

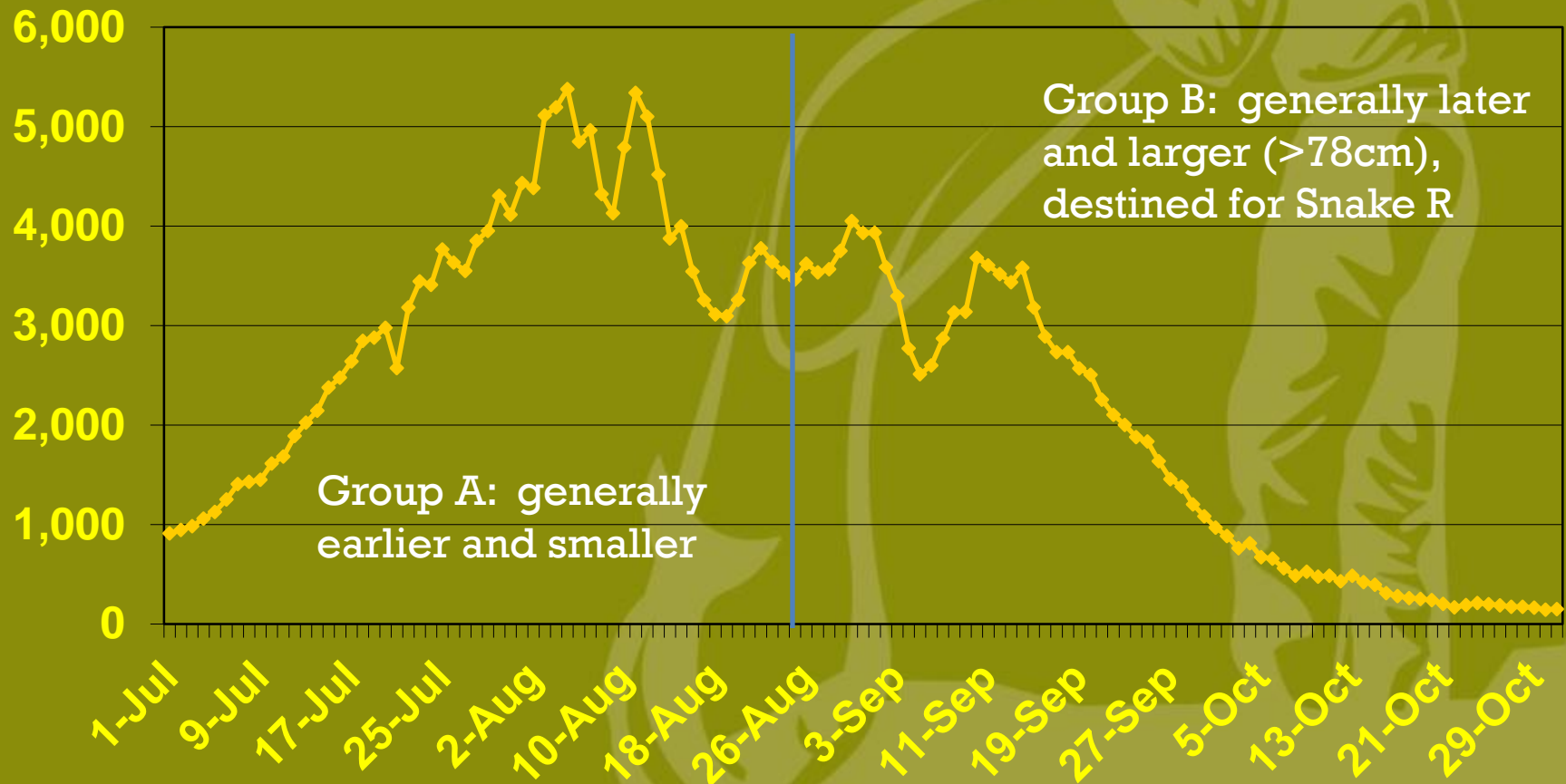
Are recent increases in Columbia Basin natural-origin steelhead adult return abundance a response to restoration actions?

Presented by: Bill Bosch, Yakama Nation Fisheries/YKFP



Acknowledgments: David Fast, Chris Frederiksen, Jeffery Trammel, Doug Hatch, Gabe Temple, Tim Ressigue, Shannon Adams, Scott Nicolai, John Marvin, Kelly Clayton, Brandon Rogers, Steve Parker, Alex Conley, and many others

Summer Steelhead Passage Timing at Bonneville Dam



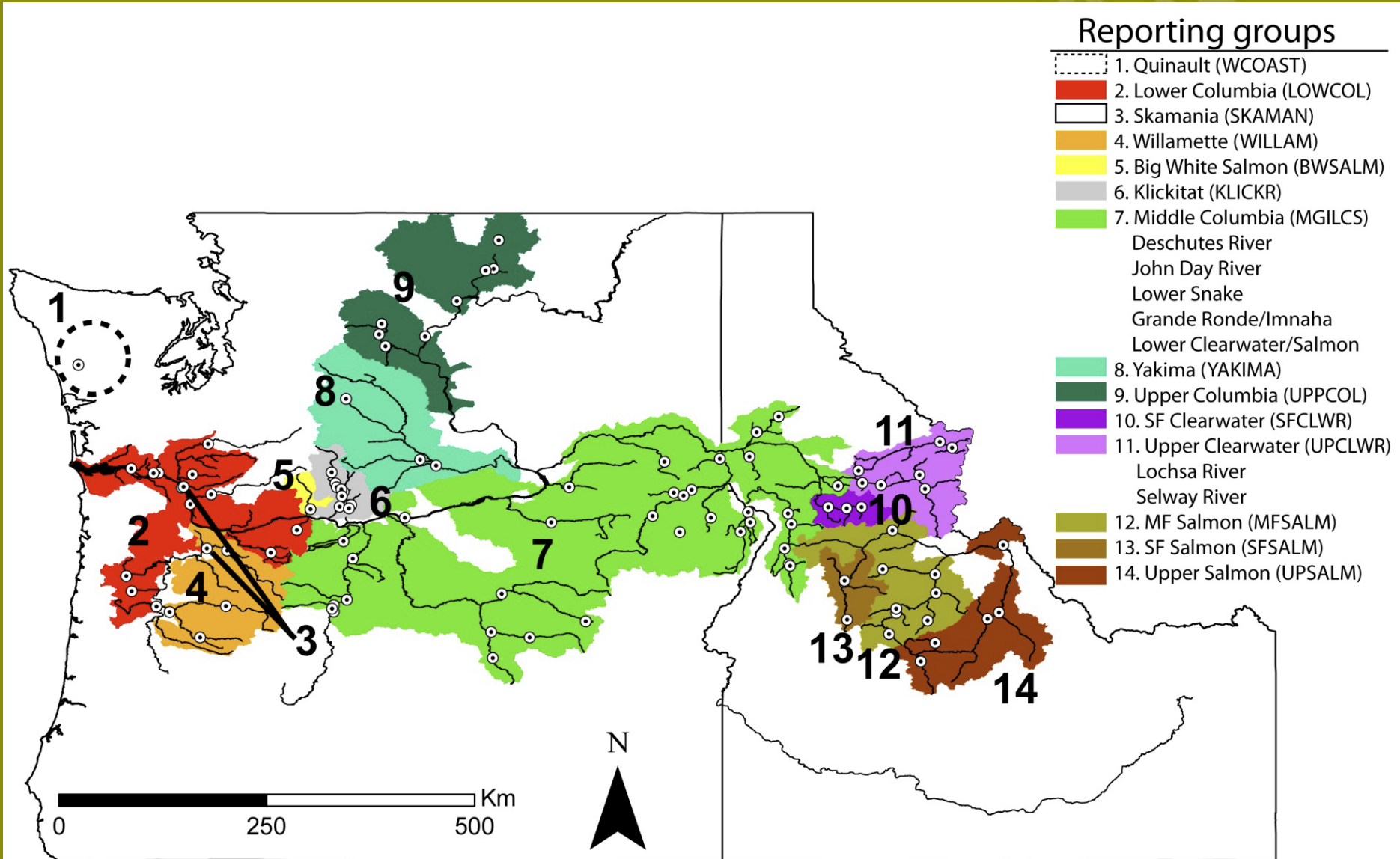
**2015 JOINT STAFF REPORT:
STOCK STATUS AND FISHERIES FOR
FALL CHINOOK SALMON, COHO SALMON, CHUM
SALMON, SUMMER STEELHEAD,
AND WHITE STURGEON**

