Threats to Coastal and Marine Ecosystems

Sedimentation, nutrient pollution from development on land, and over fishing (particularly by large trawlers now fishing close to reefs) cause major damage to the reefs of Thailand, of which over 60% have less than 50% live coral cover[6]. A recent assessment of coral reefs classified over 80% of reefs along the Andaman Coast and over 50% of reefs along the Gulf as either in "fair," "bad," or "very bad" condition and concluded that these reefs are at risk of continued degradation. An international comparative study also indicated that at least 50% of all coral reefs in Thailand experience "high" or "very high" threats[7].

Other activities such as conversion of mangrove forest to shrimp farms, excessive tourism activities, and improper management of pollution have further contributed to the degradation of coastal habitats and resources[8].

The degradation of seagrass beds is due to wastewater discharge from coastal industries, urban development, shrimp farms and other forms of coastal development. Trawling and the use of push nets and dragnets can also cause severe impacts on seagrasses[9].

The Andaman Sea is host to many threatened fauna species, including Dugong *Dugong dugon* which is globally vulnerable, a number of dolphin species, and four species of sea turtles: critically endangered leatherback turtles *Dermochelys coriacea* and hawksbill turtles *Eretmochelys imbricate*, green turtles *Chelonia mydas* which are classified as threatened and olive ridley turtles *Lepidochelys olivacea* which are classified as vulnerable. A mere 150 dugongs are estimated to live in the Andaman Sea, in scattered groups from Ranong to Satun Province. Accidental capture of dugong in fishing nets and the degradation of seagrass meadows, which they rely on for food, are the two main threats to dugong[10].

Coral bleaching

Coral bleaching is the most severe threat posed by climate change to coral reefs in Thailand[11]. Recently, the severe mass coral bleaching events in 2010 occurred on most reef sites in the country. Bleaching of reefs in the Andaman Sea was more severe and extensive than those in the Gulf of Thailand[15]. Bleaching events are predicted to increase in frequency and severity in this century[12,13,14,15]. Coral recovery from major disturbances, such as the severe coral bleaching event in 1998, was documented in some locations[20]. However coral recovery capacity is likely to diminish in some locations as disturbance frequencies increase.

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33. Reference this to the FAO country profile

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Research Team - Sakanan Plathong | Sirasa Kantaratanakul
Editors - Lea Guererro | Mark Dia | Ephraim Batungbacal
Layout/Info Graphics - Fluidkoncepts - fluidkoncepts.com
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Greenpeace Southeast Asia (Thailand Office)
1371 Capital Building,G Floor,
Phaholyothin Road, Samsennai,
Phayathai, Bangkok 10400
Tel. (02) 357 1921
Fax: (02) 357 1929
e-mail: info.th@greenpeace.org
www.greenpeace.org/seasia/th/

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Thailand's Coastal and Marine Resources

Thailand has a total marine area of 316,118.3 sq. km^2 which is divided into two distinct areas – the Gulf of Thailand in the Pacific Ocean in the east side and the Andaman Sea in the Indian Ocean in the west side. Marine fisheries and aquaculture, as well as coastal tourism and marine transportation, are the main economic activities along the coasts. Out of a population of about 67 million people, 40% or 27 million, live along the 2,614 km coastline[1].

Coral reefs in Thailand's seas cover approximately 153 sq. km^2 and are estimated to be home to 400 species of hard corals. The coral reefs, which are mostly small fringing reefs, are found both in the Gulf of Thailand (74.8 km^2) and the Andaman Sea (78.56 km^2)[2]. Seagrass meadows cover a total of 149.97 sq. km^2. Seagrass, which grow in relatively shallow waters, form a key feeding, breeding, and nursery ground for many species of fish, turtles, lobsters, and dugong. There are seagrass beds in 19 of the 23 coastal provinces and the country is home to 12 of the approximately 58 species of seagrass found worldwide.

Mangroves forests are found along both coasts where they stabilize the shoreline, protect against waves and storms, and provide a nursery and feeding ground for many species, including commercially important fish. There are mangrove forests in all the 23 coastal provinces and they cover an area of approximately 2,501.94 sq. km^2. Thailand's mangroves are also important on a global scale as the country is home to 35 of a total of 50 species found worldwide.

Other significant species found in the waters of Thailand include the sea turtle, dugong, dolphin, whales and whale sharks[3].

