Fishery Data Series No. 20-11

Southeast Pot Shrimp Stock Status Prior to the 2018/19 Season

by

Quinn Smith

December 2020

Alaska Department of Fish and Game **Divisions of Sport Fish and Commercial Fisheries**

Symbols and Abbreviations

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Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat or long
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	e
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	E
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	″
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

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SOUTHEAST POT SHRIMP STOCK STATUS PRIOR TO THE 2018/19 SEASON

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ABSTRACT

Spot shrimp *Pandalus platyceros*, and to a lesser extent coonstripe shrimp *P. hysinotis*, are targeted by a pot fishery in Southeast Alaska. Spot shrimp are protandric hermaphrodites with fairly narrow temperature and hard-bottom habitat requirements, and there is little Alaska-specific life history information. A fixed-quota harvest strategy is employed to manage the fishery; data are reviewed annually to determine stock status and guideline harvest levels (GHLs) are set within a guideline harvest range (GHR) and targeted inseason. The upper limits of GHRs were originally set based on historical harvest levels but have since been adjusted. Management is supported by a stock assessment program that includes fishery-independent pot surveys in five of 22 management units (accounting for 57% of the 10-year average annual harvest), commercial catch sampling and logbooks, and commercial catch and effort data. Data on catch rate (survey, logbook, and commercial), shrimp size, the length at which 50% are female (L_{50}), and estimates of harvest rate are analyzed annually. Data from the most current season are compared to established baselines and scored to designate a stock status of "good", "above average", "moderate", "below average", or "poor". For the 22 management units in Southeast Alaska, stock status was poor in two, below average in three, moderate in five, above average in seven, and good in two. The 'Remainder of District 12', District 14 and District 16 management units were closed for the 2017/18 season, so no stock statuses were calculated.

Key words: Spot shrimp, *Pandalus platyceros*, stock assessment, Southeast Alaska, pot fishery

INTRODUCTION

LIFE HISTORY

Spot shrimp (*Pandalus platyceros*) are widely distributed within the North Pacific Ocean. They occur from the intertidal zone to depths of greater than 1,500 feet, from the Korea Strait to the Sea of Japan, along the Siberian east coast, and from Unalaska to San Diego, California (Butler 1964).

Larvae hatch at night, assisted by the female who moves her pleopods while swimming or clinging to something to expel them. The free-swimming larvae spend up to three months as plankton. Five larval stages are reported, with stages I–IV being zoea and stage V being a megalopa (Price and Chew 1972). Five juvenile stages are reported prior to maturation to a functional, adult male (Berkeley 1930; Haynes 1985).

All pandalid shrimp are protandric hermaphrodites; they mature and spawn first as males, and subsequently transition to females and spawn as females for the remainder of their lives. Spot shrimp are thought to mature sexually after 1.5 years and to reproduce as males for one or two seasons in British Columbia (Butler 1964). The transition from male to female occurs during the late winter and early spring, and shrimp mature as females at three or four years of age in British Columbia (Berkeley 1930). Interannual and spatial variability in the size at which shrimp transition, quantitatively expressed as the length at which 50% are female (L_{50}), has been well described for congeneric northern shrimp *P. borealis*, and declines with increased growth rates, as a function of either a substantial decrease in shrimp density or an increase in water temperature (Koeller et al. 2003; Wieland 2004). Females undergo another molt into "breeding dress," characterized by deepened abdominal pleura and elongated setae on the pleopods, in the late summer or fall, after which they extrude mature eggs from their internal ovaries. Eggs are fertilized externally as they are extruded and become attached to the pleopods, where they are carried until fully developed. Near Petersburg, Alaska, Hynes (1930) found an average count of 3,900 eggs per female. In Alaska, eggs may be held until the onset of the spring phytoplankton and zooplankton blooms during late March to mid-May.

Life history information on spot shrimp, the target species for the shrimp pot fishery in Southeast Alaska, is limited. Thus, much must be inferred from examining life history information from

Prince William Sound and British Columbia studies of *P. platyceros* and from North Atlantic studies of congeneric *P. borealis*.

Reports of the duration of the female period of spot shrimp life history vary. Females are not thought to survive long after the release of eggs in British Columbia, whereas in Alaska, multiple size classes of female shrimp have been documented during Alaska Department of Fish and Game (ADF&G) surveys (Love and Bishop 2005). This suggests either multiple spawnings of individual females or a protracted and highly variable age at transition; however, the L_{50} within a year and location of Alaska shrimp is not correspondingly variable. Two sizes of female spot shrimp have also been reported during some years in Hood Canal, Washington (Chew et al. 1974).

Similarly, there is no consensus on the maximum age of spot shrimp, and it is likely to be longer in higher latitudes with colder bottom water temperatures. A maximum age of five years has been reported in Canada (Butler 1964), whereas a tagging study from Prince William Sound, Alaska, estimated the maximum age at seven or more years (Butler 1964; Kimker et al. 1996). Additionally, examinations of size frequency histograms in Prince William Sound indicated maximum age to be at least 10 years (Armstrong et al. 1995).

There is an ontogenetic change in the habitat of spot shrimp. Juvenile spot shrimp inhabit shallow water eelgrass and *Laminarium* or *Agarum spp.* kelp, but at a size of approximately 20 mm carapace length (CL) they migrate to rocky habitats including reefs, glass sponge reefs and corals (Chew et al. 1974; Marliave and Roth 1995).

Adult spot shrimp are benthic scavengers as well as predators and undergo diurnal feeding migrations, moving shoreward along the bottom into shallower waters at night and back to deeper waters during the day (Butler 1980).

Spot shrimp aggregations are likely best described as metapopulations. Although larvae are planktonic and may be widely transported by currents, juveniles and adults are relatively sedentary. Tagged adults remain within a mile or two of their release locations (Kimker et al. 1996). Larval advection into bays and fjords in Southeast Alaska may depend on prevailing wind patterns and currents, and larvae in some inshore waters may experience very small-scale entrainment patterns. Thus, depleted waters could be repopulated by a distant larval "source" if oceanographic conditions allow.

Pandalid shrimp populations are vulnerable to water temperatures outside their narrow preference (3–6ºC for *P. borealis*). Delays may occur in both egg extrusion timing and in the number of breeding females associated with temperatures outside this range (Nunes 1984). Additionally, increased water temperatures result in declines in L_{50}, which causes decreased average mature female size and population fecundity. This can result in a decline in recruitment (Koeller et al. 2003).

STOCK STATUS PROGRAM DEVELOPMENT

The assessment program for spot shrimp in Southeast Alaska was initiated in 1996. It currently consists of pot surveys, commercial catch sampling both on-the-grounds and dockside, fish tickets, and logbooks. The spatial and temporal data coverage is inconsistent, as new programs have been introduced, and spatial data coverage has been increased incrementally with funding availability, and as fishery products and gear evolve.

The goals of the shrimp pot survey are to 1) estimate a useful index of abundance for spot shrimp, 2) estimate the size composition of spot shrimp captured, 3) estimate L_{50} of spot shrimp population, and 4) describe spot shrimp bycatch species composition. For a more detailed description of the development of the shrimp pot survey, see Love and Bishop (2005).

The goals of sampling the commercial fishery are to 1) estimate spot shrimp CL frequency, either of the population using unsorted shrimp, or of the commercial harvest using sorted shrimp; and 2) estimate L_{50}.

Commercial catch sampling has been conducted from four different sample site types, some of which have been discontinued as the fishery and stock assessment program have evolved. The four types are: sampling of unsorted shrimp delivered to floating processors (FLT), sampling of sorted shrimp dockside (DS), sampling of unsorted shrimp onboard catcher-processors (ONBD), and sampling of unsorted shrimp on the grounds (OTG) from catcher-processors. A regulation giving the department the authority to require observers onboard floating processors was promulgated by the Alaska Board of Fisheries at its 1997 meeting (5 AAC 31.144). Accordingly, commercial sampling onboard floating processors (FLT) was initiated with dual objectives of providing the department with the opportunity to sample unsorted shrimp, and of assuring that harvest was reported.

Shrimp deliveries in Districts 1, 2, 3, 9, 10, and 11 were sampled during the 1997, 1998, and 1999 seasons. Subsequently, the shrimp pot fishery intensified, and an increasing proportion of the fleet became catcher-processors; by 1999, only 2 trips in District 3 were sampled, and by 2000, floating processors ceased to operate. Dockside sampling (DS) was also initiated in 1997, first in Districts 1, 6, 7, 14, and 16, and gradually expanding into Districts 3, 4, 8, 10, 11, and 15. However, dockside deliveries gradually dwindled as the proportion of the harvest that was processed onboard increased until 2002, when only Districts 6, 7, 8, 11, 14, and 15 were regularly sampled dockside. By 2007, this had decreased to Districts 6, 7, and 8. Since 2015, dockside samples have only been available from District 7. Sampling by observers stationed onboard catcher-processors (ONBD) was conducted in Districts 1 and 2 from 2000 to 2003, but this work ceased due to budget reductions in 2004. These data are not analyzed herein because of the very short time series. As the fishery intensified, on-the-grounds (OTG) sampling began in 1998, with dual objectives of obtaining catch rate information to accurately target guideline harvest levels (GHLs) inseason and of collecting sampling data from unsorted shrimp. District 2, Sections 3-A and 3-B/C, Districts 6, 7, 8, 9, and 10, Tenakee Inlet, and Section 13-C have been sampled in this way; recent trips have focused on District 1, 2, Sections 3-A and 3-B/C, Districts 6, 7, 9, and 10, and Section 13-C.

Fish tickets, with recorded harvest in pounds, effort in pot lifts, and location of harvest accurate to subdistrict, are mandatory for all commercial shrimp vessel landings. Catcher-processor vessels have been required to submit daily fish tickets since 2003. Other shrimp pot fishing vessels must record each landing on a fish ticket. Fish tickets do not require shrimp harvest to be recorded by size category.

A voluntary logbook program was initiated in 2005 with the objective of collecting size-specific spot shrimp catch-per-unit-effort (CPUE) data from catcher-processors. The level of voluntary logbook participation varied both spatially and temporally, and thus there is not an adequate time series to conduct comparisons in most areas. A regulation for mandatory catcher-processor logbooks was implemented starting with the 2015/16 season. Participating vessels provide

ADF&G with their specific size category definitions at the beginning of the season and record their harvest by shrimp size category daily.

MANAGEMENT PROGRAM

The Southeast Alaska pot shrimp fishery is managed inseason by emergency order to limit harvests in each area managed to GHLs established by the department each season. Guideline harvest ranges (GHRs) were first established in regulation in 1997 following initial implementation of separate, district-specific GHRs by emergency order for the 1995/96 season (5 AAC 31.115, *Shrimp Pot Guideline Harvest Ranges for Registration Area A*). The lower limit of each GHR is zero (indicating that an area may not open during a season), and the upper limits were originally set based on average harvest levels from the 1990/91 to the 1994/95 seasons. GHRs have been adjusted by the Board of Fisheries several times for many, but not all, management units. A thorough review of the history of and rationale for GHL changes by management unit, including the timing for creation of new management units, is provided in the triennial Board of Fisheries report (Smith and Gray 2017). GHL recommendations are made annually based on stock assessment results. In 2004, decision rules were established to guide GHL-determination based on stock status designation. A stock status designation of "poor" was associated with a 20% reduction in GHL, a stock status of "moderate" was associated with no GHL change, and a stock status of "healthy" was associated with a GHL increase of 20%. These guidelines were in place through 2005. For 2006–2007, "poor" stock status was changed to a 20–40% reduction, "moderate" to a 0–20% reduction, and "healthy" to a 20–40% increase. Beginning in 2010, two additional stock status classes—"above average" and "below average"—were added to bring the shrimp assessment in line with other shellfish assessment terminology. The current stock status definitions and associated GHL actions are shown in Table 1. Once established, GHLs for each management unit are targeted for a period of three years unless there are compelling, data-supported reasons, to do otherwise.

OBJECTIVES

The objective of this report is to provide a stock status and the confidence in stock status for each management unit of the shrimp pot fishery in Southeast Alaska.

METHODS

A combination of fishery-independent (surveys) and fishery-dependent (logbook, fish ticket, OTG sampling, and dockside sampling [DS]) data were collected to assess the relative changes in abundance, and the overall stock condition of the spot shrimp in order to maintain a long-term sustainable harvest. The current year's stock assessment, though similar in concept to previous years, has undergone substantial improvements in the form of data source weighting to provide a more consistent and logical framework from which more objective determinations of stock status can be made.

ANALYSIS AREAS

The pot shrimp fishery is managed to a preseason GHL in distinct management units. In 2018, the Board of Fisheries approved a proposal to combine portions of District 6, 8, and 10 into four separate GHL based management units. This increased the number of management areas in the southeast pot shrimp fishery from 21 to 22. For stock status analysis purposes, each management unit was divided into 1–7 separate analysis areas based on combining subdistricts that are spatially

related and/or on the distribution of fishing effort within the management unit (Table 2). These analysis areas were then individually weighted by a long-term average of commercial harvest. This provides a more accurate evaluation at the management unit level, because harvest varies dramatically among subdistricts.

STOCK STATUS MATRIX

Data are separated into four broad categories: catch rates, harvest rates, mean CL, and L_{50}. Catch rates can be used as a relative index of population size. However, CPUE data can be difficult to interpret with the confounding effects of changes in fishing effort, gear type, animal behavior, and population size. Three independent catch rates were used depending on the data available: survey CPUE of ≥XL (≥40 mm CL) shrimp, standardized commercial CPUE, and logbook CPUE of ≥XL shrimp. Although each method provides a relative index of shrimp abundance, none provide an ideal measure due to trade-offs in their collection methods. Survey catch rate data are by far the most standardized from year to year and provide the greatest resolution in detecting changes in population size. Survey effort and gear is consistent over years and sample sizes are standardized. Also, because shrimp are individually measured, catch rates can be separated by size class, and thus allow a focused view on large shrimp. This removes any potential bias of changes in catch rates due to changes in catchability and provides the most sensitive measure of population change. The downside to survey CPUE is the assumption that the relatively small spatial scale of the survey is representative of the entire district. The long-term baseline to which the current year's data were compared using a *t*-test was initially set as the mean of the first three years of the survey. These baselines have occasionally been adjusted if it was apparent that the first three years were not an appropriate comparison. When this occurs, a 10- or 15-year mean was substituted for the initial three-year mean. The short-term score was based on a linear regression analysis of the last four years (including the current year).

Commercial catch rate information is difficult to interpret even when standard and accurate measures of effort exist. This is because commercial fishermen can increase effort and efficiency in ways that are difficult to quantify in order to maintain an economically profitable harvest level even as populations decline. Specific examples of this include improved navigational plotting equipment allowing fishermen to better pinpoint habitat, improved gear efficiency, changes in bait type or volume, and changes in sorting. This problem is known to be particularly acute for fisheries on species with very limited distributions (Orensanz et al. 1998). Because the shrimp pot fishery in Southeast Alaska has had accurate units of effort since the 1996/97 season, and the species has a limited distribution, commercial catch rate is an insensitive index and declines in catch rate are likely to be observed only after large changes in population size. Nonetheless, for many districts it is the only information available. In addition, raw commercial CPUE cannot be separated by size class and therefore lacks resolution. However, the sample size of commercial catch rates is much higher than that of survey CPUE. This often leads to better representation of the full spatial scale of the fishing grounds, but also has the potential to introduce bias due to over-sampling due to lack of standardization and potential non-independence of data. To improve the utility of commercial CPUE data, a standardized catch rate is used to describe trends in CPUE. Commercial catch rates were standardized by effort. The season with the smallest effort (fewest pot lifts) was used as the standard and all other year's data were scaled to match this effort as closely as possible. All data were sorted by date to ensure CPUE was calculated from the first pot lifts of the season. The long-term baseline to which the current year's data were compared using a *t*-test consists of all

years from the 2001/02 to the 2007/08 season (where sufficient data existed). The short-term score was based on a linear regression analysis of the last four years (including the current year).

The catch rates calculated from commercial logbooks provide a compromise between the unbiased, high-resolution survey data, and the biased, lower-resolution commercial data. Because size class information is recorded on logbooks, CPUE of large shrimp can be calculated. Also, because commercial fishing occurs over a much broader scale, the spatial extent of the data should be better; however, voluntary logbook data are available for only the most recent three years. Simple analysis of variance (ANOVA) followed by a Tukey HSD (honestly significant difference) test was conducted to detect short-term trends in logbook CPUE and to identify differences between years. Declines in the 2007 season relative to either 2005 and/or 2006 were scored -1, whereas no difference was scored as 0, and an increase scored as +1.

The goal of harvest rate strategies is to maximize sustainable yield. Harvest rates generally correlate with growth, longevity, and reproductive rates of the exploited species (i.e., faster growing, shorter-lived, and more fecund species tend to tolerate higher harvest rates). Harvest rates calculated using harvest data provide an estimate of the overall fishing pressure on the exploited shrimp population. Harvest rates can be estimated by using a Leslie depletion model with commercial logbook data. The Leslie depletion model is used to estimate the exploitable population size of a fished area. From this estimate, the harvest rate can be estimated by dividing the total catch in an area by the estimated population size. The system for scoring harvest rates was dually based. First, we applied the work of Kimker et al. (1996), who found that the maximum age of *P. platyceros* in Prince William Sound exceeded seven years of age, we used eight as the maximum age, and applied the equation of Hoenig (1983) to estimate natural mortality (M) at $M = 0.55$. We set fishing mortality rate (F) equal to M, which yields a limit annual harvest rate of 42%. Second, we conducted a literature survey to check limit reference points for harvest rates currently in use for fisheries on North Atlantic *P. borealis* populations, which have a similar life history, maximum age, and natural mortality to *P. platyceros*. In Maine, Clarke et al. (2000) found that yield and egg-per-recruit modeling showed that $F = 0.34$, or an annual mortality of 29% was sustainable; they estimated the maximum age at five years, so this population could likely support a more aggressive harvest strategy than the more long-lived spot shrimp. In the past, a 35% target exploitation rate was used for *P. borealis* stocks with natural mortality in the range of $M = 0.5–0.8$ in eastern Canada (Mohn et al. 1992). However, this lost acceptance when it was exceeded for several stocks with no apparent ill effects, and since then, stock-specific limit reference points for F have been established. For *P. jordani* in California, F_{MSY} (F that produces maximum sustainable long-term yield), which should be considered a limit reference point, was estimated at 0.5 or 39% annually (Abramson and Tomlinson 1972). For Icelandic *P. borealis*, Skuladottir (1979) calculated an F_{MSY} of 0.4 or 33% annually with M assumed to be 0.2. A limit reference point called $F_{0.1}$ is the fishing mortality rate at which the slope of a yield-per-recruit curve is 10% of its original value. On the high side, for Norwegian populations, yield-per-recruit modeling estimated an $F_{0.1}$ of 0.76 or 53% annually, assuming an M of 0.75 (ICES 2000). Therefore, estimated harvest rates of ≥XL shrimp for Southeast Alaska are scored as follows: excessive (-1) for harvest rates exceeding 50%, moderate (0) for harvest rates ≥40% and ≤50%, or good (+1) for rates less than 40% annually. As logbook data accumulates, it may be possible to develop a limit reference (F_{limit}) specific to Southeast Alaska using the empirical relationship between stock trends and harvest rate estimates.

The mean carapace length (CL) is an estimate of the relative population structure. Decreases in mean CL can theoretically arise from an increase in the relative proportion of small shrimp (e.g., large recruitment event) or a decrease in large shrimp (e.g., high harvest rates). Conversely, increases in mean CL can arise from an increase in large shrimp or a decrease in small shrimp. These possibilities make the interpretation of changes in mean CL difficult. However, pre- and postseason shrimp pot surveys conducted in Districts 3 and 7 showed that the removal of large shrimp actually increases the catchability, and hence the catch rate, of small shrimp postseason (Clark and Love 2003). This suggests that a decrease in mean CL is more likely a result of decreases in larger shrimp rather than a large recruitment of small shrimp. In order to detect changes in mean CL, a *t*-test was conducted to examine the difference between the current year sample mean and the long-term baseline. Baselines for commercial samples consisted of the mean of the first three sampled years for each area having three or more trips and a sample size of 200 or more shrimp, and for survey data, the long-term baseline is based on the first three years with a sample size of 200 or more shrimp.

The unique plasticity of the size at sex change of this genus makes the L_{50} useful as an indicator of population status. For *P. borealis*, L_{50} has been shown to decline with increased growth rates, as a function of either a substantial decrease in shrimp density or an increase in water temperature (Koeller et al. 2003; Wieland 2004). Thus, decreases in L_{50} result in decreased population fecundity, because fecundity increases with size for most pandalid shrimp species; this can lead to reductions in recruitment levels and (further) reductions in population size. Unlike the other metrics described above, L_{50} data are minimally affected by catchability issues and changes in L_{50} are more easily interpreted. However, because change in reproductive age is a population level response, changes in L_{50} data are likely to respond more slowly than other metrics. In order to detect changes in L_{50}, the confidence interval around the current year sample mean was compared with the long-term baseline value. If the lower bound of the 95% confidence interval is greater than the baseline it is scored +1, if the baseline is greater than the upper bound it is scored -1, and if it lies within the lower and upper bound it is scored 0. Baselines established for commercial samples consisted of the mean of the first three sampled years for each area having three or more trips and a sample size of 200 or more shrimp, and for survey data, the long-term baseline is based on the first three years with a sample size of 200 or more shrimp.

Other information that is used in the stock assessment are qualitative data and a measure of confidence in the overall interpretation of available data. Qualitative data, although difficult to analyze, can provide useful insight into the overall stock assessment, especially in data-poor areas. Information such as changing markets, fuel prices, and weather can help interpret changes in season length, overall harvest, distribution of harvest, and effort. Direct communication with fishermen can provide their impression of stock health. These “manager scores” were scored as +1, 0, or -1. The confidence level of the stock assessment for each analysis area is assessed according to the number of data pieces for the current season compared to the total possible number. This provides a metric of our ability to interpret the overall stock health of a given area. Areas with low confidence should be treated with a more precautionary approach.

The overall health of spot shrimp populations for each analysis area was assessed by statistically comparing the current year’s data to long-term baselines, and by analyzing short-term trends. This provides an objective and repeatable method for decision-making. Stock status for each area was determined through an examination of the following response variables: catch rate, harvest rate, mean carapace length, and L_{50}. In assessing stock status, each response variable was scored

independently and weighted based on the historic correlation between the response variable and the standardized district score (see detail below). If the current year's response was significantly above the long-term baseline it was scored +1, if no difference was found it was scored 0, and if it was significantly lower than the baseline it was scored -1. Short-term trends were scored as +0.25, 0, or -0.25 for significant increase, no change, or significant decrease, respectively.

Evaluating the influence of each index on the total score is not straightforward because they are on different scales (e.g., carapace length vs. catch rate) and each index is evaluated and scored twice based on the baseline and short-term tests. Therefore, it was determined that the score for each index would be evaluated for its influence on the total district or section score calculation. Pairwise multivariate correlation analyses were performed with all indices, comparing them to each other and to the districtwide total score and the districtwide standardized score. The pairwise part of this analysis allowed for a review of the indices to determine if any were redundant (highly correlated to each other and therefore not providing any unique information) or non-informative (having the same score every year and therefore not having a correlation coefficient). The correlation between each index and the standardized district score correlation was used to determine the weighting scheme. A regional weighing scheme was determined by comparing the mean, mode, median, and weighted mean of the correlation coefficients for each district. In this regional weighting scheme, survey catch rate, logbook data, and the short-term trend in carapace length from on the grounds samples were weighted 1. The short-term trend in standardized commercial CPUE, mean carapace length data from the surveys, L_{50} data from the surveys, and manager scores were weighted 2/3, whereas long-term comparisons of standardized commercial CPUE and L_{50} data taken on the grounds were weighted 1/3. For full details on this evaluation see Smith (2018).

The total analysis area score was the weighted sum of the long- and short-term scores for each response variable for each management unit (weighted by analysis area and response variable). The possible range of scores for a given area was divided into three equal categories: "Poor" for the lowest 1/5 of possible scores, "below average" for the next 1/5, "moderate" for the middle 1/5, "above average" for the next highest 1/5, and "good" for the highest 1/5 of the possible scores. For example, if the scores ranged from +5 to -5, the categories would be as follows: "poor" is less than -3, "below average" is -3 to -1, "moderate" is -1 to +1, "above average" is +1 to +3, and "good" is greater than +3. For ease of regionwide interpretation, the overall scores for each district were also standardized to range from +1 to -1.

RESULTS AND DISCUSSION

REGIONAL OVERVIEW

The regionwide stock status score increased in the 2017/18 season. The mean standardized stock health score for all districts in 2017/18 is 0.10 (on a scale of -1 to 1, with -1 representing all scores in the matrix being negative, and 1 representing all scores in the matrix being positive), which was up from -0.08 (based on the management areas used in the 2016/17 fishery) in 2016/17 (Table 3). The regionwide increase was mainly driven by increased scores in Districts 2, 6, 7, and 10, and Sections 13 A/B. These increases were partially offset by declines in District 1 and Sections 3 B/C. Of the total regional GHL, 11% came from areas with "good" stock status (up from 0% in 2016/17), 32% came from areas with "above average" stock status (up from 25%), 34% came from areas with "moderate" stock status (strong decrease from 65%), 17% came from areas with "below average" stock status (strong increase from 4%), and 4% came from areas classified as "poor"

(slight decrease from 6%). Tenakee Inlet, the Remainder of District 12, and the Auke Bay portion of District 11 have been closed since the 2015/16 fishing season to allow for stock recovery. District 16 was closed in 2017/18 as part of the usual rotation to open every other year. Total 2017/18 GHL for the region was 545,570 lb, a less than 1% increase from the 2016/17 season. A total of 567,876 lb (107% of the GHL) was harvested.

Survey results show mixed positive and negative indicators. District 1 showed decreases in catch rates of large (≥40.5 g) and small (<40.5 g) class shrimp in Back Behm Canal and a decrease in large class but an increase in small class shrimp in West Behm Canal. District 2 showed increased catch rates of large and small class shrimp in both Kasaan Bay and Cholmondeley Sound. In District 3, Hetta Inlet showed a strong decrease in the catch rate of large class shrimp and an increase in small class, while catch rates of large and small class increased in Mid Cordova Bay. In District 7, both Lower and Upper Ernest Sounds showed increases in catch rates on large class shrimp, while small class catch rates declined in Upper Ernest and increased in Lower Ernest. Catch rates of both size classes were flat in West Tenakee Inlet. Catch rates of both large and small class shrimp declined in Hoonah Sound compared to the last survey in the fall of 2014. Survey operations were suspended in Hoonah Sound in 2015 and 2016 due to budgetary shortfalls.

On-the-grounds (OTG) sampling was available in nine of the 43 analysis areas that had fishing effort, four less than in the 2016/17 season due to reallocation of funds. Statistical tests could only be completed for eight analysis areas due to lack of long-term baseline data and insufficient sample sizes. Dockside sampling had less coverage with data from only one analysis area.

A mandatory logbook requirement for catcher-processors went into effect for the 2015/16 season, and logbook data availability expanded to 13 analysis areas that now have sufficient data and model fit to conduct harvest rate estimations on ≥XL size class shrimp. Fifteen analysis areas had the three years of logbook data required for catch rate analysis.

Catch per unit effort (CPUE) data derived from fish tickets were significantly below the long-term baseline in 20% (10/51) of the analysis areas open to fishing, a decrease from 26% in the 2016/17 season. Commercial CPUEs were significantly above the long-term baseline in 24% (12/51) of the analysis areas, an increase from 11% in the 2016/17 season. The percentage of analysis areas with no effort this season remains at 22% (same as 2015/16 and 2016/17 seasons), the highest level in a decade.

Manager scores were positive (+1) for 11 analysis areas (up from four in 2016/17), neutral (0) for 39 (down from 44), and negative (-1) for three (down from six). This gives an overall average score of 0.15, up from -0.05 during the 2016/17 season.

STOCK STATUS

A summary of stock status, stock status score, confidence level, and a standardized score by management unit is provided in Table 2. Details for each management area and its associated management units follow.

Table 1.–Stock status definitions and guideline associated actions for the pot shrimp fishery in Southeast Alaska.

Stock Status	Rationale	Range of Action
Good	Scores greater than 80% of possible maximum	0–40% harvest increase
Above Average	Scores between 60% and 80% of possible maximum	0–20% harvest increase
Moderate	Scores between 40% and 60% of possible maximum	0–20% harvest reduction
Below Average	Scores between 20% and 40% of possible maximum	0–30% harvest reduction to closure
Poor	Scores equal to and below 20% of possible maximum	0–40% harvest reduction to closure

Table 2.–Modified analysis area definitions for the shrimp pot fishery in Southeast Alaska with weights and 2017/18 manager scores.

Management unit	Analysis area	Subdistricts	Weight	2017/18 Score
District 1	Back Behm Canal	75, 77, 80	0.260	0
	East Behm	51, 53, 55, 60, 71, 73	0.200	0
	West Behm Canal	85, 90, 95	0.120	0
	Boca de Quadra	30	0.050	0
	Inner Ketchikan Inlets	27, 40, 43, 44, 45, 46, 48	0.200	0
	Portland Canal	10, 11, 13, 15	0.150	0
	Revilla Channel/Gravina Is.	21, 23, 22, 25, 29, 41	0.020	0
District 2	Lower Clarence Strait	10, 15, 20	0.040	0
	Moira Sound	30	0.170	0
	Cholmondeley Sound	40	0.290	0
	Kasaan Bay	60	0.480	-1
	Middle Clarence Strait	50, 70, 80	0.020	0
Section 3-A	Hetta Inlet	25	0.200	0
	Lower Cordova Bay	11, 15	0.200	0
	Mid Cordova Bay	21, 23	0.100	0
	Upper Cordova Bay	30, 40	0.500	0
Section 3-B/C	Craig	50, 60, 70, 80	0.400	0
	Sea Otter Sound	90	0.600	0
District 4	D 4	10, 20, 30, 35, 40, 50	1.000	0
District 5	Affleck/Port Beauclerc	10, 20	0.600	0
	Cape Pole to Point Baker	41, 42, 43, 50	0.050	0
	Rocky Pass	31, 32	0.350	0
North Clarence	SW Etolin Island	20, 22, 25	0.100	1
	Upper Clarence Strait	10, 30	0.900	1
District 7	Bradfield Canal	40, 45	0.200	1
	Lower Ernest Sound	10	0.200	1
	Upper Ernest Sound	20	0.500	1
	Zimovia Strait	30, 35	0.100	1

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Table 2.–Page 2 of 2.

Management Unit	Analysis area	Subdistricts	Weight	2017/18 Score
Sumner Strait	Western Sumner Strait	106-41, 42, 43, 44	0.200	1
	Eastern Sumner Strait	108-30, 40	0.490	0
	Stikine Strait/ Chichagof Pass	108-10, 20	0.310	1
District 9	Eliza Harbor	30	0.400	0
	Keku Strait/Port Camden	40, 41, 42, 43, 50	0.025	0
	SE Baranof Is.	10, 11, 13, 20	0.550	-1
	Western Kuiu (Saginaw to Table)	44–63	0.025	0
Southern Frederick Sound	Frederick Sound	108-41, 50, 60	0.430	1
	Farragut Bay	110-11–17	0.570	1
Northern Frederick Sound	Hobart/Windham Bays	31, 32, 33	0.440	1
	Port Houghton	34	0.410	0
	SE Admiralty (Pybus to Pt Hugh)	21–24	0.150	0
Seymour	Seymour Canal	11–14	1.000	0
Remainder District 11	Auke Bay	50, 55	0.750	NA
	Glacier-fed Bays	20, 21, 33–35	0.250	0
Tenakee Inlet	East Tenakee Inlet	41, 42	0.100	NA
	West Tenakee Inlet	43, 44, 45, 46, 47, 48	0.900	0
Remainder District 12	Freshwater Bay	50	0.200	NA
	Kelp Bay	11, 21, 22	0.700	NA
	Pt. Couverden	61	0.100	NA
Section 13-A/B	Crawfish Bay	31, 32, 33	0.300	0
	Larch/ Branch Bays	11, 12, 13	0.000	0
	Necker Bay	34	0.300	0
	Whale Bay	22, 21	0.400	0
Section 13-C	Hoonah Sound	55, 56, 57, 58	0.800	0
	Peril Strait	51, 52, 53, 54, 59	0.200	-1
District 14	Eastern Icy Strait	25, 80	0.800	NA
	Port Frederick	31–34, 27	0.200	NA
District 15 East	Chilkoot Inlet	34	0.250	0
	Lutak Inlet	33	0.200	0
	Taiya Inlet	35	0.550	0
Remainder District 15	Chilkat Inlet	32	1.000	0
District 16	Lituya Bay	13	1.000	NA

Table 3.–Score, stock status, and confidence information summarized from Tables 4–40, and standardized (Std.) score. The standardized score is used to compare among districts and ranges from +1 to -1. The standardized score is calculated as the score divided by the total possible score for a given management unit. A standardized score of ≥0.6 gives a stock status of Good, 0.2 to 0.59 is Above Average, -0.19 to 0.19 is Moderate, -0.2 to -0.59 is Below Average, and less than or equal to -0.6 is Poor.

Management Area	Score	Stock Status	2015/16 Std. Score	2016/17 Std. Score	2017/18 Std. Score	Confidence	Upper End GHR	2017/18 GHL	2017/18 Harvest	% GHL Taken
District 1	-1.59	Below Average	0.04	0.21	-0.23	0.36	164,000	64,000	73,319	115
District 2	3.72	Above Average	-0.59	0.12	0.57	0.44	120,000	30,000	27,173	91
Section 3A	-0.71	Moderate	-0.33	-0.10	-0.12	0.41	264,000	114,000	132,536	116
Sections 3-B/C	-0.73	Below Average	0.03	0.00	-0.34	0.24	70,000	30,000	33,597	112
District 4	-0.50	Moderate	-0.38	-0.31	-0.16	0.33	28,000	20,000	18,354	92
District 5	0.50	Above Average	-0.82	0.00	0.23	0.16	20,000	12,000	*	*
Northern Clarence	4.03	Good	**	**	0.91	0.45	60,000	**	52,179	NA
District 7	3.48	Above Average	-0.12	0.17	0.43	0.61	104,000	96,590	96,234	100
Sumner Strait	0.74	Above Average	**	**	0.34	0.18	25,000	**	12,132	NA
District 9	-0.70	Poor	-0.33	-0.69	-0.60	0.19	18,000	11,000	10,809	98
Southern Frederick Sound	0.88	Good	**	**	0.76	0.20	20,000	**	8,924	NA
Northern Frederick Sound	-0.31	Moderate	**	**	-0.07	0.42	50,000	**	40,365	NA
Seymour	0.83	Above Average	-0.44	-0.44	0.38	0.27	30,000	12,000	11,498	96
Remainder of District 11	1.00	Above Average	0.00	-1.00	0.46	0.07	15,000	4,000	4,399	110
Tenakee	0.08	Moderate	-0.16	0.61	0.02	0.36	34,000	Closed	0	Closed
Remainder of District 12	0.00	CLOSED	-1.00	NA	NA	0.00	15,000	Closed	0	Closed
Sections 13-A/B	0.25	Above Average	-0.24	-0.14	0.21	0.16	15,000	15,000	20,702	138
Section 13-C	-2.30	Poor	0.37	-0.68	-0.66	0.33	50,000	16,000	12,782	80
District 14	0.00	CLOSED	NA	NA	NA	0.00	20,000	Closed	0	Closed
District 15 East	-0.32	Below Average	0.15	-0.28	-0.27	0.16	20,000 (all 15)	7,500	3,666	49
Remainder of District 15	0.00	Moderate	0.00	0.00	NA	0.06	20,000 (all 15)	7,500	*	*
District 16	0.00	CLOSED	NA	0.00	NA	0.00	20,000	Closed	0	Closed
Mean	0.40	Moderate	-0.20	-0.16	0.10	0.25	1,162,000	530,570	567,875	107

Note: * = Confidential data with less than three permits participating; ** = new management unit for 2018/19 season; NA = not applicable.

KETCHIKAN MANAGEMENT AREA

District 1

The GHL in District 1 has changed five times since the 1998/99 season. Due to changes in the estimation of tail weight to whole weight, the GHL for this district increased 13% from 145,000 to 164,000 lb for the 2000/01 fishing season. Before this time tail weight was assumed to be approximately 66% of whole weight; after a large-scale sampling effort, this was revised to 50%, which subsequently increased the GHL because tail weight is extrapolated to whole weight for the purposes of catch accounting. The GHL was kept unchanged through the 2005/06 season (Table 4). In response to poor fishery performance, the GHL was reduced 40% to 98,400 lb beginning with the 2006/07 fishing season. The GHL was further reduced 20% to 78,700 lb for the 2008/09 fishing season, and 36% to 50,000 lb beginning in the 2009/10 fishing season. Due to strengthening stock health, the GHL was increased 28% prior to the 2015/16 season to 64,000 lb. Rather than targeting a specific GHL, managers have used set closure dates to control harvest. Harvest has averaged 59,500 lb (106% of GHL) over the last 10 years. Harvest in the 2017/18 season was 73,319 lb (115% of GHL). This district is divided into seven analysis areas (Back Behm Canal, East Behm Canal, West Behm Canal, Boca de Quadra, Inner Ketchikan Inlets, Portland Canal, and Revilla Channel/Gravina).

This was the seventh season of preseason surveys in District 1. Although it is a limited data set, the standard statistical tests could be performed. In Back Behm Canal, the catch rate of large class shrimp declined sharply for the second year in a row and is both below baseline–the lowest seen in the survey–and showing a significant declining four-year trend. The catch rate of large class shrimp also declined in West Behm and is now back at baseline, with no significant four-year trend (Figure 1). Mean survey CL declined in both areas and is at baseline in Back Behm and below baseline in West Behm. West Behm still shows a significantly increasing four-year trend, although CL dropped in West Behm for the last 2 years. The L_{50} is at baseline in both areas (Figure 2).

The 2017/18 season standardized districtwide commercial CPUE is up from last season and is now the highest since the 2001/02 season (Figure 3) due to better fishery performance in Back Behm, Portland Canal, and Inner Ketchikan Inlets. Analysis area specific commercial CPUE is significantly above the long-term baseline in Back Behm and Portland Canal, and at baseline in all other areas except Boca de Quadra and Revilla Channel/Gravina, which had no and too little effort for statistical tests to be performed, respectively (Table 5). No analysis areas showed a significant four-year trend. (Table 5, Figure 4).

Analysis of commercial logbook harvest data showed increased catch rates in East Behm Canal, no change in West Behm Canal, and a decrease in Portland Canal. Portland Canal also showed a 54% (excessive) harvest rate of large class shrimp (Table 5).

On-the-grounds samples showed mean CL to have declined in both Back Behm and West Behm Canals. Mean CL is at baseline in both areas and showing an increasing four-year trend in Back Behm Canal (Figure 5). No on-the-grounds L_{50} data were available for District 1 (Figure 6).

Manager scores were neutral for all analysis areas (Table 5).

The overall matrix score for District 1 is -1.59 (below average), which was down from 1.10 (above average) in 2016/17. Much of this change is due to strong decreases in survey catch rate and CL in Back Behm and West Behm Canals, as well as excessive harvest rates of large class shrimp in Portland Canal. The decrease was tempered by increased fishery CPUE in Inner Ketchikan Inlets and Portland Canal. District 1 data have moderate confidence (0.36), a slight increase from last year due to more logbook availability.

Table 4.–District 1 matrix, Part A. A 15-season history, including stock assessment recommendations, for the pot shrimp fishery in Southeast Alaska.

Season	2003/04	2004/05	2005/06	2007/08	2006/07	2008/09	2009/10	2010/11
Upper regulatory GHR	164,000	164,000	164,000	164,000	164,000	164,000	164,000	164,000
Actual GHL (lb spot shrimp)	164,000	164,000	164,000	98,400	98,400	78,700	50,000	50,000
Recommended GHL or stock status	–	Moderate	Moderate	Poor	Poor	Poor	Below Average	Below Average
Season length (days)	49	80	75	229	47	120	38	38
Landings (number)	557	604	583	336	432	218	153	131
Harvest (lb spot shrimp)	170,113	159,234	160,546	87,581	141,871	53,364	46,837	37,129

Season	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Upper regulatory GHR	164,000	164,000	164,000	164,000	164,000	164,000	164,000
Actual GHL (lb spot shrimp)	50,000	50,000	50,000	50,000	64,000	64,000	64,000
Recommended GHL or stock status	Below Average	Moderate	Moderate	Moderate	Moderate	Above Average	Below Average
Season length (days)	26	21	14	14	19	13	13
Landings (number)	131	141	114	134	154	168	146
Harvest (lb spot shrimp)	54,971	70,354	54,033	68,192	61,959	74,923	73,319

Note: En dash = not available.

Table 5.–District 1 matrix, Part B. Baselines, current season values, and scores for each stock status parameter and analysis area for the pot shrimp fishery in Southeast Alaska. Data sources are from ADF&G shrimp survey, fish tickets ("fish tix"), logbooks, and on-the-grounds (OTG) and dockside (DS) sampling of commercial catch. Data are divided by type: CPUE, harvest rate, mean carapace length (CL), and L_{50}. Score for each analysis area is the sum of all individual scores.

Analysis Area		Back Behm Canal			East Behm Canal			West Behm Canal		
Area weighting			0.26			0.2			0.12	
Stock Status Parameters	Source	Baseline	Value	Score	Baseline	Value	Score	Baseline	Value	Score
Catch rate ≥XL	survey	4.4	2.1	-1.00	–	–	–	1.9	2.7	0.00
4-yr trend in catch rate	survey	–	Sig. dec.	-0.25	–	–	–		No trend	0.00
Std. Comm. CPUE	fish tix	2.6	4.6	1.00	2.8	2.7	0.00	2.9	3.0	0.00
4-yr trend in CPUE	fish tix	–	No trend	0.00	–	No trend	0.00	–	No trend	0.00
Catch rate ≥XL	logbook	–	–	–	–	Sig. inc.	1.00	–	–	–
Harvest rate ≥XL (2015)	logbook	–	–	–	–	–	–	–	49%	–
Harvest rate ≥XL (2016)	logbook	–	11%	–	–	–	–	–	–	
Harvest rate ≥XL (2017)	logbook	–	–	–	–	–	–	–	–	–
Mean CL	survey	38.3	37.8	0.00	–	–	–	37.5	36.4	-1.00
4-yr trend in CL	survey		No trend	0.00	–	–	–	–	Sig. inc.	0.25
Mean CL	OTG	41.2	40.8	0.00	–	–	–	42.2	42.0	0.00
4-yr trend in CL	OTG	–	Sig. inc.	0.25	–	–	–	–	No trend	0.00
Mean CL	DS	–	–	–	–	–	–	–	–	–
4-yr trend in CL	DS	–	–	–	–	–	–	–	–	–
L_{50}	survey	41.2	41.4	0.00	–	–	–	42.7	42.0	0.00
L_{50}	OTG/DS	46.1	–	–	–	–	–	42.8	–	–
Manager score		–	–	0.00	–	–	0.00	–	–	0.00
Score	–	–	–	0.00	–	–	1.00	–	–	-0.75
Max. possible score	–	–	–	7.00	–	–	3.25	–	–	8.00
Stock Status	–	–	–	–	–	–	–	–	–	–
Confidence	–	–	–	0.59	–	–	0.12	–	–	0.65

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Table 5.–Page 2 of 3.

Analysis Area		Boca de Quadra			Inner Ketchikan Inlets			Portland Canal		
Area weighting			0.05			0.2			0.15	
Stock Status Parameters	Source	Baseline	Value	Score	Baseline	Value	Score	Baseline	Value	Score
Catch rate ≥XL	survey	–	–	–	–	–	–	–	–	–
4-yr trend in catch rate	survey	–	–	–	–	–	–	–	–	–
Std. Comm. CPUE	fish tix	2.8	No effort	–	2.9	3.9	0	2.5	4.4	1
4-yr trend in CPUE	fish tix	–	NA	–	–	No trend	0.00	–	No trend	0.00
Catch rate ≥XL	logbook	–	–	–	–	–	–	–	Sig. dec.	-1
Harvest rate ≥XL (2015)	logbook	–	62%	–	–	–	–	–	–	–
Harvest rate ≥XL (2016)	logbook	–	–	–	–	–	–	–	–	–
Harvest rate ≥XL (2017)	logbook	–	–	–	–	–	–	–	54%	-1
Mean CL	survey	–	–	–	–	–	–	–	–	–
4-yr trend in CL	survey	–	–	–	–	–	–	–	–	–
Mean CL	OTG	–	–	–	–	–	–	–	–	–
4-yr trend in CL	OTG	–	–	–	–	–	–	–	–	–
Mean CL	DS	–	–	–	39.4	–	–	–	–	–
4-yr trend in CL	DS	–	–	–	–	–	–	–	–	–
L_{50}	survey	–	–	–	–	–	–	–	–	–
L_{50}	OTG/DS	–	–	–	44.3	–	–	–	–	–
Manager score	–	–	–	0	–	–	0	–	–	0
Score	–	–	–	0.00	–	–	0.00	–	–	-1.00
Max. possible score	–	–	–	1.00	–	–	2.25	–	–	4.25
Stock Status	–	–	–	–	–	–	–	–	–	–
Confidence	–	–	–	0.06	–	–	0.18	–	–	0.29

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Table 5.–Page 3 of 3.

Analysis Area		Revilla Channel/Gravina			
Area weighting			0.02		
Stock Status Parameters	Source	Baseline	Value	Score	Total Score
Catch rate ≥XL	survey	–	–	–	-0.68
4-yr trend in catch rate	survey	–	–	–	-0.17
Std. Comm. CPUE	fish tix	3.0	*	*	0.15
4-yr trend in CPUE	fish tix	–	NA	–	0.00
Catch rate ≥XL	logbook	–	–	–	0.11
Harvest rate ≥XL (2015)	logbook	–	–	–	–
Harvest rate ≥XL (2016)	logbook	–	–	–	–
Harvest rate ≥XL (2017)	logbook	–	–	–	-1.00
Mean CL	survey	–	–	–	-0.21
4-yr trend in CL	survey	–	–	–	0.05
Mean CL	OTG	–	–	–	0.00
4-yr trend in CL	OTG	–	–	–	0.17
Mean CL	DS	–	–	–	–
4-yr trend in CL	DS	–	–	–	–
L_{50}	survey	–	–	–	0.00
L_{50}	OTG/DS	–	–	–	–
Manager score	–	–	–	0	0.00
Score	–	–	–	0.00	-1.59
Max. possible score	–	–	–	1.00	6.83
Stock Status	–	–	–	–	Below average
Confidence	–	–	–	0.06	0.36

Note: * indicates confidential data with less than three permits participating. En dashes = not available, NA = not applicable, *Sig. inc.* = significant increase, *Sig. dec.* = significant decrease, ≥XL = ≥40 mm CL.

