

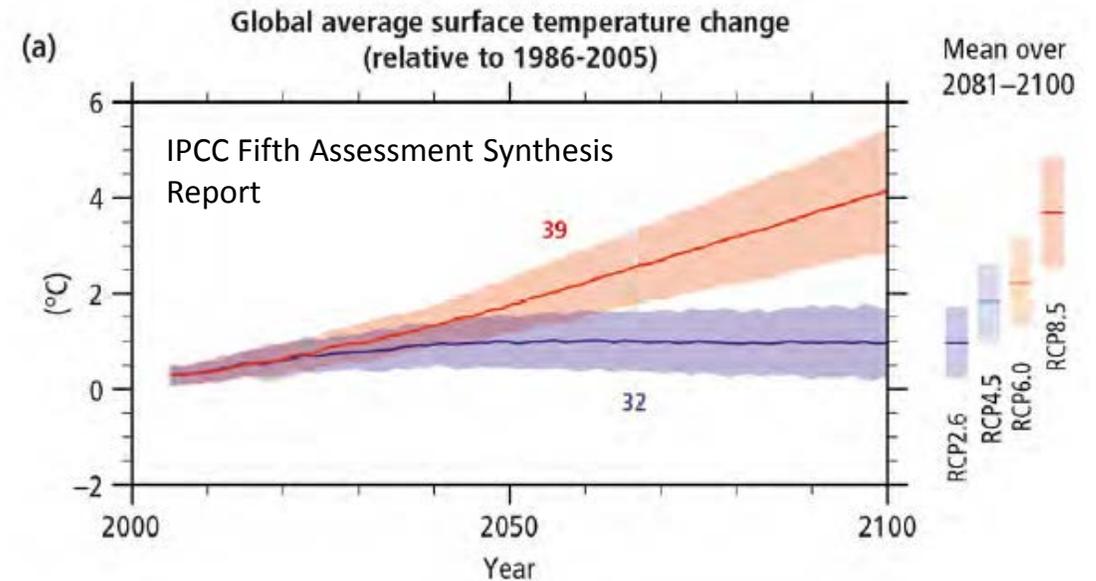


Community Risk and Resiliency Act

*Mainstreaming climate
change*

Current Mitigation Commitments Insufficient

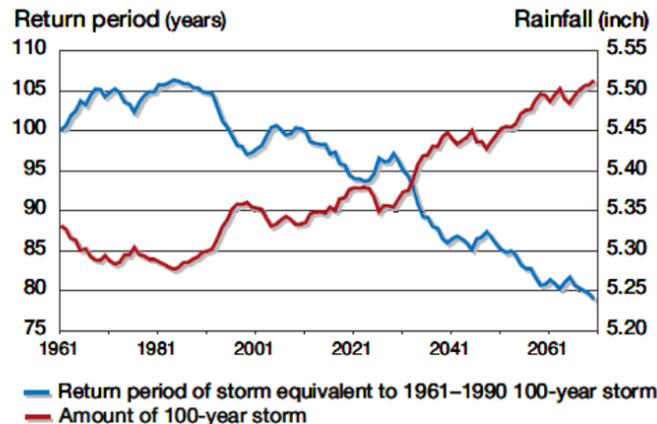
- On track to reach 560 ppm CO₂, mid- to late 21st century => 2 (more likely 3) to 4.5°C
- 3.5°C most likely by 2100 - Up to 5.5°C possible
- COP21 Intended Nationally Determined Commitments => 2.7-3.5°C by 2100



Department of
Environmental
Conservation

More Extreme Precipitation & Flooding

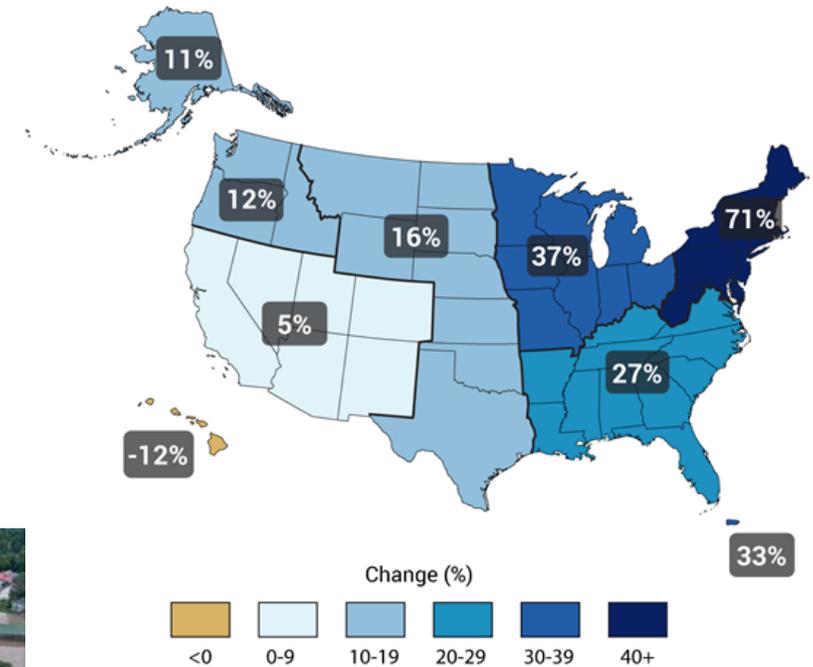
- Observed: Modest increases in annual precipitation-most regions since 1900
- Projected: 4-15% total precipitation increase by 2080
 - Mostly in winter
- Projected increasing frequency, duration, intensity of extreme events



Tryhorn and DeGaetano, 2010



Observed Change in Very Heavy Precipitation



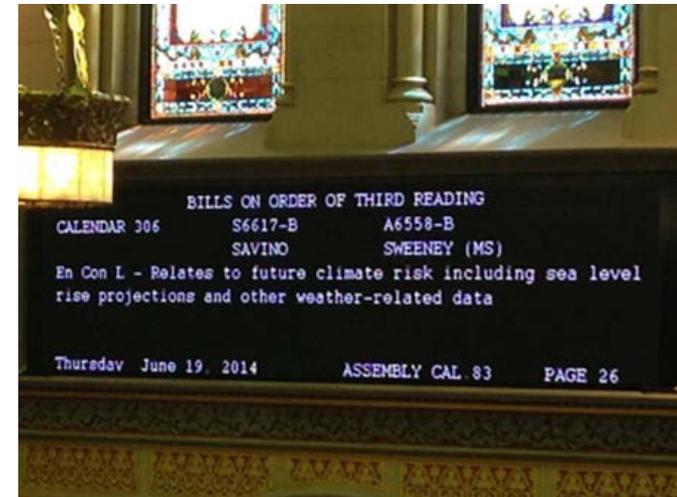
National Climate Assessment



Department of Environmental Conservation

Community Risk and Resiliency Act

- Requires sea-level rise projections (DEC)
- Requires applicant demonstration of consideration of sea-level rise, storm surge and flooding in specified facility-siting regulations, permits and funding programs, and guidance on implementation (DEC, DOS)
- Adds consideration of sea-level rise, storm surge and flooding to Smart Growth Public Infrastructure Policy Act criteria and guidance (DEC, DOS)
- Requires model local laws to enhance resiliency (DOS, DEC)
- Requires guidance on use of natural resiliency measures to reduce risk by January 1, 2017 (DEC, DOS)



