



Peconic Estuary Program and Shinnecock Indian Nation Climate Vulnerability
Assessment Services: Risk Assessment

CCMP Climate and Resiliency Workshop January 7, 2019 Overview

Climate Ready Assessment and Critical Lands Protection



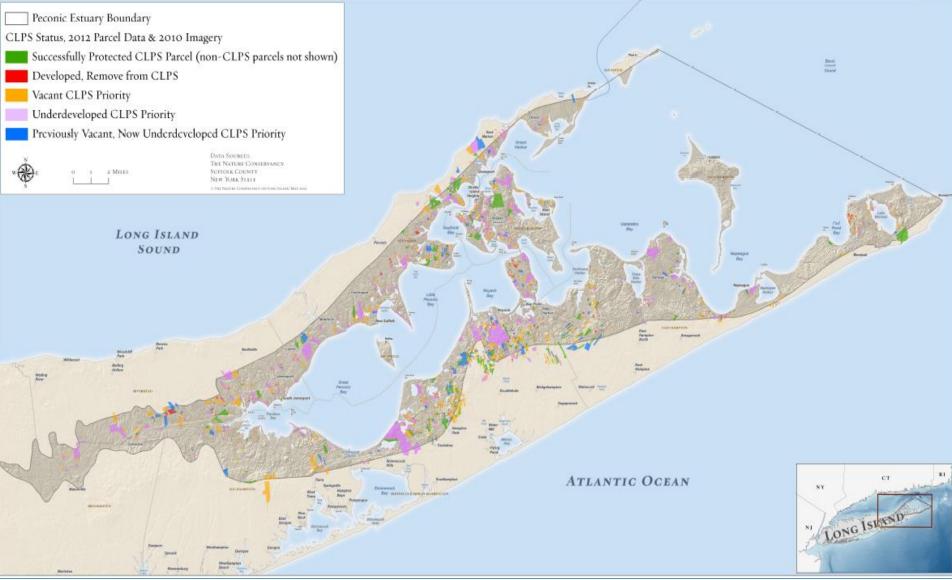
USEPA Climate Ready Estuaries Program

- Peconic Estuary Program
 - Update Critical Lands Protection Strategy (CLPS) criteria (draft completed)
 - Part of Climate Change Chapter of 2018/9 CCMP Update
 - Tool for Municipalities and Others
 - > Evaluates land available for development in Peconic watershed
 - Identifies priorities for protection
 - Vulnerability Analysis
- Shinnecock Indian Nation
 - Overlap in geography
 - Vulnerability Analysis
 - Risk Assessment to be completed separtaly



CRITICAL LAND PROTECTION STRATEGY (CLPS) REVIEW CURRENT PARCEL STATUS & CHANGES FROM 2003-2012





CLPS Update Goals

- Revise existing and develop new CLPS screening criteria and priorities (draft completed)
- Assume climate change results in
 - Sea level rise
 - Increased storm surge/flooding
 - Increased land-based run-off
 - Temperature and species changes
- Emphasize effect on estuary (primary) and land
- Emphasize measurable goals

CCMP Objectives and Actions

Objectives and actions incorporated into the CLPS update and not discussed separately

- Action 4.1.4: Monitor and review the Climate Vulnerability Assessment and Climate Ready Action Plan and update if necessary.
- Action 4.1.5: Identify Information Gaps and Develop a Climate Change Research Agenda.
- Objective 4.2: Provide tools to local government and other stakeholders to mitigate and adapt to the impacts of climate change.
- Action 4.2.1: Develop procedures in the Climate Ready Action Plan to ensure climate change as identified in the CRA, is considered in all phases of habitat restoration and water quality improvement projects funded by or in partnership with the PEP.
- Action 4.2.2: Implement the PEP 2017 Habitat Restoration Plan and the updated Critical Lands
 Protection Strategy to increase coastal resiliency by prioritizing projects that will remain viable into the future with anticipated changing coastal conditions.
- Action 4.2.3: Encourage the preservation of natural shorelines (including shoreline migration) and the
 establishment of living shorelines over hardened shorelines and eelgrass and wetland
 restoration/protection.
- Action 4.2.4: Work with municipalities to incorporate the potential impacts of climate change on human communities and natural resources into comprehensive planning that is in aligned and cohesive with all other municipalities within the Peconic Estuary and directs development towards less vulnerable, less ecologically sensitive areas.

CCMP Objectives and Actions cont.

