



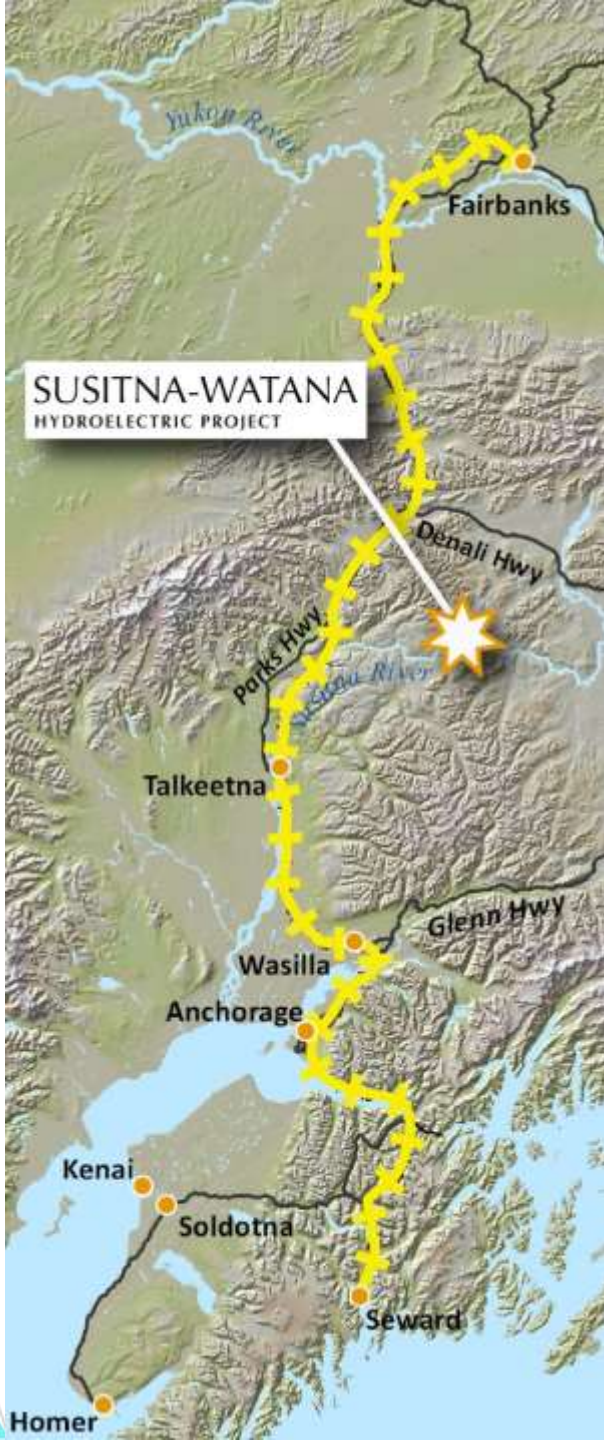
# SUSITNA-WATANA HYDROELECTRIC PROJECT

## Terrestrial Resources Technical Work Group Meeting 4<sup>th</sup> Quarter 2013

### Wildlife Program Update

November 6, 2013

Prepared by ABR, Inc. —  
Environmental Research & Services



# FERC Study Plan Determination, Feb. 1, 2013

- All 16 wildlife studies were included in the 44 studies approved by FERC on this date
- 13 wildlife studies were approved with no modifications:
  - 10.6 – Caribou
  - 10.7 – Dall’s Sheep
  - 10.8 – Large Carnivores
  - 10.9 – Wolverine
  - 10.10 – Terrestrial Furbearers
  - 10.11 – Aquatic Furbearers
  - 10.12 – Small Mammals
  - 10.13 – Bats
  - 10.14 – Eagles & Other Raptors
  - 10.16 – Landbirds & Shorebirds
  - 10.18 – Wood Frog
  - 10.19 – Wildlife Habitat Evaluation
  - 10.20 – Wildlife Harvest Analysis



# FERC Study Plan Determination, Feb. 1, 2013

- 3 studies were approved with modifications recommended by FERC staff, in response to ADF&G and USFWS requests:
  - 10.5 – Moose: Remove specific date range of May 15–31 for daily radio-tracking during calving season in 2013 and 2014.  
*[These changes were incorporated in the Final Study Plan (FSP) by AEA.]*
  - 10.15 – Waterbirds: Use 4 observers for concurrent visual observations of migrating birds along 4 transects (cardinal directions) in spring and fall 2013.  
*[These changes were incorporated in the FSP by AEA. During study implementation, after further consultation, the USFWS was satisfied with the study plan as originally proposed, which will be reflected in the Initial Study Report].*
  - 10.17 – Ptarmigan: Increase number of capture sites to 4–6 and substitute Coda net gun and noose carpets as primary capture methods, instead of mist nets.  
*[These changes were incorporated in the FSP by AEA].*

# Overview of 4<sup>th</sup> Quarter Activities, Sep.–Dec. 2013

RSP Section	Title	4 <sup>th</sup> Quarter Activity
10.05	Moose	Radio-tracking; Initial Study Report (ISR) preparation
10.06	Caribou	Radio-tracking; ISR preparation
10.07	Dall's Sheep	ISR preparation
10.08	Large Carnivores	Data processing for spatial modeling of bear densities; bear hair-snagging & sample analyses; ISR preparation
10.09	Wolverine	ISR preparation
10.10	Terrestrial Furbearers	DNA lab analyses; ISR preparation
10.11	Aquatic Furbearers	Mercury literature review; beaver survey; ISR preparation
10.12	Small Mammals	No activity (study deferred until 2014); ISR preparation
10.13	Bats	Bat detector operation/demob.; roost survey; ISR preparation
10.14	Eagles/Other Raptors	Fall migration surveys; roosting /staging surveys; ISR preparation
10.15	Waterbirds	Fall migration surveys (aerial + radar/visual); ISR preparation
10.16	Landbirds/Shorebirds	Data analysis; ISR preparation
10.17	Ptarmigan	Capture & radio-tagging; aerial transect surveys; ISR preparation
10.18	Wood Frog	Chytrid fungus sample analysis; ISR preparation
10.19	Wildlife Habitat Evaluation	No activity (study deferred until 2014); ISR preparation
10.20	Wildlife Harvest Analysis	No activity (study deferred until 2014); ISR preparation



## Study Plan Variances (General)

- Lack of access to Cook Inlet Region Village Corporation lands (mostly in western reservoir zone and Gold Creek corridor) required adjustment of sampling designs for studies with ground-based sampling components (furbearers, moose browse survey, bats, landbirds & shorebirds, wood frog).
- Cold spring and delayed breakup caused delays in timing of field surveys for eagles & other raptors, aquatic furbearers (muskrat), waterbirds, landbirds & shorebirds, wood frog.
- Three wildlife studies (desktop analyses) were deferred until 2014:
  - 10.12 – Small Mammals
  - 10.19 – Wildlife Habitat Evaluation
  - 10.20 – Wildlife Harvest Analysis.

# Wildlife Study Program Updates

- ADF&G studies (update by Mark Burch & Kim Jones):
  - 10.5 – Moose
  - 10.6 – Caribou
  - 10.7 – Dall’s Sheep (aerial survey)
  - 10.8 – Large Carnivores (bear population density modeling)
  - 10.9 – Wolverine
  - 10.17 – Willow Ptarmigan
- University of Alaska Fairbanks study (Laura Prugh & Casey Pozzanghera):
  - 10.10 – Terrestrial Furbearers
- Studies by ABR, Inc. (update by Brian Lawhead):
  - 10.7 – Dall’s Sheep (mineral lick observations)
  - 10.8 – Large Carnivores (bear hair-snares at salmon spawning streams)
  - 10.11 – Aquatic Furbearers
  - 10.12 – Small Mammals
  - 10.13 – Bats
  - 10.14 – Eagles/Other Raptors
  - 10.15 – Waterbirds (including radar/visual study of migration by all species)
  - 10.16 – Landbirds/Shorebirds
  - 10.18 – Wood Frog
  - 10.19 – Wildlife Habitat Evaluation
  - 10.20 – Wildlife Harvest Analysis



