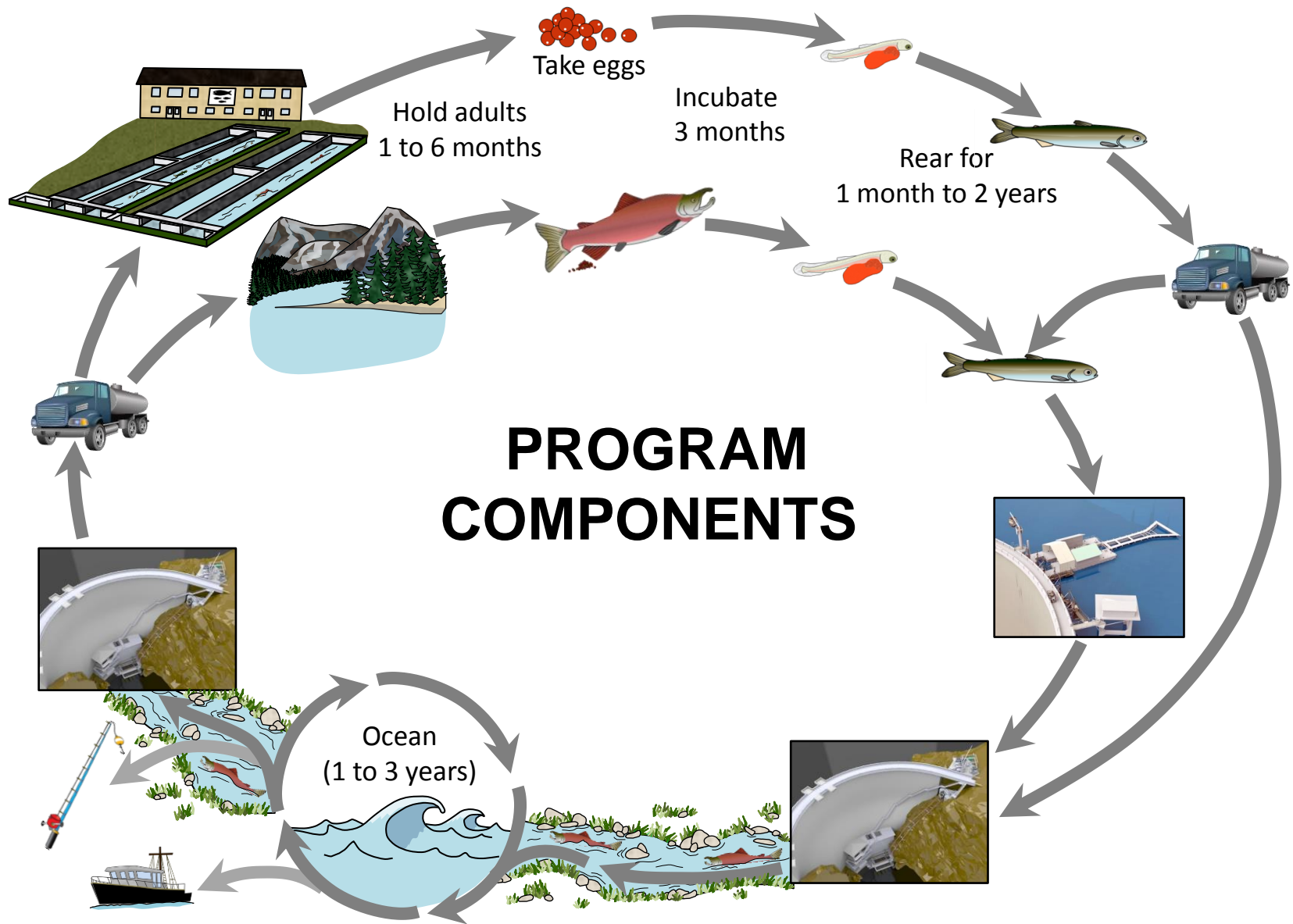


# Fisheries

## Fish Passage – Progress/Challenges

Matt Peter

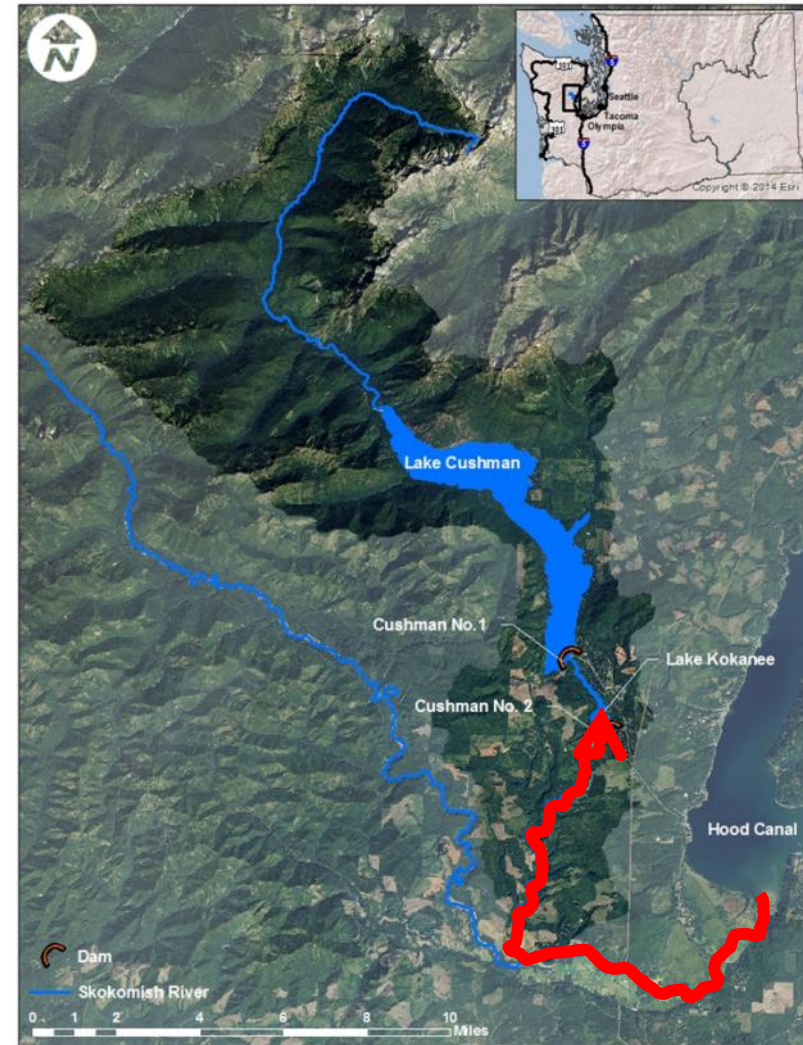
*Natural Resources Biologist*



# Fish Passage

Returning adults:

