



Flooding

Tier 2 Worksheet



Community Environmental Management

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Community Environmental Management

Flooding

Tier 2 Assessment Worksheet

CEM Overview

Flooding is a natural process, and is an integral part of the life and health of a stream. It is the means by which the landscape evolves. Precipitation runs off into streams, and during floods, the excess is then spread across the floodplain, dissipating the energy of the floodwaters and blanketing the floodplain with nutrient rich sediment. Historically, farmers have relied on this process to give them bountiful crops. Many species of fish rely on the flood to tell them when to start their migration to spawning habitat, and the floods themselves provide the habitat for them to do so. New features like gravel beds, channels and islands are scoured or formed. Many species of plants rely on floodwaters to carry their seeds to new areas, establishing new populations. All of these things result from the natural flooding process.

In the past century, we have seen a rise in the amount of damage to public and private property from flooding. While it may be linked to climatic fluctuations (e.g. El Nino), it is most permanently affected by land use changes that have occurred as a result of development. For the most part, lack of understanding of ecosystem function, poor planning, and general indifference have jeopardized our safety when it comes to flooding. These land use changes are limiting the area that is available to manage these excessive flows, and as a result, life and property are at risk.

The first and most obvious problem is development of floodplains, putting life and possessions in the path of a force of nature. Second, upland areas have been developed and urbanized. This brings an increase in the amount of impervious area, which in turn increases the amount of water that runs off, instead of infiltrating into the soil and recharging groundwater resources. This increase in water quantity and velocity has increased erosion and accelerated the runoff process, altering the natural resource patterns and increasing the flood hazard. Third, this increase in water volume and velocity increases the rate of erosion and transport of pollutants from urbanizing upland areas.

In New York State, local governments through their planning and regulatory functions, have the principle responsibility for controlling development activities. This role carries with it the responsibility for ensuring that development activities are undertaken with public health and safety of future inhabitants in mind, and in a manner that is compatible with the protection and enhancement of natural resources, including water.

The purpose of this flooding worksheet is to assess the nature of flooding problems in the community and to evaluate the capacity of the community to remediate existing flooding problems and to prevent their reoccurrence. The following is intended to provide insight into the evolving subject of flood management.

Summary of Flood Management Practices

The Upper Susquehanna Coalition has partnered with the Water Resources Institute at Cornell University and developed a "Multiple Barrier Approach" (MBA) to address watershed issues that integrates planning and implementation to form a cohesive and effective unit. The MBA can be used to address flooding issues at the source, across the landscape, in the stream corridor, and outside the physical watershed in the policy and decision making process. By developing several management options at these different levels, the probability of success is increased, along with stakeholder interest.

Flooding is a complex issue, with many factors contributing to the problem. The Federal Emergency Management Agency's (FEMA) Federal Interagency Floodplain Management Task Force developed a list of "Strategies and Tools for Floodplain Management" in 1986 that outlines four main strategies for managing flooding and preventing flood damage in communities:

- 1. Modify Susceptibility to Flood Damage and Disruption**

These management options center on nonstructural measures, and are mostly policy based. They aim to prevent flood damage in the future, as well as mitigate existing problems.

- 2. Modify Flooding**

These are all structural measures that serve to both react to problems that already exist, as well as try to prevent new problems in the future.

- 3. Modify the Impact of Flooding on Individuals in the Community**

This strategy has the most effect on individual landowners. It uses awareness, as well as government aid to protect life and property.

- 4. Protect and Restore the Resources and Functions of the Floodplain**

Floodplains are sponges that in a natural state absorb excess water volume, and filter out pollutants. With increased development, a greater volume of water and pollutants needs to be absorbed and filtered. Unfortunately, with this development usually comes a loss of floodplains and their functionality. This strategy uses education and policy to protect this valuable resource.

How this Worksheet Can Assist your Community in Protecting Life, Property and Natural Resources

This worksheet can be used to help your community to:

1. More fully understand flood management concepts,
2. Assess where your community stands relative to education and land use laws that provide for the protection of wetlands and floodplains.
3. Identify flood management needs, and
4. Begin to map out a flood management strategy for the future.

For help in filling out this worksheet and technical assistance on flooding, it is recommended that you contact your County Soil and Water Conservation District, or area USDA-NRCS Conservationist. Most communities do not have a flood management plan. This worksheet can help your community determine its flood management needs.

Technical references available for communities in New York State to learn more about flood management are listed below.

