



CRUISE REPORT ON RESEARCH ACTIVITY

M.V.SEAFDEC 2 Cruise No. 37-1/2011

3-28 July 2011

**National Research Survey by Department of Fisheries,
Brunei Darussalam**

TD/RP/167

This report is base on preliminary data

For readers who may need data in the report, please contact to:

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Survey Cruise Report

- 1. Cruise No.** : M.V. SEAFDEC2 No. 37-1/2011
- 2. Period** : 3-28 July 2011 (25 days)
- 3. Area of Operation** : Brunei Darussalam Waters
- 4. Port of Call** : Muara Fish Landing Complex (FLC)
Negara of Brunei Darussalam
- 5. Activities** : To facilitate on the national research survey conducted by Department of Fisheries, Brunei Darussalam on;
1. Demersal resources survey in Zone 2 by bottom trawl and Hydroacoustic instrument (Scientific Echo Sounder)
 2. Oceanographic survey by Integrated Conductivity Temperature and Depth, Temperature and Depth sensor and acoustic current indicator. Biological survey by Bongo net and Nueston net.
 3. Cetacean sighting

4. Report in General

Regarding to the dispute Sparty Isalands circumstance, the original plan of SEAFDEC2 Cruise No.37-1/2011, marine resource research survey for demersal and pelagic resources in Zone 3 and, 4 is terminated and rearranged by demersal research survey in Zone 2 within Waters of Brunei Darussalam. Twenty-four (24) survey stations has been reprogrammed to conduct the demersal resource survey by operating bottom trawl (otter-board trawl), hydroacoustic instrument (Scientific Echo Sounder) and Oceanographic survey within the continental shelf of Zone 2. Cruise survey is separated into 3 trips i.e. 1) Oceanographic and marine environmental survey is conducted from 8 to 12 July 2011. 2) Demersal resources survey in Zone 2 by bottom trawl is conducted from 16 to 19 July 2011, and 3) Special study

trip is arranged for Minister of Industry and Primary Resources (MIPR), Negara of Brunei Darussalam is conducted in 21 July 2011.

The first trip of oceanographic and marine environmental survey, from 8 to 12 July 2011, is completely conducted for 24 stations by using Integrated Conductivity Temperature and Depth, Temperature (ICTD), water samplings, acoustic current indicator, plankton-larvae sampling by Bongo net and Neuston net and sediment sampling by grab and core. Resources abundance information recorded by hydroacoustic equipment (Scientific Echo Sounder) is conducted during the route between survey stations.

The second trip of bottom trawl fishing operations is conducted from 16 to 19 July 2011. Nineteen (19) Otter-board trawl fishing operations are conducted during this trip. Resources abundance information recorded by hydroacoustic equipment (Scientific Echo Sounder) is conducted during trawl fishing operations. The second trip has been stopped by the trouble of hydraulic system, then M.V. SEAFDEC2 urgently to return to Muara FLC for repairing.

The third trip is special arranged for Minister of Industry and Primary Resources (MIPR), Brunei Darussalam. Cruise is conducted only day, in 21 July 2011. Oceanographic, marine environmental survey, scientific echo sounder and trawl fishing operation are demonstrated around the area of station survey No.19

Overall result from survey trips are twenty four (24) oceanographic survey operations by ICTD/CTD, Bongo net and Neuston net and sediment samplings. Nineteen (19) survey stations are conducted the demersal resources survey by otter-board trawl. Forty-four (44) tracks are recorded the resource abundance by hydroacoustic equipment (Scientific Echo Sounder). Results of catches, however, are not report as a part of fishing log. Data is available under the approval by Department of Fisheries, Negara of Brunei Darussalam.

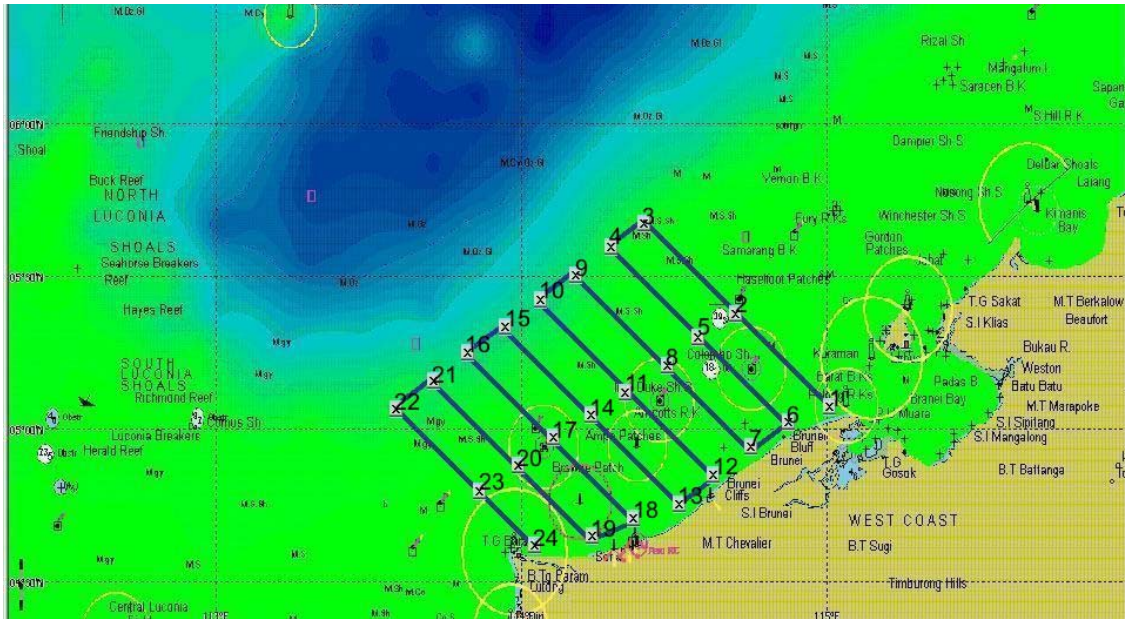


Fig. 1 Map of survey stations

| Station | Latitude | Longitude |
|---------|-----------|-------------|
| 1 | 04°42'.0N | 114°13'.20E |
| 2 | 04°47'.1N | 114°08'.1E |
| 3 | 04°53'.0N | 114°03'.0E |
| 4 | 04°54'.5N | 114°10'.5E |
| 5 | 04°49'.0N | 114°16'.2E |
| 6 | 04°43'.5N | 114°21'.5E |
| 7 | 04°46'.4N | 114°26'.5E |
| 8 | 04°51'.9N | 114°23'.1E |
| 9 | 04°58'.5N | 114°19'.0E |
| 10 | 05°01'.8N | 114°22'.8E |
| 11 | 04°56'.7N | 114°28'.5E |
| 12 | 04°53'.0N | 114°32'.0E |
| 13 | 04°57'.8N | 114°37'.5E |
| 14 | 05°02'.3N | 114°32'.5E |
| 15 | 05°06'.6N | 114°28'.8E |
| 16 | 05°08'.8N | 114°36'.0E |
| 17 | 05°03'.2N | 114°41'.5E |
| 18 | 04°58'.8N | 114°46'.2E |
| 19 | 05°03'.4N | 114°52'.5E |
| 20 | 05°06'.9N | 114°48'.0E |
| 21 | 05°15'.0N | 114°40'.2E |
| 22 | 05°18'.0N | 114°46'.8E |
| 23 | 05°12'.3N | 114°52'.5E |
| 24 | 05°09'.5N | 114°55'.5E |

Table 1 Survey Station of Trip 1, 2 around area of Zone 2

Report on Bottom Trawl

Nineteen (19) otter-board trawl fishing operations are conducted during the second trip of cruise M.V. SEAFDEC 2 No.37-1/2011, 16-19 June 2011. Depth ranges of capture is along continental shelf around zone 2, is from 20 to 60 m. Bottom trawl at stations No. 19, 20 and 23 are cancelled because trouble on the hydraulic system failure. Stations No.1 and 2 are closed to area SOUTHWEST AMPA oilfield, what prohibited to all fishing activities, has been cancelled also.

Towing time is limited as 30 minutes/operation. Total towing time is 570 minute with towing distance is 29.6 nm and approximately swept area 590 sq.m.

Result of catch included with catch per unit effort, species composition and abundance is not present in cruise report. Anyone who wish to know the details please kindly contact department of Fisheries (DOF) Brunei Darussalam or Capture Fisheries Technology Division, SEAFDEC/TD.

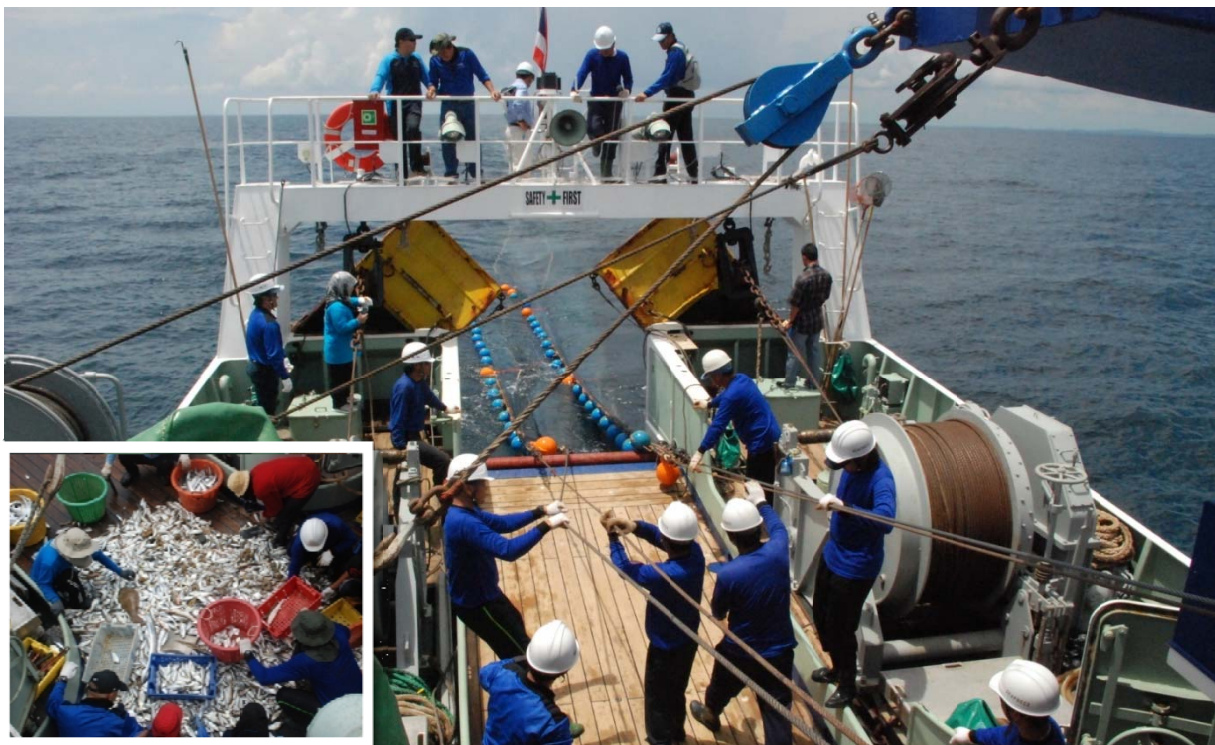


Figure 2 Bottom trawl fishing operation

Table 2 Summary of otter board trawl fishing operations

| Operation No. | Station No. | Time | Start location | | Finish location | | Time | Start location | | Finish location | | Sea depth (m) | Towing | | | |
|---------------|-------------|------|----------------|------------|-----------------|-----------|------------|----------------|-----------|-----------------|---------------|---------------|------------|----|----|-----|
| | | | Latitude | Longitude | Latitude | Longitude | | Latitude | Longitude | Time (min) | Distance (km) | | | | | |
| 1 | 23 | 1002 | 05_14.50N | 114_51.00E | 1002 | 05_15.50N | 114_51.20E | 1112 | 05_12.10N | 114_51.40E | 1150 | 05_11.50N | 114_51.20E | 45 | 30 | 1.4 |
| 2 | 22 | 1005 | 05_17.50N | 114_45.40E | 1040 | 05_18.10N | 114_46.20E | 1410 | 05_18.00N | 114_47.50E | 1400 | 05_18.40N | 114_47.50E | 51 | 30 | 1.4 |
| 3 | 21 | 1008 | 05_14.80N | 114_57.50E | 1003 | 05_14.80N | 114_58.00E | 1000 | 05_14.70N | 114_49.10E | 1000 | 05_15.20N | 114_49.50E | 54 | 30 | 1.5 |
| 4 | 16 | 1000 | 05_07.20N | 114_57.40E | 1005 | 05_08.50N | 114_56.80E | 1005 | 05_08.10N | 114_55.80E | 1005 | 05_08.00N | 114_56.70E | 57 | 30 | 1.5 |
| 5 | 3 | 0905 | 04_51.50N | 114_02.20E | 0908 | 04_52.50N | 114_03.10E | 0908 | 04_54.00N | 114_04.00E | 0920 | 04_55.20N | 114_04.00E | 58 | 30 | 1.7 |
| 6 | 4 | 0905 | 04_51.40N | 114_11.40E | 0910 | 04_52.20N | 114_11.40E | 0910 | 04_54.00N | 114_14.20E | 0902 | 04_54.00N | 114_11.50E | 48 | 30 | 1.8 |
| 7 | 5 | 1000 | 04_46.80N | 114_17.10E | 1002 | 04_48.50N | 114_16.80E | 1122 | 04_48.20N | 114_16.80E | 1150 | 04_48.50N | 114_16.70E | 55 | 30 | 1.6 |
| 8 | 6 | 1005 | 04_48.50N | 114_21.80E | 1006 | 04_48.20N | 114_21.80E | 1046 | 04_48.50N | 114_21.80E | 1400 | 04_48.50N | 114_22.40E | 55 | 30 | 1.6 |
| 9 | 7 | 1007 | 04_48.50N | 114_27.00E | 1008 | 04_48.50N | 114_27.40E | 1008 | 04_48.50N | 114_28.80E | 1007 | 04_48.50N | 114_28.50E | 52 | 30 | 1.6 |
| 10 | 8 | 1005 | 04_52.80N | 114_23.50E | 1005 | 04_52.50N | 114_24.00E | 1005 | 04_52.50N | 114_23.10E | 1000 | 04_52.50N | 114_23.50E | 28 | 30 | 1.5 |
| 11 | 9 | 0900 | 04_57.10N | 114_16.20E | 0906 | 04_57.70N | 114_16.80E | 0906 | 04_58.00N | 114_17.80E | 0908 | 04_58.20N | 114_18.50E | 51 | 30 | 1.6 |
| 12 | 10 | 0905 | 05_01.20N | 114_16.20E | 0908 | 05_02.00N | 114_23.00E | 0908 | 05_02.40N | 114_23.00E | 0907 | 05_02.50N | 114_24.00E | 36 | 30 | 1.6 |
| 13 | 15 | 0907 | 05_11.10N | 114_20.40E | 1002 | 05_09.50N | 114_30.00E | 1042 | 05_08.10N | 114_28.20E | 1102 | 05_07.50N | 114_28.40E | 56 | 30 | 1.6 |
| 14 | 14 | 1102 | 05_02.50N | 114_28.80E | 1205 | 05_02.50N | 114_30.1E | 1205 | 05_02.50N | 114_31.00E | 1200 | 05_02.50N | 114_31.50E | 37 | 30 | 1.6 |
| 15 | 11 | 1001 | 04_57.50N | 114_28.50E | 1044 | 04_58.50N | 114_28.00E | 1414 | 04_58.20N | 114_30.00E | 1400 | 04_58.50N | 114_30.50E | 51 | 30 | 1.6 |
| 16 | 12 | 1002 | 04_58.10N | 114_31.80E | 1004 | 04_58.40N | 114_32.50E | 1004 | 04_58.10N | 114_32.00E | 1008 | 04_58.50N | 114_31.70E | 25 | 30 | 1.5 |
| 17 | 15 | 1000 | 04_58.50N | 114_41.80E | 1002 | 04_58.50N | 114_34.80E | 1002 | 04_58.50N | 114_34.80E | 1000 | 04_58.50N | 114_35.20E | 27 | 30 | 1.6 |
| 18 | 17 | 0900 | 05_02.70N | 114_41.80E | 0900 | 05_02.50N | 114_42.20E | 0910 | 05_02.10N | 114_41.80E | 0940 | 05_02.50N | 114_41.50E | 38 | 30 | 1.4 |
| 19 | 18 | 0905 | 05_02.50N | 114_48.70E | 0908 | 05_02.20N | 114_48.00E | 0908 | 05_02.50N | 114_47.50E | 0942 | 05_02.50N | 114_47.10E | 38 | 30 | 1.5 |

Report on Oceanographic survey

A survey, on board M.V. SEAFDEC 2 was carried out from 8 to 13 July 2011 with 24 stations. Partial details and environmental conditions of each station are in table 1 and 2. The following are materials and method of the oceanographic survey.