## — Presentation Break —

- See separate presentation by ADF&G Division of Wildlife Conservation



*Caribou crossing Susitna River near Fog Creek, 11 May 2013.*



**SUSITNA-WATANA**  
HYDROELECTRIC PROJECT

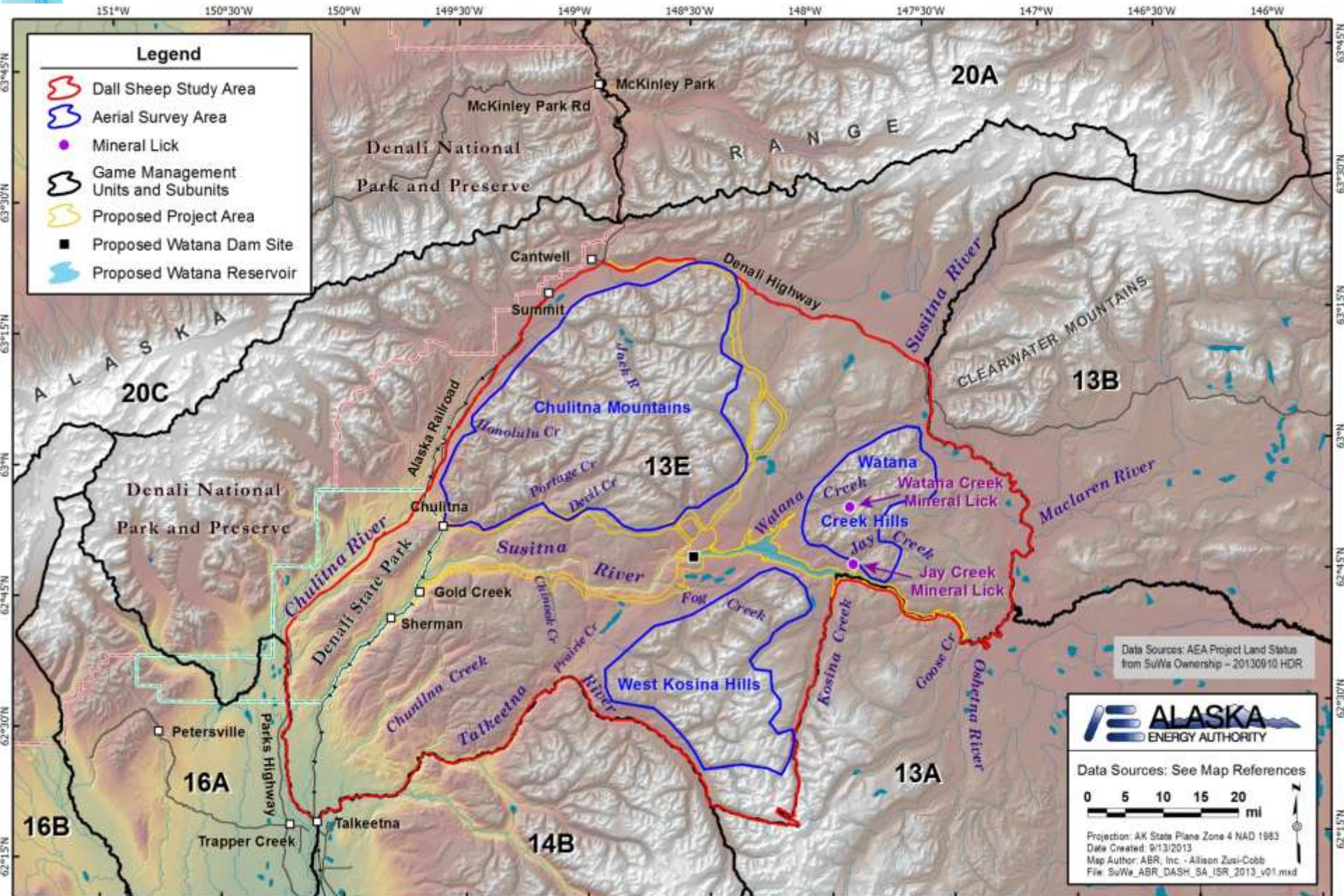
## Study 10.7 — Dall's Sheep (mineral licks)

- Field observations conducted during May 28–29 and June 19–20 by ABR biologists.
- Few sheep were seen at or near either lick: 2–3 near Jay Creek lick and 4–7 at Watana lick.
- A new lick site was found across the Watana Creek valley from the Watana lick.
- Time-lapse photos (10-minute intervals; 3,140 photos) provided minimum counts of 0–5 sheep at Jay Creek lick during May 29–June 20 (seen all days except June 12–14).
  - No variances from the study plan.





# Study Area for 10.7 – Dall's Sheep



## Study 10.7 — Plans for 2014

- Mineral Lick Use:
  - ABR biologists will conduct observations in May and June at the three known sheep licks in the study area.
- Population Survey:
  - ADF&G will conduct an aerial survey (same areas covered in 2013) in summer before the hunting season begins on August 10.
- Comparison with Historical Data:
  - ADF&G will compare current population data with historical and other recent data.



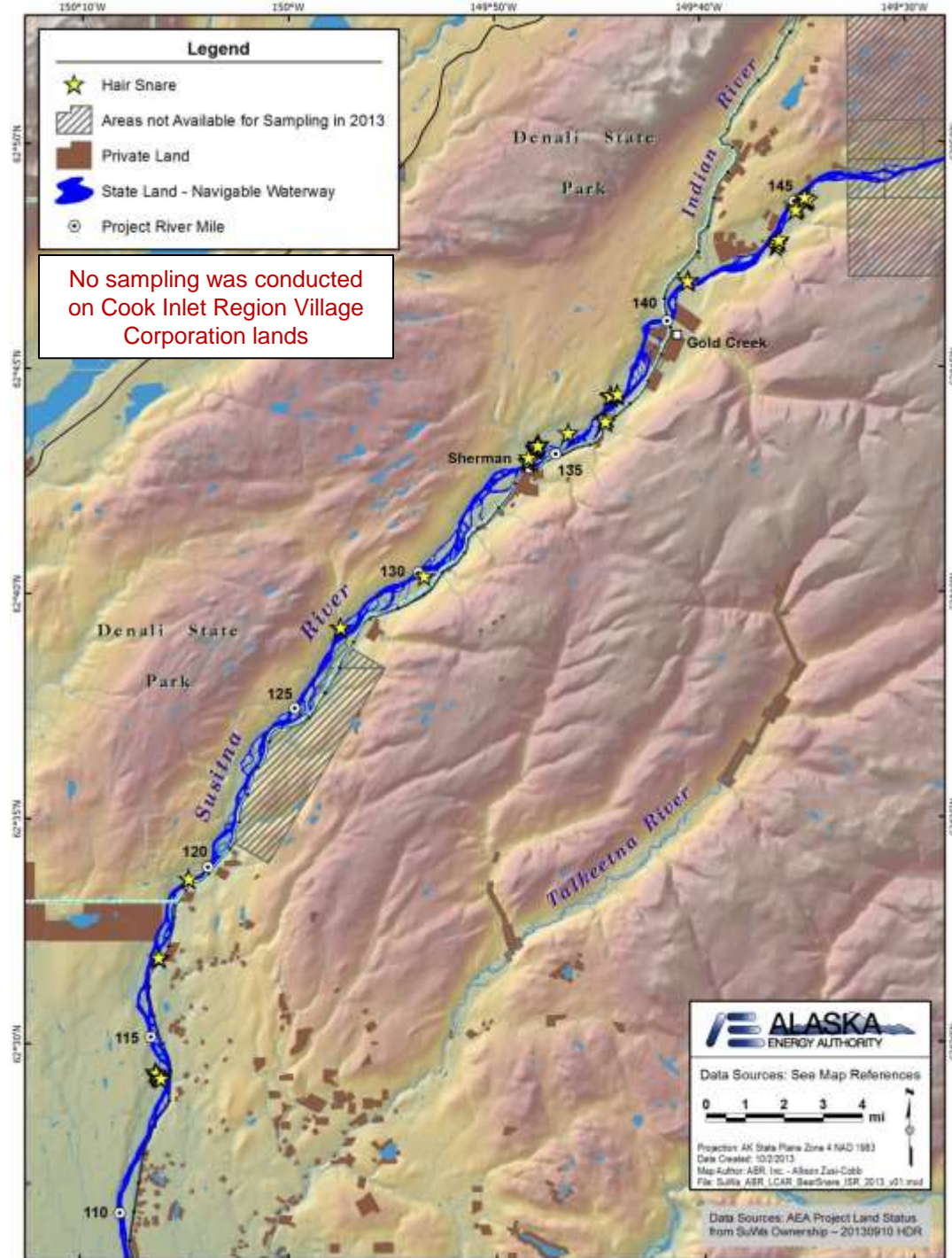
# Study 10.8 — Large Carnivores (Downstream Bears)

- Nonlethal, single-catch snares were deployed to snag hair samples from bears using areas along salmon spawning streams and sloughs downstream in the middle river reach (from the dam site downstream to the three-rivers confluence).
- Sampling began July 23 and ended September 25.
- Hair samples are being analyzed for DNA to provide minimum estimate of number of bears using streams and sloughs, and for stable isotopes to characterize diet composition.



# Locations of Bear Hair Snares, July–Sep. 2013

- Total of 52 snares were deployed in 10 general locations (sloughs & tributaries).
- Some snares were removed due to flooding during high-water event in second half of August.
- 96 hair samples were collected from 34 different snares.
- Several potential sampling sites were bypassed due to lack of access (CIRVC, ARRC, or private lands) or high levels of human activity.



# Study 10.8 — Plans for 2014

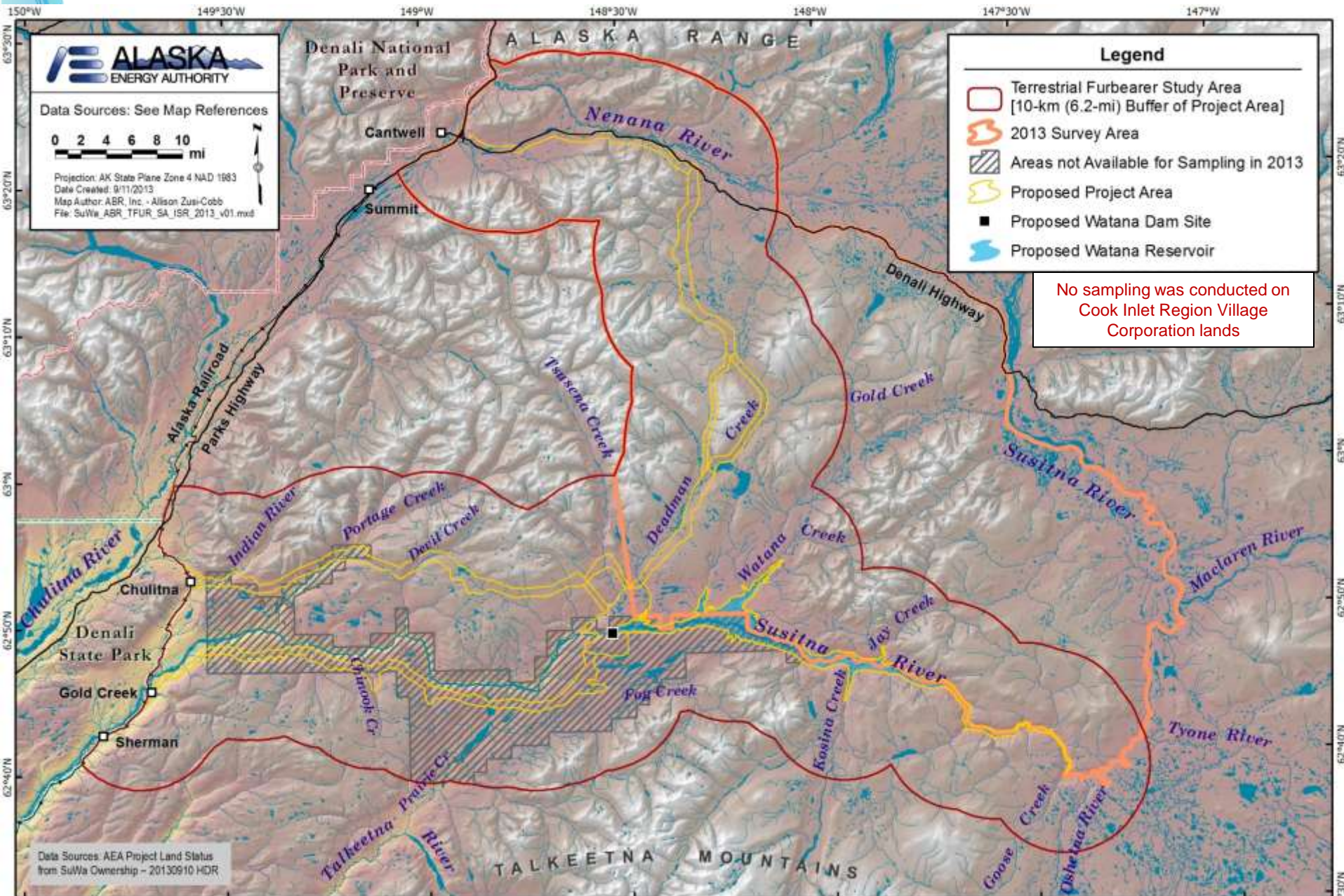
- Bear Population Density Modeling:
  - ADF&G will complete their desktop modeling analysis of population density to generate population estimates of brown and black bears in the study area.
- Hair Sampling of Downstream Bears:
  - ABR will conduct field sampling between late July and late September to obtain hair samples from bears using salmon spawning areas in the middle reach of the Susitna River downstream from the proposed dam site.
  - Hair samples will be analyzed for DNA to provide a minimum estimate of the number of bears using the downstream survey area and for stable isotopes to characterize the dietary composition of those bears.
- Wolf:
  - ABR will collaborate with ADF&G to continue synthesis of historical and recent data on the wolf population in the study area.