Table 6. Returns of Upriver Summer Steelhead to Bonneville Dam (April- October) 1984-2014.

Year	Skamania Index		Group A Index		Group B Index		Total Passage	
	Wild	Total	Wild	Total	Wild	Total	Wild	Total
1984	2,490	20,780	52,447	195,751	13,768	98,011	68,705	314,542
1985	3,690	19,990	51,922	281,504	12,986	40,870	68,598	342,364
1986	5,520	24,830	56,570	287,508	9,984	64,016	72,074	376,354
1987	7,380	17,790	106,690	238,283	13,990	44,959	128,060	301,032
1988	4,180	22,360	64,331	173,151	17,742	81,643	86,253	277,154
1989	3,770	15,730	57,513	193,079	12,367	77,604	73,650	286,413
1990	3,690	18,710	27,102	115,628	8,811	47,174	39,603	181,512
1991	1,220	10,880	60,264	234,048	6,207	28,265	67,691	273,193
1992	2,940	14,910	44,294	241,524	12,715	57,438	59,949	313,872
1993	1,250	14,360	28,650	136,701	4,378	36,169	34,278	187,230
1994	1,380	12,330	21,212	120,971	5,152	27,463	27,744	160,764
1995	1,150	8,220	25,997	180,037	1,847	13,221	28,994	201,478
1996	1,310	10,830	25,721	174,464	3,912	18,693	30,943	203,987
1997	930	11,890	30,852	208,209	3,913	36,663	35,695	256,762
1998	1,610	9,440	34,836	134,687	3,415	40,241	39,861	184,368
1999	1,310	7,160	56,626	176,466	3,740	22,137	61,676	205,763
2000	5,728	16,619	63,628	216,723	8,368	40,909	77,724	274,251
2001	7,952	28,725	137,230	515,079	12,047	86,426	157,229	630,230
2002	9,671	24,991	87,276	323,124	32,333	129,882	129,280	477,997
2003	1,801	14,154	67,049	305,795	6,417	37,228	75,267	357,177
2004	3,289	20,148	60,421	250,615	9,202	37,398	72,912	308,161
2005	2,123	11,221	58,917	251,631	9,619	48,968	70,659	311,820
2006	2,181	9,882	63,735	245,168	8,466	74,128	74,382	329,178
2007	1,727	9,475	77,268	258,848	9,015	51,073	88,010	319,396
2008	4,489	15,832	81,648	245,823	18,529	93,429	104,666	355,084
2009	3,528	13,884	154,045	543,195	13,727	44,540	171,300	601,619
2010	10,357	29,270	120,531	304,002	22,364	77,146	153,252	410,418
2011	2,814	9,750	101,263	318,125	7,771	36,996	111,848	364,871
2012	3,023	10,958	55,464	192,134	6,813	27,723	65,300	230,815
2013	1,661	5,738	90,496	214,075	2,907	11,511	95,064	231,324
2014	4,783	13,526	109,279	260,130	13,341	47,057	127,403	320,713



Map Showing Columbia R. Steelhead GSI Reporting Groups, Courtesy CRITFC



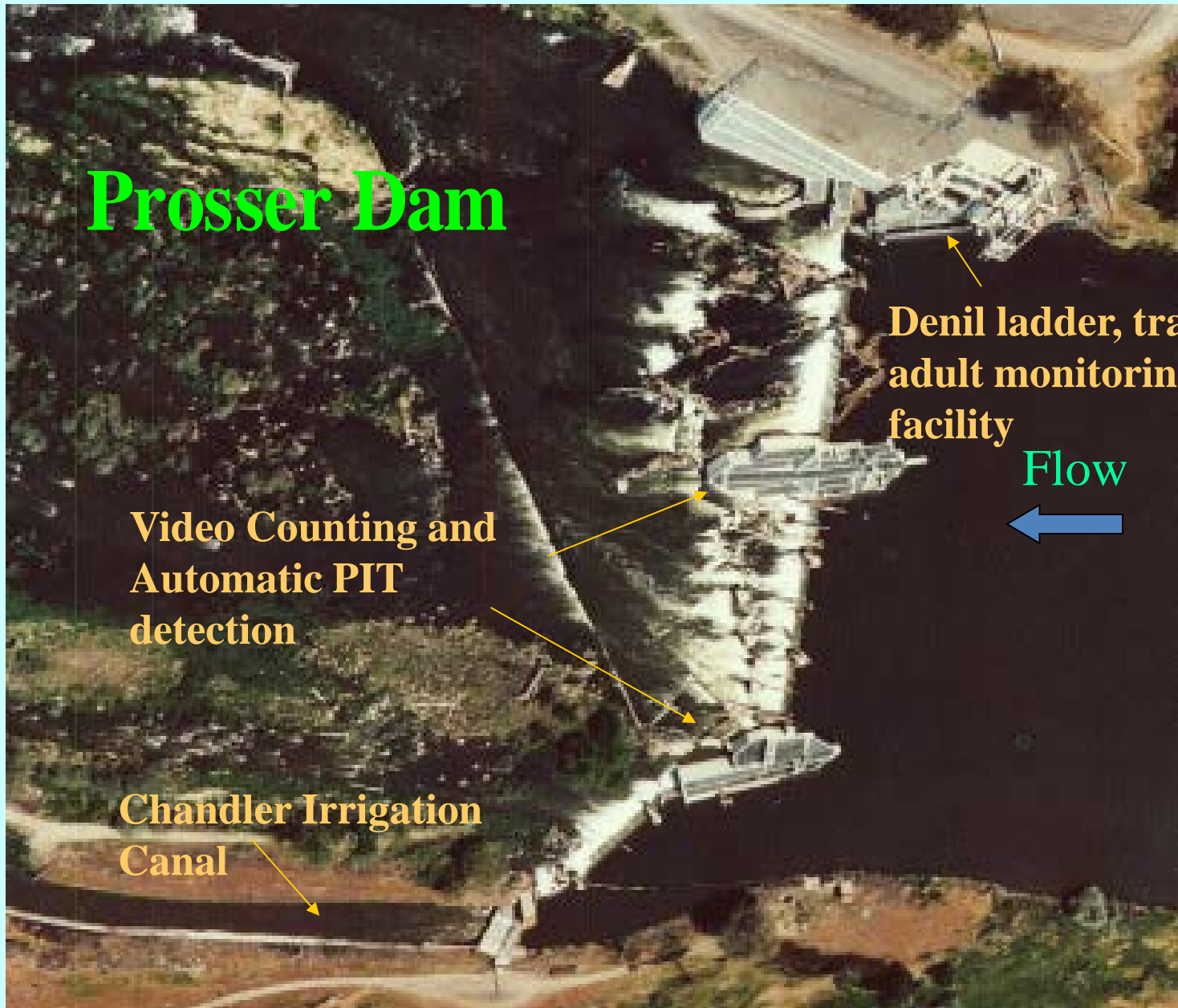
Prosser Dam

Denil ladder, trap and
adult monitoring
facility

Flow

Video Counting and
Automatic PIT
detection

Chandler Irrigation
Canal



Adult passage counts – Prosser Dam (SQL/Web)