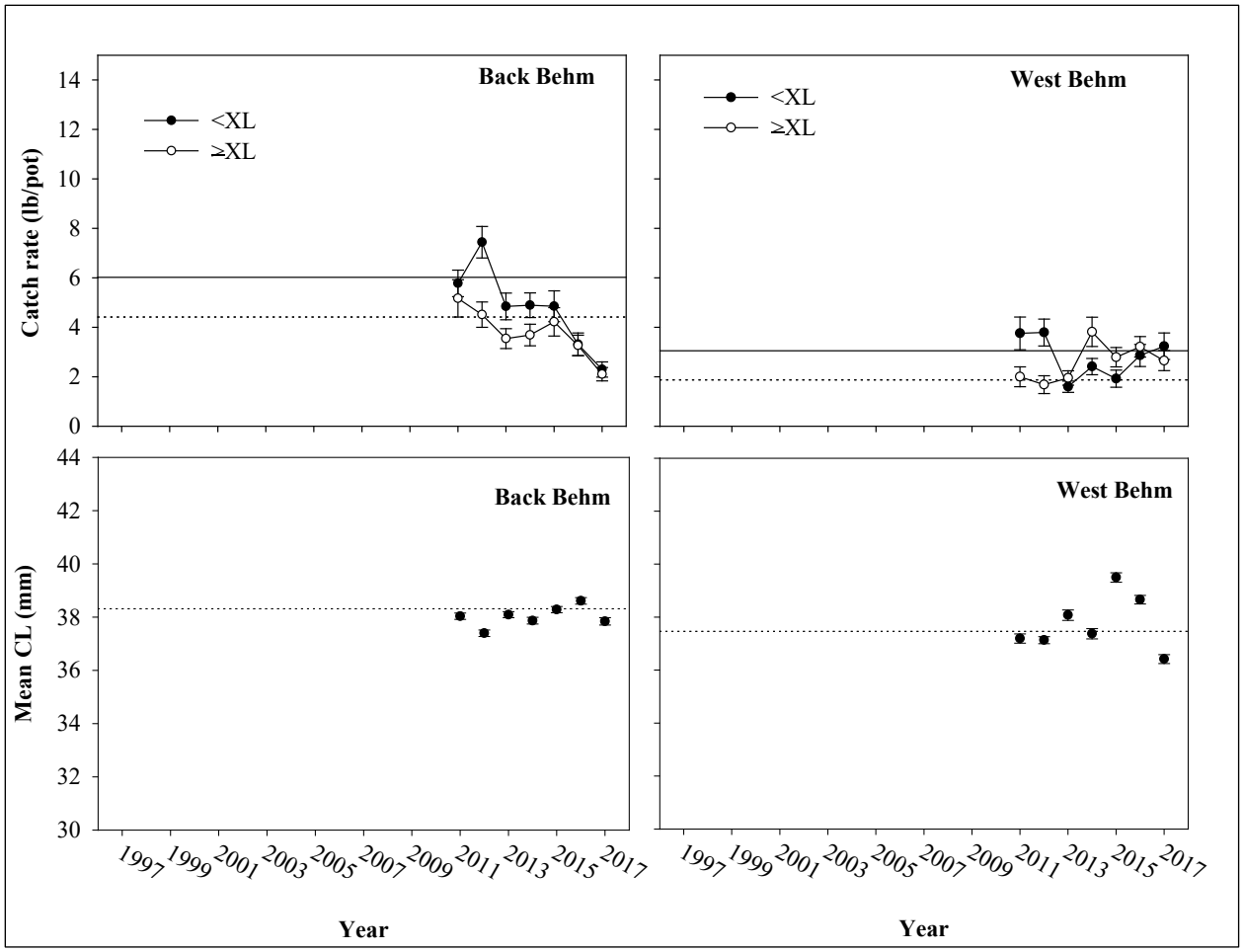

Figure 1.–Mean and standard error of spot shrimp catch rate (upper panels), and carapace length (CL) (lower panels) from preseason surveys in District 1, 2011–2017. Lines represent the long-term baselines.

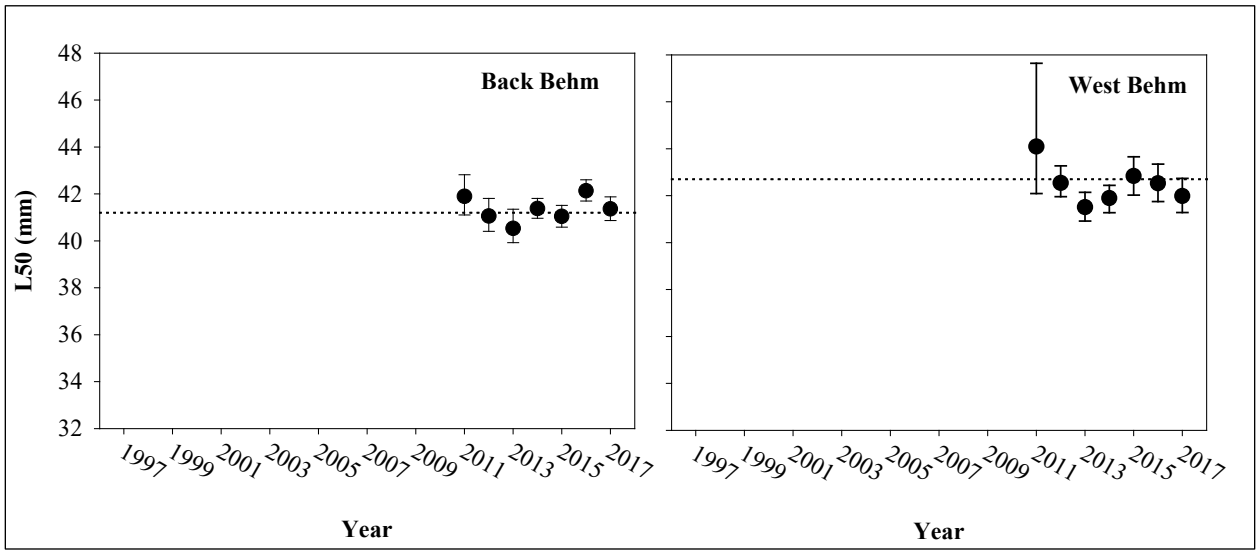

Figure 2.–L_{50} and 95% confidence intervals of spot shrimp from preseason surveys in District 1, 2011–2017. Dotted line represents the long-term baseline.

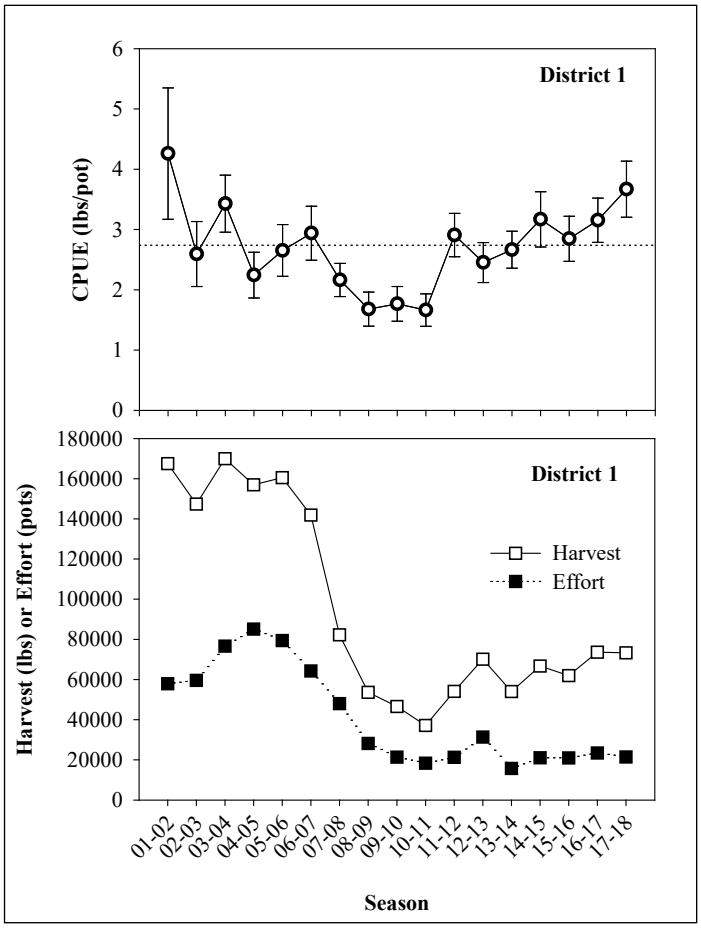

Figure 3.–Districtwide commercial CPUE and effort data for District 1, 2001/02–2017/18 seasons. CPUE is weighted by analysis area weights to allow for an overall impression of fishery performance.

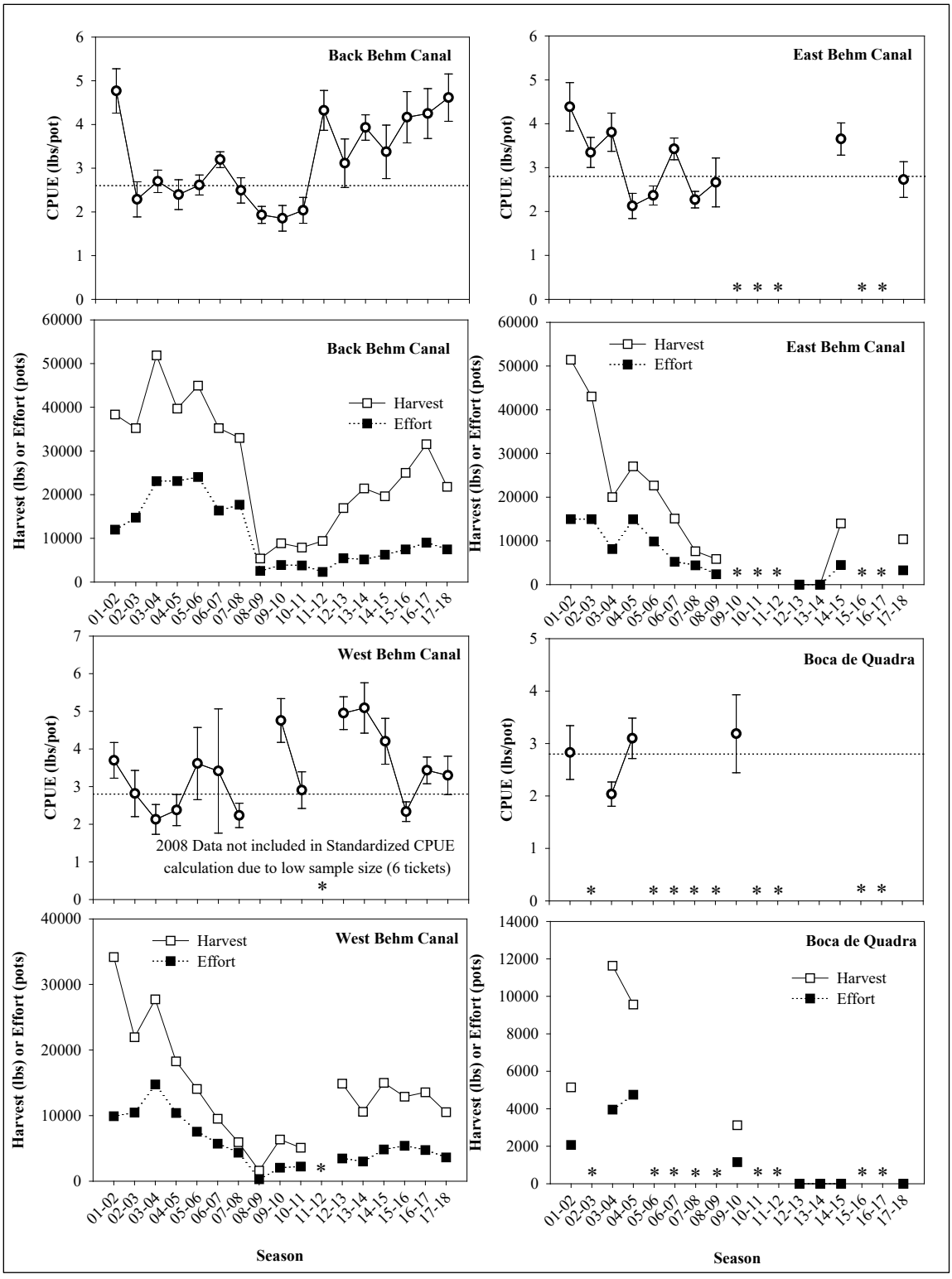

Figure 4.–Mean and standard error of spot shrimp catch rate from commercial harvest (dotted line represents the long-term baseline) and the commercial harvest and effort by analysis area in District 1, 2001/02–2017/18 seasons. Asterisks (*) indicate confidential data with less than three permits participating.

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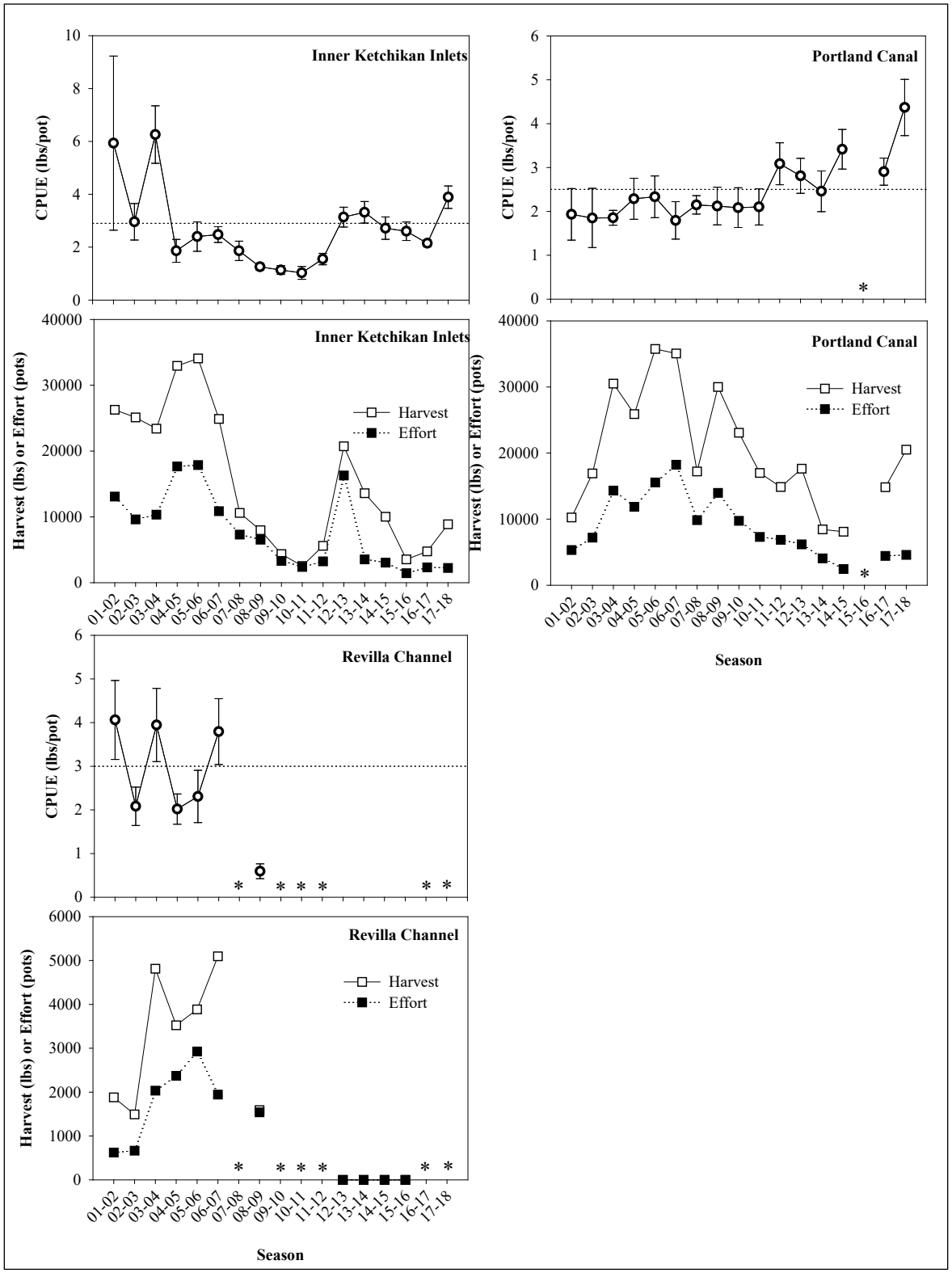
Figure 4.–Page 2 of 2.



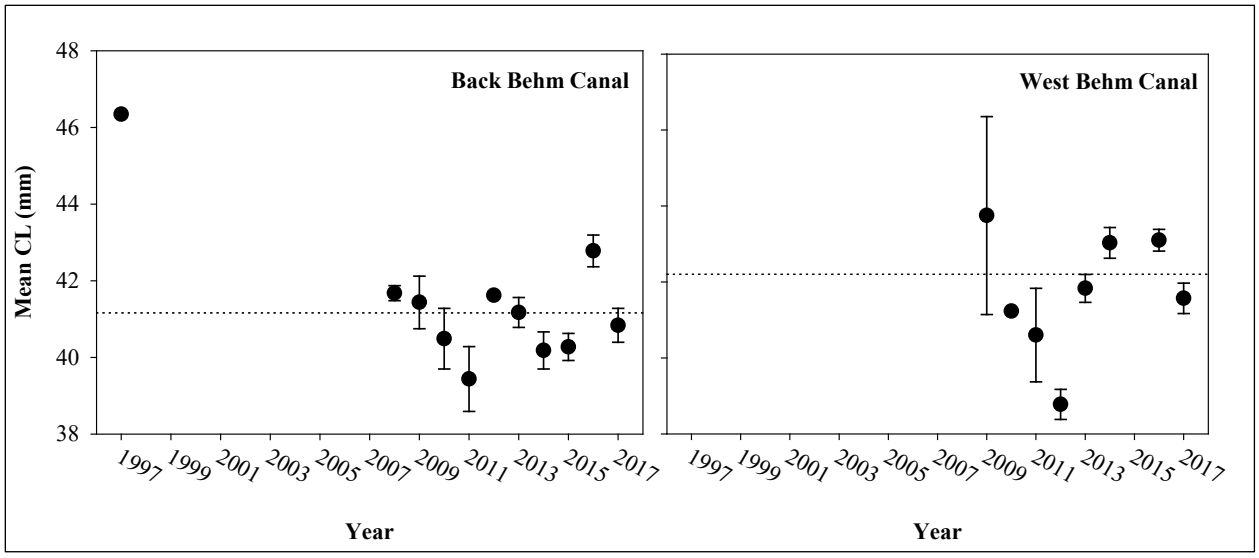


Figure 5.–Mean and standard error of spot shrimp carapace length from floating processor and on-the-grounds sampling in District 1, 1997/98–2017/18 seasons. Dotted line represents the long-term baseline. Only areas with baselines or 2017/18 season data are shown.

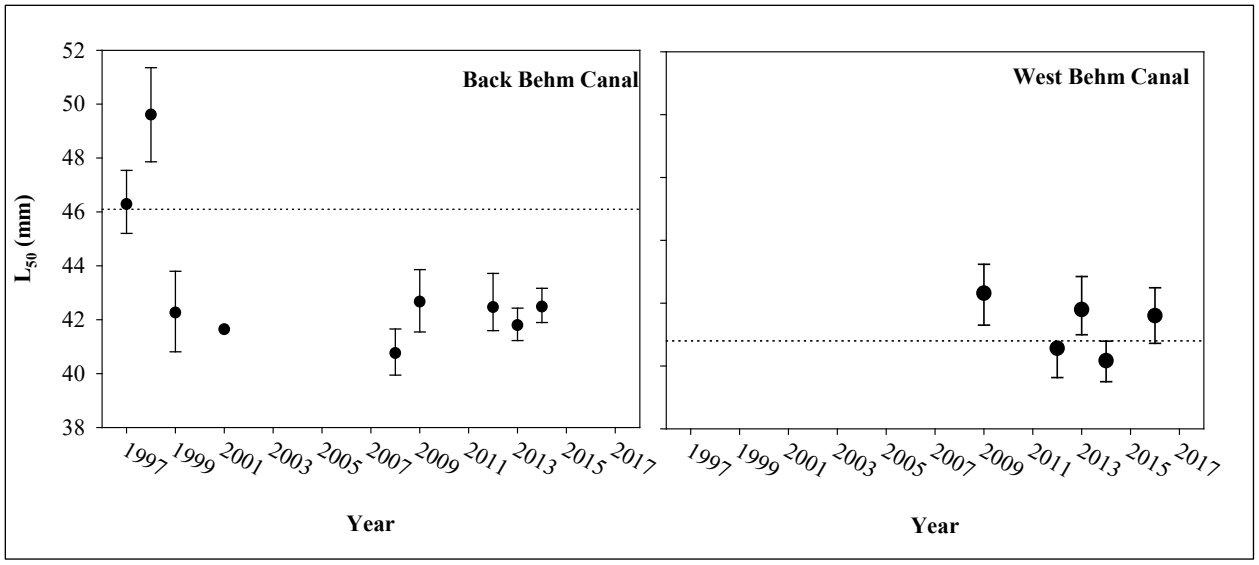


Figure 6.–L_{50} and 95% confidence intervals of spot shrimp from on-the-grounds and dockside sampling in District 1, 1997/98–2017/18 season. Dotted line represents the long-term baseline. Only analysis areas with baselines or 2017/18 season data are shown.

District 2

The GHL in District 2 has changed five times since the 1998/99 season. First, due to changes in the estimation of tail weight to whole weight, the GHL for this district increased 32% from 65,000 to 86,000 lb in the 2000/01 fishing season. Before this time tail weight was assumed to be approximately 66% of whole weight; after a large-scale sampling effort this was revised to 50%, which subsequently increased the GHL because tail weight is extrapolated to whole weight for the purposes of catch accounting. The GHL was subsequently reduced 25% back to 65,000 lb for the 2009/10 fishing season (Table 6). Due to negative survey indicators, the GHL was reduced 20% prior to the 2014/15 season. Extremely poor survey results prior to the 2015/16 season resulted in the closure of Kasaan Bay, and the GHL was reduced an additional 20%. Because stocks continued to decline in Kasaan Bay and in Cholmondeley Sound, the GHL was reduced 30% to 30,000 lb prior to the 2016/17 season. Harvest has averaged 58,200 lb (102% of GHL) over the last 10 years. This district is divided into five analysis areas: Cholmondeley Sound, Kasaan Bay, Lower Clarence Strait, Middle Clarence Strait, and Moria Sound (Table 2).

This was the seventh season of preseason surveys in District 2, and survey indicators increased in the 2017. In Kasaan Bay, the catch rate of large class shrimp is above baseline and showing a significant four-year increase. The catch rate of large class shrimp increased in Cholmondeley Sound and is no longer below baseline. The catch rate of small class shrimp increased strongly in Kasaan Bay and moderately in Cholmondeley Sound. Mean carapace length declined in Kasaan Bay and is at baseline in both areas. The L_{50} went from below baseline to above baseline in Kasaan Bay and remains at baseline in Cholmondeley Sound (Table 7, Figures 7 and 8).

Districtwide standardized CPUE increased slightly in the 2016/17 season from the historic low seen in 2015/16. It then dropped in the 2017/18 season to the second lowest since standardization was possible (Figure 9). This slight decline is due to continued decline in standardized commercial CPUE in Moria Sound (Table 7 and Figure 10).

On-the-grounds sampling showed mean carapace length to be above baseline in Cholmondeley Sound (Table 7, Figures 11 and 12).

Models for harvest rate from commercial logbook data showed a 30% (low) harvest rate of large class shrimp in Cholmondeley Sounds. In addition, logbook derived catch rate trends in Cholmondeley Sound showed an increase from the previous seasons (Table 7).

Manager scores were negative for Kasaan Bay and neutral for all other areas in this district.

The overall matrix score for District 2 is 3.72 (above average), which was up from 1.06 (above average) in 2016/17. This second year of increase is due to improved survey metrics on both surveyed areas as well as positive scores from logbook data in Cholmondeley Sound. District 2 data have moderate confidence (0.44).

Table 6.–District 2 matrix, Part A. A 15-season history, including stock assessment recommendations, for the pot shrimp fishery in Southeast Alaska.

Season	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Upper regulatory GHR	86,000	86,000	86,000	120,000	120,000	120,000	120,000	120,000
Actual GHL (lb spot shrimp)	86,000	86,000	86,000	86,000	86,000	86,000	65,000	65,000
Recommended GHL or stock status	–	Moderate	Moderate	Moderate	Poor	Moderate	Below Average	Below Average
Season length (days)	21	13	14	20	113	122	33	33
Landings (number)	187	163	150	189	175	219	140	149
Harvest (lb spot shrimp)	96,687	88,258	83,052	99,092	89,786	87,936	64,965	68,893

Season	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Upper regulatory GHR	120,000	120,000	120,000	120,000	120,000	120,000	120,000
Actual GHL (lb spot shrimp)	65,000	65,000	65,000	52,000	42,000	30,000	30,000
Recommended GHL or stock status	Moderate	Below Average	Below Average	Poor	Below Average	Moderate	Above Average
Season length (days)	20	15	19	17	26	13	15
Landings (number)	127	111	154	110	93	44	41
Harvest (lb spot shrimp)	75,425	74,631	62,250	50,826	39,203	30,630	27,173

Note: En dash = not available.

Table 7.–District 2 matrix, Part B. Baselines, current season values, and scores for each stock status parameter and analysis area for the pot shrimp fishery in Southeast Alaska. Data sources are from ADF&G shrimp survey, fish tickets ("fish tix"), logbooks, and on-the-grounds (OTG) and dockside (DS) sampling of commercial catch. Data are divided by type: CPUE, harvest rate, mean carapace length (CL), and L_{50}. Score for each analysis area is the sum of all individual scores.

Analysis Area		Cholmondeley Sound			Kasaan Bay			Lower Clarence		
Area weighting			0.29			0.48			0.04	
Stock Status Parameters	Source	Baseline	Value	Score	Baseline	Value	Score	Baseline	Value	Score
Catch rate ≥XL	survey	3.2	3.3	0.00	1.4	2.8	1.00	–	–	–
4-yr trend in catch rate	survey	–	Sig. inc.	0.25	–	Sig. inc.	0.25	–	–	–
Std. Comm. CPUE	fish tix	5.0	4.9	0.00	5.0	Closed	–	3.1	No effort	–
4-yr trend in CPUE	fish tix	–	Sig. inc.	0.25	–	–	–	–	–	–
Catch rate ≥XL	logbook	–	Sig. inc.	1.00	–	–	–	–	–	–
Harvest rate ≥XL (2015)	logbook	–	72%	–	–	–	–	–	–	–
Harvest rate ≥XL (2016)	logbook	–	–	–	–	–	–	–	–	–
Harvest rate ≥XL (2017)	logbook	–	30%	1.00	–	–	–	–	–	–
Mean CL	survey	35.2	35.7	0.00	35.5	36.1	0.00	–	–	–
4-yr trend in CL	survey		Sig. inc.	0.25		Sig. inc.	0.25	–	–	–
Mean CL	OTG	37.8	40.6	1.00	39.5	–	–	–	–	–
4-yr trend in CL	OTG	–	–	–	–	–	–	–	–	–
Mean CL	DS	–	–	–	–	–	–	–	–	–
4-yr trend in CL	DS	–	–	–	–	–	–	–	–	–
L_{50}	survey	39.3	38.8	0	38.2	39.7	1.00	–	–	–
L_{50}	OTG/DS	39.3	–	–	39.7	–	–	–	–	–
Manager score	–	–	–	0	–	–	-1	–	–	0
Score	–	–	–	3.75	–	–	1.50	–	–	0.00
Max. possible score	–	–	–	8.75	–	–	4.5	–	–	1
Stock Status	–	–	–	–	–	–	–	–	–	–
Confidence	–	–	–	0.65	–	–	0.35	–	–	0.06

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Table 7.–Page 2 of 2.

Analysis Area		Middle Clarence			Moria Sound			
Area weighting			0.02			0.17		
Stock Status Parameters	Source	Baseline	Value	Score	Baseline	Value	Score	Total Score
Catch rate ≥XL	survey	–	–	–	–	–	–	0.62
4-yr trend in catch rate	survey	–	–	–	–	–	–	0.25
Std. Comm. CPUE	fish tix	2.7	No effort	–	4.9	*	-1.00	-0.12
4-yr trend in CPUE	fish tix	–	–	–	–	Sig. dec.	-0.25	0.04
Catch rate ≥XL	logbook	–	–	–	–	–	–	0.00
Harvest rate ≥XL (2015)	logbook	–	–	–	–	18%	–	–
Harvest rate ≥XL (2016)	logbook	–	–	–	–	–	–	–
Harvest rate ≥XL (2017)	logbook	–	–	–	–	–	–	1.00
Mean CL	survey	–	–	–	–	–	–	0.00
4-yr trend in CL	survey	–	–	–	–	–	–	0.17
Mean CL	OTG	–	–	–	36.0	–	–	0.67
4-yr trend in CL	OTG	–	–	–	–	–	–	–
Mean CL	DS	–	–	–	–	–	–	–
4-yr trend in CL	DS	–	–	–	–	–	–	–
L_{50}	survey	–	–	–	–	–	–	0.42
L_{50}	OTG/DS	–	–	–	–	–	–	–
Manager score	–	–	–	0	–	–	0	-0.32
Score	–	–	–	0.00	–	–	-1.20	3.72
Max. possible score	–	–	–	1.00	–	–	2.25	6.58
Stock Status	–	–	–	–	–	–	–	Above average
Confidence	–	–	–	0.06	–	–	0.18	0.44

Note: * indicates confidential data with less than three permits participating. En dashes = not available, NA = not applicable, *Sig. inc.* = significant increase, *Sig. dec.* = significant decrease, ≥XL = ≥40 mm CL.

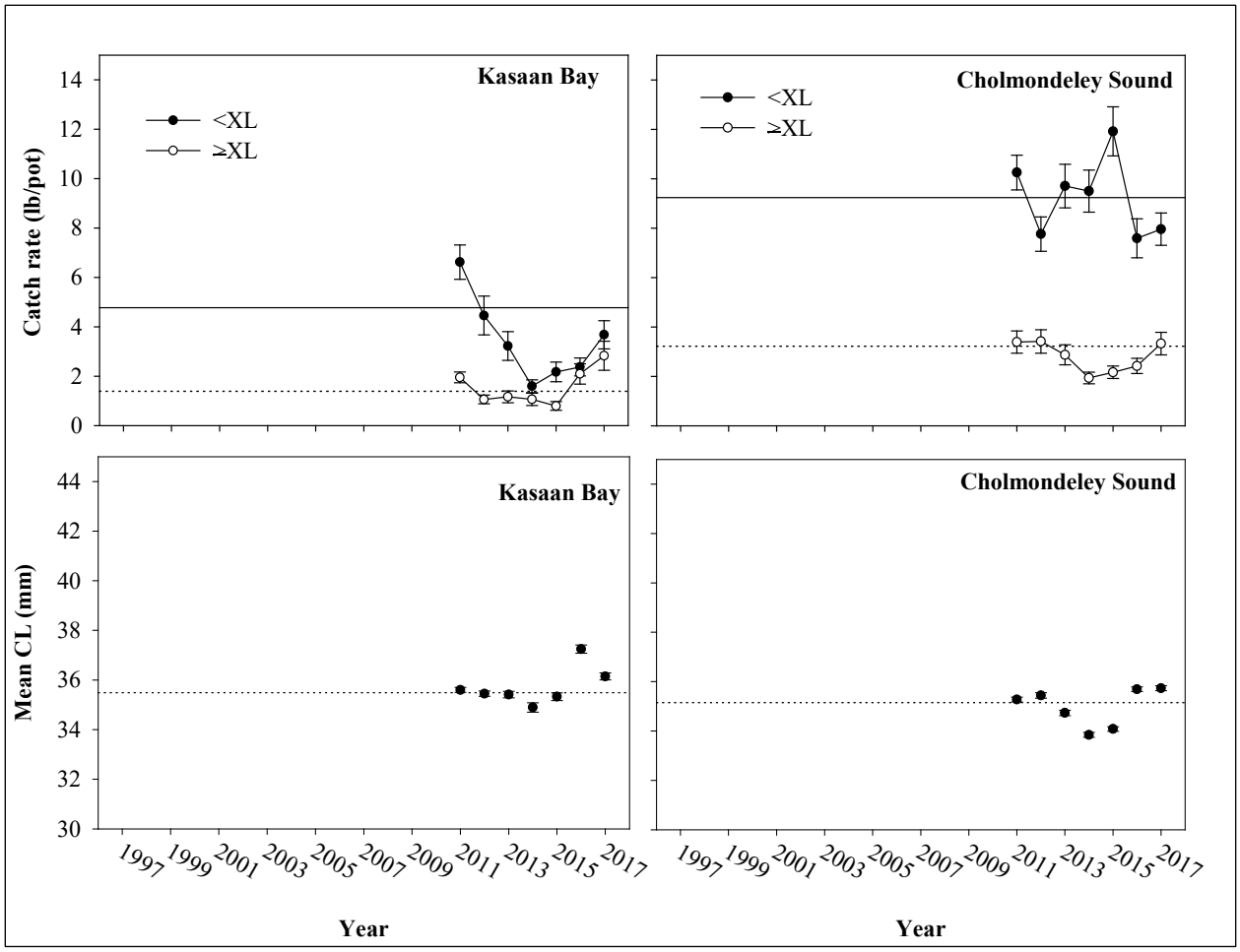

Figure 7.–Mean and standard error of spot shrimp catch rate (upper panels), and carapace length (lower panels) from preseason surveys in District 2, 2011–2017. Lines represent the long-term baselines.

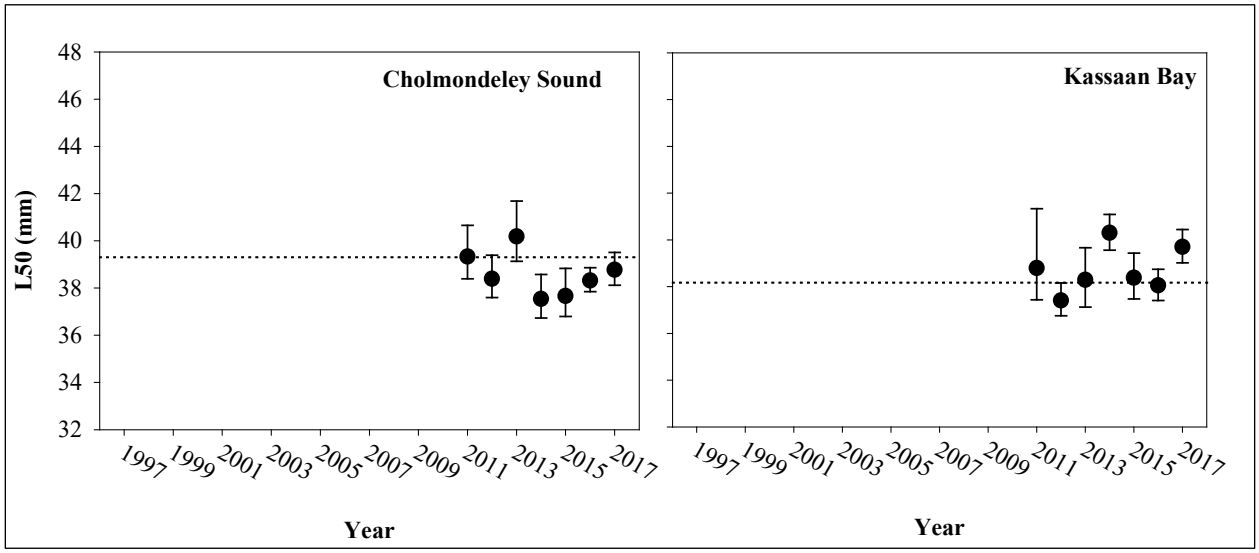

Figure 8.–L_{50} and 95% confidence intervals of spot shrimp from preseason surveys in District 2, 2011–2017. Dotted line represents the long-term baseline.

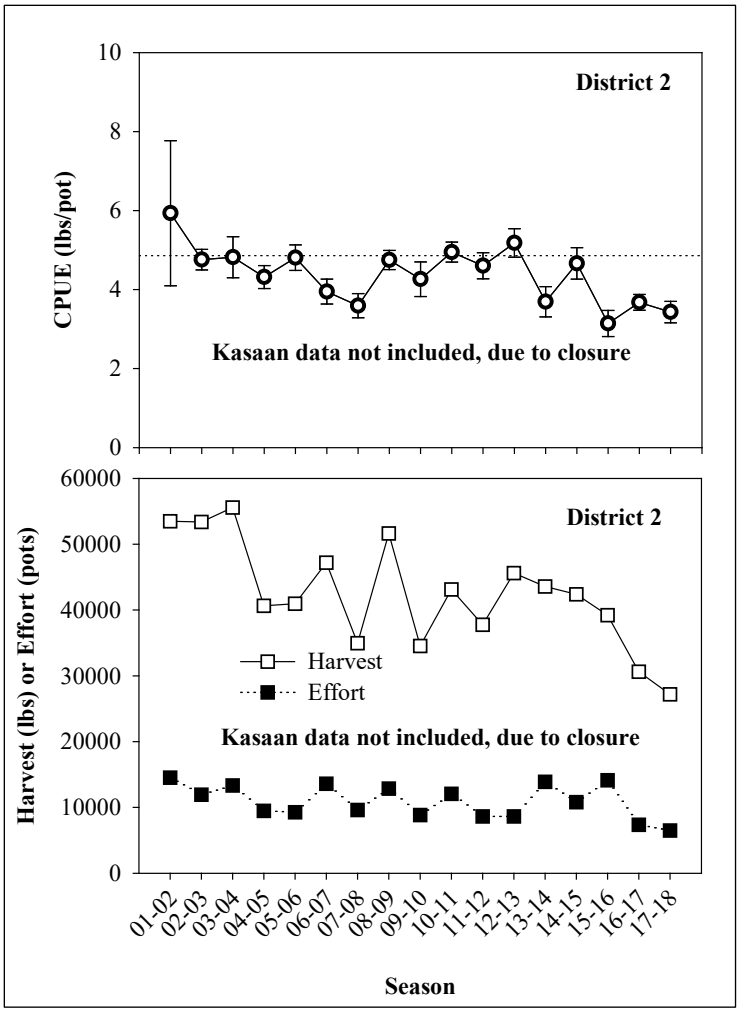

Figure 9.–Districtwide CPUE and effort data for District 2, 2001/02–2017/18 seasons. CPUE is weighted by analysis area weights to allow for an overall impression of fishery performance.

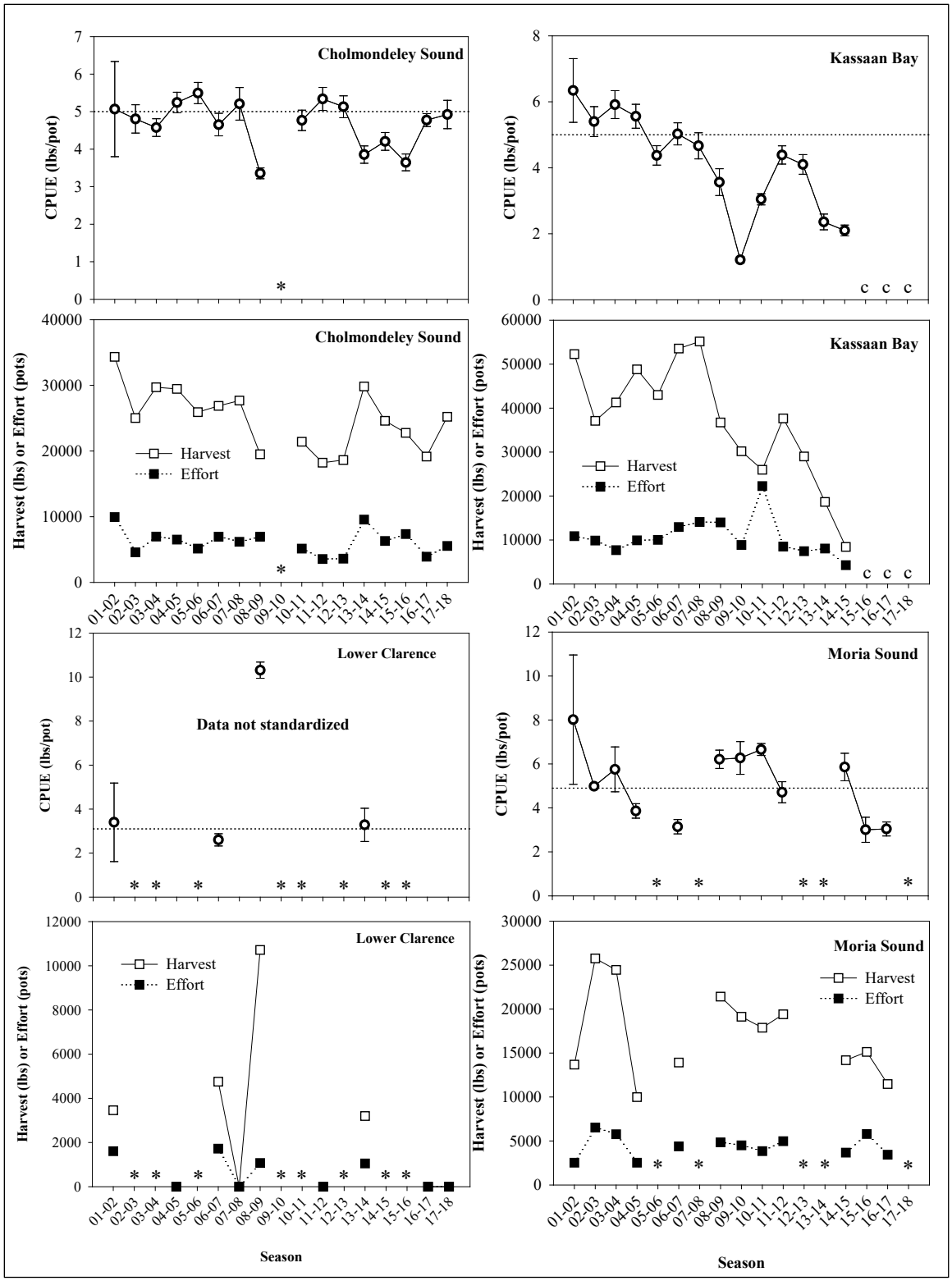

Figure 10.–Mean and standard error of spot shrimp catch rate from commercial harvest (dotted line represents the long-term baseline) and the commercial harvest and effort by analysis area in District 2, 2001/02–2017/18 seasons. Asterisks (*) indicate confidential data with less than three permits participating; "c" indicates fishery closure.

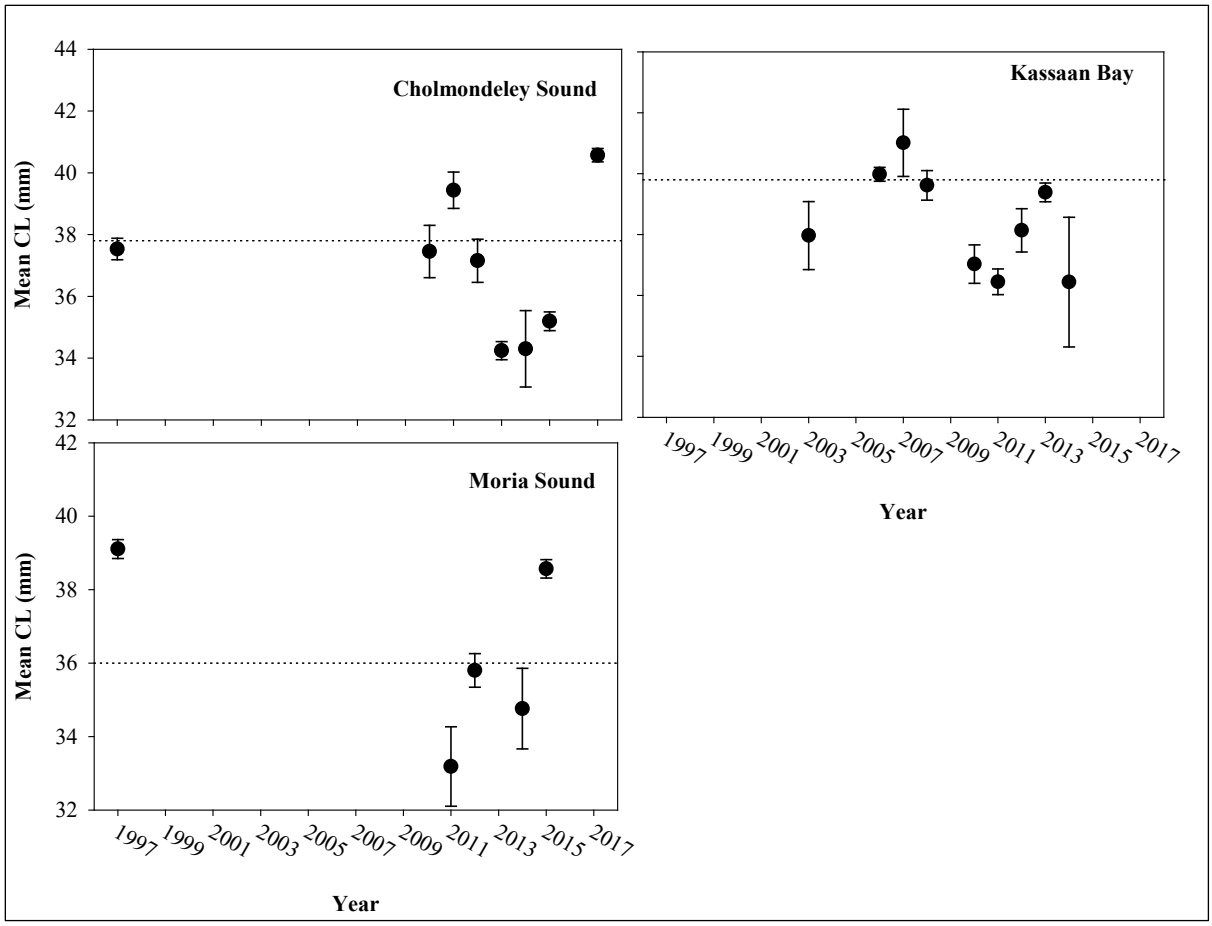

Figure 11.–Mean and standard error of spot shrimp carapace length from floating processor and on-the-grounds sampling in District 2, 1997/98–2017/18 seasons. Dotted line represents the long-term baseline. Only areas with baselines or 2017/18 season data are shown.

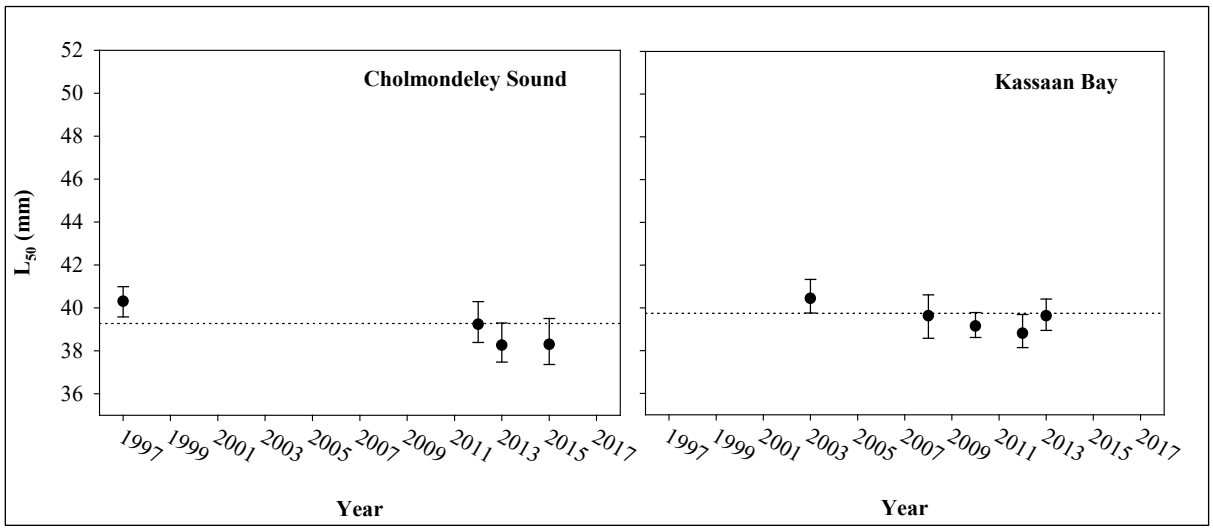

Figure 12.–L_{50} and 95% confidence intervals of spot shrimp from floating processor, on-the-grounds and dockside sampling in District 2, 1997/98–2017/18 seasons. Only areas with baselines or 2017/18 season data are shown.

District 3

Section 3-A

The GHL in Section 3-A has changed four times since the 1998/99 season. The GHL for this section was increased from 200,000 lb to 264,000 lb beginning with the 2000/01 fishing season, when Section 3-A was split from Sections 3-B and C (Table 8). In response to poor stock status, the Section 3-A GHL was reduced 25% to 198,000 lb for the 2004/05 fishing season, reduced an additional 20% to 158,400 lb for the 2008/09 fishing season, and an additional 40% to 95,000 for the 2010/11 season. The GHL was subsequently increased 20% prior to the 2015/16 season to 114,000 lb. Over the last 10 years, harvest has averaged 116,100 lb (105% of GHL); however, in the past five seasons harvest has averaged 117% of the GHL. This section is divided into four analysis areas: Hetta Inlet, Lower Cordova Bay, Mid Cordova Bay, and Upper Cordova Bay (Table 2).

Survey catch rate of large class shrimp dropped to half of its 2016 (and baseline) value in Hetta Inlet where it is now below baseline and decreasing in the four-year analysis (Table 9, Figure 13). Catch rate of large class shrimp increased in Mid Cordova Bay and is now at baseline and increasing in the four-year analysis. Catch rate of small class shrimp increased in both areas. Mean survey CL decreased in Hetta Inlet and is now at baseline but still showing an increase in the four-year analysis. Mean CL remains above baseline and increasing in the four-year analysis in Mid Cordova Bay (Table 9, Figure 13). The L_{50} remains below baseline in Hetta Inlet and at baseline in Mid Cordova (Table 9, Figure 14).

