

# Responding to a Water-Quality Event

## The 2013 South Platte Flood in Nebraska

Joint meeting of the Nebraska Surface Water  
Monitoring Council and the Nebraska Groundwater  
Advisory Committee  
November 19, 2013

# OUTLINE

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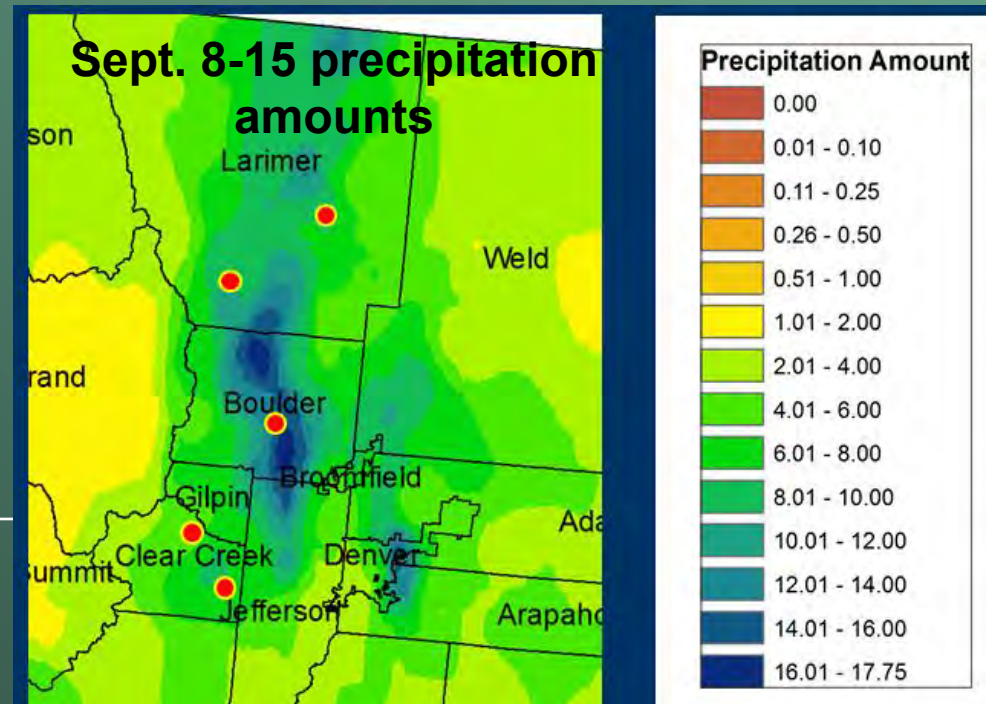
- The timeline of the 2013 South Platte Flood



- What worked well? What challenges were faced?
-

# It starts to rain...

- Excessive rainfall in Northeast CO
  - 8-17 inches of rainfall in the upper S Platte Basin between Sept. 8-15
  - 8.6 inches around Boulder on Sept 12 alone



# September 12

THE DENVER POST Weather: DENVER, CO

## BREAKING NEWS

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LOCAL NEWS

### Colorado flood: Front Range floodwaters kill three, drench homes

By Jordan Steffen and Kieran Nicholson  
*The Denver Post*

POSTED: 09/12/2013 05:42:49 AM MDT 82 COMMENTS  
UPDATED: 09/13/2013 09:23:21 AM MDT

Precipitation Type Radar denverpost.com



Light Heavy Light Heavy Light Heavy

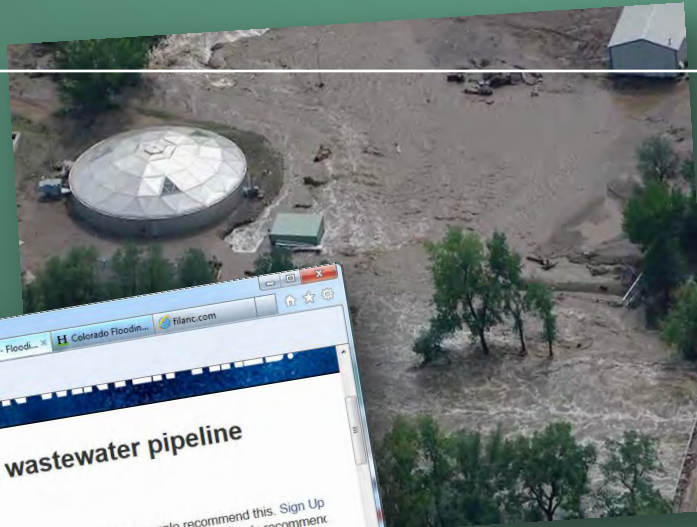
Wed Nov 13 2013 9:05 AM EST

It's still a far-off tragedy in the news



# September 14

We start hearing about spills



## Flooding causes breach in Boulder wastewater pipeline

No immediate threat to drinking water

23 people recommend this. Sign up to see what your friends recommend.



