



**Establishment and Operation of a Regional System of
Fisheries *Refugia* in the South China Sea and Gulf of Thailand**

REPORT

**MONITORING SHORT MACKEREL GONAD GROWTH AND SEA
BOTTOM CONDITIONS IN PEAM KRASOB AND KOH KAPI
FISHERIES REFUGIA**

**KOH KONG, CAMBODIA
11-12 DECEMBER 2018**

Prepared by
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TRAINING DEPARTMENT



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1. Field Trip Objective

- 1) To monitor mackerel gonad growth and sea bottom of fisheries *refugia's* site in Peam Krasob, Koh Kong province from 11 to 12 December 2018 under the support of SEAFDEC/UNEP/GEF.

2. Involved Person

- 2) There are four leaders and officers from Department of Fisheries Conservation, two officers from Fisheries Administration Cantonment in Koh Kong, and other four members of community fisheries, participating in the field trip in Koh Kong province to do a research of mackerel gonad growth and monitor sea bottom in fisheries *refugia* site. (see annex 1, 2 & 5)

3. Field Trip Activities

3.1 Collection of fish samples at landing sites and markets

- 3) Teamwork led by **Mr. Ouk Vibol** collected the samples of 3kg short mackerel at Dornng Tung market, 1kg short mackerel at Bak klorng market, and other 1kg Indo-Pacific mackerel at Bak Khlornng landing site on 11 December 2018 in order to operate and monitor fish gonad growth. Those fish is caught at coastal area for short mackerel and outside area of coastal for Indo-Pacific mackerel according to fishermen (see annex 2).

3.2 Operating fish to monitor mackerel gonad growth

- 4) 71 fish samples are operated to monitor its gonad growth, including 56 short mackerel (*Rastrelliger brachysoma*) and 15 Indo-Pacific mackerel species (*Rastrelliger kanagurta*) (see annex 2 & 3).
- 5) According to data analysis of short mackerel, the female is an average total body weight of 58.89g, an average total body length of 15.22cm, and its gonad stage of 2.35 meanwhile the is average total body weight of 54.77g, an average total body length of 14.88cm, and its gonad stage of 2.51. Generally, the short mackerel is average total body weight of 56.83g, an average total body length of 15.05cm, and its gonad stage of 2.43.
- 6) The data analysis of Indo-Pacific mackerel showed that, the female is an average total body weight of 122.03g, an average total body length of 20.01cm, and its gonad stage of 3.4 while the male is an average total body weight of 115.2g, an average total body length of 3.7. Generally, Indo-Pacific mackerel is an average total body weight of 118.62g, an average total body length of 19.77cm, and its gonad stage of 3.58.

3.3 Monitoring sea bottom in fisheries *refugia* site in Peam Krasob

- 7) 8 samples are conducted to monitoring sea bottom in fisheries *refugia* in Peam Krasob, Koh Kong province, including three times at the end, three times at middle, and other two times at starting with water depth from 2 meters to 5 meters. Based on the result of monitoring sea bottom showed that the sea bottom in fisheries *refugia* site are mostly mud and sand with mud (see annex 2 & 4).

3.4 Discussion with mackerel fishers in Peam Krasob community fisheries

- 8) According to Mr. Mey Thorn, chief of CFi in Peam Krasob, mackerel fishing grounds are conducted at Bak Khlornng, Peam Krasob, Chroy Pros, Prek Sach, Toul Koki. Mostly, fishers go fishing at Peam Krasob site; especially fishers from village 4 go fishing there from October to April. They go fishing starting early morning around 4:00 am to 7:00am or 8:00am and can catch fish from 20kg to 40 kg/day by using mackerel gillnet with net size of 3.5cm, depending on fishing months.

- 9) Generally, there may be from 300 to 400 fishing vessels of mackerel coming to fish at Peam Krasob site based on fishing month, especially the best month from December to January can increase up to 400 fishing vessels.
- 10) Fish caught is transported to sell at Dorng Tung market in Koh Kong province and the fish price is flexible upon fishing season. Today short mackerel is sold in the cost of 6000 Riel/kg (\$US1.50) at Dorng Tung market.