# Study 10.10 — Terrestrial Furbearers

- Genetic analyses:
  - Analysis of DNA from scat samples (76 red fox, 35 coyote, 2 lynx, 6 marten) and hair samples (23 lynx, 0 marten) collected in January–April 2013 is being conducted in Dr. Laura Prugh’s lab at UAF, to be completed this quarter (canid samples by December, lynx and marten by year’s end).
- Furbearer resource-use analysis:
  - Track data collected during winter 2013 are being analyzed using *Program MARK*.
  - Spatial and habitat-specific occupancy models will be generated for each target species (coyote, red fox, lynx, marten).
- Prey population indices (small mammal abundance):
  - Field sampling was conducted during June, July, and August 2013.
  - Survey sites established in 2012 that were still accessible in 2013 were resurveyed (several on Cook Inlet Region village corp. lands were not).
  - New sampling sites were established for both surveys.

# Study Area for 10.10 – Terrestrial Furbearers



# Study Plan Variances for Terrestrial Furbearers (Hair & Scat Sampling)

- Hair and Scat Sample Collection:
  - 2013 survey area was smaller than planned due to the lack of a suitable base of winter operations in the middle of the study area, the difficulty of reaching and crossing the Susitna River by snowmachine, and the lack of access to Cook Inlet Region village corporation lands in a portion of the reservoir area and Gold Creek and Chulitna corridors.
  - Deployment of lynx hair-snag stations was modified to more closely match the sampling approach used for canid scats, thereby increasing sampling efficiency while still maintaining a similar sampling density.
  - Collection of marten hair samples could not be accomplished as planned in 2013 due to the difficulty or inability to access suitable habitat (spruce forest) in the reservoir inundation zone.





# Study Plan Variances for Terrestrial Furbearers (Prey Population Indices)

- Snowshoe Hare Survey:
  - Grid locations were placed in suitable regions of the study area with contiguous habitat characteristics (dividing the study area into large survey blocks, as described in the study plan, proved impractical).
  - The number of survey sites was increased from 8–10 grids to 15 grids.
- Vole Survey:
  - The number of trap-nights per grid was shortened from 1–5 nights to a single night, to increase the area sampled.
  - Mark–recapture sampling was dropped in favor of direct enumeration.
  - Data from the 1-night trapping sessions will be compared with 5-night trapping sessions conducted in Denali National Park & Preserve to generate abundance estimates.
  - Trap grid size was increased from 50 traps/grid to 100 traps/grid.
  - The number of survey grids was increased from 8–10 to 15.

# Study 10.10 — Plans for 2014

- Hair & Scat Collection:
  - Samples will be collected during field sampling using snowmachine access in as much of the study area as can be reached safely with landowner permission.
  - Field work will be conducted daily during January–March 2014, possibly extending into April, depending on conditions.
  - Analysis of genetic samples and habitat occupancy data will be conducted during summer and fall for inclusion in the Updated Study Report (USR).
- Aerial Surveys of Tracks:
  - Three aerial surveys will be conducted (ideally, once monthly during January–March) within 3–5 days after fresh snowfall, using the same transects sampled in 1980 and in 2013.
- Snowshoe Hare and Vole Population Indices:
  - Established sampling grids for hare pellets and vole trapping will be resampled during midsummer to assess prey population trends.



# Study 10.11 — Aquatic Furbearers

## Beaver Colony Survey:

- Aerial surveys of active beaver colonies (lodges with fresh food caches) were conducted by helicopter, after leaf-fall but before freeze-up.
- The survey in the downstream area covered the riverine physiography area delineated for the riparian mapping study, which was larger than the downstream survey area proposed in the study plan.
- Dams are not being mapped for this study, but are being mapped for the riparian vegetation study in Focus Areas for geomorphology, fish barrier, and IFS studies and modeling.
- Surveys were flown October 1–2 at higher elevations in the Denali Corridor and much of the Chulitna corridor, and October 9–10 in the remainder of the study area.
- 188 lodges were mapped, 38% of which appeared to be active.
- A higher proportion of the lodges in the riverine physiography area were active than in the access corridors, although that may reflect lower detectability of inactive bank lodges.



# Study 10.11 – Beaver Colony Survey

## October 1–2 and 9–10

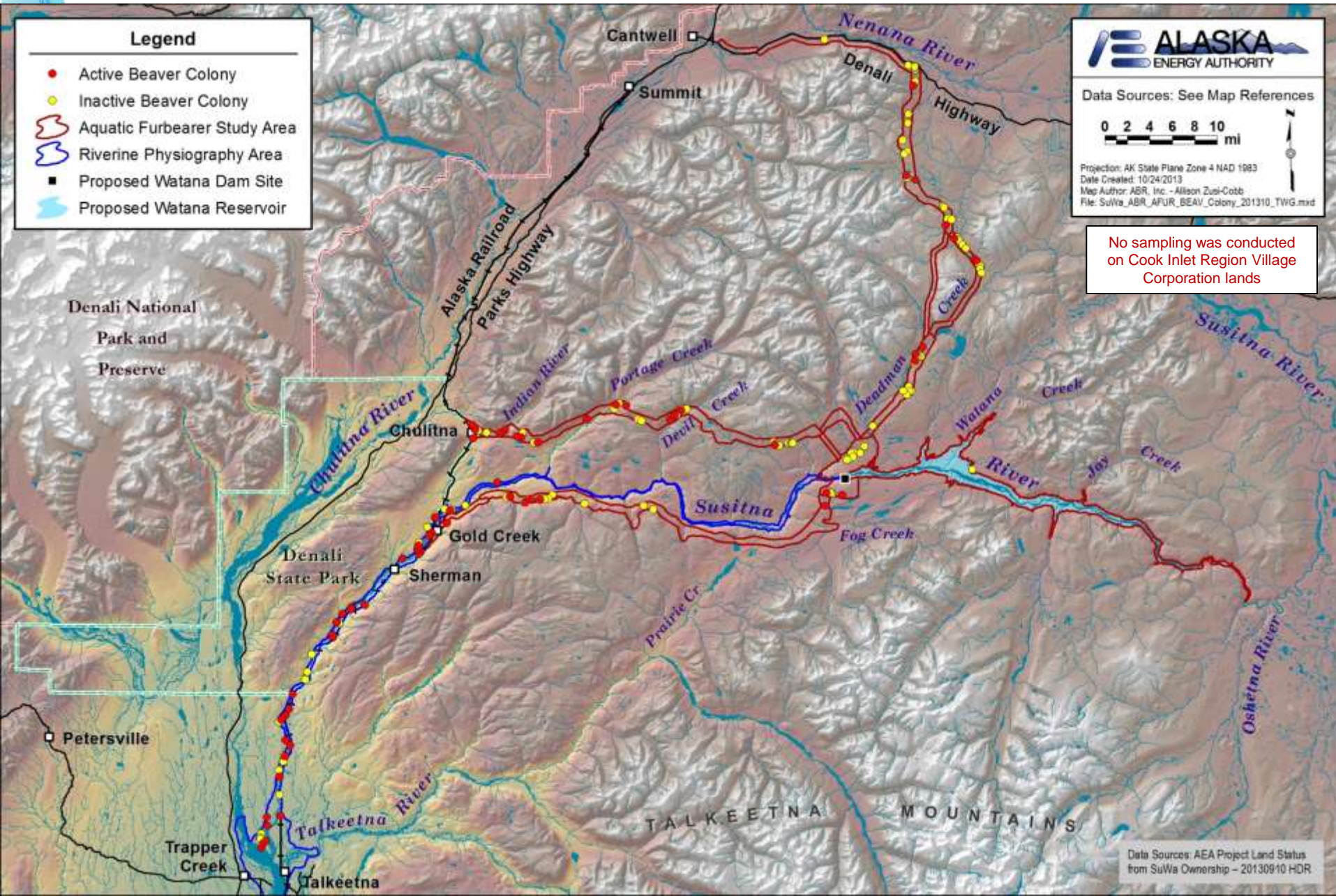
Active lodge with fresh cache



Inactive lodge with old caches



# Study 10.11 – Beaver Colony Survey Results



# Study Plan Variances for Aquatic Furbearers

- River Otter & Mink:
  - Transect surveys for tracks were not flown in late winter 2013; instead, sightings were recorded during helicopter surveys for terrestrial furbearer tracks, waterbird migration, and raptor nest occupancy; one track survey is planned in November or December 2013, pending suitable snow conditions.
  - No furs of trapped otters were obtained for mercury sampling in winter 2012–2013 because no carcasses were presented to ADF&G for sealing from the study area.
- Muskrat:
  - Aerial survey of muskrat sign (“push-ups” on pond and lake ice) planned for April 2013 was cancelled due to late spring; instead, data on muskrat sign were collected during waterbird migration and raptor nest surveys (first sign was noted in 3<sup>rd</sup> week of May due to persistent ice cover).
- Beaver:
  - No variances from the study plan.

