

New data & status assessments for lampreys (focus: Pacific Lamprey) in Oregon



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**Coastal, Columbia, & Snake
Conservation Plan for Lampreys
in Oregon (CPL)**

Outline

- **Context & species**
- **Process**
- **Overview of CPL**
 - **Status**
 - **Limiting factors**
 - **Threats**
 - **Management strategies**
 - **Research**

Context & species

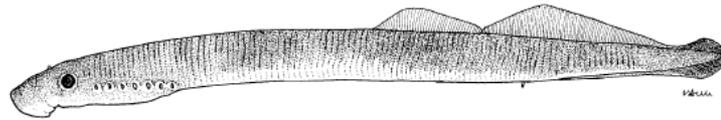
- Developed per Native Fish Conservation Policy
- Supports efforts for Pacific Lamprey by
 - Tribes
 - U.S. Fish & Wildlife Service
 - Others
- Covers 3 other lamprey species



Anadromous & parasitic



Pacific Lamprey (13-33")



Western River Lamprey (4-12")

Resident & non-feeding



Western Brook Lamprey (3-7")



Pacific Brook Lamprey (4-7")

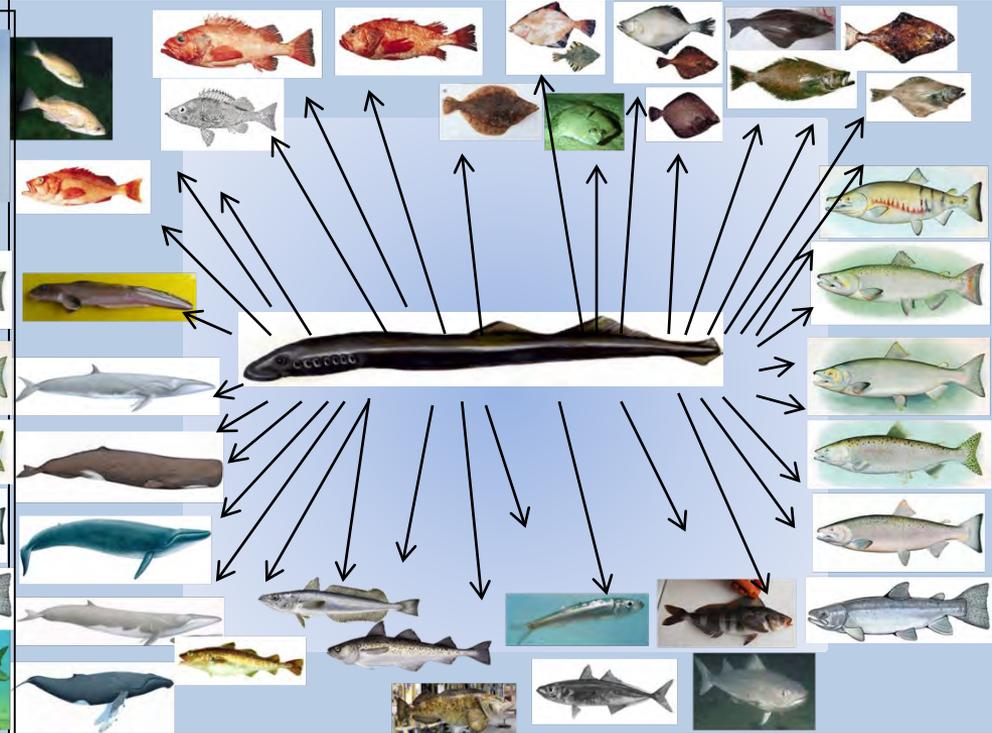
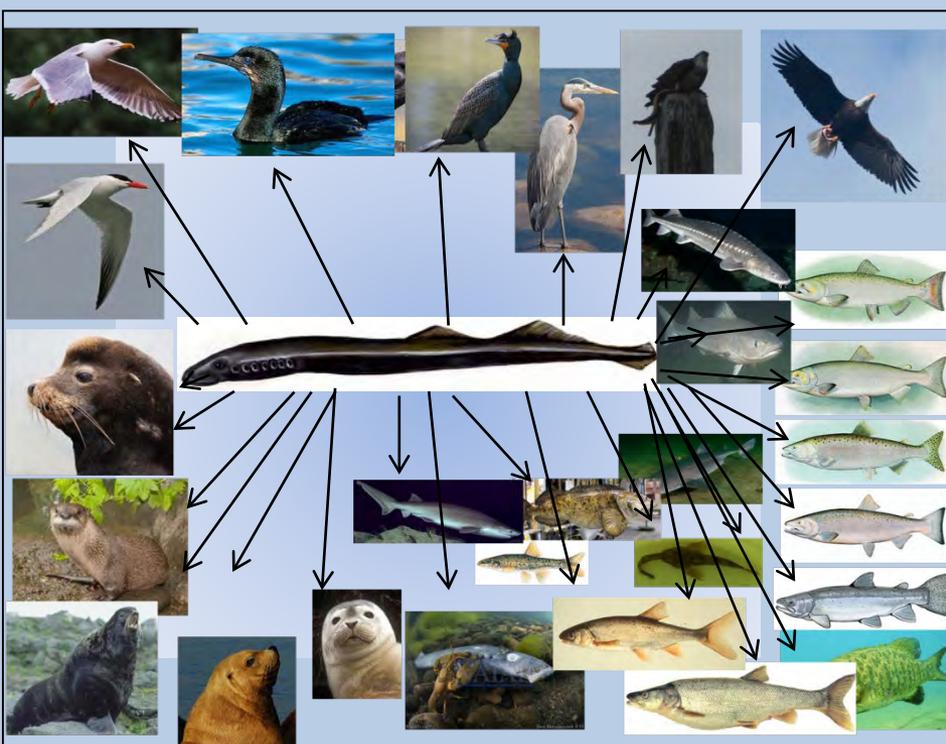




