

STUDY ON BIOLOGY OF INDO-PACIFIC MACKEREL IN TRAT PROVINCE, THAILAND

As a part of the project of monitoring Indo-Pacific Mackerel's
life cycle in the Gulf of Thailand

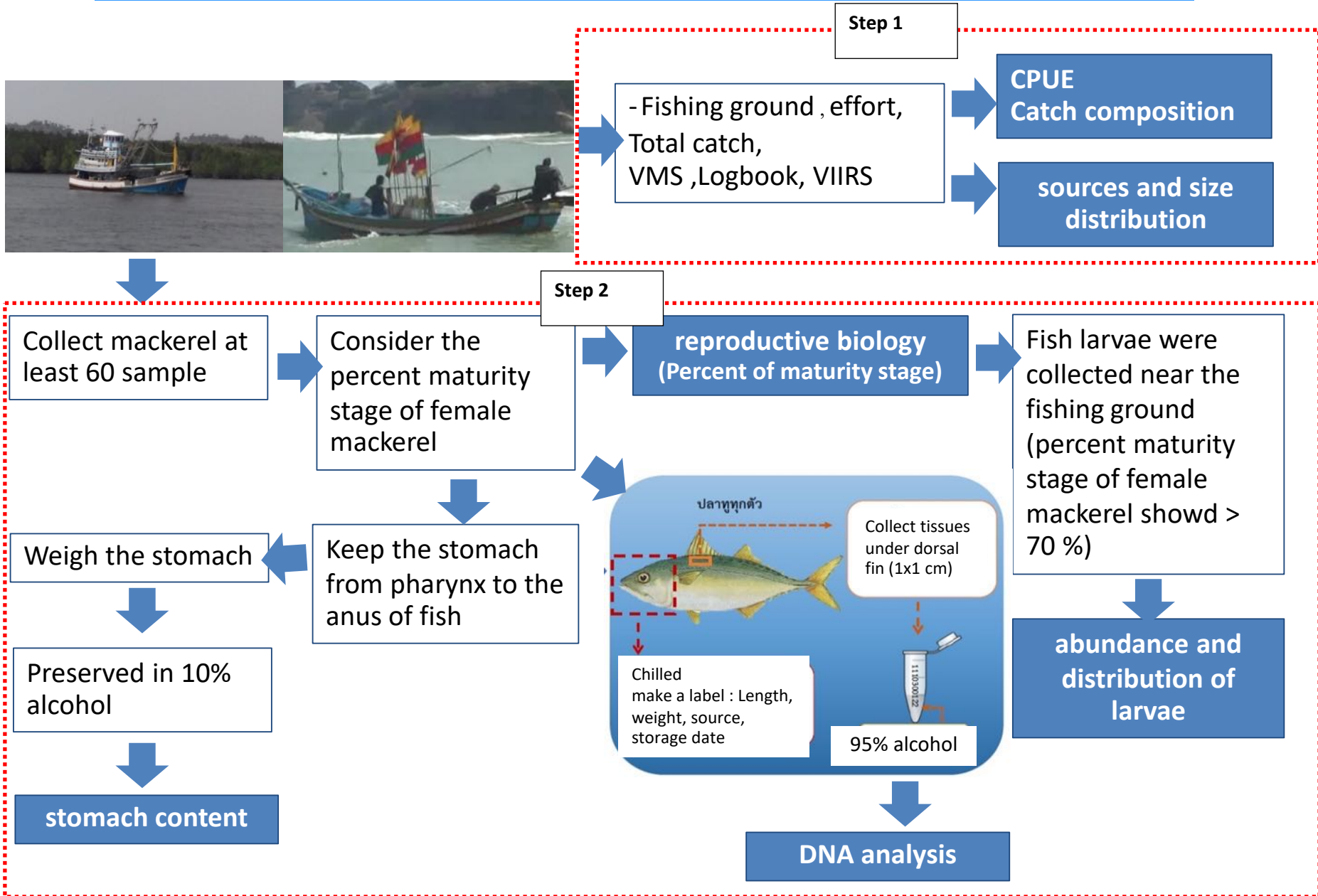
the 2nd Regional Scientific and Technical Committee meeting on 21-23 May 2019
Thansur Sokha Hotel, Kampot Province, Cambodia.

Project of monitoring Indo-Pacific Mackerel's life cycle in the Gulf of Thailand

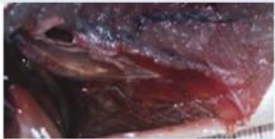






1. Study on sources and size distribution of Indo-Pacific mackerel in Gulf of Thailand
2. Study on reproductive biology of Indo-Pacific mackerel in Gulf of Thailand
3. Study on abundance and distribution of Mackerel's larvae in Gulf of Thailand
4. Study on stomach content of Indo-Pacific mackerel in Gulf of Thailand
5. Study on the genetic characteristics of Indo-Pacific mackerel population in Gulf of Thailand



Procedures for data collection



Macroscopic description of the gonad maturation stages of Mackerel (Ganga, 2010)

Stage	Female		Male	
	Description	Character	Description	Character
Immature stage	Stage 1: Immature <ul style="list-style-type: none"> Gonads small, tubular and pink Filling about 1/3 of the abdominal cavity Oocytes not visible 		<ul style="list-style-type: none"> Gonads small, whitish and flattened 	
	Stage 2: Maturing virgin and Recovering <ul style="list-style-type: none"> Gonads tubular and light yellow Filling about 1/2 of the abdominal cavity Oocytes not visible 			
Mature stage	Stage 3: Ripening, Gravid <ul style="list-style-type: none"> Gonads tubular and yellow Filling about 2/3 of the abdominal cavity Blood vessels visible on the ovary Oocytes are visible and yellow. 		<ul style="list-style-type: none"> Gonads white and turgid Filling the body cavity Milt is released on applying pressure 	
	Stage 4: Ripe <ul style="list-style-type: none"> Gonads tubular, yellow and transparent Filling about 2/3 of the abdominal cavity More blood vessels visible on the ovary Oocytes are visible and yellow 			
	Stage 5: Spent <ul style="list-style-type: none"> Gonads flabby with reddish brown Reducing to 1/2 of the abdominal cavity 			

Fish Larvae Collection

- Samples are collected by using plankton net (330 μm mesh size; 0.6 m mouth diameter; 3.0 m long) with flowmeter.
- The length of the rope for towing plankton net is calculated from
$$\text{Length} = 1.4 \times \text{Water Depth}$$
- The net is towed obliquely from a desired depth towards the water surface during a boat is running (10 min; 1.5-2.0 knots).
- All samples are fixed and preserved in 10% neutral buffered formalin.



Biological study on Indo-Pacific Mackerel

To examine period of spawning season of Indo-Pacific mackerel in Trat Province based on 3 studies results

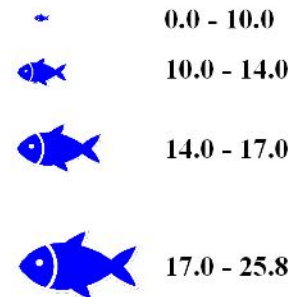
1. Study on size distribution of Indo-Pacific Mackerel
2. Percentage of maturity stage
3. Abundance and distribution of Mackerel's larvae

The results showed that the mackerel with the size of greater than 17 cm were found at the spawning grounds during spawning season. More than 60% of them were at the maturity stage, after that, the Mackerel's larvae were appeared

Shows 3 important information as follows:

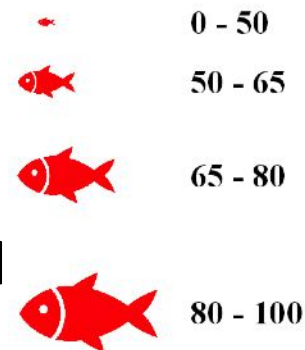
1. Information on size distribution of mackerel, represented by blue fish. It can be divided into 4 sizes, over 17 cm long, which are indicated as the breeders, juvenile fish are range between 14-17 cm, while less than 14 cm long are identified as the small fish.

