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Technical Memo

To : Charles O'Hara, Swinomish Indian Tribal Community
From: Eric Beamer
Date: January 29, 2007
Re: 2005-2006 Sampling Update to "Lone Tree Pocket Estuary Restoration 2004 Fish Sampling and Pre-Restoration Project Monitoring Report"

INTRODUCTION

The following text and figures are an addendum to the 2004 report entitled "Lone Tree Pocket Estuary Restoration 2004 Fish Sampling and Pre-Restoration Project Monitoring Report" prepared for the Swinomish Indian Tribal Community. Data presented augment the pre-restoration baseline information for Lone Tree Lagoon. Delays in restoration project construction allowed for the additional years of sampling. Because 2004 was an unusually low Chinook salmon outmigration year, the 2005 and 2006 data may represent more typical outmigration abundance and community composition. Please refer to the original document for methods and background information.

FISH USE IN LONE TREE LAGOON AND ADJACENT SKAGIT BAY, 2005-2006

Four different habitat types were sampled during 2005 and 2006. In Skagit Bay, adjacent to Lone Tree Lagoon, we sampled shallow intertidal and intertidal-subtidal fringe habitats. Within the lagoon we sampled shallow intertidal and drowned channel habitats. Data are presented in density (fish per hectare of wetted habitat area) or catch per unit effort (CPUE). The following figures represent fish abundance in the four habitats sampled.

Sampling Effort

The Lone Tree Lagoon sampling effort in 2005 and 2006 consisted of 386 beach seine sets made in the shallow intertidal zone of the lagoon and adjacent spit beach (small net beach seine method) and in the intertidal-subtidal fringe of adjacent nearshore habitats (large net beach seine method). We also conducted 14 fyke trap sampling events at the mouth of the drowned stream channel (see Table 1).

Table 1. Summary of sampling effort at Lone Tree Lagoon sites in 2005 and 2006. Table entries indicate the number of beach seine or fyke trap sets made per month.

2005					**2006**				
Month	Adjacent Nearshore		Lagoon		Month	Adjacent Nearshore		Lagoon	
	large net method	*small net method*	*small net method*	*fyke trap*		*large net method*	*small net method*	*small net method*	*fyke trap*
January	3	3	9	1	January	2	3	9	1
February	6	3	9	1	February	2	3	9	1
March	10	9	30	2	March	5	6	18	2
April	4	6	18	2	April	5	6	19	1
May	5	6	18	2	May	6	9	27	
June	5	6	18		June	4	6	12	1
July	6	3	9		July	6	9	15	
August	4	6	12		August	4	6	12	
September	2	3	9		September	4	6	12	
October	4	6	12		October	2	3	9	
					December	2	3	9	
2005 Total	49	51	144	8	2006 Total	42	60	151	6

Juvenile Chinook Timing and Relative Abundance

Figures 1 and 2 represent catch results for 2005 at each of the four habitats sampled. Results for juvenile Chinook salmon (Figures 1A-1C) are comparable between large net and small net methods because results were converted to fish density based on the average area seined. Fyke trap catch results (Figure 1D) can not be directly compared to beach seine results at this time. Figures 3 and 4 represent catch results for 2006 at the four habitats sampled.

Results indicate:

- Chinook, chum, and pink salmon utilize the lagoon. Pink and chum salmon dominated the lagoon community in 2006, following odd-year spawning of the pink salmon.
- Lagoon habitat fish densities of salmon and other fishes are approximately ten times more than fish densities in adjacent nearshore habitats.
- Juvenile salmon are most abundant in the early half of the year, replaced by shiner perch and sculpins later in the year.
- Chinook salmon tend to occupy shallow habitats (shallow intertidal, lagoon, and wetland) early in the year and move to deeper habitat later in the year. Compare all figures, graphs A to B and C to B, where peaks for Chinook are during February-April in shallow habitats compared to peaks during June in intertidal-subtidal fringe habitat.
- Wild Chinook are much more abundant than hatchery Chinook salmon, particularly in shallow habitats.

