



Department of
Environmental
Conservation

FLOODPLAIN RESILIENCY EXAMPLES

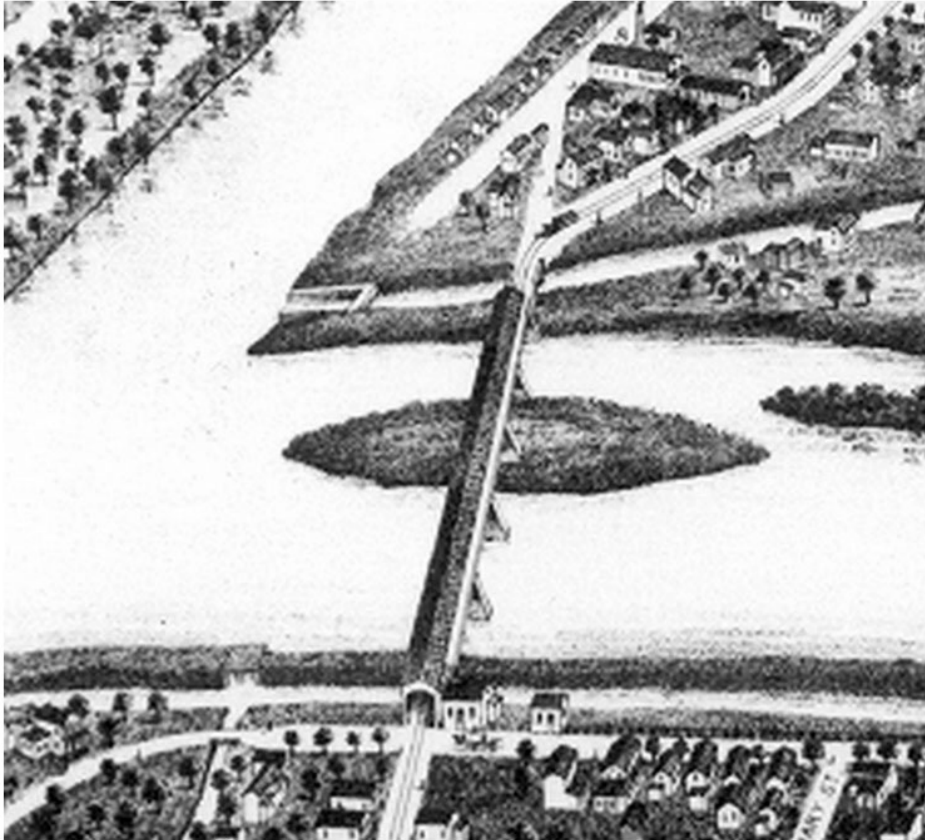
BROOME-TIOGA COUNTIES MUNICIPAL TRAINING

JUNE 26, 2025

OUTLINE

- Historic Context
- What is Acceptable Risk?
- Floodplain Development Examples
- Site Plan Review Considerations
- Floodplain Management for Renewable Energy Projects
- Local Flood Damage Prevention Laws

Historic Context



A 1873 bird's-eye rendering of Binghamton showing the covered bridge.

BROOME COUNTY HISTORICAL SOCIETY/PROVIDED

Citation:
<https://www.goerie.com/story/news/connections/history/2021/03/29/1-50-t/> accessed 4/6/2021.



A view from South Mountain of the toll bridge without its roof and outer walls, about 1883.

BROOME COUNTY HISTORICAL SOCIETY/PROVIDED

DEPARTMENT OF ENVIRONMENTAL CONSERVATION

“In 1829, the two creators of the bridge incorporated the company with several other local residents to form the Susquehanna Bridge Co. The population was growing, and with the opening of the Chenango Canal in 1837, the area was expanding on all sides of the two rivers. Everything seemed fine until 1843, when an ice flood swept away the southern half of the bridge.

“At one moment, a flood took out half of the Binghamton Bridge (current location of East Clinton Street Bridge), which swept into the Chenango Bridge and took out half of that bridge.”

