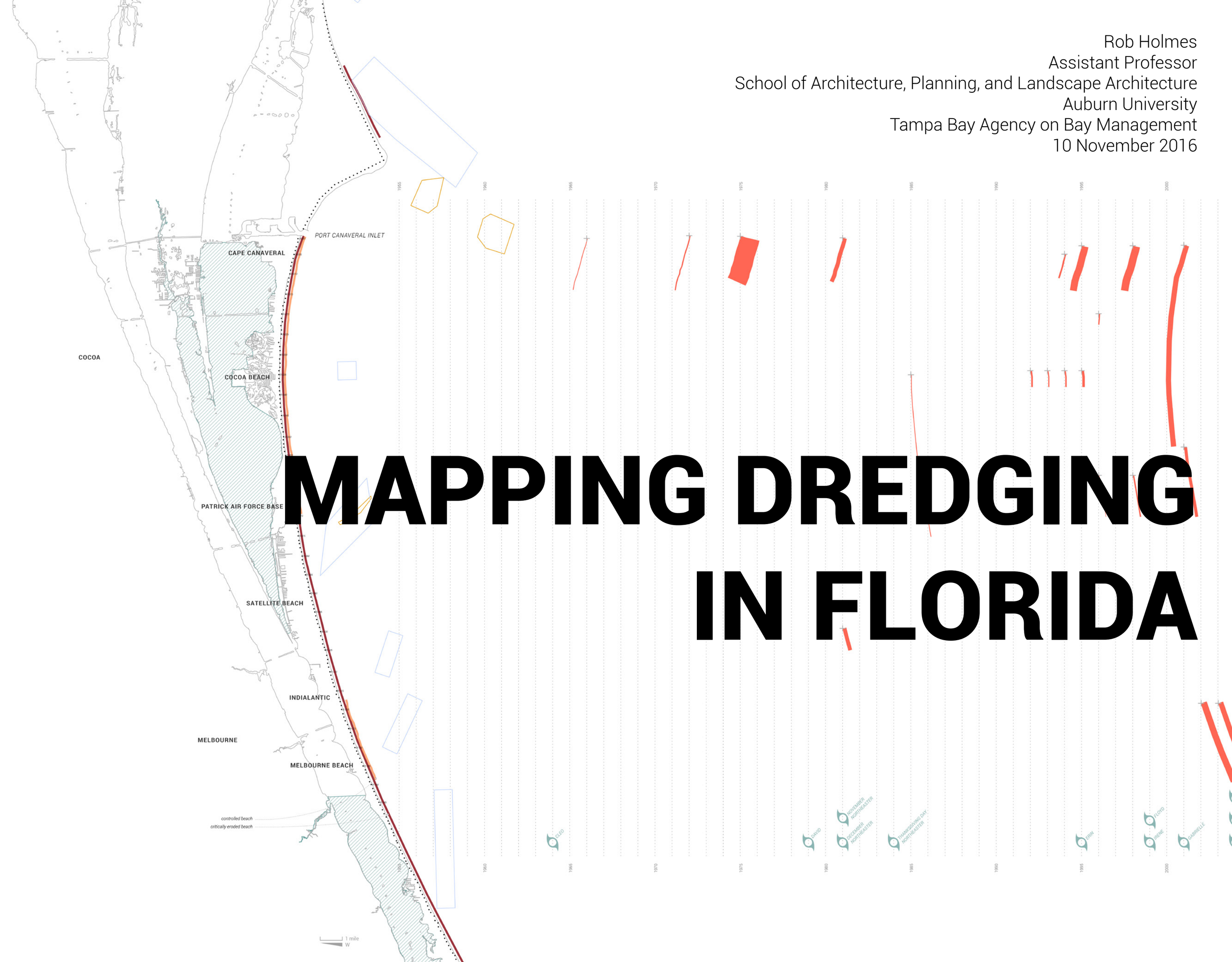
Rob Holmes
Assistant Professor
School of Architecture, Planning, and Landscape Architecture
Auburn University
Tampa Bay Agency on Bay Management
10 November 2016



MAPPING DREDGING IN FLORIDA

AUBURN UNIVERSITY

COLLEGE OF ARCHITECTURE, DESIGN AND CONSTRUCTION

Dredge Research Collaborative

MAPPING

Clearwater Pass
CLEARWATER
LARGO
PORT OF TAMPA
PALM RIVER-CLAIR MEL
PINELLAS PARK
LEALMAN
Johns Pass
ST. PETERSBURG
APOLLO BEACH
PORT OF ST PETERSBURG
GULFPORT
Blind Pass
PINELLAS COUNTY AQUATIC PRESERVE
BOCA CIEGA BAY AQUATIC PRESERVE
COCKROACH BAY AQUATIC PRESERVE
Bunces Pass East
PORT MANATEE
Egmont Channel
Southwest Channel
TERRA CEIA AQUATIC PRESERVE
Passage Key Inlet
PALMETTO
BRADENTON
Longboat Pass
BAYSHORE GARDENS
N
W
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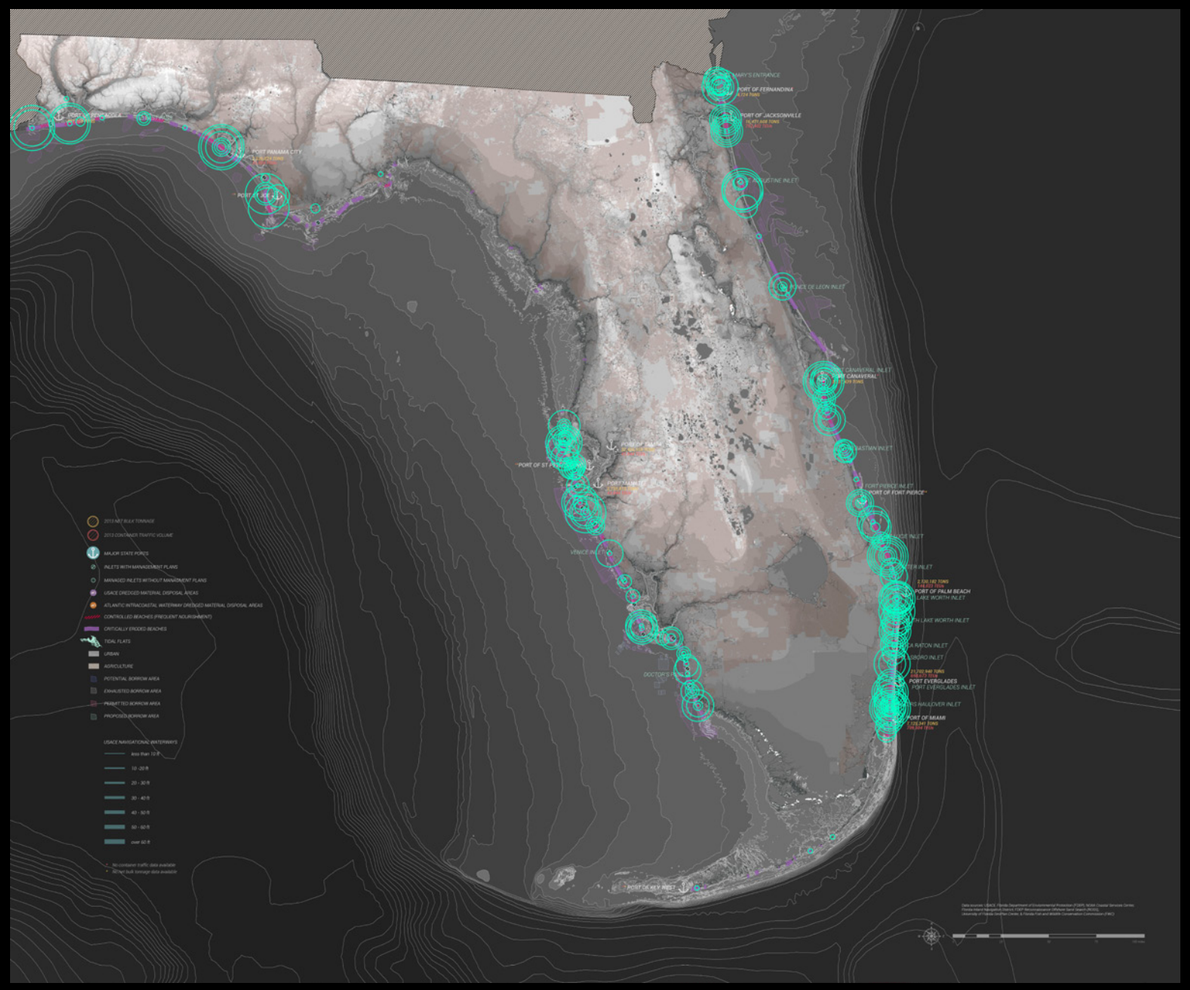
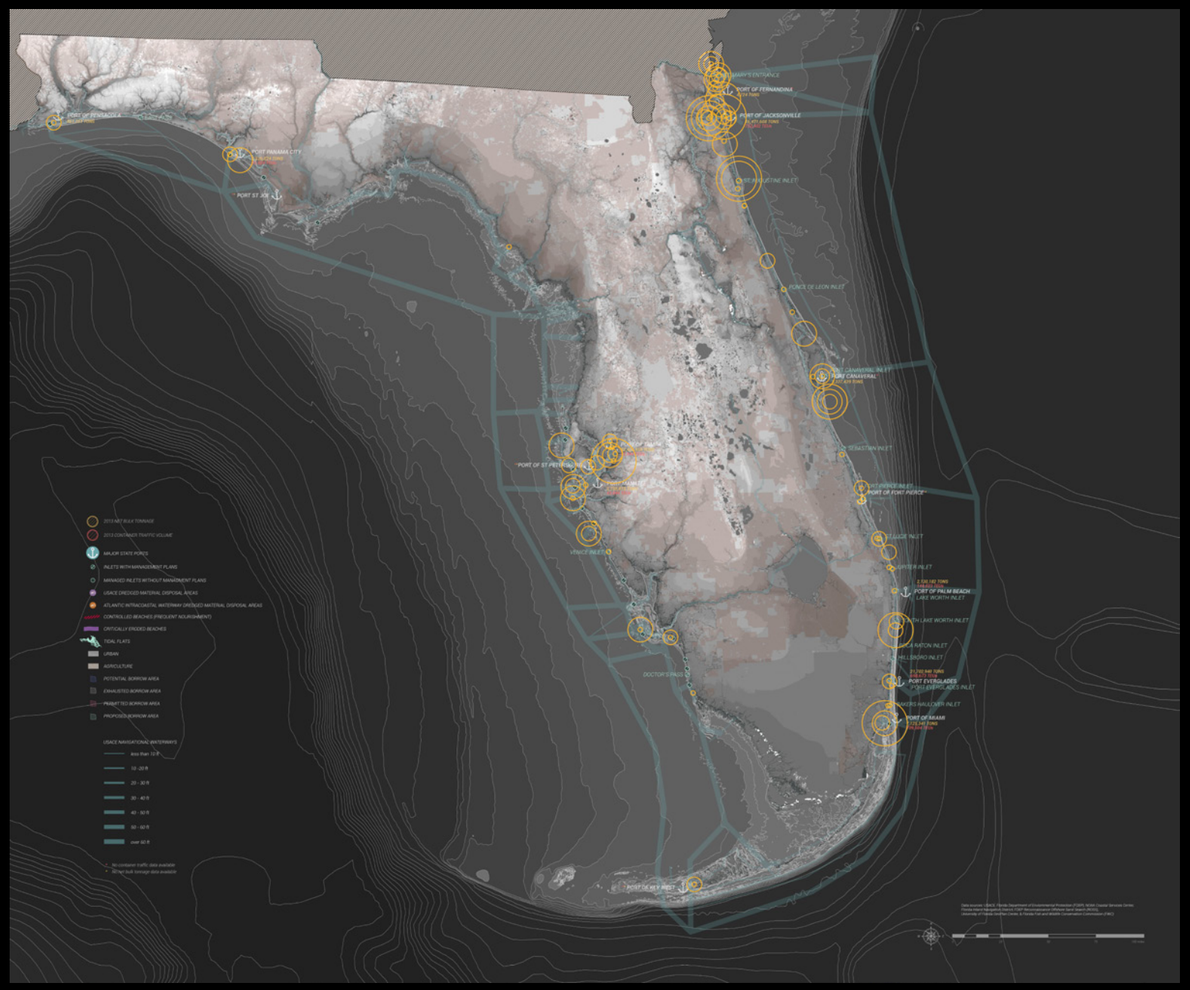
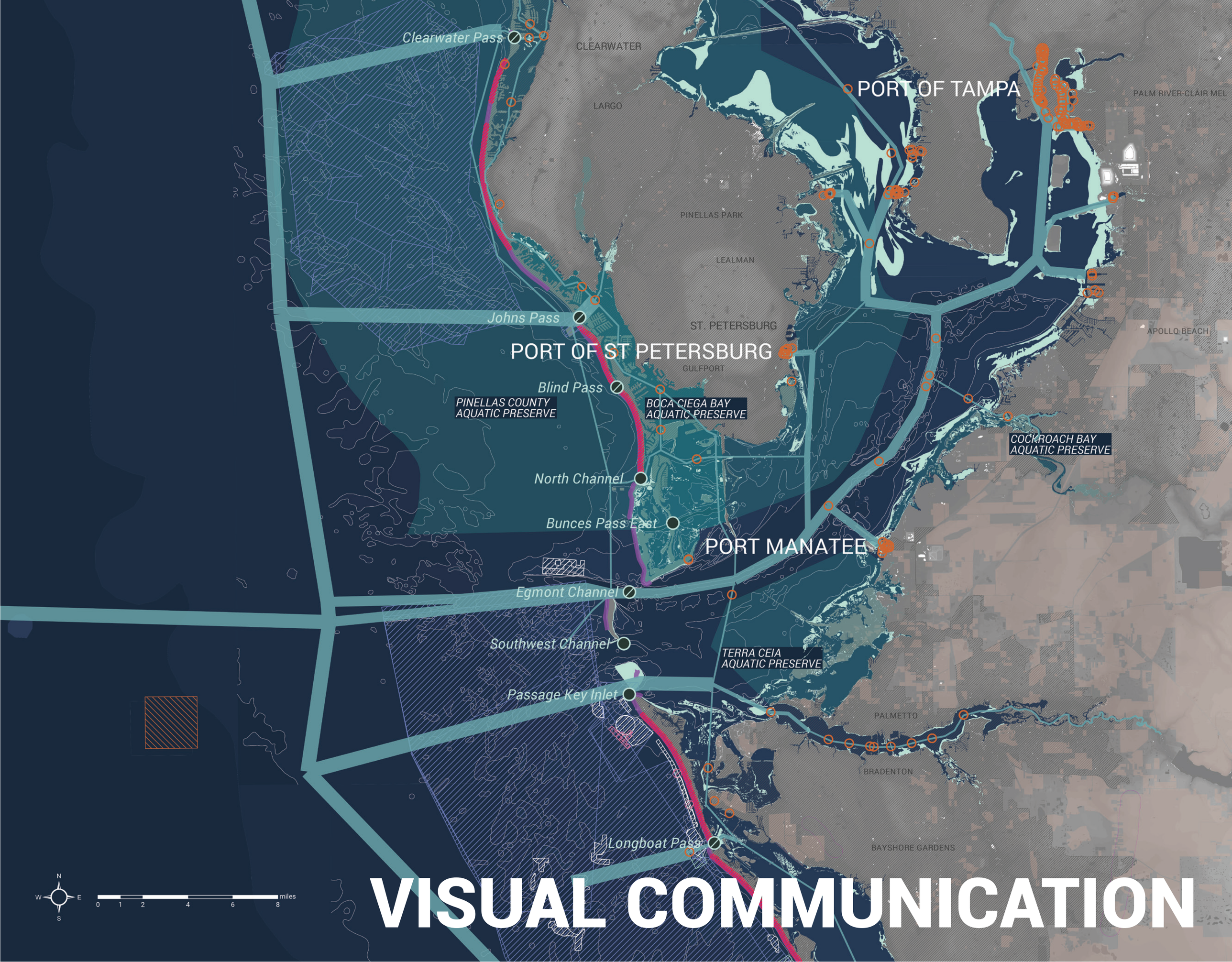
miles
0
1
2
4
6
8

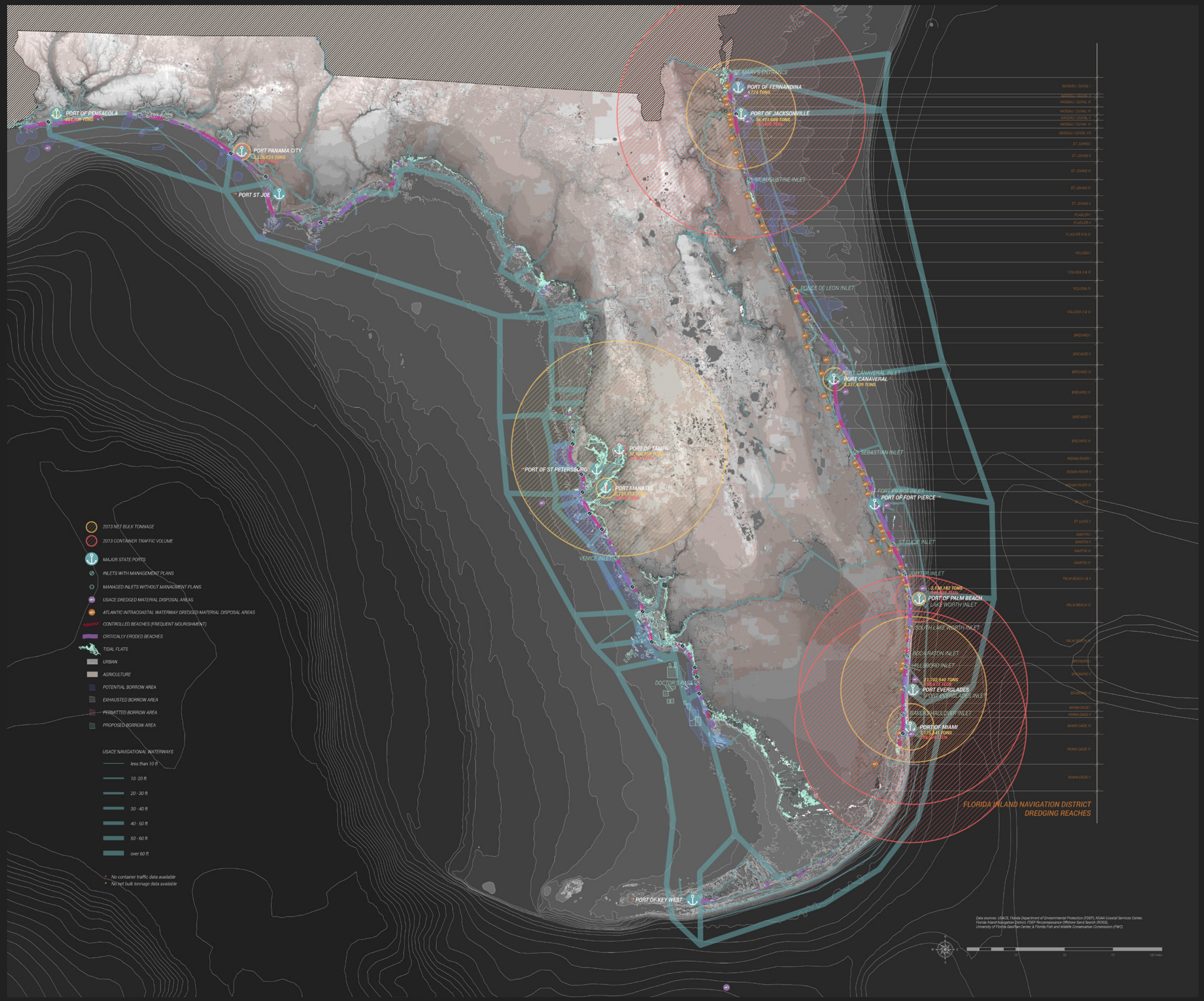




SYNTHETIC CARTOGRAPHY



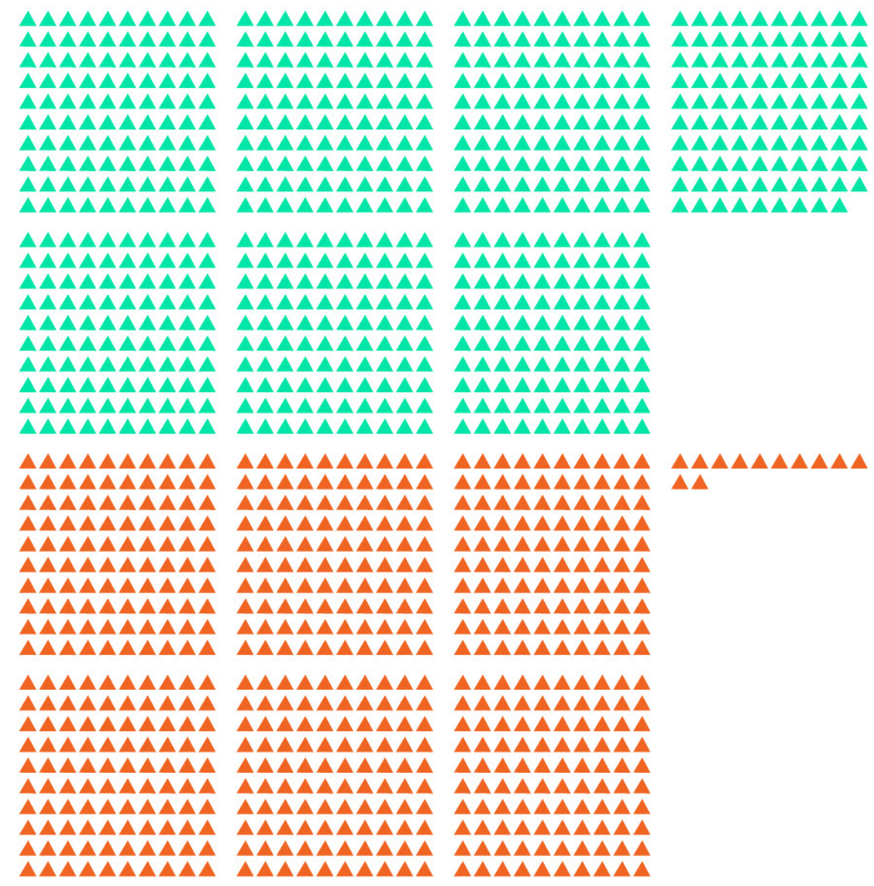
VISUAL COMMUNICATION



NAVIGATION AND NOURISHMENT

6.9M CUBIC YARDS / BEACH NOURISHMENT / YEAR

AVERAGE 2000-2014, FDEP



6.1M CUBIC YARDS / NAVIGATIONAL DREDGING / YEAR

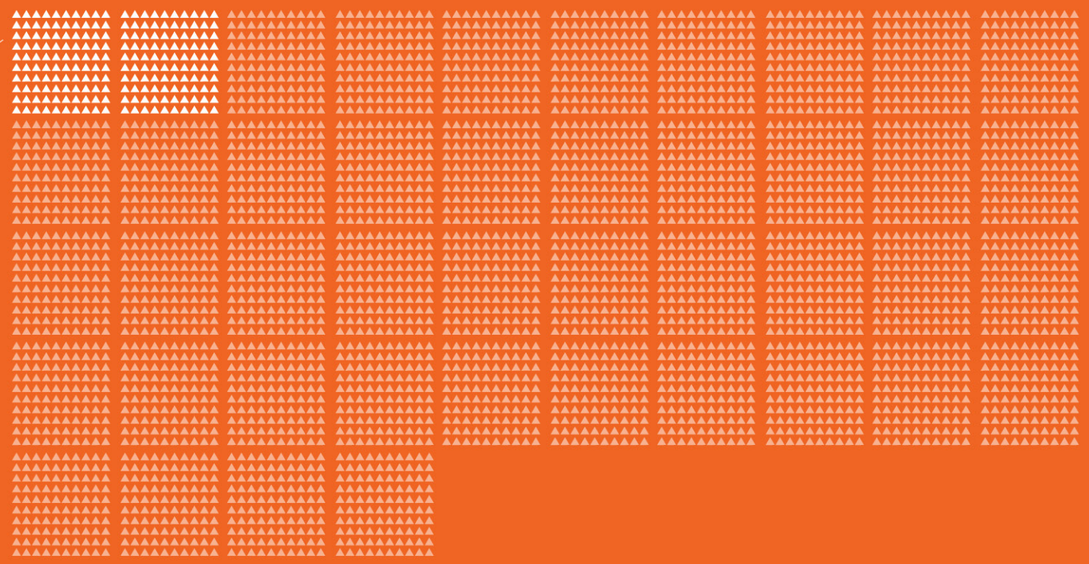
AVERAGE 2000-2014, USACE

3M-6M CUBIC YARDS /
MAINTENANCE DREDGE / YEAR
SF BAY AREA

75,000M SQ MI
DRAINAGE AREA

PACIFIC COAST | BAY-DELTA

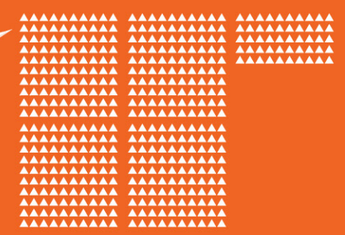
1M-2M CUBIC YARDS /
MAINTENANCE DREDGE / YEAR
42 M CUBIC YARDS / HARBOR DEEPENING
PROJECT 2004-2014



