

Data Report  
for  
Aerial Surveys conducted within the Monterey Bay  
National Marine Sanctuary, July 2000.

Prepared by

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## **Introduction**

Aerial surveys of marine mammals were conducted during July 2000 as a collaborative effort between the Monterey Bay National Marine Sanctuary (MBNMS), the National Marine Fisheries Service, Southwest Fisheries Science Center (SWFSC), and Moss Landing Marine Laboratories (MLML). The main objectives of the surveys were to 1) conduct research and monitoring projects that require aircraft within the Monterey Bay National Marine Sanctuary, 2) demonstrate feasibility of and need for a permanent NOAA aircraft on the west coast, and 3) to provide data for GIS program formulation and input. Four separate sets of transect lines were surveyed to meet several specific research and monitoring objectives:

*Sanctuary-wide pelagic (large-scale) aerial surveys* were conducted to record information on the distribution of marine mammals, sea turtles, large sharks, selected seabirds, ocean sunfish (*Mola mola*), active and derelict fishing gear, and vessels within the MBNMS.

*Meso-scale aerial surveys* were conducted within a smaller region, which coincided with the Monterey Bay Aquarium Research Institute (MBARI; <http://www.mbari.org>) and the REINAS Project CODAR (Coastal Ocean RADAR; <http://sapphire.cse.ucsc.edu/reinas/codar/>) oceanographic study area, for detailed studies of marine mammals, turtles, selected seabirds and fish, in relation to their physical environment within this portion of the MBNMS. The objectives of this component of the research were to 1) Contribute to ecosystem monitoring objectives of comprehensive physical/biological studies, 2) Collect replicated data on meso-scale distribution patterns of marine mammals, turtles and other species to be related to oceanographic data collected by MBARI and CODAR, and 3) Develop models of marine mammal, turtle and ocean sunfish distribution relative to oceanographic variables.

*Fine-scale aerial surveys:* Fine-scale surveys within Monterey Bay were conducted to collect detailed distribution information of harbor porpoise (*Phocoena phocoena*) and sea turtles, and their potential prey species, pelagic schooling fish and jellyfish. Information was also

collected on sea otters (*Enhydra lutris*), ocean sunfish, large sharks, krill swarms, fishing gear, and vessels. The objectives of this research component were to 1) Collect replicated data on fine-scale distribution patterns of harbor porpoise and schooling fish, to be incorporated into models of patchiness & variability, 2) Develop and test methods of recording schooling fish during visual aerial surveys, 3) Document sea otter depth distribution and variability, 4) Provide sighting locations to others interested in sampling turtles, krill, sharks, molas, and 5) record fishing vessels & gear for MBNMS monitoring.

*Davidson Seamount surveys:* A survey was conducted in waters over this central California seamount to provide background information to the NOAA Sanctuaries Division about species occurrence of marine mammals, seabirds, turtles, sharks and ocean sunfish in this region.

*Moss Landing Marine Laboratories, graduate student research:* In support of ongoing graduate research projects, we conducted opportunistic radio-tracking of harbor seals (S. Oates) and photographic surveys of California sea lion haul out sites along the coast between Pescadero Creek in San Mateo County and Pt. Sur in Monterey County (M. Weise).

## Methods

### *Study Areas and Transects*

The large-scale survey was conducted within the boundaries of the Monterey Bay National Marine Sanctuary. Within this region, an irregular zigzag pattern of transects was selected by randomly choosing eastern (coast) and western (offshore) end points from within a 20 minute range of latitudes (Figure 1a). This technique ensured that essentially all areas of the Sanctuary had a chance of being sampled during the large-scale surveys.

The meso-scale surveys encompassed the region covered by ongoing oceanographic studies at other research institutions in the Monterey Bay region (MBARI, CODAR). Transect lines followed a systematic zigzag pattern with end points spaced at regular 5-minute intervals of latitude (Figure 1b). The starting latitude for the set of lines was selected randomly from five possible 1-minute starting points.

Fine-scale surveys were designed to provide thorough coverage of Monterey Bay. Transects were systematically spaced every minute of latitude (Figure 1c), with the starting latitude selected randomly from a set of four 15-second intervals.

Davidson Seamount surveys encompassed a systematic set of parallel lines spaced 5 nmi apart, with randomly chosen starting latitude. The lines were 15-20 nautical miles (nmi) long and covered the seamount and adjacent waters (Figure 1a).

### *Field Methods*

A NOAA Shrike Aero Commander, twin-engine, high-wing aircraft was available from late June through late July, 2000. Flights were conducted only when weather conditions were

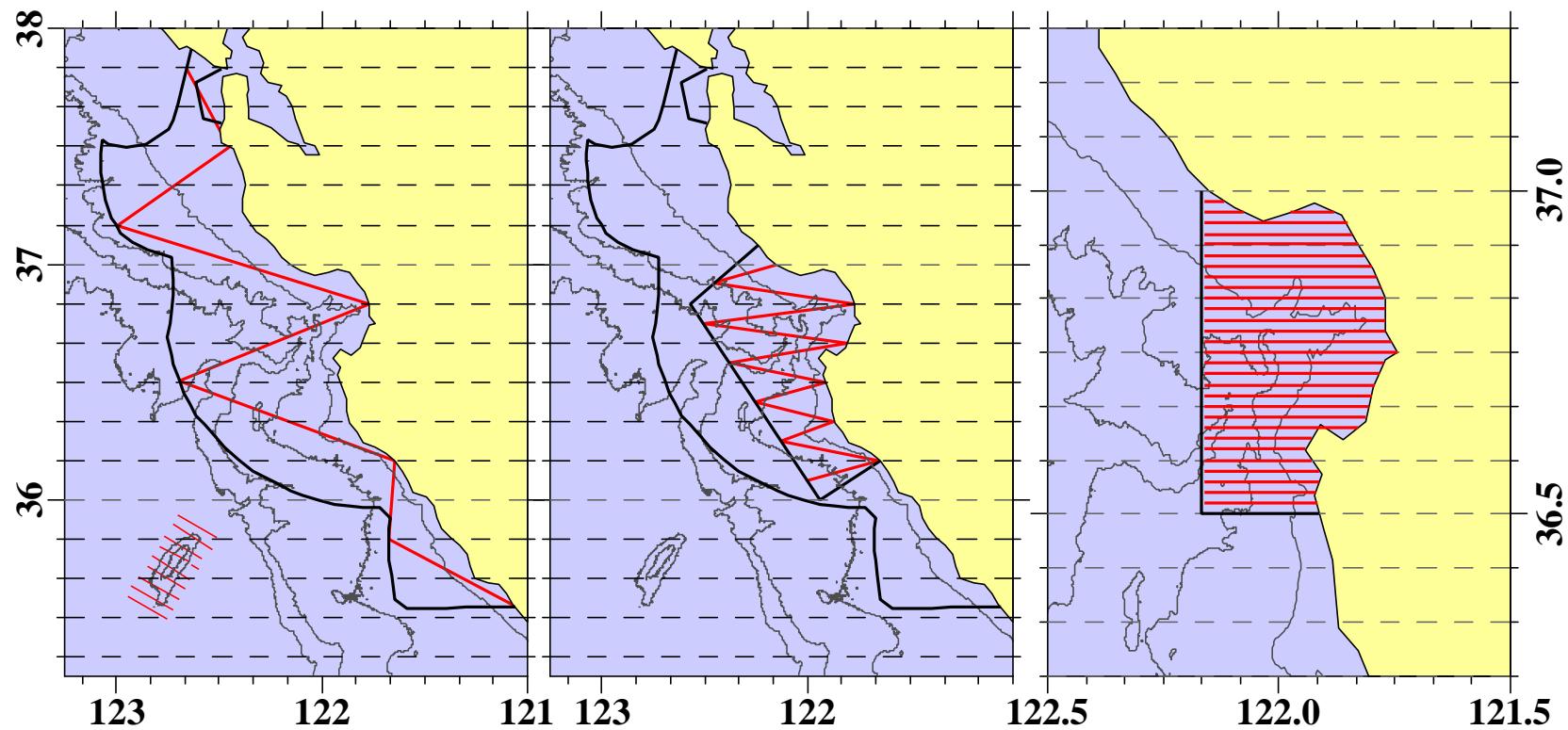


Figure 1. Planned transect lines for July 2000 Monterey Bay National Marine Sanctuaries aerial surveys: Large-scale and Davidson Seamount surveys (left), meso-scale surveys (center), and fine-scale Monterey Bay surveys (right).

expected to be good, defined as sea states of 0-3 on the Beaufort scale, with mostly clear or partly cloudy skies. The aircraft was outfitted with two bubble windows, one on each side, allowing lateral visibility from the horizon (0° declination angle) to the area directly beneath the aircraft (90° declination angle). Although it was possible to see animals directly below the plane, optimal visibility was restricted to declination angles of about 75° or less, corresponding to a minimum of about 53–57 m from the transect line at the survey altitudes of 650–700 ft. The large-scale, meso-scale and Davidson Seamount surveys were flown at 700 ft, and the fine-scale surveys were flown at 650 ft to facilitate detection and identification of harbor porpoise. On all surveys, it was occasionally necessary to change altitude slightly because of cloud cover or air traffic. If the required flight altitude was less than 450 ft or was greater than 850 ft, then survey effort was discontinued temporarily. Surveys were flown at about 100 knots airspeed. Sighting information and environmental conditions were recorded and updated throughout the survey using a laptop computer connected to the aircraft's GPS navigation system.

The survey team consisted of two observers (left and right) and one data recorder. All sightings of marine animals were recorded following line-transect methodology (Buckland *et al.* 1993). Perpendicular distances were calculated from the aircraft's altitude and the declination angle to the sighting, obtained with a hand-held clinometer. Species that occurred in small groups and were easy to identify, such as pinnipeds, turtles, albatrosses, sharks, and ocean sunfish, were recorded 'on the fly' without circling. If species identification or group size was uncertain, search effort was suspended and the aircraft circled over the animals until species were identified and group size estimates had been obtained, or until visual contact with the animals was lost. Species identification and group size estimates were determined by mutual agreement of all observers who were able to obtain an adequate view of the animals.

A radio-tracking antenna was mounted to the tail of the aircraft prior to the survey flights. During transits to and from survey lines, frequencies of radio-tagged harbor seals were monitored to obtain information on the distribution of study animals (S. Oates, MLML).

## Results

Although weather is often overcast or windy during July, each of the four survey types was flown successfully once under good to excellent viewing conditions. A list of survey dates and participants is shown in Table 1. A complete listing of survey effort, environmental conditions and sighting locations is provided in Appendix 1, with a data key in Appendix 2.

Table 1. Aerial survey dates and participants, July 2000. Unsuccessful survey flights were also attempted on July 19 (poor weather) and July 25 (mechanical problem with aircraft). A photographic pinniped haul out survey was conducted on July 26 (Weise 2000).

Position	<b>July 5</b> Meso-scale	<b>July 7</b> Complete Meso-scale	<b>July 8</b> Large-scale & Fine-scale	<b>July 12</b> Davidson Seamount	<b>July 13</b> Complete Large-scale
Observer 1	Karin Forney	Karin Forney	Karin Forney	Karin Forney	Karin Forney
Observer 2	Scott Benson	Scott Benson	Scott Benson	Scott Benson	Scott Benson
Data Recorder	Deirdre Hall	Jill Baltan	Teri Nicholson	Stori Oates	Sarah Wilkin
Radio-tracker	Jen Jolly				

A diverse suite of species were encountered during the surveys, including 321 sightings of marine mammals, seabirds, sharks, sunfish, and turtles (Table 2, Figures 2-5).

Table 2. List of marine mammal, turtle, albatross, shark, and ocean sunfish sightings during Monterey Bay National Marine Sanctuary and Davidson Seamount aerial surveys, July 2000.

Species Code	Species common name, scientific name	Davidson Seamount	Fine-scale Survey	Large-scale Survey	Meso-scale Survey	Total Sightings
PP	Harbor porpoise, <i>Phocoena phocoena</i>		5	6	1	12
PD	Dall's porpoise, <i>Phocoenoides dalli</i>		1	6	3	10
LO	Pacific white-sided dolphin, <i>Lagenorhynchus obliquidens</i>		3	4	4	11
GG	Risso's dolphin, <i>Grampus griseus</i>	1	1	2	3	7
DD	Common dolphins, <i>Delphinus delphis</i> or <i>D. capensis</i>		1			1
LB	Northern right whale dolphin, <i>Lissodelphis borealis</i>		1	5		6
BD	Baird's beaked whale, <i>Berardius bairdii</i>			1		1
MN	Humpback whale, <i>Megaptera novaeangliae</i>		1	4	5	10
BM	Blue whale <i>Balaenoptera musculus</i>			4	1	5
BA	Minke whale <i>Balaenoptera acutorostrata</i>		1			1
UP	Unid. Porpoise			1		1
SW	Unid. small whale		1			1
UB	Unid. rorqual			1	3	4
ZC	California sea lion <i>Zalophus californianus</i>		15	90	5	110
EJ	Steller sea lion <i>Eumetopias jubatus</i>				1	1
PV	Harbor seal <i>Phoca vitulina</i>			2	2	4
MA	Elephant seal <i>Mirounga angustirostris</i>		1	2		3
EL	Southern sea otter <i>Enhydra lutris</i>		2	2		4
DC	Leatherback turtle <i>Dermochelys coriacea</i>			2	1	3
ALBF	Black-footed Albatross <i>Phoebastria nigripes</i>	1	18	26	16	61
MOLA	Ocean Sunfish <i>Mola mola</i>	1	9	54	1	65

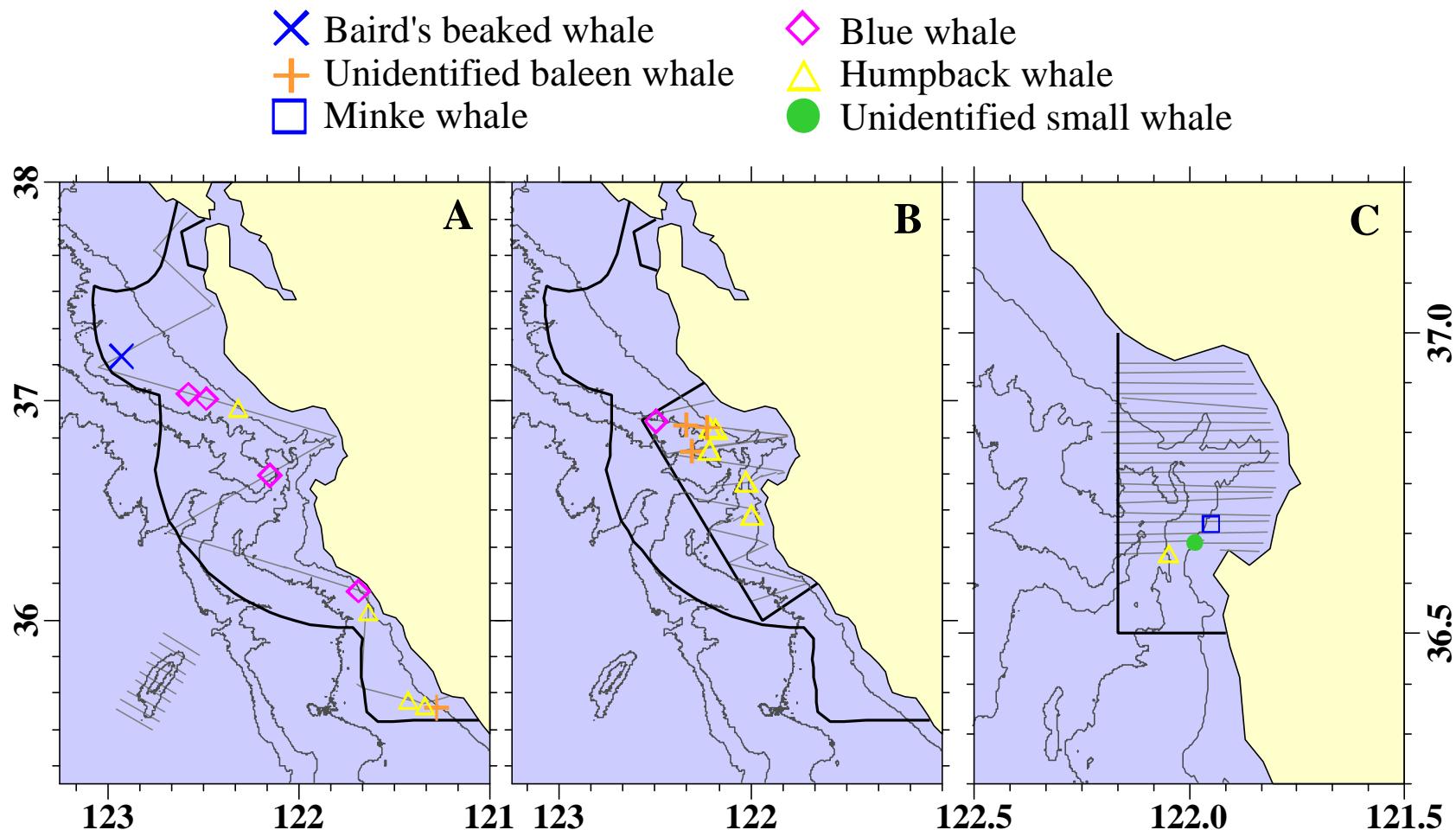


Figure 2. Sightings of large cetaceans and transect lines flown during the July 2000 Monterey Bay National Marine Sanctuary aerial surveys. (A) Large-scale survey (7/13) and Davidson Seamount Survey (7/12), (B) Meso-scale Survey (7/5 & 7/7), and (C) Fine-scale harbor porpoise survey (7/8).

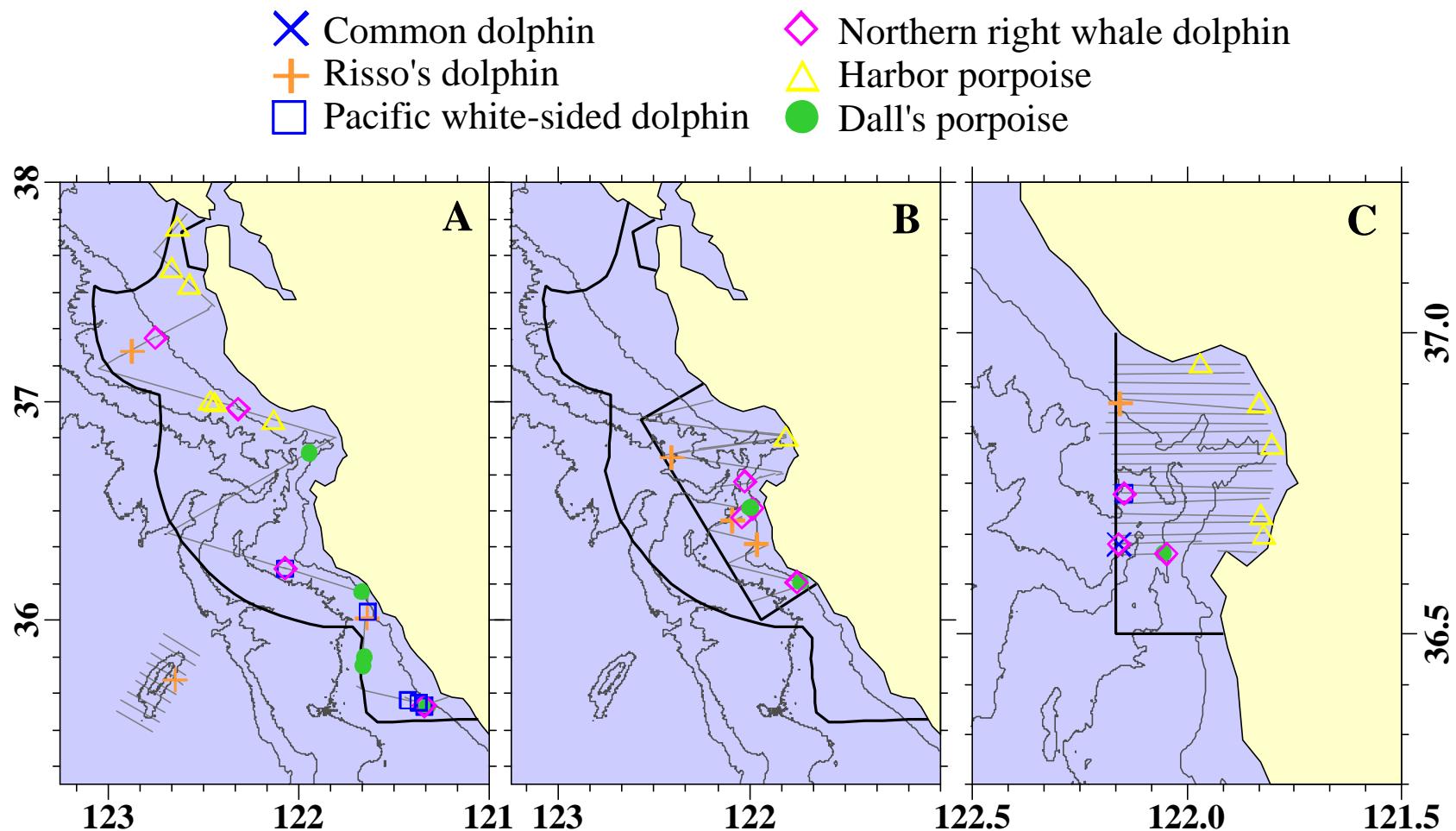


Figure 3. Sightings of small cetaceans and transect lines flown during the July 2000 Monterey Bay National Marine Sanctuary aerial surveys. (A) Large-scale survey (7/13) and Davidson Seamount Survey (7/12), (B) Meso-scale Survey (7/5 & 7/7), and (C) Fine-scale harbor porpoise survey (7/8).

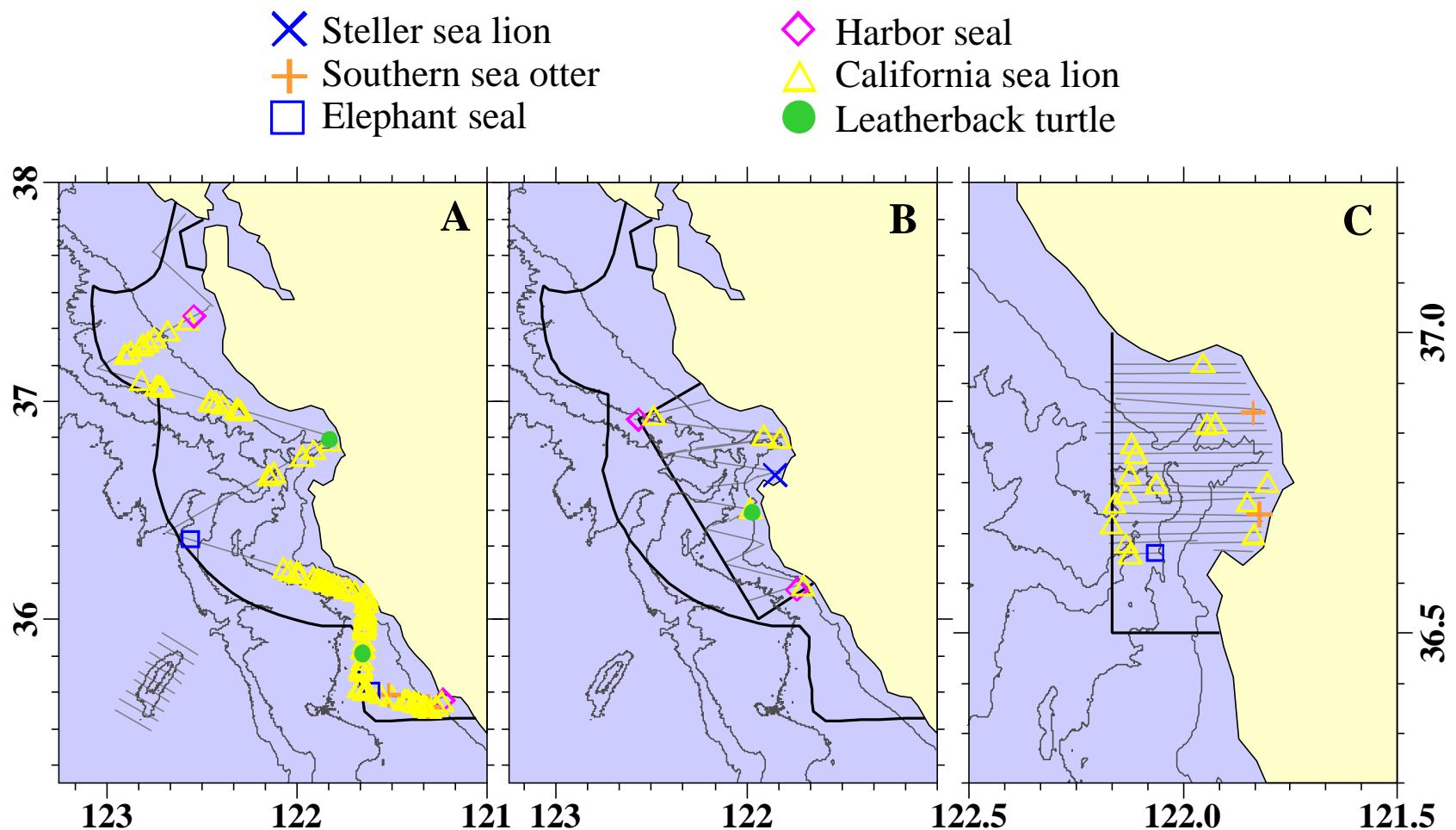


Figure 4. Sightings of pinnipeds, otters and turtles and transect lines flown during the July 2000 Monterey Bay National Marine Sanctuary aerial surveys. (A) Large-scale survey (7/13) and Davidson Seamount Survey (7/12), (B) Meso-scale Survey (7/5 & 7/7), and (C) Fine-scale harbor porpoise survey (7/8).

