STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

EVERSOURCE ENERGY APPLICATION FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, MAINTENANCE, AND OPERATION OF A 115-KILOVOLT (KV) BULK SUBSTATION LOCATED AT 290 RAILROAD AVENUE, GREENWICH, CONNECTICUT, AND TWO 115-KV UNDERGROUND TRANSMISSION CIRCUITS EXTENDING APPROXIMATELY 2.3 MILES BETWEEN THE PROPOSED SUBSTATION AND THE EXISTING COS COB SUBSTATION, GREENWICH, CONNECTICUT, AND RELATED SUBSTATION IMPROVEMENTS.	DOCKET NO. 461A NOVEMBER 29, 2017

TOWN OF GREENWICH PETITION FOR RECONSIDERATION

Pursuant to Section 4-181a(a)(1) of the Connecticut Uniform Administrative Procedures Act ("UAPA"), the Town of Greenwich ("Town") respectfully submits this Petition for Reconsideration of the Siting Council's November 14, 2017 Findings of Fact, Decision and Order in Docket No. 461A (the "Decision") for the reasons set forth herein.

Since the close of the record on October 5, 2017, new planning recommendations and sea level rise projections published by the Connecticut Institute for Resilience and Climate Adaptation ("CIRCA"), a joint effort of the Connecticut Department of Energy and Environmental Protection and UConn's Marine Science Division, establish good cause to reconsider and modify the approval of an open-air substation at 290 Railroad Avenue. In support of this Petition for Reconsideration, the Town hereby submits the proposed Supplemental Testimony and accompanying schedules 1 through 5 attached as Exhibit A (the "Supplemental Testimony").

I. The October 19, 2017 CIRCA Report.

Connecticut law requires State and local planners to take into account the impacts of sea level change, including scenarios published by the National Oceanic and Atmospheric Administration ("NOAA") and CIRCA. Supplemental Testimony, pp. 1-3. Section 6 of Public Act 13-97, now codified at *Conn. Gen. Stat.* § 25-68o(b), mandates that UConn's Marine Science Division (i.e., CIRCA) update NOAA's 2012 sea level change scenarios at least once every decade. As required by Connecticut law, at a public hearing on October 19, 2017, after the close of the record in this docket, the updated sea level rise scenarios were published for the first time by CIRCA (the "CIRCA Report"). Supplemental Testimony, p. 2. The written portion of the CIRCA Report is attached as Schedule 1 to the Supplemental Testimony.

The CIRCA Report concluded that due to its unique characteristics including its location, oceanography, weather and geology, the State of Connecticut is susceptible to greater sea level rise than other areas. (CIRCA Report, Slide 19). The CIRCA Report further concluded that Connecticut planners should anticipate a sea level rise of 50 cm (or approx. 2 feet) above the baseline elevation by 2050 and should alert the public that in the future higher thresholds may be required. (CIRCA Report, Slide 19).

Demonstrating the importance of CIRCA's findings, experts at UConn's Center for Energy and Environmental Law ("CEEL") recommend that State and local planners be required to adopt the CIRCA Report's findings as the single standard for determining the risks posed by sea level rise. *See* "Municipal Resilience Planning Assistance Project," October 19, 2017 (written presentation of CEEL Professor Joe MacDougald

and legal fellow Bill Rath). A copy of the written portion of the CEEL report is attached to the Supplemental Testimony as Schedule 3 (the "CEEL Presentation").

The CIRCA Report's updated sea level rise scenarios and planning recommendations must be considered by the Siting Council in order to make a finding that the Project is consistent with Connecticut's environmental laws. Under the Public Utility Environmental Standards Act, *Conn. Gen. Stat.* § 16-50g *et seq.* ("PUESA"), the Siting Council must find that the Project is compatible with the State's interests in preserving the environment and public health and safety. *Conn. Gen. Stat.* § 16-50p(a)(3).

The importance of planning for sea level rise is codified in numerous State laws. In 2012, Public Act 12-101 amended the Coastal Management Act, *Conn. Gen. Stat.* § 22a-90 *et seq*. and declared it the general policy and goal of the State of Connecticut to "consider in the planning process the potential impact of a rise in sea level . . . so as to minimize damage to and destruction of life and property and minimize the necessity of public expenditure and shoreline armoring to protect future new development from such hazards." *See Conn. Gen. Stat.* § 22a-92(a)(5).

Since 2012, the Legislature has codified this policy by requiring local and State planners to take into account the risks posed by sea level rise. For instance, the State of Connecticut is required to consider published sea level change scenarios in its plan and program for civil preparedness. *Conn. Gen. Stat.* § 28-5(g). A number of other statutes similarly require consideration of the impact of sea level rise. *See Conn. Gen. Stat.* § 22a-363h; § 22a-478(a)(8); § 25-157t(b)(2)(J); § 8-23(d)(11); 16a-27(h); § 25-68o(a). *See also* Supplemental Testimony, pp. 1-3.

In addition to these statutes, the policies of Connecticut State agencies require consideration of the impact of sea level rise. Indeed, the Office of Policy and Management's Plan for Conservation and Development, which must be updated every five years, is required to take into account sea level rise scenarios. The draft Plan for Conservation and Development for 2018-2023, which is expected to be submitted to the Legislature for approval before the end of the year, declares that it is Connecticut State agency policy to "minimize the siting of new infrastructure and development in coastal areas prone to erosion and inundation from sea level rise or storms, as anticipated in [published] sea level change scenarios . . .". *See* Page 19 of draft Plan for Conservation and Development, dated May 12, 2017, attached to the Supplemental Testimony as Schedule 2.

II. Open-air substations are more vulnerable to sea level rise.

In the Town's proposed Supplemental Testimony, the Town's witnesses explain the risk of constructing an open-air substation in or adjacent to a FEMA flood zone and within the coastal boundary, as the Siting Council has ordered, and the materiality of the CIRCA Report in concluding that this risk is unacceptable. Supplemental Testimony, pp. 3-5. In an open-air substation, the equipment is generally placed on grade. Supplemental Testimony, p. 5. By contrast, since indoor substations are generally designed with cable basements beneath the floor level of the equipment, the equipment is positioned several feet above grade. Supplemental Testimony, p. 5.

The Siting Council ordered the new substation to be constructed at 290 Railroad Avenue, which is within a FEMA flood zone and within the coastal boundary subject to the Coastal Management Act. *See* Decision, FOF #265 ("The Project is located within

the coastal resource boundary, as defined by the" Coastal Management Act).[1] *See* Town's Pre-Filed Testimony dated July 18, 2017, at p. 27. The CIRCA Report makes clear the real risk of flooding and potential impact on any substation built at 290 Railroad Avenue. That risk is far worse because the Siting Council ordered an open-air substation, which is more vulnerable to the effects of sea level rise than would be an indoor substation. It is essential that the substation be fully-enclosed.

Additionally, Greenwich is situated along western Long Island Sound, which realizes the highest storm surges in Long Island Sound. Supplemental Testimony, pp. 4-5. An example of this occurred during Superstorm Sandy, where the highest surge was recorded at the NOAA King's Point Station in western Long Island Sound. Supplemental Testimony, pp. 4-5 & Sched. 5. Storm surge associated with sea level rise impacts flooding on streams, such as the nearby Horseneck Brook, where downstream flow becomes restricted during storm events because of storm surge. Supplemental Testimony, p. 5. Accordingly, it is not prudent to locate an open-air substation at 290 Railroad Avenue in such close proximity to Horseneck Brook.

In addition to the fact that the equipment in an indoor substation would be elevated, indoor substations are inherently more resilient to flooding and water damage than open-air substations. Supplemental Testimony, p. 5. Other than the transformers, all equipment in an indoor substation would be protected from the elements.

[1] In Docket 461 FOF #422, the Siting Council found that "[t]he southern portion of the site is 10 feet from the edge of a designated 500 year flood zone associated with Horseneck Brook." This finding was corrected in the Town's Pre-Filed Testimony in Docket 461A, where the Town's witnesses testified that in fact, 290 Railroad Avenue is situated within a FEMA flood zone. See, Town of Greenwich Pre-Filed Testimony dated July 18, 2017, at p. 27. Although in this docket, in FOF #256 the Siting Council erroneously found that both 290 and 281 Railroad Avenue are not within FEMA flood zones, that finding as to 290 Railroad Avenue is inaccurate. Regardless, the Siting Council correctly found that 290 Railroad Avenue is situated within the coastal resource boundary.

Supplemental Testimony, p. 5. By contrast, an open-air substation, as currently ordered by the Siting Council, is vulnerable to the elements. Supplemental Testimony, p. 5. In light of the CIRCA Report, it is particularly risky to construct an open-air substation near a FEMA flood zone and within the coastal resource boundary.

The Town's proposed Supplemental Testimony cites the example of a new substation constructed by Pepco Holdings, Inc. in Avalon, New Jersey. Supplemental Testimony, p. 6 & Sched. 4. Avalon is a coastal community confronted with sea level rise. In order to address the vulnerability of a new substation to storm and flood damage, and particularly the risk of potential catastrophic equipment failure and outages arising from water damage, the new Peermont Substation was fully-enclosed. Supplemental Testimony, p. 5-6 & Sched. 4.

In the present case, the vulnerability of the new substation to the elements, and the risk of flooding and potential catastrophic equipment failure, requires a reconsideration of the Decision. To mitigate the indisputable risks of flooding identified in the new CIRCA Report, and to minimize exposure to the elements, the Decision should be modified to require a fully-enclosed indoor substation at 281 Railroad Avenue.

III. Reconsideration of an open-air substation at 290 Railroad Avenue is required under *Conn. Gen. Stat.* § 4-181a(a)(1).

The standard for reconsideration of an administrative agency's ruling is governed by *Conn. Gen. Stat.* § 4-181a(a)(1). It states:

> …a party in a contested case may, within fifteen days after the personal delivery or mailing of a final decision, file with the agency a petition for reconsideration of the decision on the ground that: (A) an error of fact or law should be corrected; (B) new evidence has been discovered which materially affects the merits of the case and which for good reasons was not presented in the agency proceeding; or (C) other good cause for reconsideration has been shown.

Reconsideration of the Decision should be granted pursuant to all three grounds under *Conn. Gen. Stat.* § 4-181a(a)(1). First, the CIRCA Report, which was published after the close of the record, materially affects the merits of the decision to locate an open-air substation at 290 Railroad Avenue. Second, the Decision should be reconsidered to correct the errors of fact and law relating to the risks of sea level rise and the health and safety risks posed by an open-air substation at 290 Railroad Avenue, and to comply with the Coastal Management Act. In light of the CIRCA Report and the Town's proposed Supplemental Testimony, the Town has shown good cause for reconsideration of the Decision as a matter of law.

Conn. Gen. Stat. § 16-50p(a)(3) requires that the Siting Council specify and consider "every significant adverse effect" of a new open-air substation at 290 Railroad Avenue. Section 16-50p(a)(3)(B) further requires the siting of any new facility to be consistent with "public health and safety." As set forth in Town's proposed Supplemental Testimony, in light of the new CIRCA Report's updated sea level rise scenarios and planning recommendations, it is critical that any new substation be fully-enclosed, and moved away from the FEMA flood zone. The Town respectfully moves

that the Siting Council reconsider the siting and design of the new substation, permit the filing of the proposed Supplemental Testimony attached hereto as Exhibit A, and conduct proceedings to allow the Siting Council to modify its order so that the new substation be fully-enclosed and moved to 281 Railroad Avenue.[2]

a. The Decision should be reconsidered under *Conn. Gen. Stat.* § 4-181a(1)(B) because the new CIRCA Report's findings materially affect the merits of the case.

The CIRCA Report, published after the close of the record, establishes the irrefutable fact that sea levels are rising, and at a dramatic level. The Town's proposed Supplemental Testimony establishes the risk of constructing an open-air substation in proximity to a FEMA flood zone. Supplemental Testimony, p. 7. If the new substation remains an open-air substation, it will be far more susceptible to flood damage than if it is fully-enclosed. Supplemental Testimony, p. 7. Merely building a perimeter fence around an open-air substation – as the Siting Council has currently ordered – will do little to avoid the risk of damage to the equipment within the substation if flooding occurs. Supplemental Testimony, p. 7. By contrast, it is far more prudent (as demonstrated by the construction of the Peermont Substation) to ensure that all substation equipment is protected within a fully-enclosed, indoor structure. Supplemental Testimony, p. 7-8.

The publication of the once per decade CIRCA Report after the close of the record, and the Town's explanatory Supplemental Testimony, should be entered into the record as the basis for an amended ruling requiring that the new substation be fully-

[2] In filing this Petition for Reconsideration directed at the fact that any new substation should be fully-enclosed and moved to 281 Railroad Avenue, the Town reserves all rights of appeal concerning all aspects of the Siting Council's Decision.

enclosed and moved to 281 Railroad Avenue. *See, e.g.*, *New London Housing Authority v. State Board of Labor Relations*, 76 Conn. App. 194, 198 (2003) (affirming "thoughtful and comprehensive" decision upholding administrative agency's decision to reconsider prior ruling based on new evidence, even where evidence was available before the record closed).

Because the CIRCA Report published after the close of the record materially affects the merits of the case and necessitates a finding that the new substation be fully-enclosed and moved to 281 Railroad Avenue, the Petition for Reconsideration should be granted under *Conn. Gen. Stat.* § 4-181a(1)(B).

b. The Decision should be reconsidered under *Conn. Gen. Stat.* § 4-181a(1)(A) because the Decision contains errors of fact and law relating to the hazards posed by siting an open-air substation at 290 Railroad Avenue.

In addition to the new findings of the CIRCA Report, the Decision contains the following errors of fact and law relating to the health and safety risks posed by an open-air substation at 290 Railroad Avenue, the risks posed by sea level rise, and the lack of compliance with the Coastal Management Act.

i. The Decision fails to make a finding that an open-air substation at 290 Railroad Avenue is consistent with public and health and safety.

Conn. Gen. Stat. § 16-50p(a)(3)(B) requires the Siting Council to find that the siting of a new substation is consistent with "public health and safety." *Conn. Gen. Stat.* § 16-50p(a)(3)(B). Nowhere in the Decision does the Siting Council make this finding as to an open-air substation at 290 Railroad Avenue. In the Decision, the Siting Council concluded that "[b]oth the 290 Railroad Avenue and 281 Railroad Avenue sites are viable locations for the Project substation, either as an open-air design or indoor

design." Opinion, p. 6. This conclusion fails to meet PUESA's "public health and safety" standard, and, with respect to 290 Railroad Avenue, is based on erroneous and incomplete findings.

Even before the publication of the new CIRCA findings, the record made clear that there is an unacceptable health and safety risk in locating an open-air substation at 290 Railroad Avenue, next door to a compressed gas facility. Ignoring this fact, the Decision merely states that "[t]here are no standards or safety codes that would prevent an open-air substation from being constructed at 290 Railroad Avenue, adjacent to the AIRGAS commercial property." This finding is wrong. The findings neglect to reference the unchallenged testimony of the Town expert witness testimony as to the policy of the National Fire Prevention Association that no prudent person would construct an open-air substation at 290 Railroad Avenue. (8-29-17 Tr. p. 245; Town 1, at 25). Even though this evidence was unchallenged, and there was discussion about this precise point at the Siting Council's regular meeting on November 9, 2017, the Decision omits any reference to it.

Indeed, there are no findings of fact anywhere in the Decision addressing the health and safety risks of an open-air substation at 290 Railroad Avenue other than Finding of Fact 317, which supports the construction of an indoor substation: "A fully-enclosed indoor substation would have a higher level of security than an open-air substation." Decision, FOF #317.

The October 19, 2017 CIRCA Report's findings on sea level rise and the increased risk of flooding compound the error of ordering an open-air substation at 290 Railroad Avenue. As a result, the Decision contains an error of law in failing to comply

with *Conn. Gen. Stat.* § 16-50p(a)(3)(B), in addition to the errors of fact described above. Therefore, it must be reconsidered under *Conn. Gen. Stat.* § 4-181a(a)(1)(A).

ii. The Decision fails to consider the adverse environmental effect of rising sea levels.

Conn. Gen. Stat. § 16-50p(a)(3) requires that the Siting Council specify and consider "every significant adverse effect" of a new substation. As described above, it is the environmental policy of the State of Connecticut to mitigate the risks of sea level rise. In the Decision, however, there are no references to any of these policies, even though 290 Railroad Avenue is within a FEMA flood zone (or, at the very least within feet of a FEMA flood zone) and within the coastal boundary subject to the Coastal Management Act. The Decision also does not contain any findings of fact relating to sea level rise and the risks of flooding of an open-air substation at 290 Railroad Avenue – issues that are now front and center in light of the October 19, 2017 CIRCA Report. Because the Decision fails to contain any finding on these risks, the Decision should be reconsidered on the grounds that it contains errors of fact and law under *Conn. Gen. Stat.* § 4-181a(a)(1)(A).

iii. The Decision fails to comply with the Coastal Management Act.

As described above, the new substation at 290 Railroad Avenue is located within the coastal resource boundary, as defined by the Coastal Management Act. See Decision, FOF #265. Under the Coastal Management Act, it is the general policy and goal of the State Connecticut to "consider in the planning process the potential impact of a rise in sea level . . . so as to minimize damage to and destruction of life and property

and minimize the necessity of public expenditure and shoreline armoring to protect future new development from such hazards." *See Conn. Gen. Stat.* § 22a-92(a)(5).

While Findings of Fact 265 through 276 of the Decision partially address the impact of the Project on coastal area resources, these findings neglect to recognize Connecticut's clear policy requiring consideration of the risks posed by sea level rise for construction within the coastal resource boundary. The Decision also does not make any finding that construction of an open-air substation at 290 Railroad Avenue within the coastal resource boundary is consistent with the Coastal Management Act.

The evidence in the record, together with the October 19, 2017 CIRCA Report and the proposed Supplemental Testimony, demonstrate that an open-air substation at 290 Railroad Avenue within the coastal resource boundary is not consistent with the Coastal Management Act. As a result, the Decision contains an error of law requiring reconsideration of the Decision under *Conn. Gen. Stat.* § 4-181a(a)(1)(A).

c. The Decision should be reconsidered under *Conn. Gen. Stat.* § 4-181a(1)(C) because the Town has shown good cause as a matter of law.

For the reasons described above, there is good cause for reconsideration of the Siting Council's ruling that an open-air substation be located at 290 Railroad Avenue. As a result, this Petition for Reconsideration should also be granted under *Conn. Gen. Stat*. § 4-181a(1)(C).

CONCLUSION

Each of the statutory bases for reconsideration of the Siting Council's order of an open-air substation requires a modification of that ruling. The new CIRCA Report makes clear that sea levels are rising, which poses a unique risk to a new substation that would be located in or near a FEMA flood zone and within the coastal resource boundary. As set forth in the Town's proposed Supplemental Testimony, in light of this new evidence, the prudent decision would be for the substation to be fully-enclosed and moved to 281 Railroad Avenue. Moreover, the siting of an open-air substation at 290 Railroad Avenue next to a compressed gas facility would create an unnecessary risk to public health and safety. Accordingly, there is good cause for reconsideration and it would be error to ignore this real risk to the Town.

The Town respectfully petitions the Siting Council to reconsider its order of an open-air substation at 290 Railroad Avenue, to allow the filing of the Town's Supplemental Testimony attached hereto as Exhibit A, and to conduct proceedings to permit the modification of this aspect of the Siting Council's Decision to require that any new substation be fully-enclosed and moved to 281 Railroad Avenue.

Respectfully submitted,

Town of Greenwich

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EXHIBIT A

THE CONNECTICUT SITING COUNCIL

DOCKET NO. 461A

EVERSOURCE ENERGY APPLICATION FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, MAINTENANCE, AND OPERATION OF A 115-KILOVOLT (KV) BULK SUBSTATION LOCATED AT 290 RAILROAD AVENUE, GREENWICH, CONNECTICUT, AND TWO 115-KV UNDERGROUND TRANSMISSION CIRCUITS EXTENDING APPROXIMATELY 2.3 MILES BETWEEN THE PROPOSED SUBSTATION AND THE EXISTING COS COB SUBSTATION, GREENWICH, CONNECTICUT, AND RELATED SUBSTATION IMPROVEMENTS.

Supplemental Testimony

of

Denise Savageau

Mitchell E. Mailman

On behalf of

The Town of Greenwich

NOVEMBER 29, 2017

Q. Since the close of the record in this Docket 461A on October 5, 2017, has any new evidence been discovered which materially affects the merits of the proceeding?

A. Yes. At a public hearing on October 19, 2017, after the record closed, the Connecticut Institute for Resilience and Climate Adaptation ("CIRCA"), a joint effort of the Connecticut Department of Energy and Environmental Protection and UConn's Marine Science Division, issued updated sea level rise scenarios and planning recommendations pursuant to *Conn. Gen. Stat.* § 25-68o(b) (the "CIRCA Report"). The written portion of the CIRCA Report, consisting of the Executive Summary and a slide presentation, is attached as Schedule 1.[1]

Q. What role does sea level rise play in environmental, development and conservation planning in Connecticut?

A. In 2012, Public Act 12-101 amended the Coastal Management Act, *Conn. Gen. Stat.* § *22a-90*, *et seq.* and declared it the general policy and goal of the State of Connecticut to "consider in the planning process the potential impact of a rise in sea level . . . so as to minimize damage to and destruction of life and property and minimize the necessity of public expenditure and shoreline armoring to protect future new development from such hazards." *See Conn. Gen. Stat.* § 22a-92(a)(5).

Since 2012, this policy has been codified in statutes requiring local and State planners to take into account the risks posed by sea level rise. These include the following statutes:

1) *Conn. Gen. Stat.* § 22a-363h authorizes the Connecticut Department of Energy and Environmental Protection ("DEEP") to

[1] The full presentation, including audio of the public meeting at which it was made, is available at https://circa.uconn.edu/2017/10/19/sea-level-rise-projections-for-the-state-of-connecticut-webinar-recording-available/ (last visited November 26, 2017).

undertake studies and pilot programs to improve coastal community resilience to a rise in sea level.

2) *Conn. Gen. Stat.* § 22a-478(a)(8) requires DEEP to consider a rise in sea level when establishing priorities for eligible water quality projects.

3) *Conn. Gen. Stat.* § 25-157t(b)(2)(J) requires a "Blue Plan" for preserving Long Island Sound that adapts to a rise in sea level.

4) *Conn. Gen. Stat.* § 28-5(g) requires the State of Connecticut to consider published sea level change scenarios in its plan and program for civil preparedness.

5) *Conn. Gen. Stat.* § 8-23(d)(11) requires towns to adopt plans of conservation and development which consider published sea level change scenarios.

6) *Conn. Gen. Stat.* § 16a-27(h) requires any revisions to the State of Connecticut's plan of conservation and development to consider risks associated with increased coastal erosion as anticipated in published sea level change scenarios.

7) *Conn. Gen. Stat.* § 25-68o(a) requires towns to consider published sea level change scenarios in preparing the town's evacuation plan or hazard mitigation plan.

In addition, on October 16, 2017, the public comment period closed in proceedings relating to the Office of Policy and Management's draft Plan for Conservation and Development, which must be updated every five years. *Conn. Gen. Stat.* § 16a-25 *et seq.* The draft Plan for Conservation

and Development for 2018-2023, which is expected to be submitted to the Legislature for approval before the end of the month, declares that it is Connecticut state agency policy to "minimize the siting of new infrastructure and development in coastal areas prone to erosion and inundation from sea level rise or storms, as anticipated in [published] sea level change scenarios . . .". *See* Page 19 of draft Plan for Conservation and Development, dated May 12, 2017, attached as Schedule 2.[2]

Q. What is the CIRCA Report?

A. As described above, Connecticut law requires state and local planners to take into account the impacts of sea level change, including scenarios published by the National Oceanic and Atmospheric Administration ("NOAA") and CIRCA. Section 6 of Public Act 13-97, now codified at *Conn. Gen. Stat.* § 25-68o(b), mandates that UConn's Marine Science Division (i.e., CIRCA) update NOAA's 2012 sea level change scenarios at least once every decade.

