Alaska Department of Fish and Game, Division of Wildlife Conservation

Sitka Black-tailed Deer Pellet-Group Surveys In Southeast Alaska 2011 Report

By

Karin McCoy

2011

Photo by Phil Mooney, 2011. NE Chichagof Island.

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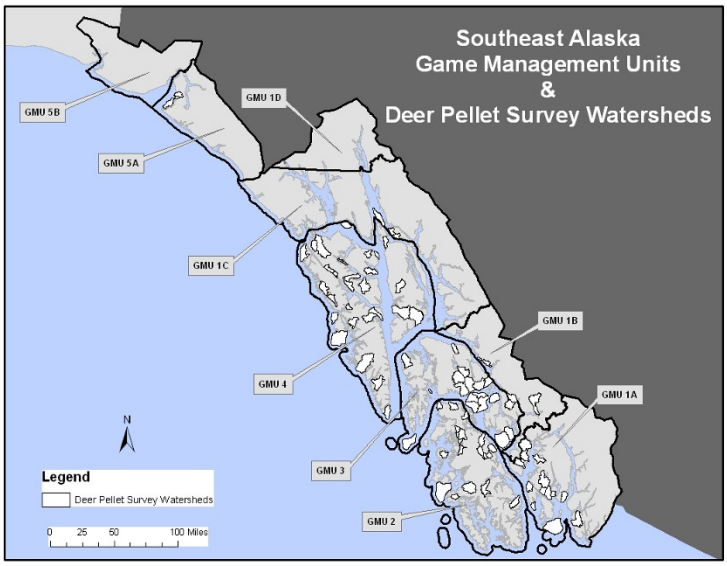
Acknowledgments: I wish to acknowledge all of the individuals that have contributed to the collection and compilation of these data over the years. The deer pellet-group survey program would not be possible without the interest, dedication, and support of ADFG and USFS staff as well as community volunteers.

Deer Pellet-Group Surveys: Program Overview

This report provides a summary of pellet surveys conducted for Sitka black-tailed deer during April and May 2011 in Region 1, Southeast Alaska. This information was collected by the Alaska Department of Fish and Game (ADFG), Division of Wildlife Conservation in collaboration with the U.S. Forest Service (USFS). Pellet-group data are used to monitor deer population trends in specific watersheds throughout the region. They are intended to document large changes (≥ 30%) in deer density . The data also permit general comparisons of deer numbers from area to area and year to year within the region.



Deer-pellet surveys have been conducted in Region 1 since 1981. Transects have been established in fixed locations within value comparison units (VCUs) for each game management unit (GMU). VCUs are USFS timber management units and are roughly equivalent to a watershed. Each VCU usually has three transects. These transects traverse deer winter range from sea level to 1500 feet in most cases, although some transects are flatter or more undulating and only traverse lower elevations. Transect locations are chosen based on a number of different considerations, including habitat characteristics, harvest pressure, management concerns, and accessibility. VCUs of higher management concern are monitored on a yearly basis, while others may only be surveyed every two or three years. Over time the monitoring of some VCUs has been abandoned in lieu of monitoring other VCUs, usually in relation to changes in management concern or habitat (such as logging).

Kirchhoff and Pitcher (1988)[1] provided a detailed discussion of objectives, sample design, and field methodology of this program.

Marty Becker on Finger River Transect with start tree. May 3rd, 2011. Photo by Phil Mooney.

[1] Kirchhoff, M. D., and K. W. Pitcher. 1988. Deer pellet-group surveys in Southeast Alaska, 1981–1987. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration Progress Report Project W–22–6, Job 2.9 Juneau. 113pp.

Program Overview, Continued

The interpretation of pellet-group data should be done with caution, as more than changes in deer population size can affect deer pellet-group density. Snowfall patterns influence the distribution and density of deer pellets from year to year. Snow persisting late into the spring at elevations below 1500 feet limits our ability to consistently survey the same elevation zone among years. Occasionally all transects in a VCU cannot be surveyed, which can influence pellet-density results among years. Furthermore, comparisons over time, or from area to area, are most valid when weather conditions are similar. Pellet groups decompose more rapidly with increasing precipitation and warmer temperatures, potentially confounding comparisons. There are also weather-related differences in deer distribution from year to year. In mild winters, deer will access forage in a variety of habitats, including logged areas that have not yet entered the stem exclusion phase (at approximately 30 years). However, in severe winters, deep snow buries forage and makes movement difficult. When evaluating deer-pellet data, the reader should consider winter severity and snowfall patterns, the number of plots sampled from year to year, the variability in the data, and the length of time since the last survey.

Old-growth forests are considered primary deer winter range because canopy cover intercepts the snow, making it easier for deer to move and forage during severe winters. When supplemental forage is available from non-primary winter range during mild winters, deer may increase to or above the carrying capacity of their primary winter range. When this happens, heavy mortality may occur during the next severe winter. Since deer utilize other habitats during mild winters and concentrate in old-growth forests during severe winters, we expect higher pellet densities on winter range after severe winters—if the majority of deer live through most of winter. But early winter mortality could cause lower densities despite the unavailability of other habitats. In addition, if deer spend more of their time on the beach instead of in the forest, lower pellet densities on forest transects could result.

Deer Pellet-Group Surveys: Results

Deer Pellet-Group Survey Results: Southeast Alaska Winter 2010-2011

GMU	VCU Name	VCU	2011 Total Plots	2011 Mean (Pellet Group/Plot)	2011 Confidence Interval	Previous Survey Year	Previous # Plots	Previous PG/Plot	Previous Confidence Interval	% change
				NORTHERN SOUTHEAST ALASKA						
1C	North Douglas	35	328	1.53	1.30-1.75	2010	312	1.07	0.89-1.24	43.1%
1C	Inner Point	36	267	2.12	1.81-2.43	2010	263	1.52	1.29-1.74	39.4%
1C	Shelter Island	124	333	1.86	1.66-2.07	2010	325	1.27	1.09-1.44	46.5%
4Z	Finger Mtn	247	209	4.13	3.48-4.78	2010	217	2.53	2.12-2.93	63.2%
4Z	Nakwasina	300	192	3.87	3.11-4.63	2010	183	2.77	2.42-3.11	39.7%
4Z	Sea Lion Cove	305	232	1.58	1.25-1.91	2010	248	1.04	0.83-1.23	52.2%
				SOUTHERN SOUTHEAST ALASKA						
3Z	East Duncan	437	289	0.64	0.51-0.77	2008	262	1.37	1.10-1.65	-53.2%
3Z	Woewodski	448	232	0.74	0.58-0.89	2010	234	0.81	0.63-0.98	-8.7%
2Z	Sarheen	549	345	1.56	1.37-1.76	2009	316	1.75	1.52-1.97	-10.6%
2Z	Sarkar	554	376	2.24	1.95-2.53	2009	350	1.66	1.46-1.86	35.3%
1A	Dall Head	765	288	0.43	0.29-0.58	2008	280	0.55	0.39-0.72	-21.6%

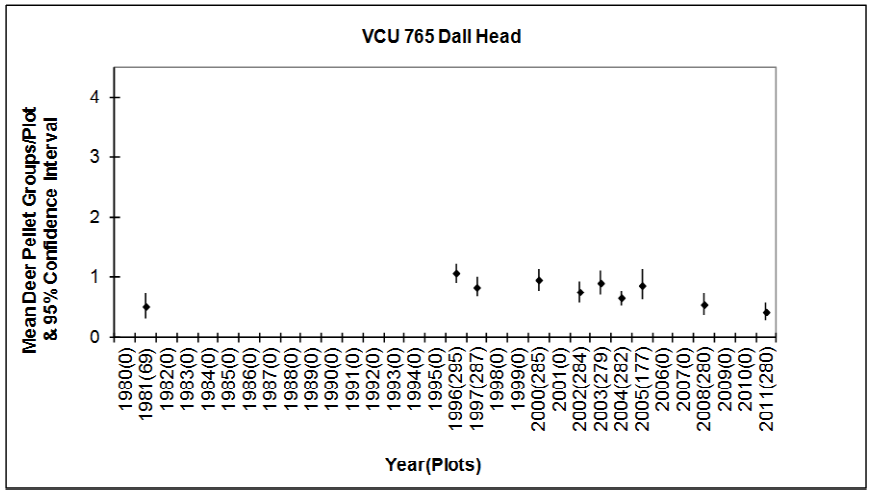
Note: Changes in pellet density are influenced by several factors and may not always reflect actual changes in deer density. Snowfall patterns influence the distribution and density of deer pellets from year to year, and snow persisting late into the spring at elevations below 1500 feet limits our ability to consistently survey the same elevation zone among years. When evaluating deer pellet data, consider the length of time since the last survey, the number of plots sampled from year to year, the variability in the data, and snowfall.

GMU 1A - Ketchikan Area

Summary: In GMU 1A, only one watershed was sampled in 2011. The pellet density measured at Dall Head Bay on Gravina was the lowest ever recorded in this area. Three severe winters in a row (2006–2007, 2007–2008, 2008–2009) likely contributed to the low density of pellet-groups observed. However, management biologists believe that wolf and bear predation in GMU 1A may also be playing a role in keeping deer numbers low in some areas. While wolves were observed on the beach during transect sampling in Dall Bay, there was not much wolf sign on the actual transect, possibly indicating the wolves were only passing through the area. Very little bear sign was observed during sampling, and no winter mortalities of deer were encountered. Observers indicated that it appeared that there would be very little winter deer food in most of the area surveyed.

Dall Head (VCU 765): This area on the south end of Gravina Island was first sampled in 1981, but the location of the 1 transect conducted is unknown. Three permanent transects were established in 1996. Much of Dall Head has been exposed to windthrow and fire and consequently there are large areas of second growth including some well-stocked red cedar stands. There is evidence of significant fire events along 2 of the 3 transects. Most of the understory is brushy conifer & salal.

Notes: only T2 and T3 were sampled in 2005. The # of plots sampled/year has ranged from 69 (1981)-295(1996).*



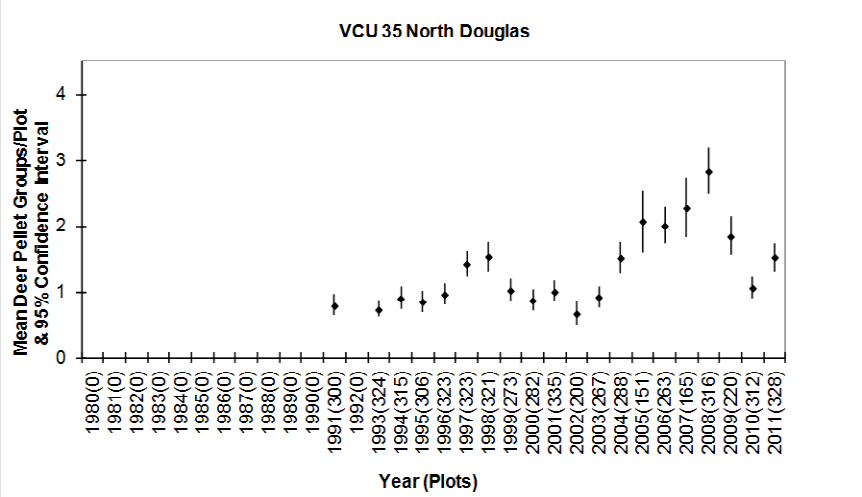
Deer Pellets. Photo by Phil Mooney, 2011.

*See Appendices 1 & 2 for # plots sampled & pellet group densities by VCU, elevation & transect. See Appendix 3 for # plots sampled & pellet densities by VCU & survey year.

GMU 1C - Juneau Area

Summary: In GMU 1C, pellet densities were back up by approximately 40% or more in the 3 VCU's sampled. Pellet densities on North Douglas were almost at 2009 levels, halting the downward trend that appeared to be developing in 2010. The pellet density on North Douglas continues to be relatively high in comparison with most years between 1991 and 2004. Similarly, pellet-group density increased dramatically within the Inner Point watershed on the backside of Douglas Island, tying for the 3rd highest pellet density recorded for that area. Pellet densities also increased on Shelter Island to an median density level for that location. It should be noted that pellet densities in Unit 1C are relatively high in comparison to most of southern Southeast Alaska, and that coupled with lower predation risk will likely allow populations to recover more quickly when they are reduced due to winter severity.

North Douglas (VCU 35): Douglas Island is located immediately opposite the city of Juneau and is heavily used by Juneau hunters. Three transects were established at the end of the road in 1991, and ADFG attempts to complete them every year. These transects rise to over 1000 feet in elevation and traverse moderate volume hemlock stands. Deer appeared to be increasing almost exponentially in this area since 2002. However, three above average winters in a row between 2006 and 2009 likely knocked the population back to some extent. The high pellet densities recorded after these three winters are likely a result, at least in part, of higher concentrations of deer on the primary winter range due to high snow depth in other habitats. The 2009–2010 winter was much milder, which would allow deer to disperse across a broader range of habitats. The much lower density recorded after the relatively mild 2009–2010 winter likely reflects both reductions in the deer population after three relatively severe winters as well as a redistribution of deer across a broader area. However, it should also be noted that this area has been surveyed primarily in conjunction with high school students for the last 5 years, and so some deviations in sampling protocol or observer bias could be also be contributing to changes in observed pellet densities.



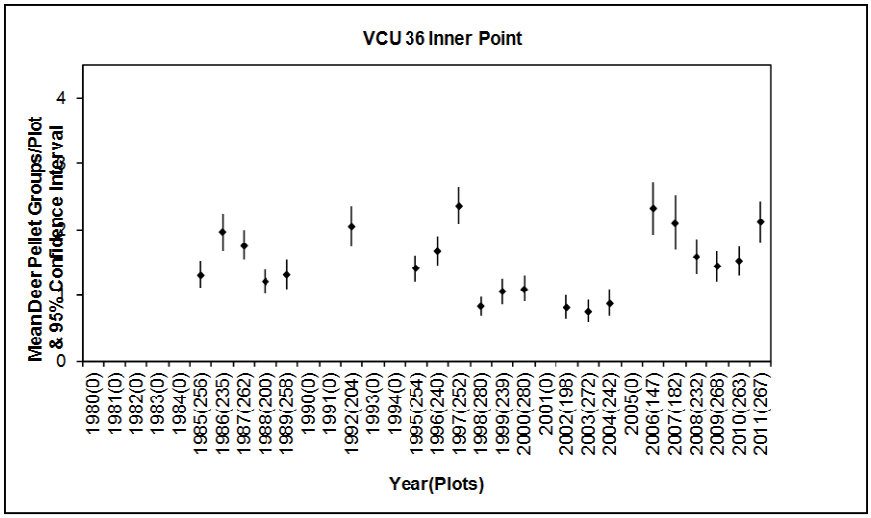
Notes: Fewer plots were sampled on all three transects in 2002 due to snow covering the transect at higher elevations. Only transects T1 and T3 were sampled in 2005. Fewer plots were sampled on all three transects in 2006 due to snow covering the transect at higher elevations. The # of plots sampled/year has ranged from 151(2005) to 335(2001).*

*See Appendices 1 & 2 for # plots sampled & pellet group densities by VCU, elevation & transect. See Appendix 3 for # plots sampled & pellet densities by VCU & survey year.

GMU 1C - Juneau Area Continued

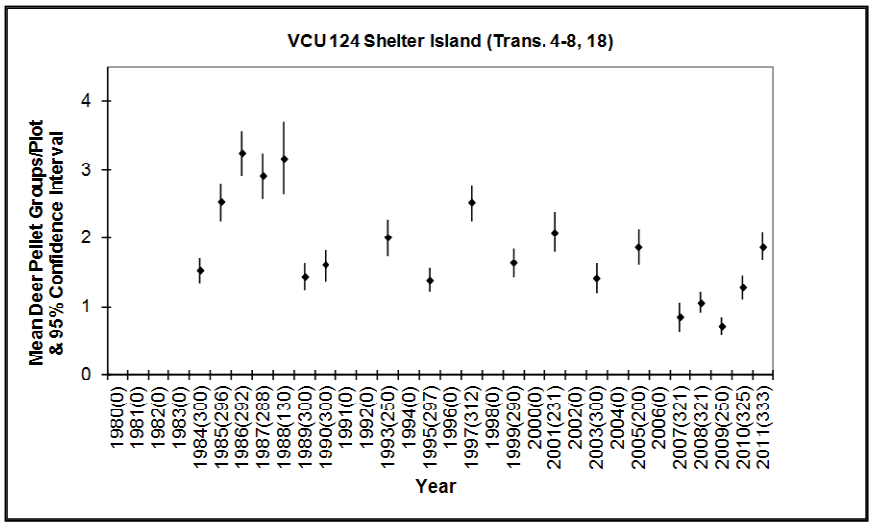
Inner Point (VCU 36): This drainage, located on the west side of Douglas Island, is popular with Juneau deer hunters. Because Douglas Island is the most important hunting area for Juneau hunters, ADFG attempts to complete these transects every year. However, because of high wind and sea conditions in Stephens Passage, access is sometimes difficult. This is a small VCU containing mostly low-volume forest, which is particularly brushy at lower elevations. Two transects (T1, T3) traverse from sea level to 1500 feet, while the third (T2), is low elevation and consists of 125 plots rising to approximately 500 feet. Three above average winters in a row (2006–2007, 2007–2008, 2008–2009) likely decreased deer populations to some extent, but the relatively mild winters of 2009–2010 and 2010–2011 likely have allowed deer numbers to recover.

