# UPDATE ON DAM SAFETY IN THE WILLAMETTE VALLEY

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Portland District, USACE

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U.S.ARMY

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# AGENDA / GOALS & OBJECTIVES



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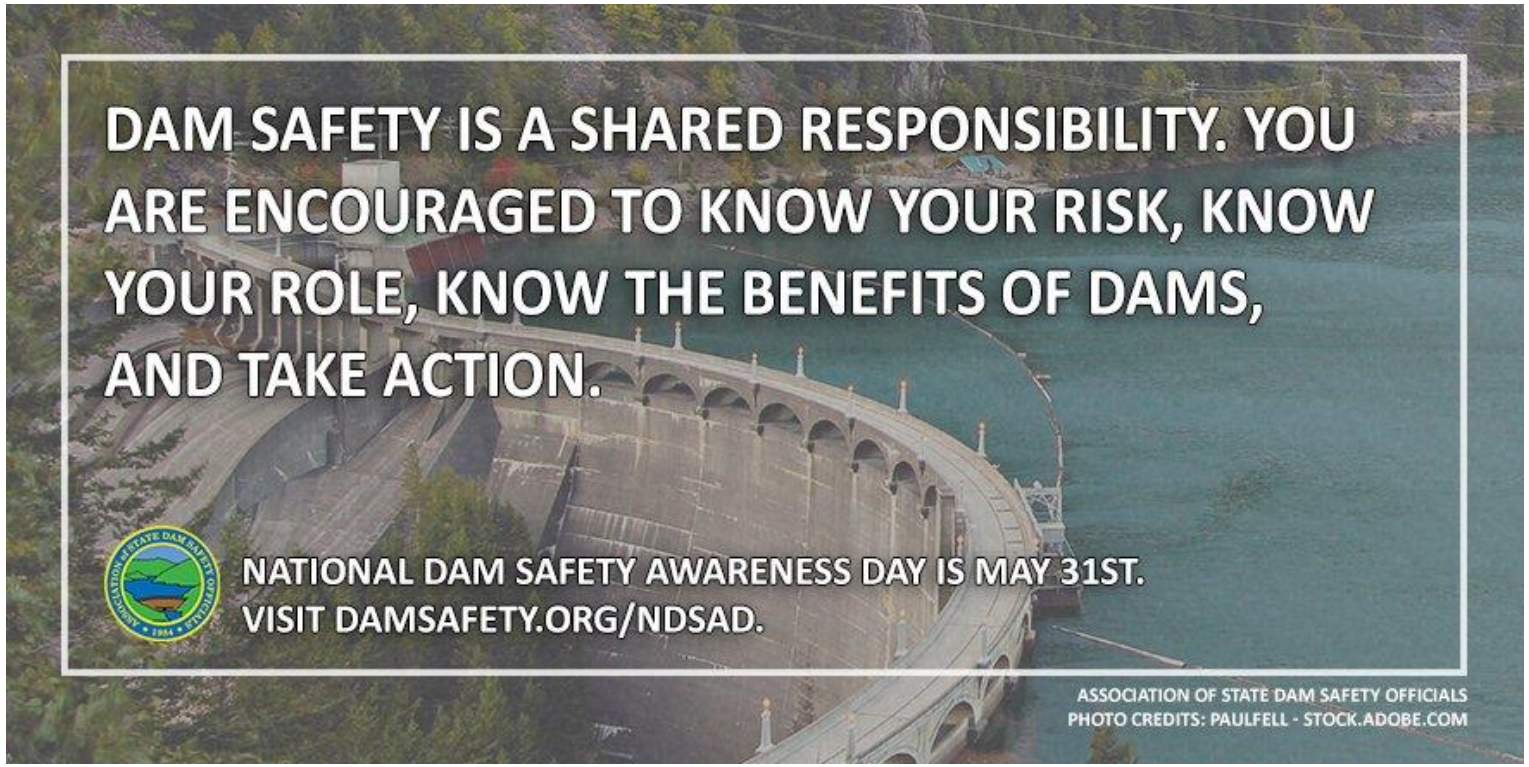
– Overview of USACE dam safety program
– Risk assessment process and tools
– Balancing flood risk with other purposes
– Spillway gate rehabilitation progress
– April 2019 example of flood risk management



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# USACE DAM SAFETY PROGRAM

Periodic Inspections

Annual Inspections

Spillway Gate Inspections

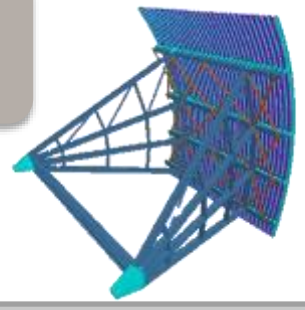
Dam Safety Training

Risk Assessments

Instrument Monitoring

EAP Updates & Exercises

Studies and Analysis



# DEFINITION OF RISK



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**HAZARDS**
- What are the hazards?
- How often and how severe?
- What are conditions at the dam?

**RISK**

**CONSEQUENCES**
- Who is downstream?
- What may flood?
- How much warning time?

**PERFORMANCE**
- How will the dam respond?
- How likely to perform satisfactory?
- What can go wrong?

# DAM SAFETY RISK TOOLBOX

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## Dam Safety Modification Study (DSMS)

Non-Routine, Very High to Moderate Risk Dams

- Alternatives Study
- Pre-Construction Engineering & Design
- Construction & Implementation
- Post-Implementation Evaluation

## Issue Evaluation Study (IES)

Non-Routine, High to Low Risk Dams

- SQRA
- Field Investigations
- Detailed Study & Analysis
- Expert Elicitation

## Periodic Assessment (PA)

Routine, All Dams

- Review Existing Information
- Periodic Inspection
- Potential Failure Modes Analysis

# SPILLWAY GATE RELIABILITY IMPROVEMENTS



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| Dam | # of Gates | Mechancal | Electrical | Structural |
|---|---|---|---|---|
| **North Santiam** | | | | |
| **Detroit** | 6 | In Construction | | |
| **Big Cliff** | 3 | Completed | | |
| **South Santiam** | | | | |
| **Green Peter** | 2 | Completed | | |
| **Foster** | 4 | Planned | Planned | Completed |
| **McKenzie** | | | | |
| **Cougar** | 2 | 1 of 2 gates complete | | |
| **Blue River** | 2 | Completed | | |
| **Middle Fork** | | | | |
| **Hills Creek** | 3 | 2 of 3 gates complete | | |
| **Lookout Point** | 5 | Completed | | |
| **Dexter** | 7 | Completed | | |
| **Fall Creek** | 2 | Completed | | |
| **Long Tom** | | | | |
| **Fern Ridge** | 6 | Planned | Planned | Not Needed |

Status as of February 2020.