16,000 SQ MI
DRAINAGE AREA
38 MI FEDERAL
CHANNELS

NEW YORK-NEW JERSEY HARBOR

4M-5M CUBIC YARDS /
MAINTENANCE DREDGE / YEAR



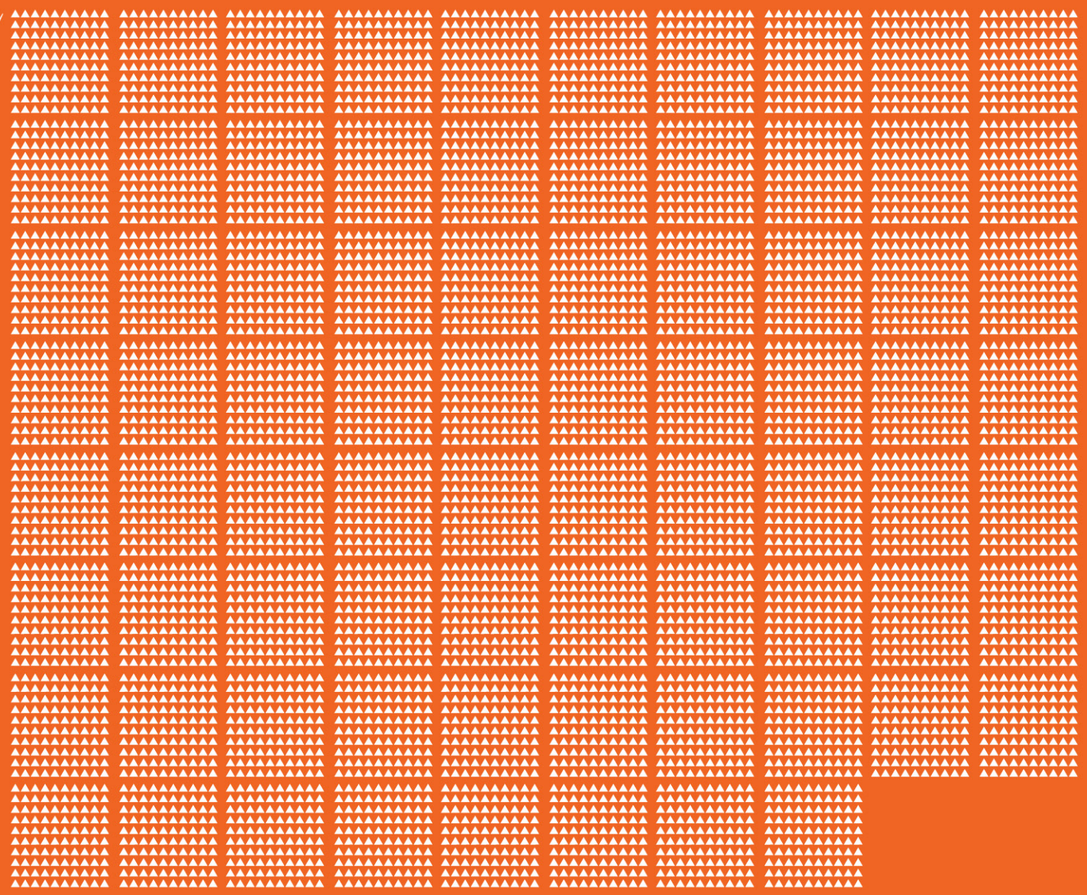
= 1 M CY DREDGE

295,000 SQ MI
DRAINAGE AREA
745 MI FEDERAL
CHANNELS

GREAT LAKES

1.51M SQ MI
DRAINAGE AREA

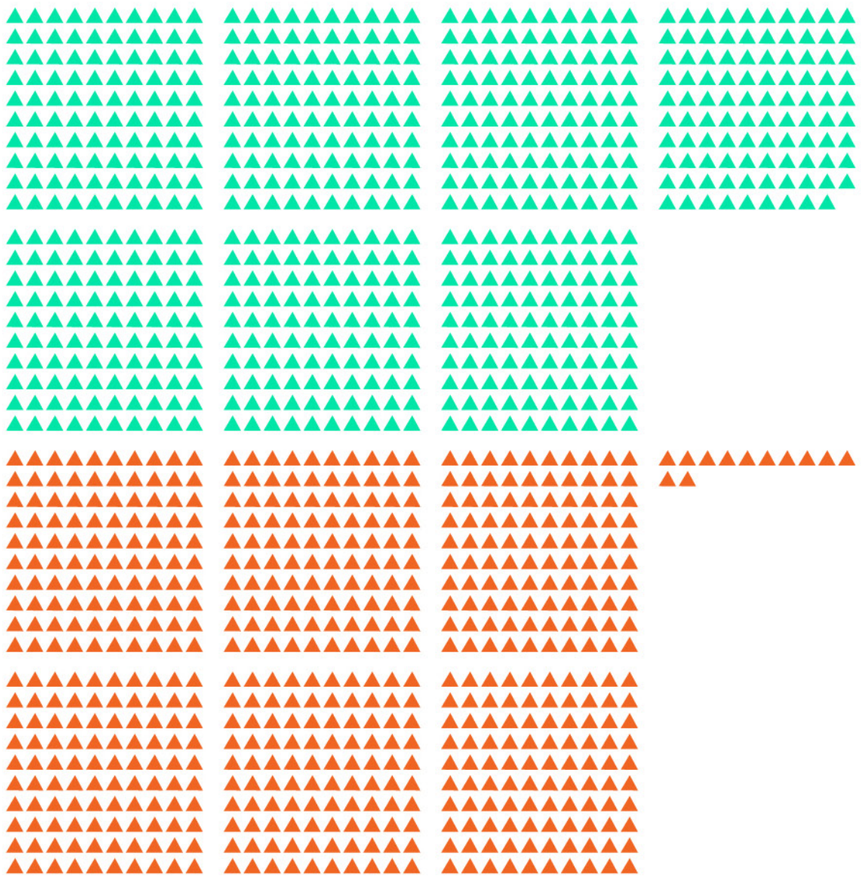
78M CUBIC YARDS /
MAINTENANCE DREDGE / YEAR



GULF COAST | MISSISSIPPI RIVER BASIN

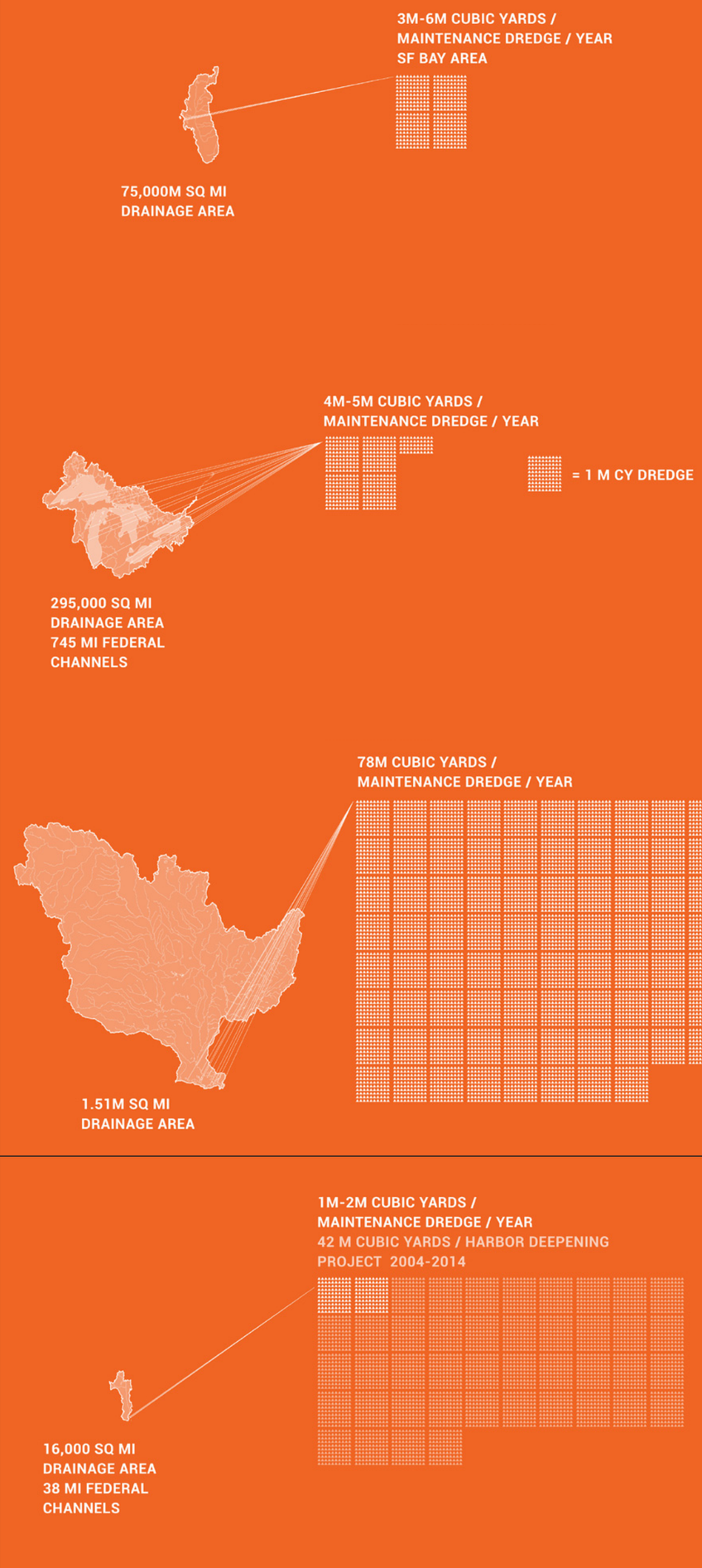
6.9M CUBIC YARDS / BEACH NOURISHMENT / YEAR

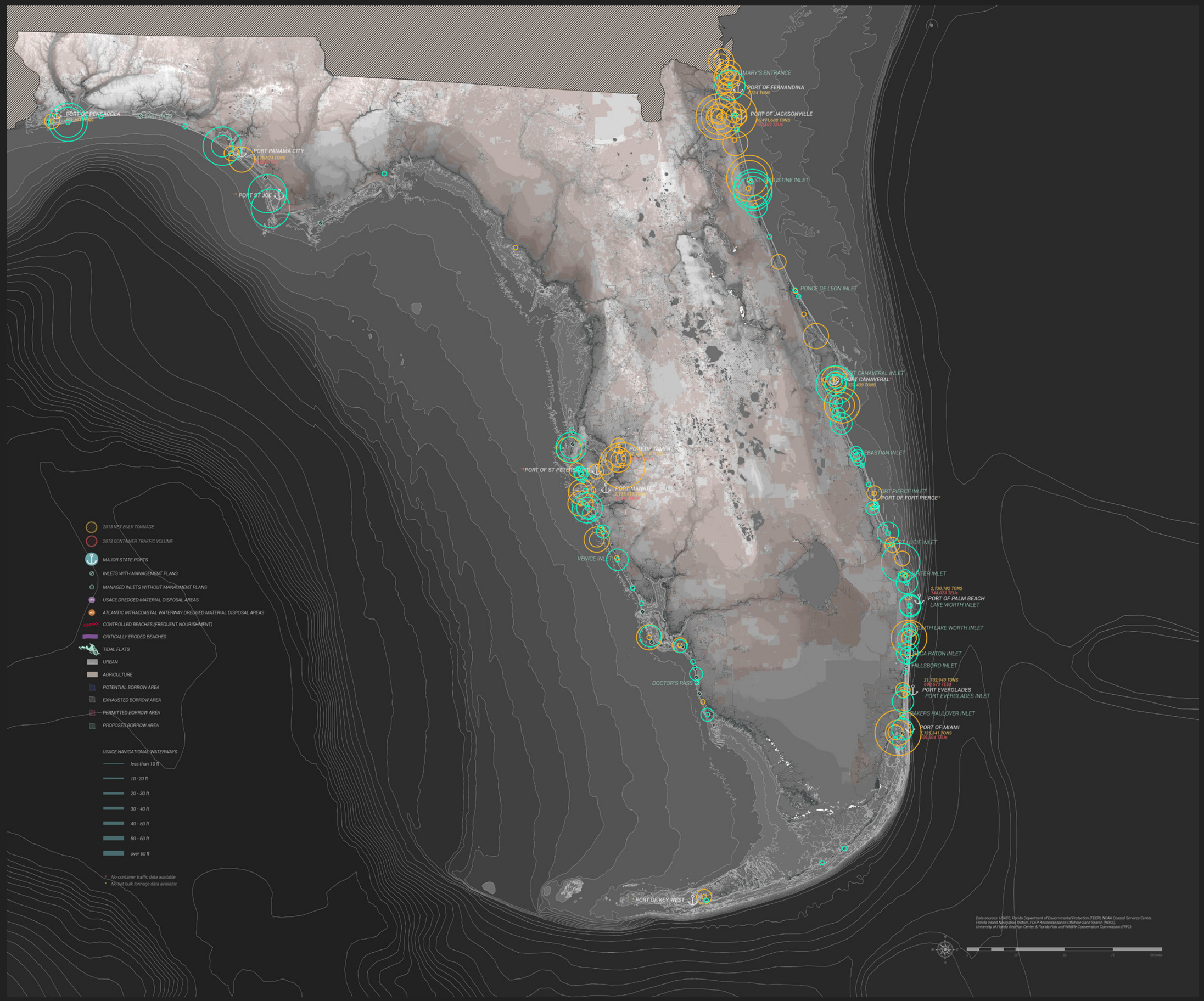
AVERAGE 2000-2014, FDEP



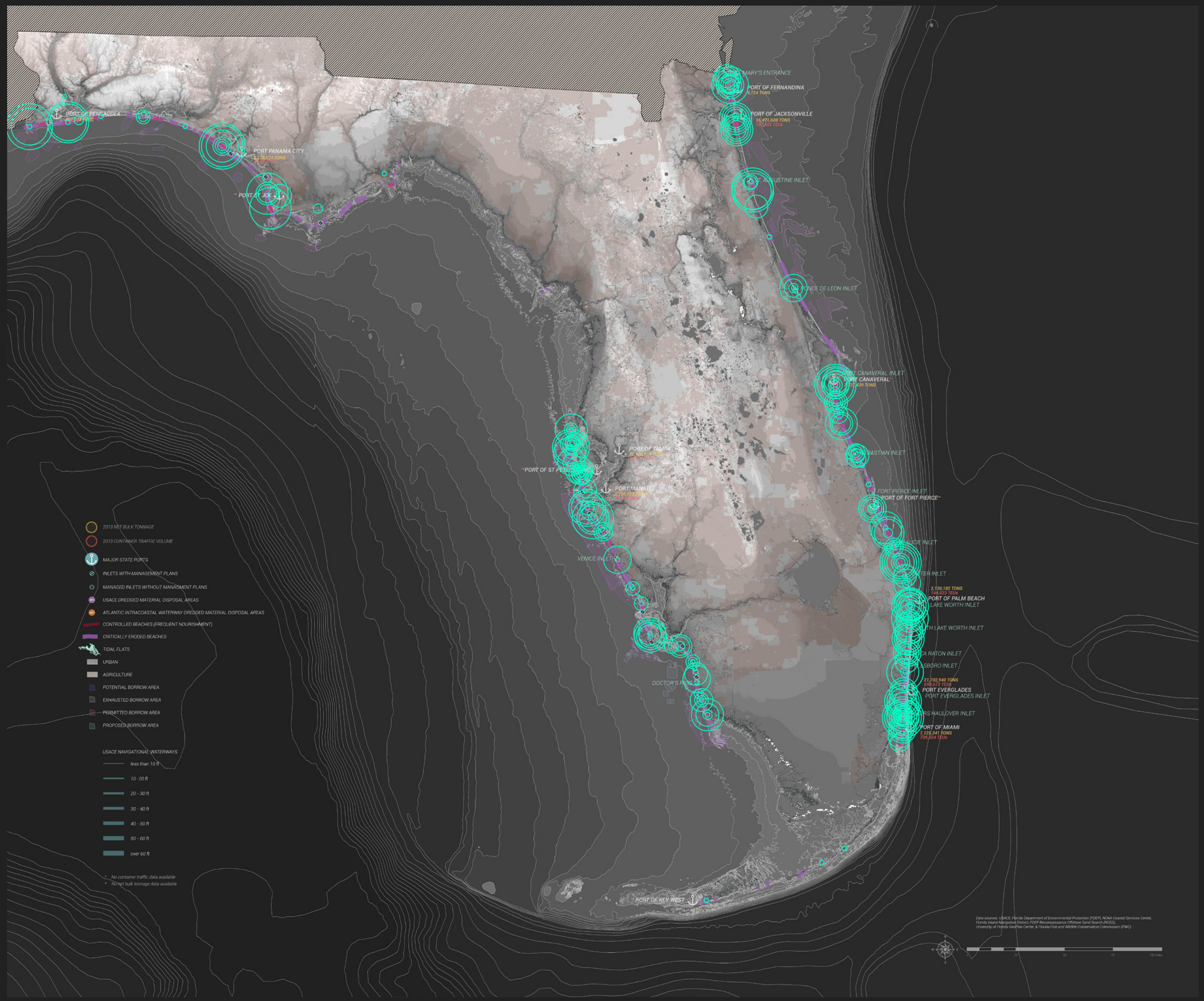
6.1M CUBIC YARDS / NAVIGATIONAL DREDGING / YEAR

