



**TO:** PRRIP GC SCORING SUBCOMMITTEE  
**FROM:** PRRIP EXECUTIVE DIRECTOR'S OFFICE  
**SUBJECT:** TIMING OF RECHARGE DIVERSIONS IN CPNRD/NPPD SCORE MODEL  
**DATE:** MAY 4, 2020

## I. INTRODUCTION

The Scoring Subcommittee met by conference call on April 21, 2020 to review the preliminary score analysis and results for the CPNRD and NPPD recharge projects. A key point of discussion was the timing of potential diversions for recharge. The EDO presented two timing options, one based on First Increment recharge operations data (2011-2017 for CPNRD and 2015-2019 for NPPD), and the other a generalized “shoulder season” diversion period.

The operations-based diversion periods (presented in Tables 6 and 10 of the draft score memo) for some canals included days in late May and early September that were seen by members of the Subcommittee as overlapping with the typical beginning and end of the irrigation season.

The shoulder season dates used for CPNRD (March 1-May 15 and September 15-November 1) were specified in Attachment A of the original 2013 Water Leasing Agreement between CPNRD and the Program. For NPPD, the Gothenburg Canal has not diverted for Program recharge in the spring due to obligations to deliver water to the B-1 Reservoir, and Dawson County Canal is generally limited to a few weeks in mid-April immediately prior to the start of irrigation. In the absence of specific dates written into the Water Service Agreements (WSAs) between the NPPD and the Program, an assumption was made that fall shoulder season diversions for both NPPD canals could occur between September 15 and December 15.

Subcommittee representatives from Nebraska DNR (Jennifer Schellpeper, Jessie Winter) and CNPPID (Mike Drain) were in favor of using only the shoulder season dates in Tables 7 and 11 of the draft score memo. The Subcommittee representative from the U.S. Fish and Wildlife Service (Tom Econopouly) requested additional information from the EDO before committing to this decision.

This memo presents the additional information and feedback exchanged by email between the EDO and Econopouly, with a focus on the assumed shoulder season diversion period for NPPD. Minor edits were made for clarity.

## II. FIRST INCREMENT EXCESS FLOW OPPORTUNITIES

Annual hydrographs for the Platte River near Grand Island and target flows were provided as excerpts from the *2017 Annual Platte River Surface Water Flow Summary* (2007-2017) and from a 2018-2019 flow summary presentation to the WAC in October 2019. The figures (attached) show that in every year, target flows stepped up on October 1 and dropped back down on November 15. Early in the First Increment, several years illustrate that it is possible to have excesses in October and the first half of November, even with the typically higher target flows.



For example:

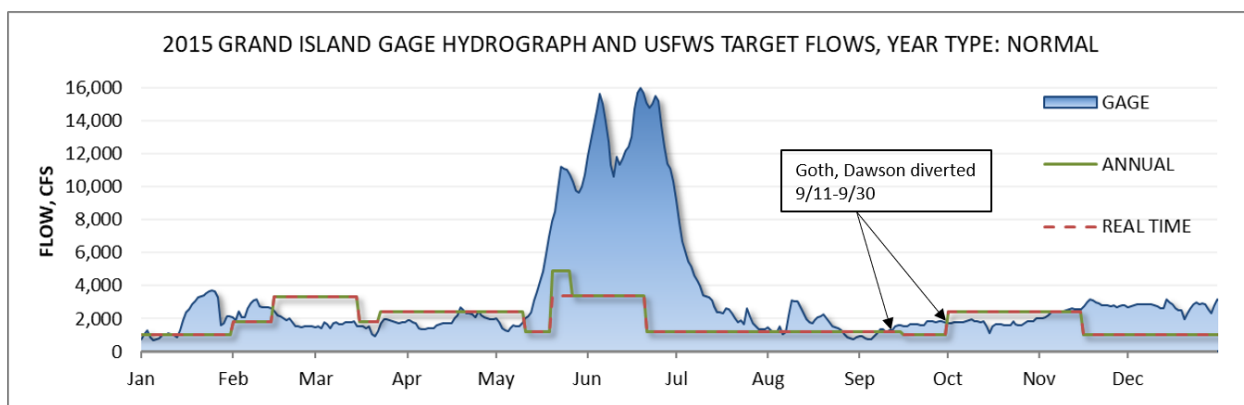
- 2008 late October
- 2009 early November
- 2011 entire period from mid-September through mid-December
- 2013 at least the first half of October (this was the Colorado flood wave passing through)

Each of these periods occurred before the inception of NPPD recharge as a Water Action Plan project.

### III. NPPD FIRST INCREMENT RECHARGE DIVERSIONS

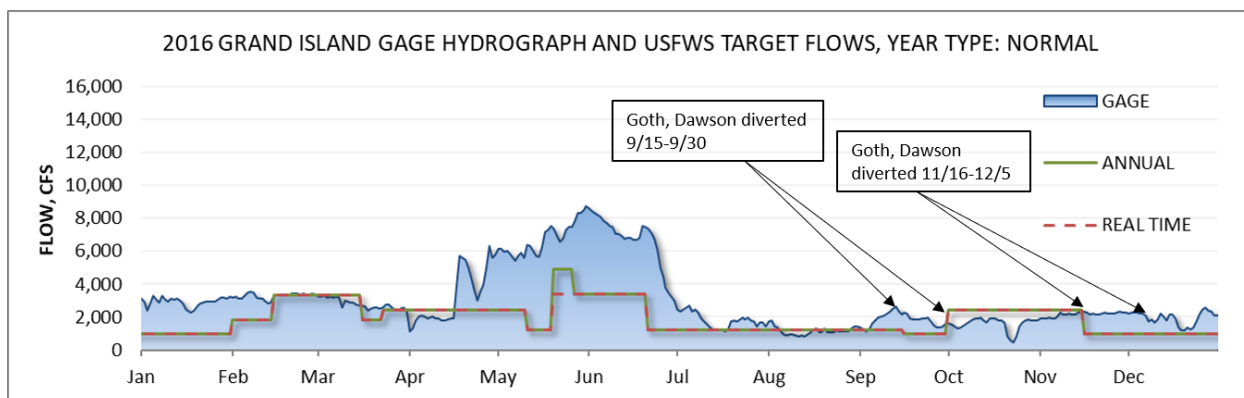
NPPD first started diverting for canal recharge (for the Program) in fall 2015. The timing of 2015-2017 NPPD recharge diversions is annotated on the hydrograph figures below. These show that the timing of diversions in those years was directly tied to when excess flows were available between September and December.

