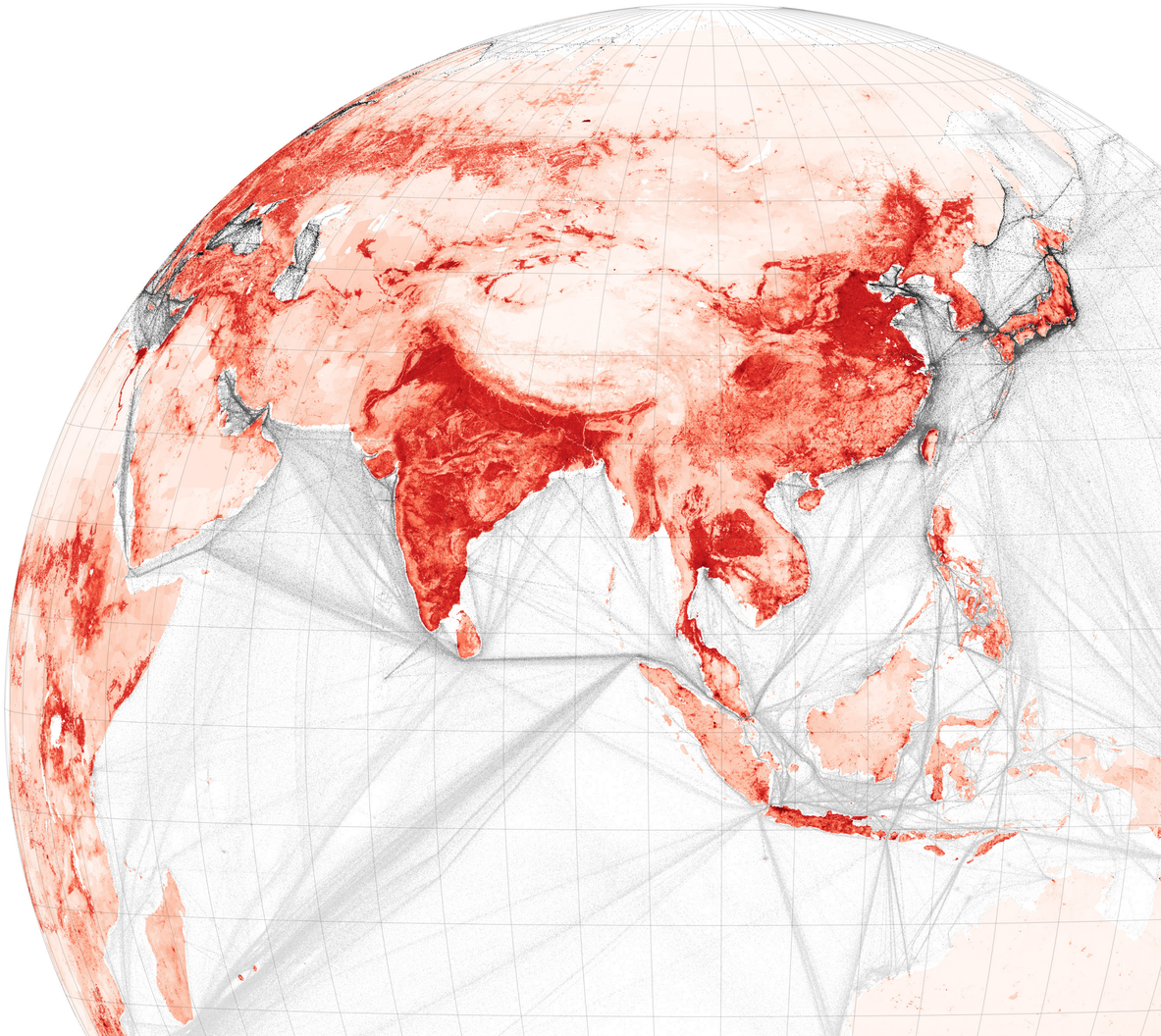
The Malacca Strait, a system to be tended to.

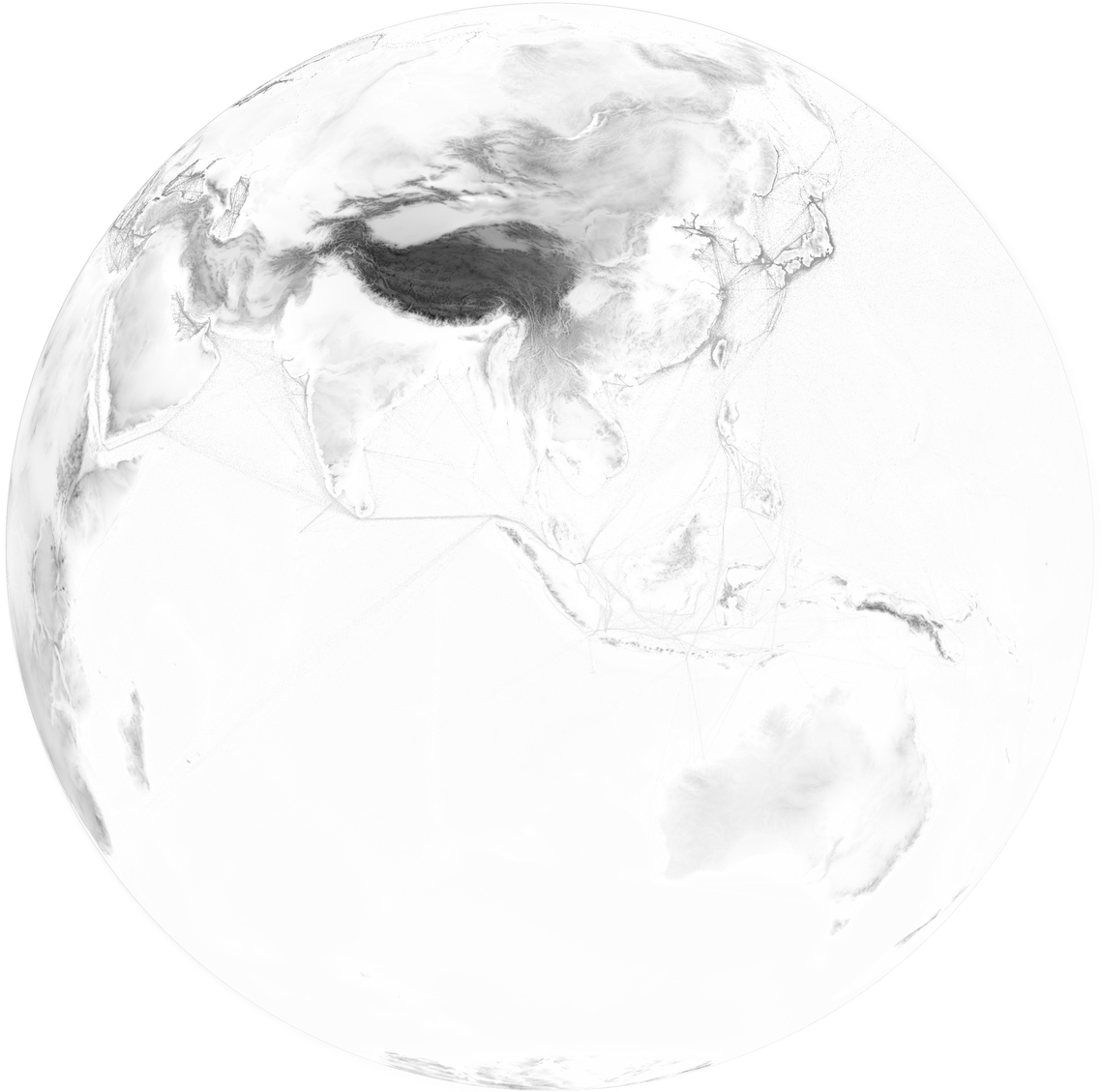
Landing in Contested Waters



Youri Stoeller
5107490
A4 Presentation

MsC AUBS
Graduation Cluster: Rights of Nature
1st mentor: dr. D. Sepulveda Carmona
2nd mentor: dr. L. Calabrese

21/06/2026





Contested Global Infrastructure



Map of the city of Malakka (J. Vingboons, 1665)

Reinforcement of a Global Infrastructure



Horsburgh Lighthouse (J.T. Thomson. 1851)

Global importance

	Panama Canal	**Suez Canal**
Minimum depth	12 meters	24 meters
Length	64 km	193 km
Standard	Panamax & New-Pana-max	Suez-max
Ship container capacity	4.500	24.000
Transits day / year	38 / 14.000	54 / 20.000
Share of global trade	5%	15%

Global importance

Roughly 100.000 ships per year
30% of global traded goods

	Panama Canal	Suez Canal	Malacca Strait
Minimum depth	12 meters	24 meters	25 meters
Length	64 km	193 km	800 km
Standard	Panamax & New-Pana-max	Suez-max	Future Malacca-max
Ship container capacity	4.500	24.000	25.000
Transits day / year	38 / 14.000	54 / 20.000	270 / 100.000
Share of global trade	5%	15%	30%

Malacca Strait

Danish Straits

English Channel

Strait of Hormuz

Panama Canal

Singapore Strait

Bab el-Mandeb Strait

Suez Canal

Panama Canal

Strait of Gibraltar

1 million oil barrels



Reinforcement UNCLOS

(d) the loading or unloading of any commodity, currency or person in contravention of the customs, fiscal, immigration or sanitary laws and regulations of States bordering straits.

2. Such laws and regulations shall not discriminate in form or in fact among foreign ships or in their application have the practical effect of denying, hampering or impairing the right of transit passage as defined in this section.

3. States bordering straits shall give due publicity to all such laws and regulations.

4. Foreign ships exercising the right of transit passage shall comply with such laws and regulations.

5. The flag State of a ship or the State of registry of an aircraft entitled to sovereign immunity which acts in a manner contrary to such laws and regulations or other provisions of this Part shall bear international responsibility for any loss or damage which results to States bordering straits.

Article 43
Navigational and safety aids and other improvements and the prevention, reduction and control of pollution

User States and States bordering a strait should by agreement cooperate:

(a) in the establishment and maintenance in a strait of necessary navigational and safety aids or other improvements in aid of international navigation; and

(b) for the prevention, reduction and control of pollution from ships.

Article 44
Duties of States bordering straits

States bordering straits shall not hamper transit passage and shall give appropriate publicity to any danger to navigation or overflight within or over the strait of which they have knowledge. There shall be no suspension of transit passage.

SECTION 3. INNOCENT PASSAGE

Article 45
Innocent passage

1. The regime of innocent passage, in accordance with Part II, section 3, shall apply in straits used for international navigation:

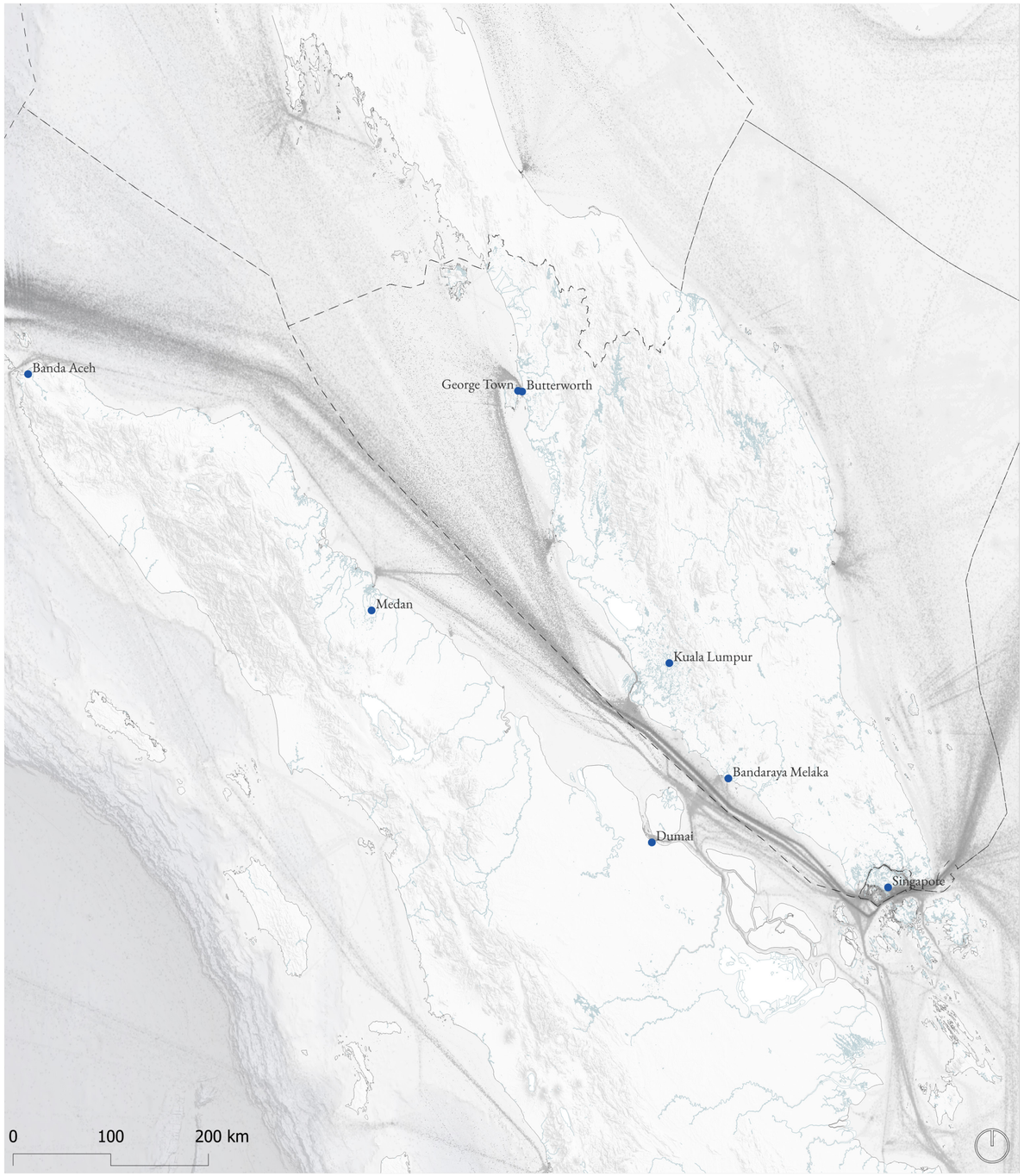
(a) excluded from the application of the regime of transit passage under article 38, paragraph 1; or

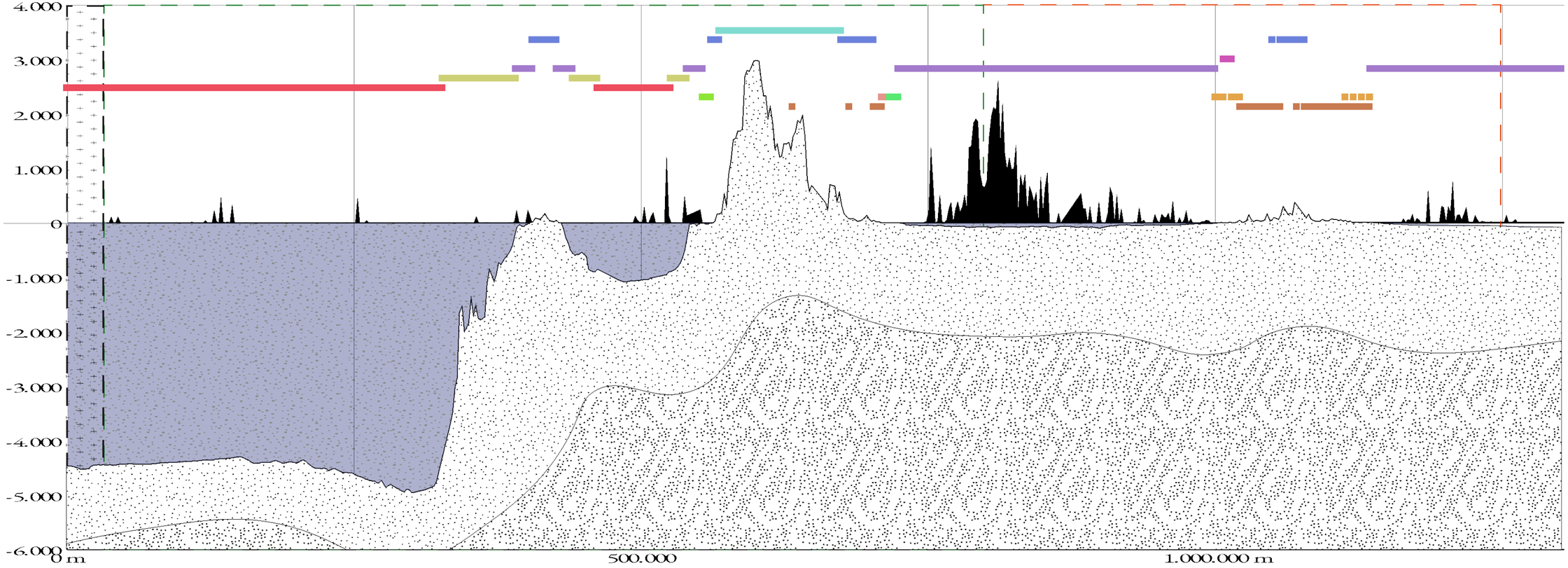
(b) between a part of the high seas or an exclusive economic zone and the territorial sea of a foreign State.

2. There shall be no suspension of innocent passage through such straits.

THE LAW OF THE SEA

Littoral States and the EEZ




4.000
3.000
2.000
1.000
0
-1.000
-2.000
-3.000
-4.000
-5.000
-6.000
0 m
500.000
1.000.000 m

Overlooking the Natural

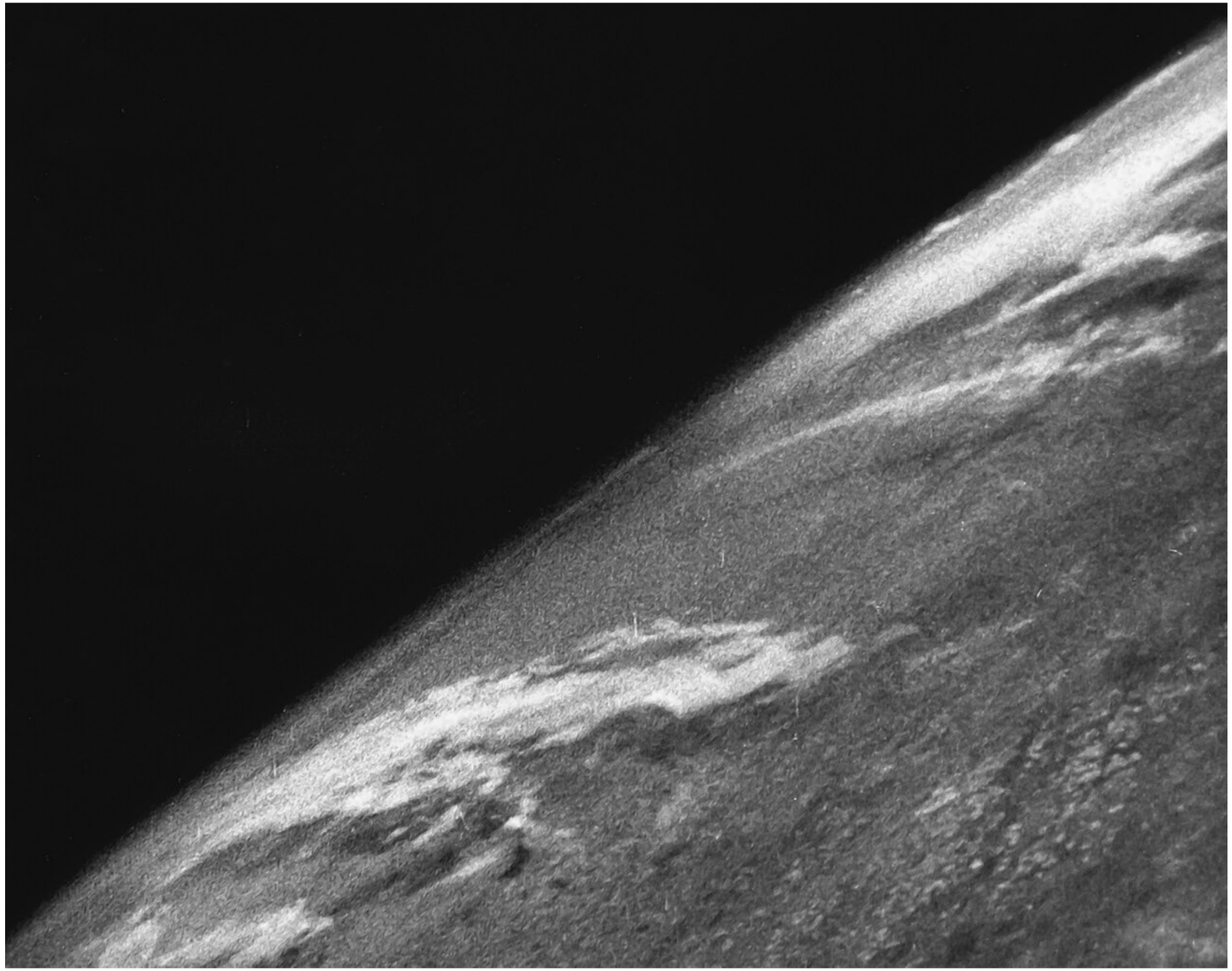



Cyclone Senyar
29/11/2025

Planetary Urbanization (Brenner et al., 2011) makes clear, the expansion of the needs of a city beyond its borders. The dissolving of the city-nature divide requires non urban spaces to be planned for.

