

# Phase 1 Habitat Assessments – *Spokane River Watershed*


SPOKANE WATERSHED RESTORATION COLLECTIVE  
TECHNICAL TEAM MEETING #2

*MAY 25, 2022*

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*Spokane Tribe of Indians*



# 2014 Fish and Wildlife Program – *The Phased Approach*



Columbia  
River Basin  
Fish and Wildlife  
Program 2014

## Phase 1: Report Completed 2019

Evaluate passage studies at hydroelectric projects, including Chief Joseph & Grand Coulee Dams

Investigate possible cost of upstream and downstream passage options

**Investigate habitat availability, suitability and salmon survival potential in habitats above GCD**

## Phase 2: Draft Implementation Plan Released Aug. 2021

Design and test reintroduction strategies and fish passage facilities

Reintroduction pilot projects

Monitoring, evaluation, and adaptive management

## Phase 3:

Review results to determine implementation and permanent inclusion to the Program

# Habitat Availability

## *Intrinsic Potential*

- Geographic Information Systems (GIS) coarse scale analysis
  - Broad-scale approach, landscape perspective
- Spawning and rearing habitats for spring Chinook and steelhead
- Habitat *Potential*, does not consider anthropogenic impacts – historical distribution

# Intrinsic Potential - *Background*

- Developed through Coastal Landscape Analysis and Modeling Study (Burnett et al. 2003, 2007)
- Refined & Applied:
  - Historic Population Structure in California (Agrawal et al. 2005)
  - Evaluating Restoration Potential (Budy and Schaller 2007)
  - Recovery Planning – Northwest Fisheries Science Center
    - *Estimating Historic Intrinsic Production Potential: Interior Columbia Stream Type Chinook and Steelhead Populations (May 2004)*
    - *Interior Columbia Basin Stream Type Chinook Salmon and Steelhead Populations: Habitat Intrinsic Potential Analysis (March 2006)*
    - *Role of large extirpated areas in recovery (ICTRT 2007)*

# Intrinsic Potential - *Ratings*

- GIS Table-Top Exercise
  - Publicly available GIS data sets
  - Broad-scale, historic, landscape perspective
  - Spawning and rearing habitats for stream-type spring Chinook and steelhead: none, low, moderate, high potential
- Validated with empirical data collected in Interior Columbia Basin
- Hydrology Network linearly referenced 200m reaches
- Reach Level Habitat Measures:
  1. Stream Width – modeled bankfull and wetted widths
  2. Stream Gradient – % change in elevation
  3. Valley Confinement – valley width to bankfull width ratio



# Intrinsic Potential - Methods

Relative Potential – Spring Chinook

Valley Width Ratio

Bankfull Width	Gradient	Confined	Moderate	Wide
		( $\leq 4 \times$ BF Width)	(4 to 20 x BF Width)	(> 20 x BF Width)
BF < 3.7m	$\geq 0$	None	None	None
	0 - 0.5	Medium	High	High
	0.5 - 1.5	Low	Medium	High
BF 3.7m to 25m	1.5 - 4.0	Low	Low	Medium
	4.0 - 7.0	Negligible	Low	Low
	> 7.0	None	None	None
BF 25m to 50 m	0 - 0.5	None	Medium	Medium
	0.5 - 10	None	None	None
	> 10	None	None	None
BF > 50m	$\geq 0$	None	None	None

(Table C-1 in ICTRT 2006)



# Intrinsic Potential - Methods

Relative Potential - Steelhead		Valley Width Ratio		
		Confined ( $\leq 4 \times$ BF Width)	Moderate (4 to 20 x BF Width)	Wide ( $> 20 \times$ BF Width)
Bankfull Width	Gradient			
BF < 3.8m	$\geq 0$	None	None	None
	0 - 0.5	None	Medium	Medium
	0.5 - 4.0	Low	High	High
	4.0 - 7.0	None	Low	Low
BF 3.8m to 25m	$> 7.0$	None	None	None
	0 - 4.0	Low	Medium	Medium
	$> 4.0$	None	None	None
BF 25m to 50 m	$\geq 0$	None	Low	Low

# Intrinsic Potential - Methods

## Factors Restricting Distribution:

- Natural Barriers – DEM gradient of >20% over 200m, field observations
- Stream Width – 95<sup>th</sup>% low value for bankfull and wetted widths
- Water Temperature – StreamNet temperature dataset, modeled July WMAT of  $\geq 22^{\circ}$  C

## Additional Habitat Screens:

- Sedimentation – soil erodibility and depositional potential
- Stream Velocity – NHD Plus mean annual stream velocity