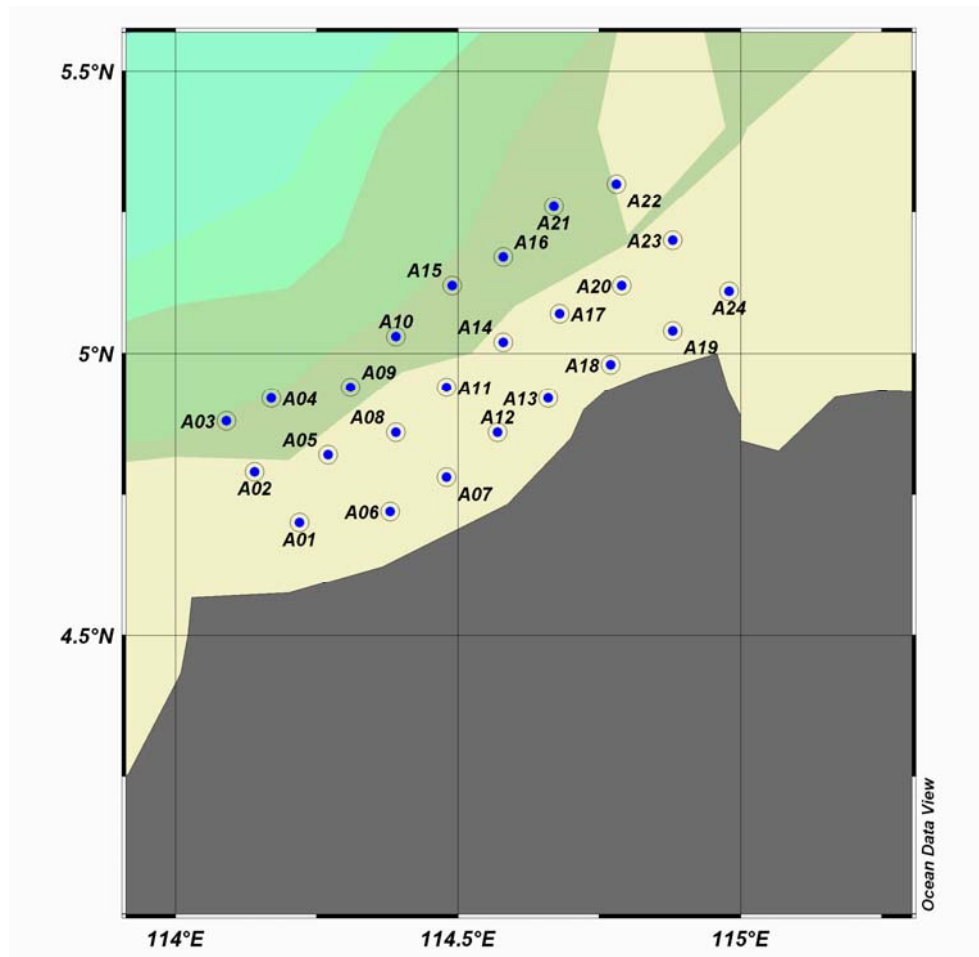


Figure 3 Map of the oceanographic survey stations

Physical and chemical character of water

Physical and chemical character of vertical profile including salinity, temperature, depth, dissolved oxygen, pH and PAR/Irradiation were measuring using SeaBird 911 iCTD M/V SEAFDEC 2, iCTD systems equipped with three main sensors for conductivity, temperature and depth and three auxiliary sensors for Dissolved Oxygen (D.O.), pH and PAR/Irradiation. The iCTD as deployed from sea surface to maximum depth approximately 5 m above sea bottom, with velocity 0.5-0.8 m/s and retrieved to surface at a similar speed. All

iCTD data were average into every 1 meter interval. Data in station were divided into down cast and up cast.



Figure 4 Oceanographic survey by CTD (Left and middle) and water sampling (right)

Water sample is separately sampling by Niskin Bottles which is normally install as a part of iCTD system. During this trip, carousel system is failure and the collecting of water samples is able to operate by traditional system.

Thermosalinograph (TSG) – Fluorometer were operated along the cruise track of M/V SEAFDEC 2. The system was designed to pump water from approximately 5 meters below the sea surface continuously for measuring salinity, temperature and fluorescence chlorophyll-a. The data were average every 6 second. Partial details of operating summary show in table 3.



Figure 5 Thermosalinograph (TSG) & Fluorometer

Nutrient

Sea water samples from Niskin bottles were filtrated through Whatman GF/C (1.2 μm) filter paper and subsampling to transport tubes. For nitrite, nitrate and phosphate samples were preserved in the freezer at -40 °C. For silicate samples were stored in dark and room

temperature. Samples will be analyzed by Department of Fisheries, Brunei and SEAFDEC/Training Department.

Zooplankton and Fish larvae

The 45 cm diameter bongo frames were attached with zooplankton and larval fish net with mesh size of 330 μm and 521 μm , respectively. A flow meter was attached at the aperture of net to measure the water volume passing through the net. Zooplankton net and fish larvae net were attached with TSK flow meters no. 7021 and 7035 respectively.

The TSK flow meters were calibrated before and after the survey period which calibration factor show in table 3.

Bongo net was oblique tow with ship speed approximately 1-2 knots. Angle of towing cable was maintained at 45 °. Towing depth was observed using Net SONDE (depth meter). Partial details of Bongo net operation show in table 3.



Figure 6 Zooplankton and larval fish samplings by Bongo net and sample preservation activities

Fish Juvenile

The operations on rectangular- mouthed Neuston net (Fig.9) with mesh size of upper part 1,000 μm and lower part 600 μm was conducted for the fish juveniles collection at the

surface layer with towing speed between 3-4 knots and approximated towing time of 15 minute.

It is advisory to include a Neuston net tow due to the larvae of several species of commercially important pelagic fishes is known to occur in the surface layer. Partial details of Neuston net operation are in table 3. The rectangular-mouthed



Figure 7 Larvae sampling by Rectangular-mouthed Neuston net.

Sediment sampling

The sediment sampling is carried out by two main equipments, i.e., 1) Smith-Mcintyre bottom sampler, and 2) gravity core sampler. The operations are conducted every station however core sampler is ineffective at the stations near shore where bottom sediment composed with sandy in majority. Sediment from core is preserve within tube liner and store in freezing room. Sediment collected by grab were collect surface layer for heavy metal contaminated investigation.



Figure 9 Sediment samplings by Bottom samplers: grab and corer

Table 3 Summary of oceanographic survey

| St. no. | Date | Start | Finish | Position | | Bottom Depth (r) | CTD file name | TSG file name | Bongo net | | | | Neuston net | | | Niskin bottle (depth, m) | Transparency (m) | Forel scale no. | Core | Grap | |
|---------|-----------|-------|--------|-----------|------------|------------------|-------------------|---------------|------------------|------------|---------------------|----------------|-------------|------------|---------------------|--------------------------|------------------|-----------------|------|------|----------------|
| | | | | Latitude | Longitude | | | | Towing depth (m) | Start Time | Towing period (min) | Flowmeter rev. | | Start Time | Towing period (min) | | | | | | Flowmeter rev. |
| | | | | | | | | | | | | 500µm | 330µm | | | | | | | | |
| A01 | 9-Jul-11 | 10:14 | 12:00 | 04°42.07N | 114°13.08E | 24 | s2d37001.s2u37001 | Firstleg_01 | 20 | 10:50 | 20 | 6970 | 6830 | 11:13 | 15.34 | 10040 | 5,10,20 | 7 | 11 | ✓ | ✓ |
| A02 | 9-Jul-11 | 13:01 | 13:30 | 04°47.11N | 114°08.34E | 45 | s2d37002.s2u37002 | Firstleg_01 | 35 | 07:00 | 30 | 4820 | 4060 | 07:32 | 3 | 8310 | 5,10,20,30,40 | 15 | 7 | ✓ | ✓ |
| A03 | 9-Jul-11 | 14:54 | 16:30 | 04°52.16N | 114°03.16E | 54 | s2d37003.s2u37003 | Firstleg_01 | 35 | 14:54 | 30 | 10740 | 10450 | 15:26 | 15 | 633 | 5,10,20,30,40,50 | 20 | 4 | ✓ | ✓ |
| A04 | 10-Jul-11 | 06:51 | 08:20 | 04°55.20N | 114°10.45E | 56 | s2d37004.s2u37004 | Firstleg_02 | 48 | 06:51 | 29.55 | 10222 | 10480 | 07:21 | 15 | 10135 | 5,10,20,30,40,50 | 16 | 4 | ✓ | ✓ |
| A05 | 10-Jul-11 | 09:20 | 09:41 | 4°44.08N | 114°16.65E | 39 | s2d37005.s2u37005 | Firstleg_02 | 20 | 09:02 | 30 | 11915 | 9150 | 09:34 | 15 | 8450 | 5,10,20,30 | 15 | 4 | ✓ | ✓ |
| A06 | 10-Jul-11 | 10:40 | 11:35 | 4°43.21N | 114°22.53E | 24 | s2d37006.s2u37006 | Firstleg_02 | 16 | 10:58 | 20 | 6610 | 6365 | 10:40 | 15 | 7710 | 5,10,20 | 12 | 4 | ✓ | ✓ |
| A07 | 10-Jul-11 | 12:33 | 13:30 | 4°46.69N | 114°28.92E | 23 | s2d37007.s2u37007 | Firstleg_02 | 18 | 12:33 | 20 | 5610 | 4940 | 12:55 | 15 | 8910 | 5,10,2 | 11 | 7 | ✓ | ✓ |
| A08 | 10-Jul-11 | 14:23 | 14:36 | 4°51.76N | 114°23.36E | 32 | s2d37008.s2u37008 | Firstleg_02 | 25 | 1.8 | 20 | 6700 | 5245 | 11:48 | 15 | 9470 | 5,10'20'30 | 13 | 7 | ✓ | ✓ |
| A09 | 10-Jul-11 | 15:27 | 16:45 | 4°57.04N | 114°17.67E | 47 | s2d37009.s2u37009 | Firstleg_02 | 33 | 15:27 | 30 | 10850 | 8260 | 15:58 | 15 | 8100 | 5,10,20,30,40 | 18 | 7 | ✓ | ✓ |
| A10 | 10-Jul-11 | 17:42 | 18:40 | 5°01.73N | 114°23.16E | 43 | s2d37010.s2u37010 | Firstleg_02 | 22 | 17:42 | 20 | 9330 | 7200 | 18:04 | 15 | 8080 | 5,10,20,30,40 | X | X | ✓ | ✓ |
| A11 | 11-Jul-11 | 06:40 | 07:00 | 4°56.65N | 114°28.68E | 31 | s2d37011.s2u37011 | Firstleg_03 | 18 | 13:00 | 20 | 6060 | 4230 | 13:22 | 15 | 8130 | 5,10,20,25 | X | X | ✓ | ✓ |
| A12 | 11-Jul-11 | 07:57 | 08:59 | 4°51.48N | 114°34.60E | 22 | s2d37012.s2u37012 | Firstleg_03 | 12 | 7:57 | 20 | 6750 | 6660 | 8:18 | 15 | 8610 | 5,10,20 | 13 | 7 | ✓ | ✓ |
| A13 | 11-Jul-11 | 09:40 | 10:44 | 4°55.07N | 114°39.77E | 14 | s2d37013.s2u37013 | Firstleg_03 | 10 | 9:40 | 20 | 10210 | 8480 | 10:01 | 15 | 4250 | 5,10 | 12 | 6 | X | ✓ |
| A14 | 11-Jul-11 | 11:30 | 12:30 | 5°00.88N | 114°34.40E | 31 | s2d37014.s2u37014 | Firstleg_03 | 25 | 11:30 | 20 | 7670 | 6620 | 11:51 | 15 | 8160 | 5,10,20,30 | 18 | 7 | ✓ | ✓ |
| A15 | 11-Jul-11 | 13:22 | 14:40 | 5°06.74N | 114°29.04E | 48 | s2d37015.s2u37015 | Firstleg_03 | 35 | 13:22 | 30 | 10210 | 7220 | 13:54 | 15 | 10350 | 5,10,20,30,40,45 | 20 | 6 | ✓ | ✓ |
| A16 | 11-Jul-11 | 15:24 | 16:40 | 5°10.19N | 114°34.48E | 49 | s2d37016.s2u37016 | Firstleg_03 | 35 | 15:24 | 30 | 8720 | 10930 | 15:55 | 15 | 10190 | 5,10,20,30,40,45 | 20 | 3 | ✓ | ✓ |
| A17 | 11-Jul-11 | 17:37 | 18:40 | 5°04.31N | 114°40.46E | 22 | s2d37017.s2u37017 | Firstleg_03 | 18 | 17:37 | 20 | 7030 | 5680 | 17:59 | 15 | 7940 | 5,10,20 | 17 | 3 | X | ✓ |
| A18 | 12-Jul-11 | 06:15 | 07:07 | 4°58.79N | 114°46.42E | 14 | s2d37018.s2u37018 | Firstleg_04 | 08 | 06:31 | 20 | 7060 | 5290 | 06:52 | 15 | 6290 | 5,10 | 12 | 4 | X | ✓ |
| A19 | 12-Jul-11 | 08:00 | 08:51 | 5°03.43N | 114°52.51E | 14 | s2d37019.s2u37019 | Firstleg_04 | 10 | 8:00 | 20 | 6770 | 4625 | 8:22 | 15 | 5770 | 5,10 | 11 | 4 | X | ✓ |
| A20 | 12-Jul-11 | 09:37 | 10:30 | 5°07.12N | 114°47.85E | 24 | s2d37020.s2u37020 | Firstleg_04 | 18 | 9:37 | 20 | 5950 | 4260 | 9:59 | 15 | 7080 | 5,10,20 | 17 | 4 | X | ✓ |
| A21 | 12-Jul-11 | 11:52 | 13:05 | 5°15.07N | 114°40.41E | 50 | s2d37021.s2u37021 | Firstleg_04 | 35 | 11:52 | 30 | 10070 | 8160 | 12:24 | 15 | 8140 | 5,10,20,30,40,45 | 25 | 3 | ✓ | ✓ |
| A22 | 12-Jul-11 | 13:55 | 15:15 | 5°17.98N | 114°46.97E | 52 | s2d37022.s2u37022 | Firstleg_04 | 40 | 13:55 | 30 | 10350 | 8970 | 14:27 | 15 | 9520 | 5,10,20,30,40,50 | 25 | 3 | ✓ | ✓ |
| A23 | 12-Jul-11 | 15:04 | 17:02 | 5°12.16N | 114°52.80E | 39 | s2d37023.s2u37023 | Firstleg_04 | 25 | 15:04 | 20 | 6605 | 4860 | 15:26 | 15 | 6770 | 5,10,20,30,35 | 17 | 4 | ✓ | ✓ |
| A24 | 12-Jul-11 | 17:55 | 18:45 | 5°06.50N | 114°58.45E | 21 | s2d37024.s2u37024 | Firstleg_04 | 15 | 18:08 | 15 | 4820 | 4060 | 17:55 | 10 | 5440 | 5,10,20 | X | X | X | ✓ |