- Action 4.2.5: Incorporate the impacts of climate change in the identification of nitrogen and pathogen sources and loading and management.
- Action 4.2.6: Review and develop Nitrogen Nonpoint Source Control Plans to incorporate
 revised septic system setbacks from groundwater and surface waters, the encouragement of
 septic system improvement, and land use planning to control nitrogen loading based on
 information due to the impacts of climate change.
- Action 4.2.7: Incorporate climate change impacts into the Peconic Estuary Solute Transport Model and the associated management actions for nitrogen management.
- Action 4.2.8: Review and develop Pathogen Nonpoint Source Control Plans to incorporate revised land cover analysis and stormwater runoff loadings to control pathogen loading based on revised pathogen loading information due to the potential impacts of climate change.
- Action 4.2.9: Incorporate the impacts of effects of climate change, including sea level rise and new flooding patterns, in the identification of toxic (pesticide, herbicide, hazardous materials, etc.) sources and loading and management.
- Action 4.2.10: Monitor and review the health of the ecosystem and analyze the success of climate adaptation projects, adjust adaptation and management strategies accordingly.

DRAFT Updated CLPS



Class 1: Habitat and Water Quality Protection

- Contains or will contain freshwater or tidal wetlands as predicted by SLAMM or identified by U.S. Fish and Wildlife Service 1994 NWI data
- Located within 1,000 feet of the shoreline of a bay, tidal creek, or the Peconic River
- Located within or has potential to connect to a Critical Natural Resource Area or a Significant Coastal Fish and Wildlife Habitats



Class 2: Inundation Areas

- · Located within a present-day flood zone
- Located in areas that will become inundated as predicted by NOAA's Coastal Inundation mapper at next earliest climate scenario

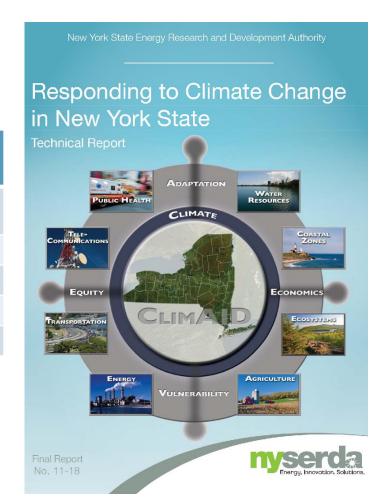


Class 3: Groundwater Protection

- Located within a zone of groundwater recharge travel time area between 0-25 years
- Located in areas with predicted increases in the saltwater interface elevation that will impact groundwater quality and elevation, causing flooding at the surface
- Located in special groundwater protection area (100 + year recharge)

ClimAID Projections

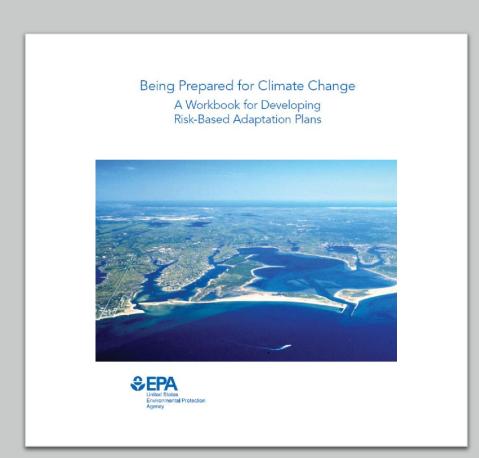
Region	Long Island (SLR in Inches)							
	Low	Low- Medium	Medium	High- Medium	High			
2020s	2	4	6	8	10			
2050s	8	11	16	21	30			
2080s	13	18	29	39	58			
2100	15	21	34	47	72			

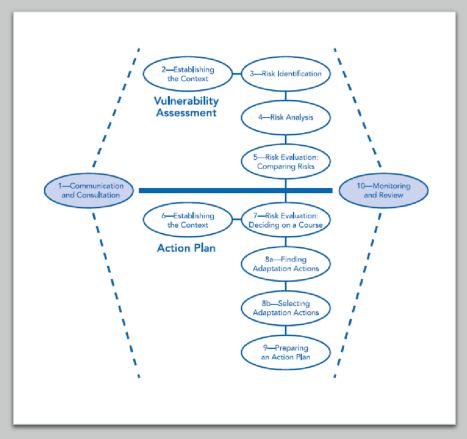


Workshop Goals

Vulnerability Assessment







Defining Risks to Develop Resiliency Plan

Defining Risks for PEP

- Step 1—Communication and Consultation
 Informing key people about the vulnerability assessment and asking for input.
- Step 2—Establishing the Context for the Vulnerability Assessment Identifying organizational goals that are susceptible to climate change.
- Step 3—Risk Identification
 Brainstorming about how climate stressors will interact with your goals.
 - Step 4—Risk Analysis
 Developing an initial characterization of consequence and likelihood for each risk.
 - Step 5—Risk Evaluation: Comparing Risks
 Using a consequence/probability matrix to build consensus about each risk.

