study

ELS and ITU Plots (2013) and Planned ELS Plots (2014), Middle River



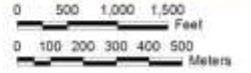
RSP 11.6: ELS and ITU Plots (2013) and Planned ELS Plots (2014) in Focus Areas



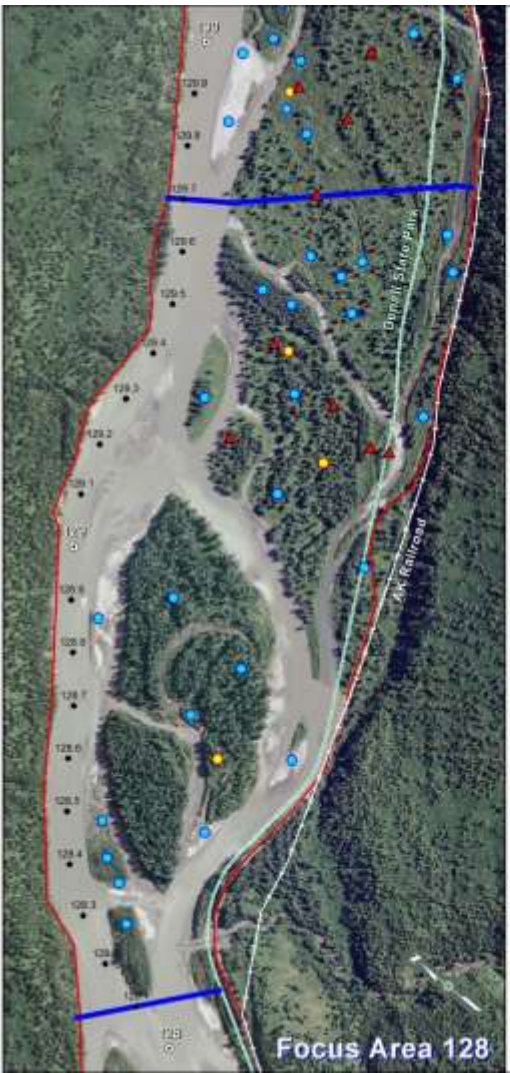
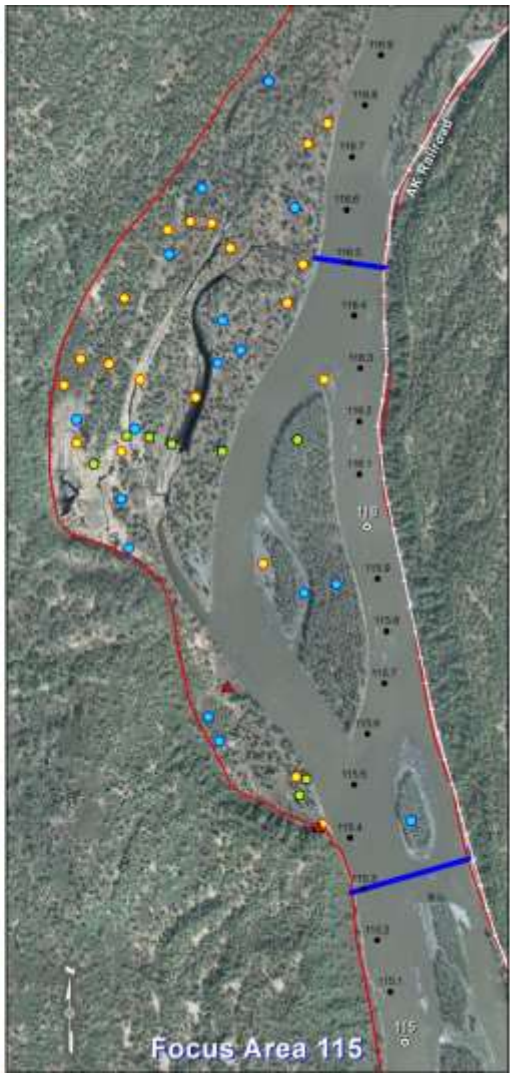
Legend

- 2013 ELS Plot
- 2013 ELS Plot, Sediment Core
- 2013 Sediment Core
- + 2013 ELS Plot, Soil Trench
- ▲ 2013 ITU Mapping Plot
- Planned 2014 ELS Plot
- Instream Flow Focus Area (Upper and Lower Extent)
- 2013 Riparian Study Area
- Project River Mile
- Project River 0.1 Mile

Data Sources: See Map References
 AEA Project Land Status from
 SuWaOwnership - 20130910 HDR

