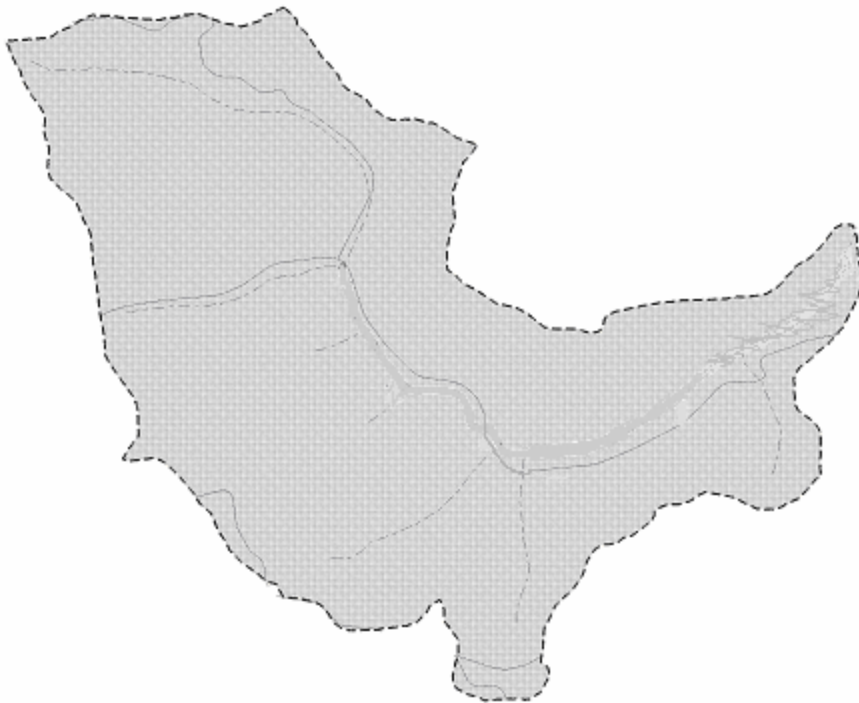
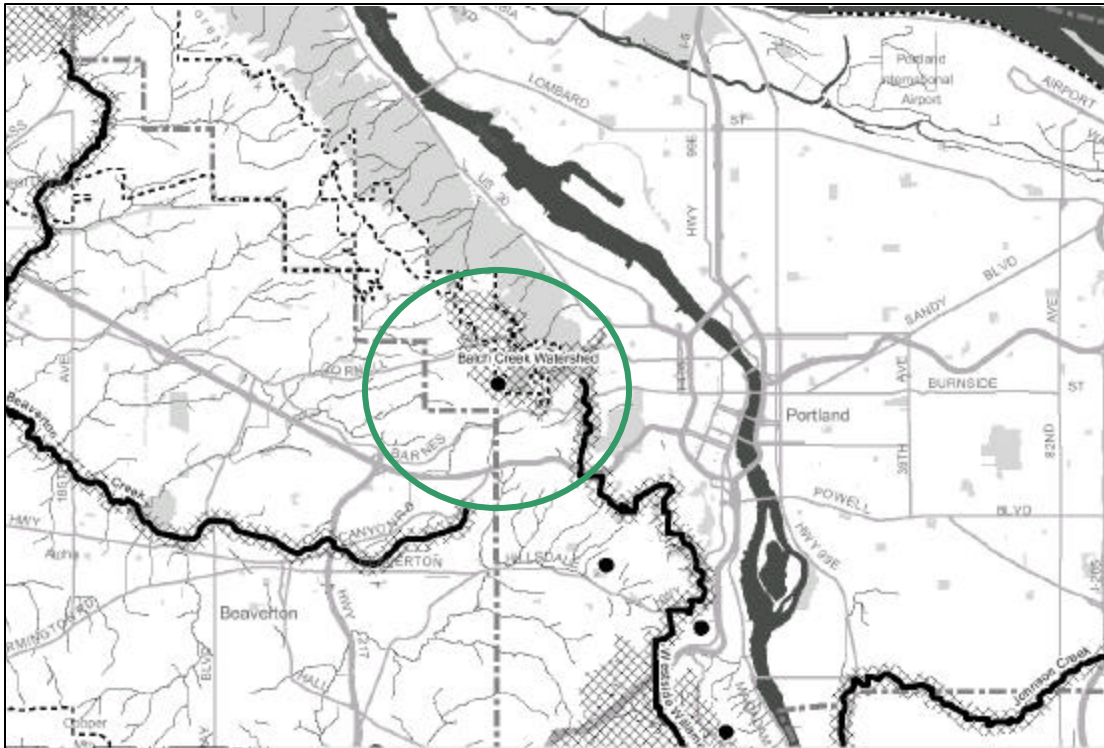


