

**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 the Nebraska Department of Natural Resources**

September 15, 2010

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	STATEWIDE ACTIVITIES.....	2
	A. General Planning Activities and Studies	
	1. Annual Evaluation of Hydrologically Connected Water Supplies	
	2. <u>Statewide CROPSIM and Water Supply and Demand Analysis Project</u>	
	B. Datasets/Data Gathering	
	1. Stream Gaging Program	
	2. Water Rights Digitizing	
	3. Flood Prone Area Mapping	
	4. National Hydrography Dataset	
	5. Nebraska Rainfall Assessment and Information Network	
	6. Watershed Boundary Delineation	
	7. Section Corner Database	
	C. Other Statewide Activities	
	1. Water Policy Task Force	
	2. Natural Resources Development Fund	
	3. Interrelated Water Management Plan Program Fund	
	4. Climate Assessment and Response Committee	
	5. Environmental Trust Technical Advisory Committee	
	6. Nebraska GIS Council and Subcommittees	
	7. Nebraska Environmental Trust Funded Studies	
	8. Hazard Mitigation Planning/Flood Mitigation Planning	
III.	PLATTE RIVER BASIN ABOVE COLUMBUS.....	11
	A. Integrated Water Management Activities/Integrated Management Plans	
	B. Studies, Programs, and Projects	
	1. Platte River Recovery Implementation Program	
	2. Platte Basin Habitat Enhancement Program	
	3. Platte River Cooperative Hydrology Study	
	4. Platte River Conjunctive Management Studies	
	C. North Platte Decree Implementation	
	D. South Platte Compact Activity	
	E. Gaging Activity	
IV.	LOWER PLATTE RIVER BASIN	16
	A. Integrated Water Management Activities	
	B. Studies, Programs, and Projects	
	1. Lower Platte River Corridor Alliance	
	2. Lower Platte River Cumulative Impacts Study	
	3. Elkhorn River Streambed Conductance Project	
	C. Gaging Activity	

V.	REPUBLICAN RIVER BASIN	18
	A. Integrated Water Management Activities/Integrated Management Plans	
	B. Studies, Programs, and Projects	
	1. Frenchman Valley Appraisal Study	
	2. Republican River Basin Conservation Study	
	3. Research on Estimation of Evapotranspiration from Riparian and Invasive Species using Remote Sensing, Modeling and In Situ Measurements in the Republican River Basin	
	4. Republican River Basin Water Sustainability Task Force	
	C. Gaging Activity	
	D. Republican River Compact Activity	
VI.	NIOBRARA RIVER BASIN.....	22
	A. Integrated Water Management Activities/ Integrated Management Plans	
	B. Studies, Programs, and Projects	
	1. Hydrogeologic and Hydrostratigraphic Framework for the Niobrara Basin	
	2. Conjunctive Water Use Model of the Upper Niobrara River Basin	
	C. Compact Activity	
	D. Gaging Activity	
VII.	BLUE RIVER BASIN	24
	A. Integrated Water Management Activities	
	B. Blue River Compact Activity	
	C. Gaging Activity	
VIII.	MISSOURI RIVER MAINSTEM BASIN AND TRIBUTARIES AND THE NEMAHA RIVER BASIN.....	24
	A. Integrated Water Management Activities	
	B. Studies, Programs and Projects	
	1. Missouri River Association of States and Tribes	
	2. MORAST Input Meetings	
	3. Missouri River Recovery Implementation Committee	
	4. Missouri River Ecosystem Restoration Plan	
	5. Missouri River Authorized Purposes Study	
	6. Other Missouri River Activity	
	C. Gaging Activity	
IX.	PLANNING AND REVIEW PROCESS EXPENDITURES FY 10 AND BUDGET FYs 2011-2015 (Table 2).....	26

TABLES

Table 1 - IWMPP Grants Funded Since Program Inception in 2006

Table 2 - Planning & Review Process Expenditures FY 10
and Budget FYs 2011-2015

I. 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 10 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* § 2-15,106.

Neb. Rev. Stat. § 2-15,106 provides that:

“On or before September 15 for each odd-numbered year and on or before the date provided in section 81-132 for each even-numbered year, the director shall submit an annual report and plan of work for the state water planning and review process to the Legislature and Governor. The report shall include a listing of expenditures for the past fiscal year, a summary and analysis of work completed in the past fiscal year, funding requirements for the next fiscal year, and a projection and analysis of work to be completed and estimated funding requirements for such work for the next succeeding four years. The explanation of future funding requirements shall include an explanation of the proposed use of such funds and the anticipated results of the expenditure of such funds. The report shall, to the extent possible, identify such information as it affects each agency or other recipient of program funds. The explanation of future funding requirements shall be in a form suitable for providing an explanation of that portion of the budget request pertaining to the state water planning and review process.”

This year's report is organized in a substantially different manner than previous reports and reflects the Department of Natural Resource's (DNR) transition to use of river basins and the integrated water management planning process as an organizational framework for its planning efforts. Beginning with this report, all of the staff work of DNR's Integrated Water Management Division and Planning and Assistance Division, as well as planning efforts that occur through the DNR's Floodplain, Dam Safety and Surveys Division are considered to be part of the Nebraska State Water Planning and Review Process. This means that some activities of those divisions that were not previously included in this report are now described. Those include stream gaging activity and activities supporting implementation of the North Platte Decree. Therefore, additional related budget items are also included in the report.

As in past years, implementation of the Groundwater Management and Protection Act (GMPA) has been one of the most important planning activities. The DNR expects this to be a major activity for both the DNR and the state's natural resources districts (NRDs) in the future. Two primary basin-oriented aspects of GMPA implementation are the annual evaluation of hydrologically connected water supplies, and compilation of joint integrated management plans.

Other major basin-oriented planning efforts include the Platte River Recovery and Implementation Program and the Republican River Settlement implementation.

Another focus of the State Water Planning and Review Process has been natural resources information management. Geographic Information Systems (GIS) and computer assisted data gathering, modeling, and analysis continue to be integral to the long-range planning and management of the state's water and soil resources.

Some of the information management activities discussed in this report are co-products of DNR's Management Services Division-Information Technology Section and the Planning and Assistance Division. This is a report of planning activities and includes no programmatic information about Information Technology Section initiatives. However, the Management Services Division-Information Technology Section does play a major role in the basic planning activities listed. Other divisions within the Department also participate in planning activities. The Floodplain Management and Dam Safety Division conducts floodplain planning activities and the agency's legal staff provides input on many planning activities.

II. STATEWIDE ACTIVITIES

A. General Planning Activities and Studies

1. Annual Evaluation of Hydrologically Connected Water Supplies

On December 18, 2009, the DNR published the fifth annual evaluation of the expected long term availability of hydrologically connected water supplies, titled "2010 Annual Evaluation of Availability of Hydrologically Connected Water Supplies." Statute requires that the report be completed on an annual basis by January 1 of each year. The Integrated Water Management Division staff compiled the report using a variety of hydrologic, water use, and water rights information, and other related data.

According to statute, the DNR is required to reach a preliminary conclusion about whether any additional basins are fully appropriated, beyond those previously identified as such by the DNR. A fully appropriated determination generally means that if not addressed through a planning process, conflicts will likely result between water users in the future.

In the 2010 report, the Blue River Basins, the Lower Niobrara River Basin, and Missouri Tributaries' Basins were evaluated. None of the basins, sub-basins, or reaches within those basins were determined to be fully appropriated. The DNR did not evaluate the Lower Platte River Basin pursuant to *Neb. Rev. Stat. § 46-713(1)(a)*. Basins that had previously been declared fully appropriated or overappropriated were not evaluated. The next annual evaluation will be completed no later than the end of December 2010.

2. Statewide CROPSIM and Water Supply and Demand Analysis Project

This project will outline a process and guidelines for establishing water supply and demand analyses for all regions of Nebraska. It will focus on identifying the data needs and possible connections between ground water models, surface water routing models, watershed runoff procedures and soil water balances along with reviewing and refining parts of these methodologies. One of the primary ways in which this effort could be used is to derive estimates

of available water supplies - both current and historical. The analyses may be used to support the DNR annual Fully Appropriated Basins reports, to estimate the difference between fully and overappropriated conditions, to assist in the development of Integrated Management Plan implementation projects, and other water efforts. The project has four major tasks.