- Enter river
- Collected in Adult Trap at base of Cushman No. 2 Dam



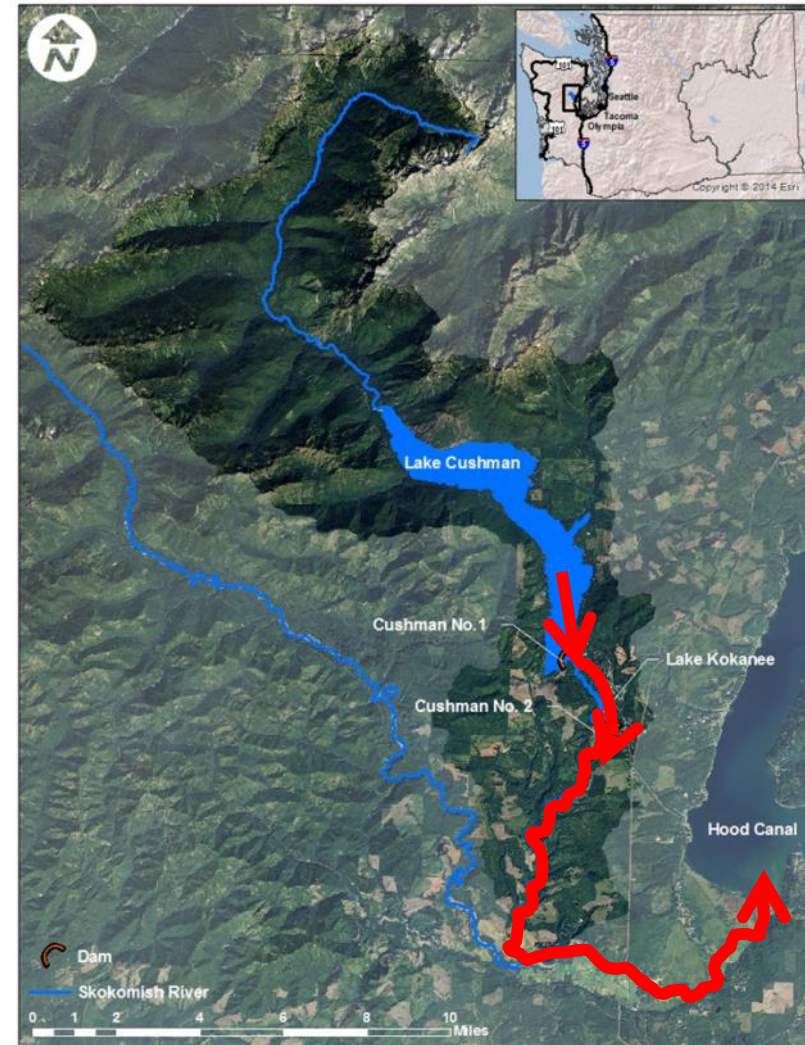
# Fish Passage

## Returning adults

- Enter river
- Collected in Adult Trap at base of Cushman No. 2 Dam

## Outmigrating juveniles

- Collected in Juvenile Fish Collector on Lake Cushman
- Trucked downstream and released at base of Cushman No. 2 Dam



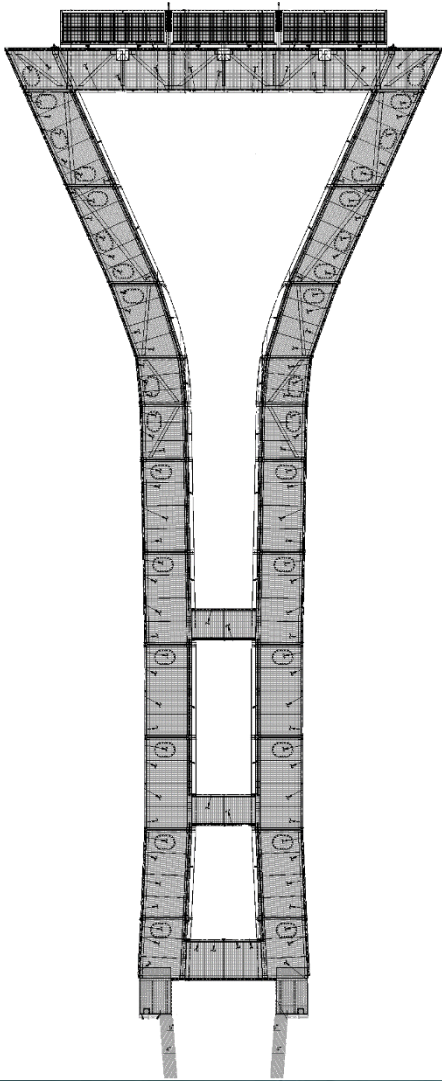


# Juvenile Fish Passage

Juvenile Fish Collector  
In operation since 2015



# Juvenile Fish Collector



- 250 cfs
- Trap and haul system
- Only viable downstream passage from Lake Cushman

# Juvenile Fish Passage

## Juvenile Fish Collector

- System Survival
- Fish Collection Efficiency



# Juvenile Fish Passage - Monitoring

## System Survival

- Survival from release at head of reservoir to below Cushman No. 2 Dam
- Performance goal of **95%** (minimum 75%)

System Survival (%)			
	Coho	Sockeye	
2015	18	--	
2016	18	--	
2017	31	--	
2018	48	35	
2019*	--	24	*Preliminary



# Juvenile Fish Passage - Monitoring

## Fish Collection Efficiency

- % of fish that approach the Juvenile Fish Collector that subsequently enter
- Performance goal of **95%**

