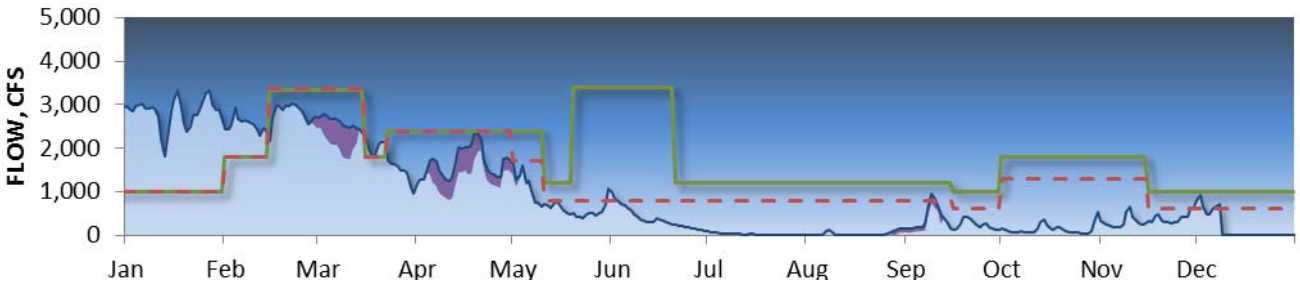
ANNUAL PLATTE RIVER SURFACE WATER FLOW SUMMARY



04/03/2013

Platte River Recovery Implementation Program

2013 ANNUAL SURFACE WATER FLOW SUMMARY DRAFT

PLATTE RIVER
RECOVERY IMPLEMENTATION PROGRAM

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PLATTE RIVER RECOVER IMPLEMENTATION PROGRAM

ANNUAL PLATTE RIVER SURFACE WATER FLOW SUMMARY

DRAFT

Contents

1. INTRODUCTION

This document provides a summary of Central Platte River flows through the Platte River Recovery Implementation Program (PRRIP or the Program) associated habitat, spanning from Lexington to Chapman, Nebraska, through the current calendar year. A one-page report follows a brief overview of the annual flow and peak flow events, United States Fish and Wildlife Service (USFWS)target flow accounting, and the Lake McConaughy Environmental Account (EA or McConaughy EA) for the current year. Annual summaries for previous years can be found in the APPENDIX A.

In addition to the annual summary, an overview of river flow at the Grand Island gage, Lake McConaughy Environmental Account operation, and Short Duration High Flow (SDHF) events is provided from the Program's beginning in 2007 through the Present.

The purpose of this document is to provide an overview of the surface water behavior in the Central Platte River and to inform management decisions related to flow releases. This document is not intended to be used to calculate or track the Program's Water Action Plan (WAP) project scoring. This document will be kept as a working draft and will be updated annually or more frequently if needed.

2. CENTRAL PLATTE RIVER SURFACE WATER SUMMARY BACKGROUND

The various aspects of the surface water report are explained below.

ANNUAL FLOW AND PEAK FLOW EVENTS

Annual flow is summarized for three gages in the associated habitat, located near Overton, Kearney, and Grand Island, Nebraska. See APPENDIX C for a map of gage locations. The Overton gage captures the flow in the Platte River near the upstream end of the associated habitat, the Kearney gage indicates flow in the middle of the area, and the Grand Island gage captures flow toward the downstream end of the reach. Flow at the Grand Island gage is shown in the "GRAND ISLAND GAGE HYDROGRAPH AND USFWS TARGET FLOWS" figure. Average daily flow data from all three gages are provided by the United States Geological Survey (USGS) on the website http://water.usgs.gov. Provisional data will be updated as approved data becomes available.

Average annual flow at each gage is shown in the **AVG ANNUAL FLOW** column. The average annual flow is calculated by averaging daily flows over the calendar year (Equation 1). The highest instantaneous flow recorded at each gage during the course of the year is shown in the **INSTANTANEOUS PEAK FLOW** column along with date the peak flow occurred in the **DATE OF PEAK FLOW** column. The **TYPE OF YEAR DESIGNATION** column indicates the annual hydrologic condition designation. It is determined by the average annual flow at the Grand Island gage and is discussed in more detail in the TARGET FLOW ACCOUNTING section below.

TARGET FLOW ACCOUNTING

The United States Fish and Wildlife Service (USFWS) developed target flows for the associated habitat, shown in the Water Plan Reference Materials of the Program Document[1], that vary based on hydrologic condition designations. The USFWS flow targets were developed for the Grand Island gage near the end of the Program's associated habitat. Hydrologic condition designations were developed by the USFWS and are determined on an annual and real time basis with the possibility of a wet, normal, or dry designation. Annual designations are based on the average annual Grand Island gage flow from 1947 to 1994, where years with the highest 33% of average annual flow are designated as wet, years with the lowest 25% of average annual flow are designated as dry, and years with flows between these ranges are designated as normal. For further discussion of annual hydrologic condition designation, see APPENDIX B. Comparing the average annual Grand Island gage flow for the year with the wet, normal, and dry thresholds determines the target flow regime for the year. The methodology behind real time designations is described in the JAWRA paper[2] by Anderson & Rodney, with target flow periods lasting for as little as seven days to as long as three months. Real time designations may vary between wet, normal, and dry over the course of the year, and the corresponding real time target flows are adjusted accordingly. The Program calculates real time hydrologic designations according to the Anderson & Rodney paper, with the methodology specifically described in the Program's Executive Director's (ED) office memo titled "Hydrologic Conditions Calculations"[3].

Deficits to target flows are calculated by comparing flow at the Grand Island gage to the USFWS target flows. The USFWS estimated a mean annual historic deficit to target flows of 417,000 af/year during wet and normal years and 333,100 af/year during dry years[4]. By the end of the first increment in 2019, the Program aims to reduce deficits to target flows an average of 130,000 to 150,000 acre-feet (af) per year. This summary describes deficits to both the annual and real time[5] target flows for each year, identified in the **TARGET CATEGORY** column.

The total amount of water that flowed by each gage location over the year is shown in the **TOTAL FLOW** column and is calculated by summing the average daily flow (Equation 2). The total flow provides the basis for the calculations of deficits to target flows. A summation of the daily target flows over the year provides the total annual volume of target flow, shown in the **TARGET VOLUME** column (Equation 3). Deficits are calculated by comparing the average daily flow at the Grand Island gage with the target flow for that date. If the flow is below the target flow, a deficit exists (Equation 4). The annual sum of daily deficits is shown in the **TOTAL DEFICIT** column (Equation 5). The total deficit is broken down into two

[1] Table A-5 in Attachment 5 Section 11 in the Platte River Recovery Implementation Program Document dated December 7, 2005.
[2] "Characterization of Hydrologic Conditions to Support Platte River Species Recovery Efforts" by Don Anderson (formerly with the U.S. Fish and Wildlife Service) and Mark Rodney; published in the October 2006 Journal of the American Water Resources Association 42(5): 1391-1403. This methodology was published before an August-September period methodology was developed.
[3] PRRIP Executive Directors Office Memorandum, "Hydrologic Conditions Calculations," updated May 3, 2012.
[4] Table A-4 in Attachment 5 Section 11 in the Platte River Recovery Implementation Program Document dated December 7, 2005.
[5] The semi-monthly to monthly target flows in column 4 of Table A5 were used to develop the figures and deficits in this summary rather than the monthly target flows in column 8 of Table A5, which are averages of the semi-monthly flows in column 4. The target flows in column 8 of Table A5 are used with a modeled hydrograph to calculate project scores.

types of deficits: deficits due to shortages in annual flow and deficits that could be avoided by retiming available annual flow. The **VOLUME DEFICIT** column shows the deficits resulting from shortages in annual flows and is calculated by subtracting the TOTAL FLOW from the TARGET VOLUME column (Equation 6). The **TIMING DEFICIT** column shows the deficits that could theoretically be avoided by retiming flows. It is calculated by subtracting the VOLUME DEFICIT from the TOTAL DEFICIT (Equation 7).

The GRAND ISLAND GAGE HYDROGRAPH AND USFWS TARGET FLOWS figure shows the annual and real time target flows overlying the Grand Island hydrograph. Periods of excess to target flows occur when the hydrograph extends above the target flows and periods of deficits to target flows occur when the hydrograph falls below the target flows. The amount of flow from the McConaughy Environmental Account is shown in purple. If data is provisional, such as when ice or equipment errors are present, no flow is shown on the Grand Island gage hydrograph.

LAKE MCCONAUGHY ENVIRONMENTAL ACCOUNT

A portion of the water in Lake McConaughy is reserved in an environmental account which is managed by the USFWS and can be used to reduce deficits to target flows. Environmental Account operations are described in the Water Plan Reference materials in the Program Document[6]. The account receives a portion of the natural inflows into Lake McConaughy and is subject to evaporation and seepage losses. Data for the McConaughy EA is provided by the Central Nebraska Public Power and Irrigation District (CNPPID) and is assumed to be provisional data. Adjustments to the volume of the EA are calculated monthly based on accruals, losses, and releases. Water from the previous year is carried over in the EA; however, the total EA volume cannot exceed 200,000 af. If Lake McConaughy fills to capacity, the EA is automatically reset to 100,000 af, regardless of that year's releases, contributions, or carryover from previous years. In the annual summaries, the losses for the EA are not shown if the account resets. The **CHANGE IN VOLUME** of the EA is the **VOLUME AT START OF YEAR** subtracted from the **VOLUME AT END OF YEAR** (Equation 8). The **ACCRUALS** column shows additions to the account that include storable natural inflows (SNI) and other water, such as transfers from the Pathfinder Environmental Account and Net Controllable Conserved Water (NCCW) credits. SNI is calculated as 10% of the storable natural inflows to Lake McConaughy but cannot exceed 10% of the available storage space in the reservoir. The EA does not receive SNI from May through September. Transfers into the EA come from the Pathfinder Environmental Account or the Pathfinder Municipal Account, typically occur in September, reflect the amount of water that reaches Lake McConaughy, and may be subject to transit losses from their original location. Net Controllable Conserved Water (NCCW) is credited to the EA on October 1st of each year. **LOSSES** include both evaporation and seepage losses and are calculated monthly based on the percentage of the total reservoir volume the EA comprises (Equation 9). Seepage gains to the reservoir are not counted toward EA accruals. **RELEASES** from the EA are determined by the USFWS and are usually aimed at reducing deficits to target flows or to achieve short duration high flows (SDHF).

[6]Attachment 5 Section 5 in the Platte River Recovery Implementation Program Document dated December 7, 2005.

The "MCCONAUGHY EA AND REAL TIME DEFICITS AT GRAND ISLAND GAGE" figure shows the EA volume, the releases made from the EA, and the deficits to target flows at the Grand Island gage. The volume changes in the EA at the end of each month are a result of the monthly adjustment to the account. EA information in this section is presented by calendar year and can be compared with the Grand Island hydrograph and deficit calculations. It cannot be directly compared with EA information in Section 5, LAKE MCCONAUGHY ENVIRONMENTAL ACCOUNT SUMMARY, 2007 TO PRESENT, which presents EA information by water year (WY).

ANNUAL FLOW AND PEAK FLOW EVENTS

(rate-based calculations)

AVERAGE ANNUAL FLOW = AVERAGE(AVERAGE DAILY GAGE FLOW) *(Equation 1)*

TARGET FLOW ACCOUNTING

(volume-based calculations)

TOTAL FLOW = SUM(AVERAGE DAILY GAGE FLOW) *(Equation 2)*

TARGET VOLUME = SUM(DAILY TARGET FLOW) *(Equation 3)*

DAILY DEFICIT= DAILY TARGET FLOW – AVERAGE DAILY GAGE FLOW *(Equation 4)*

TOTAL DEFICIT = SUM(DAILY DEFICITS) *(Equation 5)*

VOLUME DEFICIT = TARGET VOLUME – TOTAL FLOW *(Equation 6)*

TIMING DEFICIT= TOTAL DEFICIT – VOLUME DEFICIT *(Equation 7)*

LAKE MCCONAUGHY ENVIRONMENTAL ACCOUNT

(volume-based calculations)

CHANGE IN VOLUME=VOLUME AT START OF YEAR– VOLUME AT END OF YEAR *(Equation 8)*

LOSSES=SUM(SEEPAGE LOSSES)+SUM(EVAPORATION LOSSES) *(Equation 9)*

3. CURRENT YEAR ANNUAL SUMMARY

The annual summary for the current year is presented in this section. Refer to APPENDIX A for annual summaries of previous years.

2012 ANNUAL SUMMARY

ANNUAL FLOW PEAK FLOW EVENTS

The annual average gage flow at Grand Island based on current provisional data is 1010 cfs, resulting in a NORMAL annual hydrologic condition designation. The NORMAL designation is largely a result of high flows during the first part of the year. The flow conditions from June through December were extremely low, as reflected by the real-time hydraulic conditions, shown in **Table 1.** The real-time designations matched the annual designation 33% of the year.

The peak instantaneous flow at the Grand Island gage occurred on January 26 during the early high flows. The peak flows for the Overton and Kearney gages have not been provided by the USGS at this time; however, they are expected to occur near the same time as the Grand Island peak. Peak event volumes at all three gages correspond to this event.

Table 1. 2012 Real-time hydrologic condition designations

Period	Condition	Target Flow	Period	Condition	Target Flow
Jan 1 – Jan 31	NORMAL	1000	*May 20 - May 26*	DRY	800
Feb 1 – Feb 14	NORMAL	1800	*May 27 – June 20*	DRY	800
Feb 15 – Mar 15	NORMAL	3350	*June 21 – Sept 15*	DRY	800
Mar 16 – Mar 22	NORMAL	1800	*Sept 16 – Sept 30*	DRY	600
Mar 23 – May 10	NORMAL	2400	*Oct 1 – Nov 15*	DRY	1300
May 11 – May 19	DRY	800	*Nov 16 – Dec 31*	DRY	600

"ICE" GAGE READINGS

The Grand Island gage had "Ice" readings from December 9 through December 31. No flow is shown on the Grand Island gage hydrograph during this time and these flows are not accounted for in the annual average flow. The gage data is provisional and will be updated when approved data becomes available.