As required by Connecticut law, on October 19, 2017, after the close of the record in this docket, updated sea level rise scenarios were published by CIRCA. This was CIRCA's first update of sea level rise scenarios since Public Act 13-97 became law.

Q. Summarize the key conclusions of the October 19, 2017 CIRCA Report as they relate to the proceedings in this Docket 461A.

A. The CIRCA Report concluded that due to its unique characteristics including its location, oceanography, weather and geology, the State of Connecticut is susceptible to greater sea level rise than other areas. (CIRCA Report, Slide 19). CIRCA further concluded that Connecticut

[2] A link to a full copy of the draft plan is available on the Web Site of the Office of Policy and Management (www.ct.gov/opm), at http://www.ct.gov/opm/cwp/view.asp?a=2990&Q=587532&PM=1 (last visited November 26, 2017).

planners should anticipate a sea level rise of 50 cm (or approx. 2 feet) above the baseline elevation by 2050 and alert the public that in the future higher thresholds may be required. (CIRCA Report, Slide 19).

Demonstrating the importance of CIRCA's findings, UConn's Center for Energy and Environmental Law ("CEEL") recommends that state and local planners be required to adopt the CIRCA Report's findings as the single standard for determining the risks posed by sea level rise. See Presentation of UConn Law School CEEL Professor-in-Residence, Joe MacDougald and CEEL legal fellow, Bill Rath, "Municipal Resilience Planning Assistance Project," October 19, 2017 (written portion attached as Schedule 3).[3]

Q. Please describe how the October 19, 2017 CIRCA Report's findings relate to the Siting Council's decision to approve an open-air substation at 290 Railroad Avenue.

A. 290 Railroad Avenue is situated in a FEMA flood zone and within the coastal resource boundary of the Coastal Management Act. An open-air substation in or near a FEMA flood zone, or a coastal zone, faces additional risks of flooding, particularly in light of the new scenarios published by CIRCA. Additionally, Greenwich is situated along western Long Island Sound, which realizes the highest storm surges in Long Island Sound. Due to the geography of the Sound, the long "fetch" (or distance travelled) of the wind produces larger waves in the western portion of the Sound, which creates larger storm surge. *See* diagram demonstrating the long fetch of winds in the Sound included in the attached Schedule 5.

An example of this occurred during Superstorm Sandy, where the highest surge was recorded at the NOAA King's Point Station. *See* NOAA Water

[3] The full presentation, including audio of the public meeting at which it was made, is available at https://circa.uconn.edu/2017/10/19/sea-level-rise-projections-for-the-state-of-connecticut-webinar-recording-available/ (last visited November 26, 2017).

Level and Meteorological Data Report on Hurricane Sandy, Jan. 24, 2013, at p. 13 (included in Schedule 5 attached).[4] Storm surge associated with sea level rise also impacts flooding on streams, such as Horseneck Brook, where downstream flow becomes restricted during storm events because of storm surge. *See* NOAA Hurricane Sandy Impact Analysis, March 28, 2013 (included in Schedule 5 attached).[5]

In an open-air substation, the equipment is generally placed on grade. By contrast, since indoor substations are generally designed with cable basements beneath the floor level of the equipment, the equipment is positioned several feet above grade. Because the equipment in an indoor substation is fully-enclosed and more protected from outside elements than an open-air substation, it is also less susceptible to damage caused by flooding. CIRCA's findings have the effect of raising the flood plain that State and local planners must consider in addressing the risk of flooding along coastal areas. Indeed, MacDougald and Rath recommend increasing building elevation requirements to "add *at least* two feet of freeboard above ASCE 24-14 requirements." *See* CEEL Presentation, Slide 30.

Therefore, CIRCA's findings must be considered by the Siting Council in order to fully address the risk of flooding that an open-air substation at 290 Railroad Avenue would be susceptible to, which is indisputably greater than the risk an indoor substation at 281 Railroad Avenue would face.

[4]The full report is available on the NOAA Public Website at https://tidesandcurrents.noaa.gov/publications/Hurricane_Sandy_2012_Water_Level_and_Meteorological_Data_Report.pdf (last visited November 29, 2017). A copy of the report is included herein by reference.

[5] The full report is available on the NOAA Public Website at http://www.nhc.noaa.gov/outreach/presentations/Sandy2012.pdf (last visited November 29, 2017).

Q. Please describe an example of prudent substation planning and design that addresses the risk of rising sea levels.

A. In 2016, Atlantic City Electric completed construction of a fully-enclosed indoor substation in Avalon, N.J. *See* "Peermont Substation Construction Update–May 24, 2016," Official Public Web Site of Borough of Avalon, available at http://avalonboro.net/peermont-substation-construction-update-may-24-2016/. In a 2013 report, an environmental scientist at Atlantic City Electric's parent company Pepco Holdings, Inc. explained that because Avalon is a coastal community, it is confronted with the risks of sea level rise. In order to address the vulnerability of the substation to storm and flood damage, and particularly the risk of potential catastrophic equipment failure and outages arising from water damage, the new Peermont Substation was designed to be fully-enclosed rather than open-air. *See* "Challenges Impacting Critical Electrical Infrastructure in the Floodplain and Flood Prone Areas due to Storm Events and Sea-level Rise," Presentation, September 19, 2013, attached as Schedule 4 (the "Peermont Substation Report").

In the Peermont Substation Report, Pepco Holdings identified the following benefits of fully-enclosed substations in light of rising sea levels caused by global climate change:

1) Prevention of water damage to the critical substation buildings and equipment that occurs due to storm surges;
2) Elimination of potential catastrophic equipment failure;
3) Reduced equipment failures and outages due to flying debris by enclosing equipment in buildings or steel enclosures;
4) Reduced customer outages due to less substation asset damage resulting from storm surges;
5) Lessened environmental impact due to improved critical infrastructure protection; and

6) Extended life of substations with new equipment replacements and increased capacity.

See Peermont Substation Report, p. 12. The Peermont Substation is one example of a prudent substation design that addresses the risks of sea level rise caused by global climate change.

Q. In light of the October 19, 2017 CIRCA Report's findings, what would be a prudent location and design of a new substation in Greenwich?

A. First, in light of the October 19, 2017 CIRCA Report's updated sea level rise scenarios and planning recommendations, it is clear that the new substation should not be located at 290 Railroad Avenue, which is located in a FEMA flood zone and within the coastal resource boundary of the Coastal Management Act. Instead, the only prudent choice is to site the new substation further away from the FEMA flood zone, at 281 Railroad Avenue.

Second, it is critical that the new substation be an indoor, fully-enclosed substation. By making this modest modification to the current design, the following risks will be mitigated: i) catastrophic equipment failure within the substation due to storm surges and flooding, ii) equipment failures and outages due to flying debris during weather events, iii) customer outages resulting from damage to equipment in the substation due to storm surges and flooding, and iv) environmental impact resulting from flooding impact on substation equipment.

Q. In its Decision, the Siting Council noted that the cost of an indoor substation would be approximately $1.5 million greater than an open-air substation. Should this be the basis for the Siting Council's decision?

A. No. In the context of a $100 million transmission Project which the Town opposes, it would be a mistake to try to achieve "savings" of less than 2% of the total cost of the Project in the substation design. The risks associated with an open-air substation located at 290 Railroad Avenue were well-established in this docket, including significant security risks, and the public health and safety risk of siting the new substation next door to the Airgas compressed gas facility. The October 19, 2017 CIRCA Report makes clear that this design and location will also result in the new substation being more vulnerable to the impact of sea level rise, which could lead to catastrophic equipment failure in the event of storm surges and flooding. The prudent manner in which to reduce these serious risks is to modify the Decision to require that the new substation be fully-enclosed and located at 281 Railroad Avenue.

Q. Does this conclude your Supplemental Testimony?

A. Yes.

SCHEDULE 1

Sea Level Rise and Coastal Flood Risk in Connecticut: An Overview

James O'Donnell,
Connecticut Institute for Resilience and Climate Adaptation, University of Connecticut

Measurements of sea level by instruments in the water and satellite altimeters provide unambiguous evidence that the annual mean level of the ocean surface is rising. Coastal communities should expect that the frequency of coastal flooding will increase. The National Oceanic and Atmospheric Administration (NOAA) report CPO-1 (Parris et al. 2012) provided guidance on the magnitude of potential changes in the global mean sea level based on analyses of both models and data. Four projections were shared so that managers could select what they judged to be appropriate. To provide more local guidance for Connecticut we have reviewed and modified the projections to include the effects of local oceanographic conditions, more recent data and models, and local land motion (O'Donnell, 2017). A concise summary of the results are shown in Figure 1.

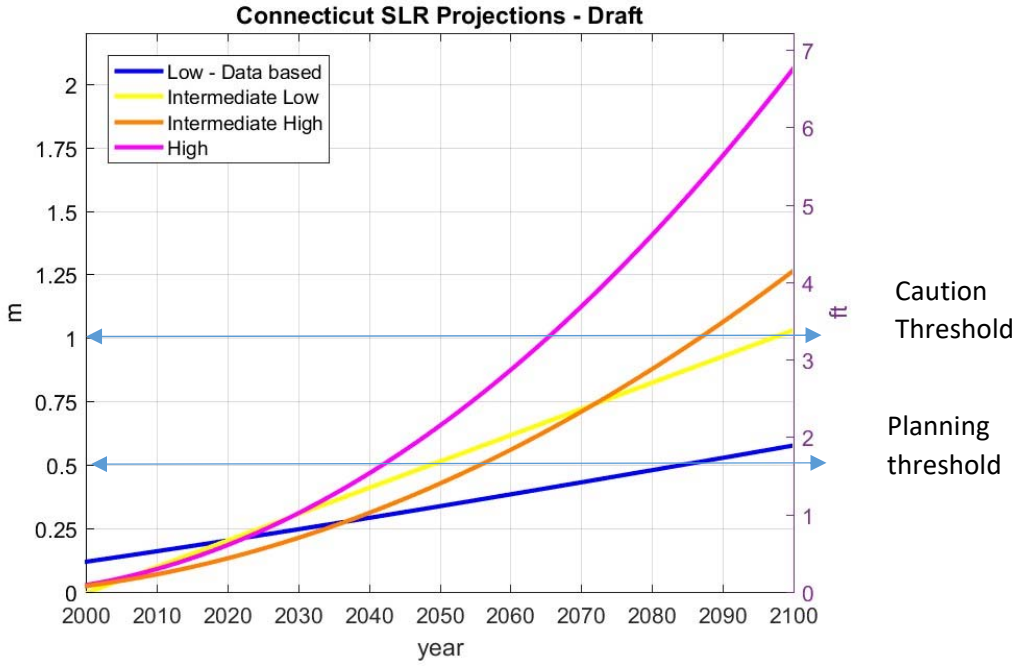


Figure 1. Sea level rise projections for Connecticut based on local tide gage observations (blue), the IPCC (2013) RCP 4.5 model simulations near Long Island Sound (yellow line), the semi-empirical models (orange line) and ice budgets (magenta line) as employed in the NOAA CPO-1 report (Parris et al., 2012).

Though we show the results of four different approaches for forecasting future annual mean sea level in Long Island Sound in Figure 1, the differences between them are not great until after mid-century. We do not expect a significant refinement in the accuracy of longer term forecasts until the character of future emissions of greenhouse gases can be predicted. We note the yellow line anticipates that emissions peak in 2040 and then fall rapidly, however, sea level late in the century is sensitive to emissions between now and 2050. We recommend that planning anticipates that sea level will be 0.5 m (1ft 8 inches) higher than the national tidal datum in Long Island Sound by 2050. It is likely that sea level will continue to increase after 2050. We recommend that global mean sea level measurements and projections be monitored and new assessments be provided to towns at decadal intervals to ensure that planning be informed by the best available science.

References

O'Donnell J., (2017) Sea Level Rise and Coastal Flood Risk in Connecticut. Draft Report to the CT Department of Energy and Environmental Protection.

Parris, A., P. Bromirski, V. Burkett, D. Cayan, M. Culver, J. Hall, R. Horton, K. Knuuti, R. Moss, J. Obeysekera, A. Sallenger, and J. Weiss (2012) Global Sea Level Rise Scenarios for the US National Climate Assessment. NOAA Tech Memo OAR CPO-1. 37 pp.

Coastal Flood Risk in Connecticut

James O'Donnell

Connecticut Institute for Resilience and Climate Adaptation
and
Department of Marine Sciences
University of Connecticut

NOAA Technical Report OAR CPO-1

GLOBAL SEA LEVEL RISE SCENARIOS FOR THE UNITED STATES NATIONAL CLIMATE ASSESSMENT

Climate Program Office (CPO)
Silver Spring, MD

Global Mean SLR Scenarios

We have very high confidence (>9 in 10 chance) that global mean sea level will rise at least 0.2 meters (8 inches) and no more than 2.0 meters (6.6 feet) by 2100.

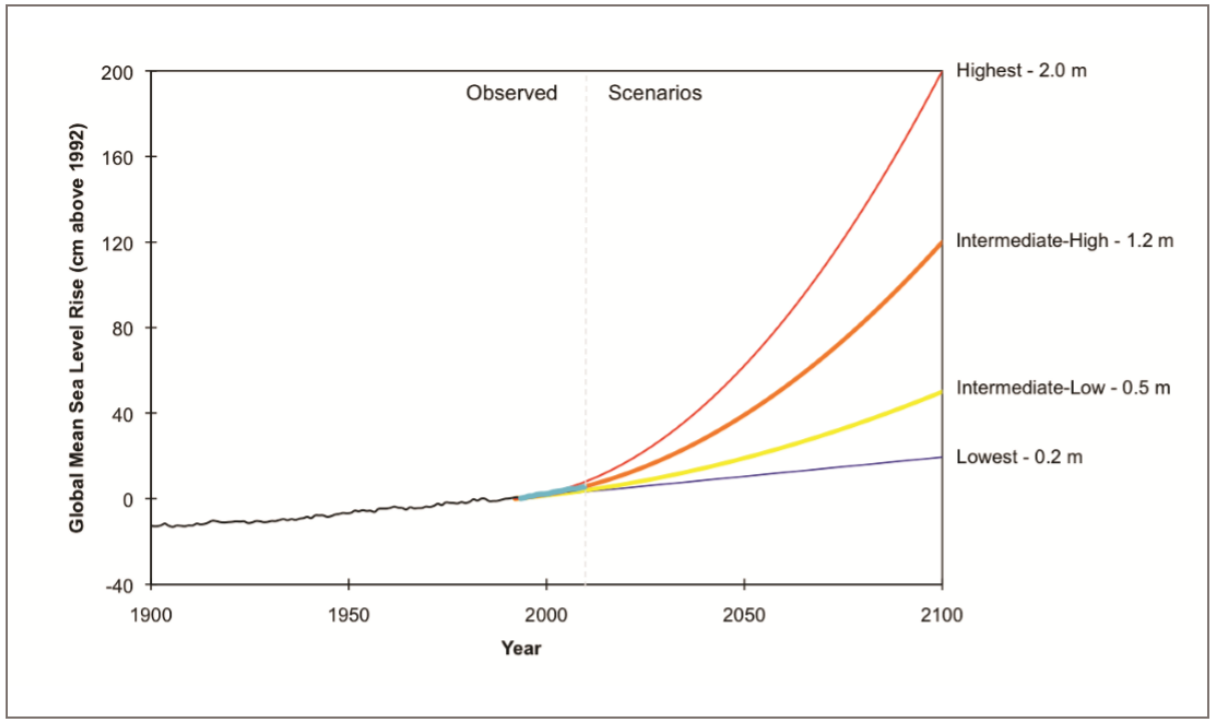


Figure ES 1. Global mean sea level rise scenarios. Present Mean Sea Level (MSL) for the US coasts is determined from the National Tidal Datum Epoch (NTDE) provided by NOAA. The NTDE is calculated using tide gauge observations from 1983 – 2001. Therefore, we use 1992, the mid-point of the NTDE, as a starting point for the projected curves. The Intermediate-High Scenario is an average of the high end of ranges of global mean SLR reported by several studies using semi-empirical approaches. The Intermediate Low Scenario is the global mean SLR projection from the IPCC AR4 at the 95% confidence interval.

Charge

In the Memorandum of Understanding between the Connecticut Department of Energy and Environmental Protection and the University of Connecticut establishing CIRCA included the direction that the institute should:

Develop a predictive tool(s) for municipalities that accounts for local conditions and establishes a mechanism for determining appropriate planning based on the sea level change scenarios published by the National Oceanic and Atmospheric Administration in Technical Report OAR CPO-1. Conduct at least one statewide workshop and provide online access to such tool(s).

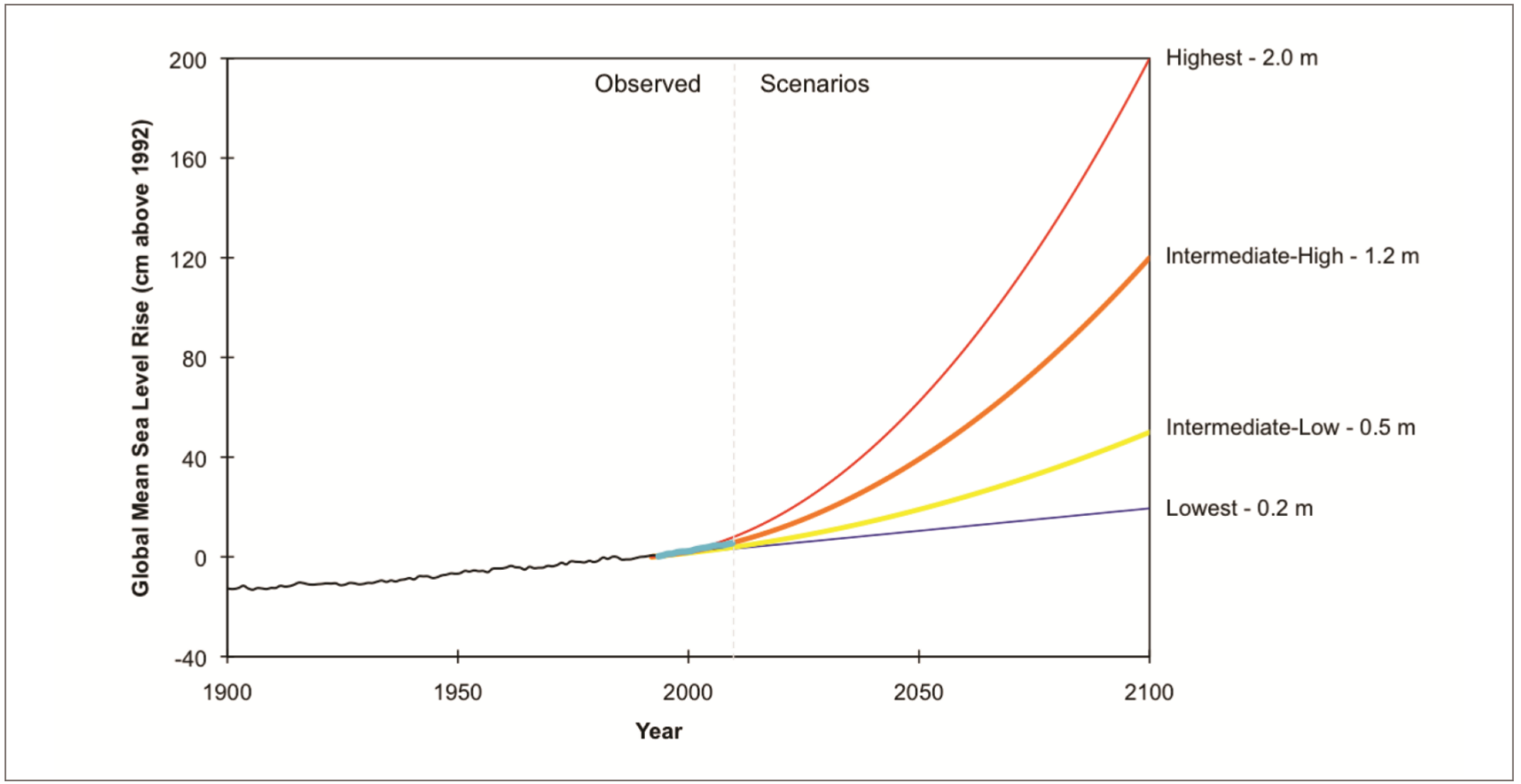


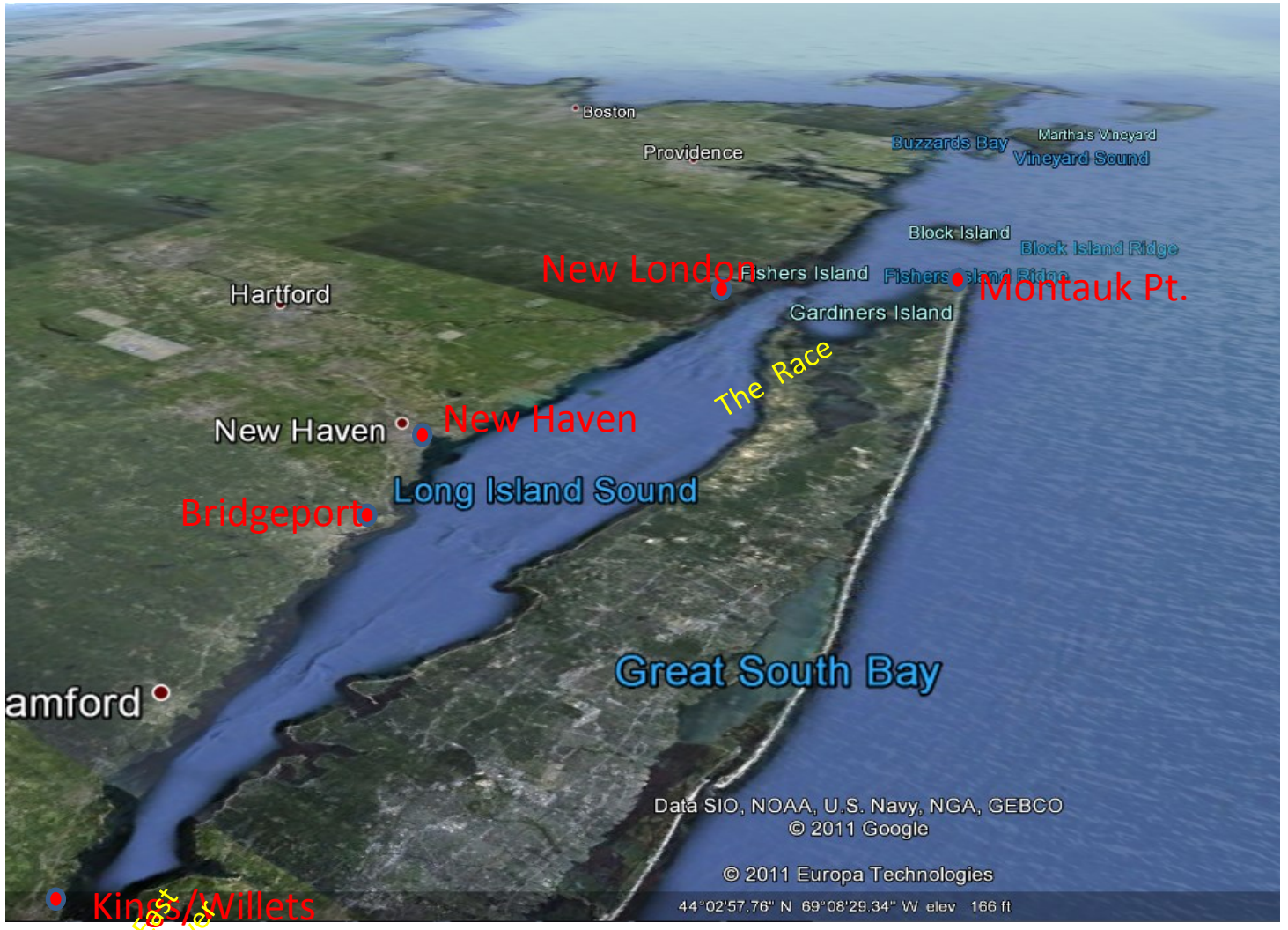
Figure 10. Global mean sea level rise scenarios. Present Mean Sea Level (MSL) for the US coasts is determined from the National Tidal Datum Epoch (NTDE) provided by NOAA. The NTDE is calculated using tide gauge observations from 1983 – 2001. Therefore, we use 1992, the mid-point of the NTDE, as a starting point for the projected curves. The Intermediate High Scenario is an average of the high end of ranges of global mean SLR reported by several studies using semi-empirical approaches. The Intermediate Low Scenario is the global mean SLR projection from the IPCC AR4 at 95% confidence interval.

