

WYOMING WATER DEVELOPMENT OFFICE

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WYOMING WATER DEVELOPMENT OFFICE

Winter 2007

Water News

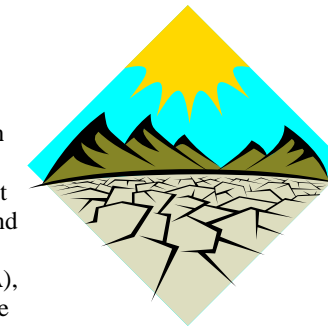
Climate, Drought and Wyoming's Water Resources

Introduction

After nearly a decade of drought the need to better understand how climate impacts Wyoming's water resources has never been greater. However, many challenges—from data gaps to a need for greater interagency communication—often stand in the way. In cooperation with the Wyoming Water Development Office (WWDO) and the Western Water Assessment (WWA), researchers from the University of Wyoming (UW) and the Ruckelshaus Institute of Environment and Natural Resources have organized a series of meetings and presentations to discuss the needs of water resource managers and stakeholders in the face of drought and an ever-changing climate. This series began with an October 5, 2006 workshop on “Water, Drought and Wyoming's Climate” held at the University of Wyoming. The workshop included nearly 80 participants representing state and federal agencies, stakeholder groups (e.g. Wyoming Stock Growers Association and Family Farm Alliance), and non-governmental organizations. Through a series of roundtables and panel discussions the participants identified several key issues related to water resource management in Wyoming, three of which are highlighted below. (Additional information available at: <http://www.uwyo.edu/ent/WyomingWater.asp>).

Identifying Vulnerabilities in Wyoming's Water Resources

How vulnerable is Wyoming and the surrounding Intermountain West to drought and other forms of climate variability and change, and how can we reduce our vulnerability to climatic extremes? These and other related questions were central themes of the October



workshop.

Wyoming's water supplies are vulnerable to climate fluctuations because they are heavily reliant on runoff from snowpack. Furthermore, the majority of this snowpack is concentrated in just a few small areas of the state. In fact most runoff comes from less than 7% of Wyoming's land area, and most of this snowmelt comes from above 10,000 feet. In turn, any reduction in average annual snowpack from just a few key mountain ranges threatens water supplies over a much larger area. In addition to reliance on snowpack, Wyoming's climate bears features of a high altitude desert, ranking as the 5th driest state in the United States.

Wyoming is also at the top of the watershed for major river systems such as

the Colorado. Being located at the top of the watershed is not an explicit water supply vulnerability at first glance. However, a smaller watershed size inhibits the possibility of capturing all available water resources. A few hot days in late spring can rapidly melt the winter snowpack, causing water in swollen streams to quickly travel downstream. Historically, we also see that droughts tend to encompass much or all of these smaller drainage basins, whereas in larger basins dry conditions in one sub-region are often offset by average to wet conditions in other locations.

Areas of Uncertainty

Concerns over areas of scientific uncertainty, especially as they relate to future climate change, increasing temperatures, and the impact on water resources, were pervasive themes throughout the workshop. The most current estimates indicate that earth has warmed approximately 1°F over the past 100 years. Based on regionalized output from numerous climate forecast models, the climate of the Upper Green River Basin and surrounding areas could warm anywhere from 3.6-7.2° F within the next fifty years. Continued increases in temperature may play a role in earlier spring snow melt, a shift from snow to rain, as well as an increase in evaporation. However, there currently exists little if any conclusive data concerning

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Special points of interest:

- As always, look for activities in your area in the Calendar of Water Events
- The SEO meeting summary/PowerPoint presentation of the November 28, 2006 Colorado River issues meeting held in Kemmerer, WY can be found at <http://seo.state.wy.us/docs.aspx>

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maps, and microfilm images. The DMS will create a document repository for electronic images of the agency's records. This will allow a much easier way for the public to search

and retrieve records. Creating this powerful, searchable repository, however, will take some time. All of the SEO existing records will need to be scanned and indexed.

During 2007, we will move the e-permit/database/GIS/DMS system from a development phase to a production environment. This will be a busy, yet exciting time for the SEO. We will be devoting

extra time and energy to learning this new system and look forward to assisting, you, the public in doing the same.