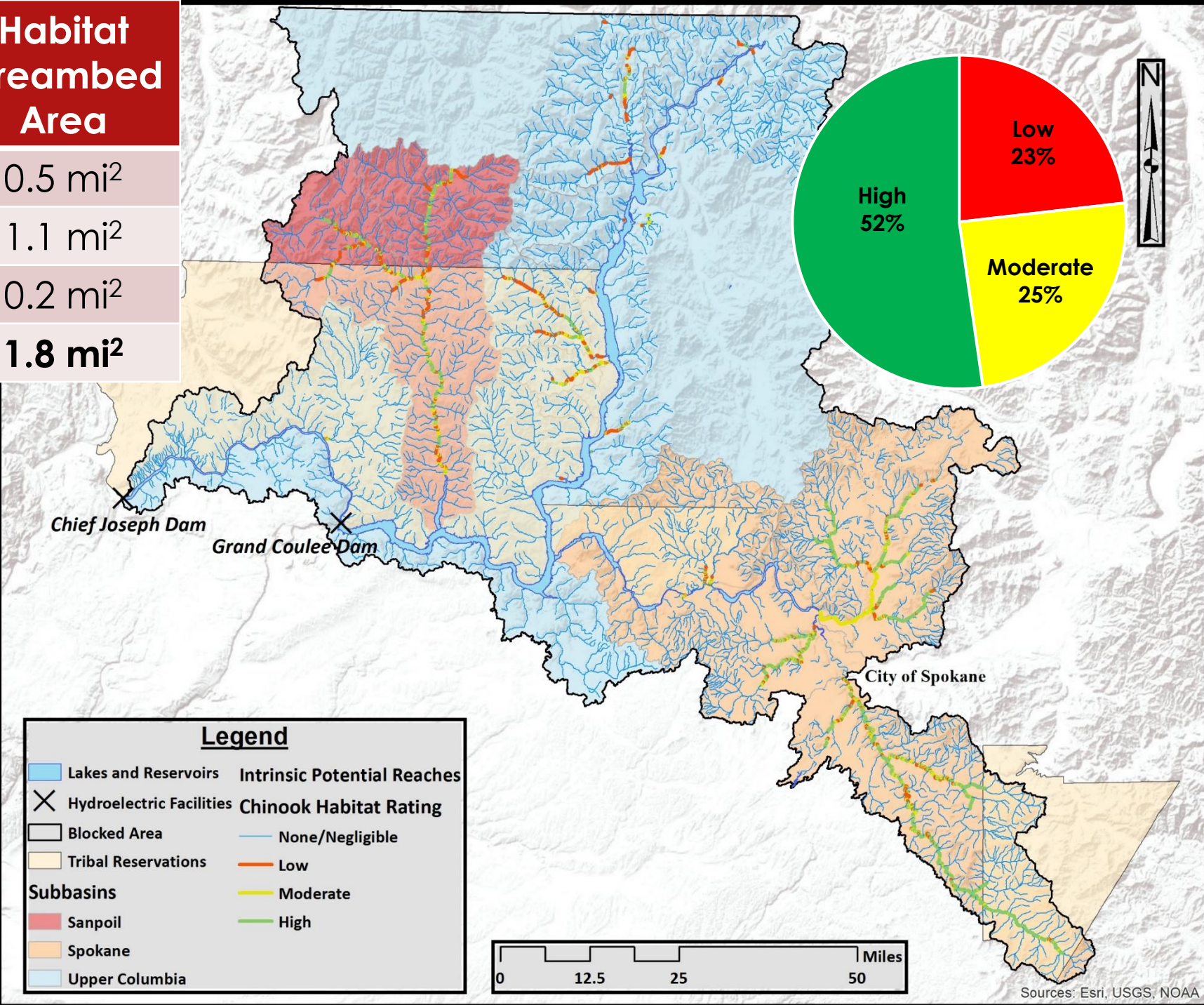
# Intrinsic Potential - *Methods*

1. NWFSC review original model, rerun, provide outputs
2. Review outputs with regional co-managers
3. Update natural fish passage barriers, re-run model
4. Summarized updated model output provided by NWFSC
  1. All Blocked Area Habitats
  2. Immediately Accessible from Reservoirs

Subbasin	Habitat Reach Length	Habitat Streambed Area
Sanpoil	82 mi	0.5 mi <sup>2</sup>
Spokane	214 mi	1.1 mi <sup>2</sup>
Upper Columbia	59 mi	0.2 mi <sup>2</sup>
<b>Total</b>	<b>355 mi</b>	<b>1.8 mi<sup>2</sup></b>

