

Annual Project Performance Report

1. State:

Grant number: F-51-R-16

Grant name: Inland and Anadromous Sport Fish Management and Research

Project number and name: Project 67: Humboldt Bay Juvenile Salmonid Investigations

2. Report Period: July 1, 2004 through June 30, 2005 **Report due date:** September 30, 2005

3. Location of work Humboldt Bay, Humboldt County California, State Congressional District 1

4. Costs: Please identify sources of federal funds and match and indicate amounts budgeted and spent for each. Indicate if match is in-kind. Indicate in table whether costs are Actual or Estimated

Source	Budgeted	Actual <input type="checkbox"/> or Estimated <input checked="" type="checkbox"/>
Federal :_Aid in Sport Fish Restoration	\$91,257	
State: Fish and Game Preservation Fund	\$34,938	
Other:_____		
Total Federal	\$91,257	
Total match	\$34,938	
Total project:	\$126,195	

5. Objectives:

- To describe the use of the tidal portion of Freshwater Creek, Humboldt Bay, by juvenile salmonids.
- To describe the use of the tidal portion of Elk River, Humboldt Bay, by juvenile salmonids.
- To describe the use of the tidal portion of Salmon Creek, Humboldt Bay, by juvenile salmonids.

6. If the work in this grant was part of a larger undertaking with other components and funding, present a brief overview of the larger activity and the role of this project.

This work is being augmented by California Fisheries Restoration Grant Program to pay for fishery technicians to conduct the field sampling. Aid in Sport Fish Restoration funds are being used to pay for project biologist, O&E, and a small portion of temporary help for project field work.

This project is also collecting juvenile salmonid emigration timing and relative abundance data to document existing conditions prior to marsh restoration projects planned in Freshwater Creek Slough and Salmon Creek estuary by other government and private agencies.

7. Describe how the objectives were met.

The California Department of Fish & Game's (CDFG) Natural Stocks Assessment Project (NSA) conducted sampling for juvenile salmonids in Freshwater Creek Slough from July-August

2004. I stratified sampling between the upper and lower sloughs due to differences in water salinity and the need to use different gear types in the two sections of Freshwater Creek Slough. During this time young-of-the-year (yoy) coho salmon were by far the most common salmonid captured and were found primarily in the upper slough. In the upper slough yoy coho salmon peak catches occurred in mid August (peak catches for the year occurred in late May and early June). Their weekly mean FL increased from 66 mm in early July to 76 mm in late August. Based on marked and recaptured individuals yoy coho salmon resided in the tidal freshwater portion of Freshwater Slough throughout the summer. All project marked yoy coho salmon were recaptured at the same site where they were originally marked indicating that they moved very little while residing in the slough. Yoy trout were also commonly captured in the upper slough. Their peak catch occurred in early July. Very few juvenile Chinook salmon, steelhead, and cutthroat trout were captured in the upper slough and very few juvenile salmonids were captured in the lower slough during July-August 2004.

Beginning in January 2005 NSA resumed sampling in Freshwater Creek Slough and initiated sampling in Elk River Slough and Salmon Creek estuary, Humboldt Bay. In lower Freshwater Creek Slough NSA captured yearling coho salmon from early March to late June. Their peak catch occurred in early May. Their weekly mean FL increased from 75 mm in early March to 119 mm in early May and then decreased to 100-105 mm by late June. NSA captured yoy coho salmon from early April to mid June and peak catches occurred in late May. Their weekly mean FL increased from 38 mm in mid April to 65 mm in mid June. NSA captured yoy Chinook salmon from late May to late June and their peak catches occurred in mid June. Their weekly mean FL varied from 65-70 mm throughout this time period. NSA captured 18 juvenile steelhead from mid March to mid June, ten of which were caught in mid June. Their weekly mean FL's ranged from 90 to 238 mm. NSA captured 6 cutthroat trout from mid May to mid June and their weekly mean FL's ranged from 176 to 196 mm. In the lower slough from January to June 2005 we applied PIT tags to 75 yearling coho, 1 yoy coho, 14 juvenile steelhead, and 6 cutthroat trout and recaptured 10 yearling coho and 1 juvenile steelhead containing a PIT tag.

In upper Freshwater Creek Slough NSA captured yearling coho salmon from late January to late June. Their peak catches occurred late April to early May. Their weekly mean FL increased from 77 mm in late January to 110 mm in early June and then decreased to 90-100 mm by late June. NSA captured yoy coho salmon from late April to late June and peak catches occurred in early May. Their weekly mean FL increased from 40 mm in late April to 63 mm in late June. NSA captured yoy Chinook salmon from early May to late June and their peak catches occurred in early June. Their weekly mean FL increased from 47 mm in early May to 61 mm in late June. NSA captured juvenile steelhead from late January to late June with no discernable peak catch. Their weekly mean FL's generally increased from 80 mm in late January to 127 mm in late June. NSA captured 12 cutthroat trout from early March to late June with seven cutthroat captured the last two weeks of June. Their weekly mean FL ranged from 80 to 213 mm. In the upper Freshwater Creek slough we PIT tagged 105 yearling coho, 23 yoy coho, 30 juvenile steelhead, and 9 cutthroat trout and recaptured 22 yearling coho, 5 yoy coho, 5 juvenile steelhead, and 2 cutthroat trout containing a PIT tag.