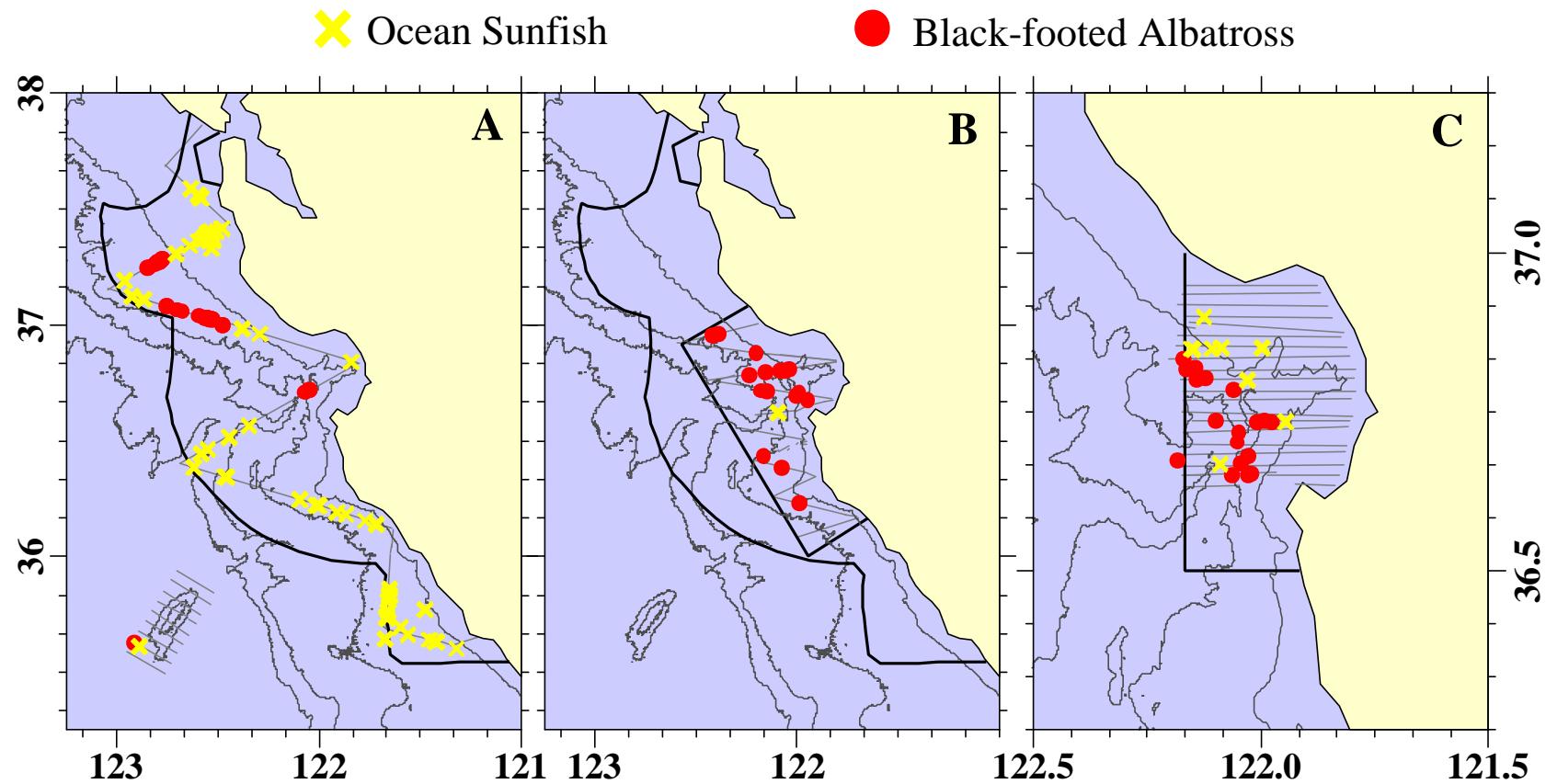


Figure 5. Sightings of Ocean Sunfish and Black-footed Albatross on transect lines flown during the July 2000 Monterey Bay National Marine Sanctuary aerial surveys. (A) Large-scale survey (7/13) and Davidson Seamount Survey (7/12), (B) Meso-scale Survey (7/5 & 7/7), and (C) Fine-scale harbor porpoise survey (7/8).

Patterns of marine mammal occurrence were largely consistent with other recent studies off central California (e.g., Allen 1994, Barlow 1995, Forney et al. 1995, Benson et al. 2002). California sea lions were the most frequently encountered marine mammal. They were seen throughout the Sanctuary, but were most common south of Pt. Sur (Fig. 4). This is consistent with their breeding migrations, as the majority of sea lions are expected to be at breeding rookeries in the southern California Channel Islands during July. Other pinniped sightings included harbor seals, elephant seals, and one Steller sea lion. Sea otters were encountered on four occasions, twice near shore in the southernmost portion of the Sanctuary, and twice in shallow areas of Monterey Bay. The most common cetaceans encountered (Figs. 2-3) were harbor porpoise, Dall's porpoise, Pacific white-sided dolphin, and humpback whale. Northern right whale dolphins, common dolphins, Risso's dolphins, blue whales, a minke whale, and one group of Baird's beaked whales were also seen. Only one species of marine mammal, Risso's dolphin, was encountered during the Davidson Seamount survey.

Leatherback sea turtles were sighted on three occasions, in Monterey Bay, off Pt. Lobos, and off the Big Sur coastline (Fig 4). Black-footed albatross and ocean sunfish were seen frequently throughout the Sanctuary (Fig 5), and each species was encountered once during the Davidson Seamount survey. Radio-tagged harbor seals were located on several flights, providing data for graduate research by a Moss Landing Marine Laboratories student.

Vessel activity during the surveys was recorded by noting positions and vessel types whenever encountered. The results are summarized by density (Fig. 6) and by type (Fig. 7). Fishing vessels, a category that included primarily commercial boats (esp. trollers), but also may have included some larger non-commercial boats, were seen most frequently. Recreational vessels, including charter sport-fishing boats, sail boats, and motorized small boats, were the second most common type of vessel seen. One research ship (R/V Pt. Lobos) and one cargo/tanker ship were also encountered. Vessel density was greatest in the northern portion of Monterey Bay, in areas of high recreational boat use and intense salmon trolling activity.

## DISCUSSION

This pilot study was designed to evaluate the usefulness of aerial surveys as a means of rapidly assessing Sanctuary resources and user activities, and to initiate a program for aerial monitoring. Three biologists and two pilots effectively surveyed several regions of interest during five working days. The NOAA Shrike aircraft was a functional, although not optimal, survey platform for these surveys. Although the Shrike was equipped with a belly port, there was insufficient space for both downward-viewing and lateral observers, and only two lateral observers could be used during the surveys. The best viewing conditions are directly below the plane, and many sightings were probably missed using only a 2-observer configuration. Survey effectiveness could be increased in the future by using an aircraft which can accommodate two lateral observers and a belly observer simultaneously (Barlow et al. 1988).

The transect design allowed a rapid assessment ('snapshot') of the distribution of marine mammals, sea turtles, large seabirds, and large, near-surface fish species within the Sanctuary. Furthermore, the three-tiered survey design (fine-scale, meso-scale, large-scale) allows maximum flexibility for future species-environment analyses combining sighting data with oceanographic data, compiled by independent researchers within the Sanctuary. Further surveys will be required to obtain a sufficient sample size for these more sophisticated analyses and modeling efforts, and to obtain meaningful estimates of species density and abundance.

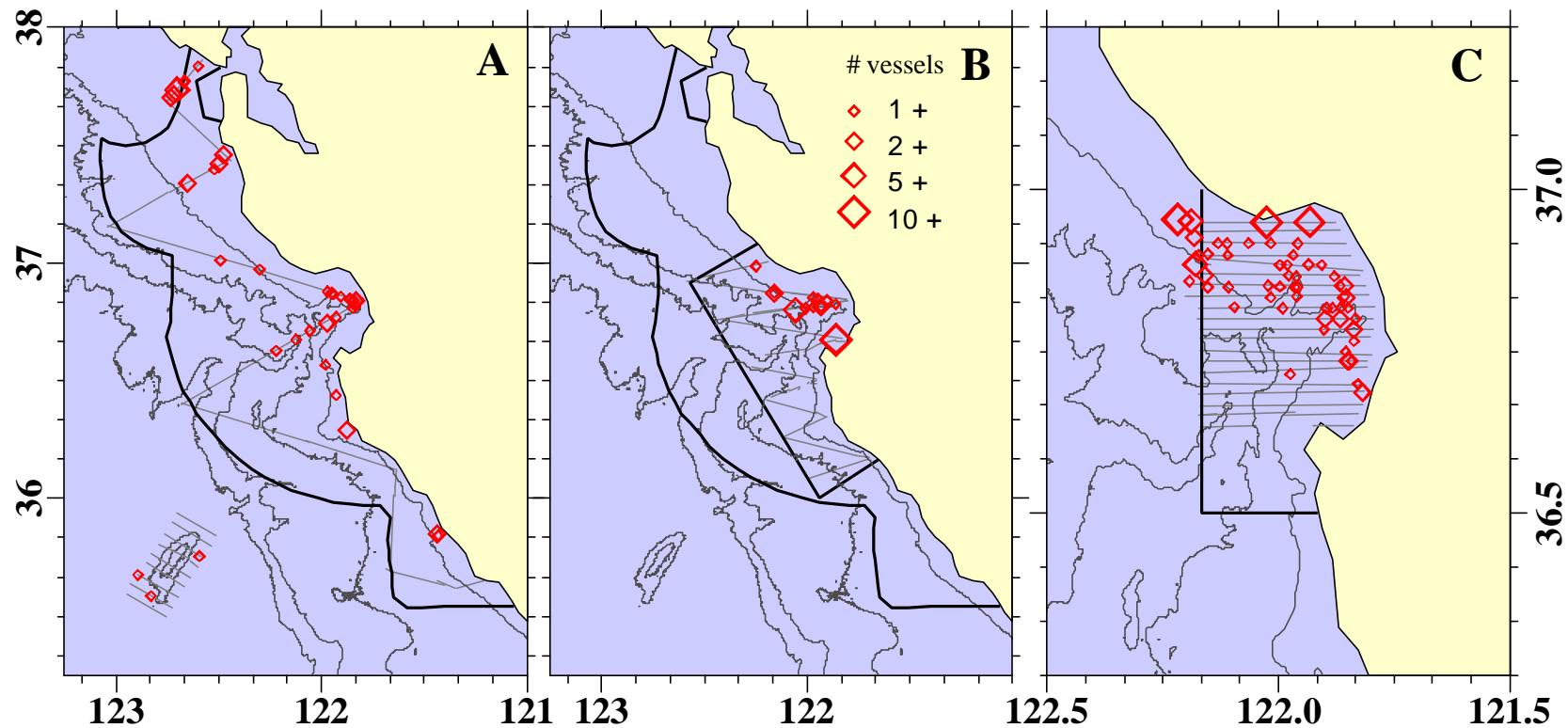


Figure 6. Sightings of all vessels on transect lines flown during the July 2000 Monterey Bay National Marine Sanctuary aerial surveys. (A) Large-scale survey (7/13) and Davidson Seamount Survey (7/12), (B) Meso-scale Survey (7/5 & 7/7), and (C) Fine-scale harbor porpoise survey (7/8)

◆ Fishing vessel  
+ Recreational vessel     
 △ Research vessel  
× Tanker/Commercial

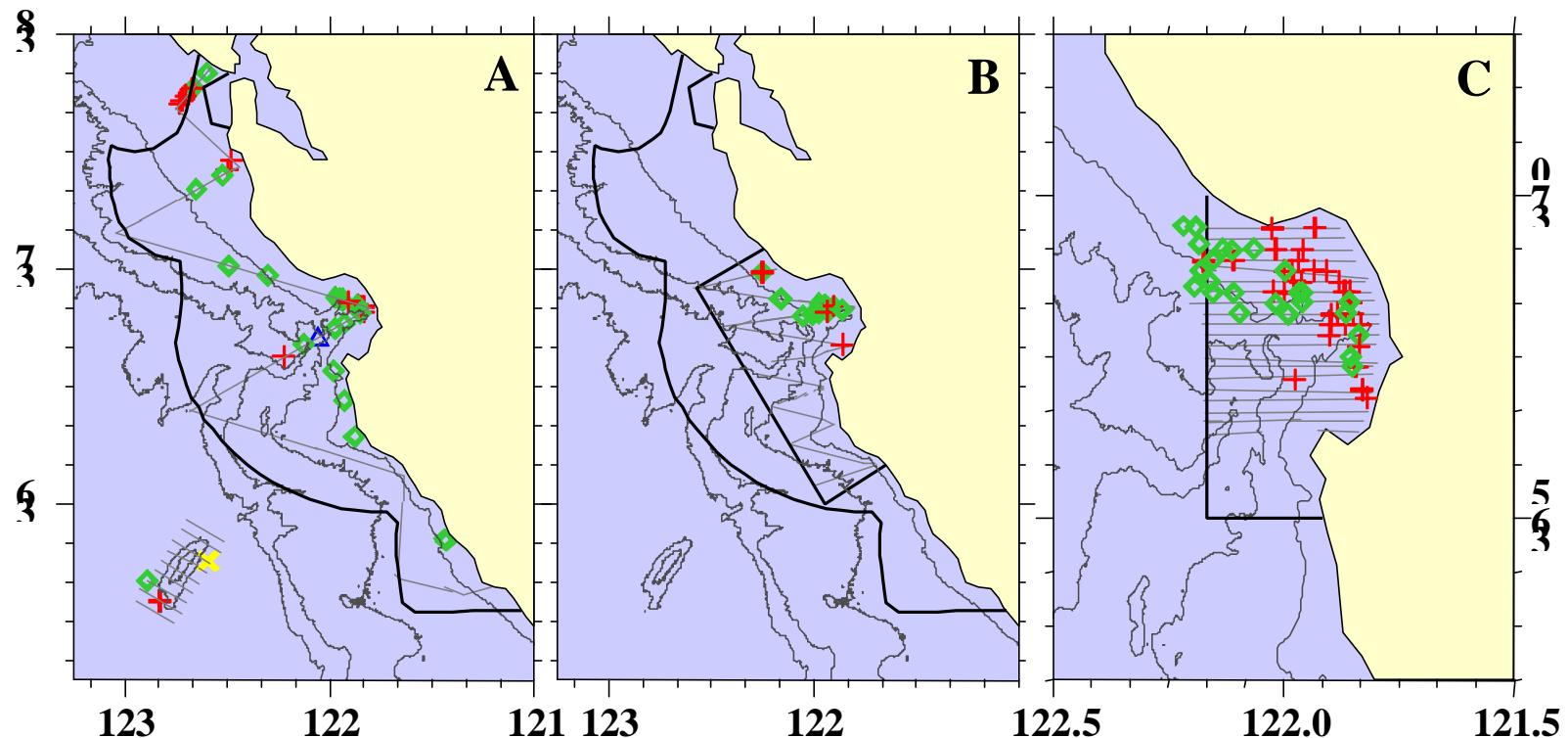


Figure 7. Sightings of all vessels, by vessel type, on transect lines flown during the July 2000 Monterey Bay National Marine Sanctuary aerial surveys. (A) Large-scale survey (7/13) and Davidson Seamount Survey (7/12), (B) Meso-scale Survey (7/5 & 7/7), and (C) Fine-scale harbor porpoise survey (7/8)

## ACKNOWLEDGMENTS

This study was initiated as a collaborative effort between the National Marine Fisheries Service and the Monterey Bay National Marine Sanctuary, with assistance from students and staff of Moss Landing Marine Laboratories. LCDR Michele Finn masterminded all logistics related to the NOAA Shrike aircraft and was an excellent pilot during the surveys, along with co-pilot LCDR Andrea Hrusovksy. Andrew De Vogelaere provided support and funding for required field equipment. Special thanks to the observers who volunteered their time for this pilot study: Jill Baltan, Scott Benson, Deirdre Hall, Jen Jolly, Teri Nicholson, Stori Oates, and Sarah Wilkin. I would also like to thank the volunteers who were on call to fly on other days when the weather did not permit surveys: Arvin Alan, Terry Darcey, Steph Dutton, Aaron King, Maris Sidenstecker, and Heidi Tiura.

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**MESO-SCALE SURVEY**

18C 110400 070500 N36:04.77 W121:59.83 DASALL.MS1 First Meso-scale MBNMS survey  
 18C 110400 070500 N36:04.77 W121:59.83  
 18C 110400 070500 N36:04.77 W121:59.83  
 18\* 110400 070500 N36:04.77 W121:59.83  
 19T.110408 070500 N36:04.67 W121:59.54 1  
 20V.110408 070500 N36:04.67 W121:59.54 40 75  
 21P.110408 070500 N36:04.67 W121:59.54 sb kf dh  
 22A.110408 070500 N36:04.67 W121:59.54 700 100  
 23W.110408 070500 N36:04.67 W121:59.54 n 0 4  
 24\*.110500 070500 N36:04.81 W121:57.58  
 26\*.110600 070500 N36:05.30 W121:55.44  
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 34W.111129 070500 N36:07.99 W121:44.42 n 0 2  
 35S.111145 070500 N36:08.22 W121:43.99 5 sb -47 y pv  
 1 sb 1 1 1 100  
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 37S.111254 070500 N36:09.44 W121:42.18 6 sb -39 y zc  
 1 sb 1 1 1 100  
 38\*.111300 070500 N36:09.58 W121:42.00  
 39O 111314 070500 N36:09.86 W121:41.68  
 40T.111334 070500 N36:10.26 W121:41.92 2  
 41V.111334 070500 N36:10.26 W121:41.92 30 20  
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 44W.111334 070500 N36:10.26 W121:41.92 n 0 2  
 45\*.111400 070500 N36:10.38 W121:42.91  
 46S.111423 070500 N36:10.35 W121:43.74 7 kf 72 y pd  
 1 kf 4 4 3 100  
 47\*.111500 070500 N36:10.42 W121:44.95  
 47C.111500 070500 N36:10.42 W121:44.95 Two PD cow/calf pairs; one calf all gray  
 48S.111507 070500 N36:10.45 W121:45.20 8 sb -36 y lo  
 1 sb 5 6 5 100  
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 72\* 112900 070500 N36:15.03 W122:06.82

73\* 113000 070500 N36:15.33 W122:06.51  
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 82\*.113200 070500 N36:16.60 W122:02.51  
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 88\*.113400 070500 N36:18.09 W121:58.81  
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 101S.113851 070500 N36:20.88 W121:57.68 9 kf 26 y gg  
     1 kf 35 36 34 100  
 102\*.113900 070500 N36:20.96 W121:57.90  
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 143\*.115100 070500 N36:24.10 W122:10.31  
 144W.115147 070500 N36:24.62 W122:11.82 n 100 2  
 145E 115152 070500 N36:24.68 W122:11.95  
 146\*.115200 070500 N36:24.82 W122:12.17  
 147R.115255 070500 N36:25.60 W122:10.47  
 148W.115258 070500 N36:25.62 W122:10.40 n 100 2  
 149\*.115300 070500 N36:25.62 W122:10.40  
 150V.115301 070500 N36:25.68 W122:10.26 30 60  
 152C.115316 070500 N36:25.86 W122:09.84 albf1  
 153V.115333 070500 N36:26.07 W122:09.27 30 60  
 154\*.115400 070500 N36:26.37 W122:08.44  
 155C.115409 070500 N36:26.49 W122:08.15 transect 5  
 156W.115442 070500 N36:26.82 W122:07.12 0 0 2  
 157\*.115500 070500 N36:27.00 W122:06.53  
 158S.115538 070500 N36:27.35 W122:05.29 10 kf 24 y gg  
     1 kf 17 18 16 100  
 159E 115544 070500 N36:27.40 W122:05.12  
 160\*.115600 070500 N36:27.26 W122:04.61

161R.115629 070500 N36:26.83 W122:05.32  
 162\*.115700 070500 N36:27.03 W122:05.98  
 163\*.115800 070500 N36:27.35 W122:05.24  
 164\*.115900 070500 N36:27.89 W122:03.28  
 165S.115931 070500 N36:28.20 W122:02.24 11 kf 71 y lo  
     1 kf 12 16 10 100  
 166E 115938 070500 N36:28.26 W122:01.95  
 167\* 120000 070500 N36:27.82 W122:01.64  
 168\* 120100 070500 N36:27.64 W122:02.07  
 169\* 120200 070500 N36:28.17 W122:01.81  
 170\* 120300 070500 N36:27.52 W122:02.11  
 171C 120347 070500 N36:27.25 W122:03.29 12, 16, 10  
 172C 120353 070500 N36:27.16 W122:03.23  
 173C 120354 070500 N36:27.16 W122:03.23  
 174\* 120400 070500 N36:27.09 W122:02.82  
 175\* 120500 070500 N36:27.43 W122:02.50  
 176R.120501 070500 N36:27.46 W122:02.44  
 177E 120525 070500 N36:27.82 W122:01.84  
 178C 120531 070500 N36:27.89 W122:01.73 going over clouds  
 179\* 120600 070500 N36:28.27 W122:00.92  
 180S 120600 070500 N36:28.27 W122:00.92 12 sb o lo  
     1 sb 125 200 100 100  
 181C 120631 070500 N36:28.72 W122:00.07 125 lag  
 181R.120631 070500 N36:28.72 W122:00.07  
 182S.120646 070500 N36:28.94 W121:59.61 13 sb -72 y mn  
     1 sb 2 2 2 100  
 183E.120700 070500 N36:29.23 W121:59.29  
 183\* 120700 070500 N36:29.23 W121:59.29  
 187R.120744 070500 N36:29.10 W121:59.04  
 188V.120757 070500 N36:29.21 W121:58.66 20 50  
 189\*.120800 070500 N36:29.24 W121:58.59  
 190t.120813 070500 N36:29.39 W121:58.13 kf 46 dc 350 j  
 191E 120846 070500 N36:29.23 W121:57.24  
 192\* 120900 070500 N36:28.92 W121:57.56 dc moving fast mostly sub-surface;  
 192\* 120900 070500 N36:28.92 W121:57.56 6-7ft, tail unknown, few scattered  
 192\* 120900 070500 N36:28.92 W121:57.56 jellies in area  
 192\* 120900 070500 N36:28.92 W121:57.56  
 193\* 121000 070500 N36:29.41 W121:57.50  
 194\* 121100 070500 N36:29.45 W121:58.12  
 195\* 121200 070500 N36:29.26 W121:58.09  
 196R.121211 070500 N36:29.35 W121:58.43  
 204R.121243 070500 N36:29.71 W121:57.93  
 205\*.121300 070500 N36:29.65 W121:57.51  
 206O 121308 070500 N36:29.58 W121:57.01  
 207T.121339 070500 N36:29.97 W121:57.11 6  
 208V.121339 070500 N36:29.97 W121:57.11 30 25  
 209P.121339 070500 N36:29.97 W121:57.11 sb kf dh  
 210A.121339 070500 N36:29.97 W121:57.11 700 100  
 211W.121339 070500 N36:29.97 W121:57.11 0 0 2  
 212\*.121400 070500 N36:30.19 W121:57.73  
 213W.121402 070500 N36:30.21 W121:57.79 0 0 2  
 214S.121437 070500 N36:30.59 W121:58.84 16 kf 64 y zc  
     1 kf 1 1 1 100  
 215S.121445 070500 N36:30.65 W121:59.15 17 sb 79 y lo  
     1 sb 6 6 5 100  
 216S.121454 070500 N36:30.71 W121:59.41 18 kf 34 y pd  
     1 kf 1 2 1 100  
 217\*.121500 070500 N36:30.75 W121:59.62  
 218S.121501 070500 N36:30.75 W121:59.62 19 sb -37 y pd  
     1 sb 2 2 2 100  
 220A.121555 070500 N36:31.10 W122:01.27 700 100  
 221\*.121600 070500 N36:31.13 W122:01.41  
 222A.121627 070500 N36:31.29 W122:02.36 800 100  
 223C.121639 070500 N36:31.37 W122:02.78 haze at 800

224C.121653 070500 N36:31.47 W122:03.28  
 225\*.121700 070500 N36:31.51 W122:03.46  
 226A.121708 070500 N36:31.57 W122:03.74 700 100  
 227W.121715 070500 N36:31.62 W122:03.95 0 0 3  
 228V.121727 070500 N36:31.73 W122:04.36 40 35  
 229\*.121800 070500 N36:31.90 W122:05.37  
 230\*.121900 070500 N36:32.26 W122:07.31  
 231W.121952 070500 N36:32.66 W122:08.99 0 0 3  
 232\*.122000 070500 N36:32.72 W122:09.25  
 233\*.122100 070500 N36:33.08 W122:11.29  
 234A.122126 070500 N36:33.24 W122:12.16 600 100  
 235W.122157 070500 N36:33.50 W122:13.16 0 60 3  
 236\*.122200 070500 N36:33.51 W122:13.23  
 237A.122233 070500 N36:33.61 W122:14.34 700 100  
 238\*.122300 070500 N36:33.66 W122:15.22  
 239V.122303 070500 N36:33.67 W122:15.37 40 60  
 240E 122313 070500 N36:33.69 W122:15.70  
 241O 122345 070500 N36:33.00 W122:16.34  
 242\*.122400 070500 N36:32.57 W122:16.48  
 243\*.122500 070500 N36:33.37 W122:15.15  
 244\*.122600 070500 N36:34.89 W122:13.71  
 245\*.122700 070500 N36:36.20 W122:12.33  
 246T.122702 070500 N36:36.23 W122:12.22 7  
 247V.122702 070500 N36:36.23 W122:12.22 30 75  
 248P.122702 070500 N36:36.23 W122:12.22 sb kf dh  
 249A.122702 070500 N36:36.23 W122:12.22 500 100  
 250W.122702 070500 N36:36.23 W122:12.22 0 60 3  
 251\*.122800 070500 N36:36.65 W122:10.12  
 252A.122812 070500 N36:36.72 W122:09.62 700 100  
 253A.122816 070500 N36:36.74 W122:09.55 700 100  
 254W.122842 070500 N36:36.90 W122:08.51 0 0 3  
 255\*.122900 070500 N36:37.01 W122:07.93  
 256\*.123000 070500 N36:37.37 W122:05.85  
 257C.123004 070500 N36:37.39 W122:05.70 mola, sb, 35  
 258\*.123210 070500 N36:37.49 W122:05.17  
 259S.123210 070500 N36:38.05 W122:01.47 21 kf 12 y mn lo  
     1 kf 33 43 28 9 91  
 260\*.123300 070500 N36:37.45 W122:00.28  
 262\*.123400 070500 N36:37.86 W122:00.57  
 263E 123421 070500 N36:37.57 W121:59.94  
 264\*.123500 070500 N36:37.20 W122:00.58  
 265\*.123600 070500 N36:37.13 W121:59.71  
 266\*.123700 070500 N36:36.70 W122:00.75  
 267R.123714 070500 N36:37.11 W122:00.53  
 268E 123719 070500 N36:37.16 W122:00.39  
 269\*.123800 070500 N36:36.10 W122:00.06  
 270\*.123900 070500 N36:37.17 W122:00.55  
 273C 123945 070500 N36:38.33 W121:59.85  
 274R.123950 070500 N36:38.37 W121:59.60  
 275\*.124000 070500 N36:38.41 W121:59.26  
 276W.124008 070500 N36:38.46 W121:58.93 0 0 2  
 277W.124011 070500 N36:38.47 W121:58.85 0 0 2  
 278C.124033 070500 N36:38.61 W121:58.07 visible ocean front at last mn/lo  
 278C.124033 070500 N36:38.61 W121:58.07 sighting, stretches into south bay.  
 279\*.124100 070500 N36:38.80 W121:57.10  
 280E 124126 070500 N36:38.93 W121:56.19  
 281O 124140 070500 N36:39.18 W121:55.84  
 282\*.124200 070500 N36:39.63 W121:56.07  
 283C 124223 070500 N36:40.22 W121:56.71 albf  
 284\*.124300 070500 N36:41.22 W121:57.88  
 285C 124342 070500 N36:42.30 W121:59.40 albf 2  
 286\*.124400 070500 N36:42.94 W121:59.78  
 287\*.124500 070500 N36:42.20 W121:59.69  
 288\*.124600 070500 N36:40.64 W121:57.66



