



Dam Safety



Integrated Water Management



Groundwater



Surface Water



Floodplain Management



Field Offices



Meet Our New Director

Gordon W “Jeff” Fassett was appointed director of the department (NeDNR) in August, 2015. Read more about Jeff’s history and vision for NeDNR [here](#).

Water Legislation

As this Legislative session nears its close, [here’s](#) a wrap up of what happened so far that affects Nebraska water.

Water Sustainability Fund

The first round of applications for this new funding source have been received, reviewed by NeDNR and are in the process of being scored. For more information, click [here](#).

Groundwater Modeling

Exciting new groundwater modeling capabilities allow for quicker and more accurate calculations. Read all about it [here](#).

Flood Risk Assessment

The Floodplain Division holds community education seminars on flood risk, mitigation and insurance. Cass County held the most recent seminar. Read all about it [here](#).



Ch-ch-ch-changes

There’s a lot happening at NeDNR. Check out a few of the many changes [here](#).



A Century of Gaging

Streamgaging in Nebraska began in 1895. Some of those original streams are still being measured. Learn about the value of this information [here](#).

Upper Platte Basin: A Look Ahead

As the first 10-year increment of the Upper Platte Basin-wide Management Plan is coming to a close. We take a look at the past 10 years and look ahead to the next 10-year phase [here](#).

Employee and Manager of the Year

See who received NeDNR honors for 2015 [here](#).

We’re Honored

NeDNR is humbled by [these](#) awards and nominations.

Jeff Fassett is settling in as new Director

Jeff Fassett became NeDNR's new Director on August 3, 2015. Since coming to NeDNR, Mr. Fassett has made it a priority to meet the agency staff, water users and regulators within Nebraska. He has set an agenda to meet with each natural resources district; many irrigation districts, power districts and municipalities across the state; and other water agency and organization heads by Christmas of this year. Mr. Fassett has previously been the State Engineer and chief water resources official for the State of Wyoming (1987-2000). As State Engineer, he served as the director of all policy, technical and administrative responsibilities of the cabinet-level agency responsible for the appropriation, beneficial use, and general supervision and regulation of all waters in Wyoming. His accomplishments as State Engineer include, among many others:

- Implementation Committee Member of the Upper Colorado River Endangered Fish Species Recovery Program.
- Wyoming Commissioner for the Upper Colorado River Commission
- Wyoming Commissioner for the Yellowstone River Compact Commission
- Wyoming Commissioner for the Snake



Gordon W "Jeff" Fassett

River Compact

- Wyoming Commissioner for the Bear River Commission
- Representative for settlement negotiations in the *Nebraska v. Wyoming* equitable apportionment litigation

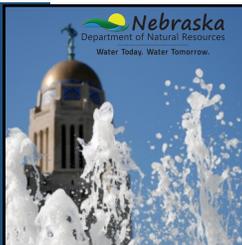
- Led the negotiation and implementation of the Platte River Cooperative Agreement.

Following his position as State Engineer, Mr. Fassett operated Cheyenne-based Fassett Consulting, LLC, an engineering consulting firm that specialized in water rights, water resources engineering, and water policy matters. He later also worked for HDR Engineering, Inc., as the Director of the Water Rights Strategic Program where he was involved with water supply, water rights, and water resources development projects across several regions and states.

When asked what differences he saw between Wyoming and Nebraska, Mr. Fassett stated, "In Wyoming I truly was a "water czar" making decisions regarding all water resources in the state as to how it was managed. In Nebraska the legal structure for managing the State's water resources it is more complicated, inclusive and directly involves many more important regulatory and water management partners such as the 23 natural resources districts."

Mr. Fassett holds a Bachelor of Science in civil engineering from the University of Wyoming and is a registered professional engineer.

Water Bills in the Legislature



The Unicameral took up two key pieces of legislation that has been followed closely by NeDNR.

Senator John Stinner introduced **LB714** intended to clarify current

law on the 15-year time period of non-use allowed for participation in state or local conservation programs.

