

Source A

GROWTH IN SIZE OF VESSELS

As global trade has accelerated, so has the growth of the shipping industry – and ship size. Container capacity has increased 1,500% since 1968 and has almost doubled over last decade. The growth of the shipping industry and ship size has played a central role in creating the modern economy, but the growth in ship size has come at a cost. It has effectively pitted port against port, canal against canal.

Ships of this size are both more efficient and environmentally friendly, but stacking containers higher makes such ships more susceptible to high winds, while stacking them wider can increase hydrodynamic forces that make them harder to steer in tight spaces, such as ports and canals.

Graphic shows container ships evolution and global maritime trade between 1970 and 2019.

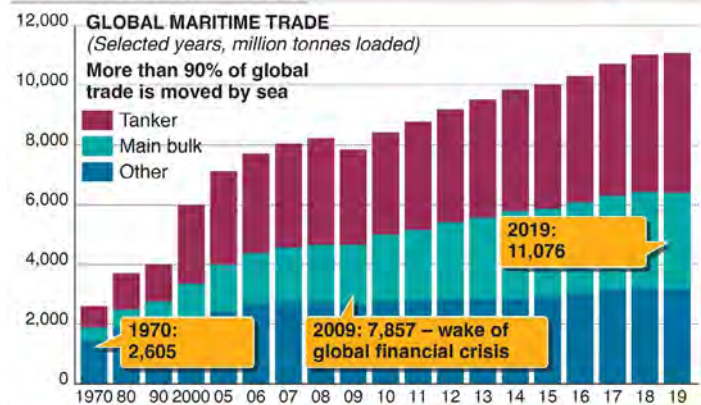
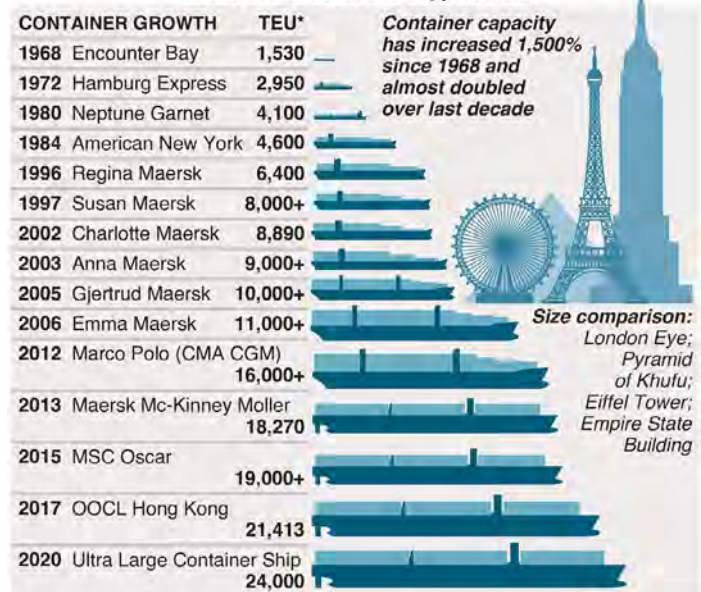
Sources:

- Too big to sail? The debate over huge container ships (FT)
- Why the World's Container Ships Grew So Big (NYT)
- 50 Years of container ship growth (AGCS)
- Review of Maritime Transport 2020 (UNCTAD)

PUBLISHED: 31/03/2021; STORY: Graphic News

Debate over huge container ships

The blocking of the Suez Canal by a 220,000-tonne ship is bringing into question whether vessels have outgrown the infrastructure needed to support them



*Twenty-foot Equivalent Unit – standard unit for describing ship's cargo capacity

Sources: Allianz Global Corporate & Specialty (AGCS), United Nations Conference on Trade and Development (UNCTAD)

© GRAPHIC NEWS



Source: <https://www.cityam.com/worlds-largest-container-ship-docks-on-the-thames/>

Port logistics

While the giant ships lower costs per container for the shipping lines and are better for the environment, they also create significant logistical challenges for the ports. The Port of Hamburg says a port call from an enormous ship requires around 3,800 trucks and 50 freight trains 48 hours before and after a ship's arrival.

See also:

Source B: Marine cargo vessels – is bigger better?

