Economics of Riparian Restoration on Western Washington Farms

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American Water Resource Association

Olympic Valley, CA

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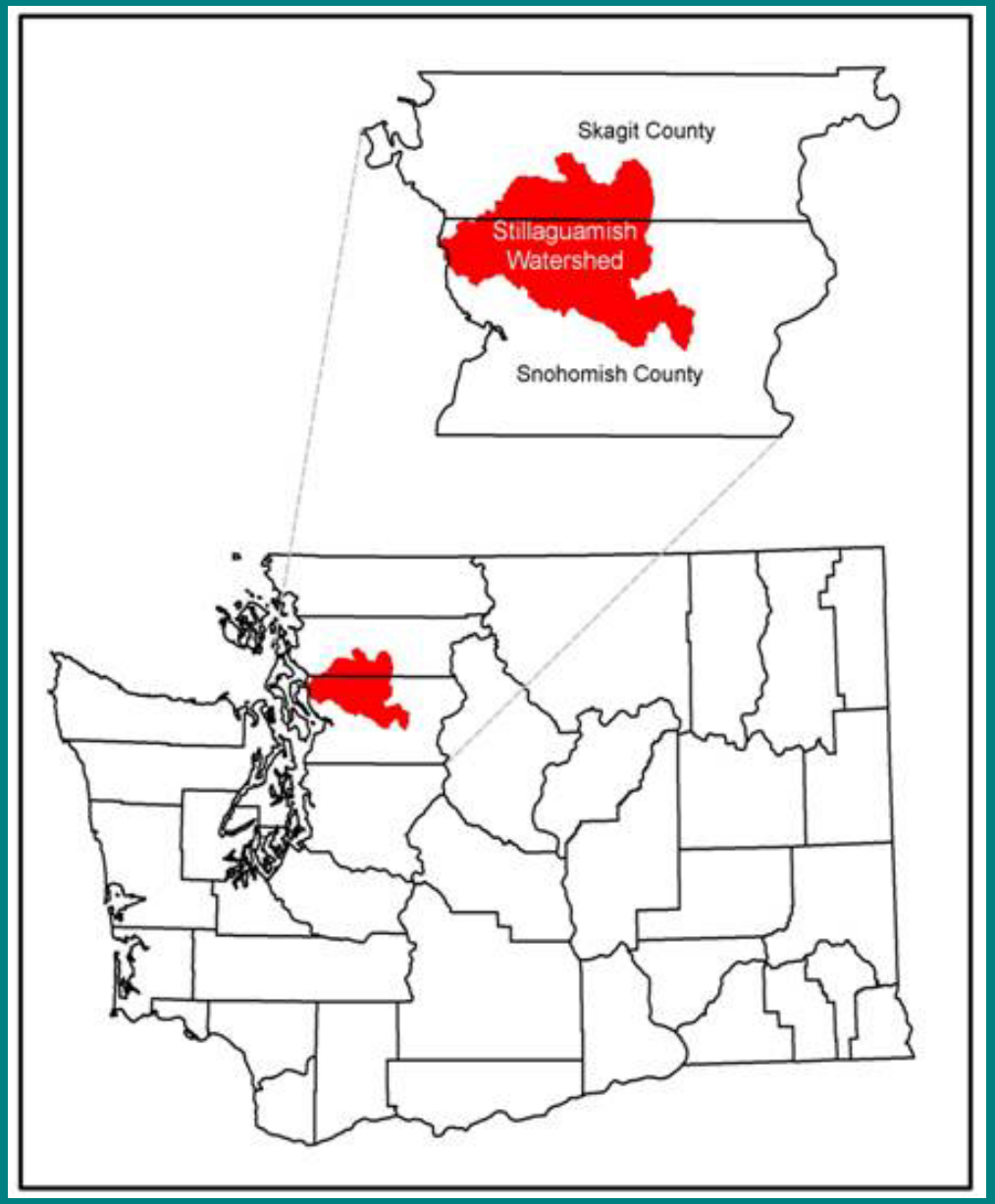
Resource Consulting

Project Background

- **Origin**
  - Stillaguamish Implementation Review Committee (SIRC)
  - Address concerns of farming community and provide sound data on economic impacts
- **Funding**
  - USFWS, WSDA, Snohomish CD, Stillaguamish Tribe, City of Arlington, Snohomish County
- **Technical Support**
  - Snohomish CD, WA State University Extension, SIRC Advisory Panel

Project Location



Stillaguamish Watershed

- 448,000 acres
- 2,214 miles streams & rivers
- ~44,000 population (2003 est.)