Fish Collection Efficiency (%)		
	Coho	Sockeye
<b>2015</b>	33	--
<b>2016</b>	37	--
<b>2017</b>	54	--
<b>2018</b>	61	40
<b>2019*</b>	--	36

\*Preliminary

# Behavioral Patterns

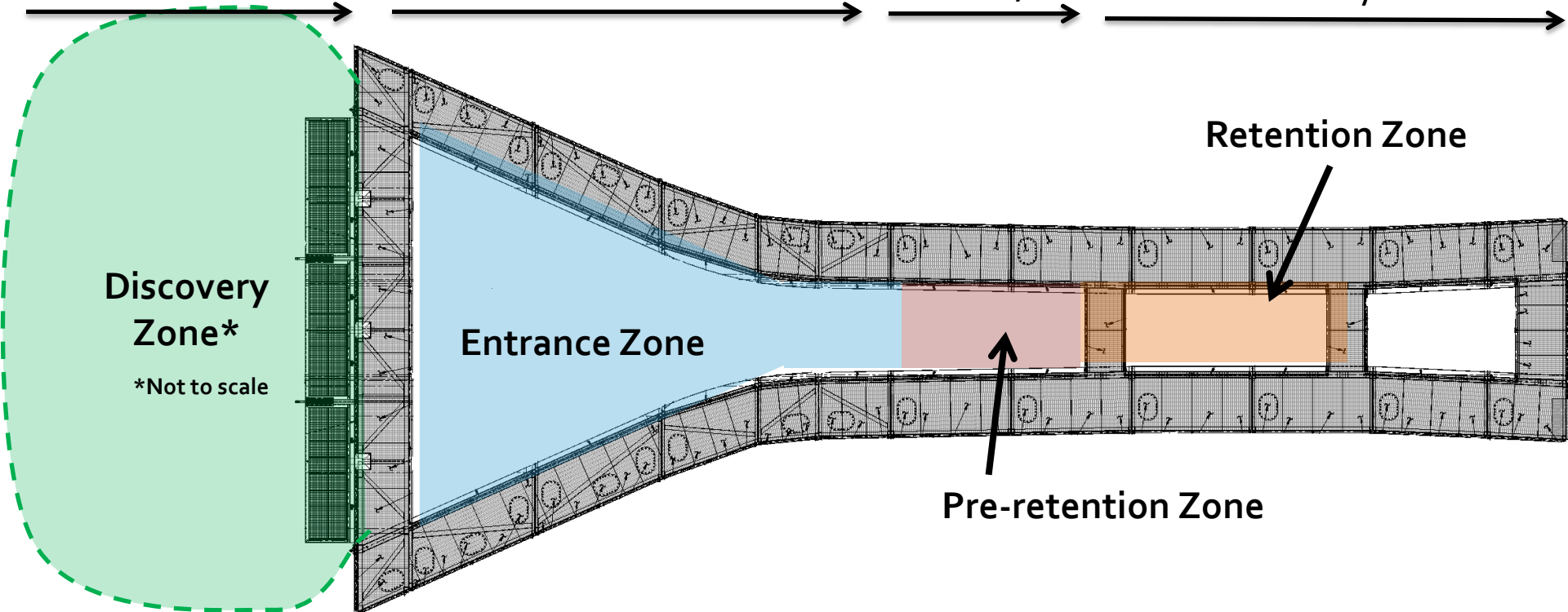


Entrance  
Efficiency

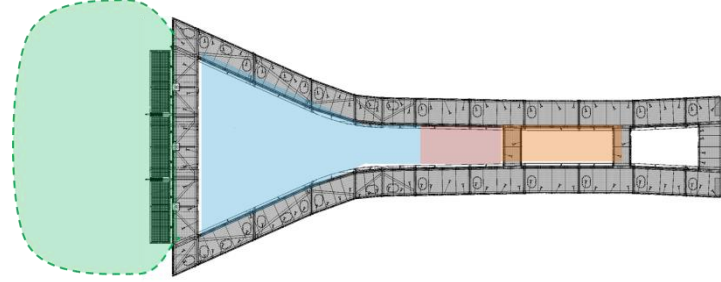
NTS  
Transition

Pre-retention  
Efficiency

Retention  
Efficiency



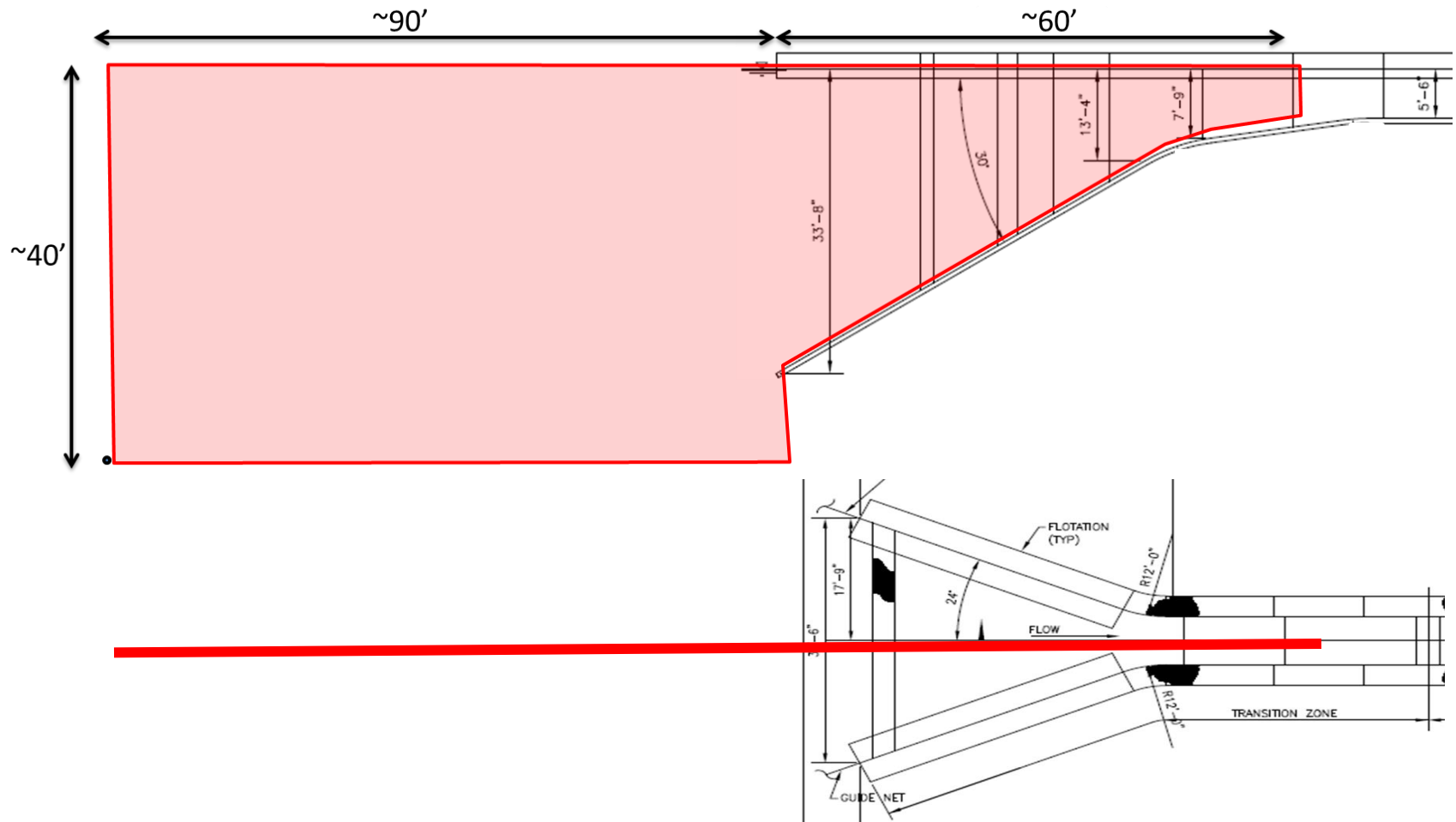
# Behavioral Patterns



	# Released	Discovery Efficiency (%)	Entrance Efficiency (%)	NTS Transition (%)	Pre-retention Efficiency (%)	Retention Efficiency (%)	FCE (%)
2015	241	74.7	--	--	--	--	32.9
2016	235	85.9	61.8	--	--	88.5	36.5
