Mundane Ambiguity: Making Public Realm with Ballast Water Infrastructure

A Thesis Submitted to the Department of Landscape Architecture,

Harvard University Graduate School of Design

by

Xingyue Huang

In Partial Fulfillment of the Requirements for the Degree of

MASTER IN LANDSCAPE ARCHITECTURE

May 2022

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Kongyne Unang Student

Thesis Advisor

MUNDANE AMBIGUITY MAKING PUBLIC REALM WITH BALLAST WATER INFRASTRUCTURE

Advised by Sergio Lopez-Pineiro

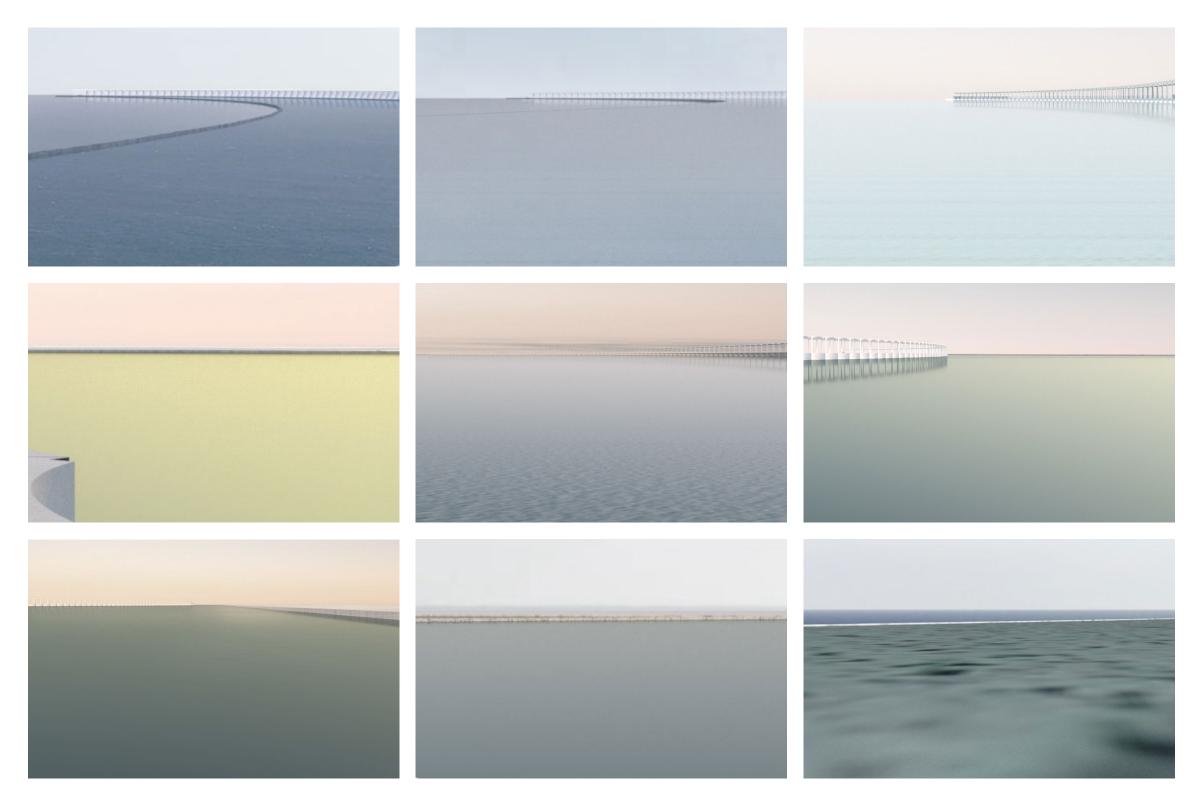
Xingyue Huang

LANDSCAPE AS BALLAST WATER INFRASTRUCTURE

"As the playing field of the global waste economy levels off, the golden age of mass-disposal is now being supplanted by the age of mass-recycling. This requires a critical reevaluation of the overlooked relationship between industry, waste, and urbanism; and a survey of successful industrial ecologies."

This thesis proposes landscape infrastructure as the agency for managing ballast water exchange, conducting mass recycling of waste materials, and creating new public realms.

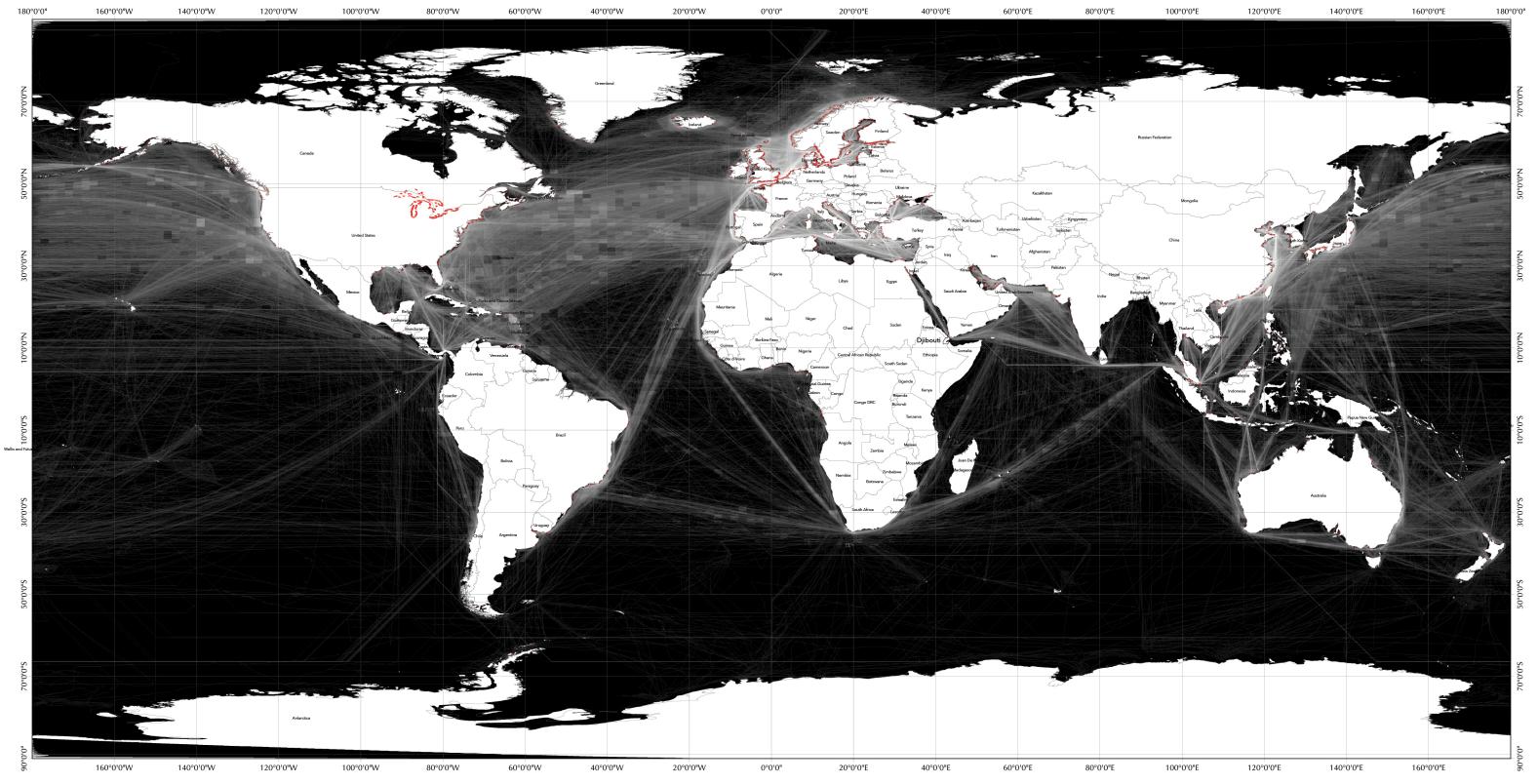
It asks if infrastructure could inform spatial qualities valuable for imagining new public realms – public realms that accommodate uncertainties and keep the ambiance of ordinary lives in an unassuming, modest yet powerful manner.





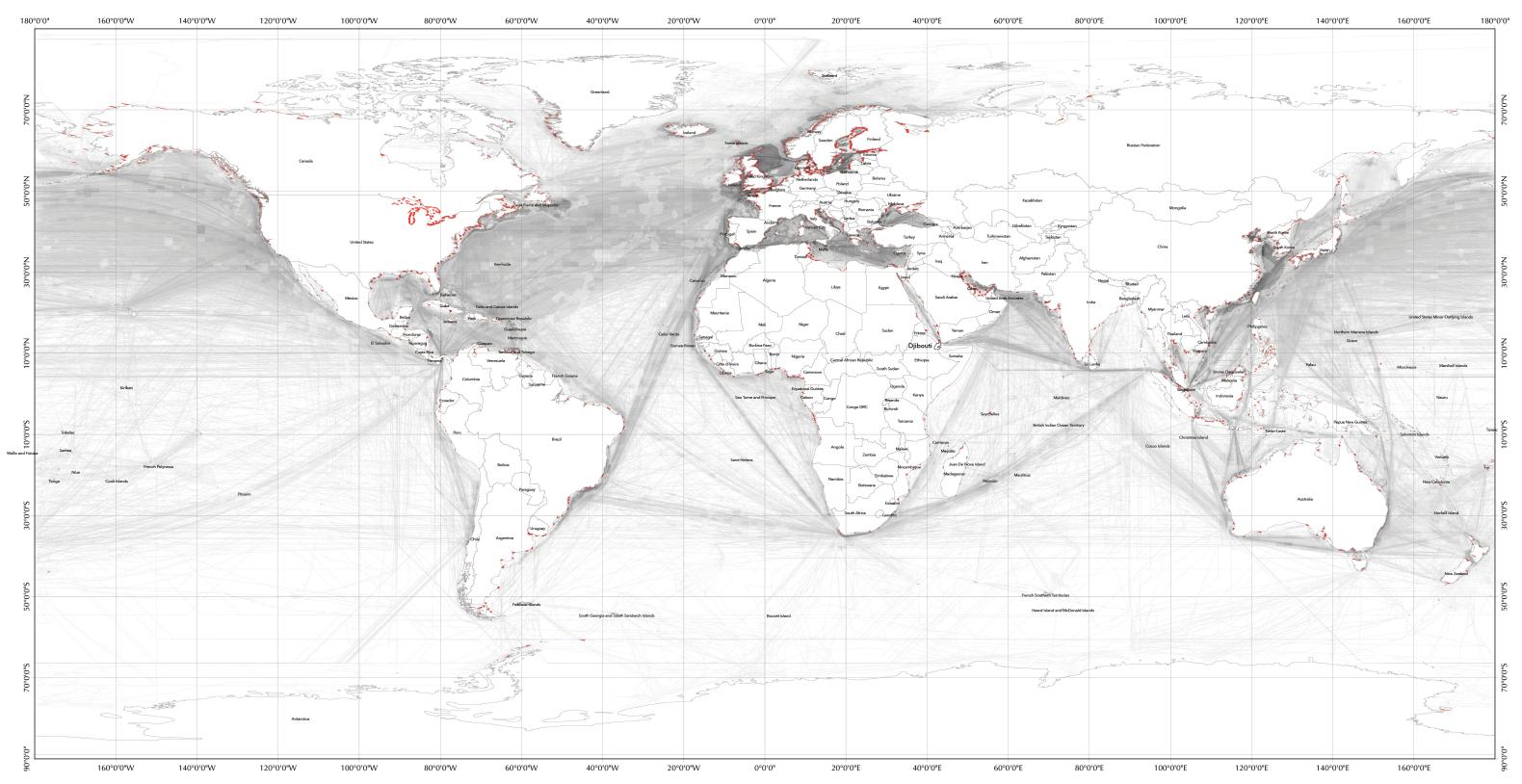






Data Source: Melanie Frazier. Recent pace of change in human impact on the world's ocean: Shipping. Knowledge Network for Biocomplexity. doi:10.5063/F1NZ85ZN.

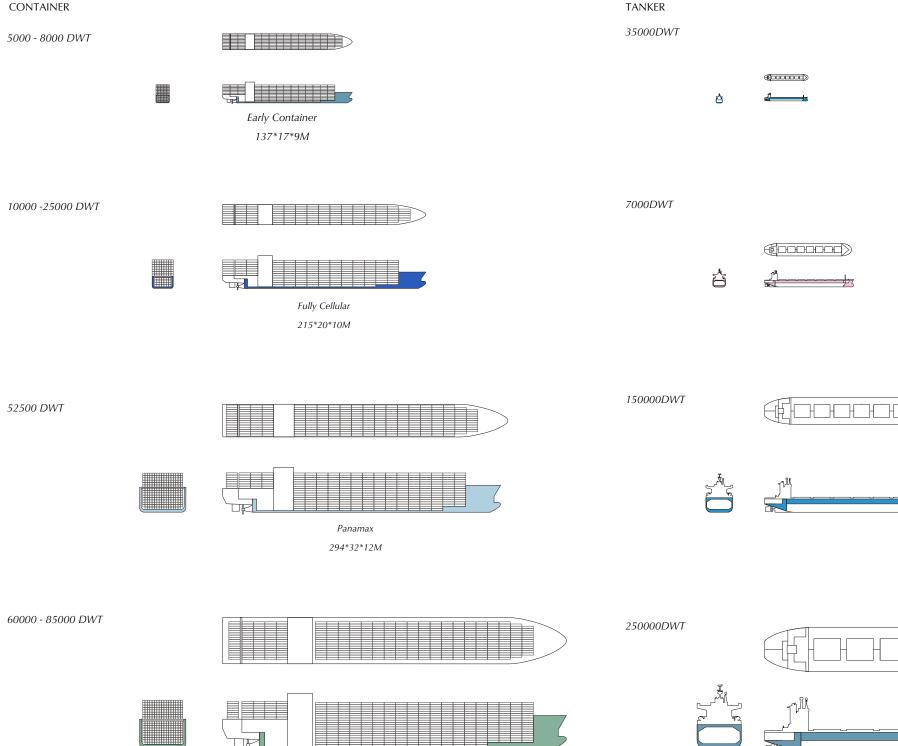
ATLAS OF GLOBAL SHIPPING INDUSTRY



Garcia H.E., T.P. Boyer, O.K. Baranova, R.A. Locarnini, A.V. Mishonov, A. Grodsky, C.R. Paver, K.W. Weathers, I.V. Smolyar, J.R. Reagan, D. Seidov, M.M. Zweng (2019). World Ocean Atlas 2018: Product Documentation. A Mishonov, Technical Editor.

ATLAS OF ECOLOGY CORRIDORS & SPECIES INTRODUCTION



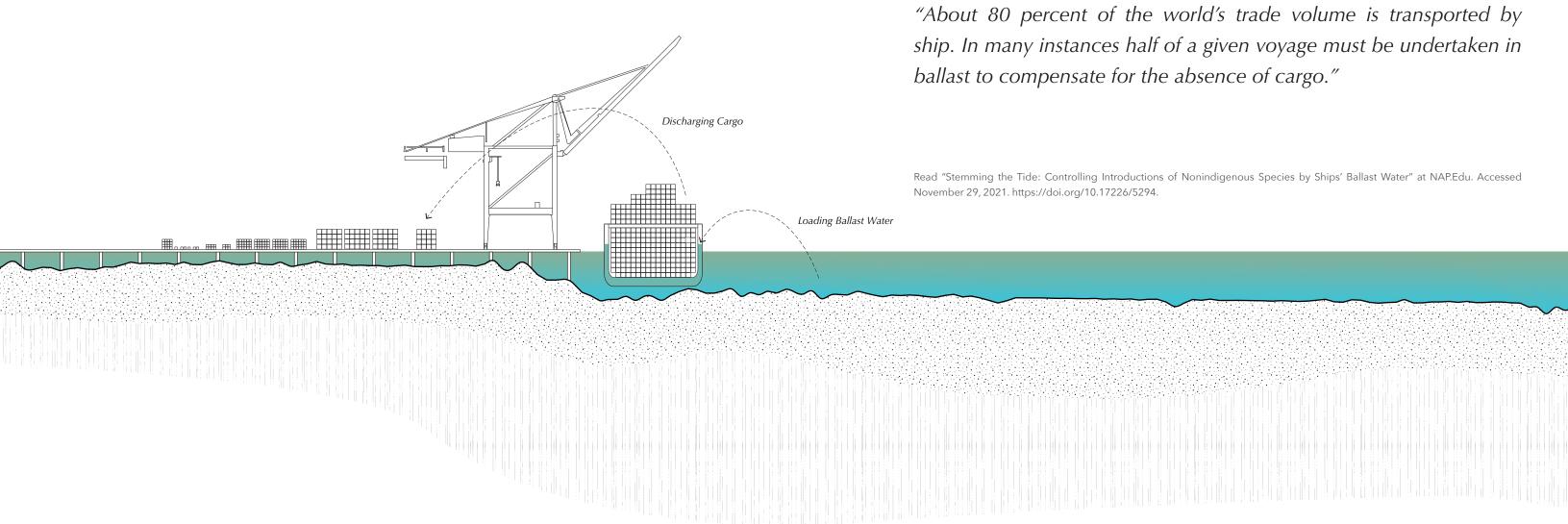


Post Panamax 366*49*15M

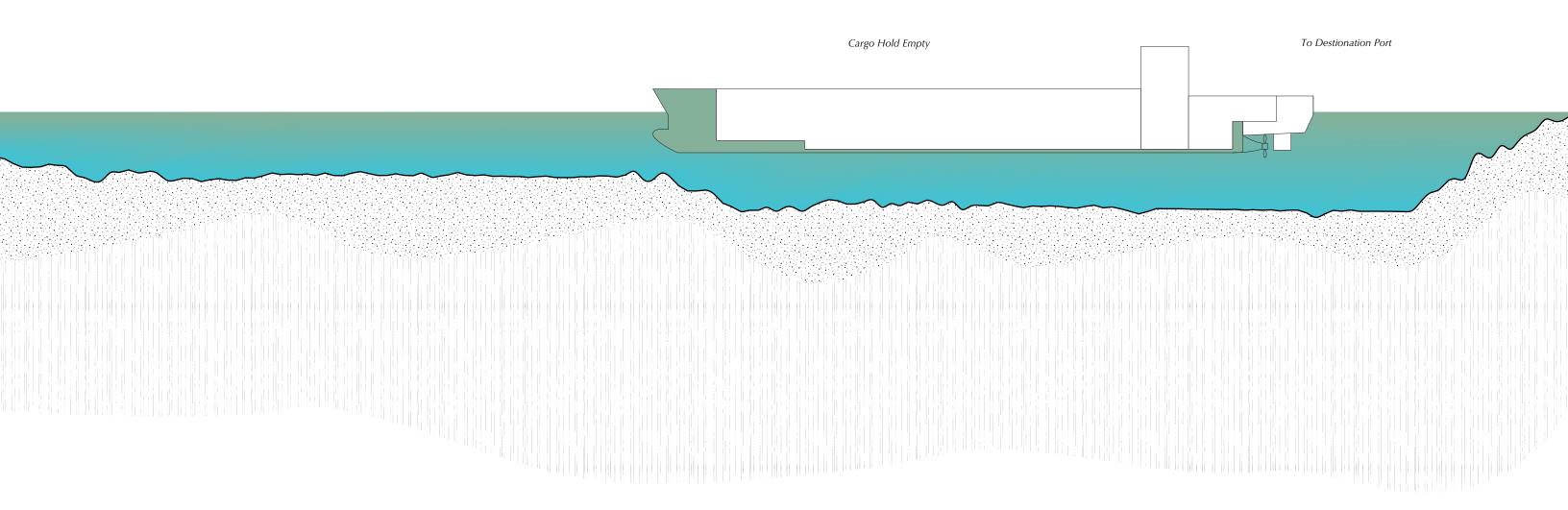
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INVENTORY OF BALLAST TANKS FROM COMMON TYPES OF SHIPS