ENVIRONMENTAL ACCOUNT

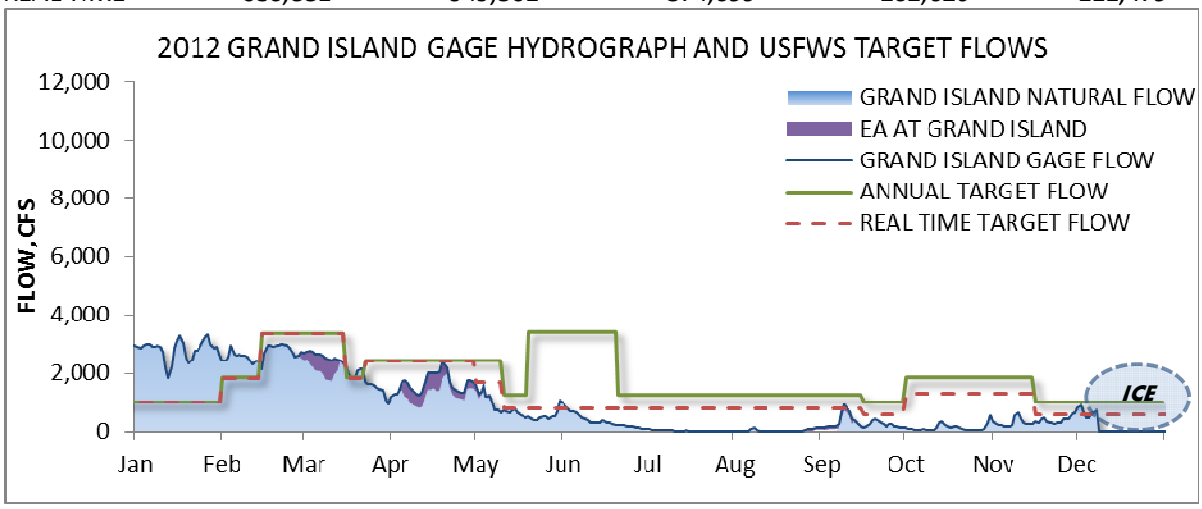
Several releases were made from the McConaughy EA over the course of the year, with releases in February, March, April, July, August, September, and October. The account received 314 af from Net Controllable Conserved Water (NCCW) and 24,030 af from Wyoming Pathfinder transfers, including water from the Pathfinder EA Account and the Pathfinder Municipal Account. Refer to SECTION 6 for more information on McConaughy EA releases.

2012 FLOW AND PEAK FLOW EVENTS

GAGE	AVG ANNUAL FLOW (CFS)	INSTANTANEOUS PEAK FLOW (CFS)	DATE OF PEAK FLOW	TYPE OF YEAR DESIGNATION	
OVERTON*	1,104	3,500	Jan. 20		*Povisional
KEARNEY*	1,031	3,430	Jan. 26		data
GRAND ISLAND*	1,010	3,590	Jan. 26	NORMAL	

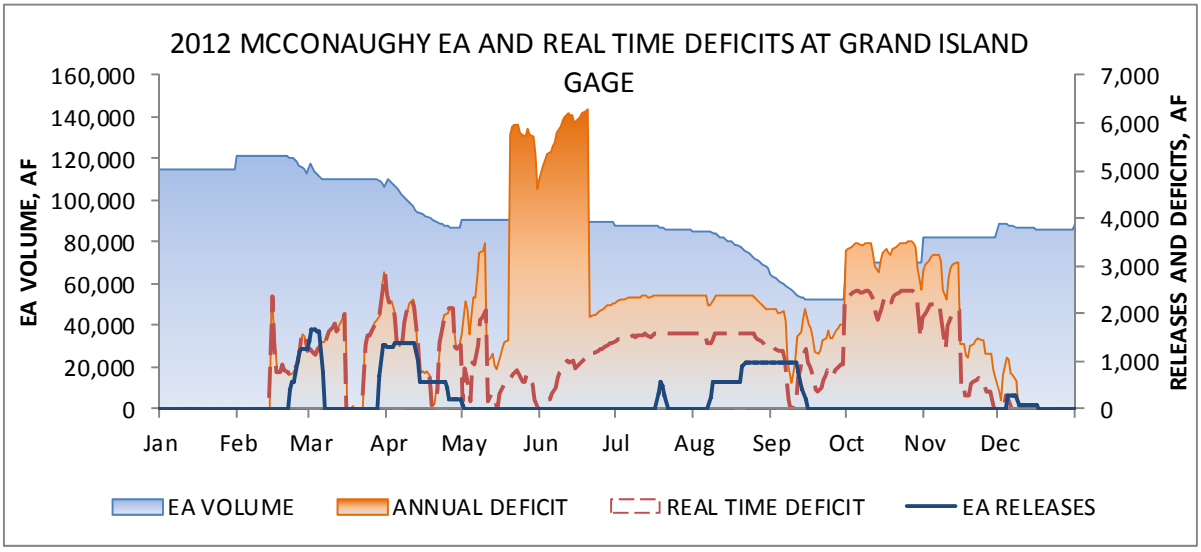
TARGET FLOW ACCOUNTING AT GRAND ISLAND

TARGET CATEGORY	TOTAL FLOW (AF)	TARGET VOLUME (AF)	TOTAL DEFICIT (AF)	VOLUME DEFICIT (AF)	TIMING DEFICIT (AF)
ANNUAL	686,881	1,298,597	701,965	611,716	90,249
REAL TIME	686,881	949,501	374,099	262,620	111,479



MCCONAUGHY ENVIRONMENTAL ACCOUNT

VOLUME AT START OF YEAR (AF)	114,402	**ACCRUALS (AF)**	68,158
VOLUME AT END OF YEAR (AF)	90,069	**LOSSES (AF)**	11,135
CHANGE IN VOLUME (AF)	-24,333	**RELEASES (AF)**	80,969

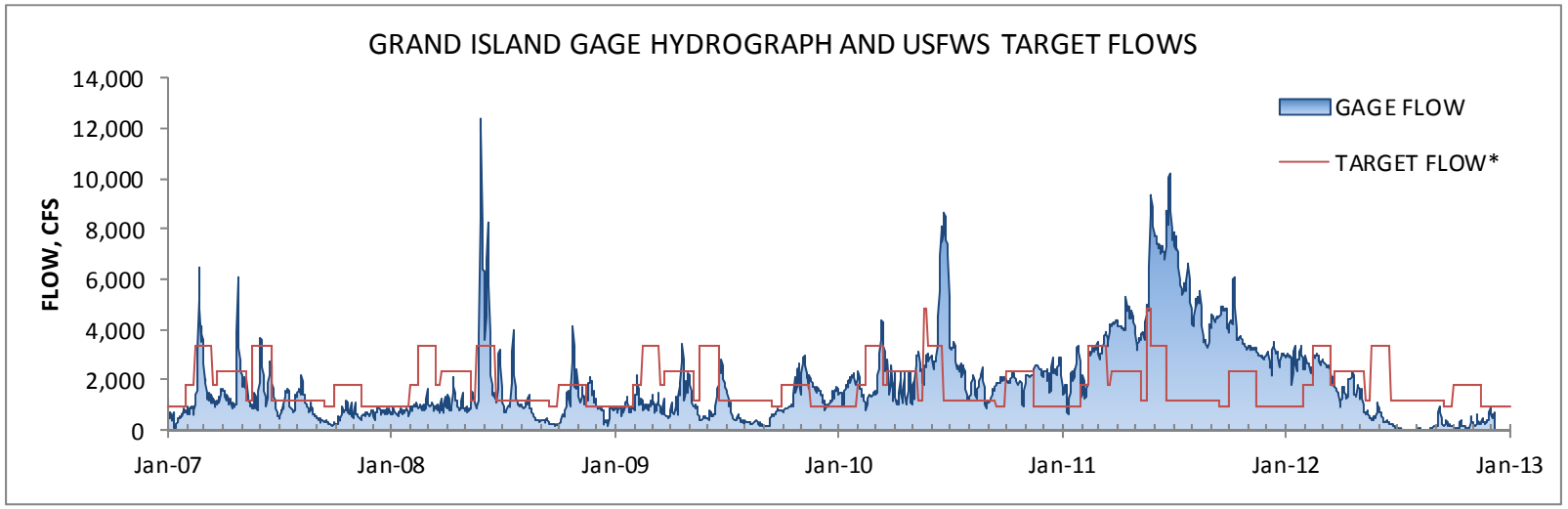


4. GRAND ISLAND FLOW SUMMARY, 2007 TO PRESENT

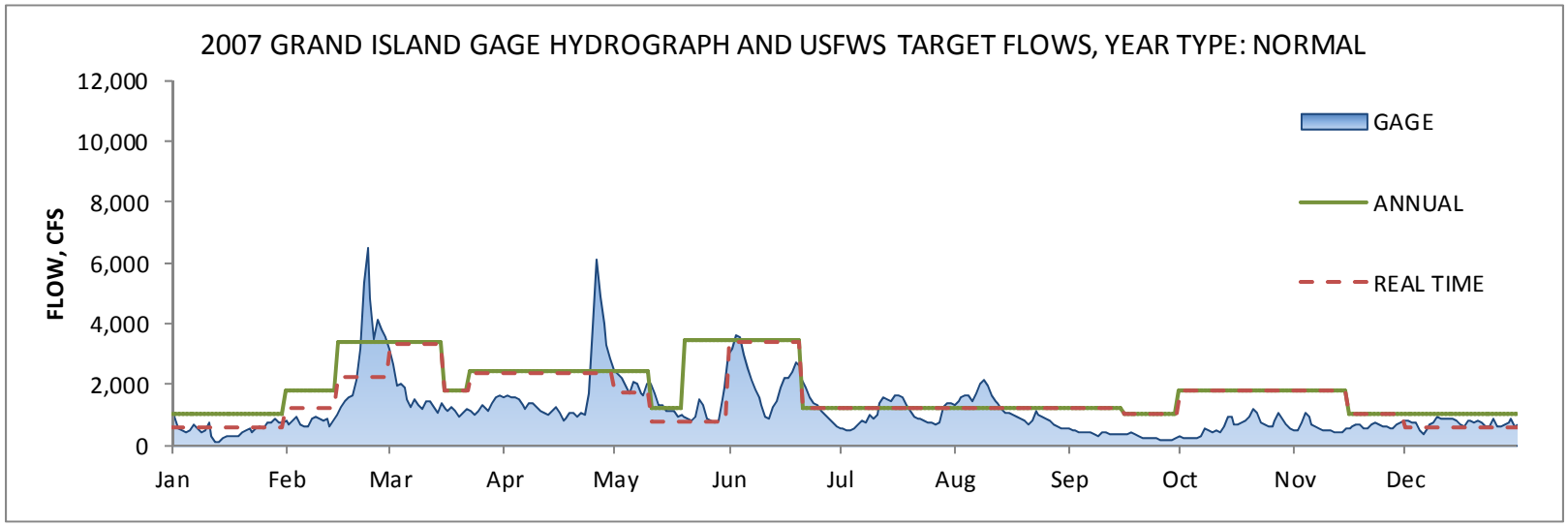
Annual Grand Island flow is summarized for each year from the beginning of the Program through the present. The **AVG ANNUAL FLOW, INSTANTANEOUS PEAK FLOW, DATE OF PEAK FLOW,** and **TYPE OF YEAR DESIGNATION** all correspond to the same columns described in Section 2. **INSTANTANEOUS MIN FLOW** column shows the lowest flow of the year and the **DATE OF MIN FLOW** column shows the corresponding date the minimum flow occurred.

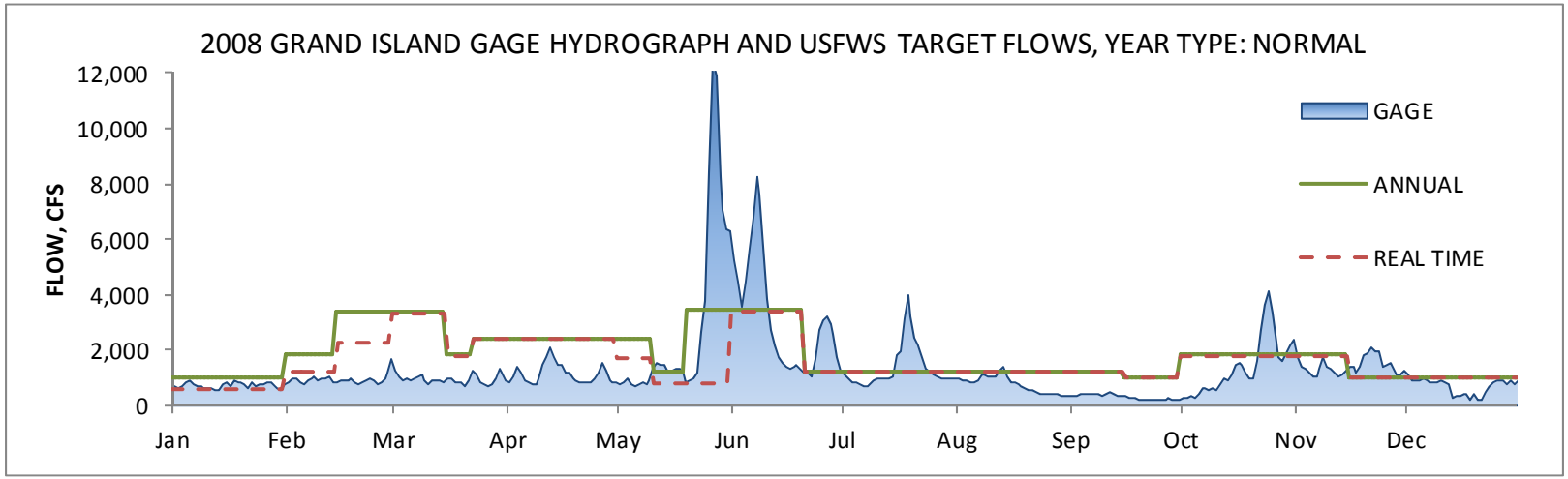
The "GRAND ISLAND GAGE HYDROGRAPH AND USFWS TARGET FLOWS" figure shows the Grand Island gage hydrograph from 2007 to the present and the annual USFWS target flows. Both the summary table and figure are included to provide year-to-year flow comparisons as well as indicate general flow trends over the course of the Program's existence. Hydrographs for individual years from 2007 to the current year are included for further comparison.

