

University of Nebraska - Lincoln

## DigitalCommons@University of Nebraska - Lincoln

---

Office of Research and Economic  
Development--Publications

Research and Economic Development, Office of

---

2009

### Watering the Next Century: Sustaining a Resource for the Future

Curt Brown

*U.S. Bureau of Reclamation*

Steve Gaul

*Nebraska Department of Natural Resources*

Eugene Glock

*Farmer and former staffer for U.S. Senator Bob Kerrey*

Jim Meisner

*Board of Directors, Twin Platte Natural Resources District*

Bob Snoozy

*Lindsay Manufacturing*

*See next page for additional authors*

Follow this and additional works at: <https://digitalcommons.unl.edu/researchecondev>



Part of the [Higher Education Administration Commons](#)

---

Brown, Curt; Gaul, Steve; Glock, Eugene; Meisner, Jim; Snoozy, Bob; and Swanson, Bob, "Watering the Next Century: Sustaining a Resource for the Future" (2009). *Office of Research and Economic Development--Publications*. 2.

<https://digitalcommons.unl.edu/researchecondev/2>

This Article is brought to you for free and open access by the Research and Economic Development, Office of at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Office of Research and Economic Development--Publications by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

---

## Authors

Curt Brown, Steve Gaul, Eugene Glock, Jim Meisner, Bob Snoozy, and Bob Swanson

## Symposium 1

### Watering the Next Century: Sustaining a Resource for the Future

## STAKEHOLDERS AND DECISION-MAKERS CONFERENCE

#### Panelists

**Curt Brown**, *Director, Research and Development, U.S. Bureau of Reclamation*

**Steve Gaul**, *Director, Planning and Assistance Division, Nebraska Department of Natural Resources*

**Eugene Glock**, *Farmer and former staffer for U.S. Senator Bob Kerrey*

**Jim Meisner**, *Member, Board of Directors, Twin Platte Natural Resources District*

**Bob Snoozy**, *Senior Vice President of Sales and Marketing, Lindsay Manufacturing*

#### Moderator

**Bob Swanson**, *Director, USGS Nebraska Water Science Center*

Each panelist has many years of experience in dealing with water issues and each brings a perspective from a different area of expertise. These include natural resources management at the state government level, research and administration for a federal agency, farming and ranching, public water policy advocacy, staffer for a Nebraska U.S. senator, and irrigation research and development in the private sector.

#### Effects of climate change

Managing water resources to provide the quantity and quality to meet the needs of agriculture, industry, recreation and urban use is one of the key challenges throughout the western U.S. and certainly in the Platte River Basin and the High Plains. Due to semi-arid conditions, the western U.S. also is one of the areas most likely to be affected by climate change and where effects already are being seen. The panelists identified changes in the timing of weather and climate events and factors affecting water supply and demand as major potential effects of climate change.

Curt Brown, providing the broad perspective of the U.S. Bureau of Reclamation, pointed out that one of the stronger signals of climate change is the warming of winter minimum temperatures. Throughout the Rocky Mountains and into the northwestern U.S. some areas have experienced significantly earlier spring runoff, indicating that mountain snow and ice are melting earlier, Brown said. Because this mountain snowpack is the largest reservoir in the West for storing and managing water, earlier melt and runoff causes significant difficulties managing that water later in the year. This change in the *timing of events* is a major climate change issue.

Warmer minimum winter temperatures also can increase the prevalence of pests, indirectly affecting water quality. An example is the spread of several pine beetle



From left: Gene Glock, Steve Gaul, Bob Snoozy

## STAKEHOLDERS AND DECISION-MAKERS CONFERENCE

Symposium 1  
Watering the Next Century:  
Sustaining a Resource for the  
Future

species throughout the Rocky Mountain chain, which has dramatically reduced the number of trees in forests and increased erosion and runoff of silt into drinking water supplies, Brown said.