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Regulatory Programs Covered by CRRA

DEC Permits

- Oil and natural gas wells
- Major projects:
 - Protection of waters
 - Freshwater wetlands
 - Tidal wetlands
 - Coastal erosion hazard areas
 - Mined land reclamation
 - Sewerage service
 - Liquefied natural gas and liquefied petroleum gas facilities

DEC Facility-siting Regulations

- Hazardous waste transportation, storage and distribution facility siting
- Petroleum bulk storage (including conformity with the uniform fire prevention and building code)
- Hazardous substance bulk storage



Funding Programs Covered by CRRA

- Water Pollution Control Revolving Fund (EFC)
- Drinking Water Revolving Fund (DOH, EFC)
- Local waterfront revitalization (DOS)
- Open space acquisition (DEC, OPRHP)
- Agricultural and farmland protection (DAM)
- Landfill closure assistance (DEC)
- Coastal rehabilitation project assistance (DEC)
- Open space project operation and maintenance agreements (OPRHP)



CRRA's Benefits

- Greater resiliency for communities, infrastructure and ecosystems
- Greater public and staff awareness of climate hazards and risk-reduction practices
- Written standards and guidance
- Inter-regional and cross-program consistency for standards and permit requirements
- Standardization of data sources, decision-support tools



Department of
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CRRA Implementation

Promulgate 6NYCRR Part 490, Projected Sea-level Rise

Inches of rise relative to 2000-2004 baseline

Time Interval	Region	Long Island					New York City/Lower Hudson					Mid-Hudson				
	Descriptor	Low	Low-medium	Medium	High-medium	High	Low	Low-medium	Medium	High-medium	High	Low	Low-medium	Medium	High-medium	High
2020s		2	4	6	8	10	2	4	6	8	10	1	3	5	7	9
2050s		8	11	16	21	30	8	11	16	21	30	5	9	14	19	27
2080s		13	18	29	39	58	13	18	29	39	58	10	14	25	36	54
2100		15	21	34	47	72	15	22	36	50	75	11	18	32	46	71



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CRRA Implementation

Develop 3 required topical guidance documents:

- Model local laws
- Smart growth public infrastructure
- Natural resiliency measures

Three interagency work groups

Public review in 2016



CRRA Implementation

Develop new ECL Article 15 Title 5, Protection of Water, guidance for bridges and culverts

- DEC, in consultation with DOS, DOT, PANYNJ et al.
- Public review in 2016



CRRA Implementation

Develop new state flood risk management standard and guidance

Available for incorporation into

- CRRA topical guidance and CRRA program-specific guidance, regulations, etc.
- Programs not covered by CRRA
- 6 NYCRR Part 502
- DEC's model local law for flood damage prevention, optional additional language
- Uniform Fire Prevention and Building Code





**Department of
Environmental
Conservation**

Draft Proposals for State Flood Risk Management Standard

Local Government Workshop, May 19, 2016

Purpose of Guidance

- Inform State Agencies on How to Carry Out CRRA Requirements
- Provide Guidance for other State Agency Programs Not Explicitly Mentioned in CRRA
- Provide Guidance for Local Communities and the Public on Improving Resiliency in a Changing Climate

Work Group

- NYS DEC Bureau of Flood Protection and Dam Safety
- NYS DOT
- NYS DOS
- NYSERDA
- NYS Dormitory Authority
- NYS Office of Homeland Security and Emergency Services
- NYS Floodplain and Stormwater Managers Association
- To Request Review by Association of State Floodplain Managers
- There Will be a Review Period Prior to Final Document

Proposed NYS Guidance

Informed by Federal E.O. 13690 and Accompanying Guidelines

- <http://www.fema.gov/federal-flood-risk-management-standard-ffrms>

More Specific to New York State

- Select Highest of Relevant Standards
- Provides Guidance on use of Sea Level Rise data and Future Conditions Stream Flow Data upstate

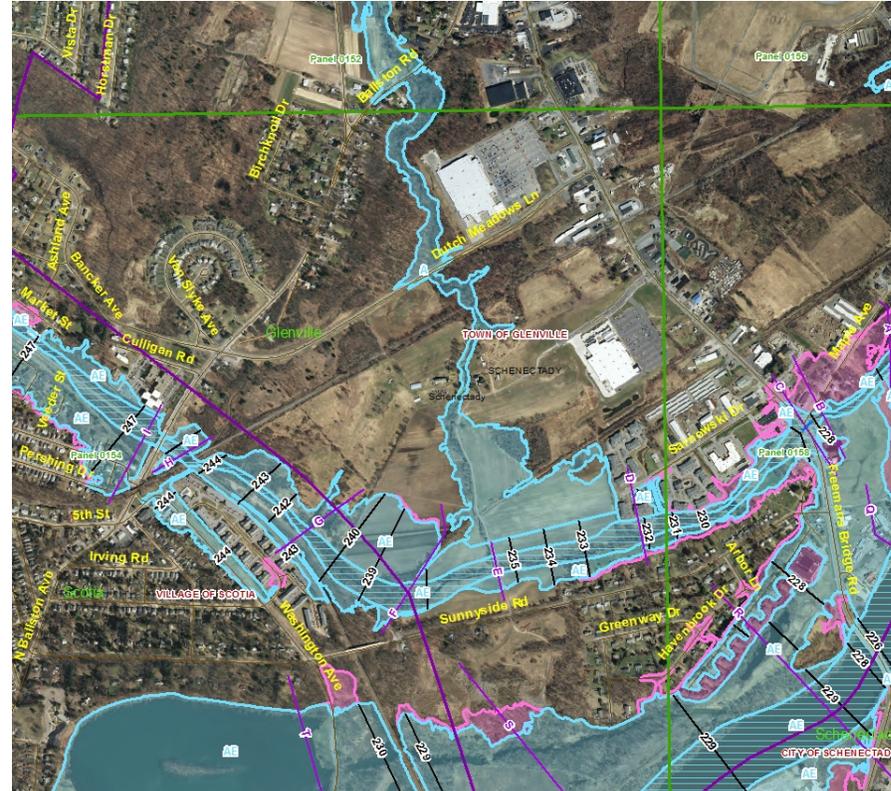
Guidance for All Flood Risk Areas

- Avoid FEMA Mapped 1% Flood Risk Zone If Possible
- Design to the most restrictive of the following:
 - The Elevation and Horizontal Flood Hazard Area Resulting from adding an additional 2' to the Base Flood Elevation
 - BFE + 3 ft for Critical Facilities
 - The Area and Elevation of the 0.2% Annual Chance Flood (500-Year Flood)
 - The Area and Elevation of the Local Flood of Record Plus 2 ft (3 ft for Critical Facilities)
 - Climate Informed Science Approach where Applicable
- Elevations apply to Lowest Floor or Safety of Facility



Where No Base Flood Elevations

- Use Higher of:
 - 3' Above Highest Adjacent Grade;
 - High Water Mark from a Flood
 - BFE From Reputable Source plus 2'
 - Develop BFE if Development Disturbs at least 2 acres or consists of at least 20 lots



