

Status of Grouse, Ptarmigan, and Hare in Alaska, 2014

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Cover Photo: Male sharp-tailed grouse, *Tympanuchus phasianellus*, conducting its breeding display, Delta Junction. ©2014 ADF&G, photo by Cameron J. Carroll.

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Introduction

Species considered small game in Alaska are defined by the Alaska Department of Fish and Game (ADF&G), Division of Wildlife Conservation (DWC) for regulatory purposes as grouse, ptarmigan, and hare. Alaska has 7 species of grouse and ptarmigan (Tetraonidae, Storch 2000) including ruffed (*Bonasa umbellus*), sharp-tailed (*Tympanuchus phasianellus*), sooty (*Dendragapus fuliginosus*), and spruce (*Falcapennis canadensis*) grouse; and rock (*Lagopus muta*), white-tailed (*L. leucurus*), and willow (*L. lagopus*) ptarmigan. In addition, Alaska has 2 species of hare (Leporidae) including Alaska (*Lepus othus*) and snowshoe (*L. americanus*) hare. All 9 species of small game can be legally harvested in Alaska with liberal seasons and bag limits for all game management units (GMU, Fig. 1).

Ruffed Grouse

Ruffed grouse reside in Interior, Southcentral, and small localized areas of Southeast Alaska near large river mouths (e.g., Stikine and Taku rivers). Ruffed grouse are native to mixed forest areas in the Interior and portions of Southeast. Ruffed grouse were translocated to the Matanuska-Susitna (Mat-Su) Valley (Fig. 2) in the late 1980s and to the Kenai Peninsula in the mid-1990s, from populations near Anderson (Steen 1995, 1999). In the Mat-Su Valley, translocated populations have expanded their range to include the entire lower Susitna River basin (just south of Cantwell), west to the southern slopes of the Alaska Range, south of Tyonek in west Cook Inlet, and up the Matanuska River (east of Chickaloon). On the Kenai Peninsula, translocated populations have expanded their range very little, and only a handful of birds have been observed on the Kenai Peninsula in the past 2 to 3 years. The cause of this is unknown; however, the more maritime climate and predominance of spruce forest may be influencing population growth and range expansion.

Population monitoring of ruffed grouse prior to the 1990s was primitive, done primarily through hunter questionnaire. To provide a better indication of the status of these species throughout their range the DWC initiated spring breeding surveys near Palmer, following translocation in 1992, and near Anderson in 1993. Spring breeding surveys have also been conducted intermittently on the Kenai Peninsula as well as near Fairbanks, Delta Junction, Tok, and McGrath. Over the last decade, wings collected from harvested ruffed grouse have provided information on harvest composition and brood production in a population. Other work done in coordination with the Ruffed Grouse Society (RGS), has focused on habitat improvement projects intended to provide greater hunting and viewing opportunities throughout central Interior Alaska and the Mat-Su Valley.

Sharp-tailed Grouse

Sharp-tailed grouse reside in Interior Alaska and portions of the upper Copper River basin. They are typically observed in the upper Koyukuk River, the Tanana River, the middle and upper Yukon and Kuskokwim rivers, and at lower elevations along portions of the Wrangell-St. Elias Mountains. However, observations have also been made of sharp-tailed grouse in the upper Nenana River, areas west and north of Glennallen (GMU 13A), and areas in Southwest Alaska, where they are much less abundant. Sharp-tailed grouse prefer recently burned areas, open grass-shrub habitat, agricultural lands, sparse shrub-spruce at timberline, and muskegs.

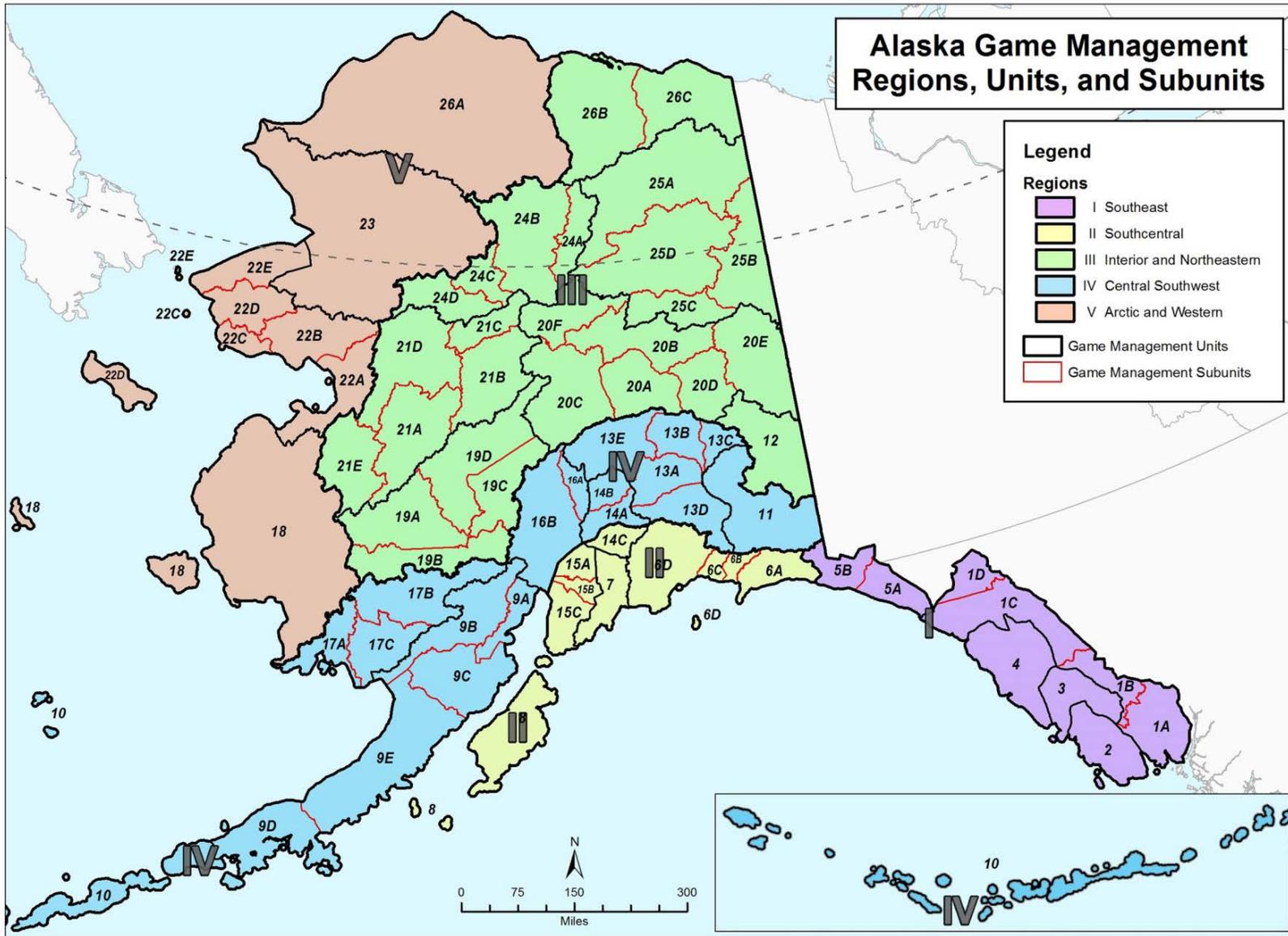


Figure 1. State of Alaska game management units.

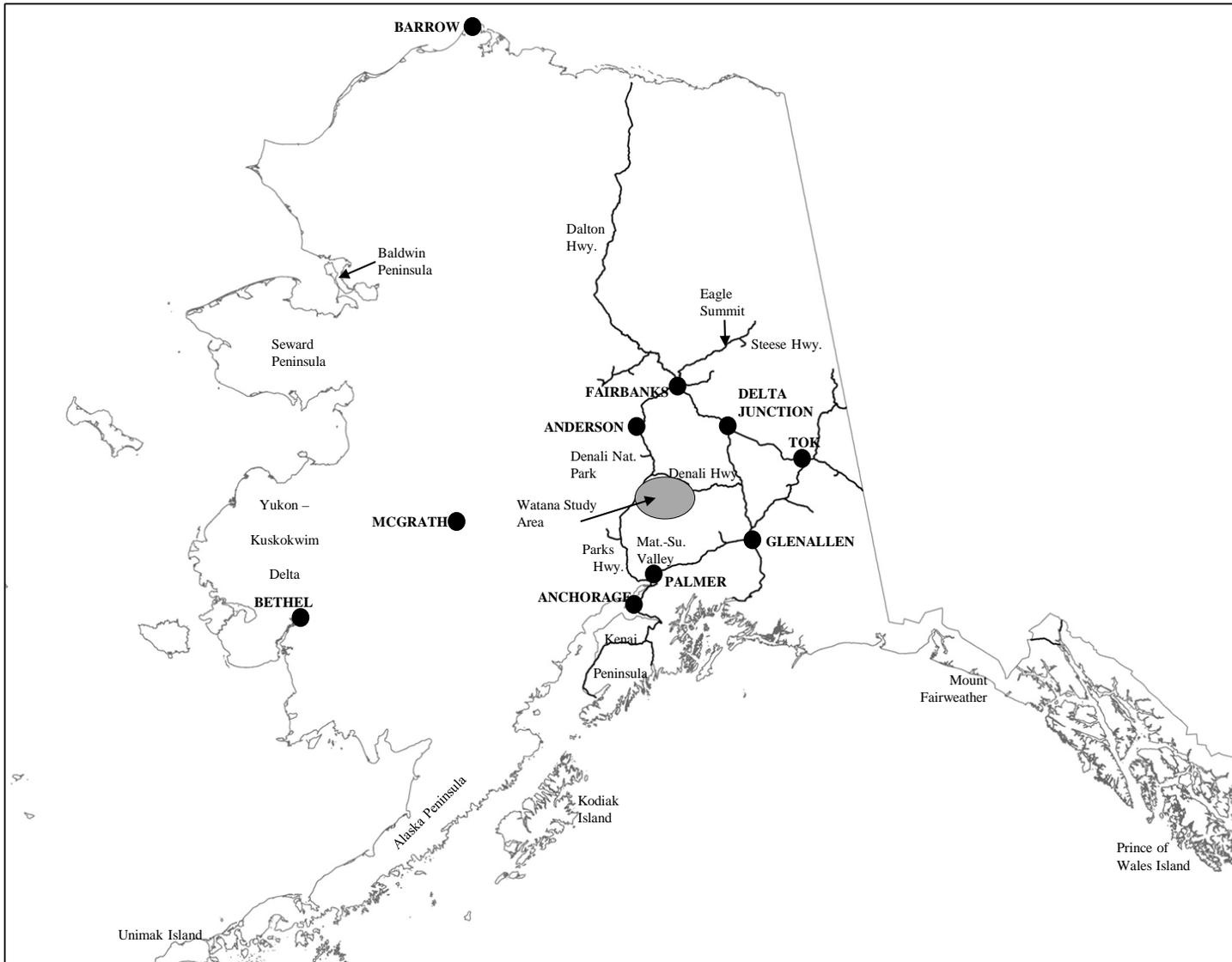


Figure 2. Alaska road system and general locations at which abundance surveys or research studies were completed or field observations were made. Locations are referred to in this report.

Early monitoring of sharp-tailed grouse was done primarily through hunter questionnaires. Biologists working for the DWC established spring breeding surveys for sharp-tailed grouse in Interior Alaska near Tok in the early 1960s. These roadside surveys were later expanded to other areas near Delta Junction and Manley Hot Springs in the early 1980s. For the last 15 years the DWC has been limited to conducting spring breeding surveys of sharp-tailed grouse in Delta Junction on the Delta Junction Agricultural Project (DJAP; GMU 20D). However, in the spring of 2013 and 2014, with the help of the University of Alaska-Fairbanks Cooperative Extension Service (Extension), efforts were made to identify additional areas near Delta Junction and areas near Tok for long-term monitoring of sharp-tailed grouse. Like ruffed and spruce grouse, wings collected from harvested sharp-tailed grouse over the last decade have provided valuable information about the proportion of juveniles. In addition to population monitoring, there have been several research projects (Raymond 2001, Paragi et al. 2012) that have taken place in the DJAP that have furthered understanding of seasonal habitat selection of sharp-tailed grouse.

Sooty Grouse

Sooty grouse (formerly known as blue grouse) is the largest of the grouse species in Alaska and resides in the coastal rainforest of Southeast Alaska, from approximately Mount Fairweather south, including GMUs 1–4 (Zwickel and Bendell 2004). However, they are not found on islands where spruce grouse reside, on Prince of Wales Island (POW) and its immediately adjacent islands. Sooty grouse can often be found high up in Sitka spruce (*Picea sitchensis*), and mountain (*Tsuga mertensiana*) and western hemlock (*T. heterophylla*) emitting a low, guttural “hoot” during the breeding season.

Historically, monitoring of sooty grouse has been done primarily through hunter questionnaires and wing collection from hunters.

Spruce Grouse

Spruce grouse is the most ubiquitous grouse species in Alaska. This grouse is found throughout most of forested Alaska, with the exception of Southeast Alaska, where spruce grouse occur only on POW and immediately adjacent islands. Spruce grouse are often observed in white spruce (*P. glauca*) and paper birch (*Betula papyrifera*) woodlands as well as black spruce (*P. mariana*) bogs.

To supplement information gathered through hunter questionnaires, roadside surveys of spruce grouse were initiated on the Steese Highway northeast of Fairbanks and along the Taylor Highway northeast of Tok in 1965 (Ellison and Weeden 1966). The surveys continued until funding for small game projects declined around the mid-1970s. Around the same time the DWC supported a graduate student who conducted research on spruce grouse on the Kenai Peninsula (Ellison 1972). Currently the DWC does not have a population monitoring program for spruce grouse and information on population status is derived primarily from hunter harvested wing collections and hunter observations.

Rock Ptarmigan

Rock ptarmigan is the second most abundant ptarmigan in Alaska and can also be found throughout the state, including the Aleutian Islands. Rock ptarmigan typically inhabit higher elevation, more exposed rock faces, scree slopes, and alpine ridges. Alpine areas with abundant dwarf birch (*B. nana*) provide good habitat and are likely places to observe rock ptarmigan.

Population monitoring and research was initiated at Eagle Summit on the Steese Highway by the DWC in the late 1950s to better understand life history and population ecology of rock ptarmigan (Weeden 1965). Concern over the potential impacts of hunting on the easily accessible ptarmigan population near Eagle Summit led to additional research in the early 1970s (McGowan 1975). Lack of funding in the 1980s brought the rock ptarmigan monitoring program at Eagle Summit to an end, and further information on rock ptarmigan populations was gleaned using wing collection and hunter questionnaires. Declines in rock ptarmigan populations along the Denali Highway in the 1990s led to concerns of potential overharvest by hunters. This concern prompted the DWC to initiate population monitoring along the Denali Highway in the late 1990s. As more resources became available monitoring programs were initiated along the Steese Highway near 12-mile Summit and Eagle Summit, the Richardson Highway near Donnelly Dome and Isabel Pass, and most recently along a ridge adjacent to the park road in Denali National Park (DNP) and on the Kenai Peninsula. In 2013, the DWC began a research project to investigate rock ptarmigan movement patterns relative to the points of access for hunters in GMU 13B. Following a partial census conducted this spring the small game program has plans to initiate a research project looking at rock ptarmigan movement patterns near Eagle Summit.

White-tailed Ptarmigan

White-tailed ptarmigan is the smallest species of ptarmigan and inhabits high elevation alpine habitat within the Alaska Range and south through Southeast Alaska. No white-tailed ptarmigan have been confirmed in Alaska north or west of the Alaska Range. This species is endemic to North America and populations can be found in high alpine portions of Southeast Alaska, coastal British Columbia, and the western United States south to New Mexico.

Due to their more remote and relatively inaccessible locations, monitoring of white-tailed ptarmigan has been done primarily through hunter questionnaires and wing collection from hunters.

Willow Ptarmigan

Willow ptarmigan are the most common ptarmigan species in Alaska, occurring in most alpine and subalpine nonforested habitats. They are not found however in the Aleutian Islands west of Unimak Island or the islands off the west coast of Alaska. Willow ptarmigan are commonly found in montane valley bottoms and along rivers where willow (*Salix* spp.) shrubs are abundant.

As with the other grouse species, early monitoring of willow ptarmigan was done through hunter questionnaires and by wing collections. Early research conducted in the 1960s by the DWC provided managers with a better understanding of life history and population ecology of willow

ptarmigan (Weeden 1965). Declines in rock ptarmigan populations along the Denali Highway in the 1990s led to concerns of potential overharvest of ptarmigan by hunters. This concern prompted the DWC to initiate population monitoring of both rock and willow ptarmigan along the Denali and Richardson highways in the late 1990s. As more resources became available monitoring programs were initiated along the Parks Highway near Broad Pass and at several locations near Anchorage, Fort Greeley, and most recently along a section of the DNP road and on the Kenai Peninsula. In 2013, and in cooperation with the University of Alaska Fairbanks (UAF) and the Alaska Energy Authority (AEA), the DWC began a 3-year research project to examine the ecology and distribution of willow ptarmigan adjacent to the proposed Susitna-Watana Hydroelectric Project (FERC No. 14241; Susitna-Watana Project) site in the upper Susitna River.

Alaska Hare

Alaska hare is one of the most poorly understood game species in the state. The species ranges from the Baldwin and Seward peninsulas to the lower Yukon and Kuskokwim rivers and throughout the Alaska Peninsula. The Alaska hare inhabits coastal lowlands, alder (*Alnus* spp.) thickets, and wet meadows.

Beyond information received from hunter questionnaires there are no active programs aimed at long-term population monitoring of Alaska hares. However, research initiated in the fall of 2012 by DWC and UAF is examining the genetic variability of the species throughout its range (T. Booms, ADF&G wildlife biologist, personal communication). This study will provide a strong first step toward documenting and understanding the basic life history and important management issues facing this species.

Snowshoe Hare

Snowshoe hares are found throughout Alaska although they are much less abundant throughout Southeast Alaska. They commonly inhabit mixed spruce forests, wooded swamps, and brushy areas that provide good cover from predators.

Early monitoring of snowshoe hare populations was from information received from hunter questionnaires. Since the late 1990s the DWC has monitored population fluctuations of snowshoe hares by performing twilight roadside hare counts along the Richardson, Parks, Steese, and Denali highways.

The interest in promoting Alaska's small game species as a valuable resource has resulted in further growth and development of our statewide small game program. In addition to hiring a statewide small game program coordinator in 2011, in February 2013 the DWC hired a second statewide small game biologist, based in Fairbanks, to focus on population monitoring, education, and research in Interior, Western, and Northwestern Alaska. The small game program objectives are diverse and comprehensive. In addition to education and outreach, the primary objectives of the program are to 1) better understand harvest composition and abundance trends of statewide small game populations, particularly those that are heavily used by hunters along road systems, and 2) develop research efforts to better inform management concerns.

