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U.S. Army Corps of Engineers Omaha District Monthly Drought Report, October 2006

U.S. Army Corps of Engineers

Omaha District

Monthly Drought Report

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US Army Corps
of Engineers
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CURRENT CONDITIONS

While the severity of the drought, as reported by the U.S. Drought Monitor, has lessened in severity, the impacts of the seven years of drought on the upper three reservoirs continue to mount. The lack of runoff, coupled with deficiencies of soil moisture, contribute to the continuing decline in reservoir elevation. This in turn exacerbates the water supply concerns, reservoir access difficulties, cultural resources concerns, and the noxious weeds issues. The three month seasonal drought outlook (through November, released by NOAA) indicates persistence of the drought with some improvement likely. The Omaha District will continue to monitor these conditions and report on their effects.

Precipitation Departures

Precipitation departures from normal during the last 72 months for the United States are shown in Figure 1. In Montana, accumulated precipitation ranges from near normal to nearly a 15-inch deficit. Wyoming's accumulated precipitation varies widely from near normal to a 20-inch deficit. Nebraska ranges from near normal to a 10-inch surplus. The Dakotas generally range from near normal to a 30-inch surplus. The South Platte River Basin in Colorado still shows precipitation deficits of 5 to 15 inches during a majority of the 72-month period.

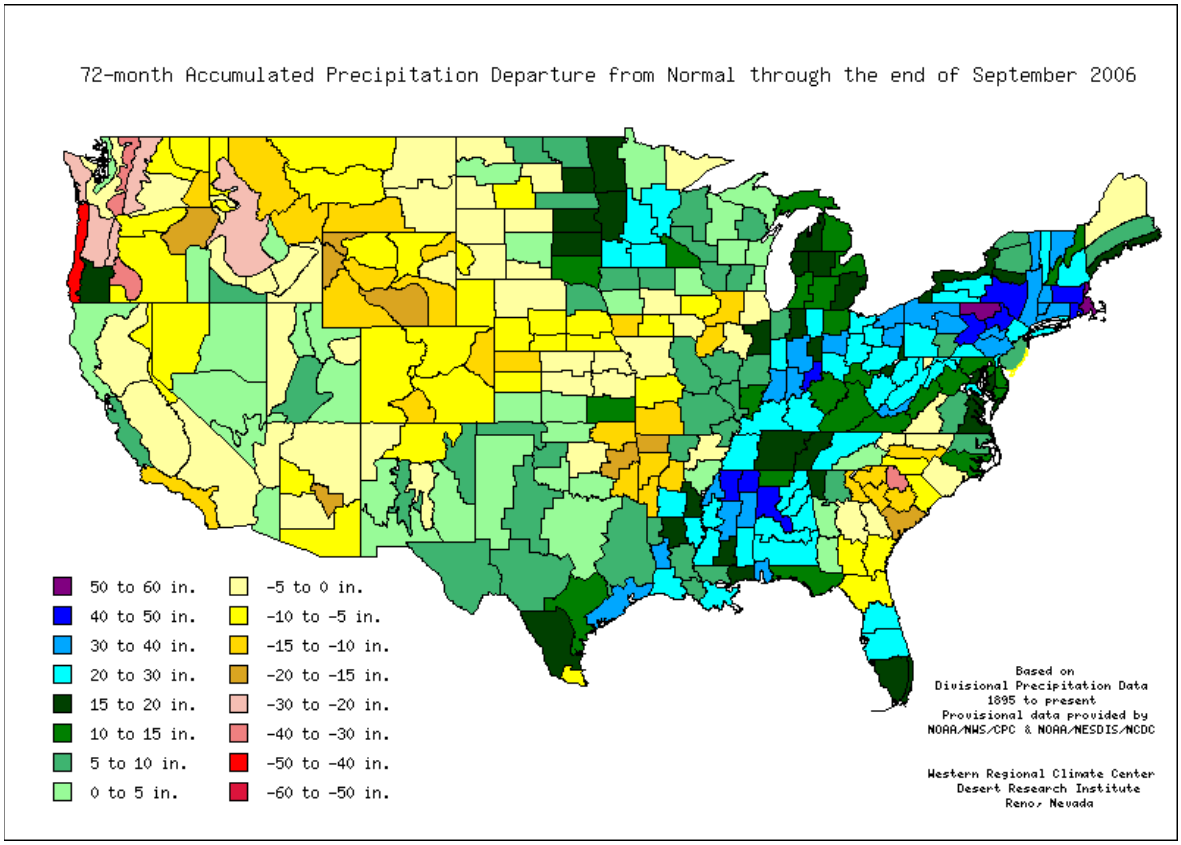


Figure 1 – 72 month Precipitation Departure From Normal
http://www.wrcc.dri.edu/cgi-bin/spiFmap.pl?dep72

The 12-month precipitation accumulation in Figure 2 indicates that precipitation throughout much of the western and northwestern District is from normal to a three-inch deficit.

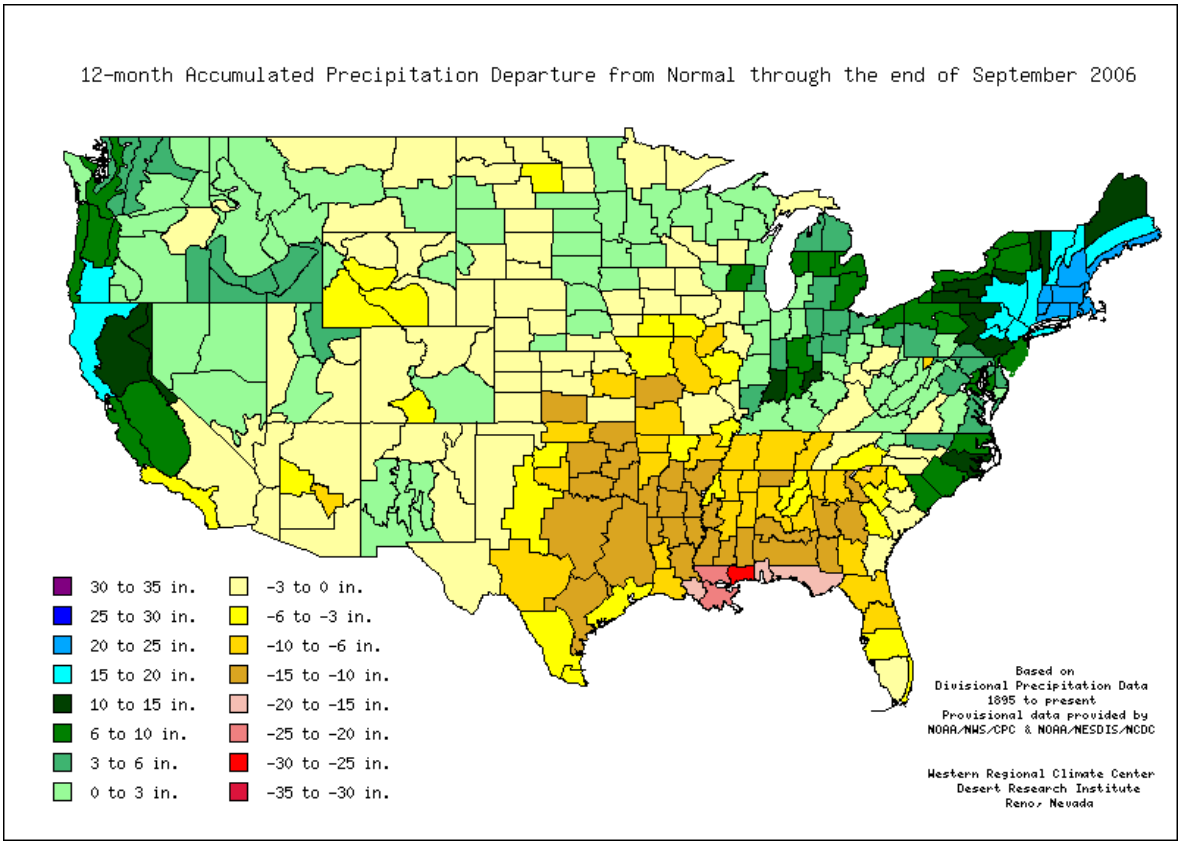


Figure 2 – 12 month Precipitation Departure From Normal
http://www.wrcc.dri.edu/cgi-bin/spiFmap.pl?dep12

The three-month period (Figure 3) shows that much of the basin has received enough short term rainfall to move towards a short term “normalcy”.