Notes: In 1986 rough water prevented access to T2 and T3, so transects running directly uphill from Inner Point and Middle point were substituted for that year only. Only T2 and T3 were run in 1988. Selective logging in 1998 prior to the count may have displaced some of the deer population. Only T1 and T3 were run in 2002. Only transects T1 and T3 were run in 2006. All transects but fewer plots were surveyed in 2007 due to snow. The # of plots sampled/year has ranged from 147(2006) to 280 (1998/2000).*



Shelter Island (VCU 124): Located north of Juneau in the lower Lynn Canal, this VCU is composed of Shelter and Lincoln islands and is a popular destination for Juneau hunters. Shelter Island, the larger of the two islands in this VCU, is primarily forested with a maximum elevation of 1,170 feet on the northern end. This VCU was sampled intensively from 1984 to 1986, but this practice was discontinued in 1987 because most of the south end is private property. Currently only transects T4, T5, T6, T7, T8, and T18 on the north end of Shelter Island are sampled. These transects were chosen because they were the most easily accessed and can a be done in one day with a six-person crew. The chart below displays only pellet densities on these six transects, including the intensive sampling period. Pellet densities for 1984–1986 that include all plots may be found in Appendix 1. Three above average winters between 2006 and 2009 likely reduced deer numbers, but current pellet counts after the relatively mild winters of 2010 and 2011 indicate the population is likely recovered.

Notes: Not all transects were sampled every year. The start location of T7 was missed in 1987 and it was run at least 1 mile south of it's proper location. In 1988, only three transects (T6, T7, T18) were run. In 1993, T7 was not done. In 2001, T18 was not done. In 2005, T7 and T8 were not done. The # of plots sampled/year has ranged from 130(1988) to 325(2010).*



*See Appendices 1 & 2 for # plots sampled & pellet group densities by VCU, elevation & transect. See Appendix 3 for # plots sampled & pellet densities by VCU & survey year.

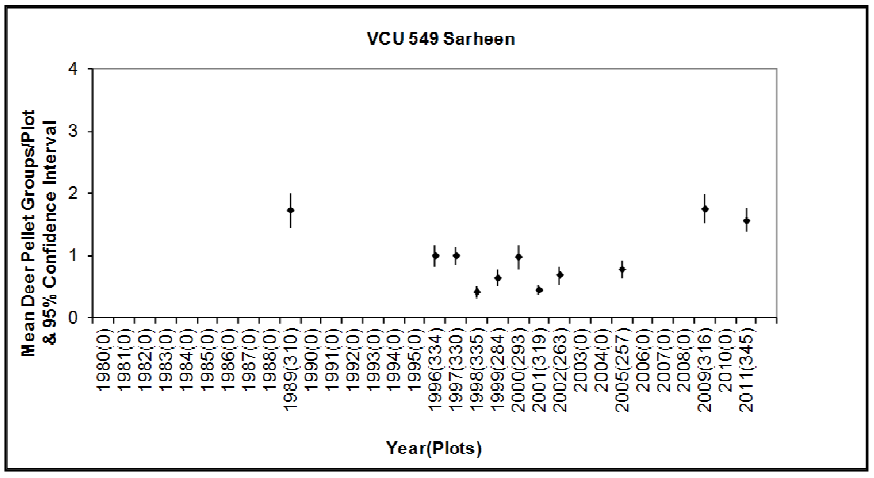
GMU 2 - Prince of Wales Island

Summary: In GMU 2Z, two watersheds were sampled in 2011. Although pellet densities in Sarheen were relatively high compared to previous years and similar to the last survey, much of the pellets and overall deer sign seemed to be near the beaches and upland to 100 yards or so, then diminished. Available browse in this area looked poor, and it appeared that the snow was heavier and persisted longer in this area compared to other locations in GMU 2Z. This may have concentrated deer in the beach fringe for a period of time, making the overall number of deer along the transects appear low. No winter mortality was found on any of the Sarheen transects. In Sarkar, browsing was heavy in several places but it appeared deer could move around most of the winter and were not space limited by snow. Like Sarheen, no winter mortality was found on the Sarkar transects.

Despite three above average winters in a row during 2006–2009, pellet counts have remained stable or increased in the two VCUs sampled. The reason we did not see a decreases after three years of relatively hard winters in GMU 2 may be because average snowfall in southern southeast Alaska is not as high as northern Southeast Alaska. While winter severity may be relatively high, it may not be high enough to cause high winter mortality as long as forage continues to be abundant and available throughout primary winter range (old-growth forest). Pellet counts after the relatively mild winters of 2010 and 2011 indicate that deer are continuing to do quite well in Unit 2.

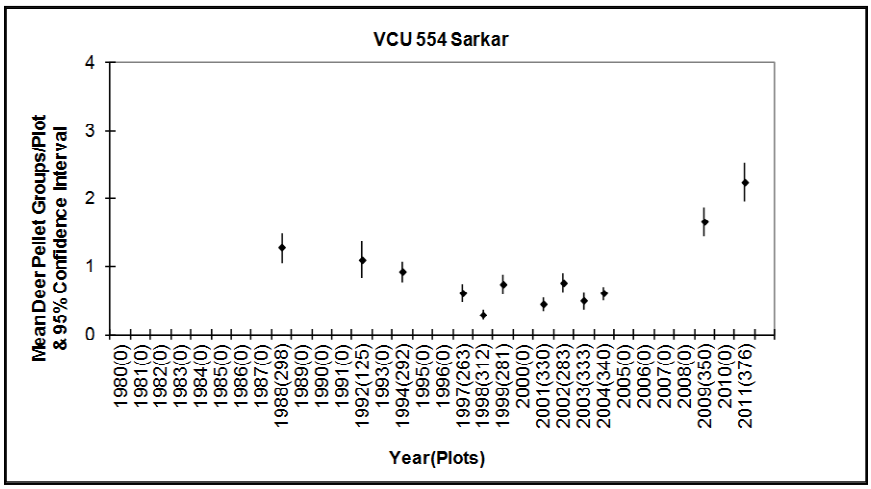
Sarheen (VCU 549): Three transects were established at Sarheen on the NW coast of Prince of Wales Island in 1989. Sarheen was selected because it is mostly unlogged, protected from rough seas, and hunters reported good success there. The transects traverse low-volume timber and reach approximately 800 feet in elevation.

Notes: the # of plots sampled/year has ranged from 257(2005) to 355(1998).*



Sarkar (VCU 554): Three transects were established at Sarkar Lake on Prince of Wales Island in 1989. All three transects start at the Sarkar Rapids bridge. Transects 1 and 3 travel through a combination of old growth and second growth, some of which is now impenetrable. Transect 2 consists entirely of old growth.

Notes: in 2001, Transect 4 was established to replace Transect 3 due to impenetrable second growth. The # of plots sampled/year has ranged from 125 (1992) to 350 (2009).*

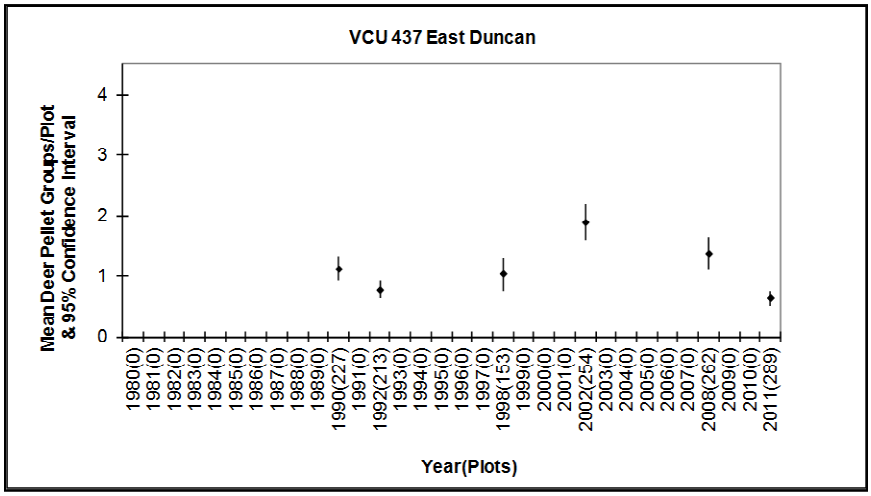


*See Appendices 1 & 2 for # plots sampled & pellet group densities by VCU, elevation & transect. See Appendix 3 for # plots sampled & pellet densities by VCU & survey year.

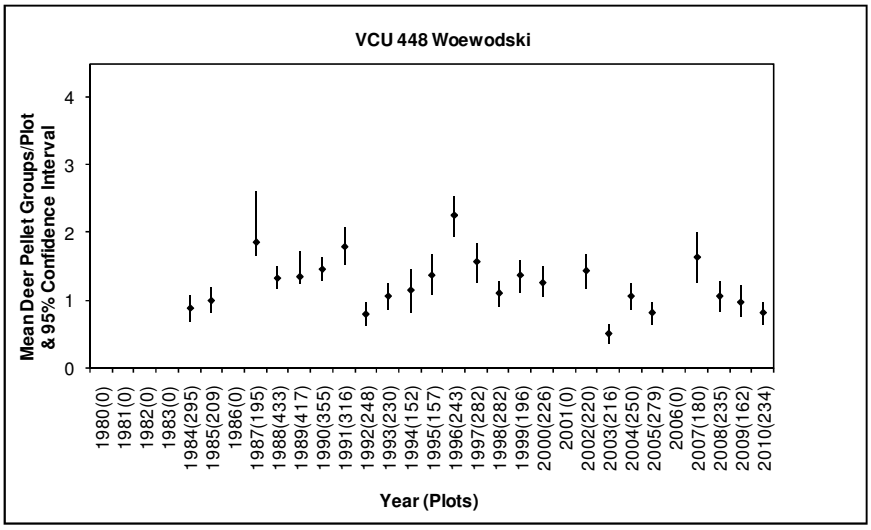
GMU 3 - Central Southeast Alaska Islands

Summary: In GMU 3Z, two VCUs were sampled in 2011 and pellet densities appear to be stable or decreasing. While the 2010–2011 winter snowfall in the Petersburg area was milder than the 5 year average, this is the only known location in the region where the recorded winter snowfall was actually higher than the 15 and 30 year averages (see page 14). The pellet-group counts in East Duncan were down by over 50% from the last survey in 2008, and the lowest counts on record. While this number seems low, because this area has not been surveyed as frequently, additional trend data will help determine if this is a just a temporary dip or a downward trend. While counts are slightly lower in Woewodski again this year, confidence intervals overlap previous years, indicating densities have likely changed very little. Pellet density counts in this area may be more stable because Woewodski is characterized by fairly steep west-facing slopes, and this area likely melts out relatively quickly, enabling deer to consistently access available forage even after heavier snowfall. Likewise, higher elevations likely melt relatively early, allowing surveys to be conducted more consistently among years.

East Duncan (VCU 437): Three transects were established on the east side of Duncan Canal in 1990. T1 is a low elevation transect which runs up to a 500-foot knob opposite the Castle Islands. Timber volume is mostly low, but deer pellet density is generally moderate. T2, brushy with a fair amount of blowdown, starts at the head of the bay and traverses mid-volume hemlock as it skirts a young clearcut. T3 starts out gradually running up a SW facing slope, but becomes very steep as it approaches 1500 feet elevation. T3 is characterized by moderate timber volume and pellet densities. Notes: A portion of T1 was clearcut in 1992, and high winds in 1998 prevented the crew from reaching the beach and so this transect was not completed that year. Notes: the # of plots sampled/year has ranged from 153(1998) to 289 (2011).*



Woewodoski (VUC 448): Three transects were located on southwestern Mitkof Island in 1984. They are all well-marked and easily accessible by skiff from Petersburg. All climb to 1500 feet elevation through moderate volume timber. It is interesting to note that despite heavy snowfalls the winter of 1998–1999, deer pellet group counts were slightly higher than the previous year, and remained in the same range during following surveys, indicating mortality during that severe winter was likely low. Corroborating evidence from deer radio-collared by the Forest Service confirmed this, as only one of 33 adult deer on Mitkof Island died of starvation that winter. Because deer were below carrying capacity in this area, their winter range was able to sustain them despite winter severity. Similarly, relatively high pellet counts have continued despite three severe winters in a row (2006–2007, 2007–2008, 2008–2009; see page 16). Pellet counts in 2010 remain relatively stable after near average snowfall (see page 15). Notes: the # of plots sampled/year has ranged from 152(1994) to 433(1988).*



*See Appendices 1 & 2 for # plots sampled & pellet group densities by VCU, elevation & transect. See Appendix 3 for # plots sampled & pellet densities by VCU & survey year.

GMU 4 - Admiralty, Baranof & Chichagof Islands

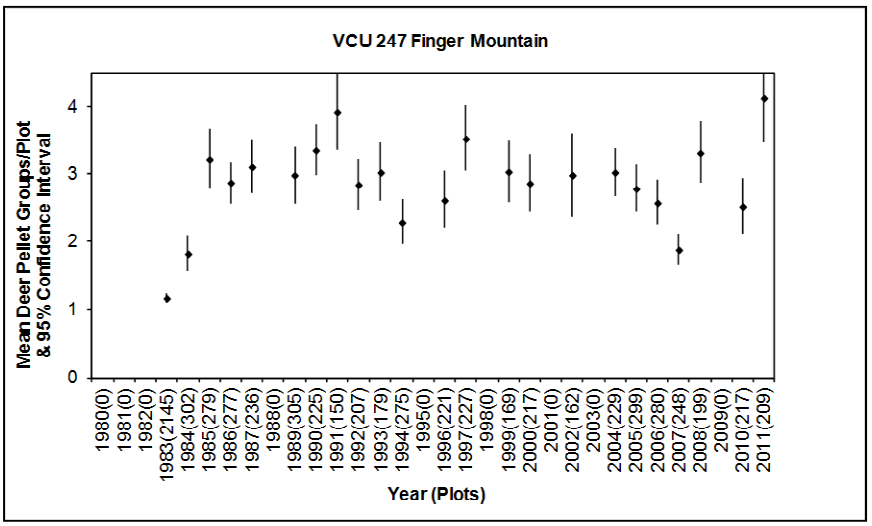
Summary: In GMU 4Z, pellet counts were conducted in three watersheds, and populations appear to be stable or increasing. Finger Mountain had the highest pellet-group counts ever recorded for this watershed, with a 63% increase over the 2010 counts. The current counts have confidence intervals that overlap with previous high counts, which likely indicate this population has remained relatively stable through the hard winters of 2006-2009 and may be starting to increase. Pellet-group counts in Nakwasina were the 3rd highest on record for that area, and a 40% increase over the 2010 survey, with confidence intervals overlapping several previous surveys. This population is likely stable or slightly increasing. Sea Lion Cove had a 52% increase over the previous survey, with confidence intervals overlapping many prior surveys counts. This population is likely stable.

The 2009-2010 and 2010-2011 winters were considerably milder than the severe winters of the previous three years, so the high counts in these 3 watersheds is not likely due to deer concentrating on winter range. Because of the mild conditions, forage availability was likely much higher the last two years, helping deer populations remain stable or even slightly increase. Observations of sustained browsing along transects from 0-950' indicate that deer likely were able to access and use much of their winter range from 0-1000' throughout the winter. Survey transects above 1100 feet were still predominately covered by snow due to late spring warming and green-up. Forage at this elevation may have been less available to deer, possible concentrating deer somewhat in the 0-1000' elevation categories, which would lead to somewhat higher pellet counts. Also of note was considerable blow-down on some Figer River and Nakwasina transects, necessitating some minor re-routes.

Finger Mountain (VCU 247): Located in Hoonah Sound, this VCU was intensively sampled in 1983 when 20 transects were completed. Three transects were chosen for long-term sampling in 1984. All transects have a SW facing aspect. This VCU is physiographically complex. While three transects probably do not reflect the entire VCU, repeating transects should yield useful trend data. Counts in in this watershed have been consistently high compared to the rest of the region, with "low" count years being higher than most high count years in other watersheds.

