

**MOOSE
ANNUAL SURVEY AND INVENTORY**

STATE: Alaska

GRANT AND SEGMENT NUMBER: W-33-12

PROJECT NUMBER: 1.0

PERIOD: 1 July 2013 – 30 June 2014

PROJECT LOCATION: Statewide

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

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

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

Regionwide Activities

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

Data associated with moose populations and harvest will be provided to the Alaska Board of Game and Regional Advisory Council at their next regularly scheduled meeting (winter 2015).

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

Information on days of effort, and location of successful and unsuccessful hunts was collected from all hunters via permit hunt reports.

Unit 1A: Two bull moose were harvested, and incisors were collected for aging these animals. Photos of each set of antlers were also obtained. Hunter success rate was 11.5%. In addition to these moose, 4 bulls were harvested on during the federal subsistence season.

Unit 1B: Thirty six bull moose were harvested, and incisors were collected for aging these animals. Photos of each set of antlers were also obtained.

Unit 1C: Forty three bull moose were harvested. Incisors were collected for aging from all but a few of the moose, and antler photos were taken of most of the bulls. Within the Gustavus portion of Unit 1C, all bulls taken at Gustavus were checked for antler configuration because of the spike fork 50" or 3 brow tine antler restriction hunt.

Unit 1D: Twenty six bulls were harvested. Incisors, antler measurements, antler point counts, and antler photos were collected from each of the harvested bull moose.

Unit 3: Fifty five bull moose were harvested. Incisors were collected for aging and antler photos were obtained from these moose.

Unit 5: Thirty six bull moose were harvested throughout the unit. Incisors were collected from all harvested bull moose, and photos of antlers were obtained for nearly all specimens.

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

Staff in Douglas and those in the outer offices of Haines and Yakutat discussed moose management with hunters during the permitting process as well as when hunters dropped off their moose jaws and/or hunt reports. In addition, Douglas staff spent time in the field at Gustavus and Haines during the moose hunts to collect samples and to interact with hunters and to discuss moose populations and moose management. Douglas staff attended Advisory Committee meetings in Juneau, Haines, Yakutat, and Gustavus to discuss moose management issues. Staff also conducted public meetings in Haines, and Gustavus to specifically address moose management issues.

Staff in the Petersburg area office discussed moose management and the status of the Unit 1B and 3 moose population with members of the Wrangell Fish and Game Advisory Committee and interested hunters from Petersburg, Wrangell, Kake and other communities. During fall 2013, staff again collected anecdotal information on the number of bulls, cows, and calves observed by hunters during the moose hunting season by way of a question on the RM038 moose registration permit hunt report.

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

Sex and age composition was attained in Unit 1B (Stikine River), 1C (Gustavus, and Berners Bay), 1D, and 5A.

Unit 1B: One hundred seventeen moose were counted, including 36 cows each with 1 calf. Poor survey conditions on the Stikine River delayed the aerial survey until after bulls had dropped their antlers; therefore we were unable to accurately assess sex composition. *Unit 1C:* Two hundred fifty nine moose were counted in 2 areas, Gustavus and Berners Bay (43 bulls, 48 calves, 93 cows and 75 moose of unknown sex).

Unit 1D: One hundred sixty three moose were counted (23 bulls, 116 cows, 21 calves, and 3 unknown sex).

Unit 5A-Yakutat forelands: Two hundred twelve moose were counted (18 bulls, 41 calves, and 153 cows).

ACTIVITY 5: Conduct calf production surveys as time and budget allows.

No calf production surveys were conducted in the Petersburg Area due to sightability problems associated with leaf-out of vegetation.

Unit 1C: Productivity surveys were conducted in Gustavus and Berners Bay for the sample of collared cow moose. Both ground tracking and helicopter tracking were used to locate the animals and determine if they had a calf.

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

No browse surveys or habitat analysis was conducted during this report period.

Activities by Unit

Unit 1B:

Activity 1: Obtain age estimates of harvested moose by sectioning incisor teeth.

Incisors from 36 bull moose were collected and sent to a lab for aging.

Activity 2: Collect information on age and antler architecture of all harvested moose to evaluate current antler restrictions.

