

# Reservoir Size, Fill, and Engineering: Implementation of Percent of Flow

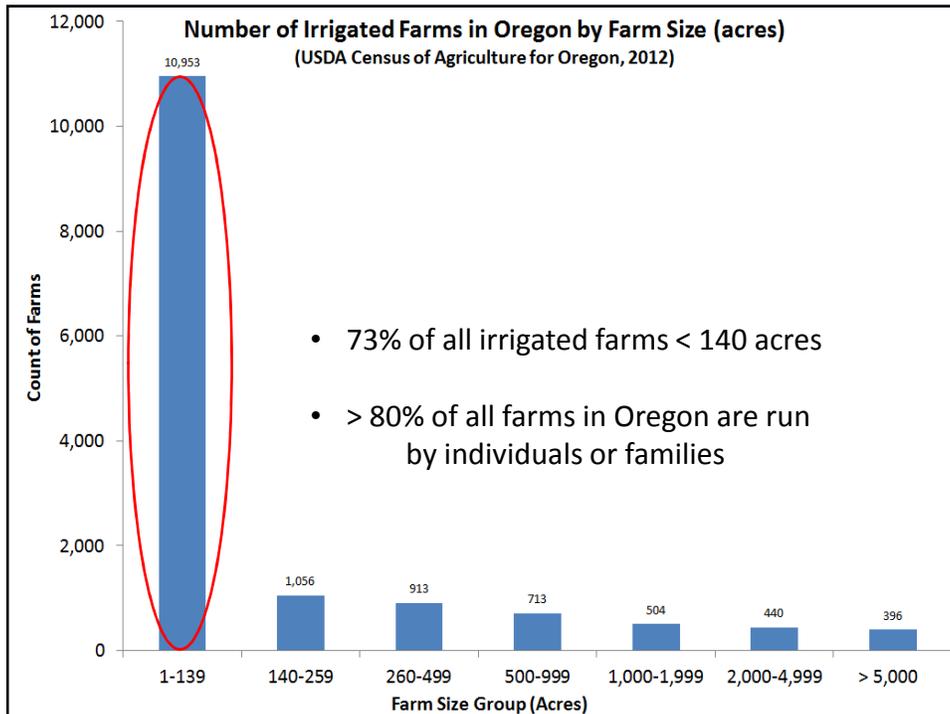
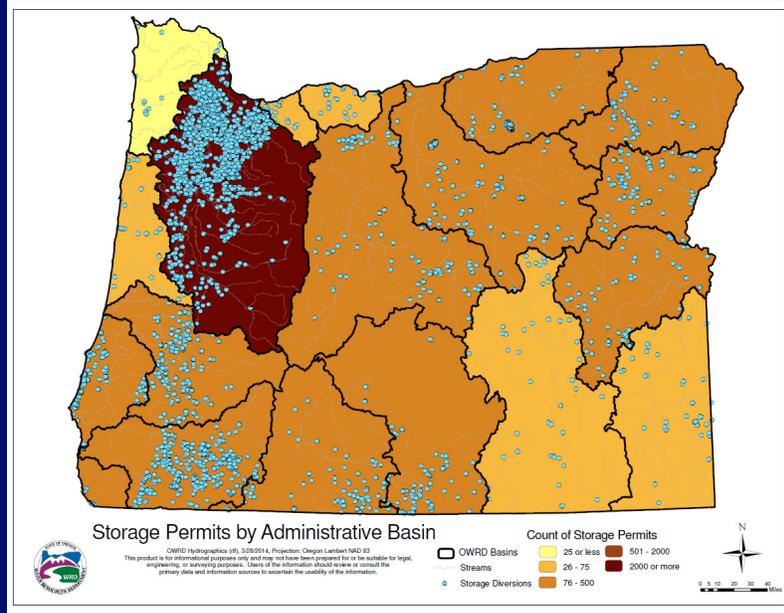
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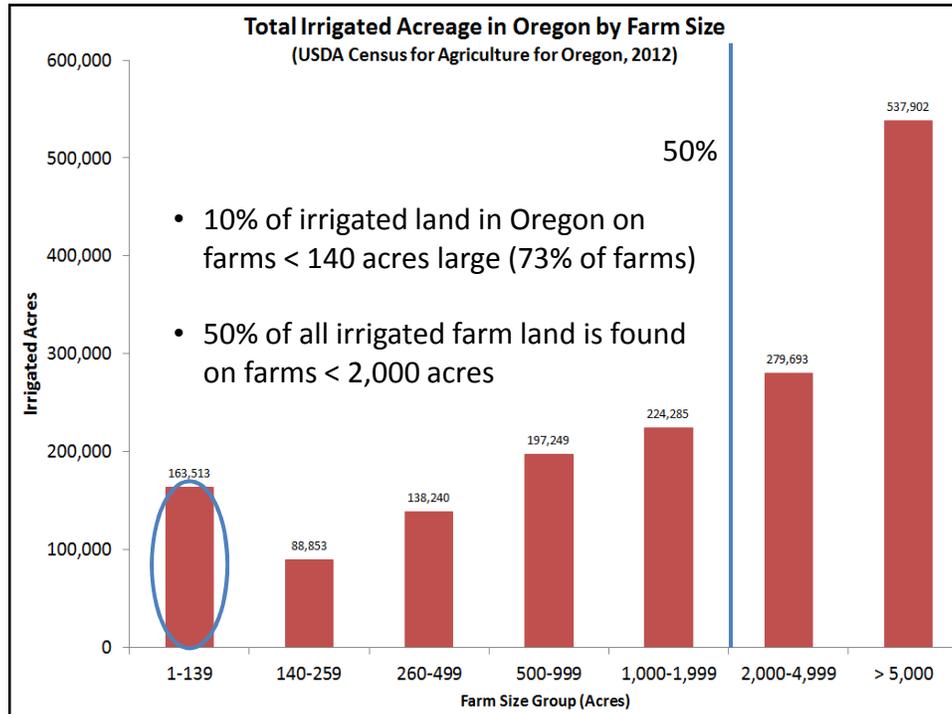
## Overview