Use Climate Informed Science

- All Tidal Areas
 - BFE + Medium SLR 2080s + 2 ft (+3 ft for Critical Facilities)
- Non Tidal Areas
 - All other than One- and Two-Family Residential Structures
 - USGS Future Flow Explorer using RCP 8.5 projection for 2050-2074
- For Critical Facilities: evaluate for full expected operational life of facility

Critical Infrastructure

Must be Functional During Flooding

- Roads other than Low Volume Roads (<400 vehicles/day)
 - Ten year projection re low volume road
 - Low volume roads that are key emergency access roads are not excluded
- Main Railroad Lines



Non-Critical Infrastructure

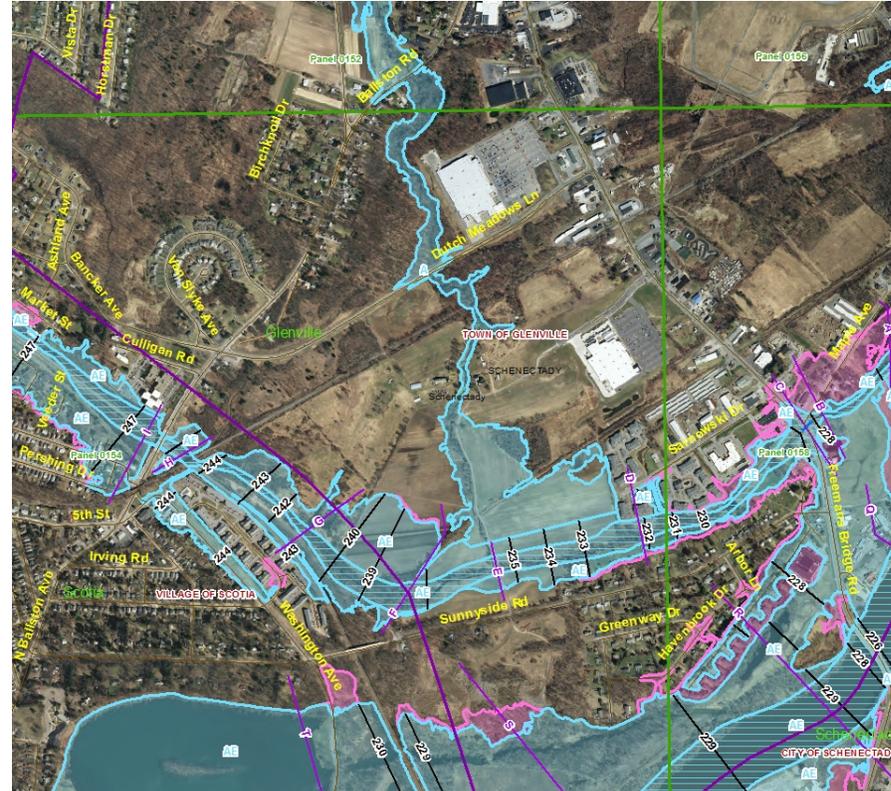
Must be designed to survive flooding and regain functionality within an acceptable period.

Should survive higher of:

- BFE + 2 ft
- 0.2% flood elevation
- Local flood or record
- USGS Future Flow Explorer using RCP 8.5 projection for operational life of facility + 2 ft

Where No Base Flood Elevations

- Use Higher of:
 - 3 ft Above Highest Adjacent Grade
 - High Water Mark from a flood
 - BFE from reputable source plus 2 ft
 - Develop BFE if development disturbs at least 2 acres or consists of at least 20 lots



Climate Informed Science Approach

Federal Climate Science Guidance

- Best Available
 - Transparent
 - Technically Credible
 - Usable
 - Legitimate
 - Flexible
- Actionable
 - Relevant to Decision
 - Reliable
 - Understandable
 - Support of Decisions
 - Co-Produced by Scientists, Practitioners and Decision Makers
 - Meets Needs of Stakeholders



Climate Informed Science Approach

Inland: Use for Larger Developments and Critical Facilities

- USGS Future Flow Explorer using RCP 8.5 Projection for 2050-2074: Application of flood regressions and climate change scenarios to explore estimates of future peak flows
<http://ny.water.usgs.gov/maps/floodfreq-climate/>

Tidal: Use for All Developments

- Medium SLR Projection for 2080s plus 2 ft of Freeboard to higher of Current BFE, Sandy Elevation or Local Flood of Record
- Critical Facilities: Extend SLR Projection to Full Expected Life of Facility and avoid VE zone



File Edit View History Bookmarks Tools Help

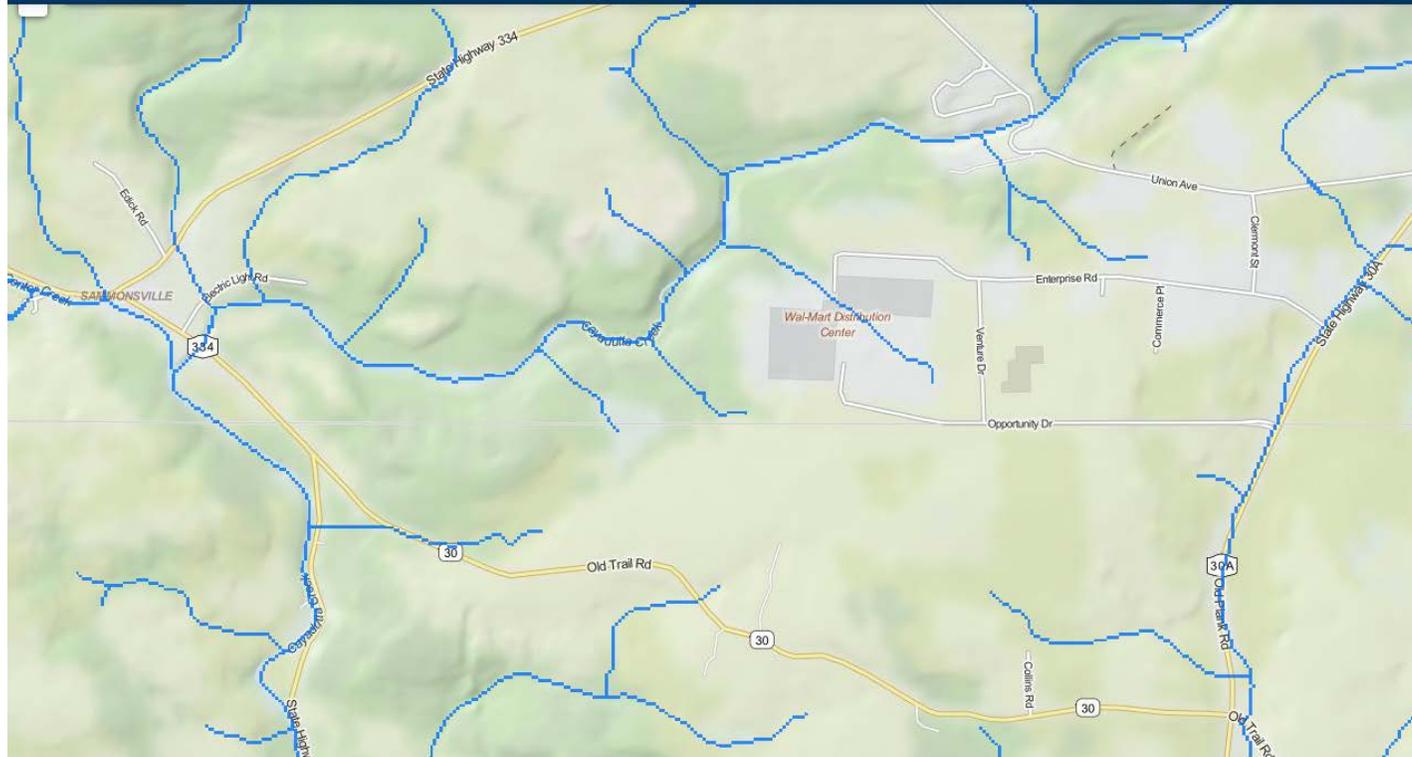
Future Flow Explorer v1.0

http://ny.water.usgs.gov/maps/floodfreq-climate/

Most Visited 42 U.S. Code Chapter 5... Home File Transfer Service From Google Chrome CIS BureauNet Inside Portal Access 2016 Floodplain symp...