Source C: Shipping containers looking for new routes

Source D: Port of Rotterdam

Source B

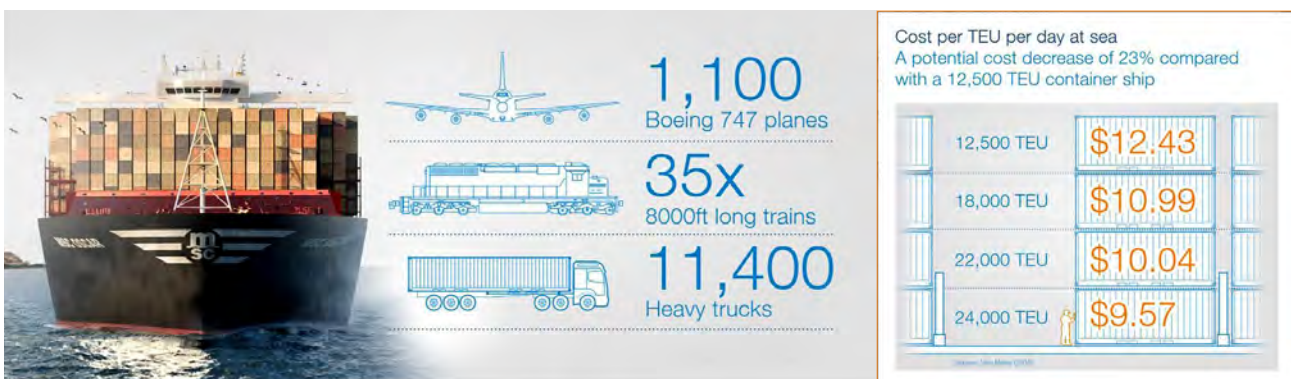
MARITIME CARGO VESSELS – IS BIGGER BETTER?

Cargo ships have transported commodities for over three thousand years. Ninety percent of goods traded globally travel by sea, stimulating spectacular increases in the size and capacity of ships. The increases in ship size are needed to create economies of scale with designs made to transport cargo with the greatest fuel and cost efficiency as possible.

The MSC Oscar for example has a deck is the size of four football fields and can accommodate 39,000 cars or 117 million pairs of sneakers. However, to reduce weight and cost, the steel hull is astonishingly thin. The Mediterranean Shipping Company says the MSC Oscar is the most energy efficient vessel on the planet: consuming 35% less fuel and emitting the same percentage less carbon dioxide.

Ongoing challenges to marine shipping include increased emission controls and the inability of docks and cargo handling infrastructure to accommodate vessels of such vast size. The MSC Oscar cannot squeeze through the Panama Canal even since its expansion in 2016.

The race for ever more fuel efficient cost-effective and environmentally friendly marine vessels will continue, driven by the growing demands of global trade, environmental constraints and the innovative design needed to meet these needs.



Source: ABB Group <https://new.abb.com/turbocharging/maritime-cargo-vessels---is-bigger-better>

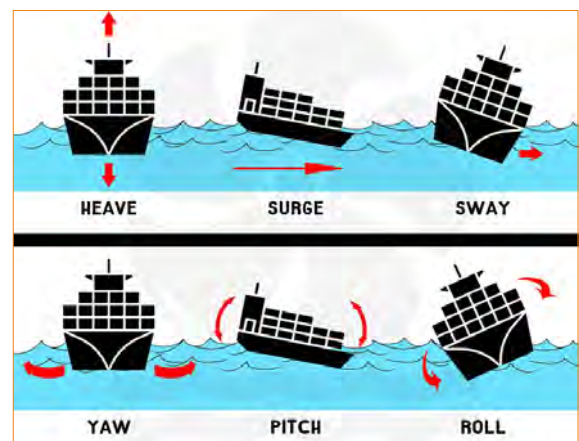
LOST AT SEA

The World Shipping Council (WSC) says that on average 1,382 containers are lost at sea every year, but there was a downward trend between 2017 and 2019 period with 779 containers lost each year.