Table 4 Summary of oceanographic survey (Continue)

| Station No | Position | | Wind | | Air | | | | | Sea Surface Temp (°C) | Current | | | | Type of bottom |
|------------|-----------|------------|------------|------|-----------|---------------|--------------|---------------|-----------|-----------------------|-----------|-----|-----------|-----|------------------|
| | Latitude | Longitude | Spd. (Knt) | Dir. | Temp (°C) | Press. (mbar) | Humidity (%) | Weather | Sea stage | | 5 m | | 30 m | | |
| | | | | | | | | | | | Spd.(Knt) | Dir | Spd.(Knt) | Dir | |
| A01 | 04'42.07N | 114'13.08E | 6.0 | 180 | 29.35 | 1013.5 | 85 | Partly cloudy | Slight | 29 | 0.4 | 226 | X | X | Muddy |
| A02 | 04'47.11N | 114'08.34E | 4.0 | 250 | 30.62 | 1012.0 | 80 | Partly cloudy | Slight | 30.29 | 0.4 | 025 | X | X | Muddy |
| A03 | 04'52.16N | 114'03.16E | 8.0 | 240 | 31.24 | 1011.0 | 85 | Partly cloudy | Slight | 30.53 | 0.5 | 061 | X | X | Muddy |
| A04 | 04'55.20N | 114'10.45E | 2.0 | 220 | 28.78 | 1014.0 | 90 | Partly cloudy | Slight | 29.74 | 0.6 | 072 | X | X | Muddy |
| A05 | 4'44.08N | 114'16.65E | 8.0 | 310 | 29.49 | 1013.0 | 80 | Partly cloudy | Slight | 29.90 | 0.3 | 025 | X | X | Muddy |
| A06 | 4'43.21N | 114'22.53E | 2.0 | 300 | 30.64 | 1013.0 | 85 | Partly cloudy | Slight | 30.24 | 0.2 | 071 | X | X | Sandy-mud |
| A07 | 4'46.69N | 114'28.92E | 4.0 | 230 | 32.05 | 1012.0 | 73 | Cloudy | Slight | 30.99 | 0.2 | 279 | X | X | Muddy |
| A08 | 4'51.76N | 114'23.36E | 2.0 | 150 | 30.80 | 1010.5 | 75 | Cloudy | Slight | 30.32 | 0.1 | 283 | X | X | Muddy-sand |
| A09 | 4'57.04N | 114_17.67E | 2.0 | 210 | 30.56 | 1010.0 | 79 | Cloudy | Slight | 30.40 | 0.3 | 012 | X | X | Sandy-mud |
| A10 | 5'01.73N | 114'23.16E | 4.0 | 030 | 31.06 | 1010.0 | 79 | Cloudy | Slight | 31.13 | 0.4 | 037 | X | X | Sandy-mud |
| A11 | 4'56.65N | 114'28.68E | 6.0 | 090 | 28.65 | 1012.5 | 92 | Cloudy | Slight | 29.84 | 0.2 | 311 | X | X | Sandy-mud |
| A12 | 4'51.48N | 114'34.60E | 0.0 | X | 28.64 | 1013.5 | 85 | Cloudy | Slight | 30.07 | 0.5 | 238 | X | X | Muddy-sand |
| A13 | 4'55.07N | 114'39.77E | 4.0 | 175 | 29.08 | 1013.5 | 93 | Cloudy | Slight | 29.87 | X | X | X | X | Sand |
| A14 | 5'00.88N | 114'34.40E | 4.0 | 200 | 31.05 | 1013.0 | 80 | Cloudy | Slight | 30.35 | 0.1 | 043 | X | X | Sandy-mud |
| A15 | 5'06.74N | 114'29.04E | 8.0 | 190 | 30.91 | 1012.0 | 86 | Cloudy | Slight | 30.62 | 0.3 | 052 | 0.2 | 088 | Muddy |
| A16 | 5'10.19N | 114'34.48E | 4.0 | 230 | 31.24 | 1010.5 | 65 | Cloudy | Slight | 30.56 | 0.3 | 028 | 0.2 | 121 | Muddy |
| A17 | 5'04.31N | 114'40.46E | 8.0 | 300 | 32.68 | 1010.5 | 78 | Cloudy | Slight | 30.70 | 0.3 | 010 | X | X | Sand |
| A18 | 4'58.79N | 114'46.42E | 2.0 | 140 | 28.37 | 1011.0 | 85 | Cloudy | Slight | 30.21 | X | X | X | X | Sand |
| A19 | 5'03.43N | 114'52.51E | 4.0 | 170 | 28.67 | 1012.0 | 85 | Cloudy | Slight | 29.98 | X | X | X | X | Sand |
| A20 | 5'07.12N | 114'47.85E | 2.0 | 150 | 31.13 | 1012.0 | 86 | Cloudy | Slight | 30.33 | 0.1 | 106 | X | X | Sand |
| A21 | 5'15.07N | 114'40.41E | 2.0 | 090 | 31.43 | 1012.0 | 80 | Cloudy | Slight | 30.39 | 0.2 | 010 | 0.3 | 277 | Muddy |
| A22 | 5'17.98N | 114'46.97E | 2.0 | 320 | 31.10 | 1011.0 | 93 | Partly cloudy | Slight | 30.85 | 0.4 | 356 | 0.1 | 326 | Muddy |
| A23 | 5'12.16N | 114'52.80E | 10.0 | 310 | 31.87 | 1009.0 | 73 | Partly cloudy | Slight | 31.84 | 0.2 | 354 | X | X | Muddy |
| A24 | 5'06.50N | 114'58.45E | 4.0 | 330 | 33.88 | 1011.0 | 73 | Partly cloudy | Slight | 30.96 | 0.7 | 063 | X | X | Sandy-mud |

Resources Survey by Hydro-acoustic instrument

Hydro acoustic survey was conducted from 8 to 21 July 2010, using the scientific echo sounder model Furuno FQ-80 installed onboard MV SEAFDEC2. The survey speed are approximate 10 knot during survey between station, and 3 to 4 knot during bottom trawl fishing operations. Total survey tracks included with calibrations are 44 tracks. The data of backscattering were recorded and made the backup in hard drive. The output data of this survey were recorded in SSV data to correct TS and SV data.

Some trouble on computer recording data has occurred during pre-check the system. It was, however, able to carry on the application program FQ-80. **Recommend to contact technician of FQ-80 to overall check whole system both software hardware of FQ-80 before carry on the next cruises.**

Other information is in the acoustic observation log sheet (Appendix 3) and the specification of Furuno FQ-80 as below;

| | | | |
|----------------------|---|----------|----------|
| Frequency | Low freq, 38 kHz High freq, 70/120 kHz (selectable) Split beam, Dual frequency | | |
| Display selection | Single frequency or Dual frequency (selectable) | | |
| Processing functions | 1. Single fish Split beam – w/azimuth offset Normal beam, ideal beam – no azimuth offset 2. TS histogram -10 dB > TS > -70 range, 0.7 dB interval 3. SV/SA calculation Tow step integration, 20 target fish setting, Individual layer integration 4. Single fish movement motion Single fish displayed in position plan view display | | |
| Output data | 1. Parameter (HAC) 2. Raw echo data : V (VHAC) 3. Single cell SV data : SCSV (HAC) | | |
| Pulse duration | | | |
| Pulse length | 38 kHz | 70 kHz | 120 kHz |
| Short | 0.263 ms | 0.143 ms | 0.143 ms |
| Medium | 0.842 ms | 0.457 ms | 0.457 ms |
| Long | 2.73 ms | 1.43 ms | 1.43 ms |

Appendix 1) Research activities of M.V. SEAFDEC2

Session I: 8 to 13 July 2011

| Date | Time | Activities | Remark |
|------------|---|--|--|
| 8 July 11 | 1800 | All researcher DOF/Brunei (11 persons) embarked on board | |
| | 1930 | Leave FLC, Muara to survey station no. 1 | |
| 9 July 11 | 0100 | Let go anchor | |
| | 0700-0810 | FQ-80 Calibration , heave up anchor | L04°47'.20N λ114°18'.20E |
| | 0850-0910 | Calibrated Flowmeter ,then proceed to station no.1 | L04°47'.30N λ114°18'.20E |
| | 0954-1148 | Oceanographic survey op.1 at station no.1 | |
| | 1000-1010 | - Water sampling, depth 23 m | L04°41'.90N λ114°13'.30E |
| | 1012-1025 | - CTD , sea depth 23 m | L04°42'.00N λ114°13'.30E |
| | 1028-1115 | - Bongo net, sea depth 24 m. | L04°42'.10N λ114°13'.40E |
| | 1117-1133 | - Neuston net, sea depth 23 m. | L04°41'.80N λ114°14'.10E |
| | 1135-1148 | - Grap and core sampling, sea depth 23 m | L04°42'.10N λ114°14'.10E |
| | 1158-1258 | Acoustic survey from station no.1 to station no.2 | L04°41'.90N λ114°13'.30E – L04°47'.10N λ114°08'.30E |
| | 1303-1315 | Oceanographic survey op.2 at station no.2 | |
| | 1303-1307 | - CTD , sea depth 45 m | L04°47'.10N λ114°08'.40E |
| | 1311-1315 | - Grap and core sampling, sea depth 23 m | L04°47'.10N λ114°08'.40E |
| | 1320-1407 | Acoustic survey from station no.2 to station no.3 | L04°47'.10N λ114°08'.30E – L04°52'.10N λ114°03'.20E |
| | 1410-1632 | Oceanographic survey op.3 at station no.3 | |
| 1410-1442 | - Bongo net, sea depth 57 m | L04°52'.10N λ114°03'.10E | |
| 1525-1543 | - Neuston net, sea depth 53 m | L04°52'.50N λ114°04'.70E | |
| 1545-1551 | - CTD , sea depth 55 m | L04°52'.60N λ114°05'.20E | |
| 1553-1608 | - Water sampling, depth 55 m | L04°52'.70N λ114°05'.20E | |
| 1610-1632 | - Grap and core sampling, sea depth 55 m | L04°52'.80N λ114°05'.90E | |
| 1700-1747 | Acoustic survey from station no.3 to station no.4 | L04°52'.10N λ114°03'.20E – L04°55'.10N λ114°10'.40E | |
| 1830 | Let go anchor, sea depth 39 m | L04°51'.40N λ114°16'.40E | |
| 10 July 11 | 0610 | Heave up anchor | |
| | 0650-0815 | Oceanographic survey op.4 at station no.4 | |
| | 0650-0721 | - Bongo net, sea depth 56 m | L04°55'.10N λ114°10'.40E |
| | 0722-0740 | - Neuston net, sea depth 56 m | L04°55'.10N λ114°10'.40E |
| | 0745-0753 | - CTD , sea depth 55 m | L04°55'.20N λ114°10'.90E |
| | 0755-0807 | - Water sampling, depth 55 m | L04°55'.20N λ114°11'.10E |
| | 0808-0815 | - Core sampling, sea depth 55 m | L04°55'.20N λ114°10'.90E |
| | 0820-0917 | Acoustic survey from station no.4 to station no.5 | L04°55'.10N λ114°10'.40E – L04°49'.00N λ114°16'.40E |
| | 0920-0937 | Oceanographic survey op.5 at station no.5 | |
| | 0920-0925 | - CTD , sea depth 39 m | L04°49'.00N λ114°16'.40E |
| | 0927-0937 | - Grap and core sampling, sea depth 39 m | L04°49'.00N λ114°16'.50E |
| 0945-1036 | Acoustic survey from station no.5 to station no.6 | L04°49'.00N λ114°16'.40E – L04°43'.20N λ114°22'.20E | |

| Date | Time | Activities | Remark |
|-------------------|---|--|--|
| 10 July 11 | 1040-1135 | Oceanographic survey op.6 at station no.6 | |
| | 1040-1055 | - Neuston net, sea depth 23 m | L04°43'.10N λ114°22'.40E |
| | 1057-1118 | - Bongo net, sea depth 23 m | L04°43'.30N λ114°22'.70E |
| | 1120-1125 | - CTD , sea depth 24 m | L04°43'.30N λ114°22'.80E |
| | 1127-1130 | - Water sampling, depth 24 m | L04°43'.40N λ114°22'.80E |
| | 1132-1135 | - Core sampling, sea depth 24 m | L04°43'.40N λ114°22'.80E |
| | 1142-1230 | Acoustic survey from station no.6 to station no.7 | L04°43'.20N λ114°22'.20E – L04°46'.80N λ114°28'.90E |
| | 1234-1335 | Oceanographic survey op.7 at station no.7 | |
| | 1234-1254 | - Bongo net, sea depth 22 m | L04°46'.60N λ114°28'.90E |
| | 1255-1310 | - Neuston net, sea depth 22 m | L04°46'.80N λ114°28'.80E |
| | 1315-1325 | - CTD , sea depth 22 m | L04°46'.70N λ114°28'.80E |
| | 1326-1335 | - Water sampling, depth 22 m | L04°46'.80N λ114°28'.60E |
| | | - Grab and core sampling, sea depth 23 m | |
| | 1336-1423 | Acoustic survey from station no.7 to station no.8 | L04°46'.80N λ114°28'.90E – L04°51'.70N λ114°23'.30E |
| | 1425-1433 | Oceanographic survey op.7 at station no.7 | |
| | 1425-1429 | - CTD , sea depth 32 m | L04°51'.70N λ114°23'.30E |
| 1431-1433 | - Core sampling, sea depth 32 m | L04°51'.70N λ114°23'.40E | |
| 1438-1525 | Acoustic survey from station no.8 to station no.9 | L04°51'.70N λ114°23'.30E – L04°56'.90N λ114°17'.60E | |
| 1527-1645 | Oceanographic survey op.9 at station no.9 | | |
| 1527-1557 | - Bongo net, sea depth 46 m | L04°57'.00N λ114°17'.60E | |
| 1558-1613 | - Neuston net, sea depth 45 m | L04°56'.60N λ114°18'.00E | |
| 1618-1625 | - CTD , sea depth 41.5 m | L04°56'.60N λ114°18'.40E | |
| 1627-1633 | - Water sampling, depth 40.5 m | L04°56'.50N λ114°18'.60E | |
| 1635-1645 | - Grab and core sampling, sea depth 40.5m | L04°56'.50N λ114°18'.70E | |
| 1655-1738 | Acoustic survey from station no.9 to station no.10 | L04°56'.90N λ114°17'.60E – L05°01'.80N λ114°22'.80E | |
| 1740-1847 | Oceanographic survey op.10 at station no.10 | | |
| 1740-1801 | - Bongo net, sea depth 43 m | L05°01'.70N λ114°23'.00E | |
| 1803-1820 | - Neuston net, sea depth 42.5 m | L05°01'.60N λ114°23'.20E | |
| 1822-1825 | - CTD , sea depth 41 m | L05°01'.50N λ114°23'.50E | |
| 1826-1832 | - Water sampling, depth 41 m | L05°01'.50N λ114°23'.60E | |
| 1833-1847 | - Grab and core sampling, sea depth 41m | L05°01'.50N λ114°23'.70E | |
| 1856-1943 2000 | Acoustic survey from station no.10 to station no.11, and then let go anchor depth 25.5 | L05°01'.80N λ114°22'.80E – L04°56'.50N λ114°28'.60E | |
| 11 July 11 | 0645-0702 | Oceanographic survey op.11 at station no.11 | |
| | 0645-0652 | - CTD , sea depth 31 m | L04°56'.60N λ114°28'.60E |
| | 0654-0702 | - Grab and core sampling, sea depth 31m | L04°56'.60N λ114°28'.60E |
| | 0705-0753 | Acoustic survey from station no.11 to station no.12 | L05°01'.80N λ114°22'.80E – L04°51'.60N λ114°34'.20E |
| | 0755-0854 | Oceanographic survey op.12 at station no.12 | |
| | 0755-0818 | - Bongo net, sea depth 21.5 m | L04°51'.40N λ114°34'.30E |
| | 0819-0834 | - Neuston net, sea depth 21.5 m | L04°51'.60N λ114°34'.40E |
| | 0836-0842 | - CTD , sea depth 21 m | L04°51'.50N λ114°34'.40E |
| 0843-0845 | - Water sampling, depth 21 m | L04°51'.50N λ114°34'.30E | |
| 0846-0854 | - Grab and core sampling, sea depth 21m | L04°51'.60N λ114°34'.30E | |
| 0855-0939 | Acoustic survey from station no.12 to station no.13 | L04°51'.60N λ114°34'.20E – L04°55'.00N λ114°39'.80E | |