Ecosystem integrators

41 predators

32 prey



Process

- ★ Internal development

- ★ External development

- Tribes, tribal agencies
- U.S. Fish & Wildlife Service
- Others biologists, managers, conservationists

- Science review

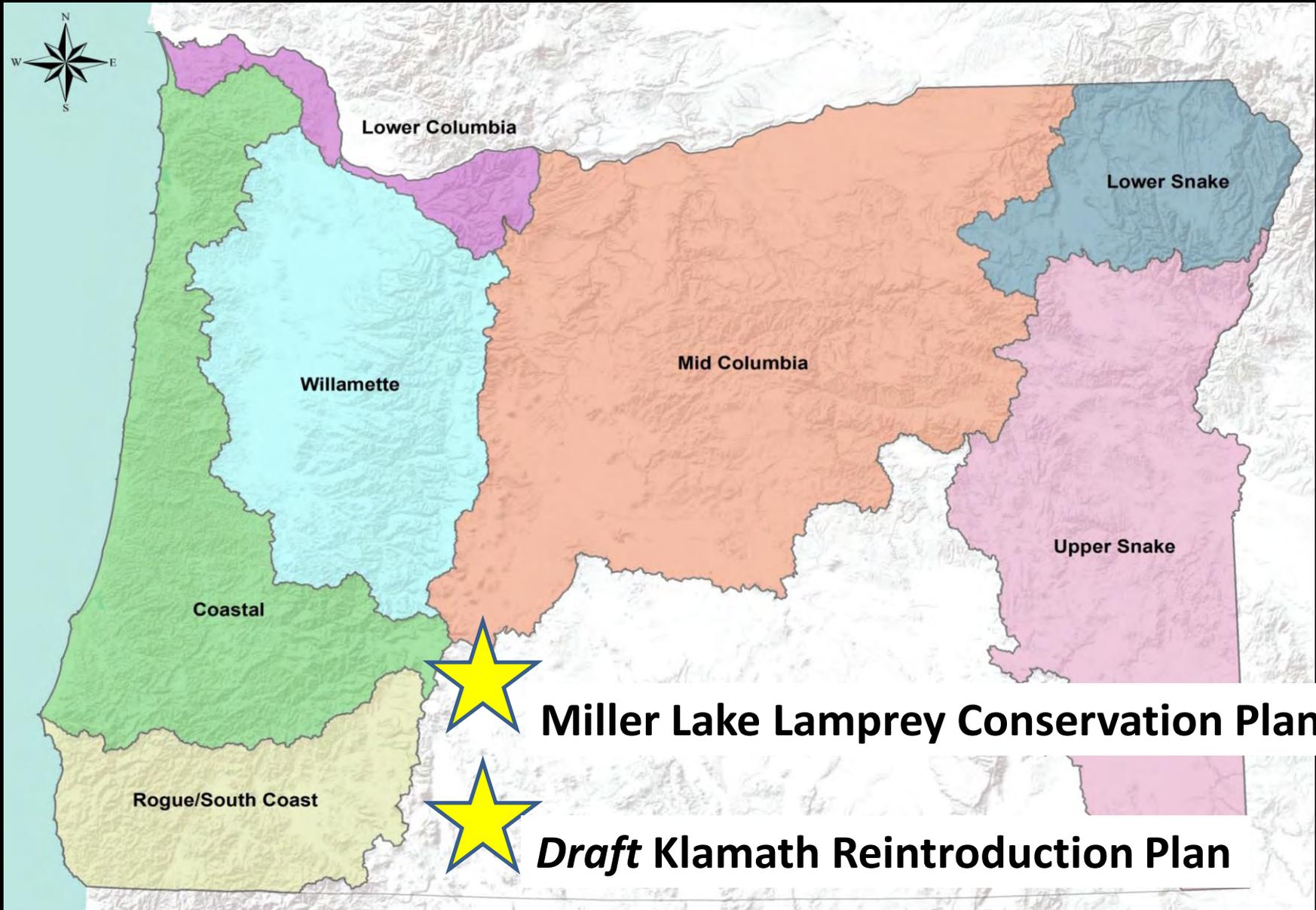
- Public comment

- Website
- Written comment period
- Public meetings

- Commission review



Overview of CPL





Western River Lamprey



Western Brook Lamprey



Pacific Brook Lamprey



Pacific Lamprey

Entosphenus tridentatus

- Historical distribution based on observation
- Current distribution based on observation (1,256 observations)