Balch Creek Watershed

Good Policy, Poor Performance



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Location of Balch Creek Watershed within the Portland Metro Region

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ABSTRACT

The Balch Creek Watershed in NW Portland, OR is an urban stream facing several problems associated with urban uses and development (*West Hills Rural Area Plan* 2002). The stream has undergone numerous restoration and improvement projects to abate many of those problems. This paper will address some of those solutions and analyze their effectiveness. The paper will serve as a tool for environmental managers who would like real-world examples of best practices in terms of urban stream restoration. The data and results come from a visual analysis of enhancement projects within the Balch Creek Watershed, government documents, and environmental inventories. It was also found that some projects were more effective at controlling urban disturbances and pollutants than others. Planting of native species and increasing buffer zones reduced streambed erosion and improved habitat conditions, but a lack of upkeep made the enhancements ineffective over time. Other solutions such as bark dust over pathways and signage were less effective at reducing erosion and controlling runoff, particularly from recreational uses when compared with the more labor intensive measures. From the visual analysis of the site, it can be determined that the abatement projects within the watershed were only minimally successful at their initial placement and became ineffective from lack of maintenance. IBI data also shows an extreme degradation of environmental quality within the watershed (Graham and Ward 2002). Despite the lack of effectiveness in the implementation of the programs, the policies on which they were based are sound. This document will prove useful for urban stream specialists and natural resource managers involved in similar minimally involved stream restoration projects.

Keywords: Urban Streams, Stream Restoration, Erosion Abatement, Water Quality

INTRODUCTION

The city of Portland, OR developed a comprehensive "Clean River Plan" to combat the effects of urbanization within the watersheds of the greater metropolitan area and to comply with State and Federal environmental regulations (*Clean River Plan* 1999). The \$877 million plan began in 1999 and is scheduled for completion around the year 2020 (CRP FAQs, March 2000). The largest component of the plan is the construction of a wastewater system that separates stormwater and surface runoff from municipal sewage. Up to the beginning of the plan, combined sewer overflows (CSOs) averaged 6 billion gallons of raw sewage into Portland's waterways each year (CRP at a Glance, March 2000). The major goal of the plan is to reduce sewage outflows into the Columbia and Willamette Rivers by 99.6% and 94% respectively. Improvement projects within the Balch Creek Watershed directly impact the amount of runoff entering Portland sewers making the stream an integral part of the program (Framework for Watershed and Habitat Conservation Planning 2001).

Additional components of the Clean River Plan include; planting trees and other native vegetation along streams to create natural buffers, reducing the flow of stormwater and pollutants into urban streams, controlling erosion from construction, logging and recreational use, as well as fostering education and stewardship among citizens (CRP FAQs, March 2000). These smaller components of the project will be examined within this paper in regards to the Balch Creek Watershed in the Macleay Park area of NW Portland, OR (see figure 1). The efforts of both government agencies and civic groups will be analyzed in terms of their effectiveness in achieving the goals of the Clean River Plan in Balch Creek. The paper will begin with the hypothesis that the caretakers of the Balch Creek Watershed are overcoming the negative effects of urbanization through progressive conservation strategies including native plant revegetation, erosion control, passive constraints (signage and railings), and by fostering relationships with environmental groups. It should be noted that due to a lack of empirical data with regards to water quality and erosion the analysis is based on a visual inspection of the watershed, interviews with involved citizens, and IBI data collected by the City of Portland.

HISTORY

The Balch Creek Watershed was formed 13 million years ago by the folding of ancient basalt flows that covered the area that is now metropolitan Portland. The area was then covered by 600 feet of wind deposited silts blown from flood deposits from the Columbia River Gorge. Underlying the silt are granite and quartzite gravels that serve as an excellent underground aquifer. The presence of the silt at upper elevations has serious implications for development in the area because the soil tends to destabilize as the moisture content increases (Balch Creek Watershed Protection Plan 1990).

