Appendix E

2012 Court Reports

With Hourly Spill, Flow And TDG Graphs

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FISH OPERATIONS PLAN IMPLEMENTATION REPORT
April 2012

Submitted by the U.S. Army Corps of Engineers
Northwestern Division
Portland, OR

Introduction:

The U.S. Army Corps of Engineers (Corps) is submitting this report in accordance with the 2012 Fish Operations Plan (2012 FOP) submitted to the U.S. District Court of Oregon on March 9, 2012. The 2012 FOP describes the Corps' project operations for fish passage at its Federal Columbia River Power System (FCRPS) dams during the fish migration season, generally April through August. To the extent Corps project operations are not specified in the 2012 FOP, the FCRPS operations will be consistent with the 2010 NOAA Fisheries Supplemental Biological Opinion (2010 Supplemental BiOp), the USFWS 2000 and 2006 BiOps, and/or other operative documents, including the 2012 Water Management Plan (WMP), WMP seasonal updates, and the 2012 Fish Passage Plan (FPP).

The Corps' April 2012 lower Snake and Columbia River project and fish passage operations are contained in this report. In particular, information in this report includes the following:

- hourly flow through the powerhouse at each dam;
- hourly flow over the spillway compared to the spill target for that hour; and,
- resultant high 12-hour average percent Total Dissolved Gas (%TDG) levels in the tailrace at each project and in the subsequent downstream project's forebay and the Camas-Washougal gauge below Bonneville Dam.

This report also provides information on presented issues and unanticipated or emergency situations that arose during implementation of the 2012 FOP in April.

Data Reporting:

I. For each project providing fish passage operations, this report contains two graphs per operational week[1] in April displaying the performance of the spill program as follows:

(A). Daily Average of the High 12 Hourly %TDG Values - described in the upper graph.
(B). Hourly Spill and Generation Flows - described in the lower graph[2].

[1] Operations are implemented from Monday through Sunday.
[2] To adequately display high flows levels, it was necessary to extend the vertical axis on the graphs for the last week of April.

The weekly graphs begin on April 2 and end on April 29 for the following lower Snake River and lower Columbia River projects: Lower Granite, Little Goose, Lower Monumental, Ice Harbor, McNary, John Day, The Dalles, and Bonneville.

Each figure represents one week of a project's operation. The graphs start at 0000 hours (%TDG graphs) and 0100 hours (flow/spill graphs) on April 2 for the lower Snake River projects, and start the same hours on April 9 for the lower Columbia River projects.

April 2 – April 8	Figures 1 – 4
April 9 – April 15	Figures 5 – 12
April 16 – April 22	Figures 13 – 20
April 23 – April 29	Figures 21 – 28

A. Upper Graph: Shows the resultant daily average %TDG for the 12 highest hours. This is primarily a result of spill at dams. The objective is to operate each project up to the TDG limits without exceeding those limits to the extent practicable.

- The blue line represents the %TDG in the tailrace of the dam. 120% TDG is the upper operating limit[3].
- The green line represents the %TDG in the forebay of the next dam downstream. 115% TDG is the upper operating limit.

B. Lower Graph: Shows the hourly flow and spill at the dam.

- The dotted blue line shows the flow through the powerhouse each hour, in thousand cubic feet per second (kcfs).
- The medium green line represents the average hourly total river flow through the project in kcfs.
- The heavy pink line represents the average hourly flow through the spillway in kcfs.
- The thin black line represents the hourly spill level as defined in the 2012 FOP.
- The heavy black line represents the target spill. This is the hourly maximum spill level. The hourly target spill may vary as a function of total river flow, forebay elevation and generator capacity, subject to the following conditions:

    - spill percentage or flow rate specified in the FOP;
    - spill caps as set daily for TDG management;
    - test spill levels for fish passage research;
    - minimum generation for power system needs;
    - minimum spill at Bonneville (50 kcfs) dam;
    - minimum spill at John Day is 25 percent of project outflow.

[3] On April 25 at 2300, the Bonneville tailwater TDG gauge was overcome with water and was no longer operable; therefore, the blue line on Figure 28 of Exhibit 2 ends on this date. During the 2011 high flows, this gauge was damaged and inoperable for the 2011 migration season. The gauge was repaired for the 2012 migration season, but again failed during high flows in April 2012. Various options are being investigated to correct the problem. In the interim, the Corps is setting the spill caps using the SYSTDG model and/or an analog to calculate the Bonneville tailwater %TDG levels using the Warrendale TDG readings.

II. A table is included at the end of the figures that lists the average daily %TDG for the 12 highest hours for all projects. The numbers in red indicate the project exceeded the %TDG gas cap - 115 percent (forebay of the next downstream dam) or 120 percent (tailwater) for each project.

General Implementation Remarks:

For all projects that spill for fish passage, the target spill may be reduced due to various conditions as described below. When spill levels briefly deviate below or above the level specified in the 2012 FOP, the heavy pink line will be below or above the heavy black line in the graphs. Actual operation deviations from the target operation during voluntary spill hours are described below. The April 2012 Spill Variance Table includes average hourly data; therefore, while spill may vary from target spill for only a portion of an hour, the April 2012 Spill Variance Table characterizes the reduction as a full hour. There are instances when the hourly spill levels are not achievable due to mechanical limitations in setting spill gates to implement the regionally coordinated spill pattern. The project operator sets the spill gate stops to most closely approximate the 2012 FOP level of spill while also avoiding exceeding the %TDG spill cap to the extent practicable.

"Low flow" operations at the lower Columbia and Snake projects are triggered when inflow is insufficient to provide both minimum generation and the specified spill levels. In these situations, the projects operate at minimum generation and pass the remainder of project inflow as spill and through other miscellaneous routes, such as fish ladders, sluiceways, and navigation locks. As flows transition from higher flows to low flows, there may be situations when flows recede at a higher rate than forecasted. In addition, inflows provided by nonfederal projects upstream are variable and uncertain.

The combination of these factors may result in instances when unanticipated changes to inflow result in forebay elevations dropping to the low end of the Minimum Operating Pool (MOP). Since these projects have limited operating flexibility, maintaining minimum generation, MOP elevation, and the target spill may not be possible throughout every hour. During low flow periods at Little Goose Dam, the overall project spill percentage appears to be reduced because the calculations do not account for the volume of water released during navigational lockages; however, the actual spill volume remains constant. When these variances occur, they are recorded in the monthly Spill Variance Table for Little Goose under the variance type "Navigation."

Actual spill levels at Corps projects may range from 1 to 2 kcfs for projects with set flow targets (Bonneville Dam may range from up to 3 kcfs lower or higher; FOP, page 19) lower or higher than specified in the 2012 FOP and the RCC spill priority list (defines the projects' %TDG spill caps). A number of factors influence actual spill, including hydraulic efficiency, exact gate opening calibration, spillway gate hoist cable stretch due to temperature changes, and forebay elevation (e.g. a higher forebay results in a greater volume of spill since more water can pass under the spill gate).

The 2012 FOP describes project "Operations during Rapid Load Changes" (p. 6). For reporting purposes, the notation "Transmission Stability" in the April 2012 Spill Variance Report Table replaces "Rapid Load Changes," and identifies instances when hourly spill levels were not met as a result of load swing hours and other related within-hour load variability issues. "Transmission Stability" occurs because projects must be available to respond to within-hour load variability to satisfy North American Electric Reliability Council (NERC) reserve requirements ("on response"). In addition to within-hour load variability, projects on response must be responsive to within hour changes resulting from intermittent generation (such as wind generation). During periods of rapidly changing loads and intermittent generation, projects on response may have significant changes in turbine discharge within the hour while spill quantity remains the same within the hour. Under normal conditions, within-hour load changes primarily occur immediately preceding and following the peak load hours; however, within-hour changes in intermittent generation can occur at any hour of the day. Occasionally, several hours after peak load hours, the project may be decreasing total outflow and generation faster than the corresponding spill decreases causing the percent spill to be slightly higher. Due to the high variability of within-hour load, reporting actual spill percentages that vary by more than the ±1 percent requirement (or other ranges specified in the 2012 FOP) may occur with greater frequency with "Transmission Stability" hours than other hours.

Occurrences requiring an adjustment in operations and/or regional coordination are described in greater detail in the "Operational Adjustments" section below.

April Operations:

The month of April was characterized by above average flows for the lower Snake and the lower Columbia Rivers. The NOAA Northwest River Forecast Center's Runoff Processor indicated April 2012 adjusted volume runoff was above the 30 year average (1971-2000): 21.4 MAF (million acre feet) or 151 percent as measured at The Dalles. The Runoff Processor also indicated April 2012 adjusted runoff was above the 30 year average (1971-2000): 7.1 MAF or 147 percent of average as measured at Lower Granite Dam. The monthly precipitation summary for the season (October – March) was slightly above average: 105 percent on the Snake above Ice Harbor Dam, and 108 percent on the Columbia above The Dalles Dam.

The high flows resulted in instances of involuntary spill due to lack of turbine capacity throughout the month. In some of these instances of involuntary spill, the resulting Daily Average of High 12 Hourly %TDG values exceeded the 115 percent forebay and 120 percent tailrace standards[4] as shown in the corresponding %TDG graphs for the lower Columbia and Snake rivers. In some instances of involuntary spill, the hourly %TDG values observed exceeded 130 %TDG.

In accordance with the 2012 FOP, spring spill operations commenced on April 3 at 0001 hours at the Corps' lower Snake projects and on April 10 at 0001 hours at the lower Columbia projects. During the April reporting period, planned spill operations according to the 2012 FOP were as follows:

[4] As provided for in the 2012 FOP (see p. 2-3)

- Lower Granite Dam - The hourly target spill discharge was 20 kcfs 24-hours/day.
- Little Goose Dam - The hourly target spill discharge was 30 percent of total river discharge 24-hours/day.
- Lower Monumental Dam - The hourly target spill flow rate was the %TDG gas cap 24-hours/day.
- Ice Harbor Dam - The hourly target spill flow rate was 45 kcfs daytime (0500-1800) and the % TDG gas cap nighttime. Beginning April 28, the hourly target spill alternated every two days between 30 percent of total river flow rate for 24-hours/day vs. 45 kcfs daytime and the %TDG gas cap nighttime. Nighttime spill hours are 1800-0500.
- McNary Dam - The hourly target spill flow rate was 40 percent of total river flow for 24-hours/day.
- John Day Dam - The hourly target spill flow rate was 30 percent of total river flow for 24-hours/day through April 26. Beginning April 27, the hourly target spill alternated between 40 percent and 30 percent of total river flow rate for 24-hours/day due to the two-day treatment spring spill test. Spill level changes occurred at 2000 hours.
- The Dalles Dam - The hourly target spill flow rate was 40 percent of total river flow for 24-hours/day.
- Bonneville Dam - The hourly target spill flow rate was 100 kcfs 24-hours/day.

Operational Adjustments

1. Lower Granite:

   On May 8 between approximately 0000 and 0045 hours during the loading of a juvenile transportation barge, high debris in the system plugged the barge loading line and caused the impingement and mortality of 200 juvenile salmon, of which it was estimated that 83 were ESA listed.[5] During this incident, project crews were implementing appropriate direct barge loading procedures; however, the effects of high levels of debris that caused the incident were not anticipated. Project staff immediately removed the debris and resumed loading the barge at 0046 hours. Under high debris conditions, Corps staff will implement raceway loading rather than direct load to avoid future occurrences. In accordance with the FPP, Corps personnel documented and reported this incident via email to the regional sovereigns on the Fish Passage and Operations Maintenance (FPOM) committee on May 8, 2012.

2. Lower Monumental Dam and Ice Harbor Dam:

   A proposed change in the Lower Monumental Dam (LMN) and Ice Harbor (IHR) forebay elevations was coordinated through the TMT on March 28 and March 29 to assist in controlling involuntary spill above the applicable State of Washington TDG levels occurring at the time. As described in the 2010 Supplemental BiOp RPA Action 5, the lower Snake projects are to be operated at MOP with a 1 foot operating range beginning at 0001 hours on April 3. The proposal was to delay the start of LMN MOP operations to April 5 (2 day delay), and delay the start of IHR MOP operations to April 6 (3 day delay). TMT

[5] These estimates are based on the "Estimation of Percentages for Listed Pacific Salmon and Steelhead Smolts Arriving at Various Locations in the Columbia River Basin 2011," NOAA Fisheries memo dated March 6, 2012.

representatives either supported or did not object to the sequential downstream draft to MOP at LMN and IHR due to a slight beneficial effect this operation would have on reducing travel times for juvenile salmon.

3. Lower Monumental Dam:

   From May 1 at 1700 hours through May 2 at 1700 hours, Unit 2 was forced out of service to repair a damaged submersible traveling screen (STS). During a routine STS inspection on May 1, project crews observed that a large piece of woody debris had lodged in the screen in such a manner that the mesh panel was pulled back allowing several juvenile salmonids access to the interior portion of the screen. A total of 112 juvenile fish mortalities were observed – 45 yearling Chinook (30 clipped, 17 unclipped), 58 juvenile steelhead (47 clipped, 11 unclipped), and 7 juvenile lamprey. Project crews repaired and re-installed the screen and Unit 2 was returned to service within 24 hours. In accordance with the FPP, Corps personnel documented and reported this incident via email to the regional sovereigns on the FPOM committee on May 2.

4. John Day Dam:

   From April 24 at approximately 2000 hours through April 25 at 1400 hours (18 hours), spill was reduced at John Day Dam in response to a barge that had run aground downstream of the project. Reducing flow and spill was required to minimize the risk of damaging or sinking the grounded barge and to prevent the barge from moving further downstream uncontrolled. For parts of the first two hours when the incident occurred, spill was reduced to as low as zero kcfs in an attempt to keep the runaway vessel from drifting downriver. Spill was below the 30 percent target spill level identified in the FOP from 2100 hours on April 24 through 1400 hours on April 25. The vessel was repaired and moved from its grounded location at approximately 1400 hours on April 25. During the time the barge was grounded, average spill was 75.6 kcfs (23.2 percent of total river flow). The lowest average hourly spill was 19.5 kcfs (7.6 percent of total river flow) for two consecutive hours during the first few hours after the incident occurred. As a result of the flow reduction, the John Day pool filled from 263.1 feet at the time of the incident to as high as 266.1 ft. when the barge was freed. This resulted in the pool elevation being above the BiOp seasonal pool elevation (generally 262.5 feet - 264.0 feet) for a total of 36 hours. The pool was above 264.0 feet from 2100 hours on April 24 until 0800 hours on April 26. This operation was coordinated with TMT on April 25.

5. The Dalles Dam:

   On April 24, BPA declared a Transmission System Emergency at 1637 hours as a result of unplanned equipment failures. To maintain required transmission grid reliability generation was re-dispatched to John Day Dam and The Dalles Dam. As a result, The Dalles Dam operated outside of the required 1% best efficiency range for 37 minutes. BPA reported the emergency declaration and resulting excursion outside of the 1% range at the TMT Meeting on April 25. BPA also reported back to TMT on May 2 with further details on the nature of the emergency, steps taken to attempt to avoid impacting fish protection measures, and the

measures ultimately taken to maintain the transmission grid reliability. There was no spill variance that resulted from this situation since project spill was above the 120% TDG level due to high flow conditions. This operation was coordinated during the April 25 and May 2 TMT meetings.

6. Bonneville Dam:

   From April 13 through April 17, the Bonneville Dam powerhouse one (PH1) was operated outside of the ±1 % of efficiency turbine operating range. This operation was implemented to accommodate a System Operations Request (SOR) submitted by the U.S. Fish and Wildlife Service (USFWS).[6] The goal of the operation was to shift generation from the Bonneville Dam second powerhouse (PH2) to PH1 in an effort to improve passage conditions for the USFWS Spring Creek Hatchery release of approximately 8 million juvenile tule fall Chinook salmon. This operation was coordinated during the April 13 TMT meeting and all TMT members either supported or did not object to this operation. A second Spring Creek Hatchery release occurred on April 30. The operation described above continued following this release.

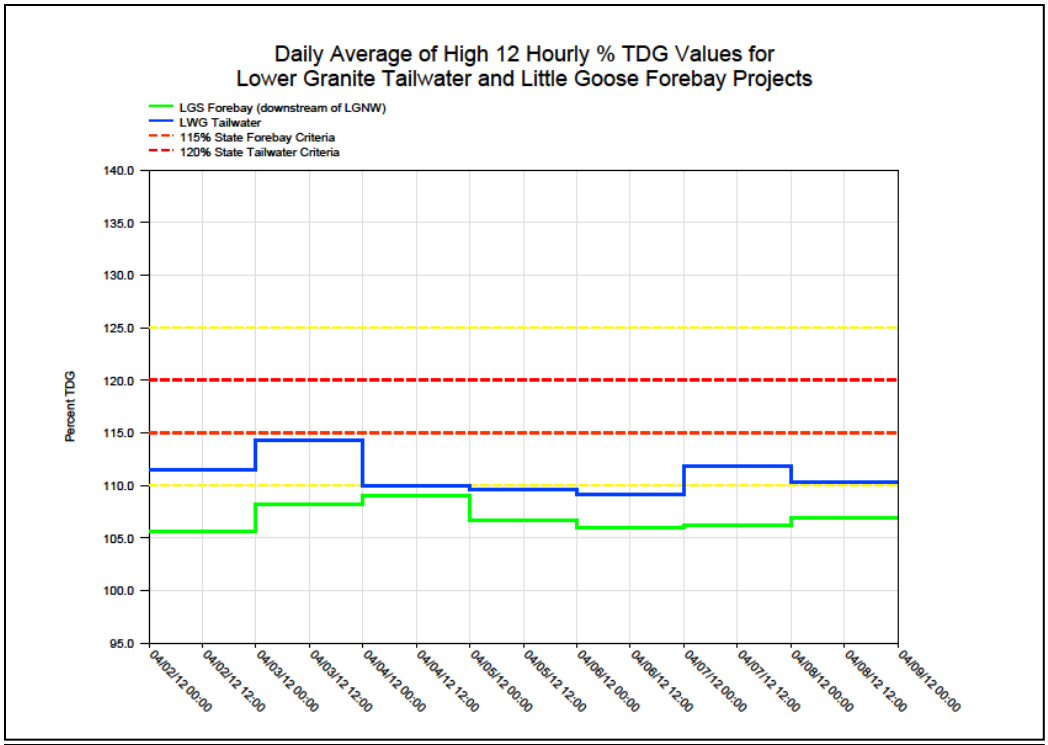
[6] SOR 2012-01 "Bonneville Operation over the Next Five Days to Facilitate Spring Creek Release."

April 2012 Spill Variance Table

Project	Parameter	Date	Time[7]	Hours	Type	Reason
Little Goose	Reduced Spill	4/13/12	1900	1	Navigation	Hourly spill decreased to 28.6% (below 30% ± 1.0% range) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 29.9%.
Little Goose	Increased % Spill	4/16/12	1700	1	Operational Limits	Hourly spill increased to 42.4% (above 30% ± 1.0% range) due to project passing inflow since pool was near full, resulting in involuntary spill. 24 hr avg. spill was 30.4%.
John Day	Reduced % Spill	4/24/12 - 4/25/12	2100-1400	18	Navigation	Hourly spill decreased ranging from 19.5 to 86.9 kcfs, below the 30% ± 1.0% range (146 kcfs spill cap). Spill reduced to not jeopardize distressed grounded barge immediately below John Day Dam.
The Dalles	Reduced Spill	4/15/12	1000- 1200; 1400; 1700-2000	8	Operational Limitations	Hourly spill decreased ranging from 107.3 to 107.9 kcfs (below 110 kcfs spill cap). Spill volume fluctuated due to physical limits of spill gate settings. 24 hr avg. spill was 39.8%.
The Dalles	Reduced Spill	4/16/12	1200; 1900-2000	3	Operational Limitations	Hourly spill decreased ranging from 107.4 to 107.9 kcfs (below 110 kcfs spill cap). Spill volume fluctuated due to physical limits of spill gate settings. 24 hr avg. spill was 39.0%.
The Dalles	Reduced Spill	4/19/12	0100-0300; 0500-0600	5	Operational Limitations	Hourly spill decreased ranging from 103.5 to 104.8 kcfs (below 106 kcfs spill cap). Project on response during intermittent generation. See p.-4. 24 hr avg. spill was 35.1%.

[7] Note: Data collected for reporting spill variances is reported using hourly-averaged data. Therefore, while spill may be increased or decreased for only a portion of an hour, it is represented in the Spill Variance Table as an hour.

Figure 1


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
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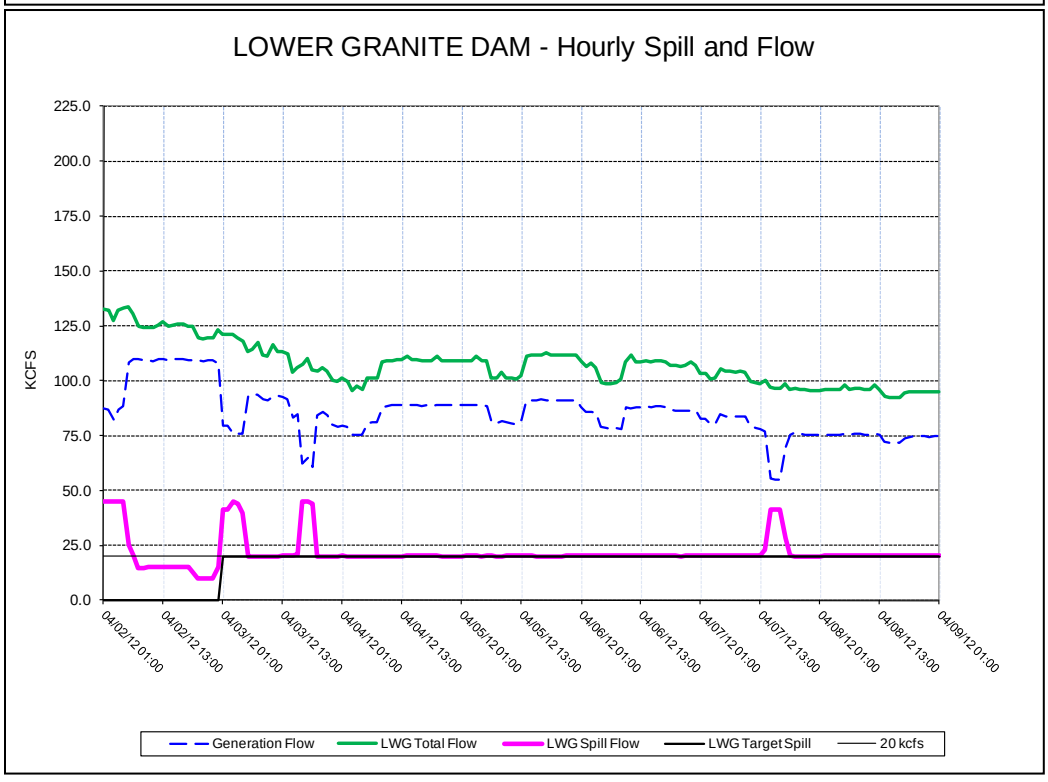
LOWER GRANITE DAM - Hourly Spill and Flow
KCFS
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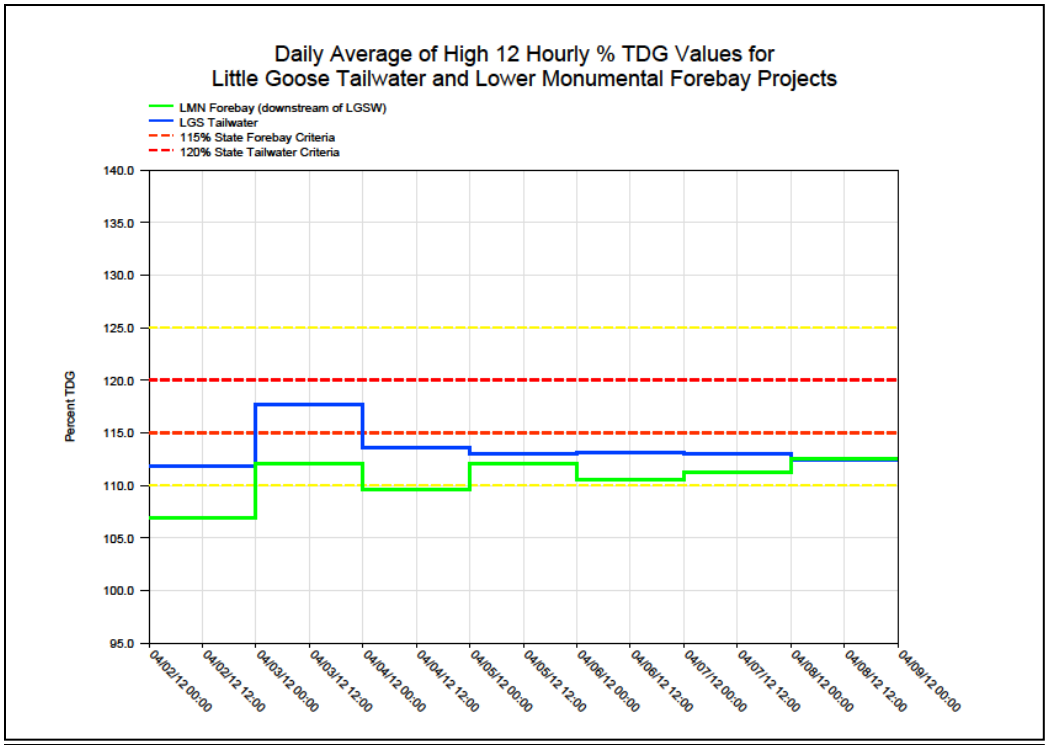
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
20 kcfs

Figure 2


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
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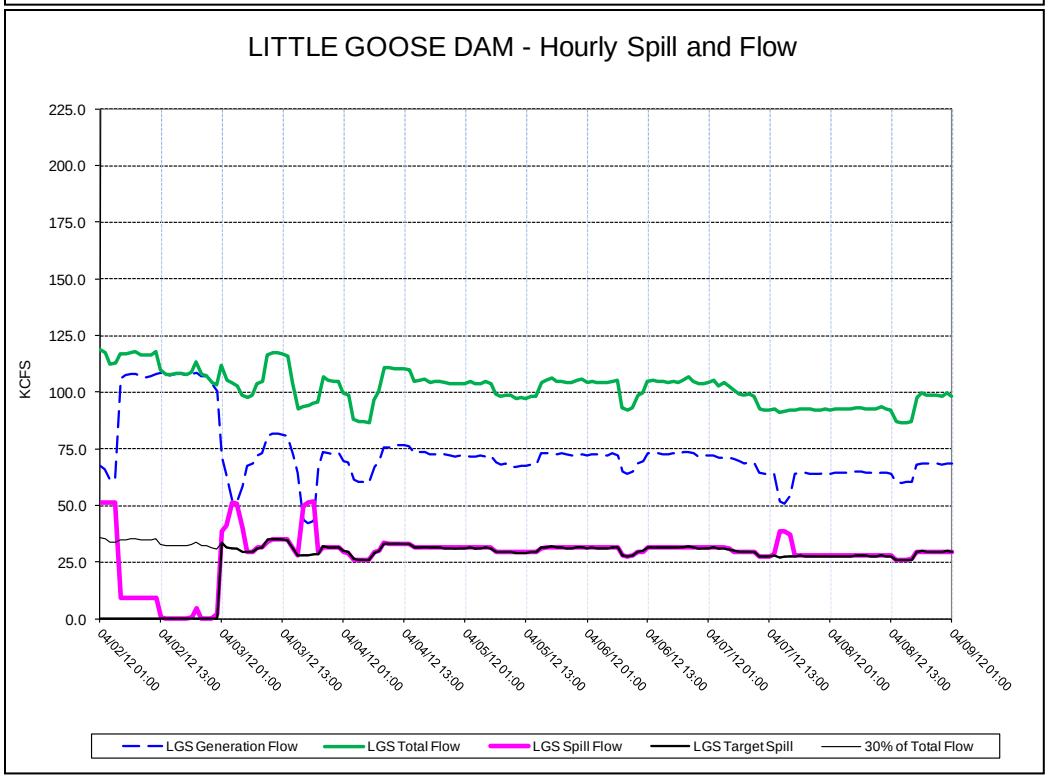
LITTLE GOOSE DAM - Hourly Spill and Flow
KCFS
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04/08/12 01:00
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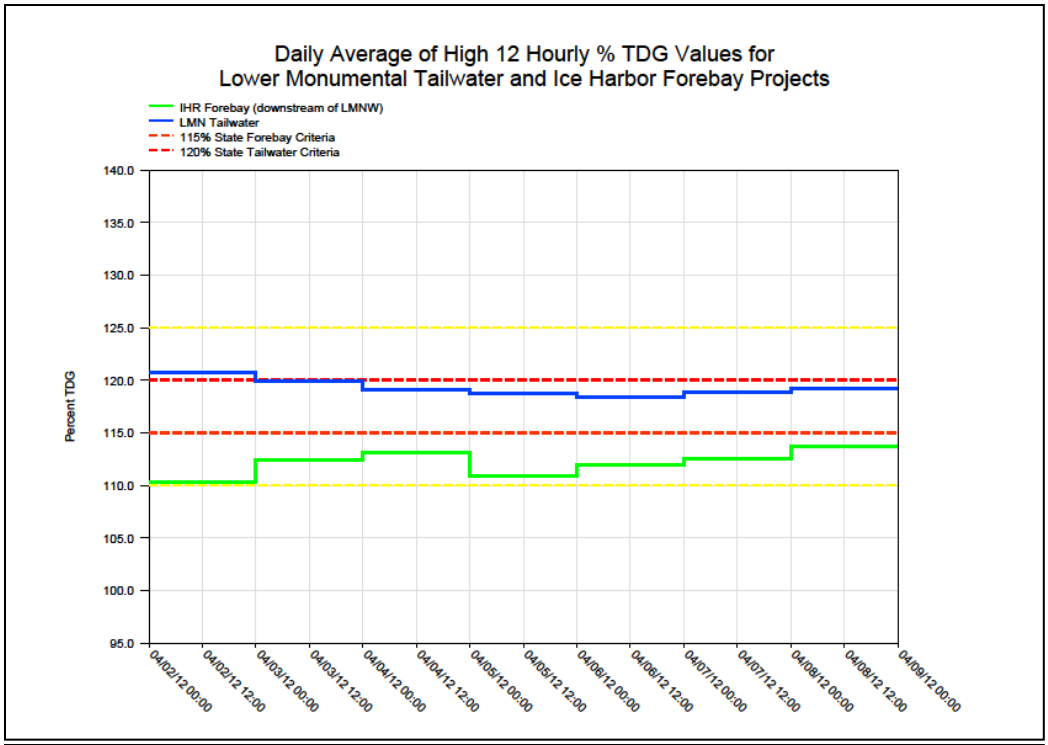
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 3


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
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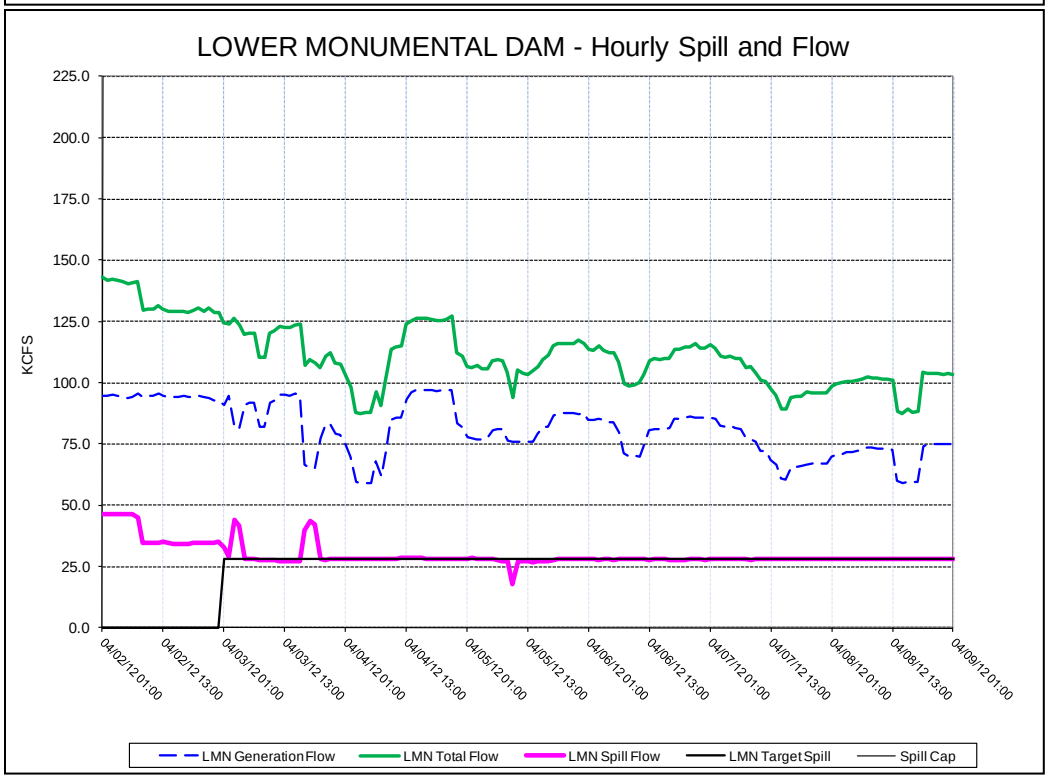
LOWER MONUMENTAL DAM - Hourly Spill and Flow
KCFS
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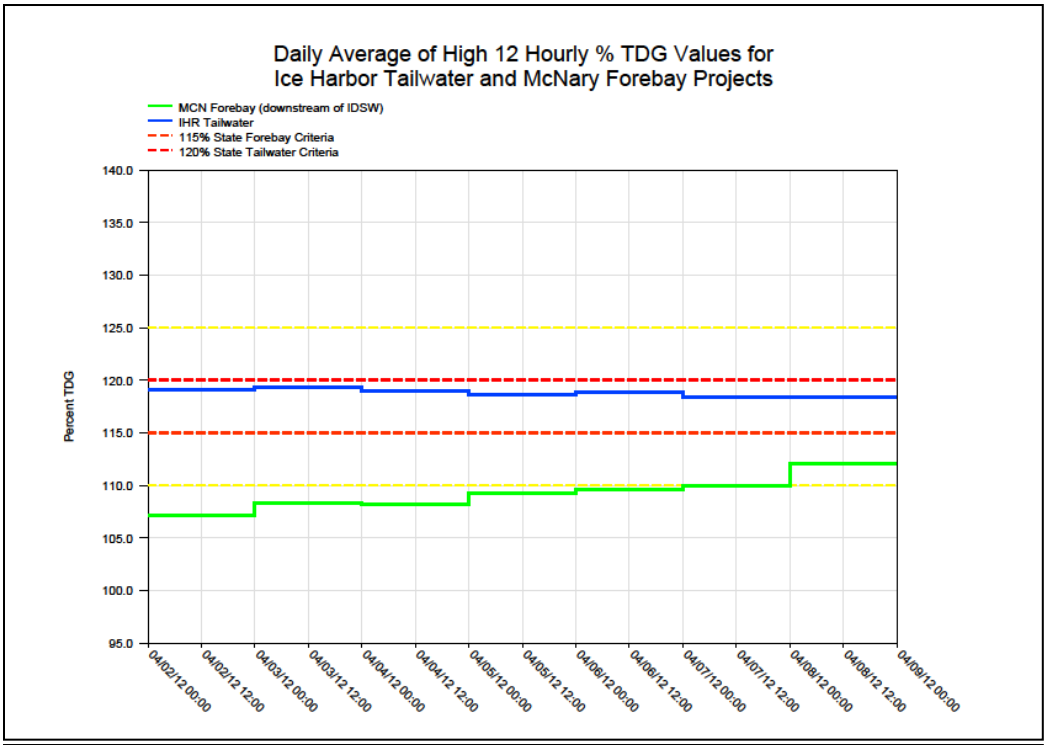
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
Spill Cap

Figure 4


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
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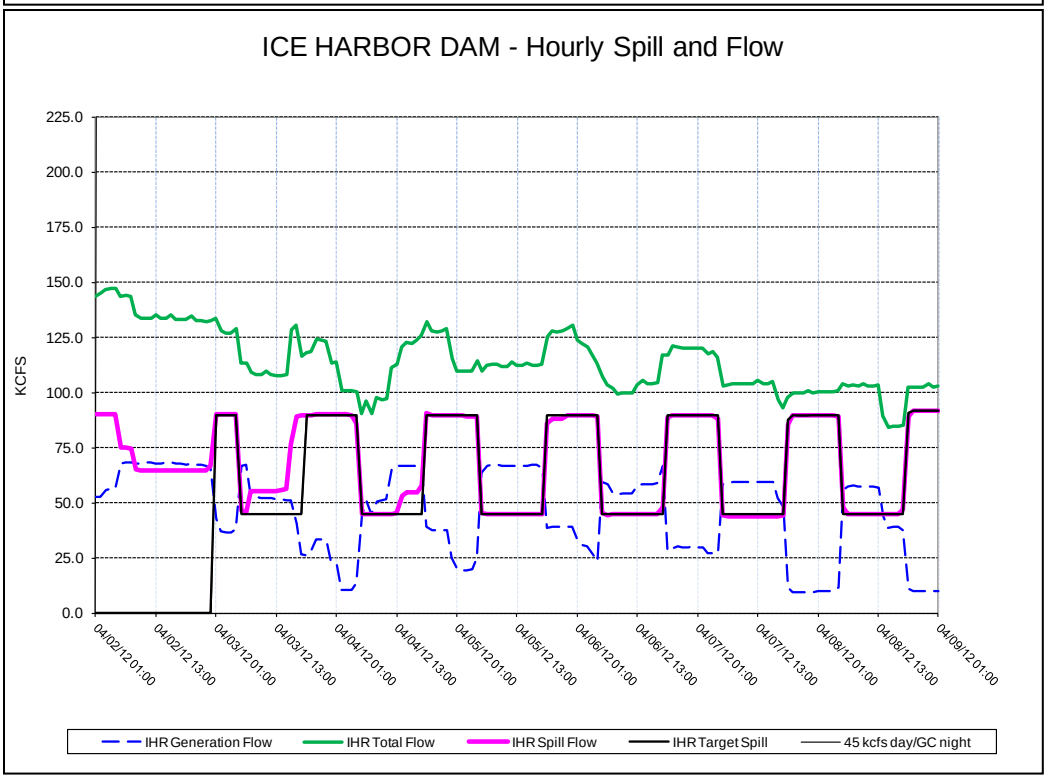
ICE HARBOR DAM - Hourly Spill and Flow
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225.0
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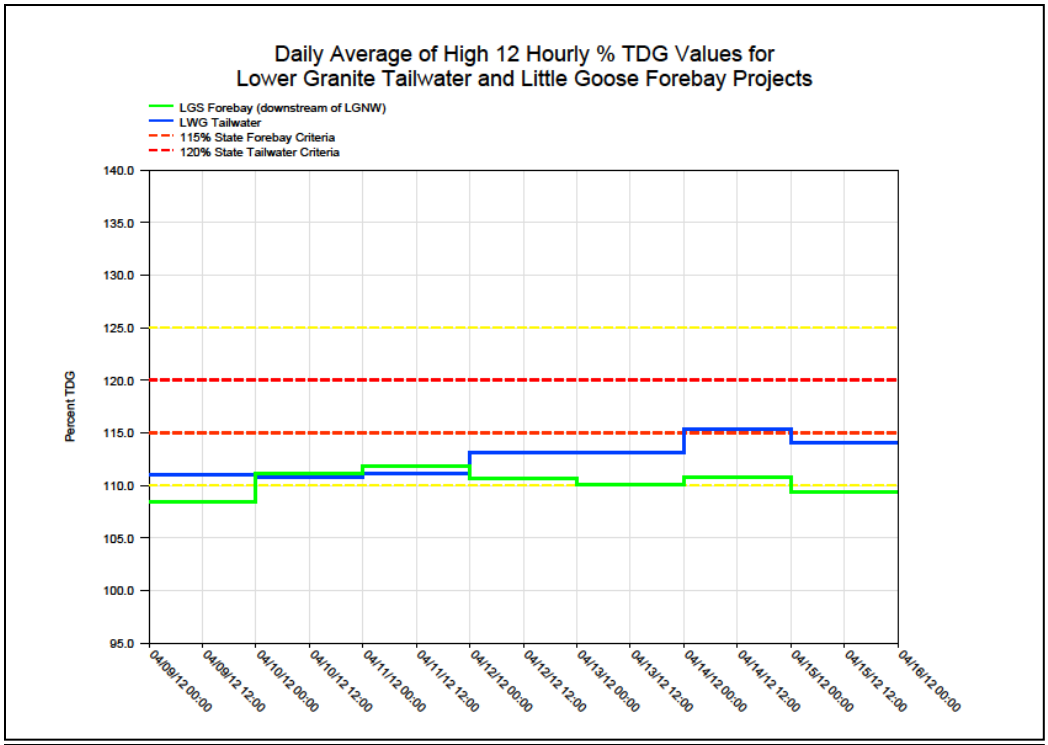
04/08/12 01:00
04/08/12 13:00
04/09/12 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
45 kcfs day/GC night

Figure 5


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
LGS Forebay (downstream of LGNW)
LWG Tailwater
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100.0
95.0
04/09/12 00:00
04/09/12 12:00
04/10/12 00:00
04/10/12 12:00
04/11/12 00:00
04/11/12 12:00
04/12/12 00:00
04/12/12 12:00
04/13/12 00:00
04/13/12 12:00
04/14/12 00:00
04/14/12 12:00
04/15/12 00:00
04/15/12 12:00
04/16/12 00:00

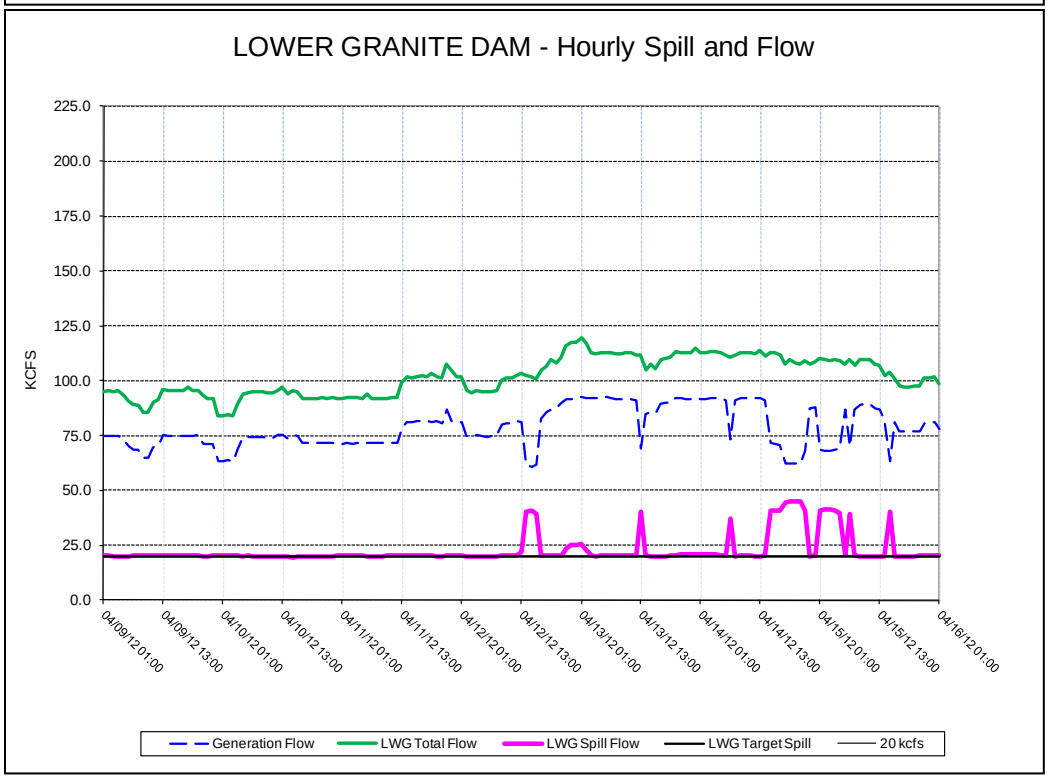
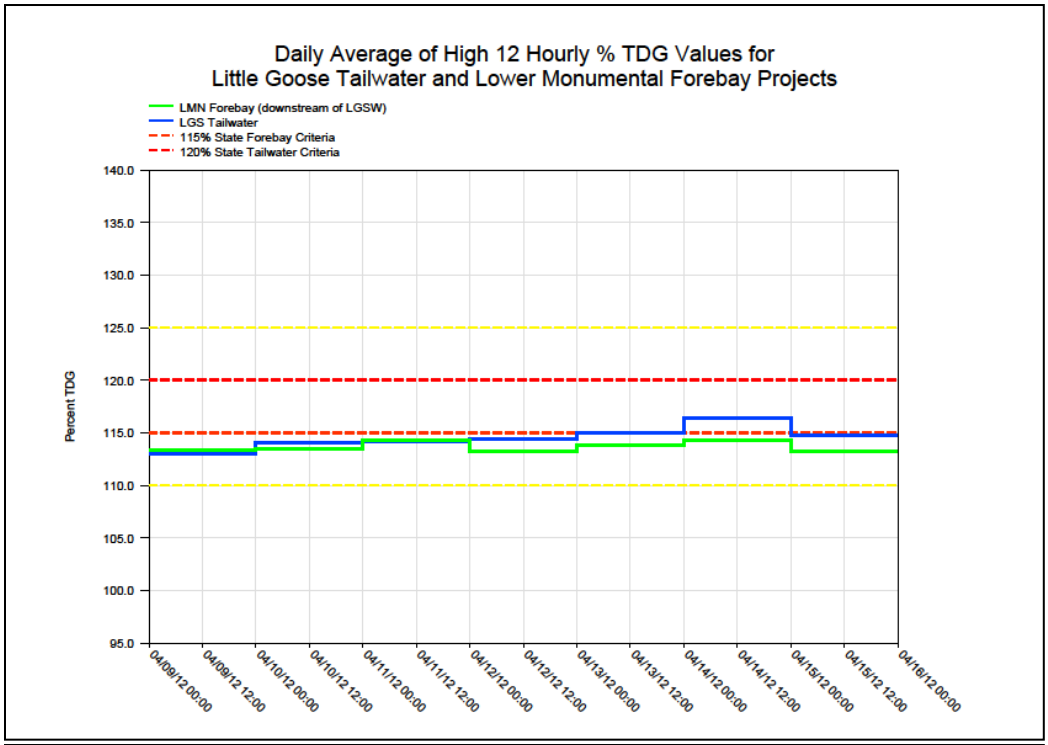

LOWER GRANITE DAM - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/09/12 01:00
04/09/12 13:00
04/10/12 01:00
04/10/12 13:00
04/11/12 01:00
04/11/12 13:00
04/12/12 01:00
04/12/12 13:00
04/13/12 01:00
04/13/12 13:00
04/14/12 01:00
04/14/12 13:00
04/15/12 01:00
04/15/12 13:00
04/16/12 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
20 kcfs

Figure 6


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/09/12 00:00
04/09/12 12:00
04/10/12 00:00
04/10/12 12:00
04/11/12 00:00
04/11/12 12:00
04/12/12 00:00
04/12/12 12:00
04/13/12 00:00
04/13/12 12:00
04/14/12 00:00
04/14/12 12:00
04/15/12 00:00
04/15/12 12:00
04/16/12 00:00

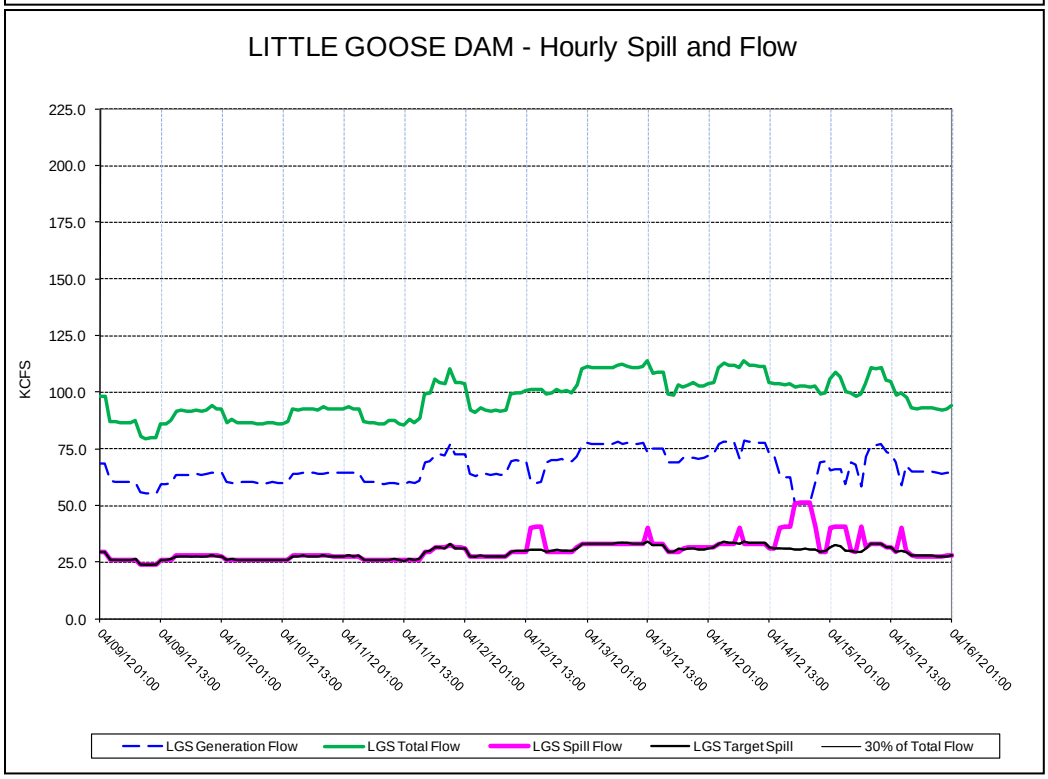
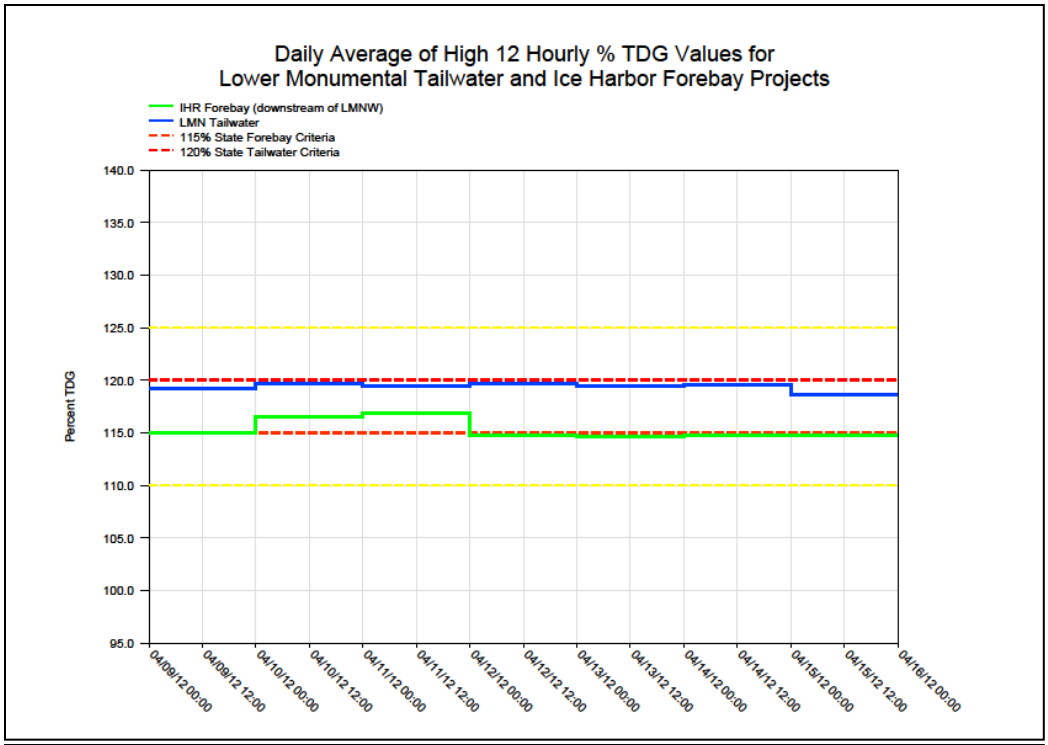

LITTLE GOOSE DAM - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/09/12 01:00
04/09/12 13:00
04/10/12 01:00
04/10/12 13:00
04/11/12 01:00
04/11/12 13:00
04/12/12 01:00
04/12/12 13:00
04/13/12 01:00
04/13/12 13:00
04/14/12 01:00
04/14/12 13:00
04/15/12 01:00
04/15/12 13:00
04/16/12 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 7


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/09/12 00:00
04/09/12 12:00
04/10/12 00:00
04/10/12 12:00
04/11/12 00:00
04/11/12 12:00
04/12/12 00:00
04/12/12 12:00
04/13/12 00:00
04/13/12 12:00
04/14/12 00:00
04/14/12 12:00
04/15/12 00:00
04/15/12 12:00
04/16/12 00:00

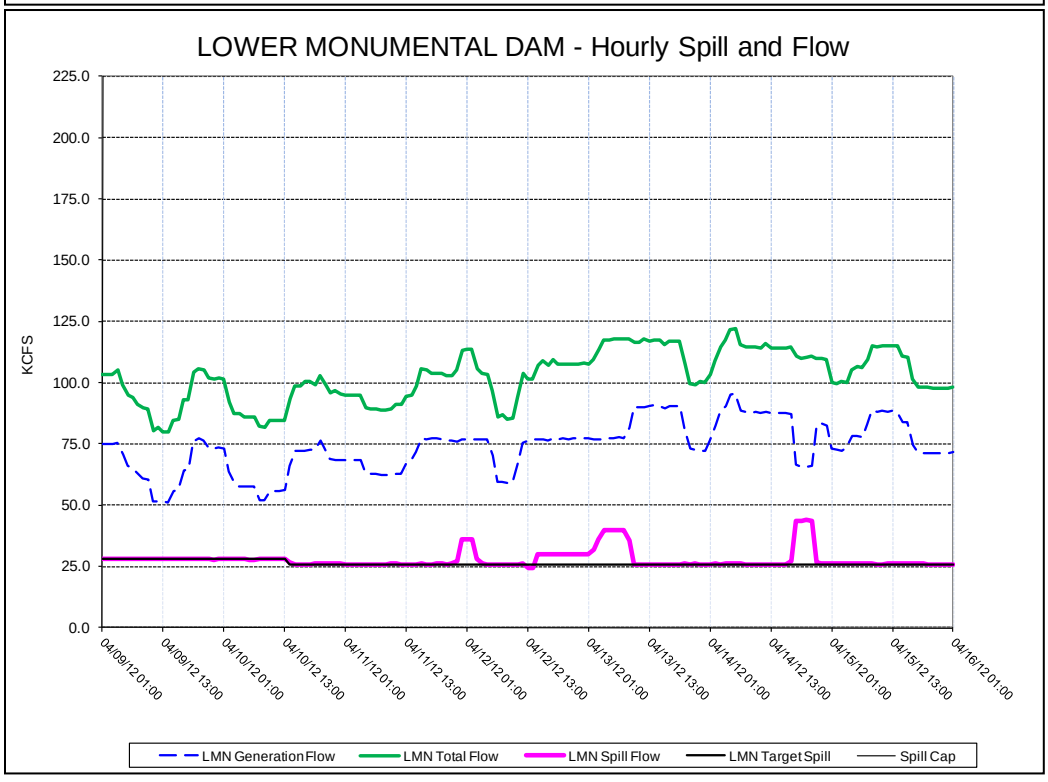
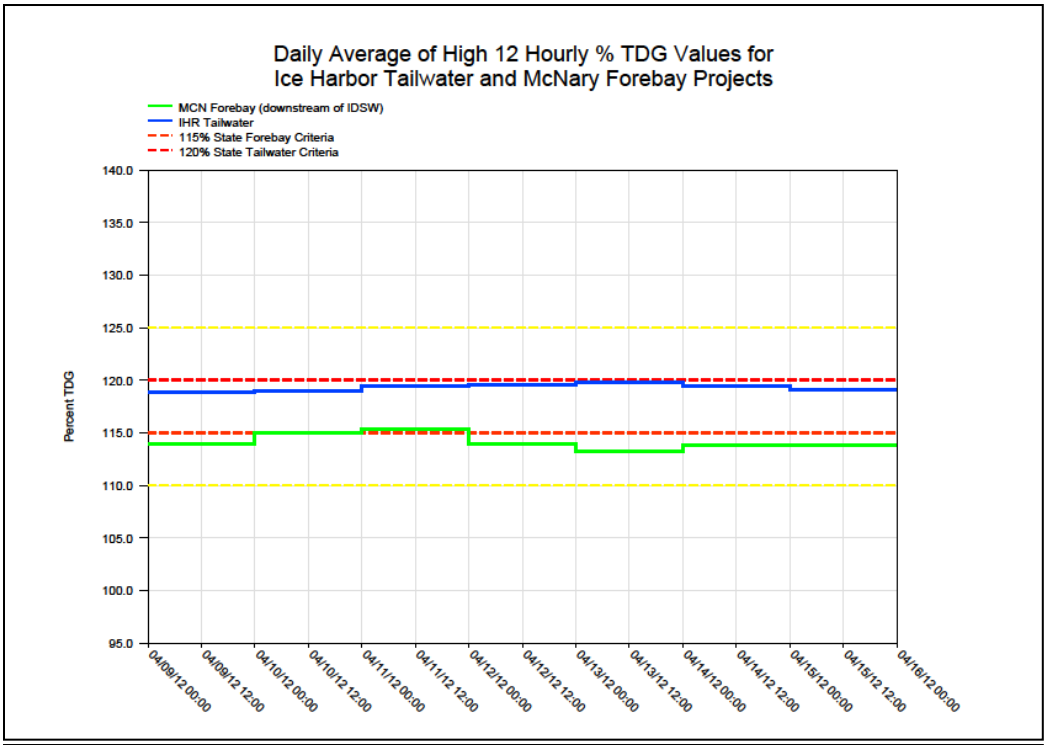

LOWER MONUMENTAL DAM - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/09/12 01:00
04/09/12 13:00
04/10/12 01:00
04/10/12 13:00
04/11/12 01:00
04/11/12 13:00
04/12/12 01:00
04/12/12 13:00
04/13/12 01:00
04/13/12 13:00
04/14/12 01:00
04/14/12 13:00
04/15/12 01:00
04/15/12 13:00
04/16/12 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
Spill Cap

Figure 8


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/09/12 00:00
04/09/12 12:00
04/10/12 00:00
04/10/12 12:00
04/11/12 00:00
04/11/12 12:00
04/12/12 00:00
04/12/12 12:00
04/13/12 00:00
04/13/12 12:00
04/14/12 00:00
04/14/12 12:00
04/15/12 00:00
04/15/12 12:00
04/16/12 00:00

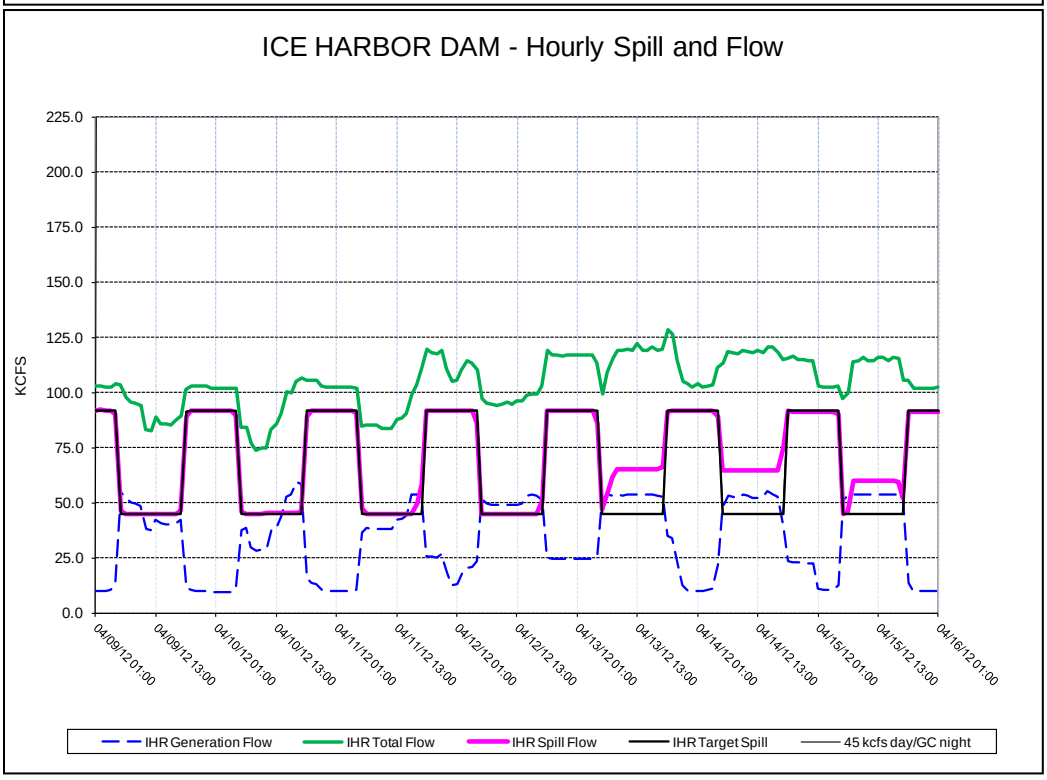
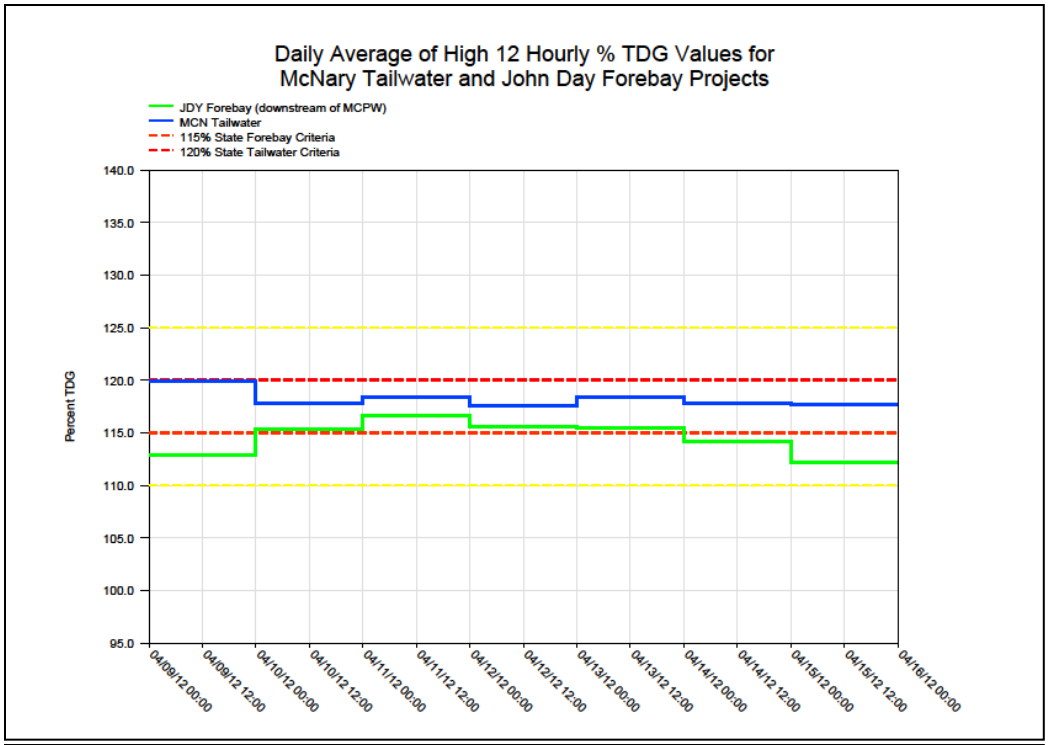

ICE HARBOR DAM - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/09/12 01:00
04/09/12 13:00
04/10/12 01:00
04/10/12 13:00
04/11/12 01:00
04/11/12 13:00
04/12/12 01:00
04/12/12 13:00
04/13/12 01:00
04/13/12 13:00
04/14/12 01:00
04/14/12 13:00
04/15/12 01:00
04/15/12 13:00
04/16/12 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
45 kcfs day/GC night

Figure 9


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/09/12 00:00
04/09/12 12:00
04/10/12 00:00
04/10/12 12:00
04/11/12 00:00
04/11/12 12:00
04/12/12 00:00
04/12/12 12:00
04/13/12 00:00
04/13/12 12:00
04/14/12 00:00
04/14/12 12:00
04/15/12 00:00
04/15/12 12:00
04/16/12 00:00

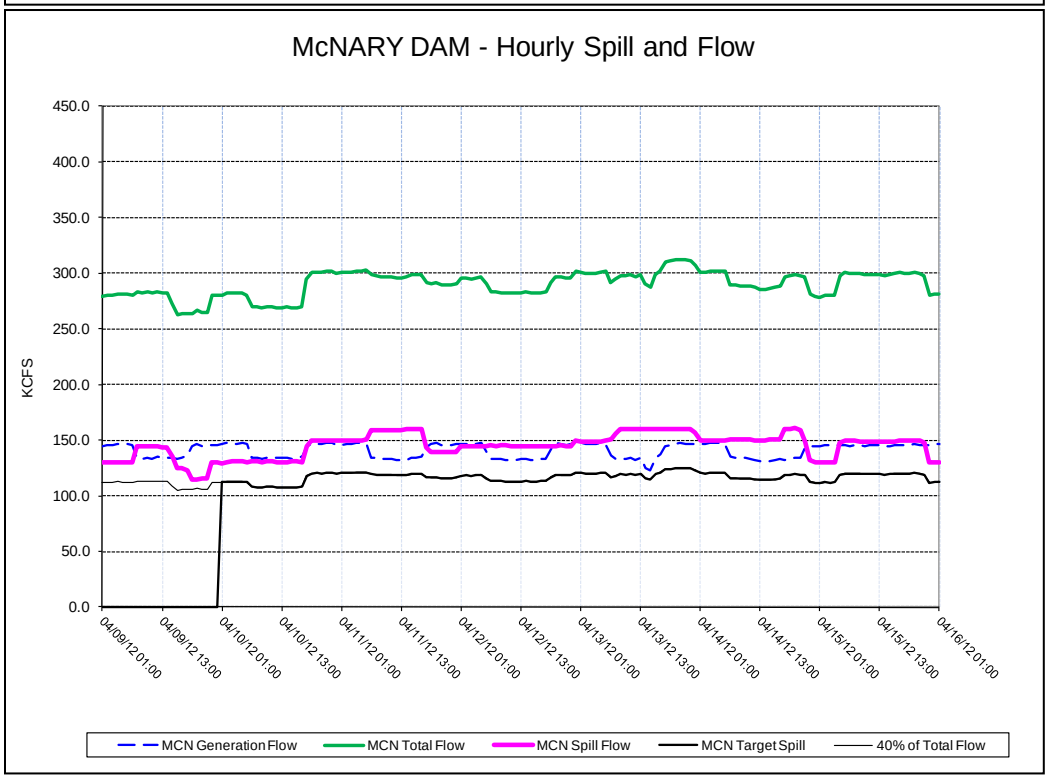
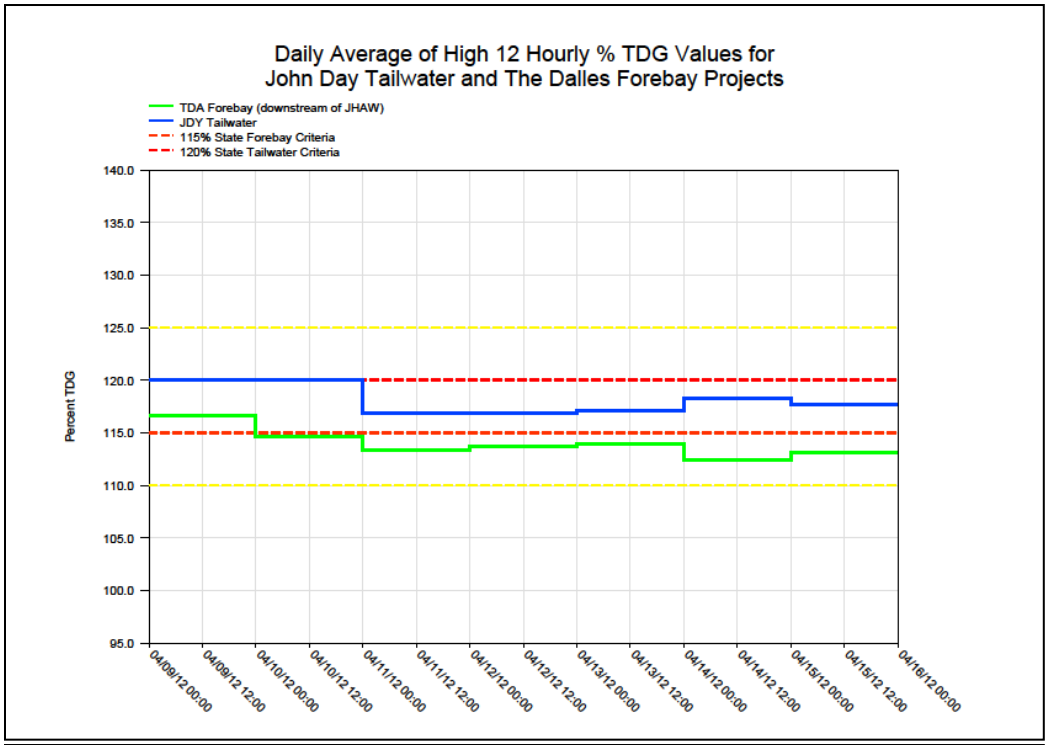