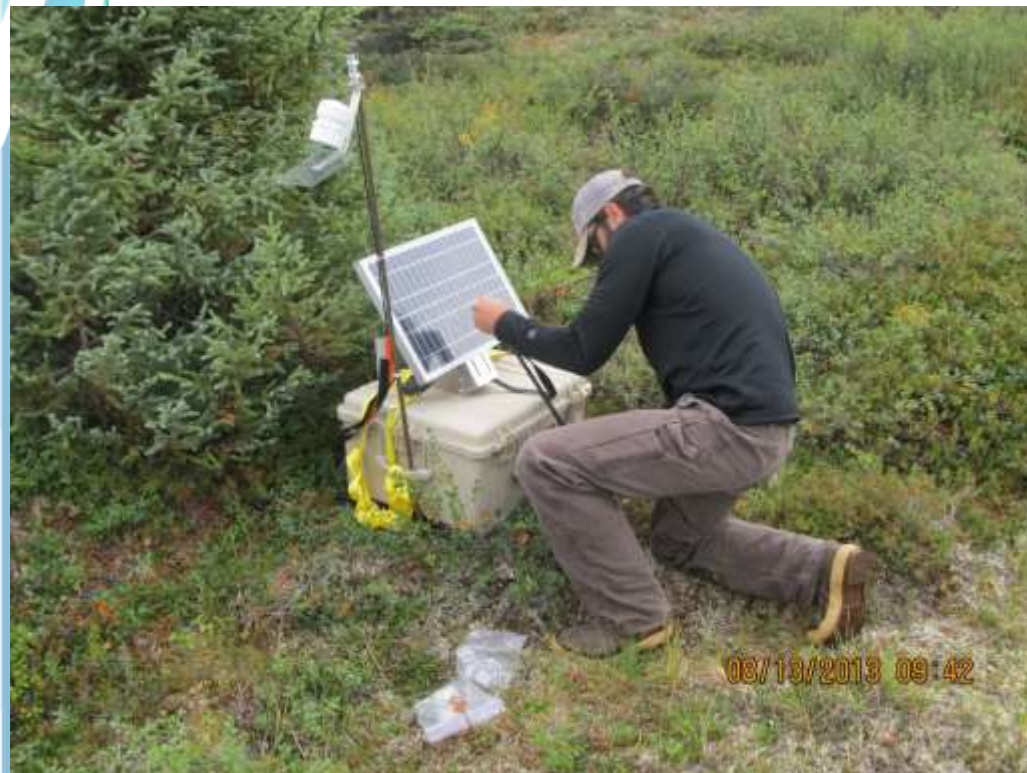
# Study 10.11 — Plans for 2014

- **River Otter & Mink:**
  - Two to three aerial surveys of tracks will be flown within 3 days after fresh snowfall during February–early April and once in November or December.
- **Hair Sampling for Mercury Assessment:**
  - Hair snagging will be attempted in winter 2013–2014 at locations where otters or mink are seen on aerial surveys in the reservoir survey area. If usable samples are not obtained by mid-February 2014, an experienced trapper will be hired for a dedicated trapping effort in the study area.
- **Beaver:**
  - Spring survey (April/May) to assess overwinter survival of active colonies identified in fall 2013.
  - Fall survey (late September/early October) to enumerate active colonies throughout study area.
- **Muskrat:**
  - Muskrat survey will be conducted as planned in spring 2014 (April or May, depending on conditions).



## Study 10.13 — Bats

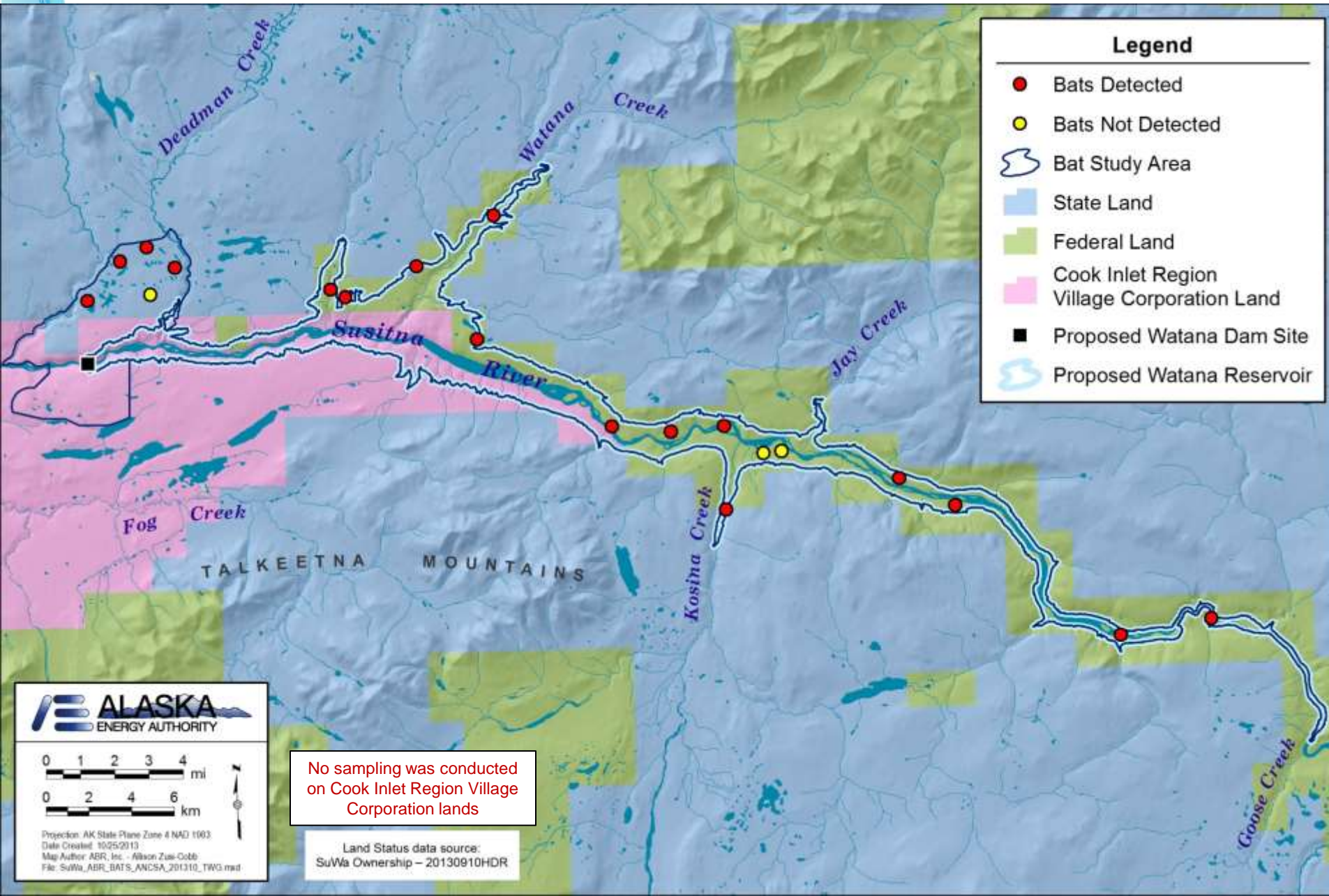
- 20 Anabat® acoustic detectors were deployed for automated recording of bat vocalizations during May 25–October 7 (data cards were changed every 2 weeks).
- 40 sampling points were selected randomly after habitat stratification, with final 20 being selected after field inspection (8 ponds, 4 streams, 4 cliffs, 4 upland sites).
- Potential roosting habitats (cliffs, rock crevices, snags) were surveyed and mapped in late June.
- Structures were identified and owners were contacted for permission to search for potential roosts in mid-August and early October (25 structures at 9 sites).



- First detection of a little brown bat (*Myotis lucifugus*) occurred on May 25, when ponds were still frozen.
- Bat vocalizations were detected at 17 (85%) of the 20 acoustic sampling sites, but no roosts have been located.
- No variances from the study plan occurred in 2013.



# Study Area for 10.13 – Bats



## Study 10.13 — Plans for 2014

- A second season of monitoring is warranted by the high proportion of acoustic detections (85% of monitoring sites) obtained in 2013, even though no roosts have yet been located.
- Sampling plan to be adjusted on the basis of 2013 results now being analyzed, possibly including:
  - Acoustic Monitoring:
    - Deployment of 20 bat detectors in the study area from May to October, targeting areas and/or habitats where bats were detected in 2013 and, if accessible, where no sampling could be conducted in the reservoir zone in 2013.
  - Roost Surveys:
    - Focus on suitable habitat features within the likely foraging range of bats around detector stations where bat vocalizations have been recorded.
    - Consider use of radio telemetry to locate roosts?