Defining Risks for PEP cont.

- Risks threaten things that are of value.
- A climate risk is the possibility that a given climate change stressor will affect PEP's ability to meet its goals
- A risk is a problem to be managed by finding ways to lower its principal characteristics: likelihood and consequence.

Climate Change Risks: USEPA

- Based on Clean Water Act Goals
- Defined Categories of Risk
 - Warmer SummersIncreased Storms
 - Warmer WintersSea Level Rise
 - Warmer WatersOcean Acidification
 - Increased Droughts
- Categories can be modified and supplemented based on local issues

TABLE 3-1A. POTENTIAL CLIMATE CHANGE RISKS FOR POLLUTION CONTROL

Clean Water Act goals	Warmer summers	Warmer winters	Warmer water	Increasing drought	Increasing storminess	Sea level rise	Ocean acidification
Controlling point sources of pollution and cleaning up pollution		□ Loss of melting winter snows may reduce spring or summer flow volume, and raise pollutant concentration in receiving waters	☐ Temperature criteria for discharges may be exceeded (thermal pollution) ☐ Warmer temperatures may increase toxicity of pollutants	☐ Critical-low- flow criteria for discharging may not be met ☐ Pollutant concentrations may increase if sources stay the same and flow diminishes	☐ Combined sewer overflows may increase ☐ Treatment plants may go offline during intense floods	☐ Treatment plants may not be able to discharge via gravity at higher water levels ☐ Treatment infrastructure may be susceptible to flooding ☐ Sewage may mix with seawater in combined sewer systems ☐ Contaminated sites may flood or have shoreline erosion ☐ Sewer pipes may have more inflow (floods) or infiltration (higher water table)	
Controlling nonpoint sources of pollution	□ Wild fires may lead to soil erosion	□ Longer growing season can lead to more lawn maintenance with fertilizers and pesticides	☐ Higher solubility may lead to higher concentration of pollutants ☐ Water may hold less dissolved oxygen ☐ Higher surface temperatures may lead to stratification ☐ Greater algae growth may occur ☐ Parasites, bacteria may have greater survival or transmission	□ Pollution sources may build up on land, followed by high- intensity flushes	☐ Streams may see greater erosion and scour ☐ Urban areas may be subject to more floods ☐ Flood control facilities (e.g., detention basins, manure management) may be inadequate ☐ High rainfall may cause septic systems to fail	□ Tidal flooding may extend to new areas, leading to additional sources of pollution	Decomposing organic matter releases carbon dioxide, which may exacerbate the ocean acidification problem in coastal waters

TABLE 3-1C. POTENTIAL CLIMATE CHANGE RISKS FOR FISH, WILDLIFE AND PLANTS

Clean Water Act goals	Warmer summers	Warmer winters	Warmer water	Increasing drought	Increasing storminess	Sea level rise	Ocean acidification
Protecting and propagating fish, shellfish and wildlife Controlling nonnative and invasive species Maintaining biological integrity and reintroducing native species	☐ Species that won't tolerate warmer summers may die/migrate; biota at the southern limit of their range may disappear from ecosystems ☐ Species may be weakened by heat and become outcompeted ☐ Essential food sources may die off or disappear, affecting the food web ☐ Species may need to consume more water as temperature rises	□ Species that used to migrate away may stay all winter □ Species that once migrated through may stop and stay □ Pests may survive winters that used to kill them □ Invasive species may move into places that used to be too cold □ Some plants may need a "setting" cold temperature □ A longer growing season may lead to an extra reproductive cycle □ Food supplies and bird migrations may be mis-timed	□ Newly invasive species may appear □ Habitat may become unsuitably warm, for a species or its food □ Heat may stress immobile biota □ Dissolved oxygen capacity of water may drop □ Some fish reproduction may require cold temperatures; other reproductive cycles are tied to water temperature □ Coral bleaching episodes may increase □ Parasites and diseases are enhanced by warmer water	□ Species may not tolerate a new drought regime □ Native habitat may be affected if freshwater flow in streams is diminished or eliminated □ Changing freshwater inputs may affect salinity distribution in estuaries (especially of interest with regard to shell fish habitat)	Greater soil erosion may increase turbidity and decrease water clarity Greater soil erosion may increase sediment deposition in estuaries, with consequences for benthic species	□ Sea level may push saltier water farther upstream (especially of interest with regard to shellfish habitat) □ Light may not penetrate through the full depth of deeper water □ Greater coastal wetland losses may occur	□ Corrosive waters may impact shellfish development □ Shellfish predators may not survive the disappearance of shellfish □ Fish may be adversely affected during development stages by changes to water chemistry □ The effect of ocean acidification on calcifying plank ton may lead to cascading effects in the food chain