McNARY DAM - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/09/12 01:00
04/09/12 13:00
04/10/12 01:00
04/10/12 13:00
04/11/12 01:00
04/11/12 13:00
04/12/12 01:00
04/12/12 13:00
04/13/12 01:00
04/13/12 13:00
04/14/12 01:00
04/14/12 13:00
04/15/12 01:00
04/15/12 13:00
04/16/12 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
40% of Total Flow

Figure 10


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/09/12 00:00
04/09/12 12:00
04/10/12 00:00
04/10/12 12:00
04/11/12 00:00
04/11/12 12:00
04/12/12 00:00
04/12/12 12:00
04/13/12 00:00
04/13/12 12:00
04/14/12 00:00
04/14/12 12:00
04/15/12 00:00
04/15/12 12:00
04/16/12 00:00

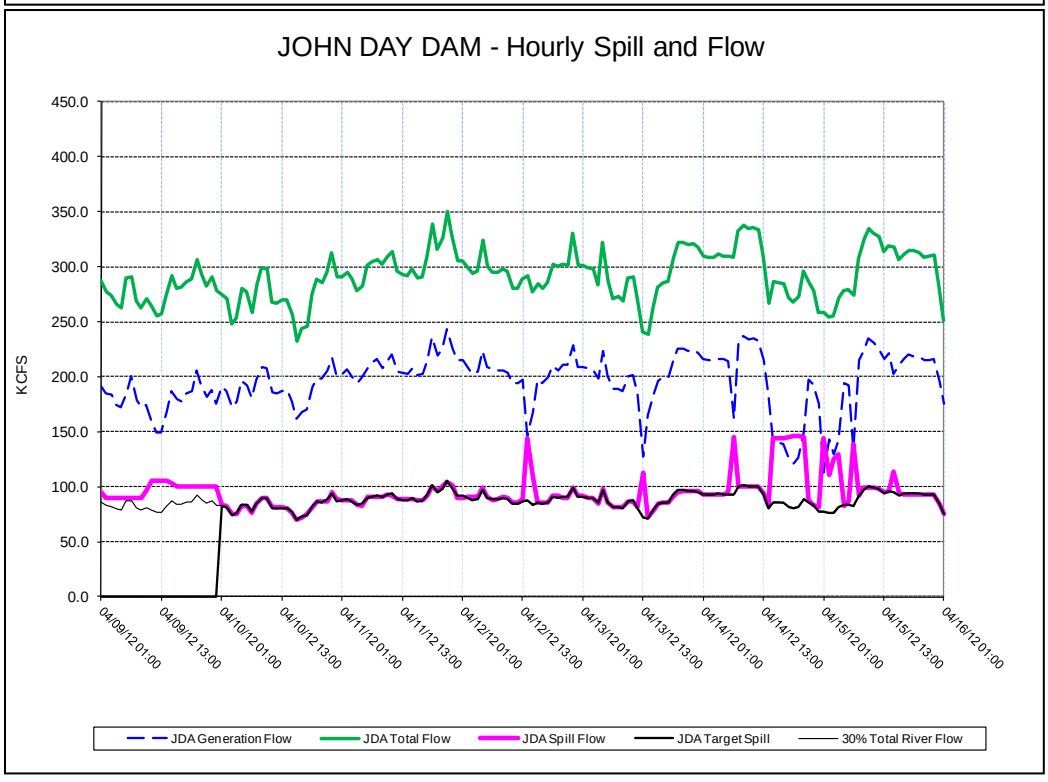
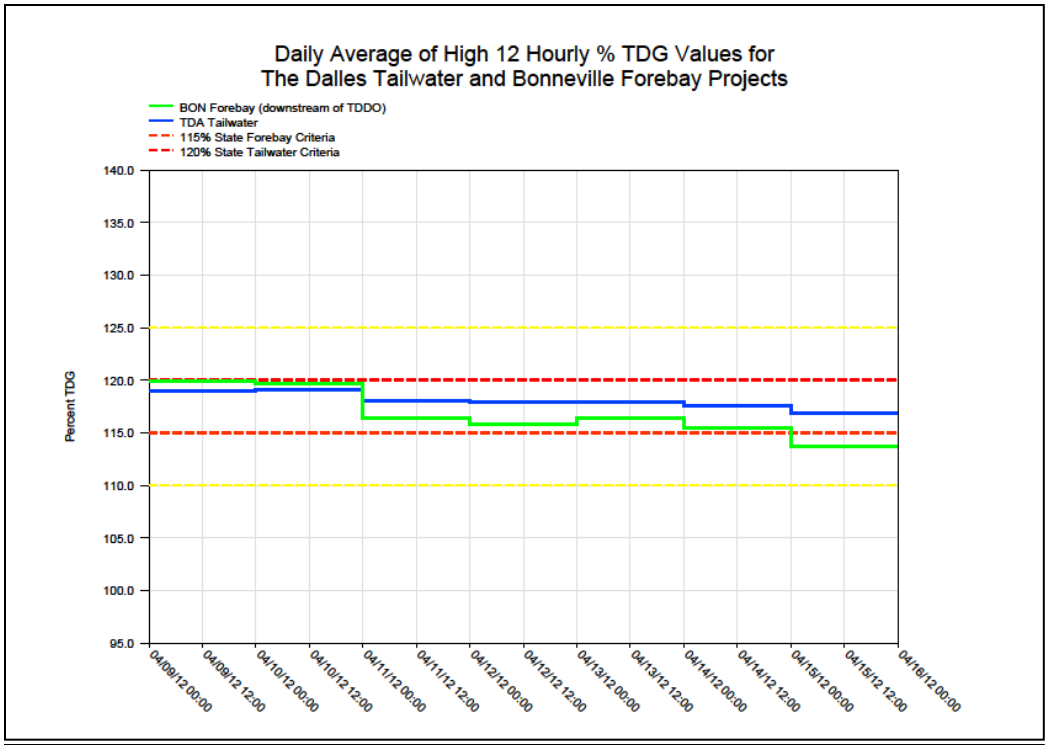

JOHN DAY DAM - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/09/12 01:00
04/09/12 13:00
04/10/12 01:00
04/10/12 13:00
04/11/12 01:00
04/11/12 13:00
04/12/12 01:00
04/12/12 13:00
04/13/12 01:00
04/13/12 13:00
04/14/12 01:00
04/14/12 13:00
04/15/12 01:00
04/15/12 13:00
04/16/12 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% Total River Flow

Figure 11


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/09/12 00:00
04/09/12 12:00
04/10/12 00:00
04/10/12 12:00
04/11/12 00:00
04/11/12 12:00
04/12/12 00:00
04/12/12 12:00
04/13/12 00:00
04/13/12 12:00
04/14/12 00:00
04/14/12 12:00
04/15/12 00:00
04/15/12 12:00
04/16/12 00:00

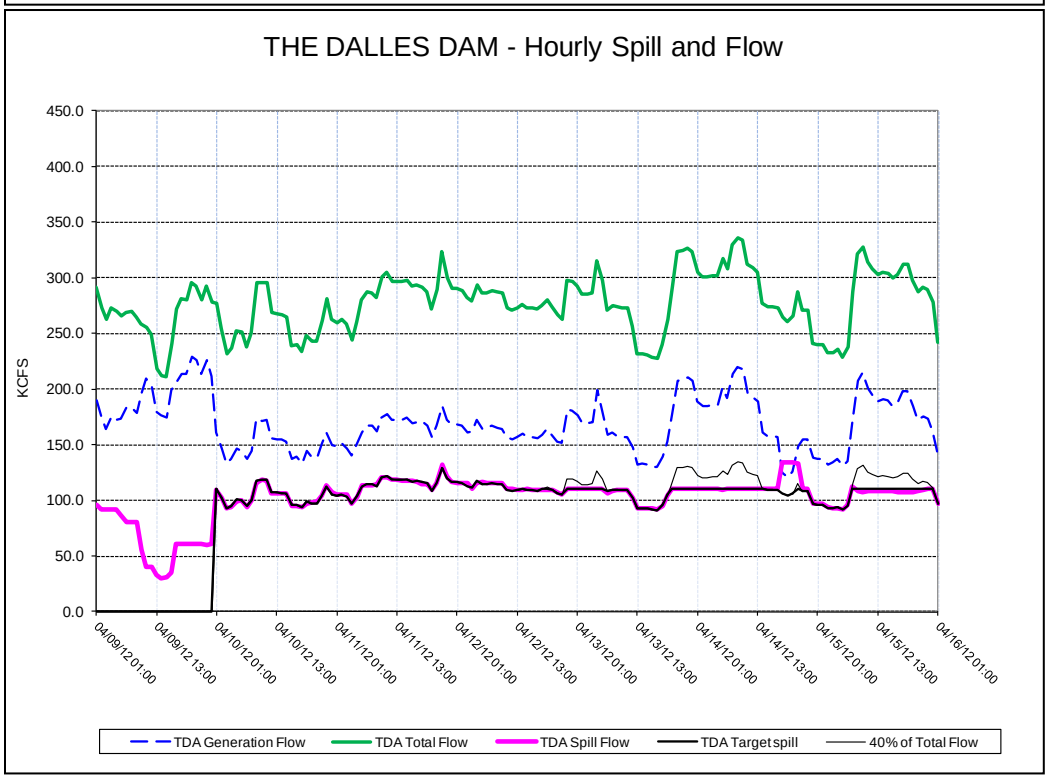
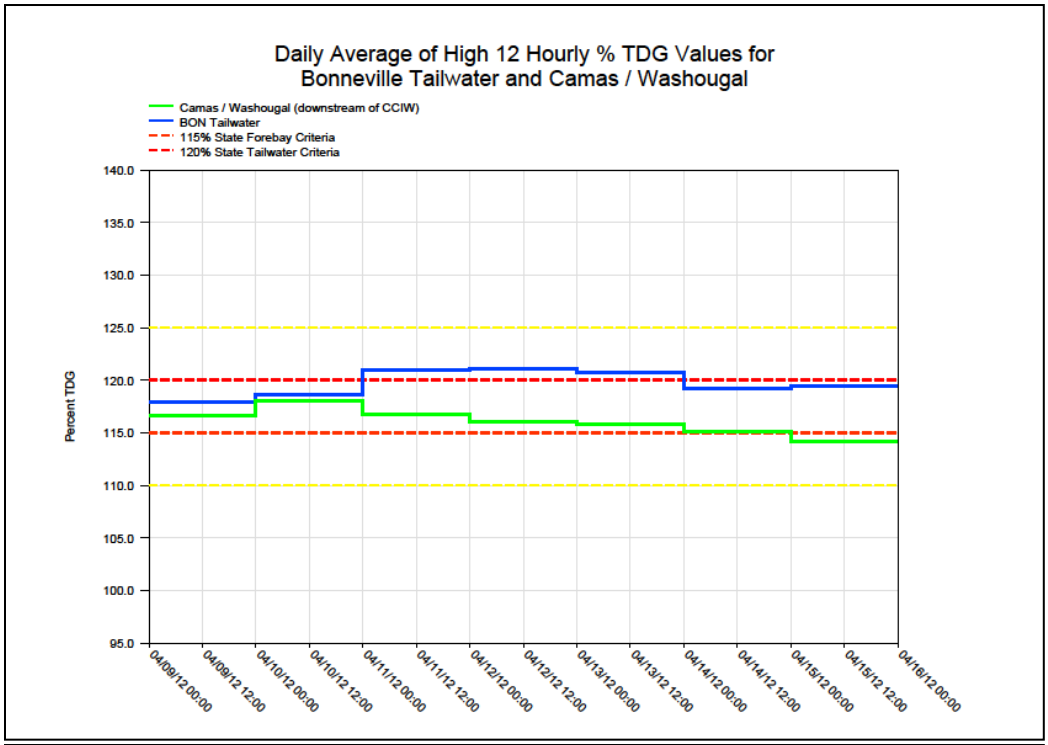

THE DALLES DAM - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/09/12 01:00
04/09/12 13:00
04/10/12 01:00
04/10/12 13:00
04/11/12 01:00
04/11/12 13:00
04/12/12 01:00
04/12/12 13:00
04/13/12 01:00
04/13/12 13:00
04/14/12 01:00
04/14/12 13:00
04/15/12 01:00
04/15/12 13:00
04/16/12 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 12


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/09/12 00:00
04/09/12 12:00
04/10/12 00:00
04/10/12 12:00
04/11/12 00:00
04/11/12 12:00
04/12/12 00:00
04/12/12 12:00
04/13/12 00:00
04/13/12 12:00
04/14/12 00:00
04/14/12 12:00
04/15/12 00:00
04/15/12 12:00
04/16/12 00:00

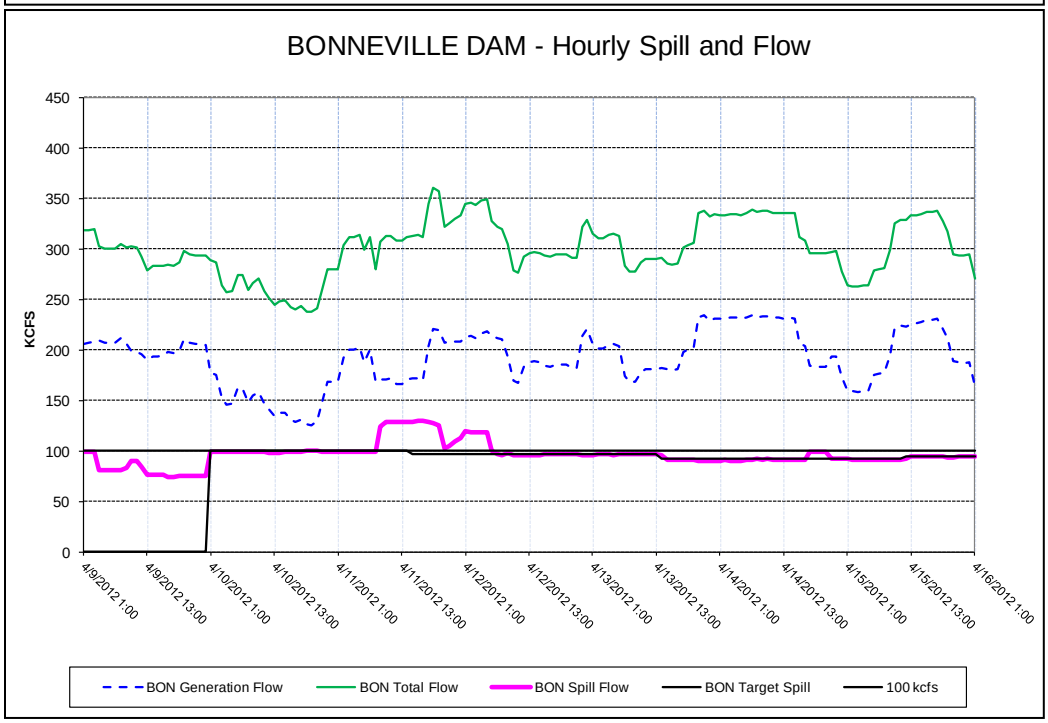
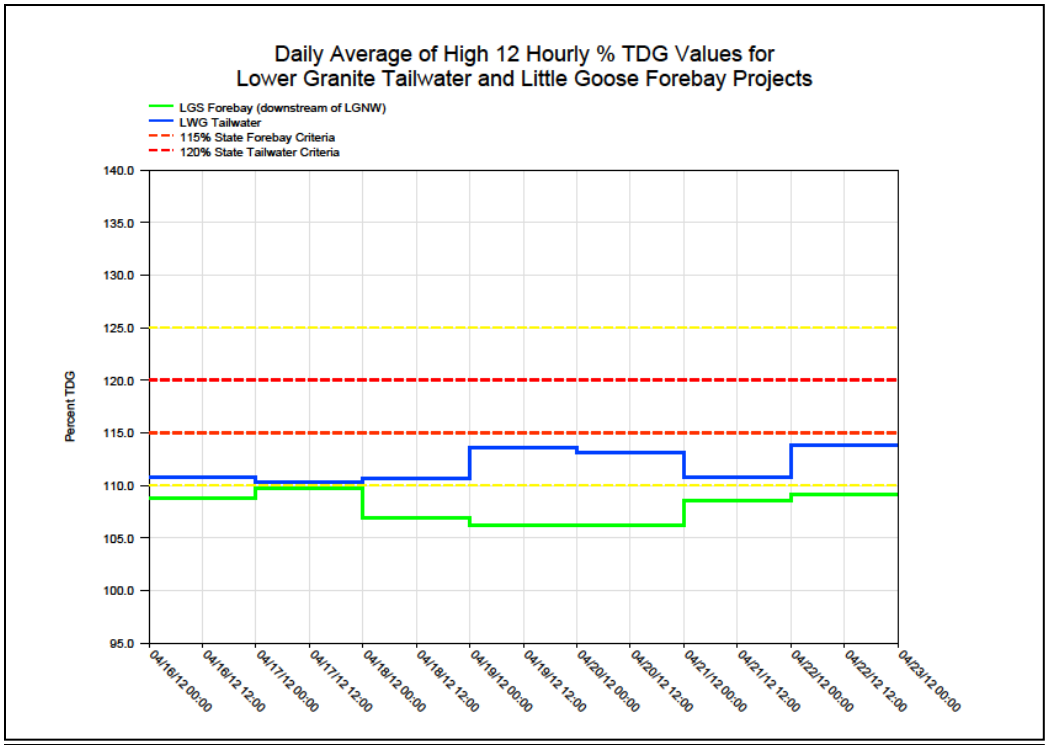

BONNEVILLE DAM - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
4/9/2012 1:00
4/9/2012 13:00
4/10/2012 1:00
4/10/2012 13:00
4/11/2012 1:00
4/11/2012 13:00
4/12/2012 1:00
4/12/2012 13:00
4/13/2012 1:00
4/13/2012 13:00
4/14/2012 1:00
4/14/2012 13:00
4/15/2012 1:00
4/15/2012 13:00
4/16/2012 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
100 kcfs

Figure 13


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/16/12 00:00
04/16/12 12:00
04/17/12 00:00
04/17/12 12:00
04/18/12 00:00
04/18/12 12:00
04/19/12 00:00
04/19/12 12:00
04/20/12 00:00
04/20/12 12:00
04/21/12 00:00
04/21/12 12:00
04/22/12 00:00
04/22/12 12:00
04/23/12 00:00

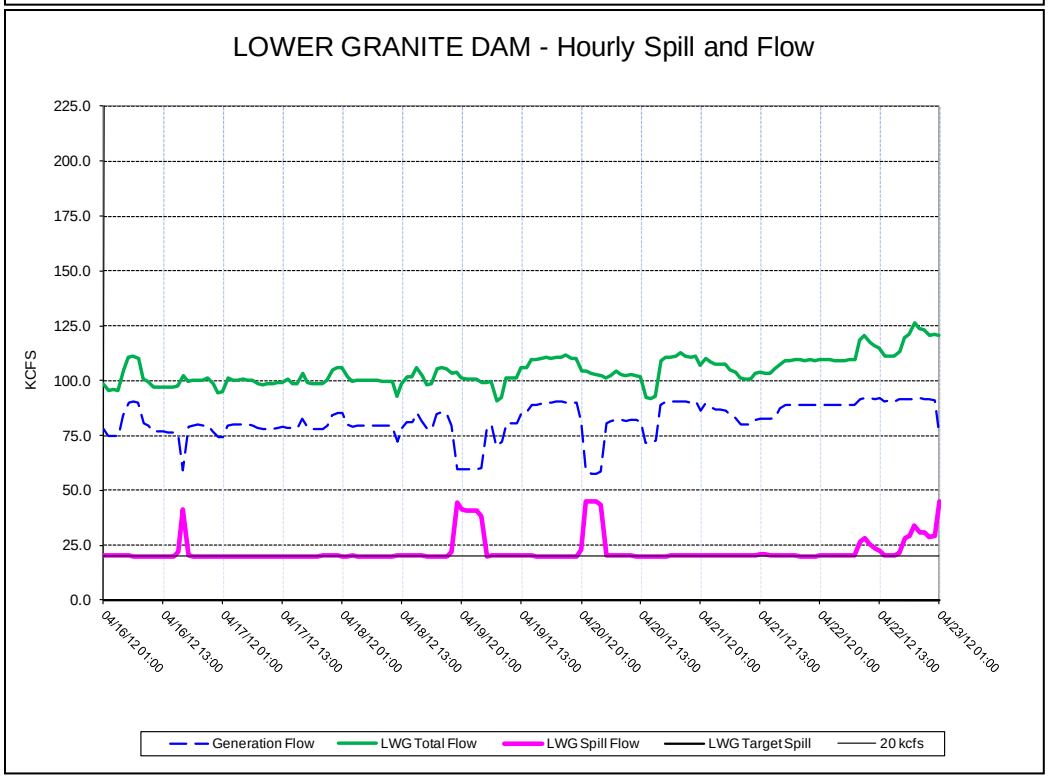
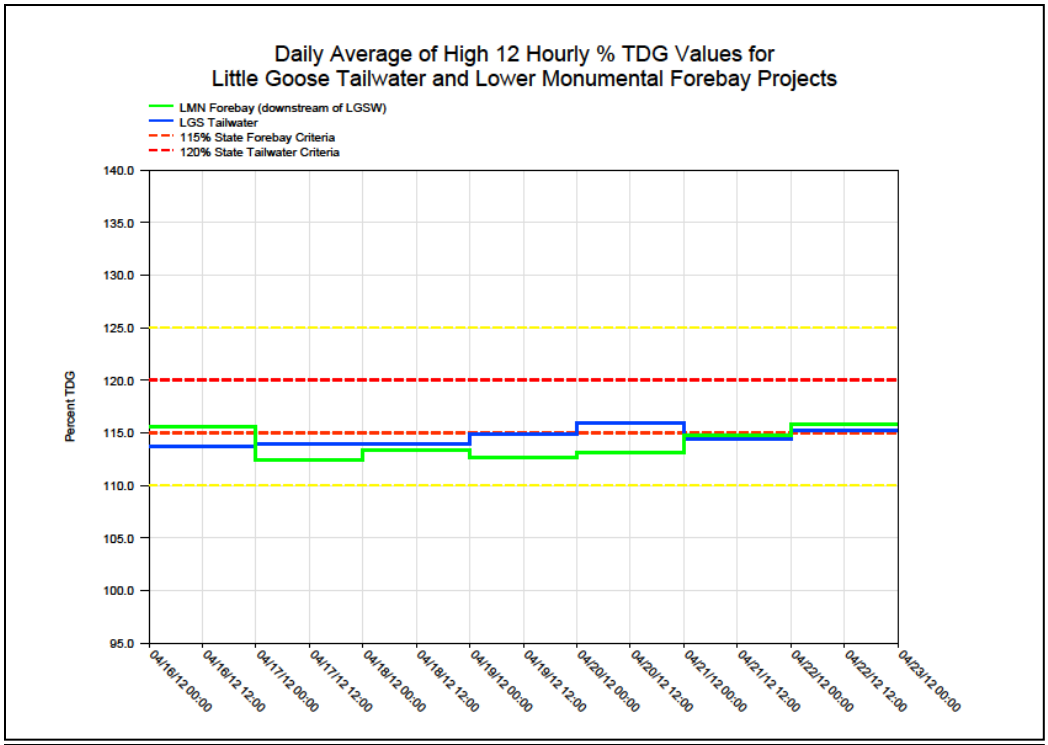

LOWER GRANITE DAM - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/16/12 01:00
04/16/12 13:00
04/17/12 01:00
04/17/12 13:00
04/18/12 01:00
04/18/12 13:00
04/19/12 01:00
04/19/12 13:00
04/20/12 01:00
04/20/12 13:00
04/21/12 01:00
04/21/12 13:00
04/22/12 01:00
04/22/12 13:00
04/23/12 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
20 kcfs

Figure 14


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/16/12 00:00
04/16/12 12:00
04/17/12 00:00
04/17/12 12:00
04/18/12 00:00
04/18/12 12:00
04/19/12 00:00
04/19/12 12:00
04/20/12 00:00
04/20/12 12:00
04/21/12 00:00
04/21/12 12:00
04/22/12 00:00
04/22/12 12:00
04/23/12 00:00

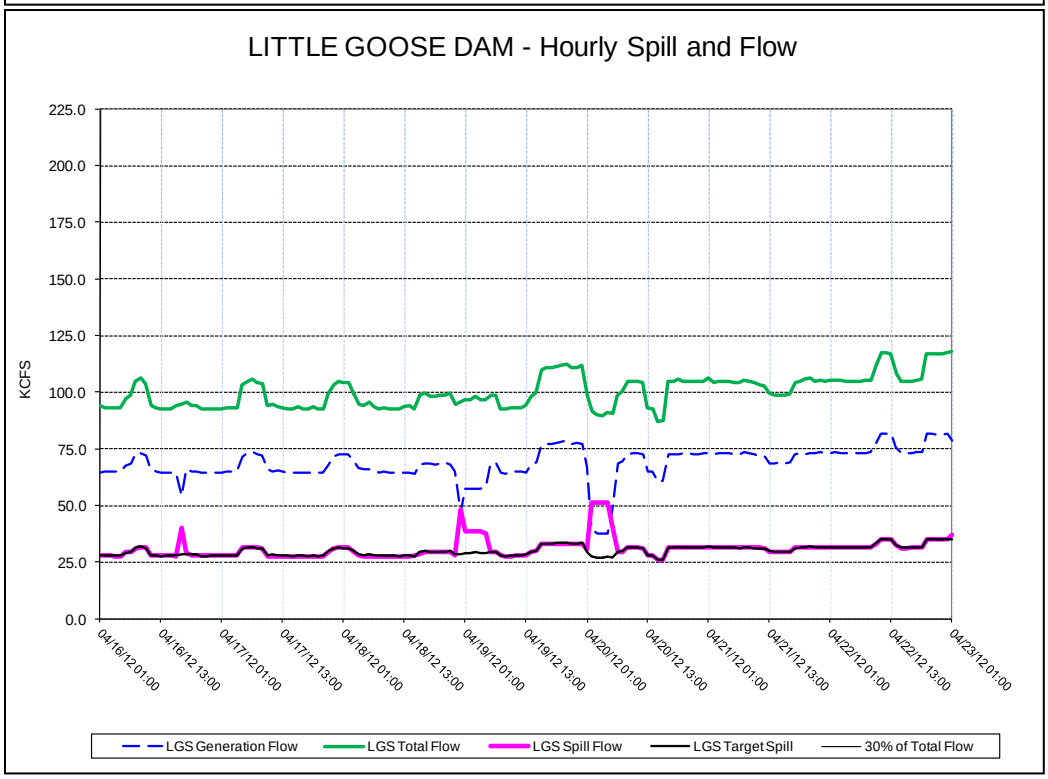
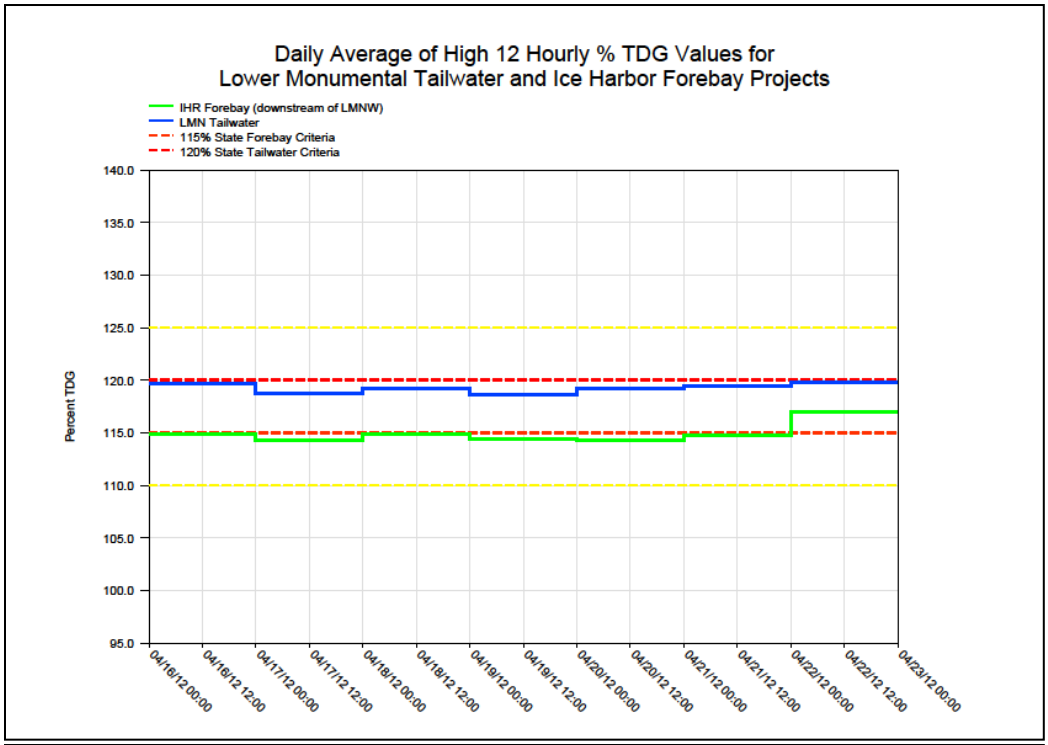

LITTLE GOOSE DAM - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/16/12 01:00
04/16/12 13:00
04/17/12 01:00
04/17/12 13:00
04/18/12 01:00
04/18/12 13:00
04/19/12 01:00
04/19/12 13:00
04/20/12 01:00
04/20/12 13:00
04/21/12 01:00
04/21/12 13:00
04/22/12 01:00
04/22/12 13:00
04/23/12 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 15


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/16/12 00:00
04/18/12 12:00
04/17/12 00:00
04/17/12 12:00
04/18/12 00:00
04/18/12 12:00
04/19/12 00:00
04/19/12 12:00
04/20/12 00:00
04/20/12 12:00
04/21/12 00:00
04/21/12 12:00
04/22/12 00:00
04/22/12 12:00
04/23/12 00:00

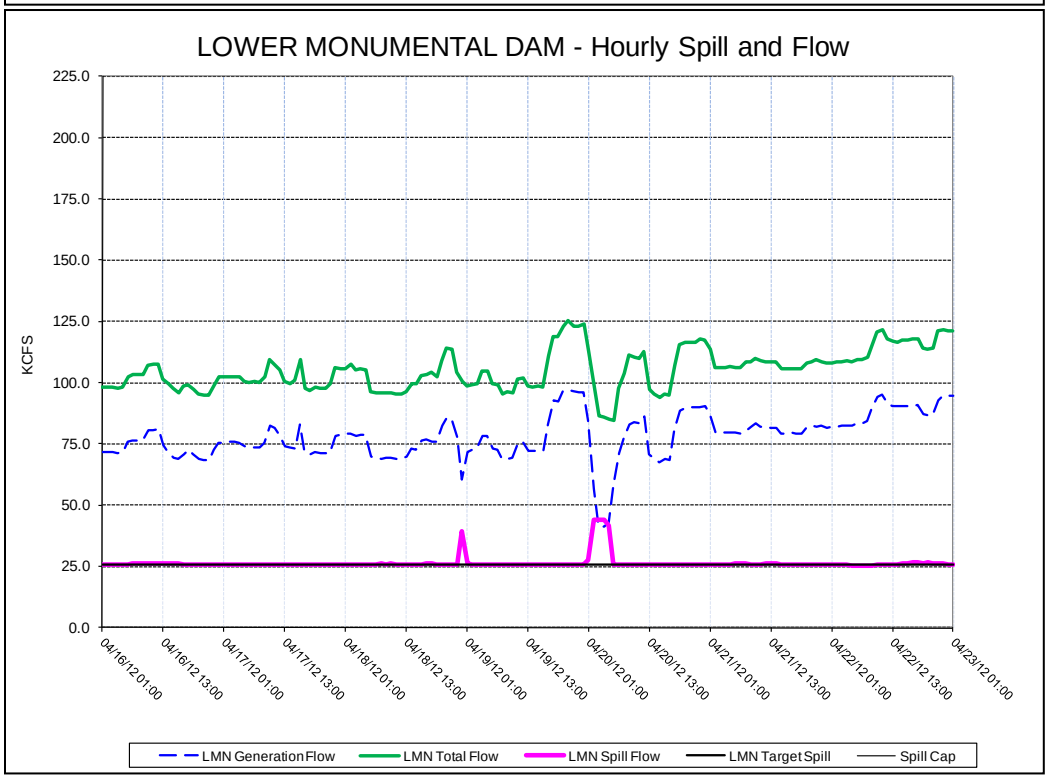
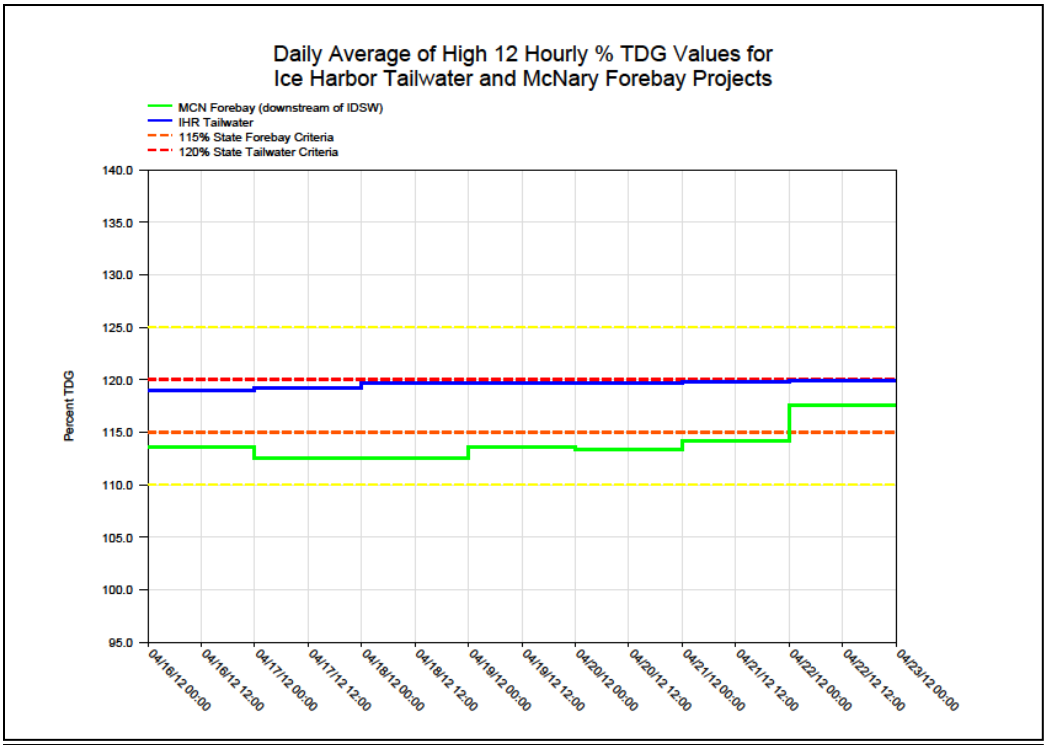

LOWER MONUMENTAL DAM - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/16/12 01:00
04/16/12 13:00
04/17/12 01:00
04/17/12 13:00
04/18/12 01:00
04/18/12 13:00
04/19/12 01:00
04/19/12 13:00
04/20/12 01:00
04/20/12 13:00
04/21/12 01:00
04/21/12 13:00
04/22/12 01:00
04/22/12 13:00
04/23/12 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
Spill Cap

Figure 16


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/16/12 00:00
04/16/12 12:00
04/17/12 00:00
04/17/12 12:00
04/18/12 00:00
04/18/12 12:00
04/19/12 00:00
04/19/12 12:00
04/20/12 00:00
04/20/12 12:00
04/21/12 00:00
04/21/12 12:00
04/22/12 00:00
04/22/12 12:00
04/23/12 00:00

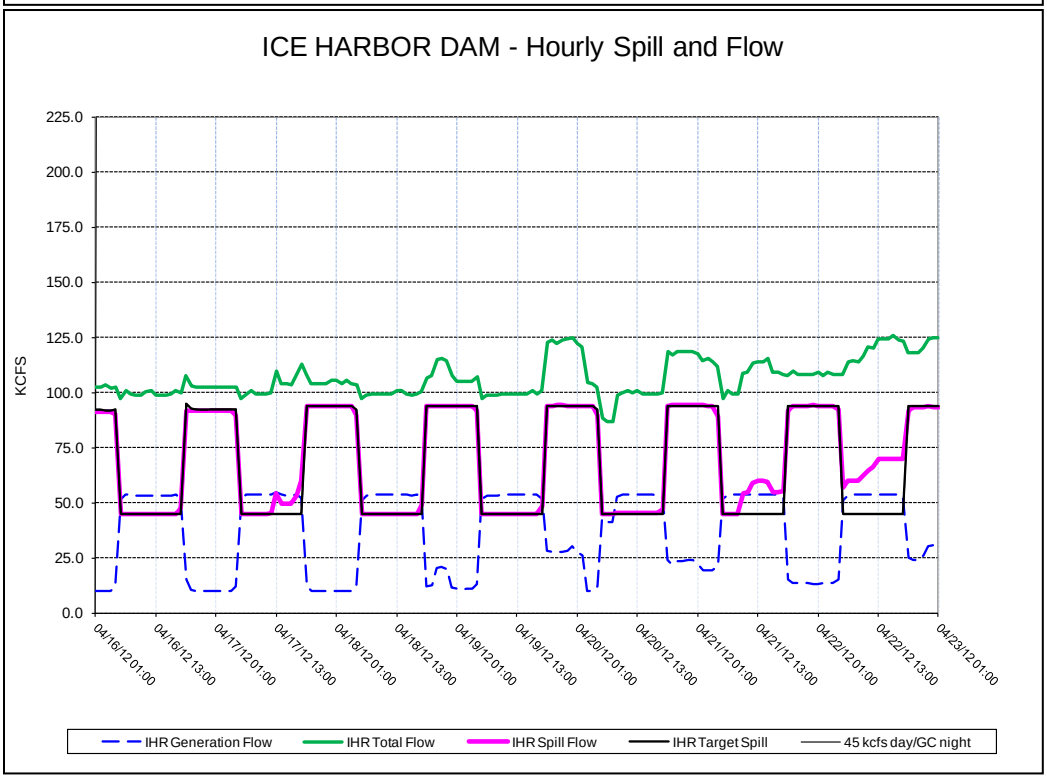
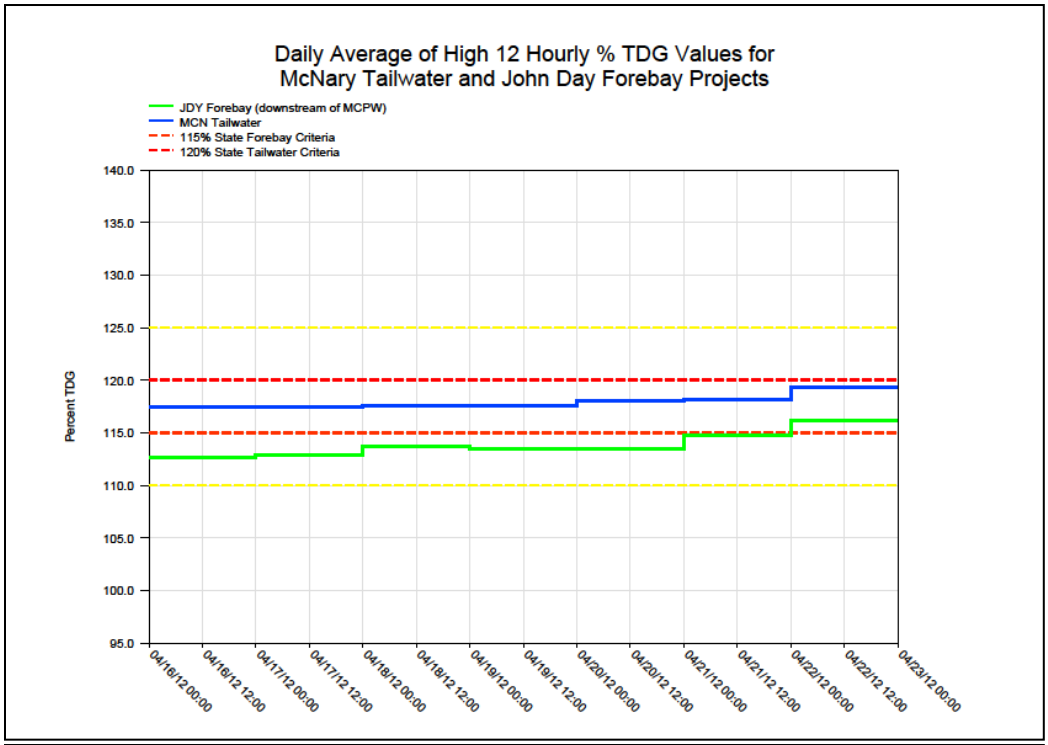

ICE HARBOR DAM - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/16/12 01:00
04/16/12 13:00
04/17/12 01:00
04/17/12 13:00
04/18/12 01:00
04/18/12 13:00
04/19/12 01:00
04/19/12 13:00
04/20/12 01:00
04/20/12 13:00
04/21/12 01:00
04/21/12 13:00
04/22/12 01:00
04/22/12 13:00
04/23/12 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
45 kcfs day/GC night

Figure 17


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/16/12 00:00
04/16/12 12:00
04/17/12 00:00
04/17/12 12:00
04/18/12 00:00
04/18/12 12:00
04/19/12 00:00
04/19/12 12:00
04/20/12 00:00
04/20/12 12:00
04/21/12 00:00
04/21/12 12:00
04/22/12 00:00
04/22/12 12:00
04/23/12 00:00

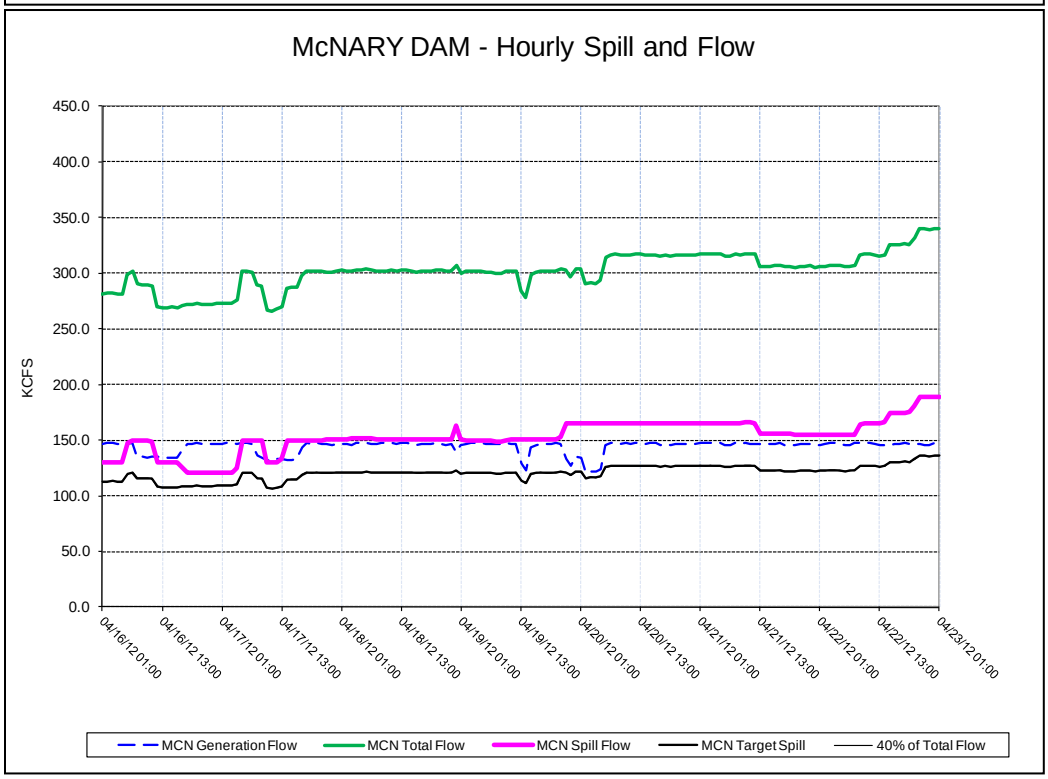
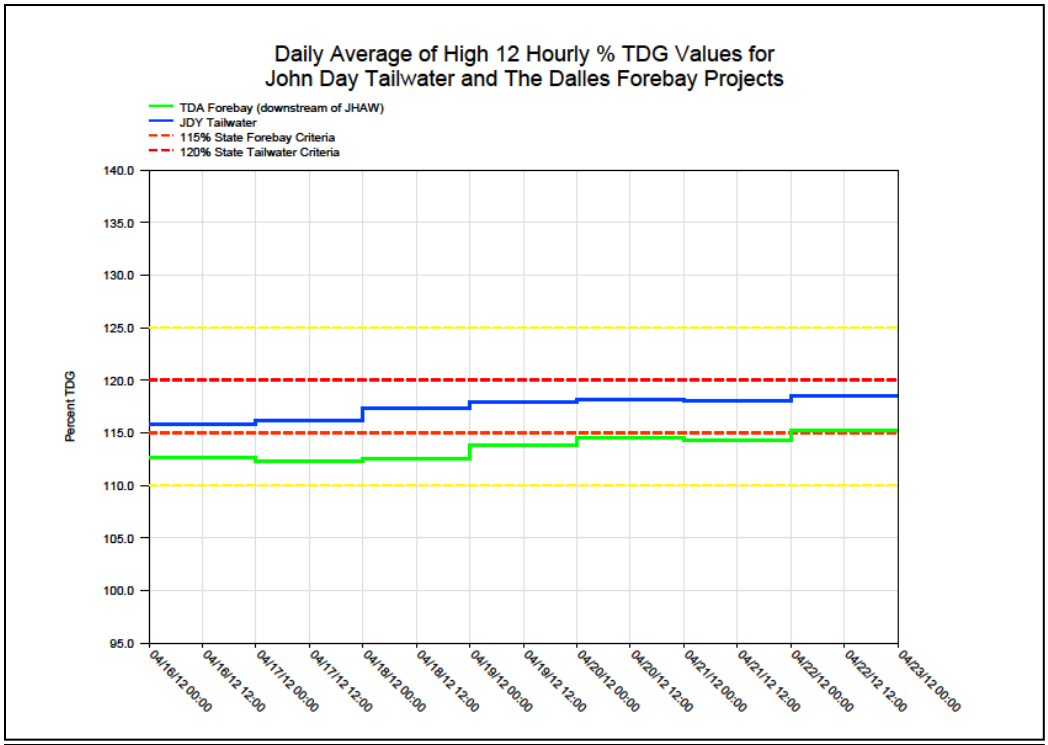

McNARY DAM - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/16/12 01:00
04/16/12 13:00
04/17/12 01:00
04/17/12 13:00
04/18/12 01:00
04/18/12 13:00
04/19/12 01:00
04/19/12 13:00
04/20/12 01:00
04/20/12 13:00
04/21/12 01:00
04/21/12 13:00
04/22/12 01:00
04/22/12 13:00
04/23/12 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
40% of Total Flow

Figure 18


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/16/12 00:00
04/16/12 12:00
04/17/12 00:00
04/17/12 12:00
04/18/12 00:00
04/18/12 12:00
04/19/12 00:00
04/19/12 12:00
04/20/12 00:00
04/20/12 12:00
04/21/12 00:00
04/21/12 12:00
04/22/12 00:00
04/22/12 12:00
04/23/12 00:00

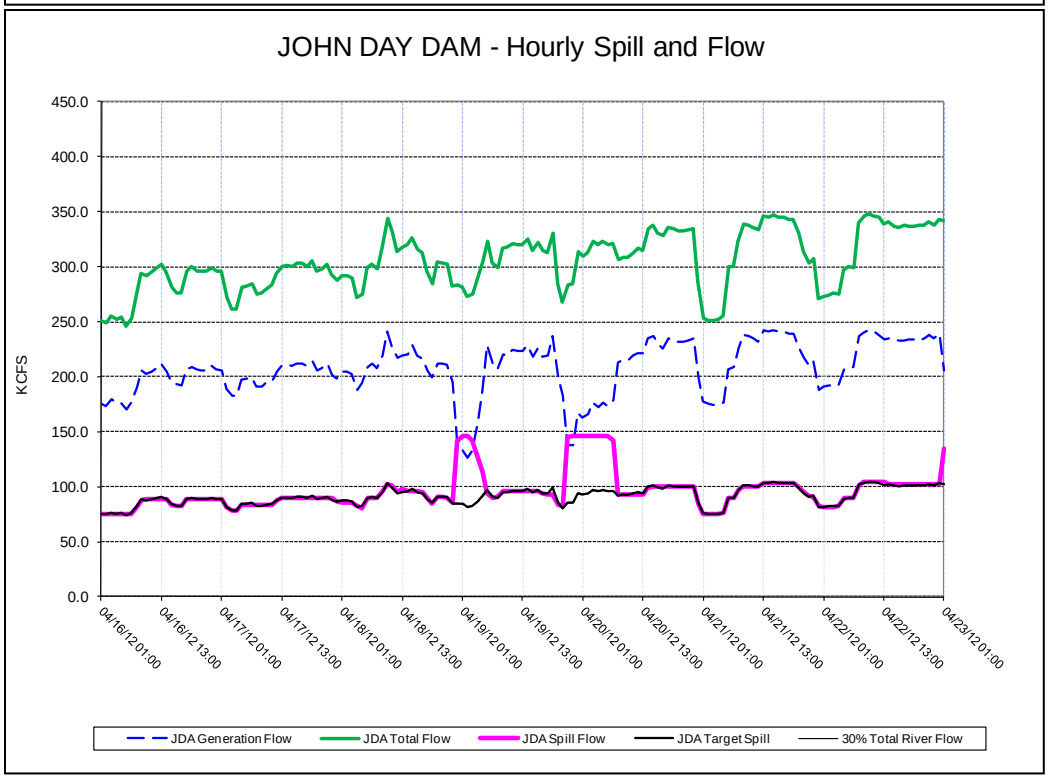
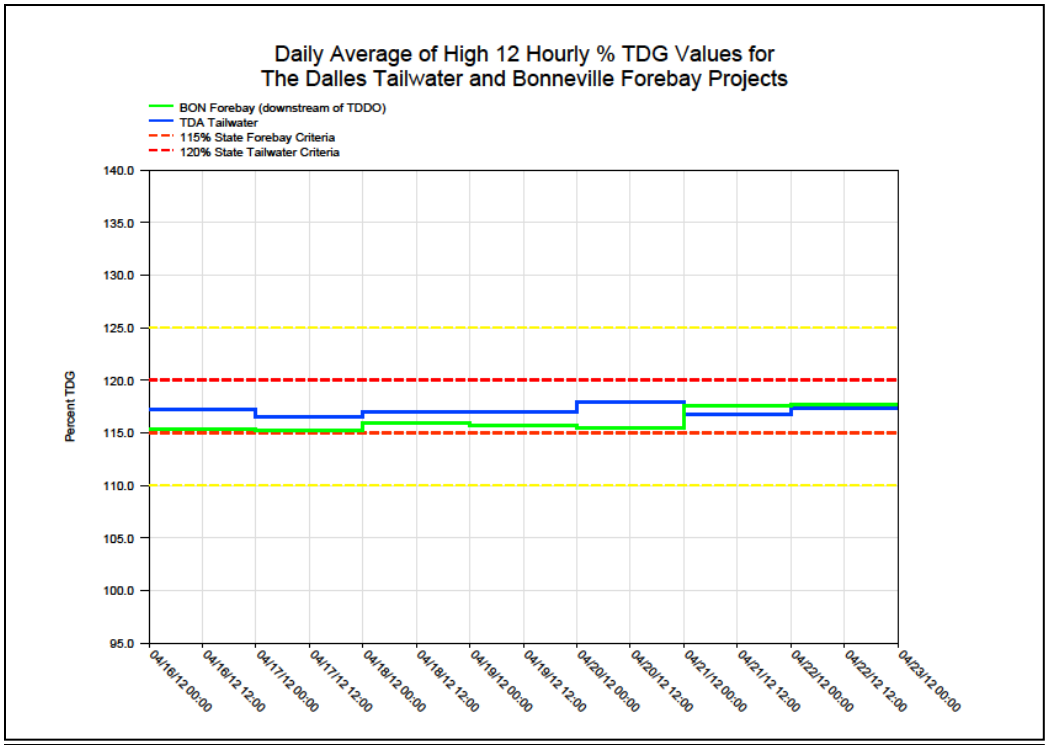

JOHN DAY DAM - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/16/12 01:00
04/16/12 13:00
04/17/12 01:00
04/17/12 13:00
04/18/12 01:00
04/18/12 13:00
04/19/12 01:00
04/19/12 13:00
04/20/12 01:00
04/20/12 13:00
04/21/12 01:00
04/21/12 13:00
04/22/12 01:00
04/22/12 13:00
04/23/12 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% Total River Flow

Figure 19


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/16/12 00:00
04/16/12 12:00
04/17/12 00:00
04/17/12 12:00
04/18/12 00:00
04/18/12 12:00
04/19/12 00:00
04/19/12 12:00
04/20/12 00:00
04/20/12 12:00
04/21/12 00:00
04/21/12 12:00
04/22/12 00:00
04/22/12 12:00
04/23/12 00:00

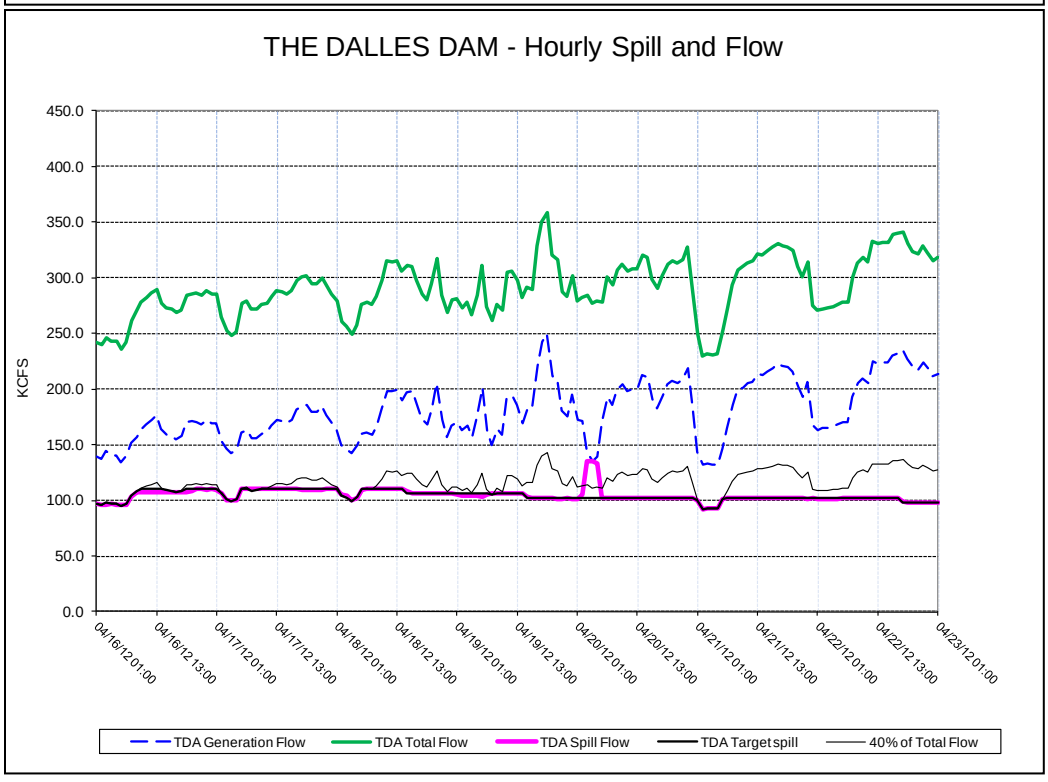
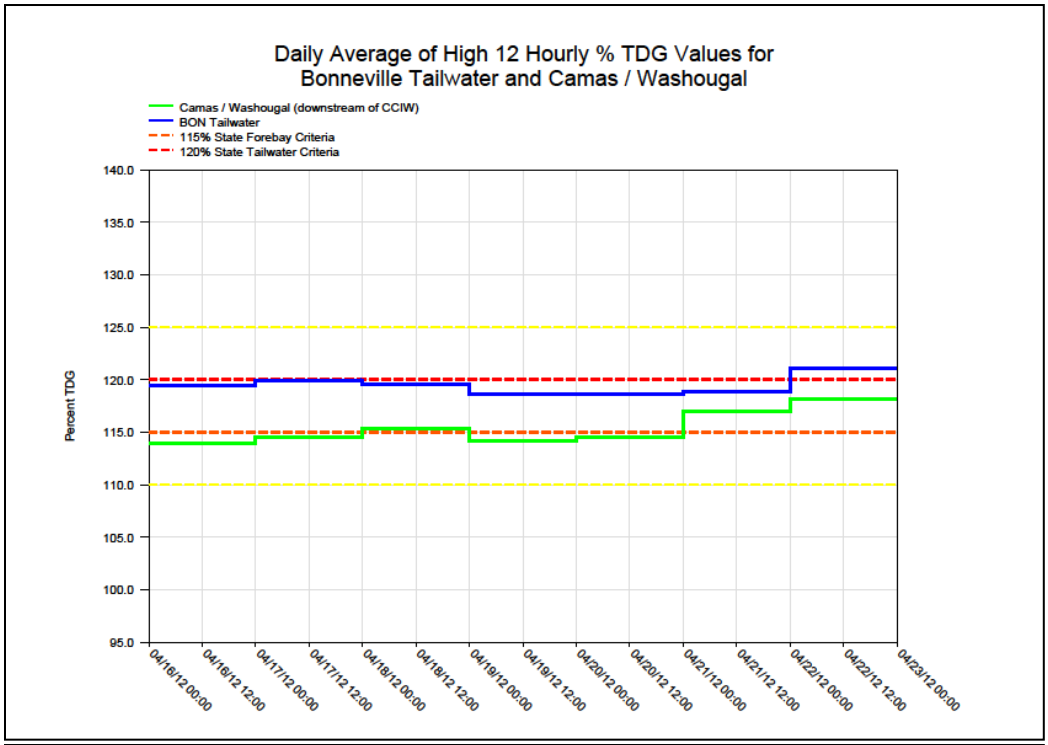

THE DALLES DAM - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/16/12 01:00
04/16/12 13:00
04/17/12 01:00
04/17/12 13:00
04/18/12 01:00
04/18/12 13:00
04/19/12 01:00
04/19/12 13:00
04/20/12 01:00
04/20/12 13:00
04/21/12 01:00
04/21/12 13:00
04/22/12 01:00
04/22/12 13:00
04/23/12 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 20


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/16/12 00:00
04/16/12 12:00
04/17/12 00:00
04/17/12 12:00
04/18/12 00:00
04/18/12 12:00
04/19/12 00:00
04/19/12 12:00
04/20/12 00:00
04/20/12 12:00
04/21/12 00:00
04/21/12 12:00
04/22/12 00:00
04/22/12 12:00
04/23/12 00:00

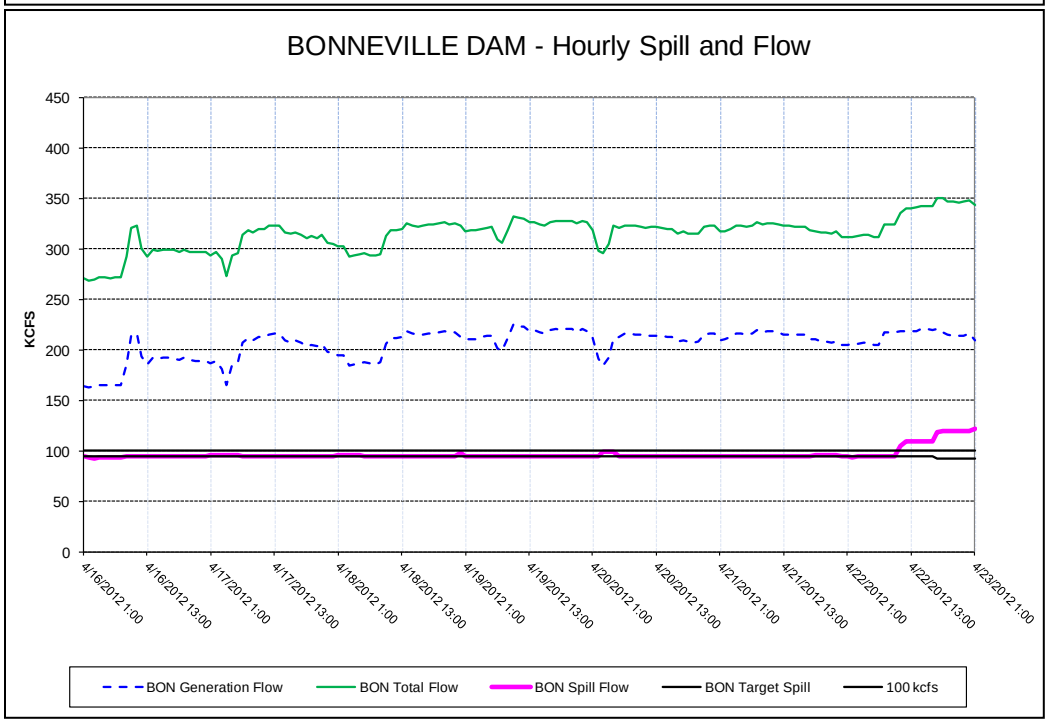
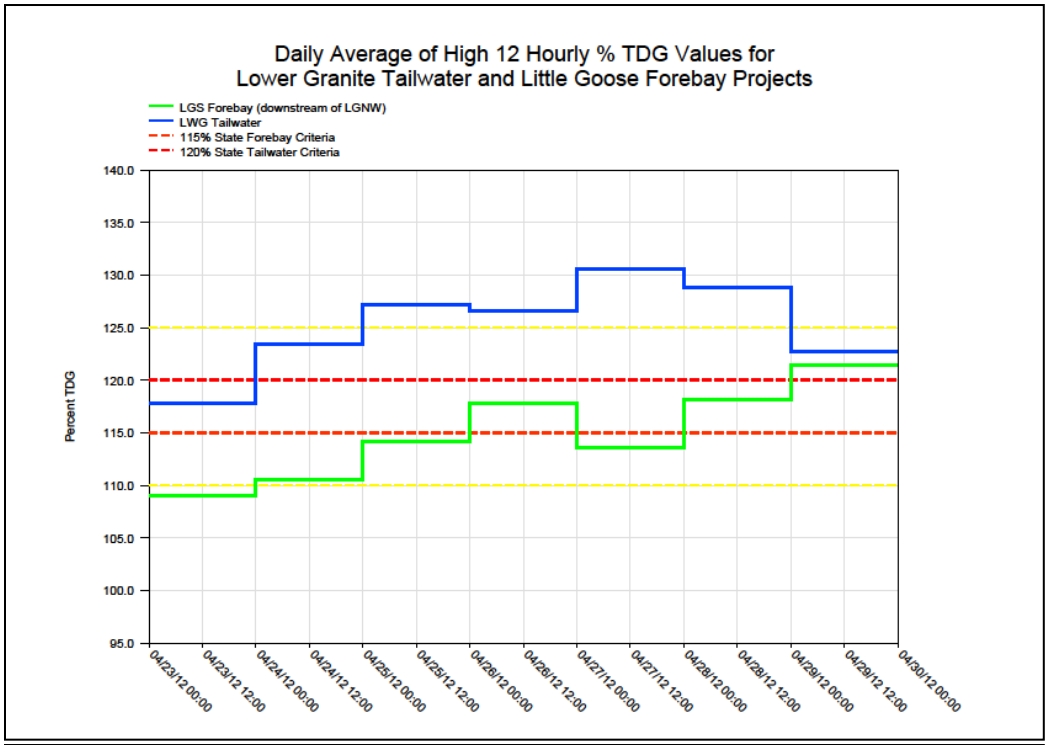

BONNEVILLE DAM - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
4/16/2012 1:00
4/16/2012 13:00
4/17/2012 1:00
4/17/2012 13:00
4/18/2012 1:00
4/18/2012 13:00
4/19/2012 1:00
4/19/2012 13:00
4/20/2012 1:00
4/20/2012 13:00
4/21/2012 1:00
4/21/2012 13:00
4/22/2012 1:00
4/22/2012 13:00
4/23/2012 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
100 kcfs

Figure 21


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/23/12 00:00
04/23/12 12:00
04/24/12 00:00
04/24/12 12:00
04/25/12 00:00
04/25/12 12:00
04/26/12 00:00
04/26/12 12:00
04/27/12 00:00
04/27/12 12:00
04/28/12 00:00
04/28/12 12:00
04/29/12 00:00
04/29/12 12:00
04/30/12 00:00

