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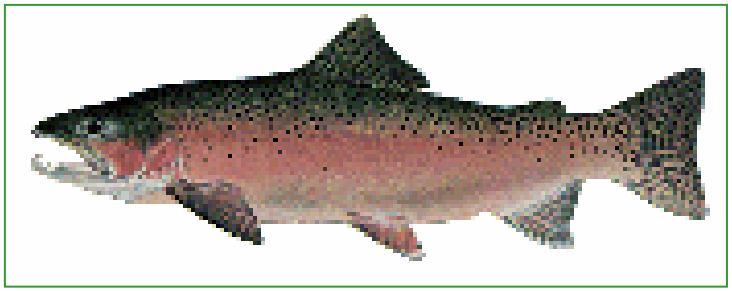
Fish Passage Improvement Projects And Habitat Access Conditions In the Coastal Coho ESU



Liz Dent

Andy Herstrom

Erin Gilbert

Habitat Factors For Decline

- Channel Form
- Substrate
- Roughness
- Estuaries and Wetlands
- Riparian Areas
- Water Quality
- Stream flow
- **Passage**
- Habitat Elimination

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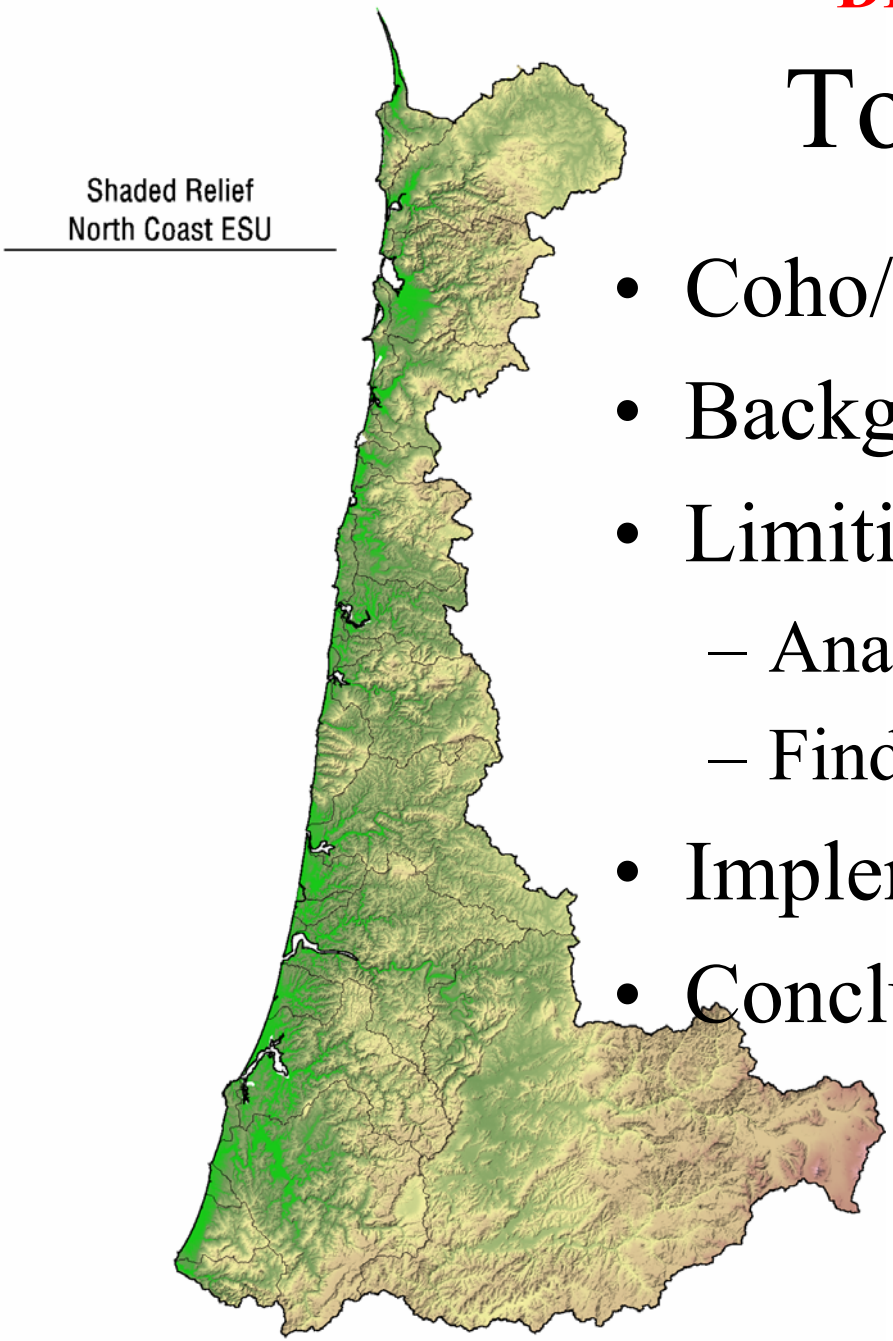
Today's Presentation



- Coho/Oregon Plan Evaluation
- Background on Fish Passage
- Limiting Factors Analysis
  - Analytical Process and Tools
  - Findings
- Implementation and Effectiveness
- Conclusions

Background on Fish Passage: Not just spawning adult fish!

- **Must pass resident and juvenile fish too.**

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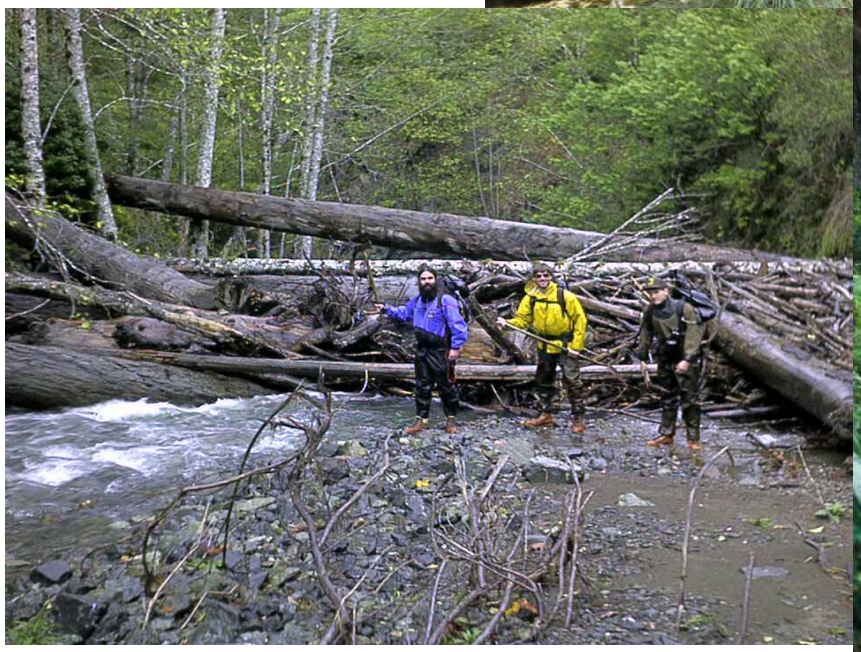
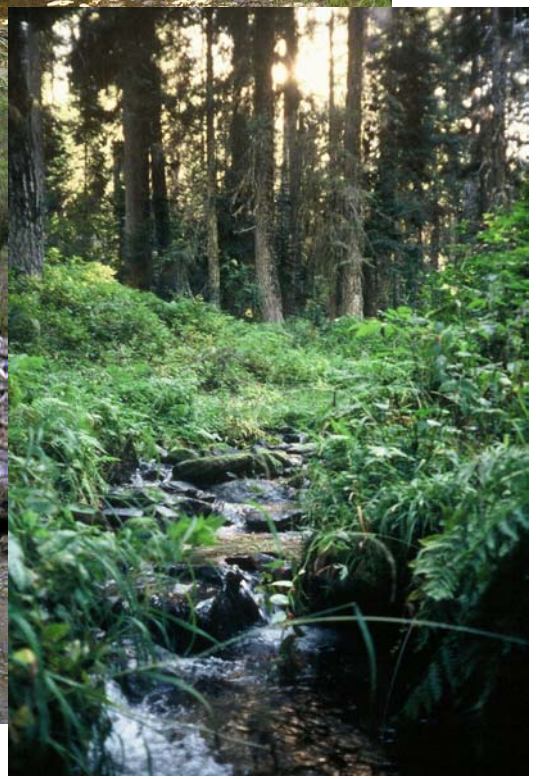
Juvenile and Resident Fish Move

- Opportunities for food
- Cooler temperatures
- Slower water for given life stages
- Avoid predation





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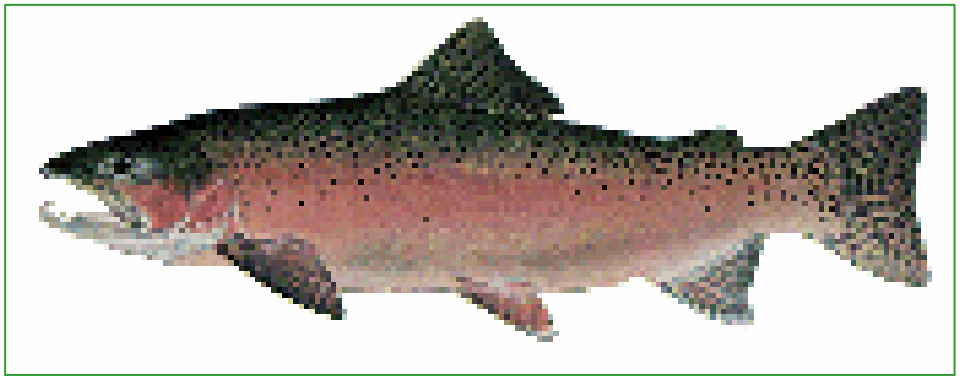
Limiting Factors Analysis



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Limiting Factors Analysis

- What percent of stream miles have improved access because of passage improvement projects reported as part of the Oregon Plan?
  - What type of habitat was accessed?
- What percent of stream miles have limited access, are accessible, or have unknown access status?

