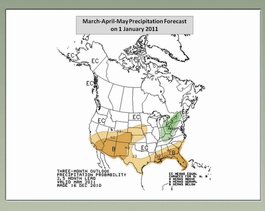
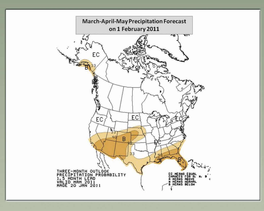
US Army Corps of Engineers
BUILDING STRONG

Missouri River
Mainstem Reservoir System

Winter: Jan/Feb 2011
Long-Term Climate Outlook

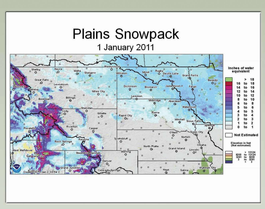


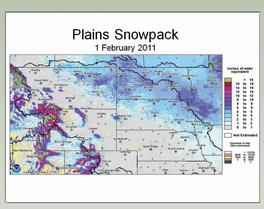


How the Corps Assesses Its Long-Term Climate Forecast

The Corps uses climate forecast information from the National Oceanic and Atmospheric Administration (NOAA). The Three-Month Outlook is updated monthly and forecasts the probability of precipitation in an area. The precipitation probability levels are: Above Normal (A), shown in shades of green; Below Normal (B) shown in shades of brown; and Equal Chances (EC), equal chance of (A) and (B), shown in white.

In both January and February, the three-month precipitation forecast called for Below Normal (B) precipitation in the lower Missouri River basin and Equal Chances (EC) for the upper Missouri River basin.

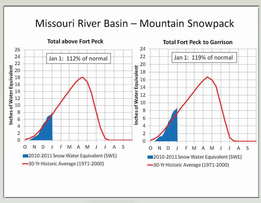


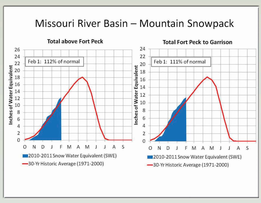


Plains Snowpack

The National Operational Hydrologic Remote Sensing Center (NOHRSC) produces plains snow assessments. These are estimates of snow water equivalent (SWE). The assessments are determined using modeled and observed snow information, airborne snow data, satellite snow cover and historic snow data.

2011 was the third consecutive year of significant plains snowpack.





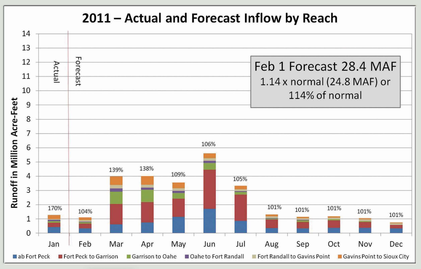
Mountain Snowpack

Runoff from mountain snowpack enters the system above the Fort Peck and Garrison reservoirs. Mountain snowpack normally peaks on or about April 15. The amount of SWE in the mountain snowpack above these two projects is determined from approximately 100 remote sensing stations.

The mountain SWE above Fort Peck and from Fort Peck to Garrison was slightly above normal when measured in January and February.

Corps' Runoff Forecast

Reach-by-Reach Runoff Forecast

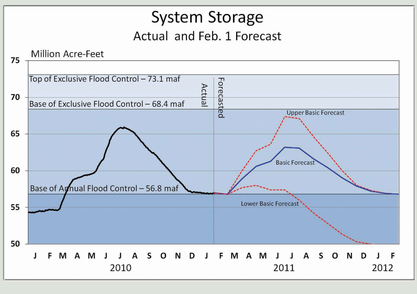


The Corps uses information from plains snowpack, mountain snowpack and the long-term climate forecast to develop a monthly runoff forecast.

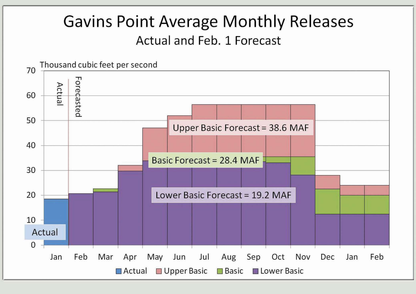
Reservoir Computer Model

After developing the monthly reach-by-reach forecast for the basin, the Corps enters this information into a reservoir model to develop the reach-by-reach expected storage and reservoir release levels.

Storage and Releases



The Corps started the 2011 runoff season with the full capacity of its 16.3 million acre feet of flood control storage available. During the 2010 runoff season, storage in the system peaked July 23, 2010, when the Corps was storing more than 9 million acre feet of floodwaters. Evacuation of those floodwaters continued from July 23, 2010 through Jan. 28, 2011, when the Corps fully evacuated all of the 2010 floodwaters and was prepared for the 2011 runoff season.



The graphic at left shows actual storage for 2010 and projected storage for 2011. The graphic at right shows projected Gavins Point releases for 2011. The Corps develops a basic forecast which assumes expected precipitation (snow and rain). The Corps also develops two contingency forecasts that set a plan for reservoir storage and release rates in the event of above and below expected precipitation.