Skagit County Water Quality Monitoring Program

Three-Year Review

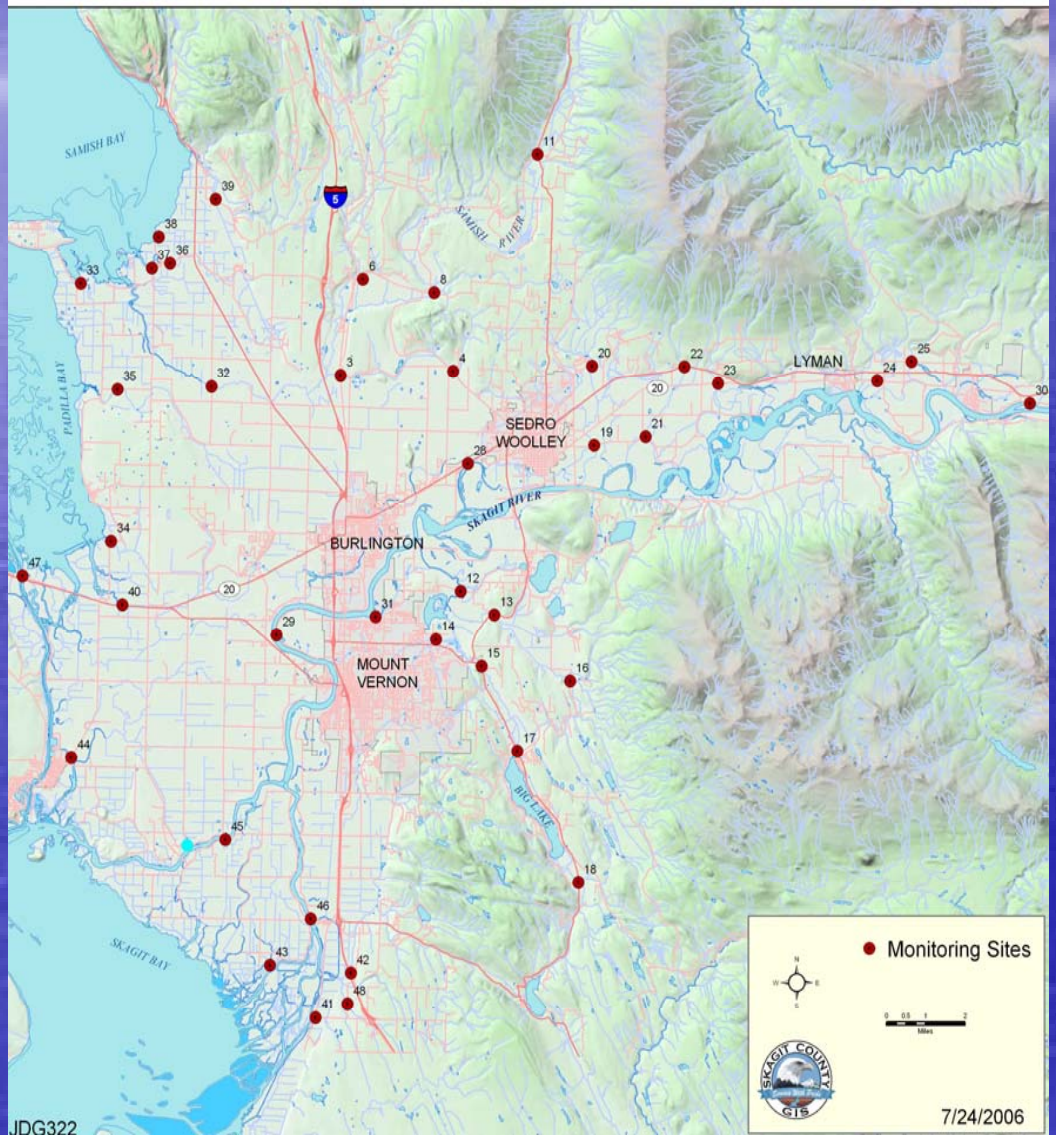
December, 2007

Lake Creek at Hwy 9

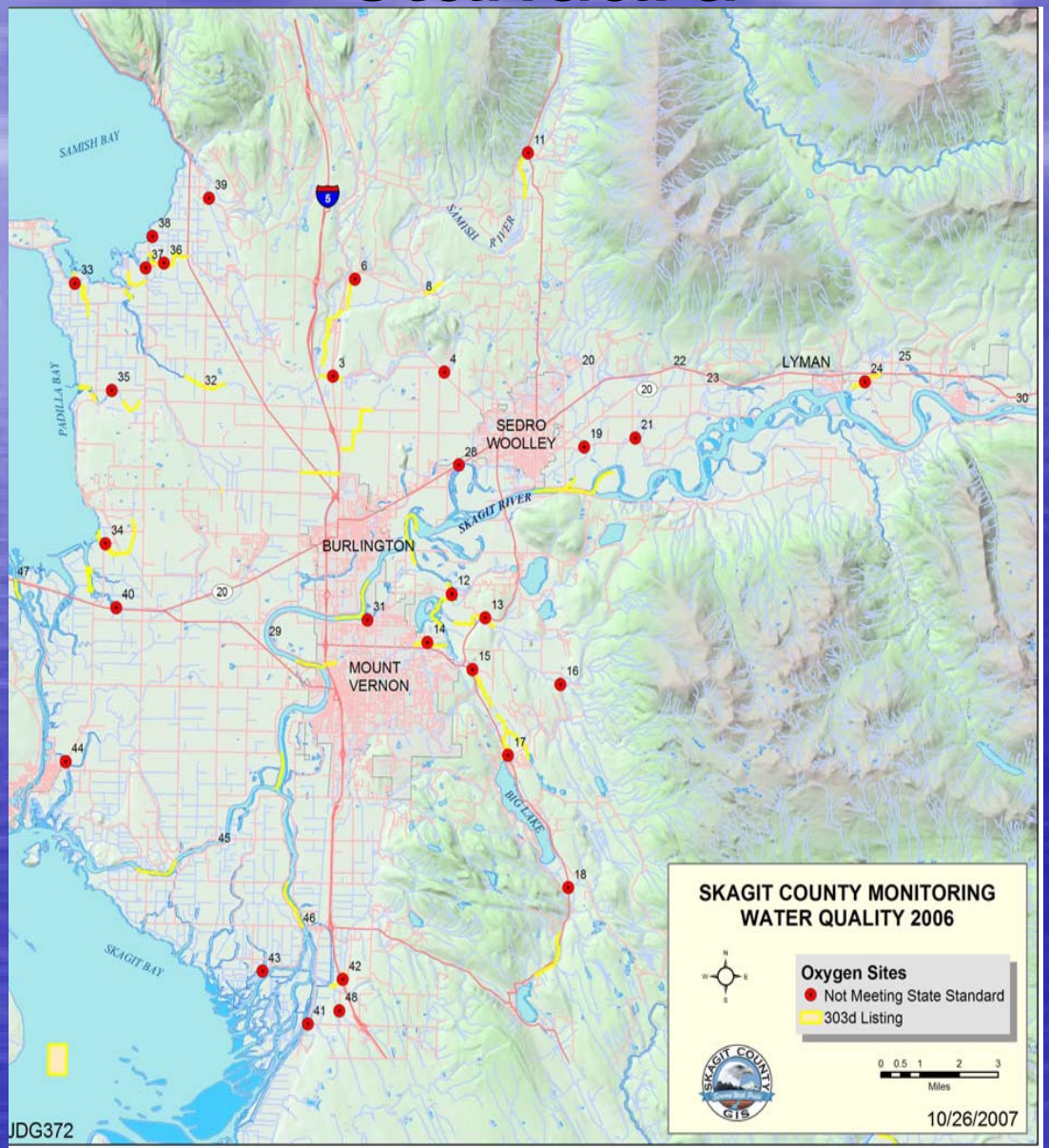
Skagit County Monitoring Program

- Initiated October, 2003
- Trends Monitoring, TMDL Support
- Biweekly samples at 40 sites