Current Status

1. Distribution

- Species Distribution Models

2. Adult Abundance Trends

- Dam cts, spawning surveys, M/R

3. Connectivity

- Count major artificial obstructions

Status

❖ *Sufficient data only for Pacific Lamprey*

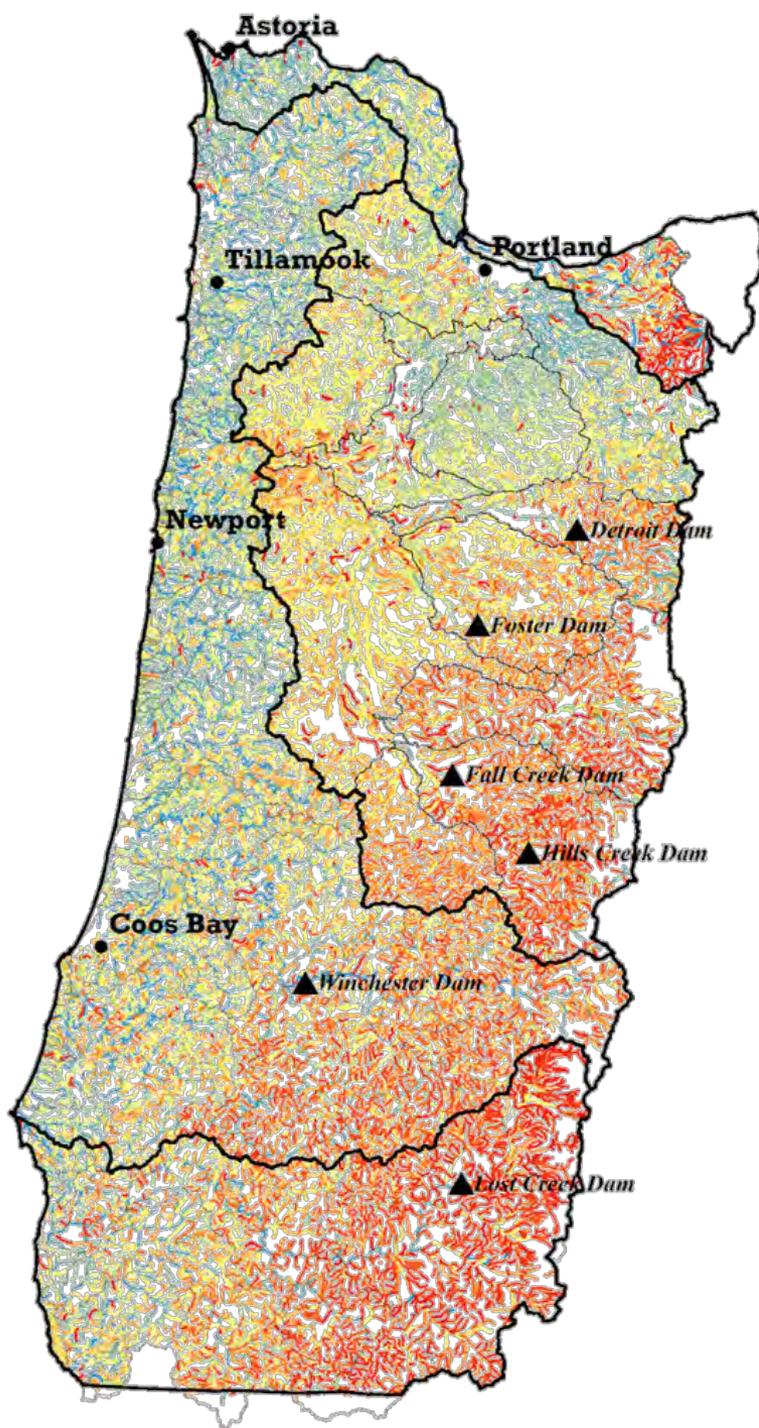
Pacific Lamprey Distribution Models



- **Predict probability of occurrence:**
 - **Lamprey data (1/0)**
 - *Western OR*
 - *>1,500 surveys*
 - **Environmental variables**
 - **Modeled w/ logistic regression**

Pacific Lamprey Distribution Models

- **ID model from candidate models**
 - AIC
- **Model validation**
 - AUC: Use predicted scores to determine cut-off
 - Cross-validation statistics