The 2013 fall season was the 5th year of the liberalized season where moose with 2 brow tines on each side were legal for harvest. Age data collected from 13 bulls that had two brow tines on both antlers had a median age of 4 years, which was less than desired under the current selective harvest strategy.

Unit 1C:

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

Two hundred fifty nine moose were counted in 2 areas, Gustavus and Berners Bay (43 bulls, 48 calves, 93 cows and 75 moose of unknown sex). Surveys were not conducted in the Taku River or in the Endicott River.

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.

Browse surveys were not conducted during this FY.

Activity 3: Monitor radio collared moose in Gustavus and Berners Bay to provide insight into moose body condition, pregnancy status, survival, and movement patterns.

Gustavus: Thirty six collared moose were monitored.

Berners Bay: Thirty four collared moose were monitored.

Unit 1D:

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

Unit 1D: One hundred sixty three moose were counted (23 bulls, 116 cows, 21 calves, and 3 unknown sex).

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.

Browse surveys were not conducted during this report period.

Unit 2

Activity 1: Document reported moose sightings in Unit 2.

Anecdotal reports of moose were noted. One cow/calf pair was reported on POW during 2013.

Unit 3

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

This was accomplished during the sealing of bears and in talking to moose hunters and deer hunters.

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

Teeth were obtained from 54 of the 55 bulls harvested and submitted for age analysis.

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

The 2013 fall season was the 5th year of the liberalized season where moose with 2 brow tines on a side were legal for harvest. Age data collected from 18 bulls that had two brow tines on both antlers had a median age of 6 years, which remained in keeping with the current selective harvest 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.

Only the Yakutat forelands were surveyed during the report period. Surveys for the Nunatak Bench and Malaspina Forelands are planned for FY14.

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

Regionwide:

ACTIVITY : Prepare biennial regional moose management reports.

Moose management report was drafted and submitted for publication. Staff continue to collect information for preparation of future reports.

ACTIVITY : 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 : 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 : 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 in 2015.

Activities by Unit:

Unit 6

ACTIVITY : Moose composition surveys were conducted in November 2013 in Unit 6C using a modified Geospatial Population Estimate techniques. By survey completion, 255 moose were observed (Table 1). Sixty-three of these moose were bulls, 129 were cows, and 63 were calves. Using these numbers, 49 Bulls: 100 Cows (B:C) and 49 calves: 100 Cows (c:C) were observed.

Using the geospatial population estimator (GSPE) allows for the generation of measures of precision. For the GSPE analysis, 192 moose were considered. Using only these numbers, 53 B:C and 49 c:C were observed. The model generated a B:C ratio of 64 with a 95% Confidence Interval of 30-97. The model also generated a c:C ratio of 50 with a 95% Confidence Interval of 17-83. Therefore, all aforementioned scenarios are encompassed by the confidence intervals.

Moose population surveys were completed using a modified Geospatial Population Estimate survey of Units 6B and 6C. The point estimate for 6B, east of the Copper River Delta and including the Martin River Valley, is 227 (90% CI 177-278). All of the results for the last five surveys fall within the confidence intervals for this survey. The point estimate for 6C, west of the Copper River Delta is 609 (90% CI 483-734.) This is virtually identical to the previous estimate

in 2012 of 601 and is above management objectives (400-500 moose). By survey completion, 397 moose were observed. GMU 6C (west of the Copper River) held the majority (73%) of these animals. Calf survival may also be higher in Unit 6C with 20% of the moose observed being calves compared with 15% calves in GMU 6B (east of the Copper River including Martin River drainages.)

Twinning surveys were attempted but advanced leaf-out prevented adequate sightability. Genetic samples were collected and submitted for a “founder effect” study.

ACTIVITY : We issued 225 permits for a total harvest of 40 moose.

Units 7&15

ACTIVITY : Two composition surveys were flown for GMU 7 with 72 moose counted, producing a bull:cow ratio of 25:100, and 16% calves. Six composition surveys conducted in subunit 15A tallied 332 moose, a bull:cow ratio of 29:100, and 16% calves. No composition surveys were conducted in subunit 15B. Three composition surveys in Unit 15C tallied 1,177 moose, a bull:cow ratio of 19:100, and 18% calves.

ACTIVITY : Hunter participation and harvest increased compared to recent years likely due to relaxed hunting restrictions with 1,586 hunters participating during the general season. Harvest for the general season was 183 bulls, with an additional 37 moose taken on drawing permits, and 7 animals harvested under the subsistence seasons.