Task 1 will be statewide application of the CROPSIM model. One of its outputs will be development of net irrigation requirements for up to five crops using a climate period of at least fifty years. Task 2 will review the use of the CROPSIM model for quality control purposes. Task 3 will involve retrieving surface water data, including diversion records and developing a common structure for managing data from different sources. Task 4 will include development of a framework for identifying and incorporating the best available data and methodologies for water planning purposes. The task would involve three primary components to establish the basis for a statewide framework. These include: 1) development of “water portfolios” that include development of a water balance for each region of the state, 2) preparing estimates for future scenarios, and 3) developing evaluation criteria that could be used to consider the effectiveness of management strategies.

The project involves both DNR and contractor work. An agreement has been signed and the project has a term running through June 30, 2012.

B. Datasets/Data Gathering

1. Stream Gaging Program

Beginning with this year’s Annual Report and Plan of Work, stream gaging activities will be considered to be part of the State Water Planning and Review Process. *Neb. Rev. Stat.* §§ 46-227, 61-208, and 61-209 authorize and require the DNR to measure the quantity of water in the state’s streams. DNR collects and reports flow data for streams, canal and pump diversions, and storage in reservoirs. Stream gaging is important for water administration, determining compliance with interstate compacts and decrees, and has major implications for a large number of environmental and discharge permits. In addition, near real-time streamflow information is critical during floods.

DNR operates 70 continuous stream and reservoir gages, eight partial year gages, 94 canal and canal return flow gages, and makes spot measurements or observations of stage at 42 sites operated by other agencies or districts. Twelve other gages are operated in cooperation with the U.S. Geological Survey.

At each site, streamflow is measured by two inter-related methods. First, streamflow is measured by field office personnel visiting each stream gaging site. The measurement takes approximately two hours at each site. Field personnel either use a rod-mounted flow meter while they wade the stream or a weighted flow meter lowered from a bridge or cableway. Many measurements, at various depths and at discrete locations across the stream, are combined together to determine the total discharge.

Stream flow calculated in this way and the measured water surface elevation are combined to create a rating table (or graphically, a curve). The rating curve is calibrated every one to two months at each stream gage, and more often on an as-needed basis. The rating table or curve will change depending on changing channel geometry due to scour or accretion.

Secondly, the stream water surface elevation is measured several times during each day using stationary equipment located in a gage house. These measurements have been made in the past using float systems or by measuring the pressure needed to push a nitrogen bubble out the end of a tube which is then equated to the depth below the water surface. The older floats and nitrogen-tank based systems are being replaced with small pump-based underwater bubbler systems or radar distance-finding gages located above the water surface.

Water surface elevation measurements made with the stationary equipment are typically recorded at 15-minute intervals. Water elevation information is uploaded to a centralized database using either a telephone or a satellite transmission system. Stream elevation information is converted to stream flow using a known relationship between water depth and velocity using the rating table or curve.

Significant funding is budgeted for ongoing stream gaging activities because of the importance of accurate, timely flow information. DNR has cut costs by minimizing the number of site visits needed to maintain accurate rating curves. Major funding needs during upcoming years will include the ongoing program replacing older nitrogen-tank-based water surface elevation equipment with either air pump bubblers or radar gages. Other equipment needs include the replacement of worn out or damaged metering equipment used by field personnel. The new generation of streamflow meters uses acoustic Doppler technology for faster, more accurate results.

During this year DNR created the position of Stream Gaging Policy Coordinator. This position was filled by transferring an engineer from another section in the department. The major duties of the new position include working to make the stream gaging website more responsive to user's needs, improving the database storage of stream gaging data (using the existing WISKI database), and assessment and recommendations for stream gaging hydrographer training.

DNR publishes an annual Hydrographic Report and Station List that may be found on the internet at http://dnr.ne.gov/docs/DNR_Publications.html. Additional stream flow information may be found at <http://dnr.ne.gov/docs/hydrologic.html>.

2. Water Rights Digitizing

Water rights digitizing is providing a useful agency database. The activity is carried out through the Floodplain/Dam Safety/Survey Division.

3. Flood Prone Area Mapping

This mapping activity/dataset is coordinated and primarily carried out through the Floodplain/Dam Safety/Survey Division. As of June 1, 2010, DNR and the Federal Emergency

Management Agency's contractors have produced 44 county-wide digital effective Flood Insurance Rate Maps (FIRMs). Five of them became effective between July 1, 2009, and June 30, 2010. The mapping process was underway in another 17 counties: eight preliminary; four draft and five workmaps. Two non-FEMA workmaps were completed in July and September 2009. The Division began FEMA-funded mapping in three counties (Dawes, Lancaster, and Colfax). Meetings were held to start the mapping process for Lancaster and Colfax. Four staff members participated in these meetings. Dawes County maps have been completed. In addition, meetings were held to start the mapping process for five county-wide workmaps funded by Community Development Block Grants. Three to five staff members participated in these meetings.

For this fiscal year, the Division will finish the Lancaster and Colfax maps funded in the previous fiscal year. In addition, the Division will be working on Phase III of the Coordinated Needs Management Strategy (CNMS) assessment for FEMA. The Division will also work on two physical map revision projects for the Big Slough in Howard County and Little Bazile Creek in Knox County. There may be a watershed-based mapping project funded for this fiscal year as well. FEMA's decision has yet to be finalized.

4. National Hydrography Dataset

The National Hydrography Dataset (NHD) is a dataset model developed jointly by the U.S. Geological Survey and the Environmental Protection Agency 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. It will enable spatial comparison of hydrographic data with a wide range of other data. More importantly, it will provide the basis for, or enhance the efficiency of, a wide range of potential water analysis activities. The National Hydrography Dataset data is available now for the entire state of Nebraska.

DNR is coordinating stewardship of the National Hydrography Dataset in Nebraska. In FY 10 Department staff attended a national conference designed to promote standardization of this dataset throughout the nation. An informal statewide user group of about 50 local users has been assembled to promote adoption of the dataset and to guide future dataset enhancements. This group met twice in 2010 and will meet quarterly for the next year. The National Hydrography Dataset will be continuously maintained so that it remains a current dataset and is improved as Nebraska's requirements dictate. DNR is currently engaged in a major maintenance effort to add additional functionality to the dataset. This effort is funded in part by a grant from U.S. Geological Survey. The dataset has been used as major input to a Stream Hydrology Project to determine and publish hydrologic statistics for streams of interest in Nebraska. This project helps address requests for flood-related information, including discharge, stage, and flood elevation information. The dataset is currently being used as a framework to manage a variety of DNR datasets including: water rights, dams, gages, and other water-related data.

5. Nebraska Rainfall Assessment and Information Network (NeRAIN)

This program was initiated by DNR in cooperation with the natural resources districts in early 2004. It was funded in part through a grant from the Nebraska Environmental Trust and is

patterned after the Community Collaborative Rain and Hail Study (CoCoRaHS) developed through Colorado State University. However, most of the participating natural resources districts have added it to their budget so NeRAIN would be maintained into the future. One goal of the project is to have one volunteer in every township in the rural areas of Nebraska and one per every square mile in the urban areas. It is all internet-driven with the website housed on the DNR website at <http://dnrdata.dnr.ne.gov/NeRAIN/index.asp>.

The NeRAIN network of volunteers spans all of Nebraska and between 800 to 900 volunteers entered data during this past year. In addition to maintaining the database and website on a daily basis, efforts are now being made to upgrade the server that distributes maps and reports of the data. This will require a re-write of several of the web pages to support new technologies that are available.

6. Watershed Boundary Delineation

This project to delineate the watersheds of Nebraska was actually started in the late 1980s and completed in the mid 1990s. Since that time, there have been three updates to improve the quality based on new technology. The latest update started in 2003 with the initial phase finished in 2005. This latest update brings the database into compliance with national standards.

The final phase of edgematching with the surrounding states is complete for the lower 48 states and the database has been nationally certified for this area. The only future work on this project will be update maintenance if any problems are noted by users.

7. Section Corner Database

Legal sections are widely used for administration of lands and critical to proper legal description of property boundaries, as well as locating surveying monuments. This makes a spatial dataset showing approximate legal sections a fundamental tool for any administrative agency. The original database was started in the early 1980s using processes and data that were available at that time. Since then, many technologies have improved dramatically and data are available now that haven't been previously. Consequently, the old data needs to be updated to current standards.

