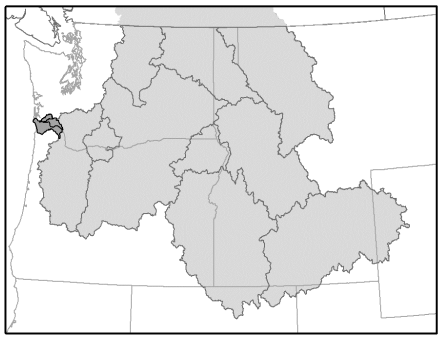
Columbia Estuary Province

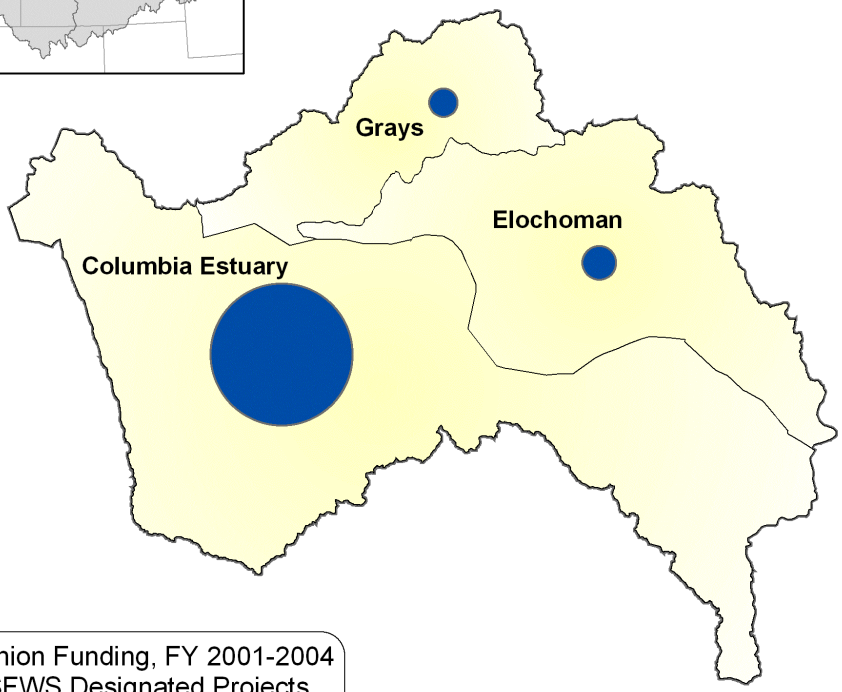
Columbia Basin Fish and Wildlife Authority



Columbia Estuary Province

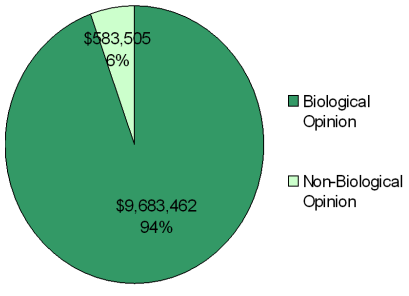
BPA Spending, FY 2001-2004

FY 2001	$1,791,008
FY 2002	$2,528,624
FY 2003	$2,335,544
FY 2004	$3,611,791
Total Spending	$10,266,967



Biological Opinion Funding, FY 2001-2004
NMFS & USFWS Designated Projects

	BiOp	Non BiOp
Columbia Estuary	$9,065,360	$303,119
Elochoman	$241,541	$280,386
Grays	$376,561	$0



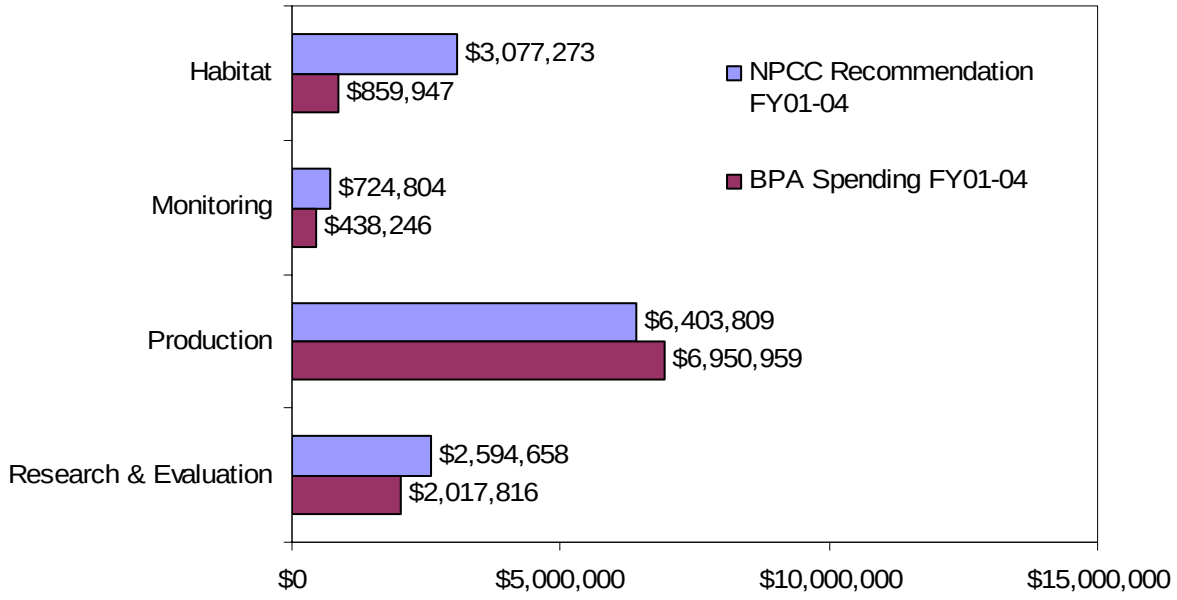
Legend

- Anadromous (100%)
- Resident (0%)
- Wildlife (0%)

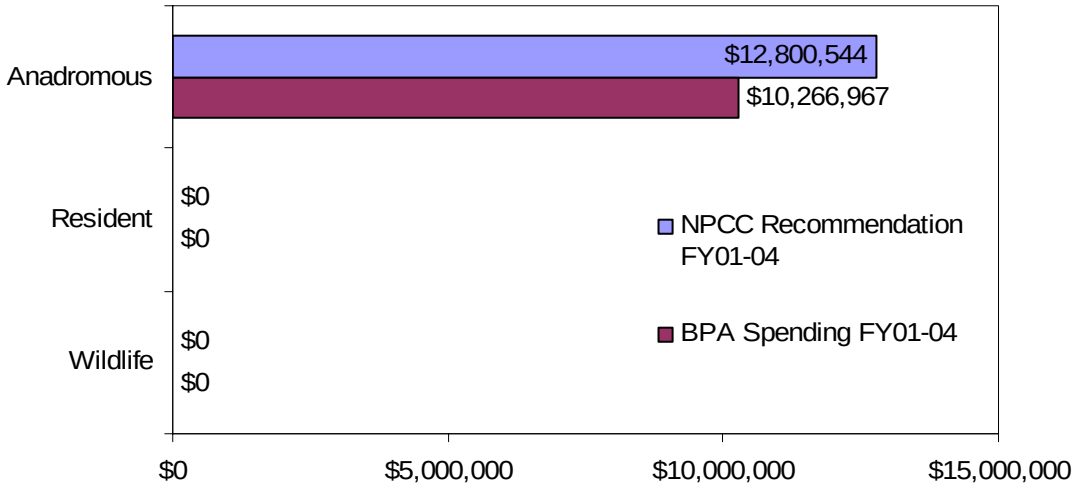
Note: Diameter of pie represents relative funding levels in each subbasin.

