



OCEANS

IN THE BALANCE,

Indonesia in Focus

GREENPEACE

Overview:

INDONESIA'S OCEANS

Indonesia is the largest archipelago in the world with 17,504 islands¹. Its coastline, at 95,181 square kilometers is fourth longest in the world. Sixty-five percent (324) of its total 497 districts and cities are coastal². In 2010, Indonesia's population reached 237,641,326³, of which more than 80% live in coastal areas⁴.

The Indonesian archipelago stretches between the Indian Ocean and the Pacific Ocean. Its coral reef area is approximately 50,875 square kilometers⁵, or about 18% of the world's total coral reef area. Most of these reefs are located in the eastern part of Indonesia, which rests within the so-called Coral Triangle.

The country's coral reefs which are located within the Coral Triangle are among the richest in biological diversity in the world, home to around 590 hard coral species⁶. The reefs in the Raja Ampat islands of Papua in particular are considered by scientists to be the "center of the center" of the world's coral reef biodiversity⁷.

Aside from economic benefits, coral reef ecosystems protect coasts from lashing waves, reducing abrasion and damage. They also contribute to fishing by providing spawning areas and nursery grounds, foraging (feeding) grounds and shelter for many types of sea creatures.

Indonesia has a fairly distributed and extensive mangrove ecosystem, comprising the greatest mangrove area in the world (FAO, 2007). Spalding *et al.* in 2010 estimated it to be around 3,189,359 hectares, placing mangrove cover in Indonesia at just below 60% of the total mangrove area in the region, or 20% of the world's total mangrove cover. According to the UN FAO, there are 48 true mangrove species in Indonesia, making the country an important center of global diversity for mangroves.

Indonesian seagrass ecosystems are estimated at 30,000 square kilometers, and contains 13 of the 16 species of seagrass species in the world⁸.

Threats to Indonesia's Marine Ecosystems

Despite recent government initiatives that have given the country a lead in conservation efforts, Indonesia's extensive marine ecosystems remain largely under threat.

According to the World Resources Institute, as of 2011 Indonesia had a total of 139,000 square kilometers of protected marine area⁹. By 2020, the government has committed to increase this figure to 200,000 square kilometers¹⁰. Management of these extensive coastal resources and protected areas, however, remains a challenge.

Recent data (2012) from the Research Center for Oceanography revealed that only 5.30% of Indonesia's coral reefs are in excellent condition. Meanwhile, 27.18% are considered to be in good condition, 37.25% in fair condition, and 30.45% in poor condition¹¹. In fact, Burke *et al.* reported that in the past half century, coral reef degradation in Indonesia has increased from 10 to 50%¹².

Threat of damage to coral reefs include coastal development, sewage discharges from activi-

ties at sea and on land, sedimentation due to damage to upstream areas and watersheds, destructive fishing practices due to blast fishing use of cyanide, illegal fishing gears, mining, coral bleaching due to global warming, and mining of coral reefs.

Indonesia has already lost most of its mangroves. From 1982 to 2000, Indonesia has lost over half of its mangrove forests, falling from 4.2 million hectares to 2 million¹³.

The problems faced by coral reefs and mangroves also confront seagrass ecosystems. Indonesian seagrass ecosystems are less studied than that of corals and mangroves. But by all indications these are also exposed to natural disturbances and, more severely, human activity. This includes dredging, development-related reclamation for seafront real estate, harbors, industries, navigation channels, industrial waste pollution particularly heavy metals and organo chlorines, disposal of organic waste, agricultural waste pollution, oil pollution, and habitat destruction in dredging disposal sites.

Mining and Sedimentation

Mining and sedimentation poses significant impacts to marine ecosystems in Indonesia. In Buyat-Ratatotok district of North Sulawesi, Indonesia, shallow marine sediments and fringing coral reefs are affected by submarine disposal of tailings from industrial gold mining and by small-scale gold mining using mercury amalgamation¹⁵. In Sampela, within the Wakatobi Marine National Park, Sulawesi, increased sedimentation and consequent lowered light levels have altered the growth rates and morphology of *Acropora* corals. The coral community is severely impacted by sedimentation, which can lead to the suffocation of corals and to decreased growth and calcification rates resulting from reduced light penetration¹⁶.