In recent years, the Section Corner Database has been used internally for several projects and as it has been used, the accuracy has been improved. The improved information has not been incorporated into the original database. A proposed project for the upcoming year is to develop standards for data improvement, and to merge the corrected data into the database. Metadata must also be developed and the process documented to provide necessary information for anyone wishing to use the information in the future.

C. Other Statewide Activities

1. Water Policy Task Force

In 2002 Nebraska 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 groundwater. 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 contributed to the introduction of LB 962, which made provisions for implementing many of the recommendations of the Task Force. The bill was subsequently passed and enacted into law. The task force held its final meeting on October 20, 2009, and was dissolved on December 31, 2009, under statutory sunset provisions.

2. Nebraska Resources Development Fund

The Nebraska Resources Development Act of 1974 created the Nebraska Resources Development Fund (NRDF) to assist with development and wise use of Nebraska’s water and land resources. The NRDF can be used to provide grants or loans to political subdivisions of the state or an agency of the state.

During FY 10, the Nebraska Natural Resources Commission (the Commission) met six times. U.S. Army Corps of Engineers 404 permits are difficult to obtain and are keeping several projects from starting construction. The Nebraska Legislature reduced funding to the Nebraska Resources Development Fund after a special session met in fall 2009. In addition to reducing the FY 10 appropriation, the legislature also reduced re-appropriation (\$2.1 million previously distributed to the fund). The Commission was forced to revoke money obligated to projects, which ultimately necessitated revocation of two projects’ allocations in order to stay in compliance with the \$18.5 million cap between total fund allocations and obligations. As a result, projects are or will be operating on borrowed capital until the Nebraska Resources Development Fund can catch up. One additional application was filed by the Nemaha Natural Resources District requesting \$1.3 million of cost share assistance for the Buck and Duck Creek Watersheds project near Peru, Nebraska.

Five projects requested FY 11 obligations. The general fund appropriation of \$3.14 million was insufficient to meet that demand. After conducting project reviews and hosting a project sponsor review and input meeting, staff submitted a recommendation for FY 11 funding, which the Commission later affirmed. One project, Western Sarpy/Clear Creek received notice from the U.S. Army Corps of Engineers that bids received had exceeded projections by \$8.148 million. The Resources Development Fund share of the local project sponsor’s share of the increase was nearly \$1.667 million. The Commission was only able to grant a little over \$954,000 due to limitations imposed by the \$18.5 million cap.

3. Interrelated Water Management Plan Program Fund

The Interrelated Water Management Plan Program (IWMPP) was created in 2006 with the passage of LB 1226, Section 20. This grant program is intended to facilitate the duties of natural

resources districts arising under the Nebraska Ground Water Management and Protection Act, and to help offset costs incurred in performing those duties. Guidelines were adopted on July 13, 2006, and revised in November 2006; July 2007, November 2007; January 2009, and November 2009.

Guidelines state that multi-year projects previously funded by the program shall have priority in the allocation of each year's available funds. After individual project reviews focusing on planned work schedule, budget, and billing timing, staff determined that \$1,759,565 was needed to continue work on previously funded projects during FY 2011 (July 1, 2010, through June 30, 2011). Six applications were filed to start new studies across the state. After nine DNR staff members and eight non-staff volunteers independently reviewed the FY 2011 applications, the applications were scored as outlined in the guidelines and ranked accordingly. The Commission approved the six new applications and budgeted \$396,547 for FY 11. The Commission committed a total of \$2,156,112.

Overall, the Commission has approved 35 projects since the program was initiated in 2006. Those projects are natural resources district efforts and not efforts of the DNR. However, in some instances DNR has also significantly participated in the studies, and those instances are noted elsewhere in the report. Because the studies have planning implications and are from funding that passes through the Natural Resources Commission and DNR, a list of studies from 2006 to date follows as Table 1.

Table 1.
Application
Number

IWMPP Grants funded since program inception in 2006

1	Blue Basin Ground Water Model
2	Characterization of Near-Surface Lithologies under Selected Irrigation Canals within the North Platte Valley, Western Nebraska, Using Geophysical Methods
3	Eastern Nebraska Water Resources Assessment
4	Elkhorn-Loup Modeling Study
5	Ground Water Mound Geology & Water Level Data Collection
6	Magnetic Resonance Sounding for Ground Water Aquifer Detection
7	Measuring Components of the Hydrologic Water Budget on Different Landscapes in the CPNRD
8	Nemaha NRD IWMPPF Request
9	Remote Sensing Technology to Produce Consumptive Water Use Maps for the Nebraska Panhandle
10	Republican River Augmentation Appraisal
11	Republican River Basin Riparian Management Study and Demonstration
12	South Platte River Compact Water Project
13	Water Banking
14	Middle Platte Ground Water Modeling
15	Lower Platte North NRD Sub-area Delineation Study
17	Lower Salt Creek Aquifer Ground Water Modeling Project
18	North Platte NRD Water Management Simulation and Optimization Analysis
19	Recharge Estimation Across the Central Platte River Basin
30	Republican River Augmentation Engineering Study
31	Characterization of Near-Surface Lithologies under Selected Irrigation Canals within the North Platte Valley, Western Nebraska, Using Geophysical Methods
32	Western Water Use Management Model
33	Conjunctive Water Use Model of the Upper Niobrara River Basin
34	Development of a Conjunctive Water Management Plan for the Platte Valley
35	Dedicated Observation Well and Geologic Data Network
36	Elkhorn-Loup Modeling Study Phase III
37	Eastern Nebraska Water Resources Assessment I
39	Republican River Basin Water Balance Study
40	Lewis & Clark NRD Aquifer Study
41	Measuring Components of the Hydrologic Water Budget on Different Landscapes in the CPNRD
42	Water Accounting GIS
43	Platte River Riparian Evapotranspiration Comparison
44	Economic Implication of Reduced Ground Water Allocations in the Nebraska Panhandle and Educational Programming to Improve Management with Less Water
45	Hydro-Geologic Study for Groundwater Management Plan Evaluation
46	Recharge Estimation across the Central Platte River Basin
47	Lodgepole Creek Flow Evaluation
48	Identifying Difference Over to Fully Appropriated
49	Stream Aquifer Relationships in the Elkhorn River Basin

4. *Climate Assessment and Response Committee*

The Climate Assessment and Response Committee (CARC) was active again in FY 09-10, although the drought conditions that had plagued the state only a few years ago were largely absent and flooding was a significant problem in the final portion of the fiscal year. The Director of DNR is a committee 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; problems caused by excess moisture or flooding conditions; and other related activity like hail, wind storms, tornadoes, and snow storms. The CARC met twice in the past fiscal year and no major action took place.

5. *Environmental Trust Technical Advisory Committee*

The Nebraska Environmental Trust Board, of which the Director of DNR is a member, has a Technical Advisory Committee (TAC) to help review grant applications. DNR staff provide assistance in project application reviews. Three staff members reviewed project applications following the September 8, 2009, application deadline. DNR TAC members commonly receive five or fewer applications each to review. Activity levels are expected to remain about the same in upcoming fiscal years.

6. *Nebraska GIS Council and Subcommittees*

The Geographic Information System Steering Committee has been reconstituted as the Nebraska GIS Council (Council) under the Nebraska Information Technology Commission. The Council has adopted a number of priority initiatives for geographic information systems applications in Nebraska. The DNR's geographic information systems coordinator serves on the Council.

Over the last year, the council has focused its planning efforts on the development of Light Detection and Radar (LIDAR) topographic data, new aerial imagery, the Nebraska Map, the National Map Initiative, a statewide street centerline-address dataset, land record modernization, and archival of old imagery and historical maps. Most recently, the Council has been attempting to set up a state GIS Services bureau to make GIS data and services available to a wider variety of users.

7. *Nebraska Environmental Trust Funded Studies*

In addition to the above activities, DNR has received Nebraska Environmental Trust grants for three separate projects. Each of those projects addresses research or educational needs closely related to the DNR's integrated water management activities. In each instance DNR has signed agreements with the University of Nebraska to complete the work. The grants include a \$215,000 award for "Enhancing the Value of Water through Management Education," which is a joint effort between Nebraska's center pivot manufacturers and the university to provide education on optimal water use. That project is scheduled for completion by June 30, 2011. A project entitled "Riparian Vegetation Impacts on Water Quantity, Quality, and Stream Ecology" has received a grant award of up to \$423,960 and is to be completed by December 31, 2010. Also funded was a

project entitled “Quantifying Evaporation, Crop Evapotranspiration, and the Water Balance for Tilled and Untilled Fields.” The grant award is expected to total \$674,160 over three years, with project completion expected by June 30, 2011.