# BALANCING FLOOD & CONSERVATION STORAGE



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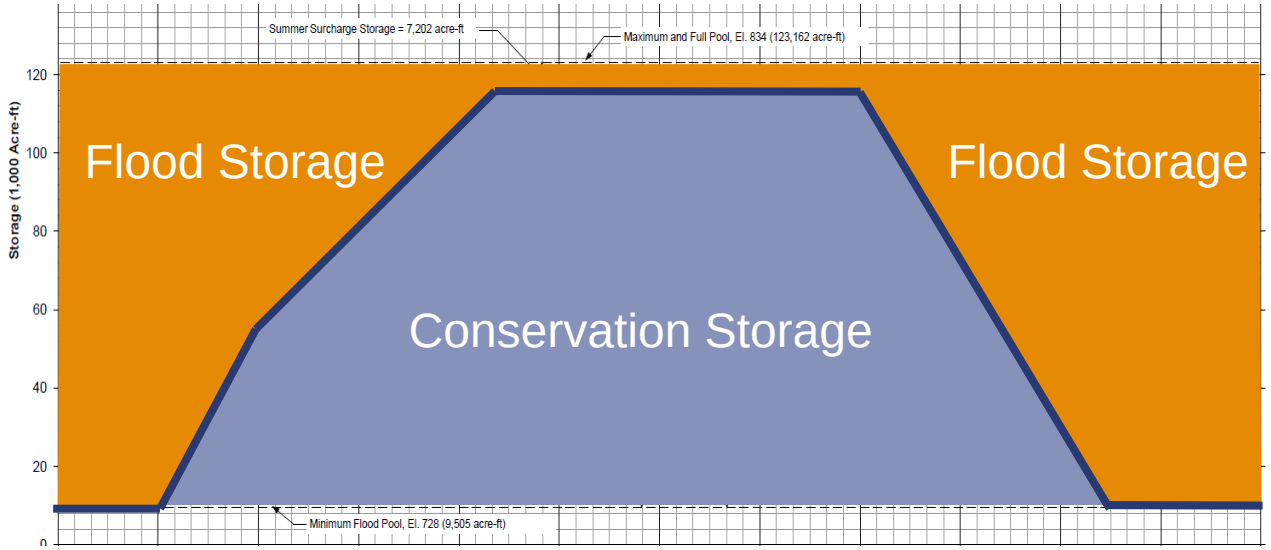
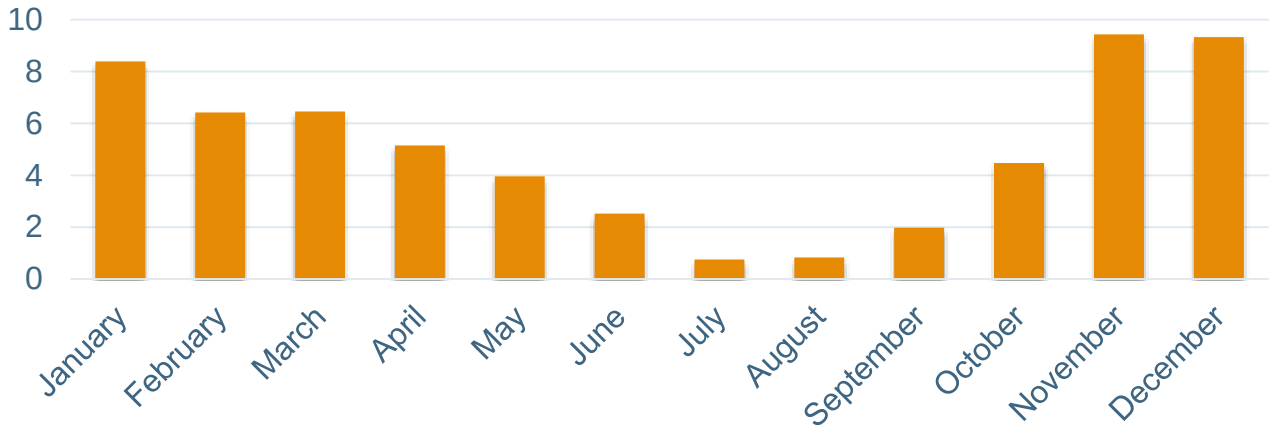



