Sammamish River Transition Zone
&
Willowmoor Floodplain Restoration Project

Bellevue City Council Study Session
February 22, 2016

King County

KING COUNTY FLOOD CONTROL DISTRICT

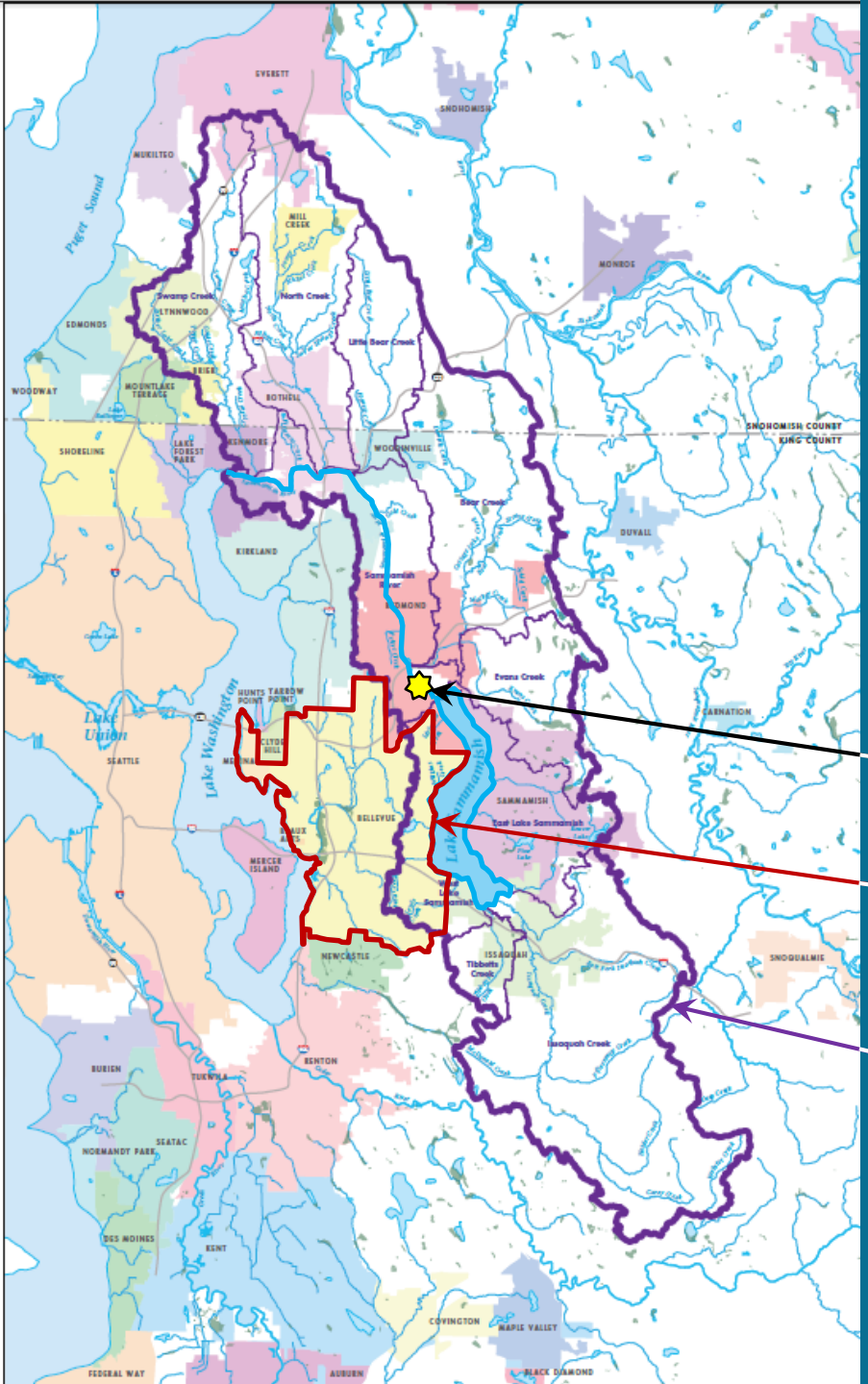
Tonight's Briefing

- Background
- Overview of Basin and Transition Zone
- Recent activities in Transition Zone
- Willowmoor Goals
- Alternatives
- Process
- Next Steps

Background

- Lake Sammamish Flooding
  - Property damage
  - Shoreline erosion
- Endangered Species Act (ESA)
- King County maintenance practices