**IP Results:  
Spring Chinook**

**All Habitats  
Rated  $\geq$  low**

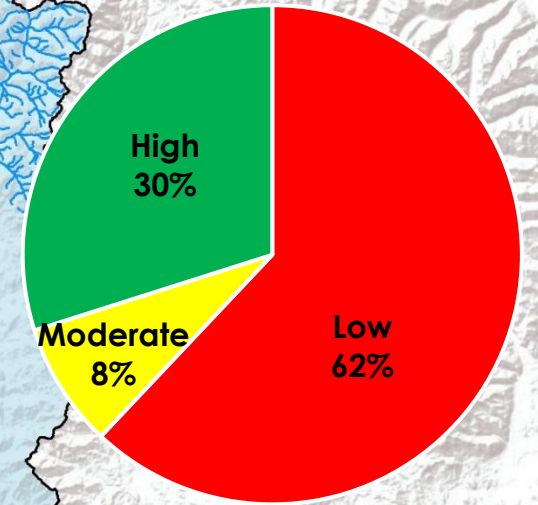
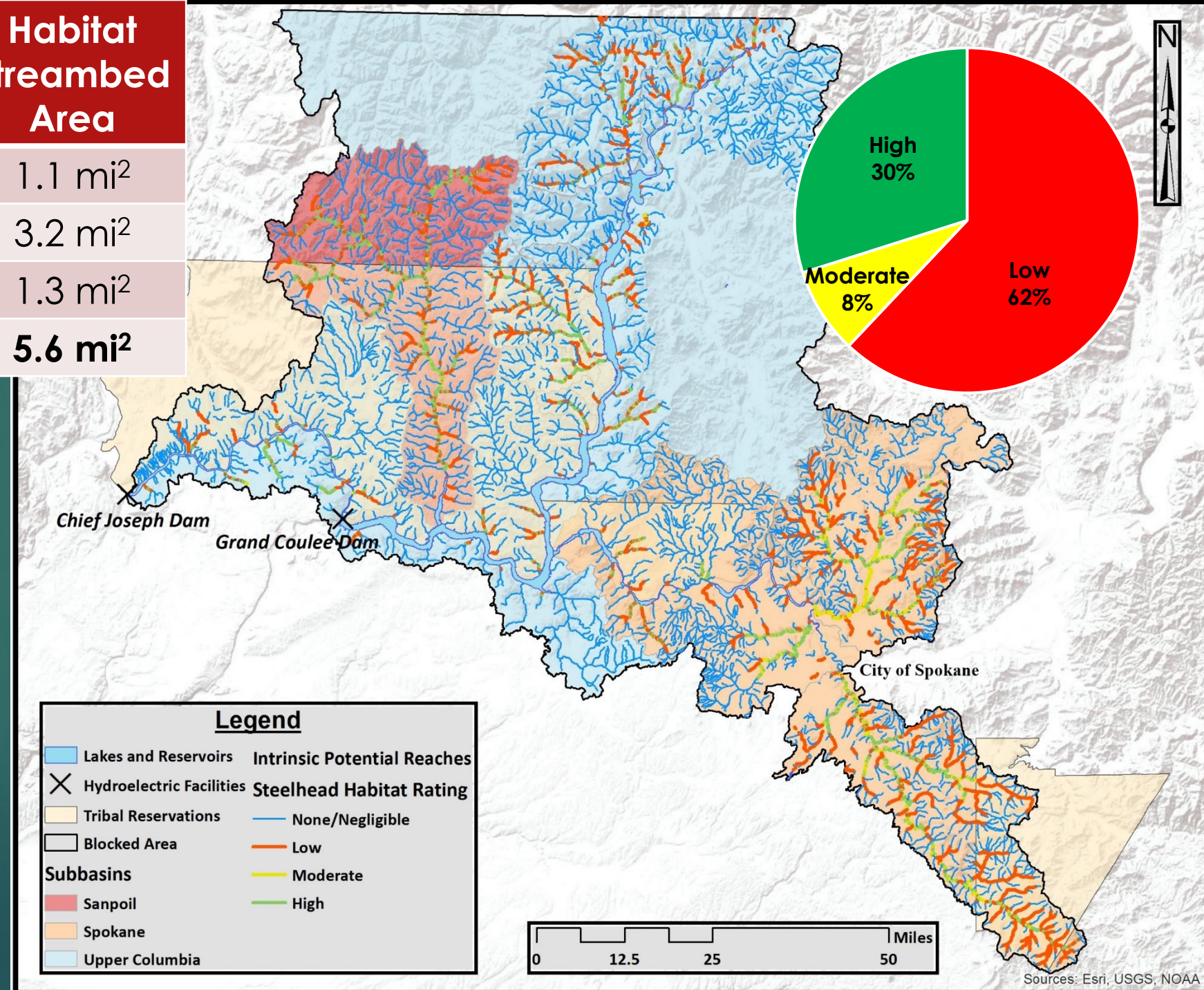