Land Use

76% Forestry

17% Rural

5% Agriculture

2% Urban

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Stillaguamish Agriculture

- 527 Farms (1997 Census)
- Approximately 38,000 acres in production
- 80% of farms are less than 50 acres in size
- Total value of agricultural production in 2002 was $57 million (est.)
- Key Agricultural sectors: Dairy, livestock, hay/corn, plant nurseries
- Net income losses in three out of last five years

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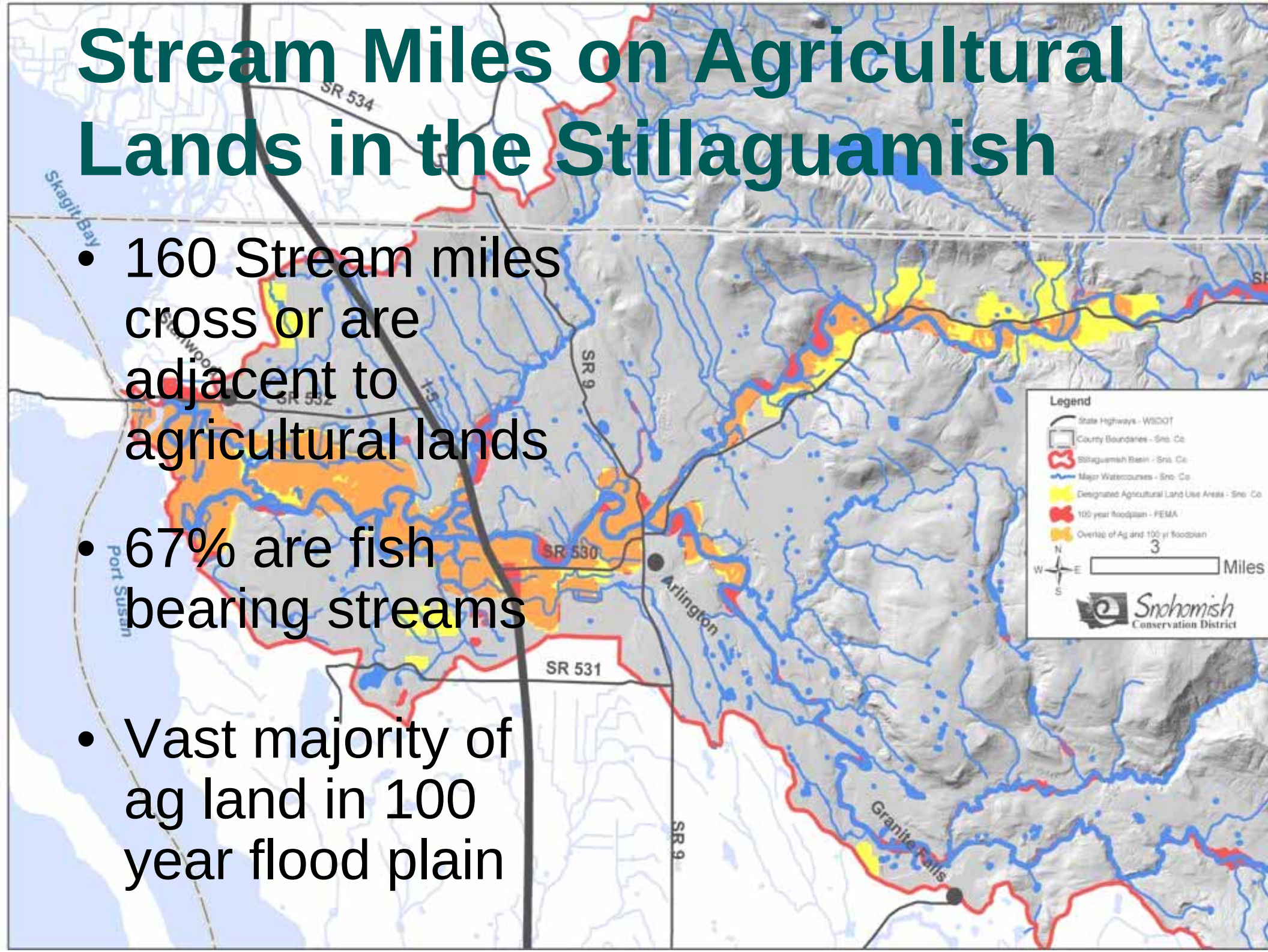
Stream Miles on Agricultural Lands in the Stillaguamish