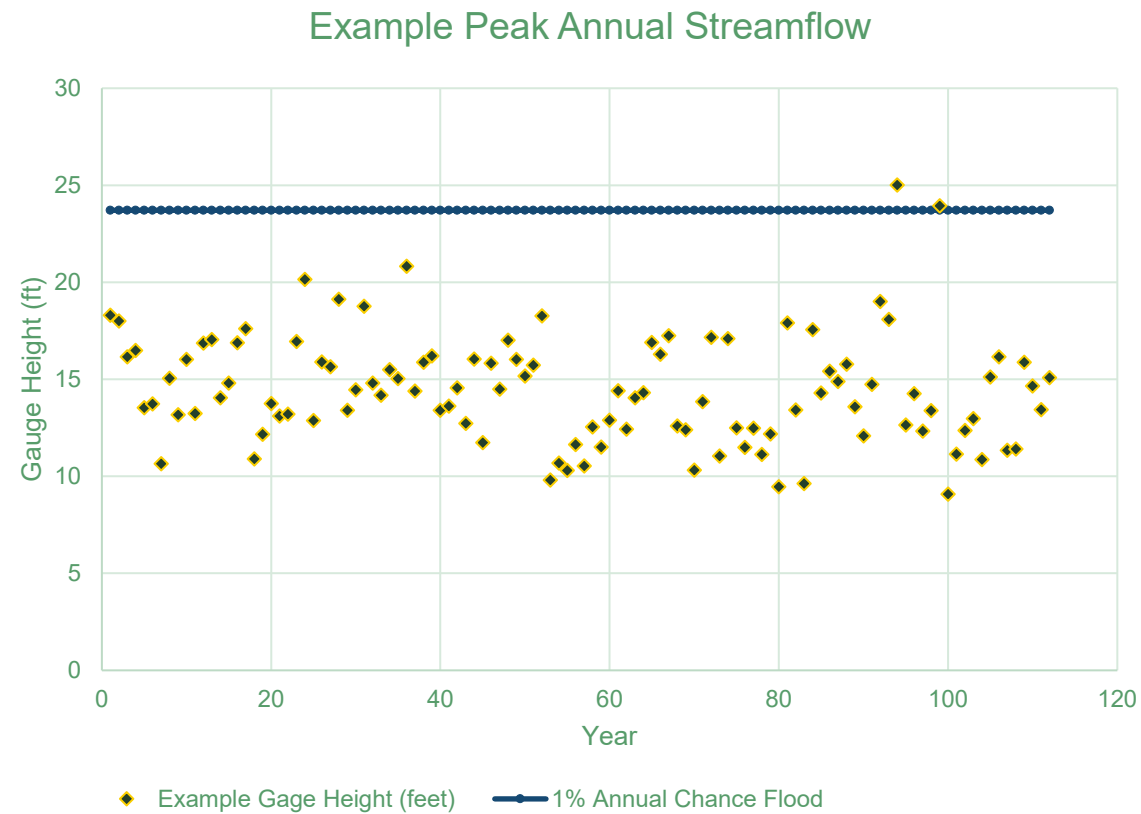
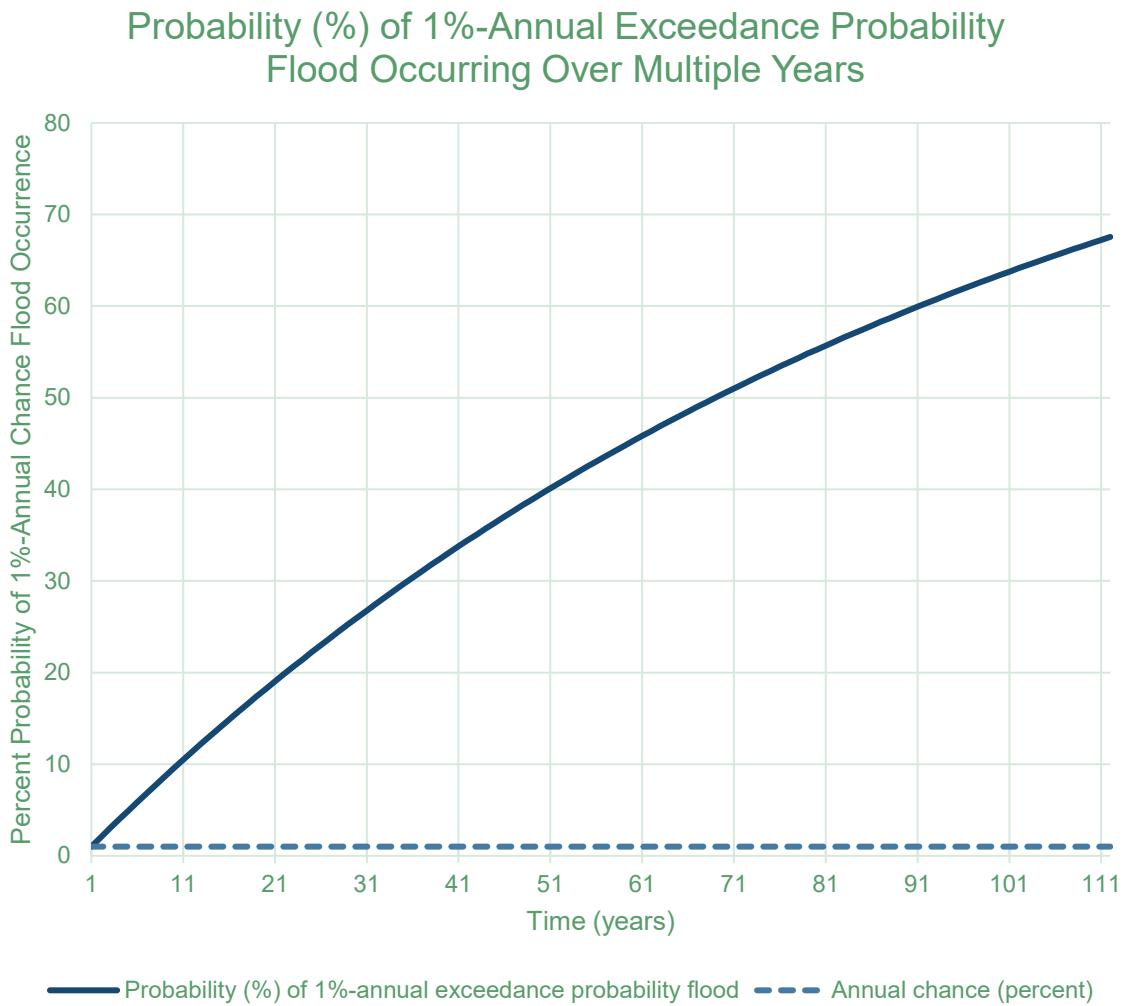
- Wooden bridge structures only lasted 20 or maybe 40 years