- The New York State Department of Environmental Conservation's Bureau of Flood Protection has resources for:
 - Coastal Erosion Management and Flooding,
 - Dam Safety,
 - Flood Control Projects, and
 - Floodplain Management

can be found at <http://www.dec.state.ny.us/website/dow/bfp/bfp.htm>, or by contacting the New York State Department of Environmental Conservation, Division of Water, Bureau of Flood Protection, 625 Broadway, Fourth Floor, Albany, NY 12233-3507, Phone: (518) 402-8151

- Information on the National Flood Insurance Program and the National Dam Safety Program can be found on the FEMA web site at <http://www.fema.gov/>, or by contacting FEMA Region II at FEMA Region II, 26 Federal Plaza, Suite 1307, New York, NY 10278-0001, Phone: (212) 680-3600, Fax: (212) 680-3681
- The American Rivers' Floodplain Protection Toolkit is a resource communities can use to protect floodplains and get management ideas. It can be found at <http://www.amrivers.org/floodplainstoolkit/>, or by contacting their Northeast Field Office at 20 Bayberry Road, Glastonbury, CT 06033, Phone: 860-652-9911, Fax: 860-652-9922, Email: lwildman@amrivers.org



Community Environmental Management

- Flooding Tier II Worksheet -

Part 1- Community Risk Assessment Factors

The following is a list of strategies many communities have used to improve their flood readiness and minimize flood damage. The more factors that apply to your Assessment Area, the less likely you are to have adverse flood impacts. Please check all of those you feel you are doing in your community.

Please check all that pertain to your community:

- Develop and/or update a flood mitigation plan.
- Ensure delineated floodplain boundaries are accurate and reflect changes due to development.
- Manage development along or within floodplains to facilitate proper floodplain function.
- Inform homeowners and businesses of existing and potential flooding risks and how their actions influence them.
- Preserve natural stream paths and prevent stream channels being constricted or altered.¹
- Prevent wetlands from being filled or drained.
- Construct new wetlands and/or restore damaged wetlands.
- Enact and effectively enforce stormwater regulations.
- Regularly maintain existing stormwater infrastructure.
- Regularly inspect and maintain existing flood control structures.
- Actively involved in watershed-wide planning and management for flooding or stormwater mitigation.
- Realize the potential for future development in the watershed and plan for increased runoff that will result.
- Realize the potential for an increase in the amount of impervious area in the watershed due to development and plan for increased runoff that will result.
- Consider the cumulative impacts of development on flooding in watershed.
- Utilize reliable and accurate sources of technical expertise to review site plans for potential flooding impacts.

¹ Natural stream design does not reduce flooding; it restores the natural flood plain and promotes natural flooding.



Part 2- Community Problem & Needs Assessment

Part 2 of this assessment will help to determine how extensive flooding is in your community and what is your community's capacity for addressing flooding issues.

Problems Associated with Increased Flooding	Causes	Impacts	Remedial & Preventative Strategies
<p>Storm sewers backing up ___ Yes ___ No</p> <p>Locations (List): _____ _____</p>	<p>1. Increase in rate and volume of runoff due to increased % of impermeable surface area in watershed from development.</p> <p>2. Loss of wetlands that function to receive excess rainfall and release it slowly.</p> <p>3. Deposition of sediment decreases capacity of conveyances</p>	<p>Check those impacts that apply:</p> <p>___ Increased flooding and flood damages</p> <p>___ Expansion of the floodplain</p> <p>Magnitude and duration of the flooding (Explain): _____ _____</p>	<p>Strategy: Modify Susceptibility to Flood Damage and Disruption</p>

<p align="center">Management Options (Indicate with a "√" if community has implemented or use a "?" if community is interested)</p>	<p align="center">Barriers To Implementation</p>	<p align="center">Community Assistance Needs²</p>
<p>Options:</p> <ul style="list-style-type: none"> ___ Street sweeping ___ Regularly maintain catch basins ___ Properly size your storm sewer system and schedule review dates to make sure sizing keeps up with growth of development and increases in runoff in the watershed ___ Educate about impervious area and infiltration. ___ Proper sizing and installation of private stormwater conveyances ___ Properly maintain storm sewers so that sediment deposition does not reduce their capacity. ___ Implement a proper clearing and snagging program to remove debris blocking culverts and bridges. ___ Modify subdivision and building rules and regulations to modify the required amount of impervious area (Road widths, curbing, etc.) ___ Restrict filling and development of flood plains. ___ Preserve the flood attenuation benefits of wetlands in the watershed ___ Develop, implement and enforce a flood mitigation plan based on FEMA guidelines to prevent flood damage to buildings and infrastructure. ___ Adopt, implement and enforce the updated New York State Model Floodplain Management Law locally. ___ Provide flood hazard documentation, FEMA FIRM and historical flood data to the public. ___ Consider flood hazards in the Master Plan and Land Use Regulations. ___ Make sure the Planning and Zoning Boards refer to flood hazard data when developing land use policy and issuing approvals to development and redevelopment. 		

² List type of assistance needed: information/education; assessment/planning; BMP design/implementation; regulatory options; project funding; etc.

