KING COUNTY FLOOD CONTROL DISTRICT

King County

Flood District Advisory Committee

March 27, 2013

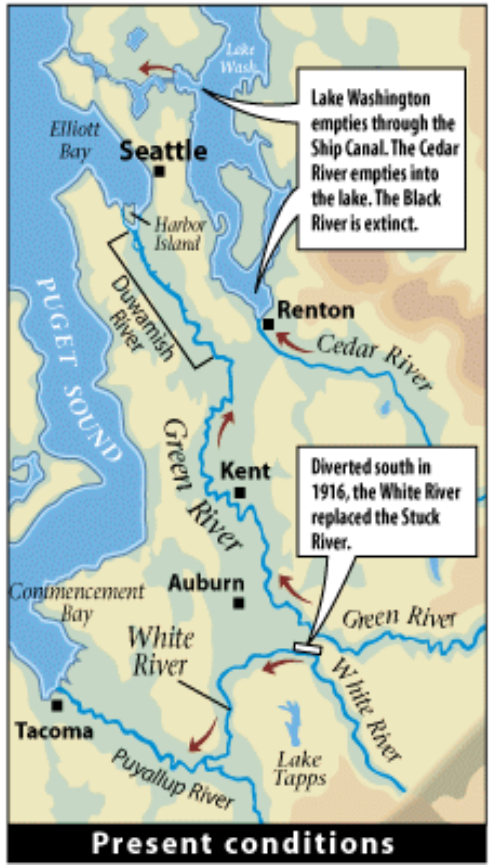
Protecting public safety, the regional economy and critical infrastructure.

Presentation Overview

- River Management in King County
- Flood Plan Goals and Philosophy
- Accomplishments since 2008
- Basin Strategies: The Short Version
- Capital Project Policies and Criteria
- 2014 Budget Development Process
- Discussion Questions:
  - Information Needs to Develop Recommendations

Key King County River Engineering Activities and Dates

- 1899: Landsburg Diversion – Cedar River
- 1906: White River Diverted (permanently in 1912)
- 1912: Cedar River Diverted to Lake Washington
- 1913: Tacoma Public Utilities Headworks – Green R.
- 1914: Cedar River Masonry Dam
- 1948: Mud Mountain Dam – White River
- 1962: Howard Hanson Dam – Green River
- 1964: South Fork Tolt River Dam
- 1966: Sammamish River Channelization
- 1930s-1970s: 500 levees & revetments constructed



Ecomomic Impacts of Flooding: Countywide

- 32,000 Floodplain Residents
- 65,000 jobs
- $3.7 Billion in total income
- 30% of aerospace jobs
- 20% of manufacturing / wholesale trade jobs
- Critical Infrastructure

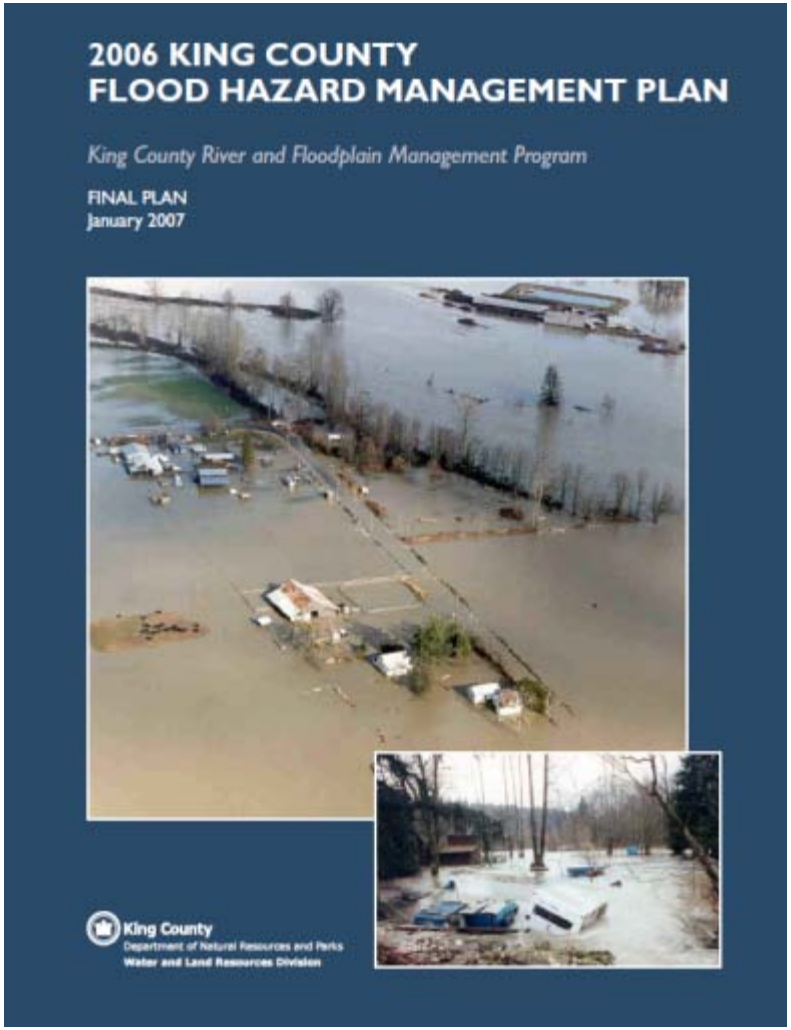
King County's Floodplain Management Philosophy