The abundance survey data, observations, and information provided in this report are for use by DWC staff to manage harvest and inform decisions on the status of various small game populations within their areas. These data will inform DWC use of its discretionary authority, within seasons specified by the Alaska Board of Game (BOG) to adjust bag limits to restrict or liberalize harvest.

This report details the activities conducted by the small game program during the 2013 regulatory year (RY13; 1 July 2013–30 June 2014). Specifically, it addresses 1) the harvest composition from the past season, 2) status of monitored grouse, ptarmigan, and snowshoe hare populations, 3) management concerns, 4) BOG regulatory changes, 5) current research, and 6) future work. As a departure from previous annual reports this information will be provided by species within each of 7 sections of the report representing unique geographic regions of the state. These regions include 1) Fairbanks and Interior Road System, 2) Alaska Range, 3) Southcentral Road System, 4) Kenai Peninsula, 5) Western Rural, 6) Alaska Peninsula, and 7) Southeast Alaska.



Methods for Population Monitoring

SPRINGTIME ABUNDANCE SURVEYS

Critical to the management of Alaska's small game is an understanding of population abundance, particularly of heavily exploited populations and those adjacent to the road system. Beginning in late April each year, numbers of breeding male grouse and ptarmigan are counted at fixed survey locations from the Steese Highway to the Kenai Peninsula (Fig. 2). This provides useful indices from which populations can be monitored and management action can be taken, if warranted. Snowshoe hares are also counted in the same areas for the same purpose.

Springtime breeding behavior of many tetraonids allows a means to index annual abundance and the eruptive nature of grouse and ptarmigan populations (McBurney 1989; Taylor 1992; Zwickel and Bendell 2004; Haddix 2007). In Alaska, male ruffed, sharp-tailed, and sooty grouse, as well as willow and rock ptarmigan, perform conspicuous, springtime, territorial displays. Male spruce grouse and white-tailed ptarmigan also perform a springtime display, but it is one that is not easily located or viewed, making monitoring of population abundance through this behavior more challenging. These 2 species are monitored through wing collections, periodic site visits to areas where fall harvest occurs, and reports from DWC biologists, hunters, and outdoor enthusiasts.

The spring breeding season for grouse and ptarmigan in Alaska occurs from late April through late May (Weeden 1965; Taylor 2013). Due to the geography of Alaska, limited road system, poor access off the road system in the spring, and staff limitations, the small game program has been largely restricted to monitoring species and areas in which population abundance can be accessed. The program has focused on those populations that are either heavily exploited by hunters, popular outdoor recreational areas, or very close to large urban areas or road systems, and afford consistent and reliable access from year to year. However, efforts have been and will continue to be made to establish remote, fly-out only survey locations for a variety of species to begin evaluating whether our road-system surveys adequately reflect the greater population trend. A more detailed description of the methods used for each specific species is included under the appropriate species section.

Ruffed Grouse

From late April to early May, male ruffed grouse exhibit a behavior known as drumming. This time of year, males attempt to attract breeding females by standing on a prominent log, stump, or subtle rise on the forest floor and flap their wings near their nearly upright body, making a sound like that of a quickening drum beat. Typically, male ruffed grouse have a preferred drumming post that is within an early successional trembling aspen (*Populus tremuloides*) or other mixed hardwood stand (McBurney 1989).

Survey methods used for ruffed grouse are consistent with state and national techniques (McBurney 1989; Taylor 1992). Drumming typically begins in late April and continues through mid-May. So, spring surveys have been completed between 25 April and 15 May. Survey routes generally consisted of 10 to 12 stops along a trail or rural road. At each stop, the observer

listened for drumming males for 4 minutes. All drums and their direction from the observer were recorded; however, the total numbers of ruffed grouse were reported rather than the total number of drums. Roadside and trail transects through known ruffed grouse habitat were established in Anderson (1993, GMU 20C), Delta Junction (2008, GMU 20D), Copper Landing (2007, GMU 7), and Palmer (1992, GMU 14A) and have been completed annually since their inception (Merizon 2013; Taylor 2013). Additional areas are being explored for future survey routes near Tok and Delta Junction, along the Taylor Highway, and locations in the eastern Mat-Su Valley.

Sharp-tailed Grouse

Male and female sharp-tailed grouse return to lek sites (communal breeding display areas) during the breeding season from late April through early May. Females were often observed, though their presence was highly variable; they may have been hidden in nearby vegetation while watching displaying males. Male counts form the basis of springtime abundance estimates as they consistently return to lek sites every spring. Males were distinguished from females by their engorged yellow supercilium (eyebrow), vocalizations, foot stomping, tail rattling, and body posturing. In Alaska, lek sites have generally been located in 1) open areas, including recent burns and cleared agricultural fields, 2) along roads, or 3) within 1–2 m of balsam poplar (*P. balsamifera*), willow (*Salix* spp.), or aspen regeneration that occurs after a burn or clearing. During lek visits the peak of daily activity occurred one hour prior to sunrise and generally continued for 2 to 3 hours. Leks were approached quietly on foot and males were counted.

Sooty Grouse

Beginning in 2012, DWC staff conducting Sitka black-tailed deer (*Odocoileus hemionus sitkensis*) spring pellet count surveys recorded the presence of sooty grouse along established transects. While conducting these surveys, field staff recorded either visual or auditory observations of individual sooty grouse. At the time of this report, observation data from spring 2014 were not available.

Spruce Grouse

The springtime display of the male spruce grouse in Interior and Southcentral Alaska is quiet and inconspicuous, making it difficult to locate displaying males. Males in Southeast Alaska have been heard and observed making wing claps while displaying, making them slightly easier to locate; however, due to a low population density and limited staff time, DWC has not been able to establish spring survey routes for this population. While displays are difficult to monitor, the presence of both male and female spruce grouse throughout the state has been noted by DWC staff during spring field work, and these observations have proven to correlate with fall abundance.

Rock Ptarmigan

Male rock ptarmigan defend breeding territories through vocalizations and display flights beginning in late April. These territories are set up in high elevation alpine areas, often adjacent to stands of dwarf birch on exposed montane slopes and ridges (Weeden 1965).

To assess statewide population abundance of rock ptarmigan we used accepted methods of counting territorial males, using a broadcast recording of a territorial male at a set distance along a survey route to elicit a response from adjacent males (Choate 1963; Watson 1965; Bergerud and Mercer 1966; Bergerud 1970; Braun and Rogers 1971; Taylor 2000, 2013). Surveys were completed by either driving a survey route along rural roads or walking on foot. Responding males were counted only within a one-quarter mile radius of each stop along the survey route. This method provided an estimate of territorial males for small areas ($\leq 3 \text{ km}^2$).

White-tailed Ptarmigan

The springtime displays of male white-tailed ptarmigan are more difficult to monitor than those of other ptarmigan species in Alaska. Access to the high alpine ridges and peaks on which they breed during the breeding season is very poor in Alaska because there are few roads to these areas, and the high mountains are frequently covered in deep snow and prone to avalanche during breeding season. Based on field observations in Alaska, male and female white-tailed ptarmigan disperse during the summer months (post breeding) and are rarely found together. However, based on field observations and hunter reports, flocks of white-tailed ptarmigan are found in the alpine in late September and October.

Willow Ptarmigan

Like male rock ptarmigan, beginning in late April and continuing through late May, male willow ptarmigan vigorously defend breeding territories through calling and display flights. These territories are typically set up in transitional shrub habitat between the subalpine and alpine in willow and dwarf birch stands (Weeden 1965). Willow ptarmigan population abundance is assessed using the same methodology as rock ptarmigan.

Alaska Hare

Currently, there are no active programs aimed at long-term population monitoring of Alaska hares. This species is one of the least accessible small game species to view and hunt, yet it is often harvested opportunistically by trappers and remote winter travelers in western Alaska.

Snowshoe Hare

Snowshoe hare populations are subject to large cyclic fluctuations that normally occur over a 9 to 10 year period (Krebs et al. 1987, 2001, Taylor 2013). DWC does not estimate population size but rather monitors population fluctuations. DWC has monitored these population fluctuations by completing early morning roadside counts of snowshoe hares along the Richardson, Parks, Steese, and Denali highways. The DWC has also relied upon numerous partners to assist in monitoring statewide hare populations, including the National Park Service (NPS), U. S. Fish and Wildlife Service (USFWS), and private individuals, to obtain data and other information.

HUNTER HARVESTED WINGS AND TAILS

In order to understand annual grouse and ptarmigan harvest composition, the program developed and is continuing an effort to collect wings, tails, and heads harvested by hunters (Table 1, Fig. 3). By examining these samples, biologists can determine age (juvenile or adult), sex, and verify species of harvested birds (Bergerud et al. 1963; Weeden and Watson 1967; Szuba et al. 1987; Gullion 1989). This is a very cost- and time-effective way for DWC to index harvest composition and estimate brood production from the previous breeding season. To promote future wing collections, the DWC has free wing envelopes available at most ADF&G offices throughout the state.

Table 1. Total numbers of hunter harvested wings collected statewide from grouse and ptarmigan by game management unit (GMU) during regulatory year 2013.

GMU	Grouse				Ptarmigan			Total
	Ruffed	Spruce	Sharp-tailed	Sooty	Willow	Rock	White-tailed	
1	0	0	0	6	0	0	0	6
3	0	0	0	3	0	0	0	3
4	0	0	0	0	3	0	0	3
7	0	115	0	0	32	0	18	165
9	0	0	0	0	174	0	0	174
10	0	0	0	0	0	1	0	1
11	0	4	0	0	0	0	0	4
12	0	17	0	0	0	0	0	17
13	0	6	4	0	273	39	17	339
14	27	37	0	0	47	7	22	140
15	0	7	0	0	2	0	0	9
16	0	2	0	0	7	0	0	9
17	0	8	0	0	0	0	0	8
19	0	19	1	0	2	0	0	22
20	14	26	19	0	0	3	0	62
22	0	0	0	0	146	17	0	163
25	0	0	0	0	2	3	0	5
Total	41	241	24	9	688	70	57	1,130

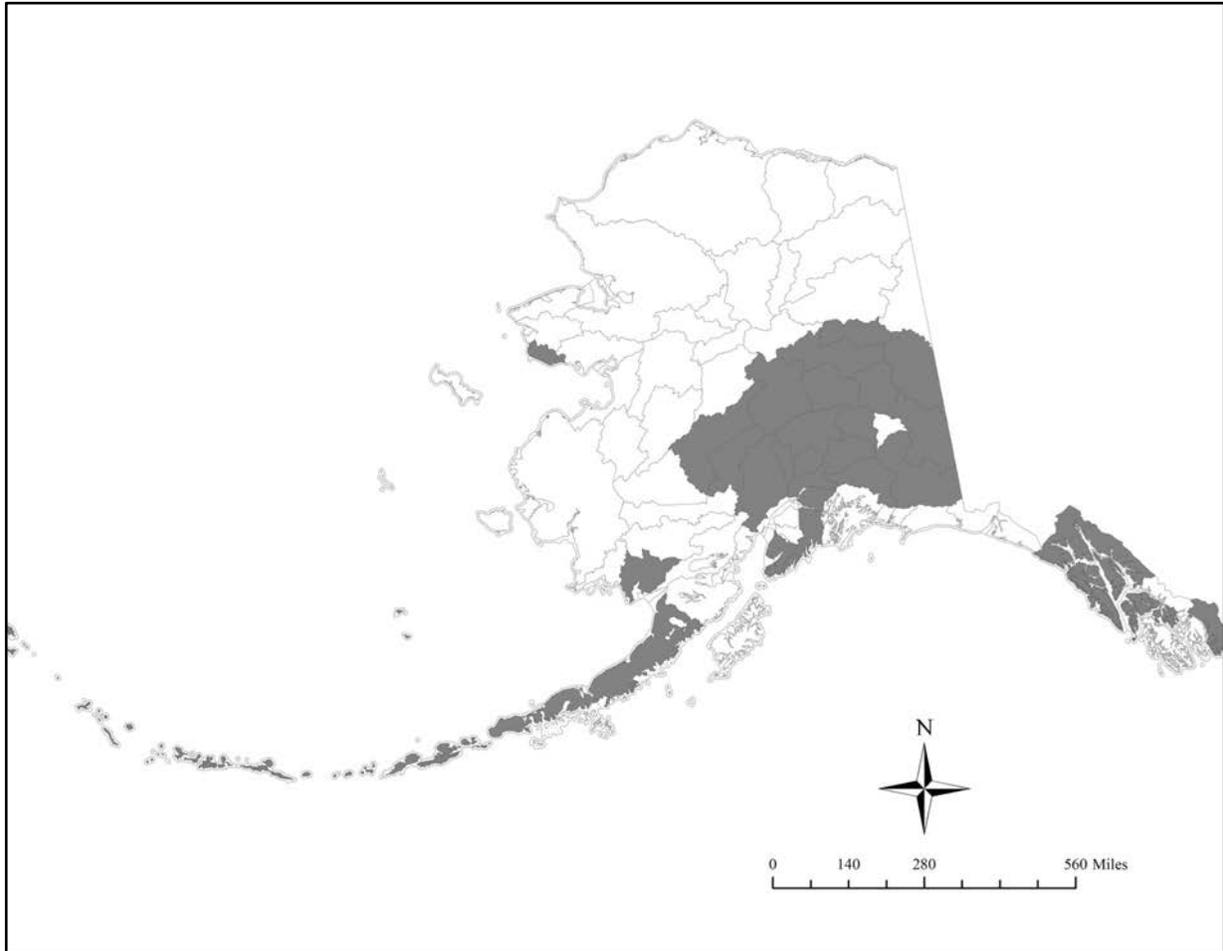


Figure 3. Game management units and subunits (shaded gray) from within which grouse and ptarmigan wings, tails, and heads were collected from hunters during regulatory year 2013.

Grouse wings were used to determine age by examining the stage of molt and primary feather (P) wear. For spruce grouse only, calamus (feather shaft) diameter of P1 was measured (Szuba et al. 1987). For ptarmigan, wings were used for one or more purposes, including to 1) determine age by examining the degree of pigmentation on P8, P9, and P10 (Bergerud et al. 1963; Weeden and Watson 1967), 2) estimate sex by measuring P8, or 3) estimate sex by measuring wing chord (Merizon 2012; Taylor 2013). Grouse rectrices (tail feathers) were used to determine sex (Henderson et. al. 1967; Schulz 1983). Heads of ptarmigan were used to verify species and estimate sex by examining plumage characteristics.



2013–2014 Climate Patterns and Breeding Season

In April and May 2013, large portions of Interior and Southcentral Alaska experienced one of, if not the longest and coldest spring in recorded history for certain portions of the state. This caused a delayed, abbreviated, or unusual breeding season for numerous grouse and ptarmigan populations. As a result, the presence of undersized, recently fledged grouse and ptarmigan chicks was readily apparent at the beginning of the RY13 hunting season. Numerous brood groups of willow and rock ptarmigan were monitored and the average weight of chicks measured 7–8 August 2013 was near 200g. Most of the chicks were barely capable of flight, making them easy targets for hunters at the start of the season. As a result, DWC provided a news release (13 August 2013) recommending grouse and ptarmigan hunters use good judgment when pursuing upland birds during the first couple of weeks of the season due to the much smaller than average chick size. Reduced body mass of chicks was not limited to willow and rock ptarmigan. Ruffed, spruce, and sharp-tailed grouse chicks were also much smaller than average.

Weeden and Theberge (1972) found that late springs did not relate to smaller clutch sizes. Nest searches conducted on radiocollared rock and willow ptarmigan by DWC staff in the summer of 2013 showed no reduction in clutch sizes despite the late spring. During the first 4–6 weeks post hatching (late June to early August 2013) conditions were ideal for successfully rearing chicks. Warm, dry conditions prevailed throughout most of the state along with strong insect and berry production.

The winter of 2013–2014 was also relatively mild throughout much of the state. There was a significant melt and freezing rain event throughout portions of the Interior and Southcentral that created difficult snow roosting conditions for grouse and ptarmigan for much of January. However, overall conditions were likely not severe enough to cause higher than normal overwinter mortality.

Throughout much of the state, a significant and extended warming of air temperatures began in late March and continued through May 2014. Snow throughout the lowland Interior and Southcentral had mostly melted by mid-April with rapid melting occurring in higher, montane environments. Even throughout much of Southeast Alaska, sooty grouse were initiating vigorous calling activity by mid-April. During the May breeding season, temperatures remained either average or slightly above average with very dry conditions throughout most of the state.

Nesting generally began from mid-May to very early June this spring. Radiocollared hen rock and willow ptarmigan were found incubating eggs on 2 June 2014 along the Denali Highway. The overall lack of actively displaying male willow and rock ptarmigan on the same date also further supported that most hens were nesting. Nesting conditions in June were fair. However, the Alaska Range, western Wrangell, eastern Talkeetna, and northern Chugach mountains experienced a 2–4 day snowstorm beginning on 18 June, followed by heavy rain and cool temperatures. This cool and wet weather began at the start of the hatch period when chicks were most vulnerable. The Talkeetna Mountains also experienced heavy snow 26–27 June. On 18 June, hen rock ptarmigan were photographed sitting on nests under 30 cm of snow (Fig. 4). When these hens were relocated on 23 June, all but one of the monitored nests had been abandoned full of eggs. One hen had successfully hatched 6 chicks but later was killed by a

predator; the plumage of both hen and chicks was likely conspicuous on the snow. In addition, average clutch size in 2014 (6 eggs per clutch) was lower than average (8-12 eggs per clutch; Hannon et al. 1998, Montgomerie and Holder 2008). Grouse species that reside at lower elevations experienced better nesting conditions throughout Alaska with average temperature and precipitation patterns. Although the Interior did not receive heavy snowfall, June was the wettest month on record for Fairbanks and much of the surrounding area (National Weather Service, www.nws.noaa.gov/climate/index.php?wfo=pafg, Accessed 1 July 2014) which could have had a negative influence on chick survival.



Figure 4. Photograph of a nesting radiocollared hen rock ptarmigan (circled) buried in 30 cm of snow along the Denali Highway immediately following a late winter snow storm, 18 June 2014.



Statewide Summary

Climate patterns during RY13 were favorable with the exception of the higher alpine ptarmigan habitats in the southern Interior and Southcentral. Despite the late arrival of spring in May 2013, conditions warmed rapidly in late May and dry conditions persisted throughout the state well into August 2013. Post hatch weather conditions were ideal for survival of grouse and ptarmigan broods during the summer of 2013. Reduced chick body size was apparent based on field observations and hunter reports throughout the state at the beginning of the RY13 hunting season as a result of the late arrival of summer and subsequent delayed nesting. Throughout the winter, snow and temperature conditions were also near average or slightly milder than average. Late April and May 2014 were unseasonably warm and dry throughout much of the state, resulting in normal timing of the spring breeding season and subsequent nesting season. Ptarmigan nest abandonment rates were high in the Alaska Range, Talkeetna and Wrangell Mountains and chick survival will likely be very low this year due to a late snowstorm. As a result, hunters can expect low ptarmigan densities in these areas during the RY14 hunting season.

