

Survey Cruise Report



- Cruise no.:** MV.SEAFDEC2 No.24-2/2007
- Period:** 15 March – 23 April 2007 (40 days)
- Area:** The Andaman Sea: the EEZ of Thai Waters
- Port of call:** Phuket, Thailand
- Objective:** Fisheries resources survey in the Andaman Sea, Waters of Thailand.
- 1) To investigate the status of demersal resources on the continental slope from 100 to 200 m using bottom vertical longline.
 - 2) To investigate the status of large pelagic resources on the continental slope to the deep sea area using drifting long line.
 - 3) To collect the oceanographic parameters and planktons for further analysis in relationship to the fisheries resources.
- Main activity:**
1. Fisheries resource survey by bottom vertical longline and pelagic longline
 2. Oceanographic survey using Integrated Conductivity Temperature and Depth measuring instrument (iCTD), Thermosalinograph-fluorometer (TSG), Van Dorn water sampler and Bongo net

List of personal on board:

Ship personals

No.	Name	Position
1	Mr. Tossaporn Sukhapindha	Captain
2	Mr. Veerachai Chettasumon	Chief engineer
3	Mr. Suren Pruksarat	Second officer
4	Mr. Somphote Vudthipanyo	Third officer
5	Mr. Komson Sangphuek	Second engineer
6	Mr. Aussawin Buachuay	Fishing Assistant
7	Mr. Vudthirat Vudthipanyo	Boatswain
8	Mr. Pradit Kui-prasert	Steerman
9	Mr. Tana Rungjoy	"
10	Mr. Somkiat Phetrasatien	Able seaman
11	Mr. Teeradat Jantana	Fitter
12	Mr. Plew Shodok	Oiler
13	Mr. Boontarin Wara-in	"
14	Mr. Watchara Panasri	"
15	Mr. Saichol Kornnoom	Cook
16	Mr. Somsak Phangkumhuk	Ship's boy

Researchers

No.	Name	Responsibility	Contact address	Period of duty
1	Mr. Isara Chanrachkij ¹	Chief scientist	isara@seafdec.org	15 Mar–17 Apr
2	Mr. Sayan Promjinda ¹	Fishing gear Technologist	sayan@seafdec.org	15 Mar–17 Apr
3	Ms. Penchan Laongmanee ¹	Oceanography	penchan@seafdec.org	31 Mar–12 Apr
4	Ms. Nawinee Khumthong ¹	Oceanography	nawinee@seafdec.org	15 Mar–31 Mar
5	Ms. Natinee Sukramongkol ¹	Oceanography	natinee@seafdec.org	31 Mar–12 Apr
6	Mr. Ritthirong Prommas ¹	Oceanography	ritthirong@seafdec.org	31 Mar–12 Apr
7	Dr. Thanitha Thapanand-Chaidee ²	Demersal resources survey	kru_a65@yahoo.com	15 Mar–31 Mar
8	Lt. Phithak Chaidee ³	Demersal resources survey		15 Mar–31 Mar
9	Mr. Reangchai Sujittosakul ³	Demersal resources survey		15 Mar–31 Mar
10	Mr. Areet Heemji ³	Fishing gear Technologist	areethimjit@yahoo.com	15 Mar–17 Apr
11	Mr. Viboon Mechareon ³	Oceanography		15 Mar–17 Apr
12	Mr. Amnuay Pisanpant ³	Fishing gear Technologist		15 Mar–17 Apr
13	Mr. Somjit Pungdaeng ³	Fishing gear Technologist		15 Mar–17 Apr

14	Mr. Pirote Naimee ³	Oceanography	p.naimee@gmail.com	15 Mar–17 Apr
15	Lt. Chirat Nuangsang ³	Fishing gear Technologist	chirat_nu@yahoo.com	15 Mar–17 Apr
16	Mr. Narupon Darumas ³	Fishing gear Technologist	ndarumas@yahoo.com	15 Mar–17 Apr

1. Southeast Asian Fisheries Development Center, Phrasamutchedi, Samut Prakan, 10290, Thailand
2. Faculty of Fisheries, Kasetsart University, Chatujak, Bangkok, 10900, Thailand
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Oceanographic survey

There were 26 oceanographic stations conducted during the survey (Fig.1). Partial detail and environmental condition of each station are in table 1 and 2 respectively. The materials and methods of the oceanographic survey were conducted as follow;

