



**Dave Heineman**  
Governor

**STATE OF NEBRASKA**  
**DEPARTMENT OF NATURAL RESOURCES**  
Brian P. Dunnigan, P.E.  
Director

September 14, 2012

IN REPLY TO:

Mr. Patrick J. O'Donnell  
Clerk of the Legislature  
P.O. Box 94604  
Lincoln, NE 68509-4604

Dear Mr. O'Donnell:

Transmitted with this letter is the 2012 "Annual Report and Plan of Work for the Nebraska State Water Planning and Review Process" as required by *Neb. Rev. Stat. § 2-15,106*.

Sincerely,

A handwritten signature in blue ink that reads "Brian P. Dunnigan".

Brian P. Dunnigan, P.E.  
Director

Enclosure

**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 2012

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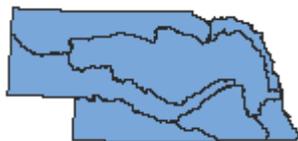
## I. INTRODUCTION

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 12 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 reflects the Department of Natural Resource's transition to use of river basins and the integrated water management planning process as an organizational framework for its planning efforts. Much of this report is organized by the basins shown in Figure 1 below. All of the staff work of the Department's Integrated Water Management Division and Planning Assistance Division, as well as planning efforts that occur through the Department's Floodplain/Dam Safety/Survey Division, are considered to be part of the Nebraska State Water Planning and Review Process. This includes stream gaging activity and activities supporting implementation of the North Platte Decree.



**Figure 1**

Of special note this year is that Department staff has begun meeting with the Public Policy Center of the University of Nebraska to consider first its internal operations in regard to water planning and then to begin assessing potential methods of iteratively building a strategic planning process that can be used to gather input, produce needed information, and provide a framework for addressing future state level water planning needs.

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

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

Another focus of the State Water Planning and Review Process has been natural resources information management. The Department is currently examining methods of developing basin water supply and use information and has begun initial efforts to develop priority information. The longer term objective is to develop an integrated network of scientific information and geohydrologic tools, INSIGHT, that can be used to make informed water use and supply decisions throughout the State. 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 the Department's Management Services Division Information Technology Section and the Planning 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/Dam Safety/Survey Division conducts floodplain planning activities and the Department'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 21, 2011, the Department published the seventh annual evaluation of the expected long-term availability of hydrologically connected water supplies, titled "2012 Annual Evaluation of Availability of Hydrologically Connected Water Supplies," also known as the Fully Appropriated Basin (FAB) Report. 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 Department is required to reach a preliminary conclusion about whether any additional basins are fully appropriated, beyond those previously identified as such by the

Department. 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 2011 report, the Blue River Basins, the Lower Niobrara River Basin, and Missouri Tributary Basins were evaluated. None of the basins, sub-basins, or reaches within those basins were determined to be fully appropriated. The Department 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 2012.

## 2. Integrated Management Plans

Currently 10 natural resources districts have completed integrated management plans. Five other natural resources districts are in the process of developing voluntary integrated management plans. The status of these plans is discussed in more detail by basin in the sections below.

## 3. INSIGHT: Development of an Integrated Network of Scientific Information and GeoHydrologic Tools to Assist Examination of Planning Options

The Department is currently working on a project to develop an organizational structure for providing better information and tools relating to basin water supply and water use that, in the longer term, can provide a sound knowledge of water availability for examining planning options throughout the State. INSIGHT will provide the best available scientific data, information, and technologies to help complete the Department's annual evaluation of river basins not currently determined to be fully appropriated. The general public will also be able to access the data through a web-based mapping tool to better understand water supply and use by location. In addition, the project is assessing areas of the state that require further study, specifically in the Lower Platte and Missouri Tributaries and in the Big Blue and Little Blue River Basin Areas. The Department has hired a contractor who is developing the web application, databases, and other tools to support INSIGHT. Completion of this project is expected in July 2013.

## 4. Statewide CROPSIM and Water Supply and Demand Analysis Project

This project will provide data and information for use in determining water supplies and demands for all regions of Nebraska. 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 Department's annual Fully Appropriated Basins Report, to estimate the difference between fully and overappropriated conditions, and 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 project involves both Department staff and contractor work. An agreement has been signed and the project has a term running through June 30, 2012.

5. Examination of Potential Strategic Water Planning Activities and Options

The Department has contracted with the Public Policy Center of the University of Nebraska for assistance in considering its internal operations in regard to water planning and to begin assessing potential methods of iteratively building a strategic planning process that can be used to gather input, produce needed information, and provide a framework for addressing future state level water planning needs.

6. Nebraska Carbon Sequestration Advisory Committee

The Nebraska Carbon Sequestration Advisory Committee was created in 2000 by LB 957, now codified as *Neb. Rev. Stat.* §§ 2-5301 to 2-5306. This committee's purpose is to assist in quantifying carbon sequestration on agricultural land and enhance the ability of agricultural landowners to participate in carbon trading (*Neb. Rev. Stat.* §§ 2-5303 and 2-5305). The Director of the Department of Natural Resources serves on this committee and the Department provides administrative support. The Nebraska Carbon Sequestration Advisory Committee met on December 9, 2011.

**B. Datasets/Data Gathering**

1. Stream Gaging Program

Stream and canal gaging activities are considered to be part of the State Water Planning and Review Process. *Neb. Rev. Stat.* §§ 46-227, 46-252, 46-258, 46-261(3), 61-208, 61-209, 61-211, 61-215, and 61-216 authorize and require the Department to measure the quantity of water in the State's streams and canals. Department staff collects and reports flow data for streams, canal and pump diversions, and storage in reservoirs. Stream gaging is important for water administration and determining compliance with interstate compacts and decrees, and has major implications for a large number of environmental and discharge permits. Stream gaging data is important information for water planning. In addition, near real-time streamflow information is critical during floods.

The Department operates 104 continuous stream and reservoir gages, 112 canal and canal return flow gages, and makes spot measurements or observations of stage at approximately 100 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. The first method involves field office personnel measuring streamflow at each stream gaging site. The measurement takes approximately two hours at each site. Field personnel either use a rod-mounted flow meter while wading in 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 to determine the total discharge.

The calculated stream flow 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 sediment scour or accretion.

For the second method, 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. The stream elevation information can then be converted to stream flow using the known relationship between water depth and velocity, often from a rating table or curve.

Significant funding is budgeted for ongoing stream gaging activities because of the importance of accurate, timely flow information. The Department has cut costs by minimizing the number of site visits needed to maintain accurate rating curves. While the stream gaging budget is a significant portion of the Department's budget, a recent study determined that Department's program is very cost effective when compared to the per-gage cost of the U.S. Geological Survey. When all expenses of the program and all direct and indirect costs of labor related to the program are included, over the past five years the Department has spent approximately \$6,300 per gage per year for all measurements and stream and canal gaging record work. Currently the U.S. Geological Survey's cost per gage is \$15,000.

In the future, it is likely that the cost of maintaining stream gages will rise slightly. Additional costs will include necessary software upgrades, replacement of existing (outdated) nitrogen tank bubbler equipment, increased use of acoustic Doppler stream discharge measurement equipment, and related training. The Department is currently working on a written plan to assess and improve the program.

The Department publishes an annual Hydrographic Report and Station List that may be found on the internet at [http://dnr.ne.gov/docs/DNR\\_Publications.html](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

The digitizing of surface water rights in Nebraska is the responsibility of the Mapping Section within the Floodplain/Dam Safety/Survey Division. Since 2006, all new water rights and modifications to existing water rights have been created and maintained using GIS software. In addition, a program is in place to create digital versions of all other existing water rights. Of the 12 water divisions in Nebraska, the private rights (those not served by irrigation districts or other water providers) have nearly all been digitized and are available to Department staff for program purposes. The process of digitizing the lands served by the irrigation districts and ditch companies in Nebraska is difficult due to the complexities of numerous water rights that interlock and overlap in various ways across their districts. The Department has been able to acquire digital versions of many irrigation districts through cooperative work agreements with the districts, either by providing mapping assistance or converting existing work into a format compatible with the Department's geodatabases. While great strides have been made in creating a digital database of Nebraska's surface water rights, there are areas that pose significant difficulties due to a lack of current mapping information for some irrigation districts. Overall, the process of digitizing the surface water rights is continuing at a good pace with more added each day, but having a complete statewide database is still years off.

Other responsibilities of the Mapping Section include:

- Creating and maintaining geodatabases for points of diversion associated with surface water rights;
- Work with the National Hydrography Database (NHD) Steward in maintaining the referencing of surface water rights information to the NHD;
- Creating and maintaining geodatabases for the Department's Conservation Reserve Enhancement Program (CREP) and Environmental Quality Improvement Program (EQIP) programs;
- Producing official maps for Department Orders;
- Scanning and processing new and existing project maps and design plans into digital format;
- Creating and maintaining geodatabases for conduct water permits;
- Creating and maintaining geodatabases for other miscellaneous projects as needed.

## 3. Flood Prone Area Mapping

This mapping activity and dataset is coordinated and primarily carried out through the Floodplain Section of the Floodplain/Dam Safety/Survey Division. As of June 30, 2012, the Department and the Federal Emergency Management Agency's contractors and cooperating technical partners have produced 55 county-wide digital effective Flood Insurance Rate Maps (FIRMs). Four of these county-wide FIRMs became effective between July 1, 2011, and June 30, 2012. The mapping process is underway in another eight counties: one preliminary, one draft, one on hold, and five work maps.

During this fiscal year, the Division completed two Federal Emergency Management Agency physical map revision projects that were funded in the previous fiscal year. These projects were

for the Big Slough in Howard County and Little Bazile Creek in Knox County. The Division began the Discovery phase of the Federal Emergency Management Agency's Risk Mapping, Assessment, and Planning (Risk MAP) program for the Lower Elkhorn Watershed and the Lewis & Clark Lake Watershed and continued to work on the Data Development phase of Risk MAP for the Lower Little Blue Watershed. The Division also completed work maps for five counties: Adams, Hamilton, Jefferson, Seward, and York.