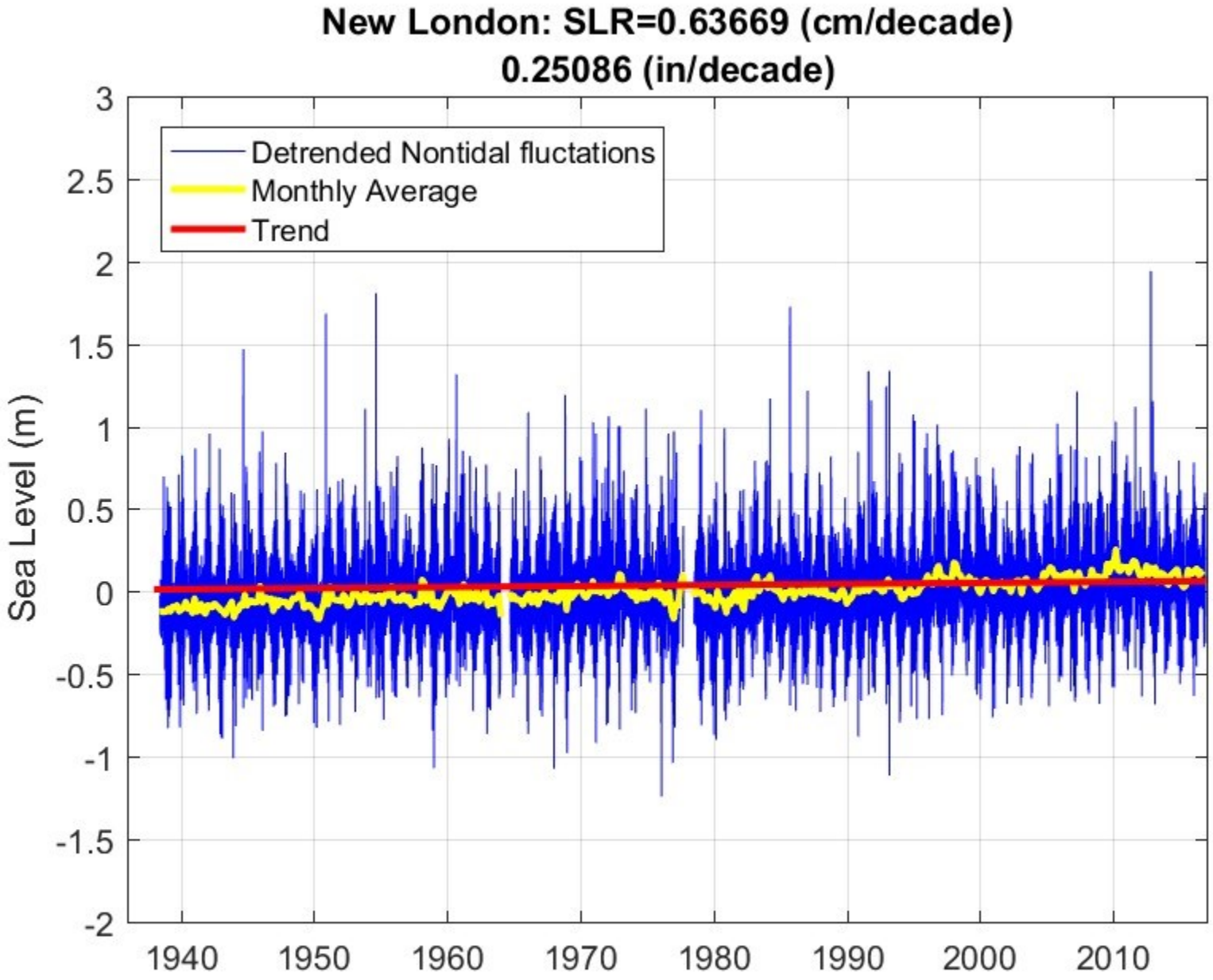
Intermediate Low

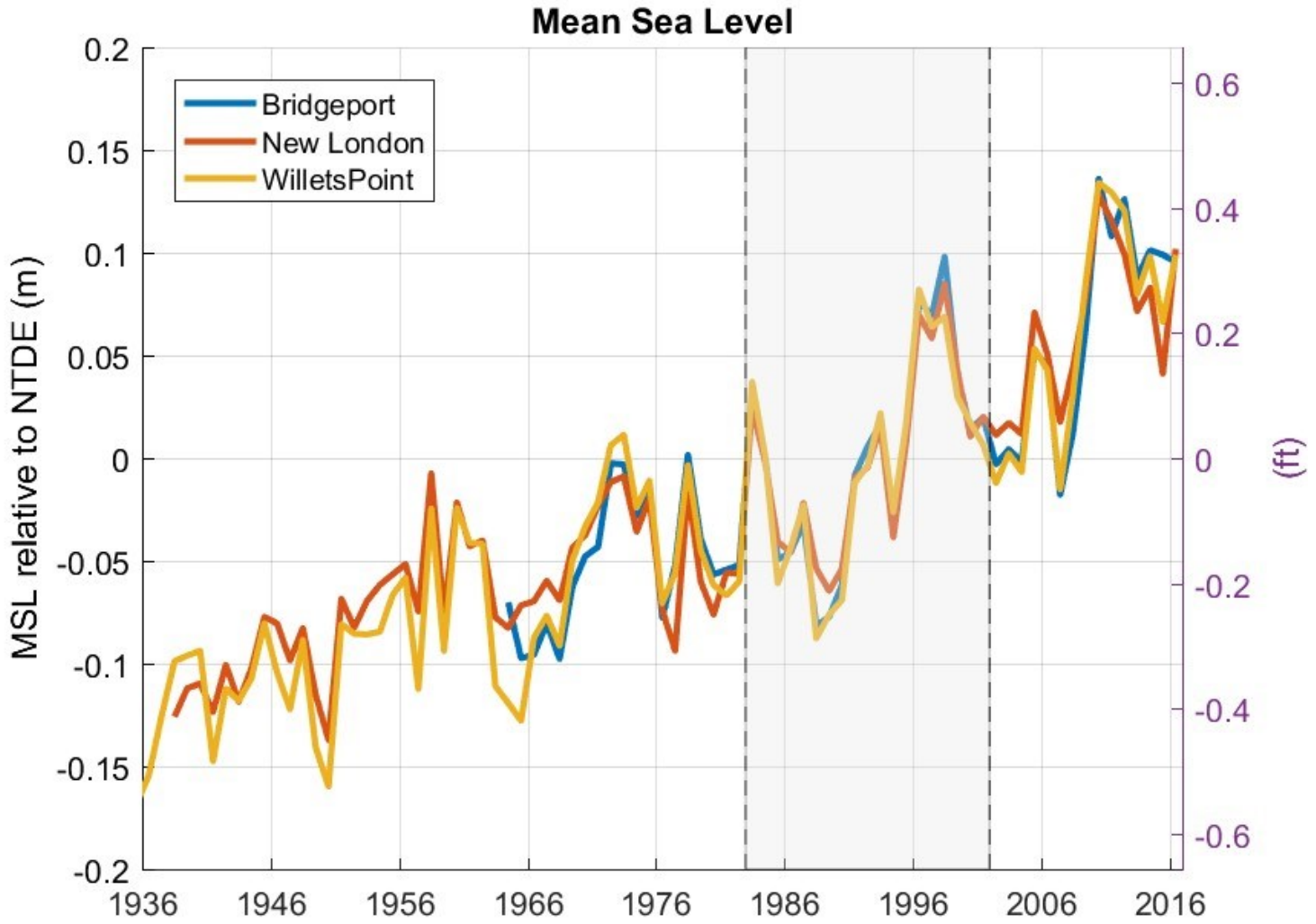
In IPCC AR4 scenario A2 the continued emission of GHGs was expected to lead to a concentration of 870 PPM by 2100 (more than twice the 2016 level) and a warming of the global average surface air temperature of 3.5 C between 2000 and 2100 (IPCC, 2007). The 5-95% range of the predicted rise in global mean sea level between the decades 1980 to 1999 and 2090 to 2099 was 0.23 to 0.51 m (or 0.75 to 1.67 ft).

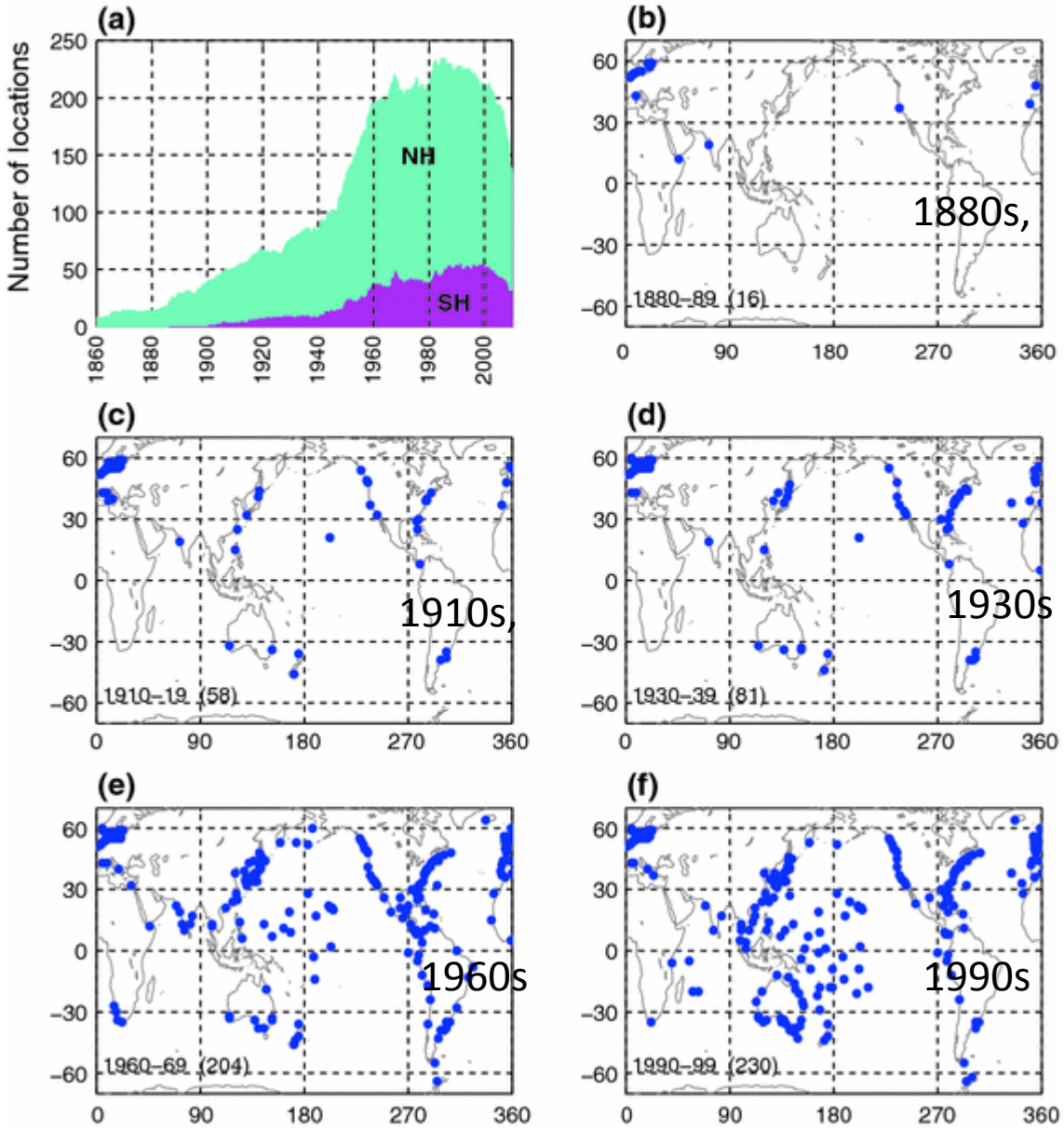
Updates

- Review of Observations in CT up to 2016
- Review of IPCC (2013) Model Predictions near CT
- Model of Mean Sea Level variations in LIS
- Summary


Boston
Providence
Buzzards Bay
Martha's Vineyard
Vineyard Sound
Block Island
Block Island Ridge
New London
Fishers Island
Fishers Island Ridge
Montauk Pt.
Hartford
Gardiners Island
The Race
New Haven
New Haven
Long Island Sound
Bridgeport
Great South Bay
amford
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
© 2011 Google
© 2011 Europa Technologies
44°02'57.76" N 69°08'29.34" W elev 166 ft
Kings/Willets Pt.
East River


New London: SLR=0.63669 (cm/decade)
0.25086 (in/decade)
Detrended Nontidal fluctations
Monthly Average
Trend
Sea Level (m)
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
1940
1950
1960
1970
1980
1990
2000
2010

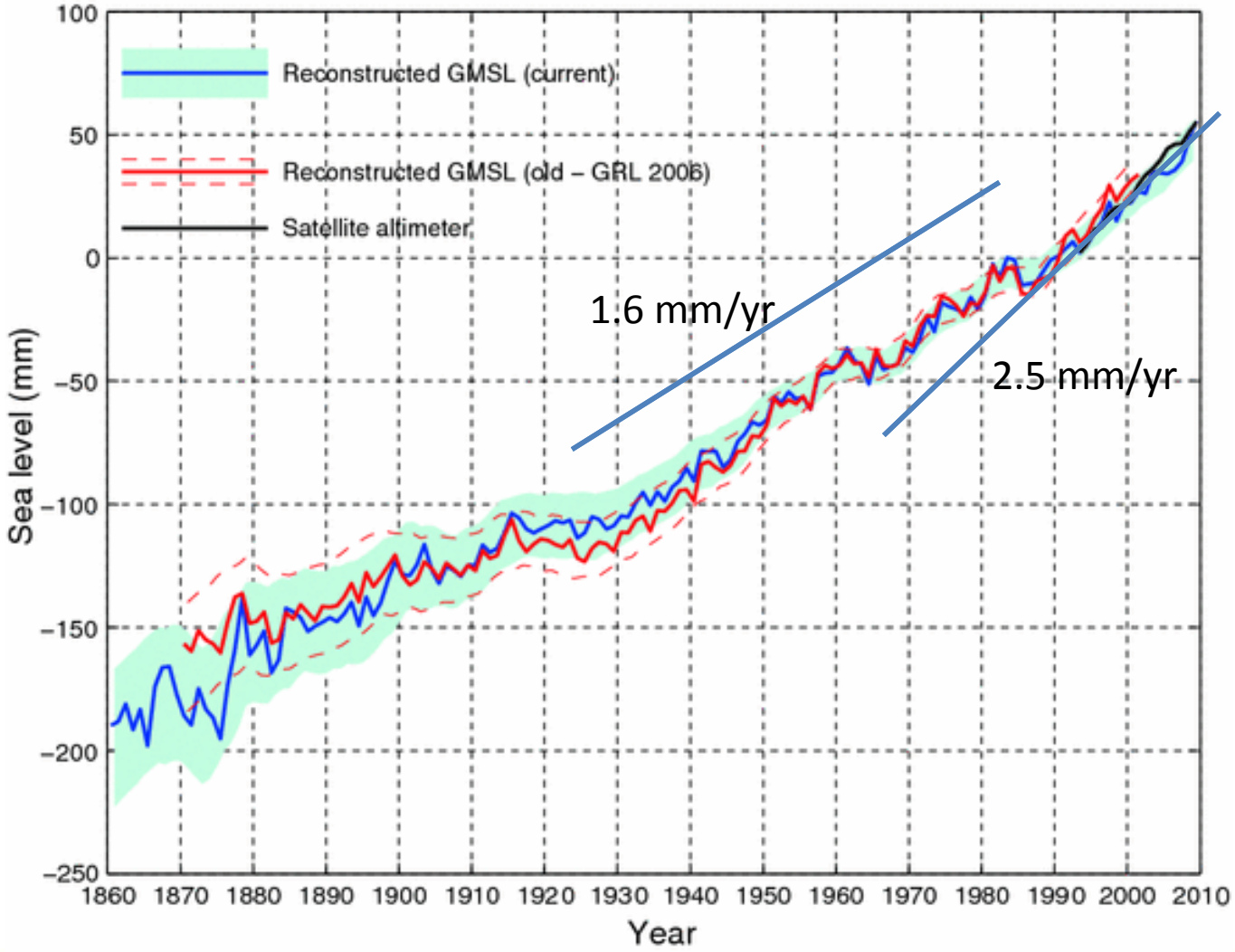

Mean Sea Level
Bridgeport
New London
WilletsPoint
MSL relative to NTDE (m)
(ft)
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
1936
1946
1956
1966
1976
1986
1996
2006
2016

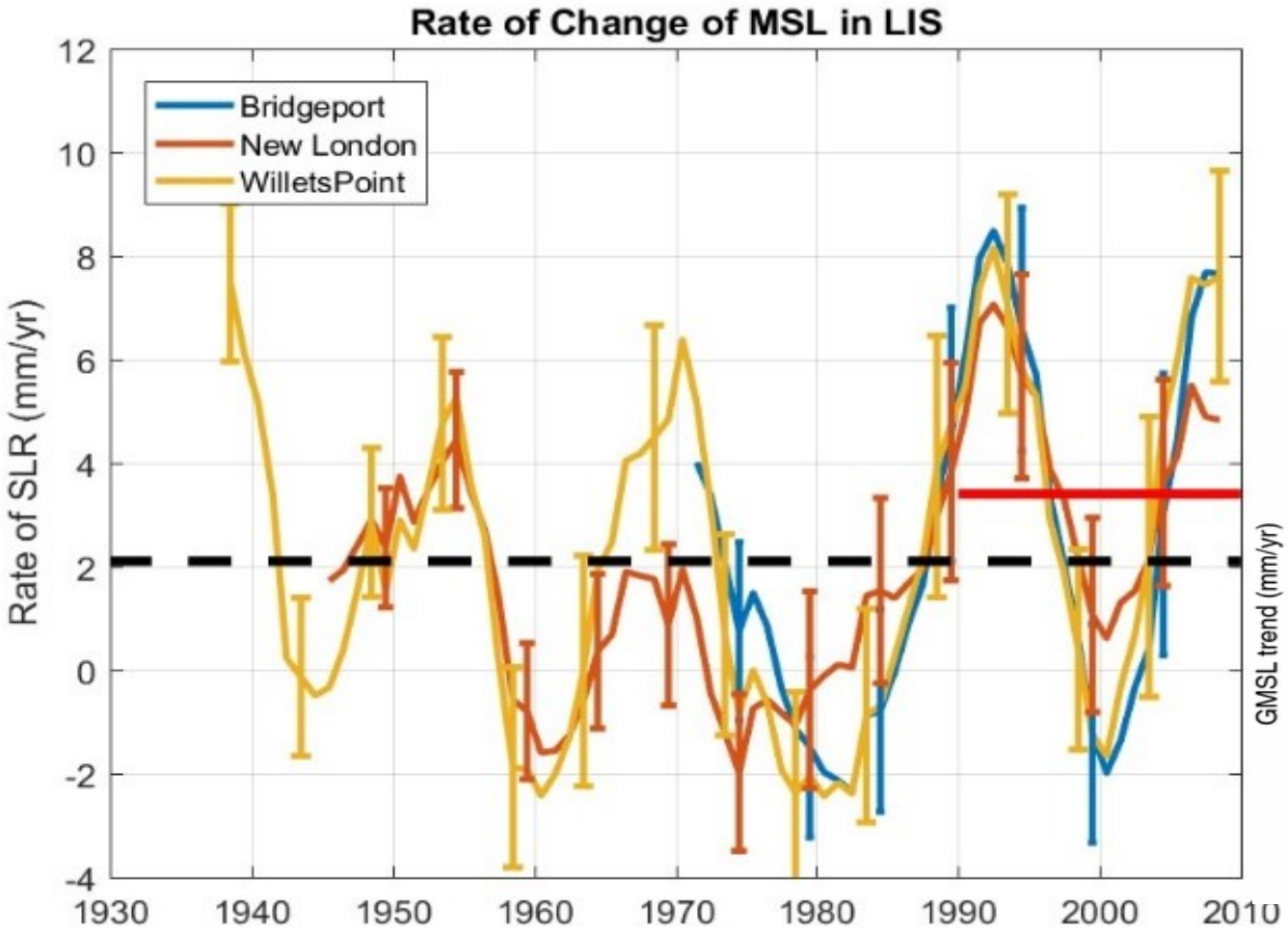


Church and White, 2011

- The number and distribution of sea-level records available for the reconstruction. **a** The number of locations for the globe and the northern and southern hemispheres. **b**–**f** indicate the distribution of gauges in the 1880s, 1910s, 1930s, 1960s and 1990s. The locations indicated have at least 60 months of data in the decade and the number of records are indicated in *brackets*

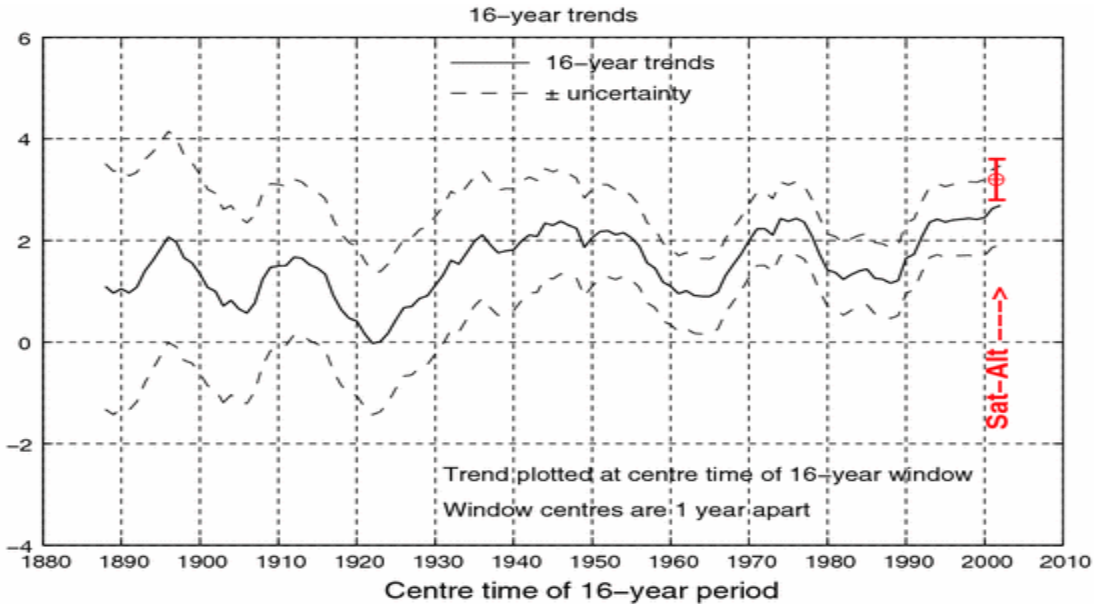
Church and White (2011) estimated the rate of sea level increase between 1900 and 2009 as 1.7 ± 0.2 mm/yr and 1.9 ± 0.4 mm/yr from 1961 to 2009



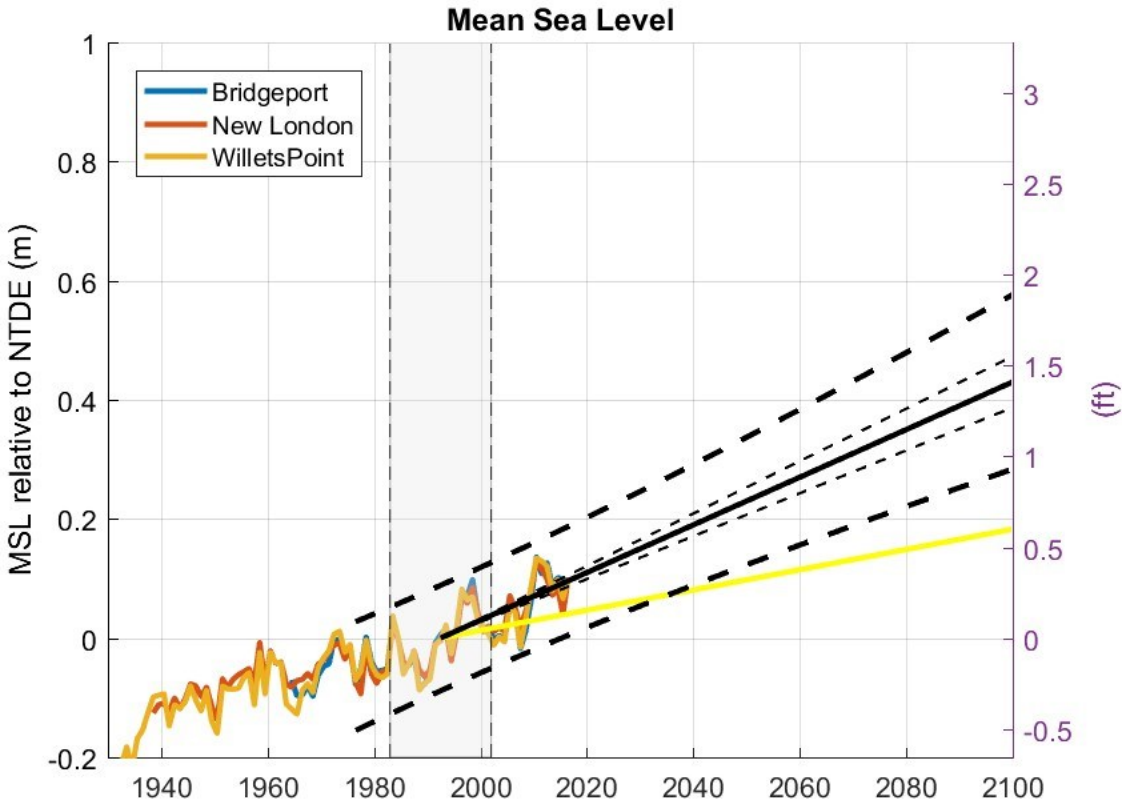


LIS Sea Level trends are in-line with the estimates of GMSL Rise when VLM (0.7mm/yr) is taken into account.