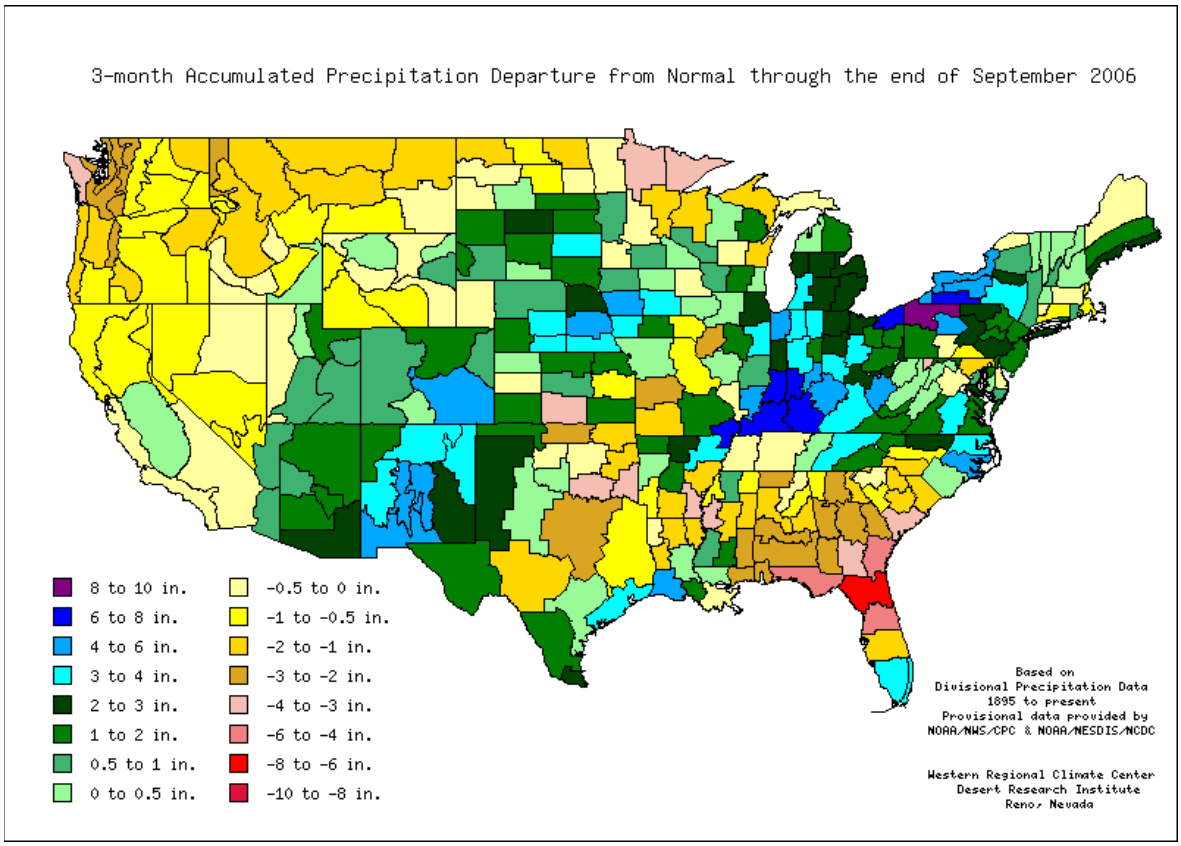


Figure 3 – 3 month Precipitation Departure From Normal
http://www.wrcc.dri.edu/cgi-bin/spiFmap.pl?dep03

A large portion of the basin received favorable precipitation in September (Figure 4).

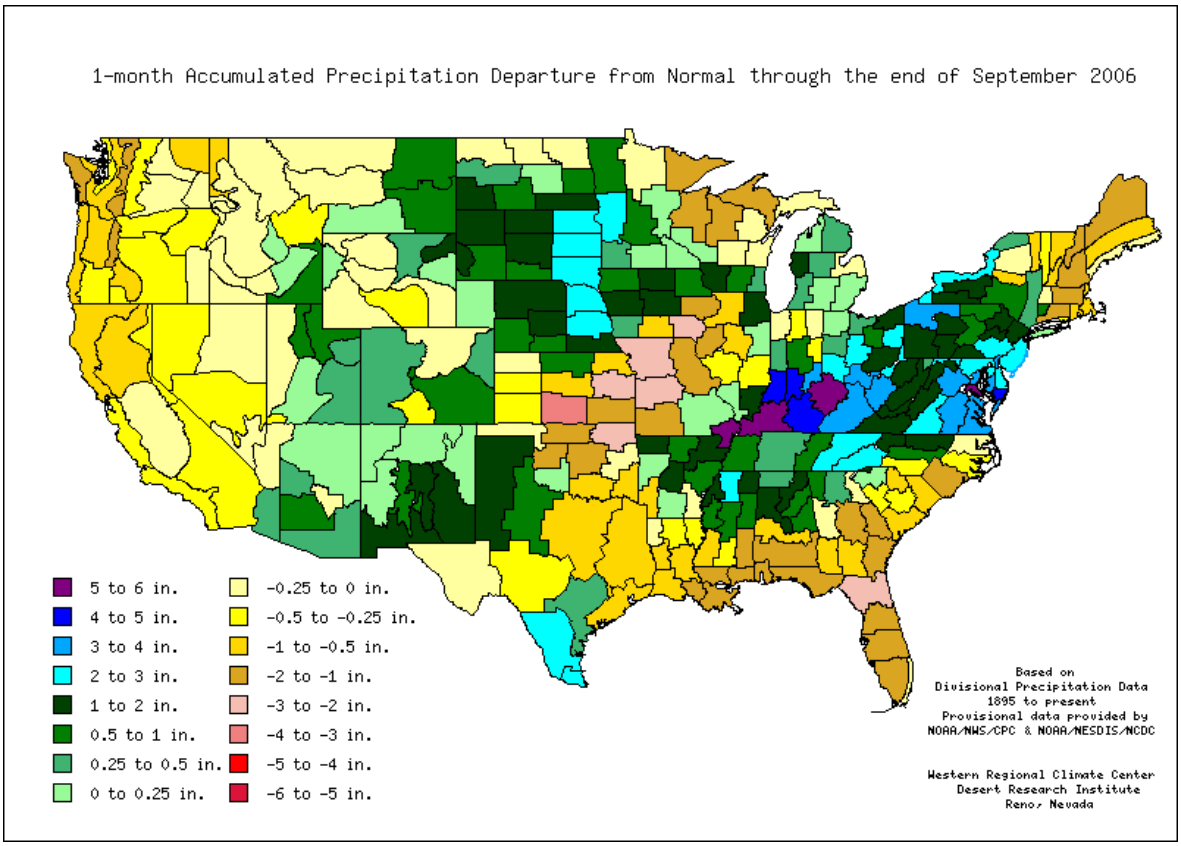


Figure 4 – 1 month Precipitation Departure From Normal
http://www.wrcc.dri.edu/cgi-bin/spiFmap.pl?dep01

Drought Indicators

The Palmer Drought Severity Index and the Drought Monitor are two commonly used drought-indicator products that convey both short-term and long-term drought conditions and impacts. Both the Palmer Index and Drought Monitor depict some regions exhibiting varying degrees of drought in Nebraska, South Dakota, Wyoming, and Montana, which have been suffering from drought since 2000.

Palmer Drought Severity Index

The Palmer Drought Severity Index (PDSI) is a meteorological drought index that monitors the hydrologic water balance including the basic terms such as precipitation, evapotranspiration, soil recharge, runoff, and moisture loss. The purpose of this index is to provide standardized measurements of the moisture balance in a region without taking into account streamflow, lake and reservoir levels, and other hydrologic impacts. PDSI is a multi-month drought index; therefore, it responds well and is more suitable for short-term droughts.

Changes to the PDSI are more immediate in response to heavy precipitation over short periods. The PDSI shown in Figure 5 reflects near normal to extreme drought conditions across the Omaha District. The near normal areas are indicative of the rains received in eastern Nebraska and South Dakota.