In the upcoming fiscal year, the Division is scheduled to complete Discovery for the Lower Elkhorn and Lewis & Clark Lake Watersheds and complete Data Development for the Lower Little Blue Watershed. Digital county-wide FIRMs are to be produced for Jefferson County as part of Data Development for the Lower Little Blue Watershed Risk MAP project. The Division plans to apply for a federal grant to update the FIRMs for the City of Wahoo. The Division also intends to continue developing work maps for counties without digital FIRMs.

#### 4. National Hydrography Dataset

The National Hydrography Dataset (NHD) is a dataset model developed jointly by the U.S. Geological Survey and the U.S. 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.

Department staff coordinates stewardship of the NHD in Nebraska. In FY 12, Department staff participated in a number of NHD advisory groups in a continuing effort to improve the dataset and the tools to utilize and maintain it. The Department also conducted research related to the development of high-resolution NHDPlus, which integrates NHD, topography, soils, and precipitation information into a single dataset for use in a variety of modeling applications. Staff presented this research at the National Stewardship Conference.

The National Hydrography Dataset is a large and complex dataset. Due to the large number of natural and man-made changes to the landscape, NHD must be continuously maintained so that it remains a current dataset and is improved as Nebraska's requirements dictate. Department staff is currently adding water bodies for new reservoirs and adding detail to the major irrigation systems throughout the state.

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 Department datasets including water rights, dams, gages, and other water-related data. Department staff is developing applications designed to improve the quality of this information and our ability to create information products from it.

5. Nebraska Rainfall Assessment and Information Network

The Nebraska Rainfall Assessment and Information Network (NeRAIN) program was initiated by the Department 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 Department's website at <http://nerain.dnr.ne.gov/nerain/>.

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, the server that distributes maps and reports of the data was upgraded in 2011. This necessitated 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. It is anticipated that national standards may change to reflect recent advancements in the distribution and accuracy of regional elevation data. As these improvements become more widespread, watershed boundary delineations may be updated to achieve accuracy comparable to the corresponding elevation.

Any future work on this project will be response to the acquisition of improved topographic data.

7. Section Corner Database

Legal sections are widely used for administration of lands and are 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.

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 been documented and is currently served to the public through the Department website. Future work on this database is not anticipated, but may be considered when potential improvements are identified.

## C. Other Statewide Activities

### 1. 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 Natural Resources Development Fund can be used to provide grants or loans to political subdivisions of the State or an agency of the State for development projects. Statutory authority for approving projects and funding level rests with the Nebraska Natural Resources Commission (Commission). The Department of Natural Resources is responsible for administering the program. During FY 12, the Commission met five times.

The FY 12 appropriation was \$3,140,325, the same amount as in FY 11. Work was progressing on eight projects that had been previously approved for funding, and FY 13 funds were requested for five of those projects. Requests far exceeded the general fund appropriation. Distribution of available funds was worked out through reviews of project status and plans with sponsors and then conducting a meeting of all sponsors. Results of these actions were reported to the Commission, who decided to complete funding for the Little Sandy Creek Watershed project and to split the remaining funds equally among the remaining requests. Increased project cost estimates were also presented by sponsors of three projects, and increases in existing project cost share commitments were requested. Increased allocations were granted for these three projects; Lower Turkey Creek, Buck and Duck Creek, and Pigeon-Jones Creek projects. Funds for both the Buck and Duck Creek project and the Pigeon/Jones Creek project are yet to be fully allocated.

Current fund constraints caused project sponsors to borrow funds in order to continue project work in a timely and efficient manner, in spite of the fact that it may be several years before funding is available to reimburse them for those outlays. Due to the limitation of available funding, no new applications are being taken at this time.

One project near Wahoo, Nebraska, the Sand Creek Environmental Restoration project, Lake Wanhoo, was completed, and opened during FY 12. Cost-share funding committed from the Natural Resources Development Fund to this project will not be fully paid for several years based on the current level of appropriation. Over its projected 50-year life, this project is expected to generate annual flood damage reduction benefits of \$335,199 and recreation benefits of \$1,441,008. The total value of the project over its projected life is \$81,099,144.

### 2. Interrelated Water Management Plan Program Fund

The Interrelated Water Management Plan Program (IWMPP) fund 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. Statutory authority for approving projects and funding levels rests with the Nebraska Natural Resources Commission (Commission). The Department of Natural Resources is responsible for administering the program.

Guidelines for the fund were originally adopted by the Commission on July 13, 2006, and subsequently 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. The FY 12 and 13 appropriations reflected a reduction of more than \$1.5 million per year compared to the previous biennium budget. In response to the reduction, the Commission acted in FY 11 to suspend consideration of new applications, an action that was later extended until currently approved projects have been fully funded.

Department staff reviewed the status and proposed work plans of each project for which FY 13 funding was requested. Funding needs were discussed in a meeting of all project sponsors, and agreement on a proposed distribution approach was reached. The Commission concurred with the sponsors' proposal to commit the \$500,000 FY 13 appropriation. Sponsors estimate that future IWMPP cost share of \$1,087,487 will be needed to fund continuing projects through completion.

Even though cost share funds are not yet available, some project sponsors are committing local funds to continue project work in order to more quickly produce project deliverables needed to better manage water resources. The Commission has stated its commitment to reimburse sponsors up to the approved cost share amounts if and when funding becomes available, and sponsors understand this may take several years.

### 3. *Climate Assessment and Response Committee*

The Climate Assessment and Response Committee (CARC) provides timely and systematic data collection, analysis, and dissemination of information about drought and other severe climate occurrences to the Governor and to other interested persons. The Director of the Department is an ex-officio committee member. The committee met on April 24 and June 6, 2012, to discuss the persistence of dry conditions throughout the state.

### 4. *Environmental Trust Technical Advisory Committee*

The Director of the Department is a member of the Nebraska Environmental Trust Board. The Board has a 70-member Technical Advisory Committee (TAC) that reviews grant applications to assure design feasibility, cost effectiveness, and the use of sound environmental principals. Applications are distributed to reviewers with backgrounds related to the specific types of projects. Members of the TAC may request additional information to clarify questions they may have about the project. TAC members also identify potential concerns they may have. DNR staff has provided assistance in project application reviews since the Trust was established in 1992.

There were 93 applications received by the September 6, 2011, deadline. Six staff members reviewed a total of nine project applications this year. The total time involved was just under 80 hours. The workload of this process varies each year depending on the types of projects proposed in the applications, the background of the reviewers, the project sponsors, and whether additional information is requested of the sponsor to complete the review. Any reviewer having

a conflict of interest with a project is requested to declare that conflict and not review that particular application.

#### 5. Nebraska GIS Council and Subcommittees

The Geographic Information System Steering Committee, using funds from a Federal Geographic Data Committee (FGDC) grant, is developing a Nebraska GIS Strategic Plan for Nebraska. The services of Applied Geographics Inc. (AppGeo), of Boston, MA, have been retained to assist in this process. AppGeo will work with a Council Strategic Planning Subcommittee to develop the plan. The Department is represented on this subcommittee. As of this publication, information has been compiled from a variety of public meetings, agency interviews, online surveys, and a review of past council initiatives and activities. A draft outline has been developed and has been reviewed by the full Council and State Agency Directors. The four strategic goals identified in the plan are:

- Facilitate the creation, maintenance, analysis, and publishing of **quality geospatial data**.
- Provide **widespread access to data** and services and encourage data sharing.
- Facilitate **technical assistance and education outreach** opportunities for furthering the adoption of NESDI data layers and geospatial applications.
- Achieve sustainable and efficient allocation of **resources to support the implementation and wise governance of GIS** services and geospatial data.

This plan will be used to guide the activities of the GIS Steering Council as we develop and maintain the Nebraska Spatial Data Infrastructure.

#### 6. Nebraska Environmental Trust Funded Studies

In 2008 the Department received approval for Nebraska Environmental Trust Fund grants on three separate projects, all of which were completed during FY 12. Each of those projects addressed research or educational needs closely related to the Department's integrated water management activities. In each instance, the Department signed agreements with the University of Nebraska to complete the work. Because those projects are now complete, they will not be included in future Annual Reports. In addition to the grants received in 2008, the Department received a 2012 grant for the Platte Water Management Action Initiative. That grant is covered separately in another section of this report.

*“Quantifying Evaporation, Crop Evapotranspiration, and the Water Balance for Tilled and Untilled Fields”* was completed in late July 2011. The grant award totaled \$674,160 over three years. An additional \$295,893 in matching effort, primarily through the University, was provided over the course of the study. The study was conducted by the University of Nebraska-Lincoln Department of Biological Systems Engineering. The goal of the project was to quantify the effect of one of the most important soil management practices (tillage) on the water availability, soil hydraulic properties (infiltration, bulk density and organic matter content), water balance components (runoff, deep percolation), crop evapotranspiration (ET<sub>c</sub>), and crop parameters and yield. The project also worked to quantify the water use differences between the no-till and

conservation till (disk till) for the state's most commonly used cropping pattern: corn and soybeans in rotation.

*“Enhancing the Value of Water through Management Education,”* which is a joint effort between Nebraska's Center Pivot manufacturers and the University of Nebraska to provide education on optimal water use, was completed January 31, 2012. The project received a \$215,000 Nebraska Environmental Trust Fund Award, and had another \$290,753 in matching value provided by the partners. The purpose of the project was to develop and deliver an organized water management educational program to provide irrigators and those advising irrigators with the knowledge and skills necessary to obtain the maximum benefit from a constrained water supply. Participating companies included: Lindsay Corporation, Reinke Manufacturing Company, Inc., T-L Irrigation Company, and Valmont Industries. A related non-Department project, *“Conserving Water through Informed Irrigation Management,”* was also more recently funded by the Nebraska Environmental Trust and has many of the same objectives, but with different strategies to reach irrigators.

*“Riparian Vegetation Impacts on Water Quantity, Quality, and Stream Ecology”* was completed March 31, 2012, and received a grant award of \$423,960. Another \$238,179 in matching value was provided through the University of Nebraska and a small Departmental cash contribution. The overall goal of the project was to develop a quantitative understanding of the role of riparian vegetation dynamics, including invasive species, on the interactions among hydrology, ecology, geomorphology, and chemistry of streams and riparian zones within the Republican and Platte River basins.