Data Sources

- **State Agencies**: OWEB, ODF State Forests, ODF&W
- **Federal Agencies**: BLM and Forest Service
- **Private Industrial Forest Landowners**: 5 industrial land owners in the Coastal Coho ESU

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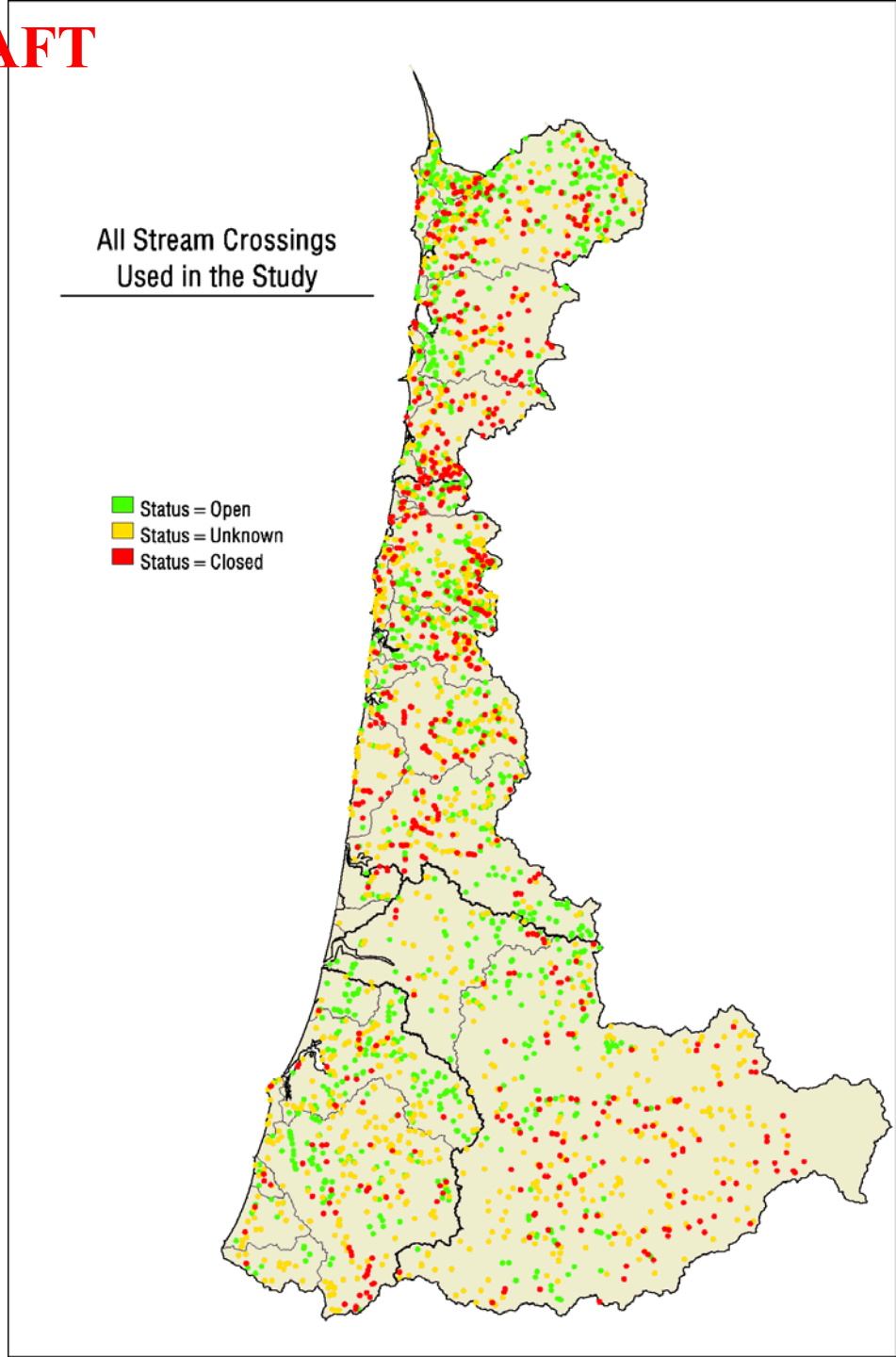
Data Description

- 4,412 crossings and barriers
  - 1,140 OWEB crossings
- Passage Status
  - Limited
  - Open
  - Unknown Status



- **Modeled Stream Layer**:
  - topographic and channel features
  - predicted average annual flow
  - ~(1:24K)
- **Modeled "*Intrinsic*" Habitat Potential**: Characterizes stream reaches as:
  - High Intrinsic Potential (HIP) or Low Intrinsic Potential (LIP).
  - *Winter* Habitat for Coho
  - Gradient, flow, valley width

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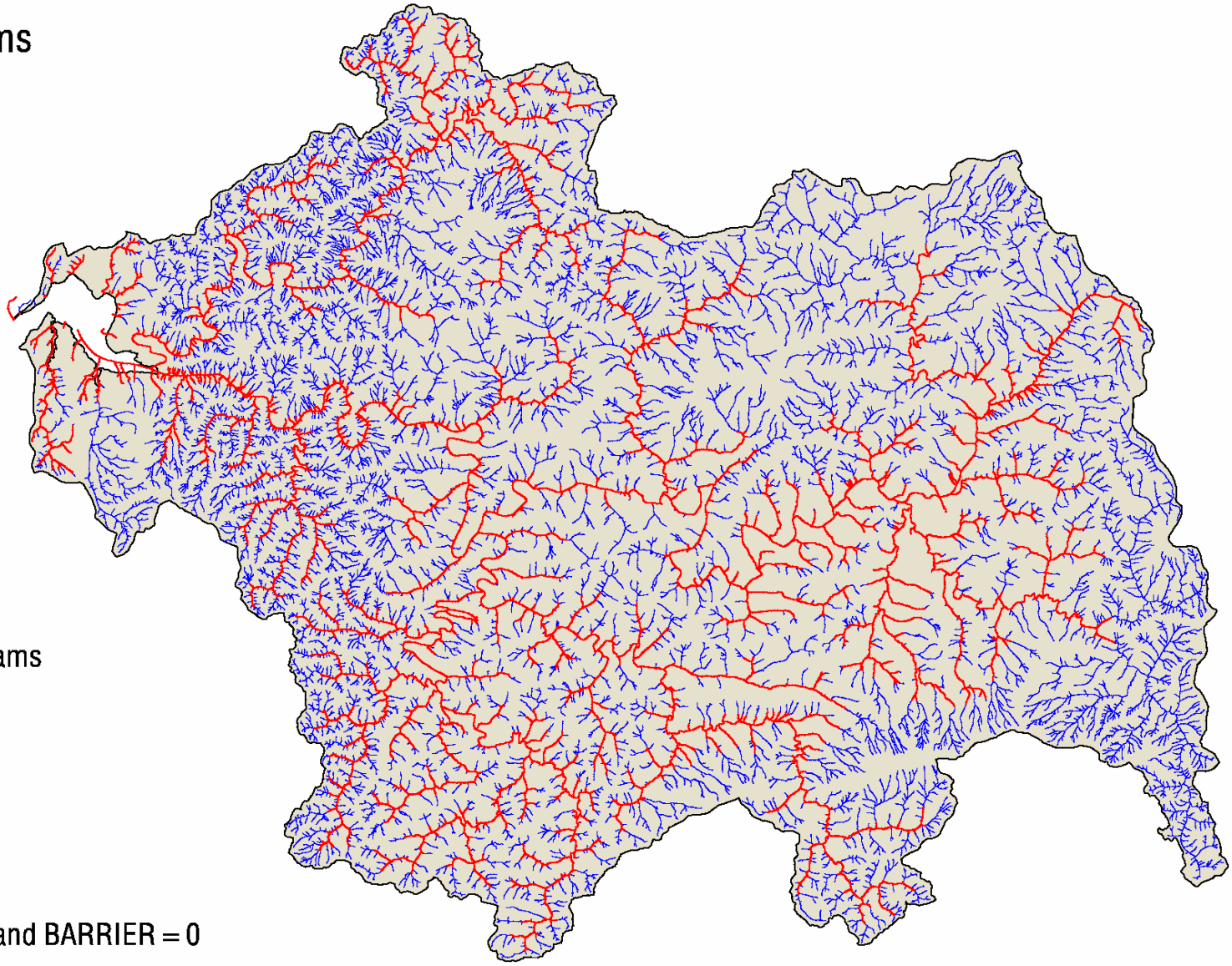
Coho CLAMS streams