Ruffed grouse throughout Alaska appear to be increasing in abundance based on spring drumming counts. Drumming counts from Delta Junction, Anderson, and Palmer all reflected higher abundance than in 2013. Observations from those areas, and from Glennallen, Tok, and the Mat-Su Valley, also reflect higher abundance than in previous years.

Sharp-tailed grouse abundance was unevenly distributed across the species' range in Alaska during RY13. Based on springtime searches for lek activity between Chicken and Tok, sharp-tailed abundance appeared to be quite high. However, within traditional monitoring sites in Delta Junction, abundance appeared to be similar to the recent 5-year average. Overall brood production also was low based on wing samples collected near Delta Junction.

Spruce grouse appeared to be at low abundance during RY13 throughout much of the easily accessible areas in Alaska. Brood production for spruce grouse was low on the Kenai Peninsula but appeared to be good in Southcentral and the Interior despite low sample sizes. Overall, hunters reported seeing and harvesting fewer spruce grouse this season than in the past.

Rock ptarmigan were more abundant than in the recent past throughout Southcentral and the Alaska Range this year. Hunters reported observing and harvesting more rock ptarmigan, and spring abundance survey data reflect a similar increase along the Denali Highway and remote locations throughout GMU 13. However, a snowstorm in late June in the eastern Alaska Range and Wrangell and St. Elias mountains likely had a negative impact on chick production. In addition, very low abundance of territorial male rock ptarmigan was documented along the Steese Highway this spring.

Very little is known about white-tailed ptarmigan abundance throughout its range in Alaska. Most of the harvest occurs near high alpine road systems (Hatcher and Thompson Pass) and alpine hiking trails throughout Southcentral and the Kenai Peninsula. Generally, very few hunters report harvesting this species due to the difficulty of accessing large portions of its high alpine range.

Willow ptarmigan abundance was also variable across its range. Willow ptarmigan abundance was higher than the recent 5-year average along the Denali Highway and southern portions of GMU 13; however, average to below average abundance was found throughout the Kenai Peninsula and many popular hunting locations throughout Southcentral. Large flocks of willow ptarmigan were also reported on the Seward and Alaska peninsulas during the fall of 2013.

Alaska hare is the least well known of all the small game species in the state. Overall, this species remains at low abundance throughout its statewide range with only periodic harvest being reported.

Throughout Alaska, snowshoe hare populations were at or very near the low of their 8–10 year population cycle. Hunters reported seeing and harvesting very few snowshoe hares during RY13. It is anticipated that hare abundance will begin to increase over the next 1–3 years with higher densities being observed first in the north (Interior) and last on the Kenai Peninsula.



Fairbanks and Interior Road System

For the purposes of this report the Fairbanks and Interior Road System (FIRS) region encompasses GMUs 12, 19, 20, 21, 24, 25, 26B, and 26C (Fig. 5). Specifically, the region extends southwest of Aniak (GMUs 19 and 21), northwest of Huslia (GMU 24), northeast of Deadhorse to the Canadian border (GMU 26), and southeast of Northway (GMU 12). The region includes 6 major highways (Dalton, Elliott, Alaska, Richardson, Parks, Taylor and Glenn highways). The range of habitat is somewhat diverse from mixed deciduous species and black spruce that dominate the landscape in the interior to alpine and tundra habitats of the Brooks Range and North Slope. The network of major highways allows for relatively easy access along or adjacent to road corridors; however, there is a large portion of the region that is inaccessible save for small aircraft or boat. Locations near Fairbanks and Delta Junction are popular for both ruffed and sharp-tailed grouse hunting due to the forest composition (mixed aspen) and frequency of wildfires that provide appropriate habitat. Ptarmigan hunting is also popular in this region at higher elevations along the Steese, Elliott, and Richardson highways. Sooty grouse are not found in this region.

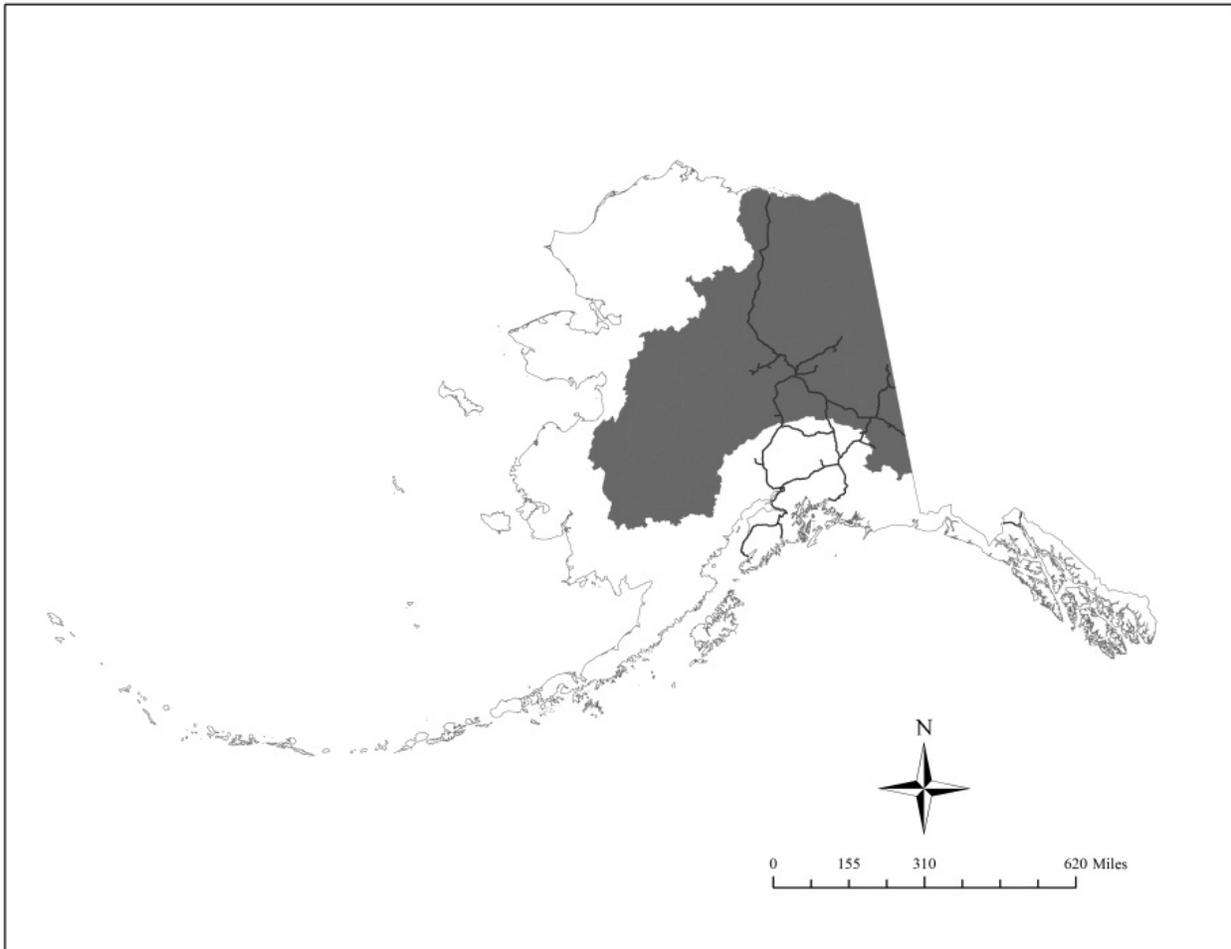


Figure 5. Map of the Fairbanks and Interior Road System region.

RUFFED GROUSE

Abundance Surveys

In 2014, DWC completed drumming counts from 27 April to 3 May. Survey conditions for all drumming counts in the FIRS region were good, with seasonably warm weather and little wind. Data from drumming counts in the region indicate that populations of ruffed grouse are increasing (Table 2).

In addition to the ruffed grouse survey routes established and completed by DWC, other organizations and government agencies conduct drumming counts annually. Contractors for the United States Army completed drumming counts during RY13 on Fort Wainwright along one route in the Yukon Training Area (YTA) near Fairbanks and along 2 routes south of Delta Junction near Fort Greely within the Donnelly Training Area (DTA) and Gerstle River Training Area (GRTA; Haddix 2007).

Table 2. Ruffed grouse drumming count totals at survey locations within the Fairbanks and Interior Road System region, 2005–2014.

GMU	Survey Location	Year									
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
20A	Anderson	33	22	14	16	8	1	9	8	NS	14
20B	Ft. Wainwright (YTA)	2	8	8	5	5	4	7	6	2	3
20D	Delta Junction				7	3	3	3	7	4	7
20D	Ft. Wainwright (DTA)				4	5	7	8	9	8	13
20D	Ft. Wainwright (GRTA)						3	4	7	7	1
19D	McGrath								12	NS	NS

In late April and early May 2014, DWC and Extension staff completed drumming surveys in several new areas near Tok and adjacent to the Taylor Highway. At least 7 ruffed grouse were heard during drumming counts and the DWC will begin long-term monitoring along these routes in the spring of 2015.

Early successional hardwood forests play a critical role in the life history of ruffed grouse. Several proposals have been submitted to the Alaska Department of Natural Resources (DNR) Division of Forestry for industrial scale timber harvesting portions of FIRS between Fairbanks and Tok, including parts of the Tanana Valley State Forest (TVSF) and private holdings. The common objective of the proposals is to reduce heating costs and increase energy independence for residents and for federal facilities, including Fort Greely in Delta Junction. Approval of these proposals could result in industrial scale logging operations on portions of southern Interior Alaska near each facility. Through sound forest management this could increase the aspen and mixed hardwood composition of the forest and thus produce more breeding and nesting habitat for ruffed grouse. This could also increase hunter access to portions of Interior Alaska that are near the road system but have not been accessible by vehicle. The DWC is working with DNR Forestry to provide input on the best harvesting practices to encourage regeneration of aspen, a preferred forage species for ruffed grouse.

RGS continues to actively support ruffed grouse habitat improvement and raise money to support habitat manipulation and hunter education and participation in the Interior. In the spring of 2014 DNR Forestry, in coordination with RGS, conducted roller chopping operations on approximately 120 acres within a portion of TVSF in an effort to improve ruffed grouse habitat near Tok.

Wing Collections

Fourteen ruffed grouse wing samples were collected from hunters that hunted within the FIRS region during RY13 (Table 3). Though sample sizes were very small, they provided information about the percentage of juveniles, which was relatively low (50%) compared to 2012 and 2011, suggesting moderate brood production in the summer of 2013.

Table 3. Total number and percent juvenile ruffed grouse based on harvested wing collections within the Fairbanks and Interior Road System region during regulatory years 2011–2013.

Regulatory Year	GMU Harvested from	Number of Samples				Total	% Juvenile
		Adult	Juvenile	Unknown			
2011	20C, 20D	6	17	1	24	71%	
2012	20B, 20C, 20D	8	17	0	25	68%	
2013	20A, 20B, 20C, 20D	7	7	0	14	50%	

Regulatory Year 2014 Hunting Projection

Hunting projections are based on springtime abundance surveys, field observations, spring and summer weather patterns, other related factors like avian predator observations, and professional judgment.

Although data from wing collections showed only moderate brood production in the summer of 2013 it is likely, based on spring drumming counts, that populations of ruffed grouse throughout the FIRS are increasing. However, June 2014 was the wettest month on record in Fairbanks and much of the surrounding area (National Weather Service, www.nws.noaa.gov/climate/index.php?wfo=pafg; Accessed 1 July 2014) which could have an impact on chick survival. At this time DWC does not have information on chick survival, which makes further projections difficult.

SHARP-TAILED GROUSE

Abundance Surveys

In 2014, springtime lek survey counts occurred from 24 April to 1 May in the DJAP and adjacent Delta Junction Bison Range (DJBR). Twenty-five leks (including 7 new leks documented on DJBR in 2014) were visited and 19 leks had males present or actively dancing (Table 4). A total of 90 displaying males were counted between the 25 leks (3.6 males/lek). Total number of displaying males per lek was higher than in the recent past on DJAP. However, more single

displaying males away from established leks were observed this year than in 2012 or 2013. When approached the males were often displaying under a tree with a single female. It is likely that these sites are not established leks but rather opportunistic locations adjacent to feeding or loafing females. It is not clear how these males should be categorized in analyzing overall abundance of the species on the DJAP.

Table 4. Total number of male sharp-tailed grouse documented on the Delta Junction Agricultural Project, 2008–2014.

Description	Year						
	2008	2009	2010	2011	2012	2013	2014
Total Males	82	54	62	67	65	67	90
Leks Counted	30	32	33	32	31	21	25
Males/Lek	2.73	1.69	1.88	2.09	2.10	3.19	3.60

Survey conditions in both Delta Junction and Tok during late April and early May were excellent, with mostly clear skies, calm to light winds, and temperatures ranging from the mid-20s to low 50s. Snow conditions were vastly different from the spring of 2013, with little to moderate snow cover that rapidly disappeared in the first few days of the survey period. Courtship behavior during survey counts appeared to be waning, with males performing less vigorously and for shorter durations than observed in previous years. It was likely that breeding was initiated earlier in 2014 due to warmer temperatures and lack of snow cover compared to 2013.

Contractors for the United States Army also performed lek surveys near Fort Greely south of Delta Junction within DTA and GRTA. Lek sites located on DTA and GRTA had an average of 4.17 males/lek in 2014. This is up slightly from the 3.78 males/lek observed in 2013 (E. Neipert, wildlife biologist, Fort Greely-Donnelly Training Area, personal communication). Following several years of observations it appears as though sharp-tailed grouse within DTA and GRTA are stable or slightly increasing.

DJAP provides reliable and consistent access to lek sites, but the highly human-manipulated environment may not offer an accurate reflection of the greater FIRS region population status. So, in the spring of 2013 and 2014 DWC worked with volunteers from Extension to document lek sites away from human-manipulated environments along the Steese, Taylor and Alaska highways. Several active leks were located near Tok in recently burned areas and DWC plans to begin long-term monitoring efforts in the spring of 2015. As was the case in 2013, no sharp-tailed grouse were observed or heard along the Steese Highway within what appears to be high quality habitat created from recent large burns. DWC will continue to search for leks adjacent to the Steese Highway in RY14.

Other DWC staff and eastern Interior residents have reported seeing more sharp-tailed grouse, especially in areas along the Taylor Highway south of Chicken and west of the Taylor Highway within habitat that burned in 2004. Sharp-tailed grouse were also routinely observed along the Alaska Highway between Beaver Creek and Tok.

Wing Collections

Twenty sharp-tailed grouse wing samples were collected from hunters that hunted within the FIRS region during RY13 (Table 5). Brood production appears to have been lower in RY13 than in the 2 previous years despite the small sample size.

Table 5. Total number and percent juvenile sharp-tailed grouse based on harvested wing collections within the Fairbanks and Interior Road System region during regulatory years 2011–2013.

Regulatory Year	GMU Harvested from	Number of Samples				% Juvenile
		Adult	Juvenile	Unknown	Total	
2011	20D	20	35	1	56	64%
2012	20B, 20D	18	31	0	49	63%
2013	19D, 20D, 20E	11	9	0	20	45%

Regulatory Year 2014 Hunting Projection

Despite lower juvenile recruitment in the fall of 2013 (45%; Table 5) it appears as though sharp-tailed grouse numbers are increasing slightly within the Fairbanks and Interior Road System. Hunters are likely to encounter greater numbers of sharp-tailed grouse in this region in RY14. However, June 2014 was the wettest month on record in Fairbanks and much of the surrounding area (National Weather Service, www.nws.noaa.gov/climate/index.php?wfo=pafg; Accessed 1 July 2014), which could have an impact on chick survival. At this time DWC does not have information on chick survival, which makes further projections difficult.

SPRUCE GROUSE

Abundance Surveys

Currently DWC has no spruce grouse population assessment projects within the FIRS region. Hunter reports of spruce grouse abundance were variable throughout the region. Reported observations from areas around Fairbanks and Tok indicated higher spruce grouse numbers than in previous years.

Wing Collections

Sixty-two spruce grouse wing samples were collected from hunters within the FIRS during RY13 (Table 6). There was a high percentage of juveniles (69%) in the fall harvest, indicating good to very good brood production. Based on DWC field observations this spring, densities were modestly higher during May than in the recent past in the FIRS region.

Table 6. Total number and percent juvenile spruce grouse based on harvested wing collections within the Fairbanks and Interior Road System region during regulatory years 2011–2013.

Regulatory Year	GMU Harvested from	Number of Samples				% Juvenile
		Adult	Juvenile	Unknown	Total	
2011	20B, 20D	4	13	0	17	76%
2012	12, 20B, 20C, 20D, 24B, 25C	25	44	1	70	63%
2013	12, 19D, 20B, 20D, 20E	19	43	0	62	69%

Regulatory Year 2014 Hunting Projection

Spruce grouse is one of the most popular and most hunted small game species in Alaska (Merizon and Carson 2013). Data from wing collections showed higher brood production in the summer of 2013 than in 2012. It is likely that populations of spruce grouse within the Fairbanks and Interior Road System are increasing. Hunter observations in the fall of 2013 also support the conclusion that there has been an increase in brood production and densities in areas around Fairbanks and Tok. However, June 2014 was the wettest month on record in Fairbanks and much of the surrounding area (National Weather Service, www.nws.noaa.gov/climate/index.php?wfo=pafg; Accessed 1 July 2014), which could have an impact on chick survival (Erikstad and Spidso 1982, Erikstad 1985). At this time DWC does not have information on chick survival, which makes further projections difficult.

ROCK PTARMIGAN

Abundance Surveys

In the FIRS region, rock ptarmigan surveys were completed from 5 to 28 May. Surveys occurred near Donnelly Dome along the Richardson Highway (GMU 20D) and along 12-mile and Eagle summits on the Steese Highway (GMU 25C). In addition, DWC established a new survey route along a portion of Primrose Ridge in DNP (GMU 20C) with a permit from NPS. The primary purpose of initiating a rock ptarmigan survey within DNP was to obtain data from a similar geographic area that does not receive any hunting pressure to be able to compare it with an adjacent area that receives considerable hunting pressure along the Denali Highway (Table 7).

Table 7. Territorial male rock ptarmigan count data at survey locations within the Fairbanks and Interior Road System region, 2007–2014.

