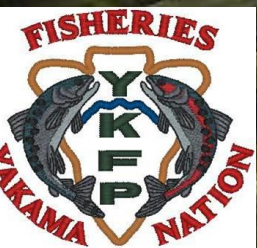


Yakima River Steelhead VSP Project: Monitoring Infrastructure & Status and Trends Update

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²Washington Department of Fish and Wildlife



Basis of Project Development (Circa 2010)

- (2010) Expand RM&E activities to fill monitoring gaps for Yakima River Steelhead identified in:
 1. Yakima River Steelhead Recovery Plan
 2. FCRPS Biological Opinion RPA review
 3. 2009 Columbia Basin monitoring strategy Review

Steelhead RM&E Project Goals & Objectives

➤ Collect biological data for status and trends monitoring

1. Data includes but not limited to: Spawner abundance, juvenile abundance, life history & demographic information, spatial distribution
2. Inform local adaptive management actions and guide recovery efforts based on population performance
 - Habitat restoration/protection
 - Yakima River flow management
 - ESA listing status (NOAA Fisheries)



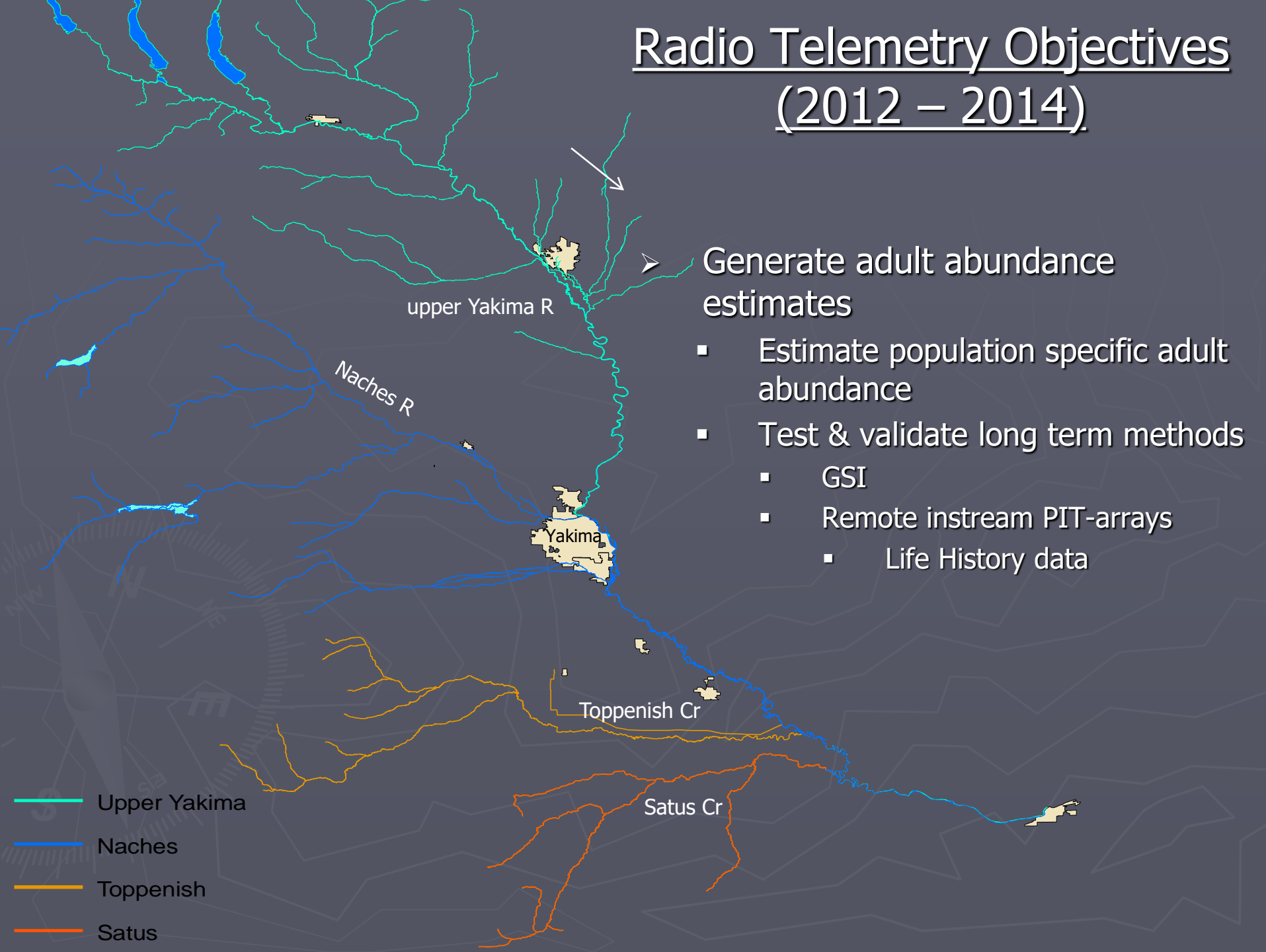
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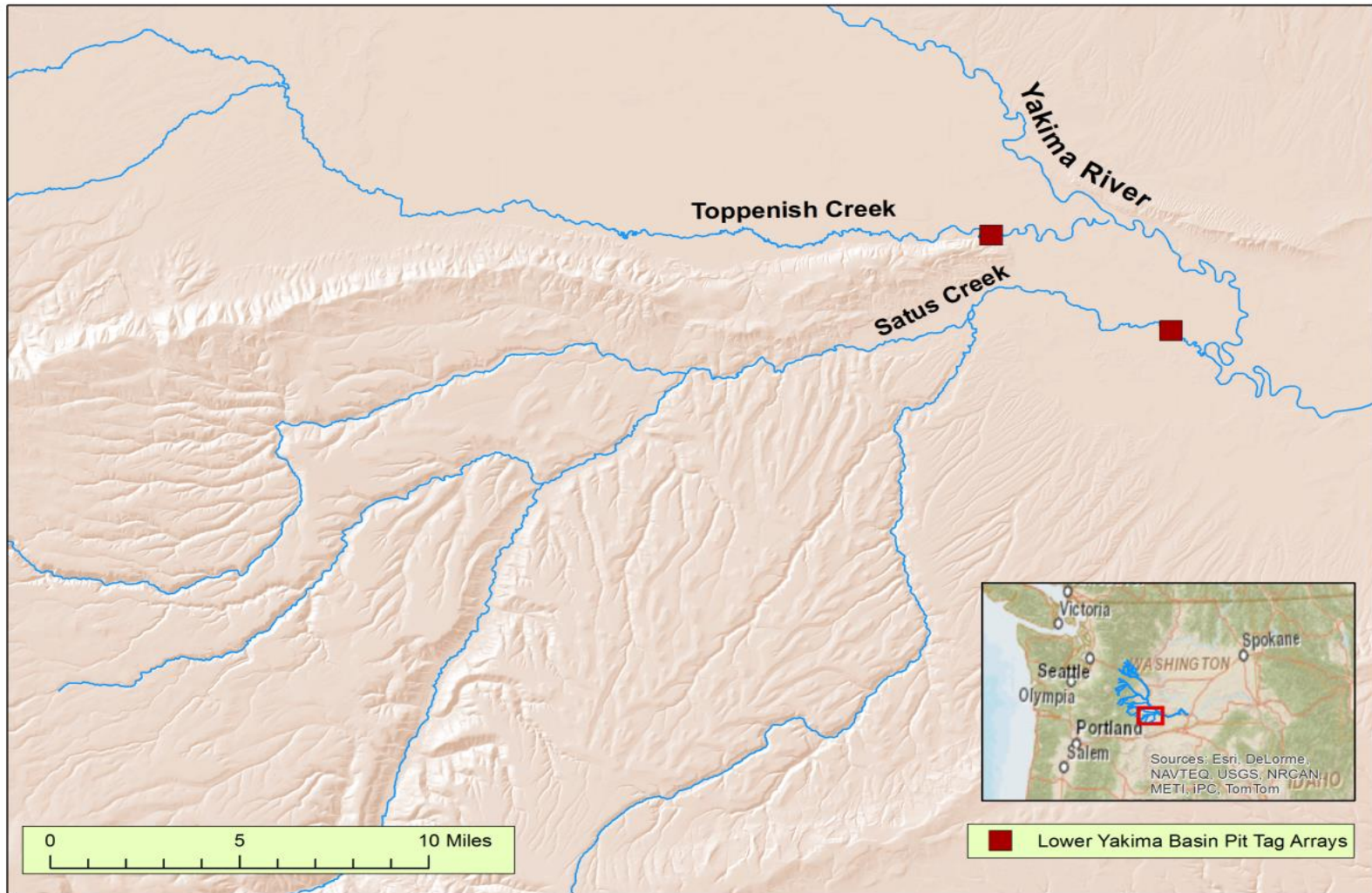
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Radio Telemetry Objectives (2012 – 2014)