AVERAGE 2000-2014, USACE

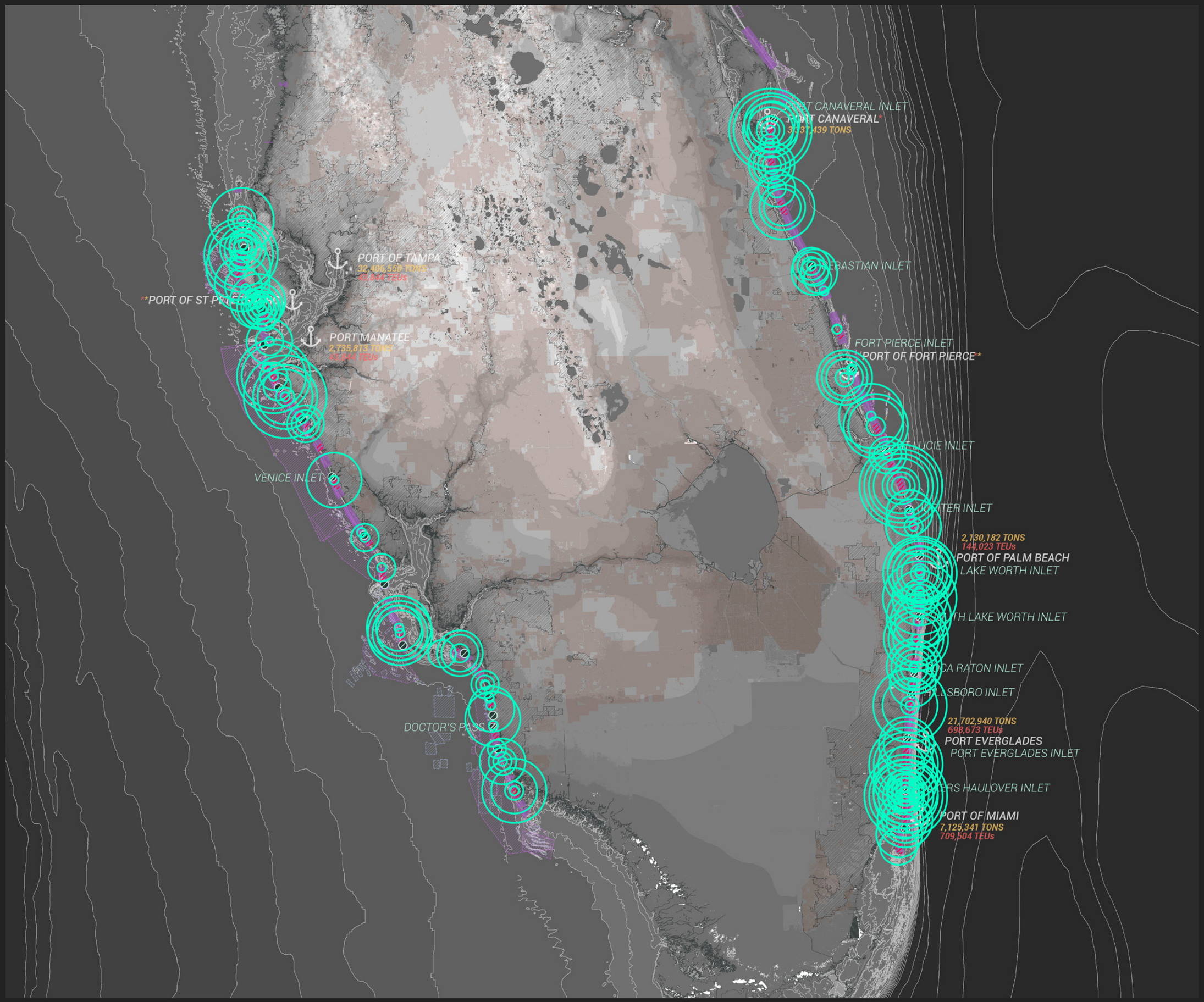




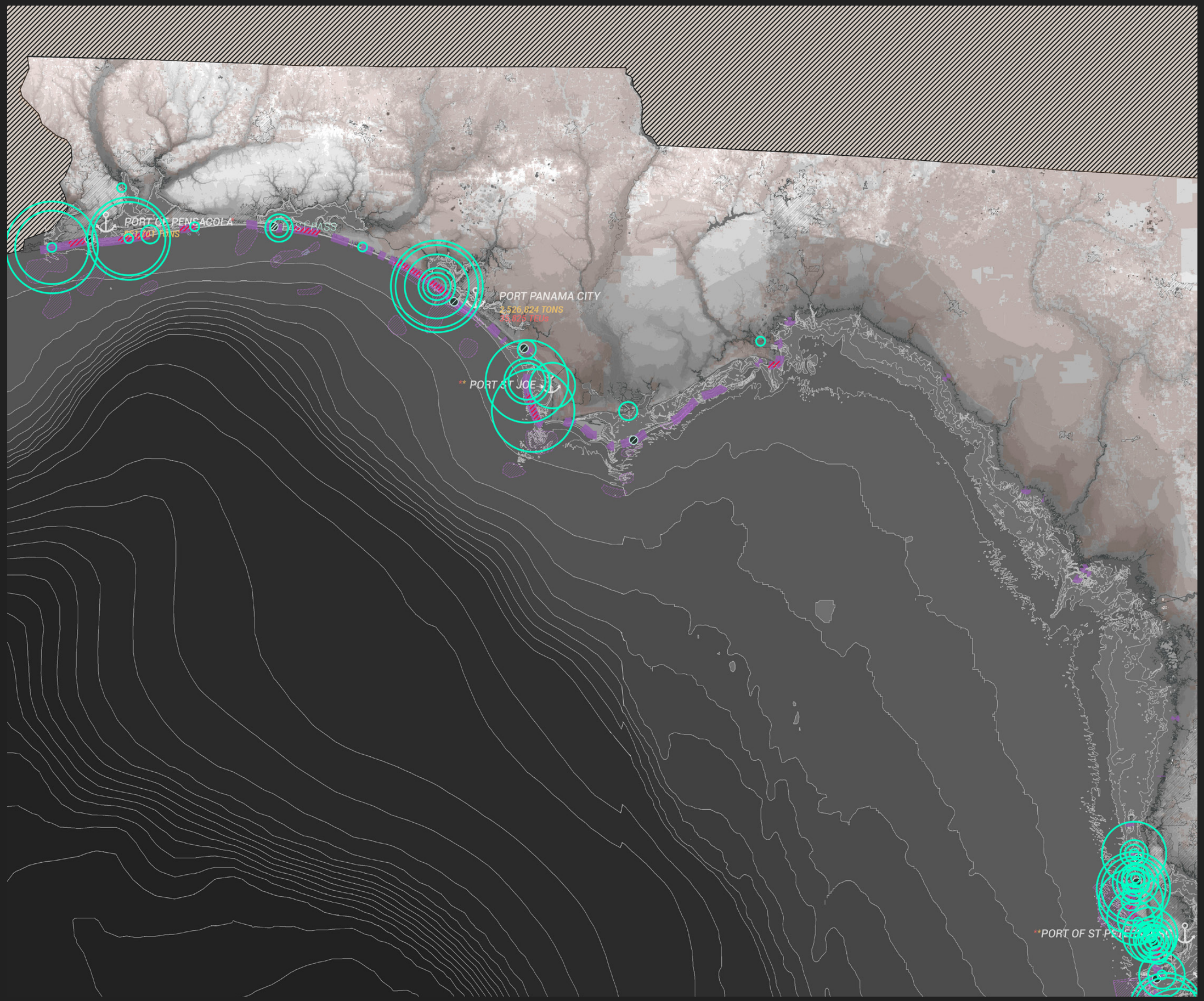
GEOGRAPHIC DISTRIBUTION OF NAVIGATION AND NOURISHMENT



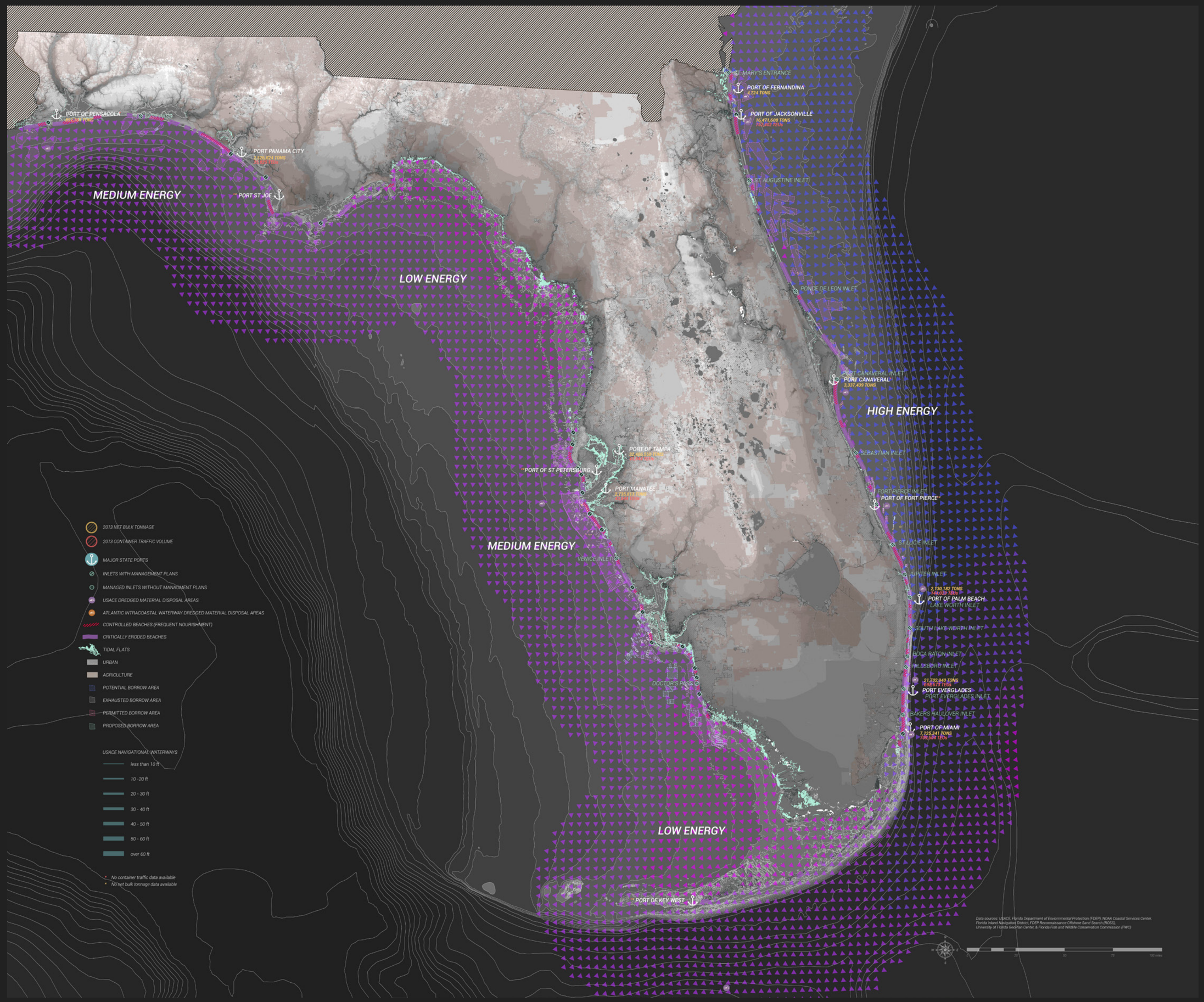
BEACH NOURISHMENT, 1944-2015 [PSDS]



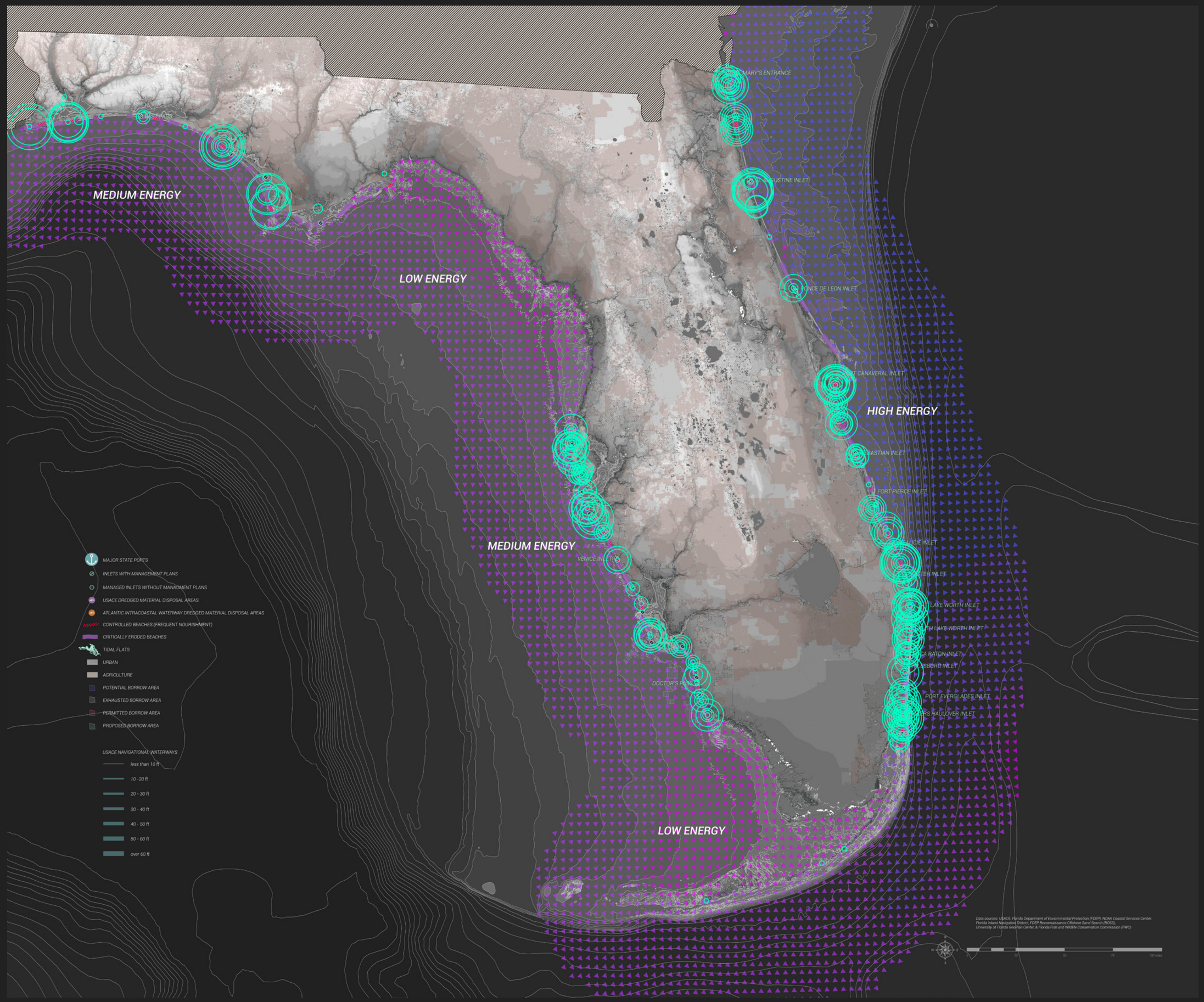
BEACH NOURISHMENT, 1944-2015 [PSDS]



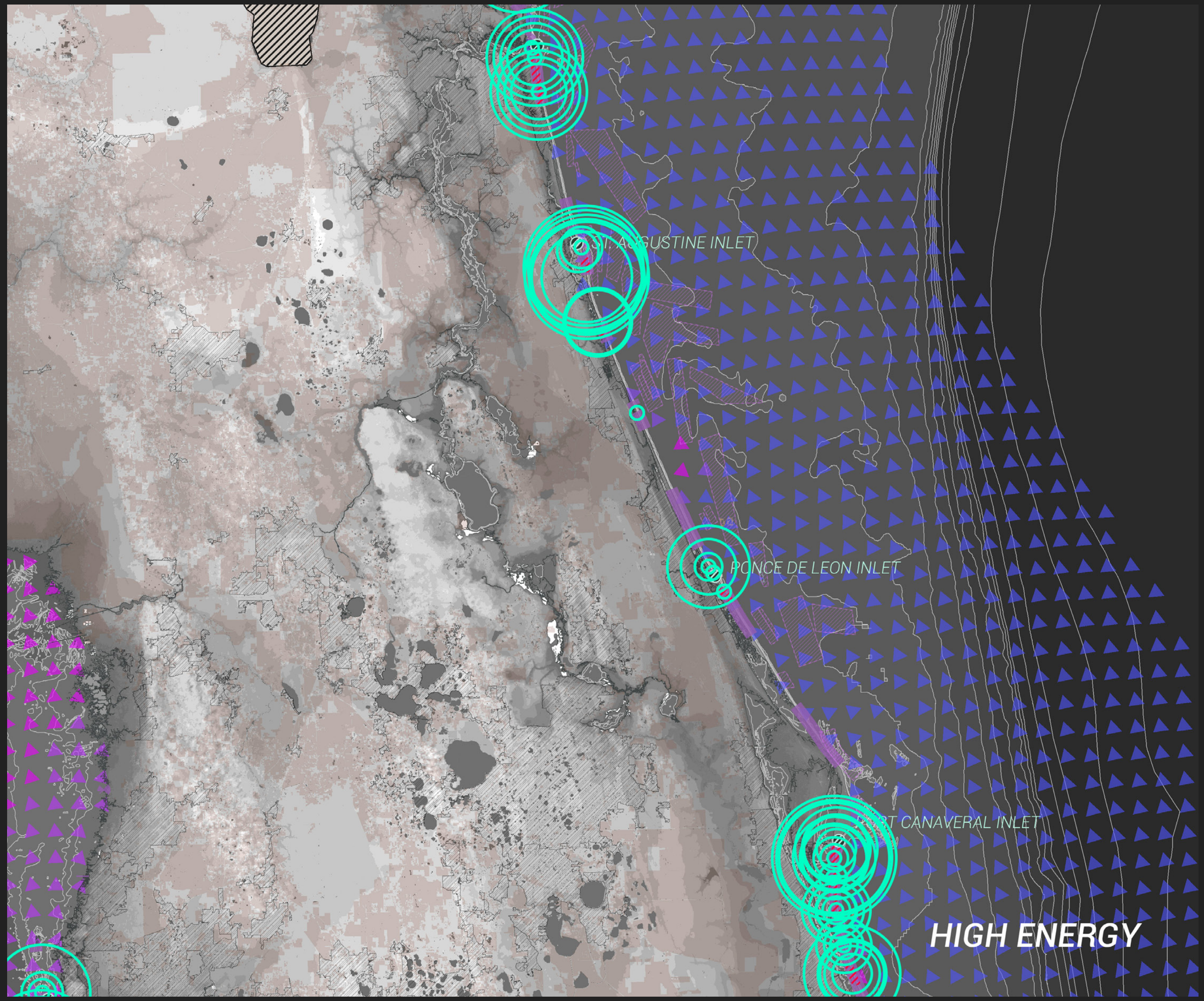
BEACH NOURISHMENT, 1944-2015 [PSDS]



ANNUAL WAVE ENERGY POTENTIAL [NREL]