[My account](#) [Log out](#)

Status and Trends Reporting

Yakama Nation Fisheries

[Home](#)
[About](#)
[Q&A](#)
[Dashboard](#)
[STAR Reports](#)
[Documentation](#)

[Home](#) » [Adult Passage Counts](#)

Facility

Year

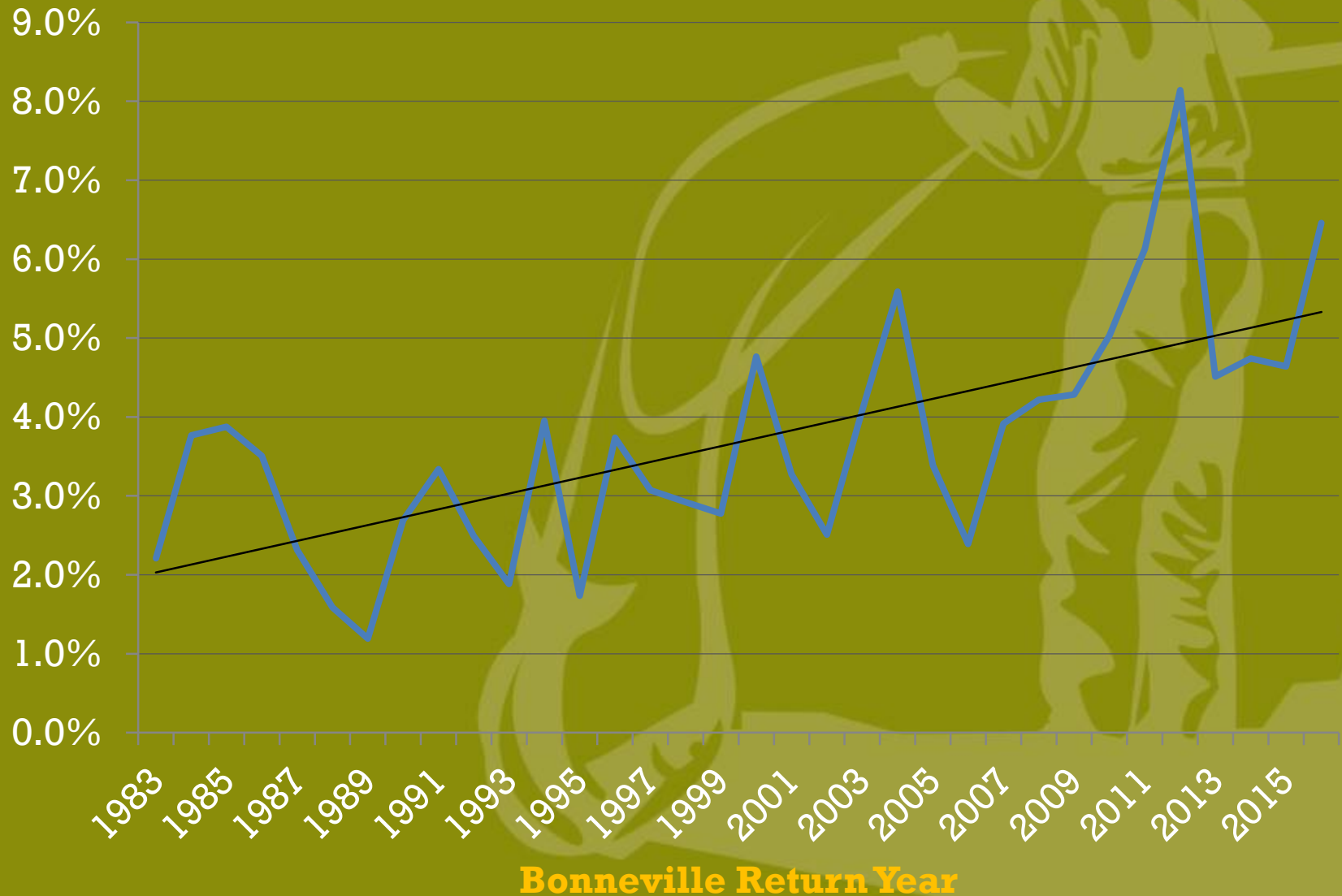
Date Sort By

Record Count: 315

[Export to csv](#)

Facility Name	Date	Adult Spring Chinook	Adult Summer Chinook	Adult Fall Chinook	Total Adult Chinook	Jack Spring Chinook	Jack Summer Chinook	Jack Fall Chinook	Total Jack Chinook	Wild Steelhead	Hatchery Steelhead	Total Steelhead	Sockeye	Coho	Jack Coho	Lamprey	Bull Trout
Prosser	11/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prosser	11/09/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prosser	11/08/2016	-	-	2	2	-	-	-	-	4	-	4	-	1	-	-	-
Prosser	11/07/2016	-	-	1	1	-	-	1	1	10	1	11	-	2	-	-	-
Prosser	11/06/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prosser	11/05/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prosser	11/04/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prosser	11/03/2016	-	-	6	6	-	-	-	-	17	-	17	-	1	-	-	-
Prosser	11/02/2016	-	-	31	31	-	-	2	2	32	-	32	-	4	-	-	-
Prosser	11/01/2016	-	-	36	36	-	-	3	3	28	1	29	-	6	1	-	-
Prosser	10/31/2016	-	-	30	30	-	-	3	3	26	-	26	-	1	1	-	-
Prosser	10/30/2016	-	-	56	56	-	-	2	2	20	-	20	-	1	-	-	-
Prosser	10/29/2016	-	-	52	52	-	-	-	-	37	-	37	-	2	-	-	-
Prosser	10/28/2016	-	-	65	65	-	-	6	6	49	-	49	-	16	4	-	-
Prosser	10/27/2016	-	-	82	82	-	-	4	4	53	-	53	-	21	3	-	-
Prosser	10/26/2016	-	-	104	104	-	-	6	6	27	-	27	-	22	3	-	-
Prosser	10/25/2016	-	-	99	99	-	-	11	11	38	2	40	-	28	6	-	-
Prosser	10/24/2016	-	-	59	59	-	-	4	4	36	1	37	-	16	1	-	-
Prosser	10/23/2016	-	-	113	113	-	-	7	7	37	-	37	-	21	-	-	-
Prosser	10/22/2016	1	-	207	208	-	-	8	8	58	-	58	-	35	1	-	-

Yakima R. wild steelhead as a percentage of all Group A wild steelhead at Bonneville, 1983-2016



PROGRESS*

Water Quantity

Improving water-use practices and restoring flows to dry sections of streams increases spawning/rearing habitats.