- Reservoir size –Exploration of USDA Ag Census- what does Oregon use now?
- Hydrographs – Is POF Feasible in Different Regions of Oregon?\*
- Engineering- What are the engineered options for POF storage?

\*Note: for time being, ignoring “storage of water outside the irrigation season” sideboards (SB839 Section 13 (3b))

## Reservoir size: What does Oregon use now?

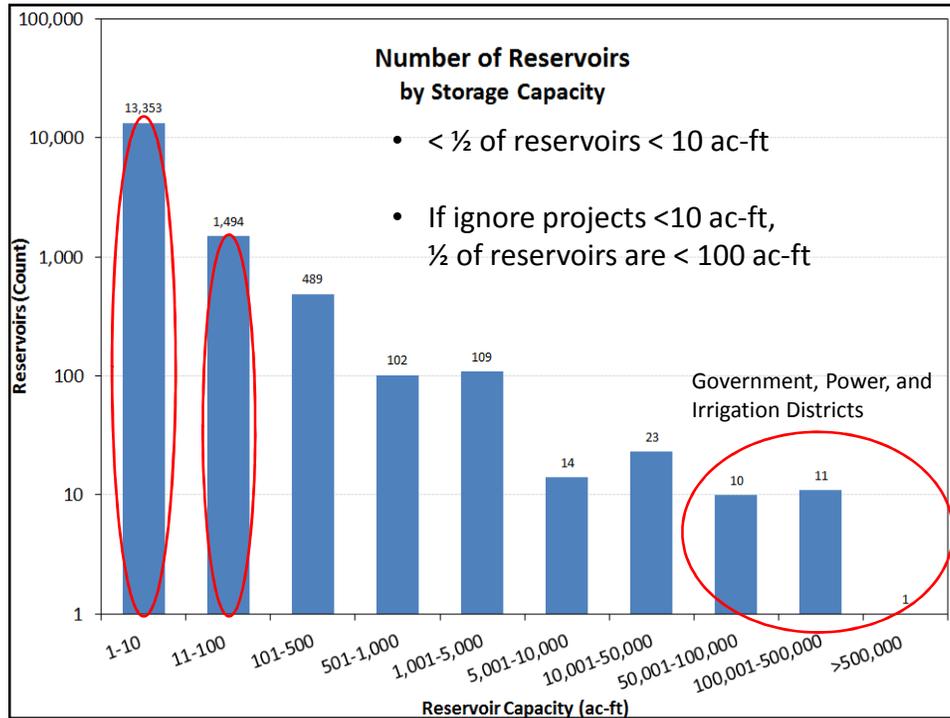




## How many farms can we serve?

- “Common” farm size: 140 acres
- “Common” farm irrigation need (3 ac-ft/ac): 420 ac-ft
- “50%” farm size: 2000 acres
- “50%” farm irrigation need (3 ac-ft/ac): 6,000 ac-ft

Reasonable Reservoir size: 6,000 ac-ft  
 Number of “Common” farms: at least 14  
 Number of “50%” farms: at least 1



## Comparison of Farm Size Across State

Agricultural District (USDA)	Percent of County Area Irrigated	Total Irrigated Area in County (Acres)	Average Irrigated Farm Size in County (Acres)
NORTHWEST	3%	19,388	42
NORTH CENTRAL	3%	27,830	180
SOUTHWEST	2%	65,064	167
NORTHEAST	4%	83,941	164
SOUTHEAST	3%	92,924	242
Statewide	3%	57,829	159

USDA Census of Agriculture for Oregon, 2012

## Farm size and irrigated acres in Union and Yamhill Counties

	Union	Yamhill
Total # Farms (with irrigation)	309	422
Total # Acres (irrigated)	49,049	22,064
Average size of irrigated farm (acres)	159	52

