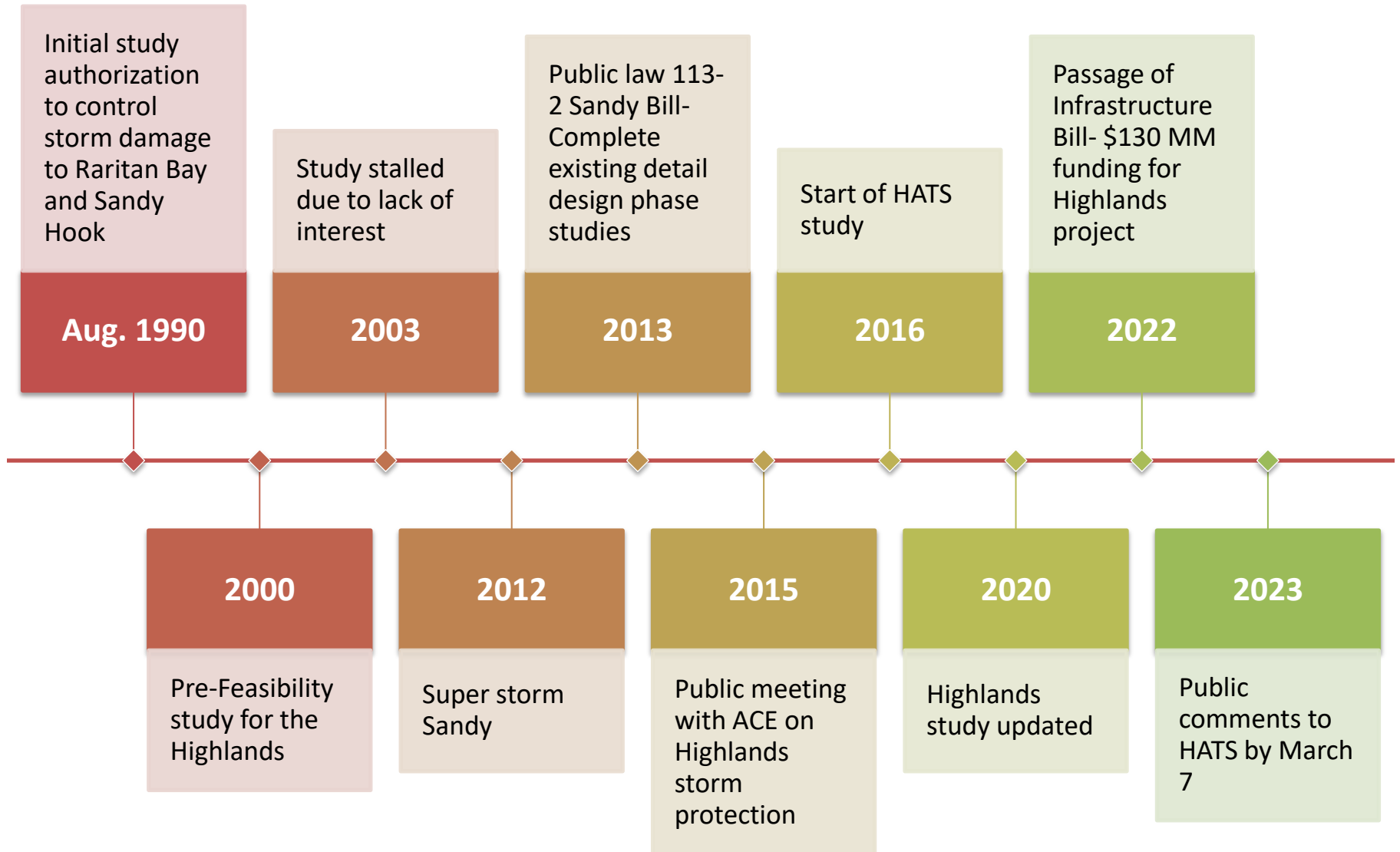


Review of the US Army Corp of Engineers (USACE) NY & NJ Harbor and Tributaries Coastal Storm Risk Management Study (HATS)

Presentation by Bob Zilinski & Steve Szulecki
Highlands Environmental Commission

History



Some basic information about the HATS study



NEW YORK-NEW JERSEY HARBOR AND TRIBUTARIES COASTAL STORM RISK MANAGEMENT FEASIBILITY STUDY



Department of
Environmental
Conservation



13



Mayor's Office of Climate &
Environmental Justice



Department
of State



STUDY AREA

- The largest and most densely populated of the 9 NACCS Focus Areas
- 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

COASTAL STORM RISKS & DAMAGES

- Significant Life/Safety Risk and over 275,000 Structures in Potential Impact Area
- Incorporates Dozens of Other Ongoing and Planned CSRM Projects in Study Area
- Present Value Damages for 100-Year Storm Range from \$100+B for Intermediate Sea Level Rise to over \$350B for High Sea Level Rise Projection

STUDY SCOPE

- **Study Cost:** \$19.4M, cost-shared 50/50 with NYSDEC and NJDEP thru July 2022, and 100% federal thereafter.
- **Study Schedule:** Assistant Secretary of the Army for Civil Works Approved (7 Apr 21) Second Exemption for Study Extension to 2024 Completion
- **Funding:** Federal funding (\$1.45M) resumed in October 2021 following lapses in fiscal years 2020 and 2021. Study also received \$6,724,000 of Disaster Relief Suppl. Appros. Act funds.
- **Study Scope:** WRDA 2020 includes study specific language

STUDY SCHEDULE

- Draft Feasibility Report and integrated Tier 1 Environmental Impact Statement Released for extended public day review with meetings planned throughout area. Comment closing date is March 7, 2023.
- See WWW.NAN.USACE.ARMY.MIL/NYNJHATS for Draft Report and dates, times and locations of future public in-person and virtual meetings.
- Final Chief of Engineers Report Approved to be Completed in 2024