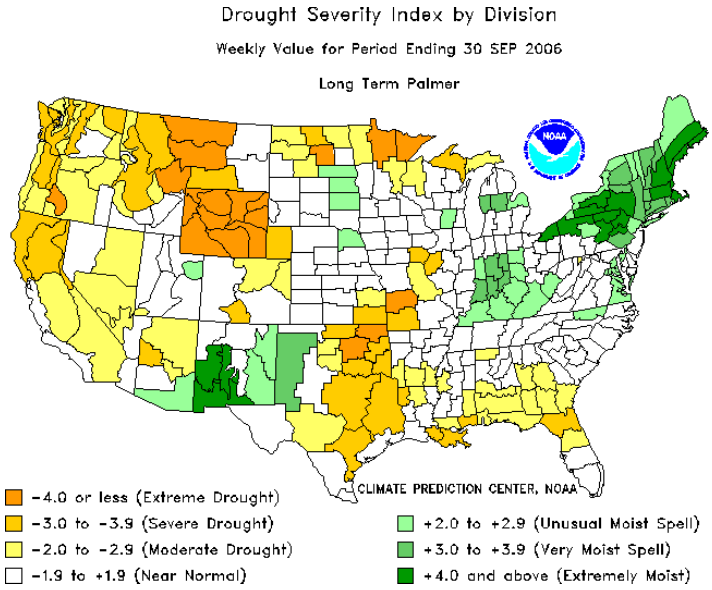


Figure 5 – Long-Term Palmer Drought Indicator Ending 30 SEP 2006
http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif

Drought Monitor

The Drought Monitor is a multi-agency comprehensive drought classification scheme updated weekly by the National Drought Mitigation Center. The Drought Monitor combines information from the Palmer Drought Index, the Climate Prediction Center's soil moisture model, USGS weekly streamflow percentiles, the standard precipitation index, the crop moisture index, and during the snow season basin snow water content, basin average precipitation, and the surface water supply index. Since this product considers streamflow conditions and reservoir water supply, and it allows manual adjustment; it is a good depiction of long-term drought impacts to the affected areas. The Drought Monitor uses four levels of drought classification (moderate, severe, extreme, and exceptional), and it notes the type of impact caused by the drought (agricultural and hydrologic).

The basin has improved and the "exceptional" drought areas shrunk through September. The figures below illustrate the extent and severity of the drought.

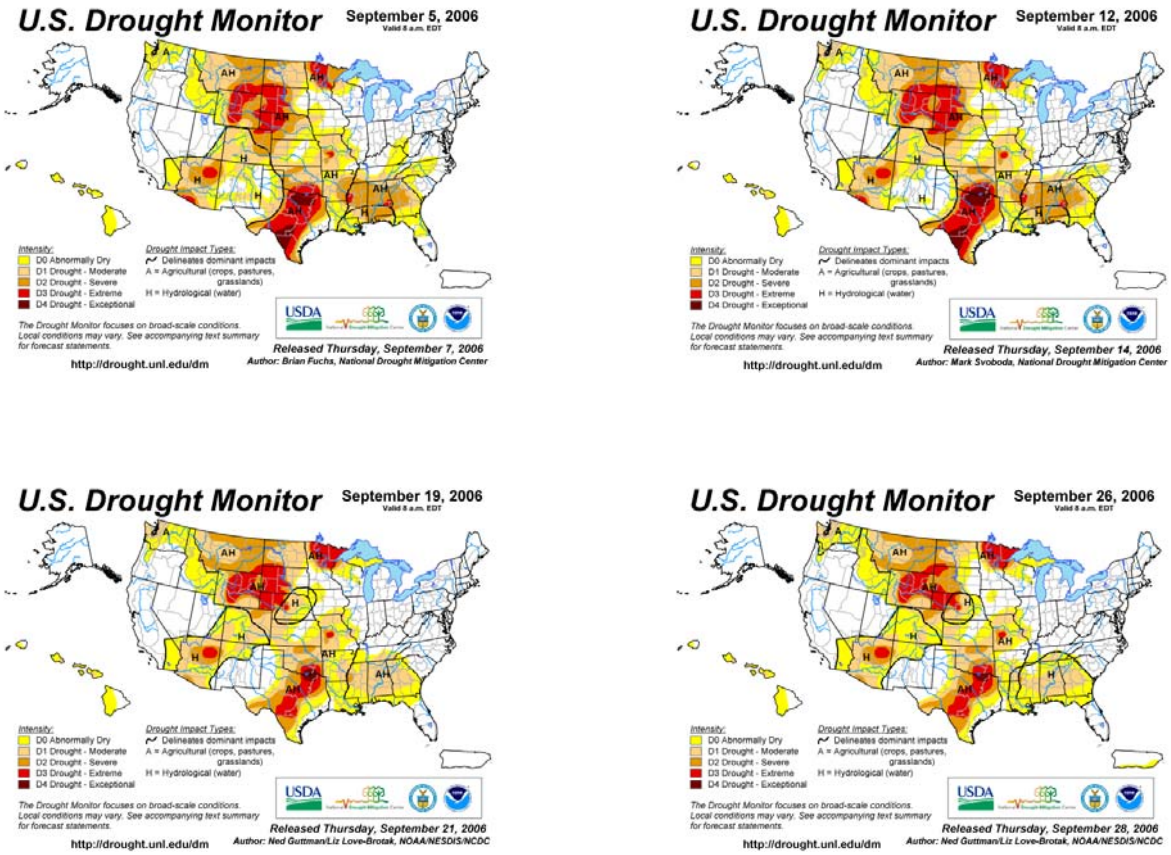


Figure 6 – U.S. Drought Monitor – September 5, 2006 through September 26, 2006
http://www.drought.unl.edu/dm/monitor.html

DROUGHT OUTLOOK

The basin drought outlook uses several expert products that indicate precipitation needs necessary to reduce the Palmer Drought to normal conditions, a one- and three-month climate outlook, and the impacts that future climate predictions could have on the current drought situation. The three-month Drought Outlook (Figure 7) indicates that large portions of the effected area could show improvement.

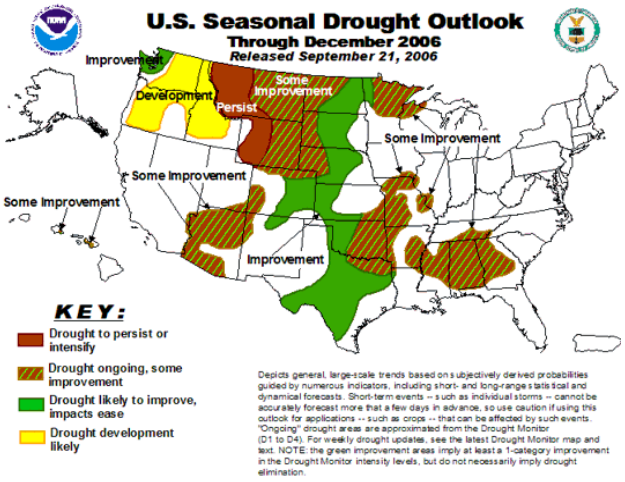


Figure 7 – Three-Month Seasonal Drought Outlook through December 2006
http://www.cpc.ncep.noaa.gov/products/expert_assessment/seasonal_drought.html

Weekly Precipitation Need

Figure 8 is the weekly precipitation needed to reduce the current Palmer Drought Severity Index value to -0.5 or near normal conditions.

