

Power to the ports: how cities could advance marine conservation in the North Pacific Ocean

Szymon Surma

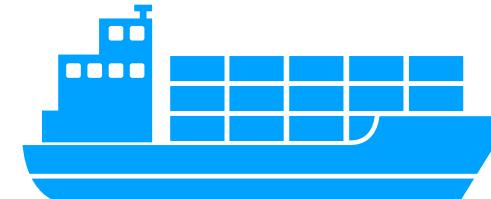
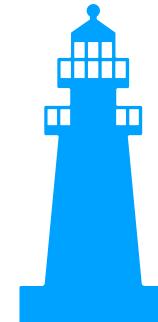
Institute for the Oceans and Fisheries, University of British Columbia



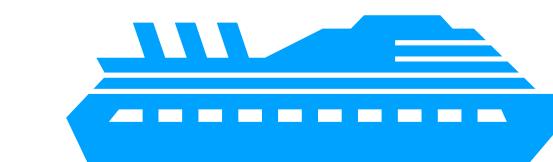
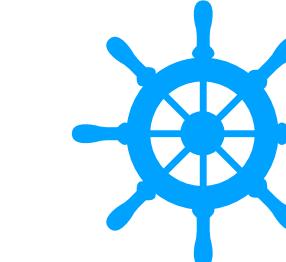
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Introduction

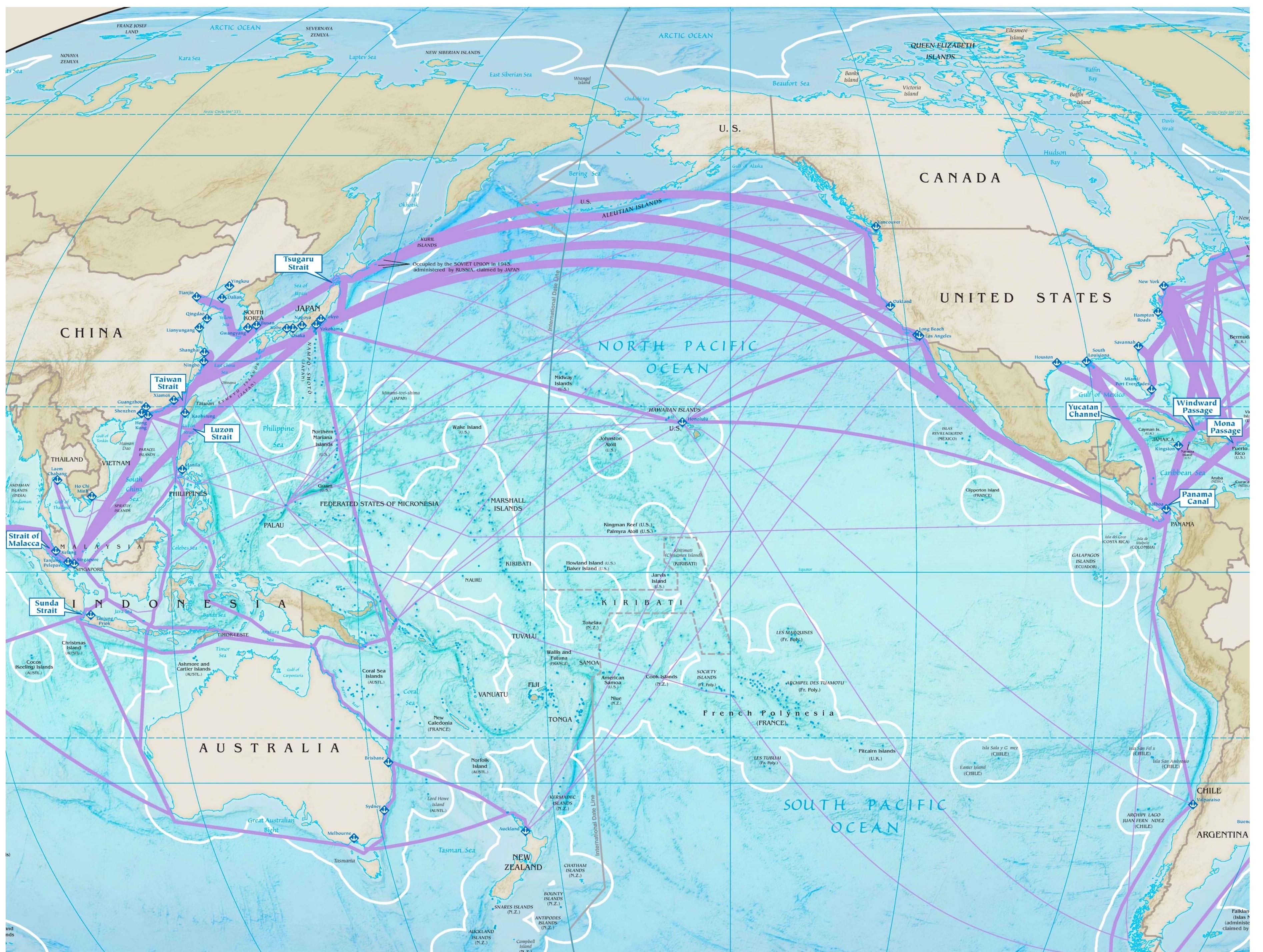
- the North Pacific is a globally vital zone of maritime trade
- 8 of the world's top 10 container ports lie in the PICES area
- port facilities and activities can adversely impact marine life
- however, many of these impacts can be effectively mitigated
- furthermore, ports could improve shipping industry practices