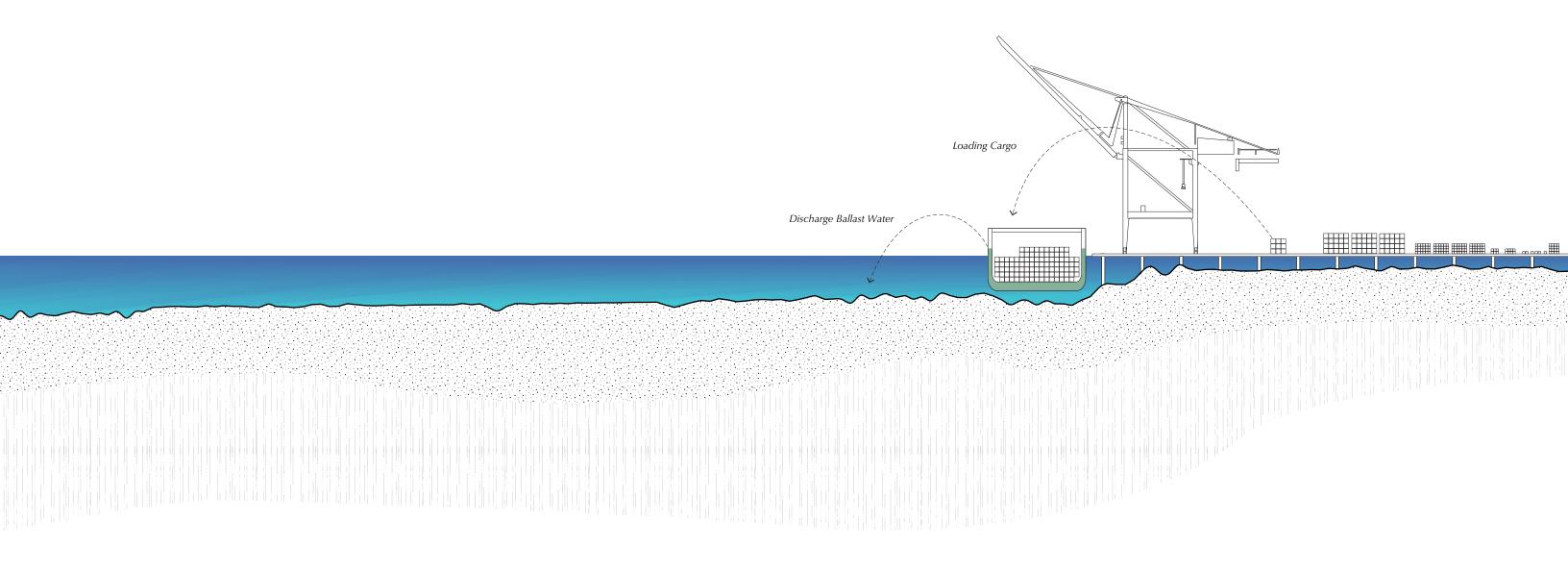
Source Port



BALLAST WATER LOADING OPERATION AT THE SOURCE PORT

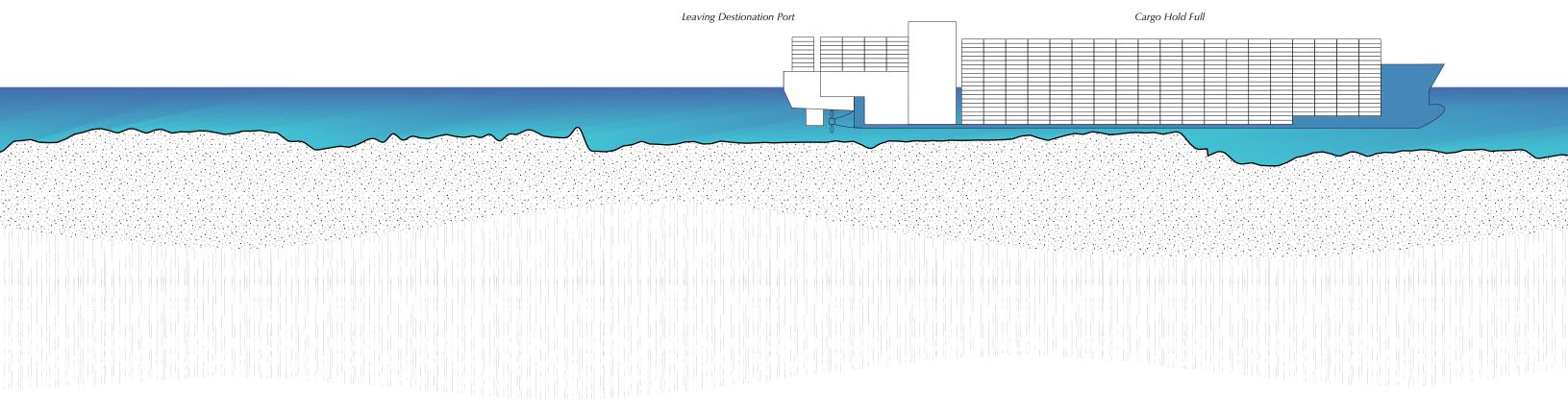


BALLAST WATER PROVIDING STABILITY AND MANEUVERABILITY FOR THE SHIP ON A VOYAGE



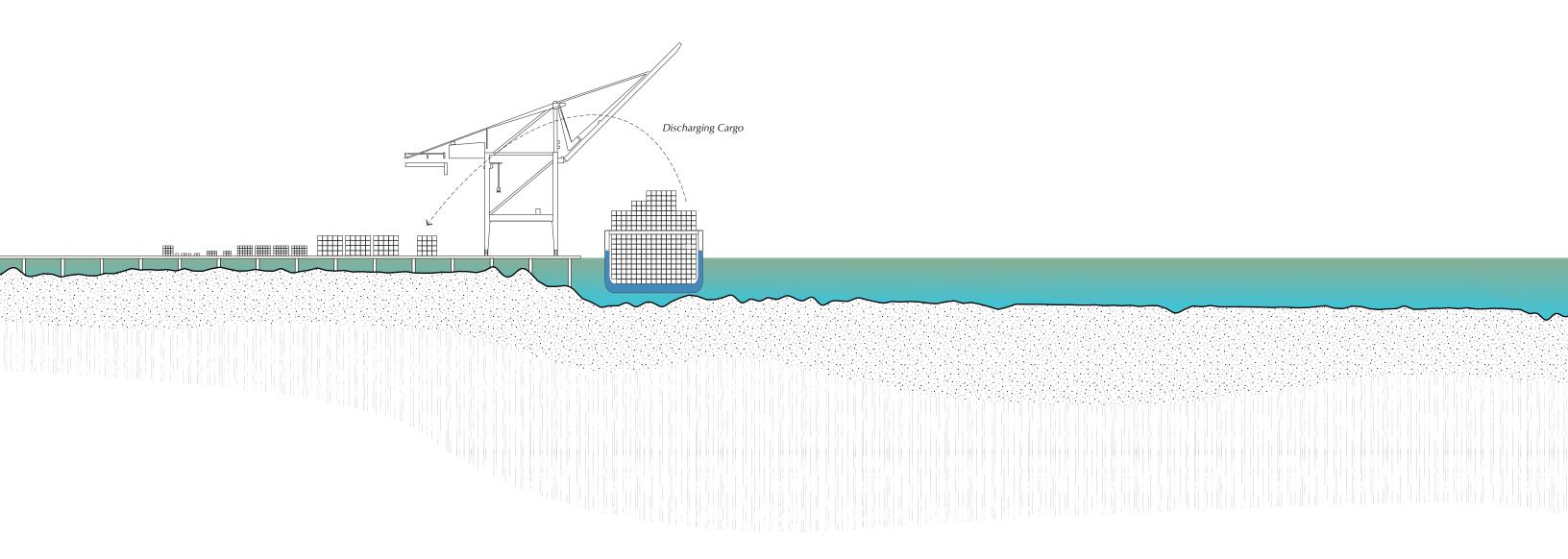
BALLAST WATER DISCHARGE OPERATION AT THE DESTINATION PORT

Destination Port





Destination Port

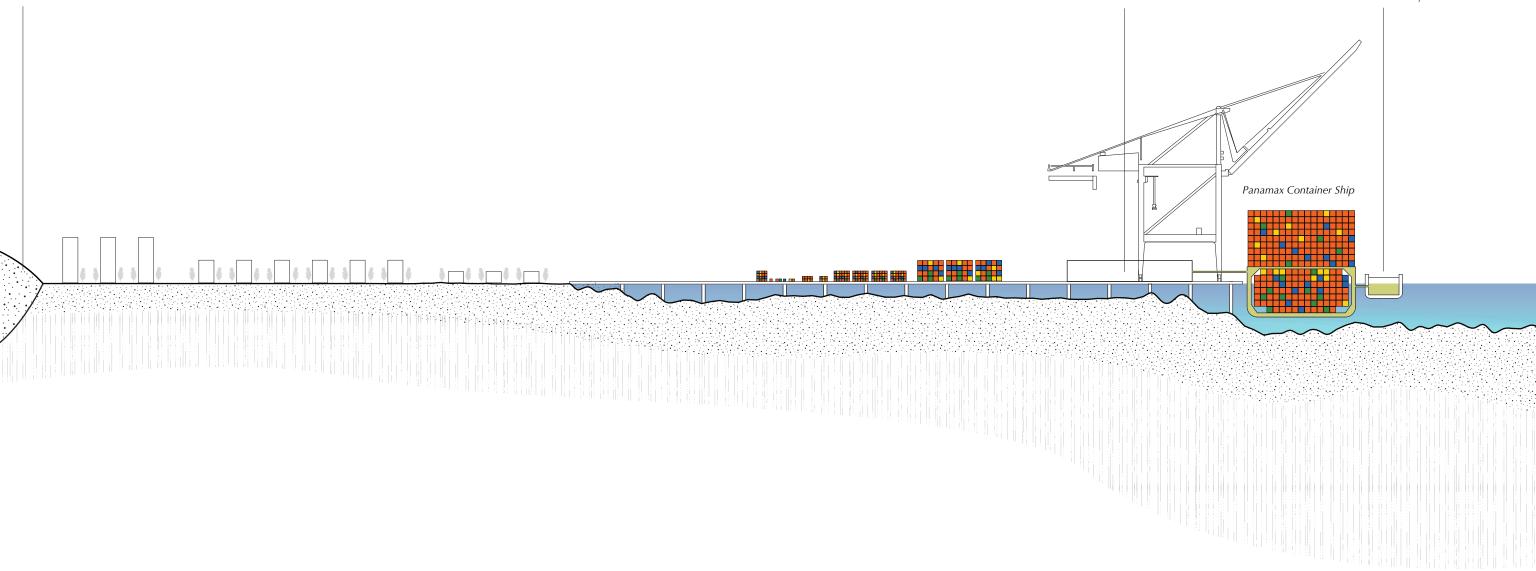


Landfill Far From Coast

To receive excavated silt

0 2.5 5 10

CURRENT BALLAST WATER WASTE MANAGEMENT

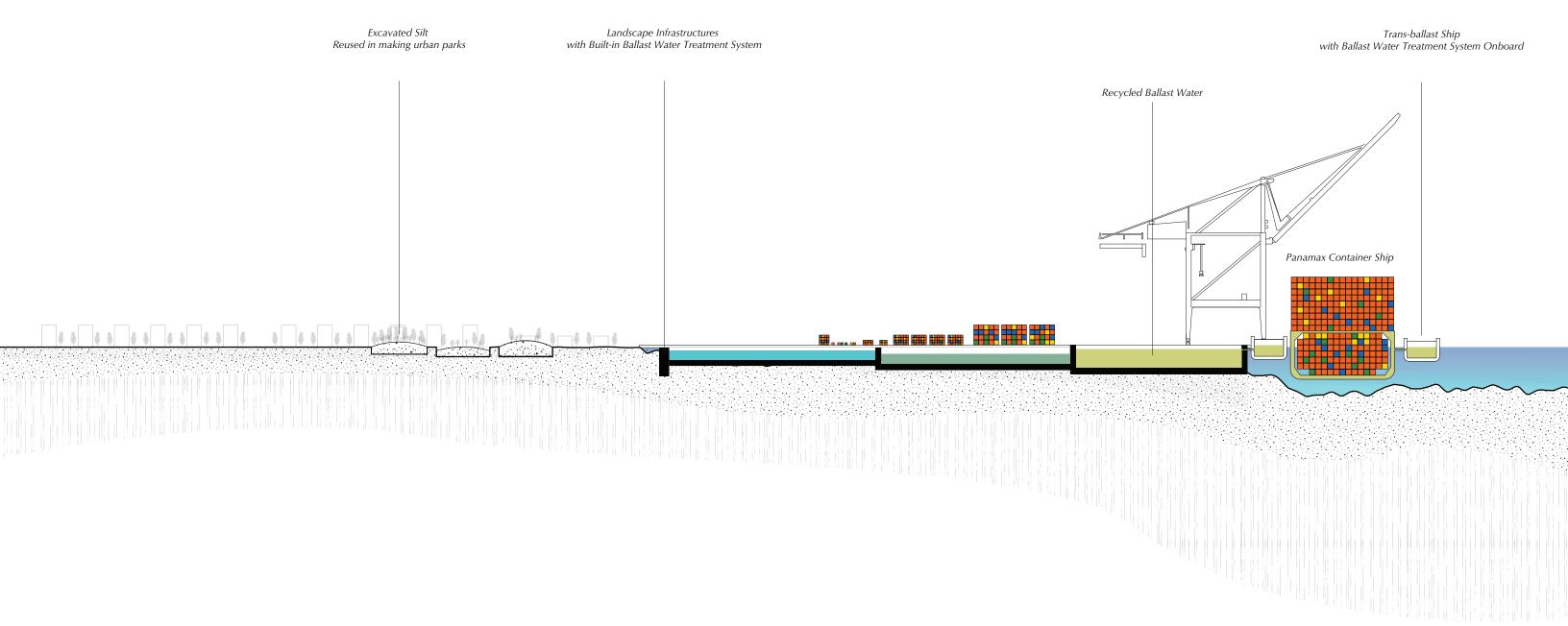


Ballast Water Management Method B:

Ballast Water Management Method A:

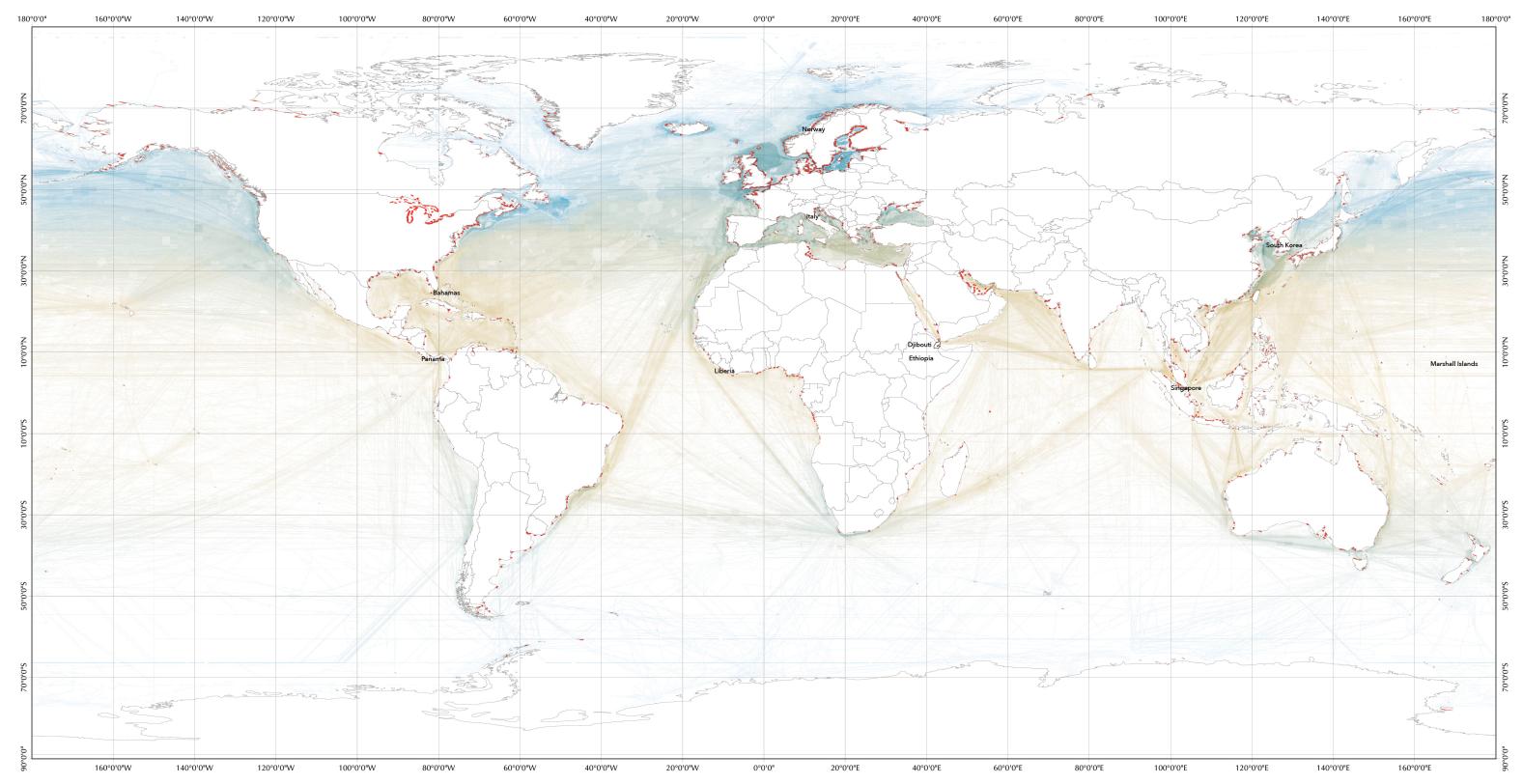


Trans-ballast Ship with Ballast Water Treatment System Onboard



0 2.5 5 10

PROPOSED BALLAST WATER WASTE RECYCLING INFRASTRUCTURE & PUBLIC SPACE



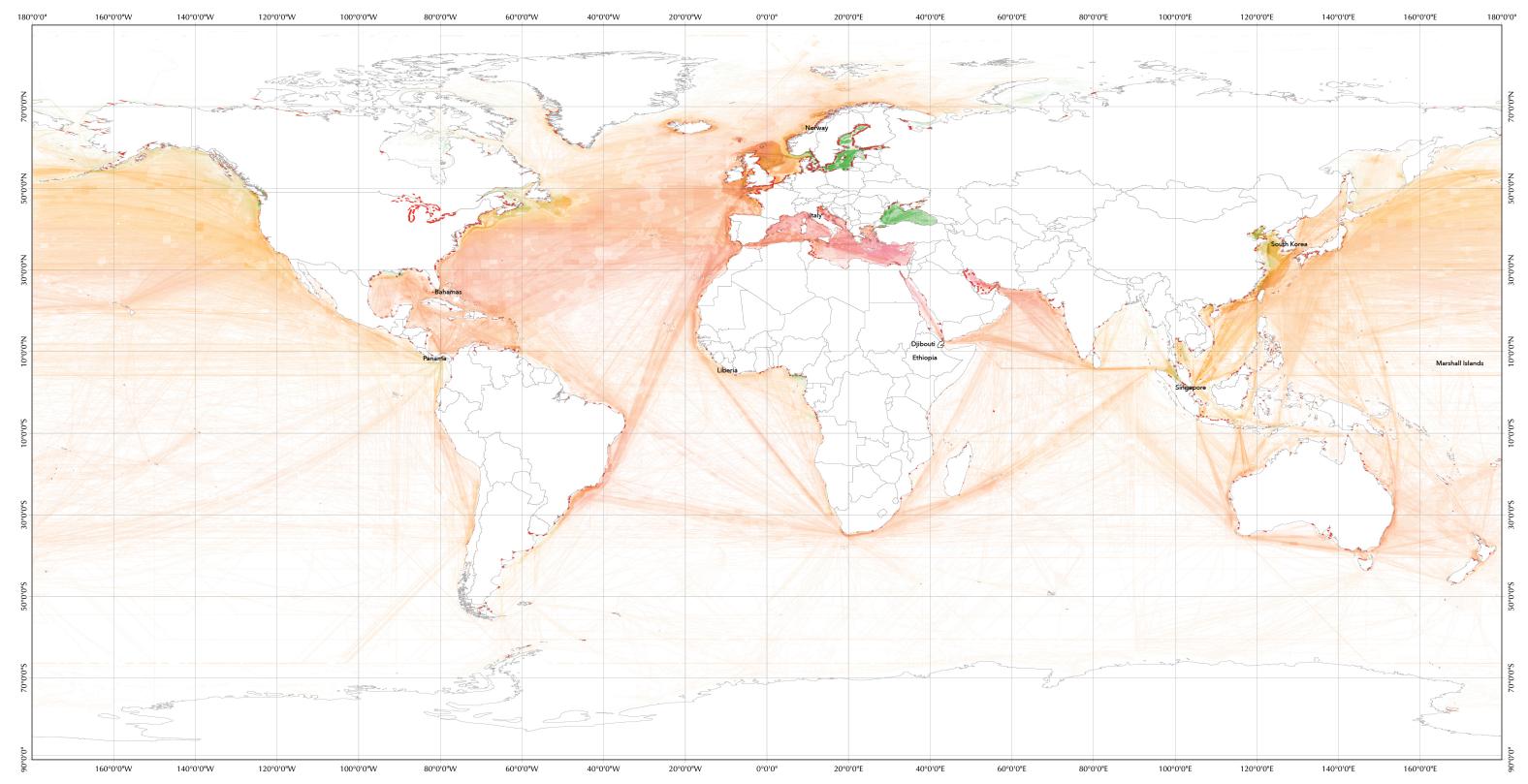
Garcia H.E., T.P. Boyer, O.K. Baranova, R.A. Locarnini, A.V. Mishonov, A. Grodsky, C.R. Paver, K.W. Weathers, I.V. Smolyar, J.R. Reagan, D. Seidov, M.M. Zweng (2019). World Ocean Atlas 2018: Product Documentation. A Mishonov, Technical Editor.

LEGEND

OCEAN SURFACE TEMPERATURE (°C)

-2.400 - 1.229	-1.229 - 3.868	3.869 - 8.966	8.967 - 14.063	14.064 - 19.161	19.162 - 24.259	24.260 - 29.356	29.357 - 33.856
< -1.8 Std. Dev.	-1.81.2 Std. Dev.	-1.81.2 Std. Dev.	-0.750.25 Std. Dev.	-0.25 - 0.25 Std. Dev.	-0.25 - 0.25 Std. Dev.	0.75 - 1.3 Std. Dev.	1.3 - 1.7 Std. Dev.

ATLAS OF OCEAN SURFACE TEMPERATURE



Garcia H.E., T.P. Boyer, O.K. Baranova, R.A. Locarnini, A.V. Mishonov, A. Grodsky, C.R. Paver, K.W. Weathers, I.V. Smolyar, J.R. Reagan, D. Seidov, M.M. Zweng (2019). World Ocean Atlas 2018. Product Documentation. A. Mishonov, Technical Editor.

LEGEND

OCEAN SURFACE SALINITY (%)

0.000 - 27.039 27.040 - 28.371 28.372 - 29.703 29.704 - 31.035 31.036 - 32.367 32.368 - 33.699 33.700 - 35.031 35.032 - 36.363 36.364 - 37.695 37.696 - 39.027 39.028 - 40.359 40.360 - 41.691 41.692 - 42.236 - 4

ATLAS OF OCEAN SURFACE SALINITY



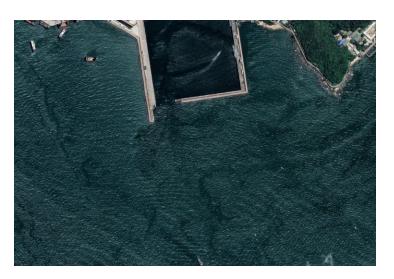
Google Earth Pro. "Bahamas, Nassau Port, August 2021." Accessed March 13, 2022.



Google Earth Pro. "Liberia, Port of Liberia, October, 2019." Accessed March 13, 2022.



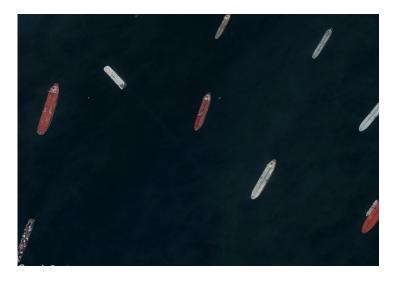
Google Earth Pro. "Panama, Catun Lake, April, 2021." Accessed March 13, 2022.



Google Earth Pro. "China, Hongkong, Stonecutters Island, July, 2021." Accessed March 13, 2022.



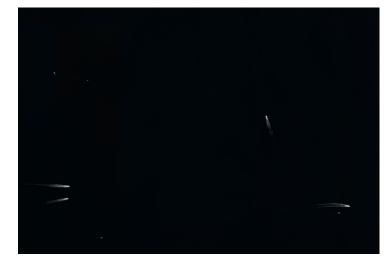
Google Earth Pro. "Marshall Islands, Feburary, 2021." Accessed March 13, 2022.



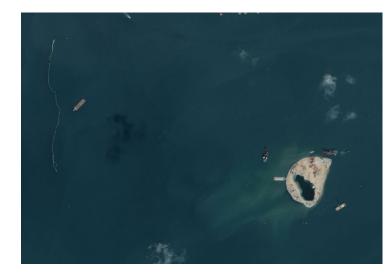
Google Earth Pro. "Singapore, Singapore Port, July, 2021." Accessed March 13, 2022.



Accessed March 13, 2022.



2022.



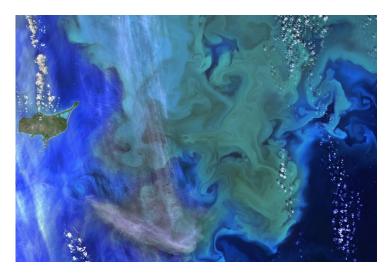
March 13th , 2022.