Subbasin	Habitat Reach Length	Habitat Streambed Area
Sanpoil	187 mi	1.1 mi <sup>2</sup>
Spokane	662 mi	3.2 mi <sup>2</sup>
Upper Columbia	312 mi	1.3 mi <sup>2</sup>
<b>Total</b>	<b>1,161 mi</b>	<b>5.6 mi<sup>2</sup></b>

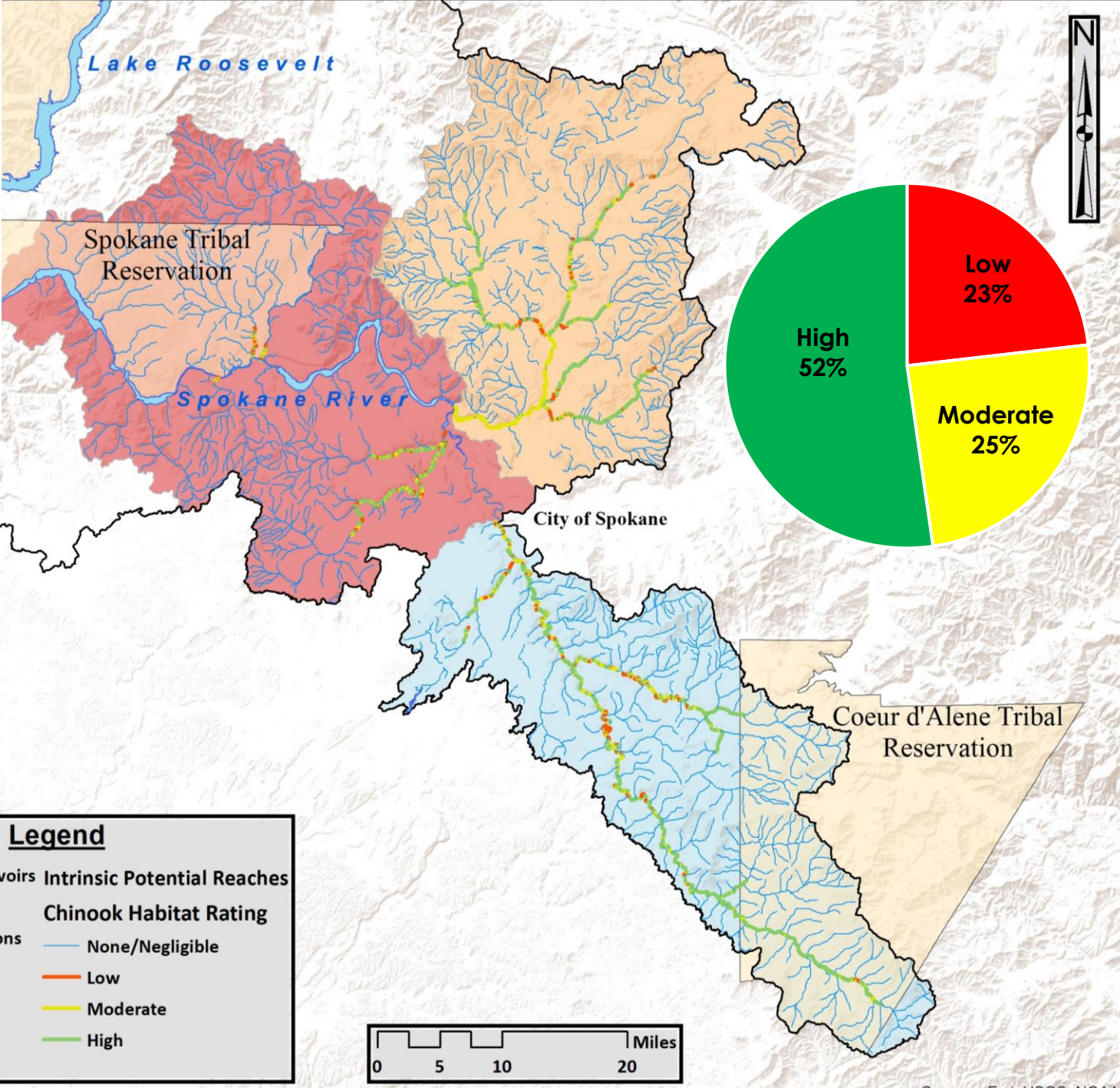
# IP Results: Steelhead

*All Habitats  
Rated  $\geq$  low*





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**IP Results:  
Spring Chinook**