Highlands is located in the
Lower Bay Area

HATS Study Area

This study area is the largest and most densely populated of the 9 NACCS Focus Areas

It is 2,150 sq miles and has 900 miles of shoreline

About 16 million people live in this area

Over 275,000 structures would potentially be impacted in the medium storm surge case

Present value of 100-year flood storm damage ranges from \$100+ Billion for the medium sea level case to \$350 Billion for the high sea level rise projection

The HATS Study

The United States Army Corp of Engineers (USACE or ACE) evaluated 6 cases:

- #1- Do nothing
- #2- **Storm barrier across the NY/NJ harbor**
- #3A **Local storm surge barriers**
- #3B **Storm surge barriers in the north bay area**
- #4 Single storm surge barrier, mostly land based protection
- #5 No storm surge barriers (land base only)

ACE is presently recommending #3B based on their cost benefit analysis

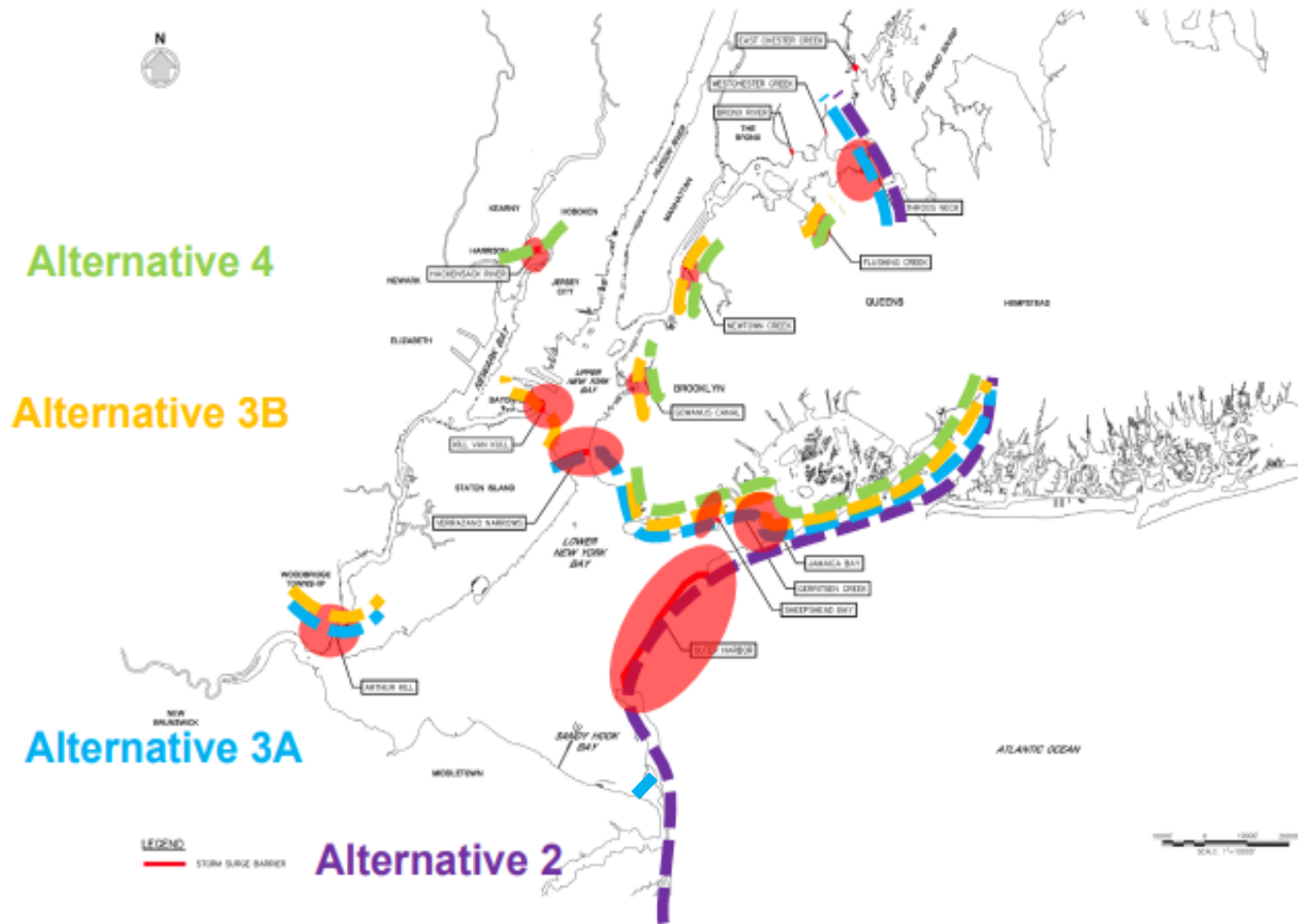
They are still in the public feedback stage: comments need to be received by March 7th 2023

Present Status of HATS Study

- The US Army Corps of Engineers present position is to proceed with Alternative Plan 3B, which protects 63% of the Upper Bay Area leaving 37% in the Lower Bay Area unprotected relying on only local storm surge mitigation.
- Plan 3B will probably make the storm surge worst in the Highlands since surge waters will be block from entering the north bay area and that excess water will be directed to the south bay area
- **The Lower Bay Area (Highlands) would need to install storm mitigation devices for its protection for all of these alternatives.**
 - **The ACE Storm Risk Feasibility Study for Highlands has been finalized and \$130,000,000 has been funded by the Feds.**
- Highland Borough Council should submit its comments before March 7th asking that the Corps of Engineers to not proceed with 3B and reconsider Alternative #2 or possibly #3A