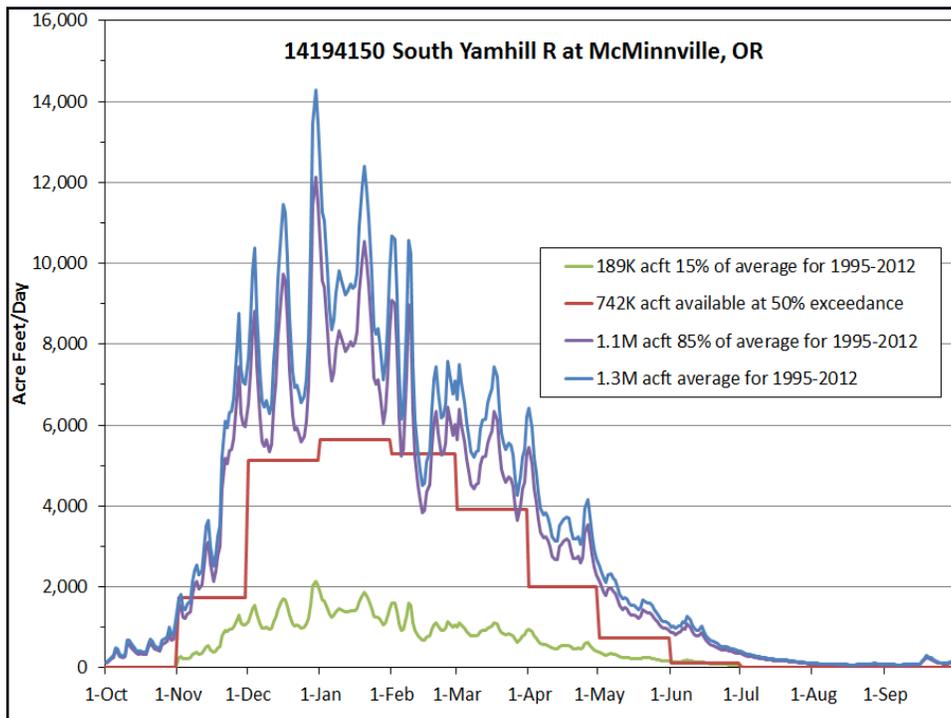
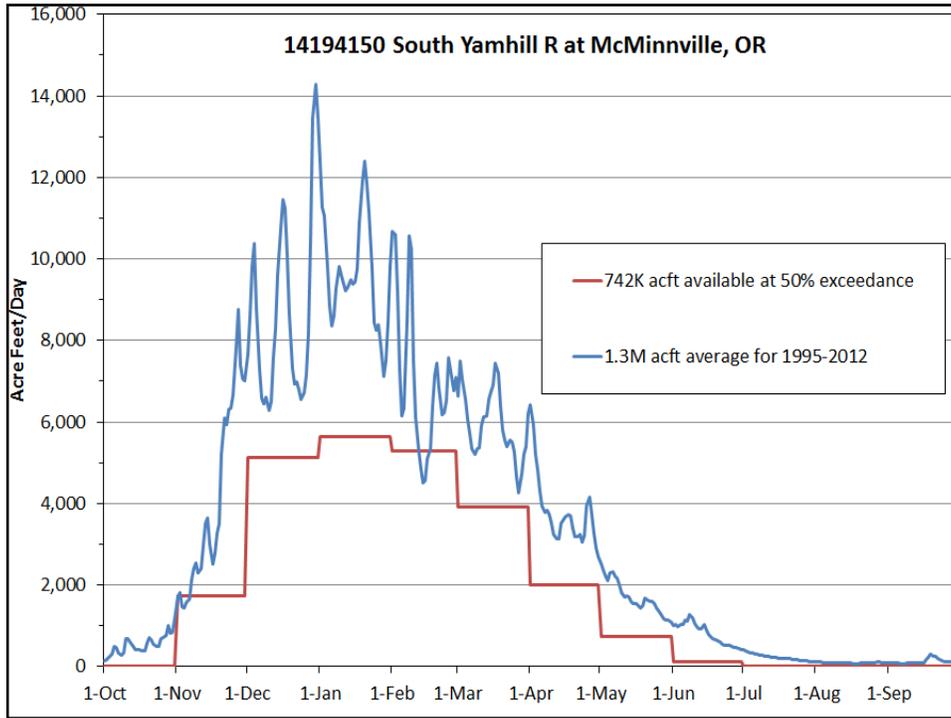
USDA Census of Agriculture for Oregon, 2012

NE = 164 NW = 42