ATLAS OF BALLAST WATER LOADING & DISCHARGE PORTS

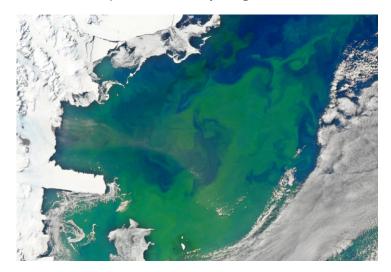
Google Earth Pro. "Italy, La Spezia Container Terminal, May, 2017."

Google Earth Pro. "Norway, Bergen Port, May, 2021." Accessed March 13,

Google Earth Pro. "South Korea, Busan Port, September, 2018." Accessed



NASA Earth Observatory. "Phytoplankton Bloom, Alaska, 2014." Accessed March 13, 2022. https://earthobservatory.nasa.gov/



NASA Earth Observatory. "Phytoplankton Bloom, Ross Sea, 2011." Accessed March 13, 2022. https://earthobservatory.nasa.gov/



NASA Earth Observatory. "Solar Evaporation Ponds, U.S., Utah." Accessed March 13, 2022. https://earthobservatory.nasa.gov/



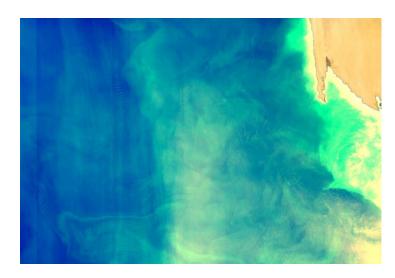
NASA Earth Observatory. "Phytoplankton Bloom, Gulf of Alaska, 2016." Accessed March 13, 2022. https://earthobservatory.nasa.gov/



NASA Earth Observatory. "Phytoplankton Bloom, South Atlantic, 2017." Accessed March 13, 2022. https://earthobservatory.nasa.gov/



NASA Earth Observatory. "Solar Evaporation Ponds & Coastal Flats, West Australia." Accessed March 13, 2022. https://earthobservatory.nasa.gov/



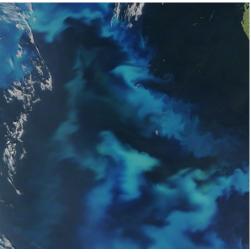




NASA Earth Observatory. "Great Salt Lake, U.S., Utah." Accessed March 13, 2022. https://earthobservatory.nasa.gov/

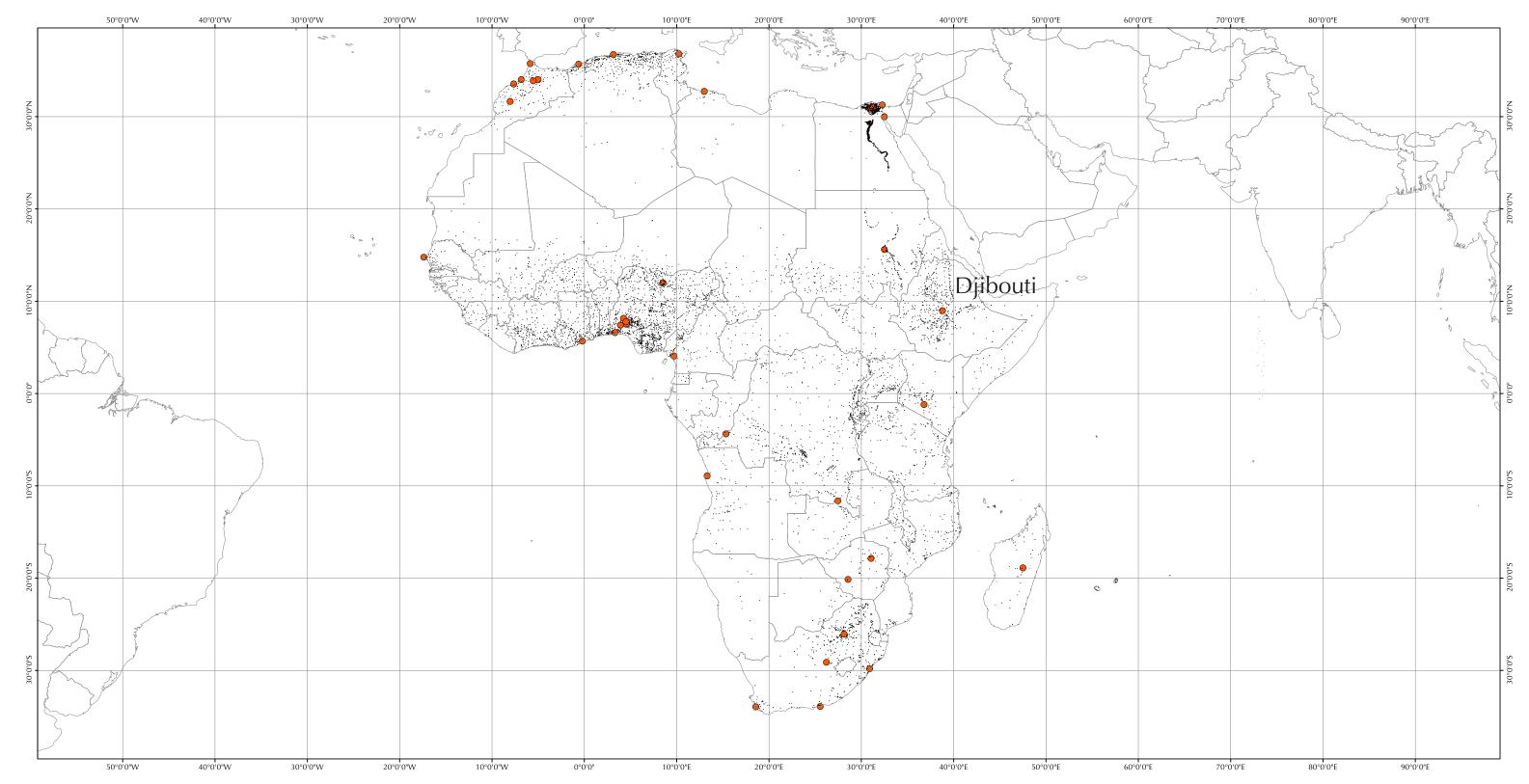
ATLAS OF THE COLOR OF MICRO-ORGANISMS IN SALINE WATERS

NASA Earth Observatory. "Phytoplankton Bloom, West Africa, 2002." Accessed March 13, 2022. https://earthobservatory.nasa.gov/



NASA Earth Observatory. "Phytoplankton Bloom, North Sea, 2015." Accessed March 13, 2022. https://earthobservatory.nasa.gov/





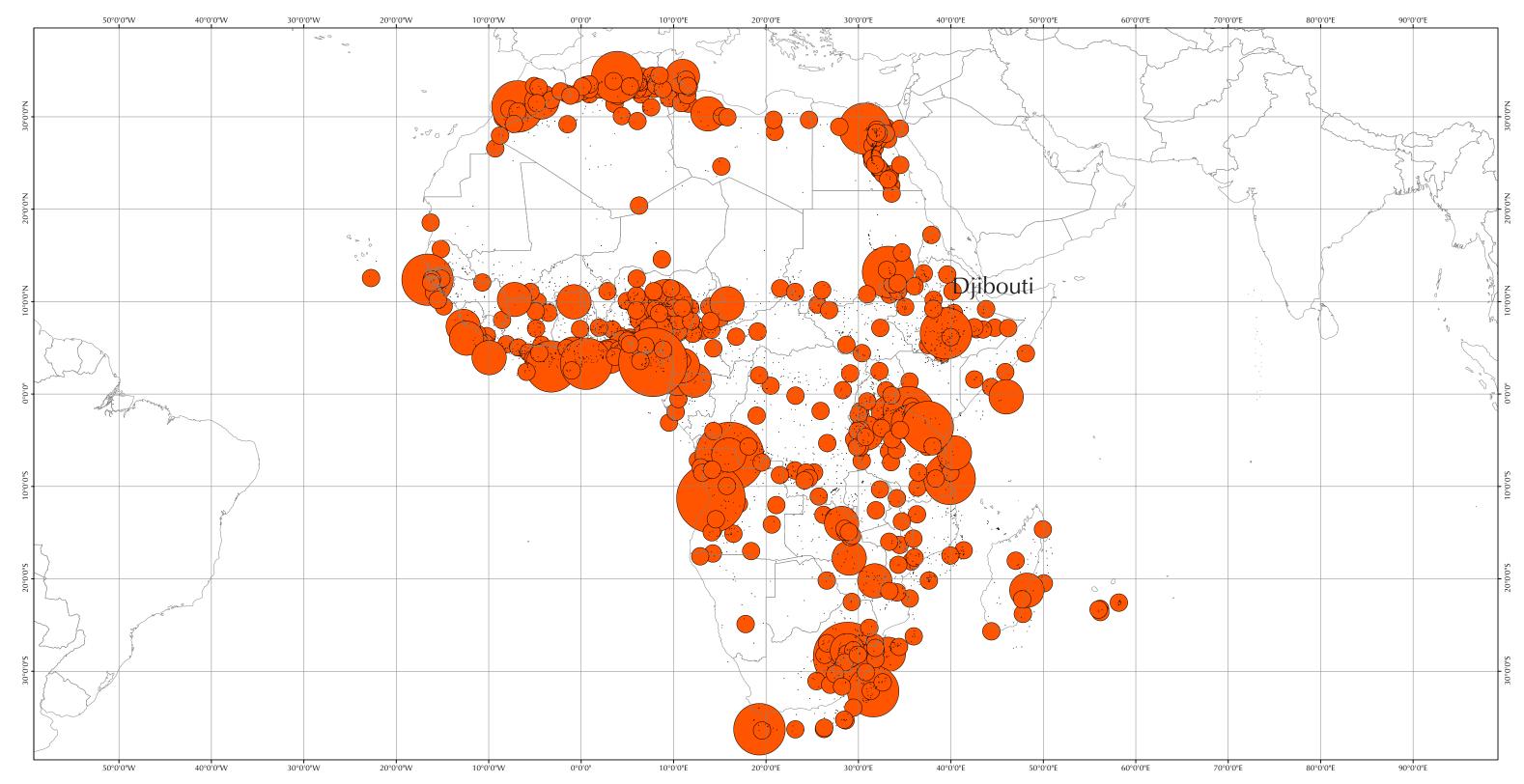
Garcia H.E., T.P. Boyer, O.K. Baranova, R.A. Locarnini, A.V. Mishonov, A. Grodsky, C.R. Paver, K.W. Weathers, I.V. Smolyar, J.R. Reagan, D. Seidov, M.M. Zweng (2019). World Ocean Atlas 2018: Product Documentation. A. Mishonov, Technical Editor.

LEGEND

URBAN POPULATION

· 0 - 100000 🔴 10000

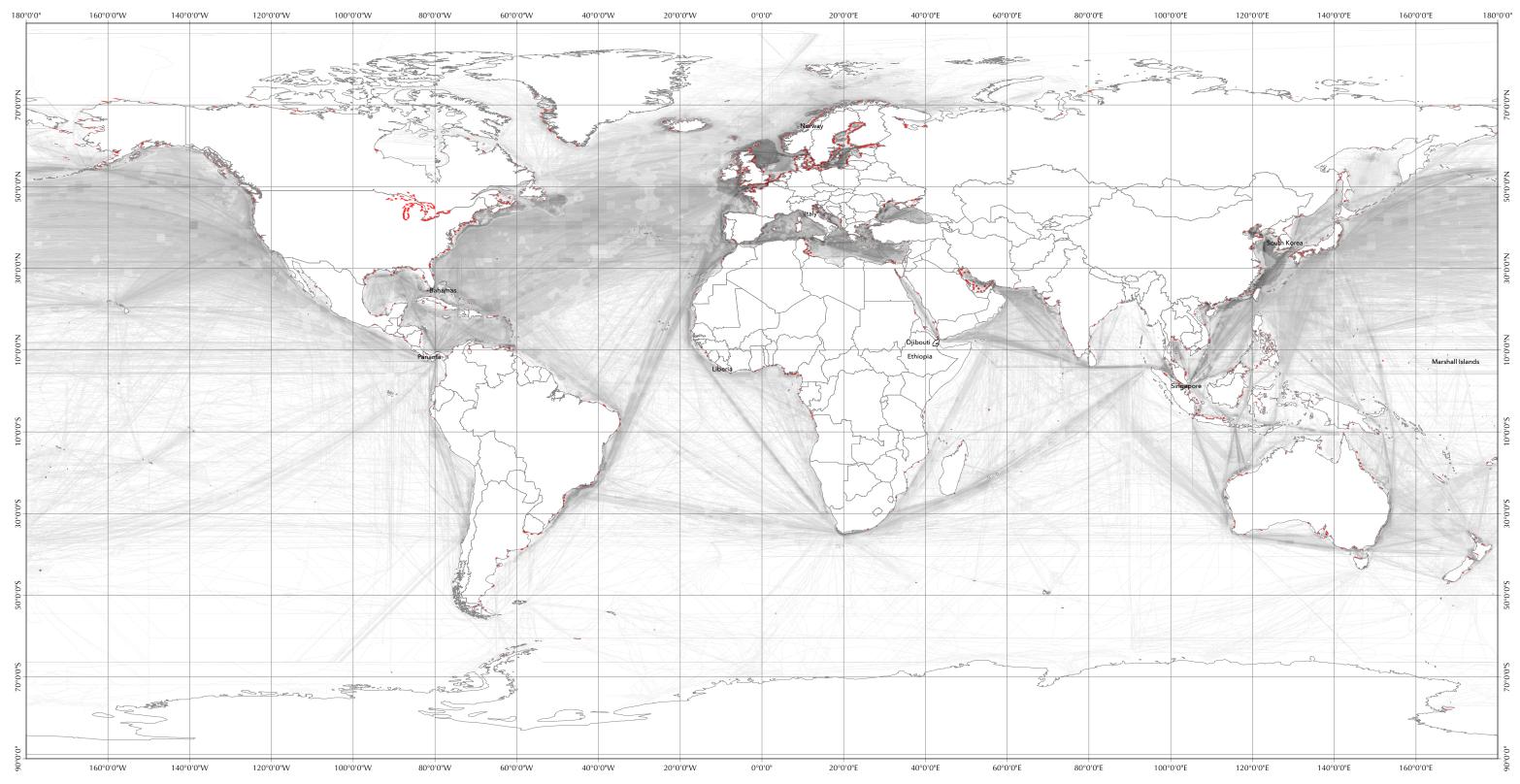
URBAN POPULATION IN AFRICA, 1950



Garcia H.E., T.P. Boyer, O.K. Baranova, R.A. Locarnini, A.V. Mishonov, A. Grodsky, C.R. Paver, K.W. Weathers, I.V. Smolyar, J.R. Reagan, D. Seidov, M.M. Zweng (2019). World Ocean Atlas 2018: Product Documentation. A. Mishonov, Technical Editor.



URBAN POPULATION IN AFRICA, 2010



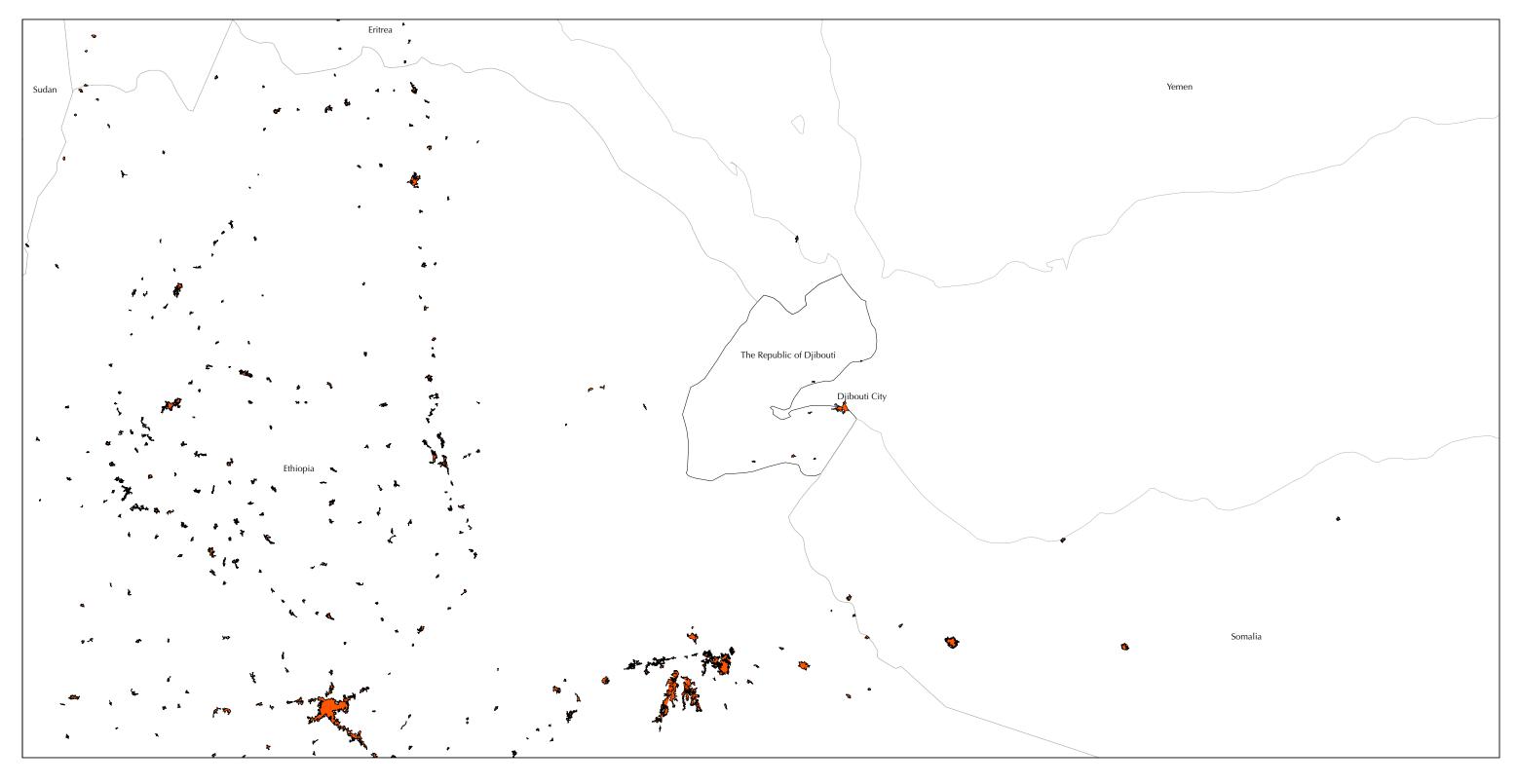
Data Source: Melanie Frazier, Recent pace of change in human impact on the world's ocean. Shipping, Knowledge Network for Biocomplexity, doi:10.5063/E1NZ85ZN

LEGEND

LEVELS OF SPECIES INTRODUCTION

low midium

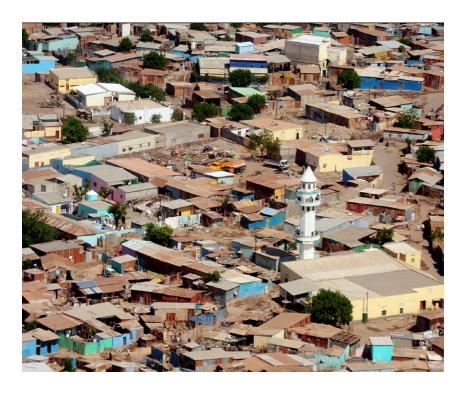
COUNTRIES OF ORIGIN OF VESSELS IN DJIBOUTI PORTS, MAY 12TH, 2021



THE URBAN AREA OF THE REPUBLIC OF DJIBOUTI & NEIGHBORING COUNTRIES









Djibouti International Free Trade Zone

Balbala District

https://www.flickr.com/photos/86778817@N00/3122507510

President Guelleh inaugurate Djibouti's new international free zone, the largest in Africa,

https://www.djiboutiembassyus.org/in-the-news/president-guelleh-inauguratedjiboutis-new-international-free-zone-the-largest-in-africa#slideshow-1

https://dpfza.gov.dj/Djibouti-Business-District

Planned CBD in Djibouti City





SALT HARVESTING AT LAC ASSAL, DJIBOUTI



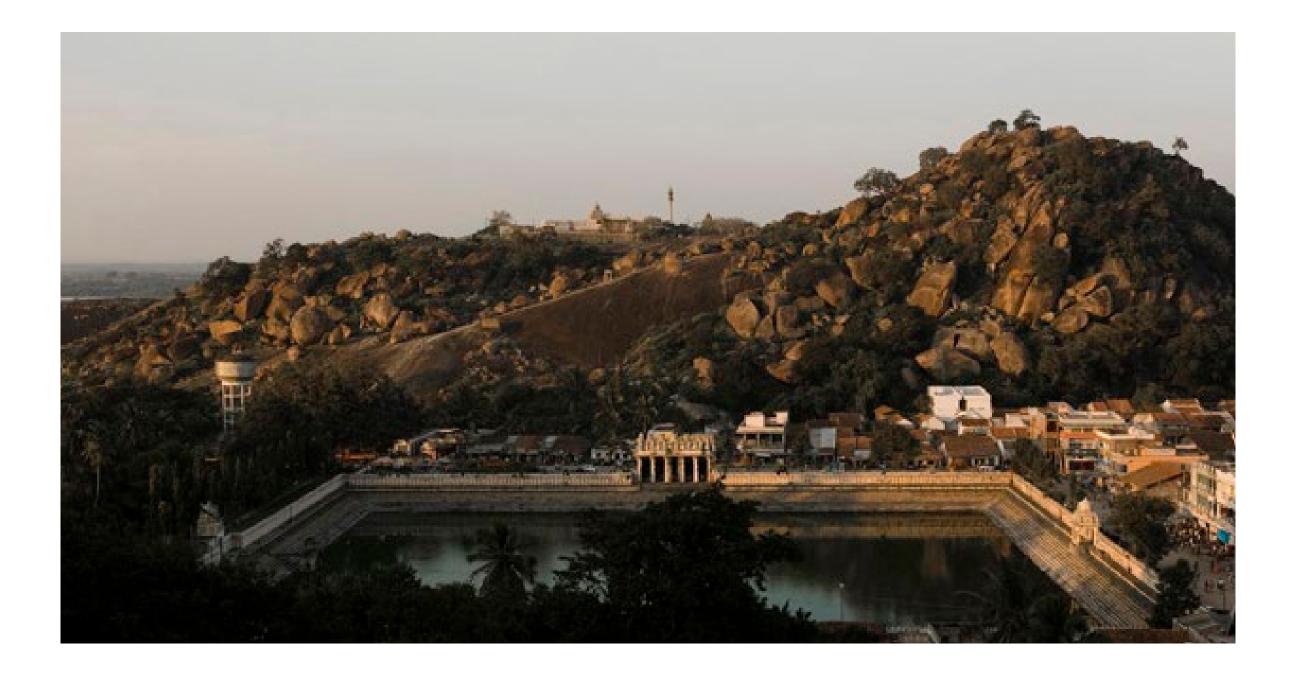


WATERFRONT, DJIBOUTI

LANDSCAPE IMAGINATION OF LARGE WATER INFRASTRUCTURE

"By imaginary, I again mean a set of representations and values that are shared by groups of varying size. Besides their image-based character, these representations and values have the quality of being linked by semantic strings that allow transition from one type of imaginary content to another. These strings, through which meaning effects are developed, help to structure imagination in the same way as a geodesic system allows a description of a surface's geometry: they enable narratives to build up."