“Finally, in 1886 a new bridge and a new design — a triple parabolic bridge made of metal was constructed. Through floods and droughts, the Washington Street Bridge has survived the test of time.”

Citation: <https://www.goerie.com/story/news/connections/history/2021/03/29/1-50-t/> accessed 4/6/2021.

WHAT IS ACCEPTABLE FLOOD RISK?

Acceptable risk is defined as compliance with local law and building codes, commonly 1%-annual chance flood (plus NYS 2 feet freeboard), which varies by building type and flood zone, e.g. agricultural barn versus hospital (critical infrastructure), reference ASCE 7 and ASCE 24.



Note 1% Annual Chance Flood concept came into use circa 1960s.

WHAT IS FLOODPLAIN DEVELOPMENT?

- "Development" means any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, paving, excavation or drilling operations or storage of equipment or materials.
- Generally all new or substantially improved development in floodplain should be compliant with local flood damage prevention law, building codes, and associated technical standards.



Elevated house construction in progress



Completed construction apartments/mixed use

FLOODPLAIN DEVELOPMENT EXAMPLES, OPTIONAL ALTERNATIVES TO TRADITIONAL BUILDING STRUCTURE DEVELOPMENT: AGRICULTURE



FLOODPLAIN DEVELOPMENT EXAMPLES: AGRICULTURE

- Solar panel elevated
- Pole canopy for vehicle parking
- Greenhouse hoophouse structure with plastic sheeting, sides can raise
- Porta potty used in lieu of development of sewer utilities
- An original parcel will allow storage shed installation (just delivered, will relocate to final location)
- Farm started in 2010 and has since expanded
- Presently (16-17 parcels) approximately 2.3 acres

E.g. Volunteers Improving Neighborhood Environments (VINES) Urban Farm, 20 Tudor St, Binghamton 13901

FLOODPLAIN DEVELOPMENT EXAMPLES: GREENSPACE

- Utilities elevated
- Elevate or floodproof any buildings e.g. bathrooms/maintenance storage, and may use high shelves for elevated storage
- Suggest pavilions oriented parallel to river
- Suggest avoid fence in floodway
- Should make any long-term fill material or compost/wood chip piles in upland area
- Boat ramp (boating/kayaking/fishing access) blend into existing streambank
- Access road flush at grade.

E.g. park, golf course, trail

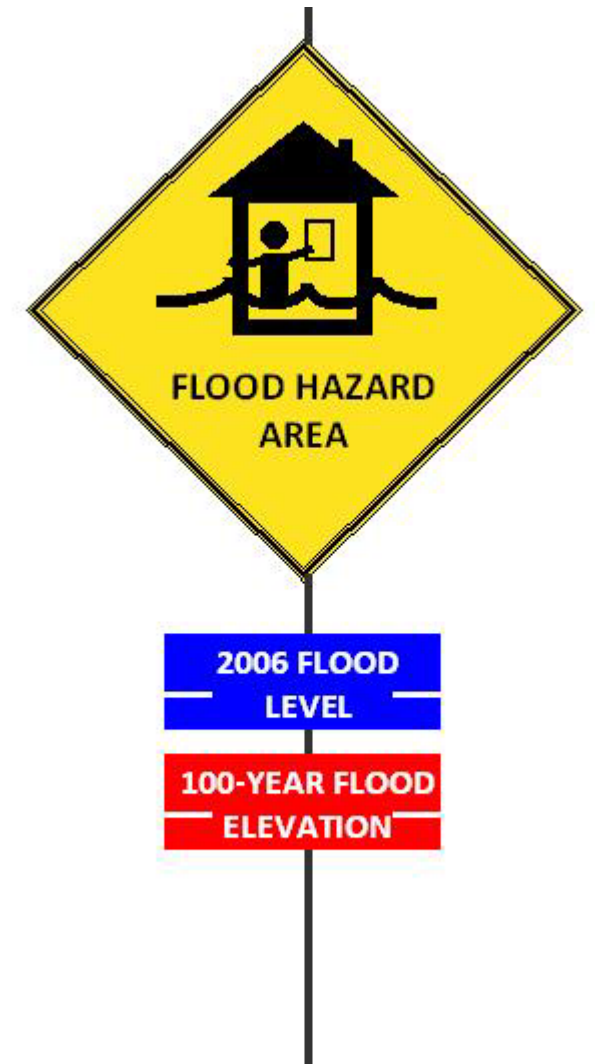
FLOODPLAIN DEVELOPMENT EXAMPLES: PARKING LOTS



FLOODPLAIN DEVELOPMENT EXAMPLES: OUTREACH/EDUCATION

Tioga County Signage Example

- Approximately 11 signs installed after 2006 flood.
- Grant for the signs (community visual landmarks), also included development and printing of a brochure, webpage update, and stream seminar the SWCD district held.
- Tioga County Emergency Management Office and Economic Development & Planning Office applied for and received Hazard Mitigation Grant Program funding from the Federal Emergency Management Agency to focus on educating the public about flooding.
- The Tioga County Highway Department installed the signs, while the Tioga County Soil & Water Conservation District (SWCD) determined the correct elevations to place the 100-year flood markers.
- The blue markers denote the level of the 2006 flood as determined by existing marks and recordings.
- The red markers depict the 100-year base flood elevation as determined by FEMA flood maps.



