

White Sturgeon Conservation Aquaculture on the Transboundary Reach



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LAKE ROOSEVELT STURGEON RECOVERY PROJECT



**Spokane Tribe
of Indians**



Lake Roosevelt Sturgeon Recovery Project



UCWSRI – TWG



Project Area



Recruitment Failure



Broodstock and Spawning



Wild Larvae and Rearing



Summary of US Stocking



Outreach and Partnerships



Questions

Upper Columbia White Sturgeon Recovery Initiative



Established in 2000



Recovery Plan in 2002

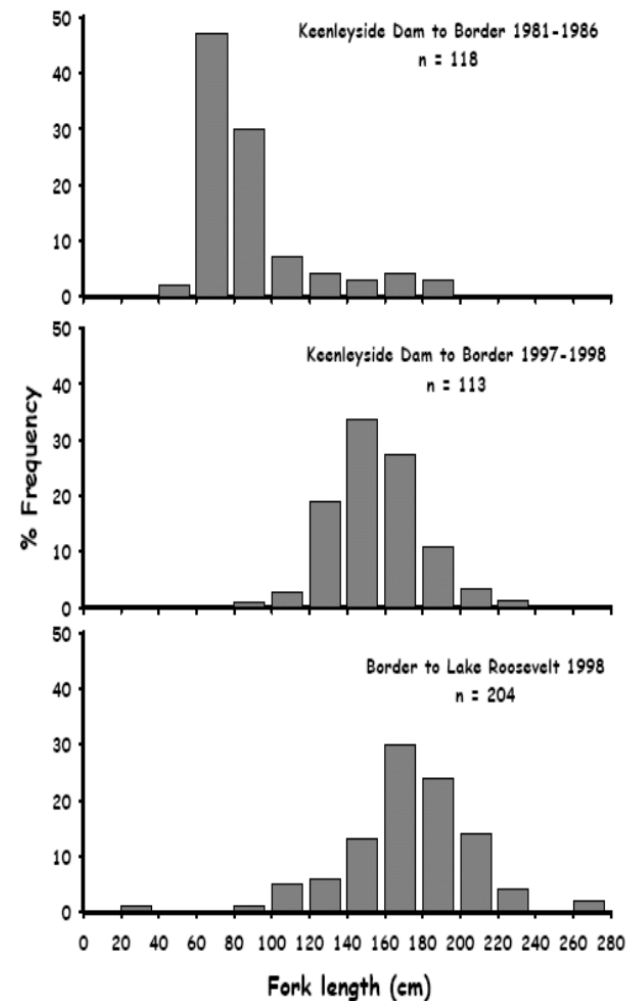
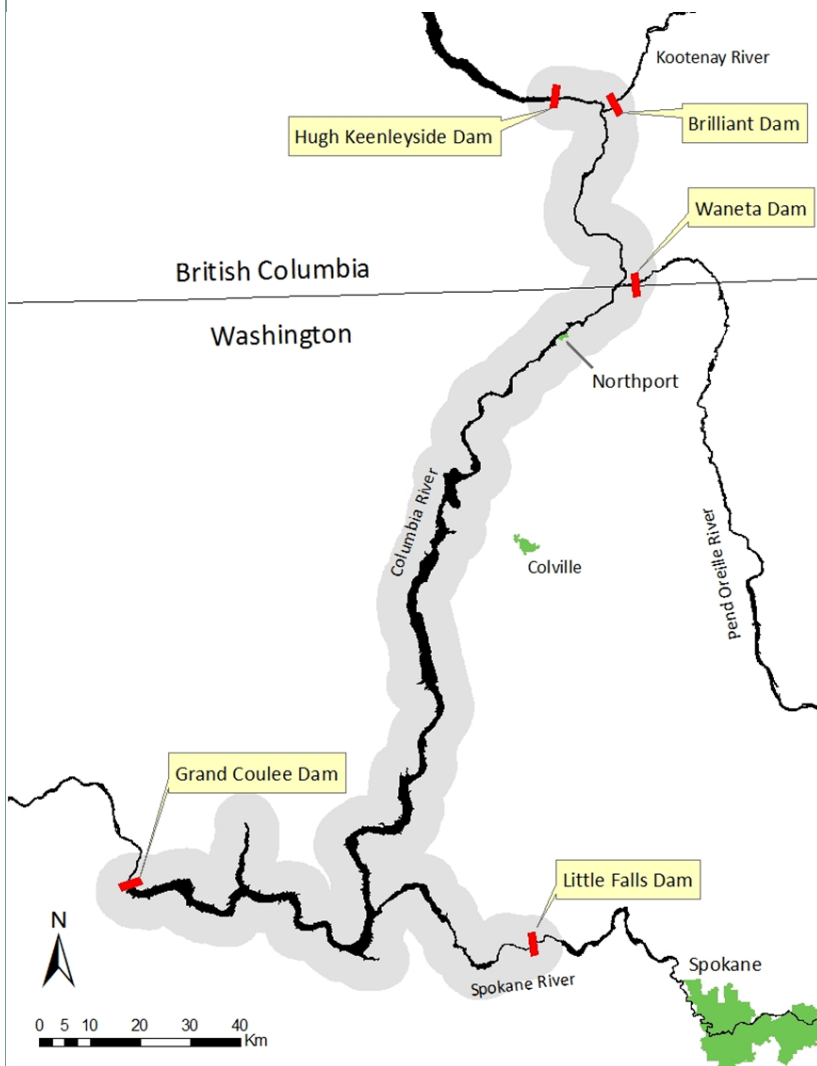


LRSRP Established in 2003



Goal: “...ensure the persistence and viability of naturally-reproducing populations...” and “restore opportunities for beneficial use if feasible.”