CAUGHT AVERAGE LENGTH (CM)



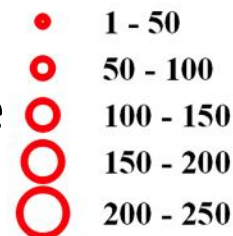
2. Percentage of maturity stage of female, represented by red fish, dividing into 4 level, including, over 80%, 2) 65-80%, 3) 50-65%, and 4) less than 50%

PERCENT (%) OF FEMALE MATURE



3. Fish larvae abundance, represented by red circle, higher volume are shown with the bigger circle

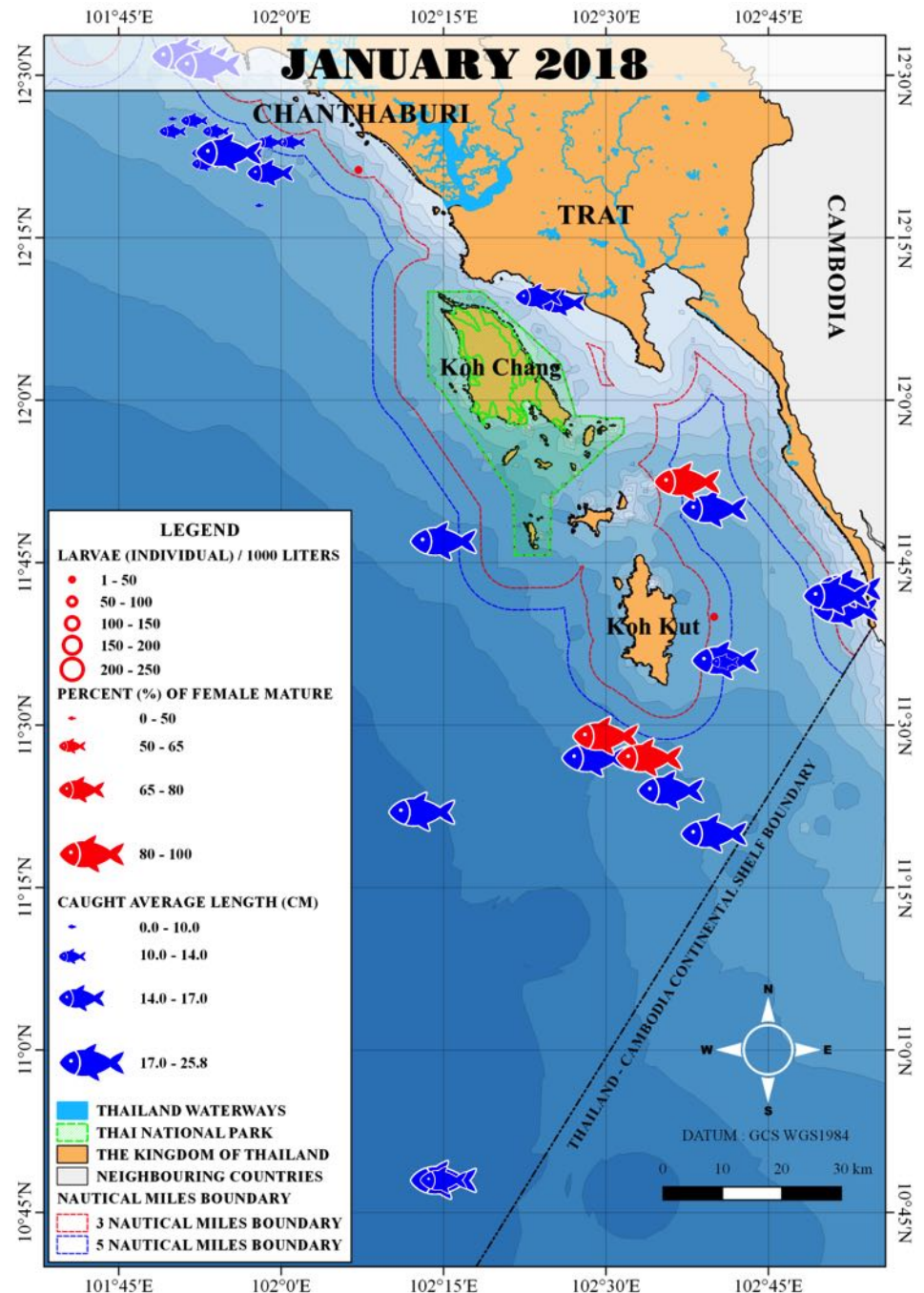
LARVAE (INDIVIDUAL) / 1000 LITERS



Result

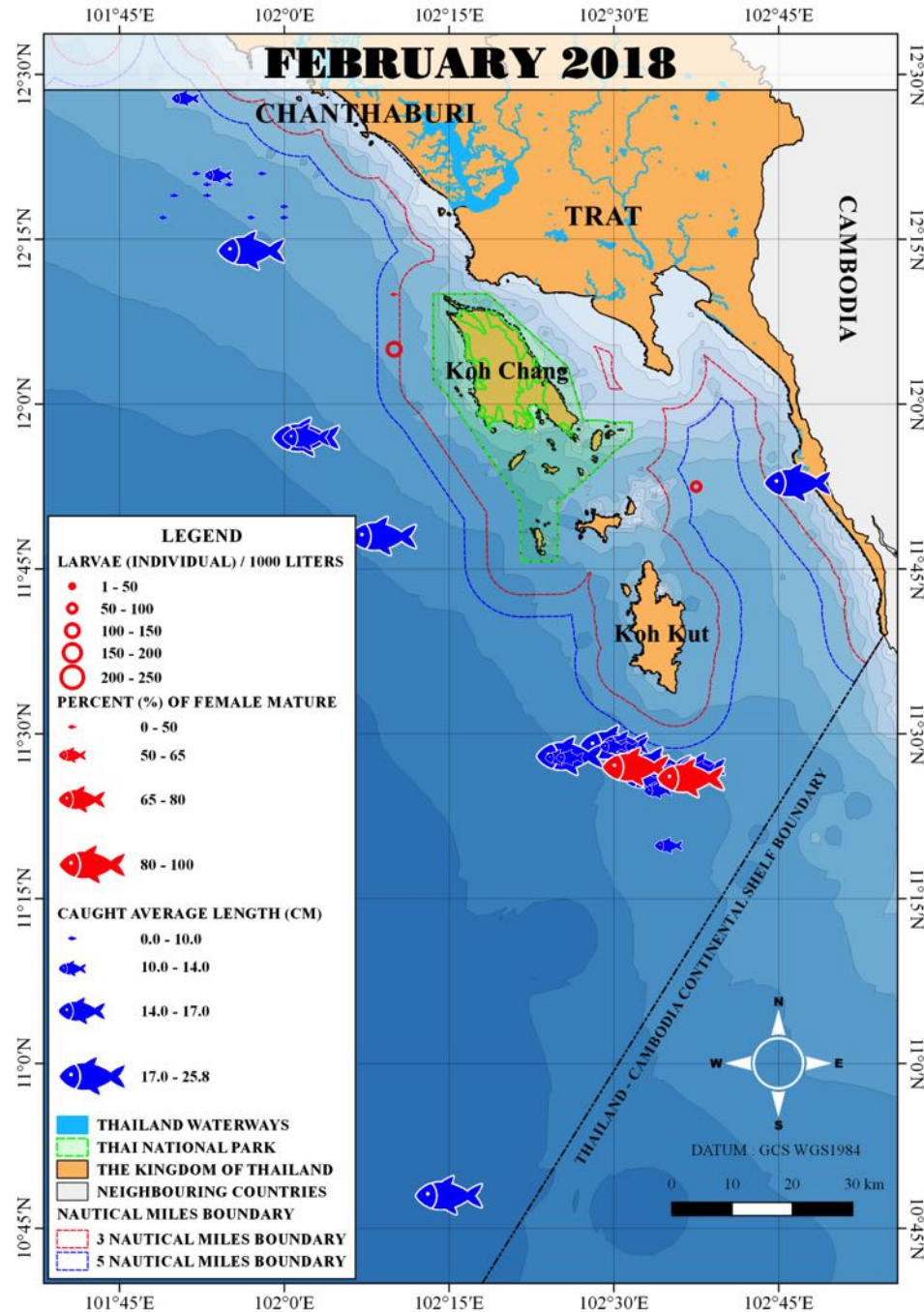
January

mature mackerel were found surrounding Koh Kood near the Cambodian waters. Over 80% of total mackerel were at maturity stage. Mackerel larvae were also found near Koh Kood