350V.131549 070500 N36:45.25 W122:24.25 20 40  
 351P.131549 070500 N36:45.25 W122:24.25 sb kf dh  
 352A.131549 070500 N36:45.25 W122:24.25 700 100  
 353W.131549 070500 N36:45.25 W122:24.25 0 70 3  
 354\*.131602 070500 N36:45.30 W122:24.04  
 355T.131602 070500 N36:45.32 W122:23.96 9  
 356V.131602 070500 N36:45.32 W122:23.96 20 40  
 357P.131602 070500 N36:45.32 W122:23.96 sb kf dh  
 358A.131602 070500 N36:45.32 W122:23.96 700 100  
 359W.131602 070500 N36:45.32 W122:23.96 0 70 3  
 360\*.131700 070500 N36:45.76 W122:21.76  
 361\*.131800 070500 N36:46.02 W122:19.71  
 362W.131803 070500 N36:46.03 W122:19.57 0 10 3  
 363S.131839 070500 N36:46.17 W122:18.43 25 sb -9 y ub  
 1 sb 2 2 2 100  
 364\*.131900 070500 N36:46.52 W122:18.12  
 365\*.132000 070500 N36:46.26 W122:19.23  
 366C.132024 070500 N36:46.02 W122:18.54 last sighting blue or fin; not resighted  
 367E.132045 070500 N36:46.61 W122:18.41  
 369\*.132100 070500 N36:46.83 W122:18.81  
 370\*.132200 070500 N36:45.88 W122:18.85  
 371\*.132300 070500 N36:47.37 W122:17.43  
 372\*.132439 070500 N36:46.73 W122:18.23  
 373\*.132500 070500 N36:44.69 W122:18.72  
 374\*.132600 070500 N36:45.74 W122:16.97  
 375\*.132700 070500 N36:46.95 W122:17.49  
 376\*.132800 070500 N36:46.06 W122:18.85  
 377\*.132900 070500 N36:45.47 W122:16.86  
 379\*.133000 070500 N36:47.19 W122:16.45  
 382\*.133100 070500 N36:46.09 W122:17.14  
 383\*.133200 070500 N36:46.81 W122:15.83  
 384R.133205 070500 N36:46.84 W122:15.65  
 387S.133214 070500 N36:46.71 W122:12.99 26 sb -64 y mn  
 1 sb 1 1 1 100  
 385C.133237 070500 N36:46.64 W122:14.32 1 mn, not same as prev sighting  
 386\*.133300 070500 N36:46.66 W122:13.45  
 388W.133342 070500 N36:46.86 W122:12.01 0 10 4  
 389V.133352 070500 N36:46.91 W122:11.76 40 60  
 390\*.133400 070500 N36:46.95 W122:11.47  
 391\*.133500 070500 N36:47.32 W122:09.41  
 392C.133509 070500 N36:47.38 W122:09.01 albf 1  
 393V.133556 070500 N36:47.60 W122:07.20 40 80  
 394\*.133600 070500 N36:47.62 W122:07.12  
 395V.133614 070500 N36:47.72 W122:06.52 30 80  
 396W.133633 070500 N36:47.83 W122:05.75 0 10 5  
 397\*.133700 070500 N36:47.95 W122:04.80  
 398\*.133800 070500 N36:48.21 W122:02.53  
 399\*.133900 070500 N36:48.47 W122:00.22  
 400W.133932 070500 N36:48.64 W121:58.96 0 10 4  
 401V.133953 070500 N36:48.77 W121:58.03 30 60  
 402\*.134000 070500 N36:48.81 W121:57.77  
 403\*.134100 070500 N36:49.06 W121:55.48  
 404\*.134200 070500 N36:49.36 W121:53.32  
 405\*.134300 070500 N36:49.61 W121:51.12  
 406\*.134400 070500 N36:49.93 W121:48.88  
 407O.134414 070500 N36:50.03 W121:48.31  
 408T.134446 070500 N36:50.47 W121:48.28 10  
 409V.134446 070500 N36:50.47 W121:48.28 75 40  
 410P.134446 070500 N36:50.47 W121:48.28 sb kf dh  
 411A.134446 070500 N36:50.47 W121:48.28 700 100  
 412W.134446 070500 N36:50.47 W121:48.28 0 10 4  
 413S.134453 070500 N36:50.48 W121:48.56 27 kf 42 y pp  
 1 kf 1 1 1 100  
 414\*.134500 070500 N36:50.48 W121:48.75

415\*.134600 070500 N36:50.48 W121:50.50  
 416C.134617 070500 N36:50.47 W121:51.09 several fish schools in area;  
 417\*.134700 070500 N36:50.43 W121:52.46  
 418\*.134800 070500 N36:50.50 W121:54.62  
 419\*.134900 070500 N36:50.79 W121:56.64  
 420\*.135000 070500 N36:51.05 W121:58.68  
 421W.135022 070500 N36:51.03 W121:59.46 0 10 5  
 422W.135036 070500 N36:51.04 W121:59.93 0 0 5  
 423\*.135100 070500 N36:51.15 W122:00.63  
 424C.135103 070500 N36:51.18 W122:00.75 lg. flock of 4000-6000 shso  
 425C.135138 070500 N36:51.31 W122:01.42  
 426\*.135200 070500 N36:51.49 W122:02.24  
 427C.135222 070500 N36:51.64 W122:02.81 another 1500-2000 sosh  
 428\*.135300 070500 N36:51.71 W122:03.81  
 429E 135332 070500 N36:51.87 W122:04.68  
 430\* 135400 070500 N36:51.95 W122:04.82  
 431O 135404 070500 N36:51.95 W122:04.82  
 431C 135404 070500 N36:51.95 W122:04.82  
 10P 131324 070700 N36:42.77 W122:17.40 kf sb jb  
 11V 131324 070700 N36:42.77 W122:17.40  
 12A 131324 070700 N36:42.77 W122:17.40  
 13W 131324 070700 N36:42.77 W122:17.40  
 14\* 131400 070700 N36:42.85 W122:19.15  
 15C 131447 070700 N36:42.76 W122:21.34 finishing mesoscale study started on 7/5/00  
 16\* 131500 070700 N36:42.68 W122:21.90  
 17A 131511 070700 N36:42.59 W122:22.51 700 100  
 18C 131525 070700 N36:42.54 W122:23.08 repeating 9; doing 10 and 11  
 19\* 131600 070700 N36:42.42 W122:24.79  
 20\* 131700 070700 N36:42.17 W122:27.42  
 21\* 131800 070700 N36:43.41 W122:28.74  
 22\* 131900 070700 N36:44.94 W122:27.98  
 23T.131909 070700 N36:45.06 W122:27.63 9  
 24V.131909 070700 N36:45.06 W122:27.63 30 60  
 25P.131909 070700 N36:45.06 W122:27.63 kf sb jb  
 26A.131909 070700 N36:45.06 W122:27.63 700 100  
 27W.131909 070700 N36:45.06 W122:27.63 n 0 3 0  
 28\*.132000 070700 N36:45.29 W122:25.85  
 29W.132039 070700 N36:45.45 W122:24.43 h 0 3 0  
 30W.132046 070700 N36:45.47 W122:24.24 n 0 3 0  
 31\*.132100 070700 N36:45.54 W122:23.76  
 32\*.132200 070700 N36:45.75 W122:21.60  
 33\*.132300 070700 N36:45.97 W122:19.48  
 34\*.132400 070700 N36:46.25 W122:17.39  
 35\*.132500 070700 N36:46.54 W122:15.14  
 36C.132537 070700 N36:46.80 W122:13.81 albf, 1  
 37\*.132600 070700 N36:46.93 W122:13.00  
 38\*.132700 070700 N36:47.10 W122:10.68  
 39W.132741 070700 N36:47.23 W122:09.04 n 0 4 0  
 40\*.132800 070700 N36:47.34 W122:08.34  
 41\*.132900 070700 N36:47.72 W122:06.18  
 42W.132905 070700 N36:47.75 W122:05.98 n 0 3 0  
 43C.132914 070700 N36:47.78 W122:05.66 high 3, low 4 beaufort  
 44C.132934 070700 N36:47.87 W122:04.91 albf, 1  
 45C.132951 070700 N36:47.96 W122:04.26 500 sootie shears  
 46\*.133000 070700 N36:48.02 W122:03.89  
 47C.133010 070700 N36:48.06 W122:03.61 albf, 1  
 48C.133014 070700 N36:48.08 W122:03.36 8 troller boats  
 49W.133021 070700 N36:48.11 W122:03.10 n 0 4 0  
 50W.133028 070700 N36:48.13 W122:02.89 n 0 4 0  
 51C.133047 070700 N36:48.23 W122:02.06 albf, 1  
 52\*.133100 070700 N36:48.29 W122:01.64  
 53C.133127 070700 N36:48.43 W122:00.51 troller, 1  
 54\*.133200 070700 N36:48.58 W121:59.23  
 55C.133222 070700 N36:48.69 W121:58.34 1 troller

56\*.133300 070700 N36:48.90 W121:56.89  
57C.133319 070700 N36:48.99 W121:56.14 2 recreational boats  
58C.133326 070700 N36:49.01 W121:55.93 1 more troller  
59C.133344 070700 N36:49.11 W121:55.24 sooties,  
60\*.133400 070700 N36:49.20 W121:54.64  
61C.133403 070700 N36:49.21 W121:54.48 fi, size 2  
62C.133418 070700 N36:49.28 W121:53.92 sooties are thinning out, about 4000  
63C.133430 070700 N36:49.32 W121:53.52 fi, 1 size  
64C.133440 070700 N36:49.37 W121:53.08 fi, size 2  
65C.133446 070700 N36:49.39 W121:52.92 fi, 2 size  
66\*.133500 070700 N36:49.46 W121:52.36  
67C.133516 070700 N36:49.54 W121:51.77 trawler boat, 1  
68C.133550 070700 N36:49.67 W121:50.54 fi, size 2  
69C.133556 070700 N36:49.70 W121:50.25 fi, size 2, j shaped  
70\*.133600 070700 N36:49.71 W121:50.17  
71C.133606 070700 N36:49.75 W121:49.92 fi, 7 small, 4 medium  
72C.133606 070700 N36:49.75 W121:49.92 fi, size 2  
73S.133616 070700 N36:49.82 W121:49.50 6 kf -68 y zc  
1 kf 1 1 1 100  
74C.133631 070700 N36:49.90 W121:48.95 long continuous fish ball at the end  
750 133650 070700 N36:50.01 W121:48.18  
77\*.133700 070700 N36:50.11 W121:47.84  
78T.133731 070700 N36:50.50 W121:48.24 10  
79V.133731 070700 N36:50.50 W121:48.24 80 40  
80P.133731 070700 N36:50.50 W121:48.24 kf sb jb  
81A.133731 070700 N36:50.50 W121:48.24 700 100  
82W.133731 070700 N36:50.50 W121:48.24 n 0 4 0  
83C.133758 070700 N36:50.50 W121:49.00 ribbons of fish balls along shore  
84\*.133800 070700 N36:50.50 W121:49.09  
85C.133825 070700 N36:50.48 W121:49.72 5 medium , 2 small fish balls  
86C.133838 070700 N36:50.46 W121:50.07 1 small fish ball  
87\*.133900 070700 N36:50.40 W121:50.66 fi 2 med, fi 2 sm,  
87\*.133900 070700 N36:50.40 W121:50.66  
88C.133936 070700 N36:50.28 W121:51.83 browner water  
89\*.134000 070700 N36:50.31 W121:52.57  
91C.134052 070700 N36:50.53 W121:54.20 1 troller, 1 rec boat  
92\*.134100 070700 N36:50.56 W121:54.39  
93S.134108 070700 N36:50.60 W121:54.60 7 sb 70 y zc  
1 sb 1 1 1 100  
94W.134123 070700 N36:50.68 W121:55.04 n 0 4 0  
95C.134149 070700 N36:50.82 W121:55.91 3 small fish balls  
96\*.134200 070700 N36:50.87 W121:56.25  
97C.134218 070700 N36:50.94 W121:56.82 small troller  
98C.134247 070700 N36:51.10 W121:57.79 water is now getting greener  
99\*.134300 070700 N36:51.13 W121:58.15  
100C.134304 070700 N36:51.14 W121:58.34 one more troller  
101W.134331 070700 N36:51.21 W121:59.27 n 0 5 0  
102\*.134400 070700 N36:51.34 W122:00.28  
103\*.134500 070700 N36:51.54 W122:02.22  
104C.134501 070700 N36:51.54 W122:02.29  
105W.134504 070700 N36:51.55 W122:02.39 n 0 4 0  
106\*.134600 070700 N36:51.82 W122:04.20  
107\*.134700 070700 N36:52.01 W122:06.39  
108W.134730 070700 N36:52.12 W122:07.48 n 0 5 0  
109\*.134800 070700 N36:52.23 W122:08.44  
110C.134822 070700 N36:52.32 W122:09.19 fi, size small  
111C.134830 070700 N36:52.35 W122:09.47 scott saw a dragger  
112C.134838 070700 N36:52.38 W122:09.75 2 more trollers  
113C.134844 070700 N36:52.40 W122:09.96  
114W.134848 070700 N36:52.41 W122:10.03 n 0 4 0  
115W.134854 070700 N36:52.43 W122:10.25 n 0 4 0  
116\*.134900 070700 N36:52.45 W122:10.46  
117S.134915 070700 N36:52.50 W122:10.91 8 kf -33 y mn  
1 kf 2 2 2 100

117E 134915 070700 N36:52.50 W122:10.91  
 118\* 135000 070700 N36:51.79 W122:10.54  
 119\* 135100 070700 N36:52.06 W122:10.81  
 120\* 135200 070700 N36:52.47 W122:10.67  
 121R.135200 070700 N36:52.48 W122:10.74  
 121C.135200 070700 N36:52.48 W122:10.74 the animals were cow/calf pair  
 122C.135201 070700 N36:52.48 W122:10.74 one large fish school  
 123\*.135300 070700 N36:52.66 W122:12.67  
 124S.135300 070700 N36:52.66 W122:12.67 9 kf -67 y mn  
     1 kf 1 1 1 100  
 125E 135304 070700 N36:52.68 W122:12.89  
 126\* 135400 070700 N36:52.27 W122:12.11  
 127\* 135500 070700 N36:52.46 W122:11.96  
 128\* 135600 070700 N36:53.00 W122:11.43  
 129R.135622 070700 N36:52.45 W122:11.65  
 130C.135636 070700 N36:52.54 W122:11.95 albf, 1  
 131\*.135700 070700 N36:52.71 W122:12.82  
 132S.135722 070700 N36:52.77 W122:13.58 10 o ub  
     1 jb 1 1 1 100  
 133\*.135800 070700 N36:52.94 W122:14.93  
 134\*.135900 070700 N36:53.15 W122:16.95  
 135\*.140000 070700 N36:53.34 W122:19.07  
 136W.140001 070700 N36:53.35 W122:19.14 n 0 4 0  
 137C.140020 070700 N36:53.39 W122:19.73 blows off in the distance  
 138S.140037 070700 N36:53.42 W122:20.22 11 jb o ub  
     1 jb 1 1 1 100  
 139\*.140100 070700 N36:53.53 W122:21.03  
 140C.140133 070700 N36:53.70 W122:22.14 blow on sighting 11 was straight up  
 141W.140146 070700 N36:53.73 W122:22.61 n 0 3 0  
 142\*.140200 070700 N36:53.75 W122:23.08  
 143\*.140300 070700 N36:54.01 W122:25.26  
 144\*.140400 070700 N36:54.18 W122:27.22  
 145V.140407 070700 N36:54.22 W122:27.52 50 30  
 146W.140422 070700 N36:54.28 W122:28.01 n 25 3 0  
 148\*.140500 070700 N36:54.45 W122:29.28  
 149S.140507 070700 N36:54.49 W122:29.63 13 kf -33 y bm  
     1 kf 1 1 1 100  
 150\*.140600 070700 N36:54.20 W122:29.28  
 151C.140616 070700 N36:54.57 W122:29.57 on first off effort did not go off line-ok  
 152C.140618 070700 N36:54.57 W122:29.57  
 153E 140623 070700 N36:54.62 W122:29.79  
 154\* 140700 070700 N36:54.02 W122:29.51  
 155\* 140800 070700 N36:54.58 W122:29.67  
 156\* 140900 070700 N36:53.88 W122:29.41  
 157\* 141000 070700 N36:54.49 W122:29.32  
 158R.141006 070700 N36:54.52 W122:29.51  
 159W.141030 070700 N36:54.61 W122:30.37 n 25 3 0  
 161\*.141100 070700 N36:54.67 W122:31.43  
 163\*.141200 070700 N36:54.92 W122:33.53  
 164S.141224 070700 N36:54.97 W122:34.29 14 sb 40 y pv  
     1 sb 1 1 1 100  
 166O 141246 070700 N36:54.94 W122:35.14  
 167\* 141300 070700 N36:54.83 W122:35.57  
 168\* 141400 070700 N36:54.15 W122:34.05  
 169\* 141500 070700 N36:54.82 W122:34.69  
 170C 141522 070700 N36:55.20 W122:33.92 lost gps-ok  
 171T.141526 070700 N36:55.19 W122:33.79 11  
 172V.141526 070700 N36:55.19 W122:33.79 25 40  
 173P.141526 070700 N36:55.19 W122:33.79 kf sb jb  
 174A.141526 070700 N36:55.19 W122:33.79 700 100  
 175W.141526 070700 N36:55.19 W122:33.79 15 25 3 0  
 176\*.141600 070700 N36:55.39 W122:32.53  
 177\*.141700 070700 N36:55.89 W122:30.41  
 178S.141738 070700 N36:56.14 W122:29.10 16 kf -36 y zc 1

1			kf	1	1	1	100
179*.141800	070700	N36:56.33	W122:28.40				
180*.141900	070700	N36:56.74	W122:26.35				
181C.141948	070700	N36:57.08	W122:24.70	albf,	1		
182*.142000	070700	N36:57.16	W122:24.34				
183C.142038	070700	N36:57.41	W122:23.05	albf,	1		
184*.142100	070700	N36:57.54	W122:22.32				
185*.142200	070700	N36:58.00	W122:20.28				
186W.142201	070700	N36:58.01	W122:20.25	15	25	4	0
187*.142300	070700	N36:58.47	W122:18.13				
188*.142400	070700	N36:58.94	W122:15.93				
189C.142428	070700	N36:59.17	W122:14.94	1 rec boat,	1 troller		
190*.142500	070700	N36:59.36	W122:13.86				
191W.142546	070700	N36:59.80	W122:12.22	15	25	5	0
192*.142600	070700	N36:59.90	W122:11.70				
1930 142617	070700	N36:59.98	W122:11.10				
194* 142700	070700	N36:59.16	W122:09.80				

LARGE-SCALE SURVEY

8C 113500 070800 N37:19.75 W122:25.22 LARGE-SCALE MBNMS SURVEY  
 9\* 113600 070800 N37:22.15 W122:25.37  
 10\* 113700 070800 N37:24.58 W122:26.01  
 11\* 113800 070800 N37:26.85 W122:27.15  
 12\* 113900 070800 N37:28.20 W122:26.86  
 13T.113924 070800 N37:27.41 W122:27.06 L06  
 14V.113924 070800 N37:27.41 W122:27.06 0 20  
 15P.113924 070800 N37:27.41 W122:27.06 sb kf tn  
 16A.113924 070800 N37:27.41 W122:27.06 700 100  
 17W.113924 070800 N37:27.41 W122:27.06 n 100 3 0  
 18\*.114000 070800 N37:26.56 W122:27.88  
 19\*.114100 070800 N37:25.50 W122:29.44  
 20C.114117 070800 N37:25.29 W122:29.93 3 rec boats  
 21C.114130 070800 N37:25.14 W122:30.24 2 jelly shoals  
 22\*.114200 070800 N37:24.79 W122:31.05  
 23C.114219 070800 N37:24.52 W122:31.61 3 jelly shoals  
 24C.114241 070800 N37:24.20 W122:32.26 1 mola  
 25C.114259 070800 N37:23.93 W122:32.75 1 mola  
 26\*.114300 070800 N37:23.93 W122:32.75  
 27C.114309 070800 N37:23.78 W122:33.03 2 mola  
 31V.114325 070800 N37:23.57 W122:33.50 20 20  
 32P.114343 070800 N37:23.30 W122:34.07 sb kf tn  
 33V.114343 070800 N37:23.30 W122:34.07 20 20  
 34A.114343 070800 N37:23.30 W122:34.07 700 100  
 35W.114343 070800 N37:23.30 W122:34.07 n 100 2 0  
 36W.114348 070800 N37:23.23 W122:34.22 n 100 2 0  
 37\*.114400 070800 N37:23.05 W122:34.67  
 38O 114412 070800 N37:23.04 W122:35.19  
 38C 114412 070800 N37:23.04 W122:35.19 aborted transect due to low clouds  
 39\* 114500 070800 N37:23.80 W122:34.01  
 40\* 114600 070800 N37:23.81 W122:31.71  
 48C 114651 070800 N37:22.31 W122:31.31 1 mola  
 49\* 114700 070800 N37:22.06 W122:31.34  
 50C 114708 070800 N37:21.71 W122:31.42 1 mola  
 51\* 114800 070800 N37:19.97 W122:31.84  
 52C 114805 070800 N37:19.78 W122:31.88 1 mola  
 53C 114820 070800 N37:19.24 W122:31.98 transit to S 104  
 54C 114853 070800 N37:17.98 W122:32.07 2 fish. med.  
 55\* 114900 070800 N37:17.74 W122:32.09  
 56S 114931 070800 N37:16.58 W122:32.13 2 kf 58 o mn  
   1 kf 1 1 1 100  
 57\* 115000 070800 N37:15.42 W122:32.13  
 58S 115049 070800 N37:13.40 W122:32.04 3 kf 38 o mn  
   1 kf 1 1 1 100  
 59\* 115100 070800 N37:13.01 W122:32.01  
 60\* 115200 070800 N37:10.71 W122:32.10  
 61\* 115300 070800 N37:08.28 W122:31.89  
 62W 115315 070800 N37:07.69 W122:31.87 n 100 1 0  
 63\* 115400 070800 N37:05.87 W122:32.01  
 64C 115423 070800 N37:04.97 W122:32.05 low clouds offshore, heading to pp line  
 38\* 093000 071300 N36:08.62 W121:44.87  
 39C 093048 071300 N36:07.07 W121:43.49 headed S; searching off effort  
 40\* 093100 071300 N36:06.70 W121:43.16  
 41\* 093200 071300 N36:04.88 W121:41.48  
 42\* 093300 071300 N36:03.00 W121:39.71  
 43\* 093400 071300 N36:01.00 W121:38.29  
 44S 093400 071300 N36:00.93 W121:38.25 1 sb o mn zc lb  
   1 sb  
 45\* 093500 071300 N35:59.09 W121:36.74  
 46\* 093600 071300 N35:57.22 W121:35.13  
 47\* 093700 071300 N35:55.30 W121:33.37  
 48\* 093800 071300 N35:53.48 W121:31.51

## Appendix 1 – Raw data record for MBNMS aerial surveys

## Large-scale

49W	093814	071300	N35:52.97	W121:31.01	n	0	1	3
50*	093900	071300	N35:51.62	W121:29.76				
51*	094000	071300	N35:49.74	W121:27.89				
52*	094100	071300	N35:47.99	W121:26.01				
53*	094200	071300	N35:46.10	W121:24.18				
54*	094300	071300	N35:44.04	W121:22.51				
55*	094400	071300	N35:42.10	W121:20.83				
57V	094406	071300	N35:41.89	W121:20.65	40	30		
58P	094406	071300	N35:41.89	W121:20.65	sb	kf		sw
59A	094406	071300	N35:41.89	W121:20.65	700	100		
60W	094406	071300	N35:41.89	W121:20.65	n	0	1	3
61S	094406	071300	N35:41.89	W121:20.65	2	sb	o	bm
1					sb	1	1	100
63*	094500	071300	N35:40.39	W121:19.08				
64*	094600	071300	N35:39.01	W121:16.53				
65*	094700	071300	N35:37.94	W121:13.80				
66*	094800	071300	N35:37.73	W121:11.17				
67*	094900	071300	N35:38.91	W121:12.28				
68T	094908	071300	N35:38.73	W121:12.60	L1			
69V	094908	071300	N35:38.73	W121:12.60	40	10		
70P	094908	071300	N35:38.73	W121:12.60	sb	kf		sw
71A	094908	071300	N35:38.73	W121:12.60	700	100		
72W	094908	071300	N35:38.73	W121:12.60	k	0	1	0
73S	094949	071300	N35:37.94	W121:13.86	4	sb	-68	pv
1					sb	1	1	100
74*.095000	071300	N35:37.77	W121:14.12					
75W	095002	071300	N35:37.71	W121:14.21	n	0	1	0
76S	095008	071300	N35:37.59	W121:14.39	5	sb	-78	zc
1					sb	1	1	100
77W	095026	071300	N35:37.26	W121:14.85	n	0	1	1
78*.095100	071300	N35:36.60	W121:15.75					
79S	095108	071300	N35:36.44	W121:15.95	6	kf	88	zc
1					kf	1	1	100
80S	095135	071300	N35:35.94	W121:16.76	7	sb	-11	ub
1					sb	1	1	100
81*.095200	071300	N35:35.78	W121:17.57					
82S	095214	071300	N35:35.80	W121:18.04	8	sb	-75	zc
1					sb	1	1	100
83S	095221	071300	N35:35.83	W121:18.25	9	kf	64	zc
1					kf	1	1	100
84S	095228	071300	N35:35.87	W121:18.46	10	sb	-29	zc
1					sb	1	1	100
85S	095236	071300	N35:35.93	W121:18.70	11	sb	-89	el
1					sb	1	1	100
86S	095250	071300	N35:36.07	W121:19.17	12	kf	39	zc
1					kf	1	1	100
87C	095252	071300	N35:36.11	W121:19.27	2	molas		
88S	095257	071300	N35:36.16	W121:19.41	14	kf	53	pd
1					kf	3	3	100
89*.095300	071300	N35:36.19	W121:19.51					
90S	095302	071300	N35:36.21	W121:19.55	15	sb	-75	zc
1					sb	1	1	100
91S	095320	071300	N35:36.41	W121:20.13	16	sb	-35	zc
1					sb	1	1	100
92S	095325	071300	N35:36.46	W121:20.27	17	kf	62	zc
1					kf	3	3	100
93S	095330	071300	N35:36.52	W121:20.44	18	sb	-35	mn
1					sb	592	688	lb
94E	095336	071300	N35:36.60	W121:20.64	512	1	80	lo
95*	095400	071300	N35:37.11	W121:20.95				zc
96*	095500	071300	N35:36.46	W121:20.35				
98*	095600	071300	N35:37.49	W121:21.33				
99C	095639	071300	N35:37.43	W121:19.86	left obs.	needs to be neg	-ok	
101*	095700	071300	N35:37.03	W121:19.24				5