- 2 alternative water sources installed

Wetland Habitat

Wetland habitats help to sustain flows of clean cool water vital to salmonids. Treatments include reconnections with streams and rivers and protection/restoration of vegetation.

- 600 acres of wetland habitat protected
- 830 acres of wetland improved through treatment

Riparian Habitat

Healthy riparian areas protect/sustain stream habitats.

- 8 miles of riparian areas protected
- 120 miles of riparian areas improved by treatments

Upland Habitat

Upland habitat health affects water quality/quantity and runoff timing.

- 1,500 acres of upland habitat protected
- 0.5 miles of road removed
- 3,800 acres of upland habitat treated/improved

Outreach

Engaging residents and partners fosters stewardship.

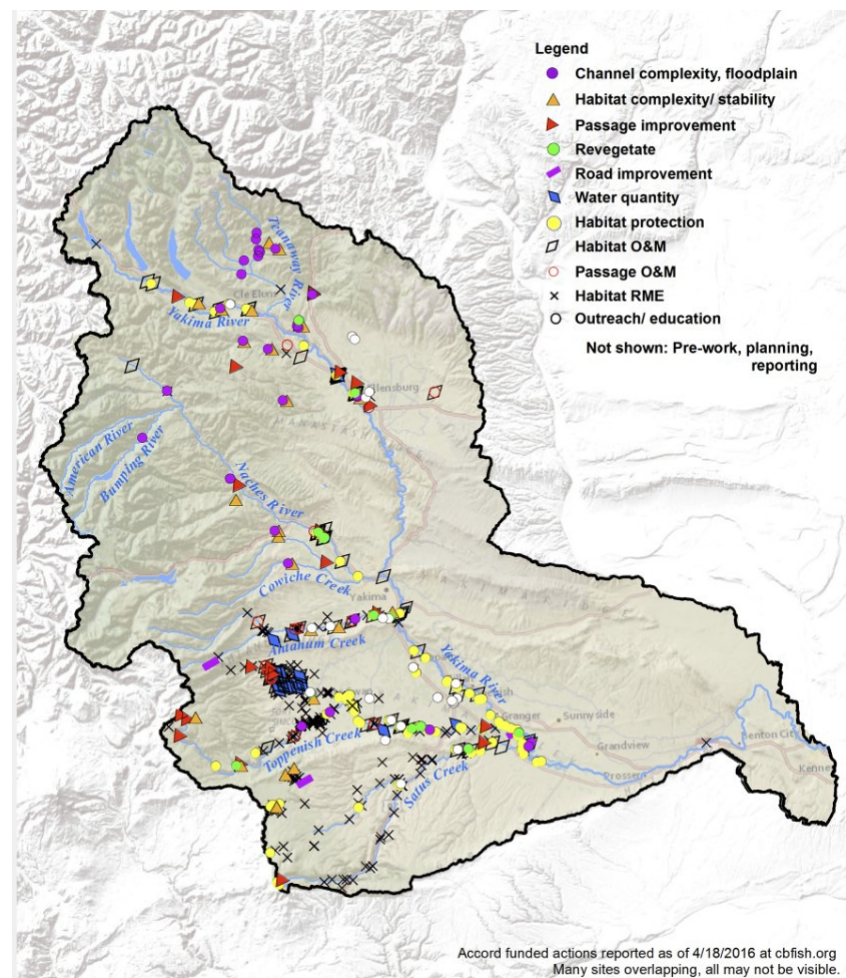
- 6,000 people have been engaged through outreach

*As reported to cbfish.org 04/18/2016.

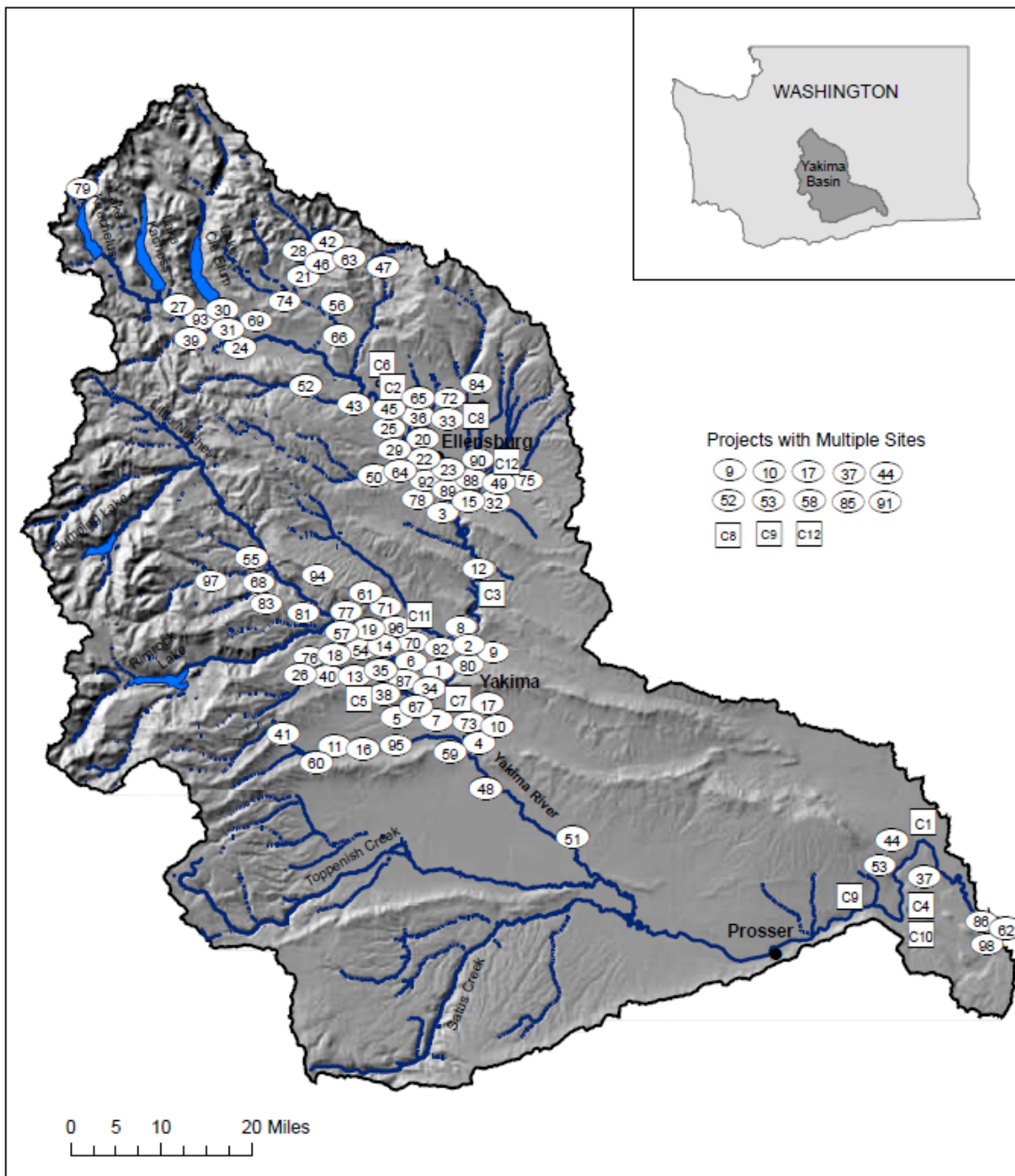


HIGHLIGHTS

Accord-funded Habitat Actions Implemented by the Yakama Nation (2008 - 2016) — Yakima Subbasin