Picon, Antoine. "Urban Infrastructure, Imagination and Politics: From the Networked Metropolis to the Smart City." International Journal of Urban and Regional Research 42, no. 2 (2018): 263–75. https://doi.org/10.1111/1468-2427.12527.



TEMPLE TANKS IN INDIA

Temple tanks serves multiple functions, including water storage, ground water recharge, flood control during wet season and preventing soil erosion. They are also sites for cultural practices.





TWO RESERVOIRS IN CENTRAL PARK

The Croton reservoir, built as a purely engineering project, was rejected by the designers, and erased in later development of the park. The Jacqueline Kennedy Onassis Reservoir (which used to be called the Manhattan Lake,) with its form adapted to the landscape aesthetic of metropolitan nature at that time, was incorporated into the design of the park and accepted by the public.



GRAND CANAL, VERSAILLES

At the Versailles, the Grand Canal was designed as a synthesis of function and image. The grandness of the water surface and the enhanced perspective has a strong presence, while the utilitarian aspect of the canal is disguised under its image.



Google Earth Pro. "Quebei (芍陂,安丰塘), Shouxian, Anhui, China 598 - 591 A.D., Water storage pond for irrigation." Accessed October, 2021



Google Earth Pro. "Grand Canal, Versailles, France, Water feature & drain for fountains." Accessed September, 2021



Google Earth Pro. "Shravanabelagola Temple Tank, India Irrigation Tank, site for cultural practices." Accessed October, 2021



Google Earth Pro. "Lake Manhattan, Central Park, U.S, Previous reservoir for Croton aqueduct." Accessed November, 2021



Google Earth Pro. "Menara Gardens, Marrakesh, Morocco, Irrigation tank & water feature." Accessed October, 2021



Google Earth Pro. "Lincoln Memorial, U.S." Accessed October, 2021





Google Earth Pro. "Haridra Nadhi Temple Tank, India, Irrigation Tank, site for cultural practices" Accessed October, 2021

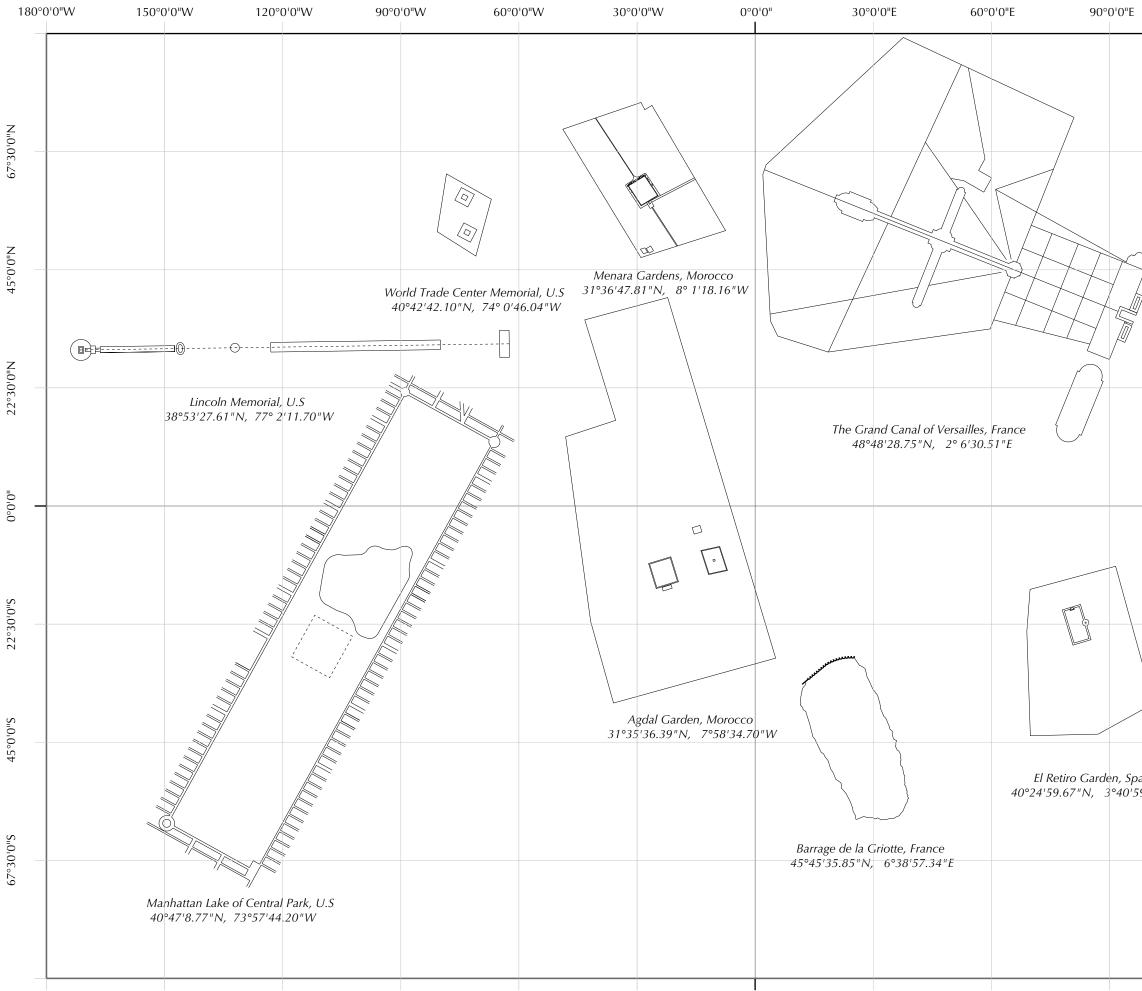


Google Earth Pro. "Barrage de la Griotte, France" Accessed March, 2021

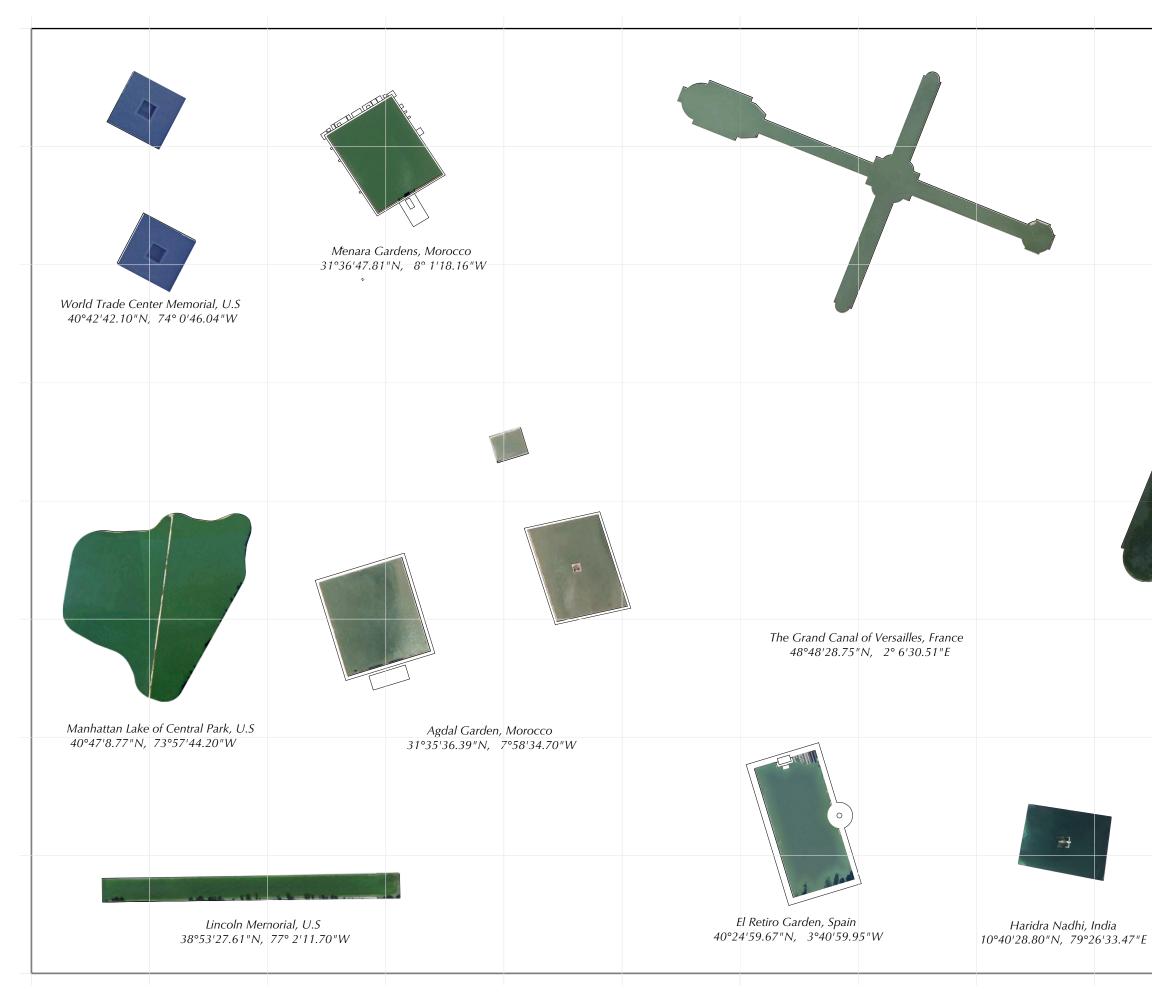
Google Earth Pro. "Agdal Gardens, Marrakesh, Morocco, Irrigation tank & water feature." Accessed October, 2021







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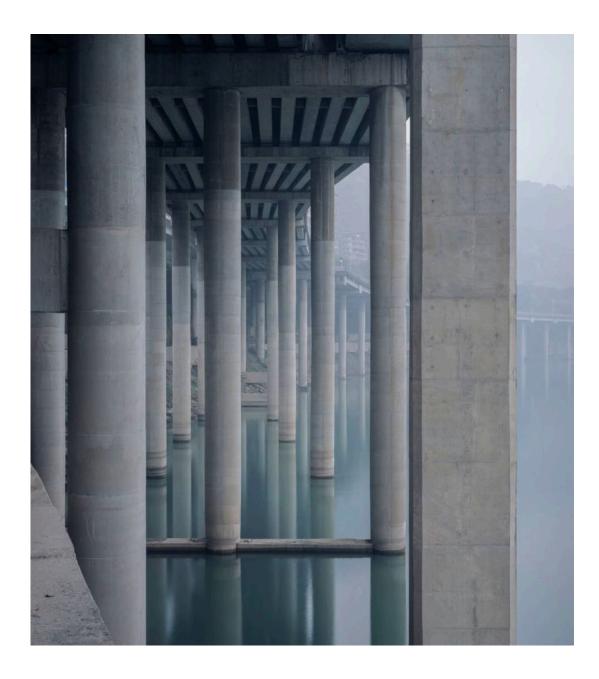


SPATIAL QUALITIES OF LANDSCAPE INFRASTRUCTURE

A large space, with a sense of plenitude, that entails self-forgetfulness in nature.

A poor space, lack of embellishment, that preserves the tranquility and lightness of everyday lives.

An obscure space, lack of identity, that invites interpretation and misunderstanding.



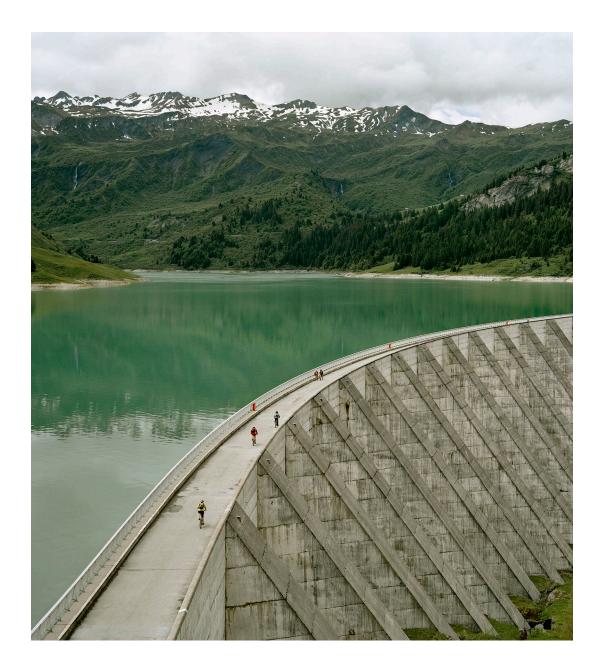
"A landscape doesn't demand from the spectator his "understanding," his imputations of significance, his anxieties and sympathies; it demands, rather, his absence, that he not add anything to it.

···

Plenitude – experiencing all the space as filled, so that ideas cannot enter ... "

LARGE SPACE

plenitude



On our first visit we get the feeling that this square is already beautiful because of it's authentic, lacking in sophistication. it possesses the beauty of what is obvious, necessary, right. Its meaning emerges directly.

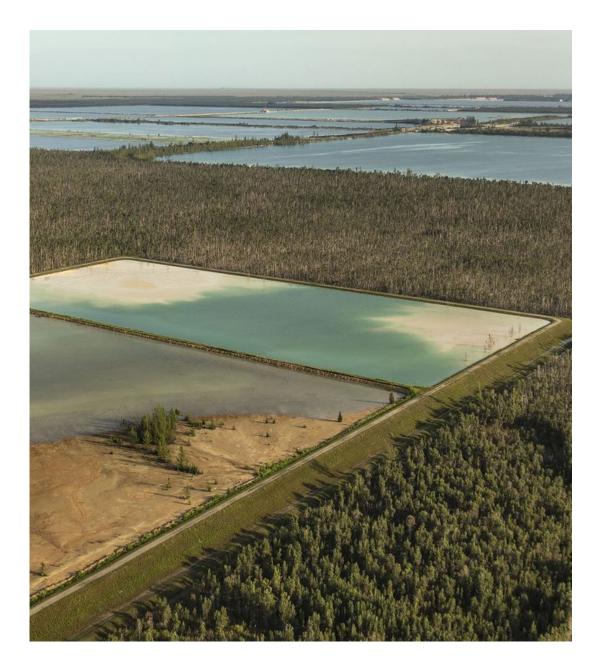
Embellishment has no place here.

Quality, charm, life exist. The square is already beautiful.

POOR SPACE

•••

lack of embellishment



"On terrains vagues, the indefinite places and vacant lots of the city, the dynamics of urban vegetation are obvious. The living conditions change, mosaic-like, at every step. Gravelly, dry soil, puddles on compacted surfaces, sealed asphalt and concrete areas, stone or brick remnants of buildings - the contemporary urban botanical garden is found in such places. And the cartography of plants is expanding."

OBSCURE SPACE

lack of identity

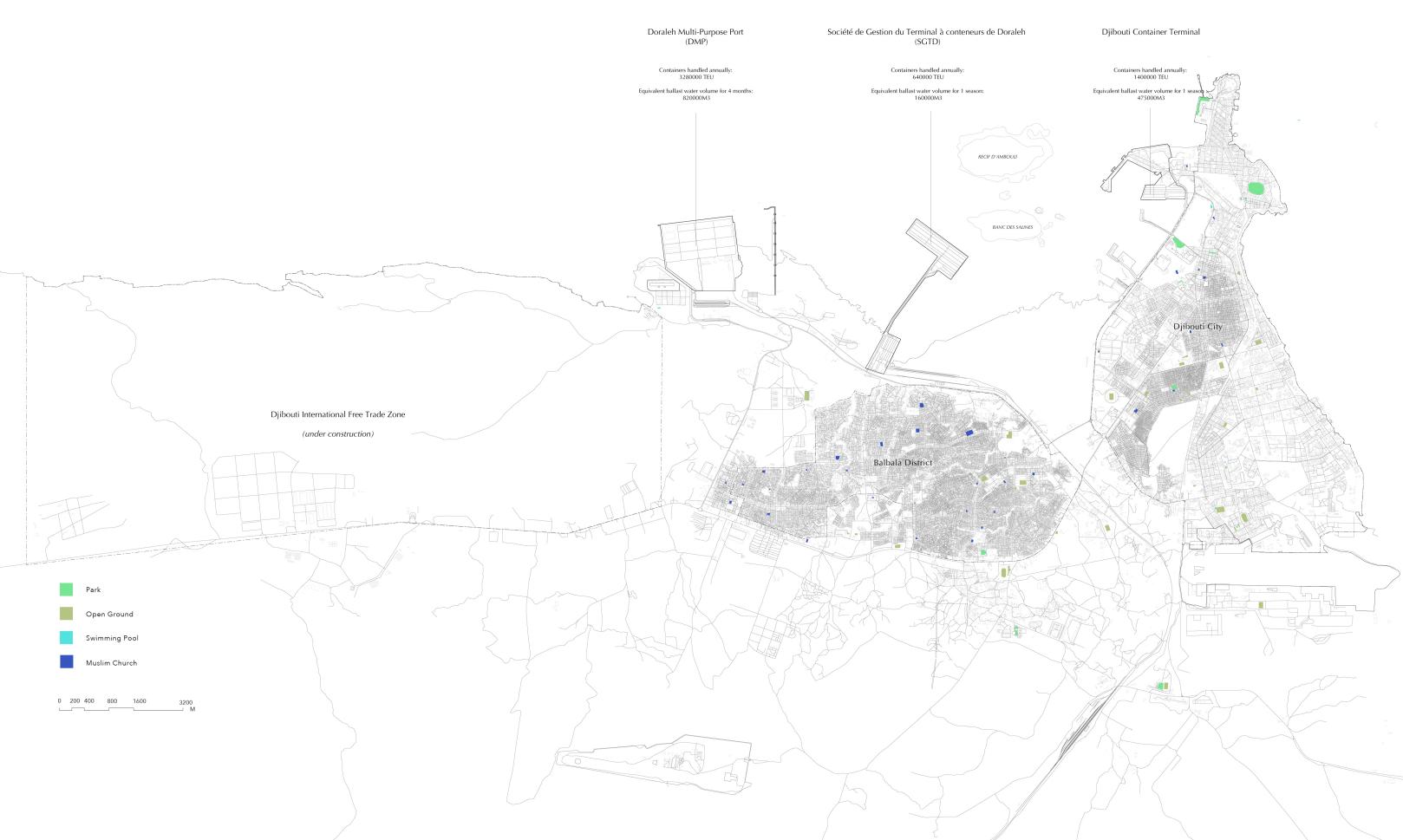
Vogt and Olafur Eliasson, Miniature and Panorama, chap. The End of the Hunt.

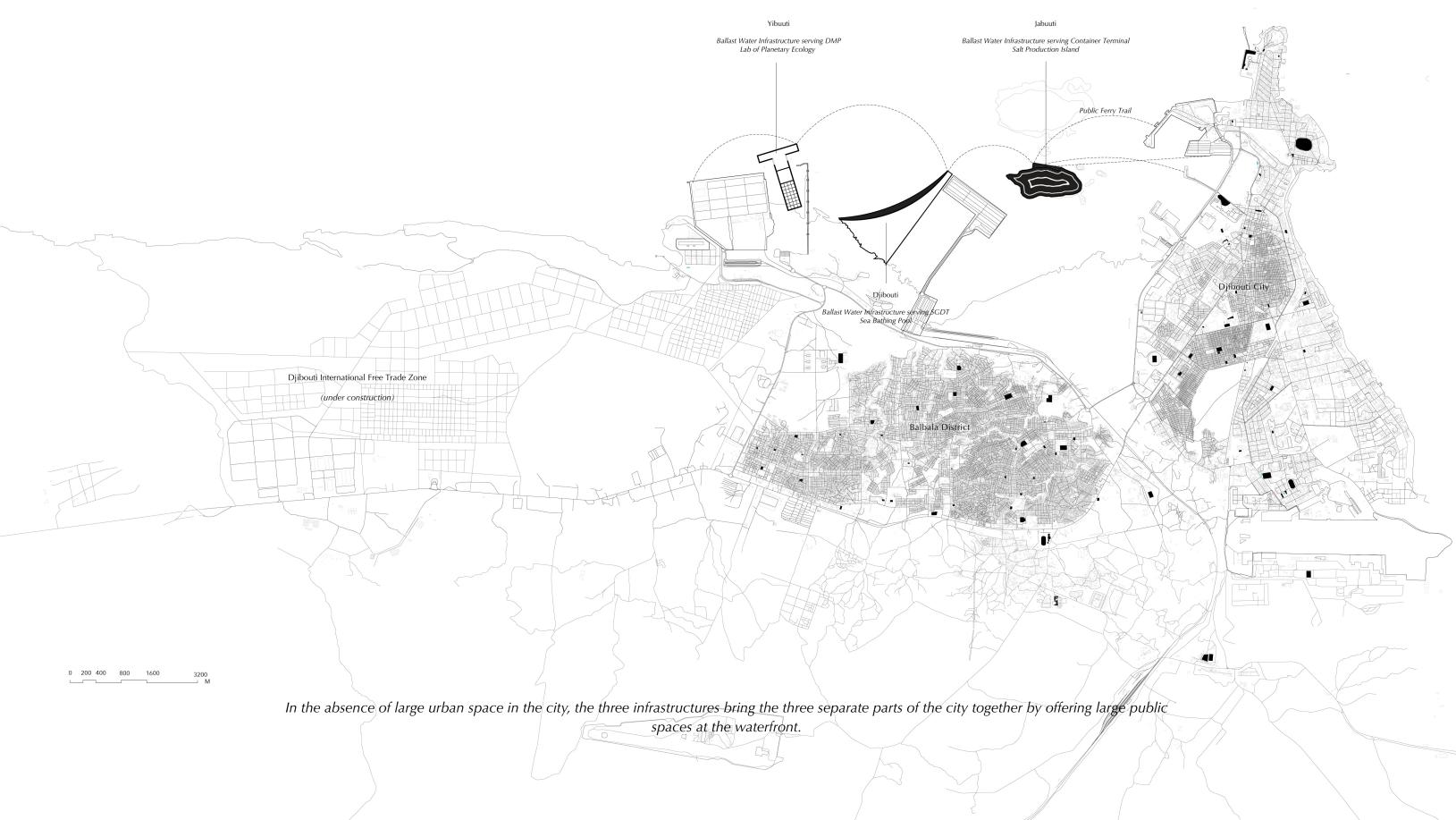
THE THREE BALLAST WATER INFRASTRUCTURES

"More and more I have the sense of being present at a point of absence where crossing centuries may prove to be like crossing languages."

