

Location



Introduction

The Kingdom of Thailand, located in Southeast Asia, is bordered by Myanmar (Burma) to the north and northwest, by Laos to the north and northeast, by Cambodia to the southeast, by the Gulf of Thailand (GOT) and Malaysia to the south and the Andaman Sea to the southwest.

The climate on Thailand's coast is tropical, with hot dry weather from March to May, and two monsoon seasons. The southwest monsoon runs from May to October and brings moderate to heavy rains to much of the country. As the monsoon retreats, passing cyclones generated in the South China Sea cause high winds and waves. During the northeast monsoon from October to April, the winds and waves that are likely to occur along the east coast of the southern peninsula are generally less intense. The country's approximately 3,219 km of coastline is characterised by sandy beaches and dunes, wetlands and mudflats, rocky beaches, cliffs and offshore islands. Thailand and Cambodia have a long-term border dispute. As of 2020, Thailand and Myanmar have not resolved the ownership of three islands in the Andaman Sea.

Regional Seas and Biogeography

- Gulf of Thailand (Central)
- South China Sea (South)
- Andaman Sea (West)

Large Marine Ecosystems:

- Bay of Bengal
- Gulf of Thailand

Habitats

On the GOT, sandy beaches and dunes, tidal flats and marshes, with areas of rocky shoreline and cliffs predominate. The Andaman Sea coast has pocket beaches, with extensive and well-preserved tidal flats, mangrove forest, numerous offshore islands and some cliffs.

-> **Tidal flats/Wetlands:** Much of Thailand's coast is comprised of tidal flats and wetlands which provide foraging and resting habitat for many migratory and resident waterbirds each year.

-> **Mangroves:** They are found mainly on the southwestern coast below *Phuket*. Further concentrations are located on the southern portion of the *Isthmus of Kra*, with more limited areas along the *Bay of Bangkok*, and on the coast around *Trat*.

-> **Seagrasses:** Seagrass beds are concentrated on the southwest coast, mainly below *Phuket*, and around the southwest part of the *Bay of Bangkok*, with other areas of the coast supporting smaller beds.

-> **Coral Reefs:** They are found along much of the west coast with the greatest concentration located south of *Phuket* and smaller concentrations on the east coast, most notably near *Khao Sam Roi Yot National Park*, along the coastline islands around Pattaya city and on the islands off *Trat* (group of islands *Mu Ko Chang*, *Mu Ko Mak* and *Mu Ko Kut*).

-> **Rocky shores:** Many of the country's offshore islands have rocky coasts, however, such coastlines are rare on the mainland

Biodiversity Hotspots

In this section, acronyms and abbreviations are used for some of the most common types of hotspot: National Park (NP), Marine National Park (MNP), Marine Protected Area (MPA), Important Bird Area (IBA), Important Marine Mammal Area (IMMA), Ramsar Wetland of International Importance (Ramsar)

-> Ramsar sites:

Don Hoi Lot (also an IBA) is an extensive areas of intertidal habitats including mangroves and mudflats hosting large number of bird species.

Khao Sam Roi Yot Wetland (also an MPA and IBA) is a combination of freshwater marsh and coastal wetlands hosting large numbers of avian species, with more than 20,000 pelicans, frigate birds and Blue-footed boobies present at times

The *Ko Kra Archipelago* (also an MPA) consists of three remote and relatively undisturbed small rocky islets covered by an extensive coral reef (the highest coral diversity recorded in the GOT). The main island *Kra Yai* is an important nesting ground for Hawksbill and Green turtles, and IUCN listed Christmas Island frigatebirds are found here as well.

The *Kuan Ki Sian of the Thale Noi Non-Hunting Area Wetlands* (also an IBA) is a freshwater wetland ecosystem which regularly holds more than 20,000 congregatory waterbirds, both residents and visitors.

The *Ko Ra-Ko Phra Thong Archipelago* consists of two islands in the Andaman Sea with mangrove forests, extensive seagrass beds and coral reefs and is recorded to provide nesting and foraging habitat for Green, Olive ridley, Hawksbill and Leatherback turtles and supports a significant breeding population of the vulnerable Lesser adjutant and Dugong.

The *Pang Nga Bay* (also a MNP) is a shallow bay with numerous islands, intertidal wetlands, mangroves, seagrass beds and coral reefs. It hosts more than 80 bird species plus Dugong and Finless porpoise.