Sectionwide CPUE showed a small decrease this season but remains at baseline (Figure 15). Standardized commercial CPUE for Section 3-A was significantly below the baseline and decreasing in the four-year analysis in Hetta Inlet, above the baseline and increasing in the four-year analysis in Mid Cordova Bay and at the baseline for all other areas (Table 9, Figure 16).

No on-the-grounds sampling occurred in Section 3A in the 2017/18 season (Table 9, Figures 17 and 18).

Commercial logbook data showed the harvest rate of large class shrimp at 54% (excessive) in Lower Cordova Bay, and 36% (low) in Upper Cordova Bay. Catch rate of large class shrimp from logbooks increased in Hetta Inlet, stayed the same in Lower Cordova Bay, and decreased in Upper Cordova Bay (Table 9).

Manager scores were neutral in all areas (Table 9).

The overall matrix score is -0.71 (moderate), flat from -0.77 (moderate) in the 2016/17 season, with 0.41 (moderate) confidence.

Table 8.–Section 3-A matrix, Part A. A 15-season history, including stock assessment recommendations, for the pot shrimp fishery in Southeast Alaska.

Season	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Upper regulatory GHR	264,000	264,000	264,000	264,000	264,000	264,000	264,000	264,000
Actual GHL (lb spot shrimp)	264,000	198,000	198,000	198,000	198,000	158,400	158,400	95,000
Recommended GHL or stock status	211,000	Poor	Poor	Poor	Poor	Poor	Poor	Below Average
Season length (days)	47	20	15	18	229	120	32	30
Landings (number)	86	88	138	355	302	265	293	164
Harvest (lb spot shrimp)	284,808	256,392	202,186	205,435	182,145	114,048	137,015	85,228

Season	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Upper regulatory GHR	264,000	264,000	264,000	264,000	264,000	264,000	264,000
Actual GHL (lb spot shrimp)	95,000	95,000	95,000	95,000	114,000	114,000	114,000
Recommended GHL or stock status	Below Average	Below Average	Moderate	Moderate	Moderate	Moderate	Moderate
Season length (days)	19	16	13	10	14	13	11
Landings (number)	171	156	132	135	147	150	160
Harvest (lb spot shrimp)	97,632	107,643	123,238	111,098	116,235	136,240	132,536

Table 9.–Section 3-A matrix, Part B. Baselines, current season values, and scores for each stock status parameter and analysis area for the pot shrimp fishery in Southeast Alaska. Data sources are from ADF&G shrimp survey, fish tickets ("fish tix"), logbooks, and on-the-grounds (OTG) and dockside (DS) sampling of commercial catch. Data are divided by type: CPUE, harvest rate, mean carapace length (CL), and L_{50}. Score for each analysis area is the sum of all individual scores.

Analysis Area		Hetta Inlet			Lower Cordova Bay		
Area weighting			0.2			0.2	
Stock Status Parameters	Source	Baseline	Value	Score	Baseline	Value	Score
Catch rate ≥XL	survey	3.2	1.5	-1.55	–	–	–
4-yr trend in catch rate	survey	–	Sig. dec.	-0.25	–	–	–
Std. Comm. CPUE	fish tix	7.3	4.1	-1.00	6.2	7.4	1.00
4-yr trend in CPUE	fish tix	–	Sig. dec.	-0.25	–	Sig. inc.	0.25
Catch rate ≥XL	logbook	–	Sig. inc.	1.00	–	No trend	0.00
Harvest rate ≥XL (2015)	logbook	–	60%	–	–	83%	–
Harvest rate ≥XL (2016)	logbook	–	58%	–	–	–	–
Harvest rate ≥XL (2017)	logbook	–	–	–	–	54%	-1.00
Mean CL	survey	34.0	34.7	0.00	–	–	–
4-yr trend in CL	survey	–	Sig. inc.	0.25	–	–	–
Mean CL	OTG	37.4	–	–	–	–	–
4-yr trend in CL	OTG	–	–	–	–	–	–
Mean CL	DS	–	–	–	–	–	–
4-yr trend in CL	DS	–	–	–	–	–	–
L_{50}	survey	38.5	37.3	-1.00	–	–	–
L_{50}	OTG/DS	37.2	–	–	38.9	–	–
Manager score	–	–	–	0.00	–	–	0.00
Score	–	–	–	-2.25	–	–	0.25
Max. possible score	–	–	–	6.75	–	–	4.25
Stock Status	–	–	–	–	–	–	–
Confidence	–	–	–	0.53	–	–	0.29

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Table 9.–Page 2 of 2.

Analysis Area		Mid Cordova Bay			Upper Cordova Bay			
Area weighting			0.1			0.5		
Stock Status Parameters	Source	Baseline	Value	Score	Baseline	Value	Score	Total Score
Catch rate ≥XL	survey	0.6	1.0	0.00	–	–	–	-0.67
4-yr trend in catch rate	survey		Sig. inc.	0.25	–	–	–	-0.08
Std. Comm. CPUE	fish tix	5.9	*	0.00	5.9	6.4	0	0.00
4-yr trend in CPUE	fish tix	–	No trend	0.00	–	No trend	0.00	0.00
Catch rate ≥XL	logbook	–	–	–	–	Sig. dec.	-1.00	-0.33
Harvest rate ≥XL (2015)	logbook	–	–	–	–	60%	–	–
Harvest rate ≥XL (2016)	logbook	–	–	–	–	63%	–	–
Harvest rate ≥XL (2017)	logbook	–	–	–	–	36%	1.00	0.43
Mean CL	survey	31.8	34.1	1.00	–	–	–	0.22
4-yr trend in CL	survey	–	Sig. inc.	0.25	–	–	–	0.17
Mean CL	OTG	–	–	–	–	–	–	–
4-yr trend in CL	OTG	–	–	–	–	–	–	–
Mean CL	DS	–	–	–	–	–	–	–
4-yr trend in CL	DS	–	–	–	–	–	–	–
L_{50}	survey	36.2	37.0	0.00	–	–	–	-0.44
L_{50}	OTG/DS	38.5	–	–	36.6	–	–	–
Manager score	–	–	–	0.00	–	–	0.00	0.00
Score	–	–	–	1.50	–	–	0.00	-0.71
Max. possible score	–	–	–	5.75	–	–	4.25	5.92
Stock Status	–	–	–	–	–	–	–	Moderate
Confidence	–	–	–	0.47	–	–	0.29	0.41

Note: * indicates confidential data with less than three permits participating. En dashes = not available, NA = not applicable, *Sig. inc.* = significant increase, *Sig. dec.* = significant decrease, ≥XL = ≥40 mm CL.

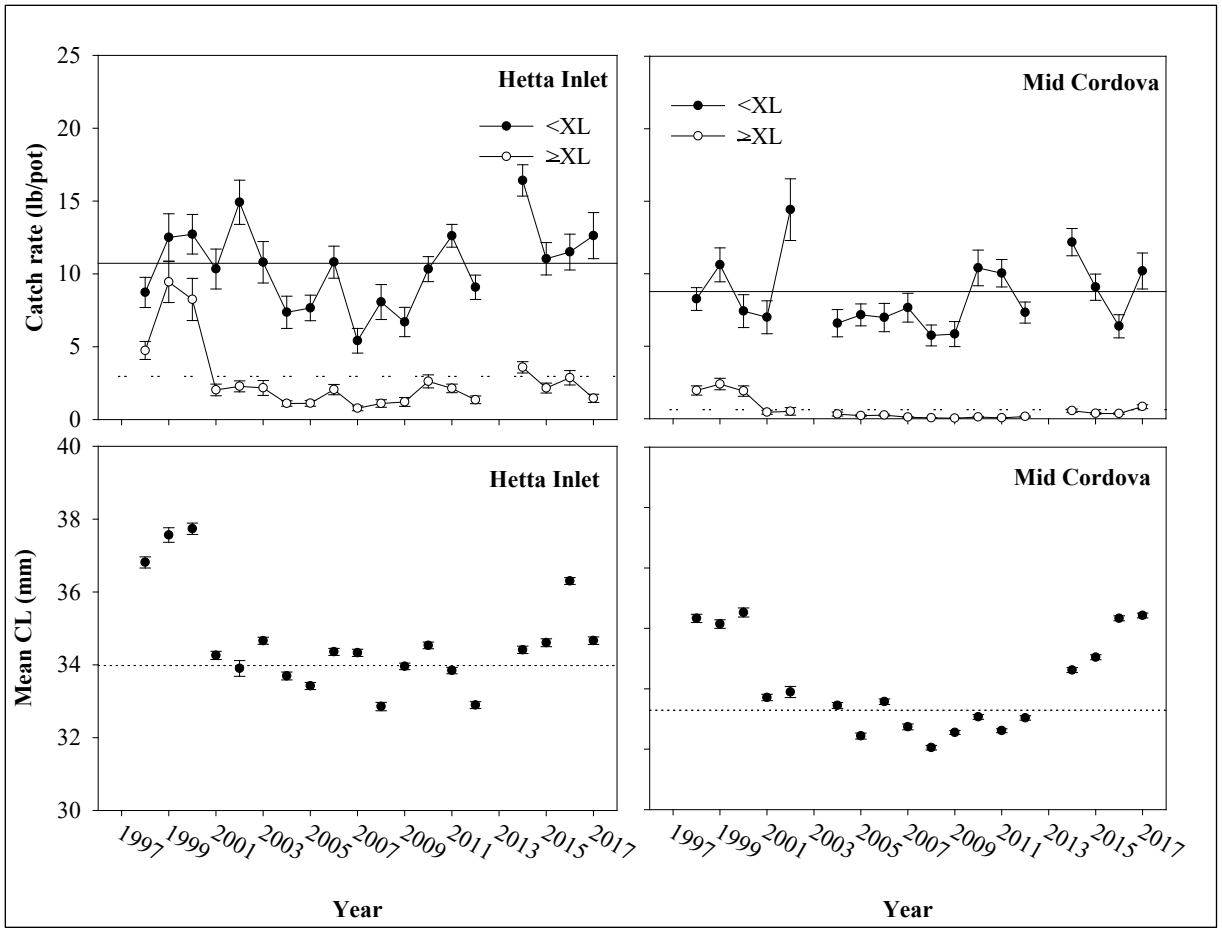

Figure 13.–Mean and standard error of spot shrimp catch rate (upper panels) and carapace length (lower panels) from preseason surveys in Section 3-A, 1998–2017. No survey was conducted in 2013 due to poor weather. Lines represent the long-term baselines.

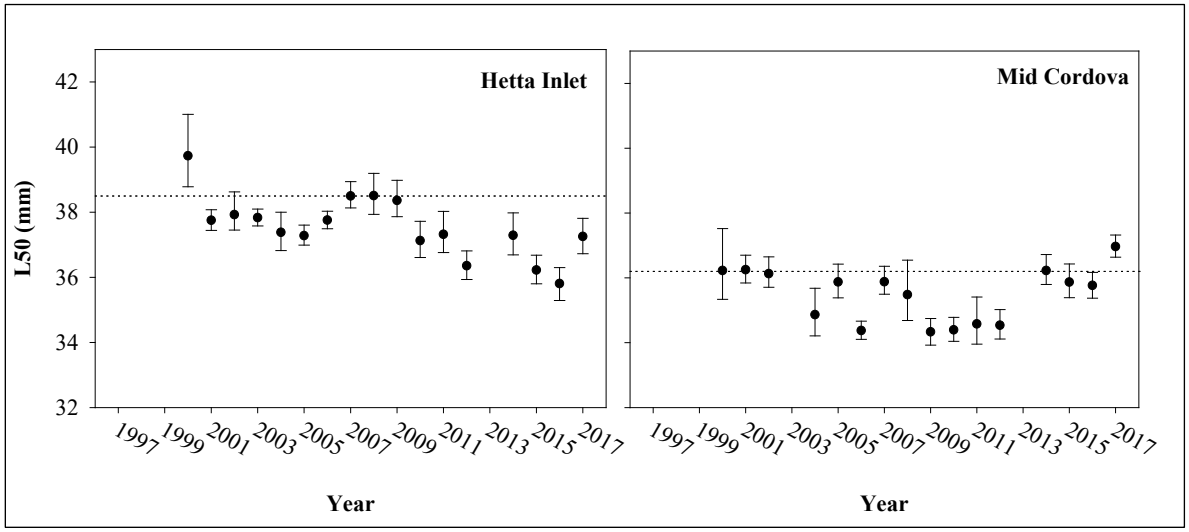

Figure 14.–L_{50} and 95% confidence intervals of spot shrimp from preseason surveys in Section 3-A, 2000–2017. No survey was conducted in 2013 due to poor weather. Dotted line represents the long-term baseline.

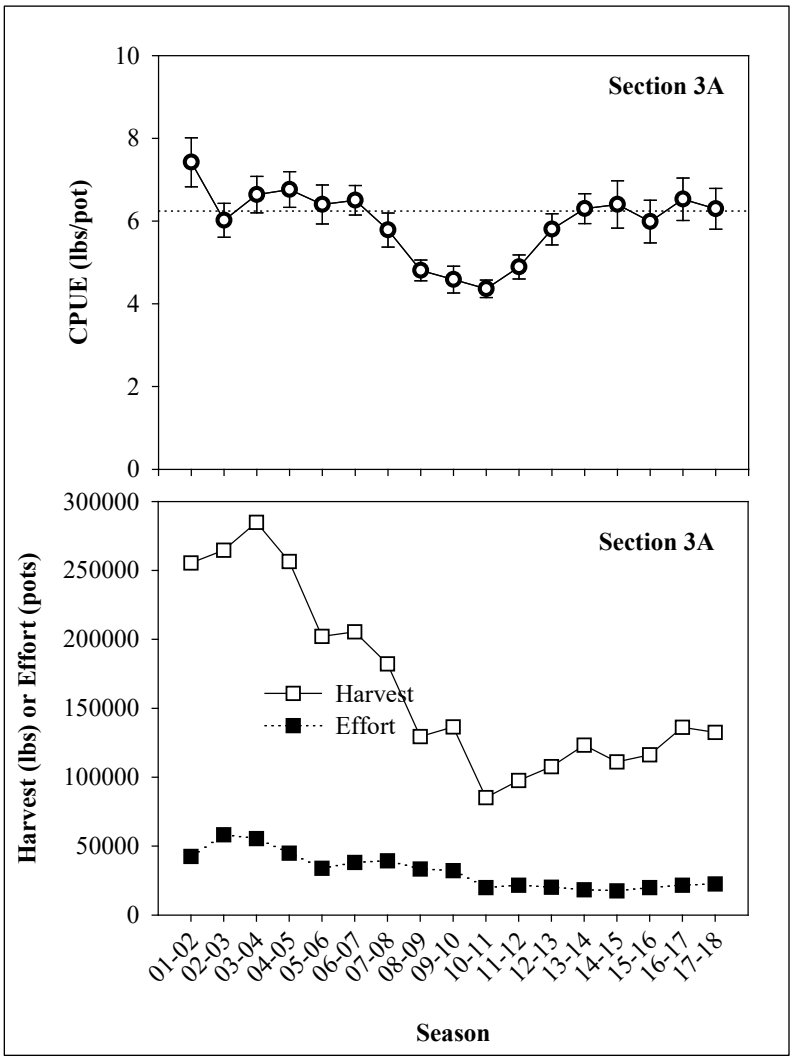

Figure 15.–Sectionwide CPUE and effort data for Section 3A, 2001/02–2017/18 seasons. CPUE is weighted by analysis area weights to allow for an overall impression of fishery performance.

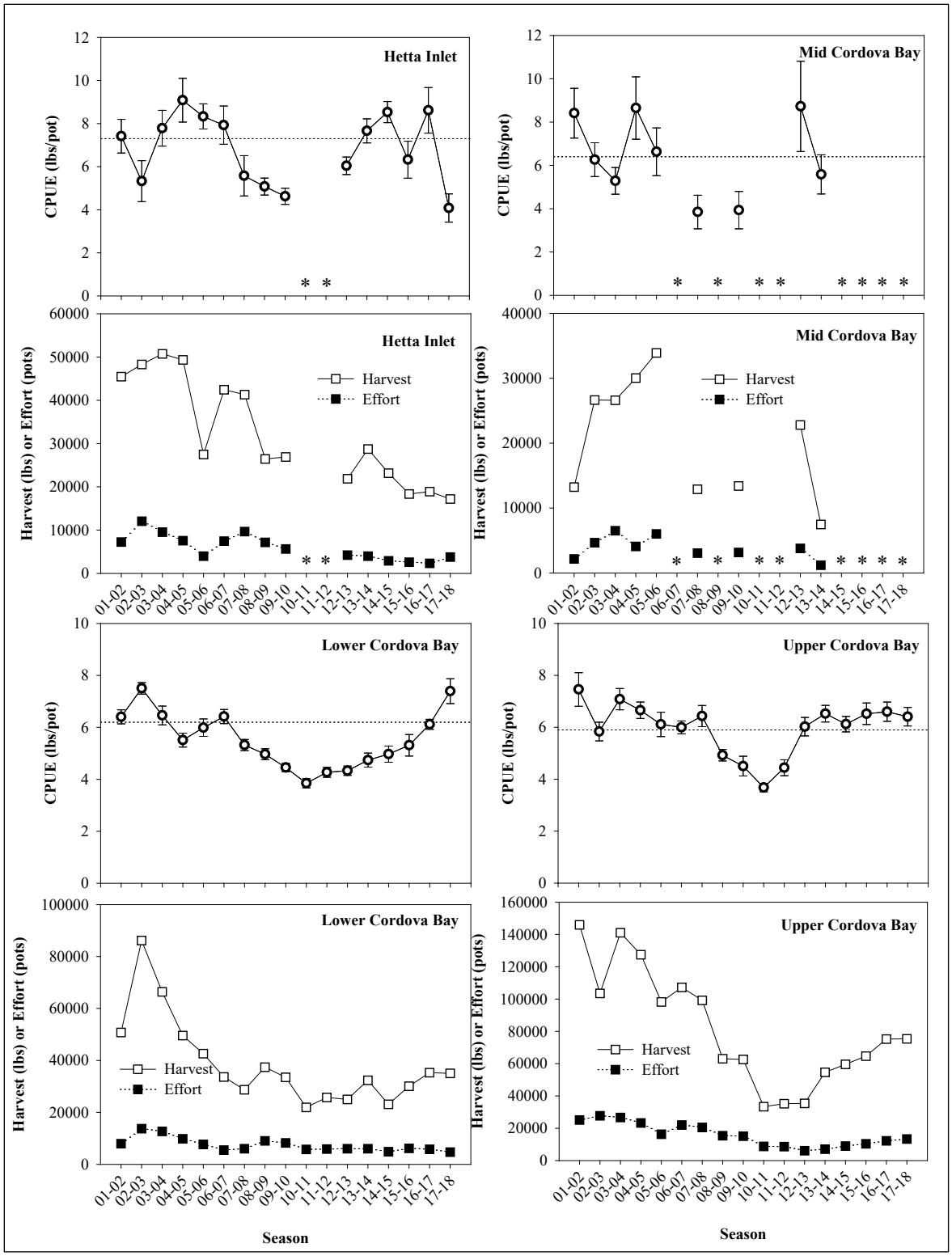

Figure 16.–Mean and standard error of spot shrimp catch rate from commercial harvest (dotted line represents the long-term baseline) and the commercial harvest and effort by analysis area in Section 3-A, 2001/02–2017/18 seasons. Asterisks (*) indicate confidential data with less than three permits participating.

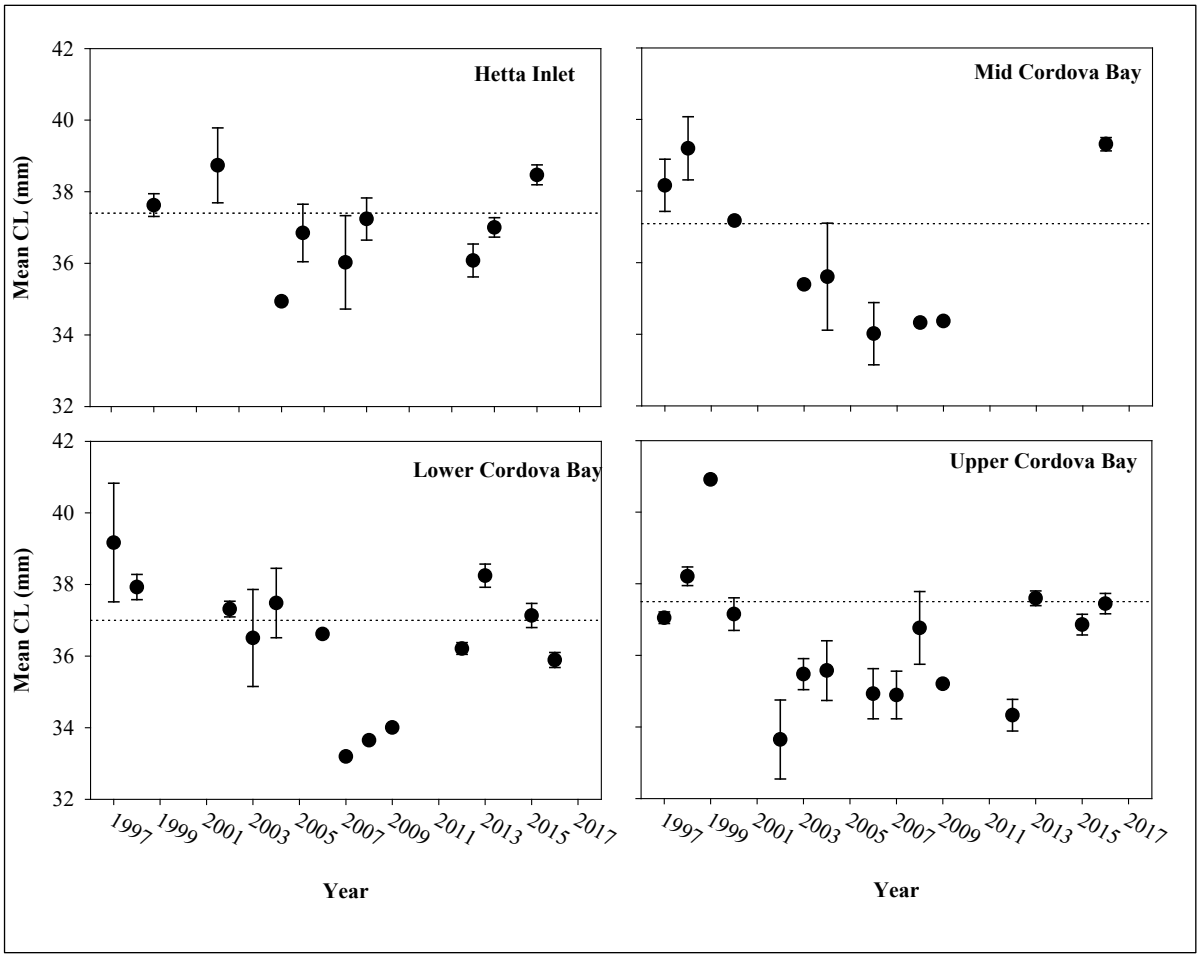

Figure 17.–Mean and standard error of spot shrimp carapace length from floating processor and on-the-grounds sampling in Section 3-A, 2001/02–2017/18 seasons. Dotted line represents the long-term baseline. Only areas with baselines or 2017/18 season data are shown.

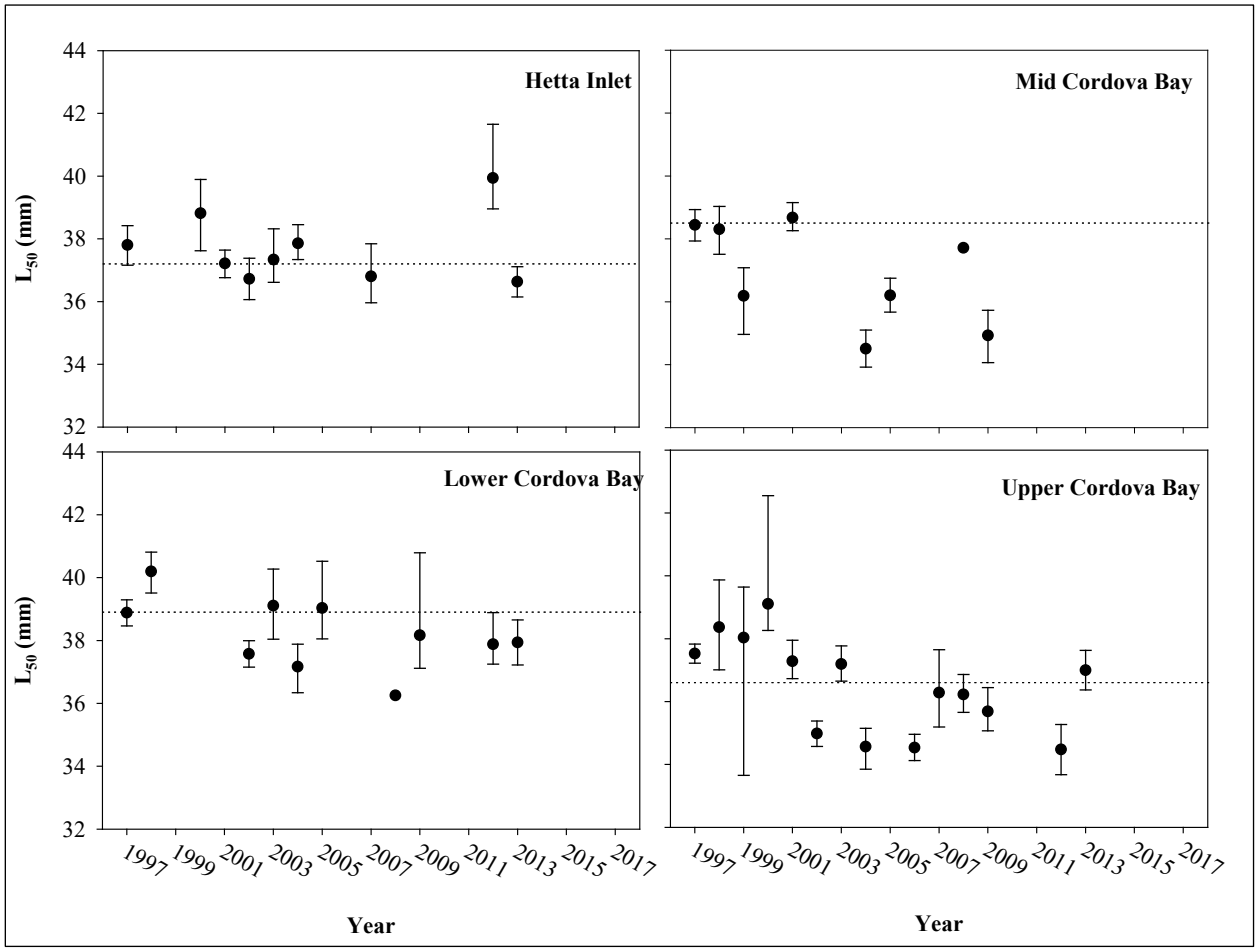

Figure 18.–L_{50} and 95% confidence intervals of spot shrimp from floating processor, on-the-grounds and dockside sampling in Section 3-A, 1997/98–2017/18 seasons. Dotted line represents the long-term baseline. Only areas with baselines or 2017/18 season data are shown.

Sections 3-B/C

The GHL in Sections 3-B/C has changed three times since the 1998/99 season. The GHL for these sections was set at 50,000 lb beginning with the 2000/01 fishing season when they were split from Section 3-A (Table 10). Beginning with the 2007/08 season, the GHL was reduced 20% to 40,000 lb in response to poor stock status. It was further reduced 25% to 30,000 lb for the 2010/11 fishing season due to continued stock health concerns. Harvest has averaged 34,800 lb (110% of the GHL) over the last 10 years. This section is divided into two analysis areas: Craig and Sea Otter Sound (Table 2).

Sectionwide CPUE decreased from last season but remains at baseline (Figure 19). Standardized analysis area commercial CPUE decreased in both Sea Otter Sound and Craig; it is now below baseline in Craig and at baseline in Sea Otter Sound (Table 11, Figure 20).

Commercial logbook data showed a 47% (moderate) harvest rate of large class shrimp in Craig, and 67% (excessive) in Sea Otter Sound (Table11).

No on-the-grounds samples were taken during the 2017/18 fishing season.

Manager scores were neutral for both areas (Table 11).

The overall matrix score is -0.73 (below average), a decrease from 0.00 (moderate) in 2016/17 due to CPUE in Craig going below baseline and excessive harvest of large class shrimp in Sea Otter Sound. Sections 3 B/C have low (0.18) data confidence.

Table 10.–Sections 3-B/C matrix, Part A. A 15-season history, including stock assessment recommendations, for the pot shrimp fishery in Southeast Alaska.

Season	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Upper regulatory GHR	50,000	50,000	50,000	70,000	70,000	70,000	70,000	70,000	70,000
Actual GHL (lb spot shrimp)	50,000	50,000	50,000	50,000	40,000	40,000	40,000	30,000	30,000
Recommended GHL or stock status	–	–	–	30,000	Poor	Moderate	Below Average	Moderate	Moderate
Season length (days)	14	14	6	47	132	120	68	22	23
Landings (number)	493	421	312	355	252	62	121	44	50
Harvest (lb spot shrimp)	64,839	46,497	56,051	47,309	44,703	29,402	47,054	33,104	40,640

Season	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Upper regulatory GHR	70,000	70,000	70,000	70,000	70,000	70,000
Actual GHL (lb spot shrimp)	30,000	30,000	30,000	30,000	30,000	30,000
Recommended GHL or stock status	Below Average	Moderate	Moderate	Moderate	Moderate	Below Average
Season length (days)	29	19	16	18	14	18
Landings (number)	68	52	67	47	52	47
Harvest (lb spot shrimp)	33,107	26,714	36,359	30,492	37,968	33,597

Note: En dash = not available.

Table 11.–Sections 3-B/C matrix, Part B. Baselines, current season values, and scores for each stock status parameter and analysis area for the pot shrimp fishery in Southeast Alaska. Data sources are from ADF&G shrimp survey, fish tickets ("fish tix"), logbooks, and on-the-grounds (OTG) and dockside (DS) sampling of commercial catch. Data are divided by type: CPUE, harvest rate, mean carapace length (CL), and L_{50}. Score for each analysis area is the sum of all individual scores.

Analysis Area		Craig			Sea Otter Sound			
Area weighting			0.4			0.6		
Stock Status Parameters	Source	Baseline	Value	Score	Baseline	Value	Score	Total Score
Catch rate ≥XL	survey	–	–	–	–	–	–	–
4-yr trend in catch rate	survey	–	–	–	–	–	–	–
Std. Comm. CPUE	fish tix	4.2	3.4	-1.00	5.0	5.0	0.00	-0.13
4-yr trend in CPUE	fish tix	–	No trend	0.00	–	No trend	0.00	0.00
Catch rate ≥XL	logbook	–	–	–	–	–	–	–
Harvest rate ≥XL (2015)	logbook	–	47%	–	–	–	–	–
Harvest rate ≥XL (2016)	logbook	–	–	–	–	–	–	–
Harvest rate ≥XL (2017)	logbook	–	47%	0.00	–	67%	-1.00	-0.60
Mean CL	survey	–	–	–	–	–	–	–
4-yr trend in CL	survey	–	–	–	–	–	–	–
Mean CL	OTG	–	–	–	37.9	–	–	–
4-yr trend in CL	OTG	–	–	–	–	–	–	–
Mean CL	DS	–	–	–	–	–	–	–
4-yr trend in CL	DS	–	–	–	–	–	–	–
L_{50}	survey	–	–	–	–	–	–	–
L_{50}	OTG/DS	–	–	–	42.5	–	–	–
Manager score	–	–	–	0	–	–	0	0.00
Score	–	–	–	-1.00	–	–	-1.00	-0.73
Max. possible score	–	–	–	3.25	–	–	3.25	2.17
Stock Status	–	–	–	–	–	–	–	Below average
Confidence	–	–	–	0.24	–	–	0.24	0.24

Note: * indicates confidential data with less than three permits participating. En dashes = not available, NA = not applicable, *Sig. inc.* = significant increase, *Sig. dec.* = significant decrease, ≥XL = ≥40 mm CL.

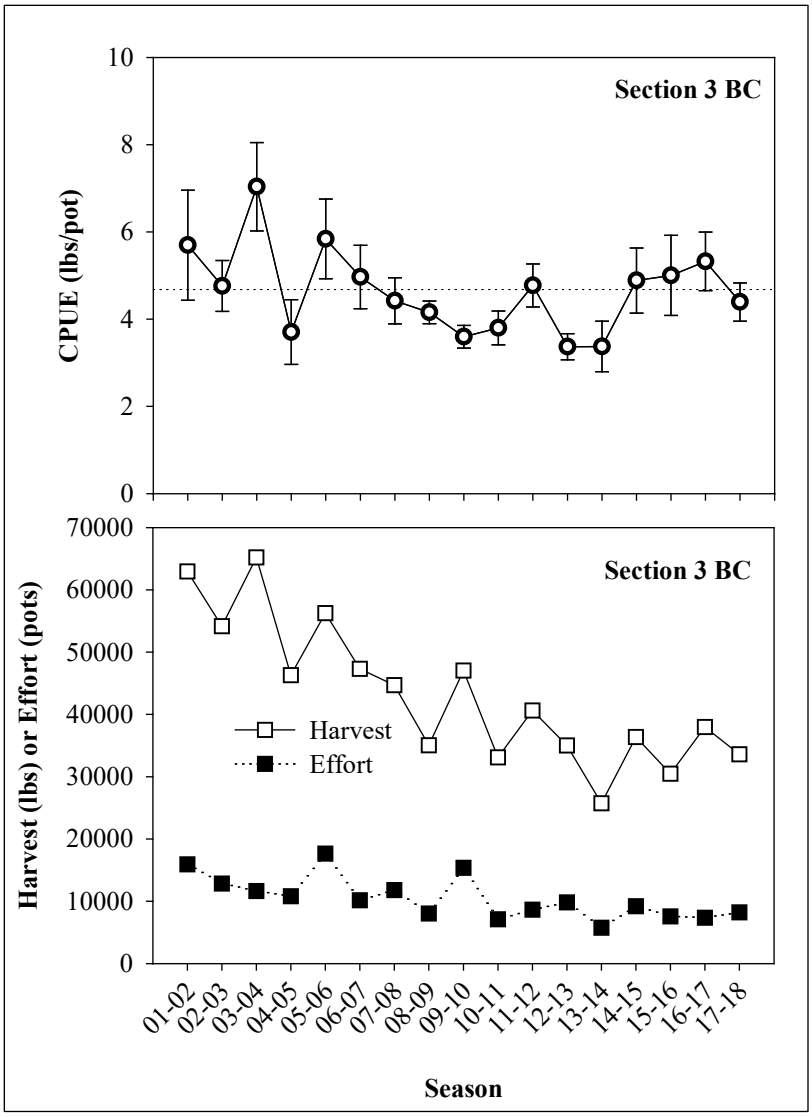

Figure 19.–Sectionwide CPUE and effort data for Sections 3B/C, 2001/02–2017/18 seasons. CPUE is weighted by analysis area weights to allow for an overall impression of fishery performance.

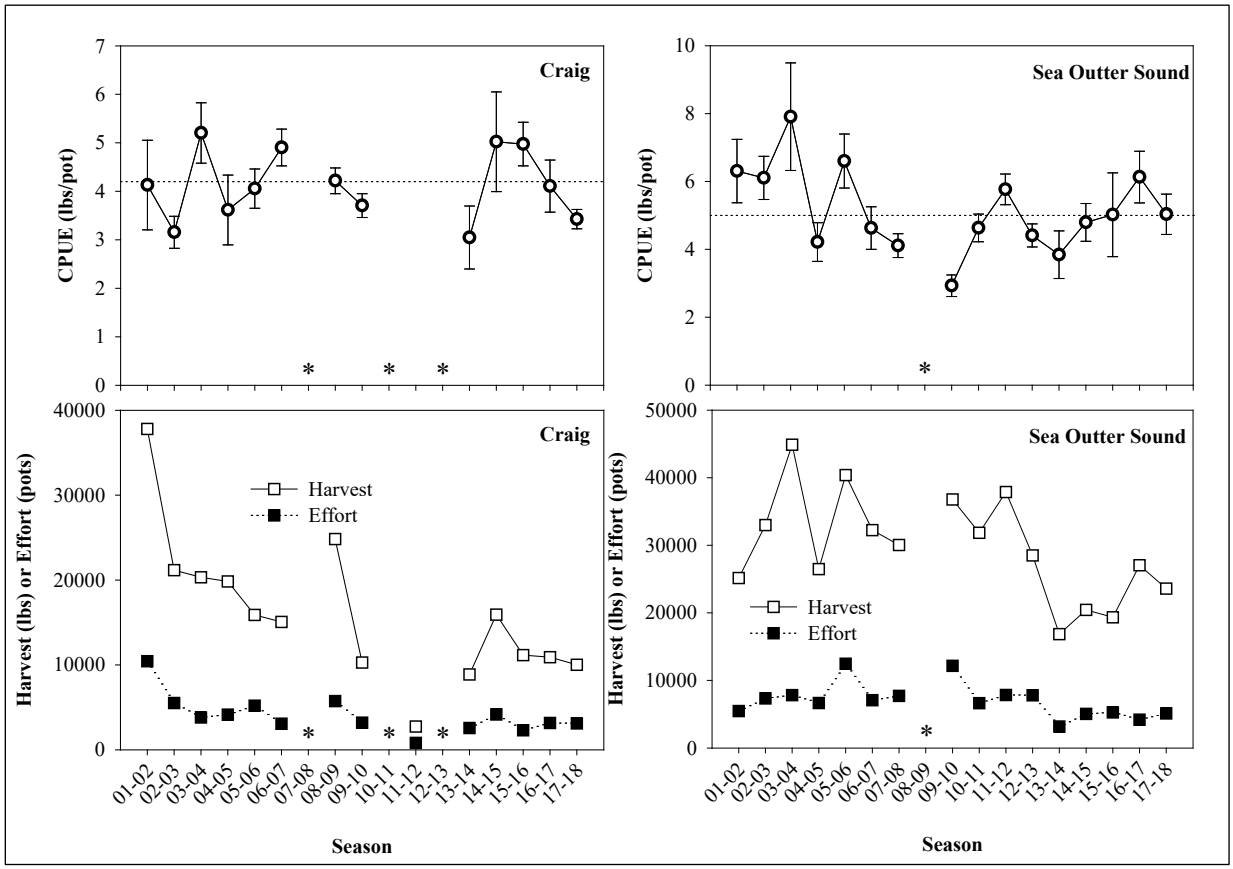

Figure 20.–Mean and standard error of spot shrimp catch rate from commercial harvest (dotted line represents the long-term baseline) and the commercial harvest and effort by analysis area in Sections 3-B/C, 2001/02–2017/18 seasons. Asterisks (*) indicate confidential data with less than three permits participating.

District 4

The GHL for District 4 has been 20,000 lb since pot fishery GHLs were first established in the 1995/96 fishing season. Harvest has averaged 15,500 lb (78% of the GHL) over the last 10 years (Table 12). This district is not divided into analysis areas.

Standardized commercial CPUE is above the baseline with an increasing four-year trend (Table 13, Figure 21).

Commercial logbook data showed the harvest rate of large class shrimp at 55% (excessive) and a flat catch rate from previous seasons.

Manager scores were neutral for this area (Table 13).

The overall score for this district is -0.50 (moderate), which was up from -1.00 (below average) in the 2016/17 season due to standard commercial CPUE now showing an increasing four-year trend. Data confidence is 0.33 (low).

Table 12.–District 4 matrix, Part A. A 15-season history, including stock assessment recommendations, for the pot shrimp fishery in Southeast Alaska.

Season	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Upper regulatory GHR	20,000	20,000	20,000	28,000	28,000	28,000	28,000	28,000
Actual GHL (lb spot shrimp)	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Recommended GHL or stock status	–	–	–	20,000	Poor	Poor	Above Average	Above Average
Season length (days)	213	150	213	229	229	229	229	125
Landings (number)	53	57	*	68	*	0	66	*
Harvest (lb spot shrimp)	20,364	19,296	*	15,085	*	0	20,932	*

Season	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Upper regulatory GHR	28,000	28,000	28,000	28,000	28,000	28,000	28,000
Actual GHL (lb spot shrimp)	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Recommended GHL or stock status	Above Average	Above Average	Moderate	Moderate	Below Average	Below Average	Moderate
Season length (days)	229	229	151	151	151	229	229
Landings (number)	*	*	31	53	20	25	45
Harvest (lb spot shrimp)	*	*	9,196	18,129	19,591	12,591	18,354

Note: * indicates confidential data with less than three permits participating; en dash = not available.

Table 13.–District 4 matrix, Part B. Baselines, current season values, and scores for each stock status parameter and analysis area for the pot shrimp fishery in Southeast Alaska. Data sources are from ADF&G shrimp survey, fish tickets ("fish tix"), logbooks, and on-the-grounds (OTG) and dockside (DS) sampling of commercial catch. Data are divided by type: CPUE, harvest rate, mean carapace length (CL), and L_{50}. Score for each analysis area is the sum of all individual scores.

Analysis Area		District 4			
Area weighting			1.0		
Stock Status Parameters	Source	Baseline	Value	Score	Total Score
Catch rate ≥XL	survey	–	–	–	–
4-yr trend in catch rate	survey	–	–	–	–
Std. Comm. CPUE	fish tix	2.4	2.7	1.00	0.33
4-yr trend in CPUE	fish tix	–	Sig.inc.	0.25	0.17
Catch rate ≥XL	logbook	–	No trend	0.00	0.00
Harvest rate ≥XL (2015)	logbook	–	–	–	–
Harvest rate ≥XL (2016)	logbook	–	99%	–	–
Harvest rate ≥XL (2017)	logbook	–	55%	-1.00	-1.00
Mean CL	survey	–	–	–	–
4-yr trend in CL	survey	–	–	–	–
Mean CL	OTG	–	–	–	–
4-yr trend in CL	OTG	–	–	–	–
Mean CL	DS	–	–	–	–
4-yr trend in CL	DS	–	–	–	–
L_{50}	survey	–	–	–	–
L_{50}	OTG/DS	–	–	–	–
Manager score	–	–	–	0.00	0.00
Score	–	–	–	0.25	-0.50
Max. possible score	–	–	–	4.25	3.17
Stock Status	–	–	–	–	Moderate
Confidence	–	–	–	0.33	0.33

Note: * indicates confidential data with less than three permits participating. En dashes = not available, NA = not applicable, Sig. inc. = significant increase, Sig. dec. = significant decrease, ≥XL = ≥40 mm CL.

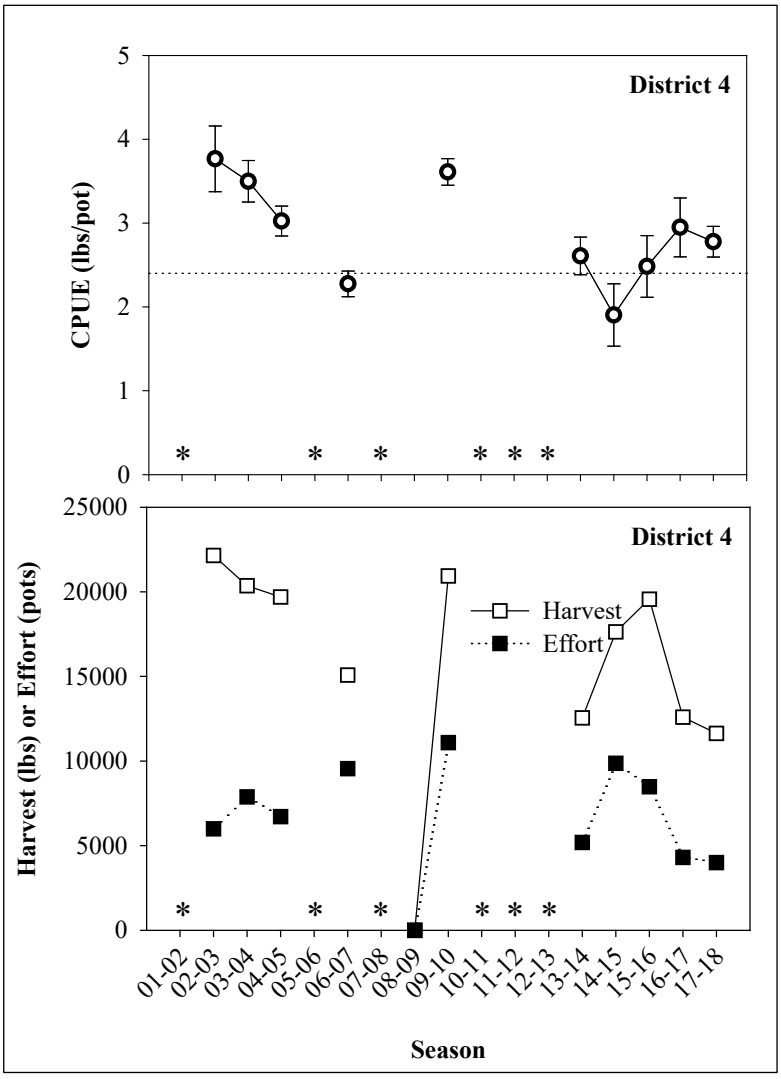

Figure 21.–Mean and standard error of spot shrimp catch rate from commercial harvest (dotted line represents the long-term baseline) and the commercial harvest and effort by analysis area in District 4, 2001/02–2017/18 seasons. Asterisks (*) indicate confidential data with less than three permits participating.

PETERSBURG MANAGEMENT AREA

District 5

The GHL for District 5 was unchanged at 20,000 lb from the 1995/96 fishing season until the 2015/16 season when it was reduced 40% to 12,000 lb due to poor stock health. Harvest has averaged 6,350 lb (35% of the GHL) over the last 10 seasons (Table 14). This district is divided into three analysis areas: Affleck/Port Beauclerc, Rocky Pass, and Cape Pole to Point Baker (Table 2). The spatial composition of harvest is highly variable in this small-GHL district (Figure 22).

Districtwide CPUE declines slightly from 2016/17 but remains at the baseline level (Figure 23). Standardized commercial CPUE increased in Affleck/Port Beauclerc and is above baseline and shows a significantly increasing four-year trend. There was no effort in other analysis areas (Table 15).

Logbook data showed a 49% (moderate) harvest of large class shrimp (Table 15).

The overall matrix score is 0.50 (above average), which was up from 0.04 (moderate) for the 2016/17 season due to increased CPUE in the Affleck/Port Beauclerc analysis area. District 5 data have 0.16 (very low) data confidence (Table 15).

Table 14.–District 5 matrix, Part A. A 15-season history, including stock assessment recommendations, for the pot shrimp fishery in Southeast Alaska.

Season	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Upper regulatory GHR	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Actual GHL (lb spot shrimp)	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Recommended GHL or stock status	–	–	–	20,000	Poor	Moderate	Above Average	Above Average
Season length (days)	229	222	151	151	229	229	151	229
Landings (number)	84	117	49	41	0	18	47	22
Harvest (lb spot shrimp)	17,733	21,498	19,282	10,216	0	3,653	16,683	10,555

Season	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Upper regulatory GHR	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Actual GHL (lb spot shrimp)	20,000	20,000	20,000	20,000	12,000	12,000	12,000
Recommended GHL or stock status	Moderate	Moderate	Below Average	Below Average	Poor	Moderate	Above Average
Season length (days)	229	151	229	229	229	229	229
Landings (number)	42	17	24	9	23	11	20
Harvest (lb spot shrimp)	8,568	5,131	2,768	2,039	4,886	1,666	8,030

Note: En dash = not available.

Table 15.–District 5 matrix, Part B. Baselines, current season values, and scores for each stock status parameter and analysis area for the pot shrimp fishery in Southeast Alaska. Data sources are from ADF&G shrimp survey, fish tickets ("fish tix"), logbooks, and on-the-grounds (OTG) and dockside (DS) sampling of commercial catch. Data are divided by type: CPUE, harvest rate, mean carapace length (CL), and L50. Score for each analysis area is the sum of all individual scores.