The country has a total of 21 declared marine national parks, six of which are located in the Gulf of Thailand and the remaining 15 in the Andaman Sea. In addition, there are five proposed marine national parks. The marine national parks cover a total estimated area of 5,812 sq. km^2, or 1.8 percent of the total marine area of Thailand. The majority of the marine national parks are smaller than 1,000 sq. km^2 and may not be enough to provide the protected habitat area required by the larger highly-mobile marine vertebrates[4].

Over 50 percent of coral reefs in Thailand are found within marine protected areas. Seagrass beds within marine protected areas are estimated at 52.09 sq. km^2 or 34.7 percent of the total area covered by seagrasses in the country. As for mangroves, only seven percent of the total area covered by mangroves is found within marine national parks[5].

Marine fisheries in Thailand

The Exclusive Economic Zone (EEZ) of Thailand covers 420,280 km^2, 304,000 km^2 in the Gulf of Thailand and 116,280 km^2 in the Andaman Sea. Its maritime border is shared with Cambodia and Vietnam in the south east, Myanmar in the west and Malaysia in the south. Thai fisheries are divided into commercial fishing and small-scale fishing. Some commercial vessels are able to fish in farther fishing areas such as the Indian Ocean, South China Sea, Indonesia and even Australia.

Marine capture fisheries can be characterized as small-scale fisheries (SSF) and large-scale fisheries (LSF). The fishing boats, which are non-powered, outboard powered and inboard powered boats less than 5 gross tonnage (GT), as well as the fishing gears generally operating inshore, are considered as SSF. Also, coastal fishing operations without boats are included in SSF. Fishing boats of more than 5 GT and the fishing operations conducted offshore are LSF.

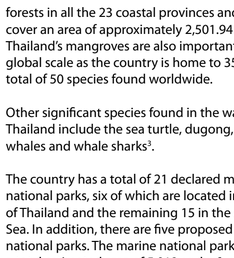
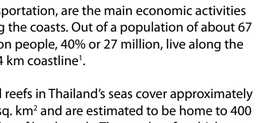


Figure 1: Distribution of marine catch

Note: Commercial fishing boats because of sheer size catches 90% of fish leaving small fishers with only 10%

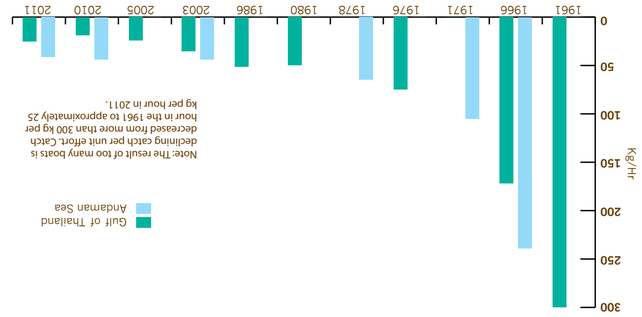
Figure 2: Total marine production by fishing ground



Note: Only 59% of catch came from Thailand waters while 41% were caught beyond Thailand's Exclusive Economic Zone
Source Fig. 1 & 2 FAO

The decline of Thailand's fisheries

The decrease in capture fishery production in Thailand is the result of the depletion of resources due to overexploitation and excessive fishing effort in both of Andaman Sea and in the Gulf. The history of marine capture fisheries in Thailand is characterized by a steady increase in catch from 1950 until 1989 followed by the leveling of the catch for around 15 years, before it experienced a continuous decline from 2004 (Figure 1).

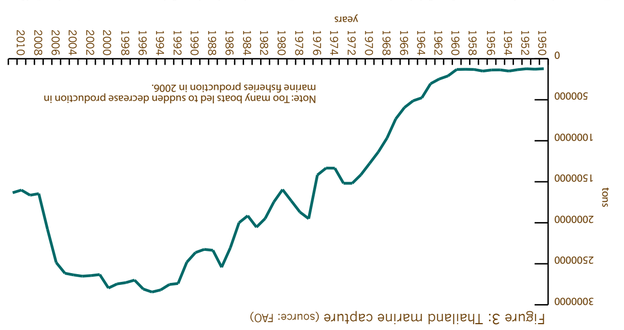


Note: The result of too many boats is declining catch per unit effort. Catch decreased from more than 300 kg per hour in the 1961 to approximately 25 kg per hour in 2011.

