

Integrating Declining Groundwater Areas into Supply and Demand Forecasting

WHY? Some aquifers are declining, so in some areas groundwater will be limiting in the future.

RECOMMENDATIONS: The 2016 Forecast explored what can be done and how to integrate groundwater into future Forecasts:

- Increase public outreach to promote water conservation measures.
- Increase coordination to ensure policies and regulations are sufficient to protect future water supplies.
- Increase groundwater monitoring to understand extent and declines.
- Integrate the risk of future curtailment due on declining groundwater into future Forecasts.

Pilot Application of METRIC Crop Demand Modeling in Washington State

WHY? Tracking water use by crops helps in water right evaluations and adjudications if data is available at fine enough scales, and can inform future Forecasts.

RECOMMENDATIONS: METRIC was found to be a useful tool to help the Office of the Columbia River:

- Improve estimates of agricultural water demand in future Forecasts.
- Improve water measurement at both the local and regional scales.
- Help evaluate crop stress and ways to adapt irrigation technology to changes in available water supply.

Water Banking Trends in Washington and Western States

WHY? Water banking is helping meet demand in areas where no new water supply is available. Limited resources impact OCR's ability to effectively fulfill its role in bank set-up and administration.

RECOMMENDATIONS: A number of options to improve water banking and water markets exist:

- Clarify mitigation, public-interest, and other criteria to streamline bank operations and guide allocation of Department of Ecology (Ecology) resources.
- Explore cost-recovery and contracting options, as well as operations and monitoring alternatives for small banks, to improve banks' cost-effectiveness.
- Clarify out-of-watershed transfer policies to prevent unintended economic impacts.

Effects of User-Pay Requirements on Water Permitting

WHY? The State Legislature has moved towards applicant-pay systems for processing water rights applications. This has caused some applicants to decline water right processing, impacting OCR's ability to reduce its backlog.

RECOMMENDATIONS: Ecology can better focus on participants likely to accept offered water permitting by:

- Requiring that new applicants submit foundational information in the initial application, and participate in a cost-reimbursement program to align expectations around cost.
- Increasing processing fees to close the gap between applicant expectations and actual costs.
- Eliminating the opportunity for applicants to remain in line if they decline an offer for water.

Western Washington Supply and Demand Forecasting

WHY? A consistent Supply and Demand Forecast across the whole state can inform the need and impacts of proposed policies that have statewide relevance.

RECOMMENDATIONS: The existing modeling framework is applicable statewide, and the relevant data sources are available. Some unique west-side differences exist, requiring:

- A robust stakeholder outreach strategy.
- A more comprehensive scoping following targeted meetings with stakeholder groups.
- Data collection to fill gaps in non-planning jurisdictions.

This publication is available on the Department of Ecology website at: <https://fortress.wa.gov/ecy/publications/SummaryPages/1612001.html>

Special accommodations: To request ADA accommodation for disabilities, or printed materials in a format for the visually impaired, call the Office of Columbia River at 509-575-2490. Persons with impaired hearing may call Washington Relay Service at 711. Persons with speech disability may call TTY at 877-833-6341.

LOOKING TO THE FUTURE

Over the next five years, OCR plans to implement many of these recommendations to advance the state of the science and key policy initiatives that affect water supply and demand in the region:

1. Capture the impact of double cropping on agricultural demand, and integrate groundwater into supply estimates.
2. Expand the use of METRIC to inform regulatory and water-right permitting actions.
3. Target water supply development efforts supported by the cost of water in the market.
4. Streamline water bank requirements.
5. Partner with Water Resources to define the merits of a statewide Forecast.
6. Include any issues arising from changes to the international Columbia River Treaty.

In this way, OCR will target investments that sustain the region's economic growth and enhance our environmental and cultural resources 20 years into the future and beyond.