ACTIVITY : 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.

ACTIVITY : No population (GSPE) surveys were conducted during the reporting period due to budget constraints and survey conditions.

Unit 14C

ACTIVITY : Conducted a fall moose population estimate (modified Gasaway survey) on Joint Base Elmendorf-Richardson and in Ship Creek Valley in cooperation with the military. Conducted composition counts in the Eklutna, Peters Creek, Twentymile, Portage, and Placer River drainages. The final population estimate for the area based on 2013 survey and census information is listed below:

Results

Total Moose	1533
Calf: Cow	0.23
Bull: Cow	0.35

ACTIVITY : 113 moose were harvested during the reporting period including 32 cows and 83 bulls.

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

Regionwide Activities

ACTIVITY 1: Prepare biennial moose management reports.

Prepared preliminary data for biennial moose management reports.

ACTIVITY 2: Monitor harvest and analyze harvest data.

Monitored preliminary harvest of 3,079 moose during general season and registration and drawing permit hunts and analyzed harvest data.

ACTIVITY 3: Monitor natural mortality and analyze mortality data.

Analyzed the effects of liberal grizzly bear hunting regulations on area specific bear harvest in relation to moose calf survival and found no relationship in Unit 12. Analyzed the effects of liberal grizzly bear hunting regulations and the brown bear control program in Unit 20E on area specific bear harvest in relation to moose calf survival and found no significant relationship.

ACTIVITY 4: Provide moose management information to state and federal regulatory processes.

Provided information to 15 State fish and game advisory committees, the Alaska Board of Game, and 2 Federal regional advisory councils and the Federal Subsistence Board.

ACTIVITY 5: Capture moose to deploy radiocollars and collect information on movements, productivity, and/or mortality.

Captured and radiocollared approximately 50 moose to collect information on movements, productivity, and mortality.

Activities by Unit

Unit 12

ACTIVITY 1: Conduct geospatial population estimation or trend/composition surveys.

Completed a trend count survey within the Robertson River drainage in Units 12 and 20D; a total of 240 moose were observed and the bull:cow and calf:cow ratios were estimated at 33:100 and 24:100 respectively.

Unit 19

ACTIVITY 1: Conduct composition–trend area and moose population estimation surveys.

Conducted composition–trend surveys in eastern Unit 19A in Nov 2013 and sampled 147 moose (28 moose/hr), including 41 calves:100 cows, and 38 bulls:100 cows.

Conducted composition–trend surveys in western Unit 19A in Nov 2013 and sampled 244 moose (54 moose/hr), including 50 calves:100 cows, and 55 bulls:100 cows.

Conducted a GSPE moose population and composition estimation survey in Unit 19A in a 534 mi² area near Sleetmute in March 2014 and obtained an estimate of 798 ± 13.6% at 90% CI with 24% calves.

ACTIVITY 2: Conduct spring calf twinning surveys.

conducted a spring calf twinning survey in Unit 19A in early June 2014. We found 48 cows with litters, including 30 sets of twins (63% twinning rate)

ACTIVITY 3: Conduct snow depth aerial surveys.

Conducted aerial snow depth surveys between November 2013 and April 2014.

Unit 20A

ACTIVITY 1: Conduct geospatial population estimation surveys.

Conducted geospatial population estimation surveys, estimating 12,193 moose.

ACTIVITY 2: Conduct spring calf twinning surveys.

Conducted May twinning surveys (12%, $n = 123$).

Unit 20B

ACTIVITY 1: Conduct a geospatial population estimation or trend area surveys.

Conducted geospatial population estimation surveys in eastern 20B (2310 moose); unable to complete surveys in remainder of unit due to weather.

ACTIVITY 2: Conduct spring calf twinning surveys.

Conducted May twinning surveys (Minto Flats = 22%, Central Unit 20B = 6%).

Unit 20D

ACTIVITY 1: Conduct a geospatial population estimate.

The southern Unit 20D GSPE survey was conducted, but a population estimate has not been generated. The northern Unit 20D GSPE survey was not conducted. Due to incomplete analysis, it is unknown if the population objective was met.

ACTIVITY 2: Conduct spring calf twinning surveys.