February

mature mackerel were found near Koh Kood, in front of Koh Yai, about 3-5 miles from the coastline, as well as in front of Koh Chang. Over 80% of total mackerel were at maturity stage. Mackerel larvae were also found near Koh Chang.

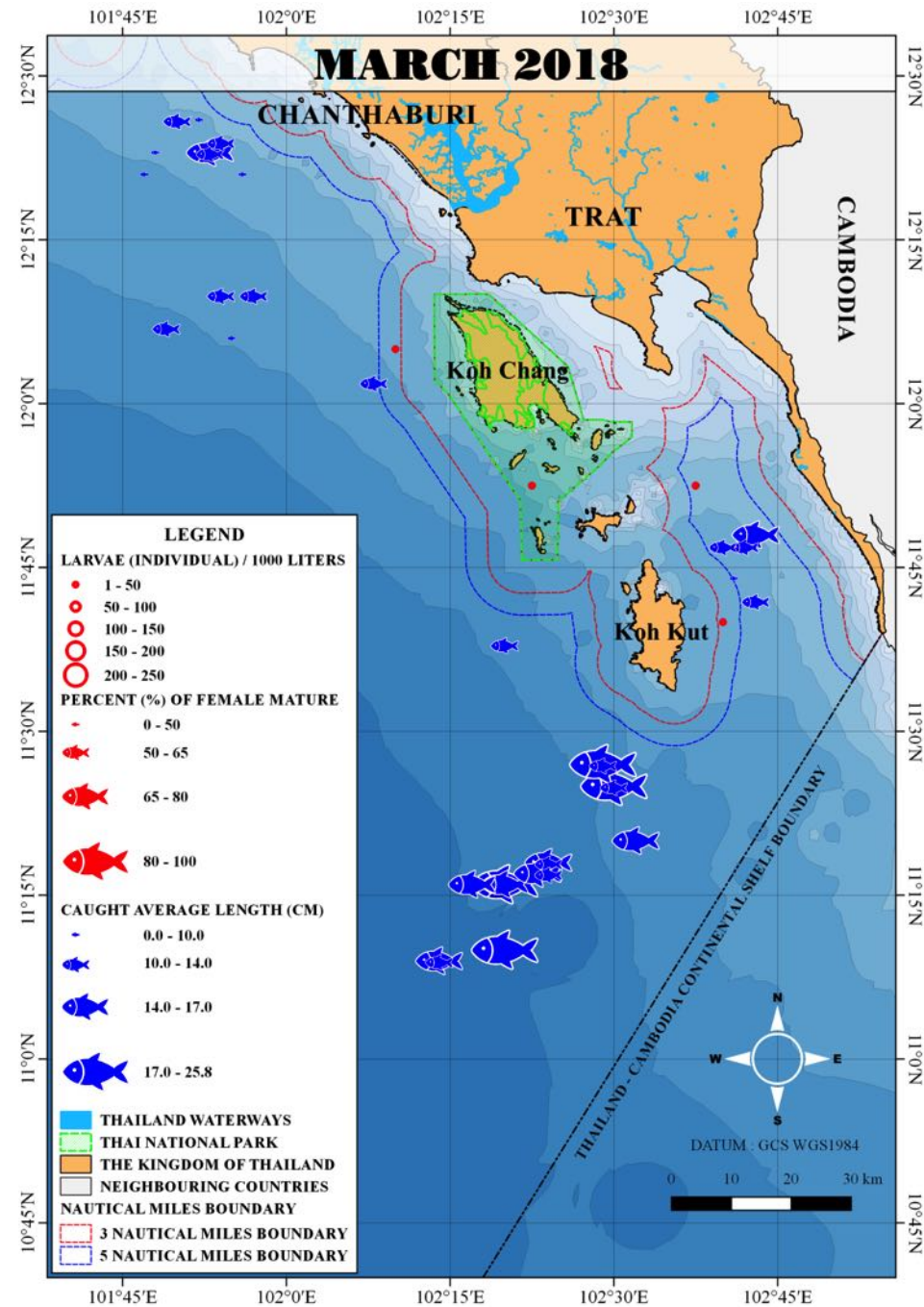


March

-mature mackerel were found near Koh Kood.

-Juvenile fish were found in front of Klong Yai, about 5-10 miles from the coastline, as well as in front of Koh Chang.

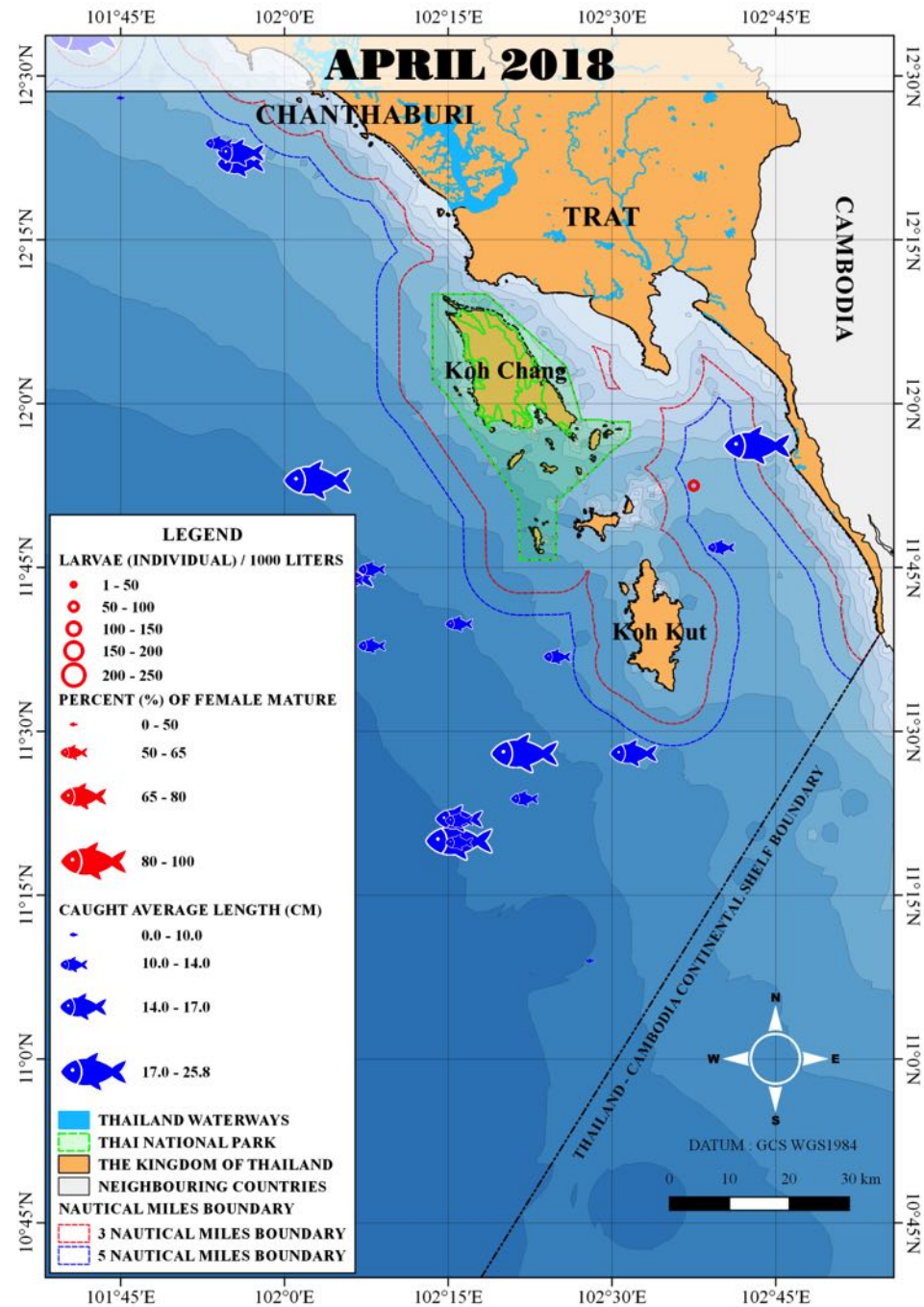
Mackerel larvae were also found near Koh Kood and Koh Chang.



