

One Levee Owner's Perspective on Levee Vegetation Issues



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One Owner/Operator Perspective

- Invited to participate
- RIP has been important to King County
- Technical expertise / want process to succeed
- We do not pretend to speak for other agencies
- We have sought participation in this process by other levee owners / operators

Adopted Flood Plan Goals

1. Reduce the risks from flood and channel migration hazards
2. Avoid or minimize the environmental impacts of flood hazard management
3. Reduce the long-term costs of flood hazard management

2006 KING COUNTY FLOOD HAZARD MANAGEMENT PLAN

King County River and Floodplain Management Program

FINAL PLAN
January 2007



King County
Department of Public Works
Water and Flood Management Division

Adopted Flood Plan Policy

King County shall protect flood storage, conveyance, and ecological values of floodplains, wetlands, and riparian corridors and, when feasible, should enhance or restore these ecological functions and values. Flood risk reduction strategies and projects should be coordinated on a river-reach scale with the salmon habitat recovery plans.

Policy G-10

2006 KING COUNTY FLOOD HAZARD MANAGEMENT PLAN

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January 2007



King County
Department of Public Works
Water and Flood Management Division

King County Flood Facilities

- Aging inventory, many of uncertain design
- Wide variety of river conditions
- 101 miles of river bank facilities
- 38 miles of levees

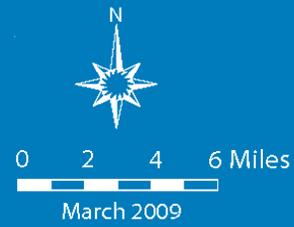
King County Flood Facilities

- Aging inventory, many of uncertain design
- Wide variety of river conditions
- 101 miles of river bank facilities
- 38 miles of levees
- Most King County levees are not currently eligible for RIP, except for Green River levees (which were focus of Workgroup discussion)