Sturgeon Recruitment Failure in the Transboundary Reach of the Columbia River



(From UCWSRI 2002)

Conservation Aquaculture



Initiated in BC in 2001



Goals:



preserve genetic diversity



restore demographics



WA program



started 2004



self contained 2006



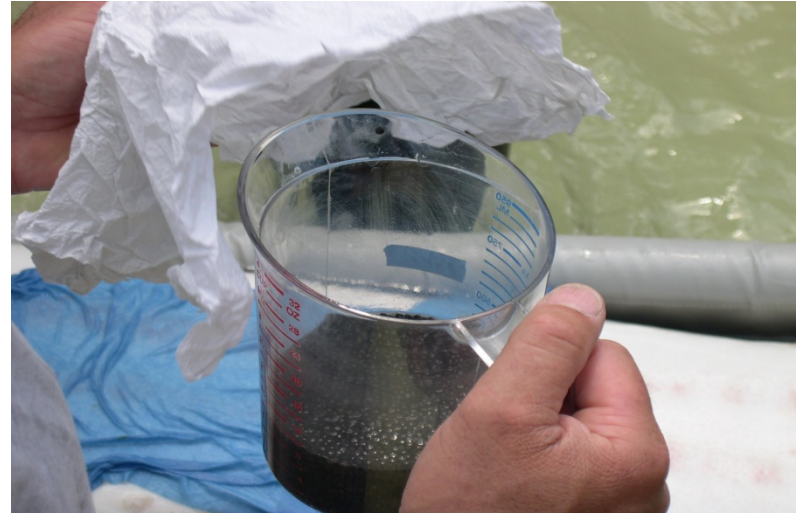
Suspension of broodstock
collection in favor of larval
collection 2011



Broodstock






Spawning






Transboundary Aquaculture Concerns



Genetic

-  Infrastructure based breeding plan
-  Limited numbers of broodstock used
-  Initially no genetic monitoring/evaluation

Practical

-  Declining ability to collect broodstock over time due to growth/mortality
-  Impacts on spawning stock (handling stress, mortality)
-  Potential impacts on efforts to restore natural recruitment



Alternative Approach - Larval Collection



Presumed benefits



Increased number of spawners represented (N_b) (Crossman et al. 2011)



Decreased relatedness (Crossman et al. 2011)



Reduction in artificial selection pressures



Imprinting



Decreased stress/mortality effects on broodstock population



Secondary monitoring benefits



Potential drawbacks



Hatchery infrastructure modifications



Disease concerns



More labor intensive from both field collection AND husbandry perspectives



Size at release

Wild Larval Collection



Wild Larvae Rearing Summary



	2010	2011
No. transported to hatchery	2,744	10,295
No. released	522	3,590
Survival to release	19%	35%
Release date	01 Dec	30 Nov
Mean (range) fork length (mm)	166 (93-246)	151 (97-215)
Mean (range) weight (g)	31 (6-90)	23 (6-64)

Sturgeon Culture



WDFW Sherman Creek Hatchery



Water source - Columbia River water



Two 5hp submersible pumps (475 lpm each)



UV filtration



Degassing columns



Heating starting in 2011



Four 4 m dia. x 1.5 m deep adult holding tanks



Eight 1.5 m dia. x .8 m deep combi rearing tanks



Otohime Marine Larval Feed



Fed 24 hrs per day plus hand fed after draw downs



Initially fed @ 12% body weight per day



with 30% freeze dried arctic copepods (1st mo.)



Prophylactic treatments (1/2 % salt)



CHL-T Available (typically @ 8 ppm)



Marine Larval Feed



Otohime Marine Diet



Otohime Marine Weaning Diets from Japan provide superior nutrition for juvenile and adult fish. They are specifically formulated for feeding to marine fish, as compared to formulas developed for freshwater fish that have added ingredients for marine fish. Otohime is the "next generation" of the Biokyowa product line, providing better nutrition, improved survival rates, and improved feeding response.



[Otohime Product Information \(pdf\)](#)

- Balanced nutrition – created specifically for marine finfish
- contains a high percentage of Krill meal
- easily digested protein
- high quality lipids
- Beta-glucan-containing yeast cell walls
- Excellent dispersibility
- Ideal sinking speed
- High shape retention in water.