The most recent 15 years has been above the long term mean. The rate is equivalent to 4 mm/yr in LIS.



Summary of Results



Year	Mean (m)	Upper 95% (m)	NOAA (m)	Mean (ft)	Upper 95% (ft)	NOAA (ft)
2020	0.15	0.25	0.06	0.5	0.81	0.21
2030	0.19	0.29	0.08	0.63	0.96	0.27
2040	0.23	0.34	0.10	0.76	1.11	0.32
2050	0.27	0.39	0.12	0.89	1.27	0.38
2070	0.31	0.43	0.13	1.02	1.42	0.43
2080	0.35	0.48	0.15	1.15	1.58	0.49
2090	0.39	0.53	0.17	1.29	1.74	0.55
2100	0.43	0.58	0.18	1.42	1.9	0.60

http://cses.washington.edu/db/pdf/snoveretalsok2013sec3.pdf

Table 2 Overview of representative concentration pathways (RCPs)

	Description[a]	Publication—IA Model
RCP8.5	Rising radiative forcing pathway leading to 8.5 W/m^2 (~1370 ppm CO_2 eq) by 2100.	(Riahi et al. 2007)—MESSAGE
RCP6	Stabilization without overshoot pathway to 6 W/m^2 (~850 ppm CO_2 eq) at stabilization after 2100	(Fujino et al. 2006; Hijioka et al. 2008)—AIM
RCP4.5	Stabilization without overshoot pathway to 4.5 W/m^2 (~650 ppm CO_2 eq) at stabilization after 2100	(Clarke et al. 2007; Smith and Wigley 2006; Wise et al. 2009)—GCAM
RCP2.6	Peak in radiative forcing at ~3 W/m^2 (~490 ppm CO_2 eq) before 2100 and then decline (the selected pathway declines to 2.6 W/m^2 by 2100).	(Van Vuuren et al., 2007a; van Vuuren et al. 2006)—IMAGE

[a] Approximate radiative forcing levels were defined as ±5% of the stated level in W/m^2 relative to pre-industrial levels. Radiative forcing values include the net effect of all anthropogenic GHGs and other forcing agents

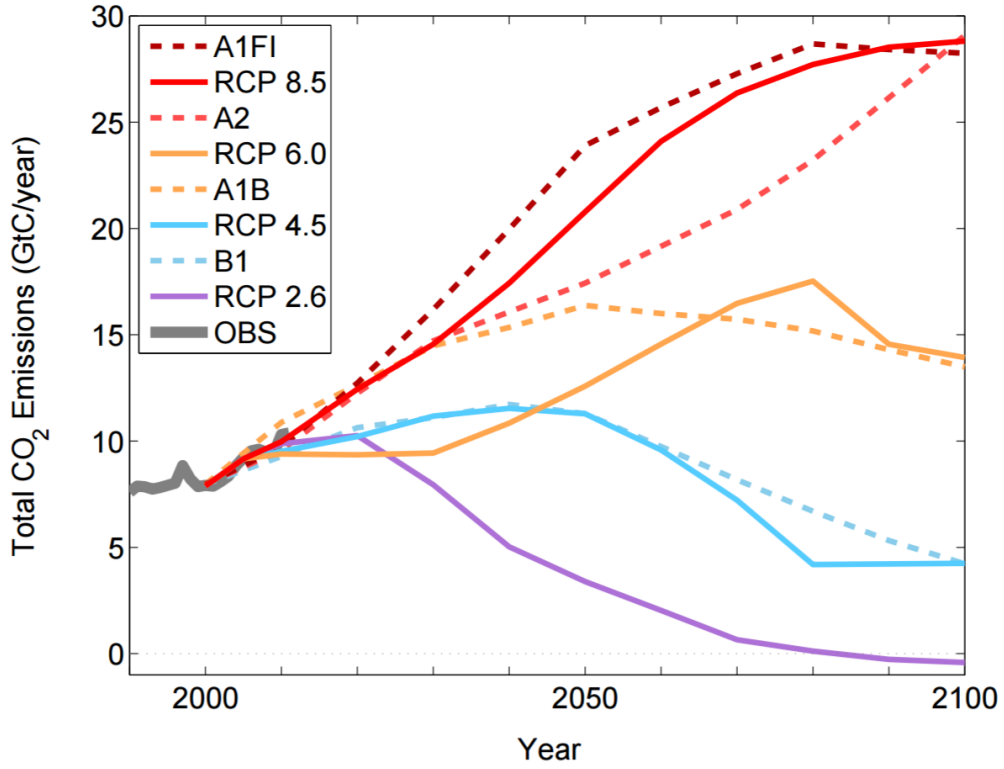
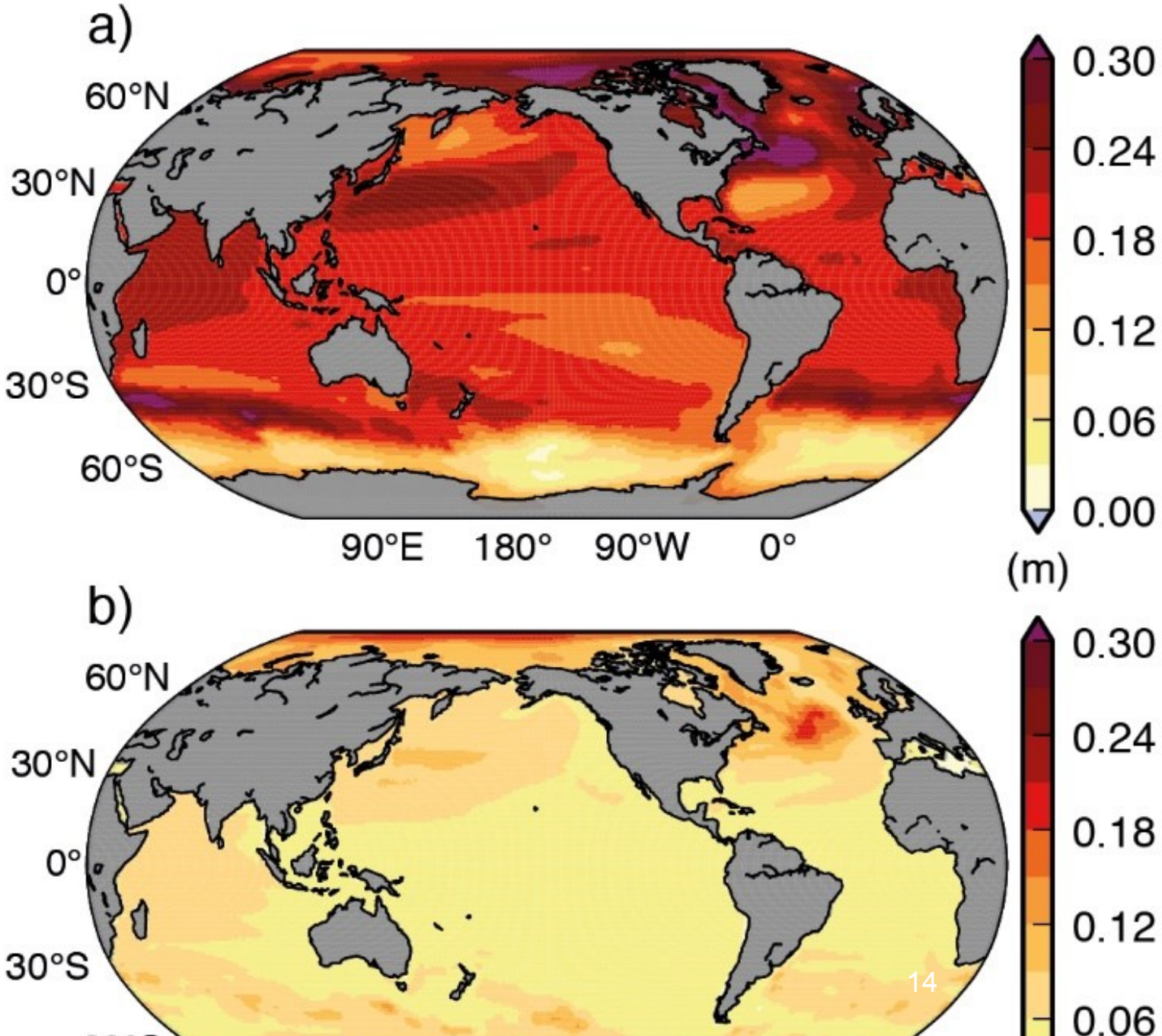


Figure 3-1. Future greenhouse gas scenarios range from aggressive reductions to large increases in greenhouse gas emissions. The figure shows annual total CO_2 emissions in Gigatons of Carbon (GtC). Though not the only greenhouse gas, CO_2 emissions are the dominant driver of global warming. The old greenhouse gas scenarios (dashed lines) have close analogs in the new scenarios (solid lines) – similar scenarios are plotted using similar colors. Actual emissions for 1990-2010 are shown in grey. Year-to-year emissions of greenhouse gases, shown in this graph, accumulate in the atmosphere, causing CO_2 concentrations to rise, as shown in Figure 3-2. Scenarios with higher emissions cause atmospheric concentrations to rise rapidly, while lower scenarios cause concentrations to rise more slowly or decline. *Figure source: Climate Impacts Group, based on data used in IPCC 2007 and IPCC 2013 (http://tntcat.iiasa.ac.at:8787/RcpDb[3] and http://sedac.ciesin.columbia.edu/ddc/sres/[4]).*

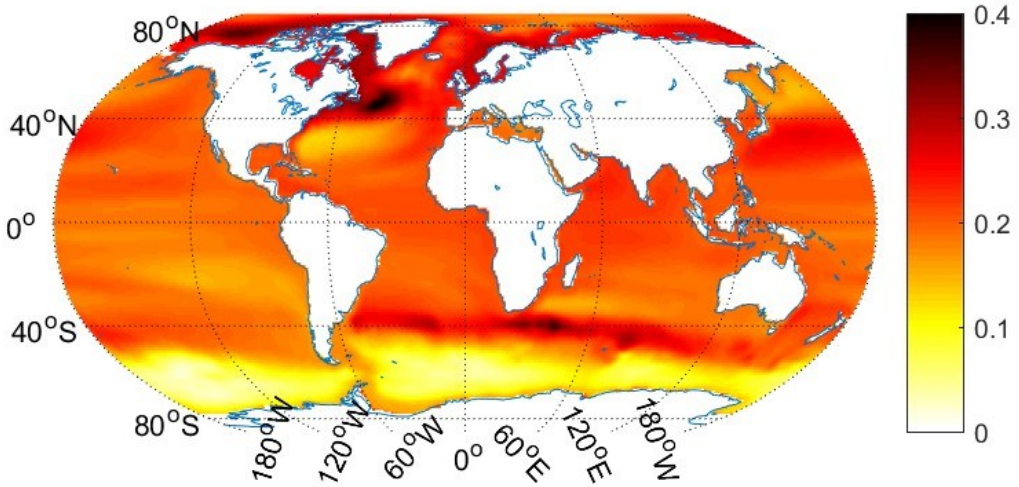


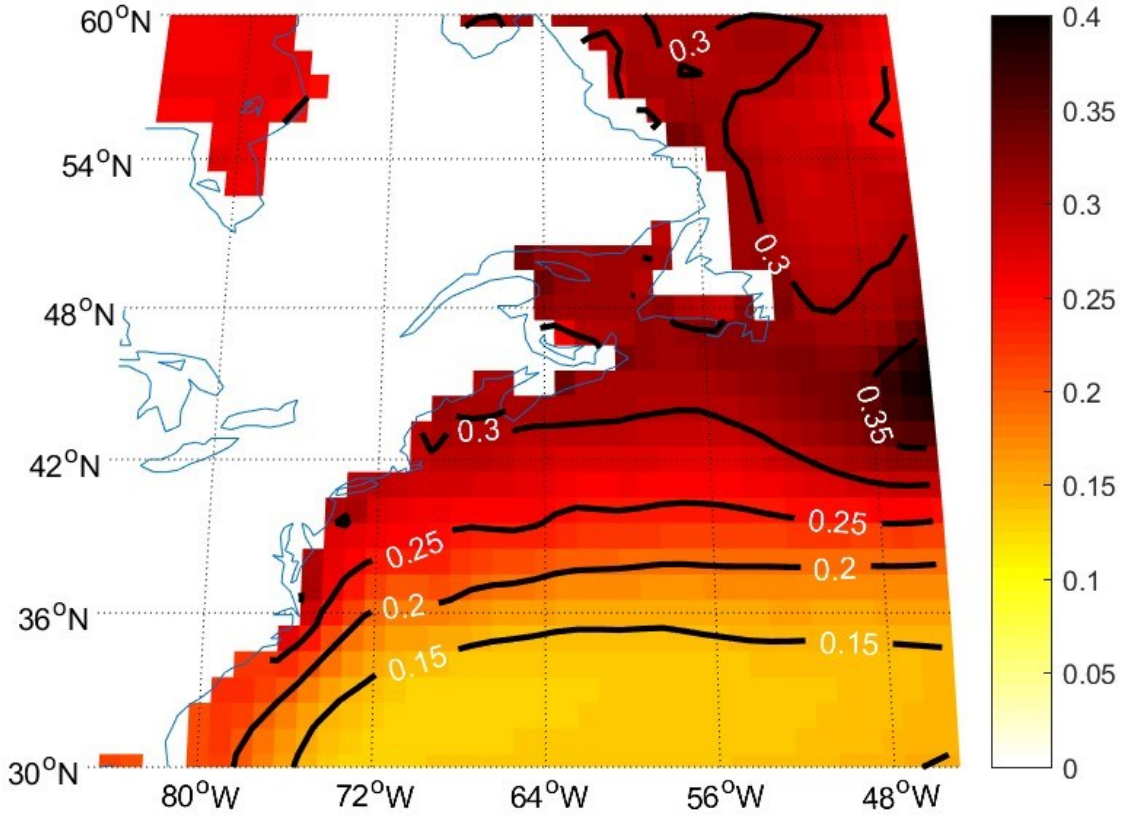
Sea Level change by 2100 in RCP4.5; from IPCC (2013)

CIRCA
Connecticut Institute for Resilience and Climate Adaptation

CONNECTICUT ENERGY ENVIRONMENT

Change in mean MSL at 2100 in RCP 4.5





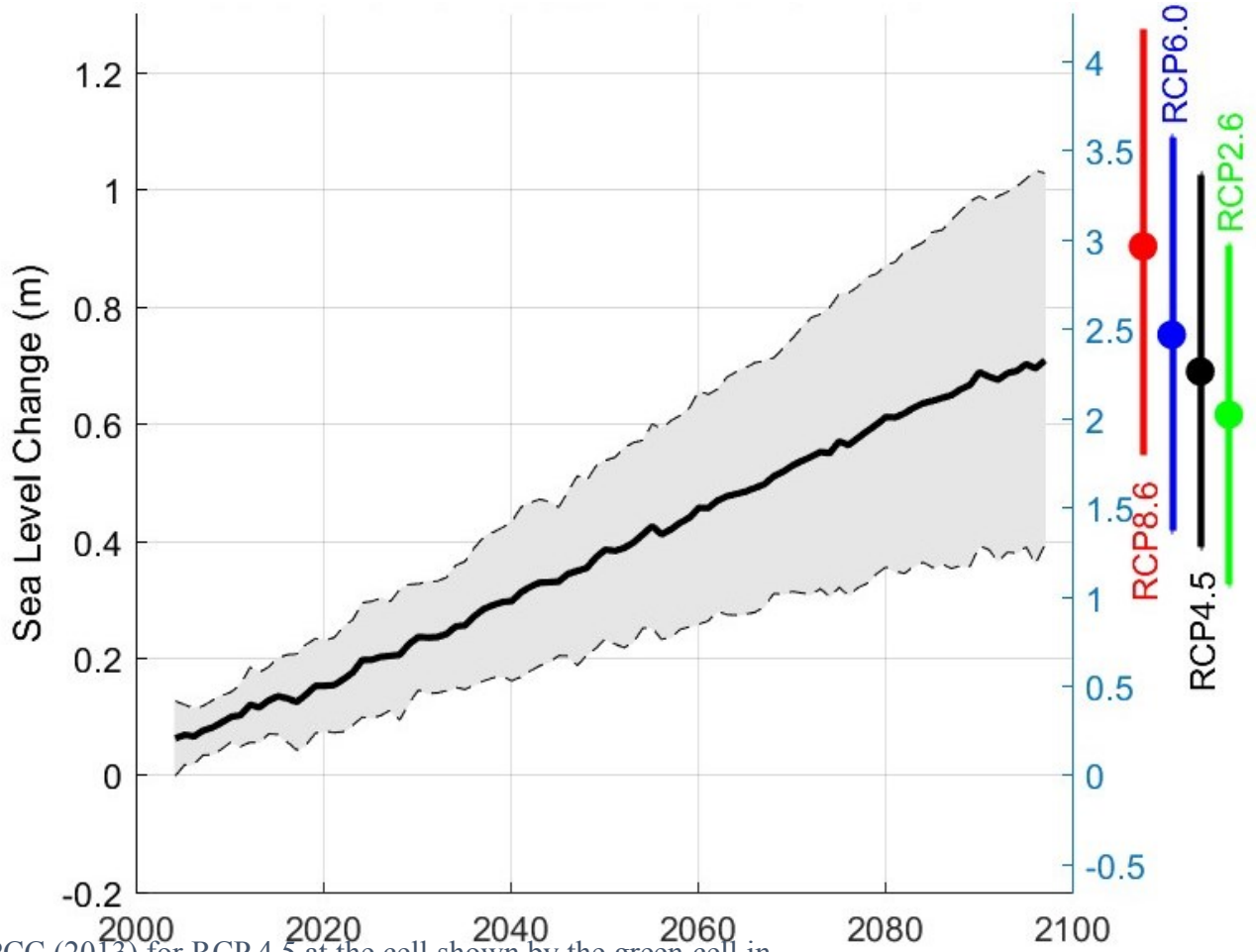


Figure 12. Sea level projection from IPCC (2013) for RCP 4.5 at the cell shown by the green cell in Figure 11 with the rate of vertical land motion added are shown by the solid black line. The 5 to 95% confidence interval is represented by the grey stripe. On the right of the figure the average sea level, and 5 to 95% range, for the interval 2090 and 2100 is shown for the 4 RCPs in IPCC (2013).