SRFB Projects in the Yakima Basin



Yakima Basin

Habitat Restoration
Projects

Funded by Washington's

Salmon Recovery
Funding Board

1999-2014



An Example of what some of this Habitat Restoration looks like:



Before: Dewatered & Inaccessible Side Channel



After: Restored Side Channel

Yakima Basin Kelt Reconditioning



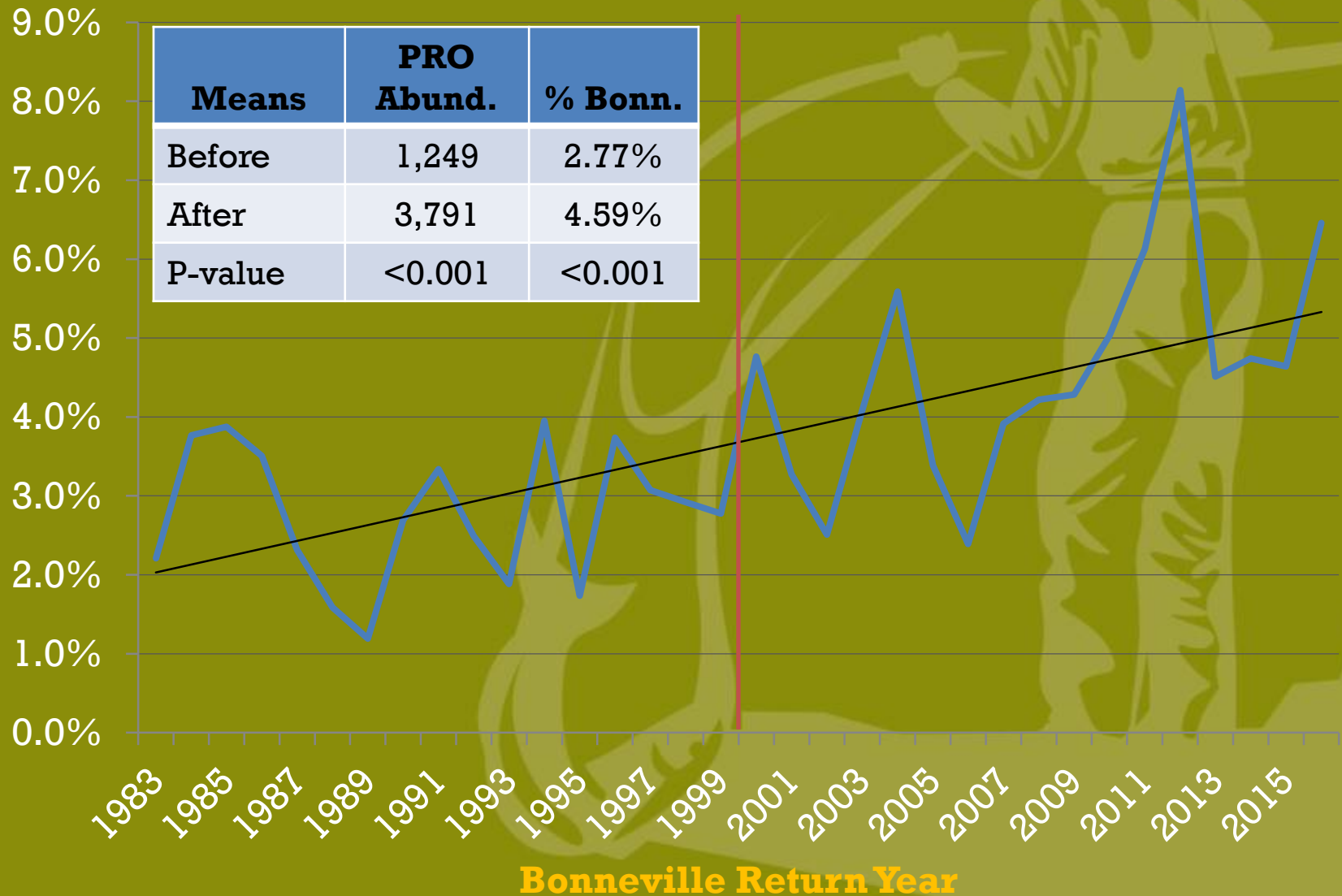
- Most (>90%) are females
- Held and fed for 6-8 months
- Released in mid-late October (beginning of upstream migration peak)
- Select own mates, where to spawn, when to spawn

Yakima Basin Kelt Reconditioning



- Captured kelts survive well through the reconditioning process (Hatch et al. 2013)
- Post-release upstream migratory patterns of reconditioned kelt steelhead mimic those of upstream pre-spawn steelhead migrants (Hatch et al. 2013)
- Reconditioned kelts have a potential repeat-spawning rate that is at least 3.6 times greater than that of transported or in-river kelt migrants (Trammell et al. 2016)
- Reconditioned kelts reproduce in the wild
- Reconditioned kelts had a lifetime reproductive success rate similar to natural kelts

Yakima R. wild steelhead as a percentage of all Group A wild steelhead at Bonneville, 1983-2016