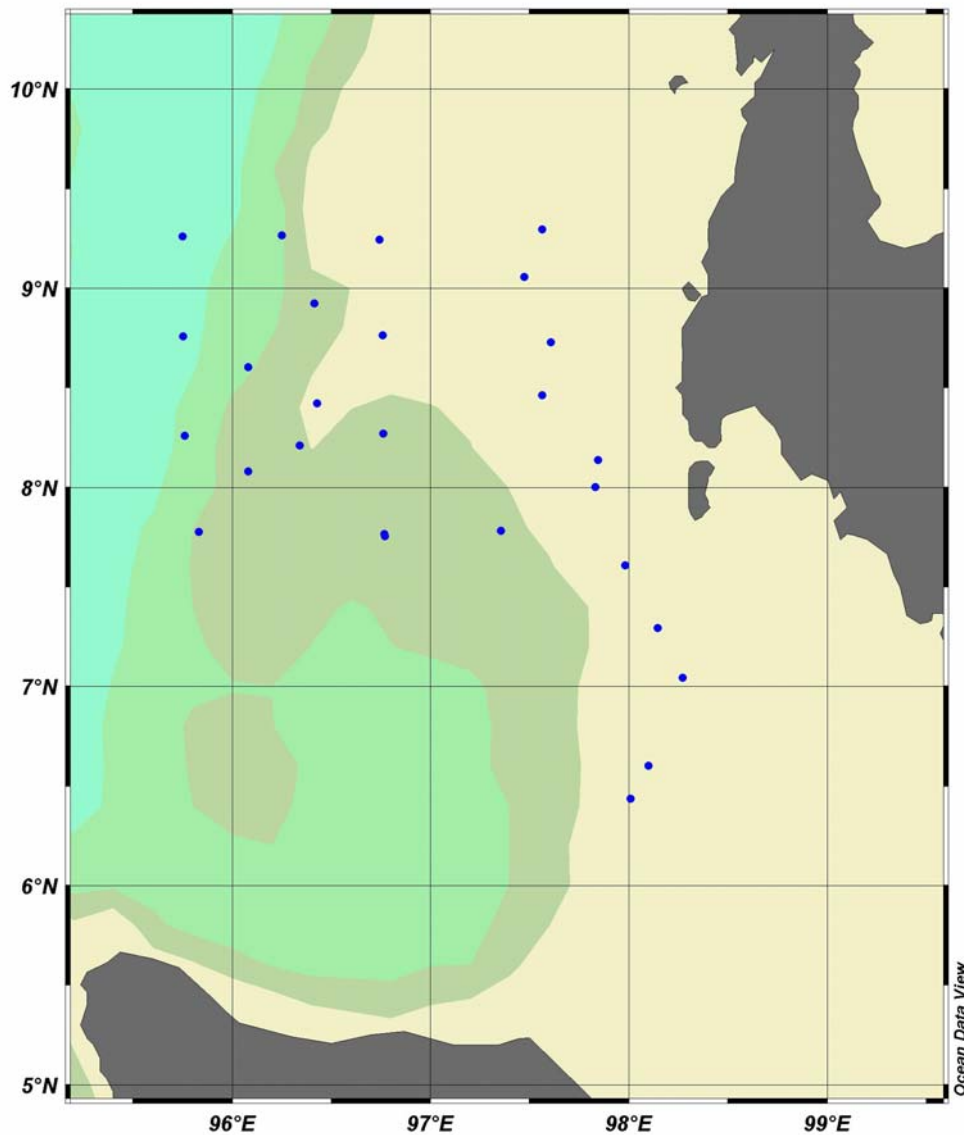


Fig. 1 Map of the oceanographic survey stations

Physical and chemical character of water



Fig. 2 Operating CTD in laboratory.

Physical and chemical character of water including conductivity, temperature, depth, dissolved oxygen, pH, chlorophyll fluorescence and PAR was measuring using SeaBird 911 CTD and Thermosalinograph with Fluorometer (TSG-Fluorometer).

The iCTD systems of M.V.SEAFFDEC 2 was equipped with three main sensors for conductivity, temperature and depth and four auxiliary sensors for dissolved oxygen, pH,

chlorophyll fluorometer and PAR. The iCTD was deployed from the sea surface to approximately 5 m above sea bottom with constant velocity 0.5 m/s and retrieved to the surface at a similar speed (1 m/s was applied for station deeper than 200 meter depth) (Fig.2).



