

WATER QUALITY AND ECONOMIC BENEFITS OF LIVESTOCK EXCLUSION FROM STREAMS: EXPERIENCES FROM VIRGINIA

R. W. Zeckoski¹, B. L. Benham², and C. Lunsford³

¹Research Associate and ²Assistant Professor and Extension Specialist, Center for TMDL and Watershed Studies, Biological Systems Engineering, Virginia Tech, Blacksburg, Virginia; ³TMDL Program Manager, Department of Conservation and Recreation, Richmond, Virginia

Abstract. Producers across Virginia are voluntarily participating in stream exclusion practices that reduce the time livestock spend in streams. Evidence from the literature suggests that stream exclusion practices can be both environmentally and economically beneficial to the producer. Studies have shown that the health and productivity of livestock increase with stream exclusion. The goal of this project was to collect information from producers across Virginia who have implemented stream exclusion practices to determine what factors affect the decision to implement stream exclusion practices and what costs and benefits producers associate with stream exclusion. The project accomplished these goals through interviews with 20 producers from varied regions of Virginia. Through these interviews, we found that producers with stream exclusion practices commonly experienced an increase in cattle weight gain (beef operations) or milk production (dairy operations) and decrease in disease. Common factors positively influencing the decision to install a stream exclusion practice include information provided by local agency personnel, a desire to take advantage of off-stream waterers and interior fencing that could be installed as part of a stream exclusion cost-share project, and a concern for the environment. A major complaint of the producers was the noxious vegetative growth in the 'fenced-off' riparian area; they hypothesized this was a main reason that many producers did not participate in stream exclusion incentive programs. Fence maintenance required in riparian areas was also a common complaint. Overall, the interviewed producers were happy with the systems they had implemented and recommended stream exclusion to their peers.

Keywords. Livestock stream exclusion, water quality, economic benefits, producer experience.

INTRODUCTION

Interest in meeting water quality standards in streams in predominantly agricultural watersheds has driven investigation into the primary agricultural contributors to water quality problems. Watershed studies have shown livestock defecation and loitering in streams to be a large contributor to water quality problems in predominantly agricultural watersheds, and frequently recommend exclusion of livestock from streams to remediate these problems (Benham et al., 2004; MapTech, Inc., 2004).

It has been well documented that excluding cattle from the streams has benefits for water quality (Sheffield et al., 1997; Thomas et al., 2005; Virginia Department of Environmental Quality, 2006; Virginia Department of Environmental Quality, 2005). Livestock contribute pathogens to the stream when they defecate there (Adams, 1994; Veira, 2003). Studies have shown decreases in sediment transport and increases in stream bank stability after livestock removal from the stream (Owens et al., 1996; McIver, 2004; Sheffield et al., 1997).

There are also economic benefits associated with the installation of stream exclusion systems. A few studies have shown increases in weight gain from beef cattle that have been provided with an alternative source of water (Wilms et al., 1994; Buchanan, 1996; Veira, 2003; Wilms et al., 2002; Dickard, 1998). For dairy cattle, ingesting greater quantities of cleaner water can improve both milk and butterfat production (Bendfeldt, 2004; Landefeld and Bettinger, 2002). Additionally, many harmful organisms are present in the stream, including those that cause foot rot, environmental mastitis, jaundice, fever, red nose, bovine virus diarrhea, and tuberculosis (Bendfeldt, 2004; Grove, 2003; Hilliard and Reedyk, 2001; Pfost et al., 2000; Adams, 1994; Jones and Swisher, 1998). Removing cattle from the stream and providing an alternative source of water limits contact with these pathogens.

Despite these benefits, many producers have been slow to adopt stream exclusion systems. The goal of this study was to determine what factors encourage or dissuade producers from implementing stream exclusion systems. Because stream exclusion systems in Virginia commonly include not only the streamside fence itself, but also interior fencing to permit rotational grazing, wells and troughs for off-stream waterers, and fencing and streambed stabilization for hardened stream crossings, this study addresses the costs and benefits of practices beyond just the stream exclusion fence itself.

METHODS

We interviewed twenty producers while conducting this investigation. Of these twenty, fourteen were beef producers, four were dairymen, and three were involved in some type of equine endeavor (an owner, a boarder, and a breeder). One of the beef producers doubled as a horse boarder during some parts of the

year. The producers were located throughout Virginia: two live in the Page Brook watershed, in Clarke County just east of Winchester; one lives in Prince William County, south of the Washington, D. C. area; eight live in the “Three Creeks” watersheds in Washington County in southwest Virginia; four live in Augusta or Rockingham County in the Shenandoah Valley; and one lives in Dinwiddie County in central Virginia (Figure 1). Of the producers we interviewed, seventeen used incentive-based cost-share program money to install their practices.

