Riparian Buffers: Function, Management, and Economic Implications for Agriculture

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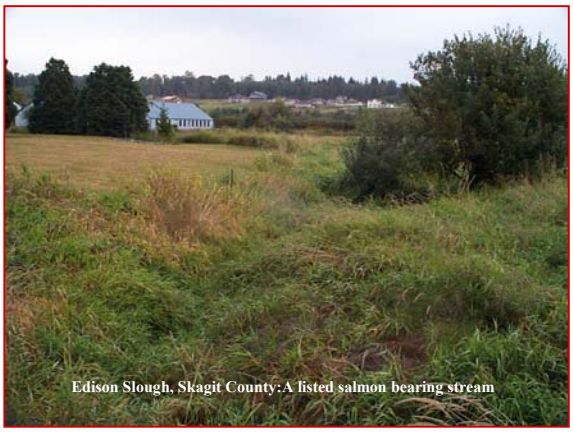

Edison Slough, Skagit County: A listed salmon bearing stream

INTRODUCTION

Recently, Pacific Northwest salmon species were listed as threatened under the Endangered Species Act. Research is lacking on how to manage floodplain riparian areas where agriculture is practiced in the PNW. Regulatory agencies are considering applying upland riparian data to downstream agricultural areas because of the **lack of science-based information**. If wide buffers are applied to all fish-bearing streams and ditches, the **viability of PNW agriculture is at risk** and much productive land would be lost to buffers or impacted by field fragmentation, shading and biotic influences.

We are examining the environmental and economic implications of establishing and managing forested riparian buffers on agricultural lands. Riparian buffers are good land stewardship because they conserve soil, provide fish and wildlife habitat, and improve surface and ground water quality.

OBJECTIVES

Our objectives are to identify **what constitutes a functional riparian buffer** to protect water quality and improve salmon habitat on agricultural land in western Washington, and to **determine the economic impact** of such buffers on farm enterprises.

APPROACH

Our project will examine existing buffers and establish new buffers on several commercial farms in western Washington. Three buffer designs will be replicated on each farm: a) 50' of hybrid poplar (7' x 7' spacing) + 25' grass filter strip; b) 50' red alder (7' x 7' spacing) + 25' grass filter strip, and: c) 75' perennial grass filter strip (Fig. 1). These plots will be compared to a farming control, for a total of 4 treatments. Sediment, surface and subsurface nutrient movement from the farm fields through the buffers will be measured using ground water wells, suction lysimeters and sediment traps placed along transects from the field edge to channel perpendicular to stream flow Fig. 2).

Once established, management options will include sustainable harvesting of the trees to supplement farm income and/or underplanting of shade tolerant conifers. All plots will be evaluated for function with respect to water quality and salmonid habitat.

Riparian buffer designs will be evaluated for economic impact on the farm enterprise, as well as long-term farmland value. Short-term (annual) impacts will be measured by incorporating costs and revenues associated with riparian buffers into existing farm enterprise annual budgets.

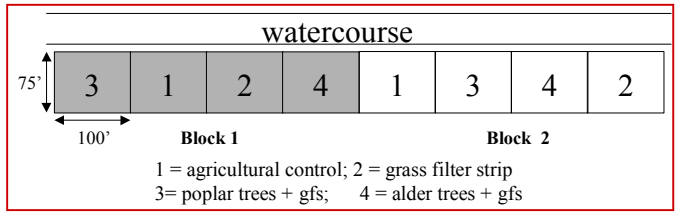

Figure 1. Representation of experimental buffers showing the four treatment buffers and randomization within the replicated blocks.

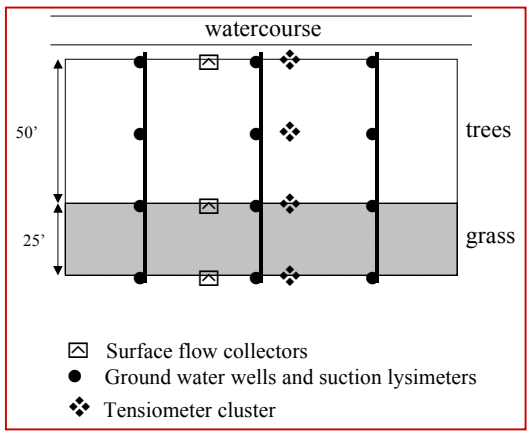

Figure 2. Proposed sampling design for each buffer plot.

RESULTS

The outcome of our research will provide **science-based, peer reviewed information** on quantity and mode (surface, subsurface and ground water) of N and P movement to water bodies as affected by the adjacent cropping system, and nutrient attenuation during movement through the different buffers allowing us to determine functionality of buffer widths and species composition for lowland agricultural areas.

From our economic analysis, we will be able to **put a dollar cost on establishing different types of buffers** and the **impact on the economic viability of agriculture** in western Washington.

Existing hybrid poplar buffer along Joe Leary Slough, Skagit County

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