## Average Precipitation at Fall Creek Dam by month, in inches (1981-2010)



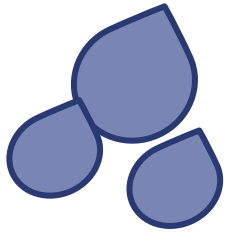

## Flood Risk Management

## Navigation

## Water Quality

## Hydropower

## Water Supply



## Fish & Wildlife

## Recreation

# APRIL 2019 – HILLS CREEK RESERVOIR OPERATIONS



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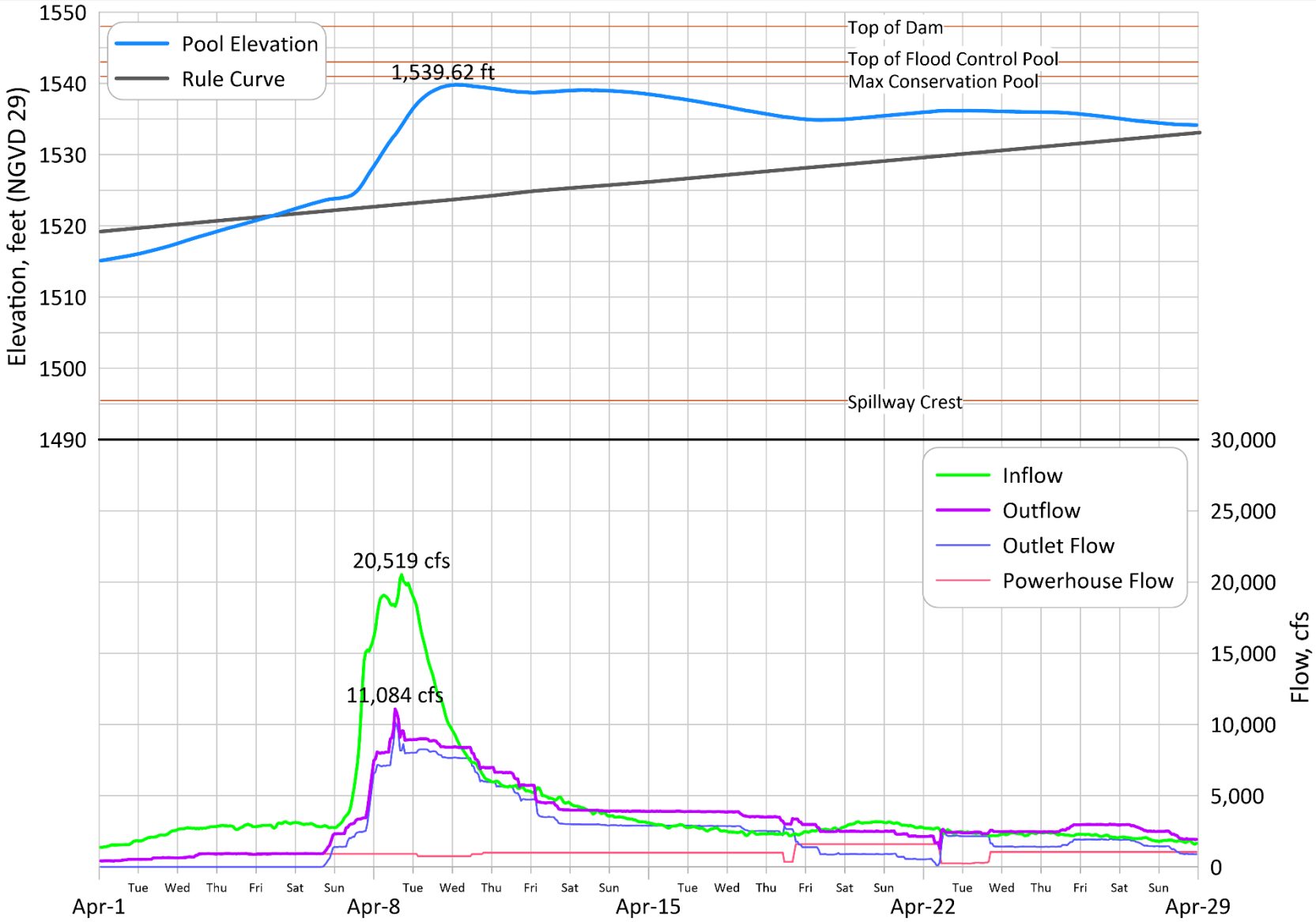