Probability of Occurrence



Willamette Falls
1913



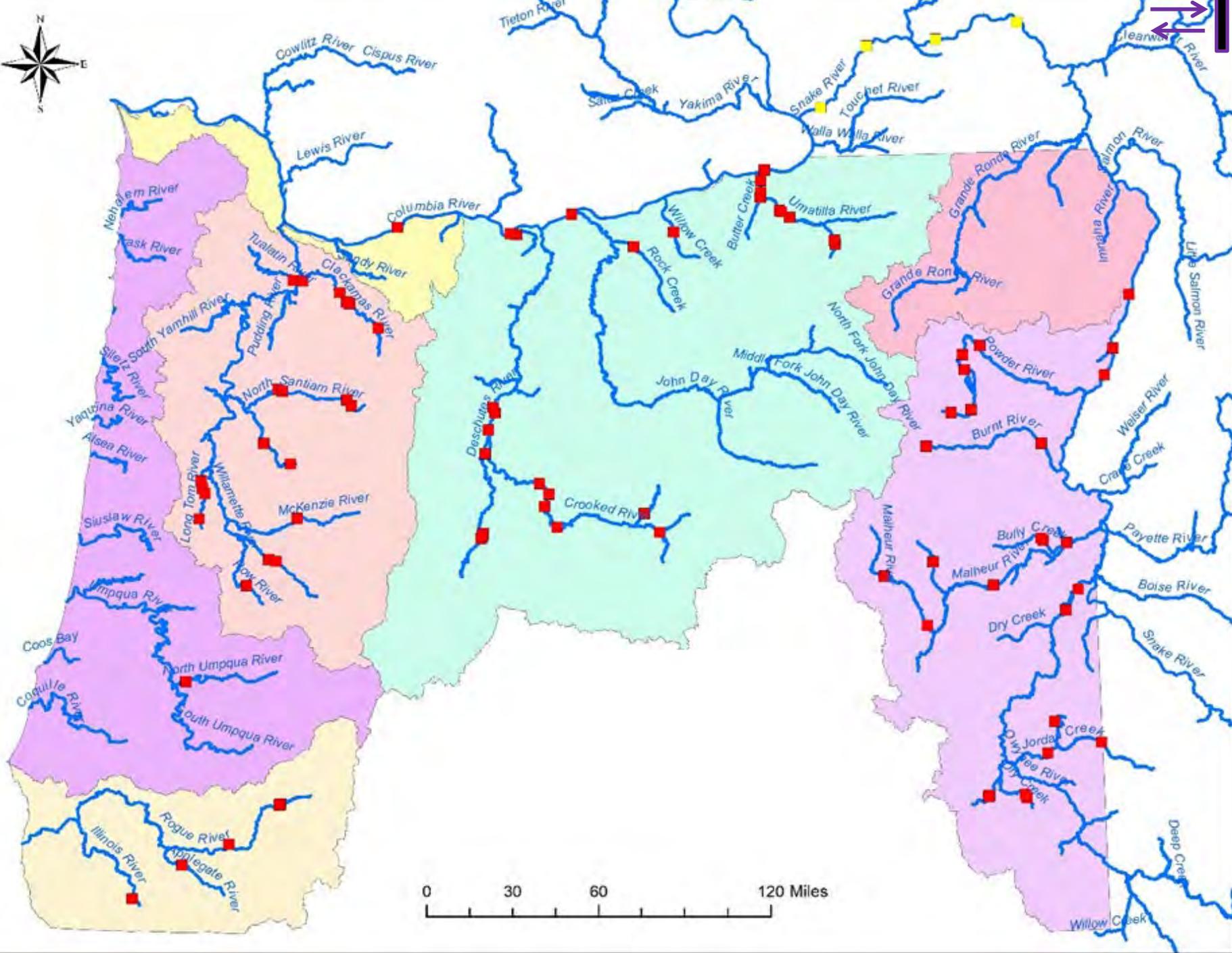
Fish at Willamette Falls. 7-15-13

Adult Pacific Lamprey Abundance Trends

- High abundance late 1800s – early 1900s
- Rapid decline 1950s – 1960s, 1980s
- Dam cts, ODFW surveys, M/R
- Recent, modest increases
- Cyclical trends (ocean cycles)
- Absence in Upper Snake
- Decreasing in Lower Snake

Connectivity

- # artificial obstructions – $\geq 5^{\text{th}}$ order streams
- USGS' National Hydrography Dataset
 - Stream GIS layer
 - ODFW's fish passage barrier data layer
- Tallied # of dams