Calendar of Water Events

March 26-28, 2007 - National Water Resources Association, Federal Water Seminar - Washington, DC

April 3, 2007 - Water Forum, Cheyenne, WY

April 12, 2007 - North Platte Decree Committee Meeting - Scottsbluff, NE

April 16-18, 2007 - Bear River Commission Meeting - Salt Lake City, UT

April 24-25, 2007 - Yellowstone River Compact Commission Meeting - Sheridan, WY

May-June, 2007
90% Completion Framework Meeting - Riverton, WY

Snake/Salt BAG - Thayne
Bear BAG - Cokeville

Green BAG - TBA
Wind/Bighorn BAG - Cody
Powder/Tongue BAG - Buffalo

NE WY BAG - Moorcroft
Platte BAG - Saratoga

May 1, 2007 - Water Forum, Cheyenne, WY

May 2-4, 2007 - Western States Water Council Meeting - Sioux Falls, SD

May 11, 2007 - Water Development Commission Meeting - Cheyenne, WY

May 14-18, 2007 - State Engineer's Office Board of Control Meeting - Cheyenne, WY

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News from the WWDO

Planning and Construction Update

Once again the WWDO received a large number of project funding requests for 2007. The Wyoming legislature has approved the 2007 program by way of Chapter 85, Omnibus Bill – Planning, and Chapter 121, Omnibus Bill – Construction.

The Omnibus Bill – Planning contains three separate programs, New Development, Rehabilitation, and Storage.

New Development, Level I reconnaissance projects include: Clearmont CBM Impact Plan; Green River Basin Plan II;

Green River, Rock Springs, Sweetwater County JPWB Master Plan II; Laramie County Aquifer Study, Phase I; Lusk Area Ground Water; Pinedale Master Plan 2007; Northern Arapaho Master Plan; Star Valley Regional Master Plan; Miti-

gation North Platte Drainage System. Additional New Development, Level II feasibility projects include: Star Valley Ranch Groundwater; Upton Well No. 6; Cody Canal Hydropower; Dixon Water Supply II; Dayton Raw Water; Frannie Raw Water; Hoback Water Supply; and Laramie Water Management Plan. The total appropriation for New Development projects is \$4.6 million.

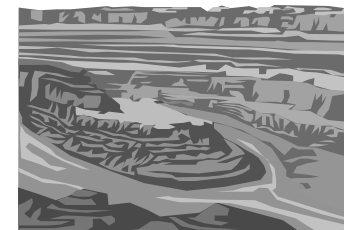
New Level II, Feasibility Studies in the Rehabilitation Program include: Enterprise Conservation, Fort Laramie Supply, Greybull Valley Irrigation District, Upper Sunshine Diversion; Kirby Irrigation; Manville Water Supply; and Willwood Diversion Dam. The total appropriation for Rehabilitation Program projects is \$840,000.

New Level II, Feasibility Studies in the Storage Program include: Viva Naughton Enlargement II; Bridger Valley Reservoir; Cottonwood Lake Enlargement; Hopkins Reservoir

Study; Rawlins Raw Water Storage; Sublette Creek Reservoir; and Upper Green River Storage. The total appropriation for Storage Program projects is \$911,000.



There are 16 projects in the Omnibus Bill – Construction, New Development Program, slated for funding. Those project are: Casper Zone III; Granger Water Storage; Greybull Valley Irrigation District Hydroelectric; Lander Paleozoic Well; Northern Arapahoe Well & Transmission; Lusk Well; Powell transmission Pipeline; Saratoga Well Field; Shoshone Well and Transmission; Sundance Meadows Water Supply; Sundance Well; alpine Water Supply; Glendo Well; Kirby Municipal; Sheridan Northwest/Big Goose Tanks; and Wheatland Black Mountain II Water Supply. Projects which have amended



recommended for funding at this time. The update will include a new groundwater component, and an update of the information contained in the first plan.

The groundwater component will be completed

appropriations include the Big Horn Joint Powers Pipeline; Laramie East Side Tank, Bedford Water Tank; Sunset Pipeline; Albin 2005 Well; Canyon Water Supply; and North Wright Transmission Line. The New Development Program appropriation is \$28.6 million.

Those Construction projects which are slated for funding in the Rehabilitation Program are: Rawlins Treated Water Tank; Cody Canal Phase I; Deaver Flume II; Heart Mountain Lining; Midvale Canal; and Sheridan/Big Goose Slip Lining. Rafter J will have an amended appropriation, with a total Rehabilitation Program appropriation of \$3.7 million.

The Omnibus Bill – Construction will also eliminate five projects with \$12.2 million returning to the New Development Program and Rehabilitation Program accounts.

by the Wyoming State Geological Survey in cooperation with the U.S. Geological Survey. A request for proposals for the updated plan will be sent to selected consultants March 12, 2007. Both the plan update and the groundwater study will be initiated in June 2007.

What's Up in the State Engineer's Office...