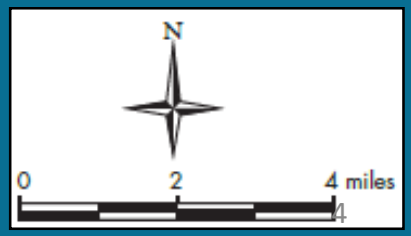
Sammamish River Basin



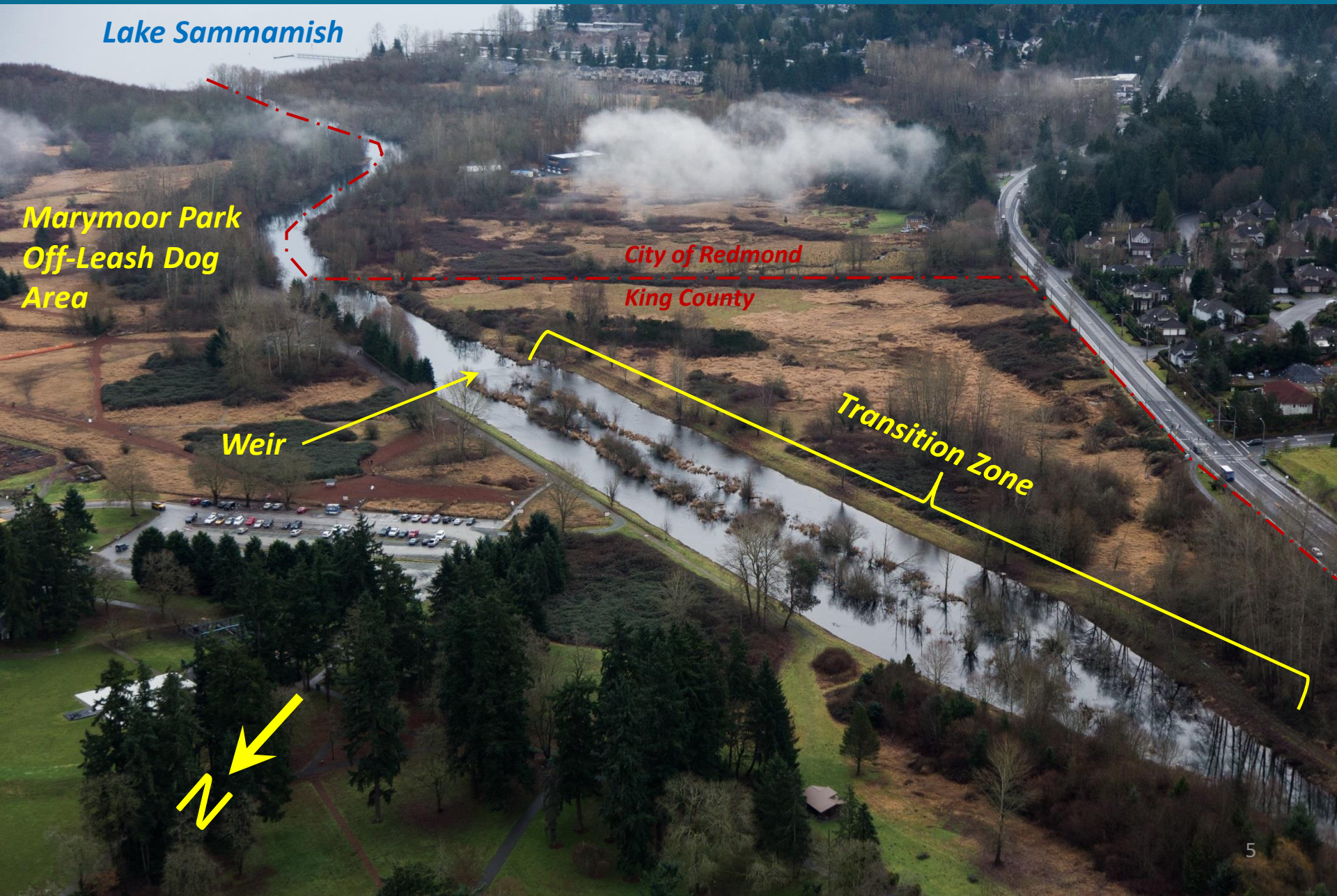
Sammamish River Transition Zone

City of Bellevue

Sammamish River Basin



Sammamish River Transition Zone



What are the Issues?

- Lakeside landowners
  Concerned about rising lake levels:
  - Impacts to docks
  - Impacts to property

- Habitat for ESA listed salmon
  Chinook listed as Threatened in 1999

- Transition Zone maintenance
  Influences lake level and habitat conditions

2011 Lake Sammamish Flood Reduction Plan

Eight Elements – all complete or partially completed:

- ✓ Four-fold increase in mowing
- ✓ Cutting buffer vegetation
- ✓ Removal of cuttings and clippings
- ✓ Sediment and debris removal evaluation →
  Study complete, debris removed upper half 2013
- ✓ Downstream Aquatic Weeds Removal (partial completion)
- ✓ TZ Flood Reduction CIP (Willowmoor Project)
- ✓ Restoration of Navigability
- ✓ Monitor Plan Effectiveness

Willowmoor - Study Goals

Flood Control:

Ensure TZ's capability to provide sufficient lake level control, flow conveyance and downstream flood control.

Habitat:

Enhance habitat conditions in the river channel, associated tributaries and adjacent wetlands for ESA Chinook and other species.

Maintenance:

Reduce costs, complexity and ecological impacts of TZ maintenance.