## Hydrographs: POF Feasible?

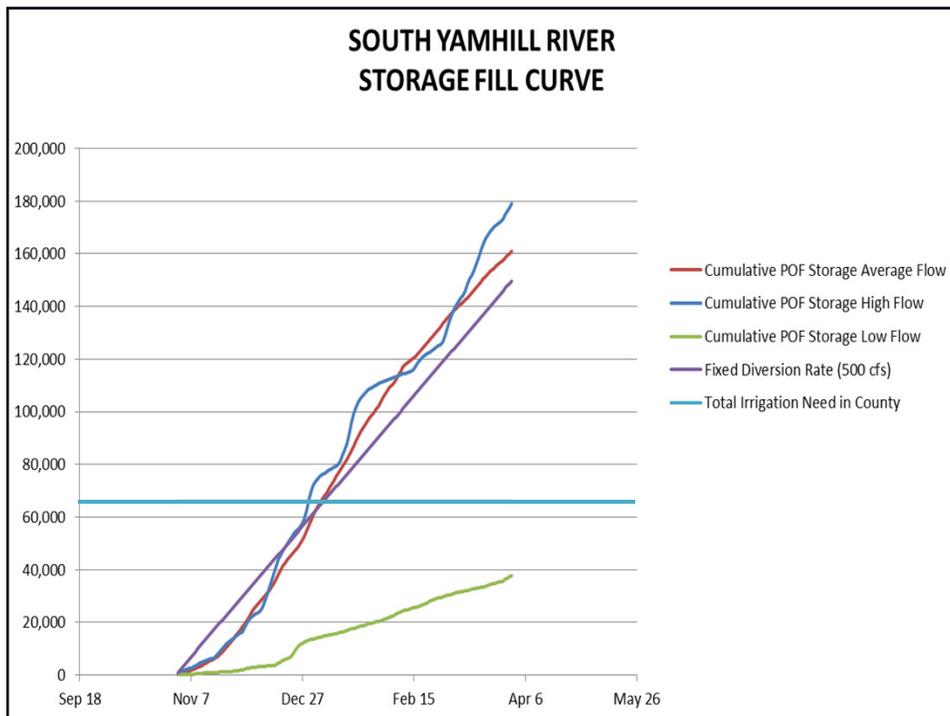
Current Total # Acres (irrigated)	Union	Yamhill
	49,049	22,064