*"In such a **planetary view**, where earth is viewed as if from out in space, all life forms as well as humans are squashed to the point of becoming invisible. This creates a **cognitive dissonance** since there is no commensurability between the lived experience of being situated in the CZ and the image provided by the planetary view."*

- Latour



First image of Earth from space (White Sands Missile Range/Applied Physics Laboratory, 1946)

Problem Statement

The Strait of Malacca is managed as a **critical global infrastructure corridor**, **prioritising navigability and economic continuity**.

This socio-technical perspective reinforces a **disconnect** between global benefits and local consequences, with ecological degradation and intensifying water-related risks **affecting the local inhabitants and systems.**

Existing governance frameworks do not recognise the dynamic and interdependent natural systems, treating risk as an isolated issue rather than a systemic outcome.

Reconfiguration of the network is needed, through critical proximity and Rights of Nature, proposes a transformative pathway that re-equilibrates global flows with long-term dynamic systems.

From **critical distance**



Silicon Island recelamation project (Copernicus, n.d.)

to critical proximity.

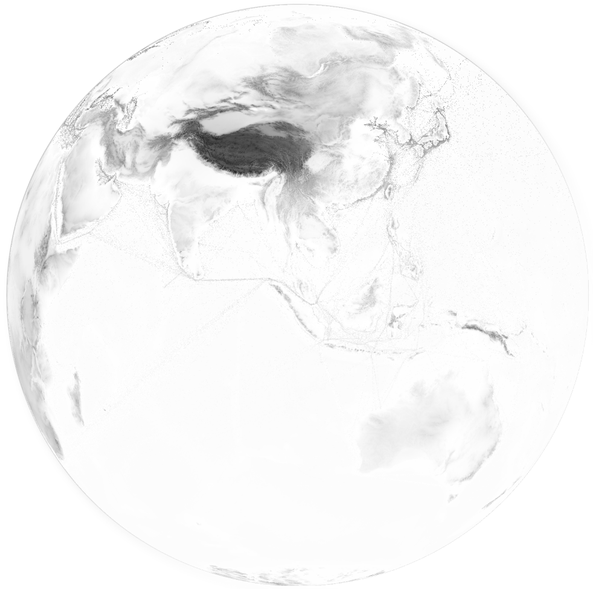


Silicon Island reclamation project as seen from Essen Beach

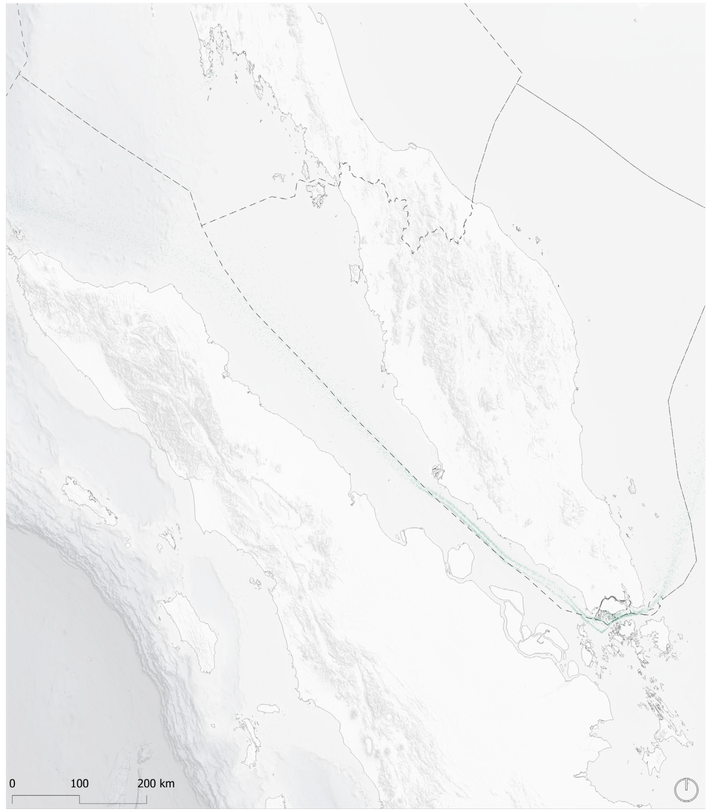
Research Question

How can a reconfiguration of the Malacca Strait drive a new future, shifting from a contested infrastructure to a critical zone, which is ecologically robust and socially equitable, by recognising critical proximity?