8. Hazard Mitigation Planning/Flood Mitigation Planning

As reported last year, the main driver for hazard mitigation planning in Nebraska was the new years’ ice storm which took place in December 2006/January 2007. In order to get as much population covered by a hazard mitigation plan with their limited resources, the priority of the Nebraska Emergency Management Agency has been to promote multi-jurisdictional plans for counties and natural resource districts. These plans have been and are being completed by private consultants with the DNR taking an assistant role. Many of the multi-jurisdictional plans mentioned last year have been completed or are in the final review stage with the Federal Emergency Management Agency (FEMA). Any community or county which participated in and has an approved plan will be eligible for the mitigation funding which will become available as a result of the June flooding. The panhandle counties, which were mentioned in last year’s report as being the only ones not in the process of completing a plan, will be starting the planning process as soon as the FEMA grant funding becomes available. The DNR continues to offer technical assistance to any entity interested in making an application for flood loss mitigation planning and projects.

III. PLATTE RIVER BASIN ABOVE COLUMBUS

A. Integrated Water Management Activities/Integrated Management Plans

The Upper Platte River Basin lies within six natural resources districts (NRDs), including the Central Platte, North Platte, South Platte, Tri-Basin, Twin Platte, and Upper Big Blue NRDs. Areas of these NRDs were designated fully and/or overappropriated after the passage of LB962 in 2004. In addition to an overappropriated basin-wide plan for areas upstream of the Kearney Canal Diversion, each NRD is also required to have an individual integrated management plan (IMP), which should address both the fully appropriated and overappropriated areas.

The Platte River Recovery and Implementation Program (PRRIP) has been an important consideration in shaping the goals and objectives of the Basin-Wide Plan. One of PRRIP’s purposes is to mitigate the adverse impacts of certain new water-related activities through the implementation of state and federal depletions plans. Nebraska is charged with getting back to a July 1, 1997, level of development of water use and associated river depletions. New or expanded uses that result in streamflow depletions must be offset. There may be additional increments to address any remaining difference between an overappropriated and fully appropriated condition.

The DNR and these NRDs completed IMPs for both the fully appropriated and overappropriated areas in 2009. The South Platte NRD adopted an integrated management plan in 2008, which was modified in 2009 to conform with the Basin-Wide Plan. The IMPs contain the current best estimate of the balance of post-1997 depletions and accretions to the Platte River and the

framework that provides the necessary measures to offset the remaining depletions within the IMP's first increment.

The Platte River Basin IMPs also contain a comprehensive program of monitoring and studies that are designed to assess the success of the IMPs and guide any modifications or improvements that may be necessary. The monitoring process will be used to determine the impacts of users on the water supply (both within the NRDs and basin-wide), to ensure that local priorities are represented, and to evaluate the long-term effectiveness of the IMPs. As part of agency integrated management planning activities, a DNR staff member was one of three co-authors of a September 2009 report entitled "Preliminary Estimate of Historical Stream Flow Reductions in the Overappropriated Portion of the Platte River in Nebraska." That report was prepared at the request of the Basin-Wide Stakeholder Group.

The hydrologically connected waters of the Platte River Basin also extend into the Upper Big Blue NRD. The DNR and Upper Big Blue NRD have developed goals and objectives, defined a management area sufficient to meet the goals and objectives, drafted controls, and developed a plan to monitor activities in the management area and further develop existing tools to refine management capabilities in the future. The DNR and the NRD conducted a stakeholder meeting, and based on comments received, the DNR and NRD believe the plan is adequate to begin the formal hearing process relating to the draft plan. The hearing, testimony evaluation and adoption of the plan are expected to be completed before the end of 2010. Implementation tasks relating to the plan will then begin.

B. Studies, Programs, and Projects

1. Platte River Recovery and Implementation Program

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 and Lower Platte River Basins. In October 2006, Nebraska Governor Heineman signed the formal document agreeing to the Platte River Recovery and Implementation Program (PRRIP). Since October 2008, the Integrated Water Management Division has provided major assistance to the Director in coordinating and conducting agency PRRIP efforts. Personnel from both the Nebraska Game and Parks Commission and the Nebraska Department of Environmental Quality are also carrying out work related to this project when their respective areas of expertise are relevant to the specific work tasks.

All PRRIP activities are overseen by a Governance Committee (GC) with representatives from ten federal, state, and local entities: U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, State of Colorado, State of Nebraska, State of Wyoming, downstream water users, South Platte water users, Upper North Platte water users, and two environmental groups.

PRRIP's first increment objectives are to reduce stream flow shortages to the U.S. Fish and Wildlife Service "target flows" by 130,000 to 150,000 acre-feet per year at Grand Island and protect, restore and maintain at least 10,000 acres of land habitat for endangered species in the

Lexington to Chapman reach of the river. The GC has moved forward with efforts in obtaining land and water. To date more than 6,000 acres have been acquired. In the area of water the GC has signed memorandums of agreement with various water action plan project sponsors and is in the process of conducting various feasibility studies on water action plan projects. In addition, PRRIP outlines a process in an adaptive management plan to test various hypotheses developed and prioritized by the GC members. Many monitoring and research aspects of the adaptive management plan are currently being implemented.

The responsibility of Nebraska under PRRIP is to mitigate, offset, or prevent any new depletion to the river's target flows and state protected flows as part of the proposed program. This responsibility is defined in Nebraska's New Depletions Plan and is shared between the State of Nebraska and the natural resources districts. The Cooperative Hydrology Study (COHYST) models have been used to estimate the level of depletions caused by new groundwater irrigation uses that were begun between July 1, 1997, and December 31, 2005. In general, these are the depletions that Nebraska has committed to offsetting. If water action plans can be readied quickly enough, some FY11 contract funds may be used to contribute to implementation of those plans for purposes of assisting Nebraska in meeting offset obligations under the New Depletion Plan. Efforts are still being made to determine the effects of depletions caused by effects of other new uses.

2. *Platte Basin Habitat Enhancement Project*

The Platte Basin Habitat Enhancement Project (PBHEP) was established to provide an added solution to help landowners in the Platte River Basin meet the region's water needs, both for wildlife and for the state's valuable agricultural economy. PBHEP is designed to help landowners make transitions that can maintain economic health while reducing depletions to the river. The sponsors of PBHEP include the DNR, Central Platte NRD, North Platte NRD, South Platte NRD, Tri-Basin NRD, Twin Platte NRD, and the Nebraska Game and Parks Commission. PBHEP is funded in part through a grant from the Nebraska Environmental Trust (NET). The Farm Bureau, the Nature Conservancy, and the Whooping Crane Trust are PBHEP partners.

Funding for the first three years of PBHEP will be \$16,143,700. The DNR will contribute \$6,023,000, NRDs will contribute \$6,765,200, NET will contribute \$3,000,000, the Nebraska Game and Parks Commission will contribute \$325,500, and the partners will contribute \$30,000. Half of the NET grant was awarded in February 2009. The grant has been approved for 2010 and is expected to be granted in 2011.

In a cooperative effort to further the funding and goals of the Platte Basin Habitat Enhancement Program, the DNR and five NRDs applied for a partnership under the Agricultural Water Enhancement Program (AWEP) administered through the Natural Resources Conservation Service. In July 2010 the Ogallala/Platte Recovery AWEP was awarded \$2 million in federal funds for 2010. The partnership would be used to reduce water consumption in the critical habitat area of the Platte Basin through the conversion of agricultural land from irrigated farming to non-irrigated land uses. State and local partner funds would be used to extend the conversion into perpetuity. The proposal was for a multi-year program that would ultimately involve \$10 million in federal funds and \$9 million in state and local funds over a five year period.