4. Conclusion

- 11) Fishermen start fishing mackerel from October to April, especially at Peam Krasob site, because it is spawning time of short mackerel and Indo-Pacific mackerel starting to spawn forward. Therefore, it is needed to take properly management measures to ensure fish stock in the nature, especially during its spawning starting in December.

ANNEX 1**List of Participants attending in monitoring mackerel gonad growth and sea bottom in mackerel fisheries refugia in Peam Krasob and Koh Kapi, Koh Kong province**

Name	Sex	Title	Organization	Telephone
1. Ouk Vibol	M	Director	DFC/FiA	012908121
2. Leng Sy Vann	M	Deputy Director	DFC/FiA	017446373
3. Mey Thorn	M	Chief	Peam Krasob Cfi	016214789
4. Heng Sokha	M	Member	Peam Krasob Cfi	0977257745
5. Bun Orn	M	Member	Peam Krasob Cfi	N/A
6. Long Manh	M	1 st Vice Chief	Peam Krasob Commune	016327095
7. Ly Kuntty	M	Vice chief of Division	MFReDI/FiA	081811644
8. Rous Sareth	M	Officer	DFC/FiA	011664696
9. Seng Bunna	M	Vice Chief of Fisheries Administration Division	Fisheries Administration Cantonment in Koh Kong	016885709
10. Nou Ngov	M	Chief of Fisheries Administration Division	Fisheries Administration Cantonment in Koh Kong	0978520520

ANNEX 2**Photos of Mackerel sellers at Dornng Tung market and landing site at Bak Khlorng in Koh Kong province**

ANNEX 3

Photos of operation action of mackerel is made by FiA's officers to monitor its gonad growth in Koh Kong province



ANNEX 4

Photos of the member of community fisheries in Peam Krasob dived to monitor sea bottom in mackerel fisheries *refugia* in Peam Krasob and Koh Kapi in Koh Kong province



ANNEX 5

Table: data set of monitoring mackerel gonad growth on 11 December 2018 in Koh Kong province

No.	Date	Fish species	Location	Type of fishing gear	Sex	Total Body Weight (g)	Total Length (cm)	Gonad stage	Gonad weight(g)	GSI	Fishing Ground
1	11/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	M	81.60	16.20	4	5.90	7.23	Coastal area
2	11/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	F	76.70	16.20	3	2.70	3.52	Coastal area
3	11/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	M	70.70	16.20	5	2.00	2.83	Coastal area
4	11/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	M	75.90	16.10	4	2.70	3.56	Coastal area
5	11/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	M	76.20	16.10	5	1.30	1.71	Coastal area
6	11/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	M	75.40	15.90	4	3.10	4.11	Coastal area
7	11/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	F	75.50	16.00	4	2.00	2.65	Coastal area
8	11/12/18	Long mackerel	Dorng Tung Market	Mackerel Gill net	F	140.80	20.60	4	6.60	4.69	Coastal area
9	11/12/18	Long mackerel	Dorng Tung Market	Mackerel Gill net	F	129.40	20.50	4	6.60	5.10	Coastal area
10	11/12/18	Long mackerel	Dorng Tung Market	Mackerel Gill net	F	124.20	19.60	4	3.00	2.42	Coastal area
11	11/12/18	Long mackerel	Dorng Tung Market	Mackerel Gill net	F	133.10	20.50	4	7.30	5.48	Coastal area
12	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	M	48.90	14.10	2	1.20	2.45	Coastal area
13	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	M	49.30	14.50	2	1.70	3.45	Coastal area
14	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	F	56.80	15.40	1	0.30	0.53	Coastal area
15	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	M	46.40	14.50	2	1.30	2.80	Coastal area
16	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	M	46.90	14.60	1	0.40	0.85	Coastal area
17	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	M	51.20	15.50	1	0.30	0.59	Coastal area
18	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	M	47.60	14.60	2	1.20	2.52	Coastal area
19	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	M	50.80	15.10	1	0.05	0.10	Coastal area
20	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	M	53.10	14.90	2	0.30	0.56	Coastal area
21	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	M	52.30	14.80	2	0.30	0.57	Coastal area
22	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	ND	54.50	14.70	0	ND	ND	Coastal area
23	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	M	50.10	14.60	2	0.50	1.00	Coastal area

