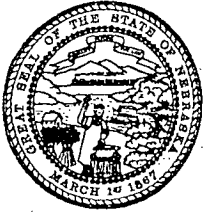


STATE OF NEBRASKA



DEPARTMENT OF NATURAL RESOURCES
Roger K. Patterson
Director

March 29, 2002

IN REPLY REFER TO:

Mike Johanns
Governor

Fred Ore
Bureau of Reclamation
Great Plains Region
P.O. Box 1607
Grand Island, NE

Dear Fred,

I am writing to you concerning Emergency Drought Assistance and Drought Planning Assistance for Nebraska in 2002. As you know drought is currently a major problem in the western portions of Nebraska. We are interested in receiving drought planning assistance pursuant to Section 202 of Title I of the Reclamation States Emergency Drought Relief Act of 1991 and drought funding assistance pursuant to Title II of the same act.

Please consider this letter our formal request for such assistance. We have attached a summary list and detailed descriptions of each of the five drought assistance proposals.

Any funding you could make available for these important projects would be extremely helpful. Please feel free to contact me if you need additional information.

Sincerely,

A handwritten signature in cursive script that reads "Roger K. Patterson".

Roger K. Patterson
Director

agk
Enclosures

clrshare/patterson

2002 NDNR Drought Assistance Proposals - Summary List

\$478,700 recommended for Approval

183,200
170,000
16,000
25,000
65,000

\$459,200
83,000

\$542,200
250,000

\$792,200

183,200
\$223,600
170,000
\$200,000
16,000
\$20,300

Republican River Basin Streamgaging/Drought - Dry Year Proposal

An Automated Soil Moisture Monitoring Network for Nebraska

Proposal: Increased Streamflow Monitoring Capabilities to Better Predict and Distribute Surface Water in the Lower Platte River Basin

\$ 25,000 Drought Mitigation Planning

\$ 63,000 Proposal: On-Site Computer Aided Capabilities for Distribution of Surface Water

\$531,900 TOTAL

478,700
459,200

19,500
additional

4000
500
100
200

4800 → 5000
15,000

- ✓ ~~1~~ Real time Cedar River Fullerton - \$5,000
 - ✓ ~~2~~ New equip; real time LPR at Columbus - \$6,000
 - * 3) New gage with control at Columbus - \$200,000
 - 4) Aqua Cules for all field people - 8 @ 20000 - \$16,000
 - 5) Five portable/stump gages @ \$3000 - \$15,000
 - 6) Real time for 3 remaining gages in Camb area - \$18,000
 - 7) New gage on Little Blue nr. Alex with real time - \$9,000
 - * 8) ~~Take another look at building Little & Big Blue Res.~~ near state line for state line flows - feasibility 50,000
 - 9) Polysomies 3? - \$16,000
 - 10) Real time on Big Sandy & Big Blue at Beatrice - \$9,000
- Can we buy through USBR or GSA?
- access downloads from USBR down link system?
- site ID nos. for Camb & BP area DCPs

83,000
(a-f)
83,000
16,000

15,000
15,000
9,000
16,000
70,000

* 200,000
50,000

250,000

1200
3200
4400

8800
9000

2500
1500

3200
700
800
200

4700

March 29, 2002

Republican Basin Streamgaging/Drought-Dry Year Proposal

Background

The past two years have been very dry in the Republican River Basin and it appears at this point that the drought will continue into 2002. As water supplies diminish it is even more important to manage this resource with greater precision and equity in accordance with State Statues. Furthermore, more timely and accurate surface water information seems likely to be helpful in future Kansas/Nebraska activities, especially in dry years.

Fluctuating flows at the Superior/Courtland Diversion dam makes it difficult to manage supplies for both Kansas and Nebraska under the Republican River Compact. Improved measurements and real time data would help maximize the use of this limited resource.

For the Nebraska Department of Natural Resources, The Nebraska Bostwick Irrigation District, Kansas Bostwick Irrigation District and the Bureau of Reclamation to better manage surface water supplies the following equipment is needed.

In addition, increased and more timely and accurate stream flow data will allow Nebraska Department of Natural Resources to more effectively administer surface water appropriations and protect storage releases while in transit to the diversion dams'.