Unsustainable extraction of non-renewable resources has caused conflicts between the interest of preserving the environment and economic development. Oil and gas industries and mining industries have been rising in the last 10 years¹⁷. One of the world's most egregious examples of tailings dumping is Freeport McMoRan's Grasberg copper-gold-silver mine in West Papua, Indonesia. Mine tailings flow into the Otomina and Ajkwa rivers, to wetland estuaries, and out to the Arafura Sea. This mine produces and dumps over 200,000 tonnes of tailings per day (over 80 million tonnes per year)¹⁸. Estimates show the mine will have produced over three billion tonnes of tailings, mostly ending up in the oceans, before it closes¹⁹.

Indonesia's Marine Protected Areas

The Indonesian government through the MMAF has established a law on Marine Protected Areas (MPAs)²⁰. MPAs are sea ecosystems protected by law or other effective means, to protect most or the entire area, with zoning, conservation and utilization of fish resources. These MPAs include coastal areas and small islands with plants and animals in it, and which may include evidence of socio-cultural history. The law prohibits activities such as the extraction of oil and gas, capture of fish, other marine life and ecology to ensure better protection. Thus, MPAs respond to both the need to preserve ecosystems to protect them from degradation, and the need to prevent overfishing.

The target of 10 million hectares of MPAs was achieved in 2009. In 2011, the Indonesian government has exceeded the target, establishing marine reserves covering an area of 15,413,517 hectares. The largest is the Savu Sea National Park which covers an area of 3,521,130 hectares, and is also the largest marine protected area in Asia.

The success of MPAs depends on how effectively these are managed. In some areas, the task includes gaining social acceptability for the marine reserve from the coastal communities. Management remains a big challenge for most of Indonesia's MPAs.

The fisheries crisis

"The End of Fishery"—this is an alarming statement contained in the journal *Science* published in 2006 by Worm *et al.* International researchers have estimated that, at the current rate of fisheries capture, we will see the collapse of global fisheries by 2048²¹. Although there is some criticism about this study from other international fisheries researchers, fisheries scarcity is a threat of grave concern to all mankind. The world's marine capture fisheries production is feeling the stresses of overfishing having reached its peak in 1996²². In 2011 global

fisheries production was 78.9 million tonnes below the 2007 production, which amounted to 80.4 million tons²³.

But while the world's marine capture fisheries production has been in decline, in Indonesia records show that the country's fisheries have been increasing steadily since 1950 to 2010. (Figure 1). The Ministry of Maritime Affairs and Fisheries is aiming to increase production to 22.39 million tonnes by 2015, to become the world's largest fish producer²⁴.

Indonesia's rich marine resources and its easy access within the territorial waters of the archipelago have led to a thriving fisheries industry. The country is currently the third largest fisheries producer in the world, following China and Peru²⁵. But even as the country's fisheries production is increasing, as with all countries worldwide, Indonesia is facing a decline of fisheries caused by the twin crises of marine ecosystem degradation as well as overfishing. However the country has the most to lose from such a decline. According to a 2012 study, compared with 27 other fish-producing countries, Indonesia's fisheries are the most vulnerable to collapse, based on indicators on coral reef management, fisheries situation and food security²⁶.

Some Fisheries Management Areas (regulated fishing grounds) in the Republic of Indonesia already face symptoms of overexploitation (overfishing) for several important commodities groups, such as large pelagic, small pelagic, shrimp, and demersal fish. In other words, Indonesia is on the verge of fish scarcity. Ironically, small scale fishers will be the ones to feel the worst impacts, paying more for fuel because the locations of fishing grounds are getting farther away.

The scarcity of fish is also reflected by the decrease in the size of fish, the declining number of catches, and the disappearance of certain species which were once the main catch, as in the case of squid in the Gulf of Jukung, East Lombok. Even worse, Indonesian fisheries are also faced with the classic problem of rampant IUU fishing practices, whether committed by Indonesian fishers who use bombs (e.g. potassium cyanide and dynamite), illegal fishing gears, and undocumented foreigners who use large fishing fleets.