COMPOSITE: ALTERNATIVE PLANS SHOWING STORM SURGE BARRIER LOCATIONS CONSIDERED





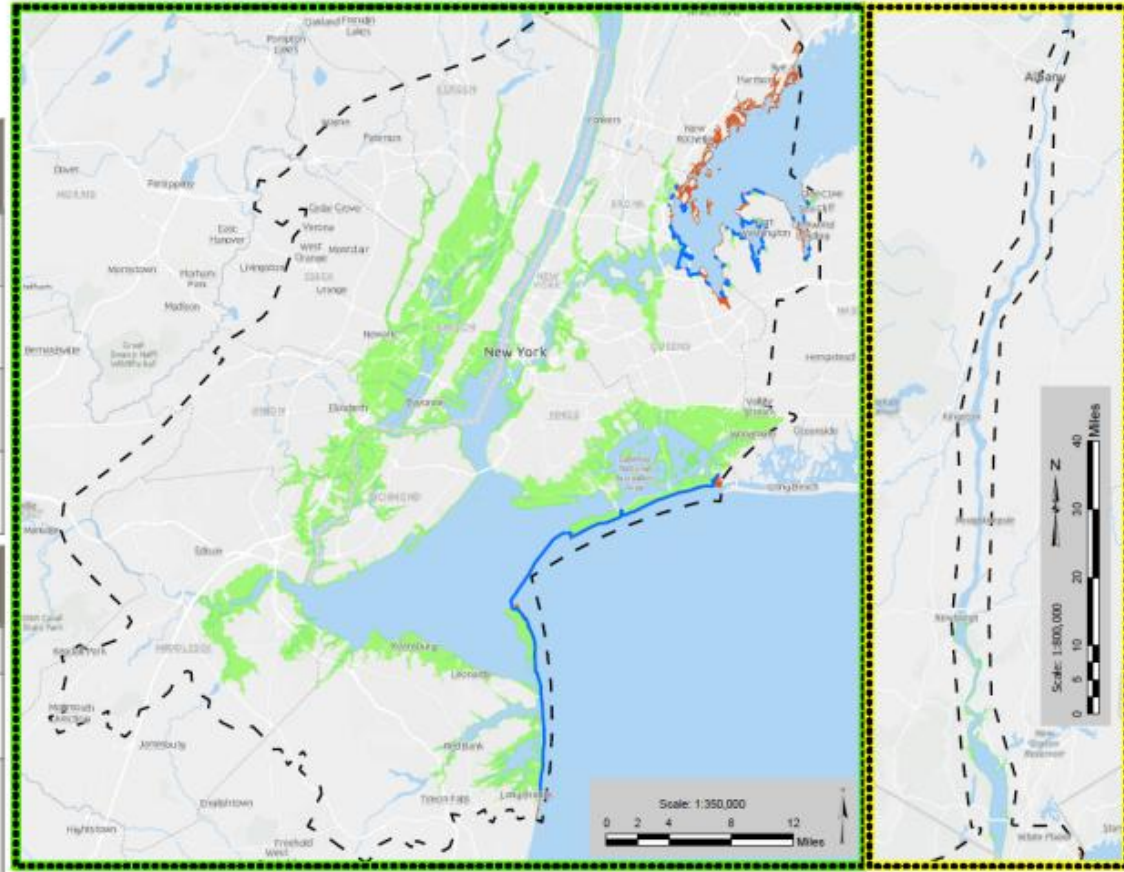
ALTERNATIVE 2



96.0% Study Area at Direct Risk Benefited

Feature Type	Approx. Miles
Storm Surge Barriers	7.4
Shoreline Based Measures	24.2
Induced Flooding-Mitigation Features	22.5
Risk Reduction Features (not shown)	36.2

Alternative	
First Cost (\$B):	\$ 112.3
Total Present Value Cost (\$B):	\$ 150.2
Estimated Construction Duration (years):	32



Legend

- Study Area
- Alternative 2 - CSR Measures (SSB, SBM, IFF)
- CSR Reduced Risk with Project Alt2 (area directly benefited)
- Residual Risk with Project Alt2 (area not benefited)