Fig. 3 Lowering CTD.

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

During retrieving iCTD, Carousel water sample (Niskin Bottles) which is a part of CTD system were used for collecting water samples from standard depth (table 3 for several study) (Fig.3).

TSG – Fluorometer were operated along the cruise track of MV.SEAFFDEC 2. The system was designed to pump water from approximately 5 meter below the sea surface continuously for measuring temperature, salinity and fluorescence chlorophyll-a. The data were average every 6 second. Operating summary was shown in table 1.

Nutrient

About 60 ml of water sample from Niskin bottles was filter through Whatman GFC filter paper and stored in the freezer at -45 °C for nutrient analysis (nitrite, nitrate, phosphate and silicate) at SEAFFDEC/ Training Department laboratory (Fig.4).

Total Nitrate and Total Phosphate (TNTP)

30 ml of water sample were freeze at -45 °C immediately after collecting for TNTP study which will be conducted at faculty of environment management, Prince Songkranakar in University.

Total Alkalinity (TA)

125 ml of water sample were collected and



Fig. 4 Water filtering for nutrient analysis.

store in room temperature for TA study at faculty of environment management, Prince Songkranakarin University.

Total Suspended Solid (TSS)

Water sample from surface and fishing depth were filter through the know weight GFC filter paper then freeze for further process at SEAFDEC/TD laboratory. In some station water from standard depth were also using for TSS study (table 3) (Fig.5).



Fig. 5 Water filtering for TSS.



Fig. 6 Fish sampling for heavy metal analysis.

Heavy Metal in flesh of marine fish

Every fishing operation, three samples of each commercial fish were collected and freeze in -15 °C for further analysis at faculty of environment management, Prince Songkranakarin University (Fig.6).

Zooplankton and Fish larvae



Fig. 7 Towing Bongo net.

The 60 cm diameter bongo frames were attached with zooplankton and larvae net with mesh size of 330 μm and 500 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 Hydro bios flow meter and TSK flow meter no. 7035 respectively.

The TSK flow meter was calibrated before the survey period which was 6.59 revolutions per meter. The hydro bios will be calibrated soonest after MV.SEAFDEC2 arrive SEAFDEC/TD. 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). The operation depth of Bongo in shallow water station was operated from the surface to 10-15

m above the sea bottom while the deep water station, maximum depth of Bongo was limit with length of wire (140 m) (Fig.7).

Towing time for downward and upward was 15 minute each. The samples were preserved in 5% buffered formalin and seawater immediately (Fig.8). Partial details of Bongo net operation are in table 3.



Fig. 8 Zooplankton and fish larvae collecting.

Preliminary analysis of oceanographic parameters

Figure 9 show data from all oceanographic stations. Data from each station had shown the similar pattern except pH data of station no 27 with unknown reason.