Other threats compounding scarcity of fisheries resources include mining in coastal areas and small islands. Mining activities from extraction to processing have damaged and polluted coastal ecosystems and living resources therein.

In order to manage fisheries, on August 3, 2011, the government issued a decree by the Ministry of Marine Affairs and Fisheries (MMAF) (No. Kep. 45/Men/2011) about the Estimated Potential of

Fish Resources in Fisheries Management Areas of the Republic of Indonesia. The decree estimated the potential to be 6.5201 million tonnes per year. The optimal utilization level required or the maximum sustainable yield (MSY) is 80% of 6.5201 million tons per year, or 5.2160 million tons. Utilization rate in 2011 reached 5.3457 million tons²⁸. Thus, data on marine catch shows that production was above MSY, at 82% of the potential. This excess production is compounded by the number of Illegal, Unreported and Unregulated (IUU fishing) estimated to be around 4,326 domestic and foreign vessels combined. According to official government sources, an estimated 25% of Indonesian fish were stolen²⁹ by IUU fishing. Thus the actual exploitation rate is higher than 82% and this places the actual fishery production in 2011 to be above MSY, at 107% of the estimated potential.

The scarcity of fish will have a major impact on small fishermen since they dominate the country's fishing fleet. According to Law No. 45 of 2004, small fishermen are those using fishing vessels of up to five gross tonnes (GT) and whose livelihoods depend upon fishing to meet their daily needs. In 2011, the number of small fishing boats (boats without motors, outboard motor boats and motor boats of up to five GT) was at about 520,472 units or 89.45% of the total Indonesian fishing fleet³⁰. In other words, the national fishing fleet is dominated by small scale fishing fleets which are only able to carry out fishing activities within the coastal waters up to 12 nautical miles (Figures 2 and 3).

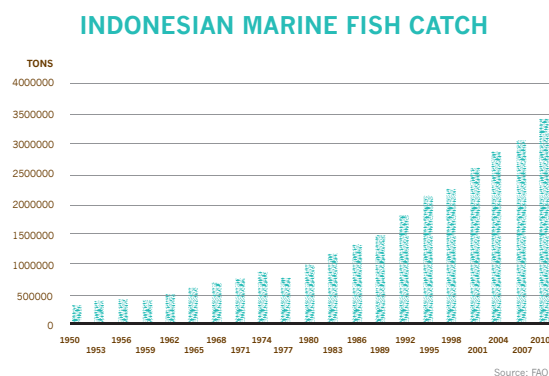
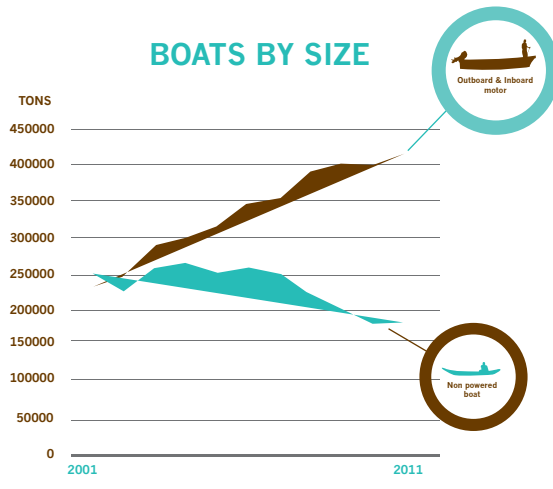
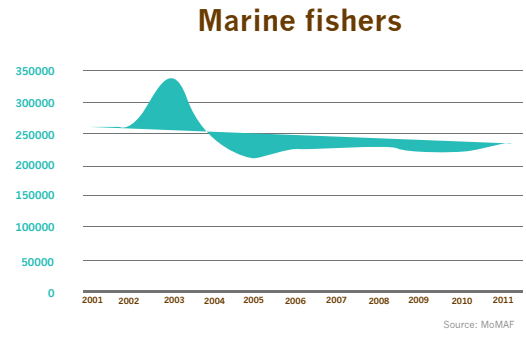


Figure 1. Indonesia's marine capture fisheries continues to increase from 51,800 tons in 1950 to 3,342,583 tons in 2010²⁷.