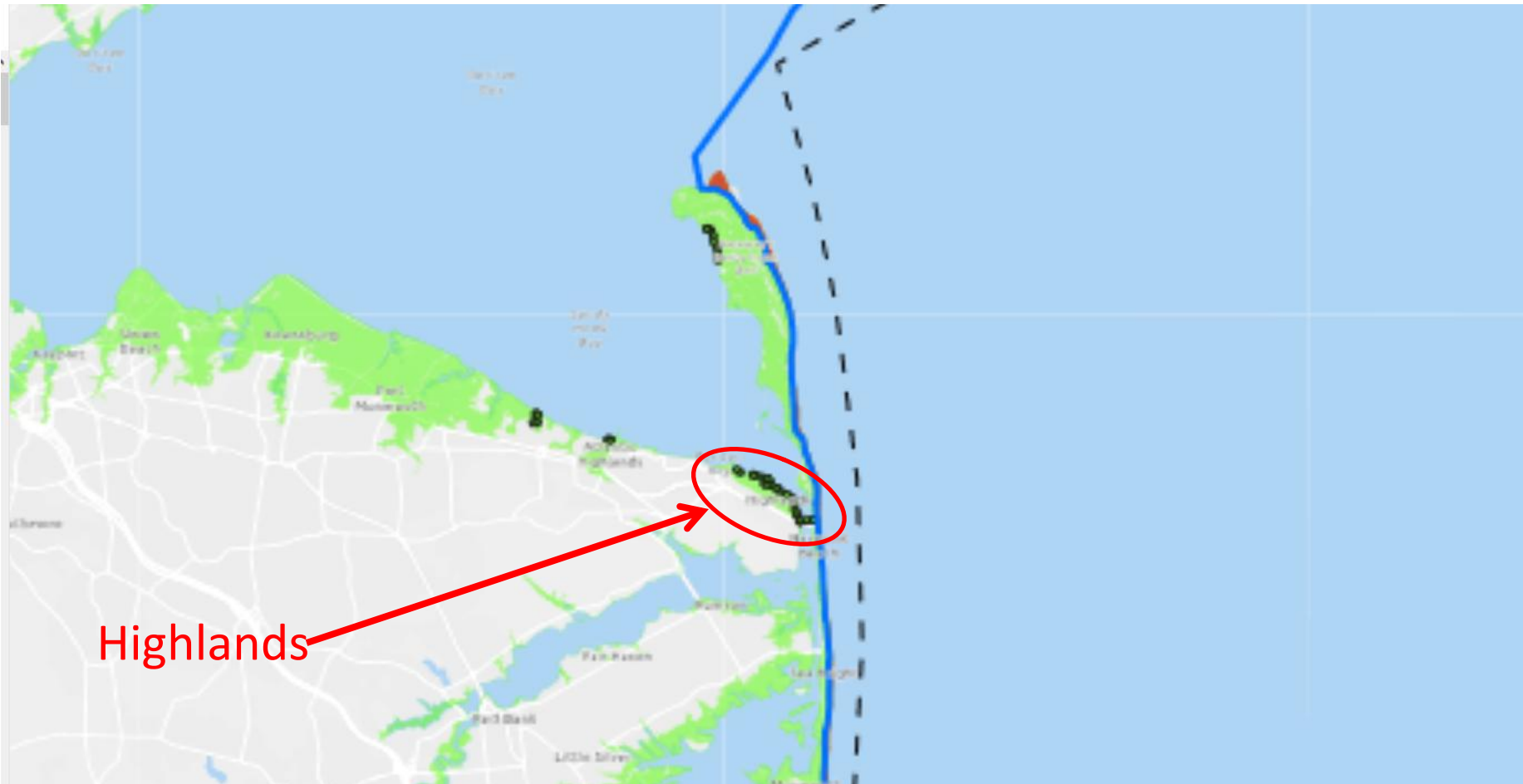
NY-NJ HARBOR AND TRIBUTARIES STUDY

Alternative 2
 Future With Project
 Reduced Risk & Residual Risk
 (1% AEP with Intermediate
 Sea Level Rise in 2095)
 Date: 12/8/2022

U.S. ARMY CORPS OF ENGINEERS
 NEW YORK DISTRICT

- Protects Highlands and 96% of the study area
- Most expensive \$150.2 Billion
- Longest construction period (32 years which skewed the economics)

Alternative #2 HATS Study



Highlands

- The NY/NJ Harbor barrier would close only under major storm events
- Highlands would still need storm mitigation levees/dunes for protection on non-major flooding.
- Federal funding of \$130 Million has been approved for the shore-based systems



