

NEW YORK – NEW JERSEY HARBOR AND TRIBUTARIES COASTAL STORM RISK MANAGEMENT FEASIBILITY STUDY (NYNJHATS)

INTERIM REPORT & CURRENT
STUDY STATUS UPDATE

GREAT NECK, NEW YORK

U.S. Army Corps of Engineers,
New York District

October 24, 2019



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*H. L. Carey Tunnel between Manhattan and Brooklyn
flooded during Hurricane Sandy, October 2012*



Flooding in Hoboken, NJ October 2012

AGENDA

5:00-5:30: Poster Boards

5:30-6:00: Presentation on Updates to Alternatives/Potential Induced Flooding

6:00-6:30: Q&A

6:30-6:45: Poster Boards (Intermission)

6:45-7:15: Presentation on Benefits/Costs and Environmental Considerations

7:15-7:45: Q&A

7:45-8:00: Poster Boards



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STUDY AREA (in green)

- The largest and most densely populated of the 9 high-risk focus areas identified in the North Atlantic Coast Comprehensive Study (NACCS)
- Area covers 2,150+ square miles and 900+ miles of affected shoreline
- 25 counties in New York & New Jersey
- Affected population of roughly 16 million people, including New York City and the six most populated cities in New Jersey



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STUDY INFORMATION & HISTORY

- **Objective:** Manage the risk of coastal storm damage in the study area
- **Non-Federal Sponsors:** New Jersey Department of Environmental Protection (NJDEP) and the New York State Department of Environmental Conservation (NYSDEC) (in partnership with the City of New York)
- **September 2017:** Identified preliminary alternatives
- **February 2019:** Released Interim Report
- **Next Step:** Release Draft Feasibility Report – Summer 2020



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INTERIM APPROVED TIMELINE

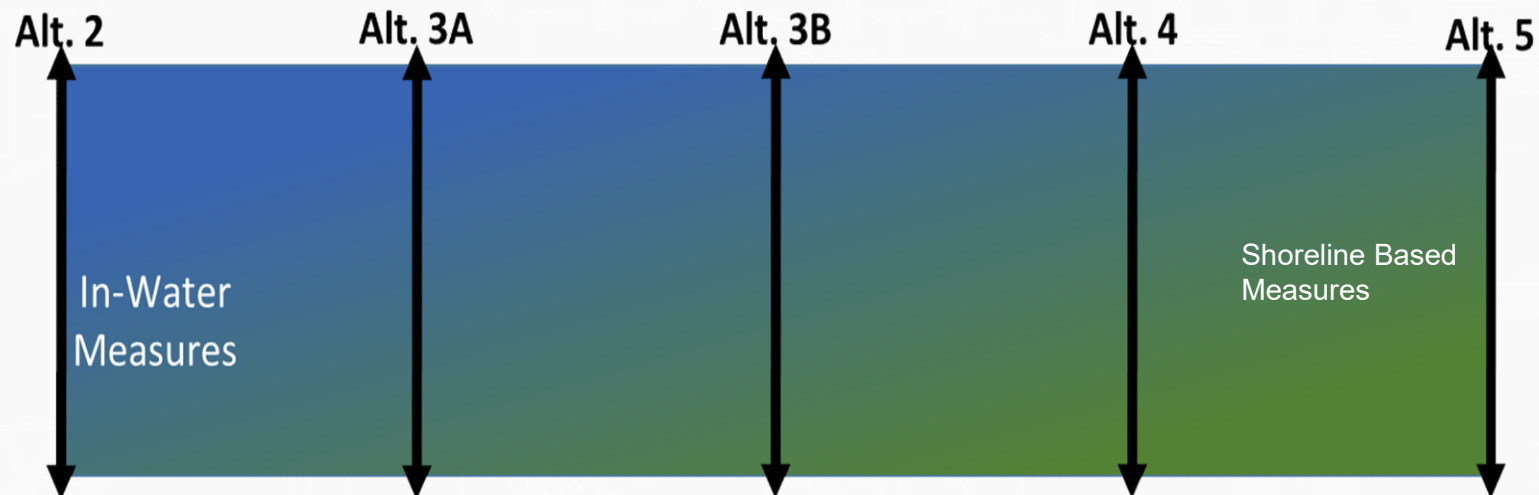




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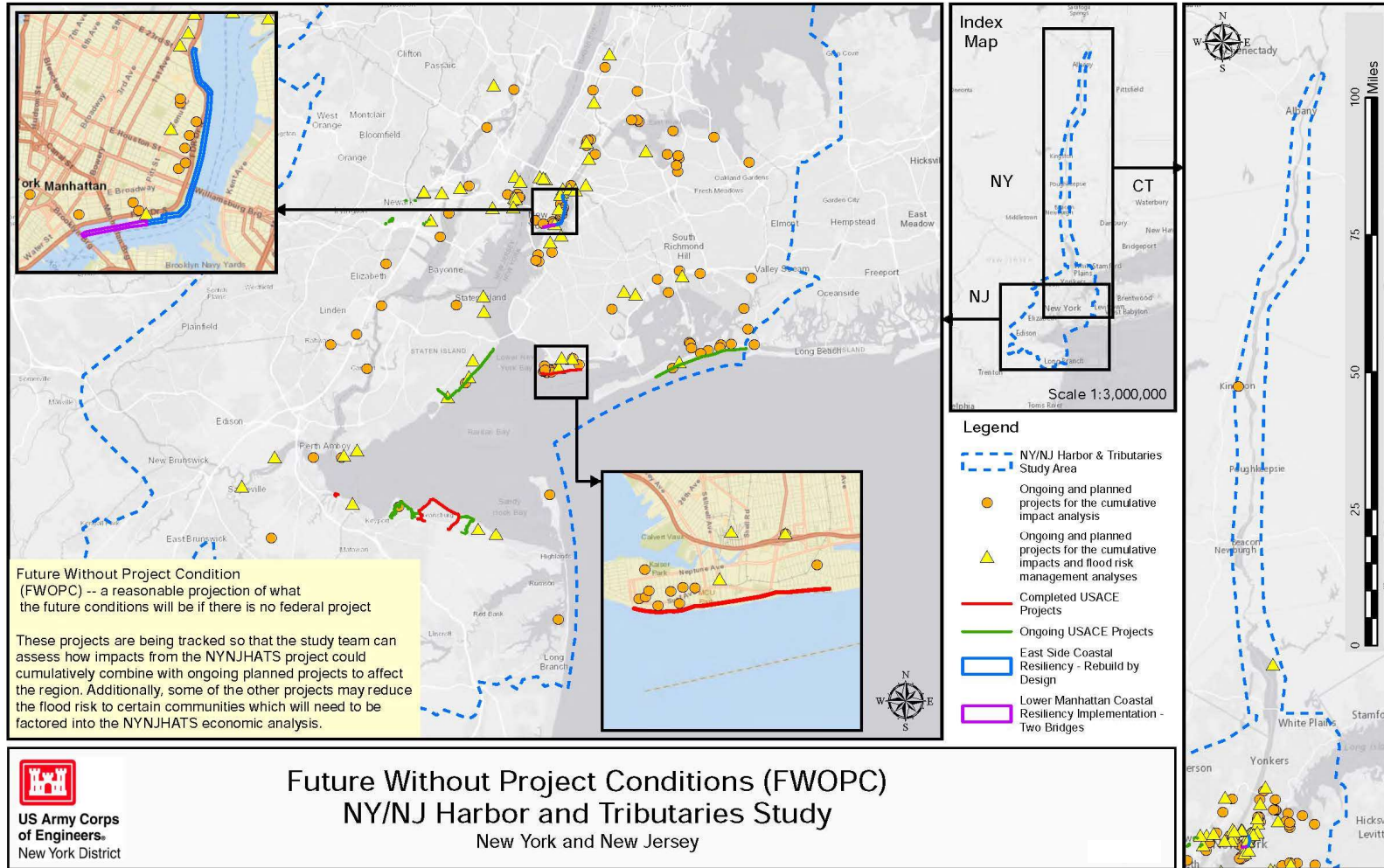
ALTERNATIVES OVERVIEW

- Alternative 1: No Action
- Alternative 2: Harbor Wide Gate and Beach Restoration
- Alternative 3A/3B: Multiple Bay/Basin Gate and Floodwalls & Levee Systems
- Alternative 4: Single Waterbody Gate and Floodwalls & Levees
- Alternative 5: Perimeter Only





ALTERNATIVE 1: NO ACTION (FUTURE WITHOUT PROJECT CONDITIONS)



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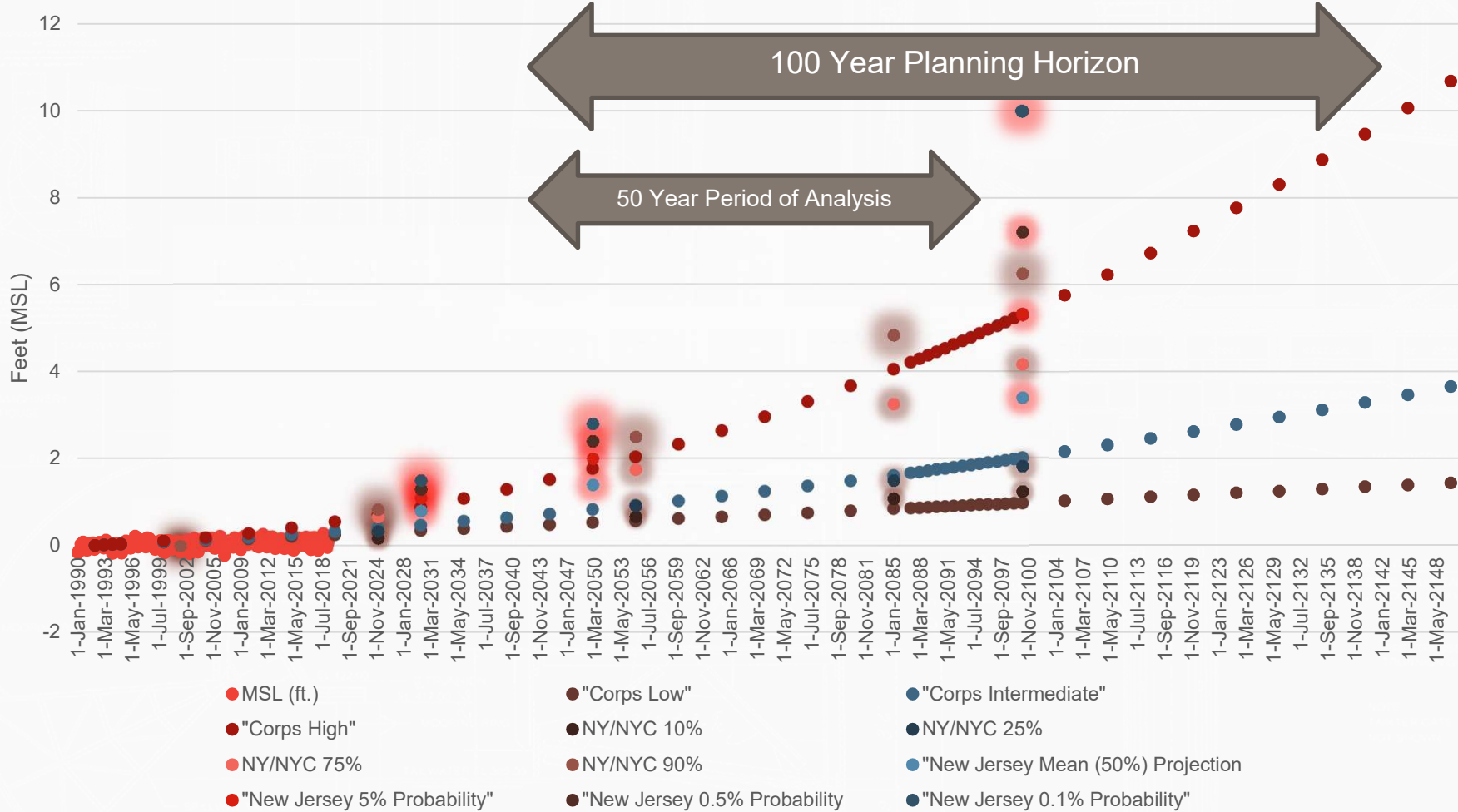


EVALUATING RELATIVE SEA LEVEL CHANGE PROJECTIONS



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Measured Sea Level at the Battery, NY and Relative Sea Level Change Projections