# MIDDLE FORK WILLAMETTE RIVER FLOWS – APRIL 2019



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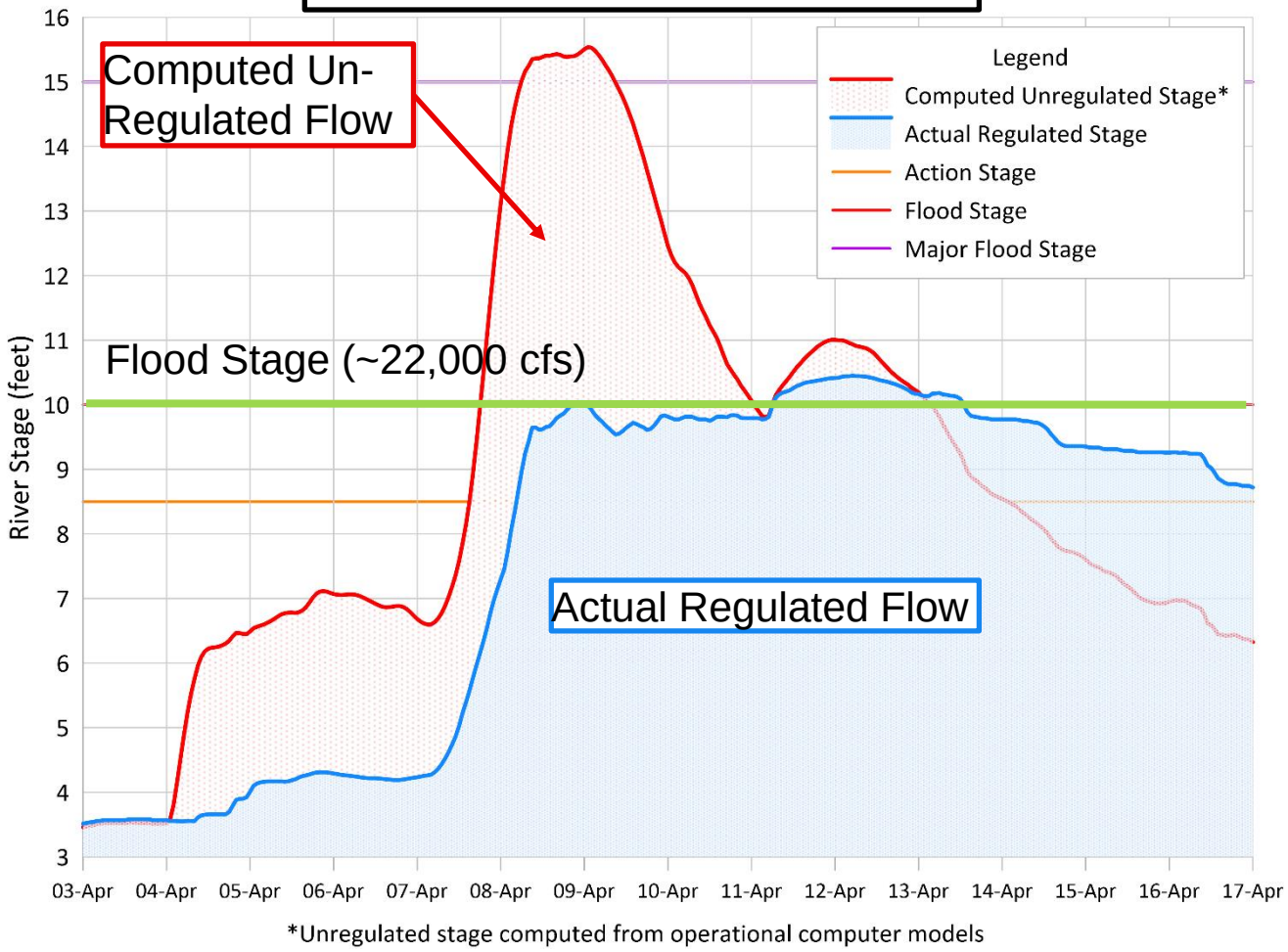
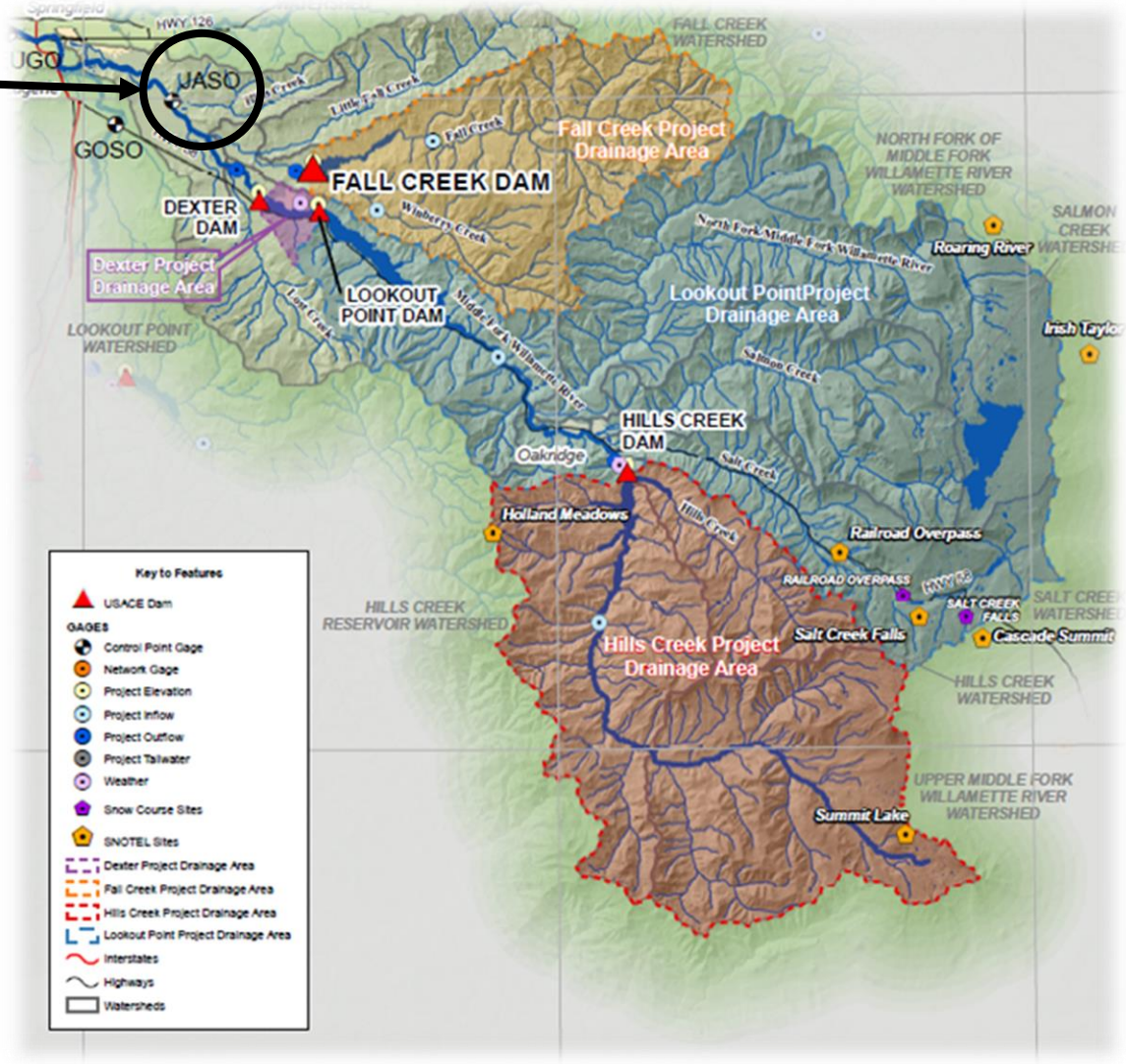
MF Willamette @ Jasper