ANNUAL FLOW AND PEAK FLOW EVENTS						
YEAR	AVG ANNUAL FLOW (CFS)	INSTANTANEOUS PEAK FLOW (CFS)	DATE OF PEAK FLOW	INSTANTANEOUS MIN FLOW (CFS)	DATE OF MIN FLOW	TYPE OF YEAR DESIGNATION
2007	1,121	7,300	Feb. 23	27	Jan. 13	NORMAL
2008	1,300	13,600	May. 27	168	Sep. 28	NORMAL
2009	1,039	3,540	Apr. 22	142	Sep. 06	NORMAL
2010	2,289	8,840	Jun. 24	819	Aug. 31	WET
2011	4,224	10,400	Jun. 27	2,750	Mar. 04	WET
2012	1,010	3,590	Jan. 26	0	Jul. 20	NORMAL
AVERAGE	*1,830*	*7,878*	*Apr. 25*	*651*	*Jun. 17*	*NORMAL*



*Target flow based on annual hydrologic condition designation


2007 GRAND ISLAND GAGE HYDROGRAPH AND USFWS TARGET FLOWS, YEAR TYPE: NORMAL
FLOW, CFS
12,000
10,000
8,000
6,000
4,000
2,000
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
GAGE
ANNUAL
REAL TIME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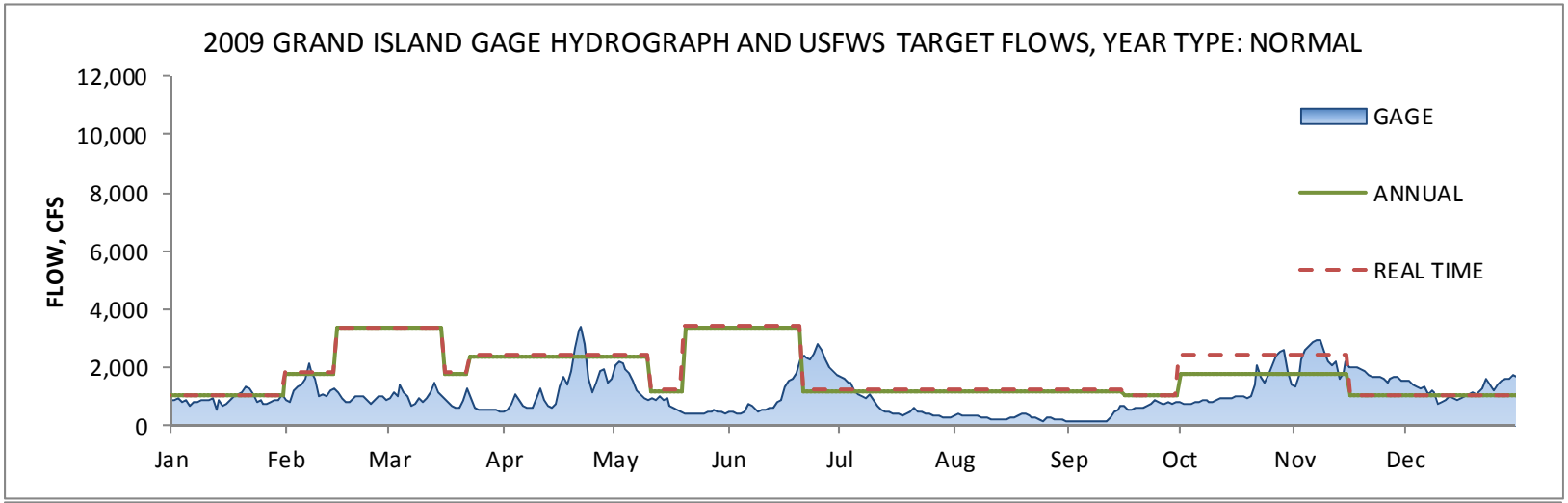
FLOW, CFS
12,000
10,000
8,000
6,000
4,000
2,000
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
GAGE
ANNUAL
REAL TIME


2009 GRAND ISLAND GAGE HYDROGRAPH AND USFWS TARGET FLOWS, YEAR TYPE: NORMAL
FLOW, CFS
12,000
10,000
8,000
6,000
4,000
2,000
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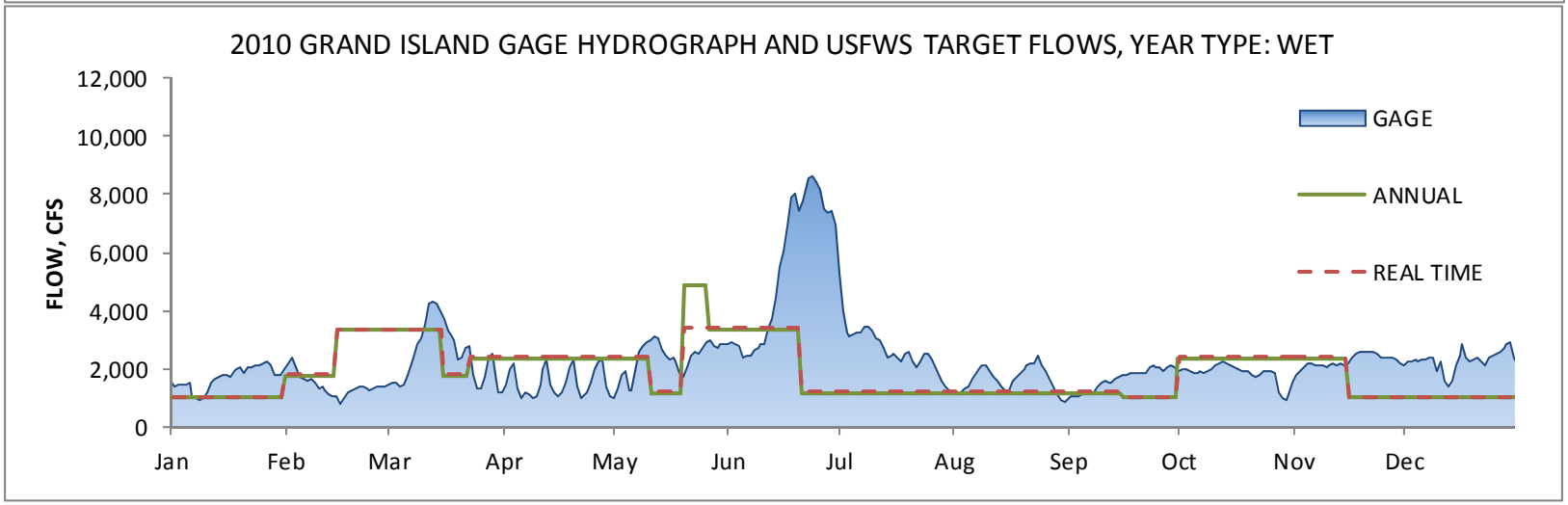
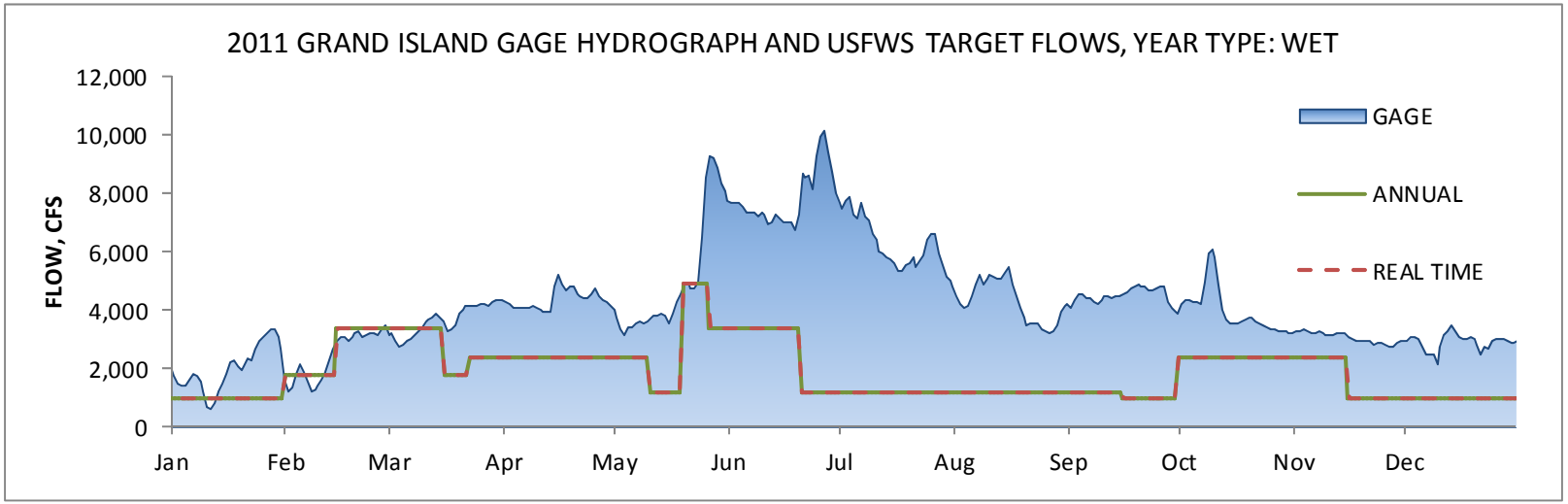
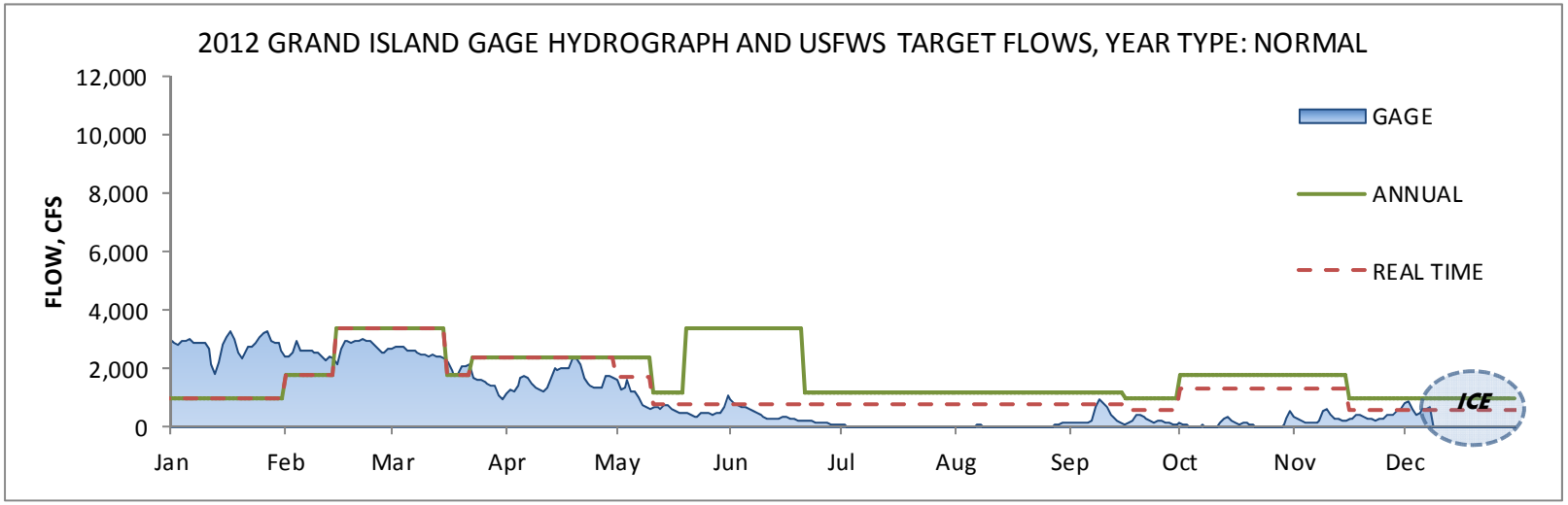
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
GAGE
ANNUAL
REAL TIME


2010 GRAND ISLAND GAGE HYDROGRAPH AND USFWS TARGET FLOWS, YEAR TYPE: WET
FLOW, CFS
12,000
10,000
8,000
6,000
4,000
2,000
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
GAGE
ANNUAL
REAL TIME


2011 GRAND ISLAND GAGE HYDROGRAPH AND USFWS TARGET FLOWS, YEAR TYPE: WET
FLOW, CFS
12,000
10,000
8,000
6,000
4,000
2,000
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
GAGE
ANNUAL
REAL TIME


2012 GRAND ISLAND GAGE HYDROGRAPH AND USFWS TARGET FLOWS, YEAR TYPE: NORMAL
FLOW, CFS
12,000
10,000
8,000
6,000
4,000
2,000
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
GAGE
ANNUAL
REAL TIME
ICE

5. GRAND ISLAND HISTORICAL FLOW SUMMARY, 1942-2011

Flow at the USGS Grand Island gage was analyzed from 1942, the year that the Kingsley dam became operational, until the present. Both average daily flow and peak instantaneous flow have been recorded over this period. The instantaneous peak flow, as determined by the USGS, is calculated by water year, which spans from October 1 of the previous calendar year through September 30. For example, the water year 2011 began on October 1, 2010, and ended September 30, 2011. For some water years, the instantaneous peak flow occurred in the beginning of the water year (October through December), resulting in two peak flow records for the calendar year and no recorded peak flow for the following calendar year. For these instances, the first peak flow in the calendar year is used for that year and no peak flow is used for the following year. The years without peak flow records are 1966, 2000, and 2009.