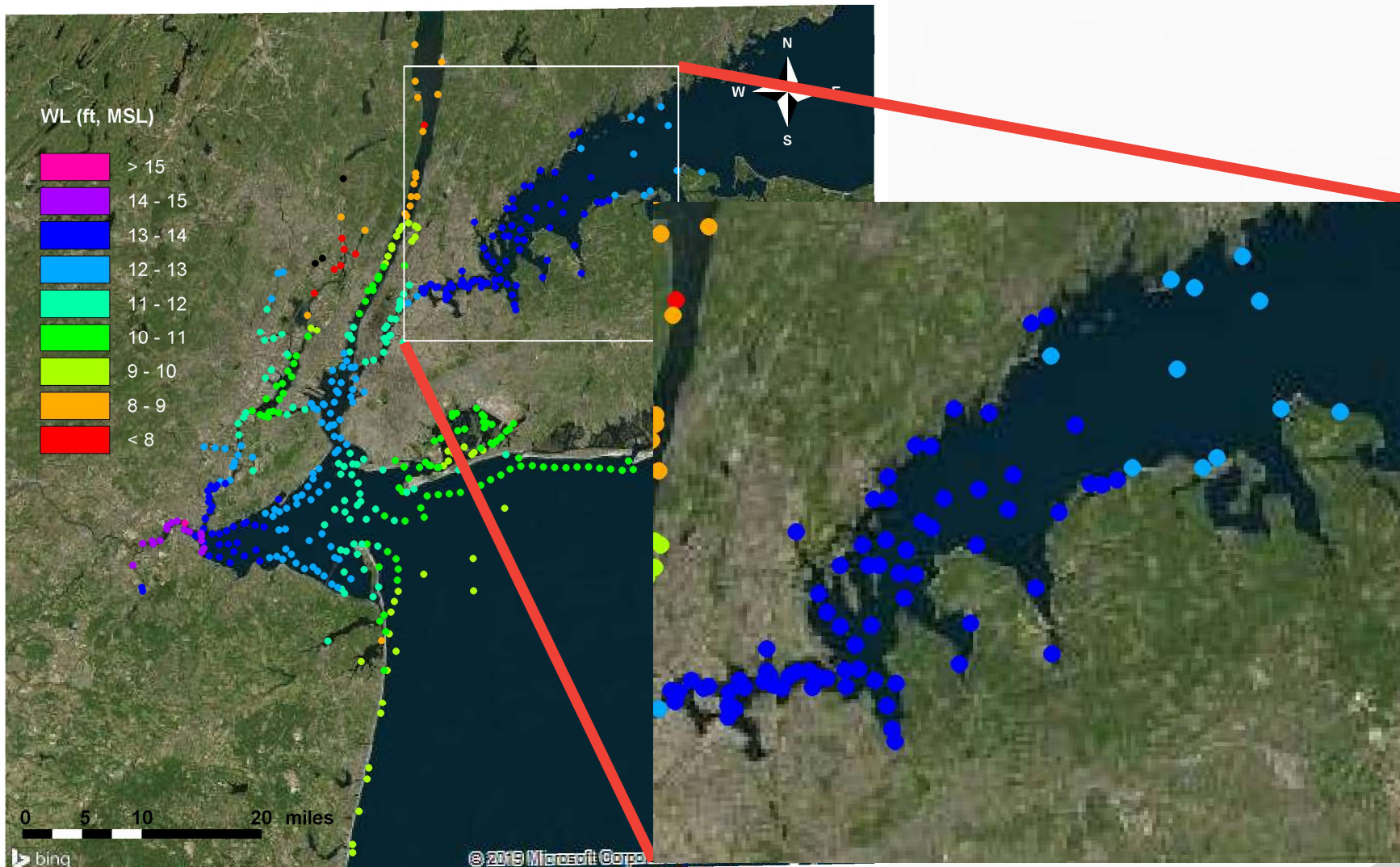


SELECTED STORM CONDITION FOR WITH PROJECT ALTERNATIVE EVALUATION AND COMPARISON



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1% AEP Water Level (50% Confidence Limit)- FWOP

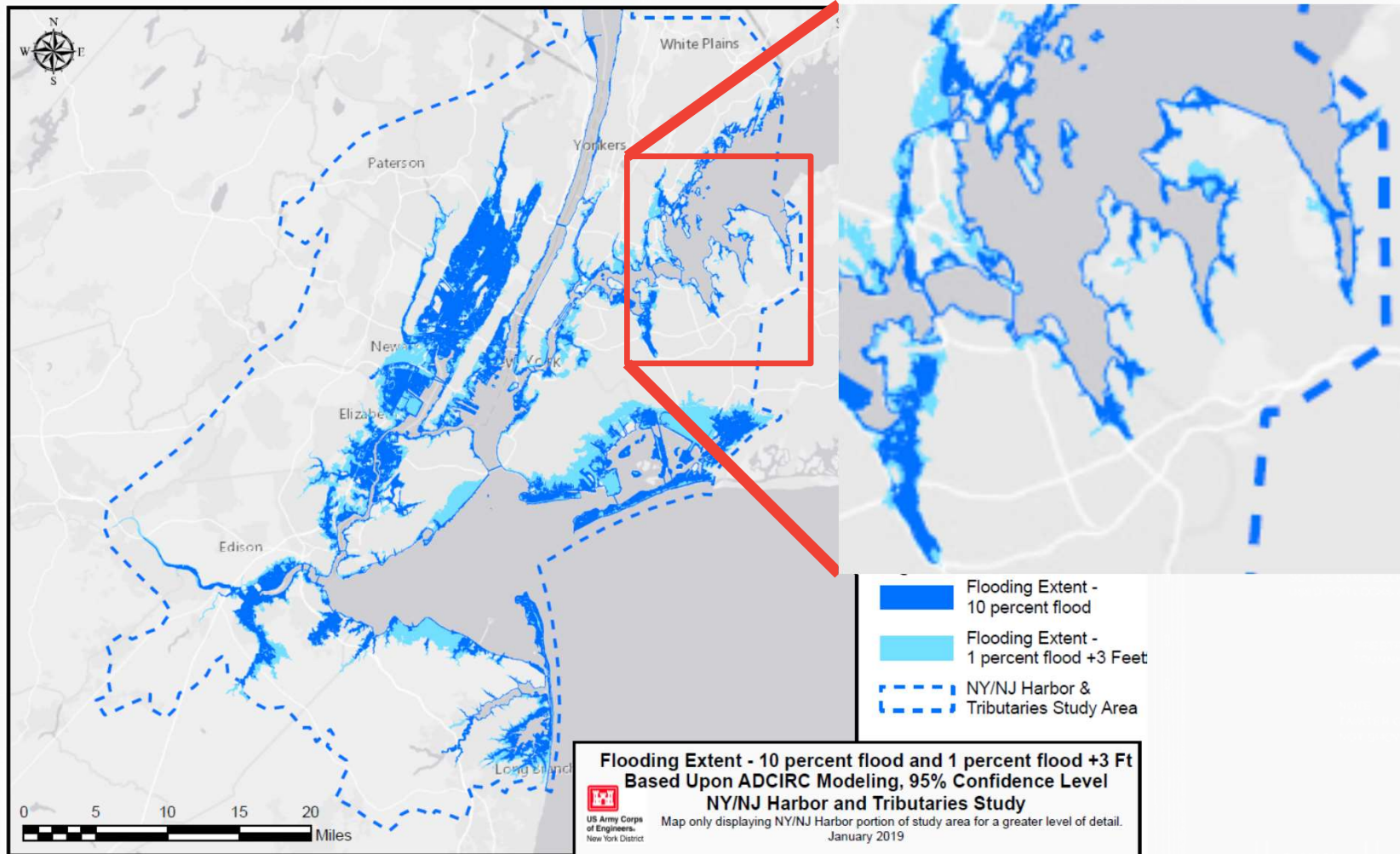




POTENTIAL COASTAL FLOODING EXTENT FROM 10% AND 1% ANNUAL EXCEEDANCE PROBABILITY



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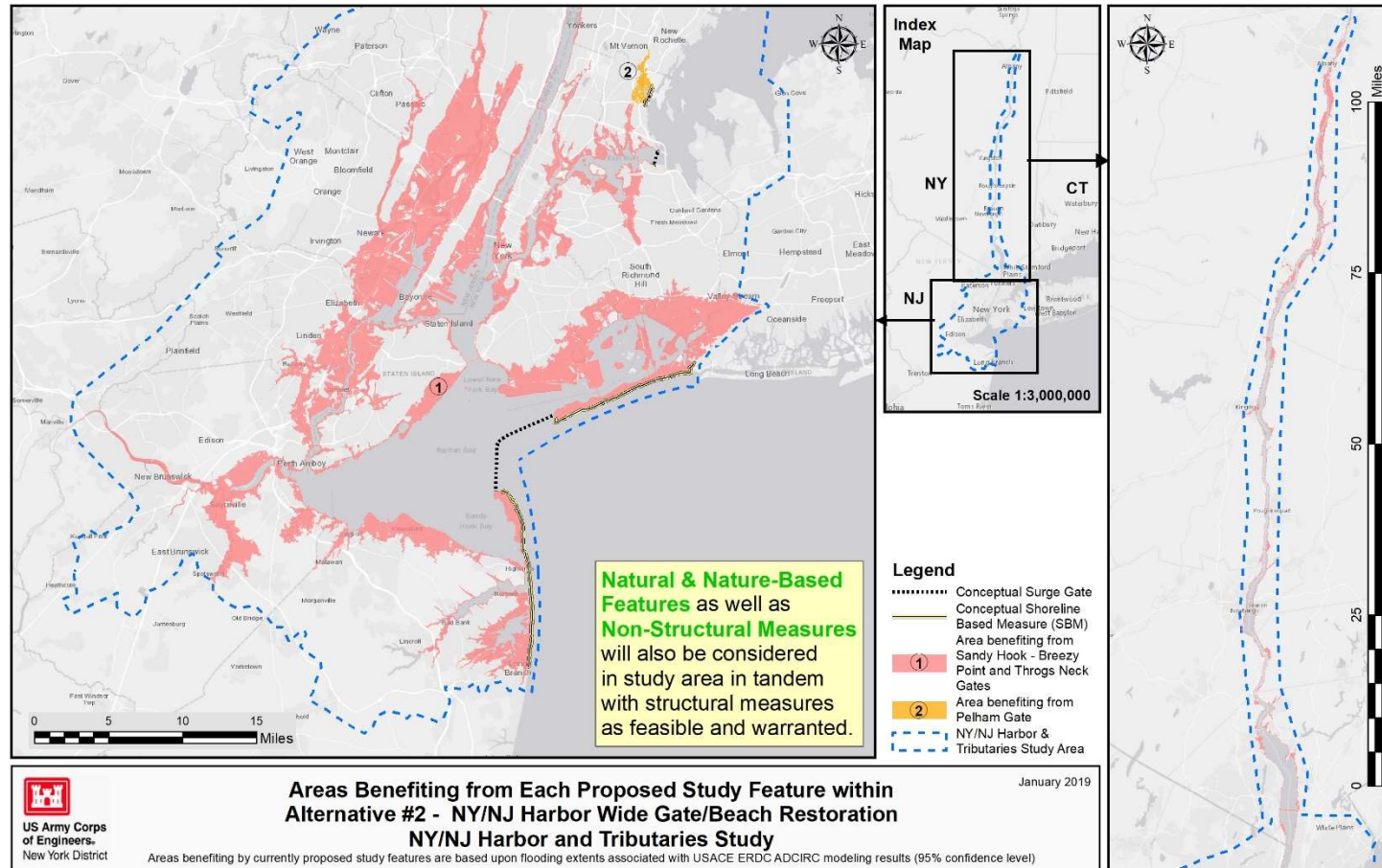




ALTERNATIVE 2 FROM INTERIM REPORT



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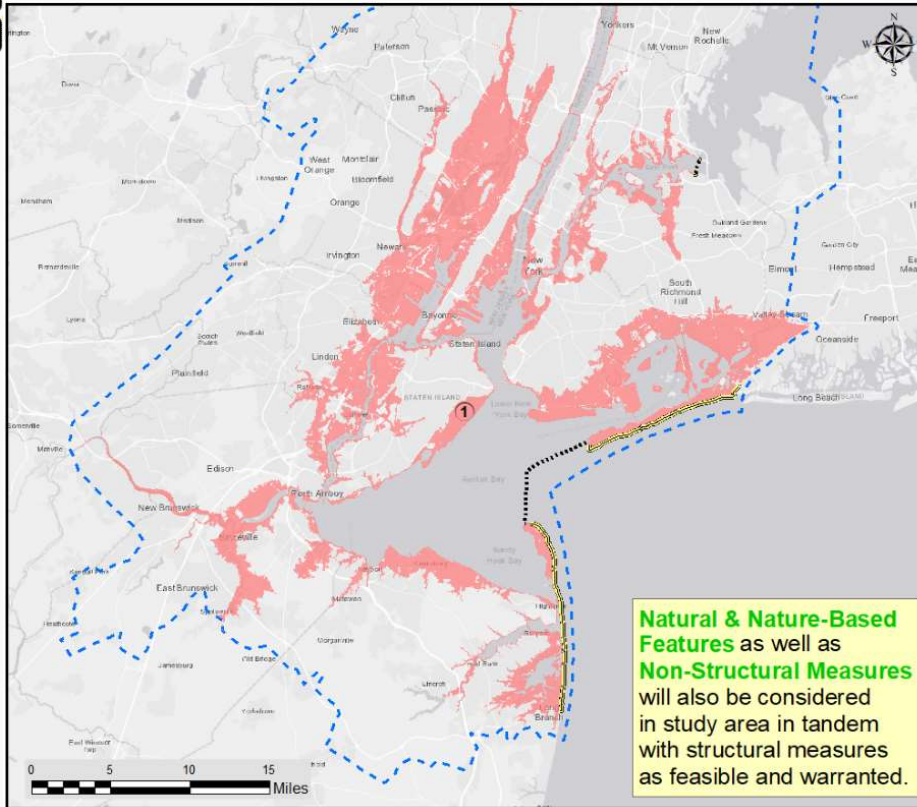


Percent of Directly Affected Study Area	Percent of Risks Avoided from GIS Analysis	Present Value of Damages Avoided (\$B)	Present Value of Estimated Alternative Total Cost (\$B)
94.7%	94.8%	\$175.1 B	\$118.1 B

All measures in alternative subject to modification/deletion/addition as study advances.