Stakeholder Involvement

Public Meetings – June 2013 and March 2015

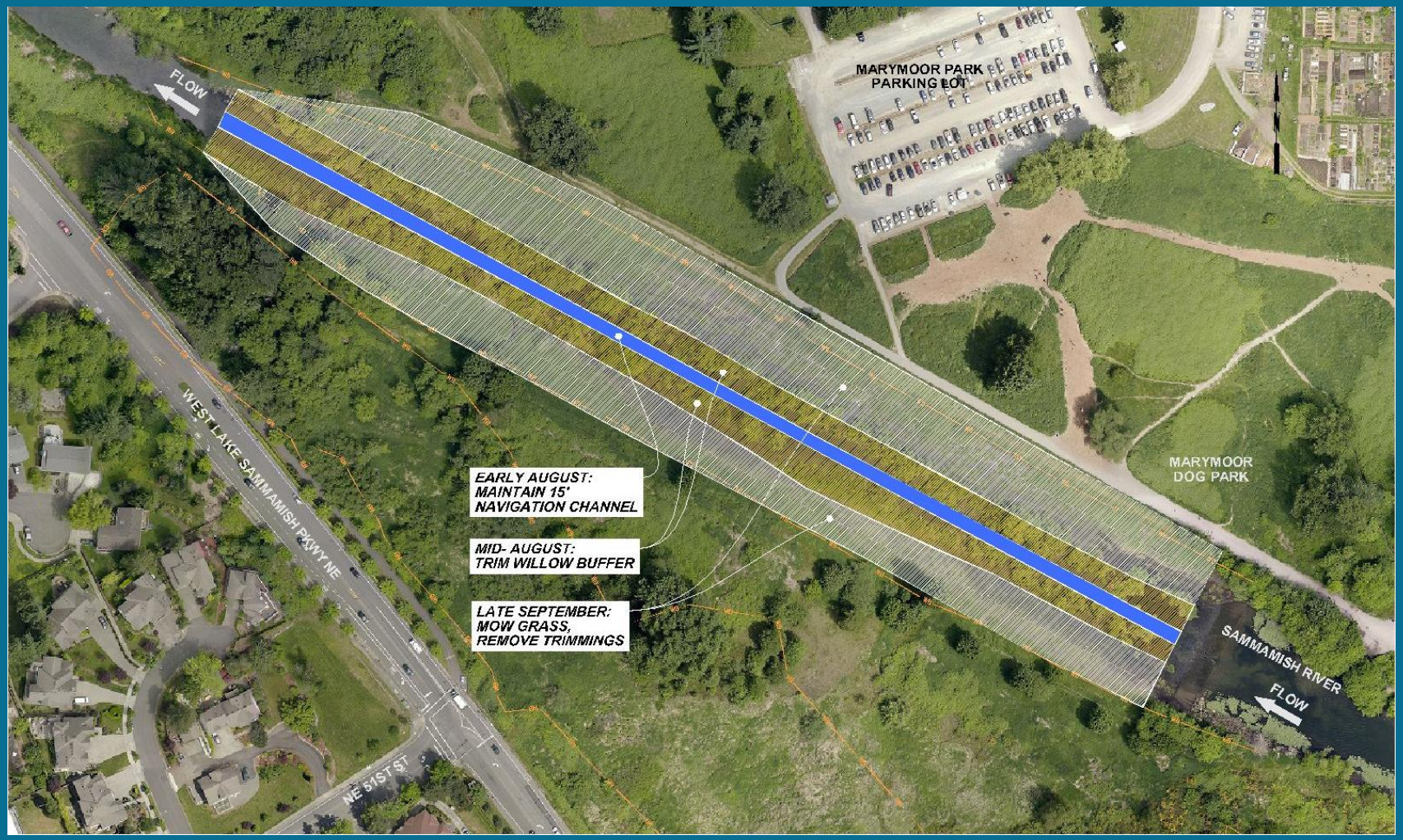
Stakeholder Advisory Committee

- **Lakeshore property owners** (7) – Washington Sensible Shorelines Association (WSSA), Sammamish Home Owners (SHO) and individual homeowners
- **Cities** (2) – Redmond, Bellevue
- **Natural resource agencies** (2) – Washington Department of Fish and Wildlife (WDFW), Washington Department of Ecology (WDOE)
- **Recreational interest groups** (4) – Serve our Dog Areas (SODA), Friends of Marymoor Park (FOMP) , Lake Sammamish Yacht Club*, Sammamish Rowing Association (SRA)
- **Environmental interest groups** (3) – Save Lake Sammamish (SLS), Eastside Audubon, WaterTenders
- **US Army Corps of Engineers** (1)
- **WRIA 8 Salmon Recovery Council** (1)
- **Businesses** (2) – OneRedmond*, JB Instant Lawn
- **Independent Consultants**** (2) – Watershed Company*, Parametrix

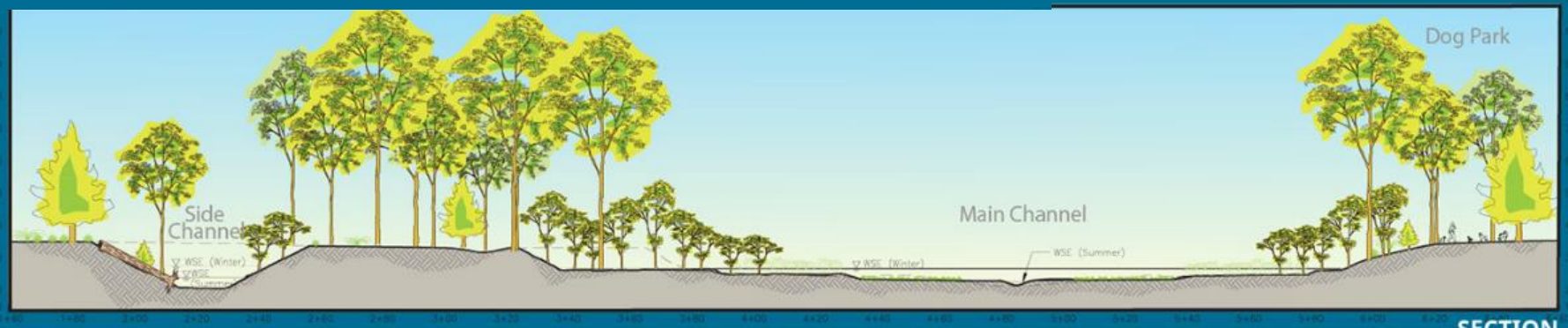
Alternative Development and Narrowing

- 5 alternatives for channel reconfiguration
- With help of Stakeholder Advisory Committee narrowed to 3:
  - ❖ Maintenance
  - ❖ Split Flow Channel
  - ❖ Widened Channel

