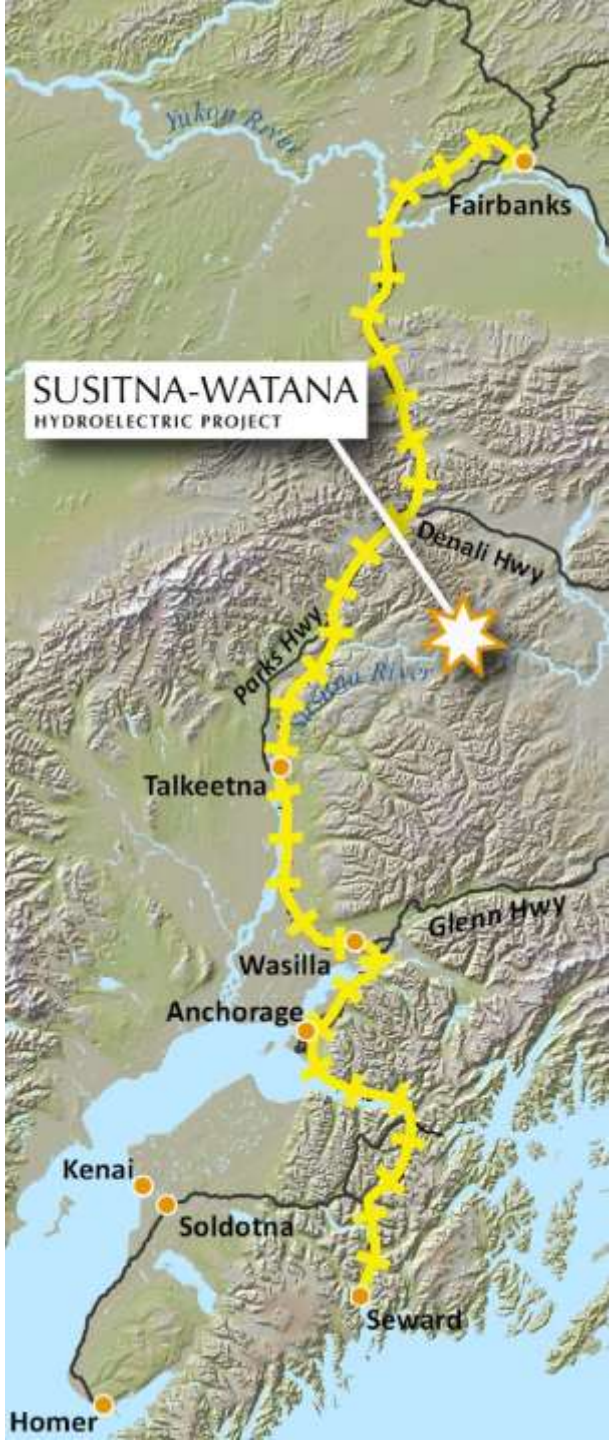

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Terrestrial Resources Technical Work Group Meeting 1st Quarter 2013

March 4, 2013

Prepared by ABR, Inc. —
Environmental Research & Services

ABR inc.
environmental research & services

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Meeting Outline

Wildlife Resources

- FERC Study Determination
- Progress updates on 2012–2013 wildlife studies
- Additional topics:
  - Delayed approval for access to ANCSA corporation lands
  - RSP supplemental FERC filing — specifically, mercury study plan, with regard to sample collection and transfer for analysis
- Summary of AEA 2012 wildlife study results

FERC Study Plan Determination, 1 Feb. 2013

- All 16 wildlife studies were included in the 44 studies approved by FERC
- 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, 1 Feb. 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 have been accommodated 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.
    [*AEA is consulting with USFWS and ADF&G regarding these changes*].
  - 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 have been accommodated by AEA*].

Progress of 2012–2013 Studies, as of 1st Quarter

- ADF&G studies (update by Mark Burch, ADF&G):
  - 10.5 – Moose
  - 10.6 – Caribou
  - 10.7 – Dall's Sheep
  - 10.8 – Large Carnivores
  - 10.9 – Wolverine
  - 10.17 – Willow Ptarmigan
- UAF study (update by Laura Prugh, IAB)
  - 10.10 – Terrestrial Furbearers
- Studies by ABR, Inc.:
  - 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)
  - 10.16 – Landbirds/Shorebirds
  - 10.18 – Wood Frog
  - 10.19 – Wildlife Habitat Evaluation
  - 10.20 – Wildlife Harvest Analysis

Wildlife Studies: 1st Quarter Activities, 2013

RSP Section	Title	1st Quarter Activity
10.05	Moose	Browse & population surveys; collar deployment & tracking
10.06	Caribou	Radio-tracking
10.07	Dall's Sheep	Planning (mineral lick visits in Q2)
10.08	Large Carnivores	Spatial modeling of bear densities; continue data review
10.09	Wolverine	SUPE or occupancy survey
10.10	Terrestrial Furbearers	Collection of hair & scat samples; aerial track transect surveys
10.11	Aquatic Furbearers	Aerial track transect surveys; hair collection from trapped carcasses; mercury literature review
10.12	Small Mammals	Literature review; begin historical data reanalysis
10.13	Bats	Review geology information for potential roost structures
10.14	Eagles/Other Raptors	Planning (field surveys begin Q2); mercury literature review
10.15	Waterbirds	Planning (field surveys begin Q2); mercury literature review
10.16	Landbirds/Shorebirds	Begin point-count allocation for field surveys in Q2
10.17	Ptarmigan	Aerial transect surveys
10.18	Wood Frog	Chytrid fungus sampling protocol; begin sampling site allocation
10.19	Wildlife Habitat Evaluation	Select species for evaluation; habitat-use literature review
10.20	Wildlife Harvest Analysis	Planning (data updates in Q3)

Additional Topics

- Delayed approval for access to ANCSA corporation lands, mainly in reservoir zone and Gold Creek corridor, has resulted in attendant delays in terrestrial furbearer sampling, moose browse survey
- RSP supplemental FERC filing — delayed approval of mercury study plan could result in delays in obtaining permits for collection of tissue (hair, feathers) samples for piscivorous wildlife, but permit applications are being submitted on the assumption that the study will be approved

Summary of 2012 Wildlife Studies

- W-S1: Big Game Movements and Habitat Use
- W-S2: Past and Current Big Game and Furbearer Harvest Analysis
- W-S3: Surveys of Eagles and Other Raptors

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2012 Objectives: Big Game Movements & Habitat Use

