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## **Grazing Management of Streamside Pastures**

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The goal of these guidelines is to promote good grazing management along streams, to protecting water quality for ourselves, our livestock and our society while maintaining the productivity of the pasture. These guidelines will give farmers an understanding of the water resources on their farms, and help them to evaluate stream health, and to manage them to protect both the water quality and the productivity of the pastures.

Wisconsin's streams are one of our most precious natural resources, providing clean water for a number of human uses from farming to recreation, and habitat for wildlife and aquatic communities. Protecting streams and their surrounding riparian areas makes good sense for everyone.

These guidelines assume a basic knowledge of rotational grazing management. If you need more general information about grazing systems, contact your county UW-Agricultural Extension Agent or:

Brian Pillsbury, NRCS Grazing Specialist	(608/355-4470)
Dan Undersander, UW Forage Extension Specialist	(608/263-5070)

### About Streams

Managing a grazing system in streamside pastures generally employs the same basic principles you might put to use on the rest of your farm, but there are a few more challenges compared to upland pastures. Livestock activity around streams requires some special attention to minimize potential damage.

**Erosion** Erosion is a natural process which we can either reduce or worsen with our grazing management. Our goal should be to minimize erosion by maintaining good sod cover and stable banks. Streams are part of a dynamic, constantly changing system which will erode in spite of our best efforts and require us to continually modify our management. (How much can we accept?)

**Stream size** Large streams (>15' wide) pose different management challenges than small streams. Large streams are in some ways easier to manage because they usually have better defined banks and are more likely to be treated as a barrier by livestock. Stock tend to cross and drink from defined spots in large streams, whereas small streams and intermittent streams are more accessible to stock and thus get more traffic and bank damage. But large streams have large watersheds and are more likely to be affected by upstream activities beyond your control. Indeed, studies from Southwestern Wisconsin indicate that current erosion problems in large watersheds may be the legacy of poor farming practices during the early 1900s.

**Flooding** can be a major challenge in managing your streambank paddocks. In

recent years, CRP and removal of livestock from forested hillsides has reduced the severity of flooding in many areas of the state. Although conversion to grass farming can greatly reduce flooding problems on a farm, it cannot eliminate them altogether because of upstream effects. In general, larger streams tend to have more severe flooding problems than small ones, but regardless, before you lay out your streamside paddocks, you need to know your stream under flood conditions. Where does the flood water go? How high can it get? Where is fencing most likely to stay put and where will you lose it during flooding events?

**Managing springs and seeps** Springs and seeps are a major source of water for streams in many parts of the state. They provide relatively pure, unpolluted groundwater and these sensitive areas should be given our best protection. Managed grazing should produce enough forage for your stock that you can afford to fence out and protect sensitive areas. If springs are needed as a source of water for your stock, you might consider fencing them out of the pasture and pumping water from the spring into a tank (see below).

## Basic Principles

**A Healthy Sod** The overall goal of grazing streambanks is to develop and maintain a thick ground cover on the streambanks to hold the soil in place. The principles used in general rotational grazing management are even more important for grazing streambank paddocks. Good, thick sod can be encouraged by allowing adequate rest periods between grazing events and by avoiding overgrazing. A good goal is to leave at least 4" of residual after grazing. It is also desirable to leave at least 6 inches of residue on the streambank areas going into the winter. The 'take-half/leave-half' principle is a good one to follow in streamside paddocks. Before you begin grazing, it may be necessary to do some seeding and temporarily fence cattle out of eroded areas until a healthy sod is formed and can be grazed.

**Livestock behavior is key** Understanding livestock behavior is the key to developing a management strategy for streamside pasture grazing. Stock will do what is convenient for them and this can cause problems around streams. Managing grazing in streamside pastures will take more time and effort, but will pay off. It is not profitable to allow your animals to stand in the stream when they could be grazing. Layout of paddocks and stream crossings should make it easy for stock to get as much water as they need, but discourage them from spending time in the stream.

Managing livestock activity is the key to protecting streambanks and water quality as well. We can use managed grazing as a tool to thicken the sod and help stabilize streambanks, but beware that not all erosion problems can be avoided even by the best management.

**When to take/keep stock out of streamside paddocks** The experience of our cooperating farmers has been that the maximum amount of time you can graze a streamside paddock without damage is 3 to 4 days with a 3 to 5 week rest period

between grazing events. When the soil is wet it may be necessary to limit grazing to 1 day or less, depending on your soil type. Experience has shown that livestock can graze wet soils for short periods of time (1 day) with little lasting damage to the sod but longer periods can cause severe damage. Good bank protection coincides with good grazing management. Shorter grazing times, longer rest periods, and avoidance of soil compaction are a key to maximizing pasture productivity as well as protecting streambanks.