102C 095702 071300 N35:36.94 W121:19.24 humpback in with group of dolphins  
 103W 095720 071300 N35:36.77 W121:19.71 n 0 1 1  
 104C 095722 071300 N35:36.77 W121:19.83 disregard last sighting  
 105\* 095800 071300 N35:36.21 W121:20.98  
 106C 095838 071300 N35:37.02 W121:21.28 2 mn; 450 lb + 25 lb; 15-20 + KF's lo; 15 zc  
 107\* 095900 071300 N35:37.46 W121:20.77  
 108\* 100000 071300 N35:36.38 W121:20.67  
 109\* 100100 071300 N35:37.73 W121:21.26  
 110C 100141 071300 N35:37.47 W121:19.94 Si 19 & 18 combined -kaf  
 111\* 100200 071300 N35:36.94 W121:20.23  
 112R.100222 071300 N35:36.81 W121:20.95  
 113S.100253 071300 N35:37.24 W121:21.94 20 kf 44 y zc  
     1 kf 1 1 1 100  
 114\*.100300 071300 N35:37.30 W121:22.11  
 115S.100306 071300 N35:37.37 W121:22.36 21 kf 32 y lb  
     1 kf 3 4 3 100  
 116S.100315 071300 N35:37.44 W121:22.67 22 kf 47 y zc  
     1 kf 1 1 1 100  
 117S.100330 071300 N35:37.52 W121:23.10 23 sb -80 y zc  
     1 sb 1 1 1 100  
 118\*.100400 071300 N35:37.72 W121:24.04  
 119S.100416 071300 N35:37.83 W121:24.61 24 sb -82 y zc  
     1 sb 1 1 1 100  
 120S.100448 071300 N35:38.09 W121:25.58 25 kf 2 y lb mn zc lo pv  
     1 kf 2048 2212 1792 97 .05 1.5 .9 .05  
 121\*.100500 071300 N35:38.24 W121:25.94  
 122S.100500 071300 N35:38.24 W121:25.94 26 sb -5 y ud  
     1 sb 20 30 15 100  
 123E 100519 071300 N35:38.66 W121:26.40  
 124C 100530 071300 N35:38.94 W121:26.24 checking out si. 25 first  
 125\* 100600 071300 N35:39.59 W121:25.64  
 126\* 100700 071300 N35:39.53 W121:24.25  
 127\* 100800 071300 N35:40.24 W121:24.72  
 128\* 100900 071300 N35:38.57 W121:23.39  
 129\* 101000 071300 N35:38.27 W121:21.33  
 130C 101013 071300 N35:38.58 W121:21.64 sig 25 includes a few lags  
 131\* 101100 071300 N35:38.85 W121:23.18  
 132\* 101200 071300 N35:40.04 W121:24.75  
 133C 101255 071300 N35:39.91 W121:26.12 also 1 pv with 25  
 134\* 101300 071300 N35:39.78 W121:26.07  
 135\* 101400 071300 N35:39.17 W121:24.71  
 136C 101438 071300 N35:38.51 W121:23.70 one 9 ft. thresher shark w/ si. 25  
 137C 101451 071300 N35:38.15 W121:23.58 another thresher shark  
 138\* 101500 071300 N35:37.88 W121:23.51  
 139C 101503 071300 N35:37.77 W121:23.50 numbers for si. 25 in notebook  
 139C 101503 071300 N35:37.77 W121:23.50 si#26 may have hooked up with si#25.  
 140R.101520 071300 N35:37.59 W121:23.99  
 141\*.101600 071300 N35:37.92 W121:25.25  
 142C.101602 071300 N35:37.92 W121:25.29 3 molas  
 143C.101610 071300 N35:37.96 W121:25.53 1 mola  
 144S.101613 071300 N35:37.98 W121:25.64 27 sb -45 y zc  
     1 sb 1 1 1 100  
 145S.101633 071300 N35:38.13 W121:26.31 28 sb -44 y zc  
     1 sb 1 1 1 100  
 146\*.101700 071300 N35:38.34 W121:27.20  
 147C.101701 071300 N35:38.35 W121:27.28 3 molas  
 148C.101705 071300 N35:38.39 W121:27.43 sig. 26 unid dolphins  
 149\*.101800 071300 N35:38.79 W121:29.29  
 150S.101822 071300 N35:39.00 W121:30.08 29 sb -39 y zc  
     1 sb 1 1 1 100  
 151S.101822 071300 N35:39.00 W121:30.08 30 kf 36 y zc  
     1 kf 1 1 1 100  
 152S.101851 071300 N35:39.25 W121:31.06 31 kf 48 y el  
     1 kf 1 1 1 100

## Appendix 1 – Raw data record for MBNMS aerial surveys

Large-scale

Appendix 1 – Raw data record for MBNMS aerial surveys

Large-scale

208S.103535	071300	N35:47.59	W121:39.53	46	kf	46	y	pd
1				kf	1	1	1	100
210*.103600	071300	N35:48.22	W121:39.48					
211C.103607	071300	N35:48.46	W121:39.45	mola				
212S.103626	071300	N35:48.95	W121:39.38	48	sb	-31	y	zc
1				sb	1	1	1	100
213C.103646	071300	N35:49.56	W121:39.32	2	mola			
214C.103649	071300	N35:49.66	W121:39.31	ignore	sighting	47-ok		
215C.103658	071300	N35:49.92	W121:39.29	mola				
216*.103700	071300	N35:49.92	W121:39.29					
217S.103701	071300	N35:50.02	W121:39.28	49	kf	58	y	pd
1				kf	1	1	1	100
219t.103716	071300	N35:50.51	W121:39.25	sb	40	dc	1	270
221C.103751	071300	N35:51.54	W121:39.17	turtle	6ft,	mola		u
222*.103800	071300	N35:51.77	W121:39.15					
223S.103805	071300	N35:51.93	W121:39.13	51	sb	-55	y	zc
1				sb	1	1	1	100
224S.103819	071300	N35:52.34	W121:39.12	52	sb	-51	y	zc
1				sb	2	2	2	100
225*.103900	071300	N35:53.50	W121:39.02					
226S.103917	071300	N35:54.04	W121:38.98	53	sb	-42	y	zc
1				sb	1	1	1	100
227*.104000	071300	N35:55.23	W121:38.97					
228V.104018	071300	N35:55.79	W121:38.96	0		40		
229*.104100	071300	N35:56.97	W121:38.86					
230S.104112	071300	N35:57.34	W121:38.79	54	kf	29	y	zc
1				kf	1	1	1	100
231S.104124	071300	N35:57.64	W121:38.75	55	kf	42	y	zc
1				kf	1	1	1	100
232S.104154	071300	N35:58.52	W121:38.68	56	kf	83		zc
1				kf	1	1	1	100
233*.104200	071300	N35:58.71	W121:38.69					
234S.104201	071300	N35:58.71	W121:38.69	57	sb	-66	y	zc
1				sb	1	1	1	100
235C.104214	071300	N35:59.08	W121:38.69	t	shark			
236S.104244	071300	N35:59.91	W121:38.60	58	kf	46	y	zc
1				kf	1	1	1	100
237*.104300	071300	N36:00.38	W121:38.54					
238S.104304	071300	N36:00.51	W121:38.51	59	kf	39		zc
1				kf	1	1	1	100
239S.104304	071300	N36:00.54	W121:38.50	60	sb	-19	y	gg
1				sb	14	14	13	100
240C.104357	071300	N36:00.33	W121:38.68	off	effort	for	circle	
241*.104400	071300	N36:00.37	W121:38.56					
242E.104406	071300	N36:00.48	W121:38.46					
243R.104410	071300	N36:00.61	W121:38.41					
244C.104412	071300	N36:00.72	W121:38.39	13/14/14	for	si	60	
245S.104428	071300	N36:01.22	W121:38.30	61	kf	33	y	zc
1				kf	3	3	3	100
246S.104447	071300	N36:01.75	W121:38.26	62	sb	-51	y	zc
1				sb	1	1	1	100
247S.104458	071300	N36:02.11	W121:38.29	63	sb	-20	y	mn
1				sb	1	2	1	100
248*.104500	071300	N36:02.14	W121:38.29					
249S.104506	071300	N36:02.34	W121:38.32	64	sb	-74	y	lb
1				kf	1350	1400	1300	100
250E.104521	071300	N36:02.82	W121:38.35					
251*.104600	071300	N36:02.42	W121:37.78					
252*.104700	071300	N36:02.16	W121:38.16					
253*.104800	071300	N36:02.38	W121:38.27					
254C.104801	071300	N36:02.41	W121:38.28	sig	64	1350/1300/1400		
255R.104804	071300	N36:02.51	W121:38.28					
256S.104809	071300	N36:02.64	W121:38.27	65	sb	-48	y	zc
1				sb	1	1	1	100

Appendix 1 – Raw data record for MBNMS aerial surveys

Large-scale

257W.104855	071300	N36:04.00	W121:38.30	n	0	1	0	
258*.104900	071300	N36:04.16	W121:38.30					
259C.104909	071300	N36:04.40	W121:38.28	fi small				
260S.104916	071300	N36:04.65	W121:38.25	66	sb	-36	y	zc
1				sb	1	1	1	100
261W.104943	071300	N36:05.36	W121:38.08	n	0	1	2	
262*.105000	071300	N36:05.80	W121:38.00					
263S.105008	071300	N36:06.08	W121:38.00	67	sb	-43	y	zc
1				sb	2	2	2	100
264S.105024	071300	N36:06.54	W121:38.03	68	sb	-60	y	zc
1				sb	4	4	4	100
265E 105039	071300	N36:06.96	W121:38.10					
266O 105042	071300	N36:07.01	W121:38.14					
267T.105049	071300	N36:07.12	W121:38.34	L3				
268V.105049	071300	N36:07.12	W121:38.34	30		10		
269P.105049	071300	N36:07.12	W121:38.34	sb		kf		sw
270A.105049	071300	N36:07.12	W121:38.34	700	100			
271W.105049	071300	N36:07.12	W121:38.34	n	0	1	1	
272S.105058	071300	N36:07.19	W121:38.61	69	kf	72	y	zc
1				kf	1	1	1	100
273*.105100	071300	N36:07.22	W121:38.77					
274C.105136	071300	N36:07.53	W121:40.00	4	ft fish			
275S.105141	071300	N36:07.56	W121:40.11	70	sb	-53	y	pd
1				sb	3	3	3	100
276*.105200	071300	N36:07.74	W121:40.71					
277S.105216	071300	N36:07.89	W121:41.32	71	sb	-50	y	bm
1				sb	1	1	1	100
278S.105227	071300	N36:07.96	W121:41.69	72	sb	-55	y	zc
1				sb	1	1	1	100
279C.105256	071300	N36:08.19	W121:42.59	fi small				
280*.105300	071300	N36:08.22	W121:42.69					
281C.105312	071300	N36:08.34	W121:43.11	mola				
282C.105316	071300	N36:08.39	W121:43.28	jellies back to Crys;	were moon jellies on bch			
283S.105325	071300	N36:08.45	W121:43.49	73	kf	79	y	zc
1				kf	1	1	1	100
284*.105400	071300	N36:08.78	W121:44.67					
285S.105400	071300	N36:08.78	W121:44.67	74	kf	74	y	zc
1				kf	1	1	1	100
286C.105448	071300	N36:09.24	W121:46.36	mola				
287*.105500	071300	N36:09.36	W121:46.73					
288S.105505	071300	N36:09.42	W121:46.91	75	sb	-70	y	zc
1				sb	1	1	1	100
289S.105547	071300	N36:09.82	W121:48.34	76	sb	-35	y	zc
1				sb	1	1	1	100
290*.105600	071300	N36:09.94	W121:48.75					
291S.105633	071300	N36:10.30	W121:49.92	77	sb	-81	y	zc
1				sb	1	1	1	100
292*.105700	071300	N36:10.52	W121:50.84					
293S.105701	071300	N36:10.52	W121:50.84	78	kf	68	y	zc
1				kf	1	1	1	100
294S.105720	071300	N36:10.70	W121:51.48	79	sb	-59	y	zc
1				sb	1	1	1	100
295C.105735	071300	N36:10.86	W121:51.97	mola				
296W.105735	071300	N36:10.87	W121:52.01	n	0	1	1	
297S.105745	071300	N36:10.94	W121:52.26	80	sb	-29	y	zc
1				sb	1	1	1	100
071300		N36:11.08	W121:52.74					
299S.105804	071300	N36:11.13	W121:52.91	81	kf	24	y	zc
1				kf	1	1	1	100
300S.105826	071300	N36:11.32	W121:53.59	82	sb	-45	y	zc
1				sb	1	1	1	100
301*.105900	071300	N36:11.54	W121:54.63					
302C.105900	071300	N36:11.54	W121:54.63	mola				
303S.105903	071300	N36:11.59	W121:54.77	83	sb	-60	y	zc

Appendix 1 – Raw data record for MBNMS aerial surveys

Large-scale

1			sb	1	1	1	100
304S.105907	071300	N36:11.62	W121:54.88	84	sb	-68	y zc
1			sb	1	1	1	100
305*.110000	071300	N36:12.16	W121:56.61				
306*.110100	071300	N36:12.74	W121:58.69				
307C.110112	071300	N36:12.86	W121:59.15	fi med			
308S.110112	071300	N36:12.86	W121:59.15	85	kf	22	y zc
1			kf	2	2	2	100
309#.110126	071300	N36:12.99	W121:59.61				
310S.110139	071300	N36:13.12	W122:00.12	87	sb	-57	y zc
1			sb	1	1	1	100
311C.110142	071300	N36:13.14	W122:00.20	mola			
312C.110157	071300	N36:13.27	W122:00.75	mola			
313*.110200	071300	N36:13.29	W122:00.87				
314S.110239	071300	N36:13.70	W122:02.24	88	sb	-28	y zc
1			sb	1	1	1	100
315*.110300	071300	N36:13.83	W122:02.86				
316S.110333	071300	N36:14.20	W122:04.14	89	kf	-3	y lb zc lo
1			kf	233	243	220	73 2 25
317E 110338	071300	N36:14.25	W122:04.33				
318* 110400	071300	N36:14.63	W122:04.74				
319* 110500	071300	N36:16.24	W122:03.41				
320* 110600	071300	N36:16.80	W122:02.92				
321C 110606	071300	N36:16.99	W122:02.86	230/240/220 ~60 lags; rest lb; 3 zc			
322* 110700	071300	N36:16.00	W122:02.68				
323C 110711	071300	N36:15.65	W122:02.78	lots of murres on water			
324* 110800	071300	N36:14.23	W122:03.15				
325R.110812	071300	N36:14.03	W122:03.51				
326*.110900	071300	N36:14.45	W122:04.99				
327W.110906	071300	N36:14.52	W122:05.25	n 60	1	1	
328C.110919	071300	N36:14.63	W122:05.70	mola			
329W.110929	071300	N36:14.72	W122:06.09	n 90	1	0	
330*.111000	071300	N36:14.94	W122:07.10				
331V.111027	071300	N36:15.19	W122:08.03	40		40	
332W.111043	071300	N36:15.34	W122:08.59	n 90	1	1	
333*.111100	071300	N36:15.50	W122:09.06				
334*.111200	071300	N36:15.98	W122:10.99				
335W.111225	071300	N36:16.24	W122:11.81	n 90	1	0	
336*.111300	071300	N36:16.64	W122:13.05				
337W.111300	071300	N36:16.64	W122:13.05	n 65	1	0	
338*.111400	071300	N36:17.16	W122:15.18				
339C.111415	071300	N36:17.31	W122:15.70	overcast very thin layer			
340*.111500	071300	N36:17.72	W122:17.21				
341W.111512	071300	N36:17.80	W122:17.54	n 65	2	0	
342*.111600	071300	N36:18.27	W122:19.20				
343*.111700	071300	N36:18.79	W122:21.14				
344*.111800	071300	N36:19.35	W122:23.14				
345W.111801	071300	N36:19.36	W122:23.18	n 65	2	1	
346W.111823	071300	N36:19.54	W122:23.88	n 65	2	2	
347C.111826	071300	N36:19.58	W122:24.02	jellies are crysora again			
348*.111900	071300	N36:19.86	W122:25.15				
349C.111917	071300	N36:20.05	W122:25.78	red tide/streaking in water here			
350*.112000	071300	N36:20.40	W122:27.16				
351C.112002	071300	N36:20.43	W122:27.27	mola			
352C.112007	071300	N36:20.47	W122:27.41	mola			
353C.112024	071300	N36:20.64	W122:28.00	mola			
354*.112100	071300	N36:20.98	W122:29.24				
355*.112200	071300	N36:21.55	W122:31.31				
356*.112300	071300	N36:22.02	W122:33.33				
357S.112305	071300	N36:22.06	W122:33.52	90 kf 90 y ma			
1			kf 1 1	1	1	1	100
358*.112400	071300	N36:22.60	W122:35.36				
359W.112440	071300	N36:22.96	W122:36.84	n 65	1	1	
360C.112452	071300	N36:23.06	W122:37.19	mola			

361\*.112500 071300 N36:23.14 W122:37.45  
 362\*.112600 071300 N36:23.77 W122:39.56  
 363E 112637 071300 N36:23.88 W122:40.88  
 364O 112638 071300 N36:23.88 W122:40.96  
 365\* 112700 071300 N36:23.85 W122:41.69  
 366R.112728 071300 N36:23.61 W122:41.11  
 367T.112730 071300 N36:23.70 W122:41.04 14  
 368V.112730 071300 N36:23.70 W122:41.04 30 50  
 369P.112730 071300 N36:23.70 W122:41.04 sb kf sw  
 370A.112730 071300 N36:23.70 W122:41.04 700 100  
 371W.112730 071300 N36:23.70 W122:41.04 n 50 1 1  
 372\*.112800 071300 N36:24.33 W122:40.26  
 373\*.112900 071300 N36:25.25 W122:38.30  
 374W.112932 071300 N36:25.72 W122:37.22 n 50 0 1  
 375\*.113000 071300 N36:26.11 W122:36.33  
 376W.113016 071300 N36:26.34 W122:35.78 n 50 1 1  
 377C.113040 071300 N36:26.71 W122:35.02 mola  
 378C.113040 071300 N36:26.71 W122:35.02  
 379\*.113100 071300 N36:27.02 W122:34.41  
 380V.113125 071300 N36:27.43 W122:33.55 10 37  
 381W.113131 071300 N36:27.49 W122:33.41 n 0 1 1  
 382C.113144 071300 N36:27.67 W122:32.99 mola  
 383\*.113200 071300 N36:27.86 W122:32.53  
 384\*.113300 071300 N36:28.78 W122:30.63  
 385C.113302 071300 N36:28.83 W122:30.53 lots of sharks; prob. blues, poss. mako; unknown  
 386\*.113400 071300 N36:29.80 W122:28.77  
 387W.113447 071300 N36:30.59 W122:27.33 n 0 0 1  
 388\*.113500 071300 N36:30.80 W122:26.89  
 389C.113505 071300 N36:30.89 W122:26.72 mola  
 390W.113511 071300 N36:30.97 W122:26.55 n 50 1 1  
 391\*.113600 071300 N36:31.71 W122:25.01  
 392\*.113700 071300 N36:32.64 W122:23.10  
 393W.113731 071300 N36:33.16 W122:22.14 n 80 1 1  
 394V.113738 071300 N36:33.27 W122:21.90 40 60  
 395\*.113800 071300 N36:33.58 W122:21.24  
 396C.113812 071300 N36:33.79 W122:20.83 mola  
 397W.113848 071300 N36:34.38 W122:19.66 n 95 1 1  
 398V.113852 071300 N36:34.43 W122:19.56 50 60  
 399\*.113900 071300 N36:34.51 W122:19.39  
 400\*.114000 071300 N36:35.48 W122:17.39  
 401\*.114100 071300 N36:36.46 W122:15.51  
 402\*.114200 071300 N36:37.36 W122:13.69  
 403C.114211 071300 N36:37.54 W122:13.32 whaler/ motor boat (small) way out here!  
 404\*.114300 071300 N36:38.33 W122:11.75  
 405W.114345 071300 N36:39.09 W122:10.16 n 70 1 1  
 406\*.114400 071300 N36:39.30 W122:09.71  
 407#.114414 071300 N36:39.58 W122:09.17  
 408S.114419 071300 N36:39.66 W122:09.03 92 sb -24 bm  
     1 sb 1 1 1 100  
 409S.114423 071300 N36:39.74 W122:08.90 93 kf 36 y zc  
     1 kf 2 2 2 100  
 410\*.114500 071300 N36:40.37 W122:07.69  
 411C.114509 071300 N36:40.51 W122:07.40 seiner just after blue whale  
 412S.114513 071300 N36:40.57 W122:07.29 94 sb -81 y zc  
     1 sb 1 1 1 100  
 413\*.114600 071300 N36:41.25 W122:05.77  
 414C.114630 071300 N36:41.74 W122:04.84 approx 150 shso off right  
 415\*.114700 071300 N36:42.23 W122:03.99  
 416C.114702 071300 N36:42.33 W122:03.86 3 albf flying  
 417C.114718 071300 N36:42.65 W122:03.40 passing over R/V Pt. Lobos w/ROV deployed  
 418C.114741 071300 N36:43.01 W122:02.73 1 albf, 1 mola  
 419\*.114800 071300 N36:43.25 W122:02.12  
 420C.114805 071300 N36:43.32 W122:01.94 approx 600 shso  
 421V.114822 071300 N36:43.56 W122:01.37 30 40

422C.114854 071300 N36:43.96 W122:00.36 500 shso  
 423\*.114900 071300 N36:44.05 W122:00.15  
 424W.114917 071300 N36:44.30 W121:59.58 n 10 1 1  
 425C.114940 071300 N36:44.66 W121:58.78 300 shso  
 426C.114947 071300 N36:44.78 W121:58.52 2 fishing vessels off right  
 427S.114956 071300 N36:44.91 W121:58.24 95 sb -30 y zc  
 1 sb 1 1 1 100  
 428S.114958 071300 N36:44.93 W121:58.20 96 kf 68 y zc  
 1 kf 1 1 1 100  
 429\*.115000 071300 N36:44.97 W121:58.13  
 430C.115011 071300 N36:45.14 W121:57.77 zc w/ fi med  
 431S.115047 071300 N36:45.73 W121:56.59 97 sb -70 y pd  
 1 sb 3 3 3 100  
 432C.115056 071300 N36:45.89 W121:56.27 3 med 2 sm fi  
 433\*.115100 071300 N36:45.95 W121:56.16  
 434C.115109 071300 N36:46.09 W121:55.87 1 longline fv  
 435C.115129 071300 N36:46.45 W121:55.19 2 fi med  
 436V.115139 071300 N36:46.62 W121:54.87 10 25  
 437S.115144 071300 N36:46.71 W121:54.70 98 kf 54 y zc  
 1 kf 2 2 2 100  
 438\*.115200 071300 N36:46.96 W121:54.23  
 439C.115248 071300 N36:47.75 W121:52.56 2 med fi  
 440\*.115300 071300 N36:47.92 W121:52.20  
 441V.115308 071300 N36:48.05 W121:51.95 10 50  
 442C.115339 071300 N36:48.60 W121:50.90 one fv troller  
 443W.115347 071300 N36:48.74 W121:50.61 n 10 2 1  
 444\*.115400 071300 N36:48.90 W121:50.28  
 445C.115402 071300 N36:48.95 W121:50.17 1 zodiac/whaler  
 446V.115414 071300 N36:49.18 W121:49.70 10 75  
 447S.115418 071300 N36:49.23 W121:49.59 99 kf 68 y zc  
 1 kf 1 1 1 100  
 448#.115421 071300 N36:49.31 W121:49.45  
 449t.115424 071300 N36:49.32 W121:49.41 sb 65 dc 1 330 u  
 450\*.115500 071300 N36:49.90 W121:48.22  
 451E.115500 071300 N36:49.90 W121:48.22  
 452O.115501 071300 N36:49.94 W121:48.15  
 453C.115508 071300 N36:50.05 W121:47.94 turtle est. 6-7 ft like earlier one  
 7\*.140300 071300 N36:49.63 W121:46.05  
 8\*.140400 071300 N36:49.76 W121:47.72  
 9T.140403 071300 N36:49.81 W121:47.85 15  
 10V.140403 071300 N36:49.81 W121:47.85 75 30  
 11P.140403 071300 N36:49.81 W121:47.85 sb kf sw  
 12A.140403 071300 N36:49.81 W121:47.85 700 100  
 13W.140403 071300 N36:49.81 W121:47.85 0 0 3 0  
 14\*.140500 071300 N36:50.18 W121:49.64  
 15C.140515 071300 N36:50.33 W121:50.13 3 rec boats  
 16C.140521 071300 N36:50.38 W121:50.38 mola  
 17C.140527 071300 N36:50.42 W121:50.56 1 rec boat  
 18\*.140600 071300 N36:50.66 W121:51.67  
 19C.140603 071300 N36:50.69 W121:51.77 1 rec boat; 1 trawler  
 20\*.140700 071300 N36:51.16 W121:53.65  
 21C.140700 071300 N36:51.16 W121:53.65 fi med  
 22C.140728 071300 N36:51.42 W121:54.46 unid boat  
 23C.140737 071300 N36:51.52 W121:54.79 some patches of red tide  
 24\*.140800 071300 N36:51.75 W121:55.44  
 25C.140822 071300 N36:51.97 W121:56.15 several jellyfish shoals in area  
 26C.140830 071300 N36:52.05 W121:56.39 trawler  
 27C.140838 071300 N36:52.12 W121:56.63 fi 3 sm  
 28C.140847 071300 N36:52.21 W121:56.94 fi sm  
 29C.140851 071300 N36:52.25 W121:57.04 1 trawler  
 30\*.140900 071300 N36:52.35 W121:57.31  
 31C.140928 071300 N36:52.65 W121:58.25 1 trawler  
 32C.140933 071300 N36:52.69 W121:58.40 fi med 1  
 33C.140954 071300 N36:52.86 W121:59.10 2 fi med