- Identify relevant data available from the Alaska Department of Fish and Game (ADF&G)
- Augment results of previous studies
- Compare wildlife location data to current proposed Project area and, where applicable, apply new analytical techniques to historical data
- Evaluate the adequacy of existing information to assess potential Project-related effects on these wildlife resources in the middle and upper Susitna River basin

2012 Methods: Big Game Movements

- Historical telemetry data acquired from ADF&G
  - Nelchina Caribou Herd, 1980–1985 (*n* = 92 animals)
  - Moose, 1976–1984 (*n* = 211; 69 with >30 locations)
  - Brown bear, 1978–1985 (*n* = 90; 39 with >30 locations)
  - Black bear, 1980–1985 (*n* = 74; 42 with >30 locations)
  - 1980s data for wolf (and wolverine) no longer available
  - More recent/current data not yet acquired from ADF&G
- Used fixed-kernel density analysis of Nelchina caribou seasonal range use and of home ranges of individual moose and bears
- Calculated estimated seasonal density of caribou in Project area and percent use of Project area by collared moose and bears
- Moose and bear results were influenced by capture locations

2012 Results: Big Game Range Use

- Nelchina Caribou Herd Distribution
  - Herd used the Project area in all seasons, peaking during calving and autumn
  - Reservoir inundation zone had the greatest use during most seasons
- Moose Home Ranges
  - 74% of moose home ranges overlapped the Project area; average use was 12%
  - Greatest use was in reservoir inundation zone (67% of moose; average use 8%)
- Brown Bear Home Ranges
  - 82% of brown bear home ranges overlapped the Project area; average use 8%
  - Greatest use was in reservoir zone (72% of brown bears; average use 4%)
- Black Bear Home Ranges
  - 74% of black bear home ranges overlapped the Project Area; average use 23%
  - Greatest use was reservoir zone (67% of black bears; average use 14%)

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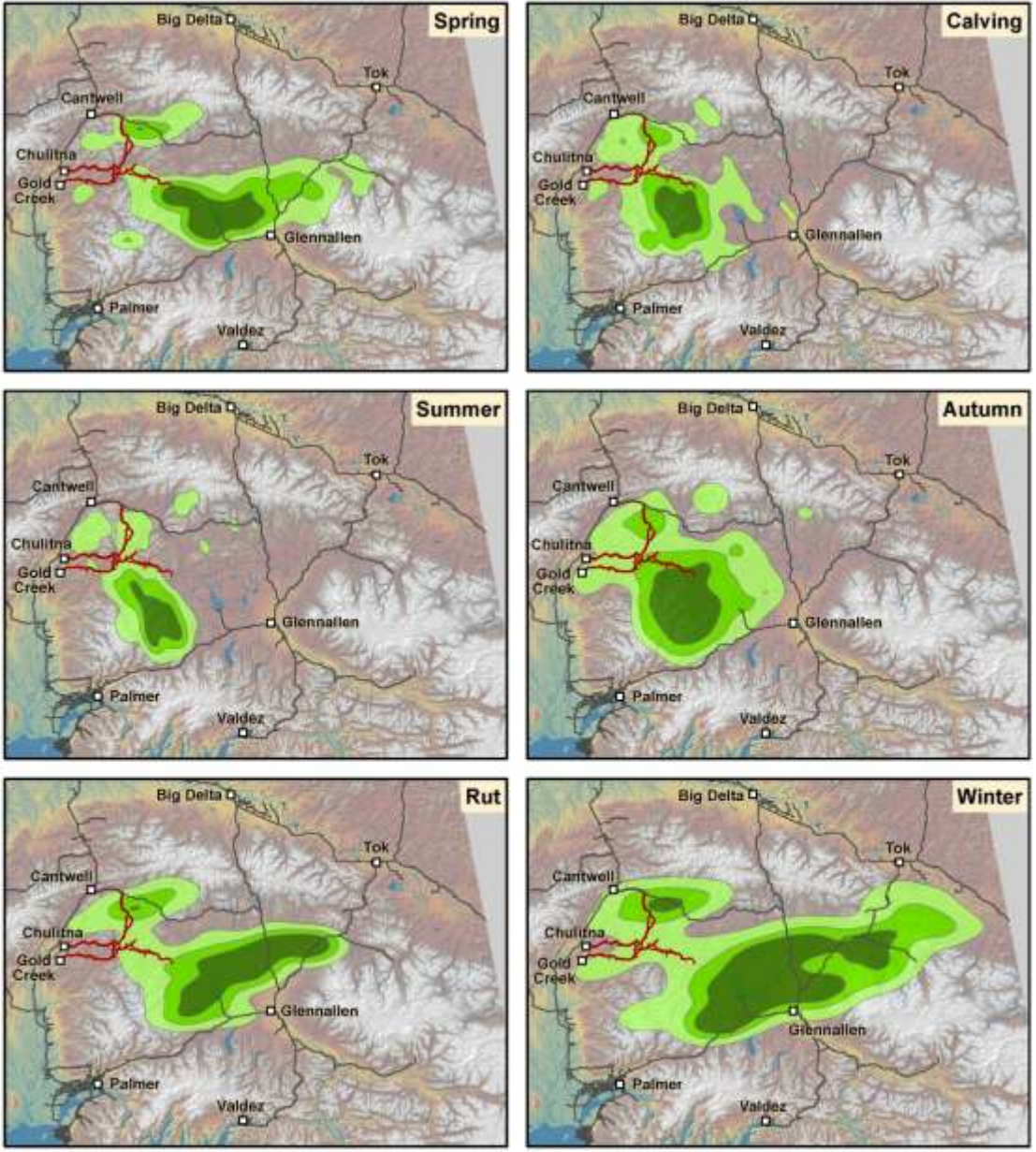
Nelchina Caribou Herd Distribution, 1980–1985



Spring:	April 1–May 14
Calving:	May 15–June 10
Summer:	June 11–July 31
Autumn:	August 1–September 30
Rut:	October 1–31
Winter:	November 1–March 31

Data source: Utilization distribution contours from fixed-kernel analysis of locations of radio-collared caribou (telemetry data from ADF&G). Contours enclose stated percentages of all collar locations. High-, medium-, and low-density areas are the 50%, 75%, and 95% utilization distribution contours, respectively. Project Area from MWH Global, 10/26/2012.