April

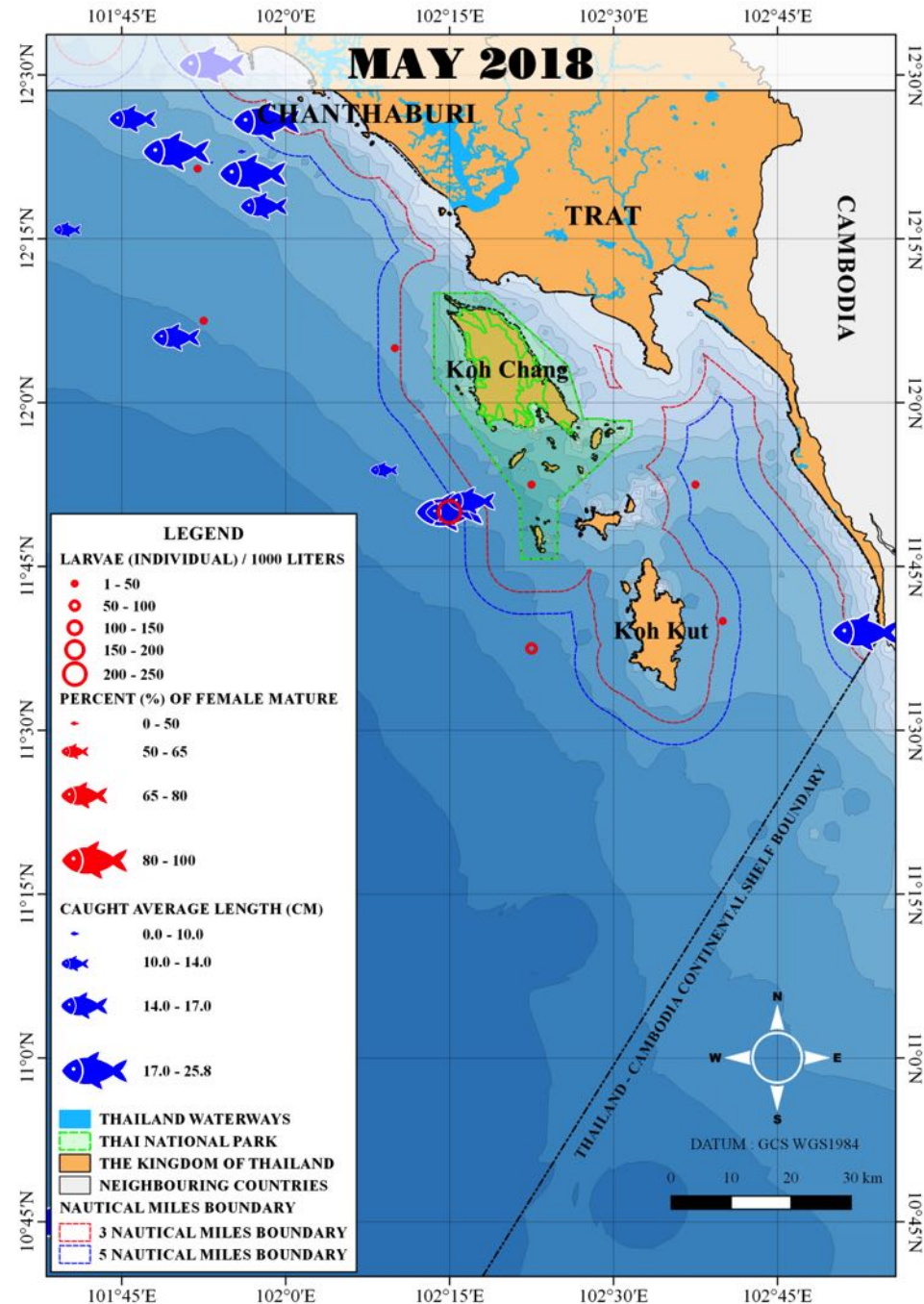
-mature mackerel were found near Koh Kood, in front of Klong Yai, about 3-5 miles from the coastline, as well as in front of Koh Chang.

-Mackerel larvae were also found near Koh Kood and Koh Chang.