GMU	Survey Location	Year							
		2007	2008	2009	2010	2011	2012	2013	2014
20C	Denali National Park								6
20D	Donnelly Dome	1	1	0	1	1	2	2	2
25C	12-Mile Summit	1	0	0	0	1	0	2	0
25C	Eagle Summit	5	5	5	4	4	3	5	1

In addition to the roadside surveys, efforts were made to conduct a spring census of territorial males in a 22 km² study area near Eagle Summit to compare results with surveys conducted in the late 1950s, 1960s, and 1970s (Weeden 1965). Although a complete census was not achieved this year, we were able to compare some count data with previous years (Table 8). Count data from 2014 is similar to count data from 1956 when the population was considered to be at low density. Although results from 2014 are incomplete, the data were consistent with other count surveys conducted along the Steese Highway this spring that indicated lower densities of rock ptarmigan.

Table 8. Territorial male rock ptarmigan count data from within defined areas of a 22 km² study area near Eagle Summit from 1956 (low density year), 1961 (high density year), and 2014. Count data from 1959 and 1962 are from an ADF&G report by Robert Weeden (Weeden 1963).

Area	Year		
	1956	1961	2014
Upper Bates	3	14	2
Lower Bates	2	22	4
Miller West	1	8	0
Miller East	2	8	0
Lower Miller	5	11	1 ^a
Eagle Fork	1	10	-
Mastodon	0	11	-
Castle	1	13	-
Cripple	3	12	2
Camp	9	23	6
Total	27	132	15

^a A complete survey of Lower Miller was not conducted in May 2014 due to snow conditions.

It appears that monitored populations of rock ptarmigan have decreased, based on territorial male counts along 3 roadside routes and one study area within the FIRS region during RY13.

Wing Collections

Six rock ptarmigan wing samples were collected from hunters within the FIRS region during RY13 (Table 9). It is difficult to make meaningful inferences about brood production based on the low sample size.

Table 9. Total number and percent juvenile rock ptarmigan based on harvested wing collections within the Fairbanks and Interior Road System region during regulatory years 2011–2013.

Regulatory Year	GMU Harvested from	Number of Samples				% Juvenile
		Adult	Juvenile	Unknown	Total	
2011	20B	10	9	0	19	47%
2012	20B, 20D, 25C, 26B	21	26	0	47	55%
2013	20B, 25C	0	6	0	6	-

Research

In 2013, hunters and DWC staff made some interesting observations of rock ptarmigan along the Steese Highway. Between January and March 2013, hunters reported increasing numbers of rock ptarmigan near 12-Mile Summit and Eagle Summit. Small to moderate flocks were observed with some regularity in these areas through mid to late March. However, beginning in April, overall abundance of rock ptarmigan began to decrease. When surveys were completed at both locations in mid-May overall densities of territorial males were very low. Attempts were made to locate birds in early June at both 12-mile and Eagle summits; however, zero rock ptarmigan were observed. It is possible that hens were on a nest and males were foraging or otherwise being less conspicuous than during the breeding season. However, it is surprising that no birds were observed.

Beyond documenting large scale movements to and away from breeding grounds (Weeden 1965), movement patterns of rock ptarmigan in Alaska are largely unknown. To better understand rock ptarmigan movement patterns along the Steese Highway near Eagle Summit the DWC intends to initiate a research project beginning in the winter of 2014–15. Rock ptarmigan will be captured and fitted with a radio transmitter for the purpose of documenting movement patterns and seasonal distribution of this heavily hunted population through the use of aerial and ground relocation efforts (For information about additional rock ptarmigan research being undertaken, see the Alaska Range section of this report).

Regulatory Year 2014 Hunting Projection

That few numbers of rock ptarmigan were observed during spring surveys along and adjacent to the Steese Highway indicates hunting opportunities may be limited during the RY14 season. It is likely poor weather experienced across the FIRS region had a negative influence on chick survival as was documented in the Alaska Range. Hunters can expect low abundance of rock ptarmigan and very low proportions of juveniles in the FIRS region rock ptarmigan populations during RY14.

WILLOW PTARMIGAN

Abundance Surveys

In the spring of 2014, DWC initiated a roadside survey of willow ptarmigan along a portion of the parks road just west of the Savage River Bridge within DNP through a permit from NPS. Ten male willow ptarmigan were observed along the survey route in 2014.

Contractors for the United States Army conduct a territorial male willow ptarmigan count south of Delta Junction near Fort Greely within the DTA. The number of territorial male willow ptarmigan observed or heard during spring surveys was down from 9 in 2013 to 1 in 2014 (E. Neipert, wildlife biologist, Fort Wainwright-Donnelly Training Area, personal communication).

Although existing survey locations were adjacent to the road system, hunter reports and DWC staff observations suggest lower numbers of willow ptarmigan than in previous years.

Wing Collections

Four willow ptarmigan wing samples were collected from hunters within the FIRS region during RY13 (Table 10).

Table 10. Total number and percent juvenile willow ptarmigan based on harvested wing collections within the Fairbanks and Interior Road System during regulatory years 2011–2013.

Regulatory Year	GMU Harvested from	Number of Samples				% Juvenile
		Adult	Juvenile	Unknown	Total	
2011	20B, 20C, 20D	8	10	0	18	56%
2012	20B, 20D, 25C	5	4	0	9	44%
2013	19C, 25C	2	2	0	4	50%

Regulatory Year 2014 Hunting Projection

The paucity of wings collected from hunters combined with spring surveys and hunter reports indicate that willow ptarmigan numbers within the FIRS region are lower than they have been in the recent past. It is likely that the poor weather conditions experienced across the FIRS region in late June did not have a favorable influence on chick survival. Hunters can expect low abundance of willow ptarmigan and very low proportions of juveniles in willow ptarmigan populations in the FIRS region during RY14.

SNOWSHOE HARE

Abundance Surveys

Roadside counts were conducted from 26 April to 11 May near Delta Junction, Donnelly Dome, and along the Steese Highway. As was the case in 2013, few hare signs (tracks, fresh droppings, kill sites, etc.) were observed (Table 11).

NPS has maintained an index of hare abundance within DNP since the late 1980s. In 2013, hare abundance was at a record low. At the time of this report the 2014 estimate was ongoing, but preliminary results suggest slightly higher numbers of hares were observed within DNP in 2014 compared to 2013.

Based on DWC staff observations in southern Interior Alaska, hare populations have reached very low densities and are expected to begin increasing over the next 1 to 2 years.

Regulatory Year 2014 Hunting Projection

During RY14 hunters can expect low to very low snowshoe hare densities in FIRS; however small isolated pockets of higher densities will be found. Population densities in the Interior are expected to begin growing over the next 1-2 years.

Table 11. Interior snowshoe hare population survey data, 2005–2014.

Year	Denali Nat. Park ^a	Breeding Bird Survey		Road-side Counts		
		Delta Jct. ^b	Donnelly ^c	Delta Jct. ^d	Anderson ^e	Steese Hwy ^f
2005	6.3	57	10			
2006	25.2	129				
2007	26.2	96	50	109	24 ^g	21
2008	28.3	89	21	91	82	14
2009	40.6	87	14	54	27	8
2010	32.9	18	12	37	10	3
2011	9.6	7	3	16	4	1
2012	0.5	8	3	27	3	0
2013	0.04	5	1	NS	NS	0
2014	Ongoing	8	1	4	NS	1

^a Denali National Park count survey is conducted by the National Park Service (C. McIntyre pers. comm.)

^b The Delta Junction Breeding Bird Survey (BBS) hare count is conducted by retired ADF&G biologist S. DuBois.

^c The Donnelly Dome Breeding Bird Survey (BBS) is conducted by Donnelly Training Area Wildlife Biologist Elizabeth Neipert.

^d Hare counts in Delta Junction include 3 road-side count areas.

^e Hare counts in Anderson include 4 road-side count areas.

^f Hare counts along the Steese Highway include 1 road-side count area.

^g In 2007 only 3 of the 4 survey areas were counted.



Alaska Range

For the purposes of this report the Alaska Range region includes GMUs 9B, 9A, 11, 13C, 13B, 13E and 16B (Fig. 6). This area includes the Denali Highway, and portions of the Richardson and Parks highways. The Alaska Range region is largely an alpine area composed of willow, dwarf birch, and subalpine spruce forests; however, spruce forest dominates in several lowland areas of the Susitna River Valley and Wrangell–St. Elias National Park. There are numerous small water bodies, large higher alpine rivers, and steep rocky and slightly vegetated hills and mountains. This region is fairly easily accessible by road, air, and off-road vehicle for recreation and hunting. The Denali Highway, in particular, is an area that receives significant grouse and ptarmigan hunting pressure during the fall and late winter (Merizon and Carson 2013). Sooty grouse are not found in this region.

RUFFED GROUSE

Currently DWC has no population assessment projects in or wing collections from the Alaska Range region. Ruffed grouse do breed within the Alaska Range region and are harvested and observed each year, although infrequently.

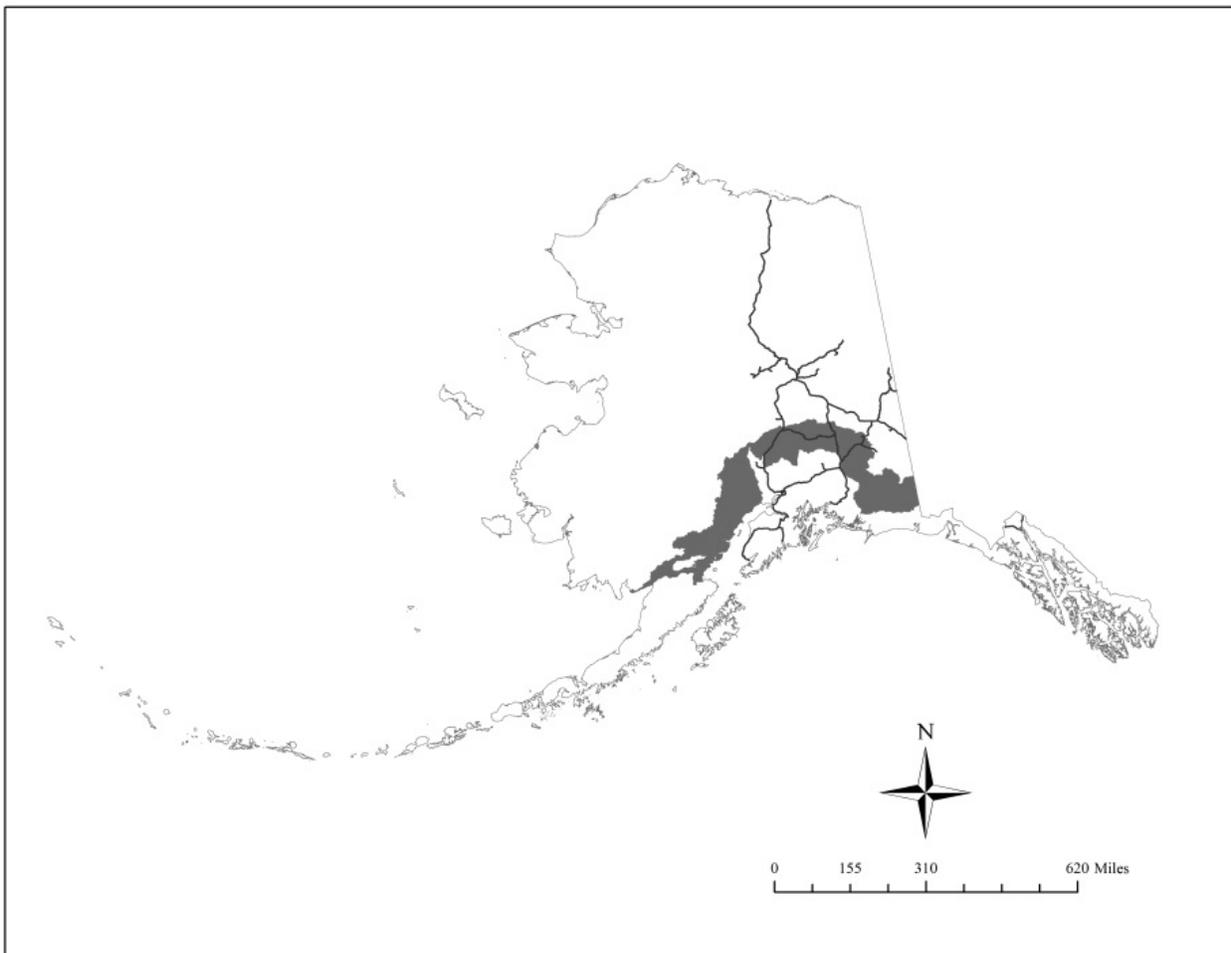


Figure 6. Map of the Alaska Range region.

SHARP-TAILED GROUSE

Abundance Surveys

Currently there are no ongoing sharp-tailed grouse population monitoring efforts within this region. However, sharp-tailed grouse are routinely observed in the spring conducting breeding displays on or adjacent to area roadways as well as by local recreators and trappers in the winter in the upper Nenana and upper Copper rivers as well as the eastern Talkeetna Mountains.

Wing Collections

Four sharp-tailed wings were collected by hunters during RY13 in the Alaska Range. All were juvenile birds; however, no inference can be made on overall juvenile production based on such a small sample. Low harvest in this region is a function of both low densities and limited access to the best sharp-tailed grouse habitat in this region.

Regulatory Year 2014 Hunting Projection

Due to lack of abundance data a hunting projection cannot be made. Still, hunters can expect to see sharp-tailed grouse in areas of this region where habitat is appropriate for this species.

SPRUCE GROUSE

Abundance Surveys

Currently there are no abundance surveys for spruce grouse conducted anywhere in the state. Based on hunter reports and DWC staff field observations, spruce grouse abundance in the Alaska Range region was low during RY13.

Wing Collections

Eight spruce grouse wings were collected by hunters during RY13 in the Alaska Range. It is difficult to make any meaningful inferences about brood production due to the very low sample size.

Regulatory Year 2014 Hunting Projection

Due to several severe storms and lowland flooding in the Alaska Range in late June, along with snow near the subalpine transition habitats, spruce grouse population density is expected to be low in this region.

ROCK PTARMIGAN

Abundance Surveys

In 2014, rock ptarmigan surveys occurred from 10 to 16 May at 1 location along the Richardson Highway (GMU 13B) and 4 locations along the Denali Highway (GMU 13B). Rock ptarmigan

numbers were higher in the Alaska Range this spring (Table 12) than in the recent past. Abundance of rock ptarmigan in GMU13B was of particular interest. DWC documented the highest rock ptarmigan abundance in 10 years in GMU13B. Abundance has not been as high since 1999 in 3 of the survey areas.

During the late winter portion of the RY13 hunting season, hunters reported seeing and harvesting more rock ptarmigan in this region than in years past. Also, while completing field work this winter and spring, territorial male rock ptarmigan were observed in areas where they normally do not occur in habitat considered marginal.

Table 12. Territorial male rock ptarmigan count data by survey location in the Alaska Range region, 2005–2014.

GMU	Highway	Site / Milepost	Year									
			2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
13B	Richardson	McCallum	2		1	0	1	0	0	2	4	2
13B	Denali Hwy	Mi 10-14	0	1	1	0	2	0	0	0	4	9
13B	Denali Hwy	Mi 12.5 N						6	7	7	8	8
13B	Denali Hwy	Mi 29-33.5	0	2	0	0	1	2	5	1	3	6

Wing Collections

Seventeen rock ptarmigan (8 juveniles, 9 adults) wing samples were collected from hunters during RY13 in the Alaska Range region. No rock ptarmigan wings were collected within this region during RY11 or RY12.

Research

Ptarmigan hunting has been closed in GMU 13B after 30 November since 2009 as a result of low rock ptarmigan abundance. Due to the similarities in plumage between the more abundant willow ptarmigan and rock ptarmigan it would be impossible to manage the species separately. During its March 2013 meeting, the BOG decided to maintain the season closure date of 30 November. To better understand the rock ptarmigan population in relation to hunting, the small game program began a study in spring 2013 with two primary objectives: 1) document rock ptarmigan movement patterns relative to the road system and points of access for hunters, and 2) create additional remote (road-inaccessible) survey locations to assess whether our roadside surveys reflect the greater GMU 13B population.

In 2013, DWC staff was able to radio collar 9 rock ptarmigan (2 females, 7 males) along the Denali Highway. Through fall of 2013 and winter of 2013–2014, radiocollared rock ptarmigan suffered very high mortality rates (89%; 8 of 9). Causes of mortalities included hunter harvest (3), wildlife (3), and unknown (2). The 1 remaining collared rock ptarmigan survived and was actively defending a breeding territory during May 2014 within 0.75 km of his 2013 territory. No rock ptarmigan were collared away from easy access points in 2013. Birds collared adjacent to the Denali Highway had relatively small movements (2–10 km from original capture location).

In May 2014, an additional 21 radio collars were deployed on rock ptarmigan in 3 separate locations within the Alaska Range region. Six collars were deployed on rock ptarmigan in the

Alphabet Hills (southern GMU 13B), 3 near McLaren Summit (Denali Highway), and 12 near Fourteenmile Lake (Denali Highway). An additional 5 collars are planned to be deployed during late summer 2014 in the Alphabet Hills. A total of 17 males (8 adult, 9 juvenile) and 4 females (1 adult, 3 juvenile) were captured and radiocollared. Average weight of males was 446g (460 adults, 434 juveniles). Average weight of the females was 465g (the 1 adult was not weighed).

During 2–3 June 2014, all 4 of the radiocollared hen rock ptarmigan along the Denali Highway were located. Two (2) hens were found incubating eggs near Fourteenmile Lake. Two hens near McLaren Summit had not yet nested. This may possibly be explained by a 7–10 day delay in plant phenology and snow melt near McLaren Summit versus Fourteenmile Lake. However, on 10 June 2014, both hens on McLaren Summit were found incubating eggs. Motion and heat sensitive Reconyx™ trail cameras were placed within 1–2 m of each nest to test whether a total chick count could be documented at the time the brood departed the nest. In addition to the nesting hen rock ptarmigan, one caribou (*Rangifer tarandus*), one brown bear (*Ursus arctos*), one savannah sparrow (*Passerculus sandwichensis*), two Arctic ground squirrel (*Urocitellus parryii*), and two humans were all photographed within 1–2 m of the hen on the nest. Hens were photographed by the trail camera moving on and off the nest 1–4 times per day; they stayed away from the nest 9–55 minutes. As a result of the 2–3 day snowstorm beginning on 18 June, 3 of the 4 hens abandoned their nests after being buried by 30 cm of snow. The fourth hen successfully hatched 6 of her 7 eggs and was photographed departing the nest immediately after 30 cm of snow fell on 18 June. This hen was found dead 3 days later from a predatory attack; conspicuous plumage of the hen and her chicks contrasting against the snow likely made them easier to locate. Higher elevation nests that weren't abandoned (1,230 m) would likely have hatched 5–10 days later (23–28 June). Clutch size ranged from 5 to 7 eggs, which is below average (Montgomerie and Holder 2008).