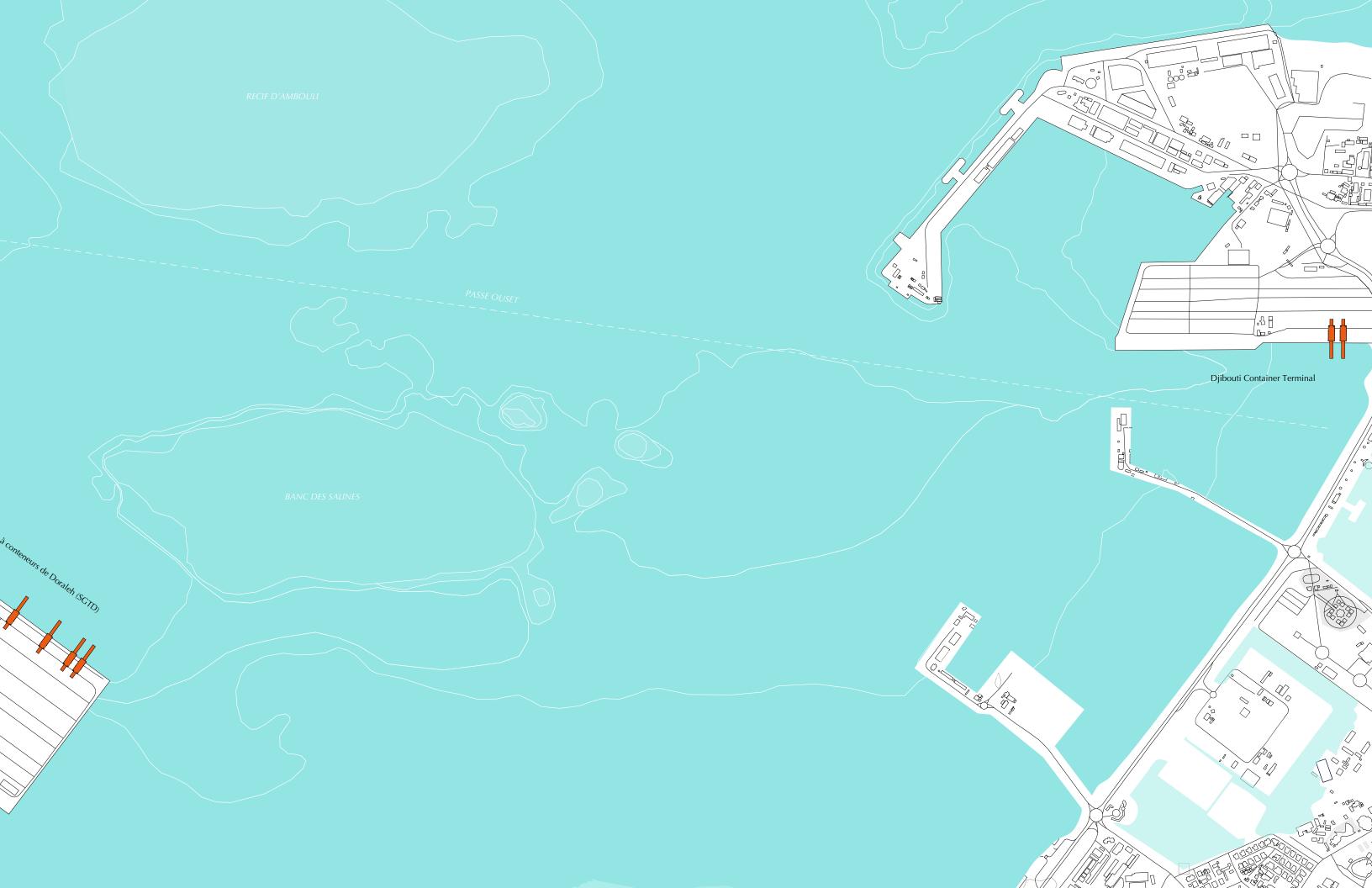
Howe, Susan, and Woodberry Poetry Room . repository. 2010. That This. New York: New Directions Pub.

Djibouti is officially known as the Republic of Djibouti. In local languages it is known as Yibuuti in Afar language and Jabuuti in Somali language. In Djibouti, a city that has a history of segregation and constant urban transformation, different languages persist. Crossing physical borders may prove to be like crossing languages. The three ballast water infrastructures take names from the three names of Djibouti in different languages spoken by the citizens.





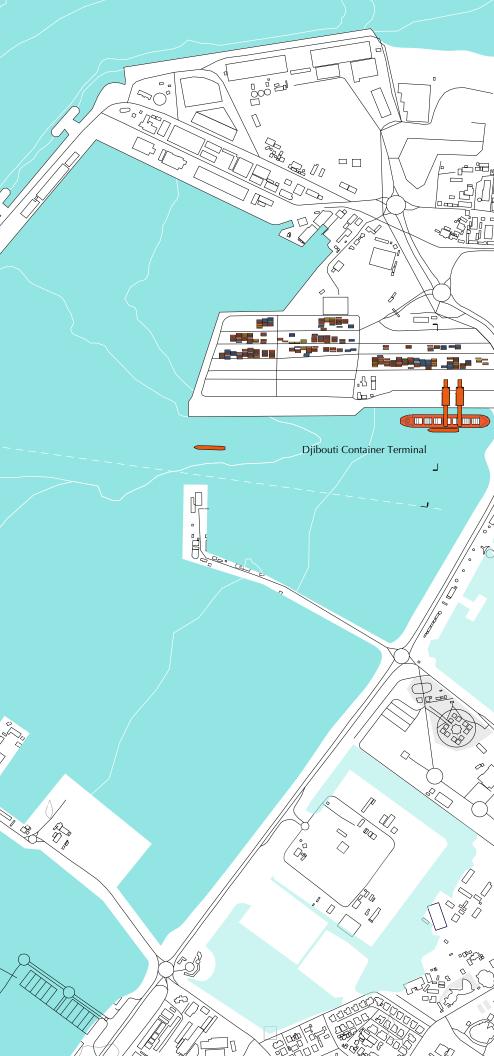


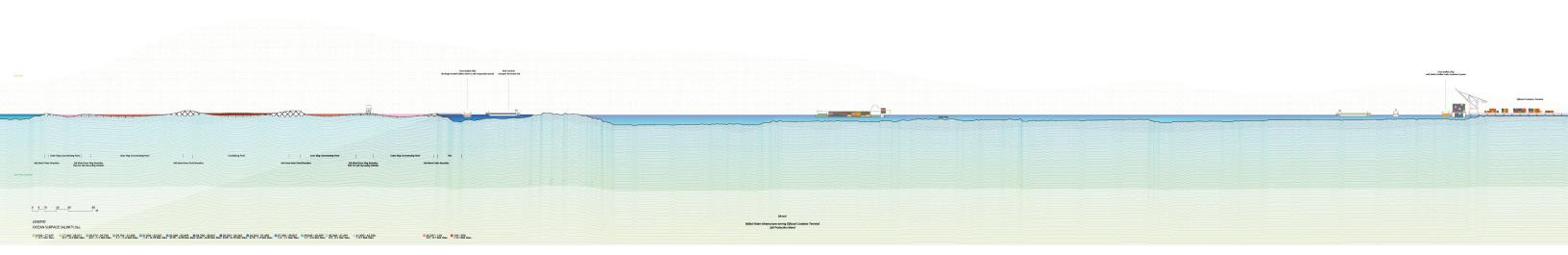


Jabuuti Ballast Water Infrastructure Serving Djibouti Container Terminal

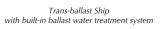
Taleh (SCTD)

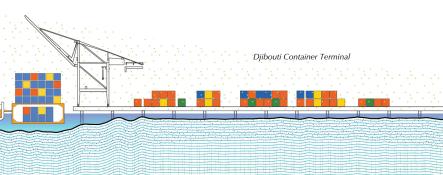
Public Park & Salt Production Island

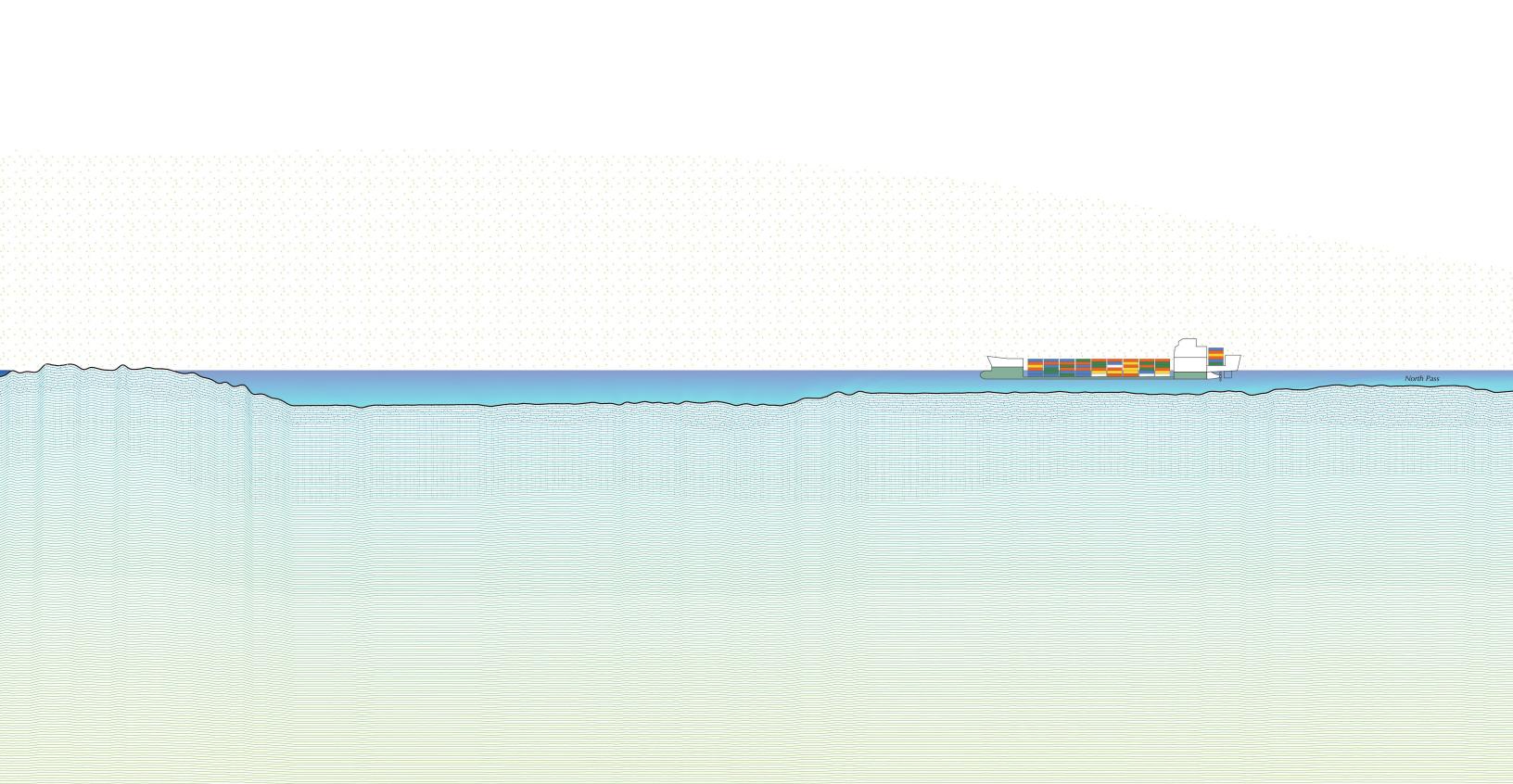


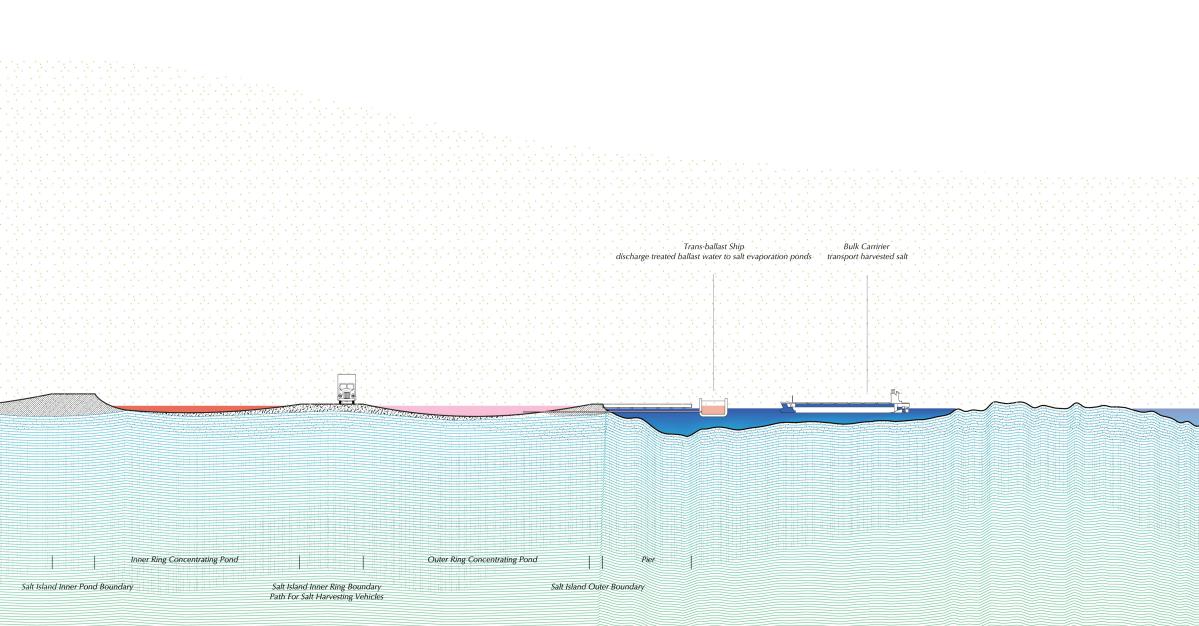


with built-in balasi wate



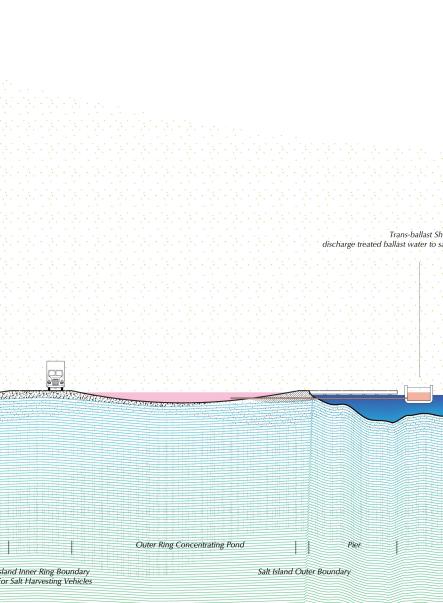






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Outer Ring Conce	entrating Pond	Inner Ring Concentrating Pond		Crystallizing Pond	Inner Ring Concentrating Pond	
Salt Island Outer Boundary	Salt Island Inner Ring Boundary Path For Salt Harvesting Vehicles		Salt Island Inner Pond Boundary		Salt Island Inner Pond Boundary	Salt Island Path For Sa
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The island evokes a sense of largeness beyond its scale. It retains the water with memory from different parts of the ocean, crystalized as salt, and exported from here to other lands.

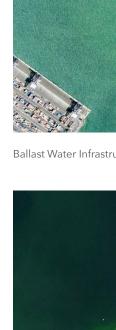




Ballast Water Infrastructure serving Djibouti Container Terminal - Jabuuti, Dec., 2019



Ballast Water Infrastructure serving Djibouti Container Terminal - Jabuuti, Feb., 2020





Ballast Water Infrastructure serving Djibouti Container Terminal - Jabuuti, Jun., 2020



Ballast Water Infrastructure serving Djibouti Container Terminal - Jabuuti, Aug., 2020

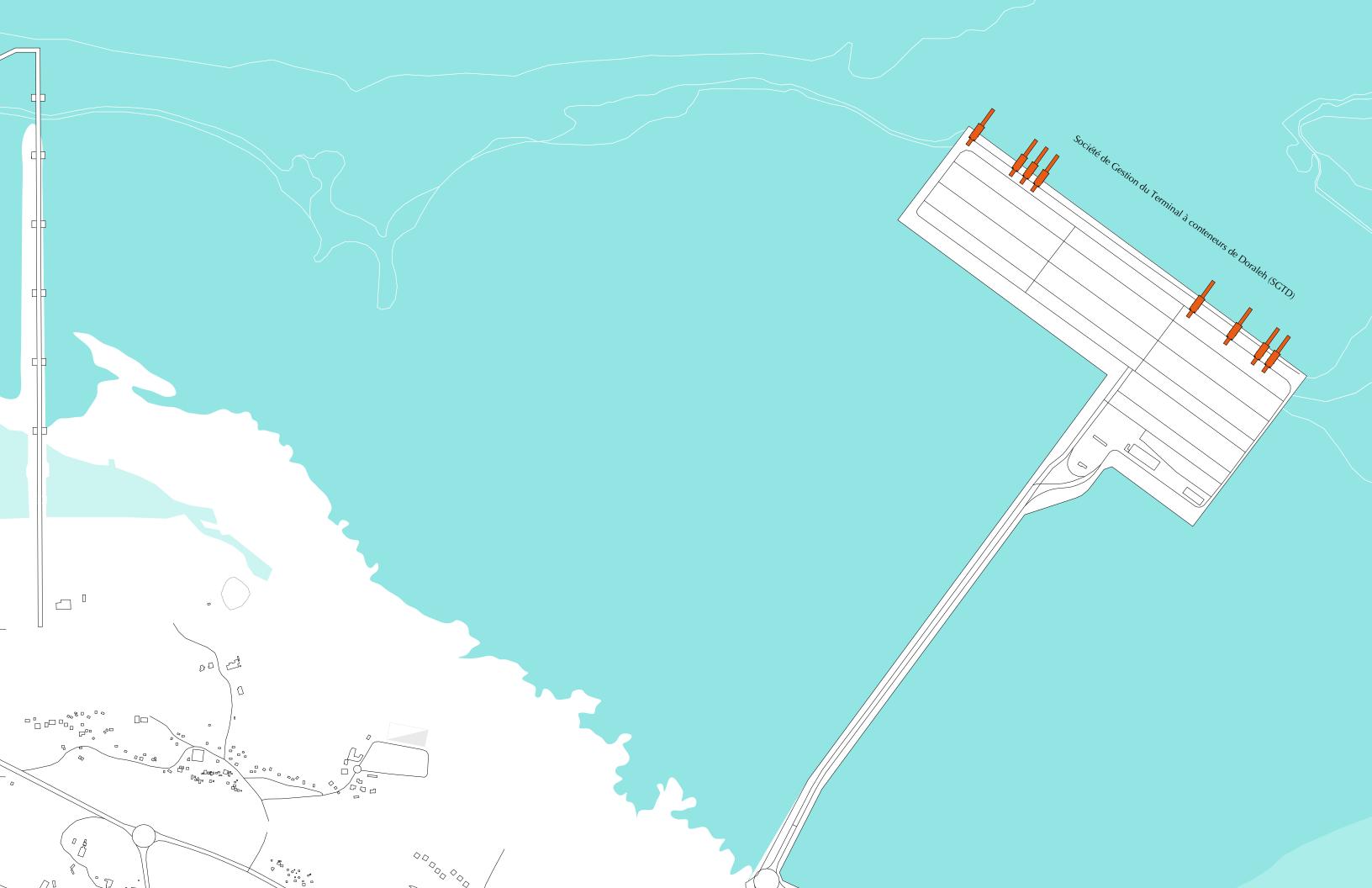


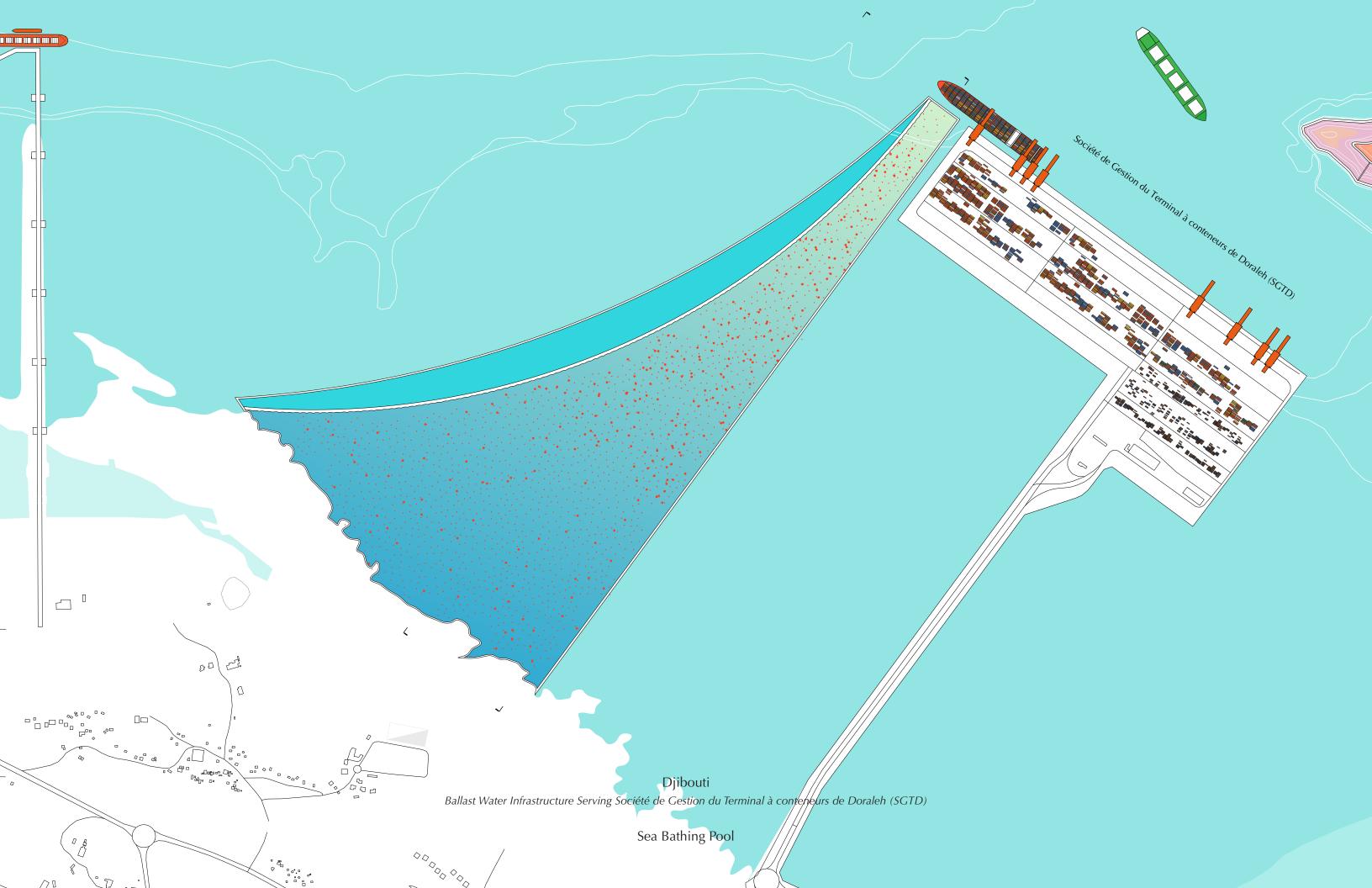
Ballast Water Infrastructure serving Djibouti Container Terminal - Jabuuti, Oct., 2020

There are two seasons in Djibouti. The salt production period coincides the dry season. The changing salinity renders the different colors of the salt ponds. These changes occur in a yearly cycle.