- SNE is on High side of all intervals
- SNE has larger variance than the global mean

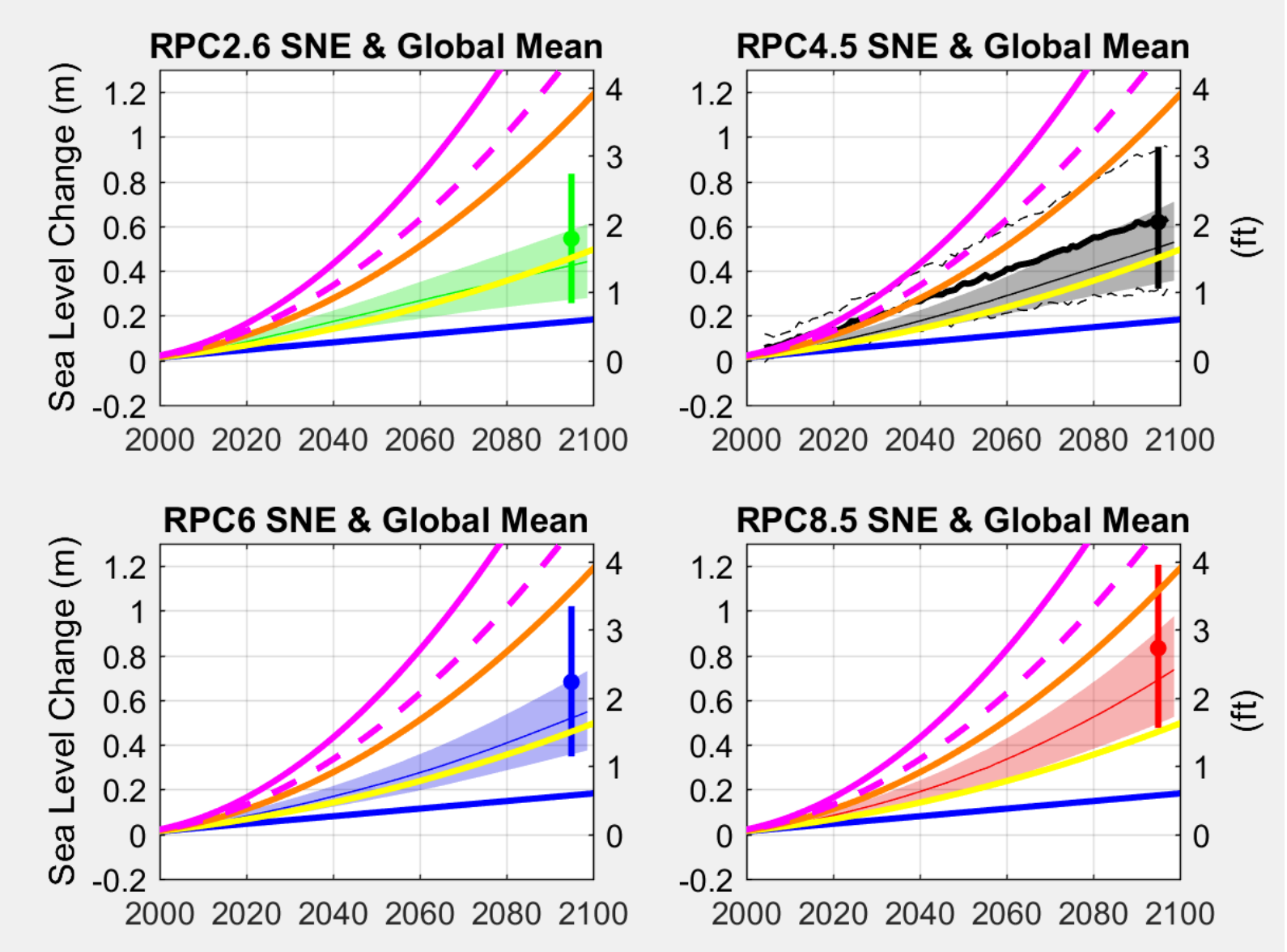
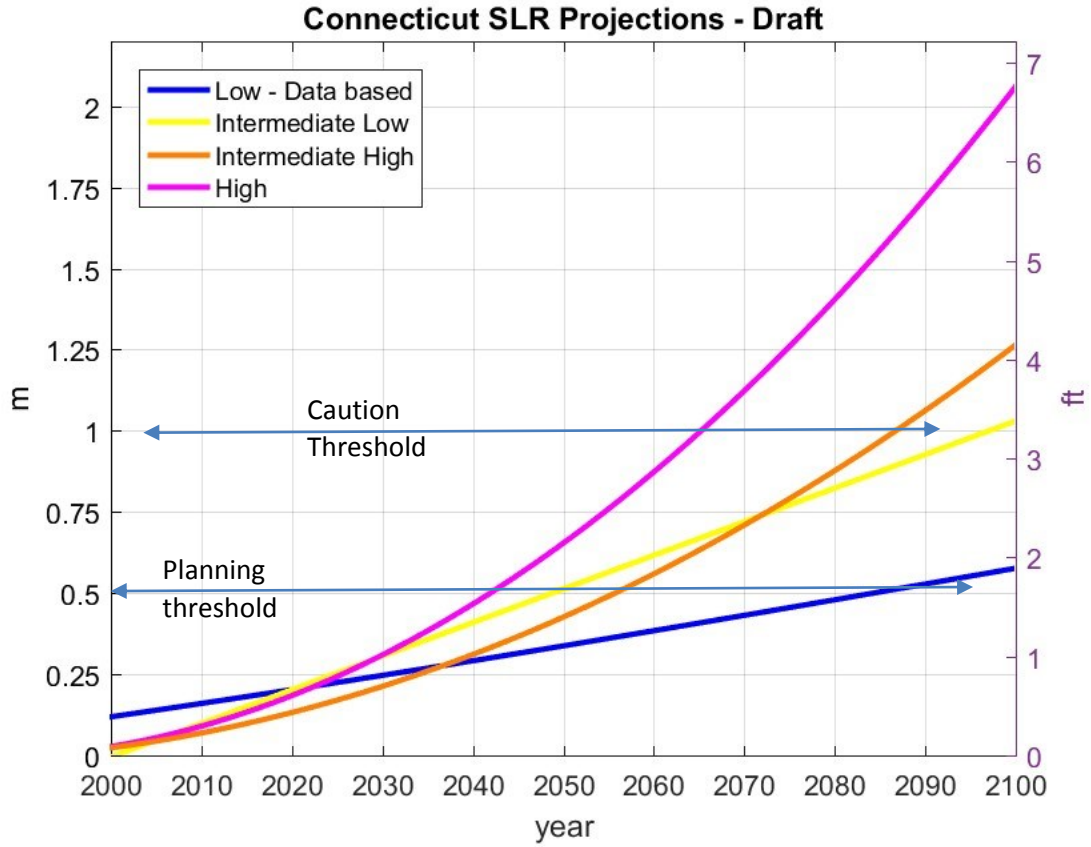
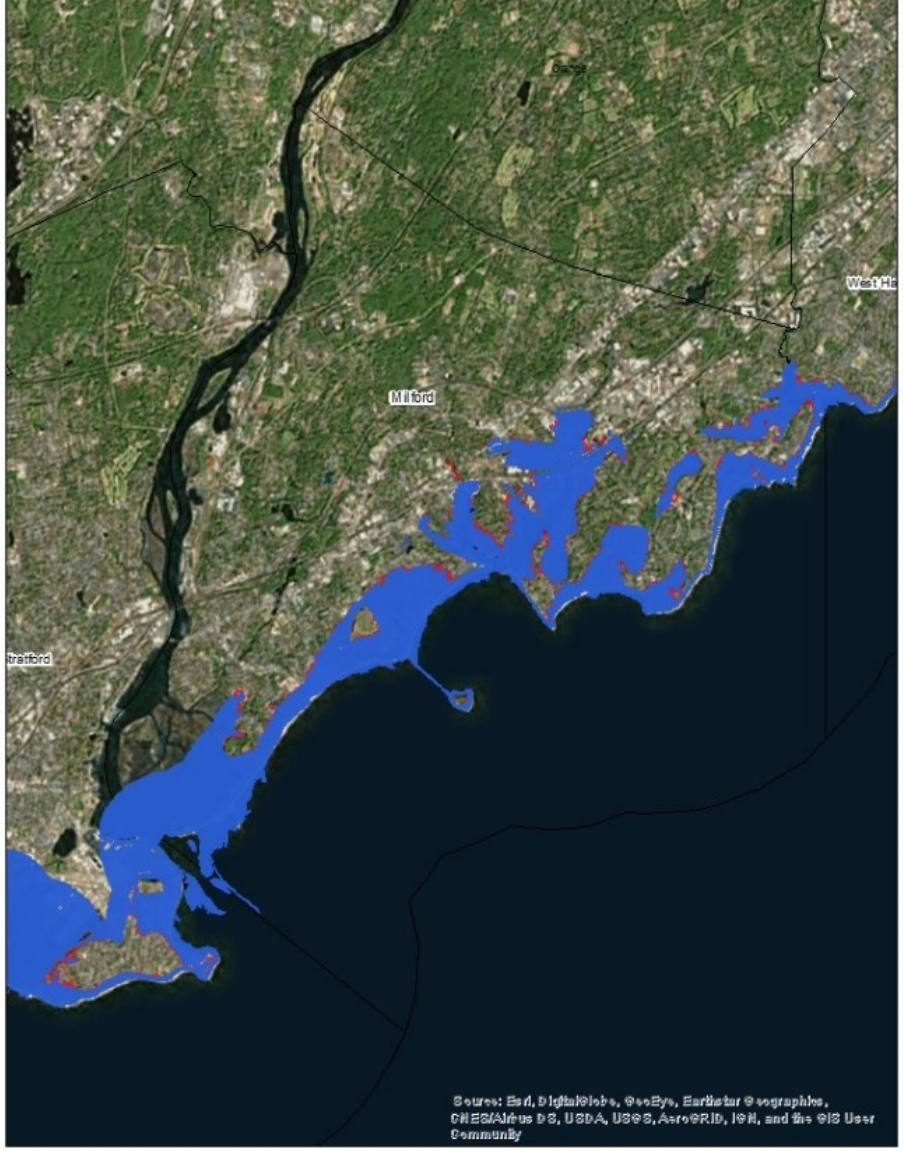


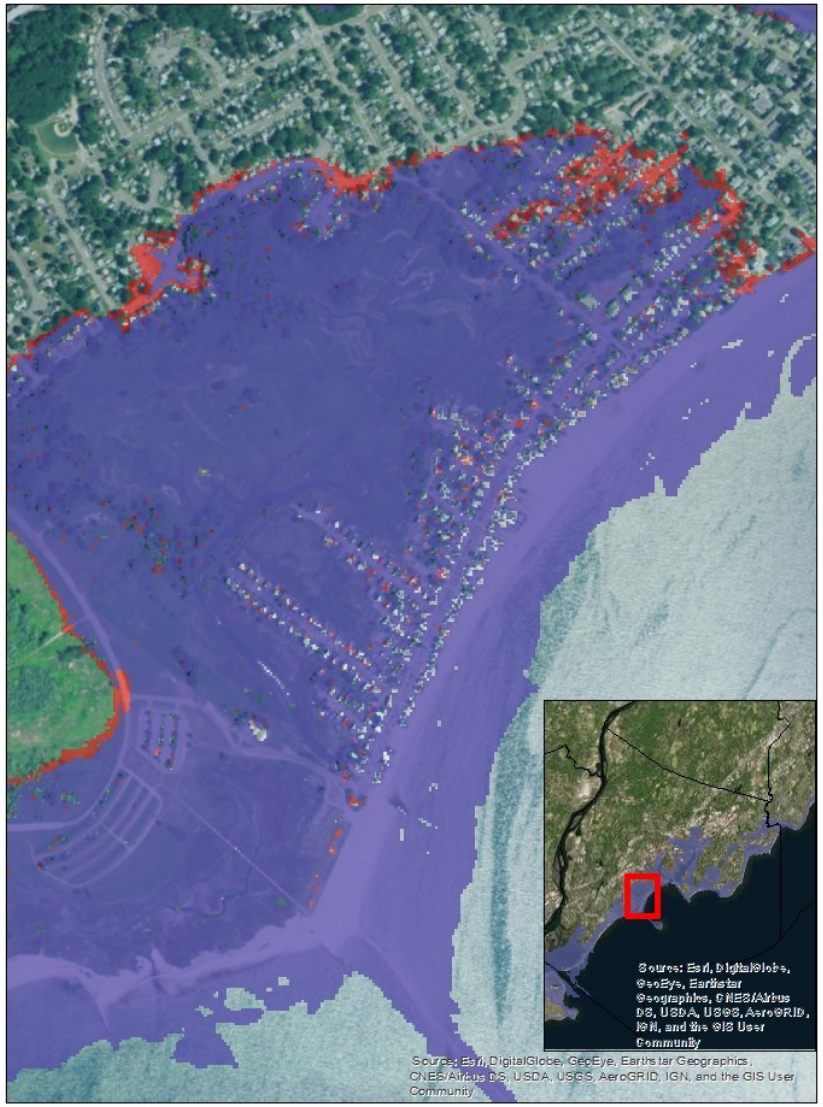
Figure 1. Sea level rise projections for Connecticut based on local tide gage observations (blue), the IPCC (2013) RPC 4.5 model simulations near Long Island Sound (yellow line), the semi-empirical model predictions are in orange and the magenta shows the ice mass balance projections.



Summary

- CT is special (location and oceanography, weather, geology). Consequently,
- We will get more SLR than other areas, and the predictions have prediction intervals.
- We should plan for 50 cm (almost 2 ft) increase by 2050 and alert people that in the future higher thresholds may be required.
- The increase in the area impacted will not be very large because of the geology of CT.
- We should institute a decadal review and update to ensure new science is incorporated in the planning to minimize costs and maximize safety.
- Since the coastal areas are flat small increases in MSL will cause a large increase in flood risk. The geometry and orientation of the Sound causes tides and surge to be larger in the west of CT so the impact of SLR on the flood risk is higher in the east.


Milford
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

SCHEDULE 2

REVISED DRAFT

CONSERVATION & DEVELOPMENT POLICIES: THE PLAN FOR CONNECTICUT

2018-2023

Prepared by the Office of Policy and Management on May 12, 2017

In accordance with Connecticut General Statutes Section 16a-28(b)

Draft Conservation & Development Policies: The Plan for Connecticut

Table of Contents

Misc. cover photo credits:

Aerial image of The Last Green Valley in Northeastern Connecticut – www.glsweetnam.com

Photo of Ed Platt Farm in Southbury, CT – Don Antilla

Photo of Wauregan Hotel in Norwich, CT – Partnership for Strong Communities

Photo of ArtSpace rental apartments in Windham, CT – Susan Westa

GROWTH MANAGEMENT PRINCIPLE #4

Conserve and Restore the Natural Environment, Cultural and Historical Resources, and Traditional Rural Lands

It is widely recognized that Connecticut's natural, cultural and historical resources, along with its rural landscapes, have intrinsic values which contribute to the state's high quality of life. Less obvious are the functional values that these resources provide, such as storm water management, flood control, oxygen production and carbon storage, and the filtration and purification of water for human consumption and habitat preservation. Similar to the need to maintain the physical infrastructure of cities and towns, there is a corresponding need to strategically invest in the state's natural infrastructure, through preservation and maintenance of multi-functional land, when it can cost-effectively perform or supplement the types of functions performed by human-engineered systems.

Graywall Farms in Lebanon, CT. Photo Credit: Robin Chesmer

"Too often communities focus on developing land versus preserving agriculture. Both have their pluses, but only agriculture provides sustainable value in terms of the environment, municipal finance, aesthetics, and food security, which can be appreciated by everyone."

—Philip Chester, Lebanon Town Planner

Furthermore, a number of Connecticut industries, such as agriculture and aquaculture, outdoor recreation, and culture and tourism, are important contributors to the state economy and to the communities in which they are based. Since the economic value of such industries is oftentimes derived from the natural and cultural resources upon which they are based, it is critical that public and private interests take a strategic and coordinated approach to protecting and/or managing the long-term viability of both the conservation and development functions of such resources.

Rural communities in Connecticut, which typically lack urban-scale infrastructure, face especially difficult challenges to grow in a manner that is consistent with their rural character. While numerous buildings in Connecticut's historic villages are in need of stabilization and mothballing to preserve options for their future reuse, such communities oftentimes perceive their growth prospects to be limited to strip commercial development along rural highways.

While the conservation of open space, historic villages, scenic roads, and farmland can have a net positive impact on the local tax base and the region's quality of life, there may also be instances where towns want to plan for the complementary expansion of existing, or the development of new, village-scale mixed use centers. Cluster development techniques, when combined with properly installed and maintained decentralized water, wastewater and/or stormwater systems, can accommodate such growth without the need for publicly subsidized expansions of infrastructure.

State Agency Policies:

Applicable Principles of Smart Growth	
Integrated Planning or investment	A
Efficiencies and coordination of services	B
Redevelopment of existing infrastructure	C
Transportation choices	D
Development of housing affordable to households of varying income	E
Concentrated, mixed use, mixed income development	F
Conservation and protection of natural resources	G

4.1 PROTECT permanently preserved open space areas, *Connecticut Heritage Areas*, and archaeological areas of regional and statewide significance;

4.2 LIMIT improvements to permanently protected open space areas to those that are consistent with the long-term preservation and appropriate public enjoyment of the natural resource and open space values of the site;

4.3 EXPAND the state's open space and greenway network through the acquisition and maintenance of important multi-functional land and other priorities identified in the State's Open Space Plan (i.e., Green Plan);

4.4 SEEK TO AVOID activities that could negatively affect rare or unique ecological communities and *natural areas*, including habitats of endangered, threatened and special concern species, other critical wildlife habitats identified in the Connecticut Wildlife Action Plan, river and stream corridors, aquifers, ridgelines, large forest areas, highland areas, coastal marsh migration areas, and Long Island Sound;

4.5 ENCOURAGE collaborative ventures with municipalities, private non-profit land conservation organizations and other entities to provide a system of appropriately preserved and managed natural areas and resources that allow for a diversity of well-functioning habitats and the sustainable use of resources;

4.6 SEEK TO ACHIEVE no-net-loss of wetlands through development planning that: 1) avoids wetlands, whenever possible; 2) minimizes intrusions into wetlands when impacts are unavoidable; 3) mitigates any resulting impacts through wetland enhancement or creation; and 4) encourages ongoing maintenance of functional wetlands and buffer areas.

4.7 REVITALIZE rural villages and main streets by promoting the rehabilitation and appropriate reuse of historic facilities, such as former mills, to allow a concentration of higher density or multiple use development where practical and consistent with historic character;

4.8 UTILIZE the state's renewable power generation potential to the extent compatible with state goals for environmental protection, and minimize potential impacts to rural character and agricultural and scenic resources when siting new power generation facilities and/or transmission infrastructure.

4.9 ENCOURAGE municipalities to build capacity and commitment for protecting the *working lands* and cultural resources that are important to the community;

4.10 PROMOTE agricultural businesses and supportive industries that are vital to the local and regional economy, preserve prime farmland through the acquisition of development rights, and minimize the loss or conversion of agricultural lands by state-sponsored development actions when avoidance of such lands is not practical;

4.11 PROMOTE Connecticut's commercial and recreational fishing and aquaculture industries consistent with marine productive capacities and environmental protections;

4.12 UTILIZE the landscape to the extent practical and incorporate sound stormwater management design, such as low impact development techniques, in existing and new development to maintain or restore natural hydrologic processes and to help meet or exceed state and federal water quality standards, so that the state's *waters* can support their myriad functions and uses;

4.13 MANAGE water resource conflicts by balancing the competing needs of water for human consumption, waste assimilation, habitat sustainability, recreation, power production, agriculture and transporting people and goods;

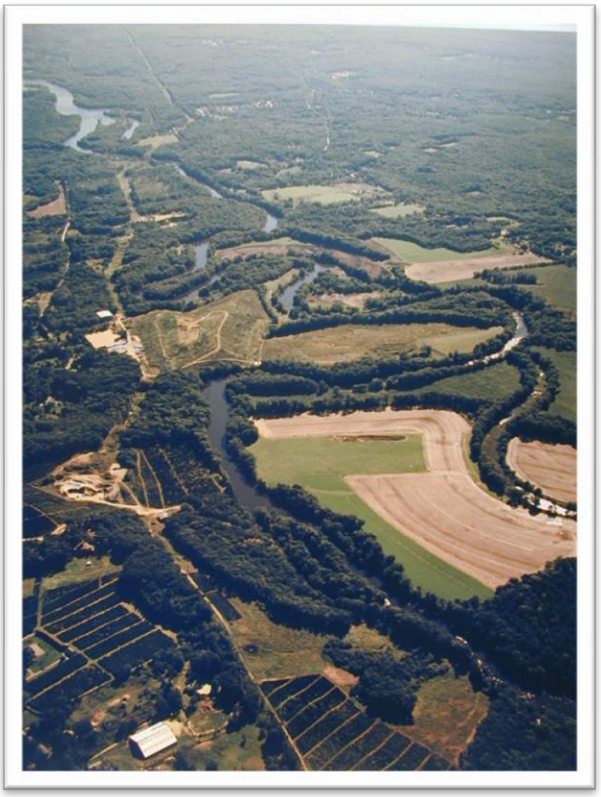
4.14 RELY upon the capacity of the land, to the extent possible, to provide drinking water and wastewater disposal needs beyond the limits of the existing service area, and comprehensively manage decentralized sewage and water systems to ensure long term viability of sewage disposal and water supply. Support the introduction or expansion of public water and/or sewer services or alternative on-site wastewater treatment systems only when there is a demonstrated environmental, public health, public safety, economic, social, or general welfare concern, and then introduce such services only at a scale which responds to the existing need without serving as an attraction to more extensive development;

4.15 MINIMIZE the siting of new infrastructure and development in coastal areas prone to erosion and inundation from sea level rise or storms, as anticipated in sea level change scenarios published by the National Oceanic and Atmospheric Administration, ensure that coastal hazards are accounted for when considering options for the replacement, expansion, or reduction of existing infrastructure under Policy 1.1, and otherwise limit development activities within coastal areas to those consistent with statutory goals and policies set forth in the Connecticut Coastal Management Act;

4.16 PROTECT the ecological, scenic and recreational values of lakes, rivers and streams by promoting compatible land uses and management practices in the vicinity of these resources;

4.17 PROTECT, MAINTAIN AND RESTORE the chemical, physical, and biological integrity of surface waters to ensure that existing and designated uses are maintained; and

4.18 PROMOTE innovative land conservation and banking practices that further local, regional and state conservation and development objectives, and minimize the need to expand infrastructure to support new development in rural areas.



"The Last Green Valley" in Northeastern CT
Photo Credit: www.glsweetnam.com

"The forest is producing oxygen. It's cleaning the air. It's purifying the water. You try to explain to people that this is a huge natural machine that is working for you, and that we have to invest in it because that's what we do – we invest in infrastructure."

—David Foster, Director of the Harvard Forest, excerpt from "The Working Forest"

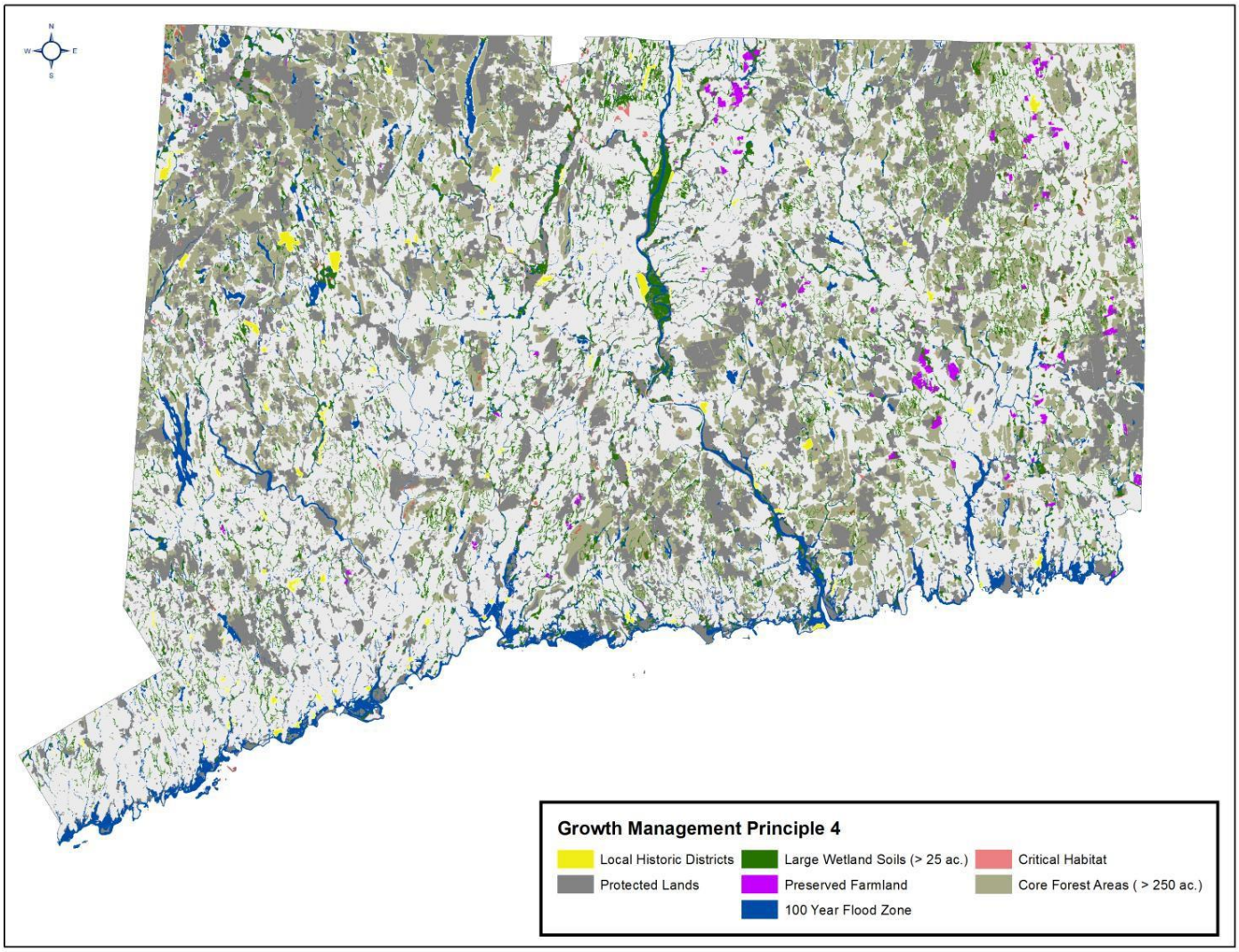
Examples of Performance Indicators for Measuring Progress:

- Acreage of preserved/protected open space
- Acreage of land being farmed in Connecticut
- Acreage of preserved farmland
- Percentage of Connecticut consumer dollars spent on locally produced farm products
- Total value of Connecticut's agricultural industry
- Acres of Inland Wetlands affected by activities subject to local or state permits
- Tons of Nitrogen delivered to Long Island Sound from Connecticut
- Oxygen depletion in Long Island Sound
- Miles of stream supporting wild brook trout and freshwater mussels
- Number of lakes meeting water quality assessment goals in Connecticut's Integrated Water Quality Report

Geographic Depiction of GMP 4

The following map reflects the geographic areas generally supported by the policies of GMP 4. State-sponsored efforts to conserve and restore the natural environment, cultural and historical resources, and traditional rural lands are broadly illustrated through the following map criteria:

1) Critical Habitat;
2) Protected Open Space;
3) Large Wetlands;
4) Preserved Farmland;
5) Core Forest Areas;
6) Local Historic Districts; and
7) 100 year Flood Zones



SCHEDULE 3

MUNICIPAL RESILIENCE PLANNING ASSISTANCE PROJECT

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CEEL Tasks

- Survey sea level rise adaptation laws and policies in other oceanfront states
- Identify legal and policy issues that frustrate sea level rise adaptation efforts
- Prepare white papers on sea level rise law and policy issues not adequately addressed by others
- Conduct outreach events to communicate legal and policy recommendations.