Contested Waters



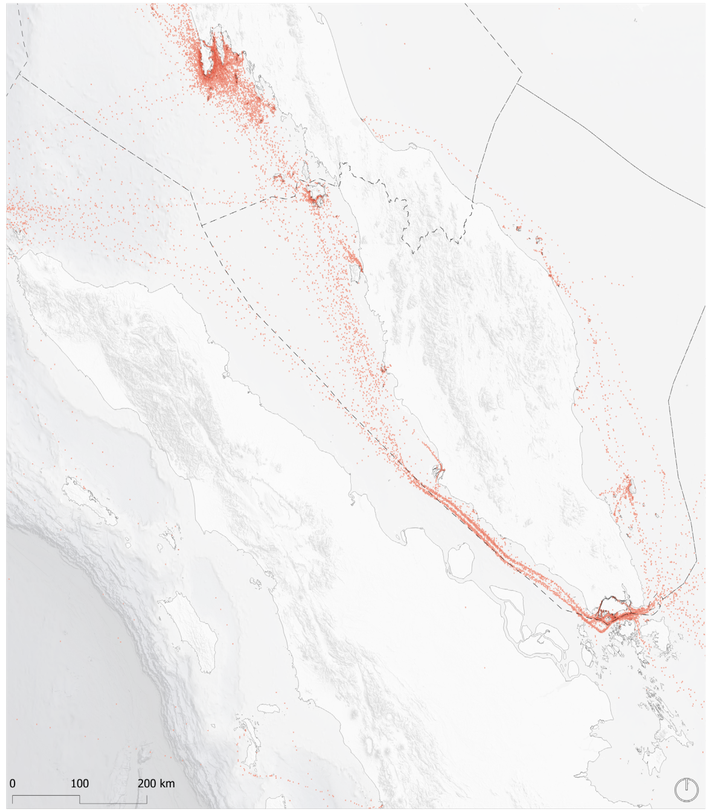
Shipping density



Density fishing

0 325.827

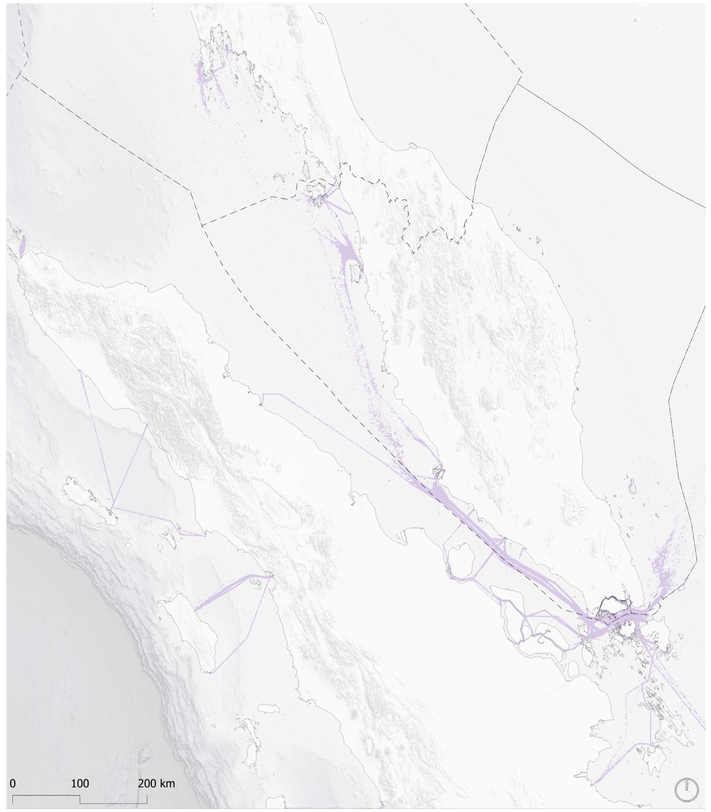
Fishing



Density leisure

0 502.538

Leisure

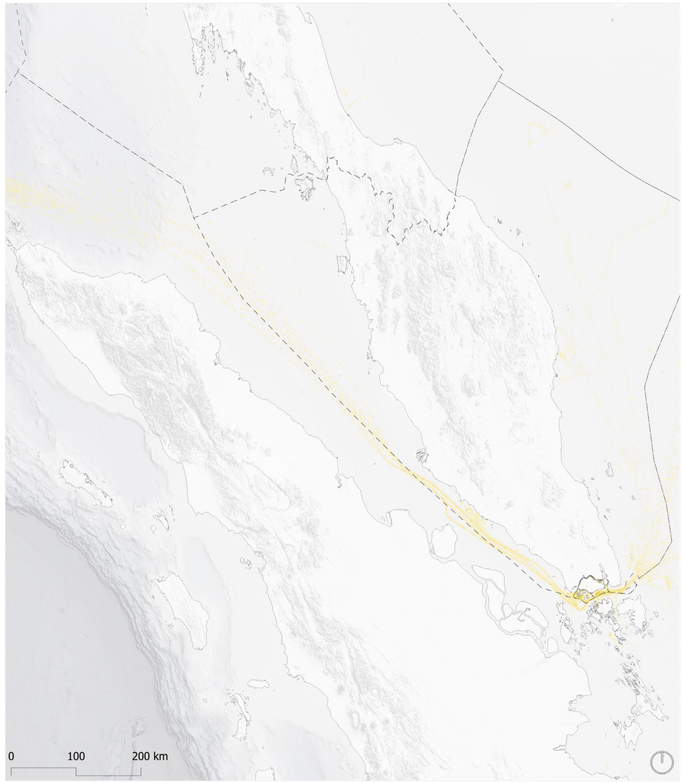


Density passenger

0 15.964

Passenger

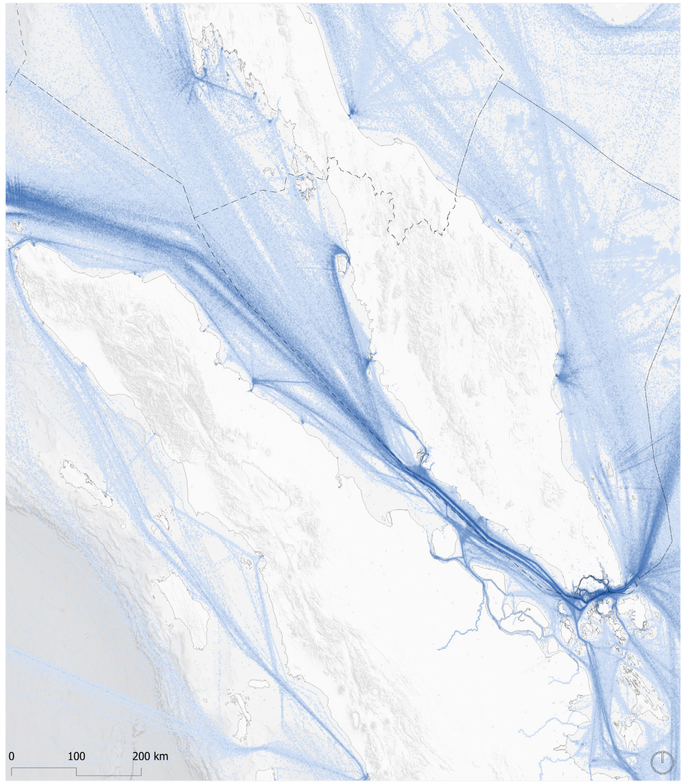
Shipping density



Density oil and gas

0 516.333

Oil and gas



Density commercial

0 18.141.974

Commercial






PZ
SAMUGARA 36


NO SMOKING
SAFETY FIRST

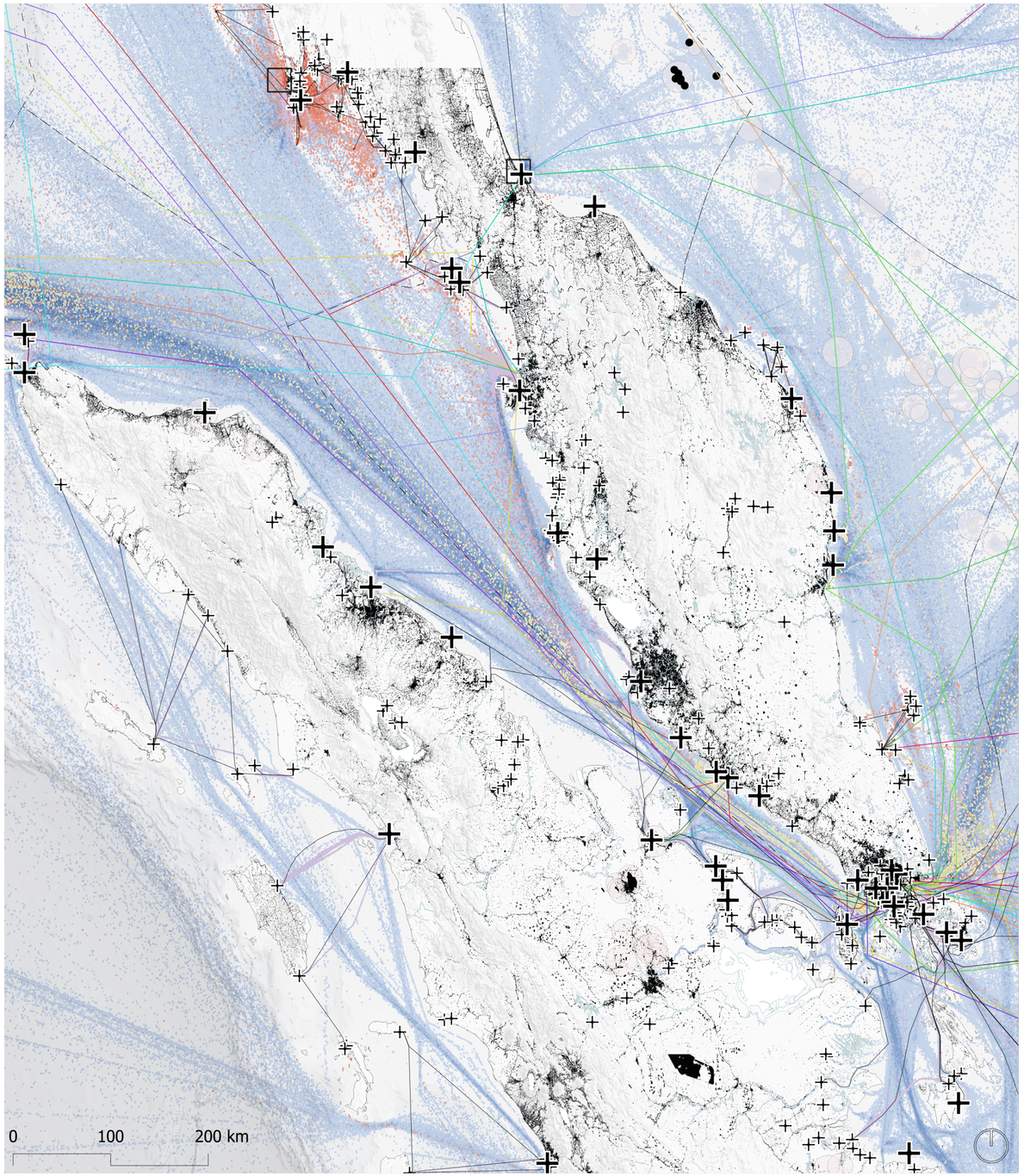

Bahri



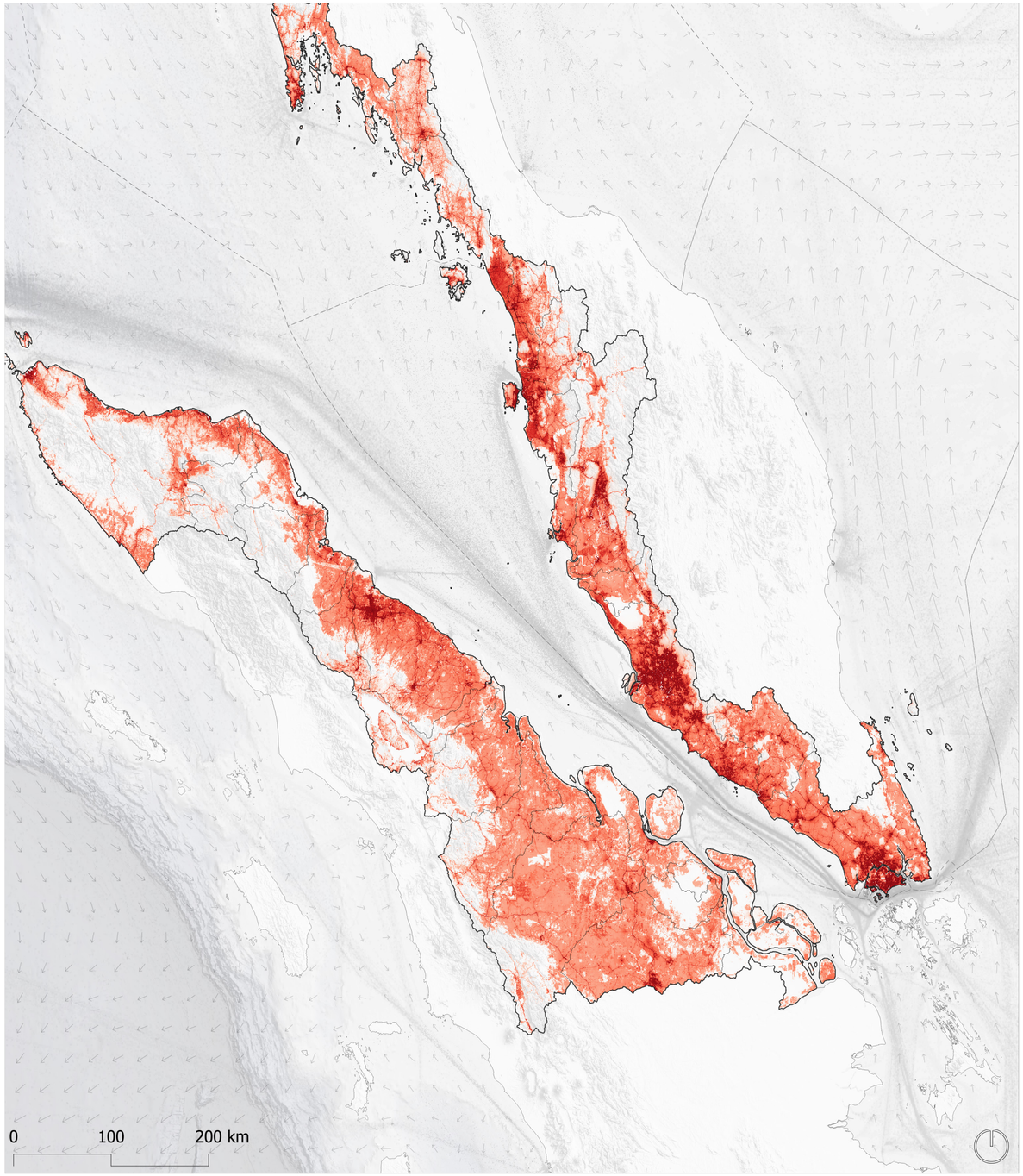

GSB
GEM 805


SAMUDERA
NORDSEAPHINA

Spreading of the Contest



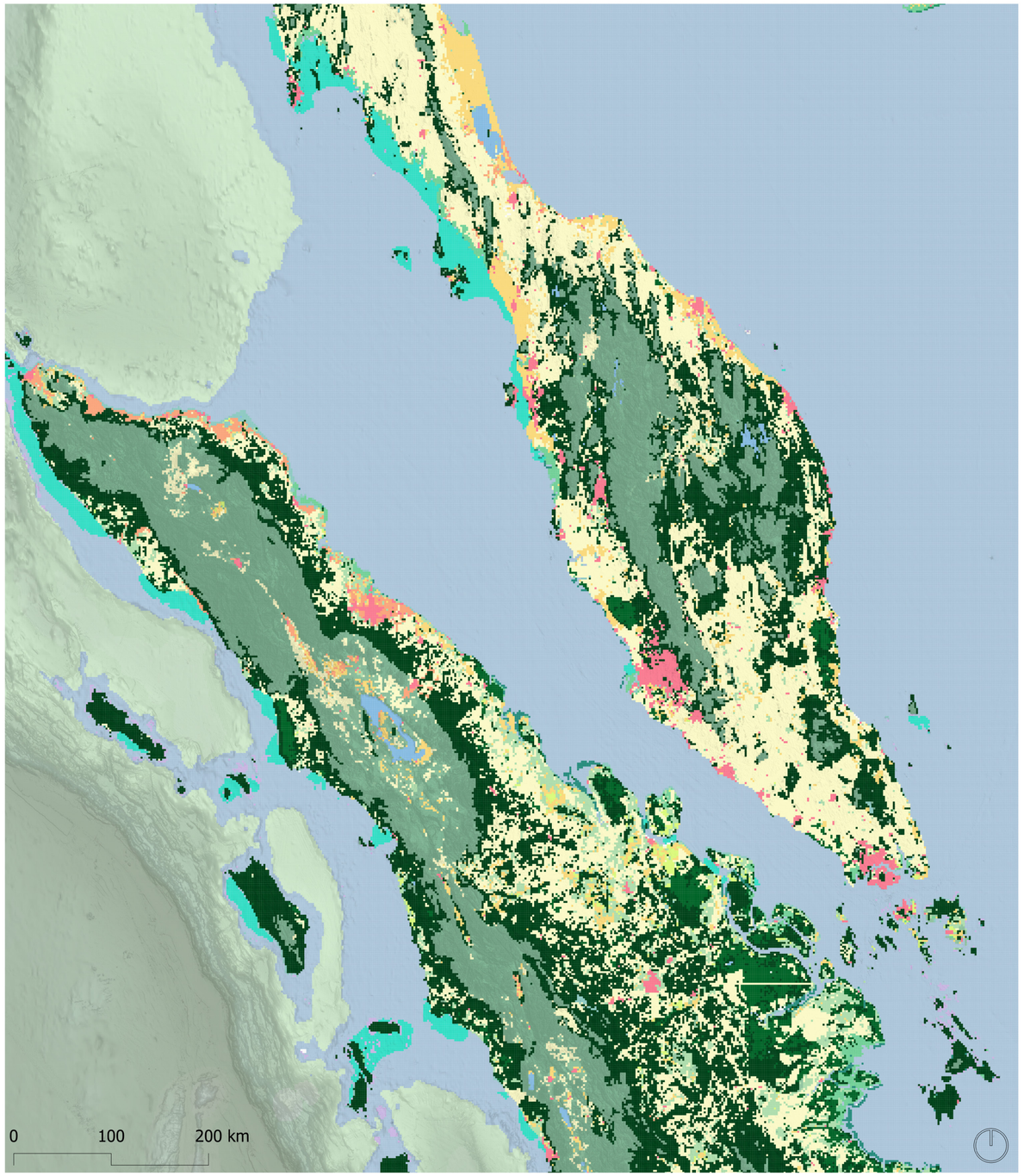
Human Modification



Human modification index

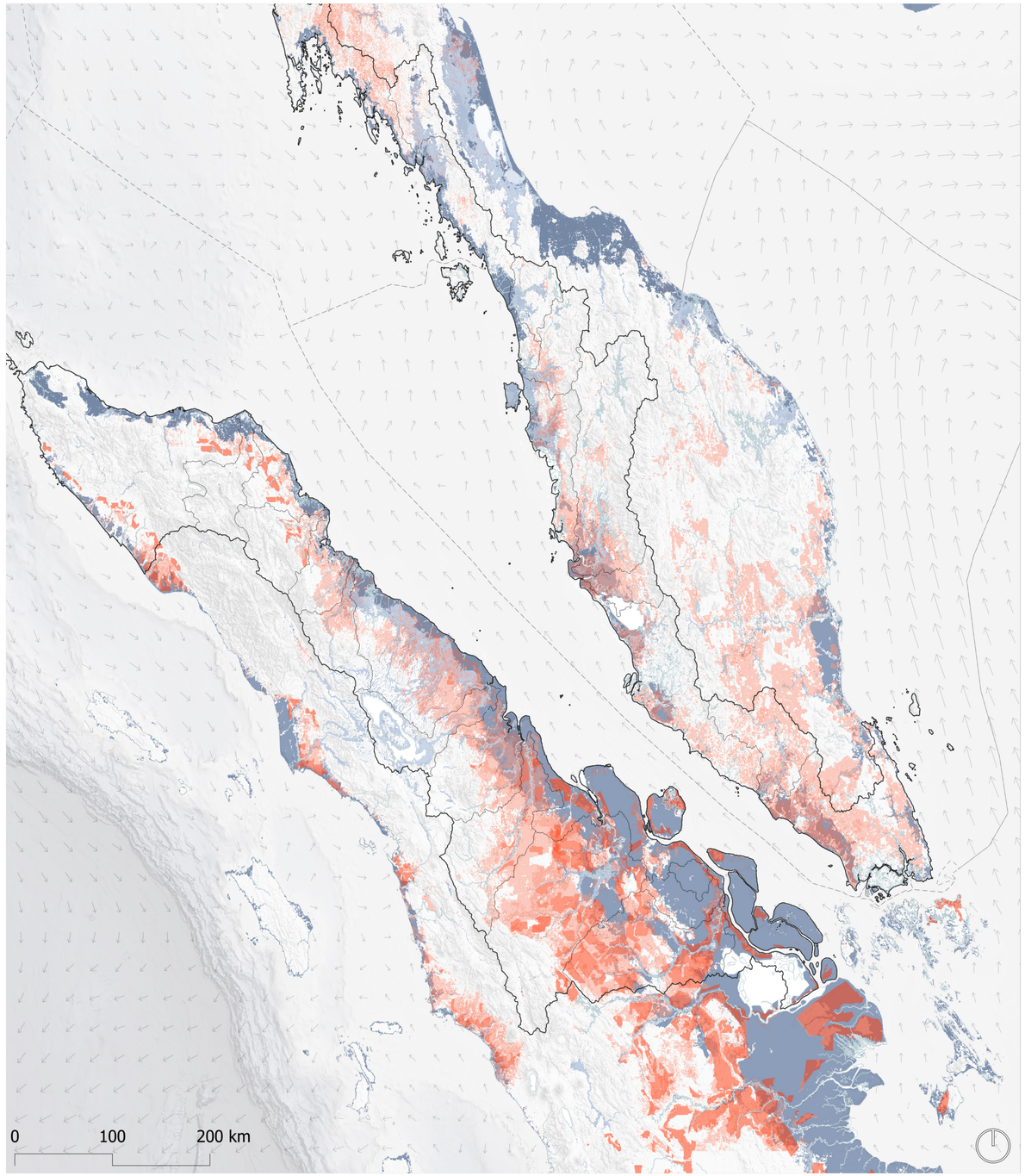
0 1

Altered Nature



Zonal Mosaic Feeding Basins
Tropical forest
Tropical mangrove
Tropical swamp
Tropical mountain forest
Tropical shrubland
High altitude tropical shrubland
Tropical grassland
Wetlands
Permanent rivers
Permanent freshwater lakes
Permanent freshwater marshes
Permanent inland deltas
Marine neritic
Coral reef
Seagrass
Continental slope/bathyl zone
Abyssal plain
Abyssal mountain
Seamount
Marine intertidal
Arable land
Pastureland
Plantations
Rural gardens
Urban areas

Disrupting the water system



Industrial oil palm plantation

Small scale oil palm plantation

Wetlands





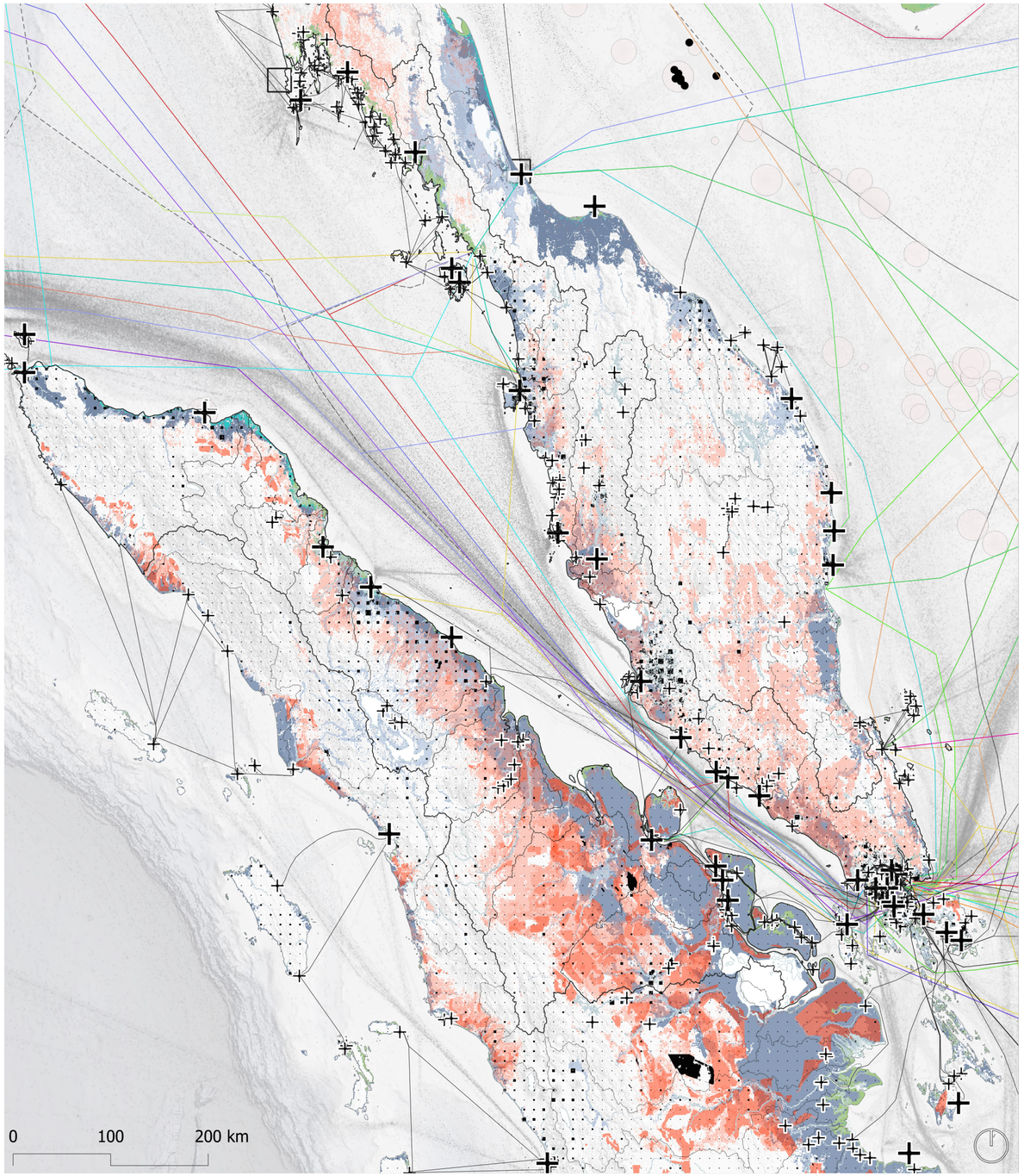



17
08
45
17
08
25





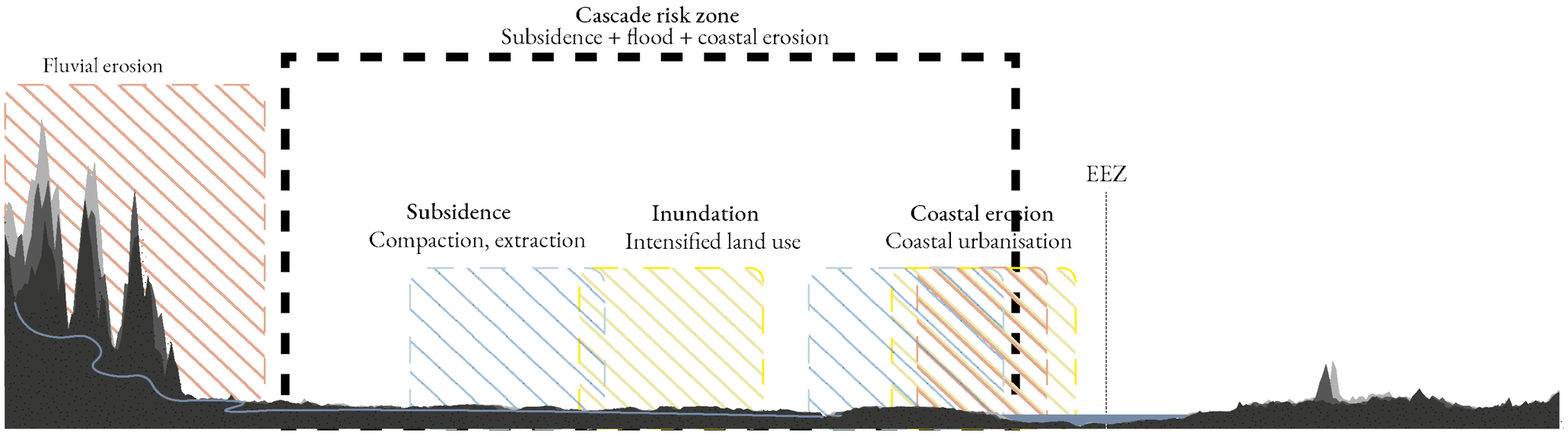
Expanded contest





Risk, for who?