2017	243	77.1	88.1	85.7	69.3	93.0	54.0
2018 Coho	77	80.5	92.7	90.3	87.0	89.0	61.4
2018 Sockeye	188	100	93.1	91.2	87.5	57.2	40.5
2019*	258	72.9	53.2	76	40.9	97.4	38.3

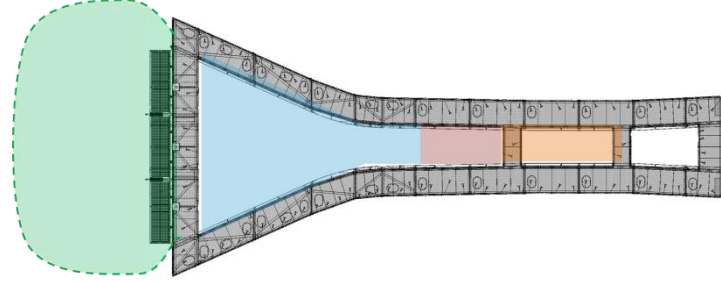
\*Preliminary

# Behavioral Patterns





# Behavioral Patterns



	# Released	Discovery Efficiency (%)	Entrance Efficiency (%)	NTS Transition (%)	Pre-retention Efficiency (%)	Retention Efficiency (%)	FCE (%)
2015	241	74.7	--	--	--	--	32.9
2016	235	85.9	61.8	--	--	88.5	36.5
2017	243	77.1	88.1	85.7	69.3	93.0	54.0
2018 Coho	77	80.5	92.7	90.3	87.0	89.0	61.4
2018 Sockeye	188	100	93.1	91.2	87.5	57.2	40.5
2019*	258	72.9	53.2	76	40.9	97.4	38.3