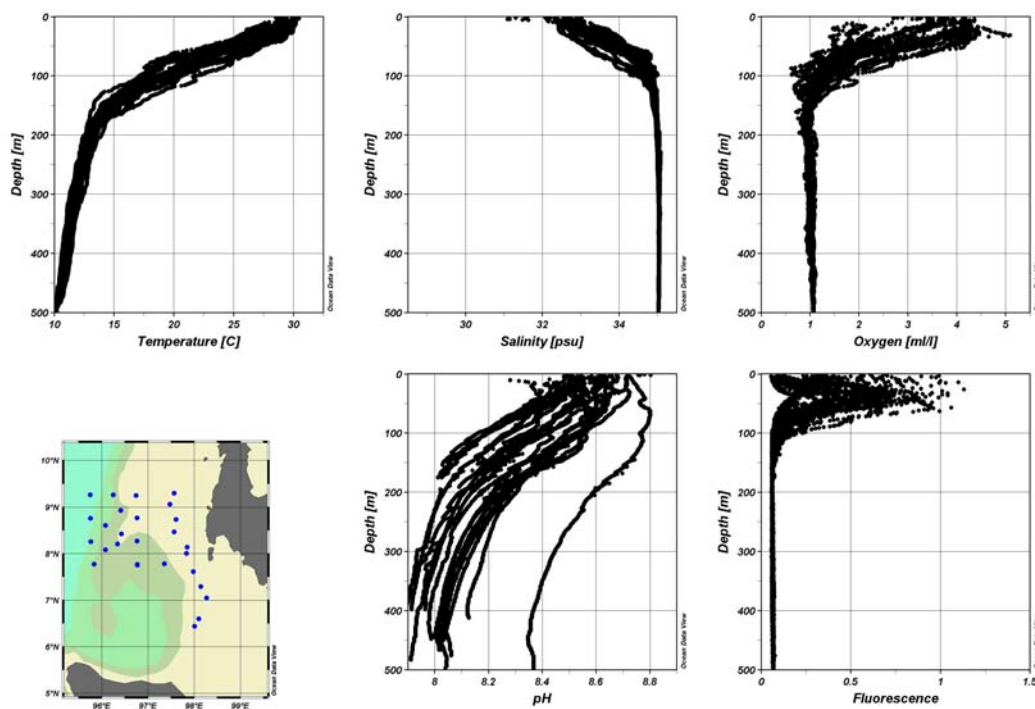


Fig. 9 Profile of temperature (°c), salinity (psu), oxygen (ml/l), pH and fluorescence of all oceanographic stations.

Along the continental shelf stations (BVL operation), the surface temperature was found lower than the offshore stations (Fig.10). Those of dissolved oxygen concentration at station no. 2, 3 and 6 was also lower than others (Fig.10).

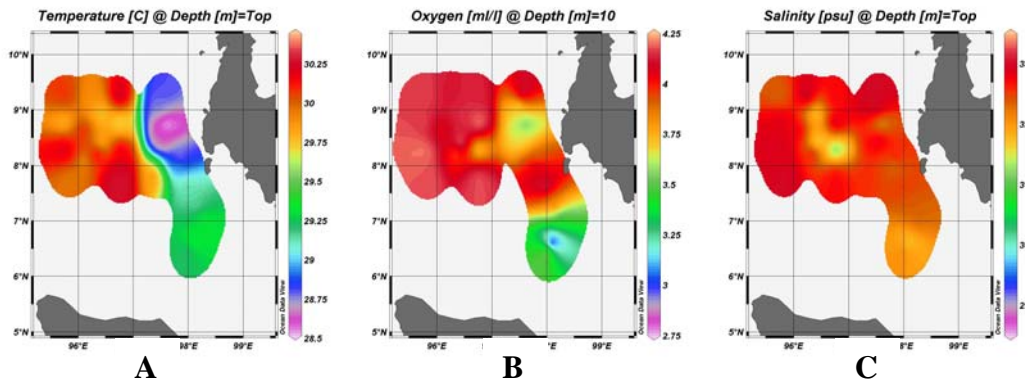


Fig. 10 Horizontal plot of A: surface temperature (°c) and B: dissolved oxygen (ml/l) C: surface salinity (psu).

Figure 11 and 12 represent the oceanographic characteristic of the fishing stations of BVL and PLL, respectively. The prominent characteristic of this area is the oxycline at station no 2, 3 and 6 which shallower than other stations (Fig 11 B).