Figure 4: Catch per unit effort (Kg/HY) (source: FAO)

Too many boats chasing too few fish leads to overfishing. For example, one study has estimated that catch of demersal (bottom dwelling) fishes in the Gulf of Thailand should not be more than 916,000-993,000 mt[20] in order to be sustainable and levels are currently much higher. In the Gulf of Thailand, catch per unit effort have decreased from 300 kg per hour in 1961 to approximately 25 kg per hour in 2011 which is a period of 50 years (Figure 4).

Demersal and other fishery resources in the Gulf are severely over-fished. Reduction of excess fishing capacity, particularly in the trawl fisheries, requires urgent management attention. In the study of Kongprom et al. (2003), excess demersal fishing effort is estimated to be about 50% of the number of registered boats in 1995. The excess number of fishing boats includes 1,024 medium otter board trawlers, 1,309 large otter board trawlers, 1,081 pair trawlers, and 167 push nets. Excess fishing effort should be eliminated and new entrants effectively banned[21].



Note: Too many boats led to sudden decrease production in marine fisheries production in 2006.

Figure 3: Thailand marine capture (source: FAO)

Trash Fish

Trash fish refers to small sized or non-target marine animals which are caught unintentionally. They are processed into fish meal for animal feed, fish paste, or used for other purposes. Trash fish caught by trawlers is approximately 60 % of their total catch[23]. Up to 32% of trash fish are juvenile target species. These smaller fish would have high value if they were allowed to reach maturity so they can be next generation of fish or our food[22]. In the last ten years, the proportion of trash fish has been increasing and target fish species is also getting smaller.

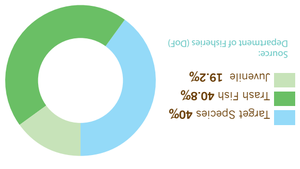


Figure 5: Trawler catch

Note: Trawlers scrape the bottom of the gulf wasting 19.2% of juvenile economic fish.

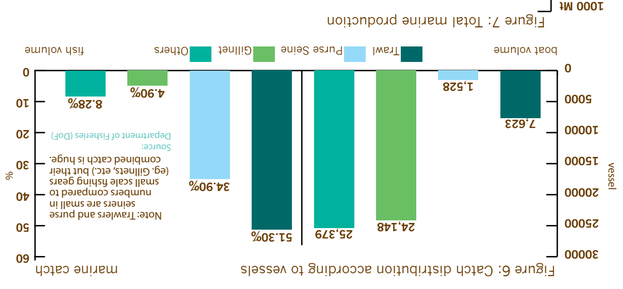
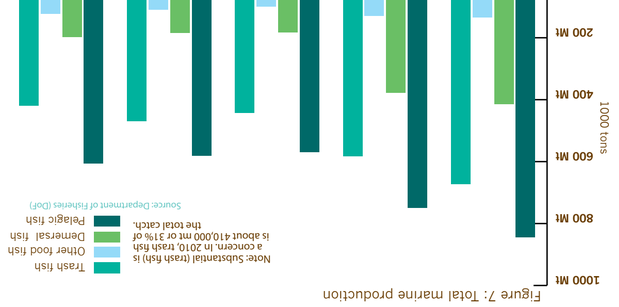


Figure 6: Catch distribution according to vessels marine catch

Note: Trawlers and purse seiners are small in numbers compared to small scale fishing gears (eg. Gillnets, etc.) but their combined catch is huge.
Source: Department of Fisheries (DoF)



Note: Substantial (trash fish) is a concern. In 2010, trash fish is about 410,000 mt or 31% of the total catch.
Source: Department of Fisheries (DoF)

Figure 7: Total marine production

Conclusion

Thailand's marine and fisheries resources are on the verge of collapse. It takes both ecosystems and fish to support the livelihoods of fishers and the entire fisheries value chain. Conflict among users is the result of the diminishing supply of resources. If appropriate management measures are not enforced through enabling laws and policy, the inevitable proliferation of illegal fishing boats during the closed season[26] push nettors are still operating illegally along the coast in areas such as Ranong and Satun Provinces on the Andaman Sea[27] and in Chumphon, Nakhon Si Thammarath and Tat in the Gulf[28]. There are currently more than 2,100 unregistered trawlers[29]