Conducted spring moose calf twinning surveys, resulting in a 24% twinning rate.

Unit 20E

ACTIVITY 1: Conduct moose population estimation surveys.

Completed a population estimation survey in a 924 mi² area in southern Unit 20E resulting in a population estimate of 590-798 moose and a bull:cow ratio of 19 bulls:100 cows.

ACTIVITY 2: Conduct spring twinning surveys.

Conducted a moose twinning survey in southwest Unit 20E to evaluate nutritional condition of habitat for moose, resulting in a twinning rate estimate of 24%.

Unit 21A and 21E

ACTIVITY 1: Conduct trend/composition surveys.

Planned but did not conduct composition–trend surveys in the Yukon-Innoko area in Unit 21E and the Innoko area in Unit 21A because of poor survey conditions.

ACTIVITY 2: Conduct spring calf twinning surveys.

Planned but did not conduct twinning surveys in the Yukon-Innoko area in Unit 21E and the Innoko area in Unit 21A.

ACTIVITY 3: Conduct snow depth aerial surveys.

Conducted aerial snow depth surveys between November 2012 and April 2013.

Unit 21B

ACTIVITY 1: Conduct population estimation or trend area surveys.

Counted 140 moose in the Nowitna Mouth trend count area (TCA) and 140 moose in the Nowitna/Sulatna confluence TCA.

ACTIVITY 2: Assist US Fish and Wildlife Service in the operation of a hunter checkstation on the Nowitna River.

Provided support to hunter checkstation and checked 106 hunters with 31 moose harvested.

Unit 21C

ACTIVITY 1: Conduct a hunter check station on the Koyukuk River.

In combination with Units 21D and 24, registered 608 hunters at checkstation on the Koyukuk River and checked 261 moose.

Unit 21D

ACTIVITY 1: Conduct fall trend area surveys.

Counted 794 moose in the Three Day Slough TCA, 365 in the Dulbi River TCA, 450 moose in the Koyukuk River Mouth TCA, 205 moose in the Squirrel Creek TCA, 274 moose in the Kaiyuh Slough TCA, and 472 moose in the Pilot Mountain Slough TCA.

ACTIVITY 2: Conduct spring twinning surveys.

Counted 240 cow:calf pairs in the 21D and 24 twinning surveys.

ACTIVITY 3: Conduct a hunter check station on the Koyukuk River.

In combination with Units 21D and 24, registered 608 hunters at checkstation on the Koyukuk River and checked 261 moose.

Unit 24

ACTIVITY 1: Conduct fall trend area surveys.

Counted 433 moose in the Huslia Flats TCA and 496 moose in the Treat Island TCA

ACTIVITY 2: Conduct spring twinning surveys.

Counted 240 cow:calf pairs in the 21D and 24 twinning surveys.

ACTIVITY 3: Operate a hunter check station on the Koyukuk River.

In combination with Units 21D and 24, registered 608 hunters at checkstation on the Koyukuk River and checked 261 moose.

ACTIVITY 4: Conduct Geospatial Population Estimator (GSPE) moose survey.

Conducted a GSPE survey, and estimated 768 moose in the 24B Kanuti GSPE survey area.

ACTIVITY 5: Conduct fall moose capture operation .

Captured 60 moose and deployed radio collars with no capture related mortalities.

Units 25A, 25B and 25D

ACTIVITY 1: Conduct a geospatial population estimator (GSPE) surveys or composition surveys.

No surveys conducted due to poor survey conditions.

Other accomplishments not planned: Assisted Yukon Flats NWR in capturing and collaring 38 adult cow moose in Unit 25D in November 2013. One cow died shortly after capture and we assumed it was capture related.

Units 26B and 26C

ACTIVITY 1: Conduct riparian zone minimum direct count surveys.

Conducted a riparian zone minimum direct count survey in April 2014, with preliminary data indicating 109 moose and no calves observed.

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

Project Location: Game Management Units 9, 11, 13, 14A, 14B, 16, and 17

Regionwide:

ACTIVITY 1: Prepare biennial regional moose management reports.

Biennial moose management reports were written and submitted to the region for editing.

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

Unit 9: A composition survey of Units 9B, 9C and Ugashik portion of 9E was conducted November 2013. Poor weather allowed a partial survey only in 9E. Bulls: 32, Cows: 84, Calves: 21, Total:137.