FLOODPLAIN DEVELOPMENT EXAMPLES: OUTREACH/EDUCATION



Troy, NY highwater mark along Hudson River



FLOODPLAIN DEVELOPMENT EXAMPLES: FUNCTIONALLY DEPENDENT USE



Sewer pump station elevated controls for two 5 horsepower pumps

FLOODPLAIN DEVELOPMENT EXAMPLE: BRIDGES



- For smaller bridges single span/upsized culverts may be preferable to avoid debris jams, if feasible from engineering perspective.
- Avoid fill in floodway, generally design to highway standards and basic floodplain requirements (LOMA as needed)
- Permit review to “determine if the proposed development adversely affects the area of special flood hazard. For the purposes of this law, adversely affects means physical damage to adjacent properties.”
- Floodplain administrator has the option of requesting a hydraulic engineering study if needed to make this determination.
- If needed, variance may be issued for temporary causeway fill during construction

Top: during construction, Bottom: post-construction

SITE PLAN REVIEW – GENERAL ITEMS

- Development of special flood hazard area is allowed, following local law and NYS building code requirements.
- Note compliant construction reduces but does not eliminate flood risk, and there is also flood risk in areas beyond the 1%-annual chance floodplain.
- Plans need to show information adequate to verify compliance with NFIP, local law, and building code minimum standards. Ensure floodplain and, if applicable, floodway boundaries are shown on plans
 - Zone AE: Base flood elevation (BFE) to nearest tenth of foot shown
 - If development in floodway, demonstrate no net rise to nearest hundredth of foot (0.00 ft) by hydraulic model ([DEC weblink](#)) typically HEC-RAS analysis. Note Communities with mapping in NYS dated 1978 to 1986 may have the floodways delineated on a separate map panel. This critical information is not shown when searching by address on FEMA's Map Service Center. To find the additional panel search "all products" on the MSC.
 - Zone A Unnumbered (Residential): BFE to nearest tenth of foot,
 - Zone A Unnumbered (Commercial/ Non-residential): highest adjacent grade plus 3 feet
- For any structures, show floor elevations to nearest tenth or hundredth of foot.
 - Details on any crawl space or basement (typically not allowed except "walk out" for parking, access, or storage)
- Show quantities of any cut/fill.
- If near a publicly-owned levee, consult with levee owner (eg. USACE/DEC/County/Town) regarding flood control land use permitting requirements.

SITE PLAN REVIEW - SCENARIOS

- Situations requiring map revisions
 - Letter of map revision based on fill (LOMR-F)
 - Apparent error in floodplain map (FIRM)
 - Bridge clearance, dam spillway, or other improvements which modify or reduce floodplain
- Situations requiring no map revisions, ie. (no floodway impacts) and none of the above.
- Special circumstances involving prior undocumented changes to the floodplain
 - Require mitigation to maximum extent practicable (as FEMA defines it) and, if appropriate, issue floodplain permit after the fact.

