

Annual Report and Plan of Work  
for the  
Nebraska State Water Planning and Review Process

Submitted to the Governor  
and Legislature by the  
Director of Natural Resources

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## **I. PLANNING AND REVIEW PROCESS ACTIVITIES**

### **A. PROVIDE INFORMATION AND ALTERNATIVE METHODS OF ADDRESSING WATER POLICY ISSUES AND AREA-WIDE OR STATE-WIDE WATER RESOURCES PROBLEMS**

- 1) Implementation of LB 962
- 2) Platte River Cooperative Agreement Studies
- 3) Republican River Basin Activities
- 4) Platte River Cooperative Hydrology Study
- 5) Floodplain Planning
- 6) Water Decision Support System
- 7) Lower Platte River and Tributaries Feasibility Study
- 8) Lower Platte River Corridor Alliance
- 9) Lower Platte Cumulative Impacts Study
- 10) Environmental Education Activities

### **B. DEVELOP AND MAINTAIN THE DATA, INFORMATION AND ANALYSIS CAPABILITIES TO PROVIDE A SUPPORT BASE FOR WATER PLANNING AND MANAGEMENT**

- 1) Water Rights Mapping
- 2) Flood Prone Area Mapping
- 3) National Hydrography Dataset
- 4) Revision of Digital Elevation Models
- 5) Revision of Digital Orthophoto Quadrangles
- 6) Tagged Vector Cleanup
- 7) Soil Survey Digitization
- 8) Watershed Boundary Delineation
- 9) Nebraska Rain Assessment and Information Network (NeRAIN)

### **C. PROJECT AND PROGRAM REVIEW ACTIVITY**

- 1) Water Policy Task Force Activity
- 2) NRDF Reviews
- 3) Climate Assessment and Response Committee
- 4) Environmental Trust Committee
- 5) GIS Steering Committee
- 6) Other Activity

### **D. PROVIDE THE STATE WITH THE CAPACITY TO PLAN AND DESIGN WATER PROJECTS**

## II. INTRODUCTION

The Nebraska State Water Planning and Review Process was initiated in 1978 to redirect and accelerate Nebraska's water planning efforts. This Annual Report and Plan of Work summarizes work completed as part of that process in FY 2004 and presents a work program and budget for future fiscal years. This is a report of the Director of Natural Resources and is submitted in compliance with Nebraska Revised Statutes Sec. 2-15106. Section 2-1599 of the statutes directs that the process shall be designed to: 1) provide the Legislature and the citizens of Nebraska with information and alternative methods of addressing important water policy issues and area wide or statewide water resources problems; 2) provide coordinated interagency reviews of proposed local, state, and federal water resources programs and projects; 3) develop and maintain the data, information, and analysis capabilities necessary to provide state agencies and other water interests with a support base for water planning and management activities; 4) provide the state with the capacity to plan and design water resources projects; and 5) conduct any other planning activities necessary to protect and promote the interests of the state and its citizens in the water resources of Nebraska.

The single most important high profile water planning activity that took place in FY 2004 was the work of the Nebraska Water Policy Task Force and the subsequent Task Force recommendations that were incorporated into LB 962, the year's major water legislation. Although NDNR staff engaged in the State Water Planning and Review Process activity provided support, information and web service for the Task Force, most NDNR staff support was provided through the agency's Director, Assistant Director, and Legal Division. Implementation of LB 962 provisions will be a major activity for both NDNR staff and NRD staff in future years. Two major aspects of that activity will be designation of fully appropriated basins and compilation of joint integrated management plans.

Another focus of the State Water Planning and Review Process has been on natural resources information management. Work has been closely coordinated with the work of the Information Technology Division to produce a variety of maps and other information useful in addressing the state's natural resources problems. Geographic information systems (GIS) and computer assisted data manipulation and modeling continue to be an integral part of the long range planning and management of the state's water and soil resources. The work items in this report continue to reflect that emphasis.

The State Water Planning and Review Process work items related to information management are found primarily in Section B. Some of the information management products and activities found in this report are co-products of the Department's Information Technology Division and the Planning and Assistance Division. This is a report of planning activities and includes no programmatic information about Data Bank Section initiatives other than the revision of digital elevation models and revision of digital orthophoto quadrangles. However, the Information Technology Division does have a major role in most of the information management/basic planning activities listed. Other divisions of the Department also participate in planning activities. For instance, the Floodplain Management and Dam Safety Division conducts floodplain planning activities and the agency's Legal Counsel is the agency lead in Platte River Cooperative Agreement activities.

Planning and review process activities are organized into the major statutory planning categories listed above. Within these categories, activities are listed roughly in the order of staff time and other non-financial support required.

### **III. STATUS REPORT ON COMPLETED AND ONGOING WORK**

#### **A. PROVIDE INFORMATION AND ALTERNATIVE METHODS OF ADDRESSING WATER POLICY ISSUES AND AREA WIDE OR STATE WIDE WATER RESOURCES PROBLEMS**

##### **1) Implementation of LB 962**

LB 962 as passed in the 2004 session of the Unicameral gives the Department of Natural Resources new responsibilities in several categories – water rights transfers, identification of overappropriated, fully appropriated basins, and joint plans for integrated management of surface water and groundwater. Both the joint plans and the appropriation determinations are planning oriented activities. The Unicameral also allocated \$2.5 million in funding to implement provisions of the billing. Overall implementation of the bill is likely to include a variety of studies, incentives, and implementation assistance for the Natural Resources Districts developing and implementing joint plans. NDNR indicated its intentions on designation of over appropriated basins in July 2004 and is to finish designation of all fully appropriated basins by December 31, 2005. These designations will be made from a variety of hydrologic, water use and water rights information as well as other related data.

Joint plans for integrated management of surface water and groundwater are to be developed by the NDNR and natural resources districts with over appropriated and fully appropriated basins. In order to help implement its responsibilities under LB 962 NDNR has filled three new staff positions, an attorney, a hydrologist, and a water administration position to deal with transfers.

