ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
PO Box 115526
Juneau, AK 99811-5526

ANNUAL SURVEY AND INVENTORY

GRANT AND SEGMENT NO. AKW-20 Wildlife Restoration FY2017

PROJECT NO. 1.0 Moose

PERIOD: July 1, 2016 – June 30, 2017

REPORT DUE DATE: June 29, 2016; resubmitted December 1, 2017

PROJECT LOCATION: Statewide

PROJECT TITLE: The Status of Alaska Moose and Factors Influencing Their Populations

REPORT DESCRIPTION: This performance report describes moose survey and inventory activities. Activities are listed by game management unit.

TITLE
The Status of Alaska Moose and Factors Influencing Their Populations in Region I

Region-wide:

Region I: Units 1, 2, 3, and 5

Activity 1: Provide information to state and federal regulatory processes on moose management.

Accomplishments: Information on moose harvest and management was provided to state and federal regulatory bodies as requested.

Activity 2: Monitor harvest through analysis of registration, Tier II, and drawing permit data (including collection of incisors for aging and photos of antlers.)

Accomplishments: All moose hunts in Region I require hunters to obtain a registration, draw, or Tier II permit. We monitored hunter interest through issuing permits and documented hunter effort and harvest through the required permit reporting process. We collected lower jaws to extract teeth for aging and in areas with antler restrictions photographed antlers of harvested moose. We sent all teeth to a commercial lab for cementum aging. Ages were reported back to ADF&G and where photos of antlers are required, both were archived in area offices.

Activity 3: Collect anecdotal information about Region I moose populations through contacts with hunters.

Accomplishments: As often as possible regional managers engaged hunters in conversation to gather anecdotal information about the hunt and population.

Activity 4: Conduct aerial surveys to assess sex and age composition of moose in key management areas of the region.

Accomplishments: Winter 2016-17 was less severe than normal, but in the northern part of the region snow conditions in late fall and early winter were adequate for area managers to fly surveys in the Haines, Gustavus, Berner's Bay, and Yakutat areas.

Activity 5: Conduct calf production surveys as time and budget allow.

Accomplishments: Demographic information was recorded during aerial surveys.

Activity 6: Conduct moose browse surveys and habitat analysis on discreet moose winter ranges throughout Region I.

Accomplishments: Browse surveys were conducted in the Gustavus area.

Activities by Unit:

Unit 1A

Activity 1: Conduct one aerial sex and age composition survey in the Unuk and Chickamin drainages annually if conditions allow.

Accomplishments: A lack of snow cover made aerial surveys impossible.

Unit 1B

Activity 1: Conduct one sex and age composition survey in the Stikine River drainage if conditions allow.

Accomplishments: A lack of snow cover made aerial surveys impossible.

Activity 2: Obtain age estimates of harvested moose by tooth section.

Accomplishments: We collected lower jaws from moose harvested in Unit 1B to extract teeth for aging. Teeth were sent to a lab, and ages were reported back to DWC.

Activity 3: Collect information on age and antler architecture of all harvested moose to evaluate current antler restrictions.

Accomplishments: We photographed antlers of harvested moose and compared antler architecture with age to evaluate the current management strategy.

Unit 1C

Activity 1: Conduct at least one sex and age composition survey each of the Berners Bay, Taku River, Endicott/St. James Bay, and Gustavus Forelands populations.

Accomplishments: Snow conditions and availability of staff and survey pilots/planes allowed us to survey the Berners Bay and Gustavus moose populations.

Activity 2: Monitor habitat conditions on the Gustavus Forelands by ground surveys of willow browse, using standard counts of number of leaders, amount of annual production, and level of browsing by moose.

Accomplishments: We conducted spring browse surveys in Gustavus.

Activity 3: Monitor radiocollared moose in Gustavus and Berners Bay to provide insight into pregnancy status, twinning rate, survival, and use radio collared animals to estimate sightability during aerial surveys.

Accomplishments: We monitored radiocollared moose in Gustavus and Berners Bay, but focused data collection on the Gustavus population.

Activity 4: Obtain age estimates of harvested moose by tooth section.

Accomplishments: We collected lower jaws from moose harvested in Unit 1C to extract teeth for aging. Teeth were sent to a lab, and ages were reported back to DWC.

Activity 5: Collect information on age and antler architecture of all harvested moose in Gustavus to evaluate current antler restrictions.

Accomplishments: We photographed antlers of harvested moose and compared antler architecture with age to evaluate the current management strategy.

Unit 1D

Activity 1: Do at least one sex and age composition survey of the Chilkat Valley population.

Accomplishments: We had good early winter survey conditions and surveyed the Haines/Chilkat Valley and Katzehin River moose populations.

Activity 2: Monitor habitat conditions in the Chilkat Valley by ground surveys of willow browse, using standard counts of number of leaders, amount of annual production, and level of browsing by moose.

Accomplishments: No activity during this report period.

Activity 3: Obtain age estimates of harvested moose by tooth section.

Accomplishments: We collected lower jaws from moose harvested in Unit 1D to extract teeth for aging. Teeth were sent to a lab, and ages were reported back to DWC.