Maintenance



Split Channel



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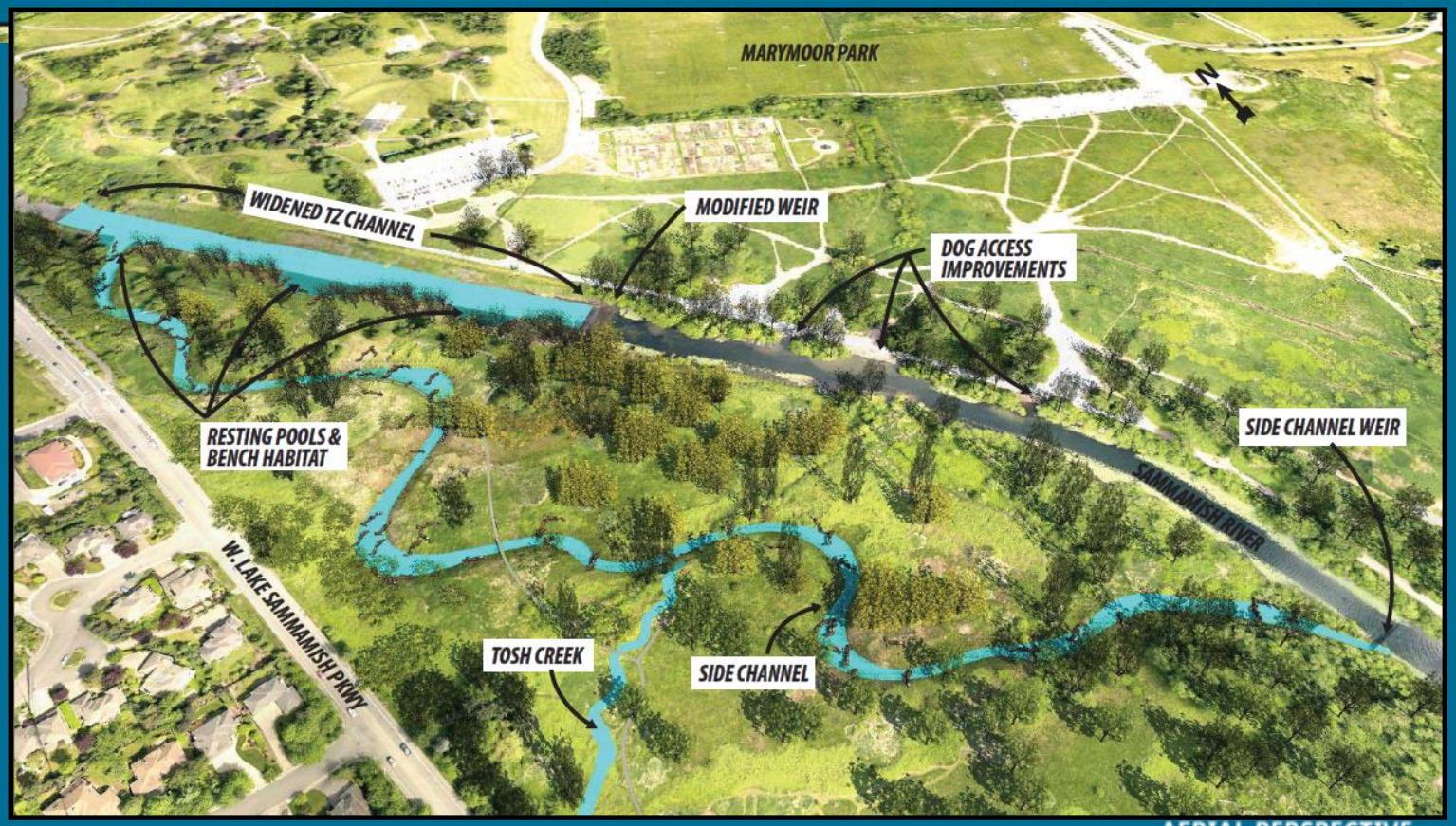
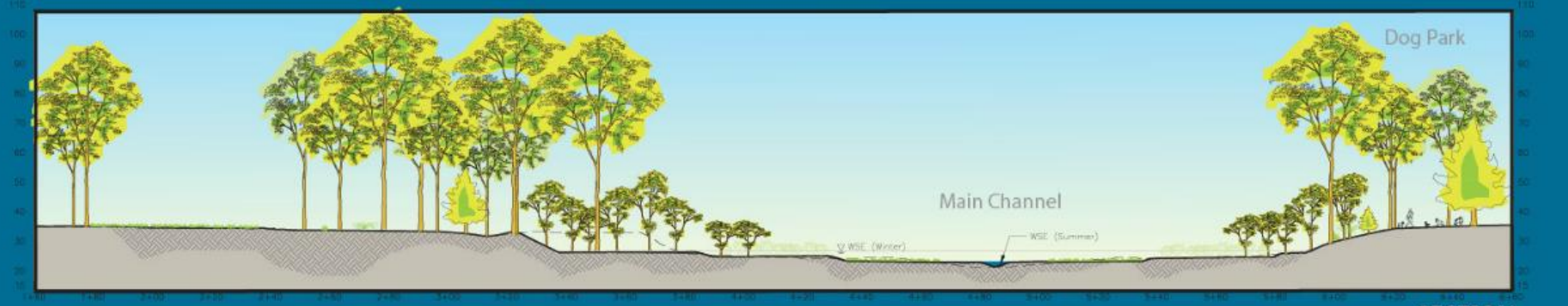