Regulatory Year 2014 Hunting Projection

Despite having a warm and dry May, conditions in the eastern Alaska Range and Wrangell and St. Elias mountains were not favorable for rock ptarmigan chick production above 925 m elevation during the critical hatch and post hatch periods from mid to late June. June was cool and wet with a severe snowstorm beginning 18 June in the eastern Alaska Range and Wrangell Mountains. This was followed by an intense rain and snow event in the western portions of this region in late June. Egg abandonment rates were high and chick survival was low as a result of these events. Hunters can expect low abundance of rock ptarmigan and very low proportions of juveniles in rock ptarmigan populations in the Alaska Range region during RY14.

WHITE-TAILED PTARMIGAN

Abundance Surveys

Currently, no abundance surveys for white-tailed ptarmigan are conducted anywhere in the state. White-tailed ptarmigan densities are typically low where they occur and their habitat selection makes this one of the more challenging small game species to pursue in Alaska.

Wing Collections

Eight white-tailed ptarmigan wings were collected by hunters during RY13 in the Alaska Range region. Four (4) were juvenile and 4 were adults; however, no inference can be made on overall juvenile production based on such a small sample. Despite moderate densities of white-tailed ptarmigan, harvest is believed to be quite low due to limited to poor access to areas where they are most abundant. No white-tailed ptarmigan wings were collected within this region during RY11 or RY12.

Regulatory Year 2014 Hunting Projection

Despite having a warm and dry May, conditions in the Alaska Range and Wrangell Mountains were not favorable for white-tailed ptarmigan chick production during the critical hatch and post hatch periods from late June to early July. Hunters can expect reduced numbers of white-tailed ptarmigan going into the RY14 hunting season with a higher than normal proportion of adults in that harvest.

WILLOW PTARMIGAN

Abundance Surveys

In 2014 willow ptarmigan surveys occurred from 10 to 17 May. Survey locations included one location along the Richardson Highway (GMU 13B), 5 locations along the Denali Highway (GMU 13B and 13E), and 1 location along the Parks Highway (GMU 13E). Most survey locations documented higher numbers of willow ptarmigan compared to spring 2013 (Table 13).

Table 13. Territorial male willow ptarmigan count data by survey location in the Alaska Range region, 2005–2014.

GMU	Highway	Site / Milepost	Year									
			2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
13B	Richardson	McCallum	11		6	10	13	14	18	20	14	18
13B	Denali	Mi 10-14	10	11	6	8	6	9	8	11	8	12
13B	Denali	Mi 15				6	4	6	9	14	17	9
13B	Denali	Mi 29-36	10	19	8	10	6	15	3	12	1	9
13B	Denali	Mi 52-58					1	6	2	7	NS	20
13E	Denali	Mi 90 - 97	5	6	8	8	11	6	8	11	6	13
13E	Parks	Mi 194-208	4	9	3	5	5	2	5	4	8	7

Territorial male willow ptarmigan abundance was higher in 2014 than in 2013. Specifically, areas of the eastern Denali Highway (GMU 13B) were much higher than in 2013 with the exception of the Mile 15 survey route. Territorial male willow ptarmigan were very abundant along the Mile 52–57 route in 2014.

Wing Collections

A total of 249 willow ptarmigan wing samples were collected from hunters in the Alaska Range region during RY13. The percent of juveniles was low (41%), as it was in RY11 and 12 (Table 14). Most of the wing collections occurred in late winter (mid-February to late March). The sex ratio of the harvest was nearly 50 males:50 females. Hunters reported very good hunting and high densities of willow ptarmigan in this region despite the low percentage of juveniles.

Table 14. Total number and percent juvenile willow ptarmigan based on harvested wing collections within the Alaska Range region during regulatory years 2011–2013.

Regulatory Year	GMU	Number of Samples			Total	Percent Juvenile
		Adult	Juvenile	Unknown		
2011	13B, 13E, 16B	67	79	0	146	54%
2012	13B, 13E, 16B, 9	40	28	2	70	40%
2013	13B, 13E, 16B	146	103	0	249	41%

Research

In May 2013, in cooperation with UAF, AEA, and the DWC, a large 3-year research study examining the ecology and distribution of willow ptarmigan adjacent to the proposed Susitna–Watana Hydroelectric Project site in the upper Susitna River was initiated (Fig. 2). A UAF graduate student is leading the project. During spring and late summer of 2013, more than 40 radio necklace collars were deployed on male and female willow ptarmigan at multiple locations north and south of the proposed hydroelectric project site. During the spring of 2014 an additional 60 radio collars were deployed. The annual movements, distribution, survival, and habitat use of the animals will be mapped to understand the value of the proposed hydroelectric project site and access corridors to the local willow ptarmigan population. So far, a variety of movements by radio collared willow ptarmigan have been observed. Annual movements have been variable, ranging from very small movements (<2–4 km) to larger spatial scale movements (>60 km). As more results of this study become available, information will be accessible at the ADF&G website (<http://www.adfg.alaska.gov/>) and in future reports.

Regulatory Year 2014 Hunting Projection

Despite a warm and dry May, conditions in the eastern Alaska Range and Wrangell and St. Elias mountains were not favorable for willow ptarmigan chick production above 770 m elevation during the critical hatch and post hatch periods from mid to late June. Of particular concern were the low proportions of juveniles in the RY13 wing collections. All of these factors combined, hunters can expect low abundance of willow ptarmigan and very low proportions of juveniles in the Alaska Range region willow ptarmigan populations during RY14.

SNOWSHOE HARE

Abundance Surveys

Currently, there are no snowshoe hare survey locations within the Alaska Range region.

Regulatory Year 2014 Hunting Projection

During RY14 hunters can expect low to very low snowshoe hare densities in the Alaska Range; however small isolated pockets of higher densities will be found. Population densities in the Alaska Range are expected to begin growing over the next 1–2 years.



Southcentral Road System

For purposes of this report the Southcentral Road System includes GMU 6, 13A, 13D, 14, and 16A (Fig. 7). This area includes heavily populated Anchorage, Eagle River, Wasilla, Palmer, and several other smaller communities scattered throughout the region. This region is a mix of lower elevation, mature mixed hardwood / spruce forest, alpine slopes and peaks, and coastal rainforest. There are numerous small water bodies, small creeks, and large rivers. This region is highly accessible by road, air, and off-road vehicle for recreation, tourism, and hunting. Sooty grouse are not found in this region.

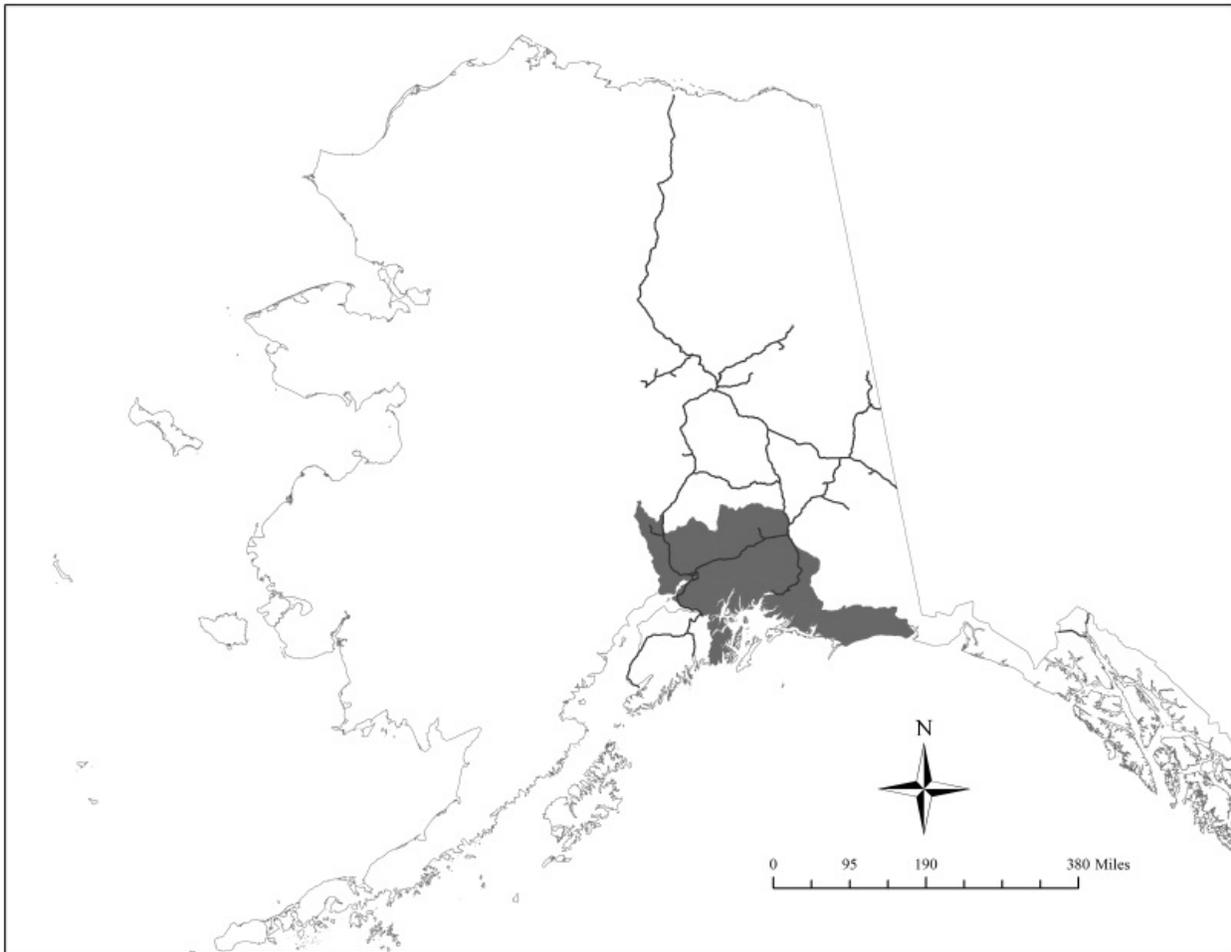


Figure 7. Map of the Southcentral Road System region.

Two areas within GMU 14C (Anchorage) require registration for small game hunting, the Eagle River Management Area and the Anchorage Coastal Wildlife Refuge. Between RY09–RY13 annual participation in this registration hunt has averaged 310 registrants, 109 active hunters, and 99 hunters that failed to report their activity (Table 15). Registration hunt participants are not required to report total harvest or species hunted.

Table 15. Participation in the small game registration hunts within GMU 14C, regulatory years 2009–2013.

Regulatory Year	Registration Permits		
	Issued	Hunted	No Report
2009	337	136	97
2010	298	106	90
2011	285	103	83
2012	303	98	89
2013	327	103	135

RUFFED GROUSE

Abundance Surveys

In 2014 DWC drumming counts occurred from 23 April to 15 May in Palmer and the Matanuska Valley Moose Range (MVMR). Ten ruffed grouse were heard drumming this spring. This is up from 2013 (8) and 2012 (5). Survey conditions were generally very good throughout the spring breeding season in Southcentral. Daytime high temperatures were average to above average.

Ruffed grouse drumming counts have become increasingly difficult for DWC staff to complete over the past 10–15 years in the Mat-Su Valley due to encroaching human noise (vehicles, chainsaws, barking dogs, aircraft, etc.). As a result, DWC solicited volunteer help in 2013 and 2014 to search for additional areas in which to establish new survey routes away from encroaching human noise. In April and May 2014, volunteers searched and listened for drumming ruffed grouse in other locations within the MVMR, specifically in areas in which habitat enhancement projects took place 2001–2003. These areas are beginning to offer good ruffed grouse habitat and drumming ruffed grouse were documented. DWC plans to create a new drumming count route prior to the spring 2015 count in some of these areas.

Since translocated ruffed grouse were released in the early 1990s, a typical population cycle has not been observed based on the ongoing springtime drumming counts. Yet, the Mat-Su Valley population continues to maintain a low but stable population.

RGS continues to actively support ruffed grouse habitat improvement and raise money to support habitat manipulation and hunter education and participation in the Mat-Su Valley and Interior Alaska (see the FIRS region, Ruffed Grouse section).

Wing Collections

Twenty-seven ruffed grouse wing samples were collected from hunters this season in the Southcentral region (Table 16). Southcentral samples yielded 70% ($n=19$) juveniles, which is high and suggests good production during summer 2013.

Table 16. Total number and percent juvenile ruffed grouse based on harvested wing collections within the Southcentral Road System region during regulatory years 2011–2013.

Regulatory Year	GMU	Number of Samples			Total	Percent Juvenile
		Adult	Juvenile	Unknown		
2011	14A, 14C	4	1	0	5	20%
2012	14A, 13B	2	2	0	4	50%
2013	14A, 14B	8	19	0	27	70%

Regulatory Year 2014 Hunting Projection

Ruffed grouse hunters in the Southcentral region can expect average ruffed grouse density at the start of the RY14 hunting season. May breeding and early nesting conditions were good. A cooler and wet June likely had minimal impact on ruffed grouse in this region.

SHARP-TAILED GROUSE

Currently, DWC does not have any population assessment projects in or wing collections from the Southcentral region for sharp-tailed grouse. These grouse are present in GMU 13A and 13D and they are harvested or observed each year.

SPRUCE GROUSE

Abundance Surveys

Based on field observation and hunting reports from within GMUs 14 and 16 road accessible areas, densities of spruce grouse appeared to be low during the fall of 2013. Hunters off the road system, including along the Yentna and Skwentna rivers and remote trail systems, reported average densities of spruce grouse during fall 2013. This is a theme that has been repeated for many of our road-inaccessible small game species for several years.

Wing Collections

Thirty-nine spruce grouse wing samples were collected from hunters during RY13 in the Southcentral region (Table 17). The percent of juveniles in this sample was 62% ($n=24$) suggesting good brood production during the summer of 2013. This is a slight increase from RY11 and RY12.

Table 17. Total number and percent juvenile spruce grouse based on harvested wing collections within the Southcentral Road System region during regulatory years 2011–2013.

Regulatory Year	GMU	Number of Samples			Total	Percent Juvenile
		Adult	Juvenile	Unknown		
2011	14B, 14C	11	16	0	27	59%
2012	13A, 14, 16B	29	40	0	69	58%
2013	13A, 14	15	24	0	39	62%

Regulatory Year 2014 Hunting Projection

Spruce grouse is one of the most popular and most hunted small game species in Alaska (Merizon and Carson 2013). In 2014, road-accessible populations of spruce grouse in Southcentral are expected to remain at low to average density. May breeding and early nesting conditions were good. A cooler and wet June likely had minimal impact on spruce grouse in this region.

ROCK PTARMIGAN

Abundance Surveys

In 2014, rock ptarmigan surveys occurred from 1 to 16 May at 1 location in Chugach State Park (GMU 14C) and 1 location near Goose Creek (GMU 13A; Table 18).

Table 18. Territorial male rock ptarmigan count data by survey location in the Southcentral region, 2011–2014.

GMU	Site / Milepost	Year			
		2011	2012	2013	2014
14C	South Fork Eagle Riv.	6	5	7	5
13A	Goose Creek		2	8	3

Abundance of territorial males along the South Fork Eagle River was near the long-term average. Throughout the RY13 hunting season hunters were reporting average to slightly above average rock ptarmigan abundance near popular hunting locations throughout GMU 14C.

Despite fewer territorial male rock ptarmigan being documented along the survey route at Goose Creek (GMU 13A), DWC staff noted very high densities of territorial male rock ptarmigan in adjacent areas while capturing and radiocollaring willow ptarmigan as part of the AEA funded study (see the Alaska Range region, Willow Ptarmigan, Research section). In addition, hunters and DWC staff both observed higher than average abundance of rock ptarmigan throughout GMU 13A during the RY13 hunting season.

Based on spring 2014 survey results, DWC staff observations, and hunter reports during the RY13 season, rock ptarmigan from the Alaska Range south throughout much of the Southcentral

region were more abundant than in the last 2–4 years. It is difficult to determine the cause of this increase; however, several factors may have had an effect, including the warm, dry summer of 2013, and the low snow fall during the winter of 2013–2014.

DWC field observations during June documented 5–7 day old chicks on 28 June. This suggests a hatch date of discrete populations of rock ptarmigan in the Southcentral Road System occurred between 21 and 23 June, similar to rock ptarmigan in portions of the Alaska Range.

Wing Collections

Twenty-nine rock ptarmigan wing samples (34% juveniles) were collected from hunters during RY13 in the Southcentral region (Table 19). Higher than average abundance of rock ptarmigan was documented throughout the western Chugach and southern Talkeetna mountains through hunter reports and DWC staff observations during the hunting season.

Table 19. Total number and percent juvenile rock ptarmigan based on harvested wing collections within the Southcentral Road System region during regulatory years 2011–2013.

Regulatory Year	GMU	Number of Samples			Total	Percent Juvenile
		Adult	Juvenile	Unknown		
2011	13A	4	4	0	8	50%
2012	13A, 14A	15	4	0	19	21%
2013	13A, 14A, 14C	19	10	0	29	34%

Regulatory Year 2014 Hunting Projection

Despite having a warm and dry May, conditions in the Chugach and Talkeetna mountains were not favorable for rock ptarmigan chick production above 925 m elevation during the critical hatch and post hatch periods from mid to late June. June was cool and wet with a snowstorm around 18 June in the northern and eastern Chugach Mountains. This was followed by an intense rain and snow event in the Talkeetna Mountains 26–27 June. Egg abandonment rates were likely high and chick survival likely low as a result of these events. Hunters can expect lower than average abundance of rock ptarmigan and a very low proportion of juveniles in the Southcentral region during RY14.

WHITE-TAILED PTARMIGAN

Abundance Surveys

Beginning in July 2012, two walking survey routes were created in areas used by hunters in the fall to monitor white-tailed ptarmigan abundance. Surveys were conducted with the help of a trained pointing dog. Individuals or family groups were located and counted (male, female, and number of chicks). One route was established in the northwest Chugach Mountains near Eagle River (GMU 14C) and one in the southern Talkeetna Mountains near Hatcher Pass (GMU 14A). Overall abundance is very low in both locations based on these routes. One white-tailed

ptarmigan was observed on each route in early July 2013. These routes will be continued in July 2014 and used as a rough index of population trends in these popular hunting locations.

Other than the recently established monitoring efforts in GMU 14C and 14A and wing sample submissions for genetic differentiation, very little scientific information on white-tailed ptarmigan in Alaska is available, and there are no population trend data available (B. Taylor, retired ADF&G veterinarian, personal communication). Observations and limited reports of white-tailed ptarmigan in specific locations in the Alaska Range, Talkeetna, Chugach, and Kenai mountains indicate a continued presence of low to moderate densities at each location. These observations are inadequate to determine if white-tailed ptarmigan numbers in Alaska periodically cycle. Long-term studies on hunted and unhunted populations in Colorado found extensive population fluctuations with evidence of a low amplitude, natural cycle (C. Braun, Grouse Inc., wildlife biologist, personal communication).