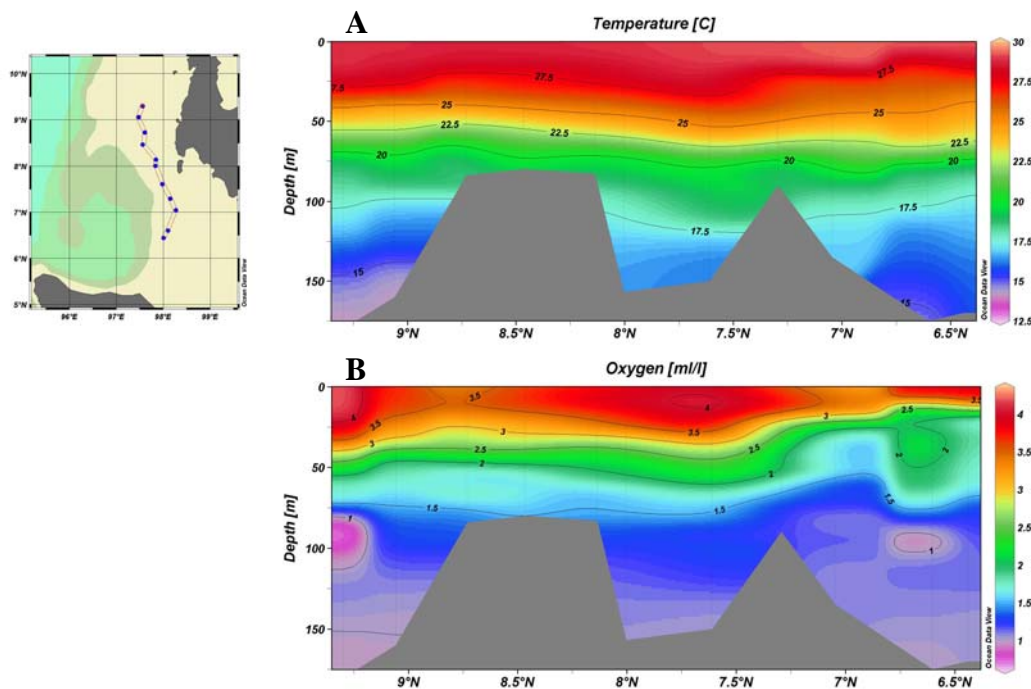


Fig. 11 Vertical plot along station no. 2, 3, 6, 8, 10, 12, 13, 15, 17, 19 and 21 of A: temperature (°c) and B: dissolved oxygen (ml/l).

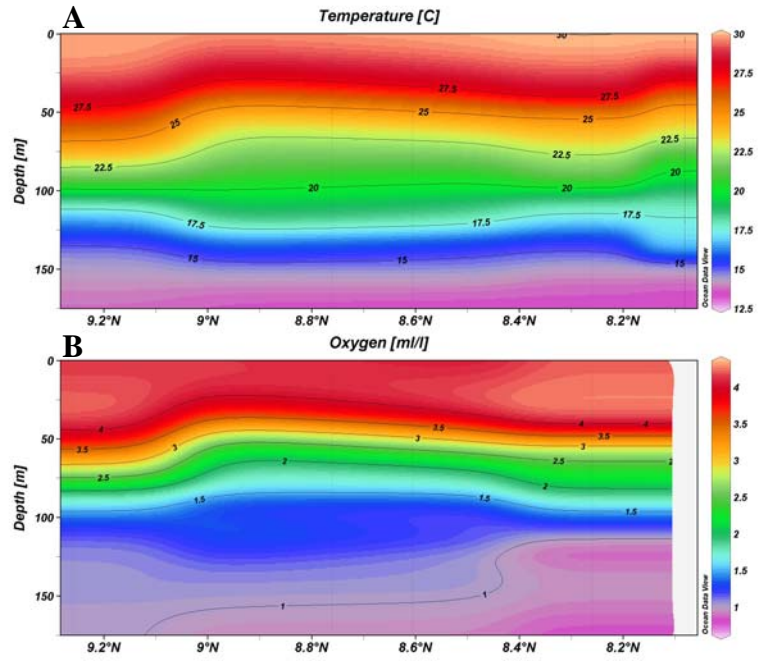
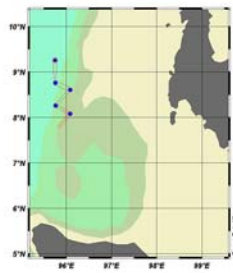


Fig. 12 Vertical plot along station no. 25, 26, 27, 28, 29 and 30 of **A**: temperature (°c) and **B**: dissolved oxygen (ml/l).