Notes: T1 & T2 were run on incorrect bearings in 1991. Blowdown in 2011 "necessitated some re-routes." The # of plots sampled/year has ranged from 150(1991) to 2145(1983).*

Finger MountainTransect. May 3rd, 2011. Photo by Phil

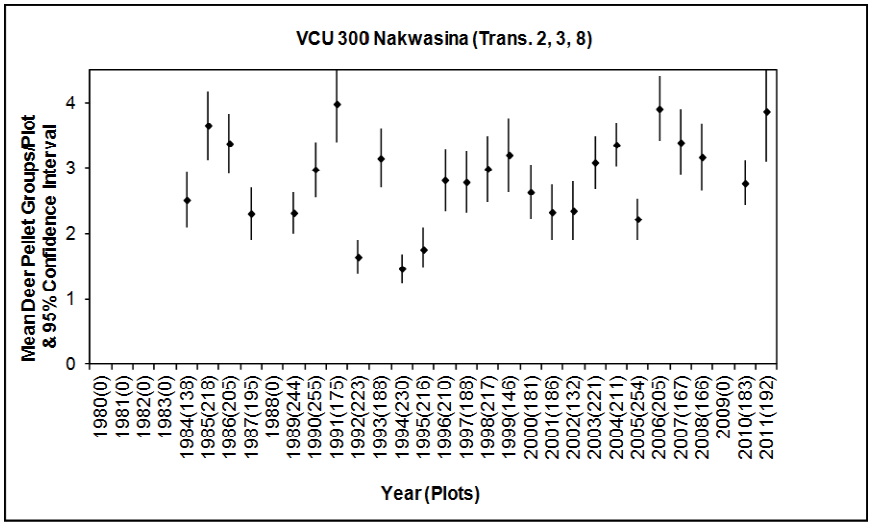


*See Appendices 1 & 2 for # plots sampled & pellet group densities by VCU, elevation & transect. See Appendix 3 for # plots sampled & pellet densities by VCU & survey year.

GMU 4 - Admiralty, Baranof & Chichagof Islands Continued

Nakwasina (VCU 300): This VCU north of Sitka is popular with local hunters and has displayed some of the highest deer pellet densities in Southeast Alaska. First sampled in 1984 with 12 transects, it was sampled more intensively in 1985 and 1986. In 1987, three transects were selected for continued sampling. This chart displays only data for transects T2, T3, and T8 since 1984. All three transects have southerly aspects and traverse mid-volume forest to elevations of 1500 feet. Heavy browsing on *Vaccinium* has been noted on all transects, and deer are likely near carrying capacity. After the hard winter of 1990–1991, deer pellet densities were high, likely from deer concentrating on winter range, but the 1992 low densities likely reflect die-off of from the 1990–1991 winter. The winters of 2006–2007, 2007–2008, and 2008–2009 were three of the most severe on record in northern Southeast Alaska. If deer populations were reduced, we would expect to see much lower densities after the next mild or moderate winter, when deer would not be as concentrated on winter range. The 2009–2010 winter was relatively mild to moderate, and pellet densities in this watershed are lower. However, the actual pellet density encountered in this area is still one of the highest in the region. While deer populations might be slightly lower than before the three severe winters, their numbers are still in the average range for the watershed and above average for the region.

Nakwasina Doe. June 21st, 2011. Photo by Phil Mooney

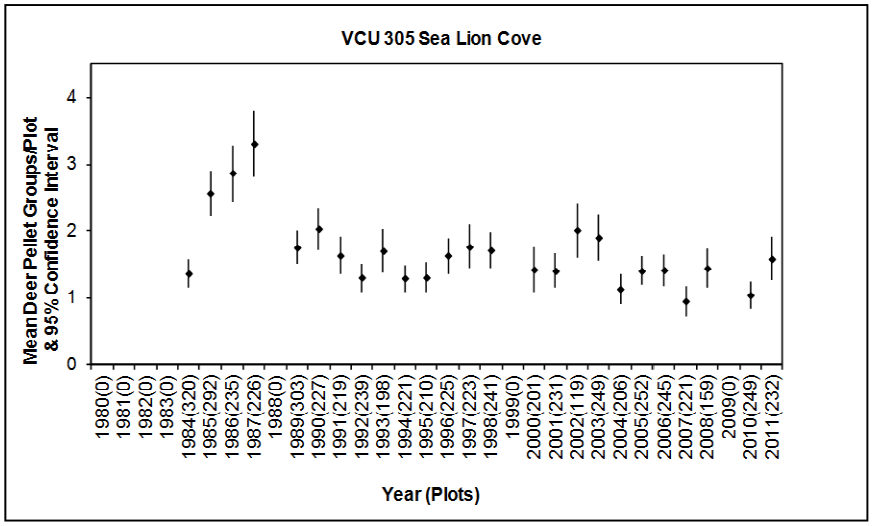


Notes: Blow-down in 2011 "necessitated some minor re-routes." The # of plots sampled/year has ranged from 138(1984) to 255(1990).*

Sea Lion Cove (VCU 305): These three transects are accessed from Kalinin Bay on Kruzof Island and are low to mid-volume timber. Heavy browsing followed by severe winters in 1989–1990 and 1990–1991 may have contributed to a decrease in the population. Likewise, the three severe winters that occurred between 2006 and 2009 may have also decreased the population, but because the confidence intervals for 2010 overlap with the previous 5 years, any decrease would likely be relatively minor. If milder winter weather continues, this population will likely have the opportunity to fully recover from any population reductions that may have occurred.

Notes: In 1987 one transect was relocated to avoid steep side-hills and ravines. The # of plots sampled/year has ranged from 119(2002) to 320 (1984).*

Kalinin Bay, May 5th, 2011. Photo by Phil Mooney



*See Appendices 1 & 2 for # plots sampled & pellet group densities by VCU, elevation & transect. See Appendix 3 for # plots sampled & pellet densities by VCU & survey year.

GMU 5 - Yakutat Area

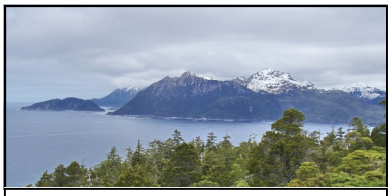
No pellet surveys were planned for GMU 5 in 2011. Please see Appendix 3 or 2008 report for GMU 5 trends.

Spike Buck at DeGroff Bay. June 13th, 2011. Photo by Phil Mooney.

*See Appendices 1 & 2 for # plots sampled & pellet group densities by VCU, elevation & transect. See Appendix 3 for # plots sampled & pellet densities by VCU & survey year.

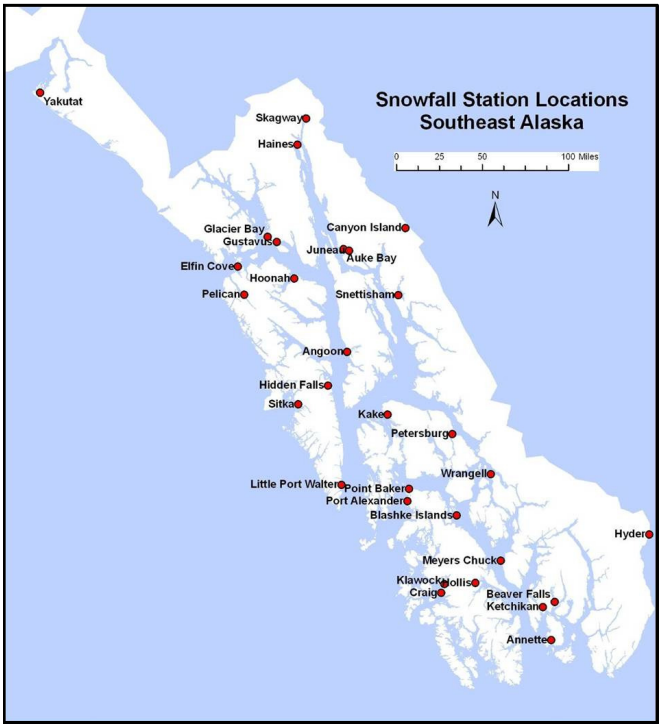
Southeast Alaska Snow Report

Winter severity, particularly snow depth, can play an important role in determining deer distribution, nutritional condition, productivity and survival. As a result, biologists often rely on winter severity information in order to forecast effects of winter conditions on deer population dynamics. Due to the strong maritime influence on deer range in southeast Alaska, winter snow conditions can be extremely variable both within a given winter and between years. Snow depths vary considerably throughout the region with northern areas (e. g. Juneau) typically receiving more winter snowfall than more southerly areas (e. g. Ketchikan/Annette). Snow depth increases with increasing elevation, on northerly aspects, and where there is less or no canopy cover. Low elevation old growth forests provide important winter habitat for deer. In areas that are heavily fragmented naturally (such as by muskegs) or due to timber harvest, deer can have difficulty moving between patches of winter range. Deer begin to flounder at snow depths exceeding 18 inches (chest-height for a deer). Deep soft snow buries forage, causes greater energy consumption and increases vulnerability to predators and hunters. However, freeze-thaw cycles and the formation of deer trails can eventually condense snow, enabling deer to walk on top of the crust.



Kalinin Bay. May 5th, 2011. Photo by Phil Mooney.

Linda Speerstra on Nakwasina Transect (1200 feet). May 6th, 2011. Photo by Phil Mooney.



Snowfall in Inches for Southeast Alaska (Winter 2010-2011)[1]

Station Name	Oct	Nov	Dec	Jan	Feb	Mar	April	May	Total	Averages[2] 5	15	30	% change from 5-year average
Yakutat	1	7.9	23	13	19	2.2	8.1	0	74	161	157	157	-54%
Elfin Cove	0	3.5	27	9.6	31	2.5	1	0	74	171	109	107	-56%
Pelican	0	1.8	30	8.9	23	1	2.5	0	67	160			-58%
Glacier Bay	M[3]	M	21	14	0	6.5	3	0	44	107			-59%
Gustavus	M	M	17	14	26	8.2	0	0	65	93			-30%
Hoonah	0	4.4	18	8.9	27	7.5	0	0	66	150			-56%
Skagway Power	0	6	2	3	16	0	0	0	27	64			-58%
Skagway Customs	M	6	9.9	11	25	1.6	0.5	0	54	53			2%
Haines Customs	7.7	46	34	15	30	2	6.6	0	142	285	259		-50%
Haines Co-op	0	47	20	68	8.3	57.7	0.3	0	202	219			-8%
Juneau Airport	0	7.7	21	16	30	4.9	0.3	0	79	122	86	87	-35%
Annex Creek	M	29	43	21	41	12.8	0.8	M	148	327			-55%
Hidden Falls Hatchery	0	1.1	53	37	17	28.6	0.2	0	136	146			-7%
Little Port Walter	0	2	42	19	13	24.6	1	0	102	163	103		
Port Alexander	T	0.2	10	8.9	3.7	8.7	0.4	0	32	65	48	49	-50%
Point Baker	0	2.6	2.5	12	1.8	14.3	0.6	0	34	45			-25%
Petersburg	0	4	32	29	28	25.4	0.5	T	119	144	78	68	-17%
Wrangell	0	1.6	12	15	19	9	T	0	56	84			-33%
Blashke Island	T	3.3	4.7	16	5.7	8.9	T	0	39	44			-12%
Meyer Chuck	M	M	M	13	M	M	M	0	13	30			-57%
Annette WSO	0	1	6.5	1.7	8.1	4.9	0.4	0	23	49	39	33	-54%
Craig	0	1	2.3	3.5	4.1	0.6	0.3	T	12	27			-56%
Hyder	M	0	3.9	38	59	0.6	T	0	101	217			-54%

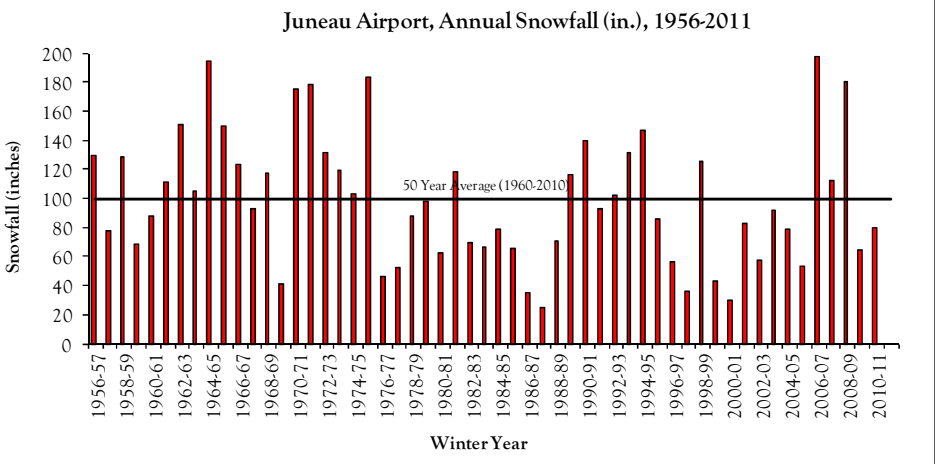
1 Data from National Weather Service, NOAA website: http://www.arh.noaa.gov/clim/akcoopclim.php?wfo=pajk
2 Averages for the 5, 15, and 30 years preceeding the 2010-2011 winter (when available).
3 Data was missing for that month of the 2010-2011 winter.

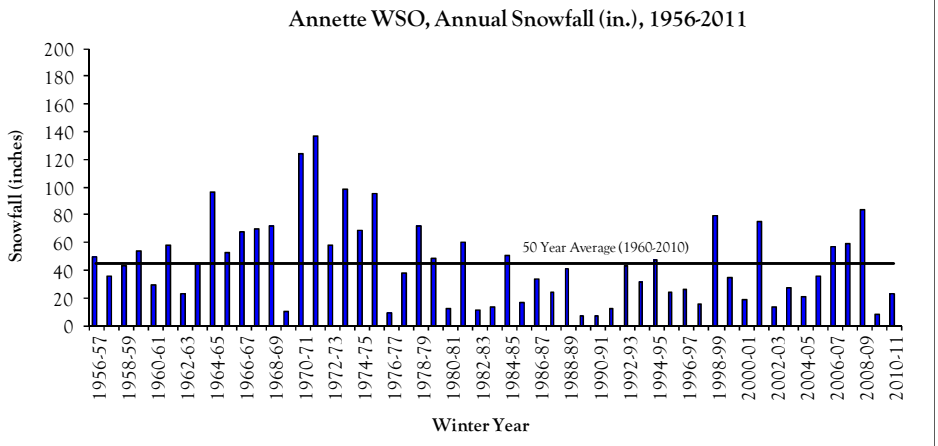
Southeast Alaska Snow Report - Continued

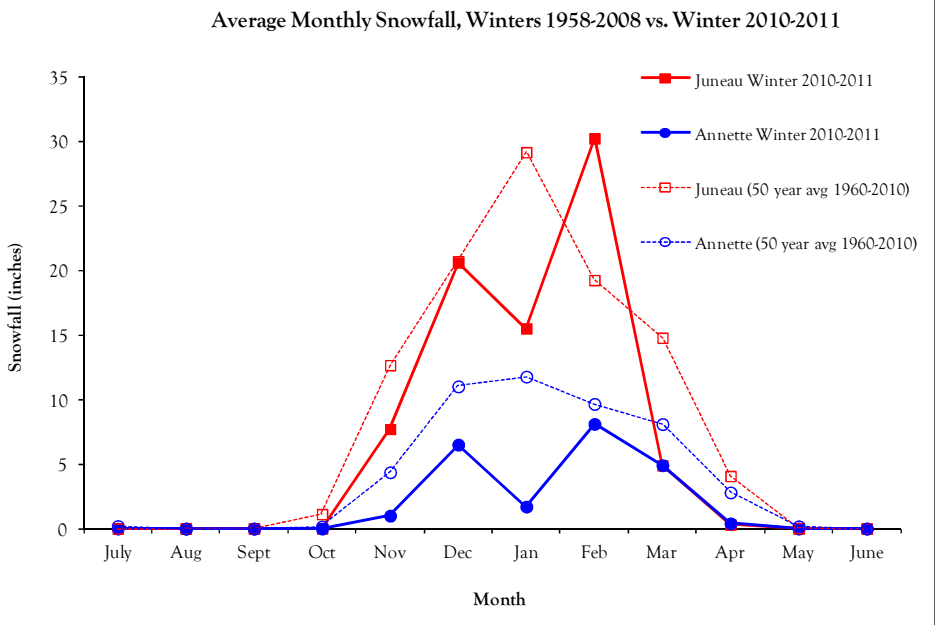
Between 1995—2006, winter conditions in southeast Alaska were relatively mild, with only one out of 11 winters having greater than average annual snowfall in the Juneau area, and two out of 11 in Annette. As a result, it is unlikely that winter conditions negatively affected deer populations between 1995 and 2006. However, the three winters between 2006 and 2009 were severe across the region.