| Date | Time | Activities | Remark |
|------------|---|--|--|
| 11 July 11 | 0940-1038 | Oceanographic survey op.13 at station no.13 | |
| | 0940-1000 | - Bongo net, sea depth 13.5 m | L04°55'.00N λ114°39'.70E |
| | 1002-1018 | - Neuston net, sea depth 14 m | L04°55'.20N λ114°39'.70E |
| | 1020-1023 | - CTD , sea depth 14 m | L04°55'.20N λ114°39'.70E |
| | 1025-1027 | - Water sampling, depth 14 m | L04°55'.20N λ114°39'.70E |
| | 1028-1038 | - Grab and core sampling, sea depth 14 m | L04°55'.20N λ114°39'.70E |
| | 1040-1127 | Acoustic survey from station no.13 to station no.14 | L04°55'.00N λ114°39'.80E – L05°00'.80N λ114°34'.20E |
| | 1130-1228 | Oceanographic survey op.14 at station no.14 | |
| | 1130-1150 | - Bongo net, sea depth 31 m | L05°00'.80N λ114°34'.40E |
| | 1152-1205 | - Neuston net, sea depth 31 m | L05°00'.90N λ114°34'.50E |
| | 1208-1215 | - CTD , sea depth 31 m | L05°01'.00N λ114°34'.50E |
| | 1216-1220 | - Water sampling, depth 31 m | L05°01'.10N λ114°34'.50E |
| | 1222-1228 | - Grab and core sampling, sea depth 31 m | L05°01'.10N λ114°34'.60E |
| | 1232-1320 | Acoustic survey from station no.14 to station no.15 | L05°00'.80N λ114°34'.20E – L05°06'.50N λ114°28'.90E |
| | 1323-1437 | Oceanographic survey op.15 at station no.15 | |
| | 1323-1350 | - Bongo net, sea depth 48 m | L05°06'.70N λ114°29'.00E |
| | 1354-1410 | - Neuston net, sea depth 48 m | L05°06'.70N λ114°29'.50E |
| | 1410-1418 | - CTD , sea depth 48 m | L05°06'.90N λ114°29'.20E |
| | 1420-1425 | - Water sampling, depth 48 m | L05°07'.00N λ114°29'.50E |
| 1426-1437 | - Grab and core sampling, sea depth 48 m | L05°07'.10N λ114°29'.70E | |
| 1444-1522 | Acoustic survey from station no.15 to station no.16 | L05°06'.50N λ114°28'.90E – L05°10'.10N λ114°34'.40E | |
| 1525-1640 | Oceanographic survey op.16 at station no.16 | | |
| 1525-1553 | - Bongo net, sea depth 49 m | L05°10'.10N λ114°34'.40E | |
| 1556-1611 | - Neuston net, sea depth 49 m | L05°10'.20N λ114°34'.70E | |
| 1613-1625 | - CTD , sea depth 48 m | L05°10'.20N λ114°34'.80E | |
| 1628-1645 | - Water sampling, depth 48 m | | |
| | - Grap and core sampling, sea depth 48 m | L05°10'.20N λ114°35'.00E | |
| 1645-1735 | Acoustic survey from station no.16 to station no.17 | L05°10'.10N λ114°34'.40E – L05°04'.40N λ114°40'.40E | |
| 1738-1836 | Oceanographic survey op.17 at station no.17 | | |
| 1738-1756 | - Bongo net, sea depth 23 m | L05°04'.30N λ114°40'.40E | |
| 1800-1815 | - Neuston net, sea depth 23 m | L05°04'.10N λ114°40'.50E | |
| 1820-1827 | - CTD , sea depth 23 m | L05°04'.20N λ114°40'.90E | |
| 1828-1830 | - Water sampling, depth 23 m | L05°04'.20N λ114°40'.90E | |
| 1831-1836 | - Grap and core sampling, sea depth 23 m | L05°04'.30N λ114°41'.00E | |
| 1842-1929 | Acoustic survey from station no.17 to station no.18 | L05°04'.40N λ114°40'.40E – L05°04'.30N λ114°40'.30E | |
| 1940 | Let go anchor sea depth 15 m. | | |
| 12 July 11 | 0600 | Heave up anchor | |
| | 0616-0710 | Oceanographic survey op.18 at station no.18 | |
| | 0616-0618 | - CTD , sea depth 14 m | L04°58'.70N λ114°46'.40E |
| | 0619-0621 | - Water sampling, depth 14 m | L04°58'.70N λ114°46'.40E |
| | 0622-0628 | - Grap and core sampling, sea depth 14 m | L04°58'.80N λ114°46'.40E |
| | 0630-0651 | - Bongo net, sea depth 14 m | L04°58'.80N λ114°46'.40E |
| | 0653-0710 | - Neuston net, sea depth 14 m | L04°58'.80N λ114°46'.40E |
| | 0717-0758 | Acoustic survey from station no.18 to station no.19 | L05°04'.30N λ114°40'.30E – L05°02'.40N λ114°52'.40E |

| Date | Time | Activities | Remark |
|------------|---|--|--|
| 12 July 11 | 0800-0852 | Oceanographic survey op.19 at station no.19 | |
| | 0800-0820 | - Bongo net, sea depth 14 m | L05°02'.40N λ114°52'.40E |
| | 0822-0839 | - Neuston net, sea depth 14 m | L05°02'.30N λ114°52'.40E |
| | 0840-0844 | - CTD , sea depth 14 m | L05°02'.40N λ114°52'.50E |
| | 0845-0847 | - Water sampling, depth 14 m | L05°02'.40N λ114°52'.50E |
| | 0848-0852 | - Grap and core sampling, sea depth 14 m | L05°02'.40N λ114°52'.50E |
| | 0855-0934 | Acoustic survey from station no.19 to station no.20 | L05°02'.40N λ114°52'.40E – L05°07'.10N λ114°47'.80E |
| | 0937-1033 | Oceanographic survey op.20 at station no.20 | |
| | 0937-0955 | - Bongo net, sea depth 24 m | L05°07'.20N λ114°47'.70E |
| | 0957-1015 | - Neuston net, sea depth 24 m | L05°07'.10N λ114°47'.80E |
| | 1018-1020 | - CTD , sea depth 14 m | L05°07'.20N λ114°47'.60E |
| | 1021-1024 | - Water sampling, depth 14 m | L05°07'.20N λ114°47'.60E |
| | 1025-1033 | - Grap and core sampling, sea depth 14 m | L05°07'.20N λ114°47'.60E |
| | 1040-1150 | Acoustic survey from station no.20 to station no.21 | L05°07'.10N λ114°47'.80E – L05°14'.90N λ114°40'.30E |
| | 1152-1305 | Oceanographic survey op.21 at station no.21 | |
| | 1152-1222 | - Bongo net, sea depth 50 m | L05°15'.00N λ114°40'.40E |
| | 1224-1239 | - Neuston net, sea depth 49 m | L05°15'.00N λ114°40'.40E |
| | 1242-1247 | - CTD , sea depth 50 m | L05°15'.20N λ114°40'.40E |
| | 1248-1254 | - Water sampling, depth 50 m | L05°15'.30N λ114°40'.50E |
| | 1255-1305 | - Grap and core sampling, sea depth 50 m | L05°15'.40N λ114°40'.50E |
| 1310-1352 | Acoustic survey from station no.21 to station no.22 | L05°14'.90N λ114°40'.30E – L05°17'.80N λ114°46'.90E | |
| 1355-1511 | Oceanographic survey op.21 at station no.22 | | |
| 1355-1425 | - Bongo net, sea depth 52 m | L05°17'.80N λ114°46'.90E | |
| 1427-1442 | - Neuston net, sea depth 52 m | L05°18'.00N λ114°46'.80E | |
| 1445-1452 | - CTD , sea depth 52 m | L05°18'.10N λ114°46'.80E | |
| 1453-1500 | - Water sampling, depth 53 m | L05°18'.10N λ114°46'.90E | |
| 1501-1511 | - Grap and core sampling, sea depth 53 m | L05°18'.20N λ114°46'.90E | |
| 1515-1602 | Acoustic survey from station no.22 to station no.23 | L05°17'.80N λ114°46'.90E – L05°17'.80N λ114°46'.90E | |
| 1605-1701 | Oceanographic survey op.23 at station no.23 | | |
| 1605-1624 | - Bongo net, sea depth 40 m | L05°12'.10N λ114°52'.70E | |
| 1626-1640 | - Neuston net, sea depth 40 m | L05°12'.00N λ114°52'.80E | |
| 1643-1647 | - CTD , sea depth 39 m | L05°12'.00N λ114°52'.70E | |
| 1648-1652 | - Water sampling, depth 40 m | L05°12'.00N λ114°52'.80E | |
| 1654-1701 | - Grap and core sampling, sea depth 40 m | L05°12'.00N λ114°52'.80E | |
| 1706-1752 | Acoustic survey from station no.23 to station no.24 | L05°17'.80N λ114°46'.90E – L05°06'.60N λ114°58'.20E | |
| 1754-1841 | Oceanographic survey op.24 at station no.24 | | |
| 1754-1805 | - Neuston net, sea depth 22 m | L05°06'.50N λ114°58'.40E | |
| 1807-1825 | - Bongo net, sea depth 22 m | L05°06'.50N λ114°58'.80E | |
| 1827-1830 | - CTD , sea depth 23 m | L05°06'.70N λ114°58'.70E | |
| 1831-1835 | - Water sampling, depth 22 m | L05°06'.70N λ114°58'.70E | |
| 1836-1841 | - Grap and core sampling, sea depth 22 m | L05°06'.70N λ114°58'.70E | |
| | | Then proceed to station no. 4 | |
| 13 July 11 | 0608-0614 | Oceanographic survey op.25 at station no.4 - Grap sampling, sea depth 57 m Then proceed to station no. 2 | L04°55'.30N λ114°10'.20E |

| Date | Time | Activities | Remark |
|-------------------|-----------|---|-------------------------------|
| 13 July 11 | 0701-0800 | Oceanographic survey op.25 at station no.2 | |
| | 0701-0731 | - Bongo net, sea depth 46 m | L04°47'.00N λ114°08'.20E |
| | 0733-0748 | - Neuston net, sea depth 46 m | L04°47'.10N λ114°08'.10E |
| | 0750-0756 | - Water sampling, depth 46 m | L04°47'.10N λ114°08'.20E |
| | 0757-0800 | - Grap and core sampling, sea depth 46 m | L04°47'.10N λ114°08'.20E |
| | | | Then proceed to station no. 5 |
| | 0853-0950 | Oceanographic survey op.26 at station no.5 | |
| | 0853-0900 | - Water sampling, depth 39 m | L04°49'.00N λ114°16'.50E |
| | 0902-0932 | - Bongo net, sea depth 39 m | L04°49'.00N λ114°16'.50E |
| | 0934-0950 | - Neuston net, sea depth 39 m | L04°49'.00N λ114°16'.30E |
| | | Then proceed to station no. 6 | |
| | 1036-1039 | Oceanographic survey op.27 at station no.6 - Grap sampling, sea depth 24 m | L04°43'.20N λ114°22'.30E |
| | | Then proceed to station no. 8 | |
| | 1127-1213 | Oceanographic survey op.28 at station no.8 | |
| | 1127-1146 | - Bongo net, sea depth 33 m | L04°51'.70N λ114°23'.30E |
| | 1147-1203 | - Neuston net, sea depth 39 m | L04°51'.70N λ114°23'.30E |
| | 1205-1210 | - Grap and core sampling, sea depth 46 m | L04°51'.90N λ114°23'.30E |
| | 1211-1213 | - Water sampling, depth 39 m | L04°51'.90N λ114°23'.30E |
| | | Then proceed to station no. 11 | |
| | 1253-1336 | Oceanographic survey op.29 at station no.11 | |
| | 1253-1256 | - Water sampling, depth 33 m | L04°56'.50N λ114°28'.70E |
| | 1300-1320 | - Bongo net, sea depth 31 m | L04°56'.50N λ114°28'.70E |
| | 1321-1336 | - Neuston net, sea depth 30 m | L04°56'.50N λ114°28'.70E |
| | | Then proceed to FCL, Muara | |
| | 1800 | Port alongside M.V.TEGGIRI | |

Session II: 16 to 19 July 2011

| Date | Time | Activities | Remark |
|-------------------|-----------|---|--|
| 16 July 11 | 0730 | All researcher DOF/Brunei (9 persons) embarked on board | |
| | 0800 | Leave FCL , Muara for survey station no. 23 | |
| | 1022-1130 | Bottom trawl fishing operation op.1 at station no.23, sea depth 45 m. | L05°14'.50N λ114°51'.00E – L05°11'.50N λ114°51'.20E |
| | 1323-1450 | Bottom trawl fishing operation op.2 at station no.22, sea depth 51 m. | L05°17'.50N λ114°45'.40E – L05°19'.40N λ114°17'.50E |
| | 1538-1650 | Bottom trawl fishing operation op.3 at station no.21, sea depth 54 m. | L05°14'.80N λ114°37'.50E – L05°15'.20N λ114°40'.30E |
| | 1750-1835 | Bottom trawl fishing operation op.4 at station no.16, sea depth 37 m. | L05°07'.20N λ114°37'.40E – L05°09'.90N λ114°35'.70E |
| 17 July 11 | 0605-0720 | Bottom trawl fishing operation op.5 at station no.3, sea depth 58 m. | L04°51'.50N λ114°02'.20E – L04°55'.20N λ114°04'.80E |
| | 0823-0932 | Bottom trawl fishing operation op.6 at station no.4, sea depth 48 m. | L04°51'.40 N λ114°11'.40 E L04°54'.90 N λ114°11'.30 E |
| | 1038-1139 | Bottom trawl fishing operation op.7 at station no.5, sea depth 36 m. | L04°46'.80 N λ114°17'.10 E L04°49'.80 N λ114°17'.60 E |
| | 1303-1400 | Bottom trawl fishing operation op.8 at station no.6, sea depth 35 m. | L04°48'.90 N λ114°21'.90 E L04°46'.50 N λ114°22'.40 E |

| Date | Time | Activities | Remark |
|-------------------|-----------|--|--|
| 17 July 11 | 1457-1557 | Bottom trawl fishing operation op.9 at station no.7, sea depth 32 m. | L04°48'.90 N λ114°27'.00 E L04°48'.10 N λ114°29'.30 E |
| | 1655-1750 | Bottom trawl fishing operation op.10 at station no.8, sea depth 28 m. | L04°52'.60 N λ114°22'.50 E L04°52'.70 N λ114°25'.20 E |
| 18 July 11 | 0600-0708 | Bottom trawl fishing operation op.11 at station no.9, sea depth 51 m. | L04°57'.10 N λ114°16'.20 E L04°59'.70 N λ114°18'.30 E |
| | 0755-0857 | Bottom trawl fishing operation op.12 at station no.10, sea depth 36 m. | L05°00'.20 N λ114°24'.00 E L05°02'.90 N λ114°24'.40 E |
| | 0957-1102 | Bottom trawl fishing operation op.13 at station no.15, sea depth 56 m. | L05°10'.10 N λ114°30'.40 E L05°07'.50 N λ114°29'.40 E |
| | 1152-1250 | Bottom trawl fishing operation op.14 at station no.14, sea depth 37 m. | L05°00'.50 N λ114°29'.60 E L05°02'.50 N λ114°31'.00 E |
| | 1331-1430 | Bottom trawl fishing operation op.15 at station no.11, sea depth 31 m. | L04°57'.50 N λ114°28'.50 E L04°59'.50 N λ114°30'.50 E |
| | 1522-1619 | Bottom trawl fishing operation op.16 at station no.12, sea depth 23 m. | L04°52'.10 N λ114°33'.80 E L04°52'.80 N λ114°31'.70 E |
| | 1700-1800 | Bottom trawl fishing operation op.17 at station no.13, sea depth 27 m. | L04°58'.30 N λ114°43'.60 E L04°55'.50 N λ114°35'.20 E |
| 19 Sep 10 | 0630-0740 | Bottom trawl fishing operation op.18 at station no.17, sea depth 19 m. | L05°02'.70 N λ114°43'.90 E L05°02'.80 N λ114°41'.30 E |
| | 0845-0942 | Bottom trawl fishing operation op.19 at station no.18, sea depth 19 m. | L05°02'.90 N λ114°49'.70 E L05°03'.60 N λ114°47'.10 E |
| | 1045-1830 | Hydraulic system trouble then SEAFDEC2 return to Maura FLC | |

Session III: 21 July 2011

| Date | Time | Activities | Remark |
|-------------------|-----------|---|--------------------------|
| 21 July 11 | 0730 | H.E. Minister of Industry and Primary Resources and his party embarked onboard M.V.SEAFDEC2 | |
| | 0830 | Leave Muara FLC to survey station19 | |
| | 1015-1106 | Demonstration on oceanographic survey at station 19 CTD, water sampling , Bongo net, Neuston net and sediment sampling. | L05°07'.0N λ114°52'.70E |
| | 1120-1220 | Bottom trawl demonstration | L05°07'.60N λ114°58'.40E |
| | 1304-1328 | Underwater camera demonstration then return to Muara FLC | L05°08'.10N λ114°52'.00E |
| | 1630 | Arrive at Muara FLC | |
| | 1700 | H.E. Minister of Industry and Primary Resources and his party disembarked onboard M.V.SEAFDEC2 | |

Appendix 2) Fishing log
Appendix 2.1 Otter board trawl fishing log



TRAWL FISHING LOGSHEET
Operation No.1



| | | | | | | | | |
|------------------------|-----------|------------------------------|-------------|--------------------------|-------------|----------------------|----------|-----------|
| Cruise no: 37-1/2011 | | Name of Vessel | | | | Air | | |
| Survey station No.23 | | M.V. SEAFDEC 2 | | | | Air Temp. | 31.8 | (°C) |
| Date: 16-July-11 | | | | | | Pressure | 1014 | hpa |
| Moon age: 15 phase: 98 | | Start shooting | | Finish shooting | | Humidity | 73 | % |
| Wind | | Time | 1022 | Time | 1042 | Water | | |
| Speed (Kt) | Direction | Latitude | 05_14.50 N | Latitude | 05_13.50 N | Surface temp. | 30.3 | (°C) |
| 2 | 120 | Longitude | 114_51.00 E | Longitude | 114_51.20 E | Bottom temp. | N/R | (°C) |
| Weather condition | | Start hauling | | Finish hauling | | Transparency | N/R | (m) |
| bc | | Time | 1112 | Time | 1130 | Current | | |
| Sea condition : Smooth | | Latitude | 05_12.10 N | Latitude | 05_11.50 N | Depth (m) | Spd (kt) | Direction |
| Vessel | | Longitude | 114_51.40 E | Longitude | 114_51.20 E | 5 | 0.4 | 071° |
| Eng. Mode: trawl mode | | Fishing gear | | | | 20 | 0.5 | 183° |
| Speed (kt): 3.0 | | Type of trawl: Bottom trawl | | | | 50 | N/R | N/R |
| RPM: 900 | | Towing time: 30 minute | | Towing distance(nm): 1.4 | | Depth of capture (m) | | 45 |
| Pitch: 9 | | Warp angle: Stb 73 / Port 70 | | Warp length (m): 200 m | | Type of bottom | | |
| Towing direction: 160° | | Net spread (m): - | | Net opening (m): 6.6 | | Total catch (kg) | | |