- Manage river corridors for long-term risk reduction
- Accommodate, rather than oppose, dynamic riverine processes
- Consider existing development, habitat, open space, agriculture, and recreation
- Implement using adaptive management

In sum, this multi-objective approach is achieved through technical studies, capital improvements, and programmatic activities

Our Three Objectives:

1. Reduce the risks from flood and channel migration hazards
2. Improve the natural environment
3. Reduce the long-term maintenance costs of flood hazard management

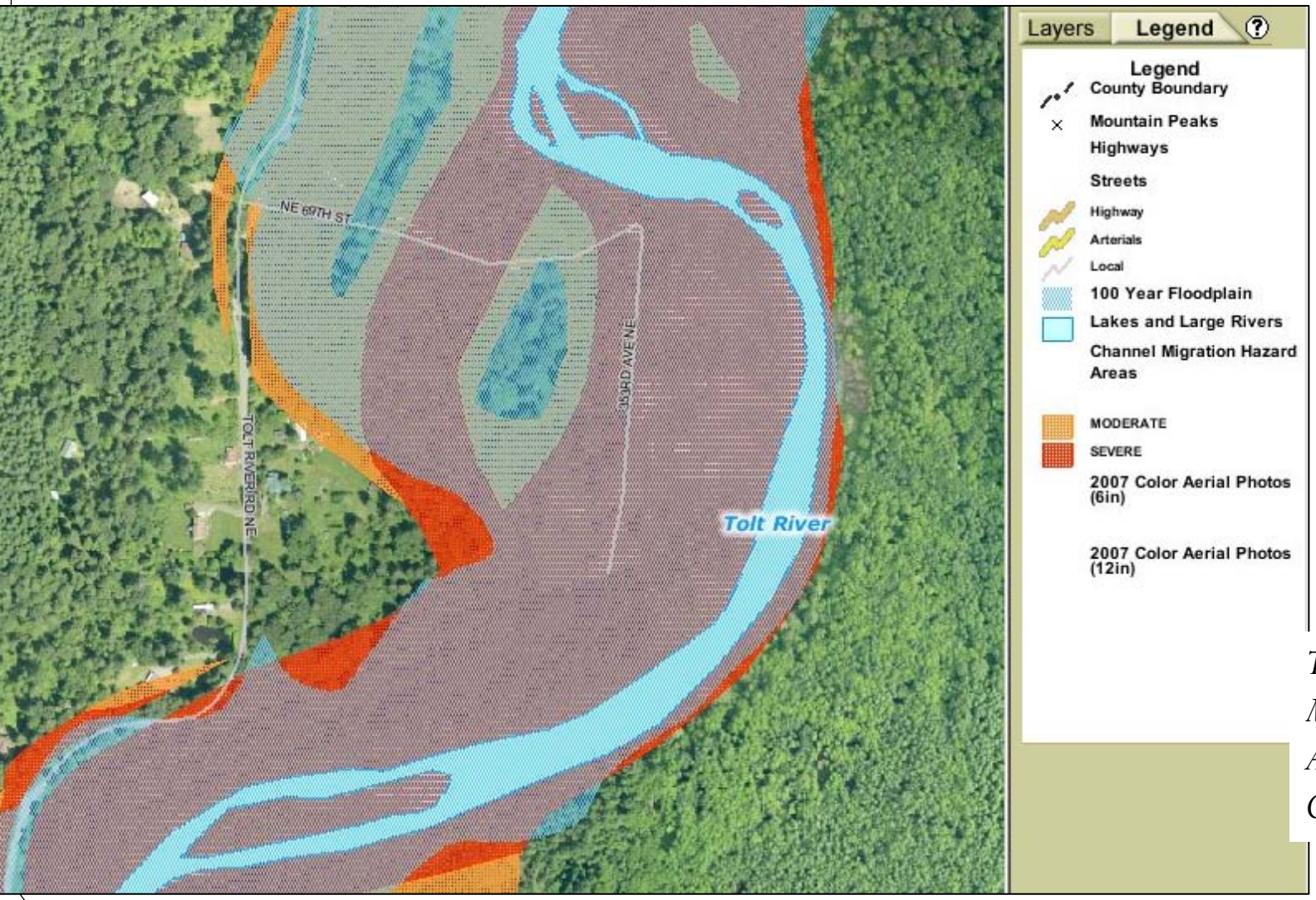


King County Flood Control District
Overview

1. Take actions to reduce flood risk.
2. Understand flood risks and where we are vulnerable.
3. Build awareness of flood risks.