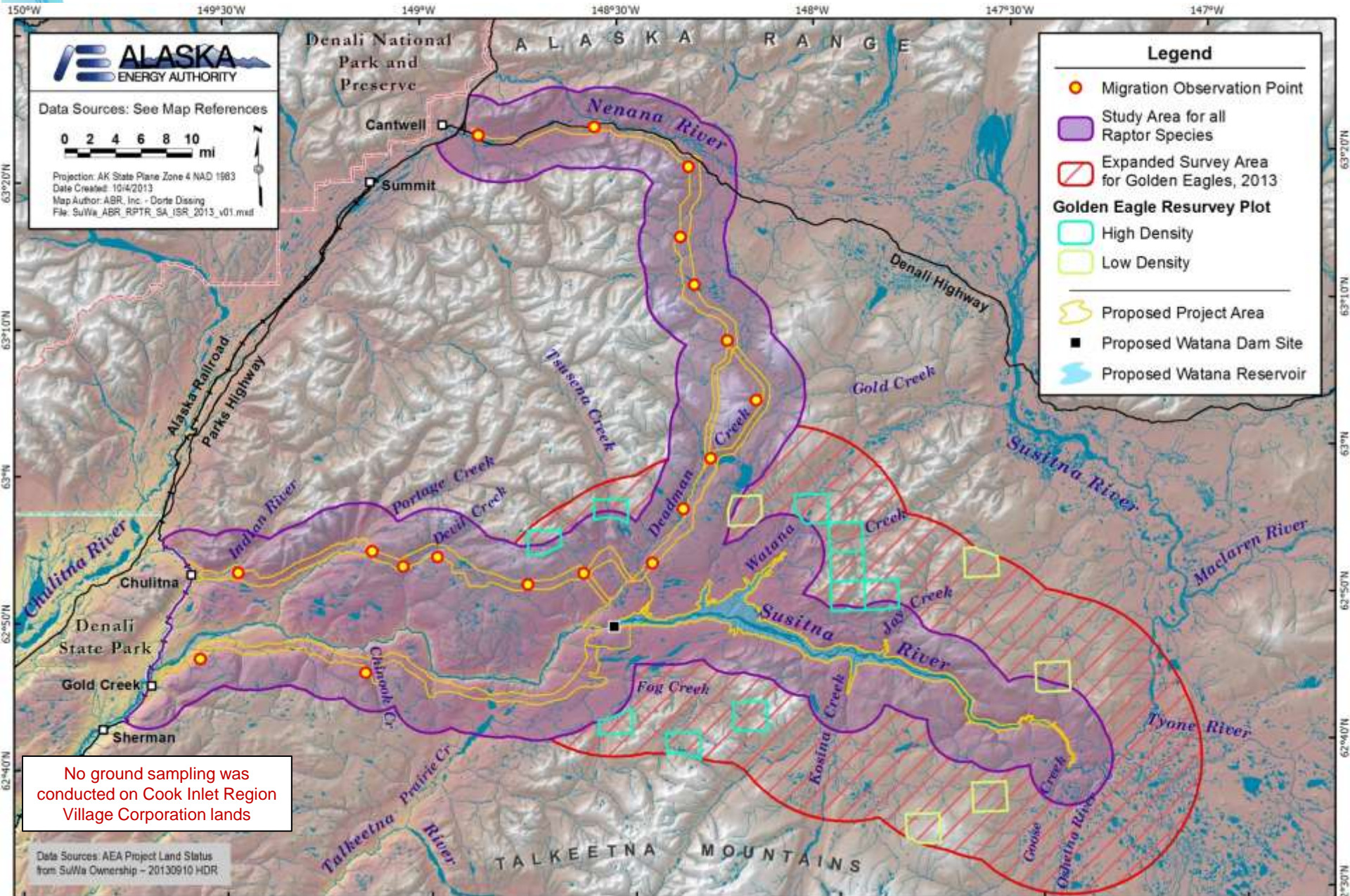


## Study 10.14 — Eagles & Other Raptors

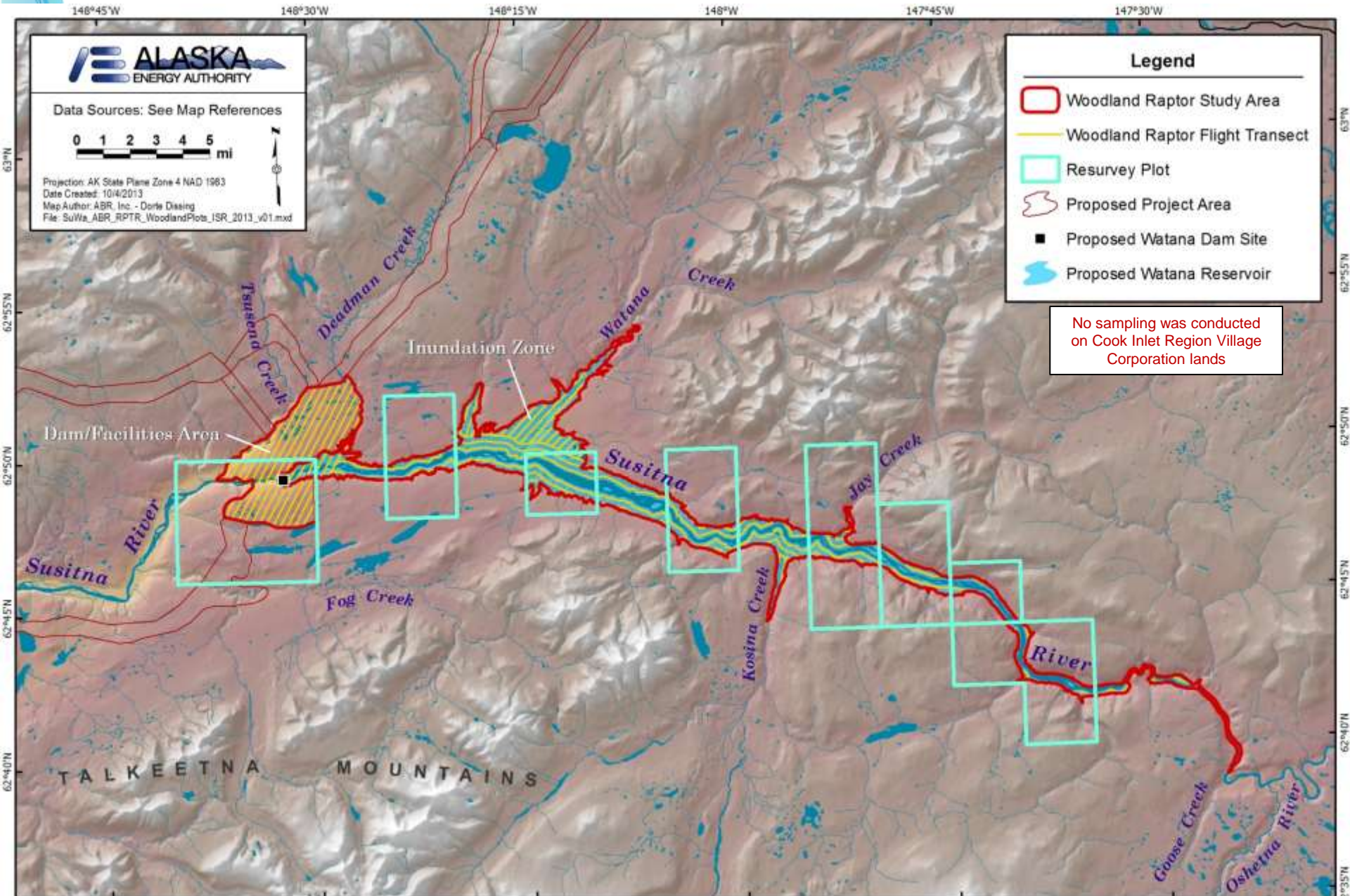
- Helicopter-supported, ground-based observations were used to study migration from 18 observation points located in or near potential transmission-line corridors (avoiding Cook Inlet Region village corporation lands) during April 12–May 11.
- Helicopter surveys were flown during May 4–12 and May 19–24 to locate nests and quantify occupancy.
- Expansion of study area from 2012 required 2 helicopters for nest occupancy surveys in early May and resulted in the discovery of numerous additional nests.
- Late spring and delayed melt resulted in persistent snow cover on cliff nests and delayed nesting by eagles and other raptors.
- Resurveys of subsamples to evaluate detectability were flown later than planned due to late snowmelt.
- Nest productivity was evaluated on surveys flown during July 6–11 and July 29–30, which indicated that productivity and success were low, consistent with the late spring and current low phase of the snowshoe hare population cycle.
- Fall migration was studied using helicopter-supported, ground-based observations during September 15–October 15 at the same 18 observation points used in spring (avoiding Cook Inlet Region village corporation lands).
- Late fall/early winter roosting and staging surveys are being conducted 4 times from early October to early December.



# Study Area for 10.14 – Eagles & Other Raptors



# Survey Area for Woodland Raptors



# Study 10.14 – Eagles & Other Raptors: Variances

- Migration Surveys:
  - Lack of access to Cook Inlet Region village corporation lands in 2013 required that several observation points be moved from the locations originally planned.
- Occupancy & Nesting Surveys:
  - No variances from the study plan were necessary for field surveys.
  - Probable nesting distributions of small forest raptors could not be determined in 2013 because the wildlife habitat map was not yet available.
- Foraging & Roost Surveys:
  - No variances from the study plan occurred.
- Feather Sampling for Mercury Assessment:
  - No feathers or other tissue samples from Bald Eagles were collected in 2013 for assessment of mercury levels because the necessary federal eagle salvage permit could not be obtained before the end of the field season.



## Study 10.14 — Plans for 2014

- Migration Surveys:
  - Helicopter-supported, ground-based observations in April–May and September–October, as in 2013, on accessible lands in the power transmission corridors.
- Nest Occupancy & Productivity (Aerial Surveys):
  - Two occupancy surveys (late April to late May), plus two productivity surveys (mid-June to late July), including nest sightability assessment.
- Nesting Habitat Delineation:
  - Combining field survey results with wildlife habitat map, when available.
- Foraging and Roosting Surveys:
  - Four aerial surveys from October to early December.
- Eagle Tissue Sampling for Mercury Assessment:
  - ABR plans to be designated as a subpermittee under a USFWS eagle salvage permit for collection and analysis of feathers (and any other suitable specimens, such as unhatched eggs or dead juveniles) in 2014.