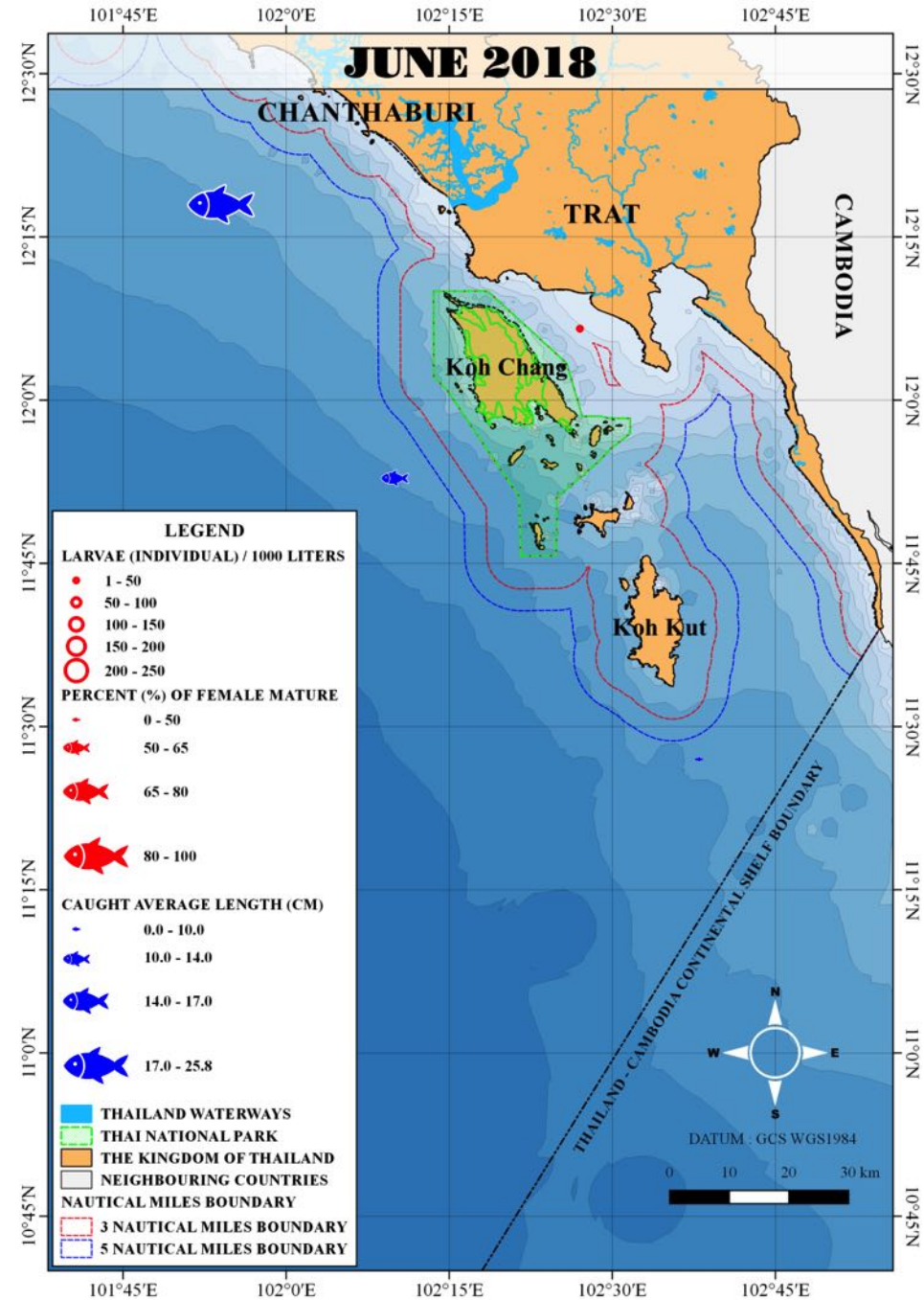
May

- mature mackerel were found at the areas of Klong Yai District, about 3-5 miles from the coastline, as well as in front of Koh Chang.
- mackerel larvae were also found surrounding Koh Kood and Koh Chang.