City of Snoqualmie

Improving Characterization of Flood Risk: Consequence, Severity, and Urgency



Tolt River Channel Migration Map – Available on King County iMap

Building Awareness of Flood Risks

Flood Update mailed to 5,200 floodplain addresses each year

Flood information available in multiple languages

King County FLOOD ALERT

Over 5,200 flood alert subscribers and flood safety videos available in 22 languages

You Tube

Flooding services

King County, Washington

Flooding services
How to prepare for a flood
Flood phone numbers
Flood warnings and alerts
About
Flood alerts
Rain gages
Sandbag distribution
Floodplain maps
Flooding documents
Historical floods
Flood buyouts and elevation
Flood Control District
Bank stabilization projects
Community Rating System
Archived news
Site map

To offer a suggestion or report an error on the King County flooding services and information website, please contact **Fred Bentler**, webmaster.

Flood warnings and alerts

King County, Washington

Current flood conditions for King County rivers. Click on a river name for more maps, data and local flood references.

River/creek	Flood conditions
Cedar River	none
Green River	none
Issaquah Creek	none
Raging River	Gage information only
Skykomish River	Gage information only
Snoqualmie River	none
Tolt River	none
White River	none

River locations in King County

Related information

- Flooding services and information
- Rivers and Floodplain Management Section
- Stormwater services

King County FLOOD ALERT

Related agencies

- Department of Natural Resources and Parks
- Water and Land Resources Division

News and announcements

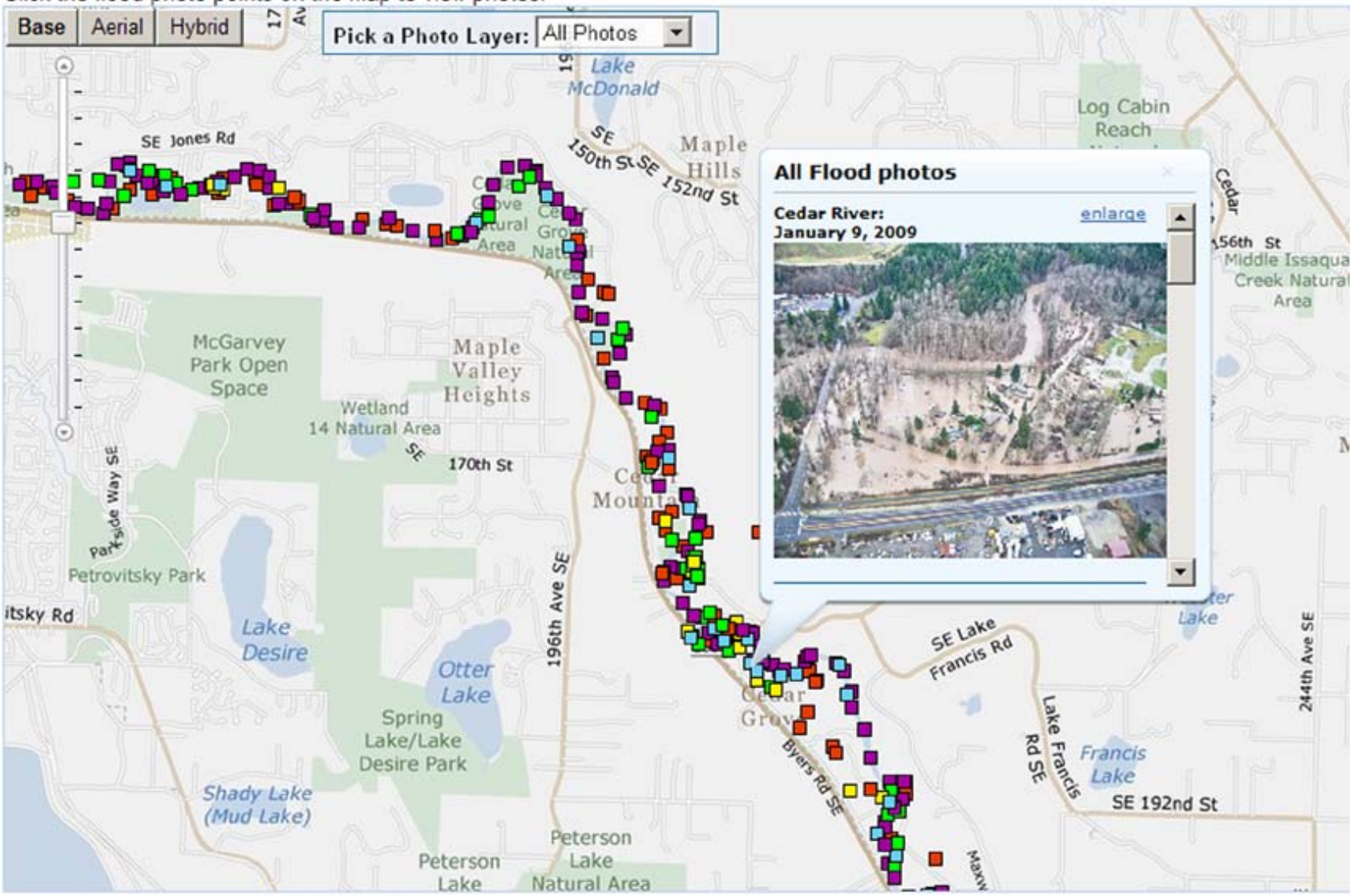
Fall 2011
New flood phases on Cedar, Tolt rivers
King County has adjusted the flood phases on the Cedar and Tolt rivers to more accurately reflect observed flooding impacts during high river flows. Flood Alerts will be issued using the latest flood phase thresholds.

