COMMUNITY DEVELOPMENT

PLANNING COMMISSION
WATER PANEL SERIES REPORT

117 NW Lafayette Avenue
P.O. Box 6005
Bend, OR 97703-6005
www.deschutes.org/cd
(541) 388-6575

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Key Participants

PLANNING COMMISSION

Dale Crawford - At Large (Chair) - Water Panel Subcommittee
Maggie Kirby - Bend Area (Vice Chair) - Water Panel Subcommittee
Jim Beeger - Bend Area - Water Panel Subcommittee
Steve Swisher - Sisters Area
Hugh Palcic - South County
Jessica Kieras - Redmond Area
Les Hudson - At Large

PANELISTS

Kyle Gorman - Oregon Water Resource Department
Stephen B. Gingerich, Ph.D - U.S. Geological Survey Oregon Water Science Center
Bridget Moran - U.S. Fish and Wildlife Service
Brett Hodgson - Oregon Department of Fish and Wildlife
Mark Buckley - ECONorthwest
Mylen Bohle - Oregon State University Extension
Leslie Clark - Central Oregon Irrigation District
Margaret Matter - Oregon Department of Agriculture
Bill Duerden - City of Redmond
Craig Horell - Central Oregon Irrigation District
Mike Taylor - Coalition for the Deschutes
Adam Sussman - GSI Water Solutions

DESCHUTES COUNTY LONG RANGE PLANNING STAFF

Nick Lelack, AICP - Director
Peter Gutowsky, AICP - Planning Manager
Matt Martin - Associate Planner
Nicole Mardell - Associate Planner

Table of Contents

Photo Source: Central Oregon Irrigation District

Executive Summary

Purpose

The Deschutes County Planning Commission is the County's citizen involvement committee responsible for carrying out a comprehensive planning program, using public input to coordinate its activities with other jurisdictions, planning bodies, and districts. Their role is to advise the Board of County Commissioners on citizen involvement programs and study and propose such measures as are advisable for promotion of the public interest, health, safety, comfort, convenience, and welfare (DCC 2.52.100). Realizing the impact of water use and water law in land use and development proceedings, the Planning Commissioners requested staff to organize a series of expert panels within the field of water management. The information gained from each panel of experts could then be used to better inform the Planning Commission, general public, and Board of County Commissioners, in land use decision making. The Commission determined the need for four separate panels:

- Hydrology of the Upper Deschutes Basin
- Environmental and Economic Impacts
- Agricultural Water Consumption and Efficiency
- Projections and Planning

A Water Panel Subcommittee was formed to develop the agenda and identify speakers for each panel. Summaries and notes from each panel are found in pages 5 to 8 of this report. Although the panelists represented a diversity of individuals, bodies, and authorities within the agricultural industry, environmental nonprofits, and government entities, three key issues and themes rose to prominence throughout the series.

Key Issues and Themes

- **WATER LAW**
  Current laws regulating water strictly limit flexibility in water use and management, and are little changed in principle from the original regulations developed in the early twentieth century. Comments from almost all panelists denoted a need to revise Oregon's water laws to reflect current (and future) conditions; to re-examine the principles of allocation (for agriculture, fisheries, municipalities, environmental groups and other sectors), the efficiency of delivery, flexibility in use and monitoring and enforcement.

- **STATEWIDE WATER POLICY**
  Many stakeholders are involved in water management including sovereign tribal nations, governmental entities, nonprofits, irrigation districts, private consultants, and water users. Each group has identified interests and perspectives that may align or contradict others, particularly in the areas of advocacy regarding the current system for holding water rights and uses where water rights may be under– or over-allocated. Although improvements could be made in the current system by voluntary collaboration or specific litigation, a larger-scale systematic change is needed, potentially through a statewide governmental review to revisit and modernize water use priorities, allocation, regulation, and management.