To date, it appears the white-tailed ptarmigan's mostly inaccessible habitat has protected them in most of their historical range in Southcentral Alaska. However, white-tailed ptarmigan often rely on their cryptic plumage to avoid predation rather than fleeing and are thus very approachable. This behavior exposes them to potentially high exploitation rates in areas that are targeted by hunters. In the future, if additional harvest pressure is exerted on white-tailed populations near urban centers, additional management tools may need to be employed to avoid overexploitation.

Wing Collections

Twenty-three white-tailed ptarmigan wing samples were collected from hunters during RY13 in the Southcentral region (Table 20). A low proportion of juveniles (30%) was documented. Most of the samples were harvested from the Chugach Mountains in GMU 14C. Few other reports from hunters or outdoor enthusiasts were available regarding abundance and presence of white-tailed ptarmigan.

Regulatory Year 2014 Hunting Projection

A hunting projection for white-tailed ptarmigan is difficult due to the limited population monitoring effort and small sample sizes for our wing collection efforts. However, despite having a warm and dry May, conditions in the Chugach and Talkeetna Mountains were not favorable for white-tailed ptarmigan chick production above 1,000 m elevation during the critical hatch and post hatch periods from mid to late June. Overall, June was cool and wet with a snowstorm around 18 June in the northern and eastern Chugach Mountains. This was followed by an intense rain and snow event in the Talkeetna Mountains 26–27 June. Hunters can expect lower than average abundance of white-tailed ptarmigan and a very low proportion of juveniles in the Southcentral region during RY14.

Table 20. Total number and percent juvenile white-tailed ptarmigan based on harvested wing collections within the Southcentral Road System region during regulatory years 2011–2013.

Regulatory Year	GMU	Number of Samples			Total	Percent Juvenile
		Adult	Juvenile	Unknown		
2011	14A, 14C	17	21	2	40	53%
2012	13A, 14A	8	3	0	11	27%
2013	14, 13D	16	7	0	23	30%

WILLOW PTARMIGAN

Abundance Surveys

Springtime abundance surveys occurred from 1 to 16 May 2014. Two survey routes were completed in Chugach State Park (GMU 14C) and one route near Goose Creek (GMU 13A) in the eastern Talkeenta Mountains (Table 21).

Table 21. Territorial male willow ptarmigan count data by survey location in the Southcentral Road System region, 2008–2014.

GMU	Site / Milepost	Year						
		2008	2009	2010	2011	2012	2013	2014
14C	Powerline	12	11	15	18	20	7	14
14C	South Fork Eagle River	4	3	5	6	7	6	6
13A	Goose Creek					12	8	9

Numbers of territorial male willow ptarmigan were higher in 2014 than in 2013. The Powerline location is in an area that receives very little hunting pressure and consistently has relatively high densities of territorial male willow ptarmigan in May. However, without knowing the scale of annual movement of the Chugach State Park populations it is difficult to assess the effect of hunting.

Wing Collections

Seventy-seven willow ptarmigan wing samples were collected from hunters in the Southcentral Road System region during RY13 (Table 22). The proportion of juveniles was low (43%; $n=33$). The majority of these samples came from GMU 14 (specifically GMU 14C), where hunters reported lower than normal willow ptarmigan abundance during the RY13 hunting season.

Table 22. Total number and percent juvenile willow ptarmigan based on harvested wing collections within the Southcentral Road System region during regulatory years 2011–2013.

Regulatory Year	GMU	Number of Samples			Total	Percent Juvenile
		Adult	Juvenile	Unknown		
2011	6, 13A, 14A, 14C, 16B	66	90	0	156	58%
2012	14, 13A, 13D, 16B	88	66	0	154	43%
2013	14, 13A, 13D, 16B	44	33	0	77	43%

However, in GMU13A, the proportion of juveniles was slightly higher (50%). Hunters and DWC staff observations also documented higher abundance of willow ptarmigan in the southern the Talkeetna Mountains than in the Chugach Mountains within GMU 14C during RY13.

Regulatory Year 2014 Hunting Projection

Despite having a warm and dry May, conditions in the Chugach and Talkeetna Mountains were not favorable for willow ptarmigan chick production above 925 m elevation during the critical hatch and post hatch periods from mid to late June. Overall June was cool and wet with a snowstorm around 18 June in the northern and eastern Chugach Mountains. This was followed by an intense rain and snow event in the Talkeetna Mountains 26–27 June. Egg abandonment rates were likely high and chick survival likely low as a result of these events. Hunters can expect lower than average abundance of willow ptarmigan and a very low proportion of juveniles in the Southcentral Road System region during RY14.

SNOWSHOE HARE

Abundance Surveys

DWC currently has no population assessment surveys in the defined Southcentral region for snowshoe hare. Snowshoe hare abundance was low throughout RY13, based on hunter reports and DWC staff field observations.

Regulatory Year 2014 Hunting Projection

During RY14 hunters can expect low to very low snowshoe hare densities in the Southcentral Road System region; however small isolated pockets of higher densities will be found. Population densities in the region are expected to begin growing over the next 1–2 years.



Kenai Peninsula

For purposes of this report the Kenai Peninsula region includes GMUs 7 and 15 (Fig. 8). This area includes the communities of Cooper Landing, Homer, Kenai, Seward and Soldotna, as well as numerous smaller communities. This region includes a wide variety of montane coastal spruce forest, mixed lowland spruce / hardwood forests, subalpine shrub, and alpine habitats. There are numerous small water bodies, creeks, and large rivers. Sharp-tailed and sooty grouse are not found on the Kenai Peninsula. This region is highly accessible by road, air, and off-road vehicles for recreation, tourism, and hunting.

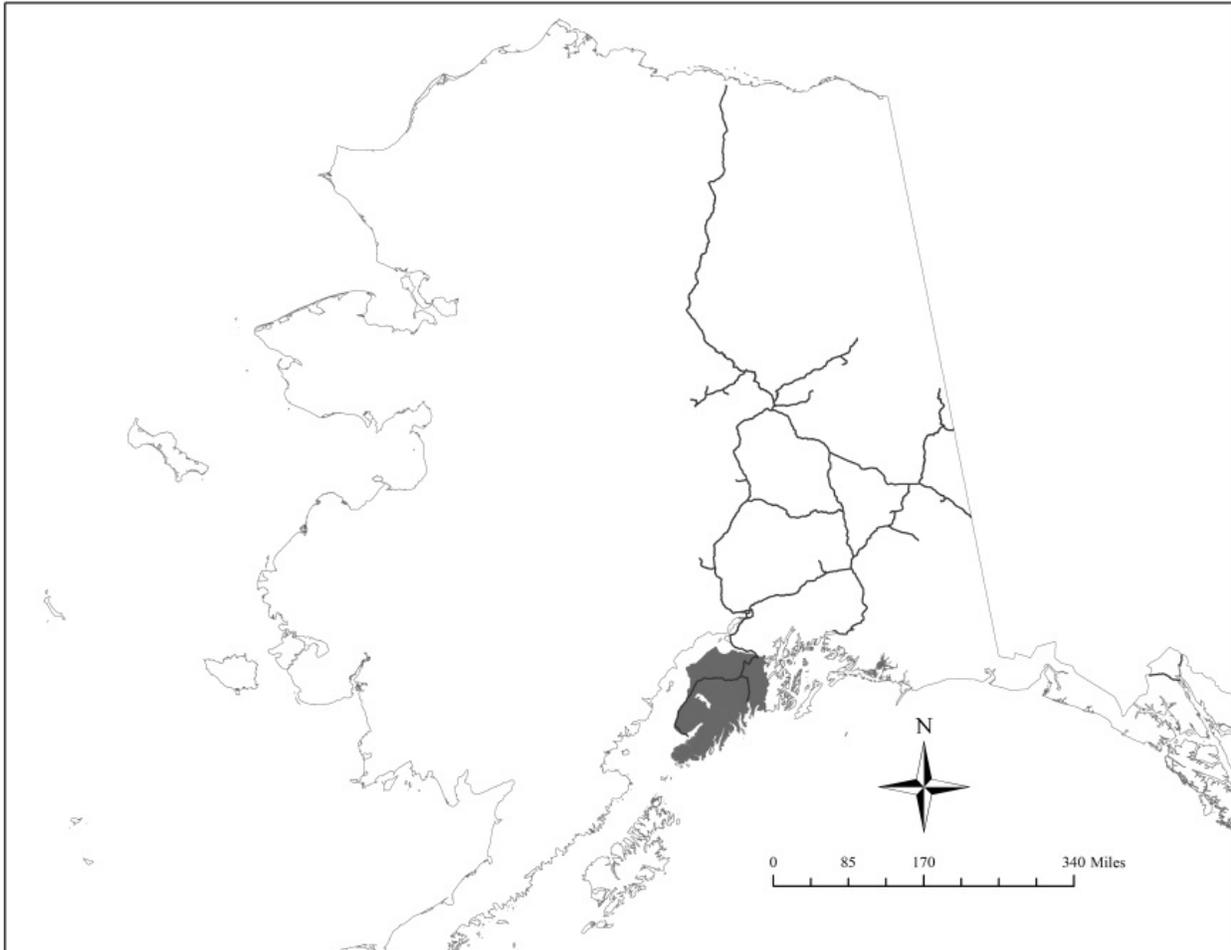


Figure 8. Map of the Kenai Peninsula region.

RUFFED GROUSE

Abundance Surveys

In 2014, DWC was unable to complete the ruffed grouse abundance survey on the Skilak Loop Road (Merizon 2013). Very few ruffed grouse have been observed or harvested on the Kenai Peninsula, based on staff observations from the recent past and hunter reports.

The ruffed grouse population on the Kenai Peninsula appears to be at very low density and the DWC asks for any help in reporting observations of ruffed grouse on the Kenai Peninsula. Reports can be submitted via e-mail at the small game web page (www.smallgame.adfg.alaska.gov).

In May 2014, the Funny River Horse Trail fire burned more than 200,000 acres between Skilak and Tustumena lakes west to near the Sterling Highway. The Kenai Peninsula experiences fairly rapid regeneration and plant succession and as a result this area may produce favorable nesting and brood rearing habitat for ruffed grouse in the next 5–10 years. It may also be favorable for other species that seek early successional habitats like moose and snowshoe hare.

Wing Collections

No ruffed grouse wings were collected from the Kenai Peninsula during RY13.

Regulatory Year 2014 Hunting Projection

A hunting projection for ruffed grouse is difficult due to the limited population, minimal monitoring efforts, and zero wing collections for the Kenai Peninsula. Ruffed grouse abundance on the Kenai Peninsula is expected to remain very low during RY14. Hunters who harvest ruffed grouse on the Kenai Peninsula are asked to please provide a report of location and a wing sample. Contact information can be found in this report or on the ADF&G’s website at www.adfg.smallgame.alaska.gov.

SPRUCE GROUSE

Abundance Surveys

Currently, no abundance surveys are conducted for spruce grouse in the state. Spruce grouse abundance on the Kenai Peninsula was low throughout RY13, based on hunter reports and DWC staff field observations.

Wing collections

A total of 122 spruce grouse wing samples were collected from hunters during RY13 in the Kenai Peninsula region (Table 23). The proportion of juveniles was low (40%). This low percent of juveniles matches what hunters reported and DWC staff observed during the RY13 hunting season.

Table 23. Total number and percent juvenile spruce grouse based on harvested wing collections within the Kenai Peninsula region during regulatory years 2011–2013.

Regulatory Year	GMU	Number of Samples			Total	Percent
		Adult	Juvenile	Unknown		Juvenile
2011	7, 15	27	54	0	81	67%
2012	7, 15	59	33	0	92	36%
2013	7, 15C	73	49	0	122	40%

A low percent juveniles was also documented during RY12 (Merizon 2013) on the Kenai Peninsula; however, spruce grouse habitat remains very good. Provided the population experiences favorable conditions during the spring and summer brood rearing period, spruce grouse densities could increase quickly.

Regulatory Year 2014 Hunting Projection

Due to 2 years with poor juvenile production it is anticipated that overall spruce grouse abundance in RY14 will be below average. Overall May breeding and early nesting conditions were good. A cooler and wet June likely had minimal impact on spruce grouse in this region.

ROCK PTARMIGAN

Abundance Surveys

DWC staff conducting the willow ptarmigan surveys planned to record territorial male rock ptarmigan observations during the 2014 survey period in May. Zero territorial male rock ptarmigan were observed along survey routes. However, in May 2014, DWC staff reported seeing abundant territorial male rock ptarmigan south of Kachemak Bay during several outings to various locations.

Rock ptarmigan are present in modest density in the Kenai Peninsula region. Hunters and hikers alike report observing rock ptarmigan along higher montane slopes of the Kenai and Chugach mountains.

Wing Collections

No rock ptarmigan wings were collected during the RY13 hunting season on the Kenai Peninsula.

Regulatory Year 2014 Hunting Projection

Overall conditions for breeding and incubation were good throughout most of the Kenai Peninsula region this spring. However, a brief snow event was recorded in portions of the Kenai Mountains in mid-June that may have affected early chick survival or even increased rates of nest abandonment as was documented in the Alaska Range. North of the Sterling Highway June weather conditions appeared to be less severe. Hunters can expect average densities of rock ptarmigan north of the Sterling Highway during RY14; however, it is likely that average to below average densities will be present south of the Sterling Highway this year.

WHITE-TAILED PTARMIGAN

Abundance Surveys

Currently, there are no white-tailed ptarmigan population assessment projects being conducted in this region. Dall sheep (*Ovis dalli*) hunters and hikers report observing white-tailed ptarmigan

throughout the Kenai and Chugach mountains on the Kenai Peninsula. However, overall abundance is likely low.

Wing Collections

Eighteen white-tailed ptarmigan wing samples were collected from hunters during the RY13 season on the Kenai Peninsula (Table 24). A low to moderate proportion of juveniles was documented; however, the small sample size makes it difficult to make any meaningful inferences.

Table 24. Total number and percent juvenile white-tailed ptarmigan based on harvested wing collections within the Kenai Peninsula region during regulatory years 2011–2013.

Regulatory Year	GMU	Number of Samples				Total	Percent Juvenile
		Adult	Juvenile	Unknown	Total		
2011	7	0	0	1	1	0%	
2012	7, 15A	1	2	0	3	67%	
2013	7	10	8	0	18	44%	

Regulatory Year 2014 Hunting Projection

Overall conditions for breeding and incubation were good throughout most of the Kenai Peninsula region this spring. However, a brief snow event was recorded in portions of the Kenai Mountains in mid-June that may have affected early chick survival or even increased rates of nest abandonment, as was documented in the Alaska Range. North of the Sterling Highway June weather conditions appeared to be less severe. Hunters can expect average densities of white-tailed ptarmigan north of the Sterling Highway during RY14; however, it is likely that average to below average densities will be present south of the Sterling Highway this year.

WILLOW PTARMIGAN

Abundance Surveys

Surveys occurred from 9 to 22 May in 2014. Three new survey routes were established near Homer (GMU 15C) in 2014. In addition to the new survey routes, one route north of Skilak Lake (GMU 15A) and 2 routes in northwestern GMU 7 were surveyed (Table 25). Overall, abundance of territorial male willow ptarmigan was low on the survey routes.

Hunters also reported low abundance of willow ptarmigan during the RY13 hunting season throughout the Kenai Peninsula. DWC staff based on the Kenai Peninsula reported high abundance of avian predators in the southern Kenai Peninsula region this past year; that may be contributing to the low willow ptarmigan abundance during the RY13 season and this spring. This high avian predator population has likely been driven by the high snowshoe hare cycle that began to decline dramatically in 2012.

Table 25. Territorial male willow ptarmigan count data by survey location in the Kenai Peninsula region, 2013–2014.

GMU	Site / Milepost	Year	
		2013	2014
15A	Skyline		3
15C	Ohlson Mtn.	0	0
15C	Bald Mtn.	3	1
15C	Eagle Lake	8	3
7	Palmer Ck Rd		15
7	Summit Ck		2

Wing Collections

Thirty-four willow ptarmigan wing samples were collected from hunters during RY13 on the Kenai Peninsula (Table 26). The sample size was low; however, 74% juveniles ($n=25$) suggests very good brood production for willow ptarmigan during the summer of 2013. Nearly all ($n=32$) of the samples were harvested within GMU 7.

Table 26. Total number and percent juvenile willow ptarmigan based on harvested wing collections within the Kenai Peninsula region during regulatory years 2011–2013.

Regulatory Year	GMU	Number of Samples				Percent Juvenile
		Adult	Juvenile	Unknown	Total	
2011	7	0	5	0	5	100%
2012	7, 15B, 15C	17	27	0	44	61%
2013	7, 15C	9	25	0	34	74%

Regulatory Year 2014 Hunting Projection

Overall conditions for breeding and incubation were good throughout most of the Kenai Peninsula region this spring. However, a brief snow event was recorded in portions of the Kenai Mountains in mid-June that may have affected early chick survival or even increased rates of nest abandonment, as was documented in the Alaska Range. North of the Sterling Highway June weather conditions appeared to be less severe. Hunters can expect average densities of willow ptarmigan north of the Sterling Highway during RY14; however, it is likely that average to below average densities will be present south of the Sterling Highway this year.

SNOWSHOE HARE

Abundance Surveys

Currently, DWC has no snowshoe hare population assessment project on the Kenai Peninsula. However, the USFWS staff at the Kenai Wildlife Refuge (GMU 15) complete annual hare pellet counts on the Kenai Peninsula. USFWS has been completing pellet counts (Krebs et al. 1987) in the refuge since 1983 (T. Burke, USFWS Wildlife Biologist, personal communication). These

counts have provided a reliable method of monitoring the fluctuating populations on the Kenai Peninsula. However, habitat change may be influencing the future reliability of existing survey methods.

Based on hare pellet counts on the Kenai Peninsula, population density peaked in 2011, remained high during the winter of 2011–2012 and began to drop in the summer of 2012. Pellet counts suggest that snowshoe hare continued to decline during the summer of 2013. Hare densities are expected to decline for the next 1–2 years before beginning the growth phase of the population cycle.

The Funny River Horse Trail fire which burned over 200,000 acres between Skilak and Tustumena lakes west to the near the Sterling Highway could produce very favorable habitat over the next 10 years for snowshoe hare, depending on how the area regenerates. Hare densities may be influenced by this fire during the upcoming peak in the population cycle, which is anticipated to occur between 2017 and 2019.

Regulatory Year 2014 Hunting Projection

During RY14 hunters can expect low to very low snowshoe hare densities on the Kenai Peninsula; however, small isolated pockets of slightly higher densities will be found.



