2016 Columbia River Basin
Long-Term Water Supply and Demand Forecast
Summary

• Why are we updating the forecast?
• Summary of 2011 Forecast
• Summary of 2016 Forecast Approach
• Summary of Emerging Policy Issues
• Schedule and Input Opportunities
2011 Water Supply & Demand Forecast

- Update required every 5 years
- Audience includes policy makers, water managers, general public
- Water and economic modeling
- Interviews with water managers
- Peer review
- Predicts agricultural, municipal, instream, and hydropower needs
- Guide for future investment
- Emerging policy issues
2011 Forecast Findings: Supply

- Water forecasted through 2030
- Modeled surface water supply / demand
- Did not forecast GW supply / demand
- Supply: surface water supplies estimated to increase statewide by 3% average
- Climate change: water supply projected to shift earlier in the year
- WDFW created an Instream Atlas to help characterize fish flow, habitat, and utilization
## 2011 Forecast Findings: Demand

<table>
<thead>
<tr>
<th>Demand Type</th>
<th>Estimated Volume (acre-feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2030 New Irrigation Demand</td>
<td>170,000</td>
</tr>
<tr>
<td>2030 New Municipal and Domestic Demand (including municipally-supplied commercial)</td>
<td>117,500</td>
</tr>
<tr>
<td>Unmet Columbia River Instream Flows</td>
<td>13,400,000</td>
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<tr>
<td>Unmet Tributary Instream Flows</td>
<td>500,000</td>
</tr>
<tr>
<td>2030 New Hydropower Demand</td>
<td>0</td>
</tr>
<tr>
<td>Alternate Supply for Odessa</td>
<td>164,000</td>
</tr>
<tr>
<td>Yakima Basin Water Supply (pro-ratables, municipal/domestic and fish)</td>
<td>450,000</td>
</tr>
<tr>
<td>Unmet Columbia River Interruptibles</td>
<td>40,000 to 310,000</td>
</tr>
</tbody>
</table>
2016 Forecast Analysis Will...

- Forecast through 2035
- Include groundwater evaluation
- Improve hydrology, cropping models, consumptive loss simulation
- Include climate change predictions
- Forecast water right and reservoir curtailment
- Evaluate potential for the forecast to be extended to Western WA in 2021
- Evaluate policy issues necessary for program administration and investments
Forecast Approach: Geography

- Geographic evaluation:
  - 7 States and Canada
  - Washington WRIAs
  - Columbia River 1-Mile Corridor

- Input from other states, watershed planning, sector experts, and the public
Forecast Approach: Modeling

Figure 3. Biophysical modeling framework for forecasting surface water supply and irrigation water demand.
Forecast Approach: Economics

Inputs:
- Future Climate Scenario
- Water Management Scenario
- Economic Scenario

Modeling Steps:
- Biophysical Modeling: VIC-CropSyst, Reservoirs, Curtailment
  - Crop Yield (as impacted by climate and water availability)
  - Adjusted Crop Acreage
  - Selective Deficit Irrigation

Economic Modeling: Agricultural Producer Response

Outputs:
1. Water Supply
2. Irrigation Water Demand
3. Unmet Irrigation Water Demand
4. Effects on Crop Yield
Yakima Basin Additional Analysis

• Relevant to 2016 Forecast because the state of the science in Yakima Basin is more advanced than most watersheds
  • Offers enhanced understanding of drought response
  • Quality of water data high (adjudication)
  • Active basin management (water masters, water right curtailment)
  • Active supply investment proposals in progress

• Further progression of supply and demand modeling
  • Economic implications of deficit irrigation, crop mix, and irrigation technology change
  • Updated climate and crop modeling
Policy Issues in 2016 Forecast

- **Water Banking**: How can water banking assist in meeting demand?
- **Cost Effects of Water**: How is an applicant-pays model affecting program participation?
- **METRIC**: How can remote sensing improve demand projections?
- **Groundwater Integration**: Where and how much will declining groundwater supplies affect demand?
Water Banking In Washington

<table>
<thead>
<tr>
<th>WA Water Banks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private</td>
</tr>
<tr>
<td>Quasi-Government &amp; NGO</td>
</tr>
<tr>
<td>Public</td>
</tr>
</tbody>
</table>

- Private: 11
- Quasi-Government & NGO: 4
- Public: 13
Water Banking: Scope and Policy Considerations

• Update 2004 Water Banking Report
  o Survey/inventory water banks

• Document Ecology impacts
  o Roles – Regulator, Funder, Incentivizer, Banker, and Auditor
  o Quantify costs

• Document how bank design/operation affect costs

• Identify regulatory, funding, and operational barriers

• Recommendations and future visioning
Cost Effects of Water

- Legislature has moved towards an applicant-pays system
  - Cost-reimbursement permitting
  - Recovery of water supply development costs

- Some applicants are choosing to defer or postpone rather than receive new water rights when offered

- This study will survey 500 applicants from various programs (Lake Roosevelt, Wenatchee, Yakima, Cabin Owners, etc.) to understand how time and financial terms of a program are affecting processing and demand for new service
Cost Effects of Water: Policy Considerations

- What price points incentivize applicant participation?
- What other program criteria affect participation (e.g. lead time, water right type, purpose of use, location)?
- What should Ecology’s reaction be to applicants that decline processing?
- Should application requirements be augmented to better reflect processing level of effort?
METRIC: Forecasting Irrigation Use

- METRIC uses field-calibrated satellite imagery to improve consumptive use forecasting
- Predict agricultural crop consumption and return flows at the field and watershed scales
- Pilot 3 subbasins: Walla Walla Basin, Yakima Basin and Okanogan Basin
- Model inputs from volunteer farms:
  - Soil moisture
  - Weather data (wind speed, temperature, heat flux)
  - Applied irrigation (Applied Water Duty)
  - Landsat flights
METRIC Policy Considerations

- Can it improve accuracy of demand estimates?
- Can it provide a surrogate or compliment to metering data?
- Can it assist in water right evaluations and adjudications?
- Can it assist in identifying areas of crop stress?
Groundwater Integration

• New component for 2016 Forecast

• Why:
  o 2011 Forecast did not evaluate effects of declining groundwater on demand
  o Users who rely on declining groundwater supplies may rely on surface water in the future
  o Surface and groundwater interactions can lead to water rights conflicts

• Goals:
  o Improve forecasting of groundwater shortages by identifying data gaps and use existing tools to predict the scope of the problem
  o Estimate surface water demand changes caused by groundwater shortages
Research & Analysis

Declining Groundwater Areas
- Published reports
- Groundwater models
- Ecology well monitoring

Groundwater Models
- Coverage
- Robustness
- Limitations

Groundwater Data
- Water level monitoring
- Aquifer tests
- Cross sections

Instream Flow Rules
- WAC 173-5(WRIA #)
- Availability
Groundwater Integration Policy Considerations

- What is the state of the science on declining groundwater areas?
- How can groundwater be integrated into comprehensive supply and demand forecasting?
- Where is demand on surface water likely to occur?
- What is the magnitude of that future demand?
- How does it compare to available water supply?
- What are the economic effects of not ensuring a firm water supply?
Forecast Report

- 50+ page Summary Report
- WRIA-focused pages
- Large Technical Report
- Web applications / content
- Instream Flow Atlas Update
Schedule / Opportunities for Input

- Data collection and modeling in 2015
- Presentations to PAG, WRAC, CCPAG, and stakeholder groups in 2015
- Watershed planning input in 2015
- Sector expert input in 2015
- Analysis and draft results in early 2016
- Public workshops and draft report in summer 2016
- Final Report Due November 15, 2016