Activity 4: Collect information on age and antler architecture of all harvested moose to evaluate current antler restrictions.

Accomplishments: We photographed antlers of harvested moose and compared antler architecture with age to evaluate the current management strategy.

Unit 2

Activity 1: Document reported moose sightings in Unit 2.

Accomplishments: No sightings were reported during this period.

Unit 3

Activity 1: Opportunistically collect anecdotal information about moose populations of Mitkof, Wrangell, Kupreanof, and adjacent islands.

Accomplishments: As often as possible the Petersburg Area Management Biologist engaged hunters in conversation to gather anecdotal information about the Unit 3 hunt and population.

Activity 2: Obtain age estimates of harvested moose by tooth section

Accomplishments: We collected lower jaws from moose harvested in Unit 3 to extract teeth for aging. Teeth were sent to a lab, and ages were reported back to DWC.

Activity 3: Collect information on age and antler architecture of all harvested moose to evaluate current antler restrictions.

Accomplishments: We photographed antlers of harvested moose and compared antler architecture with age to evaluate the current management strategy.

Unit 5

Activity 1: Conduct at least one sex and age composition survey each for the Yakutat Forelands, Nunatak Bench, and Malaspina Forelands populations.

Accomplishments: We had a short window of acceptable survey conditions, but were able to survey the Yakutat Forelands, Nunatak Bench, and Malaspina Forelands populations.

Activity 2: Conduct moose population estimate surveys in cooperation with the USFS during fall and winter.

Accomplishments: US Forest Service did not participate in the survey during this reporting period, and we did not accomplish a population estimate.

Activity 3: Obtain age estimates of harvested moose by tooth section.

Accomplishments: We collected lower jaws from moose harvested in Unit 3 to extract teeth for aging. Teeth were sent to a lab, and ages were reported back to DWC.

Submitted by: Tom Schumacher, Management Coordinator

The Status of Alaska Moose and Factors Influencing Their Populations in Region II

Regionwide: Units 6, 7, 14C, and 15

ACTIVITY 1: Prepare 5-year regional moose management reports and plans.

A moose management operational plan and report for each Unit was drafted and submitted for publication in 2016. Staff continues to collect information for preparation of future reports.

ACTIVITY 2: Provide information to state and federal regulatory processes on moose management.

Staff routinely interact with federal staff and discuss management of moose relative to the respective regulatory systems. Staff prepared information for presentation to the state Board of Game meeting cycle in 2016 and for the federal process in 2017.

ACTIVITY 3: Conduct aerial sex and age composition surveys in all units to determine status, trend, productivity, and mortality of moose.

Surveys were completed in selected hunt areas within individual GMUs. See unit specific activities.

ACTIVITY 4: Monitor the moose harvest through field observations, hunter harvest reports, and contact with hunters.

These are standard activities accomplished in each office. See unit specific activities.

ACTIVITY 5: Pursue a reassignment of Kalgin Island from Unit 16B to Unit 15.

The boundaries of Unit 15 were modified through Board of Game action to include Kalgin Island. This change was effective as of July 1, 2016.

Activities by Unit:

Unit 6: Conduct a late winter moose census (modified GSPE) in select areas.

ACTIVITY 1: Moose composition surveys were completed in Units 6A, 6B and 6C.

A GSPE survey in Unit 6A was performed in March and 140 moose were observed. Due to poor weather conditions in recent years, the last survey of this area was in 2009.

Moose population surveys were completed in December 2016 for Units 6B and 6C. Snow conditions in Unit 6B were good, but marginal in Unit 6C. In Unit 6B, 22 out of 76 sample units were flown and 17 of 47 sample units in Unit 6C.

By survey completion, 245 moose were observed in Unit 6B, 108% of the last population estimate (RY14) of 227 moose. Twenty-three of these moose were calves and 222 were adults. Eight calves: 100 Adults (c:A) were observed or 7% calves. In Unit 6C, survey conditions were too poor to generate a population estimate.

ACTIVITY 2: Issued 112 registration permits for a total harvest of 35 moose. General season harvest tickets were used by 87 hunters which took 31 moose from areas open to them.

Units 7&15

ACTIVITY 1: Survey conditions were good for the Kenai Peninsula during this reporting period due to higher snowfall than in recent years. Composition surveys were conducted in units 15A and 15C. No surveys were conducted in units 7 or 15B. The bull:cow ratio for 15A remained stable at 33:100 and the calf:cow ratio increased slightly to 24:100. The bull:cow ratio in 15C decreased slightly to 34:100 and the calf:cow ratio increased to 25:100

ACTIVITY 2: Hunter harvest and participation remained at the higher levels reached from the last regulation change. Two hundred and twenty-five bulls were taken during the general season, with an additional 9 moose taken by drawing permits, and 14 animals harvested under the federal subsistence season. One thousand seven hundred and ninety-four hunters reported as participating during the general season and additional individuals are known to have participated in the state and federal permit hunts.

