

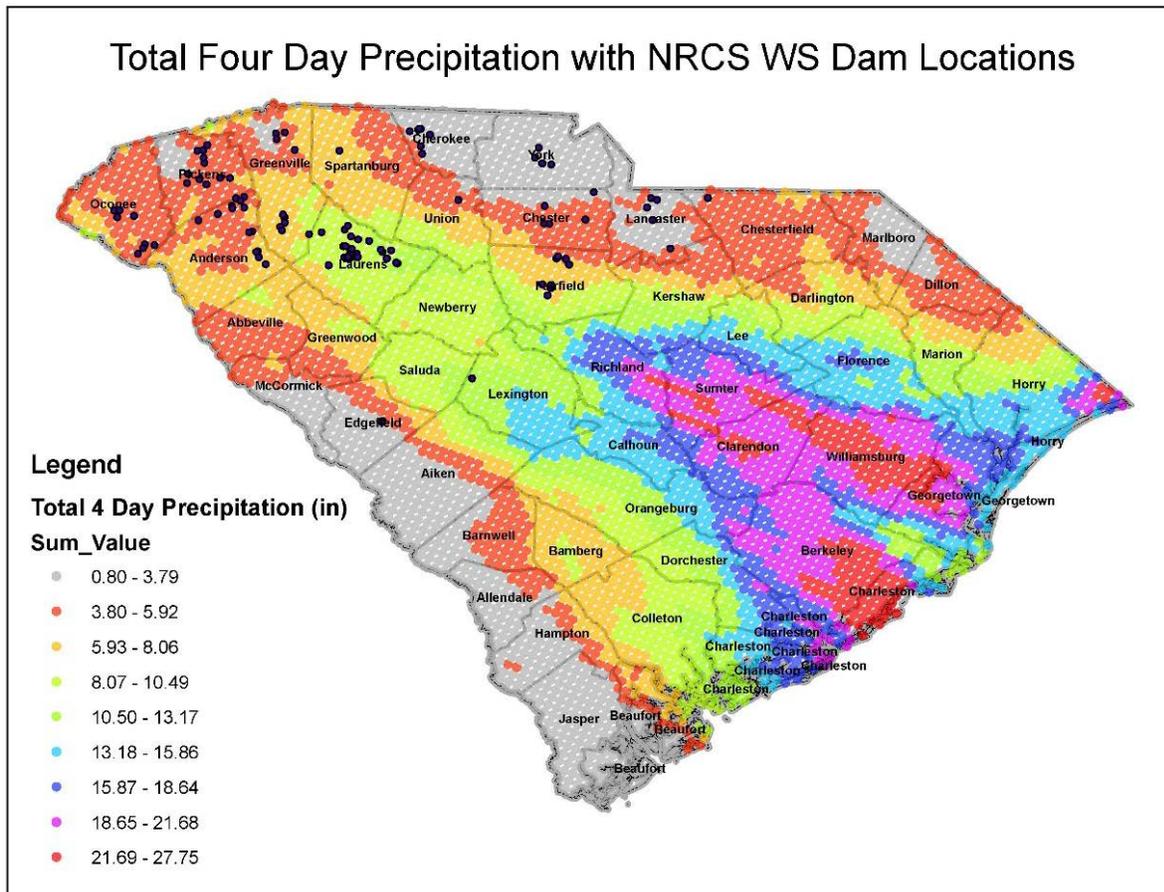
## NRCS Experience Using DamWatch® during October 1-4, 2015 Storms in South Carolina

Steve Durgin, National Design Engineer, Conservation Engineering Division, Washington, DC  
 Larry Caldwell, Retired National Rehabilitation Program Manager and Earth Team Volunteer, Stillwater, OK

### Event Description:

Heavy rainfall, associated with the effects of Hurricane Joaquin, occurred in South Carolina from October 1-4, 2015. Rainfall amounts varied from 0.5 to 27 inches across the state (USDA Natural Resource Conservation Service, October 2015). Figure 1 shows a distribution of the rainfall amounts during the event. For 105 NRCS watershed dams in 27 NRCS watersheds with PL 83-566 projects, rainfall amounts range from 2.8 to 8.9 inches.

**Figure 1. South Carolina Four-Day Rainfall Amounts**



### DamWatch Alerts at NRCS Watershed Dams:

DamWatch sends alerts to users when rainfall amounts exceed predetermined thresholds.

DamWatch administrators set rainfall alert thresholds to correspond with rainfall amounts that will potentially fill the reservoir of a dam and set spillway flow alert thresholds to correspond with rainfall amounts that will potentially result in auxiliary spillway flow at a dam.

During the event, DamWatch reported 28 NEXRAD alerts – 11 rainfall alerts and 17 spillway flow alerts (see Table 1). Thresholds for the rainfall alerts ranged from 4.6 to 7.6 inches.