Yakima River Instream PIT-Tag Detection System (IPTDS) Feasibility Sites



Satus & Toppenish Cr IPTDS: 2012-2014 Detection Efficiencies

Satus Cr Instream PIT-tag Detection Array			
Year	Total # of double tagged sthd detected	# of Detected PIT-tags	Instream Array detection efficiency
2012	159	154	96.86%
2013	102	101	99.02%
2014	113	105	92.92%
AVG			96.27%

Toppenish Cr Instream PIT-tag Detection Array			
Year	Total # of double tagged sthd detected	# of Detected PIT-tags	Instream Array detection efficiency
2012	48	48	100.00%
2013	46	45	97.83%
2014	34	31	91.18%
AVG			96.33%

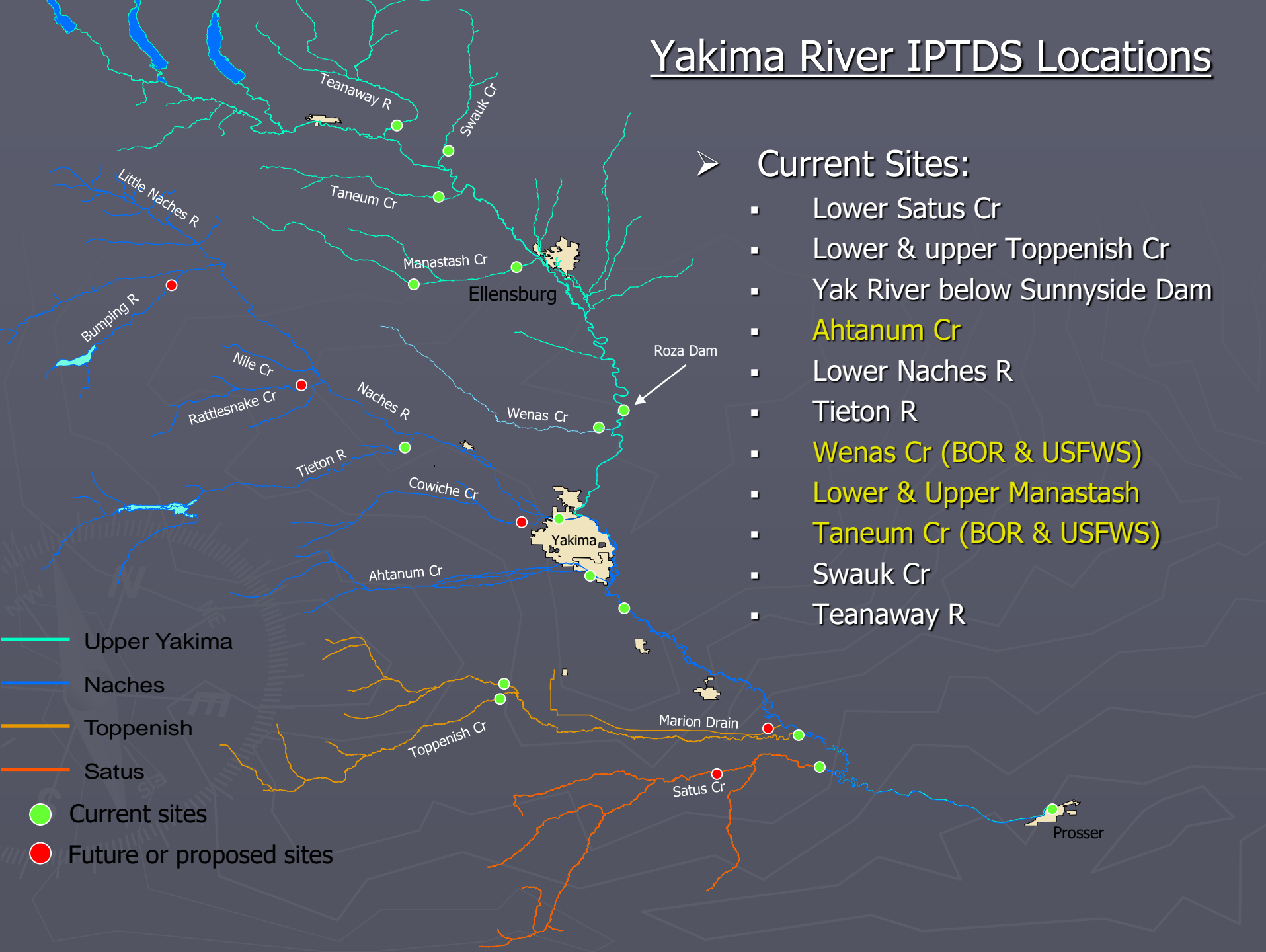
Yakima River IPTDS: Trials and Tribulations!



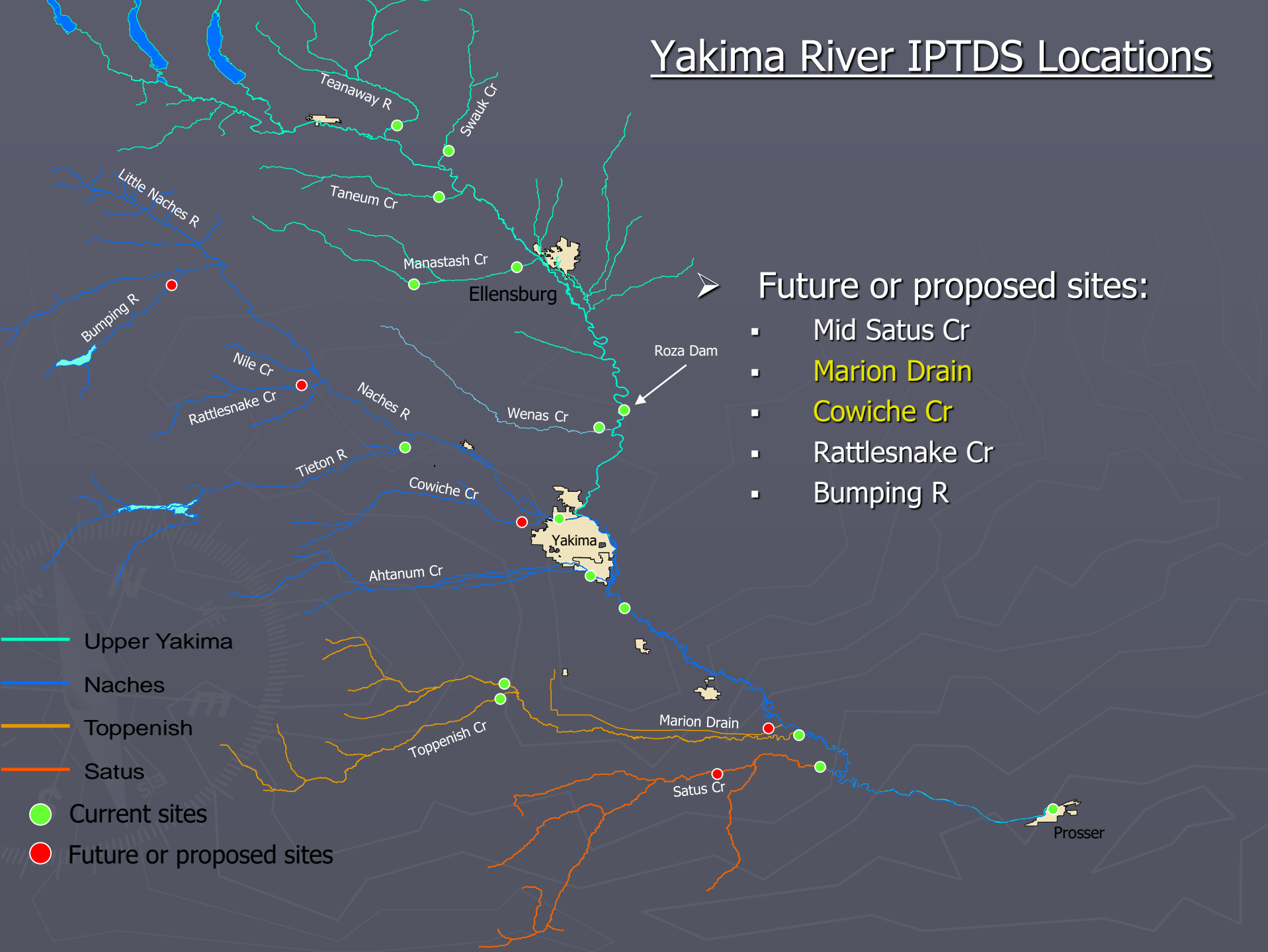
Yakima River IPTDS:



Yakima River IPTDS Locations



Yakima River IPTDS Locations



Yakima River Summer Run Steelhead

Populations

upper Yakima R.

Gmean: 51

Gmean: 246

Naches R.

Gmean: 271

Gmean: 1,101

Toppenish Cr.

Gmean: 117

Gmean: 475

Satus Cr.

Gmean: 300

Gmean: 905

Yakima River steelhead status

- 1999 Mid Columbia DPS listed as threatened

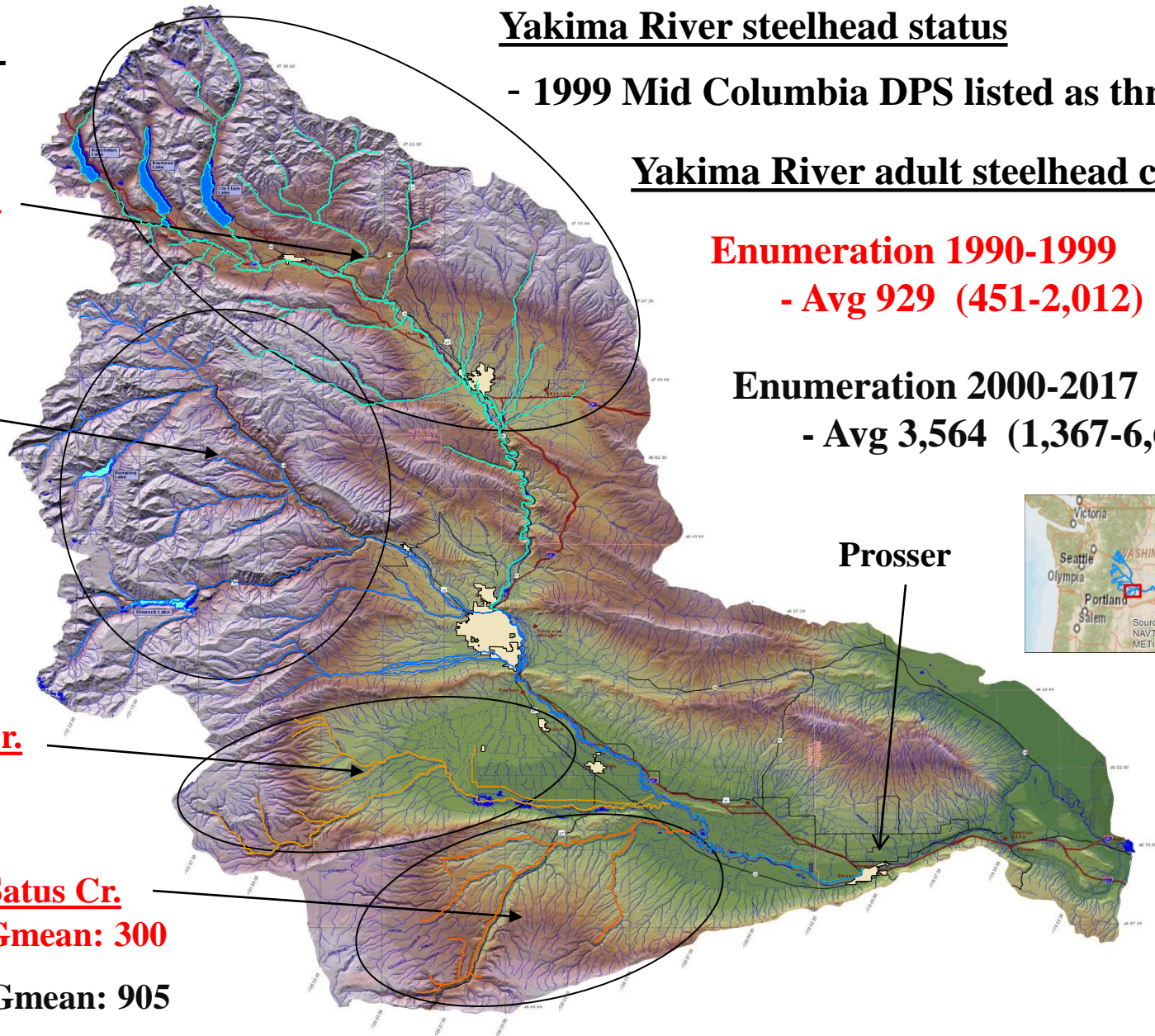
Yakima River adult steelhead counts

Enumeration 1990-1999

- Avg 929 (451-2,012)