- 2015
  - Excesses in second half of September, then again starting mid-November.
  - Gothenburg and Dawson County diverted 9/11-9/30.

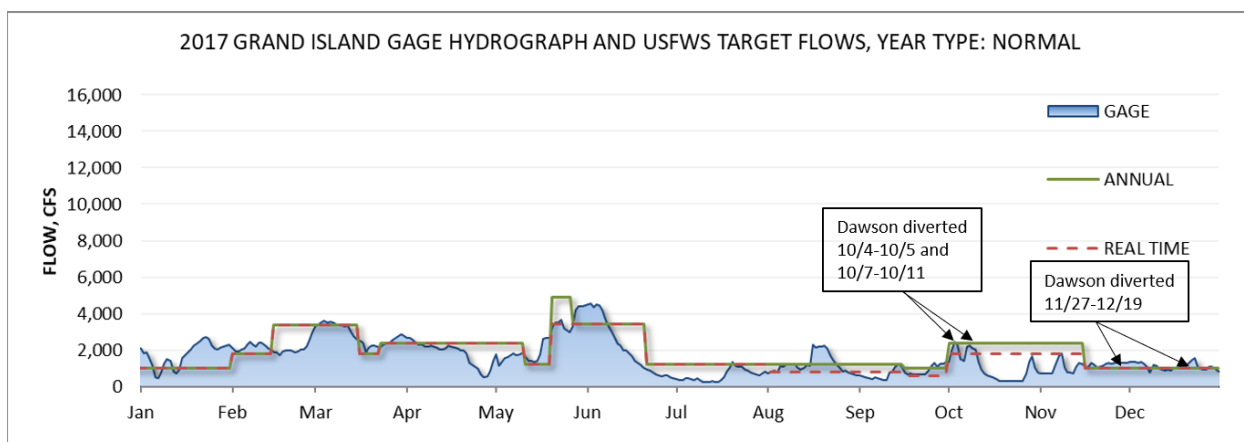


- 2016
  - Excesses most of September, then again starting mid-November.
  - Gothenburg<sup>1</sup> and Dawson County diverted 9/15-9/30 and again from 11/16-12/5.

<sup>1</sup> Gothenburg also diverted from 10/11 to 10/14. On 10/2/2016, the EDO sent a notice by email that the temporary hydrologic condition for October-November was normal with target flows of 1,800 cfs, pending a forthcoming update of monthly PDSI numbers, after which the hydrologic condition could change to wet with target flows of 2,400 cfs. NPPD started diverting for recharge at Gothenburg on 10/11. On 10/13/2016, the EDO sent another notice that the final hydrologic condition was wet with target flows of 2,400 cfs, and NPPD stopped diverting for recharge the next day.



- 2017
  - There were a few days with flows above the real time target in early October, then limited excesses after mid-November.
  - Gothenburg did not divert, but Dawson County diverted 10/4-10/5, 10/7-10/11, and 11/27-12/19.



- 2018
  - Excesses most of September, then not until mid-November.
  - Both canals diverted intermittently through much of September: Gothenburg 9/8-9/11 and 9/13-9/17, Dawson County 9/8-9/17 and 9/20-10/1.
- 2019
  - Data analysis is incomplete, but flows were still well above targets most of the way through September and continued at least through October.
  - Both canals started diverting in mid-September and continued to the middle (Gothenburg) or end (Dawson County) of October.

To the extent that NPPD did make recharge diversions during the First Increment, it was most often before October 1 and after November 15, which was tied directly to target flows and excess availability in the years 2015-2019.



#### **IV. HIGH GROUNDWATER LIMITATIONS ON CANAL RECHARGE**

On April 24, the EDO sent a follow-up email to Econopouly with additional information regarding the influence of high groundwater levels on canal recharge:

For Phelps, there are monitoring wells and specific thresholds above which Program recharge cannot occur. High groundwater definitely precluded Phelps recharge diversions between late January 2019 and mid-March 2020. Likewise, high streamflows and limited shortages prevented using the Cook well for much of the same period.

It is also noted in the score analysis that CPNRD diverted very little, if any, for recharge in 2018-2019. Thirty Mile and Orchard-Alfalfa opened up for recharge diversions in mid-April 2020 (Thirty Mile on 4/17, Orchard-Alfalfa on 4/22). The EDO is unaware of monitoring wells or water level thresholds associated with those canals, but based on conversations with CPNRD, it seems that the limited recharge operations are due to a combination of both high groundwater levels and canal damage from flooding last spring (Cozad in particular).

#### **V. RESPONSE FROM U.S. FISH AND WILDLIFE SERVICE**

On April 30, Tom Econopouly provided this response to the EDO by email:

“After consideration, I believe the best approach forward is to use the ‘shoulder season’ for scoring, with the caveat that the operations of the canals and their actual scores will be examined before entering into a second contract with CPNRD and NPPD. I understand both contracts have a 5-year term. If the utilization of the canals for recharge is significantly different from what is now listed for the ‘shoulder seasons’, then the score should be adjusted.”