*Unregulated stage computed from operational computer models



# WILLAMETTE RIVER FLOWS – APRIL 2019



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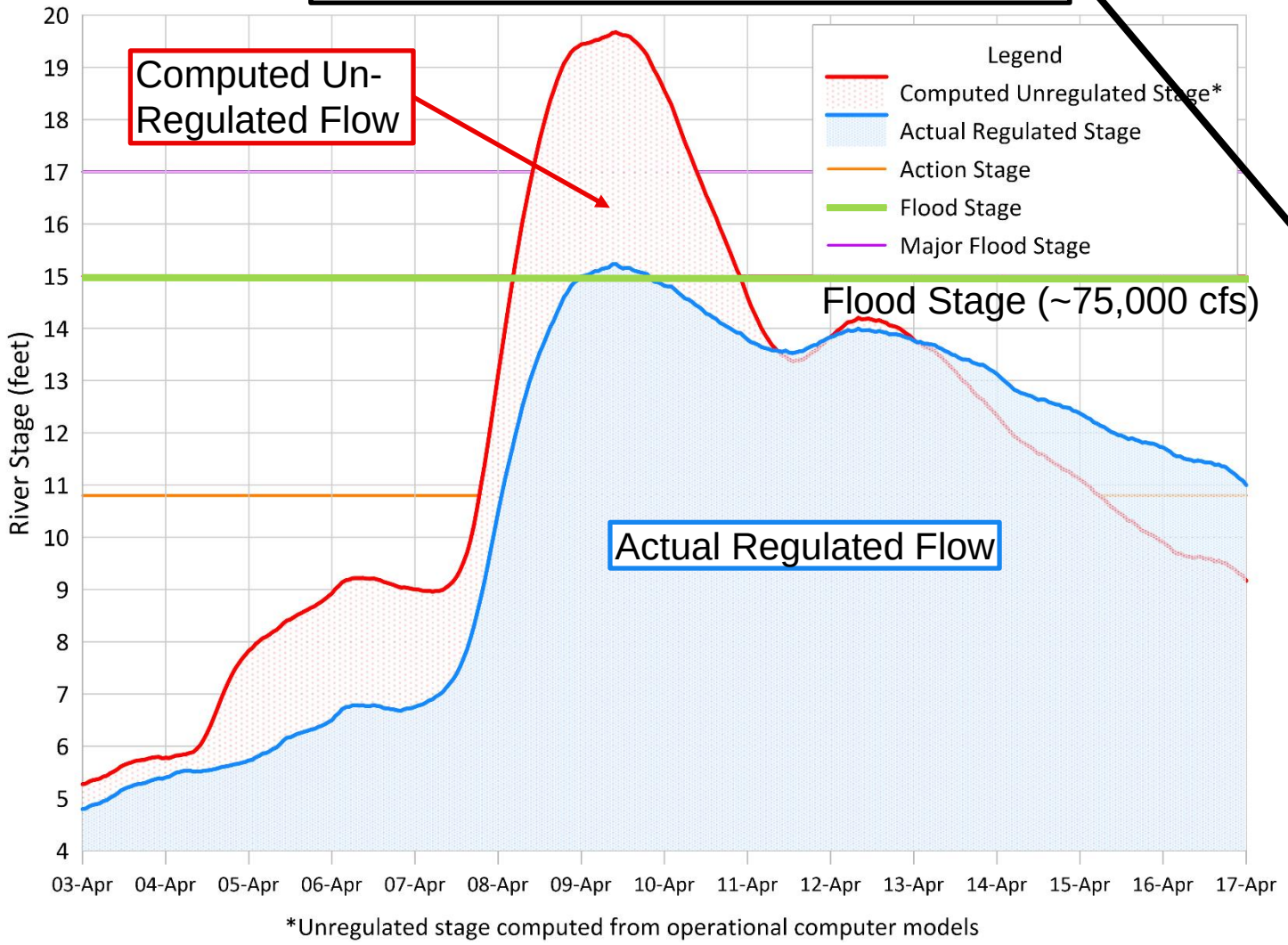
## Willamette River @ Harrisburg

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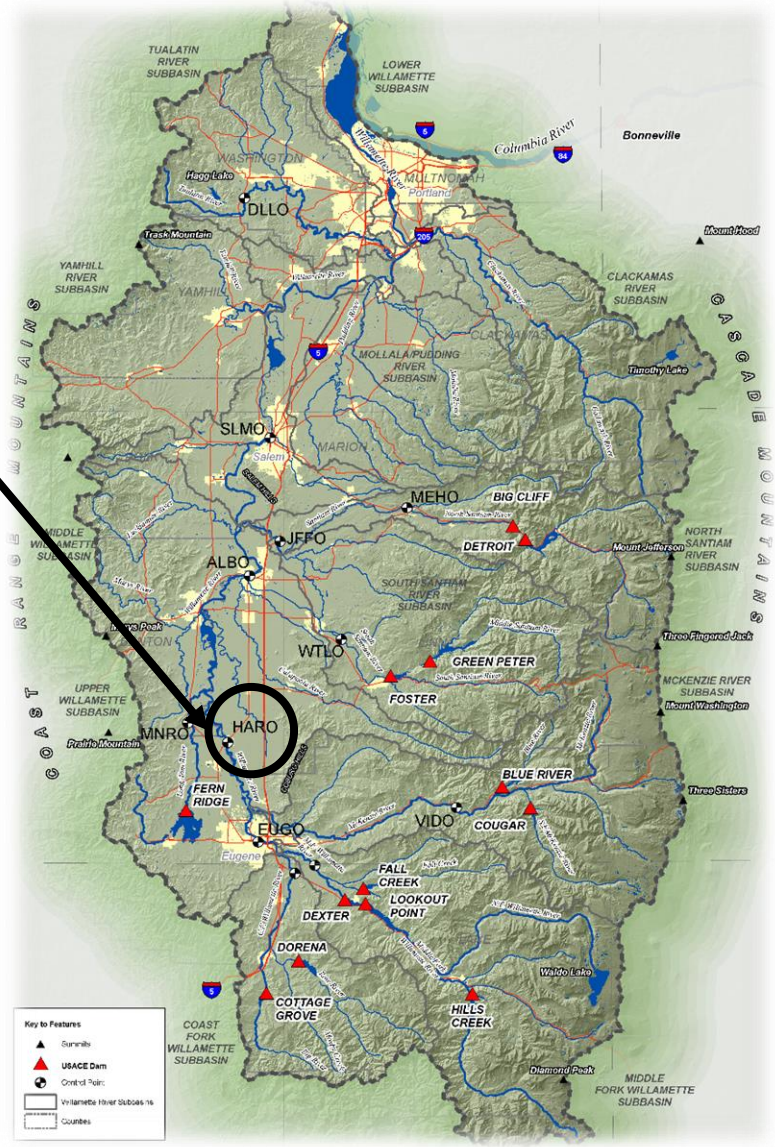