Problems Associated with Increased Flooding	Causes	Impacts	Remedial & Preventative Strategies
Storm sewers backing up, continued			<u>Strategy:</u> Modify Flooding <u>Strategy:</u> Modify the Impact of Flooding on Individuals and the Community

<p align="center">Management Options (Indicate with a "√" if community has implemented or use a "?" if community is interested)</p>	<p align="center">Barriers To Implementation</p>	<p align="center">Community Assistance Needs³</p>
<p>Options:</p> <ul style="list-style-type: none"> ___ Require developers and engineers to use stormwater BMPs outlined in the Blue Book and the Stormwater Management Design Manual. ___ Protect of existing river and stream corridors and their floodplains from development. ___ Develop a watershed land treatment program to reduce sediment and runoff from farming, timber harvesting, and construction activities. ___ Develop a stormwater management program. ___ Ensure proper function of man made diversions (e.g. bypass channels) through proper construction, inspection and maintenance. ___ After installation, monitor flood and stormwater management structures to make sure they have not moved the flooding problem elsewhere. 		
<p>Options:</p> <ul style="list-style-type: none"> ___ Promote participation in and awareness of the flood insurance program ___ Provide disaster assistance to the community, or make resources available to help them access other sources of disaster assistance ___ Put a flood warning system in place and test it regularly ___ Develop and update flood stage forecast maps available to the community, and train emergency personnel to use them ___ Develop and test an emergency plan for the community to addresses flood emergencies ___ Develop and test a flood emergency flood evacuation plan for the community ___ Assemble an emergency response team trained in handling toxic and hazardous materials in flood situations (e.g. volunteer fire department) ___ Assemble a water rescue team, or make sure one is available regionally ___ Provide training and/or informational programs on flood damage prevention for municipal officials, planning and zoning, floodplain permit administrators, CEO, building inspectors, and homeowners ___ Provide an approved list of contractors and consultants who are knowledgeable and trained in flood proofing, retrofitting and construction available to the public ___ Offer tax adjustments for those who grant conservation easements or do not develop the land they own lies within a flood plain or wetlands ___ Develop a program to purchase development rights or homes in flood plains 		

³ List type of assistance needed: information/education; assessment/planning; BMP design/implementation; regulatory options; project funding; etc.

Problems Associated with Increased Stormwater Runoff	Causes	Impacts	Remedial & Preventative Strategies
<p>Culverts and Bridges overtopped and damaged during storm events ___ Yes ___ No</p>	<p>1. Increase in rate and volume of runoff due to increased % of impermeable surface area in watershed from development.</p> <p>2. Loss of wetlands that function to receive excess rainfall and release it slowly.</p> <p>3. Deposition of sediment decreases capacity of conveyances</p>	<p>Check those impacts that apply:</p> <p>___ Increased flooding and flood damages</p> <p>___ Expansion of the floodplain</p> <p>Magnitude and duration of the flooding (Explain): _____ _____</p>	<p>Strategy: Modify Susceptibility to Flood Damage and Disruption</p>

Management Options (Indicate with a "√" if community has implemented or use a "?" if community is interested)	Barriers to Implementation	Community Assistance Needs
<p>Options:</p> <ul style="list-style-type: none"> ___ Provide for floodplain flows when designing culverts and bridges ___ Properly size culverts and bridges and schedule review dates to make sure sizing keeps up with growth of development and increases in runoff in the watershed ___ Educate about impervious area and infiltration. ___ Proper sizing and installation of private bridges and culverts ___ Provide information about how to properly size and install private bridges and culverts to the public ___ Properly maintain ditches, bridges and culverts so that sediment deposition does not reduce their capacity. ___ Implement a proper clearing and snagging program to remove debris blocking culverts and bridges. ___ Modify subdivision and building rules and regulations to modify the required amount of impervious area (Road widths, curbing, etc.) ___ Protect wetlands and floodplains from development ___ Information and education/technical assistance ___ Develop a program to prevent flood damage to homes, businesses and public infrastructure ___ Develop, implement and enforce a flood mitigation plan based on FEMA guidelines to prevent flood damage to buildings and infrastructure. ___ Incorporate flood proofing requirements in building codes ___ Acquire and or relocate homes and businesses out of the floodway ___ Adopt growth management policies that discourage development and infrastructure improvements in the floodplain ___ Develop a public information and outreach program that identifies homes at risk and provides owners with information on how to reduce flood damage ___ Preserve the flood attenuation benefits of wetlands in the watershed ___ Adopt, implement and enforce the updated New York State Model Floodplain Management Law locally. ___ Consider flood hazards in the Master Plan and Land Use Regulations. ___ Make sure the Planning and Zoning Boards refer to flood hazard data when developing land use policy and issuing approvals to development and redevelopment. ___ Ensure proper review, sizing and installation of private bridges and culverts plans ___ Identify where citizens can be directed if they have questions about how to properly size and install private bridges and culverts (e.g. Soil and Water Conservation Districts) 		