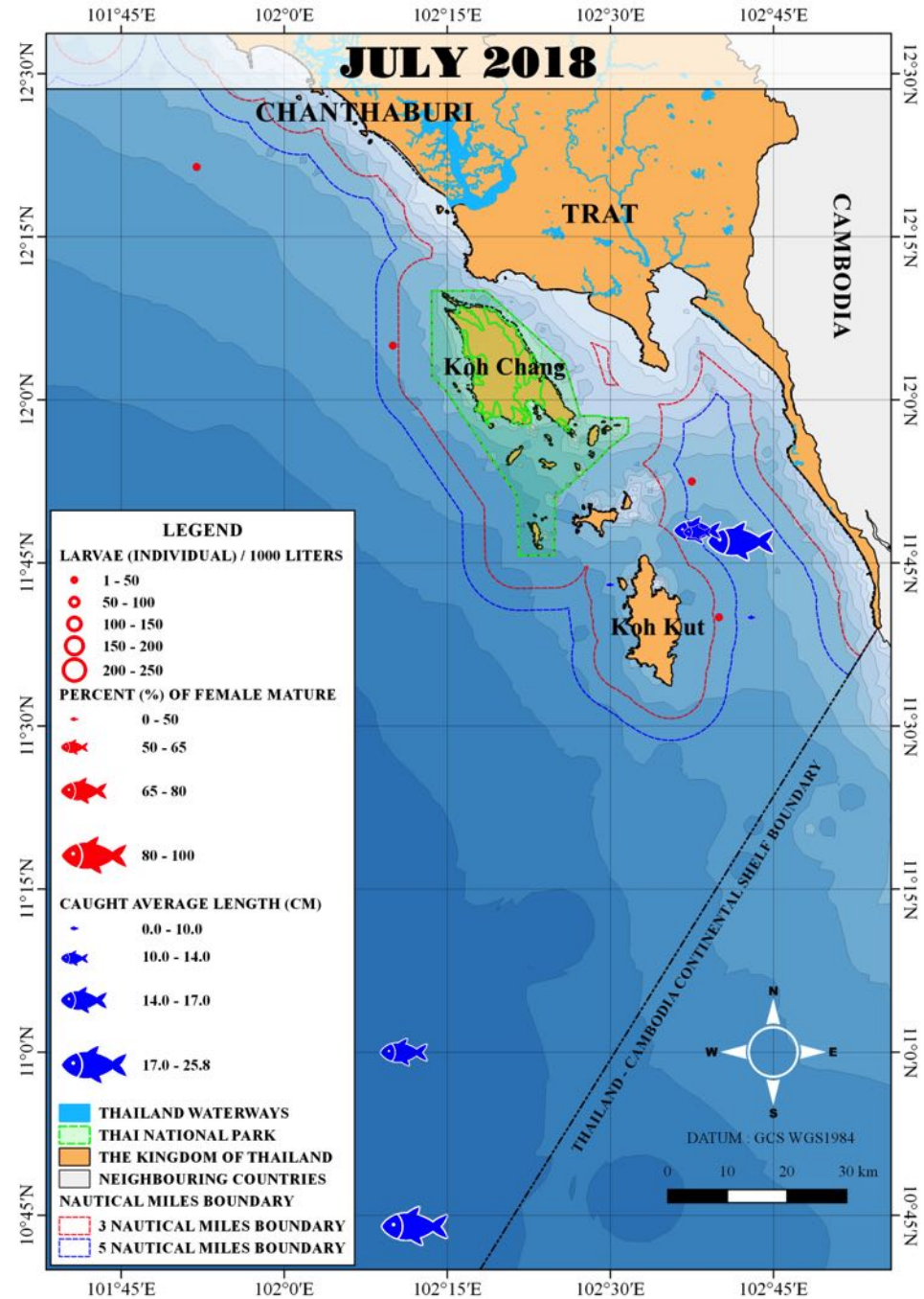
June

-mackerel were not found in Trat Province



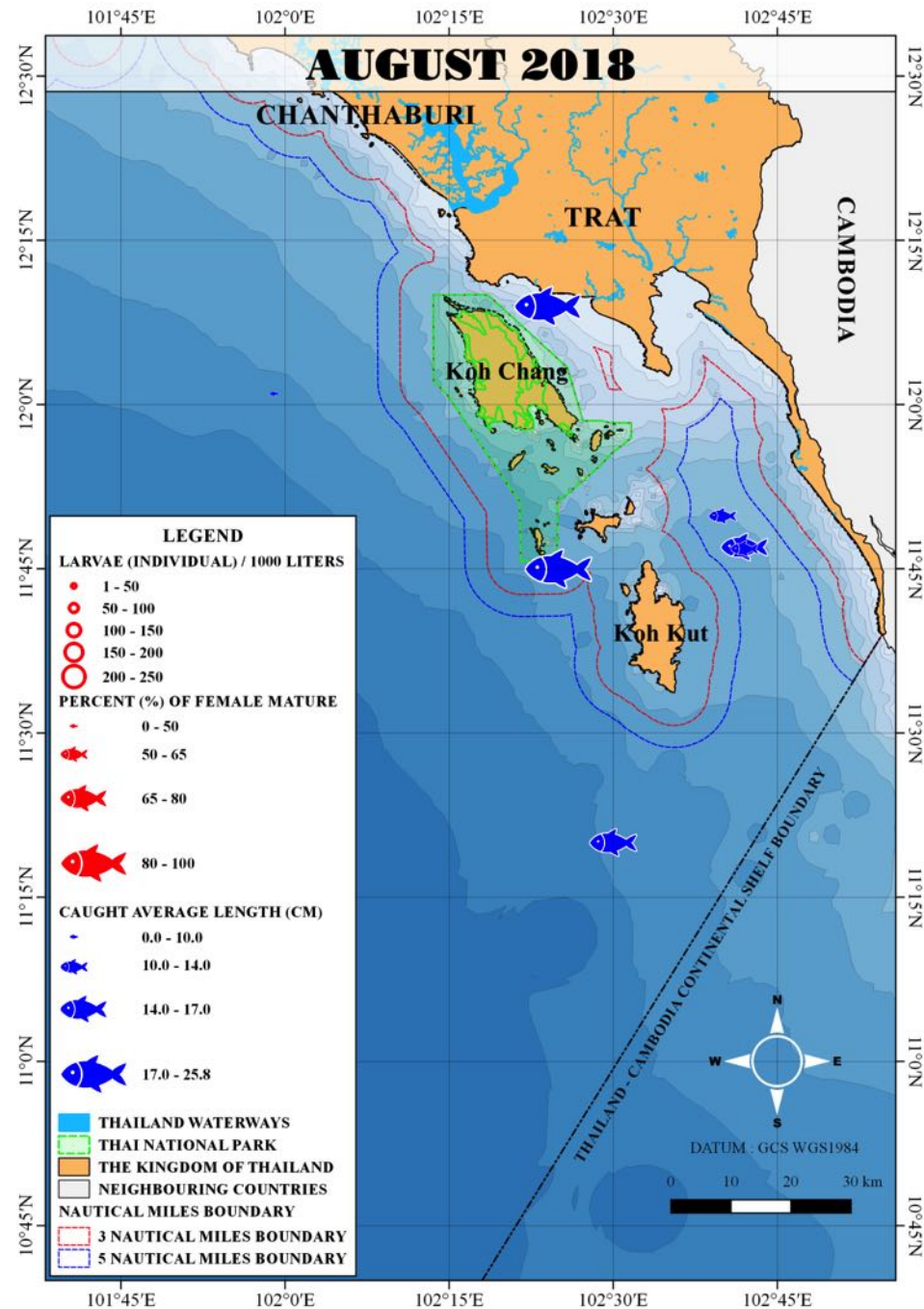
July

- Few mature fish were found in front of Klong Yai District, about 5-10 miles from the coastline.
- Few number of mackerel larvae were appeared.



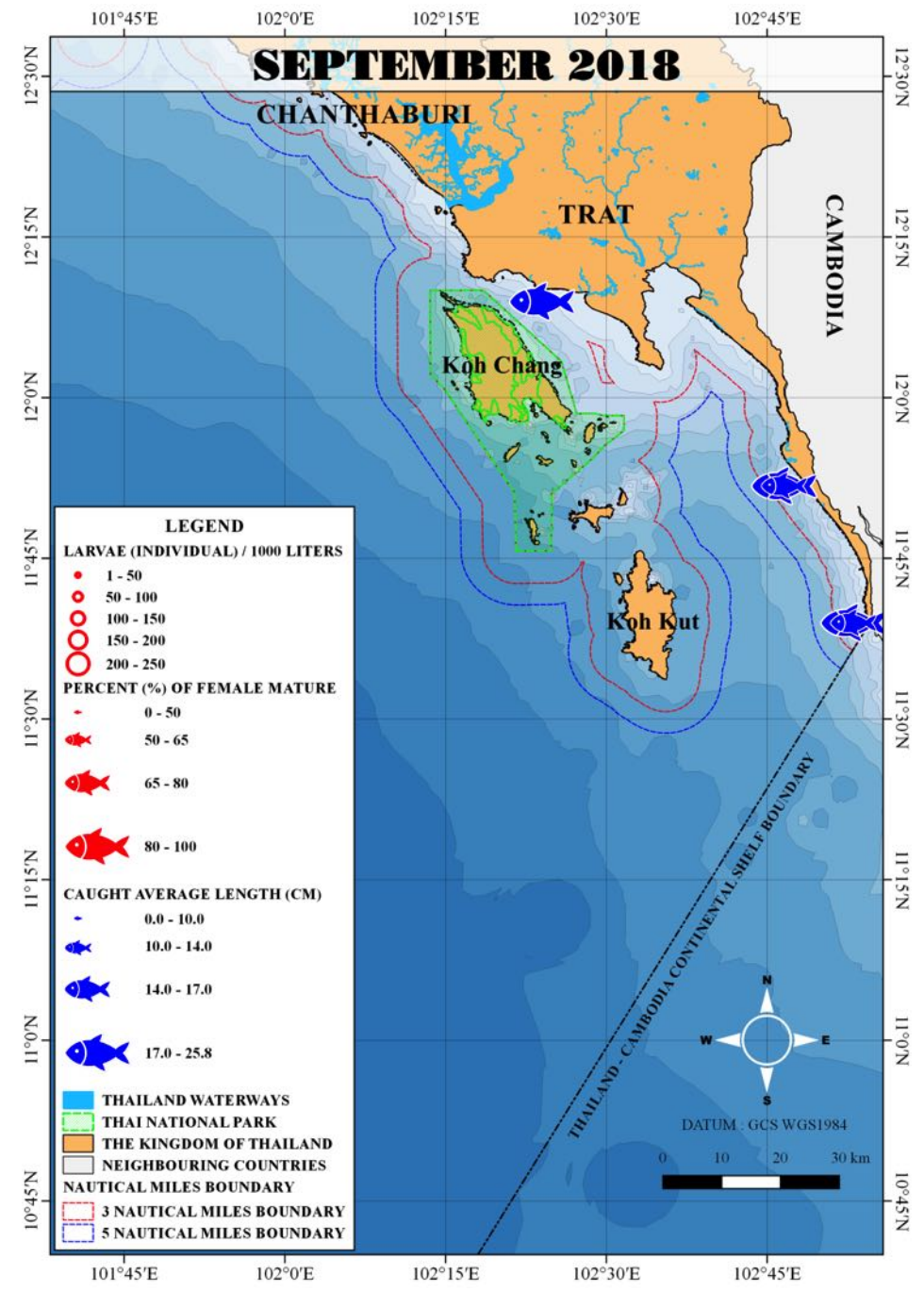
August

- Few mature fish were found at the areas of Koh Kood and Koh Chang.
- Mackerel larvae was not found