# WILLAMETTE RIVER FLOWS – APRIL 2019



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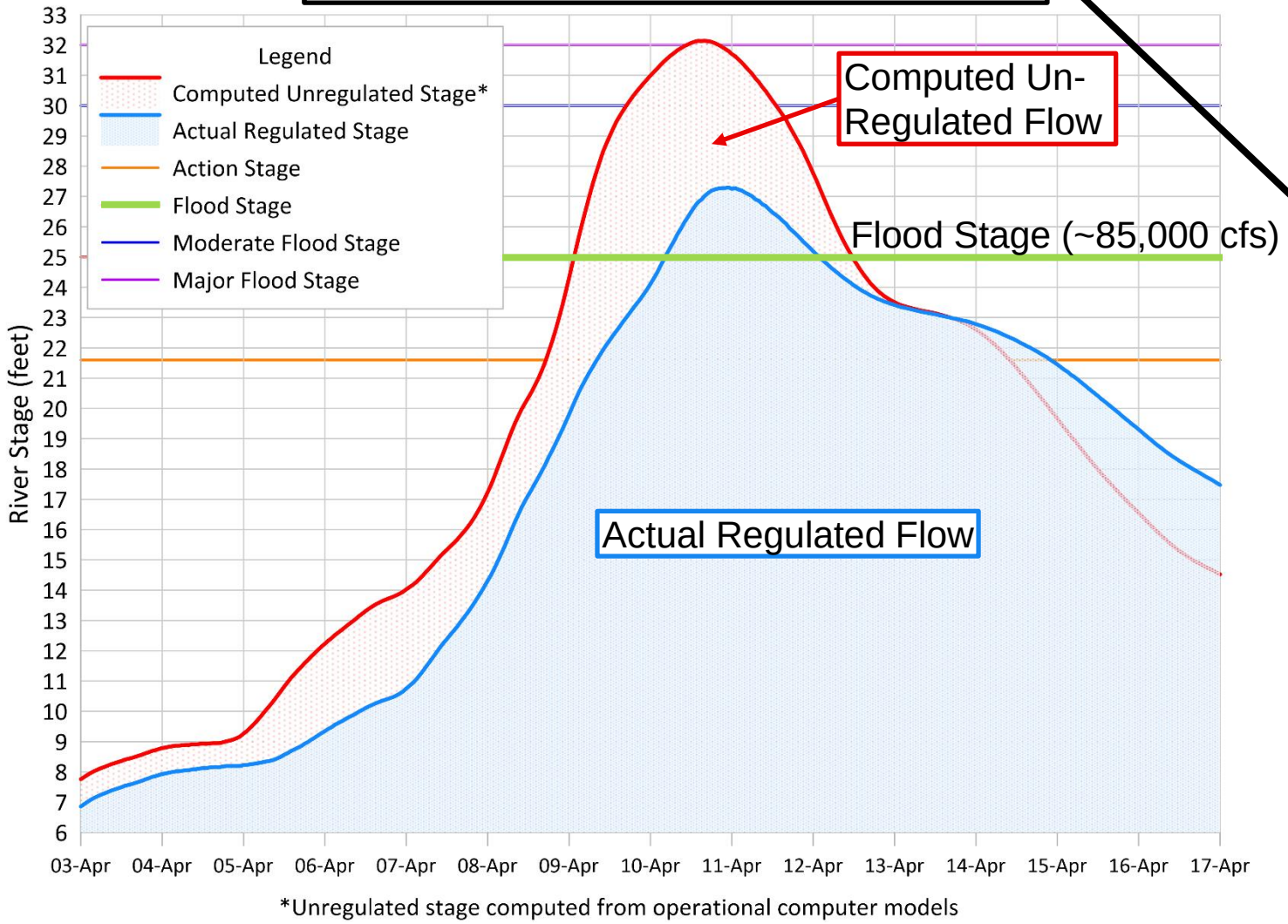
## Willamette River @ Albany

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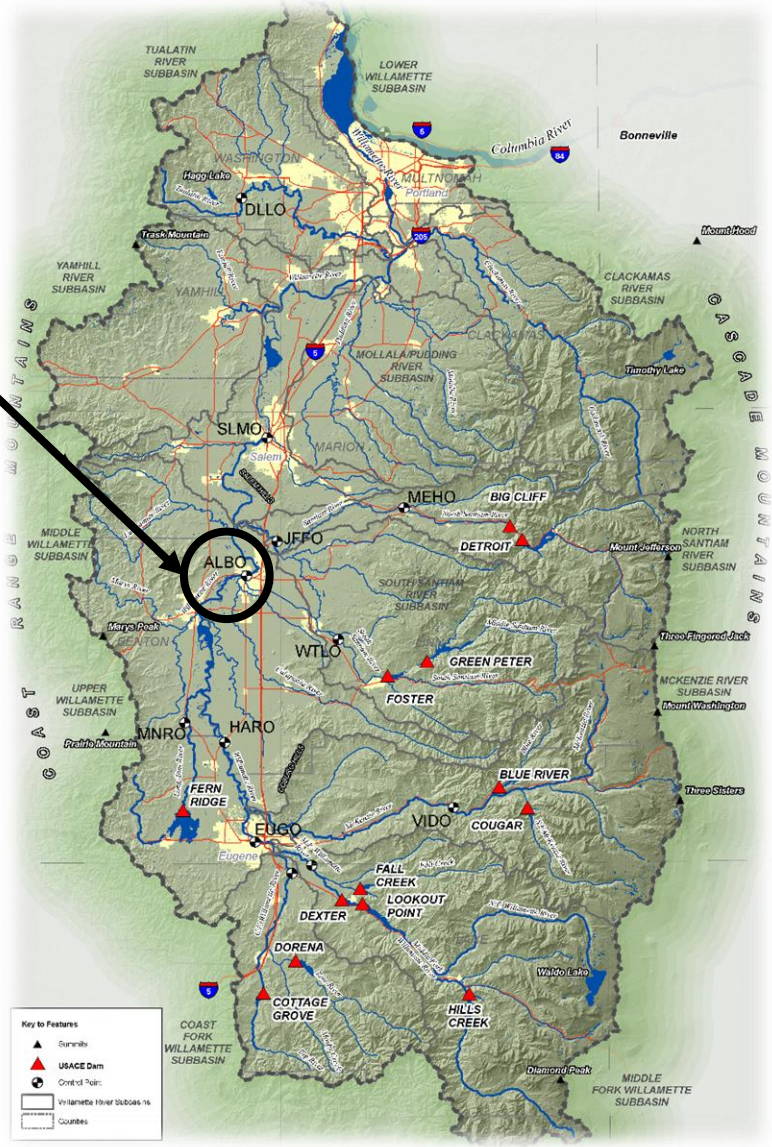