BOULDER - The City of Boulder reported a significant breach in the 75th Street Wastewater Treatment Plant Friday night as flood waters began to recede, plant staff were abated. There is no immediate threat to drinking water, the city officials confirmed that an approximate 30,000 gallons of untreated wastewater were discharged directly into Boulder Creek. There is no immediate threat to Boulder or Lafayette from reservoirs upstream of the city; Lafayette has been advised to continue drawing drinking water from Boulder Creek.

Reservoir and has not been drawing drinking water from Boulder Creek. Boulder has notified federal, state and local authorities and is working on a temporary bypass around the plant. Officials are advising residents to continue avoiding flood water and residents are being asked to minimize water use.

THE DENVER POST  
FRIDAY, SEPTEMBER 20, 2013  
DP HIGH SCHOOLS: Football season is in full swing in Colorado. Follow all the action. denverpost.com/prep

### Oil spilling into mix

10 Sites of gas and oil spilling from damaged tanks in flood-affected areas

18,725 Gallons of oil spilled in two sites reported by Anadarko Petroleum

20,500 Wells in Weld County, plus 321 in Boulder County and 253 in Larimer County

By Mark Jaffe and Bruce Fliskey  
The Denver Post

Washing floodwaters loaded with heavy debris, damaged oil and gas pipes and tanks, causing the new layer of spills that state and federal regulators were tracking Thursday.

Another eight releases, whose contents undetermined, were classified as minor by the Colorado Oil and Gas Conservation Commission — others, for example, consisted of a piece of equipment or petroleum product.

Anadarko Petroleum Corp. on Wednesday reported the two largest releases in Weld County: About 18,725 gallons in the South Platte River near Milliken. A tank farm on the St. Vrain River contained 20,500 gallons — near Fort Collins. Both releases involve condensate — a mixture of oil and water — according to Matthew Allen, a spokesman for the Denver Office of the Environmental Protection Agency. "We are back in the field today."

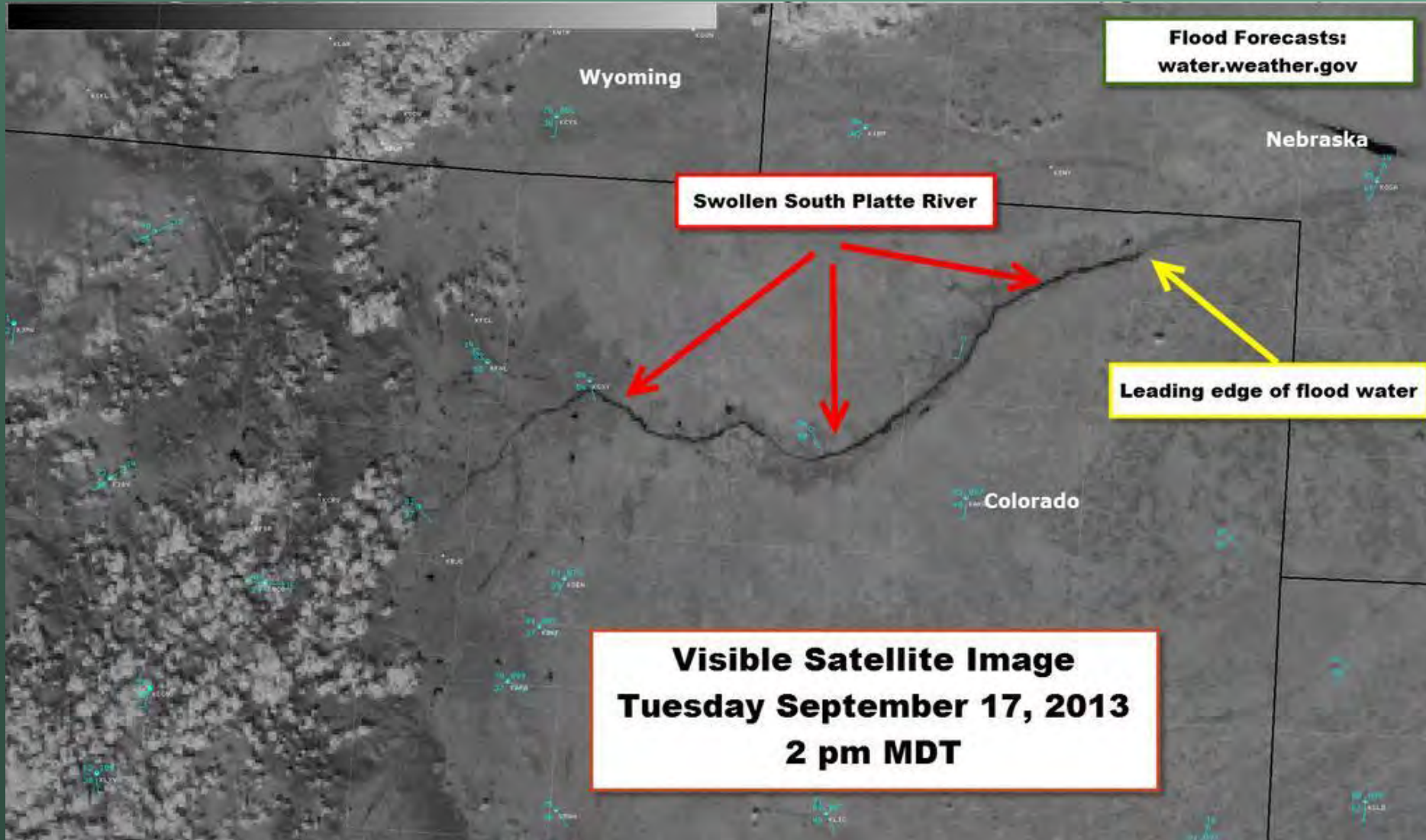
RECOVERY EFFORT  
Hickenlooper names overseer of restoration