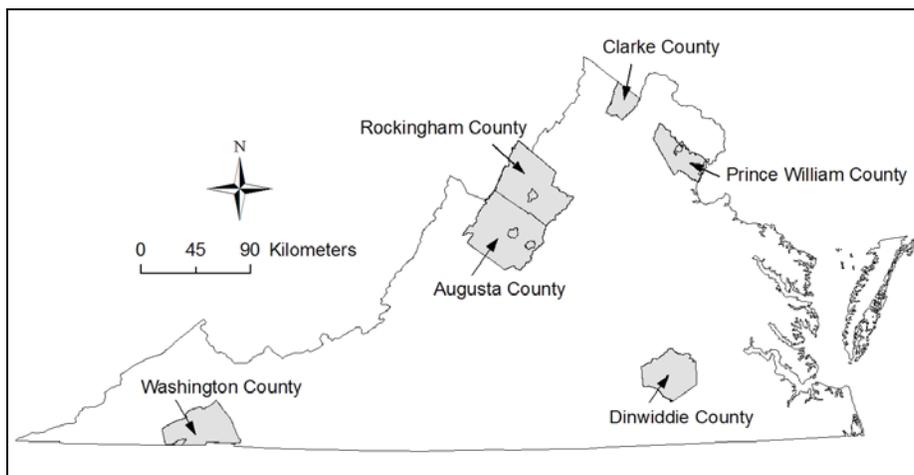


Figure 1. Counties in which the interviewed producers reside.

Each producer was interviewed in person (16) or over the phone (4). They were asked a series of questions regarding their stream exclusion practice, including:

1. Why did you decide to install fences?
2. Did you participate in a cost-share program?
3. Does your fence require upkeep and maintenance?
4. Is vegetation in the riparian area a problem?
5. Have you lost all or a portion of your fence to a flood event?
6. Have you made any other changes to your grazing practices?
7. Were off-stream waterers installed as part of the fencing system?
8. Have you experienced benefits (economic and/or environmental) after installing fences?
9. Have you noticed changes in herd health (fewer incidents of disease and injury) after installing fences?
10. Are cattle performing better?
11. Have you experienced any economic losses after installing fences?

In addition, we asked each producer to provide any other relevant information about which we did not specifically ask. This open-ended question provided insight into the producers' perspectives. After the interviews were completed, we compiled the responses and looked for obvious trends therein.

RESULTS

Motivators and Impediments

Most of the producers were motivated to install streamside fencing because they wanted access to some of the other benefits that came in the cost-share practice; for example, many were interested in waterers that could provide fresh water in more locations throughout the farm and in interior fencing to be used for rotational grazing. One gentleman was particularly interested in installing a feed pad and enclosing additional pasture area in fence to increase the productivity of his farm. The next most common motivator was a concern for the environment and a desire to ‘do the right thing’ in that respect. Several producers cited the information and encouragement provided by local agency (e.g., Cooperative Extension, Soil and Water Conservation District, Natural Resources Conservation Service) personnel as a key factor in their decision to exclude their livestock from the stream. Others were concerned that they would be forced into fencing their livestock from the stream at some point, and felt it prudent to go ahead and get it done while incentive funding was available to help and while installing stream exclusion fencing was voluntary. A few

chose to exclude their animals from the stream because they felt their herds would be healthier. And lastly, a few felt that it was important to fence cows from the stream to improve their (the producers') image in the community and to strangers passing by who might see the area.

The most common impediment to installing stream-side exclusion fencing we heard was the likelihood of nuisance vegetation growing in the riparian area and programmatic limitations on controlling such vegetation. Many of the producers told us about friends or relatives that were unwilling to put fences on their streams specifically because they did not want to deal with or watch the vegetative growth in the stream buffer. Many producers feel that the brushy growth that typically occurs in a stream buffer looks trashy and prefer the 'clean' look of a stream bank closely grazed by livestock. If not carefully managed, nuisance vegetation growing in the riparian buffer may also cause problems in the adjacent pastures. Several producers interviewed for this project use flash grazing to control the riparian vegetation. One creative individual chooses to rotate his sheep through several riparian buffers to keep the vegetation down, noting that they do not climb down the banks into the stream to cause direct problems there.

A few producers mentioned maintenance as a negative aspect of their stream fencing system, although none felt it was enough of a negative to deter participation in the program. Other issues were flooding concerns, rodents living in the riparian buffer, and low cost-share payments for fencing materials. One third of the interviewed producers had no complaints about their systems.

Overall, the producers are satisfied with their stream exclusion systems. Many made the comment that they would readily do it again if they had reason to, and in fact at the time of the interview a couple of the producers were installing fence in additional pastures. Several of the producers actively recommend stream exclusion systems to their peers.

Water Quality

Many producers noticed as they were installing their systems that once the waterers were in place the cows preferentially drank at the new water troughs rather than at the stream, even when the stream was still available to them. This is also reported in the literature (Bendfeldt, 2004; Clawson, 1993; Hilliard and Reedyk, 2001; McIver, 2004). Thus, some water quality benefits may be realized even without full streamside fence installation.