Source: <https://www.yachtingworld.com/news/could-a-floating-shipping-container-sink-your-yacht-is-the-danger-to-sailors-real-or-imagined-107508>

Motion of the ocean



Source: <https://www.shippingandfreightresource.com/thousands-of-containers-overboard-in-worst-containership-disaster-one-apus/>

Source C

SHIPPING COMPANIES LOOK FOR NEW ROUTES

Receding sea ice is now making year-round navigation of the Northern Route possible, and cargo traffic is expected to more than double in the next few years, from 33 million tonnes to 80 million by 2024, although till a long way short of the 1.17 billion tonnes that pass through the Suez Canal.

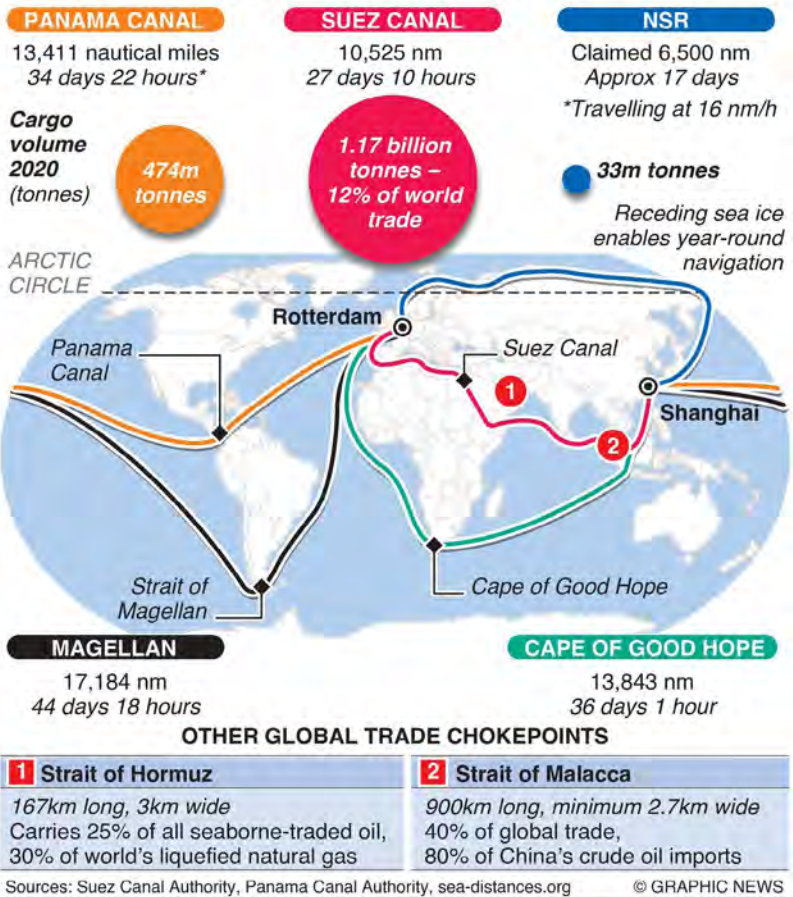
The suspension of traffic through Suez quickly disrupted world trade already suffering due to the coronavirus pandemic. However, Suez is not the only bottleneck for world trade, with the Straits of Hormuz and Malacca, and the Panama Canal, all potentially vulnerable.

Sources:

- Suez Canal traffic (Suez Canal Authority)
- Christophe de Margerie arrives at Yamal LNG's Sabetta terminal (Sovcomflot)
- Shipping distances calculator
- Panama Canal marks 1% cargo increase for fiscal year 2020 (Safety4Sea)
- Panama Canal traffic (Panama Canal Authority)

Shipping companies look to alternative routes

Russia is highlighting the viability of its Northern Sea Route (NSR) following the six-day blockage of the Suez Canal by a stranded container ship. The NSR trims 4,000 nautical miles off the route via Suez



PUBLISHED: 30/03/2021; STORY: Graphic News; PICTURES: Newscom

Ships queue to enter the Panama Canal



The Panama Canal is an artificial 77 km waterway in Panama that connects the Atlantic Ocean with the Pacific Ocean.

Also in this Edition

'Mapping the world's key maritime choke points' by Visual Capitalist.