- **EDUCATION AND FUNDING**
  Panelists offered examples of outreach and educational programs that have proven to be successful in promoting efficient water use in agricultural, commercial, and residential markets. In order to achieve larger-scale change, financial resources are needed, both to improve efficiency in water delivery to end uses (e.g. canal piping) but also to educate water users on efficient practices.

Meeting 1: Hydrology of the Upper Deschutes Basin

The Planning Commission convened the first panel to examine water availability and consumption in the Upper Deschutes River Basin. The group discussed aquifer structure, ground and surface water interaction, reservoir storage capacity, water law and water rights, impacts of climate change, monitoring data and mapping, and water projections. Additional background on Oregon's water use system can be found in the Upper Deschutes Basin Study funded by the Bureau of Reclamation in 2018.

A few key insights from this discussion include:

- **ROLE OF OREGON WATER RESOURCES DEPARTMENT**
  Oregon Water Resources Department (OWRD) regulates and measures water supply at a statewide scale. There are five regional managers in the basin; each region has two water masters responsible for regulating water use. As of 1988, no new water rights could be issued in the basin due to a lawsuit limiting water withdraws affecting the free flowing character of lower Deschutes River (Diack vs. City of Portland). Therefore, property owners seeking water rights must complete a water rights transfer, with expensive market rates per acre-foot.
- **ADVOCACY AND CONSERVATION**
  Oregon experiences water restoration achievements greater than any other state. The Deschutes River Conservancy, established in 1998, preserved the first instream flow right in Oregon along Whychus Creek. Recently, the Oregon Spotted Frog was listed to the federal Endangered Species Act (further details on page 6). This listing triggered a lawsuit against the Bureau of Reclamation and irrigation districts, which compelled the districts and the City of Prineville to prepare a Habitat Conservation Plan (HCP), consistent with the National Environmental Policy Act (NEPA).
- **WATER DEMAND AND SUPPLY**
  Per USGS reporting, municipal water use over a 50-year period is approximately 16,000 acre-feet. Comparatively, irrigation water use over a 50-year period is approximately 724,000 acre-feet. Water levels are declining primarily due to climate change (70% loss), pumping (20% loss), and lining of water transmission lines and canals (10%). Approximately 50% of diverted water is lost through seepage and only a fraction is recaptured instream. Moving forward, there is a need for upgrading irrigation delivery systems such as canals, on-site agricultural irrigation equipment and incentivizing efficient water practices.

DATE

March 8, 2018

PANELISTS

Kyle Gorman
South Central Region Manager,
Oregon Water Resources Department

Stephen B. Gingerich, Ph.D
Research Hydrologist,
U.S. Geological Survey
Oregon Water Science Center

VIDEO LINK

http://deschutescountyor.iqm2.com/Citizens/SplitView.aspx?Mode=Video&MeetingID=1963&Format=Agenda

BASIN STUDY LINK

https://www.deschutesriver.org/what-we-are-doing/upper-deschutes-basin-study/basin-study-documents/

Meeting 2: Environmental and Economic Impacts of Water Use

The second panel focused on the environmental and economic impacts of water use. Panelists discussed the relationship between water, wildlife habitat, recreational activities, and associated economic benefits within the Upper Deschutes River Basin.

A few key insights from this discussion include:

- **HABITAT CONSERVATION PLAN (HCP)**
  An HCP is a tool used between the federal government and cooperating partners to comply with the federal Endangered Species Act. The U.S. Fish and Wildlife Service (USFW) is working with eight irrigation districts and the City of Prineville on an HCP to prevent litigation associated with potential damage to Oregon Spotted Frog and Bull Trout populations and their habitats. USFW is responsible for monitoring and quantifying impacts to protected species, Oregon Department of Fish and Wildlife (ODFW) is responsible for protecting sensitive animals not listed as endangered. Panelists explained that restoration of an ecological system is 10-20 more expensive than initial preservation, therefore USFW and ODFW are proactive in promoting preservation of sensitive environments.
- **PARTNERSHIPS**
  A shared vision among all stakeholders is to modernize irrigation systems to reduce loss and promote higher instream flow return. Irrigation canals experience 40% to 60% loss. Upgrading systems can aid business operations of irrigation districts and stream flow for habitat preservation.
- **RECREATION**
  The Upper Deschutes Basin includes quality angling and hunting opportunities, including premier trout fishing near the upper section of the Deschutes River. Revenues from hunting permits primarily fund ODFW as it is a user based department. Moderating stream flow (to mitigate winter low water and summer wash out) and conserving native species can help maintain the outdoor recreation economy Central Oregon has built.

DATE

April 12, 2018

PANELISTS

Bridget Moran
Bend Field Officer Supervisor
U.S. Fish and Wildlife Service

Jennifer O'Reilly
Biologist
U.S. Fish and Wildlife Service

Brett Hodgson
Fish Biologist
Oregon Department of Fish and Wildlife

Mark Buckley, Ph.D
Partner, ECONorthwest

VIDEO LINK

http://deschutescountyor.iqm2.com/Citizens/SplitView.aspx?Mode=Video&MeetingID=2005&Format=Agenda

Meeting 3: Agricultural Water Consumption and Efficiency

The third panel of the series was originally slated to discuss water consumption and efficiency in all industries. Per information provided in the two previous panels, the Planning Commission decided to focus on water use within the agricultural industry, as it is the largest water consumer in Deschutes County and Central Oregon as a region.

A few key insights from this discussion include:

- **AGRICULTURE IN DESCHUTES COUNTY**
  Deschutes County has the highest number of individual farms in Central Oregon (1,000), compared to Crook (680) and Jefferson (480) counties. Most of these farms are between 0.5 and 10 acres. The oldest water rights in the area are from 1870-1880 and were initially allocated for the production of potato crops. Throughout time, crops have changed based on disease and popularity, including chickpeas, hemp, wheat, rye, alfalfa, marijuana, vineyards, etc. As water rights are tied to the original crop grown on the property, panelists described the difficulty in amending water rights to reflect water demands associated with new crops.
- **EFFICIENT IRRIGATION**
  Since no new water rights can be allocated, there is a premium for maintaining water rights on a property for future sale, even if the primary use of the property is not agriculture. A common issue in Deschutes County is misinformation on beneficial use, wherein many farmers use flood irrigation, water open pasture areas including rock and poor soils, and use irrigation systems incorrectly. Changes to water law could address some of the issues associated with water right transfers and beneficial use. Education could also lead to applying water efficiently to beneficial uses with modernized technology.
- **TRENDS IN EFFICIENCY**
  OSU Extension works with the Oregon Department of Agriculture and Central Oregon Irrigation District to provide onsite education to farmers as well as larger policy and programmatic elements. A traditional center pivot irrigation system averages 50-85% efficiency, whereas a dragline pivot system averages 98% efficiency. Even minor upgrades to older irrigation systems, such as replacement of valves, can result in an 18% increase in irrigation efficiency.

DATE

August 23, 2018

PANELISTS

Mylen Bohle
Area Extension Agronomist
Oregon State University Extension

Leslie Clark
Director of Water Rights
Central Oregon Irrigation District

Margaret Matter
Water Resource Specialist/Program Lead
Oregon Department of Agriculture

VIDEO LINK

http://deschutescountyor.iqm2.com/Citizens/SplitView.aspx?Mode=Video&MeetingID=2048&Format=Agenda

Meeting 4: Projections and Planning

The fourth and final panel of the series focused on planning for water use in growing communities. Panelists discussed their procedures for projecting water supply and demand, interagency collaboration, successes in innovative programming, and barriers preventing modernization of water management policies.