34\*.141000 071300 N36:52.90 W121:59.28  
 35C.141040 071300 N36:53.23 W122:00.52 crossing front; extends N-S spanning Bay  
 36\*.141100 071300 N36:53.41 W122:01.06  
 37\*.141200 071300 N36:53.83 W122:03.03  
 38C.141207 071300 N36:53.86 W122:03.28 2 fi sm  
 39C.141246 071300 N36:54.15 W122:04.49 1 fi med  
 40C.141251 071300 N36:54.20 W122:04.66 1 fi lrg; very dense  
 41\*.141300 071300 N36:54.25 W122:04.89  
 42C.141315 071300 N36:54.37 W122:05.39 lots of sm sharks  
 43\*.141400 071300 N36:54.75 W122:06.69  
 44C.141413 071300 N36:54.85 W122:07.08 1 fi med very dense with birds  
 45C.141438 071300 N36:55.06 W122:07.87  
 46S.141440 071300 N36:55.07 W122:07.93 101 kf 48 y pp  
     1 kf 3 3 3 100  
 47C.141454 071300 N36:55.20 W122:08.36 one pp of 101 is calf  
 48\*.141500 071300 N36:55.24 W122:08.52  
 49C.141539 071300 N36:55.59 W122:09.74 1 fi lrg  
 50\*.141600 071300 N36:55.75 W122:10.30  
 51\*.141700 071300 N36:56.24 W122:12.25  
 52W.141707 071300 N36:56.29 W122:12.42 0 0 2 0  
 53C.141713 071300 N36:56.35 W122:12.62 1 fi sm  
 54W.141759 071300 N36:56.73 W122:14.10 0 0 3 0  
 55\*.141800 071300 N36:56.75 W122:14.17  
 56C.141817 071300 N36:56.90 W122:14.68 red tide  
 57\*.141900 071300 N36:57.24 W122:16.01  
 58W.141911 071300 N36:57.34 W122:16.38 0 0 2 0  
 59C.141953 071300 N36:57.60 W122:17.68 mola  
 60S.141955 071300 N36:57.62 W122:17.78 102 kf 38 y zc  
     1 kf 1 1 1 100  
 61\*.142000 071300 N36:57.65 W122:17.91  
 62V.142012 071300 N36:57.74 W122:18.28 75 25  
 63S.142015 071300 N36:57.77 W122:18.39 103 kf 40 y zc  
     1 kf 1 1 1 100  
 64S.142019 071300 N36:57.79 W122:18.49 104 kf 54 y zc  
     1 kf 1 1 1 100  
 65W.142032 071300 N36:57.93 W122:18.92 0 2 0  
 66S.142039 071300 N36:57.97 W122:19.05 105 kf 24 y lo zc mn  
     1 kf 201 239 175 87 11 2  
 66E 142039 071300 N36:57.97 W122:19.05  
 67\* 142100 071300 N36:58.37 W122:19.47  
 68C 142128 071300 N36:59.05 W122:19.01 1 fi med  
 69\* 142200 071300 N36:58.62 W122:18.12  
 70C 142206 071300 N36:58.39 W122:18.07 seiner  
 72C 142210 071300 N36:58.23 W122:18.09 off effort for entire circle - oops -ok, kaf  
 73\* 142300 071300 N36:57.98 W122:19.28  
 74\* 142400 071300 N36:59.51 W122:19.12  
 76\* 142500 071300 N36:58.34 W122:18.85  
 77R.142531 071300 N36:58.41 W122:19.82  
 78C.142538 071300 N36:58.46 W122:20.03 105 est in notebook  
 79C.142547 071300 N36:58.52 W122:20.28 some stray scattered lo; incl in #105-ok  
 80\*.142600 071300 N36:58.60 W122:20.72  
 81\*.142700 071300 N36:59.01 W122:22.63  
 82C.142702 071300 N36:59.03 W122:22.70 2 mola  
 83S.142720 071300 N36:59.16 W122:23.25 106 sb -47 y zc  
     1 sb 1 1 1 100  
 84V.142728 071300 N36:59.25 W122:23.55 60 25  
 85C.142736 071300 N36:59.32 W122:23.78 intense patch of red tide  
 86\*.142800 071300 N36:59.49 W122:24.53  
 87S.142825 071300 N36:59.68 W122:25.32 107 kf 19 y zc  
     1 kf 1 1 1 100  
 88S.142856 071300 N36:59.91 W122:26.27 108 kf 44 y pp  
     1 kf 1 1 1 100  
 89\*.142900 071300 N36:59.95 W122:26.41  
 90S.142917 071300 N37:00.10 W122:26.98 109 sb -40 y zc

## Appendix 1 – Raw data record for MBNMS aerial surveys

Large-scale

1			sb	1	1	1	100
91S.142927	071300	N37:00.19	W122:27.30	110	sb	-33	y zc
1			sb	1	1	1	100
92S.142943	071300	N37:00.34	W122:27.83	111	sb	-50	y pp
1			sb	1	1	1	100
93*.143000	071300	N37:00.48	W122:28.36				
94S.143016	071300	N37:00.63	W122:28.94	112	sb	-10	y bm
1			sb	2	2	2	100
95E 143020	071300	N37:00.67	W122:29.08				
96* 143100	071300	N36:59.92	W122:29.35				
97C 143122	071300	N36:59.78	W122:28.53	albf	1		
98* 143200	071300	N37:00.53	W122:28.76				
99R.143214	071300	N37:00.60	W122:29.30				
100C.143223	071300	N37:00.65	W122:29.56	thresher shark; 1 troller			
101*.143300	071300	N37:00.94	W122:30.76				
102C.143313	071300	N37:01.06	W122:31.24	3	albf		
103C.143324	071300	N37:01.14	W122:31.55	albf	- 1		
104C.143328	071300	N37:01.18	W122:31.69	albf	1+1		
105C.143336	071300	N37:01.24	W122:31.96	5	albf		
106C.143347	071300	N37:01.33	W122:32.32	3	albf		
107C.143358	071300	N37:01.42	W122:32.67	2	albf		
108*.143400	071300	N37:01.43	W122:32.71				
109C.143409	071300	N37:01.50	W122:33.00	3	albf		
110C.143418	071300	N37:01.59	W122:33.36	4	albf		
111C.143433	071300	N37:01.70	W122:33.80	9	albf		
112V.143437	071300	N37:01.75	W122:33.98	50		10	
113C.143442	071300	N37:01.79	W122:34.13	albf	1		
114W.143448	071300	N37:01.83	W122:34.31	n	0	1	0
115S.143459	071300	N37:01.92	W122:34.66	113	kf	17	y bm
1			kf	1	1	1	100
116*.143500	071300	N37:01.92	W122:34.66				
117C.143521	071300	N37:02.13	W122:35.36	albf			
118*.143600	071300	N37:02.50	W122:36.67				
119V.143635	071300	N37:02.75	W122:37.79	50		5	
120V.143649	071300	N37:02.89	W122:38.29	30		5	
121*.143700	071300	N37:02.98	W122:38.60				
122C.143755	071300	N37:03.37	W122:40.43	1	albf		
123*.143800	071300	N37:03.42	W122:40.61				
124C.143828	071300	N37:03.68	W122:41.48	thresher shark			
125C.143840	071300	N37:03.78	W122:41.82	1albf			
126S.143857	071300	N37:03.94	W122:42.38	114	kf	76	y zc
1			kf	1	1	1	100
127*.143900	071300	N37:03.95	W122:42.42				
128S.143922	071300	N37:04.20	W122:43.19	115	kf	85	y zc
1			kf	1	1	1	100
129S.143925	071300	N37:04.22	W122:43.26	116	sb	-45	y zc
1			sb	1	1	1	100
130S.143952	071300	N37:04.44	W122:44.18	117	kf	74	y zc
1			kf	1	1	1	100
131*.144000	071300	N37:04.49	W122:44.44				
132W.144006	071300	N37:04.54	W122:44.67	n	0	0	0
133V.144011	071300	N37:04.58	W122:44.86	20		5	
134C.144016	071300	N37:04.61	W122:45.01	1	albf		
135V.144020	071300	N37:04.64	W122:45.16	20		0	
136C.144023	071300	N37:04.67	W122:45.27	lots of blue sharks by kf			
137*.144100	071300	N37:04.96	W122:46.39				
138*.144200	071300	N37:05.53	W122:48.43				
139S.144219	071300	N37:05.68	W122:49.05	118	sb	-51	y zc
1			sb	1	1	1	100
140*.144300	071300	N37:06.05	W122:50.39				
141C.144346	071300	N37:06.45	W122:51.94	mola			
142*.144400	071300	N37:06.56	W122:52.41				
143W.144451	071300	N37:07.01	W122:54.04	n	10	0	0
144*.144500	071300	N37:07.10	W122:54.33				

145C.144533 071300 N37:07.40 W122:55.52 mola  
 146V.144559 071300 N37:07.64 W122:56.40 40 20  
 147\*.144600 071300 N37:07.64 W122:56.40  
 148W.144603 071300 N37:07.67 W122:56.51 n 40 0 0  
 149V.144645 071300 N37:08.01 W122:57.97 60 40  
 150\*.144700 071300 N37:08.09 W122:58.42  
 151\*.144800 071300 N37:08.55 W123:00.43  
 152V.144838 071300 N37:08.87 W123:01.81 30 40  
 153S.144857 071300 N37:09.01 W123:02.48 119 kf 52 y lo  
     1 kf 55 60 40 100  
 154E 144900 071300 N37:09.02 W123:02.51  
 154\* 144900 071300 N37:09.02 W123:02.51  
 156\* 145000 071300 N37:08.49 W123:03.32  
 157C 145030 071300 N37:09.09 W123:02.96 combine sig 119 & 120 50/55/35-ok, kaf  
 158\* 145100 071300 N37:08.71 W123:03.55  
 159C 145113 071300 N37:08.55 W123:03.05 loosely scattered lags  
 161R.145134 071300 N37:08.96 W123:02.41  
 162C.145136 071300 N37:08.99 W123:02.39 forgot to go offline  
 163E 145147 071300 N37:09.22 W123:02.07  
 164O.145147 071300 N37:09.22 W123:02.07 16  
 165V.145147 071300 N37:09.22 W123:02.07 50 25  
 166P.145147 071300 N37:09.22 W123:02.07 sb kf sw  
 167A.145147 071300 N37:09.22 W123:02.07 700 100  
 168W.145147 071300 N37:09.22 W123:02.07 n 40 1 0  
 169\*.145200 071300 N37:09.45 W123:01.67  
 170\*.145300 071300 N37:10.40 W122:59.77  
 171\*.145400 071300 N37:11.29 W122:57.82  
 201W.145409 071300 N37:11.42 W122:57.54 n 0 1 1  
 172C.145409 071300 N37:11.42 W122:57.54 mola  
 173W.145409 071300 N37:11.42 W122:57.54 n 40 1 0  
 174W.145449 071300 N37:11.99 W122:56.26 n 40 1 1  
 175\*.145500 071300 N37:12.14 W122:55.90  
 176S.145510 071300 N37:12.28 W122:55.58 121 kf 73 y bd  
     1 kf 2 2 2 100  
 177E 145520 071300 N37:12.42 W122:55.27  
 178\* 145600 071300 N37:11.84 W122:54.84  
 179\* 145700 071300 N37:13.02 W122:56.15  
 180R.145742 071300 N37:12.35 W122:55.47  
 181\*.145800 071300 N37:12.60 W122:54.97  
 182S.145828 071300 N37:13.06 W122:54.00 122 sb -37 Y ZC  
     1 sb 1 1 1 100  
 183\*.145900 071300 N37:13.54 W122:52.99  
 184S.145910 071300 N37:13.73 W122:52.61 123 kf 23 y zc  
     1 kf 1 1 1 100  
 185S.145919 071300 N37:13.84 W122:52.37 124 kf 44 y gg  
     1 kf 8 9 8 100  
 186\*.150000 071300 N37:14.42 W122:51.12  
 187C.150015 071300 N37:14.66 W122:50.60 albf - 1  
 188C.150023 071300 N37:14.77 W122:50.35 3 albf  
 189\*.150100 071300 N37:15.33 W122:49.15  
 190S.150102 071300 N37:15.38 W122:49.04 125 sb -32 Y zc  
     1 sb 1 1 1 100  
 191S.150113 071300 N37:15.54 W122:48.67 126 sb -42 Y zc  
     1 sb 1 1 1 100  
 192C.150115 071300 N37:15.55 W122:48.63 2+2 albf  
 193C.150128 071300 N37:15.76 W122:48.21 2 albf  
 194C.150141 071300 N37:15.98 W122:47.78 1 albf  
 195C.150149 071300 N37:16.12 W122:47.50 1 albf  
 196C.150155 071300 N37:16.21 W122:47.33 1 albf  
 197\*.150200 071300 N37:16.26 W122:47.22  
 198S.150206 071300 N37:16.40 W122:46.95 127 sb -39 Y zc  
     1 sb 1 1 1 100  
 199C.150216 071300 N37:16.52 W122:46.68 2 - albf  
 200C.150229 071300 N37:16.72 W122:46.27 1 albf

## Appendix 1 – Raw data record for MBNMS aerial surveys

Large-scale

201W.150259 071300 N37:17.19 W122:45.38 n 0 1 1  
 202\*.150300 071300 N37:17.20 W122:45.35  
 203C.150304 071300 N37:17.29 W122:45.19 cloud cover dropped off a while ago; before bd  
 204S.150315 071300 N37:17.46 W122:44.86 128 kf 61 y lo zc  
     1 kf 5 5 5 80 20  
 205\*.150400 071300 N37:18.25 W122:44.66  
 206C.150418 071300 N37:17.85 W122:45.01 4 lo; 1 zc sighting 128  
 207E 150430 071300 N37:17.53 W122:44.75  
 208C 150435 071300 N37:17.49 W122:44.63 off effort for circle  
 209R.150438 071300 N37:17.46 W122:44.48  
 210\*.150500 071300 N37:17.82 W122:43.78  
 211W.150536 071300 N37:18.42 W122:42.66 n 30 1 1  
 212C.150547 071300 N37:18.56 W122:42.35 mola  
 213\*.150600 071300 N37:18.79 W122:41.92  
 214S.150637 071300 N37:19.37 W122:40.73 129 sb -51 y zc  
     1 sb 1 1 1 100  
 215W.150651 071300 N37:19.60 W122:40.25 n 20 1 1  
 216V.150659 071300 N37:19.71 W122:39.99 25 25  
 217\*.150700 071300 N37:19.75 W122:39.91  
 218C.150715 071300 N37:20.00 W122:39.36 shso - 1400  
 219C.150729 071300 N37:20.18 W122:38.97 2 trawlers  
 220W.150733 071300 N37:20.26 W122:38.78 n 0 1 1  
 221V.150743 071300 N37:20.40 W122:38.46 20 25  
 222C.150748 071300 N37:20.47 W122:38.32 mola  
 223\*.150800 071300 N37:20.63 W122:37.95  
 224C.150839 071300 N37:21.27 W122:36.63 a few murres  
 225\*.150900 071300 N37:21.60 W122:35.96  
 226C.150901 071300 N37:21.62 W122:35.92 mola  
 227C.150941 071300 N37:22.24 W122:34.66 mola  
 228S.150947 071300 N37:22.36 W122:34.41 130 kf 32 y zc  
     1 kf 1 1 1 100  
 229C.150956 071300 N37:22.50 W122:34.13 2 mola  
 230\*.151000 071300 N37:22.56 W122:33.99  
 231S.151054 071300 N37:23.34 W122:32.30 131 kf 39 y pv  
     1 kf 1 1 1 100  
 232\*.151100 071300 N37:23.42 W122:32.13  
 233C.151111 071300 N37:23.60 W122:31.74 mola  
 234C.151127 071300 N37:23.82 W122:31.24 1 trawler  
 235C.151154 071300 N37:24.22 W122:30.36 mola  
 236\*.151200 071300 N37:24.32 W122:30.16  
 237C.151217 071300 N37:24.59 W122:29.65 several adult/chick murre pairs here  
 238C.151244 071300 N37:25.02 W122:28.74 mola  
 239\*.151300 071300 N37:25.22 W122:28.23  
 240E 151308 071300 N37:25.32 W122:27.97  
 241\*.151400 071300 N37:25.49 W122:29.07  
 242\*.151500 071300 N37:25.38 W122:29.38  
 243S 151535 071300 N37:25.41 W122:28.20 132 sb -15 y ub  
     1 sb 1 1 1 100  
 244\*.151600 071300 N37:25.89 W122:28.10  
 245\*.151700 071300 N37:24.72 W122:28.98  
 246R.151716 071300 N37:24.95 W122:28.33  
 247V.151729 071300 N37:25.19 W122:28.00 30 25  
 248C.151732 071300 N37:25.28 W122:27.89 water very red here  
 249C.151756 071300 N37:25.74 W122:27.22 very, very red - tomato soup red  
 250\*.151800 071300 N37:25.81 W122:27.12  
 251E 151813 071300 N37:26.08 W122:26.79  
 252O 151814 071300 N37:26.08 W122:26.79  
 253C 151822 071300 N37:26.30 W122:26.71 heading in for potty stop for unnamed passenger  
   4P 154204 071300 N37:29.89 W122:27.33 sb kf sw  
   5V 154204 071300 N37:29.89 W122:27.33  
   6A 154204 071300 N37:29.89 W122:27.33 700 100  
   7W 154204 071300 N37:29.89 W122:27.33  
   8\* 154300 071300 N37:28.19 W122:26.19  
   9\* 154400 071300 N37:26.13 W122:25.44

10T.154430 071300 N37:25.75 W122:26.21 17  
 11V.154430 071300 N37:25.75 W122:26.21 60 15  
 12P.154430 071300 N37:25.75 W122:26.21 sb kf sw  
 13A.154430 071300 N37:25.75 W122:26.21 700 100  
 14W.154430 071300 N37:25.75 W122:26.21 n 0 2 0  
 15\*.154500 071300 N37:26.23 W122:26.98  
 16C.154540 071300 N37:27.03 W122:27.95 still lots of red water  
 17\*.154600 071300 N37:27.38 W122:28.36  
 18C.154612 071300 N37:27.68 W122:28.73 3 rec boats  
 19\*.154700 071300 N37:28.60 W122:29.90  
 20\*.154800 071300 N37:29.80 W122:31.33  
 21\*.154900 071300 N37:30.96 W122:32.78  
 22C.154952 071300 N37:31.93 W122:34.04 red tide thinning now; had been constant from beach  
 23\*.155000 071300 N37:32.08 W122:34.21  
 24S.155007 071300 N37:32.21 W122:34.36 133 kf 28 y pp  
     1 kf 2 2 2 100  
 25C.155032 071300 N37:32.77 W122:34.93 mola  
 26C.155059 071300 N37:33.33 W122:35.61 mola  
 27\*.155100 071300 N37:33.33 W122:35.61  
 28C.155114 071300 N37:33.57 W122:35.96 big mola  
 29\*.155200 071300 N37:34.42 W122:37.04  
 30C.155212 071300 N37:34.71 W122:37.39 good # of murre pairs here  
 31C.155243 071300 N37:35.25 W122:38.04 2 mola  
 32W.155250 071300 N37:35.41 W122:38.25 n 0 2 2  
 33\*.155300 071300 N37:35.56 W122:38.42  
 34V.155303 071300 N37:35.64 W122:38.52 75 15  
 35\*.155400 071300 N37:36.79 W122:39.89  
 36S.155400 071300 N37:36.79 W122:39.89 134 kf 51 y pp  
     1 kf 3 3 3 100  
 37\*.155500 071300 N37:37.89 W122:41.24  
 38C.155535 071300 N37:38.58 W122:42.21  
 39W.155535 071300 N37:38.58 W122:42.21 n 0 3 0  
 40\*.155600 071300 N37:39.07 W122:42.77  
 41\*.155700 071300 N37:40.27 W122:44.19  
 42#.155737 071300 N37:41.06 W122:45.12  
 43\*.155800 071300 N37:41.35 W122:45.74  
 44T.155853 071300 N37:40.77 W122:45.17 18  
 45V.155853 071300 N37:40.77 W122:45.17 50 20  
 46P.155853 071300 N37:40.77 W122:45.17 sb kf sw  
 47A.155853 071300 N37:40.77 W122:45.17 700 100  
 48W.155853 071300 N37:40.77 W122:45.17 n 0 3 0  
 49\*.155900 071300 N37:40.92 W122:45.07  
 50#.155905 071300 N37:41.07 W122:44.98  
 51#.155905 071300 N37:41.07 W122:44.98  
 52#.155905 071300 N37:41.07 W122:44.98  
 53#.155905 071300 N37:41.07 W122:44.98  
 54#.155905 071300 N37:41.07 W122:44.98  
 55W.155945 071300 N37:42.12 W122:44.13 n 0 3 0  
 56C.155948 071300 N37:42.20 W122:44.06 3 jelly shoals; 3 sailboats  
 57\*.160000 071300 N37:42.43 W122:43.83  
 58C.160016 071300 N37:42.85 W122:43.44 another jelly shoal  
 59C.160022 071300 N37:43.01 W122:43.29 3 sailboats  
 60\*.160100 071300 N37:43.84 W122:42.37  
 61C.160102 071300 N37:43.94 W122:42.29 fi 1 sm  
 62C.160111 071300 N37:44.13 W122:42.14 5 sailboats  
 63W.160131 071300 N37:44.64 W122:41.69 n 0 3 1  
 64\*.160200 071300 N37:45.29 W122:41.03  
 65C.160231 071300 N37:46.02 W122:40.22 1 boat  
 66C.160244 071300 N37:46.36 W122:39.87 1 sm boat; 1 fish boat  
 67W.160254 071300 N37:46.63 W122:39.61 n 0 4 1  
 68\*.160300 071300 N37:46.76 W122:39.49  
 69C.160333 071300 N37:47.59 W122:38.62 1 fi sm  
 70S.160353 071300 N37:48.04 W122:38.14 135 kf 81 y pp  
     1 kf 1 1 1 100

71\*.160400 071300 N37:48.20 W122:37.98  
 72\*.160500 071300 N37:49.61 W122:36.47  
 73C.160515 071300 N37:50.06 W122:36.06 1 trawler  
 74\*.160600 071300 N37:51.10 W122:34.93  
 75C.160600 071300 N37:51.10 W122:34.93 lot more red tide here  
 76O 160611 071300 N37:51.41 W122:34.60  
 77C 160614 071300 N37:51.49 W122:34.53 end of transect; end of survey; end of day!  
 78\* 160700 071300 N37:51.73 W122:35.37  
 79\* 160800 071300 N37:50.14 W122:34.41  
 80\* 160900 071300 N37:48.30 W122:34.03  
 81\* 161000 071300 N37:46.49 W122:33.35  
 82\* 161100 071300 N37:44.58 W122:32.81  
 83\* 161200 071300 N37:42.49 W122:32.30  
 84\* 161300 071300 N37:40.09 W122:31.73  
 85\* 161400 071300 N37:37.46 W122:31.57  
 86\* 161500 071300 N37:34.92 W122:31.74  
 87\* 161600 071300 N37:32.39 W122:31.92  
 88\* 161700 071300 N37:29.87 W122:30.99  
 89\* 161800 071300 N37:27.63 W122:29.22  
 90\* 161900 071300 N37:25.32 W122:27.67  
 91\* 162000 071300 N37:23.22 W122:25.66  
 92\* 162100 071300 N37:20.77 W122:24.79  
 93\* 162200 071300 N37:18.34 W122:25.00  
 94\* 162300 071300 N37:15.99 W122:25.41  
 95\* 162400 071300 N37:13.44 W122:25.37  
 96\* 162500 071300 N37:11.03 W122:24.31  
 97S 162554 071300 N37:09.05 W122:22.62 136 kf o mn  
     1 kf 1 1 1 100  
 98\* 162600 071300 N37:08.90 W122:22.39  
 99S 162614 071300 N37:08.48 W122:21.75 137 kf o mn  
     1 kf 3 3 3 100  
 100\* 162700 071300 N37:07.10 W122:19.91  
 101\* 162800 071300 N37:05.23 W122:17.54  
 102\* 162900 071300 N37:03.11 W122:15.33  
 103S 162934 071300 N37:01.90 W122:14.09 138 sw o mn  
     1 sw 1 1 1 100  
 104\* 163000 071300 N37:01.04 W122:13.10  
 105\* 163100 071300 N36:59.25 W122:10.41  
 106\* 163200 071300 N36:57.59 W122:07.65  
 107\* 163300 071300 N36:56.20 W122:04.56  
 108S 163337 071300 N36:54.86 W122:03.36 139 kf o pp  
     1 kf 1 1 1 100  
 109C 163355 071300 N36:54.11 W122:02.82 t shark  
 110\* 163400 071300 N36:53.94 W122:02.70  
 111C 163403 071300 N36:53.82 W122:02.62 t shark  
 112\* 163500 071300 N36:51.65 W122:01.12  
 113\* 163600 071300 N36:49.51 W121:59.53  
 114\* 163700 071300 N36:47.45 W121:57.88  
 115S 163704 071300 N36:47.23 W121:57.76 140 sb o gg  
     1 sb 30 35 25 100  
 116\* 163800 071300 N36:45.03 W121:56.31  
 117S 163835 071300 N36:43.81 W121:55.23 141 sb o pd  
     1 sb 3 3 3 100  
 118\* 163900 071300 N36:43.09 W121:54.62  
 119\* 164000 071300 N36:41.10 W121:53.68  
 120\* 164100 071300 N36:39.21 W121:53.20  
 121\* 164200 071300 N36:37.44 W121:52.27  
 122C 164219 071300 N36:36.83 W121:51.88 crossing beach