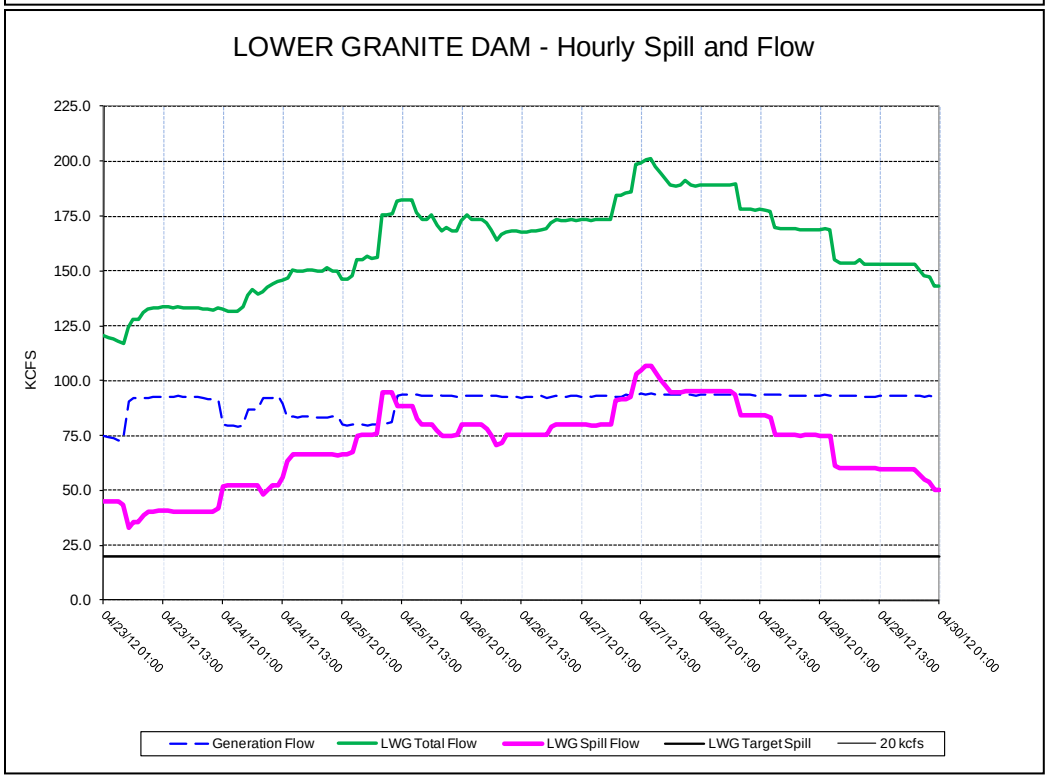
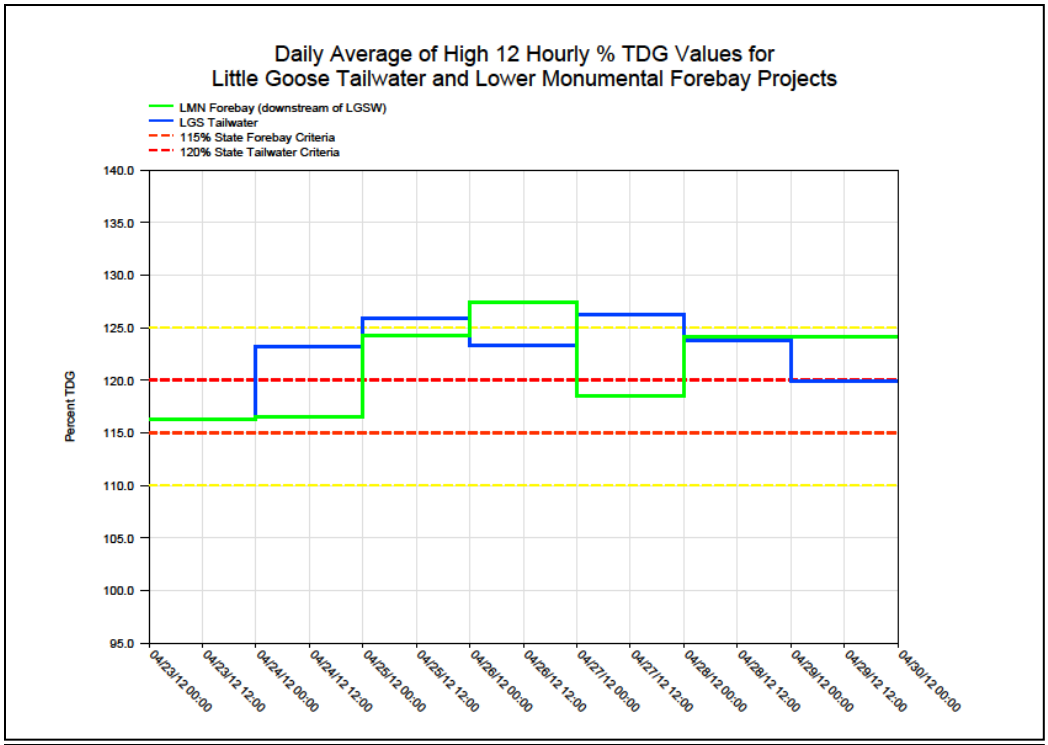

LOWER GRANITE DAM - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/23/12 01:00
04/23/12 13:00
04/24/12 01:00
04/24/12 13:00
04/25/12 01:00
04/25/12 13:00
04/26/12 01:00
04/26/12 13:00
04/27/12 01:00
04/27/12 13:00
04/28/12 01:00
04/28/12 13:00
04/29/12 01:00
04/29/12 13:00
04/30/12 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
20 kcfs

Figure 22


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/23/12 00:00
04/23/12 12:00
04/24/12 00:00
04/24/12 12:00
04/25/12 00:00
04/25/12 12:00
04/26/12 00:00
04/26/12 12:00
04/27/12 00:00
04/27/12 12:00
04/28/12 00:00
04/28/12 12:00
04/29/12 00:00
04/29/12 12:00
04/30/12 00:00

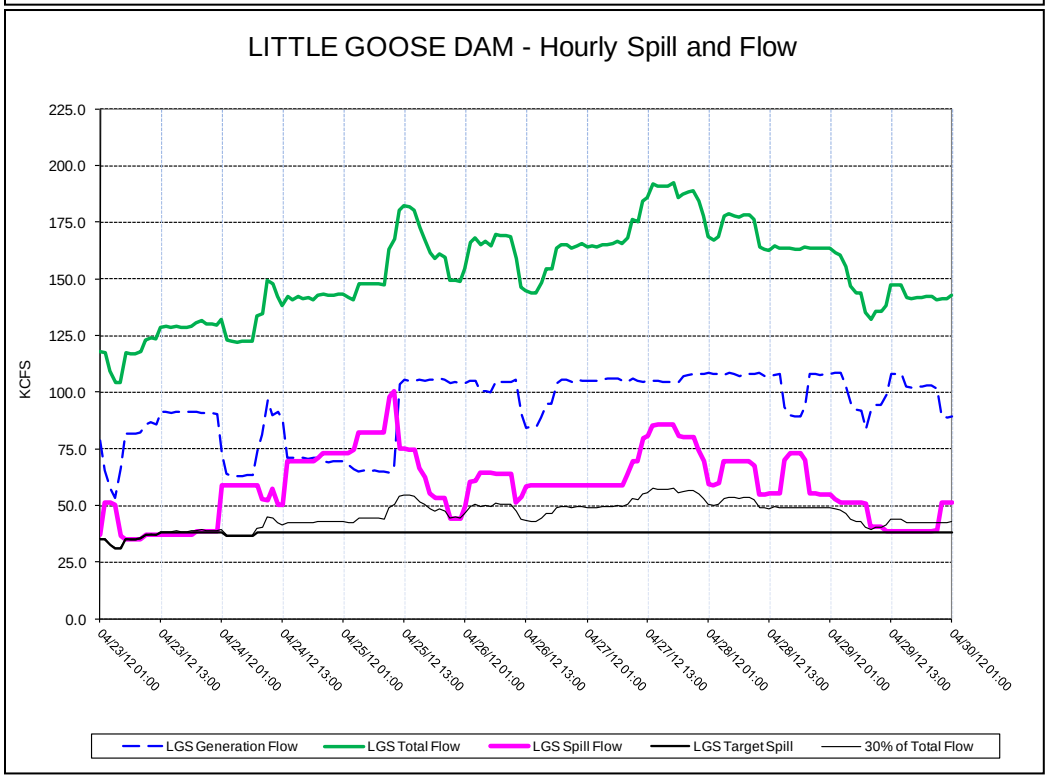
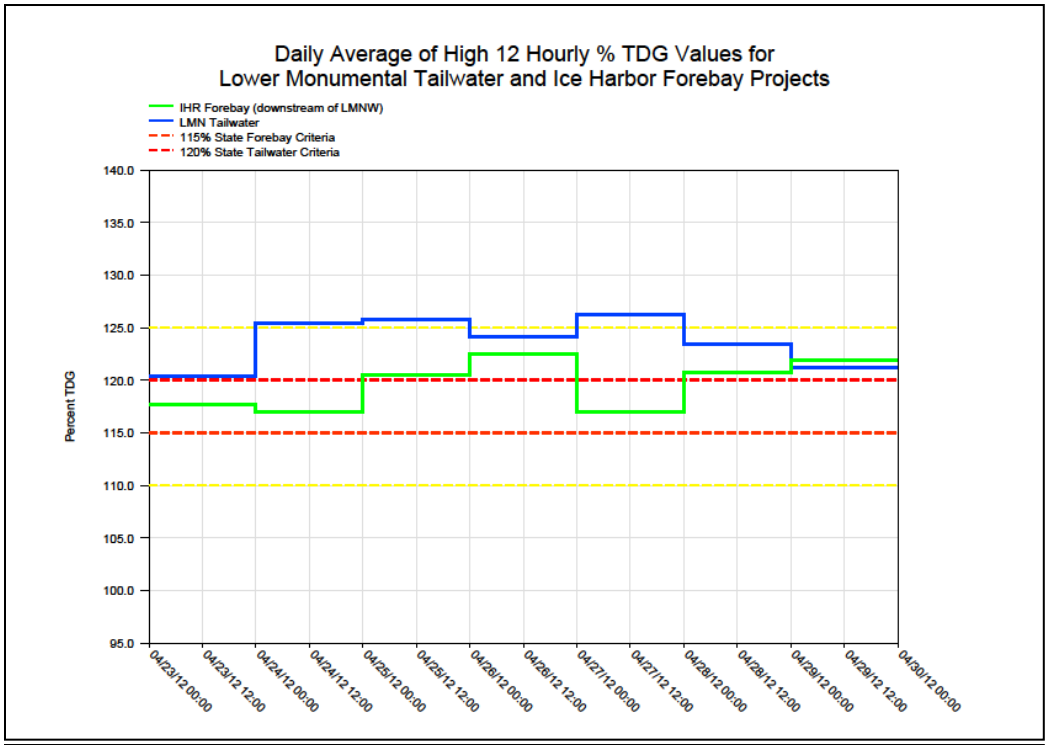

LITTLE GOOSE DAM - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/23/12 01:00
04/23/12 13:00
04/24/12 01:00
04/24/12 13:00
04/25/12 01:00
04/25/12 13:00
04/26/12 01:00
04/26/12 13:00
04/27/12 01:00
04/27/12 13:00
04/28/12 01:00
04/28/12 13:00
04/29/12 01:00
04/29/12 13:00
04/30/12 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 23


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/23/12 00:00
04/23/12 12:00
04/24/12 00:00
04/24/12 12:00
04/25/12 00:00
04/25/12 12:00
04/26/12 00:00
04/26/12 12:00
04/27/12 00:00
04/27/12 12:00
04/28/12 00:00
04/28/12 12:00
04/29/12 00:00
04/29/12 12:00
04/30/12 00:00

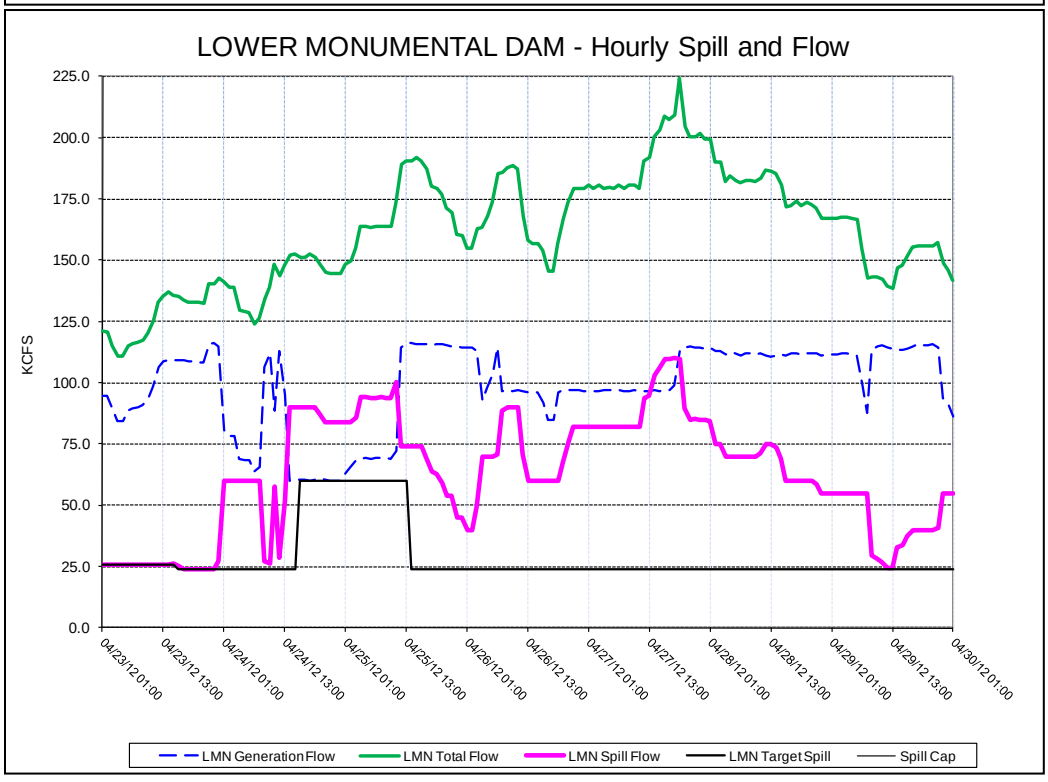
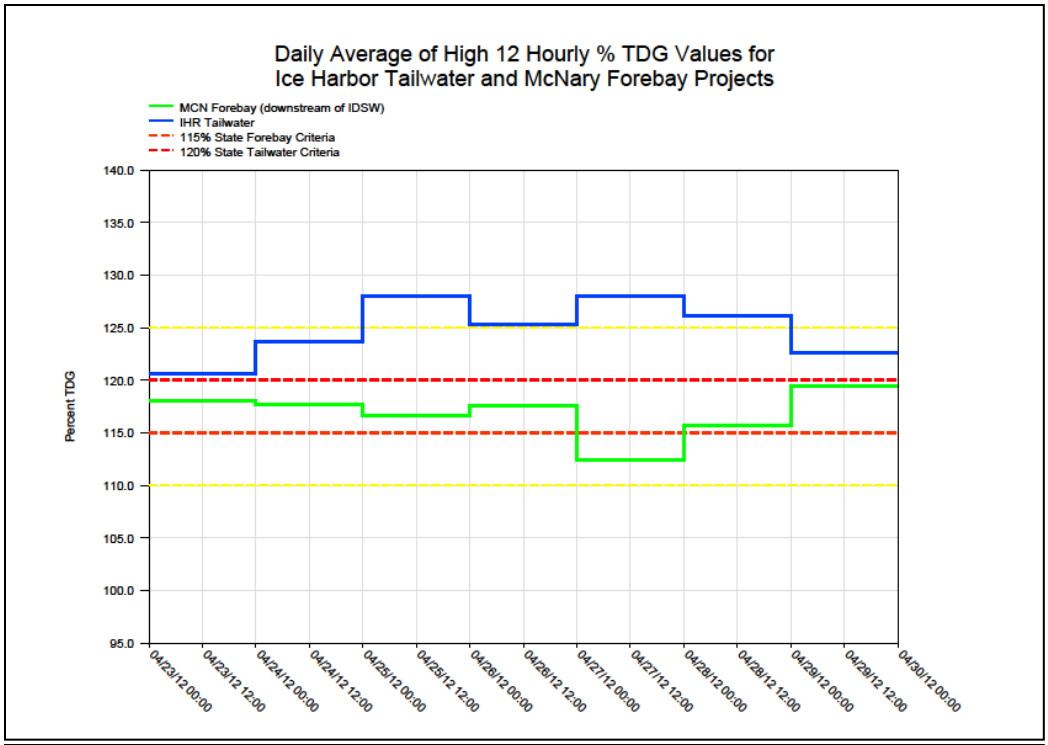

LOWER MONUMENTAL DAM - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/23/12 01:00
04/23/12 13:00
04/24/12 01:00
04/24/12 13:00
04/25/12 01:00
04/25/12 13:00
04/26/12 01:00
04/26/12 13:00
04/27/12 01:00
04/27/12 13:00
04/28/12 01:00
04/28/12 13:00
04/29/12 01:00
04/29/12 13:00
04/30/12 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
Spill Cap

Figure 24


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/23/12 00:00
04/23/12 12:00
04/24/12 00:00
04/24/12 12:00
04/25/12 00:00
04/25/12 12:00
04/26/12 00:00
04/26/12 12:00
04/27/12 00:00
04/27/12 12:00
04/28/12 00:00
04/28/12 12:00
04/29/12 00:00
04/29/12 12:00
04/30/12 00:00

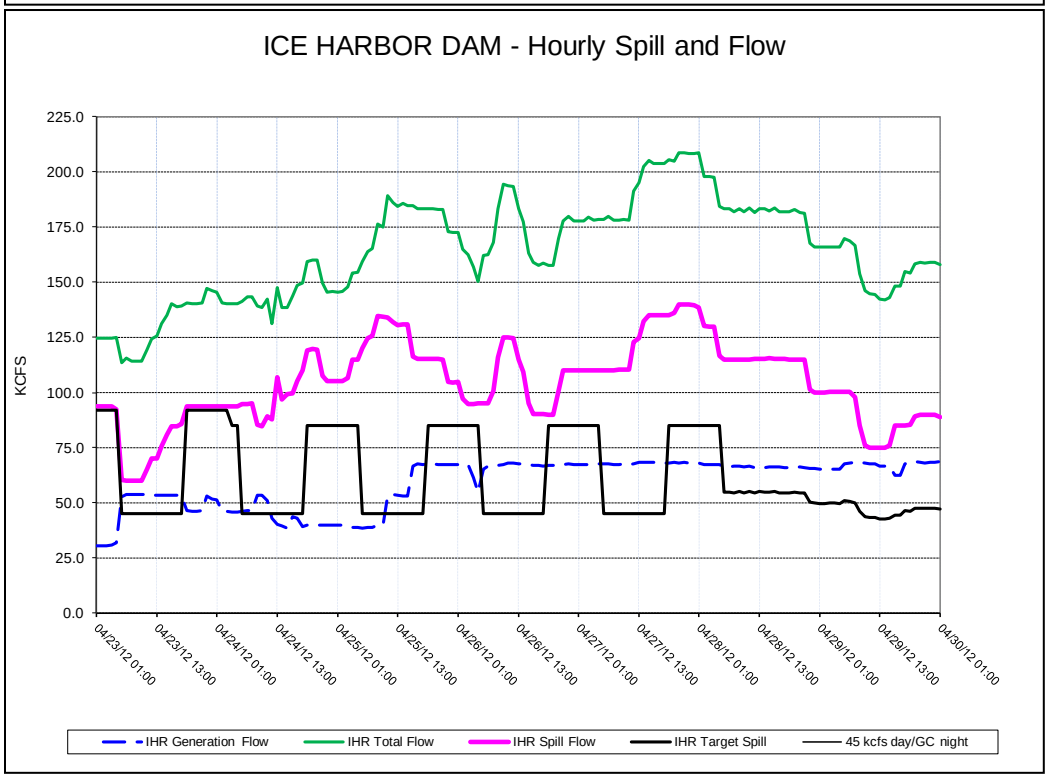
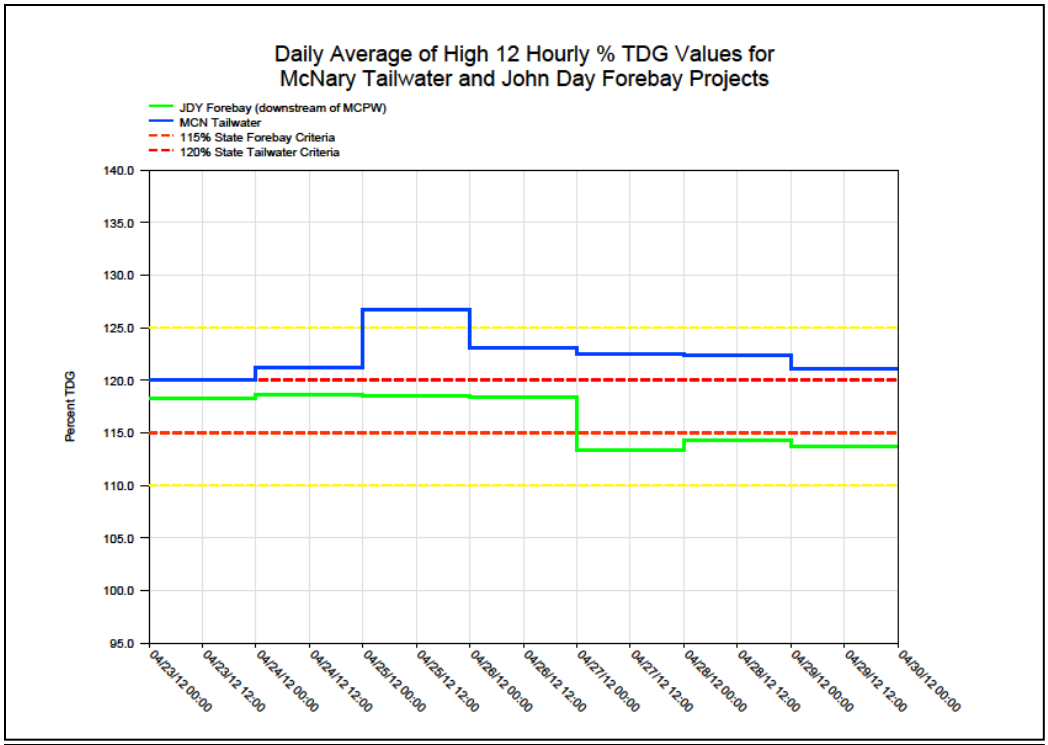

ICE HARBOR DAM - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/23/12 01:00
04/23/12 13:00
04/24/12 01:00
04/24/12 13:00
04/25/12 01:00
04/25/12 13:00
04/26/12 01:00
04/26/12 13:00
04/27/12 01:00
04/27/12 13:00
04/28/12 01:00
04/28/12 13:00
04/29/12 01:00
04/29/12 13:00
04/30/12 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
45 kcfs day/GC night

Figure 25


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/23/12 00:00
04/23/12 12:00
04/24/12 00:00
04/24/12 12:00
04/25/12 00:00
04/25/12 12:00
04/26/12 00:00
04/26/12 12:00
04/27/12 00:00
04/27/12 12:00
04/28/12 00:00
04/28/12 12:00
04/29/12 00:00
04/29/12 12:00
04/30/12 00:00

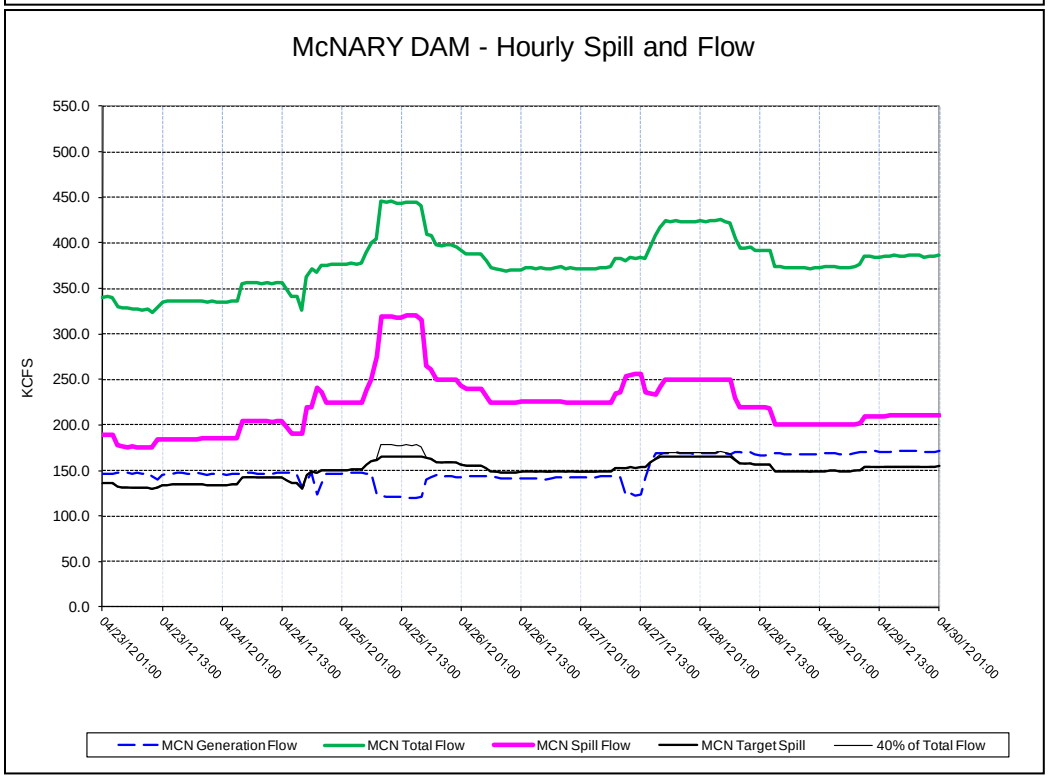
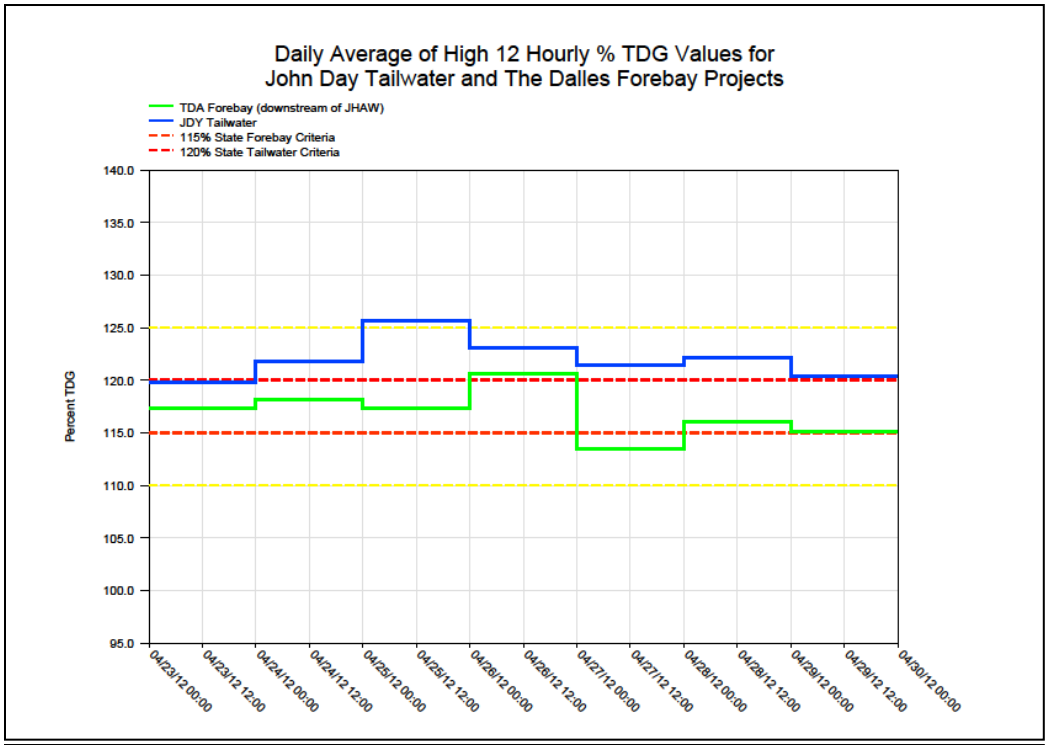

McNARY DAM - Hourly Spill and Flow
KCFS
550.0
500.0
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/23/12 01:00
04/23/12 13:00
04/24/12 01:00
04/24/12 13:00
04/25/12 01:00
04/25/12 13:00
04/26/12 01:00
04/26/12 13:00
04/27/12 01:00
04/27/12 13:00
04/28/12 01:00
04/28/12 13:00
04/29/12 01:00
04/29/12 13:00
04/30/12 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
40% of Total Flow

Figure 26


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/23/12 00:00
04/23/12 12:00
04/24/12 00:00
04/24/12 12:00
04/25/12 00:00
04/25/12 12:00
04/26/12 00:00
04/26/12 12:00
04/27/12 00:00
04/27/12 12:00
04/28/12 00:00
04/28/12 12:00
04/29/12 00:00
04/29/12 12:00
04/30/12 00:00

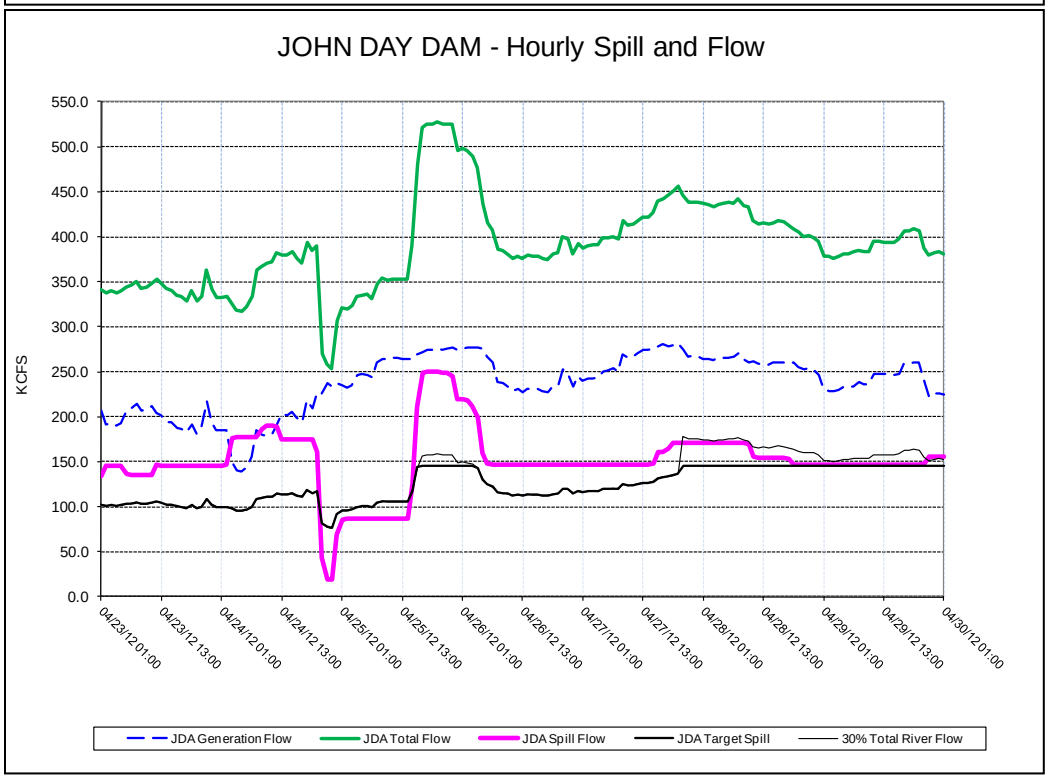
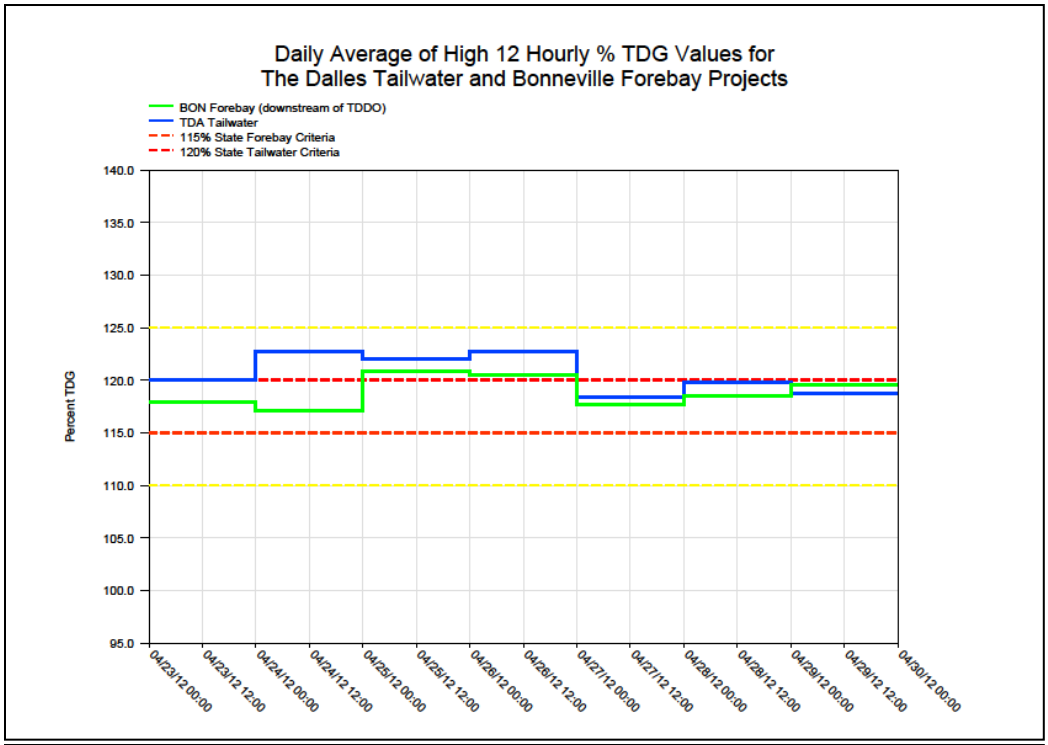

JOHN DAY DAM - Hourly Spill and Flow
KCFS
550.0
500.0
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/23/12 01:00
04/23/12 13:00
04/24/12 01:00
04/24/12 13:00
04/25/12 01:00
04/25/12 13:00
04/26/12 01:00
04/26/12 13:00
04/27/12 01:00
04/27/12 13:00
04/28/12 01:00
04/28/12 13:00
04/29/12 01:00
04/29/12 13:00
04/30/12 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% Total River Flow

Figure 27


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/23/12 00:00
04/23/12 12:00
04/24/12 00:00
04/24/12 12:00
04/25/12 00:00
04/25/12 12:00
04/26/12 00:00
04/26/12 12:00
04/27/12 00:00
04/27/12 12:00
04/28/12 00:00
04/28/12 12:00
04/29/12 00:00
04/29/12 12:00
04/30/12 00:00

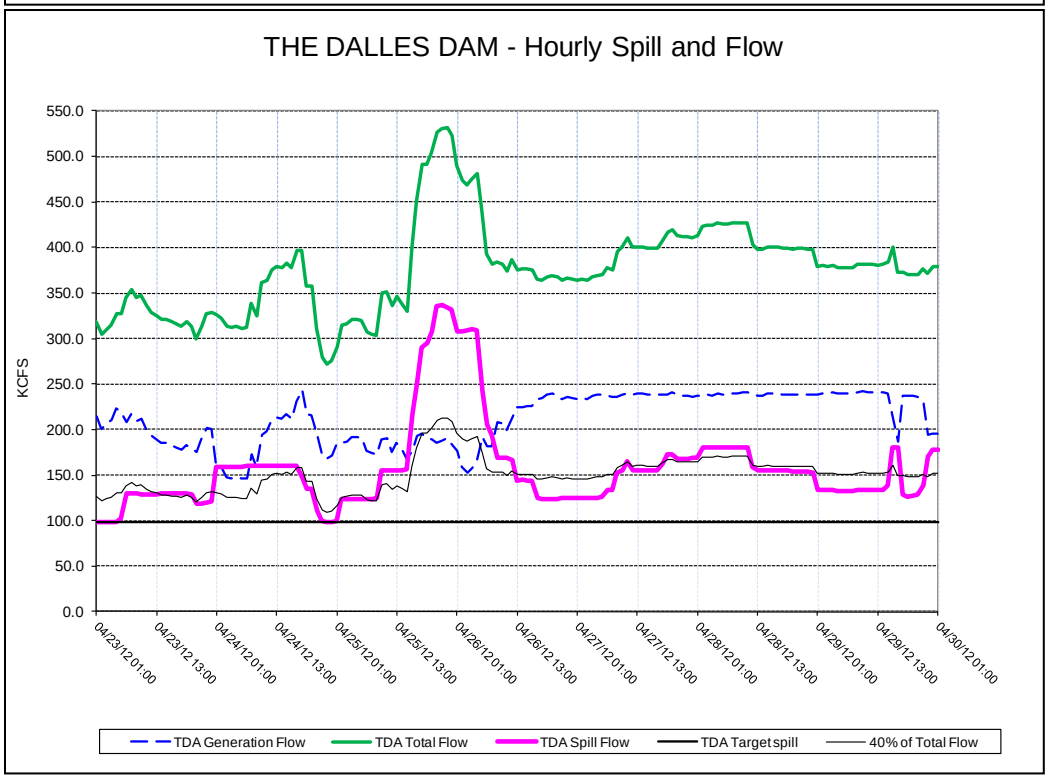
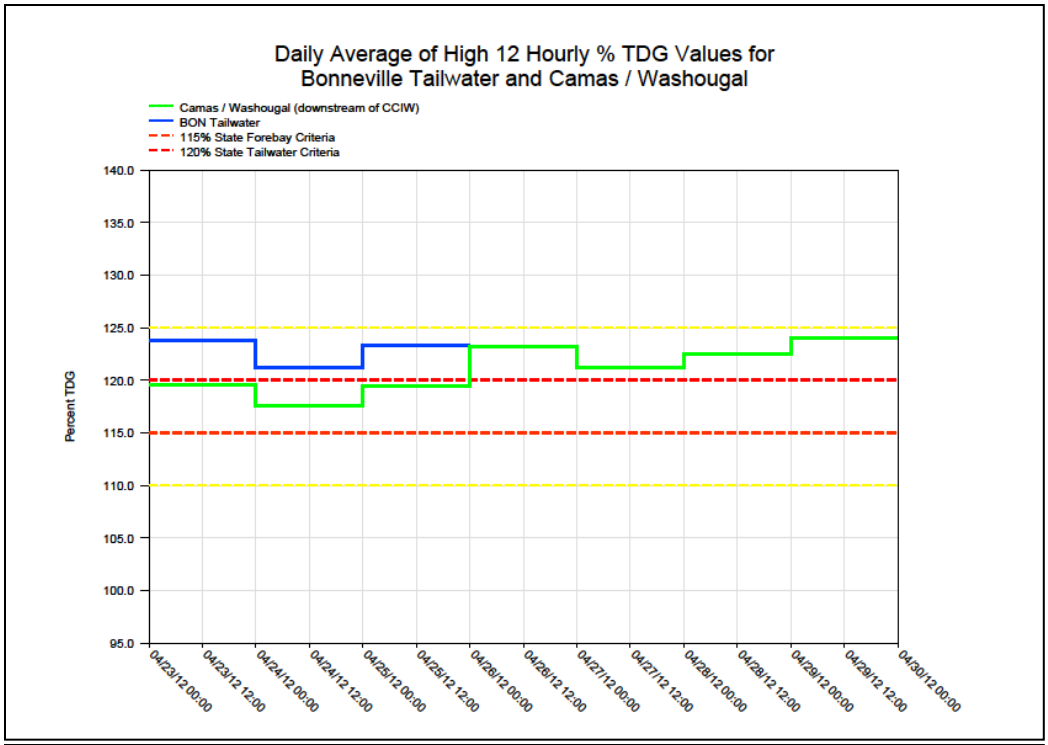
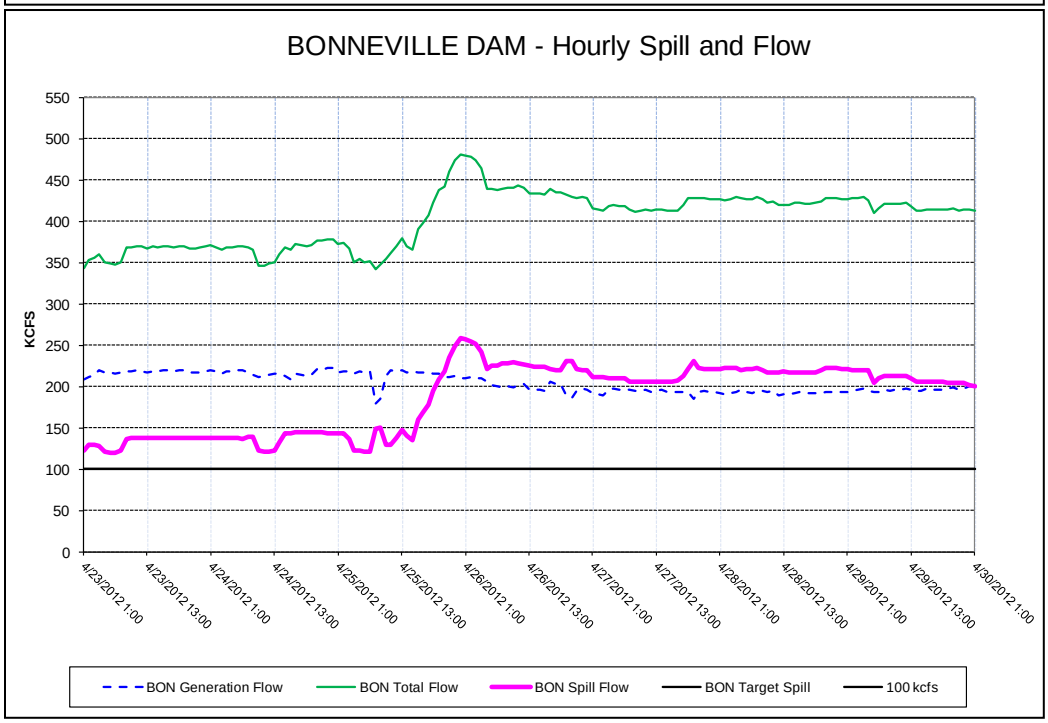

THE DALLES DAM - Hourly Spill and Flow
KCFS
550.0
500.0
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/23/12 01:00
04/23/12 13:00
04/24/12 01:00
04/24/12 13:00
04/25/12 01:00
04/25/12 13:00
04/26/12 01:00
04/26/12 13:00
04/27/12 01:00
04/27/12 13:00
04/28/12 01:00
04/28/12 13:00
04/29/12 01:00
04/29/12 13:00
04/30/12 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 28


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/23/12 00:00
04/23/12 12:00
04/24/12 00:00
04/24/12 12:00
04/25/12 00:00
04/25/12 12:00
04/26/12 00:00
04/26/12 12:00
04/27/12 00:00
04/27/12 12:00
04/28/12 00:00
04/28/12 12:00
04/29/12 00:00
04/29/12 12:00
04/30/12 00:00


BONNEVILLE DAM - Hourly Spill and Flow
KCFS
550
500
450
400
350
300
250
200
150
100
50
0
4/23/2012 1:00
4/23/2012 13:00
4/24/2012 1:00
4/24/2012 13:00
4/25/2012 1:00
4/25/2012 13:00
4/26/2012 1:00
4/26/2012 13:00
4/27/2012 1:00
4/27/2012 13:00
4/28/2012 1:00
4/28/2012 13:00
4/29/2012 1:00
4/29/2012 13:00
4/30/2012 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
100 kcfs

Average Percent TDG for Highest 12-Hours: April 1 – April 29, 2012

Date	FIXED MONITORING STATIONS																
	LWG	LGNW	LGSA	LGSW	LMNA	LMNW	IHRA	IDSW	MCNA	MCPW	JDY	JHAW	TDA	TDDO	BON	CCIW	CWMW
Gas Cap %	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115
4/1/2012	102.4	115.9	107	113.3	109	118.8	107.9	119.2	106.7	**122.5**	107.5	**120.7**	112.3	116	112	**120.1**	111.5
4/2/2012	100.6	111.4	105.6	111.8	106.9	**120.7**	110.3	119.1	107.1	**121**	106.9	**121.8**	**119**	120.9	**115.4**	**121.5**	113.2
4/3/2012	104.5	114.3	108.2	117.7	112	119.9	112.4	119.4	108.3	**120.6**	108.1	**122.2**	**121.1**	123.3	**119.6**	**121.4**	**117**
4/4/2012	105.2	109.9	109	113.5	109.6	119.1	113.2	119	108.2	120	109.3	**122.3**	**118.1**	120.1	**120**	**123.6**	**118**
4/5/2012	103.9	109.6	106.7	113	112	118.8	110.9	118.6	109.2	119.1	111.2	**120.7**	**118.7**	120.6	**116.5**	117.6	**116.8**
4/6/2012	103.2	109.1	106	113.1	110.5	118.4	111.9	118.9	109.6	**120.2**	111	**120.7**	**115.6**	118.1	**116.7**	118.8	**115.3**
4/7/2012	104.6	111.8	106.2	113	111.3	118.8	112.5	118.4	109.9	**120.7**	109.7	**120.7**	114.9	117.6	**116.7**	**121.3**	**115.3**
4/8/2012	105.9	110.2	106.9	112.4	112.5	119.2	113.7	118.4	112	119.3	110.6	**120.9**	115	120.3	**116.8**	119.3	114.7
4/9/2012	107.5	111	108.5	113	113.3	119.2	115	118.8	113.9	119.9	112.8	120	**116.6**	119	**119.9**	118	**116.6**
4/10/2012	108.1	110.7	111.1	114.1	113.5	119.6	**116.5**	118.9	114.9	117.8	**115.4**	**120.1**	114.6	119.1	**119.6**	118.7	**118**
4/11/2012	108.3	111.1	111.9	114.2	114.3	119.5	**116.8**	119.4	**115.3**	118.4	**116.6**	116.8	113.4	118	**116.4**	**121.1**	**116.8**
4/12/2012	106.9	113	110.6	114.4	113.2	119.7	114.8	119.6	114	117.6	**115.5**	116.9	113.7	118	**115.8**	**121.2**	**116.1**
4/13/2012	106	113.1	110	115	113.8	119.4	114.7	119.8	113.2	118.4	**115.4**	117.1	114	117.9	**116.4**	**120.8**	**115.8**
4/14/2012	105.4	115.3	110.8	116.4	114.3	119.5	114.8	119.4	113.8	117.9	114.1	118.2	112.4	117.6	**115.4**	119.3	**115.1**
4/15/2012	104.7	114	109.3	114.8	113.2	118.7	114.7	119.1	113.8	117.7	112.1	117.6	113.2	116.8	113.7	119.6	114.1
4/16/2012	105.1	110.7	108.8	113.7	**115.6**	119.7	114.8	118.9	113.6	117.4	112.7	115.8	112.7	117.2	**115.3**	119.6	113.9
4/17/2012	105.2	110.3	109.7	113.9	112.4	118.7	114.3	119.2	112.5	117.4	112.8	116.1	112.3	116.5	**115.2**	120	114.6
4/18/2012	105.1	110.6	106.9	113.9	113.3	119.2	114.9	119.7	112.5	117.6	113.7	117.3	112.6	117	**115.9**	119.7	115.3
4/19/2012	105.5	113.6	106.2	114.8	112.7	118.7	114.3	119.7	113.6	117.5	113.5	117.9	113.8	116.9	**115.7**	118.7	114.1
4/20/2012	105.5	113.2	106.2	115.9	113.1	119.2	114.2	119.7	113.3	118.1	113.5	118.1	114.5	118	**115.5**	118.7	114.6
4/21/2012	105.6	110.8	108.6	114.3	114.8	119.4	114.7	119.8	114.2	118.2	114.8	118	114.3	116.7	**117.6**	119	**117**
4/22/2012	106.3	113.8	109.1	115.2	**115.8**	119.8	**117**	119.9	**117.6**	119.3	**116.1**	118.5	**115.2**	117.3	**117.7**	**121.1**	**118.2**
4/23/2012	106.8	117.7	109	116.3	**116.2**	**120.4**	**117.7**	**120.6**	**118**	120	**118.3**	119.7	**117.3**	120	**118**	**123.9**	**119.5**
4/24/2012	106.2	**123.4**	110.5	**123.1**	**116.5**	**125.4**	**117**	**123.6**	**117.7**	**121.2**	**118.6**	**121.8**	**118.2**	**122.7**	**117.1**	**121.3**	**117.6**
4/25/2012	105.4	**127.2**	114.2	**125.9**	**124.2**	**125.8**	**120.5**	**128**	**116.7**	**126.8**	**118.5**	**125.7**	**117.4**	**122**	**120.9**	**123.4**	**119.5**
4/26/2012	105.9	**126.6**	**117.7**	**123.3**	**127.4**	**124.1**	**122.4**	**125.3**	**117.6**	**123.1**	**118.3**	**123.1**	**120.6**	**122.7**	**120.5**	117.1	**123.2**
4/27/2012	103.2	**130.6**	113.6	**126.2**	**118.5**	**126.2**	**117**	**128**	112.4	**122.5**	113.3	**121.4**	113.5	118.4	**117.7**	---	**121.2**
4/28/2012	105.5	**128.8**	**118.1**	**123.8**	**124.1**	**123.4**	**120.8**	**126.1**	**115.7**	**122.4**	114.3	**122.1**	**116.1**	119.8	**118.5**	---	**122.5**
4/29/2012	107.7	**122.7**	**121.4**	119.9	**124.1**	**121.2**	**122**	**122.6**	**119.5**	**121**	113.7	**120.4**	**115.1**	118.7	**119.5**	---	**124**

--- denotes missing data due to gauge malfunctioning.

Generated: Tue May 1 13:27:32 2012

Number of hours of data used:

OR: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Red text denotes exceedances.

• indicates no data due to malfunctioning gauge

- indicates gauge is out of service for winter

Dates run from hour 1 to 24 (not 0 to 23).

The gas caps shown only apply when spilling to facilitate juvenile fish passage ("voluntary spill") between April 3rd and August 31st. At all other times, the gas cap is 110%.

Total Dissolved Gas Monitoring Stations

Code	Station Name
LWG	Lower Granite Forebay
LGNW	Lower Granite Tailwater
LGSA	Little Goose Forebay
LGSW	Little Goose Tailwater
LMNA	Lower Monumental Forebay
LMNW	Lower Monumental Tailwater
IHRA	Ice Harbor Forebay
IDSW	Ice Harbor Tailwater
MCNA	McNary Forebay
MCPW	McNary Tailwater
JDY	John Day Forebay
JHAW	John Day Tailwater
TDA	The Dalles Forebay
TDDO	The Dalles Tailwater
BON	Bonneville Forebay
CCIW	Bonneville Tailwater (Cascade Island)
CWMW	Camas / Washougal

FISH OPERATIONS PLAN IMPLEMENTATION REPORT
May 2012

Submitted by the U.S. Army Corps of Engineers
Northwestern Division
Portland, OR

Introduction:

The U.S. Army Corps of Engineers (Corps) is submitting this report in accordance with the 2012 Fish Operations Plan (2012 FOP) submitted to the U.S. District Court of Oregon on March 9, 2012. The 2012 FOP describes the Corps' project operations for fish passage at its Federal Columbia River Power System (FCRPS) dams during the fish migration season, generally April through August. To the extent Corps project operations are not specified in the 2012 FOP, the FCRPS operations will be consistent with the 2010 NOAA Fisheries Supplemental Biological Opinion (2010 Supplemental BiOp), the USFWS 2000 and 2006 BiOps, and/or other operative documents, including the 2012 Water Management Plan (WMP), WMP seasonal updates, and the 2012 Fish Passage Plan (FPP).

The Corps' May 2012 lower Snake and Columbia River project and fish passage operations are contained in this report. In particular, information in this report includes the following:

- hourly flow through the powerhouse at each dam;
- hourly flow over the spillway compared to the spill target for that hour; and,
- resultant high 12-hour average percent Total Dissolved Gas (%TDG) levels in the tailrace at each project and in the subsequent downstream project's forebay and the Camas-Washougal gauge below Bonneville Dam.

This report also provides information on presented issues and unanticipated or emergency situations that arose during implementation of the 2012 FOP in May.

Data Reporting:

I. For each project providing fish passage operations, this report contains two graphs per operational week[1] in May displaying the performance of the spill program as follows:

(A). Daily Average of the High 12 Hourly %TDG Values - described in the upper graph.
(B). Hourly Spill and Generation Flows - described in the lower graph[2].

The weekly graphs begin on April 30 and end on May 27 for the following lower Snake River and lower Columbia River projects: Lower Granite, Little Goose, Lower Monumental, Ice Harbor, McNary, John Day, The Dalles, and Bonneville.

[1] Operations are implemented from Monday through Sunday.
[2] To adequately display high flows levels, it was necessary to extend the vertical axis on the graphs through May 28.

Each figure represents one week of a project's operation. The graphs start at 0000 hours (%TDG graphs) and 0100 hours (flow/spill graphs) on April 30 for the lower Snake River and the lower Columbia River projects.

April 30 – May 6	Figures 1 – 8
May 7 – May 13	Figures 9 – 16
May 14 – May 20	Figures 17 – 24
May 21 – May 27	Figures 25 – 32

A. Upper Graph: Shows the resultant daily average %TDG for the 12 highest hours. This is primarily a result of spill at dams. The objective is to operate each project up to the TDG limits without exceeding those limits to the extent practicable.

- The blue line represents the %TDG in the tailrace of the dam. 120 percent TDG is the upper operating limit[3].
- The green line represents the %TDG in the forebay of the next dam downstream. 115 percent TDG is the upper operating limit.

B. Lower Graph: Shows the hourly flow and spill at the dam.

- The dotted blue line shows the flow through the powerhouse each hour, in thousand cubic feet per second (kcfs).
- The medium green line represents the average hourly total river flow through the project in kcfs.
- The heavy pink line represents the average hourly flow through the spillway in kcfs.
- The thin black line represents the hourly spill level as defined in the 2012 FOP.
- The heavy black line represents the target spill. This is the hourly maximum spill level. The hourly target spill may vary as a function of total river flow, forebay elevation and generator capacity, subject to the following conditions:

    - spill percentage or flow rate specified in the 2012 FOP;
    - spill caps as set daily for TDG management;
    - test spill levels for fish passage research;
    - minimum generation for power system needs;
    - minimum spill at Bonneville (50 kcfs) dam;
    - minimum spill at John Day is 25 percent of project outflow.

II. A table is included at the end of the figures that lists the average daily %TDG for the 12 highest hours for all projects. The numbers in red indicate the project exceeded the %TDG gas cap - 115 percent (forebay of the next downstream dam) or 120 percent (tailwater) for each project.

[3] On April 25 at 2300, the Bonneville tailwater TDG gauge was overcome with water and was no longer operable. In the interim, the Corps is setting the spill caps using the SYSTDG model and/or an analog to calculate the Bonneville tailwater %TDG levels using the Warrendale TDG readings.

General Implementation Remarks:

For all projects that spill for fish passage, the target spill may be reduced due to various conditions as described below. When spill levels briefly deviate below or above the level specified in the 2012 FOP, the heavy pink line will be below or above the heavy black line in the graphs. Actual operation deviations from the target operation during voluntary spill hours are described below. The May 2012 Spill Variance Table includes average hourly data; therefore, while spill may vary from target spill for only a portion of an hour, the May 2012 Spill Variance Table characterizes the reduction as a full hour. There are instances when the hourly spill levels are not achievable due to mechanical limitations in setting spill gates to implement the regionally coordinated spill pattern. The project operator sets the spill gate stops to most closely approximate the 2012 FOP level of spill while also avoiding exceeding the %TDG spill cap to the extent practicable.

"Low flow" operations at the lower Columbia and Snake projects are triggered when inflow is insufficient to provide both minimum generation and the specified spill levels. In these situations, the projects operate at minimum generation and pass the remainder of project inflow as spill and through other miscellaneous routes, such as fish ladders, sluiceways, and navigation locks. As flows transition from higher flows to low flows, there may be situations when flows recede at a higher rate than forecasted. In addition, inflows provided by nonfederal projects upstream are variable and uncertain.

The combination of these factors may result in instances when unanticipated changes to inflow result in forebay elevations dropping to the low end of the Minimum Operating Pool (MOP). Since these projects have limited operating flexibility, maintaining minimum generation, MOP elevation, and the target spill may not be possible throughout every hour. During low flow periods at Little Goose Dam, the overall project spill percentage appears to be reduced because the calculations do not account for the volume of water released during navigational lockages; however, the actual spill volume remains constant. When these variances occur, they are recorded in the monthly Spill Variance Table for Little Goose under the variance type "Navigation."

Actual spill levels at Corps projects with set flow targets may vary up to ±2 kcfs (Bonneville Dam may range up to ±3 kcfs, 2012 FOP p. 19) compared to those specified in the 2012 FOP and the RCC spill priority list (defines the projects' %TDG spill caps). A number of factors influence actual spill, including hydraulic efficiency, exact gate opening calibration, spillway gate hoist cable stretch due to temperature changes, and forebay elevation (e.g. a higher forebay results in a greater volume of spill since more water can pass under the spill gate).

The 2012 FOP describes project "Operations during Rapid Load Changes" (p. 6). For reporting purposes, the notation "Transmission Stability" in the Spill Variance Report Table replaces "Rapid Load Changes," and identifies instances when hourly spill levels were not met as a result of load swing hours and other related within-hour load variability issues. "Transmission Stability" occurs because projects must be available to respond to within-hour load variability to satisfy North American Electric Reliability Corporation (NERC) reserve requirements ("on response"). In addition to within-hour load variability, projects on response must be responsive

to within hour changes resulting from intermittent generation (such as wind generation). During periods of rapidly changing loads and intermittent generation, projects on response may have significant changes in turbine discharge within the hour while spill quantity remains the same within the hour. Under normal conditions, within-hour load changes primarily occur immediately preceding and following the peak load hours; however, within-hour changes in intermittent generation can occur at any hour of the day. Occasionally, several hours after peak load hours, the project may be decreasing total outflow and generation faster than the corresponding spill decreases causing the percent spill to be slightly higher. Due to the high variability of within-hour load, reporting actual spill percentages that vary by more than the ±1 percent requirement (or other ranges specified in the 2012 FOP) may occur with greater frequency with "Transmission Stability" hours than other hours.

Occurrences requiring an adjustment in operations and/or regional coordination are described in greater detail in the "Operational Adjustments" section below.

May Operations:

The month of May was characterized by above average flows for the lower Snake and the lower Columbia Rivers. The NOAA Northwest River Forecast Center's Runoff Processor indicated May 2012 adjusted volume runoff was above the 30 year average (1971-2000): 29.2 MAF (million acre feet) or 109 percent as measured at The Dalles. The Runoff Processor also indicated May 2012 adjusted runoff was above the 30 year average (1971-2000): 7.6 MAF or 103 percent of average as measured at Lower Granite Dam. The monthly precipitation summary for May was slightly below average: 84 percent on the Snake above Ice Harbor Dam, and 79 percent on the Columbia above The Dalles Dam.

The high runoff flows resulted in instances of involuntary spill due to lack of turbine capacity throughout the month. In some of these instances of involuntary spill, the resulting Daily Average of High 12 Hourly %TDG values exceeded the 115 percent forebay and 120 percent tailrace standards[4] as shown in the corresponding %TDG graphs for the lower Columbia and Snake rivers.

In accordance with the 2012 FOP, spring spill operations commenced on April 3 at 0001 hours at the Corps' lower Snake projects and on April 10 at 0001 hours at the lower Columbia projects. During the May reporting period, planned spill operations according to the 2012 FOP were as follows:

- Lower Granite Dam - The hourly target spill discharge was 20 kcfs 24-hours/day.
- Little Goose Dam - The hourly target spill discharge was 30 percent of total river discharge 24-hours/day.
- Lower Monumental Dam - The hourly target spill flow rate was the %TDG gas cap 24-hours/day.

[4] As provided for in the 2012 FOP (see p. 2-3).

- Ice Harbor Dam - The hourly target spill alternated every two days between 30 percent of total river flow rate for 24-hours/day vs. 45 kcfs daytime and the %TDG gas cap nighttime. Nighttime spill hours are 1800-0500.
- McNary Dam - The hourly target spill flow rate was 40 percent of total river flow for 24-hours/day.
- John Day Dam - The hourly target spill alternated between 40 percent and 30 percent of total river flow rate for 24-hours/day due to the two-day treatment spring spill test. Spill level changes occurred at 2000 hours.
- The Dalles Dam - The hourly target spill flow rate was 40 percent of total river flow for 24-hours/day.
- Bonneville Dam - The hourly target spill flow rate was 100 kcfs 24-hours/day.

Operational Adjustments

1. Lower Granite Dam:

On May 15 at 2345 hours, an adult steelhead kelt became lodged in a juvenile salmon transportation loading pipe causing a blockage that resulted in the mortality of an estimated 100 juvenile salmon, of which an estimated 49 were ESA listed.[5] Also an estimated 100 live juvenile salmon were discovered and all fish released back to the river. The relative small size of the kelt allowed it to pass through the fish bypass separator bars that are designed to prevent adult fish from entering the juvenile loading facility. Corps staff were operating in accordance with established protocols, however, the Corps is exploring whether any additional measures are available to prevent this type of event in the future. The Corps notified the Fish Passage and Operations Maintenance (FPOM) members of this incident via email on May 18.

2. Lower Monumental Dam:

At the TMT meeting on May 2, it was recommended that the Corps continue with the uniform spill pattern during the following week to minimize elevated TDG levels in the system. The Corps agreed to implement this operation instead of shifting to the bulk spill pattern as specified in the 2012 FOP. On a subsequent conference call on May 4 with TMT representatives from NOAA Fisheries and Idaho, the operation of the project was reviewed and the Corps agreed to continue the uniform spill pattern through the weekend of May 5 because high involuntary flows and elevated TDG levels were expected to continue through the weekend. During the weekend, river flow and the resulting ambient TDG concentrations dropped off unexpectedly. Due to RCC communication errors and an expectation that high flows would continue, spill cap review was not conducted over that weekend. If the daily spill cap review had been conducted over the weekend, the Corps would have increased spill due to the observed change in river flow and ambient TDG. This resulted in approximately 48 hours of spill at 24 kcfs instead of 27 kcfs. The Idaho TMT representative notified the Corps about this oversight and the Corps took corrective action by increasing spill and changing to the bulk spill pattern. RCC notified NOAA Fisheries and Idaho of this change on May 7.

[5] These estimates are based on the "Estimation of Percentages for Listed Pacific Salmon and Steelhead Smolts Arriving at Various Locations in the Columbia River Basin 2011," NOAA Fisheries memo dated March 6, 2012.

3. The Dalles Dam:

At The Dalles, when TDG levels are elevated above the applicable state water quality standards, spill caps are set below the 40 percent spill level specified in the FOP. When this occurs, the project operator sets the spill level according to the spill cap for that particular day. On May 21, from 0700 to 1500 hours, May 26 from 1400 to 1800 hours, and May 27 from 0600 to 1000 hours, spill levels dropped below the spill cap by between 2.6 and 3.6 kcfs. On these three occasions, the forebay elevation dropped, which resulted in a reduced head that caused less flow to pass as spill than required to meet the spill cap. To correct for fluctuations in forebay elevation, the operator typically adjusts the spill level accordingly. However, on these three occasions, that action did not occur. On May 26 and 27, once forebay elevation increased, a corresponding spill level increase was observed, bringing the 24-hour average spill level for each day above the spill cap. In order to ensure that this issue is addressed in the future, a teletype was sent to the project to raise awareness of the events and provide guidance for appropriate action.

4. Bonneville Dam:

- From April 30 through May 4, May 16 through May 21, and May 23 through May 31, Bonneville Dam (BON) powerhouse one (PH1) was operated outside of the ±1 % of efficiency turbine operating range. This operation was a continuation of implementation of a System Operations Request (SOR) 2012-1 submitted by the Fish Passage Advisory Committee (FPAC) on April 13, 2012, which was issued to improve passage conditions for juvenile sockeye salmon passing through BON powerhouse two (PH2). The goal of the operation was to shift flow from PH2 to PH1 to improve juvenile passage conditions through the bypass system at PH2. This operation was coordinated and discussed during the May 2, 4, 16, and 23 TMT meetings, with members either supporting or not objecting to the operation. Another SOR (2012-2, dated May 30) was submitted to TMT to continue a similar operation. The Action Agencies agreed to continue the shift powerhouse discharges from PH2 to PH1 until Monday, June 4 at 1800 hours.

- On May 23, approximately 120 (exact number and origin unknown) juvenile Chinook salmon and steelhead mortalities occurred, which resulted from the installation of intake gates in turbine unit 6 during a routine turbine dewatering procedure. While this maintenance activity was conducted according to standard operating procedures, the Corps is investigating adding seals to the intake gates in order to prevent this type of event from happening in the future. FPOM members were notified of this incident via email on May 23.

May 2012 Spill Variance Table

Project	Parameter	Date	Time[6]	Hours	Type	Reason
Little Goose	Increased % Spill	5/7/12	2100	1	Human/Program Error	Hourly spill increased to 31.6 % (above 30% ± 1.0% range). GDACS error reporting spill rate, when discovered by operator, data was manually corrected. 24 hr avg. spill was 30.4%.
Little Goose	Reduced % Spill	5/27/12	1400	1	Navigation	Hourly spill decreased to 28.9 % (below 30% ± 1.0% range) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 29.7%.
Lower Monumental	Reduced Spill	5/6/12	1800-2000	3	Navigation	Hourly spill decreased to 19.0 kcfs (below 24 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/7/12	1800-1900	2	Navigation	Hourly spill decreased to 22.2 kcfs (below 32 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/8/12	1800-2000	3	Navigation	Hourly spill decreased to 17.4 kcfs (below 27 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/9/12	1800-1900	2	Navigation	Hourly spill decreased to 16.1 kcfs (below 27 kcfs spill cap). Reduced spill for safe passage of fish barge.

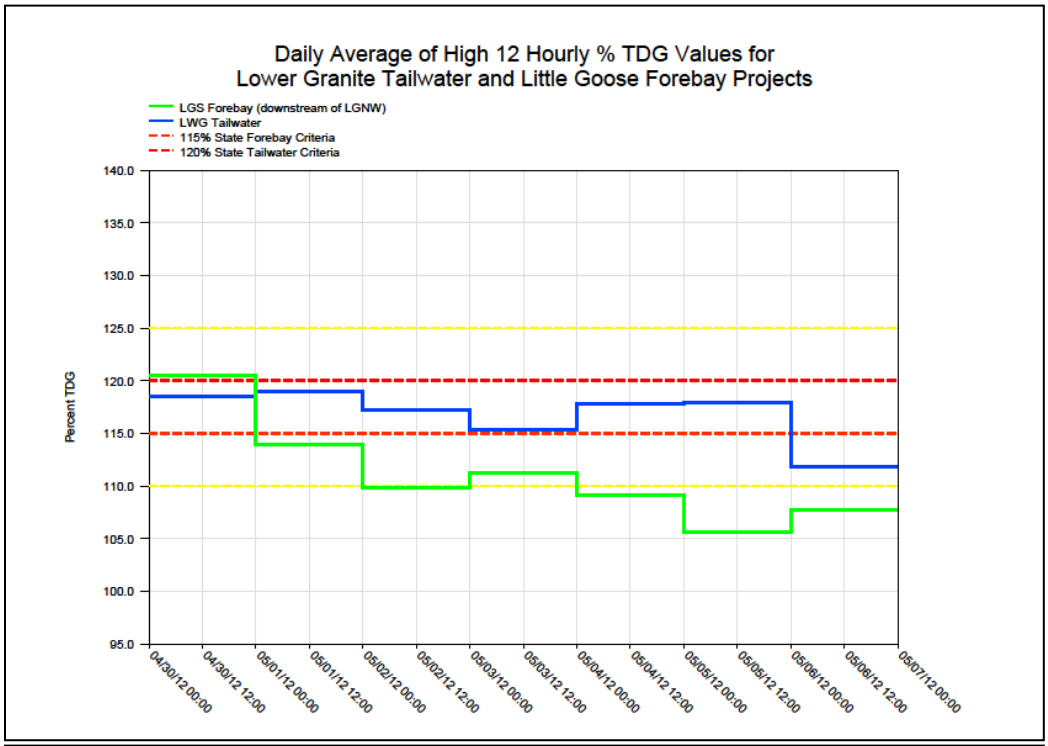
[6] Note: Data collected for reporting spill variances is reported using hourly-averaged data. Therefore, while spill may be increased or decreased for only a portion of an hour, it is represented in the Spill Variance Table as an hour.

Lower Monumental	Reduced Spill	5/10/12	1800 & 2000	2	Navigation	Hourly spill decreased to 10.6 kcfs (below 27 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/11/12	1900-2100	3	Navigation	Hourly spill decreased to 17.2 kcfs (below 26 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/12/12	1800	1	Navigation	Hourly spill decreased to 14.8 kcfs (below 26 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/13/12	1800 & 1900	2	Navigation	Hourly spill decreased to 13.4 kcfs (below 26 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/14/12	1800-2000	3	Navigation	Hourly spill decreased to 19.1 kcfs (below 24 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/15/12	1800 & 1900	2	Navigation	Hourly spill decreased to 20.0 kcfs (below 27 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/16/12	1800 & 1900	2	Navigation	Hourly spill decreased to 21.7 kcfs (below 27 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/17/12	1900	1	Navigation	Hourly spill decreased to 19.5 kcfs (below 27 kcfs spill cap). Reduced spill for safe passage of fish barge.