- encroachment of commercial fishing vessels e.g. pair- trawlers, otter-board trawlers, anchovy purse seiners, purse seiners and scoop netters into 3 km[25].
- In 2011, there were 61 recorded violations of the closed season and another six incidents of other illegal fishing in the Gulf of Thailand.
- In the Andaman Sea, small scale fishers of Satun Province reported encroachment by commercial boats during the closed season[26]
- push nettors are still operating illegally along the coast in areas such as Ranong and Satun
- In 2011, there were 40 incidents of encroachment of Vietnamese fishing vessels into Thai waters. In January 2012, eight incidents were reported[30] and in February 2012, two incidents were reported[31]. These fishers operate with longline, squid hook & line, conger eel fishing and trawling vessels.

can adapt to impacts of climate change and natural disasters, there is a limit. Ensuring that the remaining resources are still intact increases our chances to adapt to extreme changes in our environment. To do this, Greenpeace supports the global movement for the complete elimination of all forms of illegal, unreported and unregulated fishing and the shift to sustainable fisheries and the creation of marine reserves to ensure the health of the oceans.

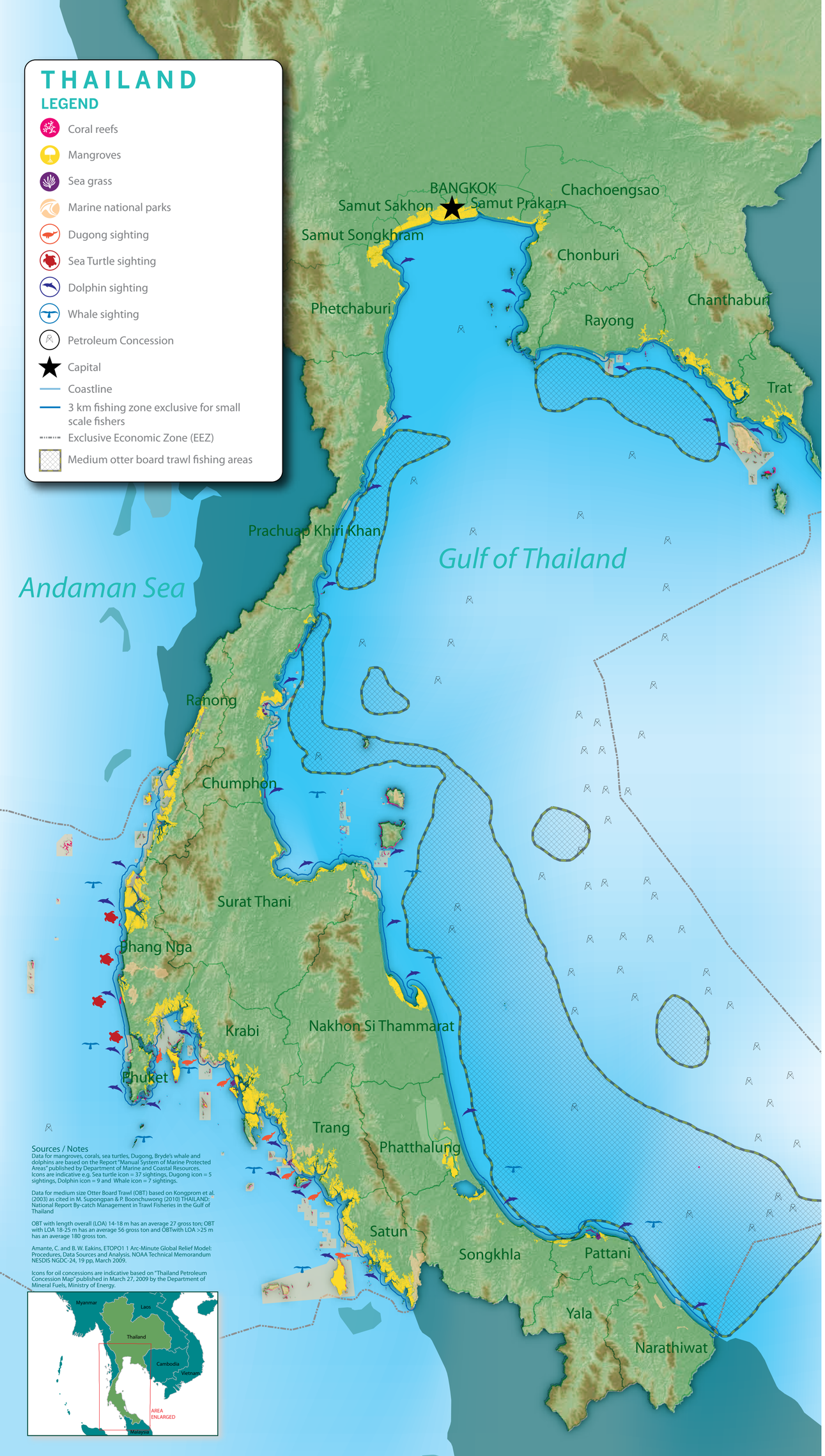
Violations

Provinces on the Andaman Sea[27] and in the Gulf[28]. There are currently more than 2,100 unregistered trawlers[29]

- In 2011, there were 40 incidents of encroachment of Vietnamese fishing vessels into Thai waters. In January 2012, eight incidents were reported[30] and in February 2012, two incidents were reported[31]. These fishers operate with longline, squid hook & line, conger eel fishing and trawling vessels.

Illegal Unreported and Unregulated (IUU) Fishing within Thai Waters

The violation of regulations by fishers includes entering prohibited areas where fishing is banned and using illegal fishing gear in Thai waters and within the Exclusive Economic Zones or other coastal States. In coastal waters, there are widespread violations of fishing regulations, including fishing during closed periods, the use of very small illegal mesh sizes, which catch juvenile fish, and the destruction of fish habitats such as mangroves, seagrass beds and coral reefs.



Marine Resources

Coral Reefs[i,ii,iii,iv,v]

* Gulf of Thailand (GoT) – **74.8** km²
* Andaman Sea – **78.56** km²
* Total Area **153** km²