Delineate How To Use OFR 2015-1235

USGS science for a changing world **Application of Flood Regressions and Climate Change Scenarios to Explore Estimates of Future Peak Flows**



Accessibility FOIA Privacy Policies and Notices

U.S. Department of the Interior | U.S. Geological Survey
URL: <http://dx.doi.org/10.5066/F7WS8R9S>
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Page Last Modified: Monday, December 28, 2015

USA.gov

Critical Facilities from Part 502, DEC Regs

- (i) facilities designed for bulk storage of chemicals, petrochemicals, hazardous or toxic substances or floatable materials;
- (ii) hospitals, rest homes, correctional facilities, dormitories, patient care facilities;
- (iii) major power generation, transmission or substation facilities, except for hydroelectric facilities;
- (iv) major communications centers, such as civil defense centers; or
- (v) major emergency service facilities, such as central fire and police stations.

Other Facilities that are Critical

- Major Employment Centers
- Water and Wastewater Facilities
- Schools
- Others???

Standards for Critical Facilities

- Part 502 already bans new state projects from Special Flood Hazard Area (100-year floodplain) if it is on list of critical facilities
- For all critical facilities in floodplains if it must go into floodplain, use additional factor of the larger of:
 - Elevation of the area inundated by local flood or record plus 3 ft of freeboard
 - A tidal or inland (upstate) Climate-Informed Science Approach calculated to the full expected operation life of the facility, plus 3 ft



Water Supply Infrastructure Wastewater Treatment Plants

Baseline Standard for Water Supply and Wastewater Treatment Plants and Pump Stations Use the highest of	Critical Equipment (exposed to sea-level rise) Use the highest of	Critical Equipment (not exposed to sea-level rise) Use the highest of
Current BFE + 2 feet	Current BFE + 5 feet	Current BFE + 3 feet
Flood of Record (if available) high-water + 1 foot	Flood of Record high water + 4 feet	Flood of Record high water + 2 feet
0.2 %	0.2%	0.2%
	The elevation and flood hazard area that result from adding the high sea-level rise projection applicable for the greater of the 2080s or the full expected operational life of the facility to the base flood elevation, plus three feet of freeboard.	A climate-informed science approach utilizing the USGS Future Flow Explorer and a hydraulic analysis using the RCP 8.5 projection applicable for the greater of the 2080s or the full expected operational life of the facility to determine the highest 1% annual chance flood elevation through the full expected operational life of the facility, plus three feet of freeboard.

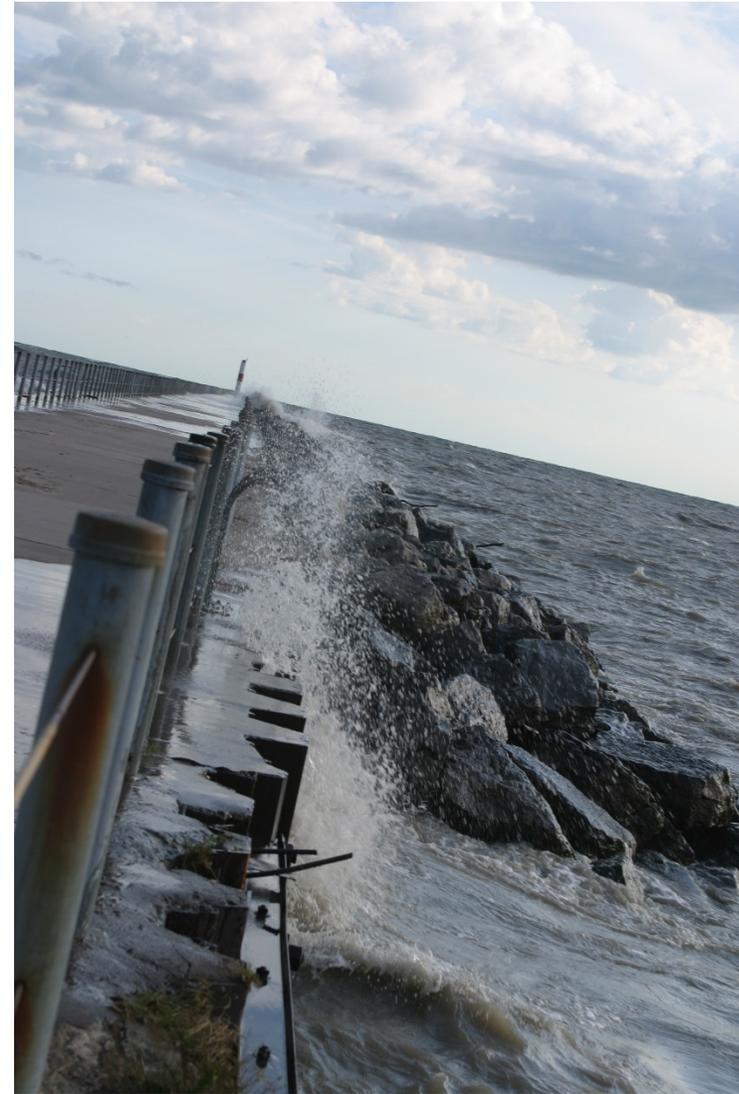
Special Considerations

- Freeboard Approach Requires New Mapping Layer OR Ground Elevation Surveys for All Developments in Larger Floodplain
- Where Digital Maps and good LiDAR Based Topography exist, a BFE plus 2 Line Can be Developed for about \$50,000 to \$75,000 Per County
- Climate Approach always requires surveyed ground elevations