Krabi Estuary (also a National Reserve Forest and IBA) with sandy beaches, mangroves and mudflats hosts more than 200 avian species and is one of the most important areas in southern Thailand for migratory birds.

Had Chao Mai (also a MPN also IBA) includes the *Ta Libong Non-hunting Area* and the *Trang River Estuaries* on the Andaman Sea and consists of three connected wetland systems including mangroves, sandy beaches, rocky marine shores, mud flats, coral reefs and seagrass beds. This site supports more than 200 bird species and provides feeding grounds for Dugong. Stump-tailed macaque may forage in the mangroves.

-> National Parks:

The *Tarutao NP* is reported to host nesting sea turtles.

The *Hat Nooparat Thara-Mu Ko Phi Phi NP* (also IBA) situated off the west coast of peninsular Thailand, supports the Christmas Island Frigatebird as well as significant numbers of other sensitive seabird species.

The *Mu Ko Chumphon NP* (also an IBA) on the east coast, centres on the Thung Kha estuary's extensive mudflats and mangroves which are important staging areas for migratory shorebirds, who feed on the tidal mudflats. The site also supports two nationally threatened species- the Black-headed ibis and Greater crested tern.

There are a number of other protected sites along the coastline and offshore both in the Gulf of Thailand and Andaman Sea, however little detail regarding species and seasonality is available.

-> IBAs:

The *Inner Gulf of Thailand* is a 195 km-long section of the coastal zone where four major rivers discharge, the *Mae Klong*, *Tha Chin*, *Chao Phraya* and *Bang Pakong*. This extensive intertidal habitat is one of the most important sites for migratory waterbirds in mainland South-east Asia with an estimation between 150,000 and 300,000 birds annually and over 100 waterbird species recorded at the site, including seven species of duck, 50 species of wader and 18 species of tern or gull.

The *Lower Central Plain* from the *Chao Phraya River* into the GOT near Bangkok regularly supports more than 20,000 waterbirds, including large numbers of wintering Greater spotted eagle and Manchurian reed warbler, with smaller numbers of Baer's pochard.

The *Ao Bandon* on the eastern coast of peninsular Thailand are extensive mudflats and offshore bars forming an important staging areas for migratory and wintering shorebirds, and regularly support more than 20,000 waterbirds.

Palian Lang-ngu from the Palian estuary to the Phak Bara estuary is an important site for migratory waterbirds, supporting over 20,000 congregatory waterbirds and at least 90 bird species.

There are a number of other protected sites along the coastline and offshore both in the GOT and Andaman Sea, however little detail regarding species and seasonality is available.

-> **IMMAs:**

The *Upper Gulf of Thailand* candidate IMMA hosts Irrawaddy dolphins, Indo-Pacific finless porpoise and Indo-Pacific humpback dolphin, in addition to providing feeding, mating and nursing grounds for Brydes whales.

The *Trat Koh Kong* candidate IMMA hosts the second largest known population of Irrawaddy dolphin, numbering approximately 500 animals, in addition to Indo-Pacific humpback dolphin and Indo-Pacific finless porpoise.

The *Satun-Langkawi Archipelago*, which includes *Thailand's Satun or Butang Islands*, are home to Irrawaddy dolphin, Indo-Pacific humpback dolphin and Indo-Pacific finless porpoise.

The *Trang* candidate IMMA hosts the largest population of dugong in Thailand, in addition to Irrawaddy, Indo-Pacific humpback and Indo-Pacific bottlenose dolphin.

At risk Wildlife

In this section, some individual wildlife species are mentioned followed by a letter in parentheses. These are species included in the IUCN Red List of Threatened Species within the top three categories of risk - Vulnerable to extinction (VU), Endangered (EN) or Critically Endangered (CR). A more complete list of IUCN listed species is found in Appendix 1.

➔ **At risk birds**

Thailand's coast supports thousands of migratory and wintering birds, particularly shorebirds, which forage in the extensive intertidal mudflats as they travel the East Asian-Australasian Flyway. A significant number of Spoon-billed sandpipers (CR) winter in the country, with serious efforts underway to monitor and protect this population. In addition, raptors, ducks, geese, terns, gulls, rails, and some songbirds, both migratory and resident, may be found on the coast.

➔ **At risk reptiles**

Five species of marine turtle are found in Thai waters, Leatherback (VU), Hawksbill (CR), Olive ridley (VU), Green (EN) and Loggerhead (VU), however the Loggerhead does not appear to nest in the country. There also appears to have been a significant decrease in marine turtle nesting in the country but it is not clear whether that is due to limited monitoring or human impact on the beaches.