Summary 2015 Fisheries and Fish Runs

U.S. v Oregon Technical Advisory Committee

May 20, 2016

Table 21b. Abundance Indicator Stocks

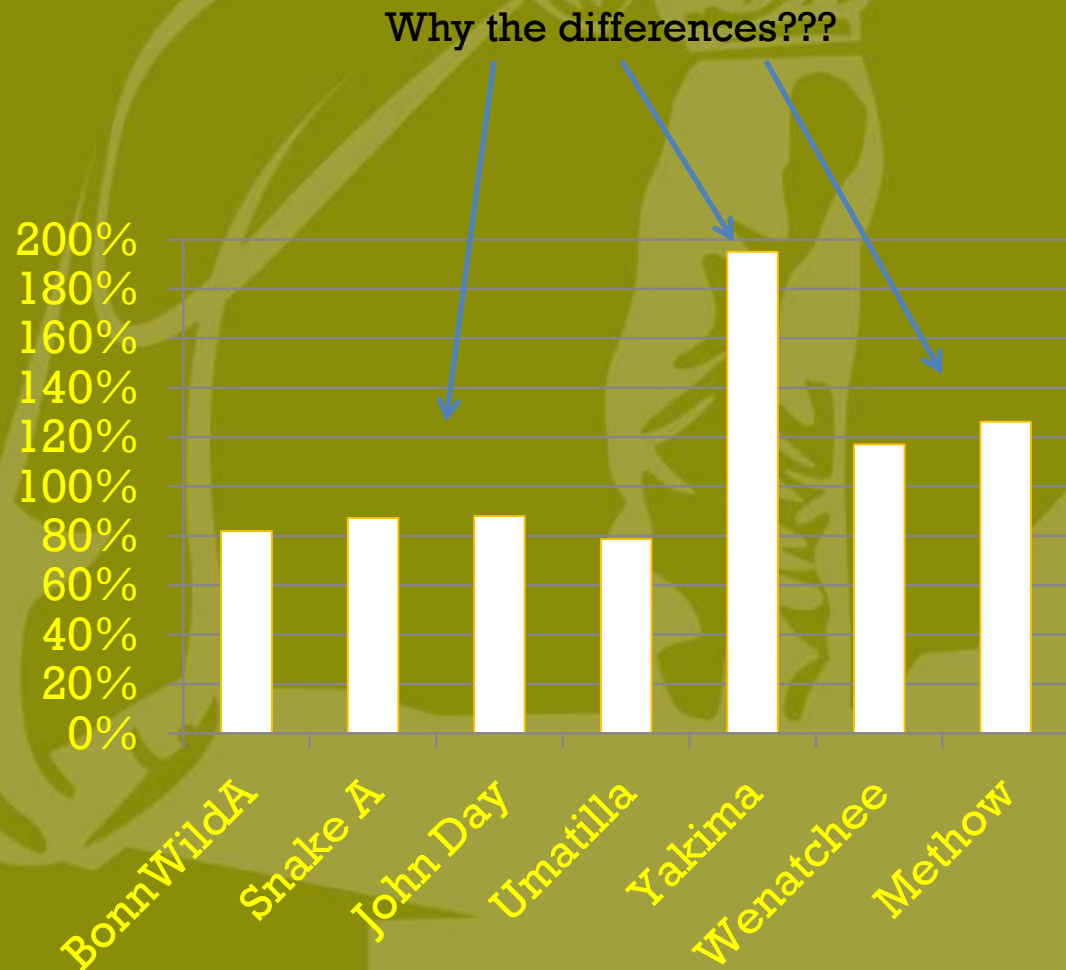
U.S. v Oregon Abundance Indicator Stocks (continued)											
	Baseline	Run Years									
Summer Steelhead	1988-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	
Group A-Index Snake River natural-origin steelhead	13,788	11,242	18,217	38,210	34,549	35,241	19,806	23,469	38,861	31,938	Lower Granite Dam count & sampling data
Group B-Index Snake River natural-origin steelhead	3,922	2,924	5,659	4,529	9,584	4,198	3,337	1,886	6,928	3,935	Lower Granite Dam count & sampling data
Joseph Creek A-run steelhead	2,400	2,322	3,598	1,831	5,647	1,305	2,148	2,640	na	na	Abundance based on redd counts
Deschutes natural-origin steelhead	4,100	3,482	4,048	4,236	7,257	5,450	3,749	5,450	na	na	Abundance based on Sherars Falls
John Day natural-origin steelhead	6,582	5,109	12,923	7,791	12,426	16,250	11,640	20,505	na	na	Abundance based on redd counts
Umatilla natural-origin steelhead	1,600	2,098	2,356	3,722	3,869	3,122	2,408	2,600	na	na	Threemile Dam counts
Klickitat natural-origin steelhead	600	1,000	500	300	600	780	na	na	na	na	Abundance based on redd counts ¹
				1,290	1,111	2,483	1,063	1,222	2,956	na	Lyle Falls (RM 2.4) mark-recapture estimate
Methow River natural-origin steelhead	400	765	705	1,225	1,096	856	548	1,138	1,216	1,100	Maximum escapement values
Wenatchee River natural-origin steelhead	700	793	788	2,486	2,432	1,578	1,040	1,516	1,909	1,500	Maximum escapement values

Percent change in Group A steelhead mean abundance indices for selected streams, Bonneville return years 1988-2006 compared to 2007-2013.

	Before	After	P-value
BonnWildA	53,455	97,245	0.0021
Snake A	13,788	25,819	0.0091
John Day	6,582	12,378	0.0109
Umatilla	1,697	3,032	0.0005
Yakima	1,643	4,849	0.0000
Wenatchee	700	1,519	0.0104
Methow	400	905	0.0002



Photo by Jeannette Burkhardt



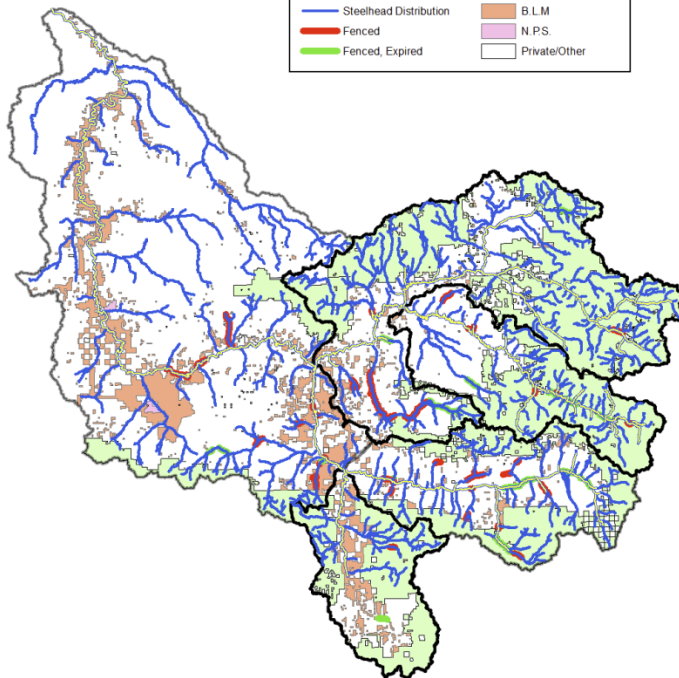
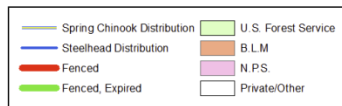
John Day Basin



Habitat Enhancement

1984-2014

John Day River Fish Habitat Projects



SYSTEM SEGMENT	SPECIES	OBJECTIVES					PROJECTS				
		Additional Rearing Habitat	Riparian Revegetation	Reduce Summer Water Temperature	Repair Dredge Damage	Additional Adult Holding	Open Stream Access	Environmental Assessment Report	Pools to be Constructed	Protective Fencing	Revegetation
(A) Main Stem John Day River	Ch & St ¹	x						30 ²			
(B) Deer Creek	St	x	x	x				x 200	x	x	
(C) Murderer's Creek	St	x						x 162			
(D) Field's Creek	St	x						x			
(E) East Fork, Beech Creek	St							x			
(F) Clear Creek	Ch & St	x						x 25			
(G) Squaw Creek	Ch & St	x					x	x 80			
(H) Canyon Creek	St	x						x 60			
(I) Middle Fork John Day R.	Ch & St	x				x					
(J) Big Boulder Creek	Ch & St	x						x 75			
(K) Granite Boulder Creek	Ch & St	x						x 100			
(L) Clear & Granite Creek	Ch & St	x			x	x					
(M) North Fork John Day R.	Ch & St	x		x			x				

Table 2.
Fish Habitat Improvement Projects, John Day River Basin

Miles Protected	Acres Leased	Fence Miles	Spring Developments
208.62	8809	329.34	64

1984-021-00	John Day Habitat Enhancement
1993-038-00	N Fork John Day R Enhancement
1996-053-00	North Fork John Day Dredge-Tail
1998-018-00	John Day Watershed Restoration Enhance Habitat in the North Fork
2000-031-00	John Day River
2001-069-00	Enhance John Day Streamflow
2007-397-00	John Day Watershed Restoration

Data Sets and Time Series Matter



- Snake A – TAC/WDFW/ODFW Reports Lower Granite Natural A-index
- Umatilla – BPA Annual Report (Jan. 2016, C. Contor, editor)
- Wenatchee/Methow – derived from mid-Columbia Dam counts (TAC, WDFW)