All CLAMS Streams
Coho Streams

MAX_GRAD_D LE .0705 and BARRIER = 0

/odf/rp25/oregon_plan_streams/zplot 08/06/04

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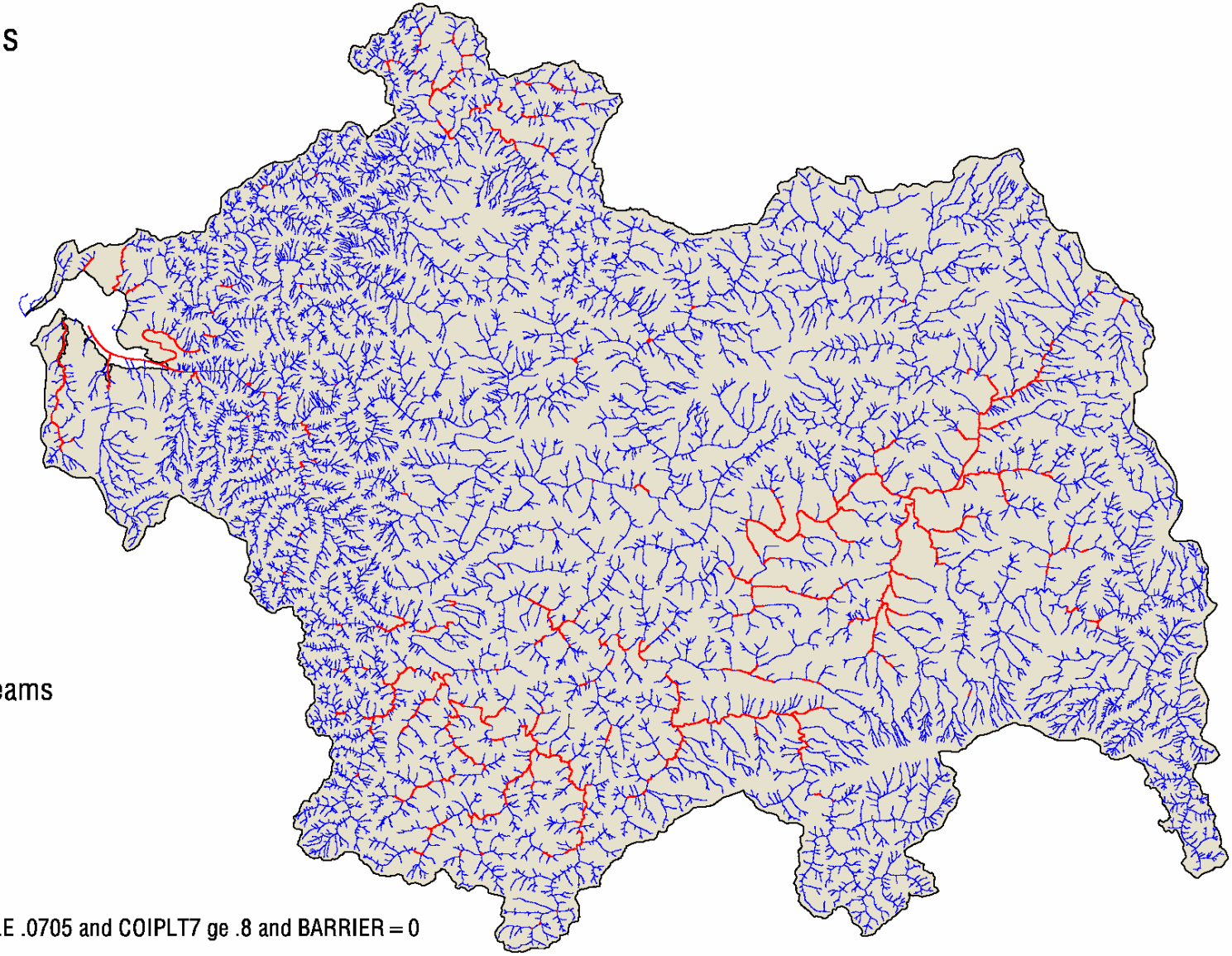
HIP CLAMS streams



HIP streams
All CLAMS Streams

HIP streams = MAX_GRAD_D LE .0705 and COIPLT7 ge .8 and BARRIER = 0

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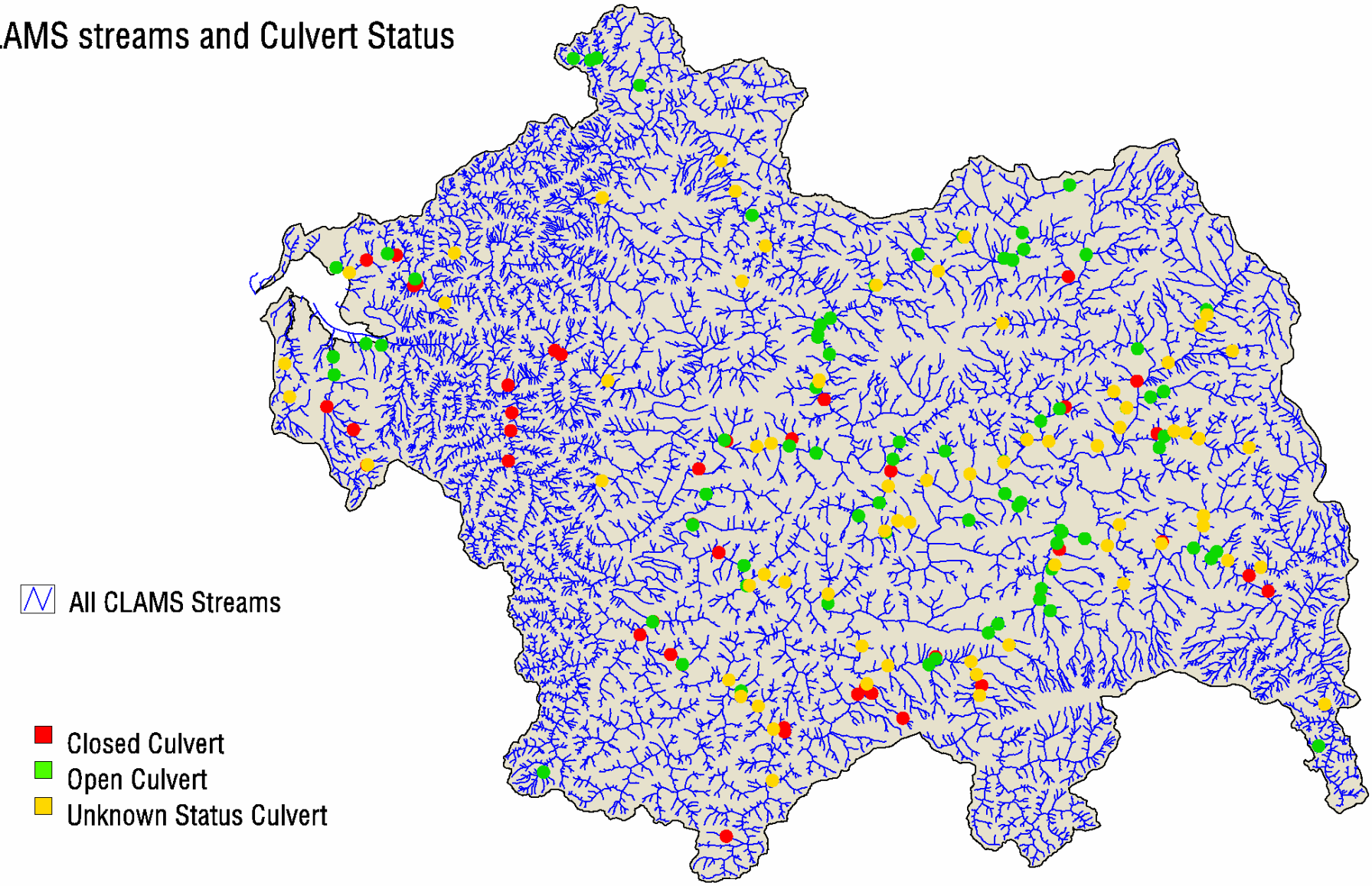
CLAMS streams and Culvert Status