## FINE-SCALE SURVEY

3C 115600 070800 N37:02.08 W122:29.06 FINE-SCALE MONTEREY BAY SURVEY  
 4C 115602 070800 N37:02.03 W122:28.97 Heading south to start porpoise survey  
 21\* 115800 070800 N36:59.38 W122:24.05  
 23A 115817 070800 N36:58.97 W122:23.13  
 24S 115856 070800 N36:58.27 W122:21.38 4 kf o mn  
     1 kf 2 2 2 100  
 25\* 115900 070800 N36:58.20 W122:21.19  
 26\* 120000 070800 N36:57.43 W122:18.26  
 27S 120019 070800 N36:57.38 W122:17.25 5 sb o mn  
     1 sb 4 4 4 100  
 28\* 120100 070800 N36:57.34 W122:15.16  
 29C 120142 070800 N36:57.19 W122:13.04 35 fishing boats, 1mi. offshore  
 30\* 120200 070800 N36:57.11 W122:12.24  
 31C 120218 070800 N36:57.05 W122:11.39 6 trolling boats  
 37T.120252 070800 N36:56.92 W122:09.95 1  
 32P 120252 070800 N36:56.92 W122:09.95 sb kf tn  
     33V 120252 070800 N36:56.92 W122:09.95 g e g g  
 34A 120252 070800 N36:56.92 W122:09.95 700 100  
 35W 120252 070800 N36:56.92 W122:09.95 n 100 3 0 0  
 36\* 120300 070800 N36:56.89 W122:09.69  
 40A.120301 070800 N36:56.89 W122:09.64 650 100  
 41W.120301 070800 N36:56.89 W122:09.64 k 100 3 0 0  
 42\*.120400 070800 N36:56.74 W122:07.34  
 44\*.120500 070800 N36:56.83 W122:05.16  
 45V.120532 070800 N36:56.81 W122:04.09 g o p g  
 47\*.120600 070800 N36:56.83 W122:03.05  
 48W.120614 070800 N36:56.86 W122:02.47 k 60 3 0 3  
 49C.120642 070800 N36:56.92 W122:01.52 25 rec. boat  
 50V.120653 070800 N36:56.93 W122:01.10 p g p g  
 51\*.120700 070800 N36:56.94 W122:00.87  
 55W.120708 070800 N36:56.95 W122:00.49 n 60 3 0 3  
 59W.120727 070800 N36:56.97 W121:59.89 n 0 3 0 3  
 63W.120754 070800 N36:57.02 W121:58.91 k 0 3 0 3  
 64\*.120801 070800 N36:57.02 W121:58.68  
 65S.120817 070800 N36:57.03 W121:58.15 6 kf 42 1 pp  
     1 kf 1 1 1 100  
 66S.120841 070800 N36:57.01 W121:57.25 7 sb -42 1 zc  
     1 sb 1 1 1 100  
 67\*.120900 070800 N36:57.01 W121:56.58  
 68C.120918 070800 N36:57.01 W121:55.95 10 rec.boats  
 72W.120932 070800 N36:57.01 W121:55.49 n 0 3 0 3  
 73C.120947 070800 N36:57.01 W121:54.92 fish ball, md.,1  
 74\*.121000 070800 N36:57.00 W121:54.42  
 75C.121010 070800 N36:57.00 W121:54.08 1 fish ball md.  
 76C.121026 070800 N36:57.00 W121:53.47 10 lg, 5 sm fish balls  
 77O 121051 070800 N36:56.96 W121:52.62  
 78\* 121100 070800 N36:56.86 W121:52.35  
 79T.121143 070800 N36:56.05 W121:52.04 2  
 80V.121143 070800 N36:56.05 W121:52.04 p g g g tn  
 81P.121143 070800 N36:56.05 W121:52.04 sb kf  
 82A.121143 070800 N36:56.05 W121:52.04 650 100  
 83W.121143 070800 N36:56.05 W121:52.04 n 0 3 0 9  
 84\*.121200 070800 N36:56.07 W121:52.59  
 85C.121243 070800 N36:56.03 W121:53.87 1 lg, 1 med., 3 lg, 1 med fish balls  
 86\*.121300 070800 N36:55.97 W121:54.41  
 88\*.121400 070800 N36:55.88 W121:56.20  
 89A.121454 070800 N36:55.99 W121:57.76 650 100  
 91\*.121500 070800 N36:56.00 W121:57.90  
 96\*.121600 070800 N36:56.03 W121:59.65  
 97\*.121700 070800 N36:55.90 W122:01.39  
 98W.121704 070800 N36:55.90 W122:01.51 n 50 3 0 9  
 99\*.121800 070800 N36:55.98 W122:03.16

100\*.121900 070800 N36:55.99 W122:04.99  
 101W.121930 070800 N36:55.98 W122:05.98 n 100 3 0 0  
 102V.121942 070800 N36:55.98 W122:06.31 g e g p  
 103\*.122000 070800 N36:56.00 W122:06.88  
 104W.122003 070800 N36:56.00 W122:06.94 n 100 2 0 0  
 105\*.122100 070800 N36:56.02 W122:08.68  
 106W.122102 070800 N36:56.02 W122:08.75 n 100 2 1 0  
 107C.122115 070800 N36:55.99 W122:09.16 lots of murres  
 108O 122153 070800 N36:55.93 W122:10.26  
 109\*.122200 070800 N36:55.91 W122:10.41  
 110C 122225 070800 N36:55.47 W122:10.98 2 trollers  
 111T.122250 070800 N36:54.95 W122:10.82 3  
 112V.122250 070800 N36:54.95 W122:10.82 g e g p  
 113P.122250 070800 N36:54.95 W122:10.82 sb kf tn  
 114A.122250 070800 N36:54.95 W122:10.82 650 100  
 115W.122250 070800 N36:54.95 W122:10.82 n 100 2 1 0  
 117\*.122300 070800 N36:54.98 W122:10.49  
 121\*.122400 070800 N36:55.06 W122:08.33  
 123C.122414 070800 N36:55.03 W122:07.84 1 troller, 100 murres  
 124C.122442 070800 N36:54.96 W122:06.71 1 troller  
 125\*.122500 070800 N36:54.98 W122:06.13  
 126V.122547 070800 N36:55.00 W122:04.41 p g p g  
 127\*.122600 070800 N36:54.99 W122:03.90  
 128C.122602 070800 N36:54.99 W122:03.82 1 troller  
 129W.122629 070800 N36:54.97 W122:02.82 n 50 3 0 3  
 130\*.122700 070800 N36:54.99 W122:01.72  
 131C.122718 070800 N36:55.04 W122:01.01 1 rec. boat  
 132\*.122800 070800 N36:55.07 W121:59.37  
 133W.122826 070800 N36:55.01 W121:58.50 n 0 3 0 3  
 134C.122851 070800 N36:54.94 W121:57.45 1 rec. boat  
 135\*.122900 070800 N36:54.94 W121:57.18  
 136\*.123000 070800 N36:55.05 W121:54.90  
 137\*.123100 070800 N36:54.96 W121:52.68  
 138C.123123 070800 N36:54.93 W121:51.77 7 large, 5 small fish balls  
 139O 123139 070800 N36:54.89 W121:51.13  
 140\*.123200 070800 N36:54.58 W121:50.56  
 141T.123230 070800 N36:53.88 W121:50.56 4  
 142V.123230 070800 N36:53.88 W121:50.56 p p g g  
 143P.123230 070800 N36:53.88 W121:50.56 sb kf tn  
 144A.123230 070800 N36:53.88 W121:50.56 650 100  
 145W.123230 070800 N36:53.88 W121:50.56 n 0 3 0 9  
 146C.123251 070800 N36:53.96 W121:51.21 5 lg, 3 md, 2 sm, 3 lg, 1 md, 1 sm fish ball  
 147\*.123300 070800 N36:53.98 W121:51.44  
 148C.123348 070800 N36:54.02 W121:52.97 6 sm fish ball  
 149\*.123400 070800 N36:53.98 W121:53.37  
 152\*.123500 070800 N36:53.96 W121:55.20  
 153C.123531 070800 N36:54.04 W121:56.13 2 sm. fi.  
 154\*.123600 070800 N36:54.01 W121:56.95  
 155C.123640 070800 N36:53.94 W121:58.09 1 rec. boat  
 156\*.123700 070800 N36:53.92 W121:58.69  
 157\*.123800 070800 N36:53.96 W122:00.58  
 158W.123816 070800 N36:53.98 W122:01.04 n 50 3 0 9  
 159W.123859 070800 N36:53.96 W122:02.41 n 90 2 0 9  
 160\*.123900 070800 N36:53.96 W122:02.41  
 161V.123918 070800 N36:53.97 W122:02.94 p g g g  
 162\*.124000 070800 N36:53.98 W122:04.17  
 163C.124048 070800 N36:53.97 W122:05.50 mix of brown and green water  
 164\*.124100 070800 N36:53.95 W122:05.80  
 165C.124126 070800 N36:53.94 W122:06.56 rec boat, 1  
 166C.124158 070800 N36:53.96 W122:07.47 1 sm mola  
 167\*.124200 070800 N36:53.96 W122:07.50  
 168W.124217 070800 N36:54.00 W122:07.99 n 90 2 0 9  
 169V.124238 070800 N36:54.03 W122:08.65 p g g g  
 170C.124255 070800 N36:54.02 W122:09.13 1 troller

171\*.124300 070800 N36:54.00 W122:09.29  
 172W.124310 070800 N36:53.97 W122:09.64 n 100 2 0 9  
 173O 124329 070800 N36:53.92 W122:10.14  
 174C 124338 070800 N36:53.86 W122:10.42 1 sail boat  
 175\* 124400 070800 N36:53.39 W122:10.80  
 176C 124413 070800 N36:53.02 W122:10.73 8 trollers  
 177T.124425 070800 N36:53.00 W122:10.31 5  
 178V.124425 070800 N36:53.00 W122:10.31 p e g g tn  
 179P.124425 070800 N36:53.00 W122:10.31 sb kf  
 180A.124425 070800 N36:53.00 W122:10.31 650 100  
 181W.124425 070800 N36:53.00 W122:10.31 n 100 2 0 0  
 182S.124453 070800 N36:53.01 W122:09.32 8 kf 37 3 gg  
     1 kf 3 3 3 100  
 183\*.124500 070800 N36:53.02 W122:09.16  
 184E 124511 070800 N36:52.90 W122:08.73  
 185\* 124600 070800 N36:52.77 W122:09.62  
 186C 124635 070800 N36:53.37 W122:08.98  
 187\* 124700 070800 N36:52.90 W122:09.13  
 190R.124748 070800 N36:53.39 W122:09.27  
 191C.124753 070800 N36:53.38 W122:09.15 3 gg; not resighted.  
 192\*.124800 070800 N36:53.34 W122:08.87  
 193\*.124900 070800 N36:53.05 W122:06.57  
 194\*.125000 070800 N36:52.98 W122:04.38  
 195W.125015 070800 N36:52.98 W122:03.78 n 80 2 0 3  
 196V.125045 070800 N36:53.02 W122:02.72 g e g g  
 197\*.125100 070800 N36:53.01 W122:02.12  
 198V.125116 070800 N36:52.99 W122:01.52 g e p g  
 199W.125124 070800 N36:52.99 W122:01.24 n 0 2 0 3  
 200C.125144 070800 N36:52.99 W122:00.43 jelly fish shoal  
 201C.125159 070800 N36:53.00 W121:59.83 1 troller, 1 dinghy  
 202\*.125200 070800 N36:53.00 W121:59.83  
 203W.125218 070800 N36:52.98 W121:59.15 n 0 3 0 3  
 204C.125226 070800 N36:52.98 W121:58.83 1 sail boat  
 205\*.125300 070800 N36:53.01 W121:57.60  
 206C.125338 070800 N36:53.05 W121:56.11 1 sail boat  
 207C.125338 070800 N36:53.05 W121:56.11  
 208\*.125400 070800 N36:53.03 W121:55.28  
 209A.125415 070800 N36:53.01 W121:54.70 750 100  
 210C.125422 070800 N36:52.99 W121:54.44 1 rec boat  
 211W.125449 070800 N36:52.94 W121:53.56 h 0 3 0 3  
 212\*.125500 070800 N36:52.92 W121:53.19  
 215A 125529 070800 N36:52.92 W121:52.13 1100 100  
 216C 125533 070800 N36:52.93 W121:51.93 1 jell fish shoal  
 218\*.125600 070800 N36:52.97 W121:51.06  
 219S 125631 070800 N36:53.09 W121:49.91 9 sb -54 1 pp  
     1 sb 1 1 1 100  
 220\*.125700 070800 N36:52.62 W121:49.10  
 221O 125710 070800 N36:52.30 W121:48.97  
 222T.125729 070800 N36:51.97 W121:49.40 6  
 223V.125729 070800 N36:51.97 W121:49.40 p p g g tn  
 224P.125729 070800 N36:51.97 W121:49.40 sb kf  
 225A.125729 070800 N36:51.97 W121:49.40 750 100  
 226W.125729 070800 N36:51.97 W121:49.40 n 0 3 0 9  
 227S.125754 070800 N36:52.02 W121:50.23 10 kf 38 1 el  
     1 kf 1 1 1 100  
 228\*.125800 070800 N36:52.03 W121:50.37  
 229A.125808 070800 N36:52.07 W121:50.70 500 100  
 232\*.125900 070800 N36:51.97 W121:52.33  
 233C.125920 070800 N36:51.95 W121:52.72 1 sail boat  
 234A.125927 070800 N36:51.95 W121:52.72 650 100  
 235\*.130000 070800 N36:51.98 W121:54.03  
 236\*.130100 070800 N36:52.03 W121:55.71  
 237\*.130200 070800 N36:51.99 W121:57.44  
 238C.130207 070800 N36:51.98 W121:57.69 1 rec. boat

239C.130243 070800 N36:51.99 W121:58.68 sm motor boat  
 240\*.130300 070800 N36:52.00 W121:59.13  
 241W.130308 070800 N36:52.00 W121:59.39 n 40 3 0 9  
 242A.130345 070800 N36:51.97 W122:00.54 650 100  
 243\*.130400 070800 N36:51.99 W122:01.00  
 244\*.130500 070800 N36:52.01 W122:02.77  
 245W.130506 070800 N36:52.02 W122:03.01 n 75 2 0 9  
 246\*.130600 070800 N36:51.97 W122:04.63  
 247W.130636 070800 N36:52.03 W122:05.65 n 100 2 0 0  
 248\*.130700 070800 N36:52.00 W122:06.29  
 249V.130725 070800 N36:51.94 W122:07.05 p g g p  
 250W.130749 070800 N36:51.97 W122:07.78 n 100 2 1 0  
 251\*.130800 070800 N36:52.00 W122:08.11  
 252W.130818 070800 N36:52.03 W122:08.72 n 100 2 1 0  
 253C.130823 070800 N36:52.03 W122:08.86 oil slicks, bilge water  
 254C.130845 070800 N36:52.00 W122:09.55 4 trollers  
 255V.130858 070800 N36:51.98 W122:09.98 g e g p  
 256\*.130900 070800 N36:51.98 W122:10.05  
 257O.130926 070800 N36:52.00 W122:10.84  
 258\*.131000 070800 N36:51.48 W122:11.58  
 259C.131000 070800 N36:51.48 W122:11.58 1 troller  
 260T.131026 070800 N36:51.05 W122:11.15 7  
 261V.131026 070800 N36:51.05 W122:11.15 g g p g tn  
 262P.131026 070800 N36:51.05 W122:11.15 sb kf  
 263A.131026 070800 N36:51.05 W122:11.15 650 100  
 264W.131026 070800 N36:51.05 W122:11.15 n 100 2 0 0  
 267\*.131100 070800 N36:51.00 W122:09.92  
 268C.131117 070800 N36:50.93 W122:09.23 1 mola  
 269C.131120 070800 N36:50.92 W122:09.15 1 troller  
 270C.131126 070800 N36:50.90 W122:08.91 1 mola  
 271C.131129 070800 N36:50.90 W122:08.83  
 272C.131134 070800 N36:50.89 W122:08.64  
 273C.131136 070800 N36:50.88 W122:08.56  
 274W.131141 070800 N36:50.88 W122:08.36 n 100 2 0 0  
 275V.131154 070800 N36:50.88 W122:07.88 g g g g  
 276\*.131200 070800 N36:50.89 W122:07.68  
 277C.131233 070800 N36:50.93 W122:06.47 1 mola, 1 troller  
 278W.131257 070800 N36:50.98 W122:05.50 n 100 3 0 0  
 279\*.131300 070800 N36:50.98 W122:05.42  
 280C.131306 070800 N36:50.99 W122:05.19 1 mola  
 281V.131351 070800 N36:50.99 W122:03.50 p g p g  
 282\*.131400 070800 N36:50.98 W122:03.14  
 283W.131405 070800 N36:50.98 W122:03.02 n 75 3 0 3  
 284C.131450 070800 N36:51.03 W122:01.30 1 sail boat  
 285\*.131500 070800 N36:51.03 W122:00.95  
 286C.131531 070800 N36:50.99 W121:59.83 1 rec boat, 1 mola  
 287W.131545 070800 N36:50.96 W121:59.28 n 0 3 0 3  
 288\*.131600 070800 N36:50.94 W121:58.78  
 289C.131622 070800 N36:50.93 W121:57.90 1 troller  
 290C.131634 070800 N36:50.93 W121:57.45 1 troller  
 291S.131653 070800 N36:50.94 W121:56.74 11 sb -66 1 zc  
 1 sb 1 1 1 100  
 292\*.131700 070800 N36:50.94 W121:56.49  
 293S.131726 070800 N36:50.99 W121:55.44 12 kf 44 1 zc  
 1 kf 1 1 1 100  
 294C.131757 070800 N36:51.08 W121:54.20 1 md fi school  
 295\*.131800 070800 N36:51.08 W121:54.11  
 296C.131814 070800 N36:51.09 W121:53.55 2 md, 1 sm fi sch  
 297C.131832 070800 N36:51.08 W121:52.86 3 sm fi sch  
 298C.131853 070800 N36:51.06 W121:52.08 3 sm fi sch, 1 rec boat  
 299\*.131900 070800 N36:51.05 W121:51.80  
 300C.131911 070800 N36:51.04 W121:51.43 3 sm fi sch, 2 rec boat  
 301C.131942 070800 N36:51.02 W121:50.14 1 lg, 2md, 1 sm fi  
 302\*.132000 070800 N36:50.99 W121:49.50

303C.132006 070800 N36:50.98 W121:49.27 1lg ,2sm fi  
 304O 132024 070800 N36:50.94 W121:48.60  
 305\*.132100 070800 N36:50.22 W121:48.05  
 306T.132106 070800 N36:50.13 W121:48.22 8  
 307V.132106 070800 N36:50.13 W121:48.22 p p g g  
 308P.132106 070800 N36:50.13 W121:48.22 sb kf tn  
 309A.132106 070800 N36:50.13 W121:48.22 650 100  
 310W.132106 070800 N36:50.13 W121:48.22 n 0 3 0 10  
 314\*.132200 070800 N36:50.02 W121:49.82  
 315C.132219 070800 N36:49.97 W121:50.41 1 zc, 53 angle  
 316C.132245 070800 N36:50.00 W121:51.16 2 rec boats  
 317C.132255 070800 N36:50.02 W121:51.47 1 rec, 1 troller, extensive brown water  
 318\*.132300 070800 N36:50.02 W121:51.62  
 319C.132325 070800 N36:49.96 W121:52.32 fi, 2 sm  
 321\*.132400 070800 N36:49.87 W121:53.33  
 322C.132416 070800 N36:49.90 W121:53.79 weather late, sorry-ok  
 323C.132440 070800 N36:49.93 W121:54.47 fi, 1 sm  
 324\*.132500 070800 N36:49.94 W121:55.01  
 325\*.132600 070800 N36:49.99 W121:56.78  
 326C.132614 070800 N36:50.03 W121:57.18 fi, 1 med  
 327C.132629 070800 N36:50.04 W121:57.57 1 troller  
 328W.132639 070800 N36:50.04 W121:57.91 n 15 3 0 10  
 329\*.132700 070800 N36:50.01 W121:58.46  
 331W.132721 070800 N36:49.98 W121:59.13 n 60 2 0 10  
 332\*.132800 070800 N36:50.02 W122:00.19  
 333C.132829 070800 N36:50.00 W122:01.01 1 troller  
 334\*.132900 070800 N36:50.01 W122:01.89  
 335W.132902 070800 N36:50.01 W122:01.96 n 85 2 0 10  
 336C.132942 070800 N36:50.04 W122:03.23  
 337W.132946 070800 N36:50.04 W122:03.33 n 85 2 1 10  
 338W.132958 070800 N36:50.00 W122:03.64 n 100 2 1 0  
 339\*.133000 070800 N36:49.99 W122:03.74  
 340V.133044 070800 N36:49.98 W122:05.06 p g g g  
 341\*.133100 070800 N36:50.02 W122:05.54  
 342C.133117 070800 N36:50.04 W122:06.13 600 shso  
 343\*.133200 070800 N36:49.99 W122:07.44  
 344W.133227 070800 N36:49.98 W122:08.26 n 90 2 1 10  
 345W.133253 070800 N36:50.02 W122:09.01 n 90 2 0 10  
 346\*.133300 070800 N36:50.02 W122:09.20  
 347C.133332 070800 N36:49.88 W122:10.21 7 albf  
 348\*.133400 070800 N36:49.82 W122:10.99  
 349O 133433 070800 N36:49.89 W122:12.09  
 350\*.133500 070800 N36:49.31 W122:12.40  
 356T.133559 070800 N36:48.91 W122:10.35 9  
 357V.133559 070800 N36:48.91 W122:10.35 g e g g  
 358P.133559 070800 N36:48.91 W122:10.35 sb kf tn  
 359A.133559 070800 N36:48.91 W122:10.35 650 100  
 360W.133559 070800 N36:48.91 W122:10.35 n 90 2 0 4  
 361\*.133600 070800 N36:48.91 W122:10.27  
 362C.133615 070800 N36:48.94 W122:09.72 1 albf  
 363C.133618 070800 N36:48.94 W122:09.64  
 365C.133648 070800 N36:48.99 W122:08.59 3 albf  
 366W.133658 070800 N36:49.01 W122:08.15 n 100 2 0 0  
 367\*.133700 070800 N36:49.01 W122:08.12  
 368W.133710 070800 N36:49.01 W122:07.72 n 80 2 0 4  
 369S.133723 070800 N36:48.99 W122:07.21 14 sb -46 1 zc  
 1 sb 1 1 1 100  
 370W.133757 070800 N36:49.03 W122:05.96 n 60 2 0 4  
 371\*.133800 070800 N36:49.04 W122:05.85  
 372C.133804 070800 N36:49.05 W122:05.73 1 troller  
 373\*.133900 070800 N36:49.05 W122:03.70  
 374C.133910 070800 N36:49.03 W122:03.36 NW/SE slick with 3000 shso total  
 375\*.134000 070800 N36:48.90 W122:01.40  
 376C.134051 070800 N36:48.96 W121:59.47 1 troller

377\*.134100 070800 N36:48.98 W121:59.18  
 378C.134103 070800 N36:48.99 W121:59.02 7500 shso  
 379C.134123 070800 N36:49.05 W121:58.31 3000 shso  
 380C.134149 070800 N36:49.04 W121:57.33 1000 shso sitting  
 381\*.134200 070800 N36:49.02 W121:56.91  
 382W.134208 070800 N36:49.01 W121:56.63 n 0 3 0 4  
 383V.134234 070800 N36:48.97 W121:55.64 p g g g  
 384\*.134300 070800 N36:48.93 W121:54.61  
 385V.134302 070800 N36:48.93 W121:54.52 p g p p  
 386C.134322 070800 N36:48.97 W121:53.74 1 rec boat  
 387C.134340 070800 N36:49.00 W121:53.06 1 rec boat  
 388\*.134400 070800 N36:49.02 W121:52.34  
 389C.134411 070800 N36:49.02 W121:51.91 1 troller, 1 sm fi  
 390C.134438 070800 N36:48.99 W121:50.95 1 rec boat  
 391\*.134500 070800 N36:48.98 W121:50.08  
 392C.134512 070800 N36:49.00 W121:49.64 brown water  
 393W.134535 070800 N36:49.02 W121:48.78 n 0 4 0 4  
 394S.134552 070800 N36:49.00 W121:48.14 15 kf 42 1 pp  
     1 kf 1 1 1 100  
 395\*.134600 070800 N36:48.98 W121:47.86  
 3960 134608 070800 N36:48.93 W121:47.51  
 397T.134657 070800 N36:48.04 W121:47.65 10  
 398V.134657 070800 N36:48.04 W121:47.65 p p g g  
 399P.134657 070800 N36:48.04 W121:47.65 sb kf tn  
 400A.134657 070800 N36:48.04 W121:47.65 650 100  
 401W.134657 070800 N36:48.04 W121:47.65 n 0 4 0 10  
 402\*.134700 070800 N36:48.05 W121:47.71  
 403W.134718 070800 N36:48.11 W121:48.16 n 0 3 0 10  
 404C.134747 070800 N36:48.06 W121:49.03 beaufort 4 to start-ok  
 405\*.134800 070800 N36:48.01 W121:49.44  
 406C.134821 070800 N36:47.97 W121:49.99 start of line 35 boat anchored outside harbor  
 407\*.134900 070800 N36:48.04 W121:51.07  
 408V.134922 070800 N36:48.04 W121:51.76 p p p g  
 409C.134929 070800 N36:48.02 W121:51.94 2 rec. boat  
 410\*.135000 070800 N36:47.96 W121:52.85  
 411C.135035 070800 N36:47.99 W121:53.85 2 rec. boat  
 412W.135052 070800 N36:48.00 W121:54.31 n 40 3 0 10  
 413\*.135100 070800 N36:47.99 W121:54.47  
 414\*.135200 070800 N36:48.00 W121:56.35  
 415C.135243 070800 N36:48.01 W121:57.62 shso, 20000 left, 800 rt  
 416\*.135300 070800 N36:48.02 W121:58.16  
 417\*.135400 070800 N36:47.99 W121:59.95  
 418C.135422 070800 N36:47.98 W122:00.50 3000 shso  
 419W.135440 070800 N36:47.97 W122:01.03 n 40 2 0 10  
 420V.135452 070800 N36:47.97 W122:01.40 p p g g  
 421\*.135500 070800 N36:47.98 W122:01.65  
 422C.135502 070800 N36:47.98 W122:01.71 1 mola  
 423C.135508 070800 N36:47.99 W122:01.87 3500 shso + 700 shso  
 424\*.135600 070800 N36:48.04 W122:03.39  
 425\*.135700 070800 N36:47.91 W122:05.19  
 426W.135715 070800 N36:47.93 W122:05.62 n 80 3 0 10  
 427V.135733 070800 N36:47.95 W122:06.13 p g p g  
 428S.135749 070800 N36:48.01 W122:06.61 16 kf 31 1 zc  
     1 kf 1 1 1 100  
 429\*.135800 070800 N36:48.05 W122:06.88  
 430C.135811 070800 N36:48.06 W122:07.19 2 albf  
 431C.135855 070800 N36:47.96 W122:08.48 1 albf  
 432\*.135900 070800 N36:47.94 W122:08.66  
 433W.135908 070800 N36:47.94 W122:08.88 n 95 2 0 10  
 434V.135925 070800 N36:47.96 W122:09.37 p g g g  
 435\*.140000 070800 N36:48.02 W122:10.41  
 4360 140002 070800 N36:48.02 W122:10.48  
 438\*.140100 070800 N36:46.97 W122:10.52  
 439T.140107 070800 N36:46.97 W122:10.27 11