Columbia Estuary Province FY 2001-2004 Spending Summaries

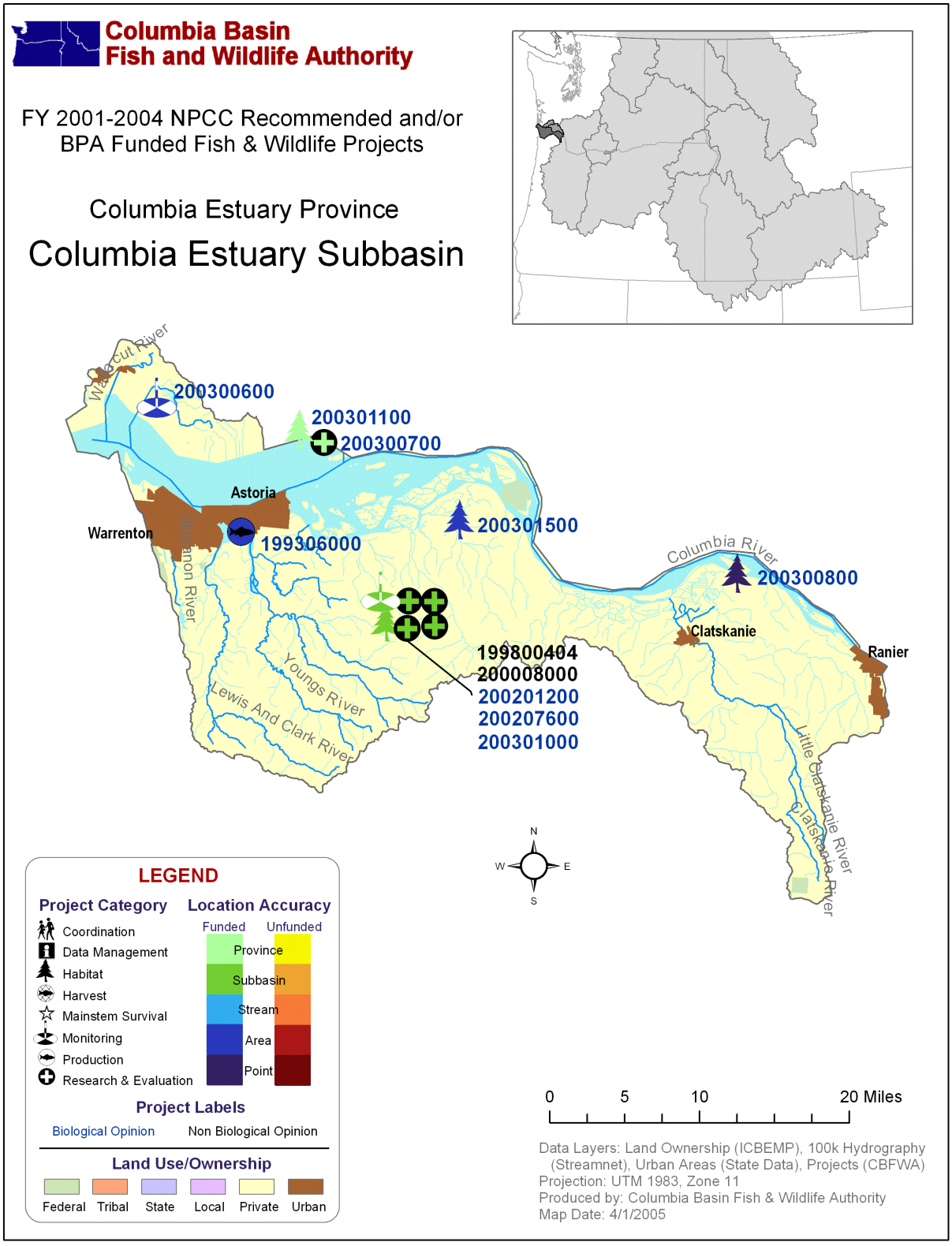
NPCC Recommendations and BPA Spending by Project Category, FY01-04



NPCC Recommendations and BPA Spending by Project Type, FY01-04



Columbia Estuary Subbasin



Projects in the Columbia Estuary Subbasin

Project ID	*Project Title*				*Review Cycle*		*BiOp?*
199306000	**Select Area Fishery Evaluation Project**				**Lower Columbia**		**yes**
FY	2001	2002	2003	2004	Type	Category	Accuracy
NPCC Rec	$1,499,842	$1,550,836	$1,679,564	$1,673,567	Anadromous	Production	area
BPA Spent	$1,624,582	$2,015,524	$1,737,604	$1,573,249			
199800404	Assess Hydro Impacts on Estuary				Not Reviewed		no
FY	2001	2002	2003	2004	Type	Category	Accuracy
NPCC Rec	$ 0	$ 0	$ 0	$ 0	Anadromous	Research & Evaluation	subbasin
BPA Spent	$21,746	$2,773	$ 0	$ 0			
200008000	Pacific Ocean Salmon Tracking				FY 2001 Innovative		no
FY	2001	2002	2003	2004	Type	Category	Accuracy
NPCC Rec	$228,600	$ 0	$ 0	$ 0	Anadromous	Research & Evaluation	subbasin
BPA Spent	$144,680	$133,920	$ 0	$ 0			
200201200	Lower Columbia River and Estuary Habitat Assessment and Mapping Project				FY 2001 High Priority		yes
FY	2001	2002	2003	2004	Type	Category	Accuracy
NPCC Rec	$ 0	$ 0	$ 0	$4,000	Anadromous	Research & Evaluation	subbasin
BPA Spent	$ 0	$108,320	$13,280	$ 0			
200207600	Protect Lower Columbia Estuary				Not Reviewed		yes
FY	2001	2002	2003	2004	Type	Category	Accuracy
NPCC Rec	$ 0	$ 0	$ 0	$ 0	Anadromous	Habitat	subbasin
BPA Spent	$ 0	$ 0	$207,227	($11,452)			
200300600	**Effectiveness monitoring of the Chinook River estuary restoration project**				**Columbia Estuary**		**yes**
FY	2001	2002	2003	2004	Type	Category	Accuracy
NPCC Rec	$ 0	$ 0	$124,804	$80,000	Anadromous	Monitoring	area
BPA Spent	$ 0	$ 0	$80,134	$82,787			
200300700	Lower Columbia River and Columbia River Estuary Ecosystem Monitoring and Data Management				Columbia Estuary		yes
FY	2001	2002	2003	2004	Type	Category	Accuracy
NPCC Rec	$ 0	$ 0	$260,000	$260,000	Anadromous	Monitoring	province
BPA Spent	$ 0	$ 0	$ 0	$275,325			

Projects in **bold** have preliminary results data included in this report.