The watershed contains over 120 separate plant species including Hemlock, Pacific Yew, Cedar, and Madrone. Abundant wildlife is also a feature of the watershed (Balch Creek Watershed Resource Site 2001). "The planning area contains a diverse bird population with some sites exceeding 70 resident and migrant species. Of the migrant species, nine warblers were identified including the rare Tennessee warbler. Other wildlife species include deer, elk, bobcat, beaver, coyote, shrews, voles, squirrels, chipmunks, weasels and bats. Pacific tree and red-legged frogs, ensatina and pacific giant salamanders, northern alligator lizards and western fence lizards, northwestern and common garter snakes, and roughskin newt are resident herptiles."(*Skyline West Resources Site* 2001) It is also of note that the Balch Creek itself is home to a small population of Cutthroat Trout, although the populations are isolated by natural and man-made barriers (BES BCW 2002).

The last two centuries of the Balch Creek Watershed resemble a modern soap opera. The area was formerly a homestead settled by Danford Balch and his family. A neighbor courted then eloped with a Balch daughter against the father's wishes. Danford then killed his daughter's husband with a shotgun. He became the first man legally hanged in Oregon. The area was then known as

the “old Balch place” since the crime (PPR 1 2002). The land was then gifted to the city of Portland in lieu of tax payments by Donald Macleay in 1897 as a “...conveyance for carrying patients from the (area) hospitals through the park during the summer.” (PPR 2 2002). Over the years the park was expanded through various civic donations, and transfers from Multnomah County. The Audubon Society turned a large portion of the park into a bird and wildlife sanctuary that exists to this day (PPR 1 2002).

BACKGROUND

The Balch Creek Watershed has been designated an environmental zone in accordance with Portland’s planning regulations. The area, along with eight similarly situated natural areas within the city, have been dedicated an “E” zone following multiple, extensive environmental inventories conducted by the city. “The Environmental Protection zone provides the highest level of protection to the most important resources and functional values. These resources and functional values are identified and assigned value in the inventory and economic, social, environmental, and energy (ESEE) analysis for each specific study area (ESEE 2001). Development will be approved in the environmental protection zone only in rare and unusual circumstances” (*Portland City Code 2002*). Because of such surveys conducted by the city, the qualitative scope of urbanization on the watershed has been detailed in numerous reports.

Most of the problems associated with Balch Creek are typical of similarly situated urban streams. Some of those problems include the siltation of the waterway due to stream bank instability, landslides, and increased storm runoff; pollution from traffic, residential waste (septic tanks, lawn runoff, pets), and recreational use (*Preliminary Review Draft 2001*, Voluntary Conservation Actions 2001). The nearby roadway contributes roughly 132 gallons of oil directly into the stream annually (DEQ 1997). Other issues include non-native invasive species like Morning Glory and Himalayan Blackberry that are overtaking portions of the park (BES BCW 2002). The watershed is also zoned for commercial logging activities, which may lead to significant erosion in the future if residents develop timber plots within the area (City of Portland Development Review Team 1998).

A low Index of Biological Integrity (IBI) score for the watershed is also a major problem. Over the entire year all of Balch Creek rates unacceptable and both reaches are “severely impaired” with a mean IBI score of 36 (Graham and Ward 2002). Such a low IBI score indicates an inhospitable habitat for organisms within the watershed (this will be further discussed in the discussion section of this paper). Graham and Ward (2002) estimate the current trout population within both reaches to be between two and four thousand trout.