NR: Not recorded



TRAWL FISHING LOGSHEET
Operation No.2



| | | | | | | | | |
|------------------------|-----------|------------------------------|-------------|--------------------------|-------------|----------------------|----------|-----------|
| Cruise no: 37-1/2011 | | Name of Vessel | | | | Air | | |
| Survey station No.22 | | M.V. SEAFDEC 2 | | | | Air Temp. | 30 | (°C) |
| Date: 16-July-11 | | | | | | Pressure | 1013 | hpa |
| Moon age: 15 phase: 98 | | Start shooting | | Finish shooting | | Humidity | 78 | % |
| Wind | | Time | 1323 | Time | 1340 | Water | | |
| Speed (Kt) | Direction | Latitude | 05_17.50 N | Latitude | 05_18.10 N | Surface temp. | 30.2 | (°C) |
| 4 | 240 | Longitude | 114_45.40 E | Longitude | 114_46.20 E | Bottom temp. | N/R | (°C) |
| Weather condition | | Start hauling | | Finish hauling | | Transparency | N/R | (m) |
| bc | | Time | 1410 | Time | 1430 | Current | | |
| Sea condition : Smooth | | Latitude | 05_19.00 N | Latitude | 05_19.40 N | Depth (m) | Spd (kt) | Direction |
| Vessel | | Longitude | 114_47.30 E | Longitude | 114_47.30 E | 5 | 0.2 | 343° |
| Eng. Mode: trawl mode | | Fishing gear | | | | 20 | 0.3 | 290° |
| Speed (kt): 3.2 | | Type of trawl: Bottom trawl | | | | 50 | N/R | N/R |
| RPM: 900 | | Towing time: 30 minute | | Towing distance(nm): 1.4 | | Depth of capture (m) | | 51 |
| Pitch: 11 | | Warp angle: Stb 71 / Port 70 | | Warp length (m): 250 m | | Type of bottom | | |
| Towing direction: 055° | | Net spread (m): - | | Net opening (m): 3.8-4.0 | | Total catch (kg) | | |

NR: Not recorded



TRAWL FISHING LOGSHEET Operation No.3



| | | | | | | | | |
|------------------------|-----------|------------------------------|-------------|--------------------------|-------------|----------------------|----------|-----------|
| Cruise no: 37-1/2011 | | Name of Vessel | | | | Air | | |
| Survey station No.21 | | M.V. SEAFDEC 2 | | | | Air Temp. | 29.1 | (°C) |
| Date: 16-July-11 | | | | | | Pressure | 1011.5 | hpa |
| Moon age: 15 phase: 98 | | Start shooting | | Finish shooting | | Humidity | 78 | % |
| Wind | | Time | 1538 | Time | 1600 | Water | | |
| Speed (Kt) | Direction | Latitude | 05_14.80 N | Latitude | 05_14.80 N | Surface temp. | 30.4 | (°C) |
| 8 | 300 | Longitude | 114_37.50 E | Longitude | 114_38.60 E | Bottom temp. | N/R | (°C) |
| Weather condition | | Start hauling | | Finish hauling | | Transparency | N/R | (m) |
| Party cloudy | | Time | 1630 | Time | 1650 | Current | | |
| Sea condition : Slight | | Latitude | 05_14.70 N | Latitude | 05_15.20 N | Depth (m) | Spd (kt) | Direction |
| Vessel | | Longitude | 114_40.10 E | Longitude | 114_40.30 E | 5 | 0.5 | 338° |
| Eng. Mode: trawl mode | | Fishing gear | | | | 20 | 0.1 | 073° |
| Speed (kt): 3.0 | | Type of trawl: Bottom trawl | | | | 50 | N/R | N/R |
| RPM: 900 | | Towing time: 30 minute | | Towing distance(nm): 1.5 | | Depth of capture (m) | | 54 |
| Pitch: 13 | | Warp angle: Stb 70 / Port 71 | | Warp length (m): 250 m | | Type of bottom | | |
| Towing direction: 090° | | Net spread (m): - | | Net opening (m): 4.6 | | Total catch (kg) | | |

NR: Not recorded



TRAWL FISHING LOGSHEET Operation No.4



| | | | | | | | | |
|------------------------|-----------|------------------------------|-------------|--------------------------|-------------|----------------------|----------|-----------|
| Cruise no: 37-1/2011 | | Name of Vessel | | | | Air | | |
| Survey station No.16 | | M.V. SEAFDEC 2 | | | | Air Temp. | 30.6 | (°C) |
| Date: 16-July-11 | | | | | | Pressure | 1012 | hpa |
| Moon age: 15 phase: 98 | | Start shooting | | Finish shooting | | Humidity | 85 | % |
| Wind | | Time | 1750 | Time | 1805 | Water | | |
| Speed (Kt) | Direction | Latitude | 05_07.20 N | Latitude | 05_07.90 N | Surface temp. | 30.2 | (°C) |
| 10 | 290 | Longitude | 114_37.40 E | Longitude | 114_36.80 E | Bottom temp. | N/R | (°C) |
| Weather condition | | Start hauling | | Finish hauling | | Transparency | N/R | (m) |
| Party cloudy | | Time | 1835 | Time | 1835 | Current | | |
| Sea condition : Slight | | Latitude | 05_09.10 N | Latitude | 05_09.90 N | Depth (m) | Spd (kt) | Direction |
| Vessel | | Longitude | 114_35.90 E | Longitude | 114_35.70 E | 5 | 0.5 | 322° |
| Eng. Mode: trawl mode | | Fishing gear | | | | 20 | 0.1 | 280° |
| Speed (kt): 3.2 | | Type of trawl: Bottom trawl | | | | 50 | N/R | N/R |
| RPM: 900 | | Towing time: 30 minute | | Towing distance(nm): 1.5 | | Depth of capture (m) | | 37 |
| Pitch: 10 | | Warp angle: Stb 73 / Port 71 | | Warp length (m): 200 m | | Type of bottom | | |
| Towing direction: 315° | | Net spread (m): - | | Net opening (m): 4.5 | | Total catch (kg) | | |

NR: Not recorded

Correspondence person on catch report:



TRAWL FISHING LOGSHEET Operation No.5



| | | | | | | | | |
|------------------------|-----------|------------------------------|-------------|--------------------------|-------------|----------------------|----------|-----------|
| Cruise no: 37-1/2011 | | Name of Vessel | | | | Air | | |
| Survey station No.3 | | M.V. SEAFDEC 2 | | | | Air Temp. | 26.5 | (°C) |
| Date: 17-July-11 | | | | | | Pressure | 1013 | hpa |
| Moon age: 16 phase: 95 | | Start shooting | | Finish shooting | | Humidity | 92 | % |
| Wind | | Time | 0605 | Time | 0628 | Water | | |
| Speed (Kt) | Direction | Latitude | 04_51.50 N | Latitude | 04_52.90 N | Surface temp. | 30 | (°C) |
| 8 | 170 | Longitude | 114_02.20 E | Longitude | 114_03.10 E | Bottom temp. | N/R | (°C) |
| Weather condition | | Start hauling | | Finish hauling | | Transparency | N/R | (m) |
| Cloudy | | Time | 0658 | Time | 0720 | Current | | |
| Sea condition : Slight | | Latitude | 04_54.40 N | Latitude | 04_55.20 N | Depth (m) | Spd (kt) | Direction |
| Vessel | | Longitude | 114_04.00 E | Longitude | 114_04.80 E | 5 | 0.2 | 055° |
| Eng. Mode: trawl mode | | Fishing gear | | | | 20 | 0.3 | 055° |
| Speed (kt): 3.5 | | Type of trawl: Bottom trawl | | | | 50 | N/R | N/R |
| RPM: 900 | | Towing time: 30 minute | | Towing distance(nm): 1.7 | | Depth of capture (m) | | 58 |
| Pitch: 11 | | Warp angle: Stb 73 / Port 71 | | Warp length (m): 200 m | | Type of bottom | | |
| Towing direction: 025° | | Net spread (m): - | | Net opening (m): 4.5 | | Total catch (kg) | | |

NR: Not recorded



TRAWL FISHING LOGSHEET Operation No.6



| | | | | | | | | |
|------------------------|-----------|------------------------------|-------------|--------------------------|-------------|----------------------|----------|-----------|
| Cruise no: 37-1/2011 | | Name of Vessel | | | | Air | | |
| Survey station No.4 | | M.V. SEAFDEC 2 | | | | Air Temp. | 26.8 | (°C) |
| Date: 17-July-11 | | | | | | Pressure | 1014 | hpa |
| Moon age: 16 phase: 95 | | Start shooting | | Finish shooting | | Humidity | 85 | % |
| Wind | | Time | 0823 | Time | 0840 | Water | | |
| Speed (Kt) | Direction | Latitude | 04_51.40 N | Latitude | 04_52.20 N | Surface temp. | 30.1 | (°C) |
| 10 | 150 | Longitude | 114_11.40 E | Longitude | 114_11.40 E | Bottom temp. | N/R | (°C) |
| Weather condition | | Start hauling | | Finish hauling | | Transparency | N/R | (m) |
| Cloudy | | Time | 0910 | Time | 0932 | Current | | |
| Sea condition : Slight | | Latitude | 04_54.00 N | Latitude | 04_54.90 N | Depth (m) | Spd (kt) | Direction |
| Vessel | | Longitude | 114_14.20 E | Longitude | 114_11.30 E | 5 | 0.3 | 118° |
| Eng. Mode: trawl mode | | Fishing gear | | | | 20 | 0.0 | 230° |
| Speed (kt): 3.2 | | Type of trawl: Bottom trawl | | | | 50 | N/R | N/R |
| RPM: 900 | | Towing time: 30 minute | | Towing distance(nm): 1.8 | | Depth of capture (m) | | 48 |
| Pitch: 10 | | Warp angle: Stb 70 / Port 69 | | Warp length (m): 200 m | | Type of bottom | | |
| Towing direction: 345° | | Net spread (m): - | | Net opening (m): 3.8 | | Total catch (kg) | | |

NR: Not recorded

Correspondence person on catch report:



TRAWL FISHING LOGSHEET Operation No.7



| | | | | | | | |
|------------------------|------------------------------|-------------|--------------------------|-------------|----------------------|---------------|-----------|
| Cruise no: 37-1/2011 | Name of Vessel | | | | Air | | |
| Survey station No.5 | M.V. SEAFDEC 2 | | | | Air Temp. | 27.7 | (°C) |
| Date: 17-July-11 | | | | | Pressure | 1014 | hpa |
| Moon age: 16 phase: 95 | Start shooting | | Finish shooting | | Humidity | 85 | % |
| Wind | | Time | 1038 | Time | 1052 | Water | |
| Speed (Kt) | Direction | Latitude | 04_46.80 N | Latitude | 04_47.60 N | Surface temp. | 30.1 (°C) |
| 8 | 180 | Longitude | 114_17.10 E | Longitude | 114_16.90 E | Bottom temp. | N/R (°C) |
| Weather condition | Start hauling | | Finish hauling | | Transparency | N/R | (m) |
| Cloudy | Time | 1122 | Time | 1139 | Current | | |
| Sea condition : Slight | Latitude | 04_49.20 N | Latitude | 04_49.80 N | Depth (m) | Spd (kt) | Direction |
| Vessel | Longitude | 114_16.60 E | Longitude | 114_16.70 E | 5 | 0.2 | 117° |
| Eng. Mode: trawl mode | Fishing gear | | | | 20 | 0.1 | 197° |
| Speed (kt): 3.2 | Type of trawl: Bottom trawl | | | | 50 | N/R | N/R |
| RPM: 900 | Towing time: 30 minute | | Towing distance(nm): 1.6 | | Depth of capture (m) | | 36 |
| Pitch: 10 | Warp angle: Stb 70 / Port 71 | | Warp length (m): 150 m | | Type of bottom | | |
| Towing direction: 340° | Net spread (m): - | | Net opening (m): 4.0-4.8 | | Total catch (kg) | | |

NR: Not recorded



TRAWL FISHING LOGSHEET Operation No.8



| | | | | | | | |
|------------------------|------------------------------|-------------|--------------------------|-------------|----------------------|---------------|-----------|
| Cruise no: 37-1/2011 | Name of Vessel | | | | Air | | |
| Survey station No.6 | M.V. SEAFDEC 2 | | | | Air Temp. | 30.3 | (°C) |
| Date: 17-July-11 | | | | | Pressure | 1012 | hpa |
| Moon age: 16 phase: 95 | Start shooting | | Finish shooting | | Humidity | 72 | % |
| Wind | | Time | 1303 | Time | 1316 | Water | |
| Speed (Kt) | Direction | Latitude | 04_48.90 N | Latitude | 04_48.20 N | Surface temp. | 30.4 (°C) |
| 8 | 180 | Longitude | 114_21.90 E | Longitude | 114_21.90 E | Bottom temp. | N/R (°C) |
| Weather condition | Start hauling | | Finish hauling | | Transparency | N/R | (m) |
| Cloudy | Time | 1346 | Time | 1400 | Current | | |
| Sea condition : Slight | Latitude | 04_46.60 N | Latitude | 04_46.50 N | Depth (m) | Spd (kt) | Direction |
| Vessel | Longitude | 114_21.90 E | Longitude | 114_22.40 E | 5 | 0.1 | 231° |
| Eng. Mode: trawl mode | Fishing gear | | | | 20 | 0.3 | 276° |
| Speed (kt): 3.2 | Type of trawl: Bottom trawl | | | | 50 | N/R | N/R |
| RPM: 900 | Towing time: 30 minute | | Towing distance(nm): 1.6 | | Depth of capture (m) | | 35 |
| Pitch: 10 | Warp angle: Stb 70 / Port 70 | | Warp length (m): 150 m | | Type of bottom | | |
| Towing direction: 180° | Net spread (m): - | | Net opening (m): 3.8 | | Total catch (kg) | | |

NR: Not recorded

Correspondence person on catch report:



TRAWL FISHING LOGSHEET Operation No.9



| | | | | | | | | |
|------------------------|-----------|------------------------------|-------------|--------------------------|-------------|----------------------|----------|-----------|
| Cruise no: 37-1/2011 | | Name of Vessel | | | | Air | | |
| Survey station No.7 | | M.V. SEAFDEC 2 | | | | Air Temp. | 30.9 | (°C) |
| Date: 17-July-11 | | | | | | Pressure | 1011 | hpa |
| Moon age: 16 phase: 95 | | Start shooting | | Finish shooting | | Humidity | 67 | % |
| Wind | | Time | 1457 | Time | 1508 | Water | | |
| Speed (Kt) | Direction | Latitude | 04_48.90 N | Latitude | 04_48.60 N | Surface temp. | 30.3 | (°C) |
| 4 | 270 | Longitude | 114_27.00 E | Longitude | 114_27.40 E | Bottom temp. | N/R | (°C) |
| Weather condition | | Start hauling | | Finish hauling | | Transparency | N/R | (m) |
| Cloudy | | Time | 1538 | Time | 1557 | Current | | |
| Sea condition : Slight | | Latitude | 04_47.90 N | Latitude | 04_48.10 N | Depth (m) | Spd (kt) | Direction |
| Vessel | | Longitude | 114_28.90 E | Longitude | 114_29.30 E | 5 | 0.3 | 253° |
| Eng. Mode: trawl mode | | Fishing gear | | | | 20 | N/R | N/R |
| Speed (kt): 3.0 | | Type of trawl: Bottom trawl | | | | 50 | N/R | N/R |
| RPM: 900 | | Towing time: 30 minute | | Towing distance(nm): 1.6 | | Depth of capture (m) | | 32 |
| Pitch: 10 | | Warp angle: Stb 67 / Port 69 | | Warp length (m): 100 m | | Type of bottom | | |
| Towing direction: 135° | | Net spread (m): - | | Net opening (m): 4.2 | | Total catch (kg) | | |