Analysis Area		Affleck/Port Beauclerc			Rocky Pass			Cape Pole to Point Baker			
Area weighting			0.60			0.35			0.05		
Stock Status Parameters	Source	Baseline	Value	Score	Baseline	Value	Score	Baseline	Value	Score	Total Score
Catch rate ≥XL	survey	–	–	–	–	–	–	–	–	–	–
4-yr trend in catch rate	survey	–	–	–	–	–	–	–	–	–	–
Std. Comm. CPUE	fish tix	1.7	2.9	1.00	2.2	No effort	–	1.3	No effort	–	0.33
4-yr trend in CPUE	fish tix	–	Sig. inc.	0.25	–	–	–	–	–	–	0.17
Catch rate ≥XL	logbook	–	–	–	–	–	–	–	–	–	–
Harvest rate ≥XL (2015)	logbook	–	17%	–	–	–	–	–	–	–	–
Harvest rate ≥XL (2016)	logbook	–	–	–	–	–	–	–	–	–	–
Harvest rate ≥XL (2017)	logbook	–	49%	0.00	–	–	–	–	–	–	0.00
Mean CL	survey	–	–	–	–	–	–	–	–	–	–
4-yr trend in CL	survey	–	–	–	–	–	–	–	–	–	–
Mean CL	OTG	–	–	–	–	–	–	–	–	–	–
4-yr trend in CL	OTG	–	–	–	–	–	–	–	–	–	–
Mean CL	DS	–	–	–	–	–	–	–	–	–	–
4-yr trend in CL	DS	–	–	–	–	–	–	–	–	–	–
L_{50}	survey	–	–	–	–	–	–	–	–	–	–
L_{50}	OTG/DS	–	–	–	–	–	–	–	–	–	–
Manager score	–	–	–	0	–	–	0	–	–	0	0.00
Score	–	–	–	0.00	–	–	0.00	–	–	0.00	0.50
Max. possible score	–	–	–	3.25	–	–	1.00	–	–	1.00	2.17
Stock Status	–	–	–	–	–	–	–	–	–	–	Above average
Confidence	–	–	–	0.24	–	–	0.06	–	–	0.06	0.16

Note: * indicates confidential data with less than three permits participating. En dashes = not available, NA = not applicable, *Sig. inc.* = significant increase, *Sig. dec.* = significant decrease, ≥XL = ≥40 mm CL.

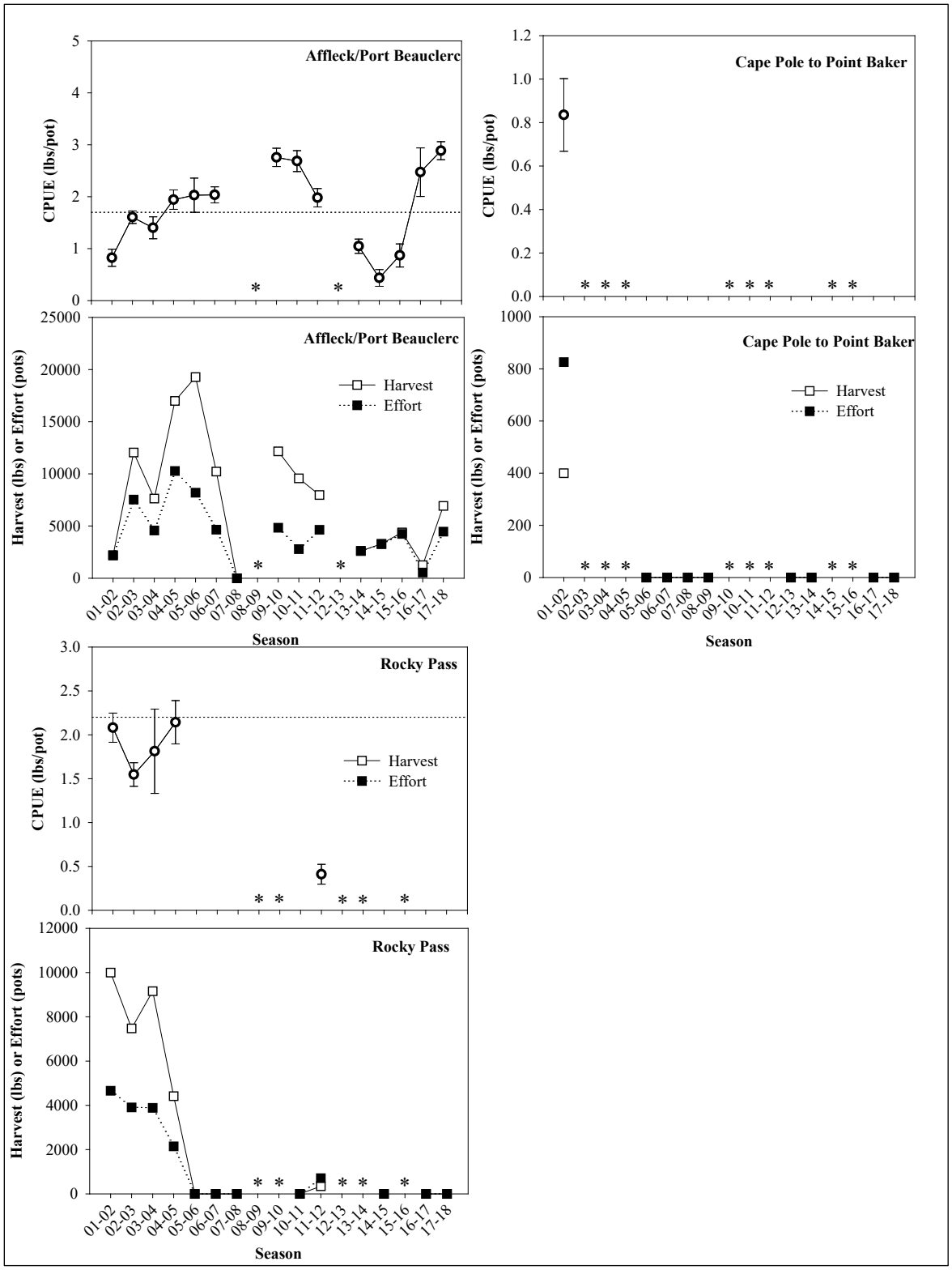

Figure 22.–Mean and standard error of spot shrimp catch rate from commercial harvest (dotted line represents the long-term baseline) and the commercial harvest and effort by analysis area in District 5, 2001/02–2017/18 seasons. Asterisks (*) indicate confidential data with less than three permits participating.

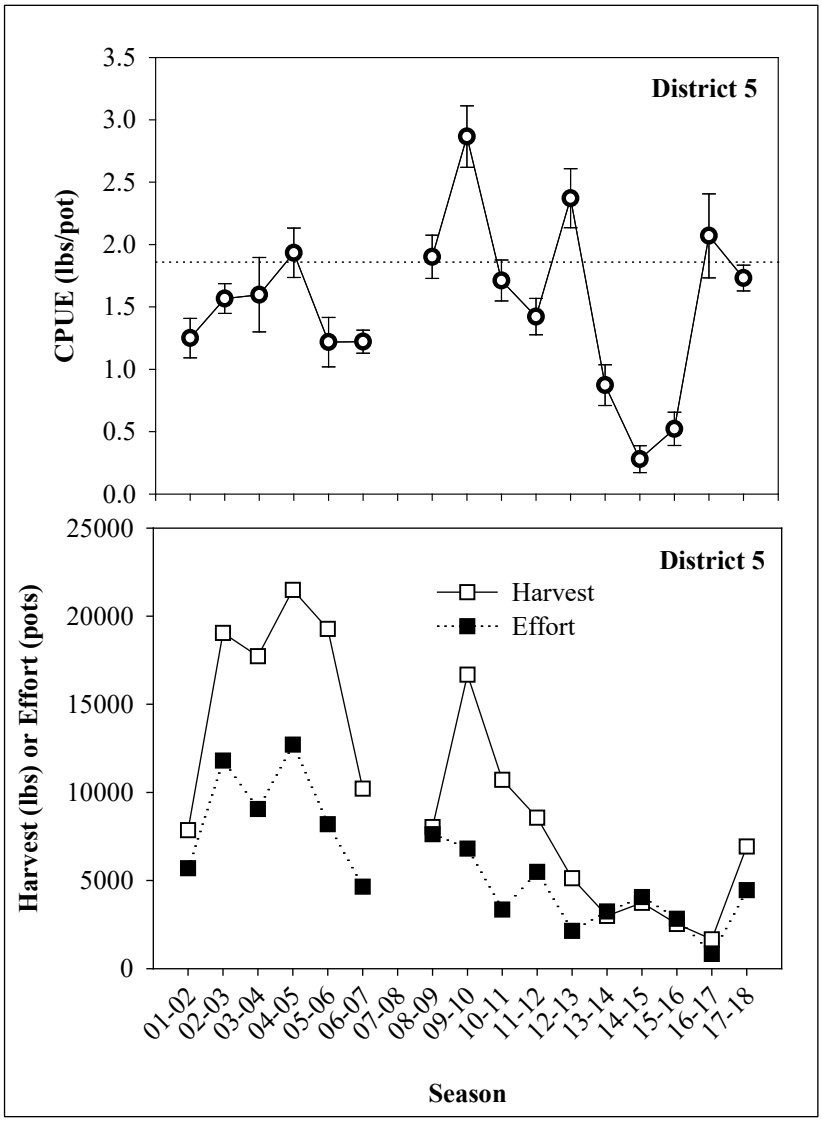

Figure 23.–Districtwide CPUE and effort data for District 5, 2001/02–2017/18 seasons. CPUE is weighted by analysis area weights to allow for an overall impression of fishery performance.

Northern Clarence Strait

The Northern Clarence Strait management area was created by the Board of Fisheries at the 2018 meeting in Sitka. It is made up of Sections 6B, 6C, and 6D and was established with an upper end GHR of 60,000 lb. Northern Clarence Strait is divided into two analysis areas: SW Etolin Island, and Upper Clarence Strait (Table 2). Although most of the harvest comes from the Upper Clarence analysis area, the spatial composition of harvest has been somewhat stable. Over the past 10 years harvest has averaged 35,178 lb (Table 16).

Districtwide weighted CPUE was up from last season (Figure 24), is now above baseline, and is the second highest in the past 12 years. Upper Clarence Strait CPUE was flat from last season's strong increase, remains above the baseline, and is showing a significant increase in the four-year analysis. The SW Etolin area CPUE declined slightly and remains at baseline with no trend in the four-year analysis (Table 17, Figure 25).

Logbook harvest rate data of large size class shrimp showed a 28% (low) harvest rate of large class shrimp in Upper Clarence. Logbook catch rates of large class shrimp increased in both areas (Table 17).

Mean CL from OTG sampling in Upper Clarence Strait decreased from last season but remains above the baseline, showing a significant four-year increase. (Table 17, Figure 26).

The L_{50} point estimate from OTG sampling in Upper Clarence increased from near record low levels and is now at baseline (Table 17, Figure 27).

The manager scores were positive in Upper Clarence and SW Etolin (Table 17).

The overall matrix score is 4.03 (good).

Table 16.–Northern Clarence Strait matrix Part A. A 15-season history, including stock assessment recommendations, for the pot shrimp fishery in Southeast Alaska.

Season	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Upper regulatory GHR	NA–former GHR for all of District 6							
Actual GHL (lb spot shrimp)	NA–former GHL for all of District 6							
Recommended GHL or stock status	NA–former stock status for all of District 6							
Season length (days)	24	21	77	39	151	78	84	92
Landings (number)	167	137	207	202	110	82	129	82
Harvest (lb spot shrimp)	67,416	64,762	78,556	71,027	30,958	29,503	49,215	32,783

Season	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Upper regulatory GHR	NA–former GHR for all of District 6						
Actual GHL (lb spot shrimp)	NA–former GHL for all of District 6						
Recommended GHL or stock status	NA–former stock status for all of District 6						
Season length (days)	10	11	21	17	23	18	19
Landings (number)	36	60	89	50	57	63	93
Harvest (lb spot shrimp)	30,657	35,051	35,116	22,039	26,108	39,126	52,179

Note: NA = not applicable.

Table 17.–Northern Clarence Strait matrix, Part B. Baselines, current season values, and scores for each stock status parameter and analysis area for the pot shrimp fishery in Southeast Alaska. Data sources are from ADF&G shrimp survey, fish tickets ("fish tix"), logbooks, and on-the-grounds (OTG) and dockside (DS) sampling of commercial catch. Data are divided by type: CPUE, harvest rate, mean carapace length (CL), and L_{50}. Score for each analysis area is the sum of all individual scores.

Analysis Area		SW Etolin			Upper Clarence			
Area weighting			0.1			0.9		
Stock Status Parameters	Source	Baseline	Value	Score	Baseline	Value	Score	Total Score
Catch rate ≥XL	survey	–	–	–	–	–	–	–
4-yr trend in catch rate	survey	–	–	–	–	–	–	–
Std. Comm. CPUE	fish tix	4.3	*	0.00	4.3	5.6	1.00	0.30
4-yr trend in CPUE	fish tix	–	No trend	0.00		Sig. inc.	0.25	0.15
Catch rate ≥XL	logbook	–	Sig. inc.	1.00	–	Sig. inc.	1.00	1.00
Harvest rate ≥XL (2015)	logbook	–	37%	–	–	41%	–	–
Harvest rate ≥XL (2016)	logbook	–	45%	–	–	48%	–	–
Harvest rate ≥XL (2017)	logbook	–	–	–	–	28%	1.00	1.00
Mean CL	survey	–	–	–	–	–	–	–
4-yr trend in CL	survey	–	–	–	–	–	–	–
Mean CL	OTG	–	–	–	37.2	37.9	1.00	0.67
4-yr trend in CL	OTG	–	–	–	–	Sig. inc.	0.25	0.25
Mean CL	DS	–	–	–	43.6	–	–	–
4-yr trend in CL	DS	–	–	–	–	–	–	–
L_{50}	survey	–	–	–	–	–	–	–
L_{50}	OTG/DS	–	–	–	39.4	39.0	0.00	0.00
Manager score	–	–	–	1.00	–	–	1.00	0.67
Score	–	–	–	2.00	–	–	5.50	4.03
Max. possible score	–	–	–	3.25	–	–	6.50	4.42
Stock Status	–	–	–	–	–	–	–	Good
Confidence	–	–	–	0.24	–	–	0.47	0.45

Note: * indicates confidential data with less than three permits participating. En dashes = not available, NA = not applicable, *Sig. inc.* = significant increase, *Sig. dec.* = significant decrease, ≥XL = ≥40 mm CL.

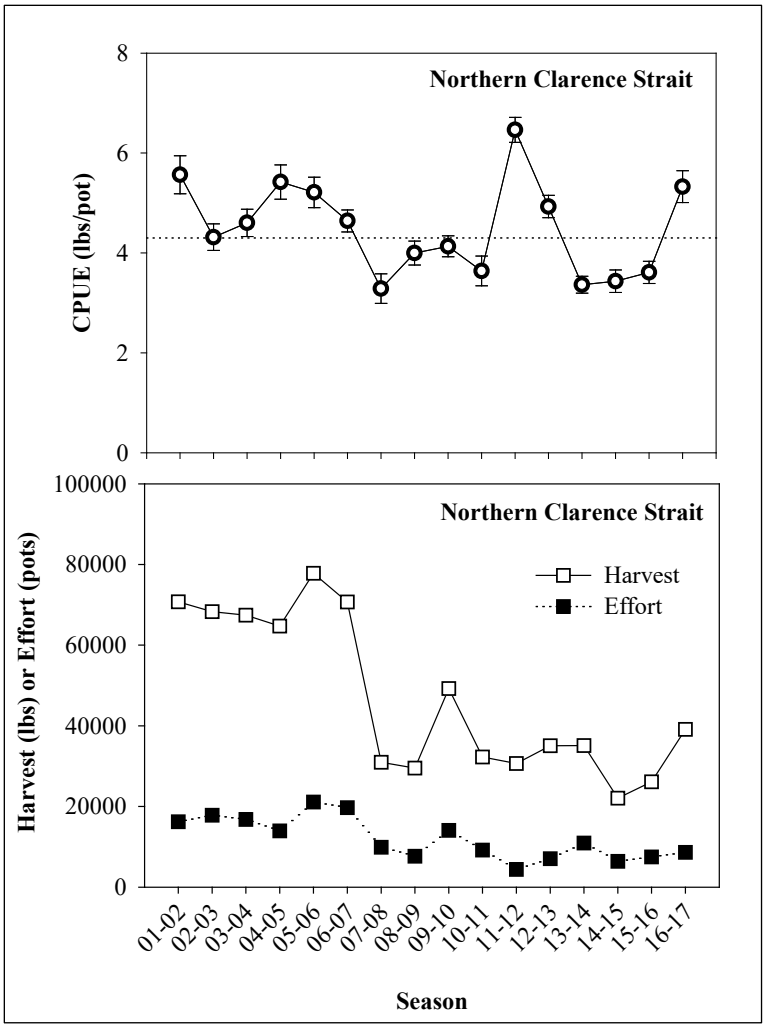

Figure 24.–Areawide CPUE and effort data for Northern Clarence Strait, 2001/02–2017/18 seasons. CPUE is weighted by analysis area weights to allow for an overall impression of fishery performance.

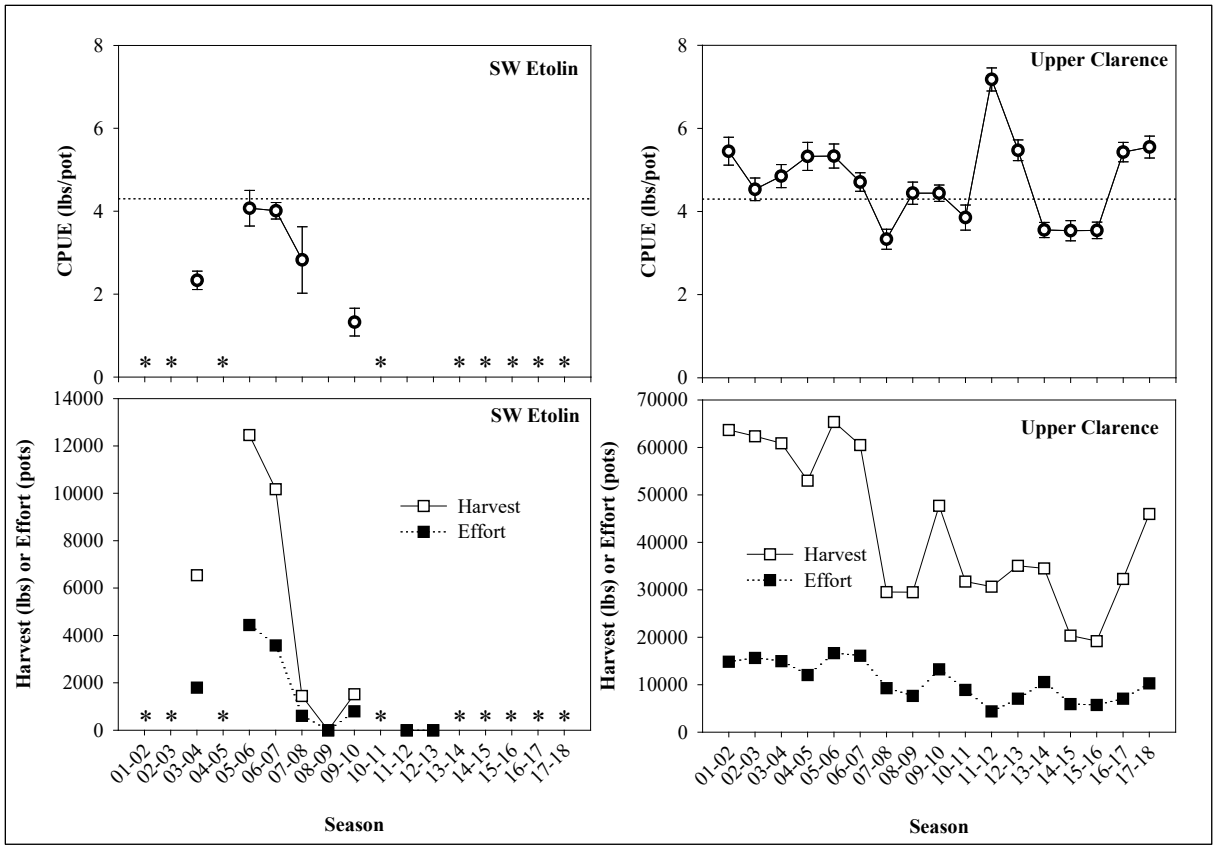

Figure 25.–Mean and standard error of spot shrimp catch rate from commercial harvest (dotted line represents the long-term baseline) and the commercial harvest and effort by analysis area in Northern Clarence Strait, 2001/02–2017/18 seasons. Asterisks (*) indicate confidential data with less than three permits participating.

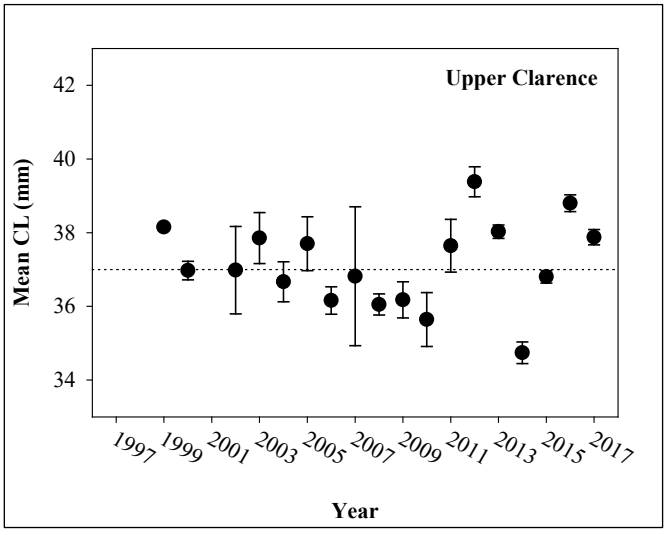

Figure 26.–Mean and standard error of spot shrimp carapace length from floating processor and on-the-grounds sampling in Northern Clarence Strait, 1997/98–2017/18 seasons. Dotted line represents the long-term baseline. Only areas with baselines or 2017/18 season data are shown.

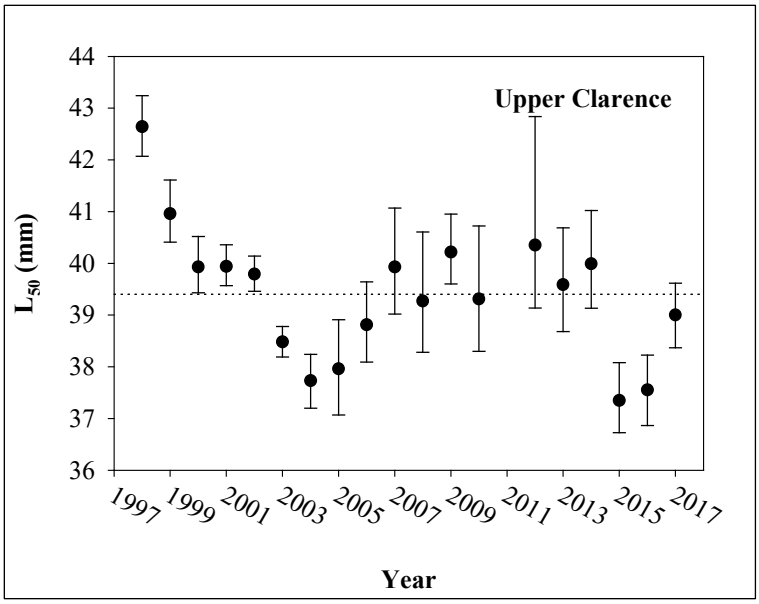

Figure 27.–L_{50} and 95% confidence intervals of spot shrimp from floating processor, on-the-grounds and dockside sampling in Northern Clarence Strait, 1997/98–2017/18 seasons. Dotted line represents the long-term baseline. Only areas with baselines or 2017/18 season data are shown.

District 7

The GHL in District 7 has changed four times since the 1995/96 season. The GHL in District 7 was set at 100,000 lb for the 1995/96–1999/00 seasons, and it was increased 4% to 104,000 lb for the 2000/01 season. The GHL was reduced 30% for the 2010/11 season to 54,600 lb, then increased 17% for the 2012/13 season when an experimental inseason GHL adjustment system was implemented. During a meeting between industry and management in January 2015, it was mutually agreed to increase the preseason GHL from 63,700 lb to 74,300 lb so that the full range of the GHR could be met using inseason adjustments. During the last 10 years, harvest has averaged 75,600 lb (101% of the GHL; Table 18). District 7 is divided into four analysis areas: Bradfield Canal, Lower Ernest Sound, Upper Ernest Sound, and Zimovia Strait (Table 2).

Survey catch rates of large size class shrimp increased in the 2017 survey, are above baseline, and are showing no four-year trend in both Upper and Lower Ernest Sounds (Table 19, Figure 28). It should also be noted that catch rate of small size class shrimp, though not scored, continues to decrease and is now at baseline in Upper Ernest Sound, and increased to baseline level in Lower Ernest Sound. Mean survey CL decreased in both areas after a strong increase last year in both survey areas. Both areas have mean CL values above the baseline with a significant increase in the four-year analysis (Table 19, Figure 28). Survey L_{50} estimates increased in both areas and are now at baseline (Table 19, Figure 29).

Districtwide weighted CPUE decreased slightly but remains well above the baseline (Figure 30). Standardized commercial CPUEs are significantly above the long-term baseline in all areas except Lower Ernest Sound where it is at baseline. Upper Ernest Sound also shows a significant increase in the four-year analysis (Table 19, Figure 31).

Logbook data showed a 42% (moderate) harvest of large class shrimp in Upper Ernest Sound and a 25% (low) rate in Zimovia Strait (Table 19). Catch rates of large class shrimp increased in Lower Ernest Sound and Zimovia, and were steady in Upper Ernest Sound.

On-the-grounds CL measurements were above baseline in Bradfield Canal and Upper Ernest Sound. Upper Ernest Sound also showed an increasing four-year trend. Dockside CL was below the baseline in Bradfield Canal but no longer decreasing in the four-year analysis (Table 19, Figure 32). On-the-grounds and dockside L_{50} samples were at baseline in Upper Ernest Sound, and below baseline in Bradfield Canal (Table 19, Figure 33).

The manager scores were positive in all areas (Table 19).

The overall matrix score for District 7 is 3.48 (above average), which was up from 1.31 (moderate) for the 2016/17 season. The increase in score this season was mainly due to improved survey catch rates in Lower Ernest Sound, improved logbook indicators, and increased CL in Upper Ernest Sound. District 7 has a 0.61 (good) level of data confidence (Table 19).

Table 18.–District 7 matrix, Part A. A 15-season history, including stock assessment recommendations, for the pot shrimp fishery in Southeast Alaska.

Season	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Upper regulatory GHR	104,000	104,000	104,000	104,000	104,000	104,000	104,000	104,000
Actual GHL (lb spot shrimp)	104,000	78,000	78,000	78,000	78,000	78,000	78,000	54,600
Recommended GHL or stock status	104,000	Poor	Poor	62,400	Moderate	Moderate	Poor	Below Average
Season length (days)	113	37	30	22	59	78	84	34
Landings (number)	470	322	254	192	223	184	240	135
Harvest (lb spot shrimp)	104,394	80,072	79,927	80,491	76,613	52,345	74,474	48,762

Season	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Upper regulatory GHR	104,000	104,000	104,000	104,000	104,000	104,000	104,000
Actual GHL (lb spot shrimp)	54,600	80,899	77,500	70,000	74,300	81,730	96,590
Recommended GHL or stock status	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Above Average
Season length (days)	12	17	17	14	12	12	13
Landings (number)	83	124	168	132	156	146	176
Harvest (lb spot shrimp)	61,825	82,552	94,922	76,890	70,091	87,752	96,234

Table 19.–District 7 matrix, Part B. Baselines, current season values, and scores for each stock status parameter and analysis area for the pot shrimp fishery in Southeast Alaska. Data sources are from ADF&G shrimp survey, fish tickets ("fish tix"), logbooks, and on-the-grounds (OTG) and dockside (DS) sampling of commercial catch. Data are divided by type: CPUE, harvest rate, mean carapace length (CL), and L_{50}. Score for each analysis area is the sum of all individual scores.

Analysis Area		Bradfield			Lower Ernest Sound		
Area weighting			0.2			0.2	
Stock Status Parameters	Source	Baseline	Value	Score	Baseline	Value	Score
Catch rate ≥XL	survey	–	5.6	–	0.8	1.1	1.00
4-yr trend in catch rate	survey	–	–	–	–	No trend	0.00
Std. Comm. CPUE	fish tix	2.5	4.8	1.00	3.6	*	0.00
4-yr trend in CPUE	fish tix	–	No trend	0.00	–	No trend	0.00
Catch rate ≥XL	logbook	–	–	–	–	Sig. inc.	1.00
Harvest rate ≥XL (2015)	logbook	–	–	–	–	–	–
Harvest rate ≥XL (2016)	logbook	–	73%	–	–	22%	–
Harvest rate ≥XL (2017)	logbook	–	–	–	–	–	–
Mean CL	survey	–	–	–	31.2	33.3	1.00
4-yr trend in CL	survey	–	–	–	–	Sig. inc.	0.25
Mean CL	OTG	41.8	45.0	1.00	–	–	–
4-yr trend in CL	OTG		No trend	0.00	–	–	–
Mean CL	DS	45.4	43.7	-1.00	–	–	–
4-yr trend in CL	DS	–	No trend	0.00	–	–	–
L_{50}	survey	–	–	–	37.9	37.9	0.00
L_{50}	OTG/DS	46.7	46.0	-1.00	–	–	–
Manager score		–	–	1.00	–	–	1.00
Score		–	–	1.00	–	–	4.25
Max. possible score		–	–	5.75	–	–	6.75
Stock Status		–	–	–	–	–	–
Confidence		–	–	0.47	–	–	0.53

-continued-

Table 19.–Page 2 of 2.

Analysis Area		Upper Ernest Sound			Zimovia Strait			
Area weighting			0.5			0.1		
Stock Status Parameters	Source	Baseline	Value	Score	Baseline	Value	Score	Total Score
Catch rate ≥XL	survey	1.6	3.0	1.00	–	–	–	1.00
4-yr trend in catch rate	survey	–	No trend	0.00	–	–	–	0.00
Std. Comm. CPUE	fish tix	3.9	5.2	1.00	2.3	3.8	1.00	0.27
4-yr trend in CPUE	fish tix	–	Sig. inc.	0.25	–	No trend	0.00	0.08
Catch rate ≥XL	logbook	–	No trend	0.00	–	Sig. inc.	1.00	0.38
Harvest rate ≥XL (2015)	logbook	–	24%	–	–	–	–	–
Harvest rate ≥XL (2016)	logbook	–	39%	–	–	42%	–	–
Harvest rate ≥XL (2017)	logbook	–	42%	0.00	–	24.6%	1.00	0.17
Mean CL	survey	35.0	36.9	1.00	–	–	–	0.67
4-yr trend in CL	survey	–	Sig. inc.	0.25	–	–	–	0.17
Mean CL	OTG	40.7	41.7	1.00	42.9	–	–	0.67
4-yr trend in CL	OTG	–	Sig. inc.	0.25	–	–	–	0.18
Mean CL	DS	43.2	–	–	–	–	–	-0.67
4-yr trend in CL	DS	–	–	–	–	–	–	0.00
L_{50}	survey	42	41.6	0.00	–	–	–	0.00
L_{50}	OTG/DS	43.2	42.8	0.00	–	–	–	-0.10
Manager score		–	–	1.00	–	–	1.00	0.67
Score		–	–	5.75	–	–	4.00	3.48
Max. possible score		–	–	10.00	–	–	4.25	8.08
Stock Status		–	–	–	–	–	–	Above average
Confidence		–	–	0.76	–	–	0.29	0.61

Note: * indicates confidential data with less than three permits participating. En dashes = not available, NA = not applicable, *Sig. inc.* = significant increase, *Sig. dec.* = significant decrease, ≥XL = ≥40 mm CL.

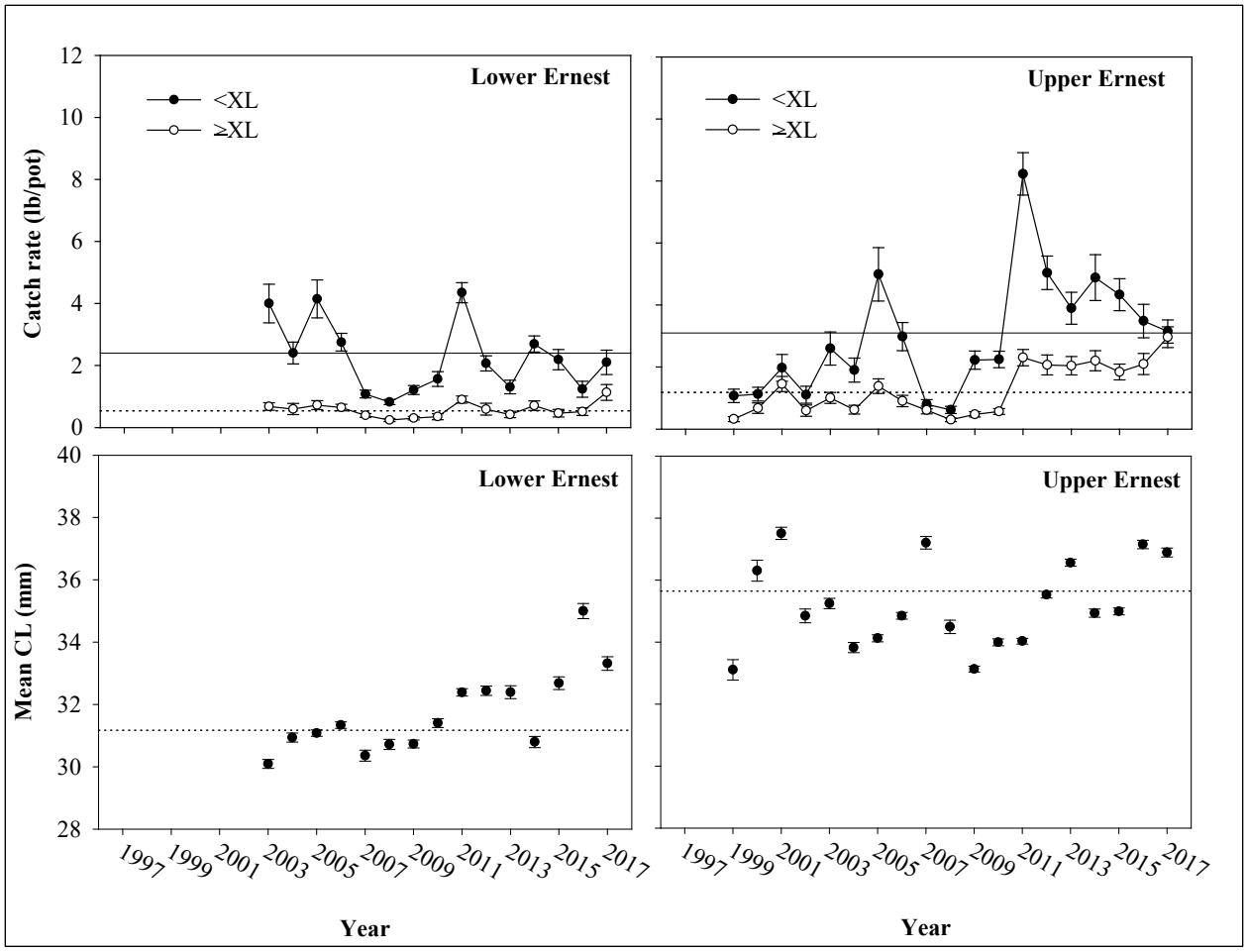

Figure 28.–Mean and standard error of spot shrimp catch rate (upper panels), and carapace length (lower panels) from preseason surveys in District 7, 1998–2017. Lines represent the long-term baselines.

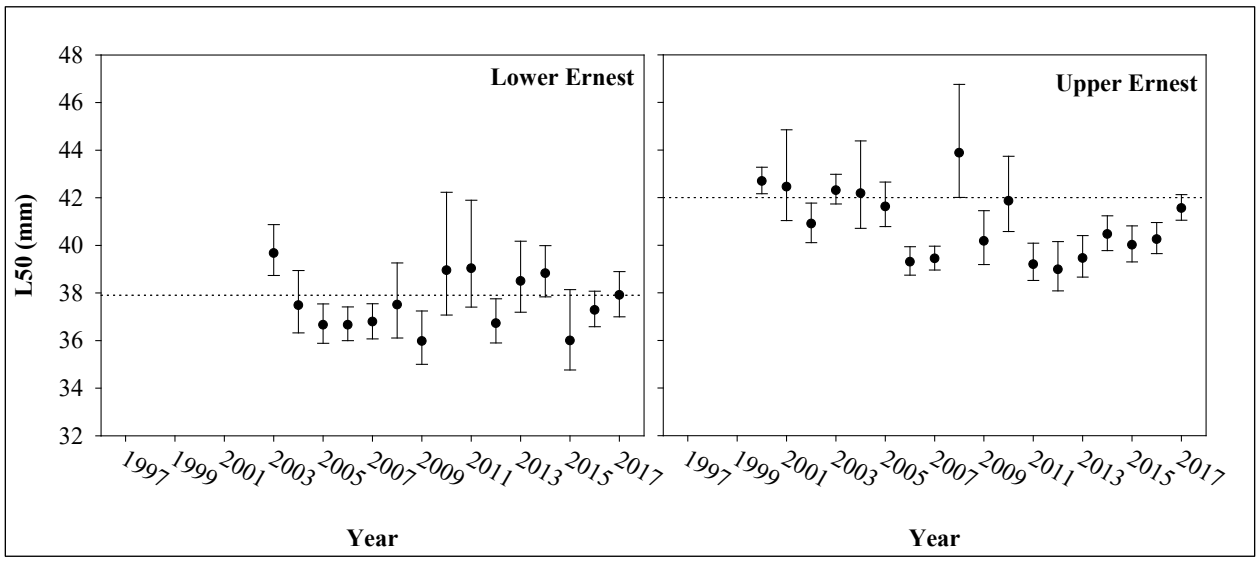

Figure 29.–L_{50} and 95% confidence intervals of spot shrimp from preseason surveys in District 7, 1998–2016. Dotted line represents the long-term baseline.

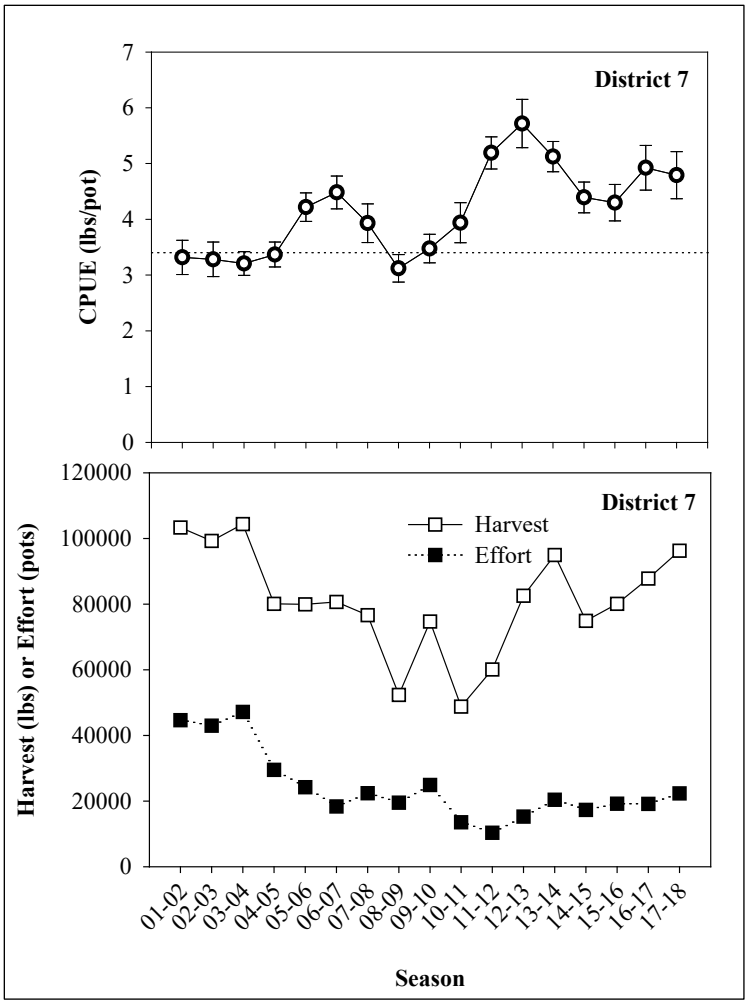

Figure 30.–Districtwide CPUE and effort data for District 7, 2001/02–2017/18 seasons. CPUE is weighted by analysis area weights to allow for an overall impression of fishery performance.

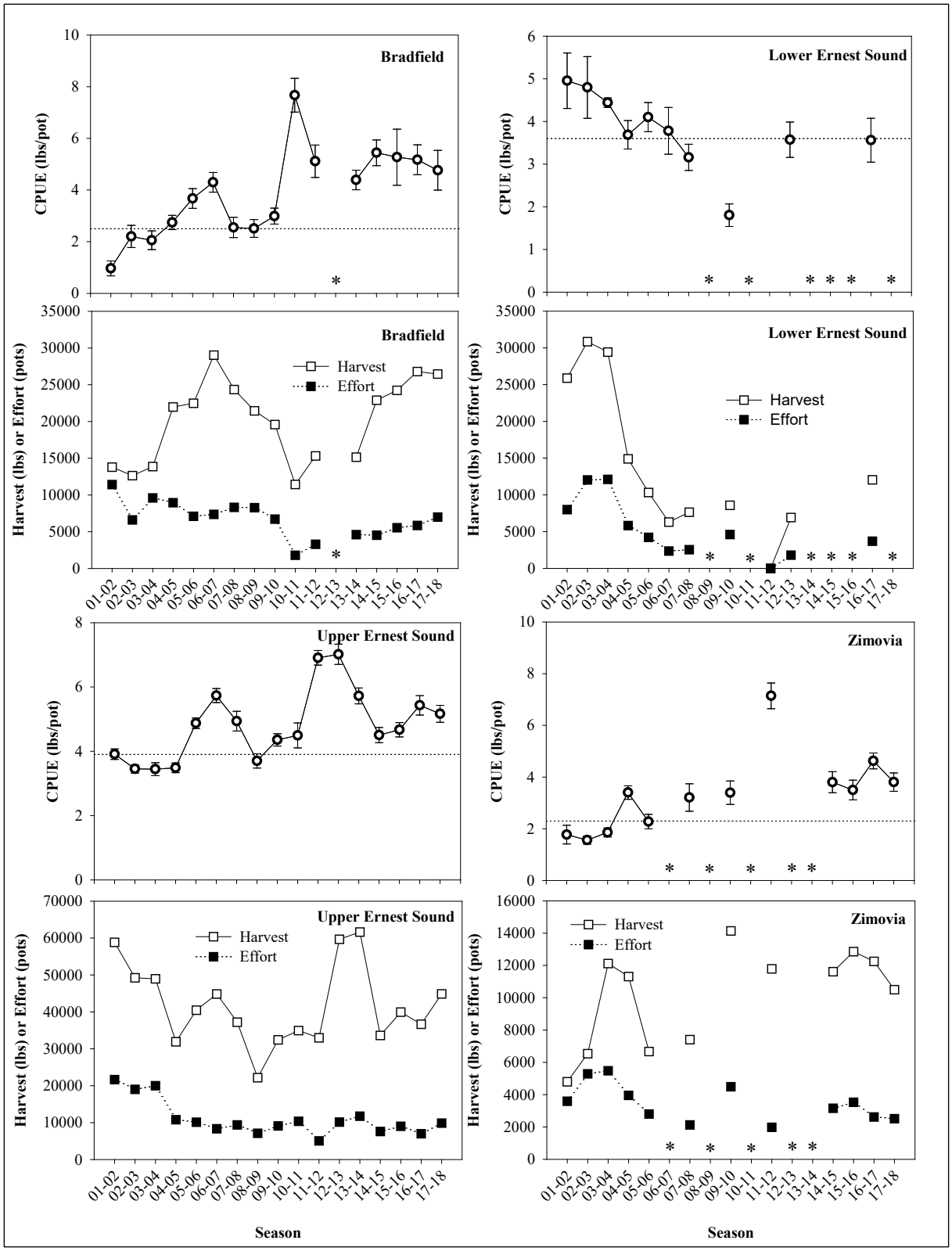

Figure 31.–Mean and standard error of spot shrimp catch rate from commercial harvest (dotted line represents the long-term baseline) and the commercial harvest and effort by analysis area in District 7, 2001/02–2017/18 seasons. Asterisks (*) indicate confidential data with less than three permits participating.

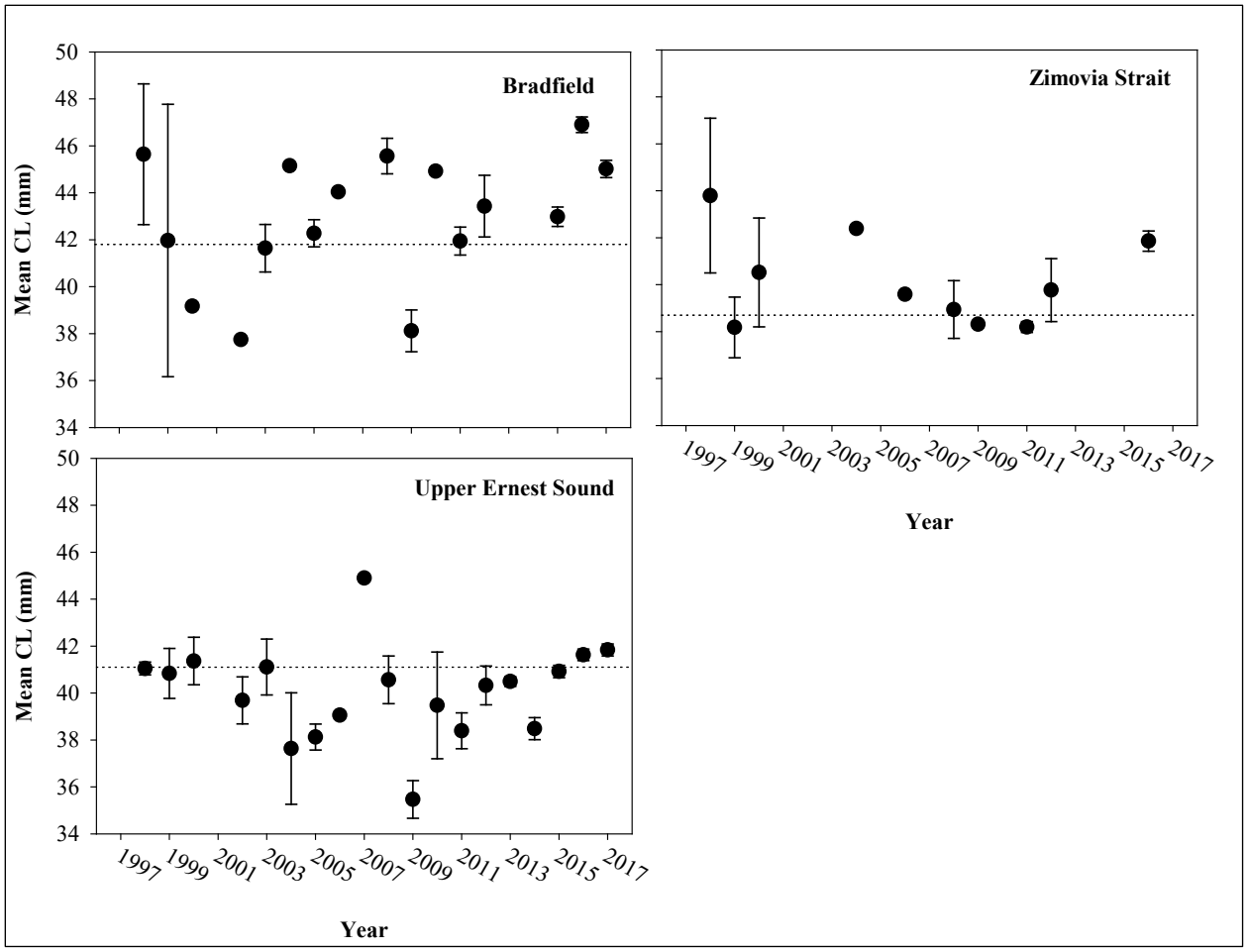

Figure 32.–Mean and standard error of spot shrimp carapace length from floating processor and on-the-grounds sampling in District 7, 1997/98–2017/18 seasons. Dotted line represents the long-term baseline. Only areas with baselines or 2017/18 season data are shown.