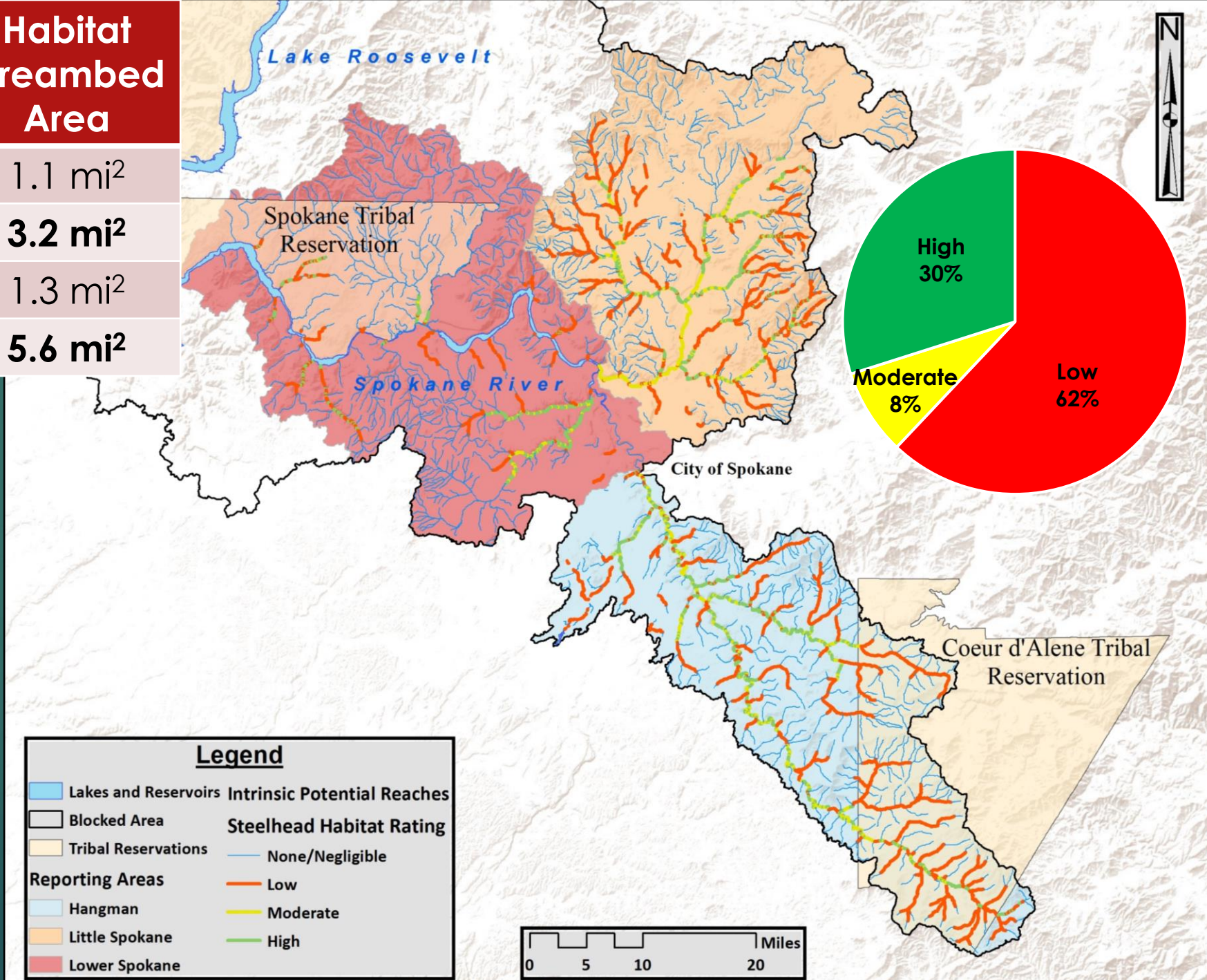
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**IP Results:  
Steelhead**