2012 data is currently provisional and will be added as it becomes approved by the USGS.

PEAKS AND AVERAGES

INSTANTANEOUS PEAK FLOWS are evaluated over the period of record and divided according to their annual hydrologic designation in the **YEAR TYPE** column. The **AVERAGE PEAK** column shows the average peak flows for the year types alongside the average month the peak occurred in the **AVERAGE MONTH OF PEAK** column. The **MAXIMUM PEAK** shows the highest annual peak for the year types alongside the **DATE** the peak occurred. The smallest annual peak for the year types is shown in the **MINIMUM PEAK** column with the corresponding **DATE** of occurrence.

Average flow for two different periods is shown in the **AVERAGE DAILY FLOW** section. The 1942-2011 period represents the flow period from the construction of Kingsley dam through the present and the 1947-1994 period corresponds to the flow period used for the USFWS annual hydrologic target flows and in the Central Platte River OPSTUDY Model. A difference of only 18 cfs in average daily flow indicates the 1947-1994 period closely approximates the behavior of the 1942-2011 period.

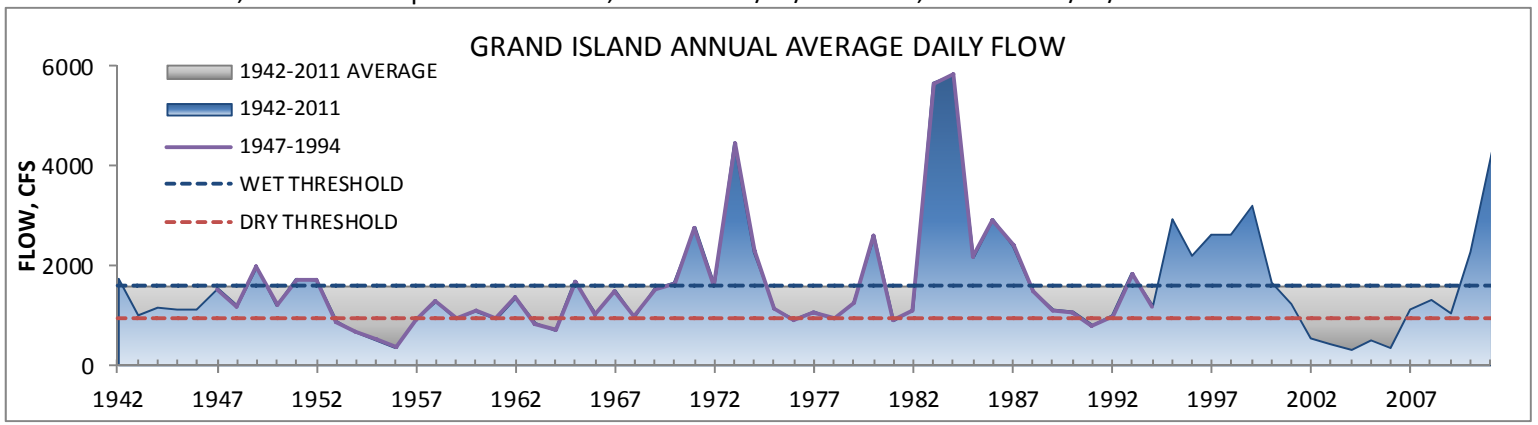
The “GRAND ISLAND ANNUAL AVERAGE DAILY FLOW” figure shows the average daily flows from 1942 to 2011, with the 1947-1994 period set off by a separate color scheme. The figure also includes the annual average daily flow for the 1942-2011 and the thresholds used by the USFWS for determining annual hydrologic conditions, with wet years falling above the 1,575 cfs line, dry years falling below the 939 cfs line, and normal years falling between the two lines.

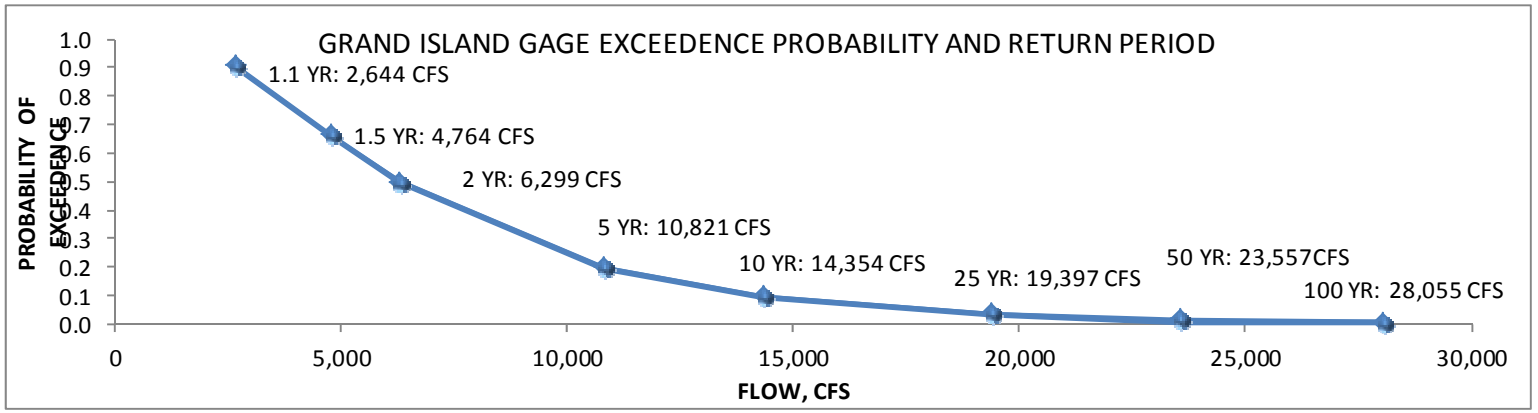
The GRAND ISLAND GAGE EXCEEDENCE PROBABILIBTY figure shows the probability of flow at Grand Island exceeding various flows along with the corresponding return periods next to the data points. The probabilities range from 0 to 1, with higher numbers indicating a higher probability of flow exceedence, and the flows are calculated from the instantaneous peak flow. The return period is the inverse of the exceedence probability with a 2 year return period corresponding to an exceedence probability of 0.5 and a 10 year return period corresponding to and exceedence probability of 0.1. Flow associated with the return period indicates the flow that is likely to occur over the return period, for example, a flow of

10,821 cfs is likely to occur every 5 years, and a flow of 28,055 cfs is likely to occur every 100 years. The exceedence probability and return periods were calculated using the flood frequency analysis spreadsheet developed by NRCS and based on USGS Bulletin 17B (http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/water/).

PEAKS AND AVERAGES

	INSTANTANEOUS PEAK FLOWS						AVERAGE DAILY FLOW	
YEAR TYPE	AVERAGE PEAK (CFS)	AVERAGE MONTH OF PEAK	MAXIMUM PEAK (CFS)	DATE	MINIMUM PEAK (CFS)	DATE	PERIOD	FLOW (CFS)
ALL	7,801	April	23,900	06/30/83	1,410	03/31/06	1942-2011	1,579
WET	11,156	May	23,900	06/30/83	4,750	05/06/72	1947-1994	1,597
NORMAL	7,385	May	20,300	06/23/47	2,650	05/25/82		
DRY	3,702	April	7,510	05/12/05	1,410	03/31/06		





6. LAKE MCCONAUGHY ENVIRONMENTAL ACCOUNT SUMMARY, 2007 TO PRESENT

ENVIRONMENTAL ACCOUNT ANNUAL TOTALS AND AVERAGES

The McConaughy Environmental Account is operated on a water year (WY) basis, beginning on October 1 of the previous year and ending on September 30, and all averages and totals shown in this section are based on water year, shown in the **WATER YEAR** column, not calendar year. The **AVERAGE VOLUME** column shows the average volume of the environmental account over the water year. The **YEAR START VOLUME** column shows the EA volume on October 1, the start of the water year, the **YEAR END VOLUME** shows the EA volume on September 30, the end of the water year, and the **Δ VOLUME** column shows the change in EA volume over the water year. The **ACCRUALS** column indicates the total amount of water added to the EA during the water year and includes storable natural inflows (SNI), water transfers, and water credits to the account. The EA receives 10% of the SNI coming into Lake McConaughy during the non-irrigation season and the account does not receive inflows from May through September. The account cannot store SNI if they exceed 10% of the total available storage capacity of Lake McConaughy. The **NATURAL LOSSES** column contains the combined water year total of seepage and evaporation losses. Evaporative and seepage losses are calculated as the total McConaughy evaporative and seepage multiplied by the percentage of the total McConaughy volume the EA represents, for example, if the total evaporation and seepage loss for McConaughy in a given month is 10,000 af and the EA volume is 20% of the total McConaughy volume, then the natural losses for the EA that month would be 2,000 af. The EA does not accrue water if seepage occurs into Lake McConaughy rather than as a loss out of the lake. The total water year releases are shown in the **RELEASES** column. The **OPERATION LOSSES** column shows losses to the EA that result from two types of operational constraints: the inability to store SNI due to available SNI exceeding 10% of Lake McConaughy's total available storage capacity and a reset of the EA resulting from Lake McConaughy reaching effective capacity. The EA is reset to a volume of 100,000 af if Lake McConaughy reaches its effective capacity. Operation losses in WY2011 resulted from SNI exceeding available storage in October, November, and March, as well as the account resetting in March. Operation losses in WY2012 resulted from SNI exceeding available storage in October.

The LAKE MCCONAUGHY EA MONTHLY AVERAGES, 2007-2012 figure show the average monthly values of accruals, releases, natural losses, and operational losses (OP. LOSSES). The accruals column appears alongside a column containing releases, natural losses, and operational losses stack vertically, allowing for a comparison of average gains and losses to the account each month. On average, accruals are high during the first part of the water year (October through April) and little to no accruals occur during the irrigation season (May through September). September accruals are mostly due to water transfers. Natural losses are fairly constant throughout the year while operational losses generally occur in October and March.

ENVIRONMENTAL ACCOUNT RELEASES

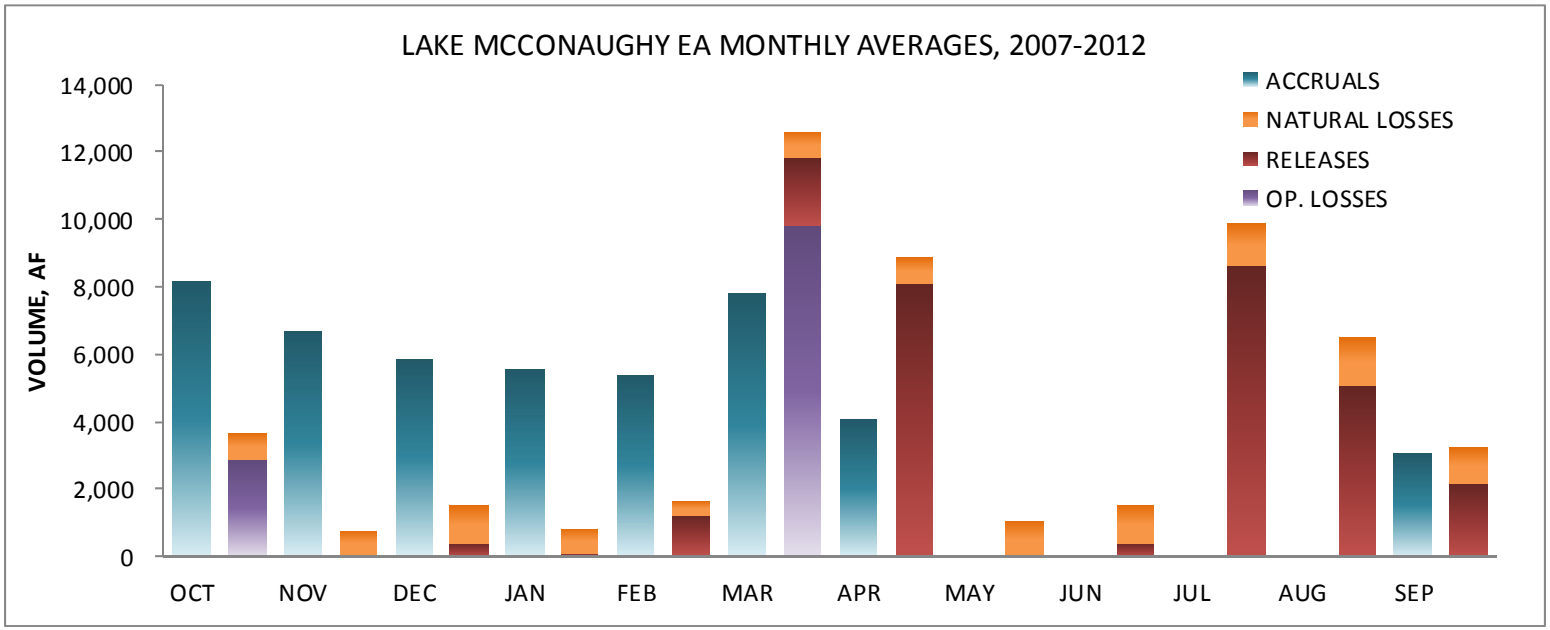
Releases from the McConaughy Environmental Account are summarized by release event in this section. The **START** and **STOP** dates are shown alongside the release's duration (**# OF DAYS**). The total **RELEASE VOLUME** is shown for each release event (note, this differs from the **RELEASES** column described on the previous page, which shows the annual volume released from the account). The volume of EA water arriving at the three gages in the habitat area is tracked in the **VOLUME** column under each gage location and the percentage of the total release volume arriving at each gage location is shown in the **% OF RELEASE** column. The amount of the release that served to reduce deficits to annual target flows at Grand Island is shown in the **DEFICIT REDUCTION** columns, with the **VOLUME** column showing the volume of deficit reduction and the **% OF RELEASE** column showing the percent of the total release volume that served to reduce deficits. The **PURPOSE** column shows the USFWS stated purpose for the EA release, see **Table 2** for descriptions of the abbreviations used in this column.

