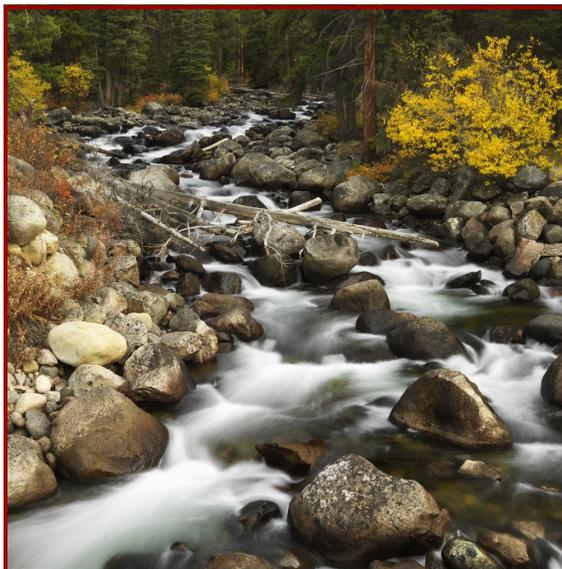




# Stream and Floodplain Management

## Introduction

Streams are complex and dynamic systems, constantly changing and adapting to the natural environment. Healthy streams will gradually change course as some bank erosion and sedimentation is natural. Floodplains are flat areas of land adjacent to streams that are formed by current flood processes and are integral parts of a natural stream system. Streams and floodplains work cohesively during flood and bank full events. A bank full event can be defined as the point at which a stream flows at its full capacity, just before flowing onto the flood plain. Bank full flows and periodic flooding are healthy stream functions that vary in frequency based on hydrologic and geographic conditions. During these events, floodplains reduce the impacts of flooding by slowing the movement of water and improve water quality by allowing sediment and other pollutants to slowly filter out of flood waters before the water returns to the stream. Maintaining stable and undisturbed stream banks and flood plains will not only provide habitat for many plant and animal species, but will also protect against erosion and property loss.



## Environmental Concerns

Healthy streams and floodplains are valuable environmental resources to farms and communities. A healthy stream with well vegetated banks and floodplain areas will allow for seasonally high water to rise about the normal water level and infiltrate bank into the stream with minimal erosion damage. Minimizing erosion will prevent excess sediment and nutrients from entering the water. Sedimentation and nutrient loading can create turbid water conditions and cause algae blooms which degrade water quality and can harm aquatic plants and animals. Streambanks, flood plains, riparian buffer areas, and surrounding land can be subject to soil erosion and flood damage if they are not managed properly. Removal of vegetation, tilling too close to the streambanks, allowing livestock to have unlimited access to the stream, or eliminating the floodplain altogether can cause banks to become denuded and unstable, thus perpetuating streambank erosion, sediment loss, and nutrient loading. Streambanks, flood plains, and riparian areas should be well vegetated with diverse low growing woody species. Any



surrounding land (i.e. cropland or pasture) should be managed properly utilizing appropriate best management practices designed to protect and preserve floodplain and buffer areas. The health of our streams and floodplains depends on the stewardship of landowners and users. Individuals can facilitate positive changes in conserving, protecting, and using land to help maintain a health stream function.

## Potential Economic Benefits

Healthy streams and floodplains provide a variety of benefits to humans and wildlife, including economic benefits. Costs associated with remediating flood and drought damage can be extremely high, especially in areas where flooding and droughts occur frequently. Maintaining well vegetated streambanks and floodplains will reduce the impacts of flooding and droughts which will minimize the mitigation costs. Additionally, maintaining healthy stream systems will provide scenic views and recreational benefits that can increase property values and contribute to the overall ecological and economic health of the local community.

## Summary of Best Management Practices

- Do not store or apply fertilizers, manure, and pesticides within floodplain areas
- Restrict livestock access to streams
- Maintain appropriately sized buffer areas along stream channels
  - Do not till crop fields close to the streambank
- Maintain low, dense stands of vegetation along streambanks
- Maintain the natural shape of the stream channel
  - Do not channelize the stream or construct unnecessary structures within the channel meander zone
- Maintain stream access to the flood plain
  - Avoid constructing dikes, levees, or building structures within the flood plain



## Summary of Regulations

### Summary of Regulations

#### Local Ordinances

Check your local regulations as they could vary from State and Federal Regulations.