#### **VI. CONCLUSION**

If the First Increment operations data were used to define timing of recharge diversions, there would be little potential for NPPD recharge diversions between October 15 and November 15. However, the additional information compiled by the EDO shows that multiple years early in the First Increment (before the NPPD recharge project began operating) show that excesses can, in fact, be available during that time.

Based on consideration of the information provided to Econopouly and presented herein, and the affirmative response from Econopouly, the EDO will proceed to use only the shoulder season options for the timing of diversions for the CPNRD and NPPD recharge score analyses. Corresponding days per month with potential recharge diversions are shown in Table 7 (CPNRD) and Table 11 (NPPD) of the draft score memo dated March 24, 2020.

In terms of ongoing modifications to the score analysis, this conclusion effectively eliminates the “a” and “b” model runs. Coupled with the decision during the Scoring Subcommittee call on April 21 to eliminate Scenario 1 (because results are identical to Scenario 2), this leaves only six individual model runs (instead of the original 20 model runs; Scenario 1 had 4 each for CPNRD and NPPD individually) that the EDO will need to test for resolving the unit response function issue. Those will be the “b” and “c” model runs for Scenarios 2, 3, and 4.

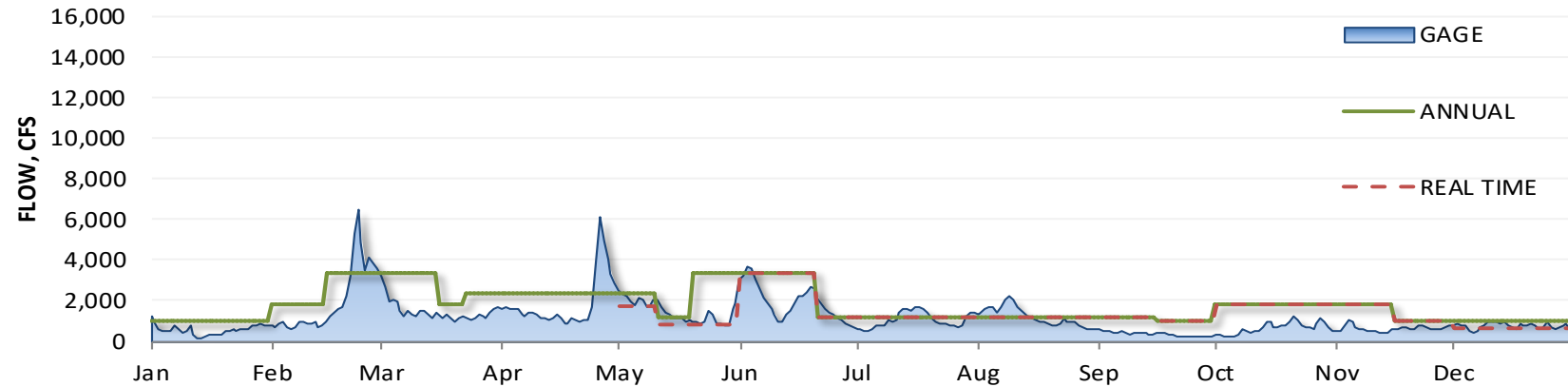


The table below illustrates which model runs are eliminated and which are to be kept for continued evaluation.

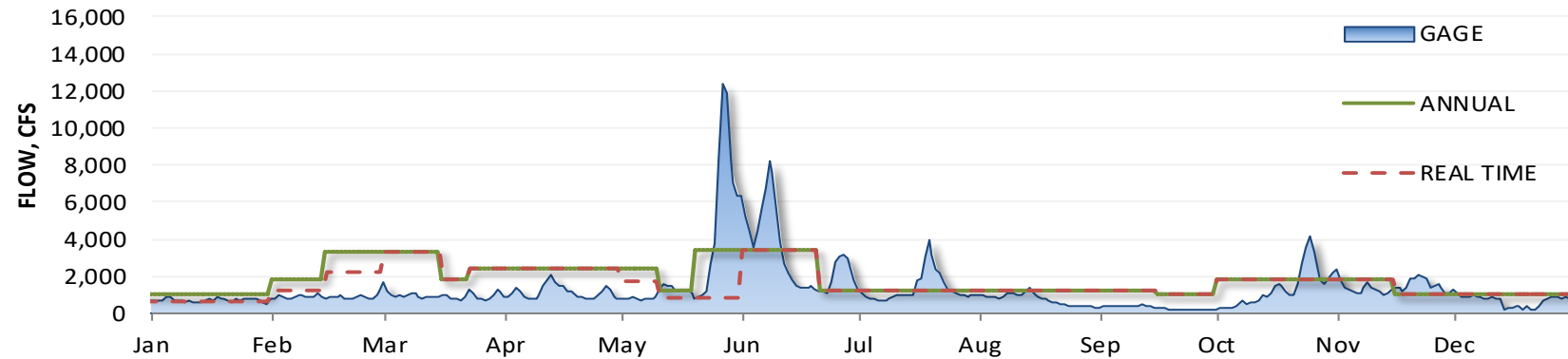
Scenario Run	Annual Diversion Limit	Recharge Timing
<del>Scenario 1</del>	<del>CPNRD or NPPD Only</del>	
<del>Run 1a</del>	<del>Unlimited</del>	<del>First Increment Operations</del>
<del>Run 1b</del>	<del>5,000 AF</del>	<del>First Increment Operations</del>
<del>Run 1c</del>	<del>Unlimited</del>	<del>Expanded (“shoulder season”)</del>
<del>Run 1d</del>	<del>5,000 AF</del>	<del>Expanded (“shoulder season”)</del>
Scenario 2	CPNRD and NPPD	
<del>Run 2a</del>	<del>Unlimited</del>	<del>First Increment Operations</del>
<del>Run 2b</del>	<del>5,000 AF</del>	<del>First Increment Operations</del>
Run 2c	Unlimited	Expanded (“shoulder season”)
Run 2d	5,000 AF	Expanded (“shoulder season”)
Scenario 3	CPNRD and NPPD, with “limited” CNPPID	
<del>Run 3a</del>	<del>Unlimited</del>	<del>First Increment Operations</del>
<del>Run 3b</del>	<del>5,000 AF</del>	<del>First Increment Operations</del>
Run 3c	Unlimited	Expanded (“shoulder season”)
Run 3d	5,000 AF	Expanded (“shoulder season”)
Scenario 4	CPNRD and NPPD, with “maximum” CNPPID	
<del>Run 4a</del>	<del>Unlimited</del>	<del>First Increment Operations</del>
<del>Run 4b</del>	<del>5,000 AF</del>	<del>First Increment Operations</del>
Run 4c	Unlimited	Expanded (“shoulder season”)
Run 4d	5,000 AF	Expanded (“shoulder season”)