Source: <https://www.over.eu/panama-canal/>

Source D

PORT OF ROTTERDAM: OCEAN TRADE CONNECTIONS



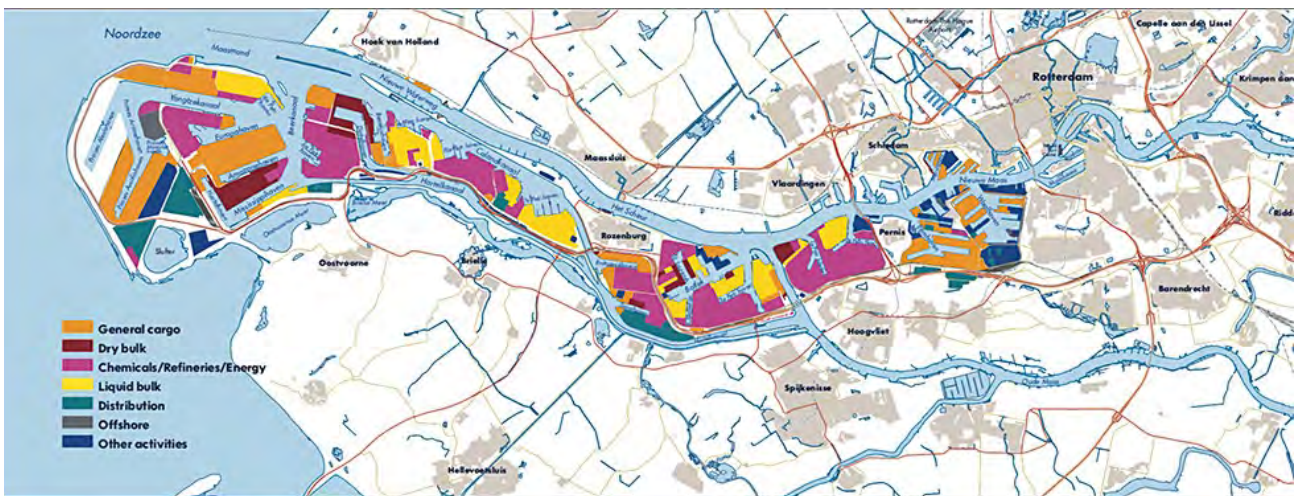
Last year, the port of Rotterdam handled 436.8 million tonnes of goods. This makes Rotterdam the largest port in Europe.

The port of Rotterdam created an infographic to show cargo shipments from all over the world arriving in the port every day during 2017. It shows the top five origins of the three cargo types that arrive in Rotterdam, showing where this cargo comes from, and which routes it takes to get there.

Source: <https://www.marineinsight.com/shipping-news/port-of-rotterdam-continues-24-7-operations/>

Image. Shipping to the Port of Rotterdam (2017). Credit portofrotterdam.com

Lands use map for the Port of Rotterdam



Source: <https://www.portofrotterdam.com/sites/default/files/2021-06/facts-and-figures-port-of-rotterdam.pdf>

Port of Rotterdam



Visualising global shipping



Source: VOX. Visualization of the world's shipping routes – <https://www.vox.com/2016/4/25/11503152/shipping-routes-map>

