Update: Tumalo Creek Restoration Subgroup

February 6, 2015

One watershed shared by many

The Tumalo Creek watershed sustains ecosystems, waters farmland, and provides the City of Bend with drinking water.

Irrigation

Flows in lower Tumalo Creek drop significantly during the summer months as 46 million gallons per day water 8,000 acres of Tumalo farmland. Conservation projects are helping keep more water in the creek while continuing to meet irrigation needs.

Stream ecosystems

Native redband trout require a year-round supply of cool, clean water for survival. While many Central Oregon rivers flow at a warm 70˚F during the summer months, Tumalo Creek averages a chilly 50˚F. Tumalo Creek is one of only four cold-water tributaries along more than 100 miles of the Deschutes River, making it a rare and valuable refuge for native fish.

Watering a city

Residents of Bend - just 10 miles away - benefit from this watershed's great tasting drinking water. Bridge Creek, a tributary to Tumalo Creek, provides an average of 10.6 million gallons per day for drinking, bathing, and watering lawns.

Denise Dahn

Tumalo Creek Restoration Subgroup

Formed from Council Resolutions 2867, 2900

- ✓ 1. Describe Current Status / Learn about Tumalo ID
- ✓ 2. Set Mutual Restoration Goal (20 cfs in Reach B)
- ❑ 3. Create List Mutual agreed projects
- ❑ 4. Create Funding Strategy
- ❑ 5. Determine Partners / Processes / related projects

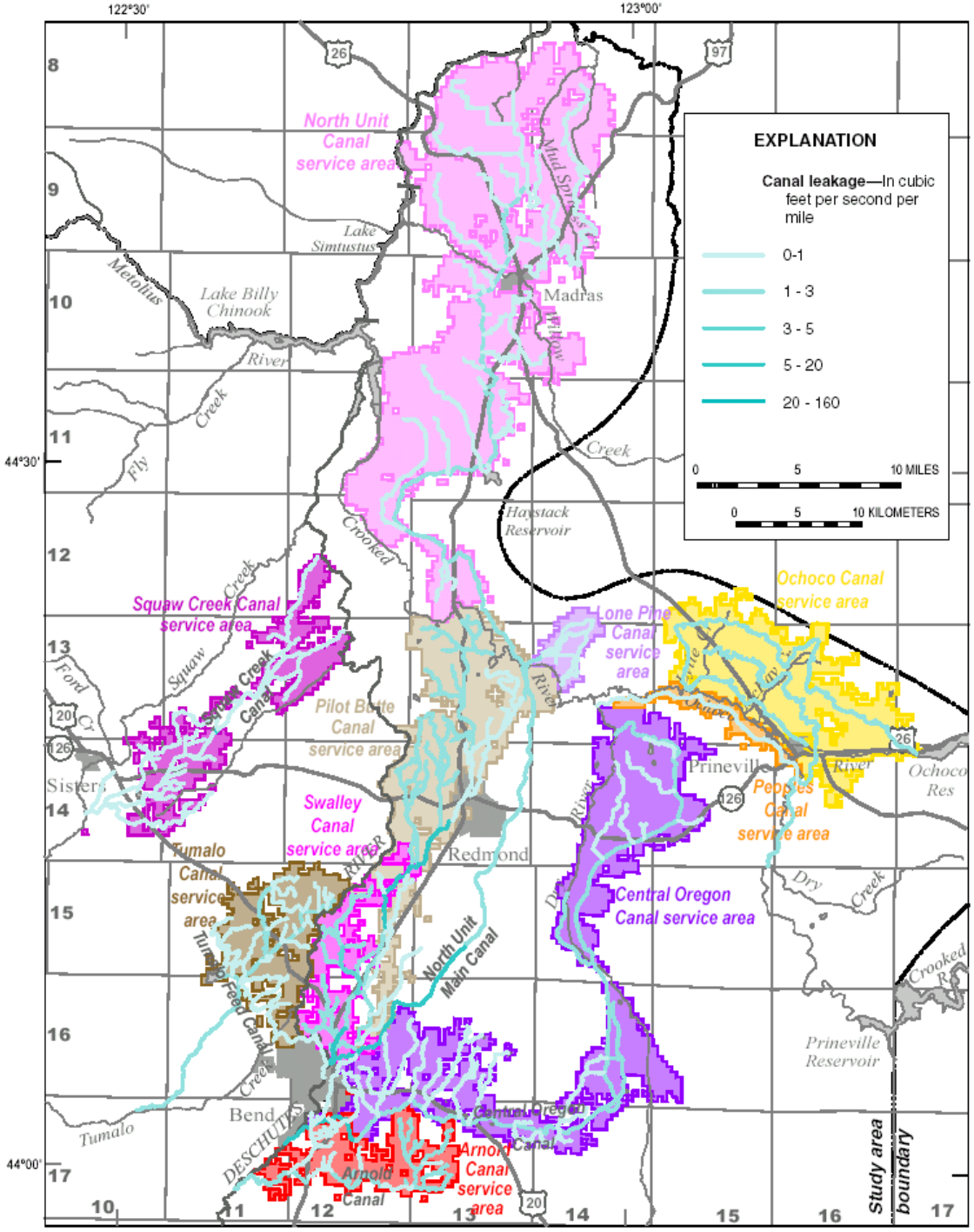
- ❑ Come back to Council / TID Board with regular updates, policy direction check-ins

Irrigated Agricultural Lands

The other "municipal government"

+/- 160,000 Acres

(Irrigation District Boundaries)



Irrigated Agricultural Lands

The other "municipal government"

+/- 160,000 Acres

(Irrigation District Boundaries)

