

# MINIMIZING AND MONITORING IMPACTS FROM URBAN PLANNED DEVELOPMENTS

Session:

*Steve Foley*

10:10-10:20	<b>Introduction to Issues and Policy Thinking</b>	<i>Steve Foley</i>
10:20-10:40	<b>Landscape Scale Influences on Fluvial Geomorphology and Water Quality</b>	<i>Ray Timm</i>
10:40-11:00	<b>Monitoring Biological Responses to Development</b>	<i>Jo Wilhelm</i>
11:00-11:20	<b>Hydrological Analysis of Adair Creek</b>	<i>Kyle Comanor</i>
11:20-11:40	<b>Development Impacts on Groundwater</b>	<i>Ken Johnson</i>
11:40-11:50	<b>Summary and New Thinking</b>	<i>Steve Foley</i>

# STORMWATER STANDARDS TIME-LINE

Pre-1975 standards only required engineering design of pipes and ditches

1975 King County began to require some rudimentary flow control on some development

1979 King County introduced the 1979 Surface Water Design Manual

- Rational Method for hydrologic modeling, Y&W method for flow control design
- No water quality facility requirements

1990 Revolutionary new 1990 King County Surface Water Design Manual

- SBUH required for flow control facility sizing
- Biofiltration and wet ponds required
- Widely imitated, cutting edge