Lower Monumental	Reduced Spill	5/18/12	1900	1	Navigation	Hourly spill decreased to 23.2 kcfs (below 27 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/19/12	1700	1	Navigation	Hourly spill decreased to 16.6 kcfs (below 27 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/20/12	1700-1900	3	Navigation	Hourly spill decreased to 16.2 kcfs (below 27 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/21/12	1700-1900	3	Navigation	Hourly spill decreased to 17.0 kcfs (below 24 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/22/12	1800	1	Navigation	Hourly spill decreased to 16.8 kcfs (below 24 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/23/12	1800	1	Navigation	Hourly spill decreased to 18.2 kcfs (below 26 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/24/12	1800	1	Navigation	Hourly spill decreased to 15.2 kcfs (below 26 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/25/12	1800-1900	2	Navigation	Hourly spill decreased to 17.1 kcfs (below 26 kcfs spill cap). Reduced spill for safe passage of fish barge.

Lower Monumental	Reduced Spill	5/26/12	1800-1900	2	Navigation	Hourly spill decreased to 15.3 kcfs (below 26 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/27/12	1800	1	Navigation	Hourly spill decreased to 21.5 kcfs (below 27 kcfs spill cap). Reduced spill for safe passage of fish barge.
The Dalles	Reduced Spill	5/21/12	0700-1500	9	Human/Program Error	Spill fluctuated due to drop in forebay elevation. Hourly spill decreased to 97.2 kcfs (below 100 kcfs spill cap). 24-hr average spill was 98.5 kcfs.
The Dalles	Reduced Spill	5/26/12	1400-1800	5	Human/Program Error	Spill fluctuated due to drop in forebay elevation. Hourly spill decreased to 107.4 kcfs (below 110 kcfs spill cap) 24-hr average spill was 112.0 kcfs.
The Dalles	Reduced Spill	5/27/12	0600-1000	5	Human/Program Error	Spill fluctuated due to drop in forebay elevation. Hourly spill decreased to 106.4 kcfs (below 110 kcfs spill cap). 24-hr average spill was 114.4 kcfs.

Figure 1


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/30/12 00:00
04/30/12 12:00
05/01/12 00:00
05/01/12 12:00
05/02/12 00:00
05/02/12 12:00
05/03/12 00:00
05/03/12 12:00
05/04/12 00:00
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05/06/12 00:00
05/06/12 12:00
05/07/12 00:00

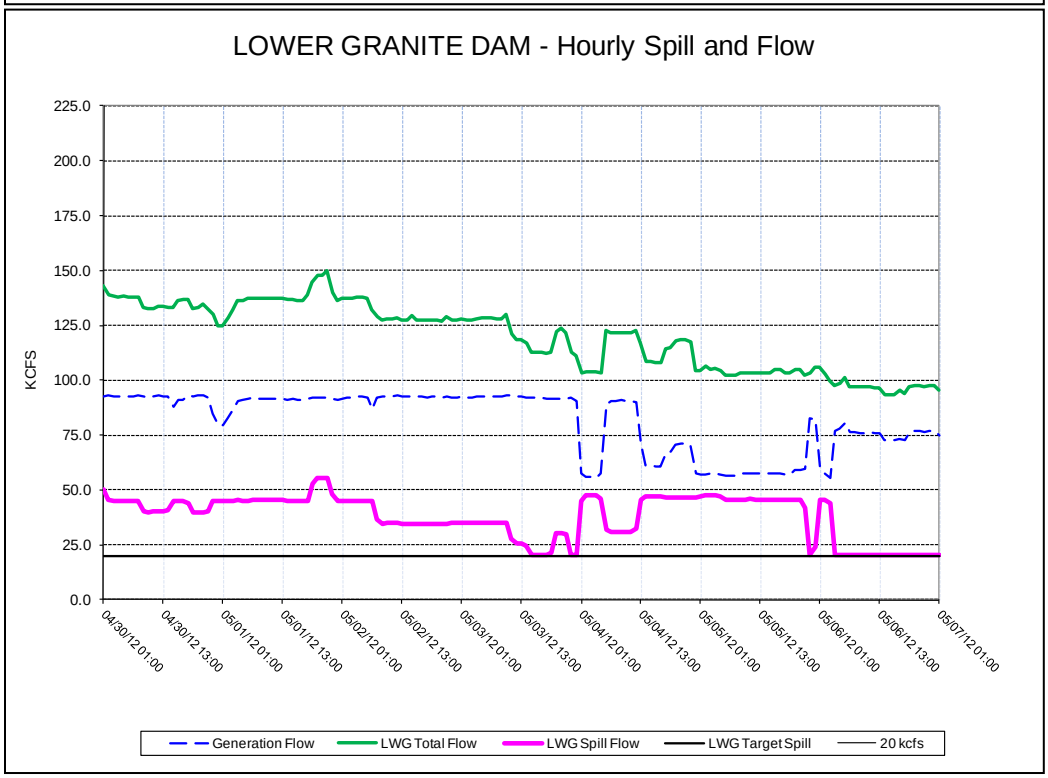
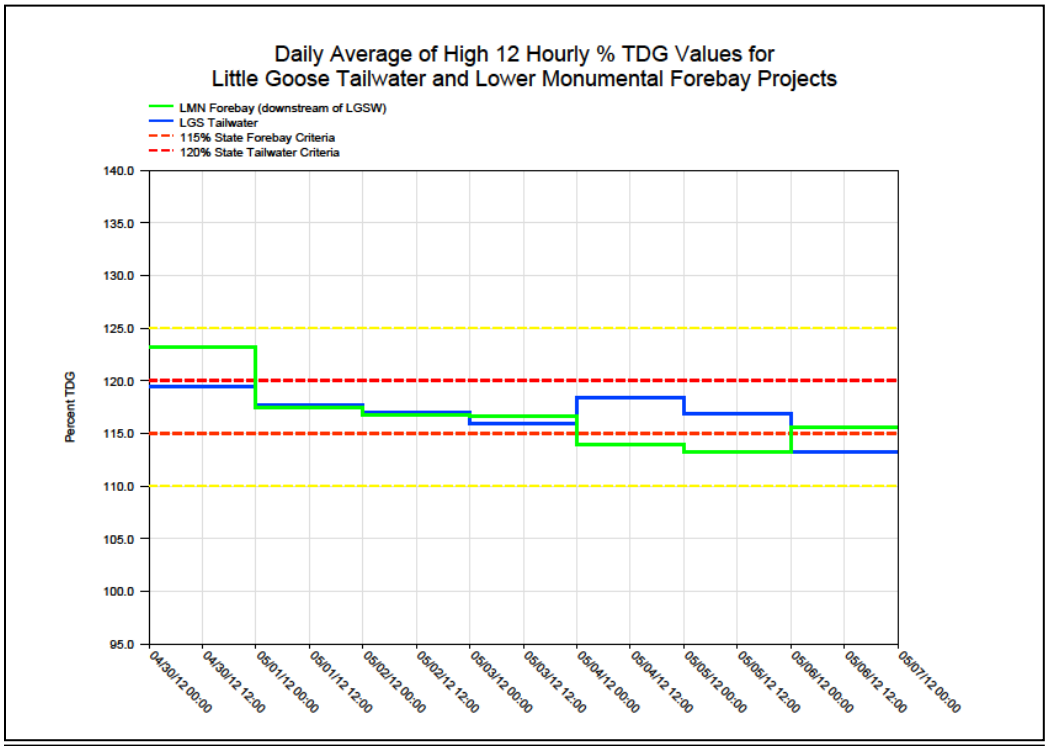

LOWER GRANITE DAM - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/30/12 01:00
04/30/12 13:00
05/01/12 01:00
05/01/12 13:00
05/02/12 01:00
05/02/12 13:00
05/03/12 01:00
05/03/12 13:00
05/04/12 01:00
05/04/12 13:00
05/05/12 01:00
05/05/12 13:00
05/06/12 01:00
05/06/12 13:00
05/07/12 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
20 kcfs

Figure 2


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/30/12 00:00
04/30/12 12:00
05/01/12 00:00
05/01/12 12:00
05/02/12 00:00
05/02/12 12:00
05/03/12 00:00
05/03/12 12:00
05/04/12 00:00
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05/06/12 00:00
05/06/12 12:00
05/07/12 00:00

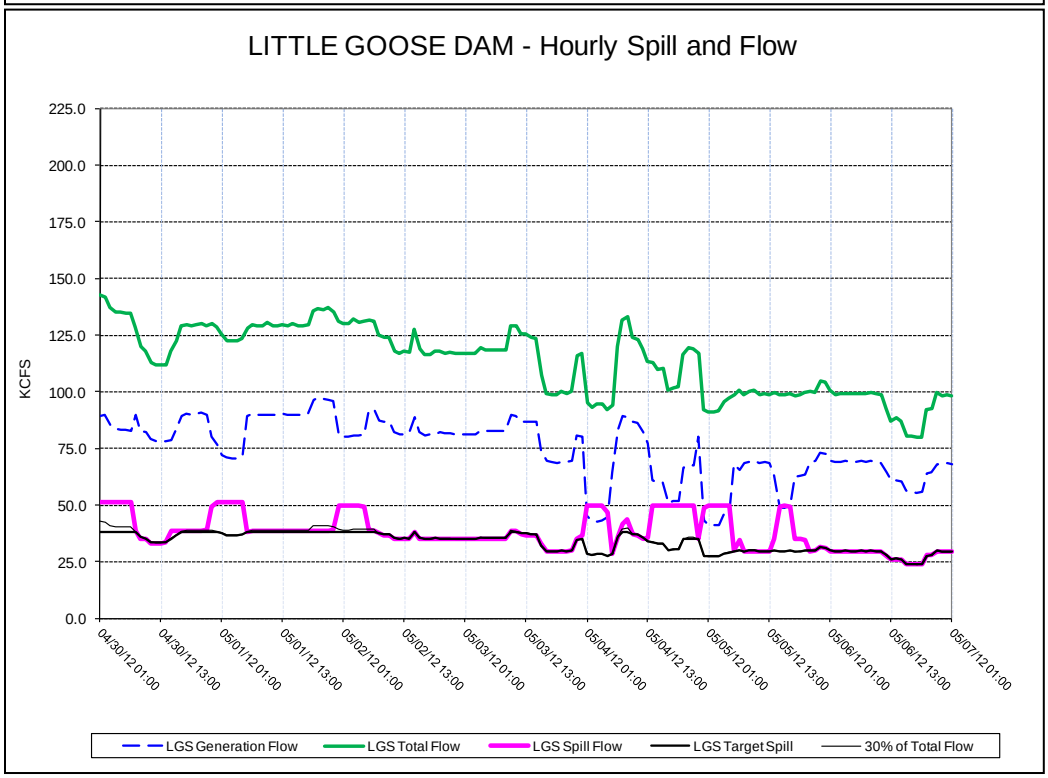

LITTLE GOOSE DAM - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/30/12 01:00
04/30/12 13:00
05/01/12 01:00
05/01/12 13:00
05/02/12 01:00
05/02/12 13:00
05/03/12 01:00
05/03/12 13:00
05/04/12 01:00
05/04/12 13:00
05/05/12 01:00
05/05/12 13:00
05/06/12 01:00
05/06/12 13:00
05/07/12 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 3

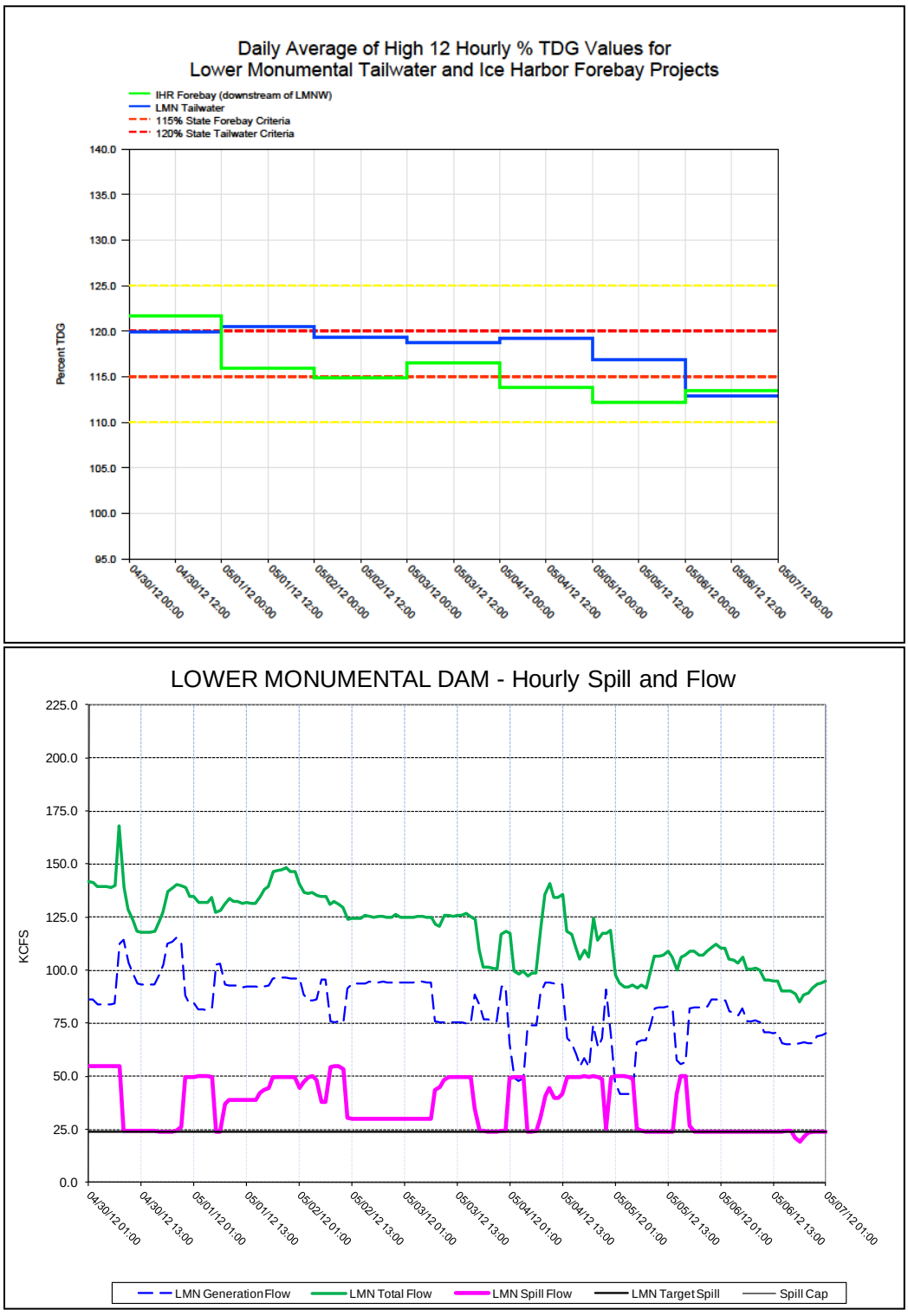
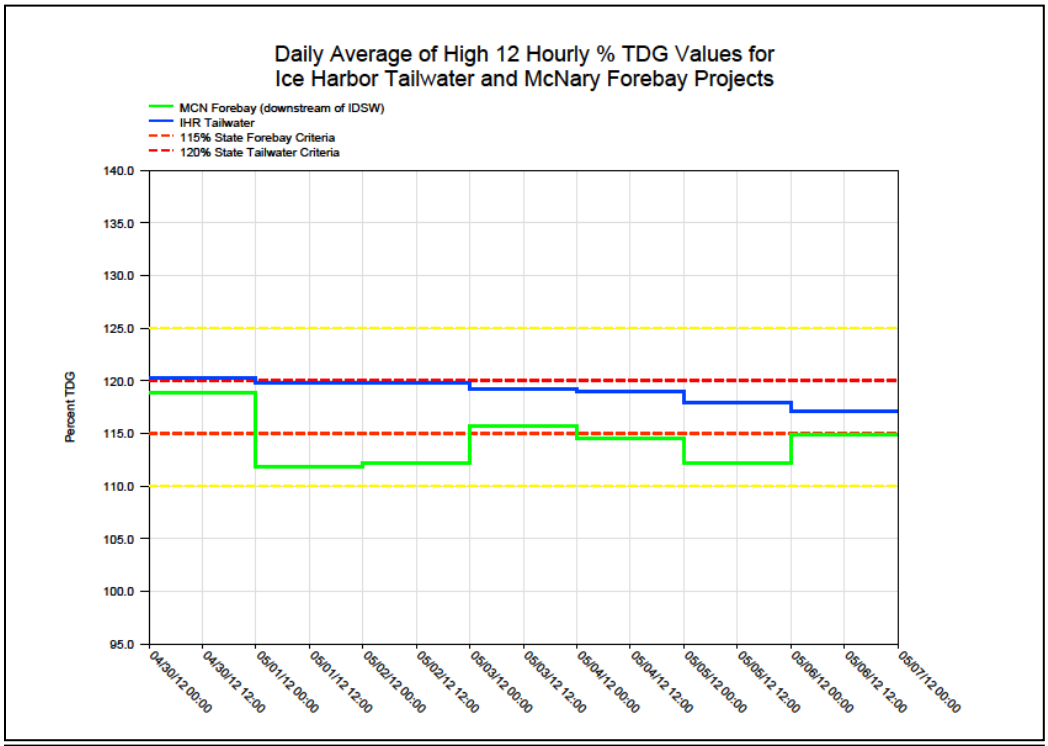

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/30/12 00:00
04/30/12 12:00
05/01/12 00:00
05/01/12 12:00
05/02/12 00:00
05/02/12 12:00
05/03/12 00:00
05/03/12 12:00
05/04/12 00:00
05/04/12 12:00
05/05/12 00:00
05/05/12 12:00
05/06/12 00:00
05/06/12 12:00
05/07/12 00:00
LOWER MONUMENTAL DAM - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/30/12 01:00
04/30/12 13:00
05/01/12 01:00
05/01/12 13:00
05/02/12 01:00
05/02/12 13:00
05/03/12 01:00
05/03/12 13:00
05/04/12 01:00
05/04/12 13:00
05/05/12 01:00
05/05/12 13:00
05/06/12 01:00
05/06/12 13:00
05/07/12 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
Spill Cap

Figure 4


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/30/12 00:00
04/30/12 12:00
05/01/12 00:00
05/01/12 12:00
05/02/12 00:00
05/02/12 12:00
05/03/12 00:00
05/03/12 12:00
05/04/12 00:00
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05/06/12 00:00
05/06/12 12:00
05/07/12 00:00

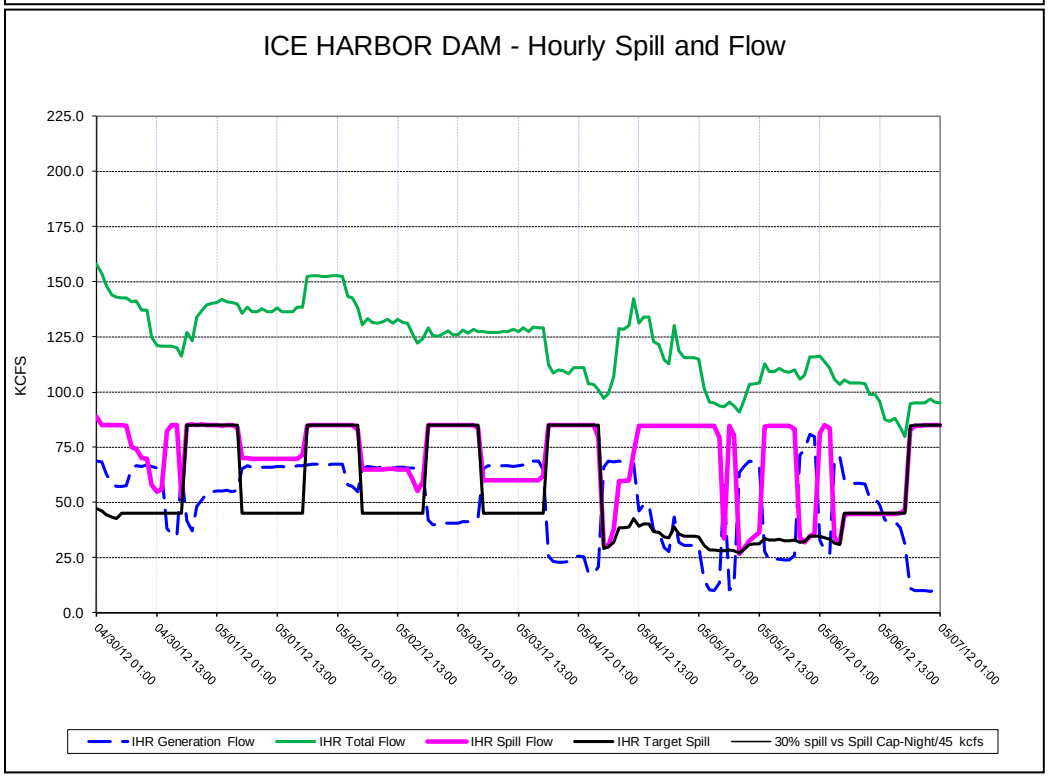
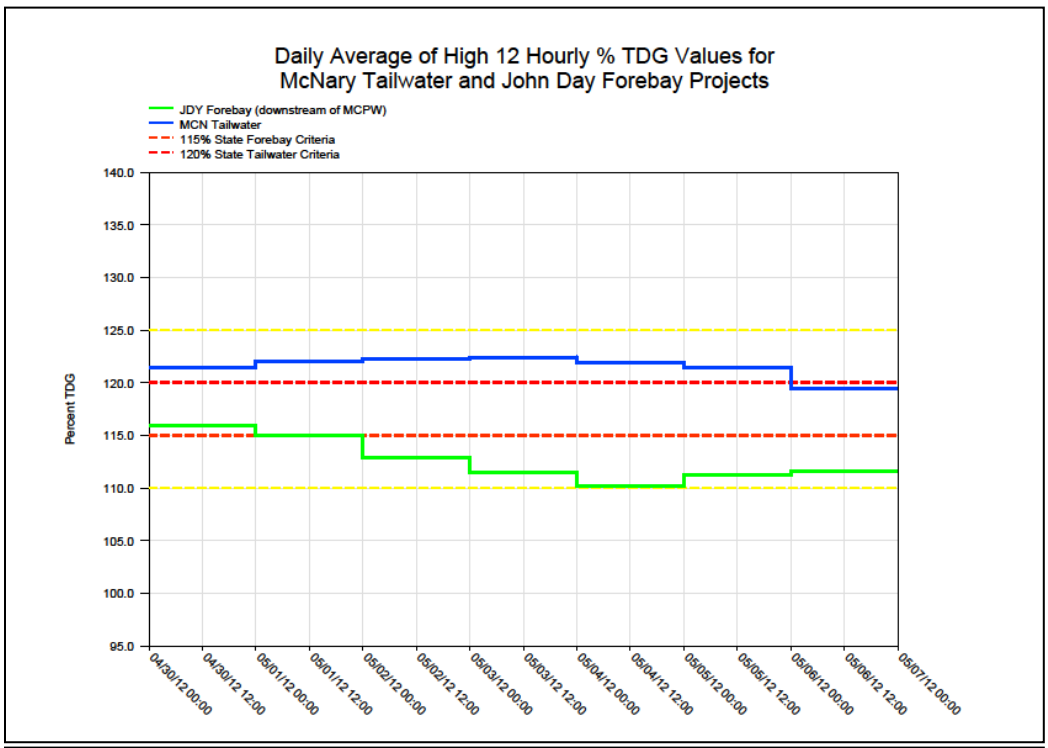

ICE HARBOR DAM - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
04/30/12 01:00
04/30/12 13:00
05/01/12 01:00
05/01/12 13:00
05/02/12 01:00
05/02/12 13:00
05/03/12 01:00
05/03/12 13:00
05/04/12 01:00
05/04/12 13:00
05/05/12 01:00
05/05/12 13:00
05/06/12 01:00
05/06/12 13:00
05/07/12 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
30% spill vs Spill Cap-Night/45 kcfs

Figure 5


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/30/12 00:00
04/30/12 12:00
05/01/12 00:00
05/01/12 12:00
05/02/12 00:00
05/02/12 12:00
05/03/12 00:00
05/03/12 12:00
05/04/12 00:00
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05/06/12 00:00
05/06/12 12:00
05/07/12 00:00

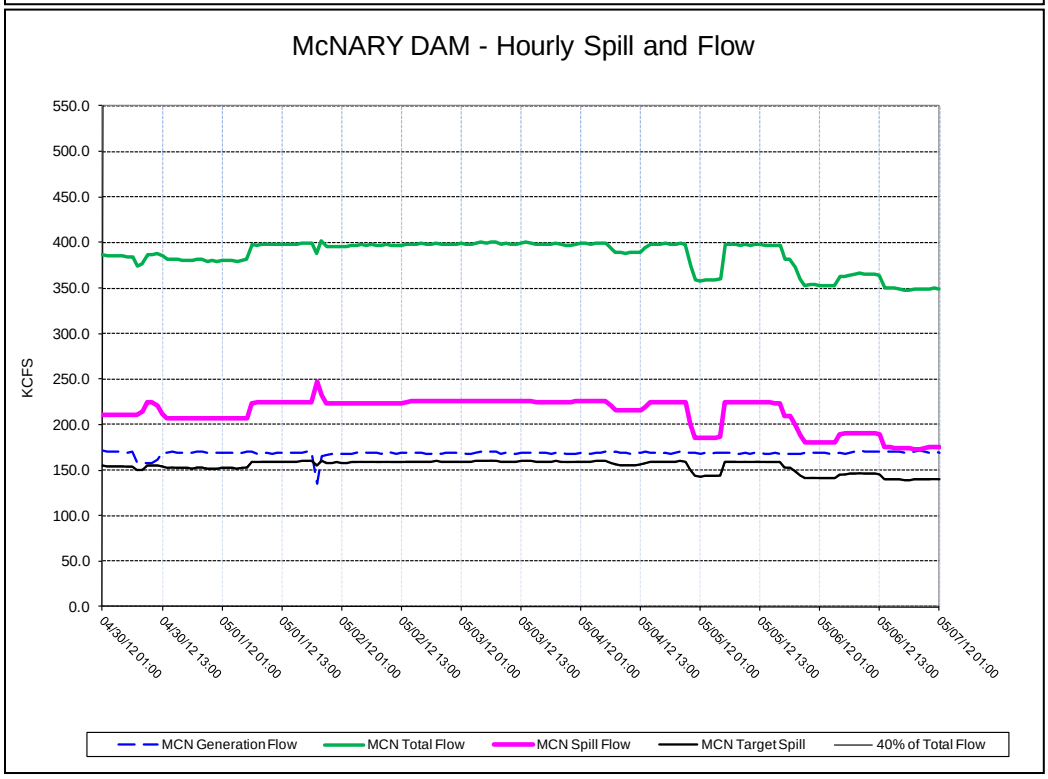
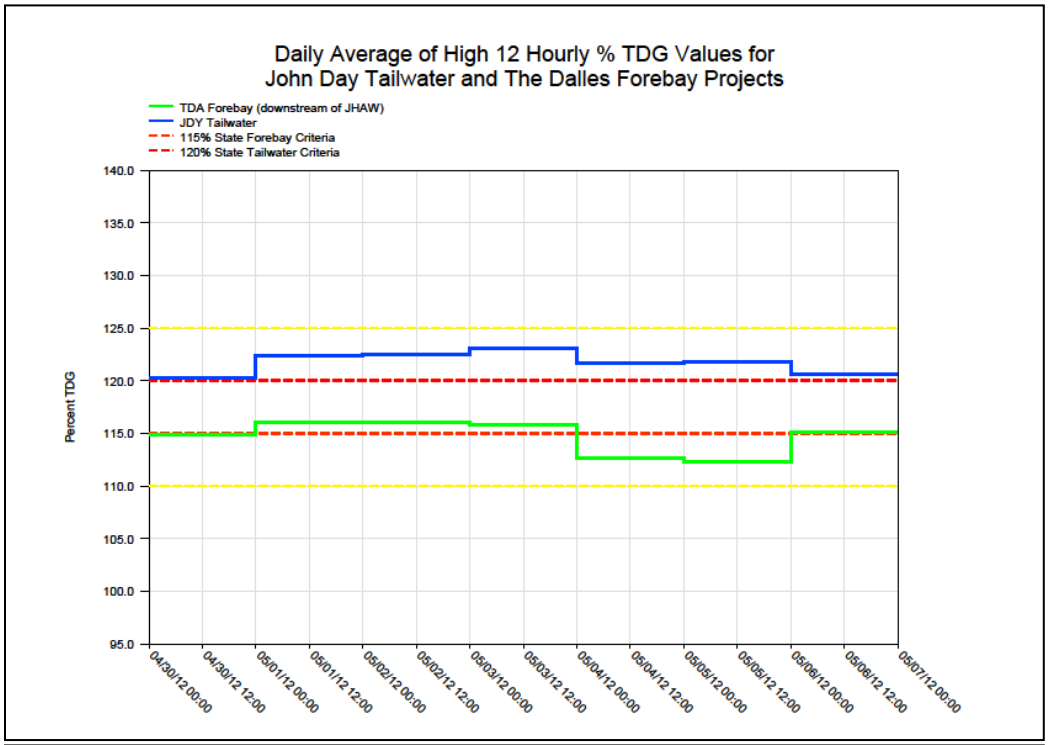

McNARY DAM - Hourly Spill and Flow
KCFS
550.0
500.0
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/30/12 01:00
04/30/12 13:00
05/01/12 01:00
05/01/12 13:00
05/02/12 01:00
05/02/12 13:00
05/03/12 01:00
05/03/12 13:00
05/04/12 01:00
05/04/12 13:00
05/05/12 01:00
05/05/12 13:00
05/06/12 01:00
05/06/12 13:00
05/07/12 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
40% of Total Flow

Figure 6


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/30/12 00:00
04/30/12 12:00
05/01/12 00:00
05/01/12 12:00
05/02/12 00:00
05/02/12 12:00
05/03/12 00:00
05/03/12 12:00
05/04/12 00:00
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05/06/12 00:00
05/06/12 12:00
05/07/12 00:00

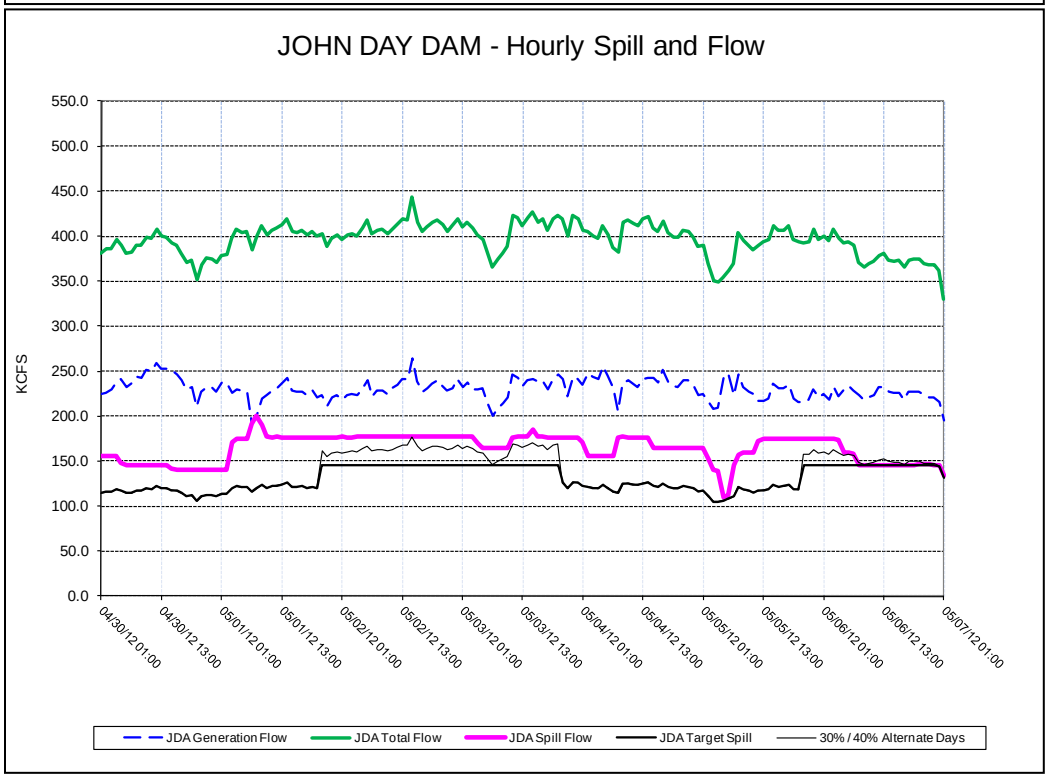
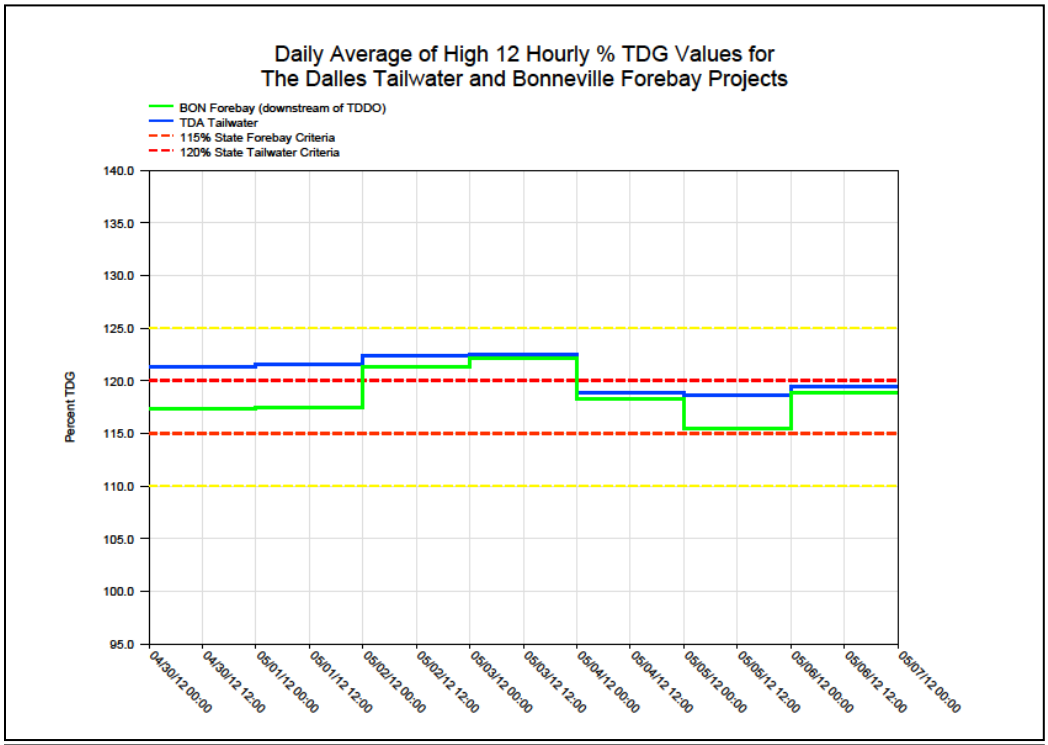

JOHN DAY DAM - Hourly Spill and Flow
KCFS
550.0
500.0
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/30/12 01:00
04/30/12 13:00
05/01/12 01:00
05/01/12 13:00
05/02/12 01:00
05/02/12 13:00
05/03/12 01:00
05/03/12 13:00
05/04/12 01:00
05/04/12 13:00
05/05/12 01:00
05/05/12 13:00
05/06/12 01:00
05/06/12 13:00
05/07/12 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% / 40% Alternate Days

Figure 7


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/30/12 00:00
04/30/12 12:00
05/01/12 00:00
05/01/12 12:00
05/02/12 00:00
05/02/12 12:00
05/03/12 00:00
05/03/12 12:00
05/04/12 00:00
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05/06/12 00:00
05/06/12 12:00
05/07/12 00:00

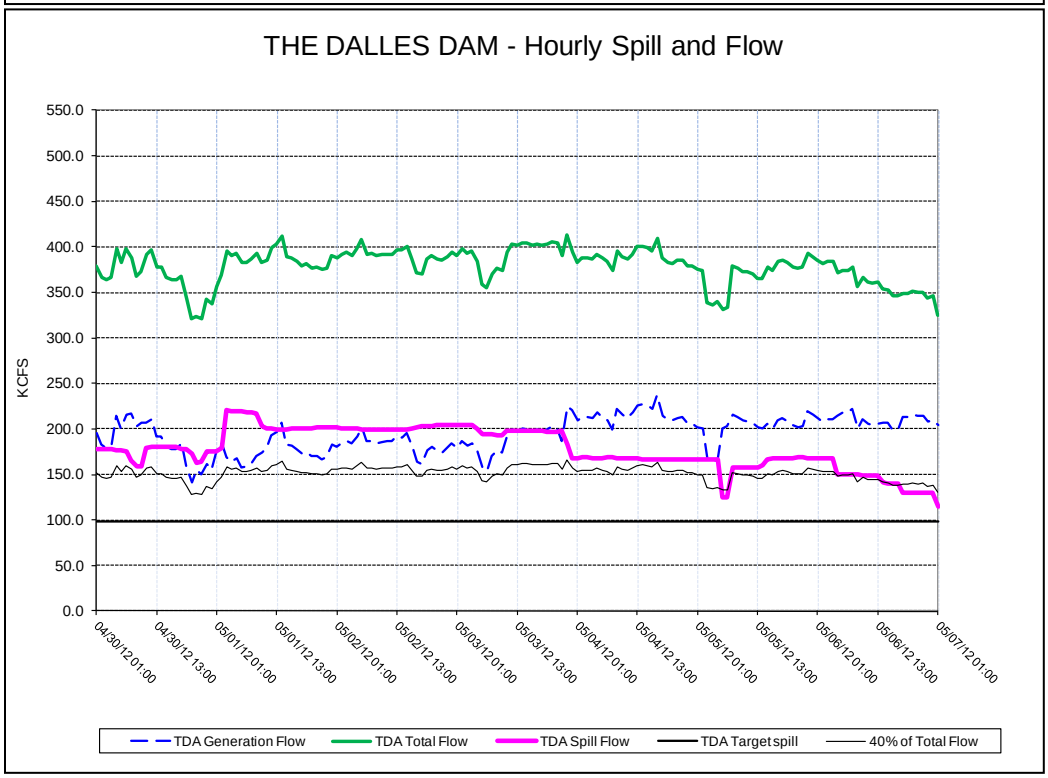
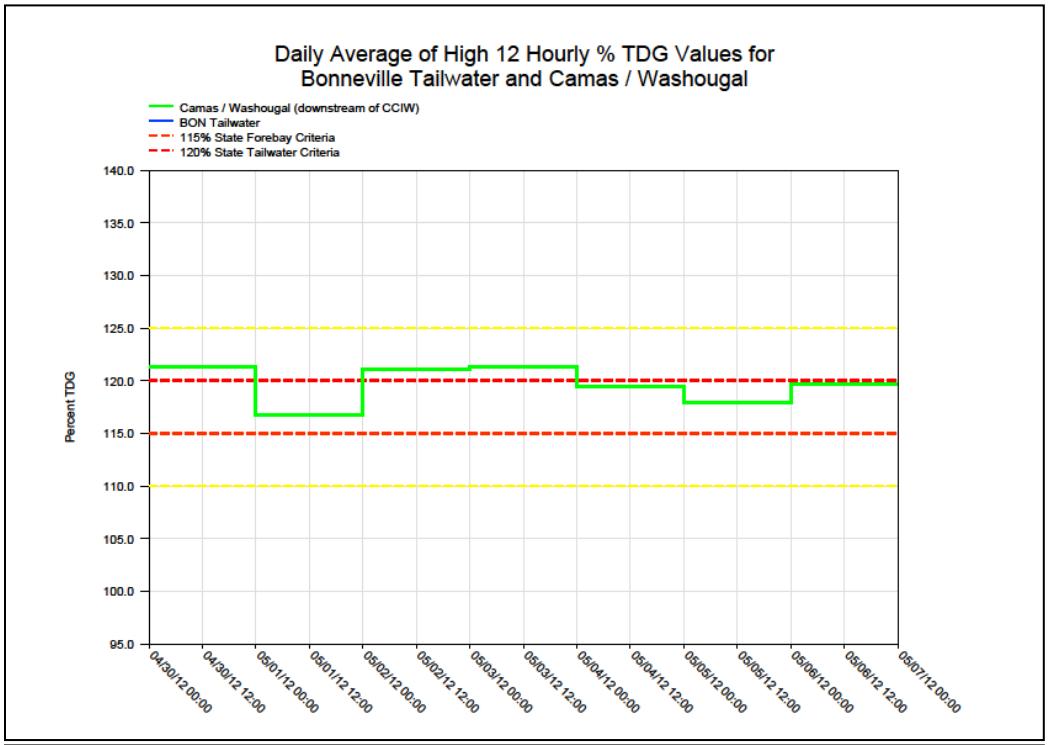

THE DALLES DAM - Hourly Spill and Flow
KCFS
550.0
500.0
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
04/30/12 01:00
04/30/12 13:00
05/01/12 01:00
05/01/12 13:00
05/02/12 01:00
05/02/12 13:00
05/03/12 01:00
05/03/12 13:00
05/04/12 01:00
05/04/12 13:00
05/05/12 01:00
05/05/12 13:00
05/06/12 01:00
05/06/12 13:00
05/07/12 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 8


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
04/30/12 00:00
04/30/12 12:00
05/01/12 00:00
05/01/12 12:00
05/02/12 00:00
05/02/12 12:00
05/03/12 00:00
05/03/12 12:00
05/04/12 00:00
05/04/12 12:00
05/05/12 00:00
05/05/12 12:00
05/06/12 00:00
05/06/12 12:00
05/07/12 00:00

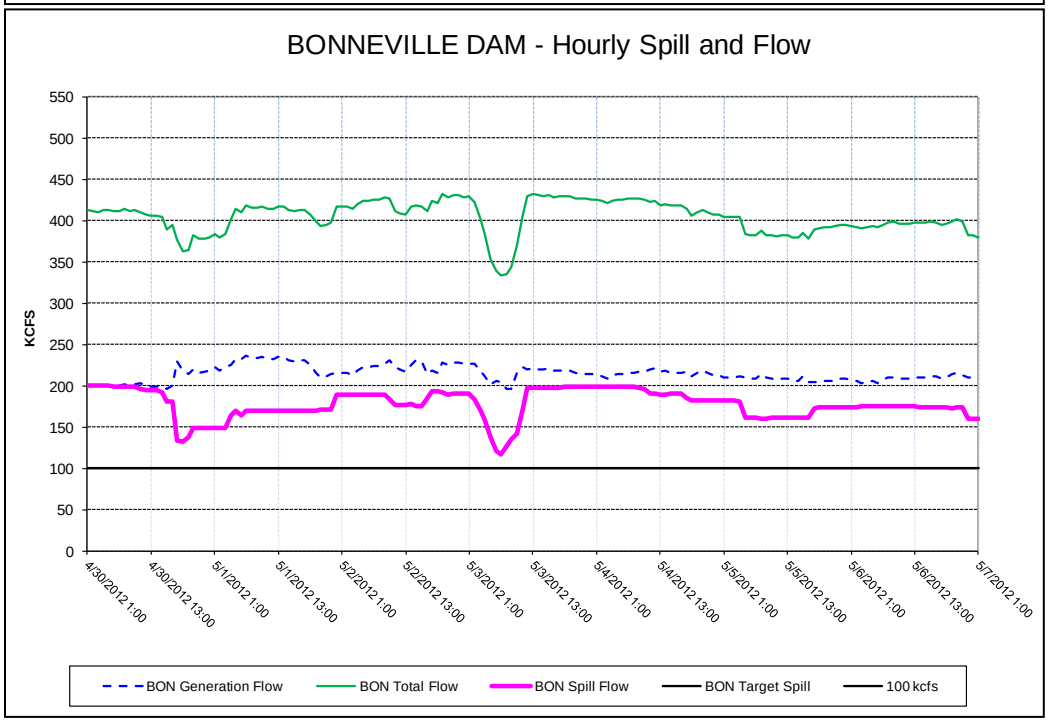
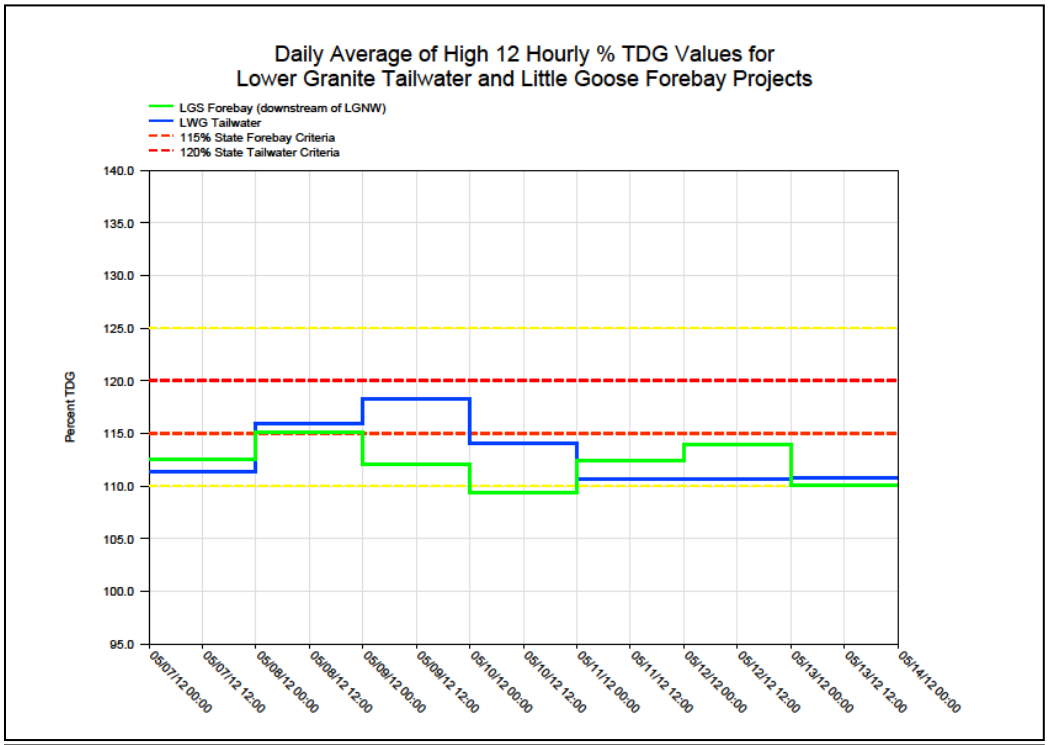

BONNEVILLE DAM - Hourly Spill and Flow
KCFS
550
500
450
400
350
300
250
200
150
100
50
0
4/30/2012 1:00
4/30/2012 13:00
5/1/2012 1:00
5/1/2012 13:00
5/2/2012 1:00
5/2/2012 13:00
5/3/2012 1:00
5/3/2012 13:00
5/4/2012 1:00
5/4/2012 13:00
5/5/2012 1:00
5/5/2012 13:00
5/6/2012 1:00
5/6/2012 13:00
5/7/2012 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
100 kcfs

Figure 9


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
05/07/12 00:00
05/07/12 12:00
05/08/12 00:00
05/08/12 12:00
05/09/12 00:00
05/09/12 12:00
05/10/12 00:00
05/10/12 12:00
05/11/12 00:00
05/11/12 12:00
05/12/12 00:00
05/12/12 12:00
05/13/12 00:00
05/13/12 12:00
05/14/12 00:00

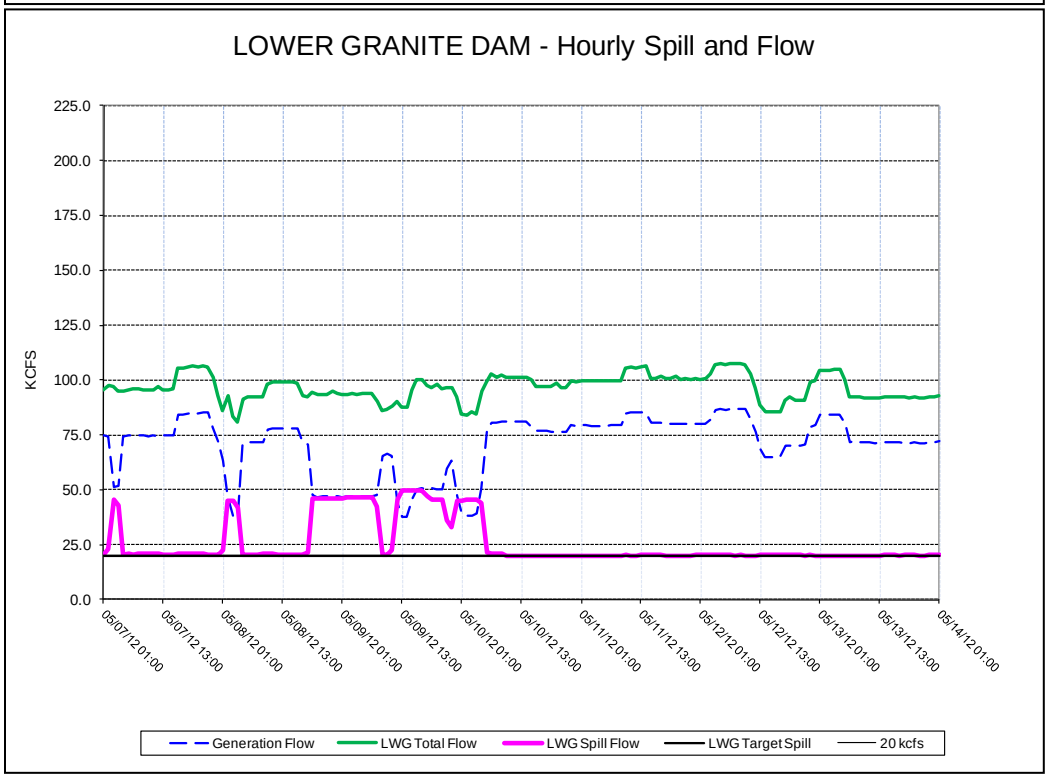
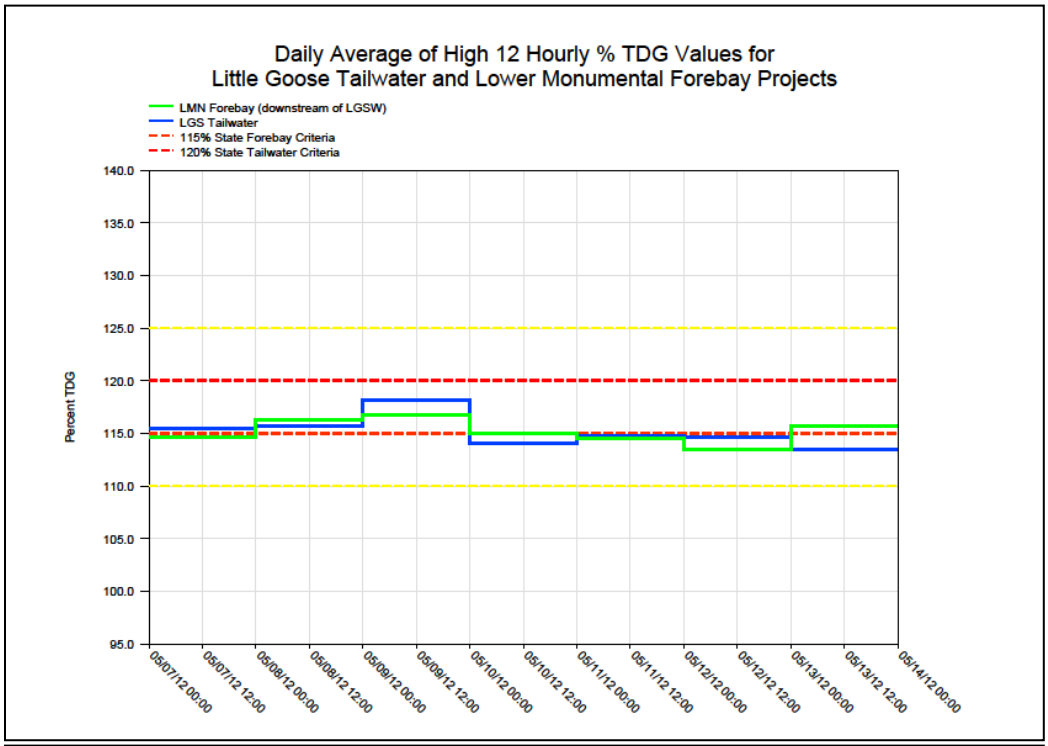

LOWER GRANITE DAM - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/07/12 01:00
05/07/12 13:00
05/08/12 01:00
05/08/12 13:00
05/09/12 01:00
05/09/12 13:00
05/10/12 01:00
05/10/12 13:00
05/11/12 01:00
05/11/12 13:00
05/12/12 01:00
05/12/12 13:00
05/13/12 01:00
05/13/12 13:00
05/14/12 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
20 kcfs

Figure 10


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
05/07/12 00:00
05/07/12 12:00
05/08/12 00:00
05/08/12 12:00
05/09/12 00:00
05/09/12 12:00
05/10/12 00:00
05/10/12 12:00
05/11/12 00:00
05/11/12 12:00
05/12/12 00:00
05/12/12 12:00
05/13/12 00:00
05/13/12 12:00
05/14/12 00:00

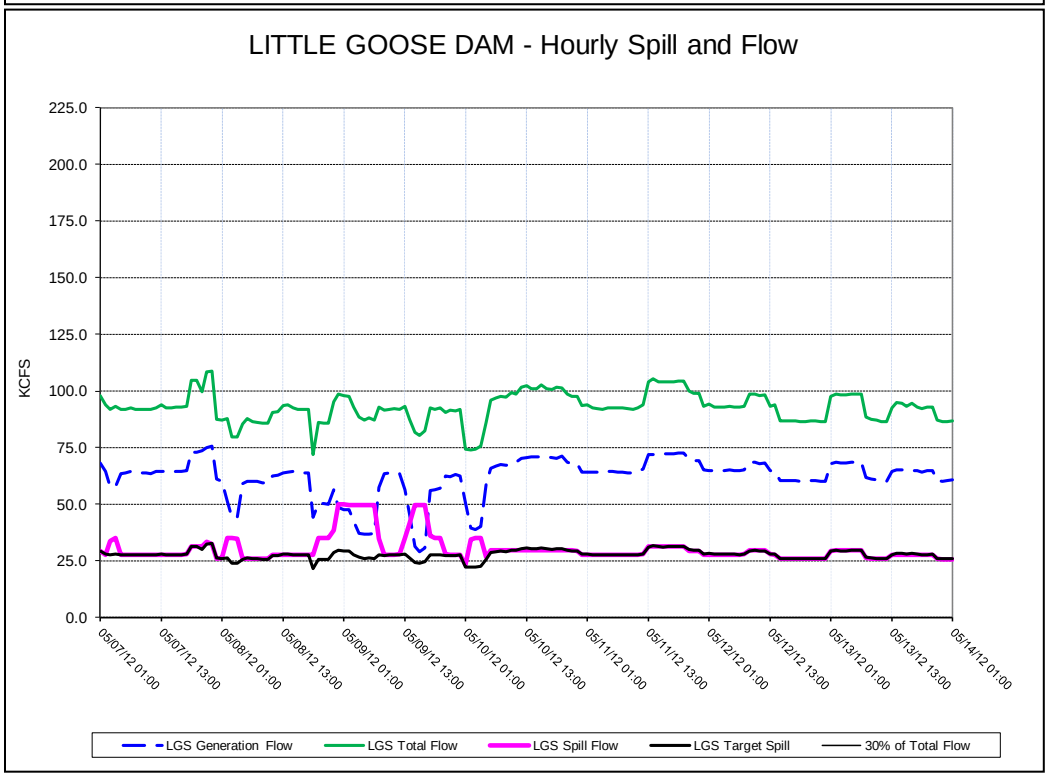

LITTLE GOOSE DAM - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/07/12 01:00
05/07/12 13:00
05/08/12 01:00
05/08/12 13:00
05/09/12 01:00
05/09/12 13:00
05/10/12 01:00
05/10/12 13:00
05/11/12 01:00
05/11/12 13:00
05/12/12 01:00
05/12/12 13:00
05/13/12 01:00
05/13/12 13:00
05/14/12 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 11

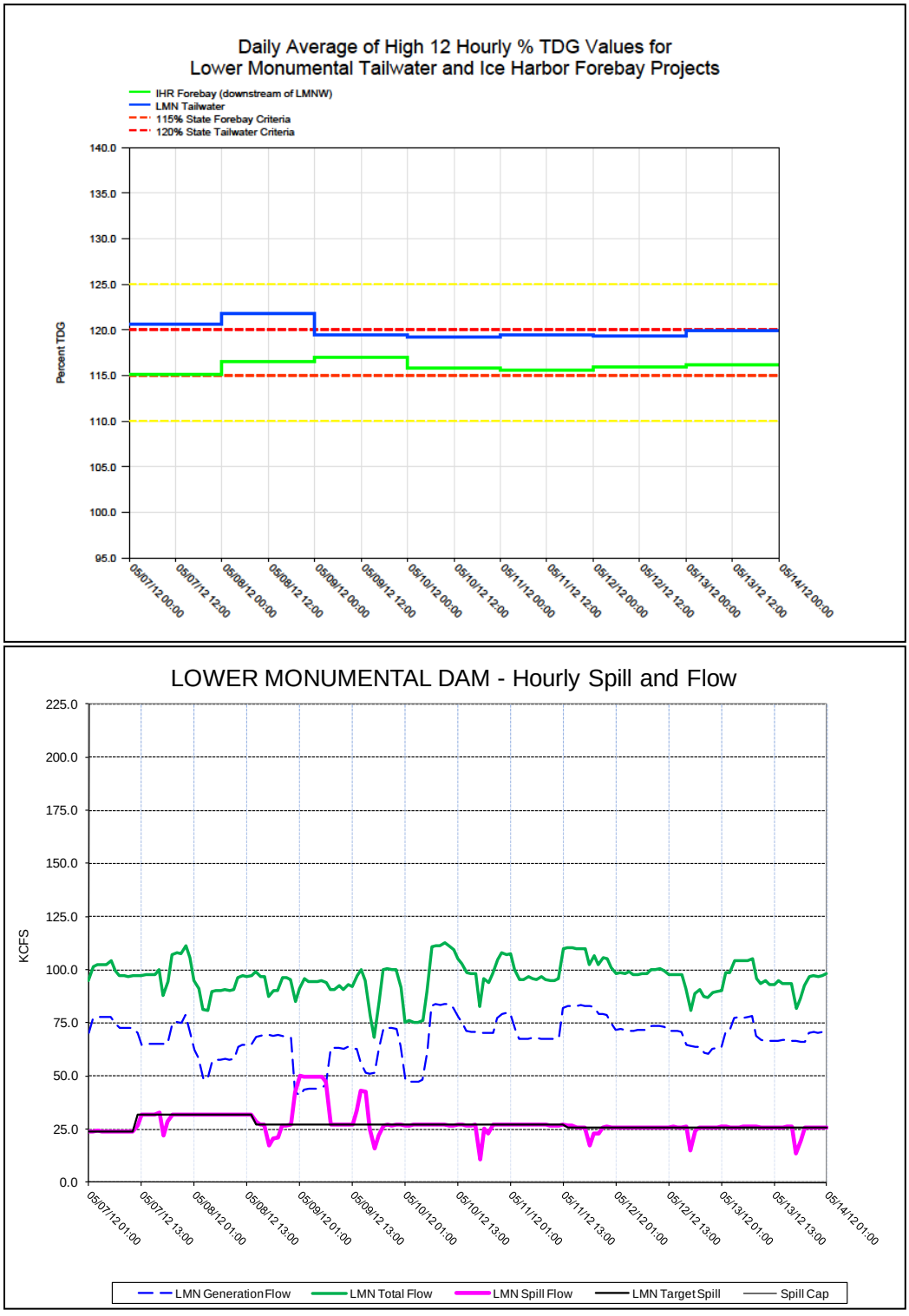

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
05/07/12 00:00
05/07/12 12:00
05/08/12 00:00
05/08/12 12:00
05/09/12 00:00
05/09/12 12:00
05/10/12 00:00
05/10/12 12:00
05/11/12 00:00
05/11/12 12:00
05/12/12 00:00
05/12/12 12:00
05/13/12 00:00
05/13/12 12:00
05/14/12 00:00
LOWER MONUMENTAL DAM - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/07/12 01:00
05/07/12 13:00
05/08/12 01:00
05/08/12 13:00
05/09/12 01:00
05/09/12 13:00
05/10/12 01:00
05/10/12 13:00
05/11/12 01:00
05/11/12 13:00
05/12/12 01:00
05/12/12 13:00
05/13/12 01:00
05/13/12 13:00
05/14/12 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
Spill Cap

Figure 12

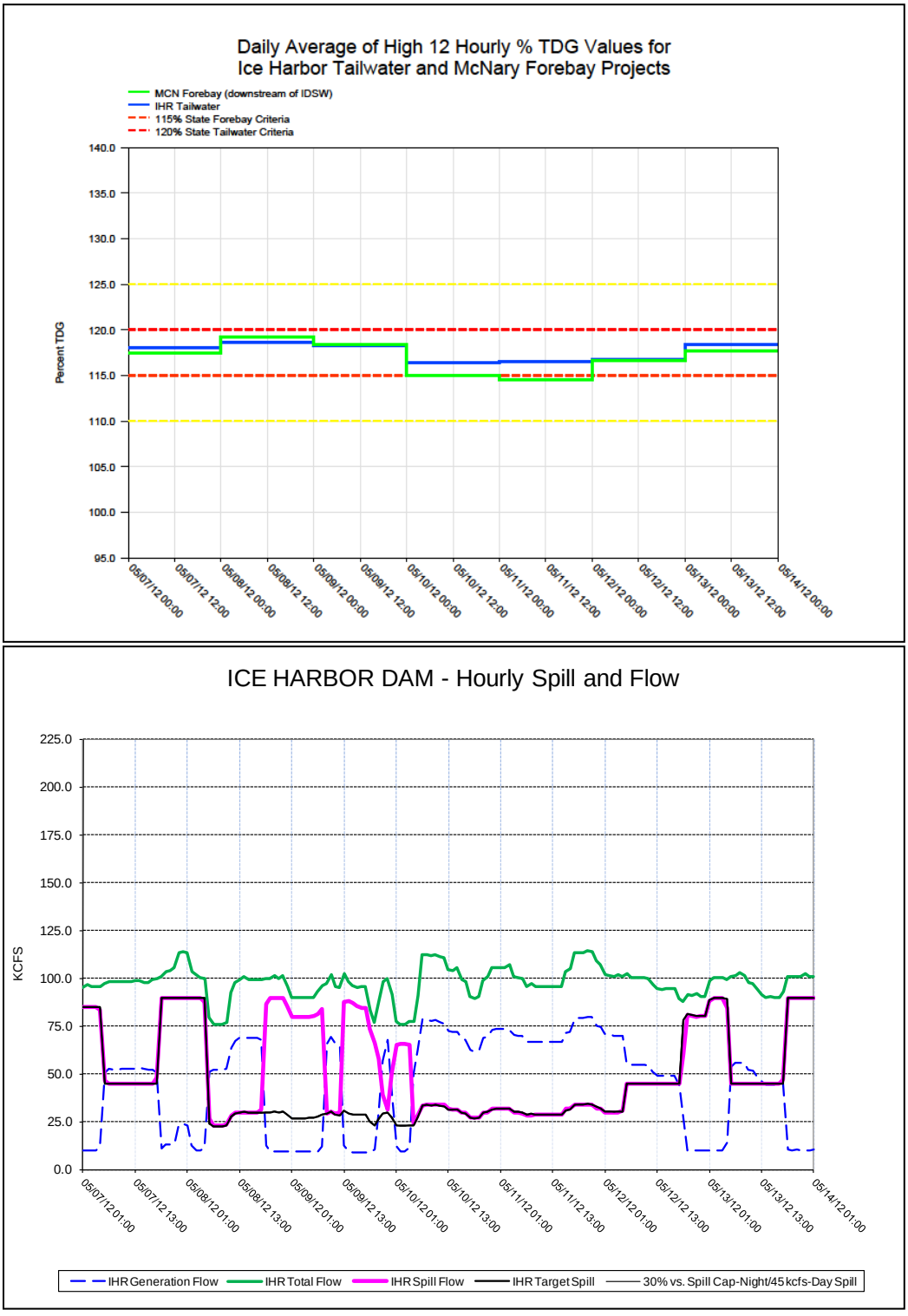
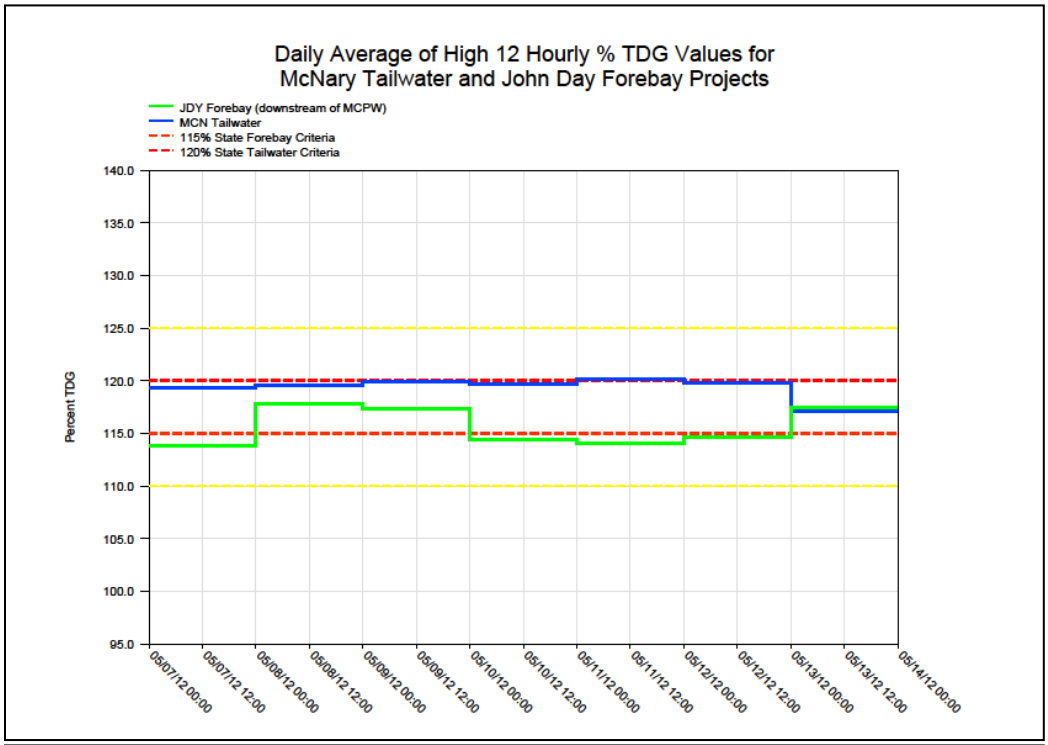

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
05/07/12 00:00
05/07/12 12:00
05/08/12 00:00
05/08/12 12:00
05/09/12 00:00
05/09/12 12:00
05/10/12 00:00
05/10/12 12:00
05/11/12 00:00
05/11/12 12:00
05/12/12 00:00
05/12/12 12:00
05/13/12 00:00
05/13/12 12:00
05/14/12 00:00
ICE HARBOR DAM - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/07/12 01:00
05/07/12 13:00
05/08/12 01:00
05/08/12 13:00
05/09/12 01:00
05/09/12 13:00
05/10/12 01:00
05/10/12 13:00
05/11/12 01:00
05/11/12 13:00
05/12/12 01:00
05/12/12 13:00
05/13/12 01:00
05/13/12 13:00
05/14/12 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
30% vs. Spill Cap-Night/45 kcfs-Day Spill

Figure 13


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
05/07/12 00:00
05/07/12 12:00
05/08/12 00:00
05/08/12 12:00
05/09/12 00:00
05/09/12 12:00
05/10/12 00:00
05/10/12 12:00
05/11/12 00:00
05/11/12 12:00
05/12/12 00:00
05/12/12 12:00
05/13/12 00:00
05/13/12 12:00
05/14/12 00:00