- Fecal coliform, DO, T, pH, Turb, Cond, Sal, nutrients
- State support from Centennial Clean Water Grant
- Data available at: http://www.skagitcounty.net/SCMP
- Rick is available at rickh@co.skagit.wa.us or 360-336-9400

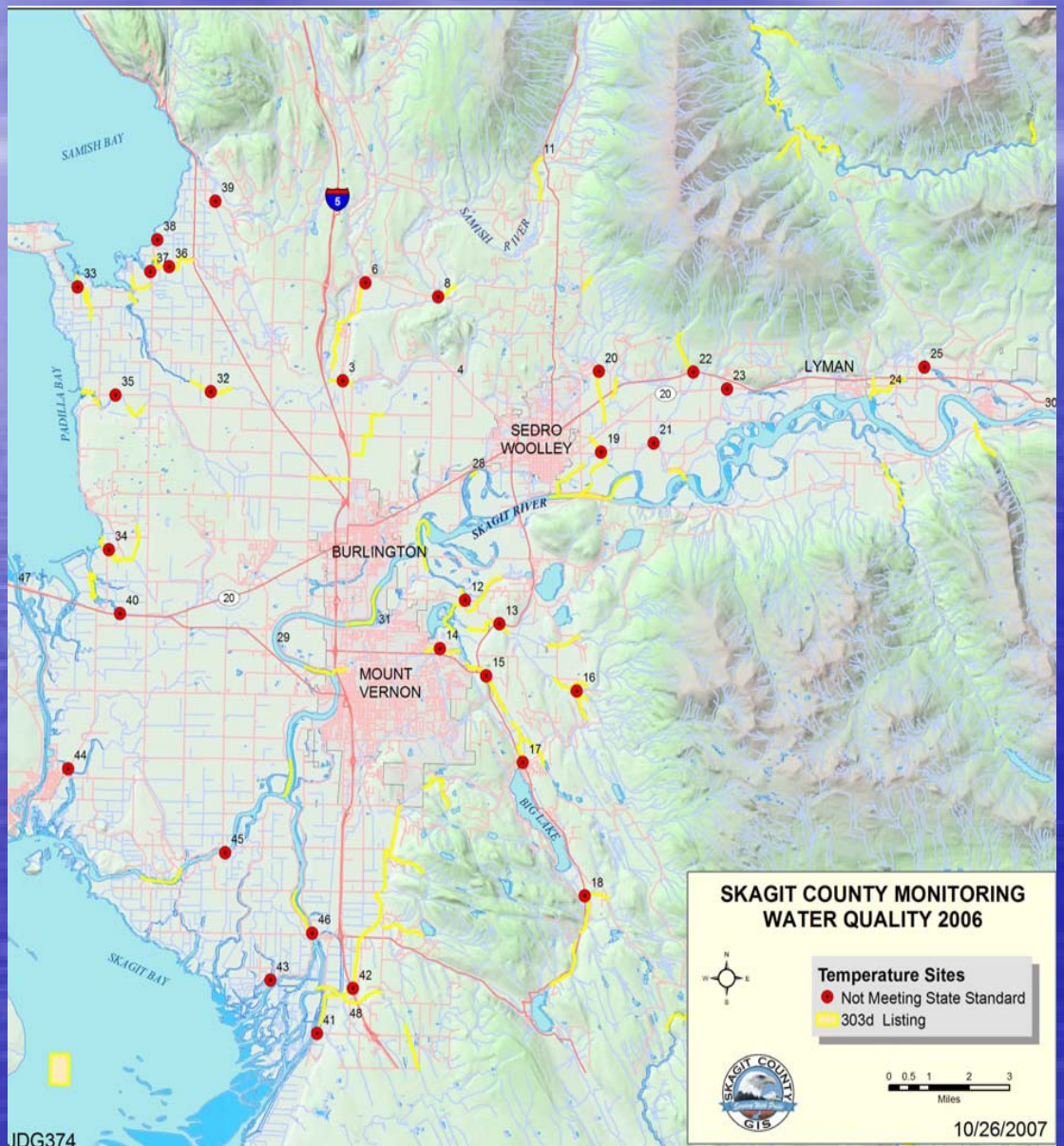
Skagit County Monitoring Program Sample Sites