Statute 46-229.04, which governs the non-use of water-use permits, allows for temporary transfers for a variety of purposes that exempt permit holders from losing the permit due to non-use. However, this specific use was not spelled out in the Statute or this bill originally or as amended. The bill did not pass out of Committee on to General File, but Senator Stinner has asked that NeDNR write a rule clarifying the allowable non-use period. Legal counsels for NeDNR are working on

developing that rule; however, it is a long process that includes feedback from constituents, approval by the State Attorney General, the Governor and the Secretary of State.

A final bill, **LB1038**, has been sent to the Governor for signing.

LB1038, introduced by Al Davis, would allow owners of hydropower facilities to voluntarily transfer ownership of that appropriation jointly to the Nebraska Game and Parks Commission and an NRD or combination of NRDs to maintain streamflow for the conservation of fish, wildlife, recreation and to assist with integrated management plans. This transfer would not affect the original priority dates or preference of the transferred appropriation.

Updates on these bills will be made available on the NeDNR website and through social media as they are known.

New Source of Financial Support Available

The Water Sustainability Fund (WSF) is a new source of financial support for programs, projects or activities that can help the State achieve goals established by the Legislature for managing and protecting our water resources. The Natural Resources Commission (Commission) oversees fund operations including selection of successful applications, and the Department of Natural Resources (NeDNR) performs fund administration. Rules adopted by the Commission and the NeDNR for the Water Sustainability Fund are Titles 261 and 264.

Twenty-seven applications were filed during the initial application period (from December 16 - 30, 2015). Future applications will be accepted from July 16 to 31 each year. The first step in the application review process involves evaluation by NeDNR's Director, Jeff Fassett, to determine whether it meets the criteria for forwarding to the NRC for scoring. The criteria are set by the Legislature and the Commission. Some of the key criteria are: the project is economically and technically feasible; planned work is not in conflict with other State or local plans; the project's effect on threatened and endangered species or associated habitat; the applicant is qualified to perform the project; and requested funding is available.

Fassett has utilized the diverse education and experience of NeDNR staff in engineering, water science and administration, geology, hydrology, economics and finance to assist in reviewing applications.

Fassett and his staff have sent 23 of the 27 applications to the Commission for scoring. A

list of those applications can be found on the Commission [website](#).

The Commission will score each application based on the degree to which it meets each of fifteen criteria set out in statute to support the WSF goals. Bonus points will be given to applications determined to be responding to the requirements of a federal mandate. Once the

Commission establishes final scores for all applications, the scores will be used to establish the ranking for approving funding. Funding will be set aside for the application with the highest score, then for the next highest, until remaining

available funds are not sufficient to fully fund the next application in line.

Once the Commission approves funding for an application, the project sponsor must enter into a contract with NeDNR prior to the sponsor being eligible for reimbursement. Reimbursement requests and financial status reports are processed by NeDNR staff until the project is complete.

Nebraska Interactive has led a team to create a new home page for the Commission (<https://nrc.nebraska.gov>) which was formerly part of NeDNR's web site. NeDNR's Kim Menke and the Information Technology Division staff were instrumental in building the Commission's web-based capability for electronic application submittal and subsequent processing. Statutes, rules, applicant guidelines, and the application form are available on the Commission's website at <https://nrc.nebraska.gov/water-sustainability-fund-0>

Submission period
for new applications
is July 16-31, 2016.

Applications are available
on the Commission's
website

nrc.nebraska.gov

Voluntary Water Use Reporting Online Survey Tool



Surface Water

Everyone knows how important water is to Nebraska. At the Department of Natural Resources, we are continually working to improve the ways we manage and forecast water needs across the state. In 2013 we began asking users of surface water (water from a river, stream, lake, or pond) in selected river basins to participate in our Voluntary Water User Reporting program. The number of selected basins has grown each year; and by this winter, we hope to offer this Voluntary Water Use Reporting program to all surface water users in Nebraska.