SITE PLAN - EXAMPLE

Shipping container (material storage)

- Require analysis of floatation/stability (worst case when empty) and elevation/anchoring, or not allow storage.
- Chemical tanks elevate, or anchor and floodproof.
- Requirement: No “physical damage to adjacent property”
- May want to require orient containers parallel to river flow



FLOODPLAIN MANAGEMENT GUIDELINES FOR SOLAR ARRAY AND WIND FARM PROJECTS



Department of
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Conservation



SOLAR ARRAYS AND WIND FARMS are collections of multiple solar panels or wind turbines that generate electricity as a system. They are often constructed across rural areas

The site construction plans should delineate all floodplain and floodway areas. Design criteria for areas of floodplain disturbance include:

1. **AVOID FLOODWAY AREAS**, if possible. Conduct hydraulic and hydrologic analysis showing no-rise (0.00 feet) if any development will encroach into designated floodway (see item 3 below).
2. **FOR SOLAR ARRAYS**: Elevate the lowest edge of all photovoltaic panels, when at full tilt, at least 2 feet above the Base Flood Elevation (BFE) in Zone AE or Zone A1–A30. If the site is in Zone A, with no BFEs, the panels must be elevated at least 3 feet above the Highest Adjacent Grade of the full tilt position. Column embedment must be enough to provide structural stability while assuming reasonably anticipated scour during the 1% event.

MODEL LOCAL LAW

June 2025

Please note for the purpose of the NYS Assessment for the CAP-SSSE Tiered State Framework, this is the current Model Local Law for NYS Communities that fall under the 44 CFR 60.3D requirements

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION LOCAL LAW FOR FLOOD DAMAGE PREVENTION INSTRUCTIONS

The attached MODEL LOCAL LAW is designed to comply with the floodplain management requirements of the National Flood Insurance Program contained in 44 CFR 60.3 (b, c, & d). The Department of Environmental Conservation (DEC) has included several optional administrative provisions in the MODEL LOCAL LAW which are strongly recommended for proper administration. **Any changes made to this MODEL should be reviewed by the community's attorney and either the DEC or the Federal Emergency Management Agency (FEMA) before enacting.** DEC and FEMA must be provided a list of any changes to this model at the time of filing.

Department of State Filing Forms - insert all required information. Blank Local Law Filing Forms, including instructions and an online interactive version, can be found at <https://dos.ny.gov/local-law-filing>.

The following sections must be completed by the community:

Sect. 1.1 - Insert legislative body and the name of the community twice.

Sect. 3.2 - If you are enacting this Local Law to comply with FEMA requirements associated with new community or county Flood Insurance Rate Maps, the Department of Environmental Conservation will include in this package a replacement Page 7 with the mapping information filled out. Simply insert the name of the community in Section 3.1 and **insert the location where the Flood Insurance Study and/or maps are on file.** Otherwise, follow the instructions for Page 7, below.

Sect. 3.1 - Insert the name of the community.

Sect. 3.2 - Complete (1) through (5) as necessary, according to the documents your community has been furnished by the Federal Emergency Management Agency (FEMA). Cross out or delete any unused subsections. Documents you may have received are:

- (a) Flood Insurance Study report--a brown or buff colored booklet, which contains technical data on flooding in the [community](#).
- (b) Flood Insurance Rate Map (FIRM)--a map in either an 11"x17" flat or a Z-fold (road map style) format. If the map consists of more than one panel, an index panel is usually included. The FIRM shows locations of areas of special flood hazard in the community; and,
- (c) Flood Boundary and Floodway Map (FBFM)--a Z-folded sheet that shows the location of floodways in the community.

If your community received only a single FIRM map, fill in (1). The community number, a six digit number whose first two digits are 36, is required and is found in the lower right corner of the FIRM. The community number may also have a letter suffix, which should also be included. Also include the "effective date" shown on the map.

If you received a FIRM map with more than one panel, fill in (2). Be sure to show the community number and the panel numbers (e.g., 361540 0001-0025) and the letter suffix, if one is shown. Also include the "effective date" shown on the index panel.

Intermunicipal Agreement and Optional Additional Language

INTERMUNICIPAL FLOODPLAIN MANAGEMENT AGREEMENT

THIS AGREEMENT made as of the date of its execution by both parties is by and between _____ ("County"), a municipal corporation under the laws of the State of New York with offices at _____, New York _____ and the CITY OF _____, ("City"), a municipal corporation under the laws of the State of New York, with offices at _____, New York _____.