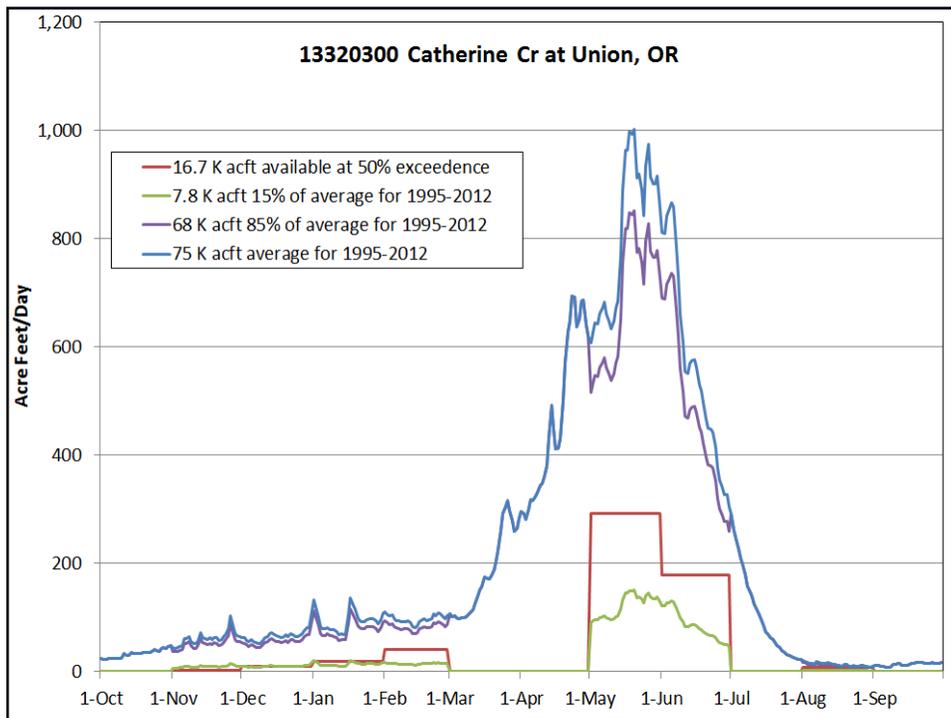
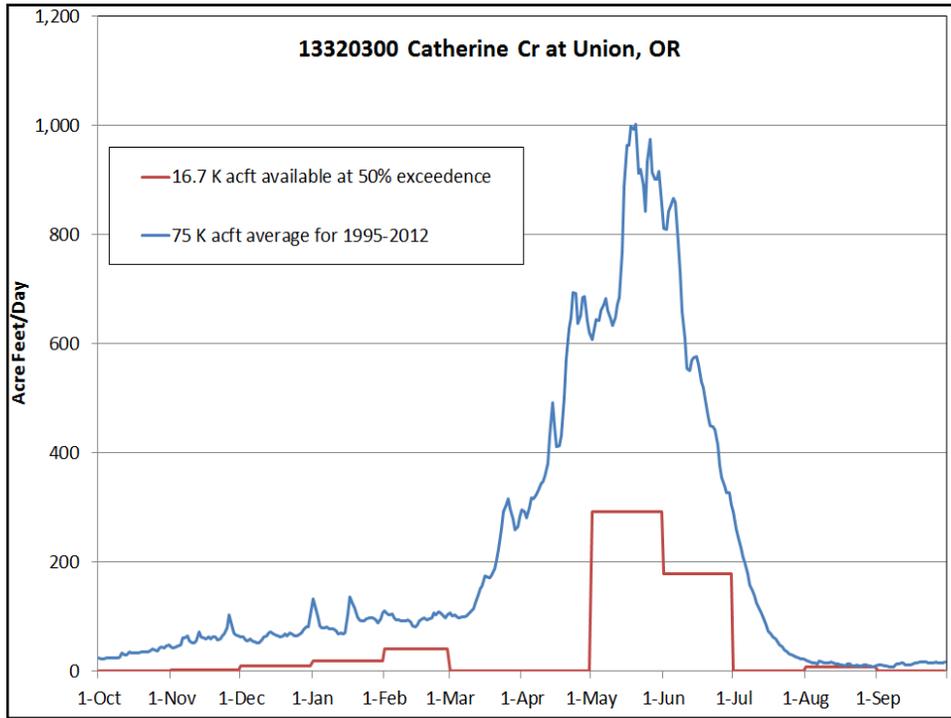
- South Yamhill River Hydrologic Regime
  - Basin Size: 500 square miles
  - Estimated Storage Potential: 150,000 acre\*ft
  - 300 acre\*ft/square mile
  - Basin Yield: 100 acres irrigation/square mile of watershed
  - Current Yamhill County irrigation need: 66,000 acre\*ft
  