Enumeration 2000-2017

- Avg 3,564 (1,367-6,602)



Prosser



Satus Creek

Dry Cr

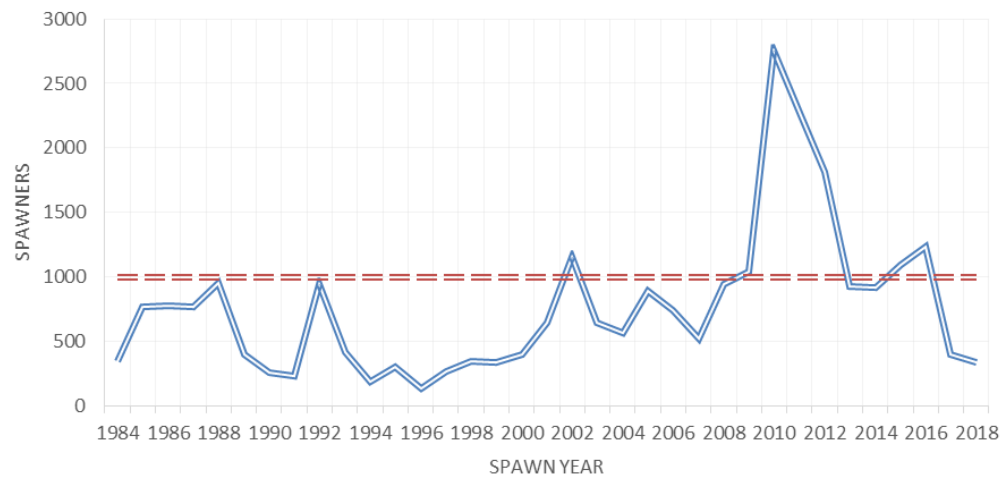
Logy Cr

Mule Dry Cr

2017 – 400 spawners

2018 – 341 spawners

SATUS CREEK STEELHEAD



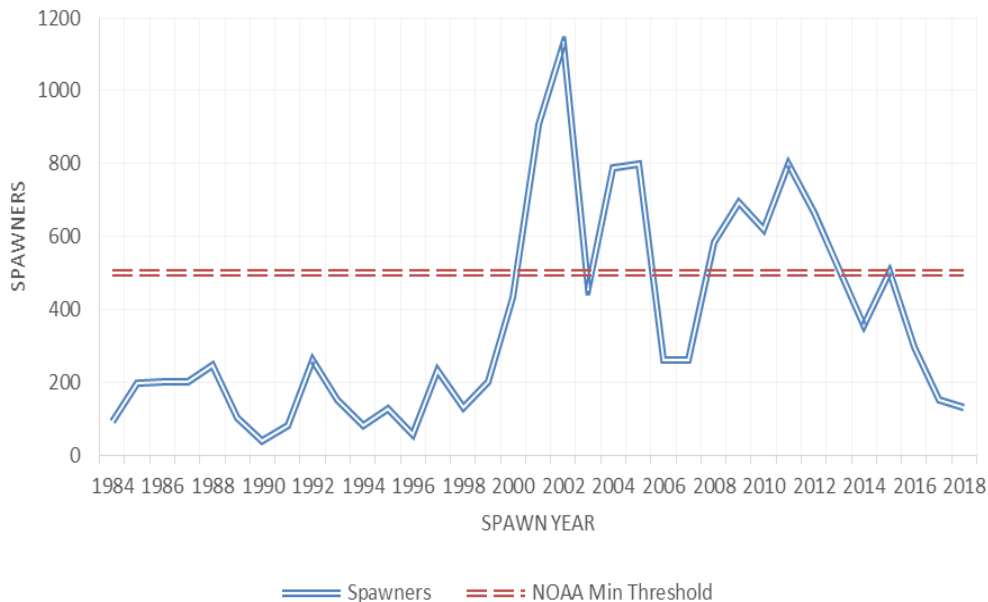
— Spawners

- - - NOAA Min Threshold

Linear (Spawners)