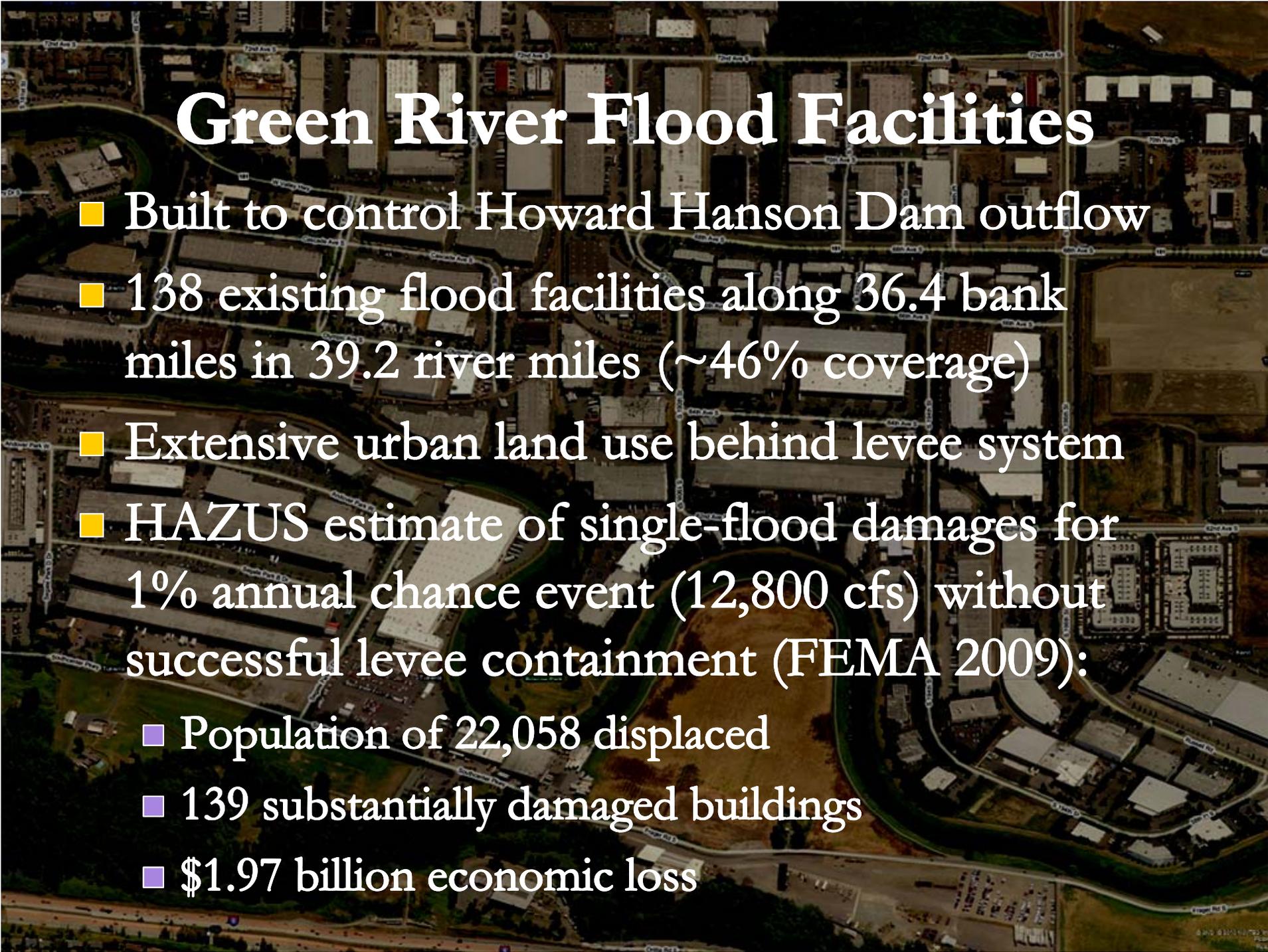
Green River Basin



-  River
-  Major Road
-  WRIA 9 Subwatershed Boundary
-  WRIA 9 Boundary