#### State Regulations

[NYS DEC Standards and Specifications for Erosion and Sediment Control](#)

[NYS DEC Floodplain Construction Requirements](#)

[NYS DEC Floodplain Management Regulations Development Permits](#)

#### Federal Regulations

[Environmental Protection Agency - Clean Water Act](#)

[Federal Emergency Management Agency –National Flood Insurance Program](#)

## Background Information for Worksheets

### ***How often do your fields or pastures flood?***

When fields or pastures experience flooding on a regular or frequent basis this can pose a high risk for soil loss/erosion and water contamination. As flood waters rise and recede they will pick up soil, sediment, and any other contaminate (manure, pesticide, etc.) that is present. If fields/pastures have become flooded more than once within the past two years, this generally indicates that they are located within a floodplain. However, if fields or pastures have never or rarely experienced floods, this does not immediately remove them from the floodplain. Farmers should be aware if any of their land is located in a floodplain area and take certain precautions to prevent soil loss and water quality contamination.

### ***Do flood waters cause erosion on fields?***

If erosion is occurring on the fields during flood events this could indicate that there is an issue with the floodplain and it cannot function properly. A problem could exist with the topography of the area or within the buffer zone area. It is also possible that a buffer zone area is not established (i.e. fields are farmed directly to streambank). Soil and sediment act as carriers for various contaminants (pesticides, nutrients) and can transport them into the water during flood or runoff events. Reducing the amount of



soil lost during flood event is critical to protect soil quality and reduce water contamination. Further investigation would be required to determine the cause of the soil erosion during flood events and to determine the best management practice to mitigate the issue.

### ***Is fertilizer or manure applied in the floodplain?***

Manure or fertilizer should not be applied in a flood plain area unless it is done when the risk for flooding is low and it is in accordance with a Nutrient Management Plan. A Nutrient Management Plan will take into account various factors including field location, soil type, topography, etc. to determine the when and how much manure/fertilizer should be applied. Farms that follow a Nutrient Management Plan will be at a much lower risk of contaminating water quality than those that do not follow a plan and spread/apply fertilizer or manure within a floodplain.



### ***Is your farmstead located within a floodplain?***

It is important for any farm to know whether or not they are located within a floodplain. This can help them implement best management practices that will reduce environmental impacts, as well as, financial losses that could occur during flood events. Various websites and mapping tools (ArcGis) can be used to determine if the farm is or has property located within a floodplain.

For More Information:

[FEMA – Map Service Center](#)

[FEMA Risk Assessment, Mapping, and Planning Partners – New York Mapping Status](#)

[Chemung County Soil and Water Conservation District – Stream Processes A Guide to Living in Harmony with Streams](#)

## Background Information for Worksheets

### ***Is manure or fertilizer stored or stockpiled in the floodplain?***

Consideration should be given to the location of manure and fertilizer storages, as well as, stock pile areas. If it can be avoided, these potential contaminants should not be stored or stockpiled in floodplain areas. If a flood were to occur the risk of contamination would be very high. Open stock piles would be washed away in the flood waters and storages could be compromised. Large quantities of manure or fertilizer in waterways can be extremely harmful to aquatic and wildlife, as well as, very dangerous to humans.

For More Information:

[Cornell University Cooperative Extension – Storing Manure on Small Farms](#)



### ***Does livestock have access to the stream?***

Livestock should be excluded from having uncontrolled access to the stream. Limiting or eliminating access will prevent the direct deposition of manure and urine into waterbodies and hydrologically active areas. It will also protect the stability of the streambanks from livestock traffic. Livestock that have unlimited access often denude vegetation along stream banks and create fresh scrapes and ruts that roughen the soil profile and destabilize the entire bank. This practice creates highly erodible conditions where bank soils are easily washed into the waterway during bank full flow events.

For More Information:

[Virginia Department of Conservation and Recreation – Streamside Livestock Exclusion](#)

### ***How close to the stream do you normally till?***

A stream needs to have established vegetated buffers to prevent bank erosion and sedimentation. The closer a farm tills to the stream, the higher the risk of erosion and bank destabilization. When a field is worked to the banks edge, vegetation and developed root structures are removed, loose soil is exposed and becomes more likely to erode.



### ***What is the predominant width of the naturally occurring stream side vegetation?***

Vegetation is essential for maintaining stable stream banks and preventing soil erosion. Stream sides should be well vegetated for at least 35 feet on each side of the stream. During bank full or flood events, vegetation will help to dissipate water energy, as well as, hold soil in place preventing or reducing sediment erosion. Buffer areas of dense vegetation should be maintained along all streambanks and these vegetated buffers should be maintained across the largest area that is practical to/for the immediately adjacent land use.