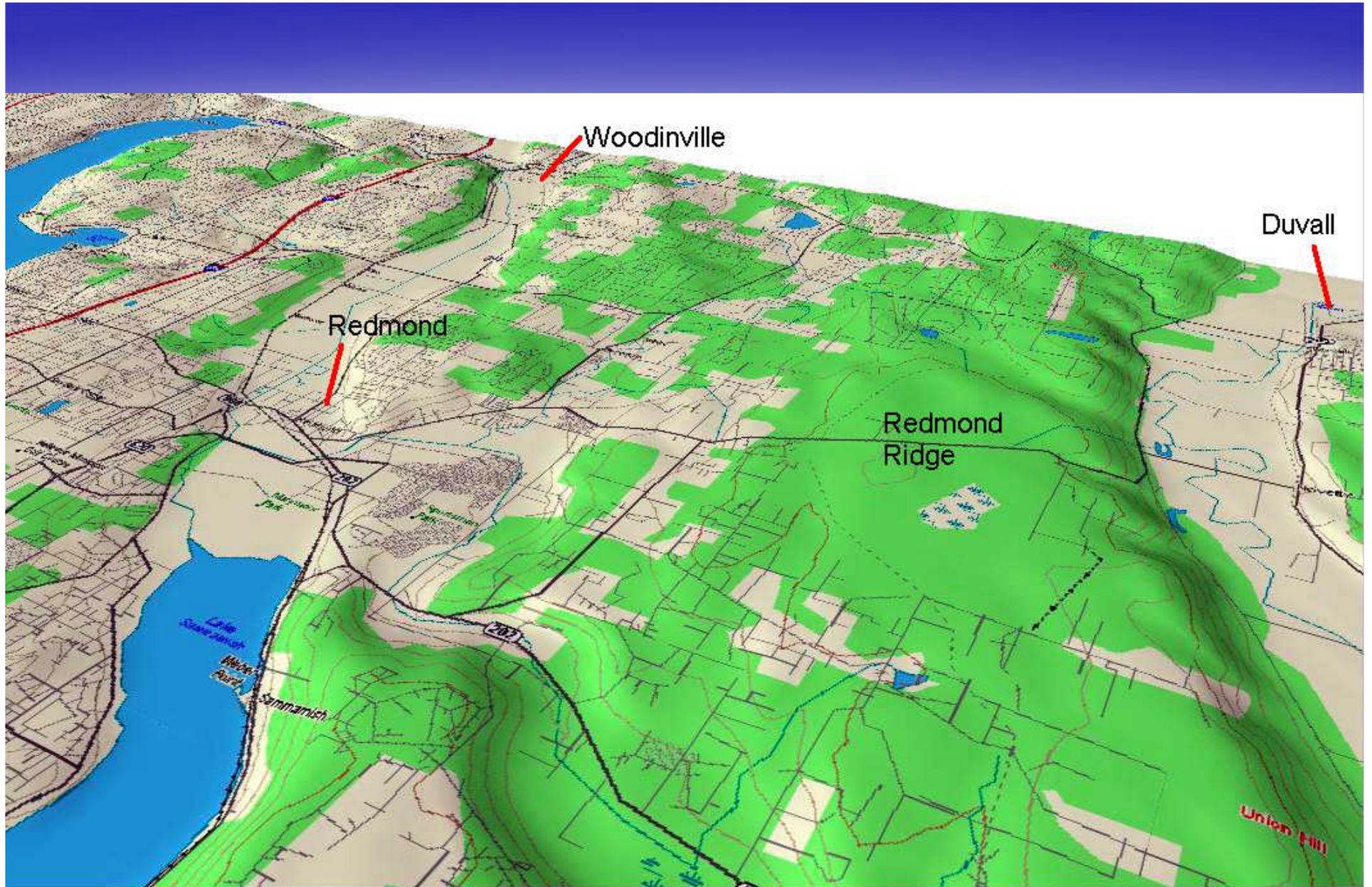
# STORMWATER STANDARDS TIME-LINE

## 1998 New King County SWDM

- Introduced continuous hydrologic model, KCRTS, true duration control
- Introduced small site BMPs emphasizing forest retention and dispersion of runoff
- New, improved water quality facility design methodologies
- Introduced new water quality facility types: sand filter, media filtration

## 2005 Latest and Greatest SWDM

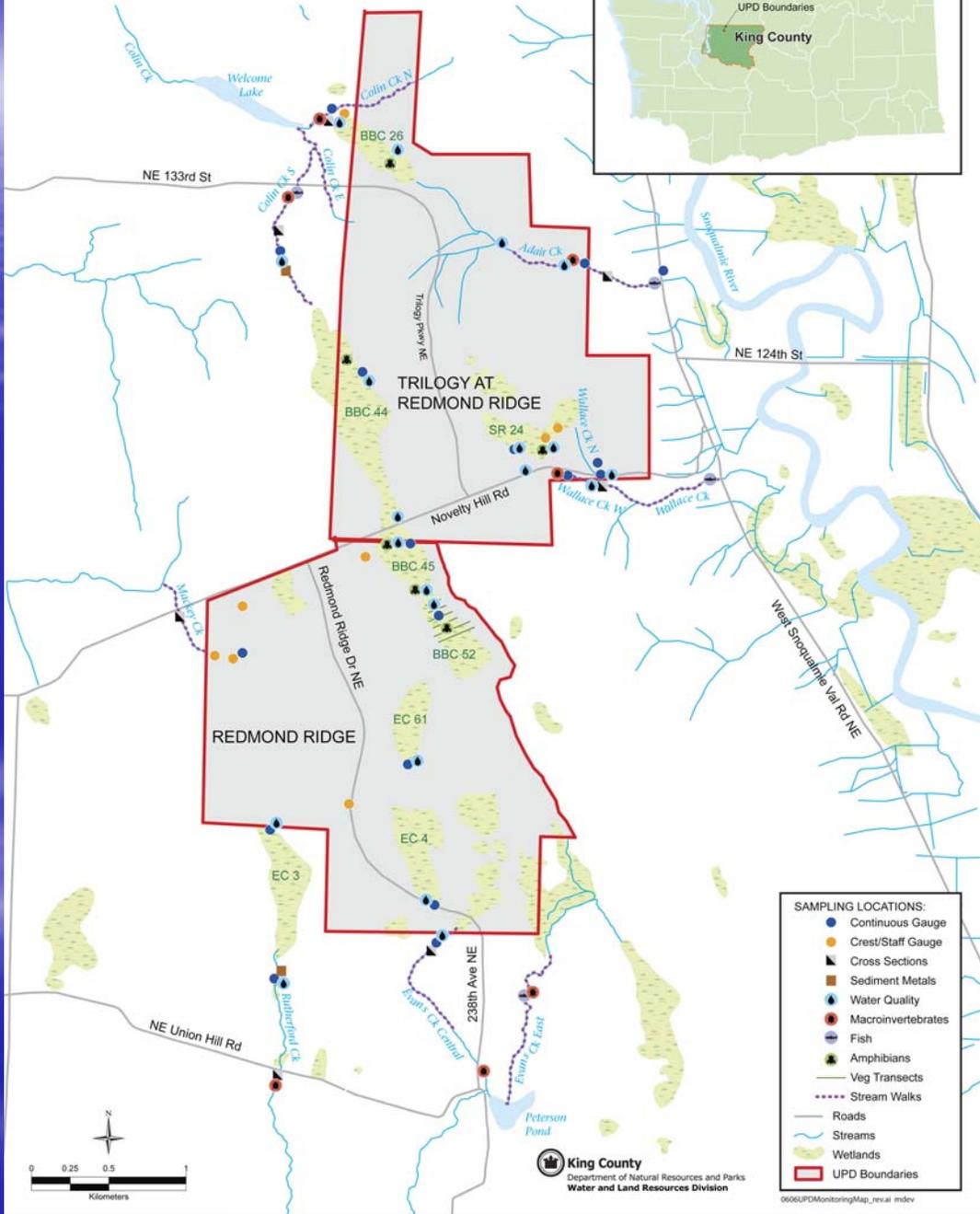
- Forested Duration flow control requirement
- Introduced LID standards and minimum requirements