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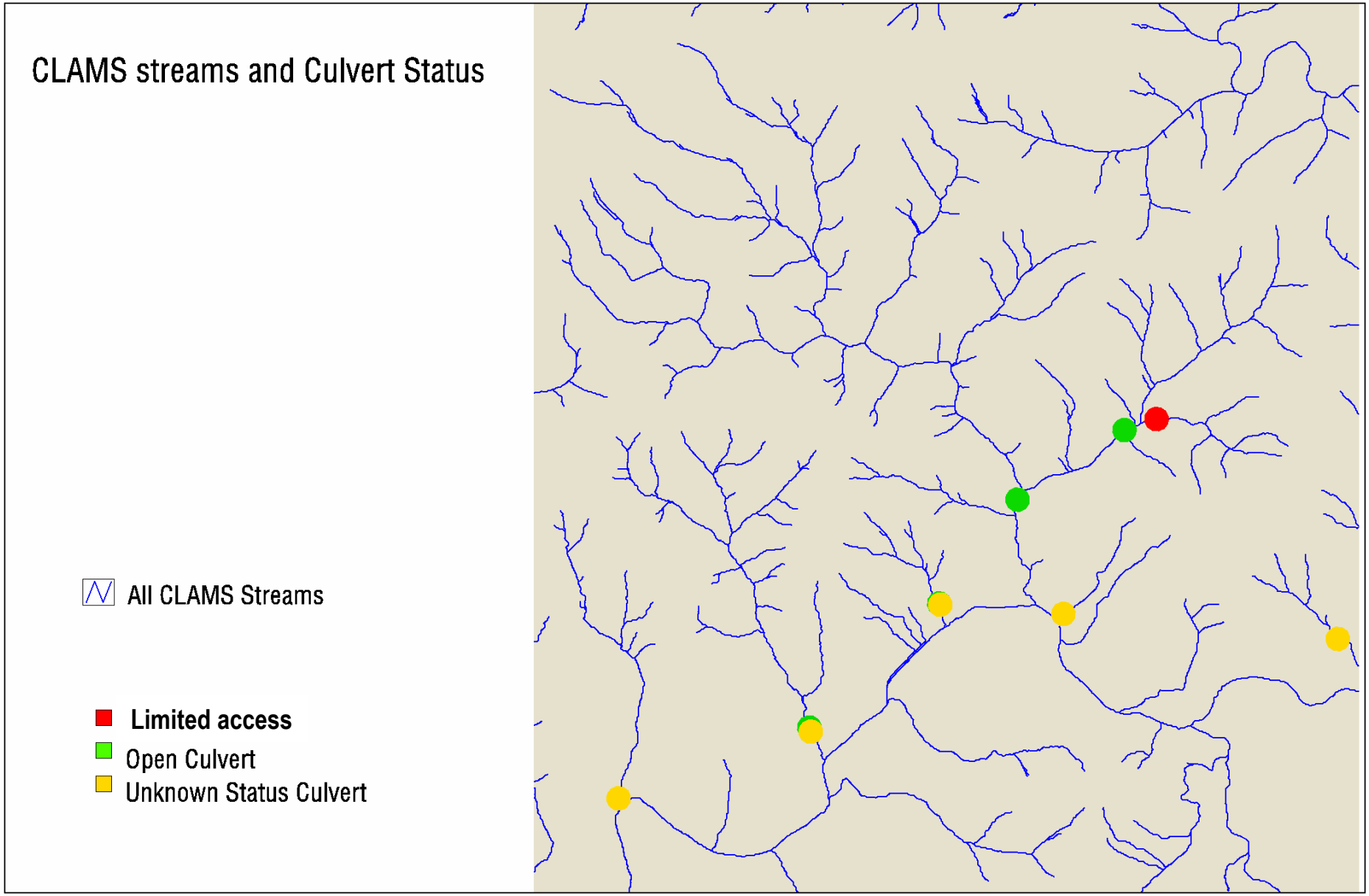

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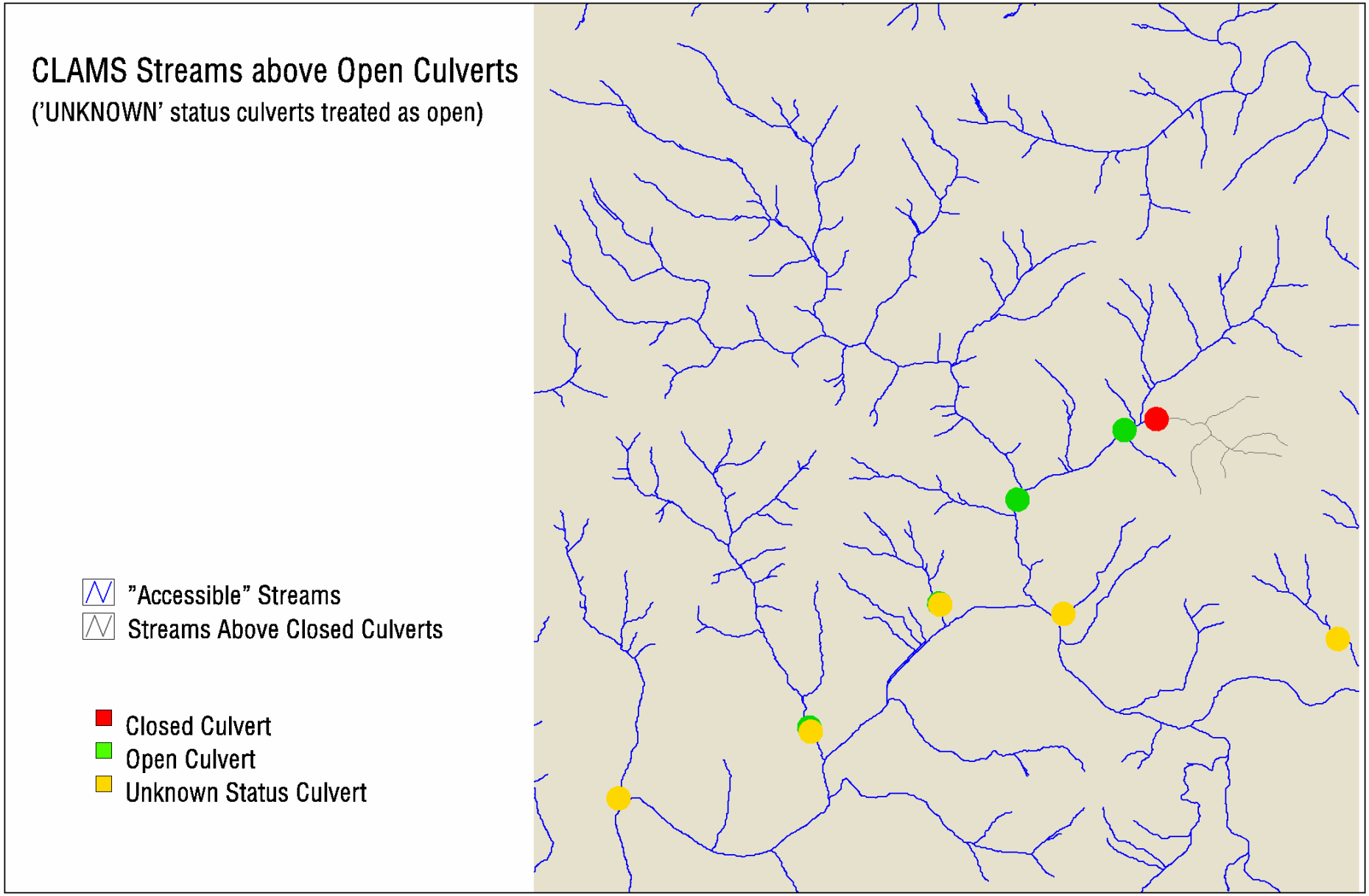
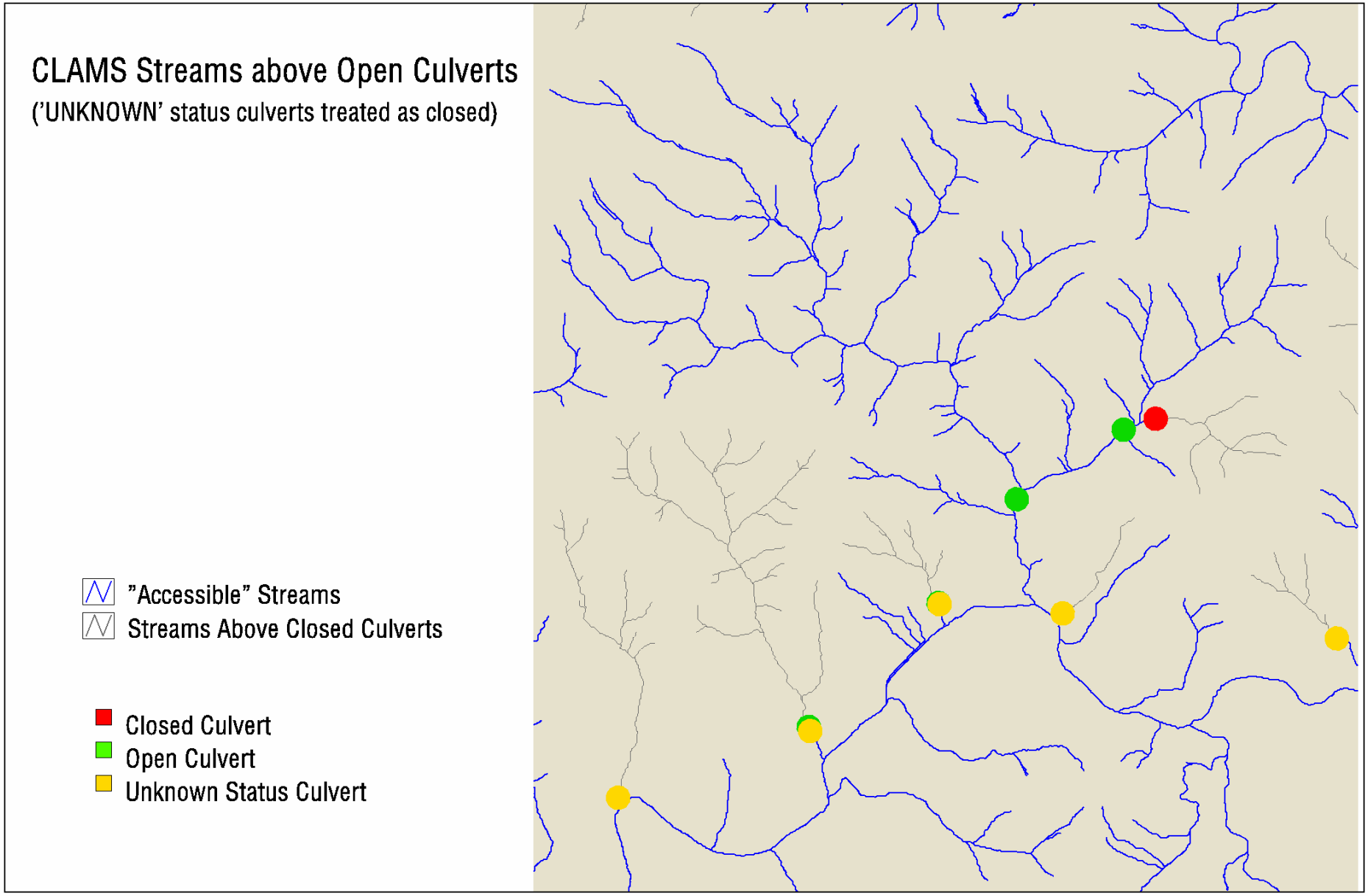

