Alaska Department of Fish and Game, Division of Wildlife Conservation, Douglas, AK

Sitka Black-tailed Deer Pellet-Group Surveys In Southeast Alaska 2009 Report

Federal Aid in Wildlife Restoration, Annual Report 1 July 2008–30 June 2009

By

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Alaska Department of Fish and Game

Division of Wildlife Conservation

Douglas, AK

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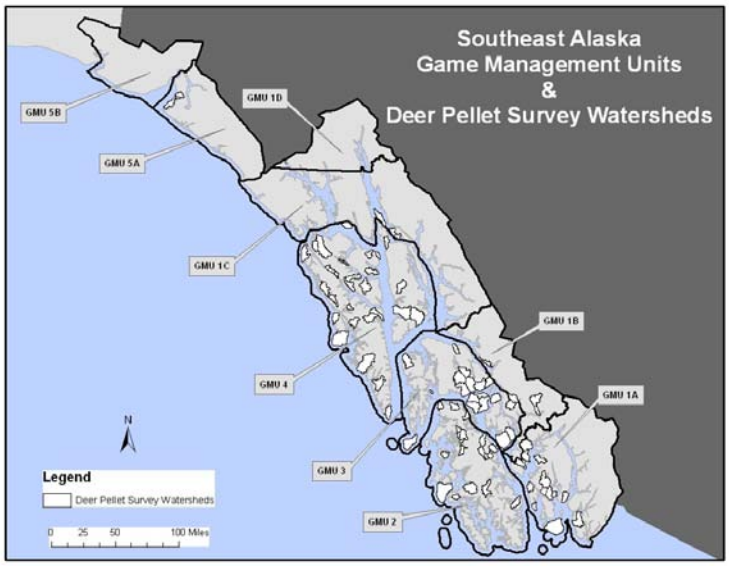
Acknowledgments: I wish to acknowledge all of the individuals that have contributed to the collection and compilation of these data over the years. The deer pellet-group survey program would not be possible without the interest, dedication, and support of ADFG and USFS staff as well as community volunteers.

Deer Pellet-Group Surveys: Program Overview



This report provides a summary of pellet surveys conducted for Sitka black-tailed deer during April and May 2009 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 and 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). Value comparison units are USFS timber management units and are roughly equivalent to a watershed. Each VCU usually has 3 transects. These transects traverse deer winter range from sea level to 1500 feet, although some transects are flatter or undulating. 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).

The reader is referred to Kirchhoff and Pitcher 1988[1] for a more detailed discussion of objectives, sample design, and field methodology of this program.

Sitka Black-tailed Deer in beach fringe at Ushk Bay, February 23rd, 2009. Photo by Phil Mooney.

[1] Kirchoff, 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.

Deer Pellet-Group Survey: 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, and 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 if there is high variability between transects. 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, 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 in part because heavy 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 2008-2009

GMU	VCU Name	VCU	2009 Total Plots	2009 Mean (Pellet Group/Plot)	2009 Confidence Interval	Previous Survey Year	Previous # Plots	Previous PG/Plot	Previous Confidence Interval	% change
				NORTHERN SOUTHEAST ALASKA						
1C	North Douglas	35	220	1.85	1.56-2.14	2008	316	2.84	2.49-3.19	-35%
1C	Inner Point	36	268	1.44	1.20-1.68	2008	232	1.59	1.32-1.85	-9%
1C	Shelter Island	124	250	0.71	0.57-0.84	2008	321	1.05	0.90-1.21	-33%
4Z	Hawk Inlet	128	207*	1.35	1.06-1.63	2008	290	1.33	1.12-1.55	1%
4Z	Pleasant Island	185	291	0.72	0.60-0.84	2005	312	1.33	1.11-1.55	-46%
4Z	Suntaheen Crk	209	202*	0.51	0.35-0.67	2005	329	1.46	1.25-1.66	-65%
4Z	Pavlof	218	192*	0.90	0.66-1.15	2005	323	2.3	2.06-2.55	-61%
4Z	Kadashan	235	137*	0.99	0.75-1.24	1996	204	2.36	1.96-2.76	-58%
				SOUTHERN SOUTHEAST ALASKA						
3Z	Woewodski	448	162	0.98	0.74-1.22	2008	235	1.06	0.83-1.28	-8%
3Z	Baht Harbor	456	125	1.19	0.86-1.52	2007	108	1.51	1.14-1.88	-21%
3Z	St.Johns Hbr	457	225	0.99	0.81-1.17	2007	211	1.98	1.65-2.31	-50%
3Z	Meter Bight	459	80**	2.29	1.33-3.24	2005	155	1.41	1.26-1.78	62%
2Z	Sarheen	549	316	1.75	1.52-1.97	2005	257	0.78	0.64-0.93	124%
2Z	Sarkar	554	350	1.66	1.46-1.86	2004	340	0.61	0.51-0.71	172%
2Z	Warm Chuck	561	278	1.69	1.45-1.93	2006	277	1.23	1.01-1.45	37%
2Z	Thorne Lake	575	311	1.97	1.70-2.25	2008	289	1.40	1.19-1.62	40%
2Z	Little Ratz	584	305	2.34	2.07-2.61	2008	246	1.44	1.19-1.70	62%

*Fewer plots because only 2 of 3 transects completed due to late season crew limitations. Entire transects completed.

** Fewer plots due to snow cover in high elevation rolling muskegs. Transects not completed.

Deer Pellet-Group Surveys: Results Continued

In **GMU 1C**, pellet densities were down by over 30% in the North Douglas and Shelter Island VCU's. However, this is the first year in which lower counts have been documented despite 3 above-average hard winters (see page 17), and actual counts in North Douglas are still higher than during the 1991-2004 period and relatively high in general. Future counts will indicate whether the population trend is truly decreasing. In contrast, the Shelter Island population appears to have decreased with low counts for 3 years and counts that have fallen below 1 MPGP (mean pellet groups per plot) for the 1st time. While pellet counts are also steadily falling at Inner Point on the backside of Douglas and the population trend in this VCU appears to be decreasing as well, actual counts are still higher than during the 1998-2004 time period.

GMU 2Z continues to be the anomaly from the rest of the region. Pellet counts appear to be remaining stable or increasing despite 3 relatively hard winters in a row for that area. This is occurring despite the fact that southern southeast Alaska had more snowfall in 2008-2009 than since the severe 1975-1976 winter. The reason we are not seeing decreases after 3 years of relatively hard winters may be because the severity of winter in GMU2 is simply not as high as the rest of the region...even the 2008-2009 winter snowfall is still below the average snowfall for northern southeast Alaska (see page 17). 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 the winter in primary winter range (old growth forests). If heavy mortality did not occur after the previous winters, deer would continue to congregate on winter range, and counts would remain stable or increase. Please note that while the increase in pellet counts in Sarkar and Sarheen appears to be extremely high, these watersheds have not been sampled since 2005 or earlier. Population levels may have increased, or deer simply may have been congregating on whatever winter range is still available in these watersheds.

GMU 3Z pellet densities are the lowest on record for two of the four VCU's sampled. The decreasing population trend at Baht, however, must be interpreted with caution because only one transect exists in this watershed and deer could be using other parts of the watershed during the these heavy snow winters. Woewodski, in contrast, shows relatively stable pellet count trends. With fairly steep west-facing slopes, this area likely melts out relatively quickly, enabling deer to consistently access available forage. The extremely high counts in Meter Bight in 2009 should be observed with caution: persisting snow precluded finishing these transects and the high but extremely variable counts are likely the result of a clumped distribution of deer at lower elevations and areas with abundant forage.

GMU 4Z pellet densities are the lowest or second lowest that they have ever been in four of the five watersheds sampled. The exception is Hawk Inlet on Northwest Admiralty Island, where pellet counts continue to be stable. However, Hawk Inlet has steep south-facing slopes that likely melt more quickly than VCUs with other aspects and topography. The other watersheds sampled in 2009 are located in areas with north, west, or easterly aspects and low elevation undulating terrain predominated by muskeg. After 3 hard winters in a row, pellet densities in these VCUs on Northern Chichagof Island and Pleasant Island appear to have plummeted. Since these watersheds had not been sampled since 2005 or earlier, and because only 2 of 3 transects were completed in each watershed, additional surveys are needed to establish more reliable and current trend information.

Holley Dennison, GMU 4 Pellet Survey 2009. Photo by Phil Mooney.

Honker Divide, GMU 2 Pellet Survey 2009. Photo by Steve Bethune.

Carl Koch, GMU 4 Pellet Survey 2009. Photo by Phil Mooney.

GMU 1A - Ketchikan Area

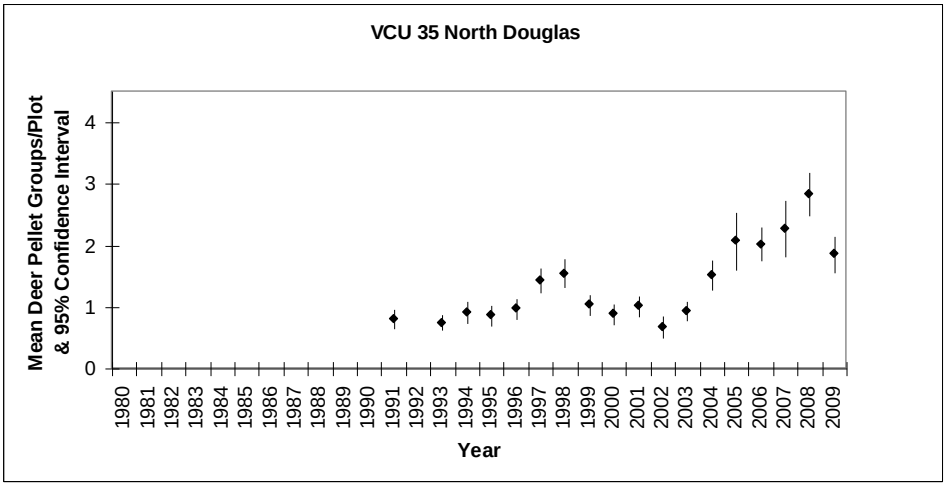
Pellet group surveys were planned but cancelled in GMU 1A in 2009 due to persisting snow, a lack of available USFS personnel, and other logistical difficulties.