Source: MMAF

Figure 2. While the number of non-powered boats continue to decline, the number of boats with outboard and inboard motors are increasing. Motorized boats are usually more efficient in catching fish.



Source: MoMAF

Figure 3. The number of marine fishers peaked in 2003 and has remained stable from 2005 to 2011

Overfishing

While there is an increase in the total production of marine fish in Indonesia, symptoms of overfishing can already be observed (Table 1). Of the country's eleven fisheries management areas (FMA), four have already surpassed the potential production. For shrimp, there are only three remaining FMAs which are not overfished. For demersal fishes (fish that feed and live near the sea floor), two FMAs are already overfished

while five are fully exploited. For small pelagics (fish that live close to the surface of the water), four FMAs are overfished while four are fully exploited. There is not much information on the general status of tuna. For squid, there is no overexploitation observed³¹.

Table 1. Status of Fisheries Management Areas (FMAs)

Source: MMAF (2011)

FMA No.	FMA-571	FMA-572	FMA-573	FMA-711	FMA-712	FMA-713	FMA-714	FMA-715	FMA-716	FMA-717	FMA-718
Fishing grounds	Malacca Strait and Andaman Sea	Indian Ocean of Western Sumatera and Sunda Strait	Indian Ocean of Southern Java, Southern Nusa Tenggara, Sawu Sea and Western of Timor Sea	Karimata Strait, Natuna Sea and South China Sea	Java Sea	Makassar Sea, Bone Bay, Flores Sea and Bali Sea	Tolo Bay and Banda Sea	Tomini Bay, Maluku Sea, Halmahera Sea, Seram Sea and Berau Bay	Sulawesi Sea and Northern of Halmahera Island	Cendrawasih Bay and Pacific Ocean	Aru Bay, Arafuru Bay and Eastern of Timor Sea
Depth	<200	200+	200+	<200	<200	<200	200+	<200	200+	200+	<200
Shrimp (udang)	Overfished	Overfished	Overfished	Overfished	Overfished	Overfished	Overfished	Overfished	Overfished	Overfished	Overfished
Demersal	Overfished	Overfished	Overfished	Overfished	Overfished	Overfished	Overfished	Overfished	Overfished	Overfished	Overfished
Small pelagic	Overfished	Overfished	Overfished	Overfished	Overfished	Overfished	Overfished	Overfished	Overfished	Overfished	Overfished
Big tuna	Insufficient information	Insufficient information	Insufficient information	Insufficient information	Insufficient information	Insufficient information	Insufficient information	Insufficient information	Insufficient information	Insufficient information	Insufficient information
Squid (Cumi-cumi)	Insufficient information	Insufficient information	Insufficient information	Insufficient information	Insufficient information	Insufficient information	Insufficient information	Insufficient information	Insufficient information	Insufficient information	Insufficient information
Potential Production	276,000	565,200	491,700	1,059,000	836,600	929,700	278,000	595,600	333,600	299,100	855,500
2011 Production	461,800	558,600	506,900	588,700	823,700	614,300	537,000	443,600	213,200	148,900	449,100



Indonesia's fishing fleet

According to government records from the MMAF, there were total of 581,845 boats in 2011. The top three provinces with the highest number of boats are Sulawesi, Sumatra and Java. There are 1,001,667 fishing gear units. Fishing gears that are small-scale and passive in nature are the most common, making up 68% of total. Hook and lines make up 40%, gillnets comprise 28% while seine nets comprise 7%. Larger scale fishing gear include 73,480 seine nets, 32,040 purse seiners, 18,451 trawlers and 10,125 tuna long liners (Figure 4).

Overfishing is about too many boats chasing too few fish. It also considers the type of fishing gear, the fishing area and the violations of fisheries laws. Indonesia has already set the estimated potential yield for each fisheries management areas. This becomes a reference point for setting some sort of allowable catch.