#### 7. Hazard Mitigation Planning/Flood Mitigation Planning

The Department currently administers three flood mitigation programs on behalf of the Federal Emergency Management Agency (FEMA). These include the Flood Mitigation Assistance, Repetitive Flood Claims, and Severe Repetitive Loss programs. All of these programs have similar goals: the reduction of flood hazards across the state through mitigation or removal of flood-prone structures from the floodplain with a special focus on repetitive loss structures. In addition to these programs, two other FEMA programs, the Hazard Mitigation Grant Program and Pre-disaster Mitigation Program, are administered by the Nebraska Emergency Management Agency (NEMA) within the State. While these programs are administered by NEMA, the Department assists NEMA as requested with review and implementation of flood mitigation related projects under the program. According to NEMA, most of the State's population is now covered by an all Hazards Mitigation Plan (HMP) or will be covered by a plan in the future and HMP's typically include flood mitigation components. Having an HMP with flood mitigation components along with participation in the National Flood Insurance Program allows communities and counties to be eligible for grant funds under all FEMA hazard or flood mitigation programs.

Under the guidance of NEMA, the State completed an update to the State level Hazard Mitigation Plan in 2011, which includes information from the current Flood Mitigation Plan produced by the Department. The Department currently has a Flood Mitigation Assistance grant from FEMA to update the State's Flood Mitigation Plan that will then be incorporated into the

next revision of the State's All Hazard Mitigation Plan, anticipated for approval in 2014. The plan update will identify flood hazard mitigation goals for the State that can be achieved through a wide range of mitigation program and project efforts and will also assist with providing the planning framework, in cooperation with local HMPs, which will give communities the ability to apply for and receive grants to complete local mitigation projects.

With the significant flood events occurring during 2011, there will be a significant amount of money allocated to the State for hazard mitigation projects through FEMA's Hazard Mitigation Grant Program administered by NEMA. It is anticipated that some potential flood mitigation opportunities, including acquisition and removal of some repetitive loss structures, may obtain funding assistance and begin implementation over the course of the next year. The Department will continue to offer technical assistance to any entity interested in making an application for or implementing flood loss mitigation planning and related projects, and this includes assisting NEMA as requested with flood mitigation related projects. The Department is currently providing coordination assistance for an ongoing mitigation project in the Village of DeWitt, Nebraska that has received grant funding under FEMA's Flood Mitigation Assistance program and includes the installation of floodgates on several culverts that will significantly reduce the repetitive flooding of portions of the community.

#### 8. Western States Water Council

The Department is an official member of the Western States Water Council. This organization benefits the Department and the State by keeping abreast of water issues at the state, regional, and national levels. The Director of the Department is the State's representative, with the Deputy Director being his alternate, and the Department's Agency Legal Counsel being a member of the legal subcommittee. The Western States Water Council meets three times a year with locations rotating among the states.

The Western States Water Council is an organization of representatives appointed by the governors of 18 western states, including Alaska, Arizona, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming.

Western States Water Council was chartered by the Western Governors' Conference in 1965 to:

- Accomplish effective cooperation among western states in the conservation, development, and management of water resources;
- Maintain vital state prerogatives, while identifying ways to accommodate legitimate federal interests;
- Provide a forum for the exchange of views, perspectives, and experiences among member states; and
- Provide analysis of federal and state developments in order to assist member states in evaluating impacts of federal laws and programs and the effectiveness of state laws and policies.

The Council is accountable to the Western Governors' Association (WGA). Even though Nebraska's Governor is currently not a member of the WGA, the Department, with the Governor's permission and the agreement of the Council, is able to participate.

Through the staff of the Western States Water Council, many studies and reports on important topics have been completed over the years that are very helpful to the Council's members, policy makers, and the public. This information is available to the public through the Council's internet site at <http://www.westgov.org/wswc/>.

#### 9. *Interstate Council on Water Policy*

The Interstate Council on Water Policy (ICWP) is a national organization of state and regional water resource management agencies. The Interstate Council on Water Policy is committed to seeking more comprehensive and coordinated approaches to water management that integrate quality and quantity concerns, groundwater as well as surface water management, and economic and environmental values. Within this context, the relationship between local, state, and federal policies, programs, and regulatory issues is of particular interest.

The Interstate Council on Water Policy was founded in 1959 to provide a voice for the states in national water policy. Its scope of interest includes such issues as watershed management, dam safety, floodplain management, groundwater, nonpoint source pollution, water quality standards, water conservation, drought and emergency management, wetlands protection, state water rights, climate change, hydropower licensing, endangered species and habitat, water supply, and water resource research and data. More information on this organization may be found at <http://www.icwp.org/2012>.

The Department's Director is the State's representative on this council and the Deputy Director is on the Board of Directors.

The Department and Nebraska benefit from this organization through the exchange of ideas and information from other states and federal officials on issues that are of importance to Nebraska, through having recognized organizational presence at the federal level to provide input and information on issues of concern, and through building relationships with our counterparts in other states and at the federal level.

#### 10. *Association of Western States Engineers*

The Association of Western States Engineers (AWSE) was formed in 1928 by the western state heads of agencies charged with administration of the laws governing appropriation and distribution or control of the water resources of each state. Its current membership includes 19 western states.

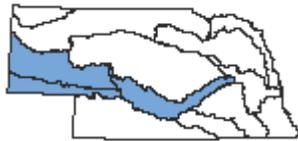
The AWSE purposes are:

- To formulate broad principles applicable to all those states for the development, use, control, and regulation of the waters thereof;

- To assist one another in the solution of individual problems through the exchange of ideas and experiences;
- To cooperate in preserving the states' inherent right to develop, use, control, and distribute the water thereof and to facilitate resolution of interstate water problems;
- To enhance the beneficial and efficient use of water by encouraging the improvement and perfection of the laws relating thereto and by other proper means;
- To circulate among members such information as may be helpful in the discharge of their official duties.

The Director of the Department is the Department's representative. The AWSE meets once a year in the fall, with meetings rotating among the states. In 2012, Nebraska will be the host state and will hold the meeting in Omaha. Topics included such items as the 2011 flooding and current actions on the Missouri River, including discussion of the national levee safety initiative. Other topics included emerging dam safety issues and water needs for energy 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 natural resources districts were designated fully and/or overappropriated after the passage of LB 962 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 addresses both the fully appropriated and overappropriated areas.

The Platte River Recovery 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 Department and these NRDs completed IMPs for both the fully appropriated and overappropriated areas in 2009. The South Platte NRD adopted an IMP in 2008, which was modified in 2009 to conform to 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 IMPs' first

increment. The Central Platte NRD amended their IMP in May 2012. The geographic area for the amended IMP encompasses all of the land area located within the boundaries of the Central Platte NRD; however, the changes only apply to the area influencing the Platte River downstream of Chapman, Nebraska. The change to the IMP defines a separate management area for the fully appropriated area influencing the Platte River downstream of Chapman. The most significant among these amendments is the potential for additional groundwater irrigated acreage development, specifically to allow the development of up to 2,500 irrigated acres or 500 acre-feet of depletion to the stream, whichever limit is met first. All existing controls remain in effect.

The Platte River Basin IMPs 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. The Department is working with the NRDs within the overappropriated portion of the Platte River Basin to develop consistent methods for reporting and assessing new permit activities as well as methods for broader evaluation of actions at achieving the goals and objectives of the IMPs.

The hydrologically connected waters of the Platte River Basin also extend into the Upper Big Blue NRD. The Department and the 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 Department and the natural resources district conducted a stakeholder meeting and completed the formal hearing process. The IMP became effective on October 18, 2010.

## **B. Studies, Programs, and Projects**

### *1. Platte River Recovery 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. Since October 2008, the Integrated Water Management Division has provided major assistance to the Director in coordinating and conducting agency Platte River Recovery Implementation Program (PRRIP) efforts. Personnel from both the Nebraska Game and Parks Commission (NGPC) and the Nebraska Department of Environmental Quality (NDEQ) 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. During calendar year 2011, the State of Nebraska was the chair of the Governance Committee.

The Governance Committee meets four times each year while the subcommittees meet more often to accomplish their tasks. The subcommittees are the Technical Advisory Committee (TAC), Water Advisory Committee (WAC), Land Advisory Committee (LAC), Independent Scientific Advisory Committee (ISAC), and the Finance Committee (FC). Each has individual tasks and goals to accomplish and all report to the Governance Committee. Details about PRRIP can be found at [www.platteriverprogram.com](http://www.platteriverprogram.com).

A new database management system and website has been developed to make access to the data gathered by PRRIP accessible to all parties and the public. The new online system has a wealth of information available to the public related to the data collected and the activities performed under PRRIP. The database system has additional features for sharing and reviewing data, document archives, and calendar features available only to PRRIP staff. A time-lapse photography project by Michael Forsberg and Mike Farrell, approved by PRRIP, has been completed, and information about it is available at <http://www.plattebasintimelapse.com>. PRRIP published a summary of accomplishments in the 2009-2010 Bi-Annual Report. The biannual report for 2010-2011 will be available in January of 2013.