NR: Not recorded



TRAWL FISHING LOGSHEET Operation No.10



| | | | | | | | | |
|------------------------|-----------|------------------------------|-------------|--------------------------|-------------|----------------------|----------|-----------|
| Cruise no: 37-1/2011 | | Name of Vessel | | | | Air | | |
| Survey station No.8 | | M.V. SEAFDEC 2 | | | | Air Temp. | 30.6 | (°C) |
| Date: 17-July-11 | | | | | | Pressure | 1011 | hpa |
| Moon age: 16 phase: 95 | | Start shooting | | Finish shooting | | Humidity | 72 | % |
| Wind | | Time | 1655 | Time | 1705 | Water | | |
| Speed (Kt) | Direction | Latitude | 04_52.60 N | Latitude | 04_52.60 N | Surface temp. | 30.8 | (°C) |
| 8 | 270 | Longitude | 114_22.50 E | Longitude | 114_23.10 E | Bottom temp. | N/R | (°C) |
| Weather condition | | Start hauling | | Finish hauling | | Transparency | N/R | (m) |
| Cloudy | | Time | 1735 | Time | 1750 | Current | | |
| Sea condition : Slight | | Latitude | 04_52.60 N | Latitude | 04_52.70 N | Depth (m) | Spd (kt) | Direction |
| Vessel | | Longitude | 114_24.60 E | Longitude | 114_25.10 E | 5 | 0.3 | 023° |
| Eng. Mode: trawl mode | | Fishing gear | | | | 20 | N/R | N/R |
| Speed (kt): 3.2 | | Type of trawl: Bottom trawl | | | | 50 | N/R | N/R |
| RPM: 900 | | Towing time: 30 minute | | Towing distance(nm): 1.5 | | Depth of capture (m) | | 28 |
| Pitch: 10 | | Warp angle: Stb 69 / Port 70 | | Warp length (m): 120 m | | Type of bottom | | |
| Towing direction: 090° | | Net spread (m): - | | Net opening (m): 3.8 | | Total catch (kg) | | |

NR: Not recorded

Correspondence person on catch report:



TRAWL FISHING LOGSHEET Operation No.11



| | | | | | | | | |
|------------------------|-----------|------------------------------|-------------|--------------------------|-------------|----------------------|----------|-----------|
| Cruise no: 37-1/2011 | | Name of Vessel | | | | Air | | |
| Survey station No.9 | | M.V. SEAFDEC 2 | | | | Air Temp. | 28.7 | (°C) |
| Date: 18-July-11 | | | | | | Pressure | 1013 | hpa |
| Moon age: 17 phase: 89 | | Start shooting | | Finish shooting | | Humidity | 92 | % |
| Wind | | Time | 0600 | Time | 0616 | Water | | |
| Speed (Kt) | Direction | Latitude | 04_57.10 N | Latitude | 04_57.70 N | Surface temp. | 29.9 | (°C) |
| 6 | 160 | Longitude | 114_16.20 E | Longitude | 114_16.90 E | Bottom temp. | 28.7 | (°C) |
| Weather condition | | Start hauling | | Finish hauling | | Transparency | N/R | (m) |
| Cloudy | | Time | 0646 | Time | 0708 | Current | | |
| Sea condition : Slight | | Latitude | 04_59.00 N | Latitude | 04_59.70 N | Depth (m) | Spd (kt) | Direction |
| Vessel | | Longitude | 114_17.80 E | Longitude | 114_18.30 E | 5 | 0.3 | 037° |
| Eng. Mode: trawl mode | | Fishing gear | | | | 20 | 0.2 | 037° |
| Speed (kt): 3.1 | | Type of trawl: Bottom trawl | | | | 50 | N/R | N/R |
| RPM: 900 | | Towing time: 30 minute | | Towing distance(nm): 1.6 | | Depth of capture (m) | | 51 |
| Pitch: 9 | | Warp angle: Stb 73 / Port 72 | | Warp length (m): 200 m | | Type of bottom | | |
| Towing direction: 042° | | Net spread (m): - | | Net opening (m):4-5 | | Total catch (kg) | | |

NR: Not recorded



TRAWL FISHING LOGSHEET Operation No.12



| | | | | | | | | |
|------------------------|-----------|------------------------------|-------------|--------------------------|-------------|----------------------|----------|-----------|
| Cruise no: 37-1/2011 | | Name of Vessel | | | | Air | | |
| Survey station No.10 | | M.V. SEAFDEC 2 | | | | Air Temp. | 28.3 | (°C) |
| Date: 18-July-11 | | | | | | Pressure | 1014 | hpa |
| Moon age: 17 phase: 89 | | Start shooting | | Finish shooting | | Humidity | 92 | % |
| Wind | | Time | 0755 | Time | 0808 | Water | | |
| Speed (Kt) | Direction | Latitude | 05_00.20 N | Latitude | 05_00.80 N | Surface temp. | 30.2 | (°C) |
| 6 | 180 | Longitude | 114_16.20 E | Longitude | 114_23.90 E | Bottom temp. | N/R | (°C) |
| Weather condition | | Start hauling | | Finish hauling | | Transparency | N/R | (m) |
| Cloudy | | Time | 0838 | Time | 0857 | Current | | |
| Sea condition : Slight | | Latitude | 05_02.40 N | Latitude | 05_02.90 N | Depth (m) | Spd (kt) | Direction |
| Vessel | | Longitude | 114_23.90 E | Longitude | 114_24.40 E | 5 | 0.2 | 102° |
| Eng. Mode: trawl mode | | Fishing gear | | | | 20 | 0.1 | 348° |
| Speed (kt): 3.4 | | Type of trawl: Bottom trawl | | | | 50 | N/R | N/R |
| RPM: 900 | | Towing time: 30 minute | | Towing distance(nm): 1.6 | | Depth of capture (m) | | 36 |
| Pitch: 10 | | Warp angle: Stb 71 / Port 70 | | Warp length (m): 150 m | | Type of bottom | | |
| Towing direction: 340° | | Net spread (m): - | | Net opening (m):4.0 | | Total catch (kg) | | |

NR: Not recorded

Correspondence person on catch report:



TRAWL FISHING LOGSHEET Operation No.13



| | | | | | | | | |
|------------------------|-----------|------------------------------|-------------|--------------------------|-------------|----------------------|----------|-----------|
| Cruise no: 37-1/2011 | | Name of Vessel | | | | Air | | |
| Survey station No.15 | | M.V. SEAFDEC 2 | | | | Air Temp. | 30.1 | (°C) |
| Date: 18-July-11 | | | | | | Pressure | 1014 | hpa |
| Moon age: 17 phase: 89 | | Start shooting | | Finish shooting | | Humidity | 79 | % |
| Wind | | Time | 0957 | Time | 1012 | Water | | |
| Speed (Kt) | Direction | Latitude | 05_10.10 N | Latitude | 05_09.50 N | Surface temp. | 30.2 | (°C) |
| 6 | 210 | Longitude | 114_30.40 E | Longitude | 114_30.00 E | Bottom temp. | N/R | (°C) |
| Weather condition | | Start hauling | | Finish hauling | | Transparency | N/R | (m) |
| Cloudy | | Time | 1042 | Time | 1102 | Current | | |
| Sea condition : Slight | | Latitude | 05_08.10 N | Latitude | 05_07.50 N | Depth (m) | Spd (kt) | Direction |
| Vessel | | Longitude | 114_29.20 E | Longitude | 114_29.40 E | 5 | 0.2 | 336° |
| Eng. Mode: trawl mode | | Fishing gear | | | | 20 | 0.2 | 087° |
| Speed (kt): 3.3 | | Type of trawl: Bottom trawl | | | | 50 | N/R | N/R |
| RPM: 900 | | Towing time: 30 minute | | Towing distance(nm): 1.6 | | Depth of capture (m) | | 56 |
| Pitch: 11 | | Warp angle: Stb 69 / Port 70 | | Warp length (m): 200 m | | Type of bottom | | |
| Towing direction: 210° | | Net spread (m): - | | Net opening (m):3.8-4 | | Total catch (kg) | | |

NR: Not recorded



TRAWL FISHING LOGSHEET Operation No.14



| | | | | | | | | |
|------------------------|-----------|------------------------------|-------------|--------------------------|-------------|----------------------|----------|-----------|
| Cruise no: 37-1/2011 | | Name of Vessel | | | | Air | | |
| Survey station No.14 | | M.V. SEAFDEC 2 | | | | Air Temp. | 29.7 | (°C) |
| Date: 18-July-11 | | | | | | Pressure | 1013.5 | hpa |
| Moon age: 17 phase: 89 | | Start shooting | | Finish shooting | | Humidity | 79 | % |
| Wind | | Time | 1152 | Time | 1205 | Water | | |
| Speed (Kt) | Direction | Latitude | 05_00.50 N | Latitude | 05_01.20 N | Surface temp. | 30.4 | (°C) |
| 4 | 190 | Longitude | 114_29.60 E | Longitude | 114_30.1 E | Bottom temp. | N/R | (°C) |
| Weather condition | | Start hauling | | Finish hauling | | Transparency | N/R | (m) |
| Cloudy | | Time | 1235 | Time | 1250 | Current | | |
| Sea condition : Slight | | Latitude | 05_02.50 N | Latitude | 05_02.90 N | Depth (m) | Spd (kt) | Direction |
| Vessel | | Longitude | 114_31.00 E | Longitude | 114_31.50 E | 5 | 0.1 | 126° |
| Eng. Mode: trawl mode | | Fishing gear | | | | 20 | 0.4 | 257° |
| Speed (kt): 3.3 | | Type of trawl: Bottom trawl | | | | 50 | N/R | N/R |
| RPM: 900 | | Towing time: 30 minute | | Towing distance(nm): 1.6 | | Depth of capture (m) | | 37 |
| Pitch: 10 | | Warp angle: Stb 70 / Port 71 | | Warp length (m): 170 m | | Type of bottom | | |
| Towing direction: 030° | | Net spread (m): - | | Net opening (m):4.0 | | Total catch (kg) | | |

NR: Not recorded

Correspondence person on catch report:



TRAWL FISHING LOGSHEET Operation No.15



| | | | | | | | | |
|------------------------|-----------|------------------------------|-------------|--------------------------|-------------|----------------------|----------|-----------|
| Cruise no: 37-1/2011 | | Name of Vessel | | | | Air | | |
| Survey station No.11 | | M.V. SEAFDEC 2 | | | | Air Temp. | 30.6 | (°C) |
| Date: 18-July-11 | | | | | | Pressure | 1012.5 | hpa |
| Moon age: 17 phase: 89 | | Start shooting | | Finish shooting | | Humidity | 72 | % |
| Wind | | Time | 1331 | Time | 1344 | Water | | |
| Speed (Kt) | Direction | Latitude | 04_57.50 N | Latitude | 04_58.00 N | Surface temp. | 30.4 | (°C) |
| 4 | 240 | Longitude | 114_28.50 E | Longitude | 114_29.00 E | Bottom temp. | N/R | (°C) |
| Weather condition | | Start hauling | | Finish hauling | | Transparency | N/R | (m) |
| Cloudy | | Time | 1414 | Time | 1430 | Current | | |
| Sea condition : Slight | | Latitude | 04_59.20 N | Latitude | 04_59.50 N | Depth (m) | Spd (kt) | Direction |
| Vessel | | Longitude | 114_30.00 E | Longitude | 114_30.50 E | 5 | 0.1 | 090° |
| Eng. Mode: trawl mode | | Fishing gear | | | | 20 | N/R | N/R |
| Speed (kt): 3.3 | | Type of trawl: Bottom trawl | | | | 50 | N/R | N/R |
| RPM: 900 | | Towing time: 30 minute | | Towing distance(nm): 1.6 | | Depth of capture (m) | | 31 |
| Pitch: 10 | | Warp angle: Stb 70 / Port 71 | | Warp length (m): 120 m | | Type of bottom | | |
| Towing direction: 030° | | Net spread (m): - | | Net opening (m):4.2 | | Total catch (kg) | | |

NR: Not recorded



TRAWL FISHING LOGSHEET Operation No.16



| | | | | | | | | |
|------------------------|-----------|------------------------------|-------------|--------------------------|-------------|----------------------|----------|-----------|
| Cruise no: 37-1/2011 | | Name of Vessel | | | | Air | | |
| Survey station No.12 | | M.V. SEAFDEC 2 | | | | Air Temp. | 32.6 | (°C) |
| Date: 18-July-11 | | | | | | Pressure | 1011 | hpa |
| Moon age: 17 phase: 89 | | Start shooting | | Finish shooting | | Humidity | 68 | % |
| Wind | | Time | 1522 | Time | 1534 | Water | | |
| Speed (Kt) | Direction | Latitude | 04_52.10 N | Latitude | 04_52.40 N | Surface temp. | 30.6 | (°C) |
| 4 | 300 | Longitude | 114_33.80 E | Longitude | 114_33.30 E | Bottom temp. | N/R | (°C) |
| Weather condition | | Start hauling | | Finish hauling | | Transparency | N/R | (m) |
| Cloudy | | Time | 1604 | Time | 1619 | Current | | |
| Sea condition : Slight | | Latitude | 04_53.10 N | Latitude | 04_52.80 N | Depth (m) | Spd (kt) | Direction |
| Vessel | | Longitude | 114_32.00 E | Longitude | 114_31.70 E | 5 | 0.5 | 009° |
| Eng. Mode: trawl mode | | Fishing gear | | | | 20 | N/R | N/R |
| Speed (kt): 2.9 | | Type of trawl: Bottom trawl | | | | 50 | N/R | N/R |
| RPM: 900 | | Towing time: 30 minute | | Towing distance(nm): 1.5 | | Depth of capture (m) | | 23 |
| Pitch: 9 | | Warp angle: Stb 71 / Port 71 | | Warp length (m): 120 m | | Type of bottom | | |
| Towing direction: 300° | | Net spread (m): - | | Net opening (m):4.0 | | Total catch (kg) | | |

NR: Not recorded

Correspondence person on catch report:



TRAWL FISHING LOGSHEET Operation No.17



| | | | | | | | | |
|------------------------|-----------|------------------------------|-------------|--------------------------|-------------|----------------------|----------|-----------|
| Cruise no: 37-1/2011 | | Name of Vessel | | | | Air | | |
| Survey station No.13 | | M.V. SEAFDEC 2 | | | | Air Temp. | 30.4 | (°C) |
| Date: 18-July-11 | | | | | | Pressure | 1011 | hpa |
| Moon age: 17 phase: 89 | | Start shooting | | Finish shooting | | Humidity | 73 | % |
| Wind | | Time | 1700 | Time | 1712 | Water | | |
| Speed (Kt) | Direction | Latitude | 04_58.30 N | Latitude | 04_57.60 N | Surface temp. | 30.6 | (°C) |
| 6 | 280 | Longitude | 114_43.60 E | Longitude | 114_34.60 E | Bottom temp. | N/R | (°C) |
| Weather condition | | Start hauling | | Finish hauling | | Transparency | N/R | (m) |
| Cloudy | | Time | 1742 | Time | 1800 | Current | | |
| Sea condition : Slight | | Latitude | 04_56.00 N | Latitude | 04_55.50 N | Depth (m) | Spd (kt) | Direction |
| Vessel | | Longitude | 114_34.80 E | Longitude | 114_35.20 E | 5 | 0.2 | 154° |
| Eng. Mode: trawl mode | | Fishing gear | | | | 20 | N/R | N/R |
| Speed (kt): 3.3 | | Type of trawl: Bottom trawl | | | | 50 | N/R | N/R |
| RPM: 900 | | Towing time: 30 minute | | Towing distance(nm): 1.6 | | Depth of capture (m) | | 27 |
| Pitch: 10 | | Warp angle: Stb 67 / Port 70 | | Warp length (m): 120 m | | Type of bottom | | |
| Towing direction: 180° | | Net spread (m): - | | Net opening (m):4.0 | | Total catch (kg) | | |