A damaged tank Thursday leaks crude close to the South Platte River near Milliken. Andy Cross, The Denver Post

Inside: Complete coverage. 4A-12A • Images: Oil and gas spills in flood-affected areas. photos.denverpost.com



# September 17





# September 18



The screenshot shows a news article from 1011 HD. The article title is "Flooding Could Spread to Parts of Nebraska". It is attributed to "Associated Press Email" and was updated on "Mon 5:11 AM, Sep 16, 2013". The article text states: "Nebraska officials are warning that flooding is possible next week along the South Platte River because of the heavy rain that has fallen in Colorado. Central Nebraska forecasters are concerned because much of the area experiencing flooding in Colorado now feeds into the South Platte River basin. The National Weather Service predicts the South Platte will approach flood stage near Roscoe around the middle of next week. National Weather Service forecaster Matt Masek says it doesn't look like the river will flood at this point, but that could change if more rain falls in the basin. Masek says the forecast will become more clear early next week." An image of a flooded area with reeds is included. The page footer reads "Western NE Authorities Getting Flooded With".

## The flood wave reaches Nebraska

- USGS streamgagers are already mobilized
- USGS samplers start discussing whether to enact their flood-sampling plan

# September 19

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**Nebraska USGS crew  
collects a sample on the  
rising limb at Roscoe**

**Other agencies also begin  
responding**





# September 20

The screenshot shows a web browser window displaying the JournalStar.com website. The page features a navigation bar with links for News, Sports, Entertainment, Opinion, Obituaries, Photos, Classifieds, Get It!, and Mugshots. The main headline reads "The slow, dirty and dangerous flooding of the South Platte River". Below the headline, there are social media sharing options for Facebook (18), Twitter (6), and a Share button (24). A video player is visible, showing an aerial view of the river with a play button in the center. At the bottom of the page, there are advertisements for "SUPER SAVER PHARMACY" and "FLU SHOTS".

## Misquote causes some consternation

*“...the state Department of Environmental Quality won't test moving water, but it could sample standing water that accumulates in public places, such as reservoirs and parks.”*

# September 20

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- Flooding along the Platte is forecast to be minimal. This may be more of a “water-quality event”
  - USGS starts coordinating its water-quality response with other offices
    - Colorado USGS office
    - Nebraska Department of Health and Human Services
    - Nebraska Department of Environmental Quality
    - Cities of Lincoln and Kearney
    - University of Nebraska-Lincoln
  - General sense is that we think our water supplies are protected but we really don't know what's in the water, especially the petroleum by-products
-

# September 20

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- **USGS revises it's flood-sampling plan to**
    - **Be consistent with Colorado USGS sampling; and**
    - **To try to meet the needs of municipal water systems**
  - **The USGS plan?**
    - **Synoptic sampling across the Platte with short turnaround**
      - **E. Coli; Benzene, Toluene, ethylene, Xylene (BTEX) screens**
      - **Volatile-Organic-Compound (VOC) sample for the City of Lincoln**
    - **At a subset of samples, analyze for a wide suite of analytes**
      - **Sampling expected over a two-week time frame**
    - **Keep our continuous monitor running on the Platte River at Louisville**
  - **Flood sampling plans for other agencies**
-



