

FINAL CRUISE INSTRUCTIONS

Eco-FOCI

NOAA Ship *Oscar Dyson*, DY-09-07

May 7 – May 20, 2009

Chief Scientist: Janet Duffy-Anderson, NOAA/AFSC

1.0 FINAL CRUISE INSTRUCTIONS

1.1 **Cruise Title** – Ecosystem and Fisheries-Oceanography Coordinated Investigations (Eco-FOCI). Spring Ichthyoplankton Bering Sea

1.2 **Cruise Numbers**:

1.2.1 **Cruise Number** – DY-09-07

1.2.2 **Eco-FOCI Number** – 3DY09

1.3 **Cruise Dates**:

1.3.1 **Departure** – Depart Dutch Harbor, Alaska, at 1500 on Thursday, May 7, 2009.

1.3.2 **Touch and Go** – Dutch Harbor, Alaska, at 0800 on Monday, May 18, 2009. TNG will be for the Chief Scientist only and will occur by small boat operation. There will be a few additional bongo tows in the Gulf of Alaska after the TNG (see map) and the rest of the scientific party will remain on board to conduct this work.

1.3.3 **Arrival** – Arrive Kodiak Island, Alaska, at 0800 on Wednesday, May 20, 2009.

2.0 CRUISE OVERVIEW

2.1 **Cruise Objectives** – Examine the interactions among climate, weather, and the recruitment of fishes in the eastern Bering Sea. We will conduct ichthyoplankton and zooplankton surveys in the waters along the eastern Aleutian Island chain, the Alaska Peninsula, and the Pribilof Islands. This work is needed to describe larval fish assemblages and determine how physical and biological factors affect the transport and survival of fish larvae. The cruise is a collaboration between the North Pacific Research Board's Bering Sea Integrated Ecosystem Research Program (BSIERP) and NOAA's North Pacific Climate Regimes and Ecosystem Productivity (NPCREP). Fish species of particular interest during this cruise are: arrowtooth flounder (*Atheresthes stomias*), Pacific cod (*Gadus macrocephalus*) and walleye pollock (*Theragra chalcogramma*). We will determine the horizontal and vertical distribution of these species as well as the abundance and distribution of their plankton prey. Near

real time discrimination of *Atheresthes* spp. larvae will be made at sea using molecular techniques.

2.1 Applicability – These instructions, with **FOCI Standard Operating Instructions for NOAA Ship OSCAR DYSON**, dated December 2008 present complete information for this cruise.

2.2 Operating Area – Eastern Bering Sea/Unimak Pass/Western Gulf of Alaska

2.3 Participating Organizations

NOAA – Alaska Fisheries Science Center (AFSC)
7600 Sand Point Way N.E.
Seattle, Washington 98115-0070

2.4 Personnel

2.4.1 Chief Scientist

| Name | Gender | Affiliation | E-mail Address | Citizenship |
|---|--------|-------------|--|-------------|
| Janet T. Duffy-Anderson (206) 526-6465 | Female | AFSC | Janet.Duffy-Anderson@noaa.gov | USA |

2.4.2 Other Participating Scientists

| Name | Gender | Affiliation | E-mail Address | Citizenship |
|---------------|--------|-------------|--|-------------|
| Matt Wilson | Male | AFSC | Matt.Wilson@noaa.gov | USA |
| Kenric Osgood | Male | OST | Kenric.Osgood@noaa.gov | USA |
| Chrissy Jump | Female | AFSC | Christina.Jump@noaa.gov | USA |
| Kathy Mier | Female | AFSC | Kathy.Mier@noaa.gov | USA |
| Lisa DeForest | Female | AFSC | Lisa.Deforest@noaa.gov | USA |
| Deborah Blood | Female | AFSC | Debbie.Blood@noaa.gov | USA |
| Tracey Smart | Female | UW | Tracey.Smart@noaa.gov | USA |

2.5 Administration

2.5.1 Ship Operations

Marine Operations Center, Pacific
1801 Fairview Avenue East
Seattle, Washington 98102-3767
Tel: (206) 553-4548 / Fax: (206) 553-1109

CDR Mike Francisco, NOAA
Chief, Operations Division, Pacific (MOP1)
Telephone: (206) 553-8705