-  Open Water
-  Unincorporated King County



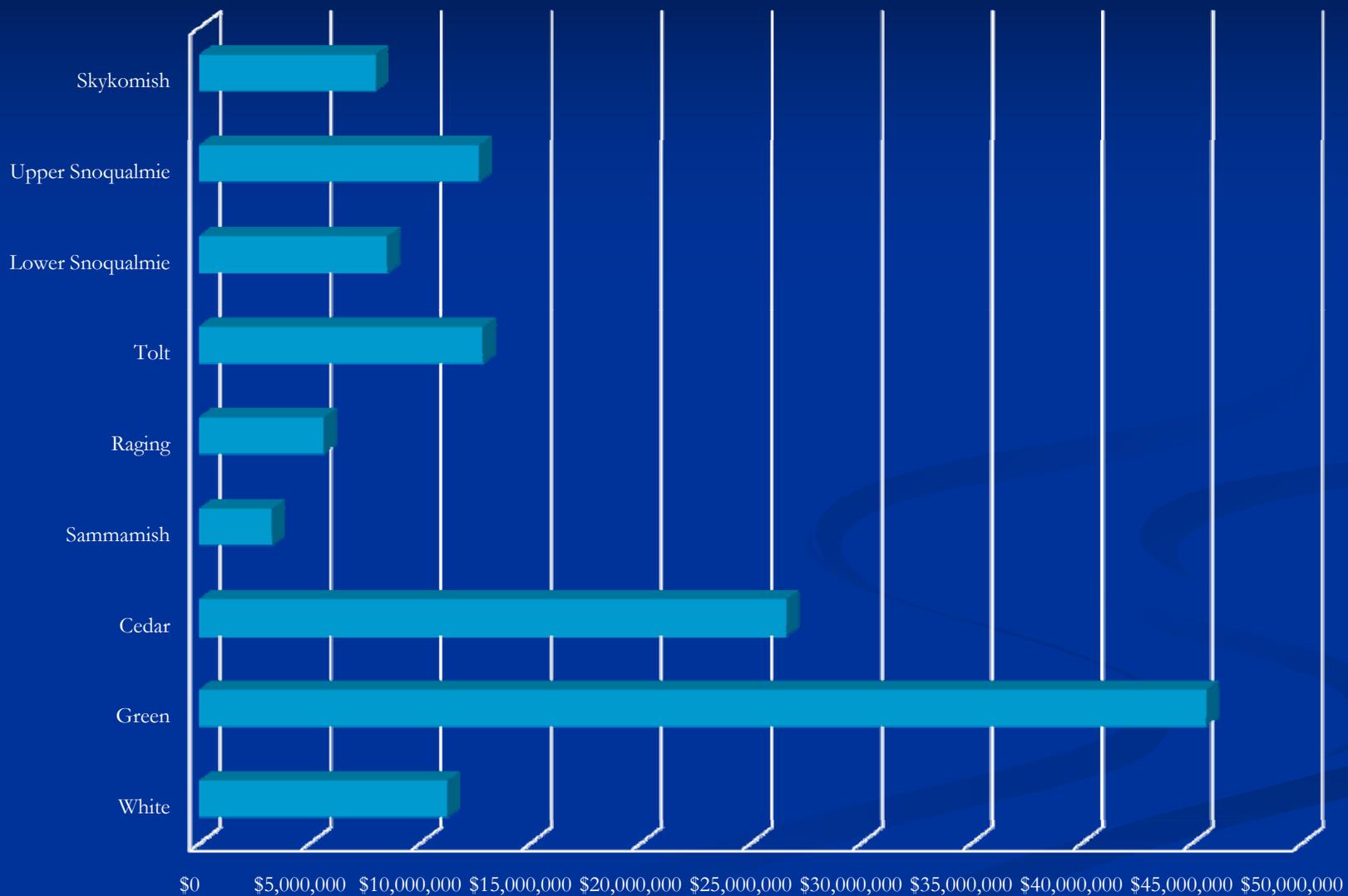
 **King County**
Department of
Natural Resources and Parks