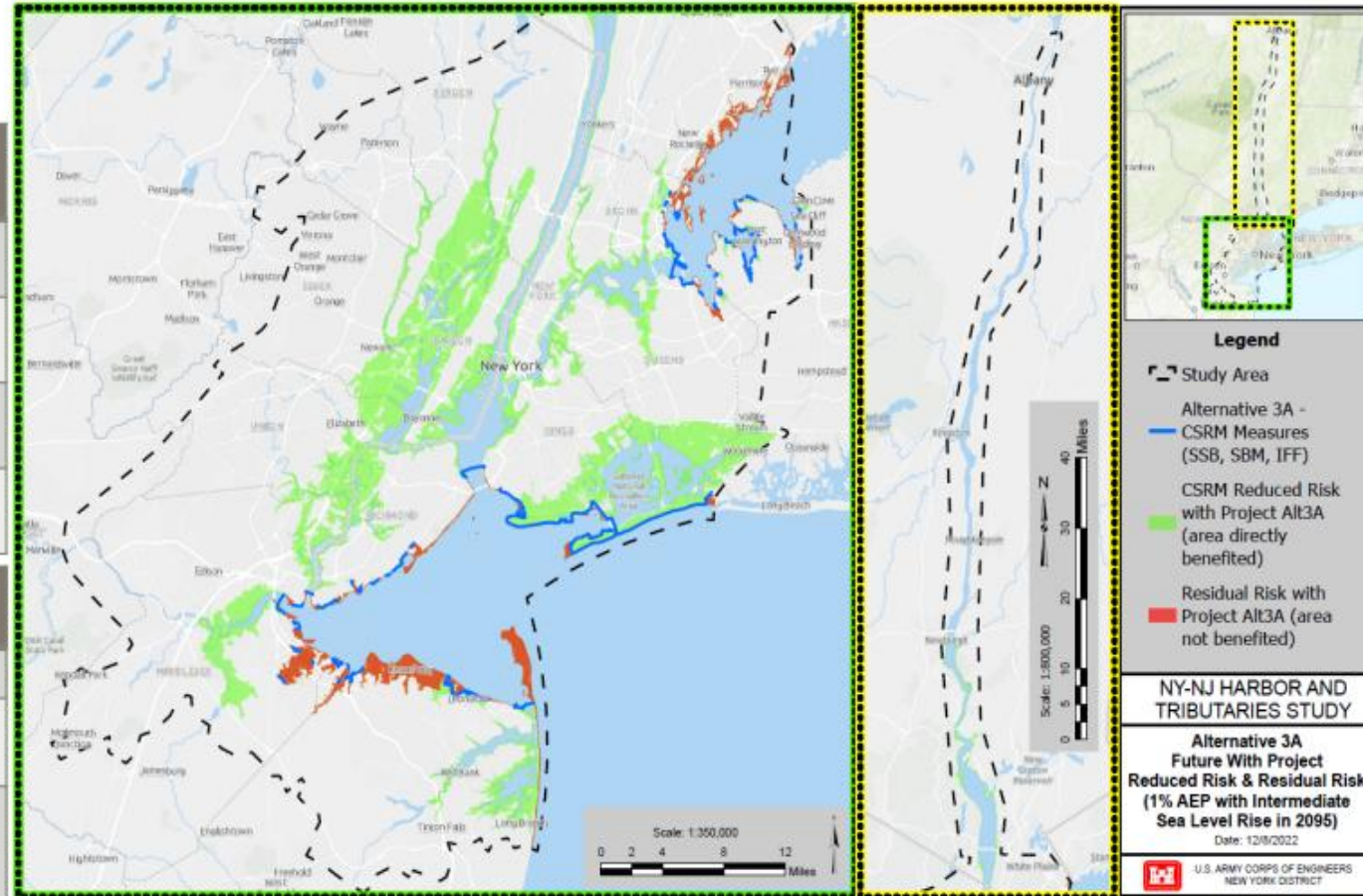
ALTERNATIVE 3A



87.1% Study Area at Direct Risk Benefited

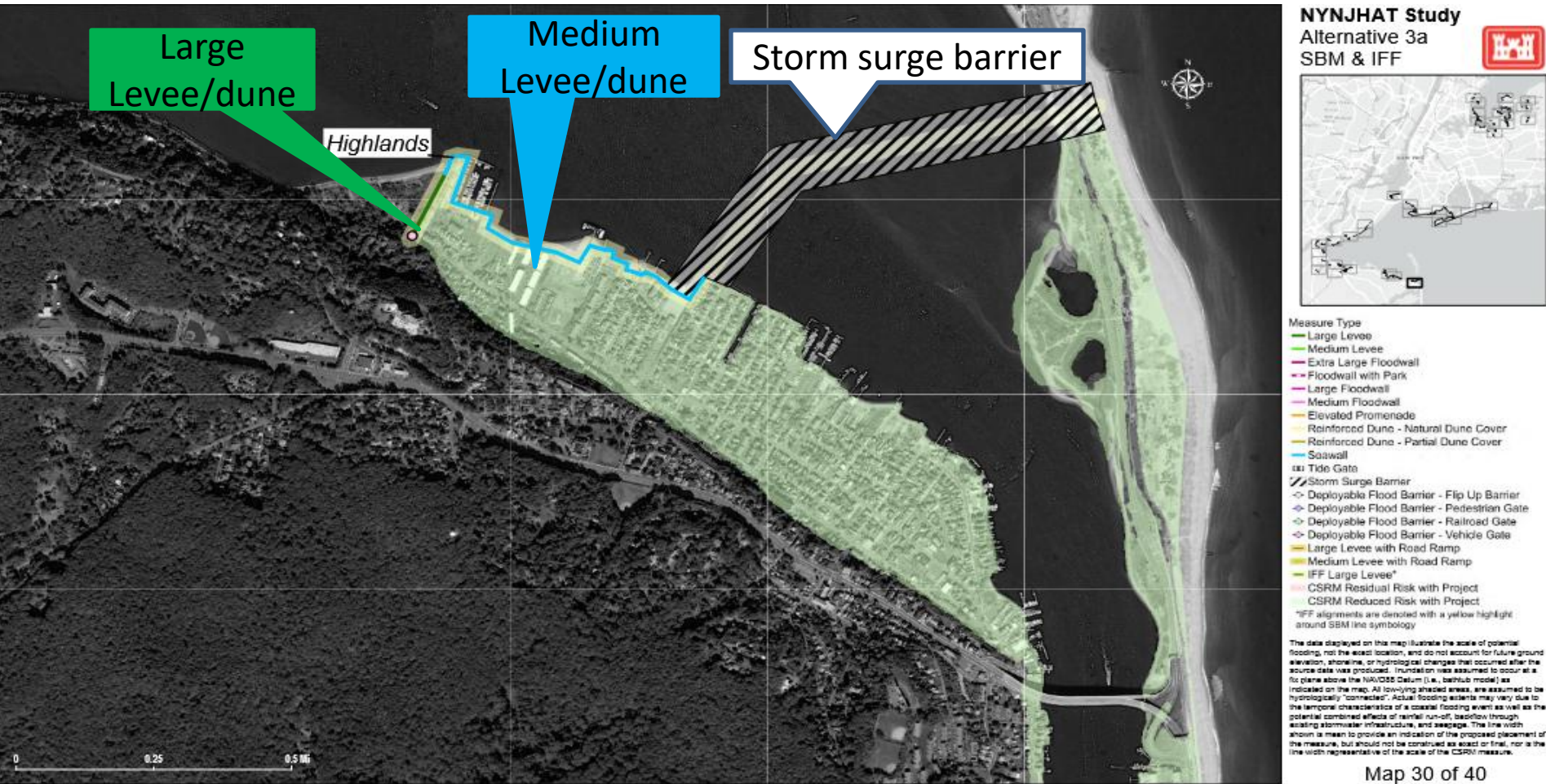
Feature Type	Approx. Miles
Storm Surge Barriers	3.7
Shoreline Based Measures	22.7
Induced Flooding-Mitigation Features	51.5
Risk Reduction Features (not shown)	27.1

Alternative	
First Cost (\$B):	\$ 76.9
Total Present Value Cost (\$B):	\$ 95.7
Estimated Construction Duration (years):	24



- Protects 87.1% of the study area,
- Highlands to be protected with levees/dunes & storm surge barriers
- Construction 24 years

Alternative plan #3A- Highlands



- Protects Highlands with levees/dunes and storm surge barriers
- Storm barriers protects up stream areas on the Shrewsbury River
- However, levees/dunes would still be needed for non-major flooding events in Highlands south of the barrier



