

**Special Project Plan: 2015 Large-Mesh Bottom Trawl
Survey of Crab and Groundfish for Kodiak, Chignik,
South Peninsula, and Eastern Aleutian Districts**

by

Kally Spalinger

July 2015

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



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Weights and measures (metric)		General		Mathematics, statistics	
centimeter	cm	Alaska Administrative Code	AAC	<i>all standard mathematical signs, symbols and abbreviations</i>	
deciliter	dL	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	alternate hypothesis	H_A
gram	g	all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.	base of natural logarithm	e
hectare	ha	at	@	catch per unit effort	CPUE
kilogram	kg	compass directions:		coefficient of variation	CV
kilometer	km	east	E	common test statistics	(F, t, χ^2 , etc.)
liter	L	north	N	confidence interval	CI
meter	m	south	S	correlation coefficient (multiple)	R
milliliter	mL	west	W	correlation coefficient (simple)	r
millimeter	mm	copyright	©	covariance	cov
		corporate suffixes:		degree (angular)	$^\circ$
Weights and measures (English)		Company	Co.	degrees of freedom	df
cubic feet per second	ft ³ /s	Corporation	Corp.	expected value	E
foot	ft	Incorporated	Inc.	greater than	>
gallon	gal	Limited	Ltd.	greater than or equal to	\geq
inch	in	District of Columbia	D.C.	harvest per unit effort	HPUE
mile	mi	et alii (and others)	et al.	less than	<
nautical mile	nmi	et cetera (and so forth)	etc.	less than or equal to	\leq
ounce	oz	exempli gratia		logarithm (natural)	ln
pound	lb	(for example)	e.g.	logarithm (base 10)	log
quart	qt	Federal Information Code	FIC	logarithm (specify base)	log ₂ , etc.
yard	yd	id est (that is)	i.e.	minute (angular)	'
		latitude or longitude	lat. or long.	not significant	NS
Time and temperature		monetary symbols		null hypothesis	H_0
day	d	(U.S.)	\$, ¢	percent	%
degrees Celsius	°C	months (tables and figures): first three letters	Jan,...,Dec	probability	P
degrees Fahrenheit	°F	registered trademark	®	probability of a type I error (rejection of the null hypothesis when true)	α
degrees kelvin	K	trademark	™	probability of a type II error (acceptance of the null hypothesis when false)	β
hour	h	United States (adjective)	U.S.	second (angular)	"
minute	min	United States of America (noun)	USA	standard deviation	SD
second	s	U.S.C.	United States Code	standard error	SE
		U.S. state	use two-letter abbreviations (e.g., AK, WA)	variance	
Physics and chemistry				population sample	Var var
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				

REGIONAL INFORMATION REPORT NO. 4K15-03

**SPECIAL PROJECT PLAN: 2015 LARGE-MESH BOTTOM TRAWL
SURVEY OF CRAB AND GROUND FISH FOR KODIAK, CHIGNIK,
SOUTH PENINSULA, AND EASTERN ALEUTIAN DISTRICTS**

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Division of Sport Fish, Research and Technical Services
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July 2015

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ABSTRACT

This report specifies special project objectives and methods of Alaska Department of Fish and Game's (ADF&G) 2015 Kodiak, Chignik, South Peninsula, and Eastern Aleutian districts large-mesh bottom trawl survey of crab and groundfish. This special project plan is used in conjunction with the large-mesh bottom trawl survey operational Plan (Spalinger *in prep*), which describes standard large-mesh trawl survey sampling. Crab and groundfish special projects for 2015 include exploring additional areas for Tanner crab presence during the South Peninsula survey, collection of stomachs and contents in the Kodiak District from walleye pollock *Gadus chalcogrammus*, Pacific cod *Gadus macrocephalus*, flathead sole *Hippoglossoides elassodon*, arrowtooth flounder *Atheresthes stomias*, Pacific halibut *Hippoglossus stenolepis*, northern rock sole *Lepidopsetta polyxystra*, and spiny dogfish *Squalus acanthias* for a National Marine Fisheries Service (NMFS) food habits study, and collection of sablefish *Anoplopoma fimbria* and rockfish *Sebastes* spp. tissue samples throughout the survey for an Alaska Department of Environmental Conservation (ADEC) fish tissue testing program. Additionally, a fishing power comparison study between the R/V *Resolution* and R/V *Solstice* during part of the Northeast and Eastside survey, sampling shrimp and forage fish using small-mesh trawl gear in Pavlof and Chiniak bays, and monitoring of sea star wasting disease will be conducted throughout the survey.

Key words: Tanner crab, shellfish, groundfish, trawl survey, Kodiak, Alaska Peninsula, Chignik, Eastern Aleutian Islands, special projects

INTRODUCTION

From mid June through mid September 2015, the Alaska Department of Fish and Game (ADF&G) will conduct a bottom trawl survey in areas of known Tanner crab *Chionoecetes bairdi* habitat, sampling stations created using a fixed grid design around Kodiak Island and south of the Alaska Peninsula from Cape Douglas to False Pass, as well as around the Eastern Aleutian Islands (Figure 1). Survey data is used to estimate relative abundance, sex composition, and maturity of Tanner crab and red king crab *Paralithodes camtschaticus*, as well as determine spatial distribution, species composition, density, and size frequency distribution of groundfish catch by haul and area. Fishery managers use survey results to help decide if surveyed stocks are capable of supporting sustainable commercial fisheries.

The 2015 bottom trawl survey will also survey new locations in the South Peninsula District, continue sampling groundfish stomachs in the Kodiak District, collect tissue samples from groundfish, collect information on sea star wasting disease, conduct a fishing power comparison study, and conduct small-mesh sampling of Pavlof and Chiniak bays. This report details survey schedule, station boundaries, and sampling methods for special projects during the 2015 trawl survey. Standard sampling methods during the bottom trawl survey are described in the operational plan (Spalinger *in prep*). Changes to standard procedures, or special projects associated with the 2015 survey are described in this document.

OBJECTIVES

Objectives for special projects during the 2015 large-mesh bottom trawl survey are:

1. Expand the South Peninsula District survey by 10–15 hauls in waters that are not part of the standard station grid and estimate Tanner crab abundance in the expanded area.
2. Collect whole stomachs and stomach contents from walleye pollock *Gadus chalcogrammus*, Pacific cod *Gadus macrocephalus*, flathead sole *Hippoglossoides elassodon*, arrowtooth flounder *Atheresthes stomias*, Pacific halibut *Hippoglossus stenolepis*, northern rock sole *Lepidopsetta polyxystra*, and spiny dogfish *Squalus acanthias* from Marmot and Chiniak bays.

3. Collect sablefish and rockfish tissue samples from the Eastern Aleutian Islands, Shelikof Strait, Morzhovoi, Cold, and Pavlof bays, and Alitak Bay and Alitak Flats.
4. Conduct paired tows using the R/V *Resolution* and R/V *Solstice* to quantify species specific differences in fishing power between the two vessels.
5. Conduct small-mesh tows in Pavlof and Chiniak bays, sampling shrimp and forage fish to continue the small-mesh time series in those areas.
6. Monitor sea stars for external signs of wasting disease throughout the survey.

METHODS

SURVEY AREA

The 27.7 m ADF&G research vessel *Resolution* will conduct survey hauls using a 400-mesh eastern otter trawl in areas of Tanner crab habitat in the Kodiak, Chignik, South Peninsula, and Eastern Aleutian districts (Figure 1, Appendices A1–A14).

SHELLFISH SAMPLING

South Peninsula Survey Expansion

The 2015 South Peninsula District trawl survey will occur in areas of known Tanner crab habitat consistent with past trawl surveys (Appendices A8–A9). However, Tanner crab may occur in areas not currently assessed by the survey. This project will expand trawl sampling in 2015 to waters which are not included in the standard survey (Figure 2).

Between 10 and 15 additional large-mesh survey hauls will be conducted in areas outside of the existing annual South Peninsula trawl survey (Figure 2). The skipper, in consultation with the cruise leader, will determine where tows will be made taking into consideration factors such as bathymetry, substrate type, time available, and weather conditions. Catch from these hauls will be sampled and summarized using standard protocols (Spalinger *in prep*) and Tanner crab catch will be extrapolated to the entire expanded survey area to estimate abundance, provided that hauls are spread throughout the survey area. Survey results will be provided to the Aleutians East Borough, who funded the additional sampling, to determine if the area warrants future survey consideration and funding.

GROUND FISH SAMPLING

Stomach Collection

Stomachs and stomach contents from walleye pollock, Pacific cod, flathead sole, arrowtooth flounder, Pacific halibut, northern rock sole, and spiny dogfish will be collected in Marmot and Chiniak bays (Appendices A1 and A2). Sample sizes are 15 to 40 stomachs depending on species size group (Appendix B1), with a maximum number of 20 stomachs per species per haul. The goal is to sample two to three species from every haul (Appendix B2). Samples will be sent to National Marine Fisheries Service (NMFS) Food Habits Laboratory in Seattle, Washington where they will be examined and data included in an ongoing food habits study.

Sablefish and Rockfish Collection

Tissue samples from sablefish and rockfish will be collected from four areas throughout the survey (Figure 3). In each area, samples from 10 to 20 individuals per species will be collected

from two or more hauls. Samples will be kept clean and away from potential contaminants, such as fuel or grease, and handled with clean gloves. Samples should consist of either the whole fish or approximately 2 lbs of muscle tissue, including skin, from behind the head. Each sample will be placed directly into a bag along with a completed specimen form (Spalinger *in prep*) that also contains a sample number. The sample number is the haul number followed by a consecutive number representing the number of fish collected from the haul (e.g. the second fish collected from haul 125 would have a sample number of 125-02). Sample number (including haul number), species, fish length (tip of nose to middle of tail), and sex will be recorded on the Alaska Department of Environmental Conservation (ADEC) fish sampling form (Appendix C1). Samples should be frozen immediately after collection. At the end of survey, samples will be sent to ADEC in Anchorage for a fish tissue testing program. The final shipment will include a completed chain of custody form (Appendix C2).

FISHING POWER COMPARISON STUDY

The R/V *Resolution* and R/V *Solstice* (17.4 m) will perform paired tows in the Northeast and Eastside sections of the Kodiak Tanner crab district. Results are intended to estimate species specific fishing power correction factors between the vessels. Plans are currently progressing to replace the R/V *Resolution* with a new vessel within the next five years. This study is an initial attempt to compare catch results and ultimately is intended to preserve the continuity of the large-mesh trawl survey time series by forming a link between data collected on the R/V *Resolution* and a future survey vessel. Details on this study, including data analysis methods, can be found in Spalinger (2015).

PAVLOF AND CHINIAK BAY SMALL-MESH TOWS

Since 1973 ADF&G and NMFS have jointly conducted small-mesh bottom trawl surveys in the Kodiak, Chignik, and South Peninsula districts using a high opening box trawl with three bridles. This survey has been conducted annually in Pavlof Bay and other areas. In 2015 funding for this survey was greatly reduced. To maintain the Pavlof Bay small-mesh time series, and provide a baseline to monitor shrimp populations, the R/V *Resolution* will perform a limited number of small-mesh tows during the large-mesh survey.

At the end of the South Peninsula large-mesh survey leg, boat officers will remove and store the large-mesh trawl net and trawl doors and replace with small-mesh trawl survey gear (Jackson 2003). Up to eight tows will be conducted in small-mesh survey stations in Pavlof Bay (Figure 4) and the catch will be sampled according to small-mesh bottom trawl survey methods (Jackson 2003). Upon completion of those eight tows the large-mesh survey gear will be reinstalled and the large-mesh survey will continue.

After the Westside leg of the large-mesh survey, the large-mesh trawl net and trawl doors will again be removed and replaced by small-mesh gear. Up to eight tows will then be conducted in small-mesh survey stations in Chiniak Bay (Figure 5) during two day-trips. Catch from those tows will be sampled according to small-mesh survey methods (Jackson 2003).

SEA STAR WASTING DISEASE MONITORING

Sea stars along the northeast Pacific coast are dying in large numbers from a wasting disease possibly caused by a densovirus (Hewson et al. 2014). External signs of the disease include skin lesions, decaying tissue surrounding the lesions which leads to limb loss, body fragmentation,

and death (Appendix D1). Monitoring groups have documented wasting disease symptoms in numerous species (Appendix D2) geographically ranging from Baja California, Mexico to Kachemak Bay, Alaska. Most observations of the disease have been from shore-based investigators in intertidal areas or subtidal areas accessible to divers.

During the 2015 trawl survey sea stars in the subsample will be examined for symptoms of wasting disease (Appendix D1). If symptomatic animals are observed, information will be recorded on the sea star wasting disease log (Appendix D3) and a photo will be taken. Haul number, species name, number of animals affected, and the file name of the photo should be recorded on the log. At the end of the survey the disease log and photos will be delivered to Kally Spalinger, the lead trawl-survey biologist. Observations will be reported to http://www.gordon.science.oregonstate.edu/sea_star_wasting/observation_log/new

Photos will be sent to seastarwasting@googlegroups.com.

