

GEODUCK CLAM STOCK ASSESSMENT SURVEYS
AND FISHERY MANAGEMENT
FOR THE 2001/2002 SEASON



By

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ABSTRACT

Surveys were conducted in portions of commercial fishing Subdistricts 101-23, 101-25, and 103-50 to estimate geoduck clam biomass. These areas included two new commercial areas identified through industry reconnaissance, and two new control areas. Surveys were conducted by Alaska Department of Fish and Game (ADF&G) divers during June and August 2001 using the ADF&G *R/V Sundance*. The fishery was opened January 14, 2002 with a Guideline Harvest Level of 129,420 kg (285,322 lb). An estimated total of 128,550 kg (283,405 lb) of geoduck clams were harvested during the 2001/2002 fishery.

INTRODUCTION

Historically, geoduck clam assessment surveys have been limited in scope in Southeast Alaska. Stock assessment surveys were first completed in Southeast Alaska in 1982 at Noyes Island and in 1988 and 1989 at Biorika Island, Kah Shakes, and Gravina Island. Although commercial fisheries have been ongoing in these areas since 1985 no additional surveys were conducted until 1997. Beginning in 1997 established commercial harvest areas were resurveyed, as were several new areas. The principal goals of this project were to: 1) conduct a biomass assessment survey prior to opening a commercial fishery in potential new areas for the 2001/2002 season, and 2) continue improvement of assessment techniques for future surveys. Areas surveyed were Cat and Dog islands control area in Subdistrict 101-23, Hotspur Island and Percy Island area in Subdistrict 101-25, Bucareli Bay, Port Real Marina, Portillo Channel, and Ulloa Channel in Subdistrict 103-50, and Port Mayoral control area in Subdistrict 103-50 (Figure 1).

METHODS

Density estimates were made by scuba divers along two-meter-wide strip transects. There are two types of transects that may be used depending on the area, type I and II; these transects serve as the primary sampling unit. type I transects run perpendicular to shore and are used along straight shorelines (not coves or bays). Transects extend to a minimum target depth of 17 m (55 fsw) depth below mean lower low water (MLLW). Dives to the target depth include the majority of habitat in which commercial divers normally operate. Dives are limited to a maximum depth of 21 m (70 fsw) because deeper dives severely limit total bottom time for scuba divers and pose safety risks when conducted repetitively over several days. Transect length varies depending on the slope of the bottom. For type I transects, two divers swam as a team along each transect, with one diver holding a two-meter rod (a 2.1-cm diameter white PVC tube) in a horizontal position, perpendicular to the census path. Transect direction was maintained by reference to a compass mounted on the rod. The diver carrying the rod counted the number of geoduck clams passing under one side of the rod (usually the left) while the second diver counted geoducks on the other side (usually the right). Alternatively, each diver may carry a one-meter rod, but under no circumstances would a diver count an area wider than one meter. type I transects are used in areas such as Vallenar Bay and Cone Island.

type II transects are used in coves and embayments where a reasonable estimate of seabed area can be made. A buoyed anchor is dropped on a transect location where divers descend and survey a predetermined measured distance. Beginning at the anchor, a 1-m² PVC frame is flipped along a compass heading (generally toward mouth of bay), and all geoducks within each frame are counted and recorded. type II transects were not used this survey season.

A variation of type I transects involves using a 1-meter square that is placed at the beginning of the transect and flipped until target depth (type I) is reached. Geoduck counts are made within each square. This method has the advantage of focusing the counts into a well-defined area and may achieve a higher within transect precision (though this has not been tested). The disadvantages are the cumbersome use of the square, particularly in dense kelp, and the longer dive time required to complete a transect.

In addition to recording the geoduck count for each transect, divers also recorded data for start and stop depths, substrate type, percent vegetative cover, vegetative type, and the presence of other species of interest

including sea urchins, sea cucumbers, abalone, and *Sargassum muticum*. Vegetative type was recorded for the two most common types on each transect, with the most prevalent type listed first. Substrates were coded using a key that groups various algae and intertidal plant species into categories (Appendix A). Similarly, substrate type was recorded as "percent cover" for up to two types and was coded (Appendix B).

The beginning and ending time for each transect was recorded by a dive tender to allow for standardization to the mean lower low water (mllw) tide stage. Preferably, shoreline (type-one) transects were paired (sides A and B) so that a dive team would census one strip while descending, and then a second strip when returning to shore. The second transect in each pair is approximately 10–15 meters to the left (when facing shore) of the first transect. This is the preferred method but may not be practical when a gentle slope requires extended bottom times, with multiple dives often necessary to complete one transect. It is left to the divers discretion as to whether a paired transect is appropriate for a particular transect site. The appendices list whether a transect was paired or not.

Density estimates for each linear shoreline (type I) were calculated as the average number of geoducks per meter of shoreline length:

$$D_I = \sum_{i=1}^n \frac{L_i}{kL_t} c_i \quad , \quad (1)$$

where:

- D_I = estimated number of geoducks per meter of shoreline,
- i = transect index,
- c_i = count of geoduck clams on each transect i ,
- L_i = shoreline segment length associated with each transect i ,
- L_t = total shoreline length,
- k = either 2 or 4.

The variable k in Equation 1 is equal to 2 when only side A is counted on a type 1 transect, or equals 4 when both sides A and B are counted, and corrects for the 2-meter width of each transect side.

Where a reasonable estimate of seabed area could be made (type II transects), the density per square meter of seabed is estimated:

$$D_2 = \frac{1}{Tn_D} \sum_{i=1}^n c_i, \quad (2)$$

where:

D_2 = estimated number of geoducks per square meter,
 c_i = count of geoduck clams on each transect i from 1 to n ,
 n_D = number of transects,
 T = transect length.

Uncertainty in the density estimate is expressed as the percent precision. The index is equal to the lower bound of the one-sided 90% confidence interval expressed as a percent of the average density and calculated as:

$$P_D = 100 \left(1 - t_\alpha \frac{s}{D\sqrt{n}} \right), \quad (3)$$

where:

P_D = percent precision of the density estimate,
 t_α = t-value from Student's distribution for a one-sided interval with significance, level $\alpha = 10\%$,
 s = standard deviation of the mean,
 D = estimated density of geoducks (D_1 or D_2).

In a perfectly precise estimate, P_D would equal 100%; decreasing numbers indicate increasing uncertainty.

Geoduck Weight Estimates

Geoduck weight estimates were made using data collected from previous commercial fisheries and assessment surveys. All data available (i.e. both commercial and survey samples) were combined and applied to the biomass estimates. In new areas where no data have been collected, all data collected and available from Southeast Alaska were averaged and used to estimate the biomass. After the fishery has occurred, data collected for that area's commercial fishery will be averaged and used to recalculate the biomass estimate.

Mean weight per geoduck within a given area is estimated as:

$$W = \frac{\sum w_i}{n_w}, \quad (4)$$

where:

W = estimated mean weight per whole geoduck,
 w_i = weight of the i th geoduck from the available data,
 n_w = sample n for weight.

Geoduck Biomass Estimates

The estimate of total geoduck biomass in an area was calculated as:

$$B_{\text{bed}} = (D_1)(W)(S) \quad \text{or}, \quad (5)$$

$$B_{\text{bed}} = (D_2)(W)(A). \quad (6)$$

Where:

B_{bed} = estimated total geoduck biomass per defined area,
 D_1 = estimated density of geoducks per linear meter of shoreline,
 D_2 = estimated density of geoducks (number per square meter),
 S = total estimated shoreline length (in meters, using NOAA charts),
 A = total estimated bed area (in square meters, using NOAA charts).

Confidence limits for the biomass estimates are based on an estimate of the variance of the biomass. A variance-of-products formula (Goodman 1960) was used to calculate a variance estimate for the product of mean density and mean weight per geoduck. Assuming that there is no correlation between density and weight then the variance of the biomass is:

$$\delta_B^2 = D^2 \frac{\delta_w^2}{n_w} + W^2 \frac{\delta_D^2}{n_D} - \frac{\delta_D^2 \delta_W^2}{n_D n_w}, \quad (7)$$

where:

δ_B^2 = variance of biomass, B ,
 δ_D^2 = variance of mean density,
 δ_w^2 = variance of mean weight.

Uncertainty in the biomass estimate is expressed as the percent of precision. The index is equal to the lower bound of the one-sided 90% confidence interval expressed as a percent of the biomass. This index, similar to P_D (Equation 3), was calculated as:

$$P_B = 100 \left(1 - t_{\alpha} \frac{s}{B_{bed} \sqrt{n_D}} \right), \quad (8)$$

where:

P_B = percent precision of the density estimate,

s = standard deviation of the mean biomass estimate (δ_B , from Equation 7).

The guideline harvest levels for biomass estimates were calculated using a precision adjusted biomass.

$$B_{adj} = P_B * B_{bed} \quad (9)$$

where:

B_{adj} = precision adjusted biomass estimate (used to calculate GHL),

P_B = from Equation 8,

B_{bed} = from Equation 5 or 6.

SHOW FACTOR SURVEYS

Geoduck clams can be difficult to count when they are hidden below the substrate. For this reason the true clam density may be underestimated. The method described below, used to estimate the true density of geoducks from visual counts, is patterned after that used by the Washington Department of Fish and Wildlife (Bradbury et al. 2000). This method was originally introduced by Goodwin (1977) who coined the term “show factor.” A “show” is either a siphon visible above the substrate or a depression in the substrate that can be identified as having been made by a clam siphon (see ADF&G RIR 1J01-25 for a complete description for department show plot methodology).

The show factor, F, is the ratio of geoduck clam shows visible during a single observation of any defined area and the true abundance of harvestable geoducks within that area:

$$F = n / N, \quad (10)$$

where:

n = the number of visible shows within a defined area (show plot),

N = the absolute number of harvestable geoducks within the area.

The guideline harvest levels for Southeast areas open during the 2000-2001 season were adjusted for a show factor as:

$$GHL_F = \frac{GHL_{bed}}{F}, \quad (11)$$

where:

GHL_F = show factor adjusted guideline harvest level (GHL) estimate,

GHL_{bed} = geoduck GHL estimate,

F = show factor, from Equation 10.

SURVEY RESULTS AND DISCUSSION

A total of 136 transects were completed during the 2001 survey season in four areas of Southeast Alaska (Table 1; Figures 2–8). Industry divers provided reconnaissance data² prior to department surveys. From this reconnaissance, two new areas were surveyed by the department for possible commercial fisheries in the 2000/2001 season: Subdistrict 103-50 and the Percy Island/Hotspur Island area in Subdistrict 101-25. In addition to providing for a commercial harvest, two areas were selected as geoduck clam control sites: Port Mayoral in Subdistrict 103-50, and the Cat and Dog islands area in Subdistrict 101-23. The Appendices list the GHL and raw data and biomass estimates for each area.

Since neither assessment surveys nor commercial fisheries occurred in these areas, no area-specific weight data was available to calculate biomass. Instead, all available geoduck clam weight data from Southeast Alaska was averaged and used to calculate the estimated biomass for these areas. This data was collected from both department assessment surveys and commercial fisheries from 1978/1979 through 2000/2001 seasons. Average weight was 1,099 g (2.4 lb) resulting from a sample size of 4,735 clams collected from 19 areas in Southeast Alaska.

² Industry reconnaissance was funded by grant NA06FN0385 from the National Oceanic and Atmospheric Administration (NOAA). The views expressed are those of the authors and do not necessarily reflect the views of NOAA or any of its sub-agencies.

A total of 28 transects were located over 5,769 m of shoreline in the Percy/Hotspur islands area. Geoduck counts along these transects resulted in a biomass estimate of 712,398 kg (1,570,569 lb). Survey raw data is in Appendix D.

A total of 78 transects were located over 31,200 m of shoreline in Subdistrict 103-50. Geoduck counts resulted in an biomass of 1,333,537 kg (2,939,946 lb). Survey raw data is in Appendix F.

As per the Geoduck Management Plan (Pritchett 1999), closed waters will be designated for research and conservation purposes. Research in closed areas will be conducted to detect population trends that are independent of commercial harvest. As these programs are developed and areas defined, small beds or portions of beds may be closed to commercial geoduck harvest. Populations in refuges provide opportunities for research of important life history events, individual growth rates, recruitment, mortality, and related information. Possible areas may be control sites, long term show factor sites, or recruitment study areas where a commercial harvest would negate any benefits that might be obtained. Refuges also meet the biological conservation objective by providing some assurance that unharvested populations remain at levels necessary for successful reproduction. These populations may provide the nucleus for production of larvae for restocking adjacent areas in the event that they are inadvertently depleted. In 2001, two areas were designated and subsequently surveyed as geoduck clam control areas in Southeast Alaska: Port Mayoral in portions of Subdistrict 103-50, and the Cat and Dog islands area in portions of Subdistrict 101-23. Both control areas are located in areas that have not previously been open to commercial harvest. These areas were chosen because of their proximity to important commercial harvest areas.

A total of 9 transects located over 900 m of shoreline were surveyed the Port Mayoral geoduck control area. The estimated biomass for this area is 38,458 kg (84,785 lb). Survey raw data is in Appendix E.

A total of 21 transects located over 3,300 m of shoreline were surveyed in the Cat and Dog islands control area. The estimated biomass for this area is 56,854 kg (125,341 lb). Survey raw data is in Appendix C.

Collecting data necessary for calculating show factors is very labor intensive and requires that divers be able to visit a site continuously for relatively lengthy periods (up to 5–7 days per site). The remoteness of most geoduck fisheries in Southeast prohibits establishing show factors specific for individual geoduck harvest areas. Data collection to develop show factors began in Southeast in 1998 (Pritchett et al. 1999). Following the 2000 survey season, a total of six sets (three 2x10 m plots per set) of show plots had been located and surveyed in areas of Southeast Alaska where geoduck assessment surveys and harvest occurs: one set each near Kolosh Island, Legma Island, Middle Gravina, Blank Inlet, Grant Island, and San Juan Bautista. The overall average show factor derived from these combined show plots was 0.80. This value compensates for retracted or covered geoduck siphons not visible during surveys. The overall affect of applying show factors is an increased estimate of biomass. No additional show plot work was completed in 2001.

FISHERY MANAGEMENT AND SEASON SUMMARY

Geoduck clams are long-lived with low and sporadic recruitment, therefore, the objective of geoduck fishery management is to allow low exploitation rates on beds open to commercial harvest. Commercial harvest is also restricted to beds for which biomass estimates are available. The guideline harvest level (GHL) for each area is calculated as 2% of the estimated biomass per year (Larson and Minicucci 1997). Harvests are by

permit only and historically have been allowed from October 1 through May 31 to avoid the summer spawning and recovery period and to minimize PSP toxin levels.

Open fishing areas were approved for harvesting geoduck clams for intrastate and interstate sale by ADEC. Geoducks were sold either fresh or frozen only after satisfactory testing for Paralytic Shellfish Poisoning (PSP) by the ADEC prior to sale and distribution. A certificate and permit from ADEC was required to possess, harvest, process, and distribute geoduck clams for sale for human consumption or bait.

The geoduck fishery in Southeast Alaska was under limited entry during this season with 104 divers eligible to participate. Each diver was required to have a current Miscellaneous Shellfish Species Registration Form during fishing operations. The ADF&G Ketchikan area office had responsibility for geoduck fisheries management within all open areas except Symonds Bay and the Goddard area that was managed through the Sitka office. The Southeast Alaska Regional Dive Fisheries Association (SARDF) Geoduck Committee requested the department open the 2000-2001 season daily from 9:00 a.m. to 3:00 p.m., until further notice beginning 9:00 a.m. Monday, January 14, 2002. Total quota available for harvest was 129,420 kg (285,322 lb, Table 2). A total of 36 divers participated in the Southeast Alaska geoduck fishery, landing a preliminary estimate of 126,075 kg (277,947 lb) of geoduck clams (Table 2). Open area descriptions for the commercial geoduck clam fisheries can be found in Appendix G.