DATA

Conservation Actions

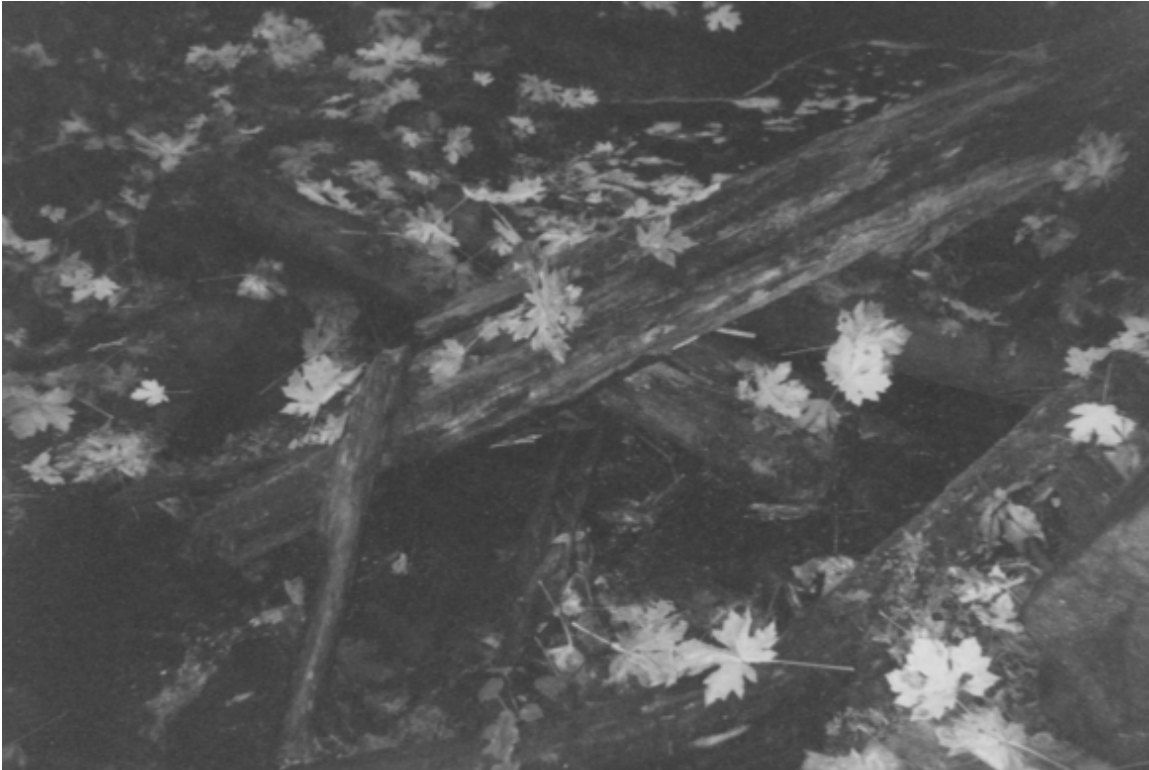


Fig. 1: Logs Placed in Stream Channel (November 5, 2002)

Logs and other debris are deliberately placed in the stream channel to provide enhanced cutthroat trout habitat. The debris provides shade and shelter for organisms within the stream. Placing logs in the channel also slows the current and allows for pooling in front of the placement (*Our Projects* 2002).



Fig 2: Native Plantings Within Balch Creek (November 5, 2002)

Wapato planted in ponds near the source of Balch Creek. These plants provide shade and organic matter to support existing trout and other vertebrate populations in the watershed. It is difficult to see in this photo but the foreground is riddled with footprints and animal tracks, despite conspicuously placed signage and railings.



Fig. 3: Replanted Ferns Occupy Cleared Space (November 5, 2002)

Cleared space along a recreational path was replanted with native ferns to control erosion and restore native habitat to the watershed. Note the encroaching blackberry and morning glory vines overtaking the replanted area.

Non-Photographic Observed Data

Other observances within the watershed included passive conservation methods such as railings along sections of trail and posted signs notifying recreational users to keep animals leashed and to avoid certain off-trail locations. Along certain replanted areas, signage was also placed identifying the area as recently revegetated or undergoing some enhancement.

Disturbances



Fig. 4: Erosion of Stream bank Along Recreational Path (November 5, 2002)

A log placed along the recreational path decayed, making the steep slope susceptible to erosion. A lack of trailside vegetation has lessened the slope's capacity to prevent such degradation, causing it to crumble and erode into the stream channel. This type of erosion is a consistent problem along the trail running parallel to the creek (Grading and Erosion Control Permit Undated). Permeable sawdust was also spread along the trail at points to prevent erosion, but most had been washed away by rainfall or compacted by pedestrian use.



Fig. 5: Himalayan Blackberry Takeover of Balch Creek Watershed (November 5, 2002)

The entire hillside was covered with a combination of Morning Glory and Himalayan Blackberry. Most of the trees surrounding the watershed were also covered in a thick growth of English Ivy.