Pacific Lamprey

Population Strata	Current Status	Desired Status
Rogue/South Coast	<i>Common</i>	Prevalent
Coastal	<i>Prevalent</i>	Prevalent
Lower Columbia	<i>Common</i>	Prevalent
Willamette	<i>Common</i>	Prevalent
Mid Columbia	<i>Limited</i>	Common
Lower Snake	<i>Rare</i>	Common
Upper Snake	<i>Absent</i>	Common
Species Management Unit	<i>Sensitive</i>	Strong-Guarded

Anadromous & parasitic



STATUS: SENSITIVE
Pacific Lampbrush (33")



STATUS: SENSITIVE
Western Sanddarter (4-12")



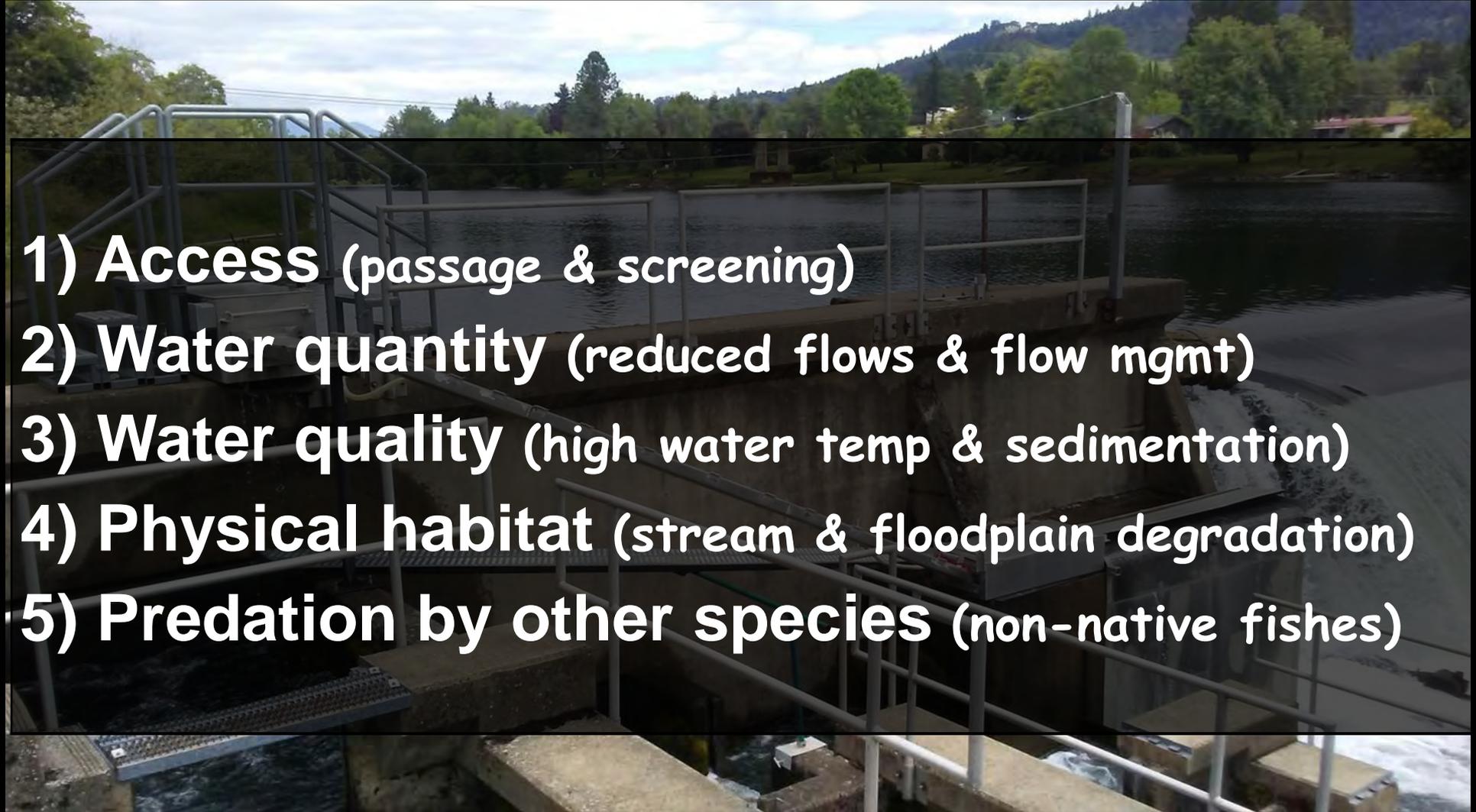
STATUS: SENSITIVE
Western Brook Silverside (3-7")