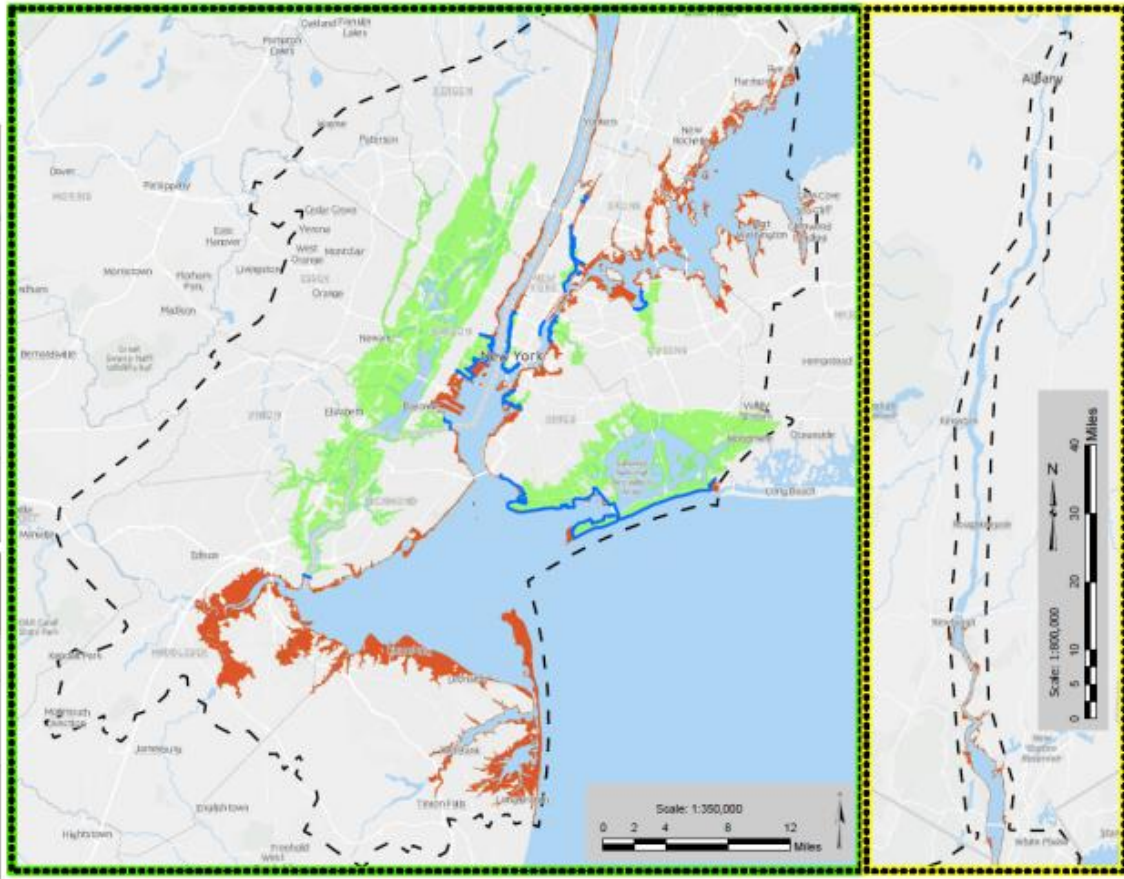
ALTERNATIVE 3B – THE TENTATIVELY SELECTED PLAN



63.0% Study Area at Direct Risk Benefited

Feature Type	Approx. Miles
Storm Surge Barriers	2.2
Shoreline Based Measures	50.6
Induced Flooding-Mitigation Features	11.8
Risk Reduction Features (not shown)	18.7

Alternative	
First Cost (\$B):	\$ 52.7
Total Present Value Cost (\$B):	\$ 76.2
Estimated Construction Duration (years):	14



Legend

- Study Area
- Alternative 3B - CSRM Measures (SSB, SBM, IFF)
- CSRM Reduced Risk with Project Alt3B (area directly benefited)
- Residual Risk with Project Alt3B (area not benefited)

NY-NJ HARBOR AND TRIBUTARIES STUDY

Alternative 3B
 Future With Project
 Reduced Risk & Residual Risk
 (1% AEP with Intermediate
 Sea Level Rise in 2095)
 Date: 12/8/2022

U.S. ARMY CORPS OF ENGINEERS
 NEW YORK DISTRICT

- Protects only 63% of the study area
- Local land-based protection needed for Highlands and the Lower Bay Area
- The northern barriers will probably increase flooding in the southern bay area when barriers are close



PROJECT COSTS (INTERMEDIATE RSLC)

Alternative	Construction Duration (years)	Years of Full Benefits*	First Costs (not including contingency)	Contingency	OMRR&R and IDC (PV)	Total (Present Value)**
2	32	32	\$70.6B	\$41.7B	\$37.3B	\$150.2B
3A	24	40	\$48.9B	\$28.0B	\$18.7B	\$95.7B
3B	14	50	\$35.6B	\$17.1B	\$23.5B	\$76.2B
4	14	50	\$28.8B	\$14.2B	\$19.4B	\$62.51B
5	5	50	\$10.1B	\$5.9B	\$9.8B	\$25.8B

* - USACE policy only allows a maximum of 50 years of benefits in the economic evaluation, but the alternatives and measures are planned for permanent implementation with an at least one-hundred-year planning horizon

** - Adaptation costs for higher sea level rise projections are under refinement and have not been included in the total cost estimates at this time

- #3B is half the price of #2
- ACE policy allows a max of 50-years of benefit
- Economics for #2 & 3A will be negatively skewed due to the 50-year max benefit since #2 will only give 32 years of benefit and #3A only 40-years compared to 50-years in case #3B



PROJECT BENEFITS & COSTS – ON AN AVERAGE ANNUAL BASIS (INTERMEDIATE RSLC)



Alternative	Average Annual Cost	Average Annual Benefits*	Net Benefits*	BCR
2	\$5.0B	\$4.6B	-\$0.5B	0.91
3A	\$3.2B	\$6.4B	\$3.2B	1.99
3B	\$2.6B	\$6.3B	\$3.7B	2.45
4	\$2.1B	\$5.0B	\$2.9B	2.39
5	\$0.9B	\$1.9B	\$1.0B	2.21

* Benefits currently based on estimated damages avoided to structures in study area. Critical infrastructure and other possible benefits under refinement and have not been included in the net benefit calculations at this time.