Green and Hawksbill sea turtles are the only species nesting in the GOT, with nests reported in *Laem Phak Bia* – Sandspit, east of *Tha Chin River* mouth, *Ko Sichang island*, *Ko Man Nai island*, *Ko Chang island* for greens only and *Khram Yai island* for both species within an area managed by the Royal Thai Navy. The *Ko Kra Archipelago* is also nesting spots reported for Hawksbill and Green turtles.

Along the Andaman Sea, from north to south, the Ko Surin islands are nesting spots for Olive ridley and *Ko Ra-Ko Phra Thong Archipelago* provides nesting and foraging habitat for Green, Olive ridley, Hawksbill and Leatherback turtles. However, the area has not been surveyed recently. The *Similan* and *Ko Payang islands* are important nesting sites for green turtles. *Thaimuang* hosts a few Leatherback and Olive ridley nests.

➔ **At risk mammals**

Thailand hosts more than 20 species of marine mammal including whales, dolphins and dugong. Species that may be found in nearshore waters include the Dugong (VU), Indo-Pacific humpback dolphin (VU), Indo-Pacific finless porpoise (V), Irrawaddy dolphin (EN), Spinner dolphin, and Pantropical spotted dolphin. Terrestrial species which may be found foraging or otherwise utilising the coastline include Fishing cat (VU), three species of otter (two of which are IUCN listed), Asian elephant (EN) and some primate species, including the Stump-tailed macaque (VU).

Past experience with oil spill and potential risks

A large number of spills, mainly originating from vessels, have been reported in Thailand since the 1970s. In 1973 1,900 tonnes of diesel and fuel oil spilled in the *Chaophraya River* and in 1992 10 tonnes of fuel oil spilled from a damaged tanker in the same river. In 1996, the tanker *Once* spilled approximately 140 tonnes of crude oil south-east of Bangkok. In 2002 the *Eastern Fortitude* grounded spilling 240 tonnes of bunker fuel reaching the shore where cleanup was initiated, and the tanker *Sky Ace* spilled bunker fuel after a collision with a container vessel. In 2004 the tanker *Dragon 1* grounded in *Pataya Bay*, spilling approximately 150 tonnes of fuel oil. In 2013 a 50,000 litre pipeline leak offshore threatened beaches in the Muang Rayong District, however, no wildlife impact was reported.

There were two spills in 2019, the partial sinking of the *Dragon 2* in Bangkok which resulted in some minor oiling, and the sinking of the *Golden Bridge 2* in the GOT, which released oil for 24 hours with no shoreline contamination reported.

There are a number of oil rigs, oil refineries, oil terminals (e.g. Map Ta Phut Port) and major ports (Laemchabang Port) in the GOT. China ships oil on the *Mekong River* which is the border between Thailand and Viet Nam. In addition, the narrow Malacca Strait between Indonesia and Malaysia which opens into the Andaman Sea just south of Phuket, is a high-risk area for collisions and groundings.

International and Regional Treaties and Agreements

→ Oil spill and HNS Response

- CLC Convention 69
- CLC Protocol 76
- CLC Protocol 92
- FUND Protocol 76
- FUND Protocol 92
- FUND Protocol 2003
- LLMC Convention 76
- LLMC Protocol 96
- OPRC Convention 90
- HNS Convention 96
- HNS PROT 2010
- OPRC_HNS 2000
- BUNKERS CONVENTION 01

→ Marine Biodiversity Protection

- Indian Ocean South East Asia (IOSEA) Marine Turtle MoU
- Association of South East Asian Nations-Oil Spill Response Action Plan (ASEAN-OSRAP) and MoU on ASEAN Cooperation Mechanism on Joint Oil Spill Preparedness and Response (ASEAN MoU)
- Joint Statement of Cambodia, Thailand and Viet Nam on Partnership in Oil Spill Preparedness and Response in Gulf of Thailand
- Memorandum of Understanding between the Republic of the Philippines and the Kingdom of Thailand on Joint Oil Spill Response
- Global Initiative South East Asia (GISEA)

Oil Spill Response and HNS Spill Response

→ National Contingency Plan?

The most recent National Oil Spill Contingency Plan (NOSCP) was approved in 2002 and is exercised every two years. It is currently being revised and updated.

PCD has an Oil Spill Environmental Recovery Plan (OSERP) which addresses protection of turtle nesting beaches, seagrass beds used by dugong, congregation areas of cetacean and nesting and feeding grounds of waterbirds. There is also a provision for surveys of dead and dying birds.