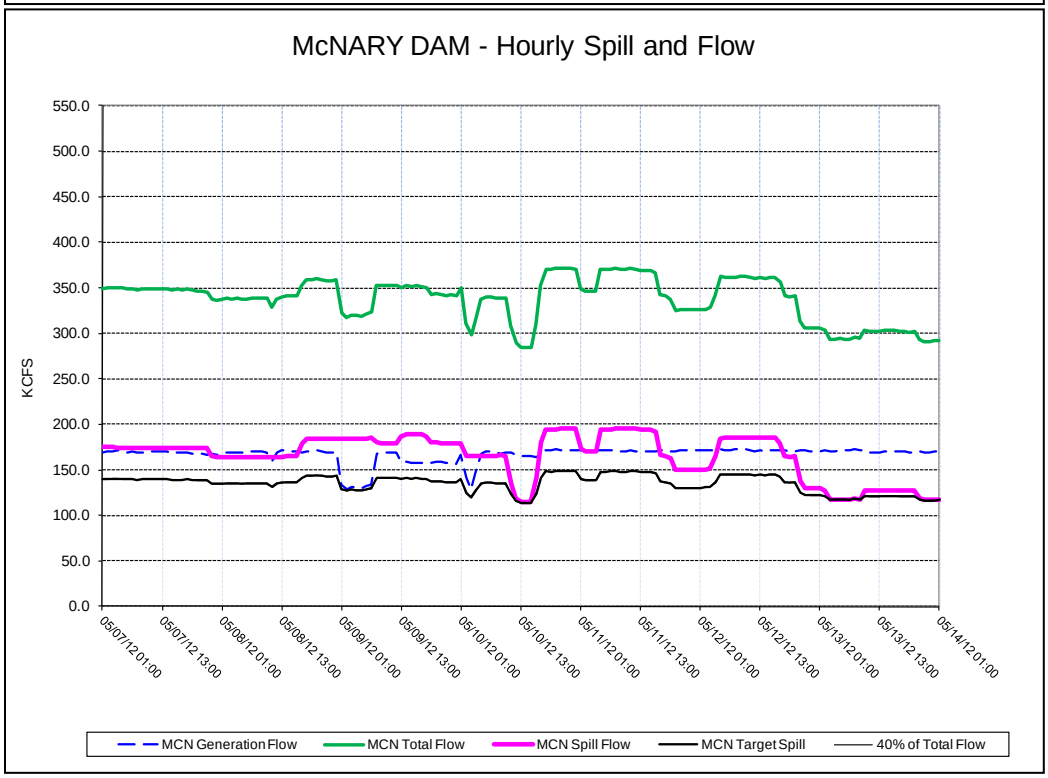

McNARY DAM - Hourly Spill and Flow
KCFS
550.0
500.0
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
05/07/12 01:00
05/07/12 13:00
05/08/12 01:00
05/08/12 13:00
05/09/12 01:00
05/09/12 13:00
05/10/12 01:00
05/10/12 13:00
05/11/12 01:00
05/11/12 13:00
05/12/12 01:00
05/12/12 13:00
05/13/12 01:00
05/13/12 13:00
05/14/12 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
40% of Total Flow

Figure 14

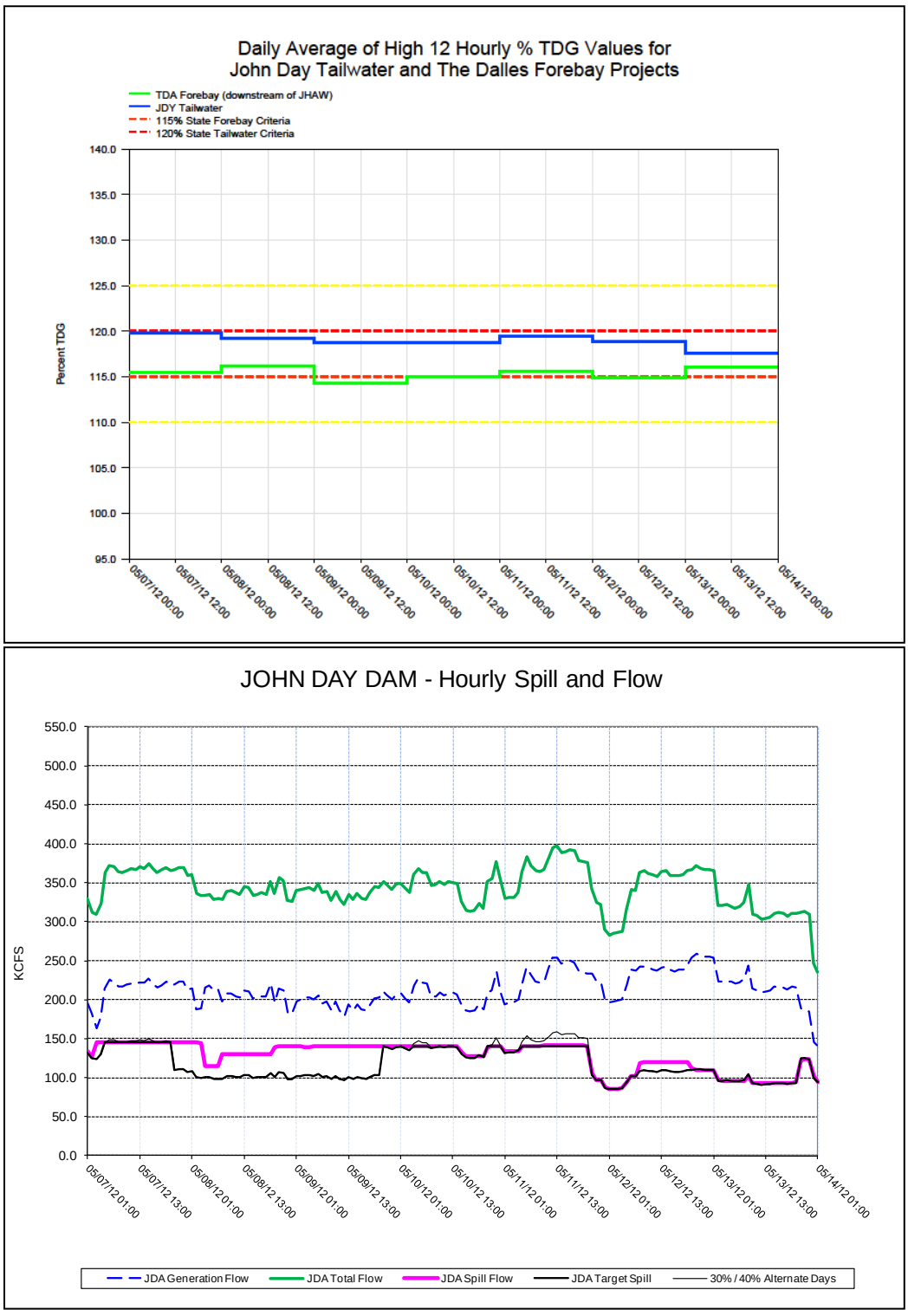

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
05/07/12 00:00
05/07/12 12:00
05/08/12 00:00
05/08/12 12:00
05/09/12 00:00
05/09/12 12:00
05/10/12 00:00
05/10/12 12:00
05/11/12 00:00
05/11/12 12:00
05/12/12 00:00
05/12/12 12:00
05/13/12 00:00
05/13/12 12:00
05/14/12 00:00
JOHN DAY DAM - Hourly Spill and Flow
KCFS
550.0
500.0
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
05/07/12 01:00
05/07/12 13:00
05/08/12 01:00
05/08/12 13:00
05/09/12 01:00
05/09/12 13:00
05/10/12 01:00
05/10/12 13:00
05/11/12 01:00
05/11/12 13:00
05/12/12 01:00
05/12/12 13:00
05/13/12 01:00
05/13/12 13:00
05/14/12 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% / 40% Alternate Days

Figure 15

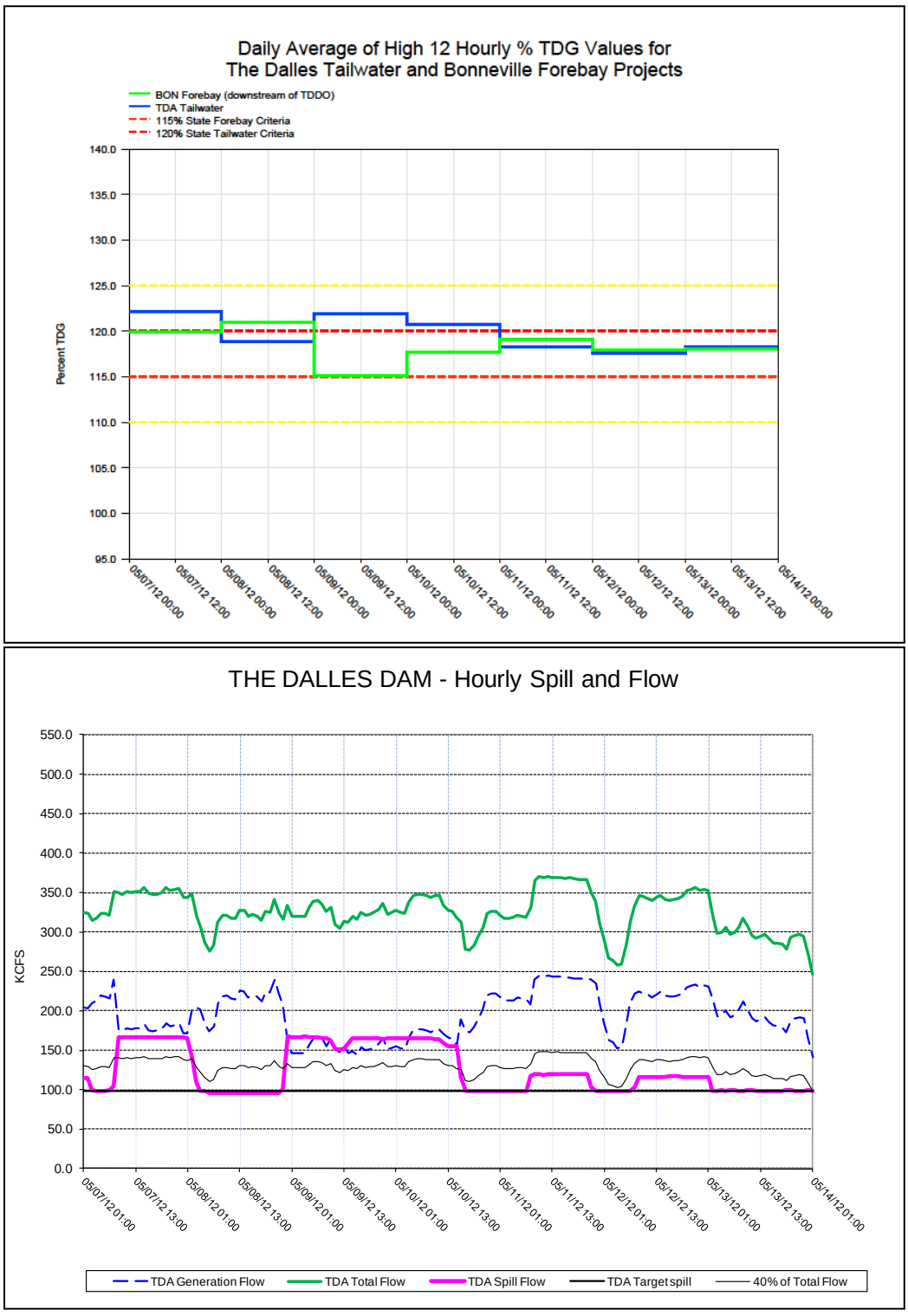

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
05/07/12 00:00
05/07/12 12:00
05/08/12 00:00
05/08/12 12:00
05/09/12 00:00
05/09/12 12:00
05/10/12 00:00
05/10/12 12:00
05/11/12 00:00
05/11/12 12:00
05/12/12 00:00
05/12/12 12:00
05/13/12 00:00
05/13/12 12:00
05/14/12 00:00
THE DALLES DAM - Hourly Spill and Flow
KCFS
550.0
500.0
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
05/07/12 01:00
05/07/12 13:00
05/08/12 01:00
05/08/12 13:00
05/09/12 01:00
05/09/12 13:00
05/10/12 01:00
05/10/12 13:00
05/11/12 01:00
05/11/12 13:00
05/12/12 01:00
05/12/12 13:00
05/13/12 01:00
05/13/12 13:00
05/14/12 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 16

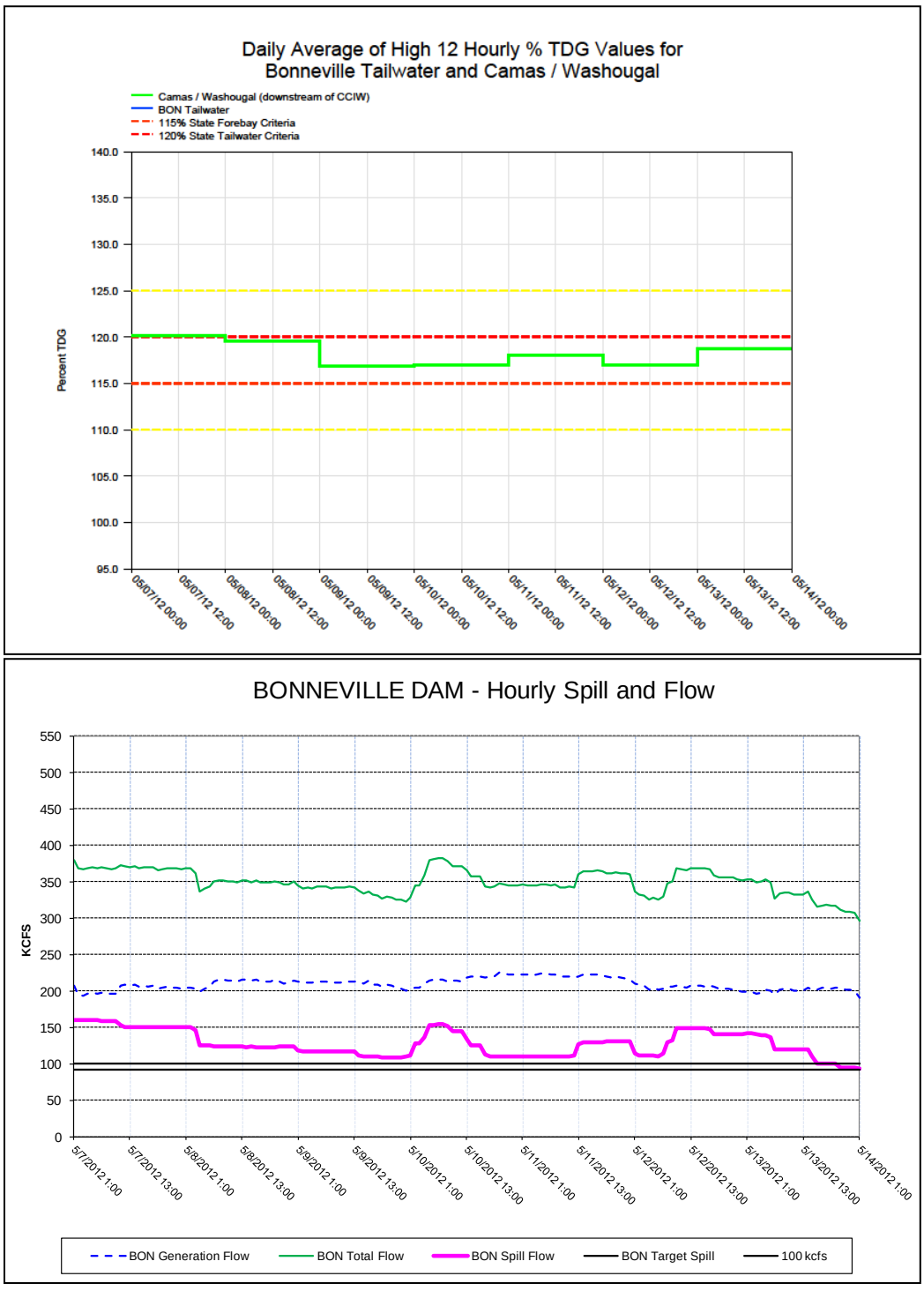
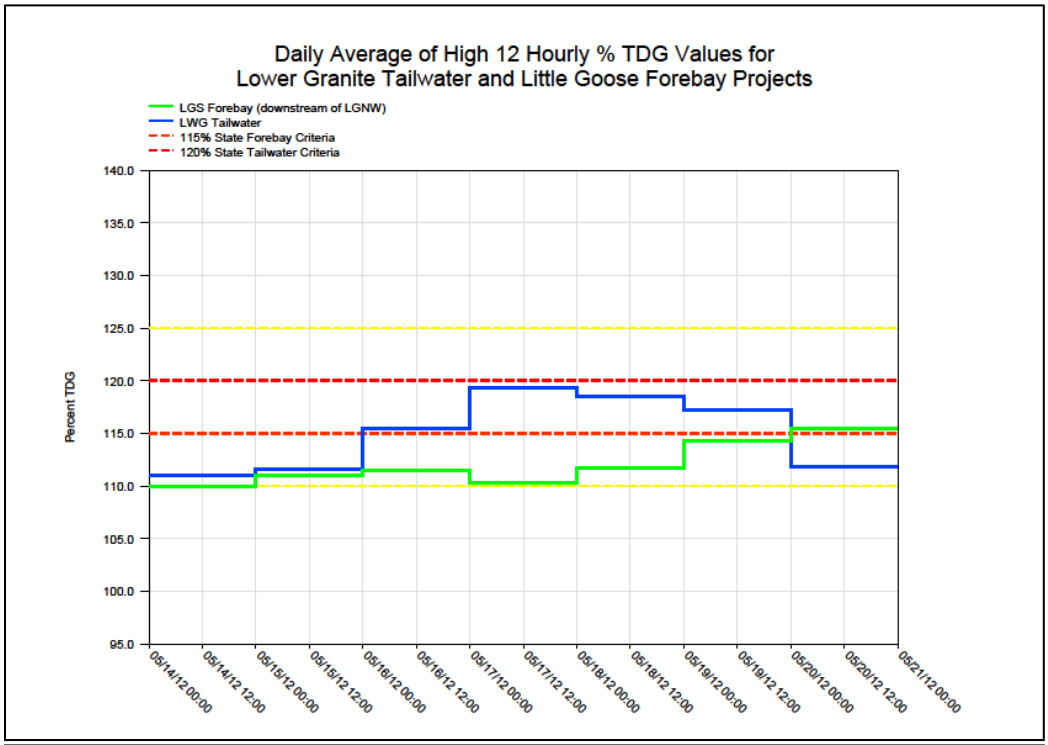

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
05/07/12 00:00
05/07/12 12:00
05/08/12 00:00
05/08/12 12:00
05/09/12 00:00
05/09/12 12:00
05/10/12 00:00
05/10/12 12:00
05/11/12 00:00
05/11/12 12:00
05/12/12 00:00
05/12/12 12:00
05/13/12 00:00
05/13/12 12:00
05/14/12 00:00
BONNEVILLE DAM - Hourly Spill and Flow
KCFS
550
500
450
400
350
300
250
200
150
100
50
0
5/7/2012 1:00
5/7/2012 13:00
5/8/2012 1:00
5/8/2012 13:00
5/9/2012 1:00
5/9/2012 13:00
5/10/2012 1:00
5/10/2012 13:00
5/11/2012 1:00
5/11/2012 13:00
5/12/2012 1:00
5/12/2012 13:00
5/13/2012 1:00
5/13/2012 13:00
5/14/2012 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
100 kcfs

Figure 17


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
05/14/12 00:00
05/14/12 12:00
05/15/12 00:00
05/15/12 12:00
05/16/12 00:00
05/16/12 12:00
05/17/12 00:00
05/17/12 12:00
05/18/12 00:00
05/18/12 12:00
05/19/12 00:00
05/19/12 12:00
05/20/12 00:00
05/20/12 12:00
05/21/12 00:00

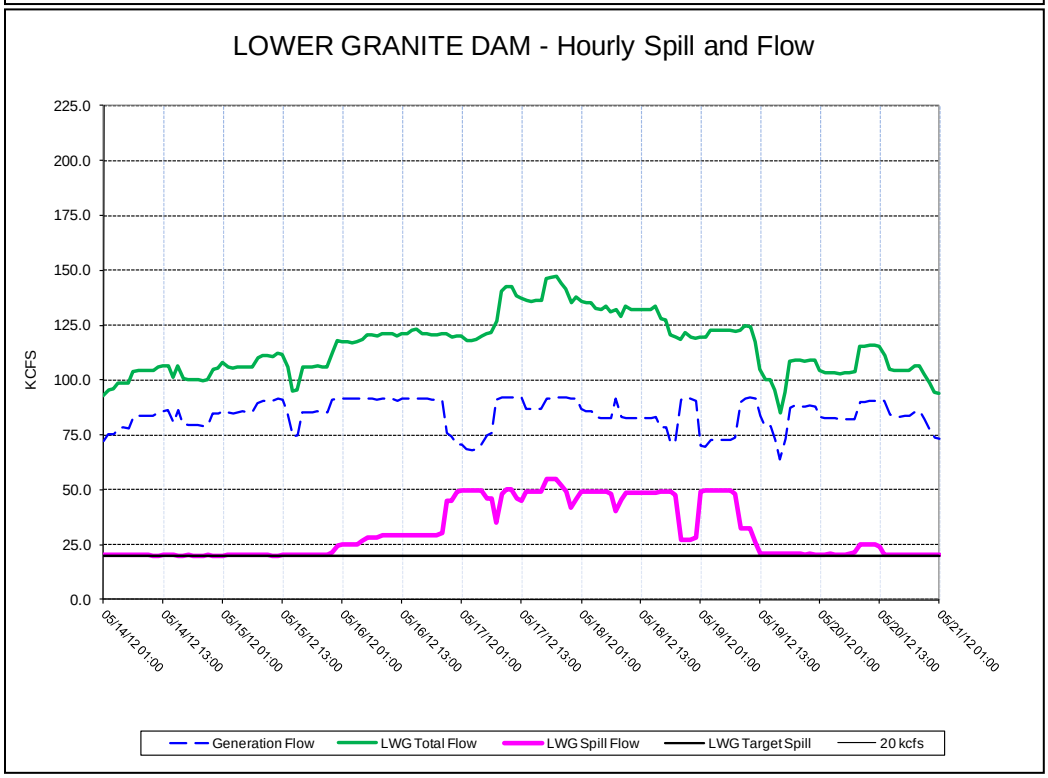

LOWER GRANITE DAM - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/14/12 01:00
05/14/12 13:00
05/15/12 01:00
05/15/12 13:00
05/16/12 01:00
05/16/12 13:00
05/17/12 01:00
05/17/12 13:00
05/18/12 01:00
05/18/12 13:00
05/19/12 01:00
05/19/12 13:00
05/20/12 01:00
05/20/12 13:00
05/21/12 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
20 kcfs

Figure 18

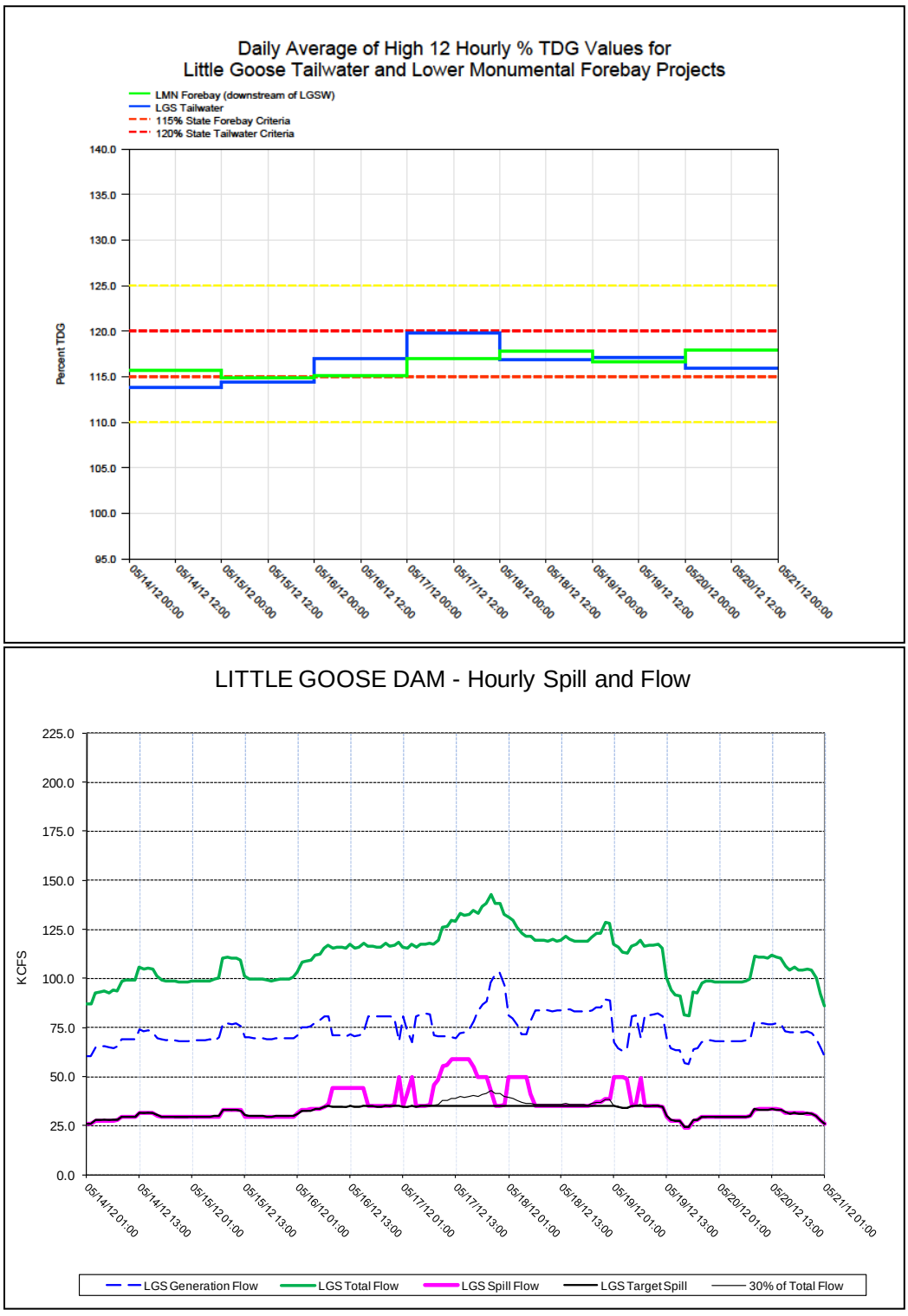

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
05/14/12 00:00
05/14/12 12:00
05/15/12 00:00
05/15/12 12:00
05/16/12 00:00
05/16/12 12:00
05/17/12 00:00
05/17/12 12:00
05/18/12 00:00
05/18/12 12:00
05/19/12 00:00
05/19/12 12:00
05/20/12 00:00
05/20/12 12:00
05/21/12 00:00
LITTLE GOOSE DAM - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/14/12 01:00
05/14/12 13:00
05/15/12 01:00
05/15/12 13:00
05/16/12 01:00
05/16/12 13:00
05/17/12 01:00
05/17/12 13:00
05/18/12 01:00
05/18/12 13:00
05/19/12 01:00
05/19/12 13:00
05/20/12 01:00
05/20/12 13:00
05/21/12 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 19

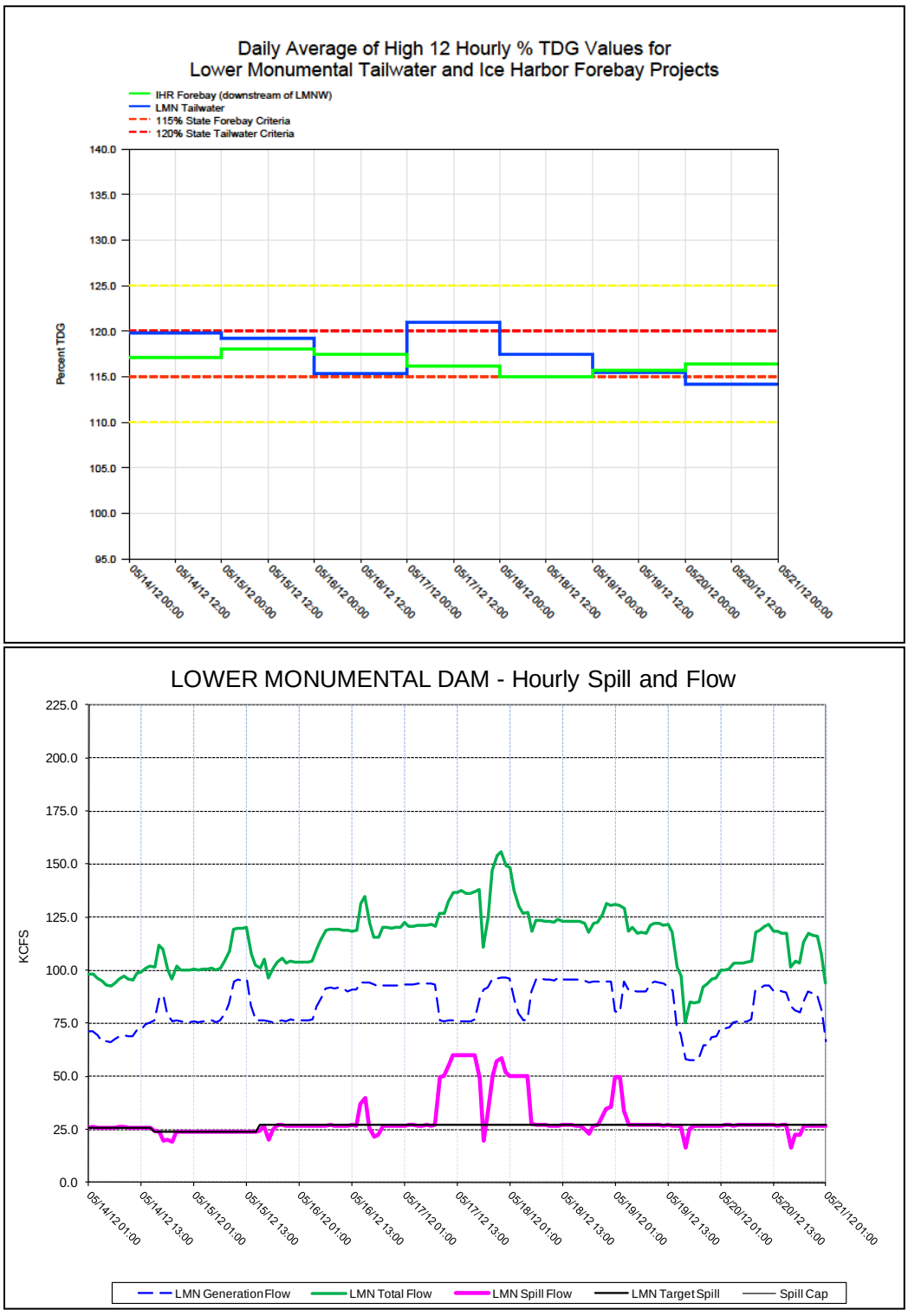
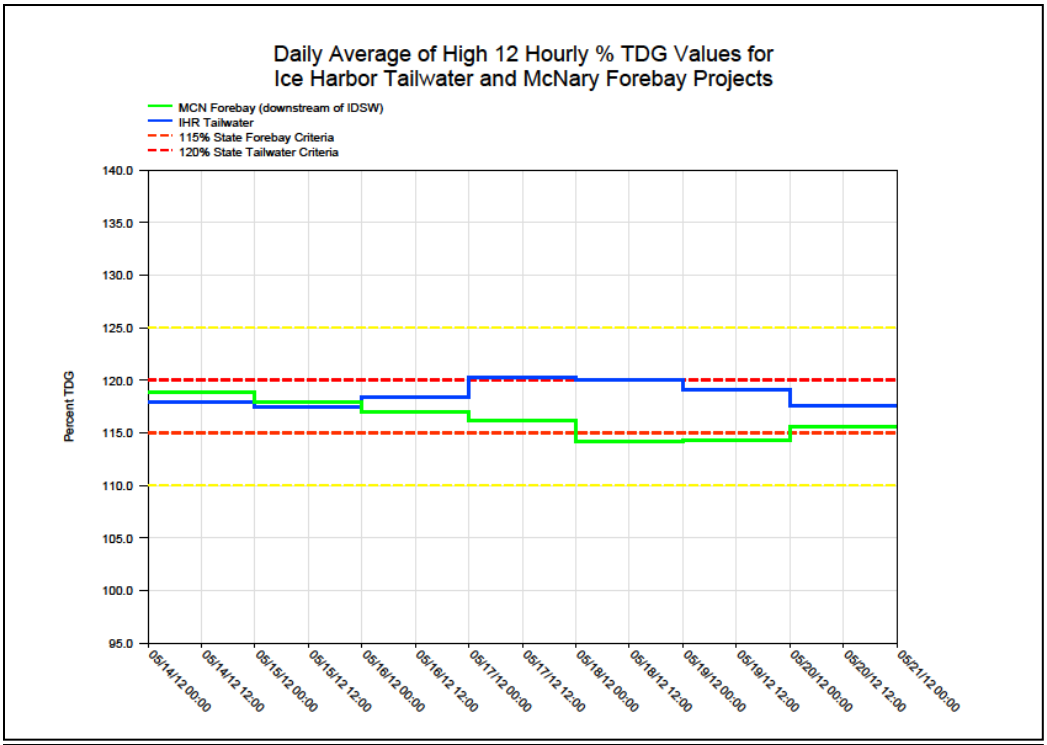

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
05/14/12 00:00
05/14/12 12:00
05/15/12 00:00
05/15/12 12:00
05/16/12 00:00
05/16/12 12:00
05/17/12 00:00
05/17/12 12:00
05/18/12 00:00
05/18/12 12:00
05/19/12 00:00
05/19/12 12:00
05/20/12 00:00
05/20/12 12:00
05/21/12 00:00
LOWER MONUMENTAL DAM - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/14/12 01:00
05/14/12 13:00
05/15/12 01:00
05/15/12 13:00
05/16/12 01:00
05/16/12 13:00
05/17/12 01:00
05/17/12 13:00
05/18/12 01:00
05/18/12 13:00
05/19/12 01:00
05/19/12 13:00
05/20/12 01:00
05/20/12 13:00
05/21/12 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
Spill Cap

Figure 20


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
05/14/12 00:00
05/14/12 12:00
05/15/12 00:00
05/15/12 12:00
05/16/12 00:00
05/16/12 12:00
05/17/12 00:00
05/17/12 12:00
05/18/12 00:00
05/18/12 12:00
05/19/12 00:00
05/19/12 12:00
05/20/12 00:00
05/20/12 12:00
05/21/12 00:00

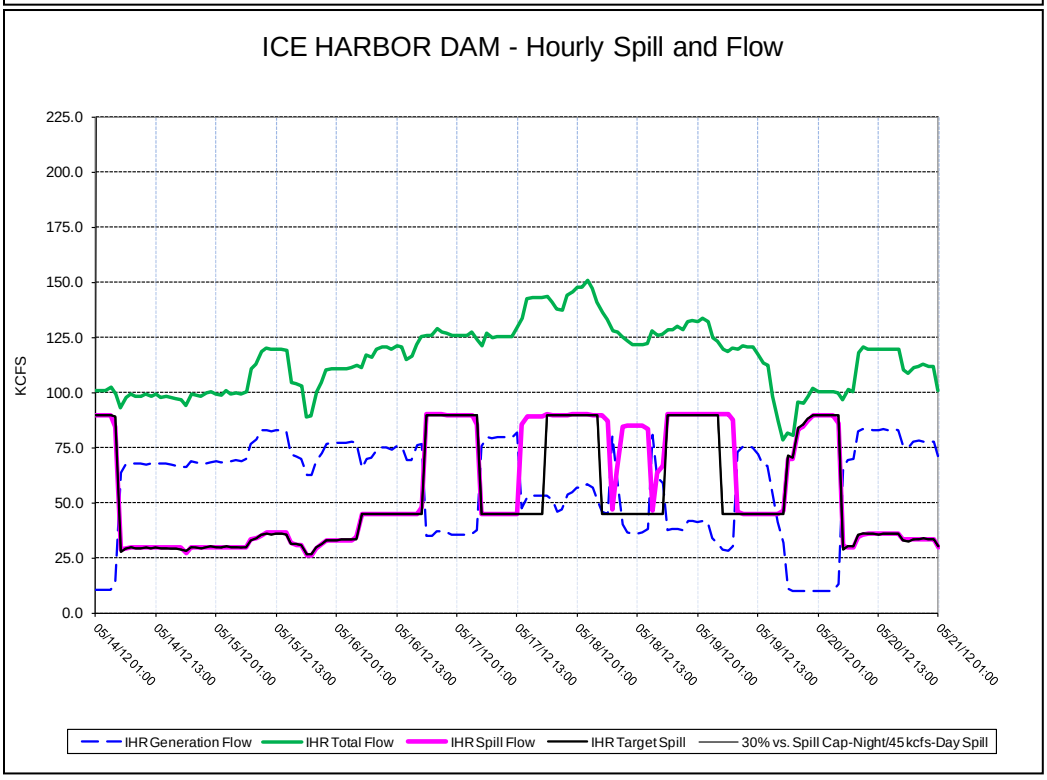

ICE HARBOR DAM - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/14/12 01:00
05/14/12 13:00
05/15/12 01:00
05/15/12 13:00
05/16/12 01:00
05/16/12 13:00
05/17/12 01:00
05/17/12 13:00
05/18/12 01:00
05/18/12 13:00
05/19/12 01:00
05/19/12 13:00
05/20/12 01:00
05/20/12 13:00
05/21/12 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
30% vs. Spill Cap-Night/45 kcfs-Day Spill

Figure 21

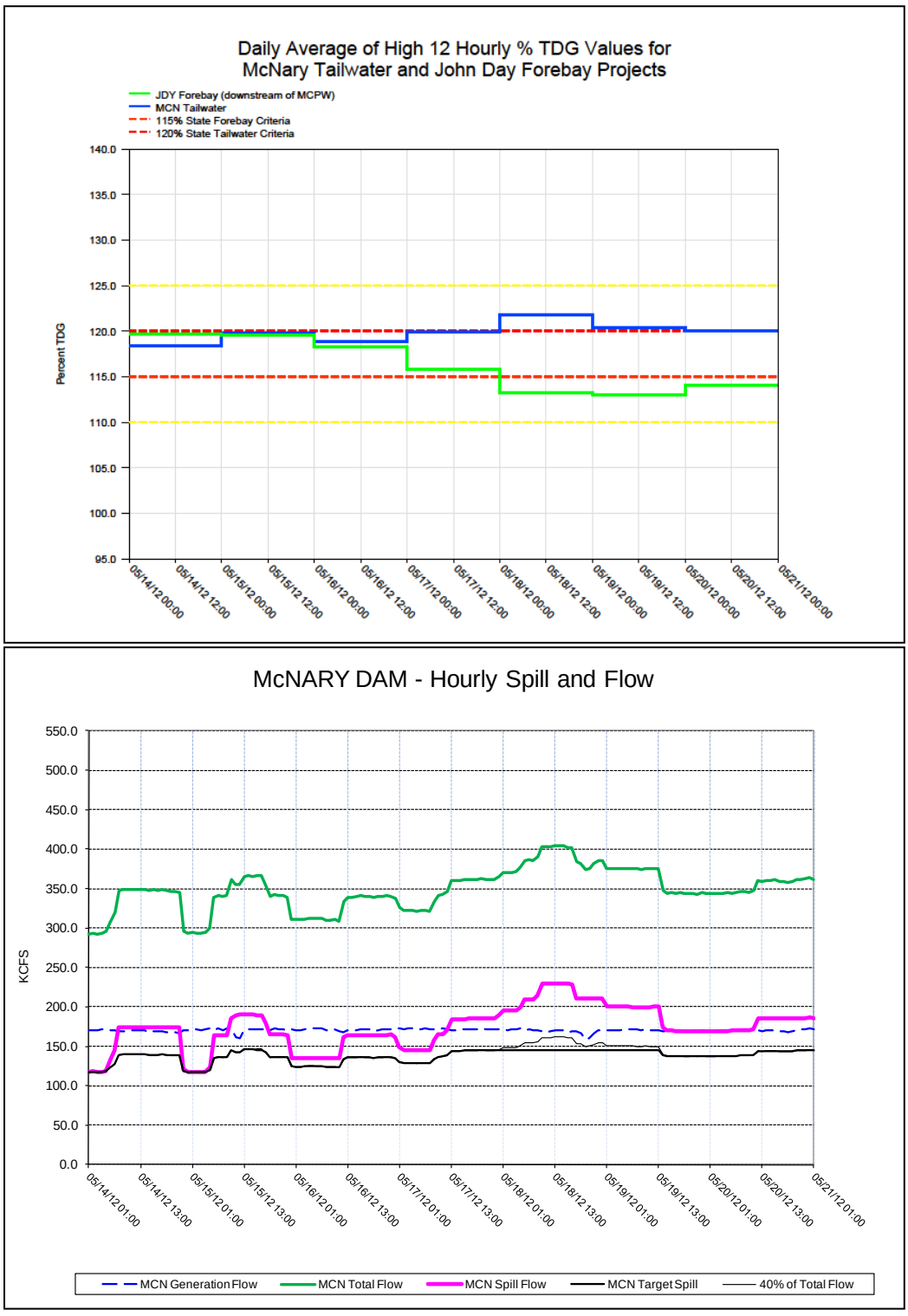
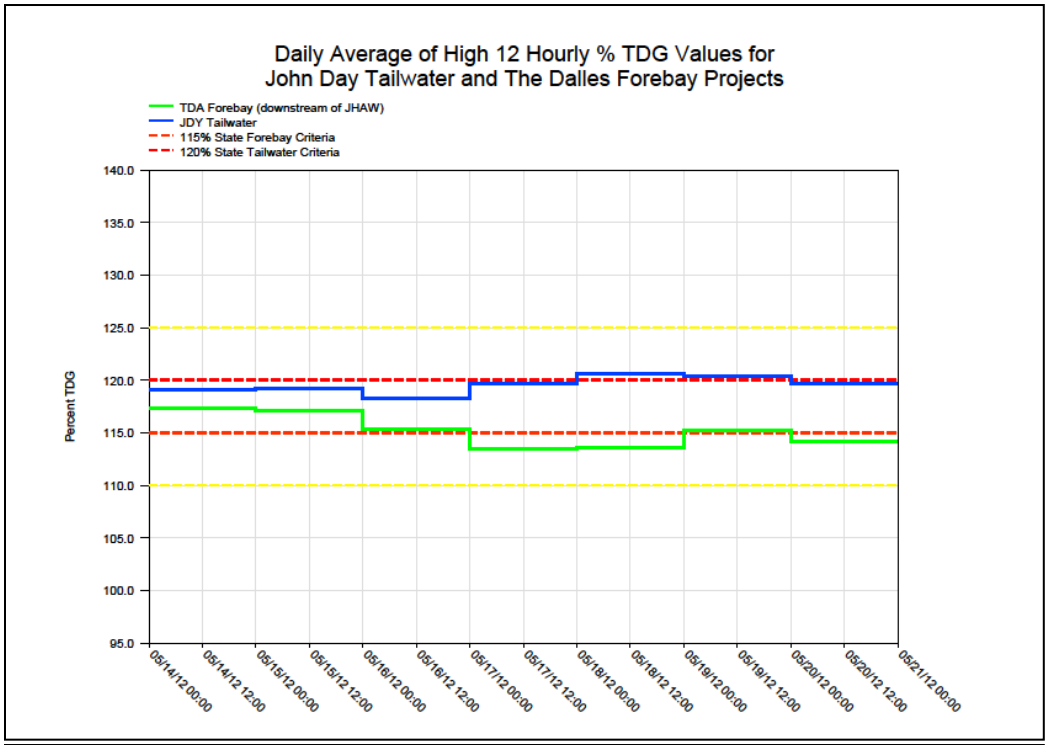

Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
05/14/12 00:00
05/14/12 12:00
05/15/12 00:00
05/15/12 12:00
05/16/12 00:00
05/16/12 12:00
05/17/12 00:00
05/17/12 12:00
05/18/12 00:00
05/18/12 12:00
05/19/12 00:00
05/19/12 12:00
05/20/12 00:00
05/20/12 12:00
05/21/12 00:00
McNARY DAM - Hourly Spill and Flow
KCFS
550.0
500.0
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
05/14/12 01:00
05/14/12 13:00
05/15/12 01:00
05/15/12 13:00
05/16/12 01:00
05/16/12 13:00
05/17/12 01:00
05/17/12 13:00
05/18/12 01:00
05/18/12 13:00
05/19/12 01:00
05/19/12 13:00
05/20/12 01:00
05/20/12 13:00
05/21/12 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
40% of Total Flow

Figure 22


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
05/14/12 00:00
05/14/12 12:00
05/15/12 00:00
05/15/12 12:00
05/16/12 00:00
05/16/12 12:00
05/17/12 00:00
05/17/12 12:00
05/18/12 00:00
05/18/12 12:00
05/19/12 00:00
05/19/12 12:00
05/20/12 00:00
05/20/12 12:00
05/21/12 00:00

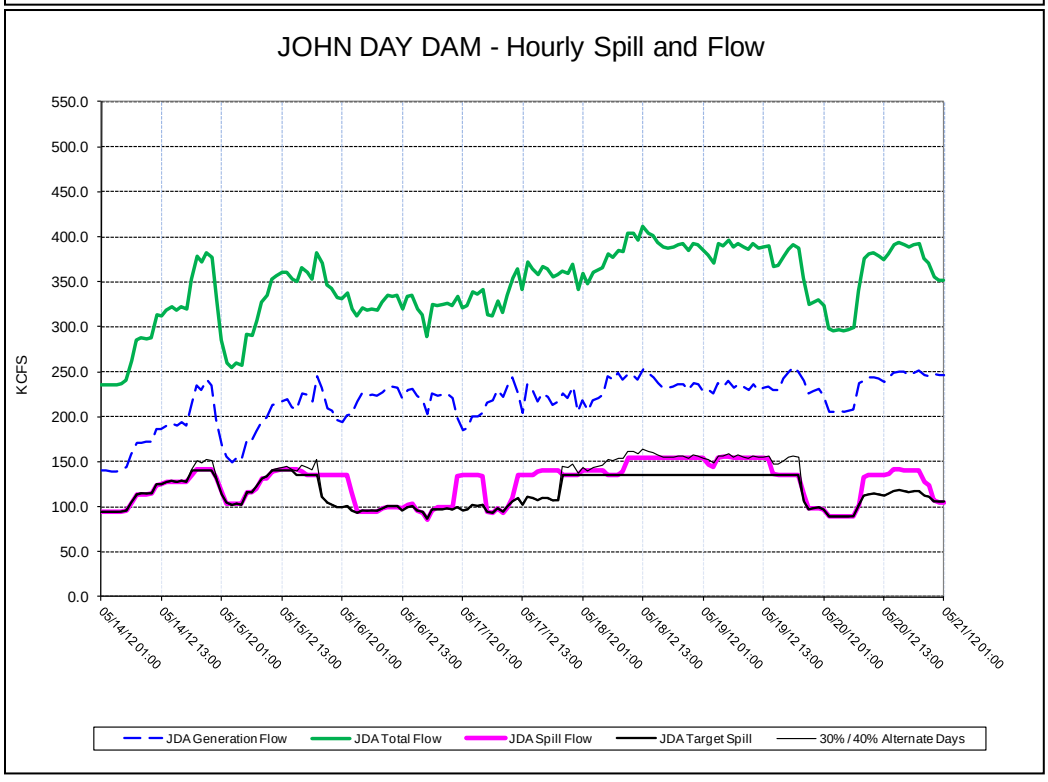
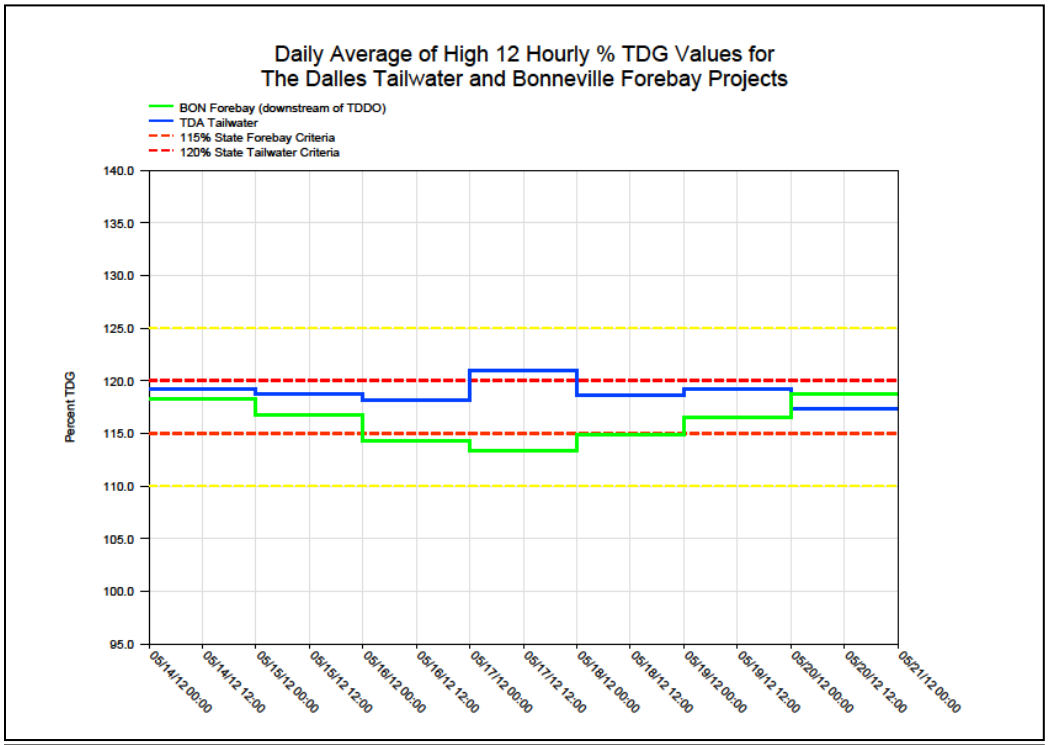

JOHN DAY DAM - Hourly Spill and Flow
KCFS
550.0
500.0
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
05/14/12 01:00
05/14/12 13:00
05/15/12 01:00
05/15/12 13:00
05/16/12 01:00
05/16/12 13:00
05/17/12 01:00
05/17/12 13:00
05/18/12 01:00
05/18/12 13:00
05/19/12 01:00
05/19/12 13:00
05/20/12 01:00
05/20/12 13:00
05/21/12 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% / 40% Alternate Days

Figure 23


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
05/14/12 00:00
05/14/12 12:00
05/15/12 00:00
05/15/12 12:00
05/16/12 00:00
05/16/12 12:00
05/17/12 00:00
05/17/12 12:00
05/18/12 00:00
05/18/12 12:00
05/19/12 00:00
05/19/12 12:00
05/20/12 00:00
05/20/12 12:00
05/21/12 00:00

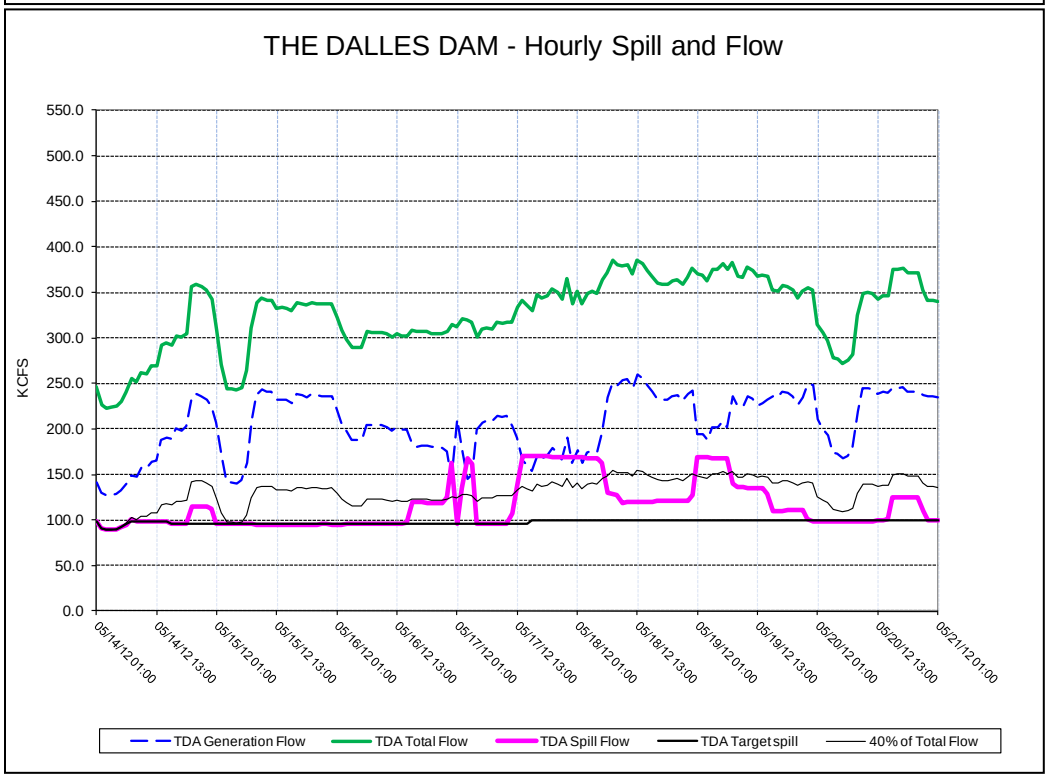

THE DALLES DAM - Hourly Spill and Flow
KCFS
550.0
500.0
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
05/14/12 01:00
05/14/12 13:00
05/15/12 01:00
05/15/12 13:00
05/16/12 01:00
05/16/12 13:00
05/17/12 01:00
05/17/12 13:00
05/18/12 01:00
05/18/12 13:00
05/19/12 01:00
05/19/12 13:00
05/20/12 01:00
05/20/12 13:00
05/21/12 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 24

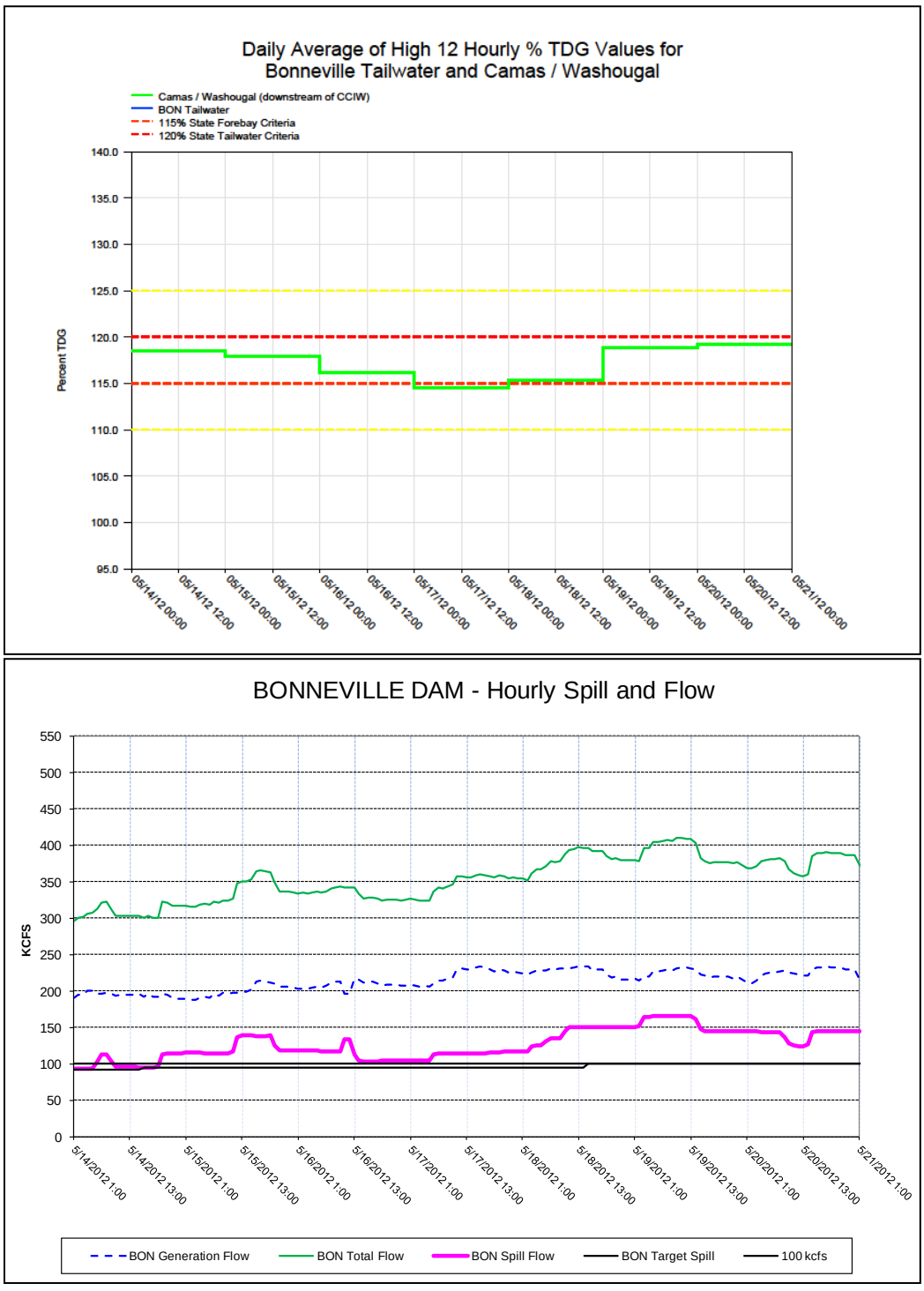
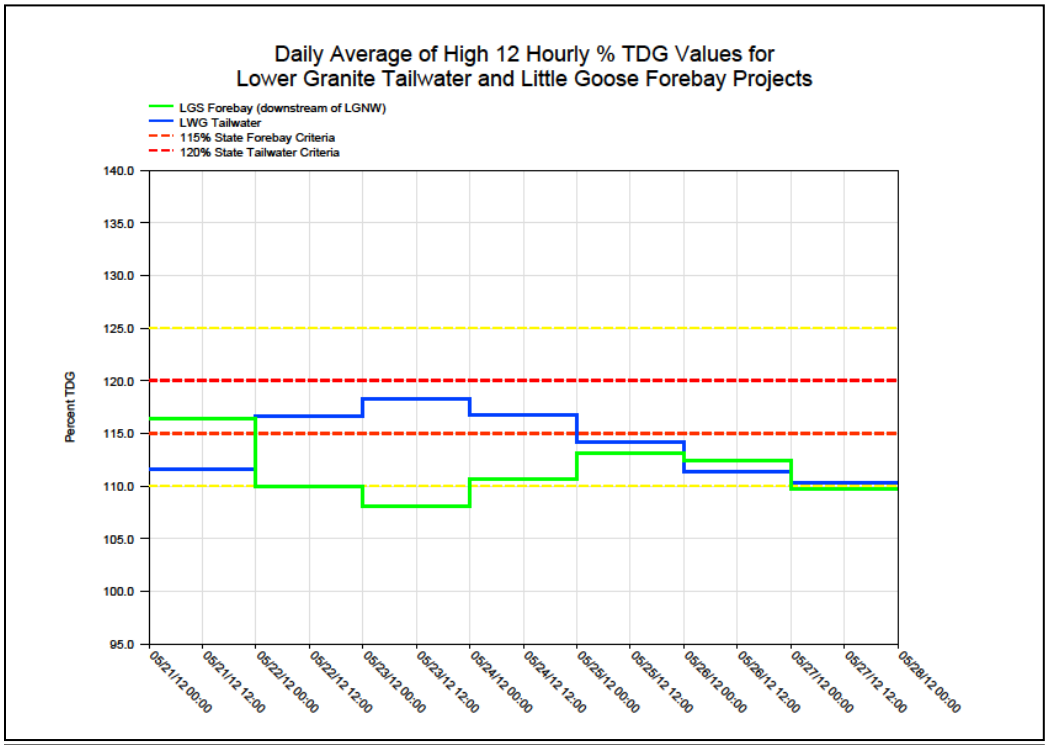

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
05/14/12 00:00
05/14/12 12:00
05/15/12 00:00
05/15/12 12:00
05/16/12 00:00
05/16/12 12:00
05/17/12 00:00
05/17/12 12:00
05/18/12 00:00
05/18/12 12:00
05/19/12 00:00
05/19/12 12:00
05/20/12 00:00
05/20/12 12:00
05/21/12 00:00
BONNEVILLE DAM - Hourly Spill and Flow
KCFS
550
500
450
400
350
300
250
200
150
100
50
0
5/14/2012 1:00
5/14/2012 13:00
5/15/2012 1:00
5/15/2012 13:00
5/16/2012 1:00
5/16/2012 13:00
5/17/2012 1:00
5/17/2012 13:00
5/18/2012 1:00
5/18/2012 13:00
5/19/2012 1:00
5/19/2012 13:00
5/20/2012 1:00
5/20/2012 13:00
5/21/2012 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
100 kcfs

Figure 25


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
05/21/12 00:00
05/21/12 12:00
05/22/12 00:00
05/22/12 12:00
05/23/12 00:00
05/23/12 12:00
05/24/12 00:00
05/24/12 12:00
05/25/12 00:00
05/25/12 12:00
05/26/12 00:00
05/26/12 12:00
05/27/12 00:00
05/27/12 12:00
05/28/12 00:00

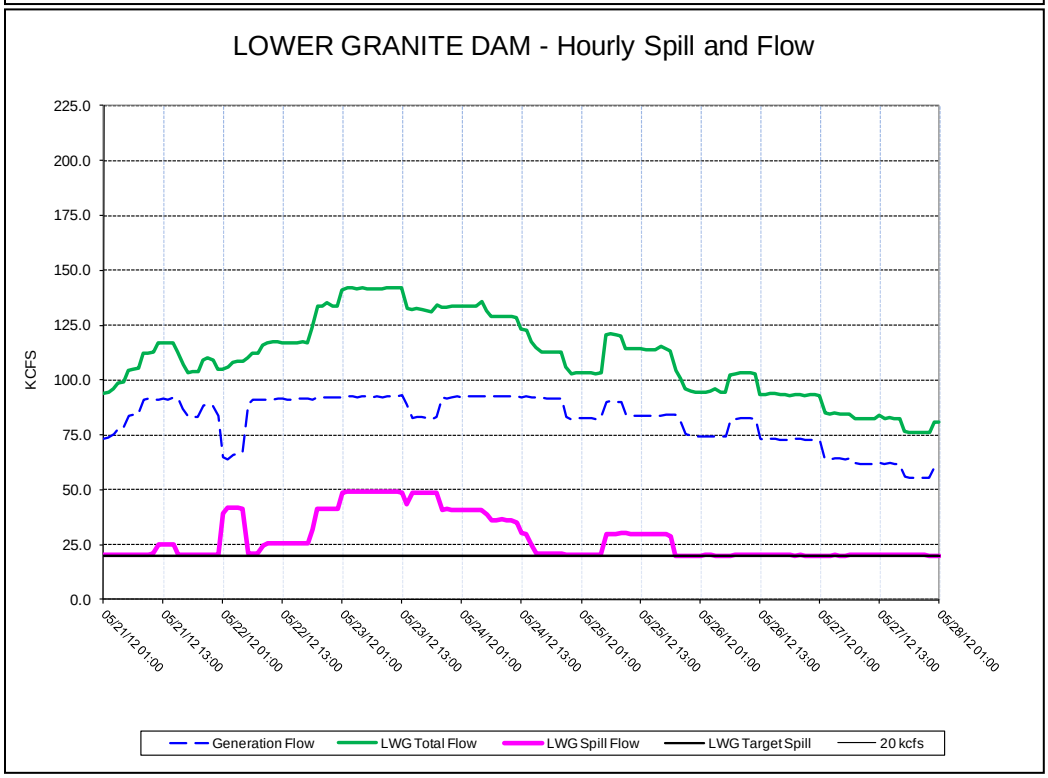

LOWER GRANITE DAM - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/21/12 01:00
05/21/12 13:00
05/22/12 01:00
05/22/12 13:00
05/23/12 01:00
05/23/12 13:00
05/24/12 01:00
05/24/12 13:00
05/25/12 01:00
05/25/12 13:00
05/26/12 01:00
05/26/12 13:00
05/27/12 01:00
05/27/12 13:00
05/28/12 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
20 kcfs

Figure 26

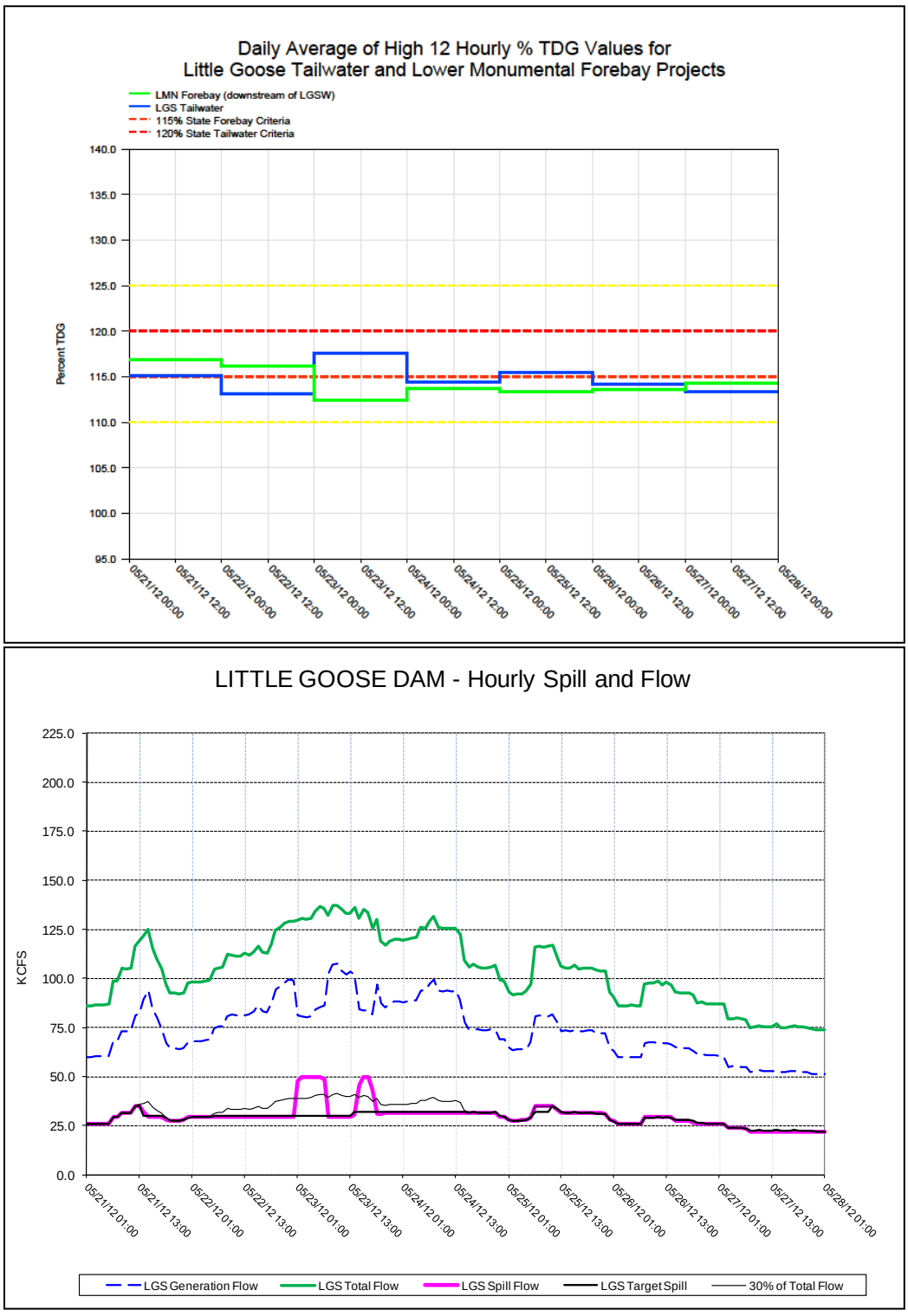
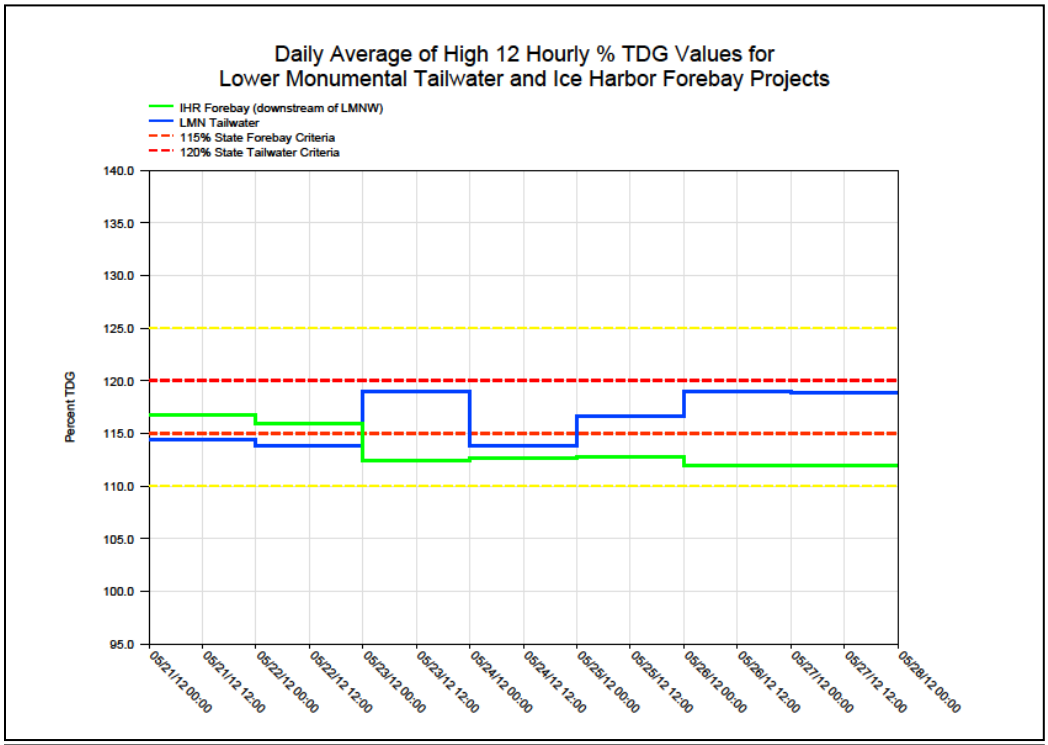