Table 2. EA release purpose abbreviation descriptions

Abbreviation	Description	Explanation
WC	Whooping Crane	Increase flows during whooping crane migration
PP	Piping Plover	Increase predator barrier and macroinvertabrate populations
LT	Least Tern	Increase predator barrier and forage fish populations
SP	System processes	Test and analyze system flows, including flow routing tests, channel maintenance, and wet meadow recharge

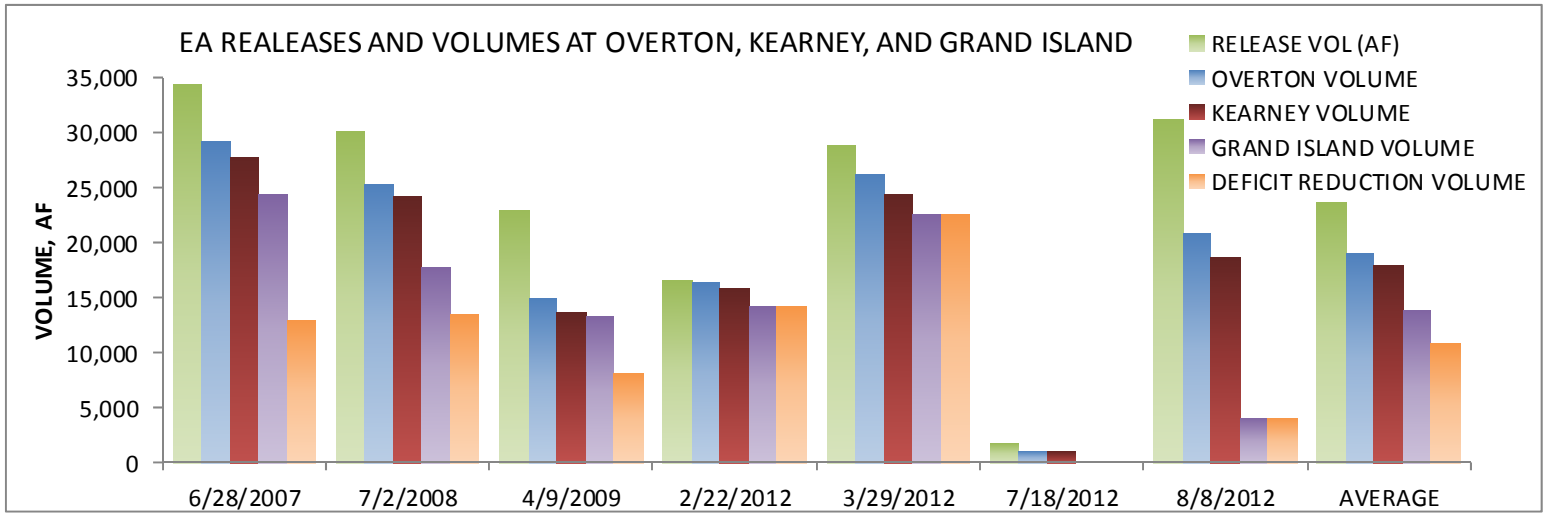
The EA RELEASES AND VOLUMES AT OVERTON, KEARNEY, AND GRAND ISLAND figure displays the volumes of EA water at the three gage locations alongside the total release volume and the volume of EA water that caused a reduction in deficits to target flows.

ENVIRONMENTAL ACCOUNT WATER YEAR TOTALS AND AVERAGES								
WATER YEAR	AVERAGE VOLUME (AF)	YEAR START VOL (AF)	YEAR END VOL (AF)	Δ VOLUME (AF)	ACCRUALS (AF)	NATURAL LOSSES (AF)	RELEASES (AF)	OPERATION LOSSES (AF)
2007	123,583	114,182	97,490	-16,692	32,804	15,122	34,374	0
2008	107,894	97,804	84,712	-13,092	35,665	18,321	30,123	0
2009	93,559	85,026	87,366	2,340	38,116	11,900	22,953	610
2010	113,263	87,680	120,060	32,380	42,716	10,024	0	0
2011	111,705	120,060	100,000	-20,060	53,832	2,403	0	65,958
2012	95,542	100,000	70,079	-29,921	71,354	9,919	78,242	12,783
AVERAGE:	*107,591*	*100,792*	*93,285*	*-7,508*	*45,748*	*11,281*	*27,615*	*13,225*



ENVIRONMENTAL ACCOUNT RELEASES

RELEASE DATE				OVERTON		KEARNEY		GRAND ISLAND		DEFICIT REDUCTION		
START	STOP	# OF DAYS	RELEASE VOL (AF)	VOLUME (AF)	% OF RELEASE	VOLUME (AF)	% OF RELEASE	VOLUME (AF)	% OF RELEASE	VOLUME (AF)	% OF RELEASE	PURPOSE
6/28/2007	8/12/2007	45	34,374	29,175	84.9%	27,748	80.7%	24,406	71.0%	12,965	37.7%	PP,LT
7/2/2008	8/5/2008	34	30,123	25,294	84.0%	24,211	80.4%	17,834	59.2%	13,569	45.0%	PP,LT
4/9/2009	4/16/2009	7	22,953	14,985	65.3%	13,589	59.2%	13,313	58.0%	8,210	35.8%	SP
2/22/2012	3/6/2012	13	16,525	16,366	88.6%	15,808	95.7%	14,264	86.3%	14,264	86.3%	SP
3/29/2012	5/1/2012	33	28,910	26,085	90.2%	24,383	84.3%	22,538	78.0%	22,538	78.0%	WC
7/18/2012	7/21/2012	3	1,706	1,091	64.0%	1,061	62.2%	0	0.0%	0	0.0%	PP, LT
8/8/2012	9/15/2012	38	31,103	20,761	66.7%	18,605	59.8%	4,104	13.2%	4,104	13.2%	PP, LT
AVERAGE		*25*	*23,671*	*19,108*	*77.7%*	*17,915*	*74.6%*	*13,780*	*52.2%*	*10,807*	*42.3%*	



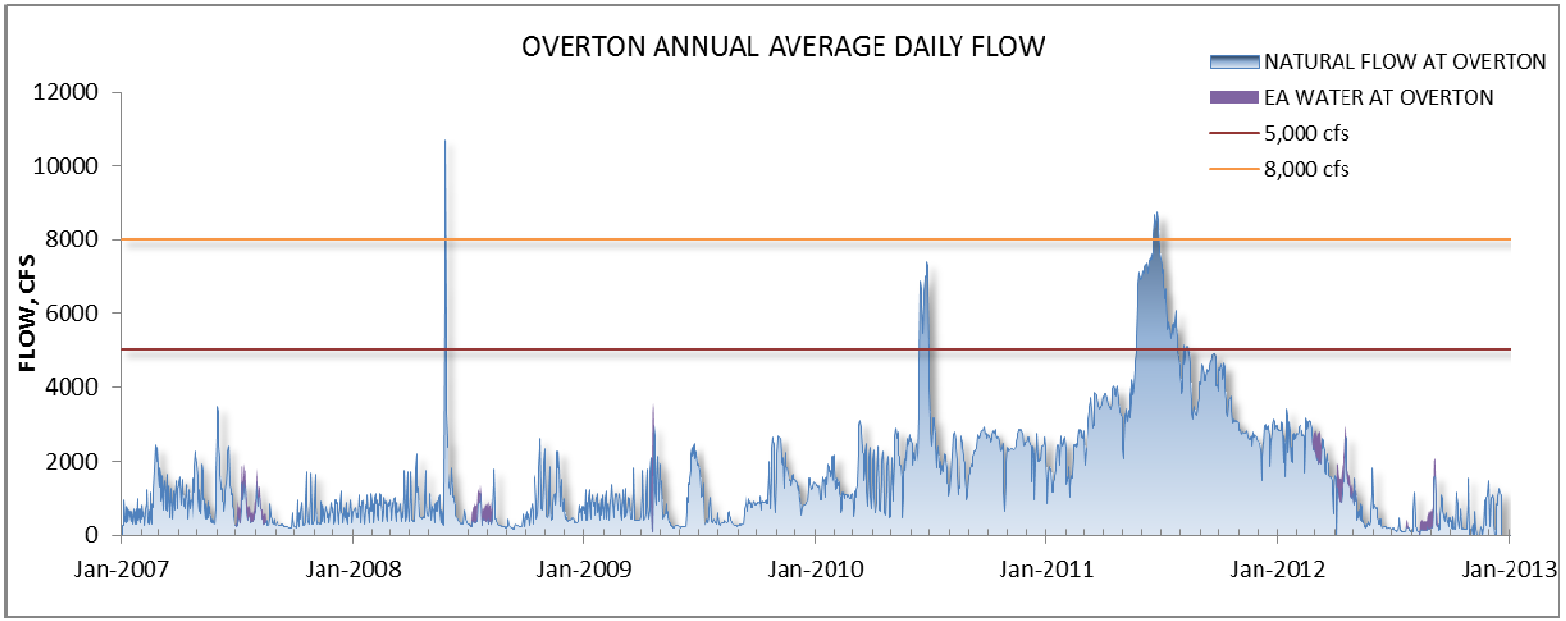
7. PEAK FLOW AND SHORT DURATION HIGH FLOW COMPARISON, 2007 TO PRESENT

The following summary compares actual peak flow events to the Short Duration High Flow (SDHF) requirements at the Overton gage. SDHF events are defined in the Program's Water Plan[7] as "flows of approximately three to five days duration with magnitudes approaching but not exceeding bankfull channel capacity in the habitat reach". The bankfull capacity in the associated habitat is between 5,000 cfs and 8,000 cfs. River flow in 2007, 2009, and 2012 did not exceed the lower SDHF threshold. Peak flow in 2008 exceeded the 5,000 cfs threshold for three days and exceeded the 8,000 cfs threshold for one day. Flows in 2010 remained between the 5,000 cfs and 8,000 cfs thresholds for 14 consecutive days. In 2011, flows exceeded the 5,000 cfs threshold for a total of 70 days and flows exceeded the 8,000 cfs threshold for 9 days. The **DAYS > 5,000 CFS** column shows the number of days in the **YEAR** that exceed 5,000 cfs and the **DAYS > 8,000 CFS** column shows the number of days in the YEAR that exceeded 8,000 cfs. The **DATES** column provides the dates when flows were above 5,000 cfs. The **3-DAY MEAN PEAK** column provides the highest 3-day average daily flow during the peak flow event, the **EVENT VOLUME** column shows the total flow during events where flow exceeded 5,000 cfs, and the **YEAR TYPE** column provides the annual hydrologic condition designation.

The "OVERTON ANNUAL AVERAGE DAILY FLOW" figure shows the Overton gage hydrograph from 2007 through the present. The amount of flow coming from the McConaughy Environmental account is shown in purple. The gage data during most of 2012 is provisional and contains several equipment errors. The figure will be updated as approved data becomes available. The 5,000 cfs line on the figure indicates the SDHF event threshold; flow events that exceed 5,000 cfs are seen in 2008, 2010, and 2011. The 8,000 cfs line shows the upper SDHF event threshold.

[7]Attachment 5 Section 5 in the Platte River Recovery Implementation Program Document dated December 7, 2005.

OVERTON GAGE						
YEAR	DAYS > 5,000 CFS	DAYS > 8,000 CFS	DATES	3-DAY MEAN PEAK (CFS)	EVENT VOLUME (AF)	YEAR TYPE
2007	0	0	-	3,183	-	NORMAL
2008	3	1	5/24 - 5/26	7,597	45,204	NORMAL
2009	0	0	-	3,447	-	NORMAL
2010	14	0	6/15 - 6/28	7,203	183,176	WET
2011	70	9	5/24 - 8/13	8,613	1,037,807	WET
2012	0	0	-	3,077	-	NORMAL
AVERAGE	*15*	*2*		*5,520*	*422,062*	



APPENDIX A: CENTRAL PLATTE RIVER SURFACE WATER SUMMARY, 2007 TO 2011

2007 ANNUAL SUMMARY

HYDROLOGIC CONDITION

The annual average gage flow at Grand Island was 1,121 cfs, resulting in a NORMAL annual hydrologic condition designation. The real time hydraulic conditions ranged between dry and normal as seen in **Table A1**.

Table A1. 2012 Real-time hydrologic condition designations

Period	Condition	Target Flow	Period	Condition	Target Flow
Jan 1 – Jan 31	-	1000	*May 20 - May 26*	DRY	800
Feb 1 – Feb 14	-	1800	*May 27 – June 20*	NORMAL	3400
Feb 15 – Mar 15	-	3350	*June 21 – Sept 15*	NORMAL	1200
Mar 16 – Mar 22	-	1800	*Sept 16 – Sept 30*	NORMAL	1000
Mar 23 – May 10	-	2400	*Oct 1 – Nov 15*	NORMAL	1800
May 11 – May 19	DRY	800	*Nov 16 – Dec 31*	NORMAL	1000

ENVIRONMENTAL ACCOUNT

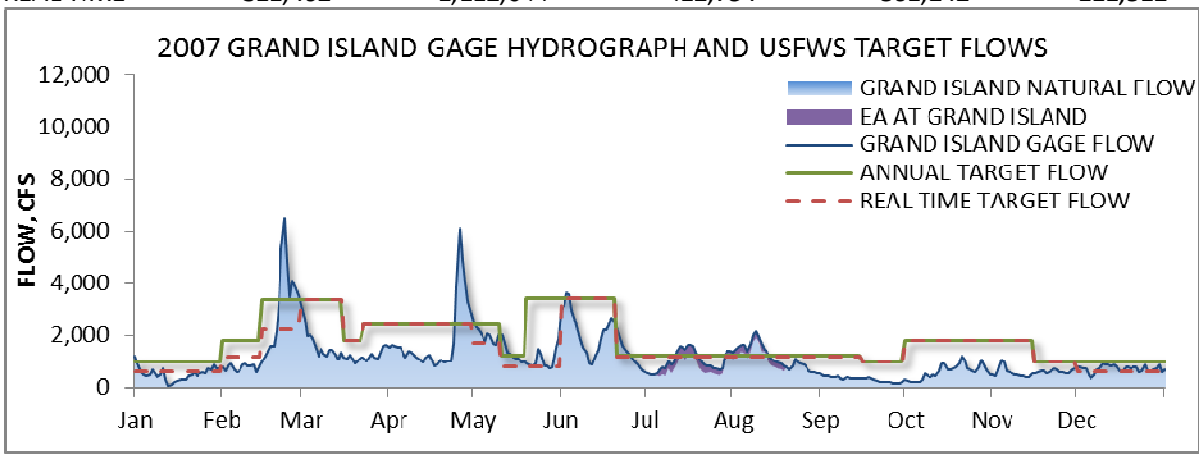
Releases from the McConaughy Environmental Account (EA) were made during the summer nesting period from June 28 through August 12, with a total volume of 34,374 af. This release was to support flows for forage fish and provide a degree of predator barrier. The account received 314 af from Net Controllable Conserved Water (NCCW) in addition to storable natural inflows.