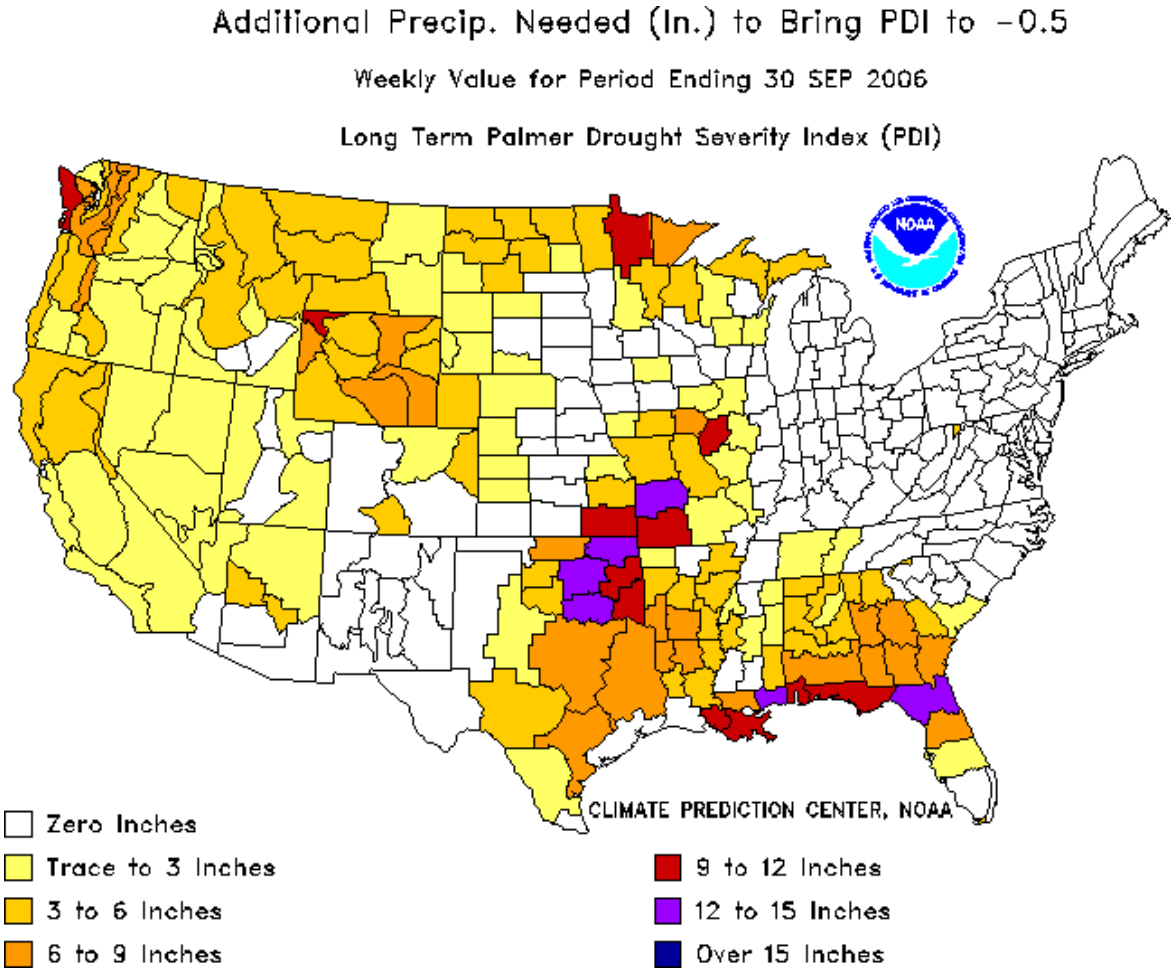


Figure 8 – Weekly Precipitation Need to Bring PDI to -0.5
http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/addpcp.gif

In order to reach near normal Palmer Drought conditions, Montana would need from 3 to 6 inches of precipitation across the state, the North Platte River basin in Wyoming would require up to 3 to 12 inches of precipitation while Nebraska would require up to 6 inches. Water supply deficits in large reservoirs, groundwater reserves, and possibly subsoil moisture reserves would receive limited benefit from the weekly Palmer precipitation needs. Mitigation of a multi-year drought would likely require multiple years of normal and above-normal water inflow conditions.

Mainstem Reservoir Information

The mainstem reservoir elevations continued to fall throughout September. The Ft. Peck reservoir is 0.7 feet higher than at this time last year, however, it is continuing to decline. Garrison reservoir is 4.6 feet lower than 2005 and the Oahe reservoir is 1.6 feet lower than 2005. Several intakes on both Lake Sakakawea and Lake Oahe are below their "operational concern" elevations (as reported by the water system's operators). However, no reports of intake failure or lack of a potable water supply have been reported. The intake elevations and conditions will continue to be monitored.

Fort Peck, Montana

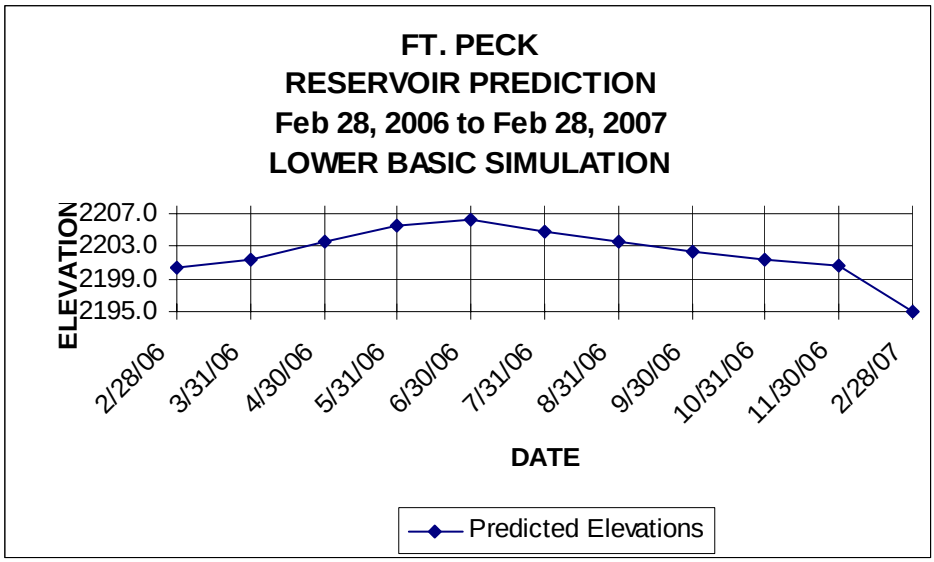
Reservoir Elevation Overview

Lake Elevation 9/30/2005 (ft. msl)	Current Lake Elevation 9/30/2006 (ft. msl)	30-Day Projected Elevation* (10/31/2006) (ft. msl)	150-Day Projected Elevation* (2/28/2007) (ft. msl)
2201.9	2202.6	2201.8	2195.5

Comments:

1. Current reservoir elevation is 31.4-feet below the top of conservation pool (elevation 2234.0 ft. msl).
2. Projections provided are based upon the Lower Basic Simulation prepared by the Reservoir Control Center.
3. Current elevation is 0.7-ft. higher than elevation on 9/30/05 (2201.9).

* Normally use 180-day projections; however, since the water year ends Feb. 28, the end of water year projection is used.



Water Intake Overview

Intake	Comments
Hell Creek State Park	No issues. Well completed 22 NOV 2004

Access Overview

1. 8 ramps usable (Corps and State); 3 ramps unusable. No permanent ramps operational.
2. Remaining concessionaires marginal.

Noxious Weeds Overview

1. As the reservoir elevation dropped, the noxious weeds spread along the shoreline.
2. Main concern is Saltcedar, which thrives along the shoreline as the reservoir elevation declines.
3. Noxious weed control is being addressed.