2007 GRAND ISLAND GAGE HYDROGRAPH AND USFWS TARGET FLOWS, YEAR TYPE: NORMAL

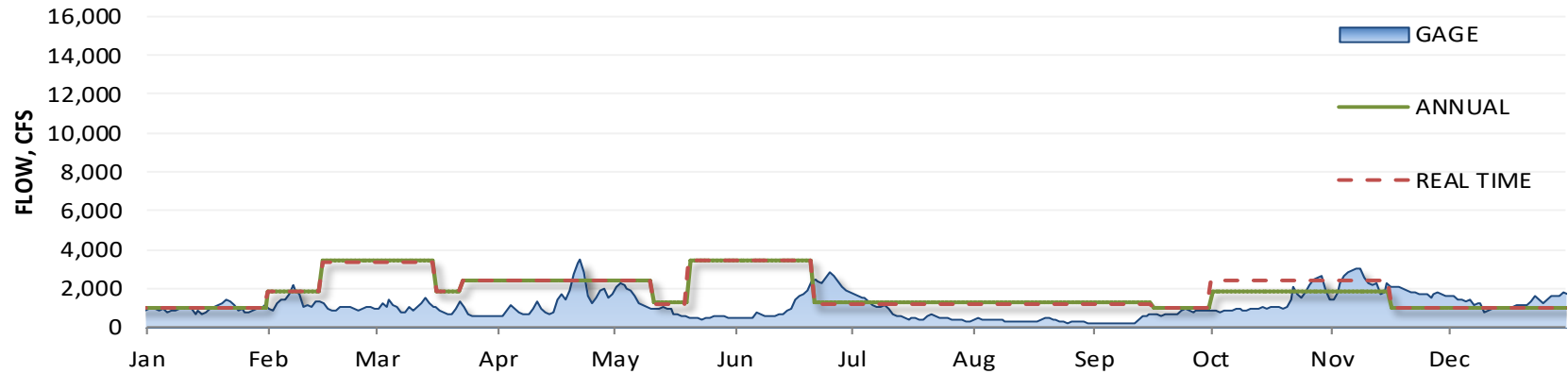


2008 GRAND ISLAND GAGE HYDROGRAPH AND USFWS