AERIAL PERSPECTIVE

Widened Existing Channel



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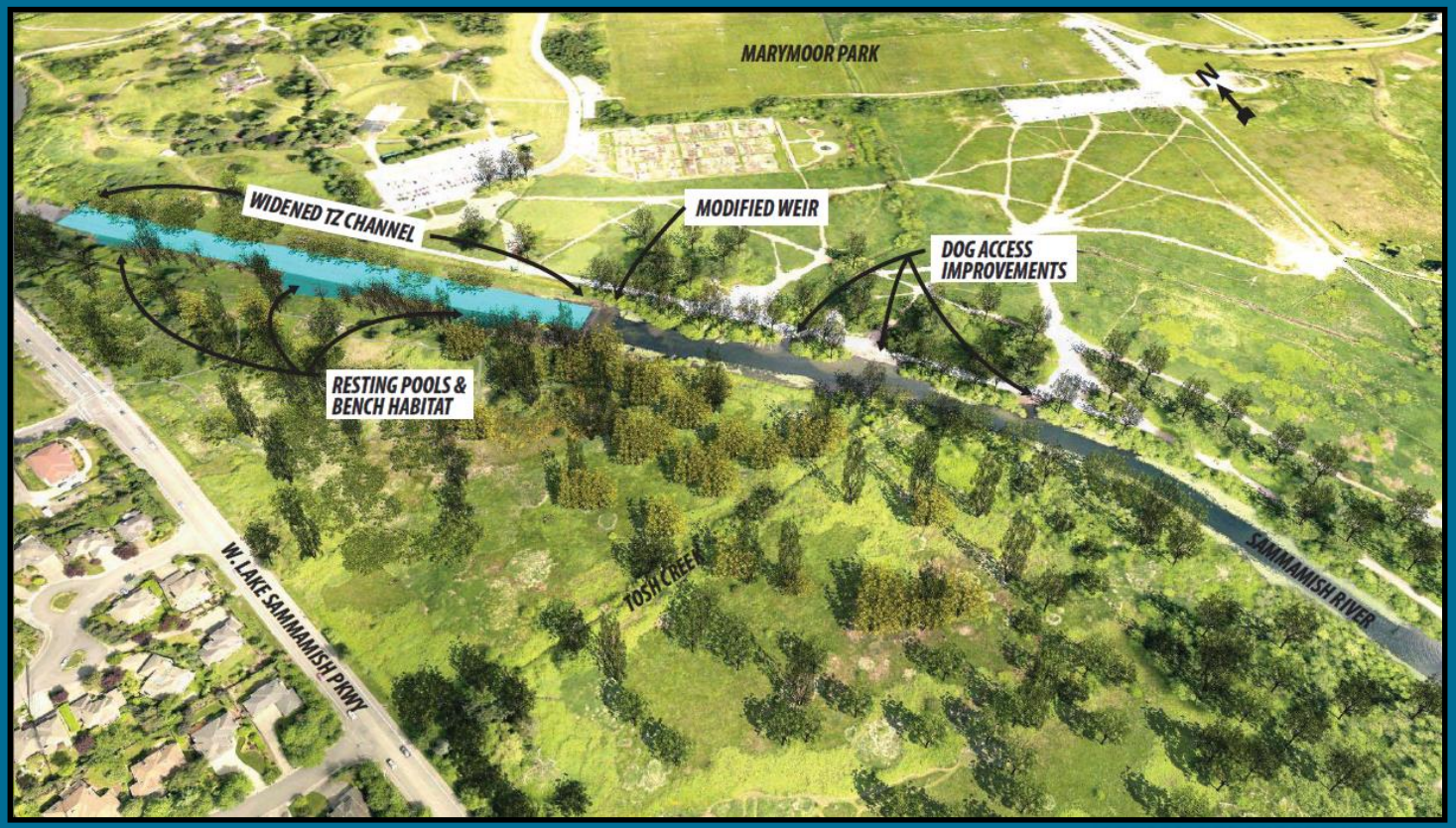


AERIAL PERSPECTIVE

Alternative	Costs		
		Design & Construction	Operation & Maintenance
Existing Maintenance	**Total**	**$0**	**$41K/yr**
Split Channel + Pumped Groundwater	Split Channel	$8.2M	$17.3K/yr
	Pumped Groundwater	$1.6M	$4.4K/yr
	Total	**$9.8M**	**$21.7K/yr**
Widened Channel + Pumped Heat Exchange	Widened Channel	$3.9M	$12.3K/yr
	Pumped Heat Exchange	$4.2M	$18.6K/yr
	Total	**$8.1M**	**$30.9K/yr**