PRRIP participated in many outreach efforts throughout the year in a variety of venues including: presenting to groups at the University of Nebraska-Lincoln, University of Nebraska-Omaha, and the University of Colorado, Boulder; contributing to Kearney Public Schools Foundation and providing materials for the new teacher welcome; presenting at, sponsoring, or otherwise participating in events such as the Nebraska First Board, Natural Resources District Board meetings, Joint Annual Convention of the Nebraska State Irrigation Association and Nebraska Water Resources Association, Husker Harvest Days, South Platte Forum, Nebraska Natural Legacy Project Conference, Rainwater Basin Joint Venture Seminar, Nebraska Chapter of Agricultural Engineers, Kearney Chapter of the Kiwanis, Nebraska Floodplain and Stormwater Managers Association, Colorado Water Congress Annual Conference, Four States Irrigation Council, National Conference on Ecosystem Restoration, Rivers and Wildlife Celebration, Collaborative Adaptive Management Network, Nebraska Alliance for Conservation and Environmental Education, and other local and interstate groups. PRRIP is highlighted in the publication “Bureau of Reclamation River Restoration Programs: A Summary of 16 Programs and Shared Institutional Challenges” prepared for a 2011 conference hosted by the Bureau of Reclamation and the Utton Center at the University of New Mexico School of Law. PRRIP and the Platte River Recreation Access Program are the Nebraska projects chosen to be highlighted in the U.S. Department of the Interior’s 2011 “America’s Great Outdoors Fifty-State Report,” which presents some of the country’s most promising ways to reconnect Americans to the natural world.

a. Land

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 Governance Committee has moved forward with efforts in obtaining land and water. As of March 2012, 9,526 acres had been acquired. Of these 9,526 acres, 3,000 are now open to the public through a contract between PRRIP and NGPC. The

Governance Committee of PRRIP approved the public access policy, the Platte River Recreation Access Program, with NGPC issuing one-day only permits through an on-line system. The policy can be found on the PRRIP website and also on the NGPC website at <http://outdoornebraska.ne.gov/hunting/guides/biggame/deer/prra.asp>.

b. Water

In the area of water, the Governance Committee has signed memorandums of agreement with various water actions plan project sponsors and is conducting various feasibility studies on water action plan projects. At this time PRRIP is focusing on three priority projects: 1) groundwater recharge projects, one each on the north and south sides of the river; 2) the J-2 re-regulating reservoir working in conjunction with the Central Nebraska Public Power and Irrigation District canal system; and, 3) leasing water from Pathfinder Reservoir. Work is also being done to implement a variety of other water projects such as water leasing agreements, a reservoir on Elm Creek, and groundwater management. An important aspect of the water projects is getting water to the critical habitat reach from Lake McConaughy. Currently, moving significant water through the channel is difficult without causing flooding. PRRIP is investigating the causes of this and plans to have a better understanding of how to approach this issue based upon the results of a river modeling study. The North Platte Decree Committee is reviewing Pathfinder Irrigation District's proposal to move water into the Inland Lakes account at a later time to reduce losses in the canals and at the same time deliver natural flow, especially during drought periods.

c. Adaptive Management

PRRIP documents outline a process in an adaptive management plan to test various hypotheses developed and prioritized by the Governance Committee members. Many monitoring and research aspects of the adaptive management plan are currently being implemented. For all purchased lands, a management plan must be adopted by the Governance Committee within a year of purchase. Many of the lands had management plans adopted in the past year. These plans describe the adaptive management actions and basic maintenance activities planned for each land tract and each land complex. Habitat enhancement bid packages have been let and work has been proceeding this year. PRRIP has several monitoring activities that are carried out throughout each year. These include, but are not limited to: LiDAR and aerial photography; geomorphology/in-channel vegetation; terns and plovers; water quality; and whooping cranes. Other major work in this area includes implementation of the sediment augmentation pilot project to test the hypothesis regarding sediment deficits in the river channel, the development of sandpit and riverine habitat for terns and plovers, and actions to test other aspects of the hypothesis regarding flow and sediment. The Governance Committee is considering seeking technical scientific advice about the Platte River Caddisfly (PRCF) due to its potential as a federally listed endangered or threatened species. Possible issues that may impact the PRCF include hydrology, the effects of invasive species such as phragmites, and PRRIP actions such as tree clearing in sloughs where the PRCF occurs; additional research is needed to learn more about the PRCF and its habitat needs. All studies carried out under the adaptive management plan receive scientific review via the PRRIP Independent Scientific Advisory Committee as well as other independently hired peer-review scientists. PRRIP contracts out for the services to hire these scientists.

#### d. Nebraska New Depletion Plan

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 the Nebraska New Depletion Plan (NNDP) 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 begun between July 1, 1997, and December 31, 2005. In general, these are the depletions that Nebraska has committed to offset. COHYST 2010 will be used to update the initial estimate of depletion and to run the analysis through the 2010 calendar year.

Nebraska supplied the annual report and update to the Governance Committee for calendar year 2010. That report showed that Nebraska is meeting the obligations of the NNDP. To mitigate for new depletions the Department has partnered with the NRDs, irrigation districts, and canal companies, through the Platte Basin Habitat Enhancement Program, in several water enhancement projects that provide accretions to the central Platte River. One such project on groundwater recharge and flood reduction was conducted in the spring and fall of 2011 and initial data indicate it will result in average annual accretions of 2,300 acre-feet between 2011 and 2019. Other collaborative efforts with the Platte natural resources districts, all of which will provide accretions to the Platte River, include: the purchase or lease of surface water appropriations and groundwater rights; regulatory actions implemented by the North Platte NRD above Lake McConaughy; several conjunctive management projects (Cozad Canal, Thirty-Mile Canal, Elwood Reservoir, and the J-2 re-regulating reservoir); groundwater re-timing projects (the North Dry Creek and Kappa Pipeline); and co-sponsoring of federal projects such as Agricultural Water Enhancement Program (AWEP), Environmental Quality Incentives Program (EQIP), and Conservation Reserve Enhancement Program (CREP) to retire water uses. Current plans are to use FY 12 funds to invest in more water projects for the purpose of assisting Nebraska in meeting offset obligations under the NNDP. Initial estimates indicate total average annual accretions to the river of these water enhancement projects of approximately 40,000 acre-feet each year from 2011 to 2019. These accretions to stream flow may assist Nebraska with meeting current and future interstate agreements while also mitigating potential flood risks.

#### 2. Platte Water Management Action Initiative

The Nebraska Department of Natural Resources and the Central Platte, North Platte, Twin Platte, South Platte, and Tri- Basin NRDs are working to implement the Platte Basin Water Management Action Initiative (Initiative). The Initiative was developed to study, design, and implement water management projects in the Platte Basin for the purposes of reducing the consumptive uses of water, enhancing streamflows, recharging groundwater, and/or supporting wildlife habitat. The Initiative is funded by the water resources cash fund and the Nebraska Environmental Trust (NET). NET made its decision to fund the Initiative at a board meeting on April 5, 2012. One of the major benefits of the Initiative is that it is expected to help meet Nebraska's requirements for complying with the currently implemented integrated management plans in the Platte Basin as well as the NNDP portion of PRRIP.

Multiple projects are being pursued as part of the Initiative. A number of projects are also being coordinated with PRRIP. One particular project is currently in the final stage of the feasibility

study, the J-2 re-regulating reservoir. This project would capture water in newly constructed facilities associated with Central Nebraska Public Power and Irrigation District's system during periods of excess flows. Water would then be released during periods of shortages to target flows.

Several projects involve the use of excess stream flows to recharge groundwater reservoirs in Nebraska. The Initiative will develop some of these projects and will coordinate with PRRIP on others. These projects involve diverting surface water from the Platte River during times of excess flow into irrigation canals during the non-irrigation season or within excess canal capacity during the irrigation season. Excess flows could also be diverted using alluvial wells located close to the Platte River. PRRIP has conducted reconnaissance-level and preliminary feasibility studies of groundwater recharge. Currently, more in-depth studies are being conducted on Phelps, Dawson, and Gothenburg Canals. The Initiative partners carried out a demonstration groundwater recharge project in the spring and fall of 2011, discussed in more detail in section III.B.9 below.

Other potential projects involve changing the use of existing surface water appropriations or groundwater certified uses. A voluntary temporary leasing program would provide incentives to farmers to annually or long-term (e.g., 30 years) lease water supplies that would otherwise have been used for irrigation. This type of project could include various water management incentives consisting of programs resulting in consumptive use reductions. The reduction in consumptive use could be added to the Lake McConaughy environmental account (EA) when storage space is available and released during times of shortage.

The Initiative is expected to result in more efficient and effective water management and will optimize a spectrum of water uses including irrigation, hydropower production, and environmental and endangered species needs. Optimizing flow levels will benefit local NRD efforts to reach a sustainable balance of water supplies and water uses and will provide additional options to irrigators seeking to maximize the value of water used. Other beneficiaries of the project include the Platte River ecosystem, which will have additional flow available during what would otherwise be periods of low flow. This in turn will be beneficial to endangered species and other species of concern along the Platte River. The State of Nebraska and the partner NRDs will benefit because the Initiative will assist in meeting Nebraska's responsibilities under the IMPs and the NNDP of PRRIP.

### 3. 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 the project include the Department, 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 partners.

Funding commitments for the three year project totals \$16,143,700. Commitments from the sponsors are as follows: \$6,023,000, Department; \$6,765,200, natural resources districts; \$3,000,000, Nebraska Environmental Trust; and \$325,500, Nebraska Game and Parks Commission. Other project sponsors committed a total of \$30,000 in-kind. As of June 2012, projects that were approved by PBHEP totaled more than \$14,600,000 and project sponsors and as of April 2012, partners contributed cash and in-kind of more than \$3,500,000. Two large projects approved by PBHEP will require funding over a multi-year period. For that reason the NET grant has been extended one year to the summer of 2013 to allow for payment to those projects over time.

In a cooperative effort to further the funding and goals of the PBHEP, the Department and five natural resources districts applied for and subsequently received funding for a partnership under the Agricultural Water Enhancement Program (AWEP) administered through the U.S. Department of Agricultural Natural Resources Conservation Service. Funding for AWEP has varied by year; in the first contract year approximately \$1,700,000 were available, in the second year \$1,000,000, and in the third year \$370,000. There is currently \$500,000 available for the temporary conversion of irrigated land to dryland; all other project dollars have been obligated. The partnership has been 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 are used to extend the conversion into perpetuity. This is a multi-year program that is eligible for another two years of funding. Future funding depends on the new farm bill. PBHEP also stretches local funding dollars by matching with other federal programs when available such as EQIP and CREP. On lands where PBHEP is able to partner with these federal programs, permanent easements are purchased, which acquire the certified groundwater right or the surface water appropriation.

As of December 2011, permanent easements for surface water appropriations and/or groundwater rights were acquired on approximately 2,500 acres of land in the Platte overappropriated area. Other projects approved and funded by PBHEP include: the conjunctive management groundwater recharge and flood reduction pilot project; Thirty-Mile Canal and Cozad Canal rehabilitation and conjunctive management projects; and the North Dry Creek groundwater project. The conjunctive management projects are discussed in more detail in section III.B.9 below.