Fig. 6: Himalayan Blackberry Overtakes a Patch of Ferns (November 5, 2002)

A lack of upkeep led to the destruction of native fern replantings by invasive blackberries along the stream bank.



Fig. 7: Mysterious Foam on the Surface of Balch Creek (November 5, 2002)

Throughout the reaches of the creek, an odorless sudsy foam covered portions of the waterway. This picture demonstrates one of the larger patches of foam below an armored section of the channel. Note the wall of ivy to the right of the barrier. Lawn chemical runoff and other pollutants from nearby houses most likely caused this foam (BES BCW 2002).



Fig. 8: Balch Creek Enters the City of Portland (November 5, 2002)

Balch Creek enters the combined sewer system of urban Portland at this wooden grate. This makes the upper reaches of the creek completely isolated from the Willamette River. Native populations of fish are trapped within the stream and have no interaction with new populations (Graham and Ward 2002).

Index of biotic integrity scores for extensive summer and intensive seasonal sampling in Portland streams, summer 2001 through spring 2002. N.S.= no survey; 0=no fish.

		IBI Score					
		Extensive	Intensive				
Stream	Reach	Summer	Summer	Fall	Winter	Spring	Mean
Balch	1	32	36	36	36	36	36
	2	36	36	36	36	36	36

Fig. 9: IBI Table From Graham and Ward (2002)

The above IBI table shows the severe impairment of both reaches of the creek.

Observance of the passive conservation methods proved them to be largely ineffective. Several dogs ran un-restrained throughout the watershed and within the stream channel itself. Users of the park also walked freely along

stream banks and within sections of the area marked off limits to recreational use. Footprints in the streambed and surrounding ponds further evidenced destructive pedestrian use.

DISCUSSION

Erosion Control Methods

A visual analysis of the erosion control programs shows an initial effectiveness when the measures are first constructed. The logs along the trail edges shore up the pathways and stabilize the slope, preventing the bank from collapsing into the stream. There were several locations where the pins supporting the logs had come loose or were missing and the logs had rolled either downhill or were compromised. Other locations had been so neglected that the logs had decayed and crumbled along with the slope into the stream channel. Figure 4 is an example of a location where the log decayed, leaving the slope vulnerable to erosion.

Sawdust placed along the pathway appeared effective in the locations that had significant amounts remaining on top of the trail. Portions of the trail that showed signs of frequent use had compacted the sawdust into the dirt creating an impermeable surface, negating the beneficial effects of the sawdust.

A lack of upkeep within the watershed is causing the erosion control methods to fail. From the visual inspection of the projects it was clear that in the well-maintained sections of the trail the measures were quite effective. Only the lower portions of the reach and the sections in the immediate vicinity of the Audubon Society building showed consistent maintenance.

Non-Native Species Removal and Revegetation Programs

In a temperate rainforest environment such as the Balch Creek Watershed, vegetation grows at a rapid pace. Non-native invasive species such as Himalayan Blackberry and Morning Glory out-compete inferior native competitors and become the dominant vegetation in the area. This is indeed the case with the Balch Creek Watershed. As with the erosion control methods within the watershed, a lack of maintenance has greatly diminished the native revegetation and invasive species removal programs' effectiveness.

The visual data demonstrates that caretakers of the watershed are fighting a losing battle. Areas had been cleared and replanted, most notably within the area of the Audubon Society section in reference to the ponds. Along the trails were patches of removed English Ivy and Himalayan Blackberry and markers indicating that the spot had undergone habitat restoration (Figs. 2 and 3).

In areas that lacked maintenance, the invasive species overtook the replanted patches and swamped the native vegetation. Figure 5 is a good example of the dominant vegetation types along the creek. Aside from the recently planted areas, it appeared that most of the rehabilitated sections of the watershed had been overtaken by invasive species. A lack of upkeep doomed

the revegetation projects to failure by allowing the invasive species to once again reclaim the restored areas.

Passive Conservation Methods

Passive conservation methods such as signage and railings did little in terms of controlling recreational use throughout the watershed. Footprints and trampled vegetation were observed even at the base of some signs. It can be seen in figure 2 that even the most maintained portion of the watershed was not immune to pedestrian traffic. Dogs were also running through the watershed without leashes or supervision. Numerous times unsupervised dogs ran through vegetation and droppings littered the sides of the trails.