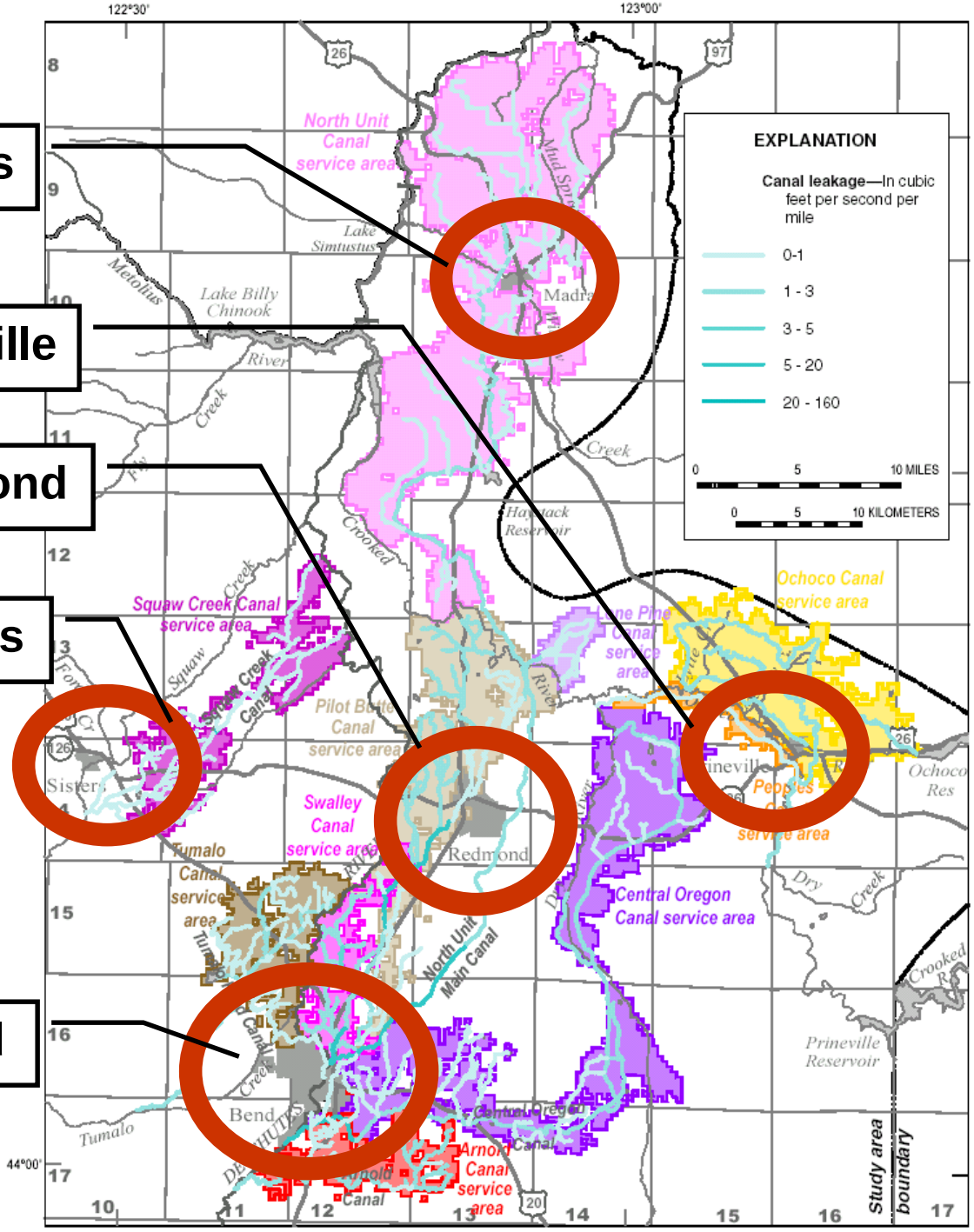
Madras

Prineville

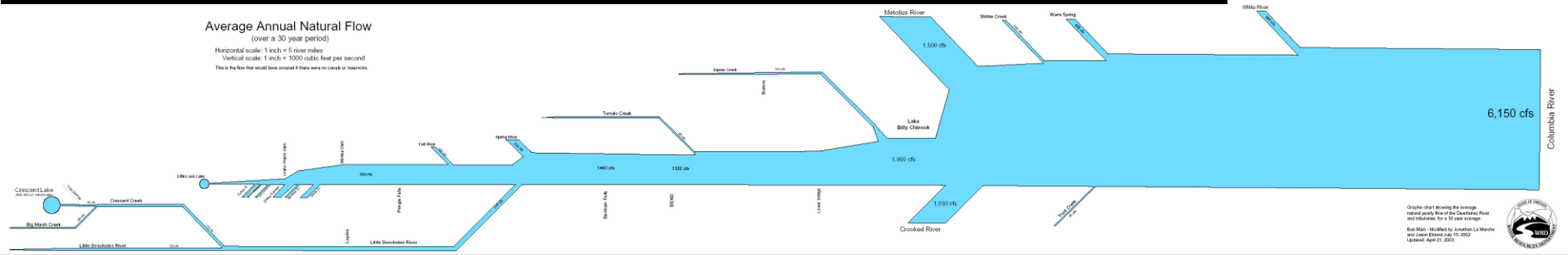
Redmond

Sisters

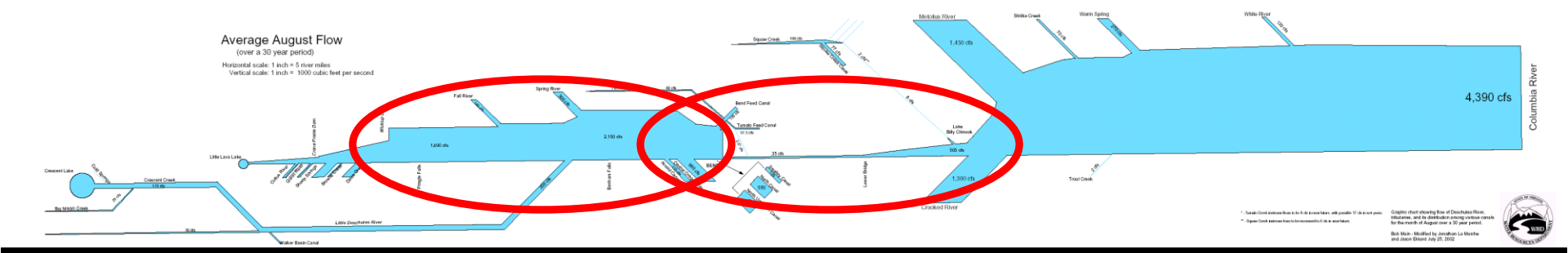
Bend



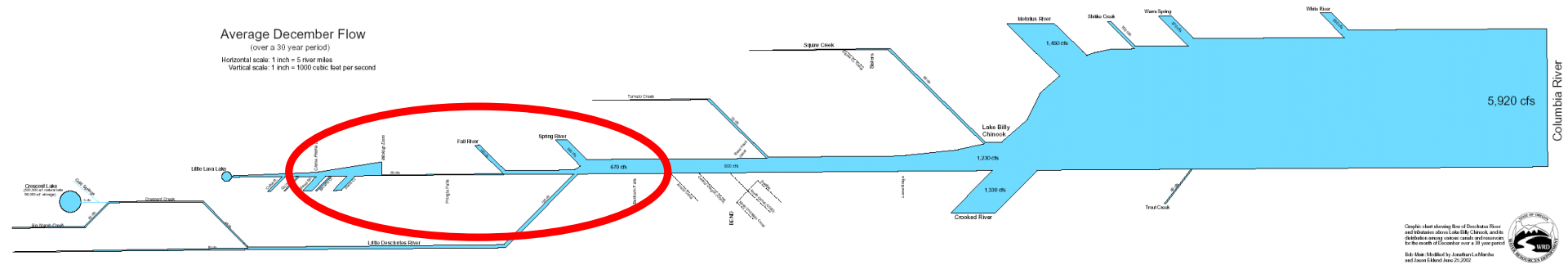
30 Year Average *Annual Natural* Flow

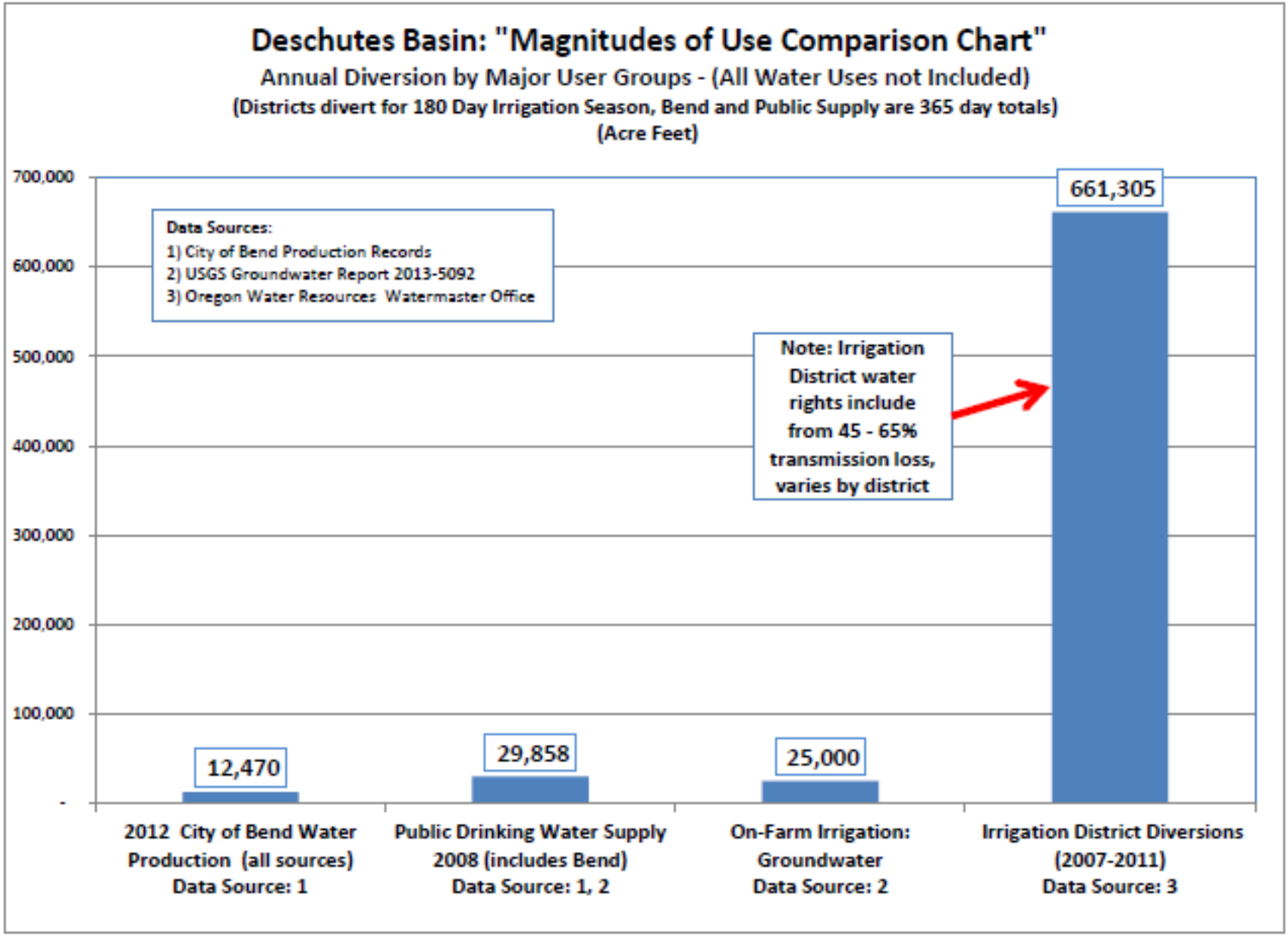


30 Year Average *Managed August Flow* (with Diversions)

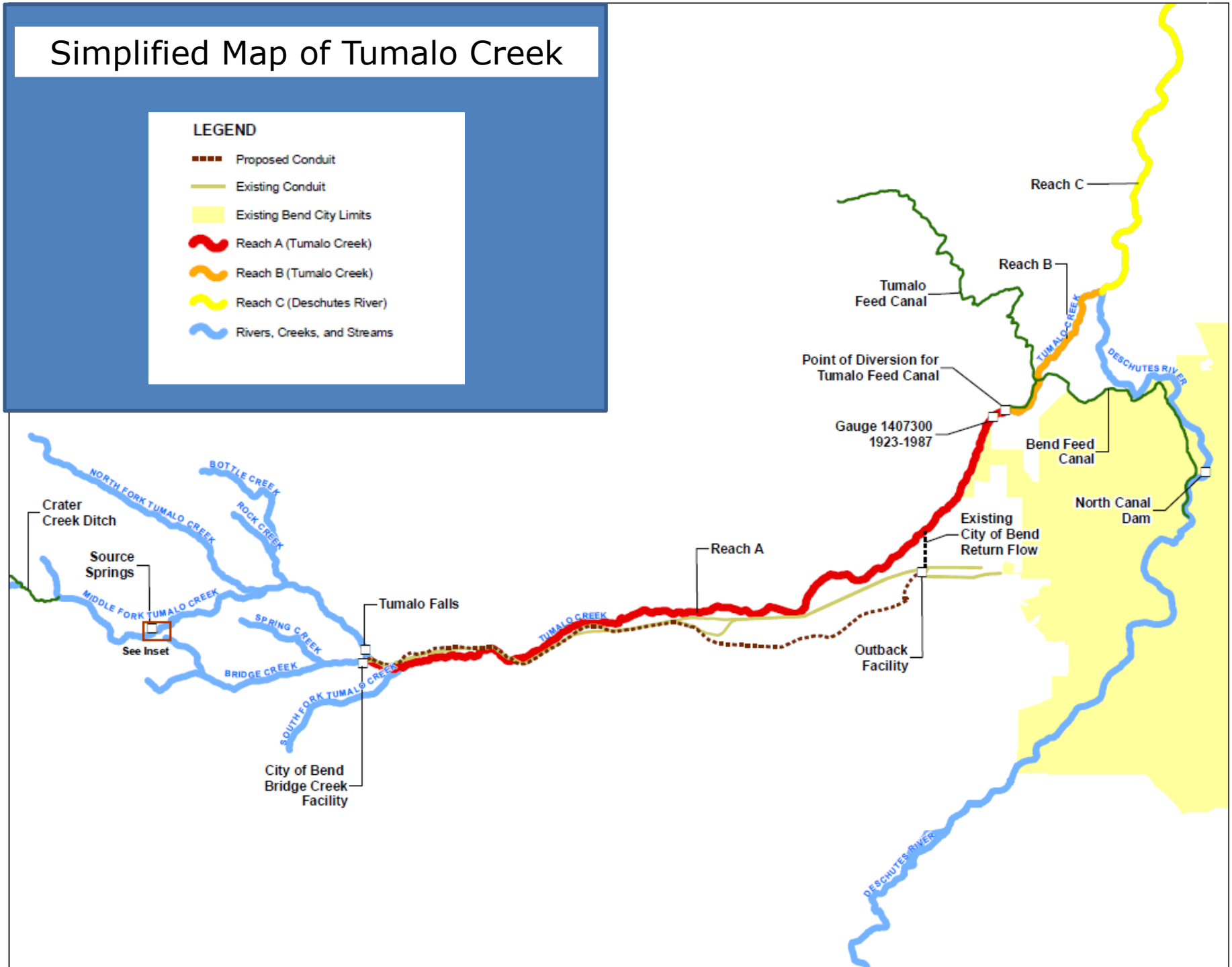


30 Year Average *Managed December Flow* (with Storage)

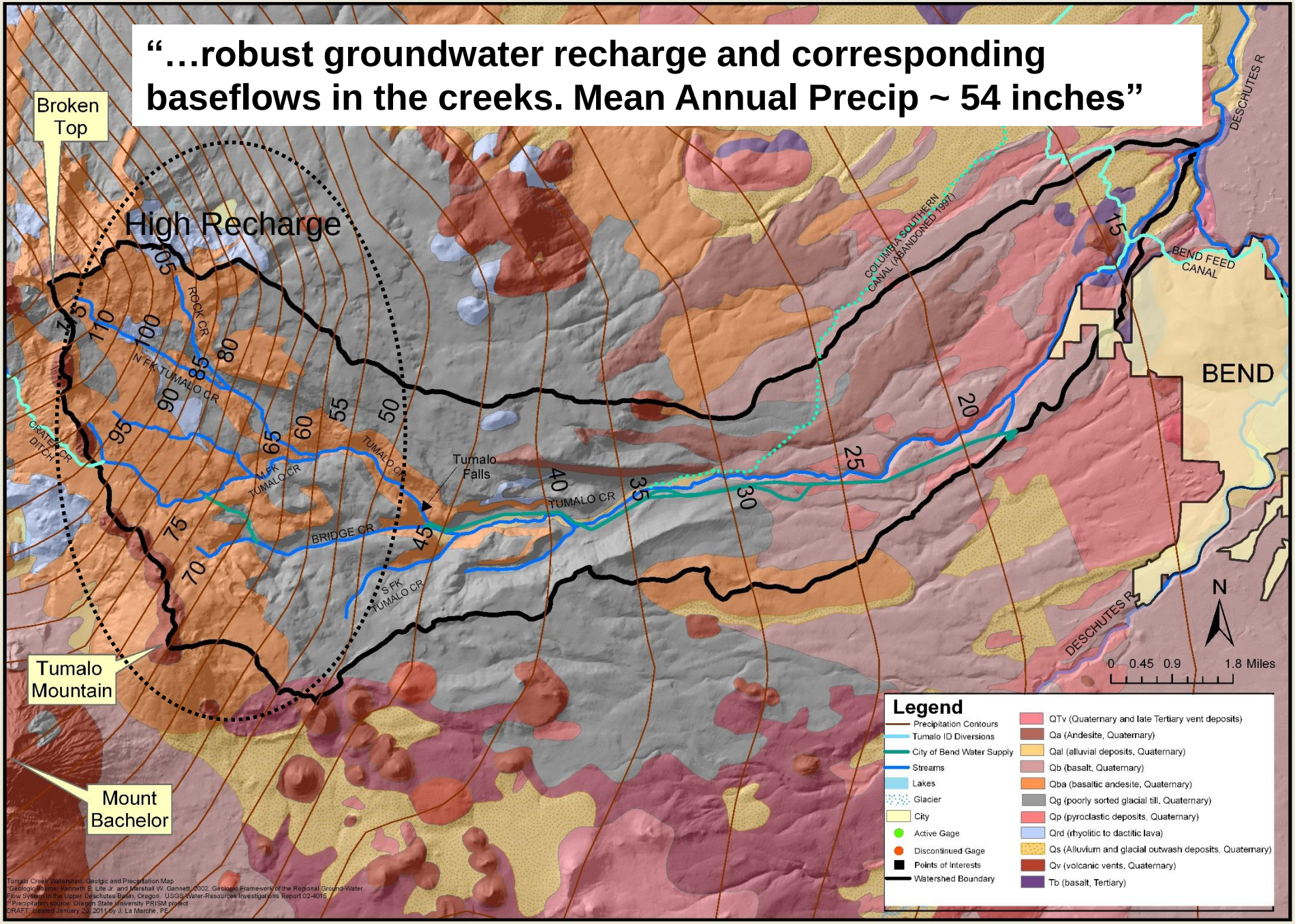



Deschutes Basin: "Magnitudes of Use Comparison Chart"
Annual Diversion by Major User Groups - (All Water Uses not Included)
(Districts divert for 180 Day Irrigation Season, Bend and Public Supply are 365 day totals)
(Acre Feet)
700,000
600,000
500,000
400,000
300,000
200,000
100,000
-
Data Sources:
1) City of Bend Production Records
2) USGS Groundwater Report 2013-5092
3) Oregon Water Resources Watermaster Office
Note: Irrigation District water rights include from 45 - 65% transmission loss, varies by district
12,470
29,858
25,000
661,305
2012 City of Bend Water Production (all sources) Data Source: 1
Public Drinking Water Supply 2008 (includes Bend) Data Source: 1, 2
On-Farm Irrigation: Groundwater Data Source: 2
Irrigation District Diversions (2007-2011) Data Source: 3