ACTIVITY 3: Skilak Loop Wildlife Management Area: provide opportunities to view moose in cooperation with Kenai National Wildlife Refuge. No explicit activities were conducted to aid in moose viewing. The Skilak Loop Wildlife Management Area remained closed to moose hunting.

ACTIVITY 4: A GSPE survey was conducted in February 2017 for Unit 15C.

Unit 14C

required to manage Alaska moose herds. Not all procedures are used each year for each herd. Information collected is used to monitor progress toward attaining management objectives for Alaska moose herds and populations.

The Status of Alaska Moose and Factors Influencing Their Populations in Region III

Region wide Activities

1. Prepare Moose Management Operational Reports and Plans.

Completed 14 five-year Moose Management Reports and Operational Plans for Units 19, 20, 21, 24, 25, 26B, and 26C.

2. Monitor harvest and analyze harvest data.

Delta: Monitored harvest in Unit 20D during 20 days of general season and 15 days of permit hunts.

Fairbanks: Collected moose harvest reports using general season, registration, and drawing hunts and mandatory harvest reports, and potlatch harvest reporting. Entered harvest data into WinfoNet database, analyzed harvest in Microsoft Excel.

Galena: Monitored harvest and analyzed data for Units 21B, 21C, 21D, and 24 using harvest ticket hunts, registration hunts, and drawing hunts and mandatory harvest reports.

McGrath: Monitor harvest and analyze harvest data to determine harvest rate and effect on moose population. Moose harvest was monitored using harvest reporting on registration hunts, tier II hunts, general season hunts and mortuary moose take.

NE AK: Monitored harvest via general harvest tickets in Units 25A, 25B, and 25D and via Tier II permits in Unit 25D. We were unable to determine harvest rate in Units 25B and 25D because of the low reporting rate. The season was closed in Units 26B and 26C because there was no harvestable surplus.

Tok: Monitored moose harvest during a 15-day season in most of Unit 12 and 20E, and a 28 to 30-day season in the remainder of Unit 12, using mandatory harvest reports.

Monitor disease and parasites, assess body condition, assess natural mortality, collect anecdotal information, and disseminate moose management information to the public,

Delta: Natural mortality events were recorded when opportunistically observed. Opportunistically responded to approximately 10 public calls regarding moose-human

interactions and collected health information on 12 cow moose harvested in the 20D antlerless moose hunt.

Fairbanks: Reports and observations of winter killed moose in Units 20A, 20B, 20C, 20F, and 25C were monitored through interviews with local residents.

Galena: Analyzed Unit 24 moose telemetry data. Reports and observations of winter killed moose in Units 21B, 21C, 21D, and 24 were monitored through interviews with local residents.

McGrath: Reports and observations of winter killed moose in Units 19, 21A, and 21E were monitored through interviews with local residents.

NE AK: Monitored natural mortality opportunistically.

Tok: Conducted radio tracking flights throughout the year to track movements, productivity, and mortality of radiocollared cows in Unit 20E.

3. Provide moose management information to state and federal regulatory processes.

Regionwide: Communicated and coordinated with and attended meetings of 15 local Fish and Game Advisory Committee, the Alaska Board of Game, 2 Federal Regional Advisory Councils, the Federal Subsistence Board, numerous local village councils, Native corporations, and the Wrangell-St. Elias Subsistence Resource Commission about moose management and to review and analyze regulation proposals for the Alaska Board of Game and the Federal Subsistence Board.

4. Capture moose to deploy radio collars and collect information on movements, productivity, and/or morality.

Delta: A plan was formulated and supplies purchased to capture yearling moose in the late winter of 2017-2018 to capture productivity data.

Fairbanks: Captured 60 short-yearling moose in Unit 20B to assess nutritional condition.

Galena: Conducted 11 radio-tracking flights and one collar flight to retrieve collars from dead moose.

McGrath: Captured and radiocollared 30 moose in Unit 19A for use in sightability trials.

Tok: Conducted 1 capture event (1 day) in Unit 20E for adult cows.

5. Conduct geospatial population estimation, trend, composition, or riparian zone minimum direct count surveys to determine population status, trend, productivity, and mortality of moose.

Delta: No annual GSPE survey was flown in 20D in FY17 due to a lack of optimal surveying conditions. Anecdotal observations of moose were recorded when moose were observed doing other work. Aerial twinning surveys were conducted during the last week of May over 11 hours

of flight time.

Fairbanks: Did not conduct population surveys due to poor survey conditions due to a lack of optimal surveying conditions. Twinning surveys were flown 20-31 May during 21.5 hours of flight time.

Galena: Conducted a 2-day twinning survey in 21D and a 1-day twinning survey in 24D. In cooperation with FWS in 21D conducted two 2-day twinning surveys in 21D.

McGrath: Conducted 4 fall composition surveys, and 2 spring twinning surveys.

NE AK: Riparian aerial surveys were conducted on moose in Unit 26B in April 2017.

Tok: A geospatial population survey (GSPE) was conducted within a 576 mi^2 area within the upper Tok River drainage in Unit 12. Due to inadequate snow cover, aerial surveys were not conducted in the remainder of Unit 12 or in Unit 20E. Completed a twinning survey in southern Unit 20E during 24 and 31 May and 6 June by utilizing radiocollared and randomly observed cows with calves throughout the 2,241 mi^2 Taylor Corridor.