Projects in the Columbia Estuary Subbasin, continued...

Project ID	*Project Title*				*Review Cycle*		*BiOp?*
200300800	**Preserve and Restore Columbia River Estuary Islands to Enhance Juvenile Salmonid and Columbian White-tailed Deer Habitat**				**Columbia Estuary**		**yes**
FY	2001	2002	2003	2004	Type	Category	Accuracy
NPCC Rec	$ 0	$ 0	$585,473	$222,250	Anadromous	Habitat	point
BPA Spent	$ 0	$ 0	$ 0	$79,948			
200301000	Historic habitat opportunities and food-web linkages of juvenile salmon in the Columbia River estuary: Implications for managing flows and restoration				Columbia Estuary		yes
FY	2001	2002	2003	2004	Type	Category	Accuracy
NPCC Rec	$ 0	$ 0	$597,559	$617,876	Anadromous	Research & Evaluation	subbasin
BPA Spent	$ 0	$ 0	$285,000	$409,609			
200301100	Implement the Habitat Restoration Program for the Columbia Estuary and Lower Columbia River				Columbia Estuary		yes
FY	2001	2002	2003	2004	Type	Category	Accuracy
NPCC Rec	$ 0	$ 0	$1,000,000	$1,000,000	Anadromous	Habitat	province
BPA Spent	$ 0	$ 0	$ 0	$518,325			
200301500	Blind Slough Restoration Project - Brownsmead, Oregon				Columbia Estuary		yes
FY	2001	2002	2003	2004	Type	Category	Accuracy
NPCC Rec	$ 0	$ 0	$173,550	$96,000	Anadromous	Habitat	area
BPA Spent	$ 0	$ 0	$ 0	$65,900			

Projects in **bold** have preliminary results data included in this report.

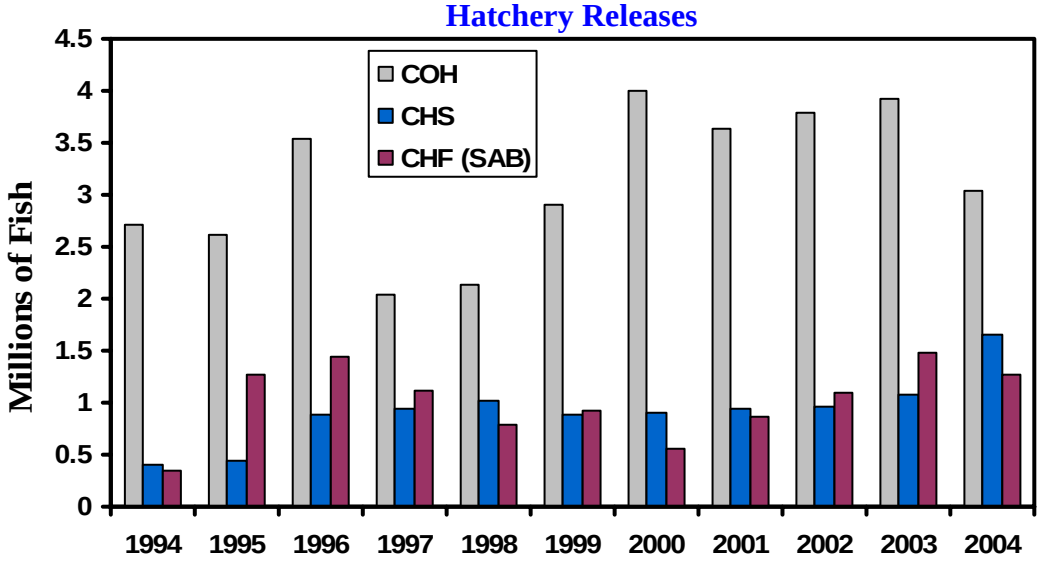
Project 199306000 — *Select Area Fishery Evaluation Project (SAFE)*

2002-2003 Project Objectives

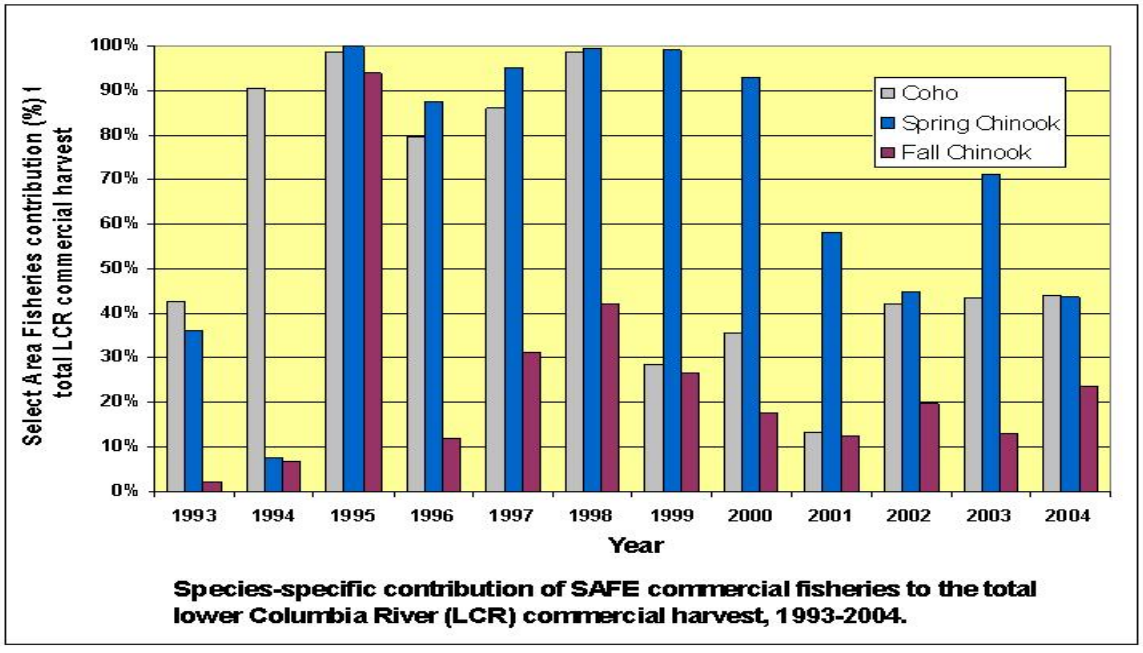
- Maximize production in appropriate select area sites

Commercial Fisheries—Preliminary Results

Hatchery Releases



Commercial Harvest



Species-specific contribution of SAFE commercial fisheries to the total lower Columbia River (LCR) commercial harvest, 1993-2004.