River Management Survey
Let us know what you think about salmon & trout, recreation, flooding and safety

July 28, 2010
King County wins four awards for excellence in Information Technology

Flood Photo Viewer

Click the flood photo points on the map to view photos.



Legend

- 2009 Flood Photos
- 2006 Flood Photos
- 1996 Flood Photos
- 1995 Flood Photos
- 1990 Flood Photos

Map navigation

Drag mouse to pan
Mouse scroll forward to zoom in
Mouse scroll backward to zoom out
SHIFT + drag to zoom in
SHIFT + CTRL + drag the mouse to zoom out

SHIFT + click to recenter
Use arrow keys to pan
Use + key to zoom in a level
Use - key to zoom out a level

Actions to Reduce Flood Risk: Frequently Flooded Structures

Before: Homes and Residents at Risk

After: Tenants Relocated and Structures Removed

Rainbow Bend, Cedar River

Since 2008, **88** parcels and 235 acres were acquired in the floodplain from willing landowners. Approximately 300 people relocated to safer, superior housing.

Actions to Reduce Flood Risk: Elevations and Farm Pads

- 50 home and 2 barn elevations completed
- Grant-funded home elevations in progress
- 26 Farm Pads completed

Actions to Reduce Risk: Rebuilding Levees

- 68 levee projects completed
- Multiple major levee rehabilitations scheduled for construction in 2013-18

Cedar River (top)
Lower Green River (bottom)

Lower Tolt Levee Setback (Near Mouth)

Actions to Reduce Risk: Partnerships and Grants

- Since 2008, grants from FEMA, Corps, State of Washington, KCD, and Conservation Futures
- $49.5M in external grant funds for flood risk reduction
- Funding to 40 jurisdictions through the Opportunity Fund

Lower Green River – Horseshoe Bend

Actions to Reduce Risk: Maintenance

- 500 levees and revetments along 120 miles of river
- Inspection and access for flood season
- 635 acres of property to maintain
- Remove15-20 at-risk structures per year

Vegetation removal, Tukwila (top)
Home demolition, Cedar River (bottom)

2008-2012 Expenditures

	Snoqualmie	Cedar	Green	White	Countywide Miscellaneous	Seattle	Subreg'l Opp. Fund	Total
Acquisition	$18,662,000	$12,714,000	$12,315,000	$4,856,000				$48,547,000
Levee Construction/Repair	$2,301,000	$3,572,000	$7,082,000	$484,000				$13,439,000
Design	$3,446,000	$3,121,000	$3,877,000	$2,758,000				$13,202,000
Elevation	$2,735,000							$2,735,000
Emergency Repair/Prep	$24,000	$120,000	$6,489,000	$358,000				$6,991,000
Feasibility	$416,000		$780,000					$1,196,000
Farm/Flood Task Force	$283,000							$283,000
Environmental Mitigation			$35,000					$35,000
Post-Construction Monitoring/Maint.					$539,000			$539,000
Payments to Jurisdictions					$33,000	$7,264,000	$9,549,000	$16,846,000
Miscellaneous					$715,000			$715,000
Grand Total	$27,867,000	$19,527,000	$30,578,000	$8,456,000	$1,287,000	$7,264,000	$9,549,000	$104,528,000

NOTE: FCD Expenditures only; does not include $25M in Corps PL 84-99 levee expenditures

2008-2012 FCD Accomplishments

	Snoqualmie-Skykomish	Cedar - Sammamish	Green - Duwamish	White River	TOTAL
Acquisition	46 properties, 160 acres	18 properties, 15 acres	6 properties, 42.6 acres	18 properties, 17.4 acres	88 properties, 235 acres
Home Elevation	50	-	-	-	50
Barns/Ag Structures	2 barn elevations	-	-	-	2
Farm Pads	26	-	-	-	26
Demolitions/ structure removal	50	76	-	11 demolished (6 relocated)	137 demolished (6 structures relocated)
Construction Projects	33	22	12	1	68

Basin Strategy Overview

Actions to Reduce Risk: Rebuilding Levees

- 68 levee projects completed
- Several major levee rehabilitations scheduled for construction in 2013-18

Cedar River (top)
Lower Green River (bottom)