The Voluntary Water Use Reporting program utilizes an online survey tool developed by NeDNR. When the harvest is over, NeDNR mails individual PIN numbers to the owners and operators of their respective surface water

appropriations. These PIN numbers are used to log in to the online survey tool. The survey tool asks for series of basic information including the number of acres irrigated with surface water, type of distribution system, crop type, if conservation tillage is practiced, and if groundwater (water from a well) is used in conjunction with surface water. There is also a field for surface water users to enter the readings from their meters if there is one present. In the Republican River basin where reporting is mandatory, the meter readings must be filled out.

The overall response rate to this voluntary reporting request has been very encouraging and further illustrates the commitment that Nebraskans have for maintaining a sustainable water supply for generations to come. This online survey tool is another step that NeDNR is taking to enhance management and oversight of surface water throughout our state.

Improved Groundwater Modeling Capabilities

New Groundwater Modeling Package Reduces Numerical Errors and Increases Speed of Stream Depletion Analyses



Integrated Water Management

NeDNR's Integrated Water Management (IWM) Division relies on numerical groundwater models to support water management decisions; however, the traditional numerical method of computing stream depletion induced by groundwater pumping is computationally intensive and prone to numerical noise. Michael Ou, an IWM Analyst, has developed a new tool that improves the stream depletion analysis process in two ways: it significantly reduces numerical errors, and it can run an analysis 20 times faster than it would take to run the same analysis using the conventional method.

Estimating stream depletion due to groundwater pumping helps IWM identify stream depletion factors, which indicate how fast groundwater pumping in a given location would reduce streamflow in a nearby river. Among other applications, the stream depletion factor is used to define the spatial boundaries of each basin's 10-50 Area, which is the area recognized by the state as being hydrologically

connected to groundwater. Calculating stream depletion factors helps NeDNR, natural resources districts, and other water managers to protect Nebraska's water supplies more effectively.

The new modeling tool is a package for MODFLOW, which is a computer model from USGS that is used to simulate groundwater flow through aquifers. The conventional method of using MODFLOW to estimate stream depletion is time consuming and labor intensive, due to the complexity of the calculations involved and the large number of times the calculations must be repeated for each analysis. In addition, each repetition potentially introduces numerical errors to the analysis.

IWM's new stream depletion analysis package greatly simplifies the required calculations based on some assumptions that typically underlie analytical stream depletion analysis methods, but that have not previously been incorporated into numerical groundwater modeling packages. Under these assumptions, the new MODFLOW stream depletion analysis package enables IWM to linearize the flow equation for stream depletion analysis. In other words, the underlying assumptions allow part of the flow equation to be approximated. The end result is that IWM can now calculate stream depletion factors 20 times faster than before, and with fewer errors.

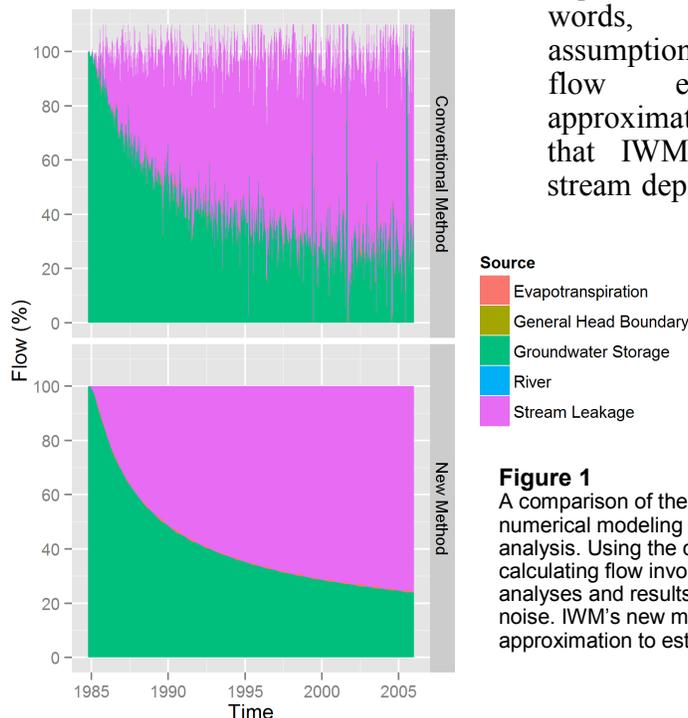


Figure 1

A comparison of the conventional and new numerical modeling methods of stream depletion analysis. Using the conventional method (top), calculating flow involves numerous complex analyses and results in considerable numerical noise. IWM's new method (bottom) uses a linear approximation to estimate the same information.