##### **2) Platte River Cooperative Agreement Studies**

On July 1, 1997 the governors of Nebraska, Colorado and Wyoming and the U.S. Secretary of Interior signed a cooperative agreement outlining a proposed basin wide recovery implementation program for endangered species in the Central Platte Basin. Roger Patterson, Director of Natural Resources, serves as the Nebraska state representative on the governing body for the agreement and Jim Cook, legal counsel for the department, serves as his alternate. The program proposes to reduce shortages to U.S. Fish and Wildlife Service “target flows” and provide additional land habitat for endangered species in the Lexington to Chapman reach of the river. The reduction in shortages to target flows is to be realized in part by: (1) operating Kingsley Dam and related facilities in Nebraska to store a portion of the inflows to Lake McConaughy as well as environmental water made available from upstream projects in an environmental account that is managed by the USFWS (this portion of the program is already in operation because of licensing requirements of the Federal Energy Regulatory Commission and releases have been made from that account starting in the summer of 2000), (2) modify Pathfinder Reservoir in Wyoming to store water in another environmental account to be similarly managed, and (3) construct and operate the

Tamarack Project in Colorado; that project will utilize excess flows when available for groundwater recharge which will return to the river at times when flow shortages are more likely.

However, the three projects listed in the previous paragraph will only supply a portion of the needed average annual 130,000 to 150,000 acre feet of target flow shortage reduction. The remainder would need to be obtained through additional water conservation and water supply projects. A Water Action Plan that identifies potential projects in all three states to achieve the remaining water objective has been prepared. No projects will be implemented until additional assessments of their feasibility and impact have been completed. Those assessments will occur during the course of the program if it is, in fact, initiated.

On the landside, the proposed program would provide for 10,000 acres of suitable habitat by the end of the first thirteen-year increment. Interests in land could be acquired through title, easements or leases but no eminent domain would be used. Taxes would continue to be paid on the land whether or not the record owner was tax exempt.

The primary agency work on the Cooperative Agreement has been handled through the Director of Natural Resources, the deputy director of the department and the agency legal counsel, none of which are part of the Planning and Assistance Division. However, Planning and Assistance Division staff has frequently worked with and are expected to continue to work with each of those other staff members and others on various activities relating to the agreement.

An additional responsibility under the agreement is for each state to mitigate, offset or prevent any new depletions to the river's target flows as part of the proposed program. This requires each state to develop a mitigation plan that will allow new uses of both surface water and hydrologically connected groundwater to begin only as long as the impacts to the target flows are offset. Nebraska's new depletion plan has been in the development stage since 1998; that work is being performed by a group of Nebraskans, most of whom represent organizations that either would be responsible for implementing the plan or constituents that would be most affected by the plan. The group is led by the Department's legal counsel. A draft of the plan has now been submitted to and is being reviewed in concept by the other members of the Governance Committee. However, further work on the details of the new depletion plan will continue in FY 2005 primarily because of its close relationship to the Cooperative Hydrology Study discussed elsewhere in this document. When that work has been completed the plan will have to be approved by the other members of the Governance Committee. Regulations to implement the plan will need to be adopted by the boards of several Natural Resource Districts.

The budget adopted by the Legislature for FY 2004 and FY 2005 included funds for a study designed to help the Governor and the state in general better understand the significance of entering into a Platte River Program once formulation of that Program is complete. That study, a survey of land use in the Platte River Basin for 2004, will be delayed until 2005 because of changes in program scheduling. Similar studies also were

conducted for 1997 through the Cooperative Hydrology Study. Comparison of land uses for 1997, 2001, and 2005 will be needed to determine the extent to which the number of irrigated acres is changing and how that is affecting flows in the Platte. Those three studies will be critical to quantifying the amount of water needed to offset for depletions caused by new uses of hydrologically connected groundwater begun between July 1, 1997 and December 31, 2005. Those are the depletions for which, under the plan in its current form, the state alone will need to offset. The cost of providing those offsets is not yet known but likely will be substantial. The 2003 Legislature appropriated \$200,000 for the 2005 land use inventory and for analysis of the results of that and the 1997 and 2001 inventories.

Funds were also appropriated for FY2004 (\$200,000) and FY2005 (\$400,000) to assist the seven natural resources districts involved in preparing for and implementing the Nebraska new depletion plan. Agreements that establish each NRD's portion of those funds and prescribing the tasks to be performed were executed in late FY2004 and early FY2005.

The Department is also serving as the agency through which the state's financial obligations for the term of the Cooperative Agreement are met. The appropriations to the Department's predecessor, the Natural Resources Commission, for FYs 1998, 1999, and 2000 for that purpose totaled \$700,000. Of the three year total, about \$265,000 was expended for Nebraska's share of the Water Conservation and Supply Study conducted by Boyle Engineering, Inc. of Denver. The contract for those services terminated at the end of calendar year 2000. Each of the other two states also had contracts with Boyle and expended the same amount.

Also funded by the three states on an equal basis was a study of the channel stability of the Platte. That study, which was conducted by Parsons Engineering, Inc., had a total price tag to the states collectively of \$300,000 and was deemed necessary by the states because of concerns with preliminary federal conclusions that the channel of the Platte River on the Big Bend reach is still degrading (narrowing and deepening) and that some of the measures proposed for the Program might actually exacerbate that problem unless other new components were added to the Program. The results of that study were helpful to the states in redirecting portions of the proposed program to what the states believe is a more realistic pilot/adaptive management approach to assessing the relationship between flows, sediment and other factors on the width and depth of the Platte River channel.