Coded Wire Tag Analyses—Preliminary Results

Coho

- Average survival almost nearly double traditional rearing strategies
- Limited ESA impacts allows for expanded harvest opportunity (SAFE = 98% and Columbia River hatcheries = 20.4%)

Spring Chinook

- Average survival approximately 15% higher than Willamette Basin hatcheries
- Harvest
  - 89% - Commercial
  - 3% - Sport
  - 8% - Escapement

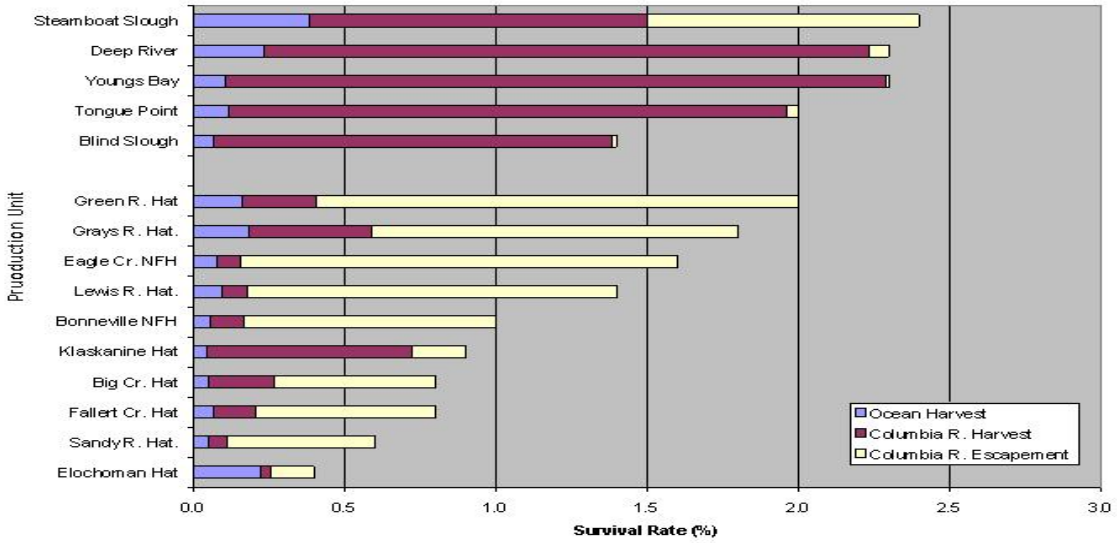
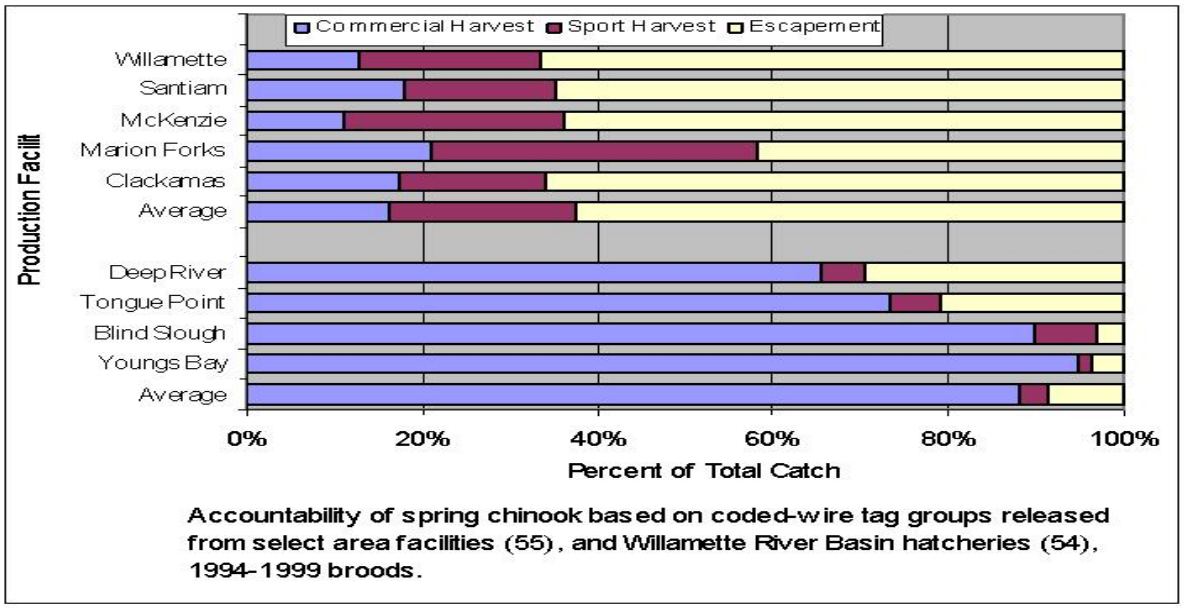


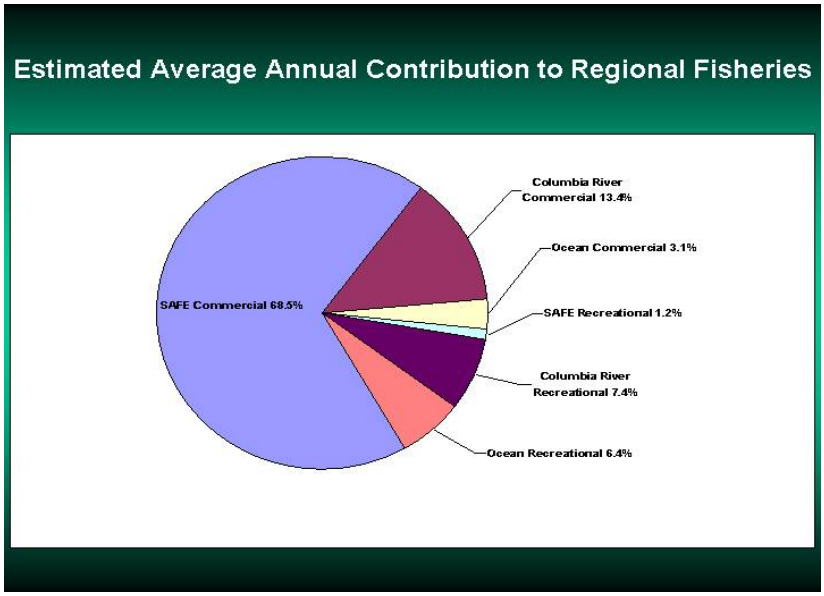
Figure 2. A comparison of survival rates and fishery contributions of 1993-1997 brood year early run coho released from SAFE net pen releases and representative hatcheries.