TARGET FLOWS, YEAR TYPE: NORMAL

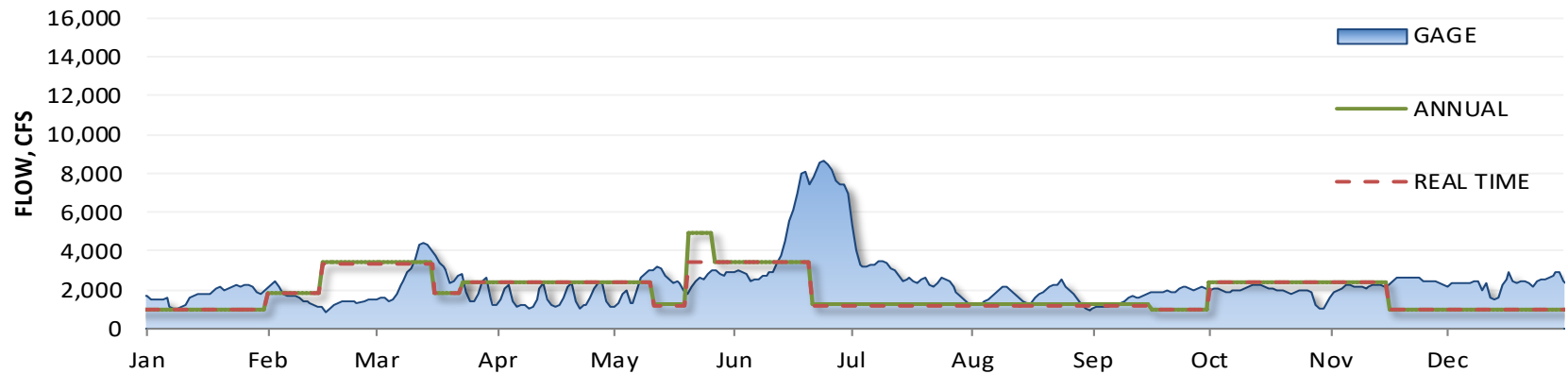


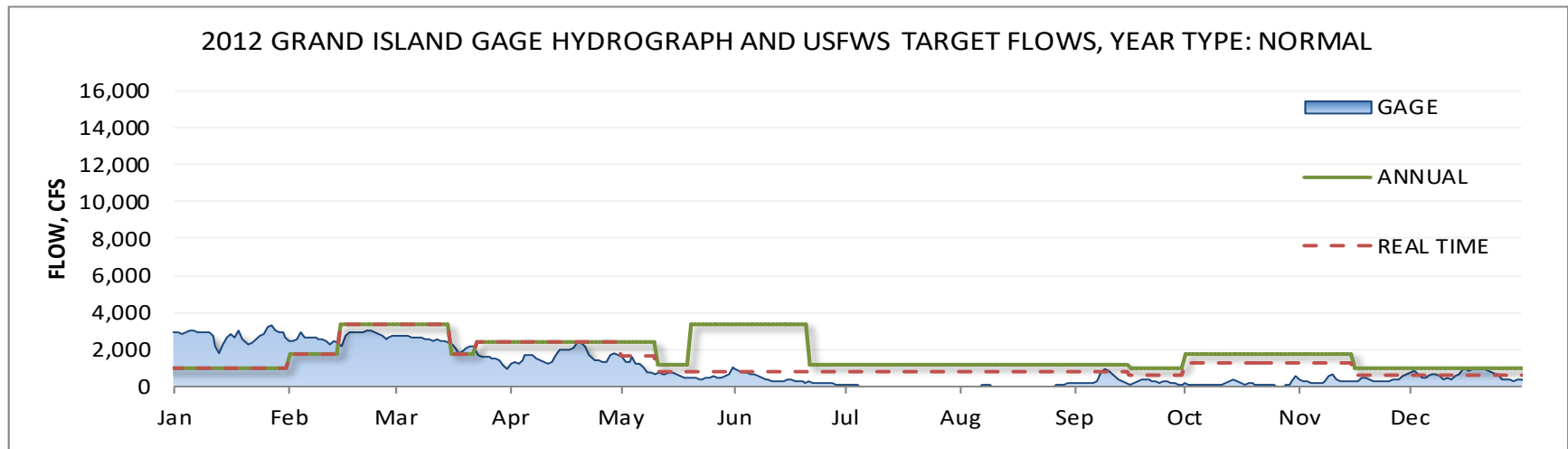
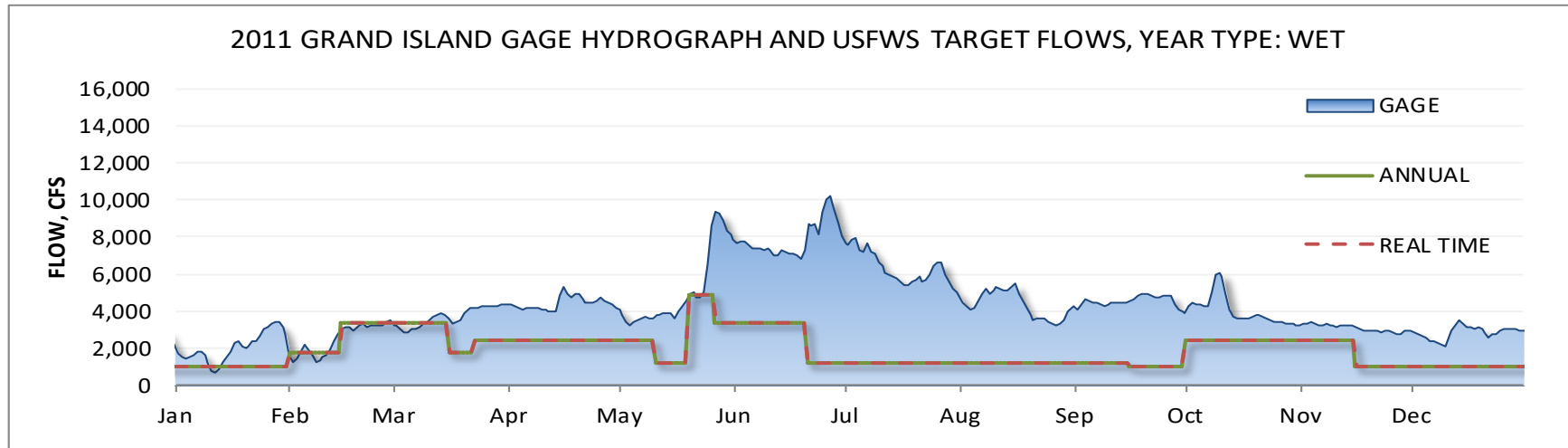