STATUS: SENSITIVE
Pacific Brook Silverside (4-7")

Resident & non-feeding

Key Limiting Factors

- 
- 1) **Access** (passage & screening)
 - 2) **Water quantity** (reduced flows & flow mgmt)
 - 3) **Water quality** (high water temp & sedimentation)
 - 4) **Physical habitat** (stream & floodplain degradation)
 - 5) **Predation by other species** (non-native fishes)

Future threats

- **Climate change**
- **Estuary & ocean conditions**
- **Development (human population growth)**

Management strategies

1. Education & outreach (New)
2. Passage & screening (New & Existing)
3. Protect & restore habitat (Existing)
4. Water conservation (Existing)
5. Translocation (New)
6. Establish in-water work BMPs (New)
7. Modify angling regulations on non-native fishes (New & Existing)
8. Pinniped mgmt (Existing)

Research, Monitoring, & Evaluation

1. Improve distribution data (New & Existing)
2. Prioritize artificial obstructions for passage & screening (New)
3. Inform passage & screening (New)
4. Improve biological knowledge (New)
5. Estimate take (New & Existing)
6. Assess complex, large-scale threats (New)
7. Assess translocation (New)
8. Estimate adult abundance (New & Existing)
9. Monitor diversity (New)

Implementation

- **Complements work by partners**
- **Collaborative approach**
- **Leverage existing work**
- **Grants for particular projects**
- **Adaptive management**