2007 FLOW AND PEAK FLOW EVENTS

GAGE	AVG ANNUAL FLOW (CFS)	INSTANTANEOUS PEAK FLOW (CFS)	DATE OF PEAK FLOW	TYPE OF YEAR DESIGNATION
OVERTON	800	4,420	Jun. 02	
KEARNEY	857	5,430	Feb. 25	
GRAND ISLAND	1,121	7,300	Feb. 23	NORMAL

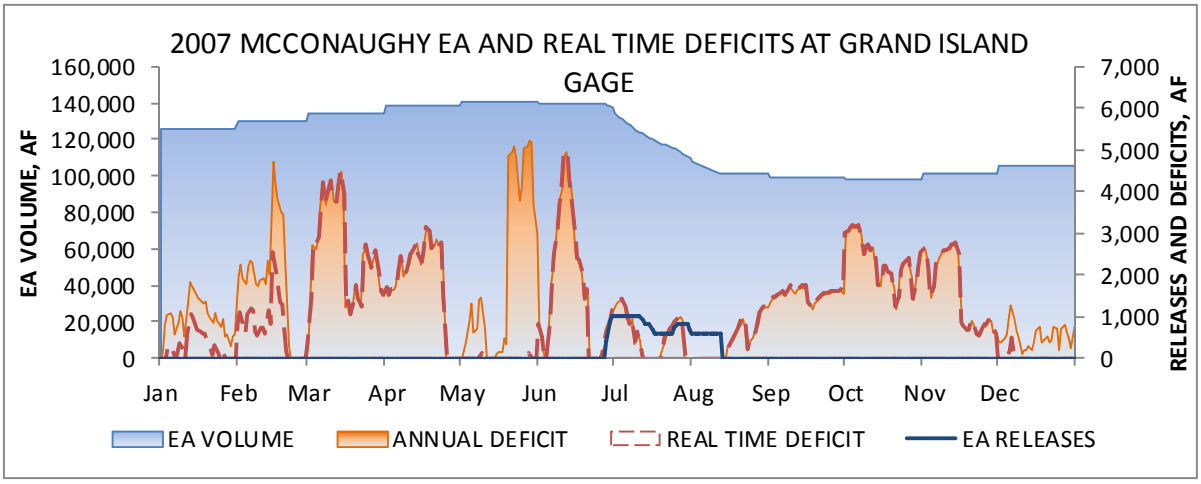
TARGET FLOW ACCOUNTING AT GRAND ISLAND

TARGET CATEGORY	TOTAL FLOW (AF)	TARGET VOLUME (AF)	TOTAL DEFICIT (AF)	VOLUME DEFICIT (AF)	TIMING DEFICIT (AF)
ANNUAL	811,402	1,291,953	543,983	480,550	63,432
REAL TIME	811,402	1,112,644	412,754	301,242	111,512



MCCONAUGHY ENVIRONMENTAL ACCOUNT

VOLUME AT START OF YEAR (AF)	125,473	**ACCRUALS (AF)**	34,794
VOLUME AT END OF YEAR (AF)	108,612	**LOSSES (AF)**	17,282
CHANGE IN VOLUME (AF)	-16,861	**RELEASES (AF)**	34,374



2008 ANNUAL SUMMARY

HYDROLOGIC CONDITION

The annual average gage flow at Grand Island was 1,300 cfs, resulting in a NORMAL annual hydrologic condition designation. The real time hydraulic conditions ranged between dry, normal, and wet, matching the annual designation 67% of the year, shown in **Table A2**.

Table A2. 2008 Real-time hydrologic condition designations

Period	Condition	Target Flow	Period	Condition	Target Flow
Jan 1 – Jan 31	DRY	600	*May 20 - May 26*	DRY	800
Feb 1 – Feb 14	DRY	1200	*May 27 – June 20*	WET	3400
Feb 15 – Mar 15	DRY	2250	*June 21 – Sept 15*	NORMAL	1200
Mar 16 – Mar 22	NORMAL	1800	*Sept 16 – Sept 30*	NORMAL	1000
Mar 23 – May 10	NORMAL	2400	*Oct 1 – Nov 15*	NORMAL	1800
May 11 – May 19	DRY	800	*Nov 16 – Dec 31*	NORMAL	1000

ENVIRONMENTAL ACCOUNT

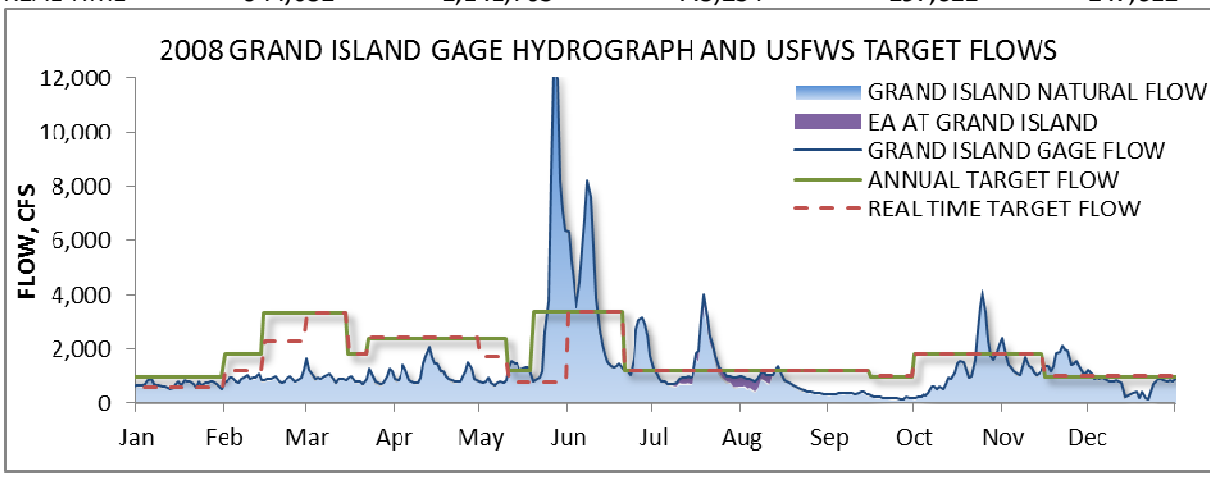
Releases from the McConaughy Environmental Account (EA) were made from July 9 through August 3, totaling 30,123 af, with the intent of assisting in flows fo forage fish during observed nesting activity. The releases served to reduce deficits to target flows by a total of 7,997 cfs. The EA followed a drought mode of operation in 2008 due to well below average carry over in Lake McConaughy and anticipated below normal water supply on the North Platte River. The account received 314 af from Net Controllable Conserved Water (NCCW) in addition to storable natural inflows.

2008 FLOW AND PEAK FLOW EVENTS

GAGE	AVG ANNUAL FLOW (CFS)	INSTANTANEOUS PEAK FLOW (CFS)	DATE OF PEAK FLOW	TYPE OF YEAR DESIGNATION
OVERTON	791	11,200	May. 25	
KEARNEY	929	13,400	May. 26	
GRAND ISLAND	1,300	13,600	May. 27	NORMAL

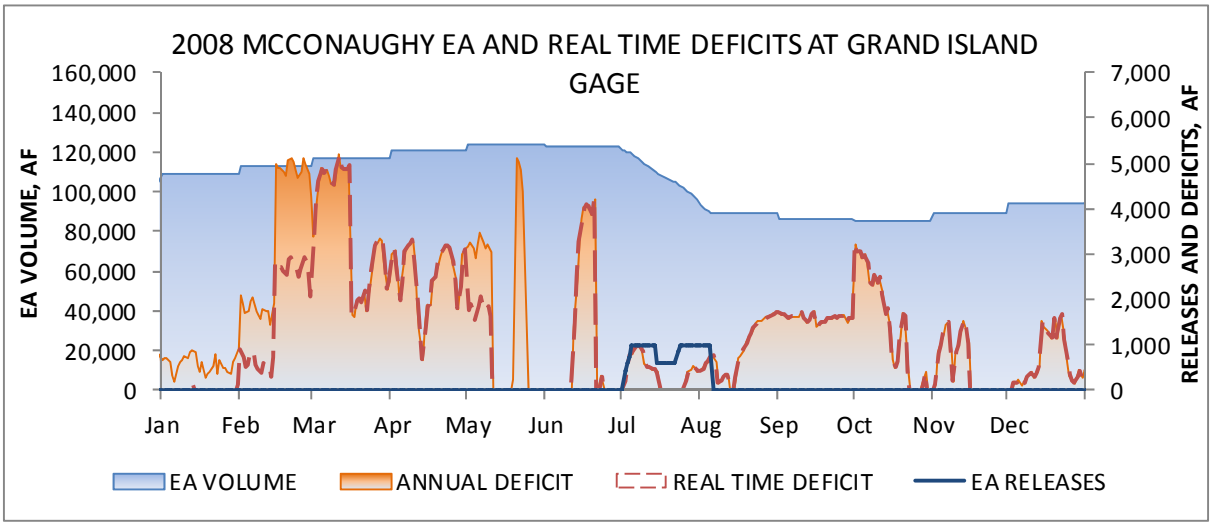
TARGET FLOW ACCOUNTING AT GRAND ISLAND

TARGET CATEGORY	TOTAL FLOW (AF)	TARGET VOLUME (AF)	TOTAL DEFICIT (AF)	VOLUME DEFICIT (AF)	TIMING DEFICIT (AF)
ANNUAL	944,081	1,298,597	547,055	354,517	192,538
REAL TIME	944,081	1,141,703	445,234	197,622	247,612



MCCONAUGHY ENVIRONMENTAL ACCOUNT

VOLUME AT START OF YEAR (AF)	108,612	**ACCRUALS (AF)**	37,681
VOLUME AT END OF YEAR (AF)	97,911	**LOSSES (AF)**	17,650
CHANGE IN VOLUME (AF)	-10,701	**RELEASES (AF)**	30,123



2009 ANNUAL SUMMARY

HYDROLOGIC CONDITION

The annual average gage flow at Grand Island was 1,039 cfs, resulting in a NORMAL annual hydrologic condition designation. The real time hydraulic condition was normal for the majority of the year, only varying from the annual designation for a dry designation from October 1 to November 15. Real time and annual designations matched 83% of the year, as seen in **Table A 3**.

Table A3. 2009 Real-time hydrologic condition designations

Period	Condition	Target Flow	Period	Condition	Target Flow
Jan 1 – Jan 31	NORMAL	1000	*May 20 - May 26*	NORMAL	3400
Feb 1 – Feb 14	NORMAL	1800	*May 27 – June 20*	NORMAL	3400
Feb 15 – Mar 15	NORMAL	3350	*June 21 – Sept 15*	NORMAL	1200
Mar 16 – Mar 22	NORMAL	1800	*Sept 16 – Sept 30*	NORMAL	1000
Mar 23 – May 10	NORMAL	2400	*Oct 1 – Nov 15*	WET	2400
May 11 – May 19	NORMAL	1200	*Nov 16 – Dec 31*	WET	1000

ENVIRONMENTAL ACCOUNT

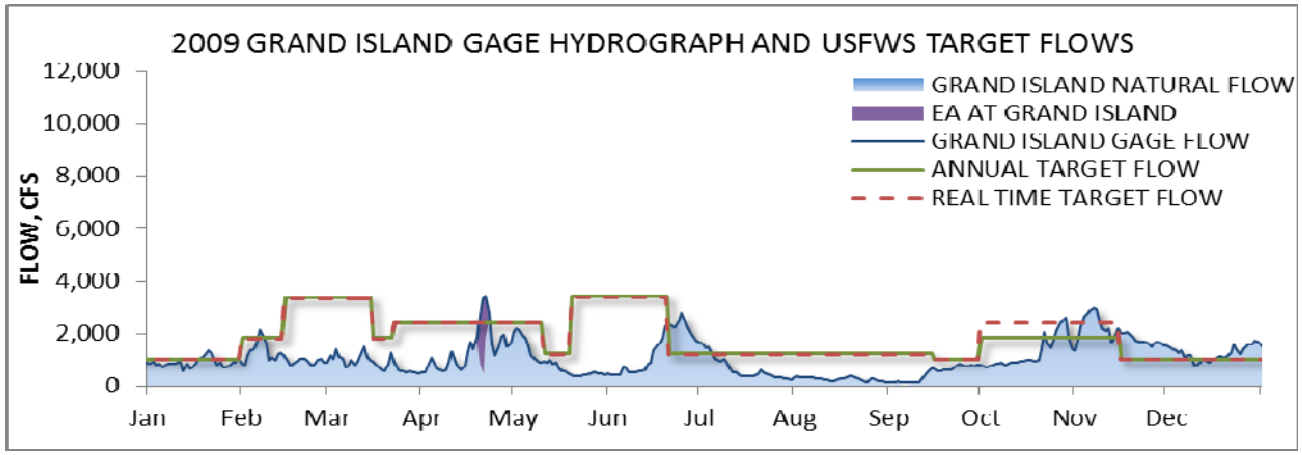
Releases from the McConaughy Environmental Account (EA) were made during a "Flow Routing Test" associated with the Program's Short Duration High Flows from April 9 through April 16 and totaled 22,953 af. The EA followed a drought mode of operation in 2009 due to well below average carry over in Lake McConaughy and anticipated below normal water supply on the North Platte River. The account received 314 af from Net Controllable Conserved Water (NCCW) in addition to storable natural inflows.