All panelists spoke of the potential effects of climate change on the water supply, particularly the consequences of reduced precipitation, including snowpack in the Rockies, the major source of water for the upper Platte River. Supply also can be affected by changes in temperature, runoff, the frequency and severity of drought cycles and changes in extreme flood events.

Climate change is likely to increase the demand for water, with higher temperatures possibly causing changes in vegetation and cropping patterns in the High Plains and the Platte River Basin.

Most importantly, higher temperatures result in crops using more water, increasing the need for irrigation – by far the largest use of water in the region. Nebraska has the second-largest number of irrigated crop acres in the U.S. – only California has more – and currently has about 50,000 center pivot irrigation systems. Bob Snoozy, a vice president for pivot manufacturer Lindsay

Manufacturing, estimated that there are several hundred thousands of pivot systems nationwide. He also said phenomenal growth in the use of pivot technology is occurring globally in Saudi Arabia, China and other regions.

“The challenge for irrigators is very simple. We need to use less water, less energy, less labor, do it in an environmentally friendly manner and do it economically to the benefit of farmers,” Snoozy said. Today’s pivots use far less water by applying water closer to the soil, and lower pressure systems cut energy costs.

Pivot systems are becoming highly automated and can be run from a cell phone or a laptop

computer. They also have the potential to monitor soil moisture and other parameters and are able to apply different amounts of water and chemicals on one square foot of soil at different rates than the surrounding land. These systems could become valuable tools for monitoring climate parameters and supplying climatological and other data from hundreds of thousands of sites, Snoozy said.

### Managing water to adapt to climate change

Nebraska is at the forefront of managing water supplies stressed by high demand. In 2002 the Governor’s Water Policy Task Force charged the state’s 23 Natural Resources Districts (NRDs), which are responsible for monitoring quality and quantity of groundwater, with taking a more proactive approach in the integrated management of surface water and hydrologically connected groundwater. The task force also charged the Nebraska Department of Natural Resources (DNR) with designating river basins as under-appropriated, fully appropriated or over-appropriated. As a result of the task force, in 2004 the state legislature passed LB 962. Steve Gaul of DNR explained that under this law, if a river basin is declared fully appropriated or over-appropriated, drilling of all new wells and the addition



From left: Curt Brown, Jim Meisner,  
Bob Swanson

of irrigated acres is suspended and DNR must work with the local NRDs to develop an integrated management plan for the basin. The goal is to sustain a balance between water uses and water supplies to protect the economic viability, social and environmental health, safety and welfare of the river basin and maintain it for the near- and long-term, Gaul said. More than half of Nebraska is now under at least a temporary moratorium on high-capacity wells.

DNR is required to conduct an annual evaluation of long-term water supply. Integrated management plans are based on data from the past 20 years, so plans will be affected if climate change impinges on water supply. Under this scenario, past uses will be declared too high, mandating cutbacks to restore sustained balance, which is much more difficult than curbing new or future uses, Gaul said. “However, the plans are flexible. They are a work in progress, which is why research is so important. They need the best scientific information available. We need to get better data.”

The Twin Platte South Natural Resources District covers parts of the North and South Platte and Platte River Basins and was declared fully and over-appropriated in 2004, said Jim Meisner, a member of the Twin Platte board for 14 years. The NRD was given three to five years to develop an integrated management plan. It assembled a task force that includes representatives of all of the stakeholders – irrigators, the Nebraska Attorney General’s office, municipalities, utilities, DNR, recreational users, legislators and others. The task force is developing a service water model using groundwater data from the multi-agency Platte River Cooperative Hydrology Study to assess the district’s total assets and consumptive use. The NRD’s plan is to manage water based on consumptive use and to reduce usage by redeeming irrigated acres or giving farmers the option to change their cropping patterns to decrease their consumptive use.