Areas of Concentrated Use

High Density | Medium Density | Low Density

Project Area

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0 20 40 60 80 100 mi

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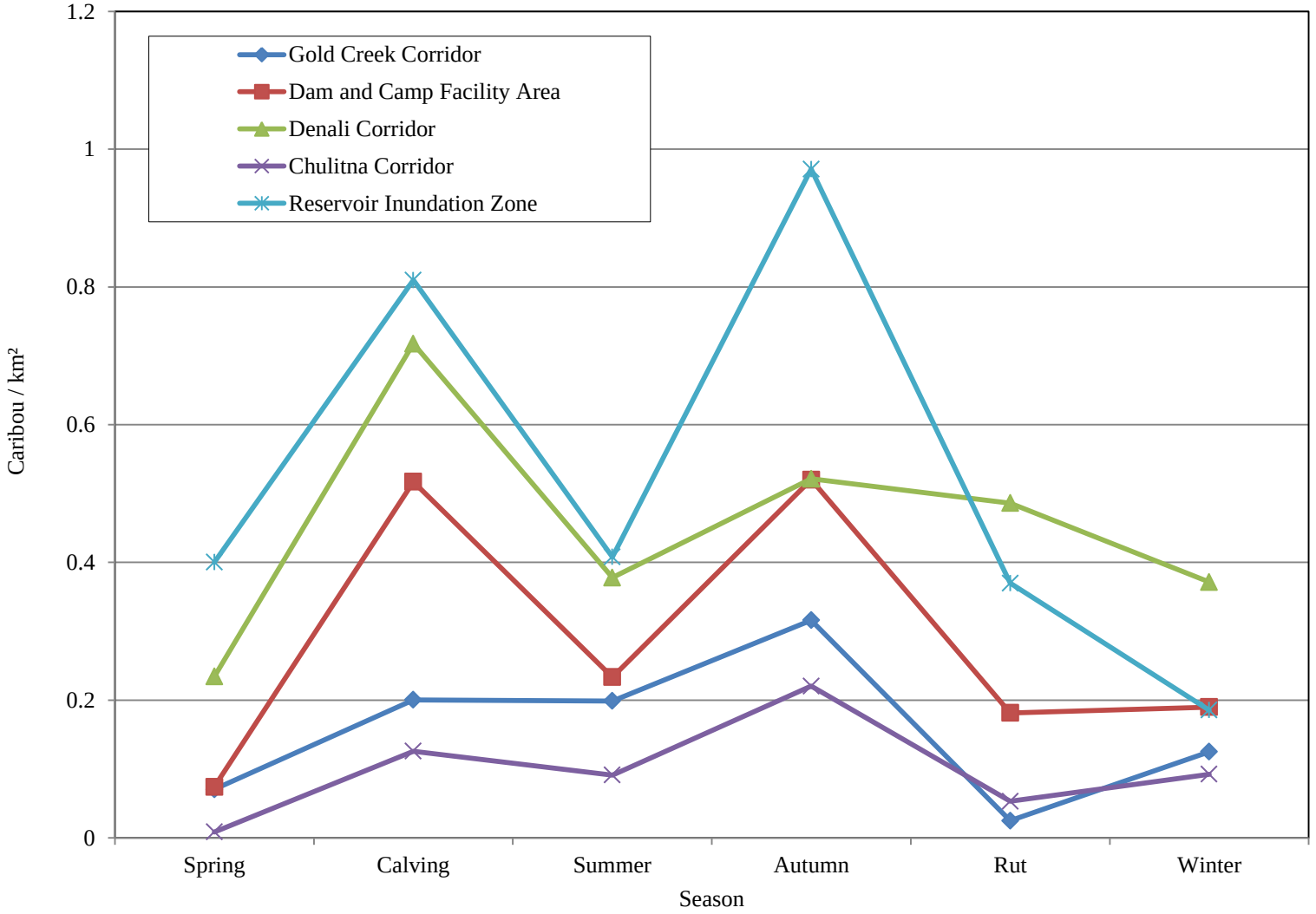
Nelchina Caribou Seasonal Density, 1980–1985



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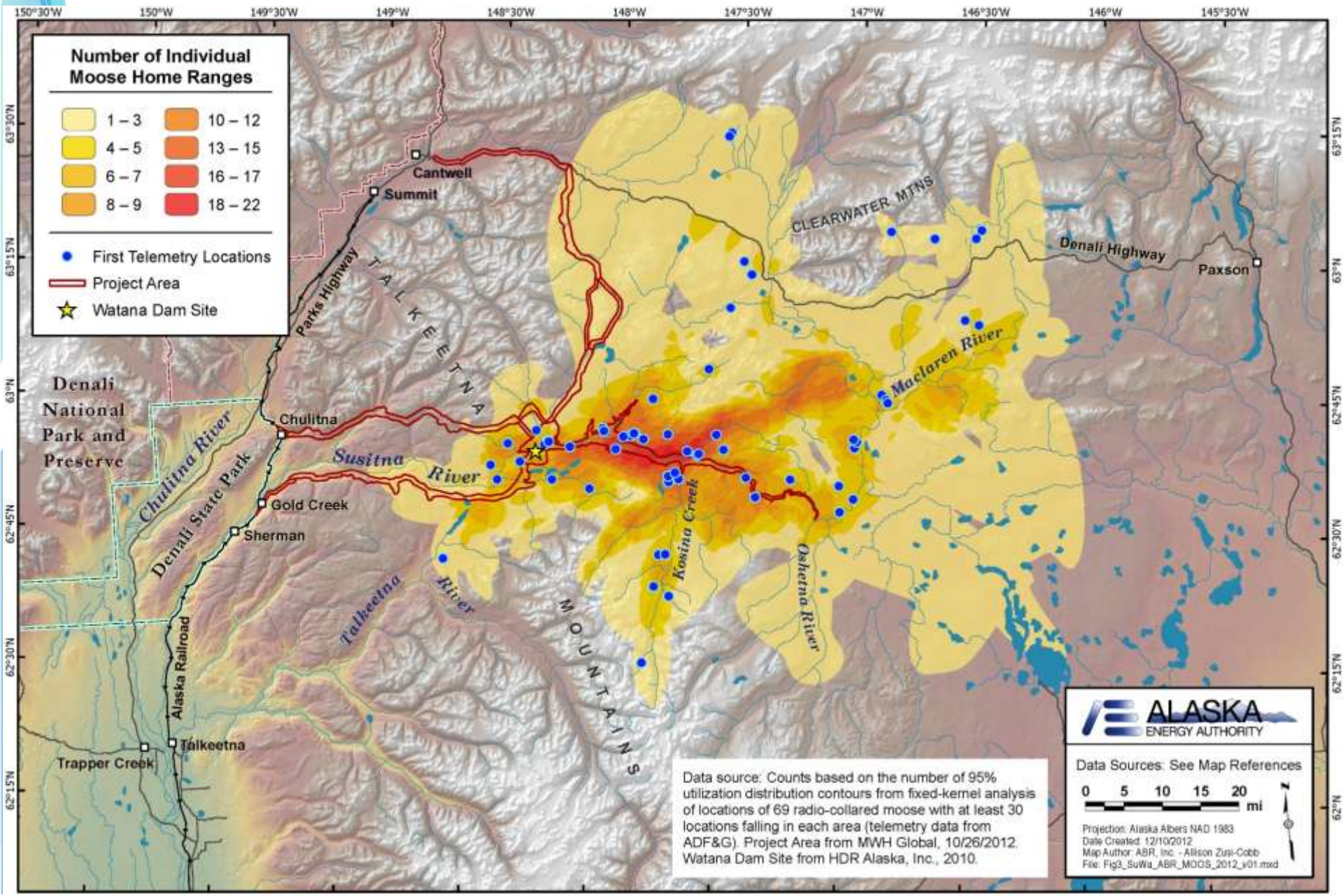
Moose Home Ranges, 1976–1984