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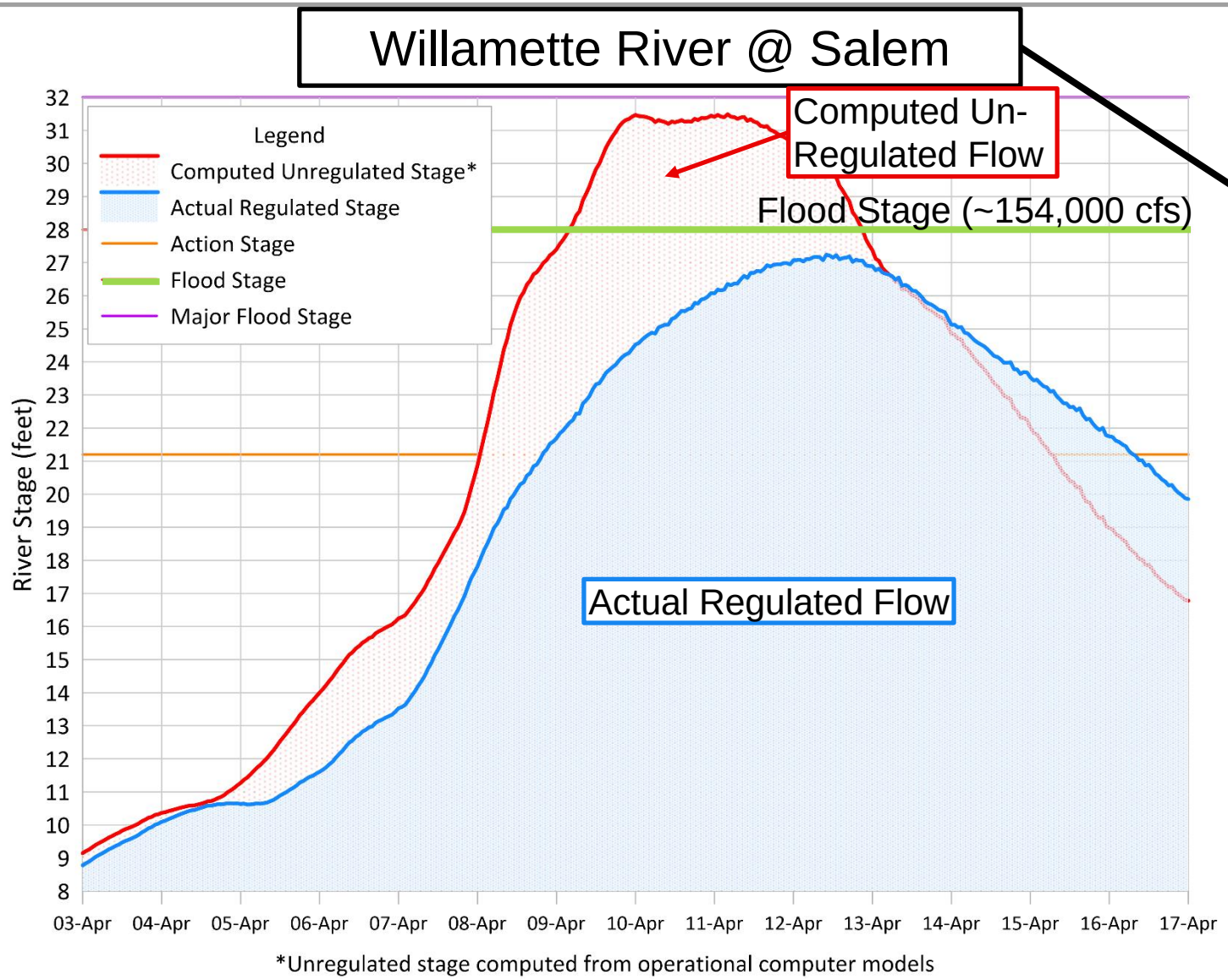