Problems Associated with Increased Stormwater Runoff	Causes	Impacts	Remedial & Preventative Strategies
<p>Culverts and Bridges overtopped and damaged during storm events, continued</p>			<p><u>Strategy:</u> Modify Flooding</p> <hr/> <p><u>Strategy:</u> Modify the Impact of Flooding on Individuals and the Community</p>

Management Options (Indicate with a "√" if community has implemented or use a "?" if community is interested)	Barriers to Implementation	Community Assistance Needs
<p>Options:</p> <ul style="list-style-type: none"> ___ Require developers and engineers to use stormwater BMPs outlined in the Blue Book and the Stormwater Management Design Manual. ___ Protect of existing river and stream corridors and their floodplains from development. ___ Develop a watershed land treatment program to reduce sediment and runoff from farming, timber harvesting, and construction activities. ___ Develop a stormwater management program. ___ Ensure proper function of bridges and culverts (e.g. bypass channels) through proper construction, inspection and maintenance. ___ After installation, monitor flows to make sure they have not created flooding problems elsewhere. ___ Provide information on dealing with nuisance beavers ___ Prepare a management plan for dealing with ice jams 		
<p>Options:</p> <ul style="list-style-type: none"> ___ Promote participation in and awareness of the flood insurance program ___ Provide disaster assistance to the community, or make resources available to help them access other sources of disaster assistance ___ Put a flood warning system in place and test it regularly ___ Develop and update flood stage forecast maps available to the community, and train emergency personnel to use them ___ Develop and test an emergency plan for the community to addresses flood emergencies ___ Develop and test a flood emergency flood evacuation plan for the community ___ Assemble an emergency response team trained in handling toxic and hazardous materials in flood situations (e.g. volunteer fire department) ___ Assemble a water rescue team, or make sure one is available regionally ___ Provide training and/or informational programs on flood damage prevention for municipal officials, planning and zoning, floodplain permit administrators, CEO, building inspectors, and homeowners ___ Provide an approved list of contractors and consultants who are knowledgeable and trained in flood proofing, retrofitting and construction available to the public ___ Offer tax adjustments for those who grant conservation easements or do not develop the land they own lies within a flood plain or wetlands ___ Develop a program to purchase development rights or homes in flood plains 		

Problems Associated with Increased Stormwater Runoff	Causes	Impacts	Remedial & Preventative Strategies
			<p>Strategy: Protect and Restore the Resources and Functions of the Floodplain</p>

Management Options (Indicate with a "√" if community has implemented or use a "?" if community is interested)	Barriers to Implementation	Community Assistance Needs
<p>Options:</p> <ul style="list-style-type: none"> ___ Develop floodplain, wetland, stream corridor and coastal barrier resources regulations to preserve the flood attenuation benefits of wetlands in the watershed ___ Work with communities in the watershed to prohibit the filling or draining of wetlands as a result of development or agriculture ___ Adopt local wetland protection regulations ___ Require necessary sign-offs by State and Federal wetland permitting agencies for proposed projects ___ Develop, implement and enforce stream bank and/or shoreline setbacks to protect banks, and vegetation from development ___ Develop and implement a policy for helping to obtain easements in flood hazard areas ___ Develop and implement a policy for helping to transfer development rights from flood prone areas ___ Minimize stormwater runoff impacts from an increase in development and impervious area in the watershed ___ Address any specific places where changing land use practices contribute to flooding ___ Develop and implement a watershed wide plan for stormwater that takes into consideration the cumulative impacts of changing land uses ___ Plan for increased development and runoff in watershed culverts, bridges, and design them to pass the floodplain flow ___ Enter into an intermunicipal agreement for the watershed wide control of runoff ___ Coordinate or cooperate (outside of a formal agreement) with other communities in the watershed to address flooding issues 		

Problems Associated with Increased Stormwater Runoff	Causes	Impacts	Remedial & Preventative Strategies
<p>Streams overtopping more frequently ___ Yes ___ No</p> <p>Locations (List): _____ _____</p>	<p>1. Increase in rate and volume of runoff due to increased % of impermeable surface area in watershed from development.</p> <p>2. Loss of wetlands that function to receive excess rainfall and release it slowly.</p> <p>3. Modification of stream channel</p>	<p>Check those impacts that apply:</p> <p>___ Increased flooding and flood damages</p> <p>___ Expansion of the floodplain</p> <p>Magnitude and duration of the flooding (Explain): _____ _____</p>	<p>Strategy: Modify Susceptibility to Flood Damage and Disruption</p> <hr/> <p>Strategy: Modify Flooding</p>