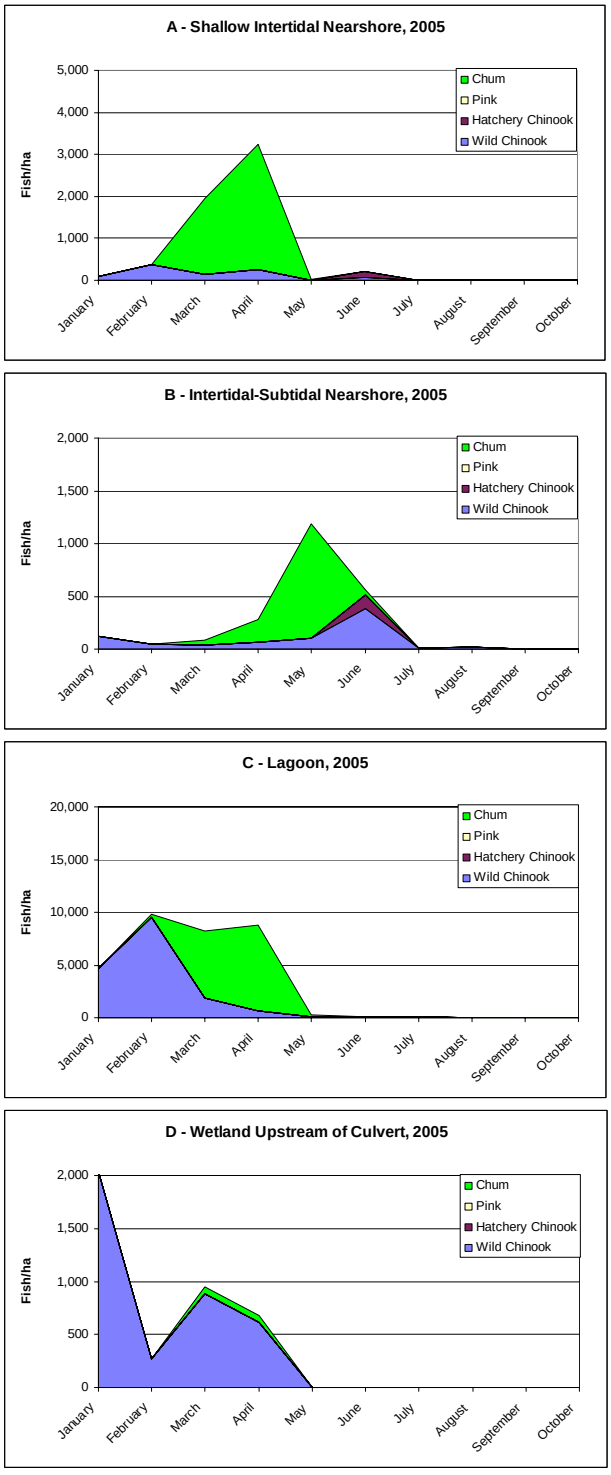

Figure 1. Juvenile salmon caught during 2005 for all Lone Tree monitoring sites by habitat type: (A) shallow intertidal nearshore adjacent to the lagoon, (B) intertidal-subtidal nearshore adjacent to the lagoon, (C) shallow intertidal within the lagoon, and (D) wetland habitat upstream of the lower culvert. The colored area of the graph represents total fish density, subdivided by densities for each salmon species.