More Considerations

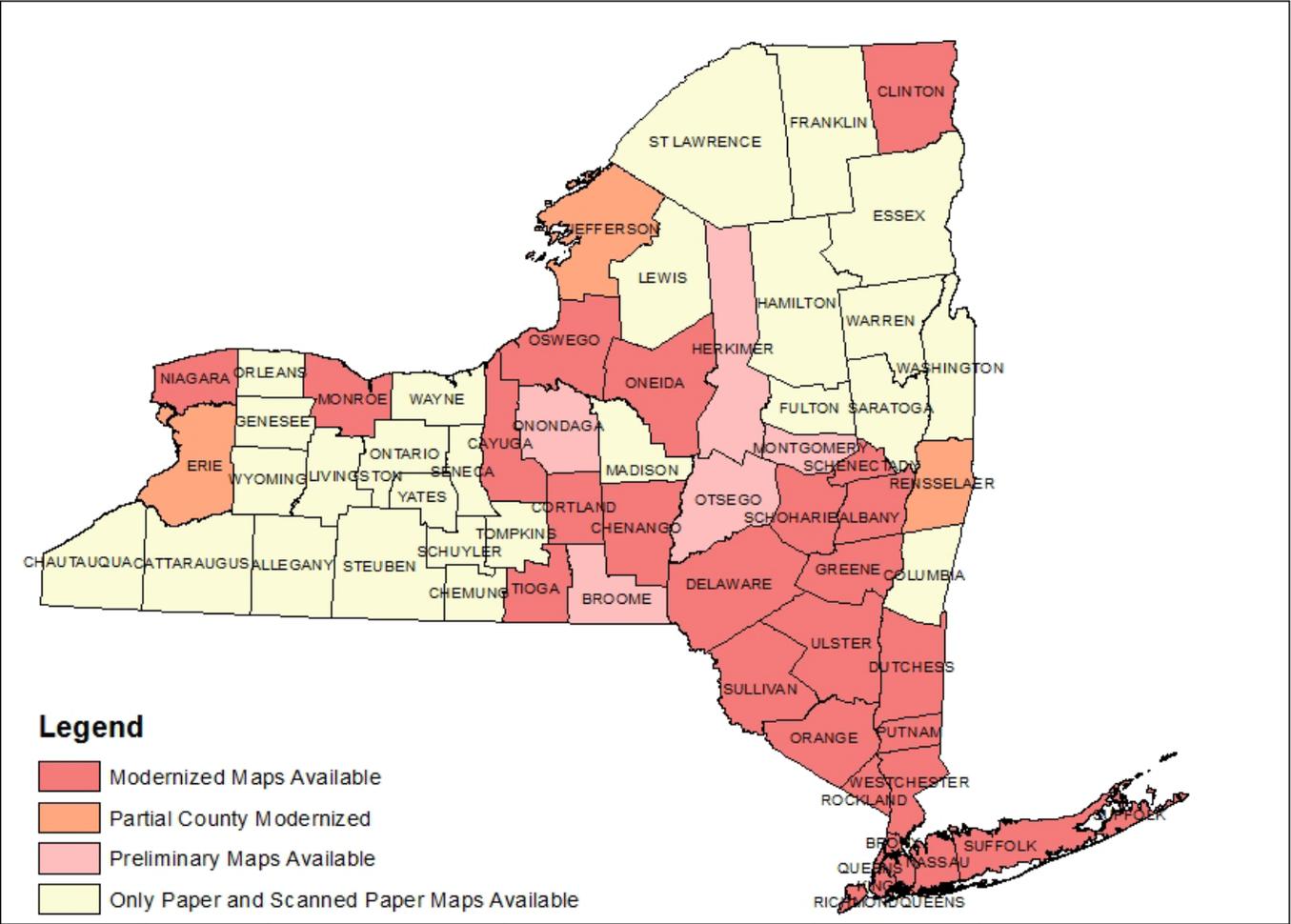
Great Lakes / Large Lakes

- Climate Science does not yet Project Probable Changes in Lake Levels
- IJC Regulation of Lake Ontario Unlikely to Change BFE
- Great Lakes Flood Maps being Revised
 - Will have VE zones and Limits of Moderate Wave Action



Current Flood Zones

FIRM Map Status 2016



Thank You

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Protection of Waters (ECL Article 15, Title 5)



Protection of Waters Permits (ECL Article 15, Title 5)

Applicability:

- Protected waters: classified as Class C(t) or higher
- Navigable waters, including adjacent or contiguous wetlands

Permits are for

- Stream disturbance, including bridges and culverts
- Excavation and fill in navigable waters
- Dams and impoundment structures
- Docks, moorings, and platforms



Protection of Waters Permits

Application review:

- Environmental impact and natural resource values – habitat, water quality, hydrology, etc.
- Adequacy of design/construction
- Operational and maintenance characteristics
- Safe commercial and recreational use of water resources
- Safeguarding of life and property

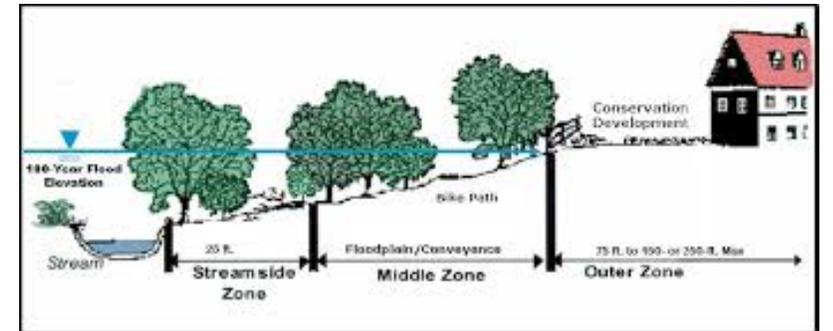
Managed by DEC Division of Fish & Wildlife



Article 15/Section 401 Guidance

- I. Guidance for review of bridges, culverts and other structures
 - a. General and specific design requirements
 - b. High-risk areas
 - i. conditions requiring larger structures
 - c. Low-risk areas
 - i. conditions where smaller structure, smaller height or less embeddedness may be allowed

- II. Streamway setback recommendations





**Department of
Environmental
Conservation**

**Department
of State**

**Department of
Transportation**

Natural Resilience Measures Guidance Community Risk and Resiliency Act

Betsy Blair, DEC Marine Habitat

Kristin Marcell, DEC Hudson River Estuary Program/Cornell

This work is/was sponsored by the National Estuarine Research Reserve System Science Collaborative, which supports collaborative research that addresses coastal management problems important to the reserves. The Science Collaborative is funded by the National Oceanic and Atmospheric Administration and managed by the University of Michigan Water Center.

Our charge

Develop “guidance on use of resiliency measures that use natural resources and natural processes to reduce risk.”

Team includes representatives from

- DEC divisions of Water; Lands and Forests; Fish, Wildlife and Marine Resources; Environmental Permits; Office of Climate Change; Great Lakes Program; Hudson River Ntl. Estuarine Research Reserve, Hudson River Estuary Program;
- DOS Office of Planning and Development;
- DOT.

Which natural features and processes reduce risk from flooding and erosion?

Natural features and natural processes (e.g. wetland, dune, bluff, floodplain, forest, riparian corridor).

Nature-based features that mimic natural features and processes, but are engineered and constructed by humans (e.g. marsh sill, constructed reef)



Examples of Coastal Features



Examples of Watershed Features



Goals for CRRA NRM guidance

- Recognition of value of natural features and processes to reduce risk and provide services
- Recognition of factors/actions that jeopardize ability of natural features and processes to reduce risk
- Standardized descriptions of preferred approaches that conserve, restore or emulate natural features and processes that reduce risk
- Clear guidance for both permit/funding program staff and project applicants.