- 3B is the alternative ACE is recommending based on their cost-benefit analysis
- We do not understand how alternative #2 that protects 96% of the area (which is 52% more area/people) delivers less benefit than case #3B which protects only 63% of the area.
- We also feel that the data is skewed due to longer construction time of #2 and 3A
- See the next slide

Normalizing the *annual net benefit* based on area protected and giving each project 50-years of benefit: so that Alternative #2 and #3A are not penalized due to longer construction time

Alternative	Ave annual cost (B)	Present ave annual benefit (B)	Present annual net benefit (B)	Present years of benefit	Proportional increase in ave annual benefit based on area protected over #3B	Increase in ave annual benefit based on area protected over #3B	New annual net benefit (B)	Normalize to 50 years total benefit	Normalized annual net benefit for 50 full years (B)
2	5.1	4.6	-0.5	32.0	1.5	7.0	1.9	1.6	3.0
3A	3.2	6.4	3.2	40.0	1.4	8.8	5.6	1.2	6.8
3B	2.6	6.3	3.7	50.0	1.0	6.3	3.7	1.0	3.7
4	2.2	5.0	2.8	50.0	-	-	-	1.0	5.0
5	1.0	1.9	0.9	50.0	-	-	-	1.0	1.9

**Over a 50-year period when normalized,
Alternative #3A and #2 have a greater benefit than
Alternative #3B**

ACE Coastal Storm Risk Management Feasibility Study for Highlands Project

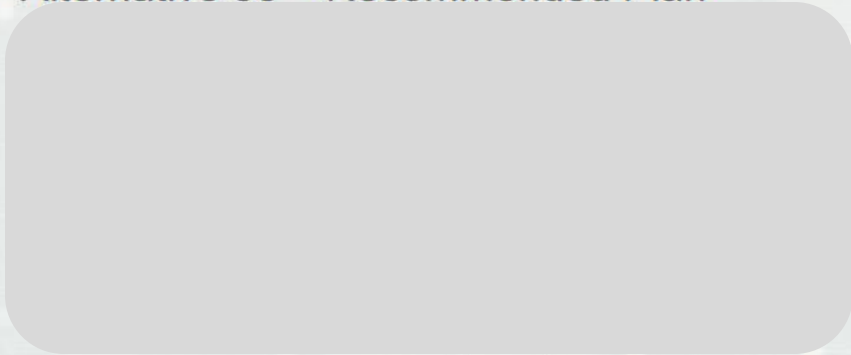
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Updated July 2015 & August 2020

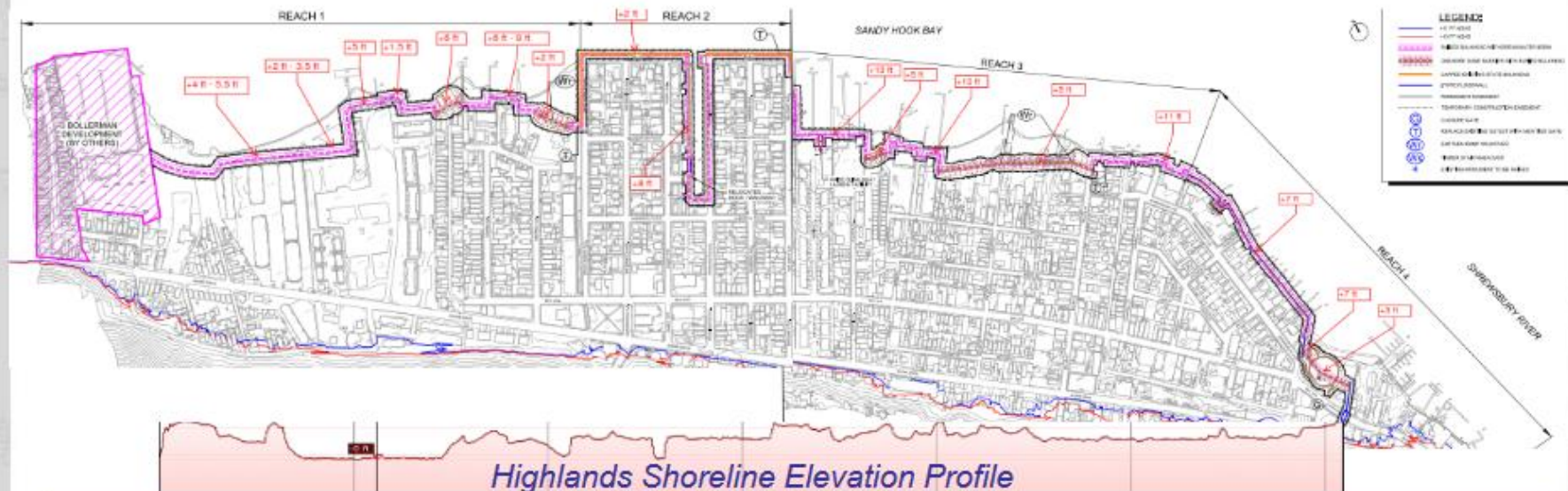
Alternative Plans

- Alternative 1 – Update of Pre-Feasibility Plan
- Alternative 2 – Non-Structural Plan
- Alternative 3 – Offshore Closure Plan
- Alternative 4 – Beach and Dune Plan
- Alternative 5 – Hybrid Plan
 - Several variations of Alternative 5 - Alternative 5e Selected