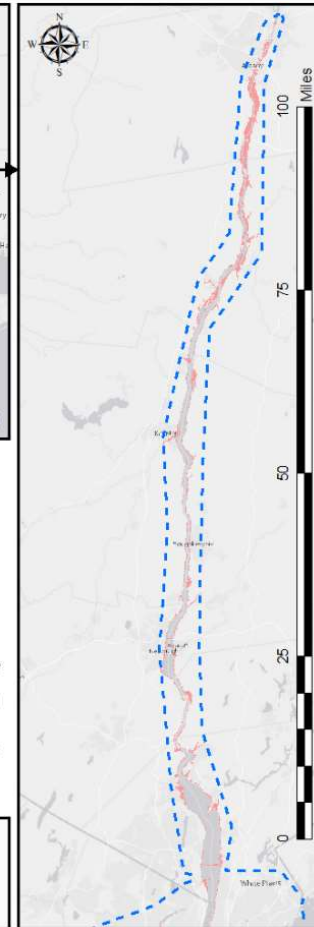
UPDATED ALTERNATIVE 2



Natural & Nature-Based Features as well as Non-Structural Measures will also be considered in study area in tandem with structural measures as feasible and warranted.



- Legend**
- Conceptual Surge Gate
 - Conceptual Shoreline Based Measure (SBM)
 - Area benefiting from Sandy Hook - Breezy Point and Throgs Neck Gates
 - NY/NJ Harbor & Tributaries Study Area



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Areas Benefiting from Each Proposed Study Feature within Alternative #2 - NY/NJ Harbor Wide Gate/Beach Restoration NY/NJ Harbor and Tributaries Study

July 2019

Areas benefiting by currently proposed study features are based upon 1 percent flood +3 feet flooding extents associated with USACE ERDC/ADCIRC modeling results (95% confidence level)

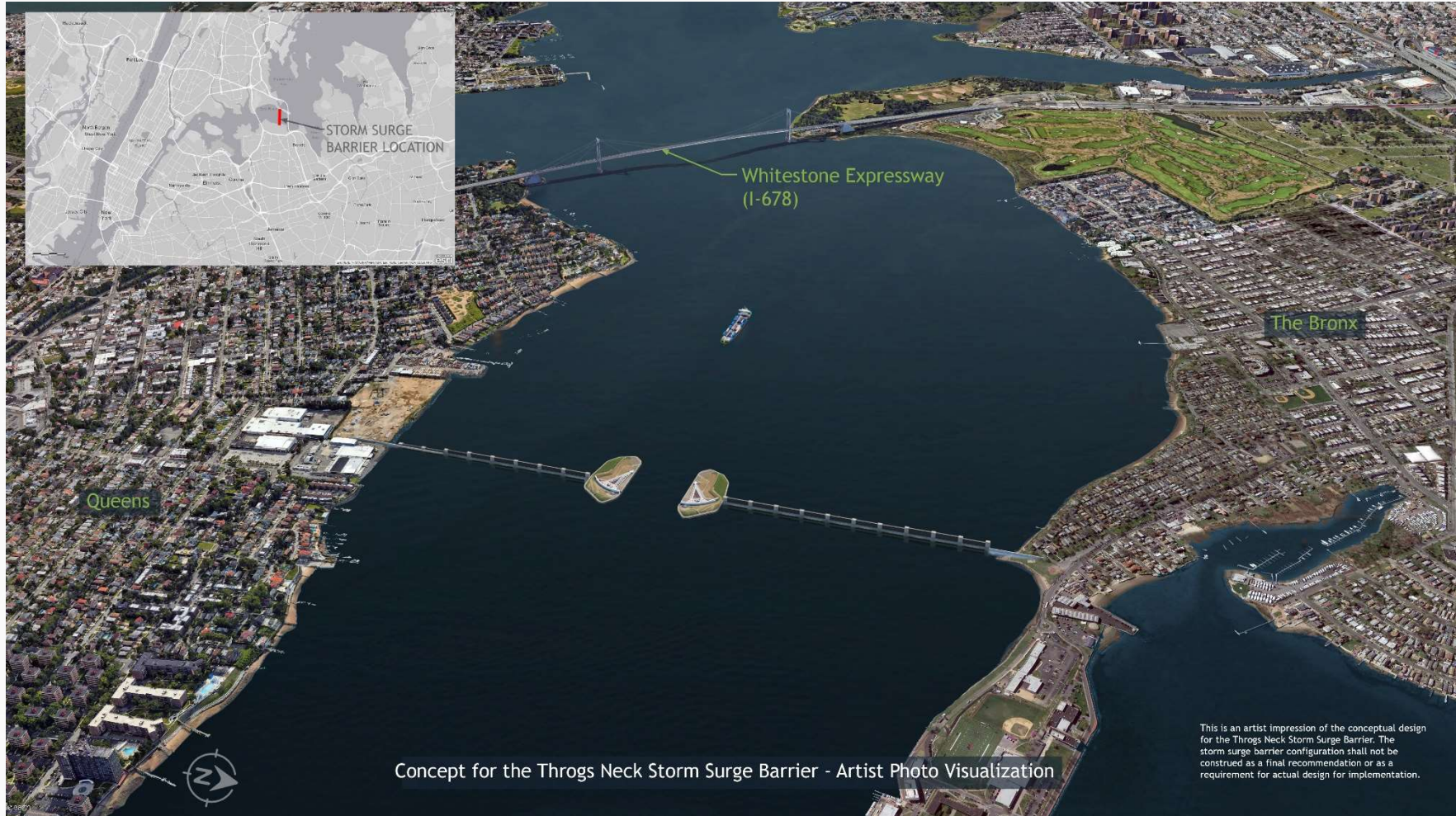
Percent of Directly Affected Study Area	Percent of Risks Avoided from GIS Analysis	Present Value of Damages Avoided (\$B)	Present Value of Estimated Alternative Total Cost (\$B)
94.1%	94.4%	\$131 B	\$62 B

All measures in alternative subject to modification/deletion/addition as study advances.

EXAMPLE SURGE GATE RENDERING (FOR ILLUSTRATION PURPOSES ONLY, DESIGN AND SITING SUBJECT TO CHANGE)



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Concept for the Throgs Neck Storm Surge Barrier - Artist Photo Visualization

This is an artist impression of the conceptual design for the Throgs Neck Storm Surge Barrier. The storm surge barrier configuration shall not be construed as a final recommendation or as a requirement for actual design for implementation.

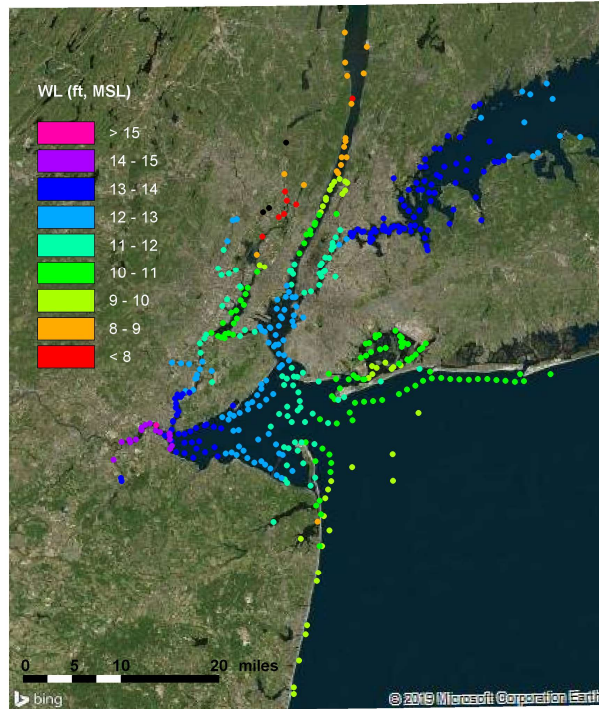


ALTERNATIVE 2 POTENTIAL INDUCED FLOODING

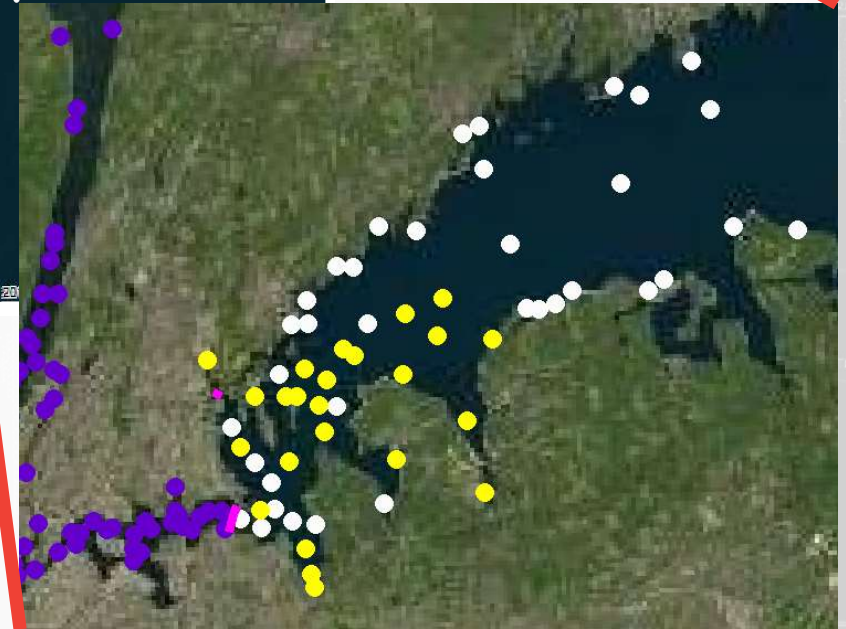
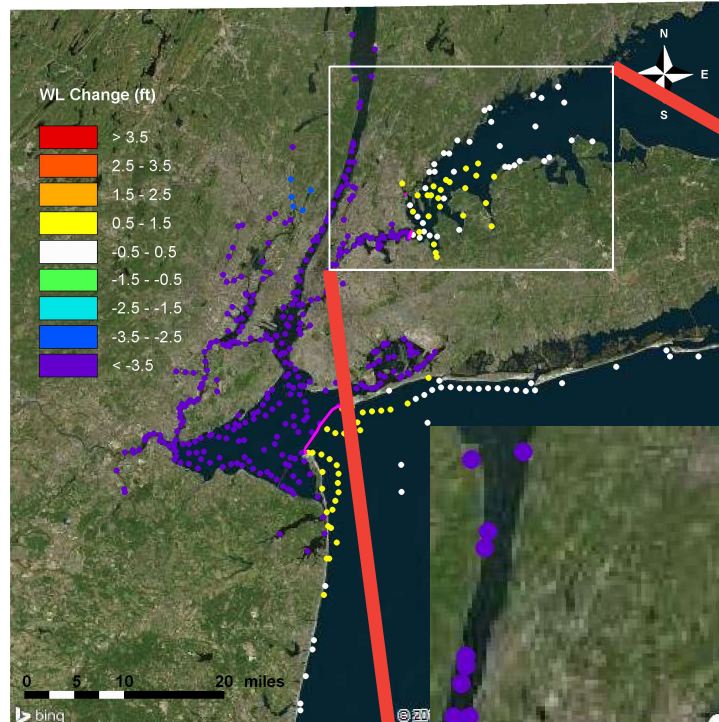


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1% AEP Water Level (50% Confidence Limit)- FWOP



1% AEP Water Level Change from FWOP to Alt 2





MITIGATION FOR POTENTIAL INDUCED FLOODING



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Measures will be included within the HAT Study Alternatives to mitigate for the (increased) flood risk as a result of the primary structural measures (e.g., storm surge barriers)