Toppenish Creek

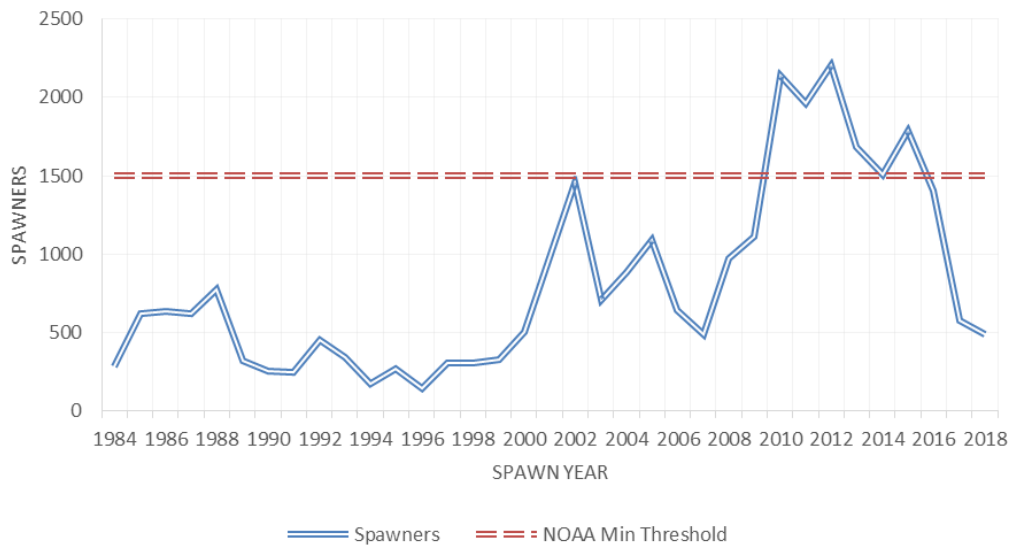
TOPPENISH CREEK STEELHEAD



2017 – 154 spawners
2018 – 131 spawners

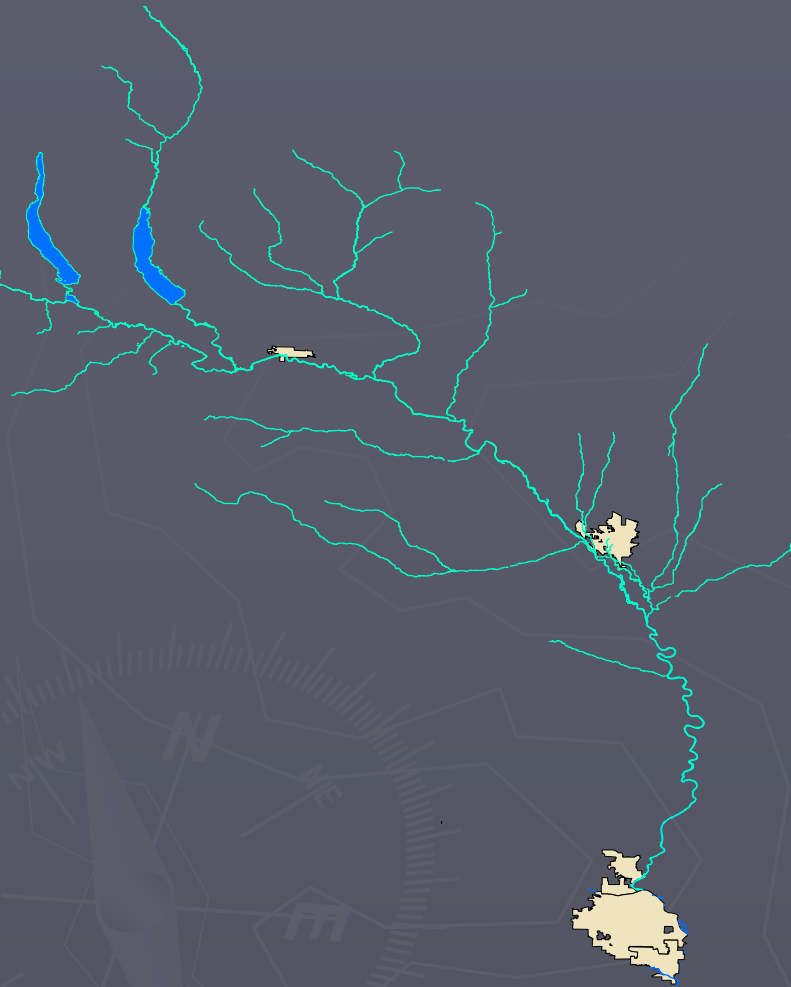
Naches River

NACHES RIVER STEELHEAD



2017 – 577 spawners
2018 – 492 spawners