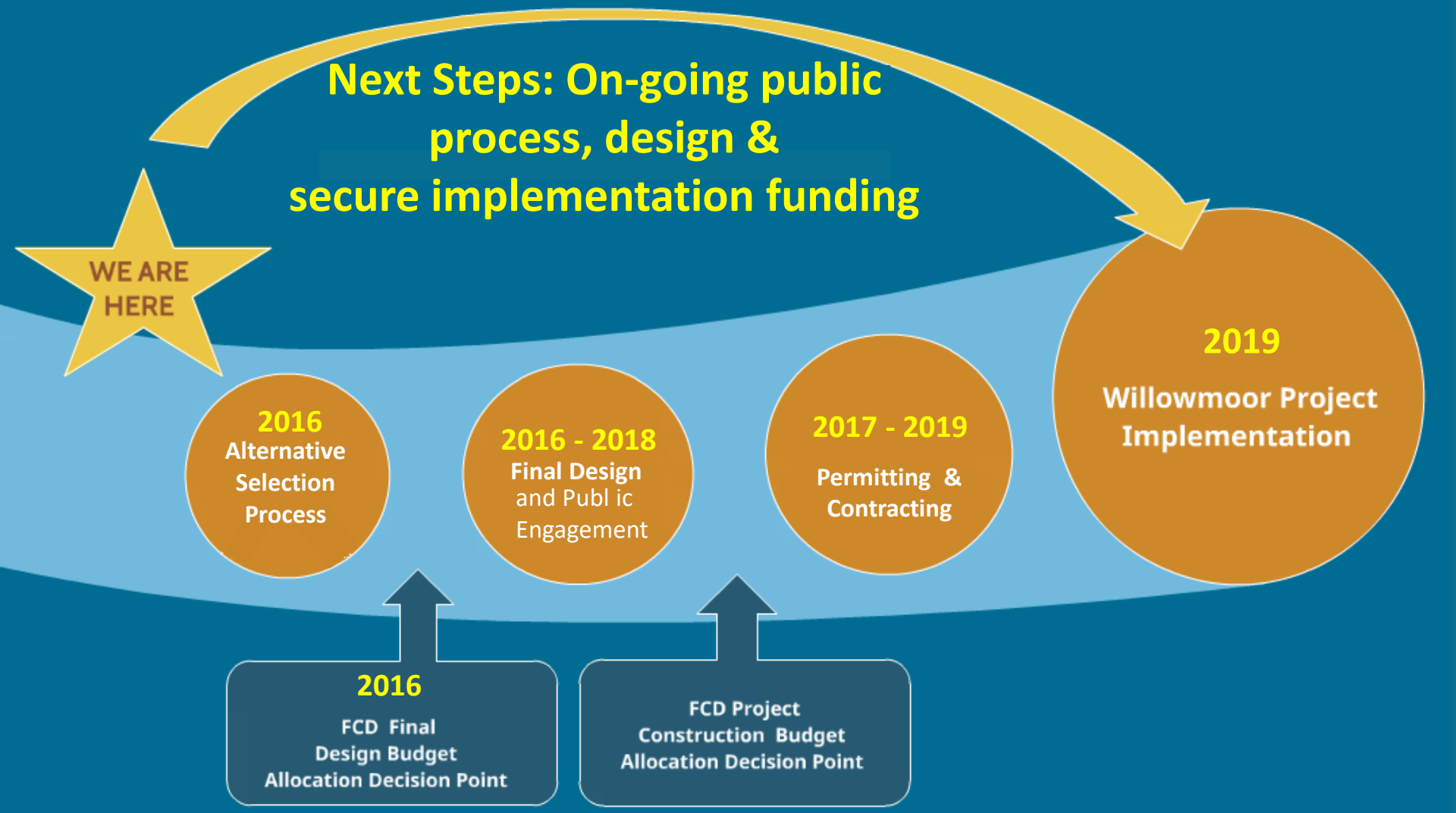
Project Funding and Implementation

- FCD Funded through 30% Design
- FCD 2016 Budget added $4M
- State Grants
  - Salmon Recovery Funding Board ($250K award)
  - Floodplains by Design ($5M pre-proposal)
- Corps of Engineers – 1135 Program
- Tribes and Agency partners
- Possible Phased Implementation

Commitments Moving Forward

- Continue close engagement of the public
- Continue maintenance before and after rebuild
- Design will evaluate adjustable weir options
- Next phase of design provides opportunity to evaluate design details
- Continue monitoring and adaptive management

Next Steps: On-going public process, design & secure implementation funding



Thank You!

Mark Isaacson, Director
Water and Lands Resources Division
mark.isaacson@kingcounty.gov
206/477-4601