\*Preliminary

# Behavioral Patterns

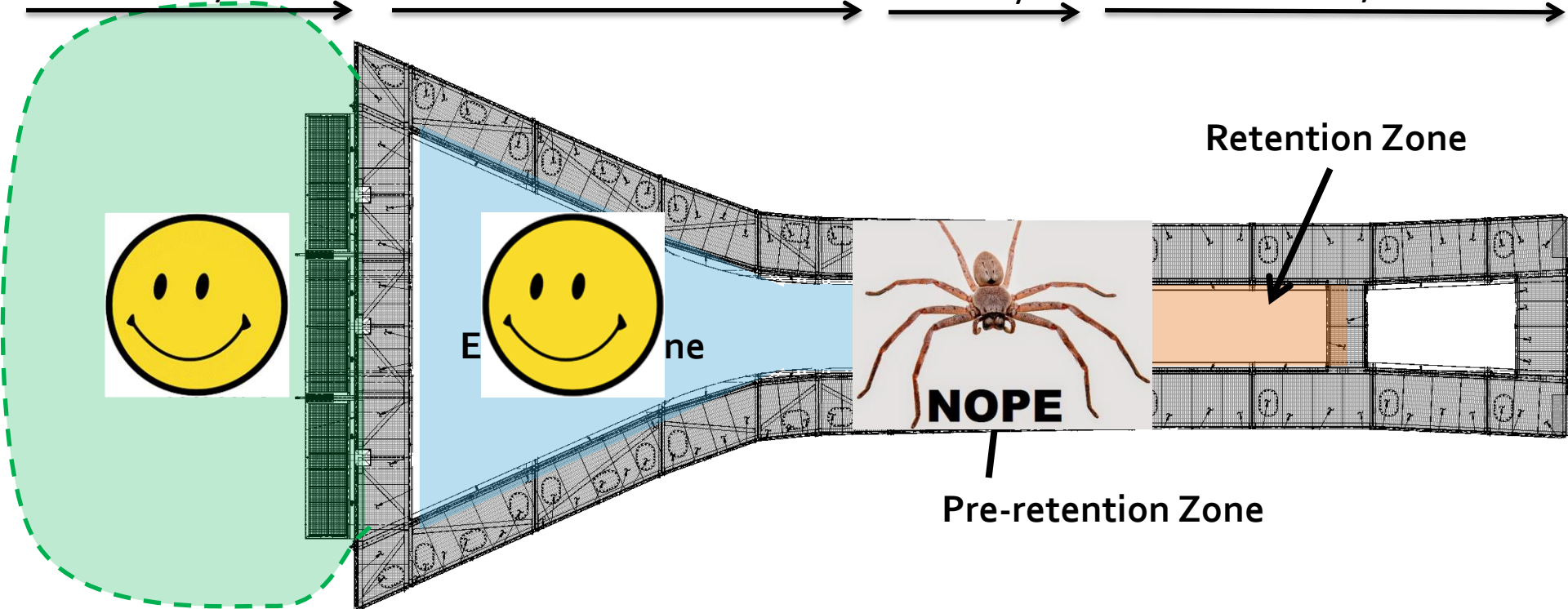


Entrance  
Efficiency

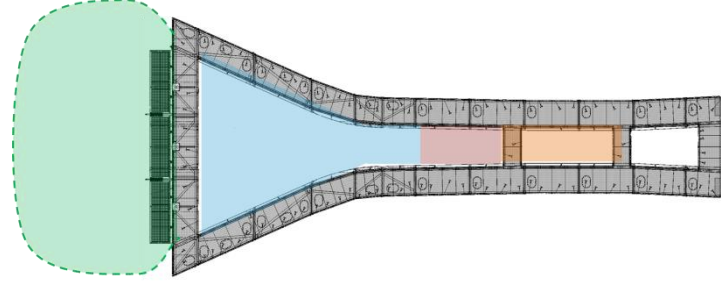
NTS  
Transition

Pre-retention  
Efficiency

Retention  
Efficiency



# Behavioral Patterns



	# Released	Discovery Efficiency (%)	Entrance Efficiency (%)	NTS Transition (%)	Pre-retention Efficiency (%)	Retention Efficiency (%)	FCE (%)
2015	241	74.7	--	--	--	--	32.9
2016	235	85.9	61.8	--	--	88.5	36.5
2017	243	77.1	88.1	85.7	69.3	93.0	54.0
2018 Coho	77	80.5	92.7	90.3	87.0	89.0	61.4
2018 Sockeye	188	100	93.1	91.2	87.5	57.2	40.5
2019*	258	72.9	53.2	76	40.9	97.4	38.3

\*Preliminary

**Predation?**

Mean fork length and weight at release  
Coho: 138.4 mm, 30.7 g  
Sockeye: 172.3 mm, 48.4 g

# Juvenile Fish Passage

## Potential Next Steps

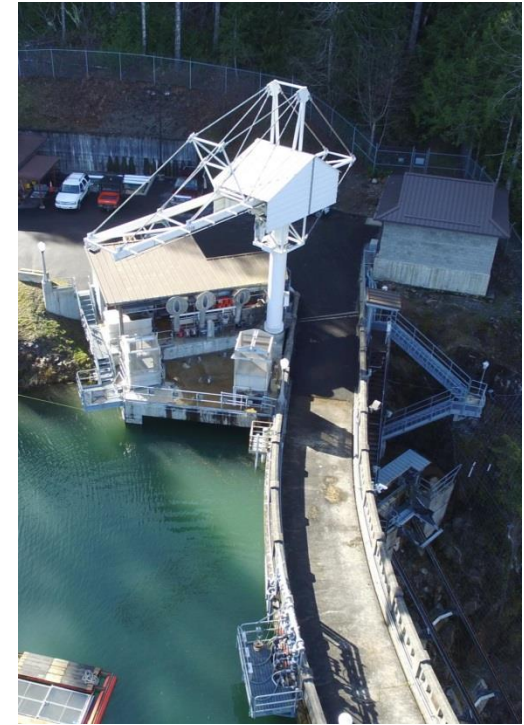
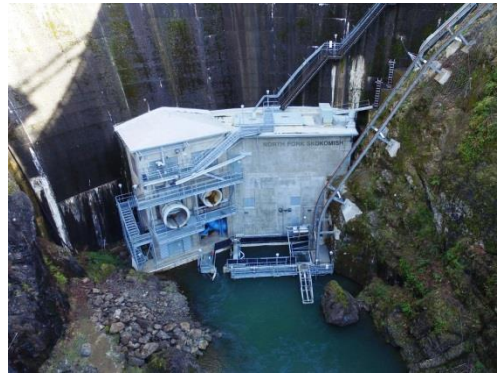
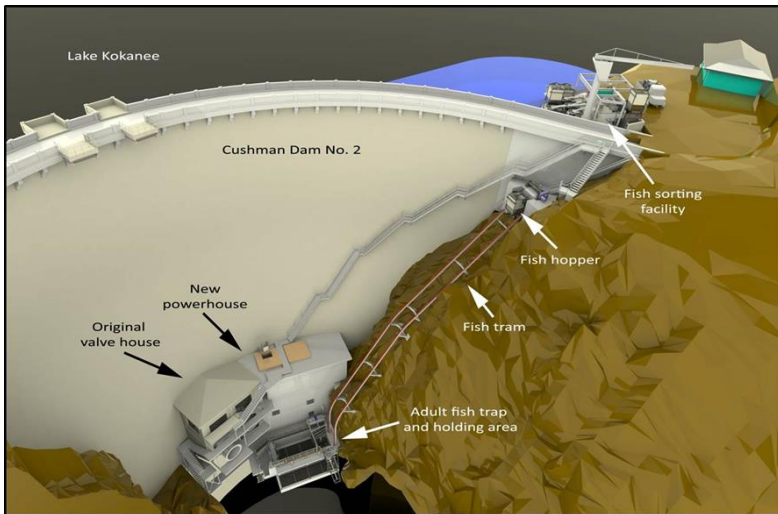
- Improve conditions in pre-retention zone
- Evaluate predation near and within the collector
- Evaluate impact of sockeye life history strategies on FCE and SS