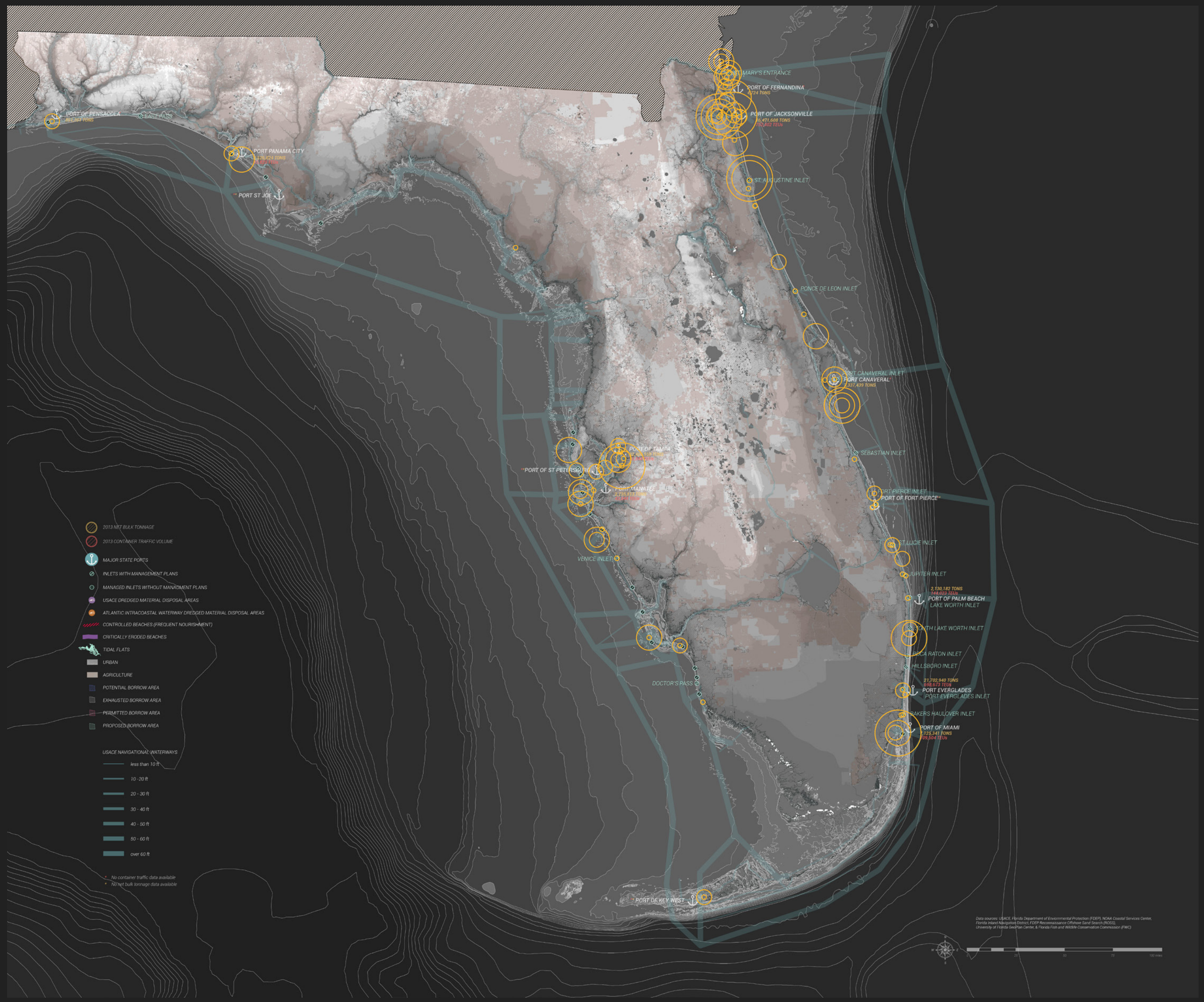


WAVES AND NOURISHMENT

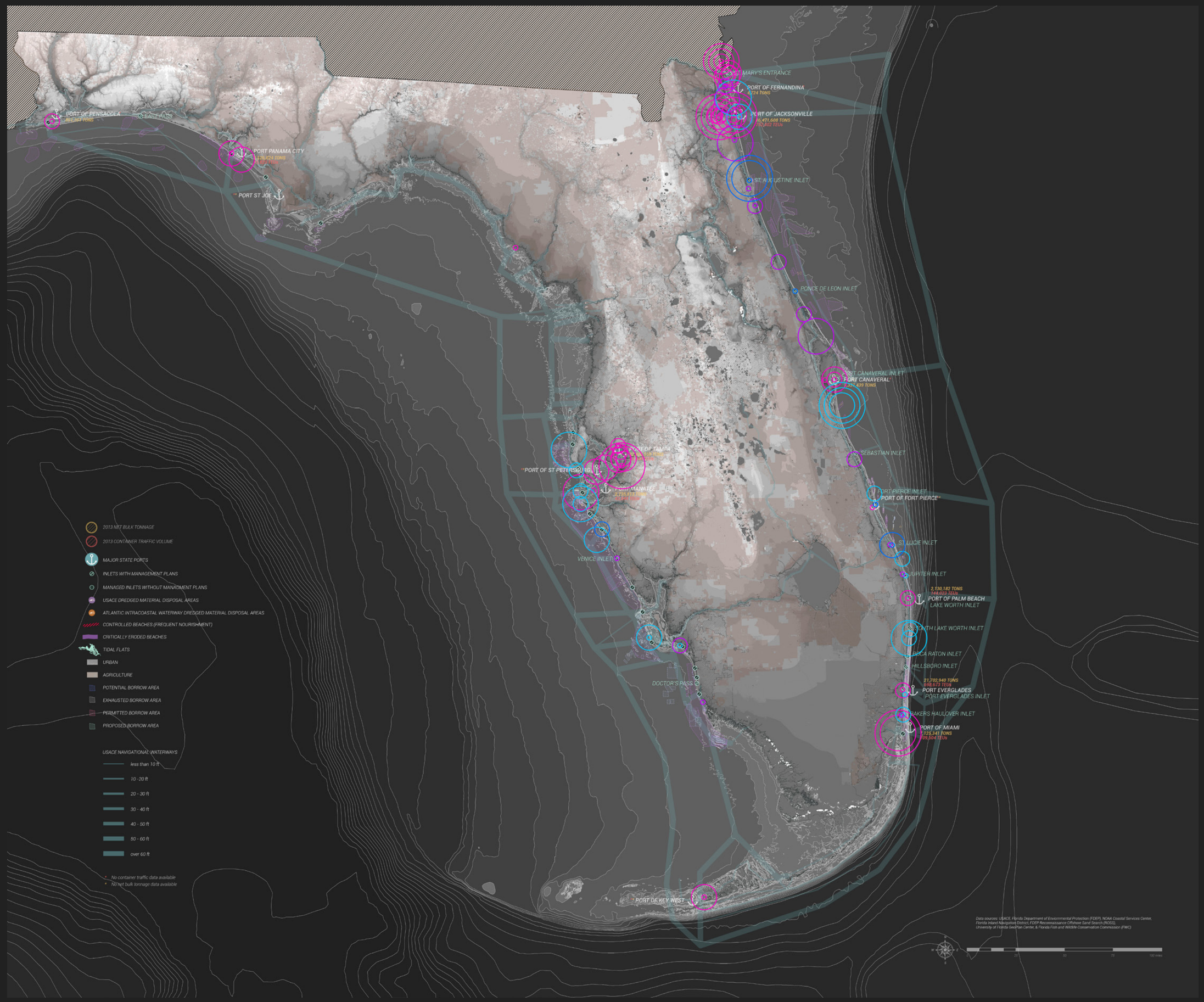


PONCE DE LEON ANOMALY

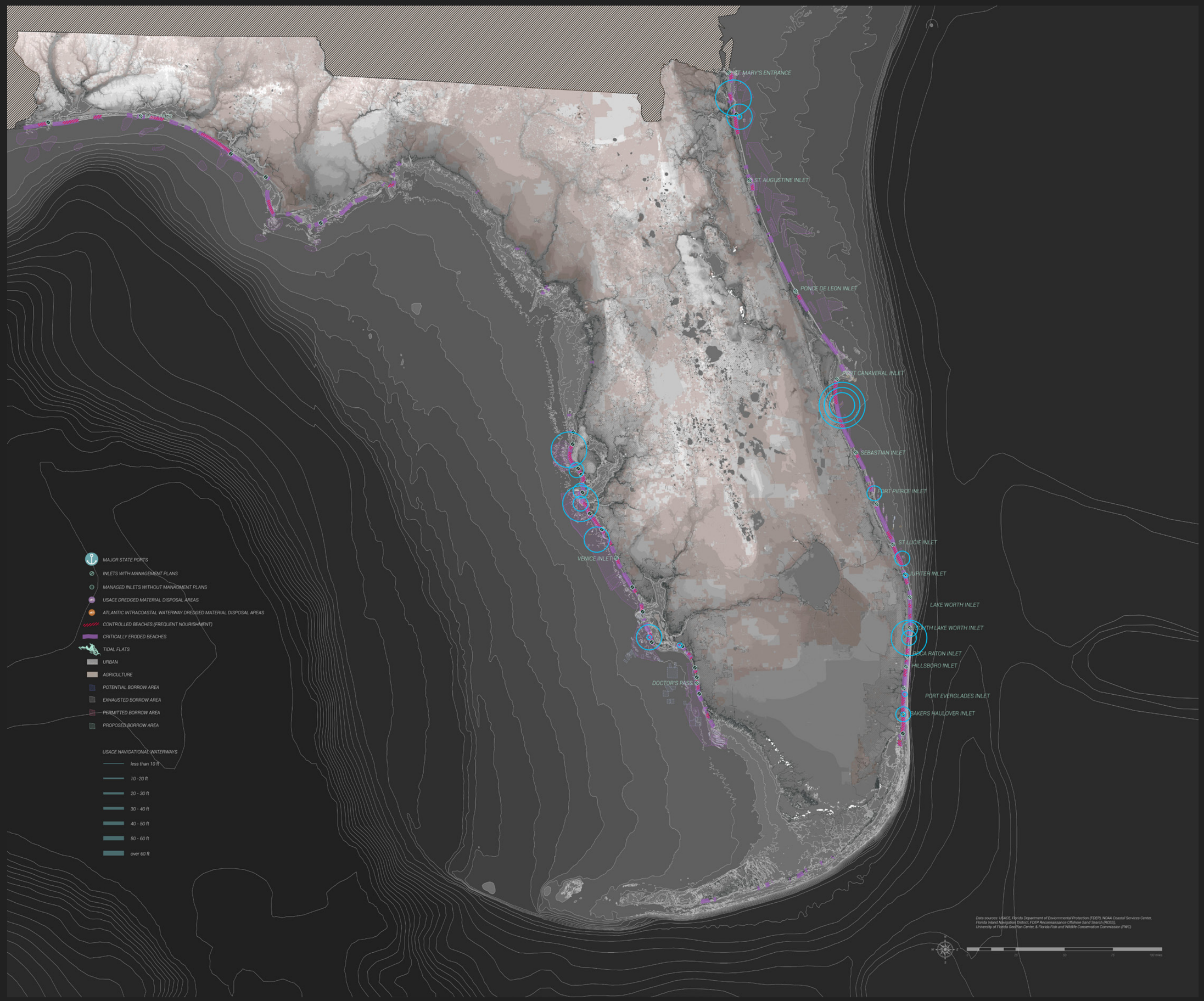
DEVELOPMENT AND ALTERATION



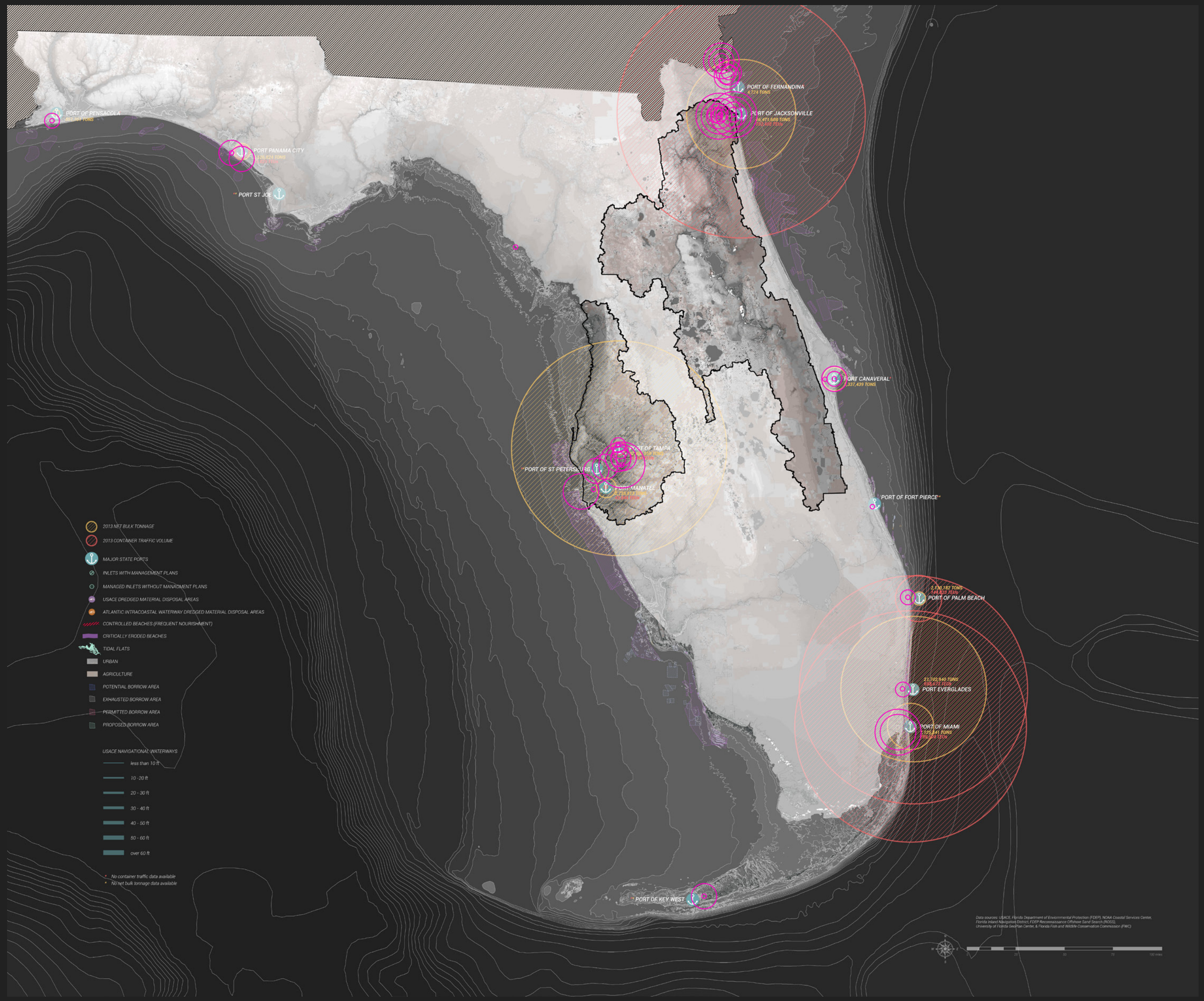
DREDGING (USACE)