2009 FLOW AND PEAK FLOW EVENTS

GAGE	AVG ANNUAL FLOW (CFS)	INSTANTANEOUS PEAK FLOW (CFS)	DATE OF PEAK FLOW	TYPE OF YEAR DESIGNATION
OVERTON	942	3,700	Apr. 19	
KEARNEY	916	3,350	Apr. 20	
GRAND ISLAND	1,039	3,540	Apr. 22	NORMAL

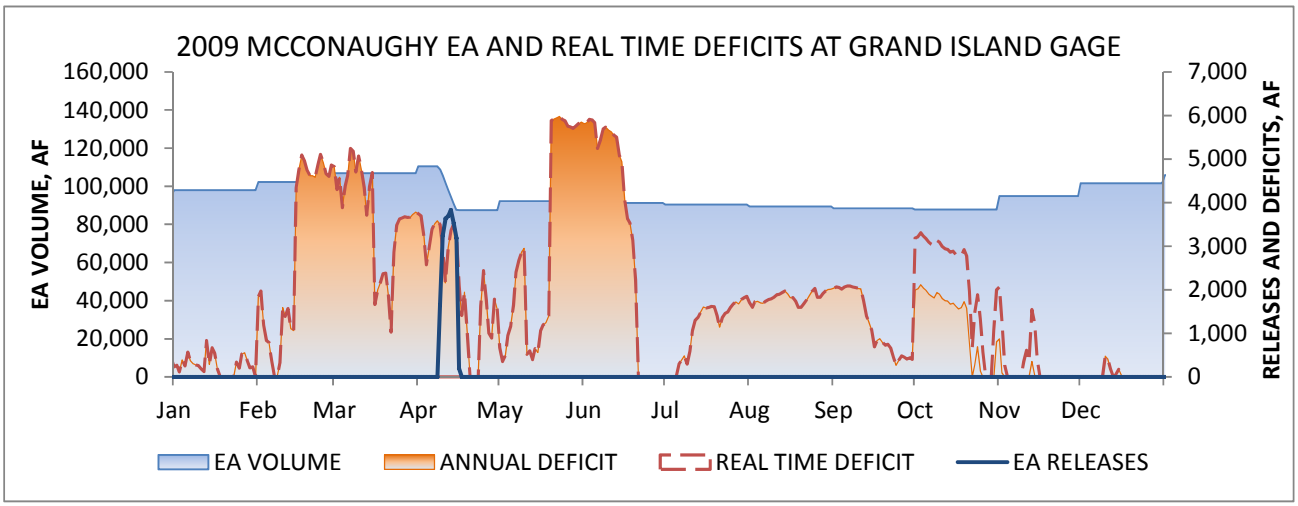
TARGET FLOW ACCOUNTING AT GRAND ISLAND

TARGET CATEGORY	TOTAL FLOW (AF)	TARGET VOLUME (AF)	TOTAL DEFICIT (AF)	VOLUME DEFICIT (AF)	TIMING DEFICIT (AF)
ANNUAL	752,038	1,291,953	632,802	539,915	92,887
REAL TIME	752,038	1,346,697	671,659	594,659	76,999



MCCONAUGHY ENVIRONMENTAL ACCOUNT

VOLUME AT START OF YEAR (AF)	97,911	**ACCRUALS (AF)**	40,015
VOLUME AT END OF YEAR (AF)	105,775	**LOSSES (AF)**	9,199
CHANGE IN VOLUME (AF)	7,865	**RELEASES (AF)**	22,953



2010 ANNUAL SUMMARY

HYDROLOGIC CONDITION

The annual average gage flow at Grand Island was 2,289 cfs, resulting in a WET annual hydrologic condition designation. The real time hydraulic condition varied between normal and wet over the year, matching the annual designation 98% of the year and only differing from May 20 through May 27, as seen in **Table A4**. For several periods during the year, the normal and wet target flows are the same; for these periods a real time designation of normal was considered to match the annual designation of wet.

Table A4. 2010 Real-time hydrologic condition designations

Period	Condition	Target Flow	Period	Condition	Target Flow
Jan 1 – Jan 31	NORMAL	1000	*May 20 - May 26*	NORMAL	3400
Feb 1 – Feb 14	NORMAL	1800	*May 27 – June 20*	WET	3400
Feb 15 – Mar 15	NORMAL	3350	*June 21 – Sept 15*	NORMAL	1200
Mar 16 – Mar 22	NORMAL	1800	*Sept 16 – Sept 30*	NORMAL	1000
Mar 23 – May 10	NORMAL	2400	*Oct 1 – Nov 15*	WET	2400
May 11 – May 19	NORMAL	1200	*Nov 16 – Dec 31*	WET	1000

ENVIRONMENTAL ACCOUNT

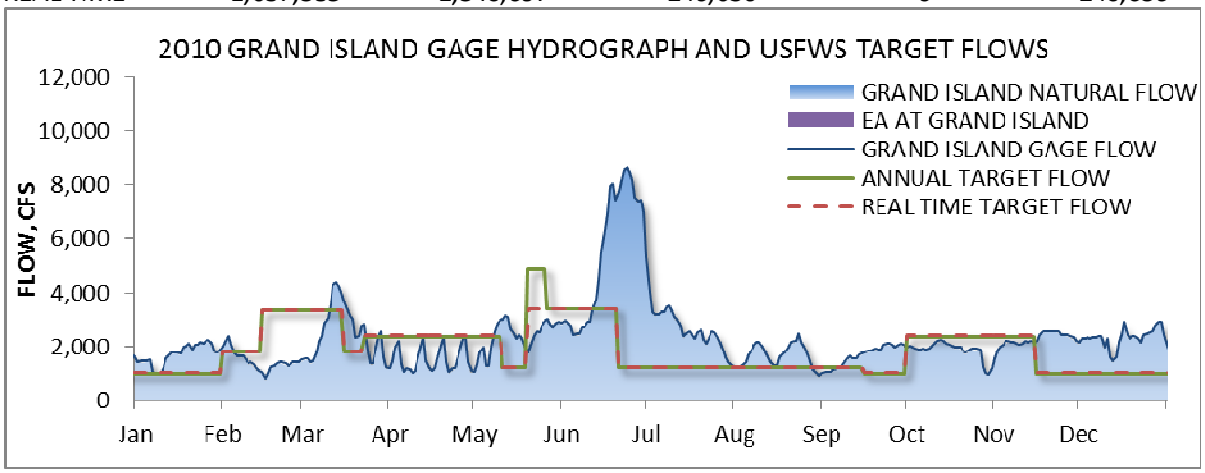
No releases were made to the McConaughy Environmental Account (EA) and the EA followed a conservation mode of operation in 2010. The account received 314 af from Net Controllable Conserved Water (NCCW) in addition to storable natural inflows; however, most of the large flows did not result in EA accruals because they fell during the May-September period when the EA does not accrue storable natural inflows (SNI). The EA was not able to capture additional SNI during October and November because the available SNI exceeded 10% of the available storage space in the Kingsley reservoir, resulting in 6,848 af less SNI in October and 304 af less SNI in November.

2010 FLOW AND PEAK FLOW EVENTS

GAGE	AVG ANNUAL FLOW (CFS)	INSTANTANEOUS PEAK FLOW (CFS)	DATE OF PEAK FLOW	TYPE OF YEAR DESIGNATION
OVERTON	2,157	7,500	Jun. 27	
KEARNEY	2,069	8,510	Jun. 17	
GRAND ISLAND	2,289	8,840	Jun. 24	WET

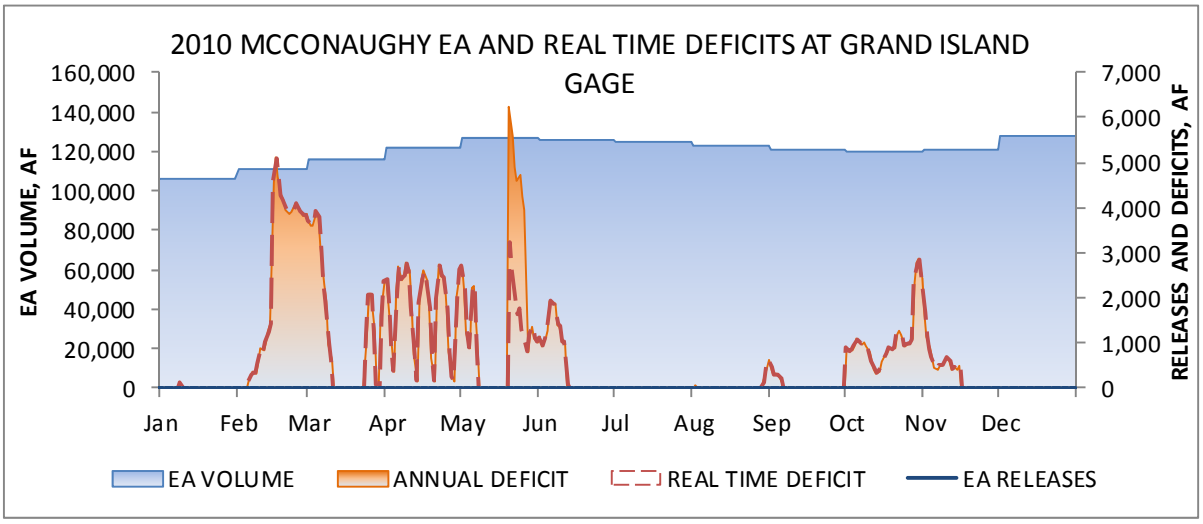
TARGET FLOW ACCOUNTING AT GRAND ISLAND

TARGET CATEGORY	TOTAL FLOW (AF)	TARGET VOLUME (AF)	TOTAL DEFICIT (AF)	VOLUME DEFICIT (AF)	TIMING DEFICIT (AF)
ANNUAL	1,657,385	1,367,524	267,463	0	267,463
REAL TIME	1,657,385	1,346,697	246,636	0	246,636



MCCONAUGHY ENVIRONMENTAL ACCOUNT

VOLUME AT START OF YEAR (AF)	105,775	**ACCRUALS (AF)**	46,168
VOLUME AT END OF YEAR (AF)	134,383	**LOSSES (AF)**	10,095
CHANGE IN VOLUME (AF)	28,607	**RELEASES (AF)**	0



2011 ANNUAL SUMMARY

HYDROLOGIC CONDITION

The annual average gage flow at Grand Island was 4,275 cfs, resulting in a WET annual hydrologic condition designation. The real time hydraulic condition remained consistently wet throughout the year, matching the annual designation 100% of the time, as seen in **Table A5**.

Table A5. 2011 Real-time hydrologic condition designations

Period	Condition	Target Flow	Period	Condition	Target Flow
Jan 1 – Jan 31	NORMAL	1000	*May 20 - May 26*	WET	4900
Feb 1 – Feb 14	NORMAL	1800	*May 27 – June 20*	WET	3400
Feb 15 – Mar 15	NORMAL	3350	*June 21 – Sept 15*	NORMAL	1200
Mar 16 – Mar 22	NORMAL	1800	*Sept 16 – Sept 30*	NORMAL	1000
Mar 23 – May 10	NORMAL	2400	*Oct 1 – Nov 15*	WET	2400
May 11 – May 19	WET	1200	*Nov 16 – Dec 31*	WET	1000

ENVIRONMENTAL ACCOUNT

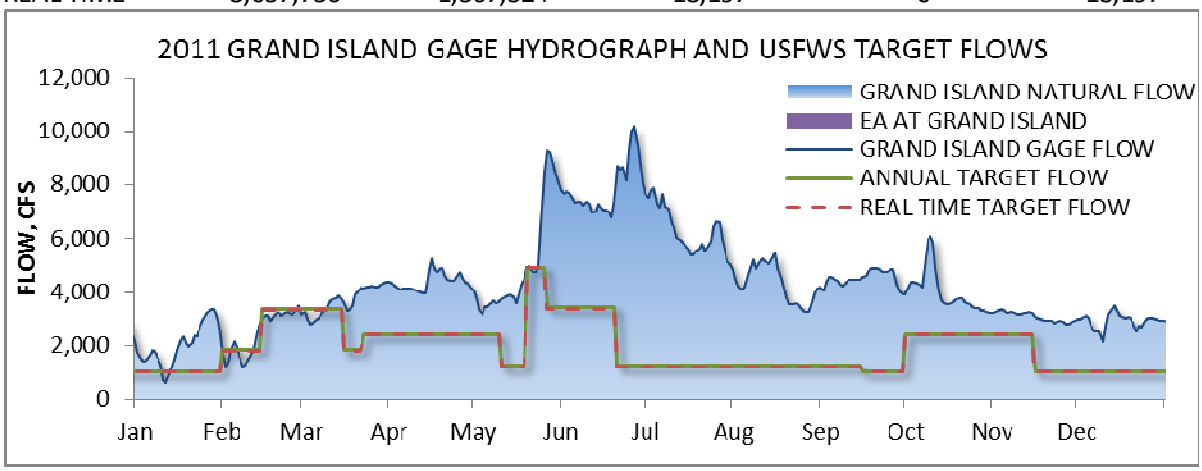
The McConaughy Environmental Account (EA) was reset to 100,000 af from March through November of 2011 due to the Kingsley Reservoir reaching and remaining at its effective capacity for most of the year. No releases were made as minimal shortages to target flows were seen over the course of the year. While the account received 314 af from Net Controllable Conserved Water (NCCW), this water was lost when the account was reset. The EA was reduced by 39,644 af in March when it was reset and it was not able to capture storable natural inflows when the Kingsley Reservoir was at effective capacity.