Management Options (Indicate with a "√" if community has implemented or use a "?" if community is interested)	Barriers to Implementation	Community Assistance Needs
<p>Options:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Restrict filling and development of flood plains. <input type="checkbox"/> Restrict construction of dikes and levees <input type="checkbox"/> Develop floodplain management land use regulations <input type="checkbox"/> Protect wetlands and floodplains in development and redevelopment policies <input type="checkbox"/> Modify subdivision and building rules and regulations to modify the required amount of impervious area (Road widths, curbing, etc.) <input type="checkbox"/> Develop a program to prevent flood damage to homes, businesses and public infrastructure <input type="checkbox"/> Develop, implement and enforce a flood mitigation plan based on FEMA guidelines to prevent flood damage to buildings and infrastructure. <input type="checkbox"/> Incorporate flood proofing requirements in building codes <input type="checkbox"/> Acquire and or relocate homes and businesses out of the floodway <input type="checkbox"/> Adopt growth management policies that discourage development and infrastructure improvements in the floodplain <input type="checkbox"/> Develop a public information and outreach program that identifies homes at risk and provides owners with information on how to reduce flood damage <input type="checkbox"/> Restrict modification to the stream channel (dredging, straightening, etc.) <input type="checkbox"/> Preserve the flood attenuation benefits of wetlands in the watershed <input type="checkbox"/> Minimize stream channel constrictions downstream (e.g., bridges, culverts, debris) <input type="checkbox"/> Adopt, implement and enforce the updated New York State Model Floodplain Management Law locally. <input type="checkbox"/> Adopt growth management policies that discourage development and infrastructure improvements in the floodplain 		
<ul style="list-style-type: none"> <input type="checkbox"/> Minimize stream channel and floodplain constrictions (e.g., constrictions due to bridges, culverts, debris) <input type="checkbox"/> Provide information on dealing with nuisance beavers <input type="checkbox"/> Prepare a management plan for dealing with ice jams 		
<p>There are other factors that influence flooding, such as stormwater and stream corridor management. We suggest you complete the Tier II Stormwater and Stream Corridor Management Worksheets to further assess your situation.</p>		

Problems Associated with Increased Stormwater Runoff	Causes	Impacts	Remedial & Preventative Strategies
			<p>Strategy: Protect and Restore the Resources and Functions of the Floodplain</p>

<p align="center">Management Options (Indicate with a "√" if community has implemented or use a "?" if community is interested)</p>	<p align="center">Barriers to Implementation</p>	<p align="center">Community Assistance Needs</p>
<p>Options:</p> <ul style="list-style-type: none"> ___ Develop floodplain, wetland, stream corridor and coastal barrier resources regulations to preserve the flood attenuation benefits of wetlands in the watershed ___ Work with communities in the watershed to prohibit the filling or draining of wetlands as a result of development or agriculture ___ Adopt local wetland protection regulations ___ Require necessary sign-offs by State and Federal wetland permitting agencies for proposed projects ___ Develop, implement and enforce stream bank and/or shoreline setbacks to protect banks, and vegetation from development ___ Develop and implement a policy for helping to obtain easements in flood hazard areas ___ Develop and implement a policy for helping to transfer development rights from flood prone areas ___ Minimize stormwater runoff impacts from an increase in development and impervious area in the watershed ___ Address any specific places where changing land use practices contribute to flooding ___ Develop and implement a watershed wide plan for stormwater that takes into consideration the cumulative impacts of changing land uses ___ Plan for increased development and runoff in watershed culverts, bridges, and design them to pass the floodplain flow ___ Enter into an intermunicipal agreement for the watershed wide control of runoff ___ Coordinate or cooperate (outside of a formal agreement) with other communities in the watershed to address flooding issues 		

Problems Associated with Increased Stormwater Runoff	Causes	Impacts	Remedial & Preventative Strategies
<p>Failure of existing flood control structures ___ Yes ___ No</p> <p>Locations (List): _____ _____</p>	<p>1. Increase in rate and volume of runoff due to increased % of impermeable surface area in watershed from development.</p> <p>2. Improper inspection and maintenance of flood control structures</p> <p>3. Sedimentation behind flood control structures decreases capacity</p>	<p>Check those impacts that apply:</p> <p>___ Increased flooding and flood damages</p> <p>___ Threat of loss of life or property</p> <p>Magnitude and duration of the flooding (Explain): _____ _____</p>	<p>Strategy: Modify Susceptibility to Flood Damage and Disruption</p> <hr/> <p>Strategy: Modify Flooding</p> <hr/> <p>Strategy: Modify the Impact of Flooding on Individuals and the Community</p>