#### 4. Platte River Cooperative Hydrology Study

The Platte River Cooperative Hydrology Study (COHYST) was begun in 1996. In 2009, the COHYST group assessed the study's goals and revised them in an updated operating plan that serves to expand its present capabilities to more fully meet the current 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 and the Colorado-Nebraska state line on the North Platte and South Platte Rivers, respectively. This study supports the integrated management planning process, and involves the Department, three natural resources districts, two power districts, and the Nebraska Game and Parks Commission as sponsors. Funds for the

project come from the Nebraska Environmental Trust, the involved parties, and in-kind services provided by the parties.

The Department is active at all levels of the study. The Department 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 February 2010, the COHYST and Conjunctive Water Management (CWM) sponsors agreed in concept on a framework to contribute to a single coordinated modeling effort to further develop tools that will meet the needs of their respective management objectives. On May 4, 2010, the COHYST sponsors and CWM sponsors met and approved an agreement to have COHYST develop the modeling tools. The proposed process includes three phases, which outline the development of an independently derived water budget and a project work plan in Phase I, work plan implementation and tool development in Phase II, and tool use and refinement in Phase III. The tools include three components, which are ultimately linked to provide a closed water budget and meet the needs of the management objectives. These components include: watershed, which partitions precipitation within the study area into various water budget terms to be used in the other components; groundwater, which refines previously conducted work and adapts to the inclusion of the other modeling components; and surface water, which will share budget terms with the other components and route the flow of water through the system. Since the 2010 annual report, COHYST has completed Phase I and realized significant progress in Phase II, which anticipates a tentative completion by December 31, 2012, subject to an externally contracted peer review of the model components and their integration. Additionally, during Phase II workplan implementation in 2010, the COHYST sponsors determined that historical acreage data should be redeveloped to more appropriately address the purposes outlined in the workplan. Redevelopment of historic acres data is nearly complete and is anticipated to be part of the calibrated models of Phase II. Phase III will commence following the peer review and evaluation of the peer review findings. The Department has contributed more than \$350,000 of in-kind service to COHYST under Phases I and II to date.

The Cooperative Hydrology Study data and models are expected to provide the foundation for the Platte River Conjunctive Management Study, integrated management planning studies and analyses required under the respective integrated management plans, and the five-year review procedures outlined in the Nebraska New Depletion Plan for the reach from Lake McConaughy to the Loup River confluence.

##### 5. Western Water Use Modeling

The Western Water Use Management Model (WWUM) was started in 2010. This project is being conducted through an interlocal agreement between the Department, the North Platte NRD, and the South Platte NRD. The goal of this project is to identify strategies developed through a Management Options Plan and assess potential methods of implementation. This project focuses on the area in the Platte River Basin upstream of Lake McConaughy to the Wyoming state line as well as Lodgepole Creek in the South Platte NRD, which are in the western portion of the COHYST study area. The Department is providing staff support to assist

with redevelopment and calibration of the Western Unit of the COHYST groundwater model and is providing expertise regarding the development of surface water operations models. The project is currently working to finalize input data for the respective models, including redeveloped historical acres data, and is developing a comprehensive calibration plan.

This study is expected to assist in both integrated water management activities and in meeting the requirements of the Platte River Recovery Implementation Program.

#### 6. Lodgepole Creek Flow Evaluation

The South Platte NRD received Interrelated Water Management Plan Program Fund (IWMPPF) funding to investigate and study the impacts to the South Platte River due to depletions to Lodgepole Creek. The project has four tasks, including: 1) historical review; 2) streamflow analysis; 3) depletions analysis; and 4) augmentation feasibility. To date, a draft historical review document has been completed, and stream flow and depletion analyses have been preliminarily conducted. Limitations were identified in the depletion analyses relating to calibration of flows in the South Platte NRD, the routing of calibrated flows, and replication of wet and dry reaches; therefore, the stream flow and depletion analyses will be re-calculated when refinements to modeling tools for the basin area are adapted to more closely represent the hydrologic conditions in the Lodgepole Creek Basin. The augmentation feasibility task will be executed at such time as the updated analyses become available.

#### 7. Overappropriated-Fully Appropriated Study

As part of the Department's integrated management planning activities, a Department 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. This report led to further work-refining procedures.

The Department and the Central Platte NRD are evaluating potential methodologies to evaluate basins for determining fully appropriated designations and to continually assess water uses and supplies for the integrated management planning process. A consultant was selected in 2010, and Integrated Water Management Plan Program funding was approved to begin July 1, 2010. This refinement of the fully appropriated procedures is a first step in identifying the overall difference between the current and fully appropriated levels of development in the Platte Basin upstream of Elm Creek. The Department and Central Platte NRD held a stakeholder meeting in May 2011, at which the preliminary findings of the study were presented. A technical memorandum on the project was completed by the consultant in November 2011 and is available on the Department website at [http://dnr.ne.gov/IWM/docs/IWM\\_TechnicalReports.html](http://dnr.ne.gov/IWM/docs/IWM_TechnicalReports.html).

#### 8. Excess Flow Analysis (Unappropriated Surface Water)

The Platte Basin integrated management plans call for an analysis to determine if there is unappropriated surface water available for use in retiming projects that would put the available water back to the river at times when depletions need to be balanced. The first analysis has been completed and shows that excess flows are available at certain times and locations in the basin.

The first phase of this project focused on identifying potential unappropriated water available within the Platte River basin upstream to Lake McConaughy. The analysis provided the Department with a spreadsheet tool to run various analyses with differing inputs and demands on the system. The following river reaches were analyzed: Julesburg to North Platte; Keystone to North Platte; North Platte to Brady; Brady to Cozad; Cozad to Overton; Overton to Odessa; Odessa to Grand Island; and Grand Island to Duncan. In addition to these reaches, the analysis takes into account the instream flow demands downstream of Duncan to the Louisville gage. This analysis has been completed and is available on the Department's website at [http://dnr.ne.gov/IWM/Reports/PlatteRiverStreamflow\\_1210.pdf](http://dnr.ne.gov/IWM/Reports/PlatteRiverStreamflow_1210.pdf). The Department and the five Platte Basin NRDs contracted to extend the analysis to focus on expanding the area studied to the Lewellen gage, above Lake McConaughy, and performing additional analysis of the results to improve understanding of the operational impacts to potential conjunctive management projects. This extended analysis is expected to be completed in the summer of 2012 and will be made available on the Department website.

#### 9. *Platte River Conjunctive Management*

As discussed in section 8 above, the Department, in conjunction with the Upper Platte natural resources districts, has been evaluating the potential for conjunctively managing surface water and groundwater through the analysis of the availability of excess flows (unappropriated surface water). Additionally, the PBHEP sponsors worked to implement the groundwater recharge demonstration and flood reduction projects in 2011.

Funding for the recharge demonstration and flood reduction projects in the Platte River Basin was provided by PBHEP, which includes support from local natural resources districts and the Department. These projects will benefit the State by moving some high flow water out of the rivers during potential flood risk times and storing some of the flows in the aquifer, potentially assisting the State with future interstate compliance efforts.

The Department has worked closely with the local natural resources districts and other water managers to develop models and other tools (COHYST, WWUM) that allow the benefits of these types of conjunctive management strategies to be evaluated. The demonstration project builds on those models and tools and allows for identification of locations best suited for these types of projects as additional opportunities present themselves in the future.

The recharge demonstration and flood reduction project took place in the spring and fall of 2011, before and after irrigation season. The diverted water flowed into canals and soaked into the ground through the unlined canals, pits, and other existing irrigation facilities. The diverted water provides for flood mitigation and for future benefit to Platte River flows by recharging groundwater, making it available to mitigate groundwater pumping depletions to streamflow and to provide accretions to Platte River baseflow. Draft documentation is complete and is being shared with basin partners to identify possible refinements. Preliminary estimates include spring diversions of approximately 77,000 acre-feet and fall diversions of approximately 131,000 acre-feet for a total over 200,000 acre-feet diverted. Recharge from these diversions is estimated at 89,000 acre-feet. Annual and cumulative returns to the Platte River were estimated using the

Hunt (1999)<sup>1</sup> method and include about 20,000 acre-feet over the next 10 years and 50,000 acre-feet over the next 50 years. The project involved more than 20 irrigation districts and canal companies and will assist Nebraska with meeting current and future interstate agreements while also mitigating potential flood risks. The program is expected to continue when flows are sufficient to satisfy existing uses and allow temporary appropriation of excess flow.

### **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 (NPDC) was created 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, and tracking irrigated acres. 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.

The NPDC continued to meet at least twice a year with other special meetings scheduled as needed. In January 2010, the position of Chair rotated from the Bureau of Reclamation to the State of Wyoming. In January of 2012 the position of Chair rotated to Nebraska, and official files have been transferred from Wyoming to Nebraska.

Nebraska also provides database management services for the NPDC.

Each year, as described in Exhibit 10 of the Decree, the Bureau of Reclamation provides a report on the number of “trigger days” that were counted during the previous irrigation season. Trigger days describe the number of days in the irrigation season when surface water appropriations are short of water and replacement of groundwater is required in the reach between Whalen Dam and the State Line. On March 16, 2011, the report was mailed to the parties stating that the calculated number of groundwater “trigger days” for water year 2010 was zero days. The average is 72 trigger days from water years 2002 to 2009 and, including water year 2010, the average drops to 64 trigger days. Both Wyoming and Nebraska agreed with the estimate for 2010. The preliminary calculated trigger days is zero for 2011 as they were in 2010.

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<sup>1</sup> Hunt, B. (1999). Unsteady Stream Depletion from Ground Water Pumping. *Ground Water*, 37(1), 98-102.

Wyoming has regular reporting requirements under various provisions of the Decree that are reported on at each meeting. These provisions are:

- Exhibits 4 and 12 describe the reporting requirements for intentionally irrigated acres located above Guernsey Reservoir and in the Lower Laramie River Basin.
- Exhibit 5 specifies that measurements of surface water diversions from the main stem be reported to the representatives of the North Platte Decree Committee. For 2010, no reporting was required because it was a non-allocation year.
- In Exhibit 6, Wyoming is required to report the consumptive use of irrigation water above Guernsey Reservoir.
- Exhibit 10 contains requirements regarding tracking the use of the ground water irrigation wells that pump in the Triangle area and the replacement water for their depletions to streamflow.
- Exhibits 13, 14, and 15 require monthly reports on water right applications or changes to existing water rights.