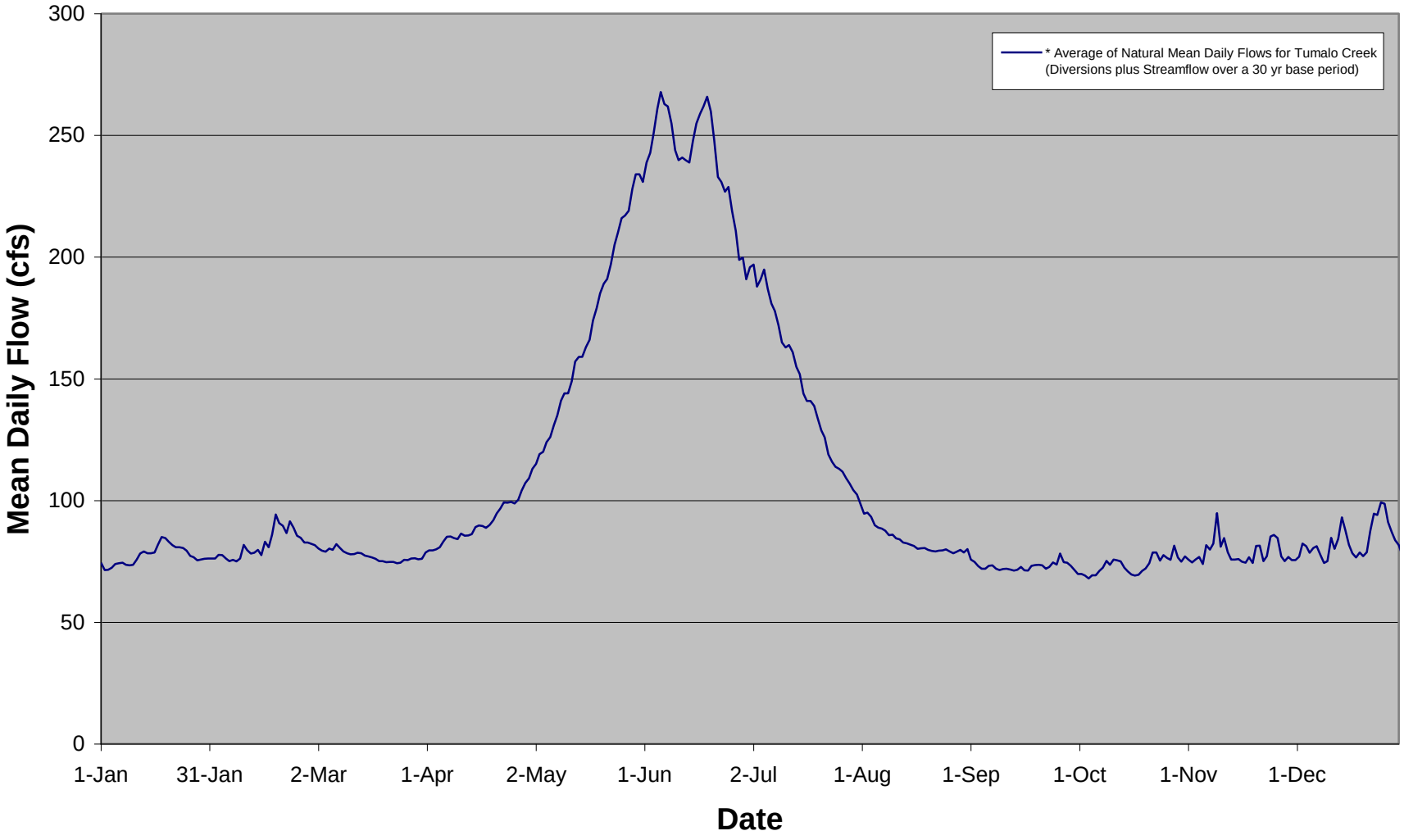
Simplified Map of Tumalo Creek



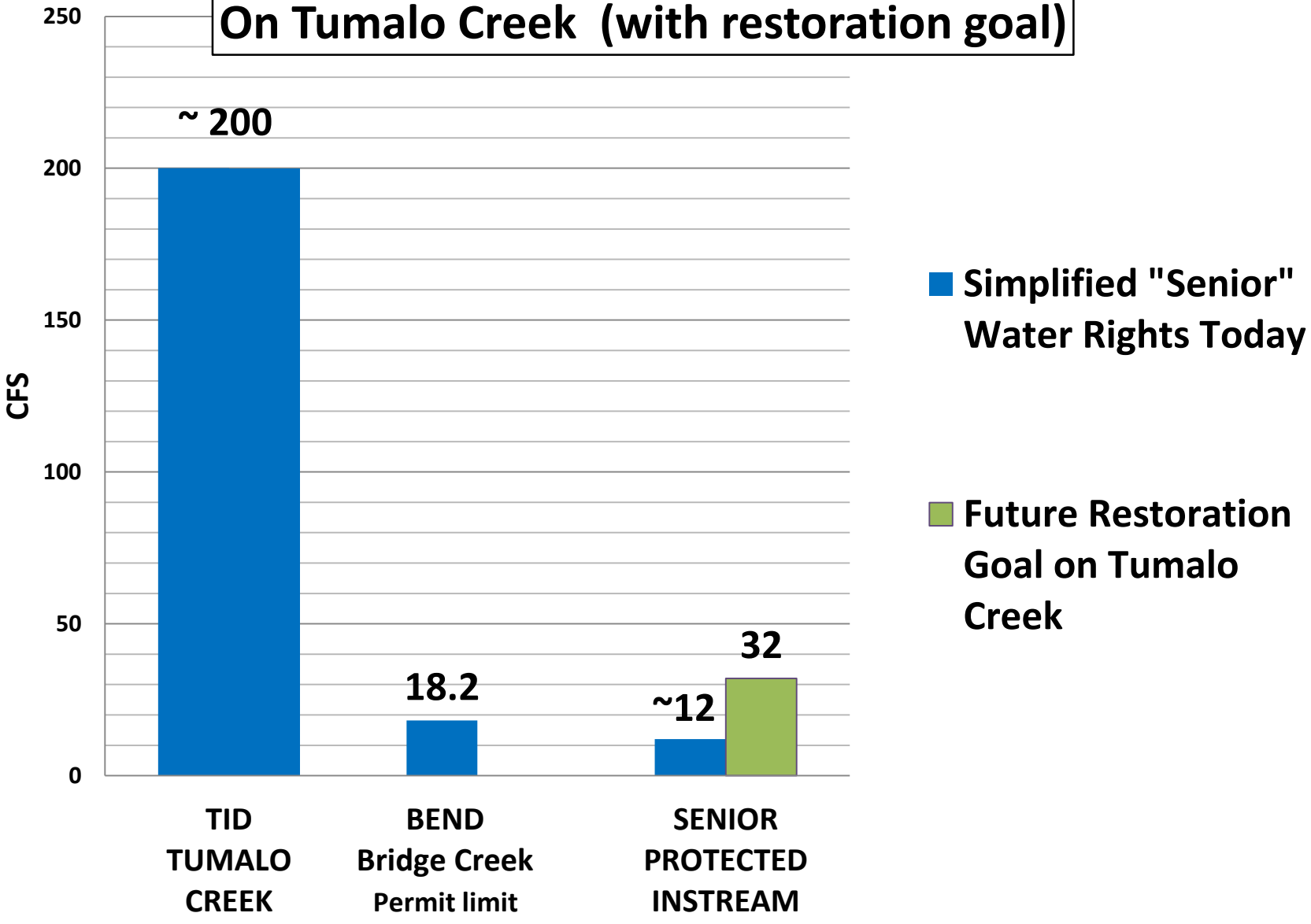
Tumalo Creek Watershed:
Geologic* and Annual Precipitation** Map



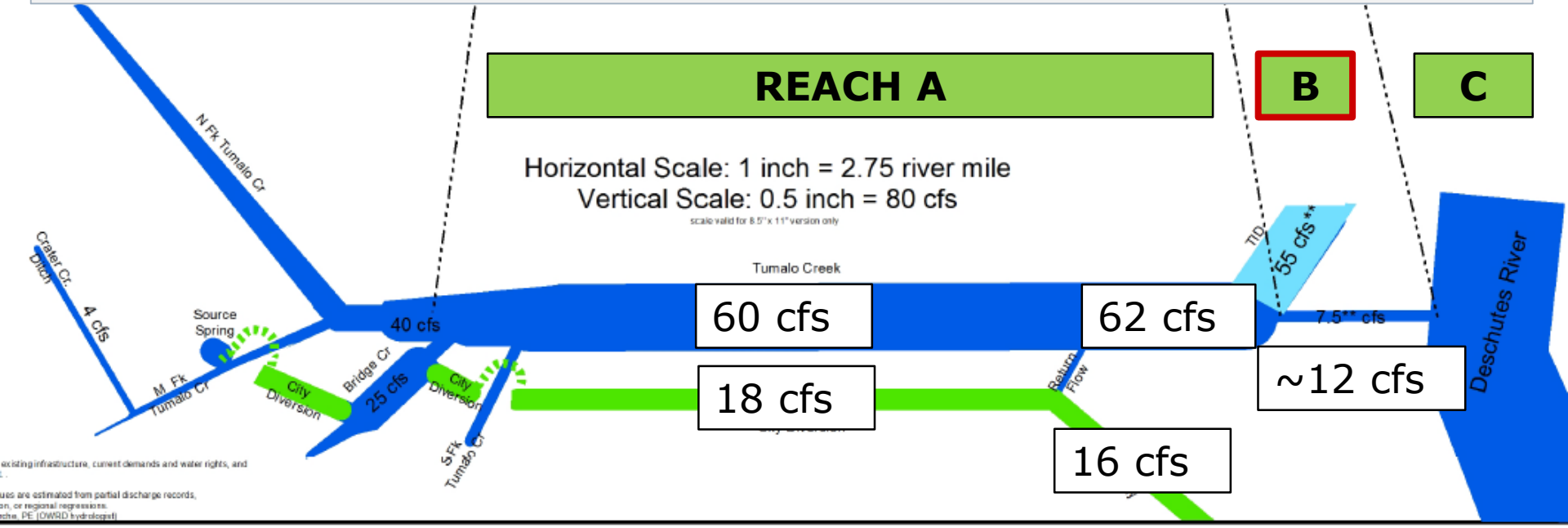
Tumalo Creek Natural Streamflow (cfs)*



EXISTING SIMPLIFIED WATER RIGHTS
On Tumalo Creek (with restoration goal)



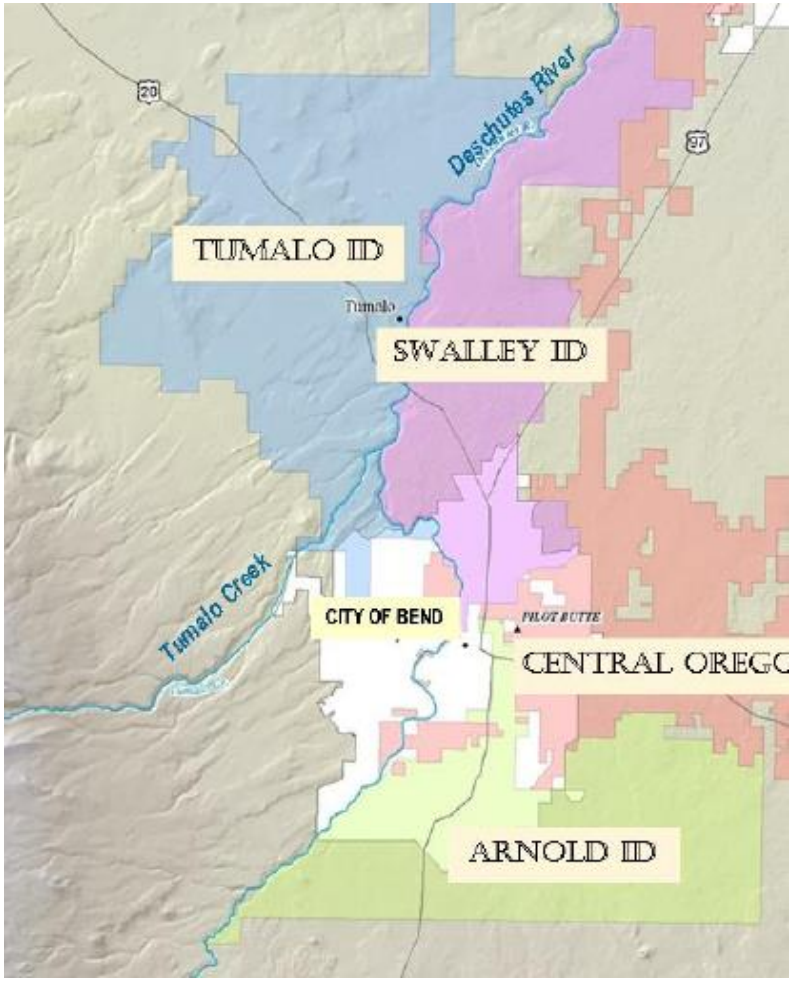
Current Conditions: Typical August Flows - Existing System