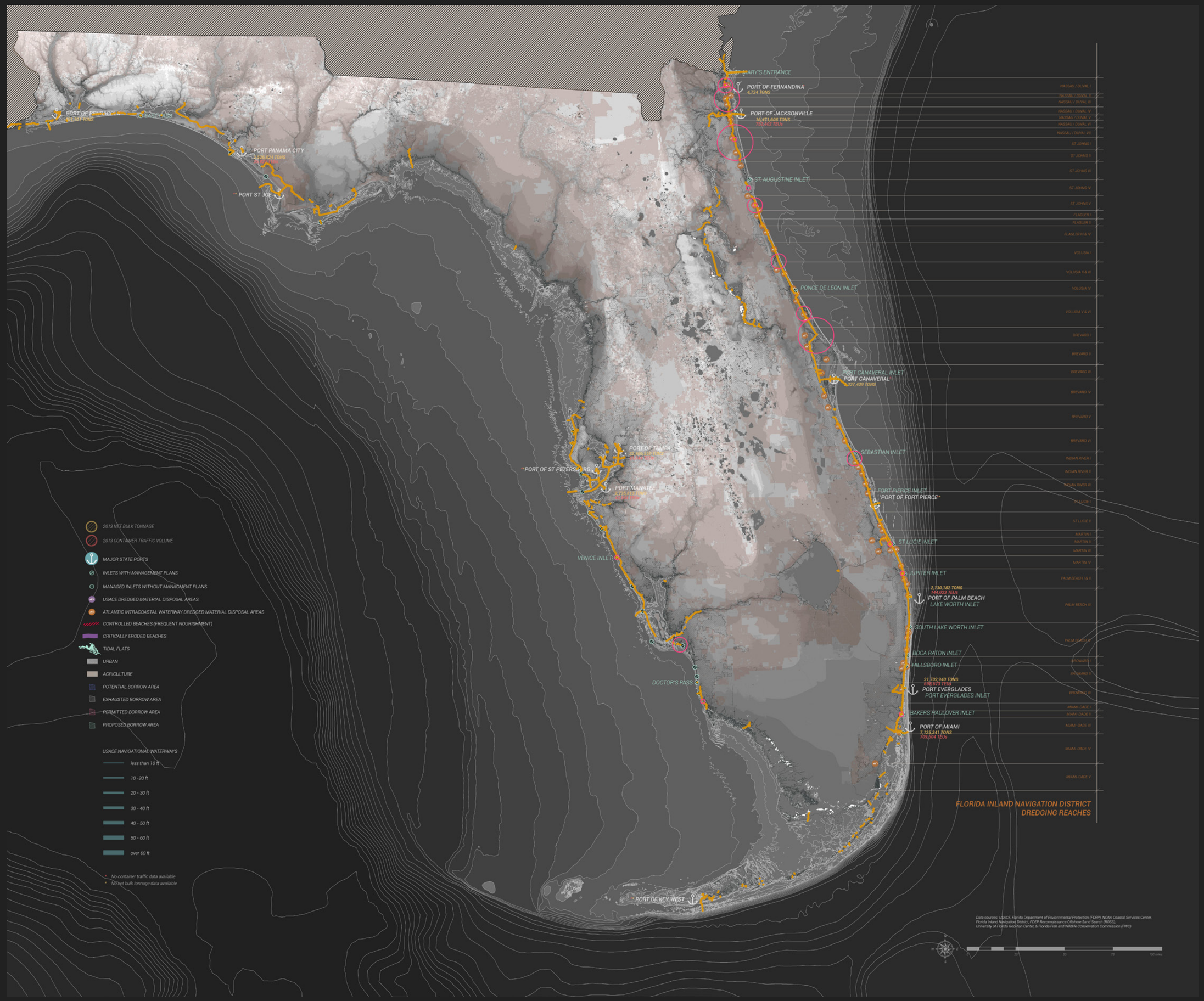
CLASSIFYING DREDGING



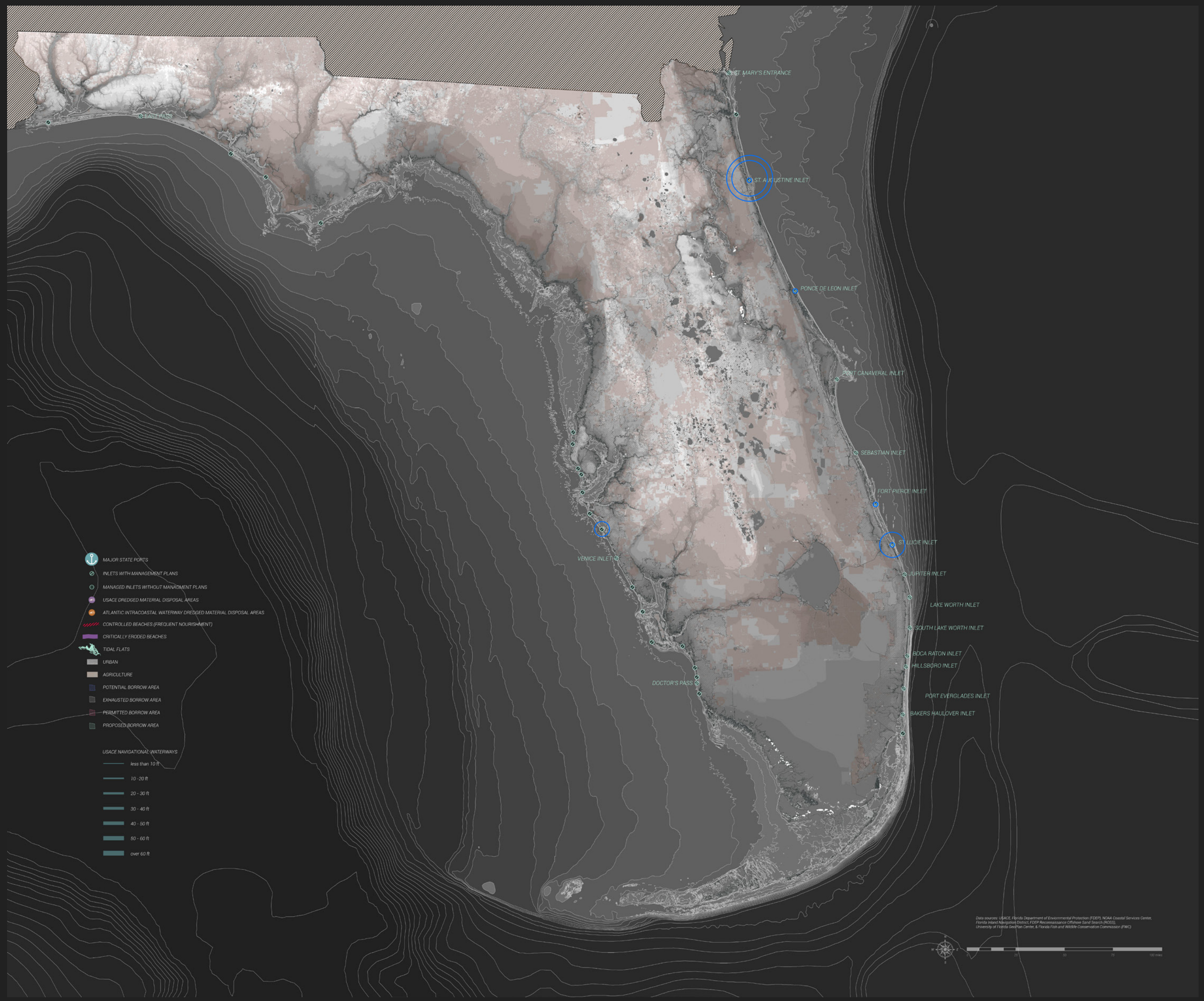
FEDERAL NOURISHMENT PROJECTS



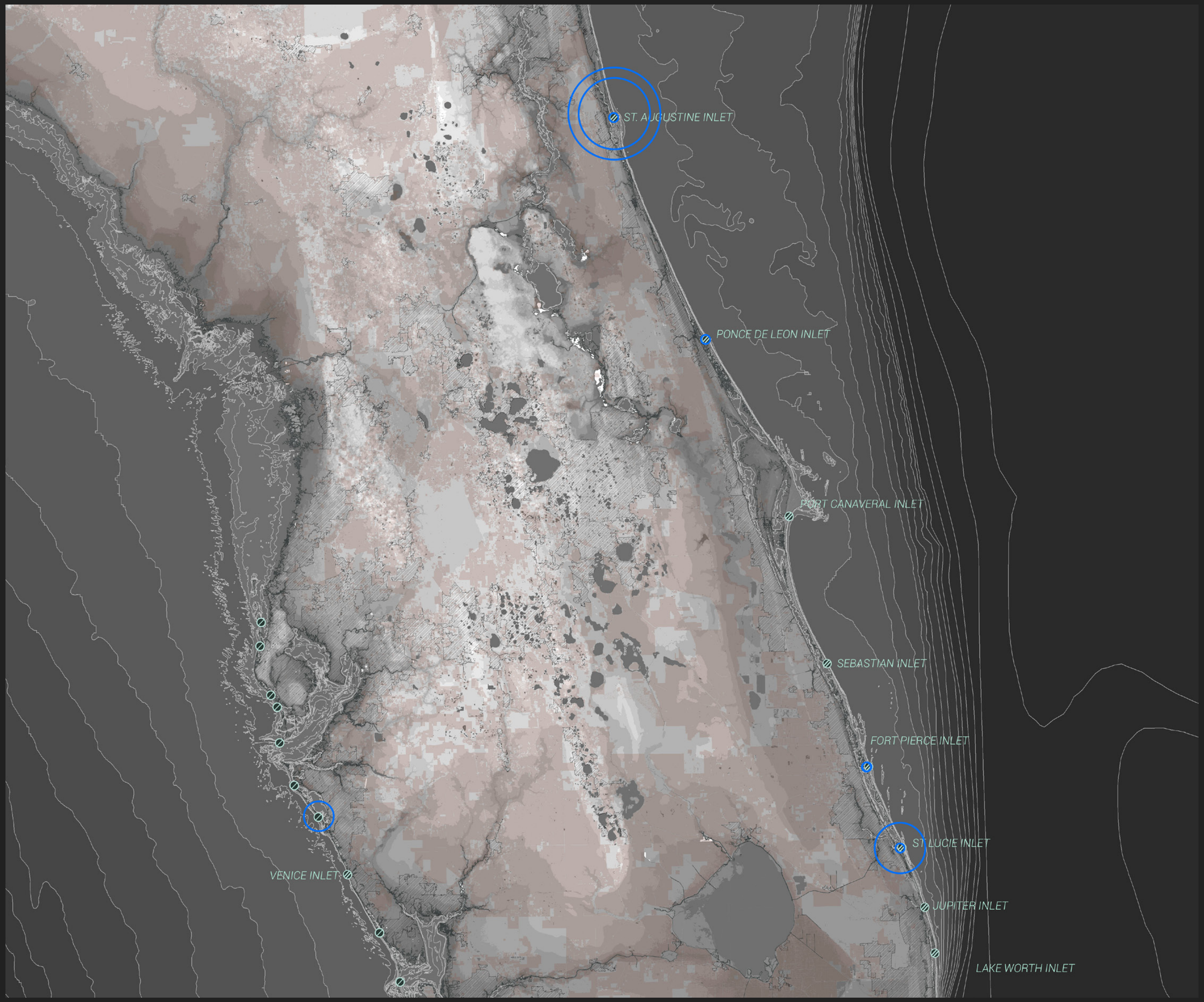
PORTS AND HARBORS



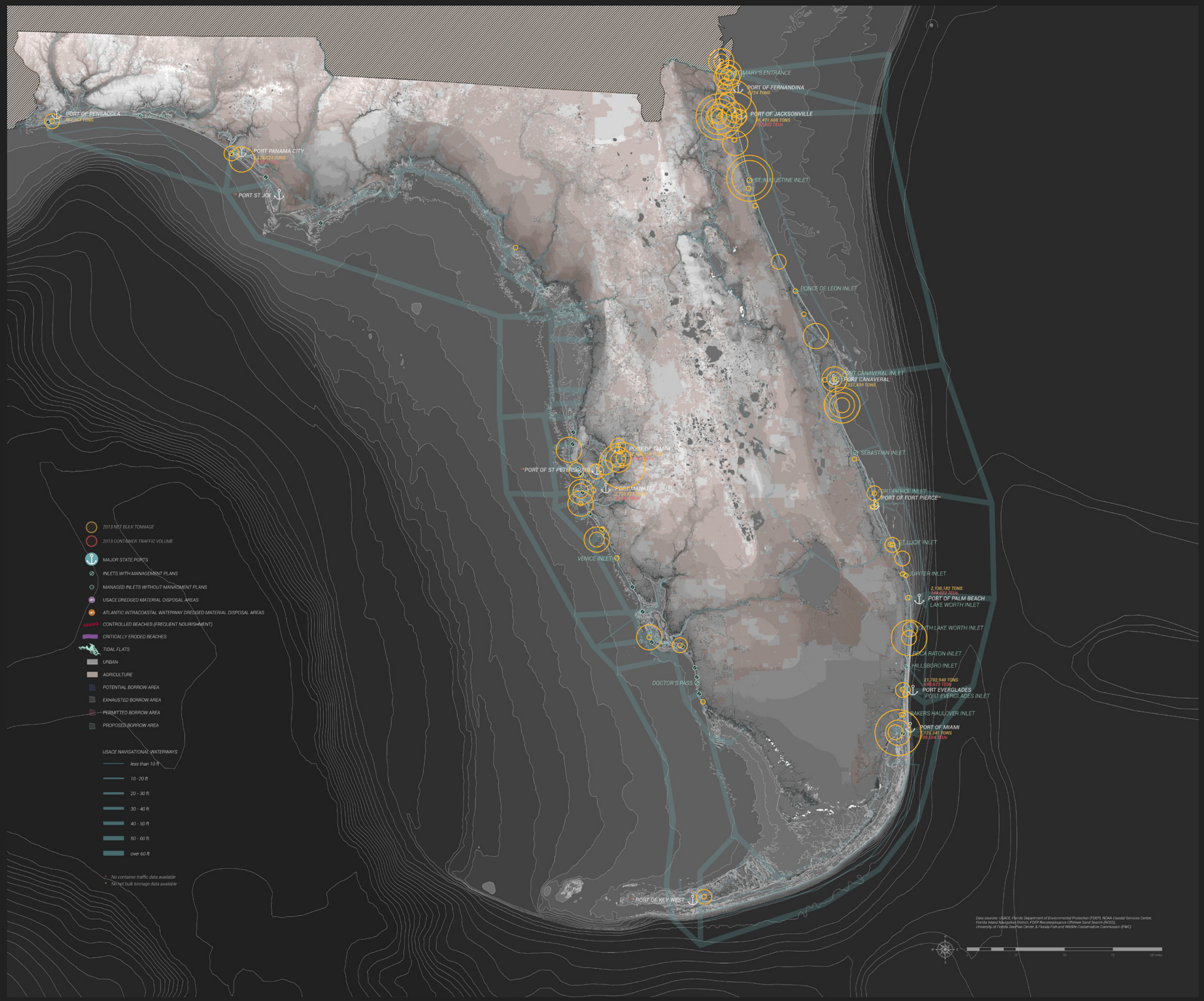
INTRACOASTAL WATERWAYS



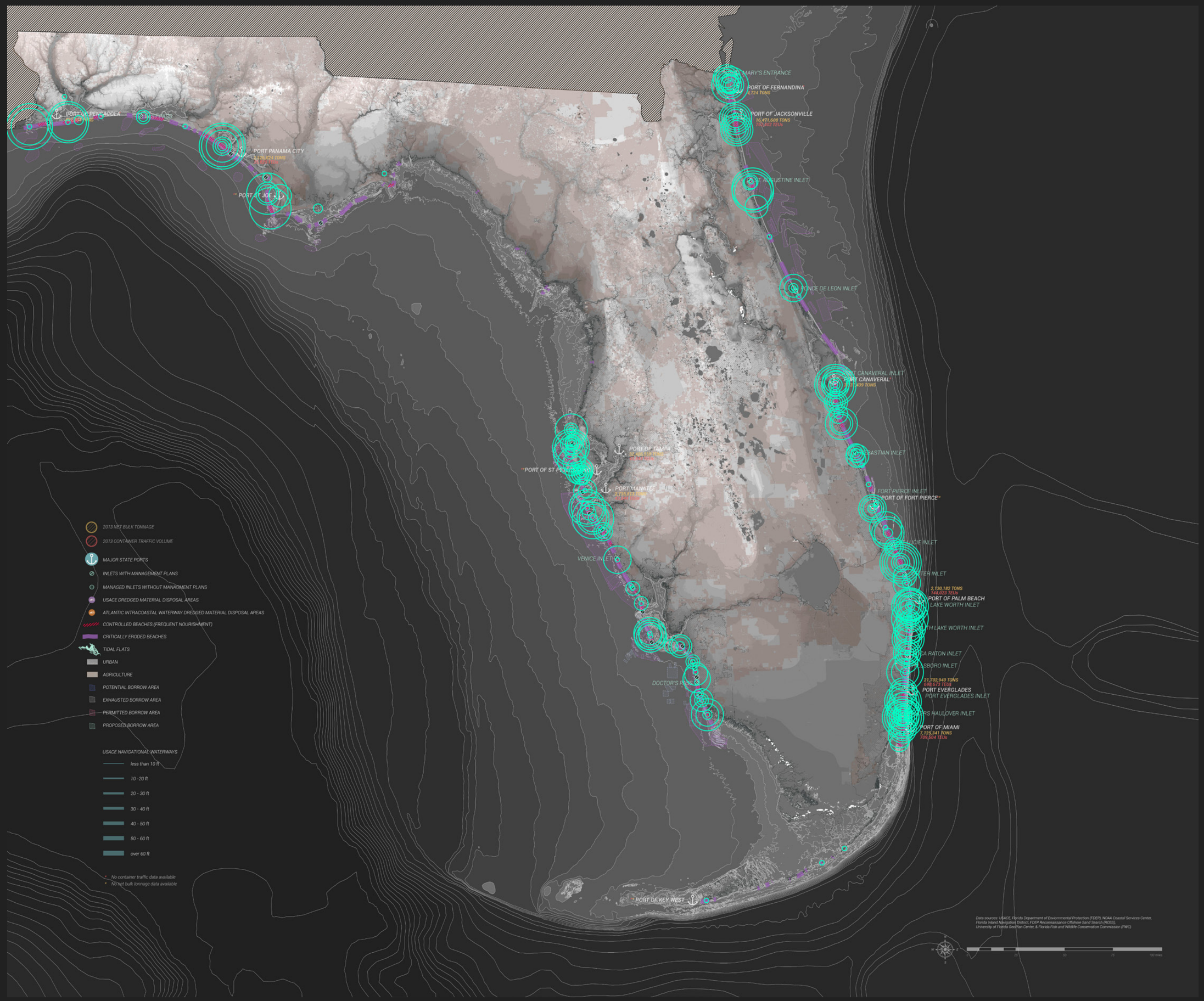
INLET MANAGEMENT



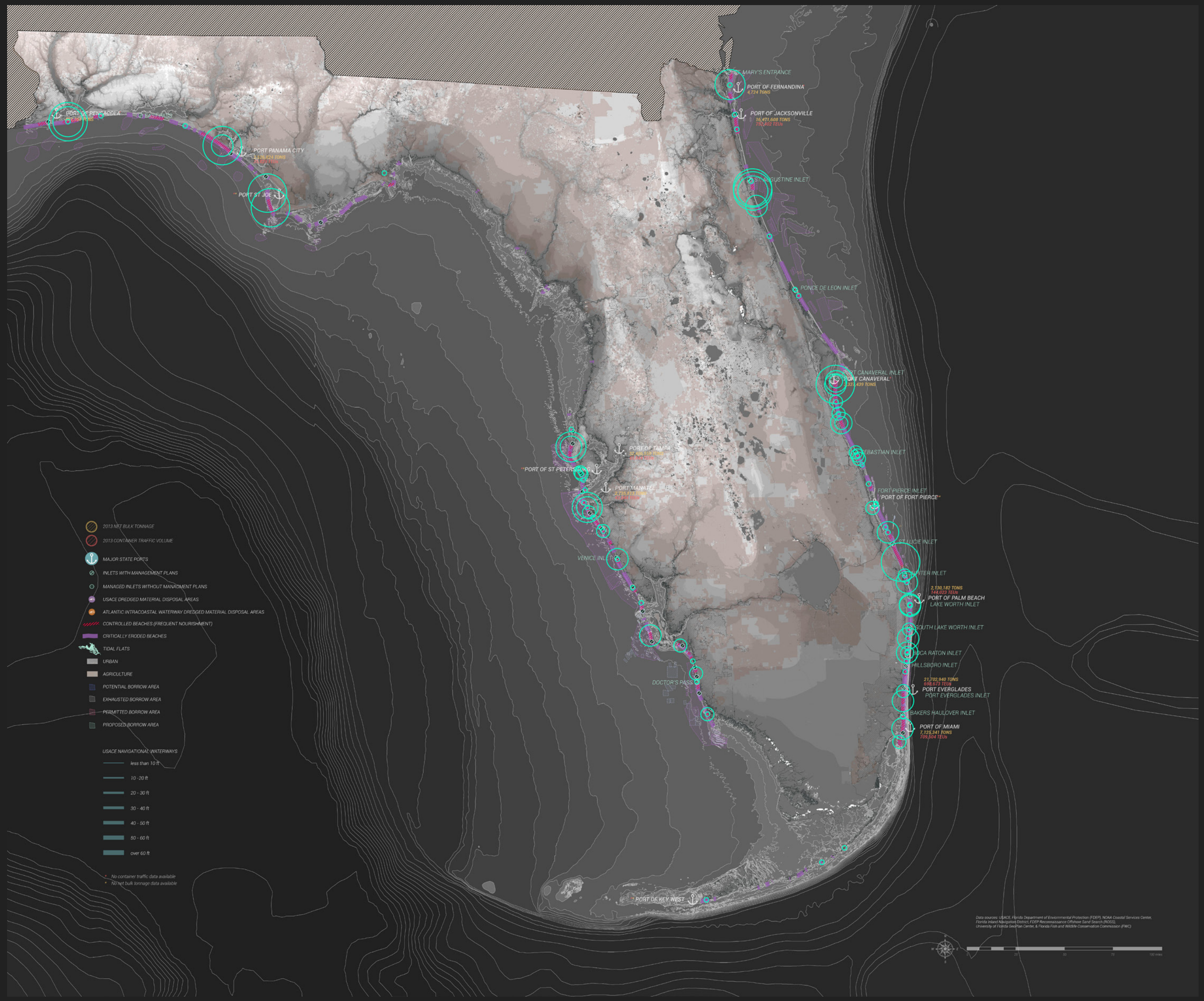
INLET MANAGEMENT



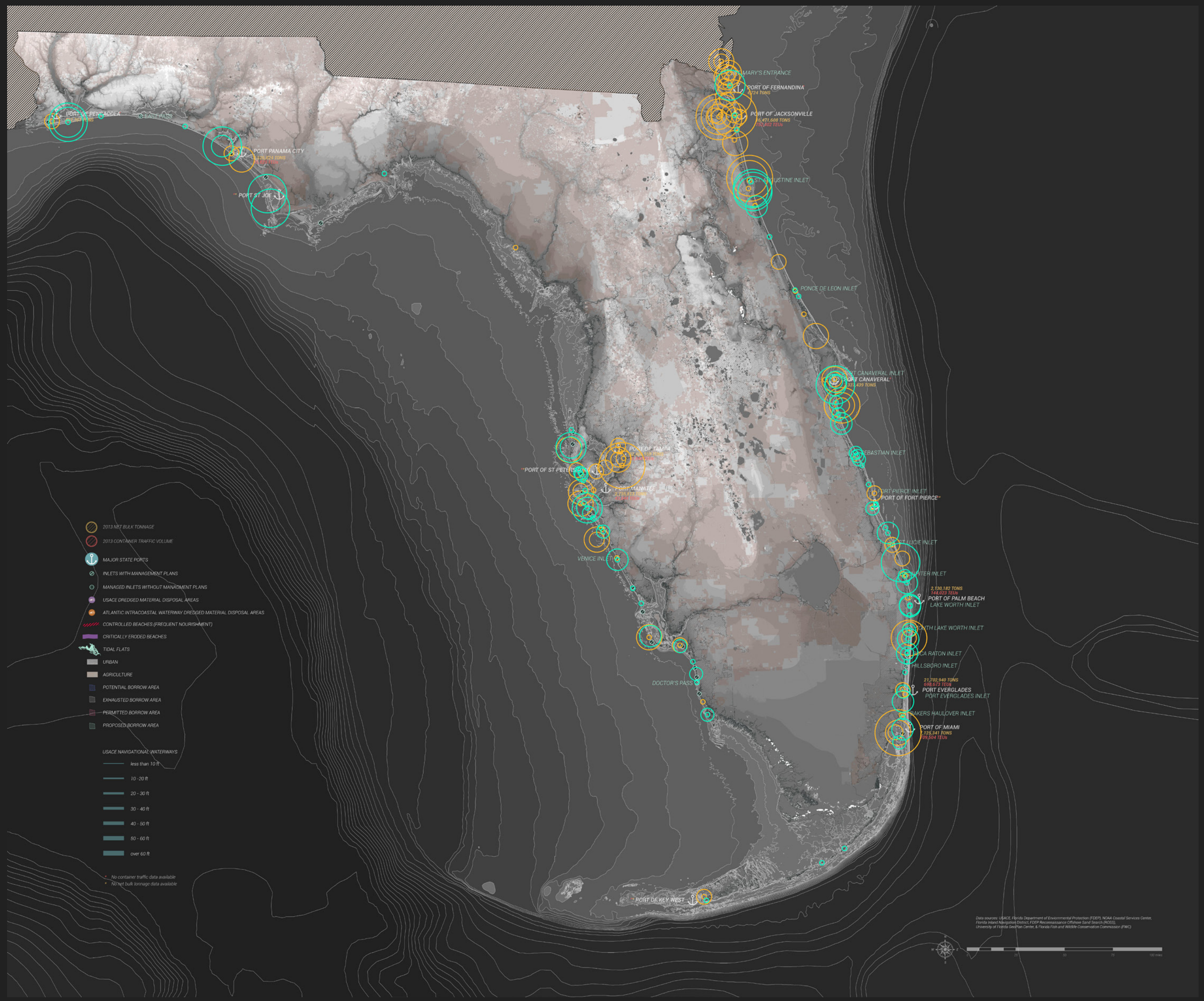
USACE NON-NOURISHMENT DREDGING, 2000-2015 [USACE NDC]



NOURISHMENT, 1944-2015 [PSDS]

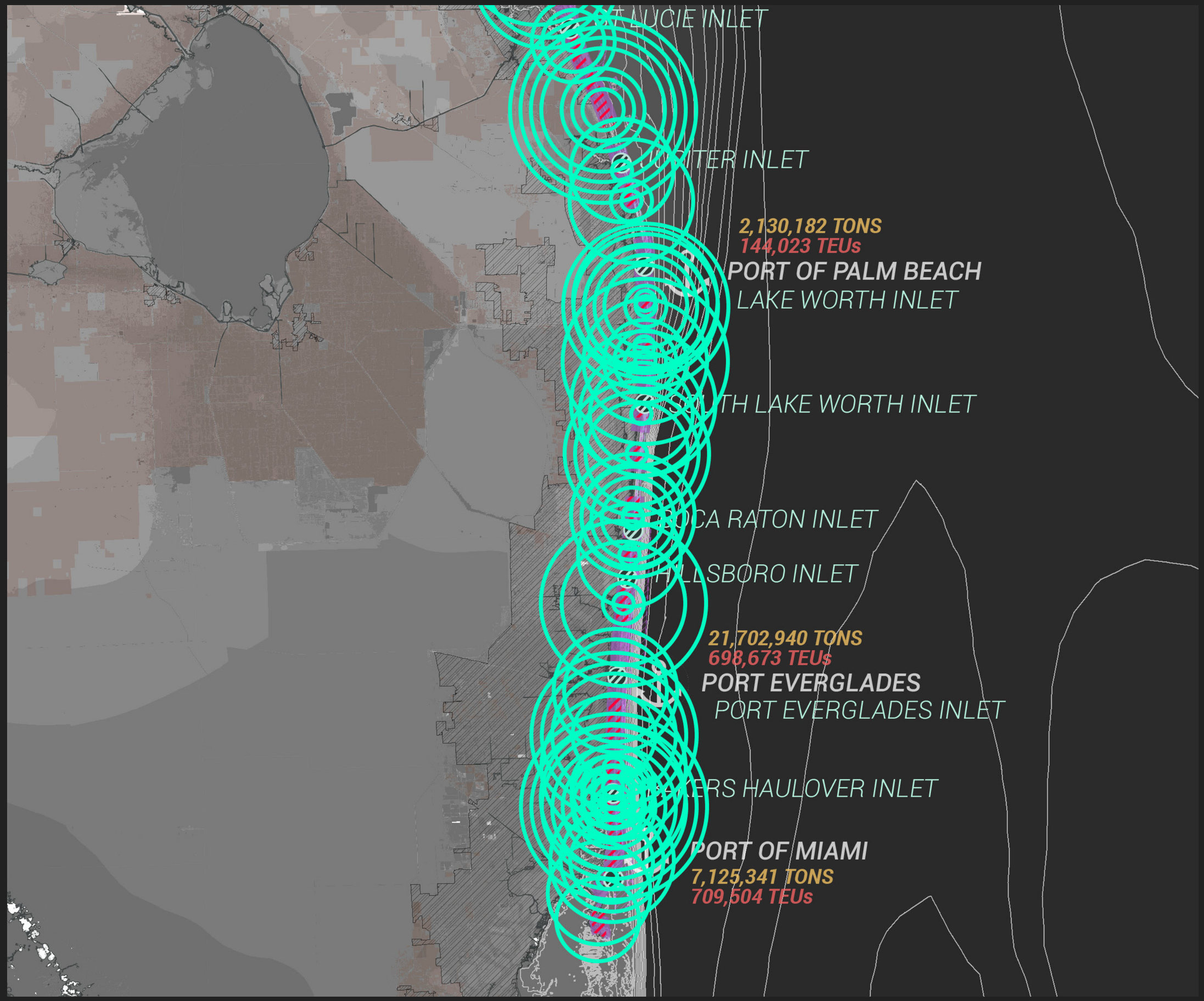


NOURISHMENT, 2000-2015 [PSDS]

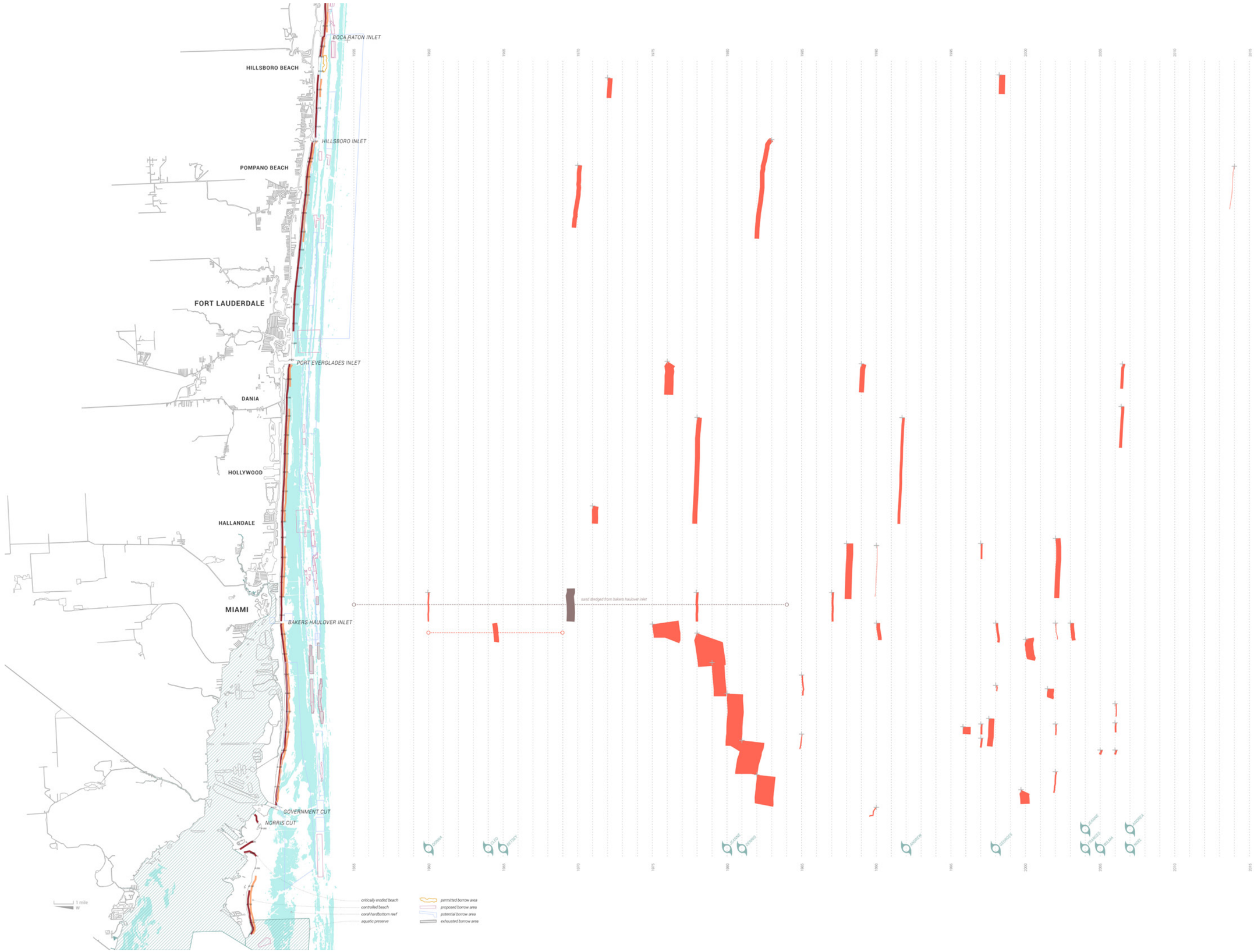


NAVIGATION AND NOURISHMENT, 2000-2015

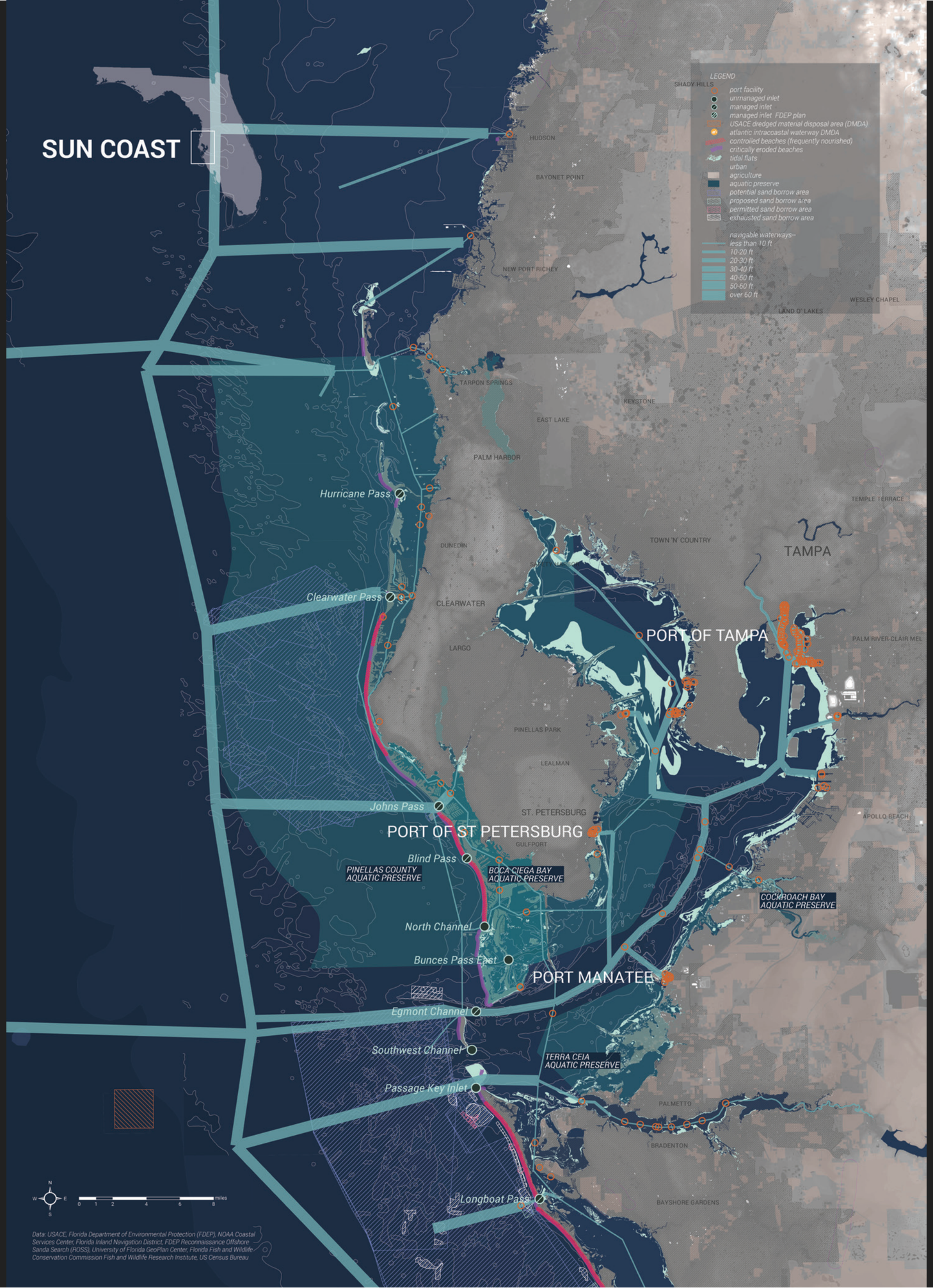
TEN COASTS



GOLD COAST NOURISHMENT, 1944-2015 [PSDS]



GOLD COAST NOURISHMENT [MULTIPLE SOURCES]


SUN COAST
LEGEND
port facility
unmanaged inlet
managed inlet
managed inlet FDEP plan
USACE dredged material disposal area (DMDA)
atlantic intracoastal waterway DMDA
controlled beaches (frequently nourished)
critically eroded beaches
tidal flats
urban
agriculture
aquatic preserve
potential sand borrow area
proposed sand borrow area
permitted sand borrow area
exhausted sand borrow area
navigable waterways--
less than 10 ft
10-20 ft
20-30 ft
30-40 ft
40-50 ft
50-60 ft
over 60 ft
SHADY HILLS
HUDSON
BAYONET POINT
NEW PORT RICHEY
WESLEY CHAPEL
LAND O' LAKES
TARPON SPRINGS
KEYSTONE
EAST LAKE
PALM HARBOR
TEMPLE TERRACE
TOWN 'N' COUNTRY
TAMPA
Hurricane Pass
DUNEDIN
Clearwater Pass
CLEARWATER
PORT OF TAMPA
PALM RIVER-CLAIR MEL
LARGO
PINELLAS PARK
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Johns Pass
ST. PETERSBURG
PORT OF ST PETERSBURG
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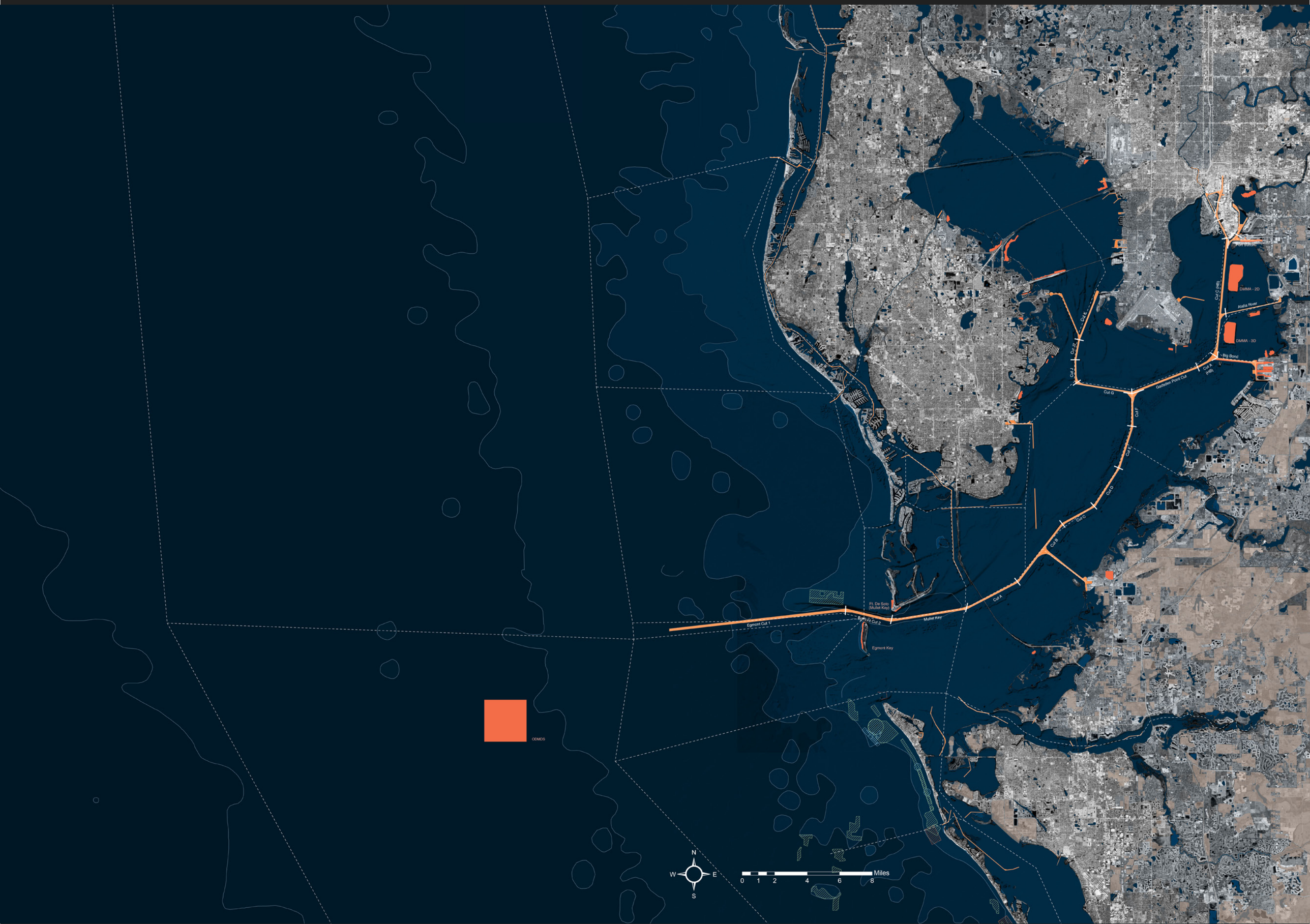
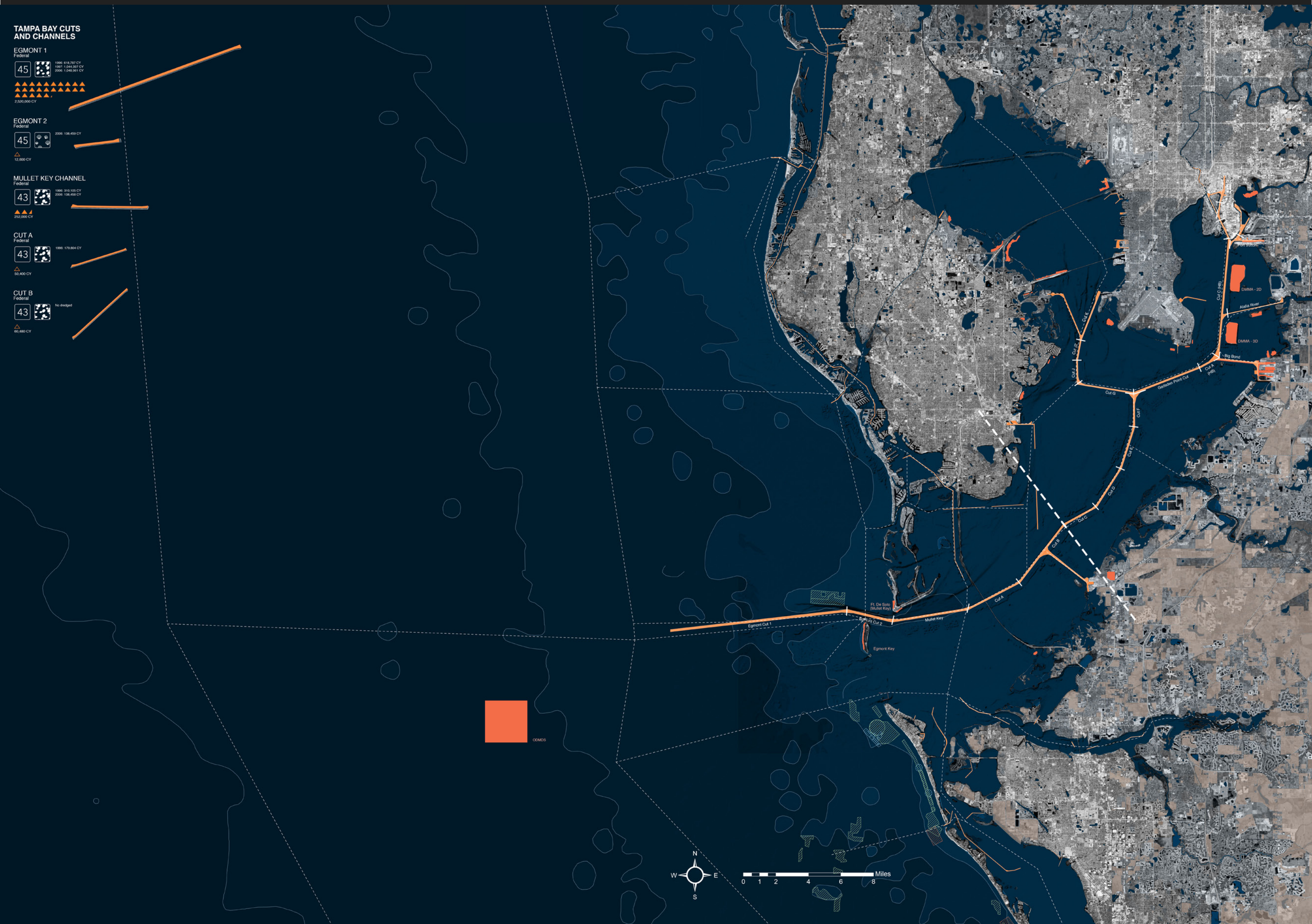
COCKROACH BAY AQUATIC PRESERVE
North Channel
Bunces Pass East
PORT MANATEE
Egmont Channel
Southwest Channel
TERRA CEIA AQUATIC PRESERVE
Passage Key Inlet
PALMETTO
BRADENTON
Longboat Pass
BAYSHORE GARDENS
N
W
E
S
0 1 2 4 6 8 miles
Data: USACE, Florida Department of Environmental Protection (FDEP), NOAA Coastal Services Center, Florida Inland Navigation District, FDEP Reconnaissance Offshore Sanda Search (ROSS), University of Florida GeoPlan Center, Florida Fish and Wildlife Conservation Commission Fish and Wildlife Research Institute, US Census Bureau