Categorizing Risks

- After Defining Risks,
 Risks are
 Categorized
- Categories help prioritize adaptation strategies

		Warmer water may stress immobile biota	Warmer water may hold less dissolved oxygen	Shoreline erosion from sea level rise may lead to loss of beaches, wetlands and salt marshes
	_	Warmer water may lead to changes in drinking water	Sea level rise may cause bulkheads, sea walls and	
	High	treatment processes	revetments to become more widely adopted	2. Combined sewer overflows may increase from more intense precipitation
92			n	n
ikelihood (probability) of occurrence	Medium	Increased wildfires from warmer summers may lead to soil erosion	Parasites and bacteria may have greater abundance, survival or transmission due to warmer water	More frequent drought may diminish freshwater flow in streams
robability)		Warmer winters may lead species that once migrated through to stop and stay	Warmer summers may drive greater water demand	More intense precipitation may cause more flooding
l) pooqi		n	n	n
Like		Warmer water may lead open seasons and fish to be misaligned	Warmer water may lead jellyfish to be more common	Contaminated sites may flood from sea level rise
	Low	Warmer winters may lead to more freeze/thaw cycles that impact water	Ocean acidification may cause the recreational shellfish harvest to be lost	Warmer water may promote invasive species
		infrastructure	n	n
		n		
	•	Low	Medium	High
			Consequence of impact	

Color key: Green Yellow Red

Risks

Worksheet Discussion



GOALS	Sea Level Rise	More Frequent and Intense Storms	Warmer Waters	Increased Droughts	Ocean Acidification	Others?
Habitat Protection: Protect current and predicted areas of critical natural habitat (tidal wetlands, eelgrass meadows, and beaches and dunes) in the Peconic Bay, tidal creeks, and the Peconic River.	Sea level rise is predicted to flood areas of wetlands	Increased storms will increase erosion of shoreline habitat	Warmer waters may decrease eelgrass viability	Times of drought may reduce freshwater input into tidal wetlands		□
Protect existing habitat Provide buffers for migration and recharge ADD	Sea level rise may increase eelgrass bed depths decreasing sunlight penetration	• Increased storm frequency and intensity storms will lead to more storm water runoff into the Estuary, increasing non-point pollution and turbidity, and decreasing	•	Increased drought will decrease river flows		
	Sea level rise will decrease beach areas	water clarity •		•		
Maintain and Enhance Species Diversity: Protect and support increased biodiversity of native species in the Peconic Bay, tidal creeks, and the Peconic River. Promote biodiversity Reintroduce native			Warmer waters may decrease eelgrass viability			
species Control non- native/invasive species ADD						

GOALS	Sea-Level Rise	More Frequent and Intense Storms	Warmer Waters	Increased Droughts	Ocean Acidification	Others?
Water Quality Protection: Protect water quality in the Peconic Bay, tidal creeks, and the Peconic River. Reduce incidents of dissolved oxygen stress Prevent non-point source pollutant discharge to the Estuary Reduce incidents of harmful algal blooms ADD		Increased storm frequency and intensity storms will lead to more storm water runoff into the Estuary, increasing nonpoint pollution and turbidity, and decreasing water clarity				
Groundwater Protection: Protect groundwater in Watershed.	□	□	□			□
Maintain existing and protect future buffers to prevent saltwater intrusion to the groundwater table						
ADD						

GOALS	Sea Level Rise	More Frequent and Intense Storms	Warmer Waters	Increased Droughts	Ocean Acidification	Others?
Recreational Opportunities and Sustainable Fisheries: Protect and promote recreational activities, including sustainable fisheries, within the Watershed.	Sea level rise may decrease beach areas					
ADD						
Others?	□		□			□
ADD						
Others?	□					
AUU						