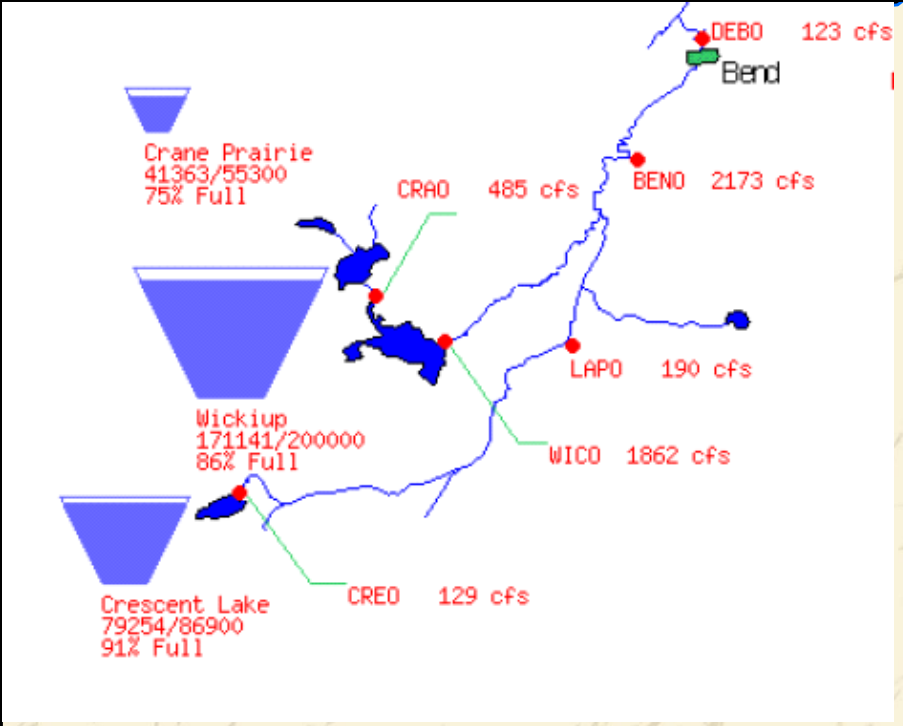


Water Conservation on Tumalo Creek by Tumalo Irrigation District

About Tumalo Irrigation District

- Started diverting water in the 1880's
- Irrigates 8,115 acres with 658 customers
- Over 80-miles of open canals and pipes
- Peak summer diversion up to 180cfs
- Two Supply Sources
  - Tumalo Creek below Shevlin Park
  - Deschutes River near Pioneer Park
- Deschutes River water is natural flow and Crescent Lake Storage





Deschutes River

Deschutes River

Tumalo

Reach B

Bend Feed Canal

Bend Feed Diversion

Columbia Southern Canal

Shevlin Park

Tumalo Diversion

Columbia Southern Diversion

Broken Top

N. Fork Tumalo Creek

Tumalo Creek

Tumalo Creek

Tumalo Creek

Bend

Deschutes River

Deschutes River

Tumalo Butte

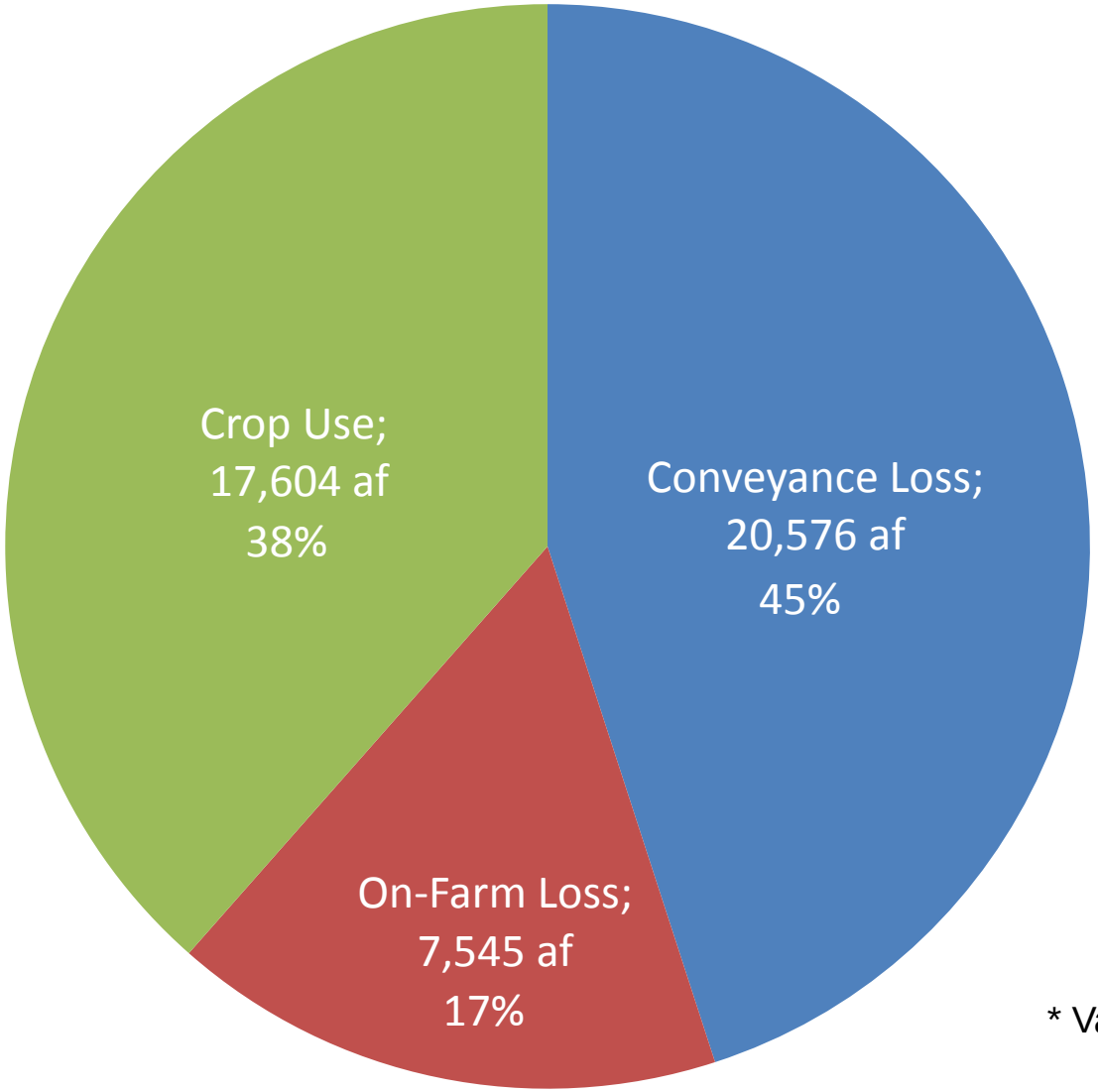
Mt Bachelor

Sources: USGS, ESRI, TANA,

Water Conservation/Piping – Why bother?

- Consistent Delivery of Water
  - Prior to conservation efforts, TID was often unable to deliver full deliveries to users.
- Aging infrastructure
  - Safety and efficiency concerns associated with old flumes, siphons, and threat of canal breaches
- Urbanization
  - Access, Aesthetics, Attractive nuisance (Open Canals)
- Environmental Reasons
  - DEQ Water Quality Issues (Total Maximum Daily Loads)
  - Endangered Species Act (Habitat Conservation Plan)
  - Fishery Issues

Conveyance and On-Farm Losses Provide Significant Opportunity for Conservation



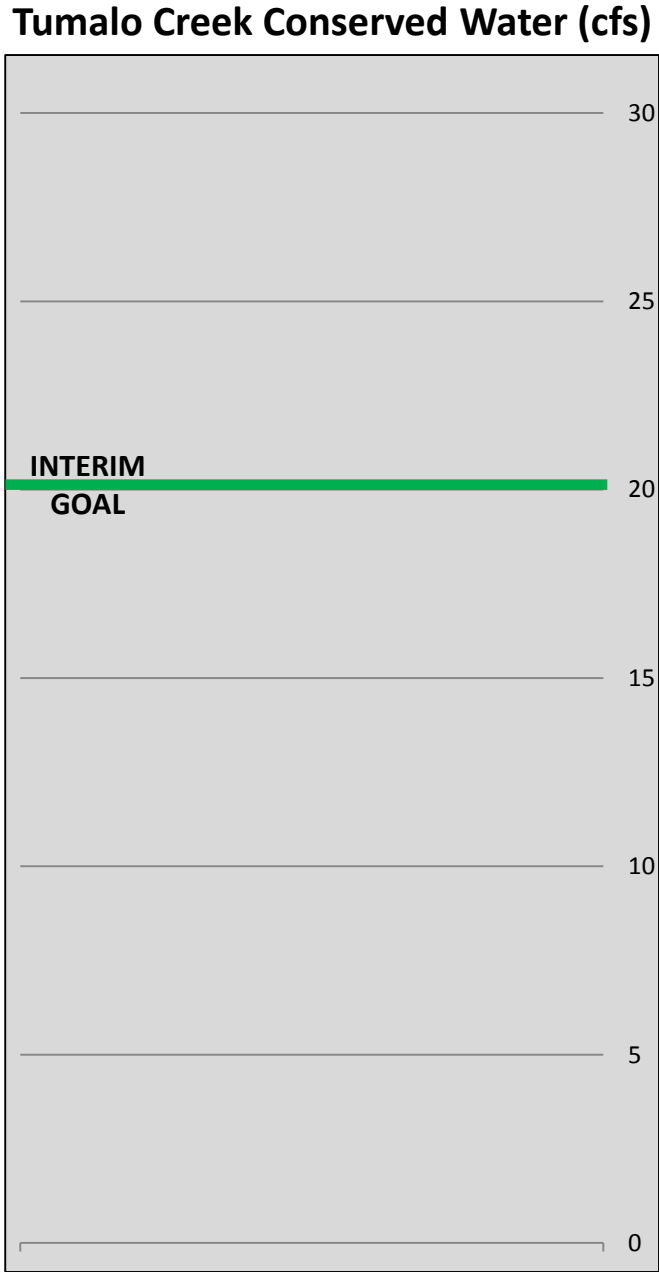
* Values are estimated

Water Conservation on Tumalo Creek
by Tumalo Irrigation District

Setting A Flow Restoration Goal

- Oregon Dept of Fish and Wildlife did flow studies to protect fish around the state in 1980s. This is the best available science. For Tumalo Creek:
  - "Minimum" flow target set for 10 cfs (already met!)
  - "Optimum" flow target set for 32 cfs
- DRC/DWA also set restoration target of 20 cfs (2006 Study)
- Oregon Water Resources has also created a *junior instream water right* on the creek with a priority of 1990, of 32 cfs.