But Not . . .

Duplicating the work of others:

- DEEP
- CIRCA
- The Nature Conservancy
- CLEAR / Adapt CT
- COGs
- Georgetown Climate Center
- Marine Affairs Institute (RWU, URI)
- National Association of Floodplain Managers

What is Sea Level Rise In Connecticut?

Rise in Sea Level
or
Sea Level Change
or
UConn Projections?

P.A. 12-101 – Rise in Sea Level

"Rise in sea level" means the arithmetic mean of the most recent equivalent per decade rise in the surface level of the tidal and coastal waters of the state, as documented in the National Oceanic and Atmospheric Administration online or printed publications for said agency's Bridgeport and New London tide gauges.

Rise in Sea Level (Tide Gauge)

22a-92 States that is a general policy and goal of the legislature to consider a rise in sea level in "the planning process"

22a-93 Defines "rise in sea level"

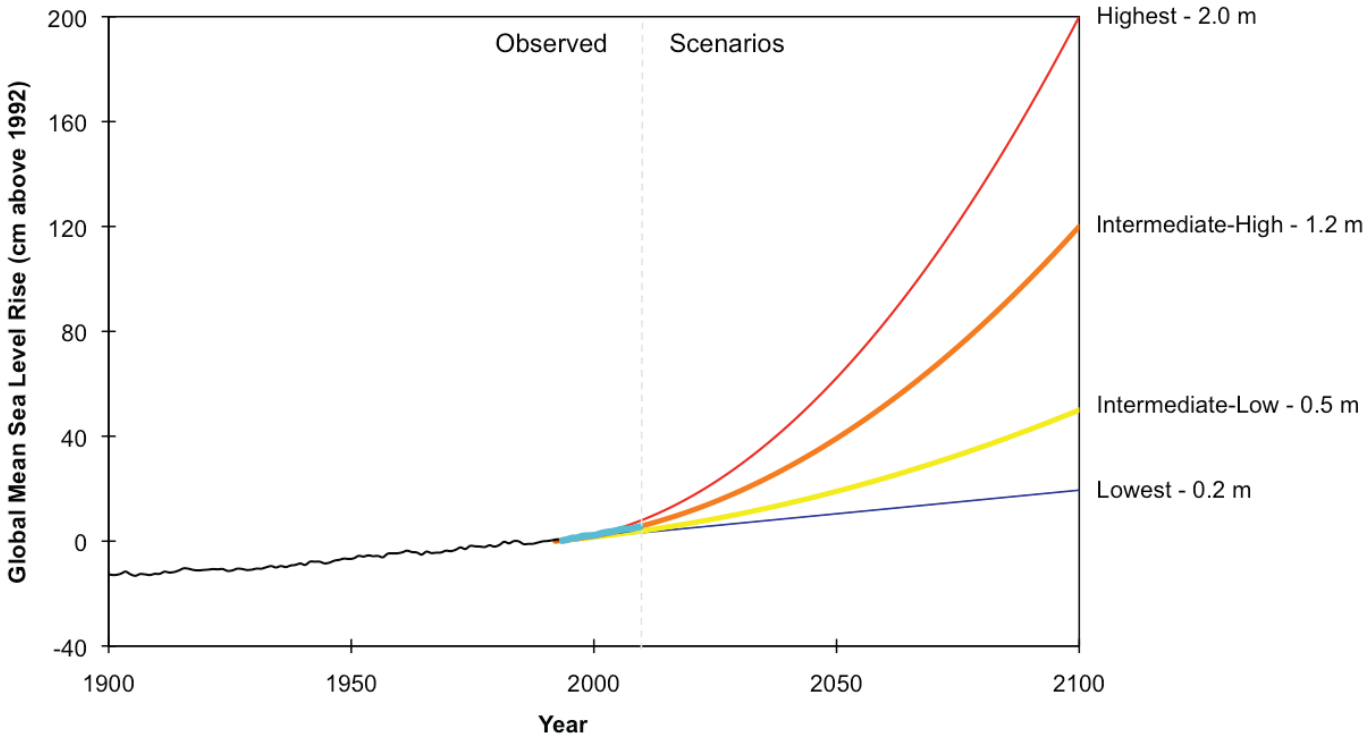
22a-363h Authorizes DEEP studies and pilot programs and UConn support to improve coastal community resilience to a rise in sea level

22a-478 Requires DEEP to consider a rise in sea level when establishing priorities for eligible water quality projects. (P.A. 13-15)

25-157t Requires a Blue Plan that adapts to a rise in sea level. (P.A. 15-66)

P.A. 13-179 - Sea Level Change

Sea Level Change scenarios published by the National Oceanic and Atmospheric Administration in Technical Report OAR CPO-1.



Scenario	SLR by 2100 (m)*	SLR by 2100 (ft)*
Highest	2.0	6.6
Intermediate-High	1.2	3.9
Intermediate-Low	0.5	1.6
Lowest	0.2	0.7

* Using mean sea level in 1992 as a starting point.

Sea Level Change (NOAA Projections)

8-23 Municipal Plan of Conservation & Development

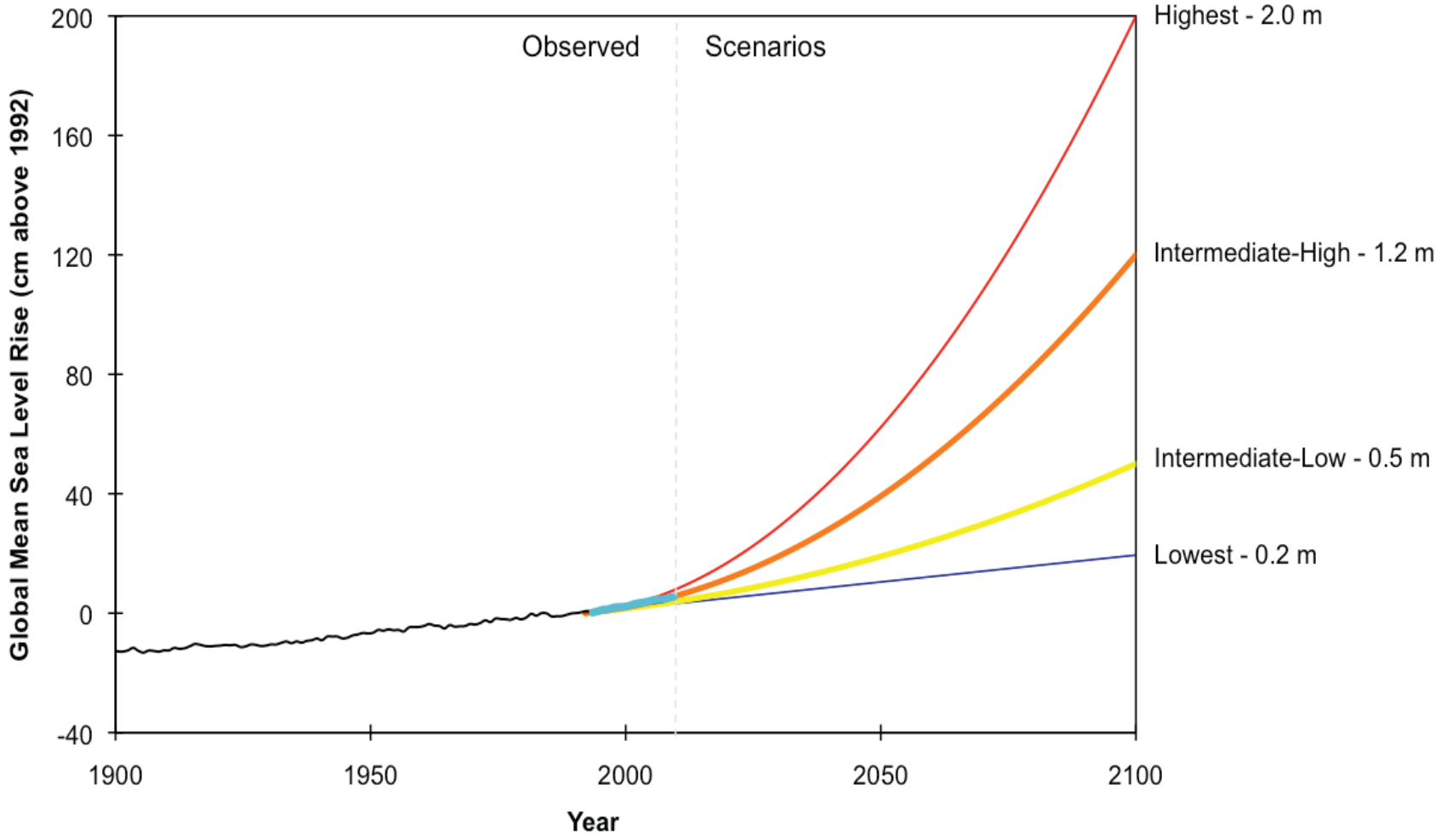
16a-27 State Plan of Conservation & Development

28-5 State civil preparedness plan and program

25-68o Municipal evacuation and hazard mitigation plans.

Sea Level Change (NOAA Projections)

25-68o UConn must update the NOAA sea level change scenarios every 10 years.



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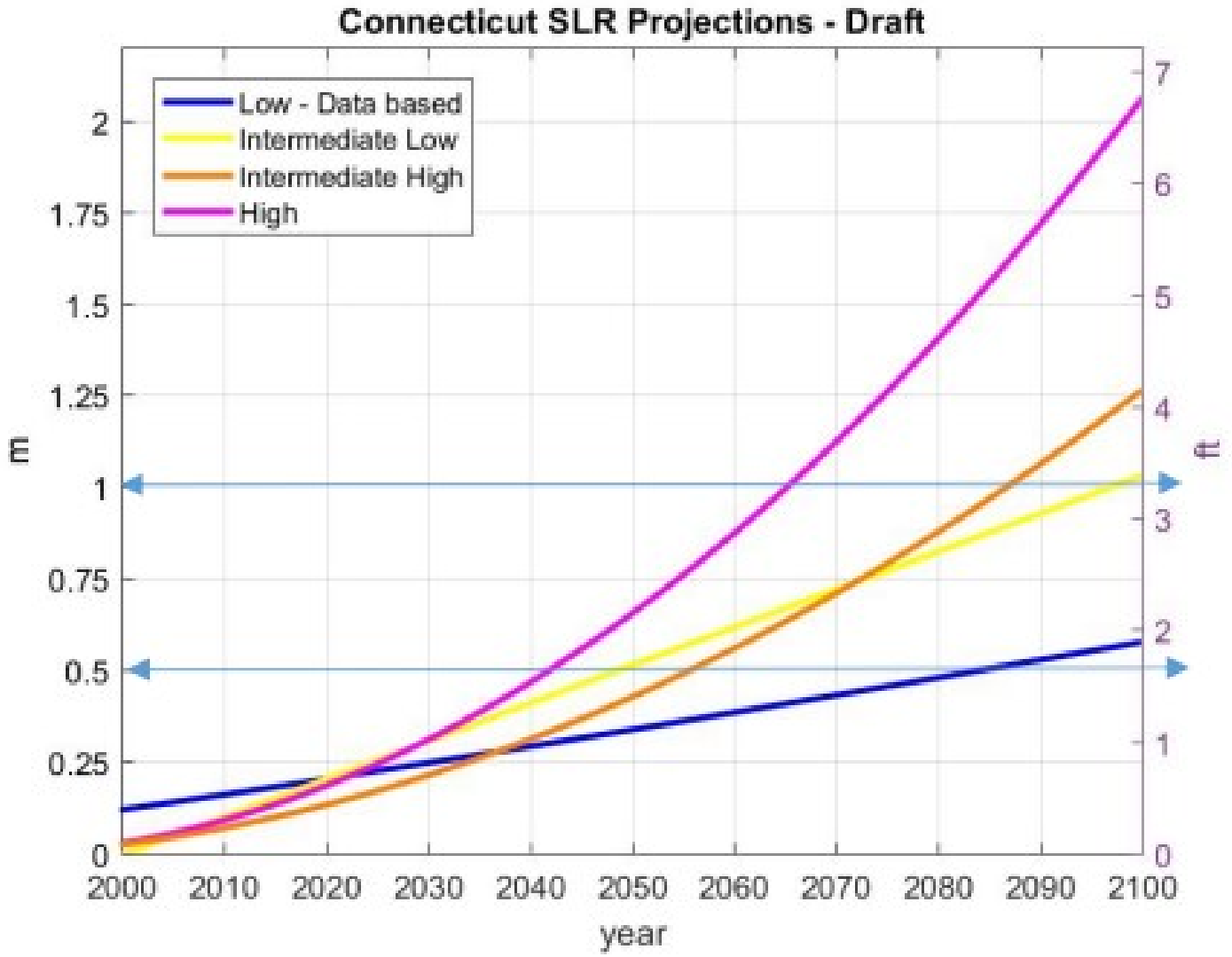

Caution Threshold

Planning threshold

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Sea Level Change (NOAA Projections)

25-68o UConn must update the NOAA sea level change scenarios every 10 years.

But there is no statute that :

- Requires or allows the UConn updates to be used where the **NOAA scenarios** or **tide gauge data** are specified

CEEL Recommendations
Rise in Sea Level / Sea Level Change

- Adopt single standard for sea level rise
- Make that single standard the latest UConn Updates to the NOAA projections
- Require a formal peer review of the UConn Updates to validate the scientific method and improve acceptance (C.A.S.E.?)
- Publish the UConn Updates on the DEEP Web Page

So How Do Connecticut Sea Level Rise Statutes Compare to Other States?

Of the 23 Oceanfront States . . .

Three have state statutes or regulations that require the consideration of **sea level rise** when making **most or all** of the **decisions** required under their state coastal management programs:

- Maryland
- Massachusetts
- Rhode Island

Of the 23 Oceanfront States . . .

Four have state statutes or regulations that require the consideration of **sea level rise** when making **some** of the **decisions** required under their state coastal management programs:

- California
- Florida
- Maine
- New York

Of the 23 Oceanfront States . . .

Four have state statutes or regulations that require the consideration of **sea level rise** during **planning processes** even though such consideration is not required during decision-making processes:

- Connecticut
- New Hampshire
- Texas
- Virginia

How Does Connecticut Coastal Management Jurisdiction Compare with Other States?

- Shared State & Local Jurisdiction
  - Sixteen Oceanfront States
    - Connecticut and 15 others
  - Division is typically at High Tide Line
- Exclusive State Jurisdiction
  - Six Oceanfront States
  - Delaware, Georgia, Mississippi, New Hampshire, New Jersey and Rhode Island

Local Programs

Local Programs

Coastal Management Programs

- Protect and restore coastal resources
- Manage coastal development, prioritize water-dependent uses
- Facilitate access to public trust beaches, waters and submerged lands.

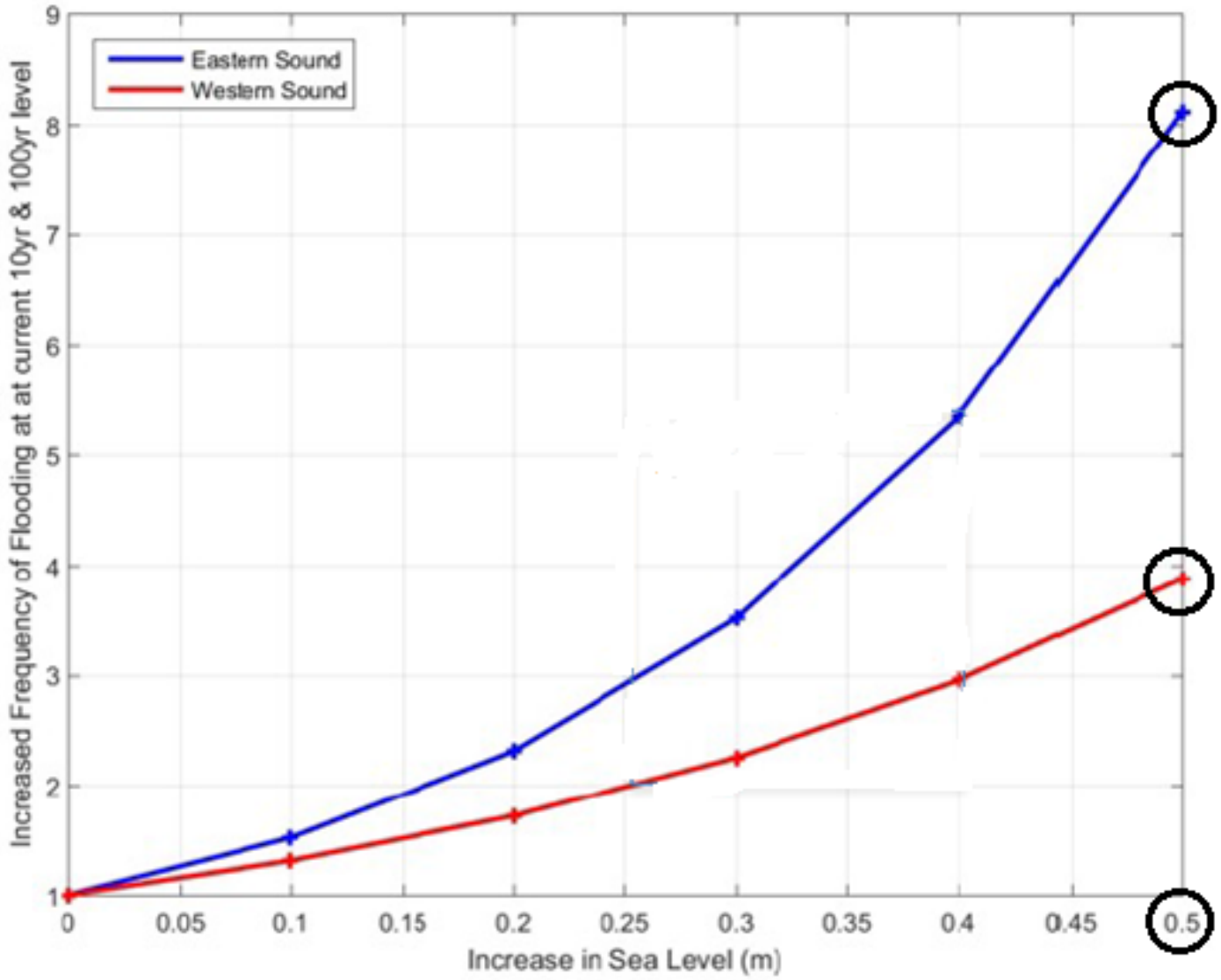
Floodplain Management Programs

- Promote public health, safety and general welfare in floodplain areas.
- Minimize public and private losses from floods in floodplains areas.

CIRCA SLR Recommendation

Plan for 2050 Long Island Sound Sea Level Rise of:

- ½ Meter
  (One Foot, Eight Inches)



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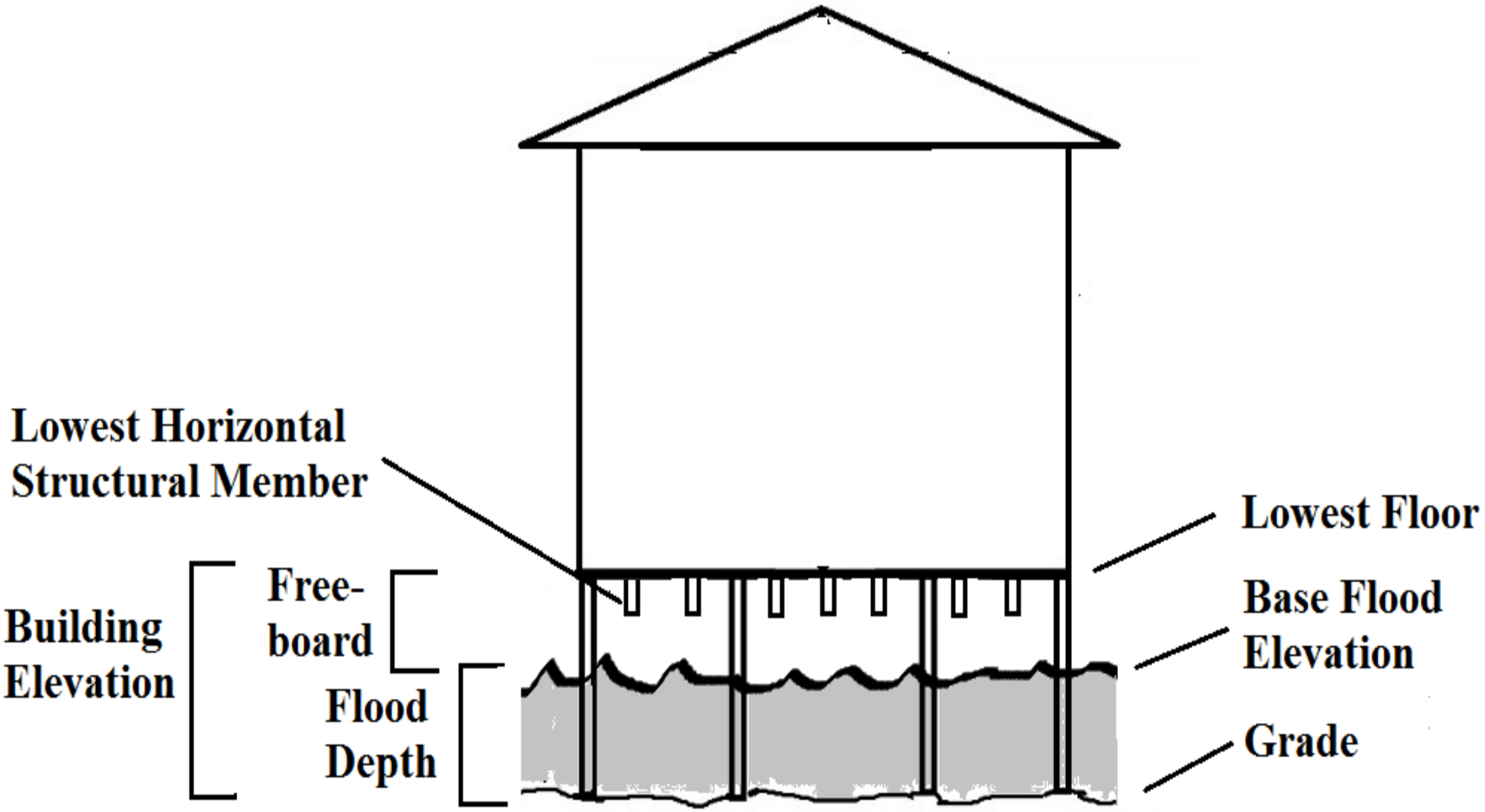
CEEL Analysis of Local Programs

- Floodplain Building Elevation Requirements in Connecticut Shoreline Municipalities
- Height Restrictions on Elevated Residential Buildings in Connecticut Coastal Floodplains
- Seawall Exemptions from Municipal Coastal Site Plan Review
- Incorporating Sea Level Rise into Existing Coastal and Floodplain Management Programs

Floodplain Building Elevation Requirements in Connecticut Shoreline Municipalities

