

Rocky Reach White Sturgeon Survival Table - DATA AND ASSUMPTIONS

DATA: (Golder et al.) Upper Columbia year 1 post release \hat{S} estimate (0-0.5 years) estimate = **27% - 29%**
 DATA: (Golder et al.) Upper Columbia year 2 post release \hat{S} (0.5-1.5 years) estimate = **84% - 90%**
 DATA: Kootenay River hatchery white sturgeon observed survival rates **60%** first year, **90%** thereafter for fish >25cm (KTOI 2007.)
 DATA: Rocky Reach 2011 first year release Survival \hat{S} (R-0.5) estimate = **35.7%** (LGL& Blueleaf 2012 Report, Rocky Reach M&E data)
 DATA: Rocky Reach 2012 first year release \hat{S} (R-0.5) estimate = **64.7%** (Golder 2013 Report, Rocky Reach M&E data)
 DATA: Release year average survival Chelan Falls fish - **33.3%** from R-0.5, and **76.7%** from 0.5-1.5 (LGL and Blue Leaf report, 2013, M&E Data)
 DATA: Rocky Reach Reservoir Surface Area: **39,659 hectares** (98,000 surface acres) @ forebay elevation of 707.0 (Full)
 DATA: Rocky Reach Reservoir emmigration rate R-1.5 \approx 4.8%

Assumption 1: First year average \hat{S} all origins R-0.5 \approx **40%** (Based on initial M&E data)
 Assumption 2: Second year average \hat{S} all origins 0.5-1.5 \approx **50%** (Based on initial M&E data)
 Assumption 3: Annual average \hat{S} all age classes and hatchery origins after year 1.5 \approx **90%**
 Assumption 5: Emmigration rate \approx Immigration rate
 Assumption 4: No harvest (mortality) occurs in first 20 years

Indicates current Cumulative Abundance \rightarrow

	Adjustable Survival Rate
\hat{S} for increment R-0.5	0.40
\hat{S} for Increment 0.5-1.5	0.50
\hat{S} for increment 1.5...20	0.90

EOY=End of Year

White Sturgeon Hatchery Supplementation Rocky Reach						Rocky Reach Supplimented White Sturgeon Annual Survival, Cumulative Abundance and Density																					
Release Year Class	Annual Release #	Annual Release Count	Annual stocking Density (fish/ha)	Cumulative Release Count	Cumulative Stocking Density (fish/ha)	Survival		90% Annual Age Class Survival After Year 1.5																			
						With 40% Survival (Rel-0.5)	With 50% Survival (0.5-1.5)	EOY 2012	EOY 2013	EOY 2014	EOY 2015	EOY 2016	EOY 2017	EOY 2018	EOY 2019	EOY 2020	EOY 2021	EOY 2022	EOY 2023	EOY 2024	EOY 2025	EOY 2026	EOY 2027	EOY 2028	EOY 2029	EOY 2030	
2011	1	6,376	0.161	6,376	0.161	2550	1,275	1,148	1,033	930	837	753	678	610	549	494	445	400	360	324	292	263	236	213	191	172	
2012	2	137	0.003	6,513	0.164	55	27	1,175	25	22	20	18	16	15	13	12	11	10	9	8	7	6	6	5	5	4	
2013	3	7,975	0.201	14,488	0.365	3190	1,595	2,653	1,436	1,292	1,163	1,046	942	848	763	687	618	556	501	450	405	365	328	296	266		
2014	4	4,962	0.125	19,450	0.490	1985	992	3,380	893	804	723	651	586	527	475	427	384	346	311	280	252	227	204	184			
2015	5	6,492	0.164	25,942	0.654	2597	1,298	4,340	1,169	1,052	947	852	767	690	621	559	503	453	407	367	330	297	267				
2016	6	6,500	0.164	32,442	0.818	2600	1,300	5,206	1,170	1,053	948	853	768	691	622	560	504	453	408	367	330	297					
2017	7	6,500	0.164	38,942	0.982	2600	1,300	5,986	1,170	1,053	948	853	768	691	622	560	504	453	408	367	330						
2018	8	6,500	0.164	45,442	1.146	2600	1,300	6,687	1,170	1,053	948	853	768	691	622	560	504	453	408	367							
2019	9	6,500	0.164	51,942	1.310	2600	1,300	7,318	1,170	1,053	948	853	768	691	622	560	504	453	408								
2020	10	6,500	0.164	58,442	1.474	2600	1,300	7,886	1,170	1,053	948	853	768	691	622	560	504	453									
2021	11	6,500	0.164	64,942	1.638	2600	1,300	8,398	1,170	1,053	948	853	768	691	622	560	504										
2022	12	6,500	0.164	71,442	1.801	2600	1,300	8,858	1,170	1,053	948	853	768	691	622	560	504										
2023	13	6,500	0.164	77,942	1.965	2600	1,300	9,272	1,170	1,053	948	853	768	691	622	560	504										
2024	14	6,500	0.164	84,442	2.129	2600	1,300	9,645	1,170	1,053	948	853	768	691	622	560	504										
2025	15	6,500	0.164	90,942	2.293	2600	1,300	9,980	1,170	1,053	948	853	768	691	622	560	504										
2026	16	6,500	0.164	97,442	2.457	2600	1,300	10,282	1,170	1,053	948	853	768	691	622	560	504										
2027	17	6,500	0.164	103,942	2.621	2600	1,300	10,554	1,170	1,053	948	853	768	691	622	560	504										
2028	18	6,500	0.164	110,442	2.785	2600	1,300	10,799	1,170	1,053	948	853	768	691	622	560	504										
2029	19	6,500	0.164	116,942	2.95	2600	1,300	11,019	1,170	1,053	948	853	768	691	622	560	504										
2030	20	6,500	0.164	123,442	3.113	2600	1,300	12,517																			
Density (fish/ha) \rightarrow						1.25	0.62	0.03	0.07	0.09	0.11	0.13	0.15	0.17	0.18	0.20	0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.27	0.28	0.32	

KTOI (Kootenai Tribe of Idaho). 2007. Kootenai River White Sturgeon Conservation Aquaculture Program, 1990-2007 (2nd Edition). Bonners Ferry, Idaho. Report edited by R. Beamesderfer and P. Anders, Cramer Fish Sciences.