*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

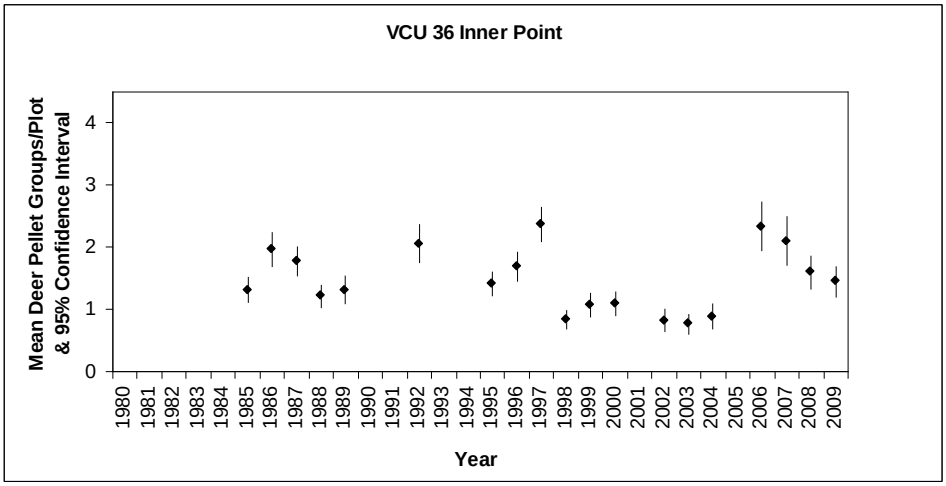
North Douglas (VCU 35): Douglas Island is located immediately opposite the city of Juneau and is heavily used by Juneau hunters. Three transects were established at the end of the road in 1991, and ADFG attempts to complete them every year. These transects rise to over 1000 feet in elevation and traverse moderate volume hemlock stands. In general, deer populations appear to be increasing in this area. However, it should be noted that the higher pellet densities during the 2006-07 and 2007-08 winters are also likely a result of higher concentrations of deer on primary winter range during these two severe winters.

Notes: Fewer plots were sampled on all three transects in 2002 due to snow covering the transect at higher elevations. Only transects 1 and 3 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).*



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 (#1, #3) traverse from sea level to 1500 feet, while the third (transect #2), is low elevation and consists of 125 plots rising to approximately 500 feet. Pellet densities decreased during the 2006-07 and 2007-08 winters, indicating that these two severe winters may be taking their toll on the local deer population. It should be noted that pellet densities, although decreasing, are still relatively high compared to counts between 1998 and 2004. All three transects (232 plots) were completed in 2008*.

Notes: In 1986 rough water prevented access to transect #2 and #3, so transects running directly uphill from Inner Point and Middle point were substituted for that year only. Only T2 and T3were 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)*

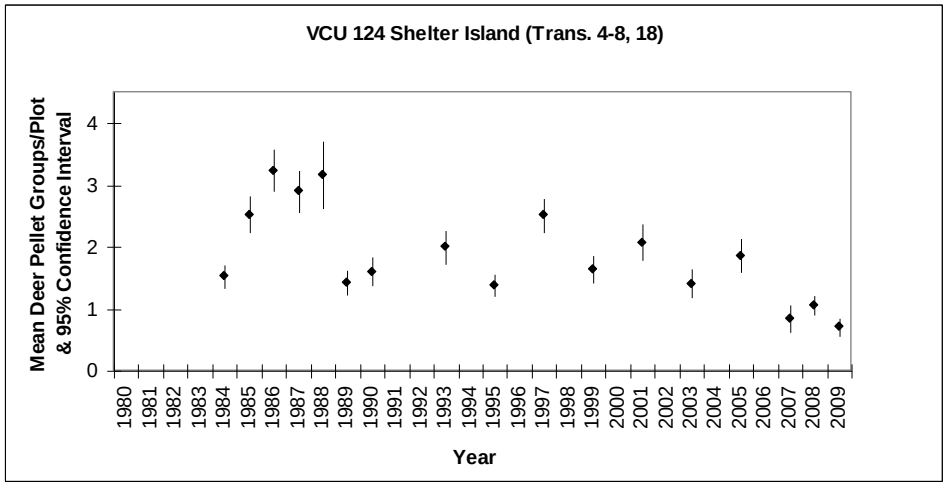


*See Appendices 1 & 2 for # plots sampled & pellet group densities by VCU, elevation & transect. See Appendix 3 for # plots sampled & pellet densities by VCU & survey year.

GMU 1C - Juneau Area Continued

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 4, 5, 6, 7, 9, and 18 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 6 transects, including the intensive sampling period. Pellet densities for 1984-1986 that include all plots may be found in Appendix 1. The start location of transect #7 was missed in 1987 and it was run at least 1 mile south of it's proper location. The lower pellet densities recorded the last two years are likely the result of increased winter mortality during the 2006-07 and 2007-08 severe winters.

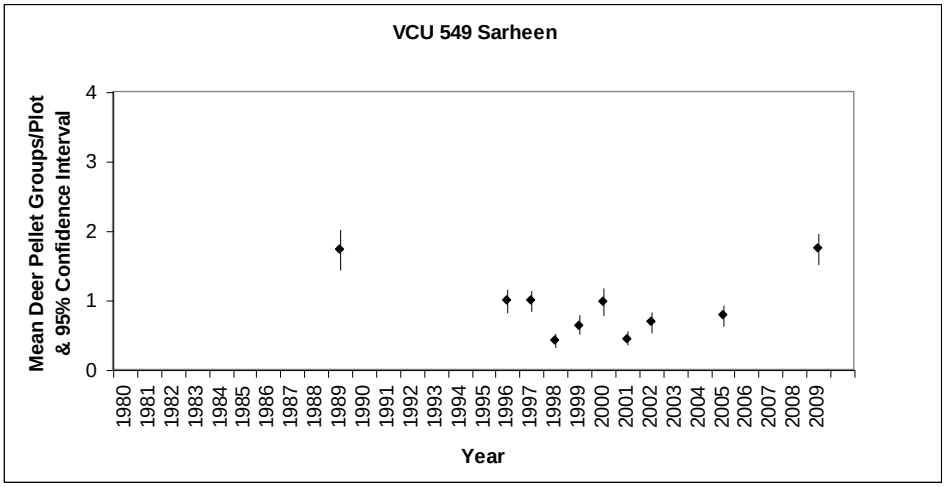
Notes: Not all transects were sampled every year. In 1988, only three transects (T6, T7, T18) were run. In 1993 T7 was not done. In 2001, T18 was not done. In 2005, T7 and T9 were not done. The # of plots sampled/year has ranged from 130 (1988) to 321 (2007/08)*



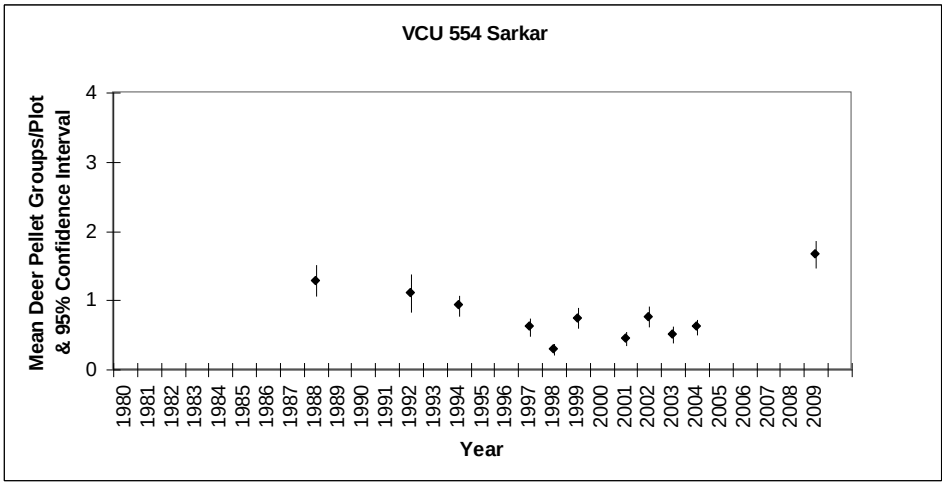
*See Appendices 1 & 2 for # plots sampled & pellet group densities by VCU, elevation & transect. See Appendix 3 for # plots sampled & pellet densities by VCU & survey year.

GMU 2 - Prince of Wales Island

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 n elevation. The # of plots sampled/year has ranged from 257 (2005) to 355 (1998).*



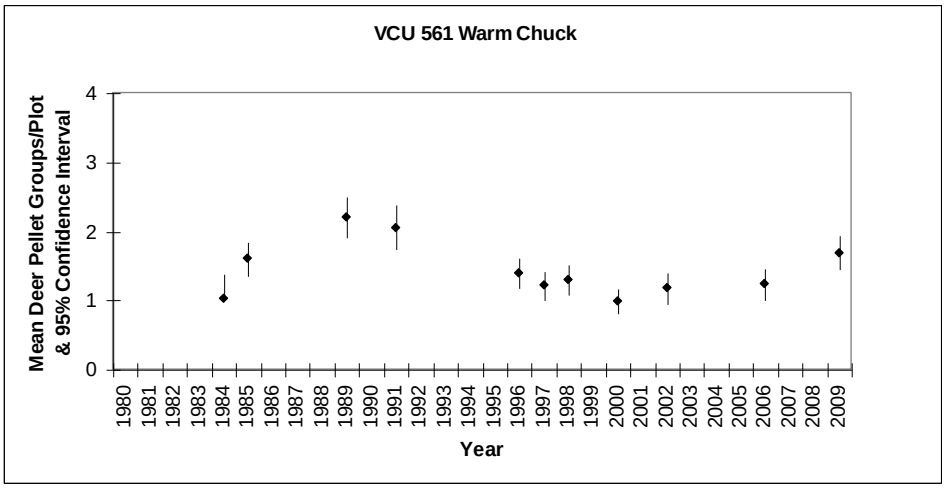
Sarkar (VCU 554): Three transects were established at Sarkar Lake on Prince of Wales Island in 1989. All three transects start at the Sarkar Rapids bridge. Transects 1 and 3 travel through a combination of old growth and second growth, some of which is now impenetrable. Transect 2 consists entirely of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



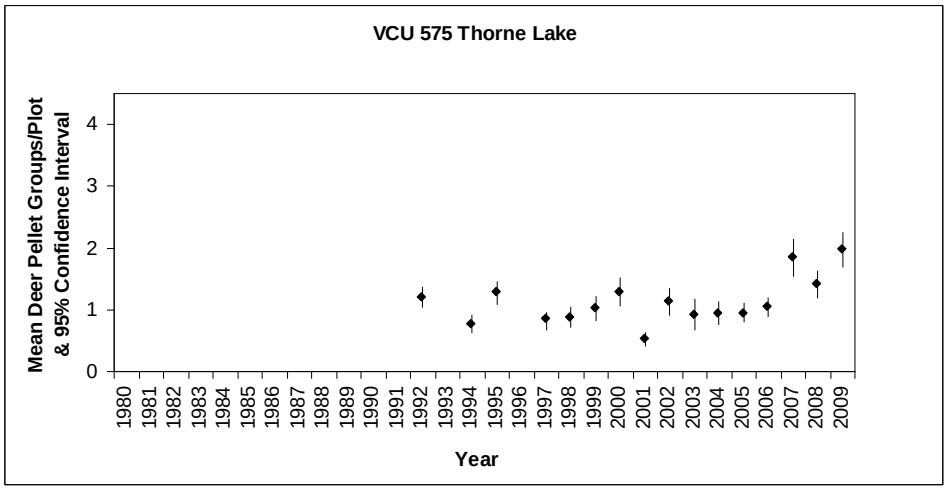
*See Appendices 1 & 2 for # plots sampled & pellet group densities by VCU, elevation & transect. See Appendix 3 for # plots sampled & pellet densities by VCU & survey year.