# September 24



Wide analytical array



BTEX & E. Coli



BTEX, E. Coli, and continuous-water quality

## ■ USGS collects a set of nine synoptic samples



Roscoe North Platte Brady Cozad Lexington Overton Kearney Venice Louisville

Image Landsat

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United States

Google earth

Eye alt 511.90 mi

Imagery Date: 4/3/2013

41°24'22.16" N 99°19'45.72" W elev 2334 ft

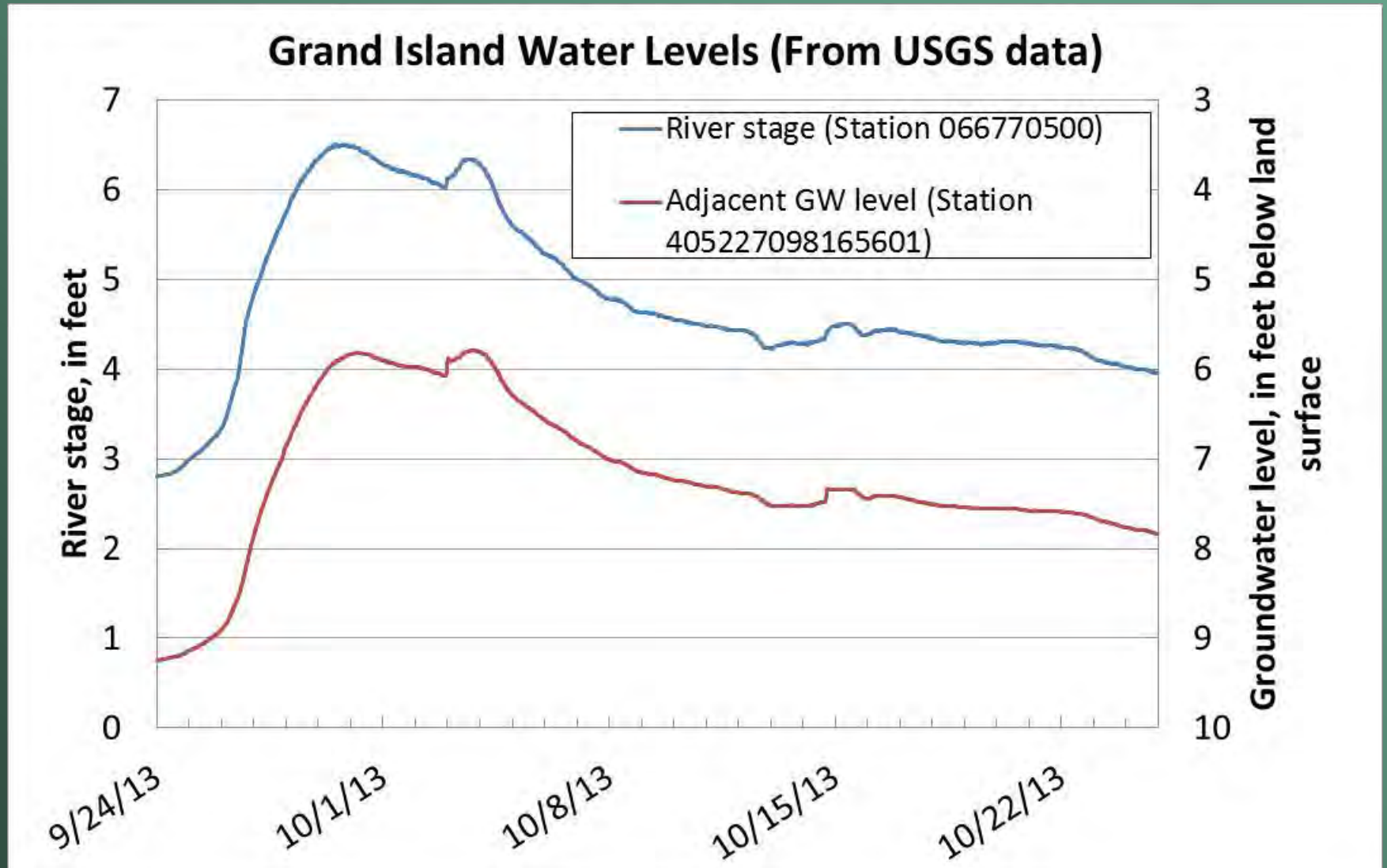
# September 26

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- **BTEX samples are analyzed at the USGS office with in-house gas chromatograph**
  - None of the samples show detections (though the detection limits were unknown)
  - Preliminary results disseminated to local partners
- **City of Lincoln analyzed the Brady sample**
  - No VOCs detected
  - Total Org. Carbon = 21.2 ppm (or mg/L)
  - F, NO<sub>3</sub>, and Br all normal



# Sidebar: SW-GW response at Grand Island





# September 27

- NDEQ news releases include E. Coli sampling results

Official Nebraska Government Website

Nebraska Department of Environmental Quality

Environmental Quality Logo

Home Year Environment

Sampling Location	Bacteria Results 9/19/2013 (pre-flood diversion)	Bacteria Results 9/27/2013	Bacteria Results 10/04/2013	Bacteria Results 10/11/2013
TCSC near North Platte	NA	214	91	53
Jeffrey Reservoir	NA	179	31	59
TCSC south of Gothenburg	4	101	78	45
East Midway Reservoir	11	210	33	32
Plum Creek Reservoir	1	74	291	20
Johnson Reservoir*	44	222	548	219