The remainder of what was left of the \$700,000 appropriated by the Legislature (approximately \$50,000 was lost to the budget reduction process in the 2002 session) and of an additional \$125,000 appropriated for FY 2004 is being used for other expenses approved by the Governance Committee. Among those expenses are the costs of the services provided by the Executive Director, Dale Strickland, a consultant from Cheyenne, Wyoming. So that the negotiated "fair shares" for the costs of the Cooperative Agreement would be provided by each party, Mr. Strickland's services are now funded 65.79% by the federal government (Department of Interior), 15.79% by Colorado, 10.53% by Nebraska, and 7.89% by Wyoming. The original deadline for the Cooperative



Agreement (July 1, 2000) has been extended until June 30, 2005. At this time it appears that the remaining portion of the original funds previously appropriated will be adequate to pay the Nebraska portion of those expenses through FY 2005.

In FY 2004 and FY 2005 the state reviewed the Draft Programmatic Environmental Impact Statement being prepared by federal agencies in a separate process. In future fiscal years, Department staff also are expected to contribute to continued development and implementation of the state new depletion plan, contribute to advancement of projects for the water conservation and supply plan, assist in land use delineation, and help with land use and mapping. Land use analysis and planning and implementation of programs and projects for mitigation of future water uses could conceivably become a major activity for Department staff if a basinwide program is established. The extent of that work will depend upon direction from the Governor and the Legislature.

One large issue unresolved when this report was finalized is how increases in Program costs are to be divided among the federal government and the three states. Since the original Cooperative Agreement was signed, the anticipated **cash** demand for the first thirteen-year increment of the Proposed Program has risen from just under \$45 million to approximately \$110 million. When the cash demand was estimated at \$45 million, Nebraska's share of the total program cost was to be taken care of by (1) credits resulting from the Environmental Account in Lake McConaughy, (2) dedication to the Program of a large habitat area, Cottonwood Ranch, by NPPD, and (3) the \$700,000 previously appropriated and discussed above. While the three states believe that increases in cost should be assumed by the federal government, a decision to that effect had not yet been made at the time this report was finalized.

### 3) **Republican River Basin Cooperative Activities**

DNR continues to work with the Republican River NRDs in matters related to the Republican River Compact. Water use requirements resulting from the lawsuit settlement along with passage of LB962 have resulted in efforts to implement Integrated Management Plans jointly with DNR and the four NRDs involved. Public information meetings and hearings were conducted in the summer of 2003. The Department has also conducted a series of meetings designed to improve the flow of information between local, federal and state personnel regarding the registration of wells and reporting of irrigated acres and crops. Database design, assistance with reporting methods and computer training have been provided. The inventory of small dams continues with a target completion date of December 31, 2004. The irrigation water meter installation program is proceeding ahead of schedule. Funds administered through DNR continue to aid the NRDs in their efforts to manage water resources and comply with Compact limitations.

### 4) **The Platte River Cooperative Hydrology Study**

The Platte River Cooperative Hydrology Study (COHYST) was a three-year cooperative effort to develop an understanding of the hydrological and geological

conditions in the Platte Basin in Nebraska upstream of Columbus, Nebraska and was completed June 30, 2001. COHYST II has taken over where the original COHYST left off and was originally scheduled to be completed June 30, 2004 but is now expected to be extended into the 2005 calendar year. That study is discussed following this description of COHYST. The goals and objectives of both studies are the same and are shown below:

To accomplish their goals, a group of Nebraska interests joined together to develop necessary data, analyses, modeling, and other information which when completed will;

1. Help Nebraska to meet its obligations under the Cooperative Agreement,
2. Enable NRDs and other entities along the Platte River to provide appropriate regulation and management,
3. Provide Nebraskans with a basis to develop policy and procedures related to ground water and surface water,
4. Enable Nebraskans to analyze proposed activities of the Cooperative Agreement and/or programs in Nebraska.

Study objectives include:

1. Collecting existing data and placing into a credible/appropriate database and fill in with new data as necessary.
2. Developing preliminary models to identify data gaps.
3. Collecting and adding supplemental data as necessary to provide a credible database.
4. Developing linked, sub-regional models to cover the Platte basin in NE.
5. Establishing credible models.
6. Using models.

The Department of Natural Resources is one of the 10 project sponsors of the study. The others are the Central Platte, Twin Platte, Tri-Basin, North Platte, and South Platte and Upper Big Blue NRDs, Nebraska Game and Parks Commission, Nebraska Public Power District, and Central Nebraska Public Power & Irrigation District. The cost was a total of \$2.7 million for COHYST I with \$1.6 million of that coming from a Nebraska Environmental Trust grant. The cost for COHYST II will be around \$3.7 million with \$1.4 million coming from NET funds and the remainder of about \$2.3 million paid for by in-kind services of the project sponsors.

Two NDNR staff members are putting in significant time on this project. One is a member of the technical staff coordinator's committee. That Committee drafted the work plan and advises the sponsors on technical matters. They also direct the efforts of the ground water modelers hired for this study. That member is also the programmer for the study responsible for developing routines for projecting crop and irrigation distribution back in time and historical pumpage from that irrigation. This is all in-kind service. The other member's time has been committed to fulfill the GIS, database and web development needs of the study. COHYST II is paying for half of that person's salary and anything above that is in-kind service.

During the 2004 FY, much of the effort for the project went towards calibration of the ground water models for the COHYST area, running programs, and editing data. Calibration has been completed on the one mile cell spacing and the work is now ongoing on the half mile cell size. Editing programs have been modified to handle various cell-size models. Additionally, some effort was put into developing web-based applications so the information created and organized for the project can be disseminated over the Internet. This will be one of the primary emphases in the future. Some of the initial use of the CoHyst data has been to assist in determining the hydrologically connected area to the overappropriated basin for purposes of helping implement LB 962.

## 5) **Floodplain Planning**

Last year, the NDNR began work on all-hazards mitigation planning. This was a change from the flood mitigation planning completed since 1998. The reason for the change is that the Federal Emergency Management Agency (FEMA) started requiring all-hazards mitigation plans as a prerequisite for receiving any federal mitigation project funds. (The regulations for this requirement are found in the Disaster Mitigation Act of 2000.) Although water related mitigation is generally a major component of hazard mitigation plans, a variety of other hazards are also a major part of these efforts.