GMU 2 - Prince of Wales Island Continued

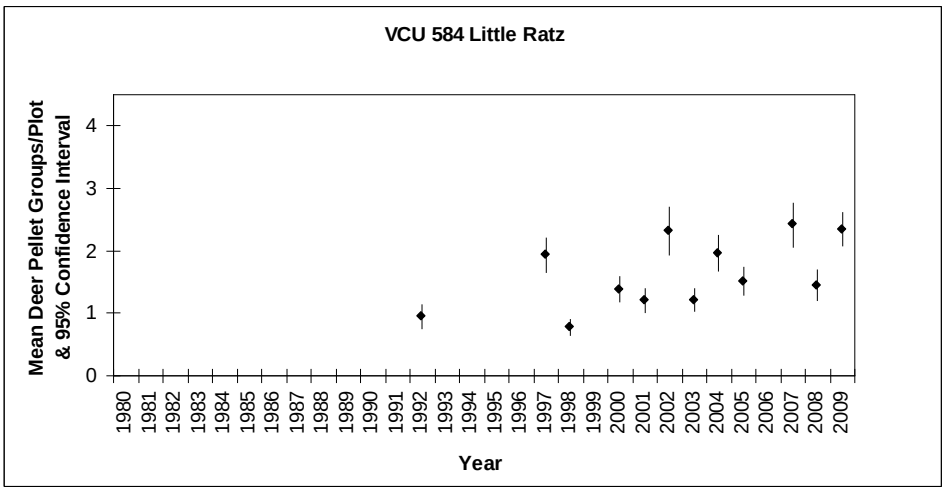
Warm Chuck(VCU 561): Located on Heceta Island off the west coast of Prince of Wales Island,this VCU is a popular hunting destination. Transects were established here in 1984 because of reported high deer populations. Transect 1 travels up a valley bottom that has been partially cutover, #2 traverses a flat poorly drained area with low volume timber, and #3 climbs a steep hill to 1500 feet elevation. Significant portions of T1 and T2 have been logged since 1984. Each of the three transects is brushy with some blowdown. Transect 3 has some cliffy areas. The # of plots sampled/year has ranged from 221 (2002) to 326(1994).*



Thorne Lake (VCU 575): In 1992, four transects were established in along the Thorne River drainage, located in the central part of Prince of Wales Island. All four transects start along Road 3015 and are accessed by vehicle from Thorne Bay. Higher counts in 2007 were likely due to deer concentrating on winter range. Notes: A new start was established for T2 in 1994 due to logging , but it still hits the edge of a clearcut. Only T2, T3, T4 were sampled in 1999 & 2004. Only T3 & T4 were sampled in 2003. The # of plots sampled/year has ranged from 123(2003) to 334(1992).*



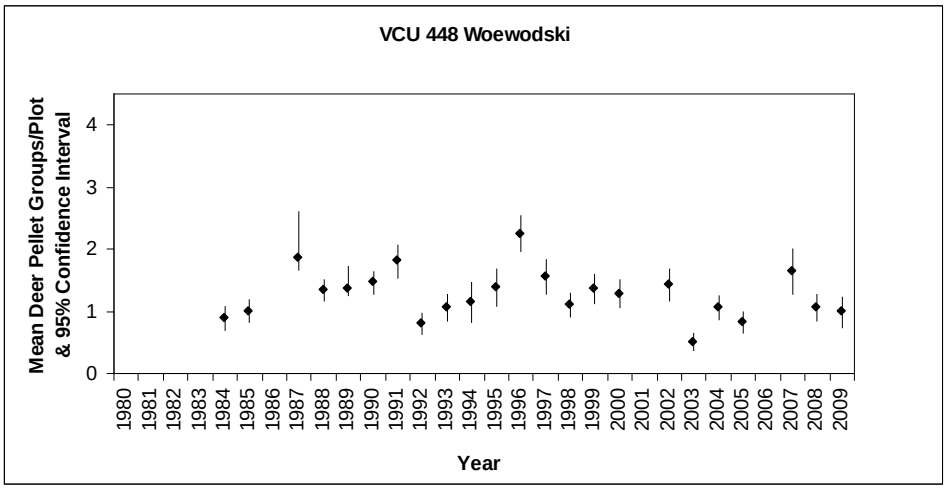
Little Ratz (VCU 584): Four transects were established in 1992 on the east coast of Prince of Wales Island. Access to all transects is by vehicle from Thorne Bay. Notes: all transects but fewer plots were run in 2002. T1 not run in 2004. T2 not run in 2007*. The # of plots sampled/year has ranged from 195 (2002) to 335 (2003).*



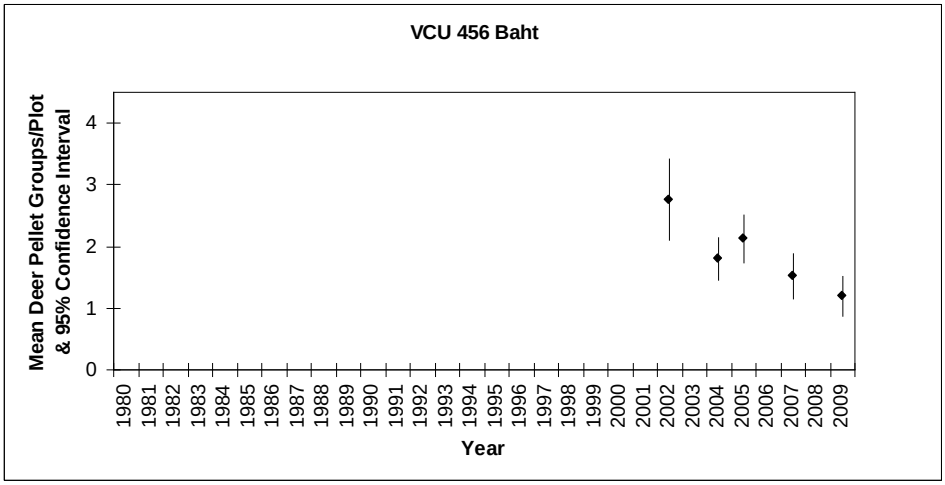
*See Appendices 1 & 2 for # plots sampled & pellet group densities by VCU, elevation & transect. See Appendix 3 for # plots sampled & pellet densities by VCU & survey year.

GMU 3 - Central Southeast Alaska Islands

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. High pellet counts have again been noted after the severe winters of 2007 and 2008, likely due to deer concentrating on winter range. Although there are no longer deer collared on Mitkof, continued pellet surveys will help biologists evaluate whether these deer faired as well as they did in 1999. Notes: the # of plots sampled/year has ranged from 152 (1994) to 433 (1988).*



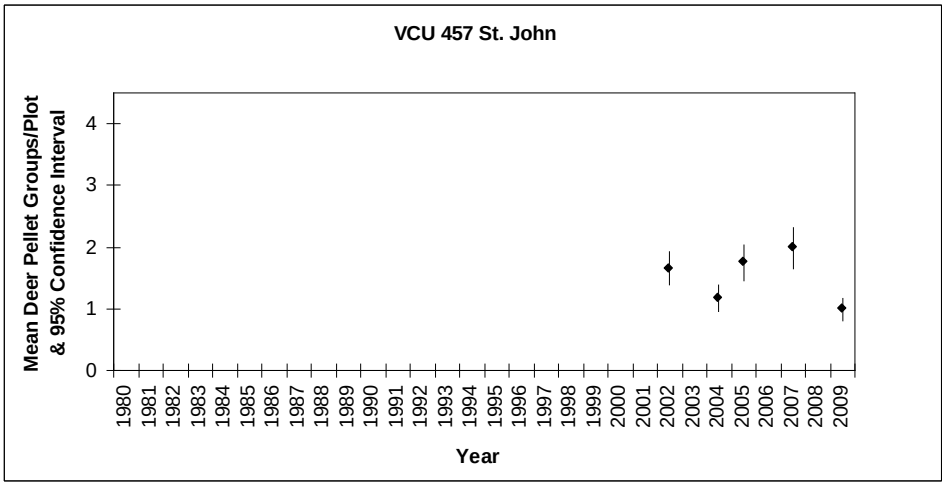
Baht (VCU 456). A single transect was established in this VCU on Zarembo Island in 2002 as a part of a greater island wide assessment of deer populations. The transect traverses medium-volume forest on a gentle north-facing slope to about 800 feet in elevation, crossing several muskegs and ending at a small lake. Given heavy snowfall in this area, we would have expected pellet densities to be higher this year on the winter range, especially given past logging in the watershed and the unavailability of those areas due to deep snow. Lower pellet groups counts may indicate higher early winter mortality in this area. The single transect in this watershed, however, limits our scope of inference. Until more transects are established in this watershed to increase sample size, little can be reliably inferred from this data with regards to changes in the deer population. Notes: the # of plots sampled/year has ranged from 101 (2005) to 125(2009).*



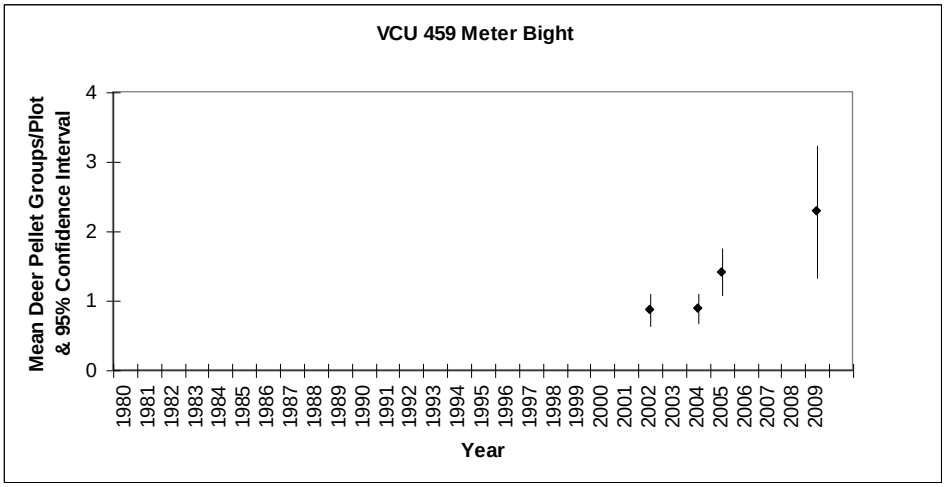
*See Appendices 1 & 2 for # plots sampled & pellet group densities by VCU, elevation & transect. See Appendix 3 for # plots sampled & pellet densities by VCU & survey year.