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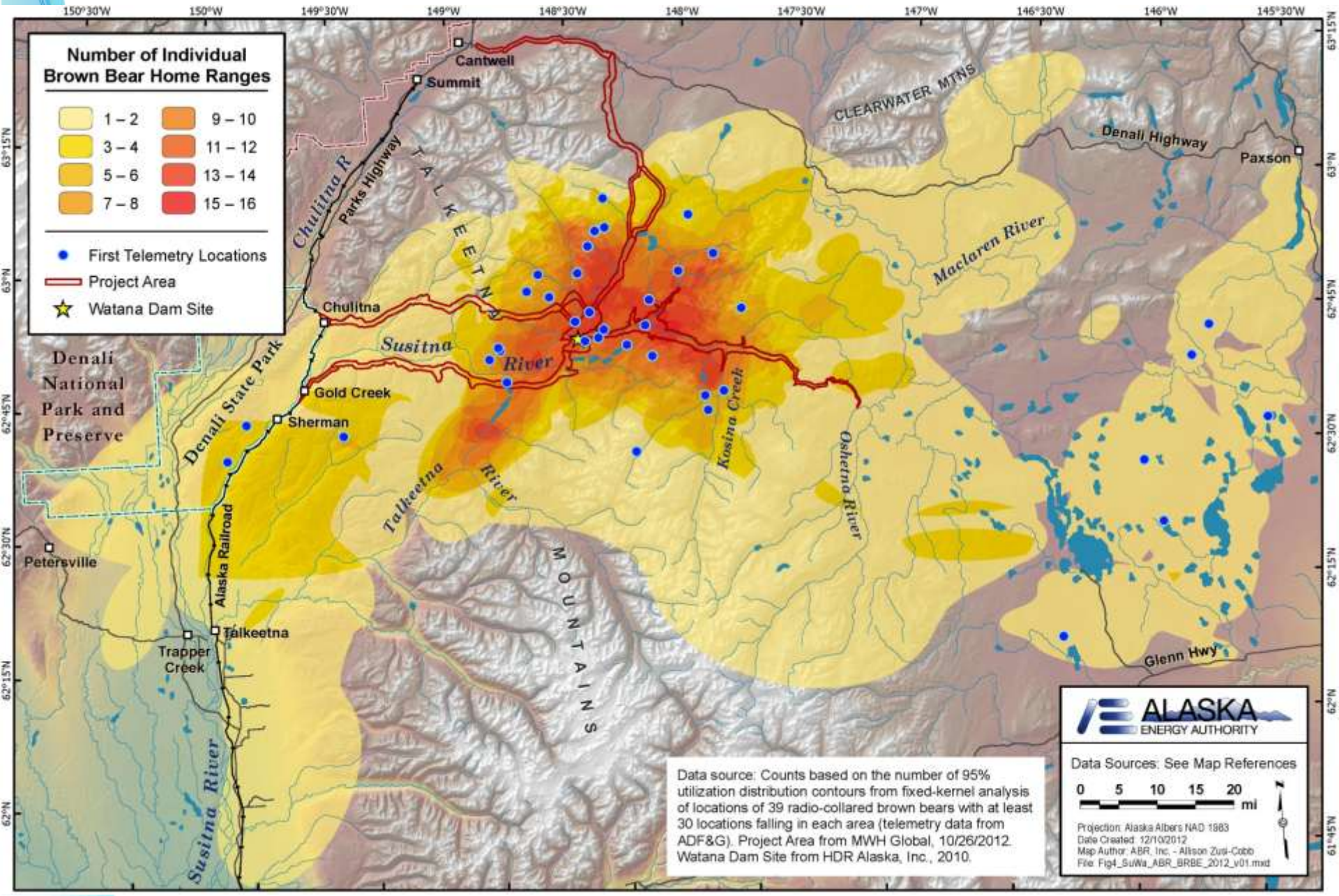
Brown Bear Home Ranges, 1978–1985