Management Options (Indicate with a "✓" if community has implemented or use a "?" if community is interested)	Barriers to Implementation	Community Assistance Needs
<p>Options:</p> <ul style="list-style-type: none"> ___ Make sure sedimentation from increased erosion in watershed does not result in decreased storage capacity of flood storage structures ___ Properly construct and maintain flood control structures ___ Ensure effective inspections and maintenance of flood control structures ___ Assign responsibility for funding and maintenance of abandoned flood control structures ___ Restrict filling and development of flood plains. ___ Adopt, implement and enforce the updated New York State Model Floodplain Management Law locally. 		
<ul style="list-style-type: none"> ___ Ensure flood control structures sized to handle an increase in runoff volume from new development ___ Ensure permanent flashboards (also called stop logs) are not in place on any dams ___ Restore wetlands and habitat after dams are removed ___ Develop a plan to reduce sediment deposition 		
<p>Options:</p> <ul style="list-style-type: none"> ___ Promote participation in and awareness of the flood insurance program ___ Provide disaster assistance to the community, or make resources available to help them access other sources of disaster assistance ___ Put a flood warning system in place and test it regularly ___ Develop and test an emergency plan for the community to addresses flood emergencies ___ Develop and test a flood emergency flood evacuation plan for the community ___ Assemble an emergency response team trained in handling toxic and hazardous materials in flood situations (e.g. volunteer fire department) ___ Assemble a water rescue team, or make sure one is available regionally ___ Provide training and/or informational programs on flood damage prevention for municipal officials, planning and zoning, floodplain permit administrators, CEO, building inspectors, and homeowners 		

Problems Associated with Increased Stormwater Runoff	Causes	Impacts	Remedial & Preventative Strategies
<p>Flooding of homes, businesses, public buildings and highways ___ Yes ___ No</p> <p>Extent (describe): _____ _____</p> <p>Locations (list): _____ _____</p>	<p>1. Increase in rate and volume of runoff due to increased % of impermeable surface area in watershed from development.</p> <p>2. Loss of wetlands that function to receive excess rainfall and release it slowly.</p> <p>3. Deposition of sediment decreases capacity of conveyances</p> <p>4. Nuisance flooding by beavers</p>	<p>Check those impacts that apply:</p> <p>___ Increased flooding and flood damages</p> <p>___ Threat of loss of life or property</p> <p>Magnitude and duration of the flooding (Explain): _____ _____</p>	<p>Strategy: Modify Susceptibility to Flood Damage and Disruption</p>

Management Options (Indicate with a "√" if community has implemented or use a "?" if community is interested)	Barriers to Implementation	Community Assistance Needs
<p>Options:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Accurately delineate boundaries of the floodplain <input type="checkbox"/> Properly size your storm sewer system and schedule review dates to make sure sizing keeps up with growth of development and increases in runoff in the watershed <input type="checkbox"/> Educate about impervious area and infiltration. <input type="checkbox"/> Proper sizing and installation of private stormwater conveyances <input type="checkbox"/> Properly maintain storm sewers so that sediment deposition does not reduce their capacity. <input type="checkbox"/> Implement a proper clearing and snagging program to remove debris blocking culverts and bridges. <input type="checkbox"/> Modify subdivision and building rules and regulations to decrease the required amount of impervious area (Road widths, curbing, etc.) <input type="checkbox"/> Restrict filling and development of flood plains. <input type="checkbox"/> Preserve the flood attenuation benefits of wetlands in the watershed <input type="checkbox"/> Develop, implement and enforce a flood mitigation plan based on FEMA guidelines to prevent flood damage to buildings and infrastructure. <input type="checkbox"/> Outline flood hazard areas on tax maps. <input type="checkbox"/> Contact FEMA about discrepancies in floodplain mapping. <input type="checkbox"/> Regularly review FEMA FIRM for accuracy. <input type="checkbox"/> Adopt, implement and enforce the updated New York State Model Floodplain Management Law locally. <input type="checkbox"/> Incorporate flood-proofing requirements for flood prone areas into building codes. <input type="checkbox"/> Provide emergency high water access and egress routes <input type="checkbox"/> Place utilities above selected flood protection elevations <input type="checkbox"/> Require placement of bulk storage facilities above selected flood protection elevations <input type="checkbox"/> Incorporate flood proofing requirements in building codes <input type="checkbox"/> Provide flood hazard documentation, FEMA FIRM and historical flood data to the public. <input type="checkbox"/> Consider flood hazards in the Master Plan and Land Use Regulations. <input type="checkbox"/> Make sure the Planning and Zoning Boards refer to flood hazard data when developing land use policy and issuing approvals to development and redevelopment. <input type="checkbox"/> Adopt growth management policies that discourage development and infrastructure improvements in the floodplain <input type="checkbox"/> Develop a public information and outreach program that identifies homes at risk and provides owners with information on how to reduce flood damage <input type="checkbox"/> Sponsor a flood damage prevention education/outreach <input type="checkbox"/> Inform homeowners and businesses currently located in flood prone areas of the risks as well as mitigation measures <input type="checkbox"/> Educate real estate agents, mortgage lenders and insurance agents about flood hazards <input type="checkbox"/> Provide a place where can the public go for historical flood information for their property <input type="checkbox"/> Identify areas with basement flooding from high water tables¹ 		

