Final Report

Erosion Survey of The Blucher Creek Watershed

Prepared for:
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1.0 Introduction

The Blucher Creek Watershed Council (BCWC) received funding from the Santa Rosa Environmental Enhancement Grant Program to perform a survey of erosion sites in the Blucher Creek watershed. The primary goal of the grant funding was to promote efforts that would control erosion and reduce sedimentation into the Laguna de Santa Rosa. Sedimentation in the Laguna decreases the quality of aquatic habitat and its ability to act as a flood control detention basin, resulting in increased flooding in the Russian River. Controlling erosion has the added benefit of improving riparian habitat for native flora and fauna in the Blucher Creek watershed. Erosion control also increases land values by controlling the loss of useable land.

In early 2002, BCWC sent a letter to approximately 1,200 landowners in the Blucher Creek watershed asking that they participate in an erosion inventory conducted by Prunuske Chatham, Inc. (PCI). Subsequently, BCWC and PCI have identified 18 landowners who would like to participate in a program to stabilize active erosion on their property. Three other landowners offered to participate, but it was determined that they did not have appreciable erosion that warrants repair.

2.0 Erosion Observations

All of the erosion sites visited were within the bed and banks of Blucher Creek or its tributaries. Surface erosion and landslides do not appear to be significant contributors of sediment to Blucher Creek. A significant landslide has occurred on the south side of Blucher Valley Road, but we did not find any indications that the slide was contributing appreciable

amounts of sediment to Blucher Creek. The landslide appears relatively stable, is vegetated, and develops very little runoff due to its location on the top of a ridge.

The most significant source of sediment that we discovered was in a 3,000-foot reach of Blucher Creek along Blucher Valley Road. Historic watershed practices have resulted in downcutting (lowering of the creek bed), with subsequent bank sloughing and erosion. The downcutting concentrates flood waters into the creek channel instead of allowing it to spread over a flood plain as it has done historically. Storm waters now flow deeper and faster and are much more capable of causing erosion. Considering that the bed and banks are primarily comprised of clay with sparse vegetation in the lower portion, we anticipate further serious erosion in the future.

PCI believes that the primary cause of the erosion found was historical watershed practices, such as the straightening of creeks and removal of riparian vegetation to create more useable land. Much of the watershed was formerly used for grazing. Livestock can promote erosion by denuding riparian vegetation and trampling stream banks. Additionally, land development has caused an increase in runoff rates, which contributes to channel erosion.

3.0 **Erosion Impact on** California Freshwater Shrimp and Steelhead

California freshwater shrimp are listed as endangered by both the federal and state governments. Steelhead are listed as threatened by the federal government.

In 1985, the California Department of Fish and Game (CDFG) reported that the freshwater shrimp density one mile above and below Knowles Corner in Blucher Creek was higher than any other shrimp stream. We are concerned that the recent erosion in the identified 3,000-foot long reach may have a negative impact on the shrimp population in Blucher Creek.

CDFG reports that steelhead were historically present in Blucher Creek. Historic data indicates that steelhead used the 3,000-foot reach that has downcut for spawning. Local CDFG biologists report that Blucher Creek is likely to support a small number of steelhead along Blucher Valley Road and Camp Road. Since most of the gravel has washed away, and

continues to wash away, the steelhead can no longer spawn in most of the 3,000-foot reach of Blucher Creek.

4.0 Non-native Vegetation

Blucher Creek and its tributaries suffer from a rampant invasion of non-native Himalayan blackberry. Other non-natives exist sporadically, but none are as widespread or oppressive as the blackberry. In some locations that we visited, the density of the blackberry was such that no other vegetation existed with the exception of large trees. After the large trees topple with age, the dominant species of vegetation within the riparian corridor will be blackberry.

Relative to native riparian vegetation, Himalayan blackberry performs poorly at controlling erosion in streams. It lacks the large root structure found in woody vegetation that provides much of the natural erosion control. As blackberry overwhelms native vegetation in Blucher Creek, it increases erosion potential and significantly diminishes the ecological quality of Blucher Creek, its tributaries, and the Laguna de Santa Rosa.

5.0 Erosion Control Design Options

The primary design goals to control and prevent erosion at the sites found are:

- Stop downcutting of the creek bed.
- Stabilize creek banks.
- Incorporate the needs of individual landowners.
- Promote habitat for native fish and wildlife.
- Avoid harm to wildlife, including the California freshwater shrimp and steelhead.

Many erosion control design options exist that may be considered. The three we believe will best satisfy the design goals identified above are:

1. Reconstruction of the creek to emulate a more natural shape.

The goal would be to restore the natural functions and habitat values by reconstructing the creek to have a more natural shape in plan, profile, and cross section. The bed and banks would be stabilized. Flows would be designed to spread out over a flood plain. Instream habitat would be promoted by the creation of pools and riffles and the addition of stable woody debris. The riparian corridor would be revegetated with a diversity of native canopy and understory plant species.

2. Construction of rock and/or wood grade control structures.

The goal would be to stabilize the creek bed while allowing flood waters to spread out over existing banks and flood plain. Boulder weirs and log structures are typically used across the streambed and can be designed to enhance riffles and pools that would promote salmonid migration. Grade control structures can also be used in downcut gullies to raise the channel bed, thereby promoting bank stability. Grade control structures must be designed to insure that the profile gradient is not reduced so much that the channel migrates around the structure.

3. Utilization of bioengineering with native vegetation and natural materials.

Bioengineering relies on the rooting ability of native plants to stabilize the bank and is often used with a combination of rock, erosion control fabrics, and other natural materials. Willow is typically secured to the bank using various techniques to provide immediate bank protection. As the plants mature, the root systems significantly increase the structure's stability while providing excellent habitat. Typical techniques include brush mattresses, woven willow walls, live staking or pole planting, willow wattles, willow baffles, and brush layering. Biotechnical techniques can be used for grade control and sediment trapping in small ephemeral streams or gullies. Techniques include brush checkdams, woven willow wall headcut repairs, and fabric-reinforced earth fill with brush layering headcut repairs. Biotechnical erosion control measures should not be used within the streambed in

channels that transport gravel, such as Blucher Creek.

At this time, more information is needed to determine specific design solutions to control erosion at the identified sites, including:

- Landowner needs.
- Regulatory concerns.
- Presence/absence of listed species.
- Topographic conditions.
- Hydrologic and geomorphic conditions (i.e., sampling of flows and sediment transport during flooding).

6.0 Recommendations

We recommend that the Blucher Creek Watershed Council undertake the following actions:

1. Continue to work with landowners on the sediment source inventory. We have seen evidence that other sediment sources exist, but our budget limited the outreach effort.

2. Request grant funding for a planning effort to work with the landowners toward eliminating non-native Himalayan blackberry from the watershed. A comprehensive watershed approach should be taken, which would require participation and approval from several regulatory agencies, especially where listed fish, wildlife, and plant species exist. Removal of blackberries could also facilitate the planning and design phase by making the areas accessible.

3. Request grant funding for a planning effort to control erosion and promote native habitat at sites found.

7.0 Acknowledgements

The volunteer efforts of the BCWC are highly commendable. We are seeing community involvement and awareness, crucial components in restoring a watershed. All participating landowners are concerned with the negative impacts of erosion on the aquatic environment, and some are concerned with the loss of land that is occurring. PCI is grateful for everyone's time and effort in contributing to the results of this report. We believe that continued involvement of the BCWC and landowners will result in a significant and sustained improvement in the ecology of the Blucher Creek watershed.