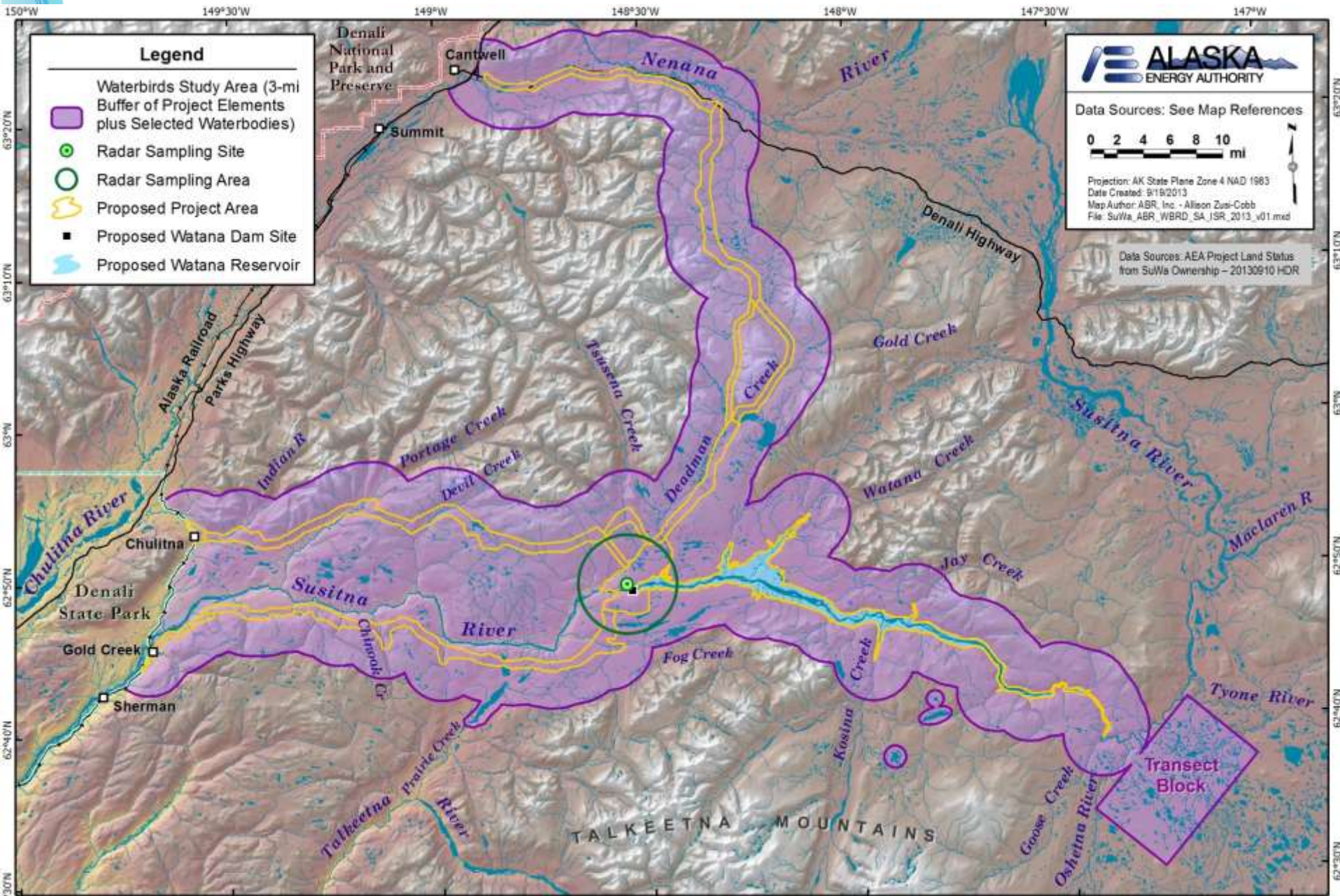
## Study 10.15 — Waterbirds (aerial surveys)

- Waterbird aerial surveys were designed to document the timing, species composition, and numbers of waterbirds migrating through, and breeding in, the study area.
- Surveys flown at 200–500 ft agl in a Robinson R-44 piston-engine helicopter.
- Surveys covered major drainages and lake complexes within 3 miles of the Susitna River from the railroad bridge crossing near Indian River upstream to the Tyone River, and of the Nenana River between Seattle Creek and Cantwell.
- Migration surveys were not postponed due to the late spring, but early surveys were of short duration due to the persistence of ice on waterbodies.
- Migration surveys (April 23, 29; May 5, 11, 18–19, 23–24, 28–29) recorded 38 species of waterbirds.
- Breeding surveys (June 1–5, June 14–17) recorded 32 species of waterbirds (including Harlequin Duck) as confirmed or probable breeders.
- Brood surveys (July 20–22; August 1–5, 14–18) confirmed that the timing of breeding in 2013 was fairly similar for dabbling and diving ducks (i.e., the normal timing pattern appeared to have been “telescoped” by the late spring).
- Fall migration surveys began August 14 and ended October 18, 2013.





# Study Area for 10.15 – Waterbirds

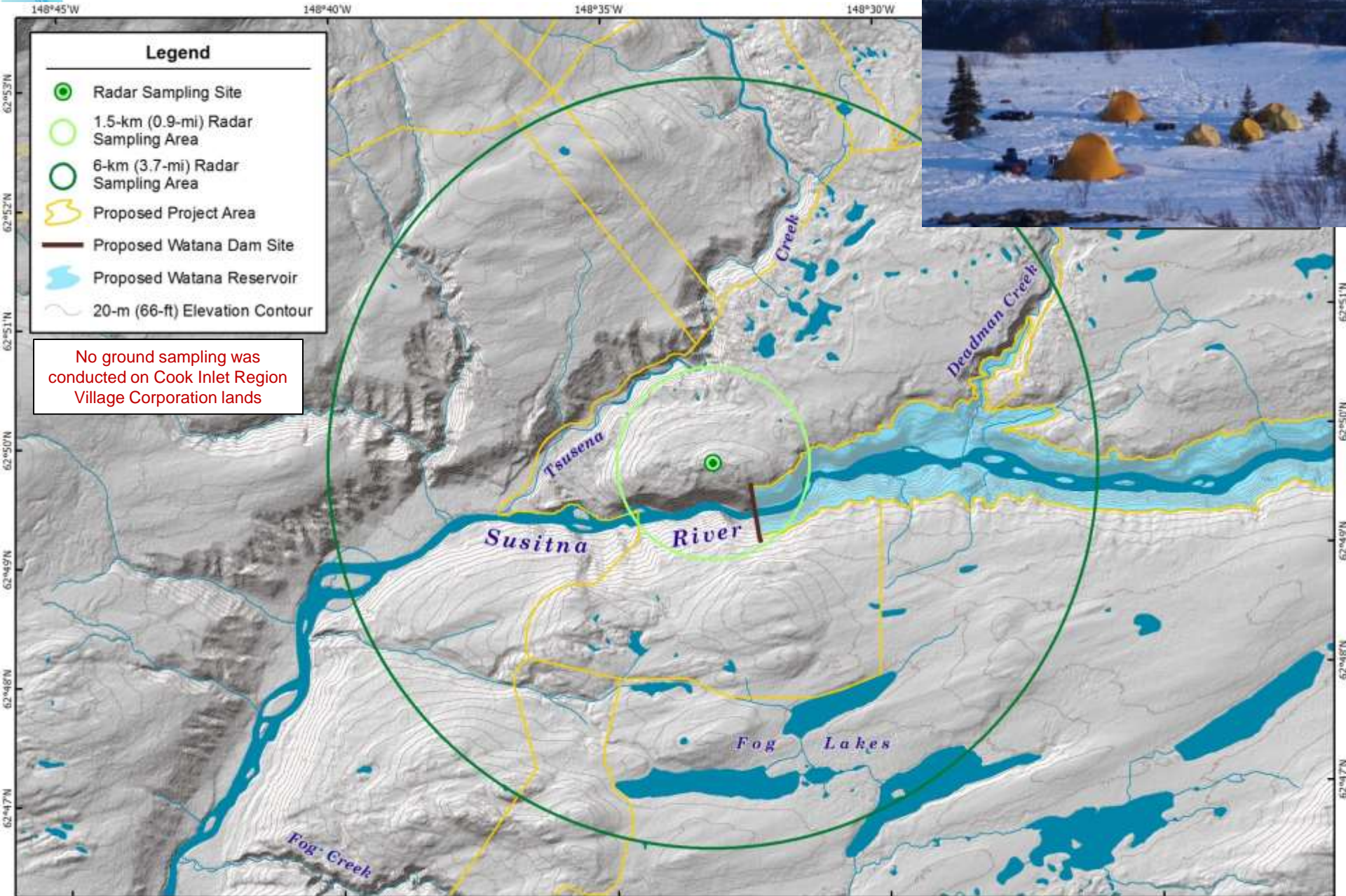


## Study 10.15 — Waterbirds (radar/visual migration surveys)

- A 4-person tent camp was established on state land just northwest of the proposed dam site to monitor all bird movements (both day and night) during spring and fall migration.
- Observations were conducted at the camp site 24 hours per day throughout a 45-day period in the spring (20 April–3 June) and a 60-day period in the fall (15 August–15 October).
- Both radar and visual surveys were conducted from fixed locations.
- A portable marine radar, powered by a portable generator, was used in both surveillance and vertical modes during all nocturnal and 3 diurnal hours (dictated seasonally by night length) to record the flight patterns, numbers, and behavior of all birds within 6 km (3.7 miles) of the site.
- During a portion of the night, an observer also used night-vision equipment to record the relative numbers of different species flying through the area.
- During diurnal periods, visual observers recorded numbers, flight characteristics, and behaviors of all birds observed within 10 km (6.2 miles) of the site.