Cass County Flood Risk Project

By Mitch Paine, CFM



In early 2013, the Nebraska Department of Natural Resources (Department) and the U.S. Army Corps of Engineers (USACE) approached the Village of Cedar Creek and the City of Louisville about digging deeper into flood risk information for properties in their communities. Both towns in Cass County were extremely interested and so set off the two year Cass County Mitigation project that yielded tremendous results for all partners.

Cedar Creek and Louisville wanted to build upon previous flood mitigation conducted in 2006. Those plans included individual structure elevations, but were based on LiDAR estimates, not field surveys. While the prior plans offered a lot of data and mitigation alternatives, the communities wanted enhanced surveys and property-level analysis along with more public participation, and NeDNR and USACE were interested in this effort too. The Cass County project was part of an ongoing effort, called the Nebraska Silver Jackets partnership, by state and federal agencies to collaborate on flood-related projects.

The goal of the project was to encourage mitigation actions with the best and most up-to-date flood risk information.

The largest effort in the project was the data collection phase. Surveyors from NeDNR worked in Cedar Creek and surveyors from USACE worked in Louisville. At each structure, the surveyors shot the elevation of the observed first floor. Because they did not have access to go inside homes, they did not measure the elevation of the basement floor. Over 500 structures were examined throughout both communities.

After collecting elevation information for the structures in the communities, the data was compared to Cass County

Assessor data and other building characteristics. Then, all of the building data was put into the context of flood risk and buildings were compared against multiple floodplains (10-year, 25-year, 100-year, etc.). Flood elevations were calculated for each building, and based upon historical damage costs, an expected annual damage estimate was calculated.

Using the data collected for each structure, USACE was able to figure out which properties were most at risk and determine appropriate mitigation alternatives for each structure. Both communities stressed doing outreach and meeting with property owners as part of the project, so the agencies sought to make the data useful to homeowners and business owners. Maps were created, flood information by address was



Homes like this one in Cedar Creek have their first floor 4-5 feet below the base flood elevation. Elevating this home would reduce flood risk and insurance, and make the family safer.

assembled, and flood insurance scenarios were developed, all to help the average homeowner understand how they could reduce risk for their property.

The public was invited to attend an open house in Louisville on February 24th, 2015, to learn more about the data collected and mitigation actions that can be taken. Over 75 community members attended, many of whom were from Cedar Creek and were concerned with flood insurance rates. Randy Behm and Tony Krause from USACE, Shandi Teltschik from FEMA, and Mitch Paine from NeDNR presented at the open house. The presentations consisted of an overview of home mitigation and

[Flood continues here](#)

Flood continued

floodproofing techniques, an overview of flood insurance changes, specific mitigation scenarios and benefits, and how homeowners can start their own risk reduction projects.

The message that NeDNR, USACE, and FEMA gave was that while home elevation projects, for example, are expensive, they can drastically reduce the

feedback showed that residents found the project incredibly helpful and useful.

While the open house was a very successful event, the floodplain administrators for Louisville and Cedar Creek have taken all of the information about properties and used it to enhance their own outreach to citizens. When people call their offices to inquire about

properties, they now have a wealth of information to give to their callers. With all of the additional flood risk data, better decisions can be made about improving buildings, home sales, buying flood insurance, building on adjacent lots, and doing mitigation



Mitch Paine of the Department presents to a full room of attendees.

amount a homeowner pays in flood insurance and actually improve the value of their building. Elevation also provides an effective way to reduce a family's risk from flooding.