Measures can be both structural and non-structural

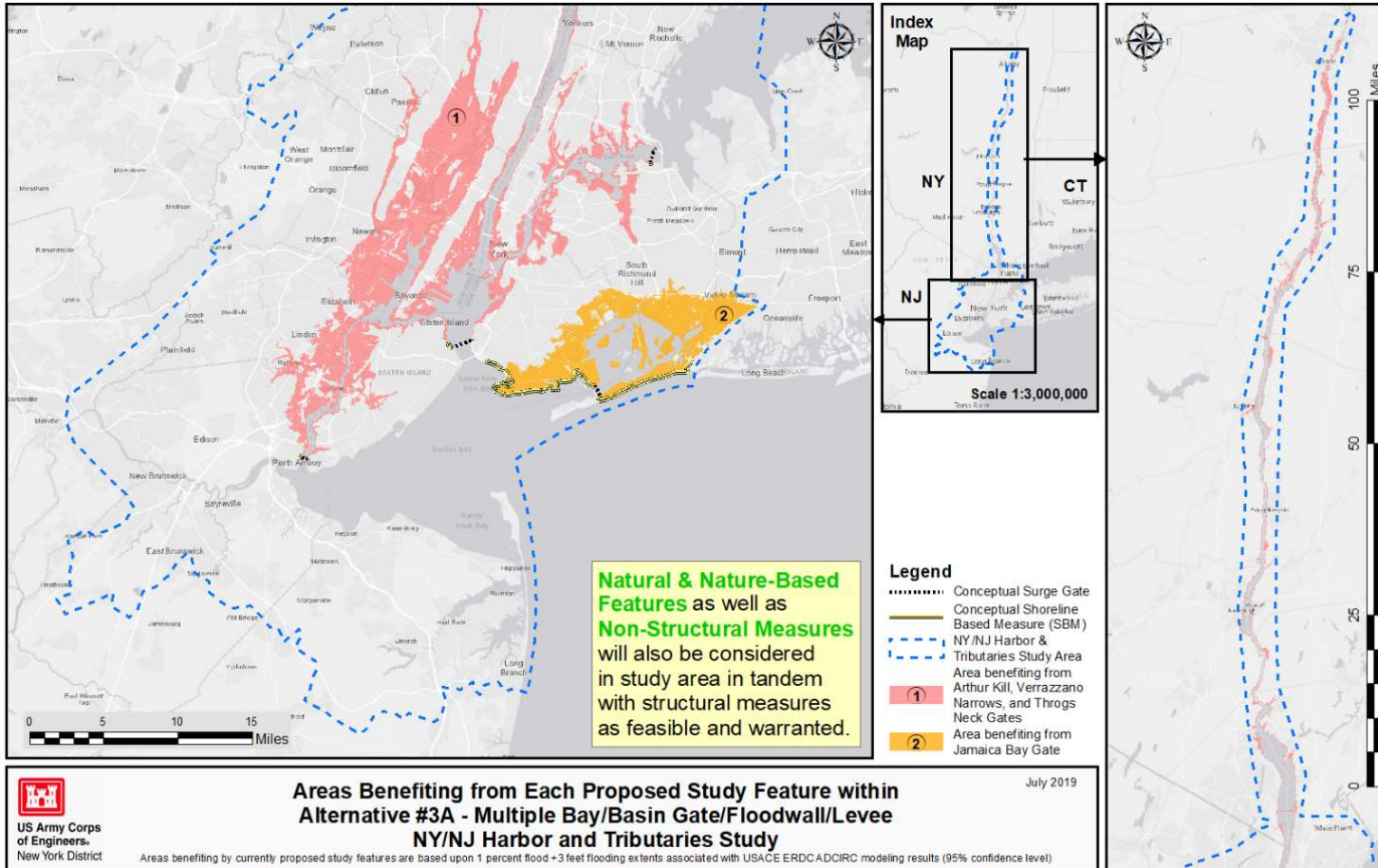
- Structural:
 - Increase elevation and extents of proposed Shore Based Measures (e.g., floodwalls and levees)
 - Include (newly added) Shore Based Measures
- Non-Structural
 - Acquisition & Relocation
 - Building Retrofit (wet or dry floodproofing)



UPDATED ALTERNATIVE 3A



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Percent of Directly Affected Study Area	Percent of Risks Avoided from GIS Analysis	Present Value of Damages Avoided (\$B)	Present Value of Estimated Alternative Total Cost (\$B)
73.7%	77.8%	\$148 B	\$34 B

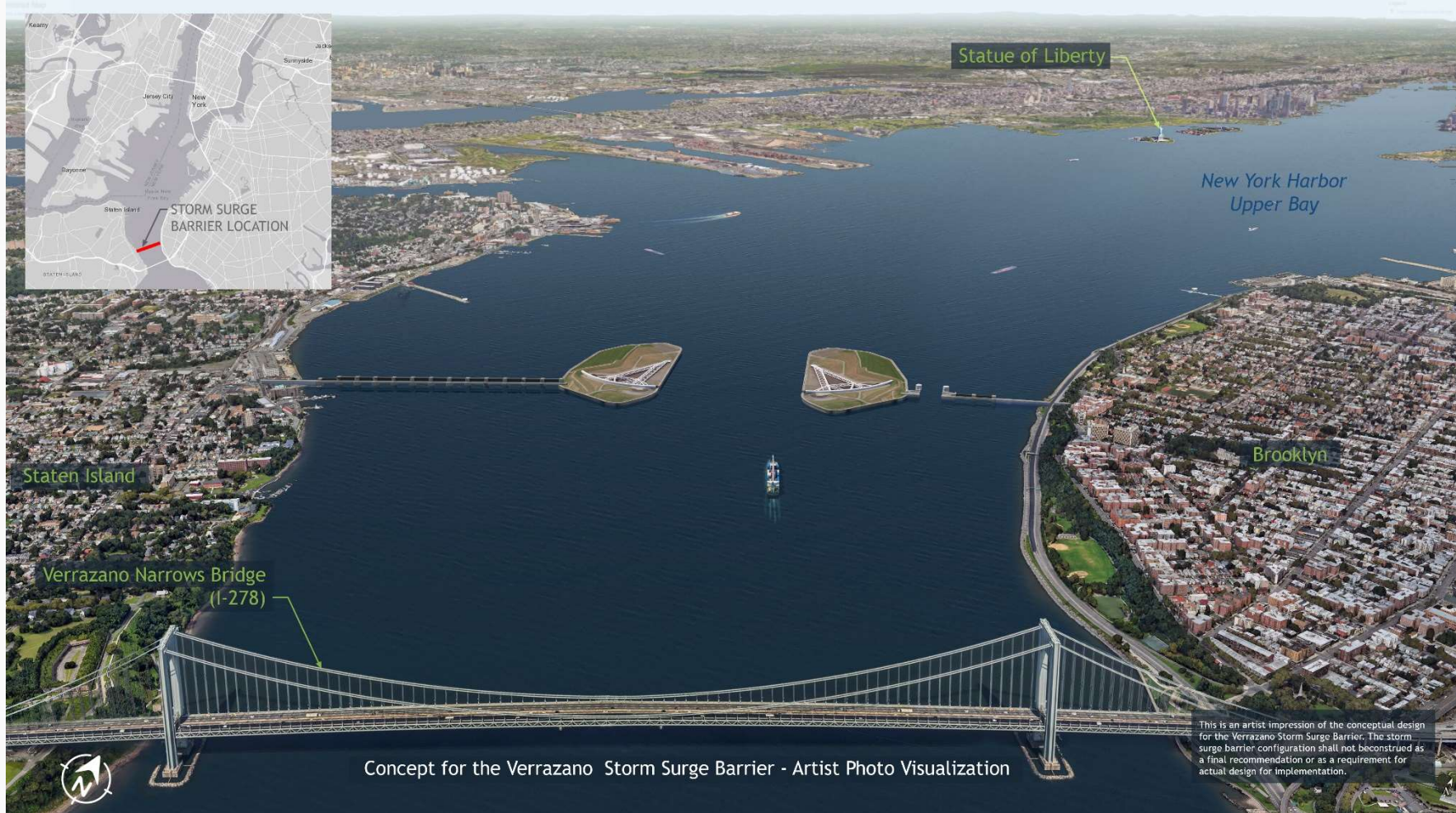
All measures in alternative subject to modification/deletion/addition as study advances.



EXAMPLE SURGE GATE RENDERING (FOR ILLUSTRATION PURPOSES ONLY, DESIGN AND SITING SUBJECT TO CHANGE)



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Concept for the Verrazano Storm Surge Barrier - Artist Photo Visualization

This is an artist impression of the conceptual design for the Verrazano Storm Surge Barrier. The storm surge barrier configuration shall not be construed as a final recommendation or as a requirement for actual design for implementation.



EXAMPLE SURGE GATE RENDERING (FOR ILLUSTRATION PURPOSES ONLY, DESIGN AND SITING SUBJECT TO CHANGE)



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This is an artist impression of the conceptual design for the Arthur Kill Storm Surge Barrier. The storm surge barrier configuration shall not be construed as a final recommendation or as a requirement for actual design for implementation.

EXAMPLE SURGE GATE RENDERING (FOR ILLUSTRATION PURPOSES ONLY, DESIGN AND SITING SUBJECT TO CHANGE)



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Concept for the Jamaica Bay Storm Surge Barrier - Artist Photo Visualization

This is an artist impression of the conceptual design for the Jamaica Bay Storm Surge Barrier. The storm surge barrier configuration shall not be construed as a final recommendation or as a requirement for actual design for implementation.