* Only **40.3%** of the total area is under protection
* over **60%** have less than **50%** live coral cover
* **400** species

Seagrass[vi,vii,viii]

* Total Area **149.97** km²
* only **35%** of the total area is under protection
* **12** species

Mangroves[ix,x]

* Total area **2,501.94** km²
* only **7%** of the total mangove cover is under protection
* **35** species

Marine National Parks[xi]

* **6** in the Gulf of Thailand
* **15** in Andaman Sea
* **5,812** km²

Endangered species[xii]

Dugong

A mere 150 dugongs (*Dugong dugon*) are estimated to live in the Andaman Sea, in scattered groups from Ranong to Satun Province. Accidental capture of dugong in fishing nets and the degradation of seagrass meadows, which they rely on for food, are the two main threats to dugong.

Sea Turtles

The Andaman Sea is host to four species of sea turtles: critically endangered leatherback turtles (*Dermochelys coriacea*) and hawksbill turtles (*Eretmochelys imbricate*), green turtles (*Chelonia mydas*) which are classified as threatened and olive ridley turtles (*Lepidochelys olivacea*) which are classified as vulnerable.

Dolphins[xx]

The Gulf of Thailand is home to seven species of dolphins. About 303 sightings have been reported. According to the International Union for Conservation of Nature (IUCN) Red List of Threatened Species, Irrawaddy dolphin (*Orcaella brevirostris*) which is included in the seven species is classified as vulnerable which means it is considered to be facing a high risk of extinction in the wild.[xxi]

Whales[xx]

There is one species of whale recorded - Bryde's whale (*Balaenoptera edeni*).
A total of 75 sightings have been reported.

Threats

Overfishing

* widespread destructive fishing and trawling have had impacts on coral reefs since the early 1960s[xiii].
* Illegal, Unreported and Unregulated (IUU) Fishing[xiv]
* 2005 Statistics _Source: DoF
  Otter Board Trawl 4,344
  Pair Trawler 1,232
  Bottom Trawl 60
  Purse Seine 1,298
  Push Net 539

Climate Change

* Coral reefs in the Andaman Sea suffered extensive coral bleaching and subsequent mortality in 1991 and 1995, and some bleaching was observed in 1998[xv]
* Coral bleaching during the 1997– 98 ENSO event was widespread in the Gulf of Thailand - as many as 60 percent of corals may have bleached in some locations[xvi]. Unfortunately, the frequency and intensity of bleaching in Thai waters appear to be increasing.