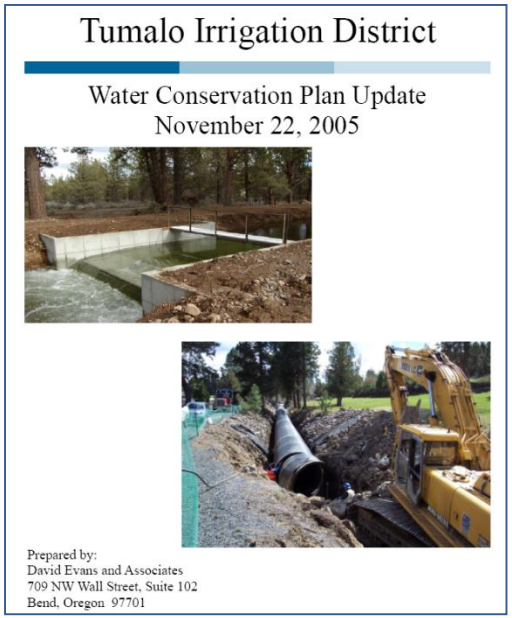
- Tumalo Creek Restoration Subgroup decided to use the attainable interim goal of 20 cfs.

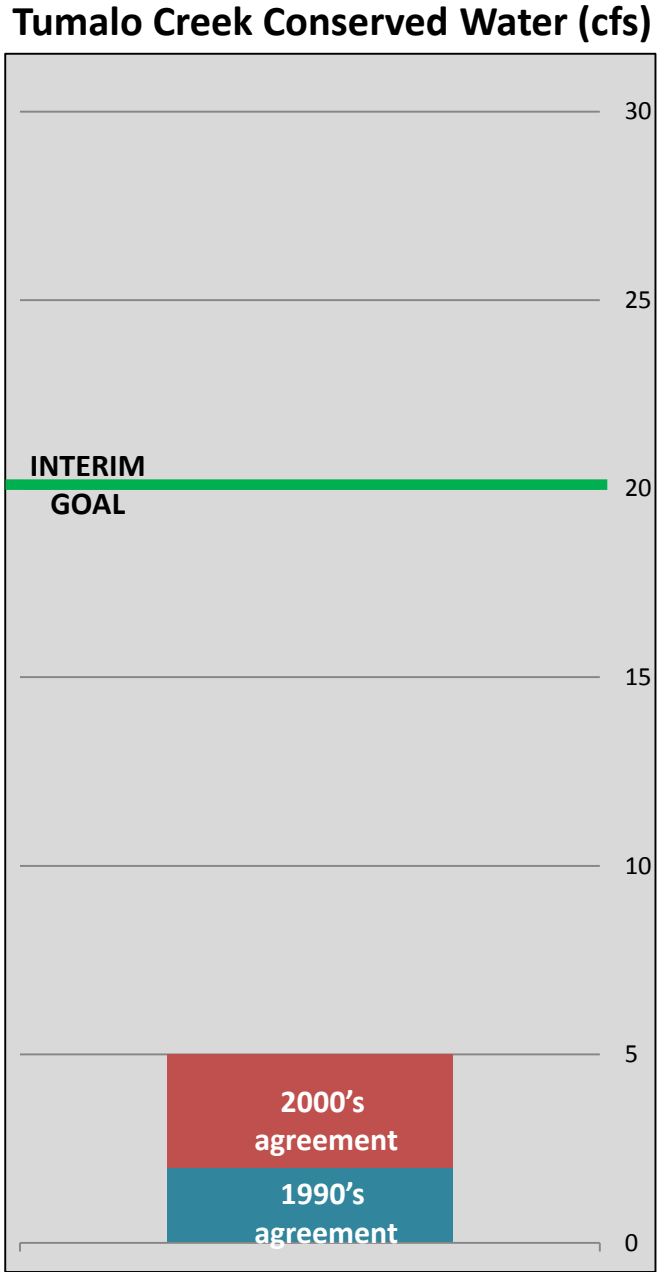


Water Conservation on Tumalo Creek by Tumalo Irrigation District

Where we began:

- In the 1990's, due to drought, water shortage and aging/failing infrastructure, TID began the push to conserve water.
- In 1995 TID replaced the Red Rock Siphon
- In 1998 TID completed the "Double Barrel" Project, restoring 9 miles of Tumalo Creek. (see map)
- In 1992 and 2000, TID made Gentlemen's Agreements to leave some water in Tumalo Creek
- In 2000 TID submitted the first Water Conservation Plan from the Agricultural community in the State of Oregon
  - Plan showed Conservation potential of over 30,000 AF





Water Conservation on Tumalo Creek by Tumalo Irrigation District

What we have done:

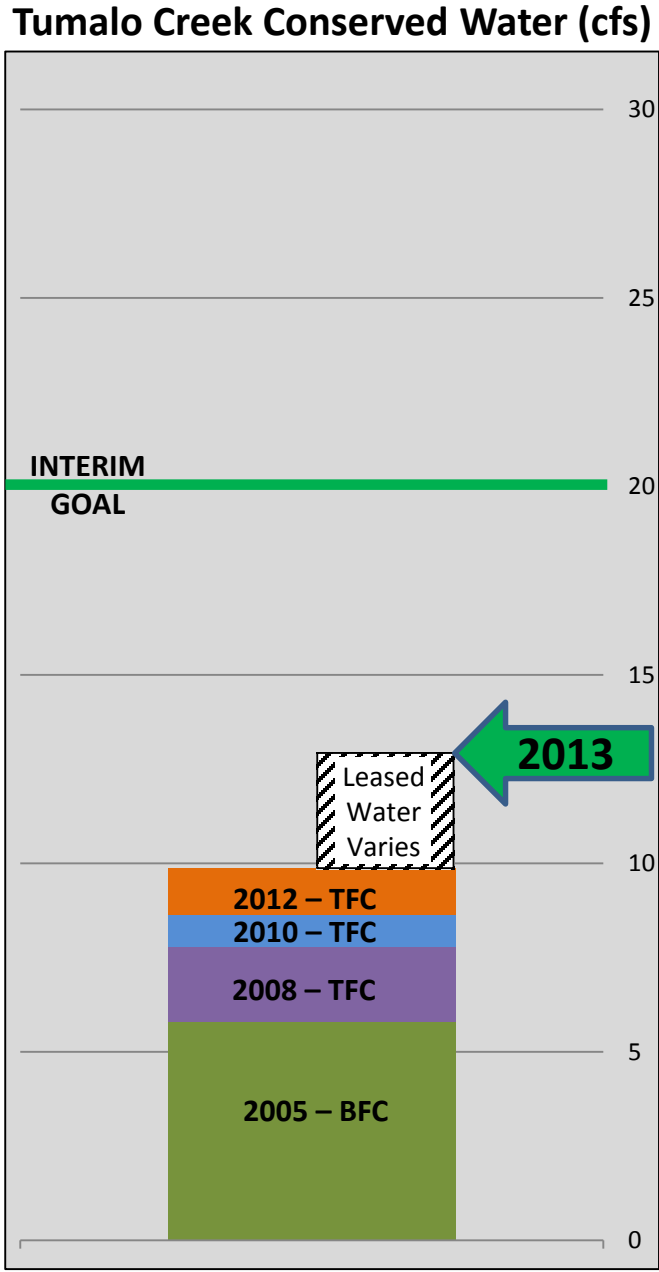
•The first Phase of the implementation of the Water Conservation Plan was piping both Feed Canals (Bend and Tumalo)

• Bend Feed Canal Projects - 2002 – 2005 Complete

•Tumalo Feed Canal Projects - 2008 – Present

Leasing:

•Since 2001, TID has been leasing water instream. Average of ~5 cfs per year.

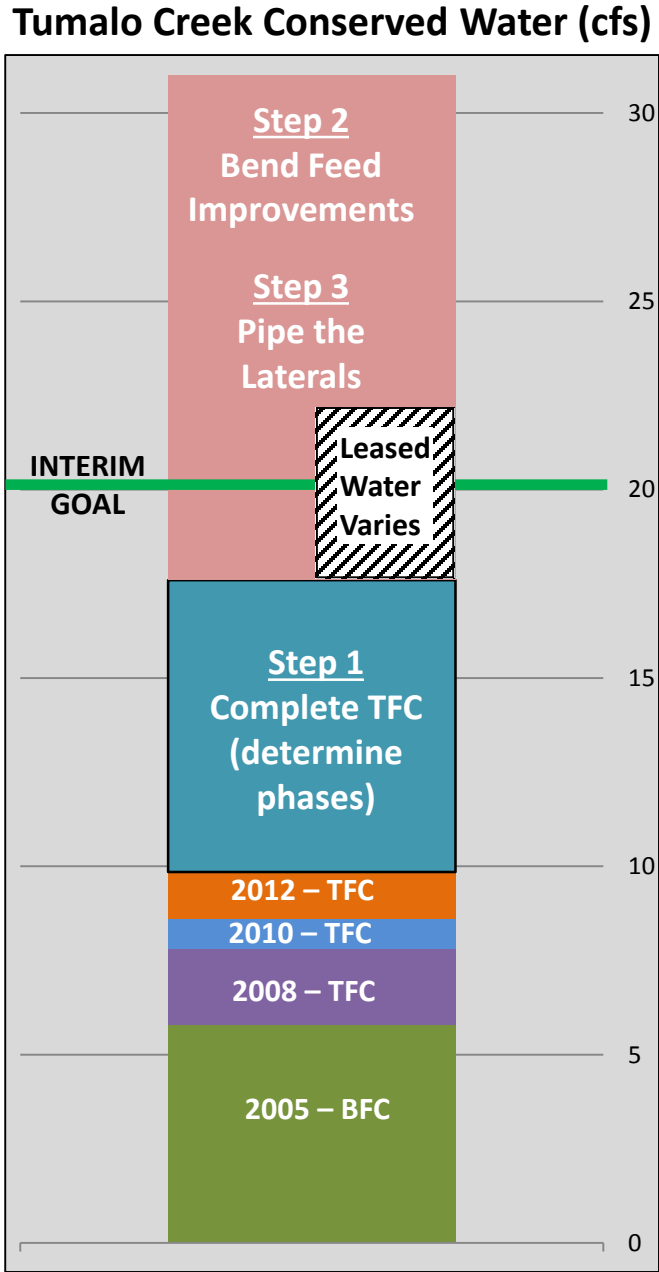


What is left to do?