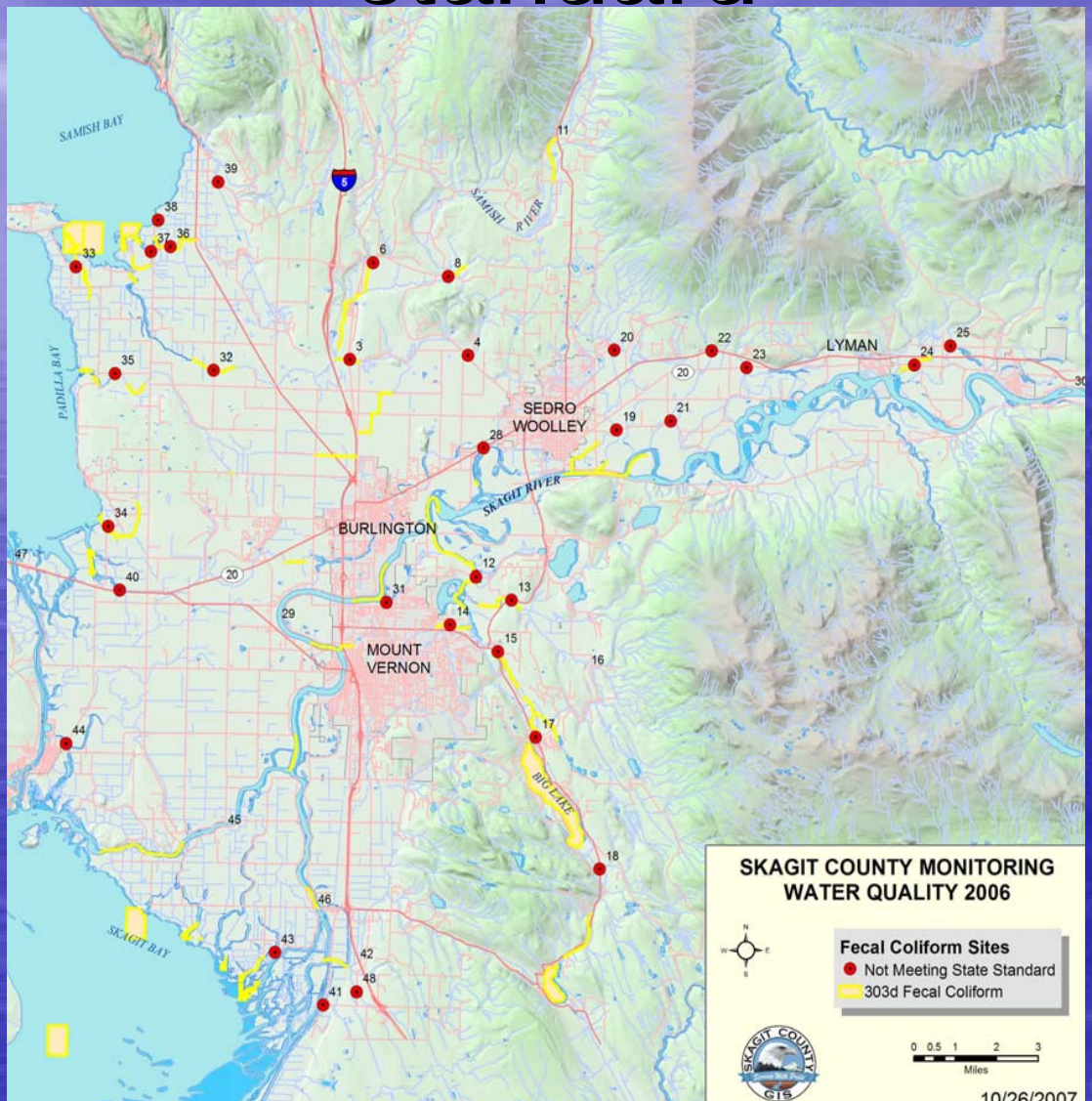
Sites not meeting dissolved oxygen standard