NR: Not recorded



TRAWL FISHING LOGSHEET Operation No.18



| | | | | | | | | |
|------------------------|-----------|------------------------------|-------------|--------------------------|-------------|----------------------|----------|-----------|
| Cruise no: 37-1/2011 | | Name of Vessel | | | | Air | | |
| Survey station No.17 | | M.V. SEAFDEC 2 | | | | Air Temp. | 29.4 | (°C) |
| Date: 19-July-11 | | | | | | Pressure | 1013 | hpa |
| Moon age: 18 phase: 89 | | Start shooting | | Finish shooting | | Humidity | 92 | % |
| Wind | | Time | 0630 | Time | 0640 | Water | | |
| Speed (Kt) | Direction | Latitude | 05_02.70 N | Latitude | 05_02.80 N | Surface temp. | 30.1 | (°C) |
| 4 | 150 | Longitude | 114_43.90 E | Longitude | 114_43.20 E | Bottom temp. | N/R | (°C) |
| Weather condition | | Start hauling | | Finish hauling | | Transparency | N/R | (m) |
| Cloudy | | Time | 0710 | Time | 0740 | Current | | |
| Sea condition : Slight | | Latitude | 05_03.10 N | Latitude | 05_02.80 N | Depth (m) | Spd (kt) | Direction |
| Vessel | | Longitude | 114_41.80 E | Longitude | 114_41.30 E | 5 | 0.3 | 350° |
| Eng. Mode: trawl mode | | Fishing gear | | | | 20 | N/R | N/R |
| Speed (kt): 3.0 | | Type of trawl: Bottom trawl | | | | 50 | N/R | N/R |
| RPM: 900 | | Towing time: 30 minute | | Towing distance(nm): 1.4 | | Depth of capture (m) | | 19 |
| Pitch: 9 | | Warp angle: Stb 74 / Port 73 | | Warp length (m): 80 m | | Type of bottom | | |
| Towing direction: 280° | | Net spread (m): - | | Net opening (m):2.4-3 | | Total catch (kg) | | |

NR: Not recorded

Correspondence person on catch report:



TRAWL FISHING LOGSHEET Operation No.19



| | | | | | | | | |
|------------------------|-----------|------------------------------|-------------|--------------------------|-------------|----------------------|----------|-----------|
| Cruise no: 37-1/2011 | | Name of Vessel | | | | Air | | |
| Survey station No.13 | | M.V. SEAFDEC 2 | | | | Air Temp. | 30.5 | (°C) |
| Date: 19-July-11 | | | | | | Pressure | 1013.5 | hpa |
| Moon age: 18 phase: 83 | | Start shooting | | Finish shooting | | Humidity | 79 | % |
| Wind | | Time | 0845 | Time | 0858 | Water | | |
| Speed (Kt) | Direction | Latitude | 05_02.90 N | Latitude | 05_03.20 N | Surface temp. | 29.9 | (°C) |
| 4 | 130 | Longitude | 114_49.70 E | Longitude | 114_49.00 E | Bottom temp. | N/R | (°C) |
| Weather condition | | Start hauling | | Finish hauling | | Transparency | N/R | (m) |
| bc | | Time | 0928 | Time | 0942 | Current | | |
| Sea condition : Slight | | Latitude | 05_03.60 N | Latitude | 05_03.60 N | Depth (m) | Spd (kt) | Direction |
| Vessel | | Longitude | 114_47.50 E | Longitude | 114_47.10 E | 5 | 0.5 | 105° |
| Eng. Mode: trawl mode | | Fishing gear | | | | 20 | N/R | N/R |
| Speed (kt): 3.0 | | Type of trawl: Bottom trawl | | | | 50 | N/R | N/R |
| RPM: 900 | | Towing time: 30 minute | | Towing distance(nm): 1.5 | | Depth of capture (m) | | 19 |
| Pitch: 10 | | Warp angle: Stb 70 / Port 70 | | Warp length (m): 80 m | | Type of bottom | | |
| Towing direction: 283° | | Net spread (m): - | | Net opening (m):3.2 | | Total catch (kg) | | |

NR: Not recorded

Correspondence person on catch report:

Appendix 3 Result of hydroacoustic survey

| | | | | | | |
|-------------|------------|---------|-------------------|--------------|--------------|-------------------------------------|
| Doc ID. | 0000001184 | Station | | Ship Course | 325 | Remark |
| Date | 09/07/2011 | From | Lat. 04°47.29 N | Ship Speed | 0 kt. | Calibration High Frequency |
| Start Time | 0754 | | Long. 114°18.19 E | Sea State | Slight | Temp: °C |
| Finish Time | 0658 | To | Lat. 04°47.29 N | Bottom Depth | 36 m. | Salinity: psu. |
| | | | Long. 114°18.18 E | | | |
| Doc ID. | 0000001185 | Station | | Ship Course | 325 | Remark |
| Date | 09/07/2011 | From | Lat. 04°47.29 N | Ship Speed | 0 kt. | Calibration Low Frequency |
| Start Time | 0759 | | Long. 114°18.19 E | Sea State | Slight | Temp: °C |
| Finish Time | 0803 | To | Lat. 04°47.29 N | Bottom Depth | 36 m. | Salinity: psu. |
| | | | Long. 114°18.19 E | | | |
| Doc ID. | 0000001186 | Station | 1-2 leg1 | Ship Course | 283 | Remark |
| Date | 09/07/2011 | From | Lat. 04°41.99 N | Ship Speed | 9.4 kt. | Route station 1-2 leg 1 |
| Start Time | 1158 | | Long. 114°13.30 E | Sea State | Slight | |
| Finish Time | 1230 | To | Lat. 04°43.51 N | Bottom Depth | 20-33 m. | |
| | | | Long. 114°07.93 E | | | |
| Doc ID. | 0000001187 | Station | 1-2 Leg2 | Ship Course | 009 | Remark |
| Date | 09/07/2011 | From | Lat. 04°43.69 N | Ship Speed | 9.8 kt. | Route station 1-2 leg 2 |
| Start Time | 1237 | | Long. 114°07.86 E | Sea State | Slight | Fish school 12- 27 m depth |
| Finish Time | 1257 | To | Lat. 04°47.02 N | Bottom Depth | 33.5 m. | |
| | | | Long. 114°08.32 E | | | |
| Doc ID. | 0000001188 | Station | 2-3 | Ship Course | 315 | Remark |
| Date | 09/07/2011 | From | Lat. 04°47.21 N | Ship Speed | 9.3 kt. | Route station 2-3 |
| Start Time | 1319 | | Long. 114°08.38 E | Sea State | Slight | Plankton intensity at 36-48 m depth |
| Finish Time | 1407 | To | Lat. 04°52.12 N | Bottom Depth | 41.4-53.2 m. | |
| | | | Long. 114°03.29 E | | | |
| Doc ID. | 0000001189 | Station | 3-4 | Ship Course | 067 | Remark |
| Date | 09/07/2011 | From | Lat. 04°52.19 N | Ship Speed | 9.9 kt. | Route station 3-4 |
| Start Time | 1659 | | Long. 114°03.32 E | Sea State | Slight | Plankton intensity at 38-45 m depth |
| Finish Time | 1746 | To | Lat. 04°55.17 N | Bottom Depth | 53 m. | |
| | | | Long. 114°10.46 E | | | |

| | | | | | | |
|-------------|------------|---------|-------------------|--------------|----------|--|
| Doc ID. | 0000001190 | Station | 4-5 | Ship Course | 135 | Remark |
| Date | 10/07/2011 | From | Lat. 04°54.98N | Ship Speed | 9.7 kt. | Route station 4-5 |
| Start Time | 0823 | | Long. 114°10.57 E | Sea State | Slight | Plankton intensity at 20-35 m depth |
| Finish Time | 0915 | To | Lat. 04°49.14 N | Bottom Depth | 50.0 m. | |
| | | | Long. 114°16.41 E | | | |
| Doc ID. | 0000001191 | Station | 5-6 | Ship Course | 135 | Remark |
| Date | 10/07/2011 | From | Lat. 04°49.09N | Ship Speed | 9.8 kt. | Route station 5-6 |
| Start Time | 0943 | | Long. 114°16.43 E | Sea State | Slight | Plankton intensity at 17-20 and 21-31 m depth |
| Finish Time | 1036 | To | Lat. 04°43.13 N | Bottom Depth | 35 m. | Bottom is change from thin echo to double bottom echo (not from setting, probably sediment is different character) |
| | | | Long. 114°22.42 E | | | |
| Doc ID. | 0000001192 | Station | 6-7 | Ship Course | 061 | Remark |
| Date | 10/07/2011 | From | Lat. 04°43.14 N | Ship Speed | 9.6 kt. | Route station 6-7 |
| Start Time | 1142 | | Long. 114°22.46 E | Sea State | Slight | Plankton intensity at 5-12 m depth and 1 m above sea bottom |
| Finish Time | 1230 | To | Lat. 04°46.77 N | Bottom Depth | 19 m. | . |
| | | | Long. 114°28.91 E | | | |
| Doc ID. | 0000001193 | Station | 7-8 | Ship Course | 313 | Remark |
| Date | 10/07/2011 | From | Lat. 04°46.74 N | Ship Speed | 9.7 kt. | Route station 7-8 |
| Start Time | 1333 | | Long. 114°28.70 E | Sea State | Slight | Plankton intensity at 5.2-12 m depth and 3 m above sea bottom |
| Finish Time | 1419 | To | Lat. 04°51.74 N | Bottom Depth | 20-32 m. | |
| | | | Long. 114°23.42 E | | | |
| Doc ID. | 0000001194 | Station | 8-9 | Ship Course | 311 | Remark |
| Date | 10/07/2011 | From | Lat. 04°51.79 N | Ship Speed | 9.6 kt. | Route station 8-9 |
| Start Time | 1436 | | Long. 114°23.39 E | Sea State | Slight | Plankton intensity at 8-14 m depth and 3 m above sea bottom |
| Finish Time | 1524 | To | Lat. 04°56.92 N | Bottom Depth | 24-35 m. | A/C from 313 to 280 at 04°53.90 N/ 114°20.57 E (1500 hrs) |
| | | | Long. 114°17.63 E | | | A/C from 280 to 327 at 04°54.70 N/ 114°18.90 E (1510 hrs) |
| | | | | | | Bottom topography is rough (rocky) |
| Doc ID. | 0000001195 | Station | 9-10 | Ship Course | 048 | Remark |
| Date | 10/07/2011 | From | Lat. 04°57.06 N | Ship Speed | 9.8 kt. | Route station 9-10 |
| Start Time | 1655 | | Long. 114°17.65 E | Sea State | Slight | Plankton intensity at 32-40.5 m and very dense at 34.5-40.5 m |
| Finish Time | 1738 | To | Lat. 05°01.77 N | Bottom Depth | 42-43 m. | |
| | | | Long. 114°23.01 E | | | |

| | | | | | | |
|-------------|------------|---------|-------------------|--------------|----------|--|
| Doc ID. | 0000001196 | Station | 10-11 | Ship Course | 132 | Remark |
| Date | 10/07/2011 | From | Lat. 05°01.64 N | Ship Speed | 10 kt. | Route station 10-11 |
| Start Time | 1856 | | Long. 114°23.14 E | Sea State | Slight | Plankton intensity at 13-17 m (thick) and 22-15 m. (weak) |
| Finish Time | 1738 | To | Lat. 04°56.55 N | Bottom Depth | 37 m. | |
| | | | Long. 114°28.61 E | | | |
| Doc ID. | 0000001197 | Station | 11-12 | Ship Course | 132 | Remark |
| Date | 11/07/2011 | From | Lat. 04°56.60 N | Ship Speed | 9.5 kt. | Route station 11-12 |
| Start Time | 0705 | | Long. 114°28.75 E | Sea State | Slight | Plankton intensity at 21-25 m and 1 m above sea bottom |
| Finish Time | 0754 | To | Lat. 04°51.60 N | Bottom Depth | 16-28 m. | Bottom is change from thin to thick echo (probably sediment is different character) Scatter fish school at 22-25 m. |
| | | | Long. 114°34.27 E | | | |
| Doc ID. | 0000001199 | Station | 12-13 leg1 | Ship Course | 045 | Remark |
| Date | 11/07/2011 | From | Lat. 04°51.77 N | Ship Speed | 9.7 kt. | Route station 12-13 leg 1 |
| Start Time | 0854 | | Long. 114°36.46 E | Sea State | Slight | Plankton intensity at 8-16 m |
| Finish Time | 0923 | To | Lat. 04°55.13 N | Bottom Depth | 16 m. | |
| | | | Long. 114°37.82 E | | | |
| Doc ID. | 0000001200 | Station | 12-13 leg2 | Ship Course | 045 | Remark |
| Date | 11/07/2011 | From | Lat. 4°55.18 N | Ship Speed | 9.5 kt | Route station 12-13 leg 2 |
| Start Time | 0925 | | Long. 114°38.05 E | Sea State | Slight | Plankton intensity at 6-14 m but dense at 8-12 m. |
| Finish Time | 0937 | To | Lat. 4°55.16 N | Bottom Depth | 10-15 m. | |
| | | | Long. 114°39.77 E | | | |
| Doc ID. | 0000001201 | Station | 13-14 | Ship Course | 316 | Remark |
| Date | 11/07/2011 | From | Lat. 04°55.17 N | Ship Speed | 9.8 kt. | Route station 13-14 |
| Start Time | 1040 | | Long. 114°39.76 E | Sea State | Slight | Plankton intensity at 4-20 m |
| Finish Time | 1127 | To | Lat. 05°00.79 N | Bottom Depth | 10-22 m. | A fish school at 12-21 m depth |
| | | | Long. 114°34.36 E | | | |
| Doc ID. | 0000001202 | Station | 14-15 | Ship Course | 315 | Remark |
| Date | 11/07/2011 | From | Lat. 05°00.86 N | Ship Speed | 9.9 kt. | Route station 14-15 |
| Start Time | 1232 | | Long. 114°34.23 E | Sea State | Slight | Plankton intensity at 19-21, 30-36, 38-43 m |
| Finish Time | 1320 | To | Lat. 05°06.53 N | Bottom Depth | 29-44 m. | |
| | | | Long. 114°29.03 E | | | |

| | | | | | | |
|-------------|------------|---------|-------------------|--------------|------------|---|
| Doc ID. | 0000001205 | Station | 15-16 | Ship Course | 054 | Remark |
| Date | 11/07/2011 | From | Lat. 05°06.69 N | Ship Speed | 10.0 kt. | Route station 15-16 |
| Start Time | 1444 | | Long. 114°29.24 E | Sea State | Slight | Plankton intensity thin at 10-35 m |
| Finish Time | 1522 | To | Lat. 05°10.12 N | Bottom Depth | 44-45 m. | Plankton intensity dense at 35-44 m |
| | | | Long. 114°34.29 E | | | |
| Doc ID. | 0000001206 | Station | 16-17 | Ship Course | 134 | Remark |
| Date | 11/07/2011 | From | Lat. 05°10.12 N | Ship Speed | 9.9 kt. | Route station 16-17 |
| Start Time | 1644 | | Long. 114°34.50 E | Sea State | Slight | Plankton intensity thin at 9.2-30.5 m |
| Finish Time | 1375 | To | Lat. 05°04.43 N | Bottom Depth | 20-45 m. | Plankton intensity dense at 14-18 m |
| | | | Long. 114°40.33 E | | | |
| Doc ID. | 0000001207 | Station | 17-18 | Ship Course | 133 | Remark |
| Date | 11/07/2011 | From | Lat. 05°04.30 N | Ship Speed | 9.3 kt. | Route station 17-18 |
| Start Time | 1840 | | Long. 114°40.52 E | Sea State | Slight | Plankton intensity thin at 5-14 m |
| Finish Time | 1929 | To | Lat. 04°58.73 N | Bottom Depth | 19-20 m. | Scatter small fish school at surface - 15 m |
| | | | Long. 114°46.40 E | | | |
| Doc ID. | 0000001208 | Station | 18-19 | Ship Course | 059 | Remark |
| Date | 12/07/2011 | From | Lat. 04°58.90 N | Ship Speed | 10 kt. | Route station 18-19 |
| Start Time | 0715 | | Long. 114°46.52 E | Sea State | Slight | Plankton intensity at 2 m above bottom |
| Finish Time | 0757 | To | Lat. 05°02.37 N | Bottom Depth | 11-14 m. | |
| | | | Long. 114°52.42 E | | | |
| Doc ID. | 0000001209 | Station | 19-20 | Ship Course | 315 | Remark |
| Date | 12/07/2011 | From | Lat. 05°02.37 N | Ship Speed | 100 kt. | Route station 19-20 |
| Start Time | 0854 | | Long. 114°52.41 E | Sea State | Slight | Plankton intensity at 2 m above bottom |
| Finish Time | 0936 | To | Lat. 05°07.10 N | Bottom Depth | 21 m. | A group of fish school 17-20 m. |
| | | | Long. 114°47.82 E | | | |
| Doc ID. | 0000001210 | Station | 20-21 leg 1 | Ship Course | 295 | Remark |
| Date | 12/07/2011 | From | Lat. 05°07.12 N | Ship Speed | 10 kt. | Route station 20-21 |
| Start Time | 1038 | | Long. 114°47.64 E | Sea State | Slight | Plankton intensity 8-16 m. |
| Finish Time | 1100 | To | Lat. 05°08.58 N | Bottom Depth | 18.3-20 m. | Adjust ship course to avoid wells |
| | | | Long. 114°44.99 E | | | |