Source E

GLOBAL SHARK POPULATIONS COLLAPSING

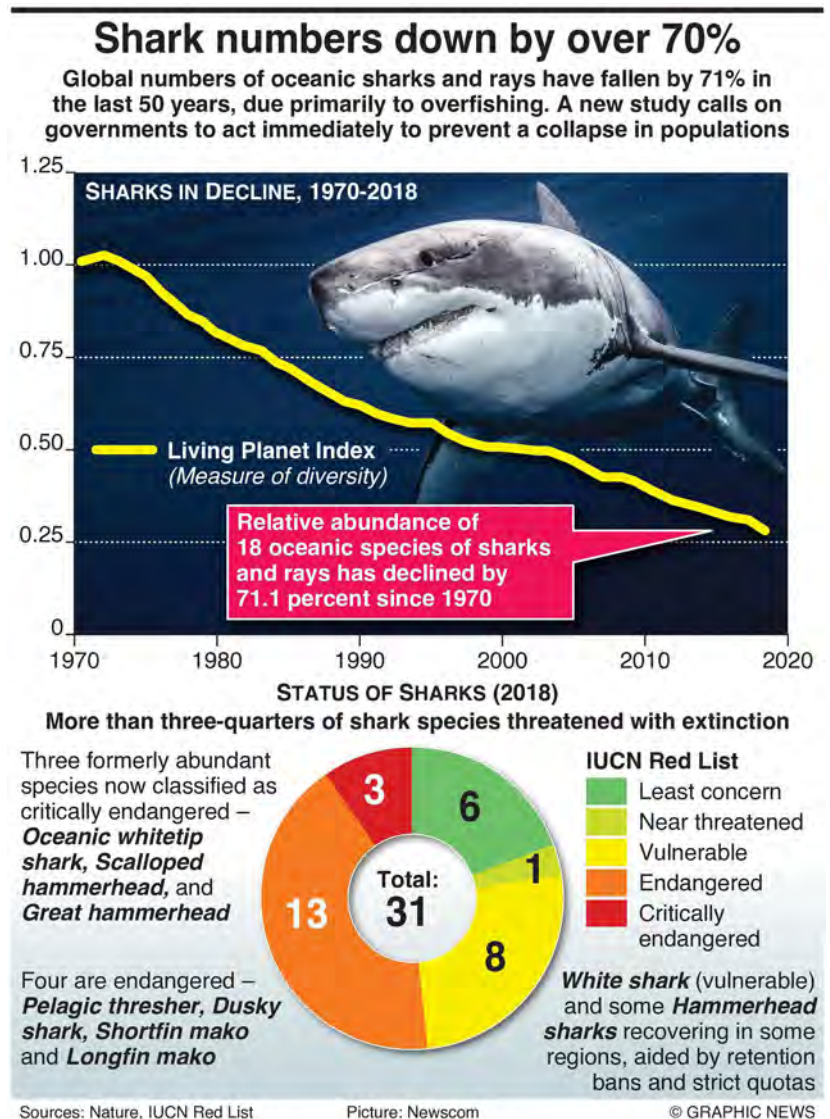
January 27, 2021 – Global numbers of oceanic sharks and rays have fallen by 71% in the last 50 years, due primarily to overfishing. A new study calls on governments to act immediately to prevent a collapse in populations.

Biologists estimated the relative abundance of 18 oceanic species of sharks and rays from 1970 to 2018 and assessed the risk of extinction for all 31 species.

Three formerly abundant species are now classified as critically endangered, the highest threatened category in a list produced by the International Union for Conservation of Nature (IUCN). Over three-quarters of shark species are now threatened with extinction. There is evidence some shark populations are rebuilding. The authors are calling for immediate government action to prevent collapses with catch limits to help promote species recovery.

Sources:

- Half a century of global decline in oceanic sharks and rays (Nature)
- Global shark and ray population crashed more than 70% in past 50 years (The Guardian)
- Extinction: 'Time is running out' to save sharks and rays (BBC)



PUBLISHED: 27/01/2021; STORY: Graphic News; PICTURES: Newscom

Bycatch



When fishing vessels go to sea, they go after a "target" catch, but as most fishing gear is unselective, fishing fleets also catch millions of tonnes of other marine life, commonly known as bycatch. The catch of "non-target" fish and marine creatures often occurs with no management. Bycatch includes turtles, marine mammals and seabirds as well as fish.

Source: https://wwf.panda.org/wwf_news/?162122/Forty-percent-of-global-fisheries-catch-wasted-or-unmanaged---WWF

Source F

OCEANS CAN BE RESTORED TO FORMER GLORY

The recent recovery of whales, seals and other marine species have allowed scientists to formulate a plan showing how the glory of the world's oceans could be restored within a generation.

Humpback whale migrations from Antarctica to eastern Australia have been increasing by about 10% a year, from a few hundred in 1968 to more than 40,000, benefiting from the 1986 ban on commercial whaling. Northern elephant seals hunted almost to extinction by 1880 when only 20 breeders remained—now number more than 200,000 due to strong protection. Southern sea otter numbers in Canada have grown to several thousand. Scientists say there is now the knowledge to create an ocean renaissance for wildlife by 2050 and bolster the services that the world's people rely on, from food to coastal protection to climate stability. The measures needed, including protecting large swathes of ocean, sustainable fishing and pollution controls, would cost \$10-20bn a year. Climate change, and the challenges of scaling up existing conservation efforts, are big hurdles and the window for action is very narrow. The study has been published in the journal Nature.