SNOHOMISH CO.
KING CO.
SHORELINE
KIRKLAND
SEATTLE
REDMOND
BELLEVUE
SAMMAMISH
SEATTLE
RENTON
KENT
FEDERAL WAY
AUBURN
KING CO.
PIERCE CO.
Snoqualmie/ South Fork Skykomish Basin
Cedar River Basin
Green River Basin
White River Basin
Snoqualmie/ South Fork Skykomish Basin
River/Stream
Other Basin Boundaries
Lake
Incorporated Area
Snoqualmie/S. Fork Skykomish Basin
N
0 2 4 6 Miles
1/22/09
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GIS, Visual Communications & Web Unit
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King County

Snoqualmie Flood Risks

Snoqualmie/ S. Fk. Skykomish Overall Approach

- Home buyouts and elevations
- Levee repairs to address flood damages
- Large levee rehabilitations and reconfigurations to reduce flood risks
- Programmatic efforts to educate and inform, protect citizens from flood hazards
- Monitoring and mapping, modifying strategies based on results

Cedar River Basin

- River/Stream
- Other Basin Boundaries
- Lake
- Incorporated Area
- Cedar River Basin

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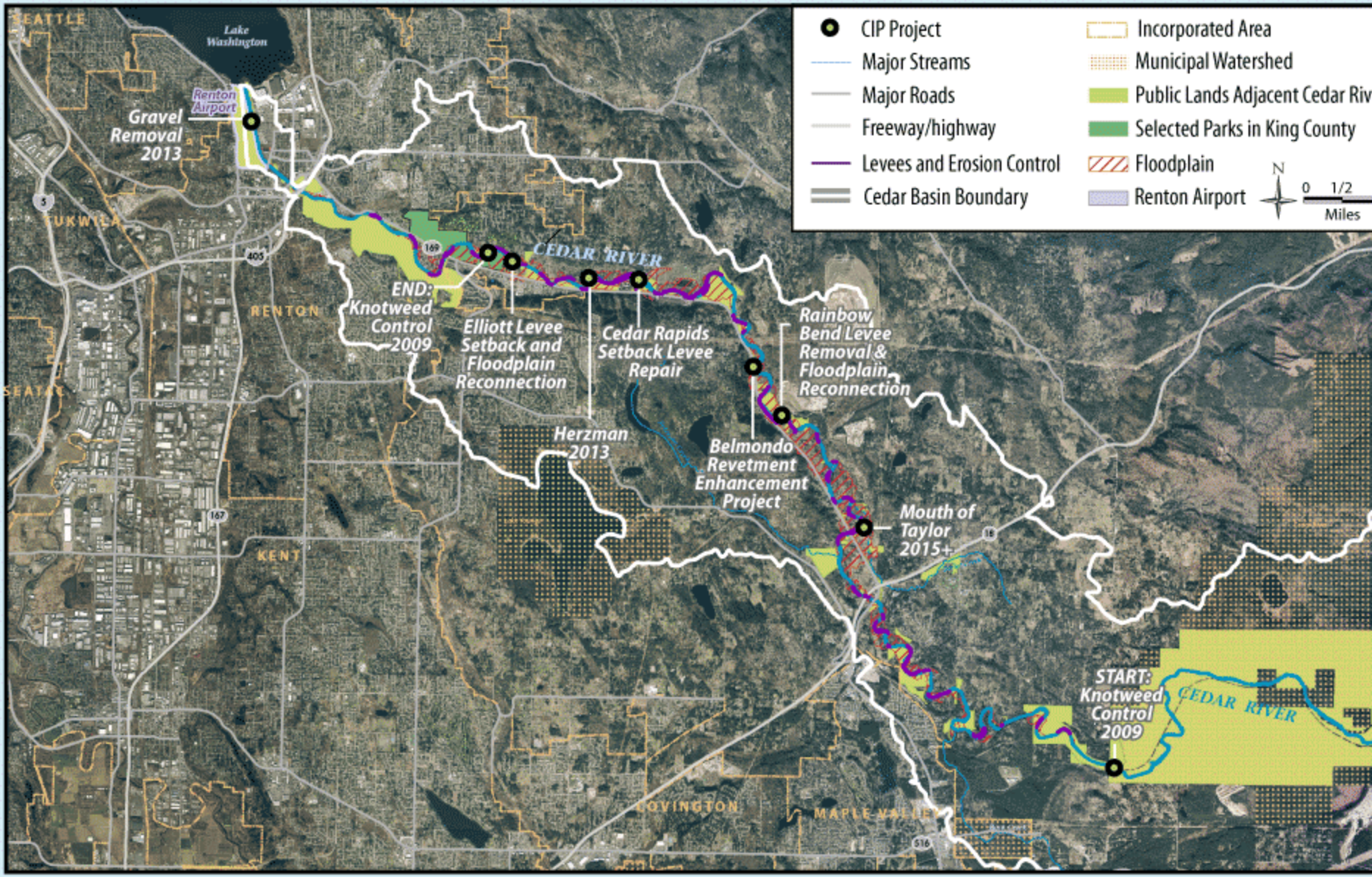
King County