For more information you may contact:

Tom Tebb, Director
Office of Columbia River
gteb461@ecy.wa.gov
509.574.3989

Melissa Downes
Office of Columbia River
mini461@ecy.wa.gov
509.454.4259

Jennifer Adam
Washington State University
jcadam@wsu.edu
509.335.7751

Jonathan Yoder
Washington State University
yoder@wsu.edu
509.335.8596

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

The Water Supply and Demand Forecast is a powerful investment tool for Washington State. It describes where demand for water has existed historically, the relative magnitude of instream versus out-of-stream demand, and how our local and regional water supply is likely to change in the next 20 years.

The 2016 Forecast summarizes the impact on water supply and demand of expected changes in:

- **Climate:** The Pacific Northwest is expected to experience increasing temperatures and shifts in precipitation, leading to wetter winters and springs, drier summers, declining snowpack, earlier snowmelt and peak flows, and longer periods of low summer flows.
- **Economics:** While some crop groups have seen relatively large changes within existing cropland, the relative acreage share for the region is expected to remain stable, with forage covering the most acreage.
- **Water management:** Increases in water storage capacity from planned projects can reduce the current users' vulnerability to drought, or can supply water to new uses, including the development of new irrigated acreage.

By exploring these three types of changes the Forecast quantifies the likely range of water supply and demand across the Columbia River Basin in 2035, paying particular attention to the portion of the Basin in eastern Washington State. This helps the Office of the Columbia River (OCR) direct water supply project development to the most important areas, to ensure a reliable water supply for Washingtonians.



VISION

Preserve and enhance the standard of living for the people of Washington by strengthening the state's economy, and restoring and protecting the Columbia Basin's unique natural environment.

MISSION

Aggressively pursue development of water supplies to benefit both instream and out-of-stream uses.

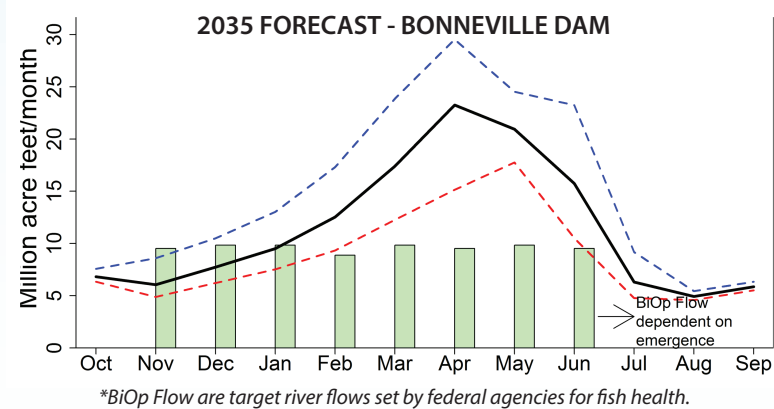
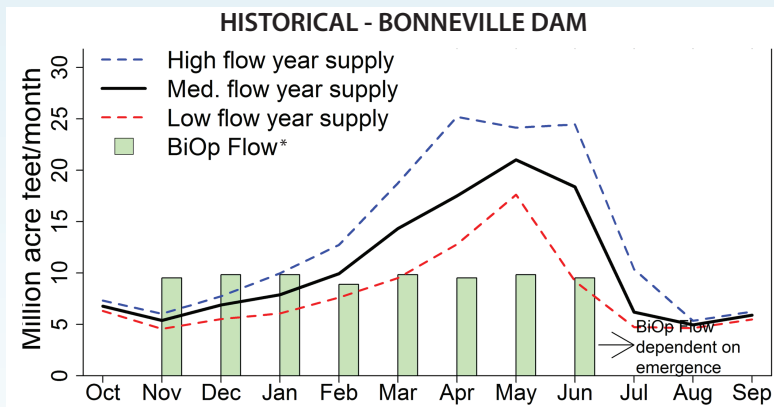
AUTHORIZING STATUTE

RCW 90.90.040(1) To support the development of new water supplies in the Columbia river and to protect instream flow, the department of ecology shall work with all interested parties, including interested county legislative authorities and watershed planning groups in the Columbia river basin, and affected tribal governments, to develop a long-term water supply and demand forecast by November 15, 2006, and shall update the report every five years thereafter.