Cellular: (206) 518-1941
E-mail: ChiefOps.MOP@noaa.gov

2.5.2 **Scientific Operations**

Dr. Phyllis J. Stabeno, PMEL
Telephone: (206) 526-6453
E-mail: Phyllis.Stabeno@noaa.gov

Dr. Jeffrey M. Napp, AFSC
Telephone: (206) 526-4148
E-mail: Jeff.Napp@noaa.gov

3.0 OPERATIONS

Data To Be Collected –

We will collect ichthyo- and zooplankton samples with 20- and 60-cm Bongo nets (20BON, 60BON + Seacat combination) and a Sameoto neuston net from a grid of approximately 12 stations in the vicinity of the Pribilof Islands and approximately 60 stations along the Alaska Peninsula, over Bering Canyon, across Unimak Pass, and in the GOA immediately outside of Unimak Pass. In addition, a 1m² Multiple Opening/Closing Net and Environmental Sensing System (MOCNESS) will be used at selected stations to examine depth-discrete distributions of larvae. The MOCNESS will be used several times during the cruise to collect diel series of the vertical distribution of larvae. Exact positions will be determined at sea based on densities of eggs and larvae collected in bongo tows. If time allows, the Continuous Underway Fish Egg Sampler (CUFES) will be used during one or two transects. We anticipate deploying 2-3 satellite-tracked drifters at selected stations within the survey grid. A standard oceanographic watch is requested for plankton towing, which consists of a winch operator, a member of the deck department, a scientific staff of three and a Survey Technician on deck. Operations will be conducted 24 hours a day.

We will collect data on the physical environment using the Sea-Bird Electronics SBE-19 SEACAT Profiler to relate larval fish abundance to environmental variables (temperature and salinity). CTDB samples may also be taken at MOCNESS sampling stations to assess microzooplankton and nutrients.

3.1.1 Scientific Computer System (SCS) – The ship's SCS shall operate throughout the cruise, acquiring and logging data from navigation, meteorological, oceanographic, and fisheries sensors. See **FOCI Standard Operating Instructions for NOAA Ship OSCAR DYSON** (SOI 5.2) for specific requirements.

3.2 Staging Plan – The majority of the equipment necessary for the cruise will be loaded onto **NOAA Ship OSCAR DYSON** from OSI in Dutch Harbor. The Chief Scientist requests notification of which pier the ship will dock at a least a couple of days in advance to make arrangements for gear delivery. All scientists anticipate arriving in Dutch Harbor on May 5th, and loading gear as soon as possible on the morning of May 6th (8 am). We request berthing aboard the ship the nights of the 5th and 6th, if possible. We request assistance with craning and gear staging from the Deck Department, and we request that we be allowed to set up equipment, including the MOCNESS on the day prior to and day of departure. We request that the ET be available to assist the scientists with setting up the MOCNESS. Prior to departure, we

will also need the assistance of the ET in mounting the ship's network drive on our FOCI computer in either the Acoustic Lab or in the Hydrographic Lab for transfer of SeaCat data for processing. We will require dedicated use of the computer lab, dry lab, hydrographic lab (for potential storage of MOCNESS accessories), and request as much counter and cabinet space as possible. We will not use the CER room for scientific studies. Some ancillary equipment (live tank, several totes) will be brought aboard for transit and eventual shipment out of Kodiak, AK but will not be used on this cruise.

3.3 De-staging Plan – The majority of our equipment (and all samples) will stay on the ship for the following cruise (DY-09-06 Leg 3; Chief Scientist - Annette Dougherty). The CO has agreed to this arrangement, and scientists will work with ship's personnel to store items in areas that are mutually agreeable during the Kodiak inport. CS Dougherty will oversee complete offloading of all gear and samples in Kodiak, AK after her cruise May 26 – June 6.

3.4 Cruise Plan – The cruise will depart from Dutch Harbor, Alaska, and occupy a series of approximately 60 stations. Station positions and a map of the working area are located in [Sections 10.2 DY-09-06.2 – Station Locations](#) and [10.4 DY-09-06.2 – Cruise Chartlet](#), respectively.