CLAMS Streams above Open Culverts
('UNKNOWN' status culverts treated as open)
"Accessible" Streams
Streams Above Closed Culverts
Closed Culvert
Open Culvert
Unknown Status Culvert
/odf/rp25/oregon_plan_streams/zplot 08/06/04


CLAMS Streams above Open Culverts
('UNKNOWN' status culverts treated as closed)
"Accessible" Streams
Streams Above Closed Culverts
Closed Culvert
Open Culvert
Unknown Status Culvert
/odf/rp25/oregon_plan_streams/zplot 08/06/04

Strengths

- The only data set of its kind at this scale
- Majority of crossings and barriers in Coho habitat
- Use of tool for future prioritization that can be adapted to other species

Limitations

- Don't have all data
- 22% could not be accurately located and were not included in the analysis
- Lumping into "limited"

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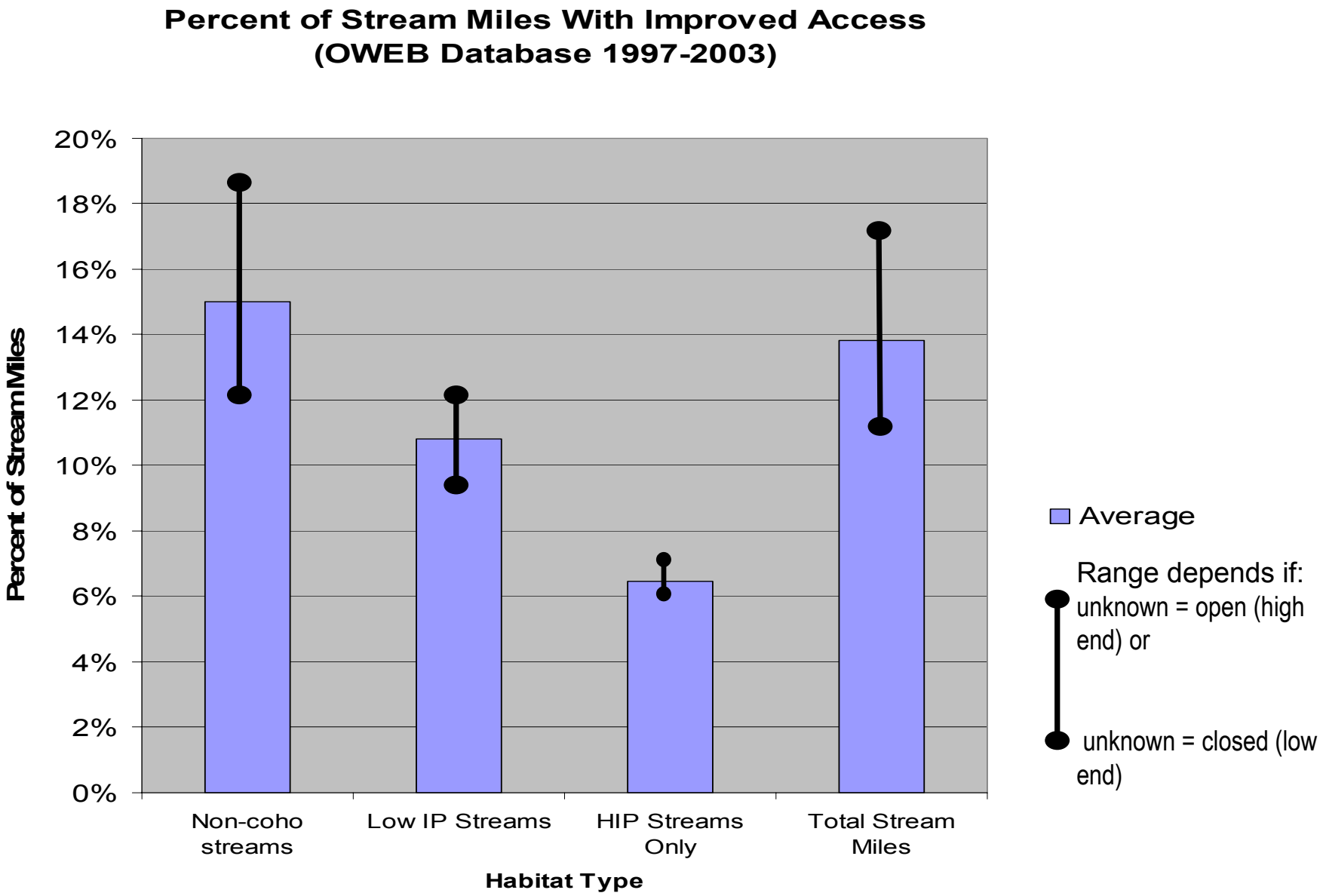