Unit 11: Composition surveys were flown during November in CA 11. Bulls: 91, Cows: 103, Calves: 27, Total: 221.

Unit 13: Composition surveys were flown during November in 12 distinct count areas. Bulls: 1,439, Cows: 4,255, Calves: 1,144, Total: 6,838.

Unit 14 A&B: Sex and age composition was determined from fall population surveys in November. Bulls: 467, Cows: 1863, Calves: 676, Total: 3006.

Unit 16 & 17: No fall sex and age compositions surveys for moose were conducted because insufficient snow precluded fall moose surveys in this area.

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

Unit	Male	Female	Unknown	Total Harvest
<i>Unit 9:</i>	99	1(illegal)	0	100
<i>Unit 11:</i>	51	0	0	51
<i>Unit 13:</i>	715	2	0	717
<i>Unit 14A:</i>	414	515	7	936
<i>Unit 14B:</i>	79	0	0	79
<i>Unit 16:</i>	385	13	7	405
<i>Unit 17:</i>	244	7	2	253

Activities by Unit:

Unit 14A&14B:

ACTIVITY 1: Conduct a fall moose census (GSPE) in select areas.

GSPEs were completed in both Unit 14A and 14B in November. The population estimate for Unit 14A is 8600 ± 1000 moose and is 2700 ± 490 for Unit 14B.

ACTIVITY 2: Monitor moose population for diseases including Chronic Wasting Disease.

Disease surveillance was discontinued on moose in the fall.

Unit 16:

ACTIVITY 1: Conduct a fall moose census (GSPE) in select areas.

Poor snow conditions prevented GSPE surveys in Unit 16.

Unit 17

ACTIVITY 1: Conduct a spring moose population survey (modified Gasaway or VerHoef) in select areas.

A GSPE survey was conducted in Unit 17C during early March of 2014. Ninety nine of 764 units were surveyed, and 633 moose were counted. The preliminary population estimate for this area is 4883 moose, with a range of 3870-5896 moose @ the 95% CI.

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

Regionwide:

Prepare biennial regional moose management reports.

A moose management report was prepared during this reporting period.

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.

Two areas were flown to determine fall composition in 2013. In the Kuskokwim drainage there were 41 bulls per 100 cows and 72 calves per 100 cows. In the Paimiut Count area, the ratios were 40 bulls per 100 cows and 48 calves per 100 cows.

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 twinning surveys on the Yukon River and Kuskokwim Rivers in late May 2014. In three days of flying we observed a total of 59 cows accompanied by calves. Twinning rates were 49% in the Lowest Yukon area, and 52% 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 did not conduct a GSPE survey during this reporting period due to poor snow conditions for almost the entire winter.

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.

Poor snow conditions prevented completion of these surveys.

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

Anecdotal evidence suggests the moose populations are increasing on the Goodnews and Kanektok drainages.

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

We analyzed harvest reports and found that 542 moose were reported taken in Unit 18 in the Yukon drainage and along the coast. Hunters also reported harvesting 3 moose in the Kanektok River drainage and 15 in the Goodnews River drainage. We contacted moose hunters opportunistically throughout the year. We also spent approximately 6 days contacting hunters by boat in the Bethel area on the Kuskokwim River during the hunting season for registration permit hunt RM615. Harvest was 119 moose in RM615 in RY13.

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 fewer 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.

No work was completed toward this activity during the reporting period because department biologists were assigned to other S&I activities.

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 was performed during this reporting period.

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

We have periodically monitored the 23 cow moose that have been fitted with radio collars. We collected data on the location of the moose as well as presence of a calf or calves was noted as the collared moose are 2 years old.

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 followed-up on the April 2013 public meeting in the community of Quinhagak to make progress towards a moose management strategy in this area.

Unit 22:

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

A geospatial moose census was completed in Unit 22D and Unit 22E. Unit 22D has an observable moose census estimate of 1106 moose ($\pm 9\%$ at 90% C.I.), and the calf:adult ratio is 16 calves:100 adults. Unit 22E has an observable moose census estimate of 701 moose ($\pm 14\%$ at 90% C.I.), and the calf:adult ratio is 16 calves:100 adults. The estimated sightability correction factor in Unit 22D is 1.19 (SE=0.180) and 1.33 (SE=0) in high and low stratum search units respectively. The estimate of total abundance in Unit 22D with the estimate of sightability applied is 1334 ($\pm 24\%$ at 90% C.I.).