3.4.1 Grid Survey – During the regular grid survey, the Sameoto neuston net will be deployed first. The net will collect fish larvae in the surface layer. Samples from the Neuston net will be preserved in 1.8% buffered Formaldehyde (5% formalin). Marks should be made at surface (in) and surface (out). A Marine Assessment Monitoring and Prediction (MARMAP) Bongo tow (SOI 3.2.2) will be conducted next. The SBE 19 SEACAT, the 20-cm Bongo (20BON) net with 0.150-mm mesh netting and the 60-cm Bongo (60BON) net mounted with 0.333 and 0.505-mm mesh will all be mounted together for this tow. Grid station bongo tows will be to a depth of 300 meters, or to 10 meters off bottom, whichever is shallowest. Marks should be made at surface (in), at-depth, and surface (out). The sample from Bongo Net 1 will be preserved in its entirety in 1.8% buffered formaldehyde solution (5% formalin) and the sample from Net 2, whenever time allows, will be rough sorted, and the contents identified. If *Atheresthes* spp. or other fish larvae of interest are found in the rough sort, then these larvae will be removed and saved for other purposes. The remainder of the sample will be preserved for zooplankton identification.

3.4.2 MOCNESS – We will opportunistically fish the MOCNESS (0.505 and/or 0.333 mm mesh) at selected stations on the Bering Sea continental shelf during the survey. Locations for this sampling to be determined at sea at the discretion of the Chief Scientist and the CO. Sampling will be at 1 or more stations over a 24 to 36- hour diel period. Marks for MOCNESS tows should be surface (in), at-depth, one mark for each subsequent closed net, and surface (out). Samples will be preserved in formalin. Depths of net trips will be determined at sea.

Associated CTDB (8 bottles) casts will collect water samples for

microzooplankton and nutrient data (SOI 3.2.1) after each MOCNESS tow. CTD bottle trips will be made at the same depths as the MOCNESS. Marks for CTD casts should be surface (in), at-depth, each bottle trip, and surface (out).

3.4.3 ARGOS Satellite-Tracked Drifter Buoy Deployments – We anticipate deployment of 2-3 ARGOS drifters (SOI 3.3.11) at selected stations along the survey grid. Sites will be determined at sea dependent upon catches of egg/larvae in the bongo or MOCNESS tows.

3.5 Station Locations – See [Section 10.2 DY-09-06.2 – Station Locations](#).

3.6 Station Operations – The following are operations to be conducted on this cruise. The procedures for these operations are listed in the *FOCI Standard Operating Instructions* (SOI). Operations not addressed in the SOI and changes to standard procedures are addressed below.

- CTD/Water Sample Operations (SOI 3.2.1),
- MARMAP Bongo Tows (SOI 3.2.2), and
- MOCNESS tows, (SOI 3.2.5)
- ARGOS Satellite-Tracked Drifter Buoy Deployments (SOI 3.2.11).

3.6.1 Neuston Net Tows

3.6.1.1 Description – Neuston nets are used for sampling the upper few centimeters of the water column. There are many frame styles that may be used; we use a Sameoto sampler made of stainless steel. Themouth opening is 30-cm x 50-cm and is designed to fish half in and half out of the water.

3.6.1.2 Rates/Fishing – The vessel should be moving slowly ahead, about 1.5 to 2.0 knots, so that the net is fishing half in and half out of the water. The exact speed necessary varies with sea conditions and is a learning process. Lower the neuston net to the surface with a crane and pay out 10 to 15 meters of wire. It may be necessary to adjust the ship's speed to maintain the proper skimming action. Start the stopwatch when the net starts to fish and tow the net for approximately 9.5 minutes, unless otherwise instructed. After 9.5 minutes, decrease vessel speed to retrieve the net. Read and record flow meter revolutions, duration of tow, and any comments on the COD form.

• **3.6.1.3 Preservation** – The Neuston sample should be preserved immediately, as specified in the *FOCI Field Manual* or sample collection request forms.

• **3.6.1.4 Maintenance** – Check net for holes and fill flow meter with water.

3.6 Underway Operations – The following are underway operations to be conducted on this cruise. The procedures for these operations are listed in the *FOCI Standard Operating Instructions for NOAA Ship OSCAR DYSON* (SOI). Operations not addressed in the SOI and changes to standard procedures are addressed below.