GMU 3 - Central Southeast Alaska Islands Continued

St. John (VCU 457): Three new transects were established in this VCU on Zarembo Island as part of a greater island wide assessment of deer populations. All three transects originate from the road system. Due to overlapping confidence intervals, it cannot be determined with any certainty whether densities are truly higher than the previous survey year. Further surveys will provide more information. Notes: the # of plots sampled/year has ranged from 211(2005) to 229(2004).*



Meter Bight (VCU 459): In 2002, two new transects (T7 and T8) were established in this VCU on Zarembo Island as part of a greater island-wide assessment of deer populations. Both transects originate from the road system, have southerly aspects, and are comprised of brushy low-volume forest interspersed with muskegs. T7 and T8 start at approximately 450 and 725 feet elevation, respectively, and normally run to approximately 1350 and 1200 feet, respectively. The 0-500 feet elevation zone is not well represented in this VCU. Only about 1/2 the normal number of plots were completed on these two transects in 2009 due to residual winter snow cover at higher elevations. The high pellet group count variability in 2009 reflects that very few pellets were counted on T8, while numerous exceptionally high counts (up to 27 pellet groups/plot) were recorded on T7, especially in the 450– 800foot elevation zone. Notes: the # of plots sampled/year has ranged from 80(2009) to 180 (2002, 2004).* Transects were not completed to higher elevations in 2009 due to persisting snow.

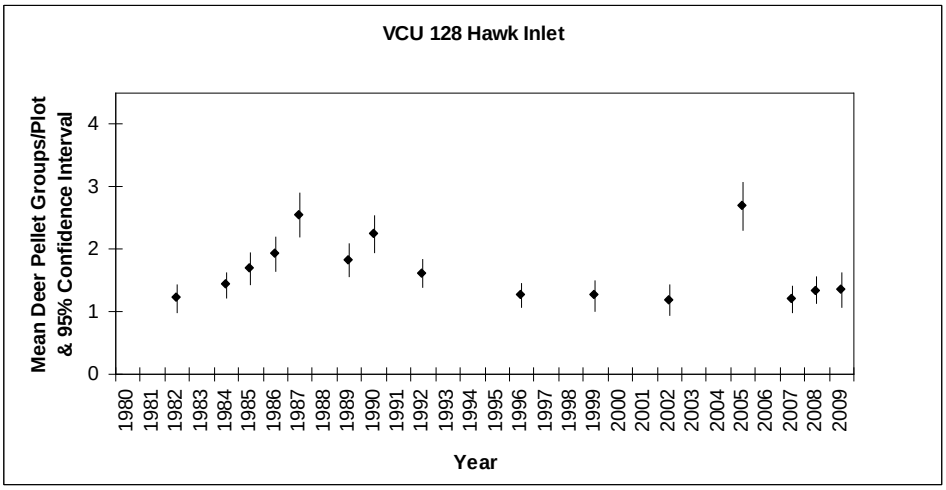


*See Appendices 1 & 2 for # plots sampled & pellet group densities by VCU, elevation & transect. See Appendix 3 for # plots sampled & pellet densities by VCU & survey year.

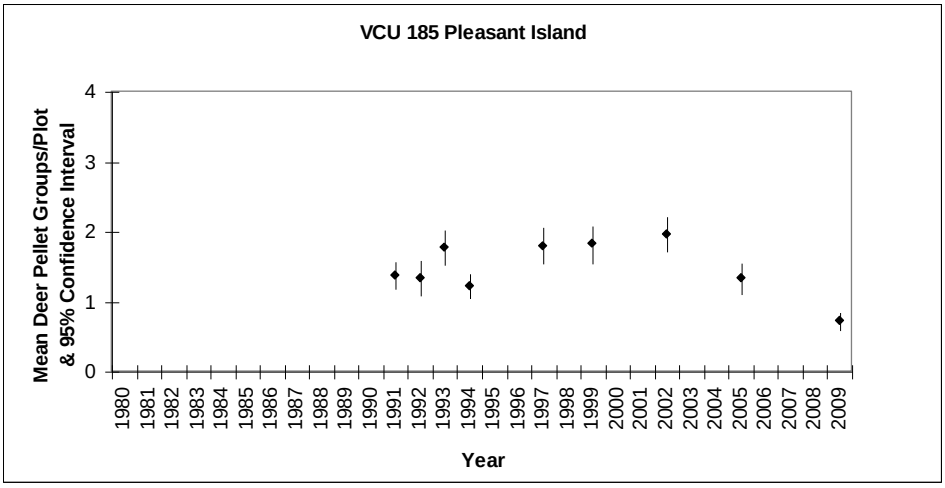
GMU 4 - Admiralty, Baranof & Chichagof Islands

Note: Persisting snow and weather precluded completing most of the VCUs scheduled in GMU 4 in 2009. Logistics and lack of personnel precluded completing all three transects in most watersheds.

Hawk Inlet (VCU 128): Located on northern Admiralty island, this VCU was intensively sampled in 1982 on both sides of the inlet, with transects running to 1000 feet. In 1984, 3 transects on the NW side of the inlet were selected for continued sampling. This chart displays the results of the intensive sampling in 1982. Pellet densities were much lower in 2007 and 2008 than 2005. It Most likely the 2005 count was a survey outlier and deer populations in this area are fairly stable. Notes: the # of plots sampled/ year has varied from 176 (1999) to 1605 (1982). * Only two of three (T2,T3) transects were sampled in 2009 due to lack of crew.



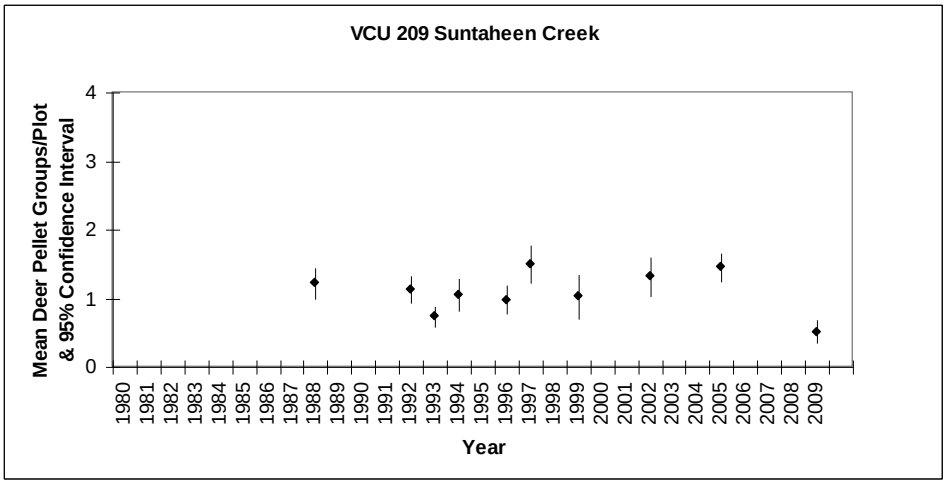
Pleasant Island (VCU 185): Pleasant Island is located in Icy Strait close to the community of Gustavus and is a main source of deer to that town's residents. Three transects were established here in 1991 in response to local concerns with winterkill in 1990. The location of the transects was chosen because most locals hunt the western half of the island and a good anchorage was available along the north shore. Pleasant Island is a low-lying island with extensive muskeg; the highest point on the island is 600 feet. Most of the good quality forest (volume class 5) is found along the beach fringe and creeks. Notes: the # of plots sampled/year has varied from 210 (1992) to 356 (1999). *



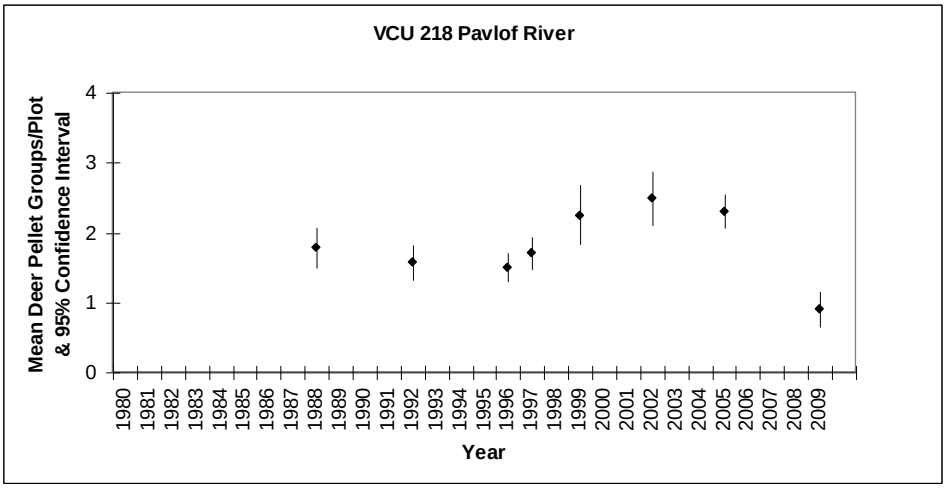
*See Appendices 1 & 2 for # plots sampled & pellet group densities by VCU, elevation & transect. See Appendix 3 for # plots sampled & pellet densities by VCU & survey year.

GMU 4 - Admiralty, Baranof & Chichagof Islands Continued

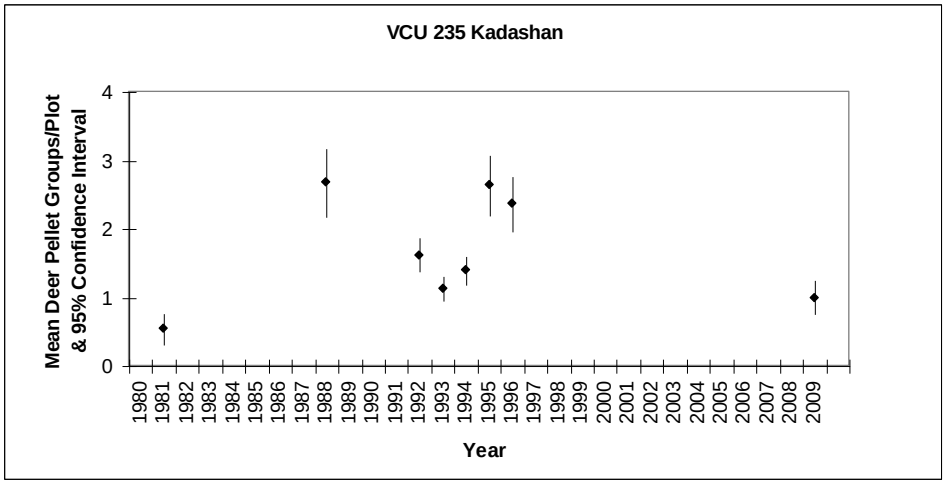
Suntaheen Creek (VCU 209): This VCU is also known as Whitestone Harbor. Located on NE Chichagof, these three transects were established in 1988. These transects traverse a lot of muskeg and scrub; most of the better habitat in the VCU is found along the beach fringe and creeks. Notes: the # of plots sampled/year has varied from 112 (1999) to 329 (2005). * Only 2 of 3 (T2, T3) transects were sampled in 2009 due to lack of crew.