DATA FORMS AND SAMPLE CUSTODY

The cruise leader will ensure all samples and data forms are completed and removed from the research vessel after each survey leg, including downloading electronically collected data to the vessel's dryhold computer and making backup copies of all electronic data by copying to an external hard drive, USB flash drive, or other location. For projects continuing on the next survey leg, samples and data forms will be organized, labeled, and dried. Forms will be stored according to project and ordered sequentially by haul. Sampling tallies and logs will be complete and kept with the data forms for reference. Data removed from the vessel should be taken directly to Kally Spalinger, the lead trawl-survey biologist. Frozen samples must be labeled prior to removal from the R/V *Resolution* and transferred to either the ADF&G warehouse freezer or the walk-in freezer in the ADF&G lab. Samples preserved in formalin must be stored outside, in a vented container, or in a designated hazardous materials storage location until shipped. Samples should be protected from high temperatures and freezing. It is important to inform the lead trawl-survey biologist of the location of all stored samples.

SPECIAL PROJECT EQUIPMENT CHECKLIST

South Peninsula survey expansion

- Nautical charts of the area to be explored
- Additional survey nets

Groundfish stomach sampling

- Specimen forms or Allegro rugged handheld computer if entering data on deck
- Specimen labels
- Tally sheets
- 5-gallon buckets and lids (10–12)
- 4 gallons formalin
- Stomach bags
- 1-liter plastic bottles
- Baking soda
- Luggage tags
- 1/8 cup measuring cup
- Safety glasses
- Hazardous materials bucket

Sablefish and rockfish collection

- 1-gallon Ziploc bags
- Specimen collection forms
- ADEC fish sampling forms
- ADEC chain of custody forms

Fishing Power Comparison Study (R/V Solstice)

- Large-mesh trawl nets (2)
- MSI-9300 crane scale
- MSI-6000 platform scale
- Magnetic fish measuring board
- Fish sampling computer
- Teguar waterproof computer with speakers and on-deck crab data entry
- Electronic calipers (3)
- Caliper cables (6)
- Laptop for data entry
- On-deck sampling forms
- Skipper trawl record forms

Pavlof/Chiniak Small-mesh Tows

- Small-mesh trawl nets (2)
- Small-mesh trawl doors (2)
- Marel M60 platform scale
- 1-gallon Ziploc bags
- 1-quart Ziploc bags
- Small-mesh on-deck forms

Sea star wasting disease monitoring

- Sea star wasting disease log
- Digital camera

PERSONNEL AND SURVEY SCHEDULE

R/V Resolution crew – Captain Denis Cox Jr., Kurt Pedersen, Gary Wilson

*Chiniak Bay –
June 5 and 9*

*Paired tows to include
Marmot Bay –
June 10 to 16*

*Eastside Kodiak –
June 17 to July 2*

Kally Spalinger (cruise leader)
Collin Hakkinen
Sherry Barker
Joy Brooks

Kally Spalinger (cruise leader)
Collin Hakkinen
Joy Brooks
Nathaniel Nichols
Kim Phillips

Kally Spalinger (cruise leader)
Collin Hakkinen
Sherry Barker
Joy Brooks

*South Alaska Peninsula, Chignik,
and Eastern Aleutian –
July 14 to August 21*

*Westside Kodiak and North Mainland –
August 25 to September 4*

Mark Stichert (cruise leader 1st ½)
Nathaniel Nichols (cruise leader 2nd ½)
Collin Hakkinen
Sherry Barker
Joy Brooks

Kally Spalinger or Paul Converse (cruise leader)
Collin Hakkinen
Sherry Barker
Joy Brooks

R/V Solstice crew – Captain Dave Anderson, James Wiese, John Crofts

*Paired tows –
June 10 to 16*

Mark Stichert (cruise leader)
Sherry Barker
Paul Converse
Martin Schuster

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FIGURES

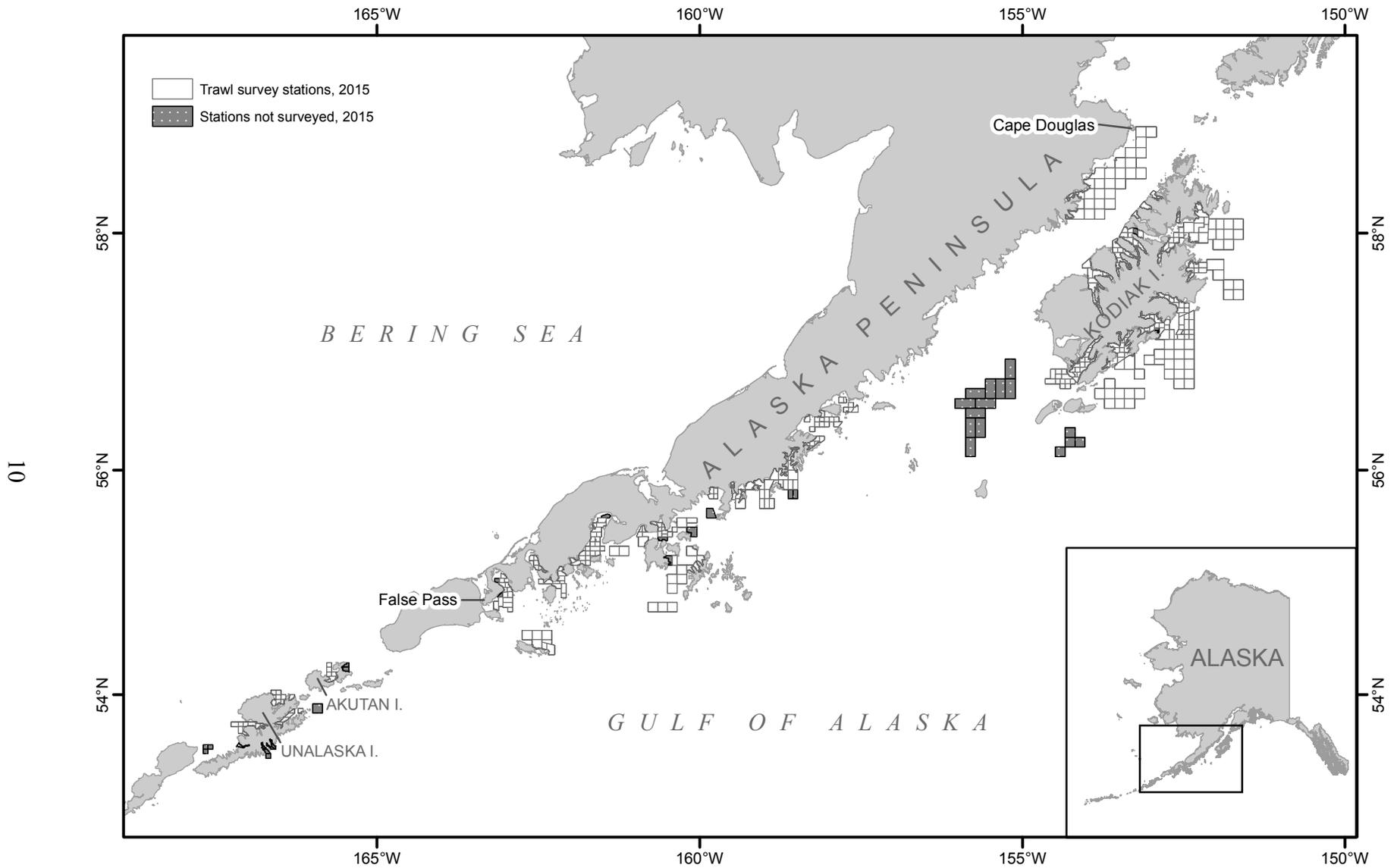


Figure 1.—Kodiak, Chignik, South Peninsula, and Eastern Aleutian districts large-mesh bottom trawl survey stations, 2015.

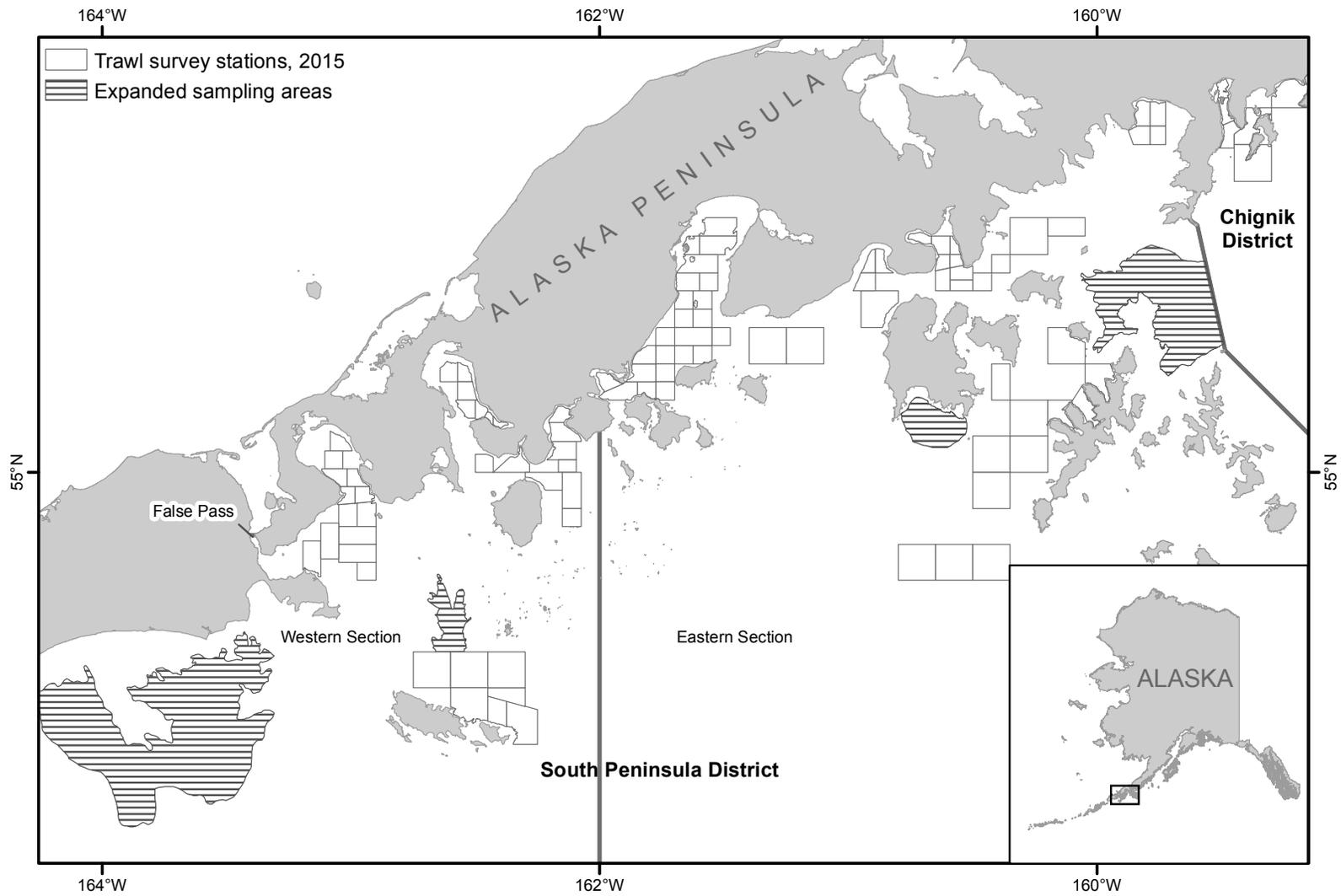


Figure 2.—Large-mesh bottom trawl standard survey stations in South Peninsula District and areas for expanded bottom trawl sampling in 2015.

