

2022 Stomach Sampling (scan & collection) In the Aleutian Islands

Six people associated with or trained by REFM's Resource Ecology and Ecosystem Modeling (Food habits lab) Program will be participating in RACE's summer trawl survey in the Aleutian Islands in 2022. They will do stomach scans and collect stomachs on Alaska Provider, and F/V Ocean Explorer.

Species and numbers of stomachs to be scanned on F/V Alaska Provider: see Table 1.

Species and numbers of stomachs to be collected on F/V Ocean Explorer: see Table 2.

Detailed stomach scan procedure for board F/V Alaska Provider will be provided directly to REEM personnel.

Stomach collection procedure on F/V Ocean Explorer

1. At every haul, select predator species as needed from Table 2 (a waterproof copy will be provided and should be put on deck).
2. Stomachs will be preserved individually in bags placed in 10% buffered Formalin solution. To make the Formalin solution, add sea water into the 5 gallon bucket about half full, then add one liter 37% of Formalin (i.e. 100% full strength of Formaldehyde) in the bucket. add one rounded 1/8 cup of baking soda per bucket.
3. Individual fish should be checked for signs of regurgitation (i.e., food items in mouth or gills and/or a flaccid stomach) and net feeding (e.g. a prey fish stuck out of the mouth). If no such signs, collect this stomach.
4. If the fish is determined to have regurgitated, select another fish from the sample. If the fish has a truly empty stomach (non-regurgitated), then that sample should be kept.
5. Put the collected stomach in a cloth bag. Each bag should contain a specimen label, which notes the species, cruise, haul, and specimen number. There is no need to tie knots in the drawstrings, simply pull the strings tight, cinching the top of the bag closed. Knotted bags are oftentimes sacrificed to process the stomachs. Specimen data is collected on the at sea tablets; for each species sampled at a station list species, cruise, haul (and depth), size, and sex, spawning condition, and specimen number of each fish sampled for stomach content analysis (individual fish weight does not have to be taken). REEM has provided analog specimen forms for use if the stomach app is unavailable at any time.
6. Use a pencil to mark what you collected on the plastic-coated tally sheet.
7. Put stomachs of ATF, PCOD, PLK, PH, POP, ATKA, SABLE, NRF each in a different bucket.
8. Use the broken lids (used) to cover the bucket each time you add some stomach collections into it. Mark the species name on the broken lids. Seal the bucket (by using the unbroken lid) only till the bucket is full or till the end of the cruise. Approximate sample size for each leg is about 1,100 stomachs. The minimum number of stomachs to be collected in one haul is 5. Use the permanent mark pen to write the species name, vessel, the address (Alaska Fisheries Science Center, Food Habits Lab, Bldg. 4, 7600 Sand Point Way NE, Seattle, WA 98115-0070) on the unbroken lid each time you seal a bucket.
9. Copy all stomach data to a thumb drive provided by REEM and return to Geoff Lang or Rick Hibpshman at the end of your leg.
10. Clean and dry the sampling equipment.
11. If you are on the last leg of a survey, refer to the End of Survey Checklist and pack the equipment. The equipment should be brought back with the RACE supply.
12. At the end of the survey (the end of the 3rd leg), unload collected buckets from the vessel and transfer to the RACE van in Dutch Harbor and ship back to Seattle.

Beginning and End of the Leg:

1. If you are the first one to do the stomach collection/scan, copy Table 1 or 2 (the numbers of the stomachs to be scanned or collected) from a REEM provided thumb drive to the survey computer on board.
2. At the end of each leg, enter your number of collections (by Species, region, depth, and size groups) to the Excel file in the computer, so the next person knows what he/she should do for the next leg.
3. At the end of the leg, bring make 2 copies of the tablet data, 1 on the catch entry computer and 1 on a REEM provided

thumb drive that you will return to Seattle with..

4. Clean and dry the sampling equipment.
5. If you are on the last leg of a survey, refer to the End of Survey Checklist and pack the equipment. The equipment should be brought back with the RACE supply.

Equipment for stomach collection on F/V Ocean Explorer

2150 Specimen labels	1 clipboard
500 Specimen forms	4 knives
50 Five-gallon buckets w/unbroken lids	6 broken lids
13 gallons Formalin	7.5 cups baking soda
1 measuring cup	6 hemostats
6 trauma shears	1 rubber mallet
1 bucket opening tool	1 three-ring binder
6 SDS 10% formalin	60 10% formalin stickers
60 luggage tags	
4 pair forceps	1 safety glasses
2 markers	
2 SDS 100% formalin	
2150 stomach bags (1000 small, 950 medium, 200 large)	