Nakat Bay

Nakat Bay (in Subdistrict 101-11) opened for a guideline harvest level of 34,385 pounds of whole geoduck clams. The area was open from 9:00 a.m. to 3:00 p.m. daily, beginning 9:00 a.m. Monday, January 14, 2002 and was closed by emergency order effective 5:00 p.m. Tuesday, March 5, 2002. The total harvest was 15,893 kg (35,038 lb) with a total of four divers making 28 landings.

Kah Shakes

Kah Shakes (in Subdistrict 101-23) opened for a guideline harvest level of 35,402 pounds of whole geoduck clams. The area was open from 9:00 a.m. to 3:00 p.m. daily, beginning 9:00 a.m. Monday, January 14, 2002 and was closed by emergency order effective 3:00 p.m. Saturday, January 26, 2002. The total harvest was 15,510 kg (34,194 lb) with a total of 11 divers making 26 landings.

Hotspur & Percy Islands

Hotspur and Percy Islands (in Subdistrict 101-25) opened for a guideline harvest level of 59,278 pounds of whole geoduck clams. The area was open from 9:00 a.m. to 3:00 p.m. daily, beginning 9:00 a.m. Monday, January 14, 2002 and was closed by emergency order effective 3:00 p.m. Sunday, January 20, 2002. The total harvest was 26,488 kg (58,396 lb) with a total of 22 divers making 72 landings.

Subdistrict 103-50

Subdistrict 103-50 opened for a guideline harvest level of 88,917 pounds of whole geoduck clams. The area was open from 9:00 a.m. to 3:00 p.m. daily, beginning 9:00 a.m. Monday, January 14, 2002 and was initially closed by emergency order effective 3:00 p.m. Monday, January 28, 2002. The fishery reopened starting Sunday, May 5, 2002 to harvest the remaining GHIL and continued each Sunday until closed by emergency order effective 8:00 p.m. Sunday, May 19, 2002. The total harvest was 40,346 kg (88,947 lb) with a total of 15 divers making 85 landings.

Steamboat Bay

Steamboat Bay (in Subdistrict 103-70) opened for a guideline harvest level of 49,461 pounds of whole geoduck clams. The area was open from 9:00 a.m. to 3:00 p.m. daily, beginning 9:00 a.m. Monday, January 14, 2002 and was closed by emergency order effective 10:00 a.m. Saturday, March 23, 2002. The total harvest was 21,843 kg (48,155 lb) with a total of 12 divers making 59 landings.

Symonds Bay

Symonds Bay (in Subdistrict 113-31) opened for a guideline harvest level of 3,438 pounds of whole geoduck clams. The area was open from 9:00 a.m. to 3:00 p.m. daily, beginning 9:00 a.m. Monday, January 14, 2002 and was closed by emergency order effective 3:00 p.m. Tuesday, January 29, 2002. The total harvest was 1,129 kg (2,488 lb) with a total of five divers making 14 landings.

Goddard

The Goddard area (in portions of Subdistricts 113-31 and 113-41) opened with a guideline harvest level of 8,393 kg (18,503 lb) of whole geoduck clams. The area was open from 9:00 a.m. to 3:00 p.m. daily, beginning 9:00 a.m. Monday, January 14, 2002 and was closed by emergency order effective 3:00 p.m. Monday, March 11, 2002. The total harvest was 7,342 kg (16,187 lb) with a total of five divers making 40 landings.

Commercial Sampling

A total of 1,331 whole geoduck clams were sampled during the 2001/2002 commercial fishery (Table 3). Average weight for this fishery was 1,177 g (2.59 lb) with, on average, smaller clams being harvested from Symonds Bay and larger clams being harvested from the Goddard area.

Log Sheets

On September 22, 2000 the SARDFa Geoduck Committee was informed that during the 2000-2001 season, the department was willing to expand fishery boundary lines beyond the areas surveyed for biomass to collect reconnaissance data needed to expand the fishery. Although the department was prepared to open this expanded area, a commitment from the divers was needed to provide good location data of harvests (previous experience with cucumber logbooks suggested that the divers might not accurately or completely fill out the logs). The committee agreed that harvest logs were important and recommended that SARDFa send a letter to divers stressing the importance of this information. For the 2000-2001 geoduck fishery in Southeast, divers were required³ to "...maintain a log sheet by recording the location and the total weight of geoducks harvested on a daily basis." Logs were to be completed when harvesting in Ulitka Bay, Little Steamboat Bay, Cone Island area, Port Santa Cruz, Southern Sea Otter Sound, and San Christoval/Palisade Island area. Logs were not required for the Foggy Bay or Goddard harvest areas. The purpose of the logs was primarily to provide reconnaissance information for potential biomass assessment surveys and potential expansion of the fishery, but also if it is determined that these areas should be divided into smaller fisheries, then where the harvest occurred can be identified and an accurate estimate of biomass can be made. Of the 74 permitted divers participating in the 2000-2001 season, only 27 divers returned logs though two of these logs were not filled out sufficiently to provide useful data. Overall, approximately 66% of the divers failed to provide any log of their harvest and of those that did respond, many did not provide a log for each area that they harvested. This number includes those divers who only harvested in an area where a log was not required. The table below more accurately represents those harvest areas where logbooks were required and logs obtained by the department during the 2000-2001 season.

³ ADF&G News Release, 11-9-00, 2000/2001 Southeast Alaska Commercial Geoduck Clam Fishery.

Fishery	Permits Fishing Areas	Harvest Logs Received	Percent Received
Cone Island	42	18	43%
Little Steamboat Bay	10	1	10%
Port Santa Cruz	21	9	43%
San Christoval/Palisade I.	20	11	55%
Southern Sea Otter Sound	24	8	33%
Ulitka Bay	6	1	17%
Total	123	48	39%

Divers were requested to complete log sheets when harvesting in Subdistrict 103-50 and the Percy-Hotspur islands areas during the 2001/2002 fishery. Both were new commercial areas open for the first time during the 2001/2002 season. The log sheets consisted of a page to record the amount harvested with attached charts to indicate where the harvest occurred (Figure 9). As per ADF&G's fish ticket database, during the 2001/2002 commercial geoduck fishery 15 divers delivered product harvested from Subdistrict 103-50 and 22 from the Percy/Hotspur islands area with 9 (60%) and 11 (50%) divers returning log sheets, respectively. It can only be assumed that all product harvested by the divers submitting log sheets was included on the log sheets. The returned log sheets accounted for 57% (Subdistrict 103-50) and 56% (Subdistrict 101-25) of the product harvested.

It is likely that several of the non-responding divers harvested in areas that had not been surveyed (e.g. they harvested in areas requiring a logbook) and therefore no record exists of specifically where this harvest occurred, nor how much product was removed. Depending on the scale used, the use of expanded areas for subsequent fisheries could possibly affect future estimates of virgin (non-fished) biomass for an area and consequently the threshold level for that area (5 AAC 38.142.(h)). In light of the lack of compliance with returning log sheets, the department considers the opening of expanded, non-surveyed areas to be threatening to the geoduck stock due to localized over fishing. The department has no plans to open expanded, non-surveyed areas for future geoduck fisheries.

LITERATURE CITED

- Bradbury, A., B. Sizemore, D. Rothaus, and L. Timme. 2000. Stock assessment of subtidal geoduck clams (*Panopea abrupta*) in Washington. Marine Resources Unit, Fish Management Division, Fish Program, Washington Department of Fish and Wildlife.
- Goodman, L. A. 1960. On the exact variance of products. Am. Statistical Association Journal. p708-713.
- Harbo, Rick M., 1997. Shells and shellfish of the Pacific northwest. Harbour Publishing, Canada.
- Larson, R. and T. Minicucci. 1997. Miscellaneous dive fisheries, 1995/96. *In*: Shellfish fisheries, southeast Alaska-Yakutat region 1995/96, report to the Board of Fisheries. Alaska Department of Fish and Game, Division of Commercial Fisheries Management and Development, Regional Information Report No. 1J96-31, Juneau.
- Pritchett, M., R. Larson, and J. E. Clark. 2000. Geoduck clam stock assessment surveys and fishery management for the 1999-2000 season. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 1J00-34, Juneau.
- Pritchett, M., R. Larson, and J. E. Clark. 1999. Geoduck clam stock assessment surveys and fishery management for the 1998/99 season. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 1J99-36, Juneau.
- Pritchett, M. 1999. Management plan for the harvest of geoduck clams *Panopea abrupta* in Southeast Alaska. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 1J99-39, Juneau.

Table 1. Biomass estimates of geoduck clams from four areas (two commercial and two control) surveyed in Southeast Alaska in 2001.

	Port Mayoral Control	Dog & Cat Control	Percy/Hotspur Commercial	103-50 Commercial
Number of Transects	9	21	28	78
Average per Linear Meter	39	16	112.46	38.93
Variance of Counts	693	299	12325.55	11040.24
Std. Variance of Mean	77	14	440.20	141.54
Shoreline (m)	900	3,300	5,769	31,200
Total Number of Geoducks	35,025	51,779	648,806	1,214,500
Variance of Total Number	62,395,313	155,195,156	14,650,400,712	137,782,241,169
Precision of Estimate	68.5%	68.1%	75.5%	60.5%
90% Coefficient of Variation	41.9%	41.5%	31.8%	50.9%
90% two-tail Precision	58.1%	58.5%	68.2%	49.1%
Average Weight (lb) ^a	2.4	2.4	2.4	2.4
Variance of Average Weight ^a	0.00011281	0.00011281	0.00011281	0.00011281
Biomass Estimate (lb)	84,785	125,341	1,570,569	2,939,946
Variance of Biomass Est.	365,756,148	909,699,363	85,894,427,412	807,528,874,746
Precision of Estimate	68.5%	68.1%	75.5%	60.5%
90% Coefficient of Variation	41.9%	41.5%	31.8%	50.9%
90% two-tail Precision	58.1%	58.5%	68.2%	49.1%
Lower Bounds Biomass Est.	49,222	73,321	1,071,374	1,443,837
Upper Bounds Biomass Est.	120,349	177,360	2,069,764	4,436,055
Show Factor Adjustment	0.80	0.80	0.80	0.80
Target Harvest Rate	4%	4%	4%	4%
Non-Precision Adjusted Quota ^b	4,239	6,267	78,528	146,997
Precision Adjusted Quota ^b	2,904	4,268	59,278	88,917

^a Weight values from overall Southeast commercial and survey weight data from 1978/1979 through 2000/2001. N = 4735.

^b In pounds. No harvest occurs in control areas. Data provided for information purposes, only.

Table 2. Southeast Alaska 2001/2002 season commercial geoduck clam harvest by area.

Area	Subdistrict-Bed	Number of Divers	Number of Landings	Guideline Harvest Level, kg (lb)	Hours Open ^a	Kilograms (lb) Harvested ^b
Kah Shakes	101-25	11	26	16,058 (35,402)	78	15,510 (34,194)
Nakat Inlet	101-11	4	28	15,597 (34,385)	318	15,893 (35,038)
Percy & Hotspur islands	101-25	22	72	26,888 (59,278)	39	26,488 (58,396)
103-50	103-50	15	85	40,332 (88,917)	135	40,346 (88,947)
Steamboat Bay	103-70	12	59	22,435 (49,461)	473	21,843 (48,155)
Symonds Bay	113-31	5	14	1,559 (3,438)	96	1,129 (2,488)
Goddard	113-31-815002, 41	5	40	6,551 (14,442)	342	7,342 (16,187)
Total		37	324	129,420 (285,322)		128,550 (283,405)

^a Each area originally open for 6-hour days (0900 – 1500).

^b Harvest Estimates from IFDB 3-21-02, 2002.

Table 3. Commercial geoduck weights collected during the 2001/2002 fishery.

	Geoduck Weight (g)					
	Count	Min	Max	Mean	Variance	Std Dev
Goddard	96	479	2,837	1,497	194,004	440
Kah Shakes	200	458	2,246	1,067	84,156	290
Nakat Bay	175	420	1,741	1,051	59,201	243
Steamboat Bay	200	479	2,714	1,242	163,749	405
Symonds Bay	160	163	1,760	969	57,269	239
Percy / Hotspur Islands	200	467	2,281	1,198	91,132	302
103-50	300	573	2,361	1,276	104,961	324
Totals (weighted, grams)	1,331	163	2,837	1,177	122,183	350
	Geoduck Weight (lb)					
Totals (weighted, pounds)	2.93	0.36	6.25	2.59	269.37	0.77

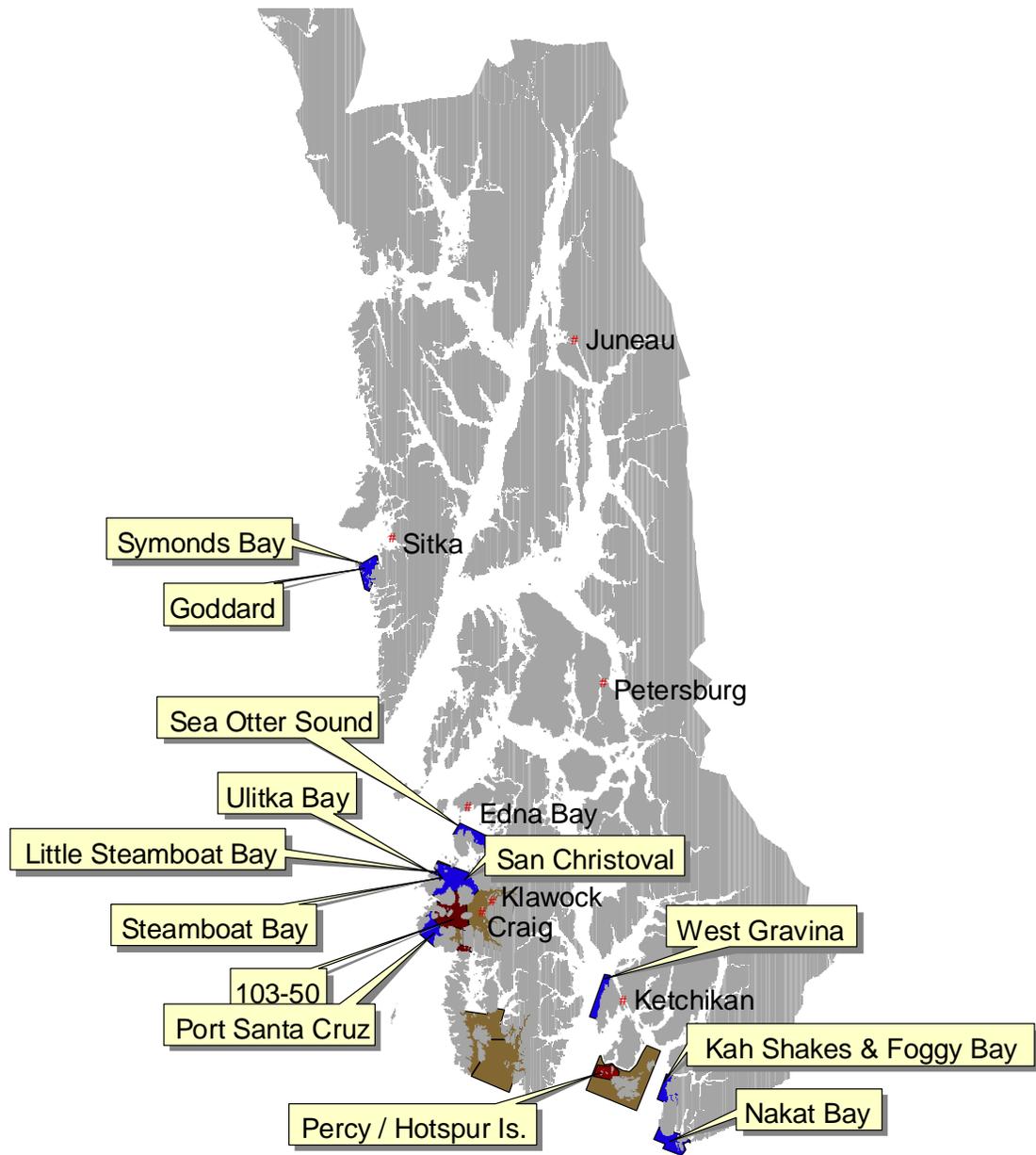


Figure 1. Geoduck clam survey and commercial harvest areas in Southeast Alaska.