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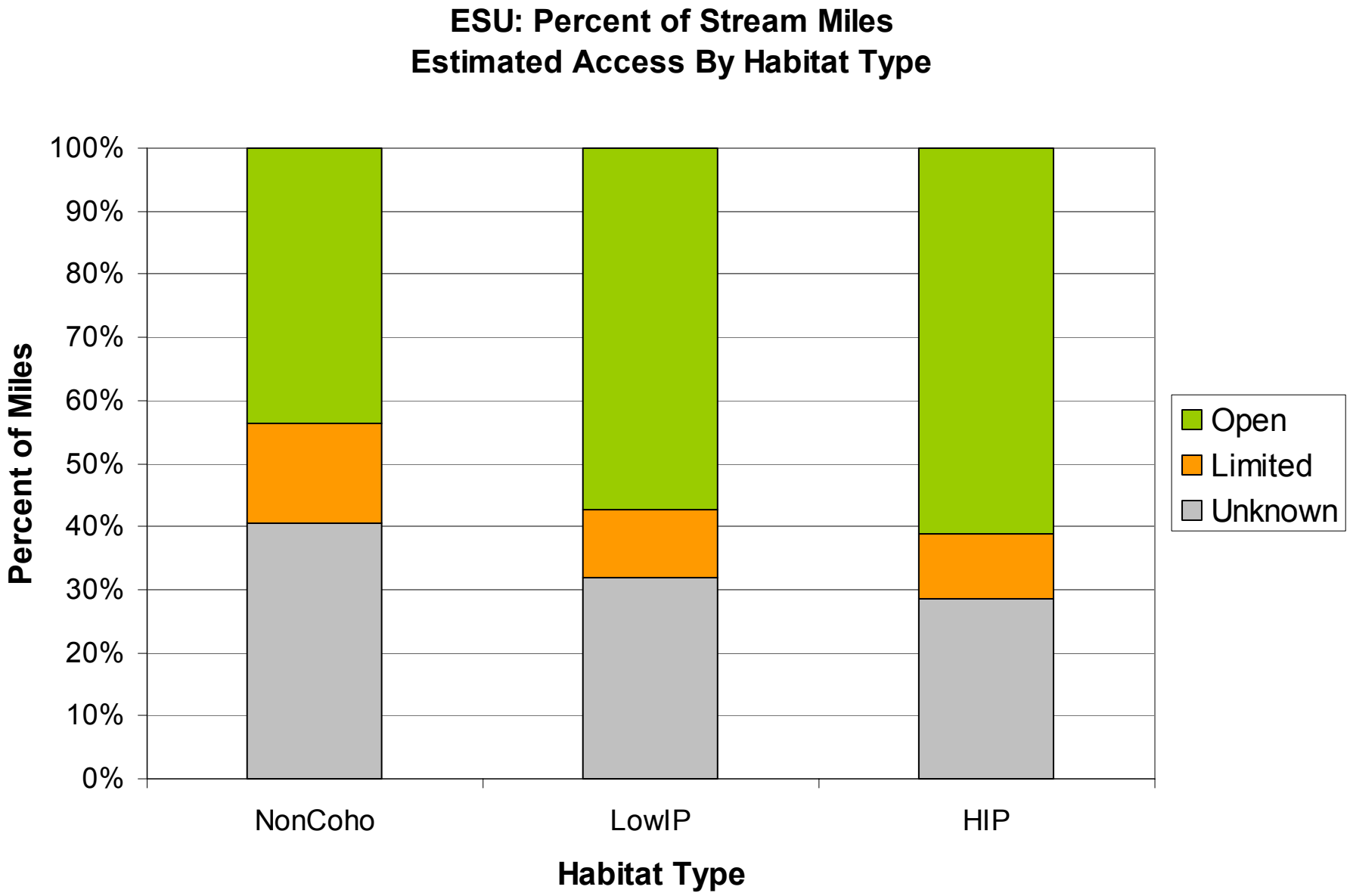

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Percent of Stream Miles with Limited or Unknown Access

- Non-Coho: 56%
  - 16% limited
  - 40% unknown
- Low IP Streams:43%
  - 11% limited
  - 32% unknown
- HIP Streams: 38%
  - 10% limited
  - 28% unknown

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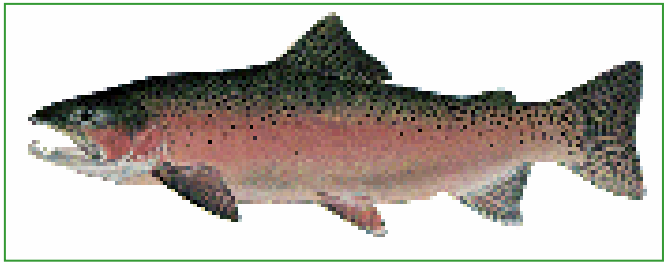
Implementation and Effectiveness



Types of Barriers

- Natural Features such as:
  - waterfalls, steep channels, low flow
- Artificial Structures such as:
  - **stream crossings**, tide gates, hatchery facilities, and impoundments

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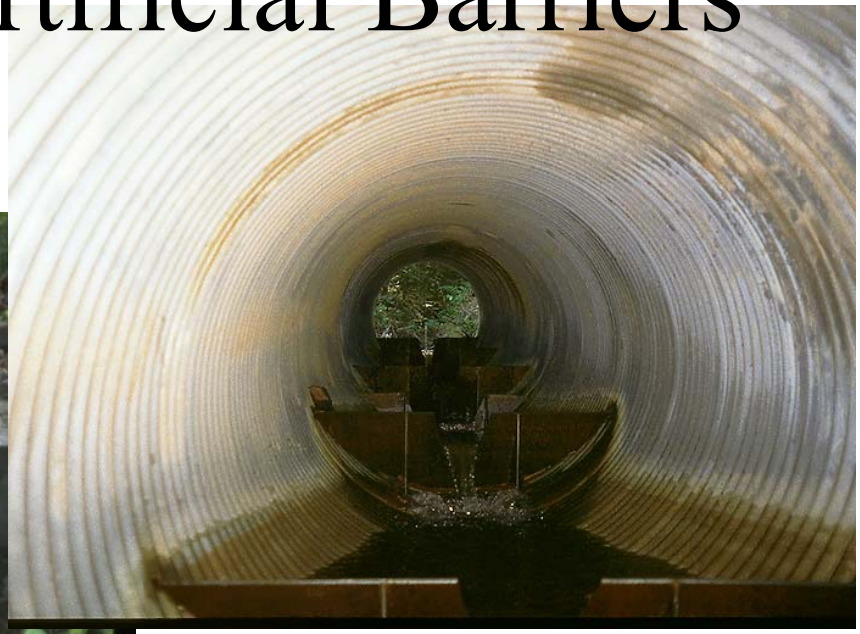
Multiple Approaches to Improving Passage through Artificial Barriers



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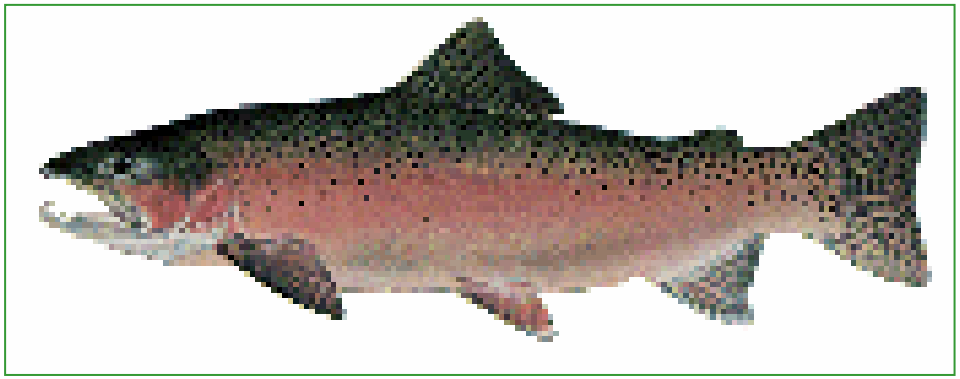
Implementation and Compliance



Existing Studies Provide Wide Range of Compliance

- 75% of culverts in forested basins are blockages or impediments (Conroy 1997)
- 23-28% of 1997/1998 installations low likelihood of passing juveniles (ODF 2000)
- 13% loss in coho summer rearing habitat (Beechie et al. 1994)