In the Juneau area, the winters of 2006—2007 and 2008—2009 had the highest and fouth highest recorded snowfall since 1956, respectively, with above-average snowfall during the 2007—2008 winter. At Annette WSO, snowfall was above average and increasing during this same time period, with the 2008—2009 winter being the highest snowfall since the 1975—76 winter. In contrast, the 2010 winter was relatively mild to moderate throughout much of the region.

The pattern of snow conditions in relation to the spatial and temporal distribution of forage can have a profound effect on deer health and survival. In 2006—2007, heavy early (Nov: Juneau 64", Annette 14") and late (March: Juneau 62", Annete 22") season snowfall likely caught deer at high elevations, limited movements, and then reburied remnant forage late in the season when deer were already weakened. In 2007—2008, snow did not come as heavy, and the peak (Feb: Juneau 44", Annete 22") was less snow that came later in the winter. In 2008—2009, however, extremely heavy snows mid-winter (Jan: Juneau 75", Annete 28") coupled with above average snowfall and a 2nd peak late-winter (March: Juneau 31", Annette 21") likely limited deer movements throughout much of the winter in northern Southeast Alaska, and to a lesser extent in southern Southeast Alaska.







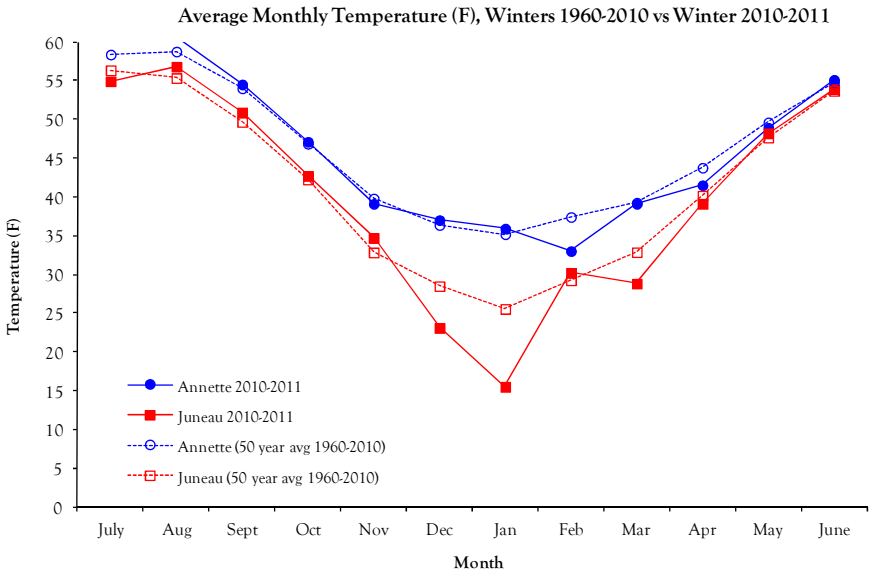
Southeast Alaska Snow Report - Continued

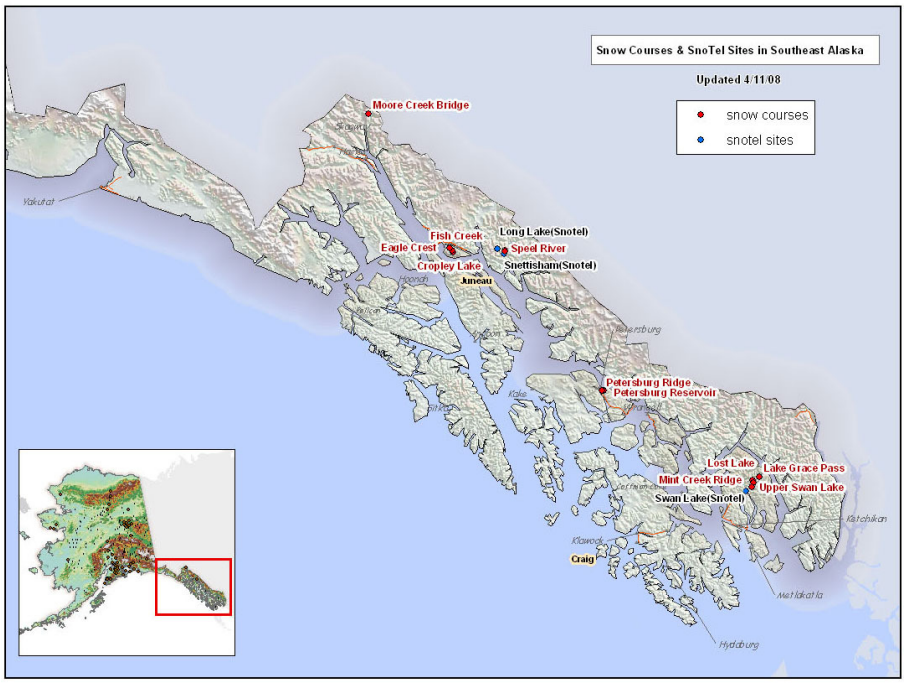
In contrast, the 2009—2010 winter was relatively mild, although a higher than average early and late season snowfall likely limited forage availability to some extent. Snowfall n 2010-2011 was fairly average; one peak in February might have limited short-term movements, but likely had no strong adverse effects.

Snowfall varies considerably among watersheds, and deer suffer most in areas with higher snowfall, where habitats were fragmented, and where populations were near carrying capacity. Because the 2009—2010 and 2010—2011 winters were relatively mild and because many older and/or diseased individuals had already died during the 2006—2009 winters, deer survival likely increased. Survival may also have increased if reduced population sizes in some areas resulted in more available forage/deer on summer and winter range.

Freeze-thaw cycles in winter are good for deer because they compact snow, expose vegetation, and enable deer to walk on snow crusts. Because freeze-thaw cycles tend to occur on a daily basis and are not easily detectable through averaged data, they are hard to evaluate for the winter season as a whole. The 2009—2011 winters were fairly average, with cooler temperatures only occurring briefly each year.

While snowfall is a good indicator of winter severity, because freeze-thaw cycles melt and compact snow, it does not always reflect what is on the ground. Snow pack analyses help fill this information gap. Snow courses are located throughout Southeast Alaska, the details of which have been included on pages 19—26. The snow depth information from these sites indicate that snow depth was near average in early 2011. The table to the right summarizes these data for the Douglas and Petersburg snow courses.





2011 Watershed Snowpack Analysis

Snow Course Name	# Courses Averaged	Percent of Average Snow Depth			
		Feb	March	April	May
Douglas Island	3	102%	87%	91%	118%
Petersburg	2	103%	100%	104%	107%

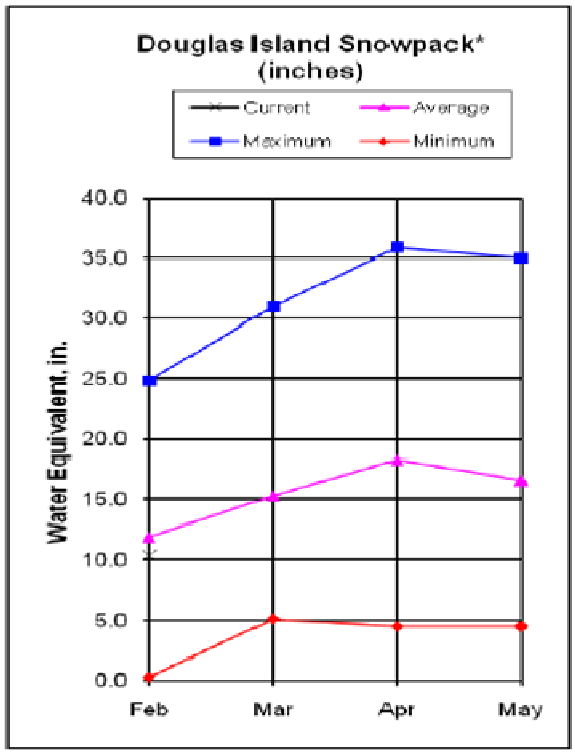
Data from NRCS Alaska Snow Survey Report: http://www.ambcs.org

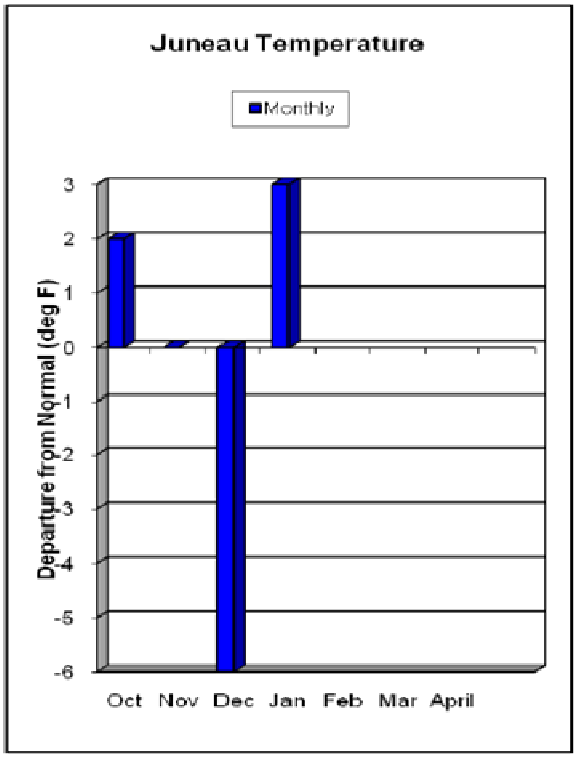
February 2011: Southeast Alaska Snow Pack Data

Reproduced from:

United States Department of Agriculture, National Resources Conservation Service. 2011. Alaska Snow Survey Report, February Issue. Pp 24. Full report available at website: http://www.ambcs.org

SOUTHEAST*





Current Basin Conditions

Currently, Southeast Alaska has near normal snow pack. On Douglas Island, the Cropley Lake snow course is 105 percent of normal and Eagle Crest is 97 percent of normal. However, Fish Creek snow course has no snow while normal is 20 inches depth with 5.0 inches water content.

Long Lake SNOTEL site is reporting 45 inches of snow and 16.0 inches of water content, which is 70% of normal. The Snettisham precipitation gauge has received 75 inches since October 1st, 92 percent of average.
The two Petersburg snow courses are 100% of normal when averaged, but are quite different separately, with the lower elevation snow course, Petersburg Reservoir being 147 percent of normal water content and the higher Petersburg Ridge being 88 percent of normal.

The average of the 4 snow measurements in the Swan Lake basin for the 1st week of January show the snow water content being 116 percent of normal.

February 2011: Southeast Alaska Snow Pack Data

Reproduced from:

United States Department of Agriculture, National Resources Conservation Service. 2011. Alaska Snow Survey Report, February Issue. Pp 25. Full report available at website: http://www.ambcs.org

Southeast

SNOWPACK DATA

Snow Course	Elev. (feet)	Date	THIS YEAR Snow Depth	THIS YEAR Water Content	LAST YEAR Snow Depth	LAST YEAR Water Content	1971 2000 AVERAGE Snow Depth	1971 2000 AVERAGE Water Content
			(inches)					
December								
Cropley Lake	1650	11/29/10	22	4.3	43	10.6	---	---
Eagle Crest	1200	11/29/10	15	3.0	26	8.3	---	---
Fish Creek	500	1/29/10	1	0.2*	9	2.4	---	---
Institute Creek	1350	12/03/10	15	2.4	26	7.4	---	---
Long Lake	850	12/01/10	24	5.5	36	9.5	36	9.1
Moore Creek Bridge	2250	No Survey			26	4.8	---	---
Petersburg Reservoir	550	12/01/10	4	0.6*	18	3.3	---	---
Petersburg Ridge	1650	12/01/10	17	4.2*	50	11.0	---	---
Rainbow Falls	500	12/03/10	1	0.2*	2	0.3	---	---
West Creek	470	No Survey			15	3.6	---	---
January								
Lake Grace Pass	1900	1/07/11	68	19.0	---	---	63	20.6
Long Lake	850	1/01/11	45	11.1	54	16.0	54	16.3
Lost Lake	425	1/07/11	21	7.7	33	9.1*	21	4.5
Mint Creek Ridge	1900	1/07/11	66	18.0	63	19.6*	58	18.0
Petersburg Reservoir	550	12/29/10	25	4.3	22	6.6	13	3.3
Petersburg Ridge	1650	12/30/10	31	6.8	50	14.1	40	11.3
Upper Swan Lake	1700	1/07/11	56	17.3	40	11.5*	34	10.4
Upper Silvas	2300	No Survey			---	---	---	---
West Creek	470	No Survey			20	5.8	---	---
February								
Cropley Lake	1650	1/31/11	53	19.3	56	22.4	58	18.4
Eagle Crest	1200	1/31/11	36	11.8	38	13.7	41	12.2
Fish Creek	500	1/31/11	0	0.0	6	3.0	20	5.0
Institute Creek	1350	No Report			21	7.3	---	---
Long Lake	850	1/27/11	45	16.0	84	25.2	75	23.9
Moore Creek Bridge	2250	2/03/11	40	9.7	59	20.0	62	16.9
Petersburg Reservoir	550	2/01/11	20	6.5	8	2.6	17	4.5
Petersburg Ridge	1650	1/31/11	45	14.0	40	17.6	57	16.9
Rainbow Falls	500	No Report			0	0.0	---	---
West Creek	470	2/02/11	12	3.5	---	---	---	---

Estimate *

PRECIPITATION DATA

INCHES ACCUMULATED SINCE OCTOBER 1ST

Precipitation Gauge	Elevation (feet)	Date	This Year	Last Year	1971 2000 Ave	% of Average
Long Lake	850	1/27/11	71.8	61.3	77.5	93
Moore Creek Bridge	2250	2/03/11	23.7	18.9	20.5	116
Snettisham	25	1/31/11	75.0	62.7	81.6	92
Swan Lake	50	No Report		---	65.1	---

WATERSHED SNOW PACK ANALYSIS

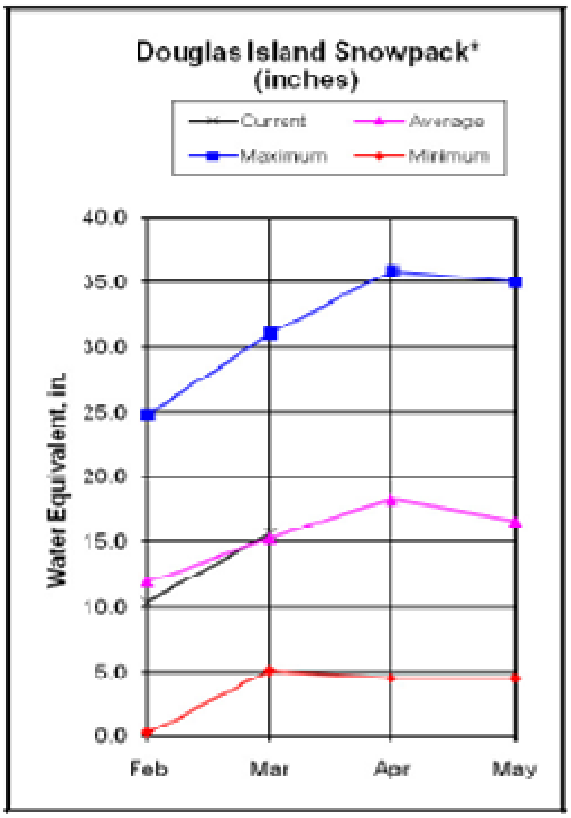
Region / River Basin	No. of Courses Averaged	Percent of Last Year	Percent of Average
Douglas Island	3	80	87
Long Lake	1	64	67
Petersburg	2	106	100

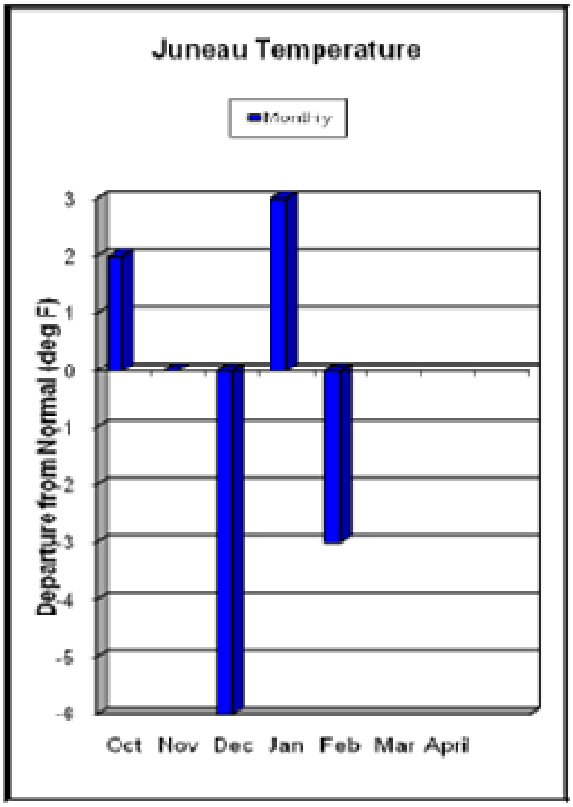
March 2011: Southeast Alaska Snow Pack Data

Reproduced from:

United States Department of Agriculture, National Resources Conservation Service. 2011. Alaska Snow Survey Report, March Issue. Pp. 28. Full report available at website: http://www.ambcs.org

Southeast





Snowcover:

Southeast Alaska is having an average snow pack year with the exception of the Snettisham/Long Lake Hydro project which is 68% of average and the area around Skagway which is 76 percent of average.
The Long Lake SNOTEL site is reporting 76 inches of snow and 25.3 inches of water content, which is 74% of average.
The two Petersburg snow courses are 103% of average water content, up 3% from last month.
The three Douglas Island snow courses are 102 percent of average up 15% water content from last month.
The Institute Creek snow course in Wrangle has 52 inches of snow depth with 18.0 inches of water content.