An aerial photograph of an urban area with a river winding through it. The river is bordered by a levee system. The background shows a dense residential and commercial area with various buildings and streets. The text is overlaid on the image in white and yellow colors.

Green River Flood Facilities

- Built to control Howard Hanson Dam outflow
- 138 existing flood facilities along 36.4 bank miles in 39.2 river miles (~46% coverage)
- Extensive urban land use behind levee system
- HAZUS estimate of single-flood damages for 1% annual chance event (12,800 cfs) without successful levee containment (FEMA 2009):
 - Population of 22,058 displaced
 - 139 substantially damaged buildings
 - \$1.97 billion economic loss

10-Year Action Plan -- Project Cost Estimates by Basin Flood Hazard Management Plan (King County 2006)



Desimone Levee Repair, 2002

Rock and large wood below OHW

Biodegradable fabric protects rest of bank
until vegetation is well established



Desimone Levee Repair, 2002

Rock and large wood below OHW

Biodegradable fabric protects rest of bank
until vegetation is well established



2002 Desimone Levee Repair

Established willow canopy provides shade and cover



2002 Desimone Levee Repair

Willows reduce near-shore velocity, induce deposition, and provide valuable visual cues for flood patrol observation.



2002 Desimone Levee Repair

Lower bank condition is clearly visible for post-flood inspection



Summer inspection of lower bank conditions
from bench under willow canopy



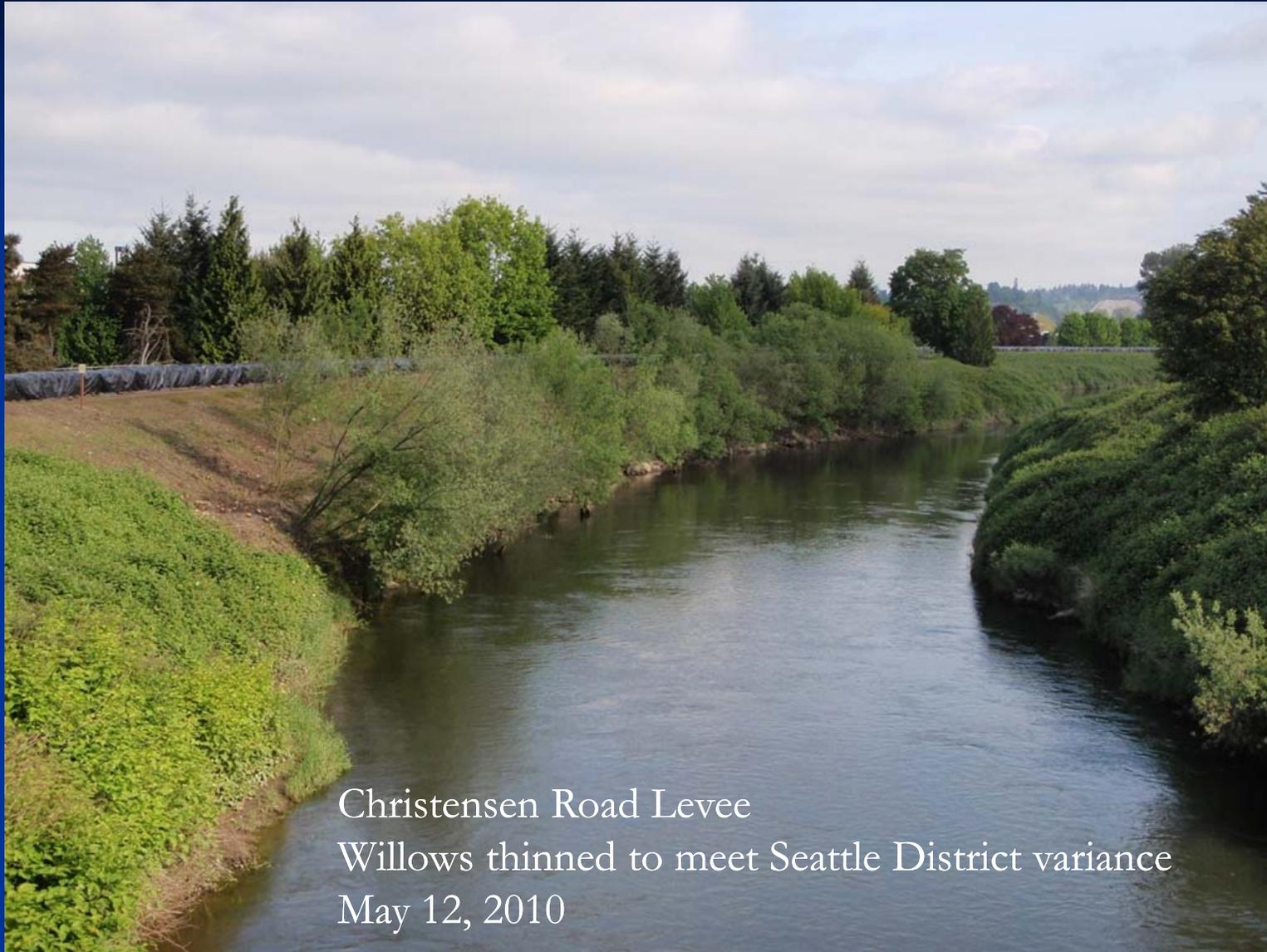
Keeping Green River Levees Eligible for the RIP