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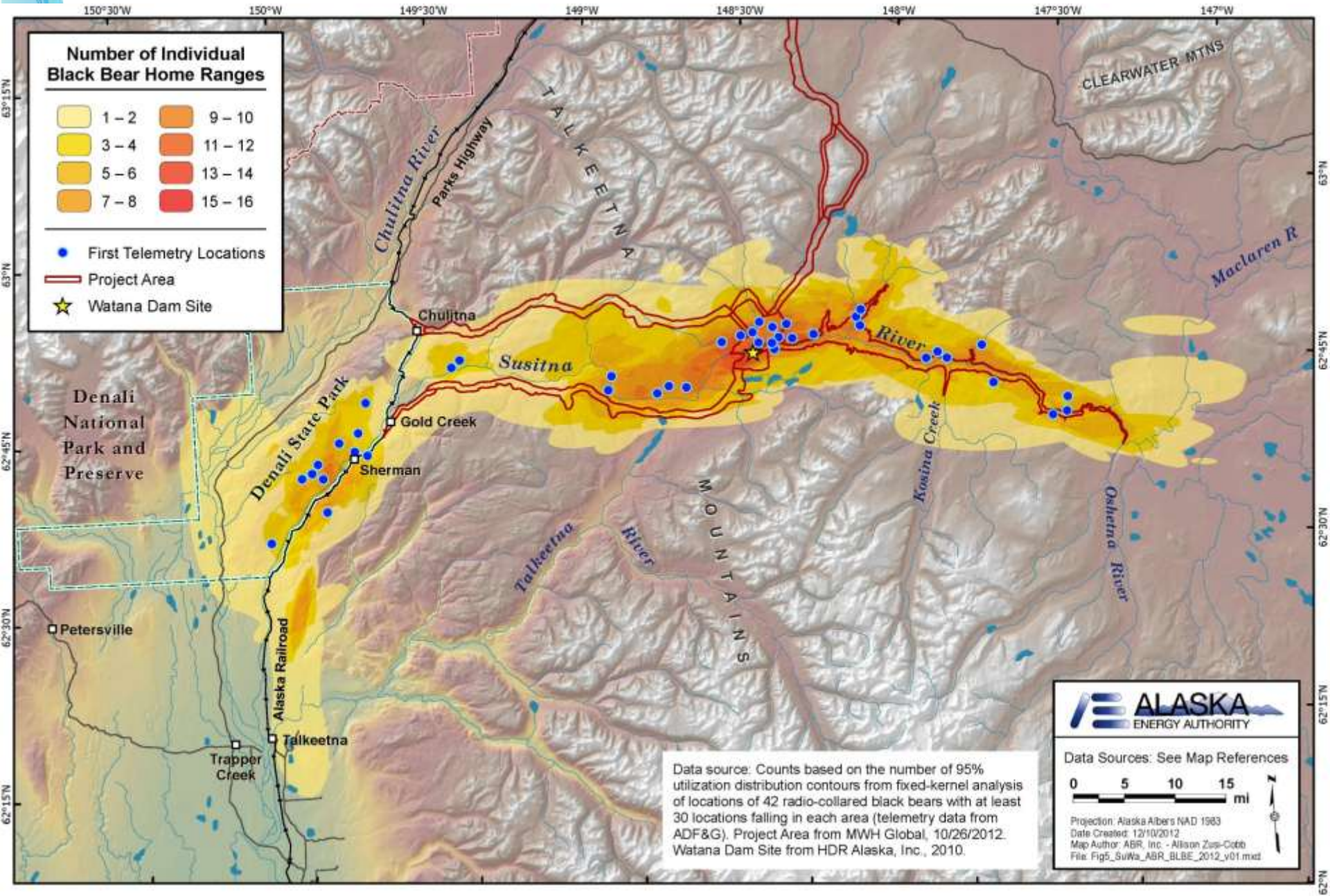
Black Bear Home Ranges, 1980–1985



Home Range Size

Home range size of radio-collared moose, brown bears, and black bears, based on a 95% UD from fixed-kernel density analysis for animals with at least 30 relocations (1980s data sets).

Species	Sex	*n*	Mean Size (km²)
Moose	Female	62	449.0
	Male	7	884.7
Brown Bear	Female	29	759.7
	Male	10	3,118.2
Black Bear	Female	26	140.0
	Male	16	477.0

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2012 Discussion: Big Game Movements & Habitat Use

Based on reanalysis of historical data:

- The Nelchina caribou herd used the Project area to some degree during all seasons of the year, with the density of use of Project area components varying among seasons.
- The Project area (especially the reservoir inundation zone) provided important wintering habitat for moose and was used extensively by brown bears and black bears.
- Black bears were largely restricted to forested habitats at lower elevations along drainages.

- Analysis of more recent/current population data from other ADF&G regional studies will continue in 2013–2014.

2012 Objectives: Wildlife Harvest Analysis

- Acquire relevant harvest data from ADF&G and USFWS for big game and furbearers in Project Area and adjacent areas
- Compile and analyze data within constraints of data availability, accuracy, precision, and confidentiality
- Summarize hunting and harvest locations and timing, harvest rates, and hunter access methods for various species
- Assess whether the spatial scale of available data is adequate for predicting Project-related changes
- Assess the need for additional data collection
- Identify potential Project-induced changes in hunting patterns or hunter access
- Inform development of 2013–2014 study plans