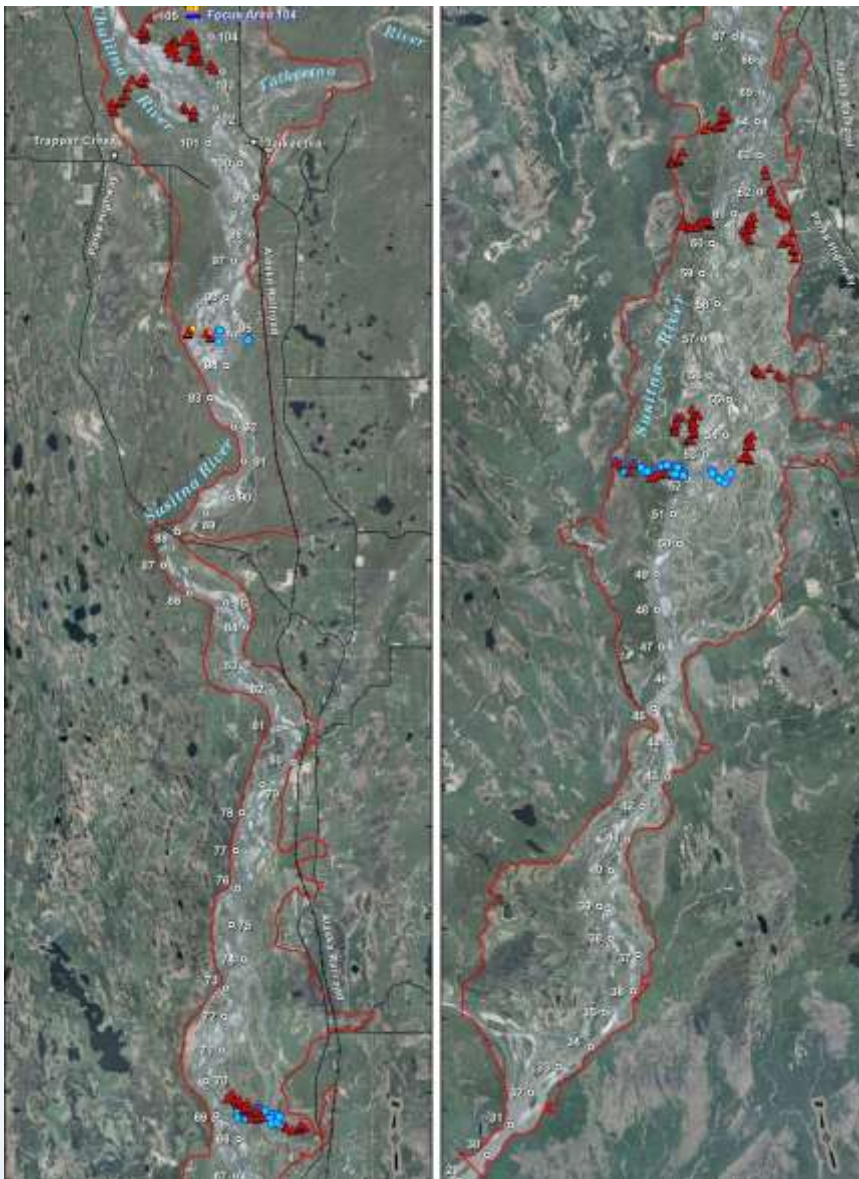


Projection: AK State Plane Zone 4 NAD 1983
 Date Saved: 10/10/2013
 Map Author: ABR, Inc. - Alaska Zhai Cobb
 File: SuWa_ABR_RIPR_FA_Plots_ISR_2013_v01.mxd



RSP 11.6: Riparian Vegetation Study

ELS and ITU Plots (2013) and Planned ELS Plots (2014), Lower River



RSP 11.6: Riparian Vegetation Study – 2013 Mapping Update

- *9,484 acres in the study area have been mapped to date*
- *Focused mapping efforts occurring now through spring*
- *ITU attributes recorded for each map polygon include:*
 - *AVC Level IV vegetation class*
 - *Seral vegetation class (e.g., poplar size class)*
 - *Riverine geomorphology class, includes flood frequency*
 - *Soils information, when applicable*



RSP 11.6: Riparian Vegetation Study – Variances

- *In the RSP, the proposed plot-allocation procedure to determine the number of ELS plots in Focus Areas (FAs) was based on FA size alone.*

In response to agency comments, this was revised to account for both FA size and the number of riparian ecotypes in each FA, such that a smaller-sized FA with a large number of ecotypes would be assigned a larger number plots than it would based on size alone. Overall a higher number of ELS plots were allocated within each FA than under the original procedure. A technical memorandum describing this revised plot-allocation procedure was filed with FERC on July 1, 2013.



RSP 11.6: Riparian Vegetation Study – Variances

- *On ELS plots, the spacing interval for the point-intercept vegetation sampling locations along transect lines was increased from 0.5 m to 1 m.*

This change facilitated the collection of more representative and accurate plant cover data (less overlap in recording the same plants in the dense, multi-canopied vegetation in the Susitna River floodplain). The larger sampling interval necessitated a larger sampling radius (23 m) for the ELS plots.