Majority of hook and liners are located in Sulawesi and Moluccas-Papua areas. Gillnets are used in all areas. While only 10% of the gears are large scale, they are not exempt from contributing to overfishing. The larger the fishing gear, the larger the volume of catch. This large scale fishing includes seine nets, purse seiners, trawlers and seine nets.

The conflict between small-scale and large scale fishing boats is a common problem in the Southeast Asian region, including in Indonesia. Most of these trawlers (67%) operate in Sumatra while 55% of the purse seiners fish in Java. More than half of seine net vessels (52%) fish in Java. The top three areas with tuna longliners fish in Java, Sumatra and Papua - Moluccas. The number of fishing gear is an indication of the level of extraction of resources (Figures 4 and 5).

The top fishing gear making up 68% of total fishing gear are small-scale and passive in nature. Hook and lines comprise 40% while gillnets comprise 28%. Larger scale fishing gear include 32,040 purse seiners, 18,451 trawlers and 10,125 tuna long liners.

Fishing Gears

Source: MMAF

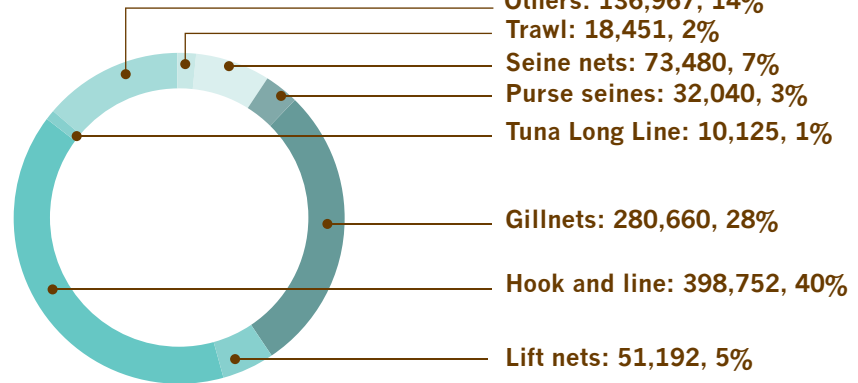


Figure 4. The chart shows the kind and number of fishing gear in use in Indonesia. The number of fishing gear is an indication of the level of extraction of resources.

Fishing Gears by Main Islands

Source: MMAF

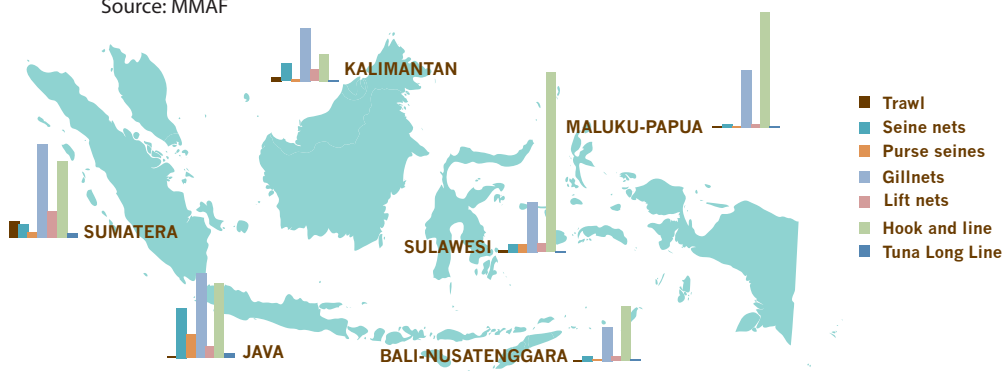


Figure 5. The chart shows the distribution of fishing gear by province.

Illegal, Unreported and Unregulated (IUU) Fishing

Illegal, Unreported and Unregulated (IUU) fishing is rampant in Indonesia, aggravating overfishing. The primary perpetrators of IUU fishing in the waters of Indonesia and its exclusive economic zone come from Malaysia, Vietnam, Myanmar, Thailand, the Philippines and China.