7. Conduct hunter check stations.

Operated Koyukuk River checkstation and checked 316 hunters during a 25-day season. In cooperation with FWS, operated Nowitna checkstation and checked 117 hunters during a 20-day season.

ACTIVITY 1: A modified Gasaway moose census was conducted on Joint Base Elmendorf Richardson and adjacent lands in March 2016. Poor snow conditions in early winter prohibited surveys during the usual period of early December.

ACTIVITY 2: 128 moose were harvested during the reporting period including 30 cows and 98 bulls.

Submitted by: Cynthia M. Wardlow, Management Coordinator

The Status of Alaska Moose and Factors Influencing Their Populations in Region IV

Region wide Activities:

Monitor moose harvests and evaluate mortality through field observations, hunter harvest reports, and contact with hunters.

Examine dead moose to look for causes of death, disease, mineral deficiencies, and contaminants.

Use public education to improve understanding of hunting regulations and the value of conserving moose populations, and to obtain better harvest data through increased harvest reporting.

Provide information to state and federal regulatory processes on moose

management. Prepare regional moose management reports on a 5-year schedule.

ACTIVITY 1: Prepare regional moose management operational plans on a 5-year schedule reports.

Eight 2016 Moose Management Operational Plans were submitted by the region during this reporting period.

ACTIVITY 2: Conduct aerial sex and age composition surveys in all units to determine status, trend, productivity, and mortality of moose.

Unit 9: Post-harvest composition surveys were conducted immediately following the September 2016 hunting season in Unit 9 using two fixed-wing aircraft. During the three days of flying, 193 moose were observed in 73 groups. Thirty-seven were breeding groups with at least one bull and one cow.

Unit 11: No composition survey was conducted.

Unit 13: Composition surveys were flown between November 21 and December 9 in two distinct count areas in 13A and 13D (five fixed-wing flights); lack of snow precluded traditional count area surveys in Units 13B, 13C, and 13E, but composition counts were flown in random areas in those units (four flights with PA-18). Bulls: 815, Cows: 2,538, Calves: 487, Total: 3,844.

Unit 14: Moose composition was derived from a February GSPE in Unit 14A

Unit 17: Composition surveys were completed in portions of Unit 17B and 17C in late November and early December 2016. Six trend areas that were established during the 1980s and three newly established trend areas were surveyed. Overall 1,192 moose were observed, with a bull:100 cow ratio of 27:100, and a calf:100 cow ratio of 18:100.

ACTIVITY 3: Monitor the moose harvest through field observations, hunter harvest reports, and contact with hunters.

Unit	Male	Female	Unknown	Total Harvest
Unit 9	60	0	0	60
Unit 11:	63	0	0	63
Unit 13	1,058	6	2	1,066
Unit 14A	459	559	1	1,019
Unit 14B	108	0	0	108
Unit 16	569	0	1	570
Unit 17:	311	19	0	330

Activities by
Unit: Unit 9:

ACTIVITY 1: Conduct geostatistical population estimation surveys (GSPE), distribution

surveys, sex and age composition surveys, or calf survival counts where appropriate to monitor trends in population density, sex and age composition, and recruitment.

No GSPEs were conducted in Unit 9 due to incompatible weather conditions.

ACTIVITY 2: Capture, collar, and track moose to understand patterns of seasonal movement, habitat use, productivity and survival.

Radiocollars were deployed on 24 female moose over the course of three and a half days in April 2016 using one R-44 helicopter and two fixed-wing aircraft.

ACTIVITY 3: Conduct spring productivity and twinning surveys to evaluate moose productivity.

Twenty fixed-wing flights were conducted from the middle of May through 5 June to evaluate moose productivity.

Unit 11:

Conduct geostatistical population estimation surveys (GSPE), distribution surveys, sex and age composition surveys, or calf survival counts where appropriate to monitor trends in population density, sex and age composition, and recruitment.

No GSPEs were conducted in Unit 9 due to incompatible weather conditions.

Unit 13:

ACTIVITY 1: Conduct geostatistical population estimation surveys (GSPE), distribution surveys, sex and age composition surveys, or calf survival counts where appropriate to monitor trends in population density, sex and age composition, and recruitment.

Due to incompatible weather GSPEs were not completed in Unit 13 during this reporting period.

In Unit 13B, adult cow survival was 92%, 81% were observed with calves, and 59% of calves at heel were twins.

ACTIVITY 2: Conduct spring productivity and twinning surveys to evaluate moose productivity.

Twinning surveys (15 fixed-wing flights) were conducted on the Alphabet Hills collared moose population (13A and 13B) in May and early June. The twinning rate for moose was determined to be 59%.

ACTIVITY 3: Periodically radio-track moose to document movements, productivity, survival, and to aid in abundance estimation.

Twenty-five radio tracking flights occurred via fixed-wing aircraft in May and June to determine moose productivity and calf survival. This information is incorporated into population models.