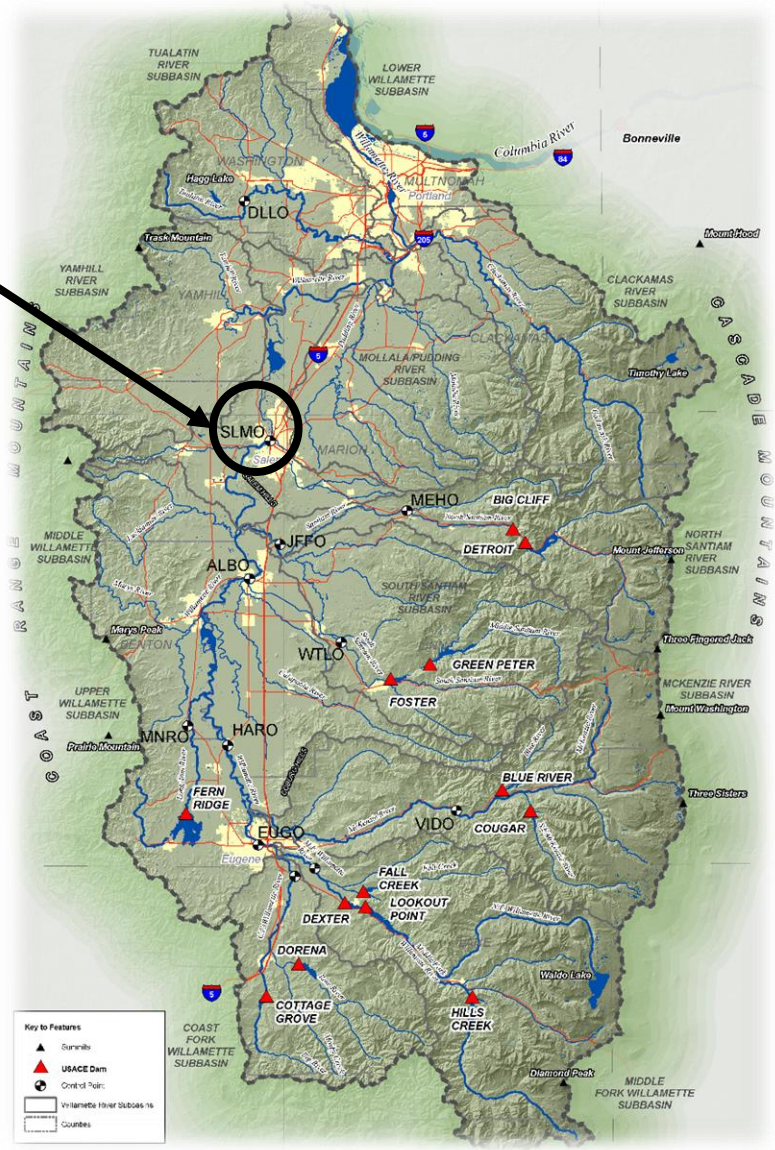

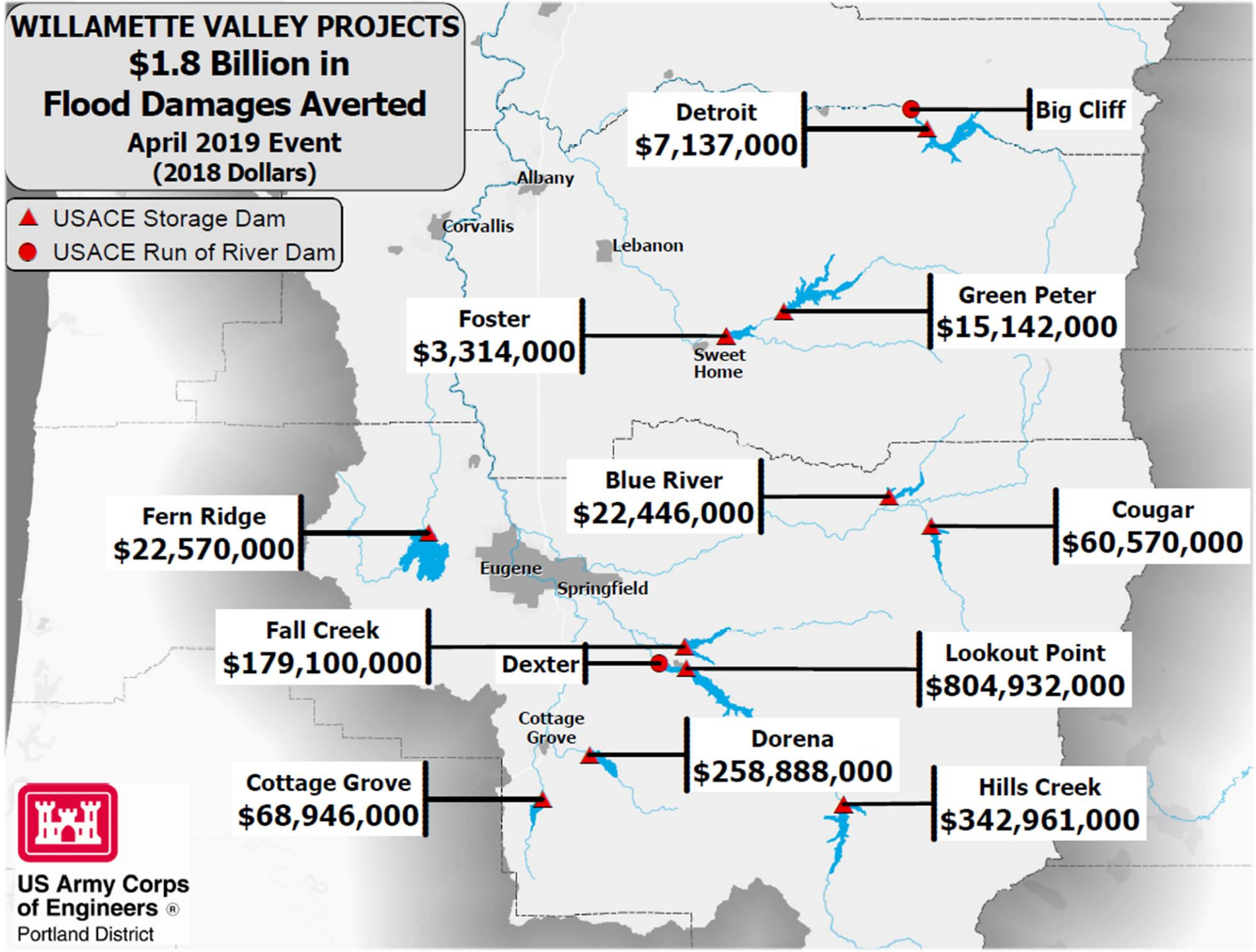
WILLAMETTE VALLEY PROJECTS
$1.8 Billion in
Flood Damages Averted
April 2019 Event
(2018 Dollars)
USACE Storage Dam
USACE Run of River Dam
Detroit
$7,137,000
Big Cliff
Albany
Corvallis
Lebanon
Foster
$3,314,000
Sweet Home
Green Peter
$15,142,000
Blue River
$22,446,000
Cougar
$60,570,000
Fern Ridge
$22,570,000
Eugene
Springfield
Fall Creek
$179,100,000
Dexter
Lookout Point
$804,932,000
Cottage Grove
Dorena
$258,888,000
Cottage Grove
$68,946,000
Hills Creek
$342,961,000
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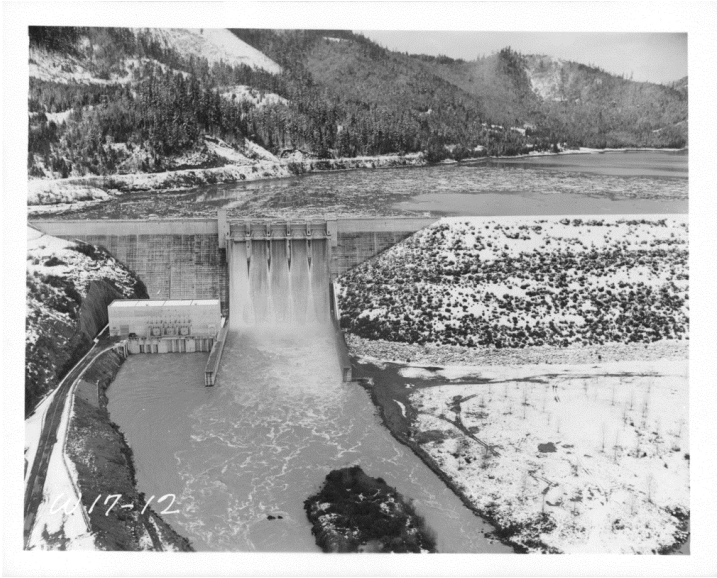
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