Although patrols are routinely performed by MMAF, IUU fishing activities persist. Suspected IUU fishing boats reached 4,326 in 2012. Of these boats, 112 were caught with supporting evidence. These include domestic and foreign fishing vessels³². Of the thousands of ships that were caught, only a dozen ships made it to the courts. Violators were from Indonesia (317), Malaysia (10), Vietnam (407), Thailand (270), Philippines (266), Laos (1), Cambodia (1), Myanmar (56), and China (1)³³.

Conclusion

Indonesia's oceans are important centres of marine biodiversity, and are at the same time highly valuable fishing grounds which provide food and livelihood to millions of people in the country. Moving forward to ensure that this resource continues to provide food for future generations means rehabilitating and protecting marine ecosystems, while at the same time curbing IUU fishing and overfishing.

Greenpeace Oceans Campaign in Indonesia

Greenpeace's Oceans Campaign in Indonesia aims to generate and support the creation of equitable, sustainable and exemplary fisheries management. This includes working toward the establishment of a network of effective marine protected areas as well as ensuring the end of destructive fishing practices as well as overfishing, which threaten local livelihoods, marine ecosystems and biodiversity.

Globally, Greenpeace campaigns for oceans protection by calling for: 1) fisheries reforms and enforcement in all levels of fisheries management, 2) and end to overfishing, 3) the creation of a network of marine reserves in international waters, and 4) the protection of the ocean's endangered species such as sea turtles, dugong, whales, sharks and dolphins.

Indonesia, as the world's largest archipelagic state, will play a key role in voicing out and providing solutions for strengthening regional and global initiatives for just, responsible and sustainable use of the world's oceans resources, as well as for the protection of biodiversity.

In Southeast Asia, Indonesia has politically and geographically strategic bargaining positions to improve its fisheries resources management. The country is in a position to lead the change for gathering and empowering regional and global initiatives which aim to tackle, combat and eliminate Illegal, Unreported and Unregulated (IUU) fishing in the region.

The proactive role of Indonesia in promoting and enhancing solutions for overcoming overfishing and overcapacity, destructive fishing, mining, pollution and climate change impacts to the oceans, is urgent. This role is also in line with the constitutional spirit of the country, which aims to take active participation in creating a world order (in harmony and balance) based on freedom, lasting peace and social justice.

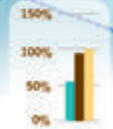
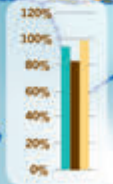
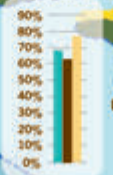
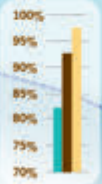
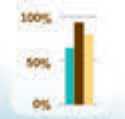
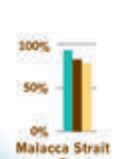
The government and the people of Indonesia should recognize the power of working together by promoting a joint vision to protect the oceans.

Indonesia's Vision 2025 states that "*Indonesia is an independent (self-dependent), progressive, just and prosperous nation.*" This vision is synthesized from National Law No. 17/2007 in the National Long Term Development Plan, and should be the platform and opportunity to increase the commitment of the government, as well as the participation of all stakeholders, to rehabilitate our seas.

Therefore, as part of achieving Indonesia's Vision 2025, key stakeholders, together with Greenpeace, are advancing the "Joint Vision for the Oceans of Indonesia, 2025."



- LEGEND:**
- Seagrass
 - Coral reefs
 - Mangroves
 - Marine Protected Areas
 - Fisheries Management Area
 - Overfished Small pelagic
 - Overfished Shrimp (udang)
 - Unprotected Dugong Habitat
 - Unprotected Sea Turtle-Nesting site
 - Percentage of Unprotected Important Ecosystem
- | Percentage of Unprotected Important Ecosystem | Mangrove | Coral reefs | Seagrass |
|---|----------|-------------|----------|
| 100% | 100% | 100% | 100% |
| 80% | 80% | 80% | 80% |
| 60% | 60% | 60% | 60% |
| 40% | 40% | 40% | 40% |
| 20% | 20% | 20% | 20% |
| 0% | 0% | 0% | 0% |