**All Habitats  
Rated  $\geq$  low**



Sources: Esri, USGS, NOAA



# Habitat Suitability – Currently

- Previous assessments largely reliant on expert opinion (e.g. NPCC Subbasin Planning)
- Limited habitat assessment data
  - Housed by a variety of managers and restoration practitioners
  - Data constrained to specific management questions or areas (e.g. CDAT Reservation)
  - No time or money to collect new data
- Needed a tool that makes best use of data we do have to evaluate current conditions to support reintroduced populations





# Habitat Suitability – Currently

## Ecosystem Diagnosis & Treatment (EDT)

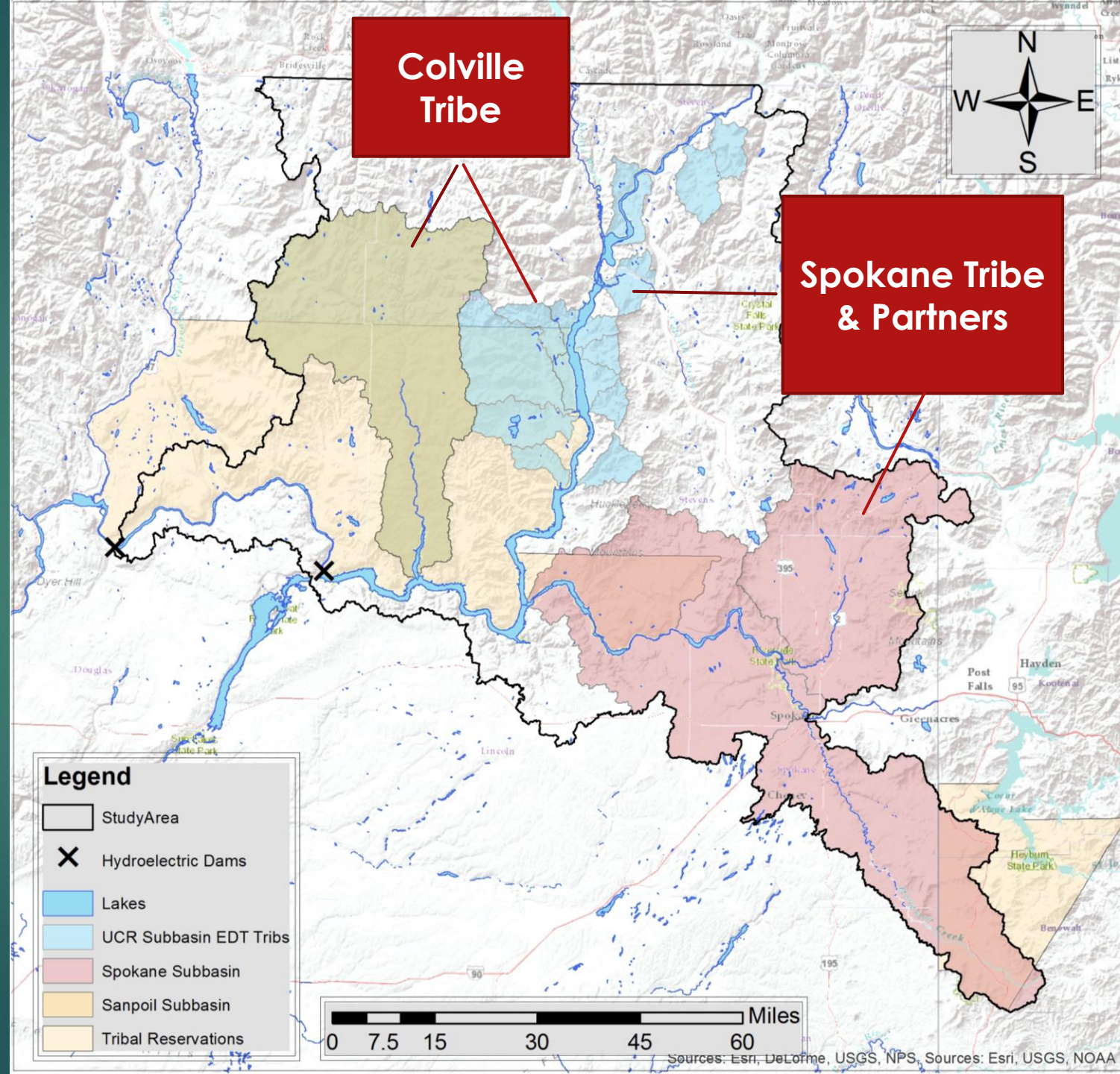
- Able to incorporate existing data
- Used in other habitat assessments and restoration planning – locally and regionally
- Consistent technique and metrics for evaluating blocked area habitats