Water-related Risks



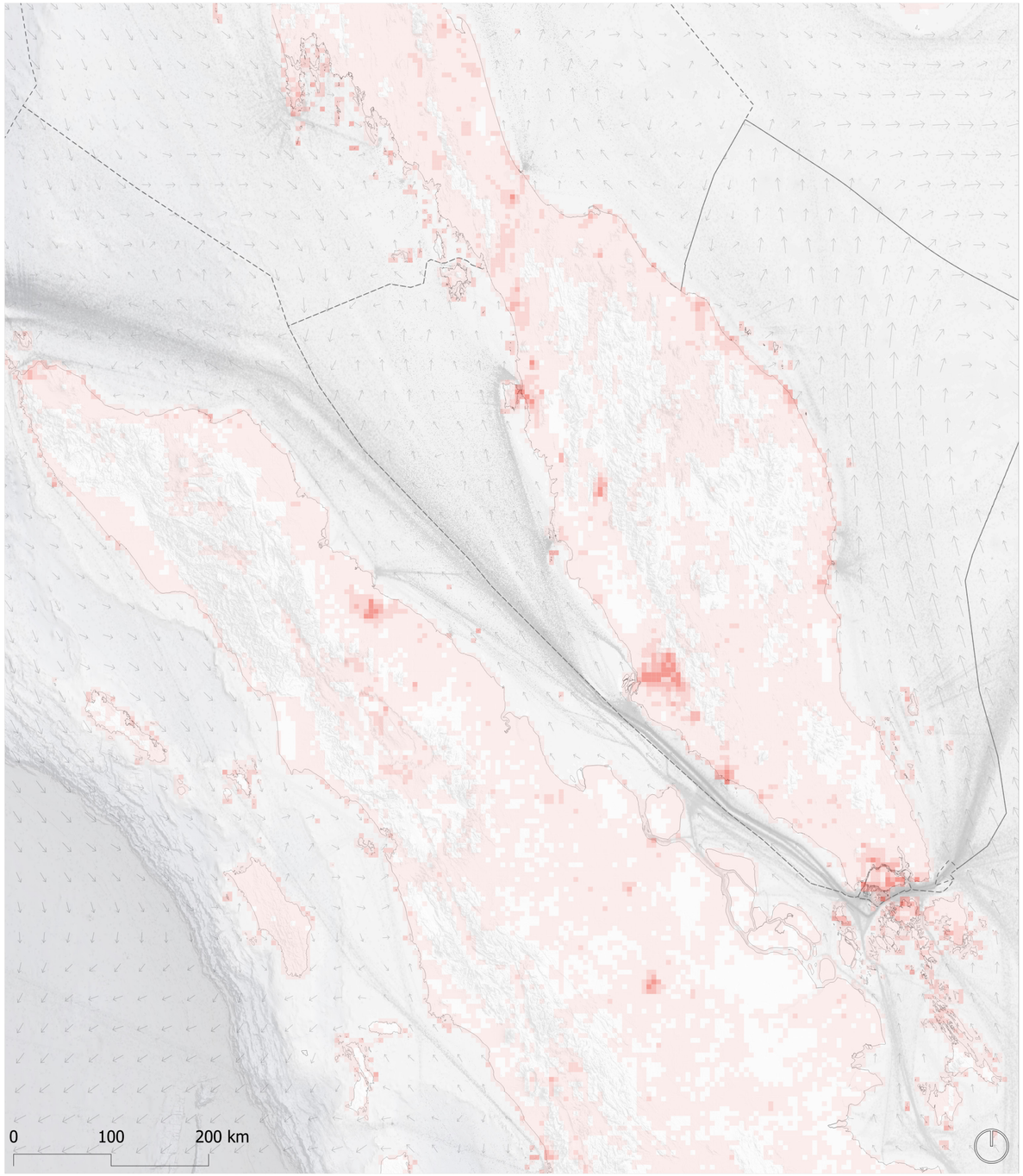
Erosion risk



Erosion risk



Erosion risk

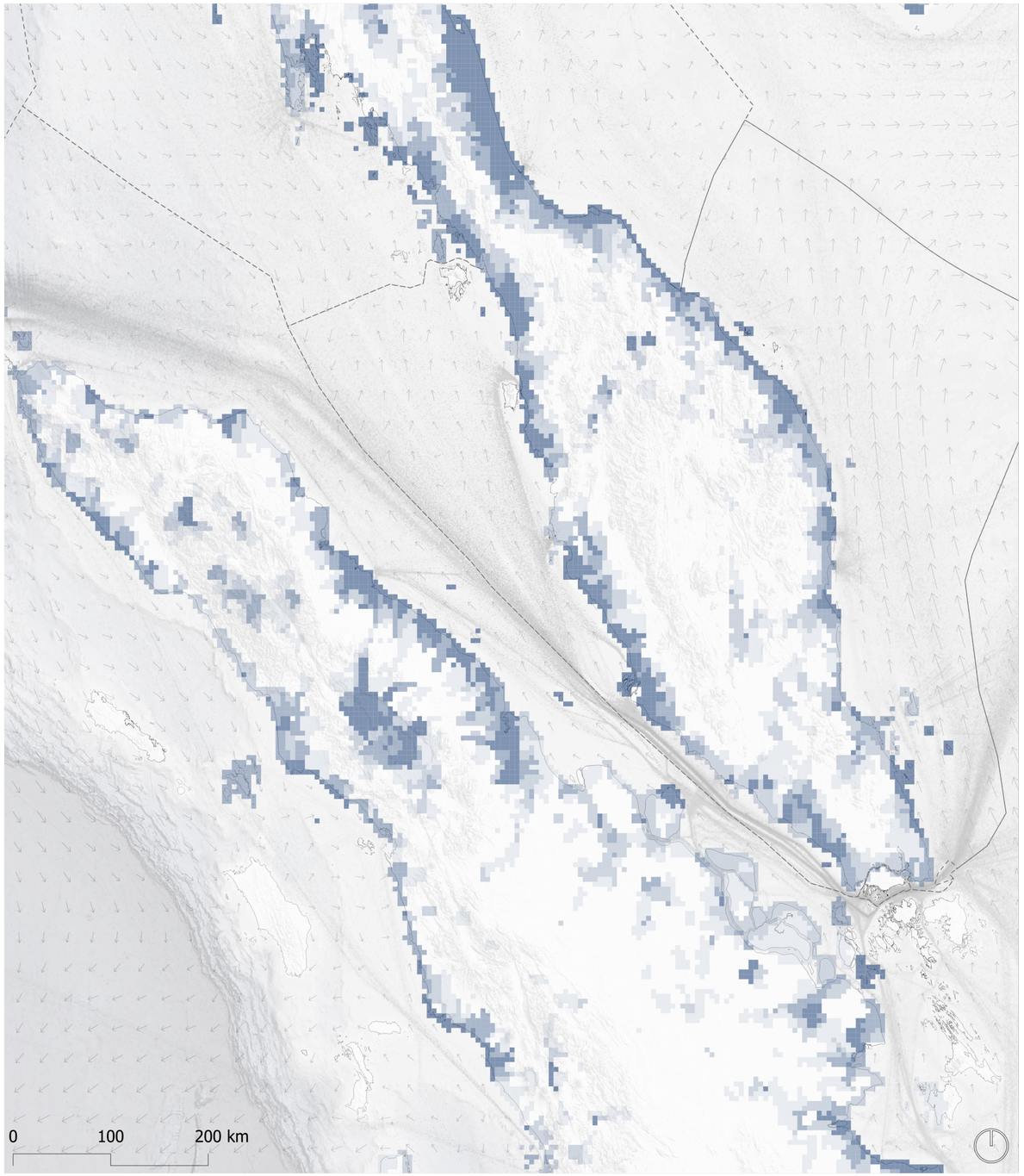


Erosion Zonal Statistics
0 - 0,2
0,2 - 0,4
0,4 - 0,6
0,6 - 0,8
0,8 - 1

Innundation risk



Innundation risk



Inundation Zonal Statistics
0 - 0,2
0,2 - 0,4
0,4 - 0,6
0,6 - 0,8
0,8 - 1

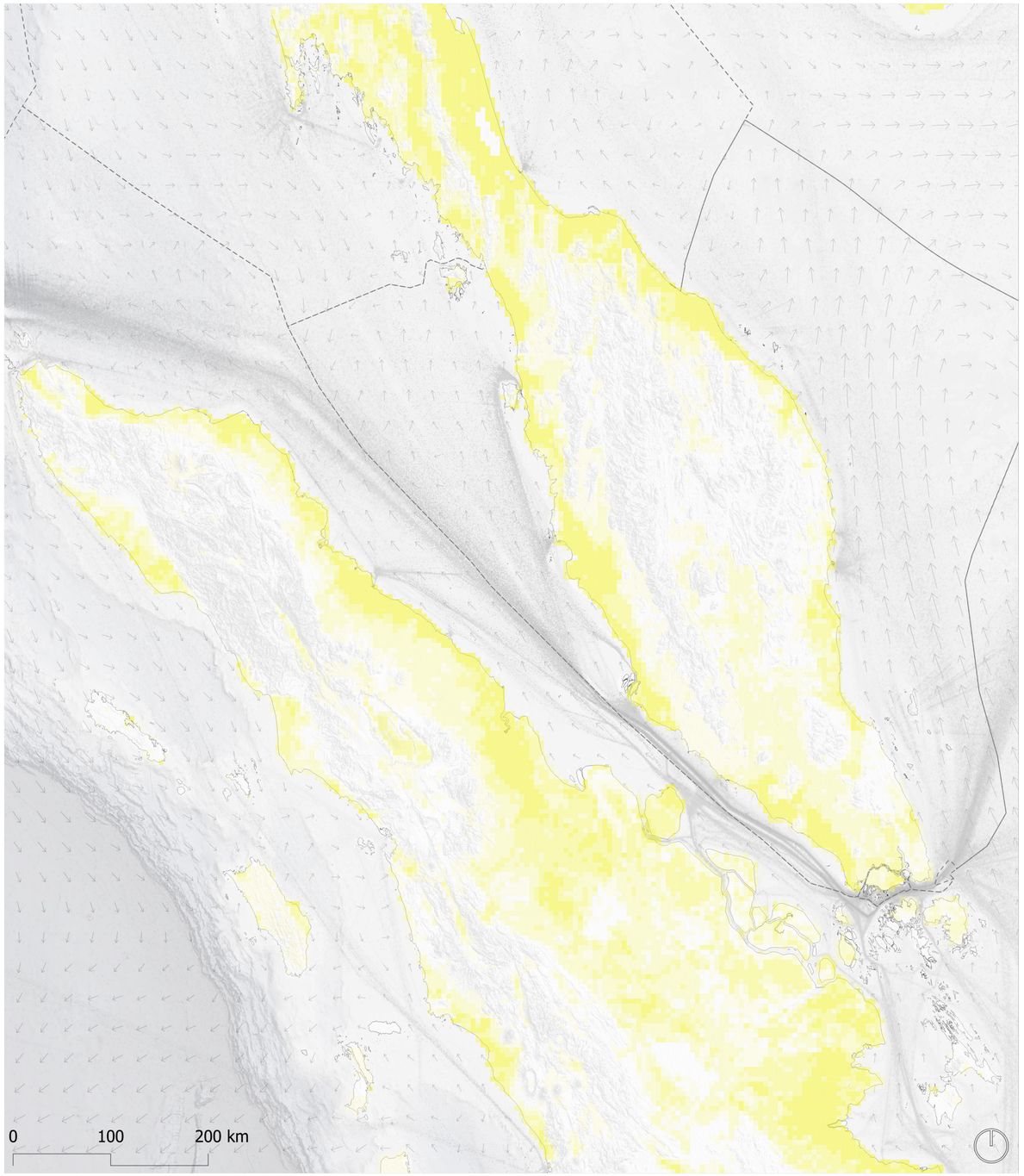
Subsidence risk



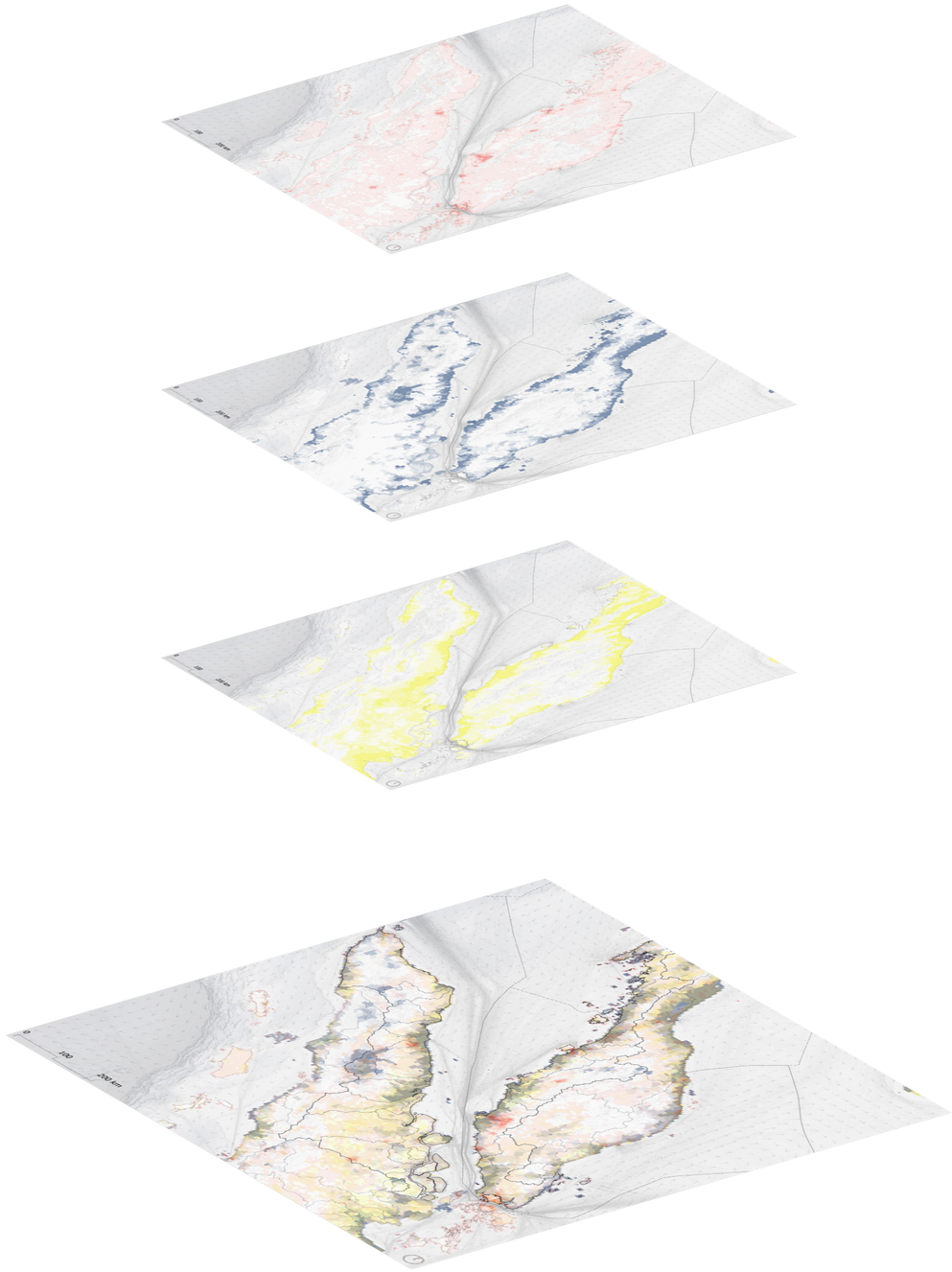
Subsidence risk



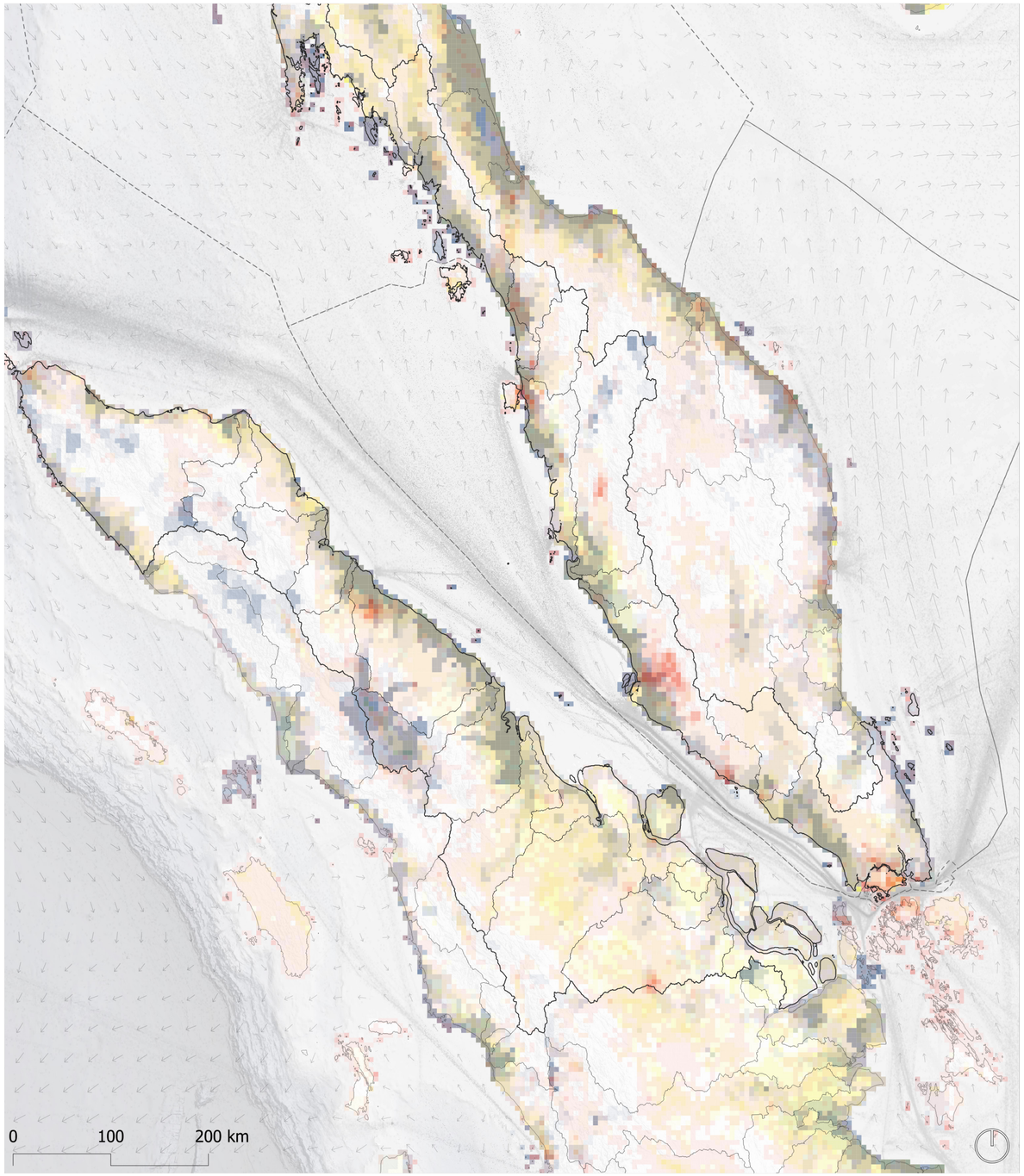
Subsidence risk



The Cascade of Risk



Where does risk land?



Subsidence Zonal Statistics copy
0 - 0,2
0,2 - 0,4
0,4 - 0,6
0,6 - 0,8
0,8 - 1

Inundation and Discharge copy
0 - 0,2
0,2 - 0,4
0,4 - 0,6
0,6 - 0,8
0,8 - 1

Erosion Zonal Stat copy
0 - 0,2
0,2 - 0,4
0,4 - 0,6
0,6 - 0,8
0,8 - 1



Silicon Island reclamation project



Rohingya settlement with Silicon Island reclamation project in the background

Risk distribution

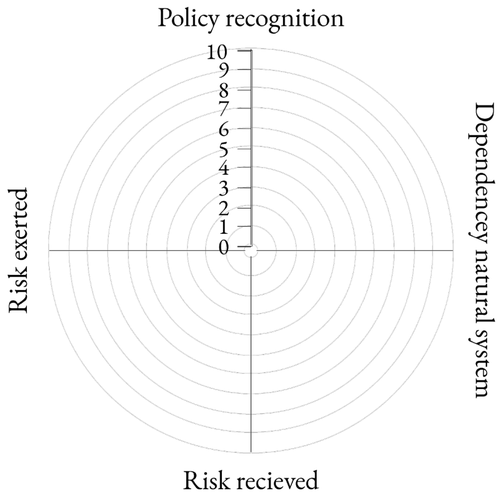
Policy recognition

Dependency natural system

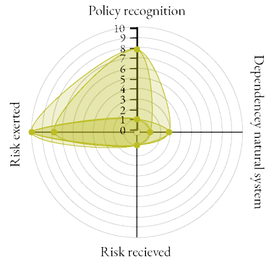
Risk received

Risk exerted

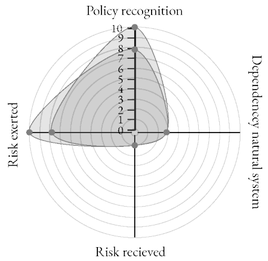
Actor



Private sector



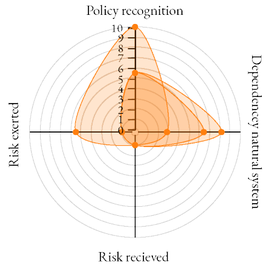
Private / public



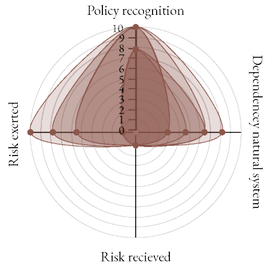
International governance



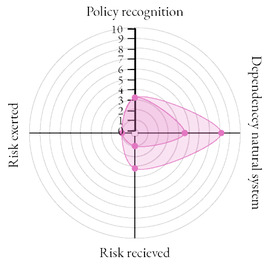
Intergovernmental



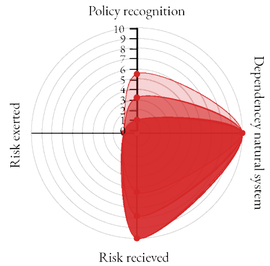
National government



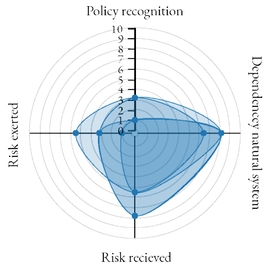
Non-governmental



More-than-human



Civil society



Prioritisation

Prioritisation of global and trans-national interest above those of the inhabitants, both human and more-than-human

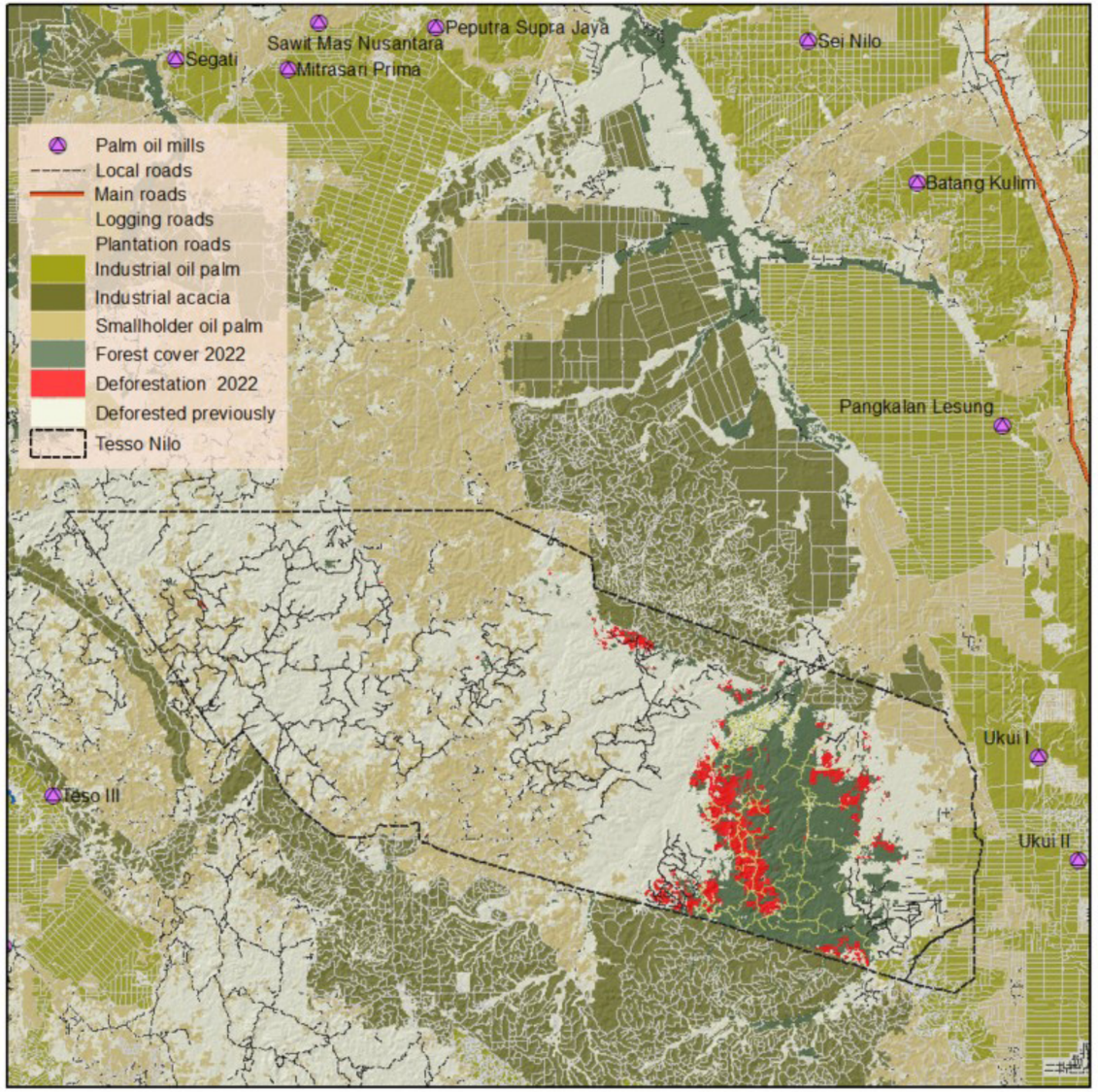
How do we manage?



