



# AEM Tier 2 Worksheet

## Stream & Floodplain Management

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### Glossary

**Aggradation:** A geologic process by which a stream bottom or floodplain is raised in elevation by the deposition of material.

**Bank slope:** 3:1 = 3 feet horizontal to 1 foot vertical. 1:1 = 1 foot horizontal to 1 foot vertical.

**Bankfull Stage:** The stage at which water starts to flow over the flood plain; the elevation of the water surface at bankfull discharge. (This discharge occurs once every 1.5 years on average.)

**Braided Stream:** Stream with three or more smaller channels. These smaller channels are extremely unstable, rarely have woody vegetation along their banks, and provide poor habitat for stream biota (plant and animal life).

**Baseflow:** Average stream discharge during low flow conditions. It is composed of runoff from the saturated zone below the water table.

**Downcutting:** Geologic process by which a stream bottom is lowered in elevation due to the net loss of substrate material.

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### Background

A stream is a complex ecosystem in which biological, physical and chemical processes interact. Maintaining stream health requires recognizing the stream's natural processes and assessing the complex effects that stream modifications cause.

Some bank erosion and changes in channel are normal in a healthy stream as it gradually changes its course. Active downcutting and excessive lateral cutting (streambank erosion) are indicative of an unstable stream channel. Excessive bank erosion occurs where riparian zones are degraded or where the stream is unstable because of changes in hydrology, sediment load or isolation from the flood plain. Unless these issues are addressed, it will be increasingly difficult to restore woody vegetation within the riparian zone. Trying to stabilize (protect) streambanks from erosion using riprap (armoring the bank with large rock) will only lead to more problems, especially downstream, if active downcutting is occurring and not addressed.

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### Agricultural Water Quality Principle:

A buffer zone or filter strip of perennial vegetation should be maintained between cropland, pasture or grazing lands and surface waters for the purpose of filtering out pollutants before they reach the water resource.

## Glossary Continued...

**Flood Plain:** The flat area of land adjacent to a stream that is formed by current flood processes.

**Incised Channel:** A channel with a streambed lower in elevation than its historic elevation in relation to the flood plain.

**Natural Vegetation:** For riparian buffers, natural vegetation refers to plant communities that contain all of the following structural components: aquatic plants, sedges or rushes, grasses, forbs, shrubs, under story and over story trees. Species should be appropriate for the area.

**Reach:** A section of stream (defined in a variety of ways, such as the section between tributaries or a section with consistent characteristics).

**Riparian:** The zone adjacent to a stream or any other water body (from the Latin word *ripa* -- pertaining to the bank of a river, pond, or lake).

**Stream:** A blue line or intermittent stream as shown on a USGS topographic map.

**Protected (Classified) Stream:** Certain waters of the state are classified and protected on the basis of existing or expected best usage of these waters. If your project affects waters of the state that are referred to as “protected streams” or “protected waters,” you are subject to the stream protection restrictions under the Protection of Waters regulations.

**Perennial Stream:** A stream that flows continuously throughout the year.

## Background Continued...

Bankfull flows, as well as flooding, are also healthy stream functions. They maintain channel shape and function (e.g. sediment transport) and maintain physical habitat for plants and animals.

A healthy riparian vegetation zone is one of the most important elements for a healthy stream ecosystem. The quality of the riparian zone increases with the width and the complexity of the woody vegetation within it.

This worksheet should be used to assess the condition of perennial stream reaches and floodplains. It can also be helpful in determining the need for and feasibility of restoring riparian buffers. For the purposes of this worksheet, a reach should be 12 times the active channel width. One or more representative reaches should be assessed. A more detailed assessment of stream health can be conducted using USDA NRCS Stream Visual Assessment, Protocol Technical Note 99-1.