ACTIVITY 4: Evaluate availability and utilization of moose browse in select areas of Unit 13.

Eighteen browse utilization plots were completed in March and April via snowmachine in Unit 13B. Random plots were predominantly located in mixed-spruce habitat and *Salix pulcra* was the most common browse species encountered.

Accumulated browse utilization data from Unit 13A&B were analyzed during this reporting period. Percent offtake was approximately 30% in Unit 13A and 32% in 13B.

ACTIVITY 5: Respond to public safety issues involving moose associated with injuries, snaring, habituation and moose-vehicle collisions (MVCs).

Glennallen staff responded to at least 6 nuisance or injured moose reports during this reporting period.

ACTIVITY 5: Monitor predator populations and other mortality factors by recording bear and wolf observations during moose surveys, and through field observations and public contacts.

Incidental bear and wolf observations were collected and compiled to aid understanding predator populations and causes of ungulate mortality.

Unit 14A&14B:

ACTIVITY 1: Conduct geostatistical population estimation surveys (GSPE), distribution surveys, sex and age composition surveys, or calf survival counts where appropriate to monitor trends in population density, sex and age composition, and recruitment.

A GSPE was completed in Unit 14A in February 2017. The population is 8,756 ± 1,489. Surveys were not conducted in Unit14B in 2016 due to inadequate weather.

ACTIVITY 2: Conduct spring productivity and twinning surveys to evaluate moose productivity (14A).

Twinning surveys were conducted in the Knik River portion of 14A during May and early June. The twinning rate for moose was determined to be 31 %. In March 2017, 60 moose were collared in Unit 14A as part of a separate moose vehicle collision study. Of those 60 moose, 45 were female. A sub-set of those collared cows were located via helicopter for the purpose of determining reproductive status. Nineteen cows were located; their apparent parturition rate was 79%, and their twinning rate was 27%.

ACTIVITY 3: Coordinate the ignition of a 300 square-acre prescribed burn in the Little Granite Creek area of the Matanuska Moose Range to enhance moose habitat (14A).

Environmental conditions did not allow for ignition during this reporting period.

ACTIVITY 4: Respond to public safety issues involving moose associated with injuries, snaring, habituation and moose-vehicle collisions (MVCs).

Palmer received at least 216 reports of injured or nuisance moose by the public during this reporting period. While all reports involve a directional response with the complainant, at least 45 reports required a field visit by staff.

ACTIVITY 5: Capture, collar, and track moose to understand patterns of seasonal movement, habitat use, and MVCs (14A).

Sixty moose (45 cows & 15 bulls) were collared in February and March with GPS transmitters and their movements were recorded.

Unit 16:

ACTIVITY 1: Conduct geostatistical population estimation surveys (GSPE), distribution surveys, sex or age composition surveys to monitor trends in population density, sex and age composition, and recruitment.

No GSPEs were completed in Unit 16 during this reporting period due to inadequate snow and weather. The population estimate for Unit 16B is 7,400 $\pm$ 1,525 moose.

ACTIVITY 2: Work with DNR-Forestry to identify areas suitable for burning to enhance moose habitat.

Staffing limitations at DNR-Forestry has hampered progress on this activity although it is moving forward.

ACTIVITY 3: Capture, collar, and track moose to understand to aid in productivity and survival moose productivity and survival.

Thirty 10-month old female moose were captured and radiocollared over the course of seven days in Unit 16.

ACTIVITY 4: Conduct spring productivity and fall/late winter survival flights to evaluate moose productivity and survival.

Flights to define spring productivity and survival were conducted every day from Mid-May until early June. The apparent parturition rate was 79% with a twinning rate of 62%. Survival of calves from Spring 2016 though the first 10 months of life was 29%.

Unit 17

ACTIVITY 1: Conduct geospatial population estimation, trend, composition, or riparian zone minimum direct count surveys to determine status, trend, productivity, and mortality of moose.

A GSPE in 17B-West was completed in February of 2017. The Unit 17B-West survey area includes that portion of 17B west of the Mulchatna River to the west end of the Tikchik Lakes system. We surveyed 109 of 602 sample units yielding an estimate of 1,497 total moose (+/- 12% at 90% CI), including 240 calves (+/- 41% at 90% CI). Calves made up 16% of the total population. This estimate for total moose corrected for sightability is 1,669 moose with a range of 1,376 to 2,144, at 90% CI.

ACTIVITY 2: Conduct twinning surveys during calving season to evaluate moose productivity.

We conducted two twinning surveys in the lower Nushagak River using an R-44 helicopter. During survey #1, we saw 90 cows, of which 10 had calves, and 50% of those had twins. During survey #2, we saw 54 cows, of which 12 had calves, and 58% of those had twins.

ACTIVITY 3: Conduct moose sex and age composition surveys using a helicopter as the survey platform.

In December a total of 7 fixed-wing flights days were spent in Unit 17B and 17C to define age and sex composition. We observed 245 moose with combined ratios of 55 bulls:100 cows and 28 calves:100 cows.