In lower Elk River Slough NSA captured yearling coho salmon from late January to late June. Their peak catches occurred in late April and in late May. Their weekly mean FL increased from 64 mm in late January to 114 mm in late May. NSA captured yoy coho salmon from late March to late June with no discernable peak catch. Their weekly mean FL increased from 39 mm in late March to 68 mm in late May. NSA captured yoy Chinook salmon from late May to late June and their peak catches occurred in mid June. Their weekly mean FL increased from 69 mm in late May to 84 mm in late June. NSA captured 3 juvenile steelhead from late

February to mid June. Their FL's ranged from 138 to 192 mm. NSA captured 1 cutthroat trout in mid May and it was 268 mm FL. In lower Elk River Slough from January to June 2005 we applied PIT tags to 69 yearling coho, 2 yoy coho, 4 yoy Chinook, and 3 steelhead and did not recapture any PIT tagged fish.

In upper Elk River Slough NSA captured yearling coho salmon from early February to late June and their peak catch occurred in early February. Their weekly mean FL increased from 76 mm in early February to 114 mm in late April and late May and then decreased to about 105 mm by late June. NSA captured yoy coho salmon from mid April to late June and peak catches occurred in early June. Their weekly mean FL increased from 39 mm in early May to 64 mm in late June. NSA captured 3 yoy Chinook salmon, all in June. Their FL's ranged from 62-85 mm. NSA captured 3 juvenile steelhead, all in June. Their FL's ranged 129-175 mm. NSA captured 1 cutthroat trout in late June and it was 138 mm FL. In upper Elk River Slough we PIT tagged 64 yearling coho, 22 yoy coho, 1 yoy Chinook, 3 juvenile steelhead, and 1 juvenile cutthroat and recaptured 3 yearling coho and 4 yoy coho containing a PIT tag.

In Salmon Creek estuary NSA captured 13 yoy coho salmon from mid April to mid June with no discernable peak catch. Their weekly mean FL increased from 32 mm in mid April to 72 mm in late June. NSA captured juvenile steelhead from early February to late June and their peak catch occurred in late March. Their weekly mean FL's ranged from 71 to 128 mm. In Salmon Creek estuary we PIT tagged 1 yoy coho, 39 steelhead and 2 yoy trout and recaptured 6 steelhead containing a PIT tag.

Summary of Project Results:

Project objectives were met.

Project documented that yoy coho salmon rear in the tidal freshwater portion of Humboldt Bay tributaries for at least 3 months. This is the first time I'm aware of that this life history trait has been documented in California for coho salmon.

Project documented that yoy coho salmon will utilize appropriate habitat adjacent to mainstem channels and collected basic habitat information about these areas. Therefore this Project can provide information to the marsh restoration community to help design projects to create this type of habitat to increase rearing habitat for yoy coho salmon.

Project results show that yoy coho salmon that rear in the estuary grow larger than their cohorts rearing in stream habitat farther upstream in the basin. Based on other studies larger size at ocean entry usually results in higher ocean survival.

Project documented that yoy Chinook salmon rear in the estuary for an average of 3 weeks and as long as 8 weeks strongly suggesting that they are important to their survival. Project also captured individual juvenile steelhead and cutthroat trout that reared for a month or more in the estuary.

Questions generated by Project:

The average size of yearling coho smolts leaving Freshwater Slough is smaller than reported from other Pacific coast estuaries. So do these smaller smolts rear in Humboldt Bay for significant periods of time before entering the ocean?

The project has captured juvenile salmonids in areas containing eel grass beds. What role

does eel grass play in life history of salmonids?

One study in Oregon showed that after rearing in the estuary for the summer yoy coho salmon migrate back upstream to over-winter. Another study in British Columbia showed that after rearing in the estuary for the summer yoy coho salmon migrated to the ocean. This project made some observations suggesting that both of the above scenarios may be occurring in Humboldt Bay tributaries. So what life history strategy do yoy coho salmon use in Humboldt Bay tributaries?

8. Discuss differences between work anticipated in grant proposal and grant agreement, and that actually carried out with Federal Aid grant funds; include differences between expected and actual costs.

No significant difference in work or cost between grant proposal and grant agreement.

9. List any publications or in-house reports resulting from this work.

No reports have been completed.

10. Name, title, phone number, and e-mail address of person compiling this report:

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