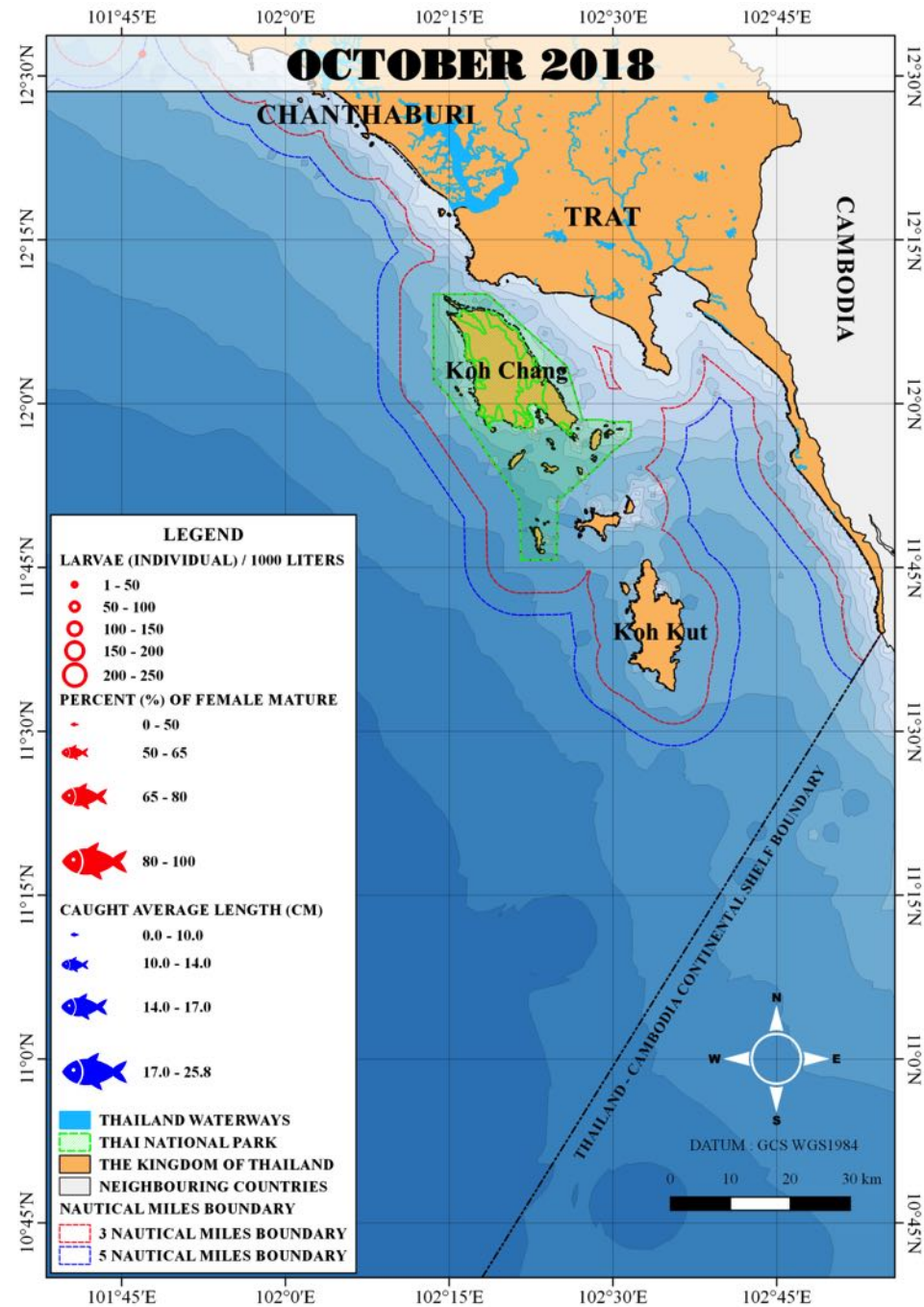
September

- Few mature fish were found in front of Klong Yai District, and Chang Strait, about 5-10 miles from the coastline.
- No mackerel larvae were appeared.