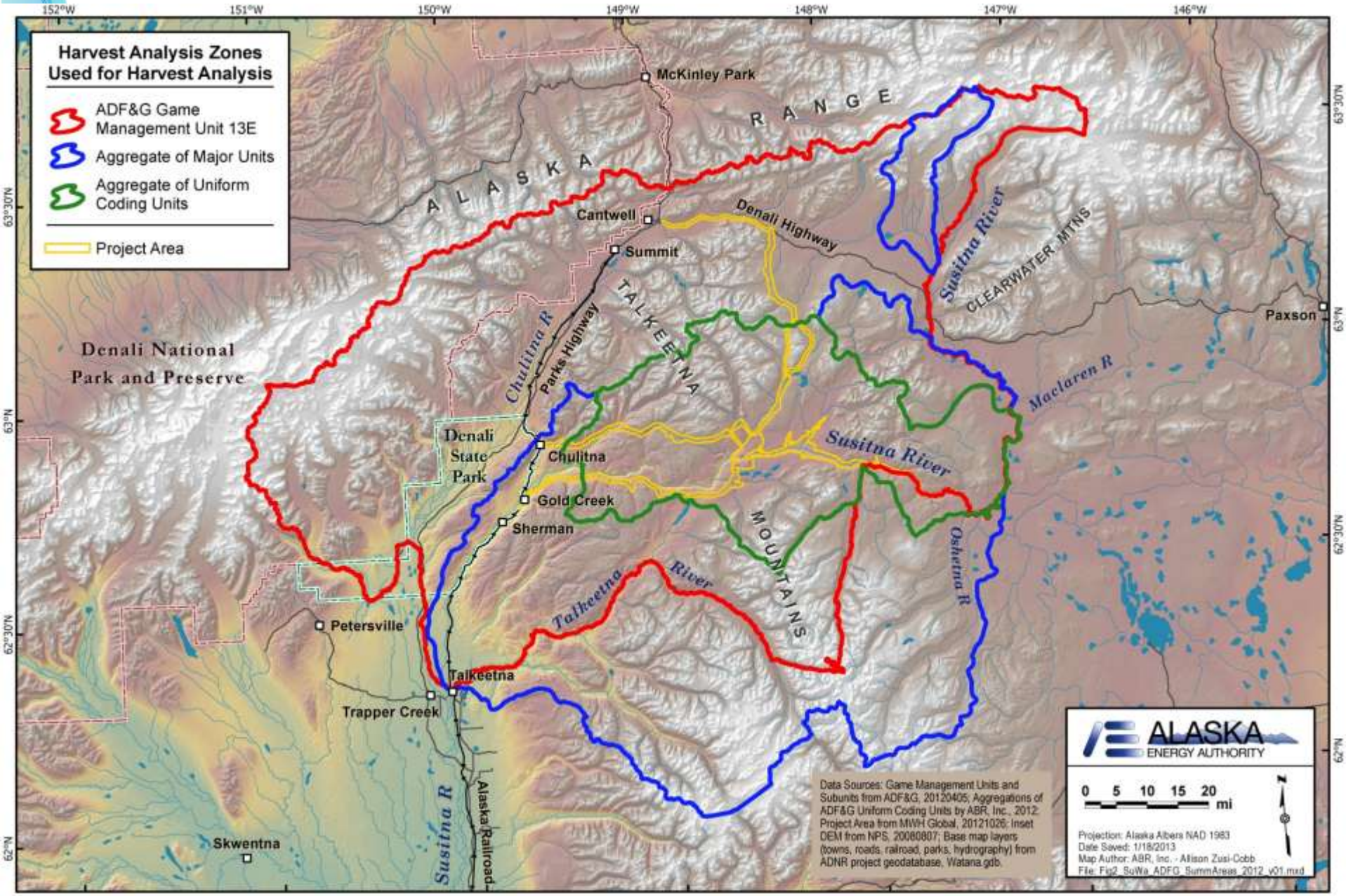
Methods: Wildlife Harvest Analysis

- Data acquired from ADF&G and USFWS:
  - ADF&G — combined data from harvest database, furbearer sealing database, and bear sealing database (2003–2011)
    - Data from Game Management Units (GMUs) 13, 14, and 16
    - Data include date, species, method of transport, days hunted, and location of hunt and harvest
    - Harvest location at 3 levels of precision: GMU Subunit, aggregate of Major Reporting Units, aggregate of 13 Uniform Coding Units (UCUs)
    - Not all data were available for all species
  - USFWS — data for subsistence harvest on federal lands under a federal permit (1994–2011)
    - Only caribou and moose harvested in GMU 13 applicable to this study
    - Data summarized for entire GMU only (no subunits)
- Analyzed data at 3 spatial scales that complied with ADF&G policy regarding data confidentiality

2012 Results: Wildlife Harvest Analysis

- Spatial accuracy of reported hunting and harvest locations is variable. Amount of data available for analysis decreases as the analysis area becomes smaller (e.g., GMU/subunit > major units > UCUs).
- The mean annual harvests for all of GMU 13E since 2003 were 392 caribou, 146 moose, 68 black bears, 58 brown bears, and 22 Dall's sheep, with fewer beavers, lynx, river otters, wolves, and wolverines being taken.
- Predominant method of access was by ORVs (3- or 4-wheeler, Argo, Coot, etc.), but boats and airplanes also had substantial use.
- As expected from open seasons, most harvest of big game occurs in fall, but some harvest of bears also occurs in spring. Most harvest of furbearers occurs during winter.
- Project area has lower rates of harvest for many species than in adjacent areas, probably due to distance from roads.

Wildlife Harvest Summary Areas



Harvest Rate Comparison Among Summary Areas

Mean annual harvest rate per 1,000 km² for each species during 2003–2011 in three analytical zones (GMU 13E, aggregated major units, aggregated UCUs), adjusted for potential underreporting at the major units and UCU level.

Species	GMU 13E (18,695 km²)	Aggregated Major Units (14,643 km²)	Aggregated UCUs (4,477 km²)
Beaver	2.13	1.68	0.40
Black Bear	3.61	4.02	1.29
Brown Bear	3.08	3.00	1.67
Caribou	20.78	13.28	10.51
Lynx	0.49	0.18	0.09
Moose	7.62	7.01	7.53
River Otter	0.37	0.29	0.04
Dall's Sheep	0.65	1.07	0.37
Wolf	1.98	1.95	2.96
Wolverine	0.53	0.56	0.30

Harvest by Access Type for UCU Areas

Harvest by species and access type for the aggregated UCU area, 2003–2011.

Species	Airplane	Horse/ Dog Team	Boat	3- or 4-Wheeler	Snow machine	Off-road Vehicle	Highway Vehicle	Airboat	Other/ Unknown
Moose	28	1	5	178	0	58	4	1	0
Caribou	133	0	24	175	1	54	4	1	1
Brown Bear	16	0	6	20	9	1	0	1	1
Dall's Sheep	10	0	0	3	0	0	0	0	0

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2012 Discussion: Wildlife Harvest Analysis

- GMU Subunit 13E is an important area for sport and subsistence harvests due to plentiful game populations and easy accessibility for hunters from Anchorage, Fairbanks, and rural areas.
- Current access to most of the Project area is relatively difficult.
- The majority of access is by ORVs (including 3- or 4-wheelers), but boats and airplanes also receive substantial use.
- Project development could increase accessibility of the Project area through road construction and boat traffic on the proposed reservoir.

2012 Objectives: Eagles and Other Raptors

- Compile existing information on nest sites by eagles and other species of raptors
- Conduct occupancy and productivity surveys of raptors
- Delineate nesting habitat features
- Conduct surveys of Bald Eagles during fall and early winter to identify winter concentration areas (foraging or roosting locations)
- Provide data for use in identifying potential Project-related impacts on eagles and other raptors

2012 Methods: Eagles and Other Raptors

- Aerial surveys:
  - Nest occupancy and productivity in 2-mile buffer around 2012 corridors and reservoir area (2,200-ft contour, now outdated)
  - Nest sightability assessment by intensive subsampling
  - Fall and winter surveys of Bald Eagle communal use areas
- Compiled nest locations in geodatabase for spatial analyses (inter-nest spacing and territory size)
- To delineate eagle nesting habitat, used field observations of cliff areas, aerial photography, and GIS analyses of remote-sensing data (slope from Digital Elevation Model and vegetative biomass from Normalized Difference Vegetation Index)

2012 Results: Nesting by Eagles and Other Raptors

Species	# Nests in Study Area	# Occupied Territories	# Successful Territories	# Nests below max. pool reservoir elevation
Golden Eagle	99 (101)[a]	25–28	6	2
Bald Eagle	41	17–18	8	8
Peregrine Falcon	Unknown[b]	7	1	4
Gyrfalcon	Unknown[b]	4	0	0
Red-tailed Hawk	1	1	1	0
Common Raven	24	6–7	Unknown[c]	13

[a] Two nests originally built by Golden Eagles were used by other species in 2012 (Peregrine Falcon and Red-tailed Hawk).