For 2011, all reports were received according to and were in compliance with the provisions of the Decree.

Section II.C of the North Platte Decree requires Wyoming to divide their 226,000 acres of intentionally irrigated acreage cap into limited caps above and below Pathfinder Dam. In 2011, Wyoming determined the split of the acreage would be 169,100 acres above Pathfinder Dam and 56,900 acres below Pathfinder to Guernsey Dam. The division of irrigated acres was presented to and accepted by U.S. Supreme Court in conformity with the Modified Decree.

The Natural Flow and Ownership Accounting Procedures (NFO), Exhibit 2 of the NPDC Charter, govern how water is allocated among the irrigation districts and each state on a daily basis. At each spring meeting, the NPDC reviews the Natural Flow and Ownership Accounting Procedures for the current year, makes necessary modifications, and gives final approval. In 2011, the NPDC developed new language to add to the Natural Flow and Ownership procedures about new accounting procedures for the Pathfinder Reservoir after the spillway modification to present at the spring 2012 NPDC meeting.

The duties of the Control Crest Subcommittee (CCSC) include: monitoring the performance of the stream gages that have control crest structures; assuring accurate measurements; reviewing the trigger day analysis performed by the Bureau of Reclamation; and performing other duties as assigned. In the spring of each year, the subcommittee presents a report on controls located in the North Platte system and recommends any changes to the relevant procedures. In 2011, no recommended changes were made by the subcommittee. The current Chair of this subcommittee is a Department Natural Resources Specialist.

The Groundwater Wells Subcommittee is assigned the task of defining an acceptable process for reviewing well permits and evaluating hydrological connections as well as reviewing baseline wells and performing other duties as assigned. A procedure to evaluate hydrologically connected groundwater wells was adopted by the NPDC in the fall of 2002. No new actions were taken by the subcommittee in this fiscal year.

The Consumptive Use Subcommittee (CUSC) is tasked with scoping the work tasks and coordinating future consumptive use studies according to Exhibit 6 of the Decree settlement documents. Current assignments include the study of weather data, irrigation practices, and water balance study sites. All of the studies provide data for the ten-year evaluation of the methodology used to calculate the consumptive use of irrigation water in the North Platte River Basin in Wyoming. The purpose of gathering the data is to provide for a more accurate and reliable method of evaluating any increases or decreases in the consumptive use of irrigation water over time. The CUSC is organizing a workshop in 2012 with the NPDC Representatives to evaluate and review the consumptive use calculations and to review the activities and outcomes of the last ten years.

1. *Weather Data*

Since 2003, the CUSC has been working with the High Plains Regional Climate Center on installing and operating weather stations. In October 2007, the subcommittee reported that three weather stations above Guernsey Reservoir had been installed and had begun collecting data. In April 2008, a decision was made about the new site for the Torrington weather station. The weather station will be relocated to the Sustainable Agriculture and Research Education Center southwest of Lingle, Wyoming. These stations will continue to be maintained by the NPDC.

2. *Irrigation Practices*

This project is described in Exhibit 6 of the Decree documents and is anticipated to be conducted every five years. The first survey of irrigation practices above Guernsey Reservoir, in the North Platte River Basin in Wyoming, occurred in January of 2006. The 2011 survey was mailed in March. The purpose of these surveys is to track changes in irrigation practices that influence the consumptive use of irrigation water. Another survey will be conducted in 2016.

3. *Water Balance Study Sites*

This project has changed through time since its original description in the settlement documents. The original project was to measure numerous aspects of the water budget in a small watershed in Wyoming. The NPDC held a two day workshop in August 2004 at which it was decided to redesign the project. That redesign, installing and maintaining flux study sites, was pursued until October 2007. At that time a decision was made to not move forward with the project in its current configuration because of the expense. Instead, the NPDC directed the CUSC to a different approach, using remotely sensed data to estimate evapotranspiration. In October 2008, the contract to perform remote sensing work above Pathfinder Reservoir was awarded to Riverside Technology. A final report was received in December of 2010. That report is being reviewed and will be discussed at the 2012 workshop.

The Official Files Ad Hoc Subcommittee was responsible for developing the protocol for the filing system that addresses all information to be retained in the NPDC files, both paper files and electronic data. This repository is open to public access, and also includes data referenced in the Final Settlement Stipulation and relevant documents generated by all parties to the Decree. The

protocols for the repository files have been finalized and the subcommittee has been dissolved. Currently, Department staff manages the repository paper files and database.

The State Line Gage Subcommittee (SLGSC) was created in April 2007 to evaluate the operation of the gages at and near the Wyoming/Nebraska state line. If problems exist, it is tasked with finding remedies to make the gaged flow more accurate. In October 2007, the North Platte Decree Committee decided to hire a consultant to evaluate the three measurement sites near the state line, and a Request for Proposal was approved for review. In June 2008, the study budget was approved and the contract was awarded to Aqua Engineering with a final report provided to the NPDC in April 2009. In January 2011, a contract was awarded to Water Resources Solutions (WRS) to complete the bendway weir feasibility study. Next, the SLGSC prepared a sole-source justification for WRS to: 1) do the construction management of the bendway weir; 2) determine the budget for construction management; 3) prepare a draft contract for WRS as construction manager; and 4) determine an overall project budget and schedule. The NPDC voted to move forward with the State Line Gage work, and the SLGSC was directed to develop a sole source justification and contract for project oversight by the end of November 2011. In June 2012, a contractor was selected to complete the construction project. It is expected that construction will happen in February 2013. The current Chair of this subcommittee is a Department Natural Resources Specialist.

The Finance Standing Subcommittee was created for the purpose of investigating how the NPDC would address future expenditures and financial organization. This subcommittee oversees the annual budget and all contracts entered into by the NPDC. The committee has contracted with the Nebraska Community Foundation through 2017 for financial services, which are overseen by this subcommittee, and this allows for funding of PRRIP water action plan projects as well as other projects for the overappropriated Basin.

The Replacement Water Subcommittee was created in the fall of 2006 to work on various tasks described in Exhibits 10 and 11 of the Decree settlement documents. Its tasks as assigned through time are: 1) to address the collecting of information on the basic parameters used to estimate the replacement water requirements in the Triangle area; 2) review the replacement water assumptions for tributary diversions in the Triangle area; and 3) review the irrigation efficiency in the Triangle area. In November 2007, the first set of surveys was mailed to producers in the area. This activity is anticipated to occur every five years. The next survey is scheduled to be mailed in late 2012 or early 2013. The responses for the new survey will be compared to the previous survey to identify any changes in irrigation efficiency and/or in the consumptive use of irrigation water. The current Chair of this subcommittee is a Department Natural Resources Specialist.

#### **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 between the states. Among other limitations, the compact explicitly prohibits use by Colorado appropriators located in the lower section of the river above the Colorado and Nebraska state line. Thus, for example, Colorado appropriators that are junior to the Western Irrigation District's water right of June 14,

1897, are prohibited from use when the flow at the state line is below 120 cubic feet per second (cfs) during the irrigation season from April 1 through October 15.

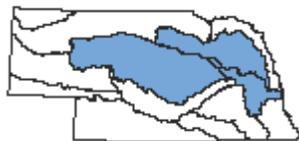
The Department's Bridgeport Field Office monitors the flow at the Colorado Nebraska state line on a daily basis during the compact-established irrigation season. If flows during the irrigation season drop below the established 120 cfs, the Bridgeport Field Office supervisor coordinates with the Colorado Division of Water Resources to have occasional joint inspections of the irrigation usage in the lower section of the South Platte River. The inspections are performed by staff from the Colorado Division of Water Resources, accompanied by Bridgeport Field Office personnel, in an effort to ensure that Colorado is complying with this aspect of the compact.

#### **E. Gaging Activity**

In the Upper Platte River Basin, the Department operates 45 stream gages, 58 canal gages, and cooperates on an additional five gages operated by the U.S. Geological Survey.

For water year 2011, a new continuously-operating stream gage was added to the network on the North Platte River at Morrill. This gage has a numerical designation of 6678500.

### **IV. LOWER PLATTE RIVER BASIN**



#### **A. Integrated Water Management Activities**

The Lower Platte Basin covers seven natural resources districts, including the Lower Elkhorn, Lower Loup, Lower Platte North, Lower Platte South, Pappio-Missouri River, Upper Elkhorn, and the Upper Loup. At this time, no portion of the Lower Platte River is designated as fully appropriated.

The basin was preliminarily determined to be fully appropriated in December 2008. The Department made a final determination in April 2009 that the basin was 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 natural resources districts must develop rules and regulations that limit the development of groundwater irrigated acres and the Department 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 Department. These restrictions apply for a minimum period of four years. Additionally, the Department may forego the previously required annual evaluation of the basin over that same four-year period. The Department did not evaluate the Lower Platte Basin in the 2011 evaluation. The Lower Platte Basin will once again be required to be evaluated at the end of 2013.

The Lower Platte South, Lower Platte North, Papio-Missouri River, and Lower Elkhorn NRDs and the Department are working to develop joint integrated management plans through a voluntary process. Several of the NRDs developing voluntary IMPs are in the initial stages of the planning process by organizing stakeholder groups.

## **B. Studies, Programs, and Projects**

### *1. Lower Platte River Corridor Alliance*

The Lower Platte River Corridor Alliance was created in 1996 through an interlocal agreement. It is a consortium of three NRDs (Lower Platte North, Lower Platte South, and Papio-Missouri River) and six state agencies. The Alliance's 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."

### *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. The study is currently in phase three and involves the U.S. Army Corps of Engineers, Lower Platte South NRD, Lower Platte North NRD, Papio-Missouri River NRD, the Nebraska Game and Parks Commission, and the Department. The Department has no monetary involvement and minimal contractual staff involvement in this study.