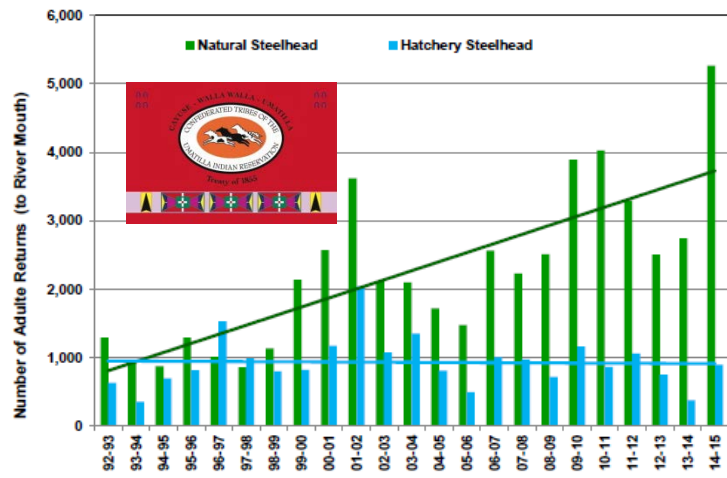
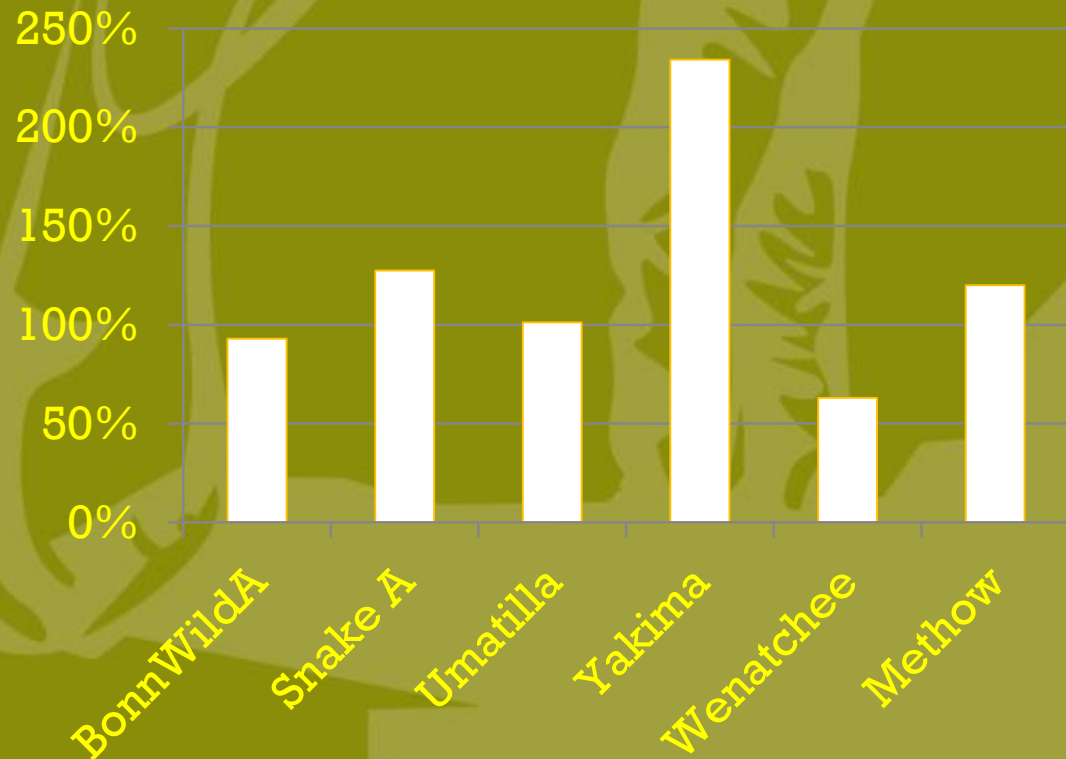


Figure 3-4 Natural and hatchery returns of summer steelhead to the Umatilla River with linear trend lines, 1992-2015



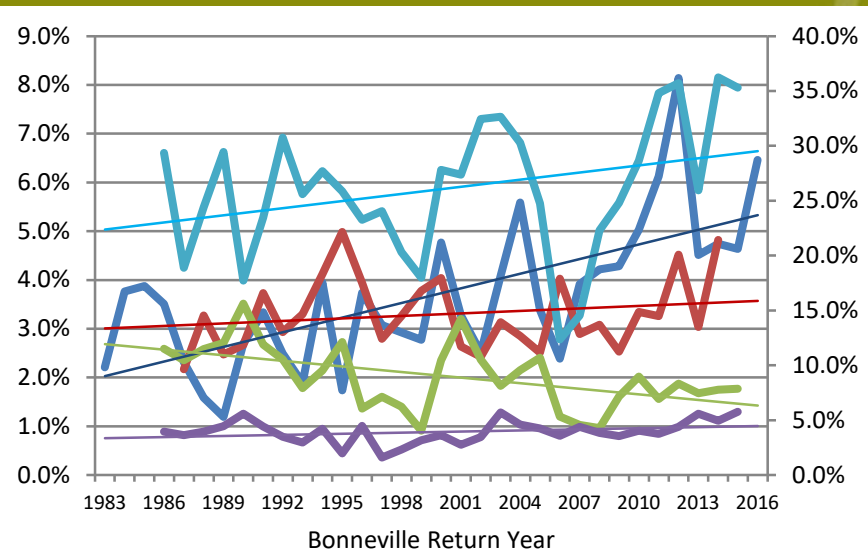
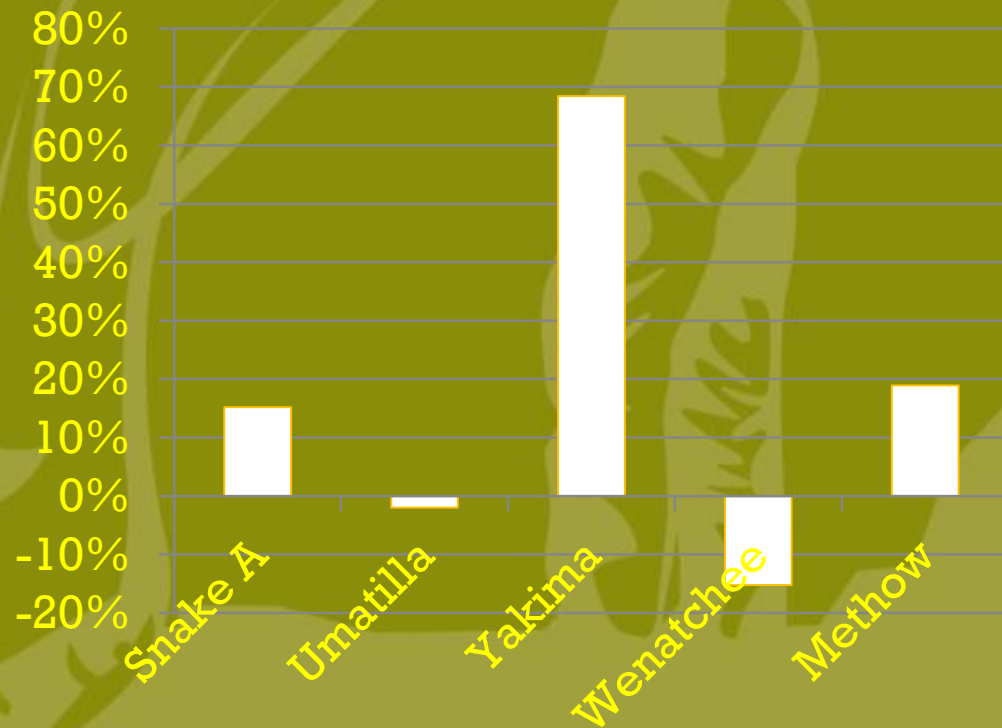
Percent change in Group A steelhead mean abundance indices for selected streams, Bonneville return years 1986-99 compared to 2000-2015.