John Engel, P.E.
Supervising Engineer
john.engel@kingcounty.gov
206/477-4685

Kate Akyuz
Project Manager
kate.akyuz@kingcounty.gov
206/477-4607

Rivers and Floodplain Management

King County

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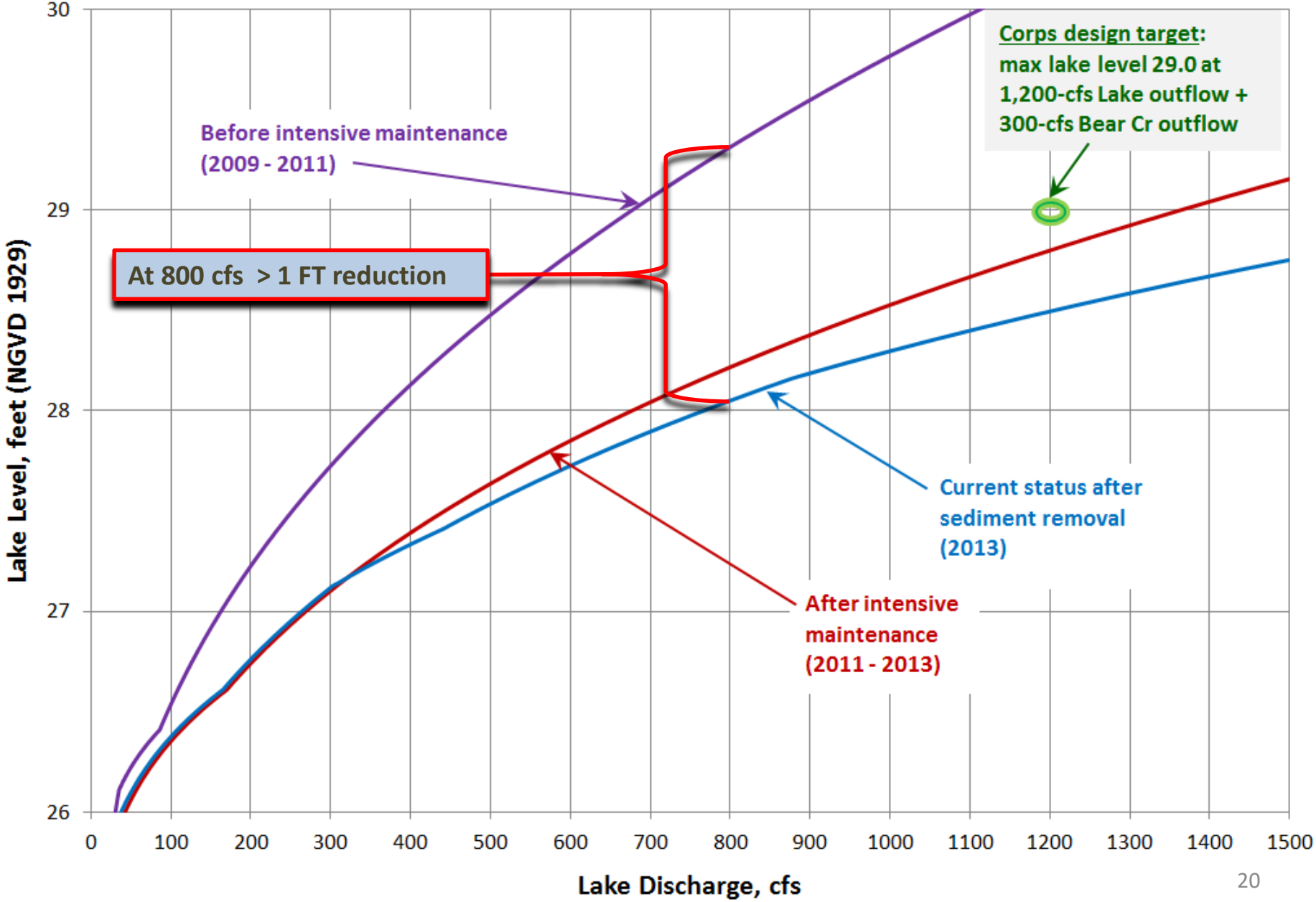
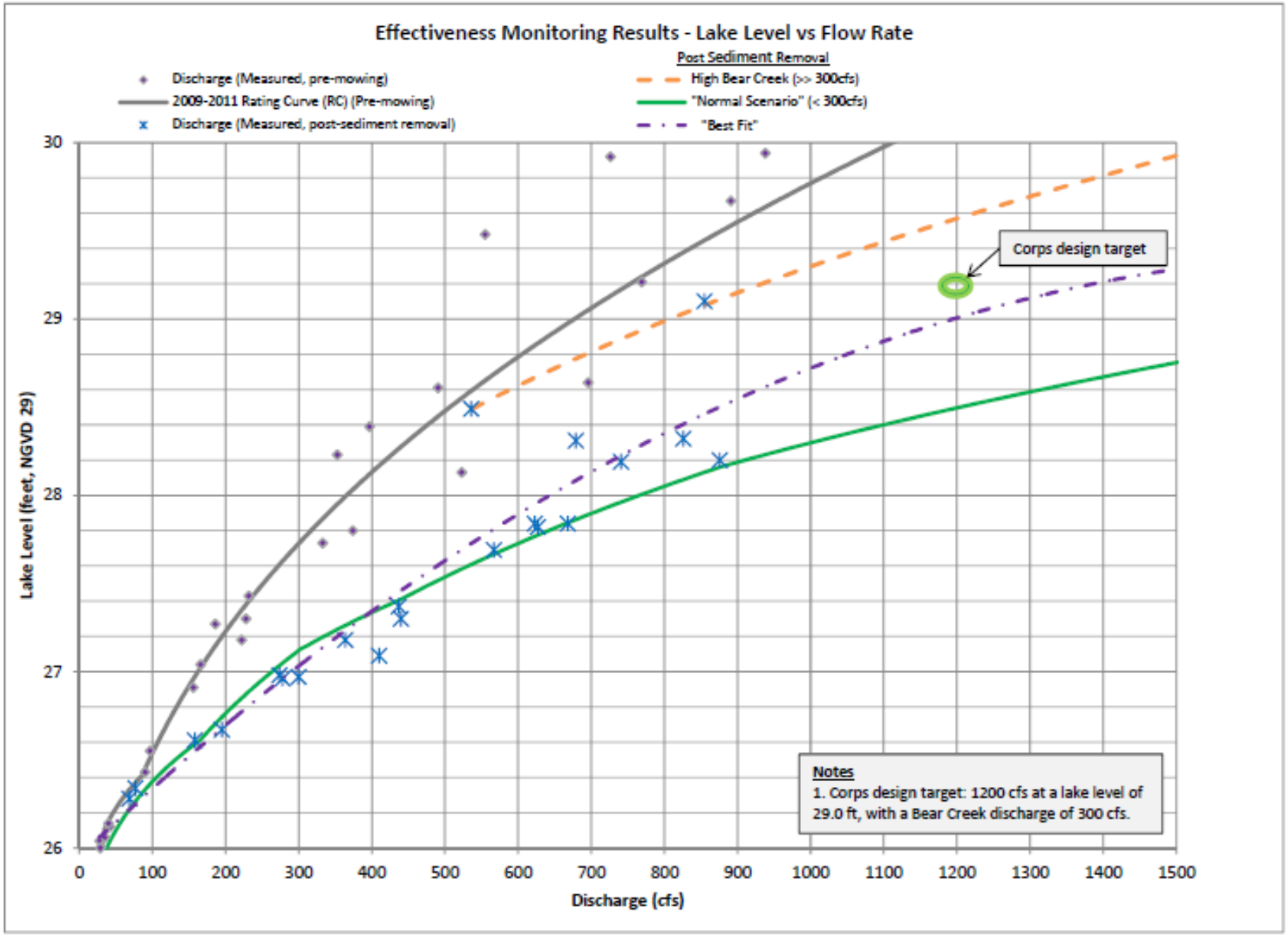
Backup Slides