Cultural Resources Overview

1. No issues to date.

Garrison, North Dakota

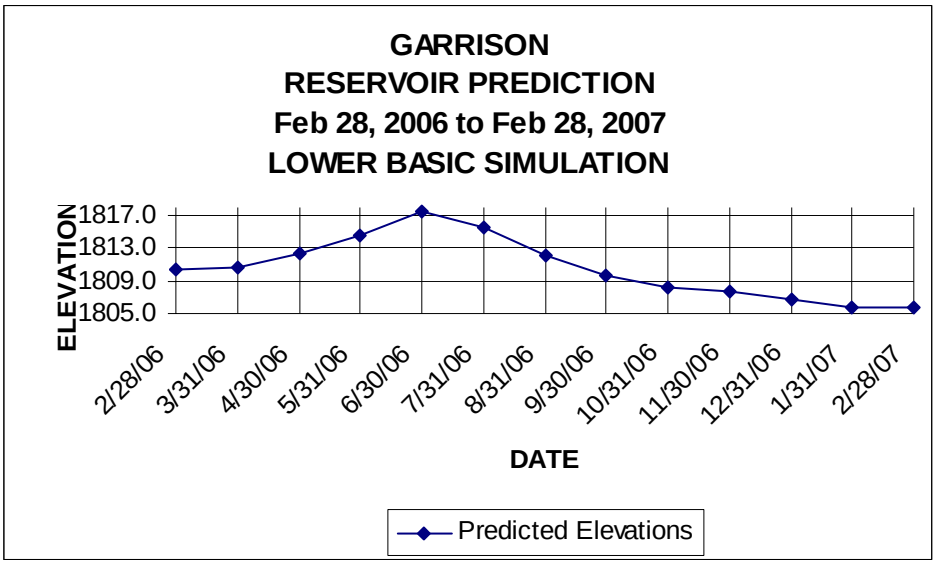
Reservoir Elevation Overview

Lake Elevation 9/30/2005 (ft. msl)	Current Lake Elevation (9/30/2006) (ft. msl)	30-Day Projected Elevation (10/31/2006) (ft. msl)	150-Day Projected Elevation* (2/28/2007) (ft. msl)
1814.2	1809.6	1808.3	1805.7

Comments:

1. Current reservoir elevation is 27.9-feet below the top of conservation pool (elevation 1837.5 ft. msl).
2. Projections provided are based upon the Lower Basic Simulation prepared by the Reservoir Control Center.
3. Current reservoir elevation is 4.6 ft. lower than elevation on 9/30/05 (1814.2).

* Normally use 180-day projections; however, since the water year ends Feb. 28, the end of water year projection is used.



Water Intake Overview

Intake	Status	Current Reservoir Elev.	Top of Screen Elev.	Operational Concern Elev.	Shutdown Elev.		Population Supported	Contingency Plan? (Y/N)	Resp. Agency
					Summer	Winter			
Whiteshield	Operational	1809.6	1787	1805	1787	1792	720	N	TAT/BOR

Comments:

1. Top of Screen Elevation taken from survey completed by the Corps in 2005. The intake was extended and lowered 2-feet since the Corps' survey in 2005.

Future Plans:

1. Ft. Berthold Rural Water System (FBRW) secured $1.0 million funding through USDA Emergency Community Water Assistance Grant Program for improvements in 2006.
2. Project design includes a 940-feet bored pipeline into the lake at elevation 1763. The line will be 24" polyethylene pipe. New SCADA control and pumps are included in the project design.
3. FBRW has the option of discontinuing existing system or keeping the system in operation as a backup.
4. Project bids were opened 19 JUL 2006. The low bid was $318,000 over the project estimate. FBRW is negotiating with the low bidder in an attempt to lower the project costs.

Intake	Status	Current Reservoir Elev.	Top of Screen Elev.	Operational Concern Elev.	Shutdown Elev.		Population Supported	Contingency Plan? (Y/N)	Resp. Agency
					Summer	Winter			
Twin Buttes	Operational	1809.6	1784.4	1805	1788	1790	425	N	TAT/BOR

Comments:

1. Top of Screen Elevation taken from survey completed by the Corps in 2005.
2. Erosion due to low reservoir levels have caused increased sediment in the intake piping. This has increased maintenance cost to remove the sediment and increased the cost of treating the water.

Future Plans:

1. Ft. Berthold Rural Water System has secured funding through the Indian Health Services, the Bureau of Reclamation, and the USDA Emergency Community Water Assistance Grant Program to improve the system in 2006.
2. Project design includes a 760-feet bored pipeline into the lake at elevation 1741. The line will be a 24" polyethylene pipe. New SCADA control and pumps are included in the design.
3. FBRW has the option of discontinuing existing system or keeping the system in operation as a backup.
4. Project bids were opened 19 JUL 2006. The low bid was $209,000 over the project estimate. FBRW is negotiating with the low bidder in an attempt to lower the project costs.

Intake	Status	Current Reservoir Elev.	Top of Screen Elev.	Operational Concern Elev.	Shutdown Elev.		Population Supported	Contingency Plan? (Y/N)	Resp. Agency
					Summer	Winter			
Mandaree	Operational	1809.6	1786	1789.0	1789	1794	780	N	TAT/BOR

Comments:

1. The new intake screen is at elevation 1786.
2. Grant monies for the project were secured from USDA Emergency Community Water Assistance Grant Program and Indian Health Services and work on the intake was completed in 2005.

Intake	Status	Current Reservoir Elev.	Top of Screen Elev.	Operational Concern Elev.	Shutdown Elev.		Population Supported	Contingency Plan? (Y/N)	Resp. Agency
					Summer	Winter			
Four Bears	Operational	1809.6	1789.9	1800.0	1792	1794	900	N	TAT/BOR

Comments:

1. Top of Screen Elevation taken from survey completed by the Corps in 2005.
2. Erosion due to low reservoir levels have caused increased sediment in the intake piping. This has increased maintenance cost to remove the sediment and increased the cost of treating the water.

Future Plans:

1. Ft. Berthold Rural Water System has secured funding through USDA Emergency Community Water Assistance Grant Program to improve the intake in 2006.
2. The project design includes 1,160-feet of 24-inch polyethylene pipe bored into the reservoir at elevation 1741. The design includes SCADA control and new pumps.
3. FBRW has the option of discontinuing existing system or keeping the system in operation as a backup.
4. Project bids were opened 19 JUL 2006. The low bid was $180,000 over the project estimate. FBRW is negotiating with the low bidder in an attempt to lower the project costs.

Intake	Status	Current Reservoir Elev.	Top of Screen Elev.	Operational Concern Elev.	Shutdown Elev.		Population Supported	Contingency Plan? (Y/N)	Resp. Agency
					Summer	Winter			
Parshall	Operable	1809.6	1803.6*	1806.6	1797.5	1801.5	1000	N	Parshall

Comments:

1. Top of Screen Elevation taken from survey completed by the Corps in 2005.
2. The City had a telescoping riser attached to the intake by 30 July 2005. The riser extended the intake to within 3- to 4-feet of the water's surface.
3. Require at least 3 feet of water over the intake for proper operation.
4. Water quality at current level is good following water treatment.

Future Plans:

1. Discussions have been held between Parshall and New Town regarding future water supply. No formal decisions have been reached. Parshall is a proposed supplier for the Rural Water System.

*Screen is raised or lowered according to reservoir elevations.

Intake	Status	Current Reservoir Elev.	Top of Screen Elev.	Operational Concern Elev.	Shutdown Elev.		Population Supported	Contingency Plan? (Y/N)	Resp. Agency
					Summer	Winter			
Pick City	Operational	1809.6	1795	1800	1798	1800	200		Pick City

Comments:

1. Top of Screen Elevation taken from survey completed by the Corps in 2005.
2. At least 5-feet of water is necessary to operate this intake. If continued usage is planned, the intake will have to be lowered.

Future Plans:

1. Rural water is available to the City, however, they have chosen to continue using their intake until the water no longer meets State Health Standards or work is required on their intake.

Intake	Status	Current Reservoir Elev.	Top of Screen Elev.	Operational Concern Elev.	Shutdown Elev.		Population Supported	Contingency Plan? (Y/N)	Resp. Agency
					Summer	Winter			
Garrison	Operational	1809.6	1787.2	1805	1792	1792	1830	N	Garrison

Comments:

1. Top of Screen Elevation taken from survey completed by the Corps in 2005.
2. A regulatory permit was currently issued for the reinstallation of existing 950-feet of 8” poly pipe and installation of new 250-feet of 8” poly pipe to extend the intake system.

Intake	Status	Current Reservoir Elev.	Top of Screen Elev.	Operational Concern Elev.	Shutdown Elev.		Population Supported	Contingency Plan? (Y/N)	Resp. Agency
					Summer	Winter			
SW Pipeline	Operational	1809.6	1779.0	1782	1776		34,000	N	SW Pipeline

Comments:

1. This system provides water for the City of Dickinson, Antelope Valley Power Plant, Coal Gasification Plant, and the Southwest Water Authority.