3. Platte River Cooperative Hydrology Study

The Platte River Cooperative Hydrology Study (COHYST) has assessed its goals and revised them in an updated operating plan that serves to expand its present capabilities to more fully meet the management needs of the basin. This renewed effort is known as COHYST 2010. The focus of COHYST 2010 is development of modeling tools capable of providing annual representation of a closed (measurement constrained) water budget in the Platte River Basin in Nebraska upstream of Columbus, Nebraska and downstream of Lake McConaughy. This study supports the integrated management planning process, and involves the DNR, three natural resources districts, two power districts, and the Nebraska Game and Parks Commission. Funds for the project come from the Nebraska Environmental Trust, the involved parties, and in-kind services provided by the parties.

The DNR is active at all levels of the study. The DNR utilizes its staff members to develop planning documents and contracts, examine the technical accuracy of modeling work, design and maintain databases, provide model design and construction, provide technical reviews, evaluate software, and provide educational seminars in support of the COHYST study. In addition in FY 11 it is anticipated that there will be contract work to update Platte Basin land use and consumptive water use to 2010. This is especially needed in areas downstream of Lake McConaughy.

The Cooperative Hydrology Study data and models are expected to provide the foundational development for the Platte River Conjunctive Management Study for the reach from Lake McConaughy to the Loup River confluence.

4. Platte River Conjunctive Management Studies

Efforts to optimize the availability of water through conjunctive management are being investigated through two separate projects. The first project is being conducted through an interlocal agreement between the DNR, the Central Platte NRD, the Twin Platte NRD, the Nebraska Public Power District, and the Central Nebraska Public Power and Irrigation District. The goal of this project is to identify strategies for conjunctively managing surface water flows and groundwater withdrawals in the Platte Basin downstream of Lake McConaughy to the confluence with the Loup River with a more specific focus in the areas within Dawson County and near Western Canal. The DNR has contributed financially to consultant efforts and provided considerable staff support to assist with development of the following tool sets: 1) a surface water model capable of being integrated with the groundwater model, both developed in collaboration with COHYST under the COHYST 2010 plan of work, 2) an economic analysis tool for the Central Platte, and 3) a water quality analysis tool for the Central Platte. Consultants, as well as DNR staff members, contribute to study management.

The second project is being conducted through an interlocal agreement between the DNR, the North Platte NRD, and the South Platte NRD. The goal of this project is to identify strategies developed through a Management Options Plan. It will focus on the area in the Platte River Basin upstream of Lake McConaughy to the Wyoming state line. The DNR will provide staff

support to assist with redevelopment of the Western Unit of the COHYST groundwater model and review other aspects in the development of surface water operations models.

These studies are expected to assist in both integrated management activity and in meeting the requirements of the Platte River Recovery and Implementation Program.

In tandem with the conjunctive management study the DNR contracted with HDR to develop a spreadsheet tool to examine the water available for appropriation in the Platte River, develop a surface water leasing document and associated documents, and to perform a conceptual design of conjunctive management using Western Canal as the example location. This project is funded by an ARRA grant received by the Nebraska Department of Environmental Quality.

5. Lodgepole Creek Flow Evaluation

This project supports efforts to refine management objectives for the first ten year increment of the South Platte NRD Groundwater Management Plan as well as studies the feasibility of augmentation to support meeting those management objectives. The South Platte NRD is the project sponsor. The project has received an Interrelated Water Management Plan Program Fund grant, and DNR is also separately contributing funding and staff time to the project.

C. North Platte Decree Implementation

The U.S. Supreme Court issued the North Platte Decree in 1945 in response to a lawsuit commenced by the State of Nebraska against the State of Wyoming in 1934. The Decree apportioned the North Platte River among Colorado, Wyoming, and Nebraska. The Decree was amended in 1953 to include the construction of Glendo Dam and Reservoir. In 1986, the State of Nebraska filed suit against the State of Wyoming. Later, Colorado and the United States again became parties to the renewed litigation, the lawsuit was resolved through a settlement finalized in March of 2001. To implement the settlement, the North Platte Decree Committee was created (NPDC) in 2001 to assist the states in monitoring, administering, and implementing the modified decree. Nebraska, Colorado, Wyoming, and the U.S. Bureau of Reclamation are parties to the NPDC.

The NPDC meets at least twice each year, typically in April and October. The NPDC focuses on implementing the water administration, reporting, and research activities outlined in the modified decree. These activities include various methods to estimate the consumptive use of irrigation water in Wyoming such as, collecting weather data, estimating evapotranspiration of irrigated crops, stream gaging, producer practice surveys, estimating groundwater pumping and surface water diversions, tracking irrigated acres, etc. The goal of these activities is to track and further refine estimates of annual water usage in Wyoming. This assists in tracking the decree mandated apportionment of water supplies between Wyoming and Nebraska.

D. South Platte Compact Activity

The South Platte Compact was signed by Nebraska and Colorado in 1923. It divides and apportions the water of the South Platte River and Lodgepole Creek among the states. The

compact restricts use by Colorado appropriators located in the lower section of the river above the Colorado and Nebraska Stateline. Colorado appropriators that are junior to the Western Irrigation District's water right of June 14, 1897, are restricted from use when the flow at the stateline is below 120 cubic feet per second (cfs) during the irrigation season from April 1st through October 15th.

The DNR Bridgeport Field Office monitors the flow at the Colorado Nebraska Stateline on a daily basis during the compact established irrigation season. If flows during the irrigation season drop below the established 120 cfs, the Bridgeport Field Office supervisor coordinates with the Colorado Division of Water Resources to have a joint inspection of the irrigation diversion sites in the lower section of the South Platte River. The joint inspection is completed by staff from the Bridgeport Field Office and the Colorado Division of Water Resources to ensure that Colorado is complying with the compact.

E. Gaging Activity

In the Upper Platte River Basin, the DNR operates 13 stream gages and uses information from an additional three gages operated by the U.S. Geological Survey.

During June 2010, a significant amount of effort was expended monitoring high flows (including some flooding) on the North Platte River and its tributaries.

IV. LOWER PLATTE RIVER BASIN

A. Integrated Water Management Activities

The Lower Platte Basin covers seven NRDs, including the Lower Elkhorn NRD, Lower Loup NRD, Lower Platte North NRD, Lower Platte South NRD, Papio-Missouri River NRD, Upper Elkhorn NRD, and the Upper Loup NRD. At this time, no portion of the Lower Platte River is designated as fully appropriated. The DNR will continue to evaluate the Lower Platte River Basin annually as required by statutes.

The basin was preliminarily determined to be fully appropriated in December 2008, then DNR made a final determination in April 2009 that the basin is not fully appropriated. Recent additions to the Groundwater Management and Protection Act require that when a reversal of a preliminary determination of fully appropriated occurs, the NRDs must develop rules and regulations that limit the development of groundwater irrigated acres and the DNR must limit the development of surface water irrigated acres in a manner that ensures the basin will not be determined to be fully appropriated based on the most recent annual evaluation conducted by the DNR. These restrictions apply for a minimum period of four years. Additionally, the DNR may forego the previously required annual evaluation of the basin over that same four-year period. The DNR did not evaluate the Lower Platte Basin in the 2010 evaluation.

Concerns over habitat for threatened and endangered species prompted the Nebraska Game and Parks Commission (NGPC) to apply for instream flow appropriations from the Department in 1993. The NGPC was granted two instream flow appropriations in the basin, one near North Bend and the second near Louisville. These two appropriations are administered by the DNR,

thereby causing closure of appropriators junior to the instream appropriations. Additionally, the NGPC recently released a biological opinion that no further degradation of the hydrograph can occur with the basin. The DNR and other various state and federal agencies have been working with the NGPC to develop potential reasonable and prudent alternatives that may allow for future water development in the basin.

B. Studies, Programs, and Projects

1. Lower Platte River Corridor Alliance

The Lower Platte River Corridor Alliance (LPRCA) was created in 1996 through an interlocal agreement. It is a consortium of three natural resources districts (Lower Platte North, Lower Platte South, and Papio-Missouri River NRDs) and six state agencies. Their mission is “to foster the development of locally drawn strategies, actions, and practices to protect, enhance, and restore the vitality of the river’s resources.”

Currently, the LPRCA is working on several projects, including the Camp Ashland River Obstruction Removal Project, the Lower Platte River Corridor Environmental Sustainability Assessment, the Lower Platte Cumulative Impact Study, and a proposal to add Shell Creek to the LPRCA WQ Monitoring Network. The Alliance meets on a quarterly basis. Although the NDNR continues to participate in Alliance meetings, in recent years it has discontinued paying dues and expends minimal staff time for Alliance related activities.