WHEREAS, the Federal Emergency Management Agency (FEMA) and the New York State Department of Environmental Conservation (NYSDEC) have promulgated regulations concerning the National Flood Insurance Program (NFIP), which, inter alia, require cities to enact a local law adopting certain floodplain management regulations; and

WHEREAS, the local law must include the designation of a "Local Administrator" as defined in such local law to administer and implement the provisions of the local law including enforcement thereof; and

WHEREAS, the City has or will adopt a local law naming the _____ as the local administrator; and

WHEREAS, _____ County has personnel trained in building code administration and enforcement activities and has the knowledge and expertise to administer and enforce the applicable floodplain management requirements; and

WHEREAS, _____ County is willing and able to assist the City by undertaking to act as the Local Administrator on behalf of the City in accord with the City floodplain prevention local law; and

WHEREAS, the City wishes to utilize the services offered by _____ County to effectuate the purposes of the local law; and

WHEREAS, pursuant to Article 5-G of the General Municipal Law the County and City are authorized to enter into a Municipal Cooperation Agreement with respect to the activities provided for herein.

NOW THEREFORE, in consideration of the mutual promises set forth herein the parties agree as follows:

1. _____ County agrees to act as Local Administrator for the City under the City's local law, which is incorporated herein by reference. The County will so act through its County Code Enforcement Office.
2. The City agrees to designate the _____ as its Local Administrator under the City local law for flood damage prevention.

Model Local Law for Flood Damage Prevention Optional Additional Language

General Comments.

The Model Local Law for Flood Damage Prevention contains language that complies with the floodplain management requirements of the National Flood Insurance Program (NFIP) contained in federal regulations 44 CFR 60.3 through 44 CFR 60.6. These requirements are minimum requirements for participation in the NFIP. The Federal Emergency Management Agency (FEMA) has calculated that buildings built to these standards suffer 70% less flood related damage than unprotected buildings. However, they can still suffer damage, so higher protection levels are warranted in most instances. For example, floods can be higher than the base flood elevation for various reasons, including larger storms, downstream obstructions, increased watershed development and floodplain filling. Setting higher standards protects against these risks.

Many of the following techniques result in lower flood insurance premiums either directly or through the Community Rating System (CRS). The CRS is a FEMA program that provides discounts for communities that take measures that are beyond the minimum requirements of the NFIP. CRS certification requires a community to accumulate at least 500 points. Flood insurance policies within communities with over 500 CRS points receive a five percent discount on each individual insurance premium. Flood insurance policies within flood hazard areas in CRS communities receive an additional five percent discount for each additional 500 points. Contact NYSDEC or visit the CRS Resource Center at <http://training.fema.gov/emweb/crs/> for more information about the Community Rating System.

The following pages contain ideas for options to decrease your community's flood risk. These are all optional. Each page contains an explanation of the measure and language that may be used. Should your community decide to utilize any of these measures, please make sure that any changes are brought to the attention of NYSDEC so that we may review the final language and assure that it is compliant with FEMA's regulations.

For more information about techniques to reduce flood risk in your community, see the publication "No Adverse Impact: A Toolkit for Common Sense Floodplain Management" by the Association of State Floodplain Managers (ASFPM). The Toolkit may be viewed at http://www.floods.org/NoAdverseImpact/NAI_Toolkit_2003.pdf or ordered directly from ASFPM by calling 608-828-3000. Questions about these materials may be addressed to the NYS DEC Floodplain Management Section at 518-402-8185 or floodplain@dec.us.gov.

Weblink: <https://dos.ny.gov/model-local-laws-increase-resilience>

CLOSING REMARKS

- Cultivate a sense of curiosity and wonder for our natural resources streams/waterbodies and living in balance with them.
- Ensuring compliant development and/or preserving floodplain areas will increase the property values of adjacent areas and allow community wealth to grow over time.
- Embrace resilient vision for future development.



Thank You

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**New York State Department of Environmental
Conservation**

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