# Adult Returns

## Adult Fish Trap

- Base of Cushman Dam No. 2
- In operation since 2015



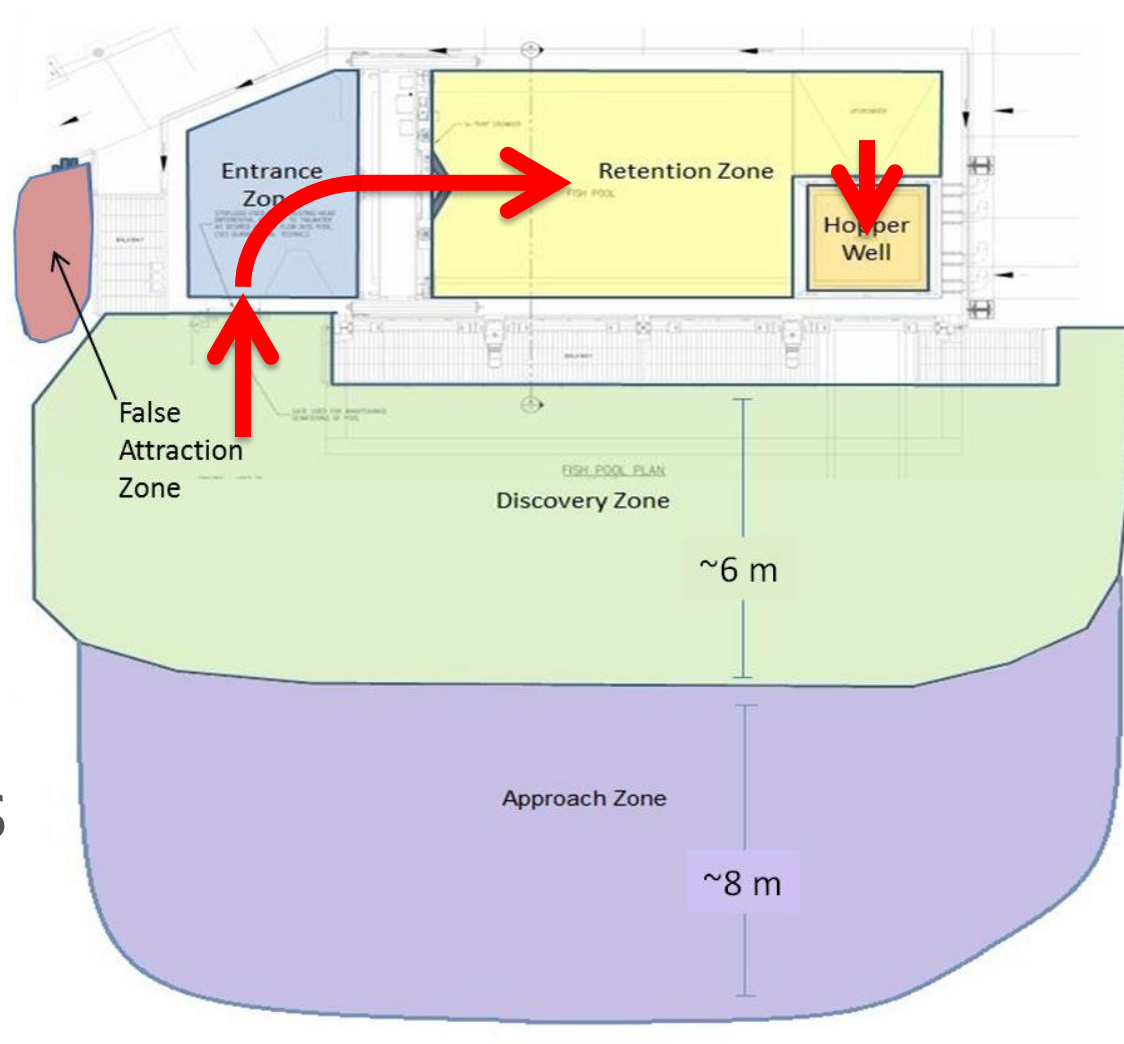
# Adult Returns

## Adult Fish Trap

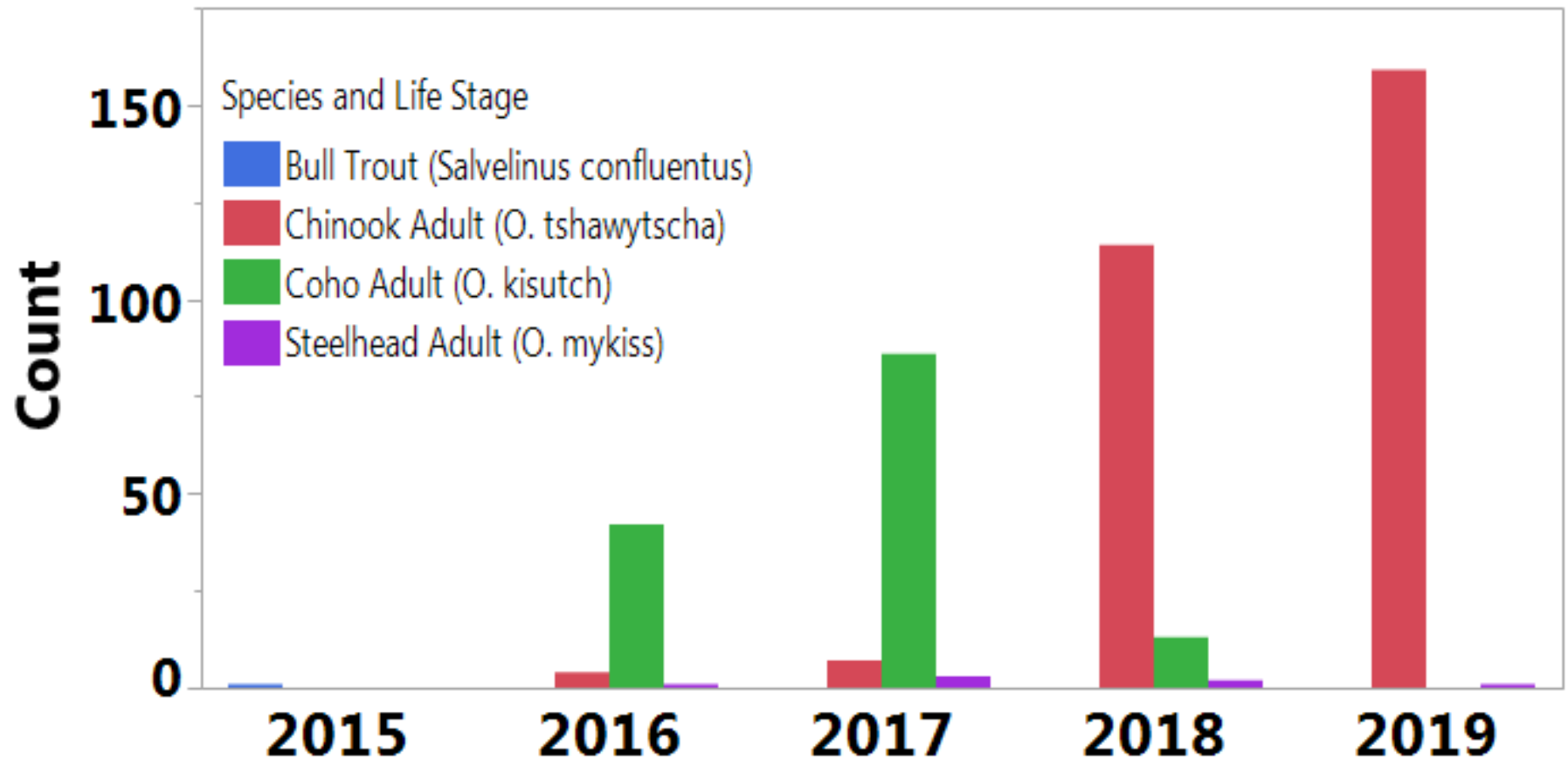
Brood collection is up despite poor performance