All-hazards mitigation plans have been completed and adopted by Tecumseh and Wahoo. Wahoo was an interesting plan because it was the first time NDNR had to deal with tree damage as a secondary hazard impact for ice storms and high wind events. A working arrangement with the Nebraska Forest Service was developed to assist with the vulnerability analysis.

Tecumseh was the first all-hazards plan that was completed in-house by NDNR staff. This was successful, so all-hazards plans were also started in Valley and Tekamah. For the Valley plan, the Corps of Engineers completed the flood mitigation portion and the NDNR is completing the other hazards components. A flood mitigation plan was previously completed by Tekamah; however, new floodplain mapping and the community's desire to step up to an all-hazards plan have led us to take on all-hazards planning.

Whenever possible, NDNR utilizes the latest technology to make vulnerability assessments, which is one of the hardest portions in any all-hazards mitigation planning effort. For example, we use the latest aerial photography to "tag" structures in a community, then drive through that community to ground-check and note how many of the structures are residences, businesses, publicly owned, or detached outbuildings on the property. This is done to give a "picture-in-time" view of the number of structures vulnerable to large disasters like tornadoes. Furthermore, by assessing the number and location of businesses in the community, it gives us an idea of the economic sustainability in the event of a major disaster. Most small businesses that are destroyed by a disaster do not come back, and this can have additional economic repercussions on a community

trying to rebuild after a disaster.

The North Platte plan is currently the only open flood-only mitigation plan. This project has been delayed because the floodplain remapping portion of the mitigation plan was more complicated than anticipated. Currently, North Platte has 25% of Nebraska's flood insurance policies because the North Platte River and South Platte River converge on its eastern edge and because both rivers have extensive mapped floodplains. Many people in North Platte believe that the current map is outdated (it became effective in 1979) and does not represent an accurate portrayal of their flood risk. We believe most North Platte citizens will be excited to see that the majority of the floodplain will be removed from their community once these maps become effective.

The NDNR does not receive as much money for implementing mitigation projects, but two have been completed in the last year. First, a clearing and grubbing and bank stabilization project was completed for a "U-curve" along Tekamah Creek in Tekamah. The other project was the acquisition/demolition of one residence as a portion of the large Cole Creek buyout project in Omaha.

The NDNR receives annual mitigation planning and project grants from FEMA. Looking ahead, the Department will be completing a drainage study for the City of Valley later this fall. It is also anticipated the agency will partner with the Papio-Missouri River NRD to start a flood-only mitigation plan for the stretch of the Elkhorn River, which includes King Lake. It is also anticipated at least one repetitively flooded commercial property in the floodway of the Big Blue River in Beatrice will be acquired and demolished.

In terms of additional all-hazards plans, there is an opportunity to receive planning funds through the relatively new Pre-Disaster Mitigation (PDM) program from FEMA. It is also anticipated NDNR will receive additional planning funds from the Nebraska Emergency Management Agency as a result of previous and current federal disasters.

## **6) Water Decision Support System**

A water decision support system is a product that allows managers to make better decisions by using the latest technology with the best information available to predict surface water conditions. As scoped a system would likely include: 1) a long-term simulation model, 2) a daily model, 3) improved data functions, and 4) a clearinghouse for current and predicted flow data. In the past, the Department has worked with the U.S. Bureau of Reclamation on potential funding. Other involved agencies have included: Nebraska Public Power District, Central Nebraska Public Power and Irrigation District, and the U.S. Fish and Wildlife Service.

It currently appears that short term constraints will severely limit NDNR work in the next few years. However, small-scale efforts will be made to improve predictive capability with existing staff. Work on the DSS with the Bureau of Reclamation has been postponed

for the next few years while the Department works on other priorities.

**7) Lower Platte River and Tributaries Feasibility Study**

In January 1998, agreements were signed initiating work on the Lower Platte River and Tributaries Feasibility Study. The \$4.78 million study to investigate flood damage reduction and water resources problems and solutions in the Lower Platte Basin is being led by U.S. Army Corps of Engineers. Completion of the study is expected by the end of 2004. In addition to the Department, cooperators include: the Lower Platte South NRD, the Papio-Missouri River NRD, the Lower Platte North NRD and the Lower Platte River Corridor Alliance. Between 1998 and 2002 the Department provided \$500,000 in pass-through funding and a total of over \$200,000 in in-kind services. The feasibility study area includes the Platte River from Columbus to its mouth.

The study is a follow-up to an earlier reconnaissance level study and is to provide a variety of structural and non-structural options and recommendations. In addition to examining five specific structural options it has solicited public suggestions on natural resources management issues for the area and is addressing water quality, land use and public policy concerns in the watershed. Along with the Corps and the Lower Platte South NRD, the Department acts as a co-sponsor and serves on the executive committee for the project. The Lower Platte South NRD acts as primary administrator of funds. Half of project costs are a Corps responsibility with the state and local sponsors providing 25% funding and 25% in-kind match.

The major Department staff input to this project has already occurred and the Department provided the final \$125,000 of its financial obligation in late FY 2002.

**8) Lower Platte River Corridor Alliance**

The Lower Platte River Corridor Alliance is an umbrella organization of state and local agencies working to foster the development and implementation of locally drawn strategies, actions, and practices to protect, enhance or restore the vitality of the river's resources between Columbus and Plattsmouth. The major project supported by the Alliance to date has been the Lower Platte River and Tributaries Feasibility Study. However, the organization has a separate purpose from the feasibility study and has been meeting on a quarterly basis.

There has been limited financial support of the Alliance by the Department and other state agencies. Departmental support is being continued in FY 2004. This activity has taken only a very limited amount of NDNR staff time. Alliance activities have included local water quality and flood mitigation planning activities.