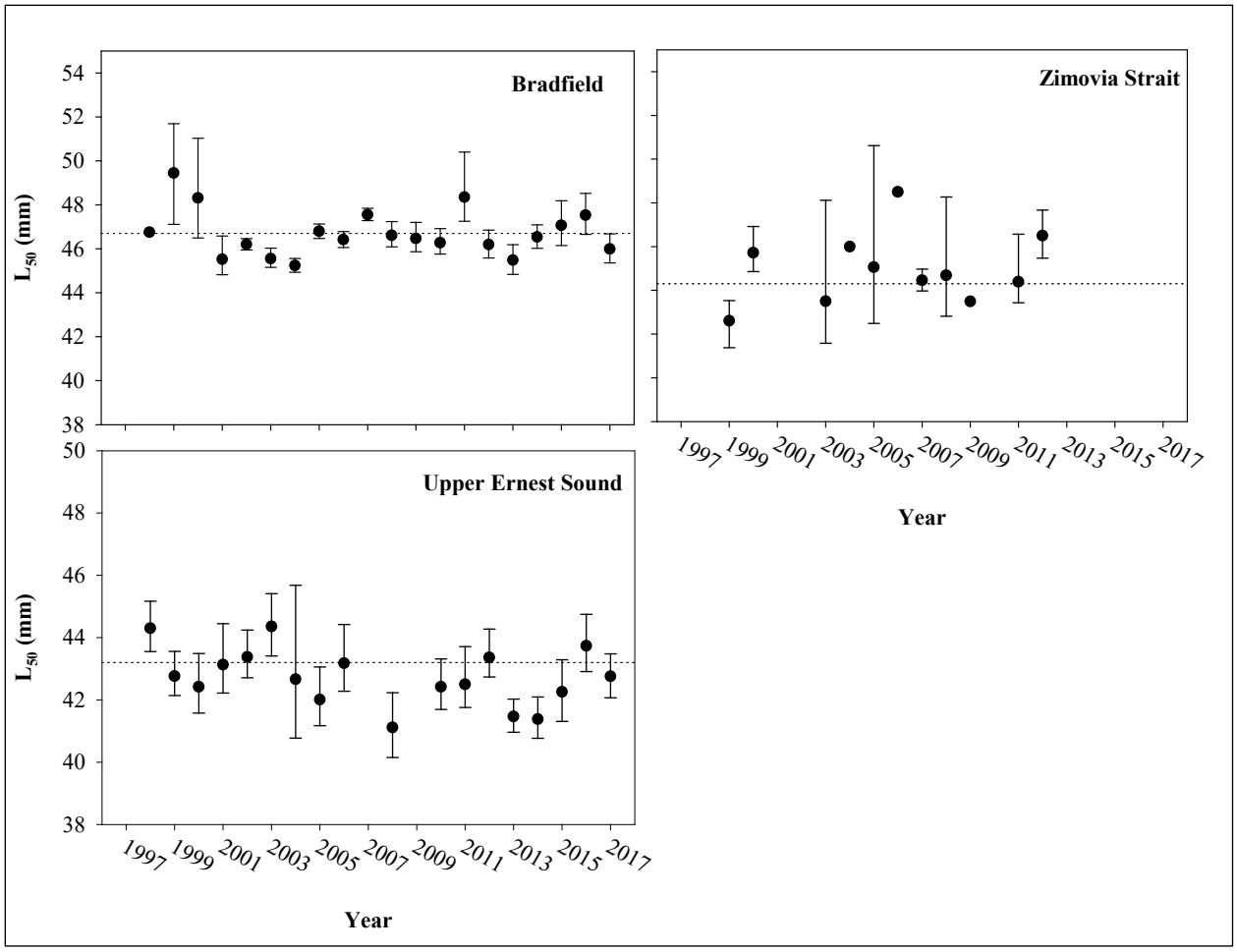

Figure 33.–L_{50} and 95% confidence intervals of spot shrimp from floating processor, on-the-grounds and dockside sampling in District 7, 1997/98–2017/18 seasons. Dotted line represents the long-term baseline. Only areas with baselines or 2017/18 season data are shown.

Sumner Strait

The Sumner Strait management area was created by the Board of Fisheries at the 2018 meeting in Sitka. It is made up of Sections 6A and 8B and was established with an upper end GHR of 25,000 lb. Sumner Strait is divided into three analysis areas: Eastern Sumner, Western Sumner, and Stikine Strait/Chichagof Pass (Table 2). Over the past 10 years harvest has averaged 9,844 lb (Table 20).

Areawide commercial CPUE has increased for the fourth season and is now the highest since standardization was possible (Figure 34). Standardized commercial CPUE increased in all analysis areas and is above baseline in Eastern and Western Sumner and at baseline in Stikine Strait. The four-year analysis shows significant increases in Eastern Sumner and Stikine Strait (Table 21, Figure 35).

Logbook data showed a 46% (moderate) harvest rate of large class shrimp in Western Sumner (Table 21).

There has been no on-the-grounds sampling conducted in the area since 2013 (Figures 36 and 37)

Manager scores were positive in Western Sumner and Stikine Strait, and neutral in Eastern Sumner.

The overall score is 0.74 (above average) and has a 0.22 (low) level of confidence (Table 21).

Table 20.–Sumner Strait matrix, Part A. A 15-season history, including stock assessment recommendations, for the pot shrimp fishery in Southeast Alaska.

Season	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Upper regulatory GHR	NA–Combination of 2 former GHRs							
Actual GHL (lb spot shrimp)	NA–Combination of 2 former GHLs							
Recommended GHL or stock status	NA–Combination of 2 former Districts							
Season length (days)	NA–Combination of 2 former Districts							
Landings (number)	92	109	103	133	109	56	81	75
Harvest (lb spot shrimp)	22,445	19,705	21,937	26,579	19,397	9,587	13,389	9,681

Season	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Upper regulatory GHR	NA–Combination of 2 former GHRs						
Actual GHL (lb spot shrimp)	NA–Combination of 2 former GHLs						
Recommended GHL or stock status	NA–Combination of 2 former Districts						
Season length (days)	NA–Combination of 2 former Districts						
Landings (number)	53	43	40	23	35	34	29
Harvest (lb spot shrimp)	12,302	9,678	6,279	3,707	9,301	12,388	12,132

Note: NA = not applicable.

Table 21.–Sumner Strait matrix, Part B. Baselines, current season values, and scores for each stock status parameter and analysis area for the pot shrimp fishery in Southeast Alaska. Data sources are from ADF&G shrimp survey, fish tickets ("fish tix"), logbooks, and on-the-grounds (OTG) and dockside (DS) sampling of commercial catch. Data are divided by type: CPUE, harvest rate, mean carapace length (CL), and L_{50}. Score for each analysis area is the sum of all individual scores.

Analysis Area		Eastern Sumner			Western Sumner			Stikine Strait/Chichagof Pass			
Area weighting			0.49			0.2			0.31		
Stock Status Parameters	Source	Baseline	Value	Score	Baseline	Value	Score	Baseline	Value	Score	Total Score
Catch rate ≥XL	survey	–	–	–	–	–	–	–	–	–	–
4-yr trend in catch rate	survey	–	–	–	–	–	–	–	–	–	–
Std. Comm. CPUE	fish tix	2.7	3.8	1.00	3.0	*	1.00	2.3	*	0.00	0.23
4-yr trend in CPUE	fish tix	–	Sig. inc.	0.25	–	–	–	–	Sig. inc.	0.25	0.17
Catch rate ≥XL	logbook	–	–	–	–	–	–	–	–	–	–
Harvest rate ≥XL (2015)	logbook	–	35%	–	–	–	–	–	–	–	–
Harvest rate ≥XL (2016)	logbook	–	–	–	–	43%	–	–	–	–	–
Harvest rate ≥XL (2017)	logbook	–	–	–	–	46%	0.00	–	–	–	0.00
Mean CL	survey	–	–	–	–	–	–	–	–	–	–
4-yr trend in CL	survey	–	–	–	–	–	–	–	–	–	–
Mean CL	OTG	–	–	–	–	–	–	–	–	–	–
4-yr trend in CL	OTG	–	–	–	–	–	–	–	–	–	–
Mean CL	DS	–	–	–	–	–	–	–	–	–	–
4-yr trend in CL	DS	–	–	–	–	–	–	–	–	–	–
L_{50}	survey	–	–	–	–	–	–	–	–	–	–
L_{50}	OTG/DS	–	–	–	–	–	–	–	–	–	–
Manager score	–	–	–	0.00	–	–	1.00	–	–	1.00	0.34
Score	–	–	–	1.25	–	–	2.00	–	–	1.25	0.74
Max. possible score	–	–	–	2.25	–	–	3.00	–	–	2.25	2.17
Stock Status	–	–	–	–	–	–	–	–	–	–	Above average
Confidence	–	–	–	0.18	–	–	0.18	–	–	0.18	0.18

Note: * indicates confidential data with less than three permits participating. En dashes = not available, NA = not applicable, *Sig. inc.* = significant increase, *Sig. dec.* = significant decrease, ≥XL = ≥40 mm CL.

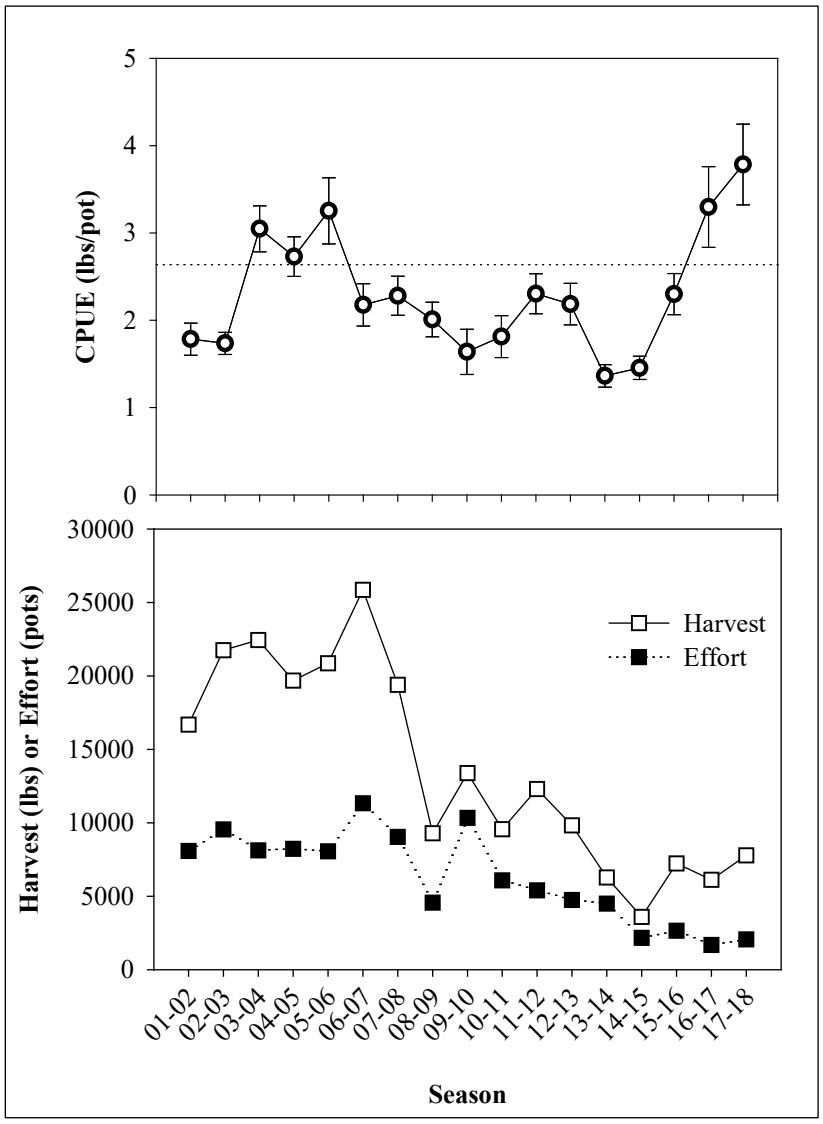

Figure 34.–Areawide CPUE and effort data for Sumner Strait, 2001/02–2017/18 seasons. CPUE is weighted by analysis area weights to allow for an overall impression of fishery performance.

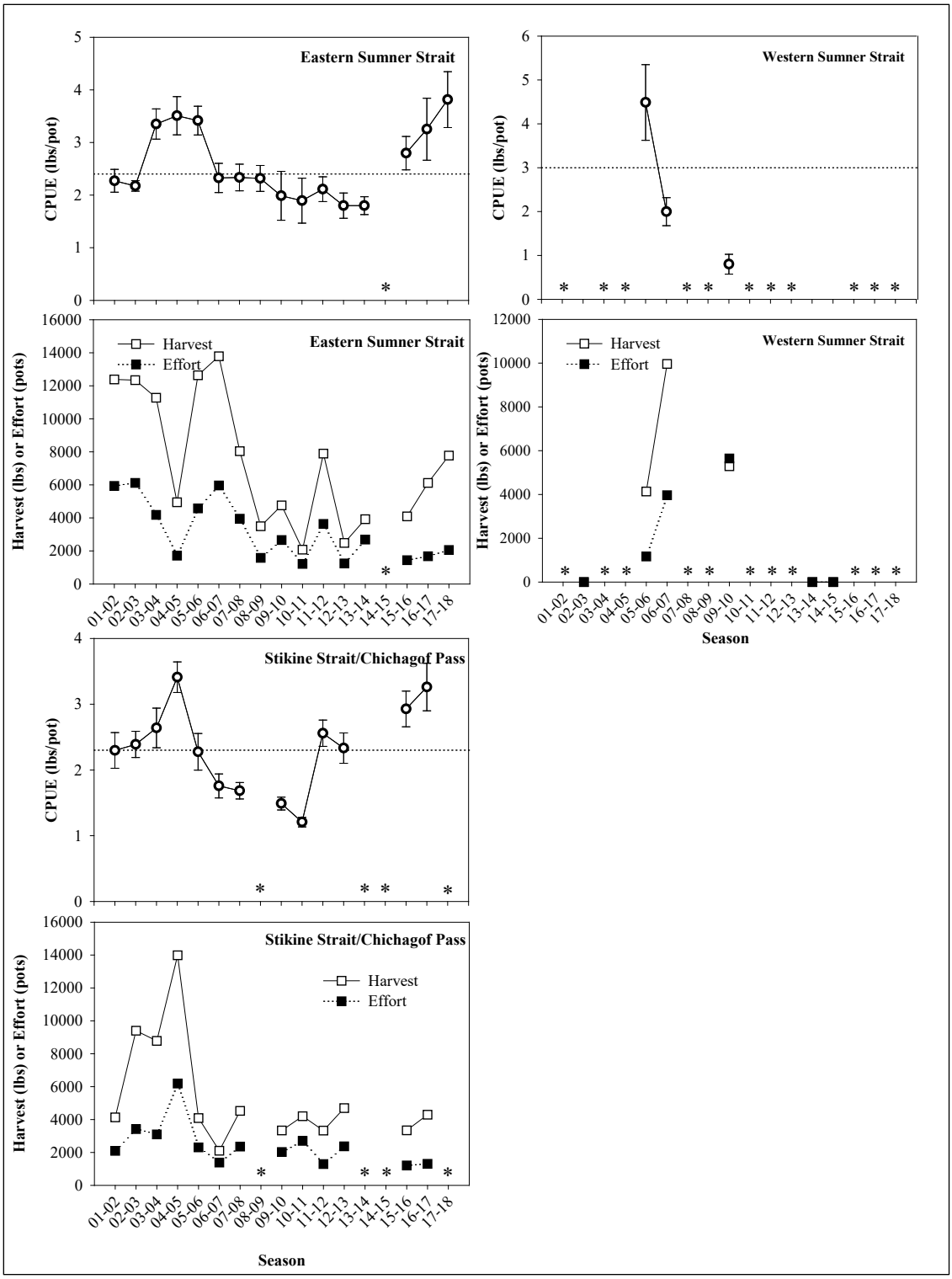

Figure 35.–Mean and standard error of spot shrimp catch rate from commercial harvest (dotted line represents the long-term baseline) and the commercial harvest and effort by analysis area in Sumner Strait, 2001/02–2017/18 seasons. Asterisks (*) indicate confidential data with less than three permits participating.

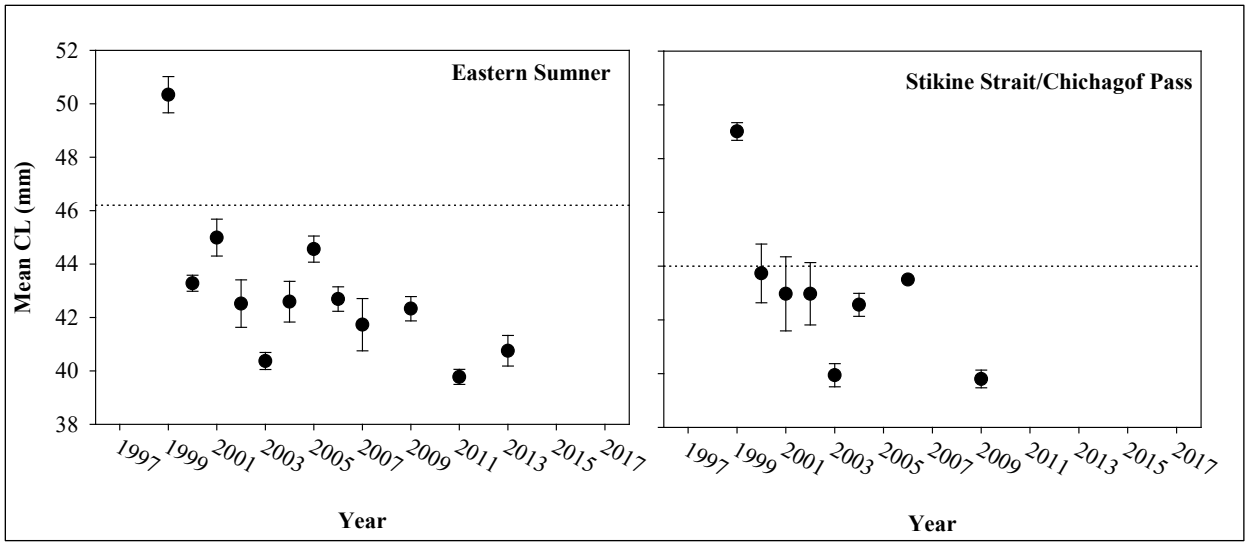

Figure 36.–Mean and standard error of spot shrimp carapace length from dockside and on-the-grounds sampling in Sumner Strait, 1997/98–2017/18 seasons. Dotted line represents the long-term baseline. Only areas with baselines or 2017/18 season data are shown.

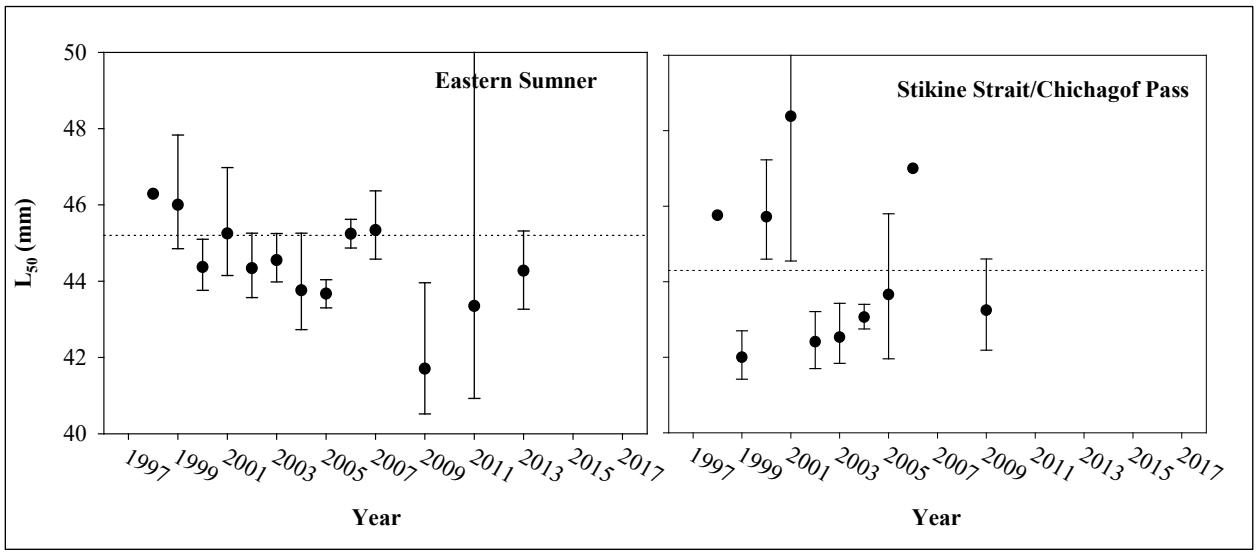

Figure 37.–L_{50} and 95% confidence intervals of spot shrimp from floating processor, on-the-grounds and dockside sampling in Sumner Strait, 1997/98–2017/18 seasons. Dotted line represents the long-term baseline. Only areas with baselines or 2017/18 season data are shown.

Southern Frederick Sound

The Southern Frederick Sound management area was created by the Board of Fisheries at the 2018 meeting in Sitka. It is made up of Sections 8A and 10C and was established with an upper end GHR of 20,000 lb. Southern Frederick Sound is divided into two analysis areas: Frederick Sound and Farragut Bay (Table 2). Over the past 10 years harvest has averaged 9,525 lb (Table 22).

Areawide CPUE increased strongly for the second year in a row and is now at the second highest level since standardization was possible (Figure 38). Analysis area standardized CPUE increased in both areas. It is at over twice the baseline level in Frederick Sound and increasing in the four-year analysis. Farragut Bay CPUE is the highest in the past 6 seasons and is at baseline (Table 23, Figure 39); however, data is confidential due to fewer than three participants.

No logbook data were available (Table 23).

There has been no on-the-grounds sampling conducted in the area since 2013 (Figures 40 and 41)

Manager scores are positive in both areas (Table 23).

The overall score is 0.88 (good) with a 0.20 (very low) level of data confidence (Table 23).

Table 22.–Southern Frederick Sound matrix, Part A. A 15-season history, including stock assessment recommendations, for the pot shrimp fishery in Southeast Alaska.

Season	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Upper regulatory GHR	NA–Combination of 2 former GHRs							
Actual GHL (lb spot shrimp)	NA–Combination of 2 former GHLs							
Recommended GHL or stock status	NA–Combination of 2 former Districts							
Season length (days)	NA–Combination of 2 former Districts							
Landings (number)	10	5	25	20	27	10	59	47
Harvest (lb spot shrimp)	4,794	6,234	14,668	10,174	7,910	6,674	18,354	16,776

Season	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Upper regulatory GHR	NA–Combination of 2 former GHRs						
Actual GHL (lb spot shrimp)	NA–Combination of 2 former GHLs						
Recommended GHL or stock status	NA–Combination of 2 former Districts						
Season length (days)	NA–Combination of 2 former Districts						
Landings (number)	11	26	19	30	15	10	10
Harvest (lb spot shrimp)	8,512	9,311	9,351	9,434	3,740	4,172	8,924

Note: NA = not applicable.

Table 23.–Southern Frederick Sound matrix, Part B. Baselines, current season values, and scores for each stock status parameter and analysis area for the pot shrimp fishery in Southeast Alaska. Data sources are from ADF&G shrimp survey, fish tickets ("fish tix"), logbooks, and on-the-grounds (OTG) and dockside (DS) sampling of commercial catch. Data are divided by type: CPUE, harvest rate, mean carapace length (CL), and L50. Score for each analysis area is the sum of all individual scores.

Analysis Area		Frederick Sound			Farragut Bay			
Area weighting			0.43			0.57		
Stock Status Parameters	Source	Baseline	Value	Score	Baseline	Value	Score	Total Score
Catch rate ≥XL	survey	–	–	–	–	–	–	–
4-yr trend in catch rate	survey	–	–	–	–	–	–	–
Std. Comm. CPUE	fish tix	2.6	*	1.00	4.4	*	0.00	0.14
4-yr trend in CPUE	fish tix	–	Sig. inc.	0.25	–	No trend	0.00	0.07
Catch rate ≥XL	logbook	–	–	–	–	–	–	–
Harvest rate ≥XL (2015)	logbook	–	–	–	–	13%	–	–
Harvest rate ≥XL (2016)	logbook	–	–	–	–	–	–	–
Harvest rate ≥XL (2017)	logbook	–	–	–	–	–	–	–
Mean CL	survey	–	–	–	–	–	–	–
4-yr trend in CL	survey	–	–	–	–	–	–	–
Mean CL	OTG	–	–	–	39.4	–	–	–
4-yr trend in CL	OTG	–	–	–	–	–	–	–
Mean CL	DS	–	–	–	–	–	–	–
4-yr trend in CL	DS	–	–	–	–	–	–	–
L_{50}	survey	–	–	–	–	–	–	–
L_{50}	OTG/DS	–	–	–	40.5	–	–	–
Manager score	–	–	–	1.00	–	–	1.00	0.67
Score	–	–	–	2.25	–	–	1.00	0.88
Max. possible score	–	–	–	2.25	–	–	2.25	1.17
Stock Status	–	–	–	–	–	–	–	Good
Confidence	–	–	–	0.18	–	–	0.18	0.20

Note: * indicates confidential data with less than three permits participating. En dashes = not available, NA = not applicable, *Sig. inc.* = significant increase, *Sig. dec.* = significant decrease, ≥XL = ≥40 mm CL.

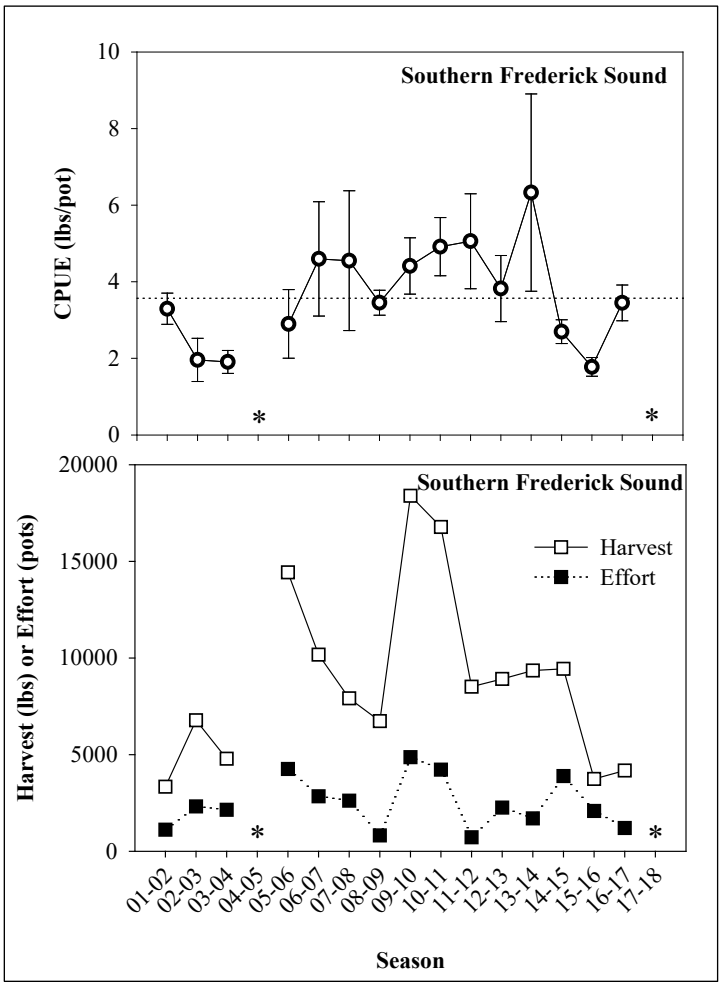

Figure 38.–Areawide CPUE and effort data for Southern Frederick Sound, 2001/02–2017/18 seasons. CPUE is weighted by analysis area weights to allow for an overall impression of fishery performance. Asterisks (*) indicate confidential data with less than three permits participating.

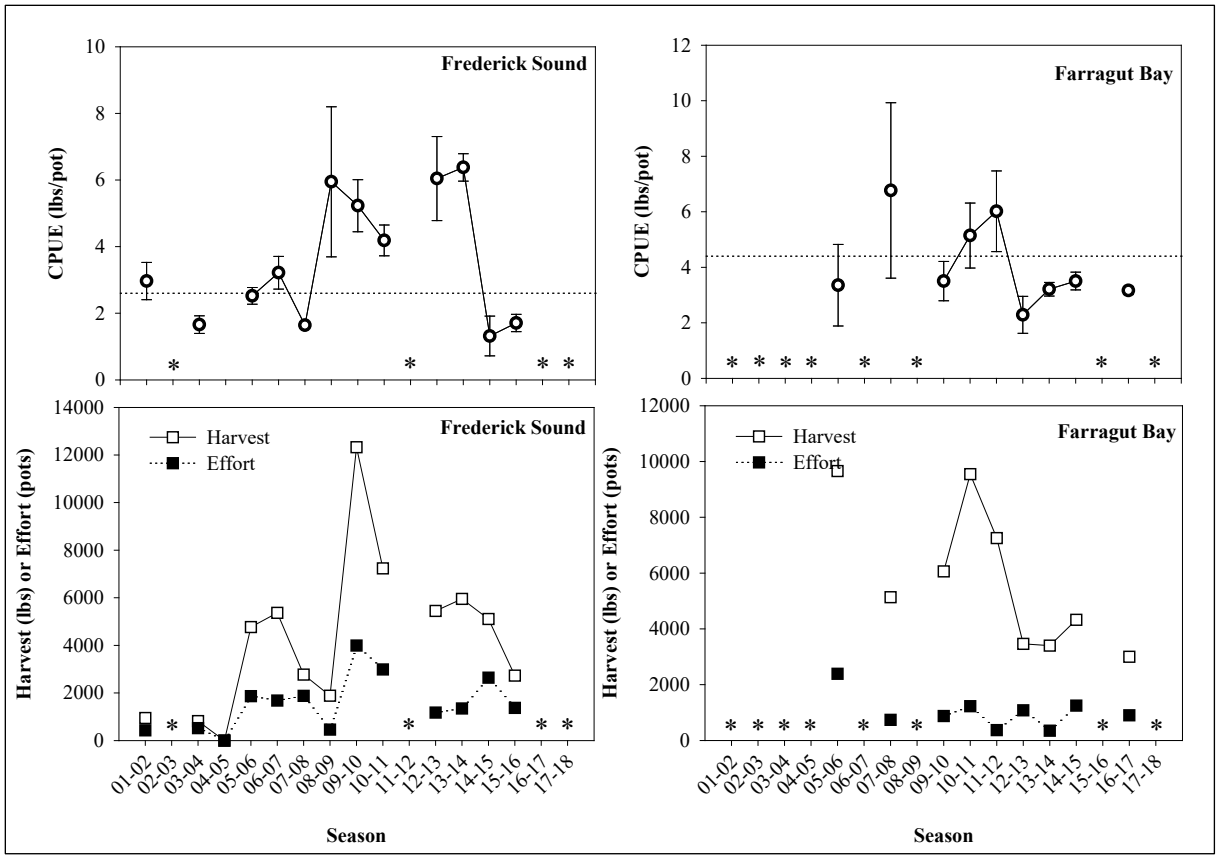

Figure 39.–Mean and standard error of spot shrimp catch rate from commercial harvest (dotted line represents the long-term baseline) and the commercial harvest and effort by analysis area in Southern Frederick Sound, 2001/02–2017/18 seasons. Asterisks (*) indicate confidential data with less than three permits participating.

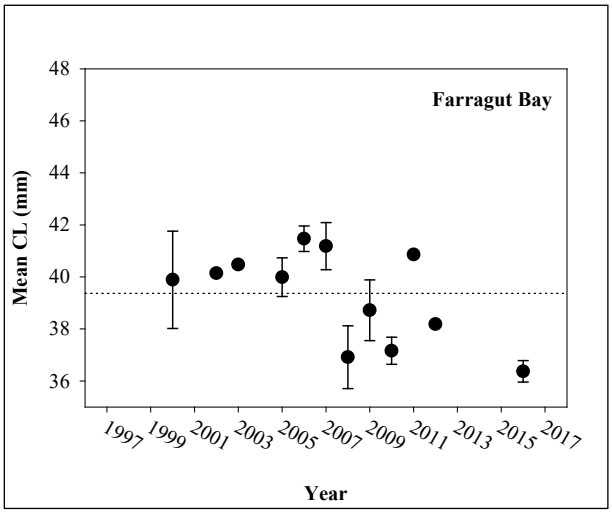

Figure 40.–Mean and standard error of spot shrimp carapace length from floating processor and on-the-grounds sampling in Southern Frederick Sound, 1997/98–2017/18 seasons. Dotted line represents the long-term baseline. Only areas with baselines or 2017/18 season data are shown.

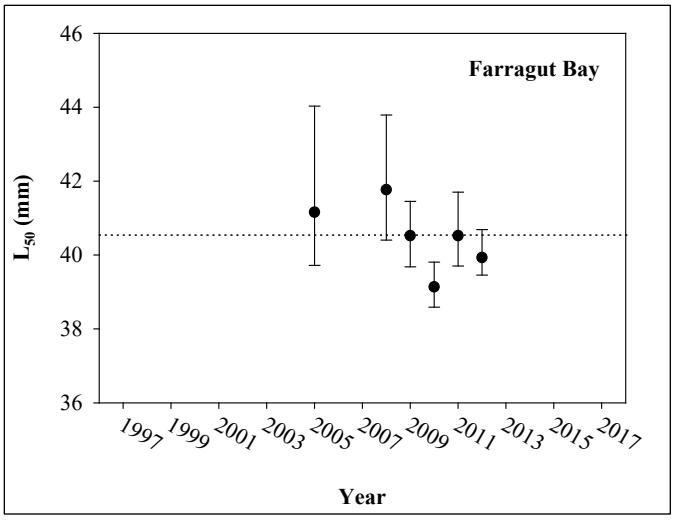

Figure 41.–L_{50} and 95% confidence intervals of spot shrimp from floating processor, on-the-grounds and dockside sampling in Southern Frederick Sound, 1997/98–2017/18 seasons. Dotted line represents the long-term baseline. Only areas with baselines or 2017/18 season data are shown.

Northern Frederick Sound

The Northern Frederick Sound management area was created by the Board of Fisheries at the 2018 meeting in Sitka. It is made up of Sections 10A and 10B and was established with an upper end GHR of 50,000 lb. Northern Frederick Sound is divided into three analysis areas: Hobart/Windham, Port Houghton, and SE Admiralty (Table 2). Over the past 10 years harvest has averaged 39,900 lb (Table 24).

Areawide standardized CPUE increased strongly from a five-year low period and is now at baseline (Figure 42). Analysis area level standardized CPUE increased in all areas. Port Houghton is now above baseline, Hobart/Windham is at baseline, and SE Admiralty remains below baseline. Port Houghton and Hobart/Windham also show significant increases in the four-year analysis (Table 25, Figure 43).

Logbook data showed a 58% (excessive) harvest rate of ≥XL class shrimp in the Port Houghton analysis area, up from 38% (low) in the 2016/17 season (Table 25).

On-the-grounds mean CL remains below the long-term baseline with a declining four-year trend in Hobart/Windham and is below the baseline in Port Houghton with an increasing four-year trend (Table 25, Figure 44).

The L_{50} increased in both Port Houghton and Hobart/Windham. It is now at baseline in Port Houghton but remains below baseline in Hobart/Windham (Table 25, Figure 45).

Manager scores are positive in Hobart/Windham and neutral in all other areas (Table 25).

The overall score is -0.31 (moderate) with a 0.42 (moderate) level of data confidence (Table 25).

Table 24.–Northern Frederick Sound matrix, Part A. A 15-season history, including stock assessment recommendations, for the pot shrimp fishery in Southeast Alaska.

Season	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Upper regulatory GHR	NA–Former GHR for All of District 10							
Actual GHL (lb spot shrimp)	NA–Former GHL for All of District 10							
Recommended GHL or stock status	NA–Former Stock Status for All of District 10							
Season length (days)	12	11	8	8	9	16	9	8
Landings (number)	99	73	59	66	57	79	67	52
Harvest (lb spot shrimp)	58,027	45,358	43,634	46,824	39,097	50,811	47,483	47,204

Season	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Upper regulatory GHR	NA–Former GHR for All of District 10						
Actual GHL (lb spot shrimp)	NA–Former GHL for All of District 10						
Recommended GHL or stock status	NA–Former Stock Status for All of District 10						
Season length (days)	7	9	10	14	16	14	9
Landings (number)	69	64	58	60	63	62	56
Harvest (lb spot shrimp)	45,402	36,458	32,198	31,408	32,693	35,067	40,365

Note: NA = not applicable.

Table 25.–Northern Frederick Sound matrix, Part B. Baselines, current season values, and scores for each stock status parameter and analysis area for the pot shrimp fishery in Southeast Alaska. Data sources are from ADF&G shrimp survey, fish tickets ("fish tix"), logbooks, and on-the-grounds (OTG) and dockside (DS) sampling of commercial catch. Data are divided by type: CPUE, harvest rate, mean carapace length (CL), and L_{50}. Score for each analysis area is the sum of all individual scores.

Analysis Area		Hobart/Windham			Port Houghton			SE Admiralty			
Area weighting			0.44			0.41			0.15		
Stock Status Parameters	Source	Baseline	Value	Score	Baseline	Value	Score	Baseline	Value	Score	Total Score
Catch rate ≥XL	survey	–	–	–	–	–	–	–	–	–	–
4-yr trend in catch rate	survey	–	–	–	–	–	–	–	–	–	–
Std. Comm. CPUE	fish tix	4.8	5.0	0.00	5.7	*	1.00	6.9	4.8	-1.00	0.09
4-yr trend in CPUE	fish tix	–	Sig. inc.	0.25	–	Sig. inc.	0.25	–	No trend	0.00	0.14
Catch rate ≥XL	logbook	–	–	–	–	Sig. inc.	1.00	–	–	–	–
Harvest rate ≥XL (2015)	logbook	–	–	–	–	45%	–	–	–	–	–
Harvest rate ≥XL (2016)	logbook	–	–	–	–	38%	–	–	–	–	–
Harvest rate ≥XL (2017)	logbook	–	–	–	–	58%	-1.00	–	–	–	-1.00
Mean CL	survey	–	–	–	–	–	–	–	–	–	–
4-yr trend in CL	survey	–	–	–	–	–	–	–	–	–	–
Mean CL	OTG	40.7	39.3	-1.00	40.6	39.5	-1.00	37.6	–	–	-0.67
4-yr trend in CL	OTG	–	Sig. dec.	-0.25	–	Sig. inc.	0.25	–	–	–	-0.01
Mean CL	DS	–	–	–	–	–	–	–	–	–	–
4-yr trend in CL	DS	–	–	–	–	–	–	–	–	–	–
L_{50}	survey	–	–	–	–	–	–	–	–	–	–
L_{50}	OTG/DS	41.3	40.6	0.00	41.5	40.7	-1.00	39.9	–	–	-0.16
Manager score	–	–	–	1.00	–	–	0.00	–	–	0.00	0.29
Score	–	–	–	0.00	–	–	-0.50	–	–	-1.00	-0.31
Max. possible score	–	–	–	4.50	–	–	6.50	–	–	2.25	4.42
Stock Status	–	–	–	–	–	–	–	–	–	–	Moderate
Confidence	–	–	–	0.35	–	–	0.47	–	–	0.18	0.42

Note: * indicates confidential data with less than three permits participating. En dashes = not available, NA = not applicable, *Sig. inc.* = significant increase, *Sig. dec.* = significant decrease, ≥XL = ≥40 mm CL.

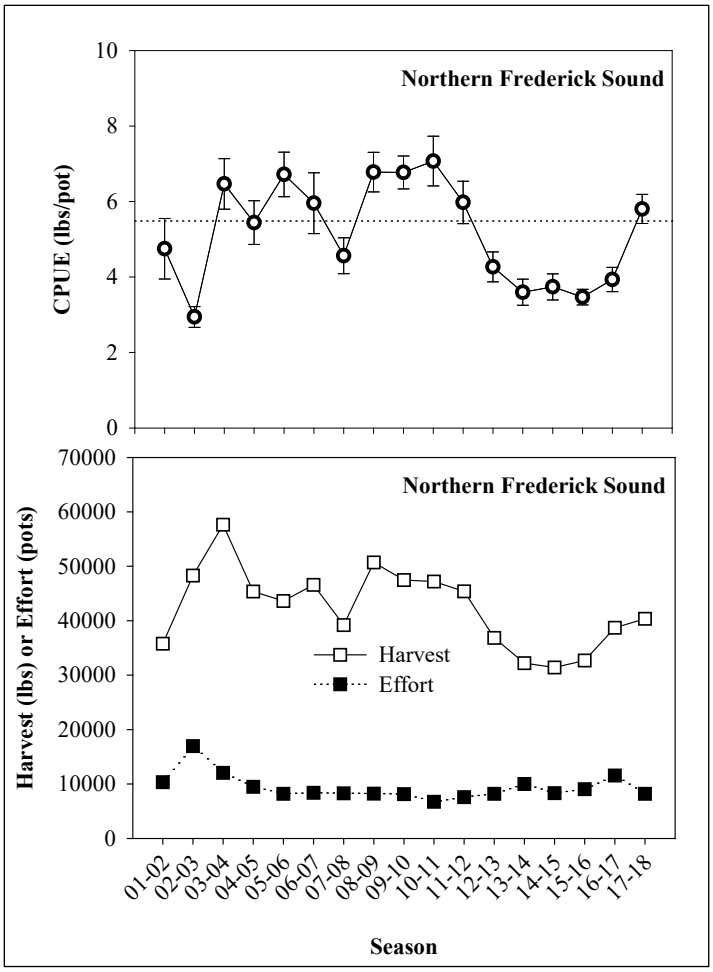

Figure 42.–Areawide CPUE and effort data for Northern Frederick Sound, 2001/02–2017/18 seasons. CPUE is weighted by analysis area weights to allow for an overall impression of fishery performance.

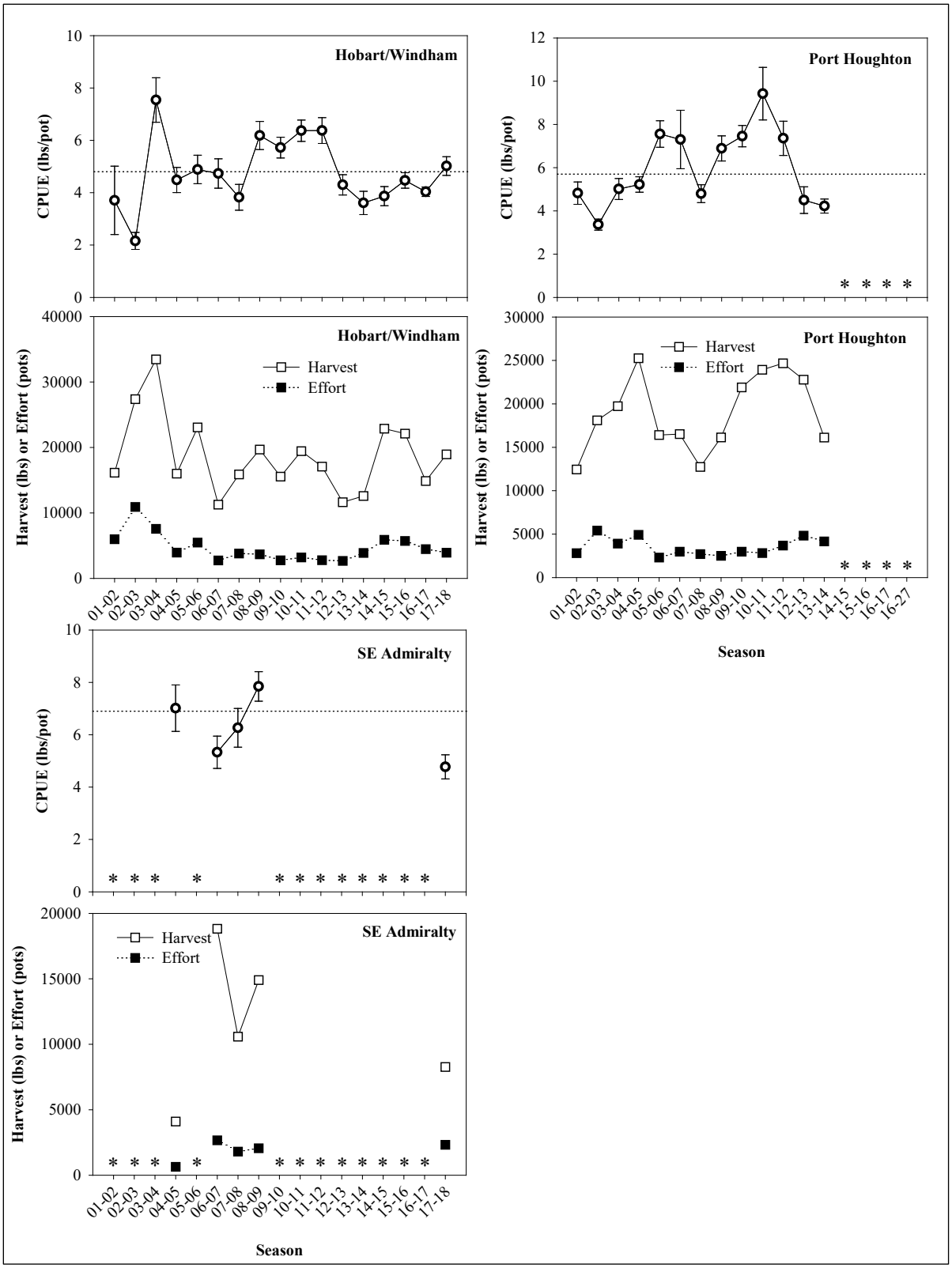

Figure 43.–Mean and standard error of spot shrimp catch rate from commercial harvest (dotted line represents the long-term baseline) and the commercial harvest and effort by analysis area in District 10, 2001/02–2017/18 seasons. Asterisks (*) indicate confidential data with less than three permits participating.

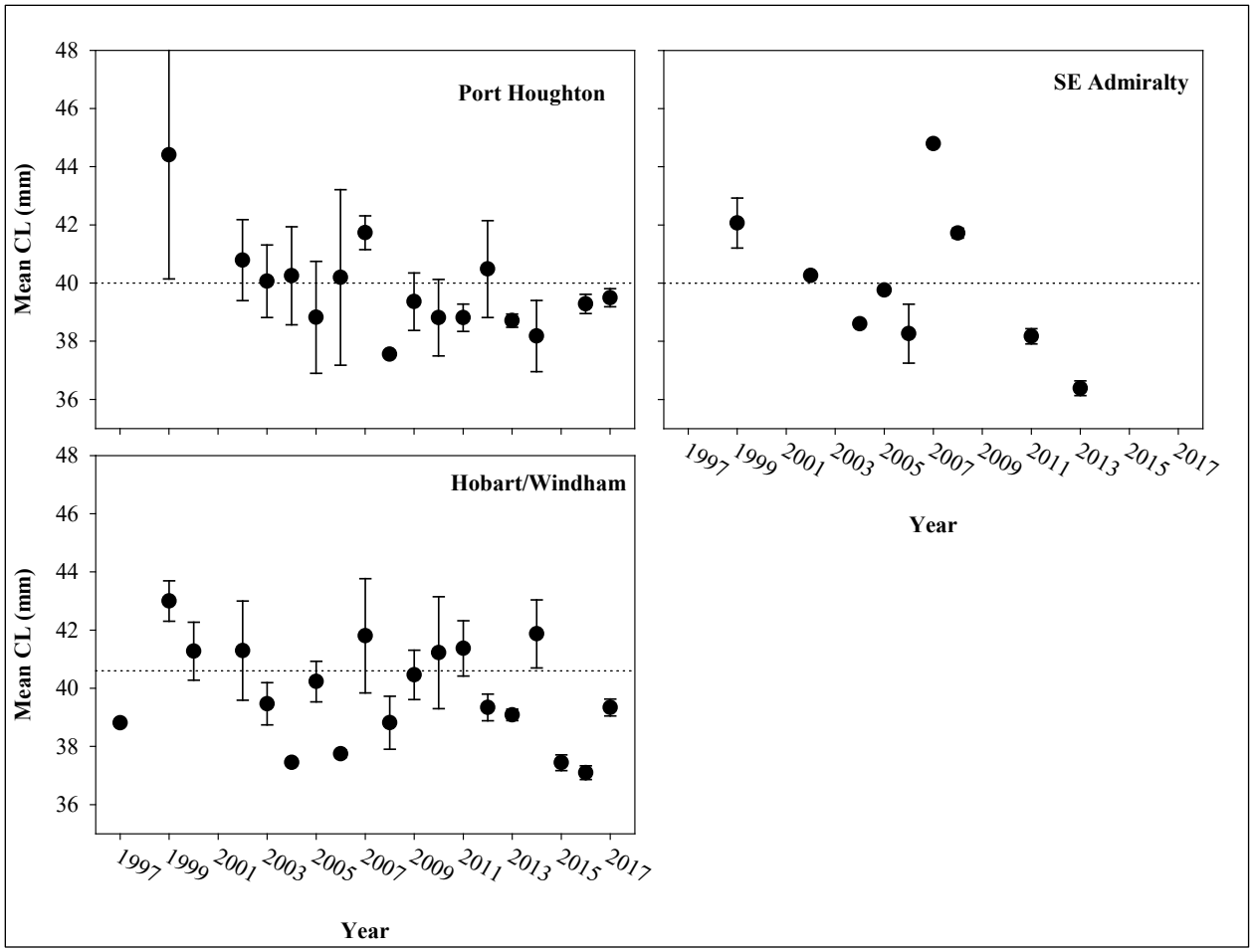

Figure 44.–Mean and standard error of spot shrimp carapace length from floating processor and on-the-grounds sampling in Northern Frederick Sound, 1997/98–2017/18 seasons. Dotted line represents the long-term baseline. Only areas with baselines or 2017/18 season data are shown.