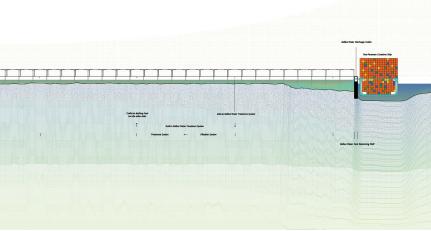


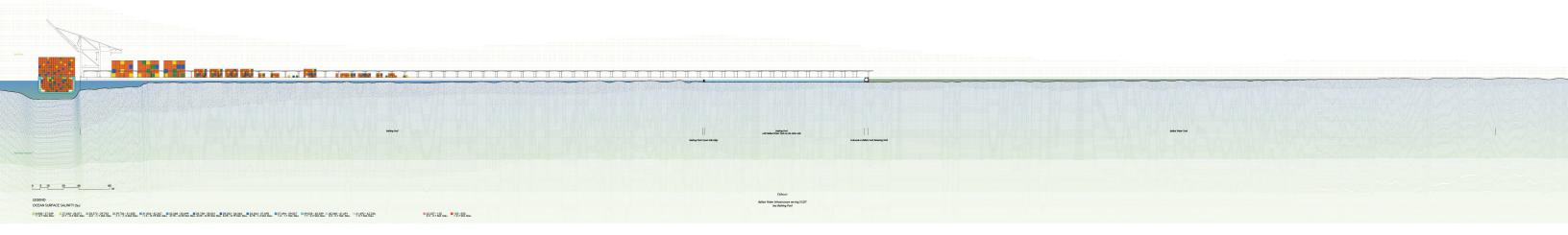
Ballast Water Infrastructure serving Djibouti Container Terminal - Jabuuti, Apr., 2020



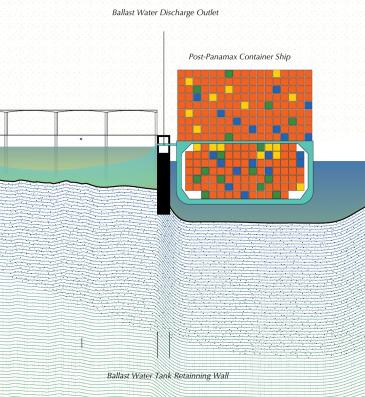


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LEGEND OCEAN SURFACE SALINITY (%) © 002-37 868 6%,	210-32 527	-2744% -2645 Dec. #2244-29427. -2645 Dec. #21-27.641 Dec. #21-27.641 Dec. #217841 Dec.	42,237 - 135 22 - 27 faid Dex. ■ 125 - 260 > 27 faid. Dex.			Ballast Womer Infoam Sea Bath	cture serving SGDT ig Pool			

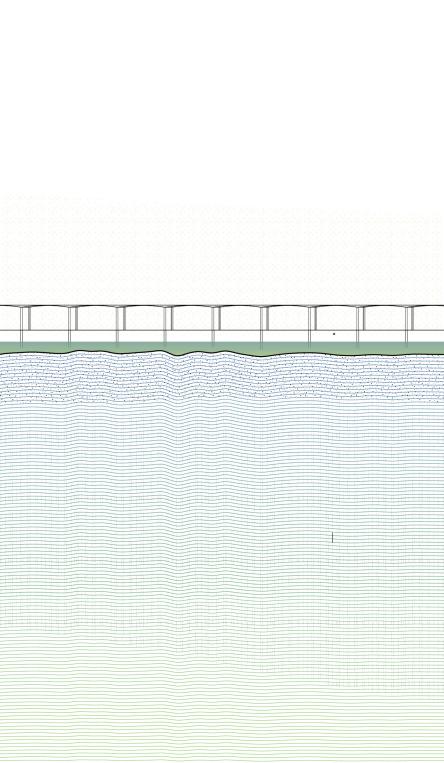




Outlet to Bathing Pool (on the other side) Inlet to Ballast Water Treatment System 1 Built-in Ballast Water Treatment System Ļ 1 Treatment System



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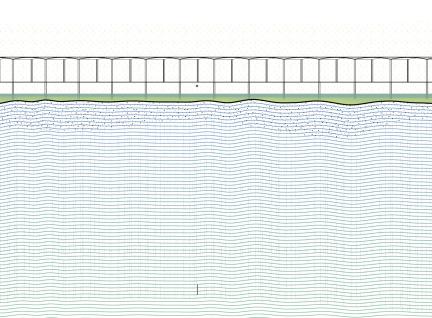
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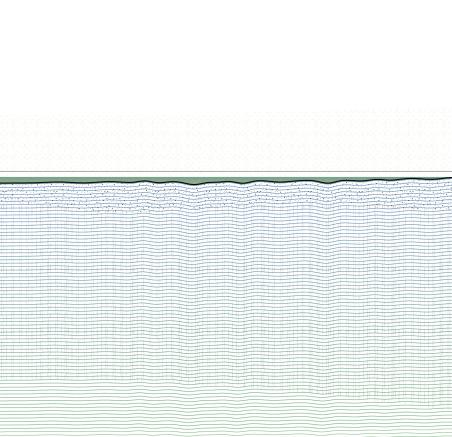
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Salt Water Intrusi	ion														
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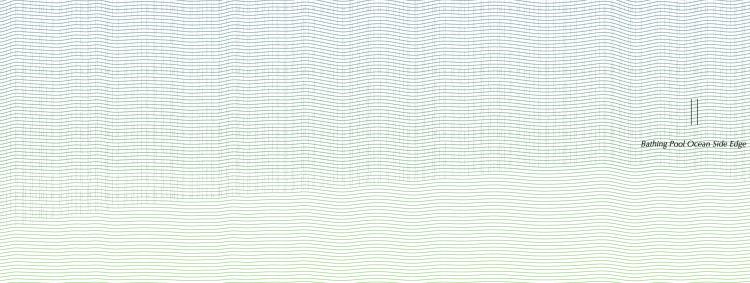


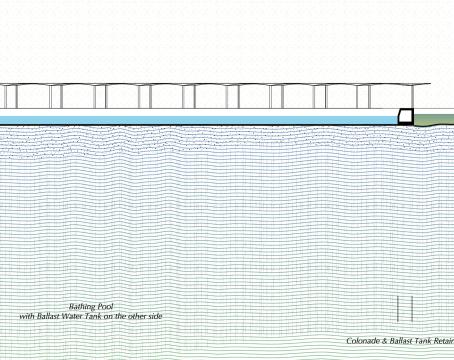
Ballast Water Tank

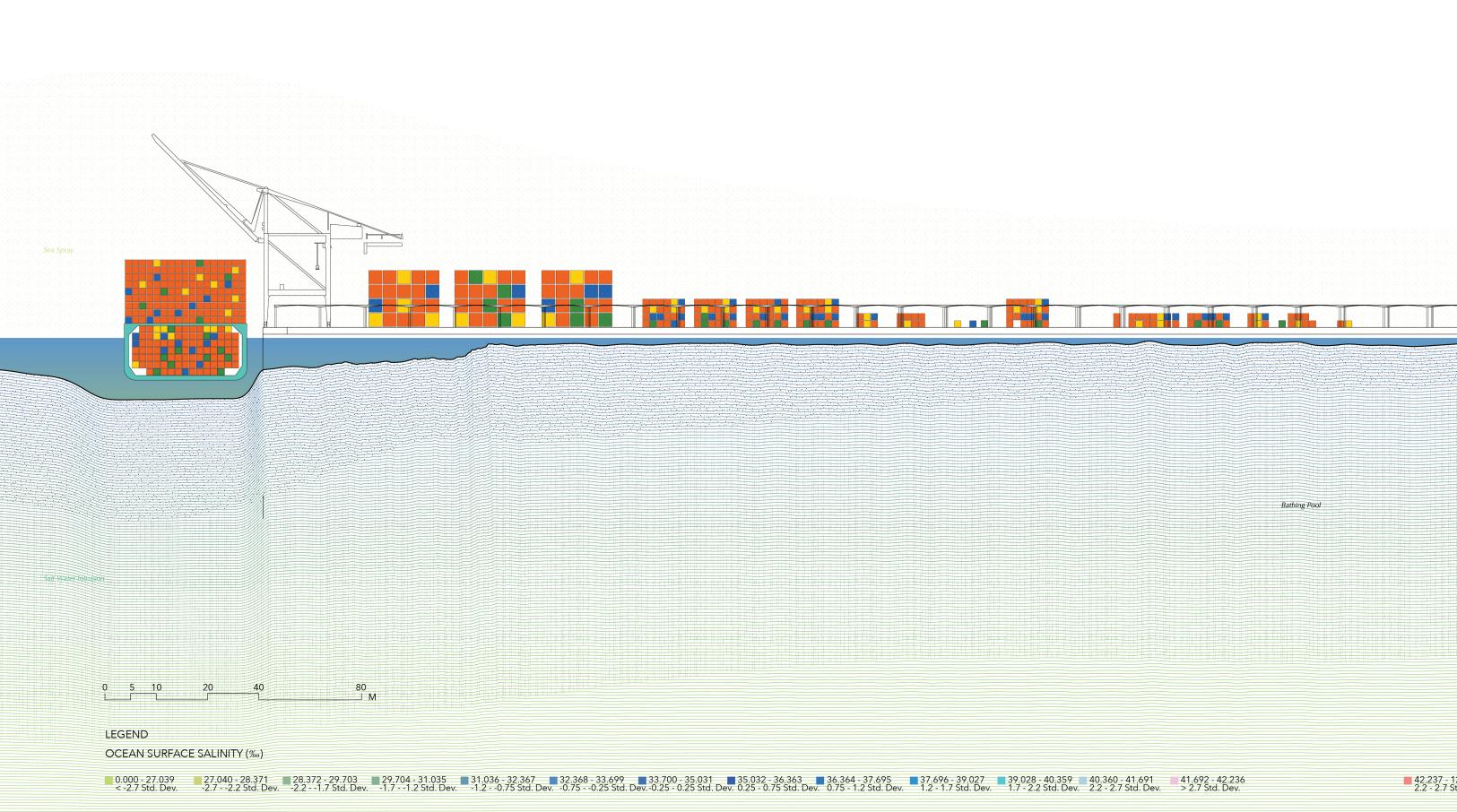
ning Wall

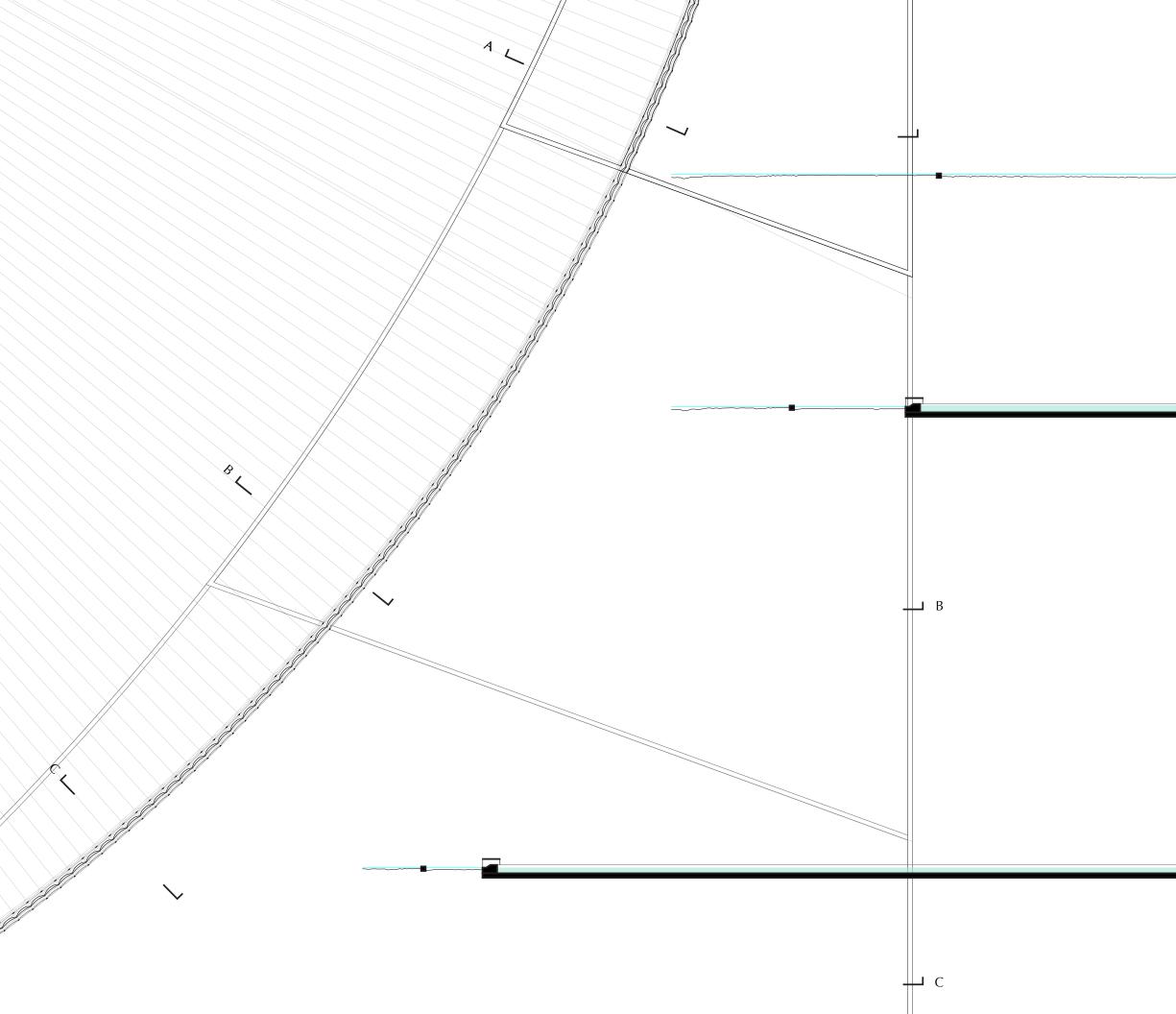


Ballast Water Tank











Section B-B









In other cities by the sea, similar landscape infrastructures are imagined



Horizon is defined, in slightly varied ways that respond to local climates.



Providing shelter



Offering openess

BILD-

B



With modest materials

CONTRACTOR DE LE CONTRACTOR DE LA CONTRACT



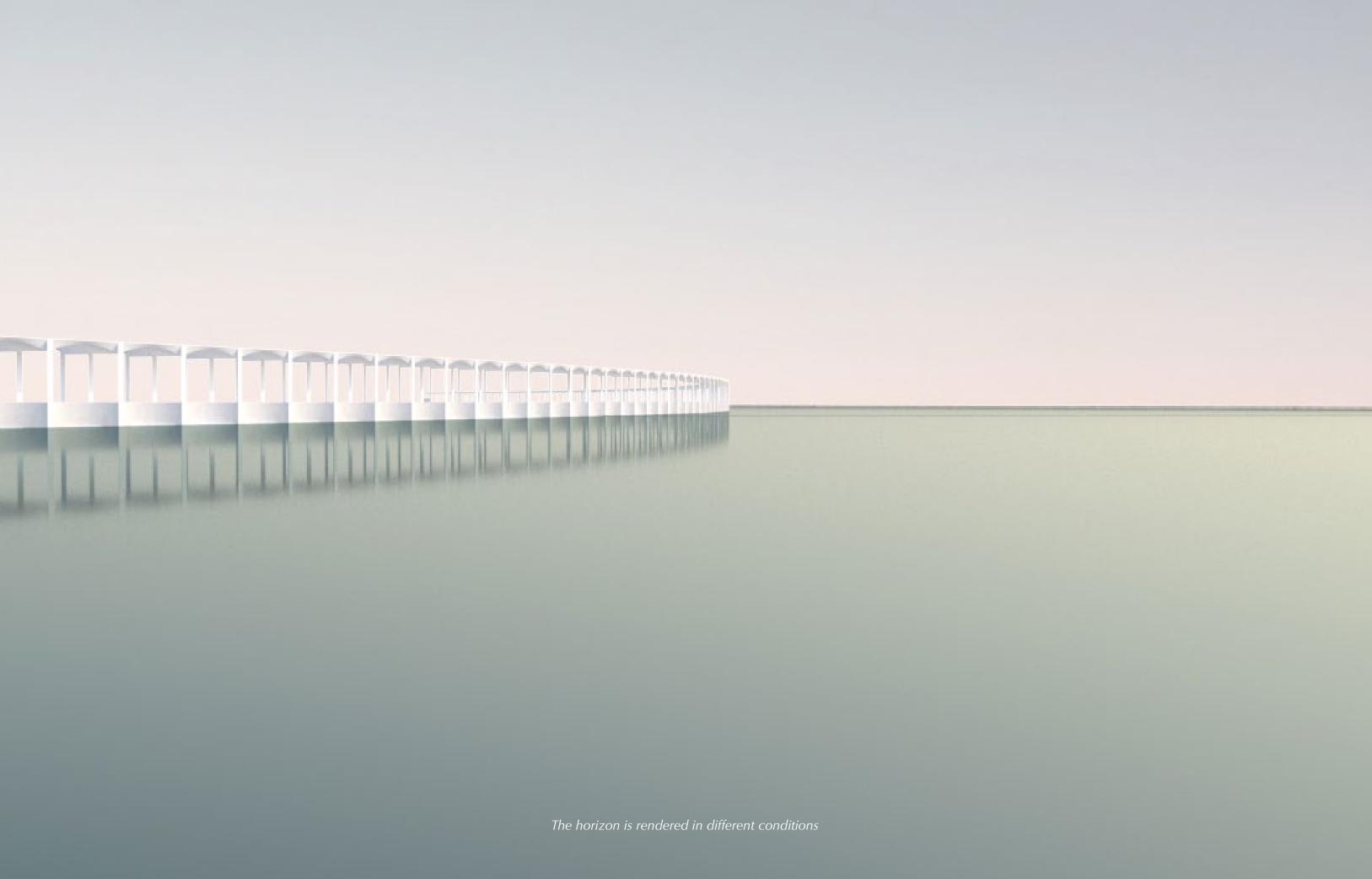
The poverty of materiality emphasizes the different qualities of water



It brings forward the ambiguities between natural and artificial

. . .



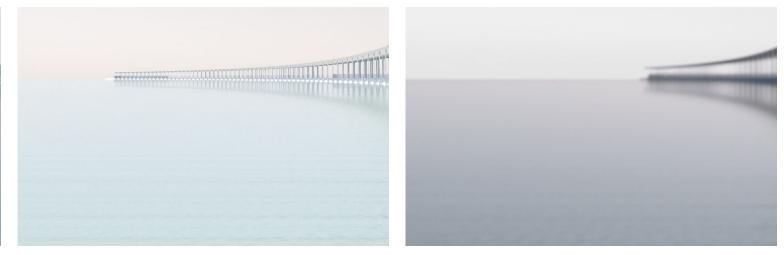


Through time

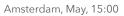


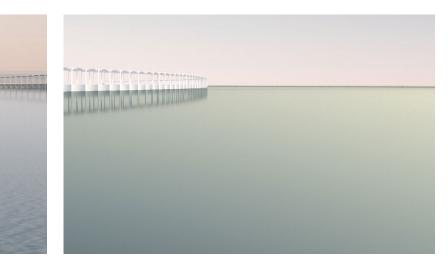






Amsterdam, July, 15:00





California, May, 17:45

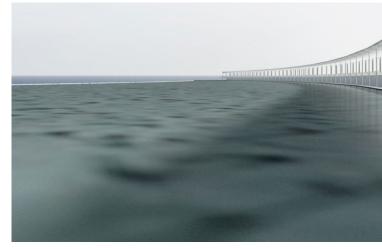


Oslo, April, 08:19

Djibouti, July, 14:00







Djibouti, August, 17:55

Djibouti, July, 14:00

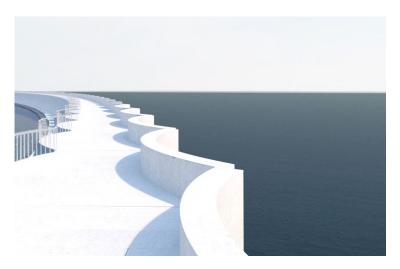
GENERIC SPECIFICITY

California, June, 07:33

Indonisia, July, 10:45



California, June, 18:35



Amsterdam, July, 15:00

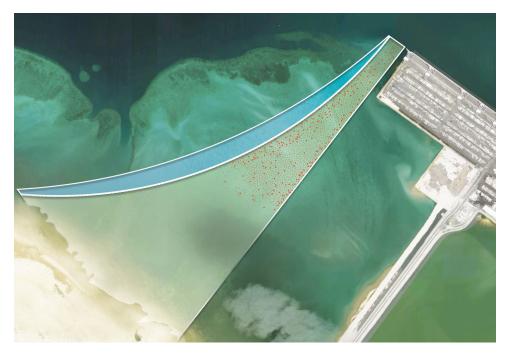
The poverty of materials and the nakedness of bathing pools enhance a sense of equality

~





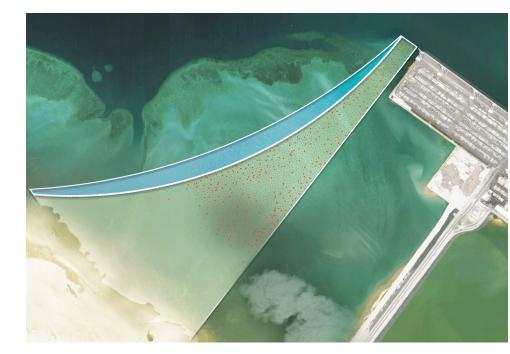
Ballast Water Infrastructure Serving Société de Gestion du Terminal à conteneurs de Doraleh (SGTD) - Djibouti, Jun. 16th 10:00, 2021