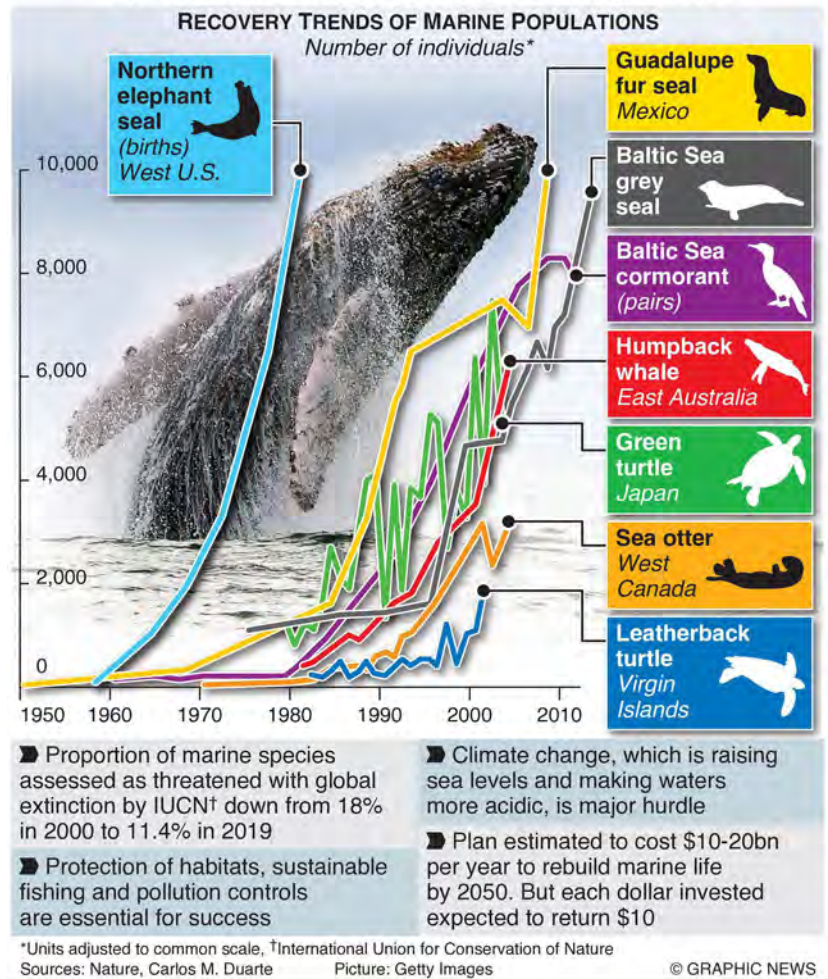
Sources:

- Rebuilding marine life (Nature)
- Whales' recovery shows we can fix damage to oceans from overfishing and climate change (The Australian)
- Oceans can be restored to former glory within 30 years, say scientists (The Guardian)
- Oceans can be successfully restored by 2050, say scientists (BBC)

PUBLISHED: 03/04/2020; STORY: Graphic News; PICTURES: Getty Images

Oceans can be restored by 2050

The recent recovery of whales, seals and other marine species have allowed scientists to formulate a plan showing how the glory of the world's oceans could be restored within a generation



Green Sea Turtle by Amanda Cotton. Source: <https://www.theoceanagency.org/ocean-image-bank>

MARITIME TRADE VESSELS

SOURCE A and SOURCE B

1. Explain the measurement unit TEU.
2. By how much did TEU change between 2002 and 2020?
3. Calculate the % change in shipping container size between 2002 and 2020.
4. Explain two advantages of larger container ships. Use statistics from Source B to support your answer.
5. Outline two disadvantages of larger container ships. Use information from source B in your answer.
6. Define the term 'Economies of scale'.
7. Identify two types of cargo ship that make up most of the global maritime trade.
8. Calculate the amount of cargo in containers moved by sea in 2019.
9. What challenges do increasingly larger container ships create for maritime ports?
10. Select two types of sea motion and explain how these could result in the loss of containers at sea.
11. Discuss how containers lost at sea could threaten ocean ecosystems.
12. Suggest other ways shipping impacts on the world's oceans?