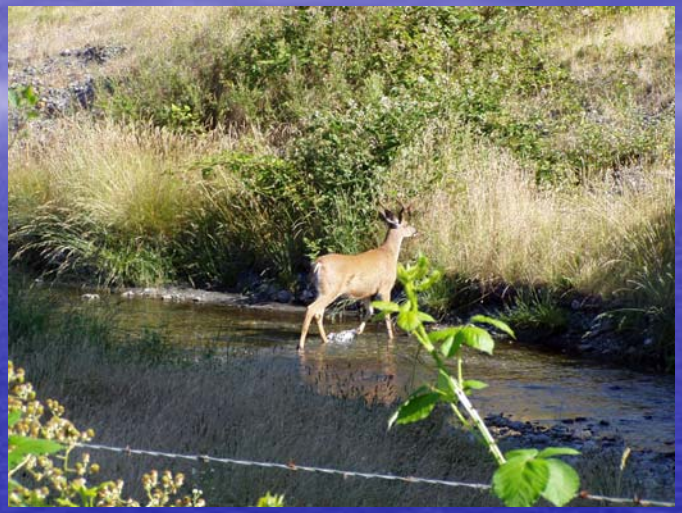
Sites not meeting temperature standard



Sites not meeting fecal coliform standard



Fecal coliform sources



Significant Trends*
"Good" trends

- **Dissolved oxygen increasing:**
  - **Four in Ag areas: Sites 4,8,13,42**
  - **Two in non-Ag areas: Sites 6, 20**
- **Fecal coliform decreasing:**
  - **One in Ag (Site 24), one non-Ag (Site 16)**
- **Turbidity decreasing:**
  - **One non-Ag (Site 11), four Skagit River (Sites 29, 30, 45, 46)**

*Kendalls Seasonal Test, 95% confidence

Significant Trends*
"Bad" Trends

- **Dissolved oxygen decreasing:**
  - **Three Ag sites (Sites 36, 37, 38)**
- **Fecal coliform increasing:**
  - **Two Ag sites (Sites 4, 41), one non-Ag site (Site 20)**
- **Turbidity increasing:**
  - **Three Ag sites (Sites 4, 41, 43), one non-Ag site (Site 28)**
- **Ammonia increasing:**
  - **Three Ag sites (Sites 4, 35, 37), one non-Ag site (Site 11)**

*Seasonal Kendall's Test, 95% Confidence

Significant Trends* Unknown Interpretation

- pH increasing:

  Many sites, both Ag and non-Ag
- Interpretation?

  Equipment?

*Seasonal Kendall's Test, 95% Confidence

Summary

- Many sites in Skagit County not meeting water quality standards
- Dissolved oxygen
- Temperature
- Fecal coliform
- Trends are mixed

Skagit County
Salmon Habitat Monitoring Program

Salmon Habitat Monitoring Program

The specific objectives of this effort are:

- Establish a statistically valid baseline of the current general physical habitat conditions in WRIAs 3 & 4 during the first year of the project.
- Conduct additional habitat conditions monitoring in future years to be used to analyze trends in salmon habitat conditions over time.
- Determine whether habitat conditions are improving, degrading, or remaining static in Ag-NRL and RRc-NRL zoned lands.
- Provide a means to differentiate between trends in salmon habitat conditions in Ag-NRL and RRc-NRL zoned lands versus other lands under Skagit County jurisdiction, as defined by the Skagit County Comprehensive Plan.

Salmon Habitat Monitoring Program

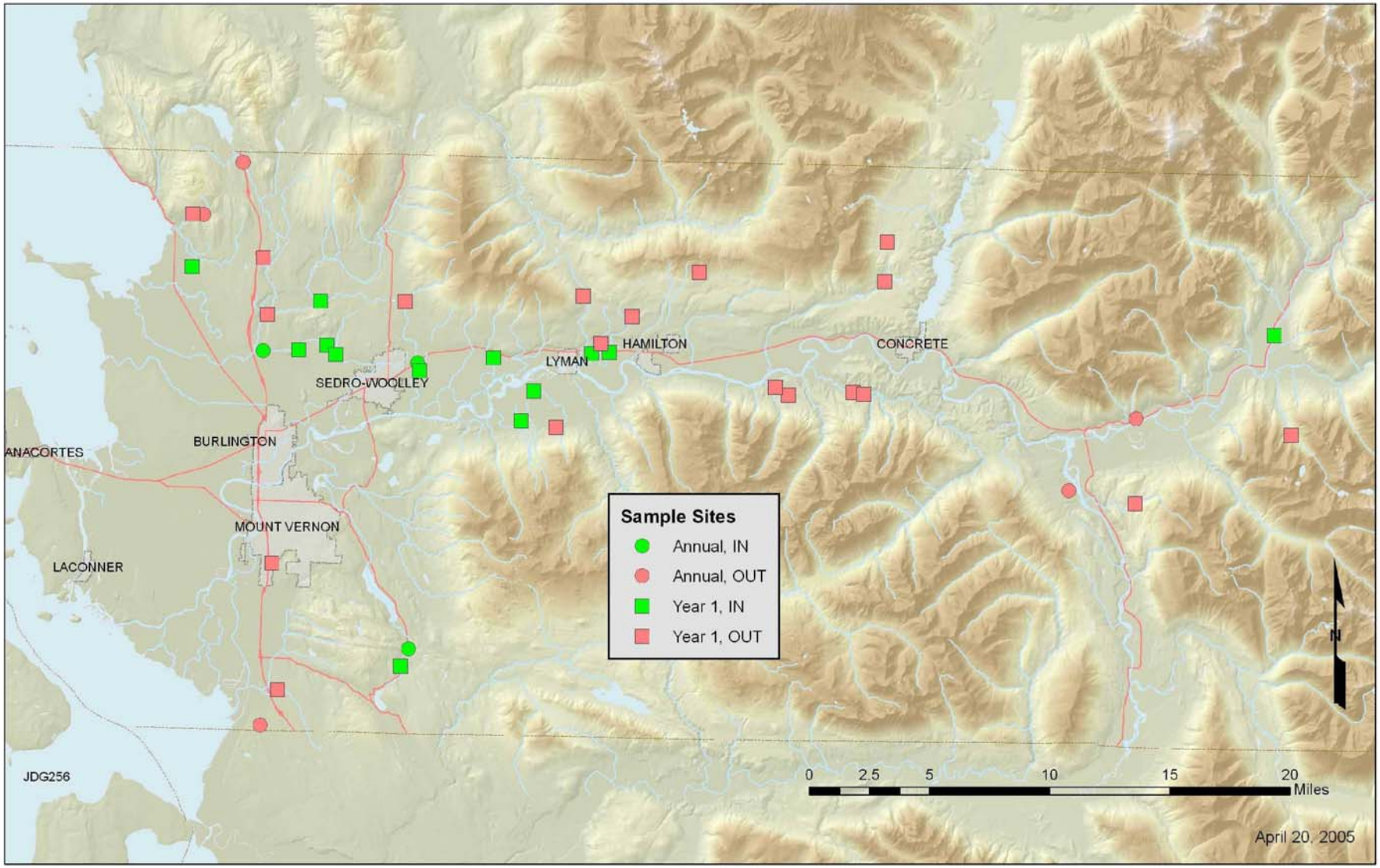
- **Skagit County staff used EPA' s Environmetal Monitoring and Assessment Program (EMAP) physical habitat survey protocols to conduct a salmon habitat survey for portions of Skagit County.**