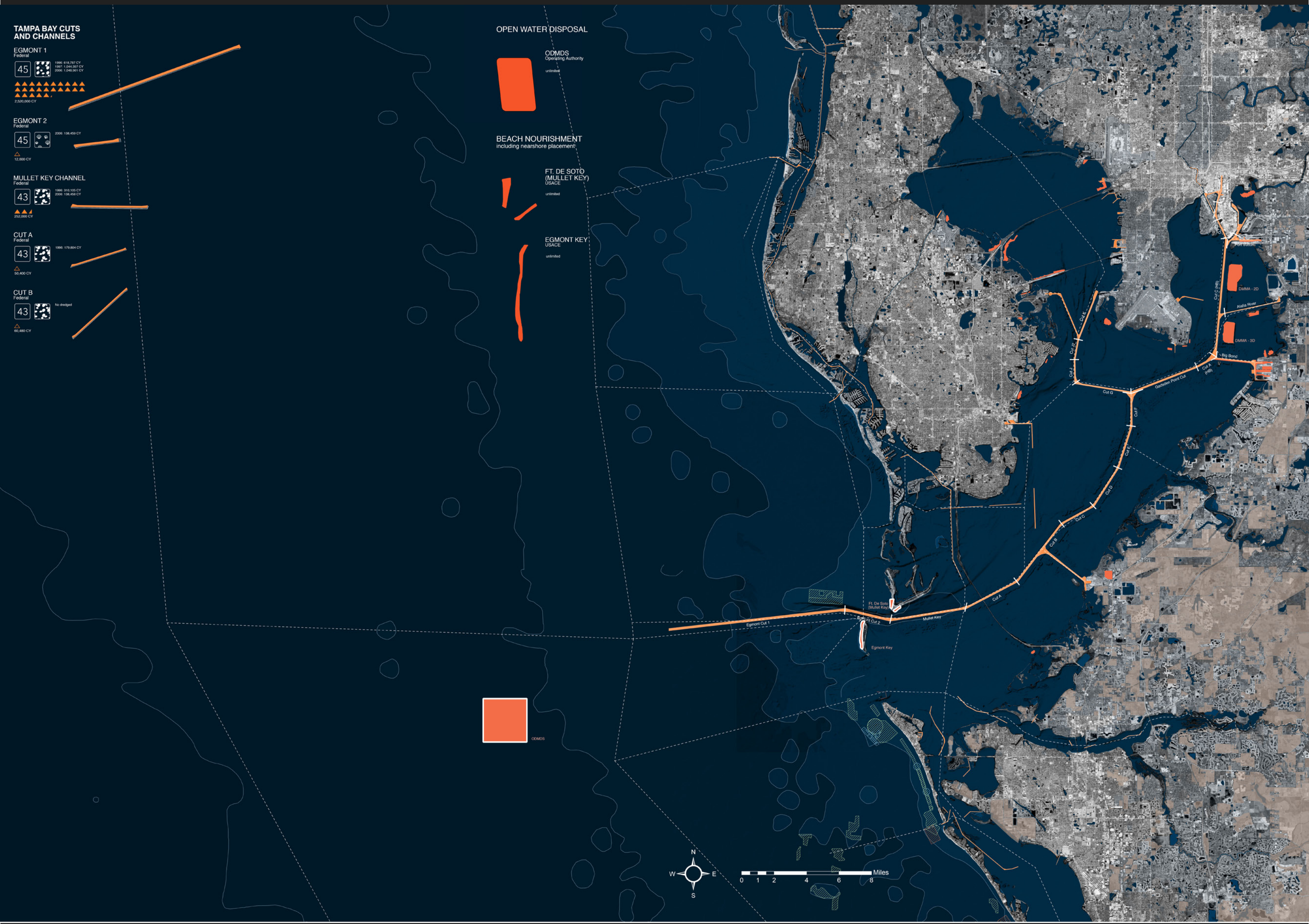
SUN COAST



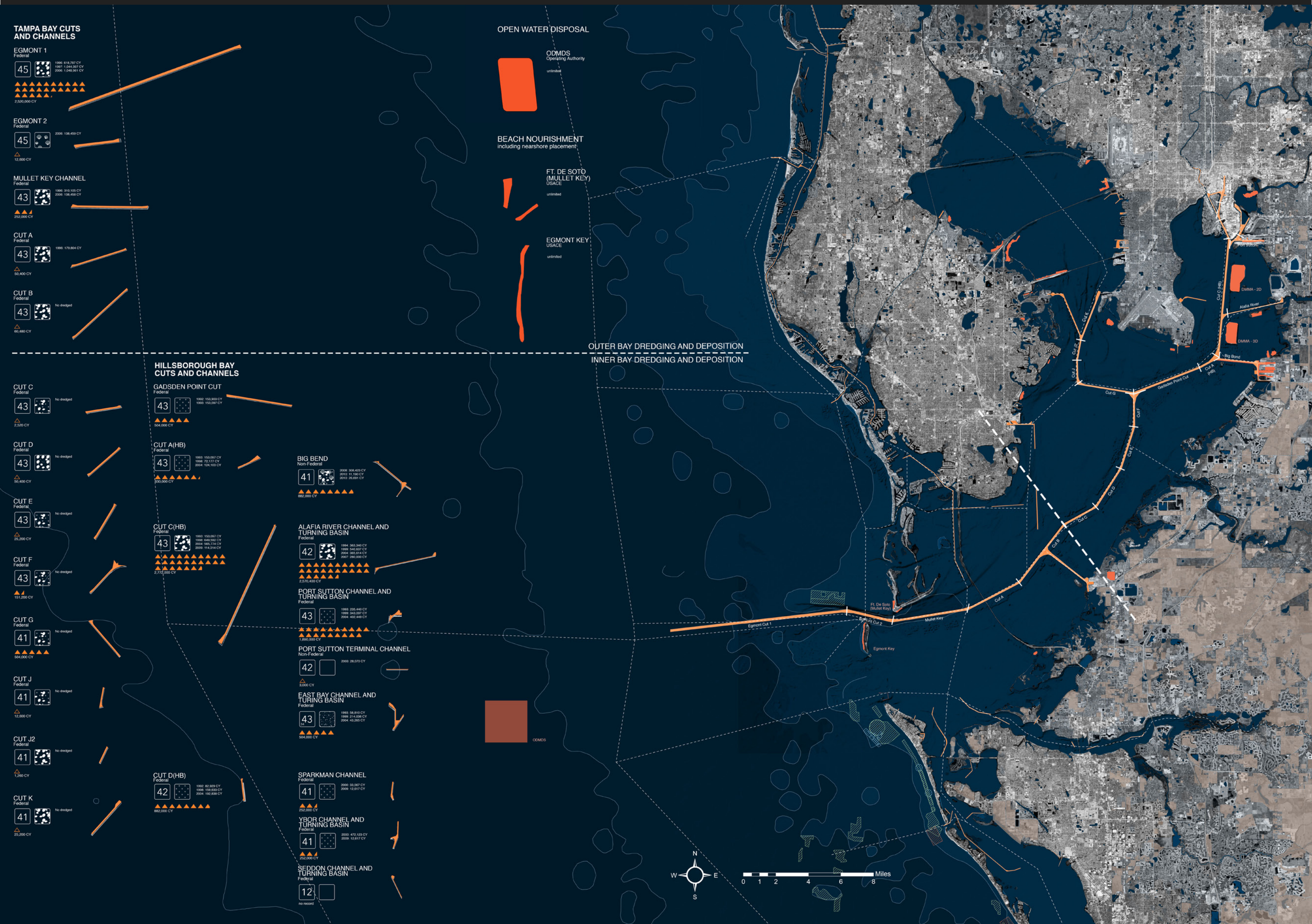
NAVIGATIONAL DREDGING [2011 TAMPA DMMP UPDATE, ETC.]



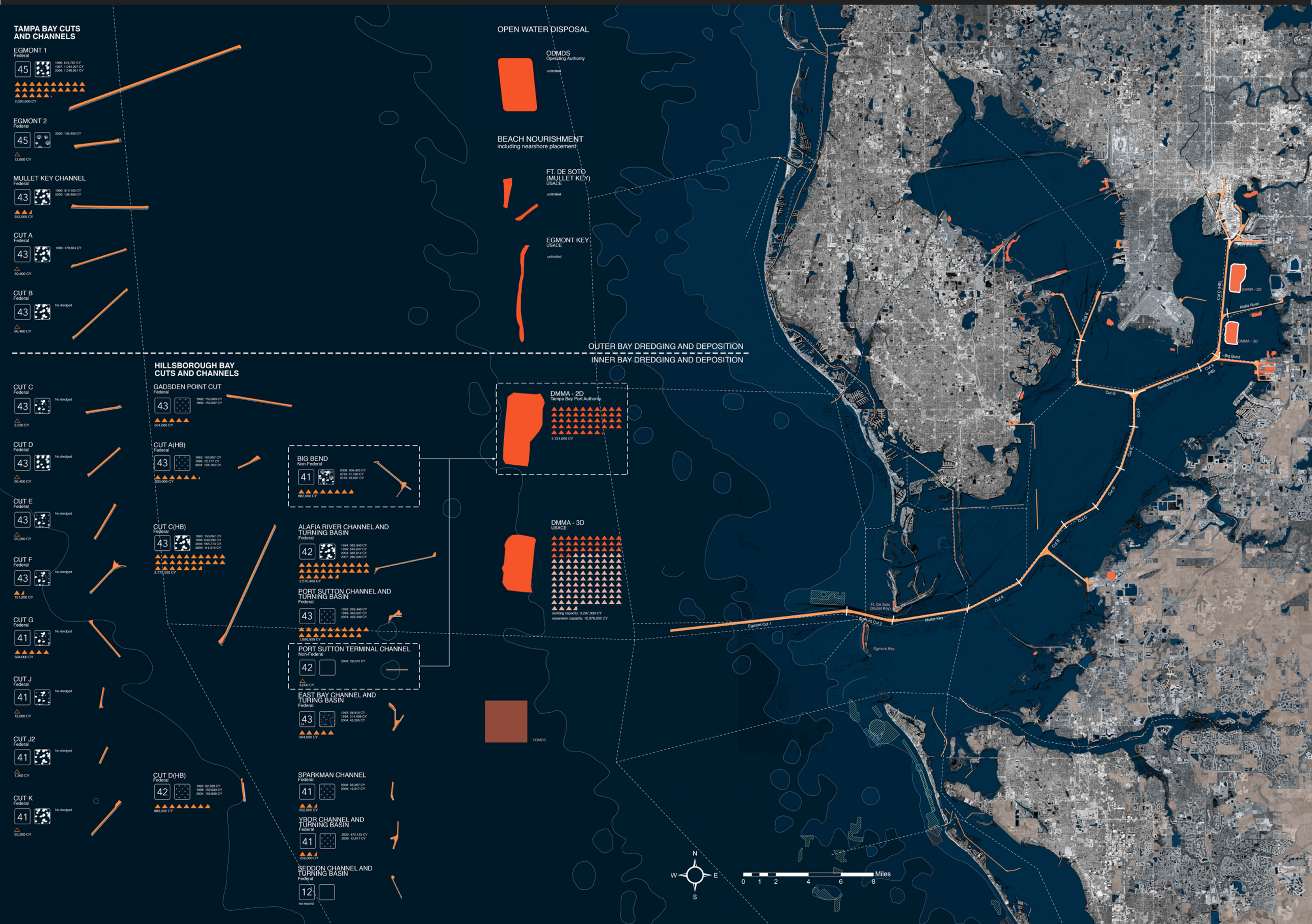
NAVIGATIONAL DREDGING [2011 TAMPA DMMP UPDATE, ETC.]



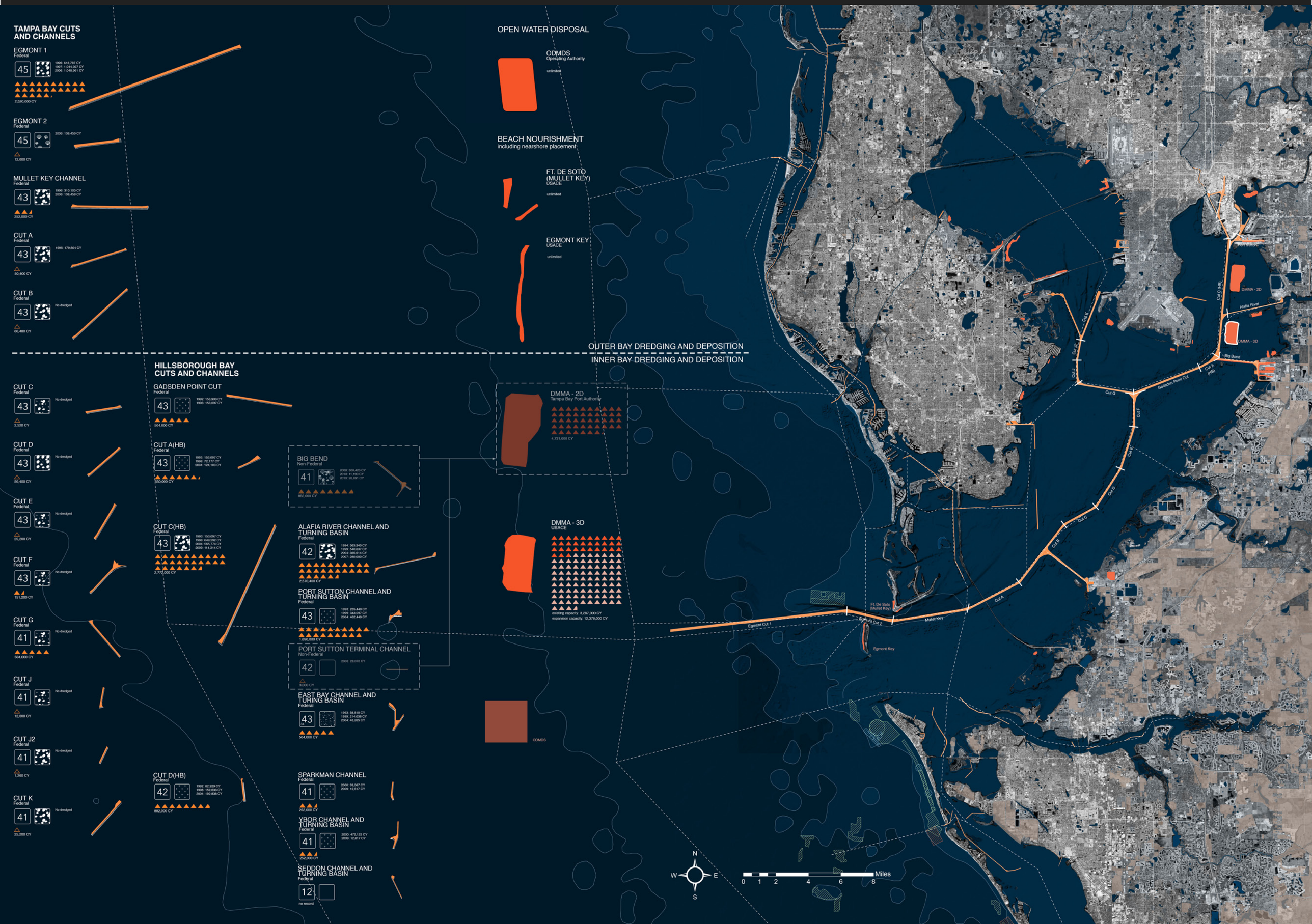
NAVIGATIONAL DREDGING [2011 TAMPA DMMP UPDATE, ETC.]



NAVIGATIONAL DREDGING [2011 TAMPA DMMP UPDATE, ETC.]



NAVIGATIONAL DREDGING [2011 TAMPA DMMP UPDATE, ETC.]



WHAT HAPPENS WHEN THE DMMAS ARE FULL?

_SCREEN_ACTIVE DREDGE SITE_PLAN

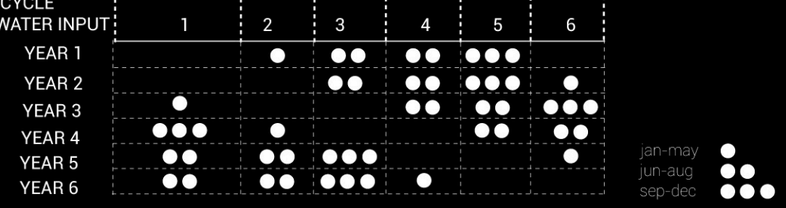
[29°46'48.69"N, 95° 5'38.75"W]

[Metabolic Wetlands]
[29°46'1.72"N, 95° 4'50.71"W]

SCALE_CELL
MAINTENANCE OPERATIONS

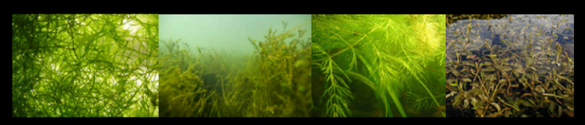
Remove contaminated plants + build up small levees	1 month
Place dredge material	2 months
Grade	1 month
Vegetate	1.5 years
Receive wastewater	4 years

SCALE_SITE
6 YEAR CYCLE
WASTEWATER INPUT



PLANT SPECIES_

deep ponds



deep marsh

shallow marsh

WHAT HAPPENS TO THE DREDGE? WHAT HAPPENS TO THE SITES?

Dredge Research Collaborative

News
DredgeFest California
All DredgeFests
Our Work
Presentations
Projects
Publications
About

We're delighted to be able to say that the DredgeFest event series has been recognized with an Honor Award in the Communications category of the American Society of Landscape Architect's 2016 Awards program.

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[collaborators]

Sean Burkholder, Buffalo
Brian Davis, Cornell
Rob Holmes, Auburn
Justine Holzman, Toronto
Tim Maly, RISD
Brett Milligan, UC-Davis
Gena Wirth, SCAPE

THE DREDGE RESEARCH COLLABORATIVE

2015
Great Lakes
DREDGE FEST
DREDGE FEST
New York City
2012
DREDGE FEST
California
2016
DREDGE FEST
Louisiana
2014

DREDGEFEST

DREDGE
FEST
NYC
SEPTEMBER 28th and 29th

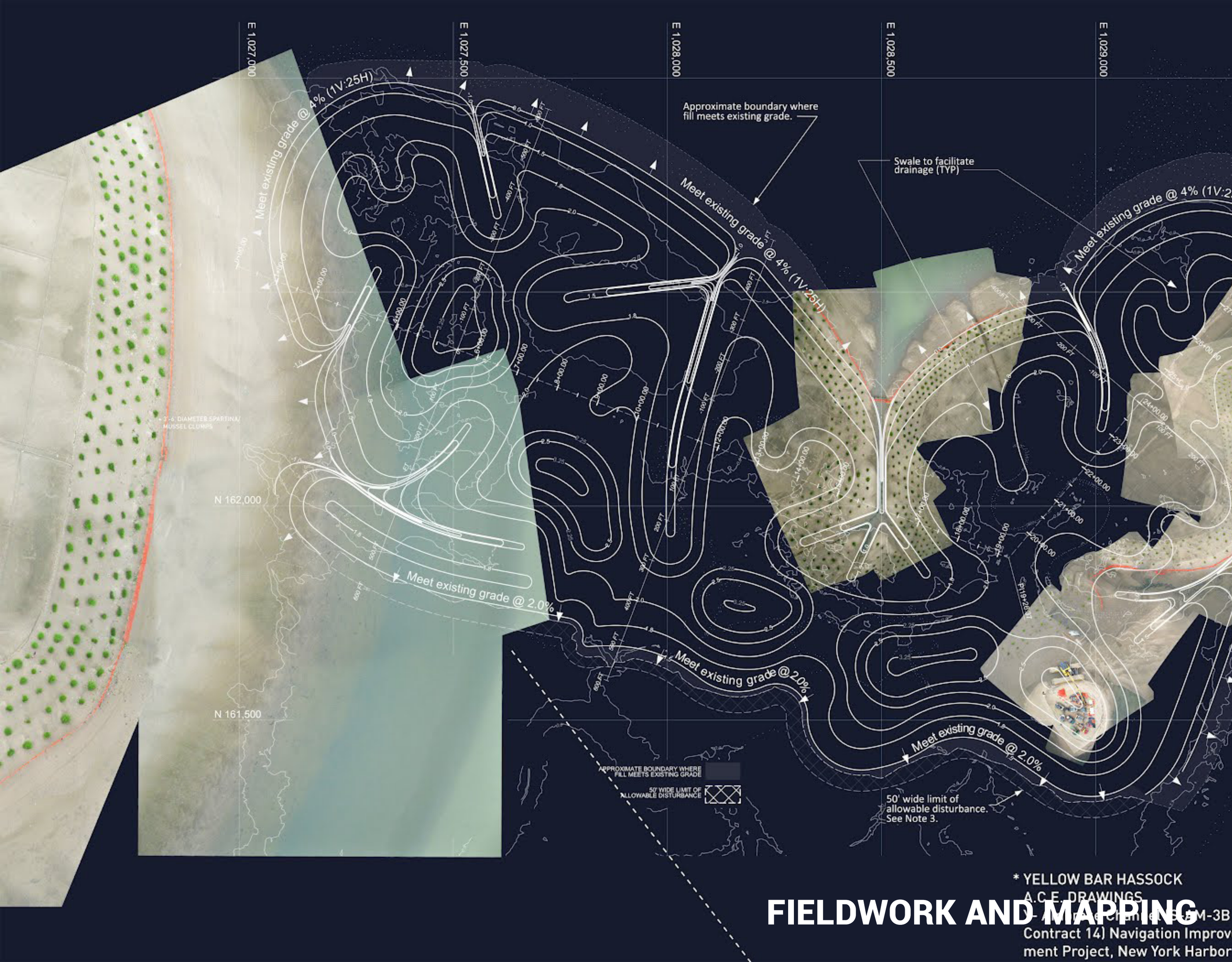
DredgeFest Louisiana is a symposium, field expedition, and speculative design workshop about the human manipulation of sediments, from the infrastructural constraint of the Mississippi River at a continental scale to bright orange erosion control fences bulging with wet mud in a spring downpour on a suburban construction site.
Space is limited. Tickets are available now at:
DredgeFest Louisiana
Symposium January 11-12 New Orleans
Workshops January 13-16 Baton Rouge
Tour January 17 New Orleans
dredgeresearchcollaborative.org
Dredge Research Collaborative