[b] Cliff-nesting falcons do not build easily identifiable nests, so only number of territories is reported.

[c] Common Ravens fledged young before productivity surveys were conducted.

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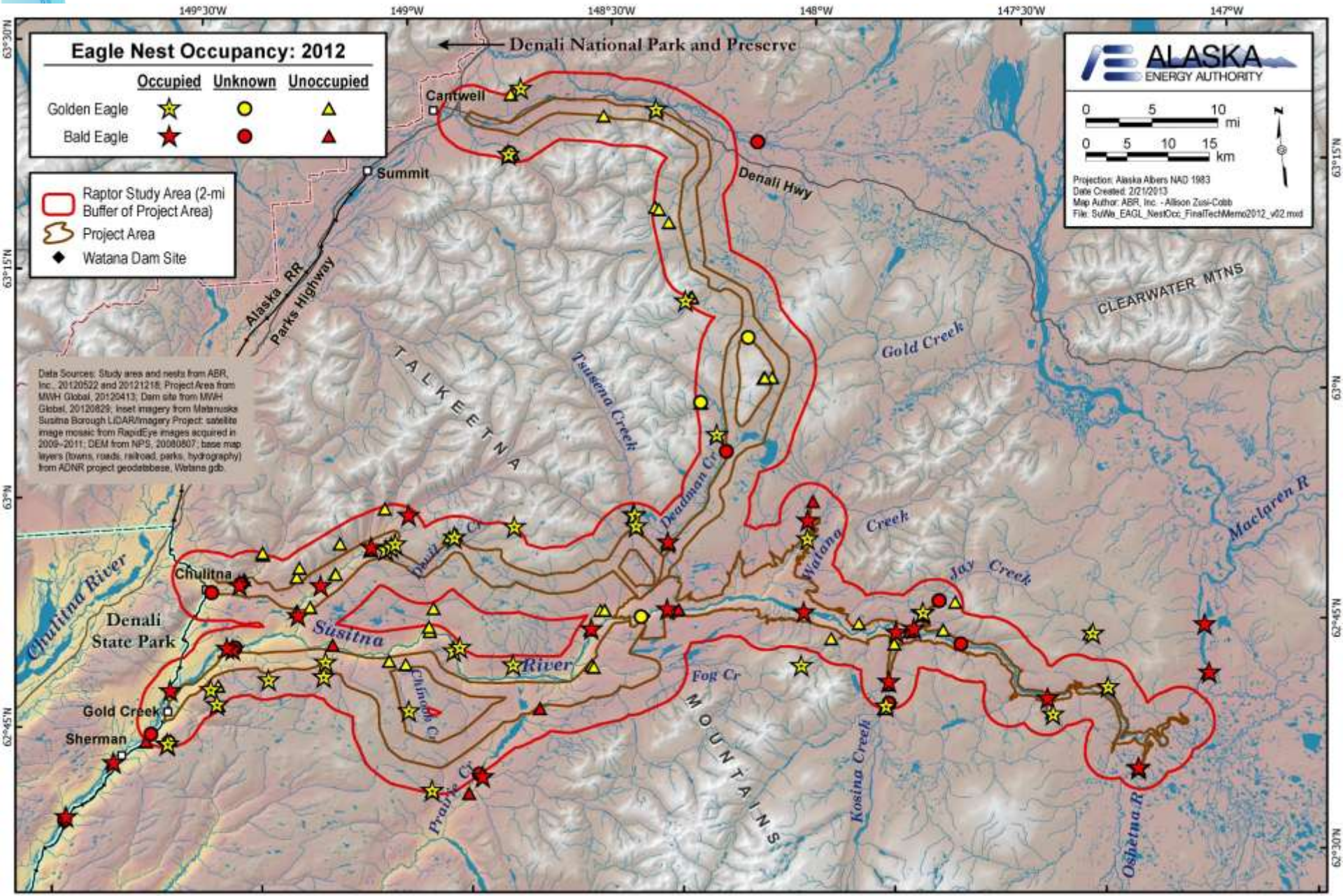
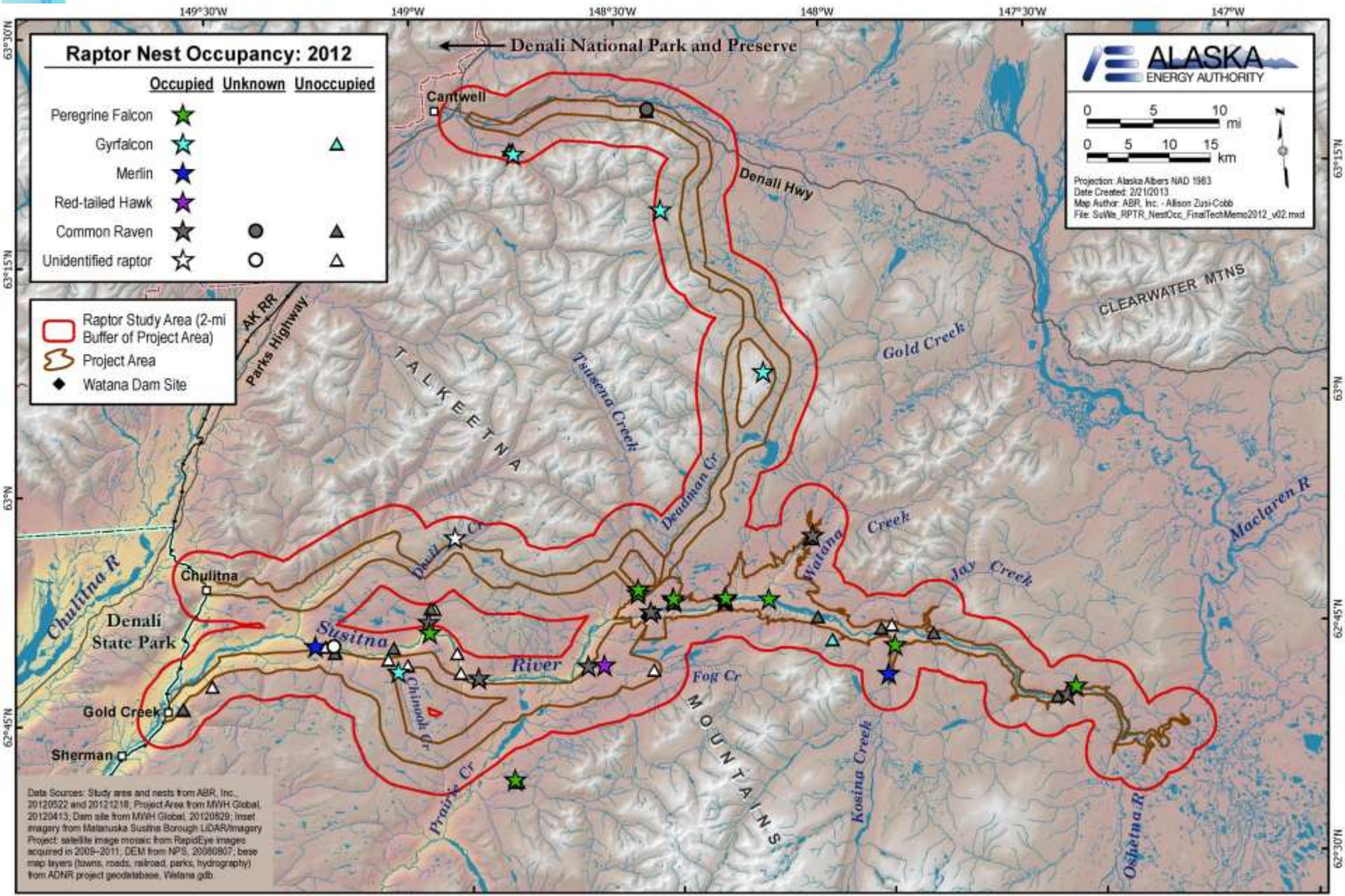
2012 Results: Golden Eagle and Bald Eagle Nests