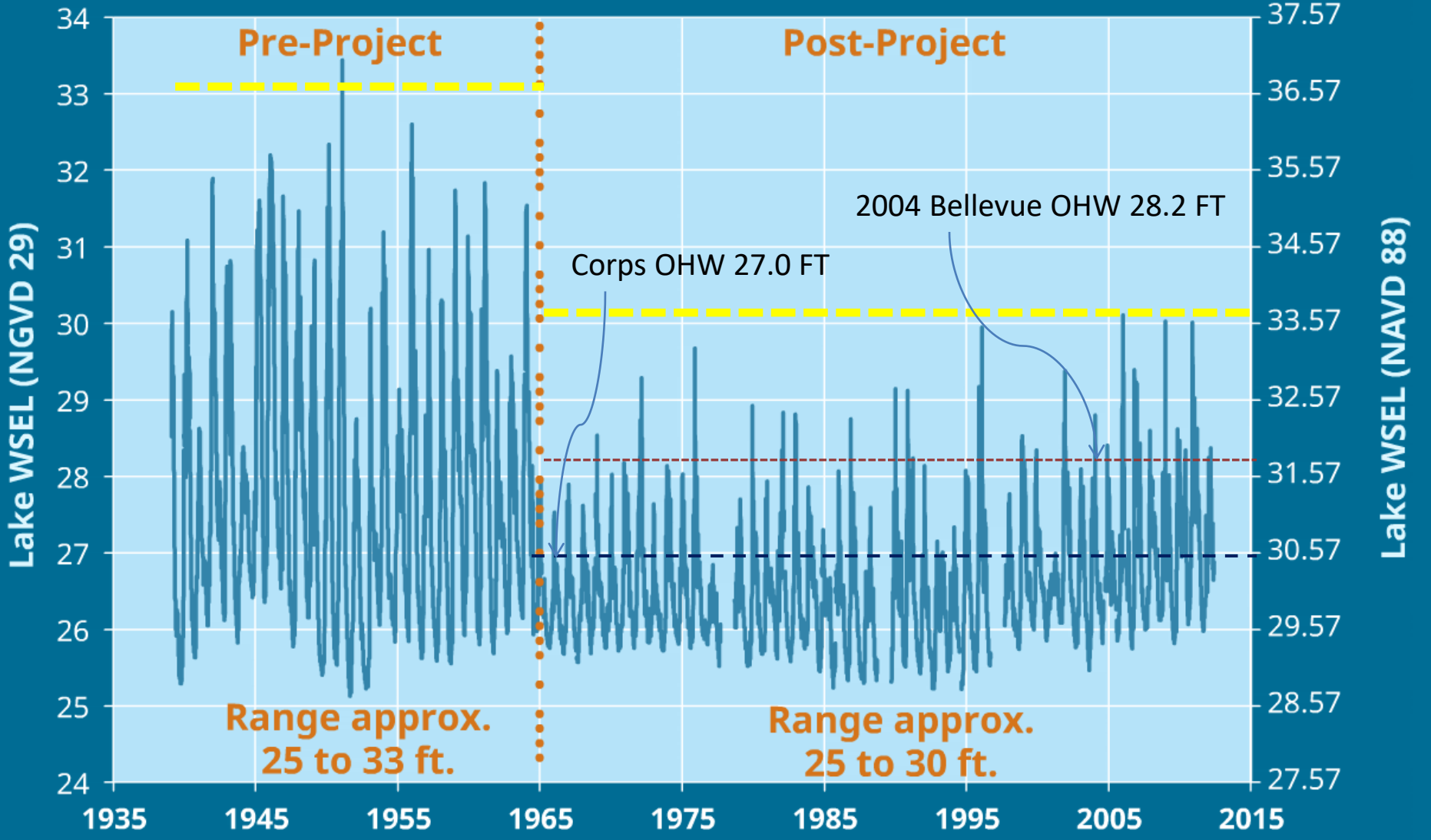
TZ Maintenance Effectiveness Monitoring Results
Lake Level vs Flow Rate




Effectiveness Monitoring Results - Lake Level vs Flow Rate
Post Sediment Removal
Discharge (Measured, pre-mowing)
2009-2011 Rating Curve (RC) (Pre-mowing)
Discharge (Measured, post-sediment removal)
High Bear Creek (>> 300cfs)
"Normal Scenario" (< 300cfs)
"Best Fit"
Corps design target
Notes
1. Corps design target: 1200 cfs at a lake level of 29.0 ft, with a Bear Creek discharge of 300 cfs.
Lake Level (feet, NGVD 29)
30
29
28
27
26
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
Discharge (cfs)

Mean Daily Lake Sammamish Water Surface Elevations

USGS 12122000 (1/30/1939 - 6/19/2012)



Lake Sammamish Ordinary High Water

Corps (1965) Set level at 27.0 FT

- Not a design element of the Corps flood control project
- Vegetation characteristics suggested 28 to 29 FT.
- Corps arbitrarily set 27.0 FT
- Corps indicated need to reassess some years after project built.

Bellevue SMP (2004) – 28.2 FT

- Shoreline Management Act required establishing OHW
- 2004 survey of vegetation characteristics.
- Regulatory level set at 28.2 FT based on survey data.

Conclusion: Technical and regulatory hurdles would be huge to change OHW. Focus on original design criteria of 29.0 FT at 1500 cfs combined flow.

Other Design Considerations

- Fish passage
- Recreational boater safety – passage for small boats
- Recreation, trails
- Adjustable weir
- Vegetation management, O&M
- Ordinary high water considerations
- Cultural resources
- Downstream stormwater outfalls

Alternatives' Performance: Reduction in High Lake Levels

	Average days/year lake level exceeds:		
	EL 27.0	EL 28.0	EL 29.0
Alt. 1: Ongoing Maint.	97	12	1.1
Alt. 4: Split Channel	47 (-50)	6 (-6)	0 (-1.1)
Alt. 5: Widened Channel	94 (-3)	11 (-1)	0.9 (-0.2)

12 years of lake level modelled

(#) = Number of days reduced relative to maintenance alt.

Project Schedule