No.	Date	Fish species	Location	Type of fishing gear	Sex	Total Body Weight (g)	Total Length (cm)	Gonad stage	Gonad weight(g)	GSI	Fishing Ground
24	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	ND	57.60	15.30	0	ND	ND	Coastal area
25	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	F	15.00	53.00	1	0.05	0.33	Coastal area
26	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	M	49.70	14.60	3	1.40	2.82	Coastal area
27	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	F	47.90	14.60	1	1.30	2.71	Coastal area
28	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	F	51.70	15.30	3	1.70	3.29	Coastal area
29	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	M	50.20	15.00	3	1.40	2.79	Coastal area
30	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	M	51.80	14.90	4	1.20	2.32	Coastal area
31	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	M	58.70	15.10	2	0.90	1.53	Coastal area
32	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	F	49.90	14.40	2	1.00	2.00	Coastal area
33	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	M	53.20	15.00	3	1.30	2.44	Coastal area
34	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	F	59.70	15.10	3	3.20	5.36	Coastal area
35	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	F	53.70	15.00	2	0.60	1.12	Coastal area
36	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	M	48.60	14.60	2	0.60	1.23	Coastal area
37	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	F	58.30	15.10	3	2.30	3.95	Coastal area
38	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	M	54.50	14.70	3	1.30	2.39	Coastal area
39	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	M	57.80	14.90	4	1.90	3.29	Coastal area
40	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	F	56.70	14.70	1	0.30	0.53	Coastal area
41	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	M	54.70	14.80	3	1.50	2.74	Coastal area
42	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	M	54.70	14.50	3	1.20	2.19	Coastal area
43	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	F	60.00	15.30	3	1.30	2.17	Coastal area
44	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	M	55.20	14.80	2	0.70	1.27	Coastal area
45	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	F	48.10	14.30	1	0.30	0.62	Coastal area
46	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	ND	57.70	15.40	0	0.00	ND	Coastal area
47	10/12/18	Short mackerel	Dorng Tung Market	Mackerel Gill net	M	54.50	14.90	2	0.90	1.65	Coastal area
48	10/12/18	Long mackerel	Dorng Tung Market	Mackerel Gill net	ND	56.80	15.70	0	0.00	ND	Outside area
49	10/12/18	Long mackerel	Bak Khlorng landing site	Trawler	F	119.70	19.20	3	3.20	2.67	Outside area

No.	Date	Fish species	Location	Type of fishing gear	Sex	Total Body Weight (g)	Total Length (cm)	Gonad stage	Gonad weight(g)	GSI	Fishing Ground
50	10/12/18	Long mackerel	Bak Khlorng landing site	Trawler	F	122.80	20.60	3	2.70	2.20	Outside area
51	10/12/18	Long mackerel	Bak Khlorng landing site	Trawler	F	101.50	20.60	3	2.70	2.66	Outside area
52	10/12/18	Long mackerel	Bak Khlorng landing site	Trawler	M	109.60	19.20	4	4.50	4.11	Outside area
53	10/12/18	Long mackerel	Bak Khlorng landing site	Trawler	F	120.30	19.90	3	4.40	3.66	Outside area
54	10/12/18	Long mackerel	Bak Khlorng landing site	Trawler	M	119.60	19.80	4	5.80	4.85	Outside area
55	10/12/18	Long mackerel	Bak Khlorng landing site	Trawler	M	114.60	19.40	3	3.50	3.05	Outside area
56	10/12/18	Long mackerel	Bak Khlorng landing site	Trawler	F	19.00	105.70	2	1.90	10.00	Outside area
57	10/12/18	Long mackerel	Bak Khlorng landing site	Trawler	F	122.80	19.60	4	3.30	2.69	Outside area
58	10/12/18	Long mackerel	Bak Khlorng landing site	Trawler	M	117.00	19.70	4	4.20	3.59	Outside area
59	10/12/18	Short mackerel	Bak Khlorng market	Mackerel Gill net	F	75.20	16.50	4	3.20	4.26	Outside area
60	10/12/18	Short mackerel	Bak Khlorng market	Mackerel Gill net	F	57.60	14.90	2	0.70	1.22	Outside area
61	10/12/18	Short mackerel	Bak Khlorng market	Mackerel Gill net	M	42.00	13.70	1	0.10	0.24	Outside area
62	10/12/18	Short mackerel	Bak Khlorng market	Mackerel Gill net	M	51.40	14.80	1	0.10	0.19	Outside area
63	10/12/18	Short mackerel	Bak Khlorng market	Mackerel Gill net	M	47.40	14.50	2	0.60	1.27	Outside area