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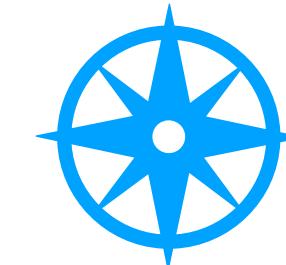
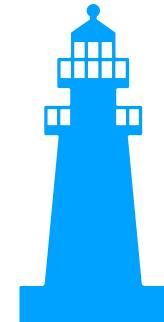


Pacific shipping lanes

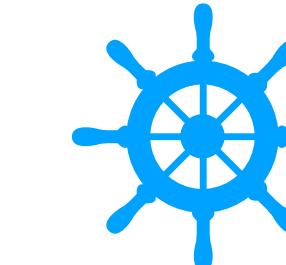


What ports are doing (I)

- 1) restoration and mitigation of marine habitats
- 2) reduction and mitigation of marine pollution
- 3) reduction and mitigation of carbon emissions
- 4) mitigation of threats to marine mammals

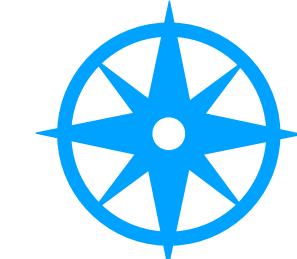
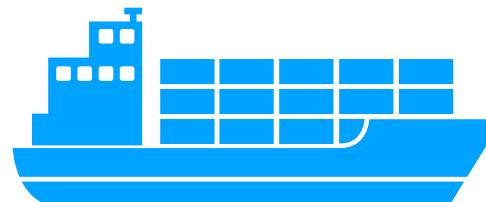
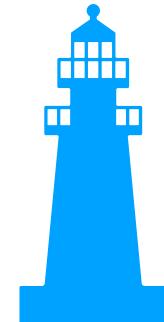


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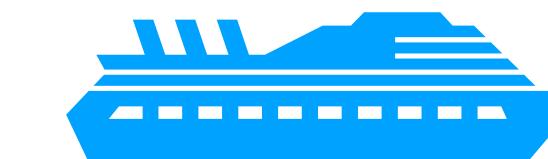
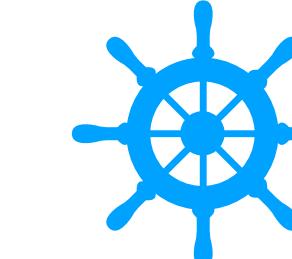