Pavlof (VCU 218): Three transects were established in this VCU on eastern Chichagof Island in 1988. Two start near the falls at Pavlof Harbor and the third starts from the beach at Wachusettts Cove. A wide variety of habitat types are encountered. High pellet densities in 1999 were originally thought to be related to deer concentrating during the abundant snow during the 1998-1999 winter, but pellet densities remained high in subsequent surveys, and so likely reflected a real population increase. In contrast, after 3 hard winters in a row (2006-07, 2007-08, and 2008-09), pellet surveys indicate the population has declined. Notes: the # of plots sampled/year has varied from 192 (2009) to 349 (1996). * Only 2 of 3 transects (T1, T2) were sampled in 2009 due to lack of crew.



Kadashan (VCU 235): Transects were originally set up at Kadashan Bay on Chichagof Island in 1981, but the locations became unknown. Three new transects were established in 1988. Two more were added by USFS in 1992 in order to compare the mostly unlogged Kadashan drainage to the nearby logged drainage of Corner Bay. All traverse mid to high volume forest. Notes: the # of plots sampled/year has varied from 96 (1991) to 385 (1993). * In 1992 and 1993: all 5 transects run. In 1994: T2, T3, T4, T5. In 1995: T3, T4, T5. In 1996: T1, T2, T3 but not fully completed due to persisting snow. Only 2 of 3 transects (T1, T2) were sampled in 2009 due to lack of crew.



*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 2009. Please see 2008 report for GMU 5 trends.

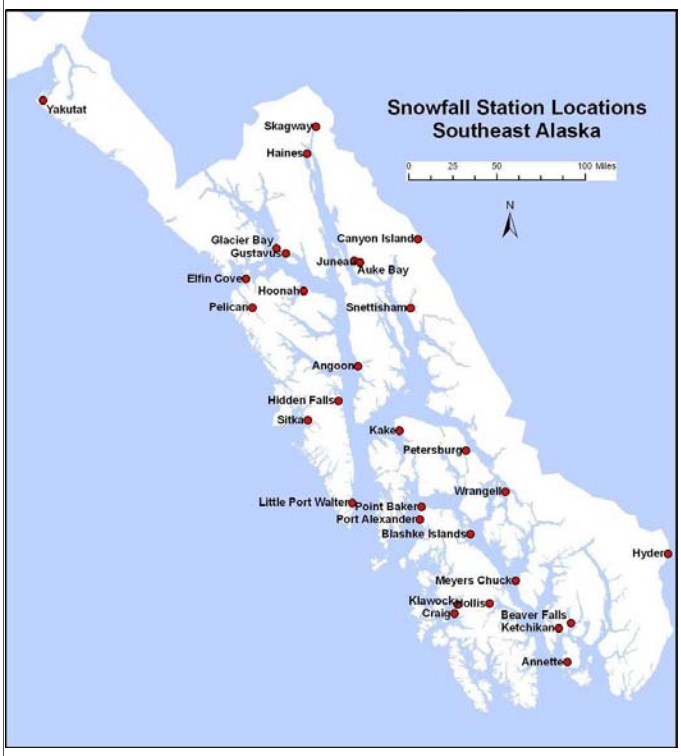
*See Appendices 1 & 2 for # plots sampled & pellet group densities by VCU, elevation & transect. See Appendix 3 for # plots sampled & pellet densities by VCU & survey year.

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.

Sitka Black-tailed Deer in POW snow, February 2009. Photo by Steve Bethune.

Sitka Black-tailed Deer walks on snow berm at Ushk Bay, February 23rd, 2009. Photo by Phil Mooney.



Snowfall in Inches for Southeast Alaska (Winter 2008-2009)[1]

Station Name	Oct	Nov	Dec	Jan	Feb	Mar	April	May	Total	Averages[2] 5	15	30	% change from 5-year average
Yakutat	6	11	52	58	38	56	5	0	225	165	152	155	36%
Elfin Cove	6	1	42	79	50	51	5	0	235	141	109	104	67%
Pelican	5	0	46	80	55	51	2	0	239	126			90%
Glacier Bay	0	0	34	63	29	20	2	0	147	117			26%
Gustavus	5	3	7	18	20	40	2	0	94	89			6%
Hoonah	8	3	25	82	17	49	7	0	191				
Skagway Power	3	4	13	14	24	12	1	0	71	54			32%
Skagway Customs	9	1	8	19	10	2	5	0	54	45			20%
Haines Customs	35	45	60	67	31	30	14	0	280	252	246		11%
Haines	19	25	57	61	46	42	9	0	259	188			38%
Juneau Airport	5	4	33	75	30	31	2	0	180	107	88	85	69%
Annex Creek	22	22	76	115	64	57	12	0	367	299			23%
Hidden Falls Hatchery	0	0	56	89	23	72	3	0	243	111			119%
Little Port Walter	0	1	63	68	25	0	7	0	165	122	88		35%
Port Alexander	0	1	22	28	16	16	4	0	86	51	46	50	68%
Point Baker	0	0	7	22	8	21	1	0	59	34			74%
Petersburg	2	1	24	54	29	48	2	0	160	111	72	64	44%
Wrangell	0	3	25	34	5	24	1	0	91	80			14%
Blashke Island	0	0	19	21	3	13	1	0	57	36			59%
Meyer Chuck	0	0	3	8	2	16	2	0	31				
Annette WSO	0	2	21	28	10	21	1	0	83	40	38	34	108%
Craig	0	1	13	11	2	12	0	0	38	23			66%
Hyder	0	M[3]	M	M	M	M	M	M	0	241			N/A

[1] Data from National Weather Service, NOAA website: http://www.arh.noaa.gov/clim/akcoopclim.php?wfo=pajk

[2] Averages for the 5, 10, and 15 years preceeding the 2008-2009 winter (when available).

[3] Data was missing for that month of the 2008-2009 winter.

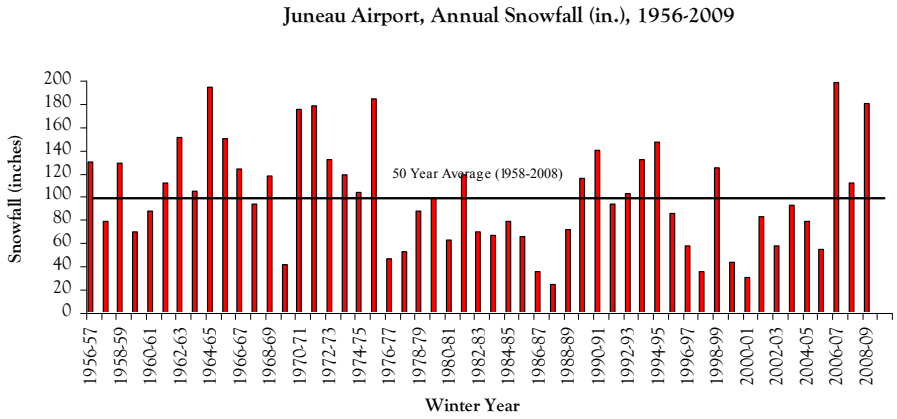
Southeast Alaska Snow Report - Continued

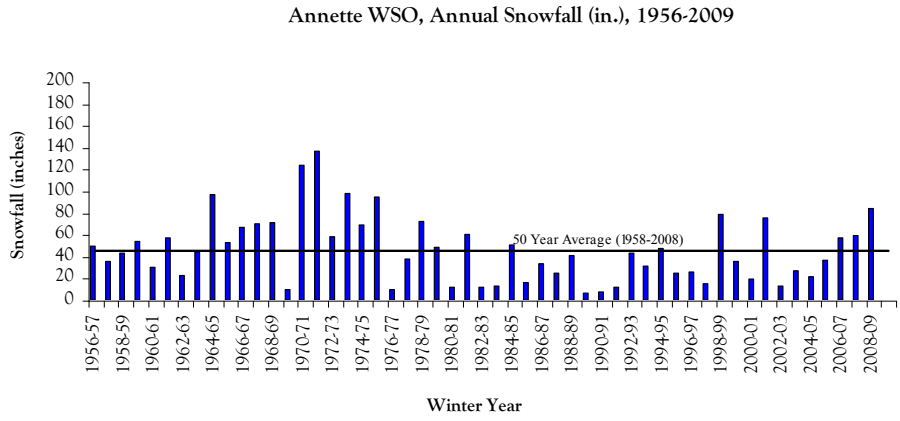
Between 1995-2006, winter conditions in southeast Alaska were relatively mild, with only 1 out of 11 winters having greater than average annual snowfall in the Juneau area, and 2 out of 11 in Annette. As a result, it is unlikely that winter conditions negatively affected deer populations during this period. However, the last 3 winters in a row have been severe winters across the region.

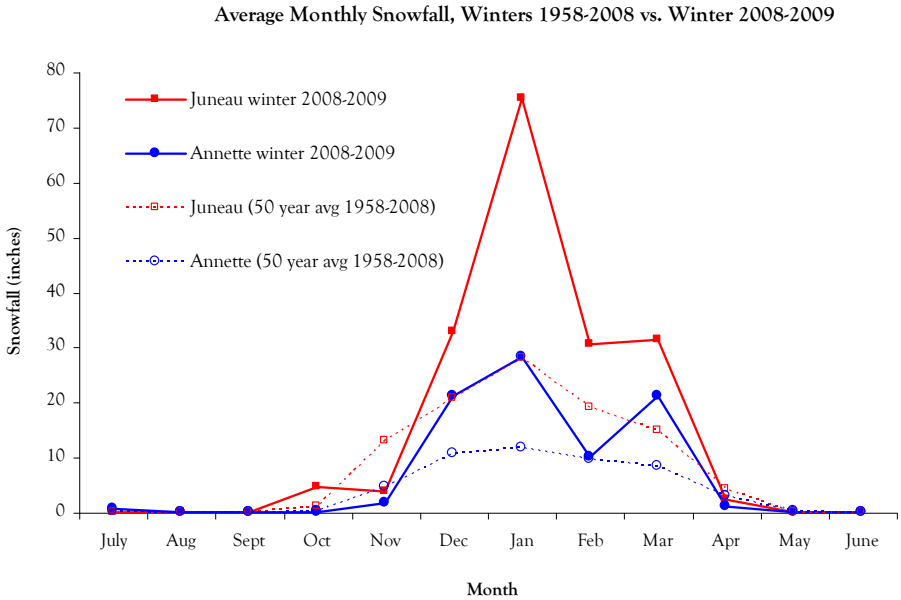
In the Juneau area, the winters of 2006-07 and 2008-09 had the highest and 4th highest recorded snowfall since 1956, respectively, with above-average snowfall during the 2007-2008 winter. At Annette WSO, snowfall has been above average and increasing for the last 3 years, with the 2008-2009 winter being the highest snowfall since the 1975-76 winter.

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 2006-07, 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.