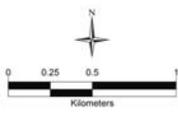
# UPD TIME-LINE

- Early 20<sup>th</sup> Century logged repeatedly
- 1970s Residential subdivision proposed
- Early 1990s UPD concept developed, Master Drainage Plan Completed
- Mid 1990s UPDs approved
- Early 21<sup>st</sup> Century construction begun and post-construction monitoring begun
- 2005 Mid-point Review of UPDs

# Urban Planned Development (UPD) Natural Resources Monitoring



- SAMPLING LOCATIONS:**
- Continuous Gauge
  - Crest/Staff Gauge
  - Cross Sections
  - Sediment Metals
  - Water Quality
  - Macroinvertebrates
  - Fish
  - Amphibians
  - Veg Transects
  - Stream Walks
  - Roads
  - Streams
  - Wetlands
  - UPD Boundaries



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# MASTER DRAINAGE PLANS

- Aquatic resources delineated
- Baseline monitoring
- Calibrated HSPF models completed
- Project-specific stormwater standards to:
  - Minimize wetland water level fluctuation
  - Prevent stream erosion
  - Preserve groundwater recharge
  - Limit pollutants
- Requirements went beyond 1990 SWDM
- Required post-development monitoring

# OTHER DESIGN ELEMENTS

- Bypass high flows to Snoqualmie River
- Avoid discharges to bog systems
- Extra-large buffers
- Soil Amendment
- Maximize infiltration
- Outfall dispersion
- Limit use of copper, zinc

# KC SUCCESSFULLY

- Developed standards that limit stormwater impacts for a large urban development at a time when much less was known about development impacts to habitat
- Implemented standards during design and construction
- Followed through with long-term monitoring of impacts to resources

# SUMMARY OF FINDINGS

- Too soon for definite conclusions
- UPDs do not seem to have caused obvious habitat damage or impacts to offsite property
- Stormwater standards appear to be effective at limiting impacts
- Changes are occurring that could signal habitat degradation

# NEXT STEPS

- Continue with monitoring
- Review results vis-à-vis project standards
- Assess implications for stormwater design standards
- Consider changes to project facilities
- Recommend changes to stormwater standards