Platte River

Sampling Location	Bacteria Results 9/19/2013 (pre-flood diversion)	Bacteria Results 9/27/2013	Bacteria Results 10/04/2013	Bacteria Results 10/11/2013	Bacteria Results 10/18/2013
Brady	687	2522	133	102	
Cozad	61	2419	78	73	
Overton	dry	3654	99	NA	42
Grand Island	24	727	488	NA	56
Duncan	dry	dry	2419	NA	387*

\*Note - Although Duncan's results on Oct. 18 were above 235 counts per 100 ml, NDEQ considers these numbers to be within normal sampling levels for the Platte River, particularly since there had been considerable rain previous to sampling, which can elevate bacteria levels. The NDEQ concluded that further sampling for floodwaters' impacts is not necessary.

100%

# September 30

- **City of Lincoln analyzes VOC samples (collected by USGS and Lincoln crews) at Duncan and North Bend**
  - Same-day analyses
  - Duncan: No VOCs, TOC = 22.6 ppm
  - N. Bend: No VOCs, TOC = 4.84 ppm (Pre-flood?)



# September 30

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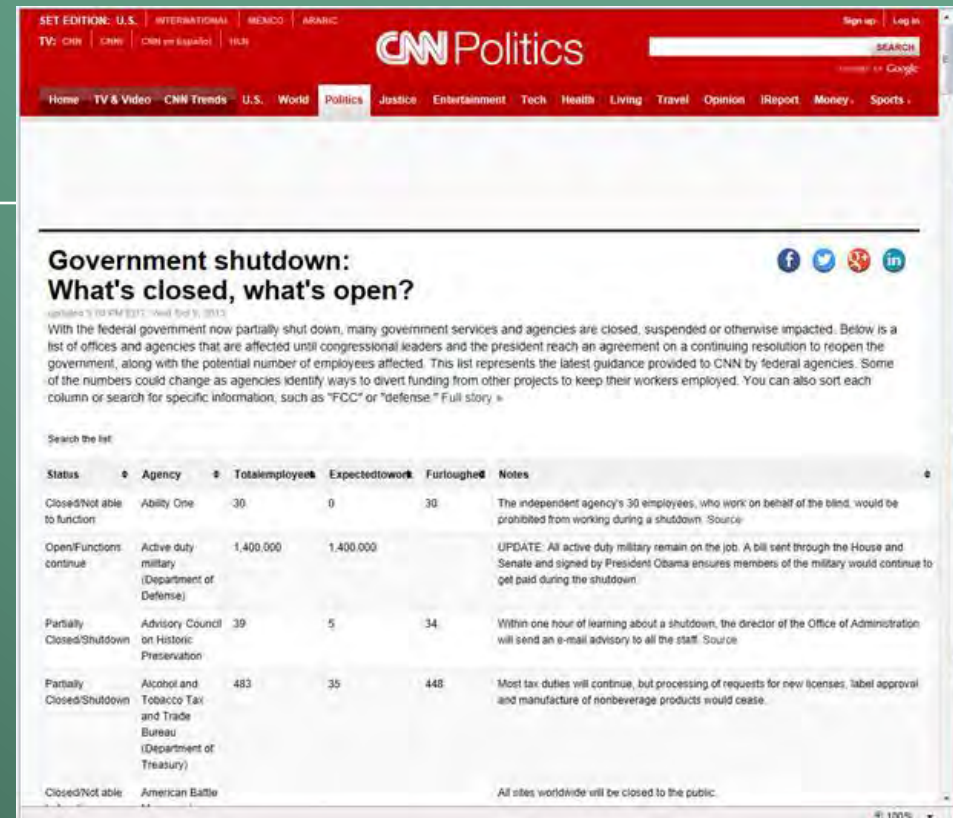
- **USGS prepares for another round of sampling at Duncan, Venice, and Louisville**
-



# October 1

## ■ Federal government shutdown

- USGS is directed to shut down its operations
- Continuous water-quality equipment on the Platte River at Louisville keeps working
- Some emergency stream-gaging continues in Nebraska
- State and local agencies continue sampling



**Government shutdown: What's closed, what's open?**

With the federal government now partially shut down, many government services and agencies are closed, suspended or otherwise impacted. Below is a list of offices and agencies that are affected until congressional leaders and the president reach an agreement on a continuing resolution to reopen the government, along with the potential number of employees affected. This list represents the latest guidance provided to CNN by federal agencies. Some of the numbers could change as agencies identify ways to divert funding from other projects to keep their workers employed. You can also sort each column or search for specific information, such as "FCC" or "defense." [Full story »](#)