### *3. Lower Platte Groundwater Model Study*

The Department is working with a contractor to determine the appropriate tools that can be developed from existing data to assess the impacts of groundwater pumping on hydrologically connected streamflows in the Lower Platte area. This study will review existing groundwater flow models, hydrogeologic studies, and available datasets to build a detailed conceptual model. Study completion is expected in 2013.

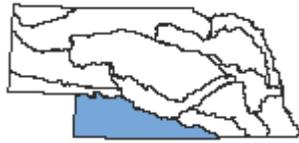
## **C. Gaging Activity**

In the Lower Platte River Basin, the Department does not operate stream gages on the Platte River. However, the Department does utilize five gages operated by the U.S. Geological Survey.

On the Elkhorn River and its tributaries the Department operates 11 stream gages, one canal gage, and cooperates with the U.S. Geological Survey on one gage.

On the Loup River and its tributaries the Department operates 10 stream gages and 23 canal gages.

## V. REPUBLICAN RIVER BASIN



### A. **Integrated Water Management Activities/Integrated Management Plans**

The Republican Basin natural resources districts, which include the Lower, Middle, and Upper Republican, were declared fully appropriated after the passage of LB 962 in 2004. These natural resources districts in cooperation with the Department have implemented three generations of integrated management plans. Integrated management plans and complementary rules and regulations implemented by the districts and the Department are used 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 Nebraska's compact compliance. *Nebraska Revised Statute* § 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 ...."

Starting in 2009, the Department 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 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 areas near streams.

In November 2010, the Upper Republican NRD, the Middle Republican NRD, and the Department implemented revised joint IMPs for those districts. This was followed by the adoption of a revised IMP in the Lower Republican NRD in October 2011.

The Department and Tri-Basin NRD worked to develop an IMP to replace the Joint Action Plan previously in force. This IMP focuses on ensuring that the Tri-Basin NRD is water neutral (i.e., depletions and imported water supplies at their southern boundary are balanced). To further this goal, the Tri-Basin NRD will work to provide 2000 acre-feet of water toward achieving a water neutral condition in the first ten year increment of the plan. The plan became effective July 1, 2012.

### B. **Studies, Programs, and Projects**

#### 1. *Republican River Basin Conjunctive Management Project*

The Republican River Conjunctive Management Study is expected to proceed in two phases. Phase I is the conceptualization of various scenarios and the development of hydrologic tools, such as surface water operations and runoff models. Phase II of the study focuses on the analysis

of conjunctive management scenarios, evaluating those scenarios to assess the hydrologic and economic implications, and developing a plan for implementation. The Department and Republican River Management Districts Association are collaborating to fund this effort. An initial draft report on Phase I has been completed.

Work continues on the Conjunctive Management Project and is anticipated to be enhanced through a WaterSMART grant recently obtained from the Bureau of Reclamation.

## 2. WaterSMART Grant

The states of Colorado, Nebraska, and Kansas have been approved for a basin study under the U.S. Bureau of Reclamation's WaterSMART initiative. A memorandum of agreement and plan of study are in development and are expected to be finalized before the end of 2012. Analyses under the basin study are designed to provide synergistic water management alternatives across the basin as identified by the respective parties.

## 3. 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 Final Settlement Stipulation 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 Republican River Compact Administration approved the study plan in July 2004.

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

- Evaluation and modification of existing models;
- Development of databases;
- On-the-ground verification;
- Application of the water balance and GIS models.

The Final Settlement Stipulation specifies that the states and the United States will spend no more than \$1,000,000, 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 \$1,000,000, 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 has conducted 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 Global Positioning System (GPS). Nebraska has surveyed these (and other non-federal) reservoirs to produce area-capacity tables.

Final modeling scenarios of the influence of terraces and small reservoirs on the evapotranspiration, runoff, and deep percolation (groundwater recharge) water budget components are currently being finalized. These three water budget terms for: 1) lands in hydrologic units with reservoirs and terraces; 2) with reservoirs and no terraces; and 3) with terraces and no reservoirs, are being computed and the volumes compared to the situation without reservoirs and terraces to quantify the effects of reservoirs and/or terraces on the water budget. These scenarios are being modeled for all combinations of five different terrace types, seven different cropping schemes, and three soil types. The changes in runoff rates, along with transmission loss factors, are used to quantify the change in runoff volumes for different hydrologic units in the Republican River Basin. It is anticipated that the project will be completed in 2012.

4. *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 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 evapotranspiration throughout the Republican River Basin. Methods to relate evapotranspiration from riparian systems to groundwater levels and water supplies are also sought to improve groundwater modeling. The study is being funded through the Department, has a budget of \$1,060,485, and is expected to be completed in 2012. Study efforts are being led by the Department of Biological Systems Engineering at the University of Nebraska-Lincoln.

5. *Republican River Basin Water Sustainability Task Force*

The Republican River Basin Water Sustainability Task Force was created by LB 1057 in 2010 to define water sustainability for the basin, develop and recommend a plan to help reach water sustainability in the basin, and develop and recommend a plan to avoid a water short year in the basin. Twelve meetings of the full task force as well as separate educational and subcommittee activities were held between June 2010 and April 2012. The 27 member Task Force completed its work and approved a final report in April 2012. The report is available on-line at [http://dnr.ne.gov/LB1057/docs/RRBWSTF\\_Final\\_Report.pdf](http://dnr.ne.gov/LB1057/docs/RRBWSTF_Final_Report.pdf). Eighteen of the 22 voting members of the task force were appointed by the Governor from various statutory required categories. The other four voting members represented the Nebraska Game and Parks Commission, the Nebraska Department of Agriculture, the University of Nebraska-Lincoln Institute of Agriculture and Natural Resources, and the Nebraska Department of Natural Resources. The statutes also directed that the chairperson of the Legislative Council appoint five members from the legislature who met stated requirements as non-voting, ex-officio members. The Department provided administrative and budgetary support to the Task Force.

### **C. Republican River Compact**

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, 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 2010, Kansas filed another claim against Nebraska and Nebraska subsequently filed a counterclaim. In the spring of 2011, the United States Supreme Court accepted the case regarding issues that were previously arbitrated. The current litigation focuses on Nebraska's non-compliance in 2005-2006, future proposed remedies for ensuring compliance, and technical issues related to methods used in Compact accounting.

### **D. Gaging Activity**

In the Republican River Basin the Department operates 19 stream gages, 10 canal gages, and cooperates with the U.S. Geological Survey on six gages.

During FY 11 and FY 12, the Department began the process of replacing five nitrogen tank-based bubbler systems with pump-based systems. This change will increase the safety of handling and using the stream gaging equipment and decrease the overall operating costs.

## **VI. NIOBRARA 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. Subsequently, 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. Several NRDs challenged the fully appropriated designation, and in 2011, the Nebraska Supreme Court reversed the 2008 fully appropriated determination on the Lower Niobrara River Basin. State statutes require that following the reversal, the NRDs (Upper Niobrara White, Middle Niobrara, Lower Niobrara, Upper Loup, and Upper Elkhorn) develop rules and regulations to limit water development for four years.

The Upper Niobrara White NRD Integrated Management Plan was adopted in 2009. The first annual IMP meeting was June 2010, at which time both the Upper Niobrara White NRD and the Department evaluated the effectiveness of the IMP. The Department is currently working with the Upper Niobrara White NRD to update the IMP as well as their rules and regulations. The third annual IMP meeting will be August 9, 2012.

The expected long-term availability of surface water supplies and hydrologically connected groundwater of the Niobrara Basin below Spencer Dam was evaluated in the “2012 Annual Evaluation of Availability of Hydrologically Connected Water Supplies.” The Department concluded that the portion of the basin examined was not fully appropriated at that time.

The Lower Niobrara NRD and the Department are working on a joint IMP through a voluntary planning process. The Lower Niobrara NRD is working to develop both their stakeholder group and the goals and objectives for the NRD.

## **B. Studies, Programs, and Projects**

### *1. 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 the Department as a partner. The total projected cost is \$154,000. This project will become part of the larger Niobrara Basin Study.

### *2. Niobrara Basin Study*

In June 2010, a proposal was submitted for U.S. Bureau of Reclamation (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. Department staff will also contribute to the cooperative effort. In May 2011, Reclamation and the Department signed the Memorandum of Agreement, effectively starting the project. Project completion is anticipated for 2013.

## **C. Compact Activity**

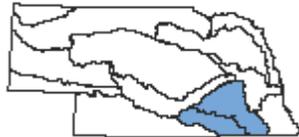
In 1962, the States of Wyoming and Nebraska ratified the Upper Niobrara River Compact. The Compact provides for an equitable division of the available surface water supply of the basin. It also provides for acquisition of information on groundwater and underground water flow necessary for apportioning said flow and calls for the states to address issues that may lead to disagreements. On October 21, 2011, the Department and the Wyoming State Engineer’s Office met to discuss the Upper Niobrara River Compact. At the compact meeting, both states discussed stream gaging efforts, surface water administration, and the Lusk Area Groundwater Study. On

April 13, 2012, a technical subcommittee held a conference call to discuss the results of the joint U.S. Bureau of Reclamation and Department Niobrara Basin Study.

#### **D. Gaging Activity**

In the Niobrara management area the Department operates eight stream gages and uses information from an additional two gages operated by the U.S. Geological Survey.

### **VII. BLUE RIVER BASIN**



#### **A. Integrated Water Management Activities**

The Blue River Basin is divided into three natural resources districts: the Little Blue; Lower Big Blue; and Upper Big Blue (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 Department must annually evaluate the basin. In the “2011 Annual Evaluation of Availability of Hydrologically Connected Water Supplies,” the Department concluded that the Basin was not fully appropriated at that time.

The Department is currently evaluating existing models and datasets in the Blue Basin to determine their suitability for the annual evaluation, and the results of this evaluation will also be used to adapt or redevelop existing tools. Development of data and information will seek to achieve a common level of detail with other basins where statute requires the Department to perform an annual evaluation.

The hydrologically connected waters of the Platte Basin extend into the Upper Big Blue NRD. The Department and the Upper Big Blue NRD have completed an IMP. More information is provided in the Upper Platte Basin portion of this report.