Cedar-Sammamish Strategy

- Reduce flood velocities and volumes that threaten critical public infrastructure, residential dwellings, and block sole-access roads
- Reduce public safety risks associated with neighborhood-scale flooding and channel migration

Major Cedar River Projects - 2012 to 2016

King County



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White River Basin

- River/Stream
- Other Basin Boundaries
- Lake
- Incorporated Area
- White River Basin

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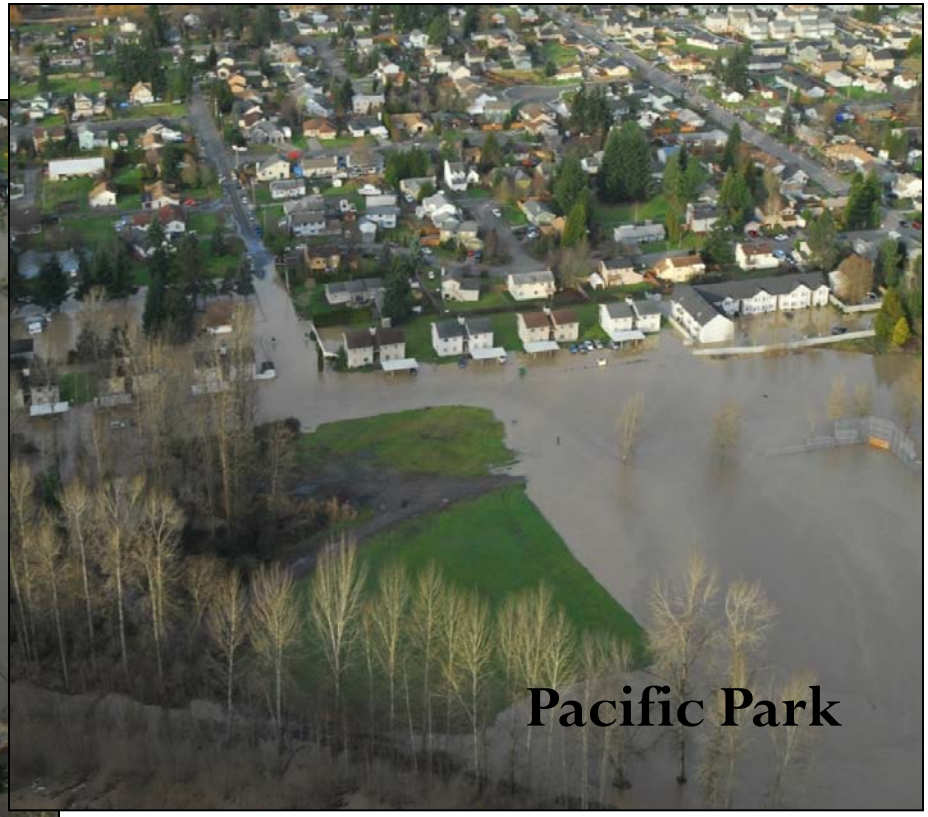
King County