Pollution and Sedimentation

* Tourism and other population pressures, have caused sedimentation and wastewater pollution to increase, and damage from boat anchors, divers, garbage, erosion, and sewage and wastewater discharge is evident[xvii].
* Sedimentation and pollution associated with coastal development and inland activities threaten over 40 percent of the country's reefs[xviii].

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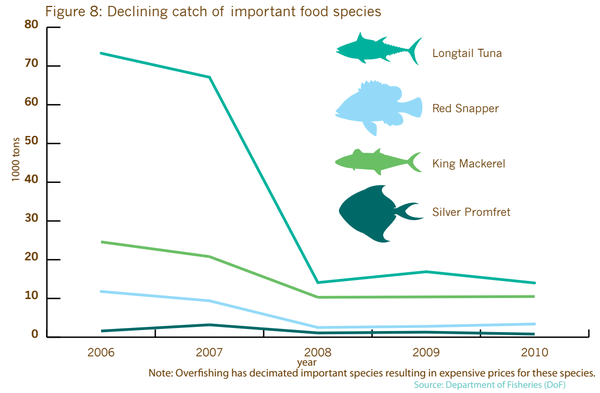
Going...going...gone

Habitat destruction and overfishing are causing fish populations to plummet and commercial fish prices to soar. The total catch for King Mackerel for instance, has decreased 43% in a space of four years, from 24,600 tons in 2006, down to 10,500 tons in 2010. Price of the same fish has a 60% increase in 5 years, from 105 Thai Baht per kilogram in 2008 to 175 Thai Baht in 2013. If nothing is done to restore fish populations, fish we normally eat today may be luxury items in the future or could disappear from our plates all together.

Figure 8: Declining catch of important food species



Note: Overfishing has decimated important species resulting in expensive prices for these species.
Source: Department of Fisheries (DoF)

To save Thailand's oceans from an impending crisis, Greenpeace is supporting priority interventions for the sustainable management of the country's coastal and marine resources and is proposing the following measures:

1) Institutional rearrangement. There is a need to initiate the adoption of a national marine interest policy and coordinating mechanisms for Thailand.

2) Enact Bill on the Management of Coastal Areas. This draft law formalizes existing practices proven to be effective, including community participation in preparing management plans and designating competent officers from various government agencies to share the responsibility of implementing and enforcing the law.

3) Improve protected area management. Lessons learned from projects should be incorporated into government policies which give authorities new mandates for participatory and decentralized management.

4) Improve the enforcement of coastal and marine-related regulations. Thailand needs to focus on the effective enforcement of environmental laws as well as stronger institutional capacity and increased investments in pollution prevention and control, with private sector participation.

5) Support and establish wastewater treatment and solid waste disposal systems. Waste water and solid waste disposal from various activities including industries, harbors, fishing ports, and from urban and agricultural areas should be regulated not only in major hotspots, but also at all coastal communities and fishing piers in Thailand.

6) Promote sustainable fisheries management by adopting an ecosystems approach to fisheries management. The Department of Fisheries should review and change policies so that sustainable fishing methods are prioritized and that the most destructive fishing methodologies are phased out.

7) Natural and Manmade Hazard Management Planning. There is a need to prepare national framework strategies for climate change, coastal erosion, natural habitat degradation and man-made hazards from ships, including oil, hazardous and noxious substances.

8) Revise coastal land use planning to support integrated coastal management. Laws, policies and regulations pertaining to land use, coastal and marine management should be reviewed and harmonized such that it does not affect sustainability of resources, environment is not destroyed or polluted, and that benefits are enjoyed by majority of Thai people.

9) Promote research and monitoring of marine and coastal resources. Thailand has developed an impressive and regionally significant research capacity, but research tends to be carried out in a fragmented and uncoordinated manner.

10) Integrate marine biodiversity and ecosystem conservation into economic planning and production landscapes. Planning processes should take into account larger areas and incorporate multiple land uses from hills to sea.

11) Budget plans for the medium and long term financing of marine and coastal resources conservation. Although the government has provided significant finance for marine and coastal conservation, it does not have a medium- or long-term plan for sustainable financing.

12) Harness markets and the private sector in marine and coastal resources conservation and sustainable use. Effective regulations and enforcement mechanisms should prevent unsustainable practices from taking place. Government should support efforts towards sustainable fishing practices in partnership with coastal fishing communities.