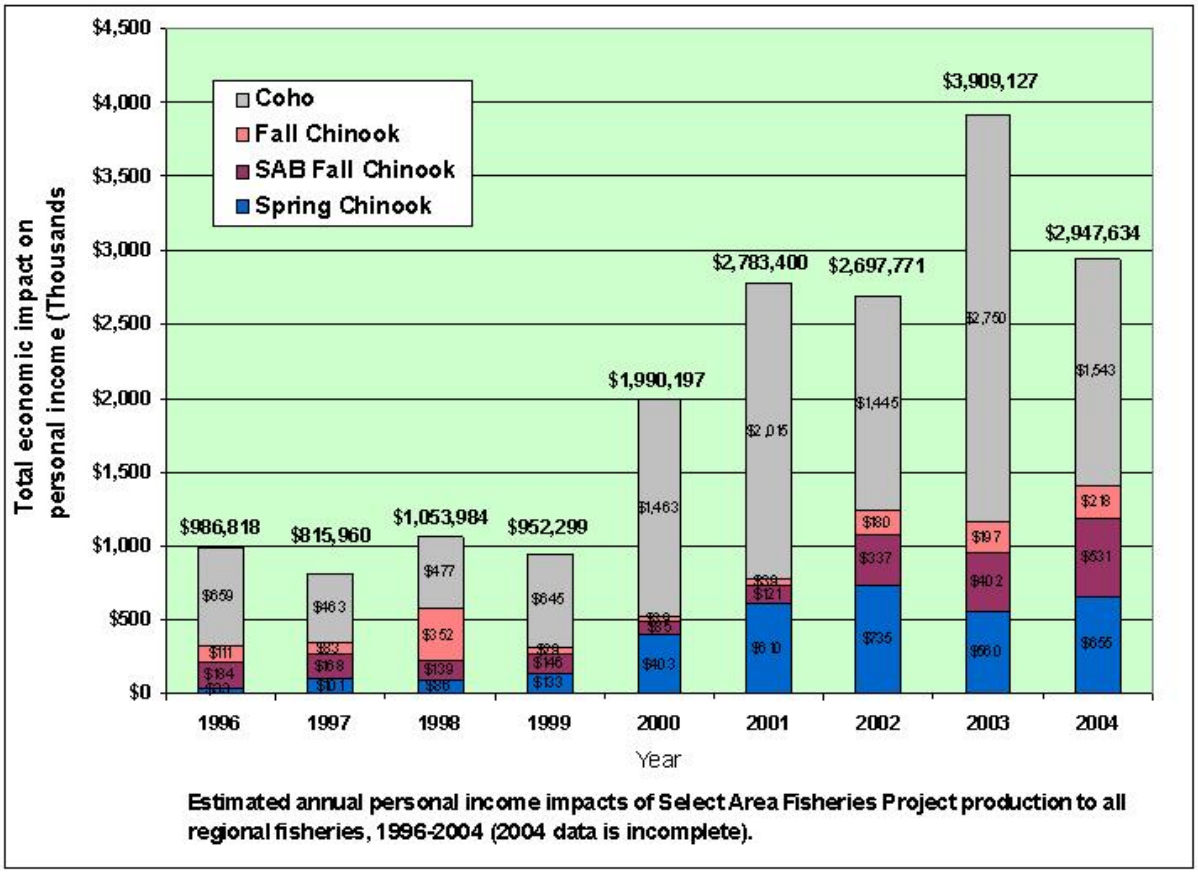


Accountability of spring chinook based on coded-wire tag groups released from select area facilities (55), and Willamette River Basin hatcheries (54), 1994-1999 broods.

Contribution to Other Fisheries—Preliminary Results

- 15% of all SAFE returns are harvested in recreational fisheries
- 16.5% of SAFE returns are harvested in ocean and mainstem Columbia River commercial fisheries





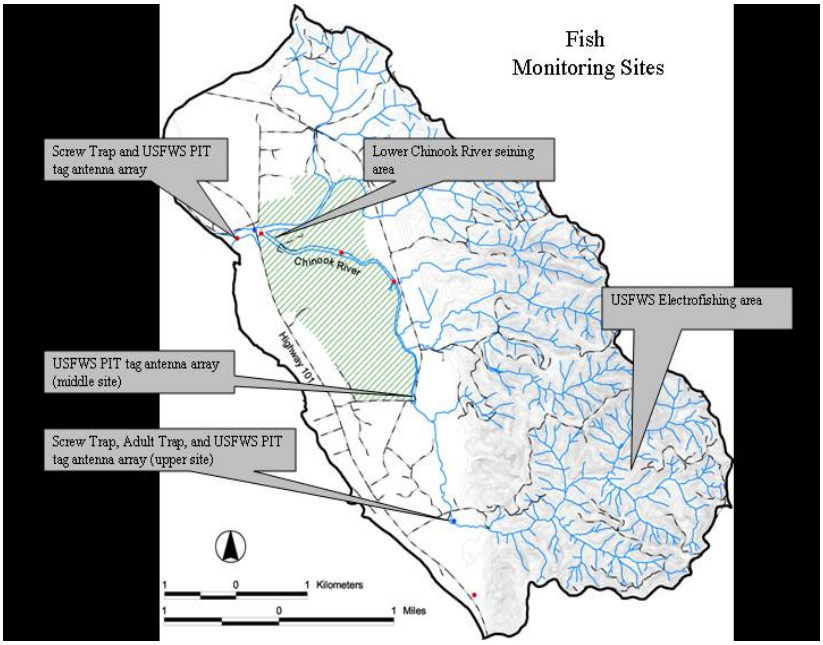
Estimated annual personal income impacts of Select Area Fisheries Project production to all regional fisheries, 1996-2004 (2004 data is incomplete).

Project 200300600 — *Effectiveness Monitoring of the Chinook River Estuary Restoration Project*

2002-2003 Project Objectives

- Determine relative abundance and length of residence of hatchery and natural salmonids in the Chinook River estuary prior to and after restoration

Length of Residence—Preliminary Results



Locations hatchery and natural salmonid abundance and length of residency was monitored in the Chinook River Estuary.

Juvenile cutthroat trout (top), chum salmon (second), coho salmon (third), and Chinook salmon (bottom) were collected throughout the Chinook River Estuary. (Photographs: Courtesy of Sea Resources)

Summary of Lower River/Estuary residence and growth based on recapture of PIT tagged juvenile salmon - 2001-2004* combined

			Time Between First and Last Capture (days)					Change in Fork Length (mm)		Mean Growth Rate (mm/day)
Species	Rearing	n	Mean	S.D.	S.E	Min/Max	n	Mean	
Chinook salmon	Hatchery	35	**2.31**	3.72	0.63	1 / 19	35	**1.15**	**0.50**
	Natural	74	**6.49**	11.30	1.31	1 / 63	34	**5.65**	**0.42**
Coho salmon (spring migrants)	Hatchery	53	**2.23**	2.67	0.37	1 / 16	53	**0.91**	**0.41**
	Natural	295	**4.74**	11.16	0.65	1 / 87	145	**3.92**	**0.54**
Coho salmon (fall migrants)	Natural	8	**160.75**	7.19	2.54	146 / 168	8	**43.25**	**0.27**

*2004 only includes tagging through July

PIT Tagging Summary for 2001 – 2004* Chinook River, Washington

Location	Year	Chinook		Coho		Steelhead	Chum	Cutthroat		
		hatchery	natural	hatchery	natural	natural	natural	natural	Sub Total	Total
Upper Chinook River	2001				129	2		10	141	1,737
	2002					4		444***	448	
	2003				584	201		363***	1,148	
	2004*									
Hatchery Smolt Trap	2001	36	5	57	133	23		154	408	3,682
	2002			18	252	34		346	650	
	2003	1	21	83	1,087	42		296	1,530	
	2004*		65	3	572	69		385	1,094	
Sea Resources Hatchery	2001	2,879**		10		1			2,890	9,251
	2002	2,987**		2,990**					5,977	
	2003			384					384	
	2004*									
Middle Chinook River	2001		1		21	1		16	39	138
	2002				42				42	
	2003			16	29	1		11	57	
	2004*									
Lower Chinook River	2001		6		6	1		2	15	89
	2002									
	2003	4	24		1			3	32	
	2004*	6	29		3	1		3	42	
Mouth Smolt Trap	2001	32	35	2	64			3	136	3,274
	2002	5	281	8	1,348	28		67	1,737	
	2003	66	226	89	431	1		26	839	
	2004*	6	319	1	214	4	4	14	562	
		6,022	1,012	3,661	4,916	413	4	2,143		18,171