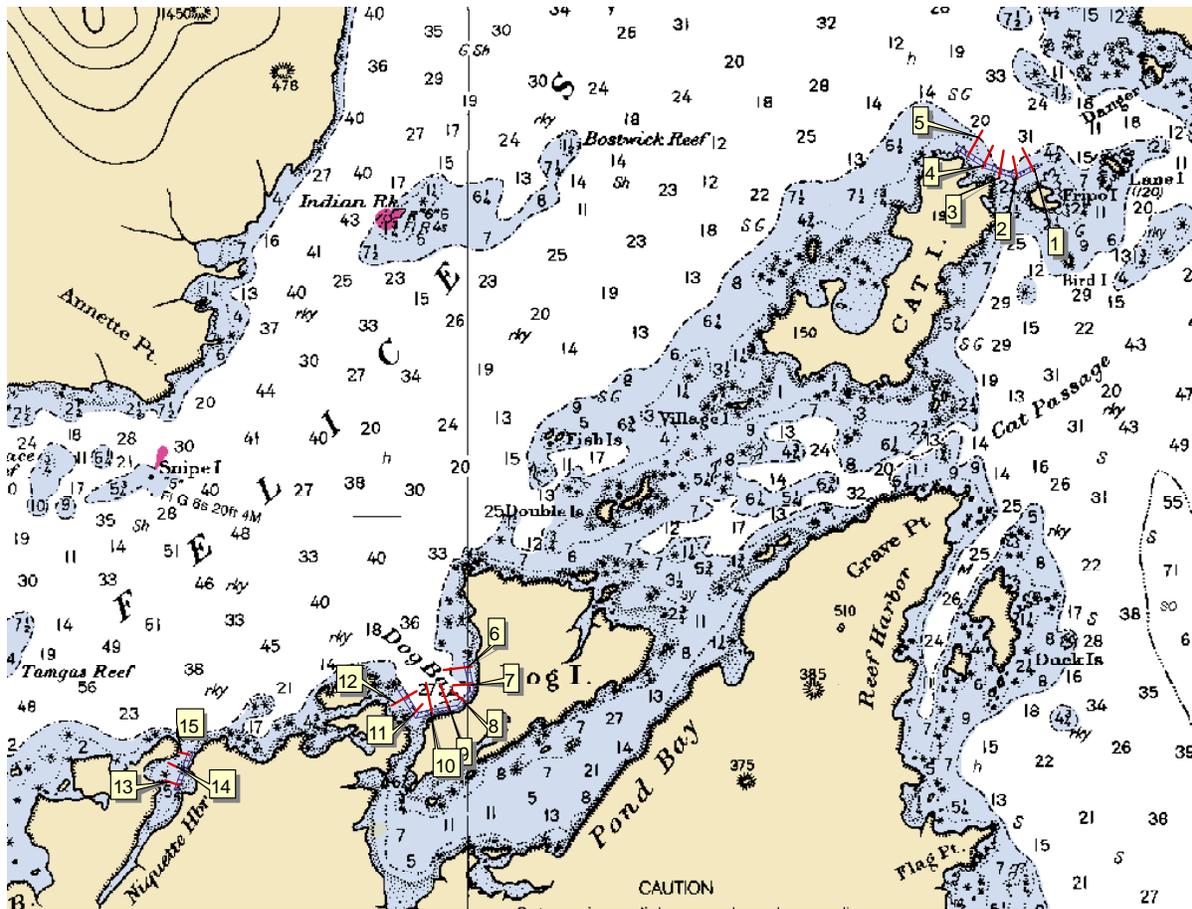


Figure 2. Dog and Cat islands control areas(in Subdistrict 101-23) 2001 geoduck survey transect location

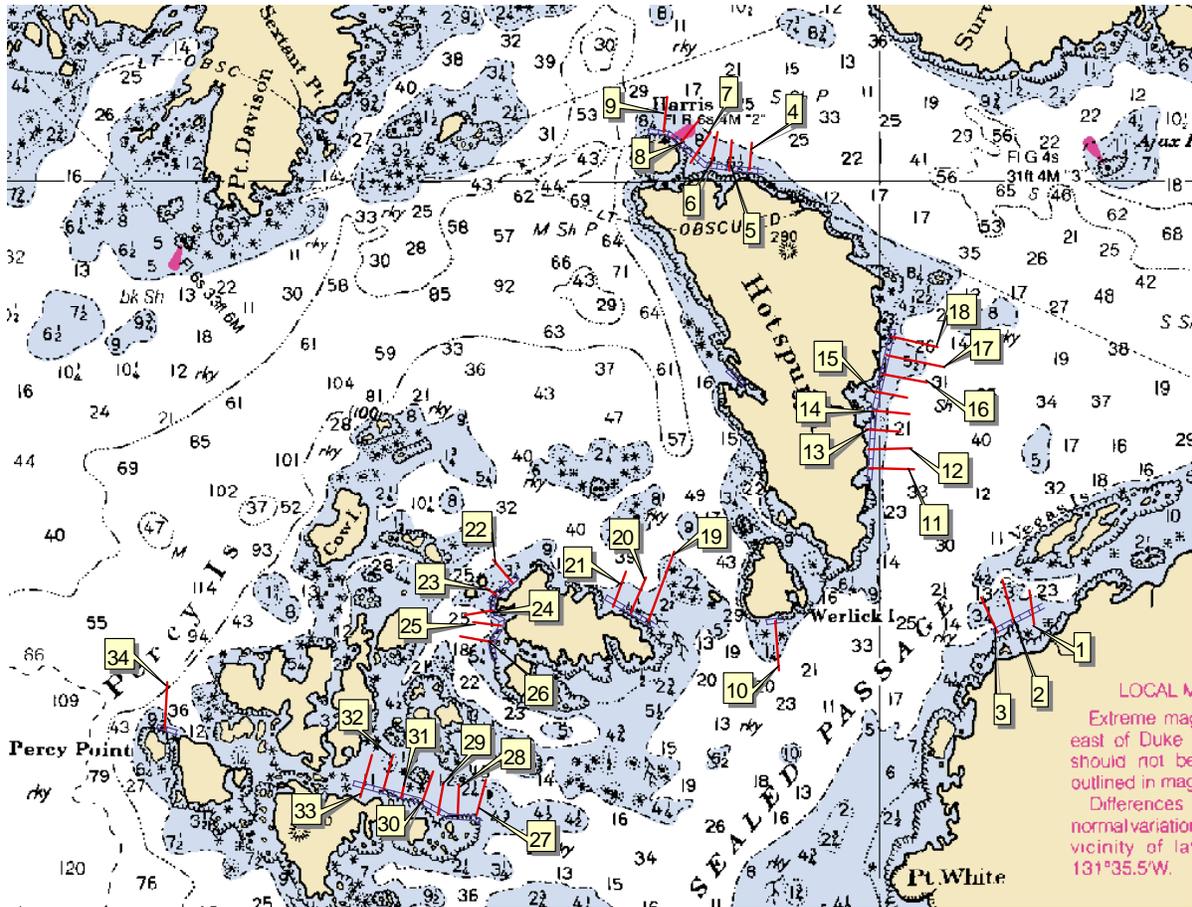


Figure 3. Percy and Hotspur islands (in Subdistrict 101-25) 2001 geoduck survey transect locations.

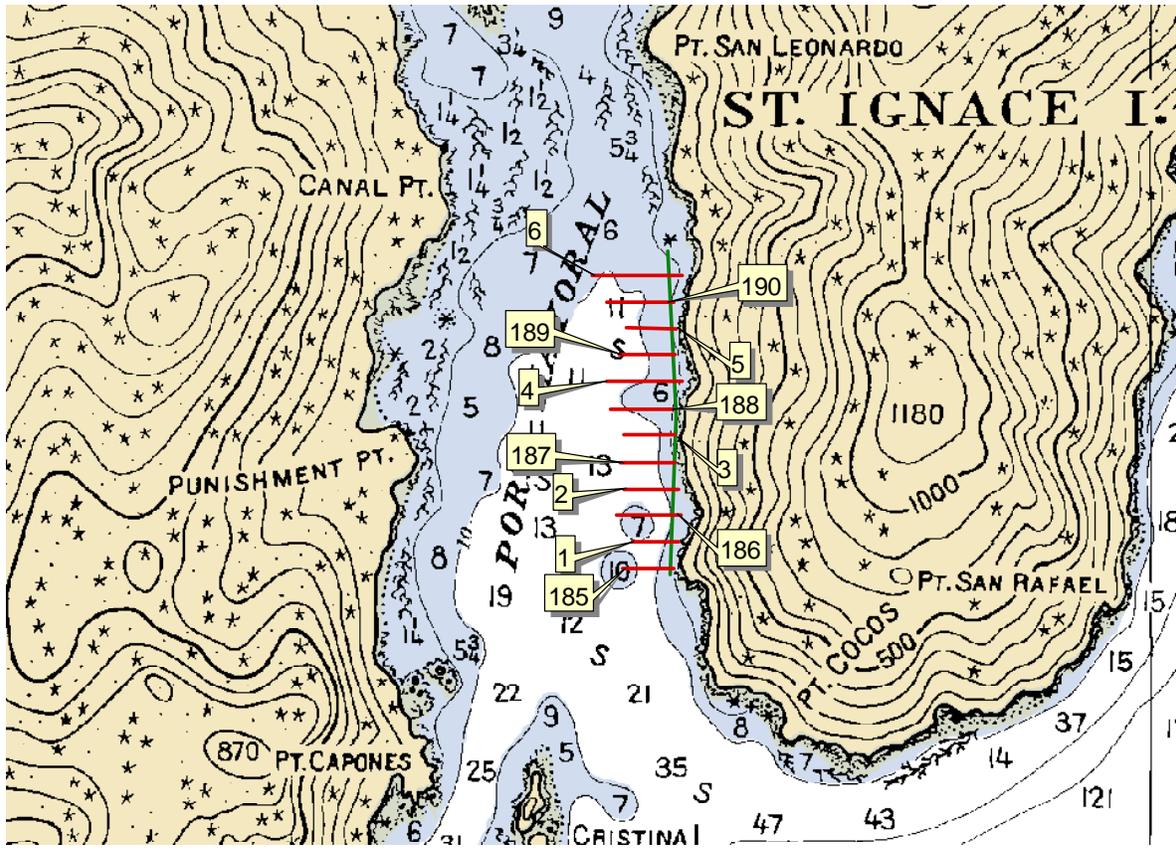


Figure 4. Port Mayoral control area (in Subdistrict 103-50) 2001 geoduck survey transect locations.



Figure 5. Subdistrict 103-50 2001 geoduck survey transects (see following figures for detailed transect locations).

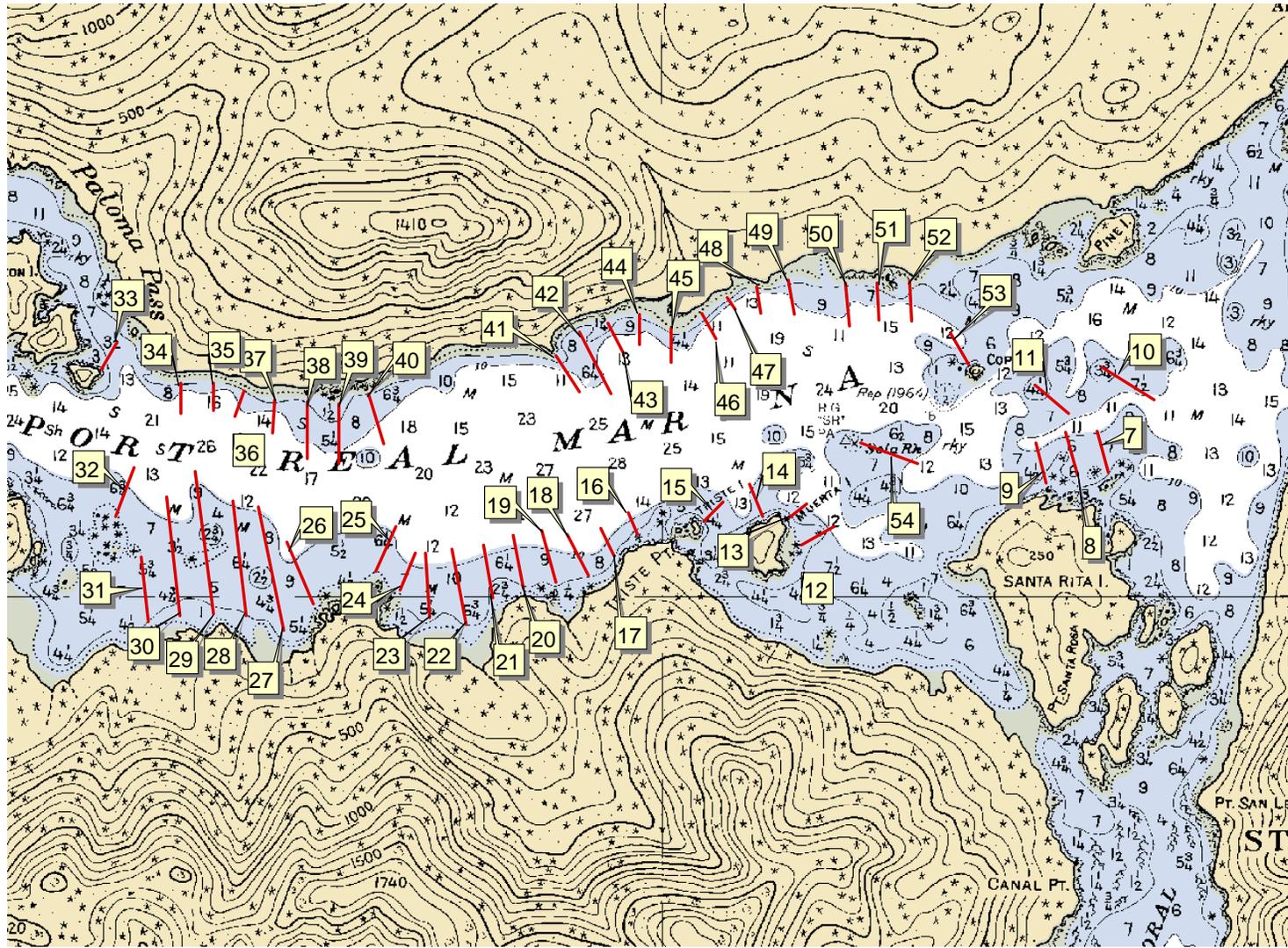


Figure 6. Port Mayoral section of Subdistrict 103-50 2001 geoduck survey transects.