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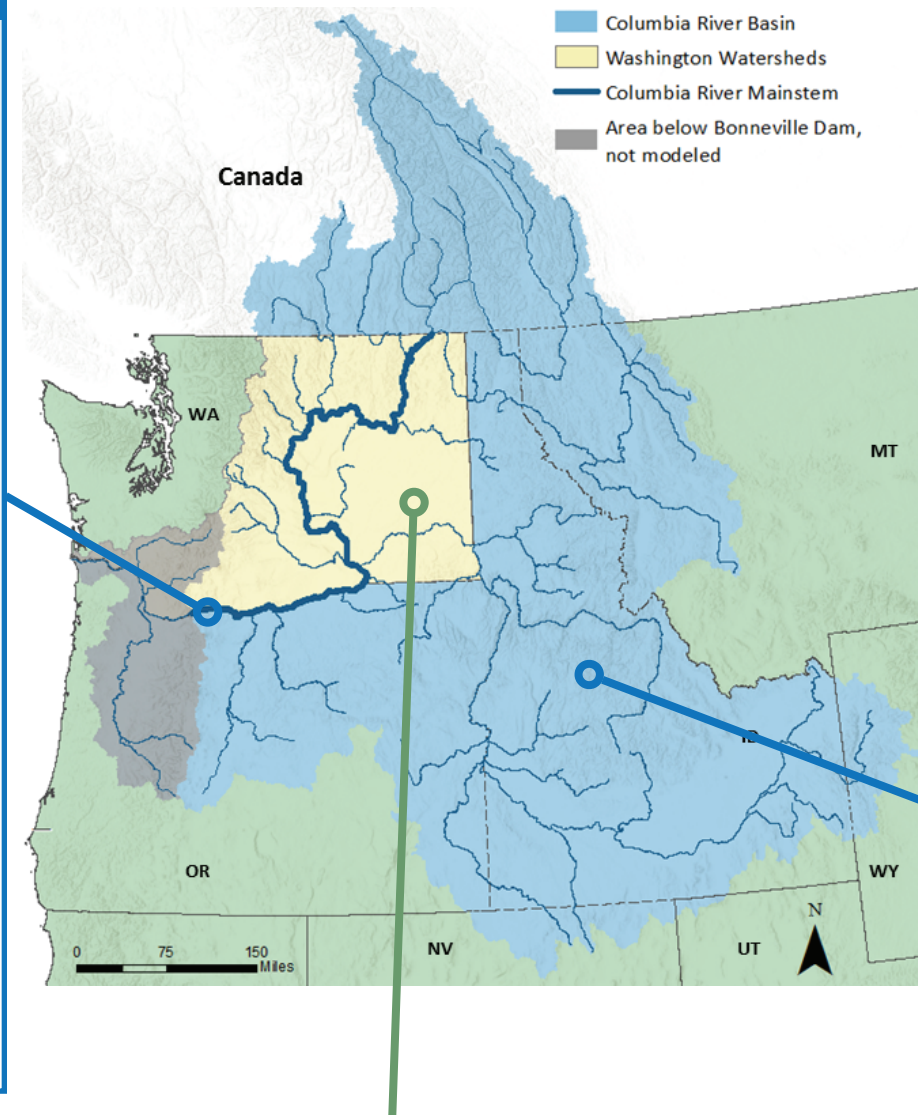
Columbia River Mainstem

Modeled results project a shift in the timing of water supply feeding the mainstem Columbia River in Washington State. Results are summarized for different dams along the mainstem, such as the Bonneville Dam, below.