Submitted by: Todd A. Rinaldi, Region IV Management Coordinator
Date: 1 September 2017

Region V

Region wide Activities:

Provide information to state and federal regulatory processes on moose management.

Area management staff reviewed State and Federal regulatory proposals, attended regulatory process meetings, and presented moose information to the State Board of Game, State Fish and Game Advisory Committees, Federal Subsistence Board, and Federal Subsistence Regional Advisory Councils.

Activities by Unit:

UNIT 18:

Conduct fall aerial sex and age composition surveys and calf production surveys in selected portions of Unit 18.

We conducted fall survey in the Kuskokwim drainage in November 2016. We classified 405 moose in two days of flying. There were 103 bulls (26.3%), 179 cows and100 calves.

Conduct spring aerial surveys (trend area surveys, distribution surveys, or calf production surveys) in selected portions of Unit 18 to assess population trend and recruitment.

We flew spring twining surveys on the Yukon River and Kuskokwim Rivers in late May 2017. In six days of flying we observed a total of 189 cows accompanied by calves. Twinning rates were 39.6%(n=53) in the Lowest Yukon area, 42.6 %(n=54) in the

Andreafsky area, 41.2 %(n=51) in the Paimiut area, and 57% (n=30) in the Kuskokwim area.

Conduct geostatistical population estimation surveys, (regular) population estimation surveys, riparian zone minimum direct count surveys, or other appropriate census techniques, to estimate the size of moose populations in selected portions of Unit 18.

We conducted one GSPE survey in the lowest Yukon census area during this reporting year. In February of 2017 an expanded survey area from 195 survey units to 284 SU being surveyed to better reflect current moose distribution. The midpoint of the survey 8,226 ±11%. We also estimated the population in the original Survey area and that resulted in an estimate of 5,719 ±12%.

Conduct fall and/or midwinter trend area surveys or distribution surveys of the Kuskokwim River and its major drainages to assess the status and estimated size of the Kuskokwim River population.

A fall composition count was conducted in this area in late 2016 (see above) so other surveys were not needed.

Monitor moose numbers, distribution, and utilization of the smaller drainages in Unit 18 through trend area surveys, distribution surveys, public contacts, and field observations.

Togiak NWR conducted a GSPE abundance estimate survey that suggests the moose populations are increasing on the Goodnews and Kanektok drainages.

Monitor overall hunting activity through, harvest reporting, hunter contacts, and field observations.

We analyzed general season harvest reports and found that 608 moose were reported taken in Unit 18 in the Yukon drainage and along the coast. Hunters also reported harvesting 7 moose in the Kanektok River drainage and 17 in the Goodnews River drainage. We contacted moose hunters opportunistically throughout the year. Harvest was 194 moose in RM615 in RY16.

Monitor other mortality factors through public contacts and field observations.

Both black and brown bears are regularly seen during spring twinning surveys in close proximity to cow moose with calves. We received more reports from hunters/trappers and the public regarding wolf kills than in the past several years.

Assess habitat quality through browse surveys and field observations.

A browse removal study was completed in April 2017 in the lowest Yukon count area. The results of this study are still being analyzed.

Capture adult or short yearling moose to attach radio collars, assess body condition in relation to habitat quality, and collect samples for disease and contaminant profiles. (All animal capture activities will follow the protocols established in the ADF&G Division of Wildlife Conservation “Animal Welfare Policy” and its wildlife capture and restraint manual.)

No capture work was performed during this reporting period.

Monitor distribution, movement, and dispersal of collared moose using radio telemetry data and aerial survey observations.

We have periodically monitored the 24 cow moose that have been fitted with radio collars. We collected data on the location of the moose as well as the presence of a calf or calves. In May 2017,8 of the 15 cows observed had calves with them, two of those were twins.

Work with the Association of Village Council Presidents (AVCP), Kuskokwim Native Association (KNA), The Kuskokwim Corporation (TKC), U.S. Fish and Wildlife Service (FWS), Unit 19 and 21A, E area biologist, affected Advisory Committees, local moose hunters, and other users to resolve conflicts between upriver and downriver uses.

Much of the upriver-downriver conflicts along the Yukon River have been resolved as moose populations have become established and increased in the downriver areas. Along the Lower Kuskokwim River, we have implemented a quota-based registration permit moose hunt and the availability of hunting opportunity has helped alleviate the conflicts between user groups. We also fielded numerous questions regarding hunting moose upriver on the Kuskokwim River.

Continue educational efforts toward increasing moose populations in the smaller drainages in Unit 18.

Along with the USFWS, we continue to provide summary information at meetings arranged by villages, Advisory Committees, and Regional Advisory Councils.

Use incentive programs and/or public education to improve understanding of hunting regulations and the value of conserving moose populations, and to obtain better harvest data through increased harvest reporting.

We have written numerous newspaper articles, New Releases and PSA's to encourage harvest reporting and explain why it is important.

Implement the cooperative moose management strategy for the Kuskokwim River moose population with participation from the Lower Kuskokwim Advisory Committee, the Yukon Delta National Wildlife Refuge (YDNWR), and interested local groups and communities.