- Scientific Computer System (SCS) Data Acquisition (SOI 3.2.14.2),
- Acoustic Doppler Current Profiler (ADCP) Operations (SOI 3.2.14.1),
- Fluorometer Monitoring (SOI 5.3), and
- Thermosalinograph monitoring (SOI 5.3).

3.7 Applicable Restrictions – None.

3.8 Small Boat Operations – None.

4.0 FACILITIES

4.1 Equipment and Capabilities Provided by Ship

- Oceanographic winch with slip rings and 3-conductor cable terminated for CTD,
- Oceanographic winch with slip rings and 3-conductor cable terminated for the SBE-19 SEACAT, for net tow operations,
- Sea-Bird Electronics' SBE-19 SEACAT system,
- Sea-Bird Electronics SBE 911plus CTD system with stand, each CTD system should include underwater CTD and weights. There should be one deck unit for the two systems,
- Conductivity and temperature sensor package to provide dual sensors on the CTD (primary),
- Niskin Bottles: 10.0 liter (4 bottles) + any available spares in any volume,
- Wire speed indicators and readout for winches,
- For meteorological observations: 2 anemometers (one R. M. Young system interfaced to the SCS), calibrated air thermometer (wet-and dry-bulb) and a calibrated barometer and/or barograph,
- Freezer space for storage of biological and chemical samples (both blast and storage freezers, -20° C and -80° C) turned on and operating,
- SIMRAD ES-60 and SIMRAD EK-60 echosounders,
- Use of Pentium PC for data analysis,
- Bench space in dry lab (survey office) for computer, monitor, printer for MOCNESS,
- Scientific Computer System (SCS),
- Laboratory space with exhaust hood, sink, lab tables, and storage space,
- Sea-water hoses and nozzles to wash nets (hero deck and aft deck),
- Adequate deck lighting for night-time operations,
- Navigational equipment including GPS and radar,
- Safety harnesses for working on hero deck and trawl deck
- Ship's crane(s) used for loading and/or deploying gear and supplies.

4.2 Equipment and Capabilities Provided by Scientists – See [Section 10.1 DY-09-06.2 – Equipment Inventory](#) for weights and dimensions.

- Manual wire-angle indicator,
- Sea-Bird Electronics SBE 911plus CTD system (backup),
- Sea-Bird Electronics' SBE-19 SEACAT system, (backup),
- PMEL PC with SEASOFT software for CTD data collection and processing,
- Fluorometer and light meter to be mounted on CTD,
- MOCNESS array,
- CTD stand modified for attachment of fluorometer,
- Conductivity and temperature sensor package to provide dual sensors on the CTD (backup),
- CTD rosette sampler,
- IAPSO standard water,
- 20-cm and 60-cm Bongo sampling arrays,
- Miscellaneous scientific sampling and processing equipment,
- ARGOS drifters
- Scientific freezer (-20 °C),
- Microscopes for examining, sorting, and measuring fish eggs and larvae,
- Haul position and catch composition forms,
- Cruise Operations Database (COD) software and forms
- Plastic five-gallon buckets
- Dissection tools

5.0 DISPOSITION OF DATA AND REPORTS

5.1 The following data products will be included in the cruise data package:

- **NOAA Form 77-13d – Deck Log – Weather Observation Sheets,**
- Electronic Marine Operations Abstracts,
- SCS backup – recordable compact diskette (DVD-RW),
- Calibration sheets for all ship's and scientific instruments used
- PMEL CTD weather observation log,
- CTD Cast Information/Rosette Log,
- Scientific Freezer Temperature Daily Log
- Controlled Environmental Room Temperature Log

5.2 **Pre- and Post-cruise Meetings** – Cruise meetings may be held in accordance with **FOCI Standard Operating Instructions for NOAA Ship Oscar Dyson** (SOI 5.5).

6.0 ADDITIONAL PROJECTS

6.1 **Definition** – Ancillary and piggyback projects are secondary to the objectives of the cruise and should be treated as additional investigations. The difference between the two types of secondary projects is that an ancillary project does not have representation aboard and is accomplished by the ship's force.

6.2 Ancillary Projects – Any ancillary work done during this project will be accomplished with the concurrence of the Chief Scientist and on a not-to-interfere basis with the programs described in these instructions and in accordance with the **NOAA Fleet Standing Ancillary Instructions**.