* 2004 only includes tagging through July.
** Tagging led by NOAA Fisheries
*** Tagging led by USFWS

Project 200300800 — *Preserve and Restore Columbia River Estuary Islands to Enhance Juvenile Salmonid and Columbian White-tailed Deer Habitat*

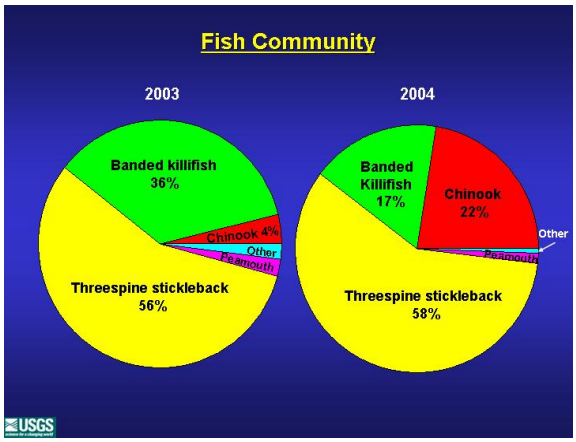
2002-2003 Project Objectives

- Purchase 426 acres on Crims Island
- Restore 175 acres to functional emergent tidal wetland and riparian forest
- Describe seasonal fish use
- Determine available food prey and food preferences
- Compare productive capacity

Columbian White-tailed Deer Habitat—Preliminary Results

- 473 acres acquired on Crimes Island
- Efforts initiated to restore 94 acres of tidal marsh and 115 acres of riparian forest on Crims Island
- Biological (10 sites) and mechanical (5.5 miles) control of purple loosestrife implemented in 2004
- Japanese knotweed—59 sites mapped and treatment plan developed

Salmonids— Preliminary Results

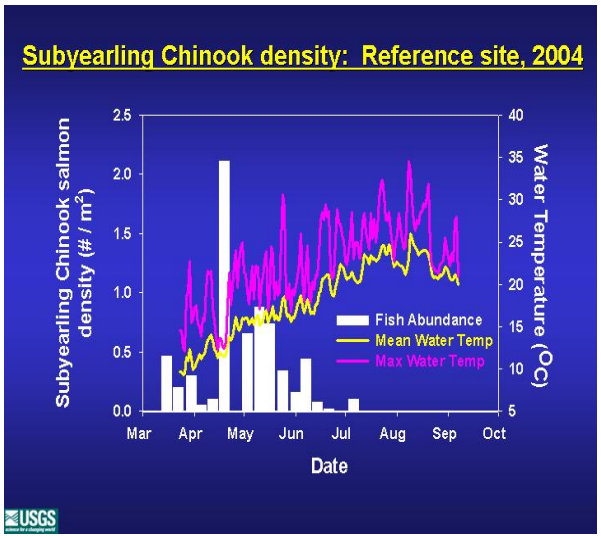


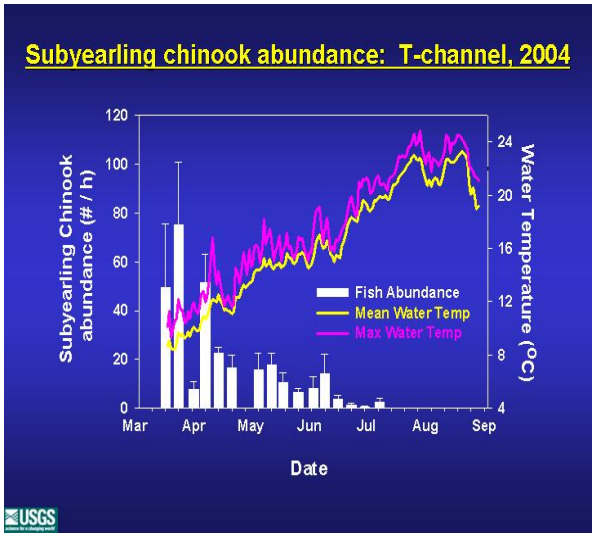
Sampling locations at Crims Island included the T-channel (1) and reference tidal marsh (2). (Photograph: Courtesy of the U.S. Geological Survey)

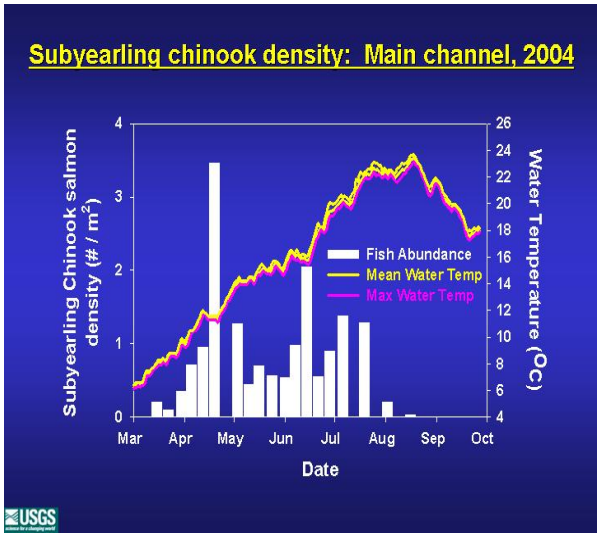
Examples of habitat sampled at Crims Island. Samples were collected from the T-channel (left) and marsh (right). (Photograph: Courtesy of the U.S. Geological Service)

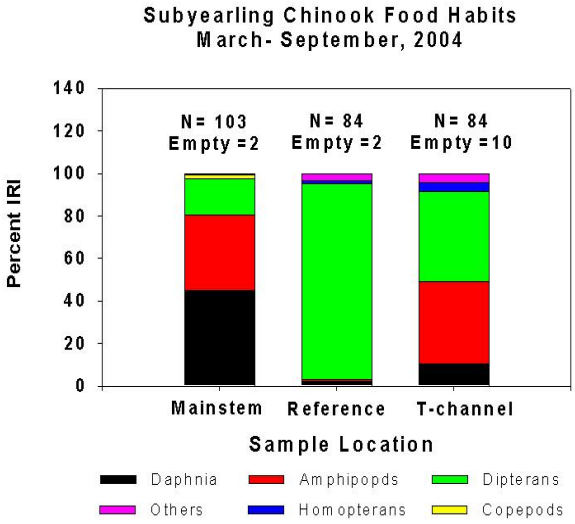
- Subyearling Chinook salmon, threespine stickleback, and banded killifish are the dominant fish species at Crims Island
- Juvenile salmonids are present from early spring through late-June, after which temperature become too warm
- Fish residence time in Crims Island habitats is low, but may increase in restored habitat which will maintain habitat at low tides
- Productivity was greatest at the reference marsh site and fish consumed more prey; however, food habits were most similar between the reference and the T-channel