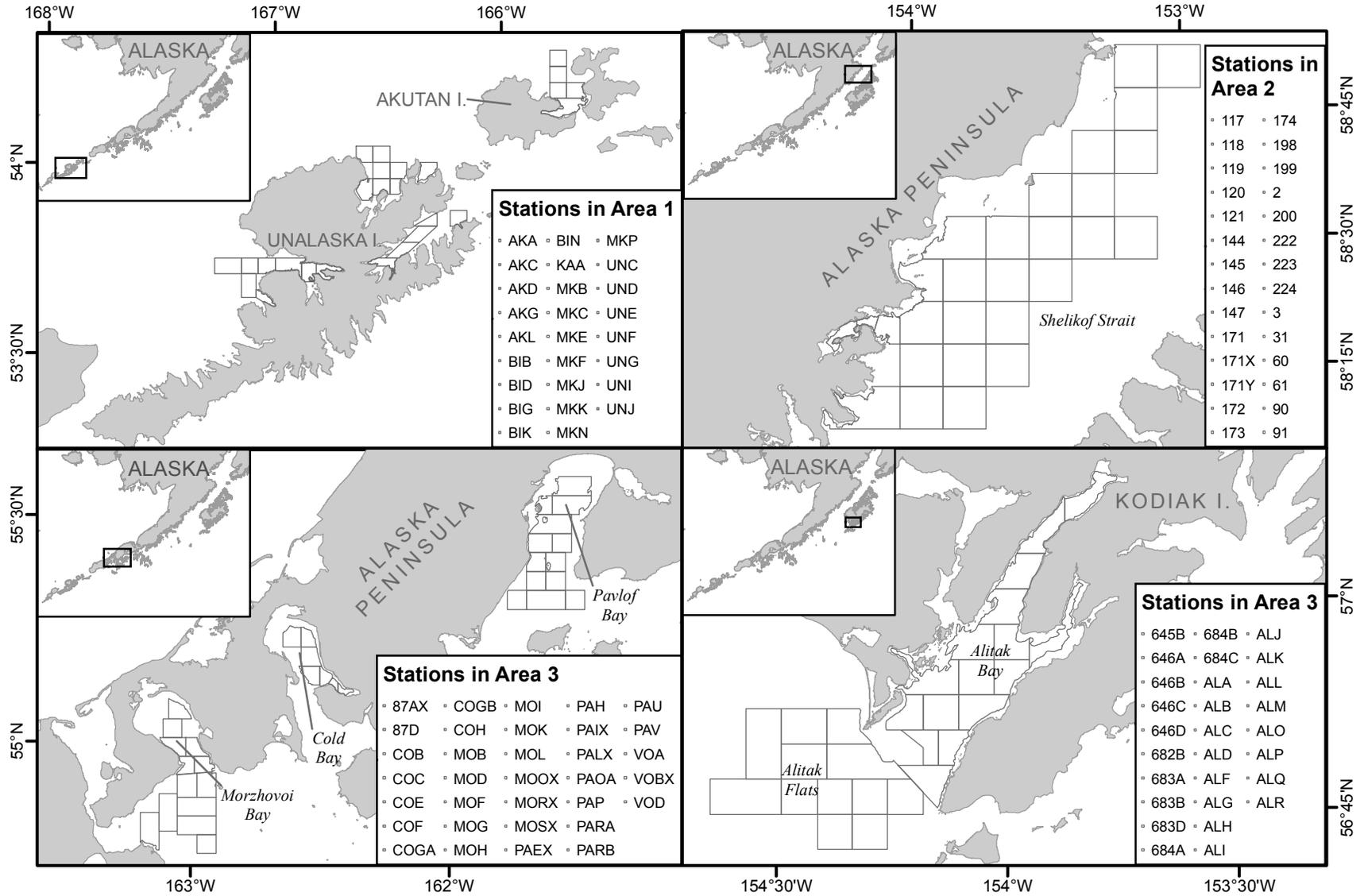


Figure 3.—Sampling areas for collection of sablefish and rockfish tissue samples for ADEC, during large-mesh bottom trawl survey, 2015.

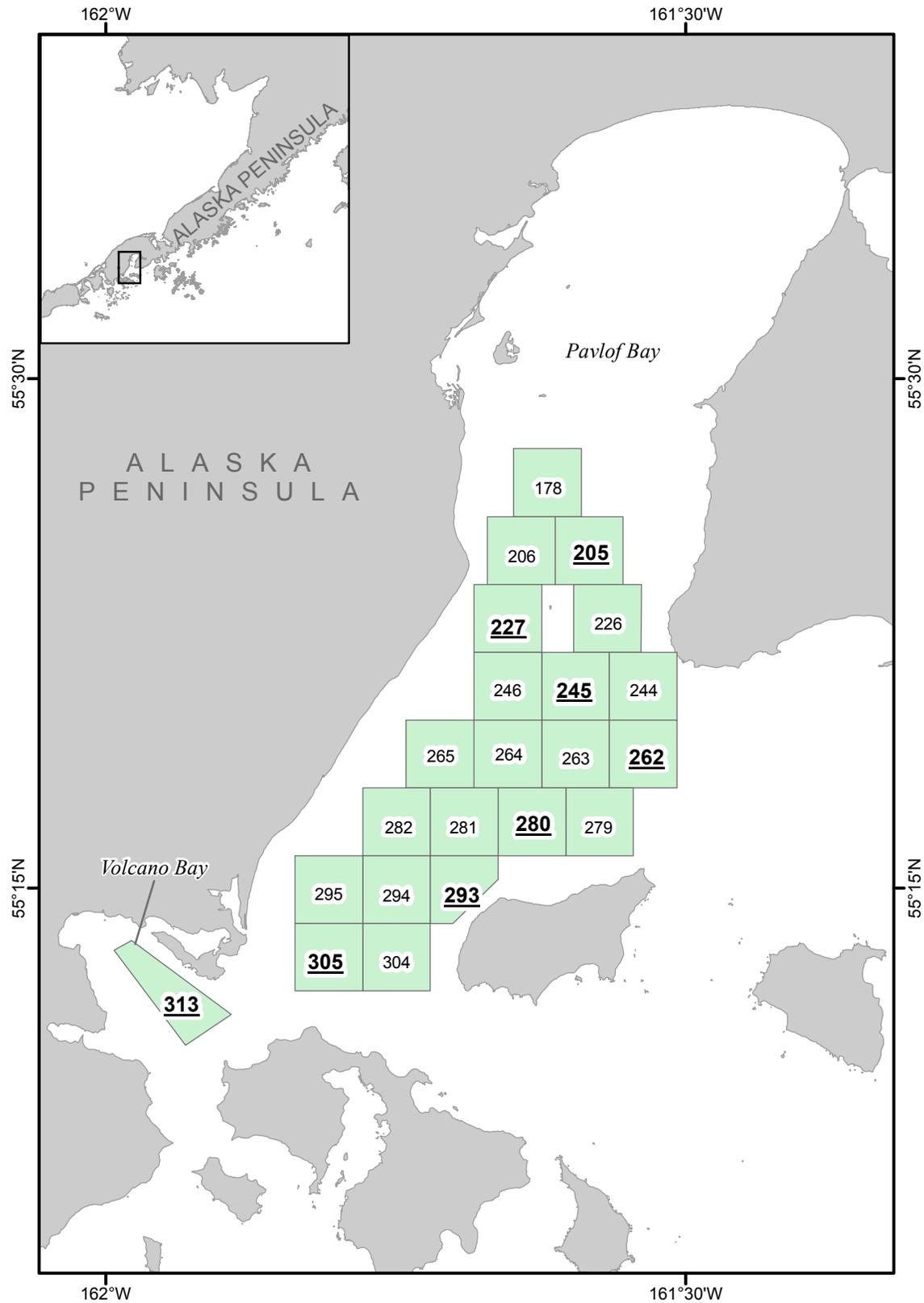


Figure 4.–Small-mesh trawl survey stations in Pavlof Bay. Stations in **bold and underlined** will be towed in 2015.

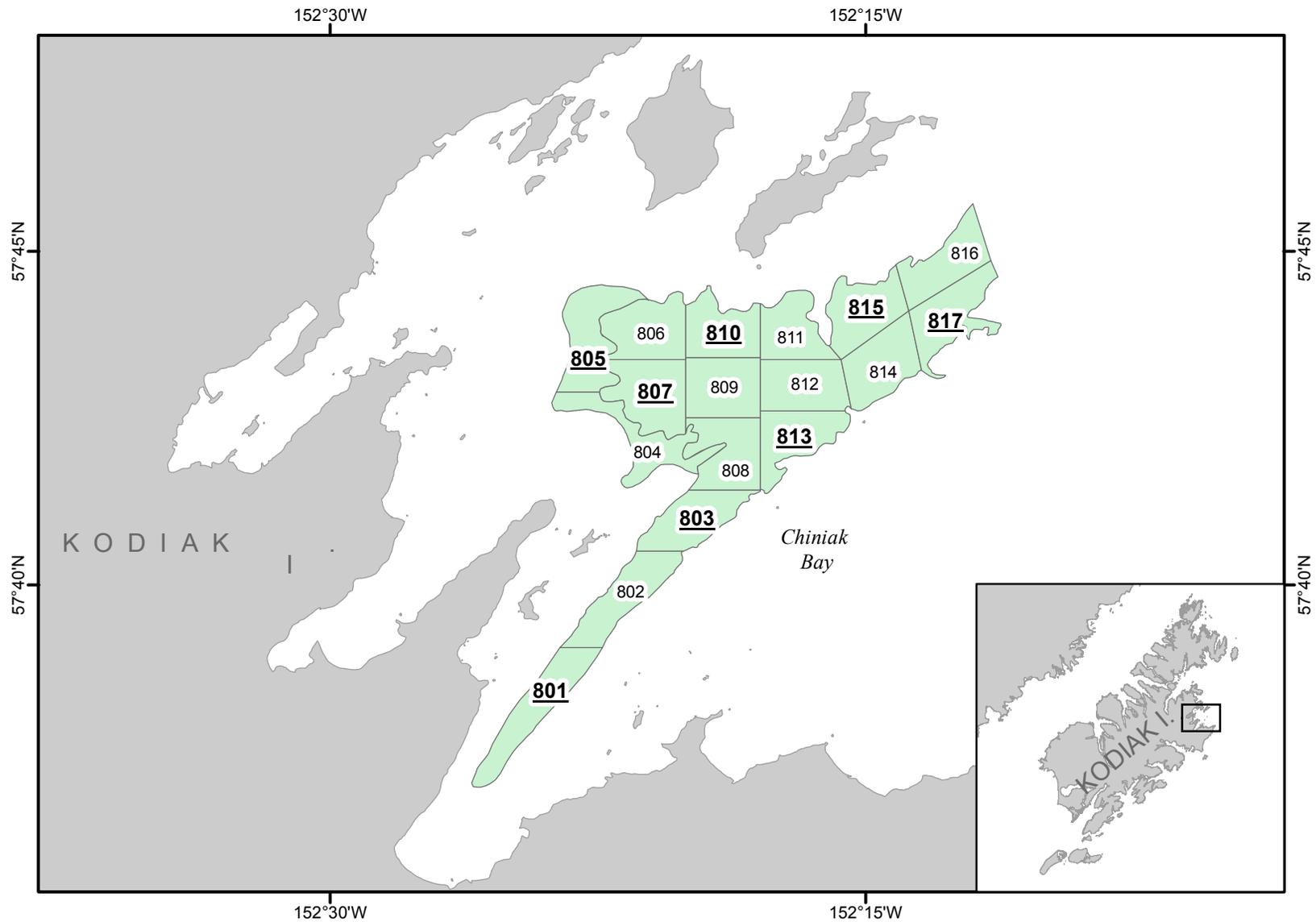
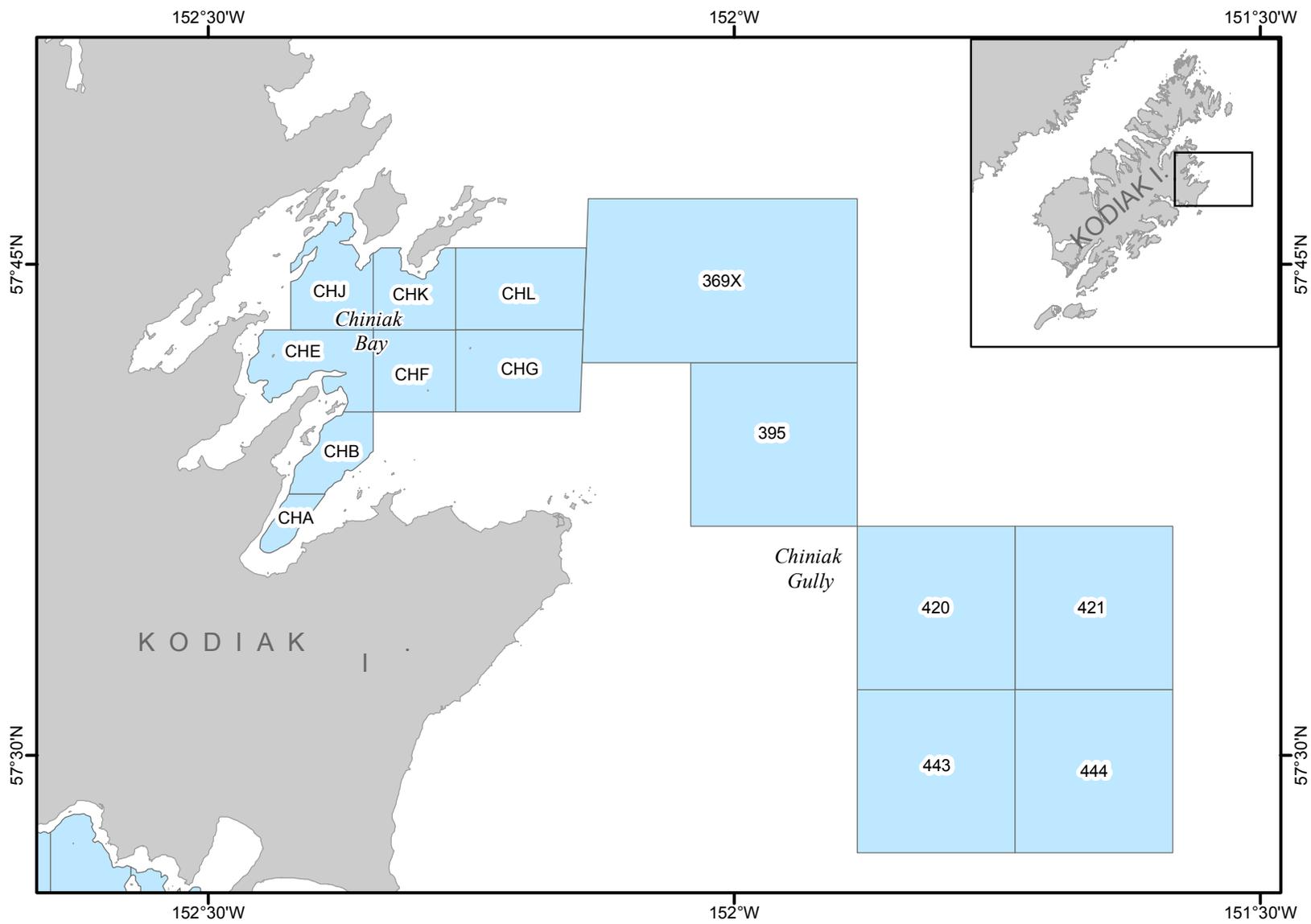