Ambition

Gap between ambition on regional policy and reality

80% Forest Coverage lost



Tesso Nilo National Park Deforestation

UNIVERSAL DECLARATION OF THE RIGHTS OF MOTHER EARTH

Universal Declaration of the Rights of Mother Earth

From World People's Conference on Climate Change and the Rights of Mother Earth, Cochabamba, Bolivia, 22 April – Earth Day 2010.

Preamble

We, the peoples and nations of Earth:
considering that we are all part of Mother Earth, an indivisible, living community of interrelated and interdependent beings with a common destiny;

gratefully acknowledging that Mother Earth is the source of life, nourishment and learning and provides everything we need to live well;

recognizing that the capitalist system and all forms of depredation, exploitation, abuse and contamination have caused great destruction, degradation and disruption of Mother Earth, putting life as we know it today at risk through phenomena such as climate change;

convinced that in an interdependent living community it is not possible to recognize the rights of only human beings without causing an imbalance within Mother Earth;

affirming that to guarantee human rights it is necessary to recognize and defend the rights of Mother Earth and all beings in her and that there are existing cultures, practices and laws that do so;

conscious of the urgency of taking decisive, collective action to transform structures and systems that cause climate change and other threats to Mother Earth;

proclaim this Universal Declaration of the Rights of Mother Earth, and call on the General Assembly of the United Nation to adopt it, as a common standard of achievement for all peoples and all nations of the world, and to the end that every individual and institution takes responsibility for promoting through teaching, education, and consciousness raising, respect for the rights recognized in this Declaration and ensure through prompt and progressive measures and mechanisms, national and international, their universal and effective recognition and observance among all peoples and States in the world.

Article 1. Mother Earth

(1) Mother Earth is a living being.

(2) Mother Earth is a unique, indivisible, self-regulating community of interrelated beings that sustains, contains and reproduces all beings.

(3) Each being is defined by its relationships as an integral part of Mother Earth.

(4) The inherent rights of Mother Earth are inalienable in that they arise from the same source as existence.

(5) Mother Earth and all beings are entitled to all the inherent rights recognized in this Declaration without distinction of any kind, such as may be made between organic and inorganic beings, species, origin, use to human beings, or any other status.

(6) Just as human beings have human rights, all other beings also have rights which are specific to their species or kind and appropriate for their role and function within the communities within which they exist.

(7) The rights of each being are limited by the rights of other beings and any conflict between their rights must be resolved in a way that maintains the integrity, balance and health of Mother Earth.

INTERNATIONAL RIGHTS OF NATURE TRIBUNAL

IRBM


Nam Tha River Basin, Lao PDR
Vu Gia Thu Bon River Basin, Viet Nam
Imus-Ylang Ylang-Rio Grande Rivers
Pasac-Guagua Watershed
Kampong Bay River
Basin, Cambodia
Kedah River Basin, Malaysia
Ciliwung River Basin, Indonesia
N
W
E
S

UNCLOS falling short

Article 40
Research and survey activities

During transit passage, foreign ships, including marine scientific research and hydrographic survey ships, may not carry out any research or survey activities without the prior authorization of the States bordering straits.

Article 41
Sea lanes and traffic separation schemes in straits used for international navigation

1. In conformity with this Part, States bordering straits may designate sea lanes and prescribe traffic separation schemes for navigation in straits where necessary to promote the safe passage of ships.
2. Such States may, when circumstances require, and after giving due publicity thereto, substitute other sea lanes or traffic separation schemes for any sea lanes or traffic separation schemes previously designated or prescribed by them.
3. Such sea lanes and traffic separation schemes shall conform to generally accepted international regulations.
4. Before designating or substituting sea lanes or prescribing or substituting traffic separation schemes, States bordering straits shall refer proposals to the competent international organization with a view to their adoption. The organization may adopt only such sea lanes and traffic separation schemes as may be agreed with the States bordering the straits, after which the States may designate, prescribe or substitute them.
5. In respect of a strait where sea lanes or traffic separation schemes through the waters of two or more States bordering the strait are being proposed, the States concerned shall cooperate in formulating proposals in consultation with the competent international organization.
6. States bordering straits shall clearly indicate all sea lanes and traffic separation schemes designated or prescribed by them on charts to which due publicity shall be given.
7. Ships in transit passage shall respect applicable sea lanes and traffic separation schemes established in accordance with this article.

Article 42
Laws and regulations of States bordering straits relating to transit passage

1. Subject to the provisions of this section, States bordering straits may adopt laws and regulations relating to transit passage through straits, in respect of all or any of the following:
   (a) the safety of navigation and the regulation of maritime traffic, as provided in article 41;
   (b) the prevention, reduction and control of pollution, by giving effect to applicable international regulations regarding the discharge of oil, oily wastes and other noxious substances in the strait;
   (c) with respect to fishing vessels, the prevention of fishing, including the stowage of fishing gear;

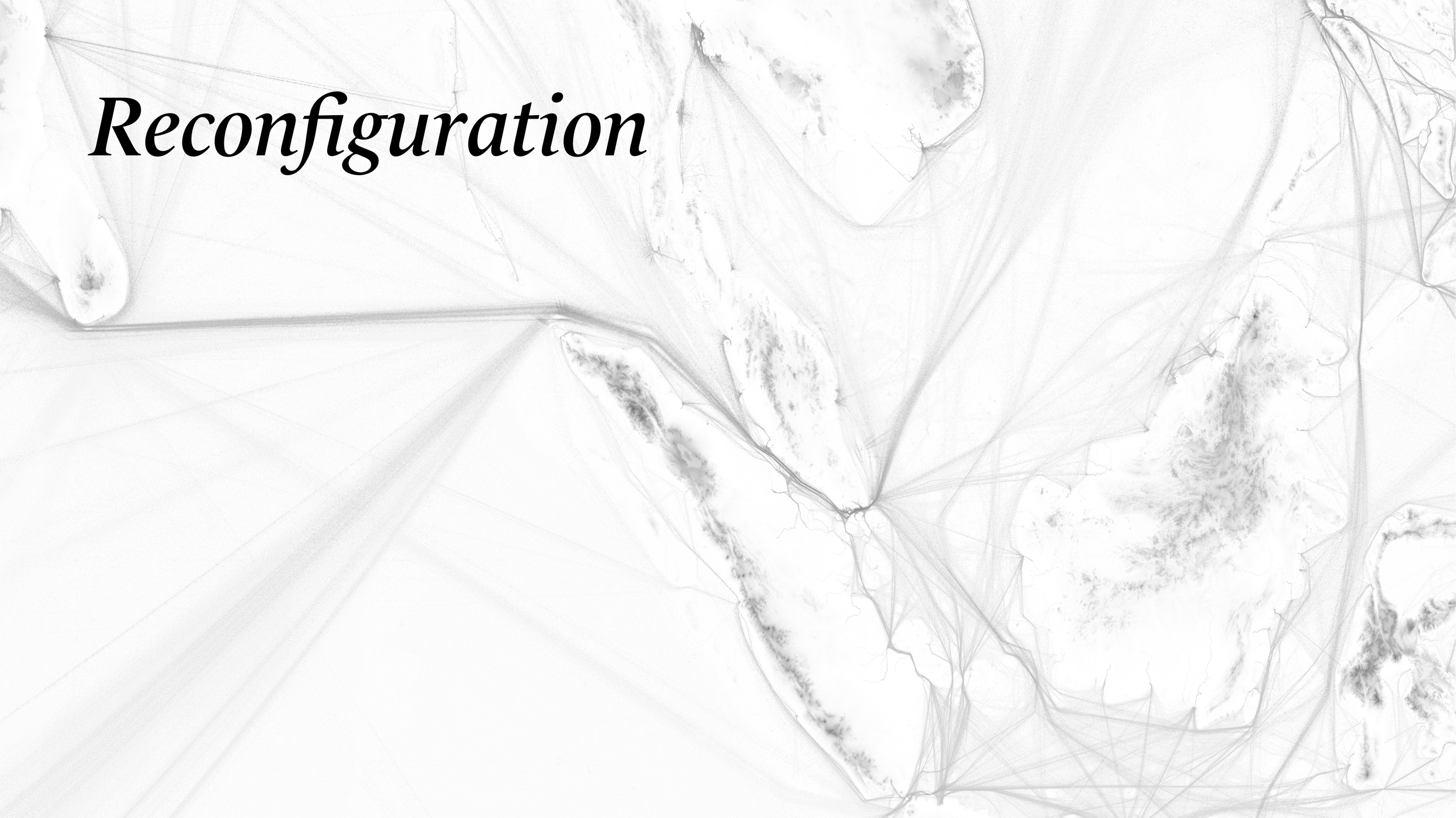
Malacca Strait Council



"... "caring about" and "taking care of," need to be ***supported by material practices****—traditionally understood as maintenance or concrete work involved in actualizing care, such as "caregiving" and "care receiving". The distinction does not separate these modes of agency. What it allows us to emphasize is that a politics of care engages much* ***more than a moral stance****; it involves affective, ethical, and* ***hands-on agencies of practical and material consequence.****"*

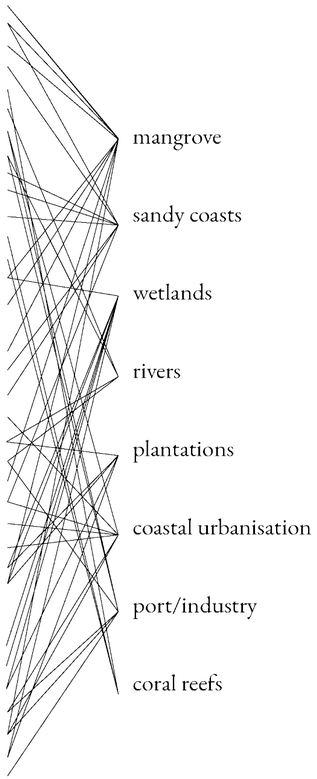
- Puig De La Bellacasa (2017)

Reconfiguration

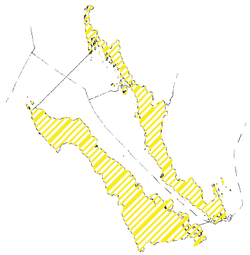


		regional	river basin	situated practices of care
practice	erosion	disruption gradient: no-go medium low robust shared coastal monitoring adaptive port infrastructure living shoreline ecological corridors	seasonal sequencing hydrological restoration riparian forest buffers agroforestry transition river meandering restoration	mangrove pioneer planting brush weir managed mangrove rotation no-anchor zone no-trawl inshore zone channel desiltation coastal setback urban retreat windbreak planting dune restoration reinforced and artificial dunes coral propagation artificial reef substrate silvofishery floating structures
	inundation	setback zones transboundary mangrove protection blue-green infrastructure wave protection	reforestation and afforestation floodplain reconnection wetland restoration peatland rewetting riparian buffer restoration	mudflat restoration dune restoration reinforced and artificial dunes urban coastal green infrastructure hydrological restoration urban retreat wave action protection living shorelines floating community infrastructure stilt infrastructure bund and sluice management paludiculture
	subsidence	transboundary peatland protection regional groundwater governance regional coastal resilience blue-carbon cooperation	integrated water governance peatland rewetting wetland restoration sustainable plantation drainage	peatland revegetation peat no-burn maintenance controlled groundwater recharge urban retreat partnerships with aquaculture peat canal blocking floating structures
policy		rights of nature framework risk policy alignment msc cross border management unified risk assessment unclos alignment knowledge transfer	rights from source-to-source recognition of ecosystems river basin policy alignment unified basin assessment knowledge transfer	community stewardship knowledge transfer

typology

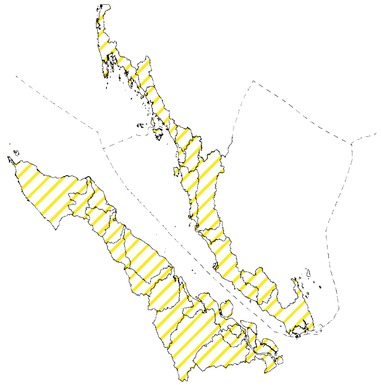


malacca strait



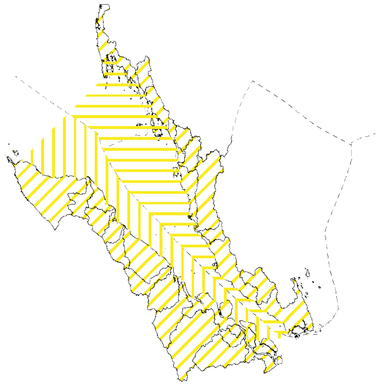
recuperation

2025



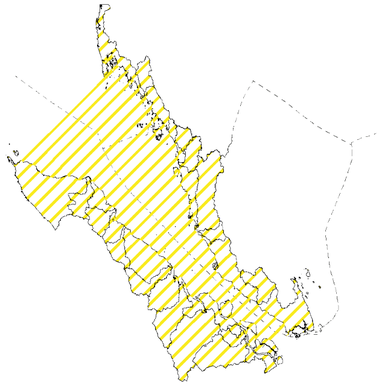
shift

2050

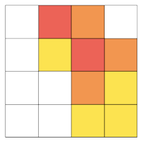


growth

2075

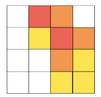


crtiical proximity



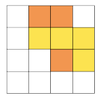
recuperation

2025



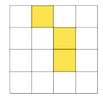
shift

2050



growth

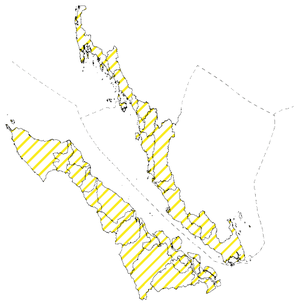
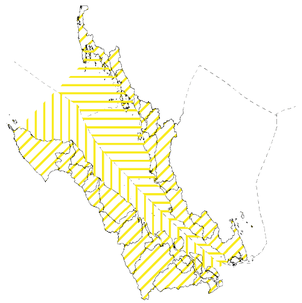
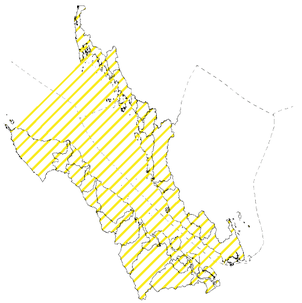
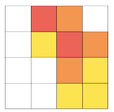
2075

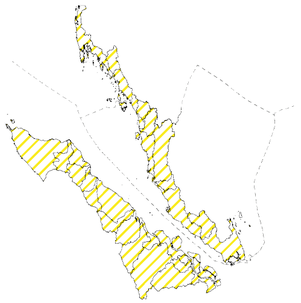
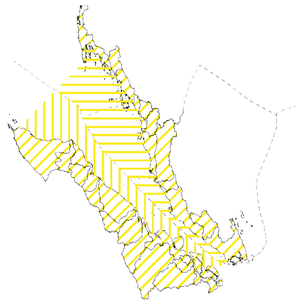
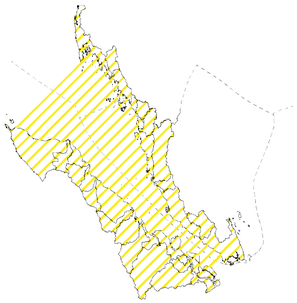
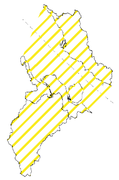
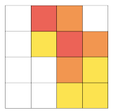


recognition

recuperation	shift	growth
2025	*2050*	*2075*
National governments	National governments	National governments
Strait users	Strait users	Strait users
Cooperative Mechanism	Cooperative Mechanism	Cooperative Mechanism
Society	Society	Society
More-than-human	More-than-human	More-than-human

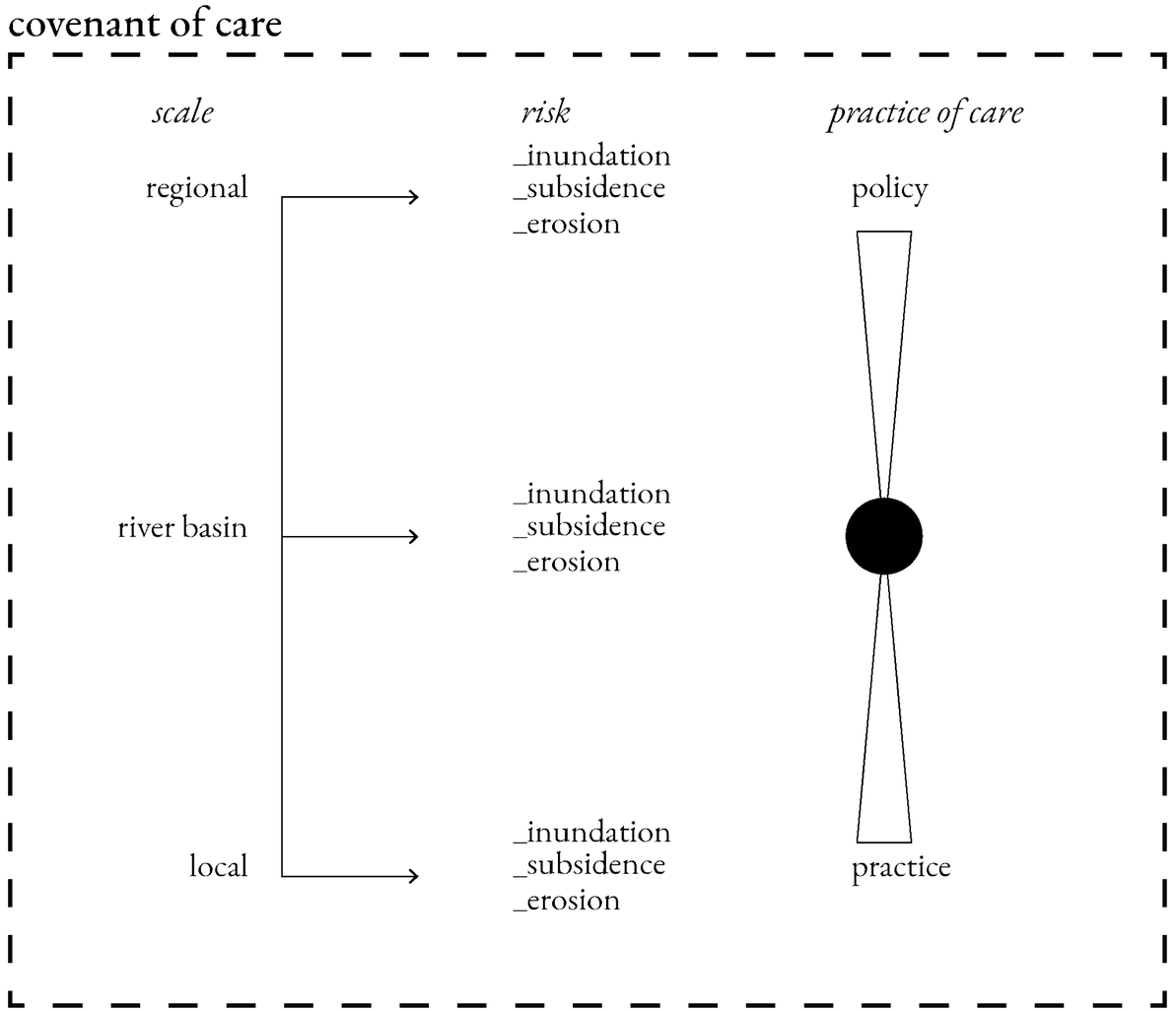
Covenant of care

		recuperation	shift	growth
		2025	*2050*	*2075*
XL	**malacca strait**				
S	**crtiical proximity**				
caretakers	**recognition**	National governments Strait users Cooperative Mechanism Society More-than-human	National governments Strait users Cooperative Mechanism Society More-than-human	**Covenant of care** National governments Strait users Cooperative Mechanism Society More-than-human