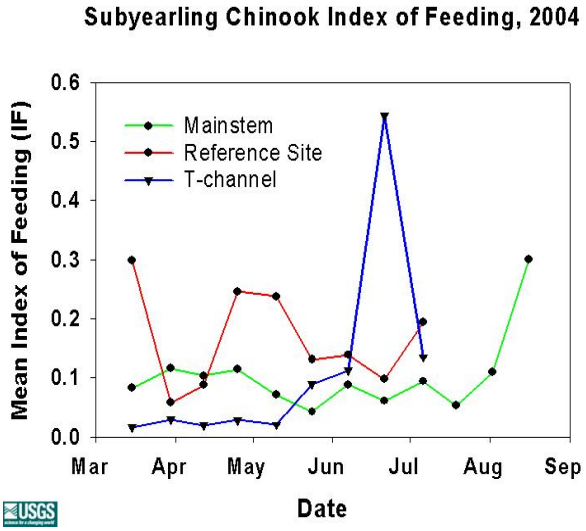
Salmonids— Preliminary Results



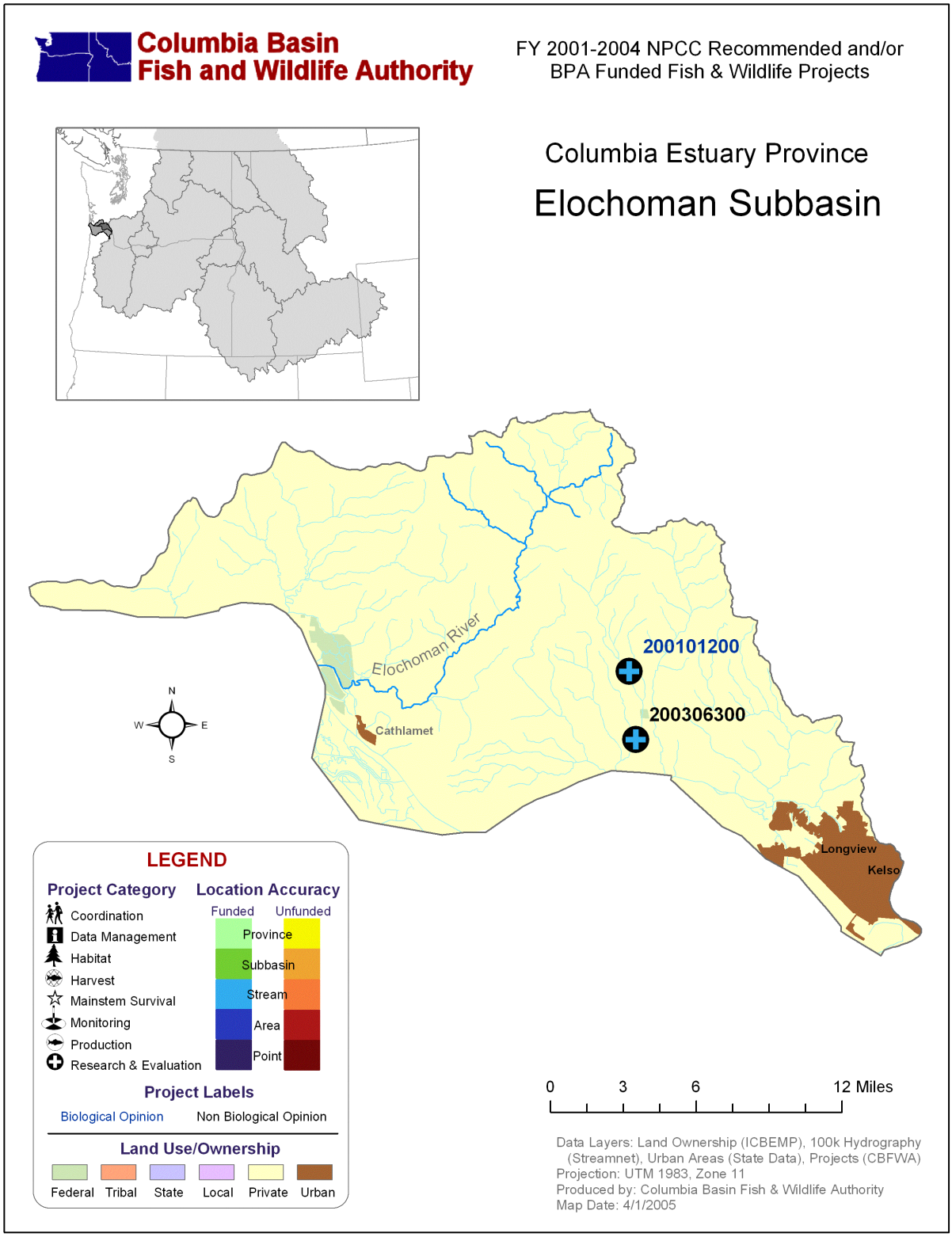








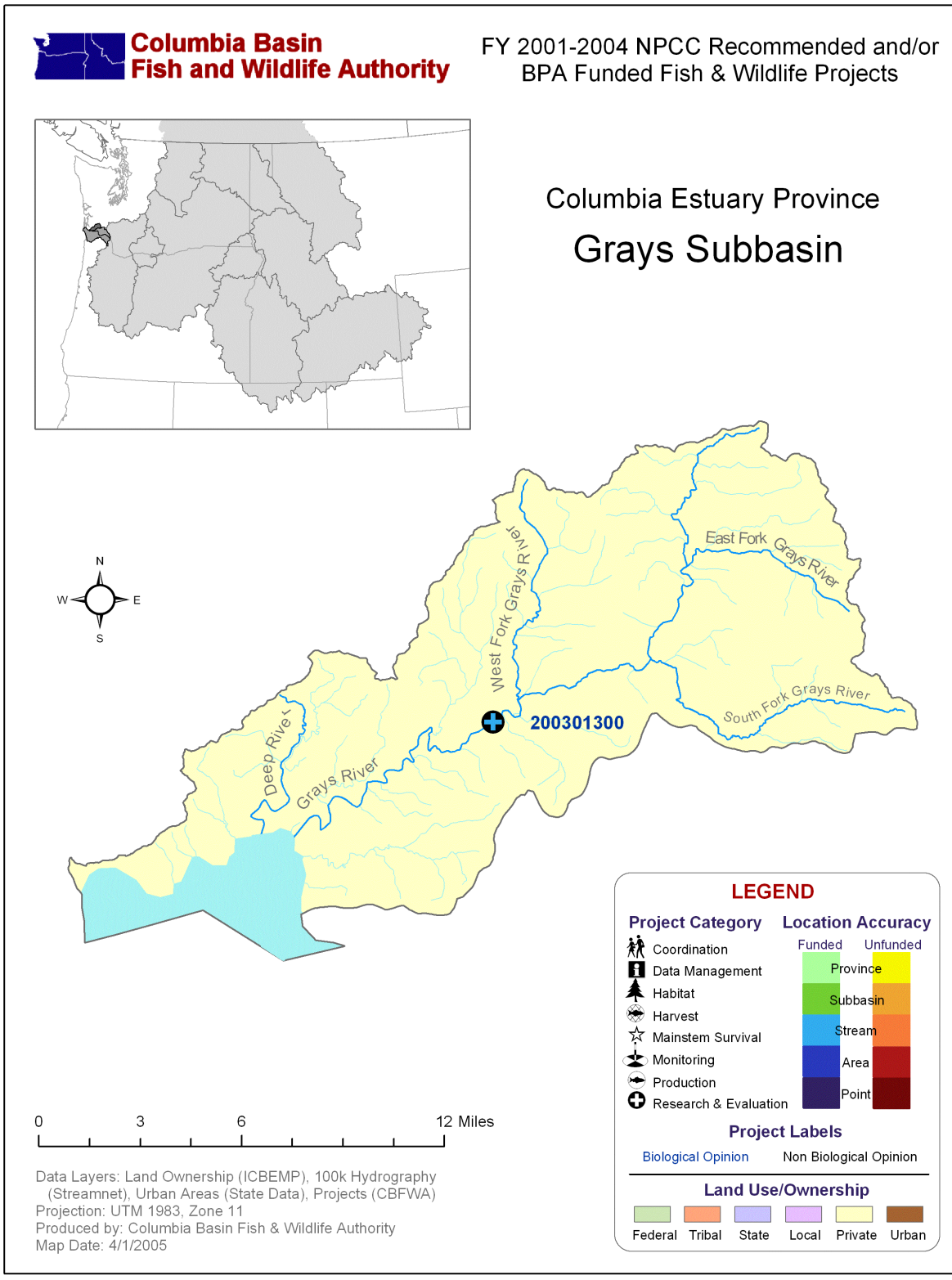
Elochoman Subbasin



Projects in the Elochoman Subbasin

Project ID	*Project Title*				*Review Cycle*		*BiOp?*
200101200	Evaluate New Methodologies for Monitoring Pacific Salmon and Steelhead: Methods for Evaluating the Effectiveness of Restoration and Recovery Programs				FY 2001 Innovative		no
FY	2001	2002	2003	2004	Type	Category	Accuracy
NPCC Rec	$197,155	$ 0	$ 0	$ 0	Anadromous	Research & Evaluation	stream
BPA Spent	$ 0	$268,087	$12,299	$ 0			
200306300	Natural Reproductive Success and Demographic Effects of Hatchery-Origin Steelhead in Abernathy Creek, Washington				FY 2003 RFS		yes
FY	2001	2002	2003	2004	Type	Category	Accuracy
NPCC Rec	$ 0	$ 0	$ 0	$ 0	Anadromous	Research & Evaluation	stream
BPA Spent	$ 0	$ 0	$ 0	$241,541			

Grays Subbasin



Projects in the Grays Subbasin

Project ID	*Project Title*				*Review Cycle*		*BiOp?*
200301300	**Grays River Watershed and Biological Assessment**				**Columbia Estuary**		**yes**
FY	2001	2002	2003	2004	Type	Category	Accuracy
NPCC Rec	$ 0	$ 0	$474,734	$474,734	Anadromous	Research & Evalua-tion	stream
BPA Spent	$ 0	$ 0	$ 0	$376,561			

Projects in **bold** have preliminary results data included in this report.

Project 200301300 — *Grays River Watershed and Biological Assessment*

2002-2003 Project Objectives

- Conduct a watershed and biological assessment

Mass Wasting and Surface Erosion Assessment—Preliminary Results

- Current sediment production levels are at least 4 times greater than estimated background levels
- Landslides and sediment production from forest roads are the two largest sources of sediment in the basin