We attended and presented information at several public meetings including: Lower Kuskokwim Advisory Committee meeting; the Bethel AC, the Lower Yukon AC, the Central Bering Sea AC and the Y-K Delta Regional Advisory Council meeting.

Develop an ongoing cooperative moose management strategy for the moose population within the Togiak Refuge portion of Unit 18 with local village leaders, members of the Central Bering Sea Advisory Committee, the Regional Advisory Council, the Togiak National Wildlife Refuge (TNWR), and interested local groups and communities.

We talked with the local Advisory Committee and community members of Quinhagak, Good News, and Platinum about the moose management strategy in this area, in addition to survey work that was conducted on the Goodnews river and Kanektok River.

UNIT 22:

Conduct a geospatial population estimation (GSPE) survey or a riparian zone minimum direct count survey in a portion of Unit 22 to monitor trends in population size, sex/age composition, and recruitment.

A GSPE survey was conducted in Unit 22A Central from 1 March through 3 March 2017. The observable moose estimate for Unit 22A Central was 840 moose (90% CI: 747-933). Recruitment was estimated as 12% short yearlings

Complete trend area surveys, sex and age composition surveys, or other aerial surveys (where appropriate in Unit 22) during late fall and early spring to provide an index of moose population status and trends, sex and age composition, and yearling recruitment.

Staff completed fall composition surveys in Unit 22A Central, Unit 22D Remainder, Unit 22D Kuzitrin, and Unit 22E during the reporting period. In Unit 22A Central, we classified 250 moose and found 124 bulls:100 cows and 30 calves:100 cows. These results may have been influenced by local harvest patterns and/or moose movement between adjacent areas and warrants further investigation. In Unit 22D Remainder, we classified 196 moose and found 23 bulls:100 cows and 23 calves:100 cows. In Unit 22D Kuzitrin, we classified 271 moose and found 20 bulls:100 cows and 14 calves:100 cows. In Unit 22E, we classified 352 moose and found 38 bulls:100 cows and 21 calves:100 cows.

A spring recruitment surveys was completed in GMU 22C. A total of 381 moose were observed including 71 short yearlings. The estimated recruitment rate for the population was 19% (90% CI: 15%-22%).

Monitor human and natural mortality factors affecting the population.

Human harvest was monitored through the harvest ticket/registration permit reporting system and Community-based Harvest Assessment surveys. No surveys were attempted to determine natural mortality rates of Seward Peninsula moose. Anecdotal evidence indicates bear predation on moose calves is depressing moose populations in much of the unit, specifically in areas of Unit 22B.

Evaluate hunting mortality by analyzing all moose harvest data.

Hunt reports were received for 2 bull fall registration hunts (RM840 including hunt areas: Unit 22C, Unit 22B west of the Darby Mountains, Unit 22D Kuzitrin River drainage, and Unit 22D Southwest, and RM841 in the central portion of Unit 22A), 1 antlered bull winter registration hunt (RM843 in Unit 22B west of the Darby Mountains), 1 nonresident bull registration hunt (RM855 in a portion of Unit 22D and Unit 22E) and a fall nonresident bull draw hunt (DM845 in a portion of Unit 22B). Harvest from other areas of the unit was monitored by harvest ticket report cards (GM000). Total reported harvest for Unit 22 during the reporting period was 190 moose (Unit 22A-40, 22B-46, 22C-17, 22D-62, 22E-25). The Department documented 172 moose in 2015-2016, 167 moose in 2014-2015 and 155 moose in 2013-2014 through similar reporting methods.

Improve harvest reporting through public education and improved communication and by conducting Community-based Harvest Assessments.

The importance of harvest reporting was emphasized to registration permit recipients, village license vendors, and hunters in Unit 22 communities. Public service announcements were posted in Nome and all residents of Unit 22 were notified by radio announcements. . Compliance with reporting requirements has improved in the

registration hunts in the Nome area; however, village surveys remain a more effective method of obtaining village harvest data.

Evaluate hunting regulations and recommend changes, if necessary, for conservation purposes.

Hunting regulations were evaluated at an annual Advisory Committee meeting and an annual Regional Advisory Council meeting.

Use incentive programs and/or public education to improve understanding of hunting regulations and the value of conserving moose populations, and to obtain better harvest data through increased harvest reporting.

Staff attended Advisory Committee meetings, federal Regional Advisory Council meetings, and the annual Reindeer Herders Association meeting to improve public understanding of harvest reporting and status of moose populations.

UNIT 23:

Conduct geostatistical population estimation surveys, distribution surveys, sex and age composition surveys, and calf survival counts where appropriate to monitor trends in population density, sex and age composition, and recruitment.

A Geospatial Population Estimate (GSPE) was conducted during this reporting period in the Unit 23 Lower Kobuk area in March 2017. Density of adult moose was 0.22 moose/mi^2 and the calf:adult ratio was 15:100.

The population estimate survey was a joint effort between NPS, USFWS, and ADF&G.

Perform- twinning surveys (calf production surveys) to monitor changes in habitat quality.