RSP 11.6: Riparian Vegetation Study – Variances

- *For ELS plots along groundwater transects, the groundwater installation equipment was placed just outside the 23-m radius of each ELS plot (as opposed to the plot center noted in the FERC-approved study plan).*

This was done to reduce the risk of vegetation disturbance within the plot because the groundwater installation equipment was large relative to the 3-m-radius ELS plot center.



RSP 11.6: Riparian Vegetation Study – Plans for 2014

- *Preliminary riparian ecotype classes will be presented in the Initial Study Report (due to FERC on February 3, 2014)*
- *Continue ITU mapping in the study area through spring 2014*
- *Continue field sampling of ELS and ITU mapping plots, focusing farther upstream in the Middle River (on Cook Inlet Region village corporation lands) and farther downstream in the Lower River*
- *Finalize the ITU mapping based on the 2014 field data*
- *Derive final riparian ecotypes from the ITU map data*
- *Derive riparian wildlife habitat and wetland types in coordination with Project wildlife researchers and the vegetation and wildlife habitat mapping study team*
- *Develop natural riparian vegetation-succession pathway models based on the 2013 and 2014 field data*



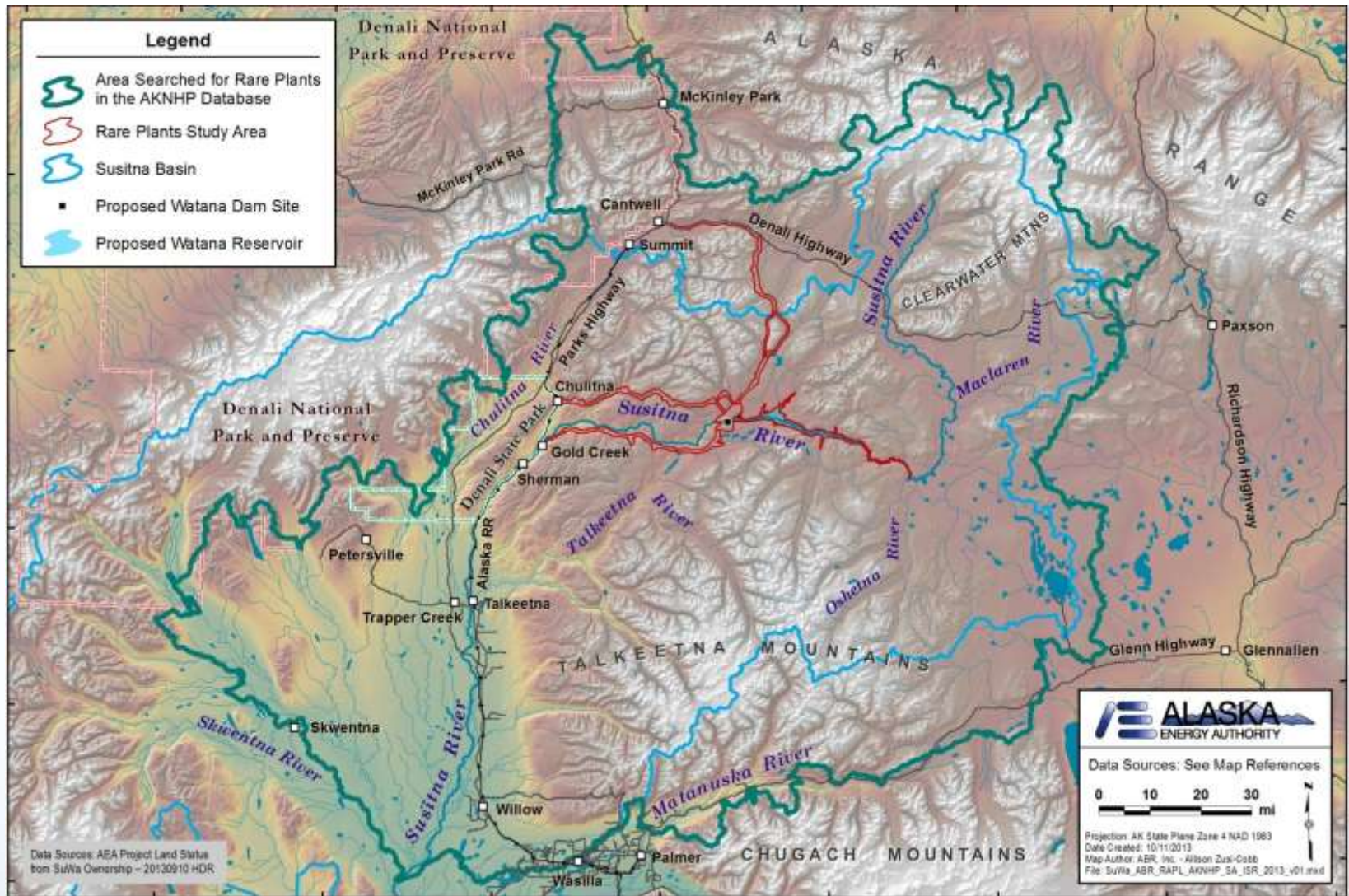
RSP 11.8: Rare Plant Study

State-level plant rarity ranking definitions used by the AKNHP (assigned by NatureServe):