March 2011: Southeast Alaska Snow Pack Data

Reproduced from:

United States Department of Agriculture, National Resources Conservation Service. 2011. Alaska Snow Survey Report, March Issue. Pp. 29. Full report available at website: http://www.ambcs.org

SOUTHEAST

SNOWPACK DATA

SNOW COURSE	ELEV.	DATE	THIS YEAR SNOW DEPTH	THIS YEAR WATER CONTENT	LAST YEAR SNOW DEPTH	LAST YEAR WATER CONTENT	1971-2000 AVERAGE SNOW DEPTH	1971-2000 AVERAGE WATER CONTENT
Cropley Lake	1650	2/28/11	79	25.5	53	23.1	70	23.9
Eagle Crest	1200	2/28/11	57	17.7	30	12.1	48	16.1
Fish Creek	500	2/28/11	13	3.6	0	0.0	20	6.0
Institute Creek	1350	3/02/11	52	18.0	---	---	---	---
Long Lake	820	2/28/11	76	25.3	74	26.7	92	34.1
Moore Creek Bridge	2260	3/03/11	60	13.0	60	10.0	62	21.3
Petersburg Reservoir	550	2/27/11	33	8.3	0	0.0	18	5.8
Petersburg Ridge	1050	2/28/11	64	20.1	45	18.0	65	21.8
Rainbow Falls	500	3/01/11	11	3.1	---	---		---
Speel River	280	2/27/11	61	16.4	46	17.0	75	26.8
West Creek	470	3/02/11	18	4.3	38	9.6	---	---

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	30-YR AVERAGE (1000AF)	50 PERCENTILE	% OF AVERAGE	MAX (kaf)	MIN (kaf)
Gold Creek near Juneau	Apr-Jul	33	34	103	43	25

PRECIPITATION DATA

INCHES ACCUMULATED SINCE OCTOBER 1ST

Precipitation Gauge	Elev.	Date	This Year	Last Year	71-2000 Ave	% of Average
Long Lake	820	2/28/11	87.1	66.3	85.9	101
Moore Creek Bridge	2250	3/03/11	26.3	22.6	23.9	110
Snettisham	25	2/28/11	92.9	87.6	95.2	98
Swan Lake	50	No Report			77.8	

WATERSHED SNOWPACK ANALYSIS

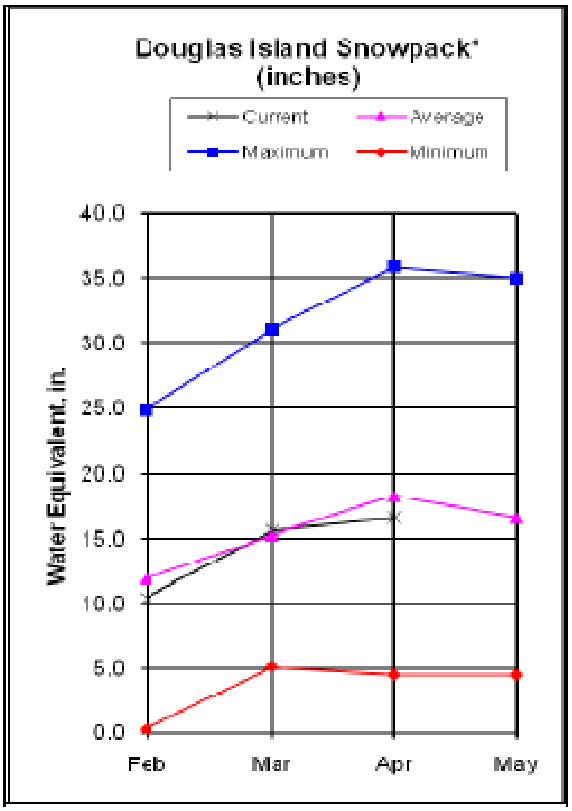
REGION / RIVER BASIN	# COURSES AVERAGED	PERCENT OF LAST YEAR	PERCENT OF AVERAGE
Douglas Island	3	133	102
Petersburg	2	153	103
Skagway	2	60	76
Snettisham	2	94	69

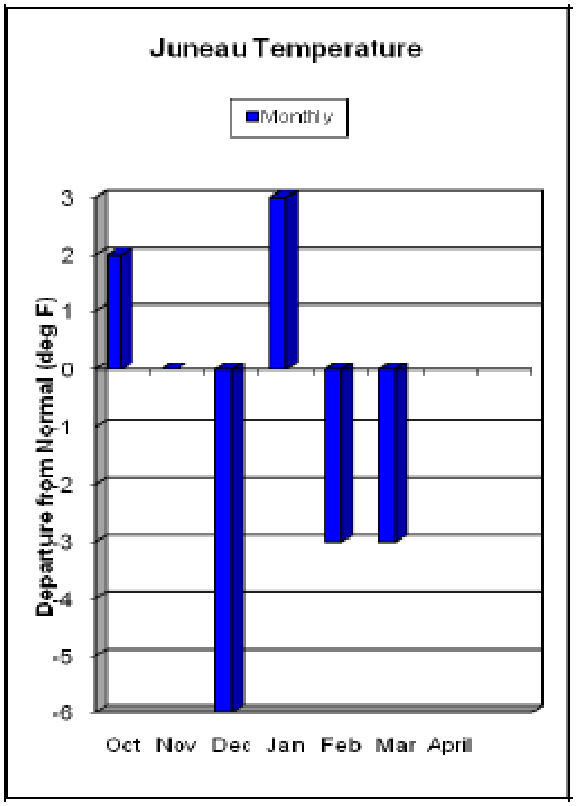
April 2011: Southeast Alaska Snow Pack Data

Reproduced from:

United States Department of Agriculture, National Resources Conservation Service. 2011 Alaska Snow Survey Report, April Issue. Pp. 28. Full report available at website: http://www.ambcs.org

SOUTHEAST*





Snowcover:

Southeast Alaska is having a near average snow pack year with the exception of the Snettisham/Long Lake Hydro project south of Juneau and the area north of Skagway.
The Long Lake SNOTEL site is reporting 86 inches of snow and 27.2 inches of water content with the average being 110 inches with 44.1 inches of water content.
The Moore Creek Bridge snow course north of Skagway has 48 inches of snow depth with 13.7 inches of water content, 69 percent of average.
The two Petersburg snow course water contents remain about the same with 104 percent of average water content, up 1 percent from last month.
The three Douglas Island snow courses have 91 percent of average water content, down 11 percent from last month.

The expected volume flow for the Gold Creek near Juneau for the April through July time frame is 32,000 acre-ft, 97 percent of average.

April 2011: Southeast Alaska Snow Pack Data

Reproduced from:

United States Department of Agriculture, National Resources Conservation Service. 2011. Alaska Snow Survey Report, April Issue. Pp. 29. Full report available at website: http://www.ambcs.org

SOUTHEAST

SNOWPACK DATA

SNOW COURSE	ELEV.	DATE	THIS YEAR SNOW DEPTH	THIS YEAR WATER CONTENT	LAST YEAR SNOW DEPTH	LAST YEAR WATER CONTENT	1971-2000 AVERAGE SNOW DEPTH	1971-2000 AVERAGE WATER CONTENT
Cropley Lake	1650	3/29/11	74	28.9	87	30.9	81	30.3
Eagle Crest	1200	3/29/11	54	18.6	49	19.4	54	18.5
Fish Creek	500	3/29/11	6	2.4*	0	0.0	19	6.2
Institute Creek	1350	No Report			28	10.9	---	---
Lake Grace Pass	1900	No Report			102	45.7	118	45.5
Long Lake	850	4/03/11	80	27.2	99	39.8	110	44.1
Lost Lake	425	No Report			2	0.5	39	15.0
Mint Creek Ridge	1900	No Report			120	44.5	117	43.6
Moore Creek Bridge	2250	4/02/11	48	13.7	71	22.6	73	20.0
Petersburg Reservoir	550	4/01/11	27	9.8	0	0.0	15	6.2
Petersburg Ridge	1650	4/01/11	66	24.0	71	28.5	71	26.4
Rainbow Falls	500	No Report			0	0.0	---	---
Speel River	280	4/01/11	53	23.3	64	23.2	78	31.1
Upper Swan Lake	1700	No Report			54	21.5	60	23.1
West Creek	470	3/29/11	12	3.9	---	---	---	---
Upper Silvas	2300	No Report			---	---	---	---

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	30- YR AVERAGE (1000AF)	50 PERCENTILE	% OF AVERAGE	MAX (kaf)	MIN (kaf)
Gold Creek near Juneau	Apr- Jul	33	32	97	40	24

PRECIPITATION DATA

INCHES ACCUMULATED SINCE OCTOBER 1ST

Precipitation Gauge	Elev.	Date	This Year	Last Year	71-2000 Ave	% of Average
Long Lake	850	4/03/11	94.4	84.5	96.4	98
Moore Creek Bridge	2250	No Report		30.8	20.8	---
Snettisham	25	3/31/11	98.5	85.6	106.8	92
Swan Lake	50	No Report		---	88.2	---

WATERSHED SNOWPACK ANALYSIS

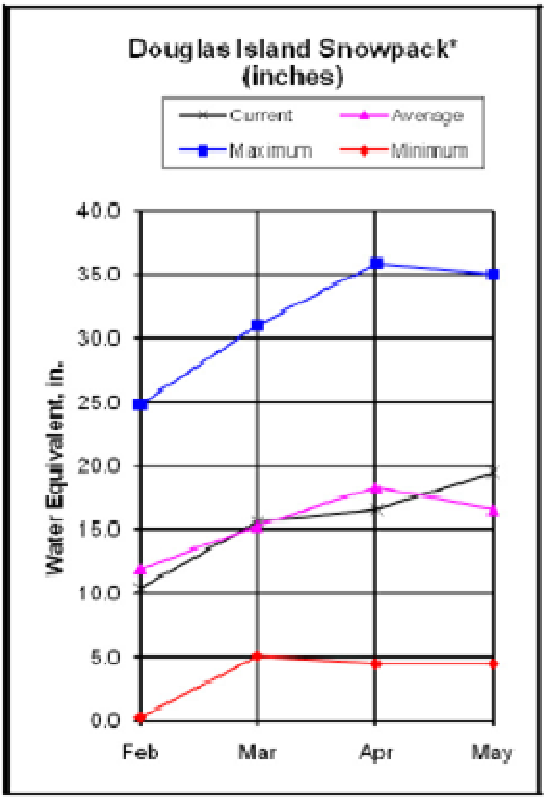
REGION / RIVER BASIN	# COURSES AVERAGED	PERCENT OF LAST YEAR	PERCENT OF AVERAGE
Douglas Island	3	99	91
Petersburg	2	119	104
Skagway	1	45	69
Snettisham	2	100	75
Swan Lake	No Report		

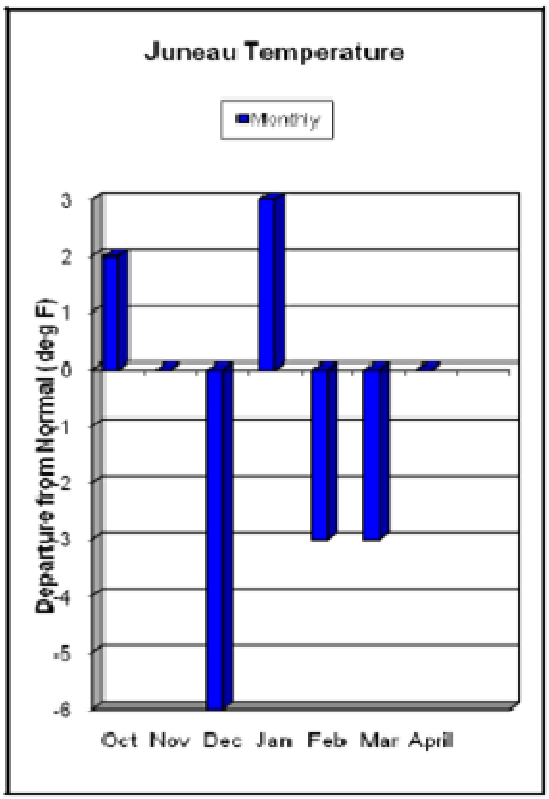
May 2011: Southeast Alaska Snow Pack Data

Reproduced from:

United States Department of Agriculture, National Resources Conservation Service. 2011. Alaska Snow Survey Report, May Issue. Pp. 28. Full report available at website: http://www.ambcs.org

SOUTHEAST*





November and April Departures are 0

Snowcover:

Southeast Alaska ranges from a below average to an above average snow pack. The Douglas Island snow courses across from Juneau are 118 percent of average with no snow at the lower site, Fish Creek. The Petersburg snow courses are 107 percent of average with no snow at Petersburg Reservoir.

The SNOTEL site at Long Lake provides information for the Snettisham hydroelectric project and reports 25.9 inches of water content with an estimated 58 inches of snow. The Speel River snow course has 34 inches of snow with 13.4 inches of water content or 51 percent of average. Combined they are 52 percent of average

Near Skagway, the West Creek snow course has no snow and the Moore Creek Bridge course has 50 inches with 17.8 inches of water content, 94 percent.

The four snow courses in the Swan Lake basin, near Ketchikan, were measured, they are 97 percent of average varying from 34 inches of snow depth at Lost Lake to 115 inches at Lake Grace Pass.

May 2011: Southeast Alaska Snow Pack Data

Reproduced from:

United States Department of Agriculture, National Resources Conservation Service. 2011. Alaska Snow Survey Report, May Issue. Pp. 29. Full report available at website: http://www.ambcs.org

Southeast

SNOWPACK DATA

Snow Course	Elev. (feet)	Date	THIS YEAR Snow Depth	THIS YEAR Water Content	LAST YEAR Snow Depth	LAST YEAR Water Content	1971-2000 AVERAGE Snow Depth	1971-2000 AVERAGE Water Content
			(inches)					
Cropley Lake	1650	4/28/11	80	36.6	76	34.0	73	32.8
Eagle Crest	1200	4/28/11	50	22.4	38	13.7	37	15.7
Fish Creek	500	4/28/11	0	0.0	0	0.0	3	1.3
Institute Creek	1350	No Report			---	---	---	---
Lake Grace Pass	1900	4/28/11	115	51.6	102	45.7	---	---
Long Lake	850	5/04/11	58*	25.9	79	35.2	100	47.9
Lost Lake	425	4/28/11	34	11.2	2	0.5	25	11.1
Mint Creek Ridge	2250	4/28/11	111	50.8	120	44.5	---	---
Moore Creek Bridge	2250	4/29/11	50	17.8	53	21.5	46	18.9
Petersburg Reservoir	550	5/02/11	0	0.0	0	0.0	6	2.3
Petersburg Ridge	1650	5/02/11	62	26.0	50	21.5	51	22.1
Rainbow Falls	500	No Report			---	---	---	---
Speel River	280	4/30/11	34	13.4	38	17.0	59	26.1
Upper Swan Lake	1700	4/28/11	108	48.8	54	21.5	---	---

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	30- YR AVERAGE (1000AF)	50 PERCENTILE	% OF AVERAGE	MAX (kaf)	MIN (kaf)
Gold Creek near Juneau	May-Jul	31	34	110	41	27

PRECIPITATION DATA

INCHES ACCUMULATED SINCE OCTOBER 1ST

Precipitation Gauge	Elevation (feet)	Date	This Year	Last Year	1971-2000 Ave	% of Average
Long Lake	850	5/04/11	100.6	88.8	104.6	96
Moore Creek Bridge	2250	4/29/11	29.2	31.7	26.6	110
Snettisham	25	4/30/11	107.8	89.9	112.5	96
Swan Lake	50	No Report		---	98.8	---

WATERSHED SNOWPACK ANALYSIS

Region / River Basin	No. of Courses Averaged	Percent of Last Year	Percent of Average
Douglas Island	3	124	118
Petersburg	2	115	107
Skagway	1	65	93
Snettisham	2	75	52
Swan Lake	4	134	97

Appendix 1: Pellet-Group Densities by VCU and Elevation

Analyzing the spatial distribution of pellet groups allows managers to better understand the relative use of habitat with increasing elevation. Use of different elevations is influenced by the presence of forage species as well as the availability of this forage given snow depth and conditions. Winter movement patterns and forage availability were likely not as limited by snow where higher elevations were heavily used. In Spring 2011, the mean pellet groups/plot in Game Management Unit (GMU) 1C increased with each higher elevation category on North Douglas and Shelter Island and decreased with each higher elevation category at Inner Point. In Unit 4Z, the mean pellet groups/plot was much higher in the low-elevation category at Finger Mountain and Nakwasina, and highest in the mid-elevation category at Sea Lion Cove. There was some clumping of pellet groups in areas with less snow at high elevations in Nakwasina, which may have lead to the higher counts recorded there. In GMU 3Z, the 2011 pellet density at Woewodski was highest at high elevations, which is the same trend as seen the previous years. In GMU 2Z, high-elevation categories and mid-elevation categories did not exist on the Sarkar transects; the high elevation category did not exist on the Sarheen transects, but use appeared higher in the mid-elevation category on Sarheen transects than the low-elevation category. In GMU 1A (Dall Head), transects were predominantly low elevation.