MARITIME TRADE ROUTES

SOURCE C

1. What does NSR refer to? Describe the location of the NSR.
2. State the time advantage of the NSR over other shipping routes.
3. Suggest why the NSR has become a more viable shipping route for Russia in recent years.
4. Why are new sea routes seen as a solution to increasingly larger container ships?
5. What do the major shipping canals (Suez and Panama) and straits (Magellan and Malacca) have in common?
6. Visit the Panama and Suez Canals using Google Earth. Use a Venn Diagram to identify similarities and difference between the two shipping routes.

SOURCE D

1. Study the location of Port of Rotterdam (POR) using Google Maps or Google Earth. Determine latitude and longitude, country, water bodies and neighbouring countries.
 - a. Use this link to examine the '*All Shipping Routes lead to Rotterdam*' infographic <https://tinyurl.com/jrt8vvhs>
 - b. Rank the three types of maritime cargo that travelled to POR in 2017 from most to least important by weight.
 - c. How much Dry Bulk cargo shipped from Australia to POR in 2017? Suggest the potential content of that cargo.
 - d. Identify the two most important sources of liquid bulk cargo into POR.
 - e. List three types of goods transported to Amsterdam in containers.
 - f. Justify the title of the infographic.
2. Refer to the article '*Mapping the world's key maritime choke points*' by Visual Capitalist in this edition.
 - a. Name three potential choke points for container ships travelling from Australia to Rotterdam.
 - b. Identify potential choke points for shipping between China and Rotterdam.
 - c. Do you think Australia would benefit from using the NSR? Explain your answer.
3. Refer to the photograph and map of POR.
 - a. Identify the type of photograph.
 - b. Locate the area shown in the photograph on the map.
 - c. Name the large water body in the background.
 - d. Suggest the direction the photographer was facing to take the photo.
 - e. Describe three general features of the POR you observe from the map and photograph.
 - f. Suggest a reason why the two largest areas for general cargo areas are at different ends of POR. (Think historically)

4. Visit the website 'Visualisation of the worlds shipping routes' <https://www.vox.com/2016/4/25/11503152/shipping-routes-map>
 - Observe the dominant trade routes.
 - Zoom in to see choke points.
 - Look to see if the NSR is actively being used.
 - Observe major maritime trade routes around, and to and from, Australia.
 - Identify areas with few or no shipping and suggest reasons.

OCEAN BIODIVERSITY LOSS

SOURCE E

1. What is the main cause of declining shark numbers?
2. How does poor 'bycatch' management contribute to overfishing?
3. Calculate the average rate of loss per decade between 1970 and 2020.
4. Calculate the % of critically endangered shark species using the sector graph. Remember 360 degrees = 100% making 3.6 degrees = 1%
5. Identify actions that are helping some shark species to recover.
6. Investigate strategies to minimise bycatch during ocean fishing.

CHALLENGE QUESTIONS

Read the following articles and for each one, respond to the following challenge questions.

1. **Visualising the human impact on the world's oceans.**

Challenge Question

In your own words explain the concept 'Blue Economy'. Use statistics in your response.

2. **Why Indigenous knowledge should be an essential part of how we govern the world's oceans.**

Challenge questions

- a. Define these concepts.
cumulative impact; tipping point; governance, co-management

7. Create a consequence diagram to illustrate the impact of overfishing on shark biodiversity and the flow on impacts of declining shark numbers on ocean ecosystems.

SOURCE F

1. Briefly describe how whale numbers have recovered over time, including the % threatened with extinction.
2. Explain the recovery of whale numbers since 1986.
3. Define the term 'renaissance' in relation to marine wildlife.
4. Compare the graphs showing numbers of Baltic Sea gray seals and West Canada sea otters since 1980. Use statistics in your answer.
5. The graph for the Japanese Green turtle and the Virgin Islands Leatherback turtle are unusual compared to other species on the graph. Suggest a reason.
6. List the three strategies suggested to see a resurgence in other ocean wildlife by 2050. Beside each strategy write a sentence outlining how the strategy would help build wildlife numbers.
7. Suggest how climate change could threaten the recovery of species into the future.
8. Why is investment in conservation value for money?

- b. Provide an example of Indigenous governance and management and an example of co-management.

3. **Container: Box that changed the world.**

Challenge question

In 200 words explain the title of this article.

4. **Mapping the world's key maritime choke points**

Challenge question

- a. In less than 200 words, describe the global distribution of marine traffic choke points
- b. In 100 words, propose and justify ONE solution for a choke point of your choice.