2009 GRAND ISLAND GAGE HYDROGRAPH AND USFWS TARGET FLOWS, YEAR TYPE: NORMAL



2010 GRAND ISLAND GAGE HYDROGRAPH AND USFWS TARGET FLOWS, YEAR TYPE: WET

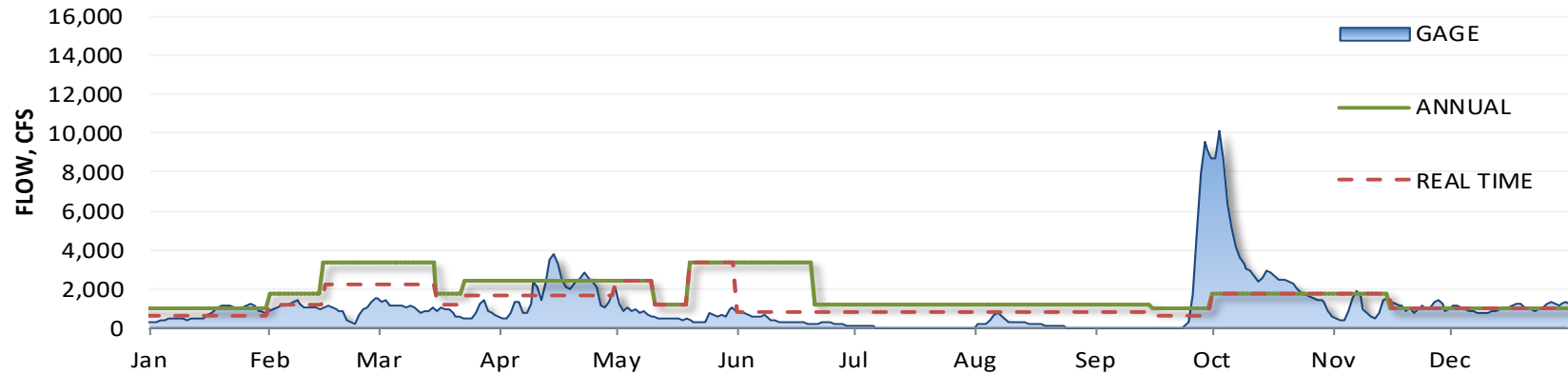




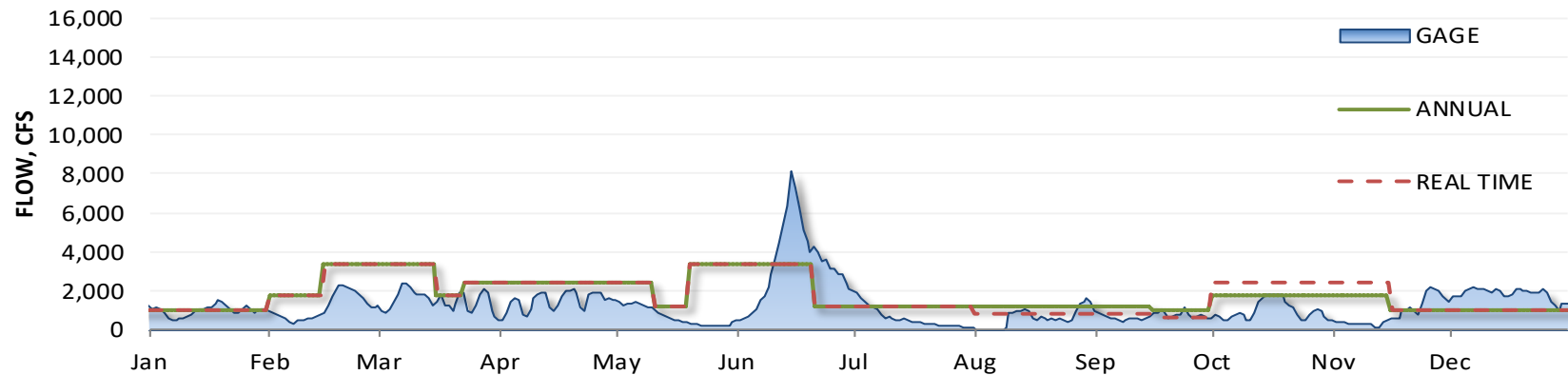




2013 GRAND ISLAND GAGE HYDROGRAPH AND USFWS TARGET FLOWS, YEAR TYPE: NORMAL