AEM Tier 2 Worksheet: Stream Management		Potential Concern		
Factors Needing Assessment:	Lower 1	2	3	Higher 4
<b>What condition is the stream channel in?</b>	Natural channel; no structures or dikes. No evidence of down cutting or excessive lateral cutting.	Evidence of past channel alteration, but with significant recovery of channel and banks. Any dikes or levees are set back to provide access to an adequate floodplain.	Altered channel: <50% of the reach with riprap and/or channelization. Excess aggradation; braided channel. Dikes or levees restrict floodplain width.	Channel is actively down cutting or widening. >50% of the reach with riprap or channelization. Dikes or levees prevent access to the floodplain.
<b>Are the banks stable?</b>	Banks are stable and low (at elevation or active floodplain). 1/3 or more of eroding surface area of banks in outside bends is protected by roots that extend to the base-flow elevation.	Banks are moderately stable and low (at elevation of active floodplain). Less than 1/3 of eroding surface area of banks in outside bends is protected by roots that extend to the base-flow elevation.	Banks are moderately unstable. Banks may be low, but typically are high (flooding occurs 1 year out of 5 or less frequently). Outside bends are actively eroding (overhanging vegetation at top of bank; some mature trees falling into stream annually; some slope failures are apparent).	Banks are unstable. Banks may be low, but typically are high. Some straight reaches and inside edges of bends are actively eroding, as are outside bends (overhanging vegetation at top of bare bank; numerous mature trees falling into stream annually; numerous slope failures are apparent).
<b>How much of a riparian zone is present adjacent to the stream? What condition is it in?</b>	Natural vegetation extends two active channel widths on each side, <b>OR</b> 100 feet wide on each side. <b>AND</b> No concentration flows through riparian zone.	Natural vegetation extends one channel width on each side, <b>OR</b> 35 feet wide on each side. <b>AND</b> If concentrated flows are evident, they are from land areas appropriately buffered with vegetated filter strips.	Natural vegetation extends at least 15 feet on each side of the channel. <b>OR</b> Filtering function is moderately compromised.	Natural vegetation is less than 15 feet wide or nonexistent on either side. <b>OR</b> Lack of regeneration. <b>OR</b> Filtering function is severely compromised by concentrated flows.

AEM Tier 2 Worksheet: Stream Management Continued		Potential Concern		
Factors Needing Assessment:	Lower 1	2	3	Higher 4
<p><b>What is the degree of canopy cover over the stream (for coldwater fisheries)?</b>  <b>Note: Assess only if channel width is less than 50 ft. Do not assess this element if woody vegetation is not naturally present (e.g.- wet meadows).</b></p>	>75% of water surface in reach is shaded, and adjoining 2 to 3 miles upstream is generally well shaded (use aerial photos to determine).	50% - 75% of water surface in reach is shaded, but adjoining 2 to 3 miles upstream is poorly shaded.	20% to 50% of water surface in reach is shaded.	<20% of water surface in reach is shaded.
<p><b>How much hydrologic alteration has the stream been subjected to?</b></p>	Out of bank flow every 2 years or more often, no water withdrawals, no dikes or other structures limiting the stream's access to the flood plain. Channel is not incised. No barriers to fish movement.	Out of bank flow occurs only once every 3 to 5 years; limited channel incision.  <b>OR</b> Withdrawals, although present, do not affect available habitat for plant and animal life.  <b>OR</b> Culverts or dams (<1' drop) within reach.	Out of bank flow occurs only once every 6 to 10 years; channel is deeply incised.  <b>OR</b> Withdrawals significantly affect available low flow habitat for plant and animal life.  <b>OR</b> Culverts or dams (>1' drop) within 3 miles of reach.	No out of bank flow; channel is deeply incised.  <b>OR</b> Structures prevent access to flood plain.  <b>OR</b> Withdrawals have caused severe loss of low flow habitat.  <b>OR</b> Culverts or dams (>1' drop) within the reach.

AEM Tier 2 Worksheet: Stream Management Continued		Potential Concern		
Factors Needing Assessment:	Lower 1	2	3	Higher 4
What does the water look like?	Clear water along entire reach with a diverse aquatic plant community. <b>AND</b> No noticeable film on submerged objects or rocks.	Fairly clear or slightly greenish or cloudy water along entire reach; moderate algal growth present.	Greenish water or considerable cloudiness most of the time along entire reach; rocks or submerged objects covered with heavy green or olive green film, especially during warmer months.	Pea-Green, gray or brown water along entire reach; severe algal blooms create thick algal mats in stream.

## Other – Stream Management

1. How close to the stream do you normally till?
2. Can your livestock gain access to the stream?
3. Is stream bank erosion threatening your fields or pasture?
4. Do your field tile or other drains empty into a stream?

## Additional Comments

AEM Tier 2 Worksheet: Floodplain Management		Potential Concern		
Factors Needing Assessment:	Lower 1	2	3	Higher 4
How often do your crop fields flood?	Never	Rarely	Occasionally	Frequently (more than once in 2 years)
Do flood waters erode your cropland?	No erosion is occurring from flood waters.			Flood waters erode cropland.
Is fertilizer or manure applied in the floodplain?	No nutrients (fertilizer or manure) are applied in the floodplain. <b>OR</b> Nutrients are applied and incorporated after the risk of flooding is over.	Nutrients are applied according to a Comprehensive Nutrient Management Plan (CNMP). <b>AND</b> Nutrients are applied after the risk of flooding is over.	Nutrients are applied according to a Comprehensive Nutrient Management Plan (CNMP). <b>AND</b> Nutrients are sometimes applied before the risk of flooding occurs.	No Comprehensive Nutrient Management Plan, <b>AND</b> nutrients are normally applied before the risk of flooding occurs.

## Other

1. Is your farmstead located within a floodplain?
2. If you have a waste storage structure, is it located within a floodplain?

## Additional Comments