Access Overview

1. Ft. Stevenson State Park Marina design is completed. However, no federal funding is available for construction.

Updated 10/5/2006

Reservoir Elevation 9/30/06 – 1809.6

Location	Type	Top Elevation	Bottom Elevation	Comments	Managing Agency	Contact Person	Phone
Beaver Bay (low-water-COE)	poured concrete	1829	1808	**Unusable**	Corps of Engineers	Linda Phelps	654-7411
Beulah Bay	poured concrete	1852.4	1799	**Usable**	Beulah Park Board	Bev Sullivan	870-5852
Camp of the Cross	Slide-in metal sections	1819	1806	**Usable**	Lutheran Bible Camp	Larry Crowder	337-2246
Charging Eagle Bay (1st low water)	poured concrete	1829.2	1810.6	**Unusable**	Three Affiliated Tribes	Jim Mossett	880-1203
Dakota Waters Resort (low-water)	poured concrete, planks	1853.4	1797	**Usable**	Beulah Park Board	Kelvin Heinsen	873-5800
Deepwater Creek (2nd low water)	concrete planks & metal	1820	1808	**Usable**	Corps of Engineers	Linda Phelps	654-7411
Deepwater Creek (1st low water)	poured concrete	1838.5	1809	**Unusable**	Corps of Engineers	Linda Phelps	654-7411
Douglas Creek (low water)	poured concrete, planks	1831	1801	**Usable**	Corps of Engineers	Linda Phelps	654-7411
Fort Stevenson State Park (low water)	poured concrete	1821.8	1790	**Usable**	ND Parks & Rec	Dick Messerly	337-5576
Four Bears Park (south low water)	concrete planks	1820.7	1803	**Usable**	Three Affiliated Tribes	Alan Chase	627-4018
Garrison Creek Cabin Site	poured concrete	1857	1802	**Usable**	Garrison Cabin Assc.	Percy Radke	337-2247
Government Bay (low water)	slide-in metal sections	1815	1803	**Usable**	Corps of Engineers	Linda Phelps	654-7411
Government Bay (main ramp)	poured concrete	1857	1810	**Unusable**	Corps of Engineers	Linda Phelps	654-7411
Hazen Bay (2nd low water)	poured concrete	1830.6	1808	**Unusable**	Hazen Park Board	Jeff Gustafson`	748-6948
Indian Hills (2nd low water)	concrete planks	1817.6	1807	**Marginal**	Parks & Rec/Tribes	Kelly Sorge	743-4122
Indian Hills (1st low water)	concrete planks	1826.4	1811.8	**Unusable**	Parks & Rec/Tribes	Kelly Sorge	743-4122
McKenzie Bay (east ramp)	poured concrete	1850.9	1796	**Usable**	McKenzie Marine Club	Rhonda Logan	579-3366

Location	Type	Top Elevation	Bottom Elevation	Comments	Managing Agency	Contact Person	Phone
Parshall Bay (2nd low-water)	poured concrete	1817.8	1808.5	**Unusable**	Mountrail County Park Board	Clarence Weltz	627-3377
Pouch Point (3rd low-water)	slide-in metal sections	1819	1809	**Unusable**	Three Affiliated Tribes	Paul Danks	627-3627
Pouch Point (2nd low-water)	poured concrete	1834.8	1813	**Unusable**	Three Affiliated Tribes	Paul Danks	627-3627
Reunion Bay (2nd low water)	concrete planks	1826.6	1808	**Unusable**	Corps of Engineers	Linda Phelps	654-7411
Sakakawea State Park (main)	poured concrete	1850	1800	**Usable**	ND Parks & Rec	John Tunge	487-3315
Sanish Bay (Aftem) (low water)	poured concrete	1830.8	1807.4	**Unusable**	Aftem Lake Development	Gerald Aftem	852-2779
Skunk Creek Recreation Area (main)	poured concrete	1840	1806.5	**Usable**	Three Affiliated Tribes	Ken Danks	290-2841
Sportsmen's Centennial Park	poured concrete	1831.6	1808.5	**Unusable**	McLean County	Les Korgel	462-8541
Steinke Bay	poured concrete	1833.1	1813.4	**Unusable**	North Dakota Game & Fish	Bob Frohlich	328-6346
Van Hook (Gull Island north low-water)	metal bridge deck sections	1817.8	1805	**Usable**	Mountrail County Park Board	Clarence Weltz	627-3377
Van Hook (west low water ramps)	poured concrete	1821.2	1808	**Unusable**	Mountrail County Park Board	Clarence Weltz	627-3377
White Earth Bay (main)	poured concrete	1850.9	1801	**Usable**	Mountrail County Park Board	Greg Gunderson	755-3277
Wolf Creek Recreation Area (1st low water)	poured concrete	1833.8	1802.5	**Usable**	Corps of Engineers	Linda Phelps	654-7411

Noxious Weeds Overview

1. Project personnel are continuing efforts to combat noxious weeds.
2. $422,000 allocated for use in FY ’06, due to budget cuts, only $81,000 anticipated for FY ’07.

Cultural Resources Overview

1. Project personnel continue to monitor the shoreline for the protection of cultural resources.

Other Areas of Interest/Concern

1. Garrison National Fish Hatchery – Three issues exist and are of concern to the State of North Dakota and the U.S. Fish and Wildlife Service.
    a. Addition of a fifth boiler and necessary power for operation.
    b. Ability to fill 40 rearing ponds.
    c. Adequacy of the existing 20-inch water supply line from the penstocks.
2. Fact sheets for the hatchery issues exist. OP-TM is investigating a design for additional power requirements to the hatchery. An MOU may need to be set up to address future operating needs and requirements.
3. Garrison Cold Water Fishery – The modification to the trashracks of intakes 2 and 3, was completed 22 July 2005. The modifications were kept in place throughout the winter period, as the cost to remove and replace was comparable to lost power generation costs. The plates will be inspected in the spring with an underwater camera to ensure structural adequacy.

Oahe, South Dakota

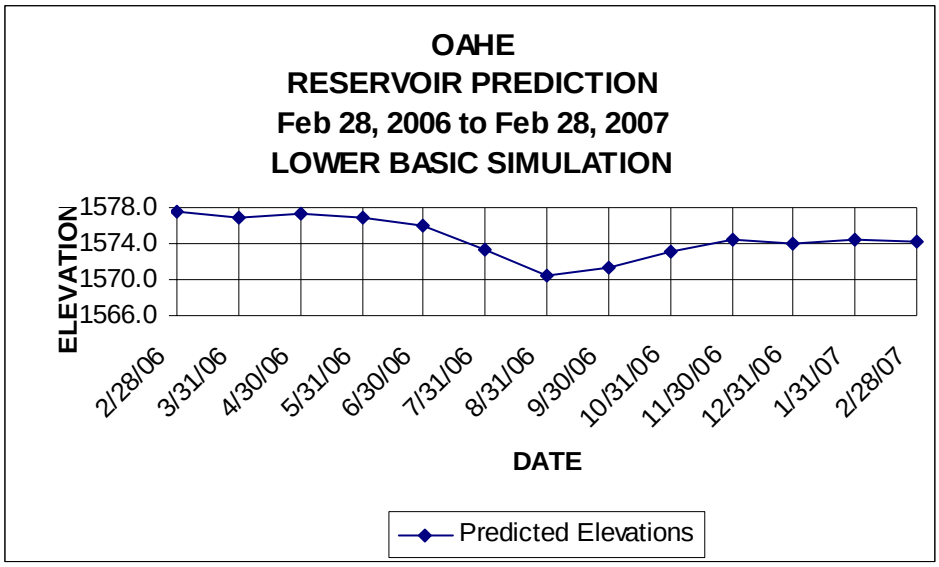
Reservoir Elevation Overview

Lake Elevation 9/30/2005 (ft. msl)	Current Lake Elevation (9/30/2006) (ft. msl)	30-Day Projected Elevation (10/31/2006) (ft. msl)	150-Day Projected Elevation* (2/28/2007) (ft. msl)
1573.0	1571.4	1573.2	1574.2

Comments:

1. Current reservoir elevation is 36.1-feet below the top of conservation pool (elevation 1607.5 ft. msl).
2. Projections provided are based upon the Lower Basic Simulation prepared by the Reservoir Control Center.
3. Current reservoir elevation is 1.6 feet lower than 9/30/05 (1573.0).

* Normally use 180-day projections; however, since the water year ends Feb. 28, the end of water year projection is used.