Panelists agreed that progress is being made in the difficult task of addressing transboundary issues where states’ laws are inconsistent or even contradictory. The Nebraska, Colorado and Wyoming tri-state Platte River compact was cited as a unique example of collaboration among states; the seven-state Colorado River compact also was noted. Farmer and water policy advocate Eugene Glock noted that farmers, NRDs, municipalities and others impacted by the Kansas-Nebraska Republican River dispute are meeting and negotiating and do not consider state boundaries to be a drawback in reaching a settlement, even though Kansas and Nebraska are still in court.

All panelists emphasized the necessity for collaboration in developing plans for managing water. “We have to bring together all of the people, the users who need the information and the scientists who can provide it, and put them together in a dynamic organization,” Brown said.

## Research needs

The need for more and better research was the panel’s common theme. Specific research needs included:

- Predicting extreme events
- More accurate, longer-term predictions for precipitation and temperature
- Downscaling climate forecasts to a river basin, or even smaller level
- Better data on snowfall and rainfall patterns
- Better data on surface water supply and climate at a basin scale
- Improved groundwater and surface water models
- More automated data – such as stream gaging – to feed into those models

## STAKEHOLDERS AND DECISION-MAKERS CONFERENCE

Symposium 1  
Watering the Next Century:  
Sustaining a Resource for the  
Future

*“We have to bring together the users who need the information and the scientists who can provide it, and put them together in a dynamic organization.”*



## STAKEHOLDERS AND DECISION-MAKERS CONFERENCE

Symposium 1

Watering the Next Century:  
Sustaining a Resource for the  
Future

*“Farmers need to be  
ahead of the curve.  
It’s a lot cheaper to  
prevent something  
than to cure it.”*

- More collaborative research among agencies
- Research on social and cultural changes that will help society adapt to climate change

In response to a question about prediction and linearity of models, Tom Armstrong, USGS senior adviser for global change programs, said this is one of the key difficulties. The predictions are linear, but the impacts of climate change are nonlinear. “We can’t look at yesterday and the day before and draw a straight line through them and say, ‘This is where we’re going for the future thousands of years out,’” Armstrong said. Scientists must examine data based on the best science in the context of uncertainties and non-linearity. When they convey information to decision-makers, they must say, “This is what the models are telling us, but there are uncertainties associated with it,” Armstrong said. “We have to give decision-makers information in an accurate, objective, unbiased way. It can’t be our best guess. Or if it is, we need to tell them so. We can’t just say, ‘This is what’s going to happen.’ That is one of the challenges.”

Glock discussed the need to include farmers and ranchers in the research efforts. This is one way to overcome the agricultural community’s skepticism about global climate change, he said. Farmers and ranchers have dealt with extremes in temperatures and precipitation throughout their lives, and some are hesitant to attribute climate changes to global warming.

“I’ll put it in the words of a young farmer in his mid-20s, who graduated from the ag college in 2005,” Glock said. “I asked him Monday, what do you think about global warming? He didn’t even hesitate. ‘If this is global warming, bring it on. I’ve never raised such good crops.’ So, you have a selling job to do with the agricultural community.”

Too often the science and its applications don’t reach the farmer until the problem has become serious. Farmers need to be ahead of the curve, Glock said. “It’s a lot cheaper to prevent something than to cure it.”

Research recommendations also should include input from farmers and ranchers to ensure wider adoption of technologies, especially practices and policies. “If you want farmers to adopt new practices, you’ve got to show them how it’s going to improve their bottom line. They may not like the idea because they’ve never done it that way before, but if it’s going to make them money they’ll give it a good shot,” Glock said.

### Recommended research needs

- Develop more accurate, longer-term predictions for precipitation and temperature
- Develop ability to downscale climate forecasts to a river basin or local level
- Gather more comprehensive data on snowfall and rainfall patterns
- Gather more comprehensive data on surface water supply and climate at a basin scale
- Improve groundwater and surface water models
- Develop automated data to populate models
- Increase collaborative research among agencies
- Research on social and cultural changes that will help society adapt to climate change
- Include farmers and ranchers in research efforts to overcome skepticism about climate change and ensure adoption of new technologies, practices and policies