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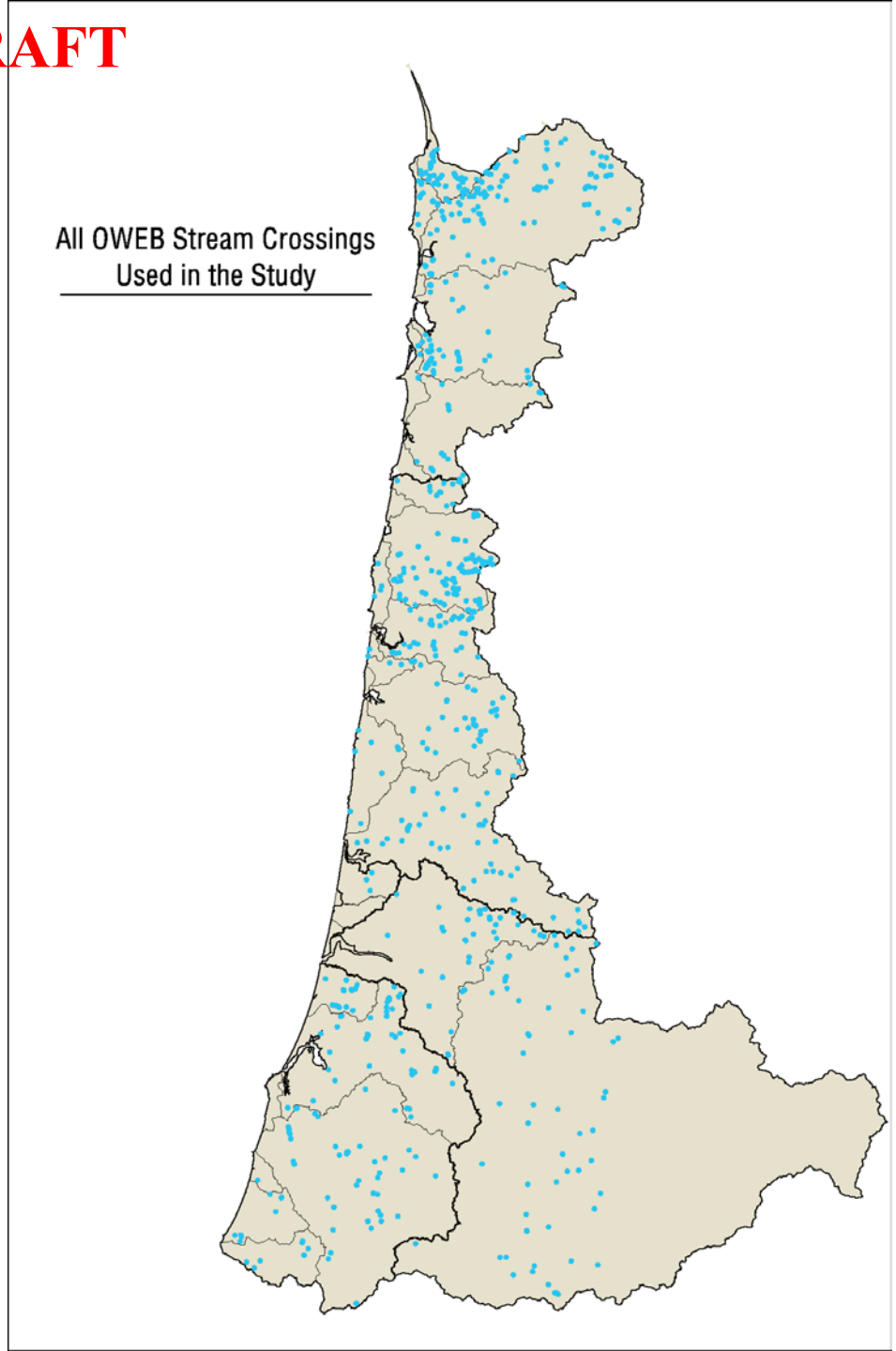
Implementation Under Oregon Plan

- 1,140 fish passage restoration projects reported since 1997 in the ESU

- Second Highest Restoration Investment (behind roads)



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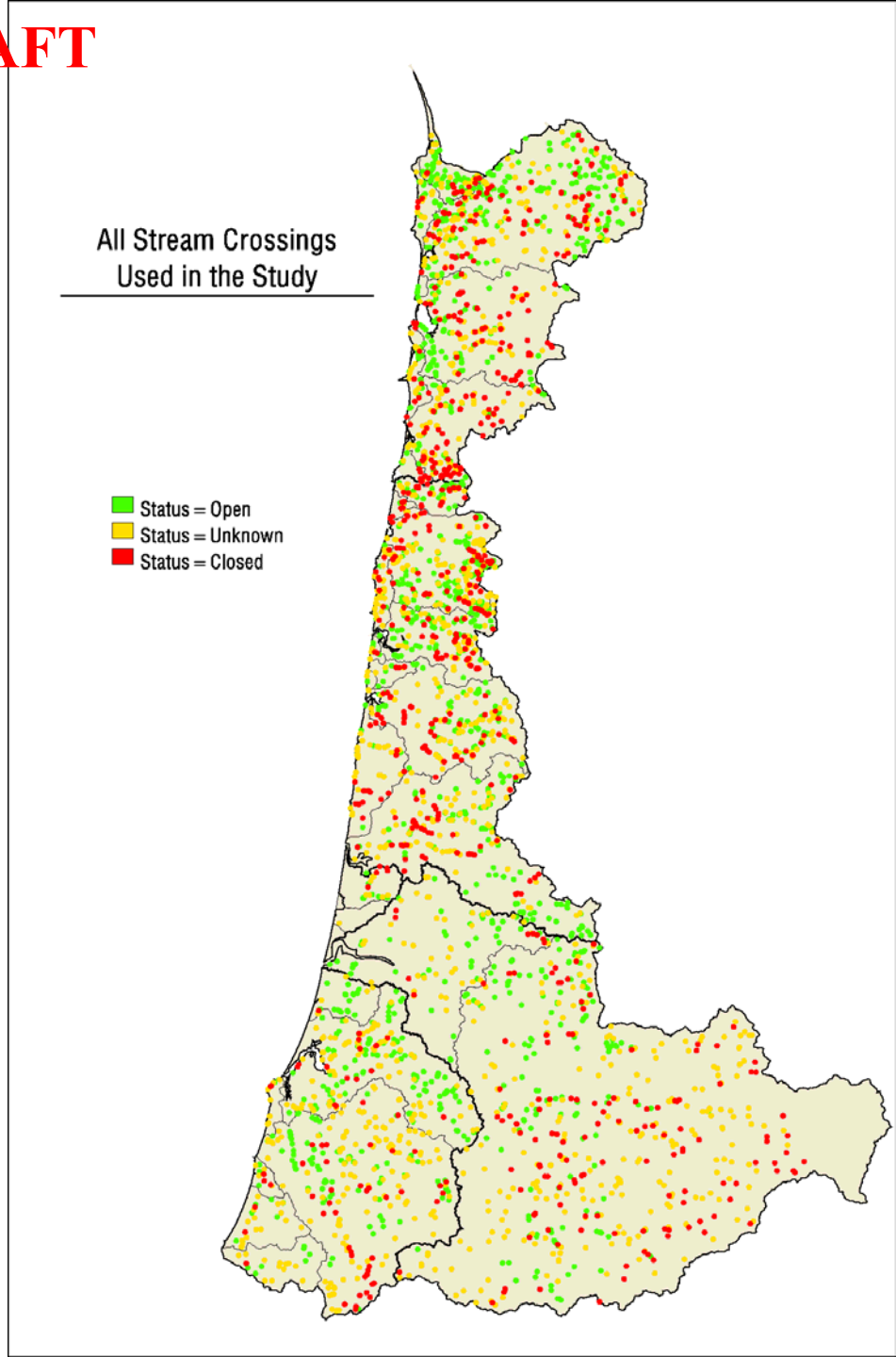
Estimated Implementation For ESU

(*Dent et al. Draft*)

- 43% pass fish
- 20% limit fish passage
- 37% with unknown access status



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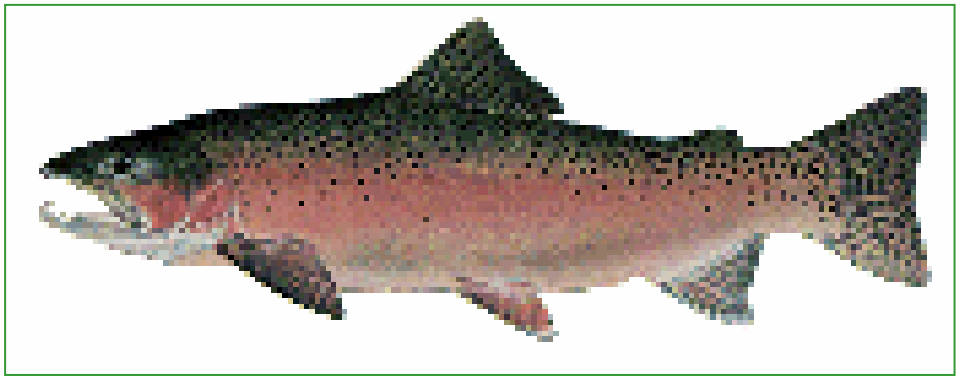
Effectiveness