- Alternative 5e – Recommended Plan



Recommended Plan



Design - 1% chance probability of exceedance (100yr event)

Features

- 10,700 ft. of floodwall (T type and I Type)
- Elevation +14 feet NAVD88
- Pump Station (300 cfs)
- Detention Pond (1.6 acres)
- Pressurized Pipes (1600 lf)
- 1 x 55 ft closure gate



Figure 4-2: Highlands Interior Drainage Basins and Alternatives

Current Risks to Highlands from Major Storms & Flooding

- Highlands is unprotected from storms like Super Storm Sandy
- Highlands experiences regular Dry-day Flooding
 - Full moon, high tide

Future Risks to Highlands

➤ **Sea Level is Rising**

- Almost 1 foot in the last 100 years
- At least, 1 foot in the next 25 years – maybe a lot more due to glacial collapse

➤ **Increased Storm Intensity & Occurrences**

- More heat in the Atmosphere = larger, more intense & more frequent storms

Warmest February Ever!



We know this intuitively, but here are some numbers:

- **Charleston, WV** – only hit 80° in February 3x's in last 100 years
 - They've hit 80° in the February – 4 of the last 6 years
 - 80° is their normal high in June
- **Great Lakes** – Record LOW ice coverage
 - Should be highest in February
 - Downward trend – 70% decline from 1973 to now
- **Vermont's Lake Champlain** – ice fishing tournament cancelled last weekend when 3 fisherman died falling through the ice

Warmest February Ever!



- **Northeast** – now warming faster than other regions
- **Plants are blooming earlier** – across the US
 - I've already seen flowers poking through the soil
 - Early blooms are often damaged or killed by a spring freeze, including flowers and food crops
- **It's nice to have a mild winter BUT....**
 - It's not normal & it reeks havoc:
 - Ticks, mosquitos, stick bugs and more are in larger numbers as a result
- **These climate problems are here and around the world**

Benefits to Highlands w/ USACE Project

- Protection from major storms
- Lower flood insurance rates – can be 100's of \$\$ per month
- Avoid difficulty selling your house – mortgage reluctance
- Avoid damage to vehicles and personal property
- Increase the value of your home
- Encourage businesses to locate here by reducing the risk to their investment
- \$130 Million has already been allocated for this project
- Secure FEMA funding for future damages (otherwise: FEMA reluctant to fund future damages)

Send
Comments
about HATS
to USACE by
March 7th

- H Mr. Bryce W. Wisemiller,
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nynjharbor.tribstudy@usace.army.mil
- HATS study link:
<https://www.nan.usace.army.mil/Missions/Civil-Works/Projects-in-New-York/New-York-New-Jersey-Harbor-Tributaries-Focus-Area-Feasibility-Study/>

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The Borough of Highlands (Highlands) is in the Lower Bay Area of the HATS study. We are very impressed with the amount of work that the US Army Corp of Engineers (USACE) has done in this study. The dedication, time, and effort to conduct a study of this scale is enormous and well appreciated. After our review of the work and given our location in the Lower Bay Area, we do have comments and recommendations that USACE needs to consider before they finalize the path forward. It is our belief that this project should protect the maximum number of the 16,000,000 people that live in this focus area.

The tentatively selected plan is Alternative #3B; this plan has a direct risk benefit for only 63% of the study area, and protects New York City, Western Staten Island, Long Island and parts of the Newark- Jersey City areas. It does not protect the Raritan, Southern Bay and Western Long Island Sound Areas. Furthermore, alternative #3B not only leaves 37% of the area unprotected, but this option very well could force more water into the Raritan and Southern Bay areas, when the storm surge barriers in the north are closed, making flooding worse in the unprotected southern area. Alternative #2 is the most effective option for maximum direct risk benefit of 96% in the study area. Maximum risk benefit should be the top priority for this study, and this is the alternative that we recommend to the USACE. Alternative #2 seems to be a more flexible solution if sea level increase is more than modeled. We also question the calculation of the annual average benefit for alternative #2 vs #3B. If alternative #2 protects 96% of the area/population, how can alternative #3B have a greater average annual benefit if it protects only 63% of the area/population? Alternative #2 must have a greater average annual benefit since it is protecting a greater area/population? In addition to the average annual benefit, given the size and scope of Alternative #2, is the USACE underestimating the longer-term benefits of Alternative #2 due to the artificially constrained 50-year time limit of economic benefits?

As a second option, Alternative #3A better protects more of the study area than #3B (87.1% vs 63%) and the Borough of Highlands believes that #3A is a better choice than #3B.

We would also like to understand how either Alternative #3b, #2, or #3A – works in conjunction with the proposed USACE updated ACE plan of July 2020 for Highlands.

Summarizing, our appreciation of the USACE efforts is noted. We would appreciate a response to the following:

- How have you calculated the average annual benefit for Alternative #2? Since Alternative #2 protects more area than #3B how can the average annual benefit for #2 be less than #3B?
- Revise the economic model where Alternative #2 is not penalized due to its long construction time.
- Reconsideration of the recommended response. Highlands Recommends - Option #2, followed by Option 3A.
- Providing us a better understanding of how prior USACE plan for Highlands (last revised 2020) integrates with any of the options under consideration.
- Highlands would like a better understanding of the next steps and timing to move these plans forward.

Lastly, we welcome opportunities to directly engage with USACE to better understand a path forward.

Best regards,