Problems Associated with Increased Stormwater Runoff	Causes	Impacts	Remedial & Preventative Strategies
<p>Flooding of homes, businesses, public buildings and highways, continued</p>			<p>Strategy: Modify Flooding</p>
			<p>Strategy: Modify the Impact of Flooding on Individuals and the Community</p>

<p>Management Options (Indicate with a "√" if community has implemented or use a "?" if community is interested)</p>	<p>Barriers to Implementation</p>	<p>Community Assistance Needs</p>
<p>Options:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Protect of existing river and stream corridors and their floodplains from filling and development <input type="checkbox"/> Develop a watershed land treatment program to reduce sediment and runoff from farming, timber harvesting, and construction activities. <input type="checkbox"/> Develop a stormwater management program. <input type="checkbox"/> Ensure proper function of man-made diversions (e.g. bypass channels) through proper construction, inspection and maintenance. <input type="checkbox"/> After installation, monitor flood and stormwater management structures to make sure they have not moved the flooding problem elsewhere. <input type="checkbox"/> Provide information regarding nuisance beavers <input type="checkbox"/> Prepare a management plan for ice jams 		
<p>Options:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Enforce effective regulations that prohibit development in the floodway <input type="checkbox"/> Educate and encourage homeowners and businesses to participate in the flood insurance program <input type="checkbox"/> Properly flood-proof buildings <input type="checkbox"/> Manage nuisance flooding by beavers <input type="checkbox"/> Promote participation in and awareness of the flood insurance program <input type="checkbox"/> Provide disaster assistance to the community, or make resources available to help them access other sources of disaster assistance <input type="checkbox"/> Implement flood warning system and test regularly <input type="checkbox"/> Develop and update flood stage forecast maps available to the community, and train emergency personnel to use them <input type="checkbox"/> Develop and test an emergency plan for the community to addresses flood emergencies <input type="checkbox"/> Develop and test a flood emergency flood evacuation plan for the community <input type="checkbox"/> Assemble an emergency response team trained in handling toxic and hazardous materials in flood situations (e.g. volunteer fire department) <input type="checkbox"/> Assemble a water rescue team or make one available regionally <input type="checkbox"/> Provide training and/or informational programs on flood damage prevention for municipal officials, planning and zoning, floodplain permit administrators, CEO, building inspectors, and homeowners <input type="checkbox"/> Provide an approved list of contractors and consultants who are knowledgeable and trained in flood proofing, retrofitting and construction to the public <input type="checkbox"/> Offer tax adjustments for those who grant conservation easements or do not develop the land they own lies within a flood plain or wetlands <input type="checkbox"/> Develop a program to acquire and or relocate homes and businesses out of the floodway 		

Problems Associated with Increased Stormwater Runoff	Causes	Impacts	Remedial & Preventative Strategies
			<p>Strategy: Protect and Restore the Resources and Functions of the Floodplain</p>

Management Options (Indicate with a "√" if community has implemented or use a "?" if community is interested)	Barriers to Implementation	Community Assistance Needs
<p>Options:</p> <ul style="list-style-type: none"> ___ Develop floodplain, wetland, stream corridor and coastal barrier resources regulations to preserve the flood attenuation benefits of wetlands in the watershed ___ Work with communities in the watershed to prohibit the filling or draining of wetlands as a result of development or agriculture ___ Adopt local wetland protection regulations ___ Require necessary sign-offs by State and Federal wetland permitting agencies for proposed projects ___ Develop, implement and enforce stream bank and/or shoreline setbacks to protect banks, and vegetation from development ___ Develop and implement a policy for helping to obtain easements in flood hazard areas ___ Develop and implement a policy for helping to transfer development rights from flood prone areas ___ Minimize stormwater runoff impacts from an increase in development and impervious area in the watershed ___ Address any specific places where changing land use practices contribute to flooding ___ Develop and implement a watershed wide plan for stormwater that takes into consideration the cumulative impacts of changing land uses ___ Plan for increased development and runoff in watershed culverts, bridges, and design them to pass the floodplain flow ___ Enter into an intermunicipal agreement for the watershed wide control of runoff ___ Coordinate or cooperate (outside of a formal agreement) with other communities in the watershed to address flooding issues 		