Equipment for stomach scanning on F/V Alaska Provider

500 Specimen labels	1 clipboard
1200 Scan forms (2-sided)	4 knives
2 sieve (333 micron)	2 pair forceps (medium)
1 sieve (1.0 mm)	1 freezer box
2 table risers	1 knife sheath
1 magnifying glass	1 sieve (1.0 mm)
4 pair forceps	1 power receptacle
4 permanent markers	2 25' extension cord
4 beakers (500 ml)	2 squirt bottles (1000 ml)
1 three-ring binder	1 squirt bottle (500 ml)
10 large Petri-dish	1 roll electrical tape
10 small petri-dish	2 measuring tape
2 plastic tub	2 scalpel handles
1 specimen table	10 scalpel blades
1 scale screen	2 digital scale
1 splicing tape self-fusing	2 caliper
3 hemostats	3 trauma shears
1 outlet adapter	3 tally boards
510 plastic bags (10-13x18,100-8x8,400-4x4)	

End of the Survey Checklist

Please do the following things at the end of the survey:

1. Clean and dry all stomach sampling gear, especially pay attention to the electronic scale. Pack all sampling gear, store in the tote, and load into the van for transportation.
2. Make a back-up copy of all stomach collection data for your leg on a thumb drive and data entry computer.
3. Make sure that all of your frozen samples have been taken care.
4. Make shipping arrangements if necessary and contact Geoff.

Table 1. Scans to be completed on the F/V Alaska Provider

Subarea	S. BS (165W -150W)			E. AI (170W -177W)			C. AI (177W -177E)			W. AI (177E -170E)			Total
Strata	Shelf	Gully	Slope	Shelf	Gully	Slope	Shelf	Gully	Slope	Shelf	Gully	Slope	
Depth	< 100m	100-199m	=> 200m	< 100m	100-199m	=> 200m	< 100m	100-199m	=> 200m	< 100m	100-199m	=> 200m	
Expected Stations	10	8	6	7	31	29	16	23	19	11	33	17	
Expected Stomachs	80	64	48	56	248	232	128	184	152	88	264	136	1680
Species													0
Walleye pollock													
<25 cm	5	0	5	0	10	10	5	5	5	5	10	5	65
25-39 cm	5	5	0	0	15	15	5	10	10	5	15	10	95
40-54 cm	5	5	5	5	20	15	10	10	10	5	15	5	110
=>55 cm	5	5	0	5	20	15	10	15	10	5	20	10	120
Subtotal	20	15	10	10	65	55	30	40	35	20	60	30	390
Pacific cod													
<30 cm	0	0	5	0	10	10	5	5	5	5	10	5	60
30-44 cm	5	5	0	0	15	15	5	10	10	5	15	10	95
45-59 cm	5	5	5	5	15	15	5	10	10	5	15	5	100
=>60 cm	5	5	0	5	20	15	10	10	10	5	15	10	110
Subtotal	15	15	10	10	60	55	25	35	35	20	55	30	365
Aft +Kf													
<30 cm	5	0	0	5	10	15	5	15	5	5	20	5	90
30-49 cm	5	5	5	5	15	15	10	15	10	5	20	10	120
=>50 cm	5	5	5	5	20	15	10	20	15	10	20	10	140
Subtotal	15	10	10	15	45	45	25	50	30	20	60	25	350
Pacific halibut													

<40 cm	5	0	0	0	10	10	5	5	5	5	5	5	55
40-69 cm	5	5	5	5	15	15	10	10	10	5	20	10	115
=>70 cm	5	5	5	5	15	15	10	10	10	5	20	10	115
Subtotal	15	10	10	10	40	40	25	25	25	15	45	25	285
Atka mackerel													
<25 cm	0	0	0	0	5	5	5	5	0	0	5	5	30
25-34 cm	5	5	5	5	10	10	5	10	5	5	5	5	75
=>35 cm	5	5	5	5	15	10	10	10	5	5	5	10	90
Subtotal	10	10	10	10	30	25	20	25	10	10	15	20	195
Sablefish													
<55 cm	5	5	5	5	5	5	5	5	5	5	5	5	60
=>55 cm	5	5	5	5	5	5	5	5	5	5	5	5	60
Subtotal	10	10	10	10	10	10	10	10	10	10	10	10	120
Pacific Ocean perch													0
all size	5	5	5	5	10	10	5	10	10	5	15	15	100
Northern rockfish													
all size	5	5	5	5	10	10	5	10	10	5	15	15	100
Total	95	80	70	75	270	250	145	205	165	105	275	170	1905