It should be noted that the number of plots in each elevation category is not equal, which may bias results to some extent. This inequality results because not all transects are created equal: some are flatter or undulating, some start with a moderate incline and become increasingly steeper with distance from the coast, while others rise steeply from sea level. Furthermore, snow conditions usually vary from transect to transect. After a severe winter, snow often persists at higher elevations and northerly aspects. Because snow hides pellets from view, transects are terminated when snow covers greater than 50% of the plot for three consecutive plots.

Mean Pellet Groups (PG) Per Plot by VCU and Elevation Category, Spring 2011

		0-500 feet			501-1000 feet			>1000 feet		
VCU	Name	PG Count	# Plots	Mean	PG Count	# Plots	Mean	PG Count	# Plots	Mean
35	North Douglas	87	100	0.87	213	151	1.41	201	77	2.61
36	Inner Point	435	184	2.36	81	44	1.84	50	39	1.28
124	Shelter Island	511	257	1.99	91	68	1.34	18	8	2.25
247	Finger Mtn	466	79	5.90	385	104	3.70	12	26	0.46
300	Nakwasina	520	90	5.78	84	50	1.68	139	52	2.67
305	Sea Lion Cove	160	103	1.55	164	68	2.41	42	61	0.69
Northern Southeast Alaska		**2179**	**813**	**2.68**	**1018**	**485**	**2.10**	**462**	**263**	**1.76**
437	East Duncan	111	200	0.56	24	39	0.62	51	50	1.02
448	Woewodski	45	76	0.59	35	65	0.54	91	91	1.00
549	Sarheen	297	205	1.45	242	140	1.73		0	
554	Sarkar	843	376	2.24		0			0	
765	Dall Head	121	270	0.45	4	15	0.27	0	3	0
Southern Southeast Alaska		**1417**	**1127**	**1.26**	**305**	**259**	**1.18**	**142**	**144**	**0.99**
All Southeast Alaska		**3596**	**1940**	**1.85**	**1323**	**744**	**1.78**	**604**	**407**	**1.48**

Appendix 2: Pellet-Group Densities by VCU and Transect

Pellet-Groups Per Plot by VCU and Transect, Spring 2011

VCU	Name	Transect	Pellet Groups (PG)	Plots	Mean PG/ Plot	Lower 95% C. I.	Upper 95% C. I.
35	North Douglas	1	146	81	1.80	1.28	2.33
35	North Douglas	2	132	125	1.06	0.82	1.29
35	North Douglas	3	223	122	1.83	1.40	2.25
35	North Douglas	Total	501	328	1.53	1.30	1.75
36	Inner Point	1	222	67	3.31	2.60	4.03
36	Inner Point	2	182	125	1.46	1.22	1.69
36	Inner Point	3	162	75	2.16	1.42	2.90
36	Inner Point	Total	566	267	2.12	1.81	2.43
124	Shelter Island	4	98	50	1.96	1.27	2.65
124	Shelter Island	5	55	50	1.10	0.65	1.55
124	Shelter Island	6	76	50	1.52	1.09	1.95
124	Shelter Island	7	109	50	2.18	1.62	2.74
124	Shelter Island	8	121	53	2.28	1.77	2.80
124	Shelter Island	18	161	80	2.01	1.64	2.38
124	Shelter Island	Total	620	333	1.86	1.66	2.07
247	Finger Mountain	1	196	61	3.21	2.28	4.14
247	Finger Mountain	2	567	100	5.67	4.56	6.78
247	Finger Mountain	3	100	48	2.08	1.46	2.71
247	Finger Mountain	Total	863	209	4.13	3.48	4.78
300	Nakwasina	2	93	49	1.90	1.25	2.55
300	Nakwasina	3	248	75	3.31	2.42	4.19

Appendix 2: Pellet-Group Densities by VCU and Transect

Pellet-Groups Per Plot by VCU and Transect, Spring 2011

VCU	Name	Transect	Pellet Groups (PG)	Plots	Mean PG/ Plot	Lower 95% C. I.	Upper 95% C. I.
300	Nakwasina	8	402	68	5.91	4.17	7.65
300	Nakwasina	Total	743	192	3.87	3.11	4.63
305	Sea Lion Cove	1	72	87	0.83	0.52	1.13
305	Sea Lion Cove	2	123	93	1.32	0.88	1.76
305	Sea Lion Cove	3	171	52	3.29	2.30	4.28
305	Sea Lion Cove	Total	366	232	1.58	1.25	1.91
437	East Duncan	1	76	125	0.61	0.38	0.83
437	East Duncan	2	74	88	0.84	0.61	1.07
437	East Duncan	3	36	76	0.47	0.29	0.66
437	East Duncan	Total	186	289	0.64	0.51	0.77
448	Woewodski	1	54	69	0.78	0.47	1.09
448	Woewodski	2	67	80	0.84	0.56	1.11
448	Woewodski	3	50	83	0.60	0.39	0.81
448	Woewodski	Total	171	232	0.74	0.58	0.89
549	Sarheen	1	139	100	1.39	0.98	1.80
549	Sarheen	2	133	120	1.11	0.88	1.33
549	Sarheen	3	267	125	2.14	1.78	2.49
549	Sarheen	Total	539	345	1.56	1.37	1.76
554	Sarkar 1	456	125	3.65	2.96	4.34	
554	Sarkar 2	197	126	1.56	1.23	1.90	
554	Sarkar 5	190	125	1.52	1.25	1.79	

Appendix 2: Pellet-Group Densities by VCU and Transect

Pellet-Groups Per Plot by VCU and Transect, Spring 2011

VCU	Name	Transect	Pellet Groups (PG)	Plots	Mean PG/ Plot	Lower 95% C. I.	Upper 95% C. I.
554	Sarkar	Total	843	376	2.24	1.95	2.53
765	Dall Head	1	74	104	0.71	0.35	1.08
765	Dall Head	2	16	91	0.18	0.09	0.27
765	Dall Head	3	35	93	0.38	0.22	0.53
765	Dall Head	Total	125	288	0.43	0.29	0.58

Appendix 3: Pellet-group count statistics, Southeast Alaska

VCU	Name	Land Acres	% CFL*	Year	Plots	Pellet-Group Mean	95%C.I.
20	Comet	9,662	12%	1994	180	0.00	0.00-0.00
27	Auke Bay	15,245	45%	1987	381	0.99	0.87-1.12
35	North Douglas	4,430	49%	1991	300	0.80	0.65-0.96
				1993	324	0.74	0.62-0.87
				1994	315	0.91	0.74-1.09
				1995	306	0.86	0.70-1.02
				1996	323	0.97	0.81-1.12
				1997	323	1.43	1.24-1.62
				1998	321	1.54	1.32-1.77
				1999	273	1.03	0.86-1.19
				2000	282	0.88	0.71-1.04
				2001	335	1.01	0.85-1.17
				2002	200	0.68	0.50-0.85
				2003	267	0.93	0.77-1.09
				2004	288	1.52	1.28-1.76
				2005	151	2.08	1.61-2.54
				2006	263	2.02	1.74-2.29
				2007	165	2.28	1.83-2.73
				2008	316	2.84	2.49-3.19
				2009	220	1.85	1.57-2.14
				2010	312	1.07	0.89-1.24
				2011	328	1.53	1.30-1.75
36	Inner Point	3,965	44%	1985	256	1.30	1.10-1.51
				1986	235	1.97	1.68-2.25
				1987	262	1.76	1.53-2.00
				1988	200	1.21	1.02-1.39
				1989	258	1.31	1.08-1.53
				1992	204	2.05	1.75-2.36
				1995	254	1.41	1.21-1.60
				1996	240	1.68	1.45-1.91
				1997	252	2.36	.08-2.64
				1998	280	0.84	0.69-0.98
				1999	239	1.06	0.87-1.25
				2000	280	1.09	0.90-1.28
				2002	198	0.82	0.64-1.00
				2003	272	0.76	0.60-0.92
				2004	242	0.88	0.68-1.08
				2006	147	2.33	1.93-2.72
				2007	182	2.10	1.70-2.50
				2008	232	1.59	1.32-1.85
				2009	268	1.44	1.20-1.68
				2010	263	1.52	1.30-1.74
				2011	267	2.12	1.81-2.43
38	Rhine Creek	6,357	2%	1997	108	0.31	0.14-0.47

*CFL = commercial forest land, or volume classes 4-7 (currently referred to as productive forest land, or "PFL"). Numbers are from the 1980's, and should be updated.

Appendix 3: Pellet-group count statistics, Southeast Alaska

VCU	Name	Land Acres	% CFL	Year	Plots	Pellet-Group Mean	95%C.I.
65	Sumdum Glacier	40,906	15%	1987	262	1.76	1.53-2.00
82	Negro Creek	12,212	31%	1989	312	0.21	0.13-0.29
89	Farragut Bay	na	na	1994	314	0.02	0.00-0.04
94	Sullivan Island	3,985	78%	1990	250	1.39	1.17-1.62
117	Couverden	9,933	10%	1993	350	0.35	0.27-0.44
124	Shelter Island (All Transects)	6,162	43%	1984	713	1.46	1.33-1.60
				1985	774	1.82	1.67-1.97
				1986	727	2.20	2.02-2.37
124	Shelter Island (Trans. 4-8, 18)			1984	300	1.52	1.34-1.70
				1985	296	2.52	2.24-2.81
				1986	292	3.24	2.91-3.57
				1987	288	2.91	2.57-3.24
				1988	130	3.16	2.62-3.70
				1989	300	1.43	1.23-1.62
				1990	300	1.60	1.37-1.82
				1993	250	2.00	1.73-2.26
				1995	297	1.38	1.20-1.56
				1997	312	2.51	2.23-2.78
				1999	290	1.63	1.42-1.85
				2001	231	2.07	1.79-2.36
				2003	300	1.41	1.19-1.63
				2005	200	1.86	1.59-2.13
				2007	321	1.10	0.97-1.41
				2008	321	1.05	0.90-1.21
				2009	250	0.71	0.57-0.84
				2010	325	1.27	1.10-1.44
				2011	333	1.86	1.66-2.07
124	Lincoln Island			1998	207	1.52	1.27-1.77
				2007	213	0.84	0.62-1.06
125	Barlow Cove	13,712	24%	1982	2,567	1.07	1.01-1.12
				1984	347	1.69	1.46-1.92
				1985	347	1.55	1.35-1.76
				1990	270	1.42	1.18-1.65
127	Calm Station	4,941	66%	1982	1,054	1.65	1.53-1.77
128	Hawk Inlet	14,318	57%	1982	1,605	1.21	0.99-1.42
				1984	339	1.42	1.22-1.63
				1985	270	1.69	1.43-1.95
				1986	286	1.92	1.64-2.19

*CFL = commercial forest land, or volume classes 4-7 (currently referred to as productive forest land, or "PFL"). Numbers are from the 1980's, and should be updated.

Appendix 3: Pellet-group count statistics, Southeast Alaska

VCU	Name	Land Acres	% CFL	Year	Plots	Pellet-Group Mean	95%C.I.
				1987	278	2.54	2.19-2.89
				1989	364	1.82	1.56-2.08
				1990	250	2.24	1.94-2.53
				1992	319	1.61	1.38-1.83
				1996	325	1.26	1.07-1.46
				1999	176	1.25	1.00-1.50
				2002	183	1.17	0.93-1.42
				2005	322	2.69	2.30-3.08
				2007	305	1.19	0.97-1.41
				2008	290	1.33	112-1.55
				2009	207	1.35	1.06-1.63
140	Dorn Island	9,485	81%	1984	230	1.27	1.02-1.53
148	Lake Kathleen	14,693	57%	1987	207	2.13	1.76-2.49
150	Lake Florence	21,342	52%	1988	294	1.48	1.27-1.69
162	Thayer Lake	25,342	79%	1987	313	2.81	2.49-3.12
				1989	283	2.04	1.75-2.32
				1994	282	2.27	1.98-2.56
				1998	308	2.13	1.87-2.38
171	Hood Bay	44,355	79%	1987	358	2.31	1.99-2.63
				1989	366	1.77	1.54-2.00
				1990	375	1.85	1.61-2.09
				1992	360	1.91	1.64-2.18
				1994	371	1.64	1.41-1.88
				2000	349	1.04	0.87-1.21
				2003	220	1.41	1.17-1.65
				2006	355	2.76	2.5-3.02
				2008	301	1.62	1.37-1.88
182	Pybus Bay	41,501	62%	1981	390	1.34	1.16-1.52
				1984	300	1.02	0.86-1.18
				1985	269	1.86	1.60-2.12
				1986	235	2.00	1.70-2.29
				1987	242	2.03	1.69-2.37
				1989	199	2.00	1.63-2.36
				1990	221	1.72	1.44-2.01
				1992	236	1.13	0.97-1.30
				1995	205	1.48	1.23-1.74
				1998	256	1.37	1.16-1.59
185	Pleasant Island	8,738	16%	1991	311	1.38	1.18-1.57
				1992	210	1.34	1.09-1.59
				1993	305	1.77	1.52-2.02
				1994	356	1.22	1.04-1.40

*CFL = commercial forest land, or volume classes 4-7 (currently referred to as productive forest land, or "PFL"). Numbers are from the 1980's, and should be updated.

Appendix 3: Pellet-group count statistics, Southeast Alaska

VCU	Name	Land Acres	% CFL	Year	Plots	Pellet-Group Mean	95%C.I.
				1997	300	1.80	1.54-2.06
				1999	223	1.82	1.55-2.08
				2002	351	1.96	1.71-2.20
				2005	312	1.33	1.11-1.55
				2009	291	0.72	0.60-0.84
189	Port Althorp	8,040	27%	1988	195	1.80	1.47-2.13
				1991	223	1.92	1.55-2.29
				1992	261	1.36	1.11-1.60
				1993	248	1.39	1.15-1.62
				1994	253	1.31	1.06-1.56
				1998	281	1.48	1.27-1.70
				2001	225	1.81	1.49-2.13
190	Idaho Inlet	53,183	22%	1988	258	1.34	1.09-1.60
				1992	219	0.94	0.69-1.19
				1993	305	0.56	0.45-0.68
				1994	294	0.71	0.58-0.84
				1998	273	1.11	0.92-1.30
				2001	308	0.94	0.78-1.11
				2004	296	1.05	0.85-1.25
202	Port Frederick	16,619	52%	1988	242	1.87	1.62-2.13
				1996	226	1.02	0.82-1.23
208	First No. 2	6,613	32%	1983	1,155	1.12	1.01-1.22
209	Suntaheen Cr. (Whitestone Harbor)	13,198	49%	1988	272	1.22	1.00-1.44
				1992	271	1.13	0.94-1.33
				1993	265	0.73	0.58-0.88
				1994	272	1.05	0.81-1.29
				1996	276	0.98	0.77-1.18
				1997	263	1.50	1.23-1.77
				1999	112	1.02	0.69-1.34
				2002	218	1.32	1.03-1.60
				2005	329	1.46	1.25-1.66
				2009	202	0.51	0.35-0.67
				2010	265	1.36	1.11-1.61
211	Point Augusta	4,688	63%	1983	757	1.78	1.62-2.01
				1993	286	2.08	1.80-2.36
				1997	234	3.30	2.90-3.70
218	Pavlof River	18,866	50%	1988	325	1.78	1.50-2.06
				1992	341	1.56	1.32-1.81
				1996	349	1.50	1.30-1.70
				1997	313	1.71	1.47-1.94
				1999	213	2.24	1.83-2.67
				2002	249	2.48	2.10-2.87

*CFL = commercial forest land, or volume classes 4-7 (currently referred to as productive forest land, or "PFL"). Numbers are from the 1980's, and should be updated.