**9) Lower Platte Cumulative Impacts Study**

The Lower Platte Cumulative Impacts Study is a joint effort to determine the cumulative impacts of development in and adjacent to the floodplain of the lower Platte

River. Partners in the effort include the Lower Platte North NRD, the Lower Platte South NRD, the Papio-Missouri River NRD, the Nebraska Game and Parks Commission, the Nebraska Department of Roads, and the Nebraska Department of Natural Resources. The study will be conducted through the U.S. Army Corps of Engineers. The Department of Natural Resources has a very limited role, but has agreed to provide \$1,000 worth of in-kind services for the study.

#### 10) **Environmental Education Activities**

Limited agency environmental education activities included: 1) participation in planning and staging the Nebraska Envirothon, and 2) participation in the Earth Wellness Festival, annually held at Southeast Community College in Lincoln.

#### **B. DEVELOP AND MAINTAIN THE DATA, INFORMATION AND ANALYSIS CAPABILITIES TO PROVIDE A SUPPORT BASE FOR WATER PLANNING AND MANAGEMENT**

Basic Planning Activities provide the data base and management information necessary to plan natural resource related activities. This activity is a major function within the Department of Natural Resources. In addition to providing information to other agencies and interests, work in this activity is used to support general planning activities, administer the planning process and review projects and plans. Although future fiscal years may see an increasing emphasis on other types of planning activity, data base management and mapping activities are expected to remain a vital part of the Department's planning program.

##### Planning Information Base – General

Natural resources needs can be better met by increased efficiency and effective use of natural resources data. Better techniques of information acquisition, processing, storage and use are required to accomplish that task. GIS processing offers a tool for decision makers that combines multiple layers of information with the interactive capability of a relational database. The databases developed through the State Water Planning and Review process will be those with special application to water or watershed planning and activities. The long-term goal of the information base is to develop the capability to analyze the relationships of a wide variety of information in a GIS environment.

The NDNR actively supports the development and use of statewide databases freely available for the use of a host of government agencies. NDNR's GIS efforts will continue to support the priorities of the GIS Steering Committee. To that end, the NDNR has aggressively populated its World Wide Web server accessible through the Internet with easily available up-to-date information in both graphic and tabular forms.

## **Planning Information Base – Work Completed and Planned**

### **1) Water Rights Mapping**

The Department continues to scan water rights project maps and digitize the boundaries of land under permit. Currently there are three water divisions completed. The digitizing work for the Big Blue basin and the Big and Little Nemaha basins, water divisions 1-D and 1-F respectively, is being checked for accuracy. The Elkhorn basin and Missouri Tribes basins are partially complete. In addition, the surface water database has been modernized and will be linked to the digital map information.

The Department has completed the installation of digital mapping software and base data in all of its field offices. Field personnel have begun using GIS and GPS technology to administer water rights. The improved accuracy and repeatability of digital techniques has enhanced the adjudication process.

New computer programs have been developed and deployed across the state to improve the mapping and measuring of water rights. These tools and techniques, as well as base data have been shared with several NRDs.

### **2) Flood Prone Area Mapping**

In FY 1999 Natural Resources Commission staff developed a relatively automated process to delineate floodprone areas using recently completed digital elevation models and digital orthophoto quadrangles. This method is now being used by NDNR to develop detailed floodplain maps for the nearly half of the counties in the state that have no countywide floodplain mapping.

In FY 2004 NDNR initiated mapping floodprone areas in Cass, Dodge, Platte, Saunders, and Wayne Counties. This work is directed from NDNR's Floodplain/Dam Safety Division and the Planning and Assistance Division provides assistance. Work is paid for in part through a continuing contract with the Federal Emergency Management Agency.

### **3) National Hydrography Dataset**

The Department of Natural Resources is currently compiling tagged vector hydros for a National Hydrographic Dataset (NHD) for the state and at present rates of progress is likely to finish the process by the end of 2007. NHD is a dataset model developed jointly by the USGS and EPA with a goal of providing a common reference digital

hydrographic dataset for a wide cross-section of applications using data related to surface water features. At 1:24,000 scale it would present water features at the same scale as other state digital Datasets. It would also better enable spatial comparison with a wide range of other data. More importantly it would provide the basis for, or enhance the efficiency of, a wide range of potential water analysis activities

The Department of Natural Resources is coordinating development of the NHD in Nebraska. Under the current process NDNR will supervise the completion of “tagged vector hydros” for targeted watersheds. Under a work share agreement the U.S. Geological Survey will then undertake the processing to convert those tagged vector hydros into the finished NHD product. The project is a joint effort, with funding being supplied through the Nebraska Department of Environmental Quality. Smaller past amounts were supplied through the Nebraska Information Technology Commission, the Nebraska Department of Roads, and NRD sources. Funding is utilized primarily to hire student digitizing personnel through the University of Nebraska Conservation and Survey Division. The students are then officed and supervised at NDNR. To date sufficient funding has been secured to complete only a portion of the state. However, it appears likely that sufficient funds will become available to complete the balance of the state.

The schedule for NDNR delivery of tagged vector hydros on past and upcoming watersheds includes:

Delivered	Salt Creek
Delivered	Lower Elkhorn
Delivered	Lower Platte
Delivered	Lower Platte – Shell
Delivered	Big Papillion – Mosquito
Delivered	Blackbird – Soldier
Delivered	Middle Big Blue
Delivered	Lower Little Blue
Delivered	Upper Big Blue
Delivered	Turkey
Delivered	West Fork Big Blue
Delivered	Upper Little Blue
Delivered	Keg-Weeping Water
Delivered	Middle Republican
Delivered	Harlan County Reservoir
Delivered	Upper Republican
Delivered	Medicine
Delivered	Red Willow
1/10/2005	Stinking Water
1/17/2005	Frenchman
1/24/2005	Prairie Dog
1/31/2005	Lower Sappa
2/14/2005	North Fork Republican



**4) Revision of Digital Elevation Models**

In FY 2004, the Department of Natural Resources, through the Data Bank completed developing statewide 3.75-minute, 10-Meter interval Digital Elevation Models (DEMs), mapped to 1:12,000 scale.. The 10-Meter DEM database, processed in both UTM and State Plane coordinate system, is available on-line and interactively retrievable over the Internet through the Data Bank. The Department uses digital elevations for production of digital orthophoto quadrangles (DOQs), flood prone area mapping, and planning purposes. The Elevation data provides information about the terrain. This is one of the framework databases that provide basic data infrastructure for a wide variety of GIS applications and geo-spatial data users.