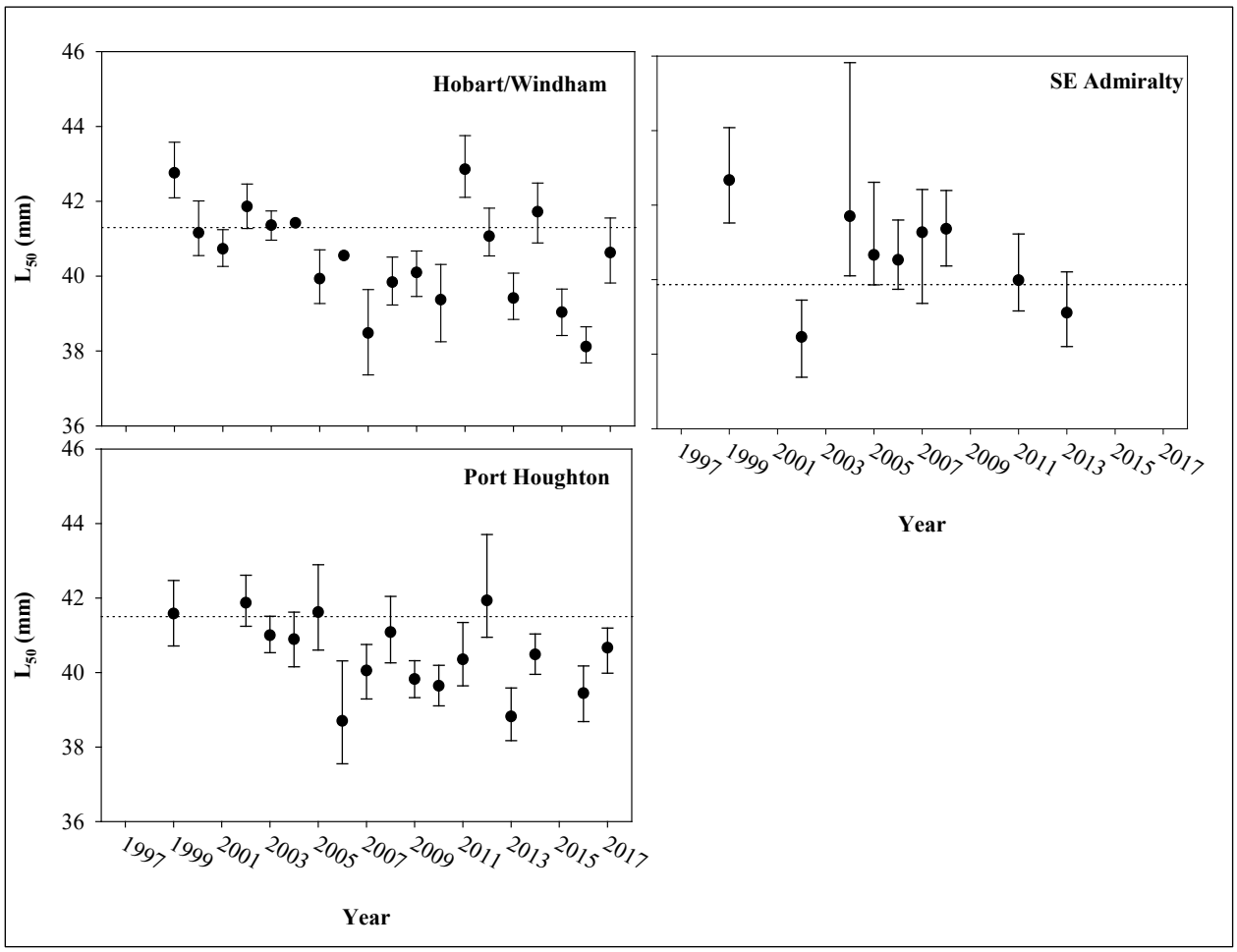

Figure 45.–L_{50} and 95% confidence intervals of spot shrimp from floating processor, on-the-grounds and dockside sampling in Northern Frederick Sound, 1997/98–2017/18 seasons. Dotted line represents the long-term baseline. Only areas with baselines or 2017/18 season data are shown.

SITKA MANAGEMENT AREA

District 9

The GHL in District 9 has changed three times since the 1998/99 season. It was increased 20% from 15,000 to 18,000 lb in the 2000/01 fishing season, where it remained until the 2011/12 season when it was reduced 29% to 14,000 lb. It was further reduced by 20% to 11,000 lb prior to the 2015/16 season due to continued declining standardized CPUE. Over the last ten years, harvest has averaged 15,450 lb (108% of the GHL) (Table 26). District 9 is divided into four analysis areas: Eliza Harbor, Keku Strait/Port Camden, SE Baranof Island, and Western Kuiu Island (Table 2). The analysis area composition of the harvest is variable, but most harvest comes from Eliza Harbor and SE Baranof Island. There were no landings from Keku Strait or Western Kuiu Island during the 2011/12 to 2017/18 fishing seasons.

The only data available for this district are standardized commercial CPUE. Overall district CPUE declined again in the 2017/18. District CPUE has been below baseline for 11consecutive seasons (Figure 46). Area CPUE is below baseline in all fished analysis areas, with no four-year trends. (Table 27, Figure 47).

There was no 2017/18 season logbook, dockside, or OTG data collected in this district.

Manager scores for this district were negative in SE Baranof Island and neutral in all other areas.

The overall matrix score is -0.70 (poor), the same as in 2016/17, because standardized CPUE remains below baseline. District 9 has a 0.19 (very low) level of data confidence.

Table 26.–District 9 matrix, Part A. A 15-season history, including stock assessment recommendations, for the pot shrimp fishery in Southeast Alaska.

Season	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Upper regulatory GHR	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000
Actual GHL (lb spot shrimp)	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000
Recommended GHL or stock status		Moderate		18,000	Moderate	Moderate	Below Average	Below Average
Season length (days)	24	30	19	16	14	12	24	49
Landings (number)	53	45	40	32	27	36	37	45
Harvest (lb spot shrimp)	17,904	17,911	20,252	24,113	17,336	17,139	18,960	21,893

Season	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Upper regulatory GHR	18,000	18,000	18,000	18,000	18,000	18,000	18,000
Actual GHL (lb spot shrimp)	14,000	14,000	14,000	14,000	11,000	11,000	11,000
Recommended GHL or stock status	Moderate	Below Average	Below Average	Poor	Below Average	Poor	Poor
Season length (days)	10	11	11	10	8	8	9
Landings (number)	13	35	38	40	28	19	21
Harvest (lb spot shrimp)	10,799	16,184	15,243	18,495	12,213	12,757	10,809

Table 27.–District 9 matrix, Part B. Baselines, current season values, and scores for each stock status parameter and analysis area for the pot shrimp fishery in Southeast Alaska. Data sources are from ADF&G shrimp survey, fish tickets ("fish tix"), logbooks, and on-the-grounds (OTG) and dockside (DS) sampling of commercial catch. Data are divided by type: CPUE, harvest rate, mean carapace length (CL), and L_{50}. Score for each analysis area is the sum of all individual scores.

Analysis Area		Eliza Harbor			Keku Strait/Port Camden		
Area weighting			0.4			0.025	
Stock Status Parameters	Source	Baseline	Value	Score	Baseline	Value	Score
Catch rate ≥XL	survey	–	–	–	–	–	–
4-yr trend in catch rate	survey	–	–	–	–	–	–
Std. Comm. CPUE	fish tix	5.7	*	-1.00	–	No effort	–
4-yr trend in CPUE	fish tix	–	No trend	0.00	–	–	–
Catch rate ≥XL	logbook	–	–	–	–	–	–
Harvest rate ≥XL (2015)	logbook	–	–	–	–	–	–
Harvest rate ≥XL (2016)	logbook	–	–	–	–	–	–
Harvest rate ≥XL (2017)	logbook	–	–	–	–	–	–
Mean CL	survey	–	–	–	–	–	–
4-yr trend in CL	survey	–	–	–	–	–	–
Mean CL	OTG	–	–	–	–	–	–
4-yr trend in CL	OTG	–	–	–	–	–	–
Mean CL	DS	–	–	–	–	–	–
4-yr trend in CL	DS	–	–	–	–	–	–
L_{50}	survey	–	–	–	–	–	–
L_{50}	OTG/DS	–	–	–	–	–	–
Manager score		–	–	0.00	–	–	0.00
Score		–	–	-1.00	–	–	0.00
Max. possible score		–	–	2.25	–	–	1.00
Stock Status		–	–	–	–	–	–
Confidence		–	–	0.18	–	–	0.06

-continued-

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Analysis Area		SE Baranof			Western Kuiu			
Area weighting			0.55			0.025		
Stock Status Parameters	Source	Baseline	Value	Score	Baseline	Value	Score	Total Score
Catch rate ≥XL	survey	–	–	–	–	–	–	–
4-yr trend in catch rate	survey	–	–	–	–	–	–	–
Std. Comm. CPUE	fish tix	4.1	*	-1.00	–	No effort	–	-0.33
4-yr trend in CPUE	fish tix	–	No trend	0.00	–	–	–	0.00
Catch rate ≥XL	logbook	–	–	–	–	–	–	–
Harvest rate ≥XL (2015)	logbook	–	–	–	–	–	–	–
Harvest rate ≥XL (2016)	logbook	–	–	–	–	–	–	–
Harvest rate ≥XL (2017)	logbook	–	–	–	–	–	–	–
Mean CL	survey	–	–	–	–	–	–	–
4-yr trend in CL	survey	–	–	–	–	–	–	–
Mean CL	OTG	–	–	–	–	–	–	–
4-yr trend in CL	OTG	–	–	–	–	–	–	–
Mean CL	DS	–	–	–	–	–	–	–
4-yr trend in CL	DS	–	–	–	–	–	–	–
L_{50}	survey	–	–	–	–	–	–	–
L_{50}	OTG/DS	–	–	–	–	–	–	–
Manager score		–	–	-1.00	–	–	0.00	-0.37
Score		–	–	-2.00	–	–	0.00	-0.70
Max. possible score		–	–	2.25	–	–	1.00	1.17
Stock Status		–	–	–	–	–	–	Poor
Confidence		–	–	0.18	–	–	0.06	0.17

Note: * indicates confidential data with less than three permits participating. En dashes = not available, NA = not applicable, *Sig. inc.* = significant increase, *Sig. dec.* = significant decrease, ≥XL = ≥40 mm CL.

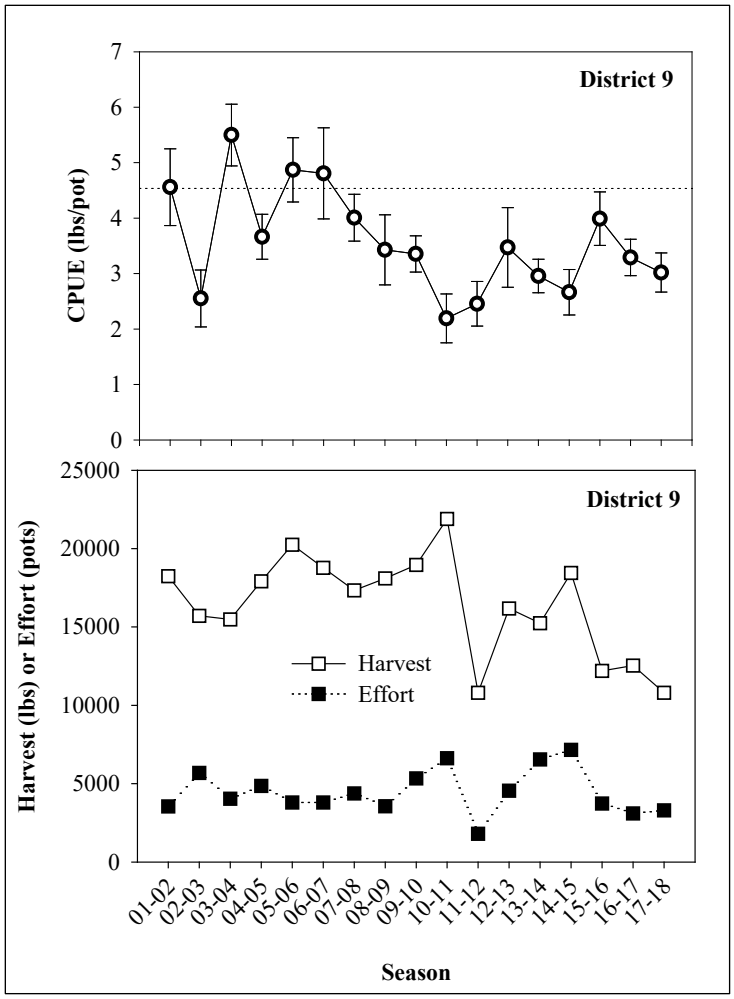

Figure 46.–Districtwide CPUE and effort data for District 9, 2001/02–2017/18 seasons. CPUE is weighted by analysis area weights to allow for an overall impression of fishery performance.

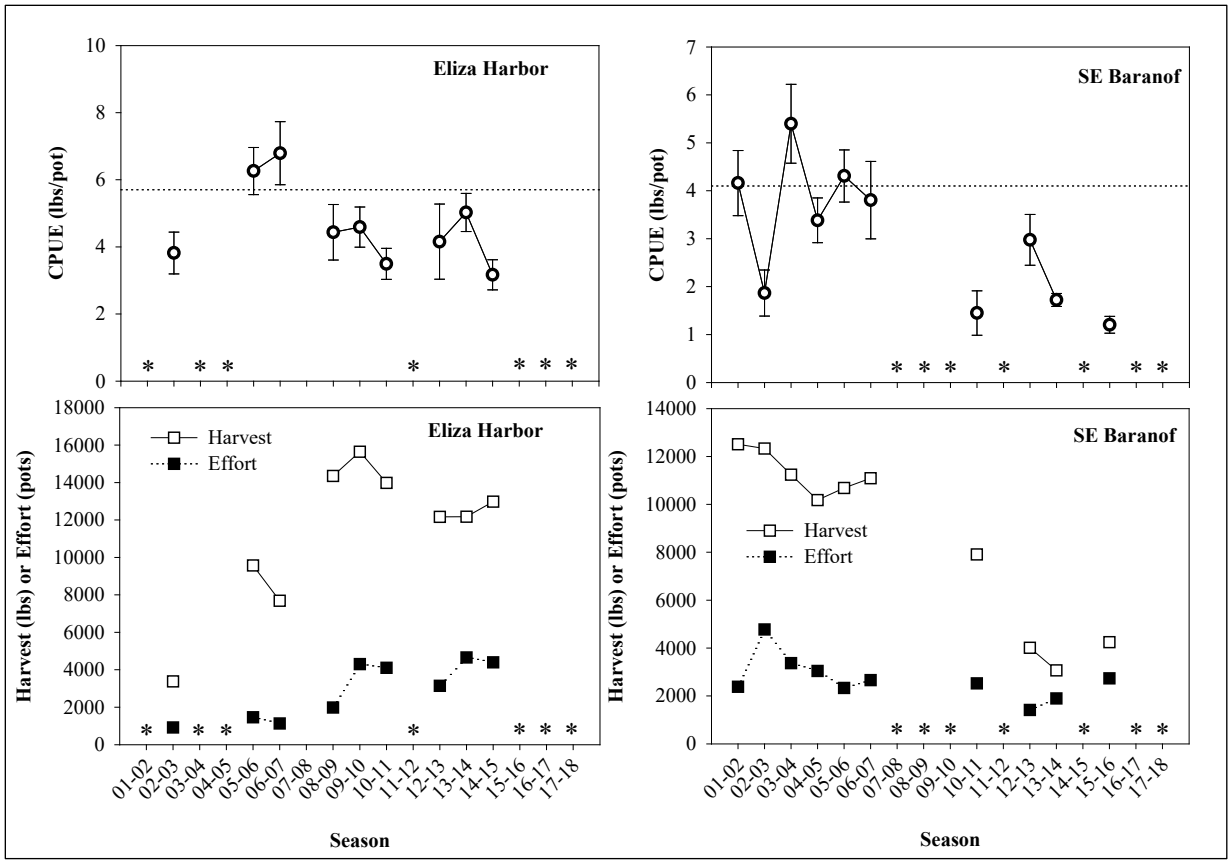

Figure 47.–Mean and standard error of spot shrimp catch rate from commercial harvest (dotted line represents the long-term baseline) and the commercial harvest and effort by analysis area in District 9, 2001/02–2017/18 seasons. Asterisks (*) indicate confidential data with less than three permits participating.

District 13

Sections 13-A/B

Sections 13-A/B were divided from Section 13-C with a GHL of 15,000 lb beginning with the 2000/01 season; prior to this, the GHL for all of District 13 was 40,000 lb. Over the past 10 seasons, harvest has averaged 15,100 lb (101% of the GHL; Table 28). This district is divided into four analysis areas: Crawfish Bay, Larch/Branch Bays, Necker Bay, and Whale Bay (Table).

Sectionwide standardized commercial CPUE increased from last season, continues to be above baseline, and is at the second highest level since standardization was possible (Figure 48). Analysis area–specific standardized commercial CPUE decreased slightly in Crawfish Bay but remains more than double the baseline. Whale Bay CPUE is at baseline (Table 29, Figure 49). Necker Bay had effort, but the pot lift data were too unreliable for CPUE calculation. No areas showed any significant four-year trends.

The manager scores are neutral for all areas (Table 29).

The overall matrix score is 0.25 (above average), which was up from -0.21 (moderate) in the 2016/17 season. The increase is due to standardized commercial CPUE in Crawfish Bay being above baseline and the loss of a negative manager score in Crawfish Bay. Section 13-A/B has a 0.16 (very low) data confidence.

Table 28.–Sections 13-A/B matrix, Part A. A 15-season history, including stock assessment recommendations, for the pot shrimp fishery in Southeast Alaska.

Season	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Upper regulatory GHR	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000
Actual GHL (lb spot shrimp)	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000
Recommended GHL or stock status	15,000	–	Moderate	15,000	Moderate	Moderate	Below	Moderate	Moderate
Season length (days)	152	152	30	17	14	120	151	151	64
Landings (number)	65	54	37	19	17	21	21	21	28
Harvest (lb spot shrimp)	13,606	18,306	13,194	16,819	11,606	11,902	9,301	11,193	15,345

Season	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Upper regulatory GHR	15,000	15,000	15,000	15,000	15,000	15,000
Actual GHL (lb spot shrimp)	15,000	15,000	15,000	15,000	15,000	15,000
Recommended GHL or stock status	Above Average	Below Average	Below Average	Below Average	Moderate	Above Average
Season length (days)	229	56	32	30	30	3
Landings (number)	21	48	49	43	43	15
Harvest (lb spot shrimp)	13,836	16,681	17,572	14,615	16,692	20,702

Note: En dash = not available.

Table 29.–Sections 13-A/B matrix, Part B. Baselines, current season values, and scores for each stock status parameter and analysis area for the pot shrimp fishery in Southeast Alaska. Data sources are from ADF&G shrimp survey, fish tickets ("fish tix"), logbooks, and on-the-grounds (OTG) and dockside (DS) sampling of commercial catch. Data are divided by type: CPUE, harvest rate, mean carapace length (CL), and L_{50}. Score for each analysis area is the sum of all individual scores.

Analysis Area		Crawfish Bay			Larch/Branch Bays		
Area weighting			0.3			0.0	
Stock Status Parameters	Source	Baseline	Value	Score	Baseline	Value	Score
Catch rate ≥XL	survey	–	–	–	–	–	–
4-yr trend in catch rate	survey	–	–	–	–	–	–
Std. Comm. CPUE	fish tix	2.1	5.0	1.00	–	No effort	–
4-yr trend in CPUE	fish tix	–	No trend	0.00	–	–	–
Catch rate ≥XL	logbook	–	–	–	–	–	–
Harvest rate ≥XL (2015)	logbook	–	–	–	–	–	–
Harvest rate ≥XL (2016)	logbook	–	–	–	–	–	–
Harvest rate ≥XL (2017)	logbook	–	–	–	–	–	–
Mean CL	survey	–	–	–	–	–	–
4-yr trend in CL	survey	–	–	–	–	–	–
Mean CL	OTG	–	–	–	–	–	–
4-yr trend in CL	OTG	–	–	–	–	–	–
Mean CL	DS	–	–	–	–	–	–
4-yr trend in CL	DS	–	–	–	–	–	–
L_{50}	survey	–	–	–	–	–	–
L_{50}	OTG/DS	–	–	–	–	–	–
Manager score	–	–	–	0.00	–	–	0.00
Score	–	–	–	1.00	–	–	0.00
Max. possible score	–	–	–	2.25	–	–	1.00
Stock Status	–	–	–	–	–	–	–
Confidence	–	–	–	0.18	–	–	0.06

-continued-

Table 29.–Page 2 of 2.

Analysis Area		Necker Bay			Whale Bay			
Area weighting			0.3			0.4		
Stock Status Parameters	Source	Baseline	Value	Score	Baseline	Value	Score	Total Score
Catch rate ≥XL	survey	–	–	–	–	–	–	–
4-yr trend in catch rate	survey	–	–	–	–	–	–	–
Std. Comm. CPUE	fish tix	2.7	*	–	2.4	*	0.00	0.25
4-yr trend in CPUE	fish tix	–	–	–	–	No trend	0.00	0.00
Catch rate ≥XL	logbook	–	–	–	–	–	–	–
Harvest rate ≥XL (2015)	logbook	–	–	–	–	–	–	–
Harvest rate ≥XL (2016)	logbook	–	–	–	–	–	–	–
Harvest rate ≥XL (2017)	logbook	–	–	–	–	–	–	–
Mean CL	survey	–	–	–	–	–	–	–
4-yr trend in CL	survey	–	–	–	–	–	–	–
Mean CL	OTG	–	–	–	–	–	–	–
4-yr trend in CL	OTG	–	–	–	–	–	–	–
Mean CL	DS	–	–	–	–	–	–	–
4-yr trend in CL	DS	–	–	–	–	–	–	–
L_{50}	survey	–	–	–	–	–	–	–
L_{50}	OTG/DS	–	–	–	–	–	–	–
Manager score	–	–	–	0.00	–	–	0.00	0.00
Score	–	–	–	0.00	–	–	0.00	0.25
Max. possible score	–	–	–	1.00	–	–	2.25	1.17
Stock Status	–	–	–	–	–	–	–	Above average
Confidence	–	–	–	0.06	–	–	0.18	0.16

Note: * indicates confidential data with less than three permits participating. En dashes = not available, NA = not applicable, *Sig. inc.* = significant increase, *Sig. dec.* = significant decrease, ≥XL = ≥40 mm CL.

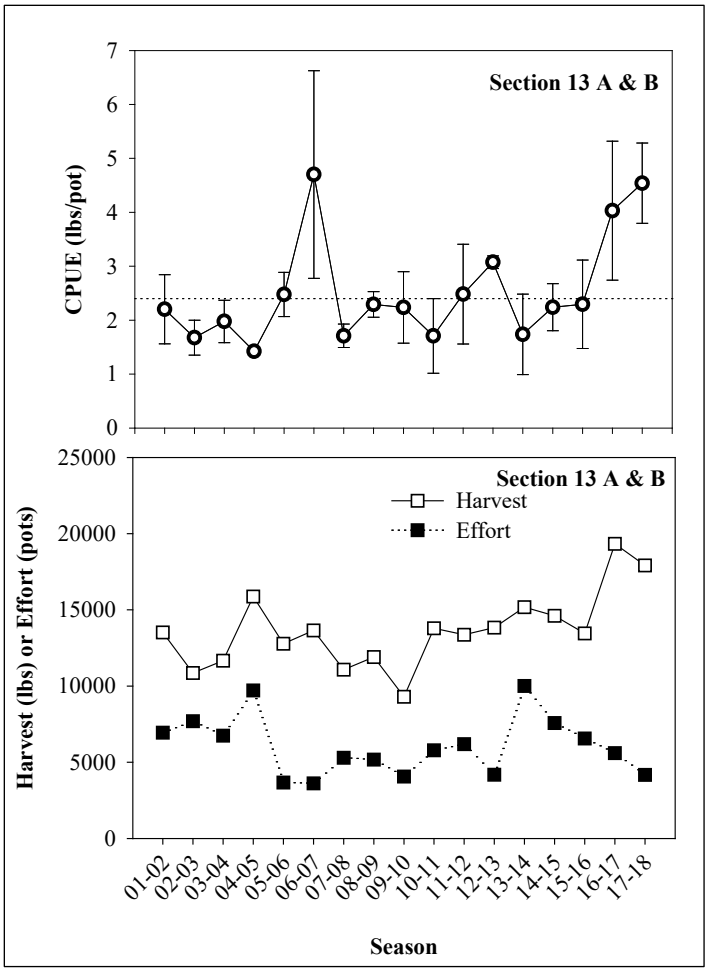

Figure 48.–Sectionwide CPUE and effort data for Sections 13A/B, 2001/02–2017/18 seasons. CPUE is weighted by analysis area weights to allow for an overall impression of fishery performance.

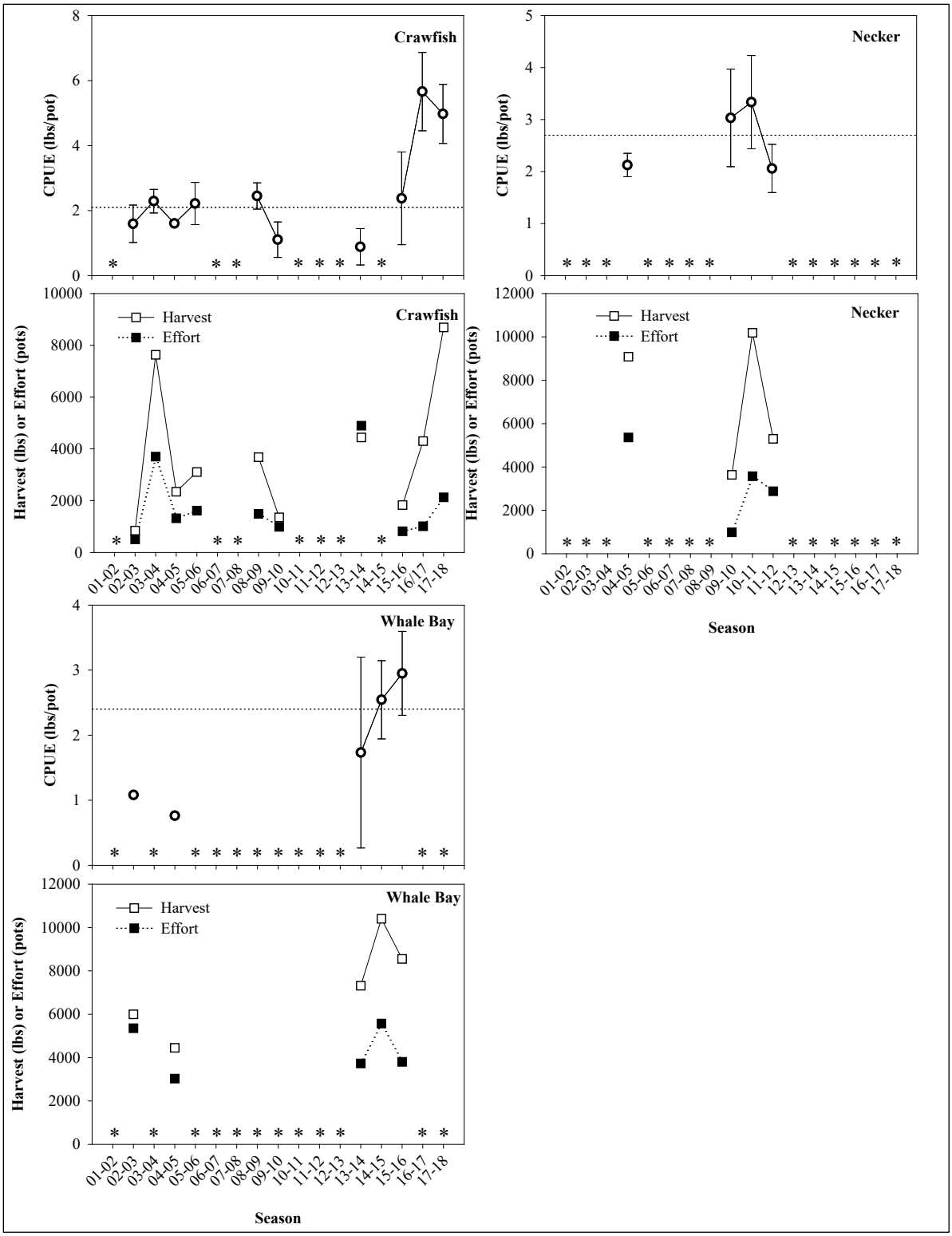

Figure 49.–Mean and standard error of spot shrimp catch rate from commercial harvest (dotted line represents the long-term baseline) and the commercial harvest and effort by analysis area in Sections 13-A/B, 2001/02–2017/18 seasons. Asterisks (*) indicate confidential data with less than three permits participating.

Section 13-C

Section 13-C was divided from Sections 13-A/B with a GHL of 25,000 lb beginning with the 2000/01 season; prior to this, the GHL for all of District 13 was 40,000 lb. Subsequently, the Section 13-C GHL was increased 40% to 42,000 lb for the 2004/05 fishing season. Due to survey results and poor fishery performance, the GHL was reduced 20% to 34,000 lb for the 2007/08 season, reduced 12% to 30,000 lb for the 2008/09 season, reduced an additional 15% to 26,000 lb prior to the 2013/14 season, and finally reduced 39% to 16,000 lb for the 2017/18 season (Table 30). Over the last 10 seasons harvest has averaged 27,200 lb (101% of the GHL). This section is divided into two analysis areas: Hoonah Sound and Peril Strait (Table 2).

The annual preseason survey in Hoonah Sound was suspended beginning in the fall of 2015 due to budgetary constraints. However, in response to strong declines in commercial CPUE on the 2016/17 season, the area was surveyed again in September of 2017. Catch rate of large and small class shrimp declined from the previous survey and catch rate of large class shrimp is now below baseline (Figure 50, Table 31). Mean CL declined slightly from the 2014 survey and is at baseline. The L_{50} values were flat from the 2014 survey and remain below baseline.

No on-the-grounds samples were taken in the 2017/18 season (Figure 52).

The sectionwide standardized commercial CPUE increased slightly from the 2016/17 season and is now at the second lowest level since standardization was possible (Figure 53). Standardized CPUE in the Hoonah Sound analysis area is below baseline with a declining four-year trend (Table 31, Figure 54).

Manager scores are neutral in Hoonah Sound and negative in Peril Strait.

The overall matrix score is -2.30 (poor) down from -1.13 (poor) in the 2016/17 season. This decrease is due to the addition of negative survey indicators and Hoonah Sound commercial CPUE, which now shows a declining four-year trend. Section 13-C has 0.33 (moderate) data confidence (Table 31).

Table 30.–Section 13-C matrix, Part A. A 15-season history, including stock assessment recommendations, for the pot shrimp fishery in Southeast Alaska.

Season	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Upper regulatory GHR	30,000	30,000	30,000	50,000	50,000	50,000	50,000	50,000
Actual GHL (lb spot shrimp)	30,000	42,000	42,000	42,000	34,000	30,000	30,000	30,000
Recommended GHL or stock status	30,000	Good	Moderate	42,000	Poor	Poor	Below Average	Below Average
Season length (days)	5	5	6	5	7	5	4	6
Landings (number)	54	38	63	41	29	30	31	36
Harvest (lb spot shrimp)	42,240	34,270	43,605	36,449	29,395	29,724	25,993	33,104

Season	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Upper regulatory GHR	50,000	50,000	50,000	50,000	50,000	50,000	50,000
Actual GHL (lb spot shrimp)	30,000	26,000	26,000	26,000	26,000	26,000	16,000
Recommended GHL or stock status	Below Average	Moderate	Moderate	Moderate	Moderate	Poor	Poor
Season length (days)	4	4	4	4	5	5	3
Landings (number)	49	37	32	22	22	32	15
Harvest (lb spot shrimp)	37,415	29,048	23,171	26,532	26,228	27,946	12,782

Table 31.–Section 13-C matrix, Part B. Baselines, current season values, and scores for each stock status parameter and analysis area for the pot shrimp fishery in Southeast Alaska. Data sources are from ADF&G shrimp survey, fish tickets ("fish tix"), logbooks, and on-the-grounds (OTG) and dockside (DS) sampling of commercial catch. Data are divided by type: CPUE, harvest rate, mean carapace length (CL), and L_{50}. Score for each analysis area is the sum of all individual scores.

Analysis Area		Hoonah Sound			Peril Strait			
Area weighting			0.8			0.2		
Stock Status Parameters	Source	Baseline	Value	Score	Baseline	Value	Score	Total Score
Catch rate ≥XL	survey	3.0	2.38	-1.00	–	–	–	-1.00
4-yr trend in catch rate	survey	–	–	–	–	–	–	–
Std. Comm. CPUE	fish tix	5.3	3.4	-1.00	3.7	No effort	–	-0.33
4-yr trend in CPUE	fish tix	–	Sig. dec.	-0.25	–	–	–	-0.17
Catch rate ≥XL	logbook	–	–	–	–	–	–	–
Harvest rate ≥XL (2015)	logbook	–	–	–	–	–	–	–
Harvest rate ≥XL (2016)	logbook	–	–	–	–	–	–	–
Harvest rate ≥XL (2017)	logbook	–	–	–	–	–	–	–
Mean CL	survey	37.8	36.3	0.00	–	–	–	0.00
4-yr trend in CL	survey	–	–	–	–	–	–	–
Mean CL	OTG	–	–	–	36.1	–	–	–
4-yr trend in CL	OTG	–	–	–	–	–	–	–
Mean CL	DS	–	–	–	–	–	–	–
4-yr trend in CL	DS	–	–	–	–	–	–	–
L_{50}	survey	42.1	40.6	-1.00	–	–	–	-0.67
L_{50}	OTG/DS	–	–	–	–	–	–	–
Manager score	–	–	–	0.00	–	–	-1	-0.13
Score	–	–	–	-3.25	–	–	-1.00	-2.30
Max. possible score	–	–	–	5.25	–	–	1.00	3.5
Stock Status	–	–	–	–	–	–	–	Poor
Confidence	–	–	–	0.35	–	–	0.06	0.33

Note: * indicates confidential data with less than three permits participating. En dashes = not available, NA = not applicable, *Sig. inc.* = significant increase, *Sig. dec.* = significant decrease, ≥XL = ≥40 mm CL.

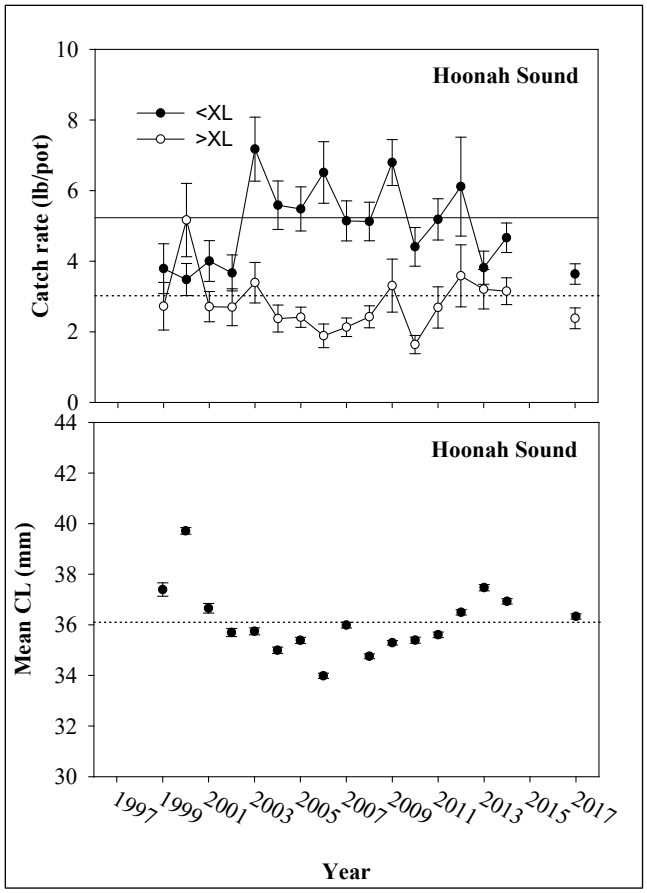

Figure 50.–Mean and standard error of spot shrimp catch rate (upper panels) and carapace length (lower panels) from preseason surveys in Section 13-C, 1999–2017. Lines represent the long-term baselines.

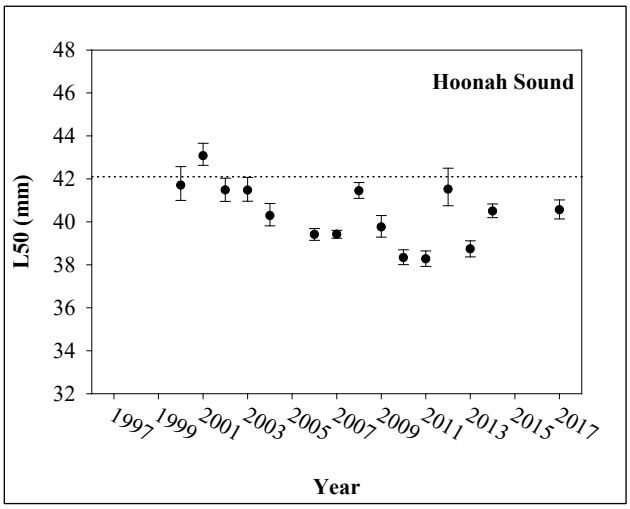

Figure 51.–L_{50} and 95% confidence intervals of spot shrimp from preseason surveys in Section 13-C, 1999–2017 seasons. Dotted line represents the long-term baseline.

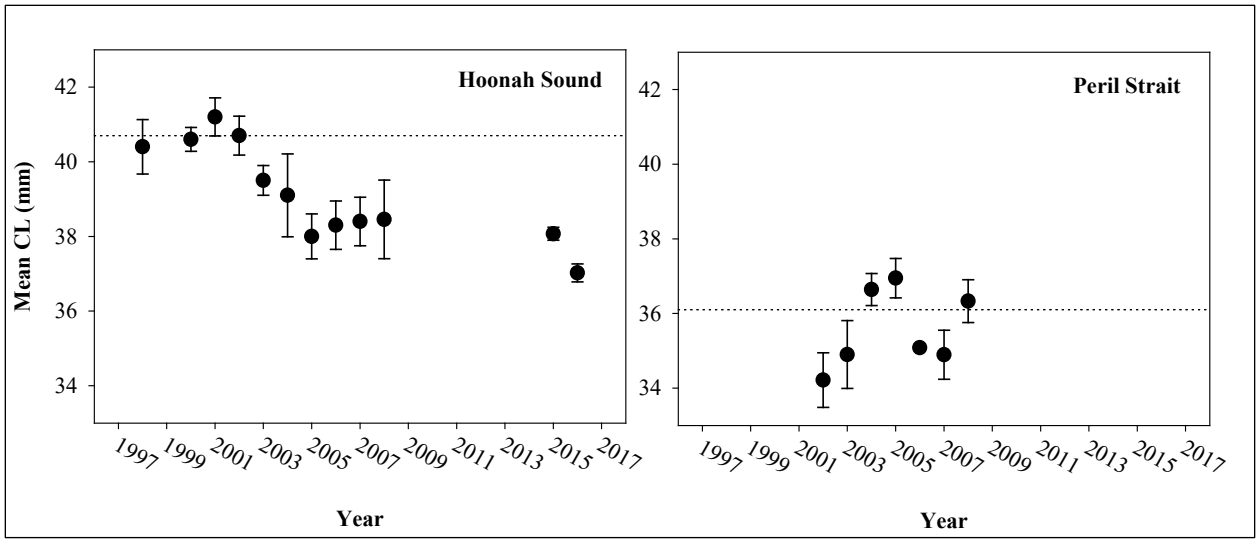

Figure 52.–Mean and standard error of spot shrimp carapace length from floating processor and on-the-grounds sampling in Section 13C, 1998/99–2017/18 seasons. Dotted line represents the long-term baseline. Only areas with baselines or 2017/18 season data are shown.

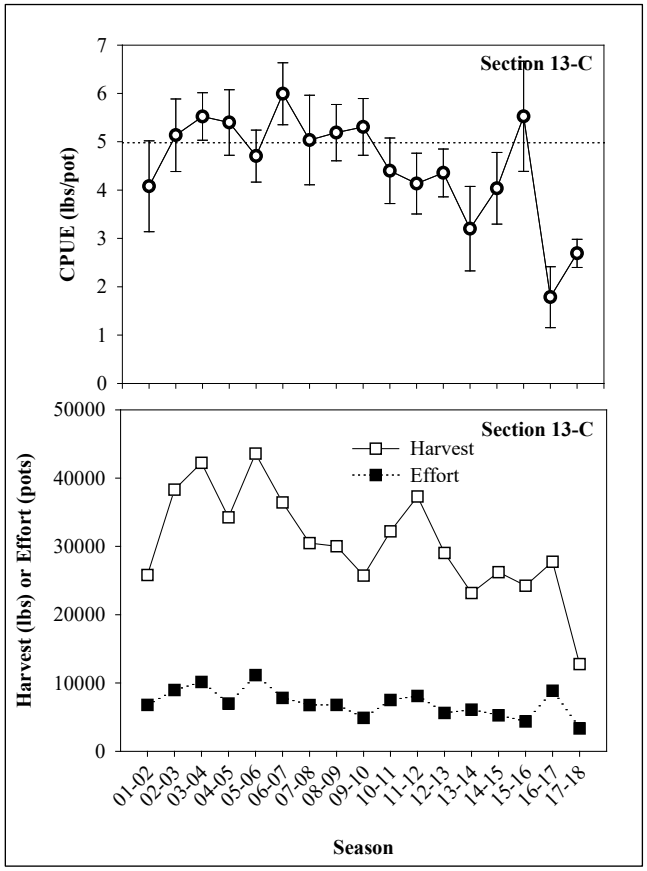

Figure 53.– Sectionwide CPUE and effort data for Section 13C, 2001/02–2017/18 seasons. CPUE is weighted by analysis area weights to allow for an overall impression of fishery performance.

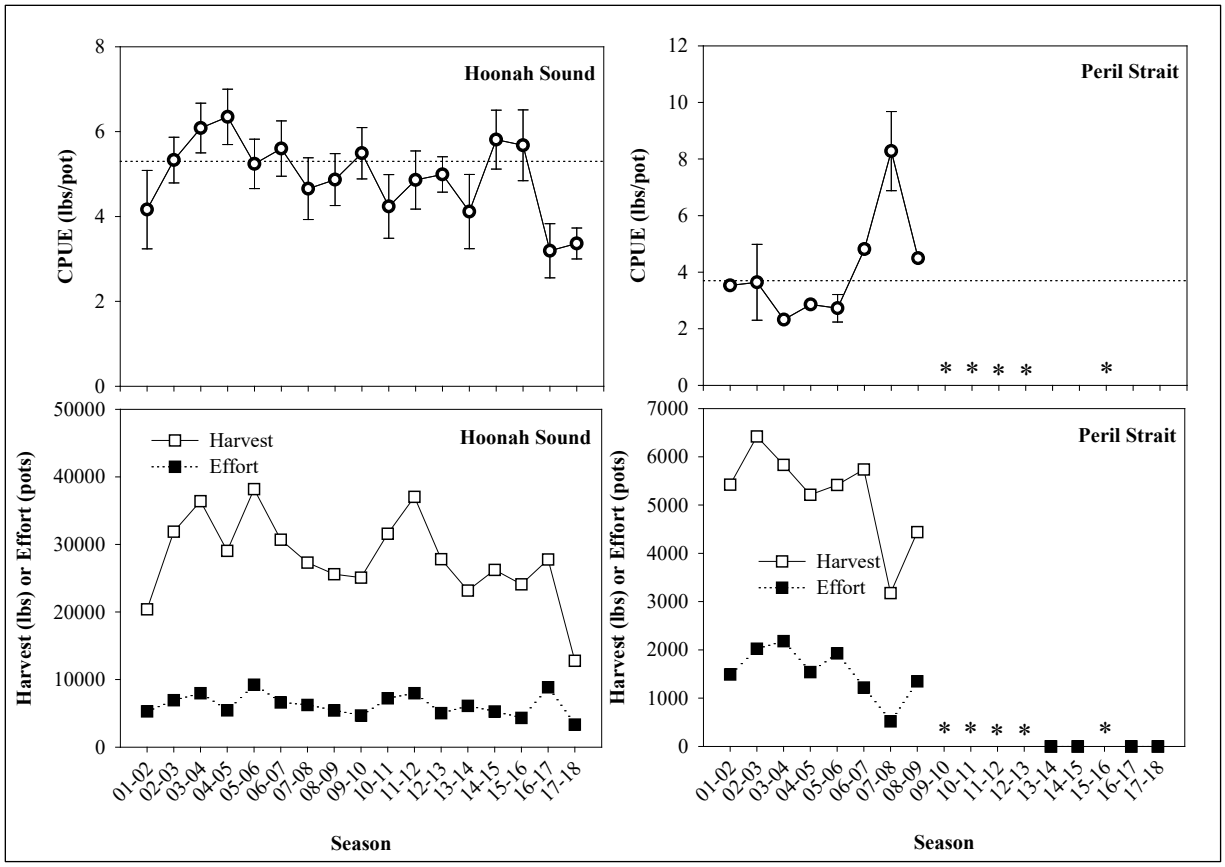

Figure 54.–Mean and standard error of spot shrimp catch rate from commercial harvest (dotted line represents the long-term baseline) and the commercial harvest and effort by analysis area in Section 13-C, 2001/02–2017/18 seasons. Asterisks (*) indicate confidential data with less than three permits participating.

JUNEAU MANAGEMENT AREA

District 11

Seymour Canal

Seymour Canal was split from the Remainder of District 11 starting with the 2012/13 fishing season. The GHR of spot shrimp is 0-30,000 lb. The 2012/13 GHL was set using an experimental system on the grounds. A traditional GHL of 15,000 lb was implemented for the 2013/14 season and reduced to 12,000 lb prior to the 2014/15 season due to declining catch rates. Over the last ten years harvest has averaged 16,450 lb (99% of GHL) (Table 32). Seymour Canal contains one analysis area (Table 2).

Standardized commercial CPUE is confidential, below the long-term baseline, and is now showing an increasing four-year trend (Table 33, Figure 55).

Logbook based catch rate of large class shrimp is increasing (Table 33).

Manager score for Seymour Canal is neutral.

The overall matrix score is 0.83 (above average), which was up from -0.33 (below average) for the 2016/17 season. Seymour Canal has a 0.27 (low) level of confidence (Table 33).

Table 32.–Seymour Canal matrix, Part A. A 15-season history, including stock assessment recommendations, for the pot shrimp fishery in Southeast Alaska.