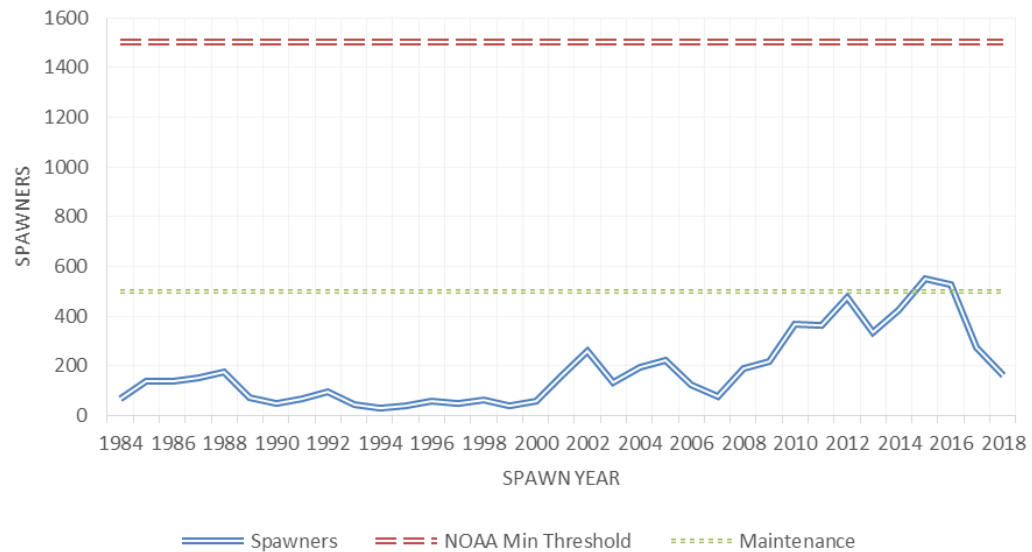
Upper Yakima River



2017 – 272 spawners
2018 – 160 spawners



UPPER YAKIMA RIVER STEELHEAD

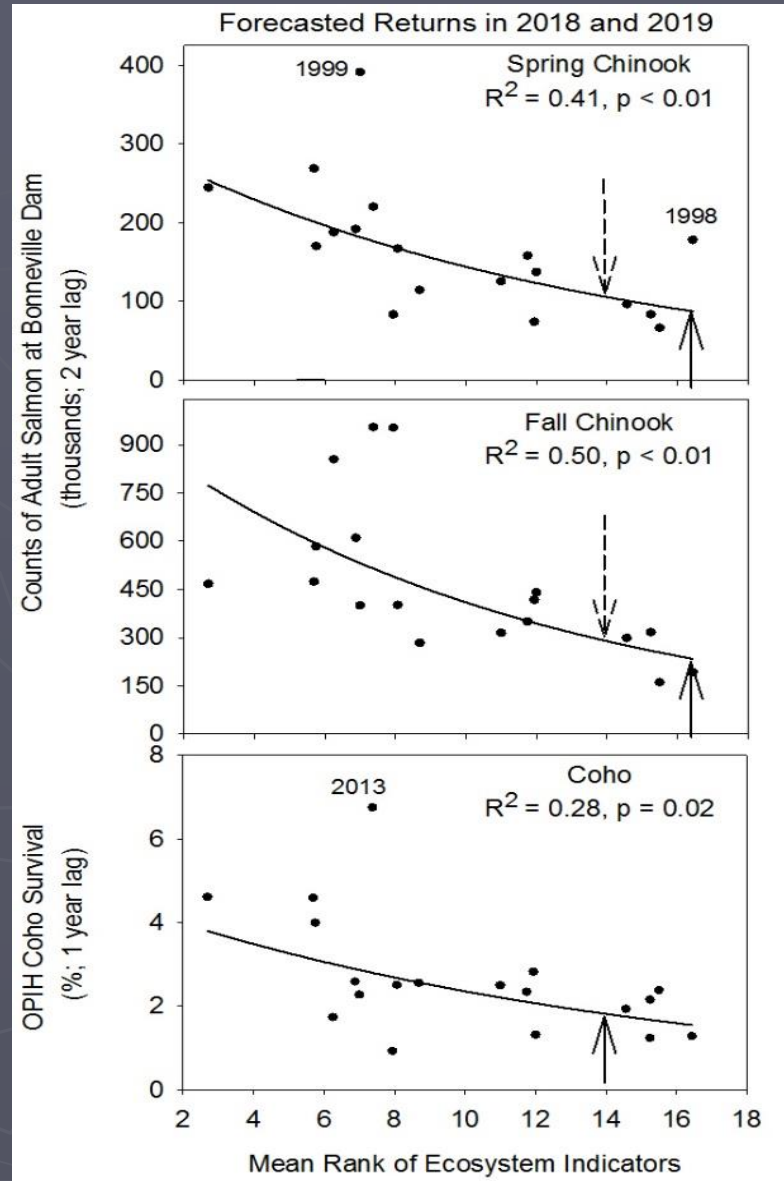


NOAA Fisheries Ocean Ecosystem Indicators

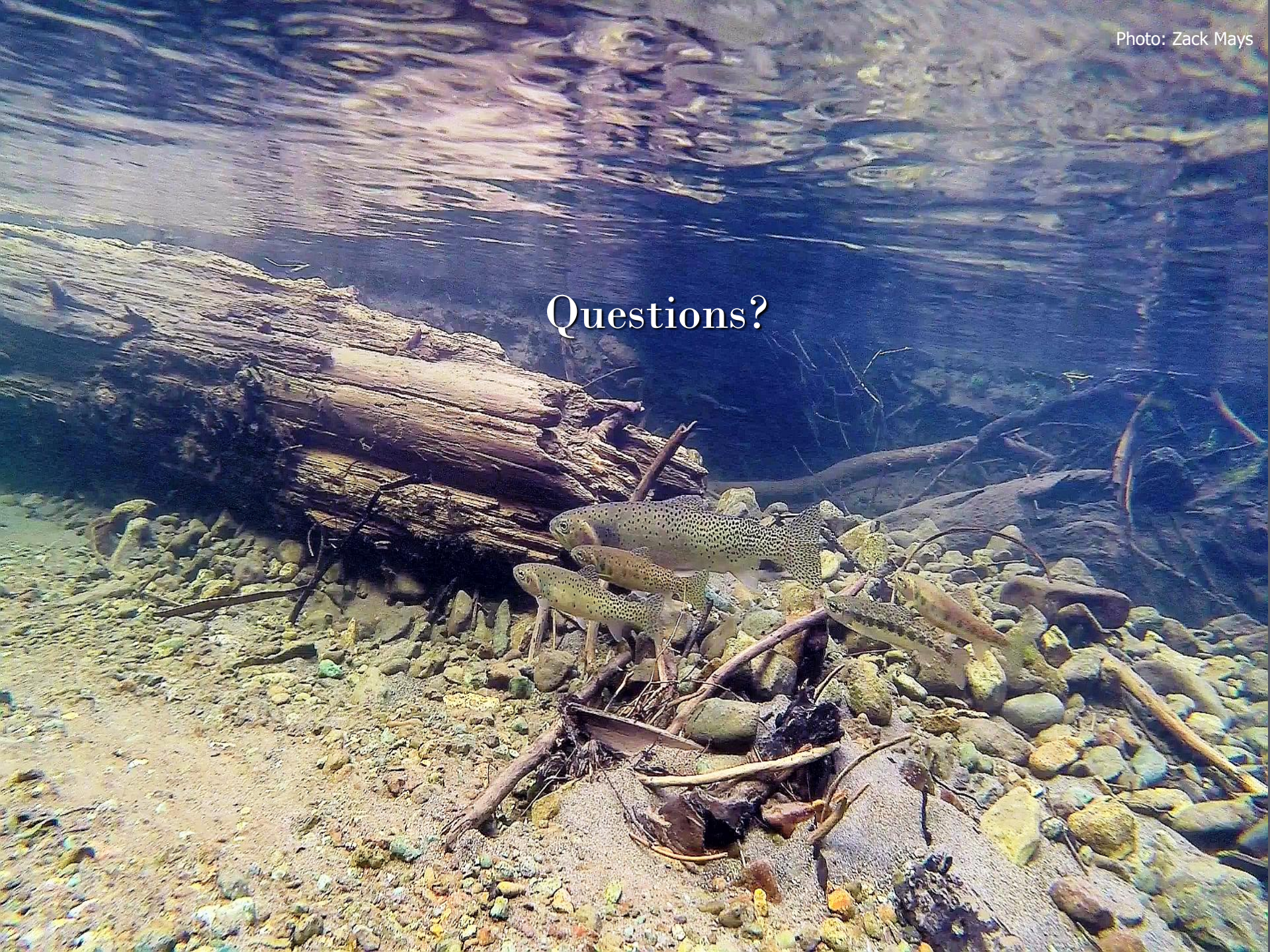
"Stoplight Chart"