Habitat restoration and mitigation

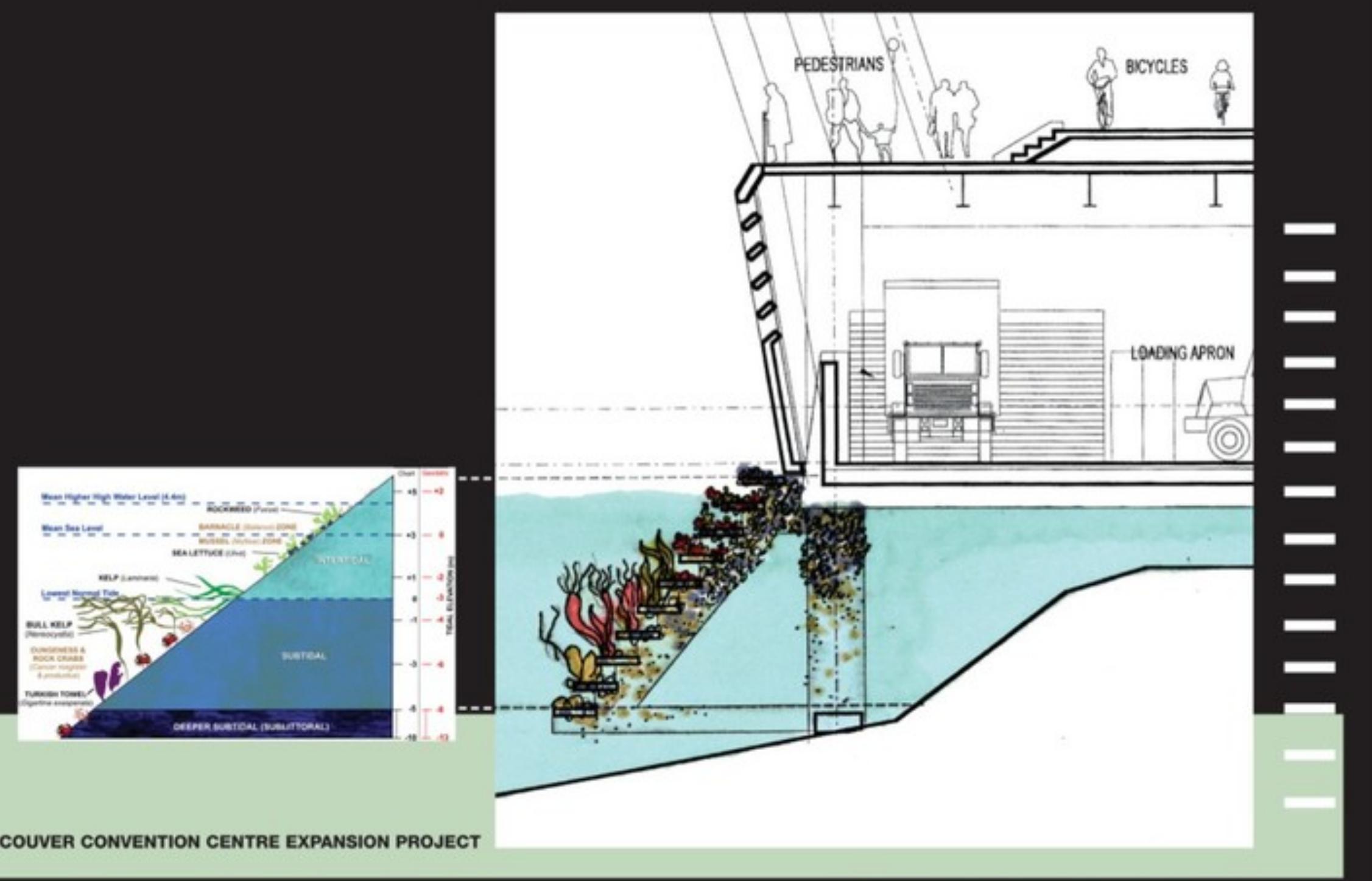
- 1) artificial intertidal and subtidal habitats on port structures
 - seawalls: rugose surfaces, tide pools, translucent panels
- 2) pockets of “natural” marine habitats among port facilities
 - beaches, coves, salt marshes, kelp forests, eelgrass beds
- 3) nursery areas and migration corridors for fish (e.g. salmon)