6.3 Piggyback Projects –

6.3.1. Collection of larval walleye pollock, Pacific cod, and arrowtooth flounder for R. Heintz (AFSC – TSMRI) to characterize growth and energy content.

6.3.2. Collection of underway parameters, including dissolved O₂ for N. Cokelet for BSIERP project.

7.0 HAZARDOUS MATERIALS

7.1 Inventory – See [Section 10.5 DY-09-06.2 – HAZMAT Inventory](#).

7.2 Material Safety Data Sheet (MSDS) – Submitted separately.

8.0 MISCELLANEOUS

8.1 Communications – Specific information on how to contact the **NOAA Ship OSCAR DYSON** and all other fleet vessels can be found at:

<http://www.moc.noaa.gov/phone.htm>

8.2 Important Telephone and Facsimile Numbers and E-mail Addresses

8.2.1 Pacific Marine Environmental Laboratory (PMEL)

FOCI – Ocean Environmental Research Division (OERD2):

- (206) 526-4700 (voice)
- (206) 526-6485 (fax)

Administration:

- (206) 526-6810 (voice)
- (206) 526-6815 (fax)

E-Mail: FirstName.LastName@noaa.gov

8.2.2 Alaska Fisheries Science Center (AFSC)

FOCI – Resource Assessment and Conservation Engineering (RACE):

- (206) 526-4171 (voice)
- (206) 526-6723 (fax)

E-Mail: FirstName.LastName@noaa.gov

8.2.3 NOAA Ship OSCAR DYSON – Telephone methods listed in order of increasing expense:

Cruise No: DY-09-07
FOCI No: 3DY09

Homeport – Kodiak, Alaska

United States Coast Guard – Kodiak, Alaska:

- (907) 487-9752
- (907) 487-9753
- (907) 487-4397
- (907) 487-4398

Cellular:

- (206) 403-8433 (CO)
- (206) 295-0775 (XO)
- (206) 295-0550 (OPS)
- (206) 295-0670 (CME)

INMARSAT B:

- 9-011-870-336-995-920 (voice line 1)
- 9-011-870-336-995-921 (fax)

Iridium:

- (808) 659-0050

Dutch Harbor Cells:

907-359-1801 (CO)
907-359-1917 (XO)
907-359-1916 (OOD)

E-Mail: Noaa.Ship.Oscar.Dyson@noaa.gov (mention the person's name in SUBJECT field.)

8.2.4 Marine Operations Center, Pacific (MOP)

Operations Division (MOP1):

- (206) 553-4548 (voice)
- (206) 553-1109 (facsimile)

E-Mail: FirstName.LastName@noaa.gov

E-Mail to Radio Room: Radio.Room@noaa.gov

9.0 Deemed Exports-NAO 207-12

The procedures for foreign nationals are listed in the **FOCI Standard Operating Instructions for NOAA Ship OSCAR DYSON** (SOI), Section 9.0

10.0 APPENDICES**10.1 DY-09-06.2 – Equipment Inventory**

| Equipment | Quantity | Weight |
|---------------------------------|---------------------|--------------|
| Larval Supply Trunk | 1 | 80 lbs |
| Formaldehyde Containers | 1 x 20-Liter | 20 lbs |
| Carboy, Saturated Sodium Borate | 1 x 20-Liter | 40 lbs |
| Miscellaneous Gear Trunks | 15 | 80-lbs (ea.) |
| 60-cm Bongo Frame | 1 | 40 lbs |
| 20-cm Bongo Frame | 1 | 40 lbs |
| Live tank | 1 | 75 lbs |
| MOCNESS Frame | 1 | 250 lbs |
| Cases, Glass Jars, 32-oz | 25 cases | 50 lbs |
| Cases, Glass Jars, 8-oz | 15 cases | 8 lbs |
| Satellite tracked drifters | 3 | 60 lbs (ea.) |
| Computer trunks | 2 | 50 lbs (ea.) |
| Live Tank (transport only) | 1 (4ft x 4ft x 4ft) | 150 lbs |

10.2 DY-09-06.2 – Station Locations:

These are locations where bongo tows will occur. Other activities (MOCNESS, CTD, drifters) will occur at selected locations pending results of bongo tows and pending approval by the CS and the CO. Additional bongo stations may be added within the grid, weather and time permitting.