There are times when we should keep livestock off streambank paddocks because damage is more likely. These include periods of wet weather (banks unstable), early spring during thaw (banks unstable), hot days (cattle will stand in the stream) and winter.

*Freezing and thawing* is one of the main causes of erosion problems around streams. Because of this, grazing and trampling damage to banks that occurs in the fall is worse than spring damage. Fall damage leaves the stream open for serious erosion problems through the winter and spring thaw period. Pasture growth over the summer can help heal spring damage before the winter 'erosion season'. Thus, proper management in the fall is one way to safeguard streambanks. Treating streambank paddocks as a stockpile area is a good idea. Leaving a higher level of grass residual on streambanks by avoiding grazing late in fall will help protect the banks over the winter. Stock should be kept off streamside paddocks in winter if the stream is not necessary as a source of water. If the stream is used for watering stock in winter, a well-constructed stream crossing with limited access is preferred (see below).

## **Two Approaches to Paddock Layout**

There are two general ways to lay out streambank paddocks. You can either fence the streambank and some surrounding pasture as separate a paddock or you can include the stream in adjacent paddocks. There are advantages and disadvantages to each and you will want to decide which is best based on your management style and the layout of your stream. A well-constructed stream crossing is an essential component of any creek paddock system (see below).

*A separate streamside paddock* can be managed differently from the rest of the pasture system. Stock can be put into these areas only when banks are less vulnerable. In most years you will be able to graze streamside paddocks almost every rotation, but with them fenced separately, you'll have the option of skipping them if conditions dictate. This option will probably require more fencing and you'll need to provide a livestock water system for stock to use when not in the streambank paddocks.

*Including the stream in adjacent paddocks* allows you to integrate them more fully into your system, but will probably cause a little more wear and tear on streambanks. Land on both sides of the stream should be fenced into the paddock unless the stream is too wide or deep to cross. Making the stream a pasture boundary is not recommended because this increases traffic along the streambank and can result

in increased erosion. By fencing the stream into the pasture, the stream can be a source of drinking water for more of your paddocks, but you will probably have to develop more crossing areas. To protect the streambanks, each section of stream should be accessible from only one paddock.

## **Fencing**

***Good fencing is worth the price*** Currently, interior fencing with polywire costs about \$0.10/foot. Interior fencing costs will easily be paid back in more and higher quality forage. In streamside paddocks, additional fencing and modifications to your layout may be necessary to protect sensitive areas or fragile banks. You can fence either across or parallel to the stream, depending on your layout. Fencing that runs parallel to the bank should be at least 20 feet away from the stream, otherwise the cattle will form trails between the fence and the bank.

***Crossing the stream with fencing*** A perennial problem with fencing around streams is losing the fence in floods. To avoid this problem and to ensure that you have a consistent power supply to your fences on the far side of the stream, you need to ensure that your fence crossing the stream is secure. Choose a high spot to install a permanent fence to carry electricity to the far side of the bank. Run heavy-duty wire from the top of the bank on one side to the top of the bank on the other at a level above normal flood stage. This wire will transmit the current across and be less susceptible to being washed out in a flood. Below the top fence and at other paddock divisions, run a portable wire down to the edge of the water and across the stream to keep the stock from getting into the next paddock through the stream. This lower, portable fence can be removed when stock are not present to avoid losing it during floods.

## **Watering Systems**

***Is this water healthy for my stock to drink?*** If you suspect that the water quality of your stream is poor, you may want to avoid watering from the stream. Water that is unpalatable to livestock may cause reduced water intake and lowered growth, meat or milk production. Water with subclinical levels of toxic compounds may also cause poorer performance in livestock. You have no control over stream water quality but you can monitor and control well water quality.

***Tank watering*** If stream water quality is an issue and in cases where animal access to the stream will result in streambank damage (generally where streambank slope is greater than 2 to 1), you need to provide an alternative to watering from the stream. Streamside paddocks are relatively easy to provide with an alternative water source because they are often downhill from the well, allowing gravity to do most of the work.

Where stream water quality is acceptable but bank damage will result from stream watering, a fairly simple system for pumping water from the stream into a tank can be

constructed for about \$300 using a bilge-type pump with flexible hosing submerged in the stream (see appendix for details *-not included in draft*). Another alternative is to install self-pumping (or nose pump) watering systems. These systems work better where some stock return the next year to teach new animals how to use the pump.

**Watering from the stream** In many cases, streams provide the most convenient and economical source of water for livestock in riparian pastures. Efforts should be made to minimize the length of stream accessed by the stock. Stock access can be limited by covering some areas with rock 2" or larger in diameter. Streambank areas used for drinking should be monitored and stock removed if damage to the streambank or bed is occurring. Installation of a stream crossing can provide safe access to streams for watering purposes.