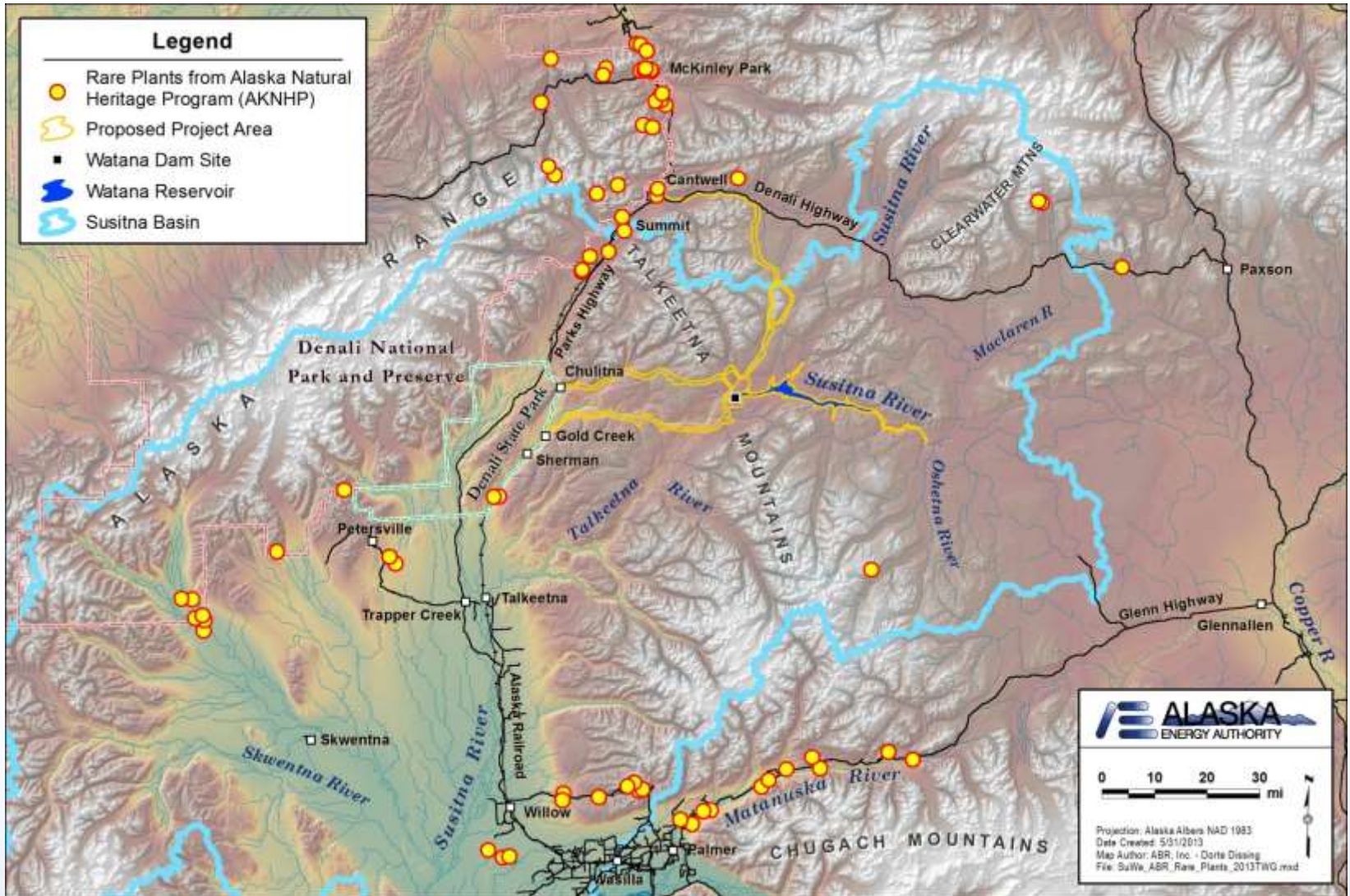
- **S1:** *Critically imperiled within the state; at very high risk of extirpation because of very few occurrences, declining populations, or extremely limited range and/or habitat*
- **S2:** *Imperiled within the state; at high risk of extirpation because of few occurrences, declining populations, limited 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*
- **S4:** *Apparently secure but uncommon within the state; may be a long-term conservation concern*