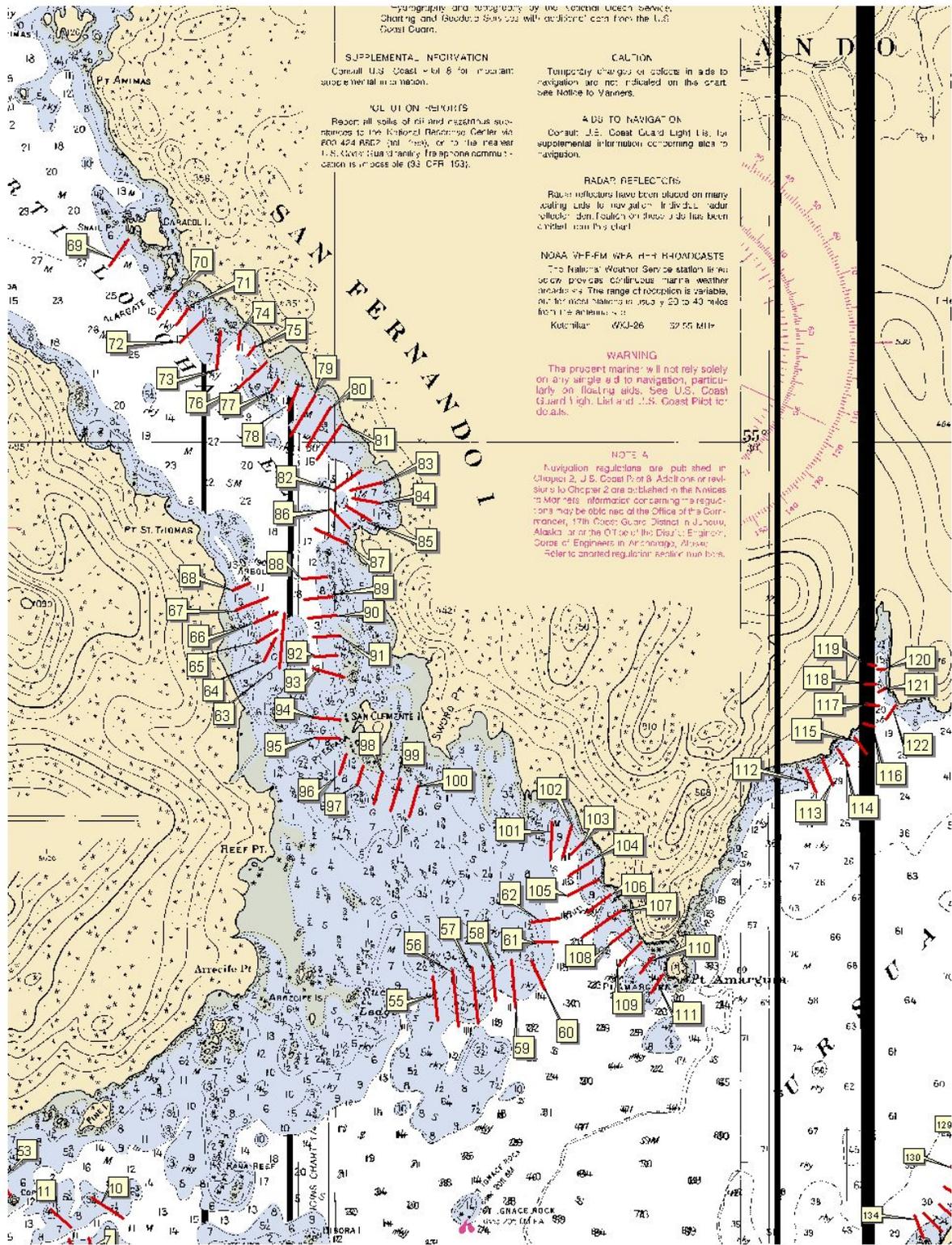


Figure 7. Portillo Channel section of Subdistrict 103-50 2001 geoduck survey transects.

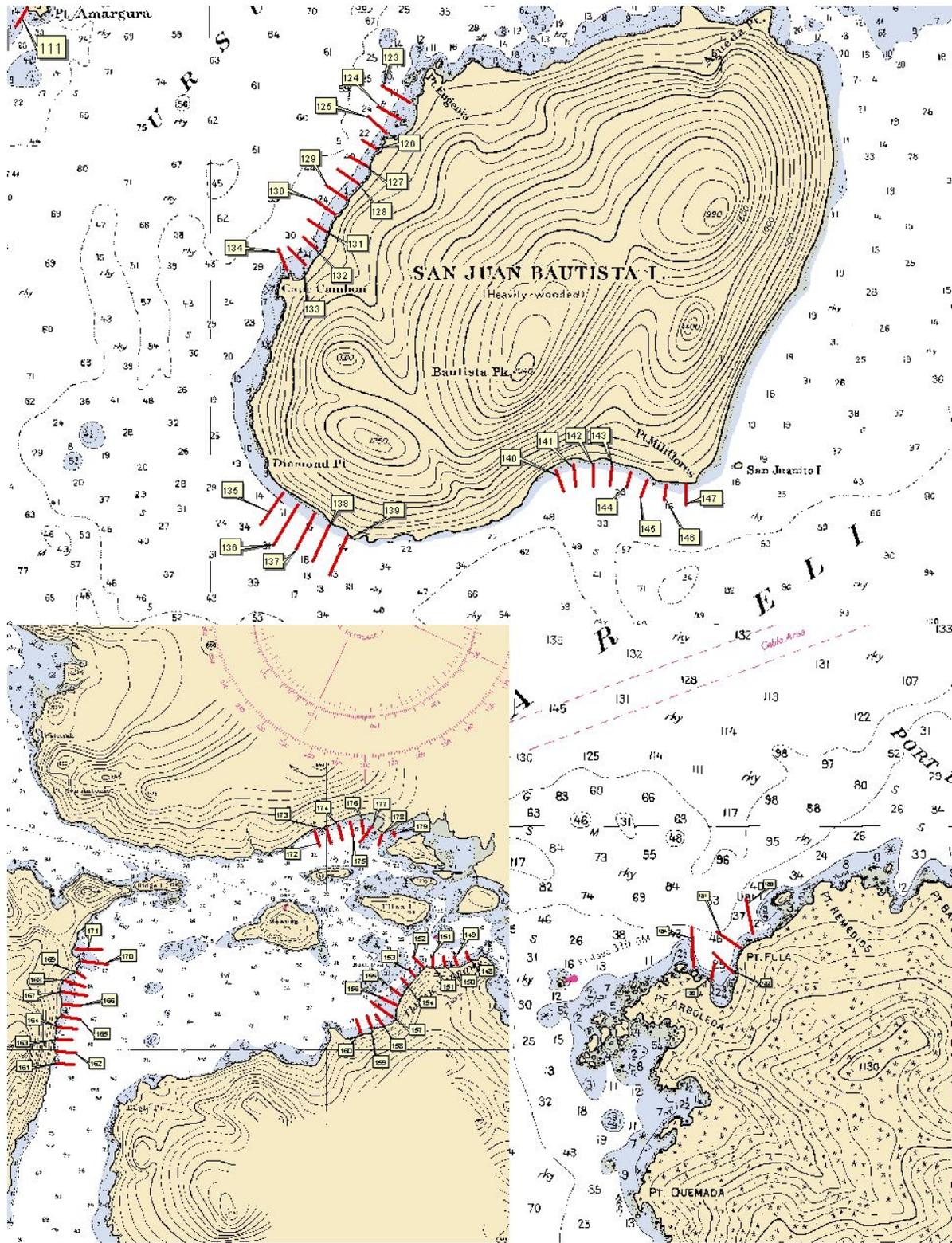


Figure 8. San Juan Bautista Island, Meares Passage, and Point Fula sections of Subdistrict 103-50 2001 geoduck survey transects.

Area Fished _____

Diver's Name: _____ Boat Name _____

Date(s): _____

Please **clearly** mark your dive site (using a number) on the chart on the back of this page.

Then put a poundage harvested next to the dive site with a description of bed quality.

Log sheets must be submitted to the department with each fish ticket. Failure to submit completed log sheets in a timely manner may result in the reduction of future open fishing area. All log data received will remain confidential. Please contact Marc Pritchett (465-4244) for clarification.

Bed #	Poundage Harvested	Quality (Circle One)		
1	_____	Excellent	Fair	Poor
2	_____	Excellent	Fair	Poor
3	_____	Excellent	Fair	Poor
4	_____	Excellent	Fair	Poor
5	_____	Excellent	Fair	Poor
6	_____	Excellent	Fair	Poor
7	_____	Excellent	Fair	Poor
8	_____	Excellent	Fair	Poor

(bed size?, geoduck densities?, ease of digging? by catch species and number?)

Comments: _____

Figure 9. Log sheets used to solicit information from 103-50 and Hotspur Island areas.

-continued-

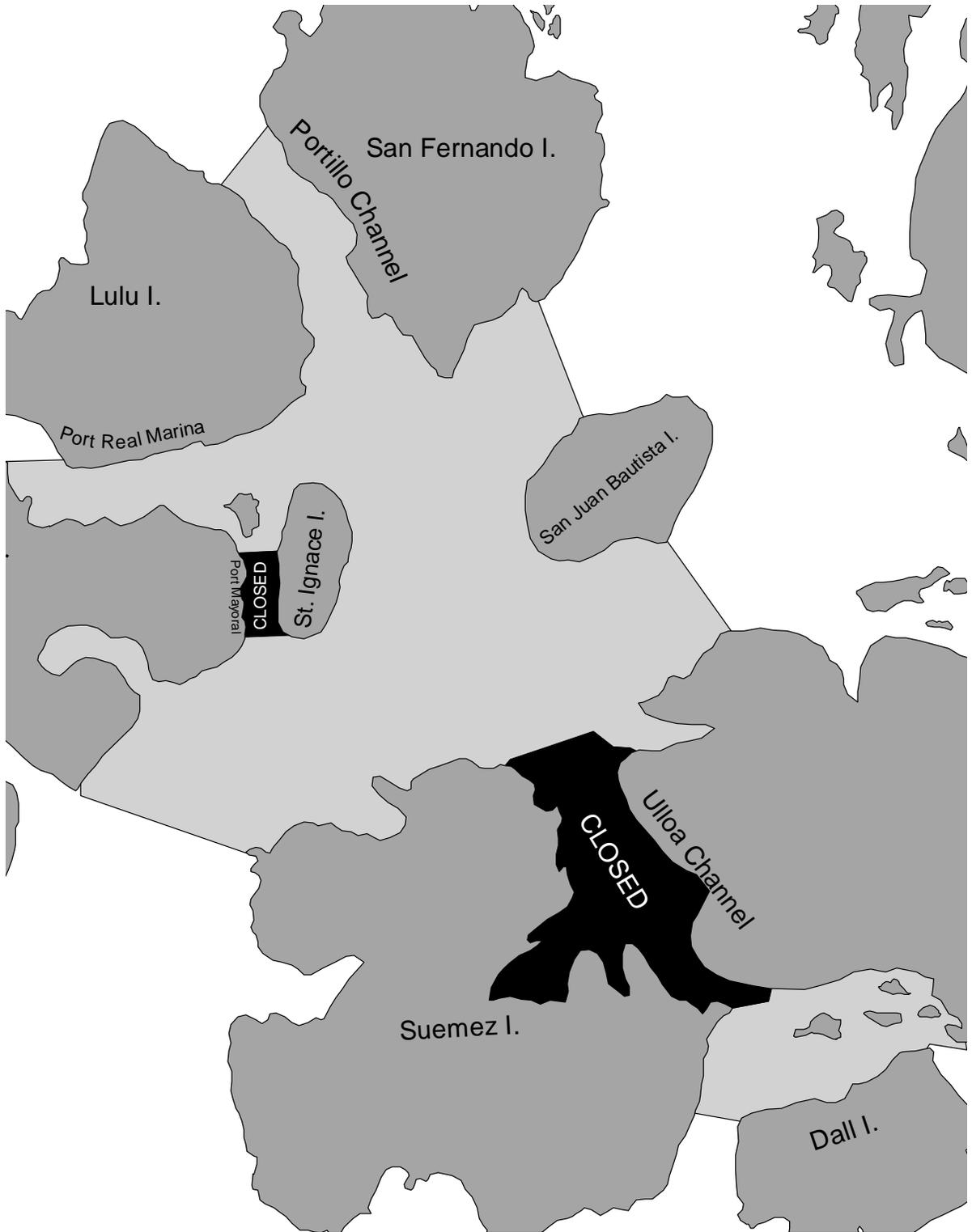


Figure 9 (page 2 of 3)

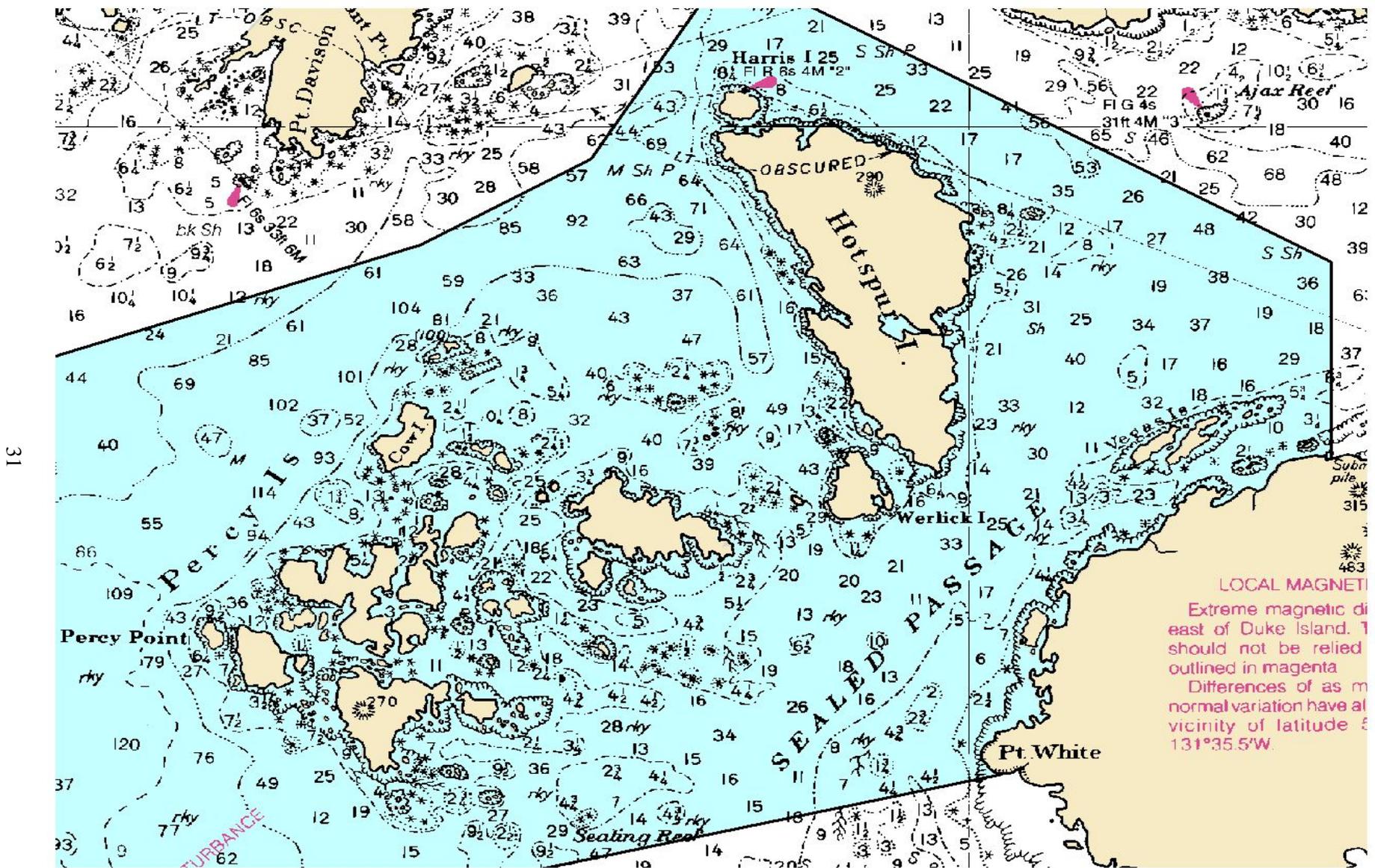


Figure 9 (page 3 of 3)

APPENDICES

Appendix A. Key to vegetative substrate types used for geoduck clam surveys.