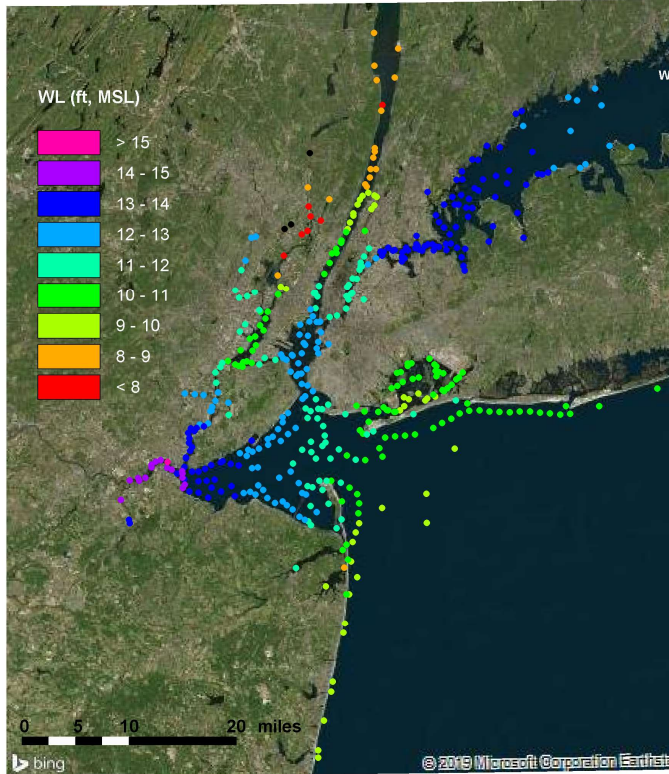


ALTERNATIVE 3A POTENTIAL INDUCED FLOODING

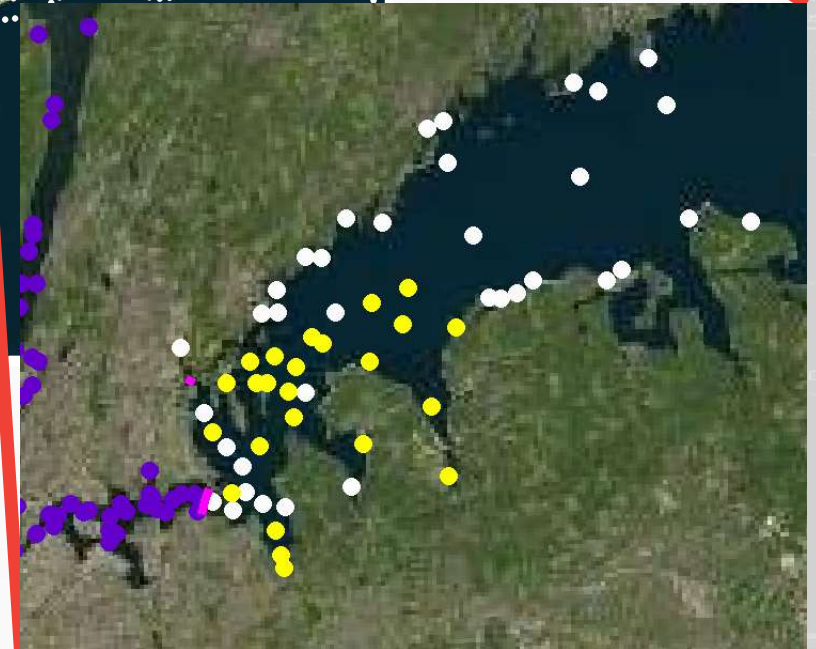
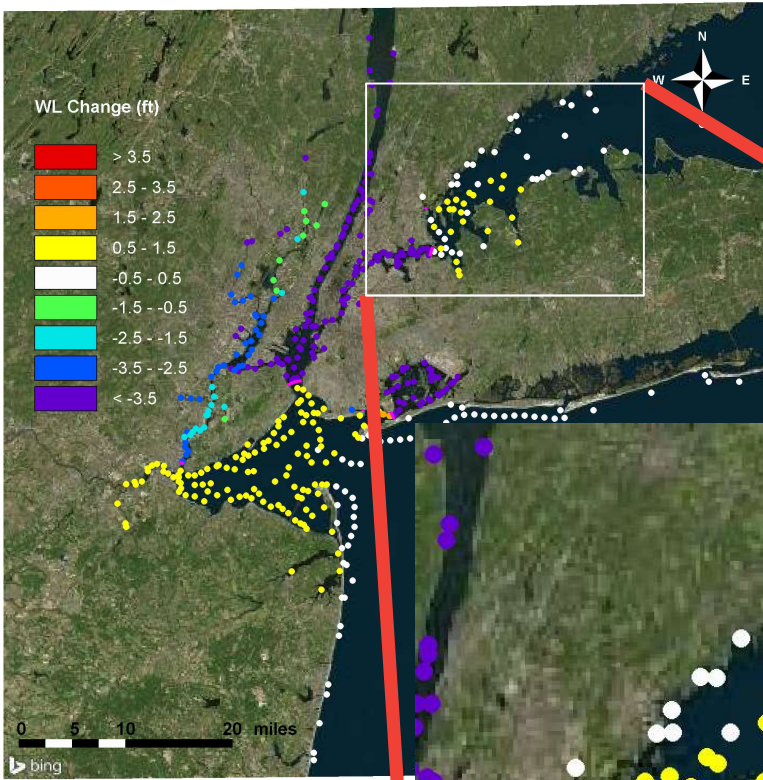


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1% AEP Water Level (50% Confidence Limit)- FWOP



1% AEP Water Level Change from FWOP to Alt 3A

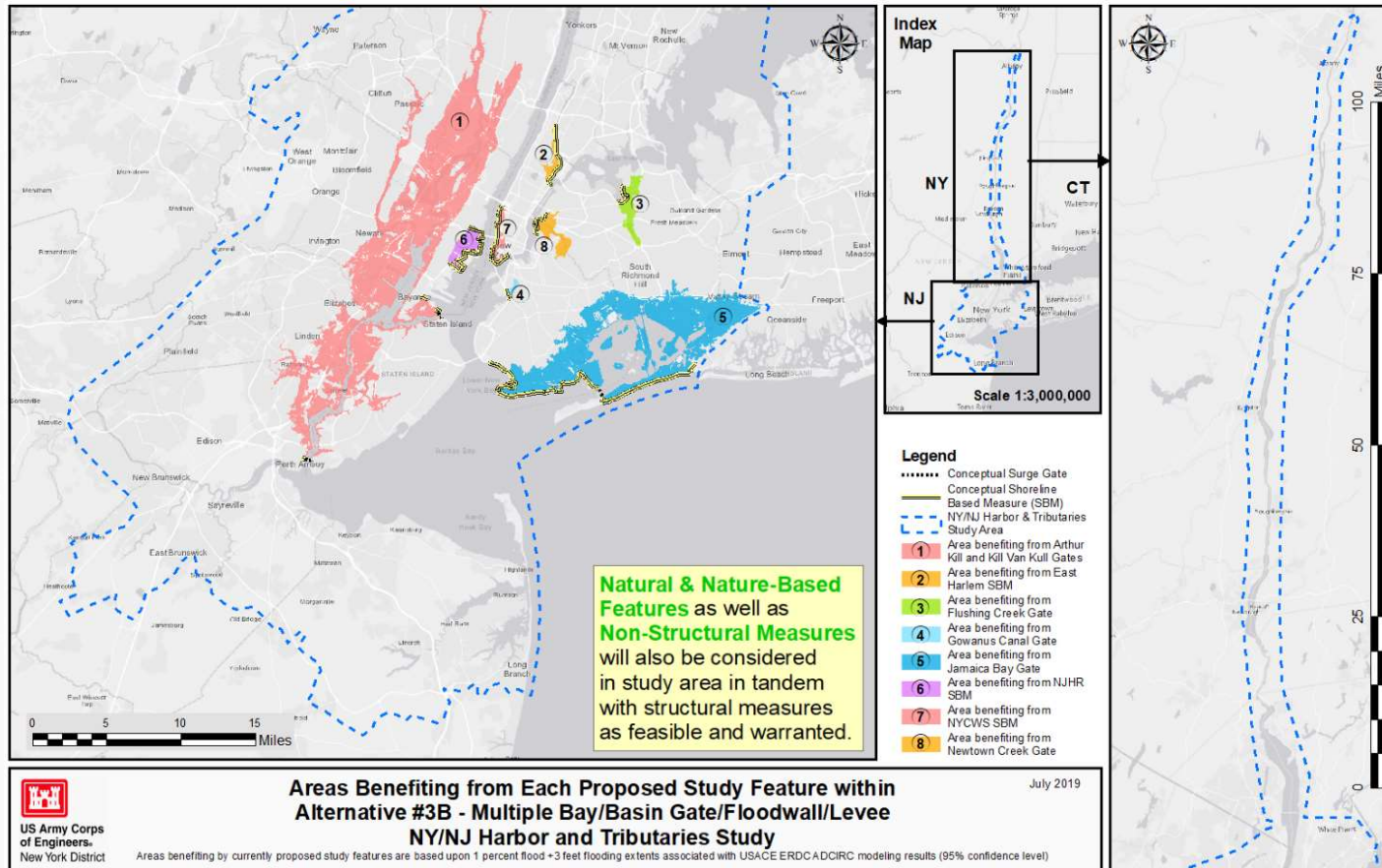




UPDATED ALTERNATIVE 3B



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Percent of Directly Affected Study Area	Percent of Risks Avoided from GIS Analysis	Present Value of Damages Avoided (\$B)	Present Value of Estimated Alternative Total Cost (\$B)
51.8%	58.5%	\$104 B	\$30 B

All measures in alternative subject to modification/deletion/addition as study advances.



EXAMPLE SURGE GATE RENDERING (FOR ILLUSTRATION PURPOSES ONLY, DESIGN AND SITING SUBJECT TO CHANGE)



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Concept for the Kill Van Kull Storm Surge Barrier - Artist Photo Visualization

This is an artist impression of the conceptual design for the Kill Van Kull Storm Surge Barrier. The storm surge barrier configuration shall not be construed as a final recommendation or as a requirement for actual design for implementation.

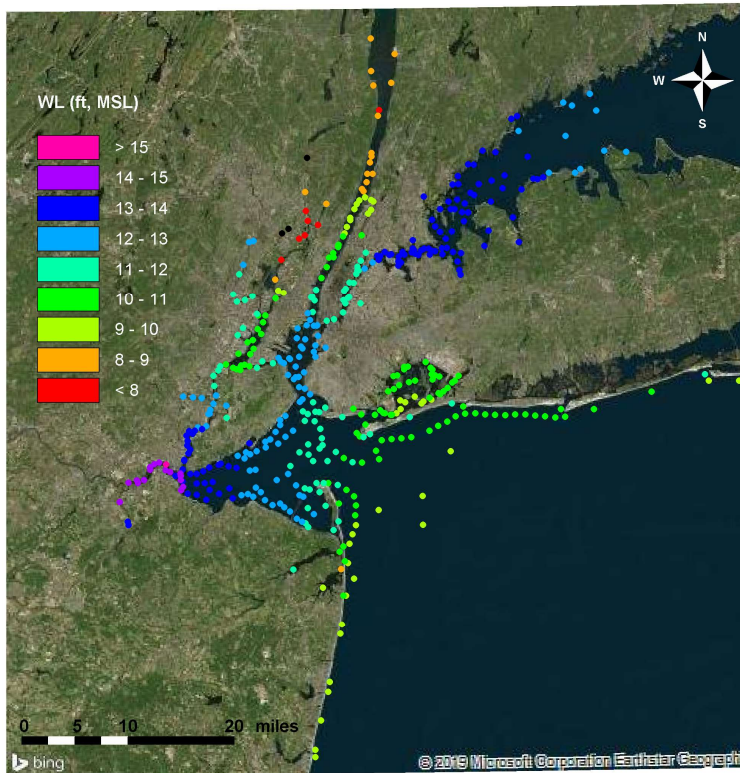


ALTERNATIVE 3B POTENTIAL INDUCED FLOODING

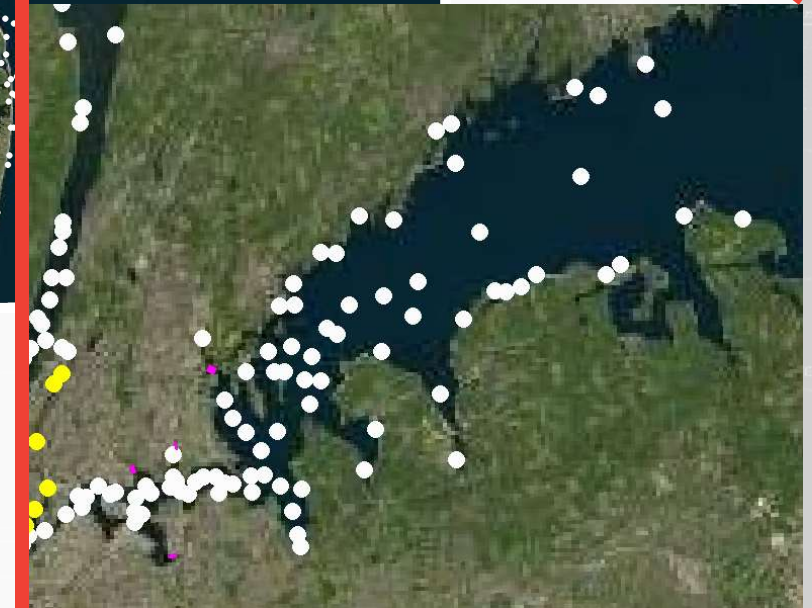
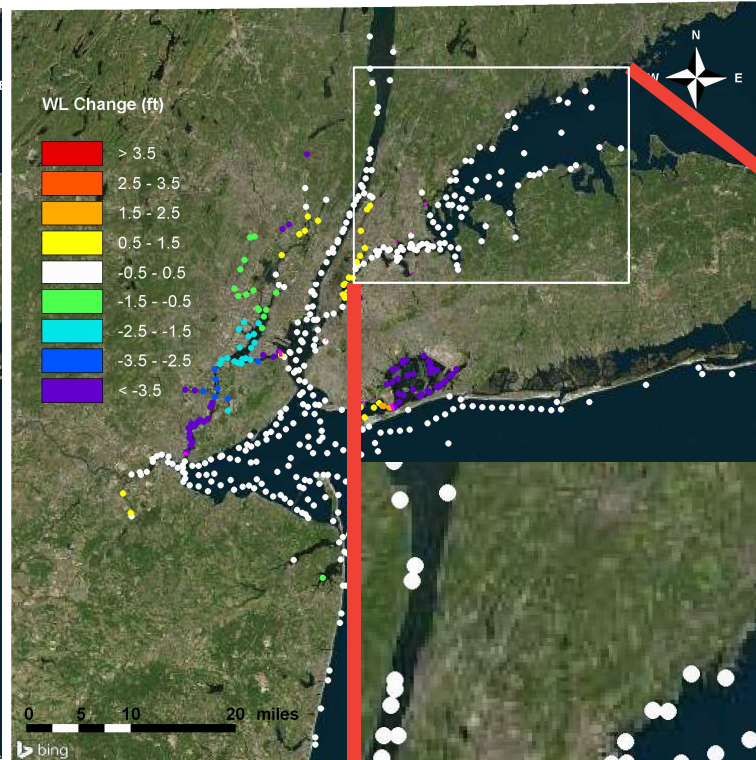


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1% AEP Water Level (50% Confidence Limit)- FWOP