RSP 11.8: Search Area for Previous Rare Plant Collection Records



RSP 11.8: AKNHP Rare Plant Collection Records in Search Area

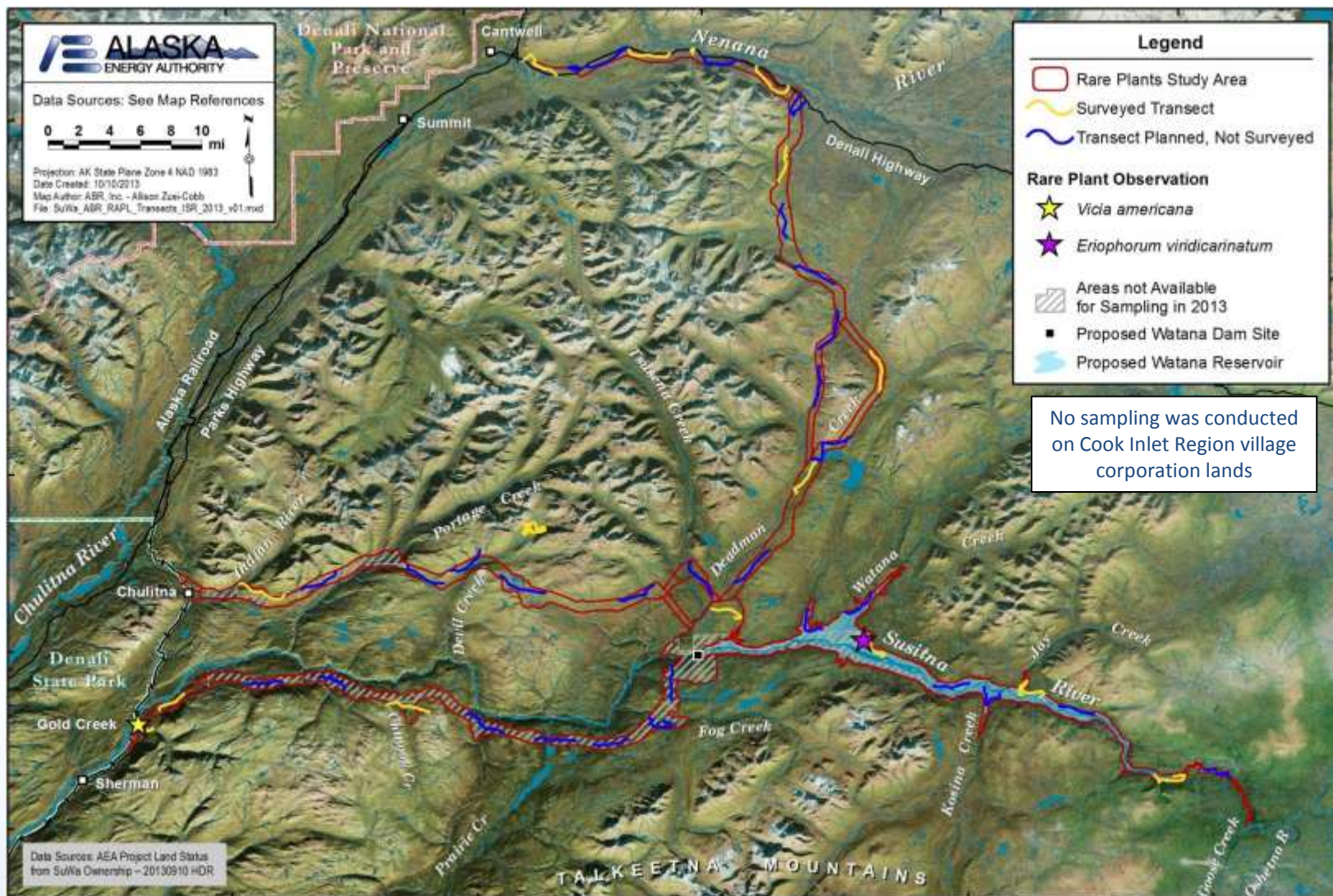


RSP 11.8: Rare Plant Study – 2013 Field Update

- *14 species (ranked S2S3 or rarer) and 25 less rare species (S3 or S3S4) were found in previous surveys in the search area for collection records—these were the focal species for the field surveys*
- *Habitats for these rare taxa were determined and field survey transects were selected so as to sample those habitats or similar habitats that could support these species in the study area*
- *Field surveys were focused on the 14 rarer species and were completed as planned in two field efforts (July 1–8 and July 30–August 5, 2013)*