Acknowledgments



Kara Anlauf-Dunn



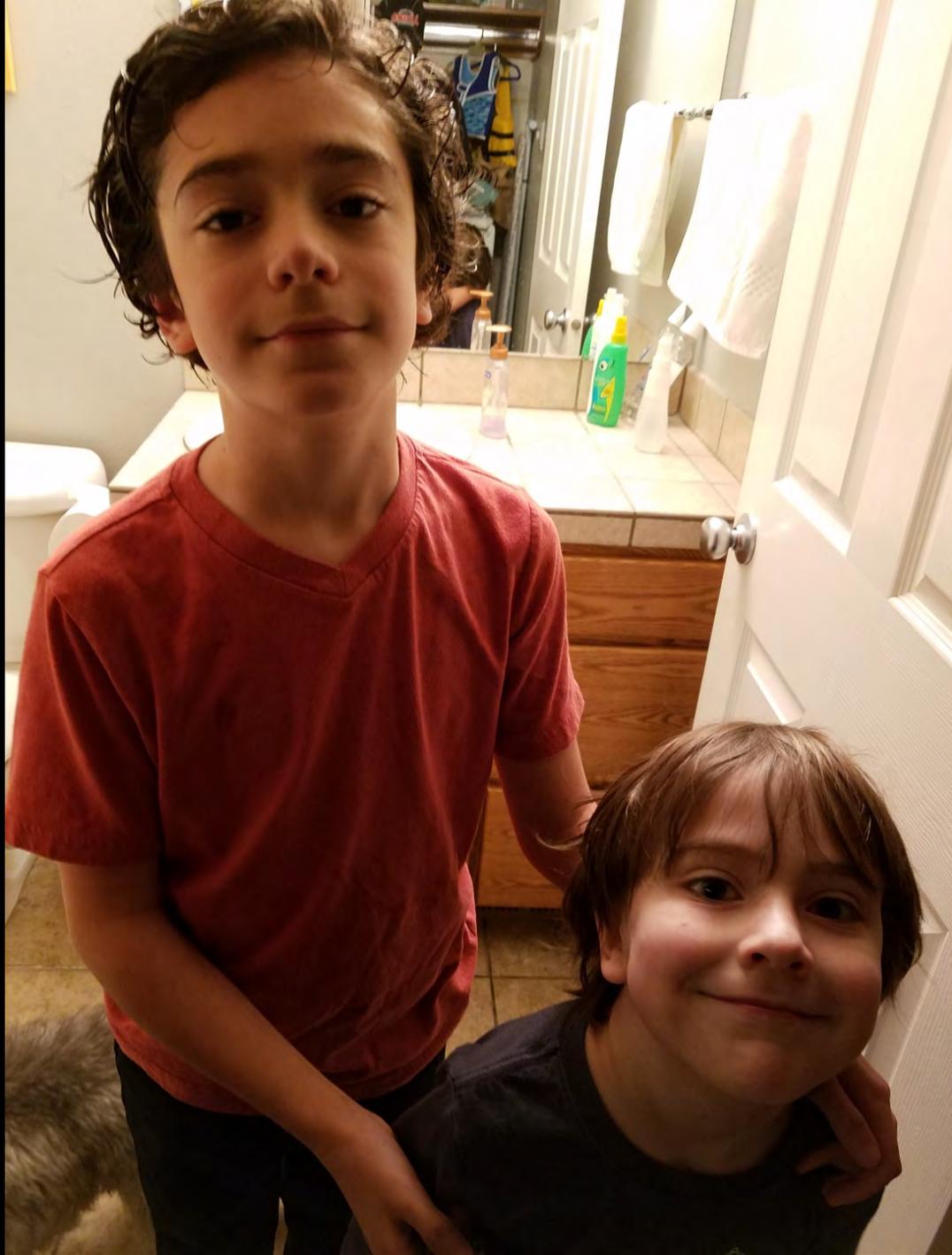
Erin Gilbert



Matt Falcy



Matt Weeber



Limiting factors

- **ODFW**
 - Interview ODFW district staff
 - Literature reviews
 - Professional judgement
- **USFWS: Scope & severity averaged, rolled up 4th field HUCs within each “Population stratum”**
- **Compared w/ ODFW rankings, selected highest**
- **LFs for Pacific Lamprey used for other lampreys**

Occurrence datasets



Data Source	Years	No. surveys
ODFW's OASIS Project	2007 – 2016	1,331
Oregon EMAP	1997 – 2001	119
Regional EMAP	1994 – 2001	33
ODFW Native Fish Program	2014	23
National Water-Quality Assessment Program	1994 – 2001	20
Western EMAP	1994 – 2001	7



Predictor variable	Description
Stream flow (historical)	Mean summer flow
Winter flow (historical)	# of daily flows – Mar 31 > 95 th percentile across yr
Center of flow (historical)	Measures majority of precipitation leaves basin as flow
Stream flow (projected)	Mean monthly temp. from best model
Stream temp. (historical)	Monthly August temp. 1993 – 2011
Stream temp. (projected)	Monthly temp. from best model
Stream slope	Stream slope (%)
Conifer cover	Conifer land cover (% within the basin)
Impervious surface	Mean imperviousness human-made surfaces (% in basin)
Lithology	Non-carbonate residual (% in basin)
Upstream distance	Upstream distance
Road-stream crossings	Density of road–stream intersections within basin

Lots of variables

Species Distribution Models

- **New way to evaluate distribution**
- **Models not static**
- **Improve w/ more sampling & modeling**
- **Incorporate**
 - Improved knowledge
 - New data