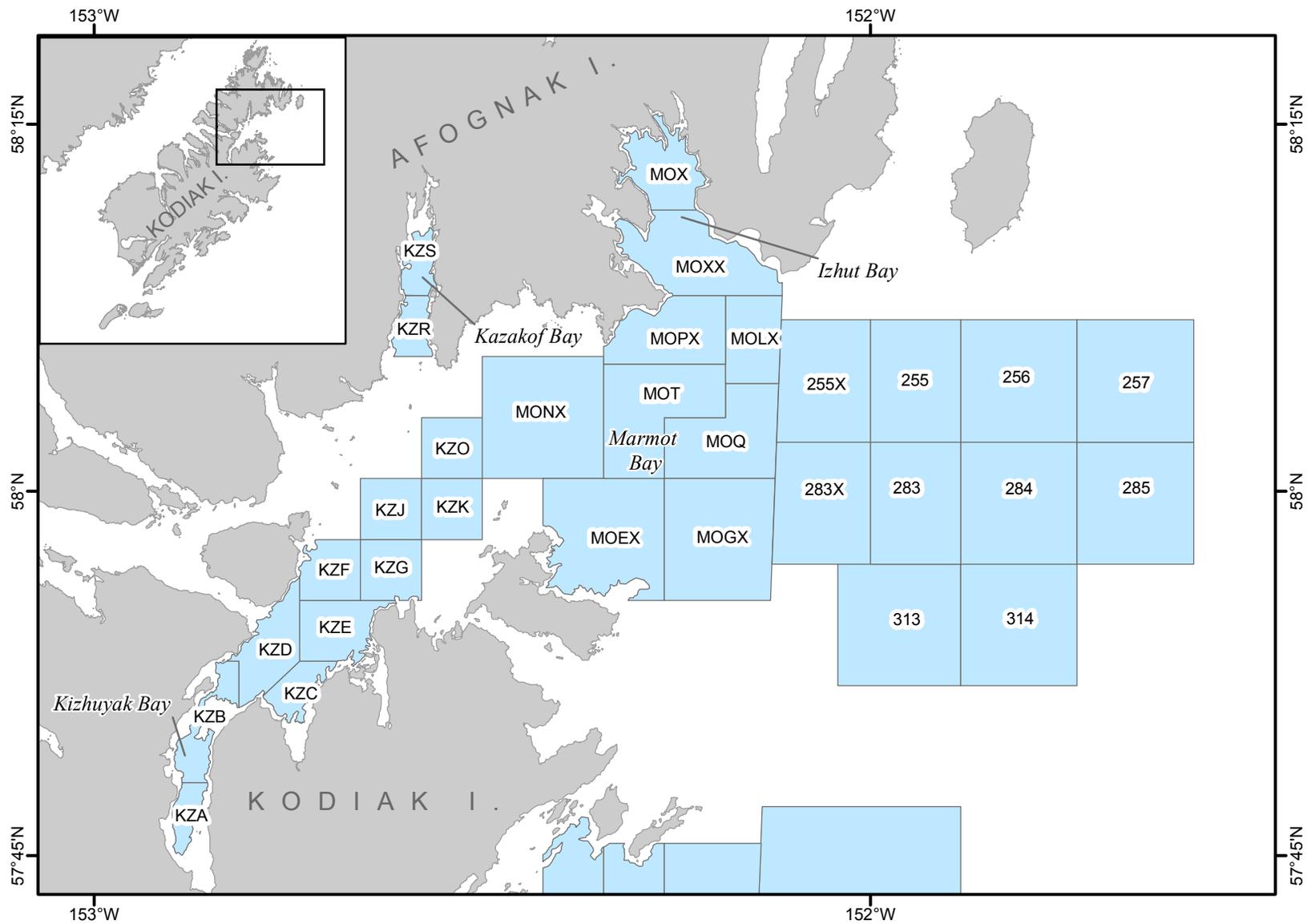
Figure 5.—Small-mesh trawl survey stations in Chiniak Bay. Stations in **bold** and underlined text will be towed in 2015.

APPENDIX A. TRAWL SURVEY STATION MAPS

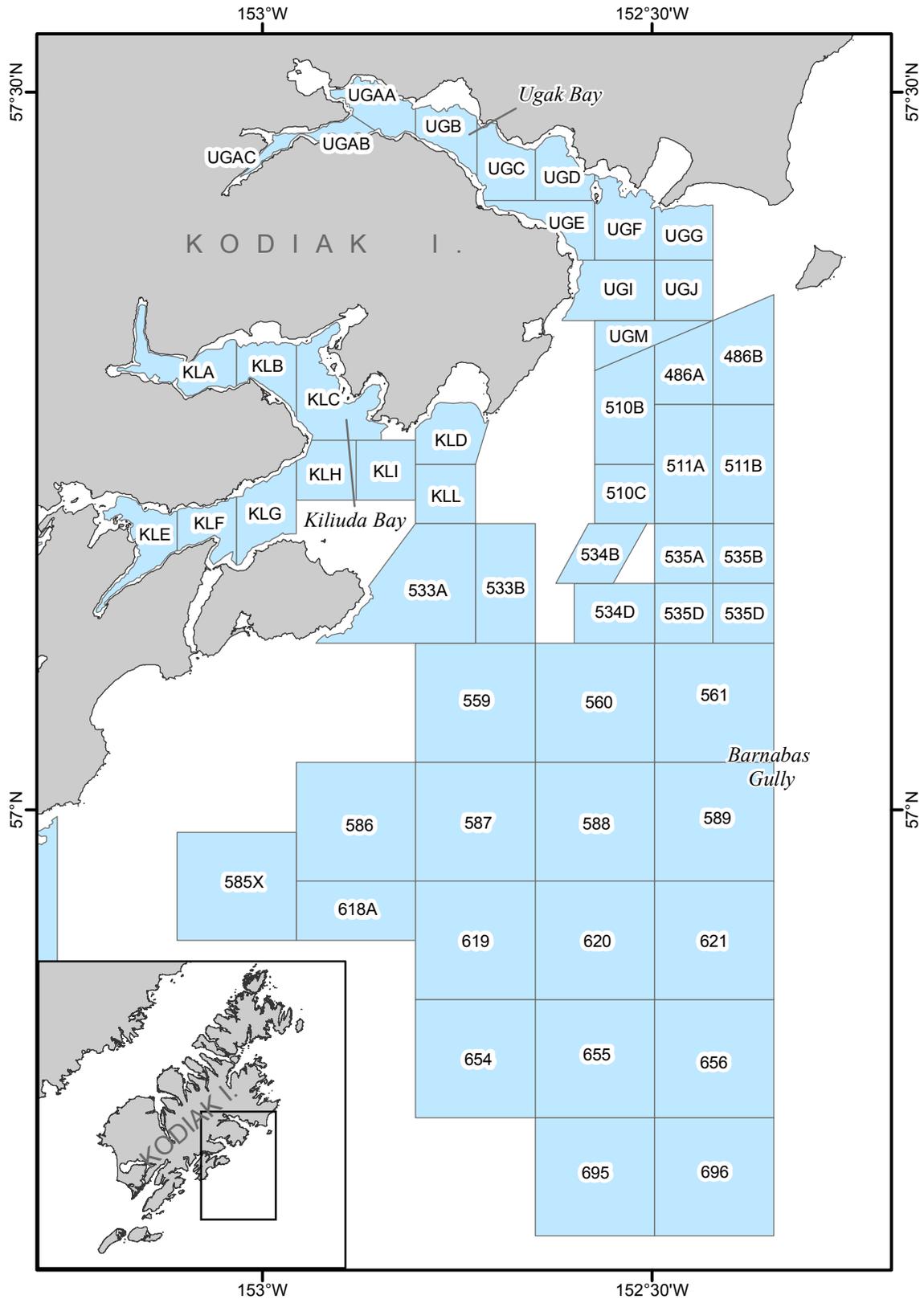
Appendix A1.—Station boundaries and names, Chiniak Bay and Chiniak Gully, 2015 Kodiak District trawl survey.



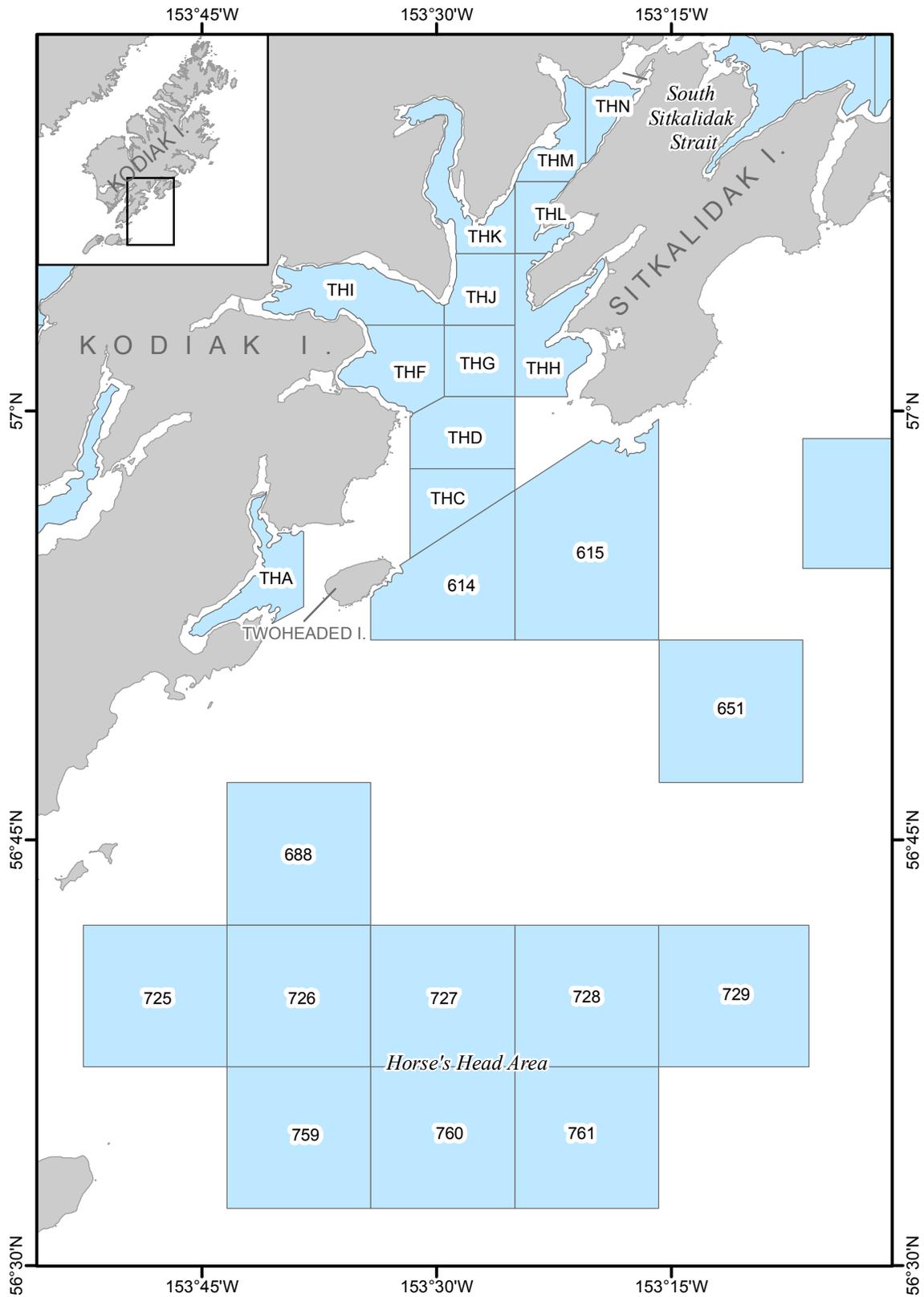
Appendix A2.—Station boundaries and names, Izhut, Kazakof, Kizhuyak, and Marmot bays, 2015 Kodiak District trawl survey.