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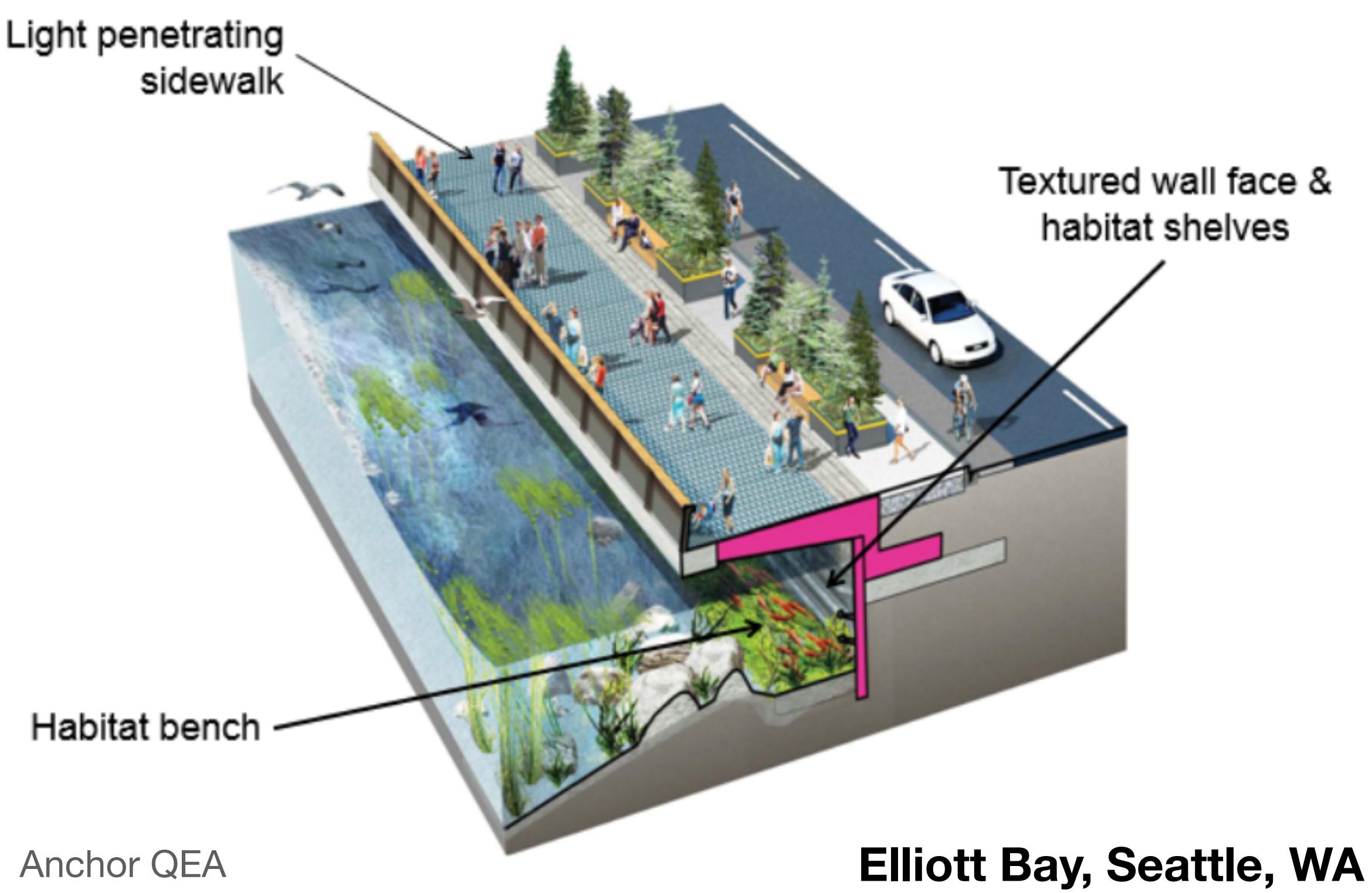
Marine habitat skirt