# Study 10.15: Radar/Visual Migration Surveys



# Study Plan Variances for 10.15 – Waterbirds

- **Aerial Surveys for Migration and Breeding:**
  - Fewer aerial surveys were flown than were described in the study plan because the 5-day interval between surveys was calculated from the end of each previous survey (surveys usually took 2 days to complete).
  - The final spring migration survey was flown in late May, instead of early June, because of the chronology of the 2013 nesting season.
- **Radar/Visual Sampling during Migration:**
  - Did not use 4 simultaneous observers for visual sampling, as recommended by FERC in their February 1 Study Plan Determination (SPD), because USFWS rescinded their recommendation after further consultation with ABR in a post-SPD meeting on March 1, 2013.
- **Feather Sampling for Mercury Assessment:**
  - Collection of feathers from piscivorous species of waterbirds was not accomplished in 2013 because suitable samples were not available from the few nests that were found on accessible lands.

# Study 10.15 — Plans for 2014

- **Aerial Surveys (Migration):**
  - Helicopter surveys of spring and fall migration, conducted at 5-day intervals between successive surveys during late April–late May/early June and mid-August–mid-October.
- **Ground-based Radar & Visual Surveys of Migration:**
  - Need for a second year of this work will be evaluated using the results of the 2013 work, to be reported in the ISR.
- **Aerial Surveys (Breeding Season):**
  - 2 breeding population surveys in June, including lake-to-lake surveys and transects in different portions of the study area.
  - 2 stream surveys for Harlequin Ducks during prenesting (late May–early June) and brood-rearing (late July–early August).
  - 2–3 surveys for waterbird broods (mid-July–early August) within 1 mile of proposed Project infrastructure.
- **Tissue Sampling for Mercury Assessment:**
  - Alternative methods for assessing mercury levels in piscivorous waterbirds may be developed for 2014, through further consultation with USFWS.



## Study 10.16 — Landbirds & Shorebirds

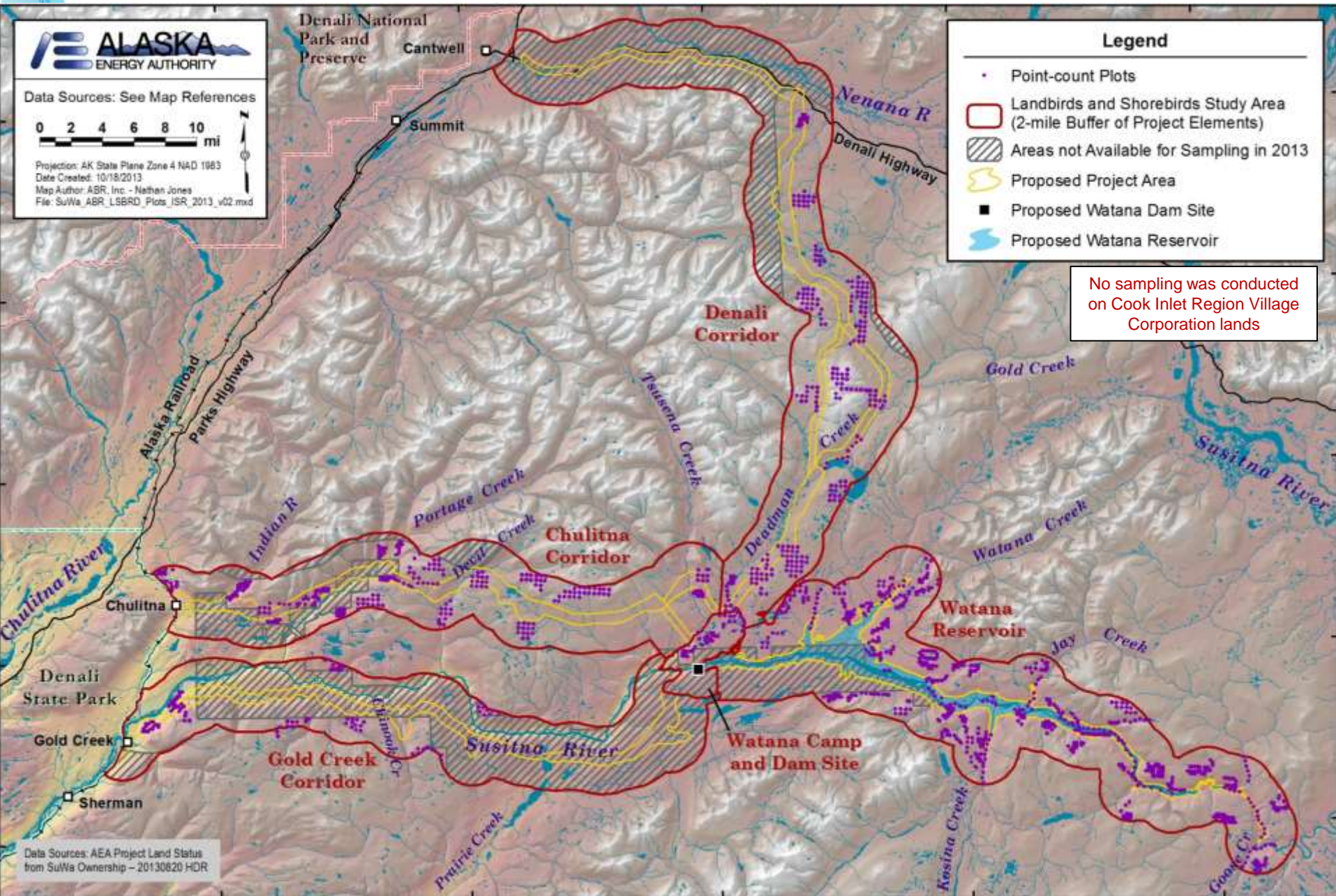
- Primary surveys were early morning point-counts conducted in all available habitats, focused on landbirds (singing males) and shorebirds (territorial displays).
- Riverine habitats (point counts and transects) and lacustrine waterbodies (shoreline transects) were sampled also in separate surveys.
- Field surveys were conducted from May 23 to June 20 (29 days of sampling).
- 4 crews of 2 biologists accessed sampling locations by helicopter and on foot.
- 1,364 point-count plots were sampled on 113 different transects (point locations were allocated by vegetation type and project component using a stratified random procedure).
- Swallow colony surveys were conducted during July 1–3 and July 15–16 in the area of the proposed Watana Reservoir; 26 colonies (mostly Bank Swallows, few Violet-green Swallows) were located, containing from 1 to 354 burrows (mean = 37 burrows).



## Study 10.16 — Landbirds & Shorebirds

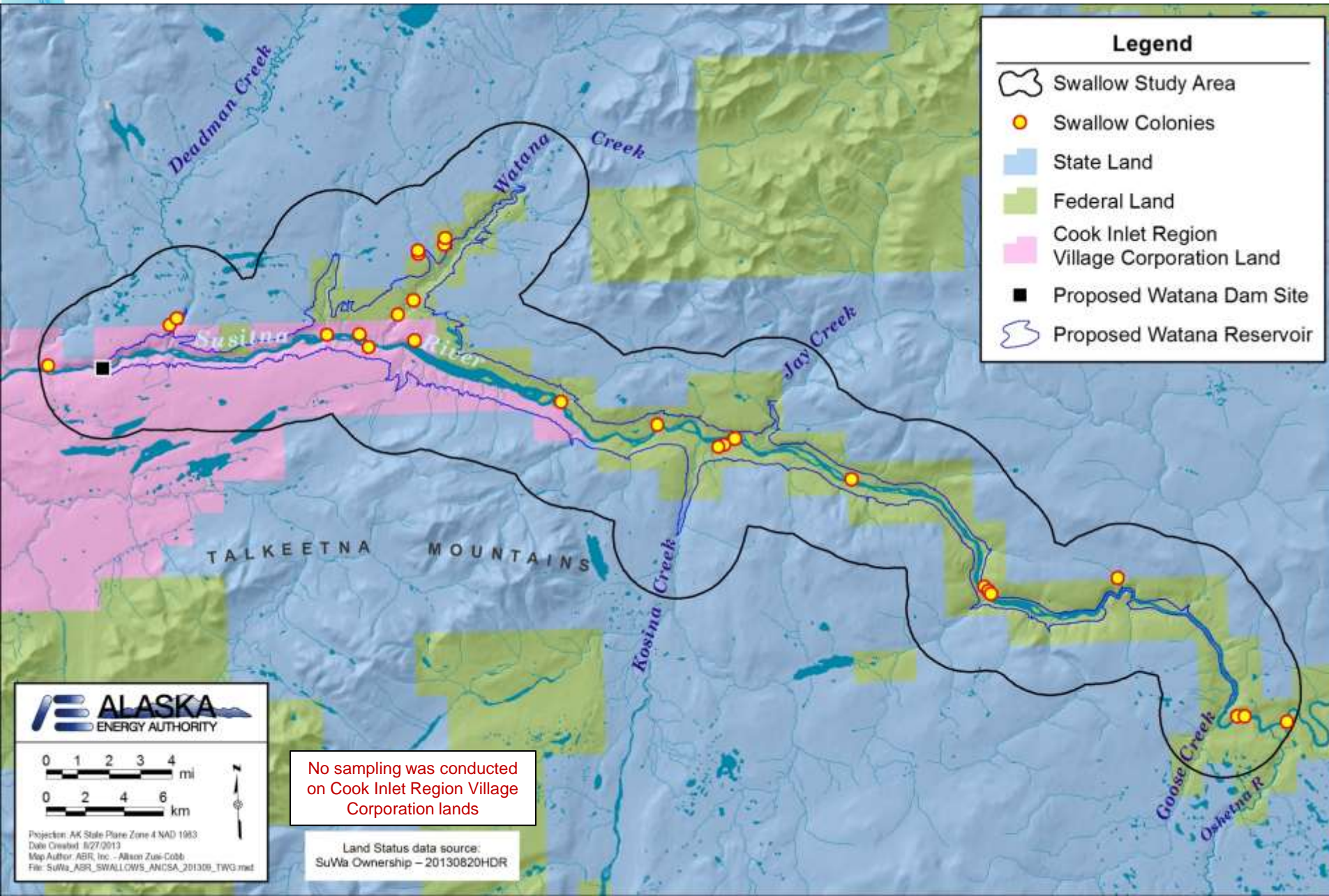
- Preview of point-count survey results:
  - Of 53 landbird species recorded, the 8 most commonly observed landbirds (59% of all landbird observations) were, in order of abundance: Fox Sparrow, White-crowned Sparrow, Common Redpoll, Yellow-rumped Warbler, Varied Thrush, Savannah Sparrow, Ruby-crowned Kinglet, and American Tree Sparrow.
  - 5 landbird species of conservation concern were recorded (in order of abundance): Varied Thrush, Blackpoll Warbler, Gray-cheeked Thrush, Olive-sided Flycatcher, and Rusty Blackbird.
  - Of 10 shorebird species recorded, the most commonly observed shorebirds (84% of all shorebird observations) were, in order of abundance: Wilson’s Snipe, Spotted Sandpiper (mostly on riverine plots), American Golden-Plover, and Lesser Yellowlegs.
  - 4 shorebird species of conservation concern were recorded (in order of abundance): American Golden-Plover, Lesser Yellowlegs, Solitary Sandpiper, and Whimbrel.