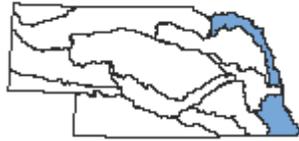
#### **B. Blue River Compact Activity**

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 of natural flow from streams in the basin and certain irrigation wells when necessary and to cooperate in maintaining the water quality of the Blue Basin. Compact meetings generally occur each spring and the 2011 meeting took place on May 16, 2012, in Blue Rapids, Kansas.

#### **C. Gaging Activity**

In the Blue River Basin, the Department operates six stream gages.

## **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 “2011 Annual Evaluation of Availability of Hydrologically Connected Water Supplies” examined the Missouri Tributaries’ Basins, including the Nemaha Basin, and the Department found the basins were not fully appropriated at that time.

### **B. Studies, Programs, and Projects**

#### ***1. Missouri Tributary Groundwater Model Study***

The Department is working with a contractor to determine the appropriate tools that can be developed from existing data to assess the impacts of groundwater pumping on hydrologically connected streamflows in the Missouri Tributaries area. This study will review existing groundwater flow models, hydrogeologic studies, and available datasets to build a detailed conceptual model. Study completion is expected in 2013.

#### ***2. Missouri River Association of States and Tribes***

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 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. It was also formed to facilitate the management of the natural resources of the basin. In November 2011, Nebraska withdrew from the organization because remaining in the Association was not in the best interest of the state.

Governor Heineman indicated that “Nebraska’s interests are currently best served by alternate forms of discussion and engagement. Our efforts must focus on flood control as the highest priority in operation of the Missouri River mainstem system. I believe it is currently in Nebraska’s best interest to engage more directly with those states and federal partners through other means.”

Since that time, the Department has supported and engaged in direct discussions and efforts, including meetings of a Missouri River Basin Governors working group.

3. Missouri River Input Group Meetings

In past years the Department occasionally organized meetings of Missouri River stakeholders in order to provide better information and input to Nebraska's MoRAST representation. Although Nebraska has withdrawn from MoRAST, it is anticipated the Department will continue to occasionally organize stakeholder group meetings in coming years in order to best understand stakeholder concerns and options for addressing them.

4. Missouri River Recovery Implementation Committee

The Missouri River Recovery Implementation Committee (MRRIC) is a seventy member stakeholder committee that represents a wide array of local, state, tribal, and federal interests throughout the Missouri River Basin. MRRIC 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 Plan. MRERP did not receive federal funding for FY 12, and prospects for future funding for that aspect of MRRIC are unknown. However, work on the Missouri River Recovery Plan continues, as does that portion of the duties of MRRIC. The Department provides the Nebraska state government representation for the committee. Other members from Nebraska represent fish and wildlife interests, thermal power, water quality, and the U.S. Department of Agriculture Natural Resources Conservation Service.

5. Missouri River Ecosystem Restoration Plan

The Missouri River Ecosystem Restoration Plan lost federal funding for the past year. While the group has not been decommissioned, it will not receive further funding without congressional action.

6. Missouri River Recovery Program

The Missouri River Recovery Program (MRRP) is a program of the U.S. Army Corps of Engineers and the U.S. Fish and Wildlife Service and its mission is to "Implement actions to accomplish Missouri River ecosystem recovery goals in coordination and collaboration with agency partners and stakeholders." MRRP is currently purchasing or obtaining easements lands along the Missouri River below Sioux City, Iowa for purposes of constructing sandbar habitat and shallow water habitat for fish and wildlife purposes and studying the science needed for recovery.

7. Missouri River Flood Task Force

The Missouri River Flood Task Force was created in response to the 2011 Missouri Basin flood. It provided a temporary forum for coordination, collaboration, and cooperation among the federal officials and designated officers of state, local, and Tribal governments within Nebraska, Montana, Iowa, South Dakota, North Dakota, Wyoming, Kansas, and Missouri. The mission of the Task Force was to assist in completing initial repairs by March 1, 2012, and to conduct long-

term recovery activities in response to the Missouri River Basin flood of 2011 to address floodplain management challenges and keep comprehensive flood risk reduction as a top priority. Department of Natural Resources staff participated in Task Force meetings and on working groups on river management, floodplain management, and agriculture. The task force held its initial meeting on October 21, 2011, in Denver and its final meeting on May 24, 2012, in Omaha.

#### 8. 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. Department staff continues to monitor the Corps' river regulation and decisions, including decisions regarding pulse flows and activity in producing the annual operating plan. The role of the Corps in river operations was the subject of considerable scrutiny during the high flows and flooding in the spring 2011 season. In addition, the previously noted surplus water issue is expected to receive considerable attention during the upcoming fiscal year.

##### a. Flooding

The Missouri River Basin flood of 2011 was the flood of record and Department staff assisted in addressing flood related needs. This included surveying the flooding and discussing actions and programs with the public and other government agencies across Nebraska. Departmental efforts included assistance at the State Emergency Operating Center (SEOC) on a daily basis. The Department's major role at the SEOC included providing the latest streamflow information to the policy group, interpreting flood inundation maps, answering questions related to the National Flood Insurance Program, and providing engineering and technical assistance as needed. The Department's Floodplain Management Section creates and maintains Nebraska's digital floodplain maps. These maps are used as references for areas that may flood based upon expected stages of the rivers. The Department is also the State Coordinating Agency for the National Flood Insurance Program. As previously mentioned, Nebraska also participated in a Governor's Missouri River working group. Two of that group's meetings were held in Omaha.

##### b. Master Manual/Annual Operating Plan

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. The Department provided comments on the 2011-2012 Annual Operating Plan for the Missouri mainstem reservoir system and Departmental staff attended meetings. The Annual Operating Plan was subject to increased scrutiny in 2011 in the wake of the flood.

The Master Manual was written by the Corps and describes how the river is to be operated. The first Master Manual describing operational criteria for the Missouri River mainstem was originally developed in 1960 and subsequently revised in 1973, 1975, 1979, 2004, and 2006. The Corps studied proposed changes from 1989 to 2002 before making the 2004 updates. The U.S. Fish and Wildlife Service issued a 2000 Biological Opinion on the Master Manual and a 2003 Amended Biological Opinion.

Each year the Corps issues an “Annual Operating Plan” describing expected actions based on the reservoir storage, expected runoff, and other factors. The Annual Operating Plan is to be based on the overriding Master Manual. Courts acknowledge that the “dominant” functions of the 1944 Flood Control Act include flood control and downstream navigation, but they also acknowledge that other river interests should similarly be provided for. The “Corps...must consider and balance river interests to achieve maximum benefits.”

#### c. Surplus Water Issues

The surplus water issue arose in late 2010 when the Corps issued a draft environmental impact statement and request for comments on the Missouri River mainstem dam and reservoir located in North Dakota. The issue was existing withdrawals from Lake Sakakawea and proposed withdrawals from Lake Sakakawea and the Corps’ determination that such withdrawals required easements and payments for storage space, even though there are some existing withdrawals that have occurred for many years. The Corps does not obtain surface water appropriations from the states. A number of Missouri River Association of States and Tribes states, including Nebraska, have indicated multiple concerns with the policy and whether it is in compliance with existing laws, regulations, and Corps policy.

In May 2012, the Corps announced that it would move forward with finalizing current outstanding application requests for access to surplus water out of Lake Sakakawea. In its final report to the Assistant Secretary of the Army, the Corps determined that it can temporarily make available 100,000 acre-feet of yield for municipal and industrial water supply use. This will allow municipal and industrial water users access for up to 10 years. The Corps was directed to proceed with processing outstanding applications for access to the surplus water and to enter into agreements for municipal and industrial use of that surplus water.

Department staff will continue to review information and are keeping informed on new developments across the basin.

#### **C. Gaging Activity**

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

**IX. (TABLE 2) - PLANNING & REVIEW PROCESS EXPENDITURES FY 12  
AND BUDGET FYs 2013-2017\* (for FYs 12 and 13 Includes combined full 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 with limited exceptions\*\*)**

	FY 2012 (est.)*	FY 2013**	FY 2014	FY 2015	FY 2016	FY 2017
Personal Services	\$ 1,641,237	\$ 1,937,061	\$ 1,891,426	\$ 1,891,426	\$ 1,891,426	\$ 1,891,426
Travel Expenses	\$ 68,120	\$ 120,066	\$ 120,066	\$ 120,066	\$ 120,066	\$ 120,066
Operating Expense – SOS Temporary Personnel	\$ 78,548	\$ 39,336	\$ 39,336	\$ 39,336	\$ 39,336	\$ 39,336
Operating Expense- Mgmt consultant, Contractual Services and Engineering & Architectural Services	\$ 450,168	\$ 6,830,143	\$ 1,692,477	\$ 1,692,477	\$ 1,692,477	\$ 1,692,477
Equipment, Computer and Software	\$ 79,729	\$ 72,000	\$ 72,000	\$ 72,000	\$ 72,000	\$ 72,000
Operating Expense - Other	\$ 184,316	\$ 141,186	\$ 141,168	\$ 141,168	\$ 141,168	\$ 141,168
Capital Outlay/Fixed Assets Except Computer	-	\$ 311,000	\$ 111,000	\$ 111,000	\$ 111,000	\$ 111,000
Interstate Water Litigation	\$ 436,099					
<b>TOTAL</b>	\$ 2,938,217	\$ 9,450,784	\$ 4,067,423	\$ 4,067,423	\$ 4,067,423	\$ 4,067,423

\* Expenditure and budgetary numbers provided for FYs 12 and 13 respectively encompass the entire budgets of the Planning and Assistance Division and the Integrated Water Management Division under Budget Program 334. This includes the entire budget 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 \$1,100,000 set aside in FY 13 as contingency funding for Republican River legal issues. Also not included is \$3,066,084 FY 13 funding 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 as of August 2012. 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. Budget for staff time expended by the Department's Administration Division, including the Director and Assistant Director is not included in this table, even though much of that work does support planning activity.

\*\* Water Resource Cash Fund monies are used for work and aid related to a variety of water management and implementation activities. The amounts above include \$595,387 in FY 13 cash funding for planning activities. However, they do not include a wider variety of cash funding which includes aid to local governments and implementation and management activities.