- **Reaches were randomly selected using EMAP site selection protocols.**

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013>
AG/RR-Nrl	30	10	10	10	10	30	10	10	10	10
OtherLands	30	10	10	10	10	30	10	10	10	10
Total # of sites	**60**	**20**	**20**	**20**	**20**	**60**	**20**	**20**	**20**	**20**

SAMPLING REGIME BY ZONING CLASS AND YEAR

Habitat Sampling Sites



The Skagit County Salmon Habitat Monitoring Program 2004/2005 Baseline Report

- Outlined our monitoring program and our sampling efforts

- Compared the baseline sampling information collected from Ag-Nrl and Non-Ag sampling sites.

At this time we can only document the data we have collected, it is too early to determine any trends in salmon habitat condition within the County.

Types of Habitat Measurements

- Channel and Riparian Characterization
- Large Woody Debris Tally Stream Discharge
- Thalweg Profile
- Assessment of Channel Constraint, Debris Torrents, and Major Floods

Channel and Riparian Characterization – Canopy Cover

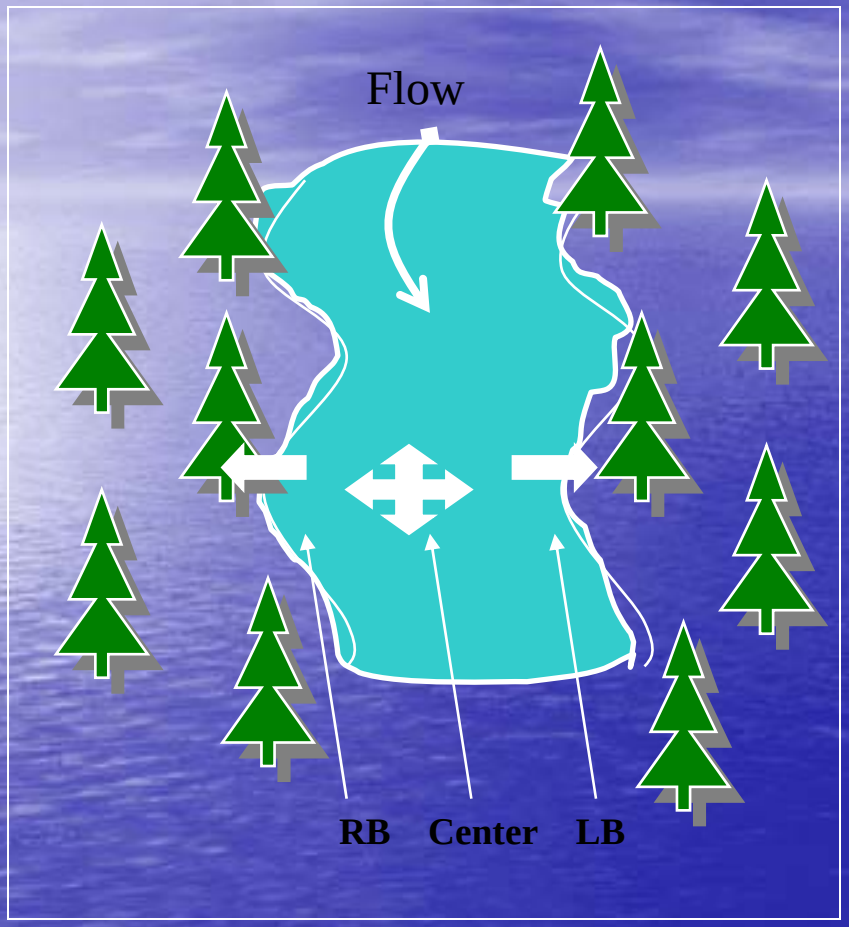
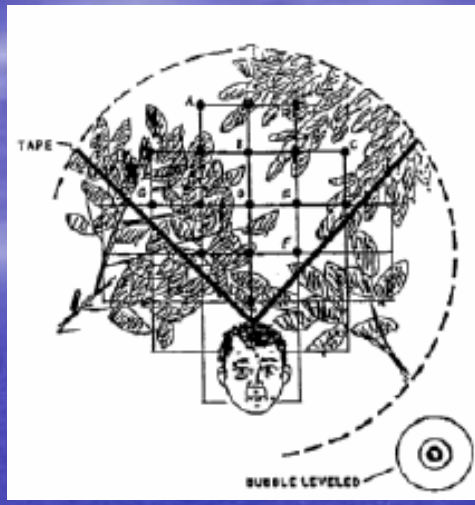


Figure 6. Visual depiction of data collection locations for densiometer measurements.