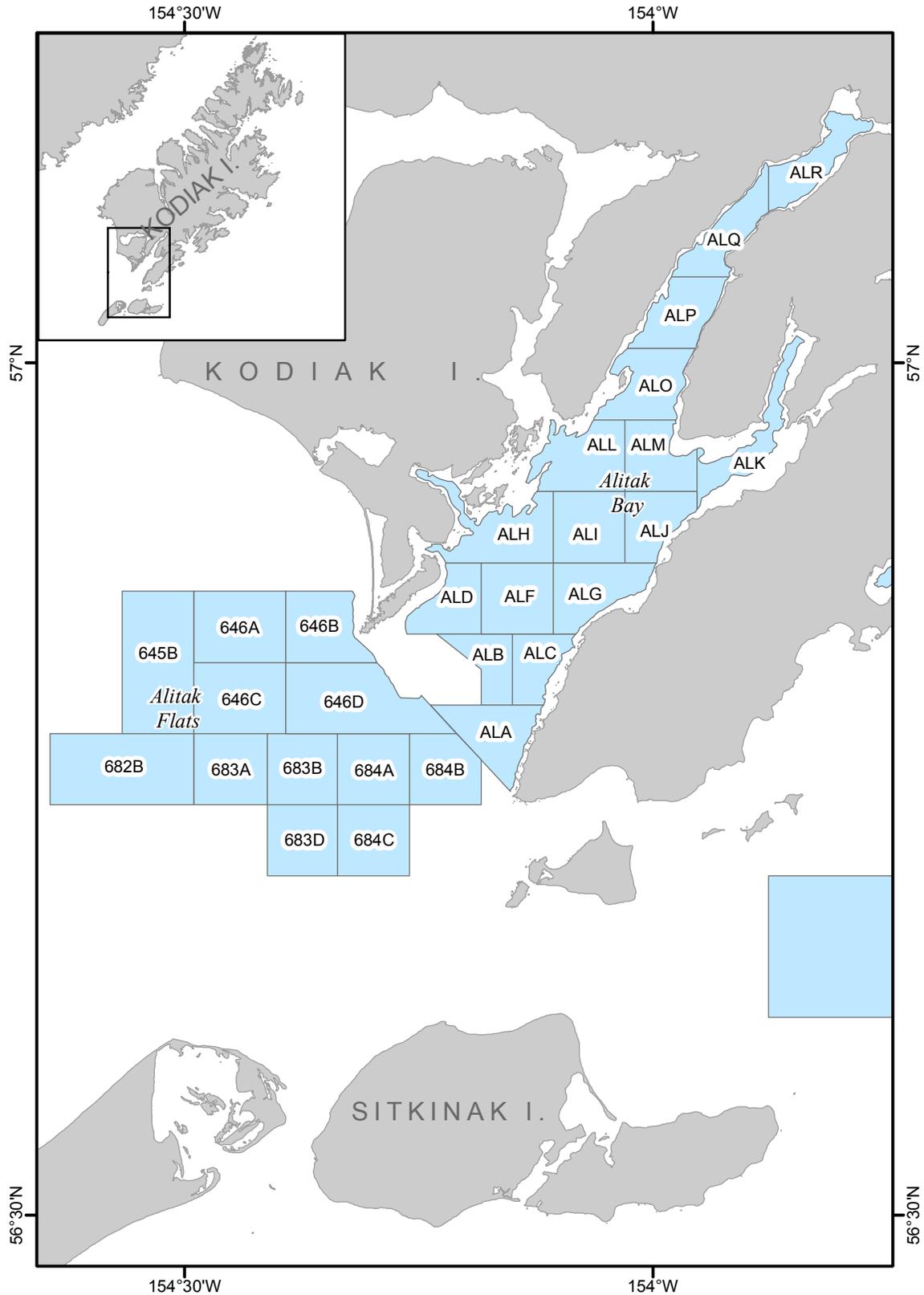
Appendix A3.—Station boundaries and names, Ugak Bay, Kiliuda Bay, and Barnabas Gully, 2015 Kodiak District trawl survey.



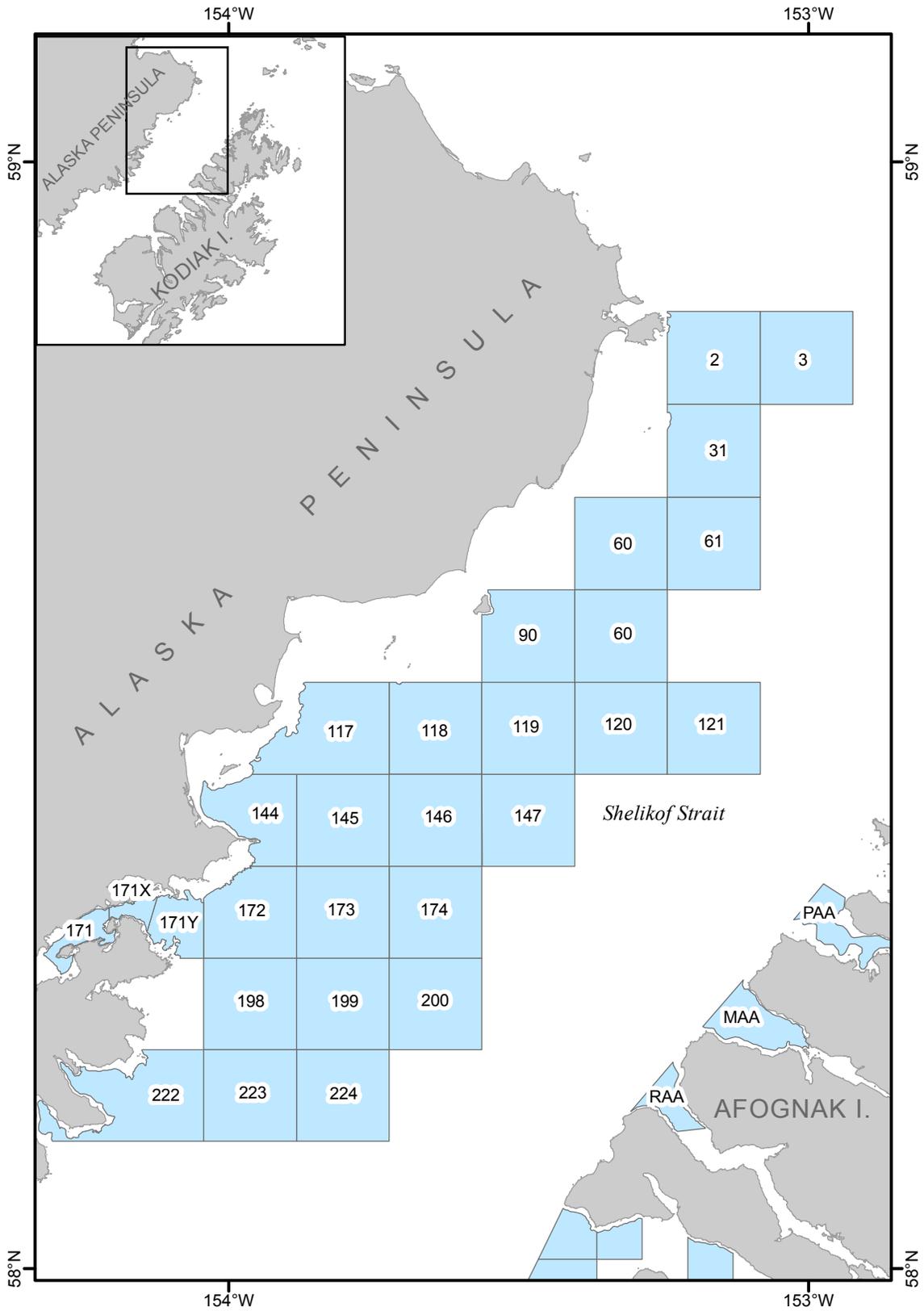
Appendix A4.–Station boundaries and names, South Sitkalidak Strait, Two Headed Island, and Horse’s Head area, 2015 Kodiak District trawl survey.



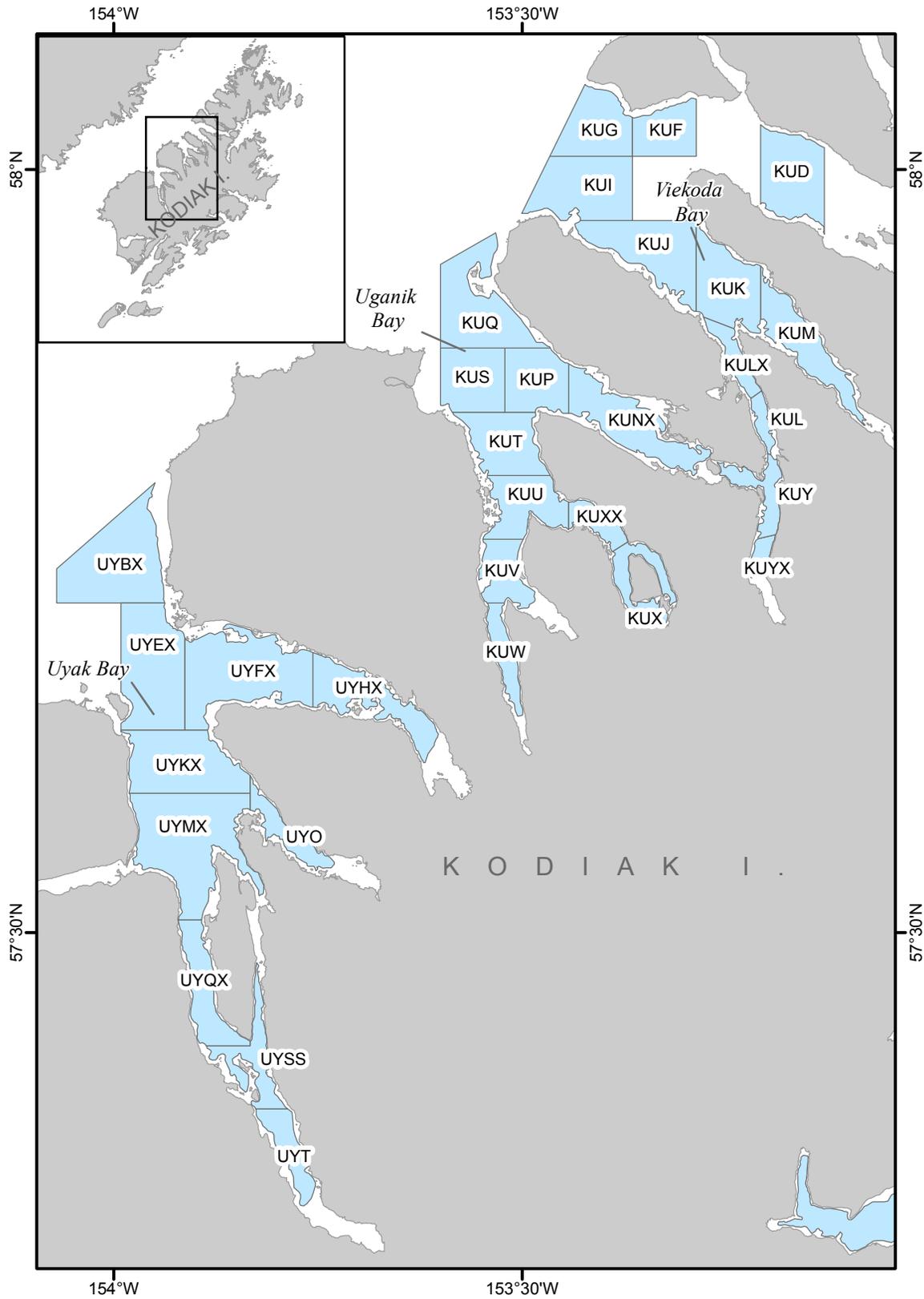
Appendix A5.—Station boundaries and names, Alitak Bay and Alitak Flats, 2015 Kodiak District trawl survey.