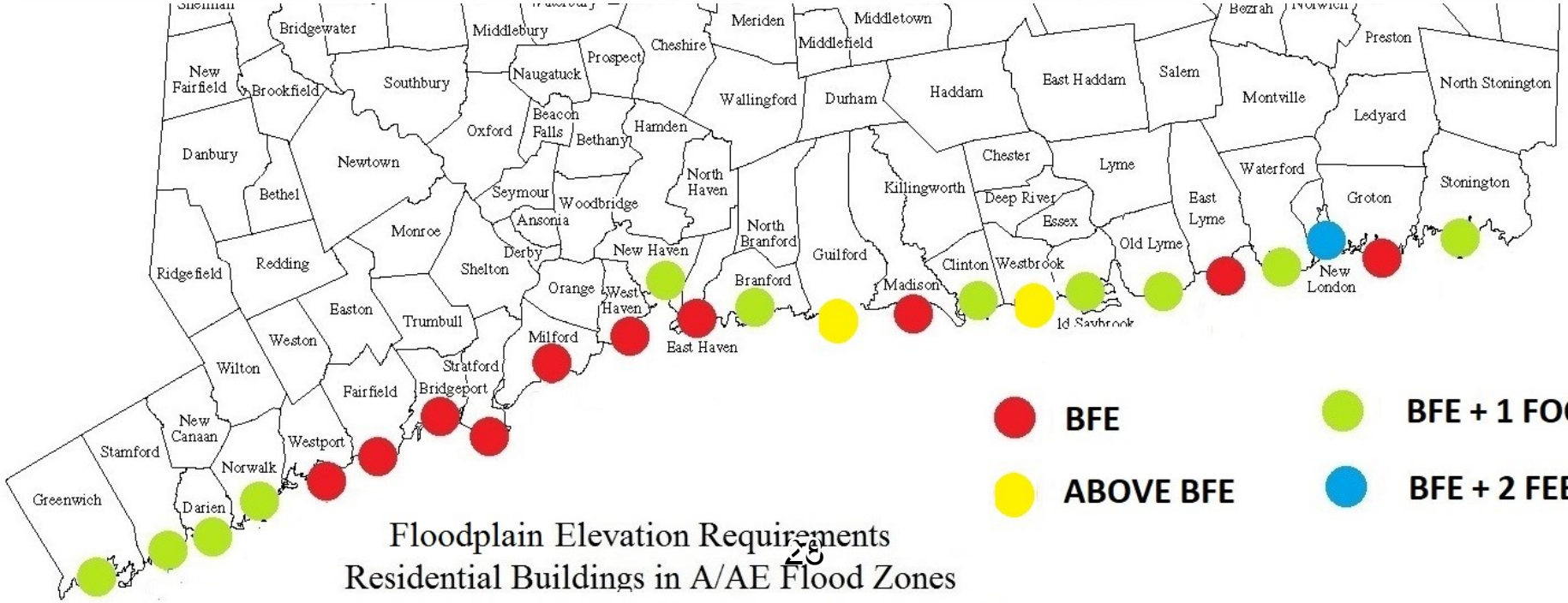
Elevated Shoreline House



Return Rate of Current 100 Year Flood Levels

⇦ **4X Return Rate** **8X Return Rate** ⇨

With 1 Foot 8 Inch Rise by 2050



Floodplain Elevation Requirements
Residential Buildings in A/AE Flood Zones

Shoreline Community Floodplain Elevation Requirements

- All 24 shoreline communities have floodplain ordinances that meet the elevation requirements of the National Flood Insurance Program
- 13 of the 24 shoreline communities have floodplain ordinances that do not meet the elevation requirements of the Connecticut State Building Code

Floodplain Elevation Recommendations

- Increase Building Elevation Requirements
  - **Good:** Meet State Building Code Requirements
  - **Better:** Adopt ASCE 24-14 for All Floodplain Structures

    (ASCE 24-14 = American Society of Civil Engineers consensus standard, "Flood Resistant Design and Construction")
  - **Best:** Add *at least* two feet of freeboard above ASCE 24-14 requirements

Freeboard is Cheap!

According to FEMA:

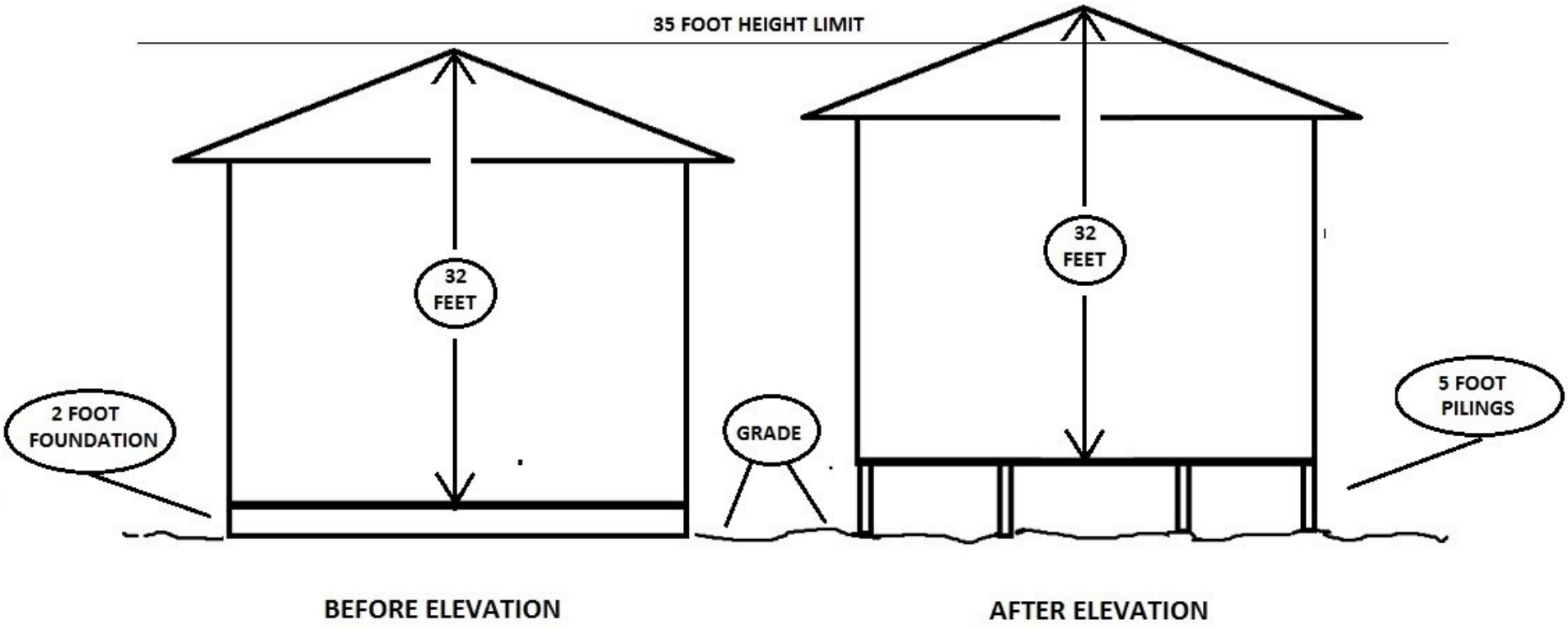
- Initial elevation inexpensive, but additional freeboard is not:
  - 4 feet of freeboard ≈ 1-2% more than the cost of elevating to BFE
- Insurance savings can pay for freeboard:
  - Six years in A Zones
  - Three years in VE zones

More Floodplain Elevation Recommendations

- Establish a “Coastal A” Zone
  - Increased elevation (and other) standards for “A Zones” subject to 1½ to 3 Foot Waves
- Consider an ordinance to implement FEMA Publication P-804, "Wind Retrofit Guide for Residential Buildings."
- Participate in the NFIP Community Rating System
  - Get money back for doing the right thing!

Height Restrictions on Elevated Residential Buildings

Height Restrictions on Elevated Residential Buildings



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Height Restrictions on Elevated Residential Buildings

Most shoreline communities use the **variance process** to deal with height above the usual limits

- **Advantage:** Maximum municipal control

Height Restrictions on Elevated Residential Buildings

- **Disadvantages of the Variance Process:**
  - Time consuming and expensive for the town and the applicant
  - Might be difficult for the applicant to demonstrate that the variance is required to alleviate an "unusual hardship" because of a "peculiar characteristic" of the property
  - An invitation to litigation

Height Restrictions on Elevated Residential Buildings

- Eight shoreline communities have adopted floodplain ordinances that accommodate some height above the usual limits without a ZBA hearing
  - Bridgeport, Fairfield, Greenwich, Guilford, Norwalk, Stamford, Waterford, Westport
- Some just add height above grade, some allow extra height based on flood levels
- **Recommendation**: Consider this option

Walls Landward of the Coastal Jurisdiction Line


Flood & Erosion Control Structure: "any structure the purpose or effect of which is to control flooding or erosion from tidal, coastal or navigable waters and includes . . . significant barriers to the flow of flood waters . . ."
SEAWALL?
SEAWALL
CMLS

Of the 24 Shoreline Municipalities

- **Two** have incorporated the DEEP recommended language that exempts walls as long as they don't meet the definition of a "flood and erosion control structure“
- **Two** have eliminated "walls" from the list of on-premises structures exempt from the site plan review process
- **Twenty** retain the language that exempts "walls" from the site plan review process

CEEL Recommendation: Eliminate the “walls” from the exemption or incorporate the DEEP recommended language for "flood and erosion control structure“

MUNICIPAL RESILIENCE PLANNING ASSISTANCE PROJECT

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SCHEDULE 4

Challenges Impacting Critical Electrical Infrastructure in the Floodplain and Flood Prone Areas due to Storm Events and Sea-level Rise

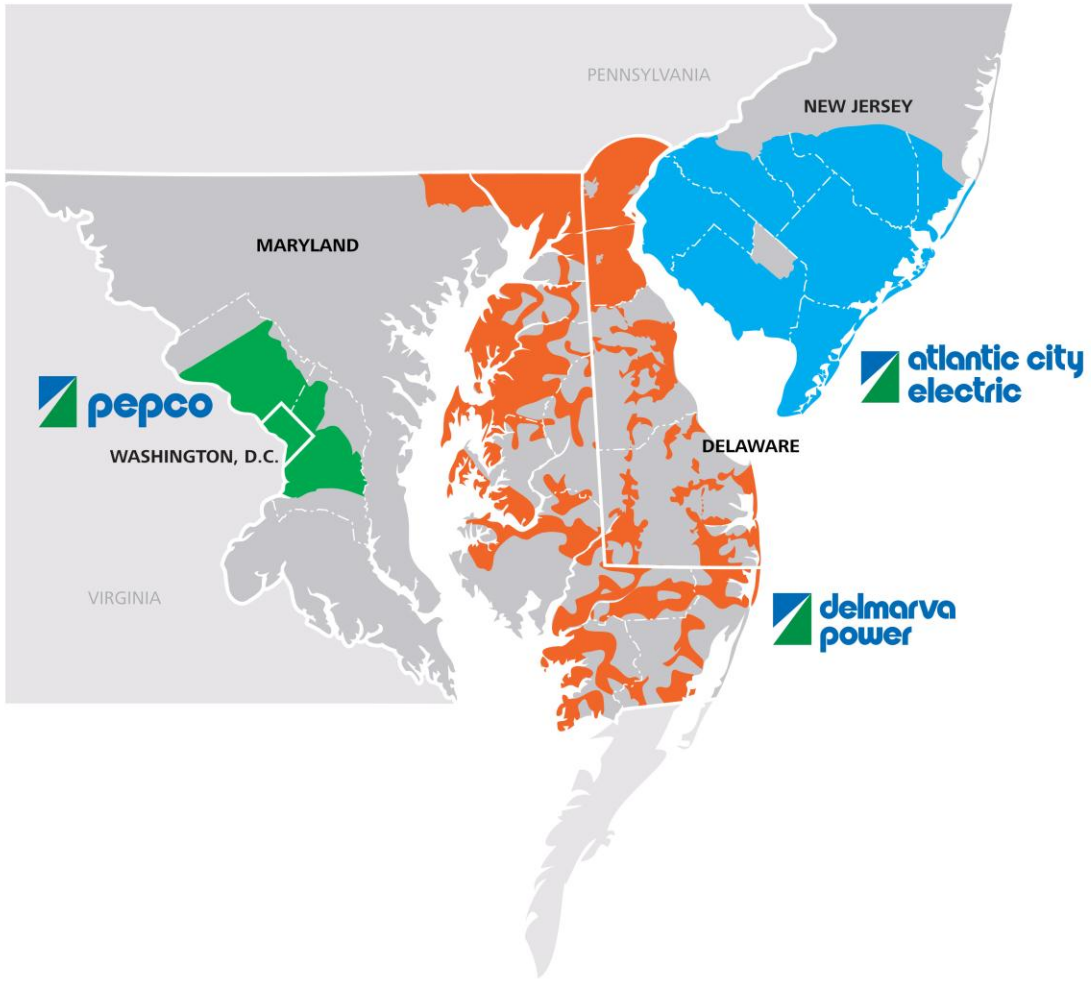
Pepco Holdings, Inc

Chuck Reed

September 19, 2013

Pepco Holdings Quick Facts

- Incorporated in 2002
- Service territory:
  8,340 square miles
- Customers served
  - Atlantic City Electric:
    - 545,000 – electric
  - Delmarva Power:
    - 503,000 – electric
    - 125,000 – natural gas
  - Pepco:
    - 793,000 – electric
- Total population served:
  5.6 million



In general, what are the issues with sea-level rise?

- Higher and more frequent flooding of wetlands and adjacent shores
- Expanded flooding during severe storms and high tides

In general, what are the issues with sea-level rise?

- Increased wave energy in the near-shore area
- Upward and land-ward migration of beaches
- Accelerated coastal retreat and erosion

In general, what are the issues with sea-level rise?

- Damage to coastal infrastructure
- Overall impacts on the coastal economy

What Challenges do Utilities face due to sea-level rise?

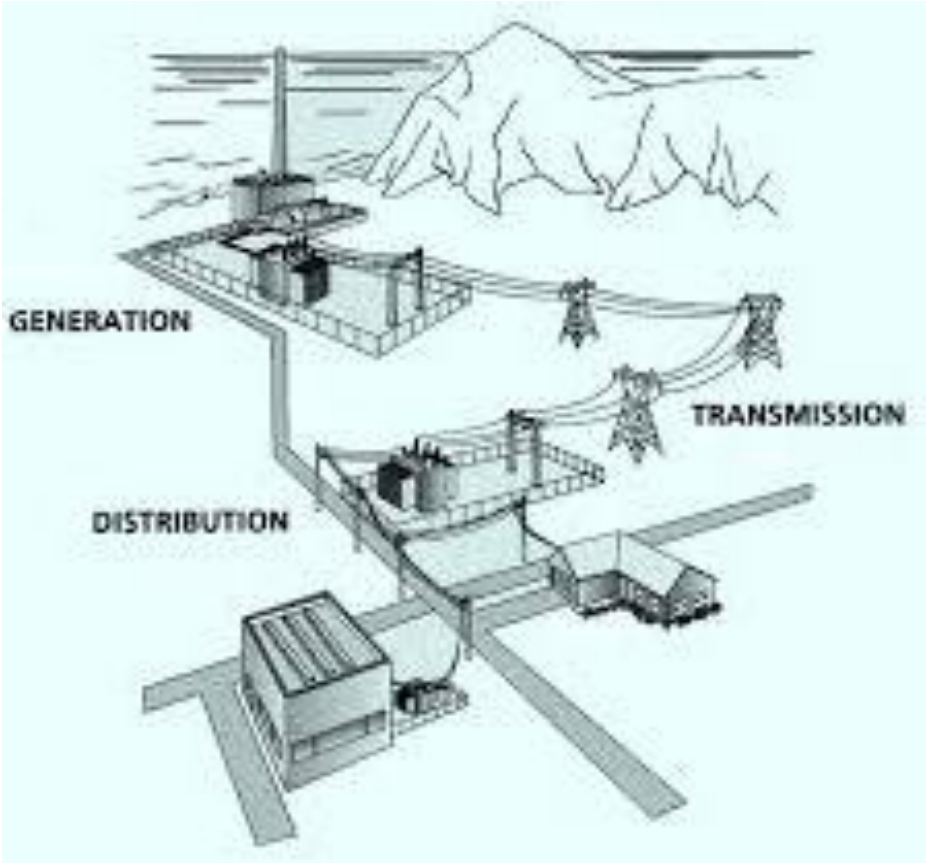
- Limited access for routine maintenance and storm restoration
- Vulnerability of our utility infrastructure to flood damage
- Changing drainage patterns affecting infrastructure stability
- Maintaining reliable service due to the affects of sea-level rise

What are we doing to address sea-level rise?

We are focusing on two critical parts of our infrastructure….

- Transmission Circuits
  - Transmission circuits are the power lines that transport high voltage electricity from the generating stations to the substations.

- Substations
  - Substation are fed by transmission circuits and transform the high voltage energy to low voltage energy that energize communities.



Transmission Circuit Hardening

Description: Upgrade 40 to 45 of the Atlantic City Electric (ACE) 69kV and 138kV transmission circuits, (approximately 375 to 425 pole-line miles), and related assets to appropriate design standards. The intent of this work is to address 1.) hardening pole line infrastructure to a steel and concrete solution to accommodate extreme wind conditions, 2.) correcting foundation stability problems in tidal wetlands and flood plains for pole lines, and, 3.) placing entire circuits or portions there of underground in especially sensitive areas. It will better position these assets to withstand extreme wind forces and storm surges by replacing vulnerable wood poles with steel, installing steel caisson foundations (as necessary), installing storm guying, and / or by using submarine cable or underground cable in conduit as conditions require.

Justification: During Hurricane Sandy, 23 transmission circuit interruptions caused wide spread outages due to downed poles and downed conductors. This included circuits that serve the Barrier Islands (including for example, Long Beach Island and Ocean City)

Potential Benefits:

- Improved customer reliability due to reduced transmission line outages resulting from storm wind and surge impacted transmission poles and lines.
- Improved restoration times due to reduced exposure of transmission line assets to storm wind and surge.
- Improved aesthetics from fewer poles with more compact construction.
- Lessened environmental impact due to improved placement of transmission assets.

Note That:

- 5 Coastal Circuits and 11 circuits feeding Barrier Islands were out during Hurricane Sandy

Transmission Circuit Hardening

LEGEND

Callout Box — Denotes transmission circuits that are candidates for rebuild			
69 kV candidate for rebuild	230 kV circuit	City	
138 kV candidate for rebuild	69 kV circuit	ACE substation	
	138 kV circuit		

Atlantic City Electric

Southern New Jersey Transmission Circuit Hardening Candidates

Barrier Island and Coastal Transmission Circuits

atlantic city electric — A PHI Company

Transmission Circuit Hardening

Transmission Circuit Hardening

Substation Storm Surge Prevention

Project Description: Upgrade substations to mitigate those with reported flooding and those in the FEMA – ABFE 1% (Advisory Base Flood Elevation – 1% annual chance of being equaled) flood plain and coastal impact areas. These will continue to be a problem due to a rise in sea level caused by global climate change. The upgrades include (a) installing new equipment at a higher elevation and in more secure buildings (b) elevating switchgear, transformers and control houses, (c) installing GIS (Gas Insulated Substation) equipment to replace air insulated equipment (d) installing protective walls and (e) weather proofed enclosure/buildings for substation switchgear and controls.

Resiliency Justification: There were 16 substations that had reported some degree of flooding in the ACE region during the last two major hurricanes (Irene and Sandy). ACE has 13 substations within the Federal Emergency Management Agency's Advisory Based Flood Elevation (ABFE) 1% flood zone. The overlap of these two, yield 20 substations that are on the Atlantic City Electric's flood prone substation list as reported and further detailed in the BPU-58 and BPU-59 compliance items found in the Board's Order Accepting Consultant's Report and Additional Staff Recommendations and Requiring Electric Utilities to Implement Recommendations, dated January 23, 2013 (BPU Docket No, EO11090543)

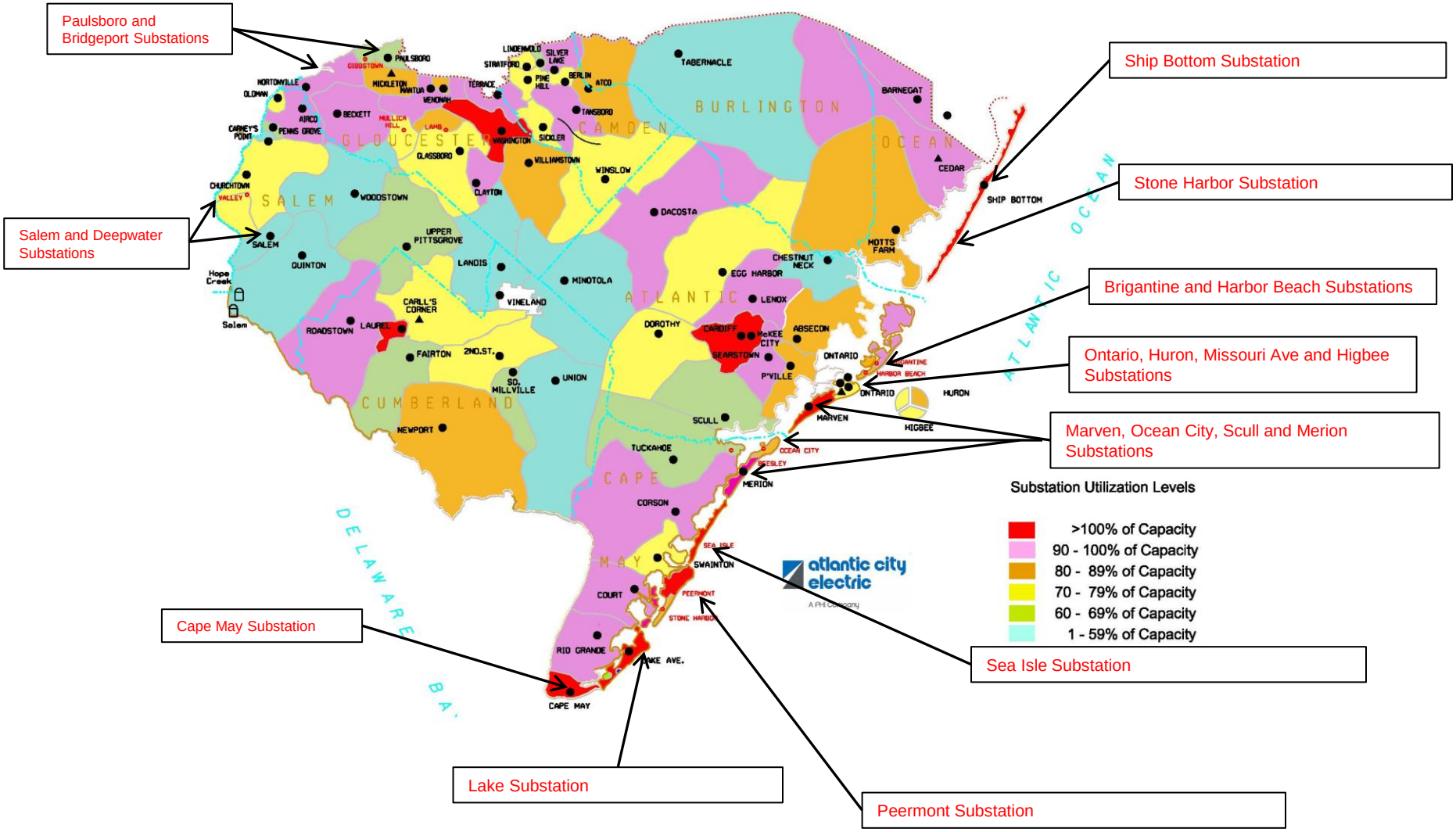
Potential Benefits:

- Prevention of water damage to the critical substation buildings and equipment that occurs due to storm surges
- Elimination of potential catastrophic equipment failure
- Reduced equipment failures and outages due to flying debris by enclosing equipment in buildings or steel enclosures
- Reduced customer outages due to less substation asset damage resulting from storm surges
- Lessened environmental impact due to improved critical infrastructure protection
- Extended life of substations with new equipment replacements and increased capacity

Notes:

- Substations are on coastal and river surge areas
- GIS site buildings
- Switchgear replacement
- Control Building replacement
- Raise Transformers

Substation Storm Surge Prevention (Map)



Substation Storm Surge Prevention (Photos)

Existing Peermont Substation

Substation Storm Surge Prevention (Photos)

New Peermont Substation

Substation Storm Surge Prevention (Photos)

Substation Firming

Project Description: Upgrade existing and build new substations as required to serve all customers from substations having 100% redundant transformer capacity.