**5) Revision of Digital Orthophoto Quadrangles**

In FY 2004, the Department of Natural Resources, through the Data Bank completed generating a second generation Digital Orthophoto Quadrangle (DOQ) coverage for the state. These DOQs (1-Meter resolution, 1:12,000, grayscale) are produced using 10-Meter DEMs and 1999 NAPP photography. The statewide coverage is targeted for completion by FY 2004. The compressed DOQs, both in UTM and State Plane coordinate system, are available on-line and interactively retrievable over the Internet through the Data Bank. These DOQs support a wide variety of applications, including development of various natural and cultural resources coverages. The Nebraska GIS Steering Committee has indicated that statewide coverage of 5 layers consisting of DOQs, soils, transportation, hydrography and land parcels is needed for Nebraska. The DOQs are important as a base map that will support the development of the other four layers. This includes use as a base map to bring soil mapping up to SSURGO national standards and to develop a National Hydrographic database (NHD) for the state. Also, the DOQs are used extensively by all levels of government for watershed planning, stream networking, and other hydrologic applications.

**6) Tagged Vector Cleanup**

The Tagged Vector Coverage was a by-product of the DEM-DOQ development process. The files that were used for that process were converted into ArcInfo coverage to be able to show USGS 7 ½ minute quadrangle contour lines. These can be used to make finer custom grids than what is currently available. This could be characterized as producing more accurate and precise digital elevation data. This project was completed in FY 2000. The results have been used for a variety of additional projects ranging from calculating depth to water (and locating wetlands) in a joint project between the Natural Resources Commission and the Rainwater Basin Joint Venture to helping NRDs developing farm terraces. Other uses have included help in the delineation of the watershed boundaries.

Although Tagged Vector Coverage has technically been completed, there are a

number of improvements in the data that should be corrected. They are very small (usually around quad boundaries) and did not affect the DOQ production so were disregarded earlier. With current ARCINFO coverage, the errors are more noticeable now and so are being corrected. This is an ongoing project that is worked on when time is available. Output uses are the same as the Tagged Vector Coverages except these coverages have improved accuracy and are subsequently more valuable and reliable. An additional use of this product is the Flood Prone Area Mapping initiative.

There is a small area of the state remaining to be completed but it is in fairly rugged terrain so will take a very long time to complete. Since this is not in a high priority area where better data is needed, it is being completed on an "as time is available" basis. This will delay the completion of this project by years but that is not considered to be critical at this point.

#### **7) Digitizing of Soil Surveys to SSURGO National Standards**

In April 1997, the Nebraska Natural Resources Commission, the Natural Resources Conservation Service, and the University of Nebraska Conservation and Survey Division entered into an agreement to digitize Nebraska's published Soil Surveys. That process was completed in June 2004.

The overall goal of the project was to develop a digital soils base of all 93 Nebraska counties and incorporate updated surveys as they become available. Once digitized, the file can be adjusted in scale, making it easier to integrate the soils data with other geographic data. The process utilizes the DEMs and DOQs produced by the Department. Both the NDNR Planning and Assistance Division and its Data Bank participate in the process. Personnel from both the Natural Resources Conservation Service and the University of Nebraska Conservation and Survey Division were stationed at the NDNR offices to work on the project. Although State level work was completed on all counties some National level processing work was still being completed on the last two counties as of July 2004. With completion of the dataset State Level work began on correcting county joins and some other map line work as well as maintenance issues.

#### **8) Watershed Boundary Delineation**

This project has been completed for several years but has been improved several times recently as more detailed maps and information became available. A recent federal initiative requires that each state have watershed boundary delineations that meet national mapping standards. While the Watershed Boundary Delineations do not meet the national mapping standards, they are close and will be used as the basis for updating to the new standards. NDNR is involved in the process of bringing this dataset up to standards as this project develops.

This product has been used in the Flood Prone Area Mapping initiative as well as being a valuable layer for base maps. Most surface water maps developed by the Data

Bank staff will probably use this layer to show boundaries and flow directions by watershed. This layer can also be used to display NDNR basic units or division boundaries, DEQ water quality stream reaches, NRCS and USGS hydrologic units, Game and Parks Commission stream fishery resource classifications and drainage areas of stream flow gage information.

#### 9) **Nebraska Rain Assessment and Information Network (NeRAIN)**

A new program has been initiated by the Nebraska Department of Natural Resources in cooperation with the Nebraska Natural Resources Districts (NRDs). It is patterned after the Community Collaborative Rain and Hail Study (CoCoRaHS) developed through Colorado State University. It is funded through a grant from the Nebraska Environmental Trust with the Little Blue NRD acting as the project sponsor for the grant.

Through the NRDs, volunteers have been organized and trained to read "official" rain gauges (purchased using the NET grant money) and to enter this precipitation and other weather related information into a website developed by the NDNR. This information is available through the NDNR website to the public and specifically for potential use by the National Weather Service to supplement their existing network.

The initial goal is to develop a network of about 1000 volunteers to be entering information into the database on a daily basis and covering an area that encompasses the river basins of the Big and Little Blue, Republican, and the Platte above Columbus (including the Loup) river basins. This was a one-year grant and depending on the success of the program, there are tentative plans to apply for an additional grant to cover the remainder of the state. The program is less than two months old as of June 2004 and already over 400 volunteers have signed up and are trained and reporting their information to the network. NDNR has most of the presentation website in place but additional development will be ongoing this year as more information becomes available.