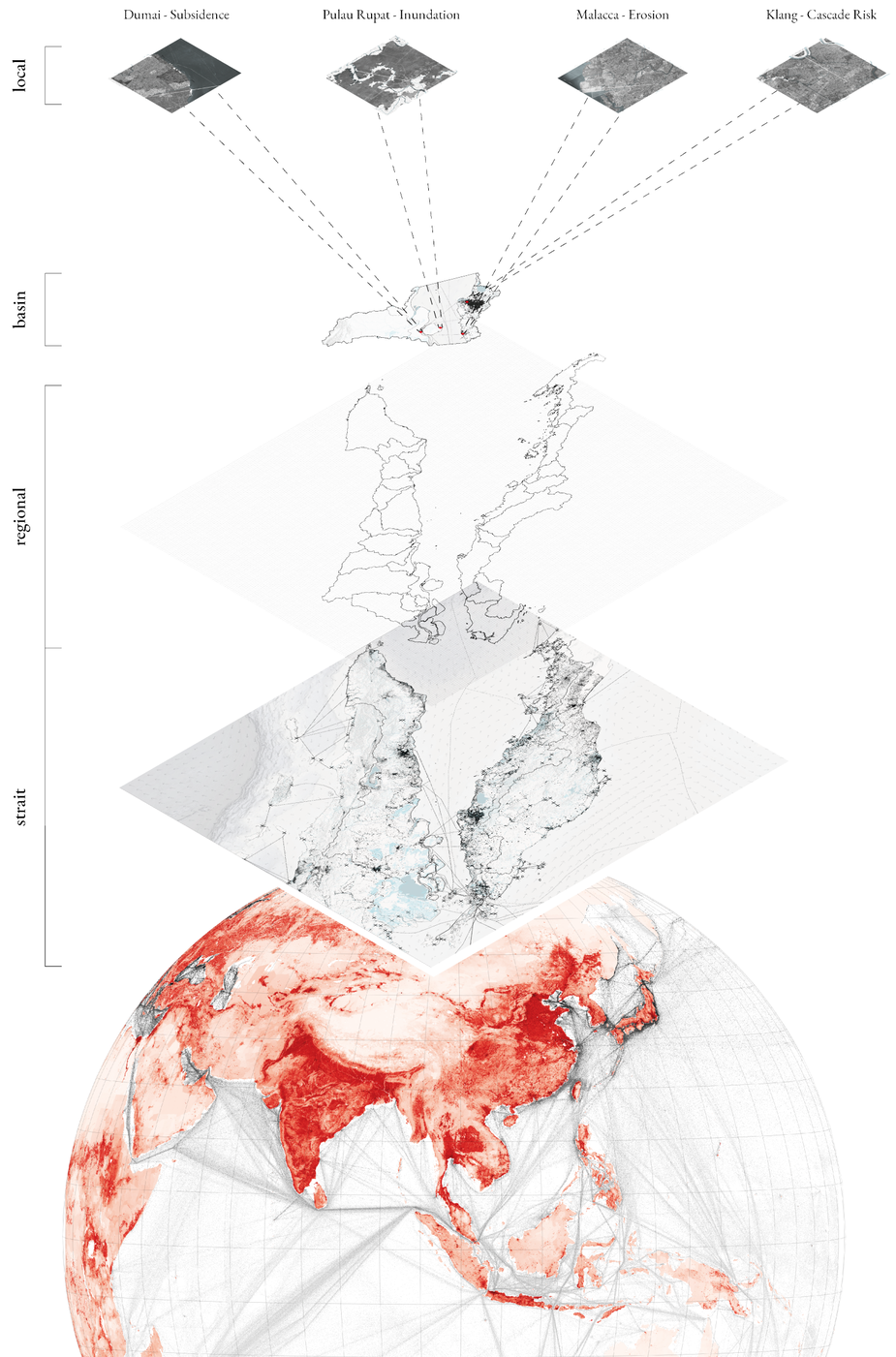
		recuperation	shift	growth
		2025	*2050*	*2075*
XL	**malacca strait**				
M	**river basin**				
S	**crtiical proximity**				
caretakers	**recognition**	National governments Strait users Cooperative Mechanism Society More-than-human	National governments Strait users Cooperative Mechanism Society More-than-human	**Covenant of care** National governments Strait users Cooperative Mechanism Society More-than-human

Care is not about fusion; it can be about the right distance

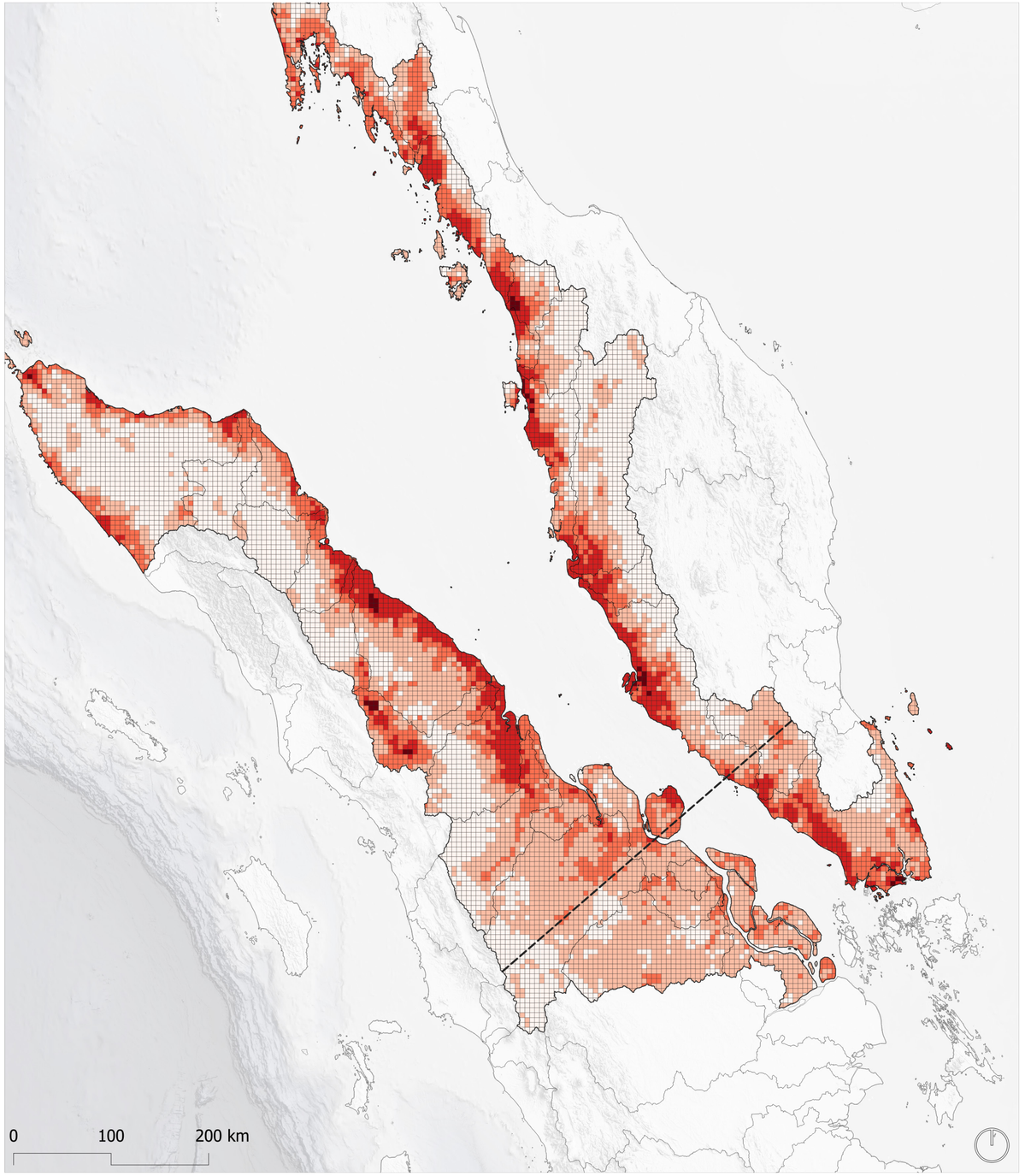
- Puig de la Bellacasa (2017)



Through Scales

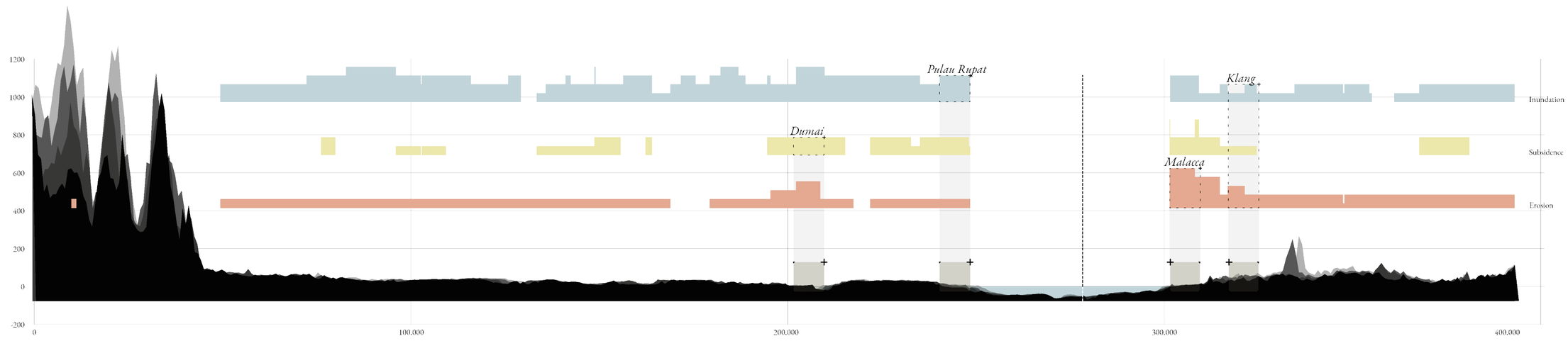


Regional Scale



Total risk Zonal Statistics
0 - 0,2
0,2 - 0,4
0,4 - 0,6
0,6 - 0,8
0,8 - 1

Basin Scale


1200
1000
800
600
400
200
0
-200
0
100,000
200,000
300,000
400,000
Pulau Rupat
Klang
Dumai
Malacca
Inundation
Subsidence
Erosion

Local Scale



Dumai - Subsidence



Pulau Rupat - Inundation



Malacca - Erosion



Klang - Cascade risk



Dumai - Subsidence



Pulau Rupat - Inundation



Malacca - Erosion

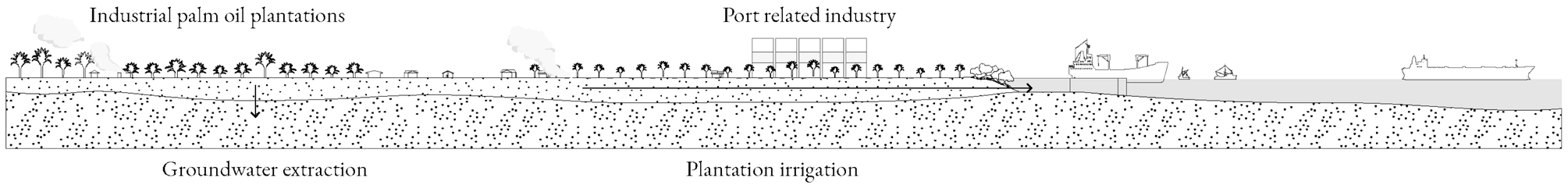


Klang - Cascade risk





Overflow area
Overflow area
Forest/park
Forest/park water retention
Industry
Room for the river
Mangrove
Silvofishery
Plantation
Industrial plantation
Plantation rewetting
Seagrass zone

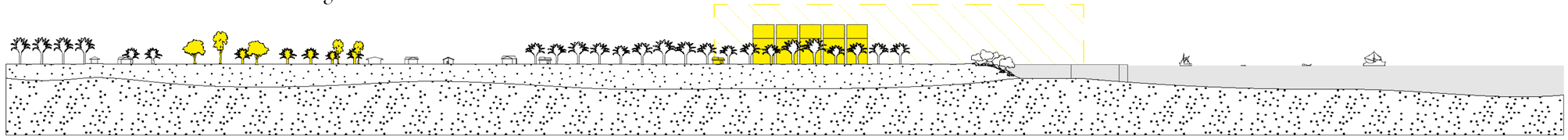




Overflow area
Overflow area
Forest/park
Forest/park water retention
Industry
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Mangrove
Silvofishery
Plantation
Industrial plantation
Plantation rewetting
Seagrass zone

Land use change

Urban retreat zone



Irrigation channel blocking

Irrigation channel blocking

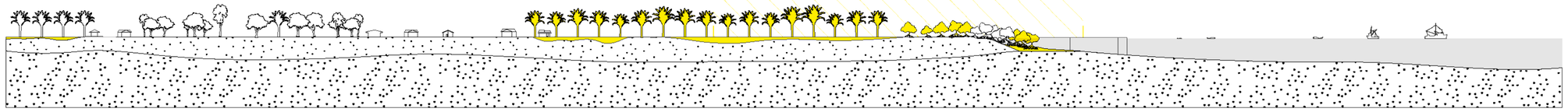


Overflow area
Overflow area
Forest/park
Forest/park water retention
Industry
Room for the river
Mangrove
Silvofishery
Plantation
Industrial plantation
Plantation rewetting
Seagrass zone

Rewetting plantations

Water retention

Urban retreat zone

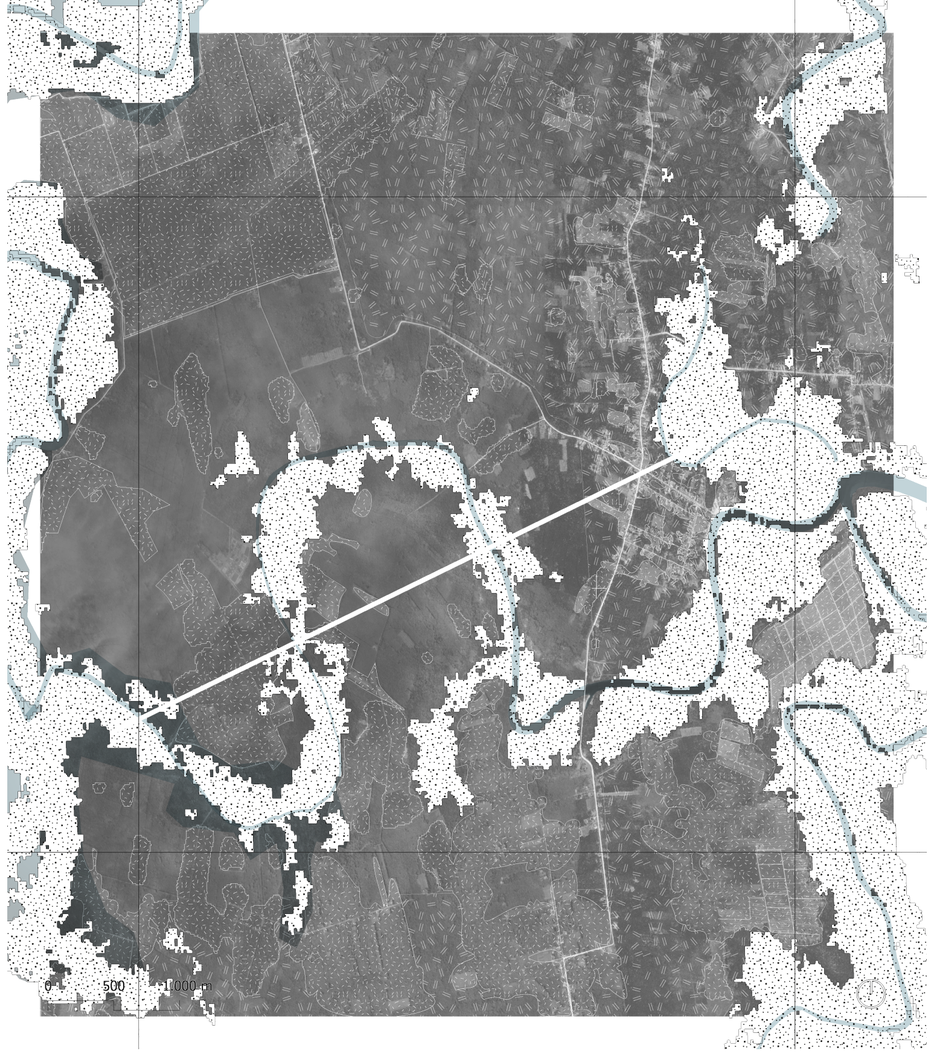


Rewetting palm oil plantations

Silvofishery


urban retreat
urban retreat
silvofishery

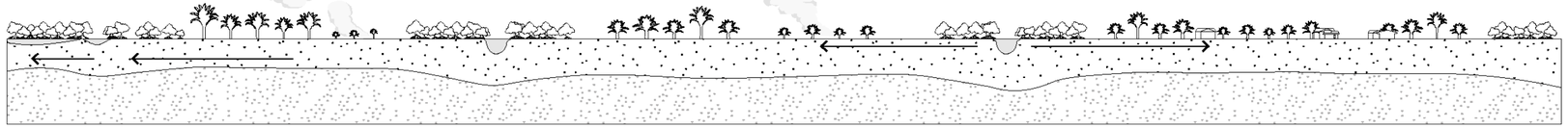




Overflow area
Overflow area
Forest/park
Forest/park water retention
Industry
Room for the river
Mangrove
Silvofishery
Plantation
Industrial plantation
Plantation rewetting
Seagrass zone