Marine Ecosystems

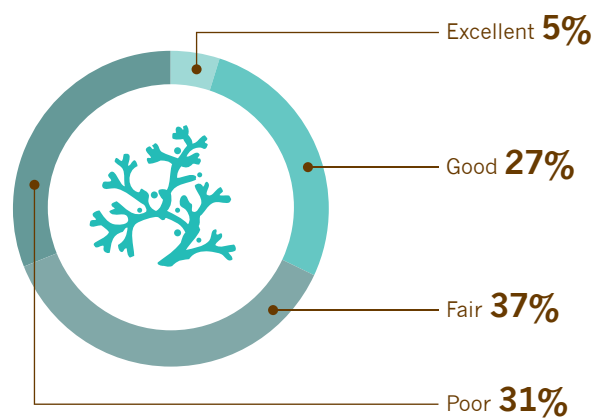


Coral

- **50,875** km² (Burke *et al.*, 2002)
- **574** coral reef species (Veron *et al.* 2009)
- **10-50%** increase in Reef degradation (Burke *et al.*, 2002)
- **22.05 %** protected (Ministry of Forestry)

Coral Reef Condition

1133 locations (2012)



Source: Puslit Oseanografi - LIPI



Seagrass

- **30,000** km²
- **13** seagrass species (Burke *et al.*, 2002)
- **17.32%** protected (Ministry of Forestry)



Mangroves

- **3,244,018** hectares (Bakosurtanal, 2009)
- **45** species (Spalding *et al.* 2010)
- **21.97%** protected (Ministry of Forestry)

Marine Fisheries

Fisheries

- **2,265,213** Employment directly related to fishing
- A total of **581,845** boats were recorded in 2011
- The top three provinces with the highest number of boats are Sulawesi, Sumatera and Jawa
- There are **1,001,667** fishing gear units throughout Indonesia

Iconic Species



Sea turtles

- **6** species
- **95** nesting sites
- **49%** protected nesting sites (Ministry of Forestry)

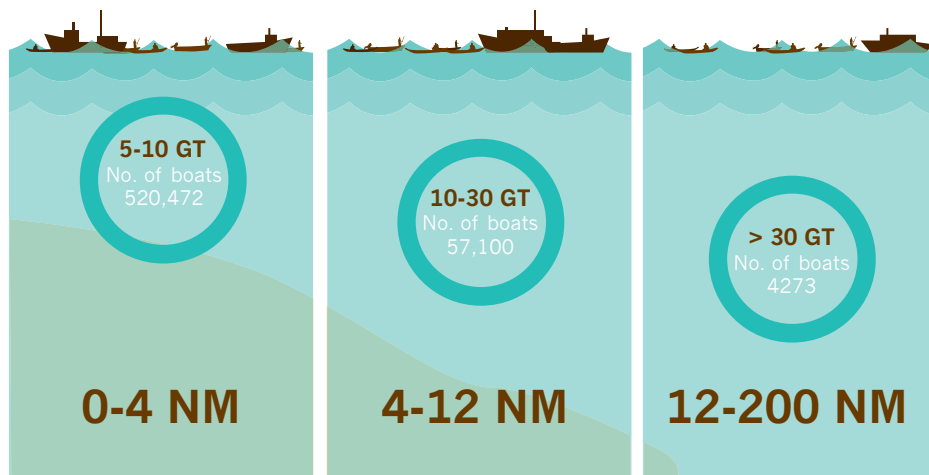
Dugong



- **28** Habitats
- **45%** protected habitats (Ministry of Forestry)

Fishing Zones

Indonesia's fisheries management areas include: **fishing line IA**, covering coastal waters up to 2 nautical miles measured from sea level at its lowest ebb, **fishing lines IB**, covering coastal waters beyond 2 to 4 nautical miles, **fishing line II**, covering the waters from fishing line II to 12 nautical miles measured from sea level at its lowest ebb, and **fishing line III**, covering the Indonesian Exclusive Economic Zone and the waters from fishing line II.