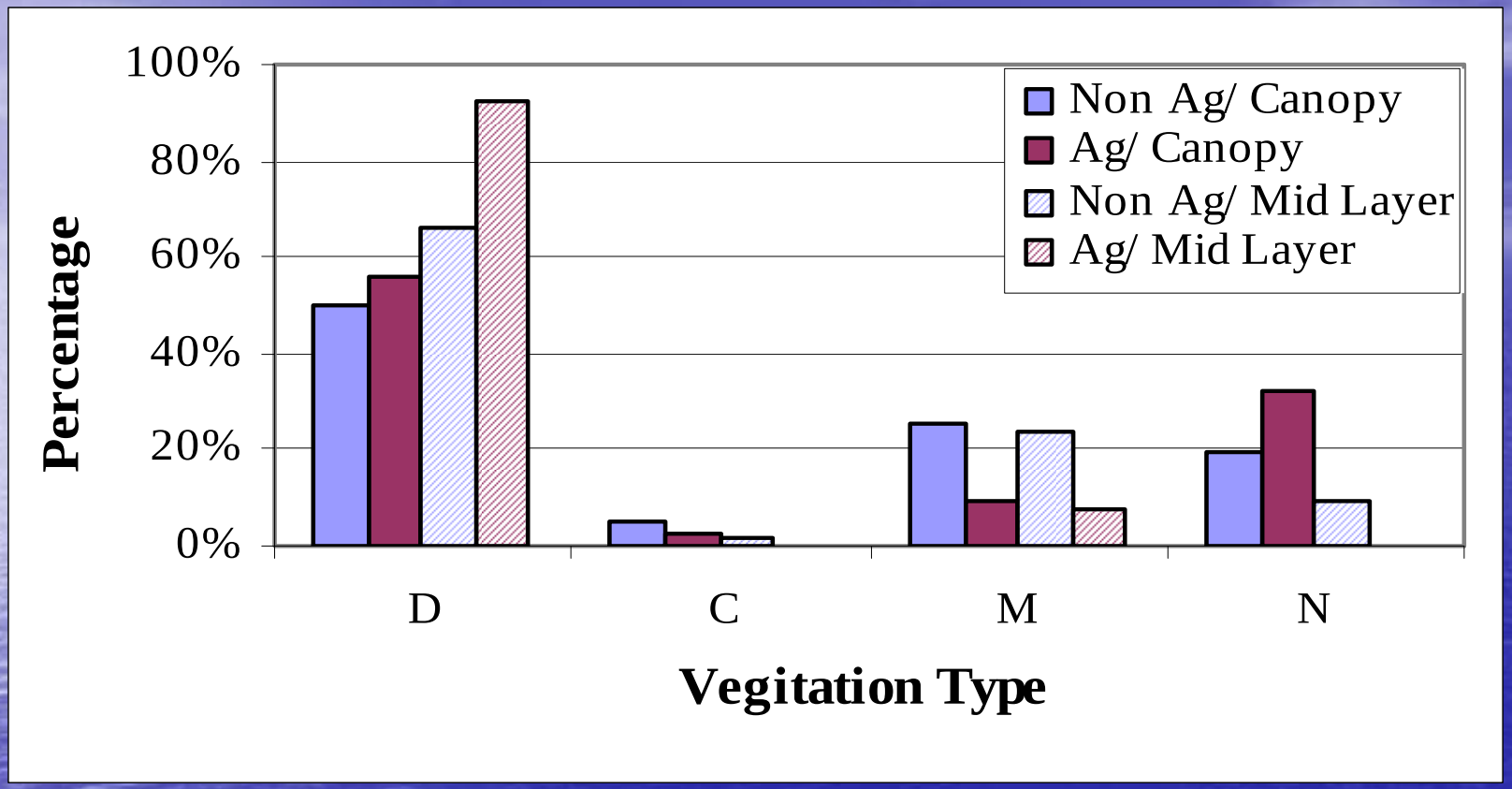
Canopy Cover or Shade are measured and at each bank using a densiometer.

Densiometer measurements were taken at 3 locations at each transect of a site reach



Zone	Mean Percentage Shade		Mean Densiometer Reading	
	Mid Channel	Bank	Mid Channel	Bank
Ag	79.35	90.78	13.49	15.43
Non-Ag	72.06	95.99	12.25	16.32