Contact

Kristin Marcell

Climate Resilience Project Coordinator, Hudson River Estuary Program

(845) 256-3017 | Kristin.Marcell@dec.ny.gov

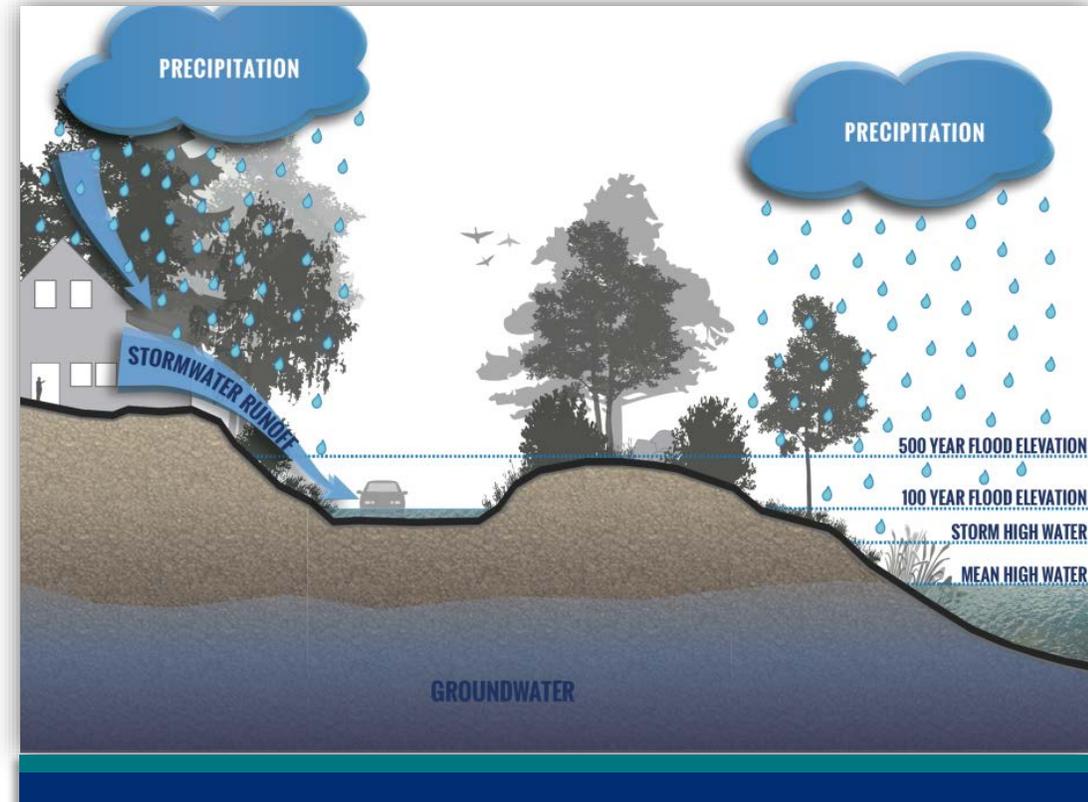
Model Local Laws

Lori Heithoff, Local Government
Specialist

Scope of Model Local Law Publication

CRRA requires DOS, in cooperation with DEC, to prepare model local laws that include consideration of future physical climate risk due to:

- sea level rise
- storm surges
- flooding



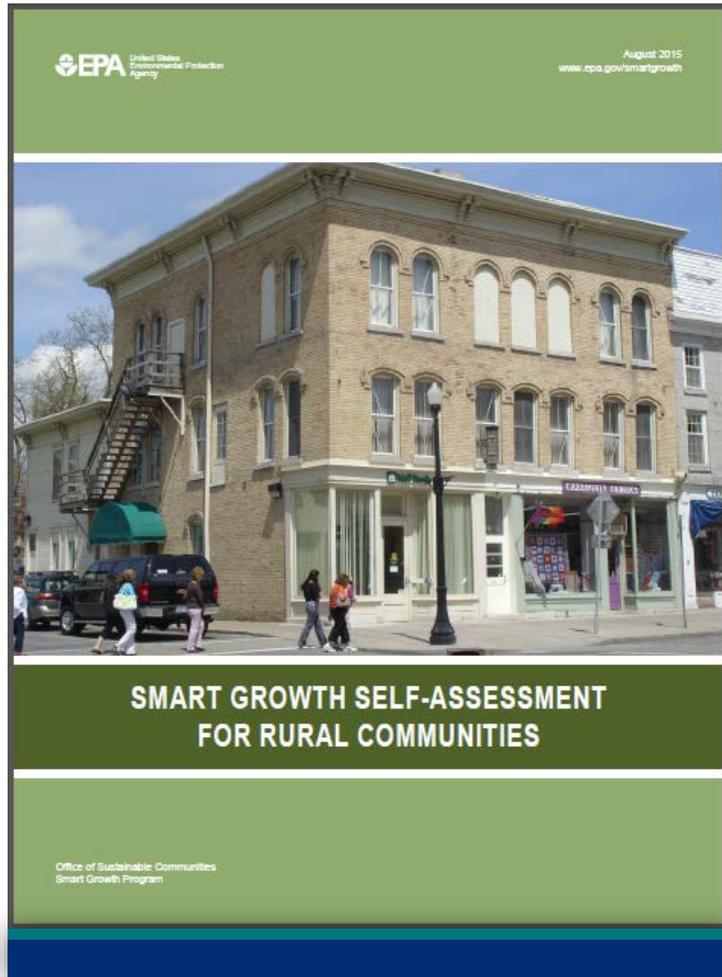
A Variety of Models will be Provided

Risks,
Challenges,
and
Landscapes
Vary

Regulatory
Culture
Differs

Administrative
Capacity
Varies

Local Law Needs Assessment



An Office of the New York State Department of State

A tool is being developed for municipalities to evaluate existing land use regulations and identify weaknesses

- Similar to the Smart Growth Self-Assessment For Rural Communities, EPA (2015) (From Madison County, NY)
- EPA/FEMA Technical Assistance reviewing land & building regulations
- Touro leadership training & technical guidance

Plans and the Level of Local Risk Support Regulatory Choices

- Planning efforts should include all relevant stakeholders
- Resiliency plans should build on or amend existing plans, such as
 - Comprehensive plan
 - Hazard Mitigation Plan
 - NY Rising Community Reconstruction Plan



Increase Resiliency by Filling Gaps in Local Laws

Zoning Districts

Chapter 201: ZONING
Article III: Districts, Boundaries and Regulations

- § 201-11 RA-1 - Residential Agricultural-1 District.
- § 201-12 RA-2 - Residential Agricultural-2 District.
- § 201-13 RR - Rural Residential District.
- § 201-14 HDR-1 - High Density Residential-1 District.
- § 201-15 HDR-2 - High Density Residential-2 District. >
- § 201-16 MU - Mixed Use District. >
- § 201-17 C - Commercial District. >
- § 201-18 CI - Corridor Industrial District. >
- § 201-19 I - Industrial District. >
- § 201-20 Hamlet Overlay District. >
- § 201-21 Residential Density Overlay District. >
- § 201-22 Residential Over Commercial Overlay District. >
- § 201-23 Public Water Supply Watershed Protection Overlay District. >
- § 201-24 Planned Development District. >

**Section 201-10
WR –
Waterfront
Residential
District.**

Existing land use provisions may merely need “plug-ins”

- Paragraphs and definitions can be added to strengthen existing laws

Some topics may need completely new language, or a completely new approach

- New sections of the municipal code may be needed in some cases

Model Local Categories

- Basic Tools of Zoning
- Watercourse and Wetlands
- Coastal Shoreline Protection
- Floodplain Development Restrictions
- Stormwater Control
- Other Natural Resource Regulations
- Resilient Construction