- Catherine Creek Hydrologic Regime
  - Basin Size: 340 square miles (210,000 acres)
  - Estimated Storage Potential at gage: 7,800 acre\*ft
  - 78 acre\*ft/square mile
  - Basin Yield: 26 acres irrigation/square mile of watershed
  - Current Union County irrigation need: 150,000 acre\*ft
  - Union County : 1,300,000 acres
  - Catherine Creek irrigation need:  
 (49,000 acre-feet/1,300,000 acres)\*210,000 acres = 8,100 acre-feet current irrigation need in Catherine Creek basin



## Yamhill-Average, Dry, and Wet Years

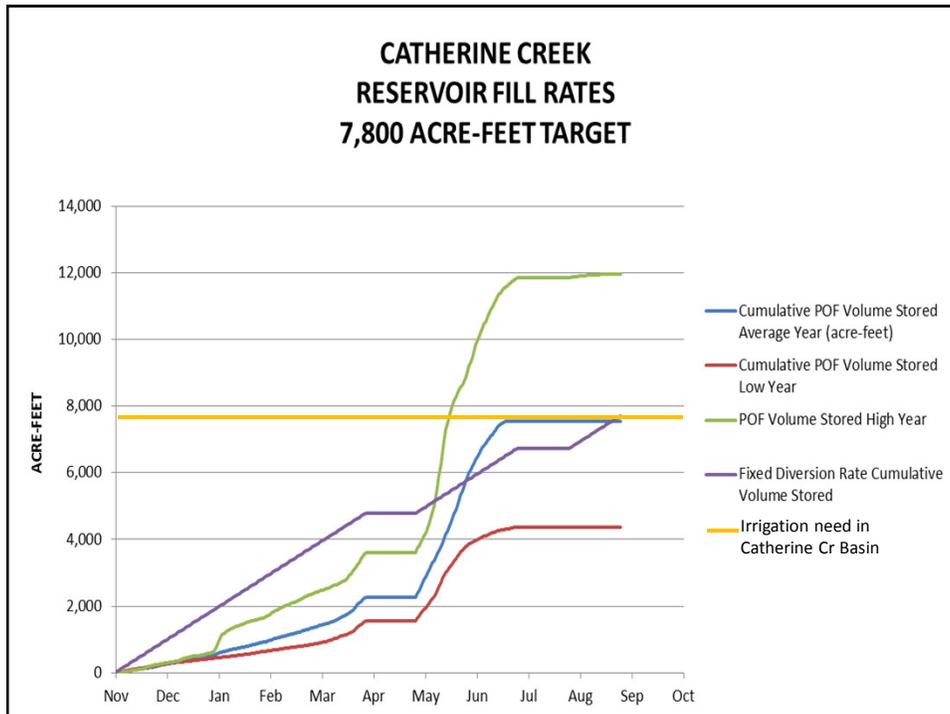
South Yamhill (14194150)	Annual Storage (Acre-Feet)
15% in Average Year (1995-2012)	189,000
Low Year = 2001	38,000
High Year = 2011	221,000