Table 1 Partial detail of oceanographic stations

St.no.	Date	Start	Finish	Lat	Long	Bot. (m)	SBE CTD	TSG	TD	Bongo net (m)	Sechi disc (m)	Foral scale
12	18/03/07	07:36	08:28	08°00.2'N	97°49.9'E	157	s2d24012,s2u24012			105		
10	19/03/07	07:30	08:41	07°36.8'N	97°59.7'E	150	s2d24010,s2u24010			105		
8	20/03/07	07:20	08:08	07°17.6'N	98°08.6'E	90	s2d24008,s2u24008			75		
6	21/03/07	07:27	08:20	07°02.7'N	98°16.2'E	135	s2d24006,s2u24006			80		
3	22/03/07	07:28	08:22	06°36.1'N	98°05.9'E	175	s2d24003,s2u24003			95		
2	23/03/07	07:25	08:17	06°26.3'N	98°00.4'E	170	s2d24002,s2u24002			108		
21	26/03/07	07:13	08:07	09°17.7'N	97°33.7'E	180	s2d24021,s2u24021			85		
19	27/03/07	06:55	07:47	09°03.5'N	97°28.3'E	160	s2d24019,s2u24019			105		
17	28/03/07	07:03	07:48	08°43.8'N	97°36.4'E	84	s2d24017,s2u24017			70		
15	29/03/07	07:10	07:55	08°27.8'N	97°33.7'E	80	s2d24015,s2u24015			70		
13	30/03/07	07:11	07:57	08°08.2'N	97°50.7'E	83	s2d24013,s2u24013			65		
22	03/04/07	05:43	07:05	07°47'N	97°21.2'E	492	s2d24022,s2u24022	20070402_st22		140		
23	03/04/07	13:20	14:44	07°45'N	96°45.5'E	859	s2d24023,s2u24023	20070403_st23	20070404_PLL2_1,20070404_PLL_2	100	21.5	3
24	4/4/2007	12:53	14:17	07°45.1'N	96°15.4'E	698	s2d24024,s2u24024	20070403_st24		88	21.4	2
25	4/4/2007	17:26	18:48	07°45.2'N	95°50.3'E	664	s2d24025,s2u24025	-	20070405_PLL3_1,20070405_PLL3_2,20070405_PLL3_3	80	21.4	2
26	5/4/2007	12:32	13:24	08°04.9'N	96°04.8'E	550	-	20070405_st26	20070405_Oceano_st26	-		
27	5/4/2007	15:16	16:35	08°15.1'N	95°45.1'E	1817	-	20070405_st27	20070405_Oceano_st27,20070405_Oceano_st27_watersampling	78		
35	6/4/2007	06:32	08:03	08°25.0'N	96°25.3'E	505	s2d24035,s2u24035	-	-	90		

Table 1 Partial detail of oceanographic stations (cont')

St.no.	Date	Start	Finish	Lat	Long	Bot. (m)	SBE CTD	TSG	TD	Bongo net (m)	Sechi disc (m)	Foral scale
34	6/4/2007	10:22	11:43	08°45.1'N	96°45.2'E	439	s2d24034,s2u24034	20070406_st34	20070407_PLL4_1,20070407_PLL4_2,20070407_PLL4_3	95	17.0	4
33	7/4/2007	10:36	11:55	08°55.0'N	96°25.2'E	475	s2d24033,s2u24033	20070407_st33	-	120	20.1	4
32	7/4/2007	14:45	16:00	09°14.7'N	96°45.2'E	391	s2d24032,s2u24032	20070407_st32	-	100	22.5	3
31	8/4/2007	10:33	11:47	09°15.0'N	96°15.0'E	616	s2d24031,s2u24031	20070408_st31	20070408_Bongo_st31	115	20.0	2
30	8/4/2007	14:20	15:29	09°15.1'N	95°45.5'E	2000	s2d24030,s2u24030	20070408_st30	-	NR	24.2	2
29	9/4/2007	11:56	13:11	08°45.0'N	95°45.3'E	2000	s2d24029,s2u24029	20070409_st29	20070410_PLL7_1,20070410_PLL7_2,20070409_Bongo_st30	468	19.1	3
28	10/4/2007	12:02	13:17	08°35.0'N	96°05.2'E	492	s2d24028,s2u24028	20070410_st28	20070410_Bongo_st28	91	24.0	2
27	10/4/2007	16:10	12:27	08°14.9'N	95°45.4'E	1321	s2d24027,s2u24027	20070410_st27	20070411_PLL8_1,20070411_PLL8_2,20070410_Bongo_st27	110	21.1	3
37	11/4/2007	10:53	12:05	08°21.1'N	96°13.0'E	503	s2d24037,s2u24037	20070411_st37	20070411_Bongo_st37	103	28.7	3
36	11/4/2007	15:10	16:23	08°15.3'N	96°45.3'E	527	s2d24036,s2u24036	20070411_st36	20070411_Bongo_st36	111	29.5	3