- Low Retention Efficiency

Evaluating options for improvement

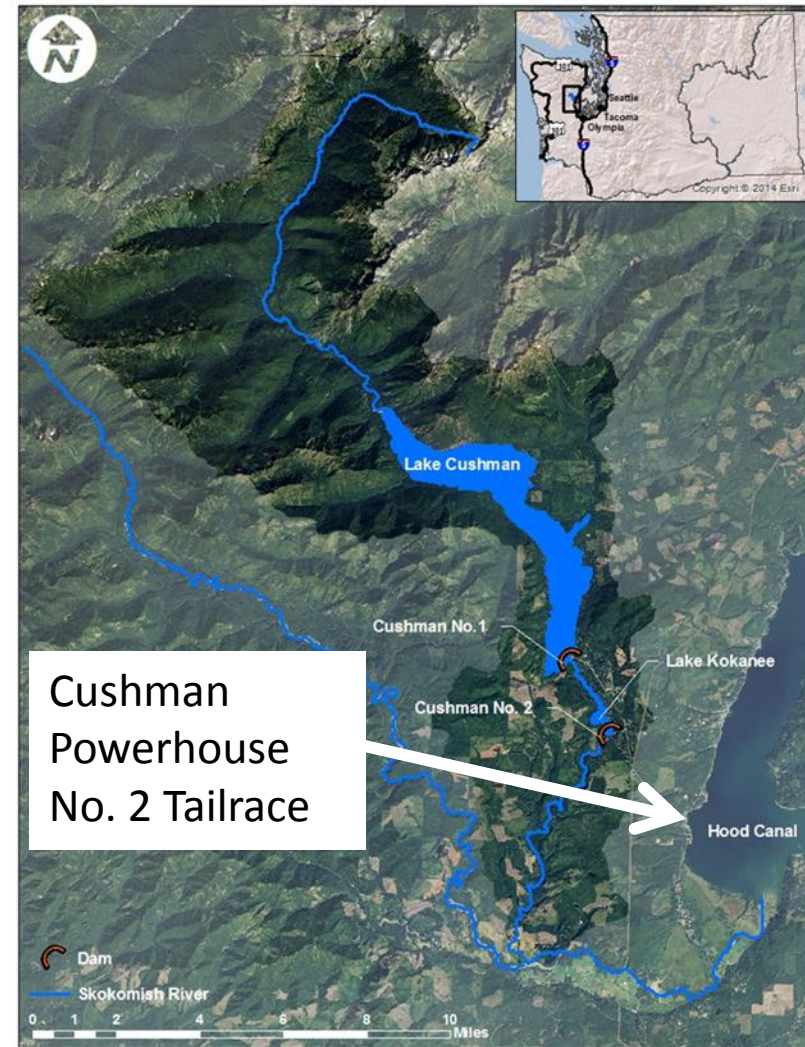


# Adult Returns



# Adult Fish Passage

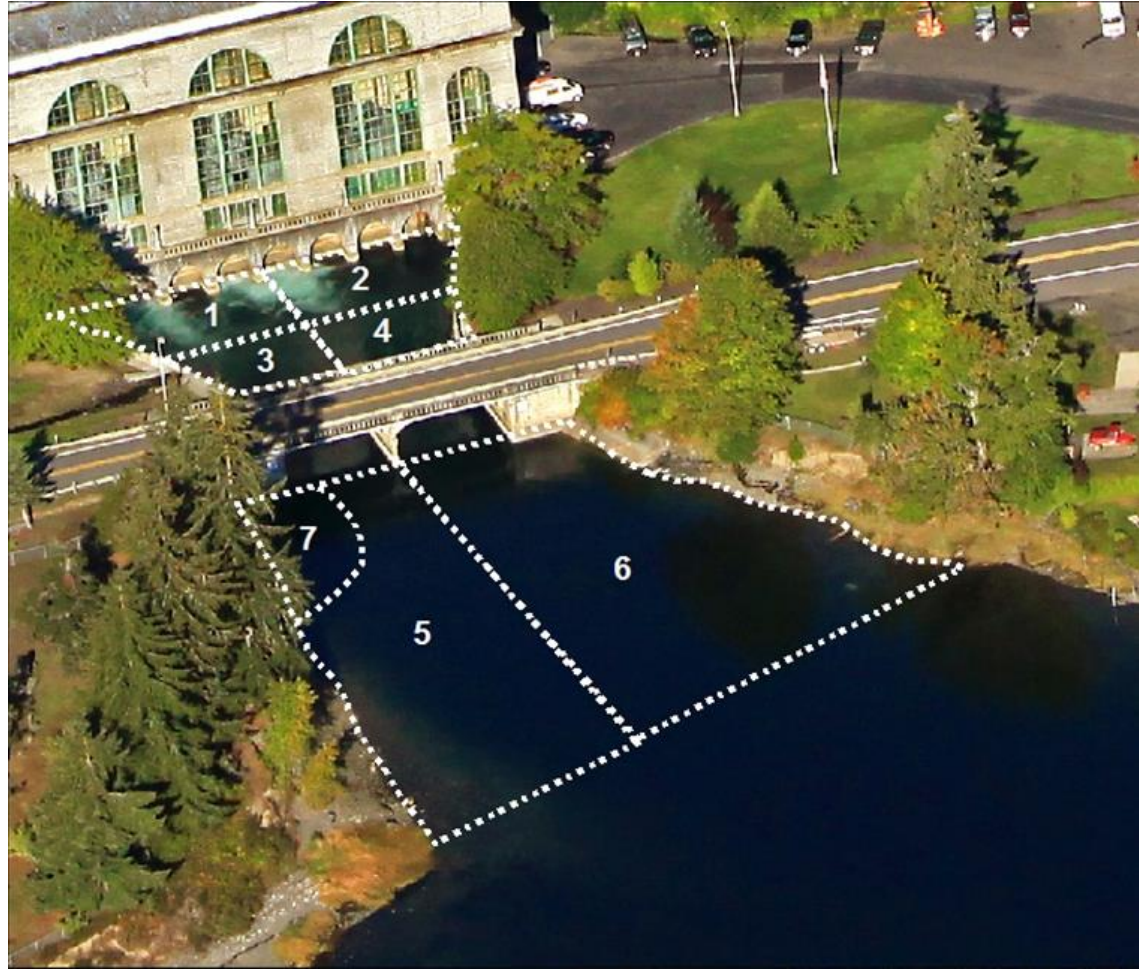
- Cushman No. 2 Dam  
Powerhouse Tailrace  