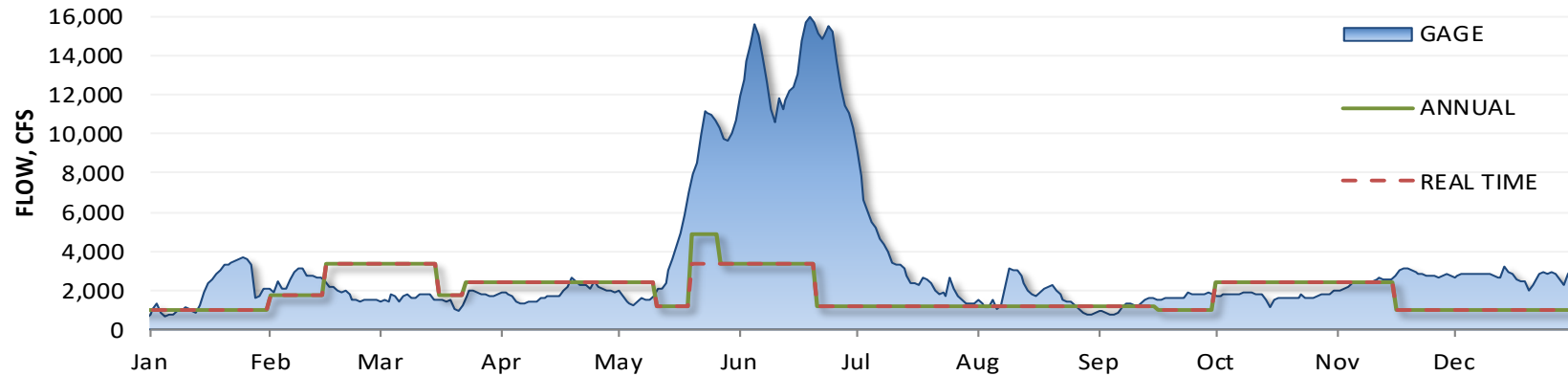


2014 GRAND ISLAND GAGE HYDROGRAPH AND USFWS TARGET FLOWS, YEAR TYPE: NORMAL

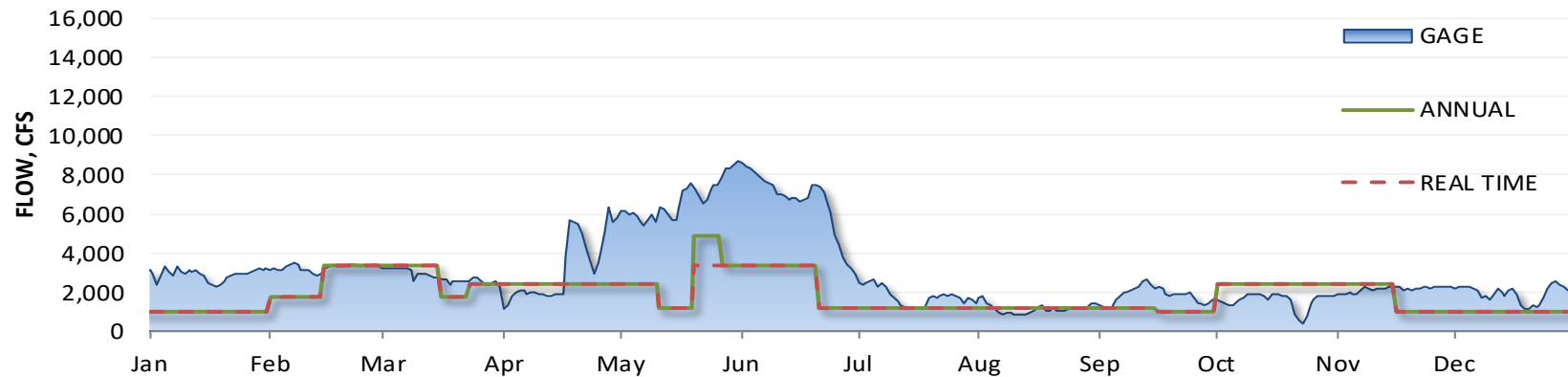


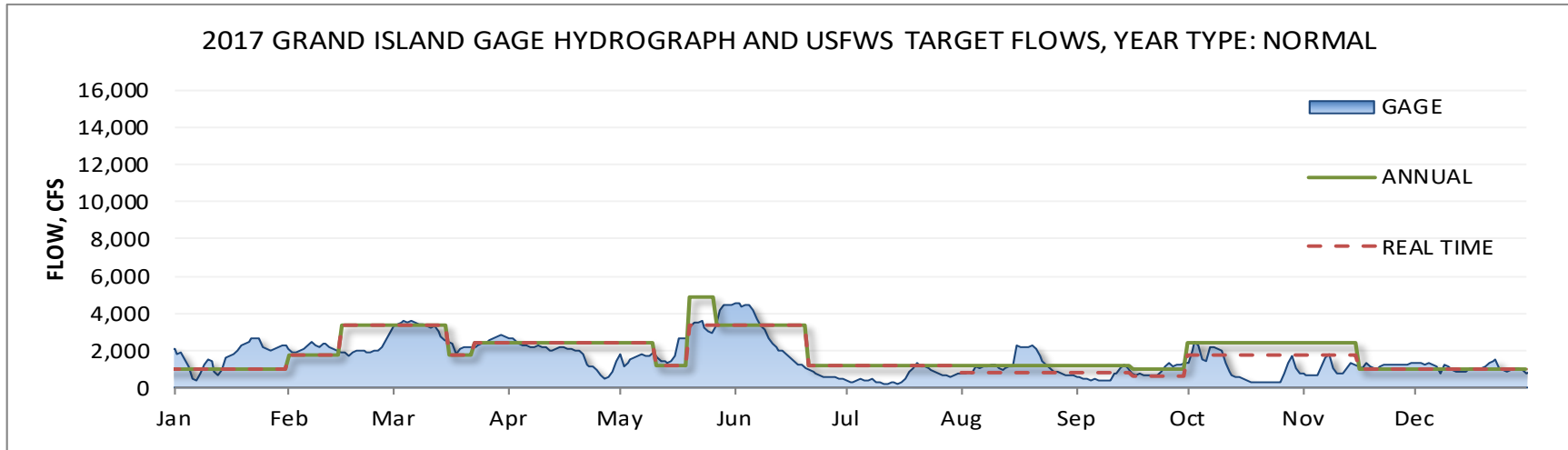


2015 GRAND ISLAND GAGE HYDROGRAPH AND USFWS TARGET FLOWS, YEAR TYPE: NORMAL

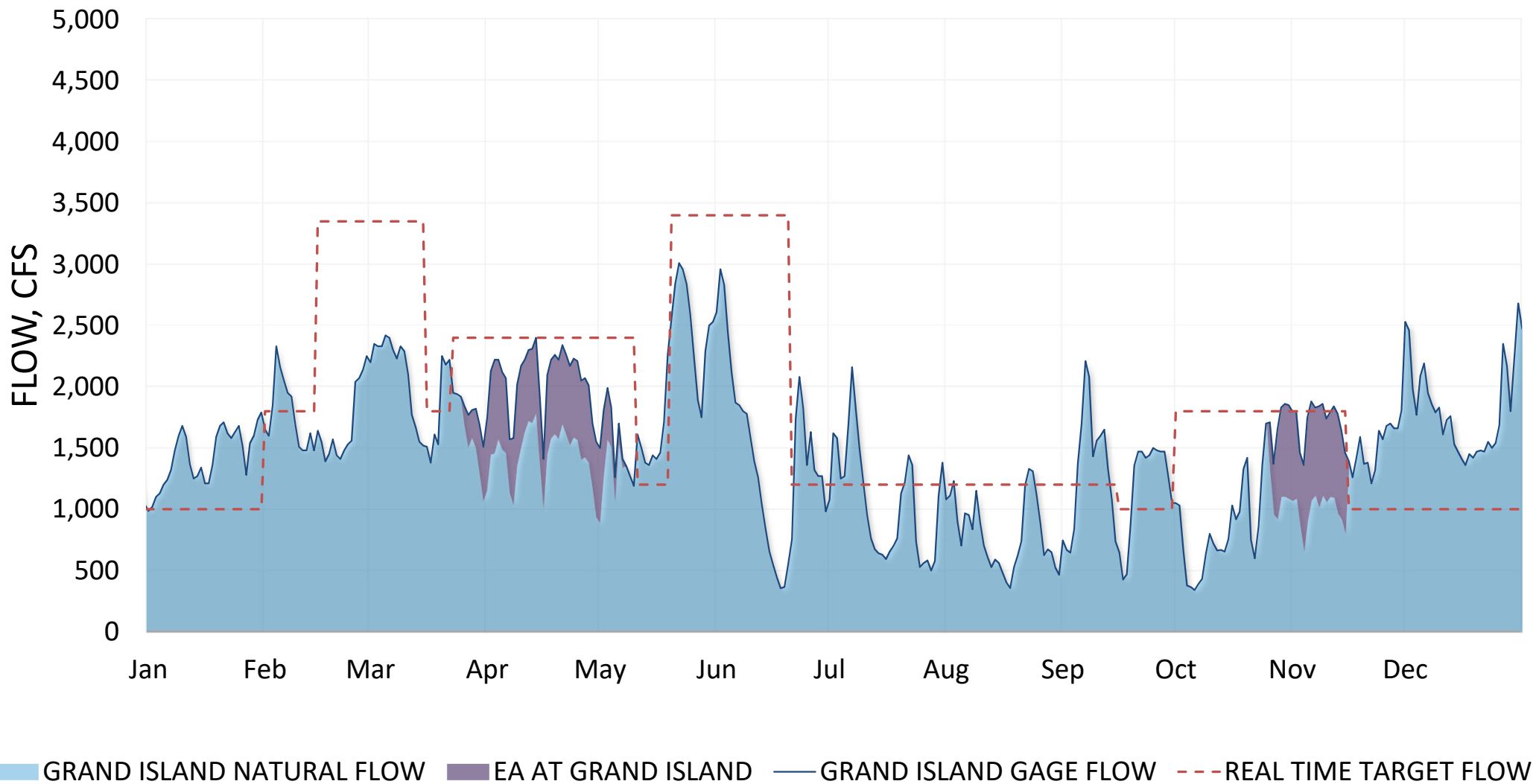


