Nebraska’s Innovative Approach to the 2013 South Platte River Flooding

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Overview

• Background
• Developing Potential Inundation Maps
• Diverting Floodwaters for Recharging the Aquifer
• Coordinating with Cooperating Agencies
• Results and Summary
Background

Big Thompson Creek

South Platte River

Enlarged Area
Flooding Begins in Colorado

• Week-long precipitation event in Colorado from September 9 – 16, 2013

• Streamgages are washed away from bridges in Colorado

• Unknown floodwaters headed to Nebraska
Flooding Begins in Colorado

Source: National weather Association
Precipitation Total in Colorado

A Google Map with information from Boulder National Weather Service Forecast office.
Department Preparation

- Peak flow determined in Colorado by Field Office
- Department floodplain managers developed potential flood inundation maps
  - Forecast flood stages
  - LiDAR & USGS topographic data
- Provide maps to Nebraska Emergency Management Agency and local government
- Working with Irrigation Districts to Divert Floodwaters
Developing Potential Flood Inundation Maps

Photos credit: NEMA & NDOR
## FIS Flow and Elevation Information

<table>
<thead>
<tr>
<th>Location</th>
<th>2% Annual Chance</th>
<th>1% Annual Chance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Flow, cfs</td>
<td>Elevation, feet</td>
</tr>
<tr>
<td>SPR at Sedgwick, CO</td>
<td>42,500</td>
<td>3580.6</td>
</tr>
<tr>
<td>SPR at North Platte</td>
<td>36,400</td>
<td>2835.9</td>
</tr>
<tr>
<td>PR near Gothenburg</td>
<td>25,000</td>
<td>2560.1</td>
</tr>
<tr>
<td>PR at Lexington</td>
<td>25,000</td>
<td>2385.6</td>
</tr>
<tr>
<td>PR near Kearney</td>
<td>25,700</td>
<td>2143.8</td>
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</tbody>
</table>

SPR-South Platte River
PR-Platte River

Nebraska Department of Natural Resources
Potential Flood Inundation Depth Map

Department of Natural Resources
Diverting Floodwaters for Recharging the Aquifer
Diverting Floodwaters for Recharging the Aquifer
Flood Flow Diversion Management

- Collaborative effort
- Contact potential partners to divert floodwaters
  - Canals
  - Irrigation Districts
- Agreements developed quickly with partners
- Coordinate timing of diversions
- Potential to provide beneficial recharge
2013 South Platte Flooding

Floodwaters Diversion Partners

- NRDs (Natural Resources Districts)
  - Central Platte NRD
  - South Platte NRD
  - Tri-Basin NRD
  - Twin Platte NRD
- Irrigation & Public Power Districts
  - CNPPID
  - NPPD
  - Paxton-Hershey Water Company
  - Platte Valley Irrigation District
  - Thirty Mile Canal Company
  - Western Irrigation District
Diversions of Fall 2013 Floodwaters
Estimated Average Rate of Floodwaters Diverted

<table>
<thead>
<tr>
<th>Canal Name</th>
<th>Average Rate, cfs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western Canal</td>
<td>59</td>
</tr>
<tr>
<td>North Platte Canal</td>
<td>69</td>
</tr>
<tr>
<td>Paxton-Hersey Canal</td>
<td>35</td>
</tr>
<tr>
<td>Suburban Canal</td>
<td>12</td>
</tr>
<tr>
<td>Phelps Canal</td>
<td>123</td>
</tr>
<tr>
<td>E65 Canal</td>
<td>280</td>
</tr>
<tr>
<td>Gothenburg Canal</td>
<td>46</td>
</tr>
<tr>
<td>Dawson Canal</td>
<td>1275</td>
</tr>
<tr>
<td>30-Mile Canal</td>
<td>1797</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3696</strong></td>
</tr>
</tbody>
</table>
2013 South Platte Flooding

Results

- Total Diverted (9/15 to 10/31/2013) 44,100 AF
- Ave. Rate of Floodwaters Diverted 3,696 CFS
- Estimated Total Recharged 29,900 AF
- Total Cost $707,748
- Cost per Acre-foot $24
Coordinating with Other Agencies

STATE
FEDERAL
LOCAL

Coordination
State and Local Agencies
• NEMA
• NDOR
• NDEQ
• State Patrol
• NRDs
• Irrigation Districts
• Local Emergency Managers
• Community Officials, and
• Others

Federal Agencies
• NWS
• NWS-RFC
• USACE
• DHS
• USGS, and
• Others
Results and Summary
## South Platte River’s New Records of Flood Stages

(Preliminary Data)

<table>
<thead>
<tr>
<th>Gage Location</th>
<th>Approximate Crest Time</th>
<th>Crest Stage</th>
<th>Flood Stage</th>
<th>Record Stage</th>
<th>Approximate Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPR near Julesburg, CO</td>
<td>Sept. 18th</td>
<td>10.7</td>
<td>10</td>
<td>10.4</td>
<td>21,000</td>
</tr>
<tr>
<td>SPR near Roscoe, NE</td>
<td>Sept. 20th</td>
<td>12.2</td>
<td>9</td>
<td>11.3</td>
<td>18,500</td>
</tr>
<tr>
<td>SPR at North Platte, NE</td>
<td>Sept. 23rd</td>
<td>14.4</td>
<td>13</td>
<td>14</td>
<td>19,200</td>
</tr>
</tbody>
</table>

SPR-South Platte River
Peak Discharges of South Platte and Platte Rivers

Source: Platte River Recovery and Implementation Program
Before and During the South Platte River Flood

Big Springs, Nebraska

Credit National Weather Service Web Site
Before and During the South Platte River Flood

Roscoe, Nebraska

Credit: National Weather Service Web Site
Before the Flood Event

South Platte River Bridge, Highway 83, North Platte, Nebraska
Friday, September 20, 2013, at 8:45 a.m.
26 Hours Later - The Flood Event

South Platte River Bridge, Highway 83, North Platte, Nebraska
Saturday, September 21, 2013, at 11:00 a.m.
Before and During the South Platte River Flood

Newberry Access Bridge
North Platte, Nebraska

Credit: National Weather Service Web Site
Summary
Nebraska’s Approach to the 2013 South Platte Flooding

✓ Proactive
✓ Anticipatory/ Make Room for Floods
✓ Collaborative
✓ Efficient
✓ Model for Future Flood Events
Questions