A few key insights from this discussion include:

- **PROGRAM EFFICIENCY**
  Municipal capital improvement plans (CIPs) estimate growth by using land use assumptions. The largest urban water uses are typically greenspace and park areas owned by a municipality, park district, or school district. Bend and Redmond utilize two of the top rated water efficiency programs in the state. Redmond has a WaterHawk program that detects leaks and water losses, while also helping users understand their consumption levels. Support from elected officials is needed to implement these programs as minimal grants are available.
- **BASIN STUDY WORK GROUP**
  Using Bureau of Reclamation funding, a 47-member working group recently completed the Upper Deschutes Basin Study (link on page 5) . The study provided a 'state of the basin' and a shared vision for the future, but the study is not designed as a plan to identify any specific actions or suggested partnerships. Previously, the Deschutes Water Alliance served as an impartial convener for all water management stakeholders, but the group is no longer able to serve in the role. Coordination and partnerships among irrigation districts, nonprofits, local governments, sovereign tribal nations, and other interested parties are needed to effectively advocate for changes to water law and to identify funding for system upgrades and efficiency programs.
- **CHALLENGES IN WATER MANAGEMENT**
  There is a scarcity of water rights in the Deschutes Basin. This drives up the price and value of existing water rights held by patrons. Existing irrigation canals are often seen as valuable aesthetic resources to abutting property owners. Piping projects have recently experienced opposition as owners pursue historic designations. Climate change is also impacting water levels in the Deschutes River, but there is very little room for adaptation at the local level. There is a need for state-led changes to water law.

DATE

December 13, 2018

PANELISTS

Bill Duerden
Public Works Director
City of Redmond

Craig Horrell
Manager
Central Oregon Irrigation District

Mike Taylor
Board President
Coalition for the Deschutes

Adam Sussman
Principal Water Resources Consultant
GSI Water Resources

VIDEO LINK

http://deschutescountyor.iqm2.com/Citizens/SplitView.aspx?Mode=Video&MeetingID=2194&Format=Agenda

Additional Resources

Meeting Notes:

Panel	Comments
Hydrology of the Upper Deschutes basin **(March 5, 2018)** Kyle Gorman – South Central Regional Manager, Oregon Water Resource Department Stephen B. Gingerich, Ph.D. - Research Hydrologist, U.S. Geological Survey Oregon Water Science Center	• OWRD regulates and measures water supply. • Mr. Gorman is 1 of 5 regional managers. He focuses on the Klamath, Deschutes, and Lake watersheds. There are two water masters in this area, each responsible for regulating water use based on the law of prior appropriation. • The Deschutes River is a managed system. There are three reservoirs: Crescent, Crane, and Wickiup and five irrigation districts. • From 1962 to the mid-1980s, the middle Deschutes River only had 30 cfs during the summer. • A USGS 1998 water study broadened everyone's understanding of how groundwater is tied to the Lower Deschutes River. • Starting in 1988, no new water rights could be issued in the Upper Deschutes basin due to a lawsuit brought against the state (Diack vs. City of Portland, 306 Or 287, 299. 1998), which obligated OWRD to limit water withdrawals if such use will diminish the free flowing character of Scenic Waterways (Lower Deschutes River). • As a result, in the Deschutes Basin, new water rights must first mitigate the use by improving surface water flows. OWRD quantifies general zones for mitigation. • The Deschutes River Conservancy was established in 1996. In 1998, they preserved the first instream flow right in Oregon along Whychus Creek. Oregon experiences restoration achievements are greater than any other state in the West. • Municipal groundwater sources are predominantly groundwater. • The listing of Oregon spotted frog to the federal Endangered Species Act triggered a lawsuit against the Bureau of Reclamation and irrigation districts. A federal judge issued a hold for the parties to explore collaboration. • Prior to the ESA listing, the outflow out of Wickiup was 20 cfs ,and 5 cfs at Crescent. Today, there is 1,000 cfs out of Wickiup and 20 to 30 cfs out of Crescent. Crane Prairie is being managed for the spotted frog for spring and fall nursery. The lake levels remain between 2 and 3 feet. • From 2000 to 2008, DRC promoted instream flows. Over the last 5 to 10 years, interest has leveled off. • Transferring irrigation rights for mitigation are held by irrigation districts based on a 2008 ruling, *Fort Vannoy Irrigation district v. Water Resources Commission*. The Oregon Supreme Court held that irrigation districts are the holders and owners of water rights beneficially applied by its members but certificated in the name of the district. The Court held that water rights, like legal title to other property, vests in the irrigation district and are held by it in trust, are dedicated and set apart for, the uses and purposes set forth in the Irrigation District law. The Court also held that the Board of Directors for the irrigation district is authorized and empowered to hold, use, acquire, manage and dispose of a water right as provided in the Irrigation District law. Private water rights are eligible for mitigation. However, there are few of them. • Facebook paid $15,000 (ac/ft) for mitigation credits in Crook County. In Deschutes, mitigation credits have sold for $2,000 (ac/ft). • DRC operates temporary mitigation credits. They are leases. Irrigation districts are supportive because patrons are still on their rolls.