Season	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Upper regulatory GHR				20,000 all District 11				
Actual GHL (lb spot shrimp and coonstripe)				20,000 all District 11				
Recommended GHL or stock status	–	Moderate	–	16,000	Moderate	Moderate	Above Average	Moderate
Season length (days)	48	43	43	19	15	19	10	10
Landings (number)	34	*	20	*	*	*	24	26
Harvest (lb spot shrimp)	14,207	*	15,565	*	*	*	25,287	23,209

Season	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Upper regulatory GHR	20,000 all 11	30,000	30,000	30,000	30,000	30,000
Actual GHL (lb spot shrimp and coonstripe)	20,000 all 11	Experimental	15,000	12,000	12,000	12,000
Recommended GHL or stock status	Below Average	Poor	Poor	Below Average	Below Average	Below Average
Season length (days)	6	8	8	12	11	9
Landings (number)	30	30	21	*	*	*
Harvest (lb spot shrimp)	20,879	21,970	13,007	*	*	*

Season	2017/18
Upper regulatory GHR	30,000
Actual GHL (lb spot shrimp and coonstripe)	12,000
Recommended GHL or stock status	Above Average
Season length (days)	9
Landings (number)	*
Harvest (lb spot shrimp)	*

Note: * indicates confidential data with less than three permits participating; en dash = not available.

Table 33.–Seymour Canal matrix, Part B. Baselines, current season values, and scores for each stock status parameter and analysis area for the pot shrimp fishery in Southeast Alaska. Data sources are from ADF&G shrimp survey, fish tickets ("fish tix"), logbooks, and on-the-grounds (OTG) and dockside (DS) sampling of commercial catch. Data are divided by type: CPUE, harvest rate, mean carapace length (CL), and L_{50}. Score for each analysis area is the sum of all individual scores.

Analysis Area		Seymour Canal			
Area weighting			1.0		
Stock Status Parameters	Source	Baseline	Value	Score	Total Score
Catch rate ≥XL	survey	–	–	–	–
4-yr trend in catch rate	survey	–	–	–	–
Std. Comm. CPUE	fish tix	7.4	*	-1.00	-0.33
4-yr trend in CPUE	fish tix	–	Sig. inc.	0.25	0.17
Catch rate ≥XL	logbook	–	Sig. inc.	1.00	1.00
Harvest rate ≥XL (2015)	logbook	–	–	–	–
Harvest rate ≥XL (2016)	logbook	–	–	–	–
Harvest rate ≥XL (2017)	logbook	–	–	–	–
Mean CL	survey	–	–	–	–
4-yr trend in CL	survey	–	–	–	–
Mean CL	OTG	–	–	–	–
4-yr trend in CL	OTG	–	–	–	–
Mean CL	DS	–	–	–	–
4-yr trend in CL	DS	–	–	–	–
L_{50}	survey	–	–	–	–
L_{50}	OTG/DS	40.6	–	–	–
Manager score		–	–	0	0.00
Score		–	–	0.25	0.83
Max. possible score		–	–	3.25	2.17
Stock Status		–	–	–	Above average
Confidence		–	–	0.27	0.27

Note: * indicates confidential data with less than three permits participating. En dashes = not available, NA = not applicable, *Sig. inc.* = significant increase, *Sig. dec.* = significant decrease, ≥XL = ≥40 mm CL.

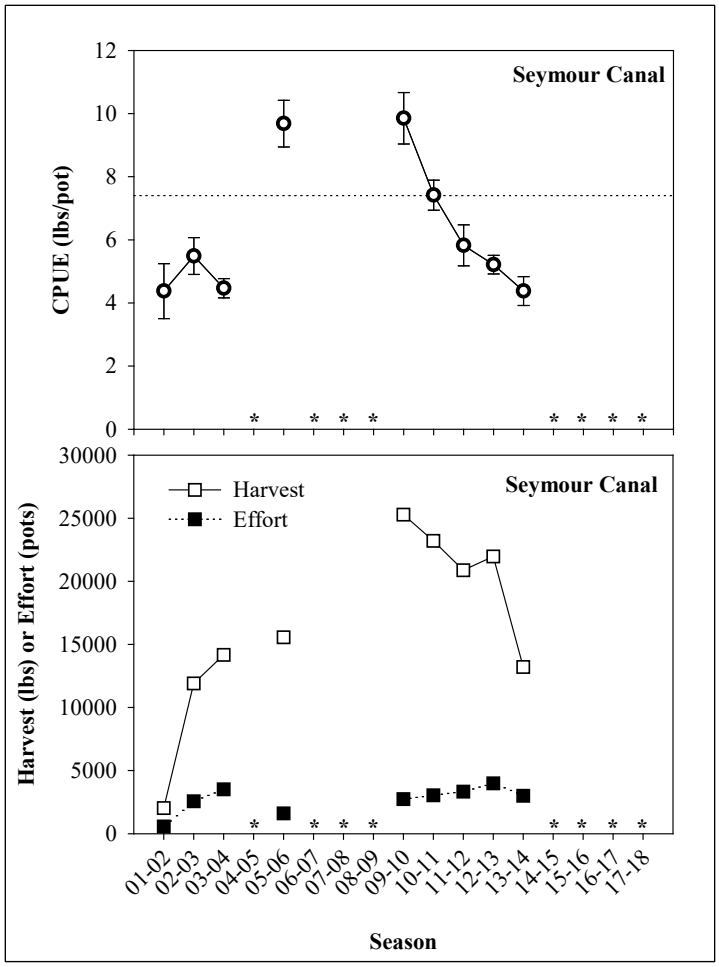

Figure 55.–Mean and standard error of spot and coonstripe shrimp catch rate from commercial harvest (dotted line represents the long-term baseline) and the commercial harvest and effort by in Seymour Canal, 2001/02–2017/18 seasons. Asterisks (*) indicate confidential data with less than three permits participating.

Remainder of District 11

The GHL for spot and coonstripe shrimp in District 11 had been 20,000 lb since the 1995/96 fishing season. Beginning with the 2012/13 fishing season, Seymour Canal was divided from the remainder of the district and the remainder was given an exploratory GHL of 7,500 lb. Due to stock declines a 4,000 lb GHL was implemented prior to the 2017/18 season. There has been a steady decline in the coonstripe and a corresponding increase in the spot shrimp harvest in this fishing area. Over the last ten years harvest has averaged 5,000 lb (54% of GHL) (Table 34). The Remainder of District 11 is divided into 2 analysis areas: 11-A and Glacier-fed Bays (Table 2).

Area wide standardized CPUE for the Remainder of District 11 increased slightly but remains among the lowest levels since standardization was possible (Figure 56). Standardized CPUE in the Glacier-fed Bays analysis area increased to baseline and shows no four-year trend (Table 35, Figure 57). The 11-A analysis area was closed beginning with the 2013/14 season due to poor stock health.

Logbook catch rates of ≥XL shrimp increased from previous seasons (Table 35).

Manager score is neutral for the Glacier-fed Bays analysis area (Table 35).

The overall matrix score is 1.00 (above average) up from -2.17 (poor) in the 2016/17 season due increased CPUE, loss of negative logbook harvest rate data, the addition of positive logbook catch rate data, and the loss of a negative manager score. The Remainder of 11 management area has a 0.27 (low) level of data confidence (Table 35).

Table 34.–District 11 matrix, Part A. A 15-season history, including stock assessment recommendations, for the pot shrimp fishery in Southeast Alaska.

Season	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Upper regulatory GHR				20,000 all District 11					
Actual GHL (lb spot shrimp)				20,000 all District 11					
Recommended GHL or stock status	–	Moderate	–	16,000	Moderate	Moderate	Moderate	Moderate	Moderate
Season length (days)	48	43	43	19	15	19	10	10	6
Landings (number)	62	52	44	*	30	*	*	*	*
Harvest (lb spot shrimp)	4,685	5,500	7,816	*	4,226	*	*	*	*

Season	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Upper regulatory GHR	15,000	15,000	15,000	15,000	15,000	15,000
Actual GHL (lb spot shrimp)	7,500	7,500	7,500	7,500	7,500	4,000
Recommended GHL or stock status	Below Average	Above Average	Moderate	Moderate	Poor	Above Average
Season length (days)	143	19	21	35	151	19
Landings (number)	20	21	24	28	34	15
Harvest (lb spot shrimp)	6,466	7,818	5,774	5,600	4,583	4,399

Note: * indicates confidential data with less than three permits participating; en dash = not available.

Table 35.–District 11 matrix, Part B. Baselines, current season values, and scores for each stock status parameter and analysis area for the pot shrimp fishery in Southeast Alaska. Data sources are from ADF&G shrimp survey, fish tickets ("fish tix"), logbooks, and on-the-grounds (OTG) and dockside (DS) sampling of commercial catch. Data are divided by type: CPUE, harvest rate, mean carapace length (CL), and L_{50}. Score for each analysis area is the sum of all individual scores.

Analysis Area		11-A			Glacier-fed Bays			
Area weighting			0.75			0.25		
Stock Status Parameters	Source	Baseline	Value	Score	Baseline	Value	Score	Total Score
Catch rate ≥XL	survey	–	–	–	–	–	–	–
4-yr trend in catch rate	survey	–	–	–	–	–	–	–
Std. Comm. CPUE	fish tix	–	Closed	–	1.9	1.9	0.00	0.00
4-yr trend in CPUE	fish tix	–	–	–	–	No trend	0.00	0.00
Catch rate ≥XL	logbook	–	–	–	–	Sig. inc.	1.00	1.00
Harvest rate ≥XL (2015)	logbook	–	–	–	–	85%	–	–
Harvest rate ≥XL (2016)	logbook	–	–	–	–	71%	–	–
Harvest rate ≥XL (2017)	logbook	–	–	–	–	–	–	–
Mean CL	survey	–	–	–	–	–	–	–
4-yr trend in CL	survey	–	–	–	–	–	–	–
Mean CL	OTG	–	–	–	–	–	–	–
4-yr trend in CL	OTG	–	–	–	–	–	–	–
Mean CL	DS	–	–	–	–	–	–	–
4-yr trend in CL	DS	–	–	–	–	–	–	–
L_{50}	survey	–	–	–	–	–	–	–
L_{50}	OTG/DS	–	–	–	–	–	–	–
Manager score		–	–	–	–	–	0.00	0.00
Score		–	–	0.00	–	–	1.00	1.00
Max. possible score		–	–	0.00	–	–	3.25	2.17
Stock Status		–	–	–	–	–	–	Above average
Confidence		–	–	0.00	–	–	0.24	0.07

Note: * indicates confidential data with less than three permits participating. En dashes = not available, NA = not applicable, *Sig. inc.* = significant increase, *Sig. dec.* = significant decrease, ≥XL = ≥40 mm CL.

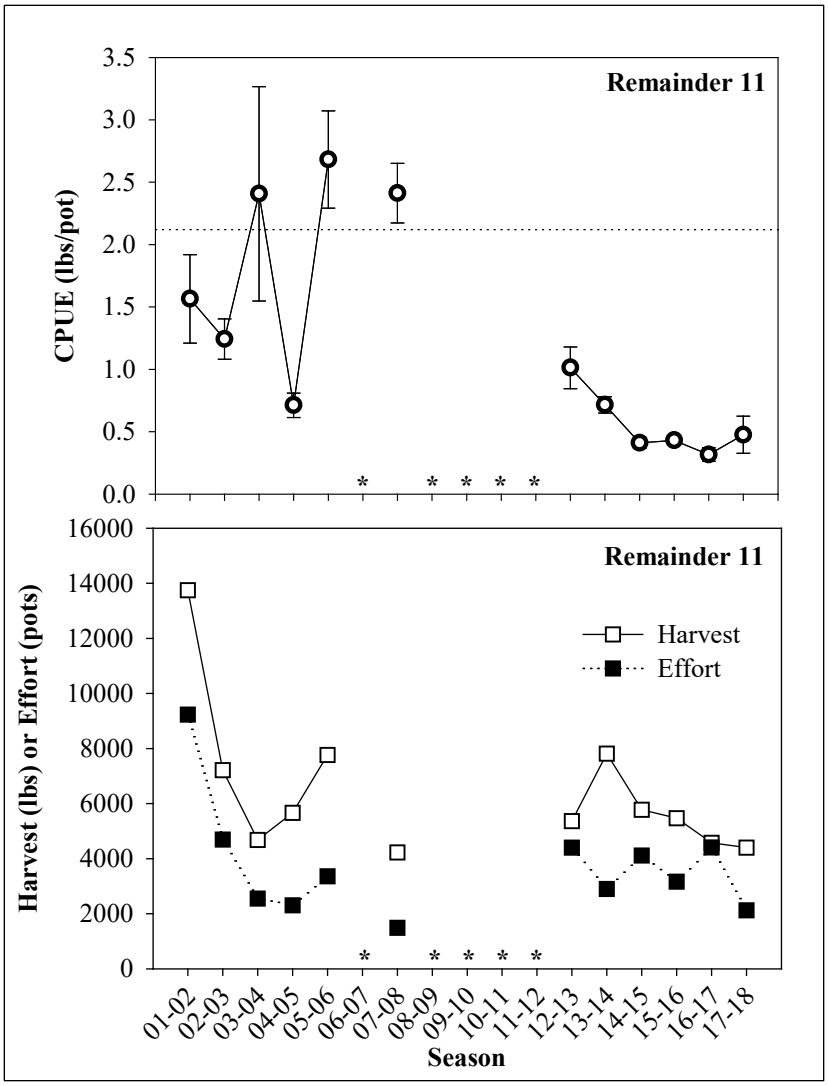

Figure 56.–Areawide CPUE and effort data for the Remainder of District 11, 2001/02–2017/18 seasons. CPUE is weighted by analysis area weights to allow for an overall impression of fishery performance. Asterisks (*) indicate confidential data with less than three permits participating.

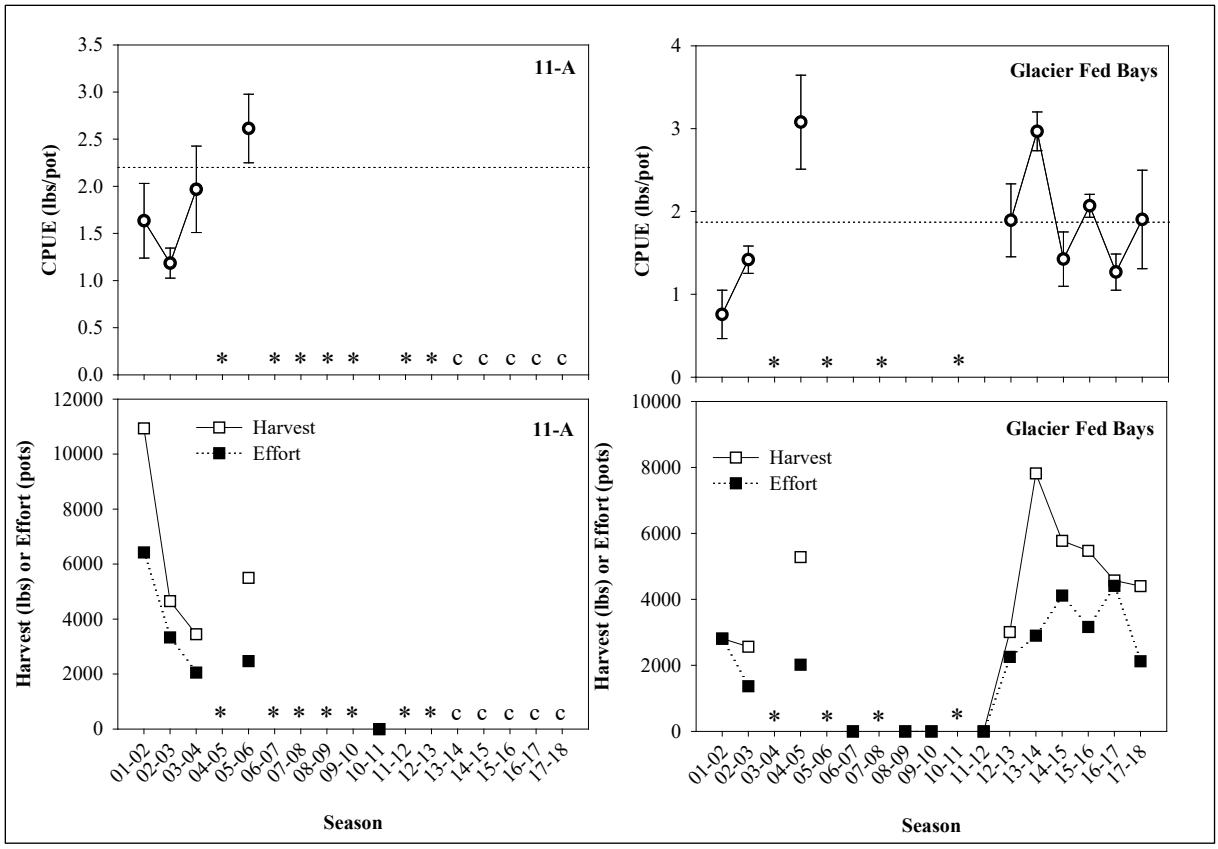

Figure 57.–Mean and standard error of spot and coonstripe shrimp catch rate from commercial harvest (dotted line represents the long-term baseline) and the commercial harvest and effort by analysis area in the Remainder of District 11, 2001/02–2017/18 seasons. Asterisks (*) indicate confidential data with less than three permits participating, and "c" indicates the area was closed to fishing.

District 12

Tenakee Inlet

Tenakee Inlet was divided from the rest of District 12 beginning with the 2001/02 fishing season with a GHR of 0–20,000 lb and a GHL of 20,000 lb. The upper end of the GHR was increased to 34,000 lb prior to the 2005/06 fishing season and the GHL was increased 30% to 28,000 lb. In response to declines in survey and fishery CPUE, the GHL was reduced 40% to 17,000 lb for the 2008/09 fishing season. Due to continued declines in stock status, the GHL was further lowered by 40% to 10,000 lb for the 2010/11 season and was closed to commercial fishing prior to the 2011/12 season. In 2012, Tenakee Inlet was closed to sport and personal use harvests. Over the last 10 years when the commercial fishery was open, harvest averaged 20,853 lb (100% of the GHL) (Table 36). This district is divided into two analysis areas: East Tenakee Inlet and West Tenakee Inlet (Table 2).

The preseason survey was discontinued in east Tenakee Inlet in 2015.

Survey CPUE of shrimp in West Tenakee Inlet dropped precipitously during the 2011 survey to the lowest level in the history of the survey, and then dropped further in 2012. There was a very slight increase in 2013, then strong increases were seen from 2014–2016. The 2017 survey showed a very slight decline from the 2016 survey. The survey catch rate of large class shrimp in West Tenakee is now at baseline and shows a four-year increasing trend. The 2017 survey also showed a third year of increase in small class shrimp (Table 37, Figure 58). Mean CL from the survey dropped precipitously and is now at baseline and continues to show a decline in the four-year analysis, this is likely partially due to the increased presence of small class shrimp (Table 37, Figure 58). Survey L_{50} declined slightly and is now at baseline (Table 37, Figure 59).

Commercial CPUE information has not been available due to the fishery closure since the 2010/11 season (Table 37, Figures 60 and 61).

Manager scores were neutral.

The overall matrix score is 0.08 (moderate), which was down from 2.02 (above average) in 2016/17 due to declining CL, L_{50}, and manager score. Tenakee Inlet has a 0.36 (moderate) level of confidence.

Table 36.–Tenakee Inlet matrix, Part A. A 15-season history, including stock assessment recommendations, for the pot shrimp fishery in Southeast Alaska.

Season	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Upper regulatory GHR	20,000	20,000	34,000	34,000	34,000	34,000	34,000	34,000
Actual GHL (lb spot shrimp)	20,000	20,000	28,000	28,000	28,000	17,000	17,000	10,000
Recommended GHL or stock status	20,000	Moderate	Good	28,000	Moderate	Poor	Below Average	Above Average
Season length (days)	6	3	5	4	3	4	3	2
Landings (number)	40	23	45	34	26	11	15	15
Harvest (lb spot shrimp)	30,494	23,729	36,435	30,032	18,086	12,270	10,981	14,152

Season	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Upper regulatory GHR	34,000	34,000	34,000	34,000	34,000	34,000	34,000
Actual GHL (lb spot shrimp)	Closed	Closed	Closed	Closed	Closed	Closed	Closed
Recommended GHL or stock status	Closed	Closed	Closed	Closed	Closed	Closed	Closed
Season length (days)	Closed	Closed	Closed	Closed	Closed	Closed	Closed
Landings (number)	Closed	Closed	Closed	Closed	Closed	Closed	Closed
Harvest (lb spot shrimp)	Closed	Closed	Closed	Closed	Closed	Closed	Closed

Table 37.–Tenakee Inlet matrix, Part B. Baselines, current season values, and scores for each stock status parameter and analysis area for the pot shrimp fishery in Southeast Alaska. Data sources are from ADF&G shrimp survey, fish tickets ("fish tix"), logbooks, and on-the-grounds (OTG) and dockside (DS) sampling of commercial catch. Data are divided by type: CPUE, harvest rate, mean carapace length (CL), and L_{50}. Score for each analysis area is the sum of all individual scores.

Analysis Area		East Tenakee			West Tenakee			
Area weighting			0.1			0.9		
Stock Status Parameters	Source	Baseline	Value	Score	Baseline	Value	Score	Total Score
Catch rate ≥XL	survey	3.7	–	–	7.1	6.29	0.00	0.00
4-yr trend in catch rate	survey	–	–	–	–	Sig. inc.	0.25	0.25
Std. Comm. CPUE	fish tix	4.5	Closed	–	7.0	Closed	–	–
4-yr trend in CPUE	fish tix	–	–	–	–	–	–	–
Catch rate ≥XL	logbook	–	–	–	–	–	–	–
Harvest rate ≥XL (2015)	logbook	–	–	–	–	–	–	–
Harvest rate ≥XL (2016)	logbook	–	–	–	–	–	–	–
Harvest rate ≥XL (2017)	logbook	–	–	–	–	–	–	–
Mean CL	survey	35.4	–	–	38.9	38.2	0.00	0.00
4-yr trend in CL	survey	–	–	–	–	Sig. dec.	-0.25	-0.17
Mean CL	OTG	–	–	–	41.1	–	–	–
4-yr trend in CL	OTG	–	–	–	–	–	–	–
Mean CL	DS	–	–	–	–	–	–	–
4-yr trend in CL	DS	–	–	–	–	–	–	–
L_{50}	survey	40.4	–	–	43	42.9	0.00	0.00
L_{50}	OTG/DS	–	–	–	–	–	–	–
Manager score		–	–	–	–	–	0.00	0.00
Score		–	–	–	–	–	0.00	0.08
Max. possible score		–	–	0.00	–	–	4.50	3.42
Stock Status		–	–	–	–	–	–	Moderate
Confidence		–	–	0.00	–	–	0.40	0.36

Note: * indicates confidential data with less than three permits participating. En dashes = not available, NA = not applicable, *Sig. inc.* = significant increase, *Sig. dec.* = significant decrease, ≥XL = ≥40 mm CL.

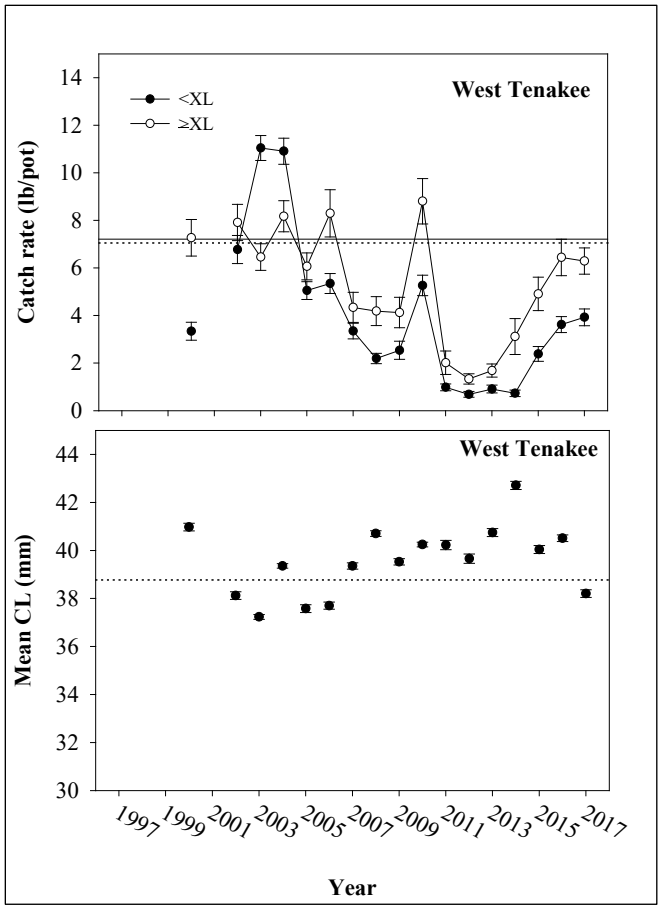

Figure 58.–Mean and standard error of spot shrimp catch rate (upper panels), and carapace length (lower panels) from preseason surveys in West Tenakee Inlet, 2000–2017. Lines represent the long-term baselines.

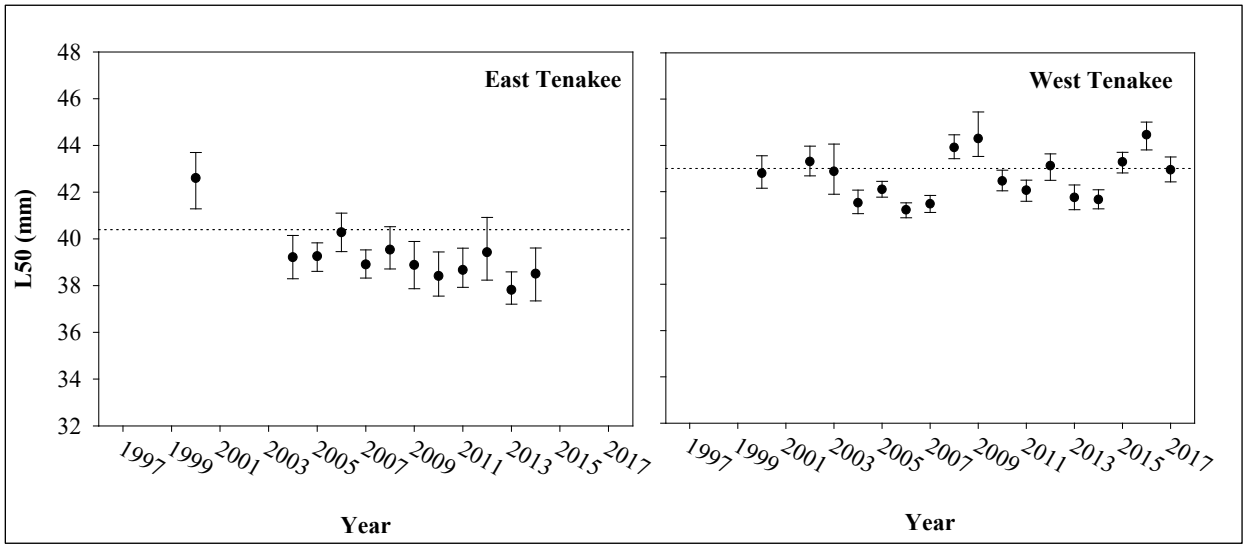

Figure 59.–L_{50} and 95% confidence intervals of spot shrimp from preseason surveys in West Tenakee Inlet, 2000–2017. Dotted line represents the long-term baseline.

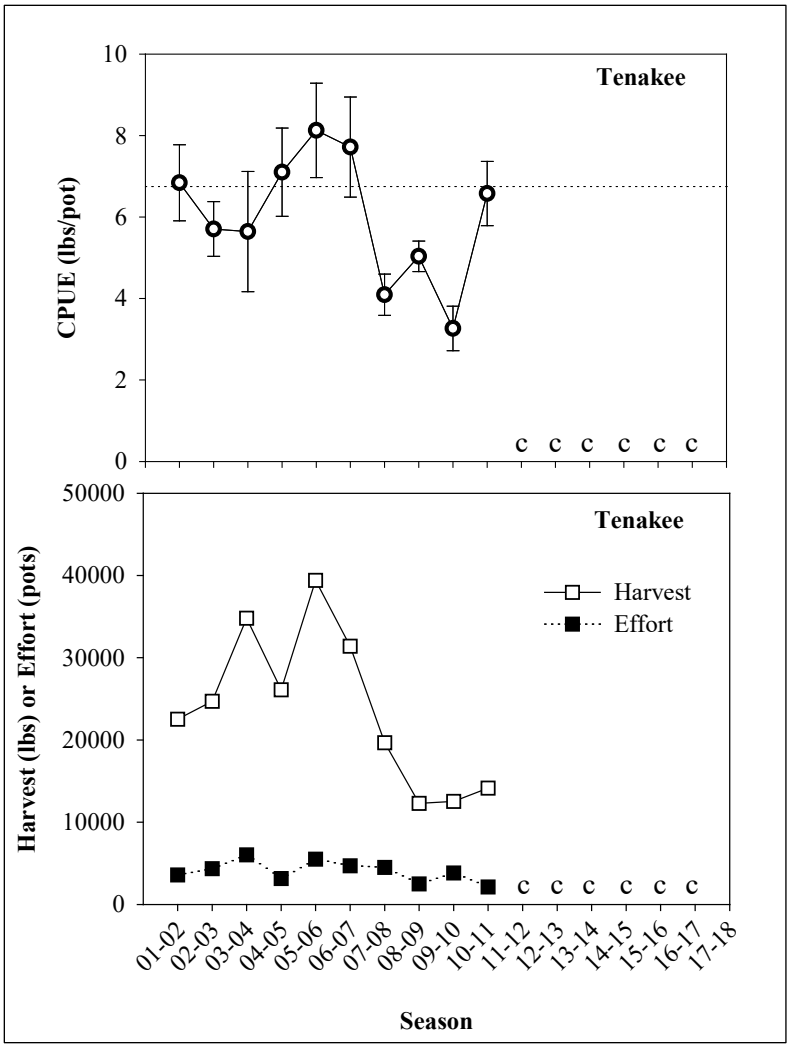

Figure 60.–Areawide CPUE and effort data for Tenakee Inlet, 2001/02–2017/18 seasons. CPUE is weighted by analysis area weights to allow for an overall impression of fishery performance, "c" indicates the area was closed to fishing.

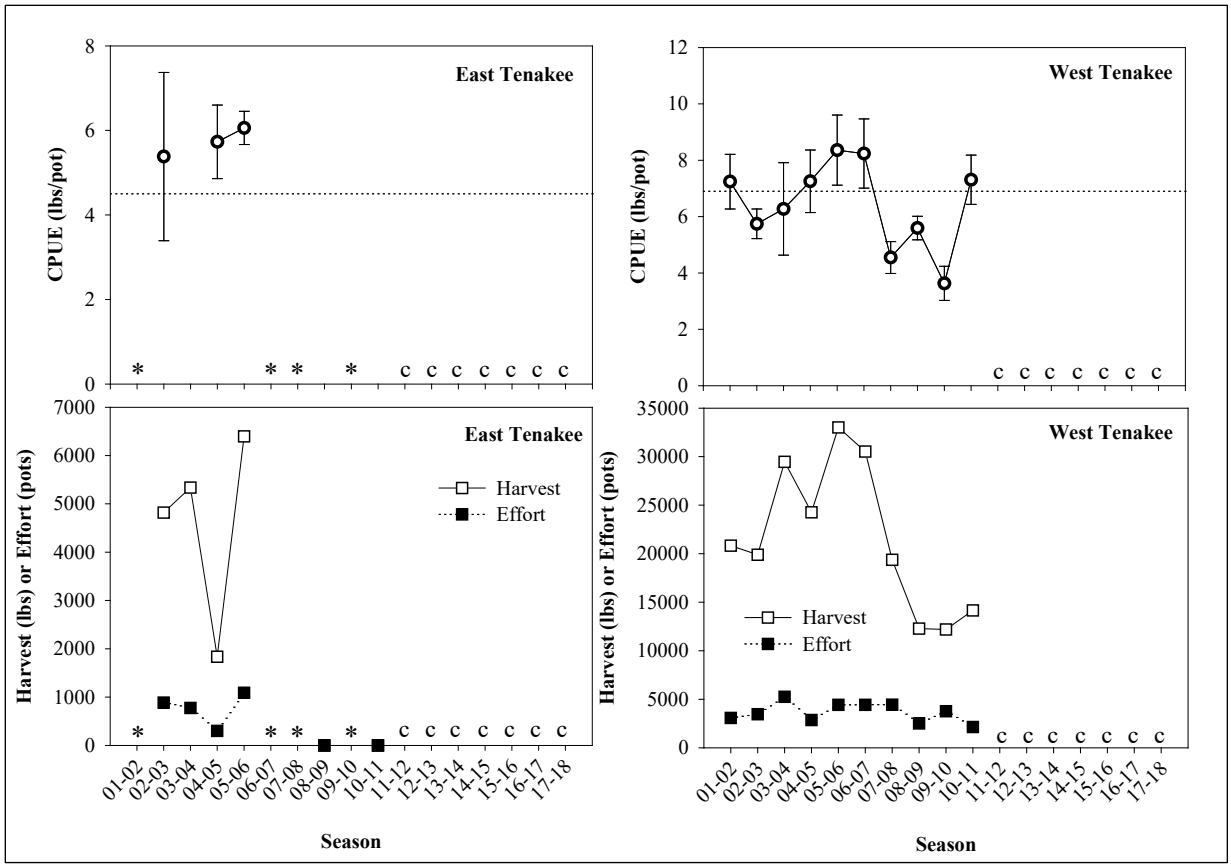

Figure 61.–Mean and standard error of spot shrimp catch rate from commercial harvest (dotted line represents the long-term baseline) and the commercial harvest and effort by analysis area in Tenakee Inlet, 2001/02–2017/18 seasons. Asterisks (*) indicate confidential data with less than three permits participating, and "c" indicates the area was closed to fishing.

Remainder of District 12

Remainder of District 12 was established prior to the 2001/02 season with a GHR of 0–15,000 lb, and the GHL was set at the upper end of the GHR. The GHL was reduced 33% to 10,000 lb for the 2008/09 fishing season. Due to declining CPUE, the Remainder of District 12 was closed prior to the 2012/13 fishing season. It was reopened at a reduced GHL of 7,500 lb for the 2015/16 season and closed for the 2016/17 season (Table 38). Over the last 10 years that the fishery was open, harvest has averaged 10,800 lb (94% of the GHL). This district is divided into three analysis areas: Freshwater Bay, Kelp Bay, and Pt. Couverden (Table 2).

Due to the lack of stock recovery in the 2015/16 season after a three-year closure, the Remainder of District 12 was closed for another three-year period beginning with the 2016/17 season (Table 39, Figures 62 and 63). This decision was based on the surveyed stock recovery in nearby West Tenakee Inlet where a measurable increase in survey CPUE was not seen until four years after the closure of the commercial, sport, and personal use fisheries. Sport and personal use fishing remain open in the Remainder of District 12.

Table 38.–Remainder of District 12 matrix, Part A. A 15-season history, including stock assessment recommendations, for the pot shrimp fishery in Southeast Alaska.

Season	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Upper regulatory GHR	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000
Actual GHL (lb spot shrimp)	15,000	15,000	15,000	15,000	15,000	10,000	10,000	10,000	10,000
Recommended GHL or stock status	15,000	–	–	15,000	Moderate	Poor	Below Average	Poor	Poor
Season length (days)	37	23	16	12	10	9	10	19	42
Landings (number)	68	51	34	39	28	24	27	26	38
Harvest (lb spot shrimp)	19,605	17,627	13,521	18,552	15,958	12,383	7,908	8,953	6,336

Season	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Upper regulatory GHR	15,000	15,000	15,000	15,000	15,000	15,000
Actual GHL (lb spot shrimp)	Closed	Closed	Closed	7,500	Closed	Closed
Recommended GHL or stock status	Closed	Closed	Closed	Poor	Closed	Closed
Season length (days)	Closed	Closed	Closed	9	Closed	Closed
Landings (number)	Closed	Closed	Closed	23	Closed	Closed
Harvest (lb spot shrimp)	Closed	Closed	Closed	5,238	Closed	Closed

Note: En dash = not available.

Table 39.–Remainder of District 12 matrix, Part B. Baselines, current season values, and scores for each stock status parameter and analysis area for the pot shrimp fishery in Southeast Alaska. Data sources are from ADF&G shrimp survey, fish tickets ("fish tix"), logbooks, and on-the-grounds (OTG) and dockside (DS) sampling of commercial catch. Data are divided by type: CPUE, harvest rate, mean carapace length (CL), and L_{50}. Score for each analysis area is the sum of all individual scores.

Analysis Area		Freshwater Bay			Kelp Bay			Pt. Couverden			
Area weighting			0.2			0.7			0.1		
Stock Status Parameters	Source	Baseline	Value	Score	Baseline	Value	Score	Baseline	Value	Score	Total Score
Catch rate ≥XL	survey	–	–	–	–	–	–	–	–	–	–
4-yr trend in catch rate	survey	–	–	–	–	–	–	–	–	–	–
Std. Comm. CPUE	fish tix	2.5	Closed	–	3.2	Closed	–	2.3	Closed	–	–
4-yr trend in CPUE	fish tix	–	–	–	–	–	–	–	–	–	–
Catch rate ≥XL	logbook	–	–	–	–	–	–	–	–	–	–
Harvest rate ≥XL (2015)	logbook	–	–	–	–	–	–	–	–	–	–
Harvest rate ≥XL (2016)	logbook	–	–	–	–	–	–	–	–	–	–
Harvest rate ≥XL (2017)	logbook	–	–	–	–	–	–	–	–	–	–
Mean CL	survey	–	–	–	–	–	–	–	–	–	–
4-yr trend in CL	survey	–	–	–	–	–	–	–	–	–	–
Mean CL	OTG	–	–	–	–	–	–	–	–	–	–
4-yr trend in CL	OTG	–	–	–	–	–	–	–	–	–	–
Mean CL	DS	–	–	–	–	–	–	–	–	–	–
4-yr trend in CL	DS	–	–	–	–	–	–	–	–	–	–
L_{50}	survey	–	–	–	–	–	–	–	–	–	–
L_{50}	OTG/DS	–	–	–	–	–	–	–	–	–	–
Manager score	–	–	–	–	–	–	–	–	–	–	–
Score	–	–	–	0.00	–	–	0.00	–	–	0.00	–
Max. possible score	–	–	–	0.00	–	–	0.00	–	–	0.00	–
Stock Status	–	–	–	–	–	–	–	–	–	–	Closed
Confidence	–	–	–	0.00	–	–	0.00	–	–	0.00	–

Note: * indicates confidential data with less than three permits participating. En dashes = not available, NA = not applicable, *Sig. inc.* = significant increase, *Sig. dec.* = significant decrease, ≥XL = ≥40 mm CL.

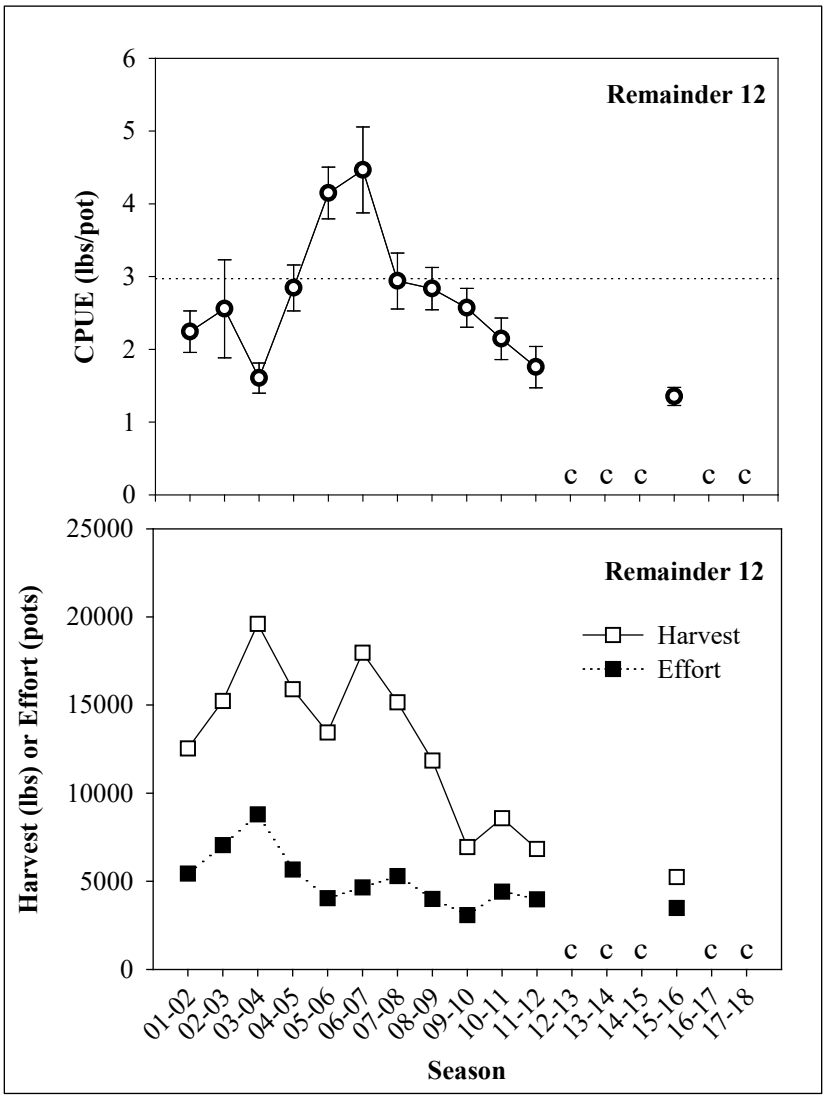

Figure 62.–Areawide CPUE and effort data for the Remainder of District 12, 2001/02–2017/18 seasons. CPUE is weighted by analysis area weights to allow for an overall impression of fishery performance, and "c" indicates the area was closed to fishing.

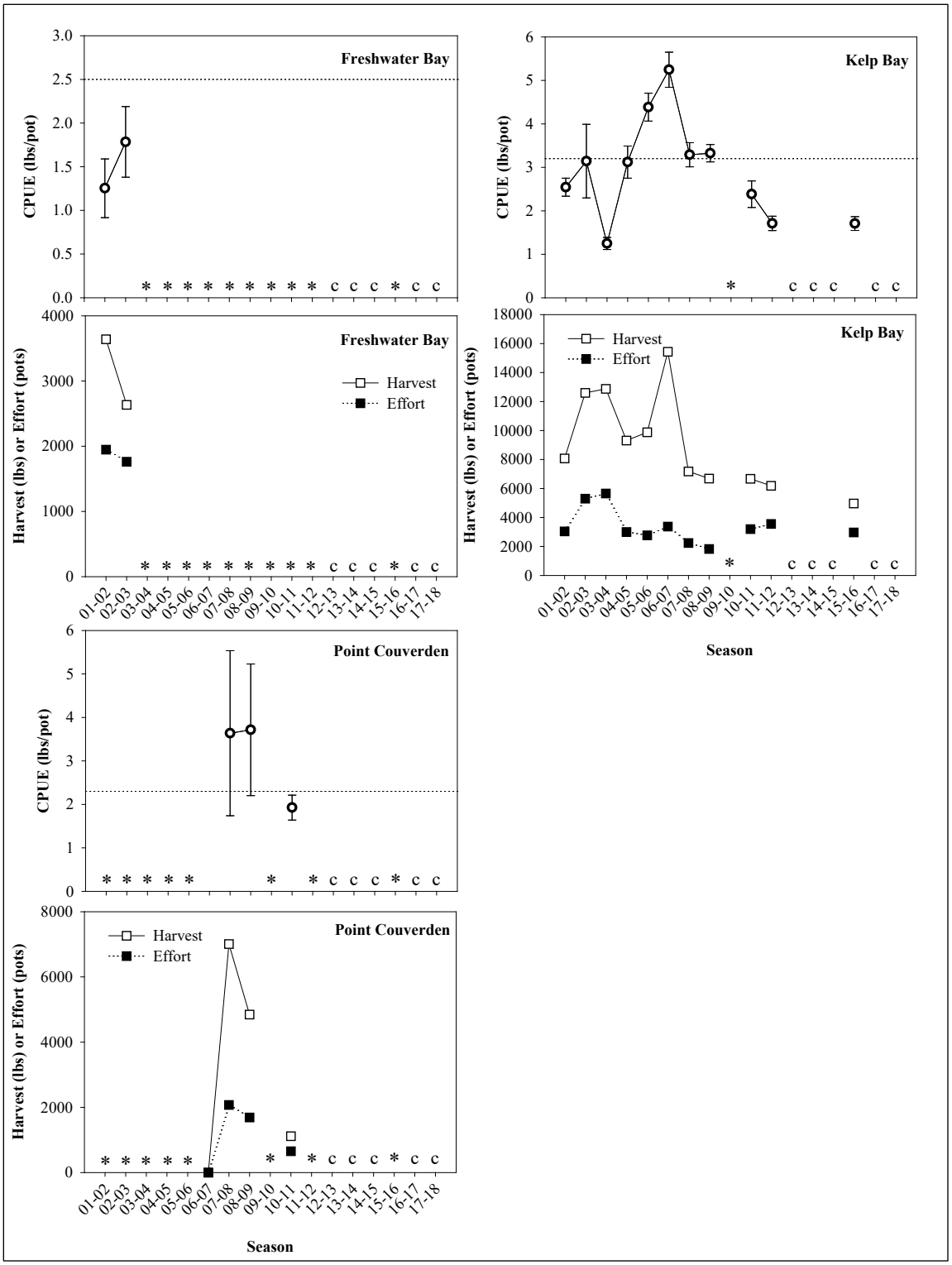

Figure 63.–Mean and standard error of spot shrimp catch rate from commercial harvest (dotted line represents the long-term baseline) and the commercial harvest and effort by analysis area in the Remainder of District 12, 2001/02–2017/18 seasons. Asterisks (*) indicate confidential data with less than three permits participating, and "c" indicates the area was closed to fishing.

District 14

The GHL in District 14b has been reduced twice since the 1998/99 season. In response to concerns over fishery performance, the GHL for District 14 was reduced from 25% to 15,000 lb beginning with the 2006/07 fishing season and an additional 33% to 10,000 lb for the 2008/09 season. The district was subsequently closed for the 2009/10–2011/12 seasons and reopened for the 2012/13 season. Due to continued poor performance, the fishery was closed for the 2013/14–2015/16 seasons (Table 40). The District reopened for the 2016/17 season with a 7,500 lb GHL. Over the past ten open fishing seasons, harvest averaged 15,100 lb (94% of the GHL). This district is divided into two analysis areas: Eastern Icy Strait and Port Frederick (Table 2).

District 14 was closed for the 2017/18 season as part of a planned rotation. In 2016/17 the districtwide standardized commercial CPUE showed an increase from the 2012/13 season but was still below baseline (Figure 64). Eastern Icy Strait was the only analysis area fished and CPUE was at baseline (Figure 65). No four-year analyses were possible due to the 2013/14–2015/16 closure.

Manager scores were neutral for Eastern Icy Strait in the 2016/17 season.

The overall matrix in 2016/17 score was 0.00 (moderate), which was up from -1.00 (poor) in the 2012/13 season due to increases in commercial CPUE. District 14 has a 0.09 (very low) level of data confidence (Table 41).

Table 40.–District 14 matrix, Part A. A 15-season history, including stock assessment recommendations, for the pot shrimp fishery in Southeast Alaska.

Season	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Upper regulatory GHR	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Actual GHL (lb spot shrimp)	20,000	20,000	20,000	15,000	15,000	10,000	Closed	Closed	Closed
Recommended GHL or stock status	20,000	Moderate	–	10,000	Poor	Poor	Closed	Closed	Closed
Season length (days)	107	68	151	151	151	120	Closed	Closed	Closed
Landings (number)	108	114	76	74	45	44	Closed	Closed	Closed
Harvest (lb spot shrimp)	19,590	21,282	15,845	13,259	13,054	7,796	Closed	Closed	Closed

Season	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Upper regulatory GHR	20,000	20,000	20,000	20,000	20,000	20,000
Actual GHL (lb spot shrimp)	10,000	Closed	Closed	Closed	7,500	Closed
Recommended GHL or stock status	Poor	Closed	Closed	Closed	Moderate	Closed
Season length (days)	54	Closed	Closed	Closed	11	Closed
Landings (number)	53	Closed	Closed	Closed	22	Closed
Harvest (lb spot shrimp)	8,833	Closed	Closed	Closed	6,806	Closed

Note: En dash = not available.