#### C. **PROJECT AND PROGRAM REVIEW ACTIVITY**

This activity includes both individual reviews and service on a wide variety of review and program planning committees. It includes both smaller one-time reviews of some projects and programs as well as larger longer-term types of review activity. Some of the major longer-term work activities in this category are:

- Water Policy Task Force Activity
- Nebraska Resources Development Fund Reviews
- Environmental Trust Advisory Committees
- Geographic Information System Steering Committee and Subcommittees
- Western Governor's Association Geographic Information System Council

- Climate Assessment and Response Committee
- Other Reviews

## 1) Water Policy Task Force

In 2002 the Nebraska Legislature created a Water Policy Task Force to evaluate the effectiveness of and make recommendations on any needed changes to the law governing the integrated management of surface water and hydrologically connected ground water. The legislature also asked the Task Force to make recommendations on water transfers, leasing and banking and on how to address inequities between surface water and groundwater users.

The Director of the Department of Natural Resources serves on the Water Policy Task Force and NDNR staff also administer a cash fund created for that effort. Major agency activity in support of that activity occurred during FY 2004. NDNR staff scheduled and coordinated meetings, developed a variety of briefing materials, maintained a task force website, used task force decisions to draft proposed legislative language, and provided overall administrative support and guidance to the task force.

In December 2003 the Task Force issued a report titled; "Report of the Nebraska Water Policy Task Force to the 2003 Nebraska Legislature". The report helped result in the introduction of LB 962 which made provision for implementing many of the recommendations of the Task Force. The bill was subsequently passed and enacted into law. The bill included provisions related to both water transfers and to integrated planning and management of surface and ground water.

LB 962 called for continuation of the task force through December 2004 and its duties will continue. The task force is charged with examining issues related to Nebraska laws governing the management surface water and groundwater. It is also charged with identifying options for resolution of the issues and making recommendations to the Governor and Legislature. Issues examined included:

- 1) A review of the laws of 1996, LB 108, to determine what, if any, changes are needed to adequately address Nebraska's conjunctive use management issues;
- 2) An evaluation of the utility of allowing temporary water transfers and, if deemed useful, development of draft legislation and procedures for authorizing and implementing a temporary water transfer law;
- 3) An evaluation of the utility of authorizing additional types of permanent water transfers and, if deemed useful, development of draft legislation and procedures for authorizing and implementing additional types of permanent water transfers;
- 4) A determination as to the usefulness of water leasing or transfers and development of a potential water banking system that would facilitate the temporary or permanent transfer of water uses; and
- 5) A determination as to what other ways, if any, inequities between surface water users and ground water users need to be addressed and potential actions the state

could take to address such inequities.

**2) Nebraska Resources Development Fund Reviews**

In FY 2004 four project applications/feasibility reports were reviewed. That were (1) Winslow Levee, (2) Skull Creek Site 31, (3) Upper Prairie/Silver/Moores Creek, and (4) Leigh Dam. DNR staff also provided some assistance to project sponsors during their preparation of these documents for Nebraska Resources Development Fund assistance and re-analyzed the economic feasibility of some projects due to cost increases.

**3) Climate Assessment and Response Committee**

The Climate Assessment and Response Committee (CARC) was active again in FY 2003/04 as drought conditions continued throughout much of the state for the fifth year. The western part of the state has been hit harder by drought conditions and many of the efforts of the CARC committee have been directed at that problem area. The Director of the Department of Natural Resources is a CARC member and the committee meets periodically and reports to the Governor. Reports are made as warranted by climatic conditions; including but not limited to problems caused by the lack of moisture; drought conditions; problems caused by excess moisture or flooding conditions; and other related activity like hail, wind storms, and tornadoes

One Planning and Assistance Division staff member also serves as a Co-Chair of two subcommittee of CARC; the Agricultural, Natural Resources, and Wildlife Subcommittee and the Risk Assessment Committee. A second Division staff member also serves on another subcommittee of CARC; the Moisture Availability and Outlook Committee. That subcommittee meets throughout the summer to assess conditions across the state and provide a summary of this information to the Chairman of the Climate Assessment and Response Committee.

**4) Environmental Trust Committee**

The Environmental Trust Board, of which the Director on Natural Resources is a member, has a technical advisory committee to help review grant applications. Department of Natural Resources staff assist in project application reviews. Activity levels are expected to remain limited in upcoming fiscal years. Time commitments range from no involvement some years to several days effort other years, depending on the projects submitted to the Trust. During the past year, staff reviewed 15 applications and attended the priorities colloquy to select grant priorities for the years 2005 to 2010.

**5) Geographic Information System Steering Committee and Subcommittees (Josh Lear)**

The Geographic Information System Steering Committee has adopted a number of priority initiatives for GIS application in the State of Nebraska. The Department's GIS

coordinators serve on the Committee. The development of digital orthophoto quadrangles (DOQs), vectorized soils databases and a high-resolution National Hydrographic database (NHD) have been identified as top areas of interest for Nebraska.

**6) Other Activity**

Other Planning and Assistance Division work in basic planning activity has included the acquisition, cataloging, and maintenance of Landsat TM terrain corrected data for landuse/landcover planning activities. This data is acquired from the EROS Data Center. The NDNR has Landsat data that includes complete statewide coverage for 1991-1993 and partial coverage of the state for 1997. Through the Platte River Hydrology Study the NDNR also acquired a set of Landsat MSS data from the early 1980s; this was also acquired through COHYST. This provides a historical reference from land use analysis.

**D. PROVIDE THE STATE WITH THE CAPACITY TO PLAN AND DESIGN WATER PROJECTS**

Although the activity has not been fully implemented, the State has participated in project planning activities through the Natural Resources Development Fund and recently through financial support for the Lower Platte River and Tributaries Feasibility study.