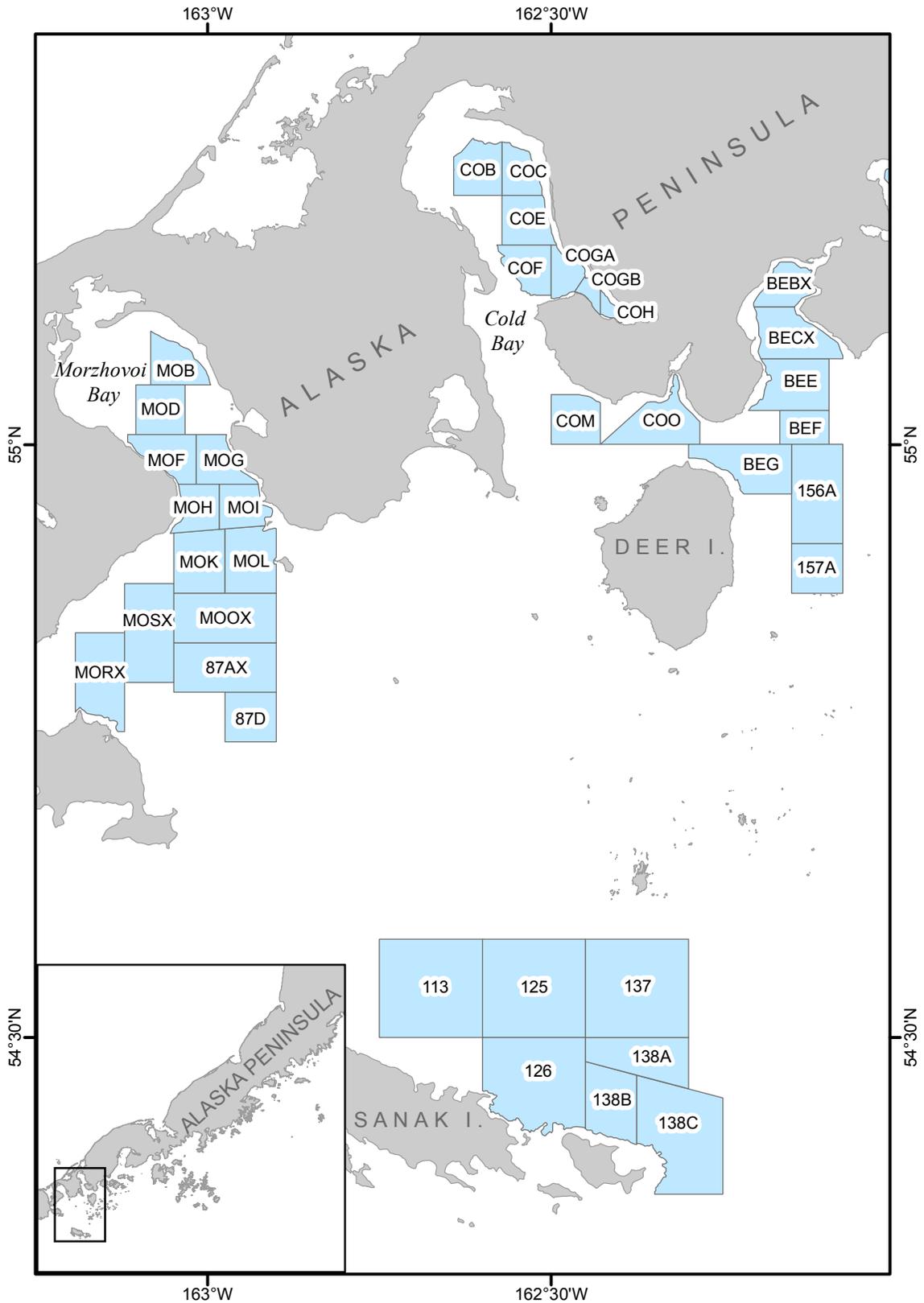
Appendix A6.–Station boundaries and names, Shelikof Strait and Afognak Island, 2015 Kodiak District trawl survey.



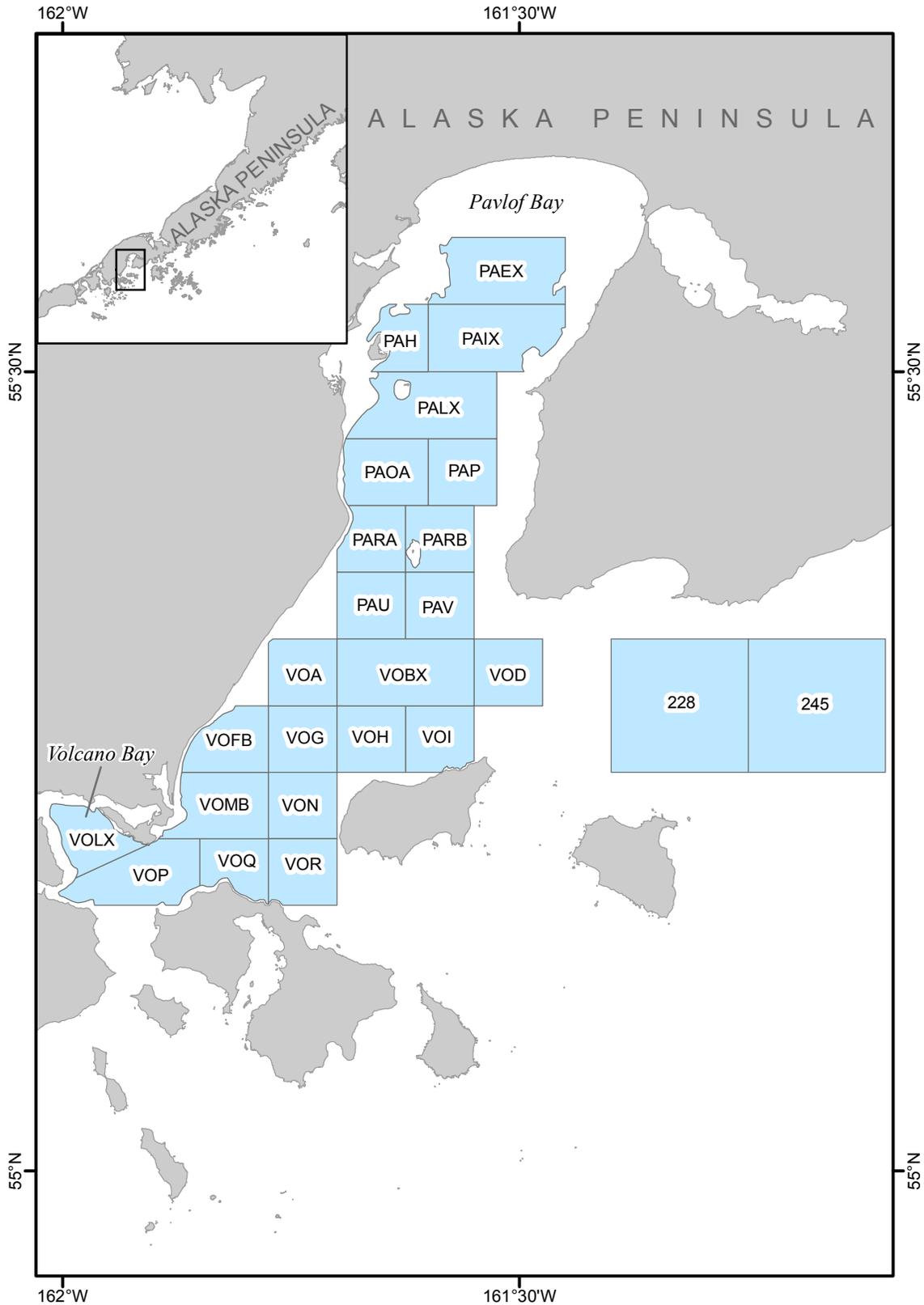
Appendix A7.—Station boundaries and names, Uyak, Uganik, and Viekoda bays, 2015 Kodiak District trawl survey.



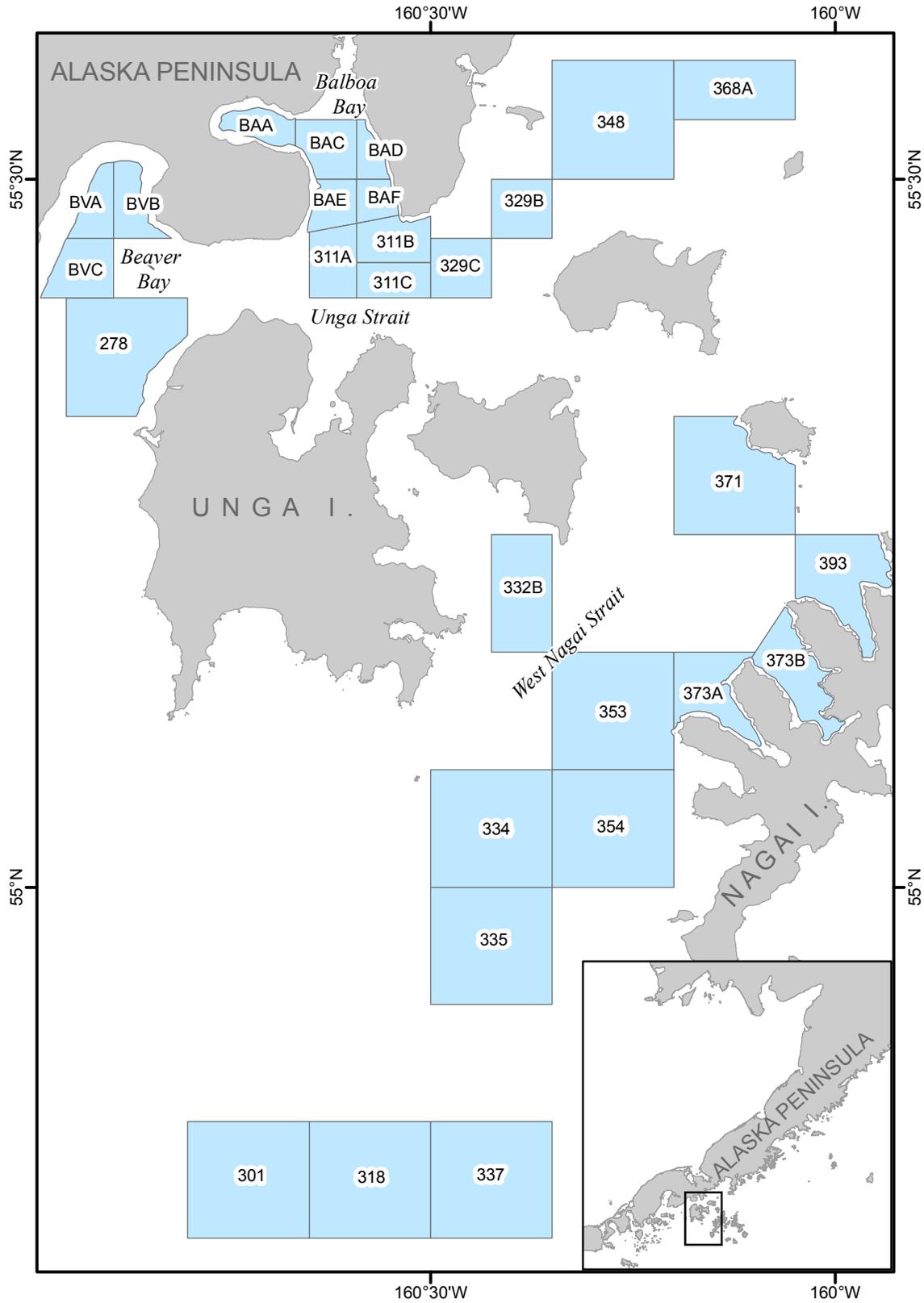
Appendix A8.—Station boundaries and names, Morzhovoi Bay, Cold Bay, Deer Island, and Sanak Island, 2015 South Peninsula District trawl survey.



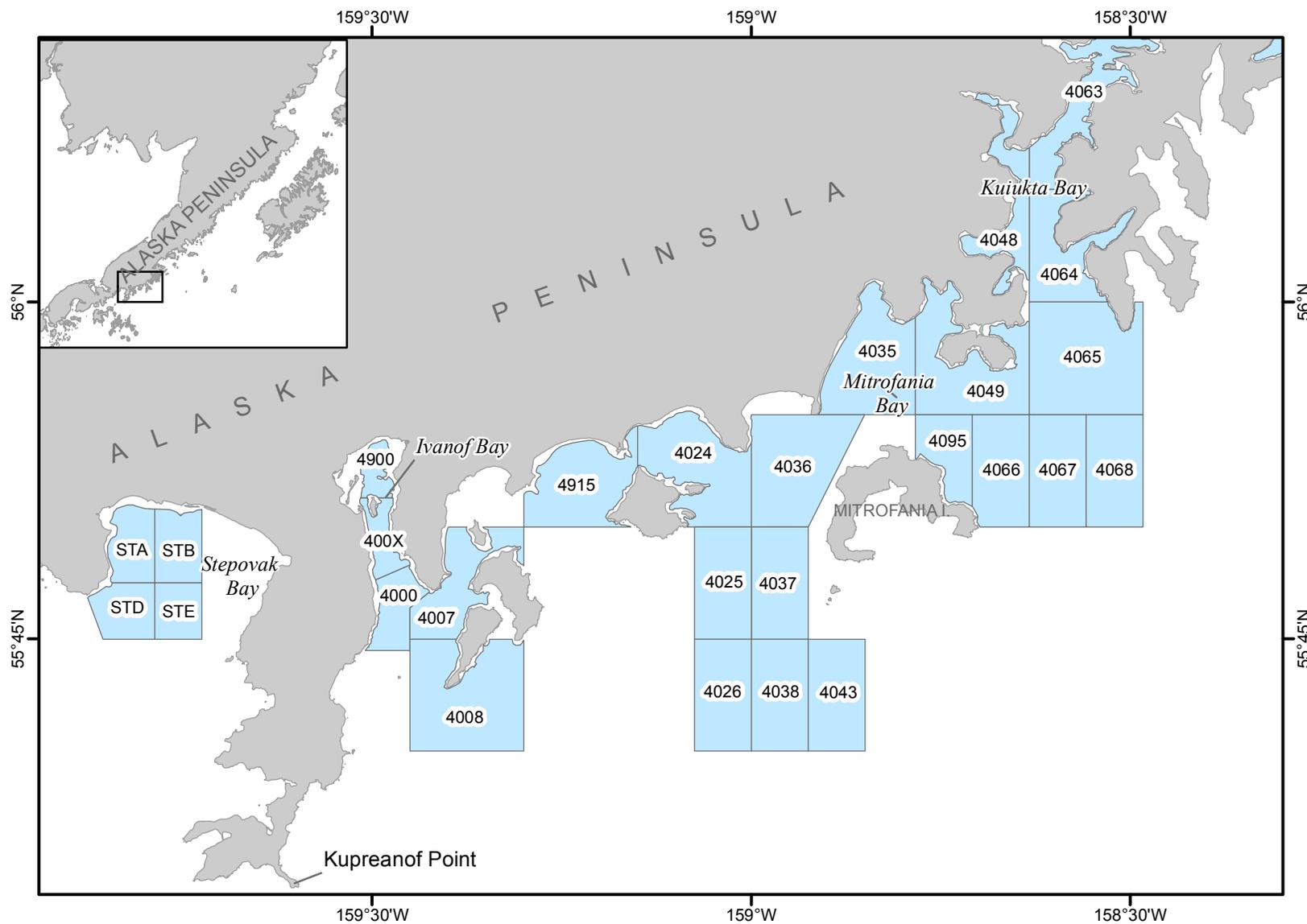
Appendix A9.—Station boundaries and names, Pavlof and Volcano bays, 2015 South Peninsula District trawl survey.