Table 2 Environmental condition during oceanographic survey

St. no.	Wind		Air					Bottom		Water	Current					
	Spd. (knt)	Dir.	Temp (°c)	Press	Humidity	Weather	Sea stage	Temp (°c)	pH	Temp (°c)	Surface		25m.		50m.	
											Spd.(Knt)	Dir	Spd.(Knt)	Dir	Spd.(Knt)	Dir
12	6.0	330	29.0	1010.0	76	BC	smooth	16.4	8.2	27.9	0.2	243	0.4	108	0.0	128
10	3.0	320	29.1	1012.0	56	BC	smooth	16.0	8.2	28.6	0.1	220	0.4	061	0.6	078
8	6.0	310	29.2	1013.5	63	BC	smooth	17.5	8.3	28.1	0.2	296	0.3	023	0.7	064
6	5.0	050	29.4	1013.0	72	BC	smooth	16.9	8.3	28.7	0.3	332	0.1	092	0.6	111
3	10.0	020	28.4	1015.0	64	BC	smooth	13.9	8.0	29.5	0.4	349	0.4	283	0.4	198
2	6.0	020	29.2	1014.0	70	BC	smooth	15.1	8.2	28.4	0.8	273	0.8	248	0.6	238
21	12.0	270	28.9	1011.0	77	BC	smooth	13.4	8.0	27.9	1.4	256	0.6	235	0.2	117
19	10.0	320	28.8	1013.0	84	BC	smooth	13.9	8.0	28.1	0.2	192	0.2	064	0.4	141
17	8.0	320	28.1	1013.5	77	BC	smooth	18.3	8.3	28.7	3.5	317	3.1	323	2.8	342
15	8.0	000	28.9	1012.0	77	BC	smooth	20.2	8.3	28.7	0.7	055	0.5	002	0.2	229
13	10.0	050	28.7	1013.0	78	BC	smooth	18.9	8.4	28.8	0.5	076	0.5	034	0.6	056

Table 2 Environmental condition during oceanographic survey (cont')

St. no.	Wind		Air					Bottom		Water	Current					
	Spd. (knt)	Dir.	Temp (°c)	Press.	Humidity	Weather	Sea stage	Temp (°c)	pH	Temp (°c)	Surface		50m.		100m.	
											Spd.(Knt)	Dir	Spd.(Knt)	Dir	Spd.(Knt)	Dir
22	12.0	300	29.7	1010.5	76	BC	smooth	13.9	8.1	28.8	0.3	312	0.5	304	0.7	323
23	8.0	170	31.6	1011.0	54	BC	smooth	10.3	8.1	30.7	0.8	071	0.7	050	0.5	103
24	12.0	130	31.4	1013.0	86	BC	slight	10.4	8.0	30.2	0.6	036	0.5	016	0.4	107
25	18.0	090	30.3	1010.0	86	Rain	slight	11.1	8.1	30.0	1.4	329	0.8	356	0.5	328
26	18.0	140	29.5	1013.5	78	BC	large	NR	NR	30.0	1.1	014	0.6	021	0.7	089
27	18.0	100	30.1	1011.5	85	BC	large	10.2	8.4	29.9	1.5	285	0.7	023	0.4	075
35	8.0	120	29.1	1013.0	77	BC	moderate	10.8	7.9	29.9	1.6	049	0.5	000	0.1	290
34	8.0	120	30.4	1014.5	85	BC	slight	11.4	8.0	29.8	0.9	347	0.5	102	0.5	358
33	10.0	050	30.7	1014.5	85	BC	smooth	10.8	8.0	29.7	0.9	028	0.1	172	0.7	345
32	10.0	110	30.3	1012.5	59	BC	smooth	11.1	8.0	30.2	0.4	099	0.7	343	1.3	351
31	10.0	050	31.1	1014.5	85	BC	slight	10.5	8.1	30.0	0.8	043	1.1	036	0.2	036
30	16.0	120	30.4	1011.0	85	BC	slight	10.2	8.0	30.2	0.3	138	0.1	275	0.4	311
29	12.0	187	32.1	1014.5	86	BC	slight	10.5	8.0	30.1	1.0	184	1.3	180	0.8	040
28	10.0	050	31.1	1014.5	86	BC	slight	10.9	7.9	30.3	0.9	348	0.5	332	0.2	231
27	10.0	060	30.7	1011.0	59	BC	slight	10.2	8.4	30.5	0.5	041	0.4	150	0.4	301
37	10.0	090	29.3	1014.0	64	BC	slight	10.9	8.0	30.3	0.9	027	0.9	028	0.7	337
36	2.0	110	31.7	1011.5	86	BC	smooth	10.7	8.0	30.4	0.8	060	0.8	046	0.9	015