2. Lower Platte River Cumulative Impacts Study

The purpose of the Lower Platte River Cumulative Impacts Study is to study the cumulative effects of activities and practices in the Lower Platte River Corridor over time. Phase I (Scope Development) was completed in August 2005. Phase II consists of acquisitions of aerial photos and transect data for six time periods (1850, 1938, 1950s, 1970s, 1993, and 2003), land classification, a hydrologic study examining changes in the river over time, and the development of an online mapping service to access the GIS information. Phase III is for watershed studies, particularly focused on ecosystem restoration and exploration of opportunities for predictive modeling along the Lower Platte River. It may help in predicting the impact of future projects, such as levees, on the river corridor. The USGS portion of the work includes sediment sampling, GIS cross-sections of the river, and sediment analysis. It also includes a GIS analysis with completion due by November 30th. Other portions of Phase III are not yet underway. The DNR has no monetary and minimal contractual staff involvement in this study and consequently future annual reports are expected to include minimal information on this effort.

3. Elkhorn River Streambed Conductance Project

The Elkhorn River Streambed Conductance Project is an effort initiated by the Lower Elkhorn NRD and the DNR in June 2007 with work being conducted by University of Nebraska-Lincoln researchers. The DNR has obligated \$42,000 to the project. Its objectives are: 1) to determine the architecture of the channel sediments in the Elkhorn River and its tributaries from which the streambed thickness will be determined; 2) to determine the vertical hydraulic conductivity of

the channel sediments from the top to the depth of up to 50 ft; and 3) to quantify the hydrologic relations between rivers and their adjacent aquifers. The project is currently scheduled for completion by September 30, 2010.

C. Gaging Activity

In the Lower Platte River Basin DNR does not operate stream gages on the Platte River. However, DNR does make use of five gages operated by the U.S. Geological Survey (USGS).

On the Elkhorn River and its tributaries DNR operates 12 gages and the USGS operates seven gages. During June 2010, a significant amount of stream gaging equipment was damaged or required relocation due to flooding of the Elkhorn and Loup River systems.

On the Loup River and its tributaries DNR operates 11 gages, including the Loup River Power Canal return. The USGS operates an additional 11 gages in the Loup River Basin.

V. REPUBLICAN RIVER BASIN

A. Integrated Water Management Activities/Integrated Management Plans

The Republican Basin NRDs, which include the Lower, Middle, and Upper Republican NRDs, were declared fully appropriated after the passage of LB962 in 2004. These NRDs, in cooperation with the DNR, implemented IMPs for the period 2005 - 2007. IMPs and complementary rules and regulations implemented by the NRDs and DNR were put in place to govern the use of hydrologically connected waters in the basin. These IMPs represent a blueprint for sustainable water management in the Republican River Basin and facilitate Nebraska's compact compliance. *Neb. Rev. Stat.* § 46-715 (4)(b) dictates that the regulatory measures in an IMP must "be sufficient to ensure that the state will remain in compliance with applicable state and federal laws and with any applicable interstate water compact or decree"

The original IMPs for the Republican River Basin lasted from 2005 to 2007 and required a pumping reduction of 5% from a representative baseline period (1998 - 2002). The IMPs limited the depletions by groundwater users within each NRD to the NRD's fixed percentage of Nebraska's total allowable Computed Beneficial Consumptive Use (CBCU) for groundwater (CBCUg) in the basin. The NRDs in the basin previously agreed to limit their groundwater to the following shares of Nebraska's CBCUg: 26% for the Lower Republican NRD, 30% for the Middle Republican NRD, and 44% for the Upper Republican NRD. This requirement ensures compact requirements will be met under any and all water supply conditions that may occur in the basin.

During 2007 and early 2008, the DNR, in conjunction with the NRDs, adopted revisions to their original IMPs. The second-generation IMPs in the Republican River Basin were originally adopted to be effective during the five-year period from 2008 to 2012. These IMPs increased the target pumping reduction to 20% from the baseline period (1998 - 2002).

In other words, the IMPs required the NRDs to take actions to reduce groundwater pumping in their respective districts in order to meet a consumptive use reduction of 20% from the 1998-2002 pumping level. Like the original IMPs, the second generation IMPs also limited each NRD's allowable groundwater depletions to the NRD's fixed percentage of Nebraska's total allowable CBCUg.

Two events led Nebraska to begin a new round of revisions on the current IMPs. First, the arbitrator recommended that Nebraska implement additional regulations for water-short years in his final order on June 30, 2009. Second, the litigation over funding provided by LB701 (2007) stalled any viable non-regulatory management options in the basin. These events spurred a new effort by the NRDs and the DNR to agree to additional regulatory measures to be incorporated into the existing IMPs. The additional regulations would be necessary only when the state is at risk of exceeding water use allowed under the compact, primarily during water short year administration.

Over the past year, the DNR and the NRDs worked together to determine viable options for additional dry-year regulatory controls in the IMPs. Significant steps were taken to develop dry year forecasting procedures and potential controls which could be implemented. Based on initial public comments, a choice was made to work toward implementing plans that would leave pumping allocations close to the current levels for normal to wet years, but require management action be taken sufficient to offset any potential overuse, or in the alternative, require curtailment of pumping.

In August 2010, the Upper Republican NRD, Middle Republican NRD and the DNR adopted revised joint integrated management plans for those Districts.

B. Studies, Programs, and Projects

1. Frenchman Valley Appraisal Study

The Frenchman Valley Appraisal Study was a cooperative effort with the U.S. Bureau of Reclamation to develop and evaluate alternative water management scenarios in the study area. One goal of the study was to optimize the economic and environmental benefits of the water resources in the area. The most recent draft study report was completed in July 2009 and has been awaiting incorporation of final changes and federal approval. Participants in the study process include the U.S. Bureau of Reclamation, the DNR, Frenchman Valley and H & RW irrigation districts, the Upper Republican NRD, the Middle Republican NRD, and the Nebraska Game and Parks Commission. Study objectives include:

- Optimize economic benefits of irrigation to the study area, including surface water and groundwater irrigation,
- Optimize economic benefits of Enders Reservoir for recreation, fish, and wildlife,
- Evaluate environmental benefits and values of recreation, fish and wildlife, and water quality to the study area,
- Evaluate economic benefits of flood control provided by Enders Dam,

- Provide alternative water management scenarios to aid partners/stakeholders in future planning, and
- Minimize adverse environmental impacts.

2. Republican River Basin Conservation Study

The Final Settlement Stipulation (FSS), which was approved on May 19, 2003, required the States of Kansas, Nebraska, and Colorado to form a Conservation Committee. The FSS required the Conservation Committee to develop a proposed study plan by April 30, 2004, to determine the quantitative effects of non-federal reservoirs and land terracing practices on water supplies in the Republican River Basin above Hardy, Nebraska. In January 2003, each state and the United States appointed individuals to represent them on the Conservation Committee. The committee members developed a study plan and transmitted it to members of the Republican River Compact Administration (RRCA). The RRCA approved the study plan in July 2004.

The Republican River Basin Conservation Study consists of four primary components:

1. Evaluation and modification of existing models
2. Development of databases
3. On-the-ground verification
4. Application of the water balance and GIS models

The FSS specifies that the states and the United States will spend no more than one million dollars, of which the United States will be responsible for 75 percent and each state will be responsible for one third of the remaining 25 percent (\$83,333 per state). The states' portions may be provided entirely through in-kind contributions. If the cost of the study exceeds one million dollars, the United States will be responsible for the entire additional amount.

Nebraska has provided in-kind contributions toward the study by selecting sites, assisting with installation of the equipment for monitoring the operation of 20 reservoirs, and by assisting with other work related to the study. Nebraska conducts site visits to the 20 reservoir sites at least twice per year to download water level recorder data and to collect water surface perimeter data using GPS. Nebraska has surveyed these (and other non-federal) reservoirs to produce area-capacity tables. Nebraska has contributed approximately \$191,000 of in-kind services toward the study from the date of approval of the study on July 27, 2004, through March 30, 2010. The total cost of the study was originally estimated to be \$1,000,000, with the Bureau of Reclamation providing 75 percent of the funds and the states dividing the remaining 25 percent equally, or approximately \$83,333 per state. The final cost will be somewhat higher due to an expanded scope of work. The project has run long; the original due date was mid-2009; it is hoped that a near-final draft will be completed during 2010.