- Preliminary results indicate that approximately 500 tonnes km^{-1} $year^{-1}$ of sediment are produced from landslides; approximately 50 tonnes km^{-1} $year^{-1}$ of sediment are produced from forest roads
- Approximately 80% of observed landslides are associated with forest roads

Landslides throughout the Grays River watershed have led to conditions such as those pictured above. (Photographs: Courtesy of the Lower Columbia River Fish Recovery Board)

Geomorphic Characterization of Alluvial Channel Network—Preliminary Results

Mainstem Grays River

- Mainstemdownstream of Bedrock Canyon is the first major response reach sensitive to changes in sediment supply
- Avulsions at two locations occurred on the mainstem Grays River in the upper basin during the December 2000 high flow event
- Up to 3 feet of aggradations occurred over much of the floodplain in the Gorely reach during the avulsions associated with the December 200 high flow event

West Fork Grays River

- Very high sediment loads have resulted in significant instream storage and have caused later channel instability

South Fork Grays River

- Areas where LWD loading remains high the South Fork Grays River exhibit complex multiple-thread forced pool-riffle morphology
- Low recruitment potential in adjacent riparian forests indicate existing morphology may nt endure as functional pieces of LWD decay

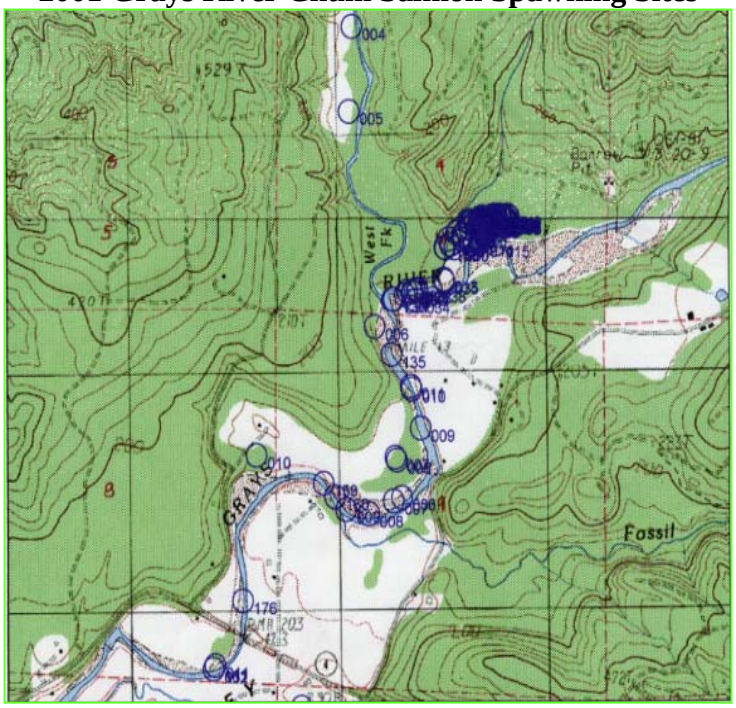
Headwater Reaches

- Many reaches exhibit significant sediment storage suggesting that sediment supply to downstream alluvial reaches will continue

Biological Assessment—Preliminary Results

Chum salmon during spawning in the Grays River (top) and chum salmon carcasses following spawning. (Photographs: Courtesy of the Lower Columbia River Fish Recovery Board)

2001 Grays River Chum Salmon Spawning Sites



This page intentionally left blank.