Monitoring





# Adult Fish Passage

- Cushman No. 2  
Powerhouse  
Tailrace  
Monitoring



# Adult Fish Passage

- Little Falls

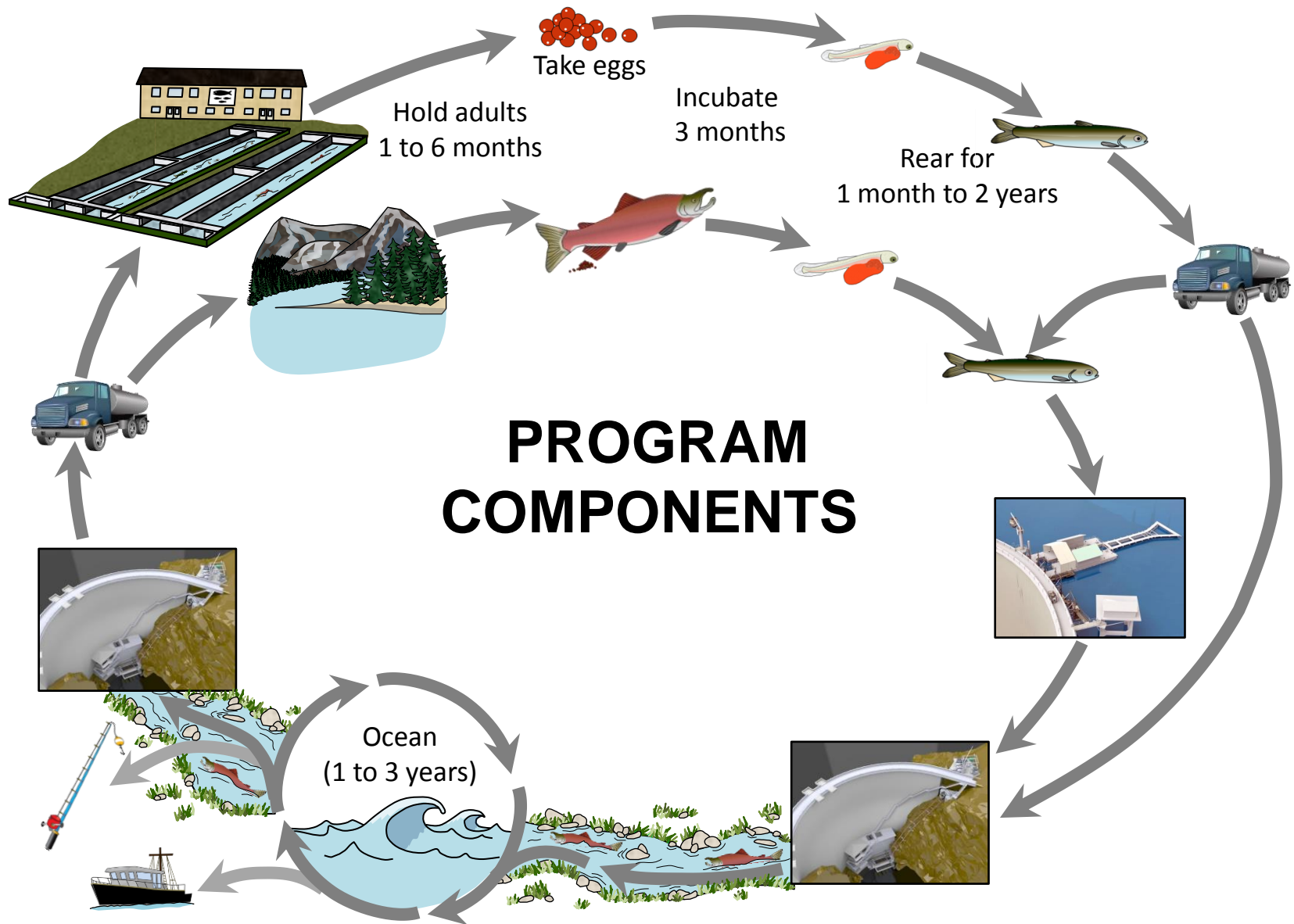




# Adult Fish Passage

- Little Falls







# Questions?