- 15.4 miles of Green River levees in RIP
- 100% RIP eligible through last flood season
- Recent years of RIP activity
 - 2008 tree removals, all eligible, major RIP projects
 - 2009 tree removals, all eligible, major RIP projects
 - 2010 willows heavily thinned, all eligible, 2 post-flood requests for help, both requests denied



Christensen Road Levee
Willow stand exceeded Corps standards
May 4, 2010

20100504 Green 14.2 Bridge Before



Christensen Road Levee
Willows thinned to meet Seattle District variance
May 12, 2010

20100512 Green 14.2 L Bridge After



Christensen Road Levee
Willows thinned to meet Seattle District variance
(stems < 4" dbh within 4' clumps on 30' centers)
May 12, 2010

20100512 Green 14.2 L T3 After

Mitigation Requirements

- Riparian tree replacement at 4:1 ratio
- Large wood replacement at 1:1 ratio, riverward slope only
- Green River removals in 2009
 - 461 trees removed
 - 146 from riverward slope
 - 1,844 riparian plantings required (~30% complete)
 - 146 LWD installations required (~12% complete)
 - Riparian mitigation site secured in 2010 (\$2 million)

Green River TMDL (Ecology, June 2011)



Green River Temperature Total Maximum Daily Load

Water Quality Improvement F

June 2011
Publication No. 11-10-046

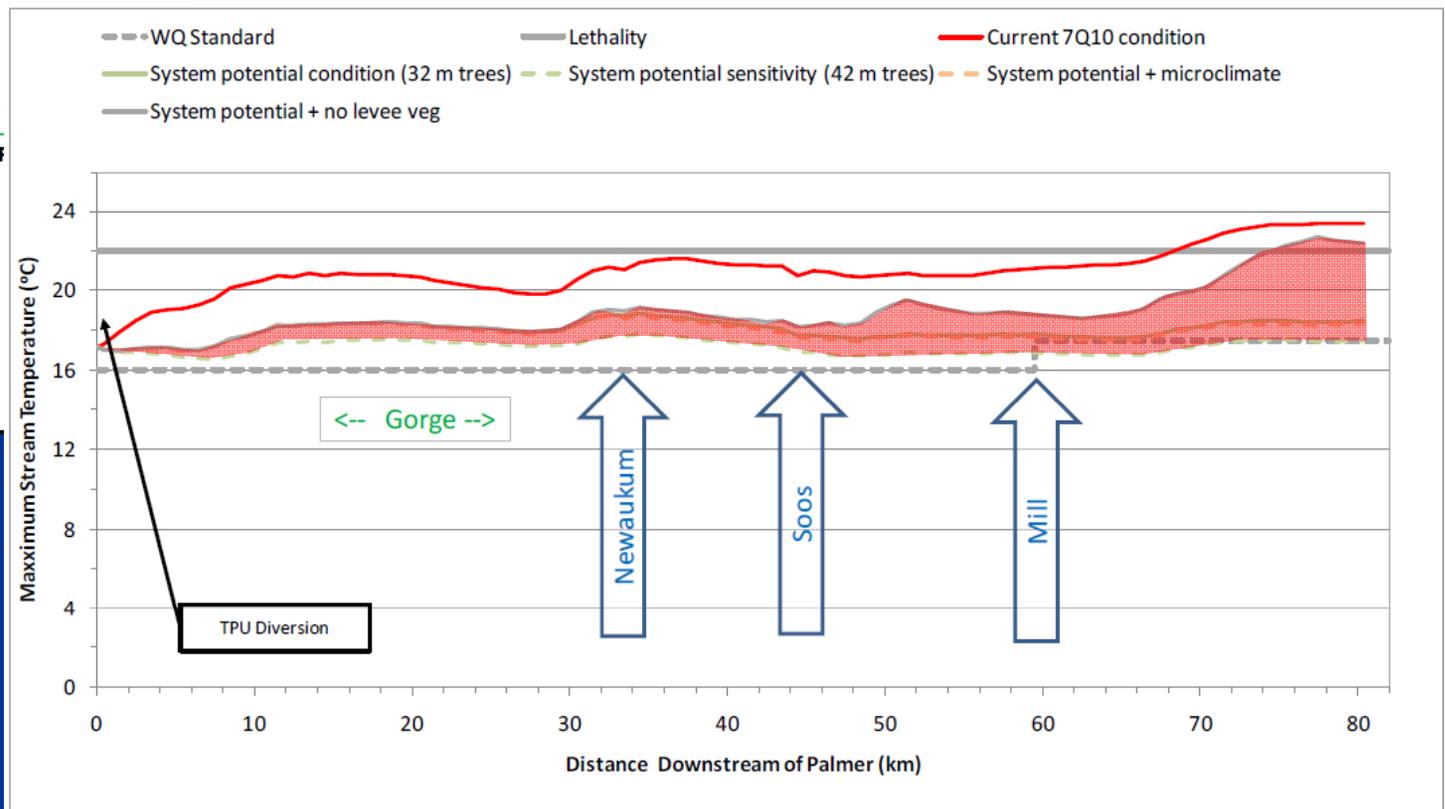


Figure 35. Maximum predicted Green River mainstem (Palmer to Tukwila) temperatures with current riparian vegetation under critical (7Q10) summer conditions and system potential (mature) riparian vegetation under critical summer conditions. Figure 31 also shows the sensitivity of the model to taller 42-m high trees, microclimate, and a scenario in which mature riparian vegetation is not permitted along any bank of the river with levees.

Funding Eligibility

- Corps expenses for King County RIP work in 2008-9: ~\$25 million (local costs ~\$10.5 million)
- Since 1990, the total federal cost share for RIP in King County has been ~\$27 million
- Seattle District RIP expenses in 3-state area (WA, OR, ID) have averaged ~\$12 million per disaster declaration since 2004

Meeting Corps Vegetation Standards on All King County River Levees

- National standard
 - Tree removal range: 13,600 to 35,300
 - Cost range: \$95 million to \$174 million
- Seattle District variance
 - Tree removal range: 8,700 to 19,000
 - Cost range: \$61 million to \$133 million

Note: KCFCD annual revenue ~\$36 million

Periodic Inspection Reports (April 2011)

- 9.0 miles (59%) “minimally acceptable,” eligible
 - Kent Shops – Narita
 - Meyers Golf
 - Horseshoe Bend
 - Galli’s
 - Dykstra

- 6.4 miles (41%) “unacceptable,” ineligible
 - Desimone – Briscoe School
 - Boeing
 - Lower Russell – Holiday Kennel
 - Upper Russell – Somes Dolan
 - County Road No. 8
 - Brannon Park – Reddington

Periodic Inspection Reports for Green River Levees (April 2011)

Oversized Trees & Shrubs	142
Mowing/Brushing Needs	96
Flood Plan Considerations	83
Levee Encroachments	73
Scarps, Sloughing, Scour	65
Supersacks, Irrigation	65
Problem Extends Beyond ROW	54
Encroaching Utility/Similar	42
Animal Burrows	37
Need Existing Documentation	34
Culverts Need Inspection	30

Levee “Encroachments” per PIRs (73 specified, 3 or more per levee)

- Asphalt trails
- Picnic tables
- Fences
- Signs
- Roads
- Power poles
- Sewer manholes
- Fire hydrants
- Municipal drainage pump stations
- Bridges (public roads and trails)
- Fishing shacks
- Drip irrigation systems

One Levee Owner Perspective

- Each levee involves unique physical and policy issues
- Ultimately, each levee owner/operator makes strategic choices on every site
- Knowledge of site-specific levee conditions will help owner/operators make good choices
- Workgroup products improve flexibility for local levee owners

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