Problems Associated with Increased Stormwater Runoff	Causes	Impacts	Remedial & Preventative Strategies
<p>Our municipality is concerned about (please check all that apply):</p> <p><input type="checkbox"/> A lack of community consensus on flood management issues and what can be done to address them</p> <p><input type="checkbox"/> Receiving and providing the best information and training to people who make decisions about development and flood management in our community (e.g. contractors, engineers, municipal officials)</p> <p><input type="checkbox"/> Implementing a flood program as an essential component to sustainable community development</p> <p><input type="checkbox"/> Increased operating and maintenance costs for the existing flood management infrastructure</p> <p><input type="checkbox"/> Proper plan review for potential flood impacts on development.</p> <p><input type="checkbox"/> Confusion over local authority to address flooding concerns</p>	<ol style="list-style-type: none"> 1. At present community is not implementing a stormwater management program. 2. At present the community is not implementing a flood mitigation plan. 3. The community is experiencing development pressure, but is having difficulty balancing economic development and growth and natural resource protection needs (including wetlands, flood plains and water quantity). 4. Community does not have adequate resources in order to operate and maintain their stormwater infrastructure. 	<p>Check those impacts that apply:</p> <p><input type="checkbox"/> Increased flow and volume of stormwater, increases the adverse flooding impacts on the community, increasing the need for costly restoration and remediation.</p>	<p>Strategy: Develop fund and implement a local flood mitigation program.</p>

Management Options (Indicate with a "√" if community has implemented or use a "?" if community is interested)	Barriers to Implementation	Community Assistance Needs
<ul style="list-style-type: none"> ___ Provide information about regulatory updates and training to officials responsible for flood mitigation ___ Develop a checklist of site plan components to determine if the proposed project is in a flood hazard area ___ Non-MS4 communities require developers to submit SWPPP for local review ___ Implement education program for developers, homeowners, businesses, highway superintendents etc..on flood mitigation ___ Involve the public in flood mitigation policy development ___ Inform engineers, local officials and construction personnel about new Phase II requirements for stormwater management and erosion and sedimentation control on an ongoing basis ___ Change development rules in your community to encourage developers to utilize model development principles⁴ such as Low Impact Development and Conservation Site Design ___ Ensure developers and contractors comply with the building codes and flood mitigation plans by inspecting and enforcing regulations, as well as use strategies such as site bonds to ensure compliance. ___ Develop intermunicipal agreements to deal with flooding on a watershed level ___ Develop a program to provide tax incentives, conservation easements, purchase of development rights, purchase or relocation of homes in the flood plain, and other strategies as necessary to prevent flood damages <p style="text-align: center;">We suggest you also complete the Land Use Planning Needs Worksheet to further assess the balance of development and economic growth in your community.</p>		

¹There is no government assistance available to homeowners with groundwater flooding problems. Flood insurance only covers flood damage if the water enters your building from the surface. Groundwater flooding is the responsibility of the homeowner.

²A Floodplain Development Permit is required for the construction, replacement or alteration of any bridge, culvert or road crossing of a stream with a Special Flood Hazard Area (100-Year Floodplain) identified on a FEMA Flood Insurance Rate Map (FIRM). Contact your municipality for permit requirements and restrictions. Private bridges and culverts are the responsibility of the landowner. Flood insurance does not cover them, and landowners are at their own risk if they wash out and emergency vehicles cannot get across them to access the property, it is the fault of the landowner. If their bridge or culvert washes out, the damage caused by their travel downstream is the responsibility of the landowner as well.

⁴ See Center for Watershed Protection publication: [Better Site Design: A Handbook for Changing Development Rules in Your Community](#)

Community Environmental Management

TIER III: FLOOD MITIGATION

STRATEGY DEVELOPMENT

Flooding is a complex issue, with many factors contributing to the problem. The Federal Emergency Management Agency's Federal Interagency Floodplain Management Task Force developed a list titled "Strategies and Tools for Floodplain Management" in 1986 that outlines four strategies for managing flooding and preventing flood damage in communities.

STRATEGY – Modify Susceptibility to Flood Damage and Disruption

- Floodplain management land use regulations
- Building codes
- Acquisition/relocation
- Development and redevelopment policies
- Information and education/technical assistance

STRATEGY – Modify Flooding

- Flood control structures; dams, levees, floodwalls etc.
- Channel alterations/dam removal
- Land treatment measures
- Stormwater management (e.g. on-site detention facilities)

STRATEGY – Modify the Impact of Flooding on Individuals and the Community

- Flood insurance
- Disaster assistance
- Information and education /emergency preparedness/training
- Tax adjustments

STRATEGY – Protect and Restore the Resources and Functions of the Floodplain

- Floodplain, wetland, stream corridor and coastal barrier resources regulations
- Land use planning
- Conservation easements
- Watershed management
- Tax adjustments
- Information and education

**If you have any questions or comments on this
draft worksheet, please contact:**

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