3. Research on Estimation of Evapotranspiration from Riparian and Invasive Species Using Remote Sensing, Modeling and In Situ Measurements in the Republican River Basin

The Department of Natural Resources plans to use the results from this study to: 1) determine if the removal of invasive species will result in a reduction of long-term evapotranspiration (ET) from riparian systems and 2) develop methods to estimate monthly and annual riparian vegetation ET throughout the Republican River Basin. Methods to relate ET from riparian systems to groundwater levels and water supplies are also sought to improve groundwater modeling. The study is being funded through DNR, has a budget of \$1,060,485 and is expected to be completed by June 2011. Study efforts are being led by the Department of Biological Systems Engineering at the University of Nebraska-Lincoln.

4. Republican River Basin Water Sustainability Task Force.

LB 1057 was passed in the 2010 session of the Nebraska Legislature and created a 26 member Republican River Basin Water Sustainability Task Force. The purposes of the task force are to define water sustainability for the Republican River Basin, develop and recommend a plan to help reach water sustainability in the basin, and develop and recommend a plan to help avoid a Water-Short Year in the basin. The task force contains membership from a number of basin interests. Members were appointed by Governor Heineman and first met on June 23, 2010. The task force is housed within the DNR for administrative and budgetary purposes only. It is charged with presenting a preliminary report to the governor and the legislature on or before May 15, 2011, and a final report before May 15, 2012. It has a total two year budget of \$50,000. That funding comes through the Water Resources Cash Fund and is not included in the budgetary total in this report.

5. *Republican River Basin Conjunctive Management Study*

The Republican River Conjunctive Management Study is expected to proceed in two phases. Phase I is the development of hydrologic tools, such as surface water operations and runoff models. Phase II of the study focuses on the development of conjunctive management scenarios, evaluating those scenarios to assess the hydrologic and economic implications, and developing a plan for implementation. The second phase is likely to be in part dependent upon a NET grant application being made specifically for that portion of the study. The DNR and Republican River Management Districts Association are expected to contribute to this effort. Should all funding become available, completion of the effort would be expected by June 30, 2012.

C. Gaging Activity

In the Republican River Basin the DNR operates 22 stream gages (one of them is owned by the U.S. Bureau of Reclamation), and uses information from approximately 12 gages operated by the U.S. Geological Survey. Three are partial year gages operated during the irrigation season when water is released from reservoirs.

During FY 2010 and FY 2011, the DNR expects to replace five nitrogen tank-based bubbler systems with four pump-based systems and one radar gage. This change will increase the safety of handling and using the stream gaging equipment and decrease the overall operating costs.

D. Republican River Compact Activity

The Republican River Compact was implemented in 1943 and allocates the streamflow supply of the Republican Basin above Hardy, Nebraska between Colorado, Kansas, and Nebraska. Traditionally, the Compact accounting focused on measured streamflows and surface water uses. In 1998, Kansas sued Nebraska alleging significant depletions of streamflow in the Republican River Basin from groundwater use. The Final Settlement Stipulation (FSS), signed in 2002, updated the Compact accounting to include the calculation of stream depletions due to groundwater use and stream accretions due to imported water supplies from the Platte Basin.

In 2008, Colorado, Kansas, and Nebraska entered into dispute resolution regarding several issues, including future compliance. In June 2009, the arbitrator, Karl Dreher, issued a finding that the IMPs may be adequate during years with average and above-average precipitation, but may be inadequate during dry years. His concern was that although the NRDs' allowable depletions to streamflow are limited to 100% of Nebraska's allowable depletions, there were no details in the plans to achieve this.

The DNR and NRDs are currently working to revise their IMPs to comply with the Republican River Compact.

VI. NIORARA RIVER BASIN

A. Integrated Water Management Activities/Integrated Management Plans

Portions of the Upper Niobrara White NRD, including the Hat Creek Basin, the White River Basin, the portion of the Niobrara River Basin above the Mirage Flats Diversion Dam, the Box Butte Creek Sub-Basin, and the Snake Creek Sub-Basin were declared fully appropriated in 2004. Then, the Niobrara River above Spencer Dam was determined fully appropriated in January 2008, including areas of Dawes, Sheridan, and Box Butte counties hydrologically connected to the Lower Niobrara River below the Mirage Flats Diversion. The Upper Niobrara White NRD IMP was adopted in 2009. The first annual IMP meeting is June 2010, at which time both the UNWNRD and DNR will evaluate the effectiveness of the IMP.

The Middle Niobrara NRD and portions of the Lower Niobrara, Upper Elkhorn, and Upper Loup NRDs were also included in the fully appropriated designation of the Niobrara River above Spencer in January 2008. The expected long-term availability of surface water supplies and hydrologically connected groundwater of the Niobrara Basin below Spencer Dam was evaluated in the "2010 Annual Evaluation of Availability of Hydrologically Connected Water Supplies." DNR concluded that the portion of the basin examined was not fully appropriated at that time.

B. Studies, Programs, and Projects

1. Hydrogeologic and Hydrostratigraphic Framework for the Niobrara Basin

This study provides geospatial coverages of aquifer properties throughout the upper portion of the Niobrara River Basin. It is intended to help expand the Box Butte groundwater model. The

Study completion report has been issued with a June 2010 completion date. The Nebraska Conservation and Survey Division conducted the study.

2. *Conjunctive Water Use Model of the Upper Niobrara River Basin*

The operations model will combine three separate models, CROPSIM, a groundwater model, and a surface water model to develop operational scenarios that maximize water use efficiency. All portions of the operations model are currently in development. The project is funded through Interrelated Water Management Plan Program Fund, with the Upper Niobrara-White NRD as the sponsor and DNR as a partner. The total projected cost is \$154,000.00. The expected project completion date is summer 2012.

3. *Niobrara Basin Study*

In June 2010, a proposal was submitted for Bureau of Reclamation assistance on a Niobrara River Basin Study. In August, Reclamation provided notification that the proposal was approved. It is anticipated that \$350,000 worth of Reclamation staff assistance will be provided. The purpose of the study will be to provide water supply and demand information for evaluation and implementation of water management options for the basin. DNR staff will also contribute to the cooperative effort.

C. Compact Activity

In 1962, the States of Wyoming and Nebraska ratified the Upper Niobrara River Compact. The Compact provides for an equitable division of the available surface water supply of the basin. It also provides for acquisition of information on groundwater and underground water flow necessary for apportioning said flow and calls for the states to address issues that may lead to disagreements. On November 20, 2009, DNR and the Wyoming State Engineer's Office met to discuss the Niobrara River Compact. At the compact meeting, both states discussed stream gaging efforts, surface water administration, and the Lusk Area Groundwater Study. On April 14, 2010, a technical subcommittee met to discuss the results of the Lusk Area Groundwater Study and potential technical projects.

D. Gaging Activity

In the Niobrara management area the DNR operates eight stream gages, and uses information from an additional two gages operated by the U.S. Geological Survey. In order to better administer water rights, during water year 2009 the DNR added one additional stream gage to the system, at Niobrara River near Butte.

During Fiscal Years 2010 and 2011 the DNR expects to replace two nitrogen tank-based bubbler systems with two pump-based systems and no radar gages. This change will increase the safety of handling and using the stream gaging equipment and decrease the overall operating costs.

VII. BLUE RIVER BASIN

A. Integrated Water Management Activities

The Blue River Basin is divided into three NRDs: the Little Blue, Lower Big Blue, and Upper Big Blue NRDs (the Tri-Basin NRD also contains a portion of the Blue River Basin). At this time, no portions of the Blue River Basin have been designated as fully appropriated. Therefore, pursuant to Nebraska statutes, the DNR must annually evaluate the basin. In the “2010 Annual Evaluation of Availability of Hydrologically Connected Water Supplies,” the DNR concluded that the Basin was not fully appropriated at that time.

The hydrologically connected waters of the Platte Basin extend into the Upper Big Blue NRD. The DNR and Upper Big Blue NRD are working to complete an IMP. More information is provided in the Upper Platte Basin portion of this report.

B. Blue River Compact Activity

In 1971, Kansas and Nebraska entered into the Blue River Compact. The Compact was put in place to promote interstate comity and achieve an equitable apportionment and orderly development of the waters of the Big Blue River Basin. It requires Nebraska to regulate diversions from natural flow of streams in the basin when necessary and to cooperate in maintaining the water quality of the Blue Basin. Compact meetings generally occur each spring and the 2010 meeting took place on May 19 in Beatrice.