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
05/21/12 00:00
05/21/12 12:00
05/22/12 00:00
05/22/12 12:00
05/23/12 00:00
05/23/12 12:00
05/24/12 00:00
05/24/12 12:00
05/25/12 00:00
05/25/12 12:00
05/26/12 00:00
05/26/12 12:00
05/27/12 00:00
05/27/12 12:00
05/28/12 00:00
LITTLE GOOSE DAM - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/21/12 01:00
05/21/12 13:00
05/22/12 01:00
05/22/12 13:00
05/23/12 01:00
05/23/12 13:00
05/24/12 01:00
05/24/12 13:00
05/25/12 01:00
05/25/12 13:00
05/26/12 01:00
05/26/12 13:00
05/27/12 01:00
05/27/12 13:00
05/28/12 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 27


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
05/21/12 00:00
05/21/12 12:00
05/22/12 00:00
05/22/12 12:00
05/23/12 00:00
05/23/12 12:00
05/24/12 00:00
05/24/12 12:00
05/25/12 00:00
05/25/12 12:00
05/26/12 00:00
05/26/12 12:00
05/27/12 00:00
05/27/12 12:00
05/28/12 00:00

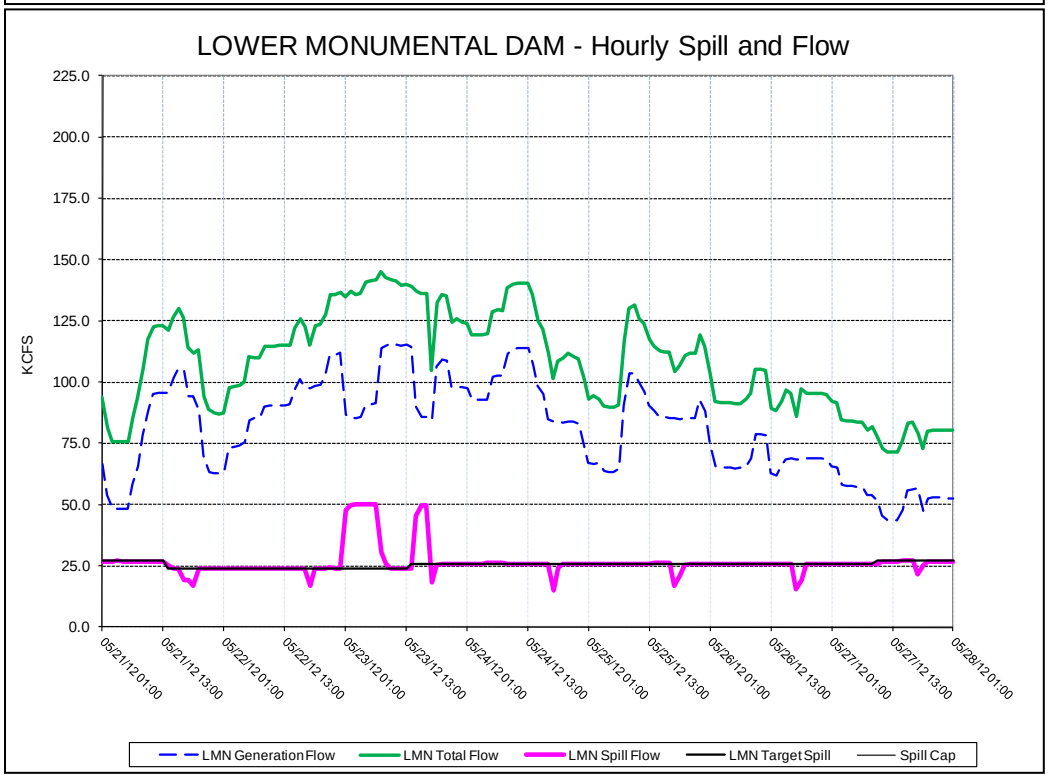

LOWER MONUMENTAL DAM - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/21/12 01:00
05/21/12 13:00
05/22/12 01:00
05/22/12 13:00
05/23/12 01:00
05/23/12 13:00
05/24/12 01:00
05/24/12 13:00
05/25/12 01:00
05/25/12 13:00
05/26/12 01:00
05/26/12 13:00
05/27/12 01:00
05/27/12 13:00
05/28/12 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
Spill Cap

Figure 28

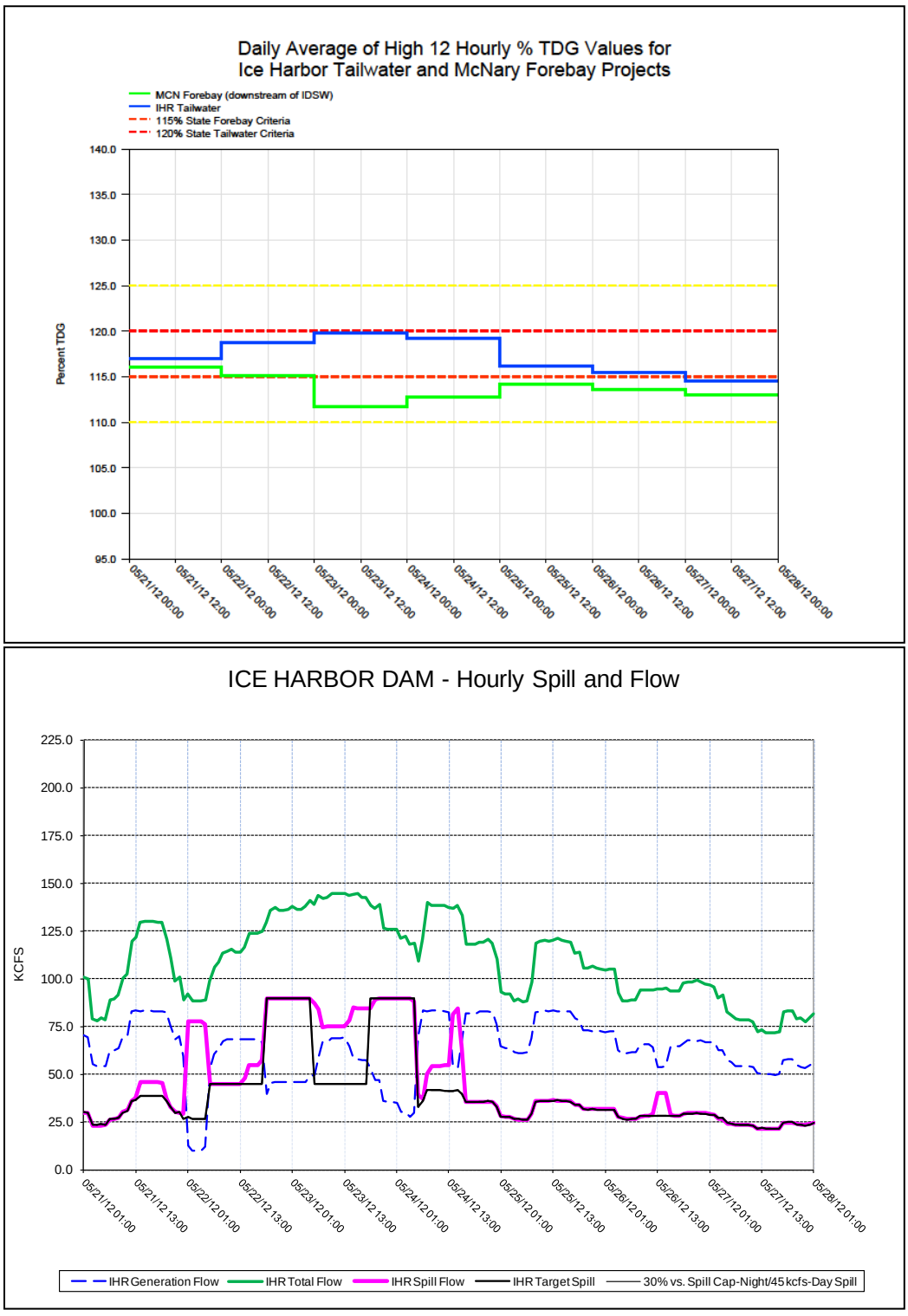

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
05/21/12 00:00
05/21/12 12:00
05/22/12 00:00
05/22/12 12:00
05/23/12 00:00
05/23/12 12:00
05/24/12 00:00
05/24/12 12:00
05/25/12 00:00
05/25/12 12:00
05/26/12 00:00
05/26/12 12:00
05/27/12 00:00
05/27/12 12:00
05/28/12 00:00
ICE HARBOR DAM - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/21/12 01:00
05/21/12 13:00
05/22/12 01:00
05/22/12 13:00
05/23/12 01:00
05/23/12 13:00
05/24/12 01:00
05/24/12 13:00
05/25/12 01:00
05/25/12 13:00
05/26/12 01:00
05/26/12 13:00
05/27/12 01:00
05/27/12 13:00
05/28/12 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
30% vs. Spill Cap-Night/45 kcfs-Day Spill

Figure 29

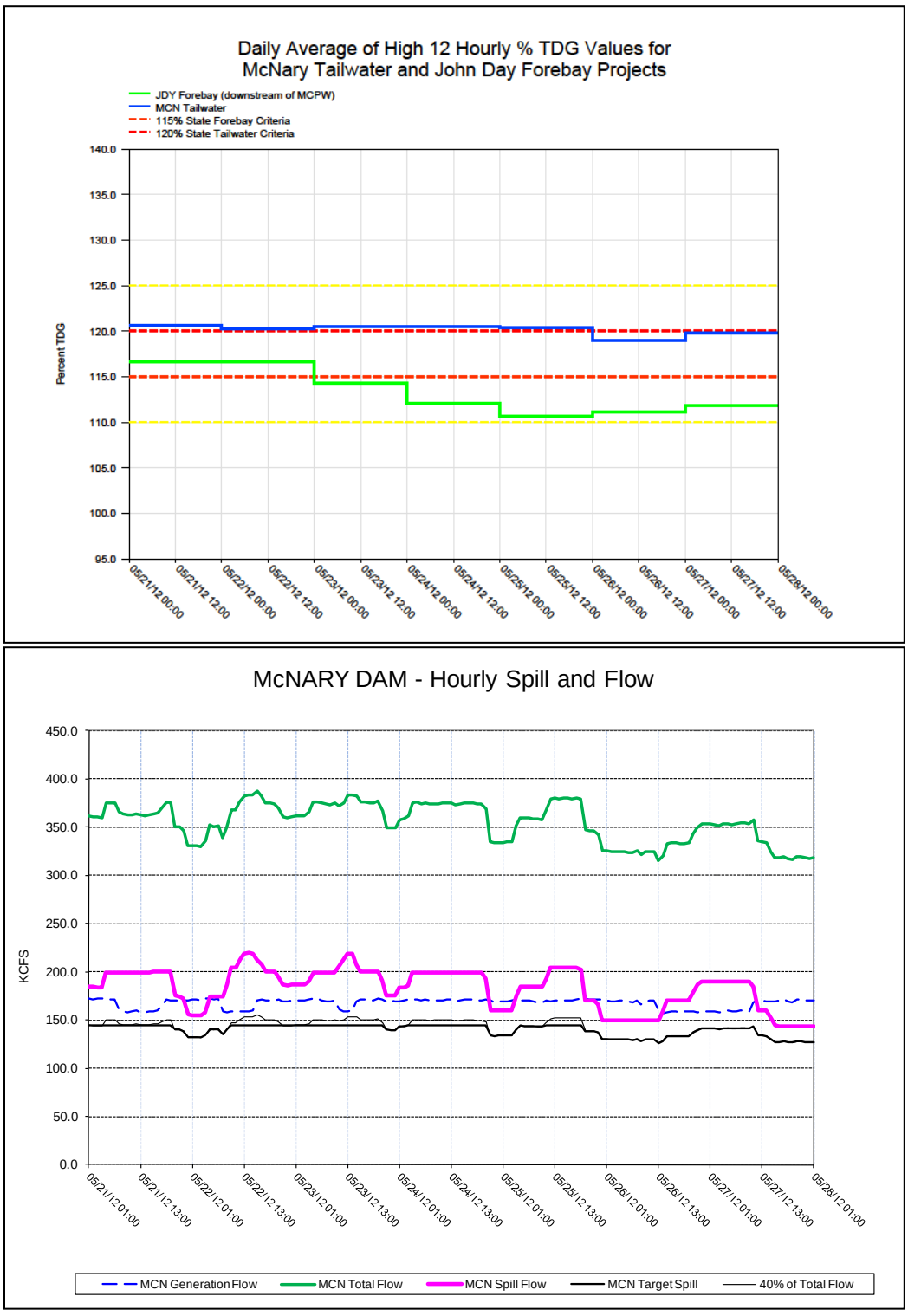

Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
05/21/12 00:00
05/21/12 12:00
05/22/12 00:00
05/22/12 12:00
05/23/12 00:00
05/23/12 12:00
05/24/12 00:00
05/24/12 12:00
05/25/12 00:00
05/25/12 12:00
05/26/12 00:00
05/26/12 12:00
05/27/12 00:00
05/27/12 12:00
05/28/12 00:00
McNARY DAM - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
05/21/12 01:00
05/21/12 13:00
05/22/12 01:00
05/22/12 13:00
05/23/12 01:00
05/23/12 13:00
05/24/12 01:00
05/24/12 13:00
05/25/12 01:00
05/25/12 13:00
05/26/12 01:00
05/26/12 13:00
05/27/12 01:00
05/27/12 13:00
05/28/12 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
40% of Total Flow

Figure 30

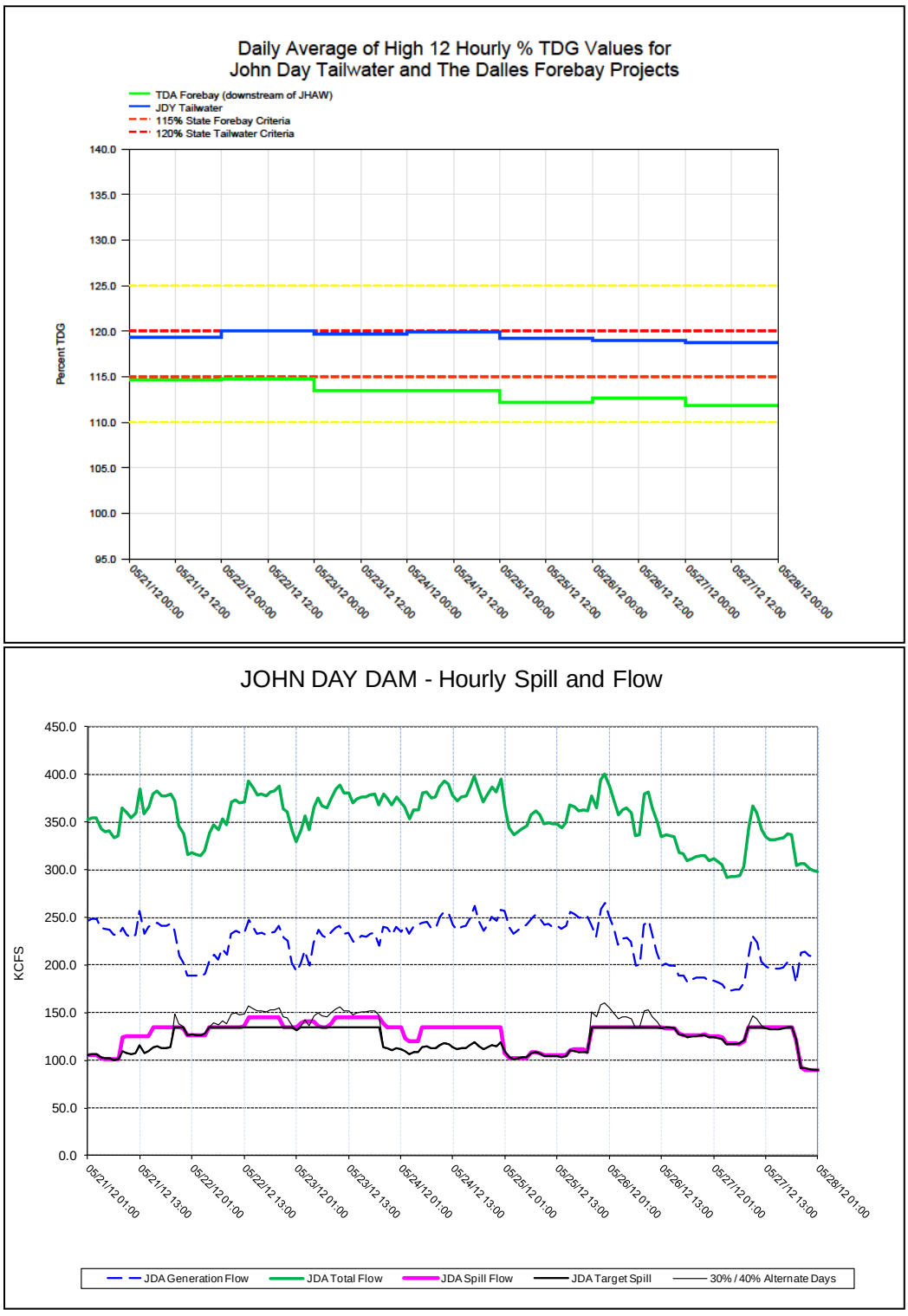

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
05/21/12 00:00
05/21/12 12:00
05/22/12 00:00
05/22/12 12:00
05/23/12 00:00
05/23/12 12:00
05/24/12 00:00
05/24/12 12:00
05/25/12 00:00
05/25/12 12:00
05/26/12 00:00
05/26/12 12:00
05/27/12 00:00
05/27/12 12:00
05/28/12 00:00
JOHN DAY DAM - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
05/21/12 01:00
05/21/12 13:00
05/22/12 01:00
05/22/12 13:00
05/23/12 01:00
05/23/12 13:00
05/24/12 01:00
05/24/12 13:00
05/25/12 01:00
05/25/12 13:00
05/26/12 01:00
05/26/12 13:00
05/27/12 01:00
05/27/12 13:00
05/28/12 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% / 40% Alternate Days

Figure 31

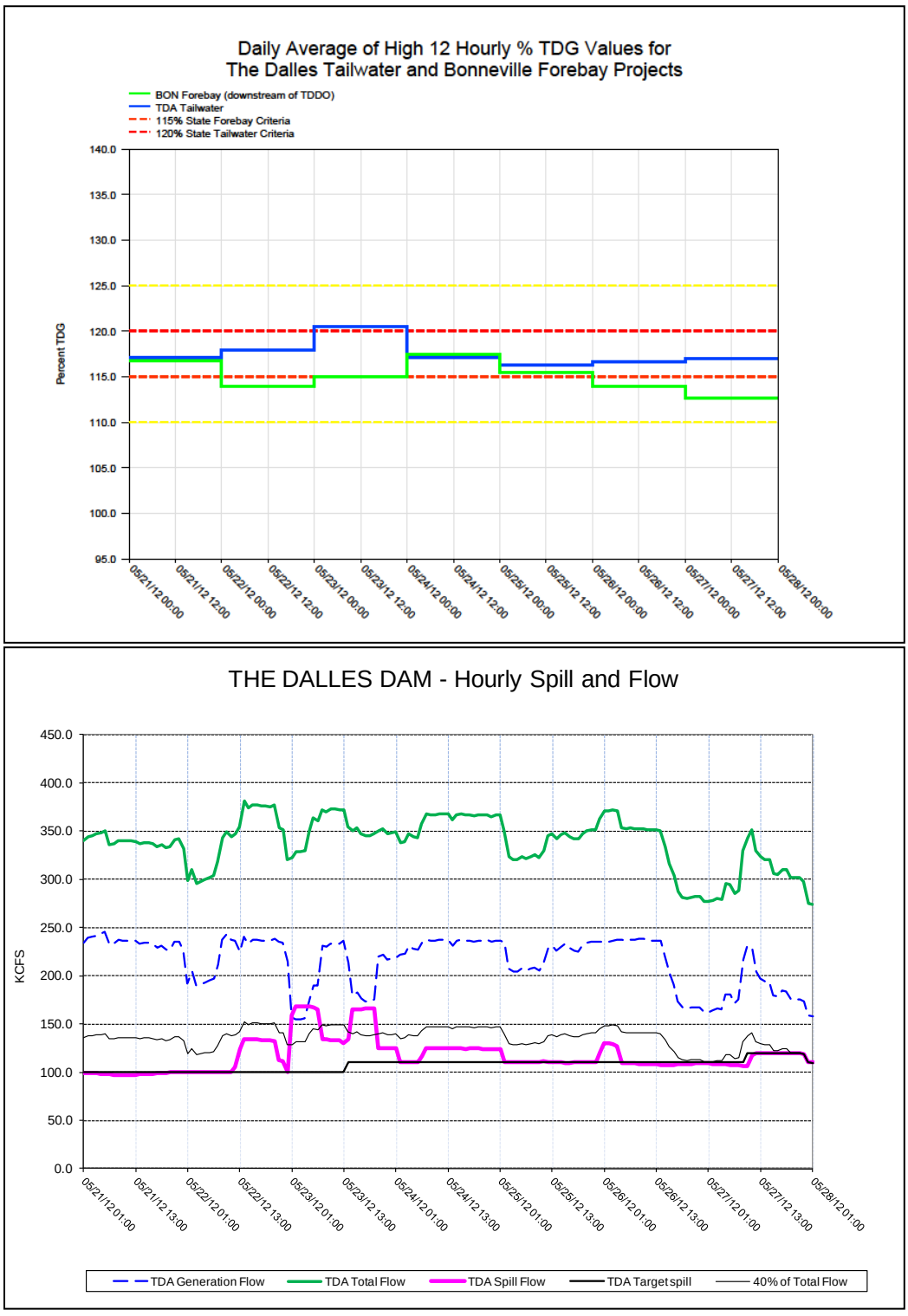
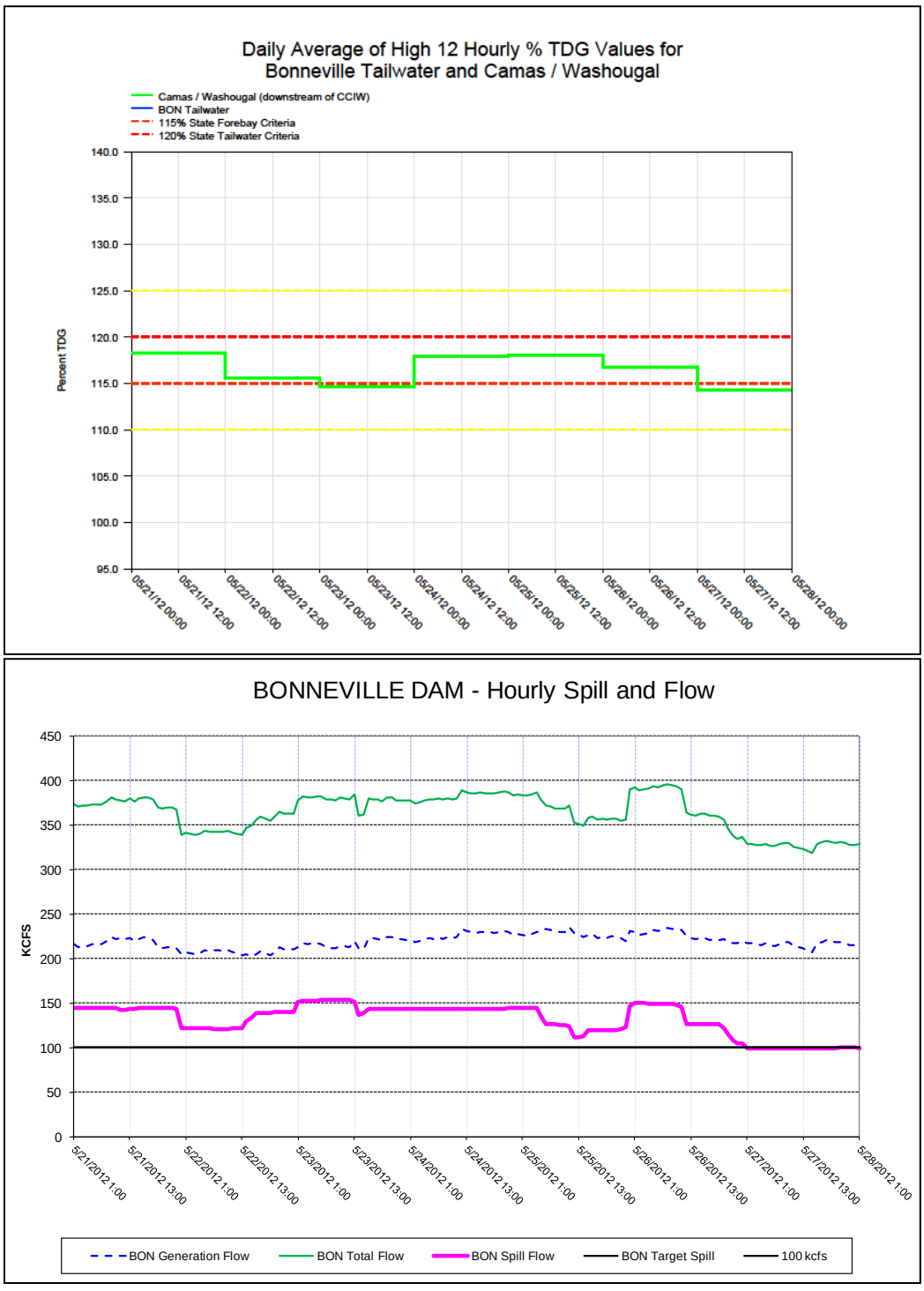

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
05/21/12 00:00
05/21/12 12:00
05/22/12 00:00
05/22/12 12:00
05/23/12 00:00
05/23/12 12:00
05/24/12 00:00
05/24/12 12:00
05/25/12 00:00
05/25/12 12:00
05/26/12 00:00
05/26/12 12:00
05/27/12 00:00
05/27/12 12:00
05/28/12 00:00
THE DALLES DAM - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
05/21/12 01:00
05/21/12 13:00
05/22/12 01:00
05/22/12 13:00
05/23/12 01:00
05/23/12 13:00
05/24/12 01:00
05/24/12 13:00
05/25/12 01:00
05/25/12 13:00
05/26/12 01:00
05/26/12 13:00
05/27/12 01:00
05/27/12 13:00
05/28/12 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 32


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
05/21/12 00:00
05/21/12 12:00
05/22/12 00:00
05/22/12 12:00
05/23/12 00:00
05/23/12 12:00
05/24/12 00:00
05/24/12 12:00
05/25/12 00:00
05/25/12 12:00
05/26/12 00:00
05/26/12 12:00
05/27/12 00:00
05/27/12 12:00
05/28/12 00:00
BONNEVILLE DAM - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
5/21/2012 1:00
5/21/2012 13:00
5/22/2012 1:00
5/22/2012 13:00
5/23/2012 1:00
5/23/2012 13:00
5/24/2012 1:00
5/24/2012 13:00
5/25/2012 1:00
5/25/2012 13:00
5/26/2012 1:00
5/26/2012 13:00
5/27/2012 1:00
5/27/2012 13:00
5/28/2012 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
100 kcfs

Date	FIXED MONITORING STATIONS																
	LWG	LGNW	LGSA	LGSW	LMNA	LMNW	IHRA	IDSW	MCNA	MCPW	JDY	JHAW	TDA	TDDO	BON	CCIW	CWMW
4/30/2012	105.7	119	113.9	117.6	117.5	120.4	115.9	119.8	111.8	122	115	122.4	116.1	121.6	117.5	---	121.3
5/1/2012	104.1	117.2	109.8	117	116.8	119.3	114.8	119.8	112.1	122.2	112.9	122.5	116	122.4	121.3	---	116.7
5/2/2012	105	115.4	111.2	116	116.6	118.7	116.5	119.2	115.7	122.4	111.4	123	115.8	122.5	122.1	---	121
5/3/2012	104.5	117.8	109.2	118.4	113.9	119.2	113.8	118.9	114.5	121.9	110.2	121.7	112.7	118.9	118.3	---	121.3
5/4/2012	102.5	117.9	105.6	116.8	113.2	116.8	112.2	117.9	112.1	121.5	111.2	121.8	112.3	118.7	115.4	---	119.5
5/5/2012	102.5	111.8	107.7	113.2	115.5	112.9	113.4	117.1	114.9	119.4	111.5	120.6	115.1	119.4	118.8	---	117.9
5/6/2012	104.5	111.3	112.5	115.4	114.6	120.6	115.1	118	117.5	119.3	113.8	119.8	115.4	122.1	119.9	---	119.7
5/7/2012	106.3	115.9	115.1	115.7	116.3	121.8	116.5	118.6	119.2	119.5	117.7	119.2	116.1	118.9	121	---	120.1
5/8/2012	105.7	118.2	112.1	118.2	116.7	119.4	116.9	118.3	118.4	119.9	117.3	118.7	114.3	121.9	115.1	---	119.5
5/9/2012	103.5	114.1	109.3	114.1	115	119.2	115.8	116.4	114.9	119.6	114.4	118.8	114.9	120.7	117.6	---	116.8
5/10/2012	102.3	110.6	112.4	114.8	114.5	119.5	115.5	116.5	114.5	120.2	114.1	119.4	115.6	118.2	119	---	116.9
5/11/2012	103.4	110.6	113.9	114.6	113.4	119.3	115.9	116.8	116.6	119.7	114.6	118.9	114.9	117.5	117.9	---	118.1
5/12/2012	104.7	110.8	110.1	113.5	115.7	119.9	116.2	118.3	117.6	117.1	117.4	117.5	116	118.2	118	---	117
5/13/2012	105.9	111	109.9	113.8	115.7	119.8	117.1	117.9	118.8	118.4	119.6	119	117.3	119.2	118.3	---	118.7
5/14/2012	106.1	111.5	111	114.4	114.9	119.2	118	117.5	117.9	119.8	119.6	119.2	117.1	118.8	116.8	---	118.5
5/15/2012	105.9	115.4	111.5	116.9	115.1	115.3	117.5	118.4	117	118.8	118.3	118.3	115.3	118.1	114.3	---	117.9
5/16/2012	105.7	119.3	110.3	119.8	117	120.9	116.2	120.2	116.1	119.9	115.7	119.7	113.5	121	113.3	---	116.1
5/17/2012	104.7	118.6	111.6	116.9	117.8	117.5	115	120.1	114.2	121.8	113.2	120.6	113.6	118.6	114.8	---	114.5
5/18/2012	105	117.2	114.3	117	116.6	115.5	115.7	119	114.3	120.4	113	120.4	115.2	119.2	116.5	---	115.3
5/19/2012	106	111.8	115.5	115.9	117.9	114.2	116.3	117.6	115.6	120.1	114.1	119.7	114.2	117.4	118.7	---	118.8
5/20/2012	106.7	111.6	116.4	115.1	116.9	114.3	116.7	117	116.1	120.6	116.7	119.3	114.6	117.1	116.7	---	119.2
5/21/2012	105.9	116.6	110	113.1	116.1	113.8	115.9	118.7	115.1	120.3	116.6	120	114.7	118	113.9	---	118.2
5/22/2012	104.6	118.3	108	117.5	112.4	118.9	112.4	119.8	111.7	120.5	114.2	119.6	113.5	120.4	114.9	---	115.6
5/23/2012	104.8	116.7	110.7	114.4	113.7	113.8	112.7	119.2	112.8	120.5	112	119.9	113.5	117.1	117.5	---	114.6
5/24/2012	105.8	114.1	113.1	115.4	113.3	116.6	112.7	116.1	114.2	120.4	110.7	119.2	112.2	116.3	115.5	---	117.9
5/25/2012	105.9	111.3	112.4	114.2	113.6	119	111.9	115.4	113.6	118.9	111.1	118.9	112.7	116.6	113.9	---	118
5/26/2012	104.7	110.3	109.7	113.3	114.2	118.8	111.9	114.5	113	119.8	111.8	118.7	111.8	117	112.6	---	116.8
5/27/2012	103.8	110.6	109.1	113.1	113.5	118.8	112.9	115.2	112.9	117.3	111.4	117.7	112	117.4	113.7	---	114.3

Total Dissolved Gas Monitoring Stations

Code	Station Name
LWG	Lower Granite Forebay
LGNW	Lower Granite Tailwater
LGSA	Little Goose Forebay
LGSW	Little Goose Tailwater
LMNA	Lower Monumental Forebay
LMNW	Lower Monumental Tailwater
IHRA	Ice Harbor Forebay
IDSW	Ice Harbor Tailwater
MCNA	McNary Forebay
MCPW	McNary Tailwater
JDY	John Day Forebay
JHAW	John Day Tailwater
TDA	The Dalles Forebay
TDDO	The Dalles Tailwater
BON	Bonneville Forebay
CCIW	Bonneville Tailwater (Cascade Island)
CWMW	Camas / Washougal

FISH OPERATIONS PLAN IMPLEMENTATION REPORT
June 2012

Submitted by the U.S. Army Corps of Engineers
Northwestern Division
Portland, OR

Introduction:

The U.S. Army Corps of Engineers (Corps) is submitting this report in accordance with the 2012 Fish Operations Plan (2012 FOP) submitted to the U.S. District Court of Oregon on March 9, 2012. The 2012 FOP describes the Corps' project operations for fish passage at its Federal Columbia River Power System (FCRPS) dams during the fish migration season, generally April through August. To the extent Corps project operations are not specified in the 2012 FOP, the FCRPS operations will be consistent with the 2010 NOAA Fisheries Supplemental Biological Opinion (2010 Supplemental BiOp), the USFWS 2000 and 2006 BiOps, and/or other operative documents, including the 2012 Water Management Plan (WMP), WMP seasonal updates, and the 2012 Fish Passage Plan (FPP).

The Corps' June 2012 lower Snake and Columbia River project and fish passage operations are contained in this report. In particular, information in this report includes the following:

- hourly flow through the powerhouse at each dam;
- hourly flow over the spillway compared to the spill target for that hour; and,
- resultant high 12-hour average percent Total Dissolved Gas (%TDG) levels in the tailrace at each project and in the subsequent downstream project's forebay and the Camas-Washougal gauge below Bonneville Dam.

This report also provides information on presented issues and unanticipated or emergency situations that arose during implementation of the 2012 FOP in June.

Data Reporting:

I. For each project providing fish passage operations, this report contains two graphs per operational week[1] in June displaying the performance of the spill program as follows:

(A). Daily Average of the High 12 Hourly %TDG Values - described in the upper graph.
(B). Hourly Spill and Generation Flows - described in the lower graph.

The weekly graphs begin on May 28 and end on July 1 for the following lower Snake River and lower Columbia River projects: Lower Granite, Little Goose, Lower Monumental, Ice Harbor, McNary, John Day, The Dalles, and Bonneville.

[1] Operations are implemented from Monday through Sunday.

Each figure represents one week of a project's operation. The graphs start at 0000 hours (%TDG graphs) and 0100 hours (flow/spill graphs) on May 28 for the lower Snake River and the lower Columbia River projects.

May 28 – June 3	Figures 1 – 8
June 4 – June 10	Figures 9 – 16
June 11 – June 17	Figures 17 – 24
June 18 – June 24	Figures 25 – 32
June 25 – July 1	Figures 33 - 40

A. Upper Graph: Shows the resultant daily average %TDG for the 12 highest hours. This is primarily a result of spill at dams. The objective is to operate each project up to the TDG limits without exceeding those limits to the extent practicable.

1. The blue line represents the %TDG in the tailrace of the dam. 120 percent TDG is the upper operating limit[2].
2. The green line represents the %TDG in the forebay of the next dam downstream. 115 percent TDG is the upper operating limit.

B. Lower Graph: Shows the hourly flow and spill at the dam.

- The dotted blue line shows the flow through the powerhouse each hour, in thousand cubic feet per second (kcfs).
- The medium green line represents the average hourly total river flow through the project in kcfs.
- The heavy pink line represents the average hourly flow through the spillway in kcfs.
- The thin black line represents the hourly spill level as defined in the 2012 FOP.
- The heavy black line represents the target spill. This is the hourly maximum spill level. The hourly target spill may vary as a function of total river flow, forebay elevation and generator capacity, subject to the following conditions:

    - spill percentage or flow rate specified in the 2012 FOP;
    - spill caps as set daily for TDG management;
    - test spill levels for fish passage research;
    - minimum generation for power system needs;
    - minimum spill at Bonneville (50 kcfs) dam;
    - minimum spill at John Day is 25 percent of project outflow.

II. A table is included at the end of the figures that lists the average daily %TDG for the 12 highest hours for all projects. The numbers in red indicate the project exceeded the %TDG gas cap - 115 percent (forebay of the next downstream dam) or 120 percent (tailwater) for each project.

[2] The Bonneville tailwater TDG gauge that was not operable after being overcome with water on April 25 at 2300 was repaired and returned to service on June 6 at 1300.

General Implementation Remarks:

For all projects that spill for fish passage, the target spill may be reduced due to various conditions as described below. When spill levels briefly deviate below or above the level specified in the 2012 FOP, the heavy pink line will be below or above the heavy black line in the graphs. Actual operation deviations from the target operation during voluntary spill hours are described below. The June 2012 Spill Variance Table includes average hourly data; therefore, while spill may vary from target spill for only a portion of an hour, the June 2012 Spill Variance Table characterizes the reduction as a full hour. There are instances when the hourly spill levels are not achievable due to mechanical limitations in setting spill gates to implement the regionally coordinated spill pattern. The project operator sets the spill gate stops to most closely approximate the 2012 FOP level of spill while also avoiding exceeding the %TDG spill cap to the extent practicable.

"Low flow" operations at the lower Columbia and Snake projects are triggered when inflow is insufficient to provide both minimum generation and the specified spill levels. In these situations, the projects operate at minimum generation and pass the remainder of project inflow as spill and through other miscellaneous routes, such as fish ladders, sluiceways, and navigation locks. As flows transition from higher flows to low flows, there may be situations when flows recede at a higher rate than forecasted. In addition, inflows provided by nonfederal projects upstream are variable and uncertain.

The combination of these factors may result in instances when unanticipated changes to inflow result in forebay elevations dropping to the low end of the Minimum Operating Pool (MOP). Since these projects have limited operating flexibility, maintaining minimum generation, MOP elevation, and the target spill may not be possible throughout every hour. During low flow periods at Little Goose Dam, the overall project spill percentage appears to be reduced because the calculations do not account for the volume of water released during navigational lockages; however, the actual spill volume remains constant. When these variances occur, they are recorded in the monthly Spill Variance Table for Little Goose under the variance type "Navigation."

Actual spill levels at Corps projects with set flow targets may vary up to ±2 kcfs (Bonneville Dam may range up to ±3 kcfs, 2012 FOP p. 19) compared to those specified in the 2012 FOP and the RCC spill priority list (defines the projects' %TDG spill caps). A number of factors influence actual spill, including hydraulic efficiency, exact gate opening calibration, spillway gate hoist cable stretch due to temperature changes, and forebay elevation (e.g. a higher forebay results in a greater volume of spill since more water can pass under the spill gate).

The 2012 FOP describes project "Operations during Rapid Load Changes" (p. 6). For reporting purposes, the notation "Transmission Stability" in the Spill Variance Report Table replaces "Rapid Load Changes," and identifies instances when hourly spill levels were not met as a result of load swing hours and other related within-hour load variability issues. "Transmission Stability" occurs because projects must be available to respond to within-hour load variability to satisfy North American Electric Reliability Corporation (NERC) reserve requirements ("on response"). In addition to within-hour load variability, projects on response must be responsive

to within hour changes resulting from intermittent generation (such as wind generation). During periods of rapidly changing loads and intermittent generation, projects on response may have significant changes in turbine discharge within the hour while spill quantity remains the same within the hour. Under normal conditions, within-hour load changes primarily occur immediately preceding and following the peak load hours; however, within-hour changes in intermittent generation can occur at any hour of the day. Occasionally, several hours after peak load hours, the project may be decreasing total outflow and generation faster than the corresponding spill decreases causing the percent spill to be slightly higher. Due to the high variability of within-hour load, reporting actual spill percentages that vary by more than the ±1 percent requirement (or other ranges specified in the 2012 FOP) may occur with greater frequency with "Transmission Stability" hours than other hours.

Occurrences requiring an adjustment in operations and/or regional coordination are described in greater detail in the "Operational Adjustments" section below.

June Operations:

The month of June was characterized by above average flows for the lower Snake and the lower Columbia Rivers. The NOAA Northwest River Forecast Center's Runoff Processor indicated June 2012 adjusted volume runoff was above the 30 year average (1971-2000): 35.4 MAF (million acre feet) or 127 percent as measured at The Dalles. The Runoff Processor also indicated June 2012 adjusted runoff was about the 30 year average (1971-2000): 5.8 MAF or 86 percent of average as measured at Lower Granite Dam. The monthly precipitation summary for June was slightly below average at 75 percent on the Snake above Ice Harbor Dam and much greater than average, 168 percent on the Columbia above The Dalles Dam (data as of June 26).

The high runoff flows resulted in instances of involuntary spill due to lack of turbine capacity and lack of load throughout the month. In some of these instances of involuntary spill, the resulting Daily Average of High 12 Hourly %TDG values exceeded the 115 percent forebay and 120 percent tailrace standards[3] as shown in the corresponding %TDG graphs for the lower Columbia and Snake rivers.

During the June reporting period, the planned 2012 FOP spill operations transitioned from spring to summer levels and were carried out as follows:

- Lower Granite Dam - The hourly target spill level was 20 kcfs 24-hours/day until June 20 when the operation transitioned to the summer level of 18 kcfs 24-hours/day.
- Little Goose Dam - The hourly target spill level was 30 percent of total river flow 24-hours/day.
- Lower Monumental Dam - The hourly target spill level was the %TDG gas cap 24-hours/day until June 20 and then changed to 17 kcfs 24 hours/day.
- Ice Harbor Dam - The hourly target spill alternated every two days between 30 percent of total river flow rate for 24-hours/day vs. 45 kcfs daytime and the %TDG gas cap nighttime. Nighttime spill hours are 1800-0500.

[3] As provided for in the 2012 FOP (see p. 2-3).

- McNary Dam - The hourly target spill level was 40 percent of total river flow for 24-hours/day until June 12 when the operation transitioned the summer level of 50 percent of total river flow for 24-hours/day.
- John Day Dam - The hourly target spill alternated between 40 percent and 30 percent of total river flow rate for 24-hours/day due to the two-day treatment. Spill level changes occur every other day at 2000 hours.
- The Dalles Dam - The hourly target spill level was 40 percent of total river flow for 24-hours/day.
- Bonneville Dam - The hourly target spill flow rate was 100 kcfs 24-hours/day until June 16 when the operation transitioned to the summer operation of alternating every two days between 95 kcfs 24-hours/day vs. 85 kcfs daytime/121 kcfs nighttime.

Operational Adjustments

1. Bonneville Dam:

From the beginning of June through June 13 at 1800 hours, Bonneville Dam continued the operation requested in SOR 2012-2. The turbine units at powerhouse one (PH1) were operated above the upper limit of the 1% of best efficiency operating range in order to limit units at PH2 to the mid-point of the 1% operating range. The Corps implemented the requested operation by shifting flow to PH1 units operating above the upper limit of the 1% range so that the operation was "flow-neutral" (i.e., no net change in spill or generation). This operation was coordinated with the TMT at the meetings on May 30 and June 6, and extended by request from the Fish Passage Advisory Committee on June 12.

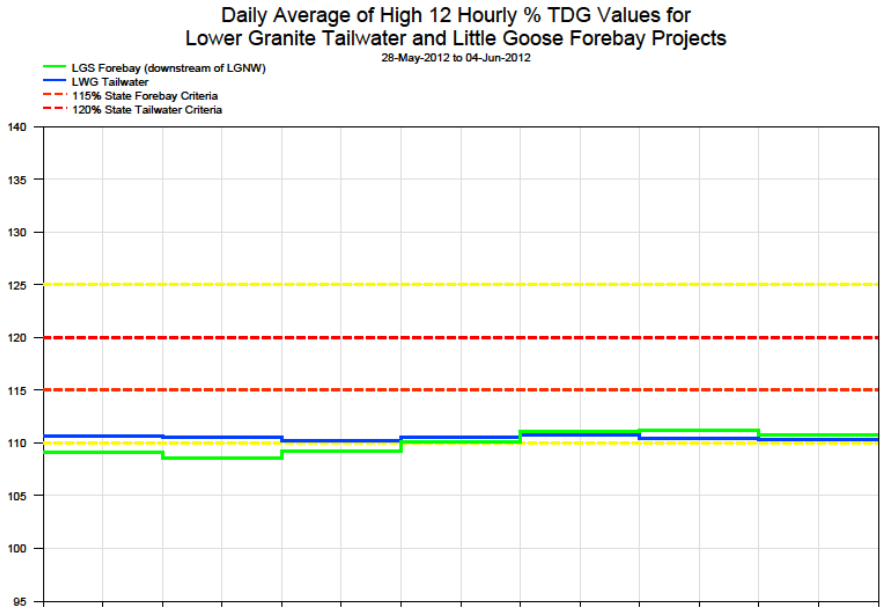
June 2012 Spill Variance Table

Project	Parameter	Date	Time[4]	Hours	Type	Reason
Lower Monumental	Reduced Spill	5/28/12	1800	1	Navigation	Hourly spill decreased to 17.2 kcfs (below 27 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	5/30/12	1800 - 1900	2	Navigation	Hourly spill decreased to 21.7 kcfs (below 27 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	6/1/12	1800	1	Navigation	Hourly spill decreased to 15.5 kcfs (below 26 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	6/3/12	1800	1	Navigation	Hourly spill decreased to 22.6 kcfs (below 26 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	6/5/12	1900	1	Navigation	Hourly spill decreased to 23.1 kcfs (below 26 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	6/7/12	1800	1	Navigation	Hourly spill decreased to 22.5 kcfs (below 26 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	6/11/12	1800 - 1900	2	Navigation	Hourly spill decreased to 19.1 kcfs (below 26 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	6/15/12	1800 - 1900	2	Navigation	Hourly spill decreased to 18.2 kcfs (below 24 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	6/17/12	1800 - 1900	2	Navigation	Hourly spill decreased to 16.0 kcfs (below 24 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	6/19/12	1800	1	Navigation	Hourly spill decreased to 21.3 kcfs (below 26 kcfs spill cap). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	6/21/12	1800	1	Navigation	Hourly spill decreased to 11.7 kcfs (below 17 kcfs FOP spill). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	6/25/12	1800	1	Navigation	Hourly spill decreased to 9.5 kcfs (below 17 kcfs FOP spill). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	6/29/12	1700	1	Navigation	Hourly spill decreased to 9.7 kcfs (below 17 kcfs FOP spill). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	7/1/12	1700& 1800	2	Navigation	Hourly spill decreased to 11.9 kcfs (below 17 kcfs FOP spill). Reduced spill for safe passage of fish barge.
Ice Harbor	Reduced Spill	6/28/12	2300	1	Human/ Program Error	Operated at 11.2 kcfs, outside of minimum generation range of 8.5-10.3 kcfs for units 1&3 due to a miscalculation.

[4] Note: Data collected for reporting spill variances is reported using hourly-averaged data. Therefore, while spill may be increased or decreased for only a portion of an hour, it is represented in the Spill Variance Table as an hour.

The Dalles	Reduced Spill	5/29/12	0800	1	Human/ Program Error	Hourly spill decreased to 38.7% (below 40% ± 1.0% range). Delay in implementing requested change to 110 kcfs. 24 hr avg. spill was 40.0%.
The Dalles	Reduced Spill	6/13/12	2000, 2100 & 2300	3	Human/ Program Error	Hourly spill decreased to 122.8 kcfs (below 125 kcfs spill cap). Spill volume fluctuated due to physical limits of spill gate settings and the spill cap was not set according to the specified spill pattern stops. 24 hr avg. spill was 39.8%.

Figure 1


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
28-May-2012 to 04-Jun-2012
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

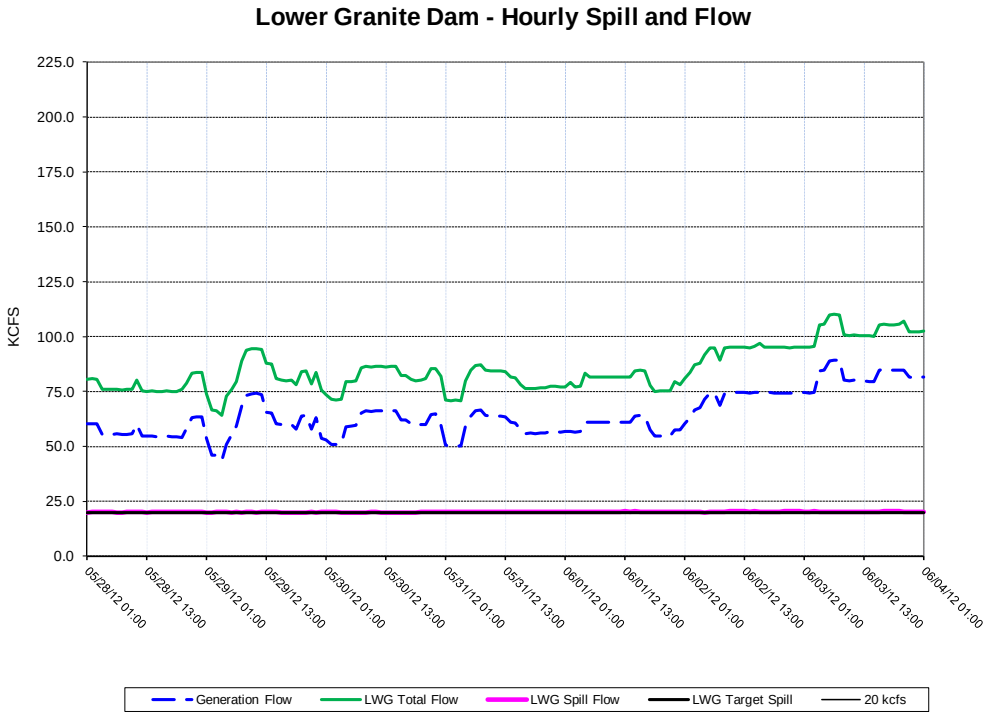
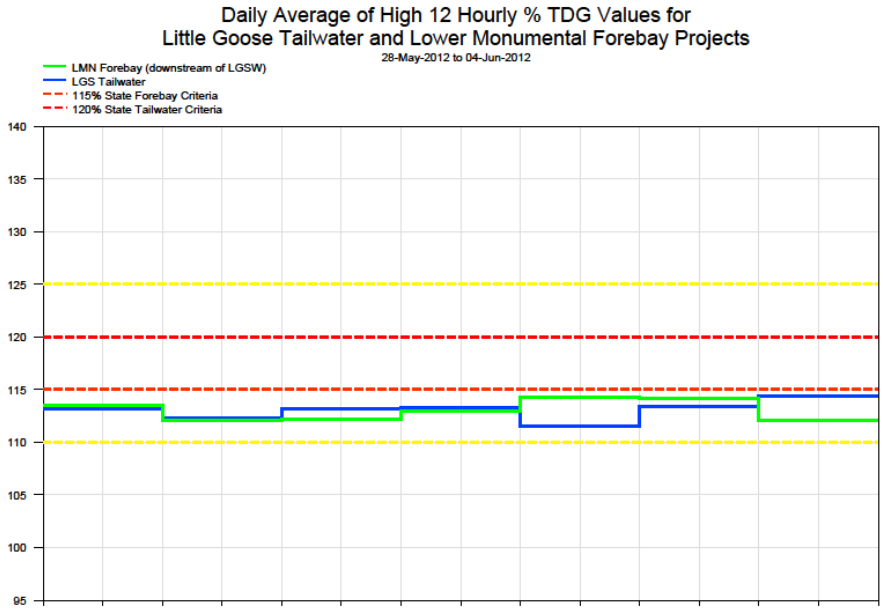

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/28/12 01:00
05/28/12 13:00
05/29/12 01:00
05/29/12 13:00
05/30/12 01:00
05/30/12 13:00
05/31/12 01:00
05/31/12 13:00
06/01/12 01:00
06/01/12 13:00
06/02/12 01:00
06/02/12 13:00
06/03/12 01:00
06/03/12 13:00
06/04/12 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
20 kcfs

Figure 2


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
28-May-2012 to 04-Jun-2012
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

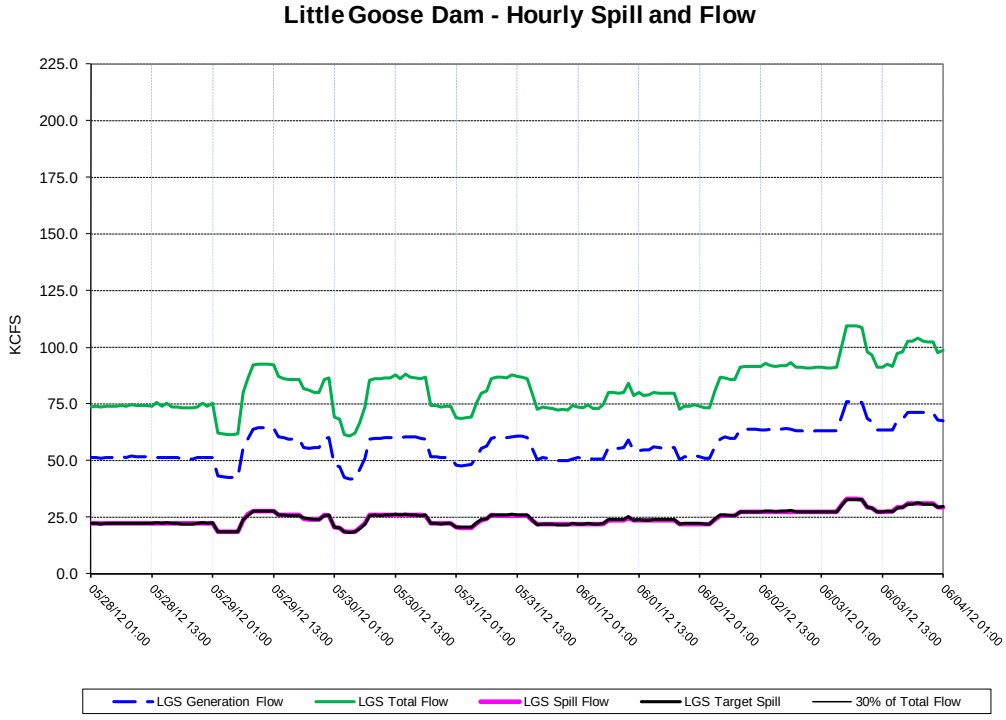
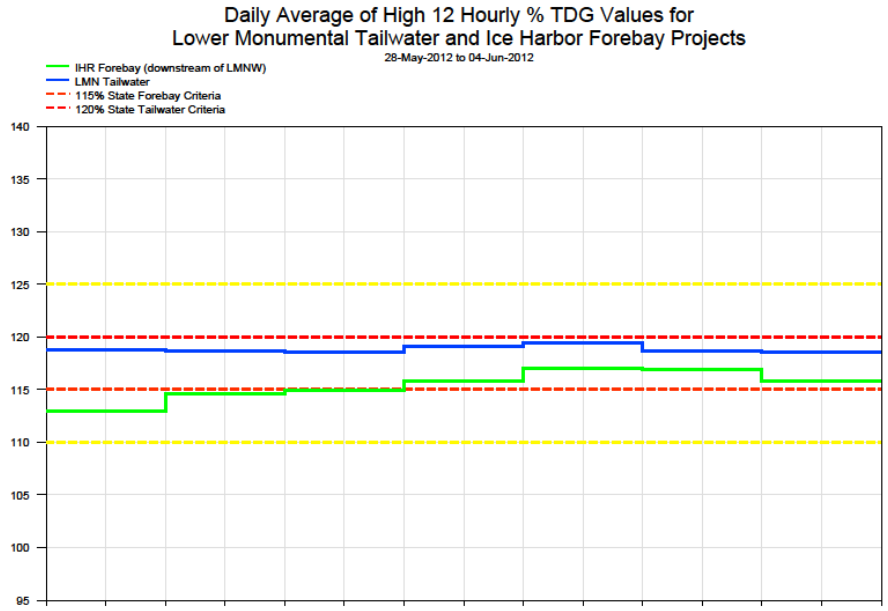

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/28/12 01:00
05/28/12 13:00
05/29/12 01:00
05/29/12 13:00
05/30/12 01:00
05/30/12 13:00
05/31/12 01:00
05/31/12 13:00
06/01/12 01:00
06/01/12 13:00
06/02/12 01:00
06/02/12 13:00
06/03/12 01:00
06/03/12 13:00
06/04/12 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 3


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
28-May-2012 to 04-Jun-2012
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

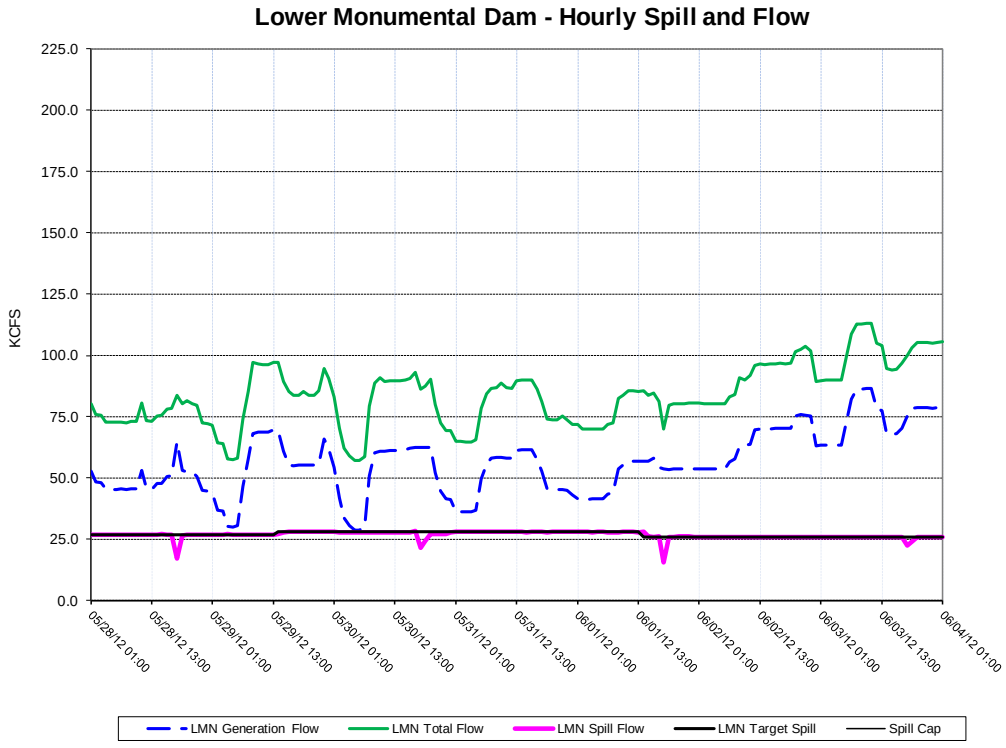
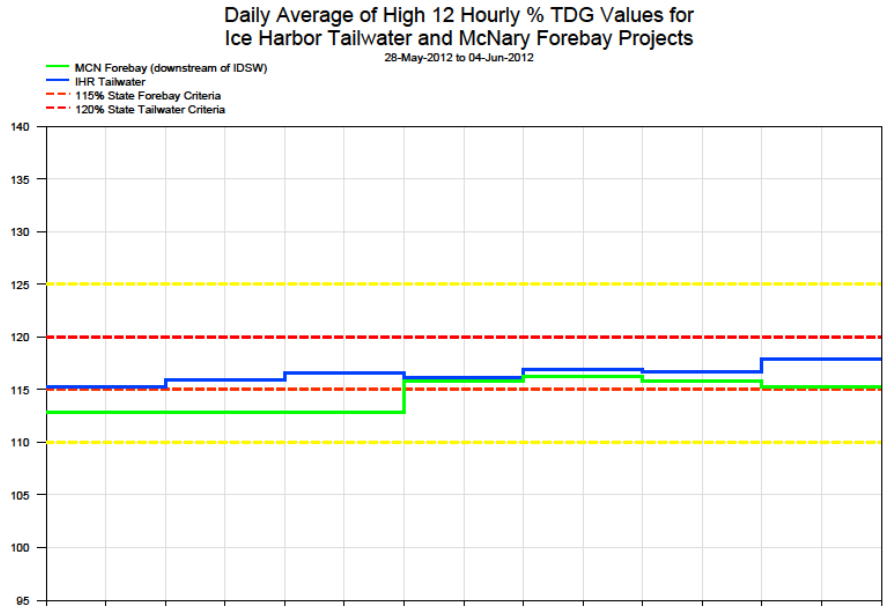

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/28/12 01:00
05/28/12 13:00
05/29/12 01:00
05/29/12 13:00
05/30/12 01:00
05/30/12 13:00
05/31/12 01:00
05/31/12 13:00
06/01/12 01:00
06/01/12 13:00
06/02/12 01:00
06/02/12 13:00
06/03/12 01:00
06/03/12 13:00
06/04/12 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
Spill Cap

Figure 4


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
28-May-2012 to 04-Jun-2012
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

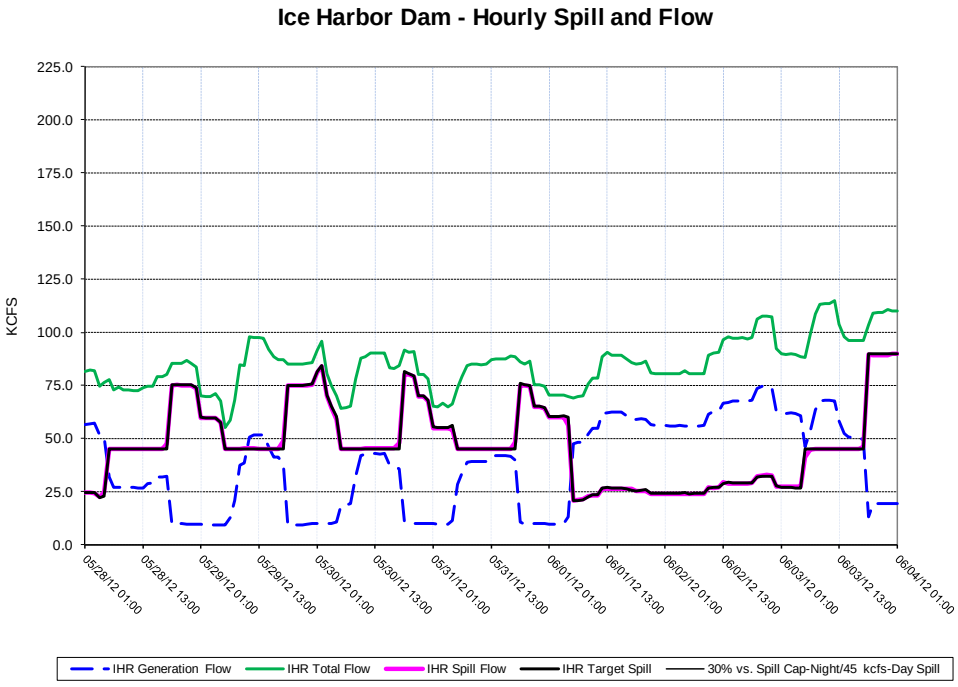
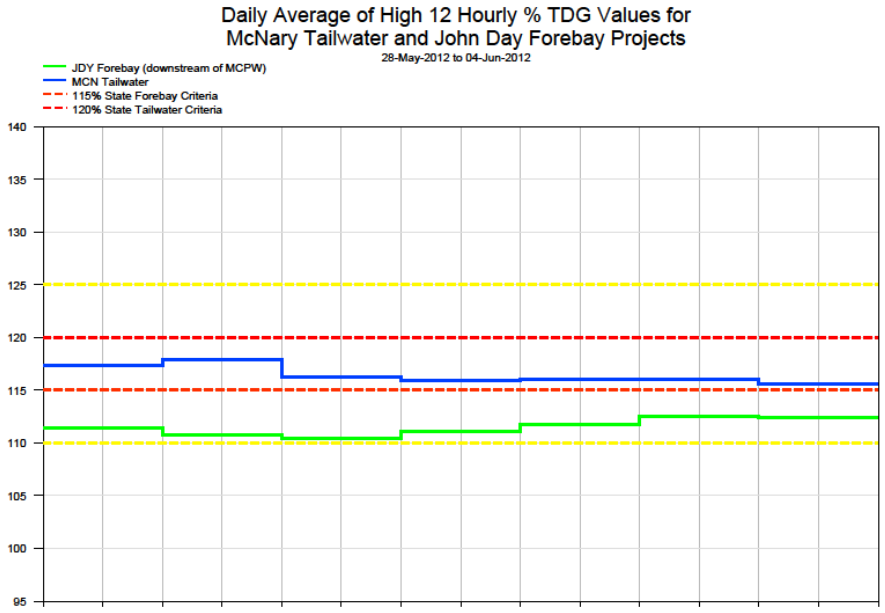

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
05/28/12 01:00
05/28/12 13:00
05/29/12 01:00
05/29/12 13:00
05/30/12 01:00
05/30/12 13:00
05/31/12 01:00
05/31/12 13:00
06/01/12 01:00
06/01/12 13:00
06/02/12 01:00
06/02/12 13:00
06/03/12 01:00
06/03/12 13:00
06/04/12 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
30% vs. Spill Cap-Night/45 kcfs-Day Spill

Figure 5


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
28-May-2012 to 04-Jun-2012
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