- done* • (\$9,500) Gaging Station located on Turkey Creek at Naponee, equipped with a Sutron satellite transmitter.
- done* • (\$9,500) Gaging Station located on Center Creek near Franklin, equipped with a Sutron satellite transmitter.
- done* • (\$9,500) Gaging Station located on the Republican River near Riverton, equipped with a Sutron satellite transmitter.
- done* • (\$5,200) Upgrade 06851500, Thompson Creek at Riverton with a Sutron Satellite transmitter.
- done* • (\$6,700) Upgrade 06852000, Elm Creek at Amboy with a Sutron Satellite transmitter.
- X* • ~~(\$23,200) Upgrade all U.S.B.R. Canal head gates with a Sutron Satellite transmitter.~~
- X* • ~~(\$70,000) Install measuring devices, equipped with Sutron Satellite transmitters on all major canal waste ways.~~ ? Demo project?
- Damsat* • (\$70,000) Radio transmitters installed on all pump diversion greater than 1 cfs located between (Harlan County Dam) and (Guide Rock Diversion Dam).
- (\$20,000) In addition to these, Computer hardware, software, and a satellite downlink to process this information in a real time fashion would assist in future water administration.

Rough Estimated Overall Budget

\$223,600

70,000
 70,000
 20,000

 160,000 ✓
 23,200 maybe

 183,200 max

Why not put
some of these sensors
in gauges equipped
with data loggers?
gdb

March 29, 2002

PROPOSAL: AN AUTOMATED SOIL MOISTURE MONITORING NETWORK FOR NEBRASKA

Background

Drought is a normal feature of Nebraska's climate, and the state is vulnerable to significant economic losses and environmental degradation resulting from its occurrence. In 2000, severe drought affected many parts of the state, and agricultural losses were estimated at over \$1 billion by Roy Frederick, a UNL agricultural economist. Monitoring the development and progression of the drought, so that a timely response by the state could be coordinated, involved a collaborative effort of the state's Climate Assessment and Response Committee (CARC), UNL extension, the High Plains Regional Climate Center (HPRCC), and the National Drought Mitigation Center (NDMC). However, in spite of these efforts, the early detection capability and the ability to monitor drought severity are both in need of further improvement.

Soil moisture is one of the most important variables in drought monitoring. Low soil moisture at critical times can cause water stress and reduce vegetative growth and yield and/or increase consumptive water use for irrigation. In the past, soil moisture data was collected through sporadic and time-consuming field campaigns. In recent years, the soil moisture sensor technology has changed significantly and, as a result, automated soil moisture sensors are now available that are stable and accurate. Currently, Nebraska's Automated Weather Data Network (AWDN) monitors meteorological variables at 50 locations in Nebraska and soil moisture measurements are now available at 14 of these sites, providing daily soil moisture values at 10, 25, 50, 100 cm depths in the soil profile (<http://www.hprcc.unl.edu/soilm/>). This information was very helpful to CARC during the 2000 drought.

Statement of Need

Although 14 soil moisture monitoring sites gives some indication of conditions around the state, it is clear that the state would benefit from additional soil moisture sensors. Adding soil moisture sensors to 30 existing stations within the AWDN would greatly expand Nebraska's soil moisture monitoring capability, and would improve the early warning and monitoring of drought across the state. In addition, to fill existing gaps within the AWDN, and provide a more uniform coverage across Nebraska, 10 new AWDN stations (along with soil moisture probes) are proposed. For example, two large counties, Cherry and Custer, do not currently have an AWDN site within the county. Adding an AWDN site in these counties would provide critical information to state officials as well as local producers.

Benefits to Nebraska

Development of a continuous soil moisture monitoring network throughout the state will allow for timely assessments of available water in the soil root zone at critical times, before, after, and during the growing season, thereby providing the opportunity for the early detection of agricultural drought. This *ground-truth* soil moisture data set is essential for determining the *crop-specific* soil water needs. This information would be especially beneficial to producers, and could provide important guidance for irrigation scheduling.

The soil moisture information could also be provided as supplementary information as part of the applications to the Farm Service Agency (FSA) for the timely release of CRP land for haying and grazing during drought events. Soil water information was submitted to FSA as part of the CRP requests in 2000, but additional soil moisture sensors in important agricultural areas across the state would facilitate the availability of this information in the future,

Soil moisture information also proves beneficial during periods of surplus moisture, and could serve as an important early warning tool for flood events around the state. Such information would be helpful for the Nebraska Emergency Management Agency (NEMA). Currently, soil moisture data collected by a statewide network in Oklahoma is being used to monitor the potential for flash flooding events in that state.

All soil moisture information provided by a network would be available on the HPRCC web site, with a direct link to this information located on the CARC and NDMC web sites, providing this real-time information to decision makers (producers, lawmakers, municipalities, NRD, water and natural resource managers, etc.) across the state.

Budget

Thirty (30) AWDN sites updated to include soil moisture measurements	
1 each @ \$3,000	\$90,000
Ten (10) new AWDN sites located to increase coverage in gaps	
1 each @ \$8,000	\$80,000
Recurring maintenance budget	\$30,000
	Total \$200,000
	170,000

March 29, 2002

Proposal: Increased Streamflow Monitoring Capabilities To Better Predict and Distribute Surface Water in the Lower Platte Basin

Background

To properly predict and distribute the drought affected flows on the Lower Platte River system; Nebraska needs to increase its stream flow monitoring and flow data retrieval capabilities. The purpose of this Nebraska Department of Natural Resources proposal is to improve that effort through acquisition of additional equipment.