Although 2008-09 was not quite as severe as the 2006-07 winter, deer likely felt the effects more than usual due to cumulative





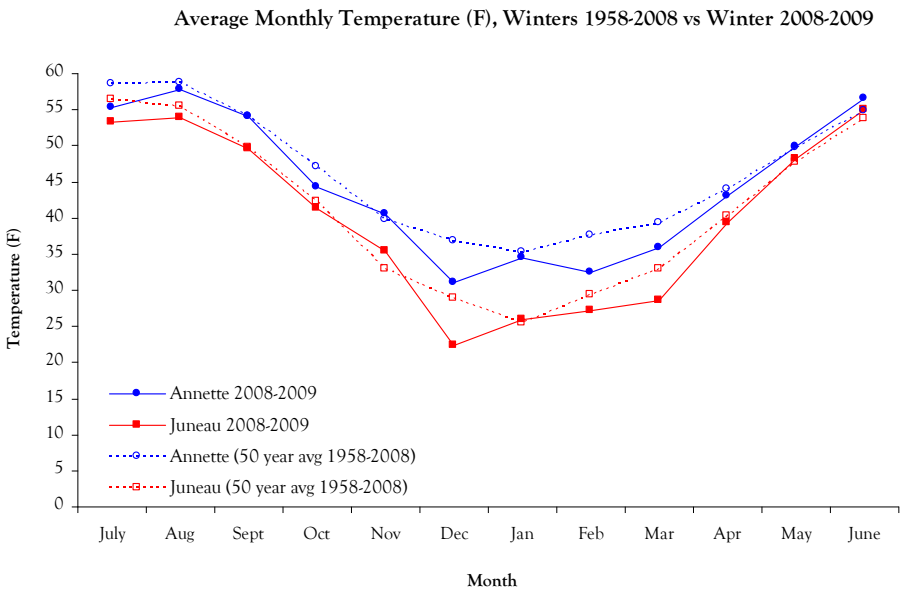


Southeast Alaska Snow Report - Continued

effects from the previous two winters. Snowfall varies considerably among watersheds, and deer would have suffered most in areas with higher snowfall, where habitats were fragmented, and where populations were near carrying capacity. However, because many older and/or diseased individuals had already died the previous winters, deer survival may have been higher in 2008-09 despite harsher conditions. This is because reduced population size would result 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. However, it is evident that the 2008-09 winter was colder than average for most months across the region. The coldest temperatures occurred in December, but cooler than average temperatures persisted through March, delaying snow melt and greenup throughout the region.

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 well above average January through May of 2009. The table to the right summarizes these data for the Douglas and Petersburg snow courses. Late snowfall and cold temperatures caused deep snow to persist into late spring.



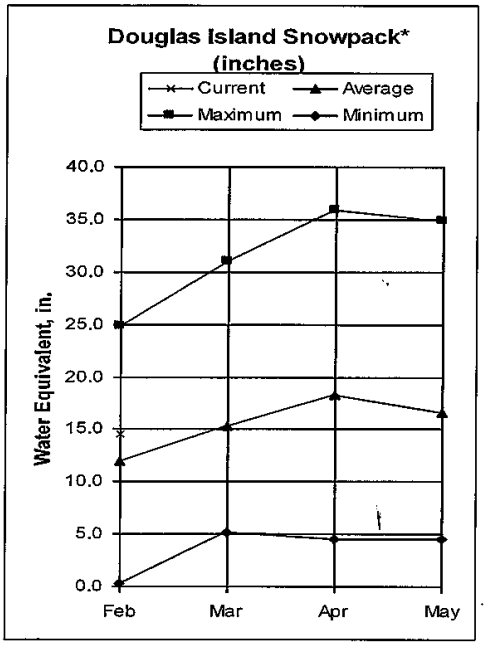
Snow Course Name	# Courses Averaged	Percent of Average Snow Depth			
		Feb	March	April	May
Douglas Island	3	122	144	158	154
Petersburg	2	163	152	191	245

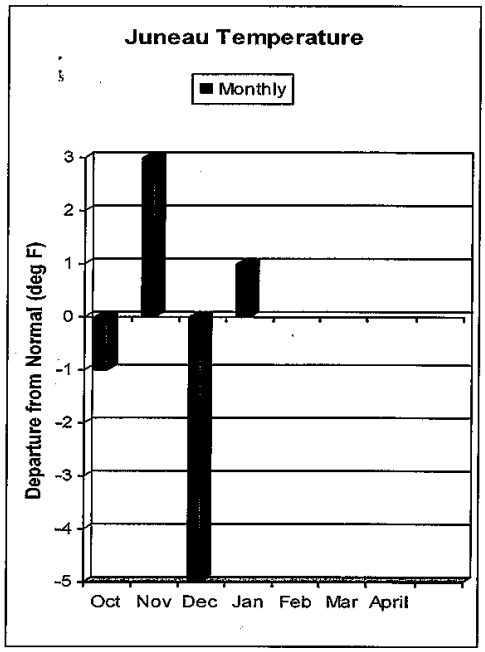
February 2009: Southeast Alaska Snow Pack Data

Reproduced from:

United States Department of Agriculture, National Resources Conservation Service. 2008. Alaska Snow Survey Report, February Issue. Pp 24. Full report available at website: http://www.ambcs.org

SOUTHEAST*





Current Basin Conditions

Southeast Alaska is having its third big snow year in a row.
The Long Lake SNOTEL site is reporting 87 inches of snow and 29.9 inches of water content, which is 119% of normal. Last year at this time, there were 92 inches of snow and 30.7 inches of water content.
The two Petersburg snow courses average out to the same as last year at 163% of normal.
The Reservoir snow course measured 11.3 inches of snow water content, which is 1.3 inches more than last year, whereas the Ridge snow course measured 23.6 inches of snow water content, and is 1.8 inches less than last year.
The three Douglas Island snow courses across from Juneau also had well above normal water contents for this time of year, and averaged 122% of normal.

* For further information contact the Natural Resources Conservation Service in Anchorage.

February 2009: Southeast Alaska Snow Pack Data

Reproduced from:

United States Department of Agriculture, National Resources Conservation Service. 2008. Alaska Snow Survey Report, February Issue. Pp 25. Full report available at website: http://www.ambcs.org

Southeast

SNOWPACK DATA

Snow Course	Elev.	Date	THIS YEAR		LAST YEAR		1971-2000 AVERAGE	
			Snow Depth	Water Content	Snow Depth	Water Content	Snow Depth	Water Content
	(feet)		(inches)					
December								
Cropley Lake	1650	11/28/08	31	10.0	---	---	---	---
Eagle Crest	1200	11/28/08	0	0.0	---	---	---	---
Fish Creek	500	11/28/08	0	0.0	---	---	---	---
Long Lake	850	12/01/08	24	8.8	19	4.6	36	9.1
Moore Creek Bridge	2250	12/08/09	30	8.0	5	4.2	---	---
Petersburg Reservoir	550	12/02/08	0	0.0	0	0.0	---	---
Petersburg Ridge	1650	12/02/08	18	5.2	29	6.0	---	---
January								
Lake Grace Pass	1900	1/07/09	89	23.0	125	45.3	---	---
Long Lake	850	12/30/08	68	16.9	80	19.1	54	16.3
Lost Lake	425	1/07/09	39	10.8	48	14.4	---	---
Mint Creek Ridge	1900	No Survey			124	41.0	---	---
Petersburg Reservoir	550	12/31/08	19	3.0	18	4.1	13	3.3
Petersburg Ridge	1650	12/31/08	50	8.6	57	14.6	40	11.3
Upper Swan Lake	1700	1/07/08	87	18.7	76	30.0	---	---
Upper Silvas	2300	No Survey			133	47.9	---	---
February								
Cropley Lake	1650	1/30/09	76	23.6	84	25.6	58	18.4
Eagle Crest	1200	1/30/09	51	15.2	64	19.5	41	12.2
Fish Creek	500	1/30/09	17	4.7	23	5.3	20	5.0
Long Lake	850	2/01/09	87	29.9	92	30.7	75	23.9
Moore Creek Bridge	2250	2/02/09	76	15.7	47	13.7	62	16.9
Petersburg Reservoir	550	2/02/09	38	11.3	46	10.0	17	4.5
Petersburg Ridge	1650	2/03/09	81	23.6	94	25.4	57	16.9
West Creek	470	1/31/09	29	8.5	32	8.4	---	---

PRECIPITATION DATA

INCHES ACCUMULATED SINCE OCTOBER 1ST

Precipitation Gauge	Elevation (feet)	Date	This Year	Last Year	1971-2000 Ave	% of Average
Long Lake	850	2/01/09	83.8	67.7	77.5	108
Moore Creek Bridge	2250	No Report			20.5	
Snettisham	25	No Report			81.6	
Swan Lake	50	1/31/09	82.8	78.1	65.1	127

WATERSHED SNOW PACK ANALYSIS

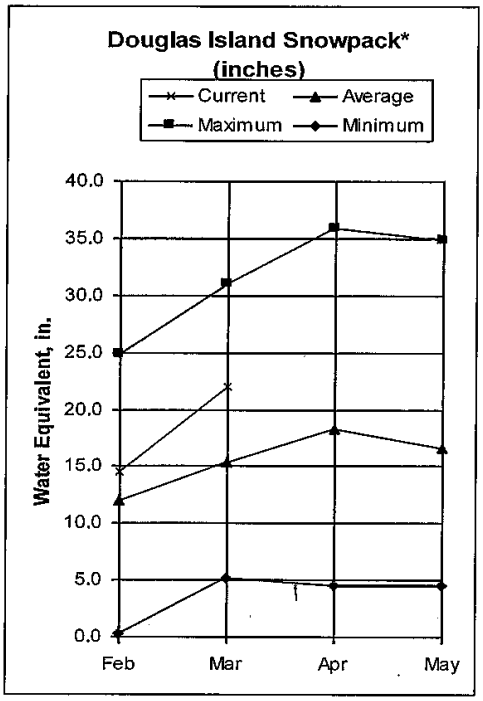
Region / River Basin	No. of Courses Averaged	Percent of Last Year	Percent of Average
Douglas Island	3	86	122
Long Lake	1	93	119
Petersburg	2	99	163

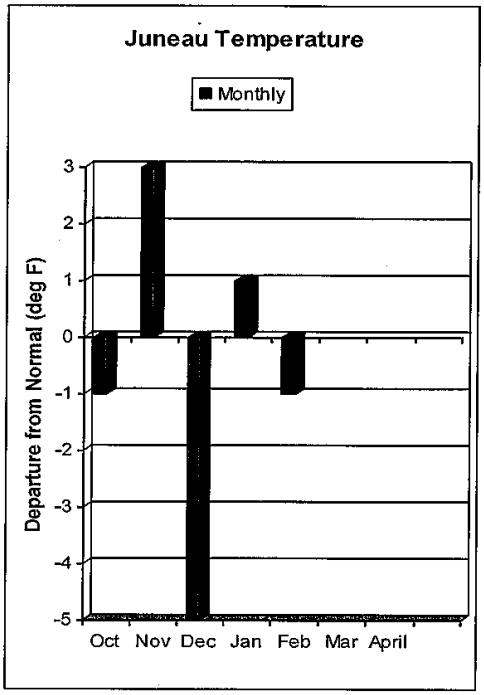
March 2009: Southeast Alaska Snow Pack Data

Reproduced from:

United States Department of Agriculture, National Resources Conservation Service. 2008. Alaska Snow Survey Report, March Issue. Pp. 28. Full report available at website: http://www.ambcs.org

Southeast





Snowcover:

Southeast Alaska continued with its 3rd big snow year in a row. The Petersburg area is a combined 152% of average. Petersburg Ridge snow course has 93 inches of snow with 28.3 inches of water (130% of normal), whereas the lower elevation site Petersburg Reservoir has only 13.6 inches of water, but is 234% of average.
The Long Lake SNOTEL site has 104 inches of snow with 38.1 inches of water content, 112% of normal.
The Douglas Island snow courses, across from Juneau, are a combined 144% of normal.
The northern part of Southeast is closer to average conditions as indicated by the Moore Creek Bridge snow course north of Skagway. It has 78 inches of snow depth with 23.5 inches of snow depth, which is 110% of normal.