Post-Disaster
Mechanisms

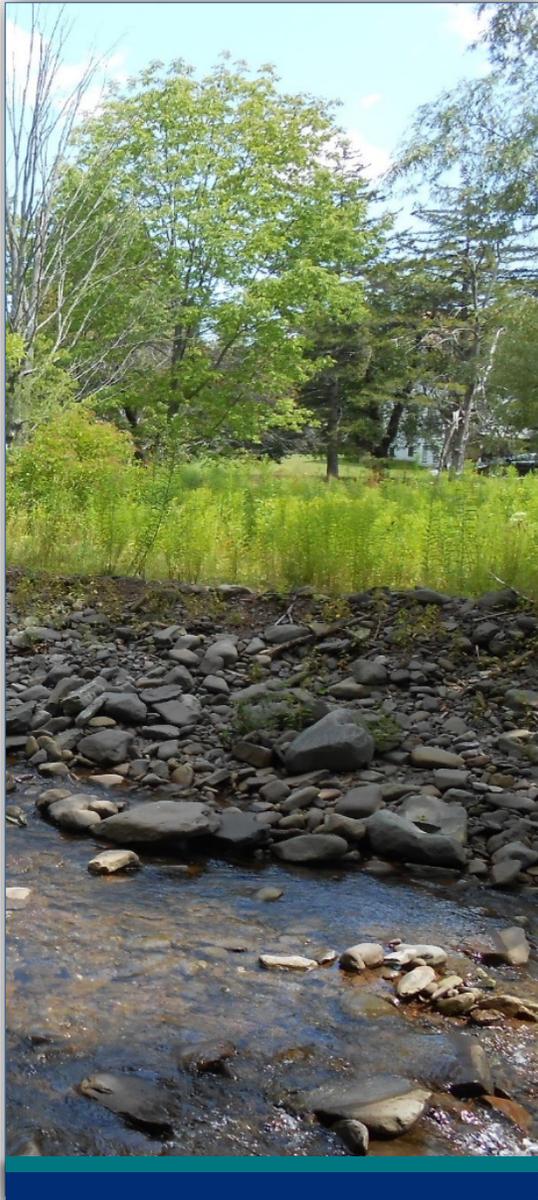


Basic Tools

- Density Standards
- Waterfront Zoning
- Subdivision Regulations
- Site Plan Review

Watercourses & Wetlands

- Comprehensive approach
- Overlay districts
- Buffers in supplemental sections
- Setbacks





Coastal Shoreline Protection

- Wetlands
- Great Lakes Shoreline
- Setbacks & Buffers
- Coastal Erosion
- Living Shorelines
- Dune Protection
- Structural Defenses
- Emergency Activities



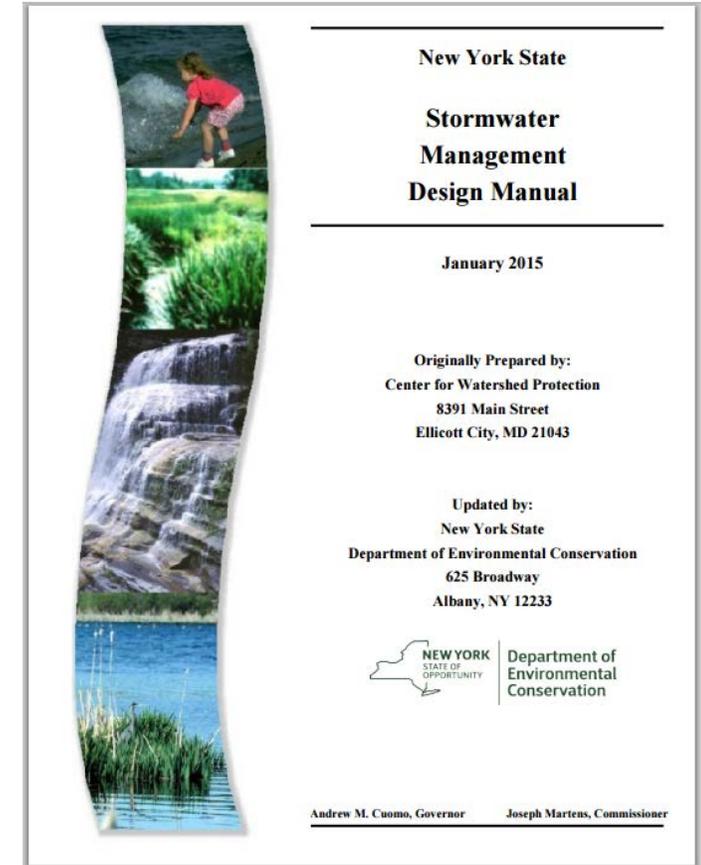
Floodplain Development Restrictions

- Limit uses in 100-year floodplain
- Overlay districts
- Fill
- Flood Damage Protection & Optional provisions

Updated State Model Laws

Substantial compliance with model local laws is needed to participate in:

- National Flood Insurance Program
- Stormwater management and erosion & sediment control in urbanized areas
- Application Review & Permitting in state Coastal Erosion Hazard Areas (CEHA)



Not all Solutions need to be Regulatory

- Acquisition of property
- Zoning incentives
- Local home elevation programs
- Seeking Community Rating System status
- Funding of rainwater barrels

www.dos.ny.gov/opd/

(518)474-6000 Planning & Development

(518)474-6740 Office of General Counsel



**Climate Smart
Communities**

The Climate Smart Communities Grant Program

Part of the Environmental Protection Fund

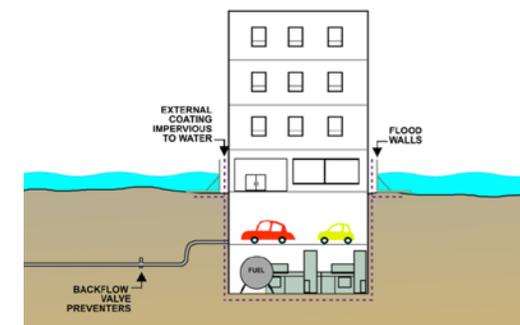
**Office of Climate Change
NYS Department of Environmental Conservation
May 2016**

Funding & Eligibility

- \$11 million for two major project categories:
 - \$10.5 million for *Climate Protection Implementation Projects*
 - \$500,000 for *Climate Smart Communities Certification Projects*
- **Municipalities** are eligible (Counties, Cities, Towns, Villages)
- Other partners may participate as part of a **partnership project** with a designated, eligible lead applicant.
 - *Submit letters of partnership and/or partnership agreements.*

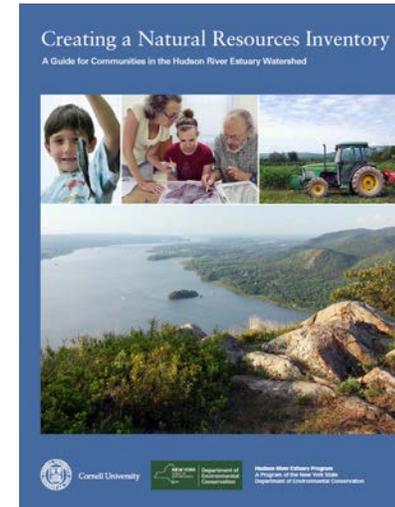
Implementation Projects - *Up to \$10.5 million for adaptation & mitigation:*