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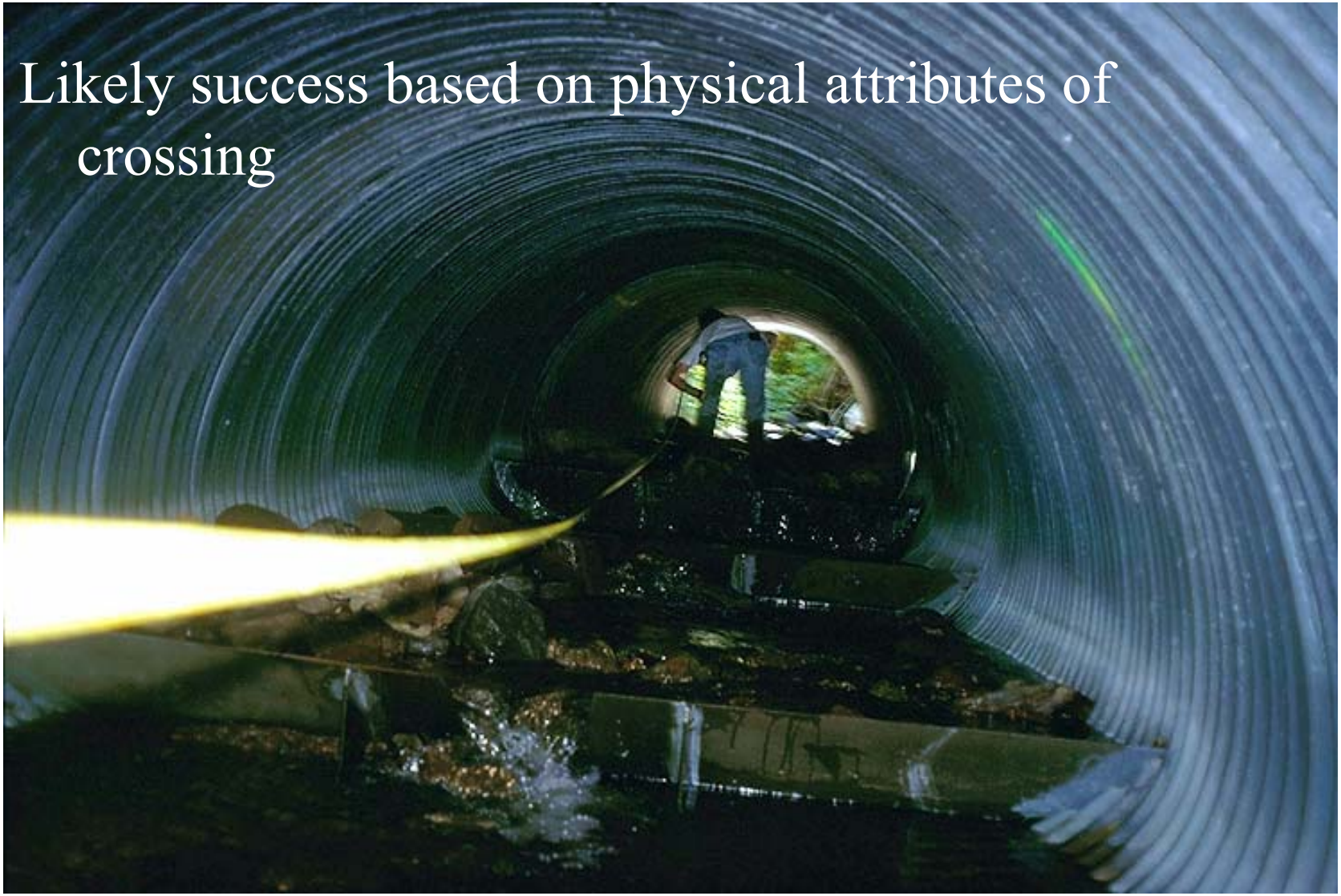
Effectiveness of Fish Passage Strategies



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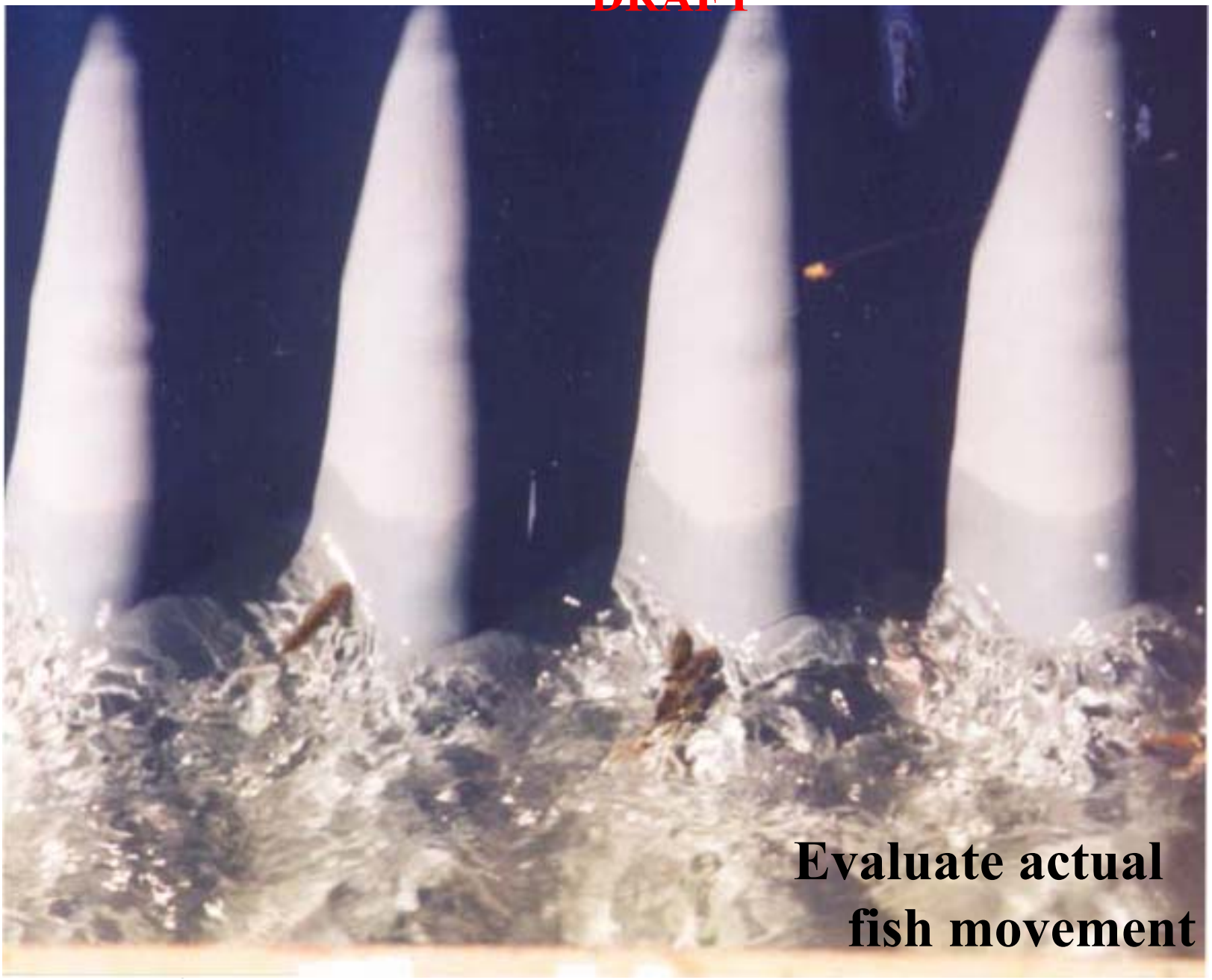

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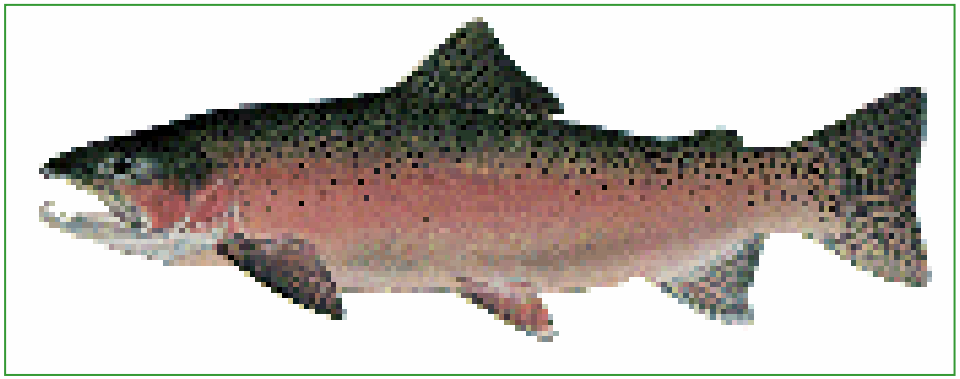
Greatest Likelihood to Pass Fish

Effectiveness

Need more field studies on the effectiveness of these strategies over time:

- Actual fish passage
- Physical attributes

Conclusions



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How significant is fish passage as a limiting factor for coho recovery?

Relatively small percent of coho streams remain inaccessible: (10 - 11%).

But, passage status is unknown for about 1/3 of coho streams.

Conclusions: Implementation

- Projects to date have been fairly evenly distributed throughout coho and non-coho streams
  - consider focused effort on coho streams.
- Estimate that 43% of crossings pass fish at all life stages

Conclusions: Effectiveness

Oregon Plan activities have improved access to coho streams:

- High IP streams by 6%
- Low IP streams by 10%

Conclusions: Effectiveness

The greatest success with stream crossing projects is associated with stream simulation strategies