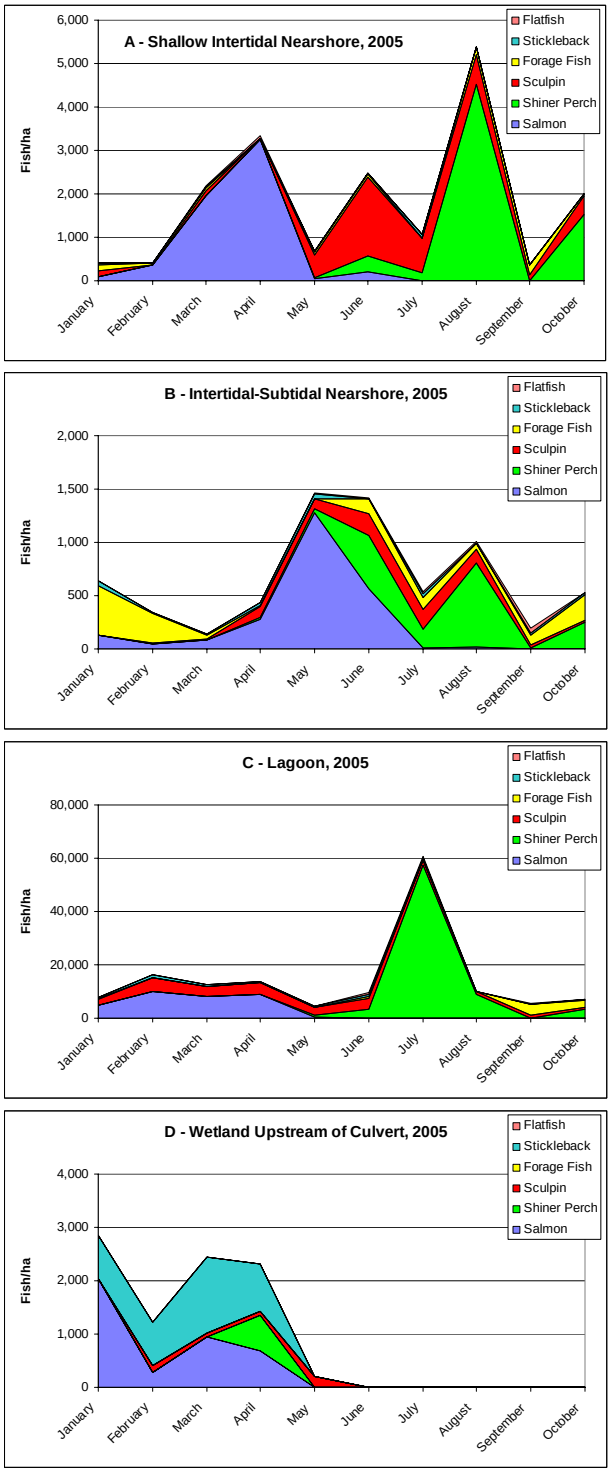

Figure 2. Fish community in 2005 for Lone Tree monitoring sites by habitat type. The colored area of the graph represents total fish density, subdivided by densities for each specie group.

Note the differing Y-axis scales when comparing between habitats and between salmon community and total fish community.