Water Intake Overview

Intake	Status	Current Reservoir Elev.	Top of Screen Elev.	Operational Concern Elev.	Shutdown Elev.		Population Supported	Contingency Plan? (Y/N)	Resp. Agency
					Summer	Winter			
Ft. Yates	Operational	1571.4	1571.2	1573	1572.2*	1575.2*	3,400	Y	SRST/BOR

Comments:

1. Top of Screen Elevation taken from survey completed by the Corps in 2005.
2. A backup well has been drilled and tested.
3. New well and plumbing is installed at Fort Yates and can be used as a backup water source.

*Intake is in riverine conditions and flow to the intake may be influenced by releases from Garrison reservoir.

Future Plans:

1. The intake at Fort Yates remains in a river condition and may continue to have sedimentation problems as long as Oahe remains below elevation 1580. Sediment levels in the sump are measured weekly and the river channel is monitored.
2. Contingency plans are in place and have been exercised.

Intake	Status	Current Reservoir Elev.	Top of Screen Elev.	Operational Concern Elev.	Shutdown Elev.		Population Supported	Contingency Plan? (Y/N)	Resp. Agency
					Summer	Winter			
Wakpala	Operational	1571.4	1563	1563	1566	1569	>500	N	SRST/BOR

Comments:

1. Top of Screen Elevation taken from survey completed by the Corps in 2005, a new low profile screen was installed lowering the top of the screen elevation to 1563.
2. Contingency plans are being drafted to respond to an intake failure. Initial response to an intake failure at Wakpala would be hauling water from the city of Mobridge to the treatment plant to be distributed using the existing transmission lines.

Intake	Status	Current Reservoir Elev.	Top of Screen Elev.	Operational Concern Elev.	Shutdown Elev.		Population Supported	Contingency Plan? (Y/N)	Resp. Agency
					Summer	Winter			
Mni Wasté	Operational	1571.4	1555.7	1580	1561.9	1560.4	14,000	Y(DRAFT)	CRST

Comments:

1. Top of Screen Elevation taken from survey completed by the Corps in 2005.
2. Construction of a temporary intake approximately 16 miles from the existing intake is underway and is proceeding well. The construction project is a collaborative effort between the Tribe, the State, the Corps and many other entities.

Access Overview

1. The State of South Dakota is responsible for maintaining recreational areas and access to the reservoir in South Dakota. The Oahe Project maintains the access in North Dakota.
2. Ramps on Oahe Project in North Dakota:

AREA	Status
Sibley Park	Usable
Little Heart Bottoms	Usable
Kimball (Desert)	Usable
Graner's Bottoms	Usable
Maclean Bottoms	Usable
Hazelton	Usable
Ft. Rice	Usable
North Beaver Bay	Usable
Walker Bottoms	Usable
Jennerville (Rivery)	Usable
Fort Yates	Unusable
Cattail Bay	Unusable
Langeliers Bay	Unusable
Beaver Creek	Unusable
State Line	Unusable

http://gf.nd.gov/fishing/mo-riv-system-boatramps-status.html.

Noxious Weeds Overview

1. The Oahe Project has a $325,000 budget for salt cedar and other noxious weed control for FY 06.

Cultural Resources Overview

1. Project personnel continue to monitor the shoreline for the protection of cultural resources. As the reservoir elevation falls, more opportunities are uncovered for looters, which collect artifacts and sell them on the open market.

Mainstem Reservoir Information, Weekly Elevation Comparison

4 Sep 2006	Project Information		Reservoir Elevation			Reservoir Storage		
Project	Multi-Purpose Pool Elev.	Flood Control Pool Elev.	Current Elevation (9/4/06)	Previous Elevation (8/28/06)	Change	Current Storage (MAC-FT) (9/4/06)	Previous Storage (MAC-FT) 8/28/06)	Change (MAC-FT)
Ft. Peck, MT	2160 - 2246	2246 – 2250	2203.7	2203.6	0.1	9.494	9.547	-0.053
Garrison, ND	1775 – 1850	1850 – 1854	1811.6	1812.6	-1.0	11.272	11.506	-0.234
Oahe, SD	1540 - 1617	1617 – 1620	1570.3	1570.4	-0.1	9.807	9.842	-0.035
Big Bend, SD	1415 – 1422	1422 – 1423	1420.7	1421.0	-0.3	1.668	1.697	-0.029
Ft. Randall, SD	1320 – 1365	1365 – 1375	1353.5	1353.4	0.1	3.405	3.391	0.014
Gavins Point, SD	1204.5 - 1208	1208 - 1210	1207.6	1207.7	-0.1	0.401	0.402	-0.001

11 Sep 2006	Project Information		Reservoir Elevation			Reservoir Storage		
Project	Multi-Purpose Pool Elev.	Flood Control Pool Elev.	Current Elevation (9/11/06)	Previous Elevation (9/4/06)	Change	Current Storage (MAC-FT) (9/11/06)	Previous Storage (MAC-FT) (9/4/06)	Change (MAC-FT)
Ft. Peck, MT	2160 - 2246	2246 – 2250	2202.9	2203.7	-0.8	9.423	9.494	-0.071
Garrison, ND	1775 – 1850	1850 – 1854	1810.3	1811.6	-1.3	11.031	11.272	-0.241
Oahe, SD	1540 - 1617	1617 – 1620	1571.3	1570.3	1.0	9.980	9.807	0.173
Big Bend, SD	1415 – 1422	1422 – 1423	1420.8	1420.7	0.1	1.673	1.668	0.005
Ft. Randall, SD	1320 – 1365	1365 – 1375	1350.2	1353.5	-3.3	3.134	3.405	-0.271
Gavins Point, SD	1204.5 - 1208	1208 - 1210	1207.5	1207.6	-0.1	0.398	0.401	-0.003

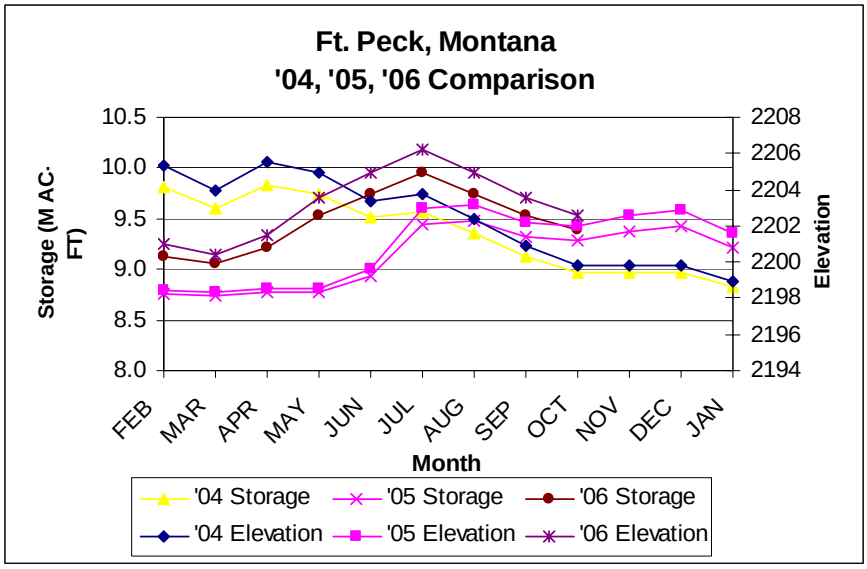
18 Sep 2006	Project Information		Reservoir Elevation			Reservoir Storage		
Project	Multi-Purpose Pool Elev.	Flood Control Pool Elev.	Current Elevation (9/18/06)	Previous Elevation (9/11/06)	Change	Current Storage (MAC-FT) (9/18/06)	Previous Storage (MAC-FT) (9/11/06)	Change (MAC-FT)
Ft. Peck, MT	2160 - 2246	2246 – 2250	2202.6	2202.9	-0.3	9.392	9.423	-0.031
Garrison, ND	1775 – 1850	1850 – 1854	1810.2	1810.3	-0.1	10.884	11.031	-0.147
Oahe, SD	1540 - 1617	1617 – 1620	1572.0	1571.3	0.7	10.103	9.980	0.123
Big Bend, SD	1415 – 1422	1422 – 1423	1421.0	1420.8	0.2	1.682	1.673	0.009
Ft. Randall, SD	1320 – 1365	1365 – 1375	1348.4	1350.2	-1.8	3.004	3.134	-0.130
Gavins Point, SD	1204.5 - 1208	1208 - 1210	1208.0	1207.5	0.5	0.411	0.398	0.013