Table 3 Partial detail of bongo net, total suspended solid and Van Dorn water sampler

St.No.	Bongo net					Total Suspended Solid				Niskin bottle (depth, m)	Remarks
	Towing depth (m)	Start Time	Towing period (min)	Flowmeter rev.		Surface		Bottom			
				Fish larvae	Zooplankton	Filter no.	Volume (liter)	Filter no.	Volume (liter)		
12	105	13:26	32	9513	4882	167+168	5	169+170	5	153,125,100,75,50,30,20,10,0	
10	105	08:24	15	5061	2639	171+173	5	172+174	5	145,125,100,75,50,30,20,10,0	
8	75	07:38	30	9541	4075	175	5	176+177	5	85,75,50,30,20,10,0	
6	80	07:46	34	9520	3765	178+179	5	180	3.8	130,100,75,50,30,20,10,0	
3	95	07:50	32	10374	2649	181+182	5	183+184	5	177,150,125,100,75,50,30,20,10,0	
2	108	07:45	32	14069	1769	185	5	186	5	165,150,125,100,75,50,30,20,10,0	
21	85	07:35	32	8270	2573	187+188	5	189	4	175,150,125,100,75,50,30,20,10,0	
19	105	07:18	29	10087	1533	190	5	191	5	155,115,100,75,50,30,20,10,0	
17	70	07:20	28	2218	1378	192	5	193+194	5	79,50,30,20,10,0	
15	70	07:24	29	NR	767	195+196	5	197	5	75,50,30,20,10,0	
13	65	07:26	31	NR	894		5		5	78,50,30,20,10,0	
22	140	06:33	32	5266	2791	200+202	5	2/1	8	485,300,250,200,150,125,100,75,50,30,20,10,0	Change new flowmeter for fish larvae
23	100	13:20	32	5182	3213	2/2	6	2/3	7	491,400,300,200,150,125,100,75,50,30,20,10,0	
24	88	12:43	32	5489	3287	2/4	6	2/5	8	469,400,300,200,150,125,100,75,50,30,20,10,0	
25	80	17:26	29	5282	3347	2/6	6	2/7	6	415,400,300,200,150,125,100,75,50,30,20,10,0	
26	-	-	-	-	-	2/8	5	2/9	6	-	CTD, Bongo not operate
27	78	15:16	30	5676	5238	2/10	6	2/11	6	230,138,92,69,46,23,0	
35	90	07:32	29	4040	3477	2/13	5	2/12	6	400,300,250,200,150,125,100,75,50,30,20,10,0	

Table 3 Partial detail of bongo net, total suspended solid and Van Dorn water sampler (cont')

St.No.	Bongo net					Total Suspended Solid				Niskin bottle (depth, m)	Remarks
	Towing depth (m)	Start Time	Towing period (min)	Flowmeter rev.		Surface		Bottom			
				Fish larvae	Zooplankton	Filter no.	Volume (liter)	Filter no.	Volume (liter)		
34	95	10:22	32	4488	3770	2/14	6	2/15	6	400,300,250,200,150,125,100,75,50,30,20,10,0	
33	120	10:36	29	4640	3008	2/16	6	2/17	5	450,400,300,200,150,125,100,75,50,30,20,10,0	
32	100	14:45	30	5203	682	2/18	6	2/19	6	380,300,250,200,150,125,100,75,50,30,20,10,0	
31	115	10:33	30	4089	2480	2/20	6	2/21	5	478,400,300,200,150,125,100,75,50,30,20,10	
30	NR	14:20	30	4892	2950	2/22	6	2/23	7	500,400,300,200,150,125,100,75,50,30,20,10,0	Net SONDE out of order
29	112	11:56	32	5103	2714	2/24	6	2/25	7	468,400,300,200,150,125,100,75,50,30,20,10,0	
28	91	12:02	30	5321	3449	2/26	6	2/27	6	440,400,300,200,150,125,100,75,50,30,20,10,0	
27	110	16:10	30	4663	2690	2/28	6	2/29	7	500,400,300,200,150,125,100,75,50,30,20,10,0	Found tuna schooling
37	103	10:53	32	5201	3062	2/30	6	2/31	6	452,400,300,200,150,125,100,75,50,30,20,10,0	
36	111	15:10	30	4163	3055	2/32	6	2/33	6	447,400,300,200,150,125,100,75,50,30,20,10,0	