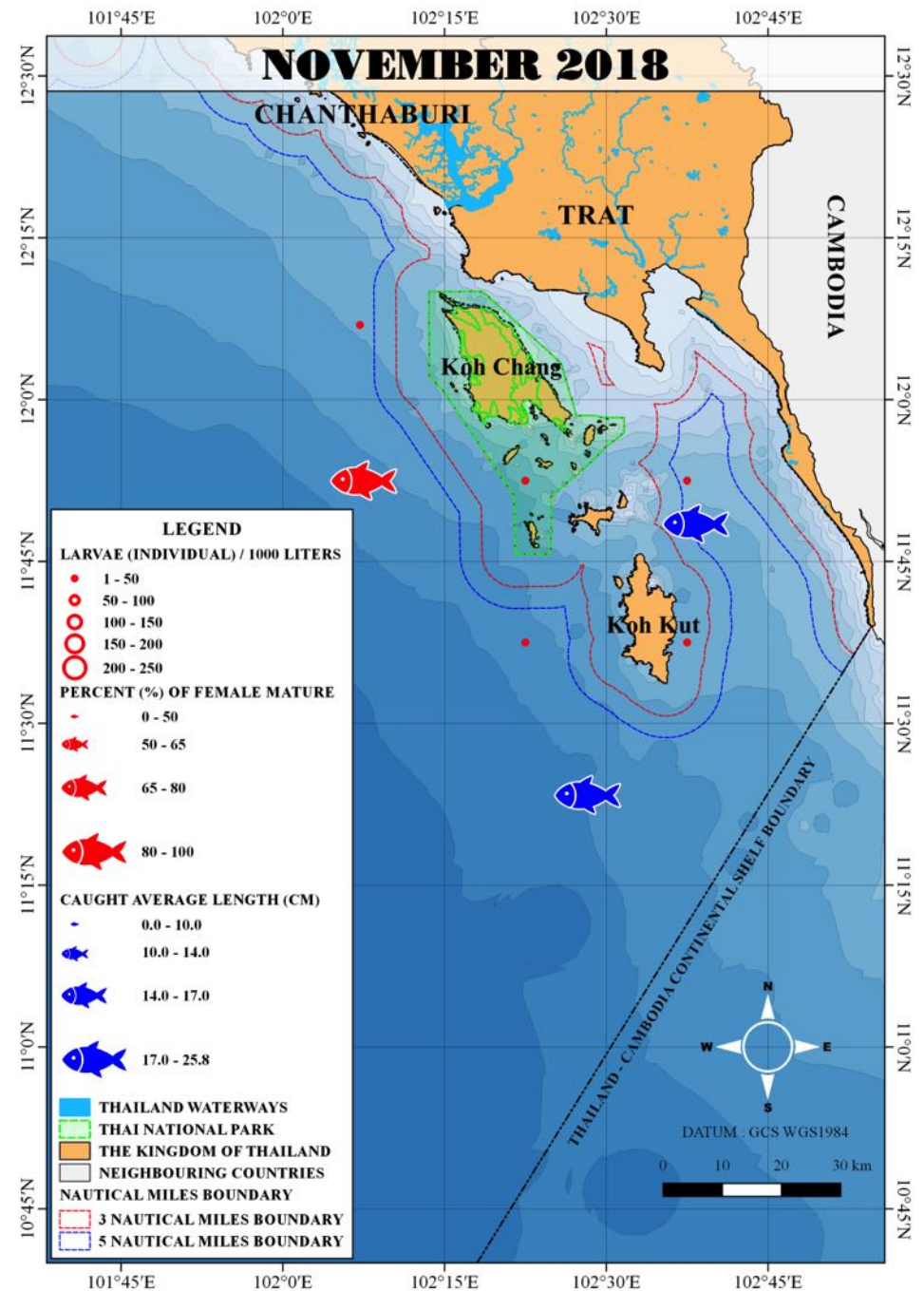
October

-Mackerel were not found in the areas of Trat Province



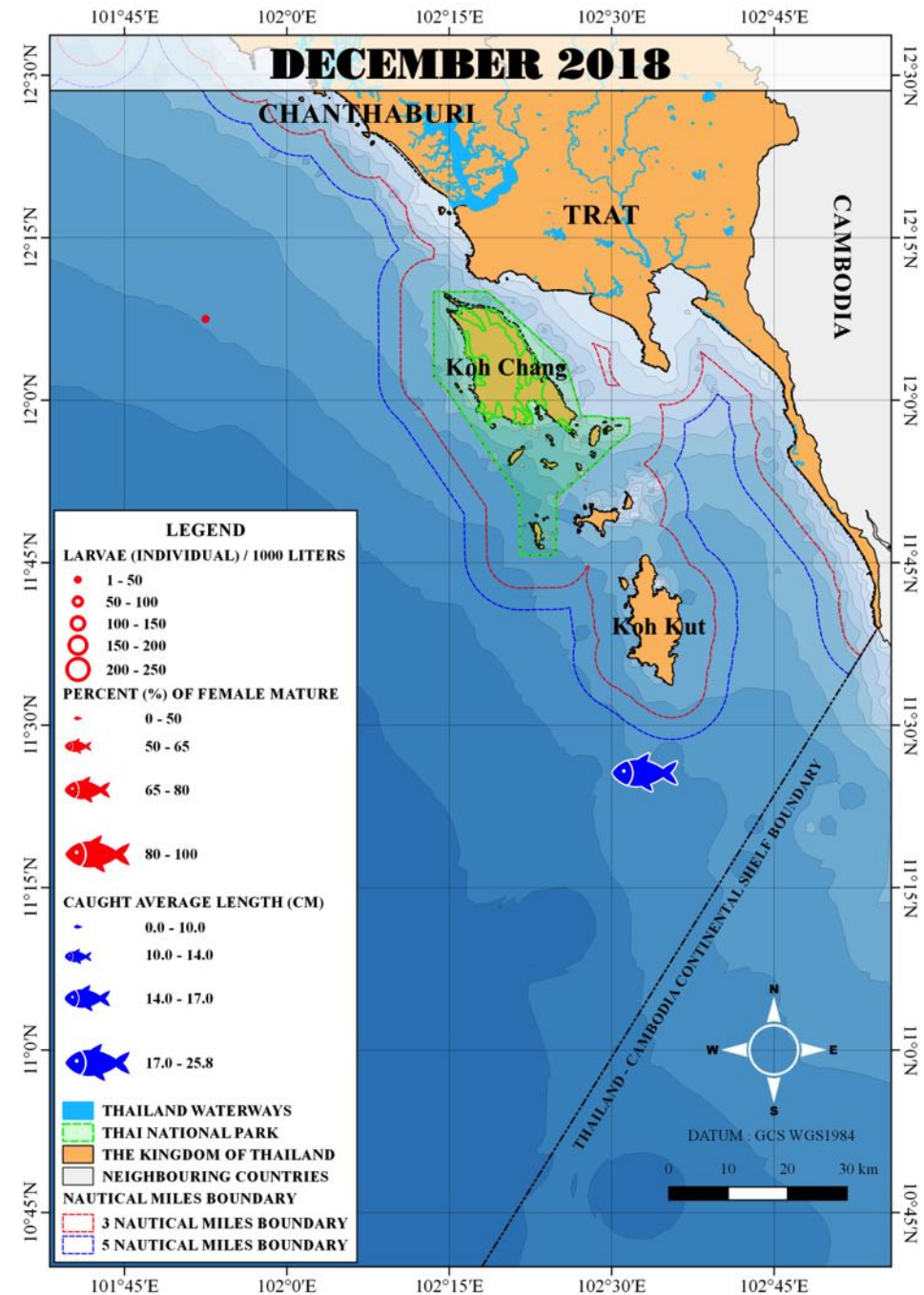
November

- Few mature fish were found in front of Klong Yai District and near Koh Kood.
- Few number of mackerel larvae were appeared surrounding Koh Kood.



December

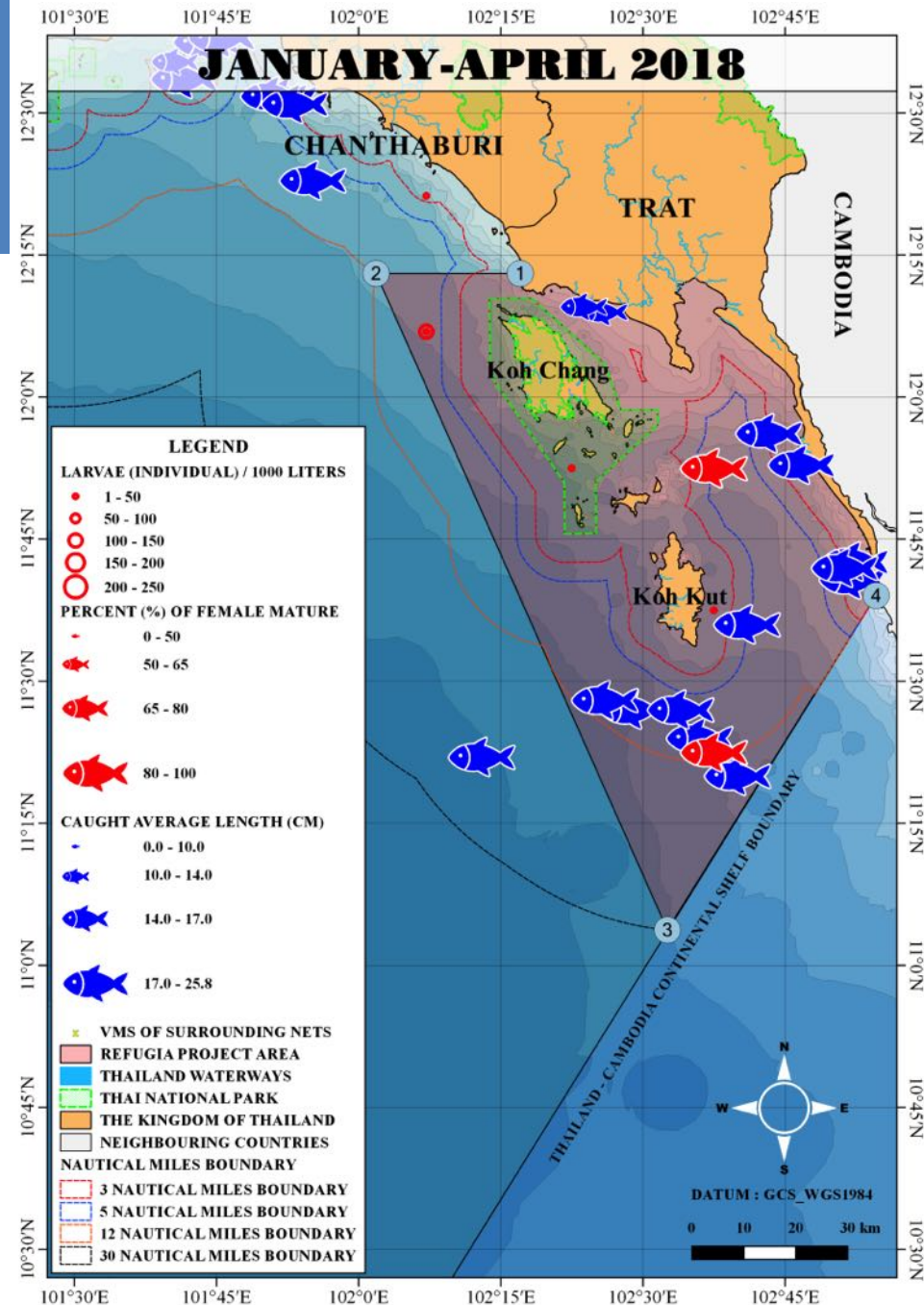
- Few mature fish were found near Koh Kood.
- Mackerel larvae were also found.



Spawning season and spawning grounds of Indo-Pacific mackerel

- Indo Pacific mackerel was spawning all year, while the peak showed in January-April.
- spawning grounds were in the areas near Koh Kood and Koh Chang, Trat Province.

6,000 Square kilometer



Thank you for you attention