

# Environmental Opportunity Assessment

Basin Scale Opportunity Assessment Workshop  
Bend, OR  
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- ▶ **Identify environmental opportunities within the context of other water uses and increasing hydropower**
  
- ▶ What it is an environmental opportunity?
  - Opportunity to improve river, riparian, or floodplain conditions
  - Primarily focused on management of the hydrologic regime
  
- ▶ DWA objective to “move stream flows toward a more natural hydrograph while securing and maintaining improved instream flow and water quality to support fish and wildlife” <sup>1</sup>

<sup>1</sup> Aylward, B. and D. Newton. 2006. *Long-range Water Resources Management in Central Oregon: Balancing Supply and Demand in the Deschutes Basin*. DWA Final Report.

- ▶ **Ecology of riverine environment is inextricably linked to the hydrologic regime**
- ▶ Direct effects → temperature, turbidity, erosion, transport, geomorphic complexity, connectivity, groundwater, etc.
- ▶ Indirect effects → water quality, habitat quality, bank stability, riparian condition, fish survival & reproduction, aquatic biodiversity, environmental cues
- ▶ Socioeconomic, cultural, and aesthetic implications

# Opportunity Assessment Process

1. Identify important environmental issues in the basin
2. Identify opportunities to help address environmental issues
3. Integrate hydropower and environmental opportunities in a scenario-based modeling framework
4. Visualize scenario modeling results to explore tradeoffs amongst different interests



- ▶ **Identify important environmental issues in the basin**
  - Water quality, instream habitat, fish passage, natural storage, floodplain, protection status, etc.
  
- ▶ High-level scoping fed by stakeholder engagement and review of existing assessments
  
- ▶ Focus on reach-specific opportunities related to changes in hydrologic regime
  - Upper and Middle Deschutes River
  - Tumalo and Whychus creeks
  - Lower Crooked River



Source: PGE ([www.deschutespassage.com](http://www.deschutespassage.com))



- ▶ **Identify reach-specific opportunities to help address environmental issues**
  - Enhance flow (timing, magnitude, duration, conservation)
  - Restoration (riparian health, bank stability, stream complexity)
  
- ▶ Key assessments
  - *Deschutes Subbasin Plan* (NPCC 2004)
  - *Upper Deschutes Subbasin Assessment* (UDWC 2003)
  - *DWA Instream Flow in the Deschutes Basin: Monitoring, Status, and Restoration Needs* (Golden & Aylward 2006)

## ▶ Integrate hydropower and environmental opportunities in a scenario-based modeling framework

Scenario is a set of opportunities to alter water management to achieve a mix of benefits

- ▶ Scoping → simulation process aimed at revealing tradeoffs amongst different interests by incrementally adjusting variable levels
- ▶ Scoping variables represent management actions

- ▶ Increase minimum flow below Wickiup Dam during the non-irrigation season from 25 cfs (baseline) to 350 cfs in ~75 cfs increments

- ▶ Simulate water conservation measures by reducing baseline irrigation demand by 10 and 20 percent



Modify timing and amount of instream flow in upper Deschutes to benefit fish, water quality, and other ecological processes

- ▶ **Combinations of scoping variables are implemented in a mass-balance river model to simulate different management scenarios**

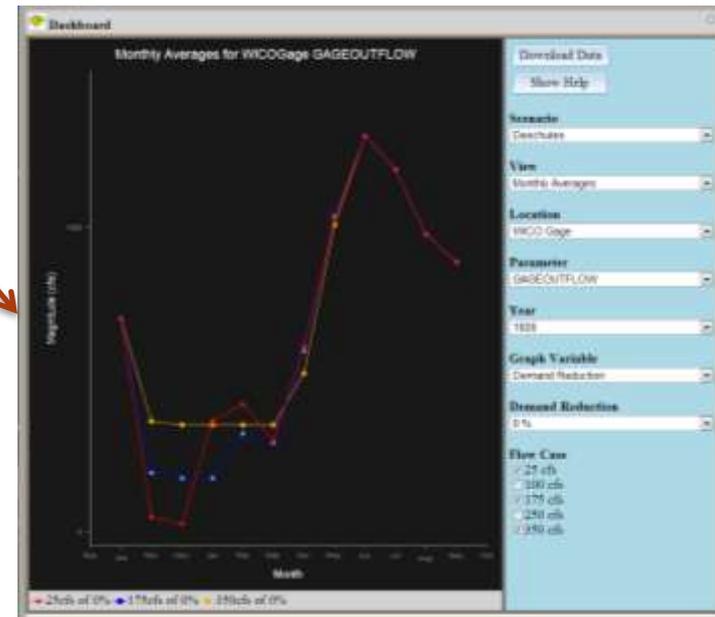
Demand Reduction Levels

	0%*	10%	20%
Flow Cases			
25*	25, 0%	25, 10%	25, 20%
100	100, 0%	100, 10%	100, 20%
175	175, 0%	175, 10%	175, 20%
250	250, 0%	250, 10%	250, 20%
350	350, 0%	350, 10%	350, 20%

\* Baseline level for scoping variable

- ▶ Interest – increase flow in upper Deschutes River during the non-irrigation season
  - Purpose → prevent freezing/thawing of river bank and channel, improve bank stability, riparian condition, and aquatic habitat
  - Target → 300 cfs
  - VBM → Mean off-season (Oct 15 – Apr 15) flow at WICO gage as a percentage of 300 cfs flow target
  
- ▶ Interest – increase flow in middle Deschutes River below Bend during the irrigation season
  - Purpose → mitigate temperature and water quality issues to benefit salmonids and meet ODEQ criteria
  - Target → 250 cfs
  - VBM → percentage of summer (Jun 1 – Aug 31) where flow >250 cfs

- Visualize scenario modeling results to explore tradeoffs amongst different interests



## ▶ Phase I assessments

- Develop a conceptual framework for identifying key environmental issues and opportunities in the basin
- More emphasis on the spatial context and quantification of environmental issues

## ▶ Recommendations from the Deschutes experience