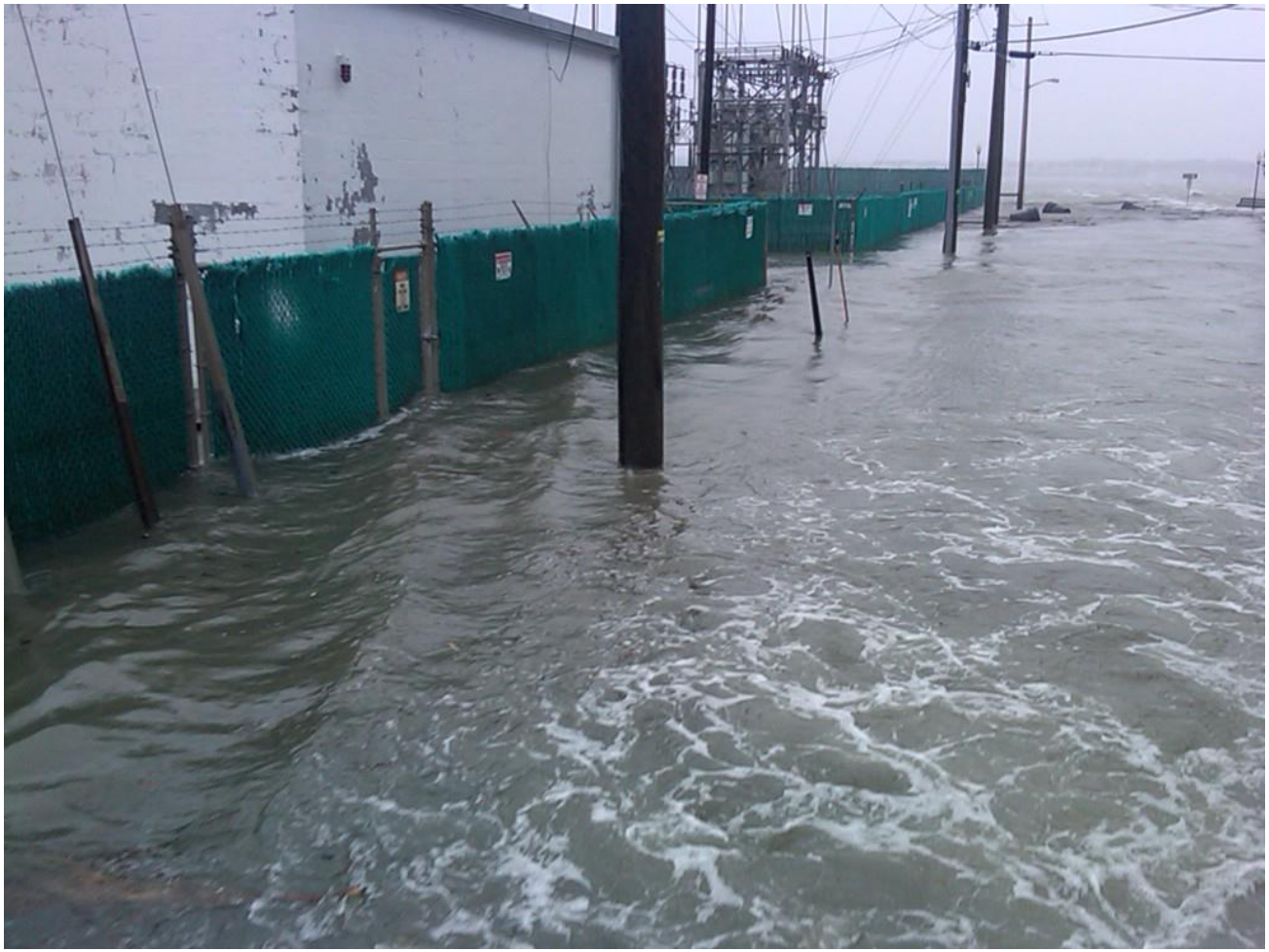
Resiliency Justification: Substation Firming eliminates the need to transport a mobile transformer to the site of a failed substation transformer to restore customers out due to the failure of that substation transformer.

Potential Benefits:

- Improved customer reliability due to the minimization of sustained outages related to substation transformer and/or transmission supply failures.
- When paired with “Create Additional Tie Points”, provides additional substation capacity for use in restoring feeders from adjacent substations.

Vulnerability Assessment

Vulnerability Assessment



Integrated Damage Prediction Model

Predicting Weather Impact

- Impact on Infrastructure and Assets
- Impact on Reliability Restoration
- Public Security Impact
- Customer Impact

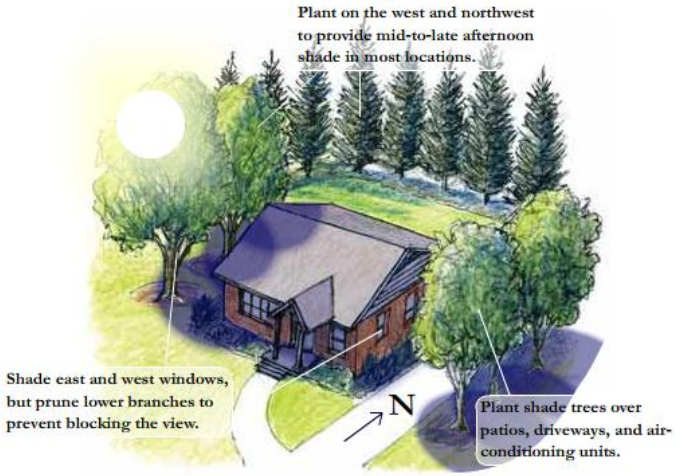
Benefits:

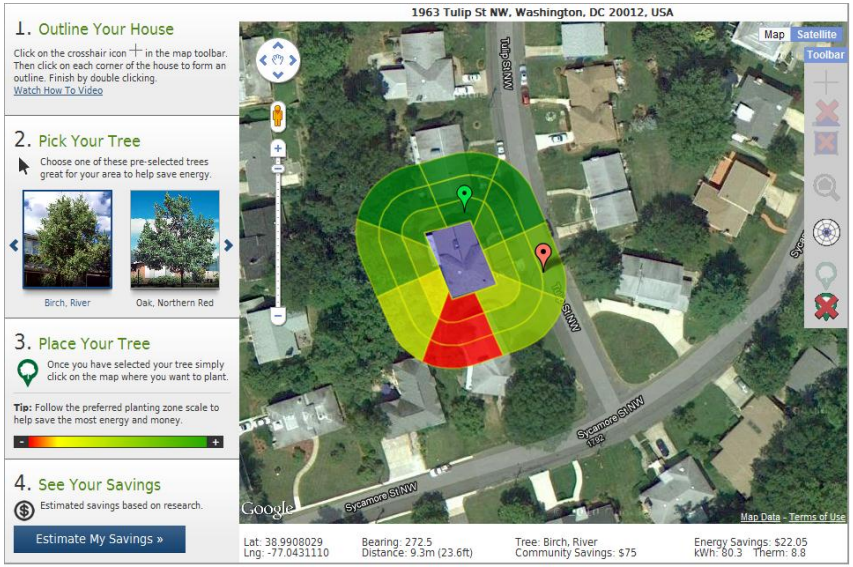
- Improved logistics and planning
- Improved ETR
- Improved Public Communications
- Improved Mutual Aid

ENERGY SAVING TREES

Arbor Day Foundation

- Two free trees per customer for energy saving benefits
- Partnership with Arbor Day Foundation since 2011
- Online mapping tool indicating best place to plant for most energy savings
- Also improves air quality, storm water, carbon sequestration
- To date, 3,900 trees in DPL (20,300 across territory)





Habitat Restoration Addressing Sea Level Rise Impacts:
Eastern Tiger Salamander, Cape May, NJ

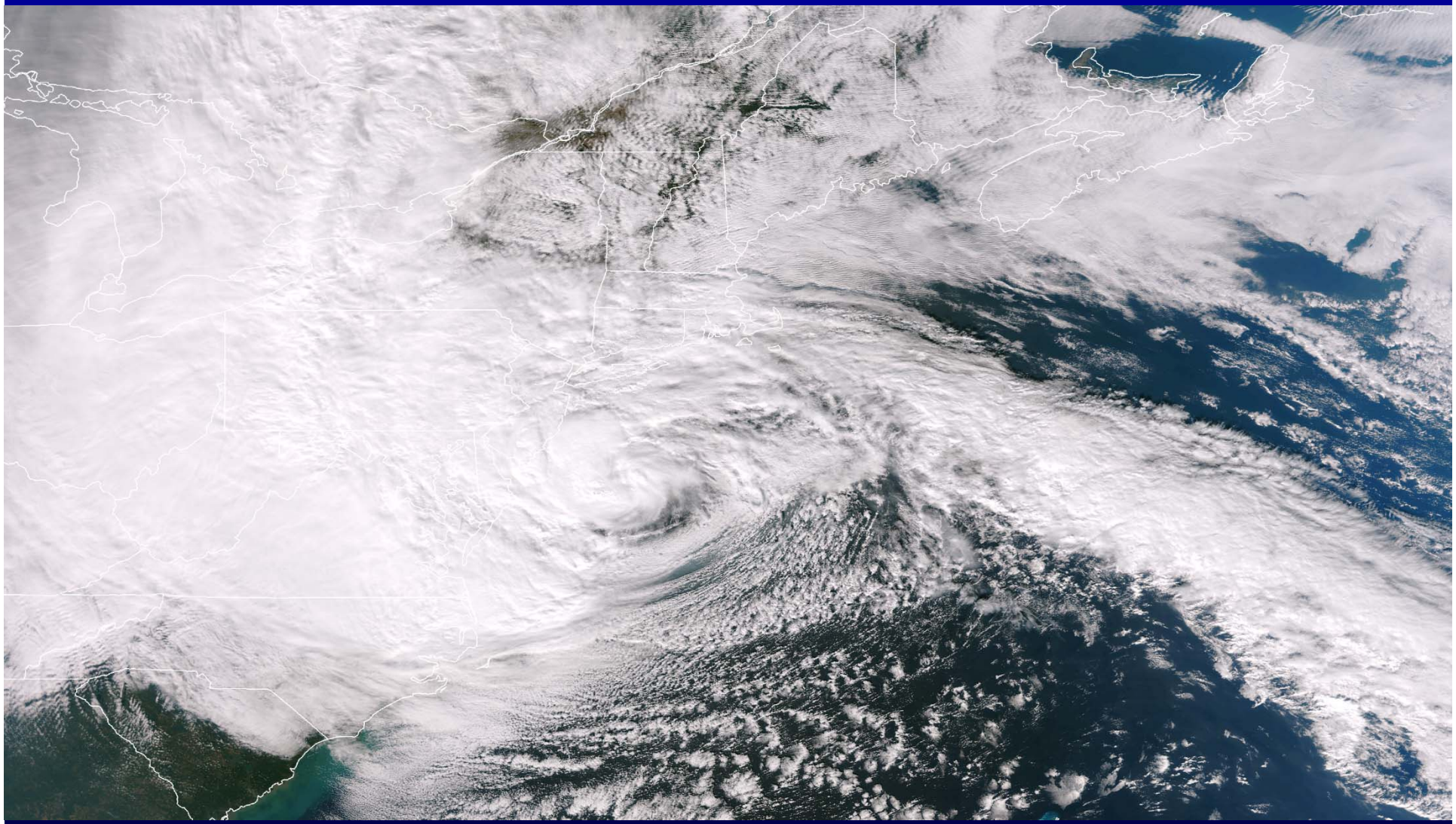
- Habitat creation to address habitat loss due to sea level rise
- Creation of vernal pools on ACE ROW
- ACE, USFWS, Conserve Wildlife, NJ DEP ENSP, Cape May County Zoo
- Federal funding to address sea level rise impacts on habitat

Habitat Restoration Addressing Sea Level Rise Impacts:
Nanticoke River Wetland Restoration, Vienna, MD

- 260+ PHI-owned acres targeted for restoration of native wetland vegetation
- Reintroduce structural diversity – improved habitat and wetland health
- MD DNR, USFWS, multiple adjacent landowners
- Landscape scale effort
- Photo: 1 yr after 1st treatment

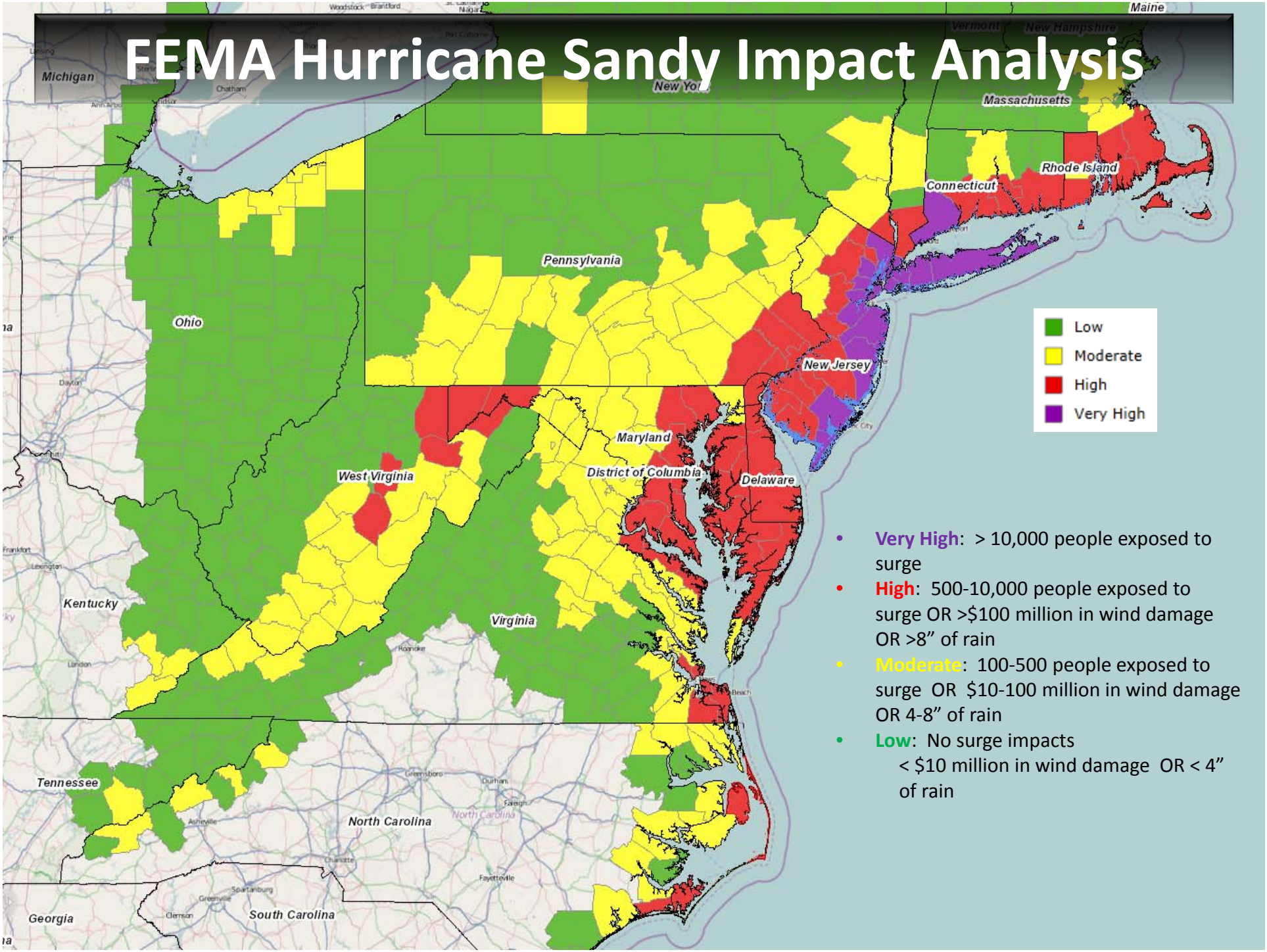
SCHEDULE 5

Hurricane Sandy



Eric Blake, 3/28/13
National Hurricane Center

FEMA Hurricane Sandy Impact Analysis

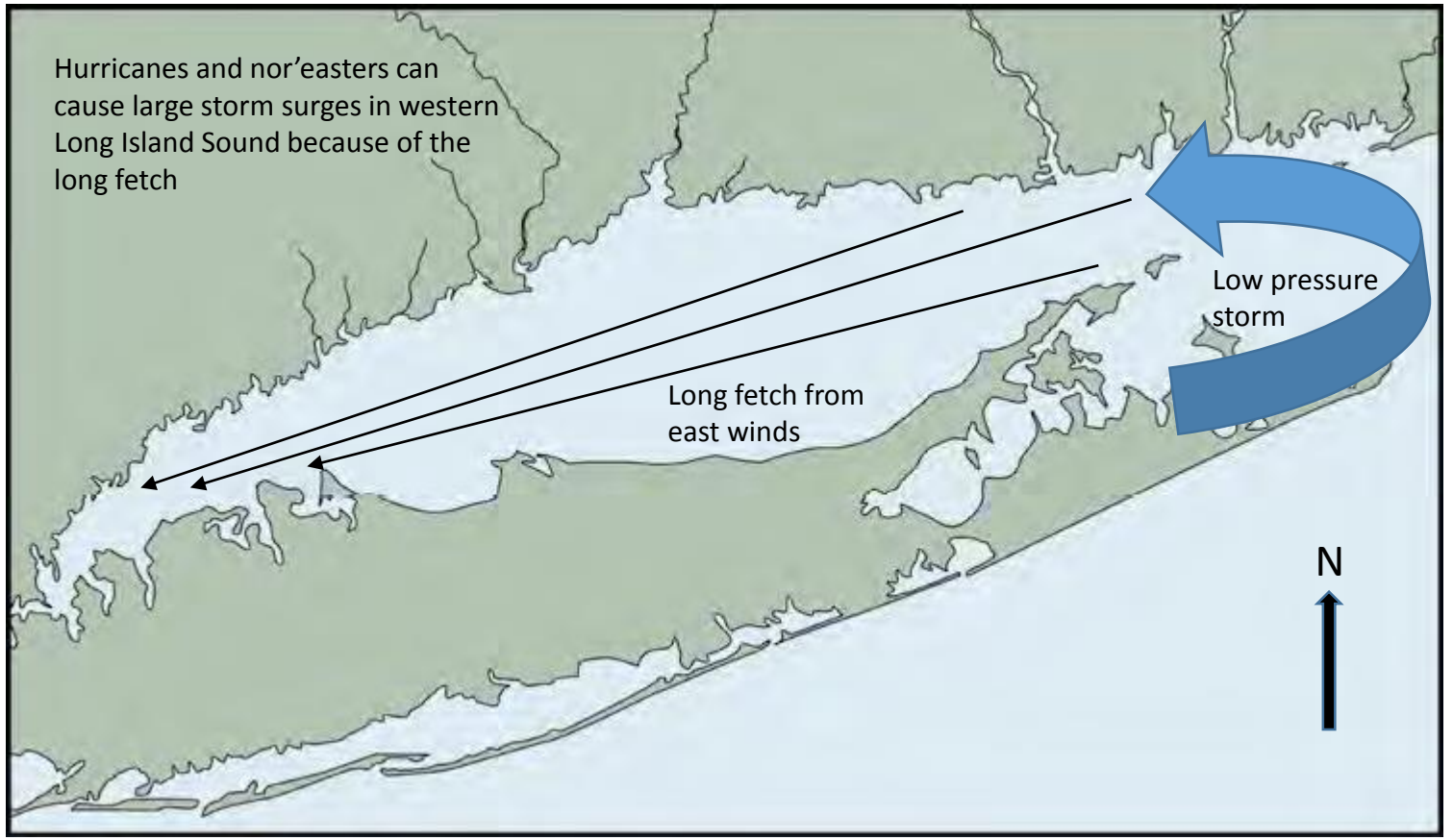


- **Very High**: > 10,000 people exposed to surge
- **High**: 500-10,000 people exposed to surge OR >$100 million in wind damage OR >8” of rain
- **Moderate**: 100-500 people exposed to surge OR $10-100 million in wind damage OR 4-8” of rain
- **Low**: No surge impacts
  < $10 million in wind damage OR < 4” of rain

Table 3a: Maximum recorded storm surge/residual levels ranked by amplitude for Hurricane Sandy, October 2012. Storm Surge/Residual represents the observed water level (storm tide) minus predicted astronomical tide levels.

Station Name	Station ID	Date & Time GMT	Residual	
			in Meters	in Feet
[3] Kings Point, NY	8516945	10/29/2012 23:00	3.855	12.65
[3] Bridgeport, CT	8467150	10/30/2012 00:18	2.997	9.83
[3] Bergen Point West Reach, NY	8519483	10/30/2012 01:48	2.913	9.56
[3] The Battery, NY	8518750	10/30/2012 01:24	2.866	9.40
[3] New Haven, CT	8465705	10/30/2012 00:06	2.786	9.14
[2,3] Sandy Hook, NJ	8531680	10/29/2012 23:36	2.611	8.57
New London, CT	8461490	10/29/2012 22:54	1.982	6.50
Newbold, PA	8548989	10/30/2012 10:42	1.956	6.42
Burlington, Delaware River, NJ	8539094	10/30/2012 10:24	1.917	6.29
[3] Marcus Hook, PA	8540433	10/30/2012 08:00	1.907	6.26
Providence, RI	8454000	10/29/2012 22:12	1.888	6.20
Tacony-Palmyra Bridge, NJ	8538886	10/30/2012 09:48	1.861	6.11
[3] Delaware City, DE	8551762	10/30/2012 06:54	1.826	5.99
[3] Conimicut Light, RI	8452944	10/29/2012 22:12	1.795	5.89
Montauk, NY	8510560	10/29/2012 22:12	1.794	5.89
[3] Philadelphia, PA	8545240	10/30/2012 09:18	1.777	5.83
Atlantic City, NJ	8534720	10/29/2012 20:42	1.773	5.82
Reedy Point, DE	8551910	10/30/2012 07:06	1.769	5.80
[3] Fall River, MA	8447386	10/29/2012 22:30	1.677	5.50
Lewes, DE	8557380	10/29/2012 17:30	1.627	5.34
Newport, RI	8452660	10/29/2012 22:18	1.627	5.34
[3] Ship John Shoal, NJ	8537121	10/30/2012 05:42	1.615	5.30
[3] Cape May, NJ	8536110	10/29/2012 18:00	1.574	5.16
[1] Quonset Point, RI	8454049	10/29/2012 20:48	1.572	5.16
Woods Hole, MA	8447930	10/29/2012 22:06	1.545	5.07
Wachapreague, VA	8631044	10/29/2012 05:54	1.508	4.95
Chesapeake City, MD	8573927	10/30/2012 10:18	1.486	4.88
Money Point, VA	8639348	10/29/2012 07:54	1.460	4.79
Sewells Point, VA	8638610	10/29/2012 07:24	1.394	4.57
Boston, MA	8443970	10/29/2012 21:00	1.394	4.57
Chesapeake Bay Bridge Tunnel, VA	8638863	10/29/2012 06:54	1.330	4.36
Ocean City Inlet, MD	8570283	10/29/2012 16:48	1.321	4.33

[1] Sensor reached physical limit on measurements and did not record a maximum value.
[2] Sensor was damaged or destroyed and likely did not record a maximum water level.
[3] Maximum recorded water level value exceeded historical maximum value.


Hurricanes and nor'easters can cause large storm surges in western Long Island Sound because of the long fetch
Low pressure storm
Long fetch from east winds
N

CERTIFICATE OF SERVICE

I hereby certify that on this day a copy of the foregoing was delivered by electronic mail to all parties and intervenors of record, as follows:

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