1% AEP Water Level Change from FWOP to Alt 3B

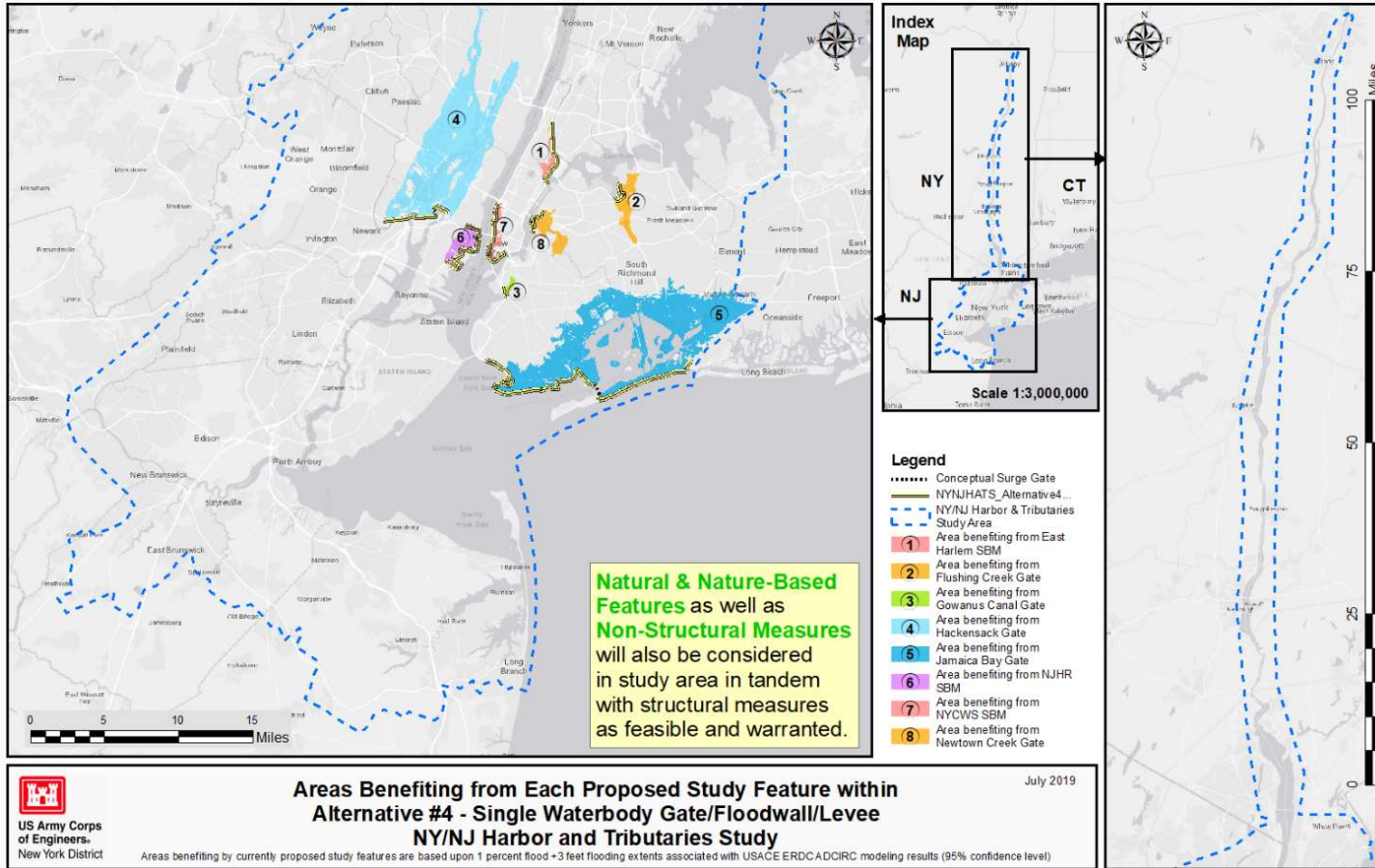




UPDATED ALTERNATIVE 4



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Percent of Directly Affected Study Area	Percent of Risks Avoided from GIS Analysis	Present Value of Damages Avoided (\$B)	Present Value of Estimated Alternative Total Cost (\$B)
33.1%	40.2%	\$96 B	\$21 B

All measures in alternative subject to modification/deletion/addition as study advances.

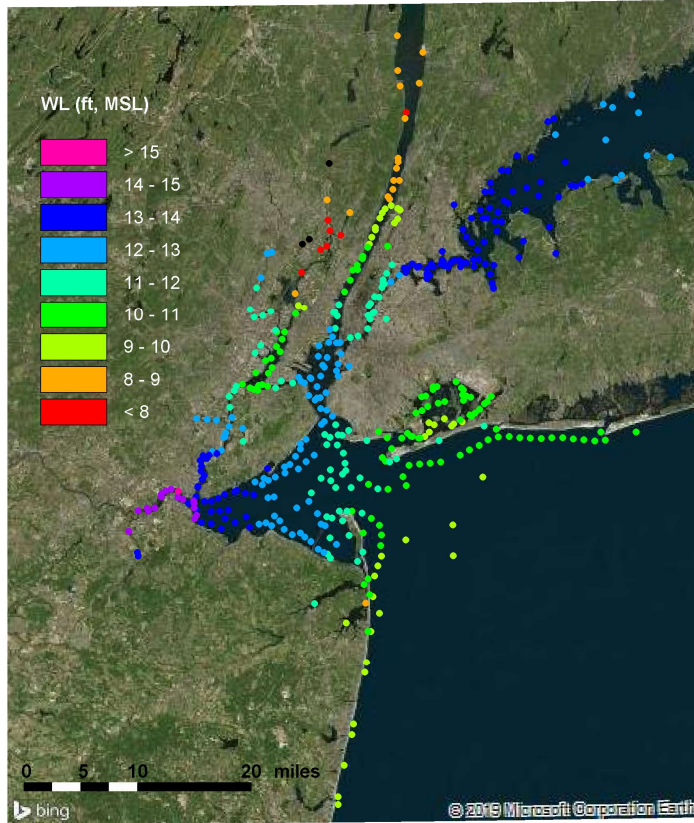


ALTERNATIVE 4 POTENTIAL INDUCED FLOODING

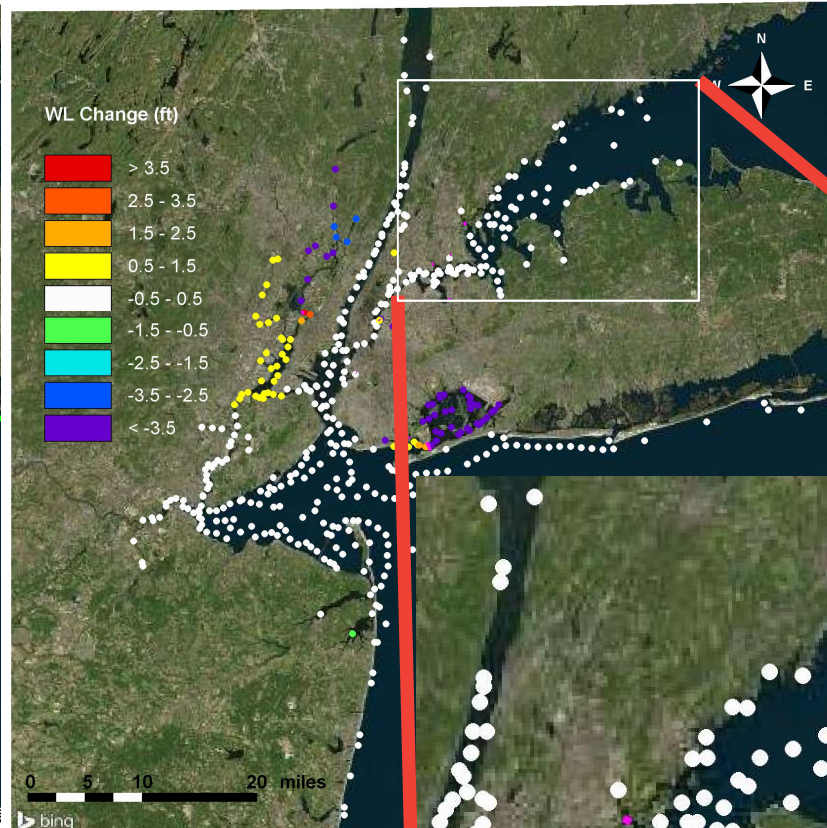


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1% AEP Water Level (50% Confidence Limit)- FWOP



1% AEP Water Level Change from FWOP to Alt 4

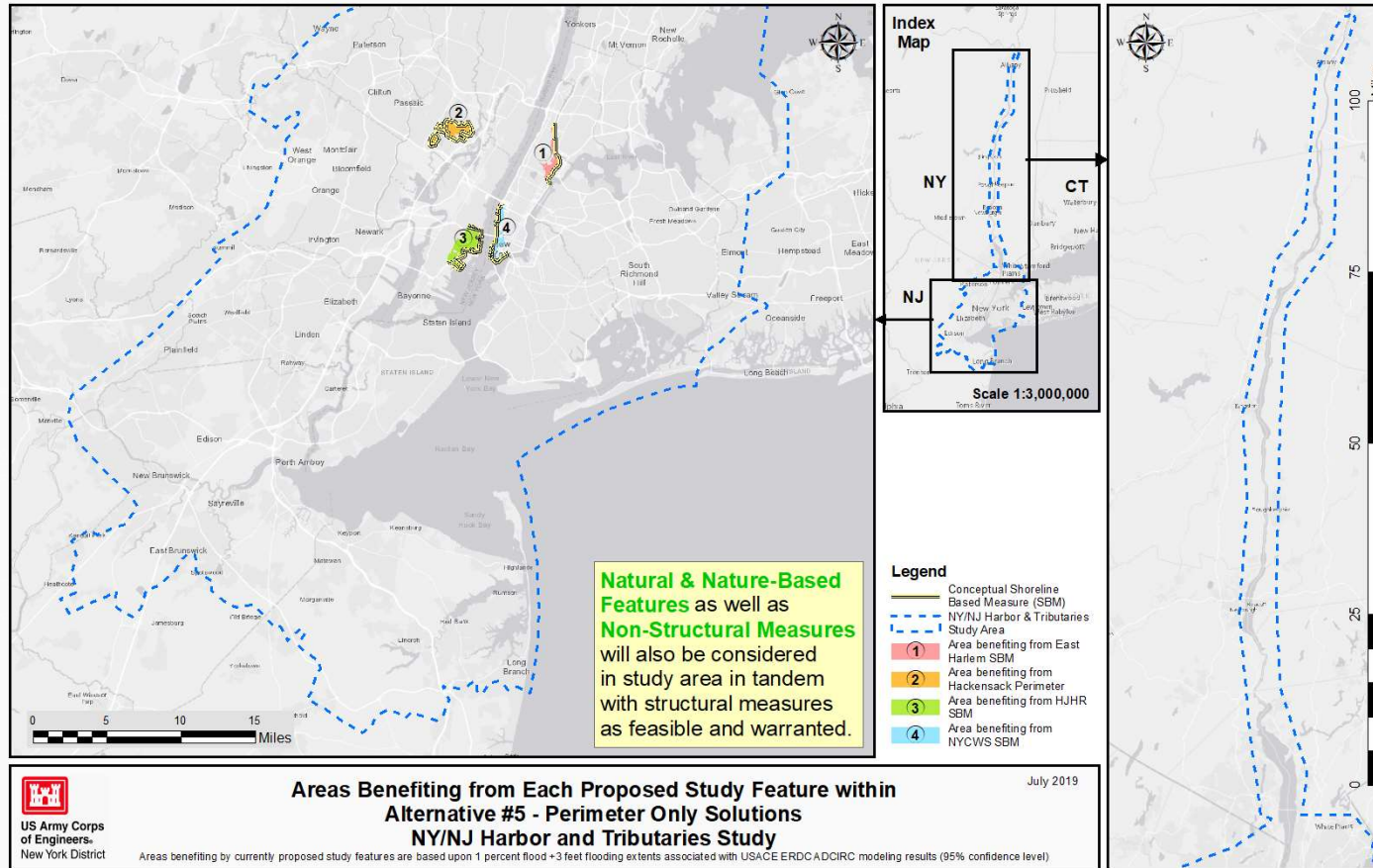




UPDATED ALTERNATIVE 5



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Percent of Directly Affected Study Area	Percent of Risks Avoided from GIS Analysis	Present Value of Damages Avoided (\$B)	Present Value of Estimated Alternative Total Cost (\$B)
2.6%	4.0%	\$35 B	\$9 B

All measures in alternative subject to modification/deletion/addition as study advances.



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Questions?