- **Step 1 - Complete the Tumalo Feed Canal**
  - When TFC is completed, there will be 17.6 cfs protected *senior* water in Tumalo Creek.
  - With current instream leasing averaging ~5 cfs annually, this will protect 22 cfs in Tumalo Creek

- **Step 2 - NEW – Complete Feasibility and Pilot Projects**
  - Bend Feed Capacity Improvements
  - Water Exchanges: Deschutes & Tumalo Creek

- **Step 3 - Begin piping the laterals**
  - By piping the laterals, TID will continue to save water and improve management of the water
  - In addition to conserving water, the laterals will deliver pressurized water to a majority of the district
    - Potentially saving enough power for over 400 homes (5,000,000 kW/hrs per year)



Tumalo Creek Restoration Subgroup

COUNCIL DISCUSSION

- ✓ 1. Describe Current Status / Learn about Tumalo ID
- ✓ 2. Set Mutual Restoration Goal (20 cfs in Reach B)
- ❑ 3. Create List Mutual agreed projects
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Habitat Restoration

Tumalo Creek Restoration Project

The 1979 Bridge Creek Fire, combined with salvage logging, left three miles of Tumalo Creek without instream woody material or riparian vegetation to provide habitat and prevent stream channel erosion. Over the last 20 years, the stream system has continued to unravel, with widespread erosion of the stream channel leading to loss of wetlands and fish and wildlife habitat.

Since 2004, the Watershed Council and the Deschutes National Forest have been leading a three-year, $900,000 effort to restore stream stability and increase fish habitat in the 2.8 mile reach most affected by the fire and salvage logging.

The project, implemented in three phases spanning from 2004 to 2007, is designed to address the long-standing issues of system instability and restore important fish habitat in Tumalo Creek. Through the course of the project, more than 50,000 native plants will be installed and over 3,000 whole trees will be added instream to provide much needed instream habitat and channel stability.

Throughout the 2.8-mile project area, restoration focused on improving fish habitat by increasing sinuosity, adding large woody material and planting native riparian vegetation.

Phase III of the Tumalo Creek project will continue in 2006 with the restoration of the final 1.1 mile reach. Funding and support is being provided by the National Forest Foundation, Oregon Watershed Enhancement Board, City of Bend, and the Deschutes Mitigation and Enhancement Fund. Summit High School is providing all project survey and monitoring as part of a science course led by Mark McGarigal.

Created logjam structures (left) help increase bank stability, provide cover for fish and retain deep pools. The log structures are assembled from whole trees keyed into the creek banks to provide long-term bank stability (right).

Over time, the 50,000 riparian plants installed as part of the project will provide additional rooting strength to reduce erosion, increase habitat and provide shade cover.

Additional habitat restoration projects include:

- ◊ Whychus Creek Restoration at Camp Polk (Sisters)
- ◊ Miller Property Bank Stablization (Deschutes River, Bend)
- ◊ Deschutes River Trail Riparian Restoration (Deschutes River, Bend)
- ◊ Deschutes River Clean Up (Deschutes River, Bend)
- ◊ Captain Jack Creek Riparian Restoration (Black Butte Ranch)
- ◊ Odell / Maklaks Creek Fish Passage Improvements (Klamath County)
- ◊ Riverbend Community Park Riparian Restoration (Deschutes River, Bend)
- ◊ Sunriver Riparian and Fish Habitat Enhancement (Deschutes River, Sunriver)

City of Bend 2014: Participation in Deschutes Basin Water Issues:

A Sampling of Key Efforts and Accomplishments

The City of Bend grew around an irrigation project in the early 1900's and Bend has played a key role in water stewardship ever since. Located at the "Farewell Bend" on the Deschutes River, today Bend is positioned as a key participant and leader on watershed related issues. From the award winning WaterWise Program, to groundbreaking roles in the Deschutes Water Alliance, Bend continues to support scientifically based, balanced, consensus driven solutions to water related natural resource issues.

Key Efforts and Accomplishments:

- **1926 – Bend Watershed Agreement with USFS:** when the City of Bend purchased the privately owned Bend Power Water and Light Company in 1924 and moved the source supply from the Deschutes River to Bridge Creek due to the contamination of the Deschutes River from upstream development, the importance of collaboration was recognized for the long term protection of the Bend watershed. Projects and staffing agreements continue to be produced to this day with Bend annually investing over $100,000 in summer fire watch, winter staff, trail maintenance, riparian projects, onging public education efforts, watershed tours and annual planning sessions.
- **1986 – Deschutes Basin Resource Committee**: Co-Partner with Deschutes County in forming the Deschutes Basin Resource Committee back in the late 1980's which was a initial effort to protect the Deschutes from further Hydro electric development and became key to identifying flow related issued in the upper basin, still embedded in both entities current comprehensive Plans. Report is great historic read of key issues
- **1993 - 2001 – USGS Groundwater Study**: City of Bend was a key participant and sponsor of the landmark USGS Groundwater Study which made the official connection between surface water and groundwater within the basin and was the basis for closing of the upper basin to groundwater appropriation unless mitigation is provided.
- **1998, 2004, 2011 – City of Bend Water Management and Conservation Plan:** led to the award winning WaterWise program and full metering of all Bend customers. Partnerships with OSU, EPA WaterSense, Alliance for Water Efficiency, Bend LaPine Schools, Oregon Green Industry, Oregon Landscape Contractor Board and many many other important partners, programs and processes.
- **1999 – OWRD Groundwater Steering Committee**: Bend provided key leadership to the complex discussion to establish the existing groundwater mitigation program that now implement SB 1033 (1995 Oregon Laws), HB 2184 (2001 Oregon Laws), HB 3494 (2005 Oregon Laws).
- **2001 – MOU - Water Quality Monitoring Program for the Upper Deschutes and Little Deschutes Subbasins**: this effort helped solidify the necessary monitoring of various parameters to help understand past, current and future conditions. Bend signed on to better inform its planning efforts within the Urban Growth Boundary.
- **2002 – Tumalo Creek Restoration Project:** Provided $150,000 and staff support to a three year effort that restored the upper 3 mile section of Tumalo Creek.

- **2002 – Deschutes Coordinating Group (DCG):** Bend was signatory to a Deschutes subbasin planning effort guided by the Northwest Power and Planning and Conservation Council (BPA). Outlines watershed priorities for species of concern in the BPA related process. The 2004 supplemental priority document is a good summary of ESA related limiting factors present in the Deschutes Basin. (http://www.nwpcc.org/fw/subbasinplanning/deschutes/plan/)
- **2003 – Memorandum of Understanding with COID:** this document was groundbreaking in acknowledging the need for coordination and collaboration between districts and municipal water providers on piping, groundwater mitigation and related water issues. Basis for co-funding of construction of ramp flumes on Pilot Butte Canal to better measure losses and led to future collaboration and formation of the DWA.
- **2004 – Deschutes Water Alliance (DWA)**: founding member with DWA partners with funding from Dept of Interior , Water 2025 program. Key studies underpin and provide a framework for all water related issues in the basin. (www.deschutesriver.org)
- **2004 – Waterway Overlay Zone (WOZ):** special planning code designation for stream corridors through Bend planning area to provide riparian and water quality protection.
- **2005 – *An Introduction to Xeriscaping in the High Desert*:** Award winning publication done jointly with OSU Extension Service promoting low water using plants that thrive in Central Oregon.
- **2006 – Winner: Oregon Water Resources Department's Stewardship and Conservation Award 2006 Water Conservation and Stewardship Award** : recognize the key accomplishments and regional leadership on municipal water conservation efforts.
- **2006 – "Winner" Oregon Department of Energy Oregon Plan for Salmon and Watersheds Award:** in recognition of efforts to promote energy and water conservation that also benefit watershed health.
- **2006 – Bend 2030** – City of Bend vision process with measurable water related environmental goals and new advisory board http://www.bend2030.org/Action_Plan/)
- **2007 – City of Bend Integrated Stormwater Management Plan / Central Oregon Regional Stormwater Manual**: the City of Bend compliance document with the Clean Water Act which furthers the efforts in a City of Bend program and regional coordinated effort that promotes standardized design criteria to better serve the region.
- **2007 – Formation of City of Bend Stormwater Utility Division and Stormwater Master Plan**: with new utility funding derived from all land owners with impervious areas to provide staff and capacity to implement the integrated stormwater plan and capital projects identified within the related Stormwater Master plan.
- **2010 –** "**Re-Formation onf the Deschutes Water Alliance- MOU Signatory**: Bend City council continues to support basin wide water management and planning efforts.
- **2010 – Bend joins EPA WaterSense Program:** The City of Bend has joined the Watersense program as a promotional partner to provide yet another resource for Bend residents to learn how to better conserve water.
- **2010 – New Irrigation District Memorandum of Understanding**: Bend signed an historic MOU with 4 irrigation districts (COID, TID, AID, SID) to work through critical coordination issues such as water supply, future planning, impacts of urbanization, stormwater impacts on canals, water quality, and land use and easement issues. Goal

is to have a signed intergovernmental agreement in concert with the UGB update also in process again in 2013. (On hold while Basin Study process rolls forward)

- **2011 – State Approval of Updated Water Management and Conservation Plan**: Bend average water use continues to decline while the Award Winning WaterWise program continues to help customers be efficient in all their water uses.