| | | | | | | |
|-------------|------------|---------|-------------------|--------------|--------------|--|
| Doc ID. | 0000001211 | Station | 21 leg 1- leg 2 | Ship Course | 295 | Remark |
| Date | 12/07/2011 | From | Lat. 05°08.69 N | Ship Speed | 10 kt. | Route station 20-21 |
| Start Time | 1104 | | Long. 114°44.87 E | Sea State | Slight | Plankton intensity 8-16 m. |
| Finish Time | 1114 | To | Lat. 05°09.47 N | Bottom Depth | 20 m. | Adjust ship course to avoid wells |
| | | | Long. 114°43.44 E | | | |
| Doc ID. | 0000001212 | Station | 21 leg 2- leg 3 | Ship Course | 315 | Remark |
| Date | 12/07/2011 | From | Lat. 05°09.64 N | Ship Speed | 9.4 kt. | Route station 20-21 |
| Start Time | 1115 | | Long. 114°43.28 E | Sea State | Slight | Plankton intensity 8-18, 21-24, 10-32 m. and 7 m above sea |
| Finish Time | 1150 | To | Lat. 05°14.89 N | Bottom Depth | 22-50 m. | bottom |
| | | | Long. 114°40.43 E | | | |
| Doc ID. | 0000001213 | Station | 21-22 | Ship Course | 065 | Remark |
| Date | 12/07/2010 | From | Lat. 05°14.97 N | Ship Speed | 10.0 kt. | Route station 21-22 |
| Start Time | 1310 | | Long. 114°40.43 E | Sea State | Slight | Plankton intensity 36-42 and 36-45 m. |
| Finish Time | 1353 | To | Lat. 05°17.91 N | Bottom Depth | 46.3-48.6 m. | |
| | | | Long. 114°46.88 E | | | |
| Doc ID. | 0000001214 | Station | 22-23 | Ship Course | 135 | Remark |
| Date | 12/07/2010 | From | Lat. 05°17.91 N | Ship Speed | 9.9 kt. | Route station 22-23 |
| Start Time | 1515 | | Long. 114°46.99 E | Sea State | Slight | Plankton intensity 8-23, 28-33, and 35-45 m. |
| Finish Time | 1603 | To | Lat. 05°12.29 N | Bottom Depth | 48-36 m. | |
| | | | Long. 114°52.63 E | | | |
| Doc ID. | 0000001215 | Station | 23-24 | Ship Course | 135 | Remark |
| Date | 12/07/2010 | From | Lat. 05°12.19 N | Ship Speed | 9.9 kt. | Route station 23-24 |
| Start Time | 1706 | | Long. 114°52.72 E | Sea State | Slight | Plankton intensity 5-18 m. |
| Finish Time | 1753 | To | Lat. 05°06.55 N | Bottom Depth | 36 m. | |
| | | | Long. 114°58.39 E | | | |

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|-------------|------------|---------|-------------------|--------------|----------|---|
| Doc ID. | 0000001219 | Station | 22 | Ship Course | 054 | Remark |
| Date | 16/07/2011 | From | Lat. 05°18.36 N | Ship Speed | 3.0 kt. | Trawl Op2 (st22) |
| Start Time | 1347 | | Long. 114°46.47 E | Sea State | Slight | Plankton layer at 42-52 m. |
| Finish Time | 1439 | To | Lat. 05°19.42 N | Bottom Depth | 35-45 m. | Fishing echo sounder is not turn off |
| | | | Long. 114°41.11 E | | | Record time is excess 20 minutes |
| Doc ID. | 0000001220 | Station | 21 | Ship Course | 092 | Remark |
| Date | 16/07/2011 | From | Lat. 05°14.83 N | Ship Speed | 3.1 kt. | Trawl Op3 (st21) |
| Start Time | 1603 | | Long. 114°38.89 E | Sea State | Slight | Plankton layer at 6-32 m. |
| Finish Time | 1658 | To | Lat. 05°14.89 N | Bottom Depth | 52 m. | Some echo of fish school |
| | | | Long. 114°40.09 E | | | Fishing echo sounder is not turn off and gaps by moderate |
| | | | | | | Sea condition |
| Doc ID. | 0000001221 | Station | 16 | Ship Course | 320 | Remark |
| Date | 16/07/2011 | From | Lat. 05°08.03 N | Ship Speed | 3.1 kt. | Trawl Op4 (st16) |
| Start Time | 1807 | | Long. 114°36.83 E | Sea State | Moderate | Plankton layer at 21-32 m. |
| Finish Time | 1833 | To | Lat. 05°09.09 N | Bottom Depth | 38-44 m. | Some echo of fish school |
| | | | Long. 114°35.98 E | | | Fishing echo sounder is not turn off and gaps by moderate |
| | | | | | | Sea condition |
| Doc ID. | 0000001222 | Station | 3 | Ship Course | 030 | Remark |
| Date | 17/07/2011 | From | Lat. 04°53.09 N | Ship Speed | 3.6 kt. | Trawl Op5 (st3) |
| Start Time | 0632 | | Long. 114°03.20 E | Sea State | Slight | Plankton layer at 18-33 m (light) 43-46 m (thick) |
| Finish Time | 0726 | To | Lat. 04°55.30 N | Bottom Depth | 57-60 m. | Fishing echo sounder is not turn off |
| | | | Long. 114°04.94 E | | | Record time is excess 29 minutes |
| Doc ID. | 0000001224 | Station | 4 | Ship Course | 355 | Remark |
| Date | 17/07/2011 | From | Lat. 04°52.61 N | Ship Speed | 3.3 kt. | Trawl O6 (st4) |
| Start Time | 0843 | | Long. 114°11.38 E | Sea State | Slight | Plankton layer at 7.7-40 m (light) 40-45 m (thick) |
| Finish Time | 0908 | To | Lat. 04°53.89 N | Bottom Depth | 50-52 m. | Fishing echo sounder is not turn off |
| | | | Long. 114°11.27 E | | | |
| Doc ID. | 0000001225 | Station | 5 | Ship Course | 348 | Remark |
| Date | 17/07/2011 | From | Lat. 04°47.82 N | Ship Speed | 3.5 kt. | Trawl O7 (st5) |
| Start Time | 1056 | | Long. 114°16.88 E | Sea State | Moderate | Plankton layer at 10-30 m (light) 30-33 m (thick) |
| Finish Time | 1118 | To | Lat. 04°49.56 N | Bottom Depth | 38 m. | Fishing echo sounder is not turn off |
| | | | Long. 114°16.69 E | | | |

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|-------------|------------|---------|-------------------|--------------|----------|--|
| Doc ID. | 0000001226 | Station | 6 | Ship Course | 179 | Remark |
| Date | 17/07/2011 | From | Lat. 04°48.16 N | Ship Speed | 3.3 kt. | Trawl O8 (st6) |
| Start Time | 1319 | | Long. 114°21.94 E | Sea State | Slight | Plankton layer at 11-22 m (light) 29-33 m (thick) |
| Finish Time | 1343 | To | Lat. 04°67.92 N | Bottom Depth | 35-36 m. | Fishing echo sounder is not turn off |
| | | | Long. 114°21.98 E | | | |
| Doc ID. | 0000001227 | Station | 7 | Ship Course | 115 | Remark |
| Date | 17/07/2011 | From | Lat. 04°48.57 N | Ship Speed | 3.3 kt. | Trawl O9 (st7) |
| Start Time | 1513 | | Long. 114°27.60 E | Sea State | Slight | Plankton layer at 5-14 m (light) 21 m – sea bottom (thick) |
| Finish Time | 1533 | To | Lat. 04°48.11 N | Bottom Depth | 30 m. | Fishing echo sounder is not turn off |
| | | | Long. 114°28.60 E | | | |
| Doc ID. | 0000001228 | Station | 8 | Ship Course | 085 | Remark |
| Date | 17/07/2011 | From | Lat. 04°52.65 N | Ship Speed | 3.4 kt. | Trawl 10 (st8) |
| Start Time | 1708 | | Long. 114°23.26 E | Sea State | Slight | Plankton layer at 7-15 m (light) 20-25 m (thick) |
| Finish Time | 1732 | To | Lat. 04°52.64 N | Bottom Depth | 29-30 m. | Fishing echo sounder is not turn off |
| | | | Long. 114°24.51 E | | | |
| Doc ID. | 0000001231 | Station | 9 | Ship Course | 044 | Remark |
| Date | 18/07/2011 | From | Lat. 04°58.00N | Ship Speed | 3.3 kt. | Trawl 11 (st9) |
| Start Time | 0622 | | Long. 114°17.16 E | Sea State | Slight | Plankton layer at 7-15 m (light) 20-25 m (thick) |
| Finish Time | 0710 | To | Lat. 04°58.37 N | Bottom Depth | 51.5 m. | Fishing echo sounder is not turn off |
| | | | Long. 114°17.51 E | | | |
| Doc ID. | 0000001232 | Station | 10 | Ship Course | 000 | Remark |
| Date | 18/07/2011 | From | Lat. 05°11.42 N | Ship Speed | 3.4 kt. | Trawl 12 (st10) |
| Start Time | 0814 | | Long. 114°23.85 E | Sea State | Slight | Plankton layer at 20-35 m |
| Finish Time | 0834 | To | Lat. 05°02.25 N | Bottom Depth | 39.8 m. | Fishing echo sounder is not turn off |
| | | | Long. 114°23.92 E | | | |
| Doc ID. | 0000001233 | Station | 15 | Ship Course | 212 | Remark |
| Date | 18/07/2011 | From | Lat. 05°09.36 N | Ship Speed | 3.3 kt. | Trawl 13 (st15) |
| Start Time | 1014 | | Long. 114°30.00 E | Sea State | moderate | Plankton layer at 5-40 m (light) 40-48 m (thick) |
| Finish Time | 1039 | To | Lat. 05°08.26 N | Bottom Depth | 54 m. | Fishing echo sounder is not turn off |
| | | | Long. 114°29.35 E | | | |

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|-------------|------------|---------|-------------------|--------------|----------|---|
| Doc ID. | 0000001234 | Station | 14 | Ship Course | 038 | Remark |
| Date | 18/07/2011 | From | Lat. 05°01.28 N | Ship Speed | 3.3 kt. | Trawl 14 (st14) |
| Start Time | 1207 | | Long. 114°30.16 E | Sea State | Slight | Plankton layer at 5-40 m (light) 40-48 m (thick) |
| Finish Time | 1232 | To | Lat. 05°02.42 N | Bottom Depth | 36.8 m. | Fishing echo sounder is not turn off |
| | | | Long. 114°30.99 E | | | |
| Doc ID. | 0000001235 | Station | 11 | Ship Course | 042 | Remark |
| Date | 18/07/2011 | From | Lat. 04°58.28 N | Ship Speed | 3.4 kt. | Trawl 15 (st11) |
| Start Time | 1349 | | Long. 114°29.20 E | Sea State | Slight | Plankton layer at 4-29 m (light) 2 m above bottom (thick) |
| Finish Time | 1409 | To | Lat. 04°59.07 N | Bottom Depth | 33.2 m. | Fishing echo sounder is not turn off |
| | | | Long. 114°29.90 E | | | |
| Doc ID. | 0000001236 | Station | 12 | Ship Course | 308 | Remark |
| Date | 18/07/2011 | From | Lat. 04°52.33 N | Ship Speed | 3.1 kt. | Trawl 16 (st12) |
| Start Time | 1537 | | Long. 114°33.27 E | Sea State | Slight | Plankton layer at 7-16, 15-20 (light), 20-22 m (thick) |
| Finish Time | 1717 | To | Lat. 04°57.46 N | Bottom Depth | 25 m. | Fishing echo sounder is not turn off |
| | | | Long. 114°34.71 E | | | Record time is excess 100 minutes |
| Doc ID. | 0000001237 | Station | 13 | Ship Course | 177 | Remark |
| Date | 18/07/2011 | From | Lat. 04°57.40 N | Ship Speed | 3.3 kt. | Trawl 17 (st13) |
| Start Time | 1717 | | Long. 114°34.71 E | Sea State | Slight | Plankton layer at 8-22 m (thick) |
| Finish Time | 1803 | To | Lat. 04°55.67 N | Bottom Depth | 26 m. | Fishing echo sounder is not turn off |
| | | | Long. 114°35.41 E | | | Record time is excess 20 minutes |
| Doc ID. | 0000001238 | Station | 18 | Ship Course | 282 | Remark |
| Date | 19/07/2011 | From | Lat. 05°02.97 N | Ship Speed | 2.9 kt. | Trawl 18 (st17) |
| Start Time | 0647 | | Long. 114°42.58 E | Sea State | Slight | Plankton layer at 9-14 m (light) 14.5 to bottom (thick) |
| Finish Time | 0850 | To | Lat. 05°02.99 N | Bottom Depth | 20 m. | Fishing echo sounder is not turn off |
| | | | Long. 114°42.50 E | | | Record time is excess 120 minutes |
| | | | | | | Scatter fish schools |
| Doc ID. | 0000001239 | Station | 19 | Ship Course | 285 | Remark |
| Date | 19/07/2011 | From | Lat. 05°03.28 N | Ship Speed | 3.4 kt. | Trawl 19 (st18) |
| Start Time | 0641 | | Long. 114°48.82 E | Sea State | Slight | Fishing echo sounder is not turn off |
| Finish Time | 0924 | To | Lat. 05°03.62 N | Bottom Depth | 17-22 m. | Scatter fish schools |
| | | | Long. 114°47.74 E | | | |

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|-------------|------------|---------|-------------------|--------------|------------|--|
| Doc ID. | 0000001244 | Station | Demonstration | Ship Course | 277 | Remark |
| Date | 21/07/2011 | From | Lat. 05°07.00 N | Ship Speed | 11.3 kt. | From Muara entrance buoy to demonstration area (St19) |
| Start Time | 0915 | | Long. 114°57.40 E | Sea State | Slight | Plankton layer at 5-16 m |
| Finish Time | 1109 | To | Lat. 05°07.61 N | Bottom Depth | 19.7-27 m. | Fishing echo sounder is not turn off |
| | | | Long. 114°53.05 E | | | |
| Doc ID. | 0000001235 | Station | Fishing demon. | Ship Course | 042 | Remark |
| Date | 18/07/2011 | From | Lat. 05°07.68 N | Ship Speed | 3.4 kt. | Trawl fishing demonstration |
| Start Time | 1349 | | Long. 114°53.96 E | Sea State | Slight | Plankton layer at 4-9 m (light) 19-26 m above bottom (thick) |
| Finish Time | 1409 | To | Lat. 05°07.88 N | Bottom Depth | 26-27 m. | Fishing echo sounder is not turn off |
| | | | Long. 114°52.66 E | | | Many gap by swell |

Appendix 4 List of personnel onboard

Ship Personnel (M.V. SEAFDEC2)

| No. | Name | Position |
|-----|-----------------------------|-----------------|
| 1 | Mr. Tossaporn Sukhapindha | Captain |
| 2 | Mr. Nanthawat Phungsuk | Chief Engineer |
| 3 | Mr. Suren Pruksarat | Second Officer |
| 4 | Mr. Vudhirat Vudthipanyo | Third Officer |
| 5 | Mr. Padung Ngowlimhua | Second Engineer |
| 6 | Mr. Nuttapong Chaitanavisut | Third Engineer |
| 7 | Mr. Thana rungjoy | Boatswain |
| 8 | Mr. Pradit Kui-prasert | Steersman |
| 9 | Mr. Charan Intippunya | Steersman |
| 10 | Mr. Somkiet Phetrasatien | Able Seaman |
| 11 | Mr. Boontarin Wora-in | Fitter |
| 12 | Mr. Plew Shodok | Oiler |
| 13 | Mr. Teeradet Jantana | Oiler |
| 14 | Mr. Akarapol Chaibanyat | Oiler |
| 15 | Mr. Saichol Kornnoom | Cook |
| 16 | Mr. Marut SangPhuek | Ship's Boy |

Additional Personnel from SEAFDEC/TD

| | | |
|----|-------------------------|----------------------|
| 17 | Mr. Isara Chanrachkij | Chief researcher |
| 18 | Mr. Sayan Promjinda | Researcher |
| 19 | Mr. Sukchai Arnupapboon | Researcher |
| 20 | Mr. Narong Raungsivakul | Researcher |
| 21 | Mr. Komsam Phofa | Assistant researcher |

List of Brunei Scientists

| No. | Name | No. | Name |
|-----|------------------|-----|-----------------|
| 1 | Mr. Matzaini | 9 | Mr. Norazmi |
| 2 | Mr. El Cinco | 10 | Mr. Haji Ramlee |
| 3 | Mr. Bidin | 11 | Mr. Haji Chuchu |
| 4 | Mr. Roslan | 12 | Mr. Harun |
| 5 | Mr. Talip Omar | 13 | Mr. Asri |
| 6 | Mr. Hatral Kamal | 14 | Ms. Raidah |
| 7 | Mr. Haji Aji | 15 | Ms. Farhana |
| 8 | Mr. Ahmad | | |