Existing floodplain

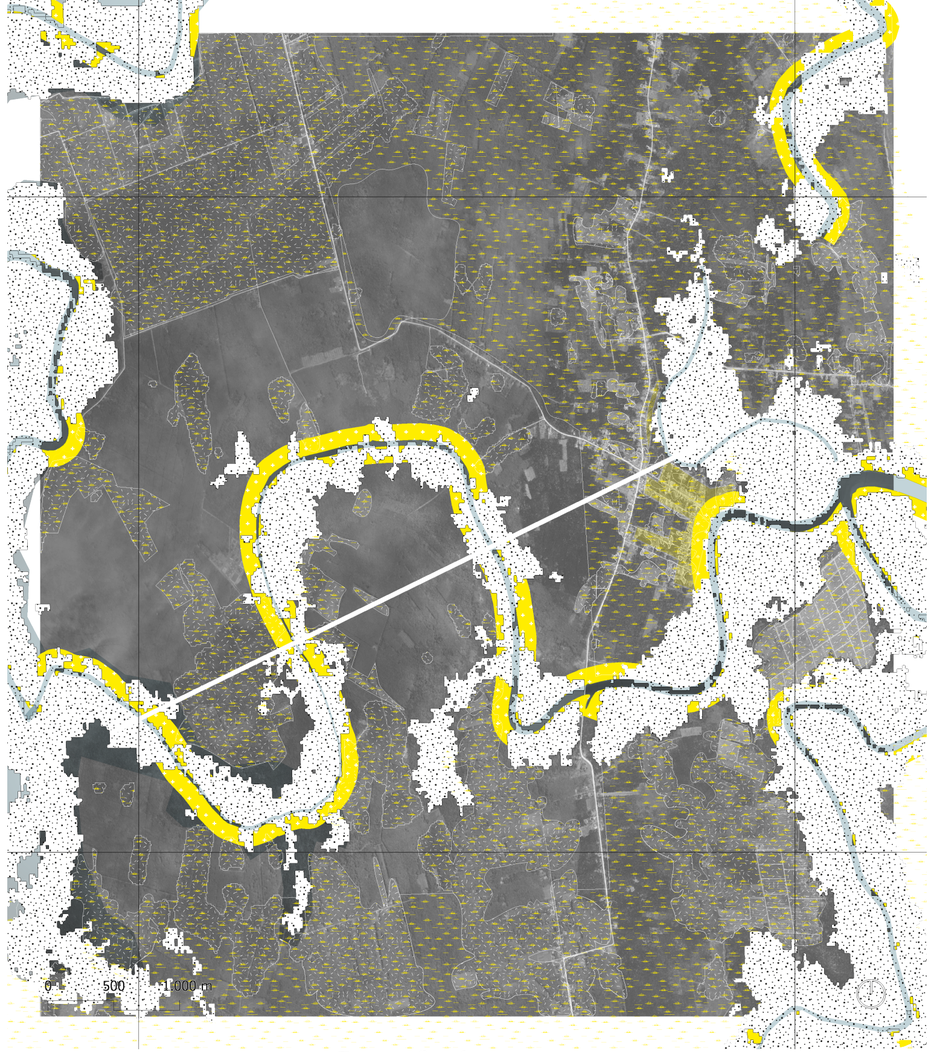
Industrial palm oil plantations



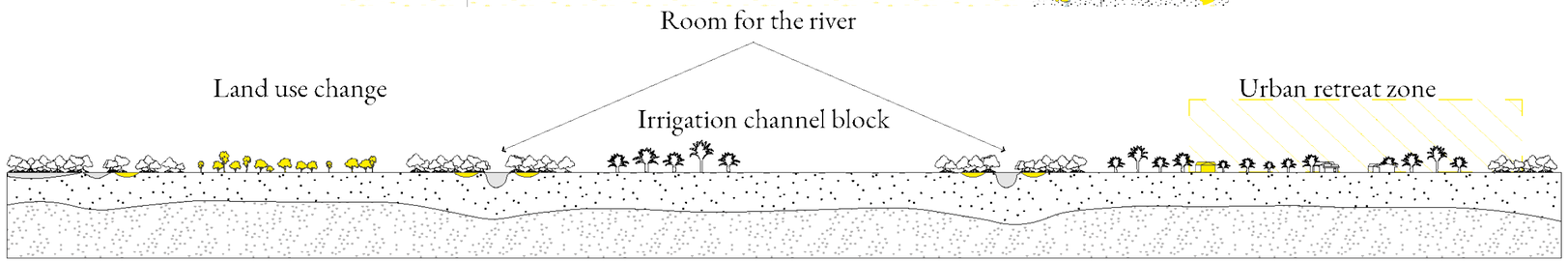
Irrigation channels

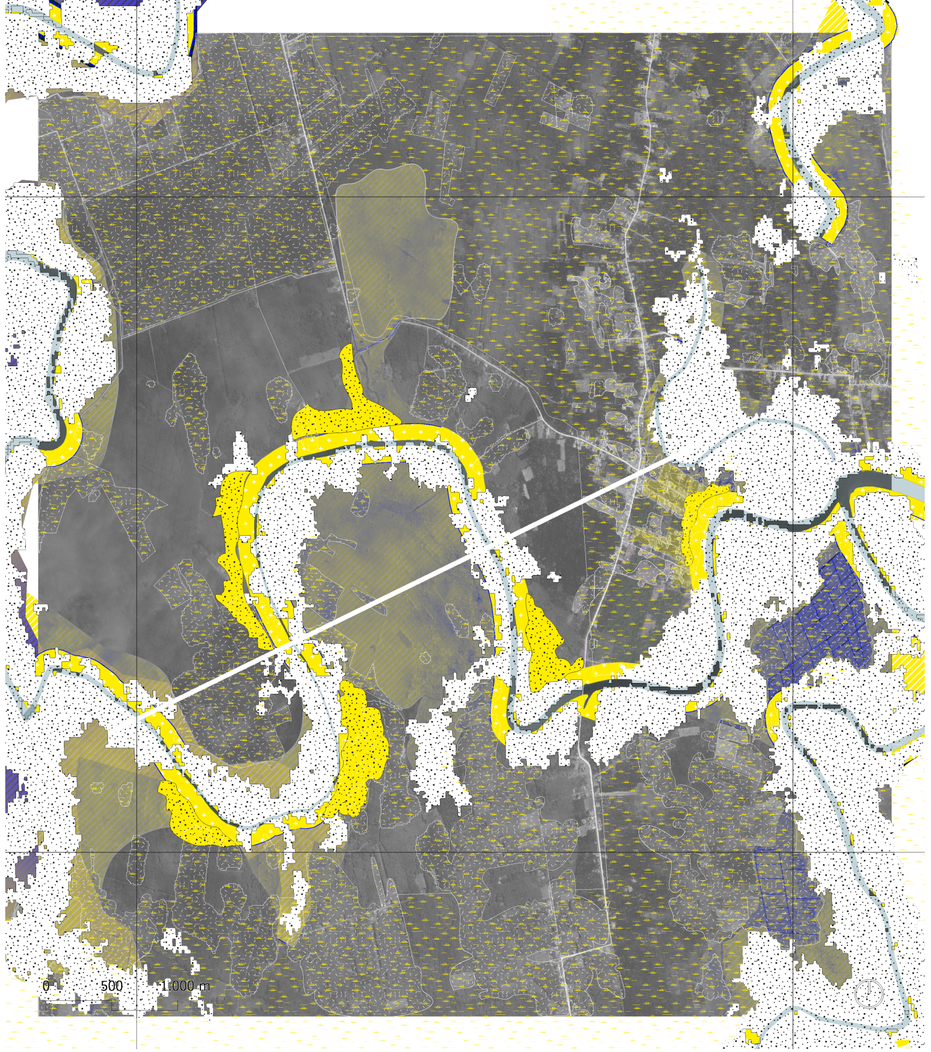
Mangrove forest

Regular inundation

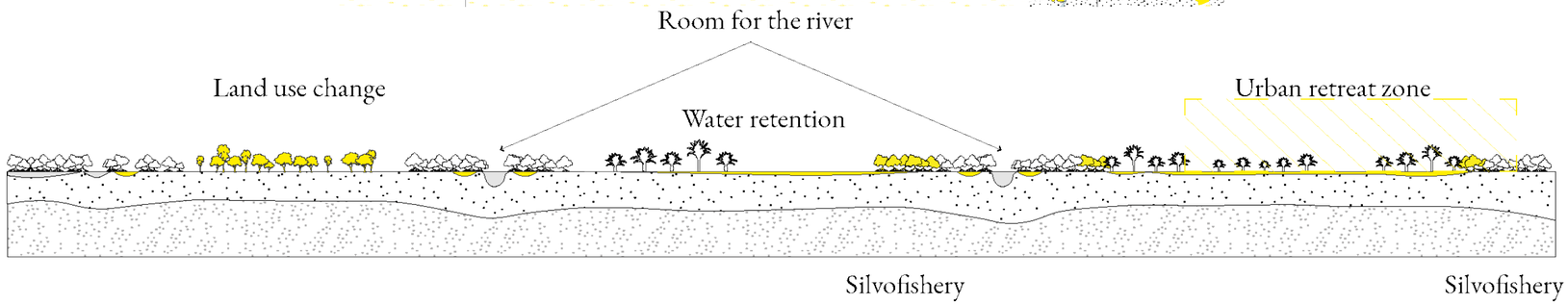


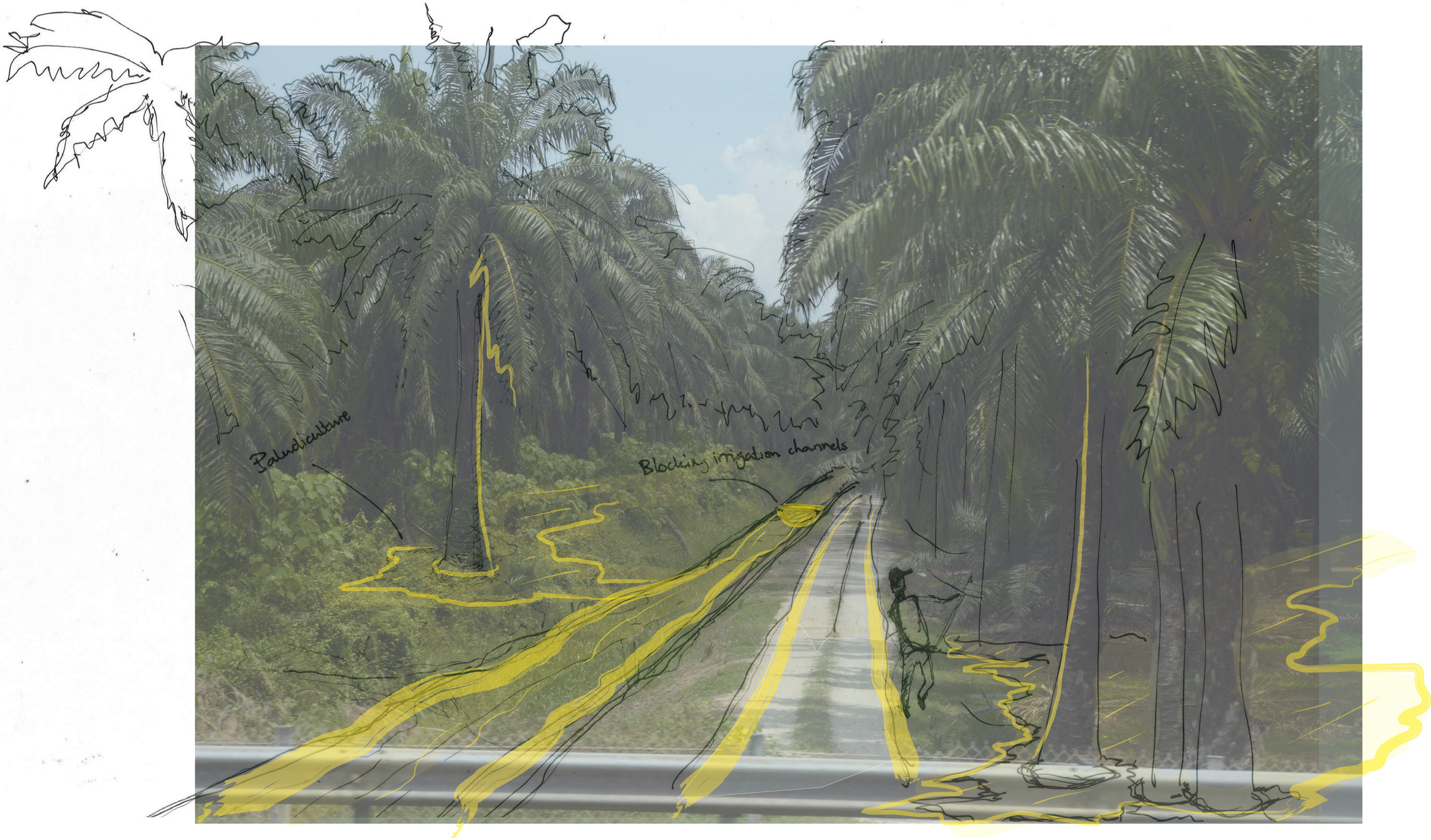
Overflow area
Overflow area
Forest/park
Forest/park water retention
Industry
Room for the river
Mangrove
Silvofishery
Plantation
Industrial plantation
Plantation rewetting
Seagrass zone



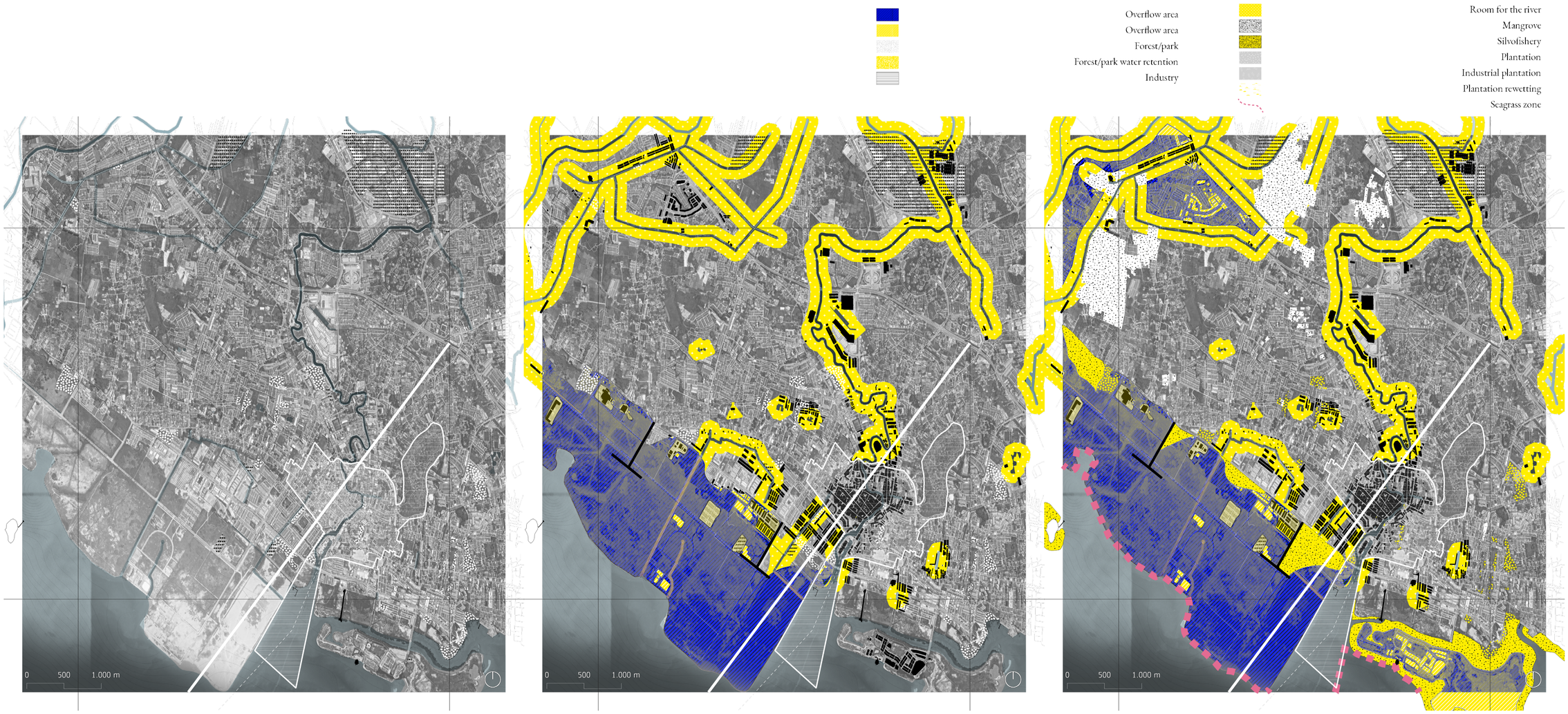


Overflow area
Overflow area
Forest/park
Forest/park water retention
Industry
Room for the river
Mangrove
Silvofishery
Plantation
Industrial plantation
Plantation rewetting
Seagrass zone




Paludiculture
Blocking irrigation channels



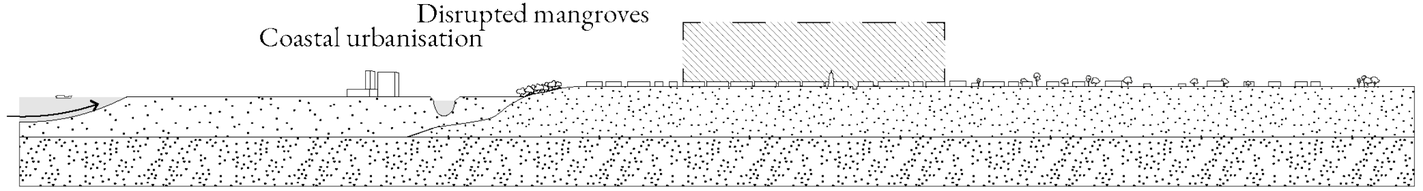

Overflow area
Overflow area
Forest/park
Forest/park water retention
Industry
Room for the river
Mangrove
Silvofishery
Plantation
Industrial plantation
Plantation rewetting
Seagrass zone
0 500 1.000 m
0 500 1.000 m
0 500 1.000 m