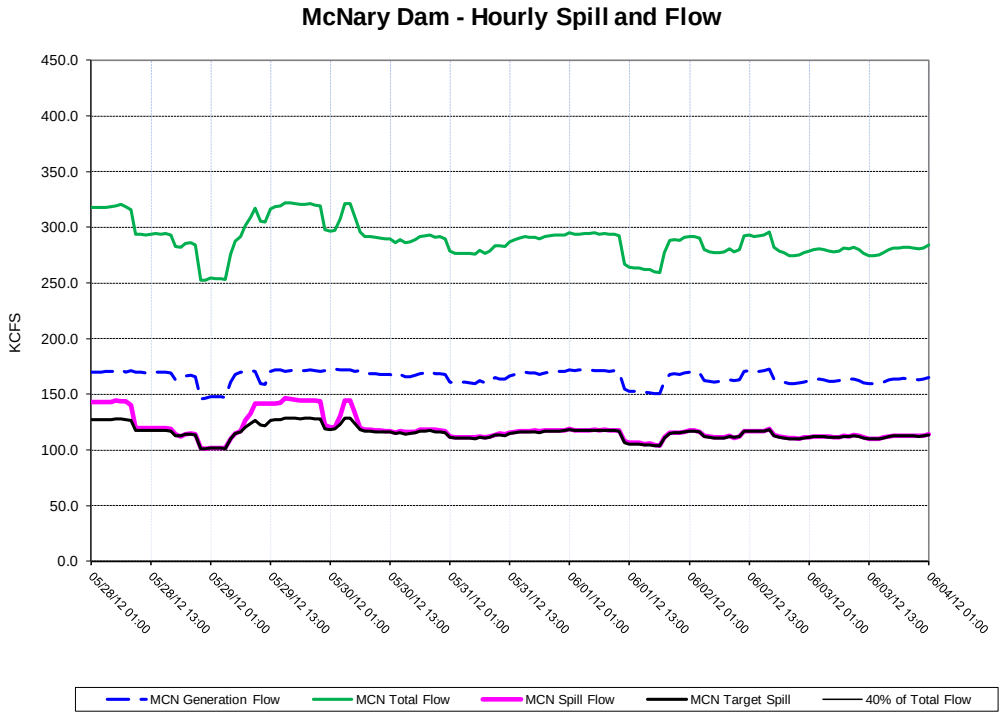
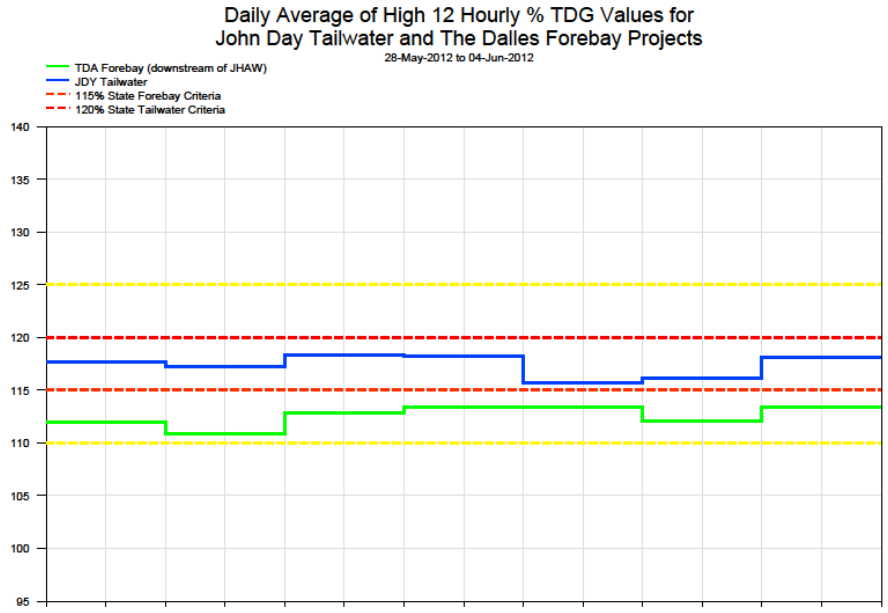

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
05/28/12 01:00
05/28/12 13:00
05/29/12 01:00
05/29/12 13:00
05/30/12 01:00
05/30/12 13:00
05/31/12 01:00
05/31/12 13:00
06/01/12 01:00
06/01/12 13:00
06/02/12 01:00
06/02/12 13:00
06/03/12 01:00
06/03/12 13:00
06/04/12 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
40% of Total Flow

Figure 6


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
28-May-2012 to 04-Jun-2012
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

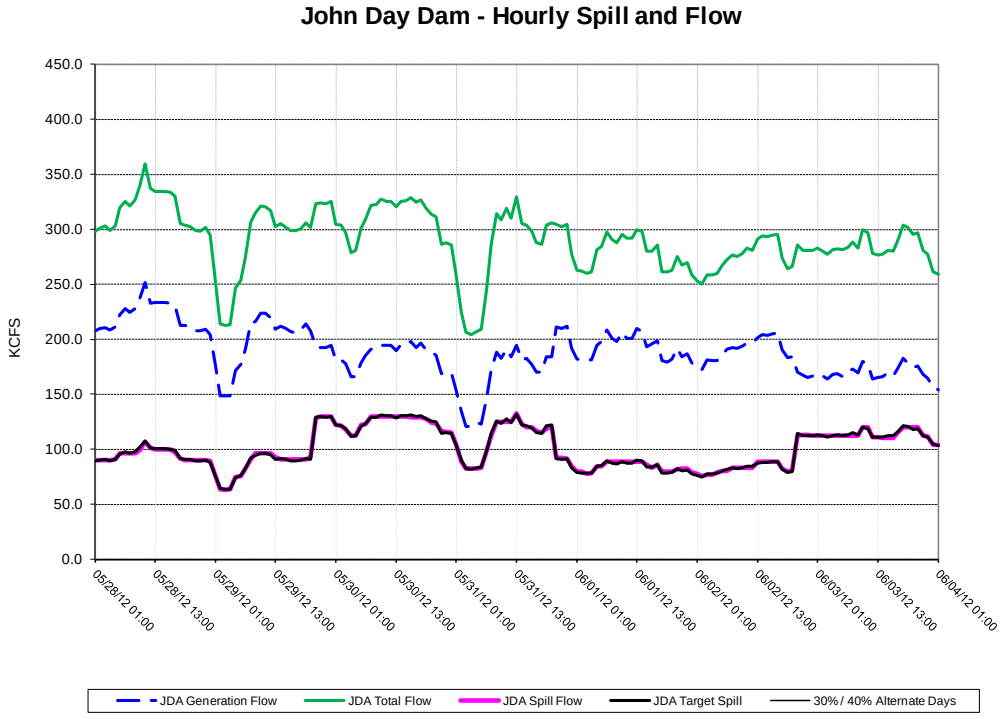
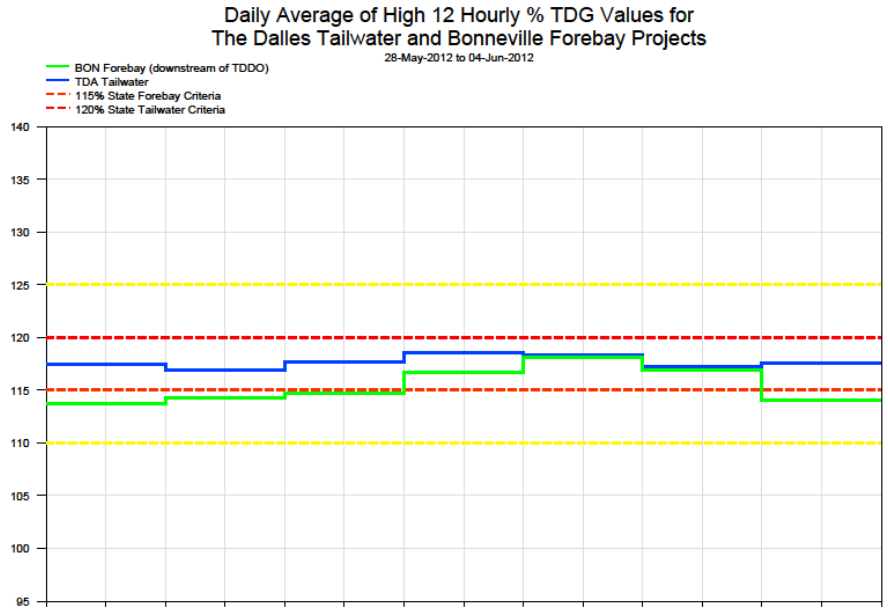

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
05/28/12 01:00
05/28/12 13:00
05/29/12 01:00
05/29/12 13:00
05/30/12 01:00
05/30/12 13:00
05/31/12 01:00
05/31/12 13:00
06/01/12 01:00
06/01/12 13:00
06/02/12 01:00
06/02/12 13:00
06/03/12 01:00
06/03/12 13:00
06/04/12 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% / 40% Alternate Days

Figure 7


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
28-May-2012 to 04-Jun-2012
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

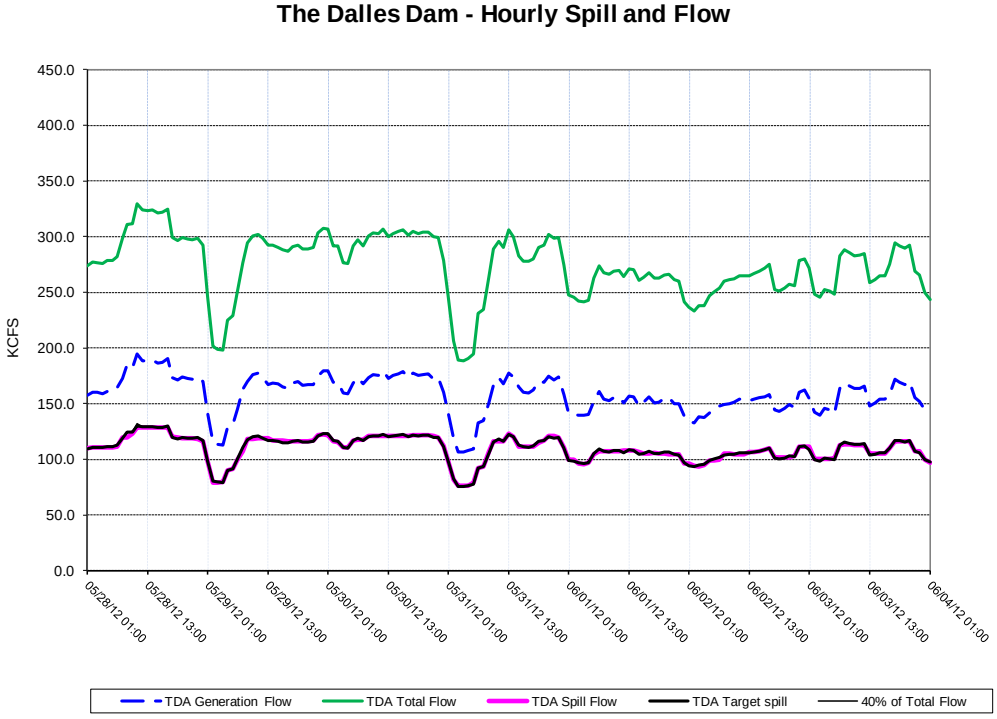
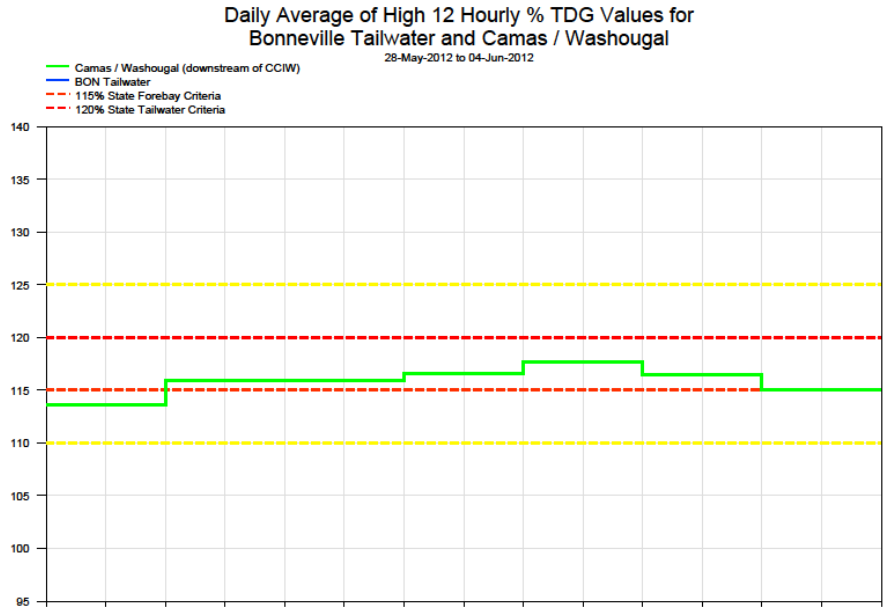

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
05/28/12 01:00
05/28/12 13:00
05/29/12 01:00
05/29/12 13:00
05/30/12 01:00
05/30/12 13:00
05/31/12 01:00
05/31/12 13:00
06/01/12 01:00
06/01/12 13:00
06/02/12 01:00
06/02/12 13:00
06/03/12 01:00
06/03/12 13:00
06/04/12 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 8


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
28-May-2012 to 04-Jun-2012
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

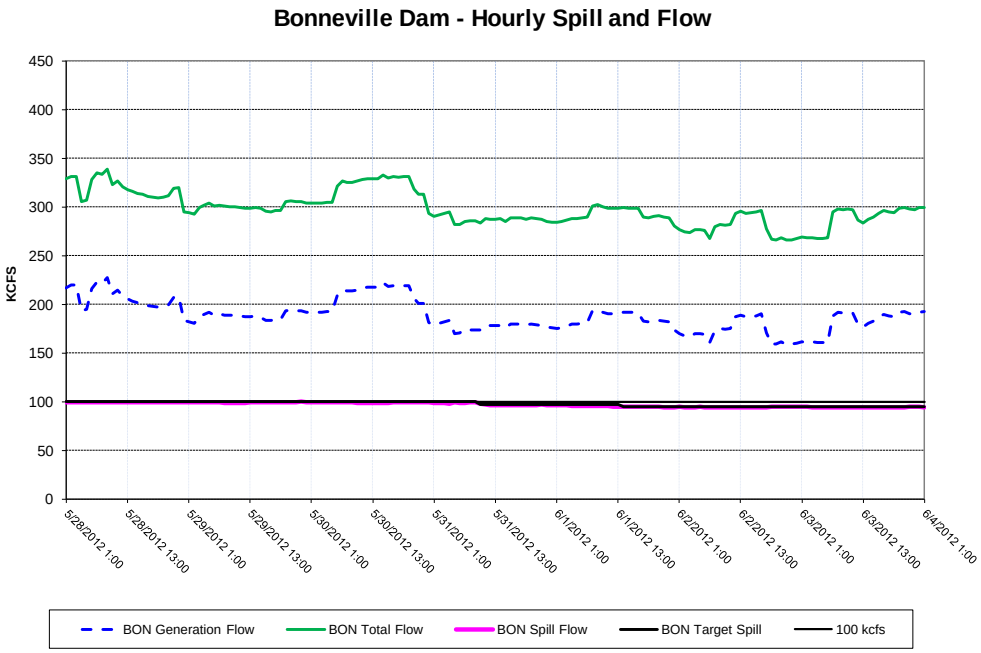
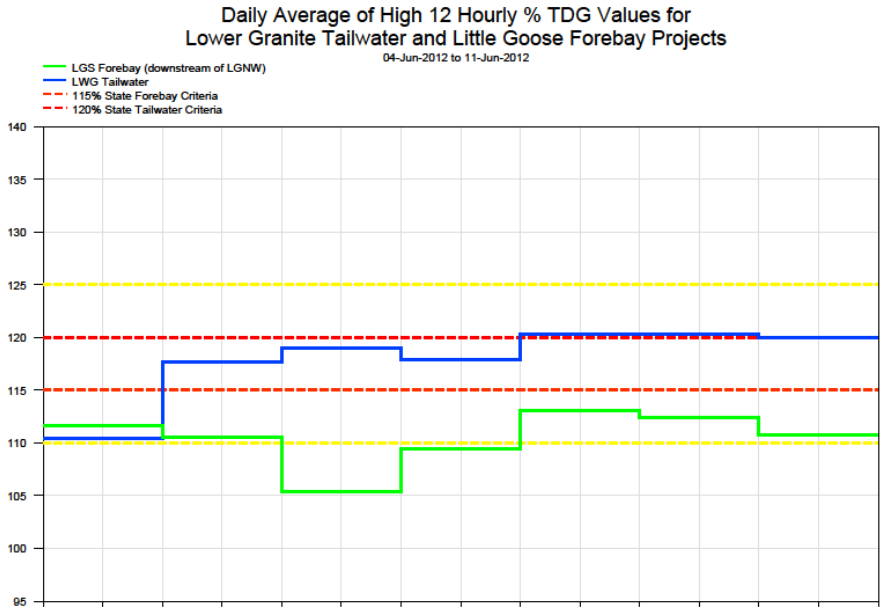

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
5/28/2012 1:00
5/28/2012 13:00
5/29/2012 1:00
5/29/2012 13:00
5/30/2012 1:00
5/30/2012 13:00
5/31/2012 1:00
5/31/2012 13:00
6/1/2012 1:00
6/1/2012 13:00
6/2/2012 1:00
6/2/2012 13:00
6/3/2012 1:00
6/3/2012 13:00
6/4/2012 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
100 kcfs

Figure 9


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
04-Jun-2012 to 11-Jun-2012
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

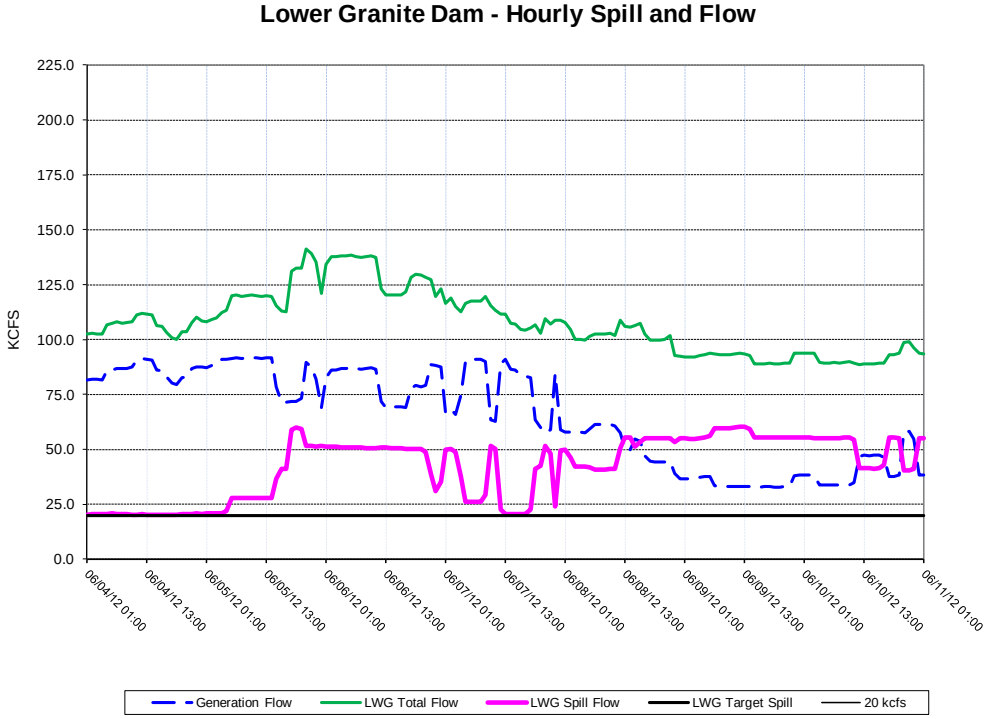
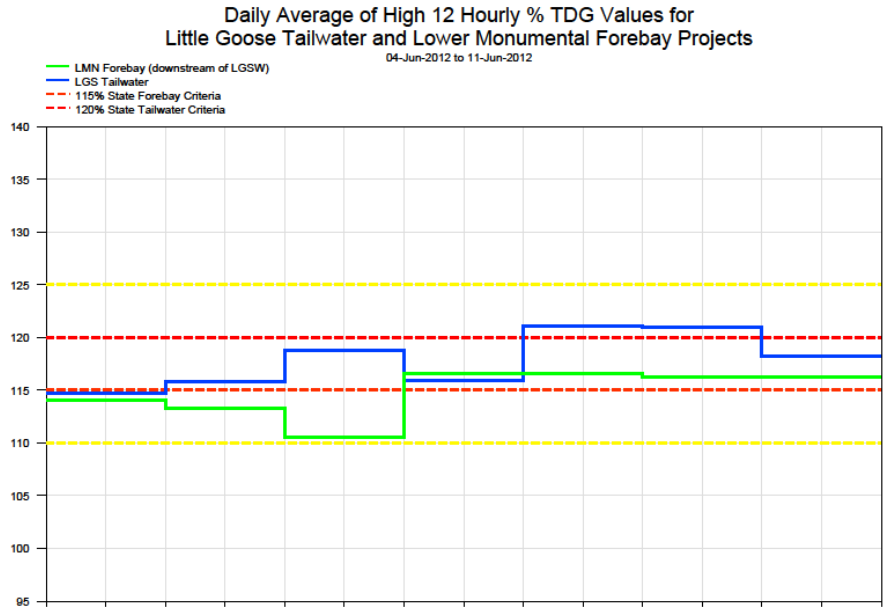

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/04/12 01:00
06/04/12 13:00
06/05/12 01:00
06/05/12 13:00
06/06/12 01:00
06/06/12 13:00
06/07/12 01:00
06/07/12 13:00
06/08/12 01:00
06/08/12 13:00
06/09/12 01:00
06/09/12 13:00
06/10/12 01:00
06/10/12 13:00
06/11/12 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
20 kcfs

Figure 10


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
04-Jun-2012 to 11-Jun-2012
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

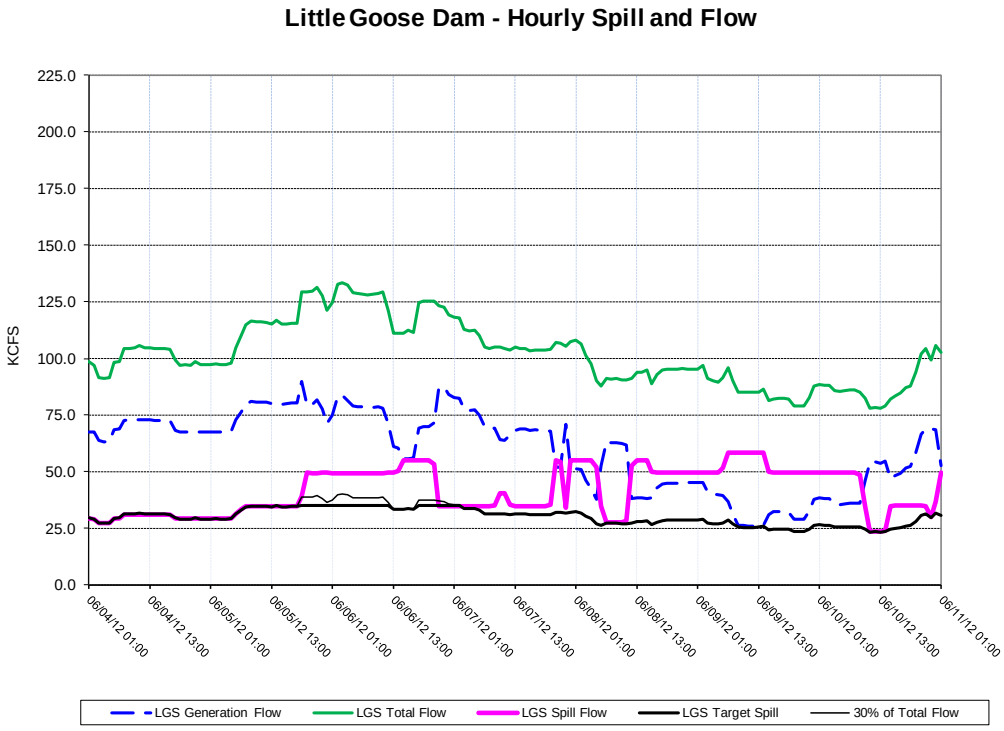
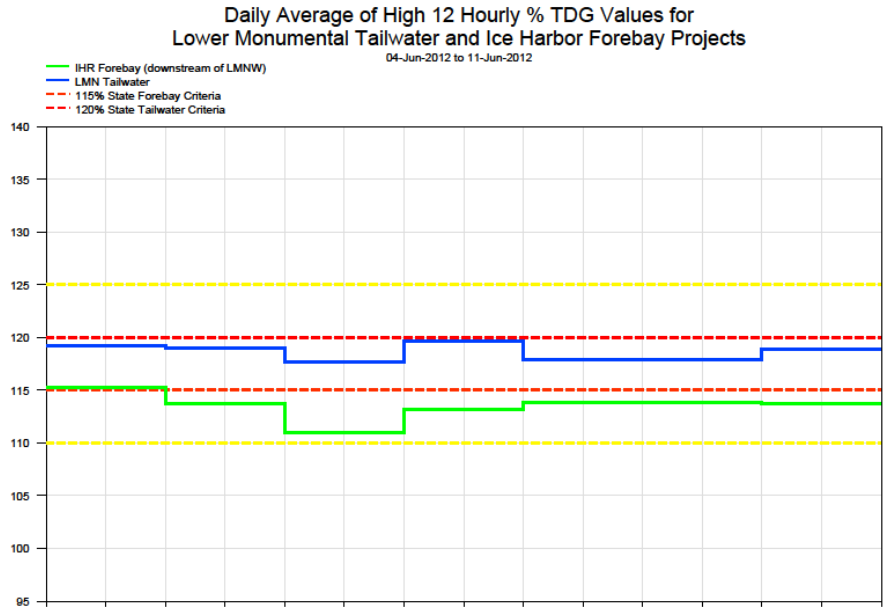

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/04/12 01:00
06/04/12 13:00
06/05/12 01:00
06/05/12 13:00
06/06/12 01:00
06/06/12 13:00
06/07/12 01:00
06/07/12 13:00
06/08/12 01:00
06/08/12 13:00
06/09/12 01:00
06/09/12 13:00
06/10/12 01:00
06/10/12 13:00
06/11/12 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 11


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
04-Jun-2012 to 11-Jun-2012
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

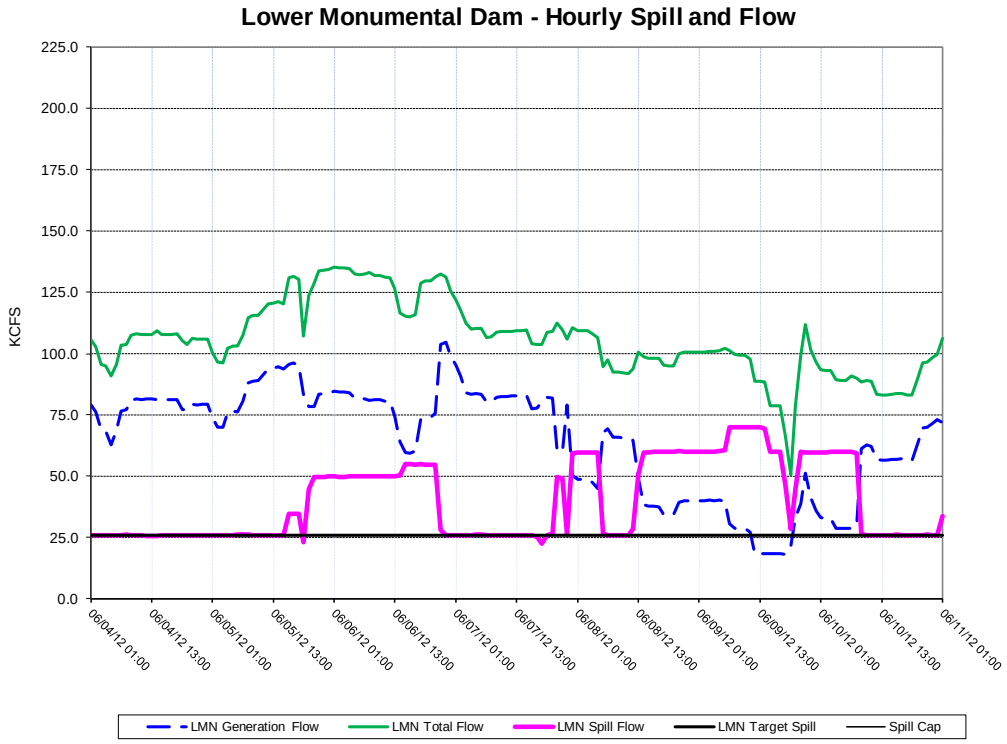
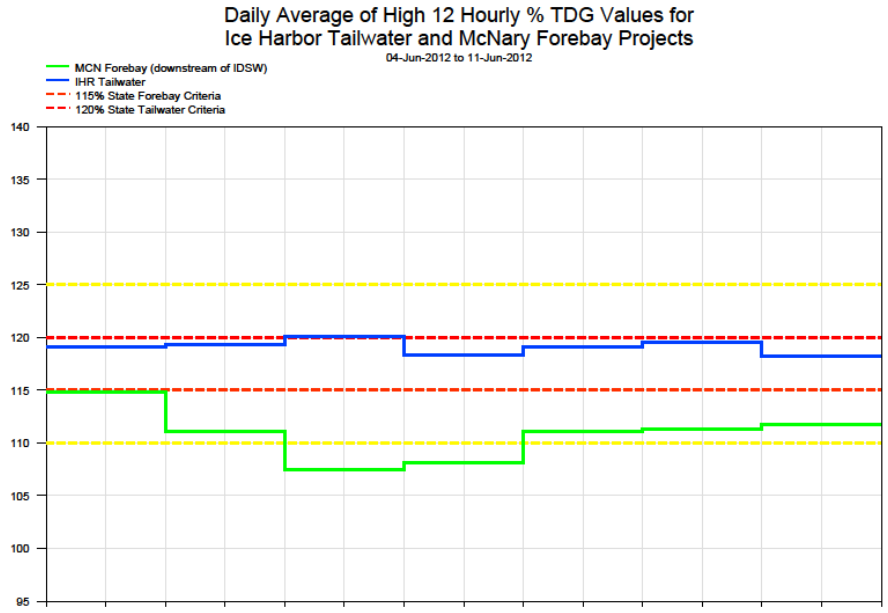

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/04/12 01:00
06/04/12 13:00
06/05/12 01:00
06/05/12 13:00
06/06/12 01:00
06/06/12 13:00
06/07/12 01:00
06/07/12 13:00
06/08/12 01:00
06/08/12 13:00
06/09/12 01:00
06/09/12 13:00
06/10/12 01:00
06/10/12 13:00
06/11/12 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
Spill Cap

Figure 12


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
04-Jun-2012 to 11-Jun-2012
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

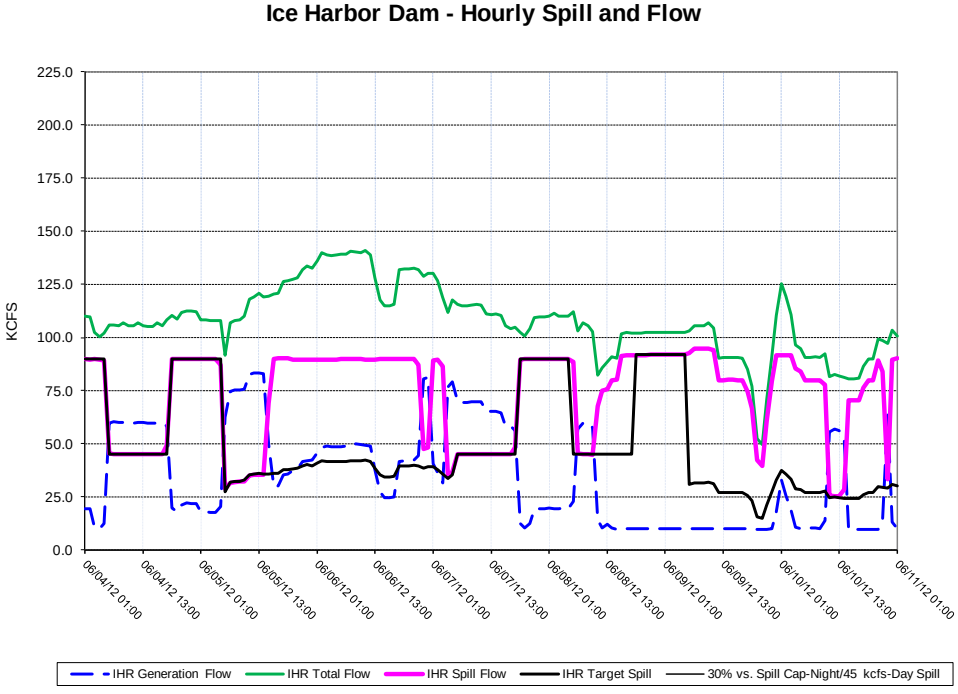
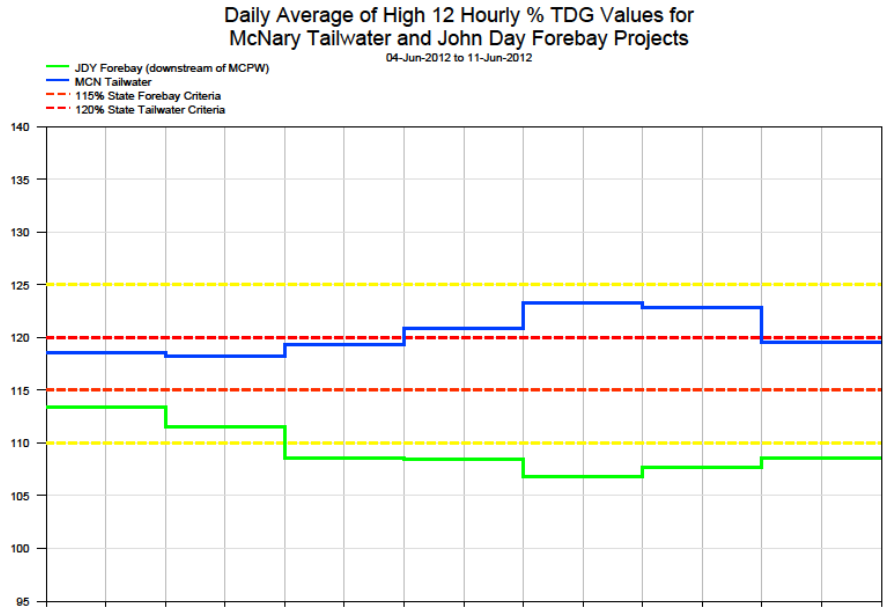

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/04/12 01:00
06/04/12 13:00
06/05/12 01:00
06/05/12 13:00
06/06/12 01:00
06/06/12 13:00
06/07/12 01:00
06/07/12 13:00
06/08/12 01:00
06/09/12 13:00
06/09/12 01:00
06/09/12 13:00
06/10/12 01:00
06/10/12 13:00
06/11/12 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
30% vs. Spill Cap-Night/45 kcfs-Day Spill

Figure 13


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
04-Jun-2012 to 11-Jun-2012
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

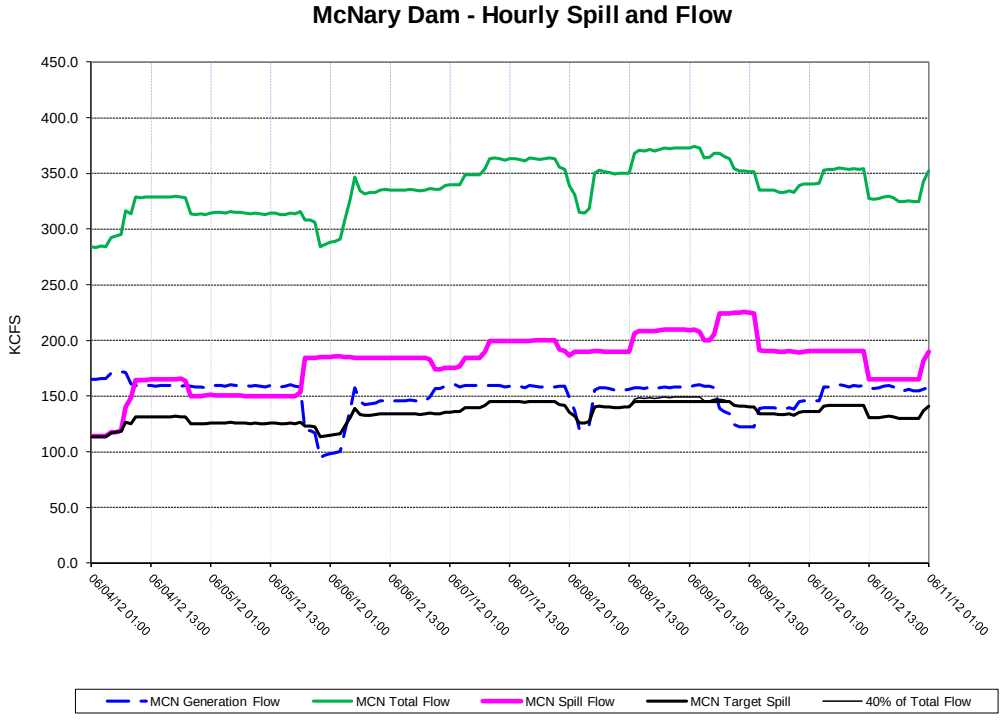
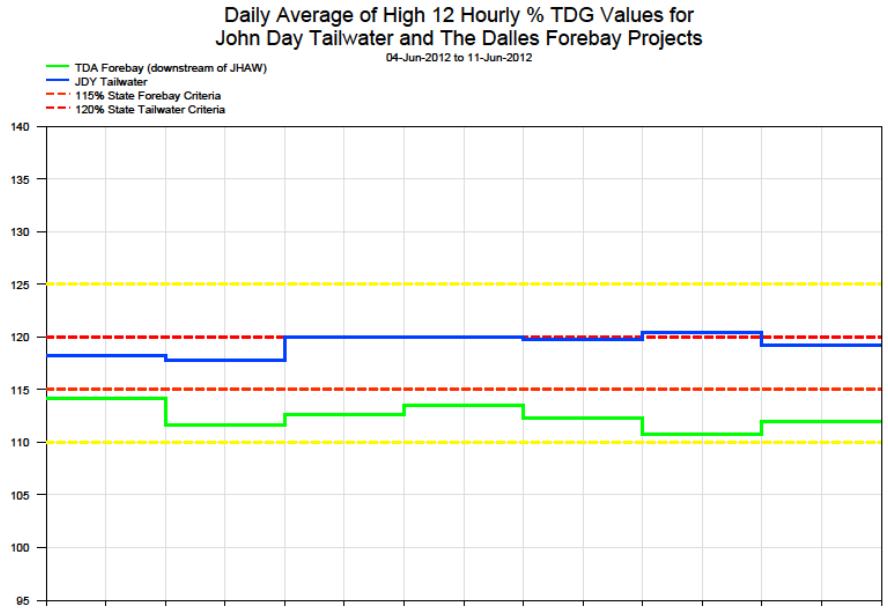

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
06/04/12 01:00
06/04/12 13:00
06/05/12 01:00
06/05/12 13:00
06/06/12 01:00
06/06/12 13:00
06/07/12 01:00
06/07/12 13:00
06/08/12 01:00
06/08/12 13:00
06/09/12 01:00
06/09/12 13:00
06/10/12 01:00
06/10/12 13:00
06/11/12 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
40% of Total Flow

Figure 14


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
04-Jun-2012 to 11-Jun-2012
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

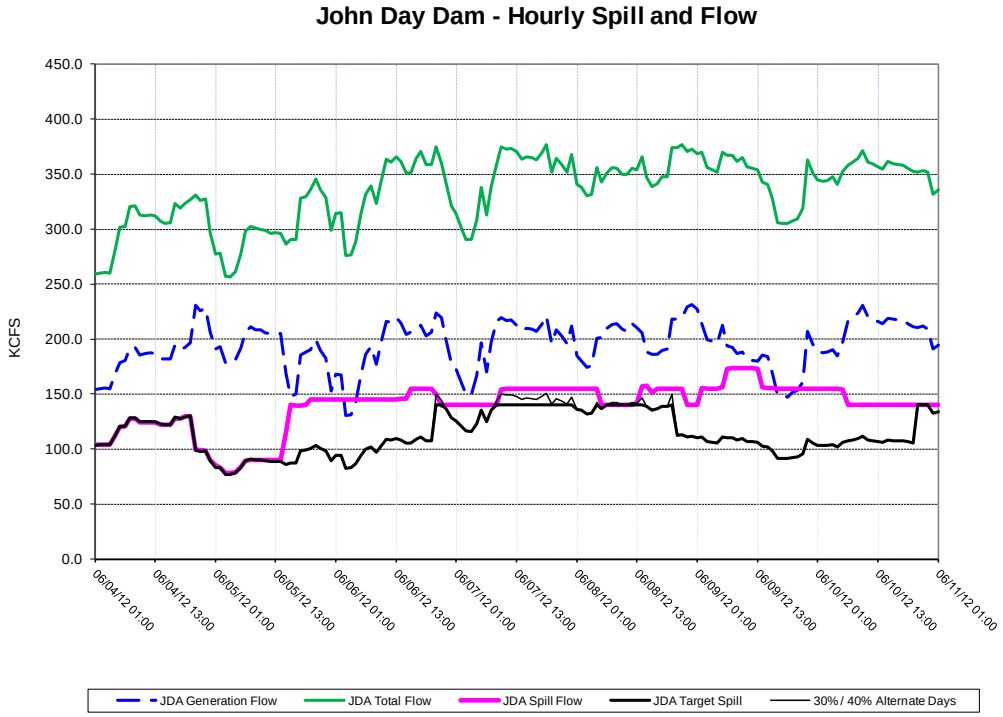
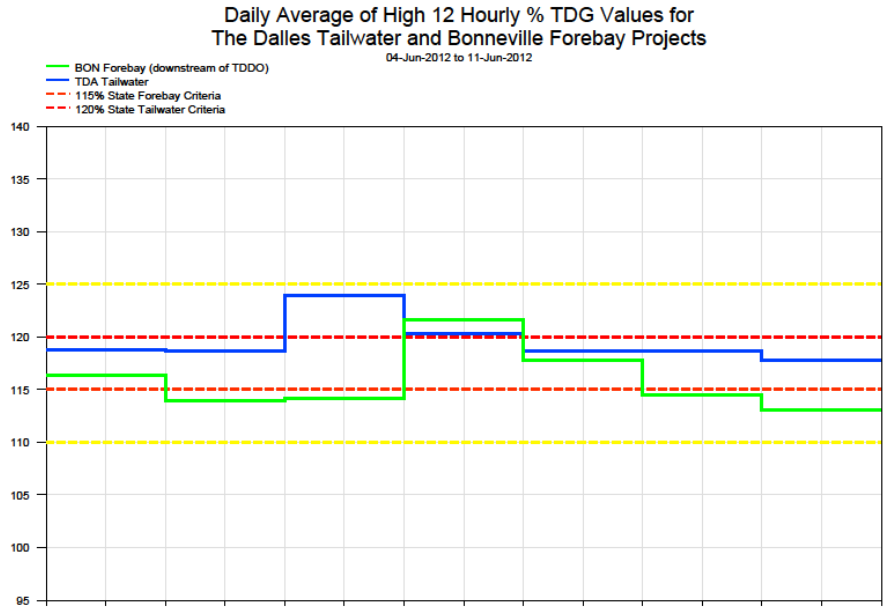

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
06/04/12 01:00
06/04/12 13:00
06/05/12 01:00
06/05/12 13:00
06/06/12 01:00
06/06/12 13:00
06/07/12 01:00
06/07/12 13:00
06/08/12 01:00
06/08/12 13:00
06/09/12 01:00
06/09/12 13:00
06/10/12 01:00
06/10/12 13:00
06/11/12 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% / 40% Alternate Days

Figure 15


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
04-Jun-2012 to 11-Jun-2012
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

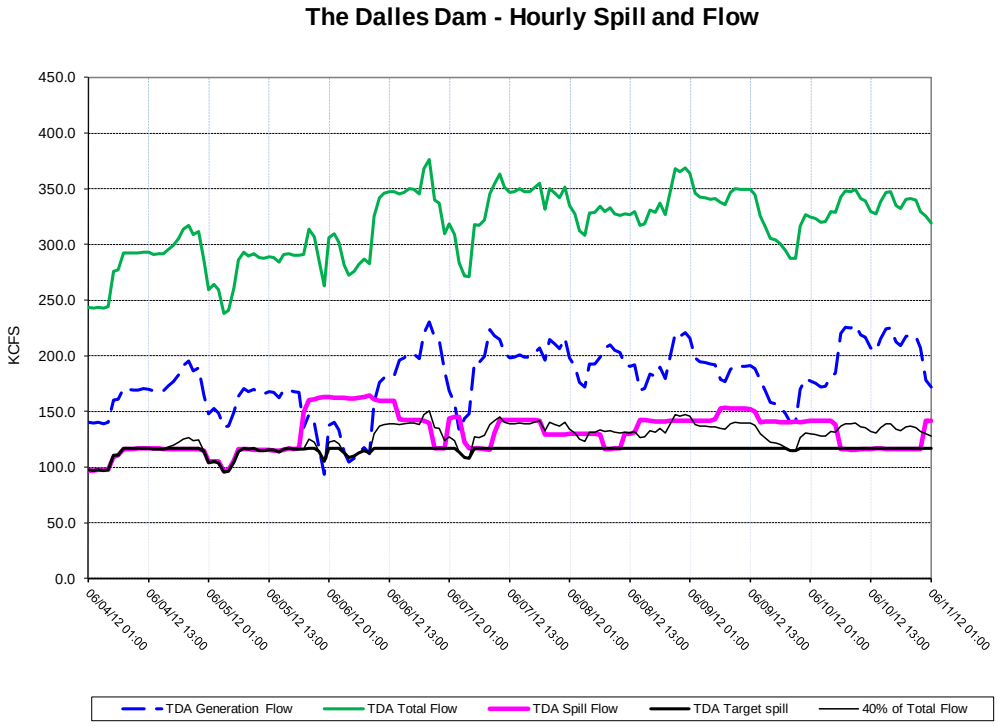
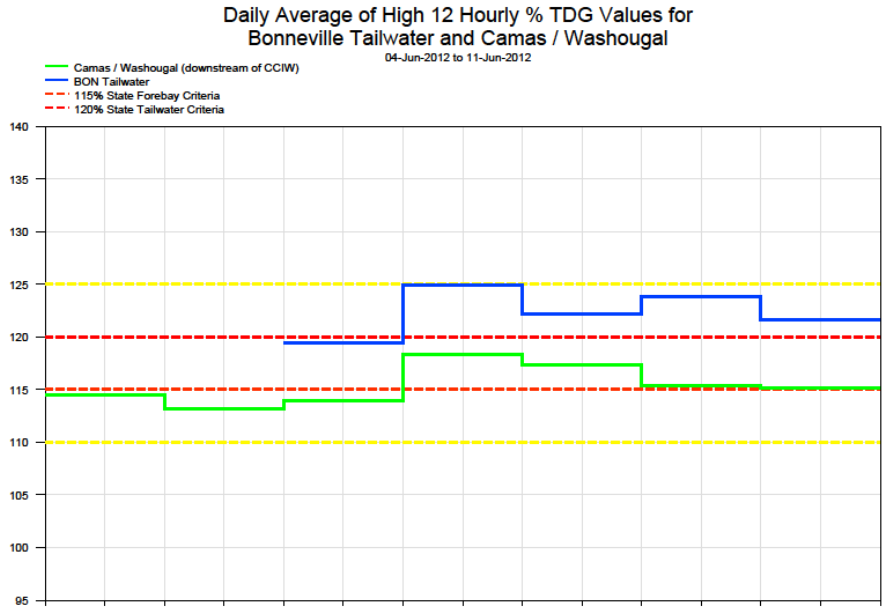

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
06/04/12 01:00
06/04/12 13:00
06/05/12 01:00
06/05/12 13:00
06/06/12 01:00
06/06/12 13:00
06/07/12 01:00
06/07/12 13:00
06/08/12 01:00
06/08/12 13:00
06/09/12 01:00
06/09/12 13:00
06/10/12 01:00
06/10/12 13:00
06/11/12 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 16


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
04-Jun-2012 to 11-Jun-2012
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

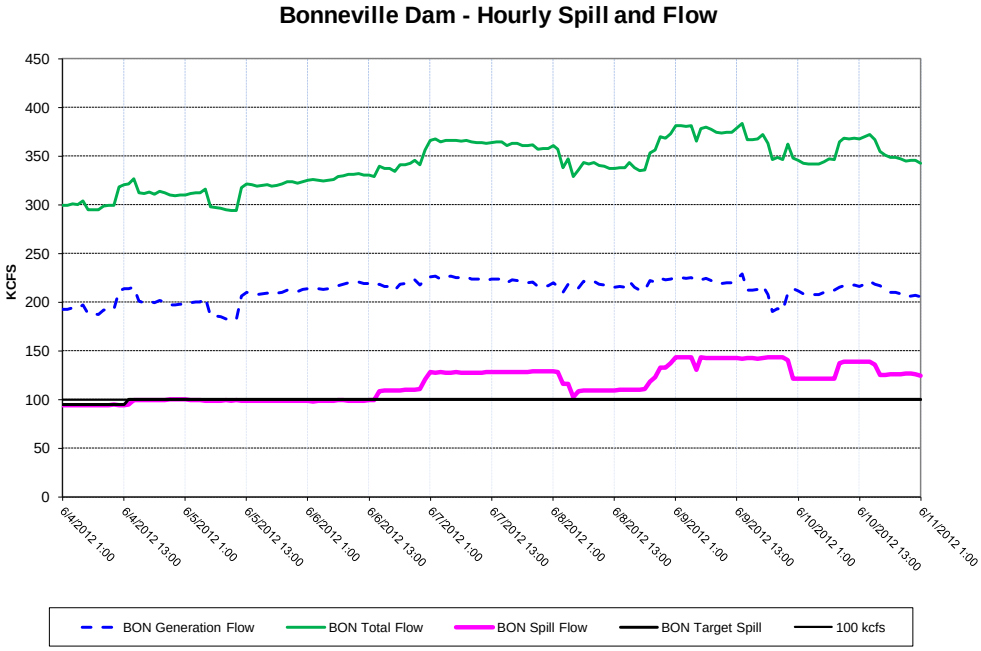
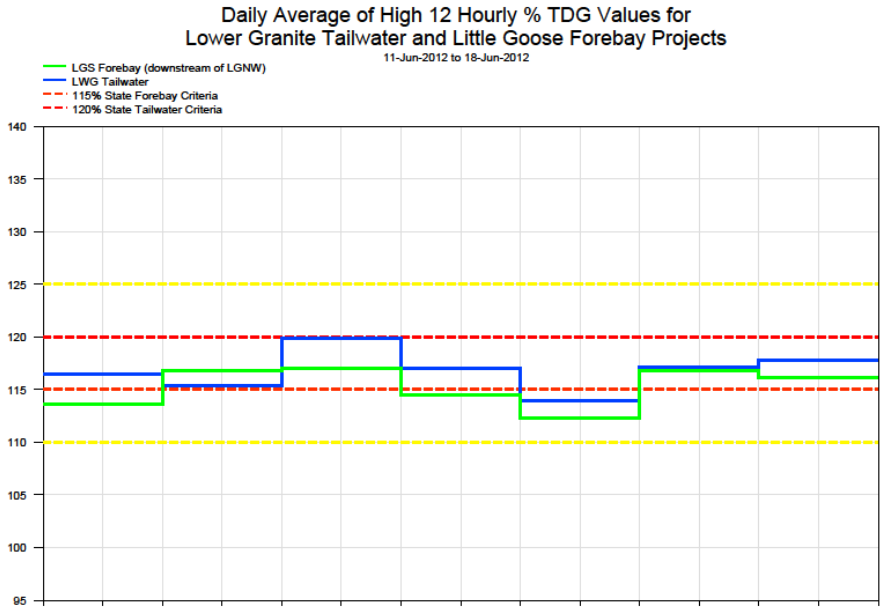

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
6/4/2012 1:00
6/4/2012 13:00
6/5/2012 1:00
6/5/2012 13:00
6/6/2012 1:00
6/6/2012 13:00
6/7/2012 1:00
6/7/2012 13:00
6/8/2012 1:00
6/8/2012 13:00
6/9/2012 1:00
6/9/2012 13:00
6/10/2012 1:00
6/10/2012 13:00
6/11/2012 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
100 kcfs

Figure 17


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
11-Jun-2012 to 18-Jun-2012
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

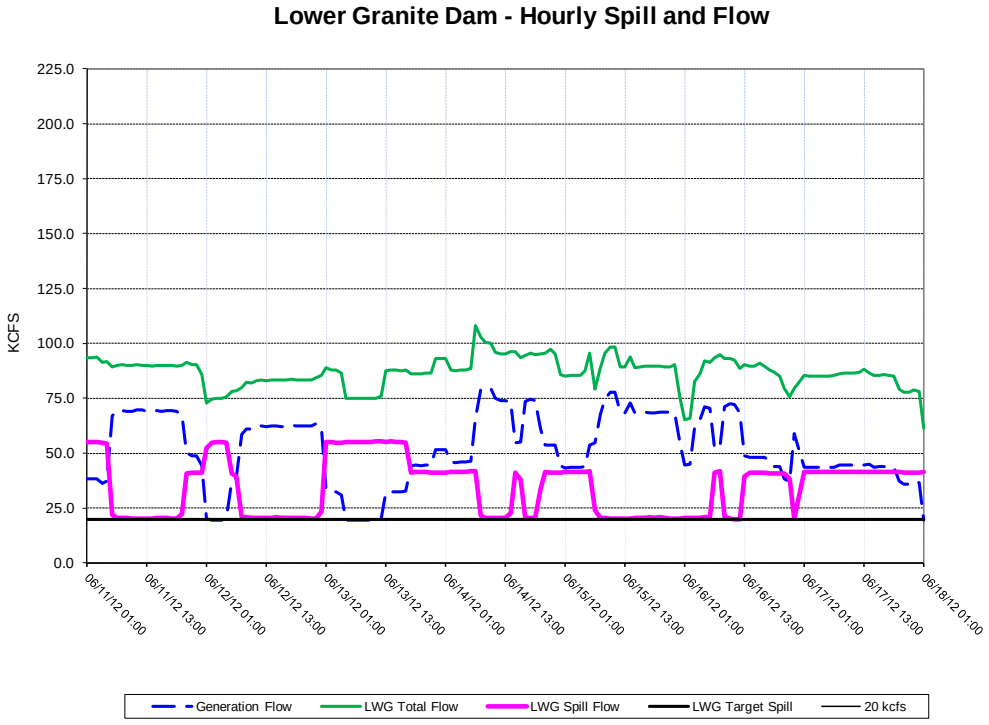
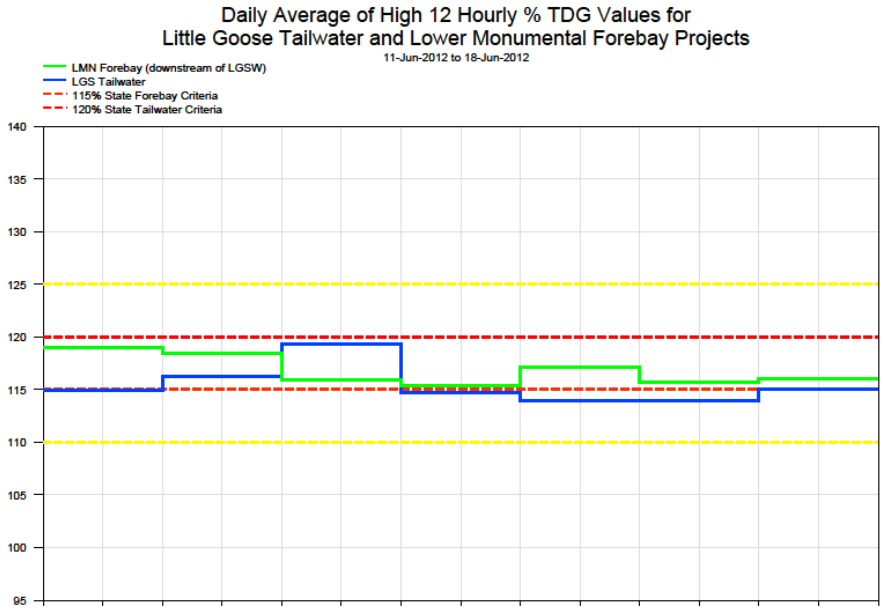

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/11/12 01:00
06/11/12 13:00
06/12/12 01:00
06/12/12 13:00
06/13/12 01:00
06/13/12 13:00
06/14/12 01:00
06/14/12 13:00
06/15/12 01:00
06/15/12 13:00
06/16/12 01:00
06/16/12 13:00
06/17/12 01:00
06/17/12 13:00
06/18/12 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
20 kcfs

Figure 18


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
11-Jun-2012 to 18-Jun-2012
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

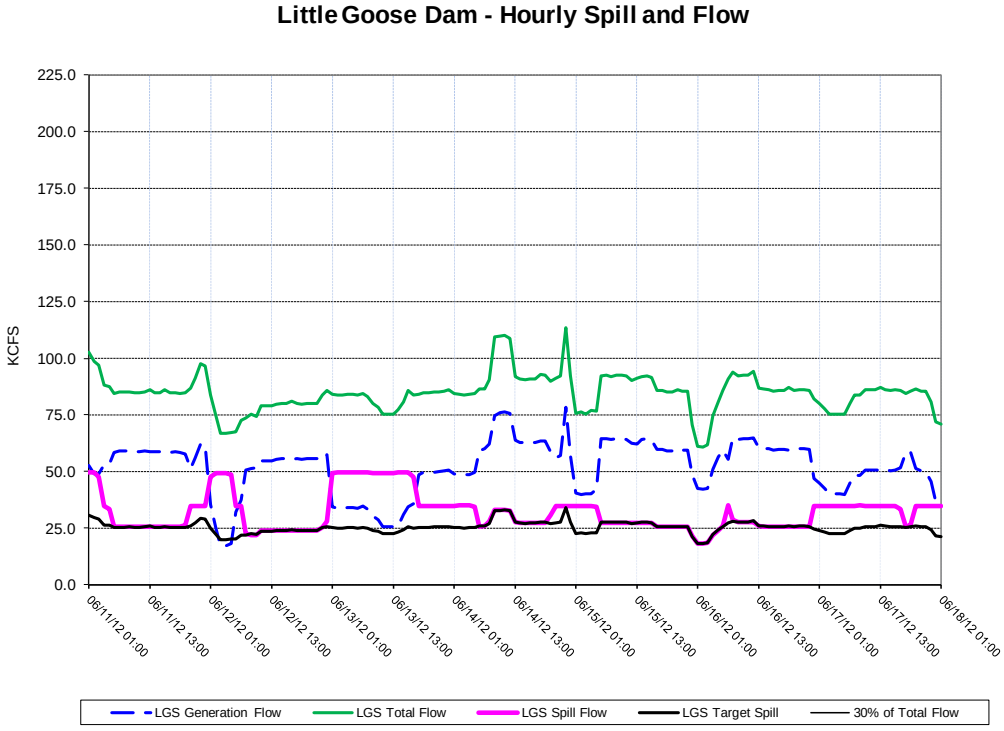
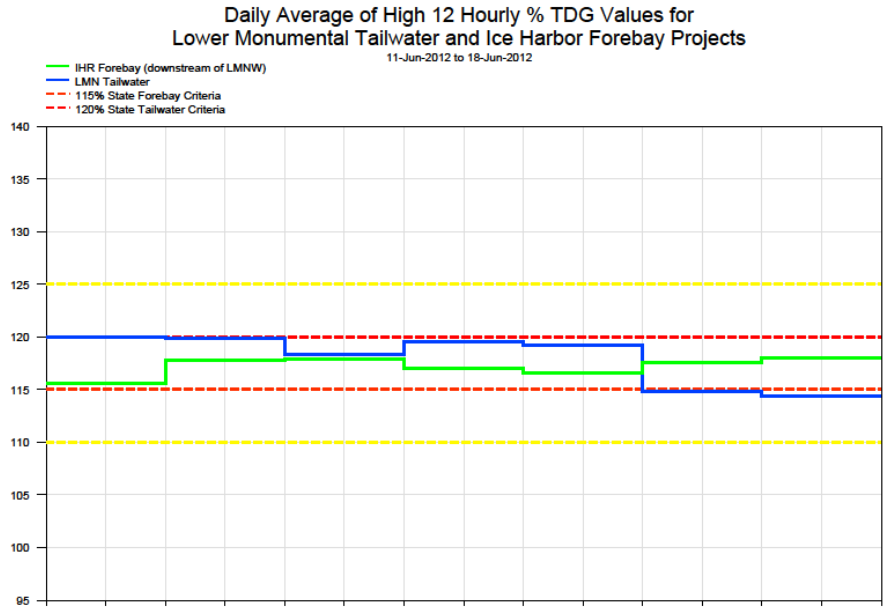

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/11/12 01:00
06/11/12 13:00
06/12/12 01:00
06/12/12 13:00
06/13/12 01:00
06/13/12 13:00
06/14/12 01:00
06/14/12 13:00
06/15/12 01:00
06/15/12 13:00
06/16/12 01:00
06/16/12 13:00
06/17/12 01:00
06/17/12 13:00
06/18/12 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 19


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
11-Jun-2012 to 18-Jun-2012
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

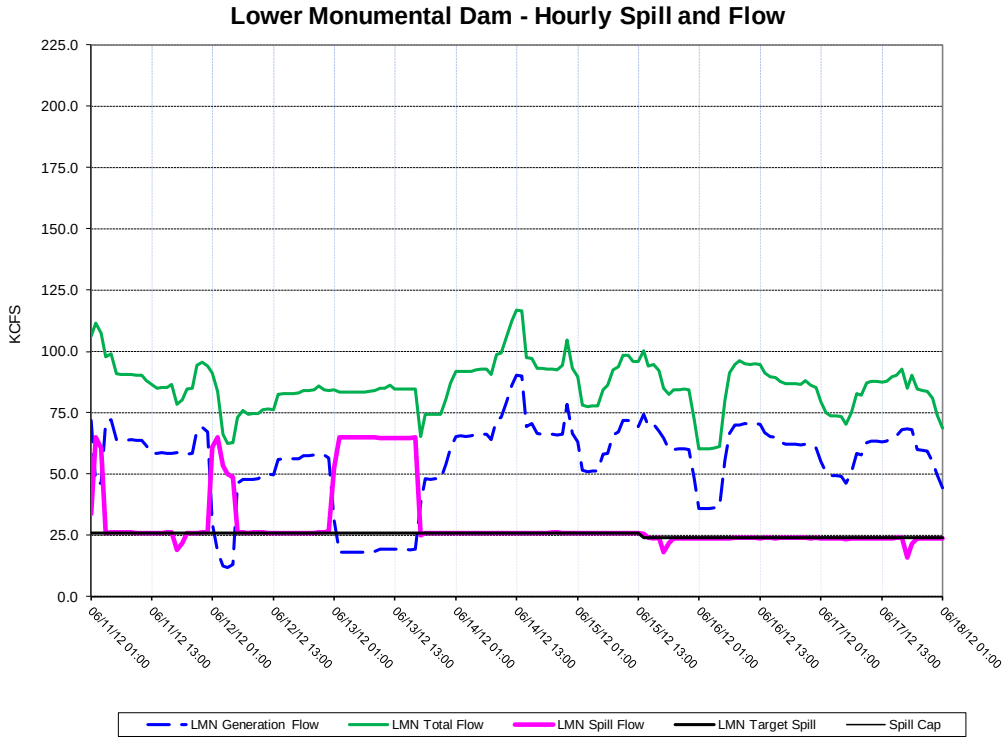
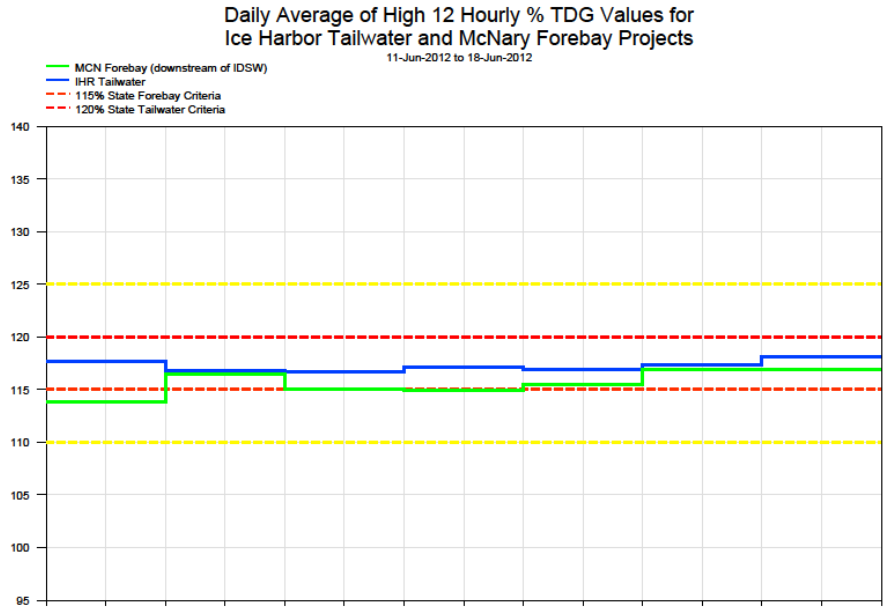

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/11/12 01:00
06/11/12 13:00
06/12/12 01:00
06/12/12 13:00
06/13/12 01:00
06/13/12 13:00
06/14/12 01:00
06/14/12 13:00
06/15/12 01:00
06/15/12 13:00
06/16/12 01:00
06/16/12 13:00
06/17/12 01:00
06/17/12 13:00
06/18/12 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
Spill Cap

Figure 20


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
11-Jun-2012 to 18-Jun-2012
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

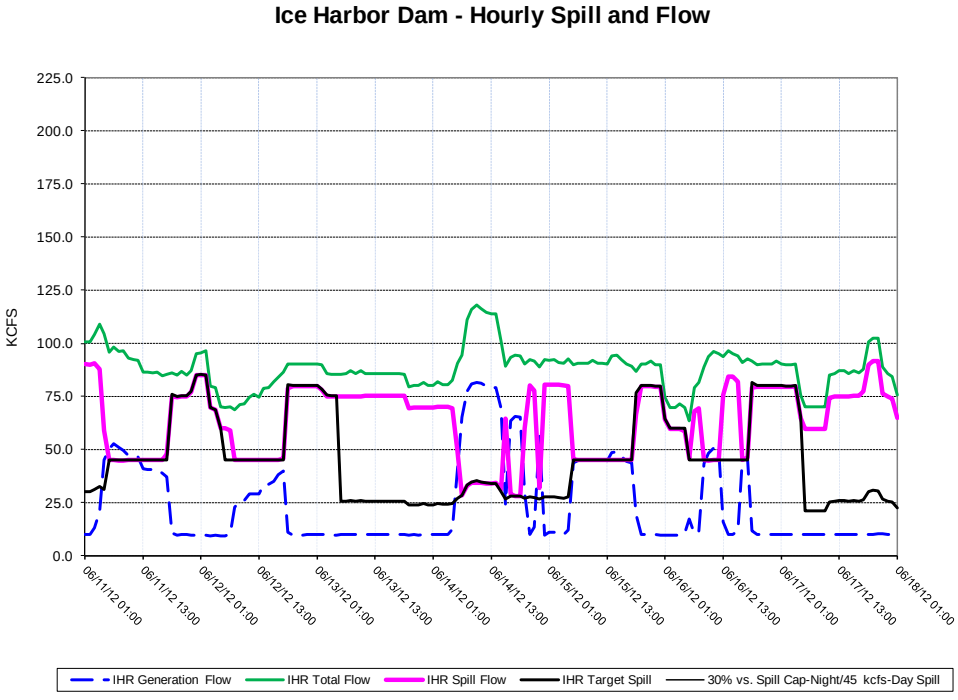
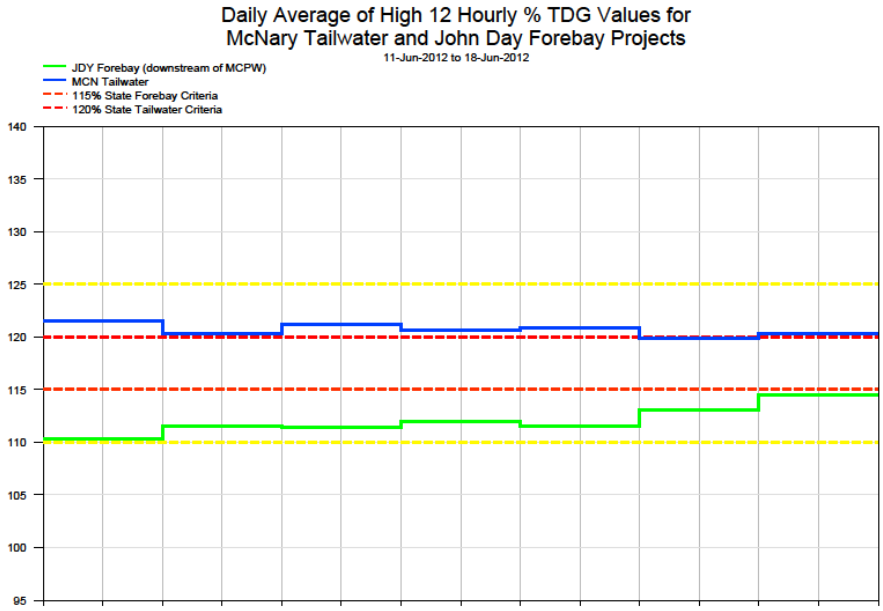