Channel and Riparian Characterization – Riparian Vegetation

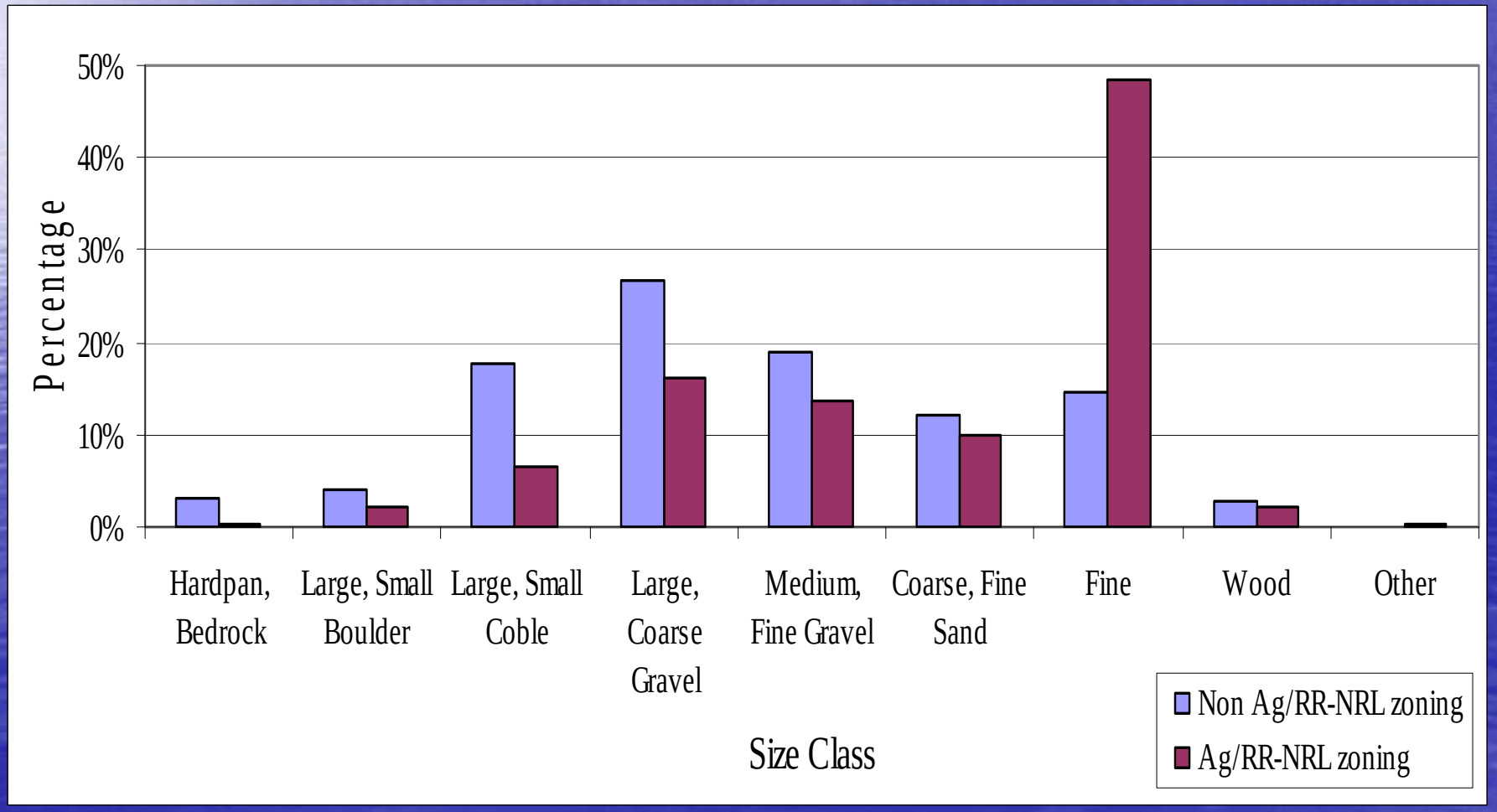


Canopy Composition percentage for both Ag/RR and Non-Ag/RR sites. (D= Deciduous; C=Coniferous; M= Mixed Canopy; N= No Canopy Present).

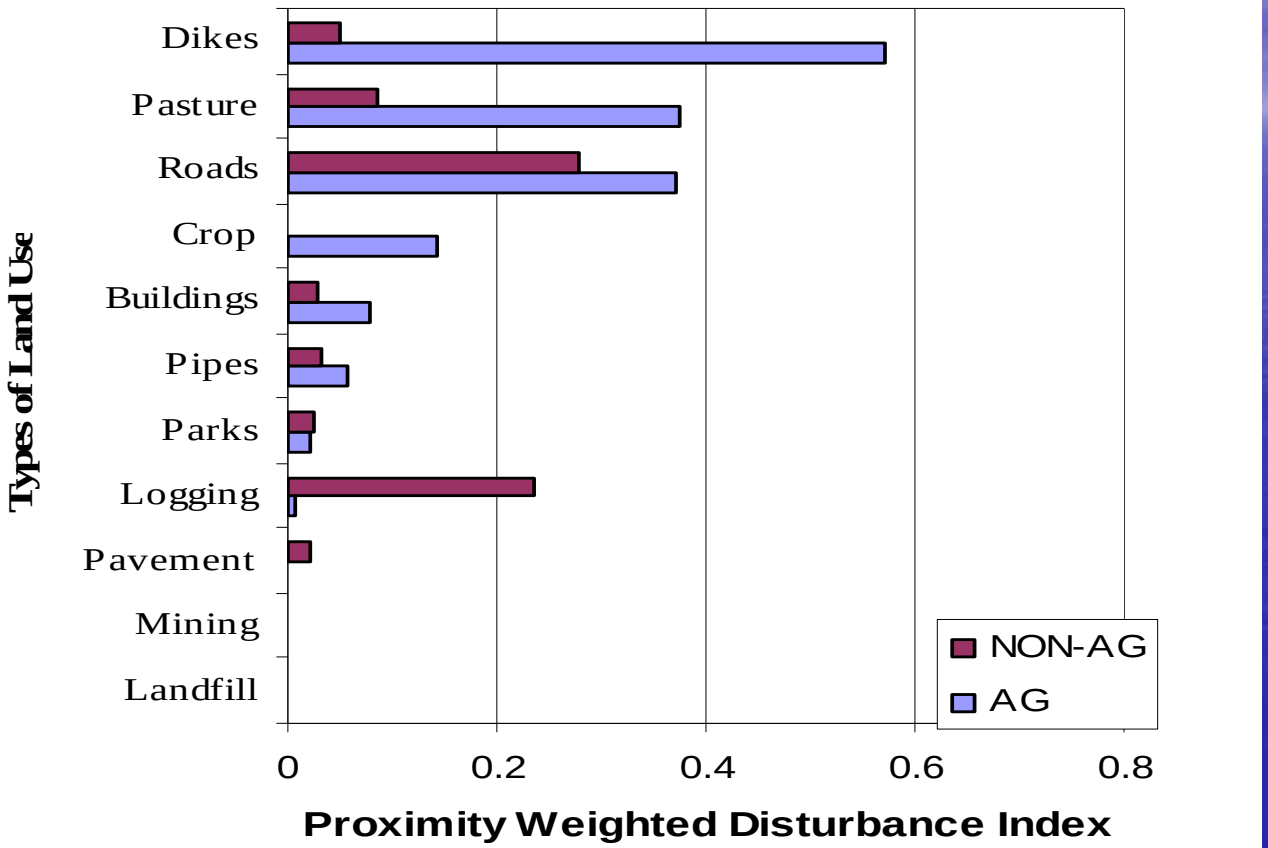
Riparian Vegetation Woody Vegetation Layers	
Canopy	> 5 m height
Mid level	.5m – 5m
Ground cover	< .5m