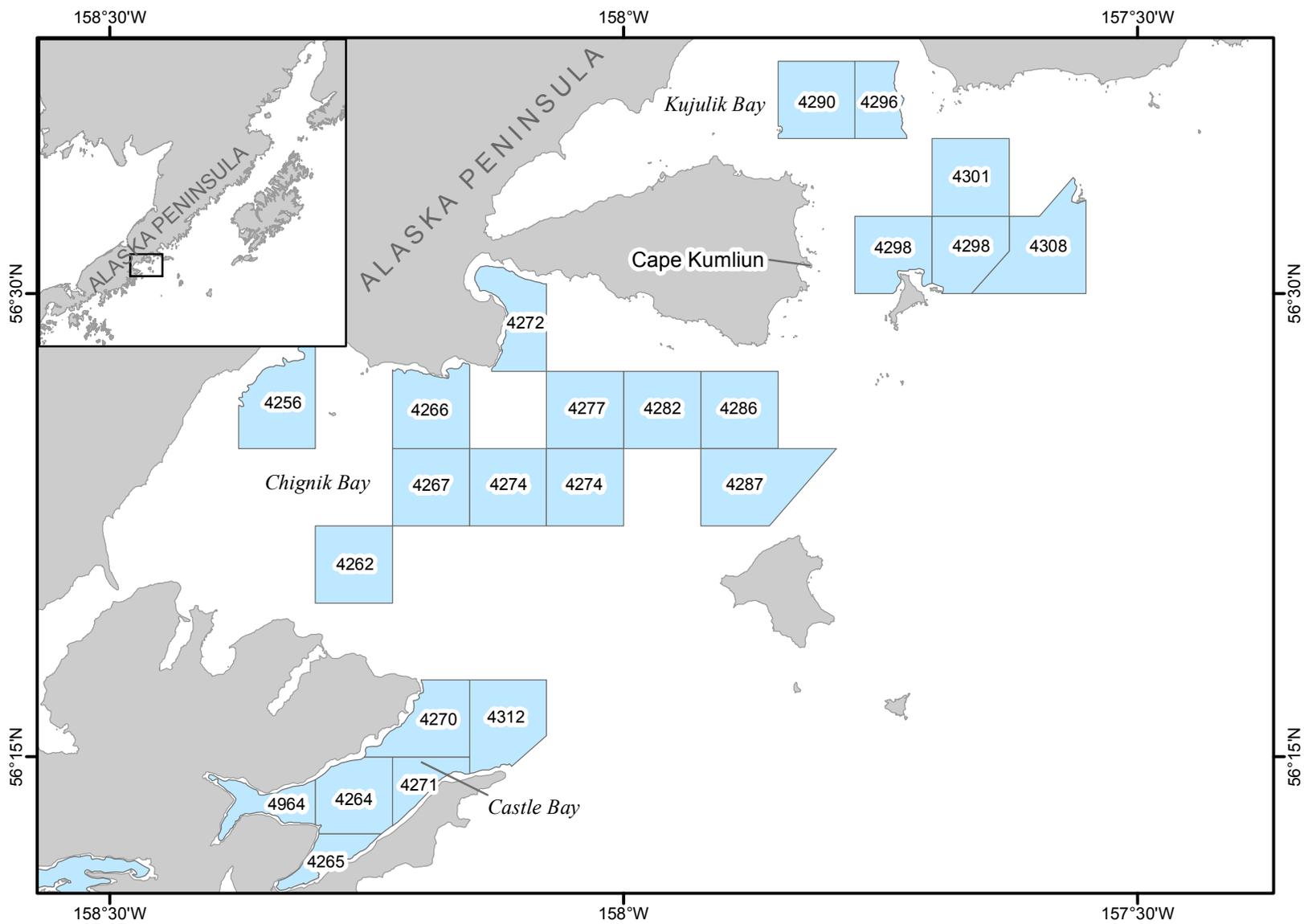
Appendix A10.—Station boundaries and names, Unga Strait, Beaver Bay, Balboa Bay, and West Nagai Strait, 2015 South Peninsula District trawl survey.



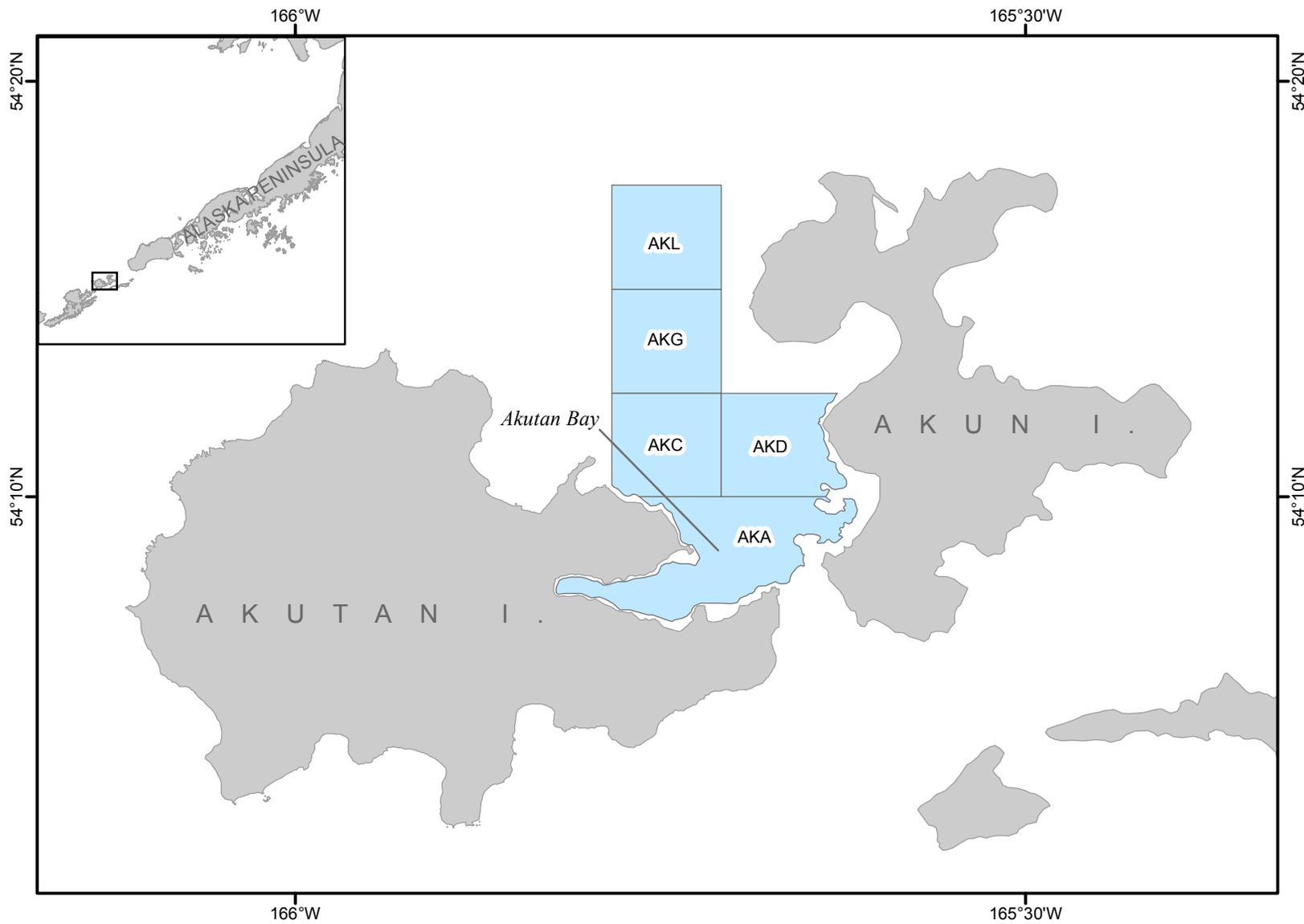
Appendix A11.—Station boundaries and names, Stepovak, Ivanof, Mitrofanía, and Kuiukta bays, 2015 South Peninsula and Chignik District trawl surveys.



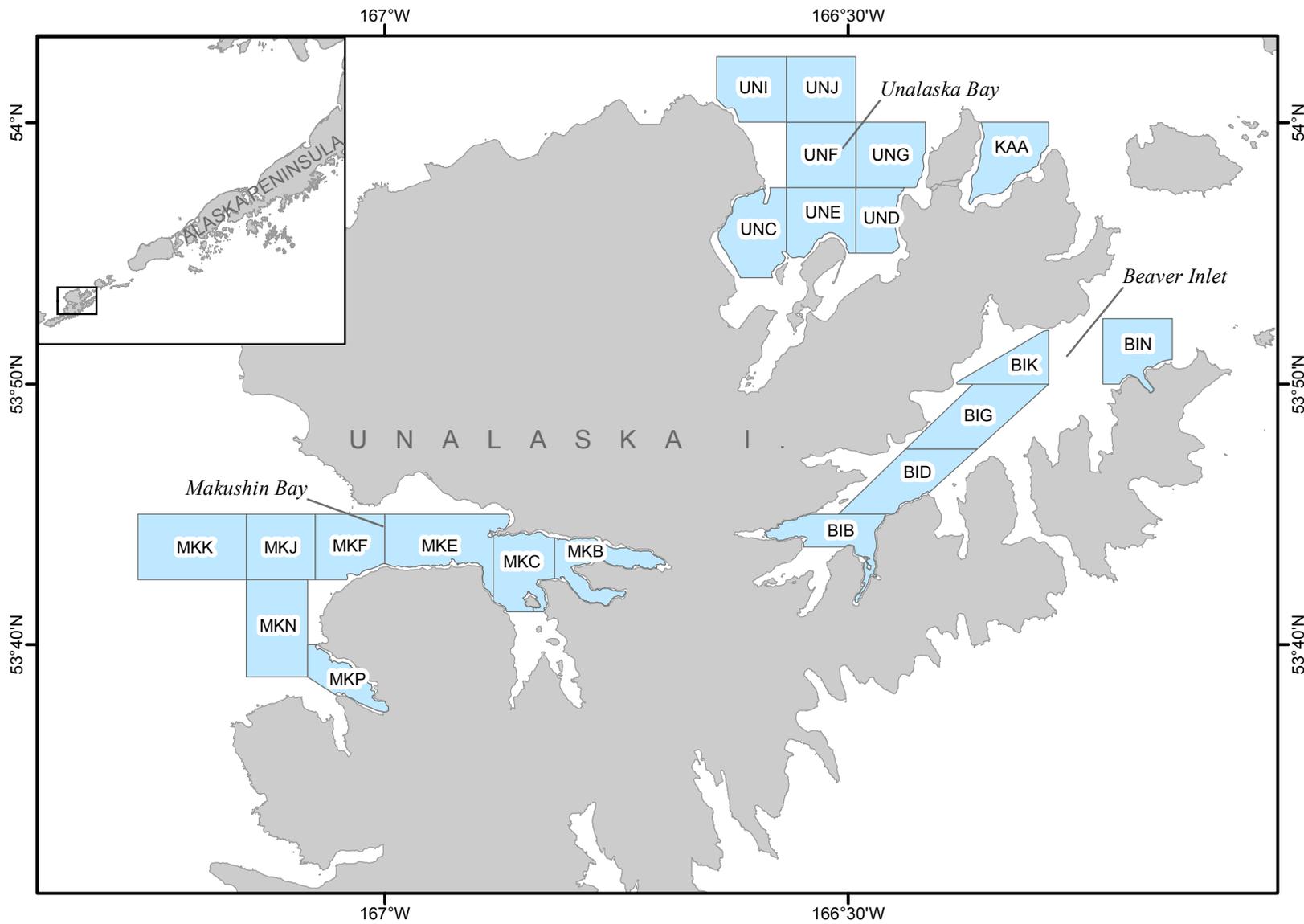
Appendix A12.—Station boundaries and names, Kujulik, Chignik, and Castle bays, 2015 Chignik District trawl survey.