RSP 11.8: Rare Plant Study – 2013 Transect Locations



RSP 11.8: Rare Plant Study – Results

- *Two rare species were found; identifications have been confirmed by UAF Herbarium staff:*
 - *Vicia americana (American vetch; S2) was found at Gold Creek Camp*
 - *Eriophorum viridicarinatum (thinleaf cottonsedge; S2S3) was found on a terrace above the Susitna River in the proposed Watana Reservoir near RM 199; it was also found by other botanical field crews outside of the rare plant study area*
- *Several other less rare taxa were found in this and other Project botanical studies; range extensions also were noted*



RSP 11.8: Rare Plant Study – Variances

- *There were no variances from the FERC-approved study plan*

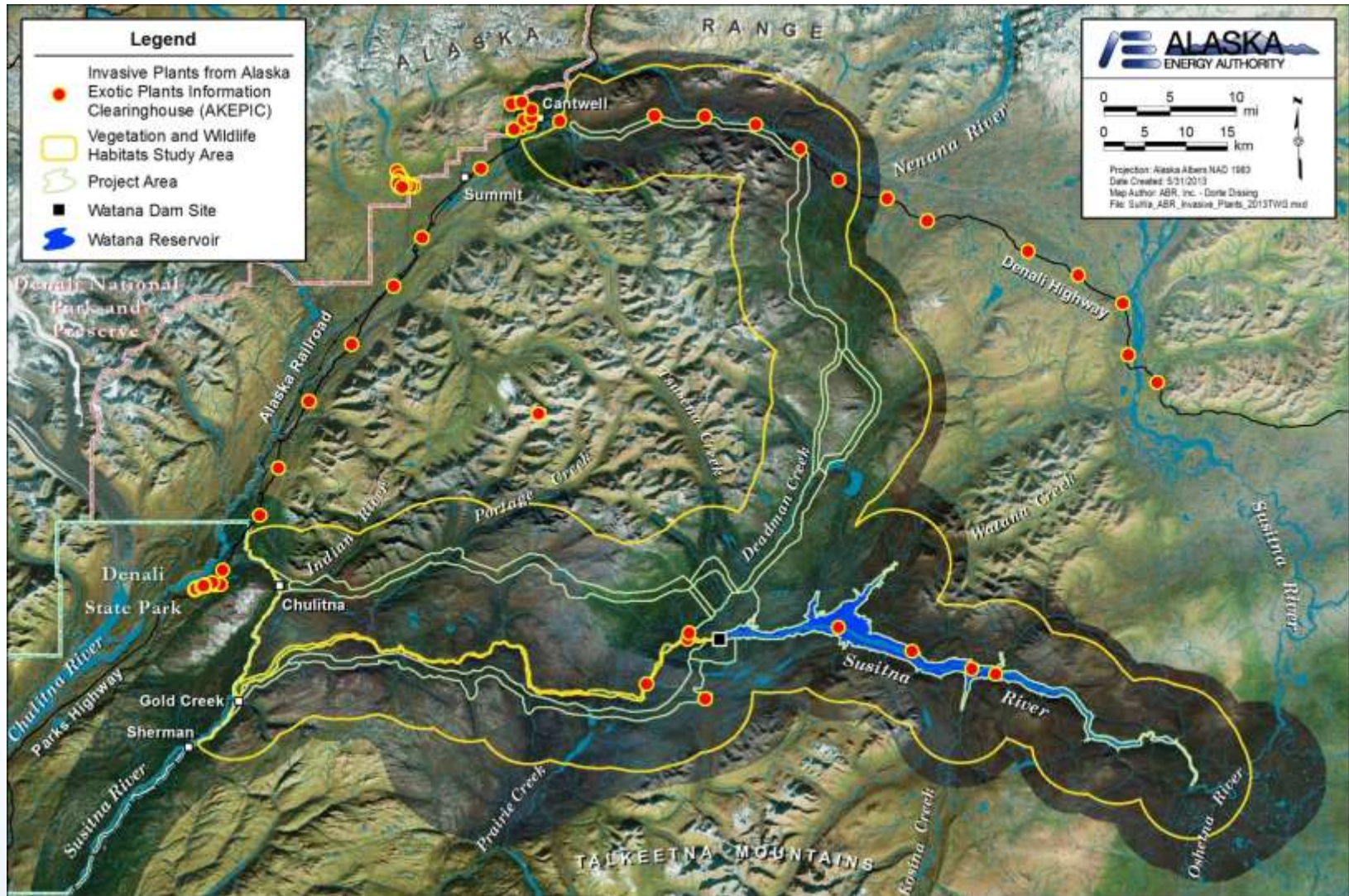


RSP 11.8: Rare Plant Study – Plans for 2014

- *Survey those allocate transects that were not sampled in 2013, including those located on Cook Inlet Region village corporation lands*
- *Survey wet sedge meadow habitats near known populations of *Eriophorum viridicarinatum* to determine the extent of occurrence in the study area and also search for populations that may occur outside of those areas that would be affected by Project development*
- *Focused surveys for rare aquatic species in ponds and lakes*