January 2009 Flood

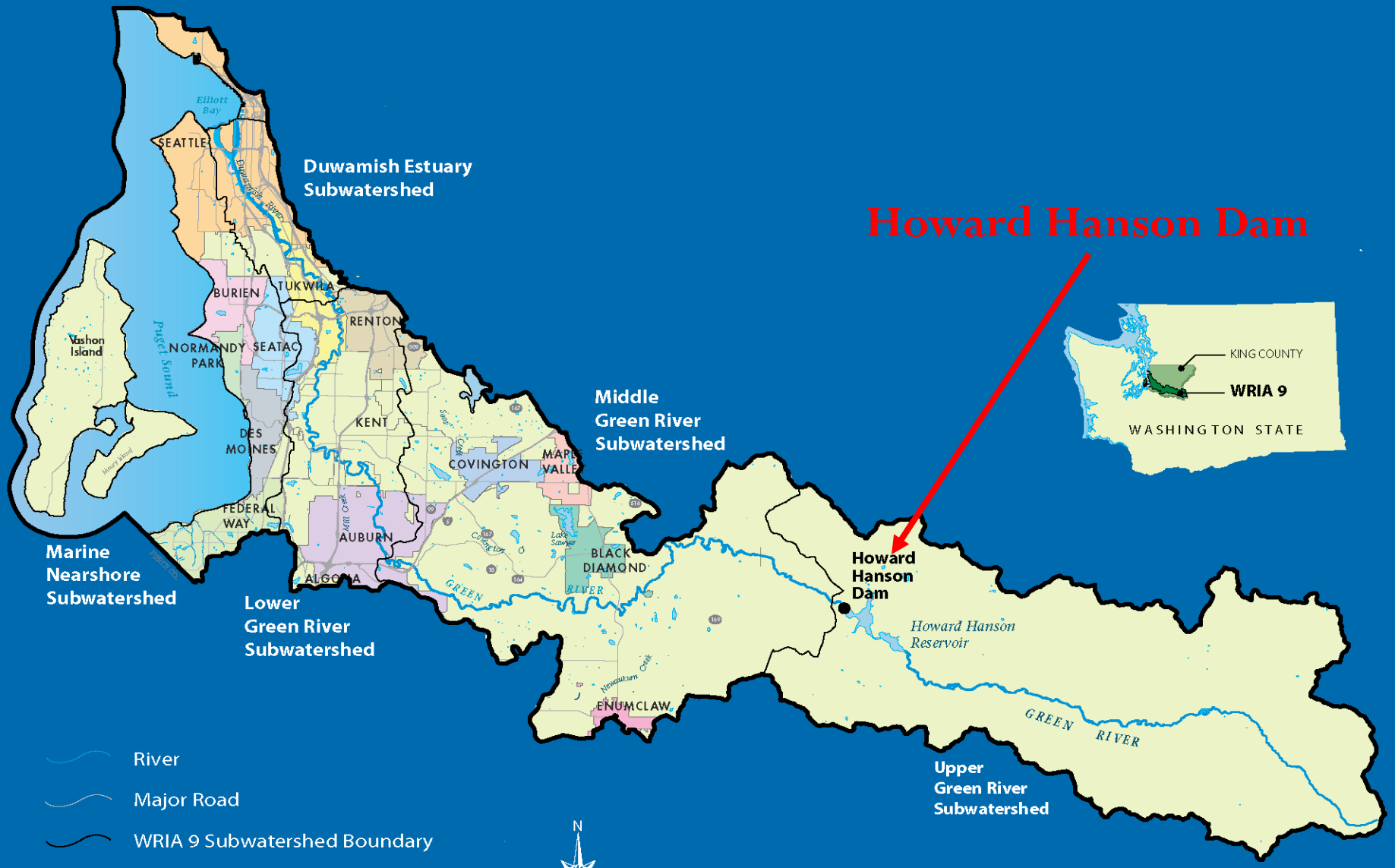
White River Estates (Pacific)


Pacific Park

Stewart Avenue

King County FCD Capital Projects

- Proposed KCFCD capital projects are levee setbacks to provide increased flood capacity
- Two large-scale projects are proposed to be installed between A-Street and 8th Street bridges
  - Countyline Levee Setback
  - Right Bank (Pacific) Levee Setback



River

Major Road

WRIA 9 Subwatershed Boundary

WRIA 9 Boundary

Open Water

Unincorporated King County

N

0 2 4 6 Miles

March 2009

King County
Department of
Natural Resources and Parks

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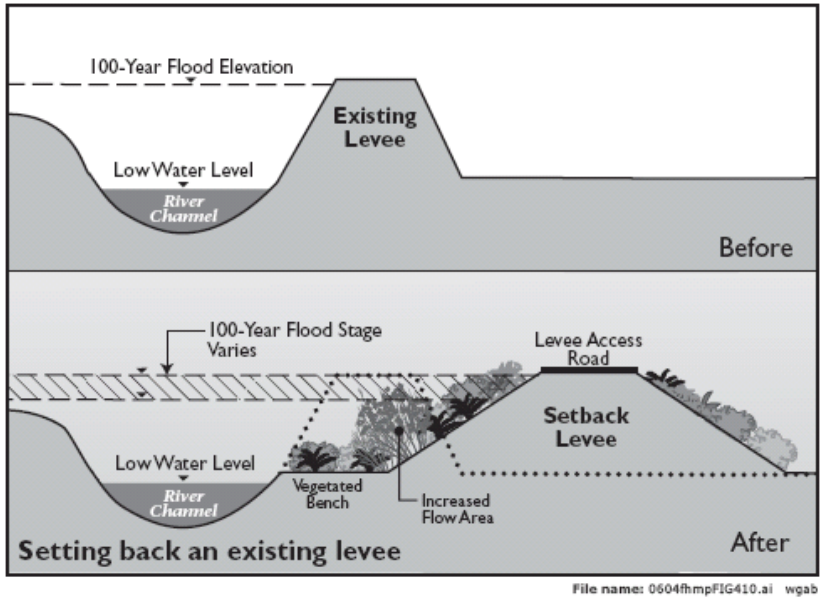
King County