ArchDaily

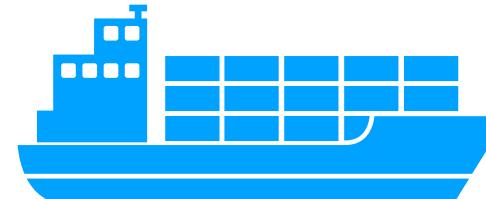
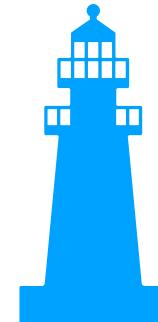
Coal Harbour, Vancouver, BC

Seawall habitats

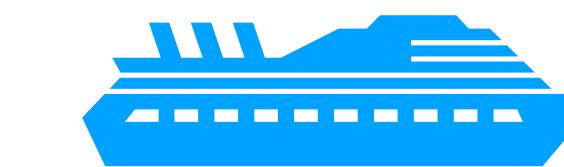
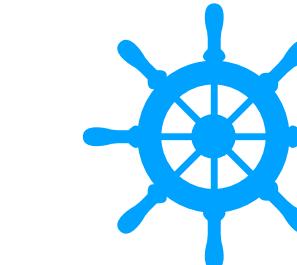


Pollution reduction and mitigation

- 1) particulate carbon emissions from ship funnels
 - connection of berths to shore power grid, electric tugs
- 2) polycyclic aromatic hydrocarbon pollution from pilings
 - removal and/or replacement of creosote-treated wood
- 3) pollution of marine habitats with plastic debris
 - removal of debris from water by specialized vessels



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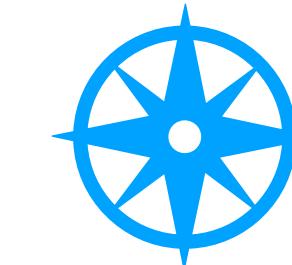
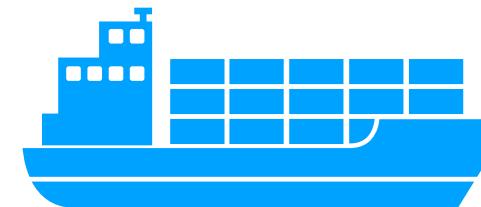
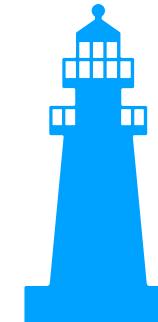
MV Raccoon

Debris removal

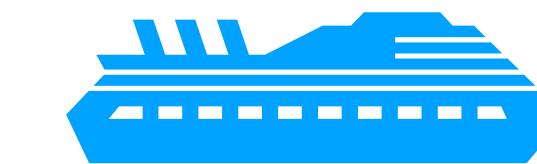
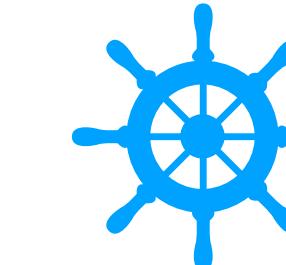


Emissions reduction and mitigation

- 1) reduction of emissions from ship funnels
 - connection to shore power, electric tugs
- 2) reduction of emissions from port terminals
 - electrification of shoreside operations
- 3) biological capture of emissions from ports
 - kelp forests, eelgrass beds, salt marshes



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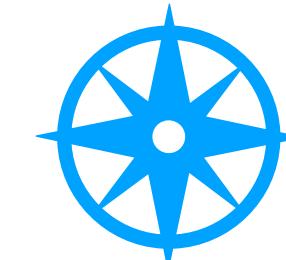
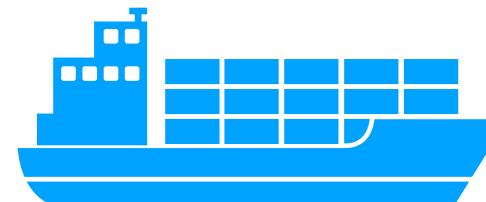
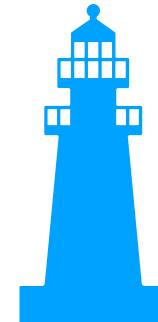