RSP 11.9: Previous Invasive Plant Locations in Project Vicinity



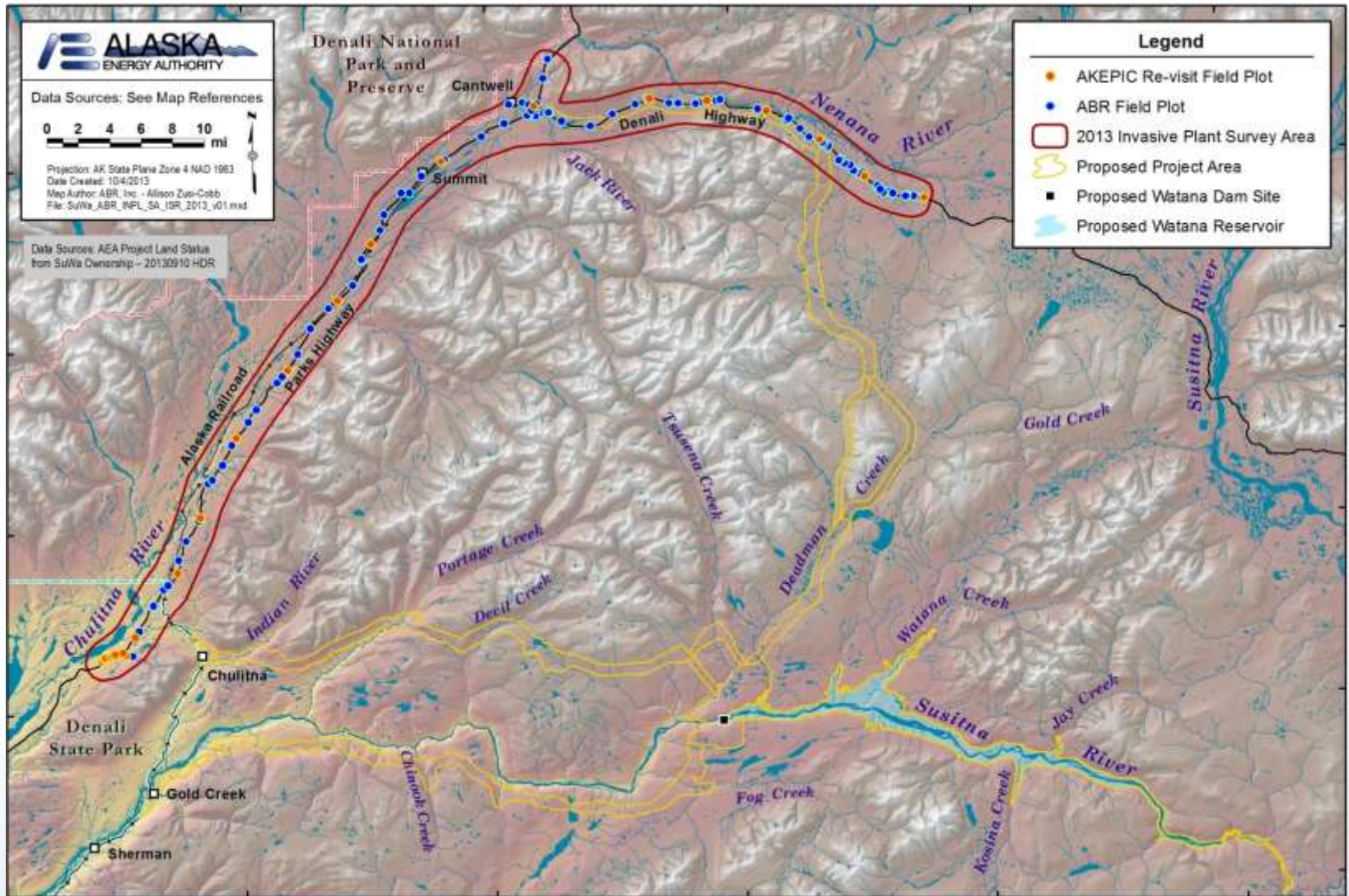
RSP 11.9: Invasive Plants – Likely Suspects