Trout Habitat Improvement

The IBI data clearly shows that the native cutthroat trout populations within Balch Creek live in a severely impaired environment. Although certain low maintenance solutions have been utilized such as placing logs in the stream channel (Fig. 1), little has been done to improve actual water quality. The two-four thousand trout within the creek live in a highly toxic environment (Graham and Ward 2002).

Non-Profit Organization Involvement

From conversations with conservation group spokespeople and the sporadic nature of conservation efforts within the watershed, it can be inferred that groups such as the Friends of Forest Park and the No Ivy League contribute minimally to the overall health of the watershed. Weekend clearings and plantings fail to provide the level of involvement that the conservation efforts require in order to remain effective in combating the negative effects of urbanization on a stream. More will be discussed on civic action groups later on in the paper.

Weakness of the Data

As the data on erosion and native planting program efficacy was visual in nature (photographic and observed) it severely limits the depth of analysis. Empirical data on issues such as TMDLs, dissolved Oxygen levels, turbidity, and pollutant levels was not available for analysis. No active monitoring of pollutant levels within Balch Creek is known to occur.

The only numerical data that was obtained was an IBI survey conducted by the Oregon Department of Fish and Wildlife to inventory and analyze fish populations within the watershed. Other government documents referencing the creek were forward looking in nature and failed to provide empirical data.

CONCLUSION

Program Efficacy

After observing the watershed, interviewing a major non-profit stewardship group, and analyzing IBI data on cutthroat trout habitat, it is clear that the original hypothesis is invalid. The conservation programs within Balch Creek Watershed are failing to improve the environmental quality of the stream. However, to claim that Balch Creek is a poor example of an urban stream would be premature. Other similarly situated streams must also be analyzed before the efforts to improve Balch Creek can be deemed failures.

The measures in place within the watershed are sound in principle and represent good policy. It is the implementation and upkeep of those measures that brings about their downfall. If resources and labor were to be applied in a consistent and larger scale manner, the measures put in place would be highly effective when it comes to improving the habitat and water quality within the Balch Creek Watershed. More research needs to be conducted to determine what the cause is behind the apparent lack of maintenance. Perhaps there are budgetary or political constraints to improving the watershed.

Local conservation groups must build stronger coalitions with neighboring citizens rather than focusing on fostering donors and obtaining grants. Less time must be spent in the office and more time must be given to grassroots conservation activities and improving community involvement in the watershed. This may be achieved through a greater amount of cooperation between governmental units and the non-profit groups in terms of sharing information and educating the public about the city's natural areas, as well as making such groups accountable for results.

Balch Creek still has a great deal of problems that need to be dealt with properly before the watershed can be fully restored. The current policies are a start in the right direction. Measures must be put in place to ensure that those policies are carried out for the long term and on a permanent basis. At present, the programs are doing little to save the watershed.

Misguided Non-Profits

Nonprofit Organizations have little funds with which they try to accomplish many goals. From the moment this group started working those organizations that help protect and enhance Forest Park and Balch Creek it was noticed that they are expected to accomplish a great deal of work with so little resources. The employees are dedicated and try and do as much as they can every workday. Employees often become overwhelmed and appear disorganized. Unfortunately, employees with environmental knowledge of the watershed were virtually impossible to locate.

On several occasion while trying to contact Friends of Forest Park, The No Ivy League or Three Rivers Conservancy the personnel were not answering phones or email, or inaccessible for any meetings. Every employee contacted

was unavailable for comment. Apparently those with no funds to provide the organizations are of little interest to the personnel or organizers.

The dedication and motivation of groups such as Friends of Forest Park cannot be questioned. However, their priorities have become misdirected toward self-preservation through fundraising. The groups failed to provide data on projects illustrated in their fundraising letters, nor was there justification for such projects. The majority of the data collected from these groups came from newspapers the employees kept and letters to donors explaining how their money was used in the enhancement of the park (or administration in this case).

Upon leaving the office of FoFP the interviewee said, "If you come across anything interesting send it my way, we could use anything." It was realized then, that the organizations involved with the stewardship of the park were not concerned about gathering empirical data or monitoring the quality of the watershed. What they were concerned with was getting the most for their money and preserving the group, leaving the rest to inconsistent volunteers. This may explain the lack of success within the watershed in creating real improvements. Some accountability within these groups must be enacted in order to ensure successful implementation of stewardship programs.

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