→ Role of Competent National Authorities

The Ministry of Transport's Marine Department is the lead agency for oil spill response and acts as the coordination centre for such responses, with assistance from the Royal Thai Navy, provincial administrations and from the Oil Industry Environmental Safety Group Association (IESG) which is an industry cooperative with Tier 1 capability. The Committee on the Prevention and Combatting of Oil Pollution is responsible for the NOSCP, which covers spills in inland waters, within port limits, coastal areas and at sea.

The Marine Department establishes the command post if the spill is in a river, lake, estuary or port limits. The Thai Navy establishes the command post for spills from beyond port limits to the Exclusive Economic Zone (EEZ).

The Pollution Control Department (PCD) of the Ministry of Natural Resources and Environment monitors slick movement and provides information on environmental sensitivities. Other agencies which might provide support, depending on the situation, include the marine police, the army and air force, fishery department and environmental planning department.

In the case of large event the regional and sub-regional Agreements listed above would come into play.

Oiled Wildlife Preparedness and Response

→ Formal guidelines?

There are no formal guidelines for oiled wildlife response, other than national impact assessment and protecting critical habitats (feeding and nesting areas for sea turtles and marine mammals).

→ Response objectives and strategy

Under the OSERP, the only objectives and strategy addressed are regarding impact assessment and habitat protection

→ Euthanasia or rehabilitation?

There is some limited wildlife rehabilitation in the country (listed below), thus it is likely that rehabilitation would be supported.

→ Impact assessment

As noted above, the OSERP covers some aspects of impact assessment, but not all.

The Thai authorities also have access to the Environmental Sensitivity Index Atlas for the (GOT), developed to guide effective planning and oil spill response in the region, with the support of the International Maritime Organization (IMO) and the Partnerships in Environmental Management for the Seas of East Asia (PEMSEA).

It is likely that the Phuket Marine Biological Center (PMBC), under the Department of Marine and Coastal Resources (DMCR), would be involved in any post-mortem examinations on marine mammals and sea turtles, at least within the Andaman Sea.

The Veterinary Medical Aquatic Animal Research Center (VMAARC) of the Chulalongkorn University in Bangkok would likely be involved in GOT incidents as they also have experience with marine mammals and sea turtles. The Bird Conservation Society of Thailand, a Birdlife International partner, does not have any experience with, or facilities for rehabilitation, but has done surveying and monitoring of a number of species and worked on bird conservation in the country, and thus may be able to assist with impact assessment as well as activities to protect important habitat.

→ Notification and early response

The PCD oversees all notification. It is not clear what early response to oiled wildlife might involve, however, the PMBC would likely be contacted for marine wildlife response as they are the primary contact for incidents involving marine mammals and sea turtles.

→ Wildlife responders

There are no experienced oiled wildlife rehabilitators, or dedicated facilities in Thailand thus international assistance would likely be needed for an oiled wildlife response.

The PMBC has a veterinary hospital and experience rehabilitating sea turtles and marine mammals. VMAARC has also cared for marine mammals and sea turtles. Chulalongkorn University also has a small animal clinic which treats avian patients and may be able to assist with oiled seabirds.

→ Cooperation between stakeholders

Both the PMBC and the VMAARC work with the DMCR on marine wildlife issues.

→ Permanent facilities

There are no permanent facilities for oiled wildlife response, however PMBC and VMAARC have rehabilitation facilities for sea turtles and marine mammals which may be of use in the event of a spill. There are no permanent facilities for marine birds in Thailand.

→ Current processes

Thailand took part in capacity building events delivered by the Global Initiative for South East Asia (GISEA) with the support of IMO. In 2019, a national Workshop was held in Bangkok to support the review and update of the NOSCP in light of lessons from recent oil spill incidents.

In 2020 GISEA and Oil Spill Response Limited (OSRL) supported PEMSEA to deliver a Sub-regional Training Workshop on Oil Spill Response Planning and Readiness Assessment, under the Framework Programme for Joint Oil Spill Preparedness and Response in the GOT to familiarise Cambodia, Thailand and Viet Nam on their ROSCP.