Search the list

Status	Agency	Total employees	Expected to work	Furloughed	Notes
Closed/Not able to function	Ability One	30	0	30	The independent agency's 30 employees, who work on behalf of the blind, would be prohibited from working during a shutdown. <a href="#">Source</a>
Open/Functions continue	Active duty military (Department of Defense)	1,400,000	1,400,000		UPDATE: All active duty military remain on the job. A bill sent through the House and Senate and signed by President Obama ensures members of the military would continue to get paid during the shutdown.
Partially Closed/Shutdown	Advisory Council on Historic Preservation	39	5	34	Within one hour of learning about a shutdown, the director of the Office of Administration will send an e-mail advisory to all the staff. <a href="#">Source</a>
Partially Closed/Shutdown	Alcohol and Tobacco Tax and Trade Bureau (Department of Treasury)	483	35	448	Most tax duties will continue, but processing of requests for new licenses, label approval and manufacture of nonbeverage products would cease.
Closed/Not able to function	American Battle				All sites worldwide will be closed to the public.

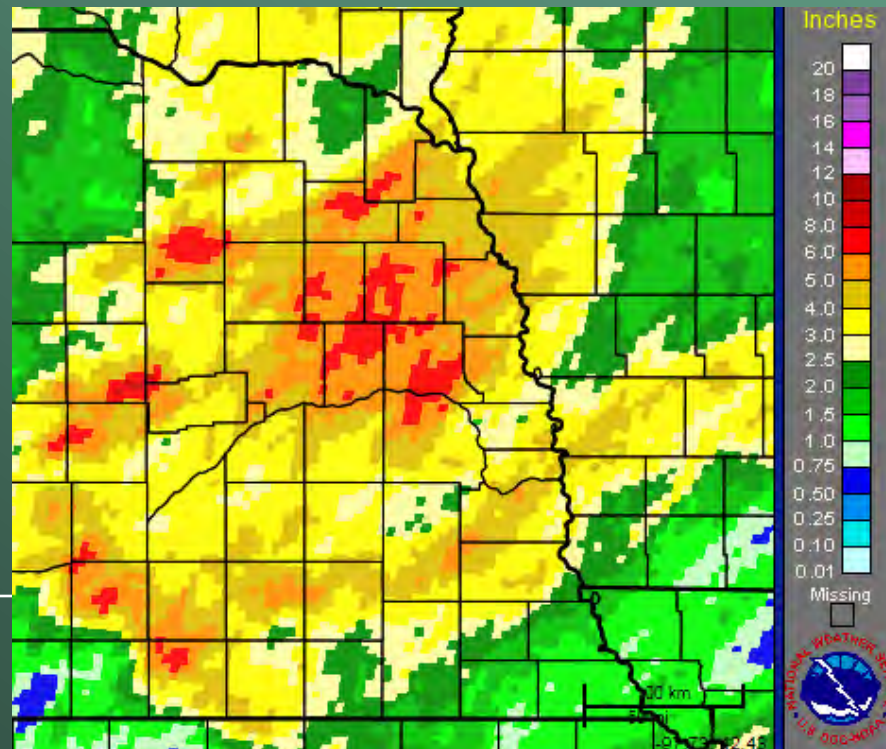
# October 1

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- **City of Lincoln additional samples**
    - Venice 10/01 No VOCs detected; TOC 19.4 ppm
    - Ashland 10/01 No VOCs detected; TOC 11.6 ppm
      - Ashland TOC 9/25 = 6.0 ppm
  - **City of Lincoln was able to obtain very rapid analytical turnaround throughout the flood:**
    - Thanks to Candy Stock and staff at Midwest Labs for VOC analyses
    - Thanks to Eileen Thaden and Allison Trentman at the Lincoln Water System – Ashland Water Treatment Plant Laboratory
-