In the spring of 2004, the State Engineer's Office (SEO) launched into an Information Technology (IT) Initiative. This initiative is designed to re-engineer the business practices of the office and modernize how data is managed and processed. This article will give the progress thus far on this very important project.

There are four main components to this project; an e-permit system, a geo-database, a geographic information system (GIS) prototype



and a document management system.

The development of the software for the e-permit system is nearing completion with final delivery

scheduled for the end of March 2007. A six-month transition phase, to test the full system, will then begin. The e-permit system will allow for electronic submittal of permit applications and petitions. Agency personnel will also be able to review and approve these instruments in an electronic format.

(Continued from page 1) how and to what degree future climate change would impact amount of precipitation in Wyoming. Improving these forecasts for long-term precipitation trends will be a primary challenge in coming years.

Areas for Further Research

According to Mike Besson, Director of the WWDO, one of our first priorities should be to understand how changes in the amount and timing of runoff from snowpack

impacts water availability and storage. Based on research presented at the workshop, slight increases in temperature could result in an overall decrease in water yield from snow. Warmer temperatures would also cause a shift in precipitation from snow to rain. In comparison to snow,

rain is more likely to enter the water supply system immediately instead of being preserved in the watershed as snowpack. In addition, warmer temperatures would promote a shift towards earlier and more short-lived peak flows, and lead to increased rates of

evaporation and diminished late-season flows. Earlier timing of spring snowmelt is growing more common in the West, and there is strong evidence for similar trends in many parts of Wyoming. However, according to

the USGS's Kirk Miller and others at the workshop, obtaining the types of consistent, long-term data needed to fully understand these trends is a major obstacle in Wyoming.

Understanding Wyoming Water in a Broader Context

Another overarching

A single-relational geo-database has also been designed. As actions are finalized in the e-permit system (permits, petitions, etc.), the new database will automatically be updated. In addition, a conversion of the existing data to electronic format will need to take place. This data conversion began in February 2007.

The GIS prototype is the next important part of this system. This will create a more user friendly method to display water rights for the public. The GIS graphically displays layers of information which includes: roads, streams, the public land survey system, points of sur-

face water diversion, and wells, along with other numerous layers. Attached to each point of diversion is the ability to view scanned documents associated with that diversion. The prototype has been completed for Rock Creek in Johnson County. The SEO will be requesting, in the 2009-2010 biennium budget, funding to extend the GIS water rights coverage from the prototype area to the entire state.

The last major part of this initiative is the document management system (DMS). Over the past 100+ years, the SEO has amassed an incredible inventory of water original permits and copies, certificates,

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River Basin Planning Update

WWC Engineering is making steady progress on the Framework Water Plan Report. However, they will not reach the original schedule of 90% completion by March. Instead the 90% Progress Meeting and Basin Advisory Group meetings will most likely be scheduled for May. Please keep your eyes open for one of our post cards announcing the meetings. If you

are interested in attending the 90% meeting and don't receive our post cards, all of the BAG meetings are posted on the framework website located at the following address, <http://www.greenwoodmap.com/framework/bagschedule.html>

With the Framework Water Plan on track for completion in the next few months the first of the River Basin Plan updates is scheduled to begin this summer. The Green River Basin was

Wyoming and the West. theme of the October workshop was the need to consider Wyoming water and drought in the context of regional and national events. Pat O'Toole, rancher and President of the Family Farm Alliance, pointed out that the Year 2005 was the first time U.S. food imports exceeded U.S. food exports, and this trend likely will continue. At the same time, millions of irrigated acres in the West will be taken out of production over the next 10 to 20 years. Such land-use changes have significant implications for regional water supplies, but also relate to broader issues of long-term economic stability in the U.S. Pat and others also emphasized how cities throughout the West often see agriculture as a reservoir for future development. The fact that demands for water in downstream states continue to grow rapidly was also raised time and again. Clearly, drought and other climatic events cannot be considered in isolation, but must be examined in light of the numerous social, economic, and demographic changes underway in

Wyoming and the West.

Next Steps

Many participants in the October workshop and subsequent meetings have pointed out the need to assess consumptive water use in light of highly variable precipitation and changes in the timing of snowmelt. Numerous participants also indicated a pressing need to discuss groundwater resources in the context of future climate and drought. Groundwater and strategies for dealing with changing snowpack and runoff regimes will be central themes of additional workshops being planned for Fall 2007. For more information, or to pass on any comments or questions please contact Steve Gray (stateclim@wrds.uwyo.edu) or J.J. Shinker (jshinker@uwyo.edu).

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