Appendix A13.—Station boundaries and names, Akutan Bay, 2015 Eastern Aleutian District trawl survey.



Appendix A14.—Station boundaries and names, Unalaska and Makushin bays and Beaver Inlet, 2015 Eastern Aleutian District trawl survey.



**APPENDIX B. GROUND FISH STOMACH SAMPLING
PROTOCOL**

Appendix B1.–Number of groundfish stomach samples, by species and size group, 2015 Chiniak and Marmot bays survey.

Species	Number	Species	Number
size group (cm)		size group (cm)	
Walleye pollock		Arrowtooth flounder	
< 30	20	< 30	40
30–44	20	30–49	40
45–54	40	≥ 50	40
≥ 55	40	Total	120
Total	120		
Pacific cod		Pacific halibut	
< 30	20	< 40	15
30–44	20	40–54	15
45–59	40	55–69	30
≥ 60	40	≥ 70	30
Total	120	Total	90
Flathead sole		Northern rock sole	
< 20	20	< 20	20
20–39	20	20–39	20
≥ 40	20	≥ 40	20
Total	60	Total	60
Dogfish			
< 40	20		
40–79	20		
≥ 80	20		
Total	60		

Appendix B2.–2015 Chiniak and Marmot bays groundfish stomach sampling protocol.

At every haul, after entire catch has been dumped in the checker bin and major species are evident, choose two to three species from Appendix B1 which are abundant enough for stomach sampling purposes (about one full basket). With the concurrence of sorting crew, designate which specimens are to be set aside for stomach dissection after baskets have been weighed and recorded. Set baskets in a cool, shaded area until entire catch has been processed.

Sampling procedures:

- (1) Collect fish that show **no** sign of either net feeding or regurgitation.
*Signs of net feeding and regurgitation (DO NOT KEEP THESE):
 - prey items in mouth or gill rakers
 - flaccid (loose and bloated) looking stomach*Signs of "natural" stomachs (KEEP THESE!):
 - naturally empty stomachs appear tight and contracted
 - stomachs appear tight around any prey inside
- (2) If the fish is collectable, measure fork length, determine sex and spawning condition, excise the stomach and place in a stomach bag with a specimen label. Try to collect 5 specimens from each size group (e.g. collect 5 stomachs from each of the < 30 cm, 30–44 cm, 45–54 cm, and ≥ 55 cm pollock) in one haul. For small fish (≤ 20 cm), do not excise the stomach but instead make a slit in the body cavity to allow penetration of formalin to the gut. Place the sample of whole fish in a large stomach bag with a label. Submerge sample in a bucket of 10% buffered formalin. To make the formalin solution, fill a 5-gallon bucket about half full with sea water, and then add one liter 37% formalin to the bucket. Add one rounded 1/8 cup of baking soda per bucket.
- (3) Each stomach bag should contain a specimen label which records species, vessel, cruise, haul, specimen number, fork length of the fish, sex, and spawning condition (spawning = 1 or not spawning = 0).
- (4) For each species, start specimen number at “1” and assign a number consecutively until the end of the cruise.
- (5) Data is recorded on a handheld computer during stomach collection. Instructions are in Appendix B3. In the event of computer failure a specimen form may be filled out for each species in each haul (Spalinger *in prep*). The specimen form should record the species, vessel, cruise, haul, fork length, sex, spawning condition (spawning or non-spawning), date, and specimen number (individual fish weight does not have to be taken).
- (6) Use broken lids to cover the bucket each time you add stomach collections into it. Seal the bucket (by using the unbroken lid) only when the bucket is full or at the end of the cruise.
- (7) Put different species collections in different buckets. Use permanent mark pen to write species name, vessel, address (National Marine Fisheries Service, Food Habits Lab, Bldg. 4, 7600 Sand Point Way NE, Seattle, WA 98115-0070) on the unbroken lid each time you seal a bucket.
- (8) When the cruise is over, please double-check that lids are completely labeled and add a luggage tag to the bucket handle. The luggage tag should indicate ‘2015, Marmot Bay (location), pollock (species), Resolution (boat), and your name’.
- (9) If you collect at least 20 stomachs per haul, you can reach the goal.

End of the Cruise:

At the end of the cruise, buckets (along with the specimen forms) and remaining equipment should be taken off the vessel and delivered to NMFS, Kodiak Laboratory. Inform Mei-Sun Yang or Geoff Lang and they will make arrangements to ship to Seattle.

Appendix B3.–Instructions for using the handheld computer (Juniper Systems, Allegro) to enter stomach collection data.

Stomach Sampling Data Entry Program – Juniper Allegro

*Use Stylus! Keep it tied to computer so we don't lose it.

From Main Screen:

Shortcut to DataPlus CE

-OR-

Start Menu\Run

C:_Drive\DataPlus CE\DataPlus CE.exe

NOTE: each species should be entered in its own application!

Go to the Application menu on the top tool bar and “Select Application”

-Scroll to the desired stomach data application and hit “OK”

ATFSTOMS = arrowtooth flounder

CODSTOMS = Pacific cod

DOGSTOMS = spiny dogfish

FHSSTOMS = flathead sole

HALSTOMS = Pacific halibut

NRSSTOMS = northern rock sole

POLSTOMS = walleye pollock

Go to the Data menu and select “Collect Data”

- 1) The species code box is auto filled with the RACE code
- 2) The ID field is auto numbered
 - Regularly check to make sure you are in sync with specimen numbers in stomach bags
 - You can change the ID number if necessary, but make sure the sequential numbering is in sync with the stomach bags.
- 3) Change to haul number to reflect the correct haul you are sampling
 - The haul field will autofill
 - When you switch hauls go back and change
- 4) Mat (Maturity): 0=not spawning, 1=spawning
 - The mat field will autofill
- 5) Sex: 1=male, 2=female, 3=unknown
- 6) Size is in cm

Hit F4 to exit the application.

To download to dryhold computer:

Dry off Allegro, particularly the contacts on bottom.

- 1) Open the application “DataPlus Professional CE Host” on the dryhold computer
- 2) With Allegro on, place in docking station
 - You may need to reposition the Allegro several times to maintain contact
 - The red light comes on when it contacts the computer
 - The indicators in the CE Device Status window on the dryhold computer turn green when a connection is made.
- 3) On dryhold computer select the button “Recv Data”
- 4) Select the stomach application that has new data and then the data set that appears. Select “Receive Data”.
 - This must be done with each species

The data is now on the dryhold computer. You can look at it in the DataPlus Professional folder. Look in Data\[APPLICATION NAME]and the most recent date. The file will open in Excel.

-continued-

To update excel tables and get a count of remaining samples:

Open the excel file – LargeMeshStomachs2015.xlsx, in the DataPlus Professional/Data folder

The following must be done for each species:

- 1) Open the data file that was just downloaded (from the DataPlus Professional\Data\[APPLICATION])
- 2) Highlight and copy columns A-I from the dataplus file (be sure not to copy extra columns)
- 3) Go to LargeMeshStomachs2015.xlsx and open the species tab that matches the dataplus file
- 4) Position the cursor in cell A1 and select “Paste”
 - The newest data will overwrite and add to any data that existed in the table
- 5) Make sure the code in the SPECIES column matches the code above the table to the right of the data

The counts in the table to the right update automatically when you paste data. You DO NOT need to change the numbers in this table yourself.

APPENDIX C. ADEC FISH TISSUE TESTING PROGRAM

APPENDIX D. SEA STAR WASTING DISEASE MONITORING

Appendix D1.–Examples of “mild” and “severe” wasting/injury likely due to sea star wasting disease.

Examples of Mild and Severe Disease
Last updated 2014-12-11

pacificrockyintertidal.org
seastarwasting.org

Examples of “mild” and “severe” wasting/injury
likely due to sea star wasting syndrome

Note: The following photos are intended to be used as a guide for identifying signs of wasting across many species of sea stars. Sea stars respond to many types of stress in a similar manner, so the tissue degradation and injuries shown in these photos may not be due to sea star wasting syndrome. However, all photos are from areas where SSWS was prevalent and thus likely responsible for the conditions shown.

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Examples of Mild and Severe Disease
Last updated 2014-12-11

pacificrockyintertidal.org
seastarwasting.org

Pisaster ochraceus

Mild Photo: Kayla Balmer



Severe Photo: John Ugerotz



Photos:
Melissa
Miner



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-continued-

Evasterias troschelii

Mild

Photo:
Mark Nayer



Photos:
Jan Kocian



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Examples of Mild and Severe Disease
Last updated 2014-12-11

Severe

Photos: Jeff Harris



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pacificrockyintertidal.org
seastarwasting.org

Pycnopodia helianthoides

Mild



Note emaciated
appearance



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Severe

Photos: Mark Nayer



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-continued-

Pisaster giganteus

Mild



Severe



Photos: Leanne Foster

Pisaster brevispinus

Mild



Photos:
Mark Nayer



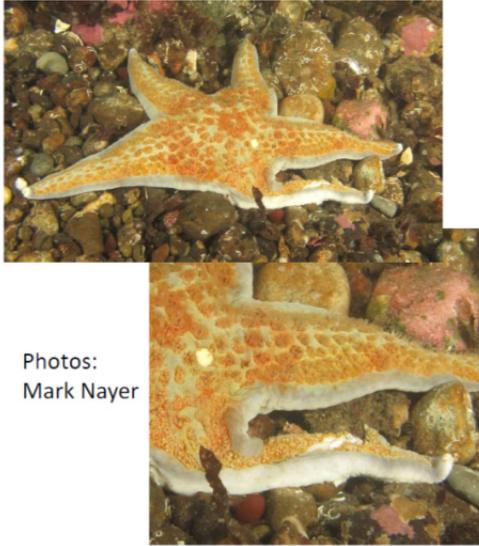
Severe



Photos:
Ken Bondy

Dermasterias imbricata

Mild



Photos:
Mark Nayer

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Severe

Photo:
Ethan Flanagan



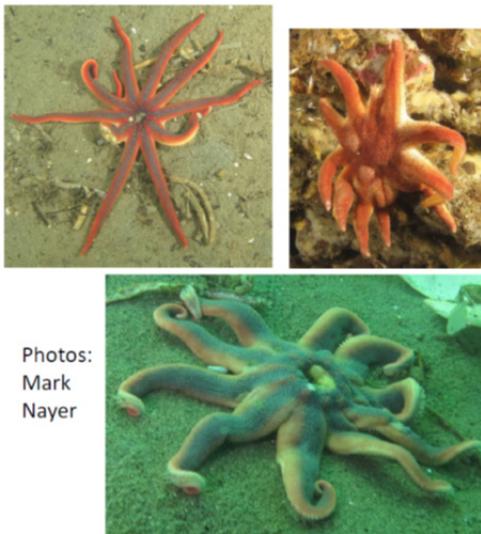
Photo:
Nate Fletcher



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Solaster spp.

Mild



Photos:
Mark
Nayer

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Severe

Photo: Mark Nayer



Photo: Neil McDaniel

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-continued-

Orthasterias koehleri

Mild



Photos: Feiro Marine Life Center



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Examples of Mild and Severe Disease
Last updated 2014-12-11

Severe

No photo available

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pacificrockyintertidal.org
seastarwasting.org

Leptasterias spp

Mild



Photo: Steve Fradkin

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Severe



Photos:
Melissa
Miner



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-continued-

Patiria (Asterina) miniata

Mild

- No photo available

Severe



Photo: Ryan Berger

Pteraster spp.

Mild



Photo: Mark Nayer

Severe



Photo: Jackie Hildering

Crossaster papposus

mild

severe



Photos: Neil McDaniel

Henricia spp.

Mild

Severe

Photo: Linda Larsen

Photo: Wendy Steffensen



Note tissue degradation on single (uppermost) arm. Lighter patches on central disk are normal coloration pattern for this species of *Henricia*



pacificrockyintertidal.org seastarwasting.org

Sea Star Species Affected by Wasting Syndrome:

High Mortality

Solaster dawsoni (morning sun star)
Evasterias troschellii (mottled star)
Pisaster brevispinus (giant pink star)
Pisaster ochraceus (ochre/purple star)
Pycnopodia helianthoides (sunflower star)

Some Mortality

Patiria (Asterina) miniata (bat star)
Dermasterias imbricata (leather star)
Solaster stimpsoni (striped sun star)
Orthasterias koehlerii (rainbow star)
Pisaster giganteus (giant star)
Henricia spp. (blood star)
Leptasterias spp (six-armed star)

Likely affected, mortality level not well documented

Astropecten spp. (sand star)
Mediaster aequalis (vermilion star)
Linkia columbiae (fragile star)
Lophaster furcilliger vexator (crested star)
Crossaster papposus (rose star)
Astrometis sertulifera (fragile rainbow star)
Stylasterias forreri (velcro star)