| Station | LatDeg | LatMin | LongDeg | LongMin | DecLat | DecLong |
|---------------------|--------|--------|---------|---------|----------|-----------|
| Depart Dutch Harbor | 53 | 54.50 | -166 | 30.90 | 53.9083 | -166.5150 |
| BM49 | 57 | 31.80 | -169 | 59.28 | 57.53 | -169.99 |
| BP49 | 57 | 24.60 | -170 | 21.36 | 57.41 | -170.36 |
| BS49 | 57 | 17.40 | -170 | 43.38 | 57.29 | -170.72 |
| BS43 | 56 | 50.99 | -170 | 17.06 | 56.84977 | -170.2843 |
| BP43 | 56 | 58.15 | -169 | 54.94 | 56.96912 | -169.9156 |
| BM43 | 57 | 5.31 | -169 | 32.75 | 57.08847 | -169.5459 |
| BM40 | 56 | 52.12 | -169 | 19.62 | 56.87 | -169.33 |
| BP40 | 56 | 44.96 | -169 | 41.82 | 56.75 | -169.70 |
| BS40 | 56 | 37.80 | -170 | 4.02 | 56.63 | -170.07 |
| BS37 | 56 | 24.61 | -169 | 51.00 | 56.41 | -169.85 |
| BP37 | 56 | 31.77 | -169 | 28.80 | 56.53 | -169.48 |
| BM37 | 56 | 38.93 | -169 | 6.54 | 56.64883 | -169.109 |
| N16 | 57 | 8.34 | -161 | 3.55 | 57.13906 | -161.0592 |
| N10 | 56 | 41.97 | -160 | 37.31 | 56.69942 | -160.6218 |
| N07 | 56 | 28.78 | -160 | 24.31 | 56.47961 | -160.4051 |
| Q07 | 56 | 21.62 | -160 | 48.15 | 56.36026 | -160.8025 |
| Q13 | 56 | 47.99 | -161 | 14.15 | 56.79989 | -161.2359 |