March 2009: Southeast Alaska Snow Pack Data

Reproduced from:

United States Department of Agriculture, National Resources Conservation Service. 2008. 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	2/27/09	98	33.9	96	34.9	70	23.9
Eagle Crest	1200	2/27/09	79	23.0	70	23.7	48	16.1
Fish Creek	500	2/27/09	32	9.2	23	6.8	20	6.0
Long Lake	820	2/28/09	104	38.1	122	41.0	92	34.1
Moore Creek Bridge	2250	2/27/09	78	23.5	66	20.1	62	21.3
Petersburg Reservoir	550	2/26/09	45	13.6	48	16.5	18	5.8
Petersburg Ridge	1650	2/27/09	93	28.3	110	35.9	65	21.8
Speel River	280	2/28/09	101	39.8	97	33.8	75	26.8

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	37	112	46	28

PRECIPITATION DATA

INCHES ACCUMULATED SINCE OCTOBER 1ST

Precipitation Gauge	Elev.	Date	This Year	Last Year	71-2000 Ave	% of Average
Long Lake	820	2/28/09	92.8	81.2	85.9	108
Moore Creek Bridge	2250	2/28/09	26.3	20.9	23.9	110
Snettisham	25	No Report		90.9	95.2	---
Swan Lake	50	No Report		96.8	77.8	---

WATERSHED SNOWPACK ANALYSIS

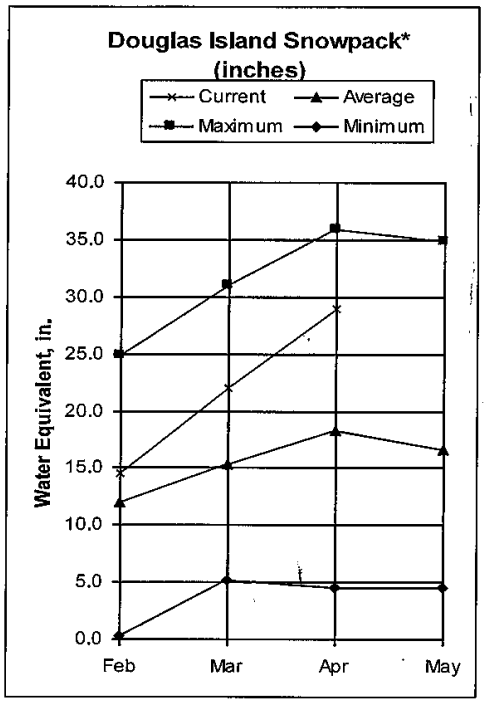
REGION / RIVER BASIN	# COURSES AVERAGED	PERCENT OF LAST YEAR	PERCENT OF AVERAGE
Douglas Island	3	101	144
Snettisham	2	104	128
Petersburg	2	80	152

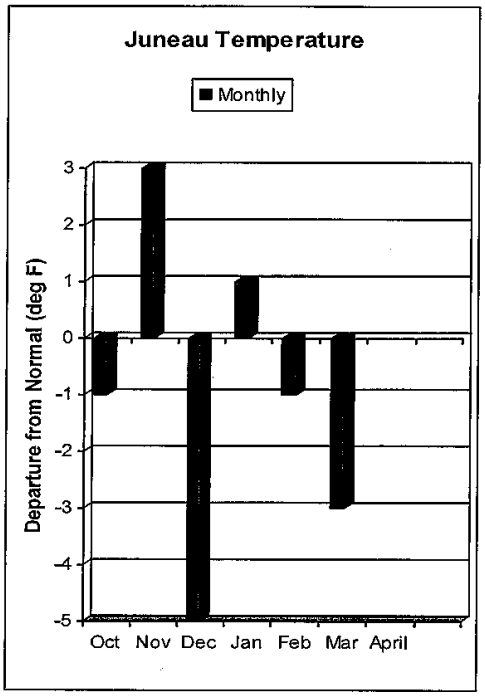
April 2009: Southeast Alaska Snow Pack Data

Reproduced from:

United States Department of Agriculture, National Resources Conservation Service. 2008. Alaska Snow Survey Report, April Issue. Pp. 28. Full report available at website: http://www.ambcs.org

SOUTHEAST*





Snowcover:

The three Douglas Island snow courses, across from Juneau, are a combined 158% of normal, and 107% of last year.

The Speel River snow course near the Snettisham Hydro-electric power facility has 132 inches of snow depth with 48.0 inches of water content, 154% of normal. This is the largest snow depth ever recorded at this site for any month and the 6th greatest water content. The record began in 1965.

The Petersburg Reservoir snow course has 69 inches of snow depth with 21.5 inches of water content. This year's measurements have only been exceeded once before two years ago on April 1st, 2007 when there was 71 inches of snow depth with 25.0 inches of water content. The record began in 1980.

The Snowmelt Runoff Index for the Municipal Watershed Creek near Petersburg is much above average at +2.7.

* For further information contact the Natural Resources Conservation Service in Anchorage.

April 2009: Southeast Alaska Snow Pack Data

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United States Department of Agriculture, National Resources Conservation Service. 2008. 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	3/31/09	125	42.0	122	42.2	81	30.3
Eagle Crest	1200	3/31/09	110	30.1	87	31.5	54	18.5
Fish Creek	500	3/31/09	43	14.6	21	7.4	19	6.2
Lake Grace Pass	1900	4/08/09	152	57.5	194	84.8	---	---
Long Lake	850	4/01/09	137	49.9	150	53.0	110	44.1
Lost Lake	425	4/08/09	67	25.5	75	28.8	---	---
Mint Creek Ridge	1900	4/08/09	137	44.5	188	76.3	---	---
Moore Creek Bridge	2250	4/01/09	71	25.8	67	23.8	73	20.0
Petersburg Reservoir	550	3/30/09	69	21.5	48	18.4	15	6.2
Petersburg Ridge	1650	4/02/09	127	40.8	127	47.6	71	26.4
Speel River	280	4/01/09	132	48.0	99	40.6	78	31.1
Upper Swan Lake	1700	4/08/09	87	30.7	---	---	---	---
West Creek	470	3/31/09	38	12.8	34	12.2	---	---
Upper Silvas	2300	No Report			225	92.8	---	---

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	39	118	47	31

PRECIPITATION DATA

INCHES ACCUMULATED SINCE OCTOBER 1ST

Precipitation Gauge	Elev.	Date	This Year	Last Year	71-2000 Ave	% of Average
Long Lake	850	4/01/09	102.1	94.4	96.4	106
Moore Creek Bridge	2250	4/01/09	23.5	25.3	24.3	97
Snettisham	25	No Report		104.7	106.8	---
Swan Lake	50	No Report		109.4	88.2	---

WATERSHED SNOWPACK ANALYSIS

REGION / RIVER BASIN	# COURSES AVERAGED	PERCENT OF LAST YEAR	PERCENT OF AVERAGE
Douglas Island	3	107	158
Long Lake	2	97	139
Petersburg	2	94	191
Swan Lake	No Report		

May 2009: Southeast Alaska Snow Pack Data

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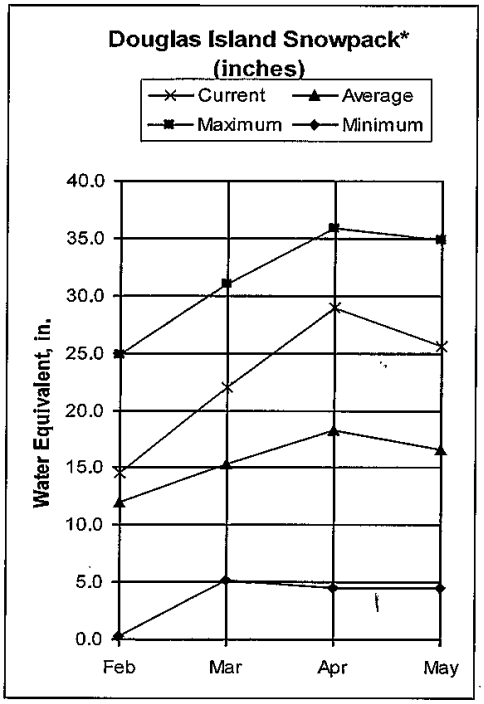
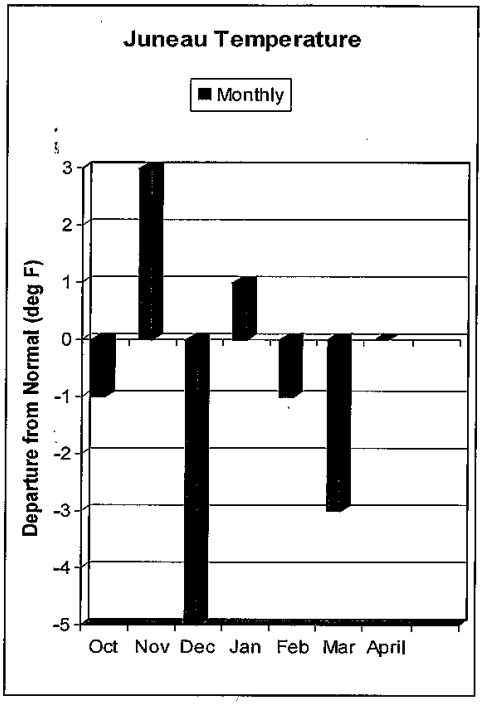
SOUTHEAST*





Snowcover:

The three Douglas Island snow courses, across from Juneau, are a combined 154% of average and 89% of last year.
The Speel River snow course near the Snettisham Hydro-electric power facility has 95 inches of snow depth with 42.2 inches of water content, 162% of average.
The Petersburg Reservoir snow course has 41 inches of snow depth with 15.8 inches of snow water content, average is 2.1 inches. The Petersburg Ridge snow course water content is 196% of average with 43.4 inches of measured water content.
The Snowmelt Runoff Index for the Municipal Watershed Creek near Petersburg is much above average at +2.9.