## Background Information for Worksheets

### ***What is the condition of the stream bank vegetation?***

The quality and condition of streambank vegetation directly correlates to water quality and the quality of aquatic habitat. If streambank vegetation is mature and well established, the water quality of the stream, as well as the quality of the aquatic habitat, will be high. Ideally, banks should be fully vegetated and established vegetation should overhang the stream, providing shade to 50% of the stream width. These conditions will help the stream maintain cool water temperatures (ideal for fish species), as well as, keep it free of sediment. If a streambank lacks vegetation that will provide for stable banks and shade cover, the water quality of the stream will likely be poor and undesirable/inhospitable for aquatic species.



For More Information:

[Cornell University Cooperative Extension – Evaluating the Health of Riparian Areas – An Overview](#)

[Cornell University Cooperative Extension – Understanding Species Diversity](#)



### ***Does field tile or other drains (e.g. outlets, ponds, WASCObS, shop/barn drain) empty into a stream?***

If tile drains are out letting into the stream it is important to know where and what they are draining as there is a potential for them to be transporting contaminants/sediment to the stream channel. Visual inspections of the tile outlets are usually a good idea to determine if contaminants are being introduced and can aid in identifying their potential sources.

### ***What is the condition of the stream channel?***

A stream that is actively down cutting/widening, is channelized, has structures blocking the floodplain, or is experiencing excessive sediment deposition poses a high concern to the farmstead. A stream with any of the previously listed conditions could have the potential to cause serious damage and/or pose a threat to water quality. Streams that are channelized with little to no flood plain, will travel at high velocities during high flow or flood events. This could cause significant erosion and property damage because the stream is unable to slow itself down and dissipate its energy. Excessive sedimentation and erosion that occurs in a poor stream channel can lead to water contamination. Sediment particles transport contaminants such as pesticides or nutrients into the stream channel. Reducing erosion will reduce the chances of water quality contamination. It is important to maintain a stream channel that is not channelized and has appropriate floodplains to allow the channel to meander and to provide for temporary storage of flood waters so stream flow can slow down naturally and reduce sedimentation.

For More Information:

[Cornell University Cooperative Extension – Understanding a Channels Ability to Dissipate Energy](#)

[Cornell University Cooperative Extension – Understanding the Lateral Stability in Riparian Areas](#)

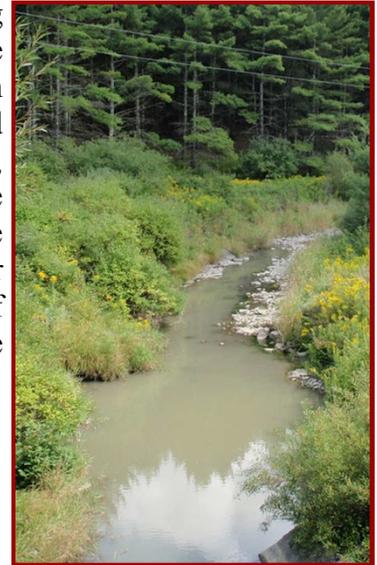
[Cornell University Cooperative Extension – Understanding Vertical Stability in Riparian Areas](#)

[Chemung County Soil and Water Conservation District – Stream Processes A Guide to Living In Harmony with Streams](#)

## Background Information for Worksheets

### ***What indicators of good water quality are present?***

Visual inspections of the stream will provide good information regarding the status of the water quality. If the water appears clear, has diverse population of aquatic vegetation, and has no noticeable film present on submerged objects, chances are that the water quality is very good and there is little indication of contamination. If the water appears green, gray, or brown, severe algal blooms are apparent, or submerged objects are buried in sediment water quality will be low. The presence of these indicators suggests that the stream is experiencing nutrient loading and/or sedimentation, although they are not indicative of the source of contamination. Careful water monitoring would be necessary to determine a potential source.



For More Information:

[USDA NRCS – Water Quality and Agriculture, Chapter 2](#)

[USDA NRCS – Water Quality and Agriculture, Chapter 3](#)

### ***Have any fish kills occurred in the past 5 years?***

When an aquatic environment becomes stressed the result can often be a fish kill. Common factors leading to fish kills are weather and pollutants. If hot, dry conditions exist this will often produce a fish kill because water levels are low, water temperatures become too warm, and the amount of oxygen available in the water for fish dwindles. Excessive pollutants can also produce fish kills because they can act as a poison to fish or can create inhospitable water conditions. Knowing how often fish kills occur can help to identify if there is a contaminate problem present in the stream. If fish kills occur on a frequent/consistent basis, this could indicate that the kill is a result of polluted/contaminated water.