After the presentations, various staff from the agencies sat with residents to help them understand their own property conditions. The one-on-one conversations helped bring the complex world of floodplain management and flood insurance down to an understandable level. Most of the audience members stayed to discuss their own property with the agency representatives. They left with a much better understanding of their property risk and their options to reduce it. The

projects to reduce flood risk.

In the coming years, hopefully this work will inspire flood mitigation projects like community-led buyouts and individual home elevations. Already, some homeowners have expressed a serious interest in elevating their home. NeDNR and USACE hope to find financial resources to help both Cedar Creek and Louisville continue to reduce their flood risk and make their communities even better places to live.

If your community is interested in doing a similar project, contact Mitch Paine at NeDNR.

For more information about the Nebraska Silver Jackets program, visit the website: <http://floods.dnr.nebraska.gov/>

Many Changes at NeDNR

In addition to a new director, NeDNR is undergoing a lot of changes. Here is just a taste of what's happening at NeDNR:

- **Newsletter:** Not only is there a new look, we are going to a nearly-all electronic delivery.
- **GovDelivery:** We recently adopted the GovDelivery system for getting information to stakeholders quickly and efficiently. If you have not signed up for GovDelivery or know of someone who hasn't and would benefit, see our website at dnr.nebraska.gov to sign up. We only capture an email and/or phone number and strive to be prudent with use, so you aren't inundated with alerts.
- **Internal Communication:** An internal electronic newsletter is being developed to ensure all staff are aware of all of the amazing happenings at NeDNR.
- **Education:** Staff are encouraged to attend training opportunities and to share what they learn with other staff through in-house education opportunities such as brown bag learning lunches.
- **Website:** A new website is in the works, but there have already been some changes.
- **Social Media:** We have increased our use of social media to keep you informed on what's happening with our most precious natural resource.

100 Years of Canal Diversion Data



Integrated Water
Management

The Department of Natural Resources or its predecessor agencies have measured stream flow and canal diversions and discharges for over 100 years. The measurement of streams began with the creation of the State Board of Irrigation in 1895. The first area of the state where canals were measured was the Platte River Basin. Several canals that are still operating have been gaged for 100 years as of this year.

The Department will have collected, or worked in cooperation with other agencies in collecting, 100 years of gage measurements at the end of the 2015 irrigation season for the following canals:

- Belmont Canal from the North Platte River, priority December 19, 1889
- Browns Creek Canal from the North Platte River, priority January 20, 1892
- Castle Rock Canal (now Castle Rock-Steamboat Canal), priority April 18, 1889
- Chimney Rock Canal from the North Platte River, priority December 3, 1890
- Empire Canal from the North Platte River, priority December 19, 1889
- Enterprise Canal from the North Platte River, priority March 28, 1889
- Gering Canal from the North Platte River, priority June 23, 1890
- Gothenburg Canal from the Platte River, priority July 5, 1890
- Interstate Canal from the North Platte River, priority September 19, 1904
- Mitchell Canal (now Mitchell-Gering Canal), priority June 23, 1890
- Paxton-Hershey Canal from the North Platte River, priority February 12, 1894
- Short Line Canal from the North Platte River, priority May 1, 1893
- Tri-State Canal from the North Platte River, priority September 16, 1887
- Winters Creek Canal from the North Platte River, priority October 18, 1888



Browns Creek Canal and Gage on the North Platte River

It appears that canals in the Republican River Basin started being reported around 1920, the Loup River Basin canals in the 1930s, and the Niobrara River Basin canals in the 1940s.

Gathering this data has changed over the last 100 years. The *1915-1916 Eleventh Biennial Report of the State Board of Irrigation Highways and Drainage* discusses that daily data was sent to the Department's office every day by

Nebraska postcards. Many of the measurements were taken based upon reading a staff gage (basically a large ruler) installed on the bank of a canal that measured the height of the water (stage). Using a conversion table based upon actual measurements made by field personnel, a calculation of the diversion rate was made in the office.