Order Online

+

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Otohime A - 1 kg (\$57.48)



[View Order](#)

[Add to Order](#)

Product	Package	Feed Size	Fish Size
Otohime A	5kg (5 x 1kg bag)	~250µm	6.0nm - 10nm
Otohime B1	10kg (5 x 2kg bag)	~360µm	9.5mm - 15mm
Otohime B2	10kg (5 x 2kg bag)	360µm - 650µm	13mm - 22mm
Otohime C1	10kg (5 x 2kg bag)	580µm - 910µm	20mm - 27mm
Otohime C2	10kg (5 x 2kg bag)	910µm - 1510µm	25mm - 34mm
Otohime S1	10kg (5 x 2kg bag)	1.0nm	25mm - 34mm
Otohime S2	10kg (5 x 2kg bag)	1.4nm	32mm - 40mm
Otohime EP1	10kg (kraft paper bag)	1.7nm	40mm - 55mm

2003 - 2011 US Transboundary Conservation Aquaculture Overview



Upper Columbia White Sturgeon Recovery Initiative (UCWSRI)

Lake Roosevelt Sturgeon Recovery Project (LRSRP)

2003 - 2007 US Transboundary Conservation Aquaculture Overview

Species	BY	Release Date	Number	Release Location	Notes	Spawn Date	Hatch Date	Total / Yr	Total / BY
White Sturgeon	2003	5/12/2004	633	Kettle Falls Bridge	Canadian eggs				
White Sturgeon	2003	5/12/2004	608	North Gorge	Canadian eggs				
White Sturgeon	2003	5/12/2004	600	Northport	Canadian eggs			1841	1841
White Sturgeon	2004	2/24/2005	725	Nancy Creek	Canadian eggs				
White Sturgeon	2004	2/24/2005	605	North Gorge	Canadian eggs				
White Sturgeon	2004	2/24/2005	567	Northport	Canadian eggs				
White Sturgeon	2004	5/11/2005	636	Nancy Creek	Canadian eggs		7/9/2004		
White Sturgeon	2004	5/11/2005	629	North Gorge	Canadian eggs		7/9/2004		
White Sturgeon	2004	5/11/2005	593	Northport	Canadian eggs		7/9/2004	3755	3755
White Sturgeon	2005	5/12/2006	1391	Nancy Creek	Canadian eggs		7/9/2005		
White Sturgeon	2005	5/12/2006	1405	North Gorge	Canadian eggs		7/9/2005		
White Sturgeon	2005	5/12/2006	1545	Northport	Canadian eggs		7/9/2005		
White Sturgeon	2005	6/28/2006	10	Sherman Creek	Canadian eggs		7/9/2005	4351	4351
White Sturgeon	2006	5/15/2007	1964	Kettle Falls Marina	US Broodstock - 1st Year	6/29/2006	7/ 5-7 /06		
White Sturgeon	2006	5/16/2007	1458	Nancy Creek	US Broodstock - 1st Year	6/29/2006	7/ 5-7 /06	3422	3422
White Sturgeon	2007	5/8/2008	15	Spring Canyon Boat Ramp	Acoustic Tagged	6/22/2007	6/ 28-31 /07		
White Sturgeon	2007	5/8/2008	15	Lincoln Boat Ramp	Acoustic Tagged	6/22/2007	6/ 28-31 /07		
White Sturgeon	2007	5/8/2008	15	Hunters Boat Ramp	Acoustic Tagged	6/22/2007	6/ 28-31 /07		
White Sturgeon	2007	5/8/2008	15	Barnaby Island	Acoustic Tagged	6/22/2007	6/ 28-31 /07		
White Sturgeon	2007	5/8/2008	15	China Bend Boat Ramp	Acoustic Tagged	6/22/2007	6/ 28-31 /07		
White Sturgeon	2007	5/8/2008	15	Porcupine Bay Boat Ramp	Acoustic Tagged	6/22/2007	6/ 28-31 /07		
White Sturgeon	2007	5/13-14/2008	3631	Kettle Falls Marina	Reared at Columbia Basin Hatchery	6/22/2007	6/ 28-31 /07		
White Sturgeon	2007	5/13-14/2008	100	Kettle Falls Marina	Reared at Colville Hatchery	6/22/2007	6/ 28-31 /07	3821	3821
White Sturgeon	2008	5/12/2009	3537	Kettle Falls Marina	Reared at Columbia Basin Hatchery	7/1/2008	7/9/2008	3537	3537
White Sturgeon	2009	5/11/2010	3877	Kettle Falls Marina	Reared at Columbia Basin Hatchery	6/23/2009	7/3/2009	4399	3877
White Sturgeon	2010	12/1/2010	522	Kettle Falls Marina	Wild-larvae raised at Sherman Creek Hatchery				
White Sturgeon	2010	4/10/2011	3869	Kettle Falls Marina	Broodstock eggs - raised at Columbia Basin Hatchery	6/28/2010	7/7/2010	3869	4391
White Sturgeon	2011	11/30/2011	3590	Kettle Falls Marina	Wild-larvae raised at Sherman Creek Hatchery			3590	3590

TOTALS

32,585 32,585

Outreach and Education



Acknowledgements



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Questions