2011 FLOW AND PEAK FLOW EVENTS

GAGE	AVG ANNUAL FLOW (CFS)	INSTANTANEOUS PEAK FLOW (CFS)	DATE OF PEAK FLOW	TYPE OF YEAR DESIGNATION
OVERTON	3,877	8,820	Jun. 20	
KEARNEY	3,972	9,460	Jun. 25	
GRAND ISLAND	4,224	10,400	Jun. 27	WET

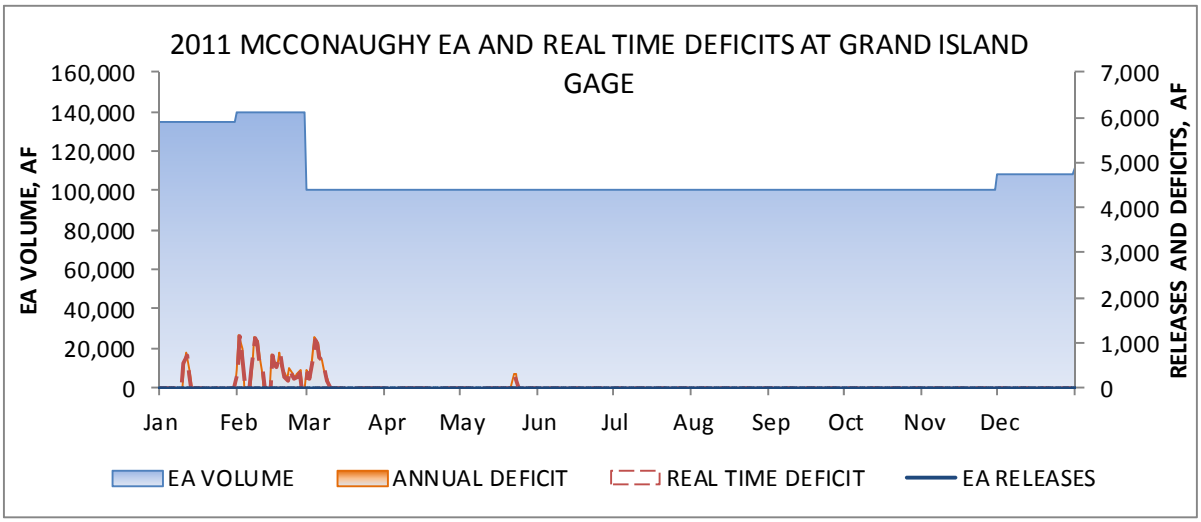
TARGET FLOW ACCOUNTING AT GRAND ISLAND

TARGET CATEGORY	TOTAL FLOW (AF)	TARGET VOLUME (AF)	TOTAL DEFICIT (AF)	VOLUME DEFICIT (AF)	TIMING DEFICIT (AF)
ANNUAL	3,057,736	1,367,524	18,197	0	18,197
REAL TIME	3,057,736	1,367,524	18,197	0	18,197



MCCONAUGHY ENVIRONMENTAL ACCOUNT

VOLUME AT START OF YEAR (AF)	134,383	**ACCRUALS (AF)**	59,473
VOLUME AT END OF YEAR (AF)	114,402	**LOSSES (AF)**	2,333
CHANGE IN VOLUME (AF)	-19,980	**RELEASES (AF)**	0



APPENDIX B: COMPARISON OF ANNUAL HYDROLOGIC CONDITION FLOW THRESHOLDS

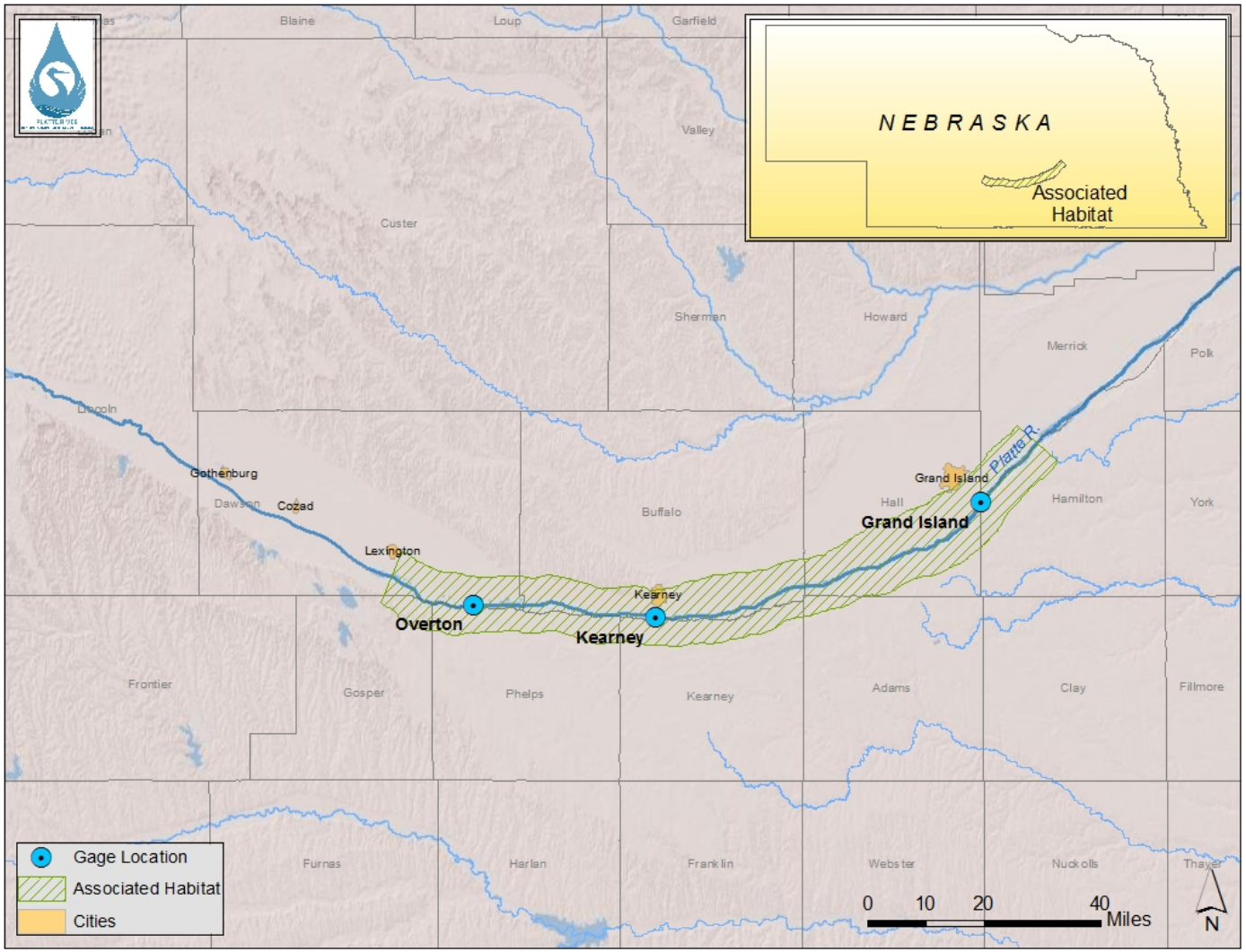
The Program currently uses the FWS annual flow thresholds to determine annual hydrologic condition designations. These thresholds were developed by taking the annual average of the average daily flows from the Grand Island gage over the period 1947 through 1994. The years with the highest 33% annual average daily flows were designated wet, the years with the 25% lowest annual average daily flows were designated dry, and the years between the two ranges were designated normal. The threshold for wet years is 1,575 cfs and the threshold for dry years is 939 cfs.

To ensure that these thresholds still adequately describe the hydrologic conditions in the associated habitat, they were compared with flow thresholds developed from the annual average daily flows at the Grand Island gage over the period 1947 through 2011. The same highest 33% and lowest 25% cutoffs were used, resulting in thresholds of 1,657 cfs for wet years and 939 cfs for dry years. The differences between the thresholds are shown in **Table C1**. Annual hydrologic conditions were assigned to each year from 1947 through 2011 using both the 1947-1994 thresholds and the 1947-2011 thresholds. The 1942-2011 thresholds only caused the hydrologic condition to change for two years, 1970 and 1972, with both years' designations changing from a wet designation by the 1947-1994 thresholds to a normal designation by the 1947-2011 thresholds.

Table C1. 1947-1994 and 1947-2011 Thresholds

Period	Wet threshold (cfs)	Dry threshold (cfs)
1947-1994	1,575	939
1947-2011	1,657	939
Difference	82	0

APPENDIX C: GAGE LOCATION MAP



APPENDIX D: GLOSSARY OF TERMS

GENEARAL

SNI: storable natural inflows, the amount of natural flow into Lake McConaughy that may be stored in the reservoir

ANNUAL SUMMARY

AVG ANNUAL FLOW: the annual average of average daily flows

INSTANTANEOUS PEAK FLOW: the maximum instantaneous flow to occur in the calendar year

DATE OF PEAK FLOW: day of the year the instantaneous peak flow occurred

TYPE OF YEAR DESIGNATION: the annual hydrologic condition designation; either wet, normal, or dry

TARGET CATEGORY--ANNUAL: the set of target flows based on the type of year designation

TARGET CATEGORY—REAL TIME: the set of target flows based on real time updates of the hydrologic condition throughout the year

TOTAL FLOW: a summation of the average daily flow over the year

TARGET VOLUME: the total volume of the target flows for the year

TOTAL DEFICIT: the sum of all the daily deficits to target flows for the year

VOLUME DEFICIT: the difference between the target volume and the total flow at Grand Island

TIMING DEFICIT: the difference between the total deficit and the volume deficit

CHANGE IN VOLUME: Change in EA volume over the calendar year

VOLUME AT START OF YEAR: EA volume at the beginning of the calendar year

VOLUME AT END OF YEAR: EA volume at the end of the calendar year

ACCRUALS: water added to the Lake McConaughy environmental account (EA) from storable natural inflows (SNI), water transfers, and water credits.

LOSSES: water removed from the EA due to evaporation and seepage

RELEASES: water released from the EA to mitigate deficits to target flows, to meet short duration high flows, or other reasons

GRAND ISLAND FLOW SUMMARY

AVG ANNUAL FLOW: See ANNUAL SUMMARY definition

INTANTANEOUS PEAK FLOW: See ANNUAL SUMMARY definition

DATE OF PEAK FLOW: See ANNUAL SUMMARY definition

TYPE OF YEAR DESIGNATION: See ANNUAL SUMMARY definition

INSTANTANEOUS MIN FLOW: the minimum instantaneous flow to occur in the calendar year

DATE OF MIN FLOW: day of the year the instantaneous minimum flow occurred

GRAND ISLAND HISTORICAL FLOW SUMMARY

INTANTANEOUS PEAK FLOW: This section shows data for the highest instantaneous flow calculated by the USGS based on water year

YEAR TYPE: See ANNUAL SUMMARY **TYPE OF YEAR DESIGNATION** definition

AVERAGE PEAK: the average peak flow for the year type

AVERAGE MONTH OF PEAK: the average month the peak occurred

MAXIMUM PEAK: the highest annual peak for the year types

DATE: the date the highest annual peak occurred

MINIMUM PEAK: the lowest annual peak for the year types

DATE: the date the lowest annual peak occurred

AVERAGE DAILY FLOW: This section shows data for the average daily flow for two periods

PERIOD: the range of years average flows are analyzed

FLOW: the average flow during the period shown

LAKE MCCONAUGHY ENVIRONMENTAL ACCOUNT SUMMARY

WATER YEAR: the period from October 1 of the previous year through September 30 of the current year, for example, the water year 2008 begins on October 1, 2007 and ends September 30, 2008

AVERAGE VOLUME: the average volume of the EA over the course of the water year

YEAR START VOL: the volume of the EA at the beginning of the water year (October 1)

YEAR END VOL: the volume of the EA at the end of the water year (September 30)

Δ VOLUME: the change in EA volume over the water year, calculated VOLUME OCT 1 – VOLUME SEP 30

ACCRUALS: the total amount of water added to the EA during the water year, including SNI, water transfers, and water credits.

NATURAL LOSSES: the combination of EA seepage and evaporation losses for the water year

RELEASES: the total amount of EA releases for the water year

OPERATIONAL LOSSES: losses from the EA's inability to store SNI or EA water lost during an account reset

 # OF DAYS: the duration of the EA release

RELEASE VOLUME: the total volume of release from the EA

VOLUME: the volume of EA water that arrived at the gage location

% OF RELEASE: the percent of the total release volume to arrive at the gage location

DEFICIT REDUCTION: the amount of the EA release that served to reduce deficits to annual target flows at Grand Island

PURPOSE: the USFWS stated purpose for the EA release

SHORT DURATION HIGH FLOW SUMMARY

DAYS > 5,000 cfs: the number of days flow exceeds the 5,000 cfs threshold

DAYS > 8,000 cfs: the number of days flow exceeds the 8,000 cfs threshold

DATES: the date range of events with flow greater than 5,000 cfs

3-DAY MEAN PEAK: the maximum of a 3-day running average of flow during the peak event

EVENT VOLUME: the volume of flow during events with flow above 5,000 cfs

YEAR TYPE: See ANNUAL SUMMARY **TYPE OF YEAR DESIGNATION** definition

UNITS

CFS: Cubic feet per second. Flows are given in cfs, one cubic foot per second of flow is equal to 1.9835 acre-feet per day.

AF: Acre-feet. EA volume, flow volume, deficit volume, EA accruals, EA losses, and EA releases are given in af.