Today we have mechanical measuring equipment that measures the stage every 15 minutes and automatically returns the reading to the Department's computers via satellite. This does not negate the need for Department personnel to obtain discharge measurements by visiting the gage to determine depth across the cross-section and water velocity across the canal. These actual site visits are conducted on a regular schedule (weekly or monthly) throughout the irrigation season or year to determine if there are any changes in the relationship between stage and discharge. These site visits are also made to verify that the gage is working properly and to enhance the rating curve which is used through the computer system to compute the amount of flow diverted by the canal.

The process of using a rating curve and adjustments was developed by Oscar Van Pelt Stout of the University of Nebraska in about 1900 and is still used today by

the Department and the U.S. Geological Survey.

The Department initiated an expected five-year project in 1912 to convert all streamgaging and canal data from paper records to electronic data. Gaged data has been entered and is currently being reviewed. Staff is currently working on entering miscellaneous stream and canal measurements into a database and locating any missing gaged data.

Upper Platte Basin-wide Planning Update



Integrated Water Management

As the first 10-year increment of the Upper Platte's basin-wide integrated management plan (IMP) begins to wind down, the Upper Platte NRDs (Central Platte, North Platte, South Platte, Tri-Basin, and Twin Platte) and NeDNR are looking ahead and initiating the planning process for the 2nd 10-year increment. The Upper Platte Basin was declared Overappropriated (OA) in 2004, after which the Upper Platte NRDs and the NeDNR (collectively organized through an Interlocal Cooperative Agreement as the Platte Basin Coalition, or PBC) have worked cooperatively through the IMP process toward goals of reducing shortages to streamflow and balancing supplies and uses. The Basin's 2nd increment will begin in September of 2019 and is required by statute to incorporate input from a number of stakeholders. Pre-planning meetings for collaborative conceptualization and design of the 2nd increment stakeholder process have already begun and the formal stakeholder planning process for the basin-wide IMP will begin in spring of 2016. Vital to the 2nd increment planning process will be the data acquired by the PBC members through studies initiated and completed in the 1st increment. Data from these studies are currently being incorporated into a comprehensive robust review, which will allow the members to assess how far they have come in reaching the goals of the basin-wide plan as well as the individual IMPs. Information gained through the robust review, paired with the procedural knowledge gained during the 1st increment stakeholder planning process, will provide the PBC members with a more solid informational foundation upon which the 2nd increment IMP can be built. As the Upper Platte Basin transitions into its 2nd increment IMP over the next few years, it will be instructive to watch this example of the adaptive management process unfold.

NeDNR Manager and Employee of the Year



Tim Gokie is the Department's Manager of the Year. Tim is a dam safety engineer and supervisor of the Dam Safety Section of the Engineering Programs & Services Division.

Tim's motto is "have fun, but get a lot done." Tim sets a good example for his staff by always being on time and putting in a full day's work. His staff meetings have purpose and an agenda. Staff members leave the meetings with a good understanding of updates, direction, and timelines. His staff praised him as always having time to answer questions. Tim is an excellent communicator at all levels.



Jim Marburger is the Department's Employee of the Year. Jim works in the Floodplain Management section of the Engineering Programs & Services Division.

Jim was one of the leads on testing the new streamgaging software that the Department moved to. He is praised by his fellow employees for his work on these programs and his ability to work well with others. Recent updates to the streamgaging data website have received praise from the NOAA National Weather Service.

Department Honors



The Nebraska Department of Natural Resources (NeDNR) was honored with a Special Achievement in GIS (SAG) award at the 2015 Esri International User Conference in San Diego, California. This award acknowledges vision, leadership, hard work, and innovative use

of Esri's geographic information system (GIS) technology.

NeDNR was also nominated for an award through the Secretary of Defense for our hiring and retention practices of folks serving in the Nebraska National Guard and Reserves.

We are proud of our men and women who serve our country and are pleased to be one of 15 Nebraska businesses nominated.