*21 Invasive Species
Previously Found in
the Vicinity of the
Project*

Scientific Name	Common Name	Invasiveness Rank
<i>Bromus inermis</i>	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	NR
<i>Matricaria discoidea</i>	pineappleweed	32
<i>Melilotus alba</i>	white sweetclover	81
<i>Melilotus officinalis</i>	yellow sweetclover	69
<i>Phleum pratense</i>	timothy	54
<i>Plantago major</i>	common plantain	44
<i>Poa annua</i>	annual bluegrass	46
<i>Poa pratensis</i>	Kentucky bluegrass	52
<i>Polygonum aviculare</i>	prostrate knotweed	45
<i>Sonchus asper</i>	spiny sowthistle	46
<i>Tanacetum vulgare</i>	common tansy	60
<i>Taraxacum officinale</i>	common dandelion	58
<i>Trifolium hybridum</i>	alsike clover	57
<i>Trifolium repens</i>	white clover	59
<i>Tripleurospermum inodorum</i>	scentless false mayweed	48
<i>Vicia cracca</i>	bird vetch	73

Species ranked on a scale of 0 to 100, with 100 being an extremely invasive species (Carlson et al. 2008, Nawrocki et al. 2011); NR = not ranked

RSP 11.9: Invasive Plant Survey Locations, 2013



RSP 11.9: Invasive Plant Study – 2013 Field Update

- *In 2013, 107 sites were sampled from August 19–28; sites surveyed included possible source areas for invasive plants (the Denali and Parks highway corridors and regularly-used trails that provide access to the Project area)*
- *28 of the 107 sites were revisits to sites where infestations of invasive plants had been previously documented by the Alaska Natural Heritage Program*
- *Invasive species were found at 98 of the 107 sites sampled*
- *Across all sites, 31 invasive species were found*



RSP 11.9: Invasive Plant Study – Results

The 15 most common invasive species found

Scientific Name	Common Name	No. Sites Recorded	Invasiveness Rank
<i>Plantago major</i>	common plantain	76	44
<i>Matricaria discoidea</i>	pineappleweed	75	32
<i>Taraxacum officinale</i>	common dandelion	71	58
<i>Hordeum jubatum</i>	foxtail barley	50	63
<i>Poa annua</i>	annual bluegrass	38	46
<i>Polygonum aviculare</i>	knotweed	25	45
<i>Phleum pratense</i>	timothy	22	54
<i>Trifolium hybridum</i>	alsike clover	20	57
<i>Crepis tectorum</i>	narrowleaf hawksbeard	10	56
<i>Poa pratensis</i> ssp. <i>irrigata</i>	spreading bluegrass	10	52
<i>Poa pratensis</i> ssp. <i>pratensis</i>	Kentucky bluegrass	10	52
<i>Stellaria media</i>	common chickweed	9	42
<i>Chenopodium album</i> var. <i>album</i>	lambsquarters	9	37
<i>Melilotus alba</i>	white sweetclover	7	81
<i>Trifolium repens</i>	white clover	7	59



RSP 11.9: Invasive Plant Study – Results

The 15 species with the highest invasiveness rankings

Scientific Name	Common Name	No. Sites Recorded	Invasiveness Rank
<i>Melilotus alba</i>	white sweetclover	7	81
<i>Bromus tectorum</i>	cheatgrass	1	78
<i>Vicia cracca</i> ssp. <i>cracca</i>	bird vetch	4	73
<i>Linaria vulgaris</i>	butter and eggs	2	69
<i>Melilotus officinalis</i>	yellow sweetclover	1	69
<i>Hordeum jubatum</i>	foxtail barley	50	63
<i>Bromus inermis</i> ssp. <i>inermis</i>	smooth brome	5	62
<i>Leucanthemum vulgare</i>	oxeye daisy	2	61
<i>Tanacetum vulgare</i>	common tansy	1	60
<i>Trifolium repens</i>	white clover	7	59
<i>Taraxacum officinale</i>	common dandelion	71	58
<i>Trifolium hybridum</i>	alsike clover	20	57
<i>Crepis tectorum</i>	narrowleaf hawksbeard	10	56
<i>Phleum pratense</i>	timothy	22	54
<i>Poa pratensis</i> ssp. <i>irrigata</i>	spreading bluegrass	10	52



RSP 11.9: Invasive Plant Study – Variances

- *There were no variances from the FERC-approved study plan.*

RSP 11.9: Invasive Plant Study – Plans for 2014

- *Expand field surveys to include disturbed sites (e.g., ORV trails) within the Project area, field camps, airstrips, and airports currently being used to support Project activities, and, if possible, along portions of the Alaska Railroad that run near the Project area*
- *Sites not within the Project area but that could serve as sources for invasives (e.g., Stephan Lake Lodge, High Lake Lodge, Gold Creek Camp, and the Talkeetna airport will be surveyed in 2014; Anchorage International airport also may be surveyed*
- *Any potential gravel material sources that are identified and any existing gravel mine sites being considered for support of Project activities also will be surveyed*
- *Finalize the ecological risk assessment for invasive species based on the data from 2013 and 2014*



Questions?