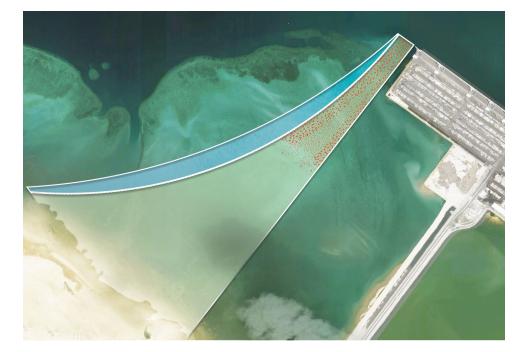
Ballast Water Infrastructure Serving Société de Gestion du Terminal à conteneurs de Doraleh (SGTD) - Djibouti, Jun. 16th 12:30, 2021



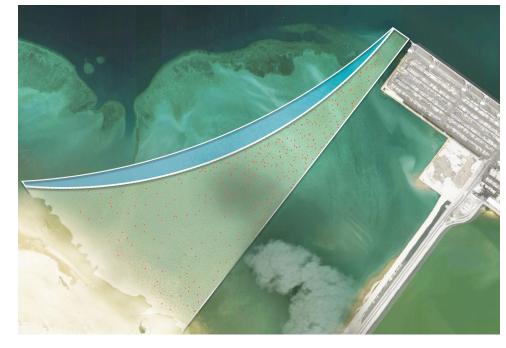
Ballast Water Infrastructure Serving Société de Gestion du Terminal à conteneurs de Doraleh (SGTD) - Djibouti, Jun. 16th 10:50, 2021



Ballast Water Infrastructure Serving Société de Gestion du Terminal à conteneurs de Doraleh (SGTD) - Djibouti, Jun. 16th 13:20, 2021



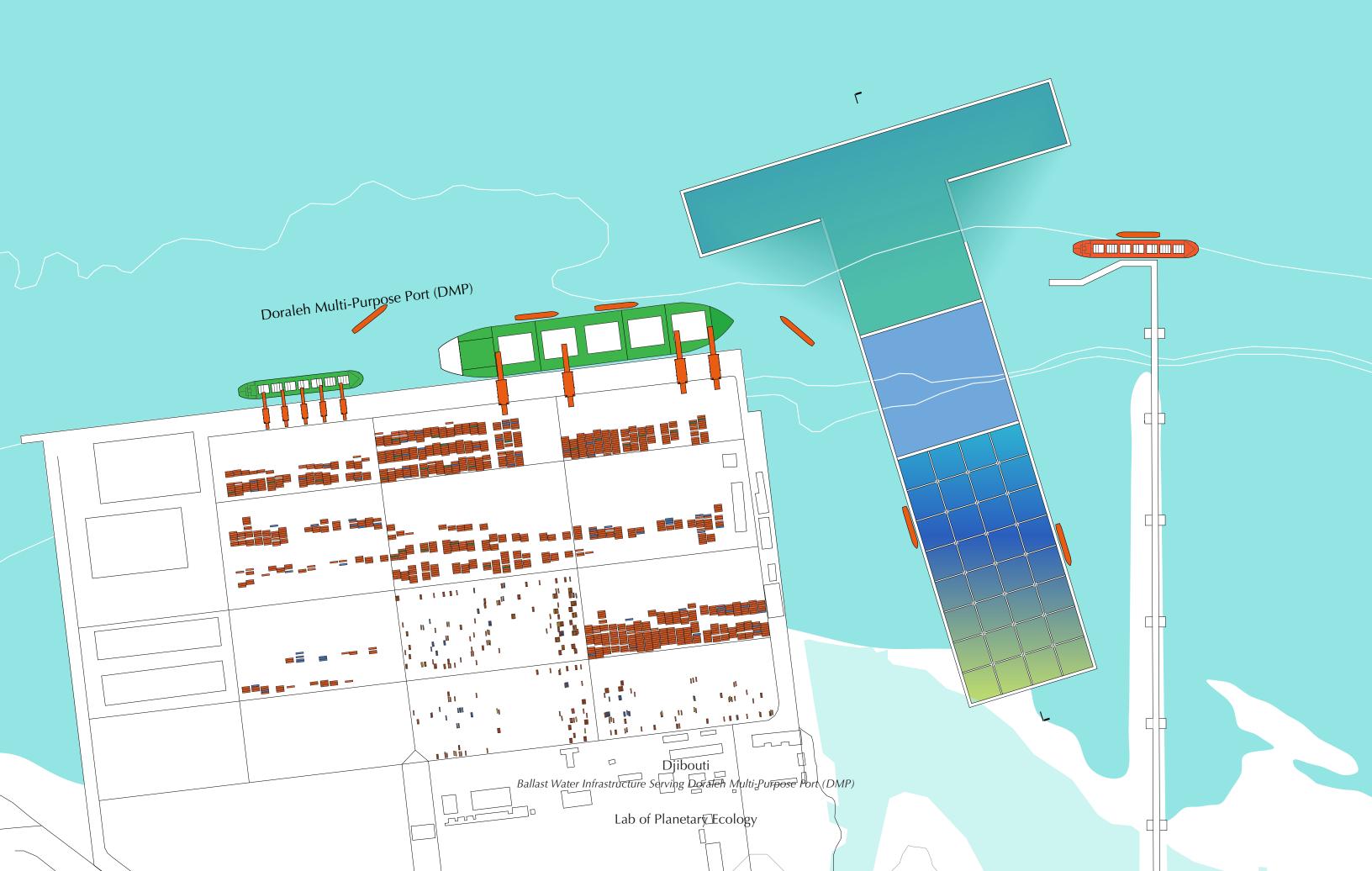
Ballast Water Infrastructure Serving Société de Gestion du Terminal à conteneurs de Doraleh (SGTD) - Djibouti, Jun. 16th 11:40, 2021

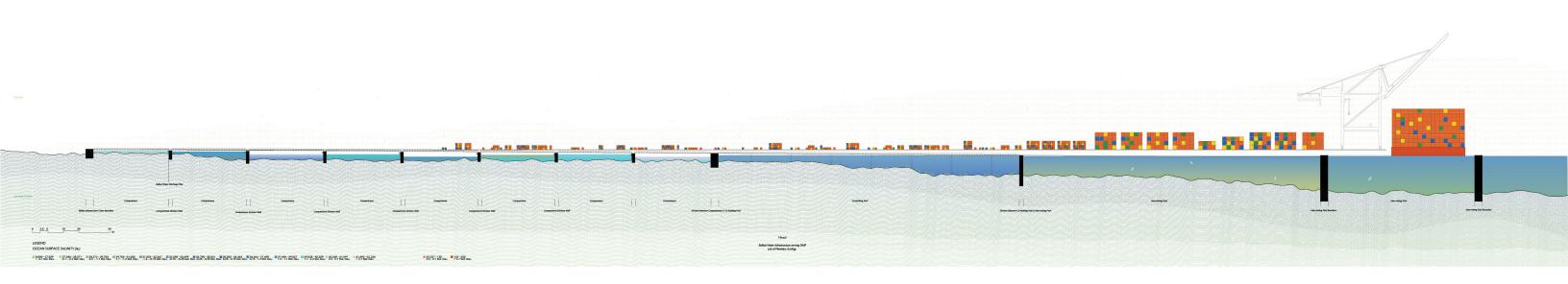


Ballast Water Infrastructure Serving Société de Gestion du Terminal à conteneurs de Doraleh (SGTD) - Djibouti, Jun. 16th 14:10, 2021

The temporality of the infrastructure is defined by the pumping rates and the sizes of the ballast tank. Typically, in a period of six hours, the ballast tank will be emptied. The fan-shaped tank exaggerates the stratification of organisms of different sizes as they are distributed according to their resistance to water flow.







Salt Water Intrus

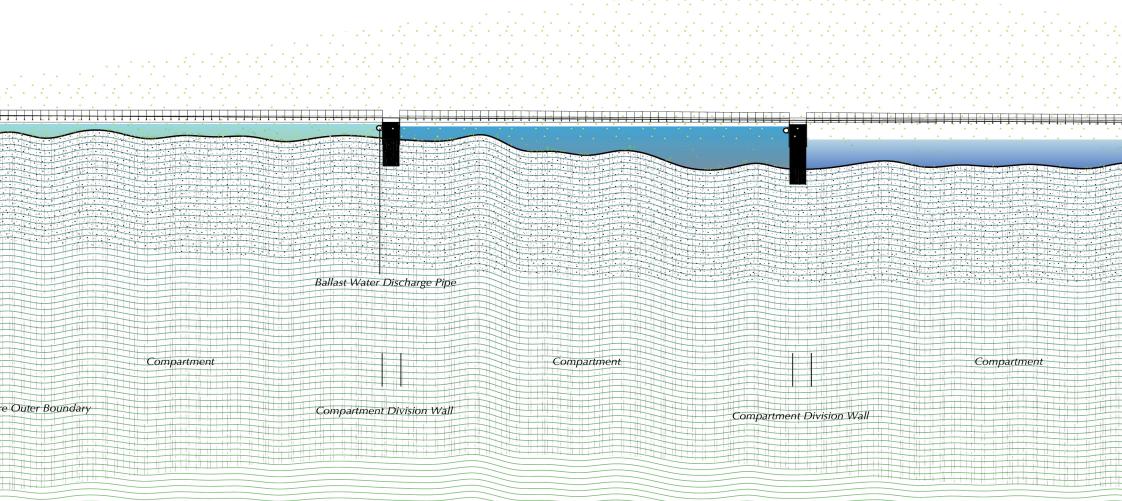
Ballast Infrastructure Outer Boundary

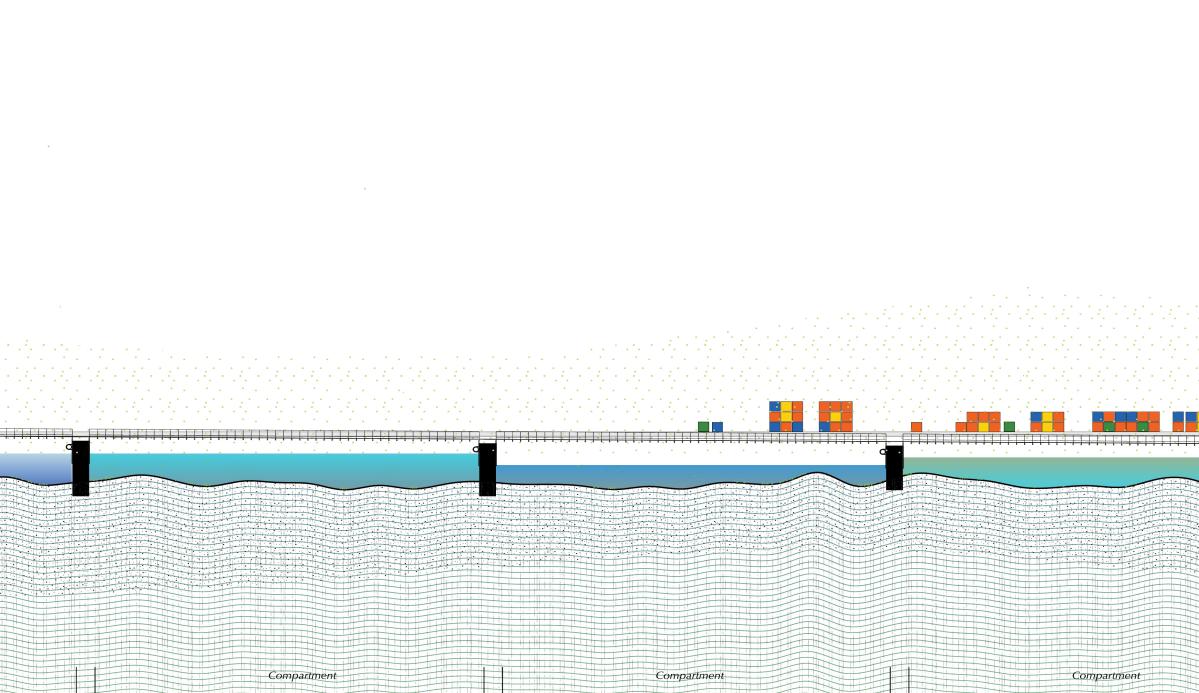
Compartment

Ballast Water Discharge Pipe

Compartment

Compartment Division Wall

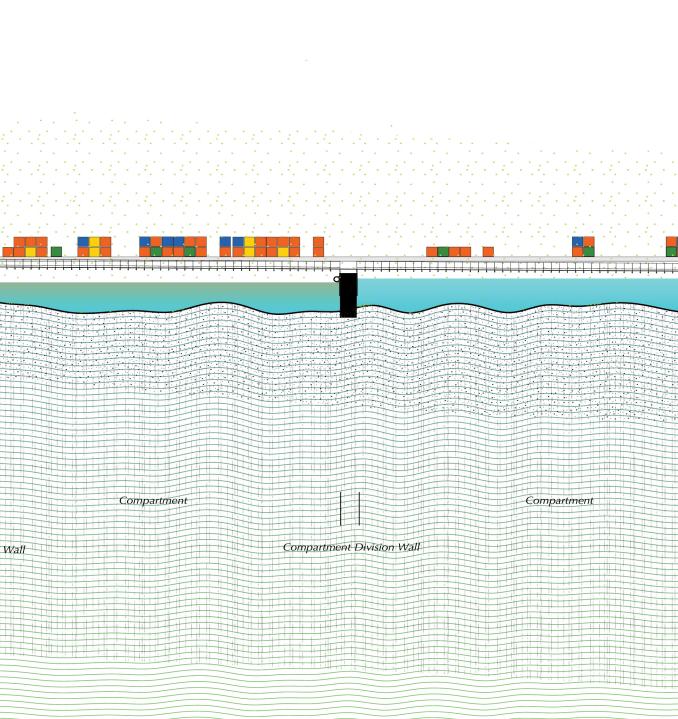


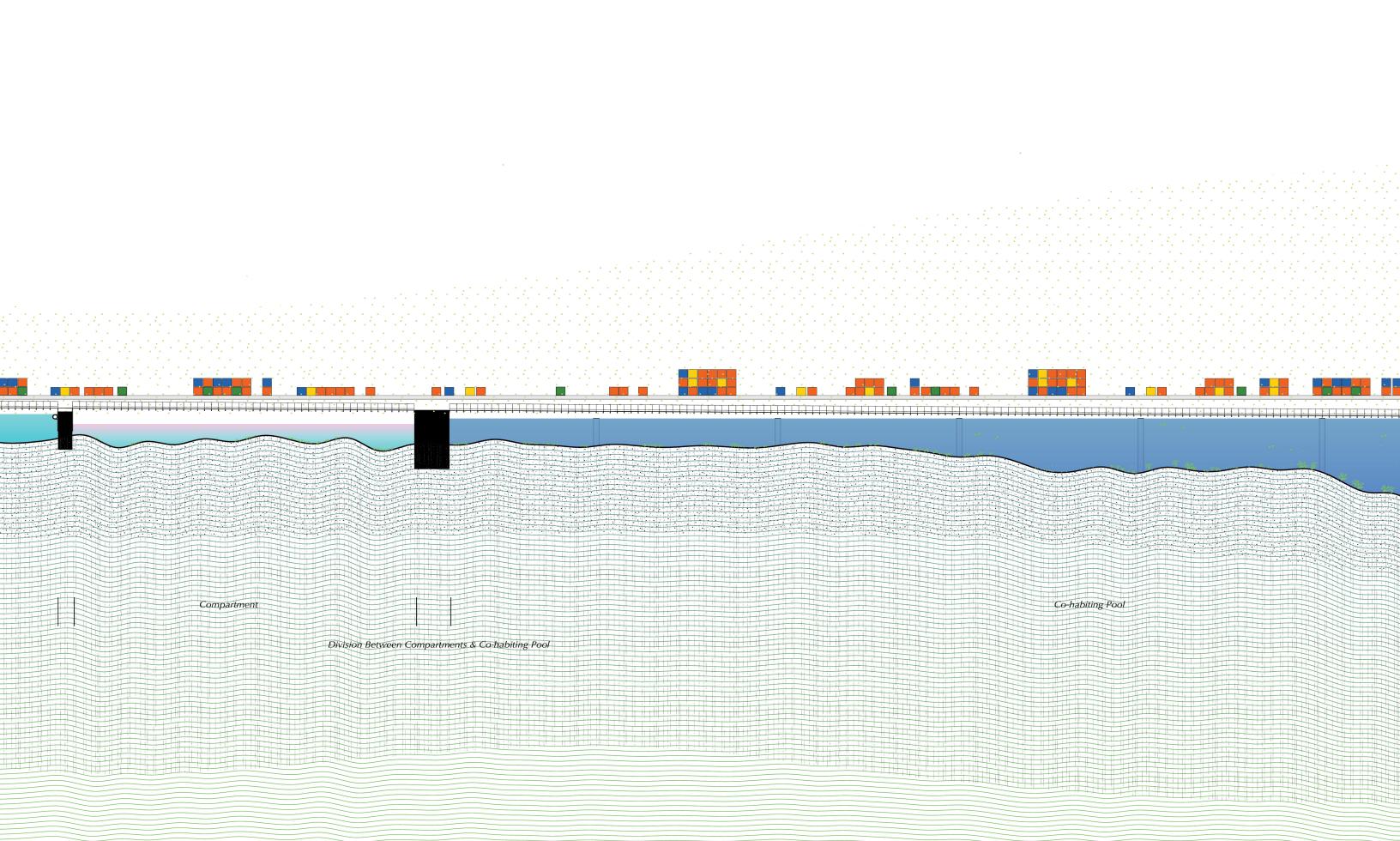


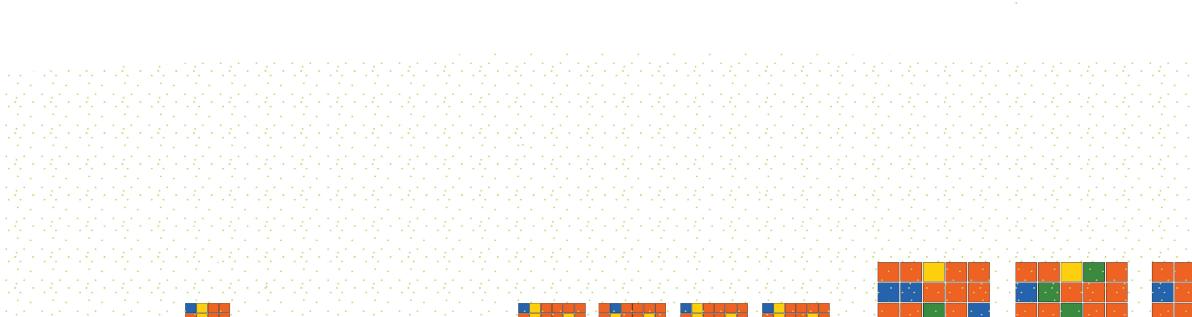
Compartment Division Wall

Compartment Division Wall

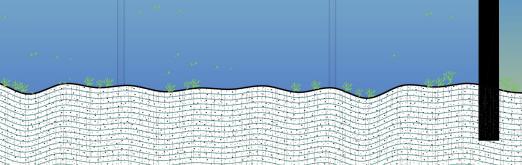
Compartment Division Wall



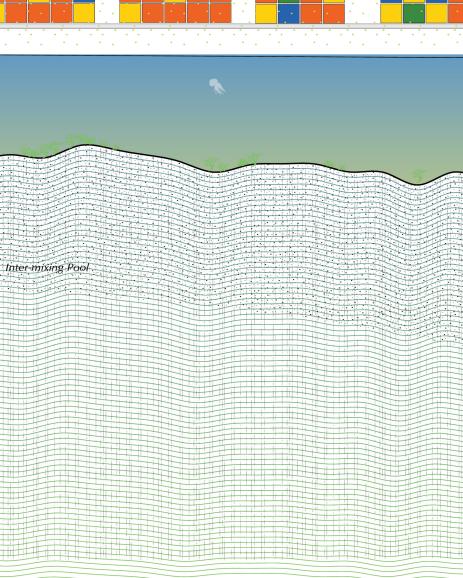


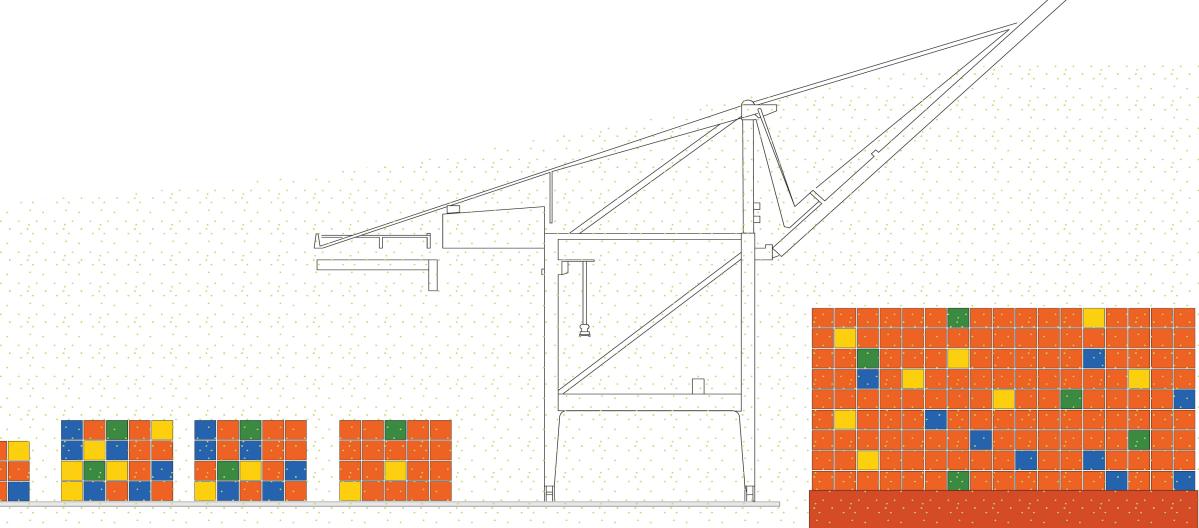


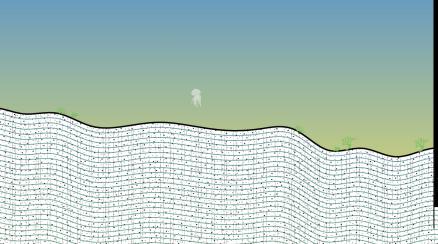


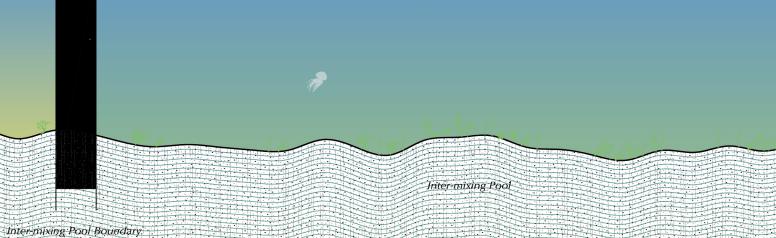




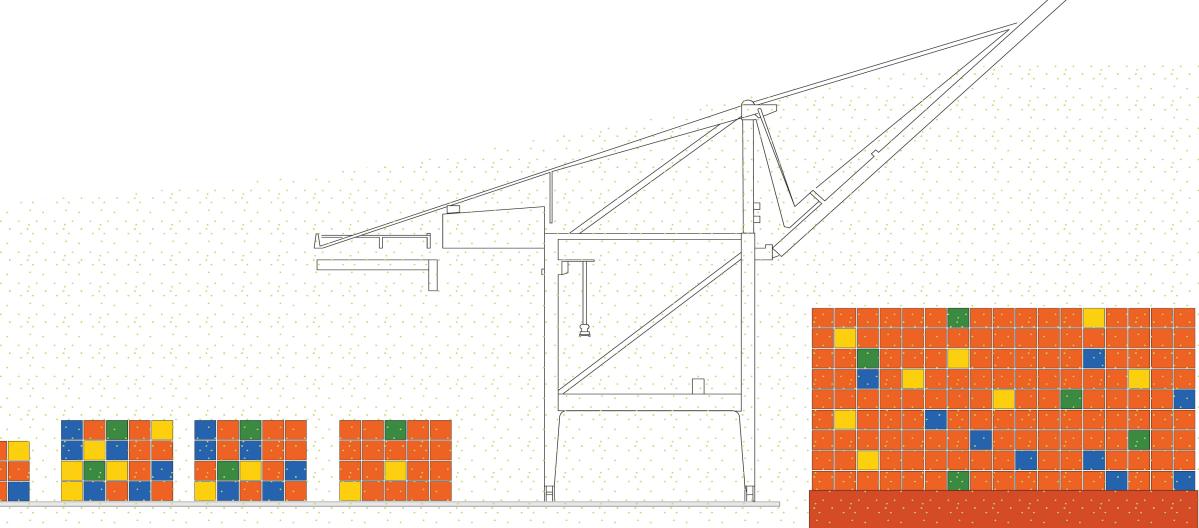


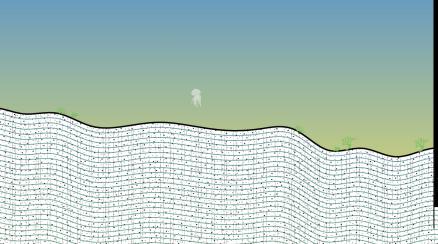


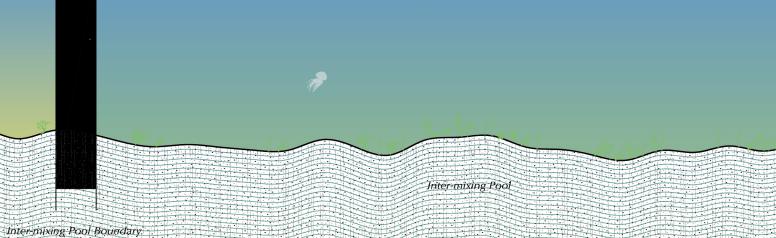




Inter-mixing Pool Boundary







Inter-mixing Pool Boundary

The boundaries of the infrastructure serve as a public promenade. It allows people to walk through bio-environments from different parts of the