Appendix 3: Pellet-group count statistics, Southeast Alaska

VCU	Name	Land Acres	% CFL	Year	Plots	Pellet-Group Mean	95%C.I.
				2005	323	2.30	2.06-2.55
				2009	192	0.90	0.66-1.15
				2010	216	1.48	1.23-1.72
221	Whip Station	4,708	53%	1981	193	0.86	0.64-1.08
222	Sand Station	12,231	50%	1981	253	0.60	0.48-0.73
223	Upper Tenakee	3,833	54%	1988	253	1.47	1.24-1.70
				1992	265	0.58	0.47-0.70
				1993	249	0.47	0.36-0.58
				1994	319	0.61	0.48-0.74
				1996	263	0.56	0.38-0.75
231	Saltery Bay	18,478	31%	1988	256	2.02	1.69-2.35
				1992	256	0.96	0.79-1.14
				1993	227	0.76	0.56-0.96
				1994	193	0.97	0.79-1.15
				1996	152	1.90	1.47-2.33
				1997	170	1.99	1.59-2.39
234	Inbetween	6,002	62%	1981	35	0.49	0.08-0.89
235	Kadashan	33,641	53%	1981	96	0.54	0.32-0.76
				1988	221	2.67	2.18-3.16
				1992	282	1.62	1.38-1.86
				1993	385	1.12	0.95-1.30
				1994	294	1.39	1.18-1.60
				1995	195	2.64	2.20-3.07
				1996	204	2.36	1.96-2.76
				2009	137	0.99	0.75-1.24
236	Corner Bay	10,930	66%	1981	60	0.35	0.17-0.53
				1992	206	2.27	1.91-2.64
				1993	50	1.72	1.25-2.19
				1994	198	1.69	1.41-1.98
246	Broad Island	17,145	38%	1981	209	1.41	1.18-1.63
247	Finger Mountain	15,918	38%	1983	2,145	1.17	1.11-1.24
				1984	302	1.83	1.57-2.09
				1985	279	3.23	2.79-3.67
				1986	277	2.88	2.57-3.19
				1987	236	3.11	2.71-3.52
				1989	305	2.99	2.57-3.40
				1990	225	3.36	2.99-3.74
				1991	150	3.93	3.36-4.51
				1992	207	2.85	2.48-3.22

*CFL = commercial forest land, or volume classes 4-7 (currently referred to as productive forest land, or "PFL"). Numbers are from the 1980's, and should be updated.

Appendix 3: Pellet-group count statistics, Southeast Alaska

VCU	Name	Land Acres	% CFL	Year	Plots	Pellet-Group Mean	95%C.I.
				1993	179	3.03	2.60-3.47
				1994	275	2.29	1.96-2.62
				1996	221	2.62	2.20-3.04
				1997	227	3.53	3.05-4.02
				1999	169	3.04	2.59-3.50
				2000	217	2.87	2.45-3.30
				2002	162	2.99	2.37-3.60
				2004	229	3.03	2.67-3.39
				2005	299	2.79	2.45-3.13
				2006	280	2.58	2.24-2.92
				2007	248	1.89	1.65-2.13
				2008	199	3.32	2.87-3.78
				2010	217	2.53	2.12-2.94
				2011	209	4.13	3.48-4.78
249	Lisianski	19,677	24%	1988	255	0.97	0.79-1.14
				1991	170	1.53	1.22-1.84
				1995	317	0.70	0.56-0.85
				1998	321	0.88	0.75-1.02
254	Soapstone	17,695	29%	1988	274	1.92	1.67-2.17
				1991	270	2.05	1.77-2.33
				1993	243	1.88	1.59-2.16
				1994	310	1.34	1.16-1.52
				1995	283	1.48	1.27-1.69
				2001	246	1.95	1.65-2.25
271	Chichagof (Klag Bay)	20,680	10%	1991	301	1.39	1.19-1.58
				1995	303	0.98	0.83-1.14
				1998	319	1.34	1.16-1.53
				2001	291	1.23	1.04-1.43
				2004	303	1.15	0.99-1.31
				2007	275	0.81	0.67-0.95
275	Cobol	14,618	49%	1984	224	1.15	0.92-1.37
				1991	185	2.96	2.37-3.54
				1995	218	1.45	1.16-1.74
				1998	219	2.19	1.86-2.51
				2001	180	1.94	1.59-2.30
				2004	232	2.97	2.48-3.46
				2007	176	2.13	1.69-2.56
279	Rapids Point	7,637	65%	1983	2,734	0.77	0.73-0.81
281	Ushk Bay	20,770	38%	1981	94	0.63	0.41-0.85
288	Range Creek	6,929	33%	1983	1,788	0.51	0.46-0.55
				1984	303	0.71	0.61-0.92
				1985	224	1.32	1.02-1.62

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Appendix 3: Pellet-group count statistics, Southeast Alaska

VCU	Name	Land Acres	% CFL	Year	Plots	Pellet-Group Mean	95%C.I.
				1997	353	1.44	1.21-1.67
				2003	355	1.65	1.43-1.87
				2006	359	1.82	1.57-2.06
				2010	341	1.06	0.88-1.24
295	Lake Eva	12,362	65%	1987	172	1.81	1.46-2.15
296	Portage Arm	16,101	59%	1981	213	0.53	0.39-0.68
				1990	214	3.09	2.70-3.48
				1997	39	1.59	0.86-2.32
				2003	103	2.77	2.28-3.26
298	M. Arm Kelp Bay	28,424	21%	1990	306	2.68	2.35-3.01
				1997	100	2.67	2.04-3.30
				2003	140	1.41	1.12-1.70
				2006	248	2.10	1.83-2.38
300	Nakwasina (All Transects)	19,575	48%	1984	196	2.51	2.14-2.88
				1985	1046	3.92	3.67-4.17
				1986	715	3.50	3.26-3.76
300	Nakwasina (Trans. 2,3,8)	19,575	48%	1984	138	2.51	2.10-2.93
				1985	218	3.65	3.13-4.17
				1986	205	3.38	2.91-3.84
				1987	195	2.31	1.90-2.71
				1989	244	2.32	2.00-2.65
				1990	255	2.98	2.56-3.40
				1991	175	3.98	3.39-4.57
				1992	223	1.64	1.37-1.90
				1993	188	3.15	2.70-3.60
				1994	230	1.46	1.24-1.68
				1995	216	1.75	1.48-2.10
				1996	210	2.82	2.35-3.29
				1997	188	2.79	2.31-3.27
				1998	217	2.99	2.48-3.49
				1999	146	3.20	2.64-3.76
				2000	181	2.64	2.23-3.05
				2001	186	2.33	1.91-2.75
				2002	132	2.35	1.90-2.80
				2003	221	3.09	2.68-3.50
				2004	211	3.36	3.02-3.70
				2005	254	2.22	1.91-2.52
				2006	205	3.91	3.42-4.40
				2007	167	3.40	2.90-3.89
				2008	166	3.17	2.66-3.68
				2010	183	2.77	2.42-3.12
				2011	192	3.87	3.11-4.63

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Appendix 3: Pellet-group count statistics, Southeast Alaska

VCU	Name	Land Acres	% CFL	Year	Plots	Pellet-Group Mean	Pellet-Group 95%C.I.
305	Sea Lion Cove (Kalinin Bay)	9,293	69%	1984	320	1.36	1.15-1.58
				1985	292	2.57	2.23-2.91
				1986	235	2.87	2.44-3.29
				1987	226	3.31	2.82-3.80
				1989	303	1.75	1.50-2.00
				1990	227	2.03	1.71-2.35
				1991	219	1.63	1.36-1.91
				1992	239	1.30	1.08-1.51
				1993	198	1.70	1.38-2.02
				1994	221	1.29	1.09-1.48
				1995	210	1.30	1.08-1.52
				1996	225	1.63	1.35-1.90
				1997	223	1.76	1.43-2.10
				1998	241	1.71	1.44-1.99
				2000	201	1.42	1.09-1.76
				2001	231	1.40	1.14-1.66
				2002	119	2.01	1.60-2.41
				2003	249	1.90	1.55-2.25
				2004	206	1.13	0.90-1.36
				2005	252	1.40	1.20-1.61
				2006	245	1.41	1.18-1.65
				2007	221	0.95	0.73-1.16
				2008	159	1.44	1.15-1.73
				2010	249	1.04	0.83-1.24
				2011	232	1.58	1.25-1.91
308	South Kruzof	71,158	25%	1993	345	1.62	1.41-1.83
				1994	370	1.71	1.52-1.90
				1999	365	1.38	1.16-1.58
315	Basin Kelp Bay	8,460	60%	1990	151	1.85	1.41-2.28
321	Redoubt Bay	9,045	58%	1989	304	2.17	1.88-2.47
339	Cape Ommaney	13,725	32%	1988	172	1.74	1.43-2.05
				2000	270	1.26	1.02-1.49
				2003	221	1.56	1.31-1.81
344	Whale Bay	na	na	2000	260	1.40	1.17-1.62
				2003	279	1.70	1.43-1.97
348	West Crawfish	57,434	16%	1989	360	1.35	1.36-1.57
				2000	211	1.34	1.07-1.61
				2003	313	1.31	1.07-1.55
361	Knight Island	10,419	40%	1991	100	0.81	0.61-1.01
				1992	100	0.95	0.74-1.16
				1994	90	0.44	0.25-0.64
				1996	153	0.00	0.00-0.00

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Appendix 3: Pellet-group count statistics, Southeast Alaska

VCU	Name	Land Acres	% CFL	Year	Plots	Pellet-Group Mean	95%C.I.
				1997	192	0.03	0.01-0.05
				2003	117	0.22	not avail
363	Humpback	7,721	74%	1991	118	0.01	0.00-0.03
368	Yakutat Islands	1,021	99%	1991	415	0.32	0.24-0.39
				1992	243	0.48	0.37-0.58
				1993	106	1.07	0.81-1.32
				1994	251	0.66	0.52-0.80
				1996	379	0.59	0.48-0.69
				1997	344	0.59	0.48-0.70
				2000	145	0.90	0.85-0.95
				2002	200	0.66	not avail
				2003	325	0.58	not avail
				2004	274	0.86	not avail
				2008	421	1.97	1.76-2.18
369	Ankau	na	na	1991	116	0.03	0.00-0.05
400	Security Bay	28,040	79%	1984	360	0.02	0.01-0.04
				1989	304	0.25	0.16-0.34
				1995	268	0.22	0.15-0.29
				2000	200	0.09	0.05-0.14
403	Pillar Bay	28,227	65%	1988	337	0.16	0.10-0.22
				2000	265	0.18	0.13-0.23
408	Malmesbury	18,151	68%	1990	206	0.11	0.05-0.18
				2000	254	0.06	0.03-0.09
417	Conclusion Island	12,561	99%	1987	207	2.66	2.32-3.01
				1989	200	0.95	0.72-1.18
				1991	200	0.71	0.53-0.88
				1996	191	1.45	1.19-1.70
427	Big John Bay	32,711	29%	1994	300	0.38	0.29-0.48
428	Rocky Pass	49,403	35%	1989	298	0.40	0.27-0.53
431	Point Barrie	22,187	27%	1988	357	0.23	0.17-0.29
				1993	375	0.77	0.64-0.90
434a	Big Level Island	727	61%	1981	399	1.54	1.45-1.63
				1983	336	1.56	
				1986	382	1.66	1.41-1.90
				1989	227	1.07	
				1991	456	2.16	1.90-2.41
				1999	427	2.00	1.74-2.26

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Appendix 3: Pellet-group count statistics, Southeast Alaska

VCU	Name	Land Acres	% CFL	Year	Plots	Pellet-Group Mean	95%C.I.
434b	Little Level Island	263	92%	1981	114	2.48	2.02-2.94
				1983	136	2.34	
				1986	122	1.39	1.07-1.70
				1989	137	1.52	
				1991	132	3.59	3.07-4.11
				1999	123	2.84	2.28-3.40
435	Castle River	32,724	36%	1984	312	0.19	0.12-0.26
				1987	305	0.51	0.37-0.65
				1989	312	0.40	0.25-0.56
				1994	310	0.32	0.24-0.40
				1998	281	0.36	0.28-0.44
				2008	275	0.12	0.07-0.17
437	E. Duncan	23,744	55%	1990	227	1.12	0.92-1.32
				1992	213	0.78	0.63-0.94
				1998	153	1.04	0.77-1.30
				2002	254	1.89	1.59-2.19
				2008	262	1.37	1.10-1.65
				2011	289	0.64	0.51-0.77
442	Portage Bay	11,269	49%	1993	282	0.43	0.31-0.56
				1995	277	0.43	0.33-0.53
				1998	285	0.39	0.29-0.49
448	Woewodski (Mitkof)	20,931	53%	1984	295	0.88	0.69-1.08
				1985	209	1.00	0.82-1.19
				1987	195	1.65	1.85-2.61
				1988	433	1.33	1.16-1.51
				1989	417	1.35	1.24-1.73
				1990	355	1.46	1.28-1.64
				1991	316	1.80	1.52-2.07
				1992	248	0.79	0.62-0.97
				1993	230	1.06	0.85-1.27
				1994	152	1.14	0.82-1.46
				1995	157	1.38	1.08-1.67
				1996	243	2.25	1.95-2.55
				1997	282	1.56	1.27-1.84
				1998	282	1.10	0.91-1.29
				1999	196	1.36	1.11-1.60
				2000	226	1.27	1.05-1.50
				2002	220	1.43	1.17-1.68
				2003	216	0.50	0.36-0.64
				2004	250	1.06	0.87-1.25
				2005	279	0.82	0.65-0.98
				2007	180	1.63	1.26-2.00
				2008	235	1.06	0.83-1.28
				2009	162	0.98	0.74-1.22

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Appendix 3: Pellet-group count statistics, Southeast Alaska

VCU	Name	Land Acres	% CFL	Year	Plots	Pellet-Group Mean	95%C.I.
				2010	234	0.81	0.63-0.98
				2011	232	0.74	0.58-0.89
448a	Woewodski Island	20,931	53%	1991	461	1.86	1.66-2.05
				1994	510	1.30	1.15-1.46
449	Frederick	6,835	70%	1981	945	0.08	0.06-0.11
				1990	180	0.55	0.36-0.74
				1992	227	0.54	0.42-0.65
452	Blind Slough	30,655	55%	1990	324	1.35	1.15-1.56
				1992	114	1.04	0.77-1.30
				1993	265	1.28	1.04-1.51
				1997	245	1.61	1.34-1.88
454	Dry	11,033	74%	1981	91	0.92	0.56-1.28
				1993	210	1.44	1.17-1.72
				1997	188	1.26	0.88-1.39
455	Vank	8,437	99%				
	a) Sokolof			1981	900	1.73	1.61-1.85
				1999	360	0.92	0.76-1.08
	b) Rynda			1981	281	0.25	0.18-0.32
				1999	280	0.27	0.18-0.36
	c) Greys			1981	284	0.25	0.18-0.32
456	Baht	16,972	69%	2002	109	2.75	2.10-3.41
				2004	108	1.80	1.45-2.15
				2005	101	2.12	1.73-2.51
				2007	108	1.51	1.14-1.88
				2009	125	1.19	0.86-1.52
457	St. John	26,112	53%	2002	220	1.65	1.38-1.93
				2004	229	1.17	0.96-1.38
				2005	213	1.75	1.44-2.03
				2007	211	1.98	1.65-2.31
				2009	225	0.99	0.81-1.17
458	Snow Passage	31,572	46%	1994	345	0.58	0.45-0.70
				1997	315	0.98	0.80-1.16
				2002	280	1.50	1.28-1.72
				2004	306	1.02	0.84-1.20
				2005	262	1.08	0.89-1.27
				2007	289	1.52	1.26-1.78
459	Meter	42,438	46%	2002	180	0.87	0.64-1.10

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Appendix 3: Pellet-group count statistics, Southeast Alaska