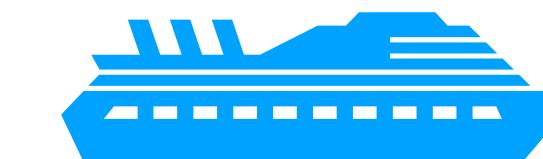
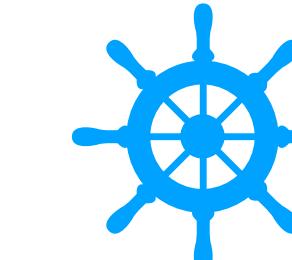
**Electric
tugboat**

Marine mammal threat mitigation

- 1) entanglement in marine debris
 - removal of debris by specialized vessels
- 2) impacts of noise from ships
 - vessel speed limits in mammal habitats
- 3) collisions in shipping lanes
 - vessel warning systems and speed limits



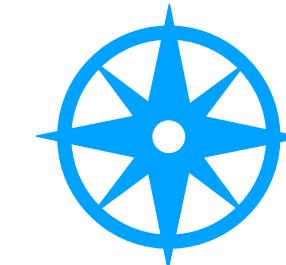
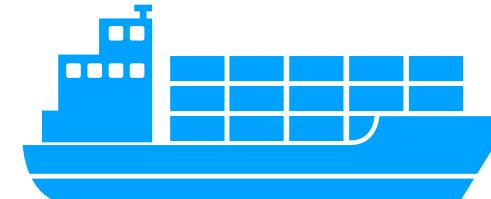
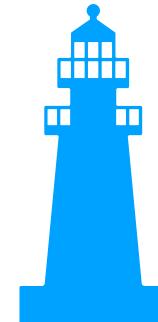
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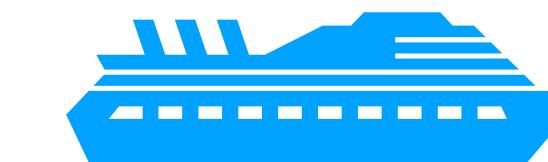
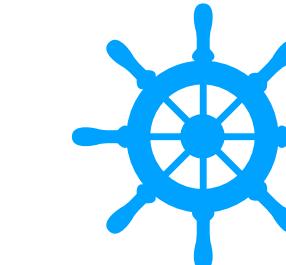
What ports are doing (II)

ports serve as crucial endpoints and hubs for maritime shipping

- shipping companies need the business ports have to offer
- thus, ports could exert influence on best shipping practices
- these include environmentally responsible marine technology
- cleaner and quieter propulsion systems are especially needed

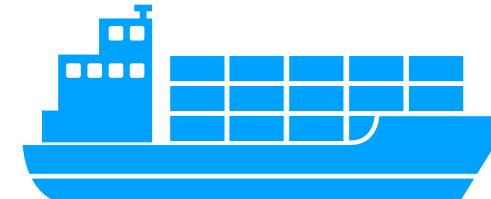
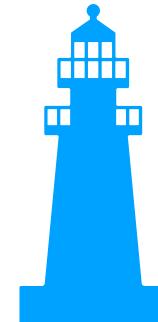


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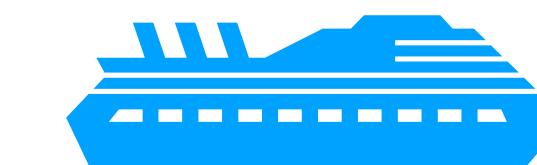
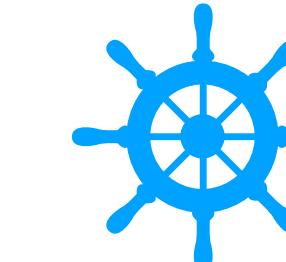


Blue-green marine technology

- propellers designed to minimize cavitation and the resulting noise
- hull coatings made to absorb engine noise and reduce turbulence
- cleaner fuels producing less particulate carbon and CO₂ emissions
- auxiliary sail, kite, or rotor technology reducing fuel consumption
- hybrid propulsion with renewables supplying extra electric power



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Wind-assisted ship (1980)



Drax Global

MV Pacific Grebe

Wind-assisted ships (2020s)