	1986-99	2000-15	P-value
BonnWildA	45,761	88,322	0.0002
Snake A	10,897	24,782	0.0001
Umatilla	1,413	2,845	0.0001
Yakima	1,167	3,900	0.0000
Wenatchee	1,024	1,669	0.0341
Methow	377	829	0.0000



Percent change in Group A steelhead mean proportion of Bonneville abundance for selected streams, Bonneville return years 1986-99 compared to 2000-2015.

	1986-99	2000-15	P-value
Snake A	0.2420	0.2787	0.1035
Umatilla	0.0334	0.0327	0.8188
Yakima	0.0266	0.0448	0.0002
Wenatchee	0.0219	0.0186	0.1591
Methow	0.0081	0.0096	0.0697



Differences in Counting Methods?

	Method
BonnWildA	Bonneville Dam
Snake A	Lower Granite Dam
John Day	Redd survey w/expansion
Umatilla	3-mile Dam
Yakima	Prosser Dam
Wenatchee	Combination
Methow	Combination



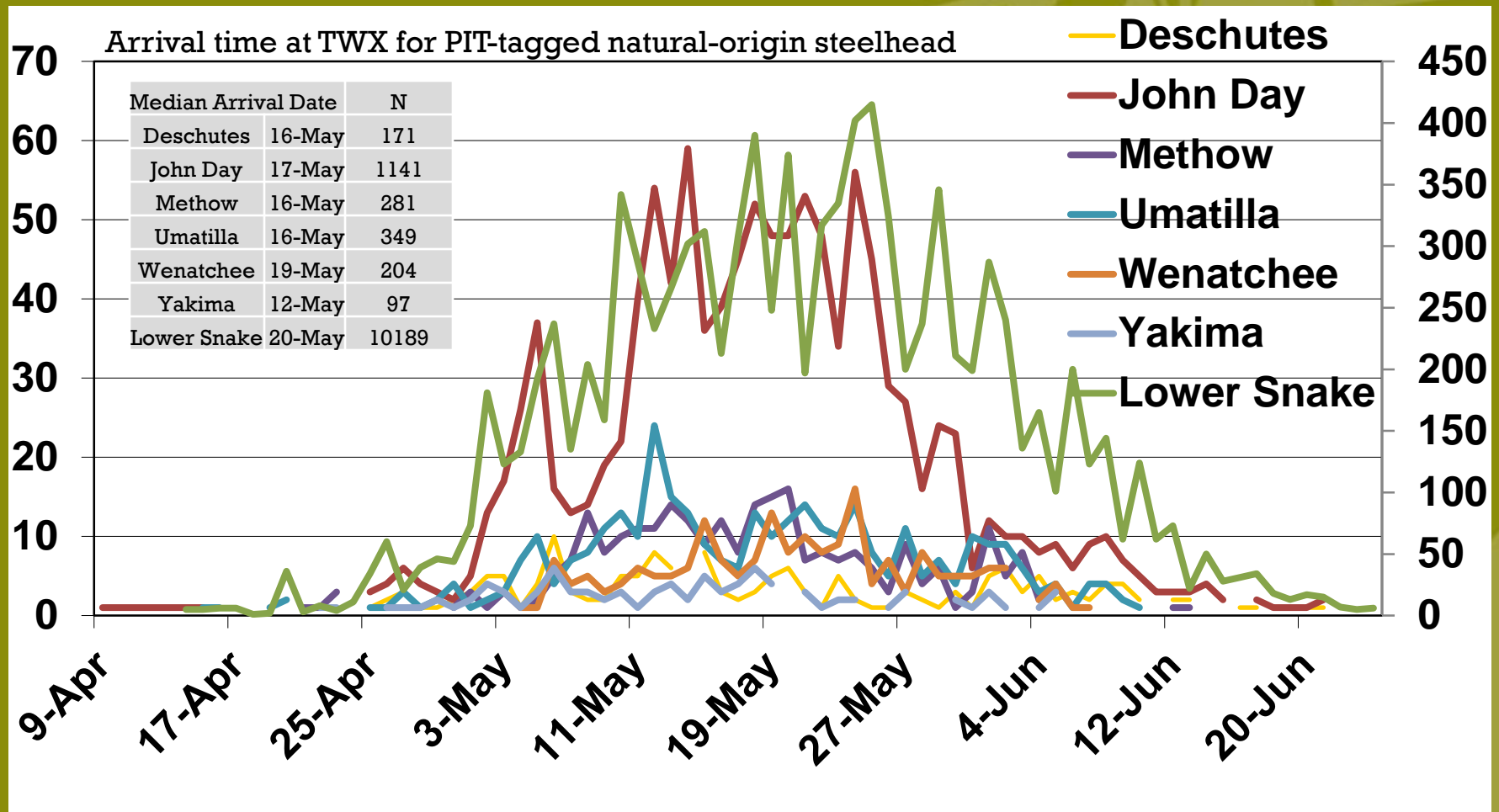
Differences in Harvest Regulations?

	Harvest Pressure*
BonnWildA	Moderate-High
Snake A	Moderate
John Day	Moderate
Umatilla	Moderate
Yakima	Low
Wenatchee	Low-Moderate
Methow	Low-Moderate

* Relative catch-and-release effort based on my read of state regulations



Timing of arrival at Columbia R. Estuary?



Reduced Predation in some areas and/or for some species?



Smallmouth bass

**Northern
Pikeminnow**



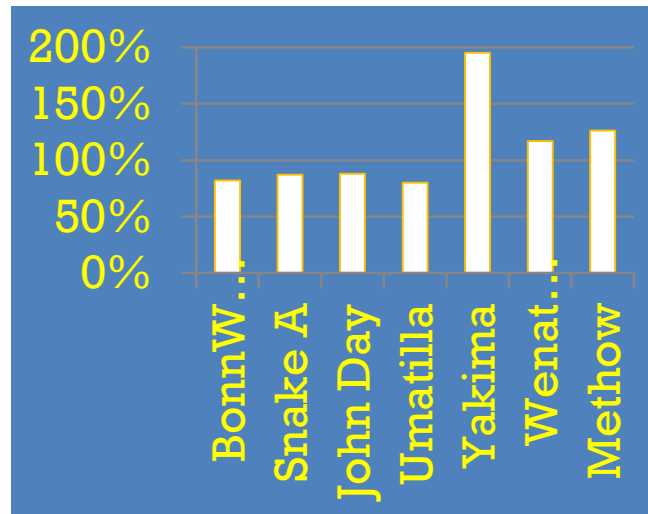
Walleye



Channel Catfish

Other ideas???

Discussion



YAKIMA BASIN
FISH AND WILDLIFE
RECOVERY BOARD



HONOR. PROTECT. RESTORE.