- 160 Stream miles cross or are adjacent to agricultural lands
- 67% are fish bearing streams
- Vast majority of ag land in 100 year flood plain



Project Objectives and Output

Objectives

1. Measure buffer impacts on net farm income for several case studies
2. Explore impact mitigation options
3. Review economic value to society of salmon habitat restoration

Output

1. Economic tools for land owners
2. Final report April, 2004

Methods: Economic Tools

- Economic tools: 3 models written in MS Excel
  - Dairy
  - Crop
  - Livestock
- Annual farm enterprise budgets
  - Revenues, variable & fixed costs
  - Capture annual impact on net revenues

How The Models Work I

- Producer inputs:
  - Farm data: Crop yield or herd production, management, labor, capital & land investments, prices
  - Buffer information: Stream types and lengths, type of buffer, cost sharing information

How The Models Work II

- Models produce enterprise budgets
  - Pre-buffer
  - Post-buffer
- Results are buffer impacts on net enterprise return
- All assumptions can be adjusted to run different buffer scenarios, and assess impacts and mitigation measures

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Analysis

- **Six commercial farm case studies**
  - 3 Dairies, 2 silage crop farms, 1 beef enterprise
- **12 buffer scenarios (for fish-bearing streams)**
  - 35’, 75’, 180’ widths
  - forested and forest/grass combination
  - with and without financial assistance

Results: Average Buffer Costs and Acreage Placed in Buffers

Total average cost per acre of riparian buffer ($):

Enterprise type	Total cost (PV)	Annualized cost (15 years)
Silage	4,432	403
Dairies	6,460	570
Beef	13,518	1,212

Average number of acres placed in riparian buffers:

Enterprise Type	35' buffer	75' buffer	180' buffer
Silage (two case studies)	2.7	5.3	19.8
Dairies (three case studies)	2.2	3.9	14.1
Beef (1 case study)	3.0	9.0	24.6

Results: Buffer Widths

- All three buffer widths created negative economic impacts to the dairy, silage and beef case studies. Negative impact increased with width.

Average percent change in Net Enterprise Return after installation of riparian buffers*

	Buffer Width		
	35'	**75'**	**180'**
Dairies	**-1.0**	**-1.5**	**-6.7**
Silage Farms	**-6.3**	**-21.9**	**-157.0**
Beef Operation	**-19.1**	**-46.5**	**-118.4**

* Numbers represent average results for both forested and forest/grass buffers; no cost sharing or rental payments are considered.

Results: Buffer Type

- No difference in the economic impact between a forested buffer and a forest/grass buffer

Results: Financial Assistance

- 100% cost-sharing and maximum rental payments were effective at *completely* offsetting economic impacts 36% of the time.
- Most successful at offsetting impacts to dairies
- Less successful at offsetting impacts from forest/grass than from forest-only buffers

Sector Specific Impacts

- Small dairy
  - Disproportionate impact
  - 42% of total buffer costs = feed replacement
  - 17% of total buffer cost = DNMP compliance costs
- Silage farms
  - 14% of total average buffer costs = Foregone income from the buffer area
- Beef Enterprise
  - 63% of buffer costs = feed replacement

Long Term Buffer Maintenance

- Important buffer cost factor for all case studies; 16-50% of total buffer costs
- Includes weed control, grass mowing and fence maintenance & repair
- Depending on the farm and buffer type, maintenance costs can extend beyond five years.

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Buffer Solutions

- Target financial assistance to type of impact
- Allow income generation in the buffer area
- Market based solutions such as water quality and habitat credits

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Applicability in other watersheds

- Economic models and types of impact are relevant in western Washington counties
- Actual buffer effect on net income is farm specific

Current and Future Work

- WSU Riparian Buffers Research
  - Measuring buffer function adjacent to various agro-enterprises
  - Creating new enterprise economic models
  - Exploring market based solutions that include riparian buffers

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Questions

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