Western Rural

For purposes of this report the Western Rural region includes GMUs 18, 22, 23, and 26A (Fig. 9). Specifically, this region encompasses an area that extends from Kuskokwim Bay southwest of Bethel (GMU 18) north to Barrow (GMU 26A). The dominant habitat in this region is tundra with pockets of mixed white and black spruce along major river corridors. Save for the Nome road system, recreational access within the Western Rural region is limited to boat or small aircraft. Willow ptarmigan are generally abundant and a popular subsistence resource for many hunters within this area. Alaska hare are only found within this and the Alaska Peninsula regions, although the historical distribution may have ranged further east along the North Slope. Sooty grouse and white-tailed ptarmigan are not found in this region.

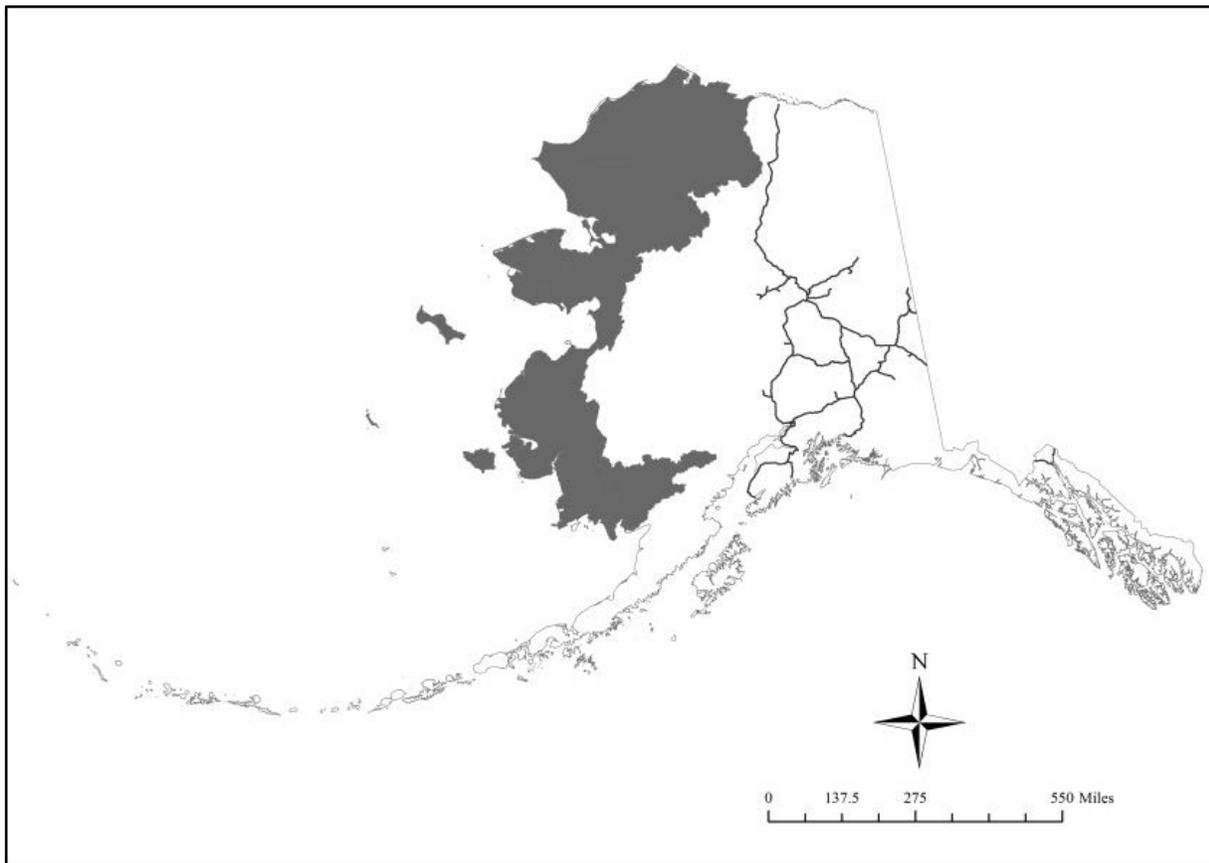


Figure 9. Map of the Western Rural region.

RUFFED GROUSE AND SPRUCE GROUSE

Currently, there are no population assessment projects for either ruffed or spruce grouse being conducted in the Western Rural region, and the DWC did not receive any wings from harvested ruffed grouse or spruce grouse during RY13.

ROCK PTARMIGAN

Abundance Surveys

Currently, there are no rock ptarmigan population assessment projects being conducted in this region.

Wing Collections

Seventeen rock ptarmigan wing samples were collected from hunters in the Western Rural region during RY13 (Table 27). The proportion of juveniles (59%) in the harvest was higher for rock ptarmigan in RY13 than in previous years.

Table 27. Total number and percent juvenile rock ptarmigan based on harvested wing collections within the Western Rural region during regulatory years 2011–2013.

Regulatory Year	GMU Harvested from	Number of Samples				% Juvenile
		Adult	Juvenile	Unknown	Total	
2011	23	4	3	0	7	43%
2012	23, 22C, 26A	11	10	0	21	48%
2013	22C	7	10	0	17	59%

Reports from DWC staff in Nome suggest that poor weather in mid-November 2013 and again in January 2014 on the southern Seward Peninsula likely had a negative effect on ptarmigan survival. Low ptarmigan abundance was also reported from DWC staff in Bethel this spring, although the warm weather and lack of snow may have had an influence on movements and aggregation size (P. Jones, ADF&G wildlife biologist, personal communication). However, observations made during breeding bird surveys in June 2014 along the Nome road system indicated that rock ptarmigan numbers were higher than average in areas of good habitat (P. Bente, ADF&G wildlife biologist, personal communication).

Regulatory Year 2014 Hunting Projection

In some areas within the Western Rural region, in particular the southern Seward Peninsula, it is likely that rock ptarmigan numbers have declined as a result of poor weather during the winter of 2013–2014. In those areas most affected by severe weather, hunters can expect low densities of rock ptarmigan in RY14. However, it is possible that in other locations within the region in areas of high quality habitat hunters may find higher numbers of rock ptarmigan in RY14.

WILLOW PTARMIGAN

Abundance Surveys

Currently, there are no willow ptarmigan population assessment projects being conducted in this region.

Wing Collections

One hundred and forty six willow ptarmigan wing samples were collected from hunters in the Western Rural region during RY13 (Table 28). These samples were collected from along the Nome road system on the Seward Peninsula (GMU 22C). The percent juveniles in the harvest was down (53%) considerably from 2012 and indicates poor juvenile willow ptarmigan recruitment in the Western Rural region.

Table 28. Total number and percent juvenile willow ptarmigan based on harvested wing collections within the Western Rural region during regulatory years 2011–2013.

Regulatory Year	GMU Harvested from	Number of Samples				% Juvenile
		Adult	Juvenile	Unknown	Total	
2011	18, 22, 23	97	82	3	182	45%
2012	22, 23, 26A	37	119	0	156	76%
2013	22C	69	77	0	146	53%

Reports from DWC staff in Nome suggest that poor winter weather on the southern Seward Peninsula likely had a negative effect on ptarmigan survival. Over the last 5–6 years large aggregations of willow ptarmigan (200+) have been observed in the winter outside of Nome near the Nome River; however, in the spring of 2014 very few aggregations were seen and tracks were relatively uncommon (D. Reed, ADF&G Biometrician, personal communication). Breeding bird surveys conducted in June 2014 along the Nome road system also indicated lower numbers of willow ptarmigan, although pockets of higher numbers were observed in the Sinuk River valley (P. Bente, ADF&G wildlife biologist, personal communication). Additional reports from DWC staff in Bethel support a conclusion that there were low ptarmigan numbers this spring, although the warm weather and lack of snow may have had an influence on movements and aggregation size (P. Jones, ADF&G wildlife biologist, personal communication). It is likely numbers of willow ptarmigan have declined from previous years, especially on the southern Seward Peninsula.

Regulatory Year 2014 Hunting Projection

In some areas within the Western Rural region, in particular the southern Seward Peninsula, it is likely that willow ptarmigan numbers have declined as a result of poor weather during the winter of 2013–2014. In those areas most affected by severe weather, hunters can expect low densities of willow ptarmigan in RY14.

ALASKA HARE

Currently, there are no active programs aimed at long-term population monitoring of Alaska hares. This species is one of the least accessible small game species to view and hunt, yet it is often harvested opportunistically by trappers and remote winter travelers in western Alaska.

Based on field observations throughout its range, populations continue to remain well below what was historically observed in the 1950s and 1960s. It remains uncertain whether this has

been a long-term decline or a midcentury crash with a continued low but stable population in recent years. In 2012, several individuals reported observing more Alaska hares between Bethel and the Ahklun Mountains than have been observed in the recent past. However, many long-term residents report much lower abundance throughout the species' entire range than was present in the 1980s (P. Jones, ADF&G wildlife biologist, personal communication). During late winter and spring of 2013, Alaska hares were also observed along the coastline of GMU 18, along the Kisaralik River, and on ridge tops and areas with little snow in the Kilbuck Mountains.

Beginning in the fall of 2012, DWC, in cooperation with UAF, began a study on Alaska hare examining the genetic variability of the species throughout its range (T. Booms, ADF&G wildlife biologist, personal communication). So far, samples have been collected from the Seward and Alaska peninsulas and areas around Bethel and Dillingham. This study may begin to reveal the movement patterns, distribution, and abundance of this unique species. This study will provide a strong first step toward documenting and understanding the basic life history and important management issues facing this species. Hunter participation is encouraged and sample collection details can be found by contacting the Fairbanks or Palmer ADF&G offices.

Regulatory Year 2014 Hunting Projection

Due to the lack of population monitoring, and unknown population status and distribution, making a hunting projection is not practical.

SNOWSHOE HARE

Currently there are no snowshoe hare population assessment projects being conducted in this region. However, as in the remainder of the state, snowshoe hare densities are expected to remain low for the next year where they are likely beginning the growth phase of their population cycle.



Alaska Peninsula

For purposes of this report the Alaska Peninsula region includes GMU 8, 9 and 10 (Fig. 10). This area includes the communities of King Salmon, Cold Bay, Kodiak, and Dutch Harbor. The region includes coastal tundra, steep volcanic mountains, isolated islands, and small isolated spruce forests. There are numerous small water bodies and creeks. This region is bordered by Bristol Bay and the Bering Sea to the north and the Pacific Ocean and Gulf of Alaska to the south. This region is remote with no widespread road system and access is largely limited to aircraft or boat.

Willow and rock ptarmigan are the predominant small game species in this region. Willow ptarmigan do not occur west of Unimak Island; however, rock ptarmigan occur throughout the Alaska Peninsula and the Aleutian Islands to Attu Island. Sharp-tailed and sooty grouse are not found in the Alaska Peninsula region.

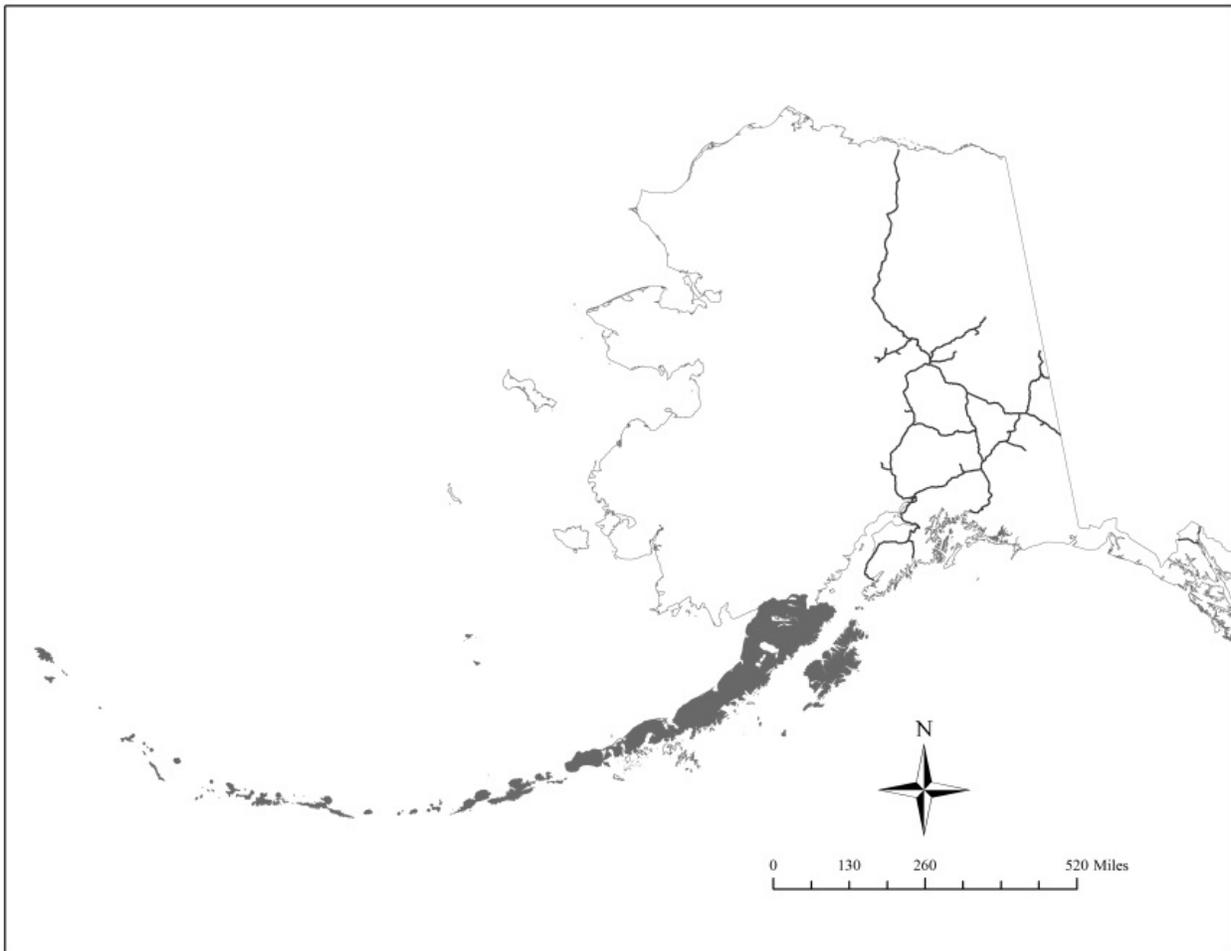


Figure 10. Map of the Alaska Peninsula region.

RUFFED GROUSE AND SPRUCE GROUSE

The extents of ruffed and spruce grouse distribution in this region are currently unknown and DWC does not have any population assessment projects or wing collections from the Alaska Peninsula region.

ROCK PTARMIGAN

Abundance Surveys

Currently, there are no rock ptarmigan population assessment projects being conducted in the Alaska Peninsula region. Based on hunter reports during RY13, particularly along the Aleutian Islands, rock ptarmigan abundance appears to be increasing.

Following fox eradication from the western Aleutian Islands by the USFWS, 75 Evermann's rock ptarmigan (*L.m. evermanni*) were captured and translocated from Attu to Agattu Island beginning in 2003 (Kaler et al. 2010). The translocation was considered a success as monitored females were documented breeding and recruiting offspring during the establishment stage. Braun et al. (2014) documented a subsequent reduced recruitment during the same time period on Attu Island, although specific factors causing reduced recruitment were not identified. Based on recent observations, it appears that rock ptarmigan abundance in the western Aleutian Islands is currently increasing or high.

Wing Collections

Only one harvested rock ptarmigan wing was collected during RY13, making inferences about juvenile production impossible.

Regulatory Year 2014 Hunting Projection

A hunting projection for rock ptarmigan in this region is difficult due to the lack of population monitoring effort and very small sample sizes for our wing collection efforts.

WHITE-TAILED PTARMIGAN

Currently, DWC does not have any population assessment projects or wing collections from the Alaska Peninsula region. The extent and distribution of white-tailed ptarmigan within the Alaska Peninsula region is unknown.

WILLOW PTARMIGAN

Abundance Surveys

Currently, DWC has no willow ptarmigan population assessment projects in the Alaska Peninsula region. However, hunter reports and DWC staff observations from the northwestern portions of this region suggest there was relatively high abundance of willow ptarmigan throughout the northern Alaska Peninsula during the fall RY13 hunting season.

USFWS has an ongoing willow ptarmigan population assessment project along the northwestern Alaska Peninsula (Savage and Johnson 2013). The study found higher densities of willow ptarmigan in 2013 in the Becharof National Wildlife Refuge than in 2012. This was also documented through hunter reports from similar areas during the fall of RY13.

Wing Collections

One hundred and seventy-four willow ptarmigan wing samples were collected from hunters during RY13 on the Alaska Peninsula; these were from GMU 9D and 9E as willow ptarmigan do not occur west of Unimak Island (Table 29). Juveniles made up 53% of the sample ($n=93$). Despite hunter reports of moderate to high densities, wing collection data suggest only moderate juvenile production in this region during the summer of 2013.

Table 29. Total number and percent juvenile willow ptarmigan based on harvested wing collections within the Alaska Peninsula region during regulatory years 2011–2013.

Regulatory Year	GMU	Number of Samples			Total	Percent Juvenile
		Adult	Juvenile	Unknown		
2011	9D	47	65	0	112	58%
2012	9D	29	31	1	61	51%
2013	9D, 9E	81	93	0	174	53%

Regulatory Year 2014 Hunting Projection

A large wing sample was collected from hunters during RY13 and willow ptarmigan juvenile production appeared to be moderate during the summer of 2013. Hunters reported very good willow ptarmigan hunting throughout much of the Alaska Peninsula in fall 2013. However, with no population assessment project in the region it is difficult to provide a meaningful hunting projection.

ALASKA HARE

Currently, DWC has no population assessment project for Alaska hare from the Alaska Peninsula region. However, DWC and UAF are in the process of collecting and analyzing tissue samples from Alaska hares throughout the species' range in Alaska (including western Alaska). Alaska hares occur throughout the Alaska Peninsula and are periodically harvested there; however, their density and distribution are currently unknown.

SNOWSHOE HARE

Currently, DWC has no population assessment project for snowshoe hare in the Alaska Peninsula region. It is believed that snowshoe hares on the Alaska Peninsula are currently experiencing the same low population abundance found throughout southern Alaska. Snowshoe hare abundance is expected to increase over the next 1–3 years.



Southeast

For the purposes of this report the Southeast region includes GMUs 1–5 (Fig. 11). This area includes the coastal communities of Juneau, Ketchikan, Sitka, and Petersburg, as well as numerous smaller communities. This region is a temperate rainforest composed of a network of small to large islands covered largely by Sitka spruce, and mountain and western hemlock. Sooty grouse are the most popular small game species to pursue in the Southeast region. Some montane alpine habitat is found on the highest coastal peaks, providing habitat for willow, rock, and white-tailed ptarmigan. This region is accessible predominantly by air and boat. Sharp-tailed grouse are not found in the Southeast region. Snowshoe hares occur at very low densities throughout the Southeast region.