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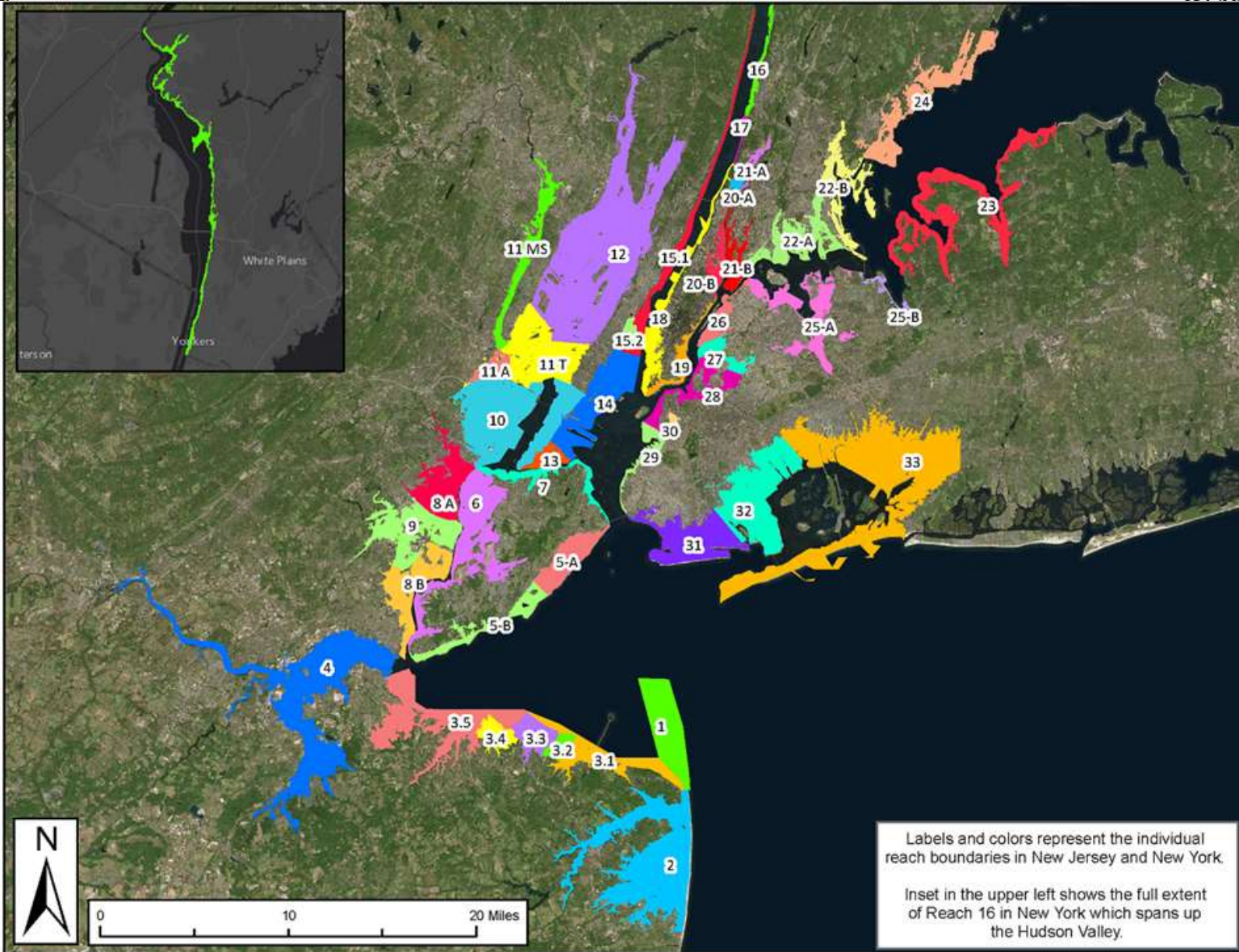
EXPLANATION OF PRELIMINARY BENEFITS AND COSTS



DELINEATION OF STUDY REACHES



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Labels and colors represent the individual reach boundaries in New Jersey and New York.

Inset in the upper left shows the full extent of Reach 16 in New York which spans up the Hudson Valley.

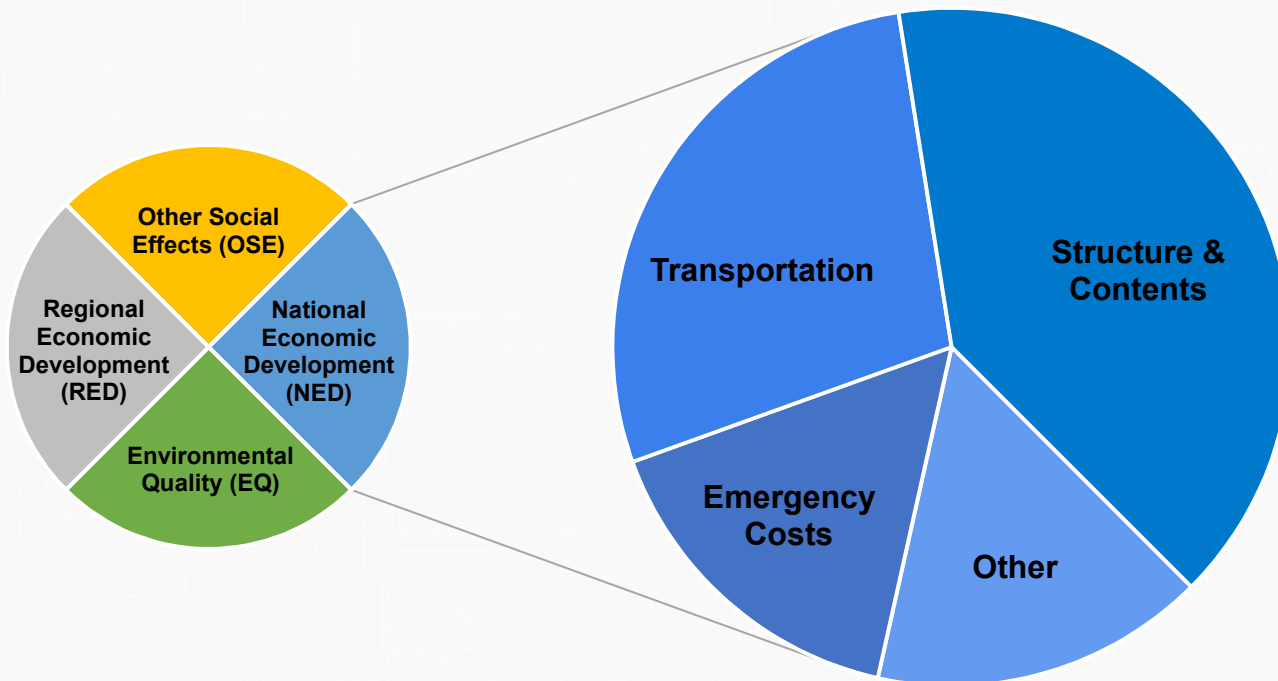


BENEFITS



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Federal Principles and Guidelines (1983)



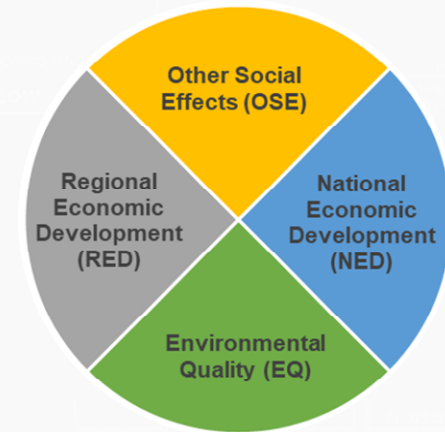
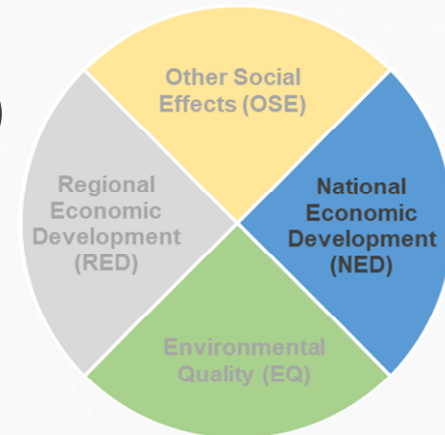


PRELIMINARY BENEFITS CALCULATION



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- Hydrologic Engineering Center – Flood Damage Analysis (HEC-FDA)
 - Focus on structure and contents
 - Monetary outputs
 - Leverages existing analyses
 - Tracks performance over time
- GIS Based Outputs
 - Four accounts – more inclusive
 - Snapshot in time

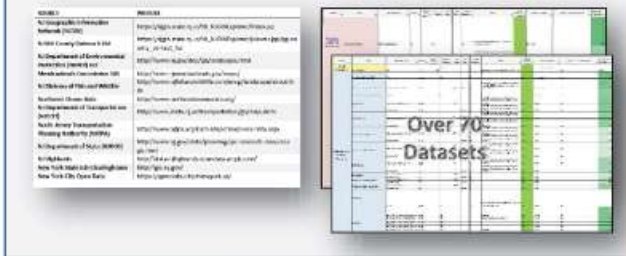




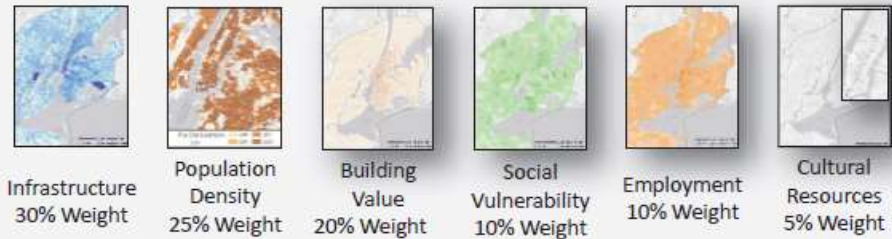
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NYNJHATS GIS Risk Analysis

Data Collection



Individual Exposure Indices created then combined to create Total Composite Exposure Index



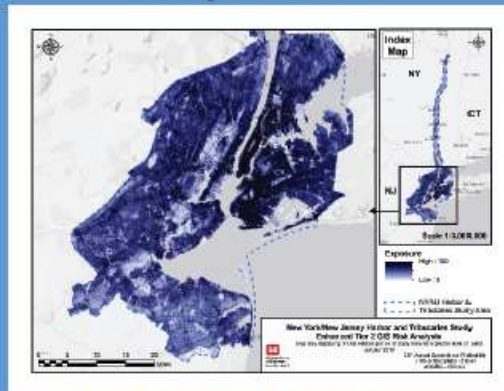
Exposure

x

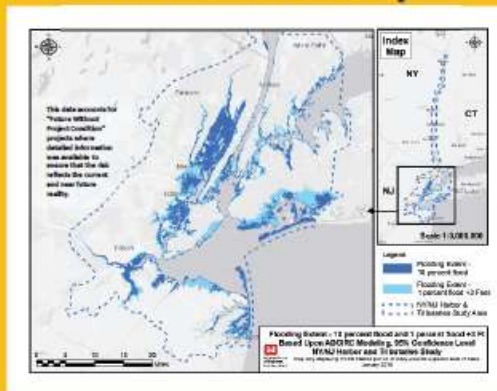
Vulnerability

=

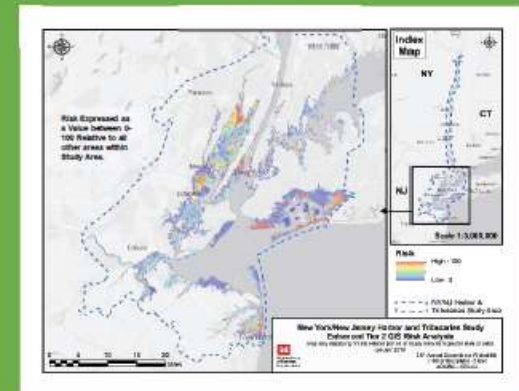
Risk



People, Infrastructure, and Resources Potentially Impacted by Flooding



Probability of Flooding



Please see the NYNJHATS Interim Report GIS Appendix for more information



COSTS CALCULATION



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Parametric basis (top down approach) for construction activities and durations, based on primary cost drivers.

- Shoreline (existing projects in area).
- Storm surge barriers (17 existing barriers).
- Includes:
 - Real estate
 - Environmental and cultural mitigation
 - Contingency
 - Design
 - Interest during construction
 - Operations and maintenance



TOTAL COST BY ALTERNATIVE



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- Contingencies, Planning Engineering & Design, Supervision & Administration and Operations and Maintenance costs calculated based on typical values for comparable flood protection projects
- Total duration of alternatives assumes concurrent construction of all separable elements
- Interest During Construction calculated with 2.875% Discount Rate
- Costs shown in 2019 US Dollars

Alternative	Total	Construction Period
2	\$62.5 B	25 Years
3a	\$34.6 B	18 Years
3b	\$30.4 B	9 Years
4	\$21.3 B	9 Years
5	\$9.6 B	9 Years



UPDATED NET BENEFITS AND BCR FOR ALTERNATIVES 2-5 (FY 19 P.L. @ 2.875%)



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Alternative Concept*	Cost (Present Value)	Net Benefits (PV) – All closures at 50% flood	Percent of Risks Reduced from GIS Analysis
1 – No Action	--	--	--
2 – Outer Harbor Surge Gates and Shore-Based Tie-ins	\$62 B	\$69 B	95%
3A – Regional Surge Gates & Shoreline- Based Measures	\$35 B	\$114 B	78%
3B – Mid-Size Surge Gates & Shoreline- Based Measures	\$30 B	\$74 B	59%
4 – Small Surge Gates & Shoreline-Based Measures	\$21 B	\$75 B	50%
5 – Shoreline-Based Measures only	\$10 B	\$26 B	4%

NOTE: All study estimates, data, features, etc. are subject to revision/refinement as study advances.