Thresholds for the spillway flow alerts ranged from 6.5 to 9.2 inches. All of the alerts occurred between 9:30 and 11:00AM on Sunday October 4, 2015, approximately 49 hours after the start of the rainfall event.

Field reconnaissance within a day of the alerts confirmed spillway flow on 13 of the 17 dams with spillway flow alerts. Field visits also found one spillway flow on a dam with a rainfall alert (see Table 1).

**Table 1 – DamWatch Alerts in South Carolina October 1-4, 2015**

County	Four Day Rainfall	All Alerts	Rainfall Alerts		Spillway Flow Alerts	
	Inches	Number	Number	Verified Spillway Flow	Number	Verified Spillway Flow
Fairfield	7.3	3	3	0	0	0
Laurens	11.4	24	8	1	16	12
Lexington	12.6	1	0	0	1	1
<b>Total</b>		<b>28</b>	<b>11</b>	<b>1</b>	<b>17</b>	<b>13</b>

### NRCS use of DamWatch during the event:

On Sunday October 4, DamWatch issued 29 NEXRAD alerts for dams in the Southeast– 28 in South Carolina and 1 in Georgia. Steve Durgin, National Design Engineer, provided details of the alerts to Noller Herbert, Conservation Engineering Director, Eric Fleming, South Carolina State Conservation Engineer, and Diane Guthrie, Georgia State Conservation Engineer. Noller, consequently, reported the details to NRCS leadership.

Steve also contacted Eric Fleming to see if he needed any assistance with DamWatch or other issues related to the event. Eric had received the DamWatch alerts on his mobile device. Eric was at a FEMA emergency center in Columbia, and was in the process of accessing DamWatch on his computer. Steve and Eric reviewed ways to sort through the alerts to prioritize dams with high hazard classification and dams with spillway flow alerts.

Eric used DamWatch to coordinate field visits by NRCS staff and others. By Tuesday October 6, NRCS staff conducted field visits of all the sites receiving DamWatch alerts, except for one dam made inaccessible by road closures. During the field reviews, staff verified spillway flows on 14 of the dams. The majority of the dams were small detention basins adjacent to channel systems. No major damage was identified during the field reviews.

### **NRCS lessons learned from the response to the event:**

DamWatch provided valuable assistance to the NRCS response during and following the event. At the same time, the event revealed opportunities for better using DamWatch to prepare for future events. The following lists some of the major lessons learned:

- DamWatch allowed NRCS staff to focus on 28 dams with alerts, instead of approximately 100 dams in the general area of the event. This enabled NRCS to utilize available staff quickly and efficiently.
- South Carolina's effort to review the dams in the field within 48 hours was commendable.
- Eric Fleming cited two difficulties using DamWatch during the event: lack of experience using the system and lack of information in the system. South Carolina staff generally lacked experience in using DamWatch and had limited files, such as as-built drawings and emergency action plans, loaded in DamWatch. South Carolina NRCS recognized the need to train staff and to load files in DamWatch to improve the availability of critical files during storms.
- Cell phone text alerts contained limited information about dams, such as NID number and event level. South Carolina recommended updating DamWatch to send out more detailed text alert information, such as county and dam name.
- Many field personnel did not have cell phones, tablets, or cameras. This limited access to DamWatch alerts, made communication between the field and State office difficult, and limited the photographic documentation of site conditions at the dams.
- Eric Fleming noted that he wished he had placed more emphasis on getting watershed project sponsors into the system. At the time of the storm, sponsors generally had not yet accessed or been trained on use of DamWatch. People near the site, like sponsors, could have provided information on conditions at the dams very quickly. This would have saved considerable time in prioritizing and completing field reconnaissance visits. South Carolina NRCS plans to work to get more sponsors signed up and trained to use DamWatch.
- When South Carolina NRCS terminated DamWatch alerts, DamWatch immediately issued new alerts. The staff considered the new alerts a nuisance. The staff did not realize they could have used an option to silence terminated alerts during the continuation of the storm.

- South Carolina NRCS recommended adding a suggested checklist of information staffs should collect when they do their field reviews (photos, depth of spillway flow, reported rainfall amounts, description of damages that occurred, etc.).
- DamWatch administrators had an important role prioritizing and supporting the activities of local users.
- South Carolina NRCS noted that numerous requests for watershed success stories from various sources served to distract limited staff from conducting support activities.

**References:**

Durgin, S. and Caldwell, L., November 3, 2015, Telephone interview with Eric Fleming, NRCS South Carolina State Conservation Engineer, Ayana Brown, NRCS South Carolina State Design Engineer, and Steve Henry, NRCS South Carolina State Environmental Engineer.

USDA Natural Resources Conservation Service, October 2015, Flood Damage Estimates (Resulting from Hurricane Joaquin October 1-4, 2015) Averted from NRCS Assisted Project Dams for South Carolina Floods.