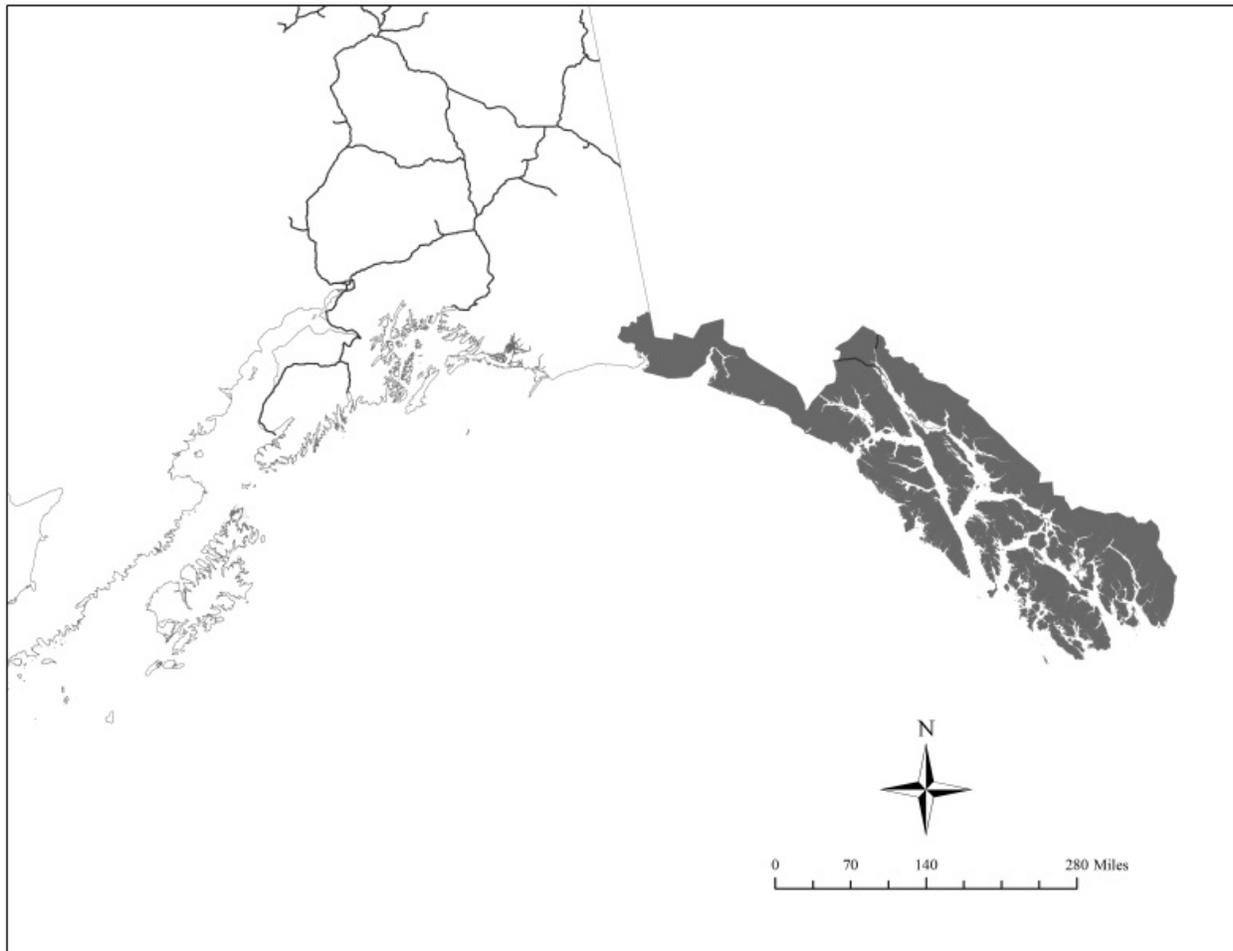


Figure 11. Map of the Southeast region.

RUFFED GROUSE

Currently, DWC has no population assessment project in or wing collections from the Southeast region. Although ruffed grouse exist in the Southeast region, their distribution is likely restricted to the large river deltas (Stikine and Taku rivers) where alder, willow, and black cottonwood (*P.*

trichocarpa) occur. Currently, abundance in these locations is unknown; hunters and outdoor enthusiasts periodically report observing ruffed grouse.

SOOTY GROUSE

Abundance Surveys

It remains difficult to estimate overall population trends of sooty grouse in Southeast. However, in April and May 2013, DWC staff recorded sooty grouse calls and sightings in 15 of 24 deer pellet transect count locations including Douglas, Gravina, Kupreanof, Mitkof, the Revillagigedo islands, and the Cleveland Peninsula. Most of these grouse were heard or observed between 150 and 400 m in elevation. Data from observations made in spring 2014 were not available at the time of this report.

Overall hunting effort and harvest is greatest in areas adjacent to large population centers and decreases considerably on remote islands or more distant locations from population centers. Based on field observations and hunter reports during RY13, sooty grouse abundance in Southeast appeared to be high. Hooting males also began hooting either on time (mid-April) or slightly early during the spring 2014 breeding season.

Wing Collections

Nine sooty grouse wing samples were collected from hunters in RY13 (Table 30). It is difficult to make meaningful inferences due to the small sample size. Most of the sooty grouse harvested during the spring portion of the RY13 hunting season were males and this is consistent with historical harvests. Sooty grouse wing samples allow the DWC to monitor the ratio of males to females in the harvest as well as track the proportion of juveniles. Most hunters reported good numbers of “hooting” males during the spring portion of the RY13 season.

Table 30. Total number and percent juvenile sooty grouse based on harvested wing collections within the Southeast region during regulatory years 2011–2013.

Regulatory Year	GMU	Number of Samples				Total	Percent Juvenile
		Adult	Juvenile	Unknown	Total		
2011	NA	0	0	0	0	NA	
2012	1, B, 1C, 1D, 3, 4	24	17	0	41	41%	
2013	1A, 1C, 1D, 3	1	8	0	9	89%	

Regulatory Year 2014 Hunting Projection

Considering the lack of available spring observations from RY12 or RY13 it is difficult to make projections for RY14. However, good hunting should be expected in areas away from large population centers or on remote islands based on DWC staff observations. Near large human populations, however, sooty grouse densities are expected to be lower with isolated pockets of high density.

SPRUCE GROUSE

There is a small population of spruce grouse that resides only on POW and the immediately adjacent islands. This population of spruce grouse is believed to be that of the subspecies (*F.c. franklinii*) that has distinct plumage and size differences from the subspecies found throughout the remainder of Alaska (*F.c. canadensis*; Dickerman and Gustafson 1996). However, genetic analysis of samples collected from this population failed to make a firm distinction between the Southeast population and the mainland Alaska population (Neraas and Tallmon 2008). Currently, DWC has no population assessment project in or wing collections from spruce grouse in the Southeast region.

ROCK PTARMIGAN, WHITE-TAILED PTARMIGAN, AND WILLOW PTARMIGAN

Currently, DWC has no population assessment project in or wing collections from rock, white-tailed ptarmigan, or willow ptarmigan in the Southeast region. The extent and distribution of these 3 species within the Southeast region is unknown; however, they are routinely observed by hunters and hikers in the higher elevation subalpine or alpine areas of most islands and mainland.



Other Small Game Program Projects

Beginning in 2014, DWC began providing hunter harvested wings to the United States Geological Survey (USGS) to examine for blood parasite loads. This work will be performed for all grouse and ptarmigan species, from numerous locations throughout the state. This work may help reveal rates of infection, parasite diversity, and overall health of some of our most heavily hunted grouse and ptarmigan populations.

DWC contracted an economic study that analyzed the economic importance of Alaska's wildlife to the state's economy in 2011 (ECONorthwest 2014). In addition to confirming the intrinsic value of Alaska's wildlife to its human residents and visiting nonresidents each year, the study showed that residents and nonresidents contributed nearly \$3.4 billion to the economy of the state in 2011. This value included contributions from both hunting and wildlife viewing. Small game species were among some of the most popular species of resident and nonresident hunters and wildlife viewers alike in 2011. Fourteen percent of resident and 2% of nonresident hunting license holders reported hunting grouse and ptarmigan in Alaska in 2011.

Towards the end of the RY13 hunting season, May 2014, the small game program initiated a second statewide small game hunter survey; the first was conducted in 2012. The objectives of this survey were to 1) understand who is hunting small game, 2) estimate the number of adult and child (<16 years old) hunters in Alaska, 3) identify which species are most hunted, 4) identify in which GMUs small game species are being hunted, and 5) methods of transportation used when hunting small game. The DWC was able to learn a great deal about small game hunters in Alaska despite a low hunter response rate in 2012 (11%; Merizon and Carson 2013). The current survey could be completed both on paper and online in hopes of encouraging more hunter responses. We are equally optimistic this survey will provide even more insight into where and how the hunters access these resources. As of early July 2014 a total of 2,643 households had responded to the survey out of 9,552 recipients (nearly 28% response rate). Of those, 16% reported hunting small game during RY13. The response rate will likely increase, as we anticipate receiving additional completed surveys. With a large enough response we may be able to estimate harvest. A summary report should be available by winter 2014 and will be viewable at and downloadable from the small game program web page (www.smallgame.adfg.alaska.gov).

Management Implications

The DWC has been tracking statewide juvenile production for grouse and ptarmigan through hunter harvested wings for 3 complete regulatory years (RY11–RY13). In these 3 years, hunters have provided DWC 3,049 wings from all 7 species of grouse and ptarmigan in Alaska. The majority of the samples collected were willow ptarmigan (59%) and spruce grouse (21%). Several consistent patterns have emerged through these efforts. First, most (94%) grouse (specifically spruce grouse) are harvested in the fall (August – October), despite the fact that in most locations the season runs into March or April (Fig. 12).

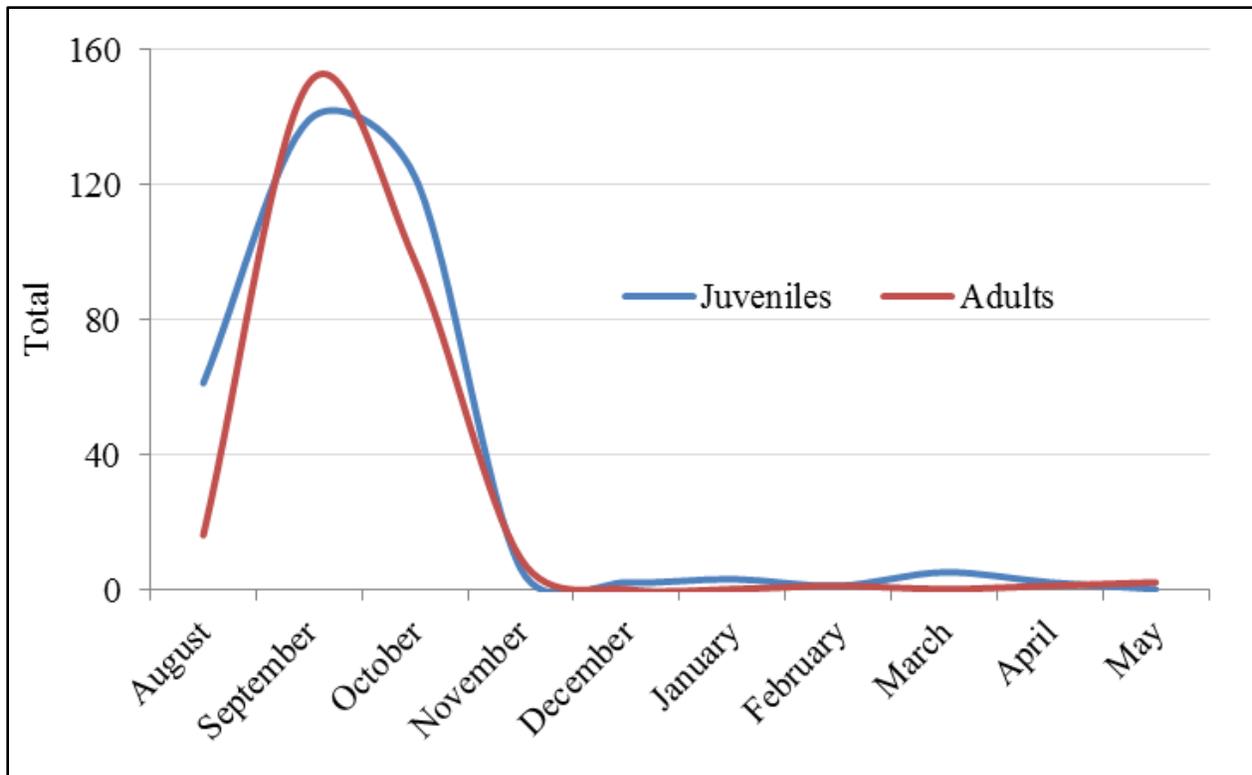


Figure 12. Statewide spruce grouse wing collections by age over the course of a hunting season, regulatory years 2011–2013.

Second, ptarmigan (specifically the most abundant and most frequently harvested willow ptarmigan) are harvested during 2 distinct time periods during the hunting season (Figure 13). Third, the relative proportion of adults changes very little between the 2 time periods; however, the proportion of juveniles changes dramatically. The large relative harvest of juveniles in the fall is likely because juveniles outnumber adults after the breeding season. However, harvest during the late portion of the hunting season (February–April) reflects the loss of those juveniles and the higher rate of harvest of breeding birds that have survived the winter. The drop in harvest in April is a reflection of hunting season closure dates in March.

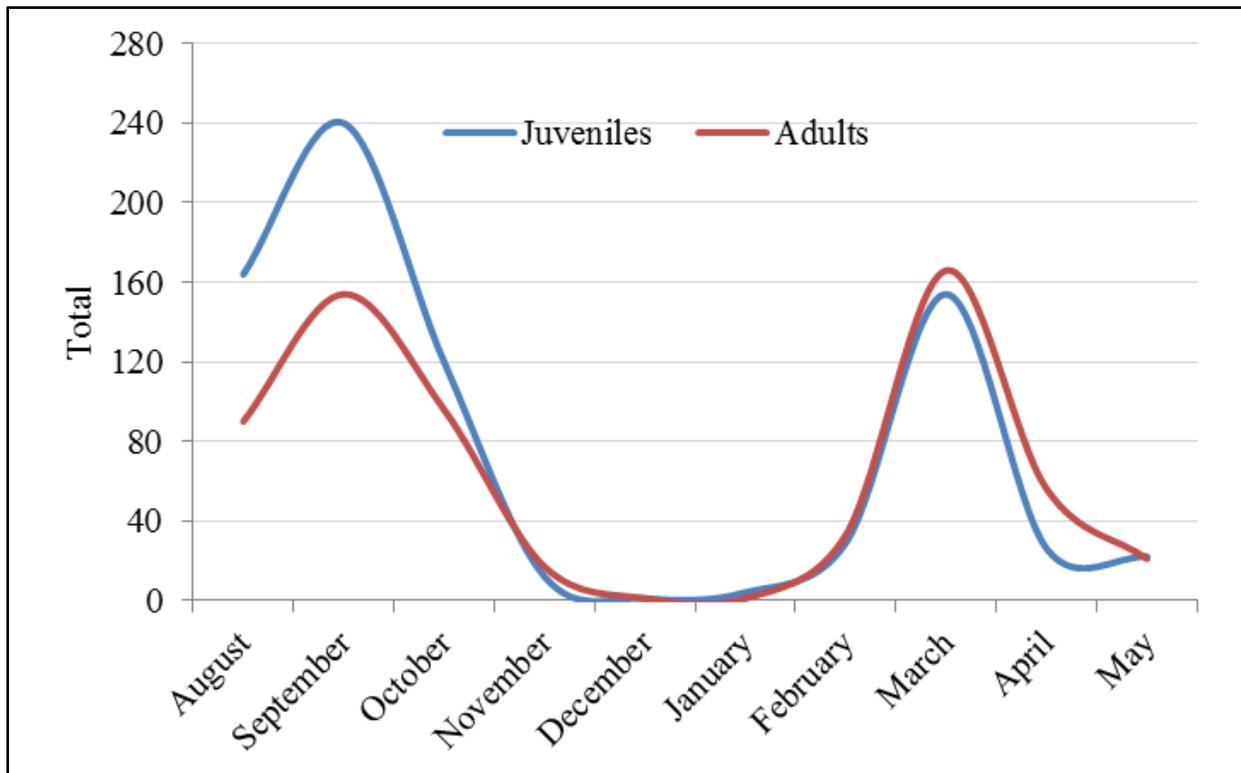


Figure 13. Change in statewide willow ptarmigan age structure over the course of a hunting season from hunter harvested wing collections, regulatory years 2011–2013.

Populations of grouse, ptarmigan, and hare throughout geographic areas along the road system from Fairbanks to the Kenai Peninsula are more heavily exploited than populations off the road system. Spring survey data consistently reflect this trend for a variety of species. The potential effect of hunting on readily accessible populations is among the greatest management concern along the road system. There are relatively few roads along the main population corridor and centers in the state, between Fairbanks and the Kenai Peninsula. However, the technological improvements of off-road vehicles over the past 10 to 15 years, including four-wheelers, snowmachines, and jet boats, have provided a great deal of access to areas away from primary roads. Game management units 13, 14, 15, and 16 are accessible on almost every side by highways, trails, or large river corridors, allowing access to what have become very popular hunting areas. Hunters frequently report however, that easily accessible hunt areas have resulted in reduced small game hunter success. These areas include roads and trails near urban centers in Anchorage, the Mat–Su Valley, and Fairbanks. Density estimates of willow and rock ptarmigan in GMU 13 suggest hunting may be reducing population abundance along road corridors like the Denali Highway.

In addition to access, late winter hunting may also be further reducing the abundance of grouse and ptarmigan. In GMU 13B, late winter (December through March) ptarmigan hunting has been closed for 5 seasons; willow and rock ptarmigan densities are higher there than in adjacent GMU 13E, where winter hunting occurs. In virtually every other state, winter and, particularly, spring (February through April) hunting is not allowed for grouse or ptarmigan species because of the additive mortality to the breeding individuals that survive winter (Sandercock et al. 2011).

As the human population in Alaska continues to grow, additional harvest and disturbance pressures will be placed on small game populations that already may be nearing or may have surpassed their ability to absorb that pressure. That is why in 2013 the small game program initiated several research studies on ptarmigan along the heavily hunted Denali Highway and why research is planned along the Steese Highway beginning in 2015. Focused research will be required to fully examine and understand these impacts. Through additional public outreach and active monitoring of abundance trends, we will continue to increase our understanding of population dynamics and what impacts these populations most. Also, as the DWC begins to have a better understanding through hunter surveys of harvest and effort, it will be better prepared to make appropriate recommendations to the Alaska BOG about future changes to season dates and bag limits.

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