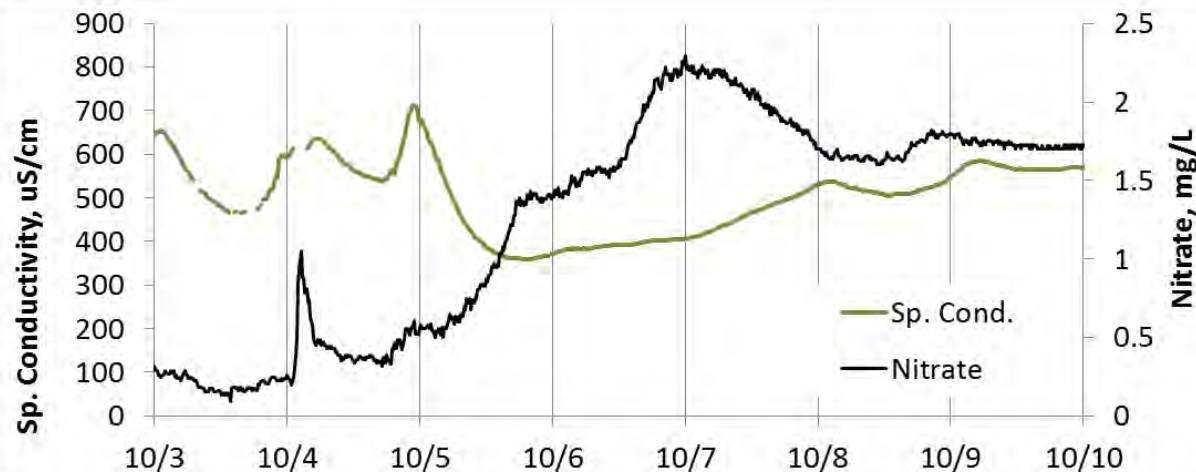
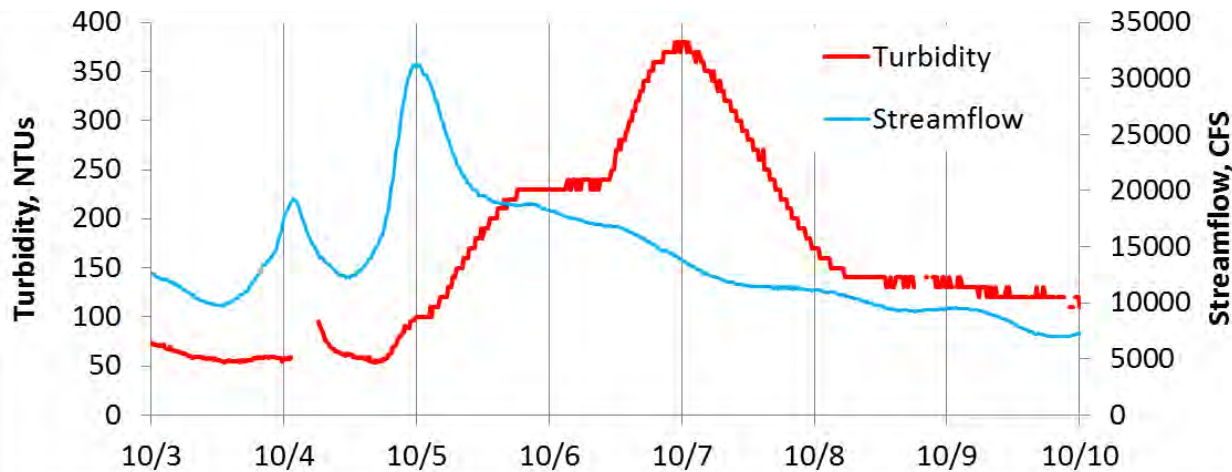
# October 2-3

- As the South Platte River flood wave approaches the Lower Platte:
  - Significant rainfall hits the Loup, Elkhorn, and Salt Creek Basins



# October 4-7

## USGS 06805500, Platte River at Louisville



- **October 4:**
  - **S. Platte flood wave arrives at the Louisville gage**
  - **Runoff from the Loup, Salt Creek, and Elkhorn basins 'muddies' the S. Platte flood signature**



# October 11

http://journalstar.com/news/local/flooded-... Flooded Platte River no lon...

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## Flooded Platte River no longer is health risk, authorities say

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**SUPER SAVER PHARMACY FLU SHOTS**

125%

# October 17 and on

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- **October 17:**
    - Government reopens and USGS sends E. Coli sampling results from Sept. 24 to Dept. of Health and and Dept. of Environmental Quality. Highest level was 1900 colonies/100 mL
  - **Preliminary USGS results available online**
    - Nebraska USGS 2013 flood samples
    - <http://waterdata.usgs.gov/ne/nwis/>
    - Analytical results for nutrients, bacteria, dissolved metals, wastewater indicator compounds, and oils and grease.
-

# South Platte flood epilogue

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- **Tragedy in Colorado**
  - **The water-*quantity*-related threat seemed to wane as the pulse moved through Nebraska**
  - **In Nebraska, the water-*quality*-related threat:**
    - **Was a news-worthy unknown**
      - News reports indicated ~19,000 gallons of oil spilled and ‘millions’ of gallons of raw sewage
      - By comparison,  $96.5 \times 10^9$  gallons of water passed by Roscoe between Sept 15 and Oct. 5 ( $8.6 \times 10^9$  gallons on Sept. 23 alone)
    - **Was alleviated by confidence in the drinking-water infrastructure and further diminished by the sampling results**
-

# Successes

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- Though more could have been done, coordination was effective
  - In the news media, our messages didn't seem to conflict with one another
  - Duplication of effort seemed to be minimal
-



# Challenges to a flood response

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- **In responding to a water-quality event, an agency has to balance:**
  - Its existing mission and duties
  - The existing mission of related agencies
  - The public good
  - Funding
- **The best laid plans of mice and men often go awry**
  - Each event is unique
  - Last-minute adjusting is inevitable, but can lead to problems
  - Gov't shutdown



# Questions?

## How do you rate the 2013 water-quality response?

- Is there a need for more water-quality coordination?
  - There is already an interagency group in place for managing/monitoring water-*quantity* during floods
  - <http://silverjackets.dnr.ne.gov/index.html>



- If so, does that need justify the setup time?