25 Sep 2006	Project Information		Reservoir Elevation			Reservoir Storage		
Project	Multi-Purpose Pool Elev.	Flood Control Pool Elev.	Current Elevation (9/25/06)	Previous Elevation (9/18/06)	Change	Current Storage (MAC-FT) (9/25/06)	Previous Storage (MAC-FT) (9/18/06)	Change (MAC-FT)
Ft. Peck, MT	2160 - 2246	2246 – 2250	9.384	2202.6	0.0	9.384	9.392	-0.008
Garrison, ND	1775 – 1850	1850 – 1854	10.831	1810.2	-0.6	10.831	10.884	-0.053
Oahe, SD	1540 - 1617	1617 – 1620	10.064	1572.0	-0.2	10.064	10.103	-0.039
Big Bend, SD	1415 – 1422	1422 – 1423	1.693	1421.0	0.1	1.693	1.682	0.011
Ft. Randall, SD	1320 – 1365	1365 – 1375	2.789	1348.4	-3.0	2.789	3.004	-0.215
Gavins Point, SD	1204.5 - 1208	1208 - 1210	0.396	1208.0	-0.5	0.396	0.411	-0.015

Mainstem Reservoir Storage Comparison – Water Years 2004, 2005, 2006

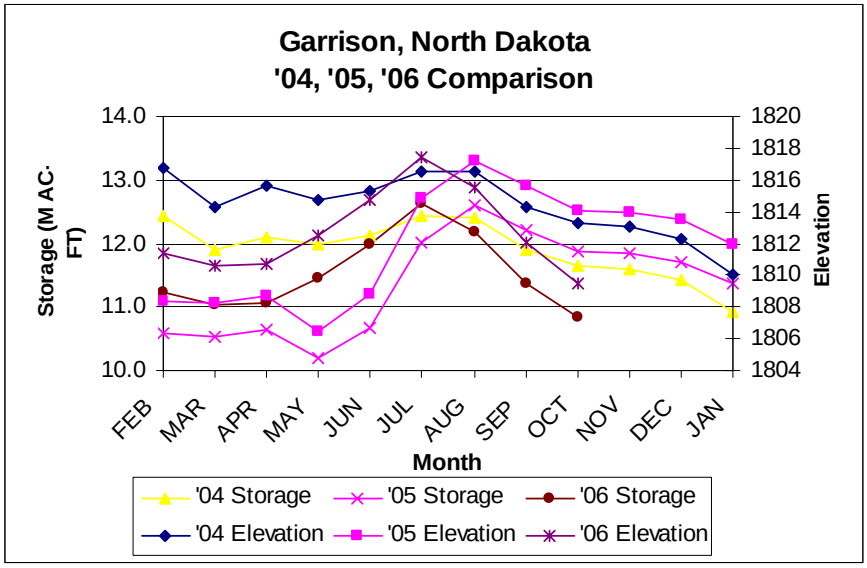
Fort Peck, Montana

Water Year 2004 (FEB 2004 – JAN 2005)			Water Year 2005 (FEB 2005 – JAN 2006)			Water Year 2006 (FEB 2006 – JAN 2007)		
Date	Elevation	Storage (MAC-Ft.)	Date	Elevation	Storage (MAC-Ft.)	Date	Elevation	Storage (MAC-Ft.)
2/1/2004	2205.3	9.806	2/1/2005	2198.4	8.749	2/1/2006	2201.0	9.134
3/1/2004	2204	9.603	3/1/2005	2198.3	8.732	3/1/2006	2200.4	9.048
4/1/2004	2205.5	9.837	4/1/2005	2198.5	8.773	4/1/2006	2201.5	9.222
5/1/2004	2204.9	9.740	5/1/2005	2198.5	8.773	5/1/2006	2203.6	9.540
6/1/2004	2203.4	9.507	6/1/2005	2199.6	8.935	6/1/2006	2204.9	9.741
7/1/2004	2203.8	9.565	7/1/2005	2203.0	9.448	7/1/2006	2206.2	9.958
8/1/2004	2202.4	9.357	8/1/2005	2203.2	9.472	8/1/2006	2204.9	9.750
9/1/2004	2200.9	9.121	9/1/2005	2202.2	9.325	9/1/2006	2203.6	9.525
10/1/2004	2199.8	8.969	10/1/2005	2202.0	9.286	10/1/2006		
11/1/2004	2199.8	8.963	11/1/2005	2202.6	9.371	11/1/2006		
12/1/2004	2199.8	8.961	12/1/2005	2202.9	9.432	12/1/2006		
1/1/2005	2198.9	8.829	1/1/2006	2201.5	9.222	1/1/2007		



Garrison, ND

Water Year 2004 (FEB 2004 – JAN 2005)			Water Year 2005 (FEB 2005 – JAN 2006)			Water Year 2006 (FEB 2006 – JAN 2007)		
Date	Elevation	Storage (MAC-Ft.)	Date	Elevation	Storage (MAC-Ft.)	Date	Elevation	Storage (MAC-Ft.)
2/1/2004	1816.7	12.446	2/1/2005	1808.4	10.574	2/1/2006	1811.4	11.230
3/1/2004	1814.3	11.891	3/1/2005	1808.2	10.537	3/1/2006	1810.6	11.040
4/1/2004	1815.6	12.110	4/1/2005	1808.65	10.632	4/1/2006	1810.7	11.076
5/1/2004	1814.7	11.989	5/1/2005	1806.47	10.189	5/1/2006	1812.5	11.460
6/1/2004	1815.3	12.121	6/1/2005	1808.8	10.665	6/1/2006	1814.7	11.992
7/1/2004	1816.5	12.426	7/1/2005	1814.9	12.026	7/1/2006	1817.4	12.629
8/1/2004	1816.5	12.401	8/1/2005	1817.17	12.591	8/1/2006	1815.5	12.172
9/1/2004	1814.3	11.914	9/1/2005	1815.56	12.216	9/1/2006	1812.1	11.372
10/1/2004	1813.3	11.645	10/1/2005	1814.11	11.861	10/1/2006		
11/1/2004	1813.1	11.589	11/1/2005	1814.00	11.837	11/1/2006		
12/1/2004	1812.3	11.422	12/1/2005	1813.50	11.707	12/1/2006		
1/1/2005	1810	10.936	1/1/2006	1812.0	11.371	1/1/2007		



Oahe, SD

Water Year 2004 (FEB 2004 – JAN 2005)			Water Year 2005 (FEB 2005 – JAN 2006)			Water Year 2006 (FEB 2006 – JAN 2007)		
Date	Elevation	Storage (MAC-Ft.)	Date	Elevation	Storage (MAC-Ft.)	Date	Elevation	Storage (MAC-Ft.)
2/1/2004	1577.6	11.204	2/1/2005	1575.2	10.715	2/1/2006	1576.8	11.037
3/1/2004	1579.2	11.504	3/1/2005	1576.2	10.924	3/1/2006	1577.6	11.209
4/1/2004	1582.1	12.110	4/1/2005	1574.29	10.568	4/1/2006	1576.7	11.024
5/1/2004	1581.6	12.056	5/1/2005	1574.82	10.608	5/1/2006	1577.4	11.150
6/1/2004	1578.4	11.338	6/1/2005	1576.47	10.980	6/1/2006	1577.0	11.088
7/1/2004	1576.8	11.045	7/1/2005	1577.6	11.214	7/1/2006	1575.8	10.880
8/1/2004	1574.3	10.540	8/1/2005	1576.38	10.958	8/1/2006	1573.4	10.378
9/1/2004	1572.1	10.112	9/1/2005	1572.64	10.363	9/1/2006	1570.3	9.807
10/1/2004	1573.2	10.316	10/1/2005	1572.63	10.267	10/1/2006		
11/1/2004	1574.8	10.608	11/1/2005	1573.90	10.501	11/1/2006		
12/1/2004	1576	10.866	12/1/2005	1575.6	10.814	12/1/2006		
1/1/2005	1575.8	10.824	1/1/2006	1575.6	10.778	1/1/2007