DredgeFest Great Lakes is a symposium, field expedition, and speculative design workshop about the human manipulation of sediments. It is an encounter between government agencies, designers, theorists, academics, corporate practitioners, industry experts, students, and the public. DredgeFest Great Lakes is run by the Dredge Research Collaborative and hosted by the University of Minnesota. This is a great opportunity to engage with others as well as obtain Continuing Education Credits from AIA // ASLA for participation at the event.
Space is limited. Tickets are available now at: http://dfgl.brownpapertickets.com
DredgeFest Great Lakes
SYMPOSIUM Friday Aug 14-Saturday August 15 University of Minnesota, Minneapolis
The symposium at DredgeFest Great Lakes will bring together a broad mix of disciplines, corporations, public agencies and organizations in live public conversation and will investigate the conference theme of 'Shifting Baselines' across five topics: Freshwater Basin, Choreographing Sediments, Landscapes of Dredge, New Economies, and Participation and Engagement.
WORKSHOP Sunday August 16-Friday August 21 University of Minnesota, Minneapolis
DredgeFest offers fast-paced and speculative small-group design workshops on the theme of dredge futurism—future scenarios related to the dredge cycle and will be led by local and international designers, including Mark Smout (Smout Allen/Bartlett SoA, UK), Kristi Cheramie (Ohio State University, US), Matthew Spremulli (University of Waterloo, CA/formerly with Lateral Office), and Fionn Byrne (University of Toronto, CA/incoming Kiley Fellow at the Harvard GSD).
TOUR Monday August 17 Duluth
A four hour tour of dredge landscapes in Duluth will be led by the Dredge Research Collaborative, the Duluth Port Authority, and the City of Duluth. The tour will take place via bus and boat and will focus on dredge use and habitat creation.
Sponsored by:
LANDSCAPE ARCHITECTURE MAGAZINE
COLLEGE OF DESIGN
UNIVERSITY OF MINNESOTA
UNIVERSITY OF MINNESOTA
Duluth Seaway Port Authority
Bay West
dredgeresearchcollaborative.org/dredgefest/
Dredge Research Collaborative

Dredge Research Collaborative
Join us for...
DredgeFest California
June 13-19, 2016 // Bay Area
DredgeFest California is about the sediment-linked phenomena of the Bay-Delta system of San Francisco. Here, pulses, droughts, dredging, diking and reclamation all intermingle in a region bound to sediment-management practices like no other.
Together, we will explore the complex relationship between human interests and ecological integrity that residents and planners must balance as they deal with climate change, sea-level rise, wetland restoration, public waterfront access, industrial needs, and the cultural heritage of the Bay-Delta region as a whole.
WORKSHOPS June 13-17
One week-long scenario planning workshop with three tracks:
Bay Sediments
Delta Earthworks
Regional Choreography
TOURS June 18-19
Two day-long tours open to the public:
Day 1: San Francisco Bay Dredging and Reclamation
Day 2: Levee-linked Landscape of the Delta
APPLY NOW for the workshops:
http://dredgeresearchcollaborative.org/dredgefest/

DREDGEFEST

FIELDWORK AND MAPPING



FIELDWORK AND MAPPING

SYMPOSIUM

What does Great Lakes dredging look like?
Where does dredge come from?
Great Lakes Basin
Sediment Traces
Landscapes of Dredge
The Great Lakes Basin
The Dredge Cycle
Dredging is the mechanized uplift of silt and sediments. Through a variety of industrial devices and coalitions of actors, muddy material is extracted and transported to new locations. It is used to clear waterways, dig channels, clean polluted riverbeds, and change the course of rivers.
We believe that dredging is a key component of a much wider cycle of human practices that accelerate, decelerate, transport, and materially alter sediments.
DREDGE CYCLE
COLLEGE OF DESIGN
UNIVERSITY OF MINNESOTA
LANDSCAPE ARCHITECTURE MAGAZINE
AIA Northern Minnesota

EXHIBITION

PUBLIC TOURS

DESIGN WORKSHOPS

Dredge Research Collaborative

DredgeFest California | Key Findings and Recommendations

#Publications

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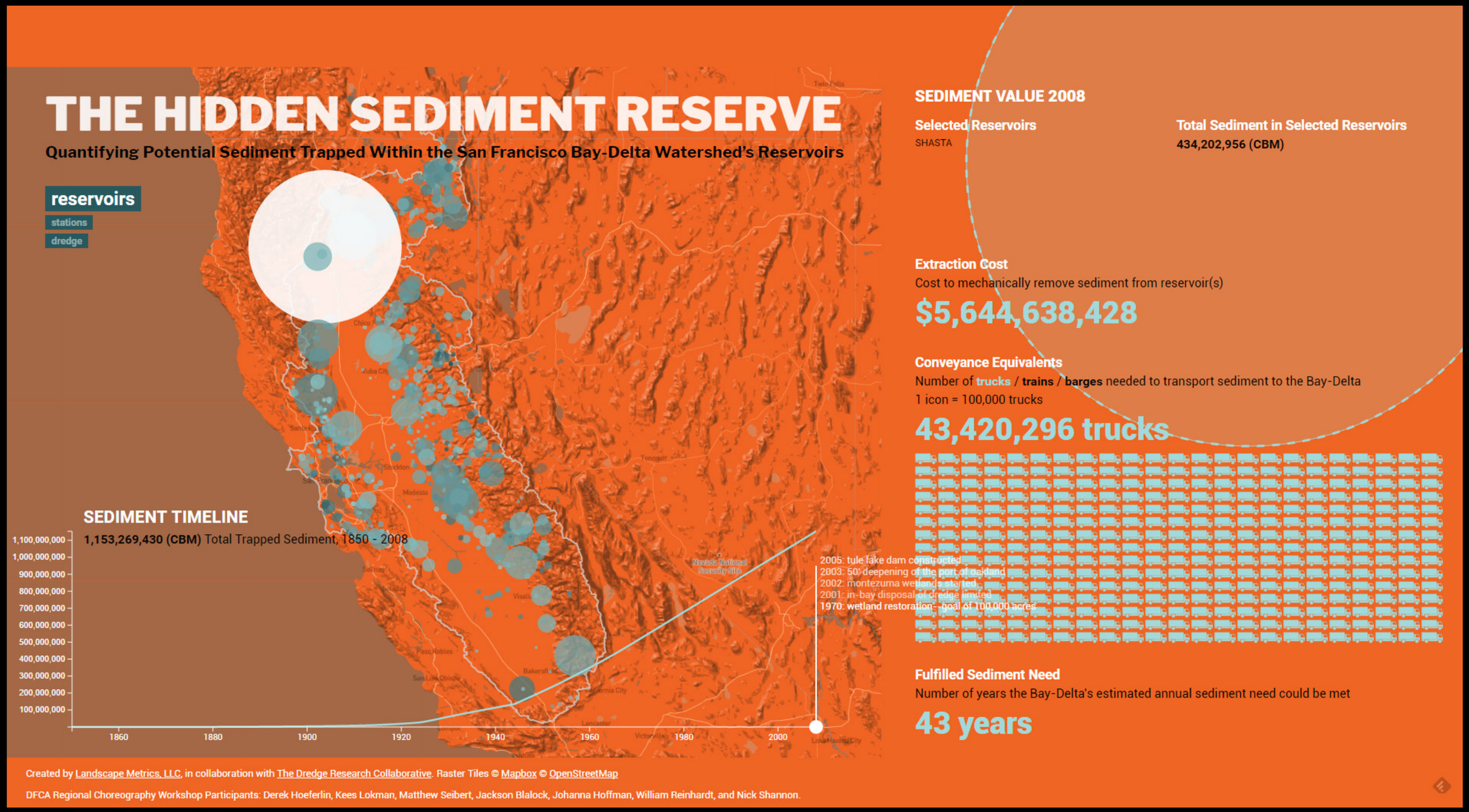
The *DredgeFest California Key Findings and Recommendations* have been synthesized from the work of DredgeFest California, a week-long event held in the Bay Area in July 2016. They draw on the work done by five teams across five days of design workshops, discussions with many different experts, two days in the field with the DredgeFest California public tours, and the background research conducted by the Dredge Research Collaborative prior to the event. Each recommendation summarizes a key principle that we believe should guide the design, planning, and management of sediment in the Bay-Delta.

Download the report here: small [55 MB] large [100 MB].

Cite this document: Milligan, B., Holmes, R., Wirth, G., Maly, T., Burkholder, S., & Holzman, J. Dredge Research Collaborative. (2016). *DredgeFest California: Key Findings and Recommendations*. Retrieved from http://dredgeresearchcollaborative.org/works/dredgefest-california-white-paper/.

PUBLICATIONS

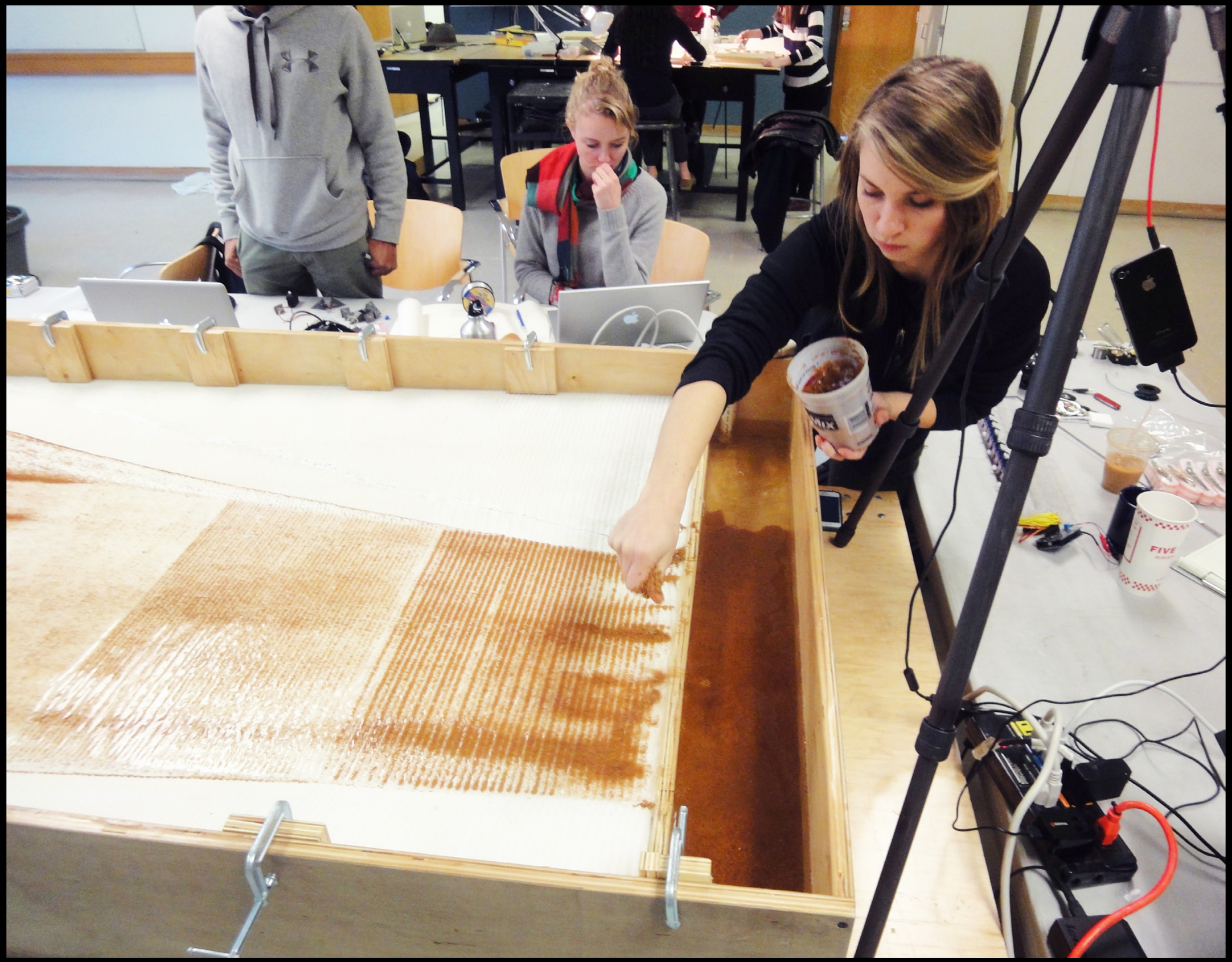
[website: Landscape Metrics with the DRC]



PUBLICATIONS

RAISING PUBLIC AWARENESS

AIDING DECISION MAKERS



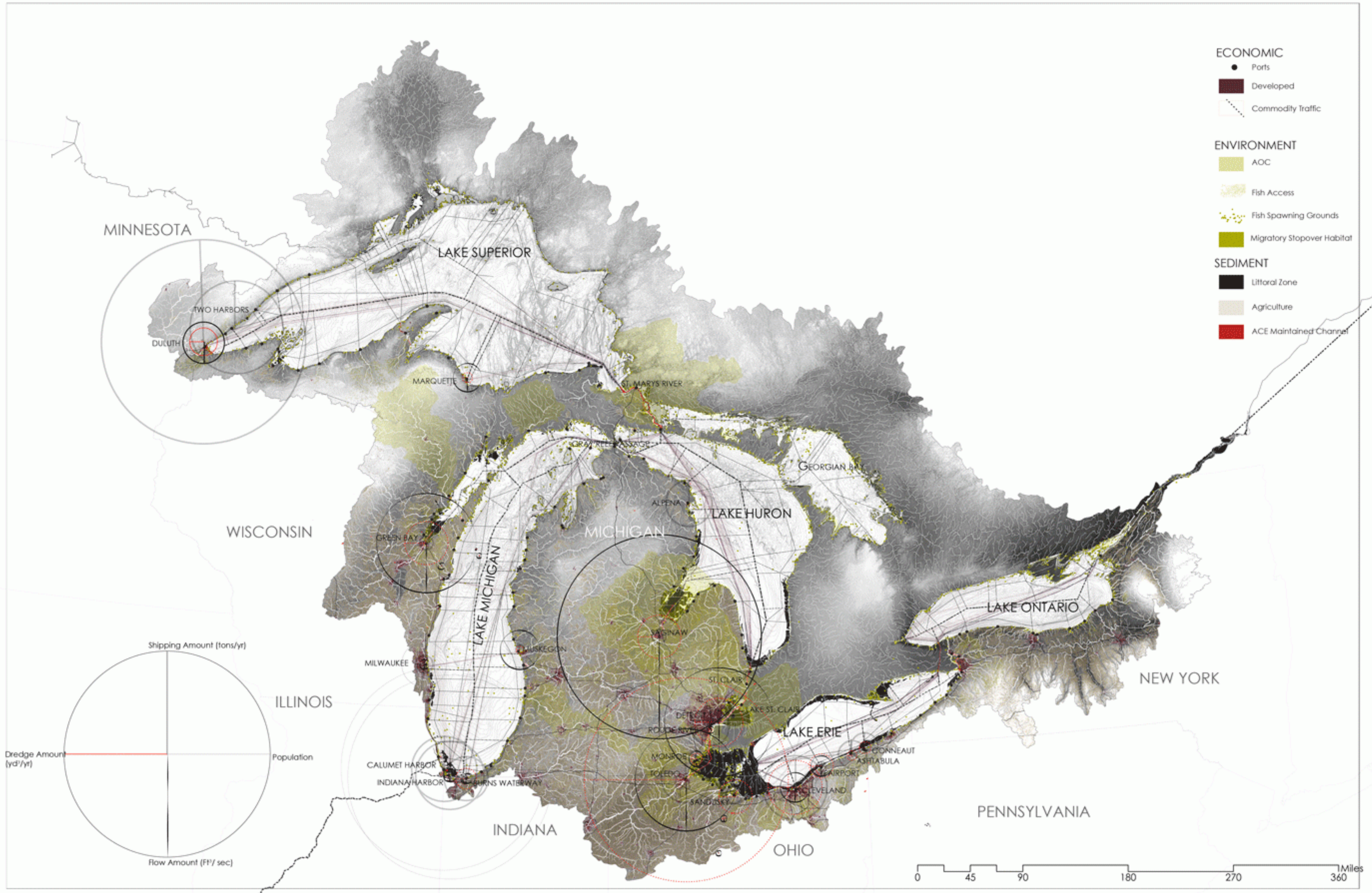
INFORMING DESIGN RESEARCH

[Members of the DRC at the USACE ERDC facility, Vicksburg, MS | October 2016]