# CONTACT INFORMATION

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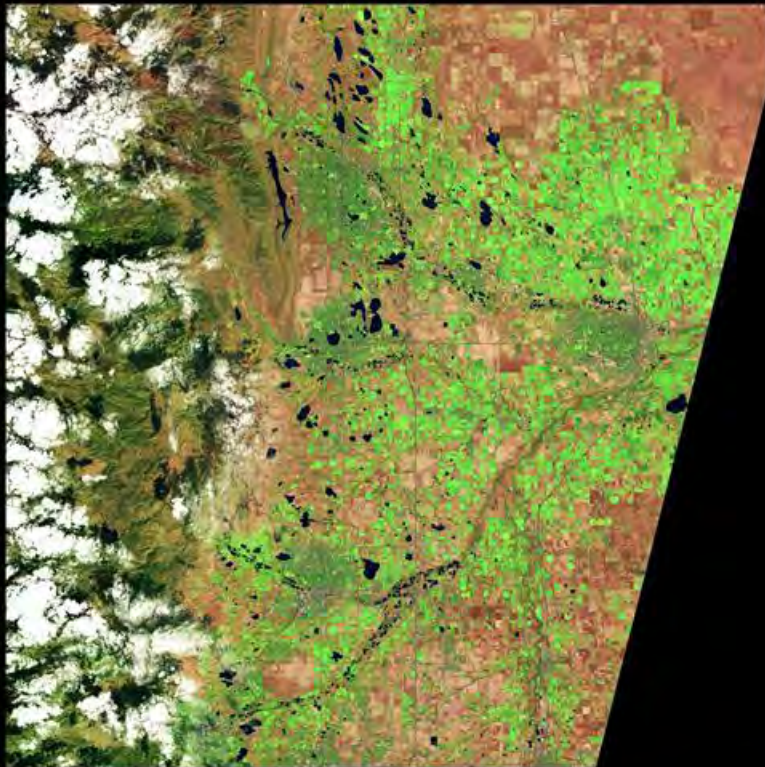
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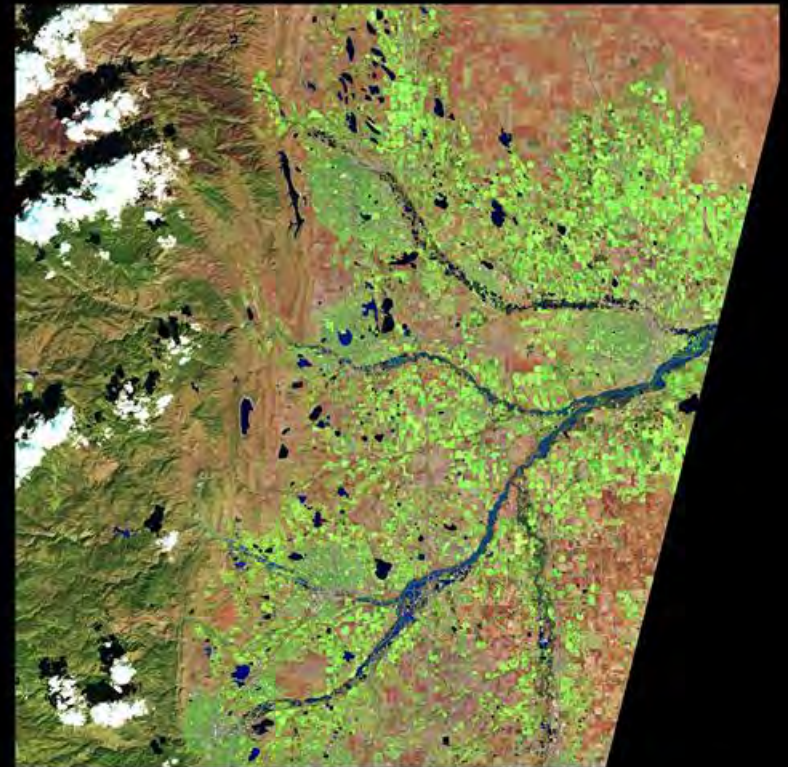
**Ronald B. Zelt**  
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# Aug. 16, 2013 vs Sept 17, 2013



Landsat 8  
August 16, 2013



Landsat 8  
September 17, 2013