- **2011 – City Includes Water Quality Protections for Open Canals**: in Bend Code Stormwater Updates (title 16) which prevent water contamination from Stormwater

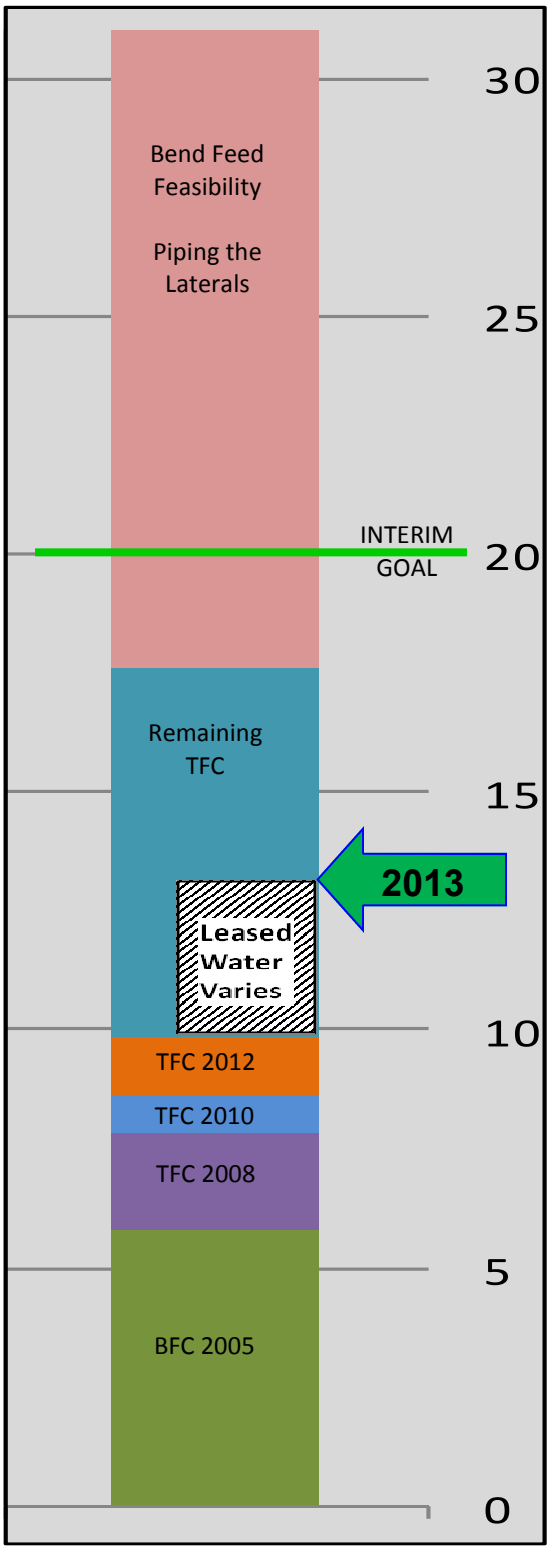
- **2012 Oregon's First Integrated Water Resource Strategy** : City staff appointed to the OWRD Policy Advisory Group for the development of the strategy which met for over two years and led to a large budget increase in the Oregon Water Resource Dept Budget during 2013 legislative session for better water management and planning in Oregon.
- **2012 Formed Tumalo Creek Restoration Subgroup (City of Bend Resolution 2900)**: The City of Bend promotes staff and elected official participation with local, regional, state and federal entities, on boards, committees and appointments, to further water management goals. COID Hydro Mitigation and Enhancement Committee, Oregon Landscape Contractor Board, Institute for Water and Watershed Advisory Board, Oregon Water Utility Council, Upper Deschutes Watershed Council, and other groups.
- **2013 City Launches WaterWise Gardening Website** – a full color garden, plant and irrigation website that actively helps you conserve
- **2013 City Supports Development of Statewide Water Supply Fund (SB 839)**
- **2014 – Reclamation Basin Study** - Awarded City, DWA, DBBC and Basin Study Work Group (BSWG) successfully compete for $1.5 Million Dollar Reclamation Basin Study
- **City Participates in Basin Study Effort –** City provides funding to participate in Basin Study, along with Central Oregon Cities Organization (COCO)
- **2014 – City Appointed to SB 839 Water Supply Fund Committee** – city staff appointed by Governor to the SB 839 Governance committee to develop rules and future legislation for long term water supply funding for Oregon.

Note: This is only a partial list of the ongoing efforts related to water, water management, related land use processes and the never ending task of building capacity to work through complex natural resource issues.

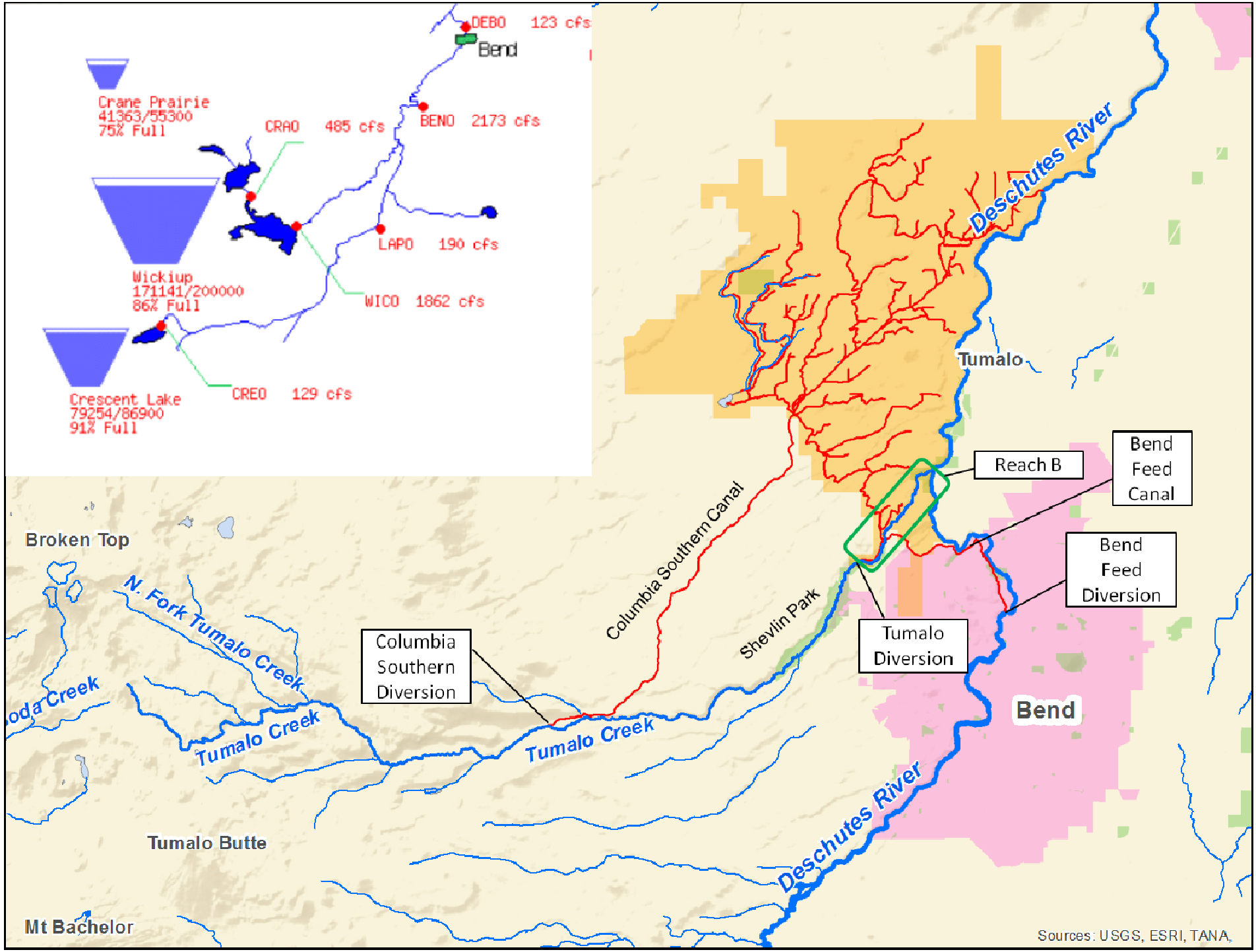
Tumalo Irrigation District
Fact Sheet—2013

- TID has been diverting water from Tumalo Creek since the mid 1880's
- TID currently serves 658 customers irrigating 8,115 acres north west of Bend
- TID diverts water from Tumalo Creek at the Tumalo Diversion Structure and from the Deschutes River at Stiedl Dam.
- Most of the water that TID diverts from the Deschutes is water that has been stored at Crescent Lake, 80 miles upstream.
- 1990's - due to drought, and water shortage TID began the push to conserve water and improve efficiencies
- 1995 - TID financed and replaced the Red Rock siphon, a 72" wood stave pipe.
- 1998 - TID completed an infrastructure and diversion modification project resulting in no longer using the Columbia Southern Diversion or Canal and restoring flow to 9 miles of Tumalo Creek through Shevlin Park.
- 2000 - TID submits Water Conservation Plan and identifies 30,000 AF of conservation potential
    - Phase 1 - Pipe the Feed Canals
    - Phase 2 - Pipe the Laterals
- 2002 - 2005 - TID completed piping sections of the Bend Feed Canal (BFC) which wraps around Awbrey Butte. With this project, TID permanently protected 5.8 cfs in Tumalo Creek.
- 2008 - 2012 - TID has completed 2 miles of the 6 mile Tumalo Feed Canal (TFC). When complete, this project will place 11.8 cfs in Tumalo Creek.
- Since 2001, TID's customers have leased their water instream. These leases have ranged from 4 cfs to almost 10 cfs

Tumalo Creek Conserved Water (cfs)



BFC = Bend Feed Canal
TFC = Tumalo Feed Canal


DEBO 123 cfs
Bend
Crane Prairie
41363/55300
75% Full
CRAO 485 cfs
BEND 2173 cfs
LAPO 190 cfs
Wickiup
171141/200000
86% Full
WICO 1862 cfs
CREO 129 cfs
Crescent Lake
79254/86900
91% Full
Deschutes River
Tumalo
Reach B
Bend Feed Canal
Bend Feed Diversion
Columbia Southern Canal
Shevlin Park
Tumalo Diversion
Columbia Southern Diversion
Broken Top
N. Fork Tumalo Creek
Tumalo Creek
Tumalo Creek
Bend
Deschutes River
Tumalo Butte
Mt Bachelor
Sources: USGS, ESRI, TANA,

Simplified Map of Tumalo Creek