Ecosystem Indicators	Year																			
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
PDO (Sum Dec-March)	17	6	3	12	7	19	11	15	13	9	5	1	14	4	2	8	10	20	18	16
PDO (Sum May-Sept)	10	4	6	5	11	16	15	17	12	13	2	9	7	3	1	8	18	20	19	14
ONI (Average Jan-June)	19	1	1	6	13	15	14	16	8	11	3	10	17	4	5	7	9	18	20	12
46050 SST (°C; May-Sept)	16	9	3	4	1	8	20	15	5	17	2	10	7	11	12	13	14	19	18	6
Upper 20 m T (°C; Nov-Mar)	19	11	8	10	6	14	15	12	13	5	1	9	16	4	3	7	2	20	18	17
Upper 20 m T (°C; May-Sept)	16	12	14	4	1	3	20	18	7	8	2	5	13	10	6	17	19	9	15	11
Deep temperature (°C; May-Sept)	20	6	8	4	1	10	12	16	11	5	2	7	14	9	3	15	19	18	13	17
Deep salinity (May-Sept)	19	3	9	4	5	16	17	10	7	1	2	14	18	13	12	11	20	15	8	6
Copepod richness anom. (no. species; May-Sept)	18	2	1	7	6	13	12	17	15	10	8	9	16	4	5	3	11	19	20	14
N. copepod biomass anom. (mg C m ⁻³ ; May-Sept)	18	13	9	10	3	15	12	19	14	11	6	8	7	1	2	4	5	16	20	17
S. copepod biomass anom. (mg C m ⁻³ ; May-Sept)	20	2	5	4	3	13	14	19	12	10	1	7	15	9	8	6	11	17	18	16
Biological transition (day of year)	17	8	5	7	9	14	13	18	12	2	1	3	15	6	10	4	11	20	20	16
Ichthyoplankton biomass (log(mg C 1000 m ⁻³); Jan-Mar)	20	11	3	7	9	18	17	13	16	15	2	12	4	14	10	8	19	5	6	1
Ichthyoplankton community index (PCO axis 1 scores; Jan-Mar)	9	13	1	6	4	10	18	16	3	12	2	14	15	11	5	7	8	17	20	19
Chinook salmon juvenile catches (no. km ⁻¹ ; June)	18	4	5	15	8	12	16	19	11	9	1	6	7	14	3	2	10	13	17	20
Coho salmon juvenile catches (no. km ⁻¹ ; June)	18	7	12	5	6	2	15	19	16	4	3	9	10	14	17	1	11	8	13	20
Mean of ranks	17.1	7.0	5.8	6.9	5.8	12.4	15.1	16.2	10.9	8.9	2.7	8.3	12.2	8.2	6.5	7.6	12.3	15.9	16.4	13.9
Rank of the mean rank	20	6	2	5	2	14	16	18	11	10	1	9	12	8	4	7	13	17	19	15
<i>Ecosystem Indicators not included in the mean of ranks or statistical analyses</i>																				
Physical Spring Trans. UI based (day of year)	3	7	19	16	4	12	14	20	12	1	6	2	8	11	17	9	18	10	5	15
Physical Spring Trans. Hydrographic (day of year)	19	3	13	8	5	12	14	20	6	9	1	9	17	3	11	2	15	7	16	18
Upwelling Anomaly (April-May)	9	3	16	5	8	13	12	20	9	4	6	7	14	16	14	11	18	1	2	19
Length of Upwelling Season UI based (days)	6	2	18	11	1	13	9	20	5	3	8	3	15	17	15	14	19	10	7	12
SST NH-5 (°C; May-Sept)	9	6	5	4	1	3	20	16	10	18	2	19	11	7	14	13	15	12	17	8
Copepod Community Index (MDS axis 1 scores)	19	3	5	7	1	13	14	17	15	10	2	6	12	9	8	4	11	18	20	16
Coho Juv Catches (no. fish km ⁻¹ ; Sept)	11	2	1	4	3	6	12	14	8	9	7	15	13	5	10	NA	NA	NA	NA	NA

Salmon Returns Versus Mean Rank of Ecosystem Indicators (NOAA Fisheries 2018)



Questions?



Yakima River Steelhead MPG: Proportion of Bonneville Group A wild