Green River Strategy

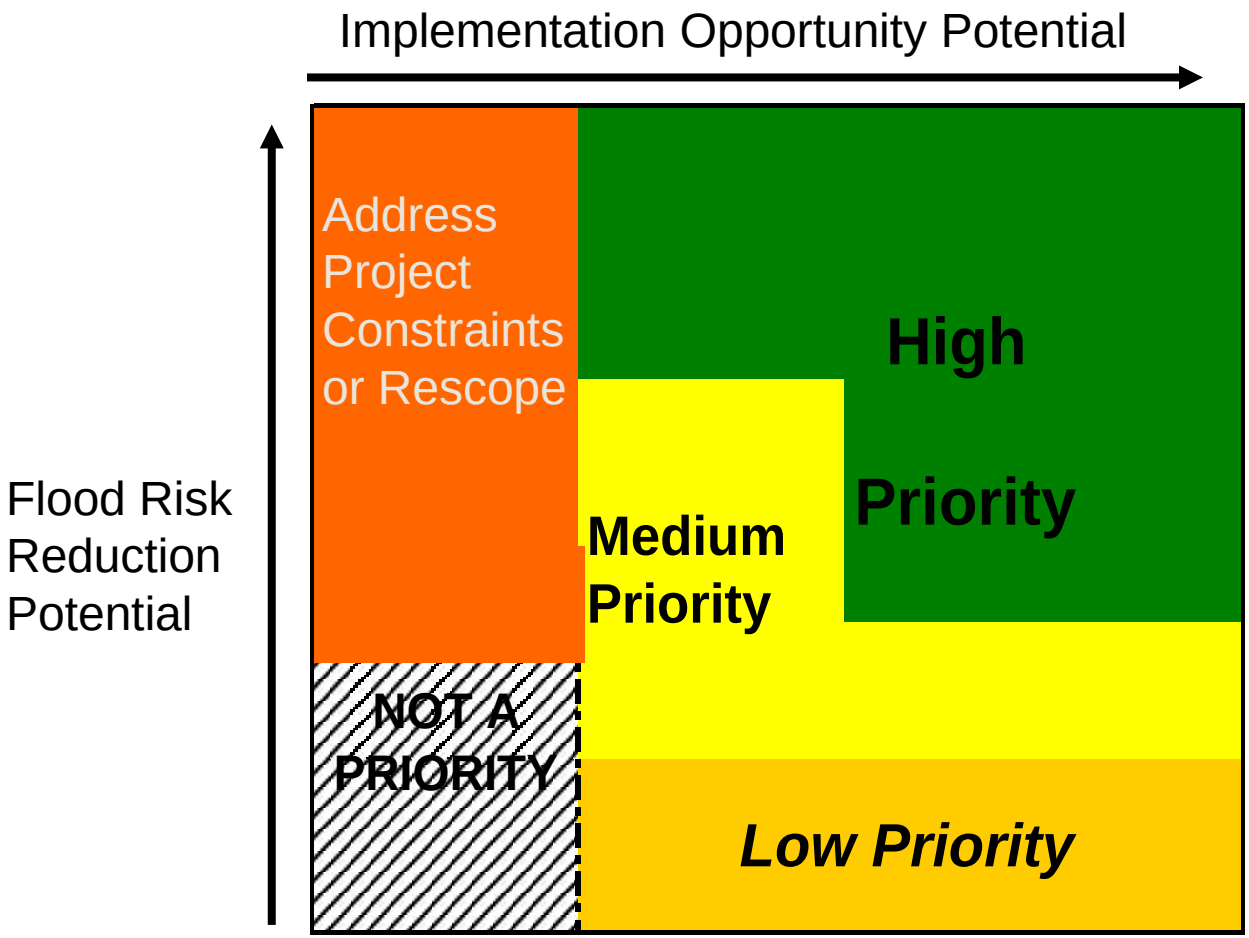
- Rehabilitate levees to current engineering designs to protect critical public infrastructure and regional distribution centers
- In many places this means setting back the levees to meet necessary geometry for a stable slope and installation of habitat features.
- Multi-Stakeholder "System-Wide Improvement Framework" to identify appropriate level of service, prioritize levee improvements, and provide alternative approach for managing vegetation

LEVEE SETBACK PROJECTS
2006 KING COUNTY FLOOD HAZARD MANAGEMENT PLAN



Bio-engineered levee setback - Lower Green River

Evaluation Criteria: Project Evaluation Approach



NOTE: This is a conceptual diagram and is not intended to imply clear and distinct thresholds between these categories.

2013 Budget Development Process

- Capital project status update
- Changes to flood risk and/or implementation factors
- 2013 projected expenditures; 2014-2019 forecasted costs
- Basin Technical Committee review and discussion
- Preliminary recommendations May 1
- TOUR!! May 1 before Advisory Committee meeting
- "Temperature Read" recommendations May 30
- Operating Budget: No significant changes proposed
- Materials to be Provided:
  - Capital Project List: document proposed revisions from 2013 adopted budget
  - Capital project status proviso report; FCD annual report
  - Operating: Work Program Scope
  - All budget attachments: by basin, by project, by program, Subregional Opportunity Fund, District administrative costs
  - Financial Plan: What's the Bottom Line?

Discussion Questions

- What information is most helpful for you to develop recommendations on the 2014 work program and budget?

- What has worked well in the past, and what could be improved?

Flood Preparedness Information

King County Flood Services
www.kingcounty.gov/flood

- King County Flood Alerts
- King County flood gage and phase information
- Sandbag distribution information

King County Flood Control District
www.kingcountyfloodcontrol.org