Code	Expanded Code	Species Included	Latin Names
AGM	Agarum	Sieve kelp	<i>Agarum clathratum</i>
ALA	Alaria	Ribbon kelps	<i>Alaria marginata</i> , <i>A. nana</i> , <i>A. fistulosa</i>
ELG	Eel grass	Eel grass, surfgrasses	<i>Zostera marina</i> , <i>Phyllospadix serrulatus</i> , <i>P.</i> <i>scouleri</i>
FIL	Filamentous red algae	Sea brush, poly, black tassel	<i>Polysiphonia pacifica</i> , <i>P.</i> <i>hendryi</i> , <i>Pterosiphonia</i> <i>bipinnata</i>
FIR	Fir kelp	Black pine, Oregon pine (red algae)	<i>Neorhodomela larix</i> , <i>N. oregona</i>
FUC	Fucus	Rockweed or popweed	<i>Fucus gardneri</i>
HIR	Hair kelp	Witch's hair, stringy acid kelp	<i>Desmarestia aculeata</i> , <i>D.</i> <i>viridis</i>
LAM	Laminaria	split kelp, sugar kelp, suction- cup kelp	<i>Laminaria bongardiana</i> , <i>L.</i> <i>saccharina</i> , <i>L. yezoensis</i> (when isolated and identifiable)
LBK	Large Brown Kelps	Five-ribbed kelp, three-ribbed kelp, split kelp, sugar kelp, sea spatula, sieve kelp, ribbon kelp	<i>Costaria costata</i> , <i>Cymathere triplicata</i> , <i>Laminaria spp.</i> , <i>Pleurophycus gardneri</i> , <i>Agarum</i> , <i>Alaria spp.</i>
MAC	Macrocystis	macrocystis	<i>Macrocystis integrifolia</i>
NER	Nereocystis	Bull kelp	<i>Nereocystis leutkeana</i>
RED	Red algae	All red leafy algae (red ribbons, red blades, red sea cabbage, Turkish washcloth)	<i>Palmaria mollis</i> , <i>P.</i> <i>hecatensis</i> , <i>P.</i> <i>callophyloides</i> , <i>Dilsea</i> <i>californica</i> , <i>Neodilsea</i> <i>borealis</i> , <i>Mastocarpus</i> <i>papillatus</i> , <i>Turnerella</i> <i>mertensiana</i>
ULV	Ulva	Sea lettuce	<i>Ulva fenestrata</i> , <i>Ulvaria</i> <i>obscura</i>
COR	Coralline algae	Coral seaweeds (red algae)	<i>Bossiella</i> , <i>Corallina</i> , <i>Serraticardia</i>

Appendix B. Key to bottom types used for geoduck clam surveys.

Code	Expanded code	Definition
RCK	Bedrock	Various rocky substrates > 1 meter in diameter
BLD	Boulder	Substrate between 25 cm and 1 meter
CBL	Cobble	Substrate between 6 cm and 25 cm
GVL	Gravel	Substrate between 0.4 cm and 6 cm
SND	Sand	Clearly separate grains of < 0.4 cm
MUD	Mud	Soft, paste-like material
SIL	Silt	Fine organic dusting (very rarely used)
BAR	Barnacle	Area primarily covered with barnacles
SHL	Shell	Area primarily covered with whole or crushed shells
MUS	Mussels	Area primarily covered with mussels
WDY	Woody debris	Any submerged bark, logs, branches or root systems

Appendix C. Dog and Cat islands geoduck control area assessment survey, 2001.

Date	Transect #	Transect side	Time in	Time out	Total time	Diver #1	Diver #2	Width	MLLW start (fsw)	MLLW End (fsw)	No. geoducks	No. horseclams	Bottom type #1	Bottom type #2	% vegetation cover	Predominant Vegetation	Comments
23-Jun-01	1	a	8:30	8:48	0:18	MP	OS	2	3	44	0						
23-Jun-01	1	a	8:30	8:48	0:18	MP	OS	2	44	60	77						
23-Jun-01	10	a	14:04	14:15	0:11	MP	OS	2	-12	66	0	rck	snd				snd starts at 75 fsw
23-Jun-01	11	a	14:08	14:28	0:20	JM	TT	2	2	28	0	4 cbl	snd	80	agm		
23-Jun-01	11	a	14:08	14:28	0:20	JM	TT	2	28	35	1	snd		10	agm		horse clams present
23-Jun-01	11	a	14:08	14:28	0:20	JM	TT	2	35	55	0	snd	sil	0			horse clams present
23-Jun-01	11	b	14:08	14:28	0:20	JM	TT	2	16	25	0	snd		40	agm		
23-Jun-01	11	b	14:08	14:28	0:20	JM	TT	2	26	39	1	snd	sil				
23-Jun-01	11	b	14:08	14:28	0:20	JM	TT	2	39	55	0	snd	sil				
23-Jun-01	12	a	14:24	15:05	0:41	MP	OS	2	-14	50	0	rck	bld				rck/bld/snd to 61 fsw
23-Jun-01	12	a	14:24	15:05	0:41	MP	OS	2	50	55	14	snd					
23-Jun-01	12	b	14:24	15:05	0:41	MP	OS	2	20	37	0						
23-Jun-01	12	b	14:24	15:05	0:41	MP	OS	2	37	58	8						
23-Jun-01	13	a	15:26	15:56	0:30	MP	OS	2	-3	16	0						
23-Jun-01	13	a	15:26	15:56	0:30	MP	OS	2	16	44	1	mud	sil	5	lam		max depth 59 fsw, started up other side for 'B'
23-Jun-01	13	b	15:26	15:56	0:30	MP	OS	2	29	25	0	rck	bld				went back to 59 fsw and swam up middle of bay, saw no geoducks or any clams
23-Jun-01	13	b	15:26	15:56	0:30	MP	OS	2	44	29	2	mud	sil	0			
23-Jun-01	14	a	18:22	18:49	0:27	SW	JRM	2	-15	29	0						
23-Jun-01	14	a	18:22	18:49	0:27	SW	JRM	2	29	55	8						
23-Jun-01	14	b	18:22	18:49	0:27	SW	JRM	2	18	55	1						
23-Jun-01	15	a	14:44	15:02	0:18	SW	TT	2	-14	22	0	0 cbl		100	lam		
23-Jun-01	15	a	14:44	15:02	0:18	SW	TT	2	22	50	3	cbl		70	lam		
23-Jun-01	15	b	14:44	15:02	0:18	SW	TT	2	7	50	0	rck	cbl	100	lam		
23-Jun-01	2	a	8:25	8:47	0:22	TT	SW	2	13	15	1	0 gvl		80	elg		
23-Jun-01	2	a	8:25	8:47	0:22	TT	SW	2	15	42	29	0 gvl	snd	0			
23-Jun-01	2	a	8:25	8:47	0:22	TT	SW	2	42	55	0	0 shl					
23-Jun-01	2	b	8:25	8:47	0:22	TT	SW	2	11	50	147	snd		5	elg		
23-Jun-01	2	b	8:25	8:47	0:22	TT	SW	2	50	55	0	shl					
23-Jun-01	3	a	9:04	9:20	0:16	SW	JRM	2	4	14	0	0 snd				elg	
23-Jun-01	3	a	9:04	9:20	0:16	SW	JRM	2	14	55	56	snd					
23-Jun-01	3	b	9:04	9:20	0:16	SW	JRM	2	20	40	20						
23-Jun-01	3	b	9:04	9:20	0:16	SW	JRM	2	40	55	0	snd					
23-Jun-01	4	a	9:06	9:32	0:26	MP	OS	2	12	17	0						
23-Jun-01	4	a	9:06	9:32	0:26	MP	OS	2	17	55	42						
23-Jun-01	4	b	9:06	9:32	0:26	MP	OS	2	14	55	31						
23-Jun-01	5	a	9:35	10:09	0:34	JFM	TT	2	17	20	0	0 cbl	snd	80	agm		
23-Jun-01	5	a	9:35	10:09	0:34	JFM	TT	2	20	55	54	snd		10	lam		
23-Jun-01	5	b	9:35	10:09	0:34	JFM	TT	2	23	25	0	0 cbl	snd	20	agm		
23-Jun-01	5	b	9:35	10:09	0:34	JFM	TT	2	25	55	47	0 snd		15	lam		

-continued-

Appendix C. (page 2 of 5)

Date	Transect #	Transect side	Time in	Time out	Total time	Diver #1	Diver #2	Width	MLLW start (fsw)	MLLW End (fsw)	No. geoducks	No. horseclams	Bottom type #1	Bottom type #2	% vegetation cover	Predominant Vegetation	Comments
23-Jun-01	6	a	10:42	11:07	0:25	MP	OS	2	8	53	0						bedrock/cbl to 25 fsw, mostly gvl w/snd to 37 fsw
23-Jun-01	6	a	10:42	11:07	0:25	MP	OS	2	53	55	4						
23-Jun-01	6	b	10:42	11:07	0:25	MP	OS	2	34	59	8	snd	shl				turned "left" into bed for side B
23-Jun-01	7	a	11:39	12:06	0:27	SW	JRM	2	-2	38	0	snd	sil	10			not geoduck habitat
23-Jun-01	7	a	11:39	12:06	0:27	SW	JRM	2	38	55	12	snd	sil				horseclams present, not good habitat
23-Jun-01	7	b	11:39	12:06	0:27	SW	JRM	2	15	51	21	snd	sil				many false geoducks
23-Jun-01	8	a	13:24	13:35	0:11	MP	OS	2	-11	61	0	mud	shl				snd shallow
23-Jun-01	9	a	13:42	13:53	0:11	MP	OS	2	-11	46	0	gvl	cbl				
23-Jun-01	9	a	13:42	13:53	0:11	MP	OS	2	46	58	5	mud	shl				a few false geoducks present
25-Jun-01	16	a	15:01	15:37	0:36	TT	KH	2	3	15	0	3gvl		30	lbk		
25-Jun-01	16	a	15:01	15:37	0:36	TT	KH	2	15	55	95	10gvl		40	lbk		
25-Jun-01	17	a	15:55	16:12	0:17	OS	KH	2	16	55	0	gvl		60	lam		
25-Jun-01	18	a	16:22	16:47	0:25	TT	OS	2	9	16	0	snd		100	elg		
25-Jun-01	18	a	16:22	16:47	0:25	TT	OS	2	16	53	22	snd					
25-Jun-01	19	a	16:20	16:56	0:36	SW	MP	2	-15	27	0	rck		90	lbk		
25-Jun-01	19	a	16:20	16:56	0:36	SW	MP	2	27	55	58	snd	rck	30	lam		
25-Jun-01	19	b	16:20	16:56	0:36	SW	MP	2	9	55	108	snd	cbl	10	lam		
25-Jun-01	20	a	14:54	15:14	0:20	MP	SW	2	0	17	0	2rck	bld	100	lam		
25-Jun-01	20	a	14:54	15:14	0:20	MP	SW	2	17	59	125	2snd		5	lam		
25-Jun-01	20	b	14:54	15:14	0:20	MP	SW	2	17	38	47	1snd					
25-Jun-01	20	b	14:54	15:14	0:20	MP	SW	2	38	59	0	rck	snd				rock reed from 70 to 50 fsw
25-Jun-01	21	a	15:27	15:50	0:23	MP	JRM	2	-13	24	0	rck					
25-Jun-01	21	a	15:27	15:50	0:23	MP	JRM	2	24	58	38	12					2 false geoduck
25-Jun-01	21	b	15:27	15:50	0:23	MP	JRM	2	21	39	18	24					1 false geoduck
25-Jun-01	21	b	15:27	15:50	0:23	MP	JRM	2	39	58	15	1					

-continued-

Cat and Dog Geoduck Control 2001 Transect Summary

Transect no	Transect side		Average per meter	shoreline (m)
	a	b		
1	77		38.5	100
2	30	147	44.3	100
3	56	20	19.0	100
4	42	31	18.3	100
5	54	47	25.3	100
6	4	8	3.0	200
7	12	21	8.3	200
8	0		0.0	200
9	5		2.5	200
10	0		0.0	200
11	1	1	0.5	200
12	14	8	5.5	200
13	1	2	0.8	200
14	8	1	2.3	200
15	3	0	0.8	200
16	95		47.5	100
17	0		0.0	100
18	22		11.0	100
19	58	108	41.5	100
20	125	47	43.0	200
21	38	33	17.8	200

-continued-

Appendix C. (page 4 of 5)

Dog and Cat islands geoduck control survey biomass estimate.

Number of Transects	21
Average per Linear Meter	15.7
Variance of Counts	299.274
Std. Variance of Mean	14.251
Shoreline (m)	3,300
Total Number of Geoducks	51,779
Variance of Total Number	155,195,156
Precision of Estimate	68.1%
90% Coefficient of Variation	41.5%
90% two-tail Precision	58.5%
Average Weight (lb)	2.420705
Variance of Average Weight ^a	0.00011281
Biomass Estimate	125,341
Variance of Biomass Est.	909,699,363
Precision of Estimate	68.1078%
90% Coefficient of Variation	41.5%
90% two-tail Precision	58.5%
Lower Bounds Biomass Est.	73,321
Upper Bounds Biomass Est.	177,360
Show Factor Adjustment	0.80
Target Harvest Rate	4%
Quota WITHOUT Precision Adjustment ^b	6,267
Quota WITH Precision Adjustment ^b	4,268

^a Weight based on commercial samples, 1992/1993 through 2000/2001. N = 4735

^b For information and comparison purposes only. No commercial harvest in control areas.

Appendix C. (page 5 of 5)

Dog and Cat islands geoduck control transect coordinates.

Transect No.	Latitude	Longitude
1	55.03522	-131.23350
2	55.03453	-131.23606
3	55.03513	-131.23922
4	55.03565	-131.24207
5	55.03695	-131.24478
6	54.98465	-131.33383
7	54.98283	-131.33293
8	54.98127	-131.33443
9	54.98058	-131.33684
10	54.98024	-131.33955
11	54.97989	-131.34285
12	54.98093	-131.34647
13	54.97280	-131.38452
14	54.97461	-131.38422
15	54.97591	-131.38287
16	55.03493	-131.23464
17	55.03451	-131.23765
18	55.03528	-131.24056
19	55.03606	-131.24358
20	54.97672	-131.37342
21	54.97674	-131.37225

Appendix D. Percy Island and Hotspur Island area assessment survey, 2001.