PLANNING & REVIEW PROCESS EXPENDITURES FY 03  
AND BUDGET FYs 2005-2009

	FY2004*	FY2005	FY2006	FY 2007	FY 2008	FY 2009
Lower Platte River Alliance	\$5,417	\$5,417	\$5,417	--	--	--
Platte River Cooperative Agreement	\$60,647	\$900,000	\$400,000	\$400,000	\$400,000	\$400,000
National Hydrography Dataset Expenses Other than DNR Staff (funded via grant or anticipated to be funded via grant)	\$79,703	\$70,000	\$70,000	\$30,000	--	--
Staff/Other	\$752,568	\$817,500	\$820,000	\$820,000	\$820,000	\$820,000
<b>TOTAL</b>	<b>\$898,335</b>	<b>\$1,795,417</b>	<b>\$1,295,417</b>	<b>\$1,250,000</b>	<b>\$1,220,000</b>	<b>\$1,220,000</b>
<i>LB 962 Planning and Study Expense</i>	--	<i>\$1,260,000</i>	<i>undecided</i>	<i>undecided</i>	<i>undecided</i>	<i>undecided</i>

\* Budgetary figures are based upon a roughly estimated combination of costs from a variety of NDNR divisions that work on state water planning and review process activities. In FY 2004 this included about 10.85 full time equivalent positions for part of the NDNR Planning and Assistance Division and about 3 full time equivalent positions from other portions of NDNR. With partial exceptions, computer and office expenditures are not included in the budgetary figures. These rough estimates include only the NDNR planning related budget. Also included in the Staff-Other category is estimated expense for digitizing personnel for the National Hydrography Dataset Project. Those personnel are hired by the UNL Conservation and Survey Division, officed at NDNR, and paid with grant money NDNR receives through the Nebraska Department of Environmental Quality. For that project, computer software, hardware and budget expense are included in this budget. The budget for the Platte River Cooperative Agreement includes pass through and contract funds. This includes monies to be passed through to Natural Resources Districts for their new depletions implementation efforts as well as contract monies for a land use inventory and for other process contractual assistance. For some out-years on the NHD budget amounts are based upon anticipated grants needed to complete the project rather than actual money pledged.

For FY 2005 a \$1,210,000 budgetary item for LB 962 Planning and Budgetary expense is included below the main budget, but not in the totals. A total of \$2,500,000 has been budgeted for LB 962 related expenses, but a portion of that is for implementation and incentive expense. LB 962 implementation will involve a wide variety of entities and is sufficiently different than other planning work to be broken out as a separate item.

## VI. GLOSSARY

**Digital Elevation Models** – This dataset provides electronic information about terrain elevation. It serves as a framework dataset useful in production of many other types of analyses and mapping efforts.

**Digital Orthophoto Quadrangles** – Digital Orthophoto Quadrangles (DOQs) are aerial photographs that have the properties of a map. These properties support the measurement of distances and areas and the identification of a location

**Fully Appropriated** – In LB 962 - “Sec. 53 (3) A river basin, subbasin, or reach shall be deemed fully appropriated if the department determines that then-current uses of hydrologically connected surface water and ground water in the river basin, subbasin, or reach cause or will in the reasonably foreseeable future cause (a) the surface water supply to be insufficient to sustain over the long term the beneficial or useful purposes for which existing natural flow or storage appropriations were granted and the beneficial or useful purposes for which, at the time of approval, any existing instream appropriation was granted, (b) the streamflow to be insufficient to sustain over the long term the beneficial uses from wells constructed in aquifers dependent on recharge from the river or stream involved, or (c) reduction in the flow of a river or stream sufficient to cause noncompliance by Nebraska with an interstate compact or decree, other formal state contract or agreement, or applicable state or federal laws”

**Geographic Information System** – Simply put, a GIS combines layers of information about a place to give you a better understanding of that place. What layers of information you combine depends on your purpose—finding the best location for a new store, analyzing environmental damage, viewing similar crimes in a city to detect a pattern, and so on.

**National Hydrography Dataset** – The National Hydrography Dataset (NHD) is a comprehensive set of digital spatial data that contains information about surface water features such as lakes, ponds, streams, rivers, springs and wells. Within the NHD, surface water features are combined to form "reaches," which provide the framework for linking water-related data to the NHD surface water drainage network. These linkages enable the analysis and display of these water-related data in upstream and downstream order

**Overappropriated** – In LB 962 - Sec. 53 (4)(a) A river basin, subbasin, or reach shall be deemed overappropriated if, on the operative date of this section, the river basin, subbasin, or reach is subject to an interstate cooperative agreement among three or more states and if, prior to such date, the department has declared a moratorium on the issuance of new surface water appropriations in such river basin, subbasin, or reach and has requested each natural resources district with jurisdiction in the affected area in such river basin, subbasin, or reach either (i) to close or to continue in effect a previously adopted closure of all or part of such river basin, subbasin, or reach to the issuance of additional water well permits in accordance with subdivision (1)(k) of section 46-656.25 as such section existed prior to the operative date of this section or (ii) to temporarily suspend or to continue in effect a temporary suspension, previously adopted pursuant to section 46-656.28 as such section existed prior to the operative date of this



section, on the drilling of new water wells in all or part of such river basin, subbasin, or reach.

**SSURGO Soil Surveys** - The Soil Survey Geographic Database (SSURGO) is a national dataset that will put all county soil surveys into an electronic format. This will allow soils information to be layered in conjunction with other electronic datasets as well as allow electronic access to county soil map information. The national SSURGO compilation process is being coordinated through the USDA Natural Resources Conservation Service.

**Tagged Vector Contours** – Tagged Vector Contours are elevation contours represented, in electronic format, as lines that have been attributed with elevations.

**Tagged Vector Hydros** – Tagged vector Hydros are surface water features represented, in electronic format, as lines that have been attributed with hydrographic descriptions.