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 22D Kuzitrin river drainage and in Unit 22D Agiapuk river drainage during the reporting period. In the Kuzitrin river drainage, we classified 295 moose and found 23 bulls:100 cows and 16 calves:100 adults. In the Agiapuk river drainage, we classified 112 moose and found 16 bulls: 100 cows and 30 calves: 100 cows.

Spring recruitment surveys were not completed. Staff availability was limited by the completion of geospatial moose surveys in Units 22D, 22E and 23.

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 Units 22A and 22B.

Evaluate hunting mortality by analyzing all moose harvest data.

Hunt reports were received for a bull fall registration hunt (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), 2 antlered bull winter registration hunts (RM843 in Unit 22B west of the Darby Mountains and RM849 in Unit 22D Kuzitrin River drainage), 2 nonresident bull registration hunts (RM842 in a portion of Unit 22D and RM853 in 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 155 moose (Unit 22A-28, 22B-34, 22C-15, 22D-58, 22E-20). The Department documented 182 moose in 2012-2013, 193 moose in 2011-2012, and 168 moose in 2010-2011 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. Community-based harvest assessments were conducted by Subsistence Division in Diomedea and Stebbins. 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. The Unit 22C antlerless moose hunts, RM850 and RM852, were closed because multiple years of cow harvest had lowered the population to management objectives and continued harvest of cows was no longer necessary for population reduction.

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 census was conducted during this reporting period in the portion of Unit 23 containing the Upper Kobuk Drainage, in early April 2014. Density of adult moose was 0.14 moose/mi² and the calf:adult ratio was 7:100.

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

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

Scheduling conflicts prevented twinning surveys this year.

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: 410 hunters reported taking 169 moose through the statewide harvest ticket

system and the registration permit system. Community-based harvest assessments suggested residents of Unit 23 have taken 400-425 moose annually during recent years, substantially more than indicated by harvest ticket hunt reports. Nonresident hunters (52 reported) took 28 moose.

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 2014 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=wildlifeplanning.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.

Incidental observations of bear, wolves, and other wildlife species were recorded during moose surveys during April 2014. 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 April 2014, but no site visits were completed due to determine cause of death.

Possibly conduct radio-telemetry projects to delineate census areas and monitor adult mortality. (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 radio-telemetry projects were initiated on moose due to conflicting projects and wide-spread icing conditions (poor weather) affecting moose.

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 a unit-wide riparian zone direct minimum count for moose in Unit 26A on 6-9 April 2014. We counted a total of 280 moose. There were 276 adults and 4 short yearlings (1%) that had survived the winter and no sets of twins.

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

We conducted a fall sex and age composition survey from 8-12 November 2013. Because of a late onset of winter, very few moose had moved to the river bottoms where we could survey them and do composition counts. We only found 32 cows and 5 bulls. None of the cows had calves.

Capture adult or short yearling moose for health assessment; collecting samples to test for disease and contaminants, and attaching radio collars. (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.)

We did not capture moose in 2014 due to budgetary restraints.

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

We radiotracked during fall composition surveys from 8-12 November 2013. We found 14 of 19 collared cows. Of these, 7 were dead and none of the other 7 had surviving calves. All of these moose were alive and most had calves in June.

We radiotracked again 6-9 April, 2014. We found 8 live cows and none of them had surviving short yearlings. There were 4 new mortalities since the November 2013 survey.

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 7 wolves, 6 bears, 2 wolverines, and 0 lynx during the spring trend count of 2014.

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

We examined and collected samples from dead moose that were found during the trend count in April and calving surveys in June.

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

We helped collect samples to assess the quality of moose browse in Unit 26A during the following plant phenology periods: late winter, green-up, peak growth, and senescence. These samples are currently being analyzed for leaf nitrogen, digestible proteins, and tannin-protein precipitation capacity. Preliminary analysis indicates 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.

Hunt report information indicates that 3 bulls were harvested in drawing hunt DM981, no moose were harvested in DM980, and 2 moose were harvested in the general season hunt.

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.