Channel and Riparian Characterization –Substate

We found that gravel was the prominent substrate type for Non-Ag sites. Sites on Ag had a significantly larger amount of fines than those on Non-Ag sites. Fine sediment accounted for nearly 50% of the sediment samples from the Ag sites



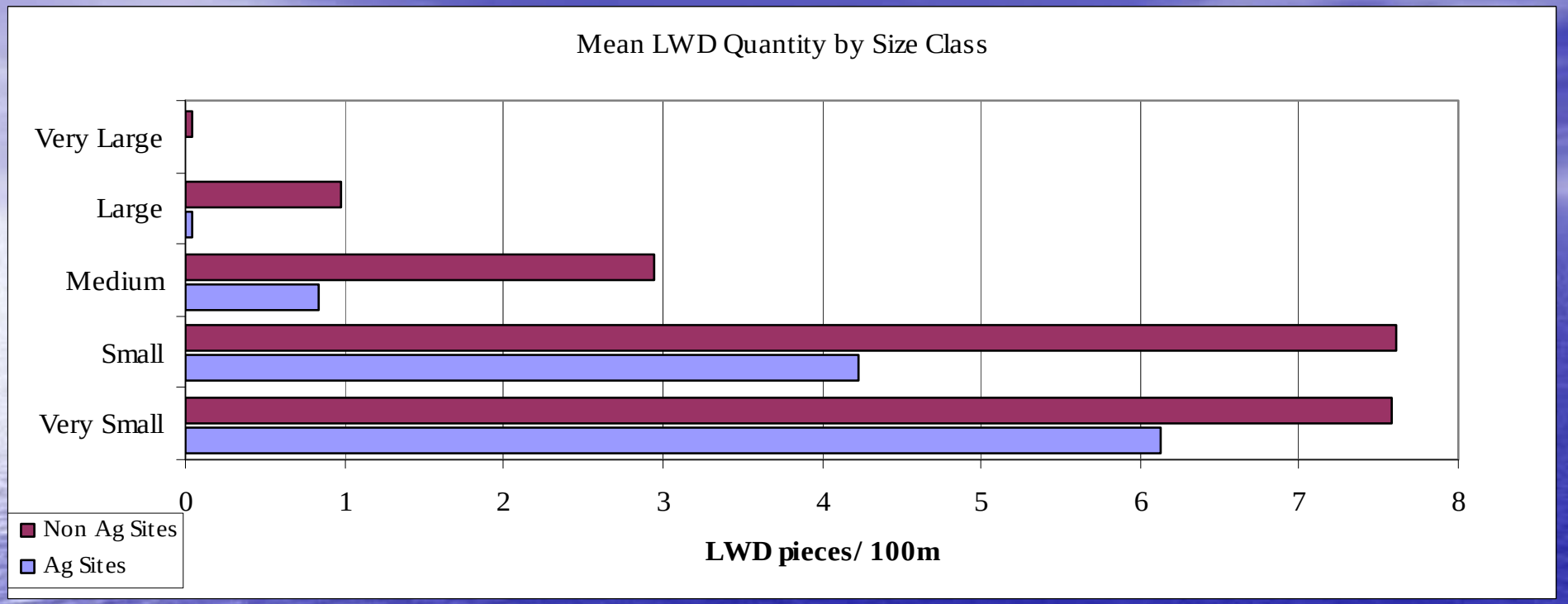
Channel and Riparian Characterization – Riparian Disturbance



This index combines the extent of the disturbance as well as the proximity of the disturbance to the stream

Figure 10. PWDI values for land use types

Large Woody Debris Tally



Diameter Class (m)	Length Class (m)		
	1.5- 5	>5- 15	>15
0.1- 0.3	Very Small	Small	Medium
>0.3- 0.6	Small	Medium	Large
>0.6- 0.8	Small	Large	Large
>0.8	Medium	Large	Very Large

Questions

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