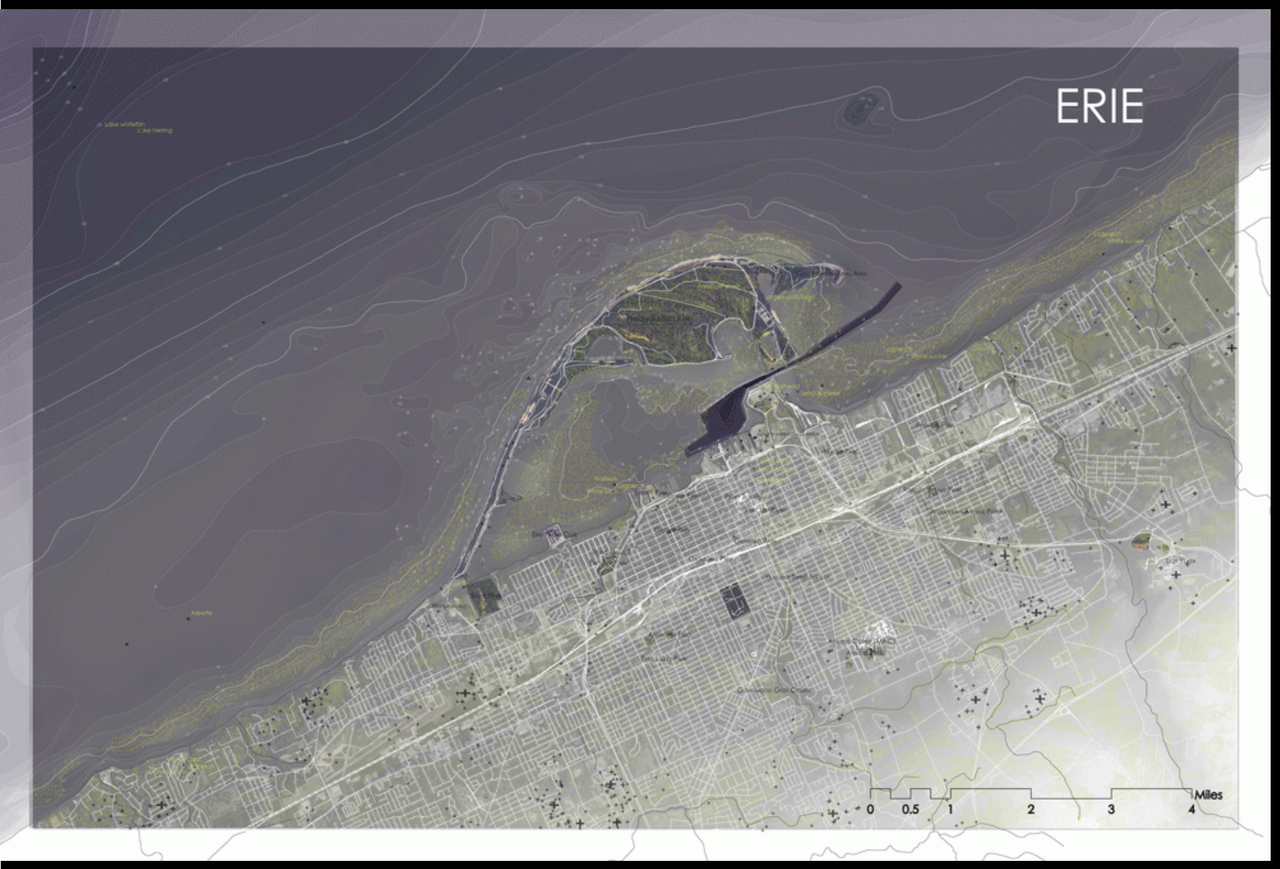
PROJECTS & PARTNERSHIPS

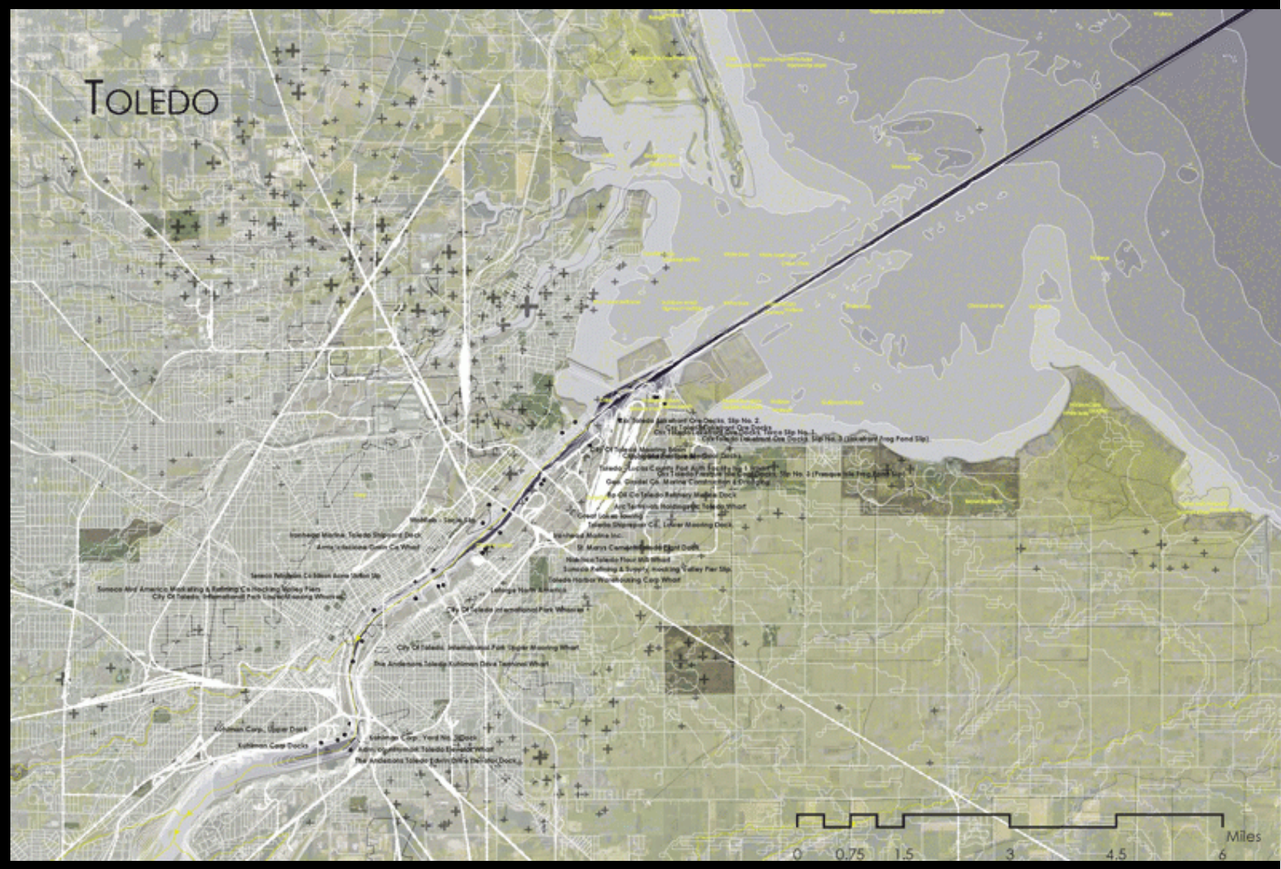
REHABILITATION | DIKE 14 / CLEVELAND LAKEFRONT NATURE PRESERVE

LANDSCAPE INTELLIGENCE | MUD LAKES PROJECT

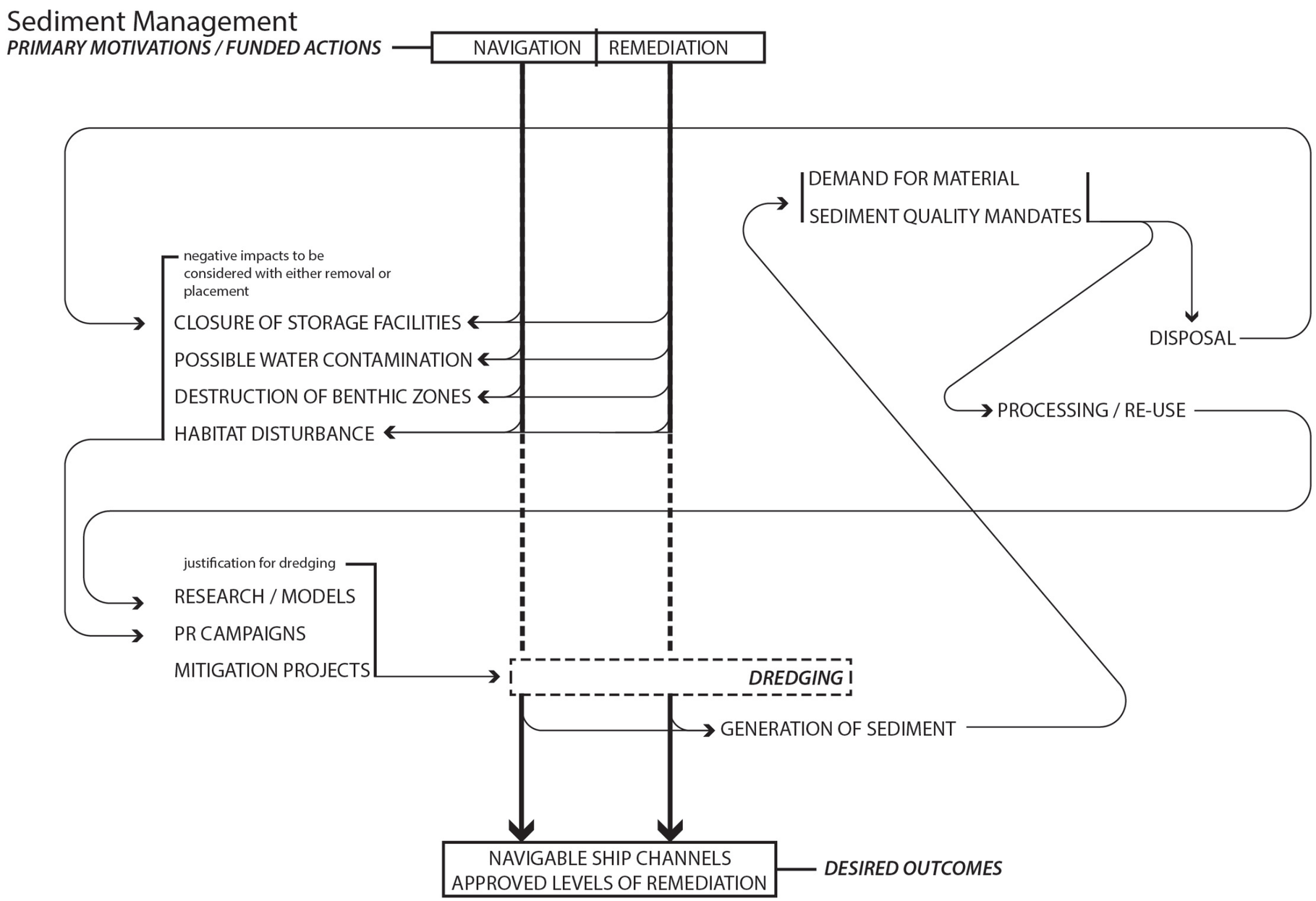


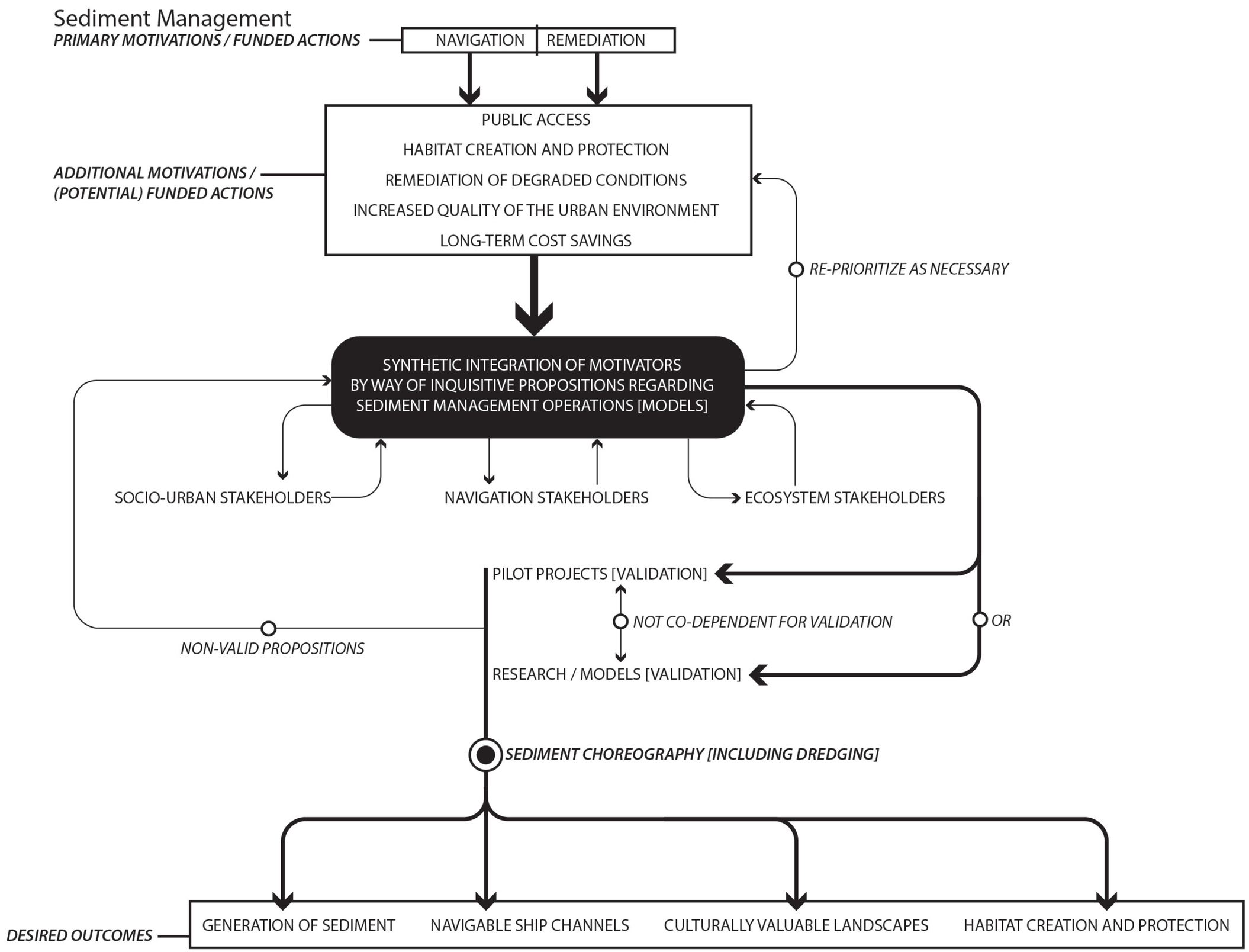
REGIONAL CHOREOGRAPHY | PORT FUTURES





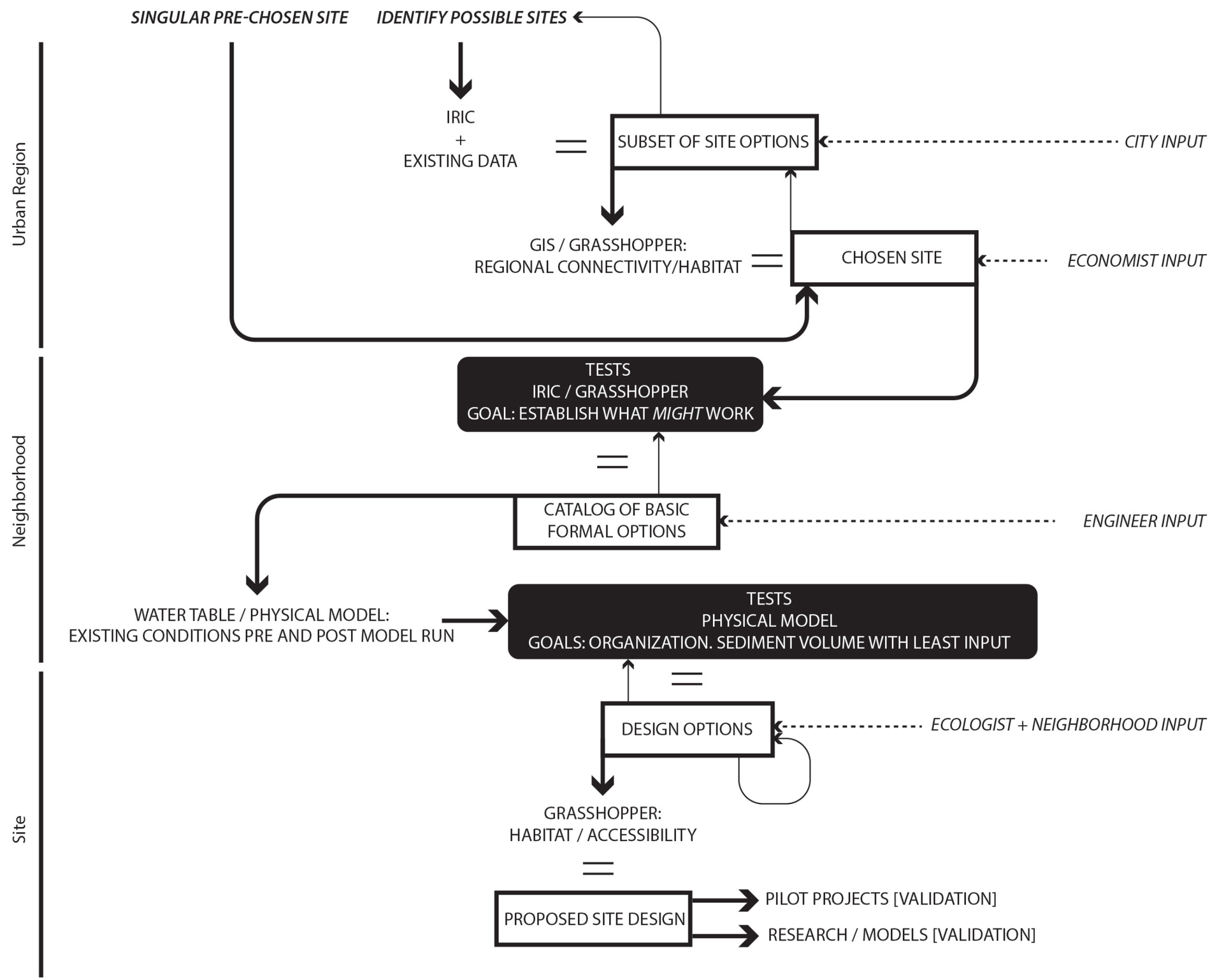
REGIONAL CHOREOGRAPHY | PORT FUTURES

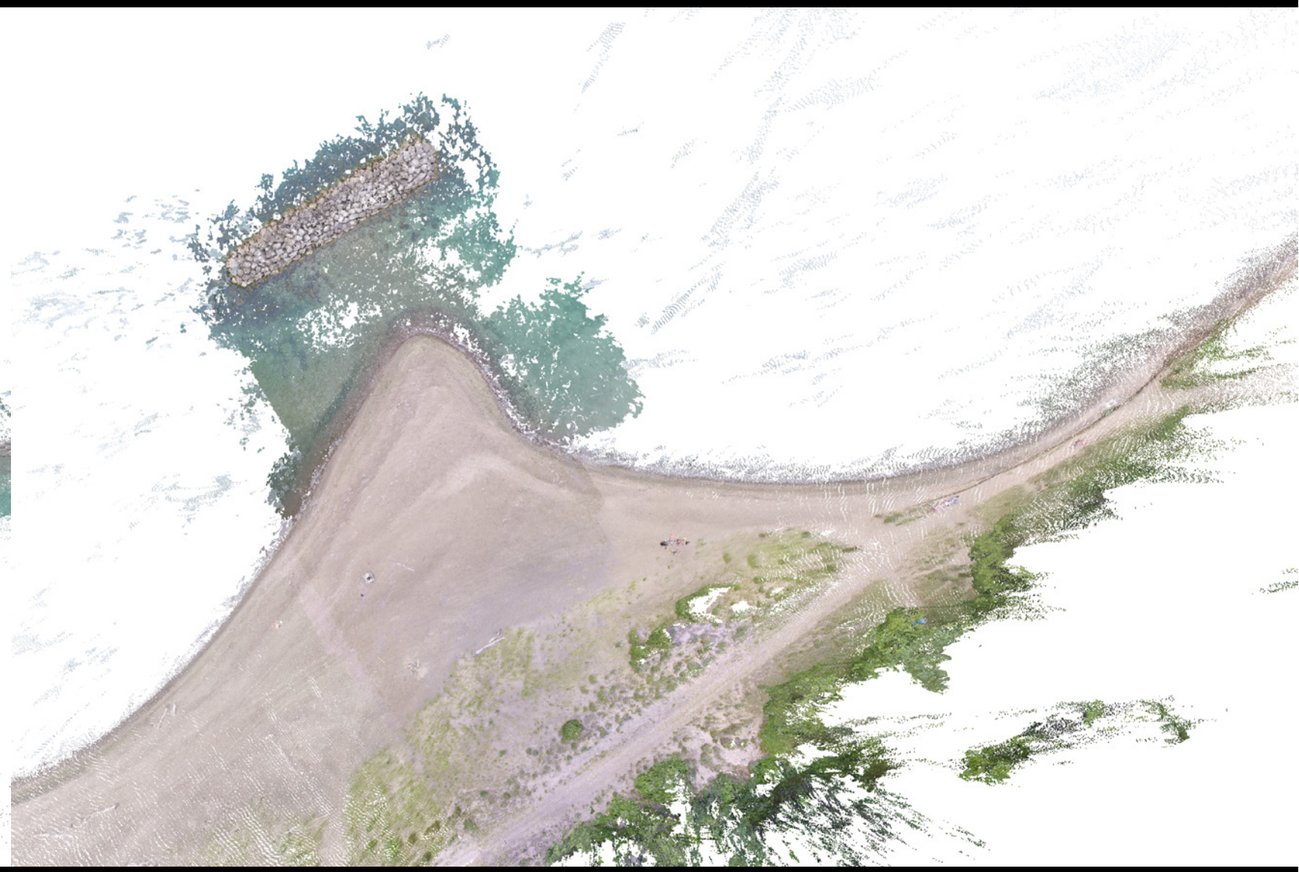

Sediment Management
PRIMARY MOTIVATIONS / FUNDED ACTIONS
NAVIGATION
REMEDIATION
DEMAND FOR MATERIAL
SEDIMENT QUALITY MANDATES
negative impacts to be considered with either removal or placement
CLOSURE OF STORAGE FACILITIES
POSSIBLE WATER CONTAMINATION
DESTRUCTION OF BENTHIC ZONES
HABITAT DISTURBANCE
DISPOSAL
PROCESSING / RE-USE
justification for dredging
RESEARCH / MODELS
PR CAMPAIGNS
MITIGATION PROJECTS
DREDGING
GENERATION OF SEDIMENT
NAVIGABLE SHIP CHANNELS
APPROVED LEVELS OF REMEDIATION
DESIRED OUTCOMES



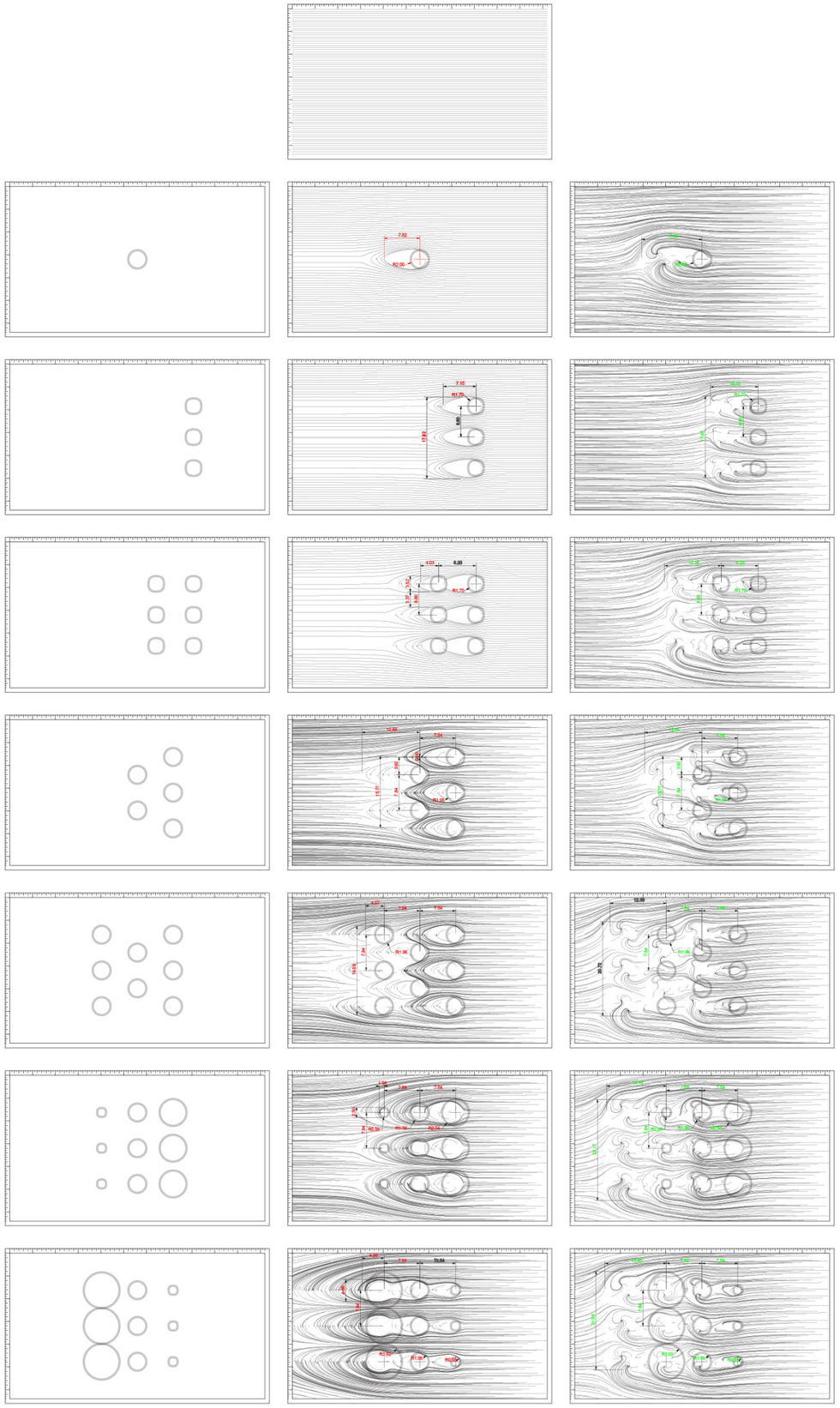
REGIONAL CHOREOGRAPHY | PORT FUTURES

Sediment Management: Model Testing Framework



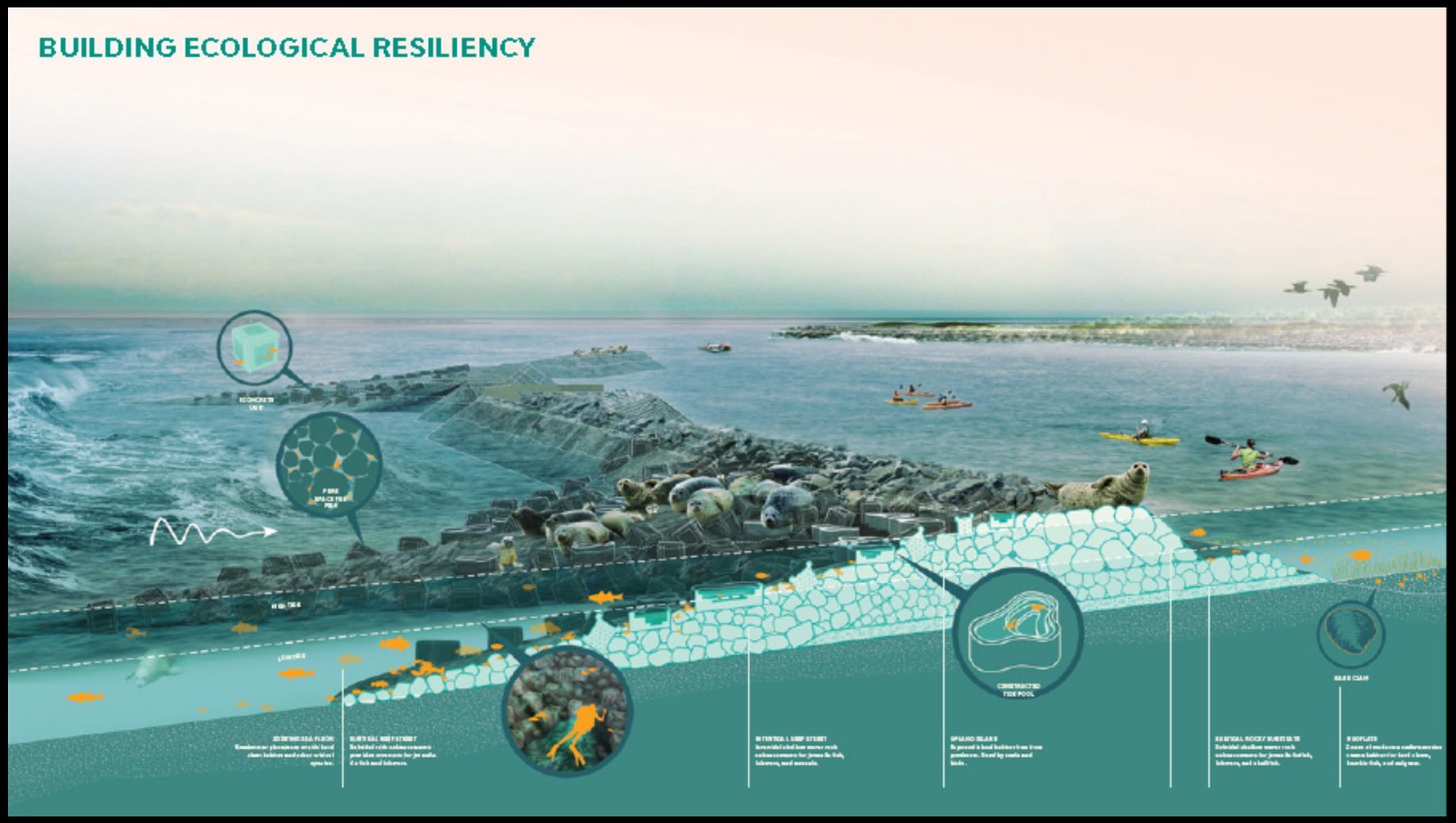


PROTOTYPING METHODS | PORT FUTURES



PROTOTYPING METHODS | PORT FUTURES

[image: SCAPE Landscape Architecture, “Living Breakwaters”]



DESIGNING & BUILDING PREFERRED COASTAL FUTURES

Dredge Research Collaborative

DredgeFest California | Key Findings and Recommendations

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dredgeresearchcollaborative.org/works/dredgefest-california-white-paper/