Date	Transect #	Transect side	Time in	Time out	Total time	Diver #1	Diver #2	Width	MLLW start (fsw)	MLLW End (fsw)	No. geoducks	No. horseclams	Bottom type #1	Bottom type #2	% vegetation cover	Predominant Vegetation	Comments
6/24/2001	1 a		8:10	8:46	0:36	TT	SW	2	9	19	167		snd		100	elg	elg to 30 fsw
6/24/2001	1 a		8:10	8:46	0:36	TT	SW	2	19	38	414		snd		30	lbk	
6/24/2001	1 a		8:10	8:46	0:36	TT	SW	2	38	55	228		snd		0		
6/24/2001	10 a		14:15	14:46	0:31	OS	TT	2	13	27	0	3	cbl	snd	60	agm	
6/24/2001	10 a		14:15	14:46	0:31	OS	TT	2	27	55	185	7	snd	shl	10	agm	
6/24/2001	11		13:53	14:17	0:24	MP	JRM	2									
6/24/2001	11 a		13:53	14:17	0:24	MP	JRM	2	-11	33	0		rck	shl	90	lam	6 false geoducks
6/24/2001	11 a		13:53	14:17	0:24	MP	JRM	2	33	55	6	3	snd	shl	0		
6/24/2001	11 b		13:53	14:17	0:24	MP	JRM	2	-11	41	0		rck	bl			
6/24/2001	11 b		13:53	14:17	0:24	MP	JRM	2	41	55	46	2	snd	shl	5	lam	9 false geoducks
6/24/2001	12 a		13:50	14:01	0:11	SW	OS	2	-11	51	0		rck	shl	10	lam	
6/24/2001	12 a		13:50	14:01	0:11	SW	OS	2	51	55	14		rck	shl			
6/24/2001	13 a		11:02	11:35	0:33	KH	JRM	2	11	24	0		rck	snd			rck to 16 fsw, 1st geoduck at 23 fsw
6/24/2001	13 a		11:02	11:35	0:33	KH	JRM	2	24	55	432						many false geoducks
6/24/2001	14 a		10:48	11:20	0:32	TT	SW	2	1	35	0		cbl		70	lam	
6/24/2001	14 a		10:48	11:20	0:32	TT	SW	2	35	55	369		cbl		10	lam	many false geoducks
6/24/2001	15 a		10:26	10:52	0:26	KH	MP	2	2	32	0						rck to 24 fsw
6/24/2001	15 a		10:26	10:52	0:26	KH	MP	2	32	39	101	6	snd	shl	20	lam	many false geoducks
6/24/2001	15 a		10:26	10:52	0:26	KH	MP	2	39	42	0		rck				rock reef, 37 to 20 to 40 fsw 26 false geoducks (for entire transect, 1 m)
6/24/2001	15 a		10:26	10:52	0:26	KH	MP	2	42	55	96	4					
6/24/2001	16 a		10:04	10:35	0:31	TT	OS	2	-2	19	0	4	gvl	cbl	40	agm	
6/24/2001	16 a		10:04	10:35	0:31	TT	OS	2	19	33	16	15	gvl		25	agm	
6/24/2001	16 a		10:04	10:35	0:31	TT	OS	2	33	48	109	10	snd	shl	0		
6/24/2001	16 a		10:04	10:35	0:31	TT	OS	2	48	52	0		shl	rck	0		
6/24/2001	17 a		10:03	10:14	0:11	MP	KH	2	3	55	8						
6/24/2001	2 a		8:18	8:57	0:39	KH	JRM	2	1	24	0	10	snd	gvl	5	lbk	
6/24/2001	2 a		8:18	8:57	0:39	KH	JRM	2	24	55	213						
6/24/2001	3 a		9:04	9:42	0:38	SW	OS	2	3	17	0	0	snd			elg	
6/24/2001	3 a		9:04	9:42	0:38	SW	OS	2	17	37	168		snd	cbl			
6/24/2001	3 a		9:04	9:42	0:38	SW	OS	2	37	41	194		cbl				
6/24/2001	3 a		9:04	9:42	0:38	SW	OS	2	41	55	145		cbl				
6/24/2001	4 a		9:11	9:34	0:23	MP	JRM	2	10	19	83		snd		100	elg	elg stops at 16 fsw
6/24/2001	4 a		9:11	9:34	0:23	MP	JRM	2	19	37	97		snd		0		
6/24/2001	4 a		9:11	9:34	0:23	MP	JRM	2	37	55	5		snd		0		
6/24/2001	4 b		9:11	9:34	0:23	MP	JRM	2	14	18	43		snd		100	elg	
6/24/2001	4 b		9:11	9:34	0:23	MP	JRM	2	18	37	131		snd		0		
6/24/2001	4 b		9:11	9:34	0:23	MP	JRM	2	37	55	0						
6/24/2001	5 a		15:44	16:09	0:25	SW	OS	2	7	38	0	0	rck		70	lam	rck cliff to approx. 50 fsw
6/24/2001	5 a		15:44	16:09	0:25	SW	OS	2	38	55	184		snd	shl	0		
6/24/2001	5 b		15:44	16:09	0:25	SW	OS	2	33	55	175		snd	shl	5	lam	
6/24/2001	6 a		15:41	16:18	0:37	MP	JRM	2	-15	29	0		rck		100	lam	
6/24/2001	6 a		15:41	16:18	0:37	MP	JRM	2	29	55	143		snd	shl			numerous horse clams

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Date	Transect #	Transect side	Time in	Time out	Total time	Diver #1	Diver #2	Width	MLLW start (fsw)	MLLW End (fsw)	No. geoducks	No. horseclams	Bottom type #1	Bottom type #2	% vegetation cover Predominant Vegetation	Comments
6/24/2001	6 b		15:41	16:18	0:37	MP JRM		2	27	55	119					few horse clams, numerous false geoducks
6/24/2001	7 a		15:03	15:30	0:27	JRM KH		2	-14	28	0					
6/24/2001	7 a		15:03	15:30	0:27	JRM KH		2	-14	55	22					
6/24/2001	7 b		15:03	15:30	0:27	JRM KH		2	-14	21	0					
6/24/2001	7 b		15:03	15:30	0:27	JRM KH		2	21	55	17					
6/24/2001	8 a		14:59	15:31	0:32	SW TT		2	1	14	0	bld	rck	100	lam	
6/24/2001	8 a		14:59	15:31	0:32	SW TT		2	14	22	1	snd		100	lam	
6/24/2001	8 a		14:59	15:31	0:32	SW TT		2	22	48	66	snd		0		
6/24/2001	8 a		14:59	15:31	0:32	SW TT		2	48	53	0	rck				
6/24/2001	9 a		14:33	14:51	0:18	MP KH		2	-5	14	0					
6/24/2001	9 a		14:33	14:51	0:18	MP KH		2	14	55	26	1				1 false geoduck
6/24/2001	9 b		14:33	14:51	0:18	MP KH		2	12	55	50					2 false geoducks
6/25/2001	18 a		12:01	12:37	0:36	TT OS		2	12	15	0	snd		100	elg	
6/25/2001	18 a		12:01	12:37	0:36	TT OS		2	15	17	19	snd		100	elg	
6/25/2001	18 a		12:01	12:37	0:36	TT OS		2	17	29	576	snd		80	lbk	
6/25/2001	18 a		12:01	12:37	0:36	TT OS		2	29	55	571	snd		10	lbk	
6/25/2001	19 a		11:48	12:19	0:31	SW JRM		2	-1	14	0	0	snd	100	elg	
6/25/2001	19 a		11:48	12:19	0:31	SW JRM		2	14	46	134	snd		40	lbk	
6/25/2001	19 a		11:48	12:19	0:31	SW JRM		2	46	55	0	rck	cbl	50	lbk	
6/25/2001	19 b		11:48	12:19	0:31	SW JRM		2	13	45	110	snd		20	lam	2 horse mussels
6/25/2001	19 b		11:48	12:19	0:31	SW JRM		2	45	55	0	rck	cbl	50	lam	
6/25/2001	20 a		11:20	11:40	0:20	KH OS		2	12	31	0					
6/25/2001	20 a		11:20	11:40	0:20	KH OS		2	31	45	59	snd	shl	50	lam	many false geoduck
6/25/2001	20 a		11:20	11:40	0:20	KH OS		2	43	55	16					
6/25/2001	20 a		11:20	11:40	0:20	KH OS		2	45	43		rck				43 to 38 to 41 rock
6/25/2001	20 b		11:20	11:40	0:20	KH OS		2	55	22	52	snd	shl			many false geoducks
6/25/2001	21 a		8:06	8:27	0:21	KH OS		2	6	28	0					
6/25/2001	21 a		8:06	8:27	0:21	KH OS		2	28	55	44	15	shl	snd	5	lbk
6/25/2001	21 b		8:06	8:27	0:21	KH OS		2	31	55	24	2				
6/25/2001	22 a		8:41	9:10	0:29	TT OS		2	9	27	0	rck		50	ner	
6/25/2001	22 a		8:41	9:10	0:29	TT OS		2	27	30	225	snd		10	lam	
6/25/2001	22 a		8:41	9:10	0:29	TT OS		2	30	35	420	snd		5	lam	
6/25/2001	22 a		8:41	9:10	0:29	TT OS		2	35	55	388	snd		0		
6/25/2001	22 b		8:41	9:10	0:29	TT OS		2	34	55	482	snd		10	lam	
6/25/2001	23 a		8:40	9:10	0:30	JRM MP		2	-1	15	0					
6/25/2001	23 a		8:40	9:10	0:30	JRM MP		2	15	52	1061					end of bed approx. 50 fsw
6/25/2001	24 a		10:07	10:49	0:42	KH TT		2	17	20	0	shl	snd	10	lam	
6/25/2001	24 a		10:07	10:49	0:42	KH TT		2	20	43	614	snd				horse clams present
6/25/2001	24 a		10:07	10:49	0:42	KH TT		2	43	56	192	snd	gvl			
6/25/2001	24 b		10:07	10:49	0:42	KH TT		2	19	55	571					
6/25/2001	25 a		9:19	9:42	0:23	SW JRM		2	2	13	0	snd		100	elg	
6/25/2001	25 a		9:19	9:42	0:23	SW JRM		2	13	2	13	rck	snd	80	lam	swam to 'other side', max depth 12 fsw
6/25/2001	25 b		9:19	9:42	0:23	SW JRM		2	2	15	0	rck	cbl	100	lam	
6/25/2001	25 b		9:19	9:42	0:23	SW JRM		2	15	2	4	rck	snd	100	lam	max depth 12 fsw
6/25/2001	26 a		10:24	10:52	0:28	JRM MP		2	2	55	210	3	snd	10	lbk	
6/25/2001	27 a		9:56	10:10	0:14	MP SW		2	20	55	0	sil		0		
6/25/2001	27 b		9:56	10:10	0:14	MP SW		2	55	50	0	sil		0		
6/25/2001	28 a		7:47	8:13	0:26	MP SW		2	16	55	802	0	snd	5	lam	6 false geoducks
6/25/2001	28 b		7:47	8:13	0:26	MP SW		2	16	55	1253	4	snd			

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Percy/Hotspur islands geoduck 2001 transect summary.

Transect	Transect side		Average per Meter
	a	b	
1	809		404.5
2	213		106.5
3	507		253.5
4	185	174	89.8
5	184	175	89.8
6	143	119	65.5
7	22	17	9.8
8	67		33.5
9	26	50	19.0
10	185		92.5
11	6	46	13.0
12	14		7.0
13	432		216.0
14	369		184.5
15	197		98.5
16	125		62.5
17	8		4.0
18	18	1166	296.0
19	19	134	38.3
20	20	75	23.8
21	21	44	16.3
22	22	1033	263.8
23	23	1061	271.0
24	24	806	207.5
25	25	13	9.5
26	26	210	59.0
27	27	0	6.8
28	28	802	207.5

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Percy/Hotspur islands 2001 geoduck biomass estimate and guideline harvest level.

Number of Transects	28
Average per Linear Meter	112.46
Variance of Counts	12,325.554
Std. Variance of Mean	440.198
Shoreline (m)	5,769
Total Number of Geoducks	648,806
Variance of Total Number	14,650,400,712
Precision of Estimate	75.5%
90% Coefficient of Variation	31.8%
90% two-tail Precision	68.2%
Average Weight (lb) ^a	2.420705
Variance of Average Weight	0.00011281
Biomass Estimate	1,570,569
Variance of Biomass Est.	85,894,427,412
Precision of Estimate	75.4855%
90% Coefficient of Variation	31.8%
90% two-tail Precision	68.2%
Lower Bounds Biomass Est.	1,071,374
Upper Bounds Biomass Est.	2,069,764
Show Factor Adjustment	0.80
Target Harvest Rate	4%
Quota WITHOUT Precision Adjustment	78,528
Quota WITH Precision Adjustment	59,278

^a Weight based on commercial samples, 1992/1993 through 2000/2001. N = 4735

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Percy/Hotspur transect coordinates.

Transect	Latitude	Longitude
1	54.95808	-131.47449
2	54.95851	-131.47783
3	54.95735	-131.48030
4	54.95611	-131.48204
5	54.97411	-131.50162
6	54.97595	-131.50198
7	54.97774	-131.50047
8	54.97966	-131.50162
9	54.98132	-131.49915
10	54.98300	-131.49864
11	54.98477	-131.49777
12	54.98666	-131.49713
13	55.00107	-131.52270
14	55.00136	-131.52591
15	55.00168	-131.52888
16	55.00291	-131.53130
17	55.00418	-131.53364
18	54.95943	-131.54083
19	54.95974	-131.54401
20	54.96201	-131.55992
21	54.94001	-131.56538
22	54.94024	-131.56852
23	54.94022	-131.57161
24	54.94115	-131.57434
25	54.94195	-131.57757
26	54.94256	-131.58057
27	54.94182	-131.58438
28	54.94832	-131.61701

Appendix E. Port Mayoral geoduck control assessment survey, 2001.

Date	Transect #	Transect side	Time in	Time out	Total time	Diver #1	Diver #2	Width	MLLW start (fsw)	MLLW End (fsw)	No. geoducks	No. horseclams	Bottom type #1	Bottom type #2	% vegetation cover	Predominant Vegetation	comments
8/10/2001	1	a	8:04	8:19	0:15	MP	JC	2	17	55	44	snd	gvl		0		1st gd @ 43
8/10/2001	1	b	8:04	8:19	0:15	MP	JC	2	33	55	44	snd	gvl		10	agm	
8/10/2001	3	a	8:32	8:50	0:18	OS	MP	2	24	55	140	snd	shl		10	lam	1st gd @ 34 fsw
8/10/2001	3	b	8:32	8:50	0:18	OS	MP	2	28	55	115	snd	shl		5	lam	gvl/bld <30 fsw & 100%lam
8/10/2001	5	a	8:03	8:20	0:17	JR	JM	2	17	55	47	gvl	snd		25	ala	1st gd @ 31 fsw
8/21/2001	186	a	15:20	15:39	0:19	MP	DB	2	18	45	16	snd	shl		5	agm	1st gd @ 44 fsw @ 19 meters
8/21/2001	186	a	15:20	15:39	0:19	MP	DB	2	45	60	32	snd	shl		5	agm	
8/21/2001	187	a	15:46	15:58	0:12	JRM	KH	2	18	60	104	snd			10	agm	1st gd @ 41 fsw
8/21/2001	188	a	15:50	16:18	0:28	MP	DB	2	18	33	1						1st gd @ 43 fsw @ 29 meters
8/21/2001	188	a	15:50	16:18	0:28	MP	DB	2	33	48	28	shl	sil		5	agm	
8/21/2001	188	a	15:50	16:18	0:28	MP	DB	2	48	14	6						
8/21/2001	189	a	16:30	16:54	0:24	MP	DB	2	18	36	10						1st gd @ 44 fsw @ 26.5 meters
8/21/2001	189	a	16:30	16:54	0:24	MP	DB	2	36	51	47						
8/21/2001	189	a	16:30	16:54	0:24	MP	DB	2	51	60	1	snd				agm	
8/21/2001	2	a	15:21	15:37	0:16	JRM	KH	2	18	56	46	snd			25	agm	1st gd @ 47 fsw, last @ 58 fsw
8/21/2001	2	a	15:21	15:37	0:16	JRM	KH	2	56	60	0	snd			0		
8/21/2001	4	a	16:07	16:26	0:19	JRM	KH	2	18	42	122	snd			25	lam	1st gd @ 37 fsw
8/21/2001	4	a	16:07	16:26	0:19	JRM	KH	2	42	60	69	snd			0		

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Port Mayoral geoduck control 2001 transect summary.

Transect no	Transect side		Length (m) ^a	Average per meter shoreline	Shoreline (m)
	a	b			
1	44	44		22.0	100
2	46		55	23.0	100
3	140	115		63.8	100
4	191		85	95.5	100
5	47			23.5	100
186	48		48.5	24.0	100
187	104		44	52.0	100
188	35		84	17.5	100
189	58		83.5	29.0	100

^a Measured length of bed (from first geoduck encountered to end of bed or target depth).

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Port Mayoral 2001 geoduck control survey biomass estimate.

Number of Transects	9
Average per Linear Meter	39
Variance of Counts	693.281
Std. Variance of Mean	77.031
Shoreline (m)	900
Total Number of Geoducks	35,025
Variance of Total Number	62,395,313
Precision of Estimate	68.5%
90% Coefficient of Variation	41.9%
90% two-tail Precision	58.1%
Average Weight (lb) ^a	2.420705
Variance of Average Weight	0.00011281
Biomass Estimate	84,785
Variance of Biomass Est.	365,756,148
Precision of Estimate	68.4924%
90% Coefficient of Variation	41.9%
90% two-tail Precision	58.1%
Lower Bounds Biomass Est.	49,222
Upper Bounds Biomass Est.	120,349
Show Factor Adjustment	0.80
Target Harvest Rate	4%
Quota WITHOUT Precision Adjustment ^b	4,239
Quota WITH Precision Adjustment ^b	2,904

^a Weight based on commercial samples, 1992/1993 through 2000/2001. N = 4735

^b For information and comparison purposes only. No commercial harvest in control areas.

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Port Mayoral transect coordinates.

Transect	Latitude	Longitude
1	55.38762	-133.44499
2	55.38938	-133.44499
3	55.39122	-133.44544
4	55.39310	-133.44492
5	55.39490	-133.44512
6	55.39671	-133.44473
185	55.38670	-133.44538
186	55.38849	-133.44482
187	55.39030	-133.44542
188	55.39213	-133.44538
189	55.39398	-133.44508
190	55.39577	-133.44512

Appendix F. Subdistrict 103-50 geoduck clam assessment survey, 2001.