C. Gaging Activity

In the Blue River Basin, the DNR operates six stream gages (none of them are owned by the Bureau of Reclamation), and uses information from an additional seven gages operated by the U.S. Geological Survey.

VIII. MISSOURI RIVER MAINSTEM BASIN AND TRIBUTARIES AND NEMAHA RIVER BASIN

A. Integrated Water Management Activities

At this time no portion of the Missouri Tributaries has been declared fully appropriated and no portion of the Nemaha River Basin has been declared fully appropriated. The “2010 Annual Evaluation of Availability of Hydrologically Connected Water Supplies” examined the Missouri Tributaries’ Basins, including the Nemaha Basin, and DNR found the basins were not fully appropriated at that time.

B. Studies, Programs, and Projects

1. Missouri River Association of States and Tribes (MoRAST)

In 2006, the creation of the Missouri River Association of States and Tribes (MoRAST) was authorized by adoption of a joint resolution by the Mni Sose Intertribal Water Rights Coalition and the governors of the States of Wyoming, Montana, North Dakota, South Dakota, Nebraska, Iowa, and Kansas. MoRAST is an interstate and tribal organization that was formed to help resolve issues of concern to the basin states and tribes; and to serve as a forum to foster communication and information exchange among the member states, tribes, and various other governmental units. Additionally, MoRAST was formed to facilitate the management of the natural resources of the Missouri River Basin, including water resources, fish, and wildlife, while considering the impacts to the economic, historical, cultural, and social resources.

The MoRAST by-laws, which were adopted by the Board of Directors in 2006, were modified in 2008 to provide for an equal number of directors from the states and the tribes, which is currently thirteen each. Each state has a representative of the state water agency and one for the state fish and wildlife agency, with the exception of Iowa, which chose to have only one representative. In Nebraska, the two representatives are Brian Dunnigan, Director of the DNR, and Kirk Nelson, of the Nebraska Game and Parks Commission. The group met twice in FY 10, on October 29-30 in Fort Pierre, SD, and on March 16, 2010, in Nebraska City. Those meetings included extensive discussion on organizational response to the Missouri River Authorized Purposes Study (MRAPS).

2. MoRAST Input Meetings

The DNR has organized several meetings of Missouri River stakeholders to provide input to the Nebraska MoRAST representatives. The stakeholders have helped provide a better mutual understanding of the needs of Nebraska river users, provided background for MoRAST meetings, and presented informed stakeholder perspectives regarding federally led efforts. In FY 10 the group met on July 27, 2009, and March 12, 2010, with both meetings occurring at the Papio-Missouri River NRD offices in Omaha.

3. Missouri River Recovery Implementation Committee (MRRIC)

MRRIC is a stakeholder committee that was created to guide the prioritization, implementation, monitoring, evaluation, and adaptation of recovery actions and provide input on the social, economic, and cultural values associated with any plans associated with the Missouri River Ecosystem Restoration Plan (MRERP) and on activities in the existing Missouri River Recovery Program (MRRP). The special assistant to the director of the DNR is the State of Nebraska's representative on this committee. Other members of the committee from Nebraska represent fish and wildlife interests (two members), thermal power (one member), water quality (one member), and the U.S.D.A. Natural Resources Conservation Service.

4. Missouri River Ecosystem Restoration Plan (MRERP)

The Missouri River Ecosystem Restoration Plan is a long-term study authorized by the Water Resources Development Act of 2007, in which the U.S. Army Corps of Engineers, in partnership with the U.S. Fish and Wildlife Service, will identify actions required to mitigate losses of aquatic and terrestrial habitat, recover federally listed species under the Endangered Species Act, and restore the ecosystem to prevent further declines among other native species. The Nebraska Game and Parks Commission represents Nebraska in the effort, but DNR staff have also participated.

5. Missouri River Authorized Purposes Study (MRAPS)

MRAPS is a congressionally authorized study to review the project purposes established by the Flood Control Act of 1944. The study will analyze the eight authorized purposes, including flood control, water supply, navigation, water quality, irrigation, recreation, hydropower, and fish and wildlife, in the view of the current values and priorities to determine if changes to the existing purposes and federal water resource infrastructure may be warranted.

The U.S. Army Corps of Engineers is working with tribes, federal and state agencies, and other stakeholders within the basin. Scoping meetings were held in summer 2010 and in late June the DNR provided an agency input letter for the effort. Natural resources districts along the river also provided a joint comment letter. DNR staff has been closely monitoring this process and attending meetings to keep informed.

6. Other Missouri River Activity

The U.S. Army Corps of Engineers regulates the Missouri mainstem reservoir system under the provisions of the Missouri River Master Manual. The Corps also issues an annual operating plan and takes public comments on the plan. DNR staff continues to monitor the Corps river regulation and decisions, including Corps decisions regarding pulse flows and Corps activity in producing the annual operating plan.

C. Gaging Activity

DNR does not operate stream gages on the Missouri River or its minor tributary streams. DNR uses information from nine Missouri River gages operated by the U.S. Geological Survey. Also, in the Nemaha River Basin, the DNR does not operate stream gages. The DNR utilizes data from the three active USGS gages in the Basin.

**IX. (TABLE 2) - PLANNING & REVIEW PROCESS EXPENDITURES FY 10
AND BUDGET FYs 2011-2015* (for FYs 10 and 11 Includes combined expenditures and budget respectively for Budget Program 334 subprograms
04 Planning and Assistance, 07 Streamgaging, 019 Water Resources (LB962), and 021 Interstate Compacts and Decrees Limited Exceptions**)**

	FY 2010 (est.)*	FY 2011**	FY 2012	FY 2013	FY 2014	FY 2015
Personal Services	\$1,735,832	\$1,803,790	\$1,738,562	\$1,738,562	\$1,738,562	\$1,738,562
Travel Expenses	\$62,185	\$122,922	\$120,066	\$120,066	\$120,066	\$120,066
Operating Expense – SOS Temporary Personnel	\$97,672	\$46,062	\$39,336	\$39,336	\$39,336	\$39,336
Operating Expense- Mgmt consultant, Contractual Services and Engineering & Architectural Services	\$1,168,073	\$2,119,100**	\$654,707	\$654,707	\$654,707	\$654,707
Equipment, Computer and Software	\$64,347	\$112,000	\$62,000	\$62,000	\$62,000	\$62,000
Operating Expense - Other	\$94,139	\$125,077	\$115,000	\$115,000	\$115,000	\$115,000
Capital Outlay/Fixed Assets Except Computer	\$83,736	\$136,000	\$106,000	\$106,000	\$106,000	\$106,000
TOTAL	\$3,287,784	\$4,464,951	\$2,835,671	\$2,835,671	\$2,835,671	\$2,835,671

* Beginning with this year's Annual Report and Plan of Work expenditure and budgetary numbers provided for FYs 10 and 11 respectively encompass the entire budgets of the Planning and Assistance Division and the Integrated Water Management Division under Budget Program 334. This includes the budgets of Subprogram 04 Planning and Assistance, Subprogram 07 Streamgaging, Subprogram 019 Water Resources (LB 962), and Subprogram 021 Interstate Compacts and Decrees with the exception of \$1,500,000 set aside in FY 11 as contingency funding for Republican River related legal issues and \$105,507 in FY 10 Funds for Aid to Governments and \$3,279,784 in FY 11 funds set aside for State matching funds for the Conservation Reserve Enhancement Program (CREP). The combined total filled staff positions in the two Divisions was 20.5 as of September 1, 2010. In addition to the budget above, staff from the agency Floodplain/Dam Safety/Surveys Division provide floodplain planning that is included in this report, but not reported in this budget table. Also not included in this table are Water Resources Cash Fund monies, Interrelated Water Management Plan Program Fund monies or other pass through aid monies outside of these four budget programs. However, because of the close relation of some of these funds, reports on planning related activities they fund are included in the report.

** The exceptions are \$1,500,000 FY 11 funds set aside as contingency funding for Republican River related legal issues and \$3,279,784 in FY 11 funds set aside for State matching funds for the Conservation Reserve Enhancement Program (CREP) as well as \$105,507 in funds for aid to governments in FY 10.