Documentation and references

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- Birdlife Data Zone Country Profile: <http://datazone.birdlife.org/country/thailand>
- Important Marine Mammal Areas: <https://www.marinemammalhabitat.org/imma-eatlas/>
- Convention on Migratory Species IOSEA Thailand Report (2019): https://www.cms.int/iosea-turtles/sites/default/files/document/cms_iosea_mos8_inf.7.1.w_national-report-thailand-2019_e.pdf
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- UNEP WCMC- Ocean Data Viewer: <https://data.unep-wcmc.org/datasets/>
- Weather Atlas: <https://www.weather-atlas.com/en/thailand-climate>
- Turtle Nesting Distribution Abundance and Migration: <https://apps.information.qld.gov.au/TurtleDistribution/>

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Appendix 1

→ At risk birds

Common name / Latin name / IUCN Red List Category (CR,EN,VU) / Resident-Migratory (season) / Breeding-Nesting-Pupping (season)

Baer's pochard / *Aythya baeri* / CR / Migratory (winter) / Non-breeding
 Christmas Island frigatebird / *Fregata andrewsi* / CR / Migratory / Non-breeding
 Spoon-bill sandpiper / *Calidris pygmaea* / CR / Migratory (winter) / Non-breeding
 Scaly-sided merganser / *Mergus squamatus* / EN / Rare vagrant / Non-breeding
 White-winged duck / *Asarcornis scutulata* / EN / Resident / Breeding/nesting
 Masked finfoot / *Heliopais personatus* / EN / Migratory / Non-breeding
 Storm's stork / *Ciconia stormi* / EN / Resident (southeast coast) / Breeding
 Black-faced spoonbill / *Platalea minor* / EN / Rare vagrant on both coasts / Non-breeding
 Far Eastern curlew / *Numenius madagascariensis* / EN / Rare / Non-breeding
 Great knot / *Calidris tenuirostris* / EN / Migratory (Spring/autumn) / Non-breeding
 Spotted Greenshank / *Tringa guttifer* / EN / Migratory / Non-breeding
 Common pochard / *Aythya farina* / VU / Migratory (winter) / Non-breeding
 Lesser adjutant / *Leptoptilos javanicus* / VU / Resident / Breeding/nesting
 Chinese egret / *Egretta eulophotes* / VU / Migrant (spring/autumn) / Non-breeding
 River tern / *Sterna aurantia* / VU / Resident / Breeding/nesting
 Greater spotted eagle / *Clanga clanga* / VU / Resident / Breeding/nesting (inland only)
 White-browed reed-warbler / *Acrocephalus tangorum* / VU / Resident / Breeding/nesting (summer)

→ At risk reptiles

Common name / Latin name / IUCN Red List Category (CR,EN,VU) / Resident-Migratory (season) / Breeding-Nesting-Pupping (season)

Hawksbill turtle / *Eretmochelys imbricata* / CR / Migratory / Nesting (January to August)
 Green turtle / *Chelonia mydas* / EN / Migratory / Nesting (May to August)
 Loggerhead turtle / *Caretta caretta* / VU / Migratory / Non-nesting
 Leatherback turtle / *Dermochelys coriacea* / VU / Migratory / Nesting (February to July) (few nest sites)
 Olive ridley / *Lepidochelys olivacea* / VU / Migratory / Nesting (October to February) (few nest sites)

→ At risk mammals

Common name / Latin name / IUCN Red List Category (CR,EN,VU) / Resident-Migratory (season) / Breeding-Nesting-Pupping (season)

Sei whale / *Balaenoptera borealis* / EN / Migratory / Non-breeding
 Fin whale / *Balaenoptera physalus* / EN / Migratory / Non-breeding
 Blue whale / *Balaenoptera musculus* / EN / Migratory / Non-breeding
 Irrawaddy dolphin / *Orcaella brevirostris* / EN / Resident / Breeding/calving
 Asian elephant / *Elephas maximus* / EN / Resident / Breeding and calving largely take place inland
 Hairy-nosed otter / *Lutra sumatrana* / EN / Resident / Breeding/pupping
 Sperm whale / *Physeter macrocephalus* / VU / Migratory / Non-breeding
 Indo-Pacific humpback dolphin / *Sousa chinensis* / VU / Resident / Breeding/calving
 Indo-Pacific finless porpoise / *Neophocaenoides* / VU / Resident / Breeding/Calving
 Dugong / *Dugong dugon* / VU / Resident / Breeding/calving (year round)
 Fishing cat / *Prionailurus viverrinus* / VU / Resident / Breeding
 Smooth-coated otter / *Lutrogale perspicillata* / VU / Resident / Breeding/pupping
 Stump-tailed Macaque / *Macaca arctoides* / VU / Resident / Breeding/birthing