Most of the producers noticed some sort of beneficial environmental change as a result of implementing a stream exclusion system. The producers' visual assessment of the streams was that they were much cleaner than before the stream exclusion systems were put in place. One producer commented that where before the bottom of his creek was muddy and silty, he can now see a clean gravel streambed. Many noticed reduced erosion after installing streamside fences. Several of the producers reported increased numbers of wildlife, including fish, tadpoles, frogs, ducks, deer, and muskrats. Measured water quality improvements included decreased turbidity and fecal coliform bacteria counts and improved benthic communities. A couple of the producers allow young students to come to their farms to learn about the benefits of stream exclusion fencing and to take water quality samples from the streams.

Economic Benefits

The economic benefits realized by the interviewed producers fall into three general categories: increased productivity, decreased incidence of disease, and improved management. Most of the producers who fenced their livestock from the stream and provided an alternate source of water experienced increases in beef cattle weight gain and dairy cattle milk production and quality. One producer reported increased weight gains of 5-10% over a 9-10 month growth period for the beef he raises. Most producers cited the better grass available from their rotational grazing systems and the cleaner water available from alternative water sources as the reasons for the increased weight gains and better milk production. Neither of these is a direct result of streamside fencing (for instance, several farmers who put in streamside fencing but did not implement rotational grazing and still allowed access to the stream as the sole water source via a hardened crossing did not see these improvements), but both internal fencing for rotational grazing and wells and troughs for alternative waterers are included in the typical stream exclusion cost-share package in Virginia (SL-6) (Virginia Department of Conservation and Recreation, 2005). In addition to the weight gains on a per-cattle basis, most farmers who implemented rotational grazing saw increased beef production on a weight-per-acre basis.

Many producers commented on general herd health improvements that resulted from implementing their stream exclusion systems. Most producers who provided an alternative source of water for their livestock saw a decrease in incidence of disease. Common diseases that declined after stream exclusion included foot rot, pink eye, scours, and mastitis. Producers noted that the reason for the decline in scours and mastitis in particular was the fact that the cows' udders were no longer immersed in dirty water as they had been when the cows were allowed to stand in the stream. Additionally, one producer noted that his cows no longer drown in the stream as a result of getting caught in tree roots on the stream bank, and another reported a decrease in injuries once his cows no longer bunched close together to fit in the stream.

Improved management capabilities were also commonly cited as economic benefits for producers implementing stream exclusion systems that included rotational grazing. Several producers commented that it was easier to move the herd around, gather the herd for veterinary visits, and locate or isolate individual animals or groups of animals by using the paddocks in the rotational grazing system. Rotational grazing combined with strategic water placement improved pasture utilization for many of the interviewed producers. This improved pasture utilization helps distribute manure throughout the pasture and a couple producers reported decreased fertilizer costs as a result.

As is expected, there are costs involved in implementing a stream exclusion system. Aside from the obvious cost of the actual system installation (which can be somewhat offset by cost-share payments), other items that incurred costs included regular fence maintenance, fence replacement after flooding or fallen trees, riparian buffer vegetation management, opportunity costs of the land in the buffer area lost to production, and electrical costs to run pumps to supply off-stream waterers. Additionally, one producer reported frustration with needing someone to check to make sure the off-stream waterers are functioning while he travels. However, all the farmers felt that the benefits they received outweighed the costs involved. Some felt this was true on a strictly monetary basis – rental payments from the Conservation Reserve Enhancement Program (CREP), increases in cattle weight gains, and/or increases in stocking rates more than made up for the costs involved in maintaining the system. Others felt this was true on a more intangible basis, feeling that the improvements to their public images or benefits to water quality made the system well worth its costs.

CONCLUSION

A key finding of this study is that providing producers with additional options within an incentive-based cost-share fencing program (e.g., interior fencing, feed pads, wells, and off-stream waterers) can be a huge motivator to install streamside fencing. Many producers do have a genuine concern for the environment and want to do what is right; sometimes all that they need is someone from a relevant agency to come and talk with them on an individual basis to discuss the pros and cons of these best management practices.

Vegetative growth in the riparian buffer is a general concern for many producers, both for aesthetic and management reasons. Programs that work with producers to address these issues may meet with more success in the future. For example, although flash grazing is not necessarily desirable from a water quality standpoint, if it convinces a producer to implement stream fencing, it is certainly more beneficial than allowing cattle to continuously loiter in the stream.

And, finally, there are many economic and water quality benefits that accrue from excluding cattle from the stream, particularly if this exclusion is accompanied by rotational grazing and off-stream watering. Fresh water can decrease incidence of many diseases in cattle and increase productivity. Rotational grazing and strategic water placement allows better pasture utilization and, commonly, a higher stocking rate for the farm. Water quality benefits of stream exclusion have been well documented in the literature and were observed by several of the interviewed producers.

Overall, Virginia's experience with stream exclusion systems has been positive. The producers we interviewed for this project, all of whom have voluntarily implemented stream exclusion practices, have been satisfied with the results.

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