Coastal reclamation

UNESCO zone

Disrupted mangroves

Coastal urbanisation

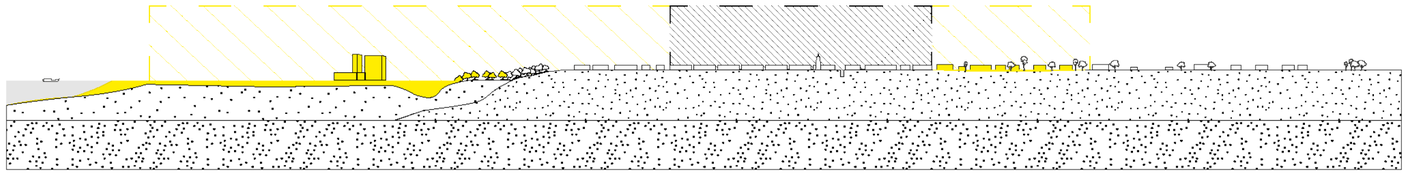


Coastal erosion

Urban retreat

UNESCO zone

Room for the river

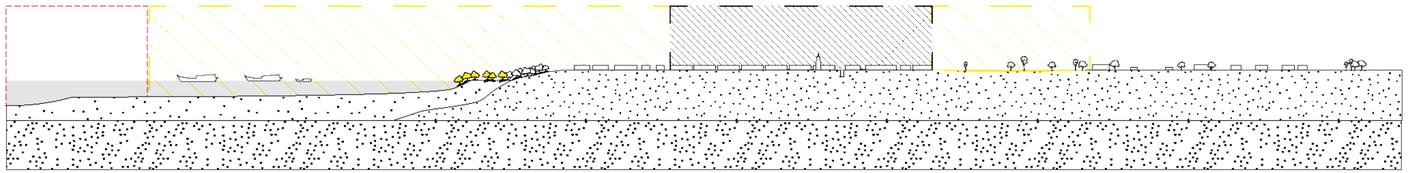


Returning to the old coastline

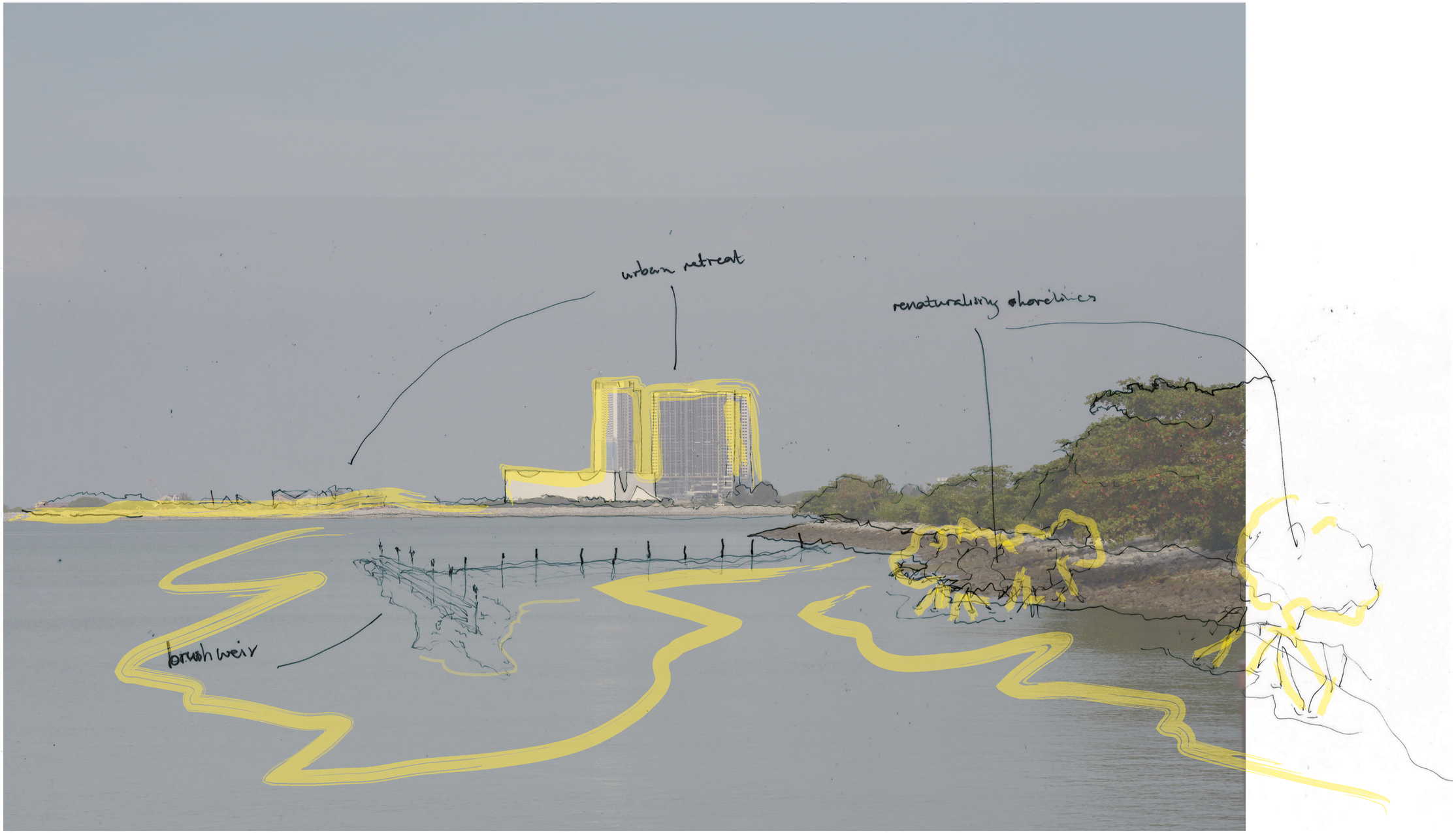
No-trawl zone

UNESCO zone

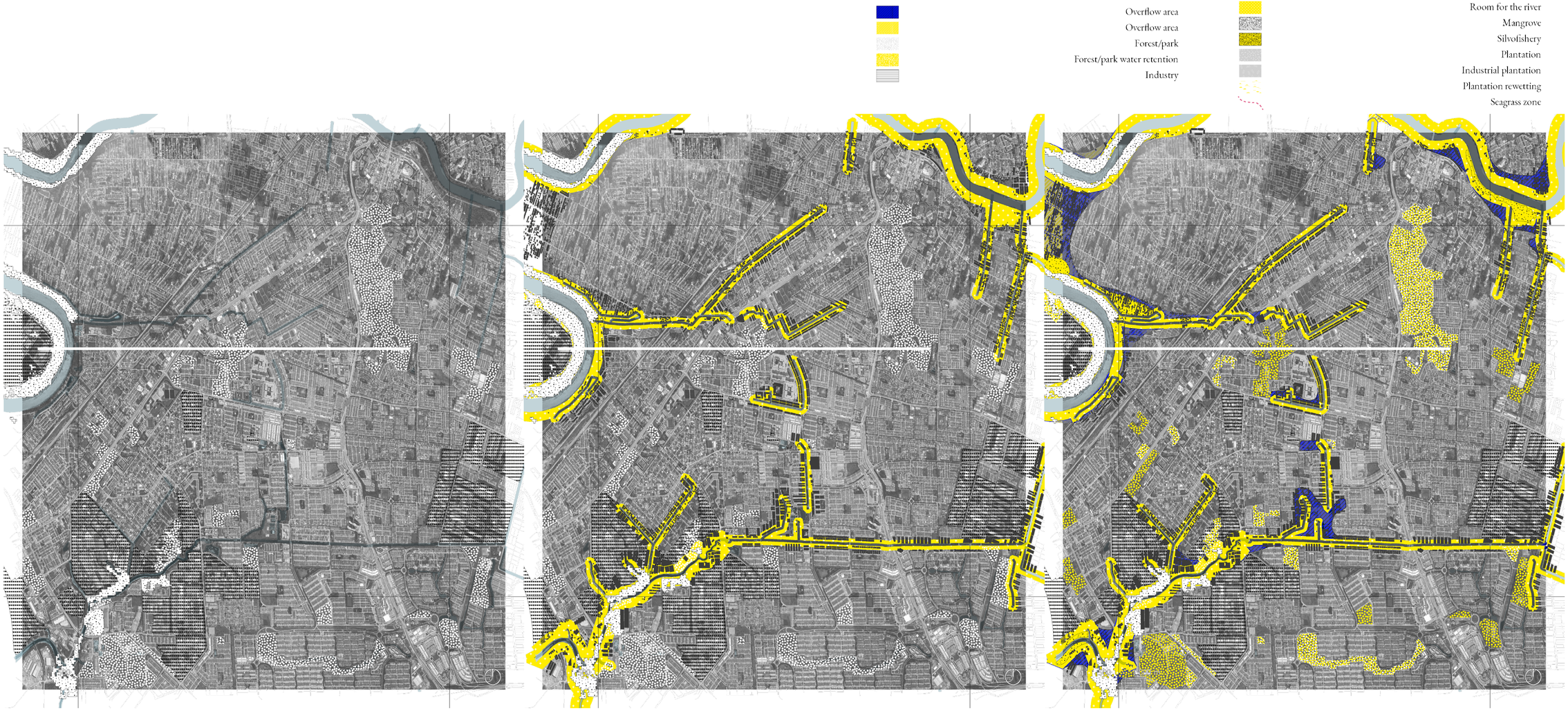
Room for the river



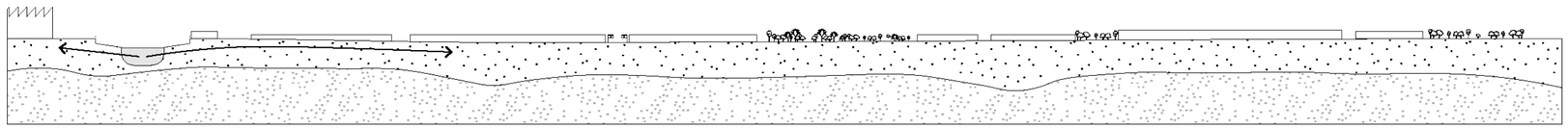
Silvofishery


urban retreat
renaturalising shorelines
brush weir



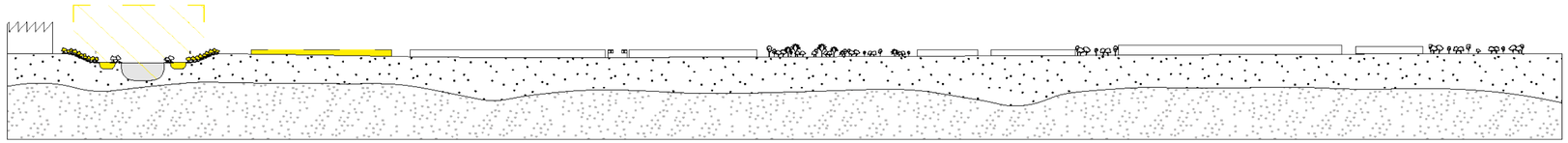

Overflow area
Overflow area
Forest/park
Forest/park water retention
Industry
Room for the river
Mangrove
Silvofishery
Plantation
Industrial plantation
Plantation rewetting
Seagrass zone

Port industry Fluvial flooding Urban park Urban park



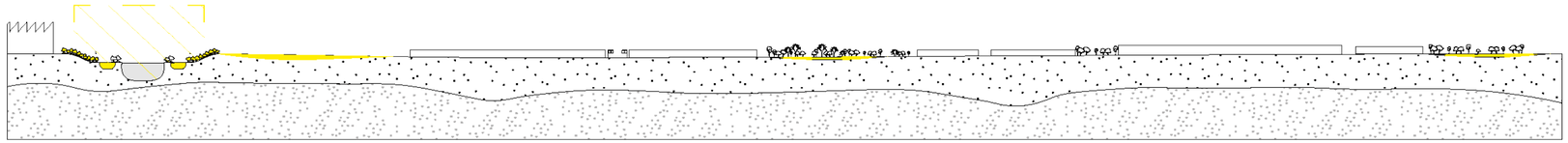
Hard river defense

Room for the river Urban retreat



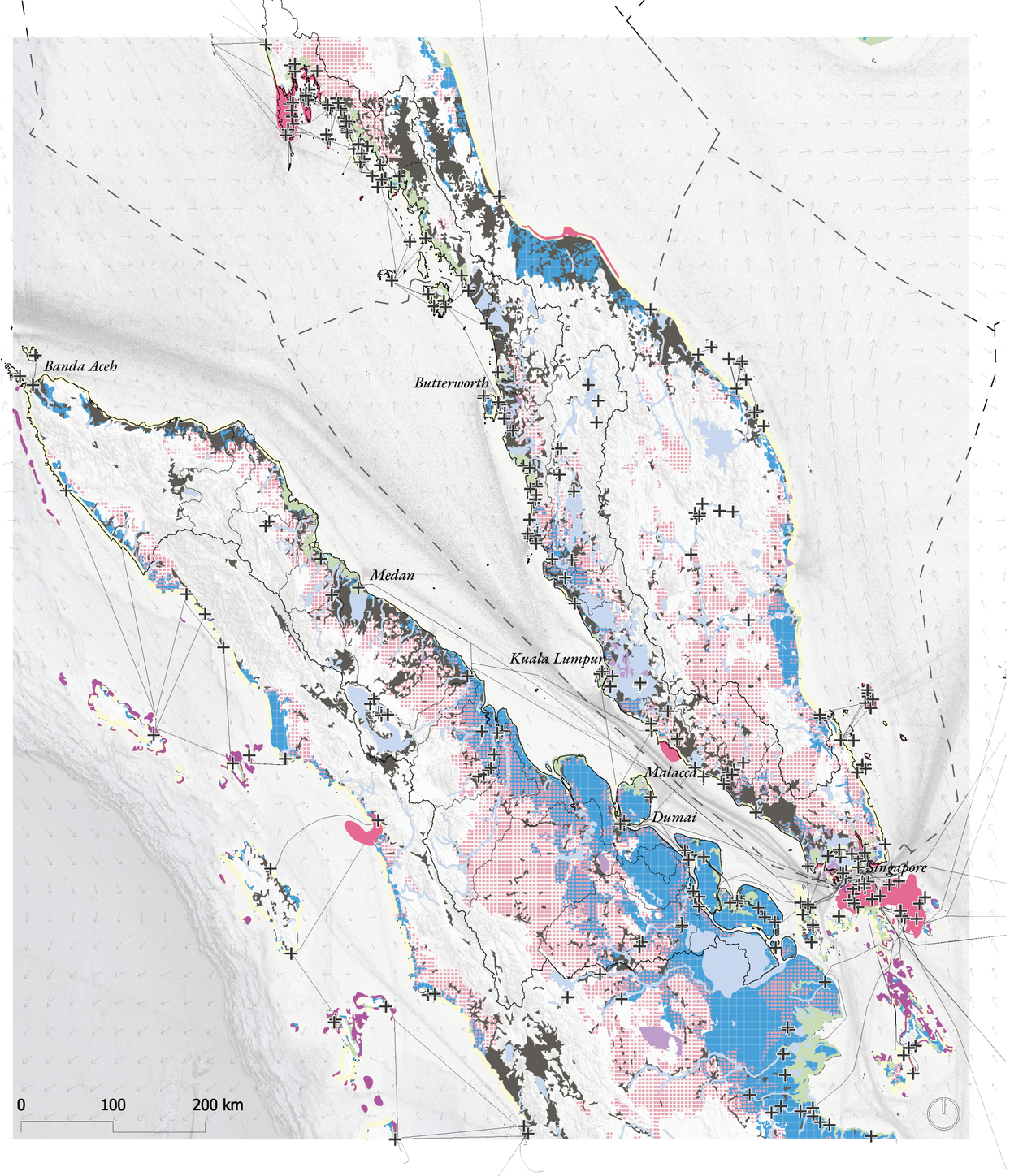
Renaturalising banks

Overflow area Urban retention Urban retention

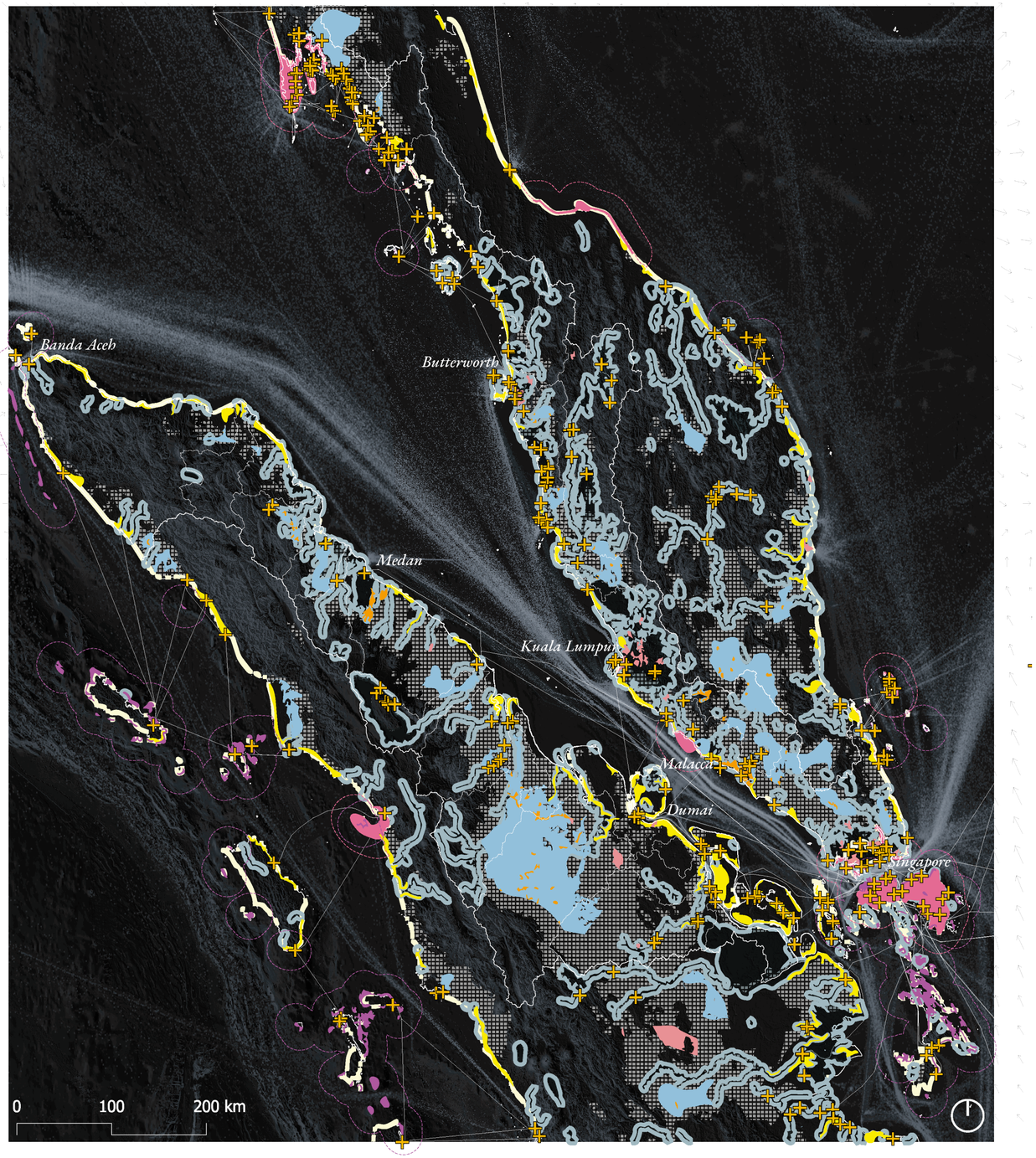



urban retreat
overflow area
overflow area

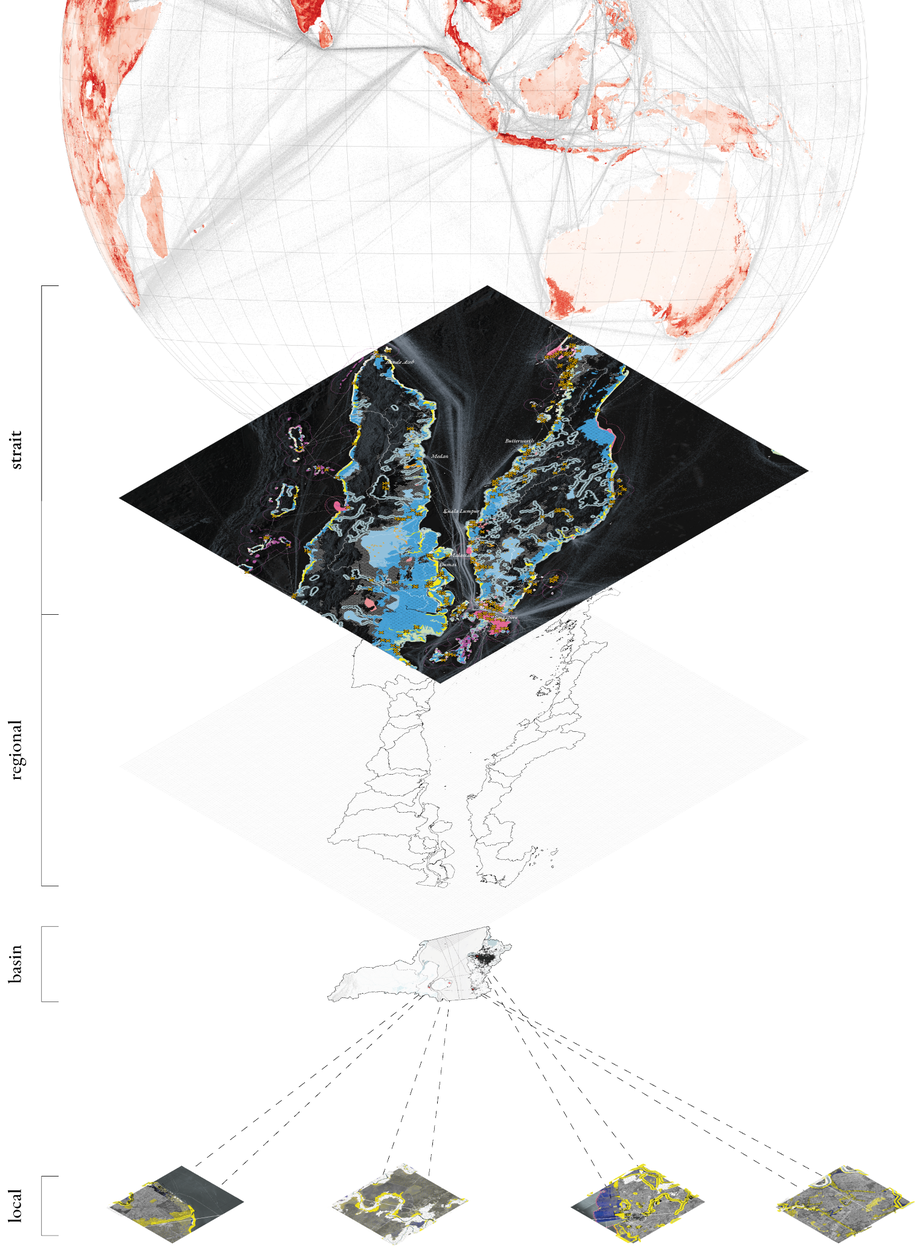
Typologies


Banda Aceh
Butterworth
Medan
Kuala Lumpur
Malacca
Dumai
Singapore
0
100
200 km
Wetlands
Urban
Industrial plantation
Mangrove
Water
Seagrass
Coral reef
Sandy beach
Ports

Possible Future



A New Balance



The Strait of Malacca is **not a problem to be solved**, but **a living system to be tended to**. This framework proposes pathways for **care, stewardship, and recognition**, driving transformation rather than short-term adaptation. By balancing **critical distance** with **critical proximity**, it repositions the Strait not as infrastructure alone, but as **part of Earth's Critical Zone**.

The challenge is **not** how to make the Strait serve the world more **efficiently**, but rather how to enable the world to **care for natural systems that sustain it.**