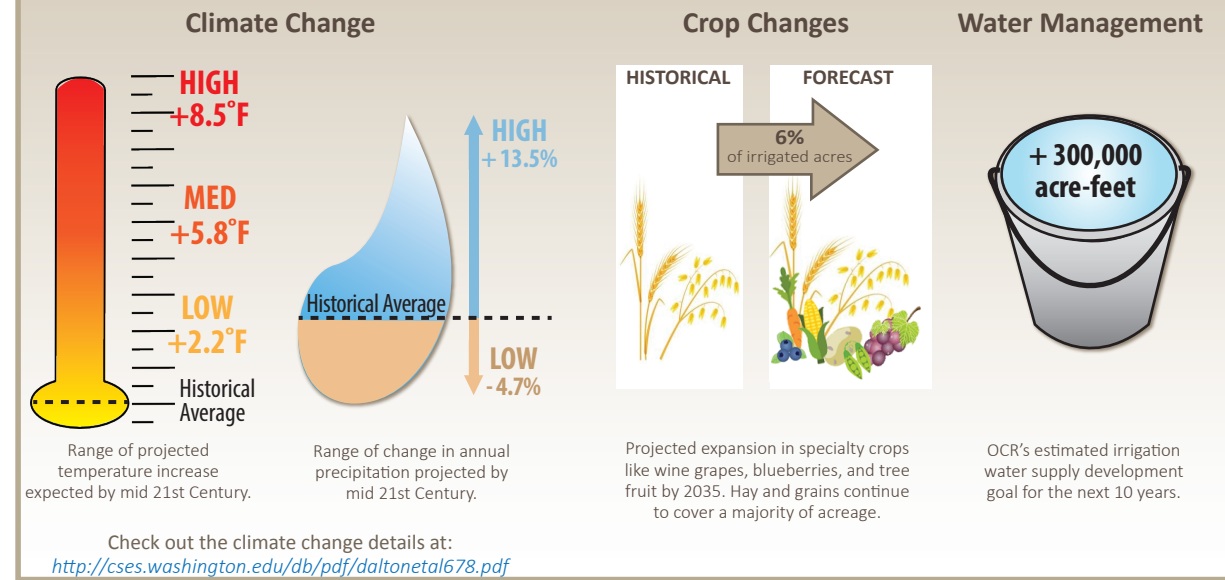


These shifts in water supply have implications for the frequency and magnitude of future curtailments. Check out the details at:

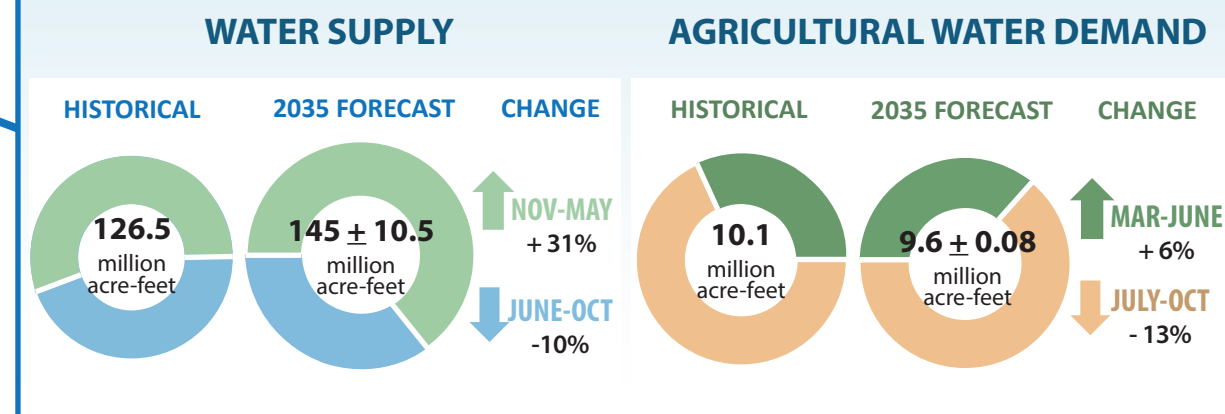
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Expected Changes that Impact Water Supply & Demand