Additional Resources

Meeting Notes:

Panel	Comments
Hydrology of the Upper Deschutes Basin continued	• USGS is a non-regulatory agency that is recognized as the nation's leading science agency. • In the mid-1990s, USGS published a series of reports addressing hydrology, geology and groundwater recharge. • First model in 2000/2001 identified groundwater and surface water relationship. • In 2017, USGS identified a state of the art model, examining different scenarios on groundwater pumping impacts to stream flow. • Basin study modeling revealed that municipal use over a 50-year period utilizes only 16,000 ac/ft, in contrast to irrigation use, which is 724,000 ac/ft. • The upper Deschutes basin aquifer recharges at 3,800 cubic feet per second. • Groundwater wells are measured every quarter. There are 25 to 30 wells. Trends show water levels declining. • The reason is due to climate change. It is estimated that 70% of the declines are due to climate, 20% to pumping; and 10% to lining (less water transmission loss) and other irrigation efficiency measures. • The federal Endangered Species Act represents the greatest threat to water use. • Irrigation districts need to improve delivery systems to aid upper and middle Deschutes River flows. • Patrons and Irrigation Districts will need to change their attitudes related to water consumption. Recognizing that about 50% of the diverted water is lost through seepage and is a net loss to the Upper and Middle Deschutes River (although a fraction is re-captured in the Lower Deschutes) it is important that water delivery and use adapts to future need rather than be bound by historic practice; move away from flood irrigation, improve efficiency of delivery and use to grow the same crop with less water but preserve the individual 'Water Right ' in whole, help undercapitalized end users meet the cost of upgrade, pipe to an on demand system (this alone will reduce water demand by 20%), establish incentives for users that improve their water use efficiency.The costs for upgrading irrigation delivery systems is expensive. • Carey Water Rights allow one to divert enough water to meet delivery demand.

Additional Resources

Meeting Notes:

Panel	Comments
Environmental and Economic Impacts of Water Use **(April 12, 2018)** Bridget Moran - Bend Field Office Supervisor, U.S. Fish and Wildlife Service; Jennifer O'Reilly – Biologist, U.S. Fish and Wildlife Service; Brett Hodgson - Fish Biologist, Oregon Department of Fish and Wildlife; and Mark Buckley, Ph.D – Partner, ECONorthwest	• USFWS working with 8 irrigation districts and Prineville on a Habitat Conservation Plan. An HCP is a tool to comply with the federal Endangered Species Act; it shields parties from litigation, in this case from injuring (take) the Oregon spotted frog and in the lower Deschutes River, bull trout. • An HCP lists activities that effect the listed species. For example, irrigation districts store and release water. Those two activities can harm the frog. It can take years of negotiation. The lifespan for an HCP can be 40 years. • It is a formal process that quantifies the effects of an operation following the National Environmental Policy Act (EIS, public comment, publish draft and ultimately final publication). • Once an HCP is final, it offers parties relief/regulatory assurance with an incidental take permit as long as they comply with the terms of the document. For irrigation districts, there is certainty as they invest in the long term maintenance and operation of their facilities. • Senator Merkley helped pass federal funding, PL5.66 that provides financial assistance to irrigation districts. For FY 2017 and 2018 there is a total of $300M to assist irrigation districts modernize their facilities. It requires a 50% match from outside sources, which can include state and other sources. • An HCP allows irrigation districts to "minimize and mitigate their impacts to spotted frog to the maximum extent possible." • Today, the Deschutes riverbed is 20% higher than normal (pre-irrigation). • USFWS is responsible for quantifying the impacts to the spotted frog to protect, enhance, and optimally, recover the species. • Each HCP has biological goals and objectives to establish biological function to the greatest degree possible. • There are benchmarks for federally listing species. The ESA has definitions for plants and animals. There is a five factor analysis/threat based approach. • ODFW is responsible for protecting sensitive plants and animals. When plants/animals experience significant threats, USFWS will analyze those threats, calling for data, and if necessary initiate a federal rule making process. • Oregon spotted frog is an indicator species for clean water, wetland viability, riparian health, and ecological function. • Prioritizing sensitive species is budget driven and can be political. Environmentalists sued USFWS for not protecting sensitive species. The lawsuit was eventually settled, which led to the process of listing the spotted frog under ESA. • Spotted frog habitat is located in Wickiup Reservoir, Crane Prairie Reservoir, and the upper Deschutes and Little Deschutes Rivers. • Bull frogs are a significant threat to the spotted frog. They are recognized as a top 10 invasive species. • USFWS has a safe harbor agreement with landowners to address impacts of bull frog listing.

Additional Resources

Meeting Notes:

Panel	Comments
Environmental and Economic Impacts of Water Use **Continued**	• It is more effective to protect ecological systems than to restore them. Restoration can be 10 to 20 times more expensive. • Protecting intact core areas for the spotted frog is essential. It is an extraordinary planning opportunity. • Irrigation canals experience 40% to 60% transmission loss. • One goal is to modernize irrigation systems which allows surface water to return as instream flow. • Conserving native species provides quality angling and hunting opportunities. • State conservation goals can conflict with recreational goals. • The upper Deschutes River is a premier trout fishery. There are a lot of opportunities to improve water quality and quantity for the whole ecosystem. • Moderating stream flows improve ecological function. • ODFW is a user based department. Revenue is focused on one spectrum, hunting, while there are significant demands associated with habitat conservation. • There are opportunities to share water and move it around. Thirty percent of COID's patrons flood irrigate. • Short term tools for irrigation districts are fallowing farms and leasing water for instream use.

Additional Resources

Meeting Notes:

Panel	Comments
Agricultural Water Consumption and Efficiency **(August 23, 2018)** Mylen Bohle - Area Extension Agronomist, Oregon State University Extension Leslie Clark - Director of Water Rights, Central Oregon Irrigation District Margaret Matter – Water Resource Specialist, Program Lead, Oregon Department of Agriculture	• OSU Extension works with Oregon Department of Agriculture (ODA) and Central Oregon Irrigation District (COID) and provides onsite services to farmers as well as developing larger policy and programmatic elements. • History: Oldest water rights in DC are from 1870/1880, first crop was largely potatoes. Throughout time, crops grown have changed based on disease and popularity: chickpeas, hemp, wheat, rye, hay grass, alfalfa, Marijuana, wineries etc. • Original water rights were tied to the crop (i.e. potatoes, alfalfa) which make them difficult to alter/change with new crops/new farming practices. • DC has over 1,000 individual farms, compared to Crook County (680) and Jefferson County (480). Majority are "small farms" and range from >0.5 acre to 10 acres. • Most efficient crops depend on the individual farm. Common practice for marijuana production is to use drip irrigation within greenhouses/indoor structures (100% efficient), dragline pivot irrigation (98% efficient), traditional center pivot (50-85% efficient). Even minor changes to pivots could result in an 18% increase in efficiency. • Greatest opportunity for change within water use would be pasture areas. Many areas in DC where owners are misinformed of irrigation maintenance/operations, some are still watering juniper and rock. • Alfalfa is the largest user of water, but in DC there's a limited ability of large acreage parcels. • ODA is researching how to adjust prior appropriate process to today – ie allocate enough water for farmers, fisheries, how to remap water to other irrigation districts, etc. Ex: Colorado is able to lease rural water to cities during droughts. • COID would like to be able to move water from district to district. Example: North Unit irrigation district serves highly productive farms in Jefferson County but have junior water rights compared to COI, so are the first to lose water in a shortage. • Changes to water law are needed but require action at the state level. • More education/outreach regarding ag and water is needed, COID and OSU lack funding for positions currently. Each would prefer to have a staff person who could specialize in irrigation efficiency/outreach. • Harney County recently undertook an initiative to switch all overhead pivots to Low Energy Sprinkler Application (LESA) pivots in response to over-allocation of water. Funding came from Energy Trust of Oregon and Bureau of Reclamation.

Additional Resources

Meeting Notes:

Panel	Comments
Projections and Planning **(December 13, 2018)** Bill Durden - Public Works Director, City of Redmond Craig Horell - Manager, Central Oregon Irrigation District Adam Sussman - Principal Water Resources Consultant Mike Taylor – Board President, Coalition for the Deschutes	• Coalition for the Deschutes established a new program recently called "A Shared Vision for the Deschutes" to engage a variety of project partners toward a unifying vision. • Although many wells in Deschutes County are relatively shallow, municipal wells in Redmond were dug to be quite deep and draw downs are not currently of concern. For Redmond, parks and green space are often the largest water consumers, but consumption is overall manageable. • The 47-member Upper Deschutes Basin Study work group has been highly effective in collaborating on a "state of the basin" report. The study is now complete, but it is only a study. There are not any action items or next steps proposed at this time. • Assessing water efficiency and consumption management is among the top priority of those managing water. COID has a System Improvement Plan to identify areas where losses can be curbed. Redmond has seen a decrease in water use due to low flow technology and metering. • Redmond's WaterHawk program is in place to detect leaks and water losses in their utility system, as well as helping consumers understand their water consumption in detail and offering rebates to incentivize conservation. • Redmond shared concerns regarding population growth and infrastructure—water pressure in wells may be impacted during high use seasons. • Proliferation of wells in Redmond may lead to a drawn down of the aquifer during high use season. • Greatest opportunity for change within water use would be pasture areas. Many areas in DC where owners are misinformed of irrigation maintenance/operations, some are still watering juniper and rock. • Alfalfa is the largest user of water, but in DC there's a limited ability of large acreage parcels. • ODA is researching how to adjust prior appropriate process to today – ie allocate enough water for farmers, fisheries, how to remap water to other irrigation districts, etc. Ex: Colorado is able to lease rural water to cities during droughts. • COID would like to be able to move water from district to district. Example: North Unit irrigation district serves highly productive farms in Jefferson County but have junior water rights compared to COI, so are the first to lose water in a shortage. • Changes to water law are needed but require action at the state level. • More education/outreach regarding ag and water is needed, COID and OSU lack funding for positions currently. Each would prefer to have a staff person who could specialize in irrigation efficiency/outreach. • Harney County recently undertook an initiate to switch all overhead pivots to Low Energy Sprinkler Application (LESA) pivots in response to over-allocation of water. Funding came from Energy Trust of Oregon and Bureau of Reclamation.