Date	Transect #	Transect side	Time in	Time out	Total time	Diver #1	Diver #2	Width	MLLW start (fsw)	MLLW End (fsw)	No. geoducks	No. horseclams	Bottom type #1	Bottom type #2	% vegetation cover	Predominant Vegetation Type	Comments	
8/10/2001	7 a		8:45	9:26	0:41	JRM	KH	2 27	42		13		sil	shl	75	red	1st gd @ 48 fsw	
																	1st gd @ 35 fsw, sea otter near transect	
8/10/2001	9 a		10:00	10:10	0:10	JR	KH	2 25	55		20		sil	shl	50	red		
8/10/2001	13 a		9:13	9:27	0:14	JC	OS	2 17	55		1		rck	snd	50	lam	1st gd @ 50 fsw	
8/10/2001	13 b		9:13	9:27	0:14	JC	OS	2 41	55		2		rck	snd	80	lbk	few gd off transect	
8/10/2001	15 a		9:38	10:03	0:25	JC	MP	2 14	55		3		2 snd	shl	50	lam	1st gd @ 23 fsw	
8/10/2001	17 a		10:18	10:36	0:18	MP	OS	2 13	56		3				90	red	1st gd @ 39 fsw	
8/10/2001	17 a		10:18	10:36	0:18	MP	OS	2 56	74		0							
8/10/2001	19 a		10:50	11:13	0:23	OS	JC	2 12	55		2		snd	mud	90	red	1st gd @ 25 fsw	
8/10/2001	21 a		11:26	12:00	0:34	MP	JC	2 14	55		15						1st gd @ 24 fsw, 2nd gd @ 48 fsw	
8/10/2001	21 b		11:26	12:00	0:34	MP	JC	2 55	59		28							
8/10/2001	23 a		14:01	14:30	0:29	MP	OS	2 2	55		2	1					1st gd @ 49 fsw	
8/10/2001	23 b		14:01	14:30	0:29	MP	OS	2 55	64		9							
8/10/2001	25 a		14:49	15:22	0:33	OS	JC	2 -7	56		24		snd	rck	60	red		
8/10/2001	25 a		14:49	15:22	0:33	OS	JC	2 56	60		0							
8/10/2001	27 a		15:43	16:49	1:06	MP	JC	2 22	31		8	7					2-tank dive (1543-1612 & 1619-1649)	
																		1st gd @ 34 fsw, 2nd gd @ 38 fsw w/rck reef between (17 fsw); 1 false geoduck
8/10/2001	27 a		15:43	16:49	1:06	MP	JC	2 32	52		93	3						
8/11/2001	29 a		8:08	8:37	0:29	OS	JC	2 20	46		47		rck	shl				
8/11/2001	29 a		8:08	8:37	0:29	OS	JC	2 36	60		7							
8/11/2001	29 a		8:08	8:37	0:29	OS	JC	2 46	36		63							
8/11/2001	31 a		8:11	8:24	0:13	JR	KH	2 35	39		7		sil		75	lam	1st gd @ 40 fsw	
8/11/2001	31 a		8:11	8:24	0:13	JR	KH	2 39	50		6		sil		25	lam		
8/11/2001	31 a		8:11	8:24	0:13	JR	KH	2 50	60		28		sil		5	lam	more gd deeper	
8/10/2001	35 a		13:56	14:05	0:09	JR	JRM	2 14	55		0		snd		20	lam	gd below target depth,	
																		1st gd @ 43 fsw, more gd deeper, sargassum shallow
8/10/2001	37 a		14:14	14:27	0:13	JRM	KH	2 14	56		50		snd		50	lam		
8/10/2001	39 a		14:43	15:03	0:20	JRM	KH	2 28	55		188		snd		50	lam	1st gd @ 38 fsw; gd 38-45 fsw	
8/10/2001	39 a		14:43	15:03	0:20	JRM	KH	2 55	60		0							
8/10/2001	41 a		15:20	15:34	0:14	JRM	JR	2 28	55		17		snd	shl	10	red	1st gd @ 46 fsw	
8/10/2001	41 a		15:20	15:34	0:14	JRM	JR	2 55	60		4		shl	snd	0			
8/10/2001	43 a		15:48	16:01	0:13	KH	JRM	2 25	55		5		sil	mud	50	red	1st gd @ 55 fsw	
8/10/2001	43 a		15:48	16:01	0:13	KH	JRM	2 55	60		4		sil	mud	0			
8/10/2001	45 a		16:16	16:23	0:07	KH	JR	2 9	55		0		gvl	wdy	5	ala		
8/10/2001	47 a		16:36	16:48	0:12	JR	JRM	2 15	55		0		shl	cbl	25	red	1st gd @ 59 off transect	
8/10/2001	49 a		11:22	11:28	0:06	JR	KH	2 27	55		1		sil	shl	5	ala	1st gd @ 36	
8/10/2001	51 a		10:49	11:02	0:13	JRM	KH	2 24	56		52		shl		25	red	1st gd @ 36 fsw	
8/10/2001	53 a		10:20	10:34	0:14	JR	JRM	2 30	55		67		snd	shl	10	ala	1st gd @ 38 fsw, most below 45 fsw	
																		otter excavations, many freshly open/discarded shells
8/12/2001	55 a		7:51	8:11	0:20	JC	OS	2 30	56		0	1	gvl	snd	25	agm		
8/12/2001	55 a		7:51	8:11	0:20	JC	OS	2 56	60		0							
																		1st gd @ 47 fsw, large otter excavations @ 48 fsw
8/12/2001	57 a		8:22	8:47	0:25	MP	OS	2 22	55		82		snd	shl	35	lam	geoduck continue deeper at approx. same density	
8/12/2001	57 a		8:22	8:47	0:25	MP	OS	2 55	60		44		snd	shl	5	lam		
8/12/2001	59 a		9:05	9:35	0:30	JC	MP	2 22	55		27		snd	shl	5	lam	1st gd @ 57 fsw	

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Appendix F. (page 2 of 6)

Date	Transect #	Transect side	Time in	Time out	Total time	Diver #1	Diver #2	Width	MLLW start (fsw)	MLLW End (fsw)	No. geoducks	No. horseclams	Bottom type #1	Bottom type #2	% vegetation cover	Predominant Vegetation Type	Comments
8/12/2001	59 a		9:05	9:35	0:30	JC	MP	2 55	60	14							geoduck continue deeper at same or greater concentration
8/12/2001	61 a		9:52	10:07	0:15	OS	JC	2 26	55	0	snd	shl		25	lam		
8/12/2001	61 a		9:52	10:07	0:15	OS	JC	2 55	60	0							
8/11/2001	63 a		15:33	16:14	0:41	KH	JRM	2 34	45	1312		snd	shl	25	lam		1st gd @ 46 fsw; many geoduck deeper
8/11/2001	65 a		14:54	15:16	0:22	JRM	JR	2 22	55	42		snd	sil	20	lam		1st gd @ 50 fsw
8/11/2001	67 a		14:33	14:43	0:10	JR	KH	2 27	55	0		sil		25	lam		
8/11/2001	69 a		9:32	10:04	0:32	MP	OS	2 29	54	265	0						
8/11/2001	69 a		9:32	10:04	0:32	MP	OS	2 34	32	78	4	snd		50	mac		bed split by rck reef w/macro; 1st gd @ 36 fsw
8/11/2001	69 a		9:32	10:04	0:32	MP	OS	2 54	59	0							bed ended before target depth
8/11/2001	71 a		9:37	9:50	0:13	JRM	JM	2 37	55	0		snd		25	red		
8/11/2001	73 a		10:03	10:14	0:11	KH	JRM	2 29	55	29		snd	gvl	50	lam		1st gd @ 34 fsw
8/11/2001	75 a		10:20	10:28	0:08	MP	JC	2 29	55	3		sil	gvl	0			1st gd @ 32 fsw
8/11/2001	75 a		10:20	10:28	0:08	MP	JC	2 55	60	0							
8/11/2001	77																shallow area in area marked, from shore depth was only 2.0 to 17.5 fsw. Did not dive.
8/11/2001	79 a		10:36	10:53	0:17	JR	KH	2 40	55	15		snd	shl	15	lam		1st gd @ 42 fsw
8/11/2001	81 a		10:39	11:08	0:29	JC	OS	2 0	55	11	3	snd	shl				1st gd @ 45; false geoducks present
8/11/2001	81 a		10:39	11:08	0:29	JC	OS	2 45	55	3							
8/11/2001	83 a		11:08	11:21	0:13	JRM	JR	2 36	55	0		snd		25	red		
8/11/2001	85 a		11:17	11:40	0:23	MP	OS	2 23	55	13	1	mud		25	lam		1st gd @ 36 fsw
8/11/2001	85 a		11:17	11:40	0:23	MP	OS	2 55	60	8		mud	snd				false geoducks
8/11/2001	87 a		14:04	14:16	0:12	KRM	KH	2 36	55	90		sil		50	lam		1st gd @ 47; more gd deeper
8/11/2001	89 a		14:04	14:26	0:22	MP	JC	2 17	55	416		snd	shl	40	lam		
8/11/2001	89 a		14:04	14:26	0:22	MP	JC	2 55	60	65		snd					
8/11/2001	91 a		14:37	15:02	0:25	JC	OS	2 -7	55	575				40	lbk		1st gd @ 43 fsw; otter holes
8/11/2001	91 a		14:37	15:02	0:25	JC	OS	2 36	60	27							more gd deeper but less dense
8/11/2001	93 a		15:16	15:45	0:29	MP	OS	2 28	55	793	6	snd	shl	25	lam		1st gd @ 38 fsw; no gd seen deeper
8/11/2001	93 a		15:16	15:45	0:29	MP	OS	2 55	60	308		snd	shl				
8/11/2001	95 a		16:10	16:21	0:11	MP	JC	2 7	57	0		gvl	cbl	0			HIGH CURRENT!!! No geoducks seen. Not gd habitat.
8/11/2001	97																Did not dive due to high current
8/11/2001	99																Did not dive due to high current. Not likely gd habitat in channel
8/12/2001	101 a		7:49	8:09	0:20	JRM	JR	2 31	48	24		snd	sil	15	lam		1st gd @ 44 fsw
8/11/2001	103 a		16:33	16:48	0:15	JR	JRM	2 30	55	16		snd		15	lam		1st gd @ 59 fsw
8/12/2001	105 a		8:39	8:58	0:19	KH	JRM	2 24	55	3		snd		40	lam		1st gd @ 58 fsw
8/12/2001	105 a		8:39	8:58	0:19	KH	JRM	2 55	60	25							
8/12/2001	107 a		9:09	9:25	0:16	JR	KH	2 31	55	195		snd	shl	50	lam		1 st gd @ 40 fsw
8/12/2001	107 a		9:09	9:25	0:16	JR	KH	2 55	60	43		sil		25	lam		
8/12/2001	109 a		9:33	9:49	0:16	JR	JRM	2 32	55	49		snd		25	lam		1st gd @ 37 fsw
8/12/2001	111 a		10:02	10:11	0:09	JRM	KH	2 24	55	27		snd	shl	25	lam		1st gd @ 39 fsw
8/12/2001	113 a		10:32	10:40	0:08	KH	JR	2 45	55	0		shl	gvl	0			
8/12/2001	113 b		10:32	10:40	0:08	KH	JR	2 34	55	0		shl	gvl	0			

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Appendix F. (page 3 of 6)

Date	Transect #	Transect side	Time in	Time out	Total time	Diver #1	Diver #2	Width	MLLW start (fsw)	MLLW End (fsw)	No. geoducks	No. horseclams	Bottom type #1	Bottom type #2	% vegetation cover	Predominant Vegetation Type	Comments
8/12/2001	115 a		10:27	10:46	0:19	MP	OS	2 15 55			168	23 sil	shl		50 lam	1st gd @ 20 fsw	
8/12/2001	115 a		10:27	10:46	0:19	MP	OS	2 55 60			18						geoduck continue deeper, easy digging
8/12/2001	117 a		10:51	10:59	0:08	JR	JRM	2 -3 55			1		shl		0		1st gd @ 55 fsw
8/12/2001	119 a		11:05	11:12	0:07	JC	MP	2 4 55			3		mud sil		0		1st gd @ 45 fsw
8/12/2001	119 a		11:05	11:12	0:07	JC	MP	2 55 60			1		mud		0		
8/12/2001	121 a		11:09	11:21	0:12	KH	JRM	2 6 55			0		rck snd		10 lam		
8/12/2001	123 a		13:22	13:33	0:11	OS	JC	2 21 55			11		snd				1st gd @ 53 fsw
8/12/2001	123 a		13:22	13:33	0:11	OS	JC	2 55 60			8						geoducks deeper but less dense
8/12/2001	125 a		13:32	13:48	0:16	JR	KH	2 14 55			54		snd wdy		10 lam		1st gd @ 28 fsw
8/12/2001	125 a		13:32	13:48	0:16	JR	KH	2 55 60			1		snd wdy		5 lam		
8/12/2001	127 a		13:40	13:49	0:09	MP	OS	2 17 55			5		gvl		5 lam		1st gd @ 38 fsw
8/12/2001	127 a		13:40	13:49	0:09	MP	OS	2 55 67			0		gvl wdy		0		
8/12/2001	129 a		13:59	14:10	0:11	MP	JC	2 -3 55			35		snd wdy				1st gd @ 30 fsw
8/12/2001	129 a		13:59	14:10	0:11	MP	JC	2 55 60			1						
8/12/2001	131 a		14:00	14:10	0:10	JRM	JR	2 13 55			41		snd		40 elg		1st gd @ 25 fsw
8/12/2001	133 a		14:19	14:32	0:13	OS	JC	2 20 55			52		sil		25 lam		1st gd @ 24; horseclams present
8/12/2001	133 a		14:19	14:32	0:13	OS	JC	2 55 60			3						
8/12/2001	135 a		14:32	14:40	0:08	KH	JR	2 29 55			4		shl		35 lam		1st gd @ 53 fsw
8/12/2001	137 a		14:45	14:55	0:10	OS	MP	2 21 55			0		gvl		35 agm		
8/12/2001	137 a		14:45	14:55	0:10	OS	MP	2 55 75			0						
8/12/2001	139 a		14:46	15:04	0:18	KH	JR	2 24 55			48		snd		50 lam		1st gd @ 34 fsw
8/12/2001	141 a		15:15	15:31	0:16	JC	MP	2 16 55			37		2 snd sil		30 lbk		1st gd @ 33 fsw
8/12/2001	143 a		15:18	15:27	0:09	JR	JRM	2 18 55			0		cbl		30 lam		
8/12/2001	145 a		15:39	15:51	0:12	MP	JC	2 21 55			0		gvl cbl		0		not geoduck habitat
8/12/2001	145 a		15:39	15:51	0:12	MP	JC	2 55 60			0		gvl cbl		0		not geoduck habitat
8/12/2001	145 a		15:39	15:51	0:12	MP	JC	2 60 69			0		cbl snd		0		not geoduck habitat
8/12/2001	147 a		15:41	15:51	0:10	KH	JRM	2 17 55			0		rck shl		20 lam		
8/13/2001	161 a		9:57	10:04	0:07	KH	JRM	2 30 55			0		cbl gvl		5 lam		
8/13/2001	163 a		9:47	9:54	0:07	OS	MP	2 14 60			0		gvl		10 lbk		
8/13/2001	165 a		9:36	9:43	0:07	JR	JRM	2 19 55			2		cbl		25 lam		1st gd @ 31 fsw
8/13/2001	167 a		9:07	9:22	0:15	JR	KH	2 27 55			90		snd		25 lam		1st gd @ 41 fsw
8/13/2001	169 a		8:38	8:49	0:11	JM	KH	2 7 55			0		gvl		30 lam		
8/13/2001	171 a		8:19	8:27	0:08	JR	JRM	2 18 55			6		snd gvl		25 lam		1st gd @ 28 fsw
8/13/2001	173 a		8:02	8:17	0:15	MP	JC	2 8 60			40		3 snd sil		20 lbk		
8/13/2001	175 a		8:26	8:36	0:10	MP	OS	2 10 55			2		gvl sil		75 lam		16-28 fsw cobble, w/snd @ 28 fsw; 1st gd @ 29 fsw
8/13/2001	175 a		8:26	8:36	0:10	MP	OS	2 55 60			0		gvl sil		0		
8/13/2001	177 a		8:47	8:58	0:11	JC	OS	2 8 60			0		mud		50 lam		
8/13/2001	179 a		9:09	9:19	0:10	JC	MP	2 8 60			0		rck snd				swam parallel to shore approx. 50 m & saw NO geoducks
8/14/2001	181 a		7:47	8:11	0:24	KH	JRM	2 10 55			9		snd		5 lam		1st gd @ 53 fsw
8/14/2001	181 a		7:47	8:11	0:24	KH	JRM	2 55 60			5		snd		5 lam		
8/14/2001	183 a		7:42	8:03	0:21	MP	JC	2 10 55			79		cbl snd		75 lam		1st gd @ 17 fsw
8/14/2001	183 a		7:42	8:03	0:21	MP	JC	2 55 60			6		snd		5 agm		

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Appendix F. (page 4 of 6)

Subdistrict 103-50 2001 geoduck transect summary.