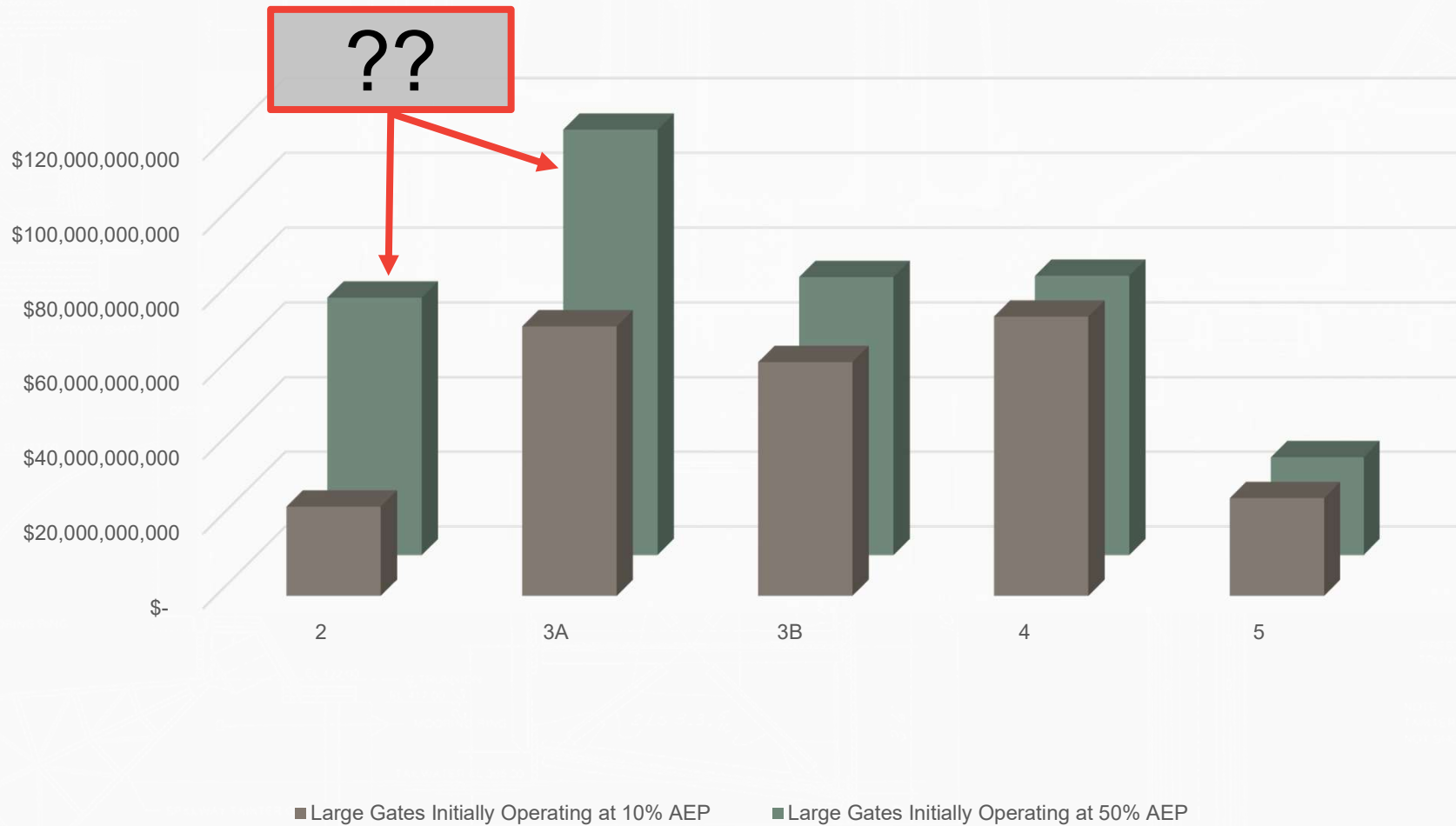


POTENTIAL EFFECTS OF GATE OPERATION ON FORMULATION & TSP SELECTION



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NYNJ HAT Study Alternative Net Benefits (PV) as of 11 Jul 19





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NEXT STEPS – KEY ITEMS FOR FURTHER STUDY



FACTORS AFFECTING ALTERNATIVE SCREENING & NEEDING FURTHER EVALUATION



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Benefits Likely Increase	Effect TBD	Costs Likely Increase
Evaluate other RSLC scenarios	Operations assumptions	Refine hydrodynamic modeling (<i>induced flooding, tidal exchange</i>)
Period of Analysis	Navigation – impacts to port operations and mitigation	Real Estate (<i>site specific</i>)
Refine & expend benefits modeling (<i>other accounts, critical infrastructure, etc.</i>)		Environmental & Cultural Mitigation Costs (<i>site specific</i>)
		Interior drainage
		Cost refinements (<i>site specific</i>)



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ENVIRONMENTAL CONSIDERATIONS AND NEPA PROCESS



NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)



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Multiple laws, executive orders and regulations are considered as part of the NEPA process.

- National Historic Preservation Act, as amended
Preserves historic and archaeological sites
- Clean Water Act
Prevents water pollution
- Endangered Species Act
Protects plants and animals from extinction
- Clean Air Act
Prevents air pollution
- Environmental Justice
Addressing equity in adverse and beneficial environmental effects
- State laws



Piping Plover.



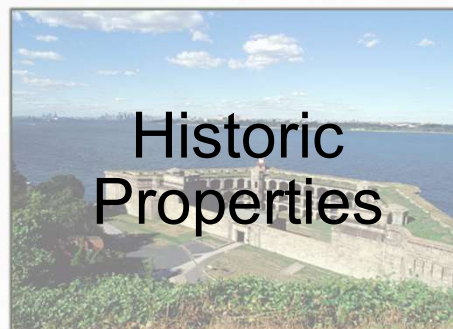
Atlantic Sturgeon.



ENVIRONMENTAL CONSIDERATIONS



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TYPES OF NEPA ANALYSIS

- Categorical Exclusion
- Environmental Assessment (EA)
- Environmental Impact Statement (EIS)
- Tiered Environmental Impact Statement (EIS)

Least

Level of
Analysis
&
Number
of
Reviews

Most



PUBLIC ENGAGEMENT



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NEPA Scoping Meetings:

9 Scoping Meetings were held from July to October 2018 in Lower Manhattan, Newark, Poughkeepsie, Coney Island, White Plains, and Nassau County – **705** Participants - **4,250** submissions of comments.

Interim Report Public Meetings:

8 Public Meetings were held from March to April 2019 in Lower Manhattan, Westchester County, Brooklyn, the Bronx, Staten Island, Poughkeepsie, NY, and Middletown and Lyndhurst, NJ - **418** Participants - **816** submissions of comments and growing.



COOPERATING AND PARTICIPATING AGENCIES



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- Federal Emergency Management Agency
- US Environmental Protection Agency
- US Fish and Wildlife Service
- US Coast Guard
- National Ocean and Atmospheric Administration/National Marine Fisheries Service
- National Park Service



AGENCY & PUBLIC COORDINATION: WHAT WE HEARD



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- Potential for profound environmental impacts
- Potential for profound impact to commercial and recreational navigation
- Storm Surge vs. Sea Level Rise
- Concerns over cost of construction
- The need to keep the public informed of the study scope and process
- Potential for induced flooding
- Need to focus on critical infrastructure
- Incorporate Natural and Nature Based Features into plans for storm surge barriers



NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) FUTURE STEPS



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Conduct formal consultation with Resources Agencies

Develop quantitative ecological model for assessing environmental benefits and impacts.

Prepare Tier 1 level impacts assessment and identify additional analysis needed for environmental impacts (Tier 2 EIS)

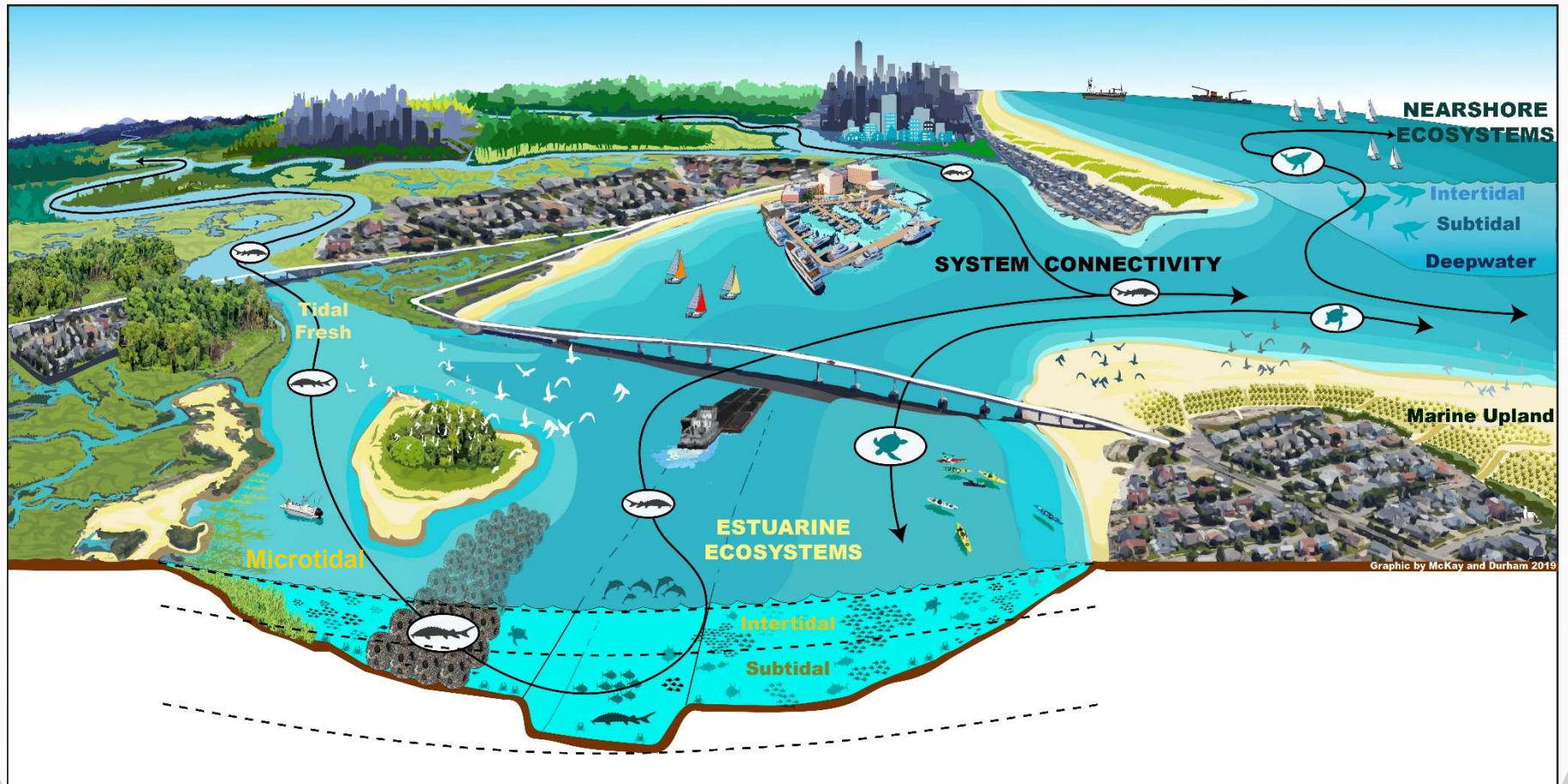
***Environmental evaluation is a large part of the study process.
No construction will occur without thorough environmental evaluation and
coordination with environmental regulatory and resource agencies.***



NEW YORK BIGHT ECOSYSTEM MODEL



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SCHEDULE AND STUDY CONTACT INFORMATION

STUDY SCHEDULE



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Important Dates

Action	Date
Interim Report Released to Public	Feb. 19, 2019
Informed Cooperating Agencies	Feb. 26, 2019
Public Meetings on Interim Report	Mar.-Oct. 2019
Draft Integrated Feasibility Report and Tier 1 Environmental Impact Statement	Jul. 2020
Public Meetings on Draft Report	Aug. 2020
Final Integrated Feasibility Report and Tier 1 Environmental Impact Statement	Mar. 2021
Chief of Engineer's Report	Jul. 2022



ADDITIONAL INFORMATION



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- ❑ Interim Report and this presentation can be accessed at the following address:
www.nan.usace.army.mil/NYNJHATS

- ❑ Webinar Presentation/Video of Interim Report Summary was posted in March 2019 to website.

- ❑ Study Status and Update Paper planned for release to public by December 2019.

- ❑ Comments are always welcome – please submit to:
NYNJHarbor.TribStudy@usace.army.mil



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Questions?