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Ballast Water Infrastructure Serving Doreleh Multi-Purporse Port - Yibuuti, Jan. 1st, 2021



Ballast Water Infrastructure Serving Doreleh Multi-Purporse Port - Yibuuti, Jan. 15th, 2021



Ballast Water Infrastructure Serving Doreleh Multi-Purporse Port - Yibuuti, Apr., 2021



Ballast Water Infrastructure Serving Doreleh Multi-Purporse Port - Yibuuti, May., 2021

The extreme climate of Djibouti would alter the natural cycles of organisms, creating spontaneous emergence at unexpected points in time.



Ballast Water Infrastructure Serving Doreleh Multi-Purporse Port - Yibuuti, Feb. 7th, 2021

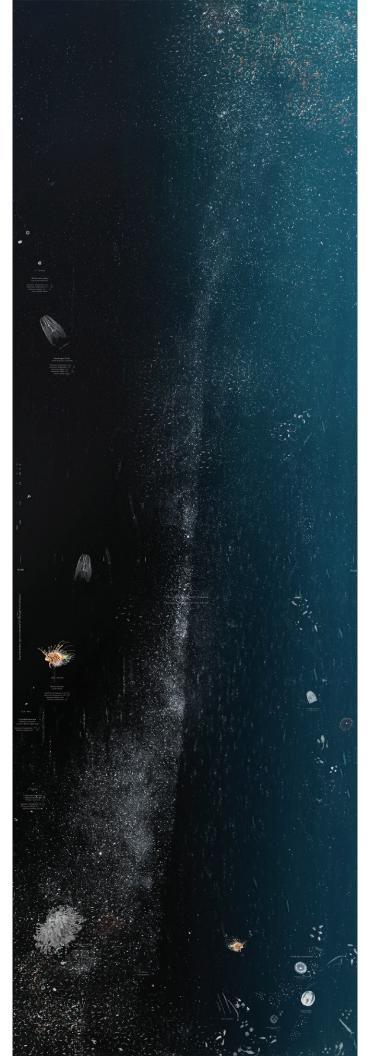


Ballast Water Infrastructure Serving Doreleh Multi-Purporse Port - Yibuuti, Jun. 2021

RECIPROCITY BETWEEN FATHOMABLE AND UNFATHOMABLE

"If we were to consider landscape architecture as an active agent in the play of evolutionary intervention, how would one have to construe ecology and creativity in design practice? In what ways would they have to be appropriated for landscape architecture to function as a significant evolutionary agent - one that might develop greater diversity and reciprocity between the cultural world and unmediated Nature? Of what would such a creative ecology consist?"

Corner, James, and Alison Bick Hirsch. 2014. The Landscape Imagination : Collected Essays of James Corner, 1990-2010. First edition. New York: Princeton Architectural Press.





15 - 30 mm

Chthamalus proteus Crustaceans-Barnacles

Minimum Temperature (°C) 16 Maximum Temperature (°C) 38 Minimum Salinity (‰) 22 Broad Salinity Range



Mnemiopsis leidyi North American comb jelly

100-120mm

Minimum Temperature (°C) 4 Maximum Temperature (°C) 31 Minimum Salinity (‰) 3 Maximum Salinity (‰) 39 Broad Salinity Range





200 - 300 mm

Pterois volitans Devil Firefish

Minimum Temperature (°C) 9.5 Maximum Temperature (°C) 39.5 Minimum Salinity (‰) 7 Maximum Salinity (‰) 36

0.5 - 4mm

0

Crepidula fornicata Mollusks-Gastropods common Atlantic slippersnail

Minimum Temperature (°C) 0 Minimum Salinity (‰) 15



1 - 2.5mm

Tubastraea coccinea Cnidarians-Anthozoans Orange Cup Coral

Minimum Temperature (°C) 15 Minimum Salinity (‰) 18 Maximum Salinity (‰) 40

Pro-



Undaria pinnatifida *Alga*e

Minimum Temperature (°C) 0 Maximum Temperature (°C) 27 Minimum Salinity (‰) 20 Maximum Salinity (‰) 37





leptomedusan hydromedusa -Phialella quadrata

0

Macroplankton

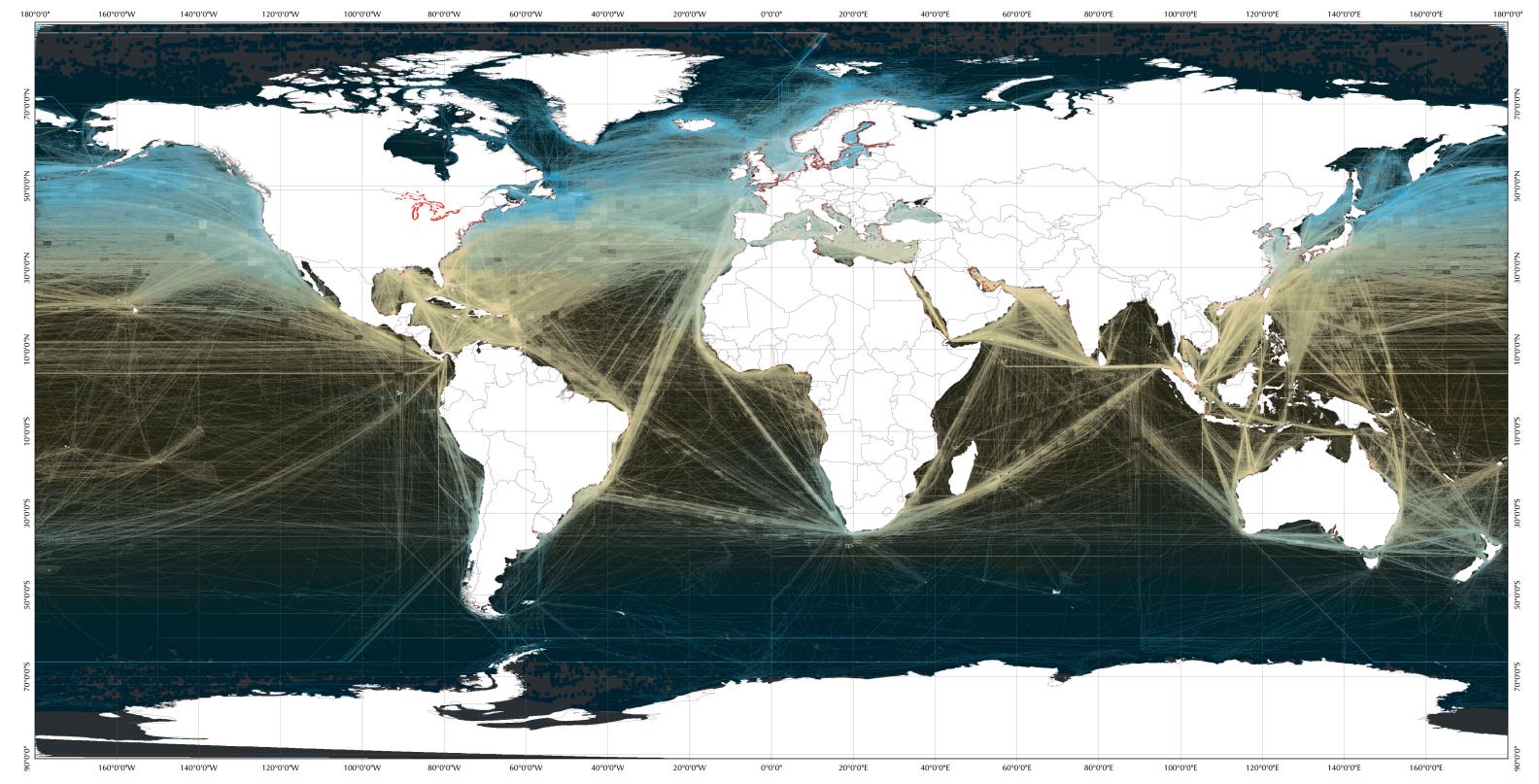
20 - 200mm



M

leptomedusan hydromedusa -Obelia spp cydippid ctenophore -Pleurobrachia pileus





Garcia H.E., T.P. Boyer, O.K. Baranova, R.A. Locarnini, A.V. Mishonov, A. Grodsky, C.R. Paver, K.W. Weathers, I.V. Smolyar, J.R. Reagan, D. Seidov, M.M. Zweng (2019). World Ocean Atlas 2018: Product Documentation. A. Mishonov, Technical Editor.

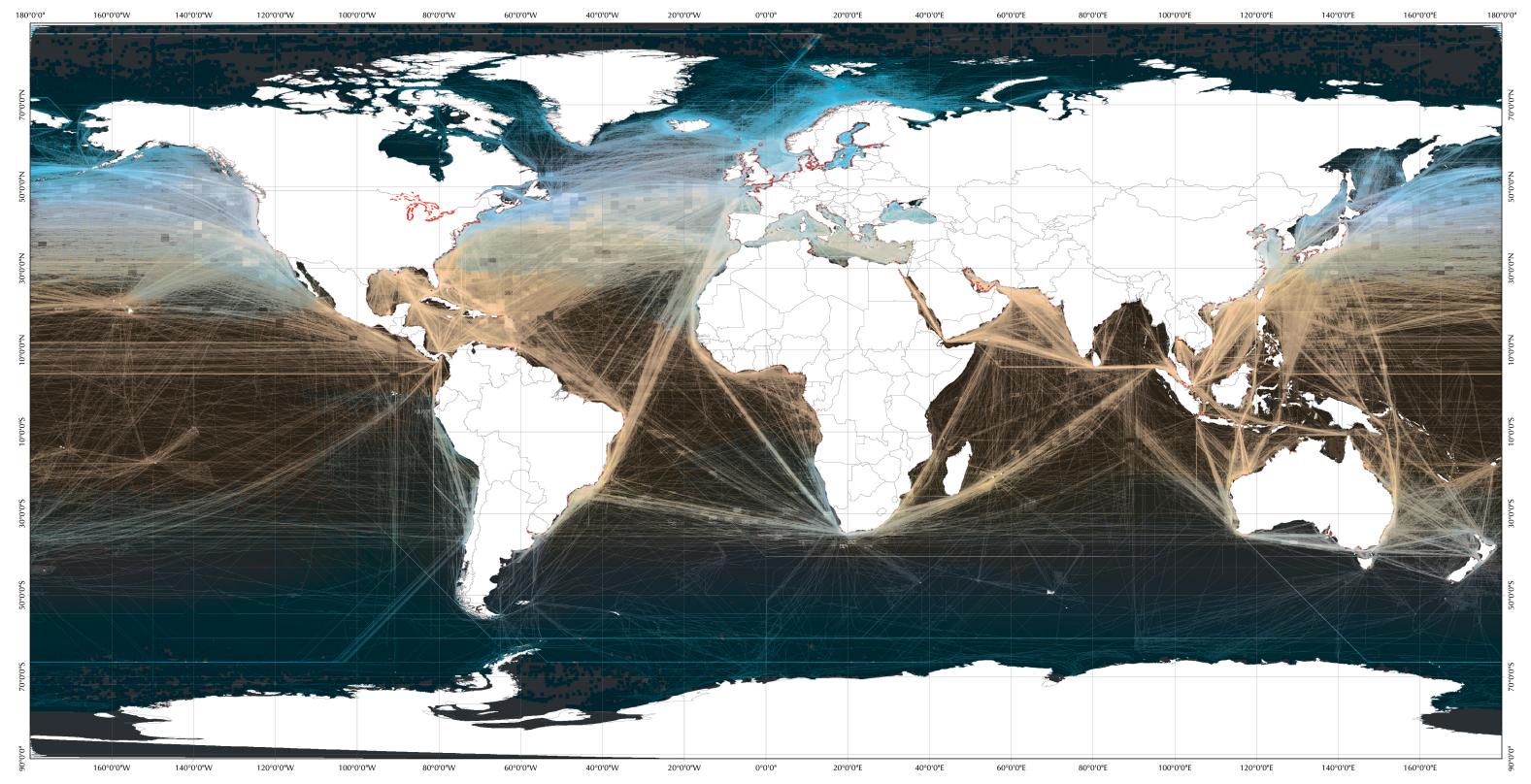
OCEAN SURFACE TEMPERATURE

0.2 - 20mm

Mesoplankton

1

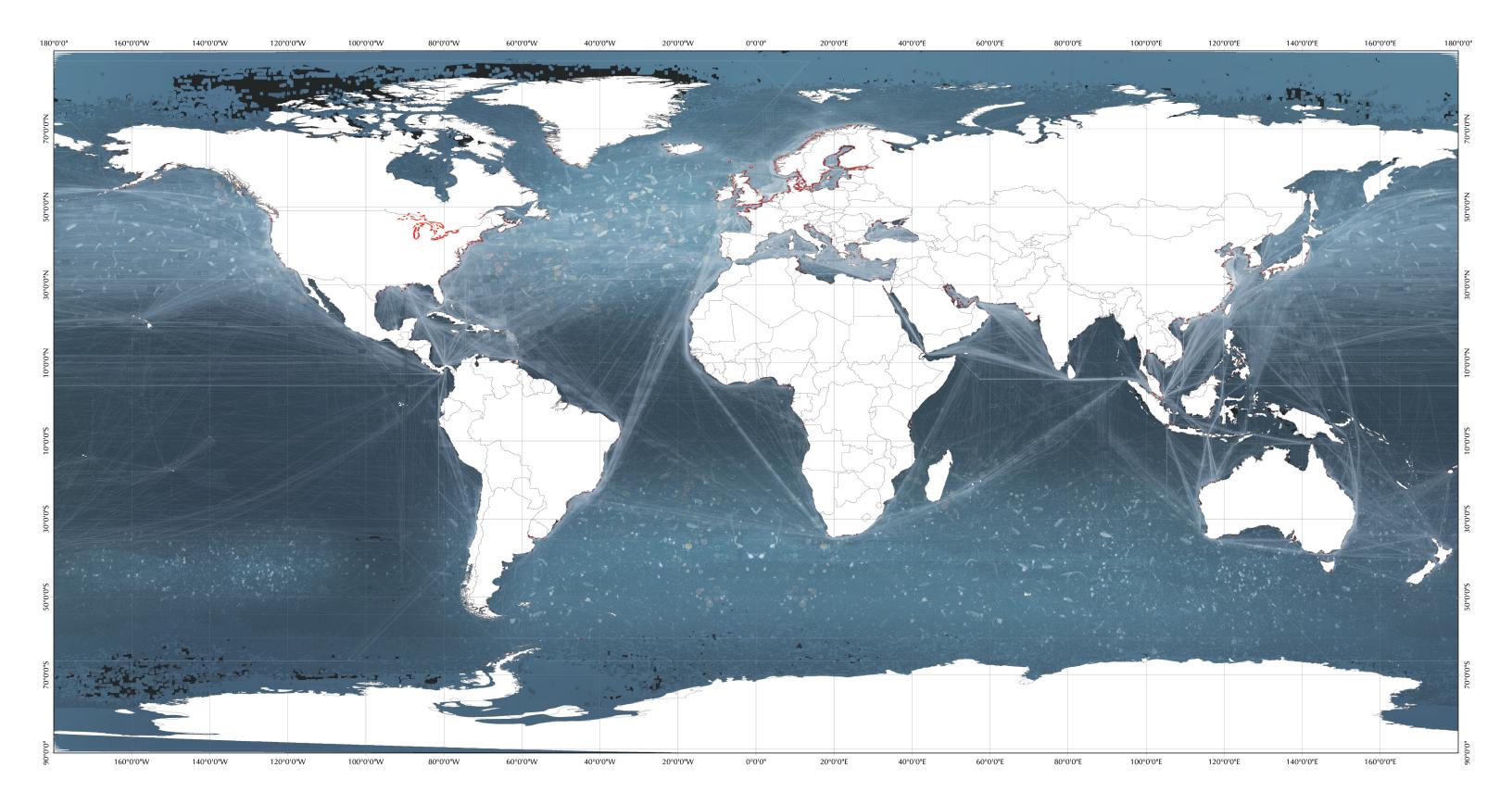
20 -200 μm Microplankton



Garcia H.E., T.P. Boyer, O.K. Baranova, R.A. Locarnini, A.V. Mishonov, A. Grodsky, C.R. Paver, K.W. Weathers, I.V. Smolyar, J.R. Reagan, D. Seidov, M.M. Zweng (2019). World Ocean Atlas 2018: Product Documentation. A. Mishonov, Technical Editor.

PROJECTED CHANGES IN OCEAN SURFACE TEMPERATURE

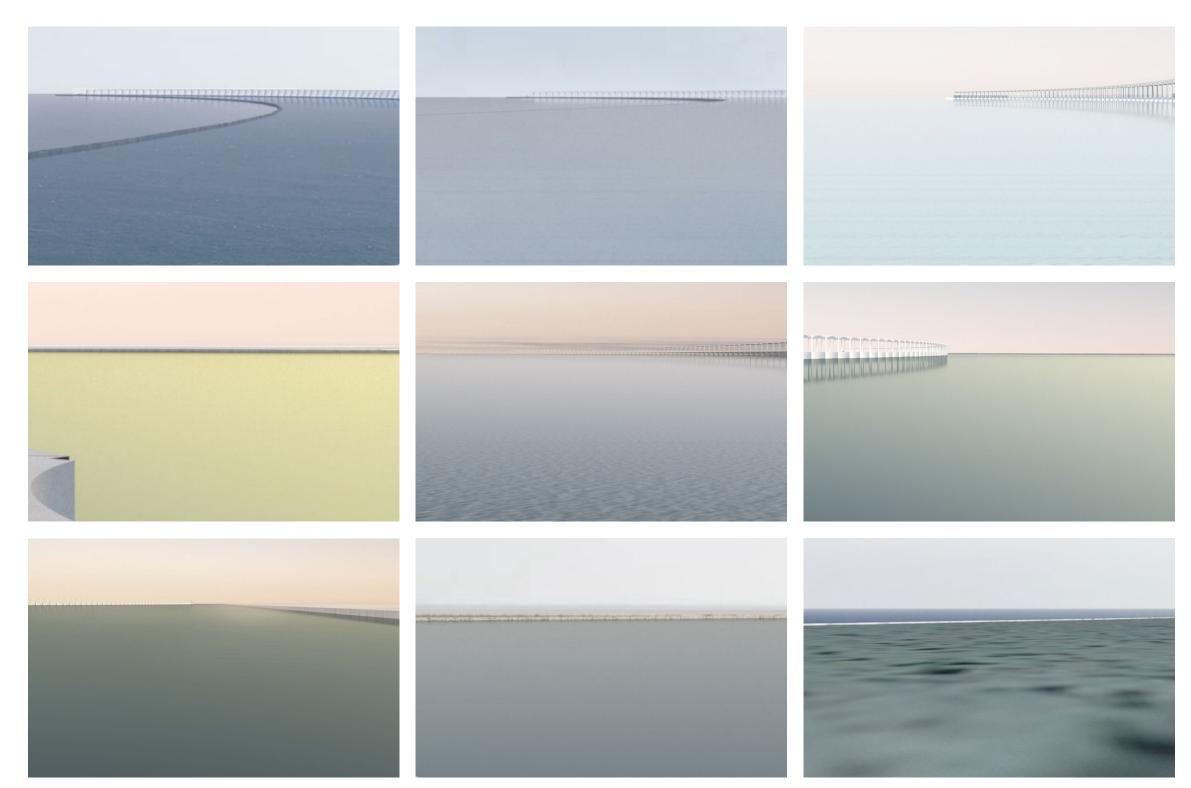




PHYTOPLANKTON MIGRATION DUE TO OCEAN TEMPERATURE CHANGE

Climate change, rising sea temperature, plankton migration, urbanization, growth, modernization, algae bloom, ... the continuous, constant changes alter the planet at unfathomable scales. In the same space, there are also the everyday lives experienced through the salty taste, the color of water, and the disappearing and reappearing horizon. Bridging the unfathomable macro and micro scales with the fathomable human experience, these infrastructures create public realms that accommodate uncertainties and keep the ambiance of ordinary lives in an unassuming, modest yet powerful manner.

1 A 1









Selected Bibliography:

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