Although eastern Nebraska itself is not experiencing a drought as western Nebraska is, the effects of the drought in the west is felt throughout the state. The Platte River flows across the entire state from west to east. A drought in the west shows up as reduced stream flows in eastern Nebraska. The demand for the water flowing in the Platte River exceeds its supply. Instream flow rights for fish and wildlife uses on the Platte as well as agricultural uses on the Platte and its tributaries require the best monitoring system we can provide. Inadequate monitoring capabilities hamper the making of good water distribution decisions. Bad decisions are costly to the adversely affected user, whether it be the endangered and threatened species that the instream flow rights were taken out to protect or the individual irrigators which depend on the rivers for much needed water for their thirsty crops. The lack of water at a crucial time cannot be made up once the damage is done. Timing is important to all the affected users.

A computer aided decision support system is being developed to help NDNR make better decisions. The system greatly increases our ability to track and predict stream flow. That system depends on specific, accurate and timely data.

Additional equipment is needed to provide the data needed for improved NDNR management. Two holes in Nebraska's data network have been identified. A remote access stream gage on the Loup River Power Canal return near Columbus Nebraska will help fill one of those holes. A gage at this site will greatly increase our tracking of flow capability and allow much better predictions of flow downstream. To equip that gage NDNR is requesting \$9,500. The data from the gage will be retrieved either through a satellite downlink or through the telephone system.

Additional equipment is also needed to add real time capabilities to the gage on the Cedar River near Fullerton, Nebraska to fill the other hole. The Cedar River is a major tributary stream on the lower end of the Loup River both of which ultimately contribute significantly to the flows of the Platte River. The gage at the site currently provides a continuous record of the stage/flow of the Cedar River. The data is retrieved on site monthly from which the annual record is produced. Additional data logging and remote retrieval equipment would allow us to access that data as necessary and use the information in our decision process. Big changes in the flow of that stream are not known on a daily basis and therefore flow predictions and

2400
3200
100
shelter swk 100
cable - 5800
6000

distribution decisions are not as good as they could be. Nebraska needs additional equipment at this site to make good decisions. NDNR is requesting \$5,800 to equip this gage so its data can be retrieved through satellite downlink or through the telephone system. We are also requesting \$5,000 to backup the above mentioned gages.

1200
1800
3200

5200

Estimated Overall Budget

Total cost of the project outlined above amounts to \$20,300.

→ 16,000

3200
1200

4400
↓

March 29, 2002

PROPOSAL: ON-SITE COMPUTER AIDED CAPABILITIES FOR DISTRUBUTION OF SURFACE WATER

The drought brings with it diminished stream flows throughout the state. Recently approved instream flow rights for fish and wildlife establish varying yet specific target flows and various sites on the Platte River. Other users upstream from these instream flow target sites must be regulated and/or closed to assure the targets are being met. This includes some 2100 irrigation permits that rely on the streams in the Platte, Loup, Elkhorn Rivers and their tributaries for their water supply. The drought stricken Republican River Basin although not subject to the instream flow demands on the Platte River is closely monitored for proper distribution of water among some 600 surface water irrigation users. Surface water use in the Republican is monitored to comply with terms of an interstate compact. The staff of the Department of Natural Resources Field Offices monitors use of irrigation permits closely. The tighter the water supplies are, the more important it is for them to be effective and efficient in their water distribution duties. Currently in order to accomplish this, the field staff must carry with them a large collection of maps, water right listings and measuring equipment. They set rates and operation times "by hand". The maps and listings they must carry with them is often unmanageable. A computer-integrated system would eliminate their map burden and eliminate regulating calculation errors and automate the writing of regulation orders. Record keeping of water administration activities will also be enhanced by such a system, allowing for more efficient use of the field staff.

A system to integrate water right information and computer aided issuance of regulating orders has been developed. This system adds effectiveness and efficiency to the water distribution activity.

power supplies

Additional equipment is needed to implement the newly developed system. Laptop computers, portable printers and specialized software are needed. Four systems are needed for water administration in the Lower Platte Basin, two in the Elkhorn Basin, five in the Central Platte and Loup Basins, four in the upper Platte Basin, and three on the Republican Basin are needed. We are requesting funding to purchase these systems. The cost for each of these 18 systems, which would include a laptop computer, a portable printer and the specialized software, is \$3500.

Total cost for the 18 systems is \$63,000.