## Catherine Creek-Average, Dry, Wet Years

Catherine Cr (13320300)	Annual Storage (Acre-Feet)
15% in Average Year (1995-2012)	7,800
Low Year = 2001	7,100
High Year = 2011	14,000



## Fill Rate Summary

- Does POF provide access to water?
- In-Depth Assessments
- Additional regulations and SB 839 stipulations
- Recommendation : Remove “non-irrigation” season language and instead use water availability to set the diversion season

## Diversion Engineering

- Fixed Rate Diversions are most common
  - Diversion with full channel dam and Fish Ladder
  - Dam with orifice control
- Percent of Flow Diversions are possible
  - Pumped diversion
  - Weir split of flow
  - Adjustable orifice based on gaged river and diversion flows

Diversion with Full Channel Dam and In Channel Ladder



Diversion with Full Channel Dam and Fish Ladder



## Full Channel Dam and Fish Ladder



## Winter Diversion Ice Concerns

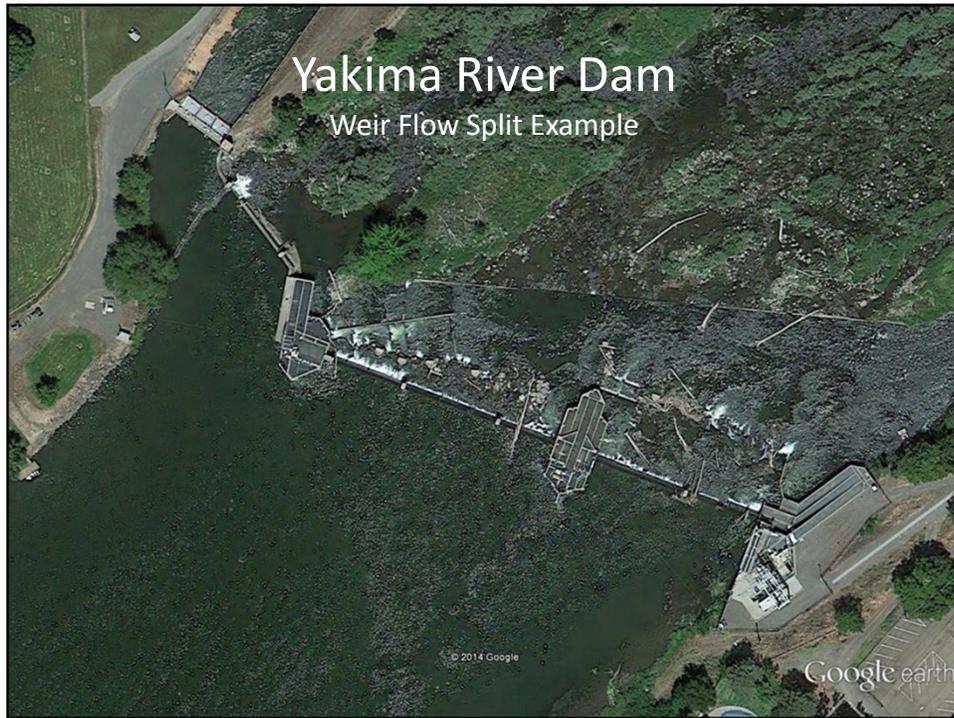


## Pumped Diversion w/o Dam



## Weir and Orifice Style Diversion





Questions?