# Study 10.16 – Study Area & Sampling Points





# Study 10.16 – Swallow Colony Locations



# Study Plan Variances for Study 10.16 – Landbirds & Shorebirds

- Point-count Surveys:
  - Plot-allocation procedure in 2013 was modified because current aerial imagery was not available for the full study area, prohibiting the allocation of plots by image-signature as proposed in the RSP; instead, plots were allocated using a stratified random procedure relying on AVC Level III vegetation types, which were mapped for the APA Project in the mid-1980s.
  - Lack of access to Cook Inlet Region village corporation and ARRC lands, as well as lack of full coverage of the study area in the 1980s vegetation mapping, limited the area in which surveys could be conducted.
- Swallow Colony Survey:
  - Helicopter surveys were used instead of boat-based surveys to locate swallow colonies.
  - Some colonies had to be observed from a distance due to the lack of access to Cook Inlet Region village corporation lands, but data collection was not compromised.



## Study 10.16 — Plans for 2014

- Point-count and Transect Surveys:
  - Repeat intensive sampling in May and June, including point counts in all available habitats plus riverine- and lacustrine-focused surveys; previously inaccessible lands will be surveyed, if permitted in 2014.
- Estimation of Breeding Population Density & Abundance:
  - Use combined 2013–2014 point-count data, corrected for detectability, to determine densities and total estimated birds occurring in various subdivisions (e.g., buffers of each of the proposed Project components) in the study area.
- Habitat-use Analyses:
  - Conduct habitat-use analyses, based on the final mapped wildlife habitat types, to facilitate work on the Evaluation of Wildlife Habitat Use (RSP 10.19).
- Swallow Colony Survey:
  - Repeat helicopter-based survey(s) in July in reservoir inundation zone, reexamining colonies found in 2013 and searching for more.
- Tissue Sampling for Mercury Assessment:
  - Develop alternative approaches for collecting tissue samples from Belted Kingfishers, in consultation with USFWS.

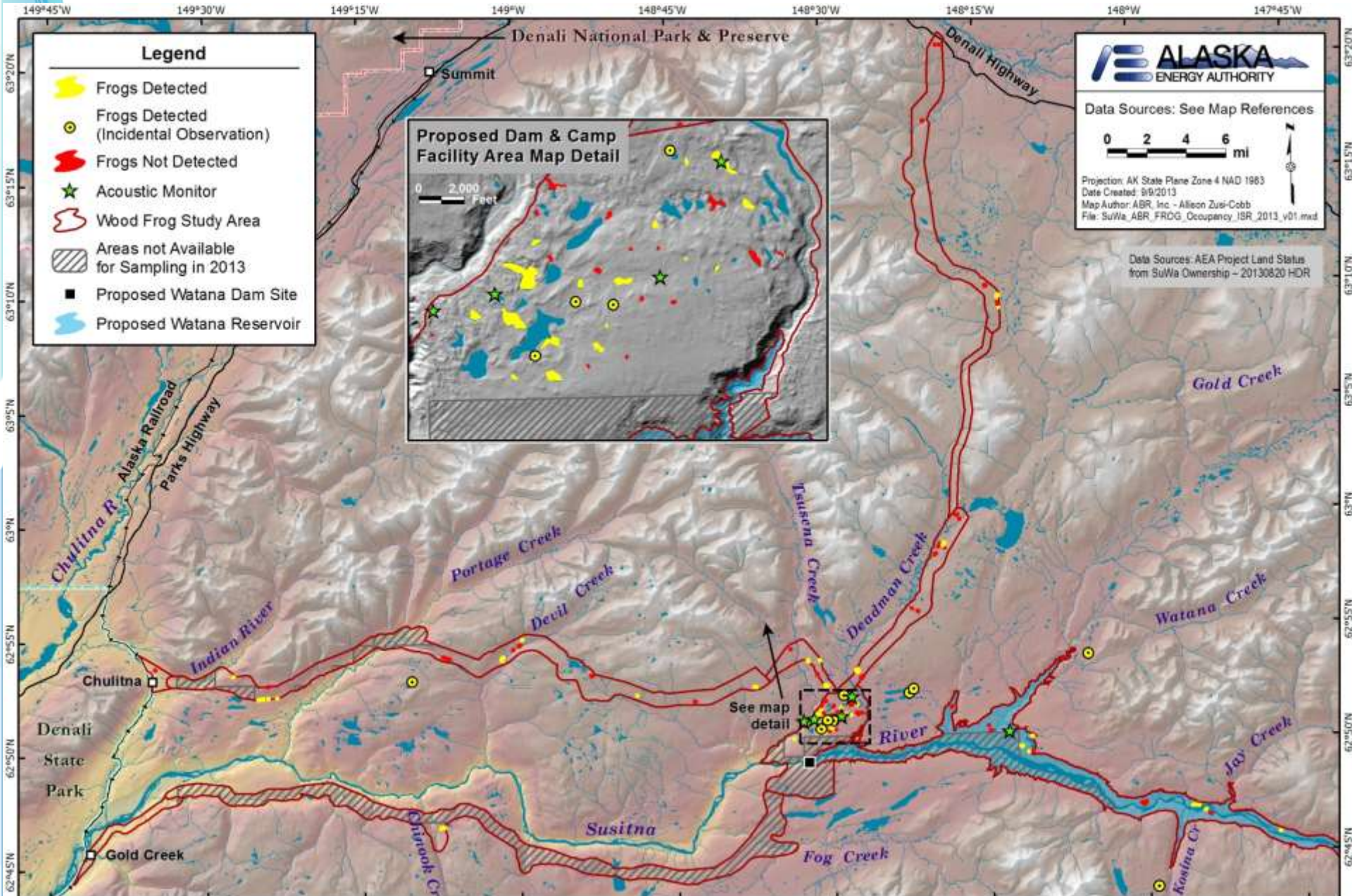


## Study 10.18 — Wood Frog

- Objective was to investigate occurrence and habitat occupancy in the study area (reservoir inundation zone, dam/camp/facilities area, road corridors).
- Primary sampling method was auditory survey to detect calling male frogs during the spring breeding season; egg masses also were recorded when seen ( $n = 13$ ).
- Frogs captured opportunistically by hand ( $n = 7$ ) were swab-sampled for the presence of *Batrachochytrium dendrobatidis* (amphibian chytrid fungus). None of the samples tested positive.
- Surveys were conducted at 90 sampling sites by 2 crews of 2 observers each, staggering the timing of visits to accommodate repeated visits, if necessary, during the sampling period (May 30–June 8).
- Start of surveys was postponed about 2 weeks due to the cold, late spring and delayed melt.
- Detectability was assessed through multiple site visits and deployment of acoustic monitors at 5 sites where frogs were detected on the first survey.
- Wood frogs were detected at 47 of the 90 sites sampled and the probability of detection was estimated to be 61% with a single visit, 85% with two visits, and 94% with three visits.



# Study Area & Sampling Points for 10.18 – Wood Frogs



# Study Plan Variances for 10.18 – Wood Frogs

- **Auditory Surveys:**
  - Selection of sampling locations had to be modified because complete mapping of wetlands and wildlife habitats was not available in 2013 and Cook Inlet Region village corporation lands could not be accessed; instead, an alternative sample allocation plan was used to ensure random selection of sampling sites in available areas, based on waterbody mapping & image interpretation.
  - Daily distribution of sampling times was modified to accommodate helicopter scheduling, resulting in surveys being conducted during 09:00–20:00 rather than 12:00–22:00, as proposed in the study plan.
- **Occupancy Modeling & Habitat Associations:**
  - Limited statistical power prevented an estimate of detectability from field survey data, but detectability was estimated from both the occupancy modeling and acoustic monitoring, providing essentially identical results.
- **Acoustic Monitoring & Chytrid Fungus Sampling:**
  - No variances occurred.

## Study 10.18 — Plans for 2014

- **Auditory Surveys:**
  - Data will be evaluated to determine if field surveys (involving up to 3 visits per site during the peak period of calling activity by breeding male frogs, expected in mid- to late May) will be conducted in some of the areas inaccessible for sampling in 2013.
  - Egg masses will be searched for opportunistically at sampling sites, in addition to listening for calling males.
- **Acoustic Monitoring:**
  - Acoustic monitors will be deployed at locations where frogs are detected on the first visit to better delineate the seasonal and diurnal timing of calling activity, for use in detectability assessment & occupancy modeling.
- **Chytrid Fungus Sampling:**
  - Frogs will be captured by hand and/or net to obtain swab samples for laboratory assay of the presence of amphibian chytrid fungus.
- **Occupancy Modeling & Habitat Associations:**
  - Detectability and habitat covariates will be incorporated into a habitat modeling analysis.

# Questions?



*Wolf near Deadman Creek and the Denali access corridor, June 3, 2013.*



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