Table 2. Stomach collections on the F/V Ocean Explorer

Subarea	S. BS (165W -150W)			E. AI (170W -177W)			C. AI (177W -177E)			W. AI (177E -170E)			Total
Strata	Shelf	Gully	Slope	Shelf	Gully	Slope	Shelf	Gully	Slope	Shelf	Gully	Slope	
Depth	< 100m	100-199 m	=> 200m	< 100m	100-199 m	=> 200m	< 100m	100-199 m	=> 200m	< 100m	100-199 m	=> 200m	
Expected Stations	10	8	6	7	31	29	16	23	19	11	33	17	
Expected Stomachs	50	40	30	35	155	145	80	115	95	55	165	85	1050
Species													0
Walleye pollock													
<25 cm	3	0	3	0	5	5	3	3	3	3	5	5	38
25-39 cm	3	3	0	0	8	8	3	5	5	3	8	10	56
40-54 cm	3	3	3	3	10	8	5	5	5	3	8	5	61
=>55 cm	3	3	0	3	10	8	5	8	5	3	10	10	68
Subtotal	12	9	6	6	33	29	16	21	18	12	31	30	223
Pacific cod													
<30 cm	0	0	3	0	5	5	3	3	3	3	5	5	35
30-44 cm	3	3	0	0	8	8	3	5	5	3	8	10	56
45-59 cm	3	3	3	3	8	8	3	5	5	3	8	5	57
=>60 cm	3	3	0	3	10	8	5	5	5	3	8	10	63
Subtotal	9	9	6	6	31	29	14	18	18	12	29	30	211
Aft +Kf													
<30 cm	3	0	0	3	5	8	3	8	3	3	10	5	51
30-49 cm	3	3	3	3	8	8	5	8	5	3	10	10	69
=>50 cm	3	3	3	3	10	8	5	10	8	5	10	10	78

Subtotal	9	6	6	9	23	24	13	26	16	11	30	25	198
Pacific halibut													
<40 cm	3	0	0	0	5	5	3	3	3	3	3	5	33
40-69 cm	3	3	3	3	8	8	5	5	5	3	10	10	66
=>70 cm	3	3	3	3	8	8	5	5	5	3	10	10	66
Subtotal	9	6	6	6	21	21	13	13	13	9	23	25	165
Atka mackerel													
<25 cm	0	0	0	0	3	3	3	3	0	0	3	5	20
25-34 cm	3	3	3	3	5	5	3	5	3	3	3	5	44
=>35 cm	3	3	3	3	8	5	5	5	3	3	3	10	54
Subtotal	6	6	6	6	16	13	11	13	6	6	9	20	118
Sablefish													
<55 cm	3	3	3	3	3	3	3	3	3	3	3	3	36
=>55 cm	3	3	3	3	3	3	3	3	3	3	3	3	36
Subtotal	6	6	6	6	6	6	6	6	6	6	6	6	72
Pacific Ocean perch													0
all size	3	3	3	3	5	5	3	5	5	3	8	8	54
Northern rockfish													
all size	3	3	3	3	5	5	3	5	5	3	8	8	54
Total	57	48	42	45	140	132	79	107	87	62	144	152	1095

Pacific Halibut are collected under the collection permit granted to the bottom trawl survey by IPHC

Formalin Handling Procedures.

Formalin Handling Protocol

- Formalin is a relatively hazardous chemical and must be handled appropriately to ensure your safety. You are dealing with a small quantity of formalin and if these guidelines are followed your exposure will be well below established safe exposure levels.
- Read the Material Safety Data Sheet (MSDS) before using formalin to understand its properties.
- ALWAYS wear gloves, rain gear, and goggles/safety glasses when directly using formalin.
- ALWAYS use formalin on an open deck---DO NOT use below decks or in your cabin.
- Inform captain and crew that you have formalin onboard, where it is stored, location of Material Safety Data Sheets (MSDS), potential hazards, and what to do in case of spill.
- IF spilled--this is a small enough quantity to dilute with water and wash overboard.
- Add formalin to bucket that is already half full with seawater, rather than adding seawater to the formalin. This will ensure that the formalin is quickly diluted, and will lessen the chance of getting formalin splashed on you.
- Use extreme caution when adding formalin to bucket with seawater, hold the bucket lid over as much of the bucket as possible while pouring the formalin, creating a 'shield'.
- IF formalin comes into contact with your skin or eyes—rinse immediately, and thoroughly, with water for 15 minutes as per MSDS.
- IF ingested--consume large quantities of water, do not induce vomiting, seek medical attention as soon as possible as per MSDS.
- IF overcome by fumes--move to fresh air, administer oxygen if necessary and available as per MSDS.

Where to Keep Formalin Onboard?

- Formalin should be stored in a well ventilated space. 100% formalin should be stored at or above, below this temperature it will lose its potency as a component of the formalin precipitates from the solution. Pure formalin is considered a flammable material and should be stored in an appropriate flammable storage area until it has been diluted as described above. Once diluted to a 10% solution, formalin can, and should be stored on a weather deck if possible. It won't freeze.
- It is best to store your bucket securely tied to an immobile object. Leave the bucket in place and carry samples to the bucket after you are done with your sampling. This will avoid the potential of spilling formalin in the factory and will keep the formalin away from fish processing operations.
- Do not to submerge your gloves in the formalin when you add samples to the bucket. If the samples float, use a pair of forceps or some other sampling tool to submerge the samples. Rinse with water after formalin contact.
- Anytime formalin gets spilled and/or inadvertently comes into contact with any object other than your samples, flush the object or area with plenty of water.