440V.140107 070800 N36:46.97 W122:10.27 g g p p  
 441P.140107 070800 N36:46.97 W122:10.27 sb kf tn  
 442A.140107 070800 N36:46.97 W122:10.27 650 100  
 443W.140107 070800 N36:46.97 W122:10.27 n 100 2 0 0  
 444\*.140200 070800 N36:47.03 W122:08.22  
 445#.140233 070800 N36:47.00 W122:06.98  
 446\*.140300 070800 N36:46.97 W122:06.01  
 447\*.140400 070800 N36:46.99 W122:03.81  
 448C.140408 070800 N36:46.99 W122:03.53 1 albf  
 449W.140414 070800 N36:46.99 W122:03.34 n 50 2 0 4  
 450\*.140500 070800 N36:46.94 W122:01.60  
 451V.140550 070800 N36:47.01 W121:59.79 g g p g  
 452\*.140600 070800 N36:47.01 W121:59.39  
 453V.140620 070800 N36:46.99 W121:58.63 g g g g  
 454\*.140700 070800 N36:47.01 W121:57.09  
 455\*.140800 070800 N36:46.99 W121:54.75  
 456C.140820 070800 N36:46.98 W121:54.05 1 rec boat  
 457W.140859 070800 N36:47.02 W121:52.51 n 25 3 0 4  
 458\*.140900 070800 N36:47.03 W121:52.43  
 459C.140953 070800 N36:46.95 W121:50.30 2 trollers  
 460\*.141000 070800 N36:46.95 W121:50.09  
 461\*.141100 070800 N36:46.97 W121:47.78  
 462C.141102 070800 N36:46.97 W121:47.74 fi, 4 lg, 2 sm  
 463O.141103 070800 N36:46.96 W121:47.65  
 464T.141155 070800 N36:46.16 W121:48.08 12  
 465V.141155 070800 N36:46.16 W121:48.08 p p g g  
 466P.141155 070800 N36:46.16 W121:48.08 sb kf tn  
 467A.141155 070800 N36:46.16 W121:48.08 650 100  
 468W.141155 070800 N36:46.16 W121:48.08 n 50 3 0 10  
 469\*.141201 070800 N36:46.17 W121:48.18  
 470V.141238 070800 N36:46.10 W121:49.36 p p p g  
 471\*.141300 070800 N36:45.97 W121:49.97  
 472C.141305 070800 N36:45.95 W121:50.15 1 rec boat  
 473\*.141400 070800 N36:45.94 W121:51.68  
 474\*.141500 070800 N36:46.01 W121:53.43  
 475\*.141600 070800 N36:45.97 W121:55.21  
 476C.141656 070800 N36:46.00 W121:56.89 2500 shso  
 477\*.141700 070800 N36:45.99 W121:56.95  
 478\*.141800 070800 N36:46.00 W121:58.73  
 479W.141812 070800 N36:46.02 W121:59.16 n 75 2 0 10  
 480C.141853 070800 N36:45.96 W122:00.38 1200 shso  
 481\*.141900 070800 N36:45.96 W122:00.61  
 482C.141933 070800 N36:46.00 W122:01.60 1000 shso  
 483C.141955 070800 N36:46.02 W122:02.22 1800 shso  
 484\*.142000 070800 N36:46.01 W122:02.37  
 485\*.142100 070800 N36:45.96 W122:04.10  
 486\*.142200 070800 N36:46.07 W122:05.93  
 487W.142203 070800 N36:46.06 W122:06.06 n 100 2 0 10  
 488C.142210 070800 N36:46.05 W122:06.26 2000 shso  
 489V.142232 070800 N36:46.00 W122:06.94 p g p g  
 491S.142252 070800 N36:45.97 W122:07.52 19 kf 73 1 zc  
 1 kf 1 1 1 100  
 492\*.142300 070800 N36:45.96 W122:07.75  
 493\*.142400 070800 N36:46.03 W122:09.65  
 494O.142413 070800 N36:46.01 W122:10.07  
 495\*.142500 070800 N36:45.05 W122:10.69  
 496T.142516 070800 N36:44.90 W122:10.17 13  
 497V.142516 070800 N36:44.90 W122:10.17 g g g p  
 498P.142516 070800 N36:44.90 W122:10.17 sb kf tn  
 499A.142516 070800 N36:44.90 W122:10.17 650 100  
 500W.142516 070800 N36:44.90 W122:10.17 n 100 2 0 0  
 501\*.142600 070800 N36:45.00 W122:08.41  
 502\*.142700 070800 N36:44.94 W122:06.06  
 503S.142759 070800 N36:44.95 W122:03.74 20 kf 84 1 zc

1			kf	1	1	1	100
504*.142800	070800	N36:44.95	W122:03.74				
505*.142900	070800	N36:45.00	W122:01.57				
506C.142912	070800	N36:44.98	W122:01.08	shso	7500		
507*.143000	070800	N36:44.96	W121:59.34				
508W.143014	070800	N36:44.98	W121:58.79	n	80	2	0 4
509W.143027	070800	N36:44.98	W121:58.32	n	65	2	0 4
510C.143054	070800	N36:45.00	W121:57.33	shso	500		
511*.143100	070800	N36:45.01	W121:57.17				
512*.143200	070800	N36:44.96	W121:54.80				
513W.143234	070800	N36:45.00	W121:53.54	n	25	3	0 4
514V.143255	070800	N36:45.04	W121:52.69	p	g	g	g
515*.143300	070800	N36:45.05	W121:52.52				
516C.143331	070800	N36:44.97	W121:51.27	1	troller		
517*.143400	070800	N36:44.94	W121:50.27				
519S 143453	070800	N36:45.06	W121:48.20	21	kf	44	1 zc
1			kf	1	1	1	100
520*.143500	070800	N36:45.00	W121:47.97				
518O 143521	070800	N36:44.44	W121:47.83				
521C 143521	070800	N36:44.44	W121:47.83				
522T.143548	070800	N36:44.10	W121:48.39	14			
523V.143548	070800	N36:44.10	W121:48.39	p	p	g	p
524P.143548	070800	N36:44.10	W121:48.39	sb	kf		tn
525A.143548	070800	N36:44.10	W121:48.39	650	100		
526W.143548	070800	N36:44.10	W121:48.39	n	80	3	0 11
527*.143600	070800	N36:44.13	W121:48.70				
528*.143700	070800	N36:44.10	W121:50.45				
529C.143701	070800	N36:44.10	W121:50.51	1	rec. boat		
530C.143710	070800	N36:44.09	W121:50.77	3	rec boat		
531C.143718	070800	N36:44.07	W121:51.05	2	trollers		
532V.143752	070800	N36:43.99	W121:52.04	p	p	p	p
533*.143800	070800	N36:43.98	W121:52.29				
534W.143820	070800	N36:43.95	W121:52.86	n	90	3	0 11
535*.143900	070800	N36:43.99	W121:54.02				
536*.144000	070800	N36:44.00	W121:55.85				
537C.144032	070800	N36:44.02	W121:56.76	1	mola		
538*.144100	070800	N36:43.97	W121:57.62				
539C.144127	070800	N36:43.96	W121:58.44	1	albf		
540*.144200	070800	N36:44.01	W121:59.34				
541C.144205	070800	N36:44.02	W121:59.52	2	albf		
542C.144224	070800	N36:44.00	W122:00.11	800	shso		
543C.144238	070800	N36:43.97	W122:00.50	1	albf		
544*.144300	070800	N36:43.94	W122:01.07				
545W.144314	070800	N36:43.96	W122:01.51	n	90	3	0 11
546W.144358	070800	N36:44.01	W122:02.81	n	100	3	0 0
547*.144400	070800	N36:44.01	W122:02.90				
548V.144404	070800	N36:44.02	W122:03.03	p	g	p	p
549*.144500	070800	N36:43.95	W122:04.69				
550C.144535	070800	N36:44.01	W122:05.80	1	albf		
551W.144544	070800	N36:44.01	W122:06.07	n	100	2	0 0
552V.144550	070800	N36:44.01	W122:06.27	g	g	g	p
553*.144600	070800	N36:43.99	W122:06.60				
554S.144647	070800	N36:43.99	W122:08.04	22	kf	84	1 zc
1			kf	1	1	1	100
555*.144700	070800	N36:44.01	W122:08.43				
556S.144710	070800	N36:44.00	W122:08.76	23	sb	-42	170 lb lo
1			sb	170	200	145	76 24
557*.144800	070800	N36:44.07	W122:08.95				
558O 144804	070800	N36:44.09	W122:09.12				
559*.144900	070800	N36:44.14	W122:09.38				
560*.145000	070800	N36:44.35	W122:09.75				
563*.145105	070800	N36:43.12	W122:10.35				
564T.145114	070800	N36:43.07	W122:09.76	15			
565V.145114	070800	N36:43.07	W122:09.76	g	g	g	g

566P.145114 070800 N36:43.07 W122:09.76 sb kf tn  
 567A.145114 070800 N36:43.07 W122:09.76 650 100  
 568W.145114 070800 N36:43.07 W122:09.76 n 100 2 0 0  
 569S.145120 070800 N36:43.07 W122:09.61 24 kf 64 1 zc  
 1 kf 1 1 1 100  
 570\*.145200 070800 N36:43.06 W122:08.14  
 572O 145206 070800 N36:43.04 W122:07.91  
 573C 145238 070800 N36:42.80 W122:06.66 ended transect; back to airport to refuel  
 574\* 145300 070800 N36:42.73 W122:05.54  
 575\* 145400 070800 N36:42.74 W122:02.55  
 576\* 145500 070800 N36:42.67 W121:59.87  
 577\* 145600 070800 N36:41.94 W121:57.51  
 578\* 145700 070800 N36:40.67 W121:55.48  
 579\* 145800 070800 N36:39.88 W121:52.87  
 12C 155500 070800 N36:38.87 W121:52.47 Second flight for Porpo surveys.  
 13\* 155600 070800 N36:40.26 W121:50.55  
 14\* 155700 070800 N36:39.87 W121:50.52  
 15C 155727 070800 N36:40.62 W121:49.78 0.75 mi. oil slick  
 16\* 155800 070800 N36:41.53 W121:48.78  
 25\* 155900 070800 N36:43.42 W121:48.38  
 26T.155901 070800 N36:43.43 W121:48.41 15  
 27V.155901 070800 N36:43.43 W121:48.41 p p g g  
 28P.155901 070800 N36:43.43 W121:48.41 kf sb tn  
 29A.155901 070800 N36:43.43 W121:48.41 500 100  
 30W.155901 070800 N36:43.43 W121:48.41 n 100 3 0 0  
 31\*.160000 070800 N36:43.32 W121:50.23  
 32S.160026 070800 N36:43.11 W121:51.01 25 kf -73 1 zc  
 1 kf 1 1 1 100  
 33W.160057 070800 N36:42.99 W121:51.88 n 100 3 0 0  
 34\*.160100 070800 N36:42.99 W121:51.93  
 36C.160138 070800 N36:42.98 W121:53.02 1 fi, 1 jelly shoal  
 37\*.160200 070800 N36:43.02 W121:53.64  
 38A.160237 070800 N36:42.93 W121:54.70 550 100  
 39\*.160300 070800 N36:42.94 W121:55.39  
 40\*.160400 070800 N36:42.94 W121:57.16  
 41C.160422 070800 N36:42.92 W121:57.83 500 shso  
 42C.160446 070800 N36:42.91 W121:58.51 1 research vessel (MacArthur)  
 43\*.160500 070800 N36:42.92 W121:58.90  
 44W.160536 070800 N36:42.92 W121:59.88 n 100 3 1 0  
 45C.160544 070800 N36:42.92 W122:00.12 350 shso  
 46\*.160600 070800 N36:42.94 W122:00.55  
 47C.160609 070800 N36:42.97 W122:00.89 1000 shso  
 48C.160642 070800 N36:43.01 W122:01.78 1500 shso  
 49\*.160700 070800 N36:43.00 W122:02.37  
 50C.160719 070800 N36:42.97 W122:02.90 1 albf  
 51\*.160800 070800 N36:43.00 W122:04.11  
 52W.160801 070800 N36:43.00 W122:04.11 n 100 3 0 0  
 53\*.160900 070800 N36:43.01 W122:05.82  
 54C.160933 070800 N36:42.97 W122:06.76 1 skua?  
 55\*.161000 070800 N36:42.98 W122:07.61  
 56\*.161100 070800 N36:42.98 W122:09.37  
 57O 161126 070800 N36:42.92 W122:10.08  
 58\* 161200 070800 N36:42.20 W122:10.55  
 59T.161220 070800 N36:41.89 W122:10.06 16  
 60V.161220 070800 N36:41.89 W122:10.06 g p g g  
 61P.161220 070800 N36:41.89 W122:10.06 kf sb tn  
 62A.161220 070800 N36:41.89 W122:10.06 550 100  
 63W.161220 070800 N36:41.89 W122:10.06 n 100 3 1 0  
 64\*.161300 070800 N36:42.02 W122:08.62  
 65W.161310 070800 N36:42.06 W122:08.23 n 100 3 0 0  
 66\*.161400 070800 N36:42.00 W122:06.32  
 67\*.161500 070800 N36:42.02 W122:03.99  
 68C.161525 070800 N36:42.05 W122:03.08 1 albf  
 69\*.161600 070800 N36:42.01 W122:01.78

70C.161656 070800 N36:42.01 W121:59.62 100 shso  
 71\*.161700 070800 N36:42.01 W121:59.45  
 72W.161756 070800 N36:41.97 W121:57.30 n 100 2 0 0  
 73\*.161800 070800 N36:41.97 W121:57.18  
 74W.161842 070800 N36:41.84 W121:55.49 n 100 3 0 0  
 75\*.161900 070800 N36:41.84 W121:54.89  
 76\*.162000 070800 N36:42.06 W121:52.59  
 77\*.162100 070800 N36:42.09 W121:50.41  
 78C.162117 070800 N36:41.94 W121:49.76 1 rec boat, 1 sail boat  
 79S.162119 070800 N36:41.92 W121:49.68 26 kf -52 1 pp  
     1 kf 1 1 1 100  
 80S.162129 070800 N36:41.86 W121:49.32 27 sb 68 2 el  
     1 sb 2 2 2 100  
 81O 162147 070800 N36:41.69 W121:48.64  
 82\*.162200 070800 N36:41.41 W121:48.38  
 83T.162222 070800 N36:41.11 W121:48.76 17  
 84V.162222 070800 N36:41.11 W121:48.76 g p g g tn  
 85P.162222 070800 N36:41.11 W121:48.76 kf sb  
 86A.162222 070800 N36:41.11 W121:48.76 550 100  
 87W.162222 070800 N36:41.11 W121:48.76 n 100 3 0 0  
 88C.162235 070800 N36:41.15 W121:49.13 2 rec. boat  
 89\*.162300 070800 N36:41.14 W121:49.82  
 90C.162318 070800 N36:41.08 W121:50.40 2 sm fi  
 91\*.162400 070800 N36:40.97 W121:51.56  
 92\*.162500 070800 N36:41.01 W121:53.30  
 93\*.162600 070800 N36:40.96 W121:55.03  
 94C.162645 070800 N36:40.90 W121:56.38 1 lg fi  
 95\*.162700 070800 N36:40.92 W121:56.86  
 96S.162703 070800 N36:40.93 W121:56.98 28 kf -37 1 ba  
     1 kf 1 1 1 100  
 97\*.162800 070800 N36:41.10 W121:58.62  
 98\*.162900 070800 N36:40.90 W122:00.34  
 99C.162939 070800 N36:40.76 W122:01.54 1 albf  
 100\*.163000 070800 N36:40.78 W122:02.12  
 101\*.163100 070800 N36:40.93 W122:03.78  
 102\*.163200 070800 N36:41.00 W122:05.56  
 103\*.163300 070800 N36:40.99 W122:07.30  
 104W.163345 070800 N36:41.04 W122:08.63 n 100 3 1 0  
 105\*.163400 070800 N36:41.01 W122:09.05  
 106S.163433 070800 N36:40.92 W122:10.02 29 sb 44 1 zc  
     1 sb 1 1 1 100  
 107O 163445 070800 N36:40.92 W122:10.35  
 108\*.163500 070800 N36:40.79 W122:10.67  
 109C.163515 070800 N36:40.33 W122:10.84 1 albf  
 110T.163546 070800 N36:39.80 W122:10.22 18  
 111V.163546 070800 N36:39.80 W122:10.22 g p g g tn  
 112P.163546 070800 N36:39.80 W122:10.22 kf sb  
 113A.163546 070800 N36:39.80 W122:10.22 550 100  
 114W.163546 070800 N36:39.80 W122:10.22 n 100 3 0 0  
 115\*.163600 070800 N36:39.83 W122:09.64  
 116\*.163700 070800 N36:40.06 W122:07.51  
 117C.163756 070800 N36:40.03 W122:05.38 1 mola  
 118\*.163800 070800 N36:40.02 W122:05.22  
 119\*.163900 070800 N36:40.00 W122:03.02  
 120C.163910 070800 N36:40.03 W122:02.59 4 albf  
 121\*.164000 070800 N36:39.96 W122:00.71  
 122C.164040 070800 N36:40.00 W121:59.21 50 shso  
 123\*.164100 070800 N36:39.98 W121:58.49  
 124\*.164200 070800 N36:39.86 W121:56.30  
 125\*.164300 070800 N36:40.01 W121:53.99  
 126\*.164400 070800 N36:39.96 W121:51.75  
 127W.164415 070800 N36:39.93 W121:51.21 n 100 4 0 0  
 128S.164444 070800 N36:39.92 W121:50.16 30 sb 64 1 zc  
     1 sb 1 1 1 100

129\*.164500 070800 N36:39.95 W121:49.55  
 130S.164508 070800 N36:39.95 W121:49.29 31 kf -46 1 pp  
     1 kf 1 1 1 100  
 131O 164514 070800 N36:39.93 W121:49.04  
 132\* 164600 070800 N36:39.13 W121:49.28  
 133T.164612 070800 N36:39.07 W121:49.67 19  
 134V.164612 070800 N36:39.07 W121:49.67 g p g g  
 135P.164612 070800 N36:39.07 W121:49.67 kf sb tn  
 136A.164612 070800 N36:39.07 W121:49.67 550 100  
 137W.164612 070800 N36:39.07 W121:49.67 n 90 4 0 0  
 138C.164635 070800 N36:39.09 W121:50.34 2 med fi  
 139\*.164700 070800 N36:39.05 W121:51.08  
 140C.164718 070800 N36:39.01 W121:51.65 1 sm fi  
 141C.164740 070800 N36:38.98 W121:52.27 2 sm fi  
 142C.164748 070800 N36:38.97 W121:52.47 1 sm fi  
 143C.164756 070800 N36:38.97 W121:52.74 1 sm fi  
 144\*.164800 070800 N36:38.97 W121:52.80  
 145C.164803 070800 N36:38.98 W121:52.92 1 lg fi  
 146C.164809 070800 N36:38.98 W121:53.10 4 sm fi  
 147C.164826 070800 N36:38.99 W121:53.54 2 sm, 3 lg fi  
 148\*.164900 070800 N36:38.98 W121:54.50  
 149C.164910 070800 N36:38.99 W121:54.75 2 sm fi  
 150W.164949 070800 N36:39.07 W121:55.99 n 100 3 0 0  
 151\*.165000 070800 N36:39.02 W121:56.29  
 152C.165005 070800 N36:39.00 W121:56.41 2 sm, 1 md fi  
 153C.165019 070800 N36:38.92 W121:56.86 4 zc on the red pinos buoy  
 154\*.165100 070800 N36:38.85 W121:58.03  
 155S.165139 070800 N36:38.99 W121:59.14 32 sb 50 1 sw  
     1 sb 1 1 1 100  
 156E 165141 070800 N36:39.00 W121:59.20  
 157\* 165200 070800 N36:39.35 W121:59.35  
 160\* 165300 070800 N36:39.01 W121:59.33  
 161\* 165400 070800 N36:39.41 W121:58.28  
 162\* 165500 070800 N36:39.04 W121:59.39  
 163\* 165600 070800 N36:39.07 W121:58.08  
 166\* 165700 070800 N36:39.14 W121:59.60  
 167C 165722 070800 N36:38.77 W121:59.18 sw, possible ziphius  
 168\* 165800 070800 N36:39.29 W121:59.30  
 169\* 165900 070800 N36:39.32 W121:58.93  
 170\* 170000 070800 N36:39.20 W121:57.92  
 171\* 170100 070800 N36:38.48 W121:58.23  
 172R.170143 070800 N36:39.15 W121:57.86  
 173\*.170200 070800 N36:39.02 W121:58.35  
 174\*.170300 070800 N36:39.08 W122:00.15  
 175C.170336 070800 N36:39.07 W122:01.21 1 albf  
 176C.170349 070800 N36:39.01 W122:01.58 1 albf  
 177\*.170400 070800 N36:38.98 W122:01.82  
 178\*.170500 070800 N36:38.96 W122:03.70  
 179C.170504 070800 N36:38.96 W122:03.80 1 albf  
 180\*.170600 070800 N36:38.98 W122:05.60  
 181\*.170700 070800 N36:39.00 W122:07.39  
 182V.170701 070800 N36:39.00 W122:07.39 p p g g  
 183S.170721 070800 N36:39.00 W122:08.00 33 sb 45 1 zc  
     1 sb 1 1 1 100  
 184\*.170800 070800 N36:38.96 W122:09.08  
 185S.170816 070800 N36:38.96 W122:09.55 34 kf -83 35 lo dd  
     1 kf 35 50 28 71 29  
 186E 170833 070800 N36:38.95 W122:10.01  
 187\* 170900 070800 N36:38.45 W122:09.98  
 188C 171000 070800 N36:38.69 W122:09.98 Initially saw two small groups of DD;  
 188C 171000 070800 N36:38.69 W122:09.98 thoracic patch, beak and shape clearly visible  
 188C 171000 070800 N36:38.69 W122:09.98 light very bad so could only see straight down  
 188C 171000 070800 N36:38.69 W122:09.98 Upon recircle found only scattered Lags.  
 189\* 171100 070800 N36:39.10 W122:09.41

190\* 171200 070800 N36:39.10 W122:08.88  
 191\* 171300 070800 N36:38.52 W122:08.87  
 192\* 171400 070800 N36:38.74 W122:08.20  
 193\* 171500 070800 N36:39.06 W122:07.67  
 194R.171508 070800 N36:39.04 W122:07.94  
 195\*.171600 070800 N36:39.01 W122:09.40  
 196O 171634 070800 N36:38.98 W122:10.36  
 197\* 171700 070800 N36:38.46 W122:10.78  
 198T.171730 070800 N36:37.82 W122:10.06 20  
 199V.171730 070800 N36:37.82 W122:10.06 p p g p tn  
 200P.171730 070800 N36:37.82 W122:10.06 kf sb  
 201A.171730 070800 N36:37.82 W122:10.06 550 100  
 202W.171730 070800 N36:37.82 W122:10.06 n 100 3 0 0  
 203\*.171800 070800 N36:37.89 W122:08.95  
 204S.171841 070800 N36:37.99 W122:07.46 35 sb 56 1 zc  
 1 sb 1 1 1 100  
 205\*.171900 070800 N36:38.01 W122:06.70  
 206\*.172000 070800 N36:38.02 W122:04.48  
 207S.172014 070800 N36:38.01 W122:03.94 36 kf -31 1 ma  
 1 kf 1 1 1 100  
 208S.172032 070800 N36:37.97 W122:03.28 37 kf -47 5 pd  
 1 kf 5 5 4 100  
 209S.172045 070800 N36:37.96 W122:02.86 38 sb 76 3 lo mn  
 1 sb 54 74 44 98 2  
 210E 172046 070800 N36:37.96 W122:02.79  
 213\* 172200 070800 N36:37.75 W122:00.29  
 214\* 172300 070800 N36:38.04 W122:01.65  
 215\* 172400 070800 N36:38.20 W122:01.67  
 217\* 172500 070800 N36:37.89 W122:01.18  
 218C 172514 070800 N36:37.91 W122:00.73 50 lo, 1 mn  
 219C 172542 070800 N36:37.96 W121:59.78 forgot to go offline during last circle, sorry-ok  
 220\* 172600 070800 N36:38.01 W121:59.11  
 221V 172655 070800 N36:37.98 W121:57.16 g p g p  
 222\* 172700 070800 N36:37.99 W121:56.94  
 223O 172714 070800 N36:38.03 W121:56.48  
 224R.172740 070800 N36:38.14 W121:55.49  
 225W.172750 070800 N36:38.13 W121:55.17 n 100 2 0 0  
 226V.172757 070800 N36:38.11 W121:54.89 g g g p  
 227\*.172800 070800 N36:38.10 W121:54.81  
 228C.172817 070800 N36:38.03 W121:54.19 1 sm fi  
 229W.172829 070800 N36:37.98 W121:53.71 n 100 3 0 0  
 230C.172836 070800 N36:37.95 W121:53.48 1 md fi  
 231\*.172900 070800 N36:37.90 W121:52.57  
 232C.172930 070800 N36:37.95 W121:51.44 3 md, 2 sm fi  
 233C.172946 070800 N36:37.99 W121:50.86 1 md fi, 1 sm fi  
 234C.172953 070800 N36:38.02 W121:50.55 1 md fi  
 235\*.173000 070800 N36:38.04 W121:50.40  
 236O 173004 070800 N36:38.06 W121:50.21  
 237C 173100 070800 N36:38.23 W121:50.52 Light getting low -- ending survey for today  
 237\* 173100 070800 N36:38.23 W121:50.52  
 238\* 173200 070800 N36:36.40 W121:50.44