2016 GRAND ISLAND GAGE HYDROGRAPH AND USFWS TARGET FLOWS, YEAR TYPE: NORMAL

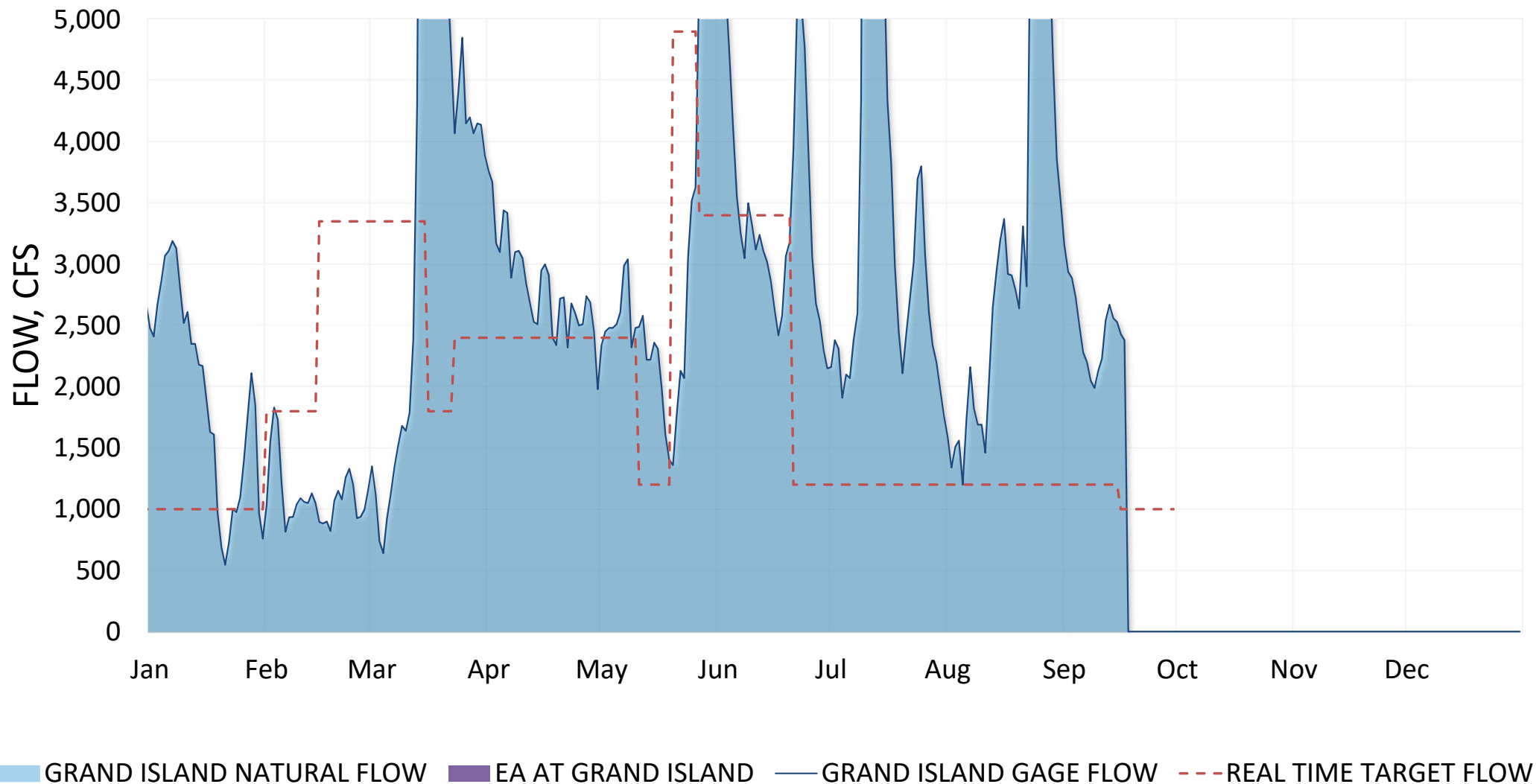




# 2018 Grand Island Hydrograph and USFWS Target Flows



# 2019 Grand Island Hydrograph and USFWS Target Flows



# 2019 Grand Island Hydrograph and USFWS Target Flows