For More Information:

[USGS – What Causes Fish Kills](#)

### ***How often does the stream run dry?***

In order to properly diagnose and mitigate any issues that may be occurring in and surrounding the stream, it is important to record whether or not the stream is perennial (flows continuously) or intermittent (seasonal, does not flow constantly).

### ***How often does out of bank flow occur?***

The term ‘bank flow’ refers to a stream when it is at its full carrying capacity, just before its waters flow onto the floodplain. If this is occurring frequently, it could indicate that the stream is subject to frequent flooding. In this instance, it is important for buffers and floodplains to be established and/or maintained to prevent significant erosion and sedimentation issues.

### ***Are water withdrawals taken from the stream?***

It is important to note if water is being withdrawn from the stream and for what purpose. It is a common practice for farms to draw water for irrigation purposes. If this practice is occurring, the farm may need to obtain a permit based on the volume of water withdrawn on a daily basis. It is also important to note that when weather conditions are dry, withdrawals should be monitored carefully.

## Background Information for Worksheets

### *Are invasive species a concern along the stream reach?*

If invasive species are present along the stream, this may pose a high concern. Invasive plants, such as Japanese Knotweed, have shallow root systems and do not stabilize the bank. This could exacerbate erosion and flood damage. Invasive species will likely dominate the banks, reducing biodiversity within the vegetative community and possibly among resident wildlife. This could seriously impact water quality and aquatic habitats as there would not be adequate vegetation to support high quality water conditions and negatively impact habitat quality for many resident wildlife species, particularly birds.



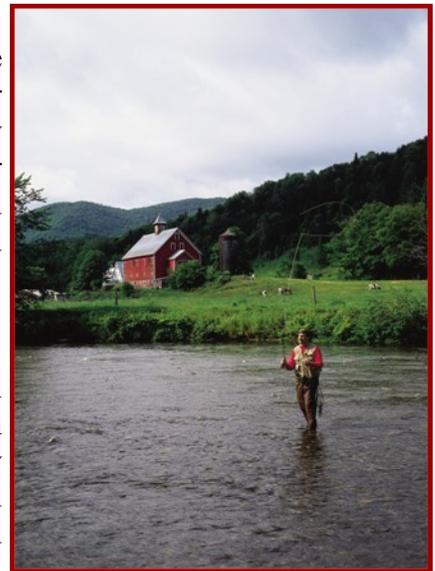
Japanese Knotweed

For More Information:

[NYS DEC – Conserving Natural Areas and Wildlife in Your Community, Chapter 13 - Natural Landscaping](#)

### *How good is the fishing?*

The presence of fish is often a good indicator of water quality. If there are little to no fish present, the stream could be experiencing water quality issues. If there are abundant fish populations, specifically sensitive fish species (i.e. Trout), this can indicate that the water quality is good, that sediment contribution to the stream are low and there are adequate amounts of bankside vegetation and oxygenated water to support healthy fish populations.



### *Is public access to the stream permitted?*

It is important to note if public access to the stream is permitted in order to have a good idea of any potential non-farm impacts upon existing stream conditions and how the stream is being used. If any serious contamination issues occur in the stream, public access should be restricted until the sources of contamination can be identified and mitigated.

## Conclusion

AEM Tier 2 Assessments document environmental stewardship and establish benchmark conditions on the farm. They also identify resource concerns and areas of opportunity. The AEM Tier 2 worksheets also help to further establish baseline data that can be used to prioritize issues for Tier 3 planning.

Tier 2 Assessments should be completed on-site with the farmer. When the initial assessment is completed, appropriate feedback in the form of an AEM Tier 2 Worksheet Summary should be provided to the farmer. The summary should include an overall level of concern for the worksheet, explanation of the overall ranking, a list and description of items of greatest concern, as well as, documentation of what is being done well and what areas need improvement. After the evaluation is complete, the farm should be given a ranking which will determine their priority to advance to the AEM Tier 3 planning phase. Appropriate ranking categories that could be used are: High, Medium, or Low Priority. A ranking procedure that has been approved by your local AEM Team should be