## Stream Crossings

**Where should the stock cross?** It's not always necessary to build a stream crossing, but it's a good idea because it allows you to control where the cattle cross and where they drink. If you are already grazing along your stream, your stock have probably chosen a spot to cross. This is probably the best place to put the crossing. Your least expensive, most successful option is to improve this spot with a focus on livestock convenience, encouraging them to use it.

**Basic requirements** Livestock look for two basic things when crossing a stream or approaching it to drink: they need to be able to see the bottom and they need a firm bed to walk on. Most animals will avoid soft muddy areas, steep banks and rocky areas whenever possible and we can use these tendencies to minimize damage to the stream.

The primary component of a stream crossing is a layer of gravel thick enough to support the weight of the animals. The size of the gravel or aggregate affects how long the cattle spend in crossing. Aggregate with 1.5 inch diameter is best; it is large enough that it is uncomfortable underfoot so that the stock will not be tempted to stand around in the water but not so large as to keep animals off. In situations where the streambed is unstable, a layer of fiber cloth (geotextile) under the rock base may be called for. Fiber cloth is particularly useful when there are springs in the vicinity of the crossing.

**Cost-sharing** There is cost-sharing money available for installing stream crossings through USDA-National Resource Conservation Service (NRCS) and possibly the Wisconsin Department of Natural Resources (DNR) through the Priority Watershed Program. Contact your local representative for details. If you can't get information locally, contact Brian Pillsbury, our statewide NRCS grazing specialist.

## Modifying Streambanks

Fisheries managers have developed a number of methods to improve instream

habitat for the aquatic community. These include shaping banks, stabilizing banks with rock (riprapping), and providing instream habitat using wooden frames or rocks. All of these practices are compatible with managed grazing and cost-sharing may be available for installation. Shaping and stabilizing banks can not only improve fish habitat, but minimize erosion problems, improve forage productivity and reduce management worries. Any effort to modify streambanks should be done only in consultation with your local DNR representative. Permits may be required.

*Shaping steep streambanks* can be very effective, but costly, unless you have access to a back hoe or other earth-moving equipment. The target slope will depend on your situation, but, in general, reducing a bank to a 1:1 slope will alleviate most erosion problems. A 4:1 slope will practically eliminate them. Shaping should be done in late spring to allow establishment of a good sod before the end of summer. Once the bank has been shaped, it should be seeded with a mix of pasture grasses and legumes of your choice. Be sure to include annual or perennial ryegrass in the mixture at about 2 lb/a or oats at 1 bu/a. These species will germinate quickly and provide ground cover to hold the soil while the slower germinating grasses establish.

*Ripraping* can help reduce bank cutting and erosion on stream curves. However, it is expensive and too much rock along the water's edge can cause problems--weeds grow up among the rocks and cannot be reached by the stock to be eaten down. Keeping rock at or below the surface of the water will allow stock to graze up to the stream edge. Rocks should be fist to football sized, with larger rocks in flood prone streams. Placement should deflect the stream current from the bank.

## Managing Trees

*Value of trees* Trees can contribute in several ways to the health of the stream ecosystem. The shade that they create can help keep the water cool and reduce nuisance aquatic plant growth. The leaves and woody debris that they contribute to the stream is a source of habitat for fish and food for aquatic insects (which in turn are food for fish).

*Problems with trees* Trees, like streams, influence livestock behavior. And trees along streams can be a headache for graziers. Trees and the shade they create can be detrimental to maintaining a good, thick sod in riparian areas, especially on banks. Trees can catch debris during flooding and cause erosion problems. A single, large tree can encourage animals to congregate in its shade and cause bank damage. Small, fast growing trees like willow and box elder often attract beavers.

*What to do?* Because of their value to the stream ecosystem, the best approach to trees is to do nothing unless they are causing a problem. Don't remove more trees than you need to solve the problem. If removal is necessary, larger trees can be girdled and allowed to die or cut down outright. Small trees should be mowed or otherwise cut off as close to the ground as possible. Many of these species will resprout, but most livestock will keep the sprouts grazed down.

### **Contacts, References, Appendices**

- 1) specifications of bilge pump design
- 2) specifications/sources of self pump waters
- 3) fence construction options for crossing streams

*Suggestions?*

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These guidelines are based on research conducted in cooperation with the following farm families: Dick and Kim Cates, Reid and Carol Ludlow, Dan and Jeanie Patenaude, and Dick and Terry Ryan. The research was conducted under the auspices of the Wisconsin Agricultural Ecosystems Research Project. For more information, contact: Laura Paine, UW Agronomy Department, 1575 Linden Drive, Madison, WI 53706. Phone: 608/262-6203. Email: [lkpaine@facstaff.wisc.edu](mailto:lkpaine@facstaff.wisc.edu).