DAVIDSON SEAMOUNT SURVEY:

3C 133600 071200 N36:31.34 W122:03.41 DAVIDSON SEAMOUNT SURVEY  
 4\* 133700 071200 N36:29.67 W122:04.91  
 5C 133727 071200 N36:29.01 W122:05.87 heading out to Davidson Seamount  
 6C 133739 071200 N36:28.72 W122:06.33 saw 6-7 humpbacks off Cypress Pt.  
 7\* 133800 071200 N36:28.27 W122:07.02  
 8C 133812 071200 N36:27.96 W122:07.37 Stori picked up 2 seals  
 9\* 133900 071200 N36:26.64 W122:08.68  
 10\* 134000 071200 N36:24.83 W122:10.19  
 11\* 134100 071200 N36:23.08 W122:11.46  
 12\* 134200 071200 N36:21.50 W122:13.43  
 17\* 134300 071200 N36:20.10 W122:15.34  
 18\* 134400 071200 N36:18.79 W122:16.81  
 23\* 134500 071200 N36:17.51 W122:18.27  
 24\* 134600 071200 N36:15.95 W122:19.80  
 25\* 134700 071200 N36:14.32 W122:21.46  
 26\* 134800 071200 N36:12.64 W122:23.31  
 27\* 134900 071200 N36:10.91 W122:25.05  
 28\* 135000 071200 N36:09.04 W122:26.75  
 33\* 135100 071200 N36:07.28 W122:28.35  
 34\* 135200 071200 N36:05.52 W122:30.16  
 35\* 135300 071200 N36:03.40 W122:30.46  
 36\* 135400 071200 N36:01.25 W122:29.92  
 37\* 135500 071200 N35:58.98 W122:30.05  
 38\* 135600 071200 N35:56.76 W122:30.07  
 39\* 135700 071200 N35:54.54 W122:30.05  
 40\* 135800 071200 N35:52.82 W122:29.97  
 41\* 135900 071200 N35:51.18 W122:29.87  
 42T.135956 071200 N35:50.19 W122:30.79 D1  
 43V.135956 071200 N35:50.19 W122:30.79 60 30  
 44P.135956 071200 N35:50.19 W122:30.79 SB KF SO  
 45A.135956 071200 N35:50.19 W122:30.79 700 100  
 46W.135956 071200 N35:50.19 W122:30.79 N 90 3 O  
 47\*.140000 071200 N35:50.24 W122:30.90  
 48\*.140100 071200 N35:51.33 W122:32.78  
 49C.140104 071200 N35:51.42 W122:32.92 LIGHT CLOUD COVER, LETTING LIGHT THROUGH  
 50\*.140200 071200 N35:52.35 W122:34.74  
 51\*.140300 071200 N35:53.33 W122:36.79  
 52\*.140400 071200 N35:54.35 W122:38.69  
 53\*.140500 071200 N35:55.32 W122:40.69  
 540 140541 071200 N35:56.02 W122:42.08  
 55\* 140600 071200 N35:56.15 W122:42.76  
 56\* 140700 071200 N35:54.84 W122:43.55  
 57T.140749 071200 N35:53.57 W122:43.46 D2  
 58V.140749 071200 N35:53.57 W122:43.46 30 50  
 59P.140749 071200 N35:53.57 W122:43.46 SB KF SO  
 60A.140749 071200 N35:53.57 W122:43.46 700 100  
 61W.140749 071200 N35:53.57 W122:43.46 N 90 3 O  
 62\*.140800 071200 N35:53.45 W122:43.18  
 63\*.140900 071200 N35:52.51 W122:41.57  
 64\*.141000 071200 N35:51.51 W122:39.93  
 65\*.141100 071200 N35:50.55 W122:38.15  
 66\*.141200 071200 N35:49.62 W122:36.46  
 67\*.141300 071200 N35:48.69 W122:34.71  
 68\*.141400 071200 N35:47.82 W122:32.89  
 690 141429 071200 N35:47.31 W122:32.01  
 70\* 141500 071200 N35:46.61 W122:31.71  
 71\* 141600 071200 N35:45.28 W122:33.09  
 72\* 141700 071200 N35:44.71 W122:34.88  
 73T.141700 071200 N35:44.76 W122:34.95 D3  
 74V.141700 071200 N35:44.76 W122:34.95 60 30  
 75P.141700 071200 N35:44.76 W122:34.95 SB KF SO  
 76A.141700 071200 N35:44.76 W122:34.95 700 100  
 77W.141700 071200 N35:44.76 W122:34.95 N 90 3 O

78C.141727 071200 N35:45.31 W122:35.71 TANKER JUST SOUTH OF STUDY AREA  
 79\*.141800 071200 N35:46.01 W122:36.73  
 80\*.141900 071200 N35:47.11 W122:38.66  
 81\*.142000 071200 N35:48.18 W122:40.76  
 82\*.142100 071200 N35:49.26 W122:42.77  
 83\*.142200 071200 N35:50.19 W122:44.78  
 84O 142230 071200 N35:50.68 W122:45.89  
 85\* 142300 071200 N35:50.72 W122:46.99  
 86\* 142400 071200 N35:49.17 W122:47.69  
 87T.142443 071200 N35:48.08 W122:47.46 D4  
 88V.142443 071200 N35:48.08 W122:47.46 10 40  
 89P.142443 071200 N35:48.08 W122:47.46 SB KF SO  
 90A.142443 071200 N35:48.08 W122:47.46 700 100  
 91W.142443 071200 N35:48.08 W122:47.46 N 90 3 O  
 92\*.142500 071200 N35:47.90 W122:46.89  
 93\*.142600 071200 N35:47.00 W122:45.14  
 94\*.142700 071200 N35:46.09 W122:43.37  
 95\*.142800 071200 N35:45.16 W122:41.59  
 96\*.142900 071200 N35:44.21 W122:39.78  
 97C.142914 071200 N35:43.98 W122:39.36 OVERCAST THICKER, DARKER NOW  
 98C.142928 071200 N35:43.76 W122:38.99 PIECE OF KELP!  
 99S.142938 071200 N35:43.61 W122:38.71 1 SB 33 Y GG  
 1 sb 49 50 48 100  
 100\*.143000 071200 N35:43.60 W122:38.04  
 101E 143028 071200 N35:44.21 W122:38.67  
 102\*.143100 071200 N35:43.62 W122:38.80  
 103\*.143200 071200 N35:44.24 W122:38.91  
 104R.143251 071200 N35:43.51 W122:38.26  
 105\*.143300 071200 N35:43.37 W122:38.03  
 106C.143319 071200 N35:43.07 W122:37.56 50/48/49 SIGHTING 1, GG  
 107\*.143400 071200 N35:42.44 W122:36.48  
 108O 143414 071200 N35:42.27 W122:36.15  
 109\*.143500 071200 N35:41.30 W122:35.85  
 110\*.143600 071200 N35:39.91 W122:36.79  
 111T.143657 071200 N35:39.36 W122:38.37 D5  
 112V.143657 071200 N35:39.36 W122:38.37 60 25  
 113P.143657 071200 N35:39.36 W122:38.37 SB KF SO  
 114A.143657 071200 N35:39.36 W122:38.37 700 100  
 115W.143657 071200 N35:39.36 W122:38.37 N 90 3 O  
 116\*.143700 071200 N35:39.36 W122:38.37  
 117\*.143800 071200 N35:40.50 W122:40.27  
 118\*.143900 071200 N35:41.51 W122:42.23  
 119\*.144000 071200 N35:42.63 W122:44.10  
 120\*.144100 071200 N35:43.78 W122:45.90  
 121\*.144200 071200 N35:44.82 W122:47.90  
 122W.144236 071200 N35:45.42 W122:49.10 N 90 2 O  
 123O 144246 071200 N35:45.57 W122:49.42  
 124\*.144300 071200 N35:45.75 W122:49.87  
 125\*.144400 071200 N35:44.64 W122:50.96  
 126T.144459 071200 N35:43.16 W122:50.98 D6  
 127V.144459 071200 N35:43.16 W122:50.98 30 50  
 128P.144459 071200 N35:43.16 W122:50.98 SB KF SO  
 129A.144459 071200 N35:43.16 W122:50.98 700 100  
 130W.144459 071200 N35:43.16 W122:50.98 N 90 2 O  
 136\*.144500 071200 N35:43.16 W122:50.98  
 147\*.144600 071200 N35:42.25 W122:49.22  
 148\*.144700 071200 N35:41.22 W122:47.65  
 150W.144726 071200 N35:40.81 W122:46.91 N 90 3 O  
 151\*.144800 071200 N35:40.22 W122:46.05  
 152\*.144900 071200 N35:39.29 W122:44.25  
 153\*.145000 071200 N35:38.37 W122:42.57  
 154\*.145100 071200 N35:37.53 W122:40.81  
 155O 145130 071200 N35:37.13 W122:39.96  
 156\*.145200 071200 N35:36.45 W122:39.48  
 157\*.145300 071200 N35:35.18 W122:40.64  
 158T.145347 071200 N35:34.62 W122:41.78 D7

159V.145347 071200 N35:34.62 W122:41.78 60 25  
 160P.145347 071200 N35:34.62 W122:41.78 SB KF SO  
 161A.145347 071200 N35:34.62 W122:41.78 700 100  
 162W.145347 071200 N35:34.62 W122:41.78 N 95 3 O  
 163\*.145400 071200 N35:34.89 W122:42.15  
 164\*.145500 071200 N35:35.78 W122:44.10  
 165W.145504 071200 N35:35.85 W122:44.25 N 95 2 O  
 166\*.145600 071200 N35:36.75 W122:46.02  
 167C.145602 071200 N35:36.77 W122:46.06 SAILBOAT OFF LEFT SIDE  
 168V.145610 071200 N35:36.93 W122:46.37 40 25  
 169\*.145700 071200 N35:37.74 W122:47.81  
 170\*.145800 071200 N35:38.66 W122:49.79  
 171\*.145900 071200 N35:39.63 W122:51.66  
 172O 145952 071200 N35:40.38 W122:53.38  
 173C 145957 071200 N35:40.42 W122:53.50 FISHING VESSEL 1-2 MILES NORTH OF PLANE  
 174\*.150000 071200 N35:40.44 W122:53.62  
 175\*.150100 071200 N35:39.48 W122:55.10  
 176\*.150200 071200 N35:37.96 W122:56.08  
 177\*.150300 071200 N35:38.75 W122:57.20  
 178T.150348 071200 N35:38.06 W122:55.79 D8  
 179V.150348 071200 N35:38.06 W122:55.79 20 40  
 180P.150348 071200 N35:38.06 W122:55.79 SB KF SO  
 181A.150348 071200 N35:38.06 W122:55.79 700 100  
 182W.150348 071200 N35:38.06 W122:55.79 N 100 2 O  
 183\*.150400 071200 N35:37.86 W122:55.41  
 185C.150425 071200 N35:37.48 W122:54.67 ALBF, 1  
 186\*.150500 071200 N35:36.96 W122:53.61  
 187W.150504 071200 N35:36.85 W122:53.40 N 100 3 O  
 188C.150509 071200 N35:36.78 W122:53.27 1 MOLA  
 189W.150558 071200 N35:36.07 W122:51.84 N 100 2 O  
 190\*.150600 071200 N35:36.03 W122:51.77  
 191C.150651 071200 N35:35.30 W122:50.33 LITTLE WHITE DOT JELLIES  
 192\*.150700 071200 N35:35.18 W122:50.07  
 193C.150707 071200 N35:35.09 W122:49.88 SAME SAIL BOAT - closer now  
 194C.150758 071200 N35:34.32 W122:48.39 OIL SLICK, SHIP BILGE (SMALL)  
 195\*.150800 071200 N35:34.30 W122:48.35  
 196\*.150900 071200 N35:33.40 W122:46.62  
 197\*.151000 071200 N35:32.52 W122:44.87  
 198W.151003 071200 N35:32.46 W122:44.77 N 100 2 O  
 199O 151044 071200 N35:31.89 W122:43.45  
 200\*.151100 071200 N35:31.63 W122:42.97  
 201\*.151200 071200 N35:30.21 W122:43.73  
 202\*.151300 071200 N35:29.31 W122:45.27  
 203T.151303 071200 N35:29.42 W122:45.44 D9  
 204V.151303 071200 N35:29.42 W122:45.44 40 30  
 205P.151303 071200 N35:29.42 W122:45.44 SB KF SO  
 206A.151303 071200 N35:29.42 W122:45.44 700 100  
 207W.151303 071200 N35:29.42 W122:45.44 N 95 2 O  
 208\*.151400 071200 N35:30.25 W122:47.14  
 209\*.151500 071200 N35:31.17 W122:49.09  
 210\*.151600 071200 N35:32.20 W122:51.03  
 211\*.151700 071200 N35:33.13 W122:52.90  
 212C.151757 071200 N35:34.06 W122:54.73 TERN, POSSIBLY ARCTIC OR COMMON- LIGHT COLOR  
 213\*.151800 071200 N35:34.11 W122:54.84  
 214\*.151900 071200 N35:35.05 W122:56.69  
 215O 151901 071200 N35:35.07 W122:56.72  
 216\*.152000 071200 N35:36.23 W122:57.01  
 217C 152008 071200 N35:36.17 W122:56.62 DONE WITH DAVIDSON SURVEY! NICE CONDITIONS OUT HERE  
 218C 152030 071200 N35:36.06 W122:55.81 HEADING TO COAST TO LISTEN FOR STORI'S HARBOR SEALS  
 219\*.152100 071200 N35:35.84 W122:54.66  
 220\*.152200 071200 N35:35.42 W122:52.07  
 221\*.152300 071200 N35:35.09 W122:49.28  
 222\*.152400 071200 N35:34.96 W122:46.53  
 223\*.152500 071200 N35:34.77 W122:43.71  
 224\*.152600 071200 N35:34.60 W122:40.89  
 225\*.152700 071200 N35:34.36 W122:38.19

226\* 152800 071200 N35:34.12 W122:35.39  
 227\* 152900 071200 N35:33.95 W122:32.57  
 228\* 153000 071200 N35:33.57 W122:29.89  
 229\* 153100 071200 N35:33.82 W122:27.06  
 230\* 153200 071200 N35:34.05 W122:24.33  
 231\* 153300 071200 N35:34.30 W122:21.50  
 232\* 153400 071200 N35:34.54 W122:18.66  
 233\* 153500 071200 N35:34.80 W122:15.82  
 234\* 153600 071200 N35:34.97 W122:12.99  
 235\* 153700 071200 N35:35.29 W122:10.20  
 236\* 153800 071200 N35:35.57 W122:07.38  
 237\* 153900 071200 N35:35.77 W122:04.61  
 238\* 154000 071200 N35:35.98 W122:01.81  
 239\* 154100 071200 N35:36.14 W121:59.01  
 240\* 154200 071200 N35:36.70 W121:56.16  
 241\* 154300 071200 N35:37.21 W121:53.48  
 242\* 154400 071200 N35:36.89 W121:50.69  
 243\* 154500 071200 N35:36.23 W121:48.13  
 244\* 154600 071200 N35:36.43 W121:45.25  
 245\* 154700 071200 N35:37.39 W121:42.61  
 246C 154753 071200 N35:38.56 W121:40.43 SKSP, MOLA  
 246C 154753 071200 N35:38.56 W121:40.43 SEARCHING OFF TRANSECT (LITTLE R EFFORT)  
 247\* 154800 071200 N35:38.67 W121:40.23  
 247\* 154800 071200 N35:38.67 W121:40.23  
 248C 154820 071200 N35:39.13 W121:39.46 JELLIES  
 249C 154839 071200 N35:39.63 W121:38.71 BROWN ONES, CHRYSURA  
 250\* 154900 071200 N35:40.18 W121:37.93  
 251C 154958 071200 N35:41.71 W121:35.89 MOLA  
 252\* 155000 071200 N35:41.77 W121:35.81  
 253W 155022 071200 N35:42.33 W121:35.09 N 95 2 1  
 254S 155037 071200 N35:42.77 W121:34.51 3 SB O ZC  
     1 sb 1 1 1 100  
 256\* 155100 071200 N35:43.37 W121:33.68  
 257\* 155200 071200 N35:45.02 W121:31.38  
 258S 155204 071200 N35:45.10 W121:31.25 4 SB O ZC  
     1 sb 1 1 1 100  
 259\* 155300 071200 N35:46.49 W121:29.01  
 260S 155309 071200 N35:46.70 W121:28.61 5 kf O lb zc mn lo  
     1 kf 578 674 550 90 7 .5 2.5  
 262\* 155400 071200 N35:45.94 W121:28.35  
 263C 155406 071200 N35:46.16 W121:28.49 mola  
 264S 155446 071200 N35:47.17 W121:29.49 6 kf O pv  
     1 kf 2 2 2 100  
 264C 155446 071200 N35:47.17 W121:29.49 pv with orange on head  
 265\* 155500 071200 N35:46.80 W121:29.56  
 266\* 155600 071200 N35:46.65 W121:28.51  
 267\* 155700 071200 N35:46.43 W121:30.78  
 268\* 155800 071200 N35:47.06 W121:29.36  
 269\* 155900 071200 N35:46.90 W121:28.40  
 270\* 160000 071200 N35:47.45 W121:30.16  
 271\* 160100 071200 N35:46.18 W121:28.72  
 272C 160104 071200 N35:46.20 W121:28.56 busy area with large lb school, scattered zc,  
 273C 160126 071200 N35:46.76 W121:28.00 some lo, 2-4mn, lots of shso  
 274\* 160200 071200 N35:47.66 W121:27.30  
 275\* 160300 071200 N35:47.24 W121:28.80  
 276\* 160400 071200 N35:46.28 W121:29.20  
 279\* 160700 071200 N35:45.61 W121:29.04  
 280C 160746 071200 N35:46.45 W121:27.69 STORI HEARD A SIGNAL, BUT NOT SURE WHICH ANIMAL  
 281\* 160800 071200 N35:46.77 W121:27.30  
 282C 160858 071200 N35:48.10 W121:25.58 Si#5: LB 520/600/500, LO 15/20/12,  
 282C 160858 071200 N35:48.10 W121:25.58 MN 3/4/3, ZC 40/50/35; PV 2/2/2  
 283\* 160900 071200 N35:48.10 W121:25.58  
 284\* 161000 071200 N35:49.80 W121:25.58  
 285C 161022 071200 N35:50.52 W121:26.02 TROLLER  
 286C 161026 071200 N35:50.62 W121:26.07 ALSO HAD BLUE SHARKS  
 287W 161034 071200 N35:50.86 W121:26.19 N 95 2 2

288C 161037 071200 N35:50.96 W121:26.24 2 TROLLERS  
 289W 161044 071200 N35:51.22 W121:26.39 N 95 2 1  
 290\* 161100 071200 N35:51.60 W121:26.69  
 291C 161131 071200 N35:52.28 W121:27.56  
 292A 161135 071200 N35:52.35 W121:27.65 700 100  
 293\* 161200 071200 N35:52.94 W121:28.34  
 294\* 161300 071200 N35:54.88 W121:28.75  
 295\* 161400 071200 N35:56.66 W121:29.22  
 296\* 161500 071200 N35:58.51 W121:29.82  
 301\* 161600 071200 N36:00.08 W121:30.84  
 302\* 161700 071200 N36:00.80 W121:32.89  
 303\* 161800 071200 N36:01.50 W121:34.84  
 304\* 161900 071200 N36:03.26 W121:35.96  
 305\* 162000 071200 N36:04.96 W121:37.26  
 306\* 162100 071200 N36:06.72 W121:38.19  
 307\* 162200 071200 N36:08.33 W121:39.61  
 308\* 162300 071200 N36:09.75 W121:41.16  
 309\* 162400 071200 N36:11.06 W121:42.81  
 310\* 162500 071200 N36:12.12 W121:44.70  
 311\* 162600 071200 N36:13.17 W121:46.65  
 3C 162843 071200 N36:16.50 W121:46.65 accidentally unplugged computer. check BAK file-ok  
 4C 162848 071200 N36:16.50 W121:51.73 still listening for seals  
 5\* 162900 071200 N36:16.79 W121:52.12  
 6C 162919 071200 N36:17.22 W121:52.68 3 trollers, one whaler  
 7\* 163000 071200 N36:17.94 W121:53.94  
 8\* 163100 071200 N36:19.74 W121:54.11  
 9\* 163200 071200 N36:21.69 W121:54.67  
 10\* 163300 071200 N36:23.75 W121:55.01  
 11\* 163400 071200 N36:25.76 W121:55.62  
 12C 163416 071200 N36:26.36 W121:55.81 fishing boat offshore 1.5nmi  
 13S 163447 071200 N36:27.36 W121:56.20 1 kf o mn  
     1 kf 3 3 3 100  
 14\* 163500 071200 N36:27.74 W121:56.37  
 15\* 163600 071200 N36:29.63 W121:57.51  
 16S 163614 071200 N36:29.98 W121:57.87 2 kf o mn  
     1 kf 1 1 1 100  
 17C 163644 071200 N36:30.90 W121:58.46 off Pt Lobos  
 18\* 163700 071200 N36:31.35 W121:58.66  
 19S 163755 071200 N36:33.27 W121:58.85 3 kf o mn  
     1 kf 1 1 1 100  
 20\* 163800 071200 N36:33.42 W121:58.86  
 21C 163815 071200 N36:34.05 W121:58.85 troller  
 23\* 163900 071200 N36:35.56 W121:58.64  
 24C 163943 071200 N36:36.91 W121:57.70 no more seals heard  
 25\* 164000 071200 N36:37.37 W121:57.28

## Appendix 2 – Key to aerial survey data

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Data files collected during the MBNMS aerial surveys followed a format similar to that of NMFS/SWFSC ‘DAS’ files (Carretta and Forney 1993). Each data line begins with a sequential record number, followed by a single-character event code, time, date, latitude and longitude. Detailed information for each event is recorded in columns 40-80, as specified below.

<u>Column:</u>	<u>Description</u>
1-3	Line number
4	Event code (see below)
5	blank
6-11	time (HHMMSS)
12	blank
13-18	date (MMDDYY)
19	blank
20-28	latitude (NDD:MM.MM)
29	blank
30-39	longitude (WDDD:MM.MM)
40-44	
45-59	
60-64	
65-69	
70-74	
75-79	

} Individual data items, according to event code key below.

### Event code key:

Data relevant to each event code (column 4) are listed beginning in column 40, as follows:

Event Code	Event Description	Data Format	Key to data entries
T	Transect start		
40-44	Trans #	###	Transect number
V	Viewing Conditions		
	FINE-SCALE SURVEYS USE CATEGORICAL SCORES		
40-44	LtIns	#	Key: ('Ins': 90-35°, 'Out' <35° declination angle) e = excellent g = good p = poor o = off (too much glare to see)
45-49	LtOut	#	
50-54	Belly	#	
55-59	RtIns	#	
60-64	RtOut	#	
	ALL OTHER SURVEYS USE % GLARE IN ENTIRE VIEWING AREA		
40-44	LtFront	%%	
45-49	Belly		
50-54	RtFront	%%%	
55-59	LtRear		
60-64	RtRear		
P	Observer positions		
40-44	LeftFrnt	##	Observer initials: dh = Deirdre Hall jj = Jen Jolly sb = Scott Benson sw = Sarah Wilkin
45-49	Belly	##	
50-54	RightFrnt	##	
55-59	LeftRear		
60-64	RightRear		
65-69	Recorder	##	
A	Altitude and speed information		
40-44	Altitude	###	Altitude in feet
45-49	Speed	###	Airspeed in knots

## Appendix 2 – Key to aerial survey data

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W Weather & environment information  
40-44 HazeKelp # H=Haze, K=Kelp, R=Red Tide, N=None  
45-49 %Clouds %% % cloud cover over viewing area  
50-54 Beauf # Beaufort sea state (0-5)  
55-59 Jellifsh # Jellyfish (0=none, 1=few, 2=moderate, 3=lots)

S Marine mammal sighting information  
40-44 SightNum ### Sequential sighting number  
45-49 Observer ## Observer initials for sighting  
50-54 Angle (-)## Declination angle to sighting (left=negative)  
55-59 SiTyp ## Sighting type (P=primary, S=secondary)  
60-64 SpCode1 ## Species codes for  
65-69 SpCode2 ## up to four species  
70-74 SpCode3 ## in sighting (see  
75-79 SpCode4 ## Table 2 for codes)

1 Observer group size and species % estimates  
40-44 Observer ## Observer initials for estimates  
45-49 Best #### Best estimate of total group size  
50-54 High #### Maximum estimate of total group size  
55-59 Low ##### Minimum estimate of total group size  
60-64 SpPcnt1 %% Species percentages for  
65-69 SpPcnt2 %% up to four species in  
70-74 SpPcnt3 %% sighting. In same order  
75-79 SpPcnt4 %% as species codes in S line.

s Sighting position update (if animals re-sighted)  
40-44 SightNum ### Sighting number  
45-49 Angle (-)## Declination angle to sighting (left=negative)

t Turtle sighting information  
40-44 Observer ## Observer initials for sighting  
45-49 Angle (-)## Declination angle to sighting (left=negative)  
50-54 SpCode ## Turtle species code  
55-59 #Turt ## Number of turtles in sighting  
60-64 TvlDir ### Turtle travel direction (degrees, e.g., 90=East)  
65-69 Tail? ## Y=Tail, N=No tail, U=unknown/not visible

C Comment line  
40-80 any Any comment can be entered here.

O End transect

E Suspend survey effort (e.g., to circle)

R Resume survey effort

\* Automatic position recorded every minute

# Deleted event