- Construction of natural resiliency measures
- Relocation or retrofit of climate-vulnerable facilities
- Conservation or restoration of riparian areas and tidal marsh migration areas
- Reduction of flood risk
- Clean transportation
- Reduction or recycling of food waste
- **Grant size** - \$100,000 to \$2,000,000

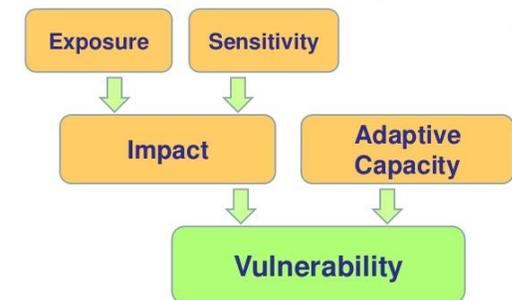


Certification Projects - Up to \$500,000 for certification:

- Right-sizing of government fleets
- Developing a natural resource inventory
- Conducting vulnerability assessments
- Developing climate adaptation strategies
- Updating hazard mitigation plans to address climate change
- **Grant size** - \$25,000 to \$100,000



Vulnerability Assessment Framework

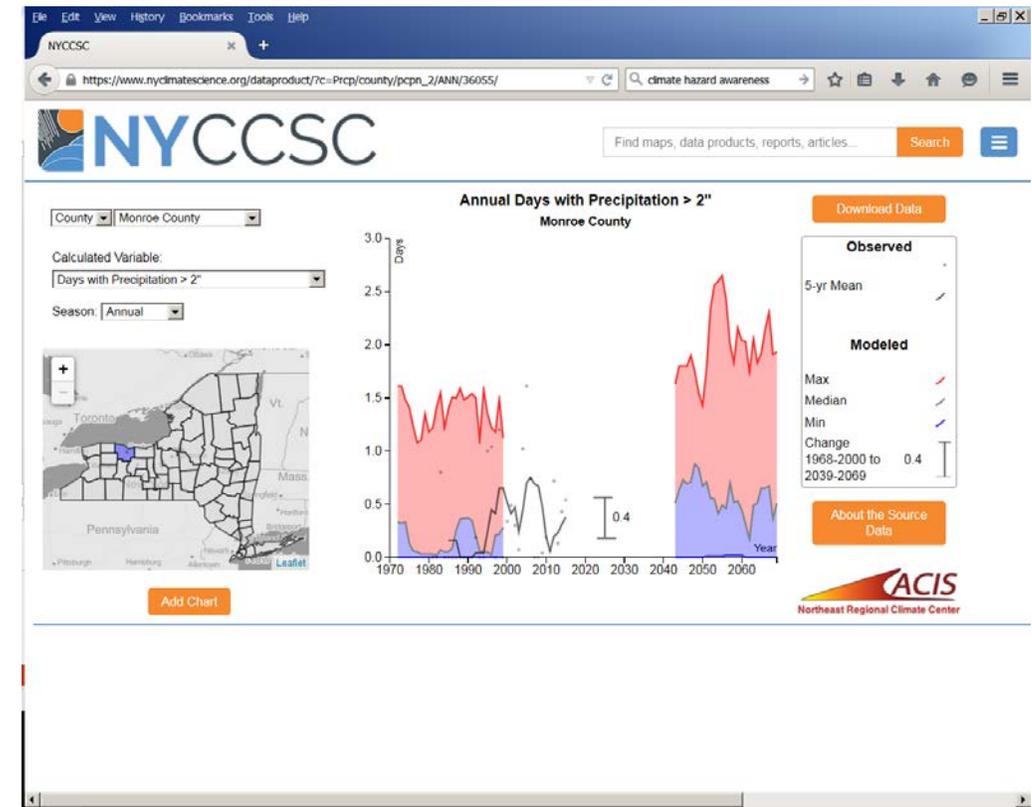
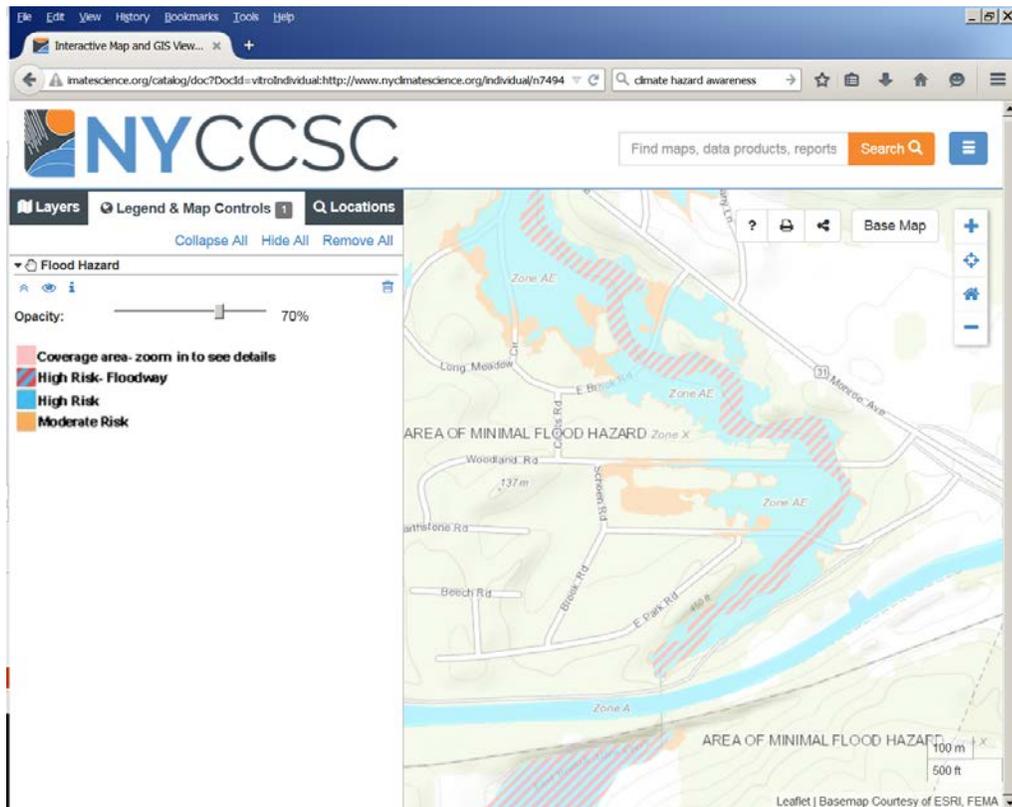


IPCC-oriented definition of vulnerability

Climate Change Science Clearinghouse

Maps, data and documents

Designed for agency and municipal decision makers



<https://www.nyclimatescience.org>

Thank You

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Connect with us:

- DEC: www.dec.ny.gov
- Community Risk and Resiliency Act: www.dec.ny.gov/energy/102559.html
- Climate Smart Communities: www.dec.ny.gov/energy/76483.html
- Facebook: www.facebook.com/NYSDEC
- Twitter: twitter.com/NYSDEC
- Flickr: www.flickr.com/photos/nysdec



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