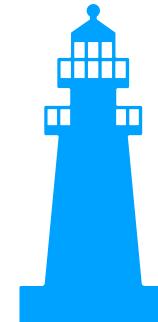
Drax Global

Concept ship

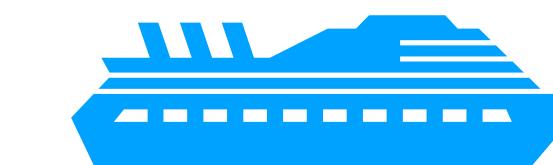
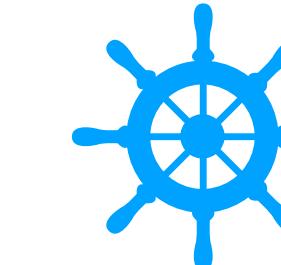
Ports and incentives

mechanisms for ports to exert influence on shipping industry

- lower port fees for ships using new blue-green technology
- higher fees for ships that fail to meet minimum standards
- certification programs for most advanced lines and ships
- “name and shame” campaigns against the worst offenders

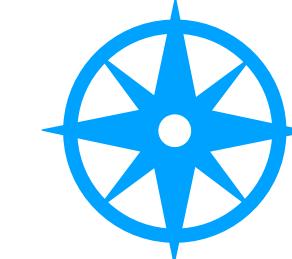
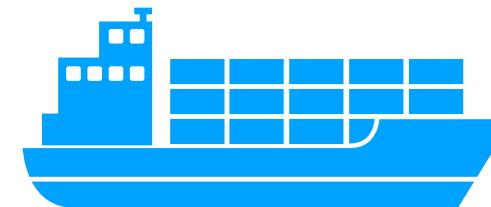
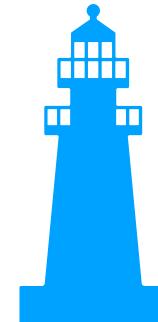


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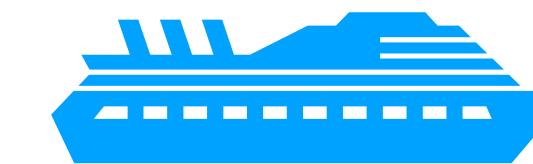
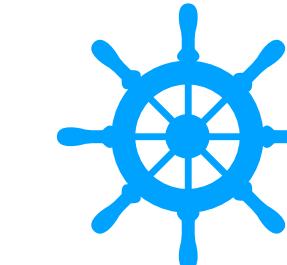


What ports could do

- these programs would work best if many ports implemented them
- thus, they would benefit from multilateral cooperation among ports
- such multilateralism would go beyond bilateral “sister port” ties
- it could help establish a set of shared best shipping practices
- these could be set in a document signed by port authorities

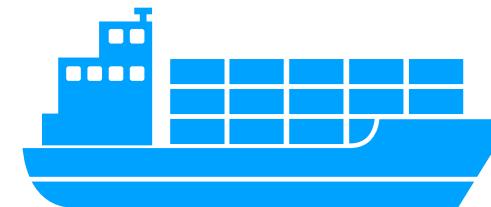
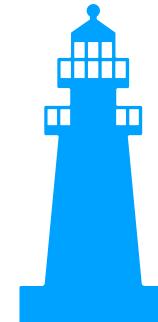


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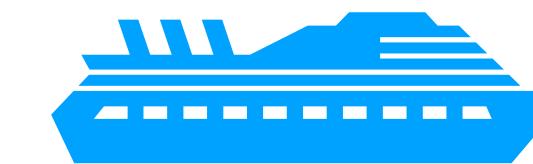
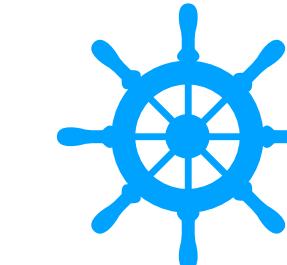


Conclusions

- the North Pacific is a globally crucial maritime shipping zone
- some ports are effectively mitigating their environmental impacts
- ports are also invaluable nodes for the maritime shipping industry
- thus, they could help advance adoption of blue-green technologies
- multilateral ties and shared best practices could help achieve this



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Acknowledgments





Thank you!

どうもありがとうございました!