Transect	Transect side		Average per meter	Shoreline	Transect	Transect side		Average per meter	Shoreline
	a	b				a	b		
7	13		6.5	400	91	602		301	400
9	20		10	400	93	1101		550.5	400
13	1	2	0.75	400	95	0		0	400
15	3		1.5	400	101	24		12	400
17	3		1.5	400	103	16		8	400
19	2		1	400	105	28		14	400
21	15	28	10.75	400	107	238		119	400
23	2	9	2.75	400	109	49		24.5	400
25	24		12	400	111	27		13.5	400
27	101		50.5	400	113	0	0	0	400
29	117		58.5	400	115	186		93	400
31	41		20.5	400	117	1		0.5	400
35	0		0	400	119	4		2	400
37	50		25	400	121	0		0	400
39	188		94	400	123	19		9.5	400
41	21		10.5	400	125	55		27.5	400
43	9		4.5	400	127	5		2.5	400
45	0		0	400	129	36		18	400
47	0		0	400	131	41		20.5	400
49	1		0.5	400	133	55		27.5	400
51	52		26	400	135	4		2	400
53	67		33.5	400	137	0		0	400
55	0		0	400	139	48		24	400
57	126		63	400	141	37		18.5	400
59	41		20.5	400	143	0		0	400
61	0		0	400	145	0		0	400
63	1312		656	400	147	0		0	400
65	42		21	400	161	0		0	400
67	0		0	400	163	0		0	400
69	343		171.5	400	165	2		1	400
71	0		0	400	167	90		45	400
73	29		14.5	400	169	0		0	400
75	3		1.5	400	171	6		3	400
79	15		7.5	400	173	40		20	400
81	14		7	400	175	2		1	400
83	0		0	400	177	0		0	400
85	21		10.5	400	179	0		0	400
87	90		45	400	181	14		7	400
89	481		240.5	400	183	85		42.5	400

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Subdistrict 103-50 2001 geoduck survey biomass estimate and guideline harvest level.

Number of Transects	78
Average per Linear Meter	39
Variance of Counts	11,040.244
Std. Variance of Mean	141.542
Shoreline (m)	31,200
Total Number of Geoducks	1,214,500
Variance of Total Number	137,782,241,169
Precision of Estimate	60.5%
90% Coefficient of Variation	50.9%
90% two-tail Precision	49.1%
Average Weight (lb) ^a	2.420705
Variance of Average Weight	0.00011281
Biomass Estimate	2,939,946
Variance of Biomass Est.	807,528,874,746
Precision of Estimate	60.4890%
90% Coefficient of Variation	50.9%
90% two-tail Precision	49.1%
Lower Bounds Biomass Est.	1,443,837
Upper Bounds Biomass Est.	4,436,055
Show Factor Adjustment	0.80
Target Harvest Rate	4%
Quota WITHOUT Precision Adjustment	146,997
Quota WITH Precision Adjustment	88,917

^a Based on commercial samples, 1992/1993, 2000/2001. N = 4735

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Appendix F. (page 6 of 6)

Subdistrict 103-50 transect coordinates.

Transect no	Latitude	Longitude
7	55.42389	-133.45579
8	55.42342	-133.45870
9	55.42330	-133.46186
10	55.43011	-133.45650
11	55.42904	-133.46303
12	55.41966	-133.48592
13	55.42125	-133.48760
14	55.42136	-133.49025
15	55.42106	-133.49594
16	55.42022	-133.50266
17	55.41889	-133.50486
18	55.41779	-133.50732
19	55.41738	-133.51049
20	55.41716	-133.51379
21	55.41665	-133.51689
22	55.41485	-133.51954
23	55.41514	-133.52310
24	55.41687	-133.52620
25	55.41808	-133.52846
26	55.41613	-133.53474
27	55.41455	-133.53771
28	55.41547	-133.54140
29	55.41565	-133.54469
30	55.41551	-133.54799
31	55.41514	-133.55116
32	55.42117	-133.55459
33	55.43003	-133.55569
34	55.42911	-133.54793
35	55.42908	-133.54469
36	55.42864	-133.54165
37	55.42812	-133.53836
38	55.42805	-133.53532
39	55.42790	-133.53221
40	55.42849	-133.52924
41	55.43048	-133.51036
42	55.43217	-133.50842
43	55.43268	-133.50564
44	55.43312	-133.50247
45	55.43202	-133.49917
46	55.43298	-133.49594
47	55.43415	-133.49368
48	55.43467	-133.49070
49	55.43518	-133.48760
50	55.43492	-133.48184
51	55.43503	-133.47874
52	55.43507	-133.47538
55	55.45049	-133.40069
56	55.45112	-133.39756
57	55.45124	-133.39433
58	55.45141	-133.39110
59	55.45199	-133.38796
60	55.45187	-133.38463
61	55.45382	-133.38402
62	55.45555	-133.38463
63	55.47902	-133.42575
64	55.47959	-133.42817
65	55.48137	-133.42959
66	55.48327	-133.42989
67	55.48447	-133.43272

Transect no	Latitude	Longitude
68	55.48625	-133.43353
69	55.51871	-133.45050
70	55.51406	-133.44242
71	55.51269	-133.44040
72	55.51148	-133.43797
73	55.51011	-133.43545
74	55.50999	-133.43232
75	55.50873	-133.42979
76	55.50724	-133.42807
77	55.50535	-133.42636
78	55.50512	-133.42292
79	55.50414	-133.42019
80	55.50323	-133.41747
81	55.50145	-133.41585
82	55.49726	-133.41272
83	55.49617	-133.40928
84	55.49445	-133.40959
85	55.49279	-133.41110
86	55.49221	-133.41464
87	55.49072	-133.41524
88	55.48745	-133.41807
89	55.48568	-133.41747
90	55.48390	-133.41595
91	55.48212	-133.41585
92	55.48028	-133.41605
93	55.47827	-133.41544
94	55.47437	-133.41595
95	55.47259	-133.41615
96	55.47099	-133.41504
97	55.46972	-133.41221
98	55.46921	-133.40908
99	55.46881	-133.40615
100	55.46823	-133.40322
101	55.46479	-133.38140
102	55.46444	-133.37816
103	55.46278	-133.37655
104	55.46163	-133.37392
105	55.45945	-133.37412
106	55.45807	-133.37180
107	55.45658	-133.37008
108	55.45486	-133.36887
109	55.45342	-133.36715
110	55.45233	-133.36483
111	55.45066	-133.36331
112	55.46955	-133.33977
113	55.47041	-133.33715
114	55.47150	-133.33452
115	55.47259	-133.33179
116	55.47391	-133.33038
117	55.47581	-133.32997
118	55.47764	-133.33048
119	55.47936	-133.32957
120	55.47902	-133.32745
121	55.47730	-133.32704
122	55.47552	-133.32543
123	55.44205	-133.30088
124	55.44044	-133.30219
125	55.43924	-133.30461
126	55.43763	-133.30623

Transect no	Latitude	Longitude
127	55.43613	-133.30795
128	55.43458	-133.30956
129	55.43315	-133.31128
130	55.43165	-133.31310
131	55.43005	-133.31472
132	55.42849	-133.31643
133	55.42717	-133.31805
134	55.42643	-133.32088
135	55.40568	-133.32159
136	55.40464	-133.31916
137	55.40372	-133.31633
138	55.40263	-133.31391
139	55.40160	-133.31108
140	55.40763	-133.27693
141	55.40832	-133.27390
142	55.40832	-133.27087
143	55.40809	-133.26784
144	55.40769	-133.26491
145	55.40689	-133.26208
146	55.40637	-133.25915
147	55.40643	-133.25582
148	55.26363	-133.12907
149	55.26297	-133.13203
150	55.26293	-133.13527
151	55.26260	-133.13837
152	55.26256	-133.14133
153	55.26124	-133.14327
154	55.25988	-133.14515
155	55.25844	-133.14709
156	55.25683	-133.14861
157	55.25502	-133.14926
158	55.25387	-133.15163
159	55.25317	-133.15466
160	55.25255	-133.15747
161	55.24794	-133.23872
162	55.24971	-133.23792
163	55.25148	-133.23799
164	55.25333	-133.23785
165	55.25506	-133.23677
166	55.25687	-133.23648
167	55.25864	-133.23699
168	55.26033	-133.23554
169	55.26165	-133.23280
170	55.26334	-133.23093
171	55.26523	-133.23288
172	55.28285	-133.16944
173	55.28334	-133.16634
174	55.28404	-133.16339
175	55.28441	-133.16014
176	55.28470	-133.15704
177	55.28375	-133.15473
178	55.28256	-133.15207
179	55.28293	-133.14875
180	55.32452	-133.44504
181	55.32352	-133.44712
182	55.32151	-133.44804
183	55.32110	-133.45085
184	55.32195	-133.45356

Appendix G. Open area descriptions for the 2001/2002 geoduck clam commercial fishery.

Nakat Bay: in Subdistrict 101-11, only in those waters of Nakat Bay, Sitklan Passage, Lincoln Channel and Tongass Passage east of the longitude of Tree Point light and south of a line extending from a point on the mainland shore at 54°48'18" N. latitude, 130°47'18" W. longitude to the northernmost tip of Slim Island, to a point approximately 0.25 nm north of High Point at 54°47'47" N. latitude, 130°44'17" W. longitude, and west of a line from Point Phipp at 54°46'36" N. latitude, 130°37'15" W. longitude to a point at the southwestern entrance of Fillmore Inlet at 54°47'36" N. latitude, 130°38'05" W. longitude, and north of the U.S. Canadian border.

Kah Shakes: in Subdistrict 101-23, only in those waters along the mainland shore south of the latitude of Kah Shakes Point at 55°04'05" N. latitude and north of the latitude of Kirk Point at 55°00'00" N. latitude.

Hotspur & Percy Islands: in Subdistrict 101-25, only in those waters of Clarence Strait and Sealed Passage west of 131°26'36" W. longitude (located on the northwest side of Duke Island), east of 131°39'00" W. longitude (same longitude as the westernmost tip of Annette Island), and north of a line from the southernmost tip of Point White located at 54°56'00" N. latitude, 131°29'18" W. longitude to a point in Clarence Strait located at 54°54'38" N. latitude, 131°39'00" W. longitude, with the following exception; all waters within 3,000 feet of Annette Island are closed.

103-50: Bucareli Bay, Port Real Marina, Portillo Channel, Ulloa Channel, and contiguous waters (Subdistrict 103-50), only in those waters enclosed south of a line from a point on the northeast side of Lulu Island at 55°30'37" N. latitude, 133°28'05" W. longitude to a point on the northwest side of San Fernando Island at 55°31'32" N. latitude, 133°26'49" W. longitude, and south of a line through Paloma Pass at the latitude of the southernmost tip of Pigeon Island located at 55°25'50" N. latitude (the west entrance of Port Real Marina), and north and east of a line from the westernmost tip Point Arboleda to the southernmost tip of Point San Roque (excluding all waters of Port San Antonio Bay), and north of a line from a point on the southeast side of Suemez Island at 55°14'37" N. latitude, 133°14'22" W. longitude, to Eagle Point located on the northwest side of Dall Island, and north of a line through Tlevak Narrows beginning at the easternmost tip of Turn Point located at 55°15'47" N. latitude, 133°07'14" W. longitude to a point on Prince of Wales Island at 55°15'45" N. latitude, 133°06'26" W. longitude, and west of a line from the southernmost tip of Point Miliflores located on the south side of San Juan Bautista Island to Tranquil Point, and west of a line from Point Cuerdo located on the southeast side of San Fernando Island to Point Eugenia located on the north side of San Juan Bautista Island, with the following exceptions: all waters in Port Mayoral north of the latitude of the northernmost tip of Cristina Island located at 55°22'50" N. latitude, and south of the latitude of Point San Leonardo located at 55°24'15" N. latitude are closed to the harvest of geoduck clams; and those waters of Ulloa Channel south of a line beginning on the northeastern shore of Suemez Island at 55°20'43" N. latitude, 133°19'45" W. longitude and extending to the northernmost tip of Cape Flores, then to the southernmost tip of Joe Island, then due east to Prince of Wales Island, and north and west of a line extending from the easternmost tip of Ridge Island to a point on Prince of Wales Island at 55°16'45" N. latitude, 133°12'11" W. longitude, are closed to the harvest of geoduck clams.

Steamboat Bay: in Subdistrict 103-70, only in those waters of Big Steamboat Bay along the northern shore of Noyes Island south of a line from Point Incarnation at 55°33'19" N. latitude, 133°37'19" W. longitude, to Steamboat Point at 55°33'09" N. latitude, 133°38'54" W. longitude and north of 55°32'13" N. latitude (approximately 2400 feet north of the head of Steamboat Bay).

Symonds Bay: in Subdistrict 113-31, only in those waters of Symonds Bay on Biorka Island south of a line from the westernmost tip of Hanus Island at 56°51'54" N. latitude, 135°30'30" W. longitude, to the easternmost tip of Entrance Island at 56°51'55" N. latitude, 135°31'31" W. longitude.

Goddard: in portions of Subdistricts 113-31 and 113-41, only in those waters along the western coast of Baranof Island south and west of a line beginning at the southern entrance to Kanga Bay at 56°53'33" N. latitude, 135°22'47" W. longitude to the northwesternmost tip of Kanga I. located at 56°54'04" N. latitude, 135°22'02" W. longitude, then extending north and west to the southernmost tip of Ulinoi I. located at 56°55'51" N. latitude, 135°23'45" W. longitude, to the northwest tip of Ulinoi I. located at 56°55'59" N. latitude, 135°24'01" W. longitude, then southwest to the northernmost tip of the unnamed island within the Taigud Islands at 56°55'45" N. latitude, 135°24'51" W. longitude, then continues southwest to the northeasternmost tip of Hanus I. located at 56°51'56" N. latitude, 135°30'25" W. longitude, then north and east of a line extending from a point on the southeast shore of Biorka I. at 56°50'33" N. latitude, 135°30'58" W. longitude to a point at 56°45'00" N. latitude, 135°22'26" W. longitude; and north of 56°45'00" N. latitude and west of 135°20'00" W. longitude and all waters within Big Bay were open, with the following exception: All waters of Kliuchevoi Bay were closed east of a line from 56°50'24" N. latitude, 135°22'31" W. longitude to 56°50'12" N. latitude, 135°22'41" W. longitude, and those waters within the unnamed bay located southeast of Frosty Reef east of a line from 56°52'49" N. latitude, 135°22'56" W. longitude to 56°52'42" N. latitude, 135°22'59" W. longitude to 56°52'38" N. latitude, 135°22'59" W. longitude.

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