In May 2017 a twinning survey of the Lower Kobuk yielded a twinning rate of 41%.

Monitor hunting activity and harvests through the statewide harvest ticket system, Community-based Harvest Assessments, public contacts and field observations.

We monitored hunting activity and harvests through the statewide harvest ticket, registration permit and drawing permit systems and Community-based Harvest Assessments: 408 hunters reported taking 133 moose through the statewide harvest ticket system and the registration permit system. Community-based Harvest Assessments were not conducted in Unit 23 this year. Previous Community-based Harvest Assessments suggest residents of Unit 23 have taken 400-425 moose annually during recent years, substantially more than indicated by harvest ticket hunt reports. No nonresident permits were issued.

Community-based Harvest Assessments were completed by Division of Subsistence in Kotzebue in Unit 23, and in Point Hope in nearby neighboring Unit 26A. Data analysis is currently ongoing and results are not available.

Continue the Unit 23 User Issues planning process to minimize user-group conflicts in relation to biological parameters of moose.

Staff participated in the May 2016 meeting of the Unit 23 User Issues working group. Summary information for this user-group is posted at ADF&G website: http://www.adfg.alaska.gov/index.cfm?adfg=plans.unit23

Use incentive programs and/or public education to improve understanding of hunting regulations and the value of conserving moose populations, and to obtain better harvest data through increased harvest reporting.

We spoke with many local and nonlocal hunters to improve the accuracy of moose harvest data. Public Service Announcements were recorded for radio broadcast to help educate the hunters about regulations and acquiring the necessary permits. This year, harvest reports were actively pursued by staff and nearly 100% compliance was achieved.

Monitor predator populations and other mortality factors by logging bear and wolf observations during moose surveys, and through field observations and public contacts.

A lower Noatak brown bear abundance survey was completed in May 2016 in cooperation with NPS.

Incidental observations of bear, wolves, and other wildlife species were recorded during moose surveys during March 2017. Due to small sample size, no additional analysis was completed.

Examine dead moose to look for causes of death, disease, mineral deficiencies, and contaminants.

Locations of moose mortalities were noted during GSPE census surveys in March 2017, but no site visits were completed due to determine cause of death.

Unit 26A:

Survey unit-wide riparian zones and other suitable areas of willow habitat, using trend area surveys, riparian zone minimum direct count surveys, or other appropriate survey techniques to estimate the moose population trend in Unit 26A.

We conducted an annual trend count and recruitment survey of the entire survey area (i.e., population census) in Unit 26A on 10-14 April 2017. We counted a total of 348 moose in the census area. There were 285 adults and 63 short yearlings (18%) that had survived the winter. This was an increase in both adult moose and recruitment compared with recent previous spring surveys.

Conduct a yearly fall aerial sex and age composition survey of the Colville River population.

We were unable to complete this survey in 2015 or 2016 due to low snow coverage. In 2014, we conducted a fall sex and age composition survey from 5–9 November. We found 26 bulls, 61 cows, 7 calves for a total of 94 moose. The bull:cow ratio was 42B:100C. Calves were 7.4% of the population with a calf:cow ratio of 12CA:100C

Conduct spring, summer, and fall radio telemetry surveys to examine calf production and survival and adult distribution and mortality rates.

Due to the aging nature of the collared sample, we discontinued monitoring of collared moose in this population.

Monitor predator populations and other mortality factors by conducting wolf population surveys, logging bear and wolf observations during moose surveys, and through field observations and public contacts.

We observed no wolves and 2 wolverines in the core moose habitat during the spring trend count of 2017.

Examine dead moose to look for causes of death, disease, mineral deficiencies, and contaminants.

We did not observe or examine any moose mortalities in this reporting period.

Evaluate quantity and quality of moose browse in portions of Unit 26A.

Preliminary analysis of previously collected browse samples indicate comparatively low digestible protein for Colville River browse samples.

Monitor hunting activity and harvests through the statewide harvest ticket system, Community-based Harvest Assessments, public contacts and field observations.

Drawing hunts have remained closed due to low population status. Hunt report information indicates that 2 bulls and 1 cow were harvested by resident hunters by harvest ticket in Unit 26A.

Community-based Harvest Surveys were completed by Division of Subsistence in Barrow and other North Slope villages. Data analysis is currently ongoing and results are not available.

Develop updated population objectives in cooperation with the public and other agencies.

We worked with the North Slope Borough Fish and Game Management Committee to discuss population and management objectives. We developed and completed the moose Operational Report and Plan.

Submitted by: Phillip Perry, Region V Management Coordinator

II. SIGNIFICANT DEVIATIONS AND/OR ADDITIONAL FEDERAL AID-FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THIS SEGMENT PERIOD

Due to an unallowable expense on the FY2017, AKW-7 grant report, $6,513 will be debited to this grant in FY2018, AKW-23, and $60,040 will be credited due to a miss allocation of personal services, for a total adjustment of $53,527.

III. PUBLICATIONS

None.

IV. RECOMMENDATIONS FOR THIS PROJECT

None.

PREPARED BY: Lem Butler and Brenda Bowers

DATE: December 1, 2017