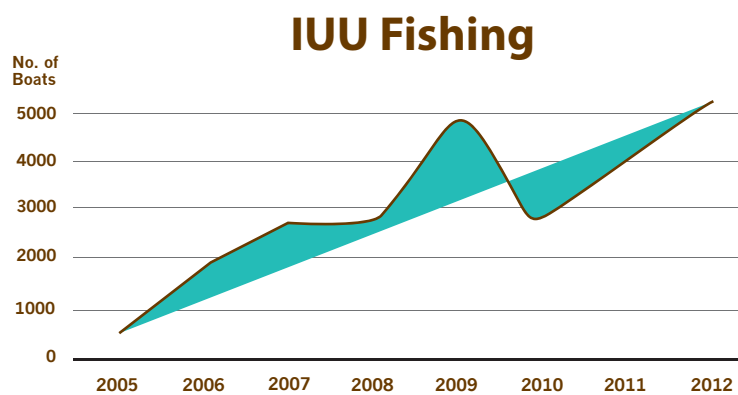
This determination is based on the water depth of the catch line, which is divided into two namely: shallow waters of up to 200 meters include FMA-571, 711, 712, 713, 718, and waters 200 meters and above which includes FMA-572, 573, 714, 715, 716, 717.

Climate change impacts

Bleaching events are very likely to occur annually in most tropical oceans by the end of the next 30-50 yearsⁱ. Bleaching or whitening of corals occurs when algae living within coral tissues are expelled. Reef building corals become stressed if exposed to small slight increases (1-2°C) in water temperature and experience coral bleaching. Coral reefs are sensitive to elevated sea temperaturesⁱⁱ, resulting in coral bleaching. Preserving 10% of coral reefs worldwide would require limiting warming to below 1.5 °C relative to pre-industrial levelsⁱⁱⁱ. In May 2010, Aceh in Indonesia was affected when sea temperature reached 34 degrees Celsius -- 4 degrees Celsius higher than long term averages for the area which resulted in the bleaching of over 60 percent of corals^{iv}.

IUU Fishing Threats

- Destructive Fishing
- Illegal Unreported and Unregulated (IUU) Fishing
- Overfishing and Overcapacity



Source: PSDKP (2013)

Illegal, Unreported and Unregulated (IUU) fishing has been increasing from 2005 to 2013.

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ⁱⁱHoegh-Guldberg, G. & Smith, G. J. The effect of sudden changes in temperature, light and salinity on the population density and export of zooxanthellae from the reef corals *Stylophora pistillata* Esper and *Seriatopora hystrix* Dana. J. Exp. Mar. Biol. Ecol. 129, 279-303 (1989).

ⁱⁱⁱFrieler K *et al.* 2013. Limiting global warming to 2°C is unlikely to save most coral reefs. Nature Climate Change. Vol. 3, 165-170.

^{iv}<http://www.sciencedaily.com/releases/2010/08/100816170839.htm> Accessed May 22, 2013

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- ⁶ Veron, J. E. N. 2002. "Reef Corals of the Raja Ampat Islands, Papua Province, Indonesia, Part I: Overview of Scleractinia." In A Marine Rapid Assessment of the Raja Ampat Islands, Papua Province, Indonesia, edited by S. A. McKenna, G. R. Allen and S. Suryadi. Washington, DC: Conservation International
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- ⁸ Presentation Grace Nontji, former Head of Research Center for Oceanography-LIPI, Indonesian Seagrass Committee.
- ⁹ Burke *et al.* 2012. Reefs at risk, Revisited in the Coral Triangle. World Resources Institute.
- ¹⁰ Burke *et al.* 2012. Reefs at risk, Revisited in the Coral Triangle. World Resources Institute.
- ¹¹ <http://www.coremap.or.id/Kondisi-TK/> (accessed April 2013)
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- ¹³ http://news.mongabay.com/2010/1201-hance_nasa_mangroves.html
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Our oceans are in crisis. It needs you. Be the voice. Be the Solution. Let's act to defend our oceans!

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