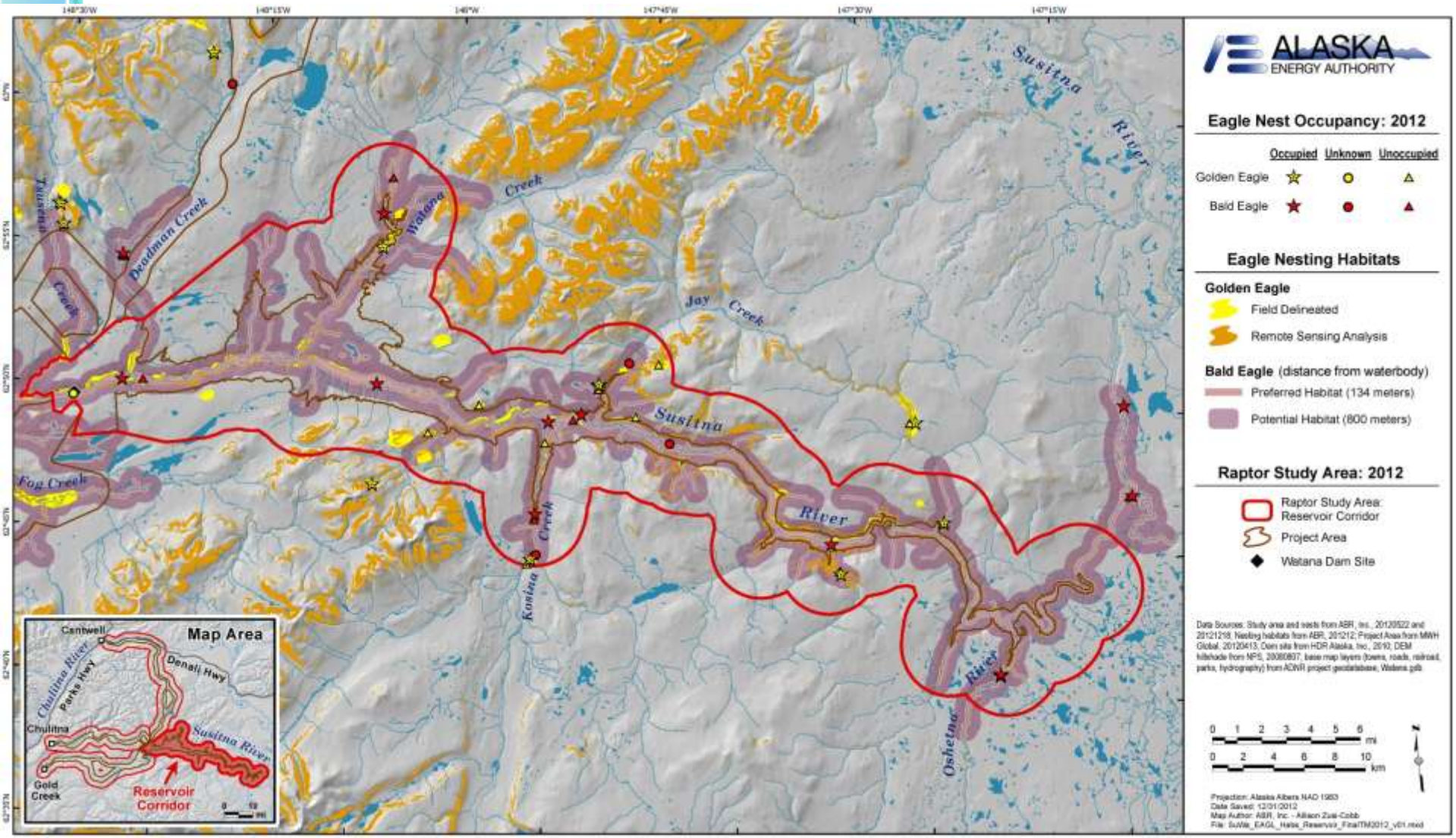
2012 Results: Nests of Other Raptor Species



2012 Results: Delineation of Eagle Nesting Habitats

- Nesting habitat models indicate that a substantial amount of Bald and Golden Eagle nesting habitat is available in the study area.
- Field delineation: 251 cliff areas were identified as potential Golden Eagle nesting habitat.
- Bald Eagle habitat occurs primarily along the forested margins of the Susitna River and its tributaries.
- Additional field delineation in 2013–2014, combined with the wildlife habitat map to be produced in 2013–2014, will allow refinement of models of potential nesting habitat.

2012 Results: Eagle Nesting Habitat Delineation Example (Reservoir Section of Study Area)



2012 Results: Fall/Winter Bald Eagle Surveys

- Four surveys:
  - October 17: 21 Bald Eagles (largest concentration was 9 birds in Stephan Lake/Prairie Creek area)
  - October 31: 5 Bald Eagles
  - November 13: 5 Bald Eagles
  - December 14: None
- Only one Bald Eagle was seen in the proposed reservoir area, on October 17
- No indication of late-spawning salmon runs or associated major concentrations of Bald Eagles were recorded in 2012