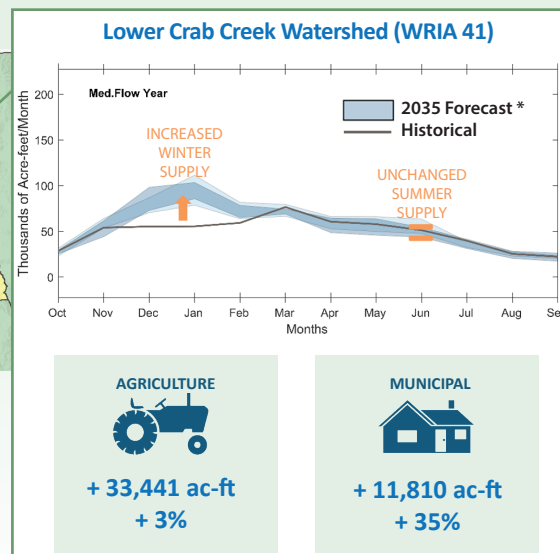
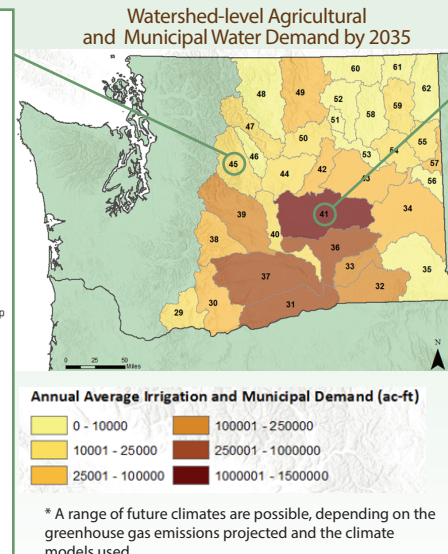
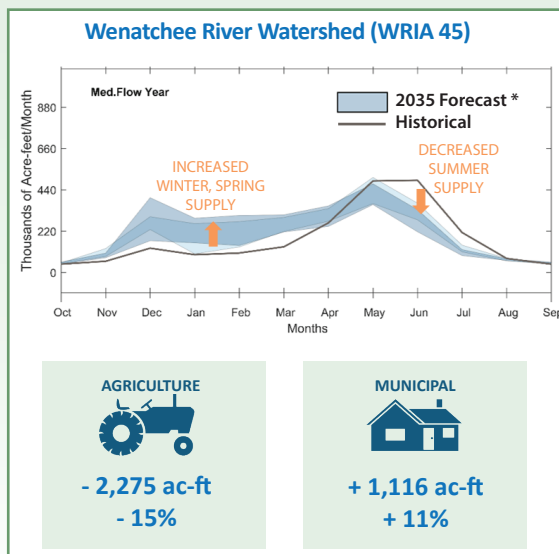
Columbia River Basin



Eastern Washington's Watersheds

Changes in Watershed-Level Supply and Demand by 2035

Projected changes in watershed-level water supply, agricultural and municipal demand vary across eastern Washington's watersheds. The Wenatchee River and Lower Crab Creek watersheds exemplify the range of projected changes.



Changes in Annual Demand for Eastern Washington by 2035

AGRICULTURE	-6% to +4%	-332,837 to +169,973 acre-feet depending on climate scenario, double cropping, and planned water supply projects. Decreases are due to wetter springs and projected shift to more water-efficient crops. Increases are projected with increases in irrigated acreage due to planned water supply projects.
MUNICIPAL	+18%	80,000 acre-feet in total diversion demands for municipal and domestic water. Increase is due to projected increases in population.
HYDROPOWER	+12% to +25%	+35,000 to +75,000 acre-feet in instream flows to provide sufficient additional hydropower generation capacity to meet projected increases in energy demand for the entire Columbia River Basin.

Unmet Instream Flows

Under the 2001 drought conditions, there were **13,400,000 acre-feet** in unmet Columbia River instream flows at McNary Dam, on the Columbia River Mainstem.

Under drought conditions (ranging from an average drought to the worst drought on record from 1981 to 2011), there has been **30,000 to 660,000 acre-feet** in unmet instream flows in tributaries to the Columbia River.

Check out the projected changes for your watershed at: <https://fortress.wa.gov/ecy/publications/SummaryPages/1612001.html>