* For further information contact the Natural Resources Conservation Service in Anchorage.

May 2009: Southeast Alaska Snow Pack Data

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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	4/29/09	114	39.8	117	49.1	73	32.8
Eagle Crest	1200	4/29/09	78	30.8	83	36.9	37	15.7
Fish Creek	500	4/29/09	15	6.1	0	0.0	3	1.3
Long Lake	850	4/29/09	111	51.8*	129	60.5	100	47.9
Moore Creek Bridge	2250	5/01/09	62	25.2	62	24.2	46	18.9
Petersburg Reservoir	550	5/01/09	41	15.8	40	15.6	6	2.3
Petersburg Ridge	1650	4/29/09	101	43.4	114	51.5	51	22.1
Speel River	280	5/01/09	95	42.2	89	38.4	59	26.1

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	36	116	43	29

PRECIPITATION DATA

INCHES ACCUMULATED SINCE OCTOBER 1ST

Precipitation Gauge	Elevation (feet)	Date	This Year	Last Year	1971-2000 Ave	% of Average
Long Lake	850	5/01/09	101.7	106.7	104.6	97
Moore Creek Bridge	2250	5/01/09	24.9	25.7*	26.6	96
Snettisham	25	5/01/09	134.9	121.8	112.5	120
Swan Lake	50	No Report		123.6	98.8	---

WATERSHED SNOWPACK ANALYSIS

Region / River Basin	No. of Courses Averaged	Percent of Last Year	Percent of Average
Douglas Island	3	89	154
Petersburg	2	88	245
Snettisham	2	95	127

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. In Spring 2009, the mean pellet-groups/plot in Game Management Unit (GMU) 1C was highest in the mid elevation category for North Douglas, but highest in the low elevation category for Inner Point and Shelter Island. In Unit 4Z, most VCUs did not have any plots in the mid or high elevation category. However, where mid-elevation was sampled (Hawk Inlet, Kadashan), it was characterized by higher pellet densities than the 0-500 foot elevation range. In GMU 3Z, pellet density was equal or lower in the mid elevation category for 3 of 4 VCUs sampled. In GMU 2Z, pellet densities were generally higher in the mid or high elevation categories where these were sampled. Winter movement patterns by deer were likely not as limited by snow where higher elevations were heavily used (Thorne Lake, Little Ratz).

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

Mean Pellet Groups (PG) Per Plot by VCU and Elevation Category, Spring 2009

		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	259	137	1.89	126	53	2.38	23	30	0.77
36	Inner Point	325	172	1.89	43	53	0.81	18	43	0.42
124	Shelter Island	160	206	0.78	13	33	0.39	4	11	0.36
128	Hawk Inlet	55	45	1.22	202	124	1.63	22	38	0.58
185	Pleasant Island	209	291	0.72		0			0	
209	Whitestone Harbor	103	202	0.51		0			0	
218	Pavlof	173	188	0.92	0	4	0.00		0	
235	Kadashan	97	95	1.02	30	21	1.43	9	21	0.43
NORTHERN SOUTHEAST		**1381**	**1336**	**1.03**	**414**	**288**	**1.44**	**76**	**143**	**0.53**
448	Woewodski	62	43	1.44	43	54	0.80	53	65	0.82
456	Baht Harbor	93	56	1.66	56	69	0.81		0	
457	St.Johns Harbor	181	154	1.18	13	11	1.18	28	60	0.47
459	Meter Bight	6	3	2.00	148	54	2.74	29	23	1.26
549	Sarheen	395	221	1.79	157	95	1.65		0	
554	Sarkar	578	349	1.66	2	1	2.00		0	
561	Warm Chuck	445	267	1.67	25	11	2.27		0	
575	Thorne Lake	231	142	1.63	320	142	2.25	63	27	2.33
584	Little Ratz	358	171	2.09	172	57	3.02	184	77	2.39
SOUTHERN SOUTHEAST		**2349**	**1406**	**1.67**	**936**	**494**	**1.89**	**357**	**252**	**1.42**
ALL SOUTHEAST ALASKA		**3730**	**2742**	**1.36**	**1350**	**782**	**1.73**	**433**	**395**	**1.10**

Appendix 2: Pellet-Group Densities by VCU and Transect

Pellet-Groups Per Plot by VCU and Transect, Spring 2009

VCU	Name	Transect	Pellet Groups (PG)	Plots	Mean PG/ Plot	Lower 95% C. I.	Upper 95% C. I.
35	North Douglas	1	144	73	1.97	1.43	2.52
35	North Douglas	2	167	74	2.26	1.74	2.77
35	North Douglas	3	97	73	1.33	0.92	1.74
35	North Douglas	Total	408	220	1.85	1.57	2.14
36	Inner Point	1	47	68	0.69	0.47	0.91
36	Inner Point	2	272	125	2.18	1.73	2.62
36	Inner Point	3	67	75	0.89	0.62	1.17
36	Inner Point	Total	386	268	1.44	1.20	1.68
124	Shelter Island	4	42	50	0.84	0.58	1.10
124	Shelter Island	5	31	50	0.62	0.41	0.83
124	Shelter Island	6	14	50	0.28	0.11	0.45
124	Shelter Island	7	55	50	1.10	0.68	1.52
124	Shelter Island	18	35	50	0.70	0.34	1.06
124	Shelter Island	Total	177	250	0.71	0.57	0.84
128	Hawk Inlet	2	87	101	0.86	0.55	1.18
128	Hawk Inlet	3	192	106	1.81	1.36	2.27
128	Hawk Inlet	Total	279	207	1.35	1.06	1.63
185	Pleasant Island	1	96	105	0.91	0.70	1.13
185	Pleasant Island	2	56	125	0.45	0.32	0.57
185	Pleasant Island	3	57	61	0.93	0.59	1.28
185	Pleasant Island	Total	209	291	0.72	0.60	0.84
209	Whitestone Hbr	1	55	119	0.46	0.29	0.63
209	Whitestone Hbr	2	48	83	0.58	0.28	0.88
209	Whitestone Hbr	Total	103	202	0.51	0.35	0.67

Appendix 2: Pellet-Group Densities by VCU and Transect

Pellet-Groups Per Plot by VCU and Transect, Spring 2009

VCU	Name	Transect	Pellet Groups (PG)	Plots	Mean PG/ Plot	Lower 95% C. I.	Upper 95% C. I.
218	Pavlof	1	58	74	0.78	0.38	1.19
218	Pavlof	2	115	118	0.97	0.67	1.28
218	Pavlof	Total	173	192	0.90	0.66	1.15
235	Kadashan	1	78	82	0.95	0.65	1.25
235	Kadashan	2	58	55	1.05	0.63	1.48
235	Kadashan	Total	136	137	0.99	0.75	1.24
448	Woewodski	1	83	80	1.04	0.67	1.41
448	Woewodski	3	75	82	0.91	0.60	1.22
448	Woewodski	Total	158	162	0.98	0.74	1.22
456	Baht Harbor	6	149	125	1.19	0.86	1.52
456	Baht Harbor	Total	149	125	1.19	0.86	1.52
457	St.Johns Hor	4	79	81	0.98	0.68	1.27
457	St.Johns Hbr	5	102	73	1.40	1.06	1.73
457	St.Johns Hbr	9	41	71	0.59	0.33	0.84
457	St.Johns Hbr	Total	222	225	0.99	0.81	1.17
459	Meter Bight	7	170	54	3.15	1.81	4.49
459	Meter Bight	8	13	26	0.50	0.09	0.91
459	Meter Bight	Total	183	80	2.29	1.33	3.24
549	Sarheen	1	170	91	1.87	1.53	2.21
549	Sarheen	2	272	125	2.18	1.73	2.62
549	Sarheen	3	110	100	1.10	0.83	1.37
549	Sarheen	Total	552	316	1.75	1.52	1.97
554	Sarkar	1	282	125	2.26	1.86	2.65
554	Sarkar	2	143	100	1.43	1.12	1.74

Appendix 2: Pellet-Group Densities by VCU and Transect

Pellet-Groups Per Plot by VCU and Transect, Spring 2009

VCU	Name	Transect	Pellet Groups (PG)	Plots	Mean PG/ Plot	Lower 95% C. I.	Upper 95% C. I.
554	Sarkar	5	155	125	1.24	0.96	1.52
554	Sarkar	Total	580	350	1.66	1.46	1.86
561	Warm Chuck	1	222	112	1.98	1.64	2.32
561	Warm Chuck	2	131	105	1.25	0.80	1.70
561	Warm Chuck	3C	117	61	1.92	1.53	2.30
561	Warm Chuck	Total	470	278	1.69	1.45	1.93
575	Thorne Lake	1	113	77	1.47	1.13	1.80
575	Thorne Lake	2	275	126	2.18	1.66	2.71
575	Thorne Lake	3	108	66	1.64	1.19	2.09
575	Thorne Lake	4	118	42	2.81	1.96	3.66
575	Thorne Lake	Total	614	311	1.97	1.70	2.25
584	Little Ratz	1	248	106	2.34	1.88	2.80
584	Little Ratz	2	89	67	1.33	0.91	1.75
584	Little Ratz	3	245	63	3.89	3.28	4.50
584	Little Ratz	4	132	69	1.91	1.42	2.40
584	Little Ratz	Total	714	305	2.34	2.07	2.61

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
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**

*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.
				2009	**268**	**1.44**	**1.20-1.68**
38	Rhine Creek	6,357	2%	1997	108	0.31	0.14-0.47
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
124	Lincoln Island			1998	207	1.52	1.27-1.77
				2007	213	0.84	0.62-1.06

*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	Pellet-Group 95%C.I.
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
				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

*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.
				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
				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

*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.
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.	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
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
				2005	323	2.30	2.06-2.55
				2009	192	0.90	0.66-1.15
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

*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.
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
				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

*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.
				2006	280	2.58	2.24-2.92
				2007	248	1.89	1.65-2.13
				2008	199	3.32	2.87-3.78
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
				1997	353	1.44	1.21-1.67
				2003	355	1.65	1.43-1.87
				2006	359	1.82	1.57-2.06

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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.
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

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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
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

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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.
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
				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

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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.
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
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
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

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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.
				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
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

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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.
	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
				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

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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.
				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
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
				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

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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.
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
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

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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

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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.
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
				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
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
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

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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.
				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
625	Trocadero	16,624	75%	1995	235	1.74	1.41-2.06
				1997	235	1.18	0.97-1.38
				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

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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.
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
719	Port Stewart	21,482	55%	1993	289	1.22	1.03-1.42
				1995	278	1.61	1.35-1.87
				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

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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.
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
				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

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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.
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
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
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

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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.
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

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