VCU	Name	Land Acres	% CFL	Year	Plots	Pellet-Group Mean	95%C.I.
				2004	180	0.89	0.68-1.10
				2005	155	1.41	1.75-1.07
				2009	80	2.29	1.33-3.24
461	Woronkofski (All Transects)	14,500	63%	1985	646	1.63	1.45-1.81
461	Woronkofski (Trans. 10,11,12)			1985	218	2.01	1.62-2.39
				1987	201	2.23	1.85-2.61
				1989	223	2.52	2.18-2.85
				1991	203	1.59	1.32-1.85
				1993	225	0.22	0.13-0.31
				1994	224	0.26	0.18-0.34
				1999	216	0.11	0.06-0.17
				2004	227	0.08	0.03-0.13
467	Mosman	25,573	54%	1993	304	0.07	0.03-0.11
473	Onslow	28,947	55%	1984	321	0.37	0.28-0.46
				1985	334	0.59	0.48-0.70
				1986	347	0.72	0.59-0.84
				1987	336	0.42	0.31-0.55
				1988	329	0.44	0.32-0.55
				1991	322	0.66	0.51-0.80
				1993	341	0.68	0.55-0.82
				1994	340	0.88	0.74-1.02
				1997	346	0.73	0.59-0.86
				2002	332	0.97	0.81-1.13
				2006	363	0.60	0.48-0.71
				2008	339	1.33	1.13-1.53
				2010	366	0.96	0.81-1.10
474	Fisherman's Cove (Canoe)			2001	228	0.11	0.06-0.17
480	Fools Inlet	30,906	44%	1994	194	0.54	0.38-0.70
				2001	201	0.61	0.45-0.77
489	Muddy River	40,275	37%	1996	348	1.53	1.26-1.80
490	Horn	9,815	55%	1998	250	0.60	0.47-0.74
				2003	290	0.67	0.53-0.81
504	Madan	na	60%	2001	244	0.23	0.14-0.31
511	Harding	na	20%	2001	207	0.02	0.00-0.05
524	Frosty Bay	17,959	41%	1991	266	0.70	0.55-0.86
527	Protection	6,257	100%	1997	332	1.15	0.99-1.30

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Appendix 3: Pellet-group count statistics, Southeast Alaska

VCU	Name	Land Acres	% CFL	Year	Plots	Pellet-Group Mean	95%C.I.
				1998	281	0.59	0.47-0.71
				2000	325	0.56	0.46-0.66
				2002	349	0.70	0.56-0.83
				2003	319	0.69	0.53-0.85
528	Mt. Calder	9,232	83%	1988	252	2.14	1.78-2.49
				1997	272	1.17	0.96-1.39
				1999	165	0.48	0.31-0.62
532	Red Bay	15,145	66%	1987	177	0.32	0.18-0.47
				1994	256	0.94	0.74-1.14
				1996	281	1.19	0.97-1.41
				1997	248	1.07	0.89-1.25
				1998	283	0.73	0.59-0.88
				2001	337	0.76	0.61-0.90
				2002	289	1.49	1.28-1.71
				2003	314	1.15	0.94-1.34
				2004	315	0.85	0.68-1.02
				2006	295	1.54	1.31-1.78
539	Exchange Cove	10,406	74%	1988	266	1.39	1.15-1.64
				1992	125	1.10	0.83-1.38
				1997	303	1.25	1.04-1.46
549	Sarheen	11,875	52%	1989	310	1.73	1.44-2.01
				1996	334	1.00	0.83-1.16
				1997	330	1.00	0.85-1.14
				1998	355	0.42	0.33-0.51
				1999	284	0.64	0.51-0.78
				2000	293	0.98	0.78-1.17
				2001	319	0.45	0.36-0.55
				2002	263	0.69	0.54-0.83
				2005	257	0.78	0.64-0.93
				2009	316	1.75	1.52-1.97
				2011	345	1.56	1.37-1.76
554	Sarkar	32,183	60%	1988	298	1.28	1.06-1.50
				1992	125	1.10	0.83-1.38
				1994	292	0.92	0.77-1.07
				1997	263	0.61	0.48-0.74
				1998	312	0.29	0.21-0.37
				1999	281	0.74	0.60-0.88
				2001	330	0.45	0.35-0.55
				2002	283	0.76	0.62-0.90
				2003	333	0.50	0.38-0.62
				2004	340	0.61	0.51-0.71
				2009	350	1.66	1.46-1.86
				2011	376	2.24	1.95-2.53

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Appendix 3: Pellet-group count statistics, Southeast Alaska

VCU	Name	Land Acres	% CFL	Year	Plots	Pellet-Group Mean	95%C.I.
561	Warm Chuck	12,348	85%	1984	326	1.02	1.02-1.38
				1985	295	1.60	1.36-1.84
				1989	302	2.21	1.91-2.50
				1991	291	2.05	1.73-2.37
				1996	276	1.39	1.17-1.61
				1997	247	1.21	1.01-1.41
				1998	246	1.29	1.08-1.51
				2000	288	0.99	0.81-1.16
				2002	221	1.17	0.94-1.39
				2006	277	1.23	1.01-1.45
				2009	278	1.69	1.45-1.93
564	Coronation	19,107	69%	1983	696	1.20	1.04-1.36
				1985	228	2.34	
				1988	408	1.41	1.17-1.66
				1989	293	1.63	1.28-1.98
				1997	289	0.44	0.34-0.55
				2001	336	0.85	0.67-1.03
569	Baker	31,802	68%	1991	256	0.08	0.04-0.12
				1997	250	0.14	0.08-0.20
575	Thorne Lake	17,970	68%	1992	334	1.20	1.03-1.37
				1994	293	0.76	0.62-0.91
				1995	299	1.27	1.09-1.45
				1997	303	0.84	0.66-0.96
				1998	316	0.87	0.71-1.03
				1999	231	1.02	0.83-1.21
				2000	311	1.28	1.06-1.51
				2001	327	0.53	0.42-0.63
				2002	284	1.12	0.90-1.35
				2003	123	0.91	0.66-1.16
				2004	218	0.94	0.75-1.13
				2005	287	0.94	0.79-1.10
				2006	287	1.04	0.89-1.20
				2007	204	1.84	1.54-2.15
				2008	289	1.40	1.19-1.62
				2009	311	1.97	1.70-2.25
				2010	313	1.75	1.54-1.97
578	Snakey Lakes	6,431	84%	1986	279	0.62	0.51-0.73
				1988	300	1.05	0.84-1.26
				1989	200	1.56	1.26-1.86
				1993	356	0.77	0.61-0.93
				1997	310	1.39	1.17-1.60
				1998	225	0.71	0.55-0.87
				1999	250	0.86	0.67-1.05
				2000	263	1.55	1.24-1.86
				2001	358	0.89	0.74-1.03

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Appendix 3: Pellet-group count statistics, Southeast Alaska

VCU	Name	Land Acres	% CFL	Year	Plots	Pellet-Group Mean	95%C.I.
				2002	180	1.45	1.19-1.71
				2004	203	0.89	0.72-1.06
				2005	235	1.27	1.03-1.51
				2007	290	1.54	1.30-1.78
				2008	300	1.43	1.22-1.64
				2010	302	1.36	1.17-1.56
581	Luck Lake	19,818	67%	1986	178	1.74	1.41-2.07
				1988	300	2.11	1.80-2.41
				1993	175	1.10	0.87-1.32
				2001	320	0.60	0.47-0.72
584	Little Ratz	12,392	65%	1992	272	0.94	0.76-1.13
				1997	255	1.93	1.64-2.21
				1998	282	0.78	0.64-0.91
				2000	304	1.38	1.18-1.59
				2001	287	1.20	1.00-1.39
				2002	195	2.32	1.92-2.71
				2003	335	1.21	1.03-1.39
				2004	228	1.96	1.68-2.24
				2005	291	1.51	1.28-1.73
				2007	233	2.41	2.06-2.77
				2008	246	1.44	1.19-1.70
				2009	305	2.34	2.07-2.61
				2010	355	2.05	1.79-2.30
587	Tuxekan	12,129	77%	1988	300	1.06	0.84-1.28
				1997	314	1.04	0.87-1.22
				1998	353	0.48	0.37-0.58
				1999	328	1.26	1.03-1.49
621	12 Mile	23,344	59%	1985	196	0.31	0.19-0.43
				1986	300	0.64	0.48-0.81
				1987	370	0.65	0.49-0.81
				1988	302	0.62	0.46-0.77
				1989	235	0.78	0.59-0.98
				1990	176	1.18	0.84-1.52
				1991	231	1.84	1.48-2.21
				1992	250	0.43	0.32-0.55
				1993	258	0.84	0.63-1.05
				1994	324	0.93	0.76-1.09
				1997	202	1.45	1.10-1.79
				1998	280	0.83	0.63-1.02
				2002	220	0.51	0.38-0.63
				2007	189	1.59	1.32-1.86
				2008	190	2.14	1.75-2.52
				2010	308	1.38	1.19-1.55
625	Trocadero	16,624	75%	1995	235	1.74	1.41-2.06
				1997	235	1.18	0.97-1.38

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Appendix 3: Pellet-group count statistics, Southeast Alaska

VCU	Name	Land Acres	% CFL	Year	Plots	Pellet-Group Mean	95%C.I.
				1998	267	0.97	0.78-1.16
				2002	332	0.93	0.75-1.10
628	Pt. Amagura	10,477	26%	1997	255	1.04	0.83-1.24
				1998	325	0.93	0.78-1.08
635	Port Refugio	9,118	50%	1985	317	2.69	2.27-3.12
				1986	324	2.52	2.09-2.96
				1987	369	1.76	1.46-2.07
				1988	270	1.15	0.90-1.40
				1989	507	0.80	0.68-0.93
				1990	232	1.25	1.03-1.48
				1991	367	1.13	0.95-1.32
				1992	254	0.76	0.57-0.95
				1993	213	1.35	0.98-1.71
				1994	280	1.85	1.51-2.19
				1997	276	0.82	0.65-1.00
				1998	315	0.78	0.61-0.96
				2000	272	0.94	0.75-1.13
				2002	317	1.12	0.93-1.31
				2007	311	1.72	1.48-1.96
				2008	342	1.53	1.33-1.73
679	Kitkun Bay	15,359	75%	1988	240	0.31	0.20-0.42
				1989	273	0.89	0.71-1.07
				1995	264	0.40	0.28-0.52
				1997	261	0.31	0.19-0.44
685	Nutkwa	17,079	73%	1988	234	0.09	0.02-0.16
716	Helm Bay	16,127	57%	1981	704	0.16	0.12-0.19
				1984	302	0.54	0.44-0.65
				1985	181	0.85	0.65-1.05
				1988	247	1.66	1.38-1.95
				1991	240	1.63	1.35-1.92
				1992	169	1.25	0.96-1.53
				1993	286	1.37	1.16-1.59
				1995	284	1.31	1.09-1.52
				1997	265	0.79	0.65-0.99
				1998	232	0.44	0.34-0.55
				1999	82	0.70	0.53-0.87
				2001	251	0.41	0.30-0.51
				2004	170	0.25	0.15-0.35
				2005	286	0.22	0.15-0.29
				2007	243	0.50	0.35-0.64
				2010	256	0.24	0.16-0.31
719	Port Stewart	21,482	55%	1993	289	1.22	1.03-1.42
				1995	278	1.61	1.35-1.87

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Appendix 3: Pellet-group count statistics, Southeast Alaska

VCU	Name	Land Acres	% CFL	Year	Plots	Pellet-Group Mean	95%C.I.
				1997	289	1.29	1.08-1.50
				1999	182	0.77	0.57-0.97
				2001	289	0.21	0.13-0.29
722	Spacious Bay	31,461	44%	1993	300	0.54	0.43-0.64
				1995	283	0.45	0.35-0.54
				1997	276	0.43	0.33-0.53
				1999	161	0.09	0.04-0.13
				2001	285	0.06	0.02-0.09
738	Margaret	19,286	67%	1985	515	0.57	0.47-0.66
				1986	251	0.84	0.69-1.00
				1988	110	1.31	0.96-1.67
				1989	129	0.62	0.44-0.80
				1990	274	0.56	0.44-0.68
				1991	272	0.76	0.58-0.94
				1993	281	0.31	0.23-0.39
				1995	304	0.70	0.56-0.84
				1997	297	0.56	0.43-0.68
				1999	264	0.47	0.98-1.45
				2001	279	0.44	0.34-0.54
748	George Inlet	19,448	28%	1981	110	0.21	0.09-0.33
				1984	344	0.27	0.19-0.35
				1985	313	0.52	0.39-0.65
				1989	169	1.41	1.08-1.75
				1990	240	1.03	0.82-1.25
				1991	168	1.49	1.15-1.84
				1992	195	0.65	0.49-0.81
				1994	309	0.95	0.79-1.11
				1996	305	0.98	0.76-1.19
				1998	314	0.52	0.40-0.65
				2000	270	0.51	0.38-0.64
				2002	227	0.18	0.09-0.28
				2004	309	0.25	0.18-0.32
752	Whitman Lake	6,015	38%	1981	45	0.18	0.02-0.33
				1987	187	0.16	0.09-0.23
				1990	193	0.46	0.32-0.59
				1992	189	0.20	0.12-0.28
				1997	181	0.81	0.63-0.98
				1998	209	0.47	0.33-0.61
758	Carroll Pt.	11,629	34%	1985	118	0.66	0.46-0.86
				1986	118	0.75	0.56-0.95
				1988	85	1.15	0.81-1.48
				1992	87	0.28	0.14-0.41
				1994	125	0.70	0.49-0.90
				1998	125	0.51	0.38-0.64

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Appendix 3: Pellet-group count statistics, Southeast Alaska

VCU	Name	Land Acres	% CFL	Year	Plots	Pellet-Group Mean	95%C.I.
				2002	84	0.36	0.21-0.50
				2008	122	1.42	1.00-1.83
759	Moth Bay	7,652	23%	1985	140	0.59	0.42-0.74
				1986	156	0.98	0.79-1.17
				1988	78	0.71	0.46-0.97
				1992	136	0.48	0.30-0.66
				1994	136	0.94	0.71-1.17
				1998	176	0.68	0.53-0.82
				2002	150	1.09	0.84-1.34
				2008	191	1.30	1.08-1.53
760	Lucky Cove	12,377	43%	1985	335	1.16	1.00-1.33
				1986	258	1.16	0.95-1.32
				1988	65	1.01	0.68-1.34
				1990	263	1.10	0.92-1.27
				1991	271	1.39	1.07-1.70
761	Vallenar			2003	96	0.99	0.74-1.24
764	Blank Inlet	3,640	19%	1981	108	1.24	0.89-1.59
765	Dall Head	4,803	63%	1981	69	0.52	0.31-0.74
				1996	295	1.07	0.90-1.24
				1998	287	0.84	0.67-1.01
				2000	285	0.96	0.77-1.14
				2002	284	0.76	0.59-0.94
				2003	279	0.91	0.71-1.11
				2004	282	0.66	0.53-0.79
				2005	177	0.87	0.62-1.12
				2008	280	0.55	0.39-0.72
				2011	288	0.43	0.29-0.58
767	Duke Island	39,171	17%	1996	294	0.05	0.02-0.09
				2000	282	0.13	0.08-0.18
				2002	292	0.19	0.12-0.26
				2008	291	0.16	0.09-0.22
769	Alava Bay	13,563	60%	1985	311	0.52	0.39-0.65
				1986	326	0.85	0.68-1.01
				1991	143	1.64	1.22-2.05
				1994	326	0.79	0.64-0.94
				1996	324	0.93	0.77-1.09
				1998	335	0.66	0.52-0.79
				2000	329	0.75	0.56-0.93
				2002	107	1.22	0.90-1.55
				2004	313	0.92	0.75-1.09
	T3 only			2006	92	1.01	0.75-1.27
				2008	330	1.14	0.95-1.32

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Appendix 3: Pellet-group count statistics, Southeast Alaska

VCU	Name	Land Acres	% CFL	Year	Plots	Pellet-Group Mean	95%C.I.
772	Wasp Cove	4,882	90%	1985	271	0.41	0.31-0.51
				1986	300	0.50	0.38-0.62
				1989	145	0.58	0.39-0.77
				1991	207	0.13	0.07-0.18
821	Winstanley Island	14,104	45%	1991	49	0.27	0.11-0.42
859	Very Inlet	na	na	2002	306	0.11	0.07-0.16
999	Gravina	na	na	1981	226	1.06	0.89-1.22
	(All Transects)			1984	1,087	0.86	0.78-0.94
				1985	1,172	1.23	1.13-1.32
				1986	1,267	1.40	1.30-1.50
999	Gravina			1984	376	0.88	0.73-1.03
	(Trans. 1,2,3)			1985	224	1.44	1.20-1.67
				1986	346	1.62	1.43-1.81
				1987	334	1.63	1.41-1.84
				1988	278	2.06	1.78-2.35
				1989	182	1.13	0.86-1.41
				1990	279	1.40	1.12-1.68
				1991	154	1.12	0.80-1.43
				1992	302	1.22	1.05-1.38
				1994	331	1.58	1.37-1.79
				1996	338	1.47	1.28-1.67
				1997	274	1.71	1.47-1.95
				1998	307	1.34	1.12-1.56
				2000	267	1.24	1.06-1.42
				2003	78	0.87	0.54-1.20
				2005	205	1.20	0.95-1.46
	T1 only			2006	89	0.83	0.57-1.09
	T2 & T3 only (logging on T1)			2007	167	0.86	0.68-1.04
				2010	258	0.33	0.24-0.41

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