# Blocked Area EDT

## 2 Modeling Efforts

- CCT – Sanpoil & W. Roosevelt Tributaries
- STI – Spokane & E. Roosevelt Tributaries
- CCT – Intensive, Dedicated Monitoring
- Spokane – Independent, Dispersed Monitoring
- Same species information, habitat rules, & assumptions

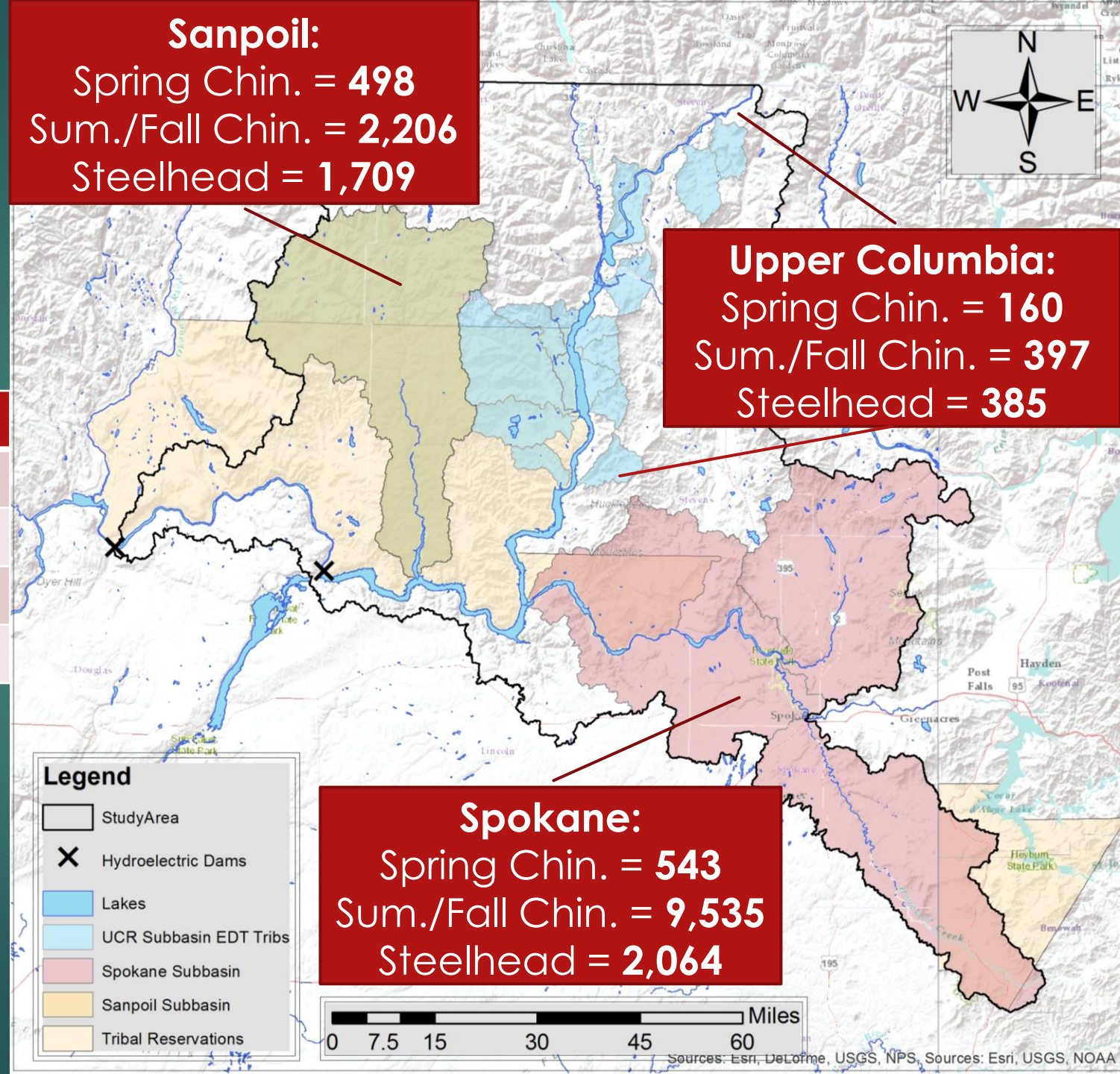
*Results reflect  
Current Condition*





# EDT Results – Adult Capacity

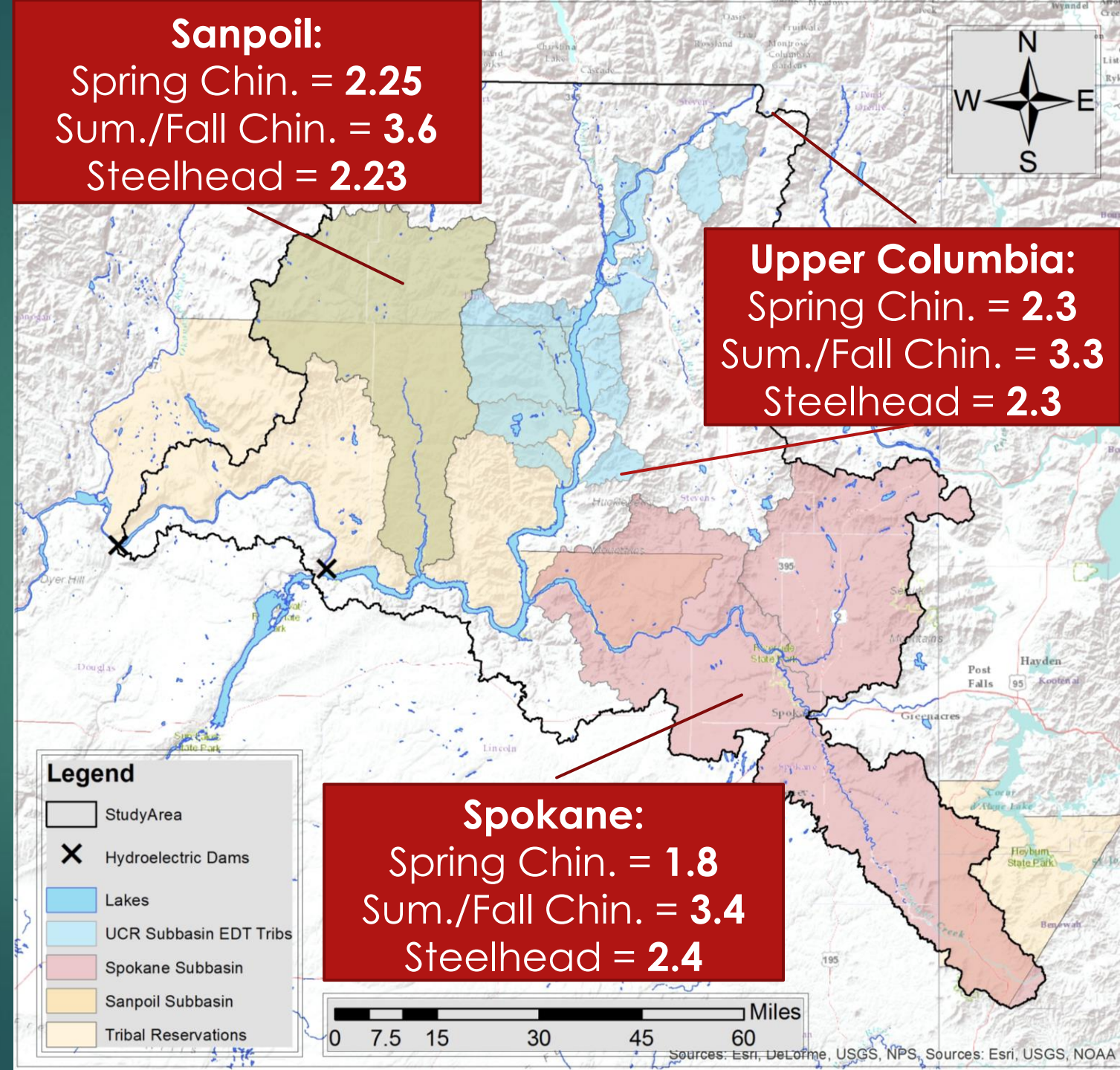
	<b>TOTAL</b>
Spring Chinook	1,201
Summer/Fall Chinook	12,138
Steelhead	4,168
<b>TOTAL</b>	<b>17,507</b>





# EDT Results – Productivity

# of returning adults  
per spawner



# Takeaways

*Significant habitat availability, and suitability...*

## Intrinsic Potential:

- Provided a useful geographic distribution of the species
- Can be a helpful tool in the interim (see [UW GIS tool](#))

## EDT:

- Did well at incorporating existing data
- Provided consistent metrics for reintroduction
- *Data were limited, significant gaps remain*
- Developed a framework that can be built upon



# Thank You

Photo Credit:  
Michael Visintainer,  
Silver Bow Fly Shop