No.	Date	Fish species	Location	Type of fishing gear	Sex	Total Body Weight (g)	Total Length (cm)	Gonad stage	Gonad weight(g)	GSI	Fishing Ground
64	10/12/18	Short mackerel	Bak Khlorng market	Mackerel Gill net	M	51.40	14.30	3	2.30	4.47	Outside area
65	10/12/18	Short mackerel	Bak Khlorng market	Mackerel Gill net	M	50.40	14.60	3	1.30	2.58	Outside area
66	10/12/18	Short mackerel	Bak Khlorng market	Mackerel Gill net	F	62.50	15.40	3	1.80	2.88	Outside area
67	10/12/18	Short mackerel	Bak Khlorng market	Mackerel Gill net	M	53.70	14.70	1	0.40	0.74	Outside area
68	10/12/18	Short mackerel	Bak Khlorng market	Mackerel Gill net	F	57.90	15.50	3	1.90	3.28	Outside area
69	10/12/18	Short mackerel	Bak Khlorng market	Mackerel Gill net	ND	42.20	14.40	0	ND	ND	Outside area
70	10/12/18	Short mackerel	Bak Khlorng market	Mackerel Gill net	M	56.10	14.60	2	1.10	1.96	Outside area
71	10/12/18	Short mackerel	Bak Khlorng market	Mackerel Gill net	M	44.40	14.20	2	0.30	0.68	Outside area

ANNEX 6

Monitoring sea bottom in fisheries refugia site in Peam Krasob, Koh Kong province

Number of Sample	Water depth (m)	Type of sea bottom	Monitored Target
1st time	3.5	Mud	End
2nd time	4	Mud	End
3rd time	5	Mud	End
4th time	4	Mud	Middle
5th time	2	Mud	Middle
6th time	2.5	Sand with mud	Middle
7th time	2.5	Sand with mud	Starting
8th time	2	Sand with mud	Starting

ANNEX 7

Agenda of the Field Survey

Date/Time	Description	Responsible person
10 December 2018	Leaving Phnom Penh for Koh Kong	
11 December 2018	Collection of fish samples at landing sites and markets in Koh Kong	
8:30am-10:00am	Dong Tung market	<ul style="list-style-type: none"> • Mr. Ouk vibol, • Mr. Leng Sy Vann, • Mr. Ly Kunthy , • Mr. Rous Sareth
10:00am -12:00pm	Bak Khlorng market and Landing site	<ul style="list-style-type: none"> • Mr. Ouk vibol, • Mr. Leng Sy Vann, • Mr. Ly Kunthy , • Mr. Rous Sareth
12:00pm-2:00pm	Lunch	All
2:00pm -5:30pm	Operating fish to monitor its gonad growth	<ul style="list-style-type: none"> • Mr. Ouk vibol, • Mr. Leng Sy Vann, • Mr. Ly Kunthy, • Mr. Rous Sareth
12 December 2018		
8:30am-12am	Monitoring sea bottom of fisheries <i>refugia</i> site in Peam Krosob	<ul style="list-style-type: none"> • Mr. Ouk vibol, • Mr. Leng Sy Vann, • Mr. Ly Kunthy , • Mr. Rous Sareth
12:00pm- 2:00pm	Lunch	All
2:00pm -4:00pm	Discussion with mackerel fishermen in Peam Krasob CFI	<ul style="list-style-type: none"> • Mr. Ouk vibol, • Mr. Leng Sy Vann, • Mr. Ly Kunthy , • Mr. Rous Sareth
13 December 2018	Leaving Koh Kong for Phnom Penh	