Table 41.–District 14 matrix, Part B. Baselines, current season values, and scores for each stock status parameter and analysis area for the pot shrimp fishery in Southeast Alaska. Data sources are from ADF&G shrimp survey, fish tickets ("fish tix"), logbooks, and on-the-grounds (OTG) and dockside (DS) sampling of commercial catch. Data are divided by type: CPUE, harvest rate, mean carapace length (CL), and L_{50}. Score for each analysis area is the sum of all individual scores.

Analysis Area		Eastern Icy Strait			Port Frederick			
Area weighting			0.1			0.9		
Stock Status Parameters	Source	Baseline	Value	Score	Baseline	Value	Score	Total Score
Catch rate ≥XL	survey	–	–	–	–	–	–	–
4-yr trend in catch rate	survey	–	–	–	–	–	–	–
Std. Comm. CPUE	fish tix	1.7	Closed	–	1.6	Closed	–	–
4-yr trend in CPUE	fish tix	–	–	–	–	–	–	–
Catch rate ≥XL	logbook	–	–	–	–	–	–	–
Harvest rate ≥XL (2015)	logbook	–	–	–	–	–	–	–
Harvest rate ≥XL (2016)	logbook	–	–	–	–	–	–	–
Harvest rate ≥XL (2017)	logbook	–	–	–	–	–	–	–
Mean CL	survey	–	–	–	–	–	–	–
4-yr trend in CL	survey	–	–	–	–	–	–	–
Mean CL	OTG	–	–	–	–	–	–	–
4-yr trend in CL	OTG	–	–	–	–	–	–	–
Mean CL	DS	40.4	–	–	–	–	–	–
4-yr trend in CL	DS	–	–	–	–	–	–	–
L_{50}	survey	–	–	–	–	–	–	–
L_{50}	OTG/DS	40.5	–	–	–	–	–	–
Manager score	–	–	–	–	–	–	–	–
Score	–	–	–	0.00	–	–	0.00	0.00
Max. possible score	–	–	–	0.00	–	–	0.00	0.00
Stock Status	–	–	–	–	–	–	–	Closed
Confidence	–	–	–	–	–	–	–	–

Note: * indicates confidential data with less than three permits participating. En dashes = not available, NA = not applicable, *Sig. inc.* = significant increase, *Sig. dec.* = significant decrease, ≥XL = ≥40 mm CL.

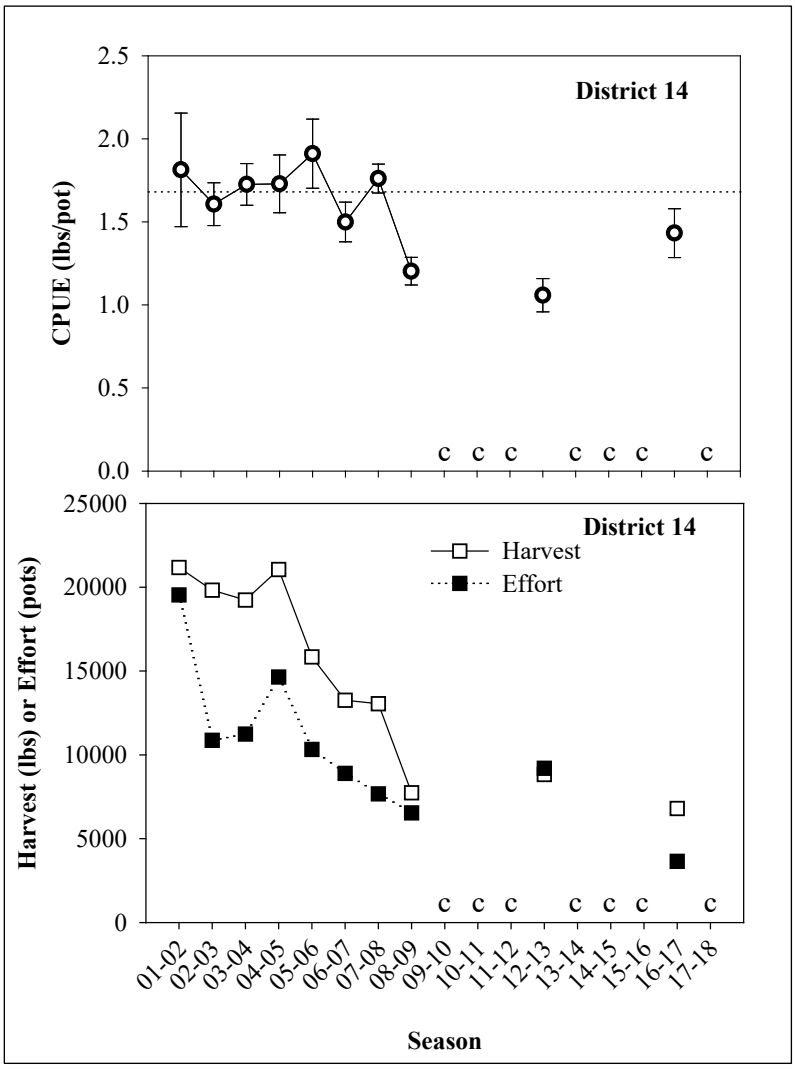

Figure 64.–Districtwide CPUE and effort data for District 14, 2001/02–2017/18 seasons. CPUE is weighted by analysis area weights to allow for an overall impression of fishery performance, "c" indicates the area was closed to fishing.

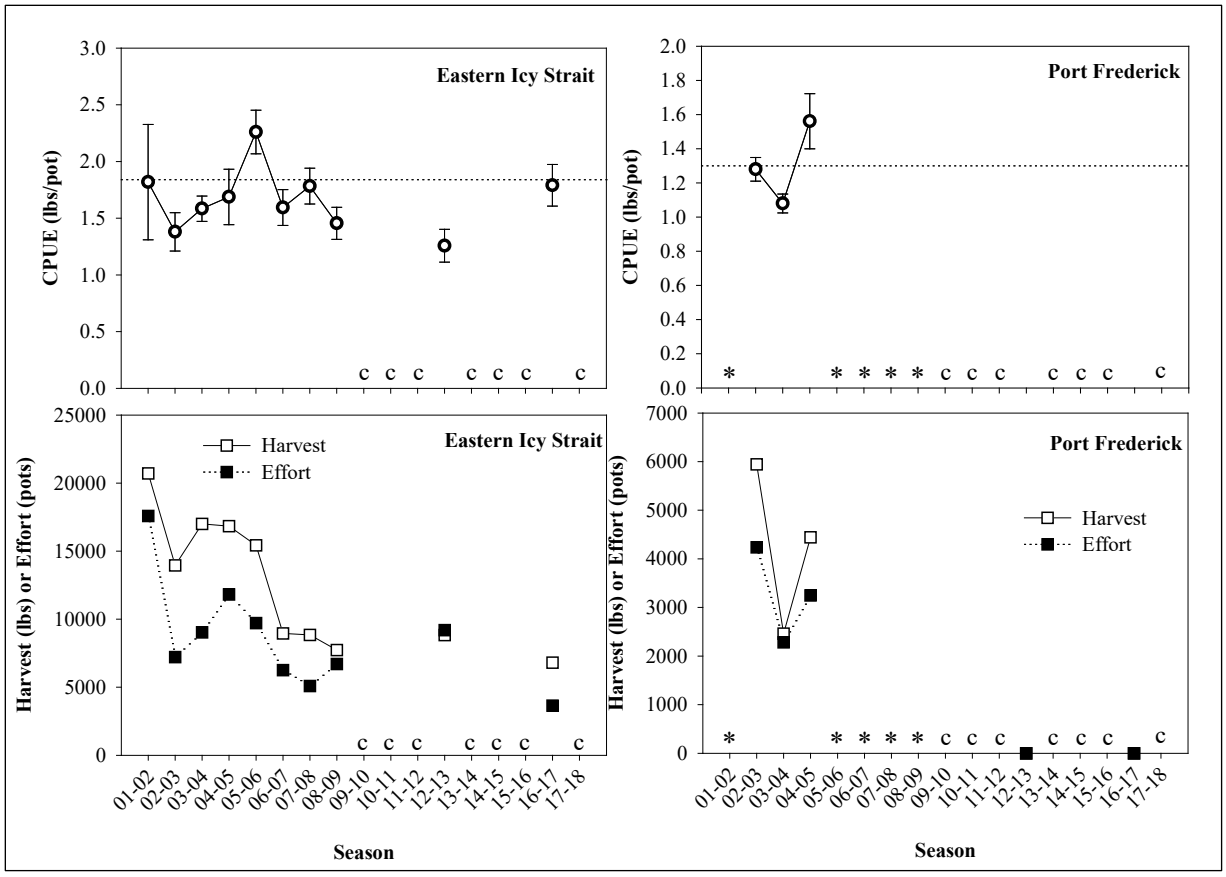

Figure 65.–Mean and standard error of spot shrimp catch rate from commercial harvest (dotted line represents the long-term baseline) and the commercial harvest and effort by analysis area in District 14 for the 2001/02–2017/18 seasons. Asterisks (*) indicate confidential data with less than three permits participating, and "c" indicates the area was closed to fishing.

District 16

The initial GHL in District 16, established for the 1995/96 fishing season, was 20,000 lb of coonstripe shrimp. The GHL was reduced 25% to 15,000 lb for the 2004/05 fishing season. Continuing declines in fishery performance resulted in a three-year closure from 2005/06 through 2007/08. Following the closure, an every-other-year rotational fishery with a 15,000 lb GHL of combined spot and coonstripe shrimp was implemented beginning with the 2008/09 season. Since 2008/09, harvest has averaged 13,500 lb (90% of the GHL) (Table 42). This district is divided into two analysis areas: Lituya Bay and Rest of 16 (Table 2). In recent years, all harvest in the district has come from Lituya Bay.

District 16 was closed for the 2017/18 season as part of its normal rotation. In 2016/17 Standardized commercial CPUE for spot and coonstripe shrimp combined was at baseline in the Lituya Bay analysis area (Figure 66). The species make-up of the catch has changed dramatically over the past ten years. The spot shrimp CPUE has slowly increased since the inception of rotational fisheries, and the coonstripe shrimp CPUE has fallen over the same time period.

The overall 2016/17 matrix score was 0.31 (moderate), which was up from 0.00 (moderate) in 2015/16. The increase is due to low logbook harvest rates, tempered by decreased manager scores. District 16 has a 0.18 (low) level of data confidence (Table 43).

Table 42.–District 16 matrix, Part A. A 15-season history, including stock assessment recommendations, for the pot shrimp fishery in Southeast Alaska.

Season	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Upper regulatory GHR	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Actual GHL (lb shrimp)	20,000	15,000	Closed	Closed	Closed	15,000	Closed	15,000	Closed
Recommended GHL or stock status	–	Poor	Closed	Closed	Closed	Above Average	Closed	Good	Closed
Season length (days)	152	151	Closed	Closed	Closed	127	Closed	54	Closed
Landings (number)	41	*	Closed	Closed	Closed	*	Closed	*	Closed
Harvest (lb)	15,017	*	Closed	Closed	Closed	*	Closed	*	Closed

Season	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Upper regulatory GHR	20,000	20,000	20,000	20,000	20,000	20,000
Actual GHL (lb shrimp)	15,000	Closed	15,000	Closed	15,000	Closed
Recommended GHL or stock status	Above Average	Closed	Above Average	Closed	Moderate	Closed
Season length (days)	72	Closed	72	Closed	151	Closed
Landings (number)	*	Closed	28	Closed	*	Closed
Harvest (lb)	*	Closed	14,118	Closed	*	Closed

Note: * indicates confidential data with less than three permits participating; en dash = not available.

Table 43.–District 16 matrix, Part B. Baselines, current season values, and scores for each stock status parameter and analysis area for the pot shrimp fishery in Southeast Alaska. Data sources are from ADF&G shrimp survey, fish tickets ("fish tix"), logbooks, and on-the-grounds (OTG) and dockside (DS) sampling of commercial catch. Data are divided by type: CPUE, harvest rate, mean carapace length (CL), and L_{50}. Score for each analysis area is the sum of all individual scores.

Analysis Area		Lituya Bay			Rest of 16			
Area weighting			1			0		
Stock Status Parameters	Source	Baseline	Value	Score	Baseline	Value	Score	Total Score
Catch rate ≥XL	survey	–	–	–	–	–	–	–
4-yr trend in catch rate	survey	–	–	–	–	–	–	–
Std. Comm. CPUE	fish tix	3.5	Closed	–	–	Closed	–	–
4-yr trend in CPUE	fish tix	–	–	–	–	–	–	–
Catch rate ≥XL	logbook	–	–	–	–	–	–	–
Harvest rate ≥XL (2015)	logbook	–	–	–	–	–	–	–
Harvest rate ≥XL (2016)	logbook	–	–	–	–	–	–	–
Harvest rate ≥XL (2017)	logbook	–	–	–	–	–	–	–
Mean CL	survey	–	–	–	–	–	–	–
4-yr trend in CL	survey	–	–	–	–	–	–	–
Mean CL	OTG	–	–	–	–	–	–	–
4-yr trend in CL	OTG	–	–	–	–	–	–	–
Mean CL	DS	–	–	–	–	–	–	–
4-yr trend in CL	DS	–	–	–	–	–	–	–
L_{50}	survey	–	–	–	–	–	–	–
L_{50}	OTG/DS	–	–	–	–	–	–	–
Manager score		–	–	–	–	–	–	–
Score		–	–	0.00	–	–	0.00	0.00
Max. possible score		–	–	0.00	–	–	0.00	0.00
Stock Status		–	–	–	–	–	–	Closed
Confidence		–	–	0.00	–	–	0.00	0.00

Note: * indicates confidential data with less than three permits participating. En dashes = not available, NA = not applicable, *Sig. inc.* = significant increase, *Sig. dec.* = significant decrease, ≥XL = ≥40 mm CL.

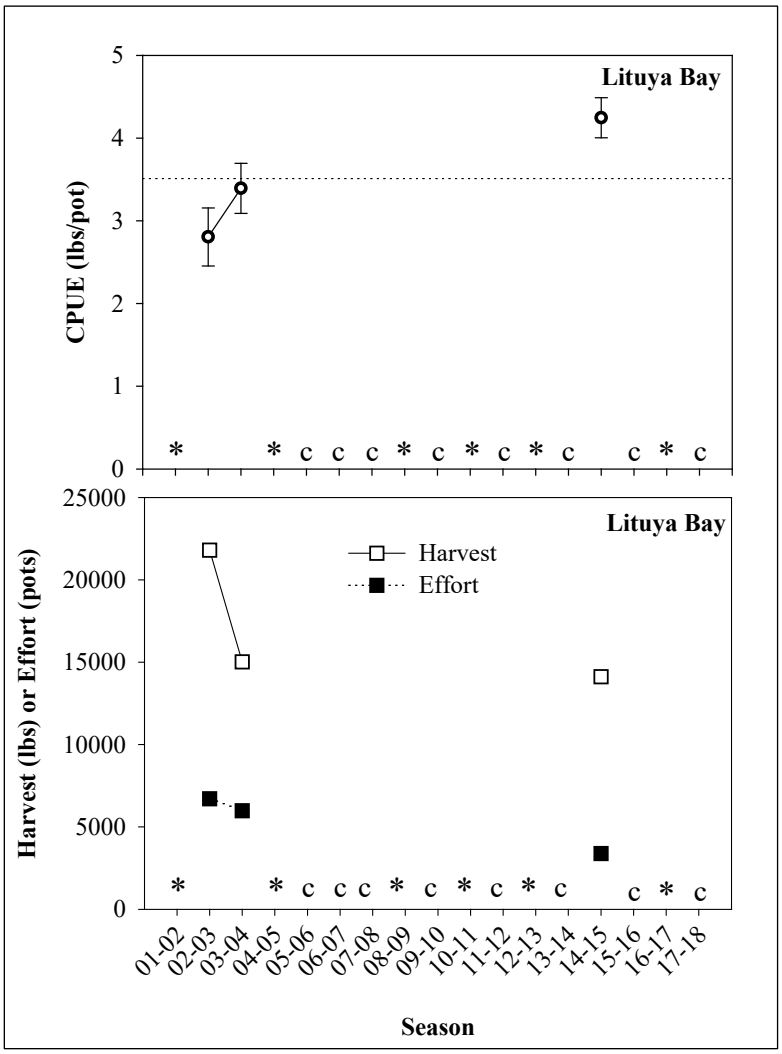

Figure 66.–Mean and standard error of spot and coonstripe shrimp catch rate from commercial harvest (dotted line represents the long-term baseline) and the commercial harvest and effort by analysis area in District 16, 2001/02–2017/18 seasons. Asterisks (*) indicate confidential data with less than three permits participating, and "c" indicates the area was closed to fishing.

HAINES MANAGEMENT AREA

District 15

The District 15 GHL for coonstripe shrimp was 20,000 lb through the 2004/05 season; it was reduced 25% to 15,000 lb for the 2005/06 season in response to conservation concerns. Due to continuing conservation concerns, the district was then closed for the 2006/07–2008/09 seasons. District 15 reopened in the 2009/10 season under a new spatial management strategy. Functionally, the District 15 GHL is now managed as two separate areas each with a GHL. A GHL of 7,500 lb was assigned to "District 15-East," an area composed of Chilkoot, Lutak, and Taiya Inlets. A second 7,500 lb GHL was specified for "District 15-Remainder," which includes only Chilkat Inlet. These area descriptions and GHLs are used as a management tool only and are not in regulation.

District 15-East

This area has been managed for a 7,500 lb GHL since reopening in 2009/10. During this time harvest has averaged 6,700 lb (90% of the GHL) (Table 44).

District 15-East standardized CPUE declined for a third year in the 2017/18 season and is now at levels that triggered a closure in 2005/06 (Figure 67). Standardized CPUE was below baseline in Lutak and Chilkoot Inlets and at baseline in Taiya Inlet (Table 45, Figure 68). The standardized CPUE in Lutak Inlet is the second worst on record in the Southeast pot shrimp. Standardized CPUE showed significant four-year declines in Lutak and Taiya Inlets.

Dockside sampling data were not available for the 2017/18 season (Table 45, Figures 69 and 70).

Manager scores were neutral in all areas in District 15 East (Table 45).

The overall matrix score is -0.32 (below average), which was down from 0.09 (moderate) in 2016/17 due to declines in CPUE in Chilkoot Inlet and continued poor CPUE in Lutak Inlet. It should be noted that without the neutral manager scores the area would score as "poor". District 15-East has a 0.16 (low) data confidence (Table 45).

District 15-Remainder

This area has been managed for a 7,500 lb GHL since reopening in 2009/10. During this time harvest has averaged 3,250 lb (43% of the GHL) (Table 46).

Standardized CPUE dropped precipitously in the 2015/16 season to the lowest on record in the Southeast pot shrimp fishery. There was no harvest in the District 15-Remainder during the 2016/17, or winter portion of the 2017/18 seasons. Fishing occurred in the summer 2017/18 season, but all catch information is confidential due to less than three vessels participating (Table 47, Figure 71).

There has been no on-the-grounds sampling conducted in the area since 2014 (Figure 72).

Table 44.–District 15-East matrix, Part A. A 15-season history, including stock assessment recommendations, for the pot shrimp fishery in Southeast Alaska.

Season	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Upper regulatory GHR					20,000 all District 15				
Actual GHL (lb spot shrimp)	20,000[a]		15,000	Closed	Closed	Closed	7,500	7,500	7,500
Recommended GHL or stock status	20,000	Poor	Poor	Closed	Closed	Closed	Good	Above Average	Moderate
Season length (days)	230	229	151	Closed	Closed	Closed	151	151	28
Landings (number)	8	14	3	Closed	Closed	Closed	29	31	27
Harvest (lb Coonstripe shrimp)	572	1,248	680	Closed	Closed	Closed	6,588	7,164	7,936

Season	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Upper regulatory GHR			20,000 all District 15			
Actual GHL (lb spot shrimp)	7,500	7,500	7,500	7,500	7,500	7,500
Recommended GHL or stock status	Above Average	Moderate	Moderate	Moderate	Moderate	Below Average
Season length (days)	99	39	34	151	229	229
Landings (number)	36	43	41	*	20	19
Harvest (lb coonstripe shrimp)	7,386	7,868	8,689	*	3,666	3,614

Note: * indicates confidential data with less than three permits participating; en dash = not available.

[a] For the 2003/04 and 2004/05 seasons, District 15 was managed as one management unit (e.g., District 15-East and District 15-Remainder combined).

Table 45.–District 15-East matrix, Part B. Baselines, current season values, and scores for each stock status parameter and analysis area for the pot shrimp fishery in Southeast Alaska. Data sources are from ADF&G shrimp survey, fish tickets ("fish tix"), logbooks, and on-the-grounds (OTG) and dockside (DS) sampling of commercial catch. Data are divided by type: CPUE, harvest rate, mean carapace length (CL), and L_{50}. Score for each analysis area is the sum of all individual scores.

Analysis Area		Chilkoot Inlet			Lutak Inlet			Tayia Inlet			
Area weighting			0.25			0.20			0.55		
Stock Status Parameters	Source	Baseline	Value	Score	Baseline	Value	Score	Baseline	Value	Score	Total Score
Catch rate ≥XL	survey	–	–	–	–	–	–	–	–	–	–
4-yr trend in catch rate	survey	–	–	–	–	–	–	–	–	–	–
Std. Comm. CPUE	fish tix	2.0	*	-1.00	1.6	*	-1.00	1.9	2.0	0.00	-0.15
4-yr trend in CPUE	fish tix	–	–	–	–	Sig. dec.	-0.25	–	Sig. dec.	-0.25	-0.17
Catch rate ≥XL	logbook	–	–	–	–	–	–	–	–	–	–
Harvest rate ≥XL (2015)	logbook	–	–	–	–	–	–	–	–	–	–
Harvest rate ≥XL (2016)	logbook	–	–	–	–	–	–	–	–	–	–
Harvest rate ≥XL (2017)	logbook	–	–	–	–	–	–	–	–	–	–
Mean CL	survey	–	–	–	–	–	–	–	–	–	–
4-yr trend in CL	survey	–	–	–	–	–	–	–	–	–	–
Mean CL	OTG	34.8	–	–	33.4	–	–	34.5	–	–	–
4-yr trend in CL	OTG	–	–	–	–	–	–	–	–	–	–
Mean CL	DS	–	–	–	–	–	–	–	–	–	–
4-yr trend in CL	DS	–	–	–	–	–	–	–	–	–	–
L_{50}	survey	–	–	–	–	–	–	–	–	–	–
L_{50}	OTG/DS	–	–	–	30.5	–	–	31.3	–	–	–
Manager score		–	–	0	–	–	0	–	–	0	0.00
Score		–	–	-1.00	–	–	-1.25	–	–	-0.25	-0.32
Max. possible score		–	–	2.00	–	–	2.25	–	–	2.25	1.17
Stock Status		–	–	–	–	–	–	–	–	–	Below average
Confidence		–	–	0.18	–	–	0.18	–	–	0.18	0.15

Note: * indicates confidential data with less than three permits participating. En dashes = not available, NA = not applicable, *Sig. inc.* = significant increase, *Sig. dec.* = significant decrease, ≥XL = ≥40 mm CL.

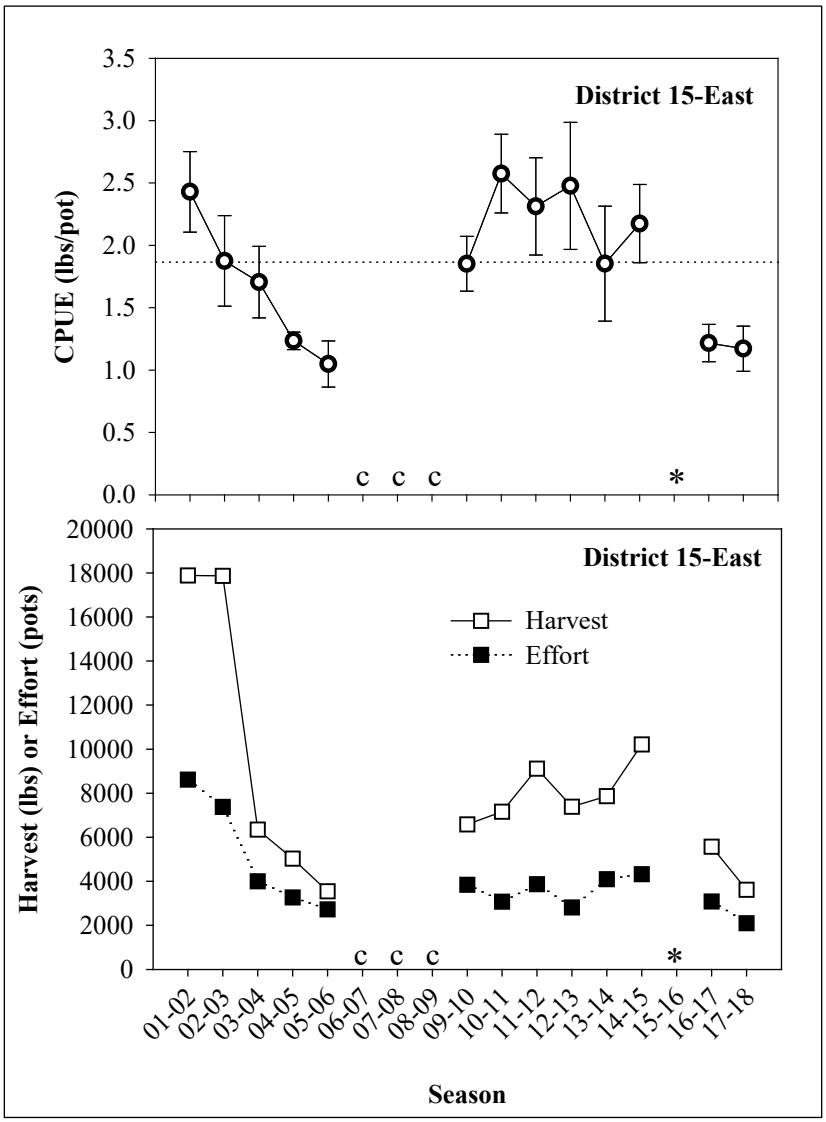

Figure 67.–Areawide CPUE and effort data for District 15-East, 2001/02–2017/18 seasons. CPUE is weighted by analysis area weights to allow for an overall impression of fishery performance. Asterisks (*) indicate confidential data with less than three permits participating, and "c" indicates the area was closed to fishing.

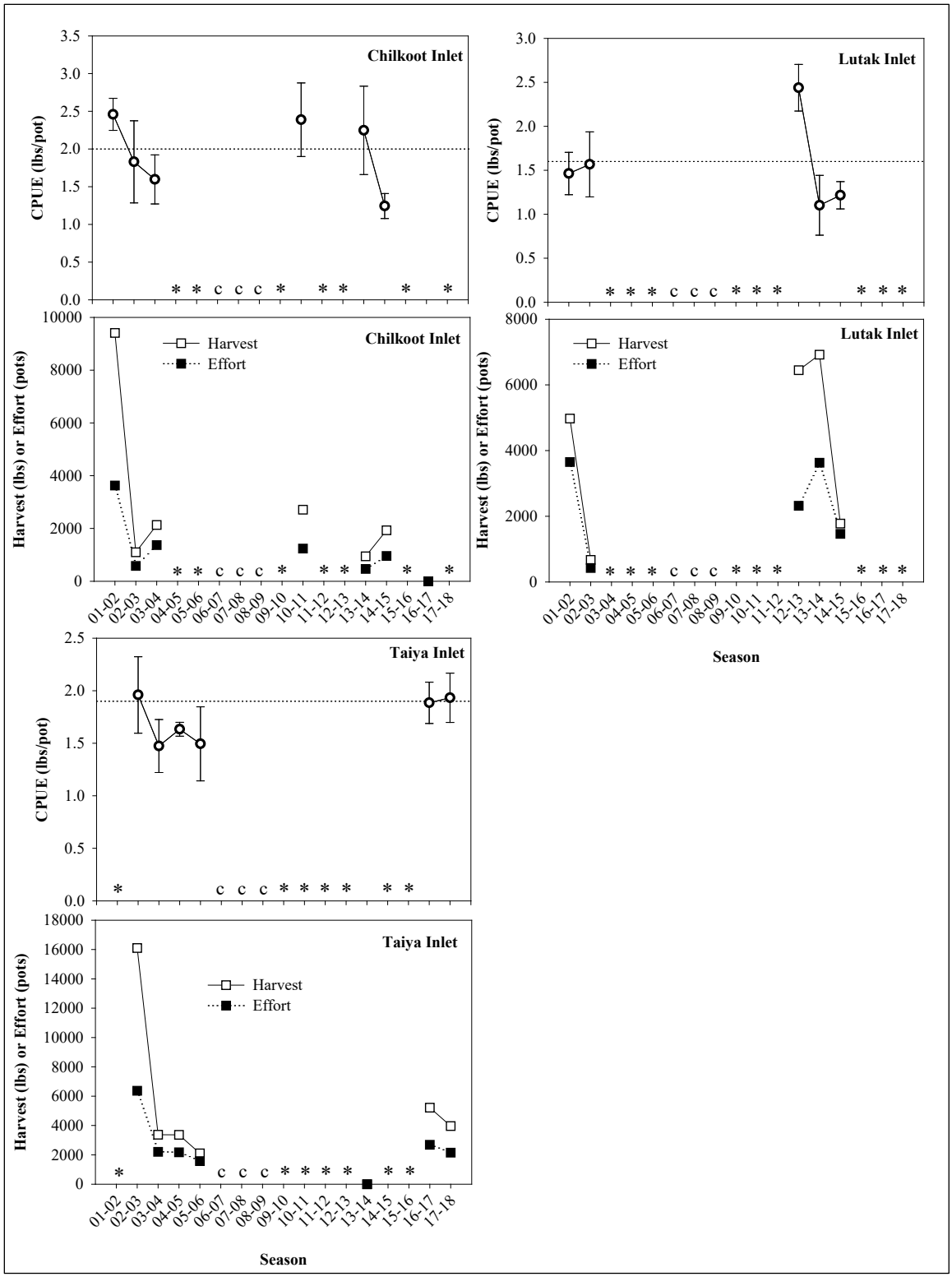

Figure 68.–Mean and standard error of coonstripe shrimp catch rate from commercial harvest (dotted line represents the long-term baseline) and the commercial harvest and effort by analysis area in District 15-East, 2001/02–2017/18 seasons. Asterisks (*) indicate confidential data with less than three permits participating, and "c" indicates the area was closed to fishing.

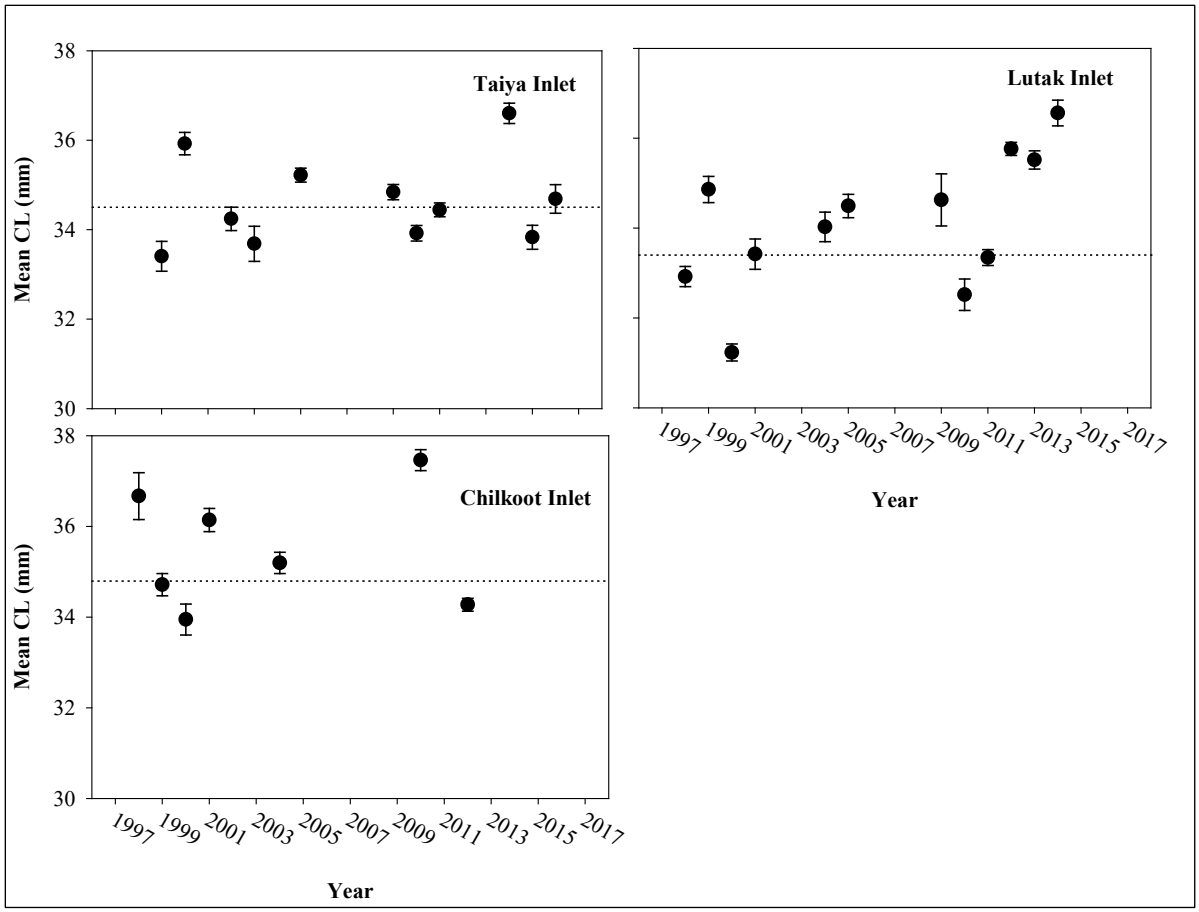

Figure 69.–Mean and standard error of coonstripe shrimp carapace length from floating processor and on-the-grounds sampling in District 15-East, 1999/00–2017/18 seasons. Dotted line represents the long-term baseline. Only areas with baselines or 2017/18 season data are shown.

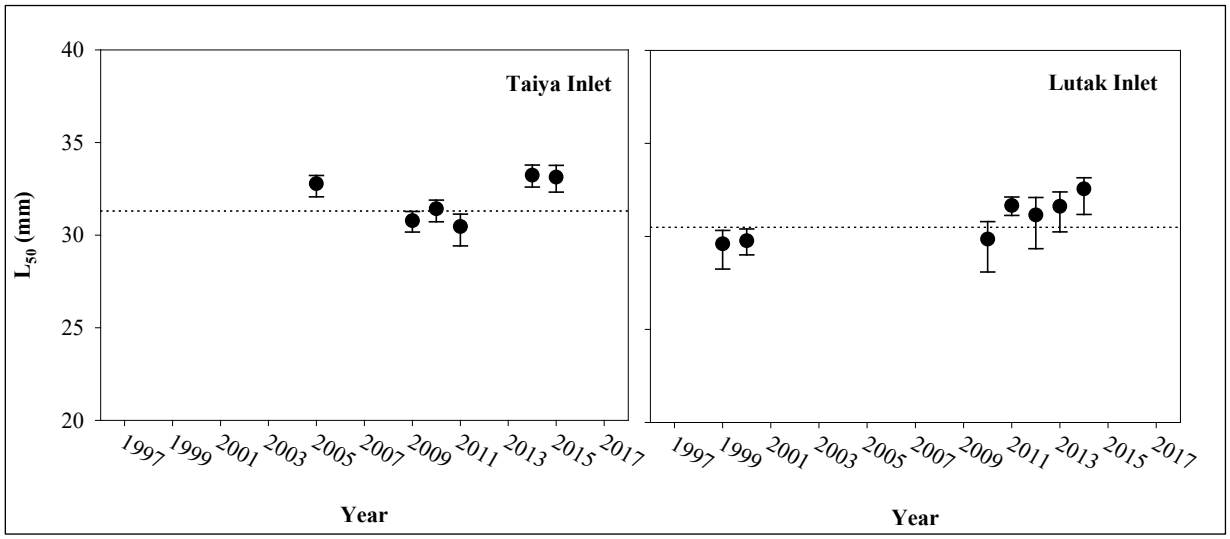

Figure 70.–L_{50} and 95% confidence intervals of coonstripe shrimp from floating processor, on-the-grounds and dockside sampling in District 15-East, 1997/98–2017/18 seasons. Dotted line represents the long-term baseline. Only areas with baselines or 2017/18 season data are shown.

Table 46.–District 15-Remainder matrix, Part A. A 15-season history, including stock assessment recommendations, for the pot shrimp fishery in Southeast Alaska.

Season	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Upper regulatory GHR				20,000 All District 15				
Actual GHL (lb coonstripe shrimp)	20,000[a]		15,000	Closed	Closed	Closed	7,500	7,500
Recommended GHL or stock status	20,000	Poor	Poor	Closed	Closed	Closed	Good	Above Average
Season length (days)	230	229	151	Closed	Closed	Closed	151	151
Landings (number)	*	*	*	Closed	Closed	Closed	*	*
Harvest (lb coonstripe shrimp)	*	*	*	Closed	Closed	Closed	*	*

Season	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Upper regulatory GHR				20,000 all District 15			
Actual GHL (lb coonstripe shrimp)	7,500	7,500	7,500	7,500	7,500	7,500	7,500
Recommended GHL or stock status	Above Average	Above Average	Below Average	Above Average	Moderate	No Effort	Moderate
Season length (days)	28	192	151	180	151	229	229
Landings (number)	*	73	42	40	*	0	*
Harvest (lb coonstripe shrimp)	*	8,389	6124	4,192	*	0	*

Note: * indicates confidential data with less than three permits participating.

[a] For the 2003/04 and 2004/05 seasons, District 15 was managed as one management unit (e.g., District 15-East and District 15-Remainder combined).

Table 47.–District 15-Remainder matrix, Part B. Baselines, current season values, and scores for each stock status parameter and analysis area for the pot shrimp (coonstripe shrimp) fishery in Southeast Alaska. Data sources are from ADF&G shrimp survey, fish tickets ("fish tix"), logbooks, and on-the-grounds (OTG) and dockside (DS) sampling of commercial catch. Data are divided by type: CPUE, harvest rate, mean carapace length (CL), and L_{50}. Score for each analysis area is the sum of all individual scores.

Analysis Area			Chilkat Inlet		
Area weighting			1.0		
Stock Status Parameters	Source	Baseline	Value	Score	Total Score
Catch rate ≥XL	survey	–	–	–	–
4-yr trend in catch rate	survey	–	–	–	–
Std. Comm. CPUE	fish tix	1.3	*	0.00	0.00
4-yr trend in CPUE	fish tix	–	–	–	–
Catch rate ≥XL	logbook	–	–	–	–
Harvest rate ≥XL (2015)	logbook	–	–	–	–
Harvest rate ≥XL (2016)	logbook	–	–	–	–
Harvest rate ≥XL (2017)	logbook	–	–	–	–
Mean CL	survey	–	–	–	–
4-yr trend in CL	survey	–	–	–	–
Mean CL	OTG	33.8	–	–	–
4-yr trend in CL	OTG	–	–	–	–
Mean CL	DS	–	–	–	–
4-yr trend in CL	DS	–	–	–	–
L_{50}	survey	–	–	–	–
L_{50}	OTG/DS	–	–	–	–
Manager score	–	–	–	0.00	0.00
Score	–	–	–	0.00	0.00
Max. possible score	–	–	–	2.00	1.00
Stock Status	–	–	–	–	Moderate
Confidence	–	–	–	0.06	0.12

Note: * indicates confidential data with less than three permits participating. En dashes = not available, NA = not applicable, *Sig. inc.* = significant increase, *Sig. dec.* = significant decrease, ≥XL = ≥40 mm CL.

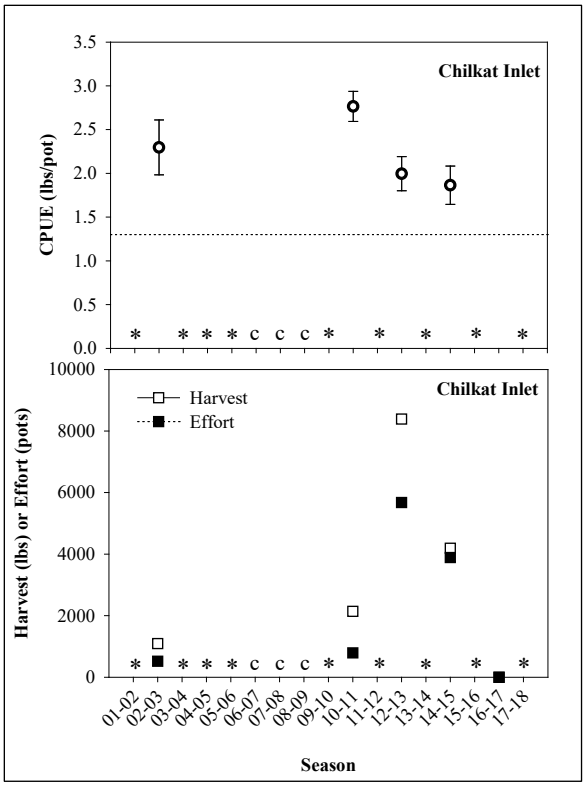

Figure 71.–Mean and standard error of coonstripe shrimp catch rate from commercial harvest (dotted line represents the long-term baseline) and the commercial harvest and effort by analysis area in District 15-Remainder, 2001/02–2017/18 seasons. Asterisks (*) indicate confidential data with less than three permits participating, and "c" indicates the area was closed to fishing.

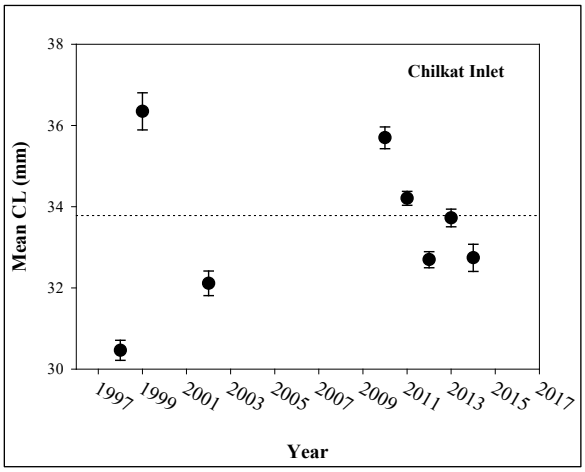

Figure 72.–Mean and standard error of coonstripe shrimp carapace length from floating processor and on-the-grounds sampling in District 15-Remainder, 1997/98–2017/18 seasons. Dotted line represents the long-term baseline. Only areas with baselines or 2017/18 season data are shown.

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REFERENCES CITED

Abramson, N. J., and P. K. Tomlinson. 1972. An application of yield models to a California ocean shrimp population. Fisheries Bulletin 70:1021-1041.

Armstrong, D. A., P. A. Dinnel, J. M. Orensanz, J. L. Armstrong, T. L. McDonald, R. F. Cusimano, R. S. Nemeth, M. L. Landor, J. R. Skalski, R. F. Lee, and R. J. Huggett. 1995. Status of selected bottomfish and crustacean species in Prince William Sound following the Exxon Valdez oil spill. Pages 485-547 [*In*] P. G. Wells, J. N. Butler, and J. S. Hughes, editors. Exxon Valdez Oil Spill: Fate and effects in Alaskan waters. American Society for Testing and Materials (1219), Philadelphia, PA.

Berkeley, A. A. 1930. The post-embryonic development of the common pandalids of British Columbia. Contributions to Canadian Biology 6:79-163.

Butler, T. H. 1964. Growth, reproduction, and distribution of pandalid shrimps in British Columbia. Journal of the Fisheries Research Board of Canada 21:1403-1452.

Butler, T. H. 1980. Shrimps of the Pacific coast of Canada. Canadian Bulletin of Fisheries and Aquatic Sciences 202, Ottawa.

Chew, K. K., D. Holland, J. W. Wells, D. H. McKenzie, and C. K. Harris. 1974. Depth distribution and size of spot shrimp, *Pandalus platyceros* trawled in Dabob Bay of Hood Canal, Washington, from 1966 to 1972. Proceedings of the National Shellfish Association 64:28-32.

Clark, J. E., and D. C. Love. 2003. Southeast Alaska pot shrimp research. Pages 39–57 [*In*] Nearshore marine research in Alaska: Final comprehensive progress report, August 1, 2000–June 30, 2002, NOAA Cooperative Agreement NA06FN0385: Project 4: Southeast Alaska pot shrimp research. Alaska Department of Fish and Game, Division of Commercial Fisheries, Juneau.

Clarke, S. H., S. Cadrin, D. F. Schick, P. J. Diodati, M. P. Armstrong, and D. McCarron. 2000. The Gulf of Maine northern shrimp (*Pandalus borealis*) fishery: A review of the record Journal of Northwest Atlantic Fishery Science 27:193-226.

Haynes, E. B. 1985. Morphological development, identification, and biology of larvae of Pandalidae, Hippolytidae, and Crangonidae (Crustacea, Decapoda) of the northern North Pacific Ocean. Fishery Bulletin 83:253-288.

Hoenig, J. M. 1983. Empirical use of longevity data to estimate mortality rates. Fisheries Bulletin U.S. 82:898-903.

Hynes, F. W. 1930. Shrimp Fishery of Southeast Alaska. Appendix to the Report of the U.S. Commissioner of Fisheries for 1929. #B.F. Doc. No. # 1052. Bureau of Fisheries.

ICES (International Council for the Exploration of the Sea). 2000. Report of the Pandalus Assessment Working Group. ICES CM #2000 ACFM:02. International Council on the Exploration of the Sea.

Kimker, A. T., W. E. Donaldson, and W. R. Bechtol. 1996. Spot shrimp growth in Unakwik Inlet, Prince William Sound, Alaska. Alaska Fishery Research Bulletin 3(1):1–8.

Koeller, P. A., M. Covey, and M. King. 2003. Is size at sex transition an indicator of growth or abundance in pandalid shrimp? Fisheries Research 65:217–230.

REFERENCES CITED (Continued)

Love, D. C., and G. H. Bishop. 2005. Pot shrimp stock assessment survey results from 1996-2003 in Districts 3, 7, 12, and 13 of Southeastern Alaska. Alaska Department of Fish and Game, Fishery Data Series No. 05-32, Anchorage.

Marliave, J. B., and M. Roth. 1995. Agarum kelp beds as nursery habitat of spot prawns *Pandalus platyceros* Brandt, 1851 (Decapoda, Caridea). Crustaceana 68:27–37.

Mohn, R. K., D. G. Parsons, and L. Savard. 1992. Shrimp management alternatives. Canadian Technical Report of Fisheries and Aquatic Sciences #1884. Canadian Atlantic Fisheries Scientific Advisory Committee.

Nunes, P. 1984. Reproductive and larval biology of northern Shrimp, *Pandalus borealis* Kroyer, in relation to temperature. Master of Science thesis. University of Alaska Fairbanks, Fairbanks.

Orensanz, J. M., J. L. Armstrong, D. A. Armstrong, and R. Hilborn. 1998. Crustacean resources are vulnerable to serial depletion - The multifaceted decline of crab and shrimp fisheries in the Greater Gulf of Alaska. Reviews in Fish Biology and Fisheries 8:117–176.

Price, V. A., and K. K. Chew. 1972. Laboratory rearing of spot shrimp larvae (*Pandalus platyceros*) and description of stages. Journal of the Fisheries Research Board of Canada 29:413–422.

Skuladottir, U. 1979. Comparing several methods of assessing the maximum sustainable yield of *Pandalus borealis* in Arnarfijopur. Rapports et Procès-Verbaux des Réunions du Conseil International pour l'Exploration de la Mer 175:240–252.

Smith, Q., and D. Gray. 2017. 2018 Report to the Board of Fisheries on Region 1 Shrimp Fisheries. Alaska Department of Fish and Game, Fishery Management Report No. 17-61, Anchorage

Smith, Q. 2018. Southeast Pot Shrimp Stock Status Prior to the 2017/18 Season. Alaska Department of Fish and Game, Fishery Data Series No. 18-34, Anchorage.

Wieland, K. 2004. Length at sex transition in northern shrimp (*Pandalus borealis*) off West Greenland in relation to changes in temperature and stock size. Fisheries Research 29:49–56.