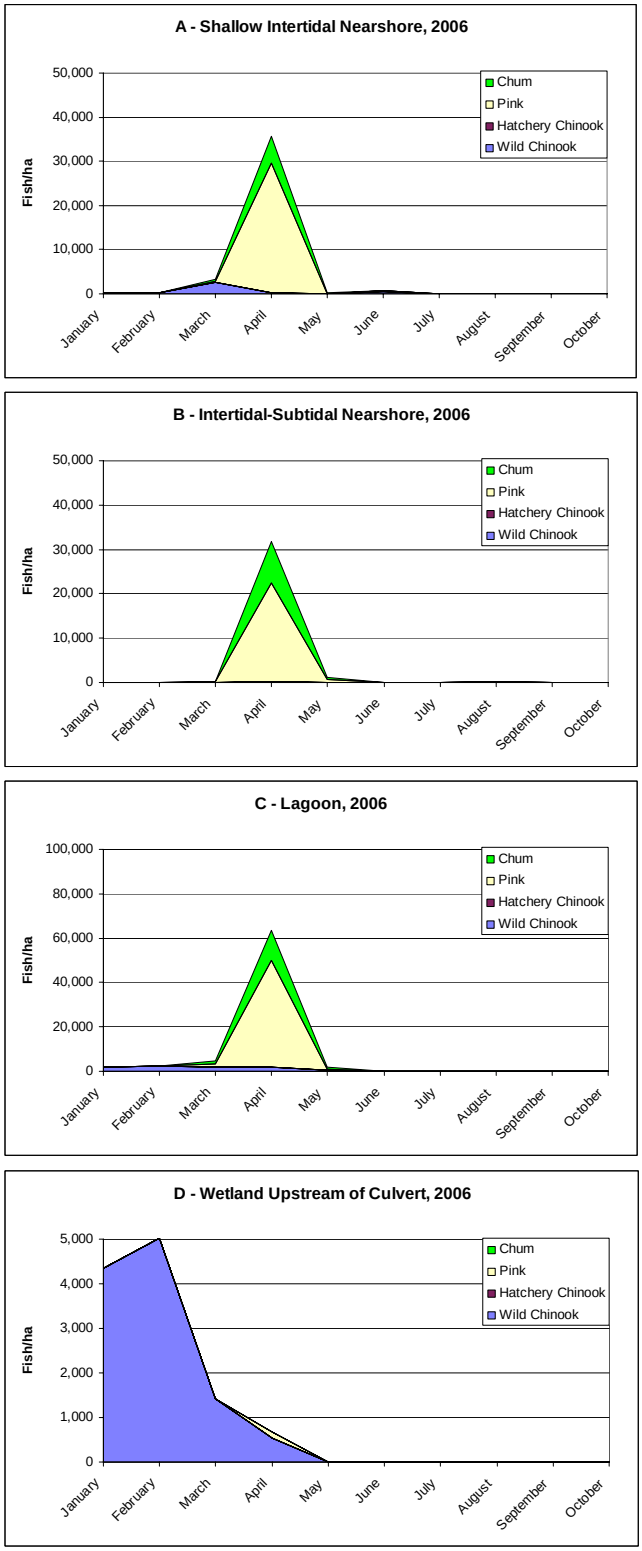

Figure 3. Juvenile salmon caught during 2005 for all Lone Tree monitoring sites by habitat type: (A) shallow intertidal nearshore adjacent to the lagoon, (B) intertidal-subtidal nearshore adjacent to the lagoon, (C) shallow intertidal within the lagoon, and (D) wetland habitat upstream of the lower culvert. The colored area of the graph represents total fish density, subdivided by densities for each salmon species.

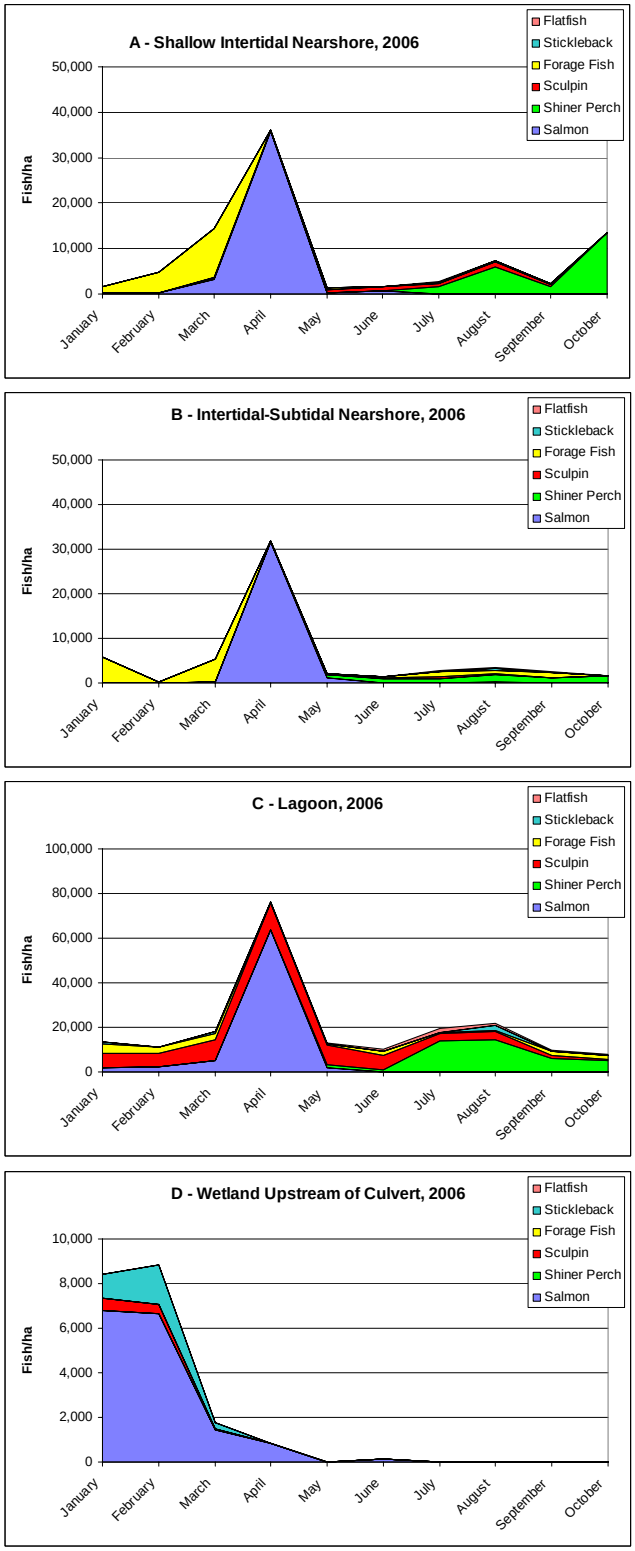

Figure 4. Total fish community during 2006 for all Lone Tree monitoring sites by habitat type. The colored area of the graph represents total fish density, subdivided by densities for each specie group.

Note the differing Y-axis scales when comparing between habitats and between salmon community and total fish community.