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| | | | | | | |
|----------------------|----|---------|------|--------|----------|-----------|
| Q19 | 57 | 14.37 | -161 | 40.46 | 57.23953 | -161.6744 |
| W19 | 57 | 0.05 | -162 | 27.61 | 57.00083 | -162.4601 |
| W13 | 56 | 33.67 | -162 | 1.46 | 56.56119 | -162.0243 |
| W07 | 56 | 7.29 | -161 | 35.62 | 56.12156 | -161.5937 |
| Z07 | 56 | 0.13 | -161 | 59.22 | 56.00 | -161.99 |
| Z13 | 56 | 26.51 | -162 | 25.02 | 56.44 | -162.42 |
| Z19 | 56 | 52.89 | -162 | 51.06 | 56.88 | -162.85 |
| AF19 | 56 | 38.57 | -163 | 37.80 | 56.64278 | -163.63 |
| AF13 | 56 | 12.19 | -163 | 11.88 | 56.20314 | -163.198 |
| AF07 | 55 | 45.81 | -162 | 46.26 | 55.7635 | -162.771 |
| AL07 | 55 | 31.49 | -163 | 33.00 | 55.5248 | -163.55 |
| AL13 | 55 | 57.87 | -163 | 58.44 | 55.96444 | -163.974 |
| AL19 | 56 | 24.24 | -164 | 24.18 | 56.40408 | -164.403 |
| AR19 | 56 | 9.92 | -165 | 10.32 | 56.17 | -165.17 |
| AR13 | 55 | 43.54 | -164 | 44.76 | 55.73 | -164.75 |
| AR07 | 55 | 17.17 | -164 | 19.50 | 55.2861 | -164.325 |
| AR04 | 55 | 3.98 | -164 | 6.94 | 55.06628 | -164.1156 |
| AL04 | 55 | 18.30 | -163 | 20.40 | 55.30499 | -163.34 |
| AU04 | 54 | 56.82 | -164 | 30.12 | 54.95 | -164.50 |
| AU07 | 55 | 10.01 | -164 | 42.60 | 55.17 | -164.71 |
| AU10 | 55 | 23.19 | -164 | 55.20 | 55.39 | -164.92 |
| AU16 | 55 | 49.57 | -165 | 20.52 | 55.83 | -165.34 |
| BA16 | 55 | 35.25 | -166 | 6.34 | 55.58751 | -166.1057 |
| BA10 | 55 | 8.87 | -165 | 41.16 | 55.15 | -165.69 |
| BA07 | 54 | 55.68 | -165 | 28.62 | 54.93 | -165.48 |
| BA04 | 54 | 42.49 | -165 | 16.20 | 54.71 | -165.27 |
| BG04 | 54 | 28.17 | -166 | 2.04 | 54.47 | -166.03 |
| BG07 | 54 | 41.36 | -166 | 14.40 | 54.69 | -166.24 |
| BG10 | 54 | 54.55 | -166 | 26.82 | 54.91 | -166.45 |
| BM10 | 54 | 40.23 | -167 | 12.27 | 54.67047 | -167.2045 |
| BM07 | 54 | 27.04 | -166 | 59.94 | 54.45065 | -166.999 |
| BM04 | 54 | 13.85 | -166 | 47.64 | 54.23 | -166.79 |
| BS04 | 53 | 59.53 | -167 | 32.94 | 53.99213 | -167.549 |
| BS07 | 54 | 12.72 | -167 | 45.18 | 54.21195 | -167.753 |
| BS16 | 54 | 52.28 | -168 | 22.20 | 54.8714 | -168.37 |
| BS19 | 55 | 5.47 | -168 | 34.68 | 55.09122 | -168.578 |
| BV22 | 55 | 11.50 | -169 | 9.54 | 55.19169 | -169.159 |
| TNG Dutch Harbor | 53 | 54.50 | -166 | 30.90 | 53.9083 | -166.5150 |
| gd101 | 54 | 9.6456 | -164 | 54.408 | 54.16076 | -164.9068 |
| gf101 | 54 | 2.7588 | -164 | 39.636 | 54.04598 | -164.6606 |
| gh103 | 54 | 3.129 | -164 | 13.194 | 54.05215 | -164.2199 |
| gf103 | 54 | 10.0158 | -164 | 27.888 | 54.16693 | -164.4648 |
| gd103 | 54 | 16.9032 | -164 | 42.63 | 54.28172 | -164.7105 |
| Arrive Kodiak Island | 57 | 45.00 | -152 | 29.60 | 57.7500 | -152.4933 |

10.3 Biomass Removal Estimates:

DY09-06.2

7 May - 20 May 2009

Estimation of Fish Removal

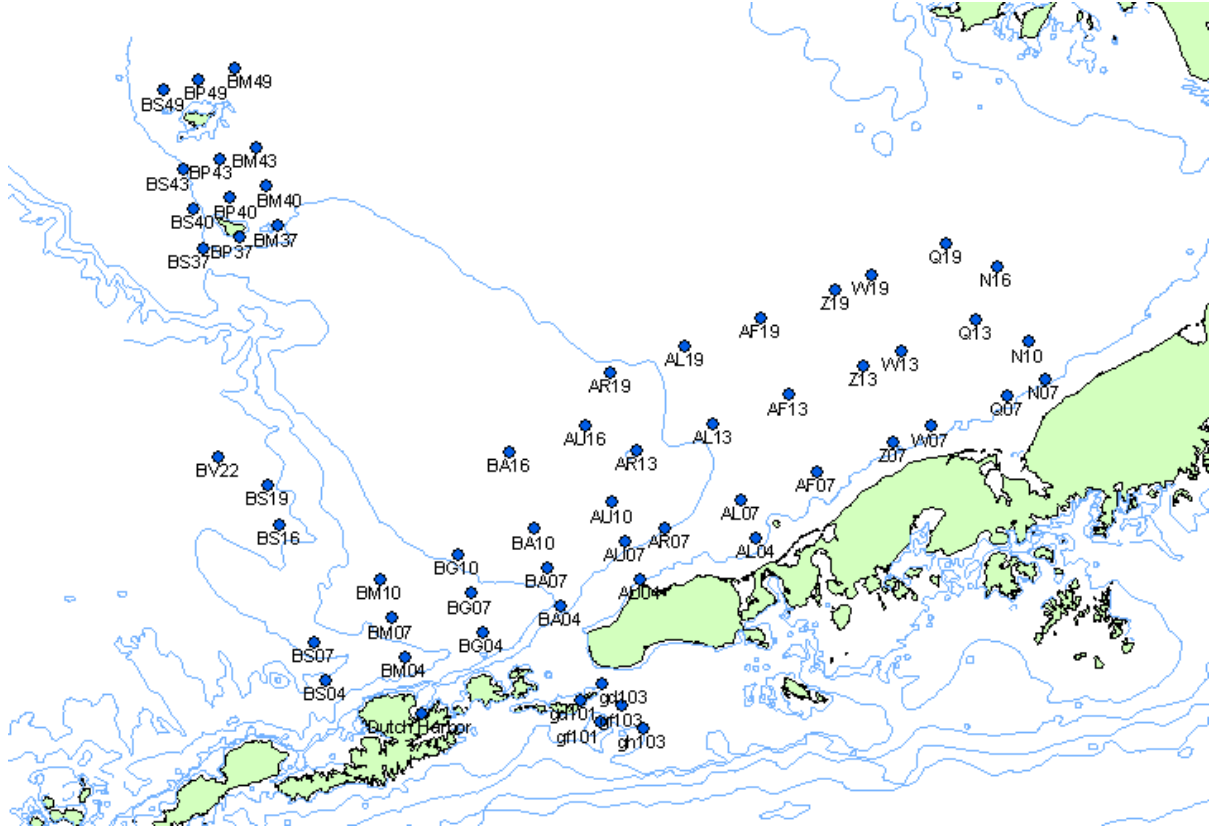
Projected removal of fish biomass per sample:

Cruise No: DY-09-07

FOCI No: 3DY09

| Sample | # Hauls | Arrowtooth fl. | Rockfishes | Walleye pollock | Pacific cod | Pacific halibut |
|---------|---------|----------------|------------|-----------------|-------------|-----------------|
| Bongo | 55 | <0.1 kg | <0.1 kg | <0.1 kg | <0.1 kg | <0.1 kg |
| MOCNESS | 15 | <0.1 kg | <0.1 kg | <0.1 kg | <0.1 kg | <0.1 kg |

10.4 DY-09-06.2 – Cruise Chartlet



10.5 HAZMAT Inventory

| Chemical | CAS Number | Respondee | Org. | Qty | H | F | R | Storage Code | Hazard Class | Packing Group Number | UN | Reportable Quantity | Response Indices |
|-----------------------------------|------------|----------------|------|-------------|---|---|---|--------------|---------------|----------------------|------|---------------------|------------------|
| Formaldehyde, 37% | 50-00-0 | Duffy-Anderson | AFSC | 60-L | 3 | 2 | 2 | Flammable | 3 & 8 | III | 1198 | 100 LBS | 2 |
| Sodium Borate | 1330-43-4 | Duffy-Anderson | AFSC | 500-g | 1 | 0 | 0 | General | Not regulated | | | | 3 |
| Sodium Borate Solution, Saturated | mix | Duffy-Anderson | AFSC | 20-L | 1 | 0 | 0 | General | Not regulated | | | | 3 |
| Alcohol, Reagent, 95% | mix | Duffy-Anderson | AFSC | 1 x 20-l | 3 | 3 | 1 | Flammable | 3 | II | 1987 | 350 Lb | 1 |

Spill Response 1: Ventilate area of leak or spill. Wear appropriate personal protective equipment. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Neutralize with alkaline material (soda ash, lime), then absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. **Do not flush to sewer!** U.S. Regulations (CERCLA) requires reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the U.S. Coast Guard National Response Center is (800) 424-8802.

Spill Response 2: Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, or earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. **Do not flush to sewer!** If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. U.S. Regulations (CERCLA) requires reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the U.S. Coast Guard National Response Center is (800) 424-8802.

Spill Response 3: Ventilate area of leak or spill. Wear appropriate personal protective equipment. Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust.

Cruise No: DY-09-07
FOCI No: 3DY09

CAPT Michelle G. Bullock
Commanding Officer
Marine Operations Center,
Pacific
206-553-7656

Dr. Doug DeMaster
Science and Research Director
Alaska Fisheries Science Center
206-526-4000