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/11/12 01:00
06/11/12 13:00
06/12/12 01:00
06/12/12 13:00
06/13/12 01:00
06/13/12 13:00
06/14/12 01:00
06/14/12 13:00
06/15/12 01:00
06/15/12 13:00
06/16/12 01:00
06/16/12 13:00
06/17/12 01:00
06/17/12 13:00
06/18/12 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
30% vs. Spill Cap-Night/45 kcfs-Day Spill

Figure 21


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
11-Jun-2012 to 18-Jun-2012
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

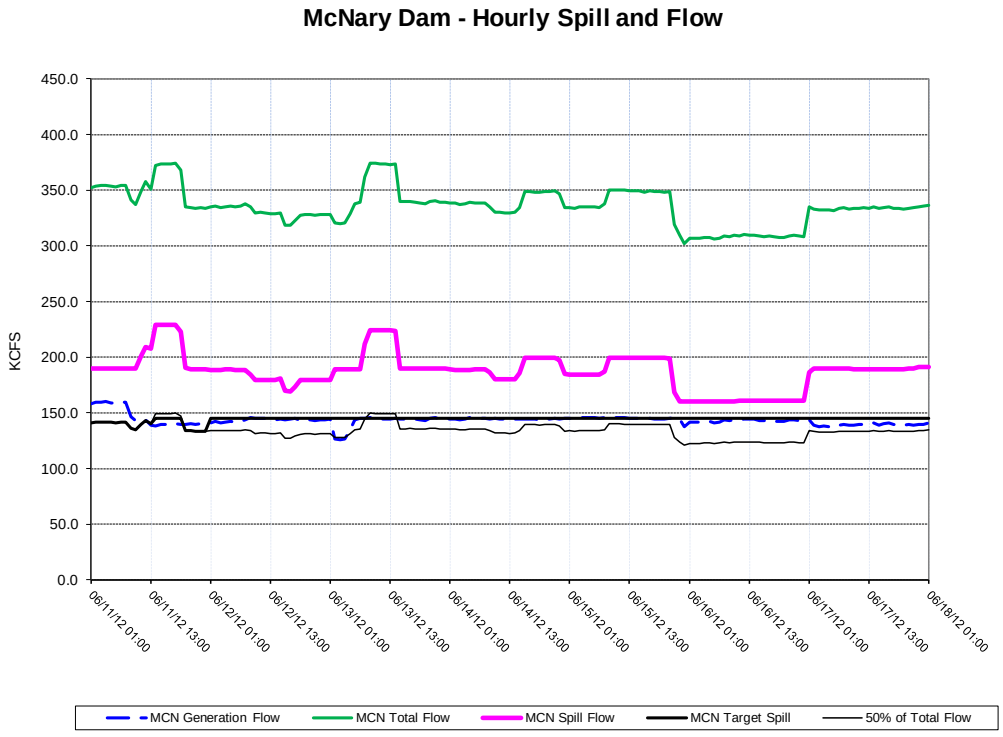
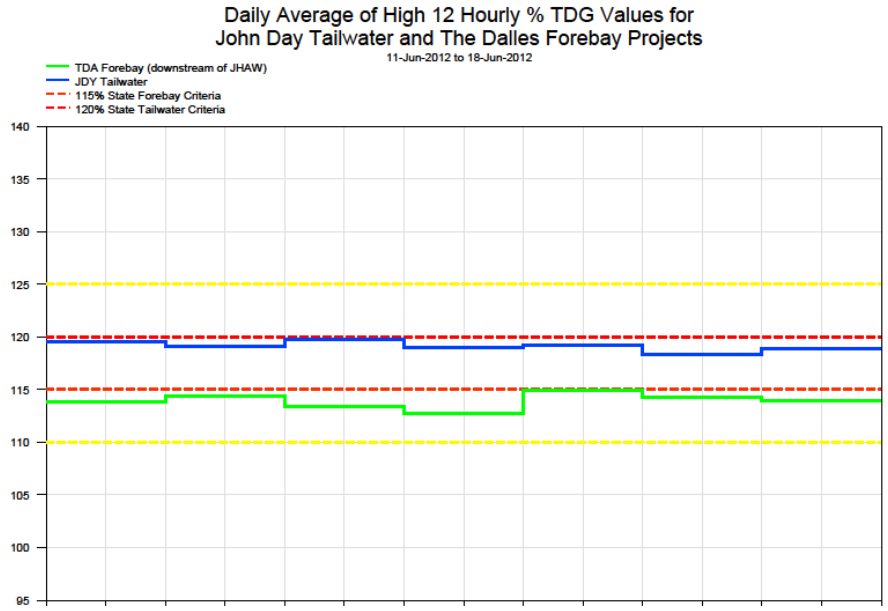

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
06/11/12 01:00
06/11/12 13:00
06/12/12 01:00
06/12/12 13:00
06/13/12 01:00
06/13/12 13:00
06/14/12 01:00
06/14/12 13:00
06/15/12 01:00
06/15/12 13:00
06/16/12 01:00
06/16/12 13:00
06/17/12 01:00
06/17/12 13:00
06/18/12 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
50% of Total Flow

Figure 22


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
11-Jun-2012 to 18-Jun-2012
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

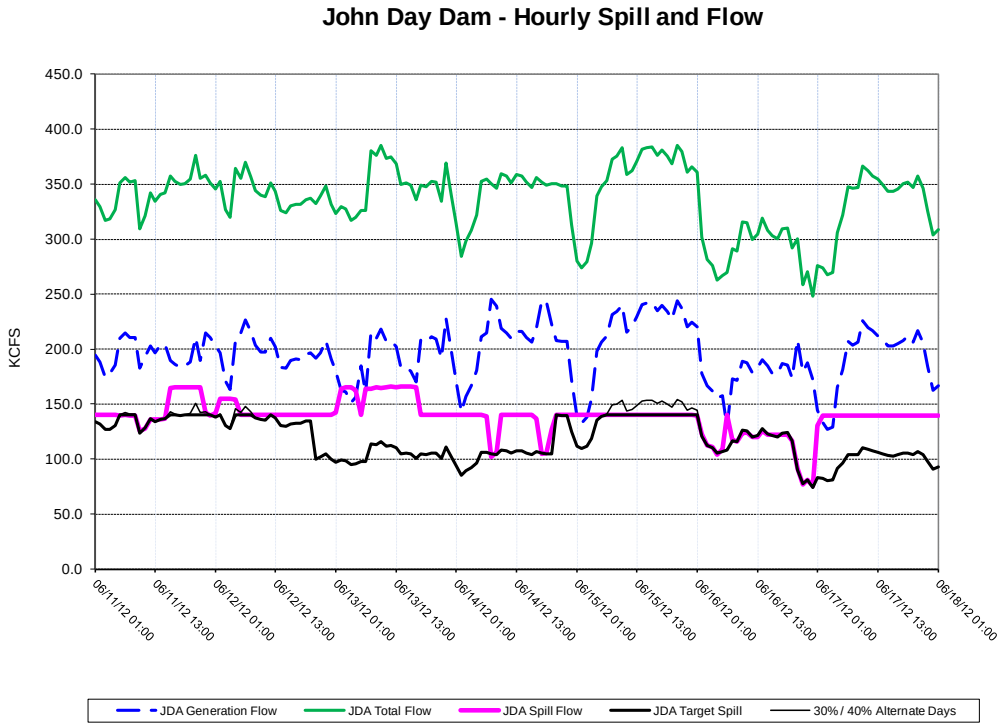
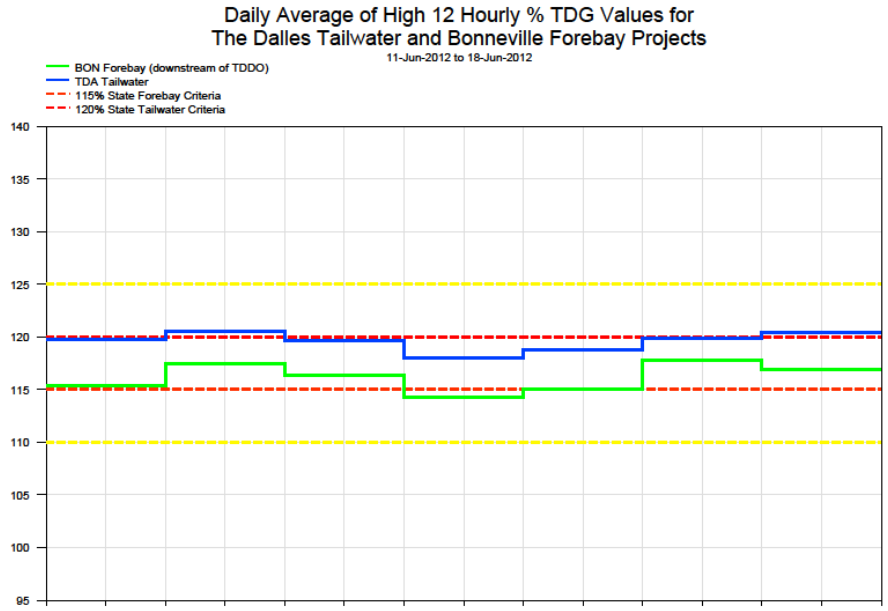

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
06/11/12 01:00
06/11/12 13:00
06/12/12 01:00
06/12/12 13:00
06/13/12 01:00
06/13/12 13:00
06/14/12 01:00
06/14/12 13:00
06/15/12 01:00
06/15/12 13:00
06/16/12 01:00
06/16/12 13:00
06/17/12 01:00
06/17/12 13:00
06/18/12 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% / 40% Alternate Days

Figure 23


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
11-Jun-2012 to 18-Jun-2012
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

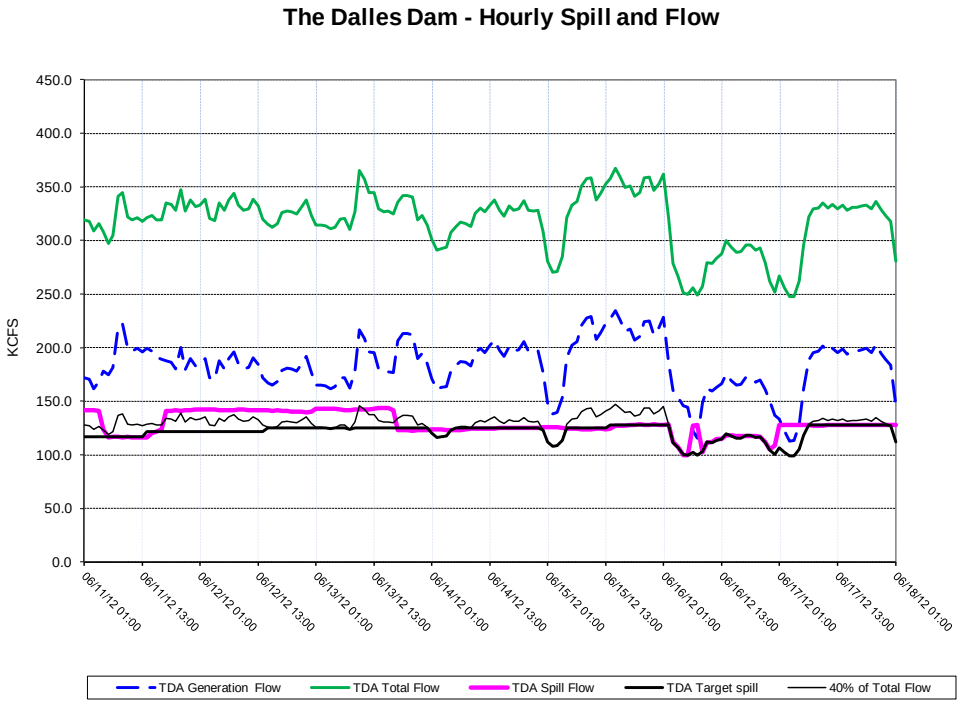
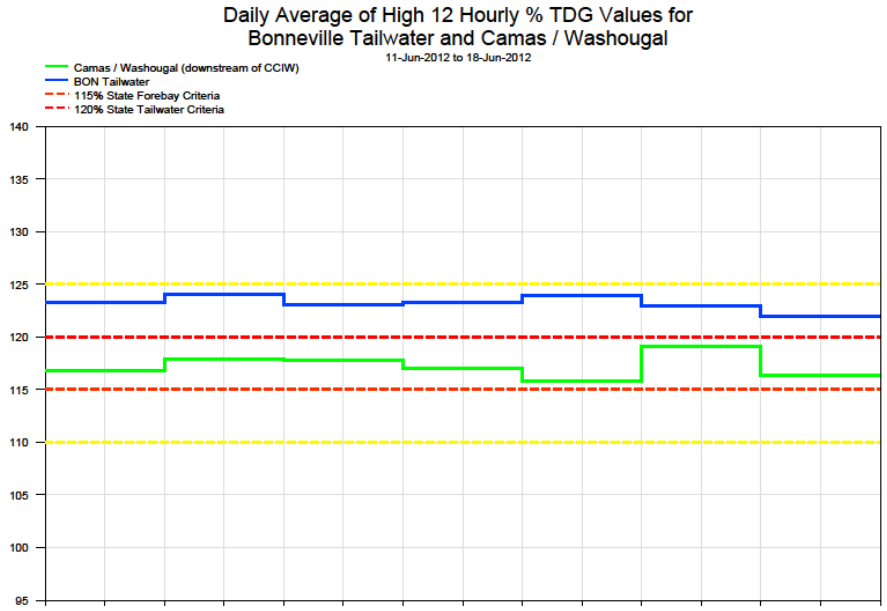

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
06/11/12 01:00
06/11/12 13:00
06/12/12 01:00
06/12/12 13:00
06/13/12 01:00
06/13/12 13:00
06/14/12 01:00
06/14/12 13:00
06/15/12 01:00
06/15/12 13:00
06/16/12 01:00
06/16/12 13:00
06/17/12 01:00
06/17/12 13:00
06/18/12 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 24


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
11-Jun-2012 to 18-Jun-2012
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

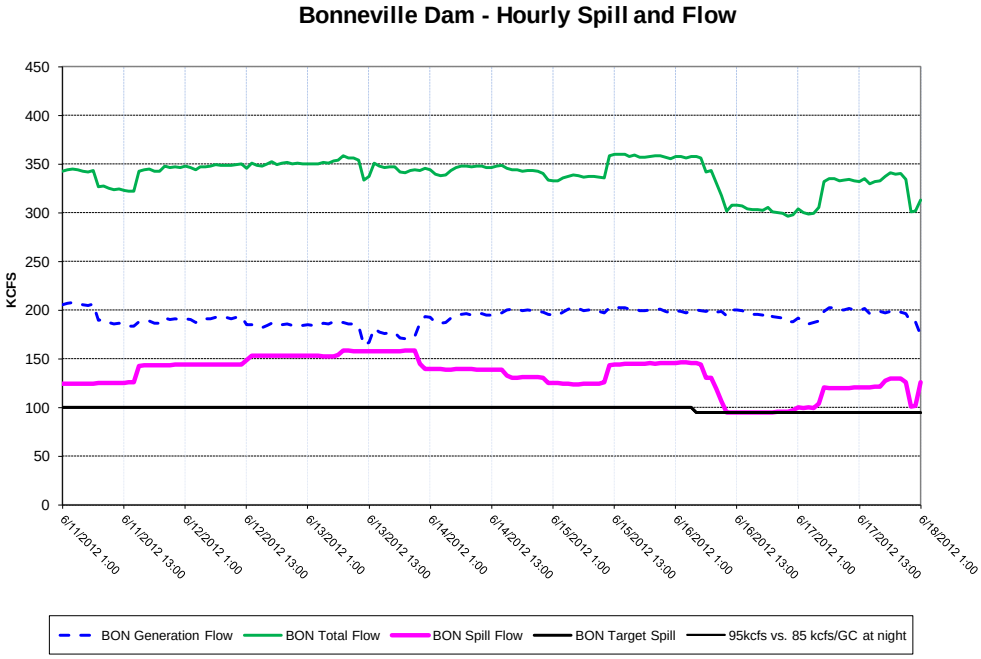
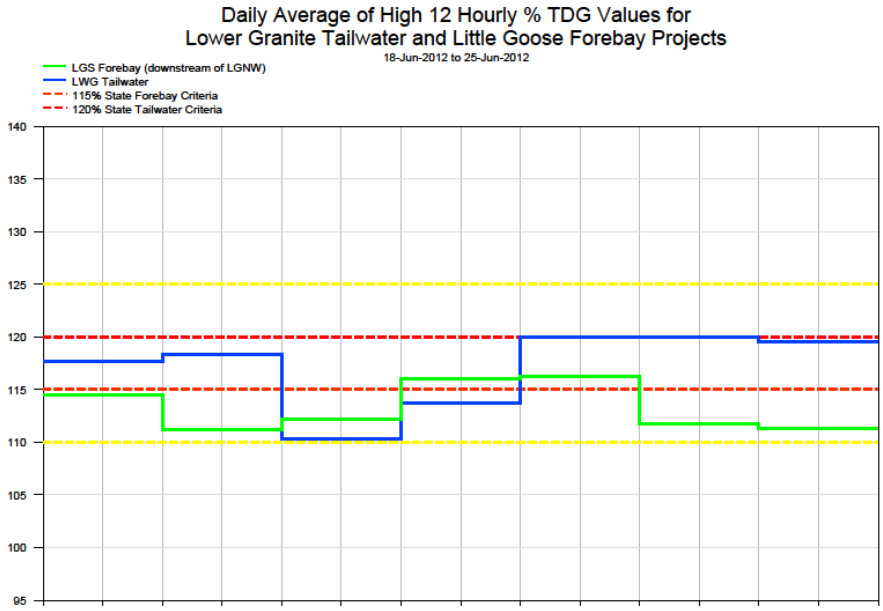

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
6/11/2012 1:00
6/11/2012 13:00
6/12/2012 1:00
6/12/2012 13:00
6/13/2012 1:00
6/13/2012 13:00
6/14/2012 1:00
6/14/2012 13:00
6/15/2012 1:00
6/15/2012 13:00
6/16/2012 1:00
6/16/2012 13:00
6/17/2012 1:00
6/17/2012 13:00
6/18/2012 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
95kcfs vs. 85 kcfs/GC at night

Figure 25


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
18-Jun-2012 to 25-Jun-2012
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

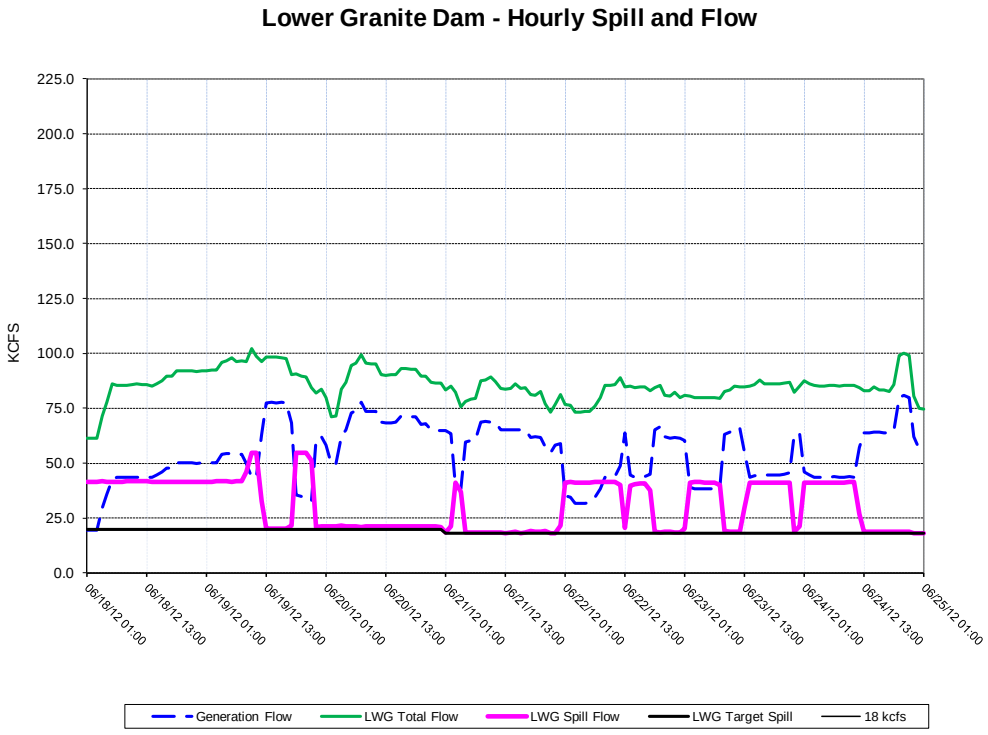
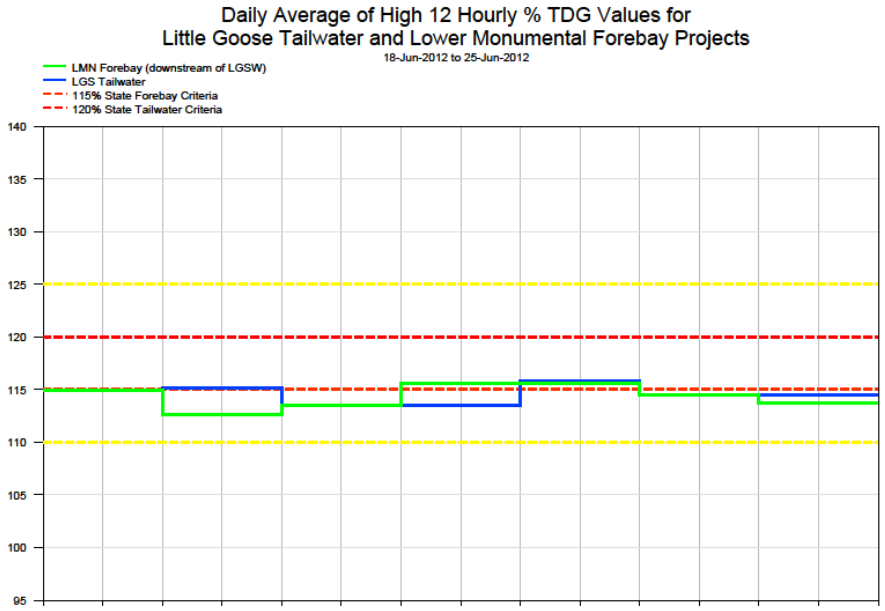

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/18/12 01:00
06/18/12 13:00
06/19/12 01:00
06/19/12 13:00
06/20/12 01:00
06/20/12 13:00
06/21/12 01:00
06/21/12 13:00
06/22/12 01:00
06/22/12 13:00
06/23/12 01:00
06/23/12 13:00
06/24/12 01:00
06/24/12 13:00
06/25/12 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
18 kcfs

Figure 26


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
18-Jun-2012 to 25-Jun-2012
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

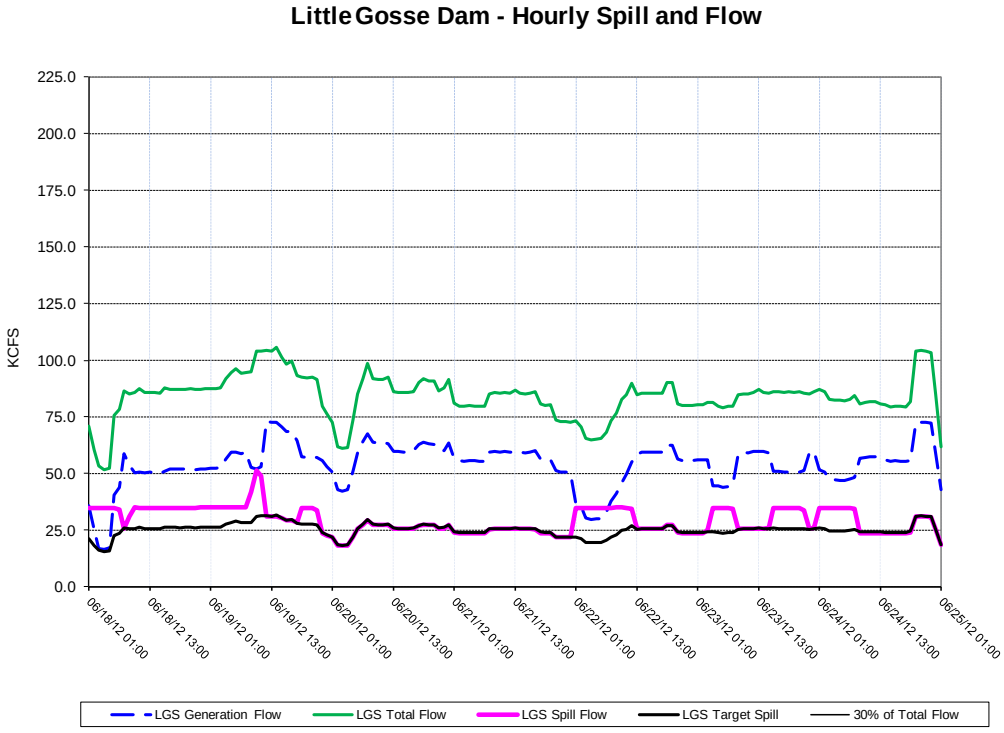
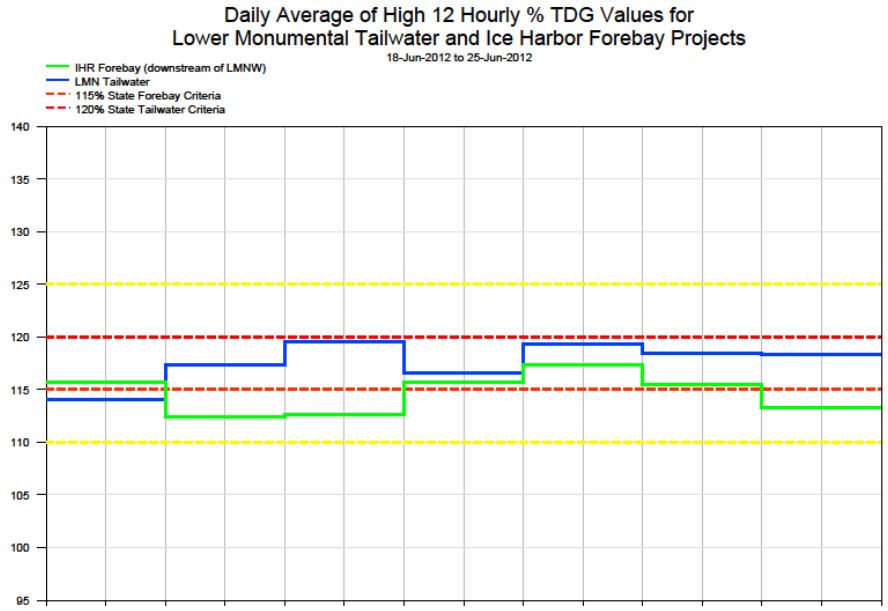

Little Gosse Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/18/12 01:00
06/18/12 13:00
06/19/12 01:00
06/19/12 13:00
06/20/12 01:00
06/20/12 13:00
06/21/12 01:00
06/21/12 13:00
06/22/12 01:00
06/22/12 13:00
06/23/12 01:00
06/23/12 13:00
06/24/12 01:00
06/24/12 13:00
06/25/12 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 27


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
18-Jun-2012 to 25-Jun-2012
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

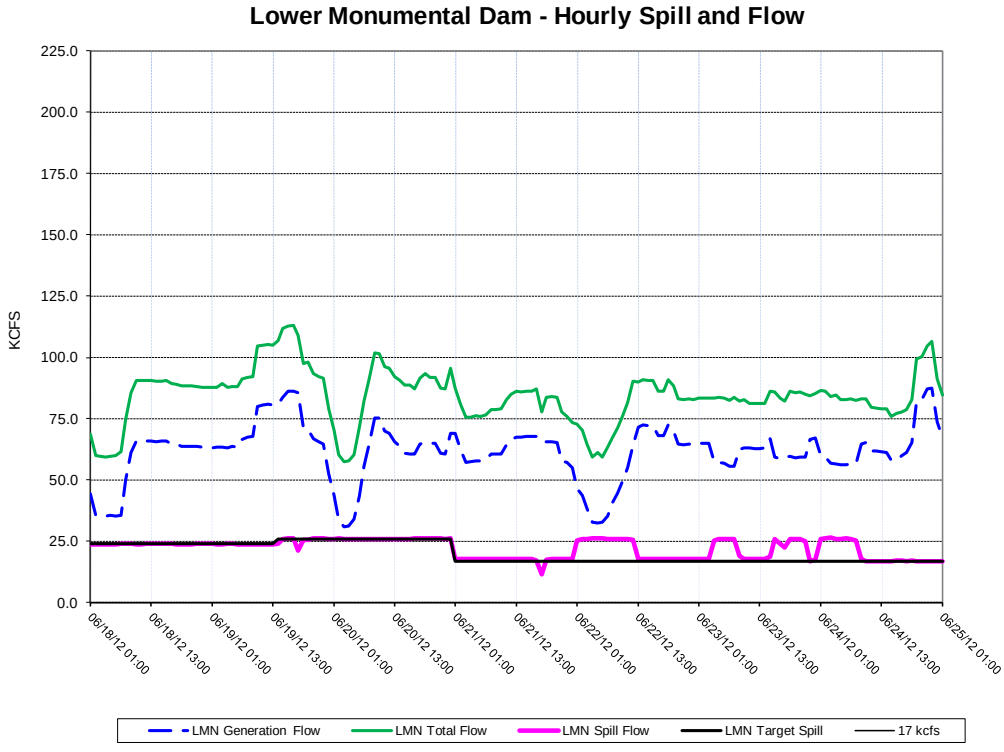
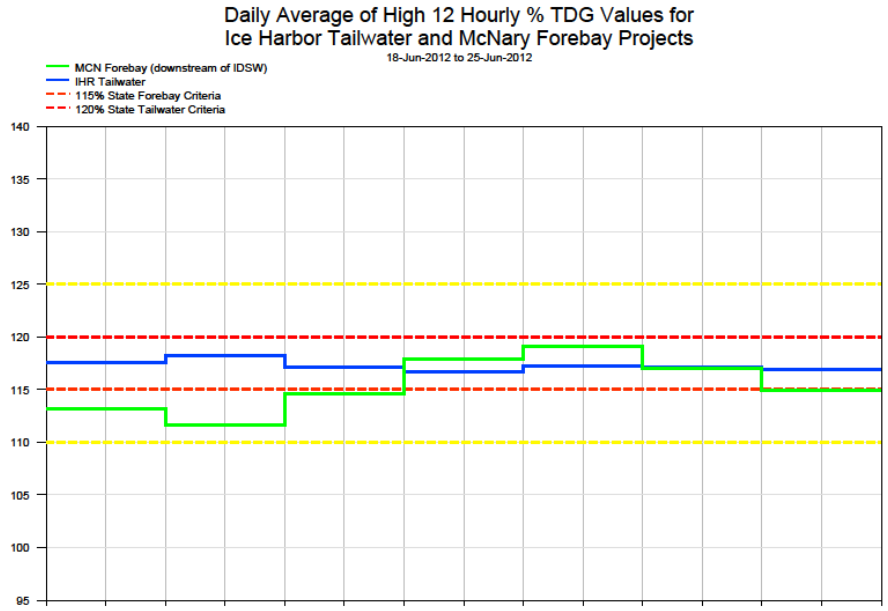

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/18/12 01:00
06/18/12 13:00
06/19/12 01:00
06/19/12 13:00
06/20/12 01:00
06/20/12 13:00
06/21/12 01:00
06/21/12 13:00
06/22/12 01:00
06/22/12 13:00
06/23/12 01:00
06/23/12 13:00
06/24/12 01:00
06/24/12 13:00
06/25/12 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
17 kcfs

Figure 28


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
18-Jun-2012 to 25-Jun-2012
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

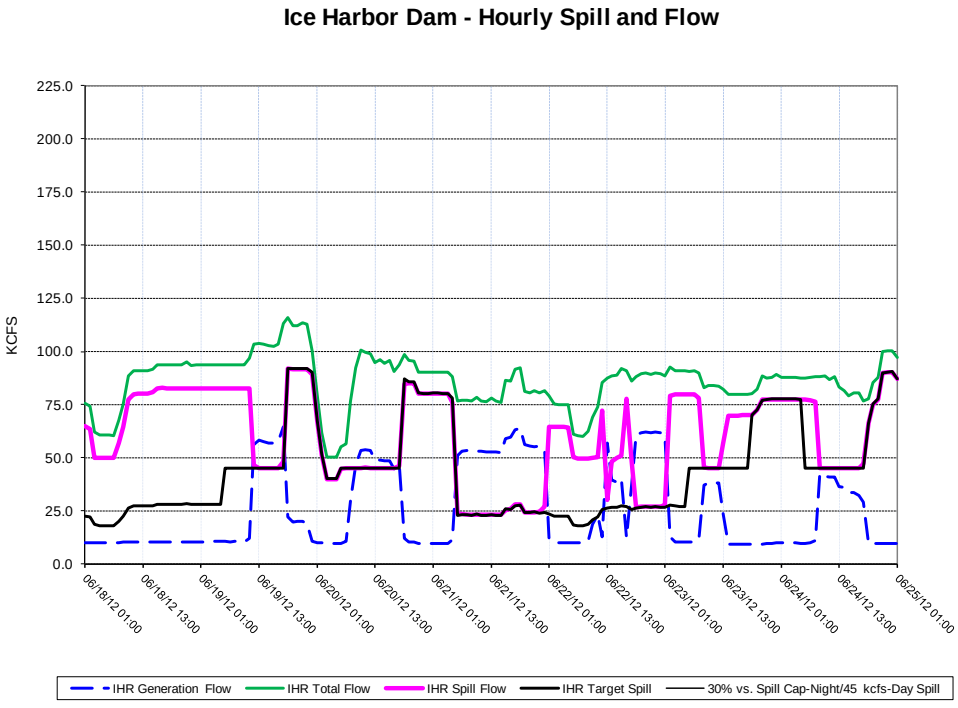
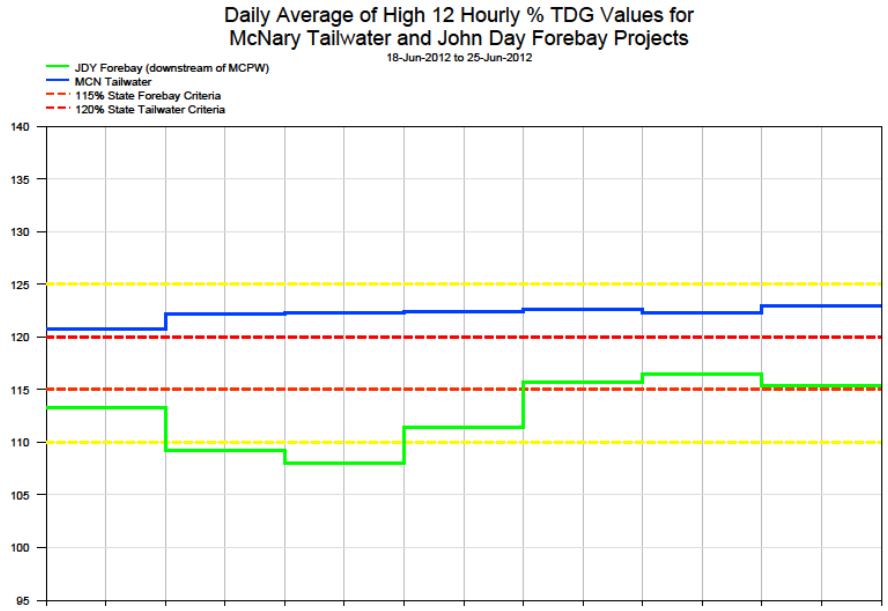

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/18/12 01:00
06/18/12 13:00
06/19/12 01:00
06/19/12 13:00
06/20/12 01:00
06/20/12 13:00
06/21/12 01:00
06/21/12 13:00
06/22/12 01:00
06/22/12 13:00
06/23/12 01:00
06/23/12 13:00
06/24/12 01:00
06/24/12 13:00
06/25/12 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
30% vs. Spill Cap-Night/45 kcfs-Day Spill

Figure 29


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
18-Jun-2012 to 25-Jun-2012
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

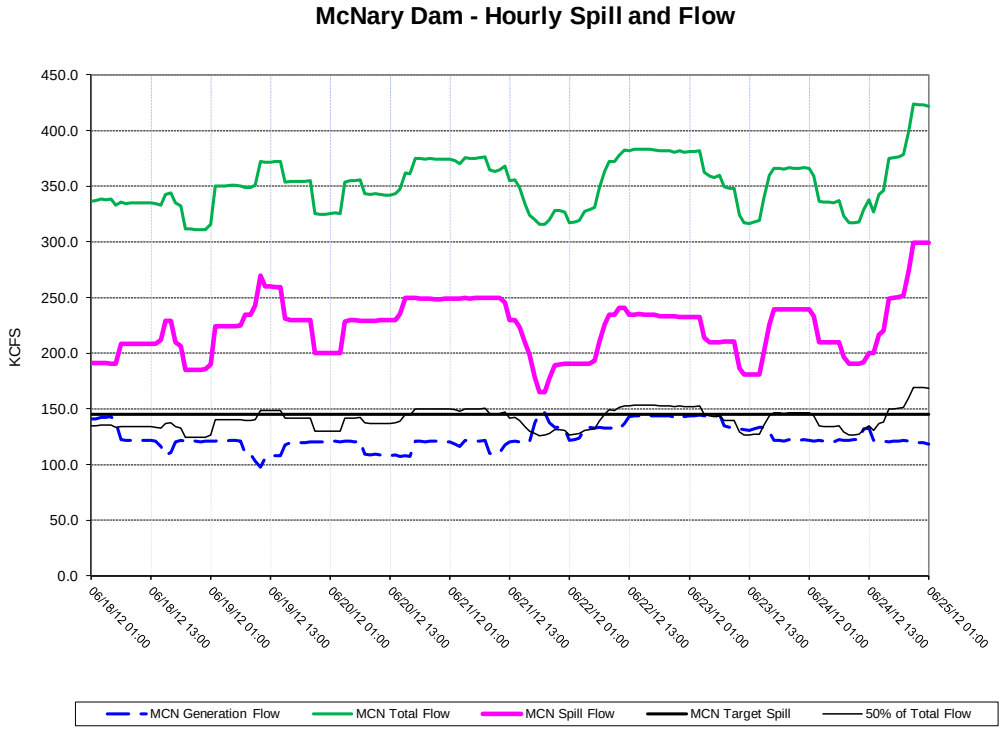
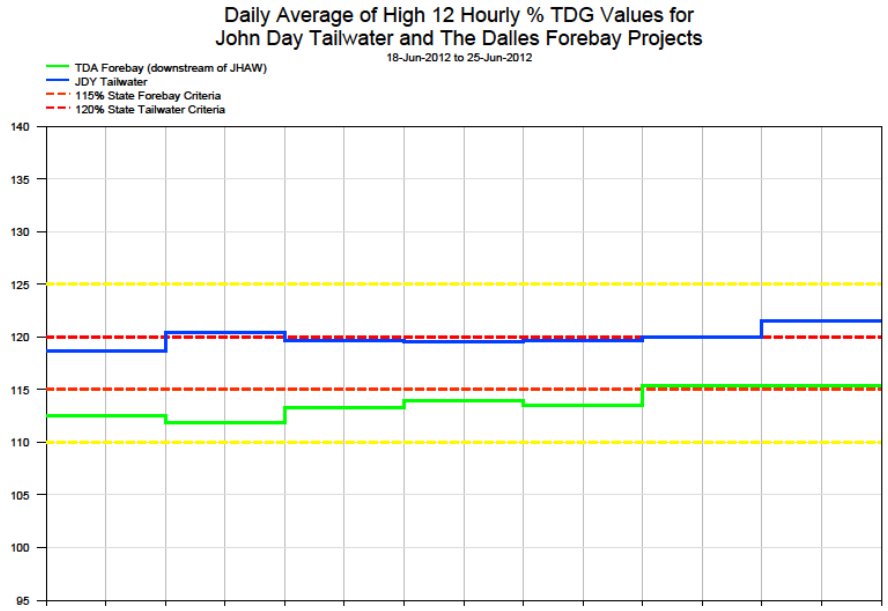

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
06/18/12 01:00
06/18/12 13:00
06/19/12 01:00
06/19/12 13:00
06/20/12 01:00
06/20/12 13:00
06/21/12 01:00
06/21/12 13:00
06/22/12 01:00
06/22/12 13:00
06/23/12 01:00
06/23/12 13:00
06/24/12 01:00
06/24/12 13:00
06/25/12 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
50% of Total Flow

Figure 30


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
18-Jun-2012 to 25-Jun-2012
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

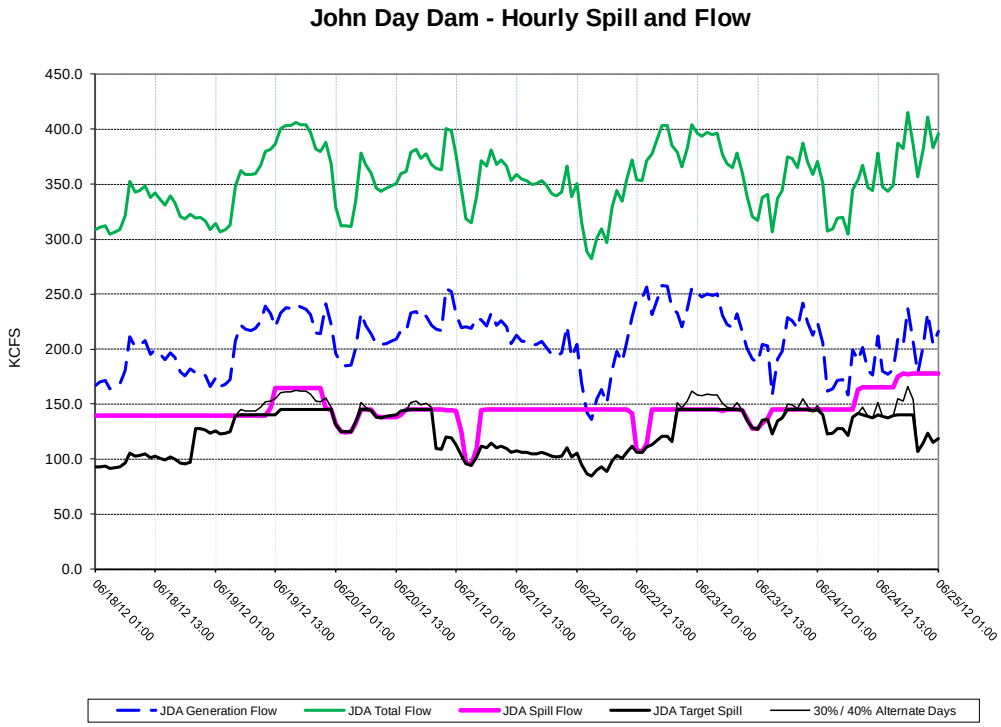
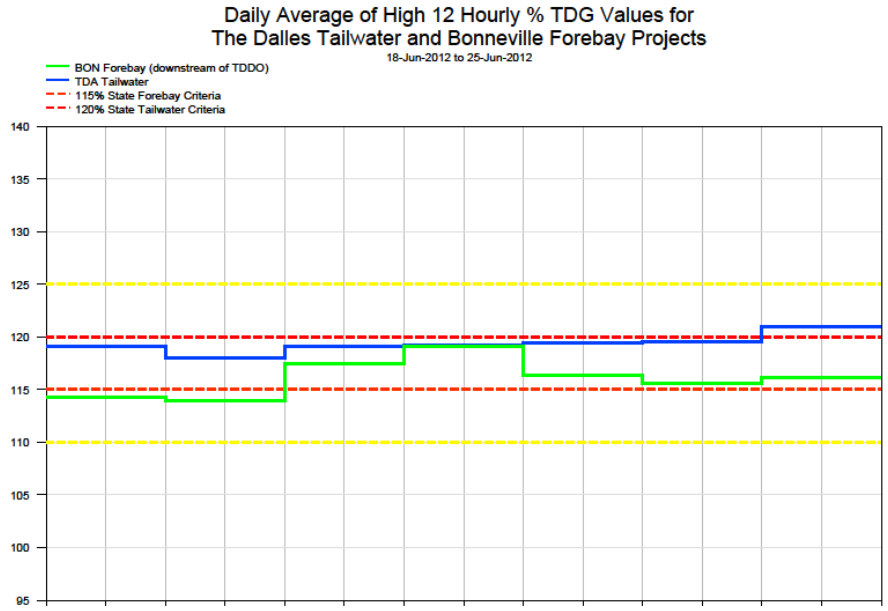

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
06/18/12 01:00
06/18/12 13:00
06/19/12 01:00
06/19/12 13:00
06/20/12 01:00
06/20/12 13:00
06/21/12 01:00
06/21/12 13:00
06/22/12 01:00
06/22/12 13:00
06/23/12 01:00
06/23/12 13:00
06/24/12 01:00
06/24/12 13:00
06/25/12 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% / 40% Alternate Days

Figure 31


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
18-Jun-2012 to 25-Jun-2012
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

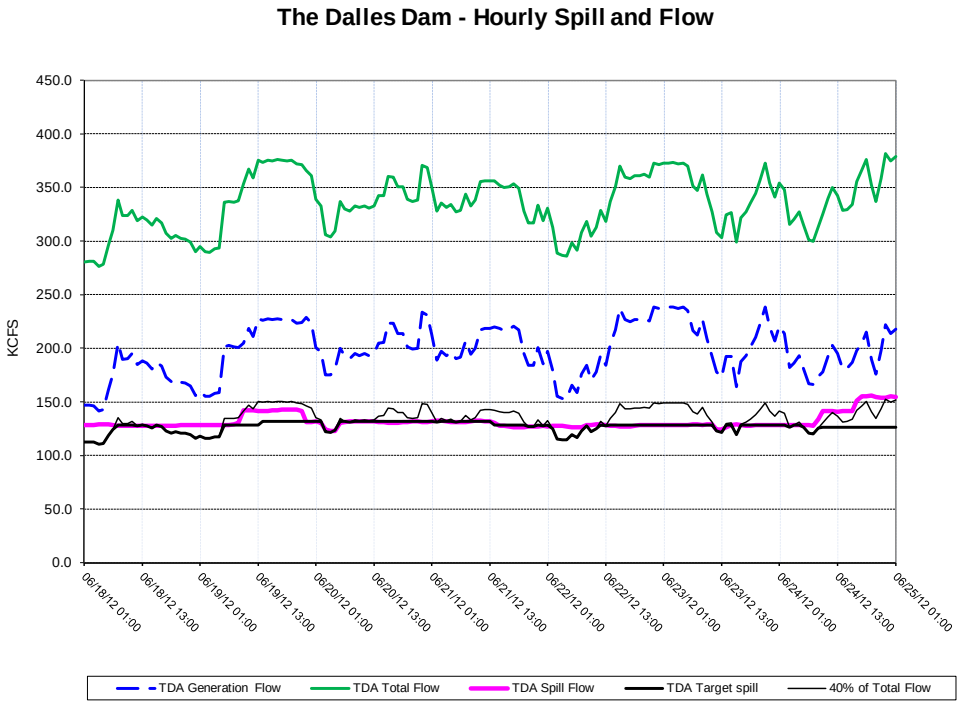
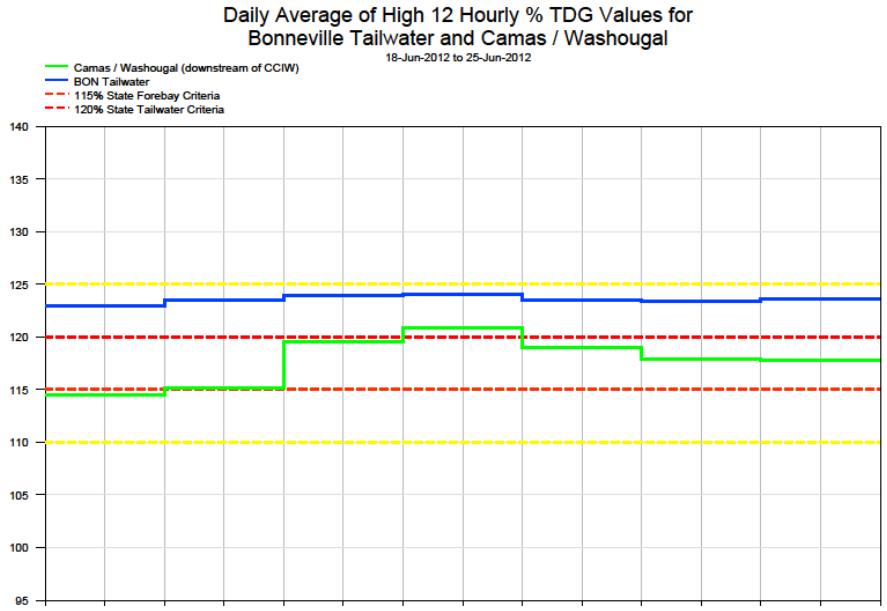

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
06/18/12 01:00
06/18/12 13:00
06/19/12 01:00
06/19/12 13:00
06/20/12 01:00
06/20/12 13:00
06/21/12 01:00
06/21/12 13:00
06/22/12 01:00
06/22/12 13:00
06/23/12 01:00
06/23/12 13:00
06/24/12 01:00
06/24/12 13:00
06/25/12 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 32


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
18-Jun-2012 to 25-Jun-2012
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

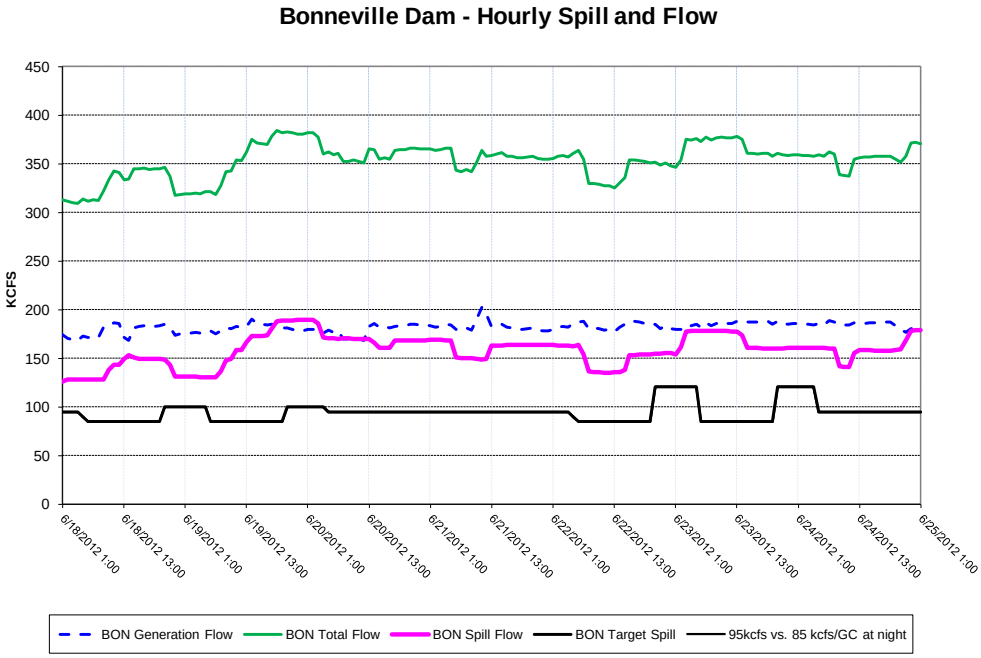
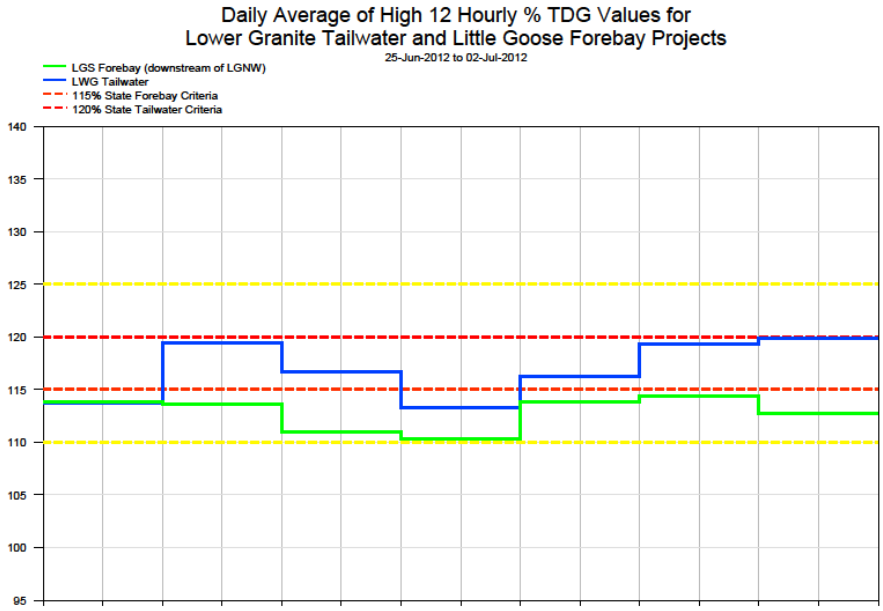

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
6/18/2012 1:00
6/18/2012 13:00
6/19/2012 1:00
6/19/2012 13:00
6/20/2012 1:00
6/20/2012 13:00
6/21/2012 1:00
6/21/2012 13:00
6/22/2012 1:00
6/22/2012 13:00
6/23/2012 1:00
6/23/2012 13:00
6/24/2012 1:00
6/24/2012 13:00
6/25/2012 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
95kcfs vs. 85 kcfs/GC at night

Figure 33


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
25-Jun-2012 to 02-Jul-2012
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

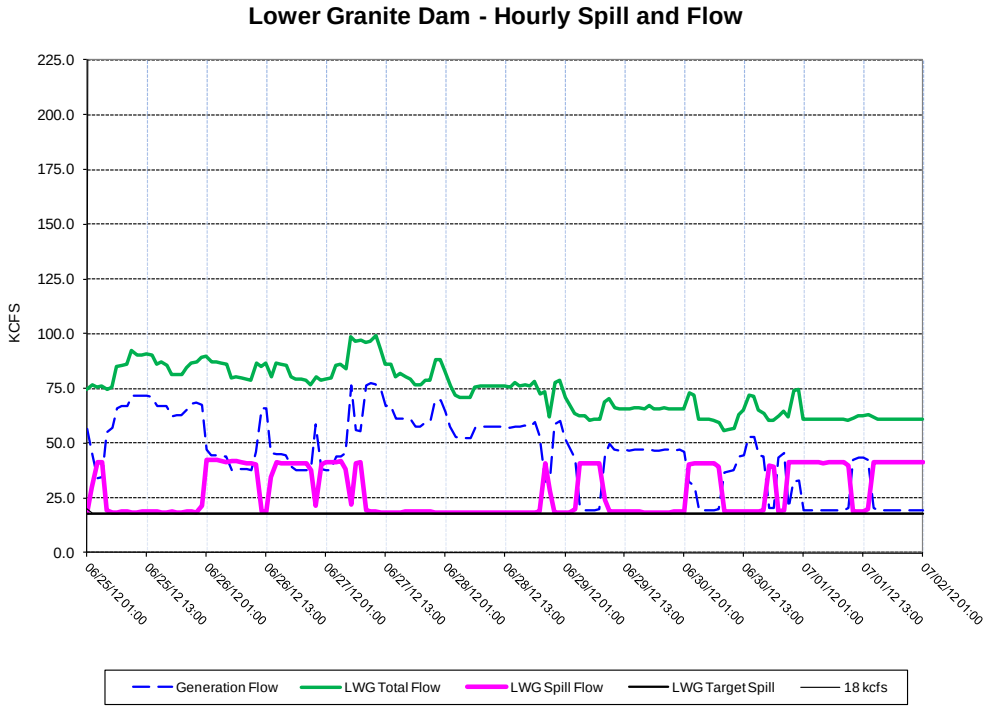
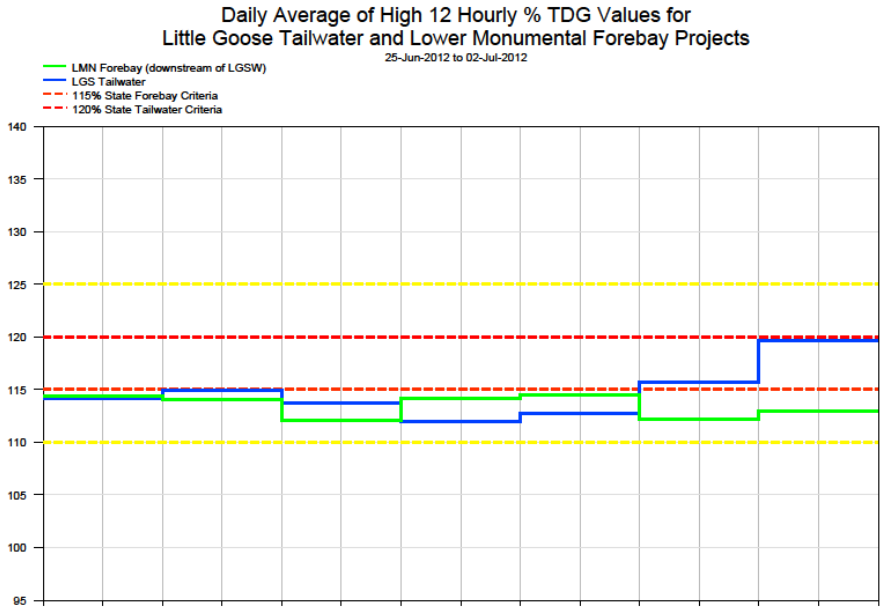

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/25/12 01:00
06/25/12 13:00
06/26/12 01:00
06/26/12 13:00
06/27/12 01:00
06/27/12 13:00
06/28/12 01:00
06/28/12 13:00
06/29/12 01:00
06/29/12 13:00
06/30/12 01:00
06/30/12 13:00
07/01/12 01:00
07/01/12 13:00
07/02/12 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
18 kcfs

Figure 34


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
25-Jun-2012 to 02-Jul-2012
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

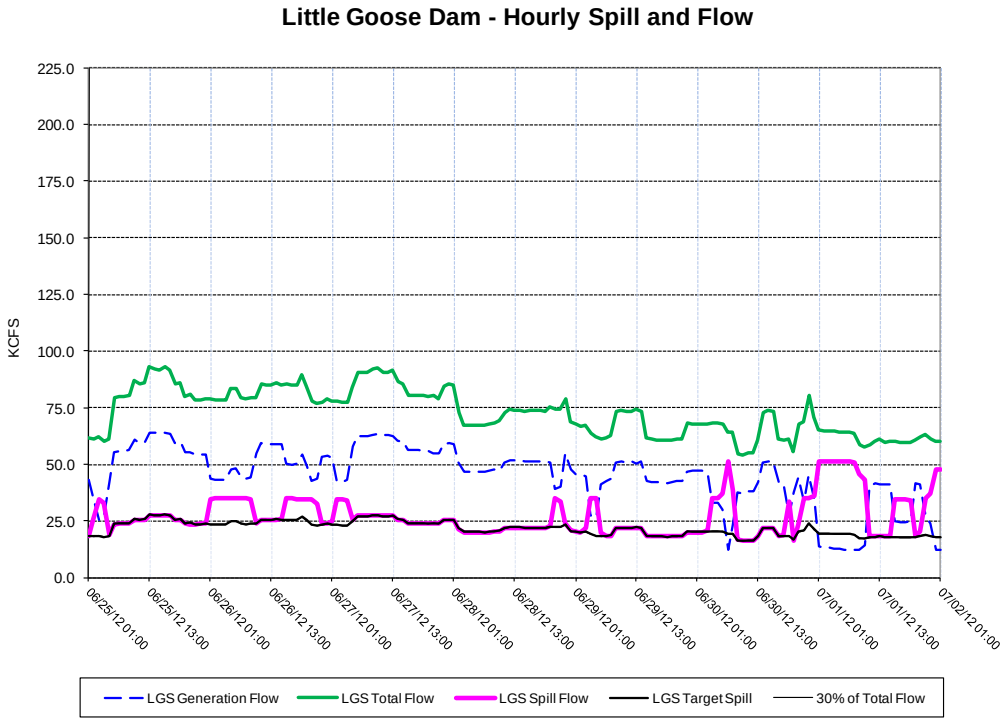
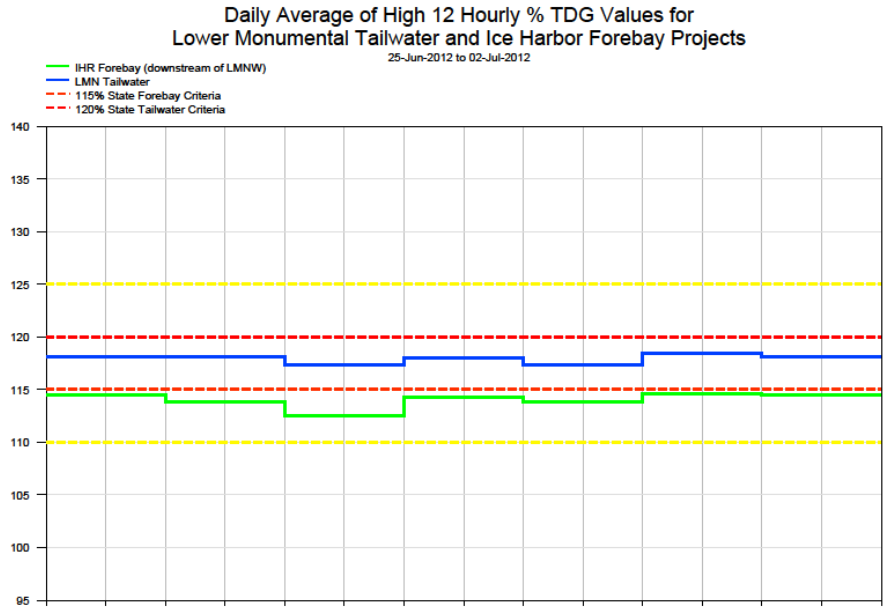

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/25/12 01:00
06/25/12 13:00
06/26/12 01:00
06/26/12 13:00
06/27/12 01:00
06/27/12 13:00
06/28/12 01:00
06/28/12 13:00
06/29/12 01:00
06/29/12 13:00
06/30/12 01:00
06/30/12 13:00
07/01/12 01:00
07/01/12 13:00
07/02/12 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 35


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
25-Jun-2012 to 02-Jul-2012
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

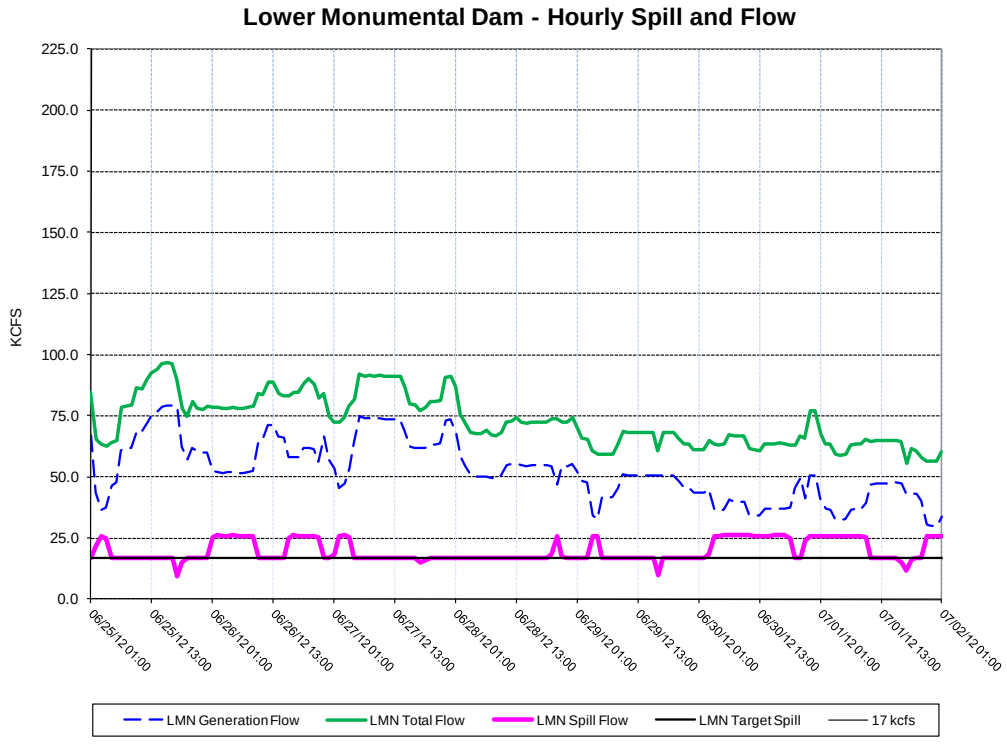
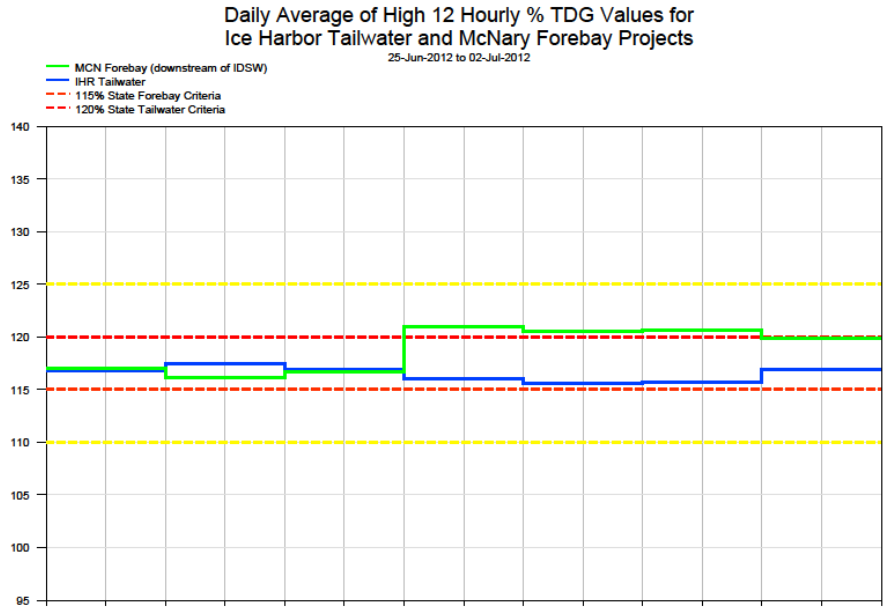

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/25/12 01:00
06/25/12 13:00
06/26/12 01:00
06/26/12 13:00
06/27/12 01:00
06/27/12 13:00
06/28/12 01:00
06/28/12 13:00
06/29/12 01:00
06/29/12 13:00
06/30/12 01:00
06/30/12 13:00
07/01/12 01:00
07/01/12 13:00
07/02/12 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
17 kcfs

Figure 36


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
25-Jun-2012 to 02-Jul-2012
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

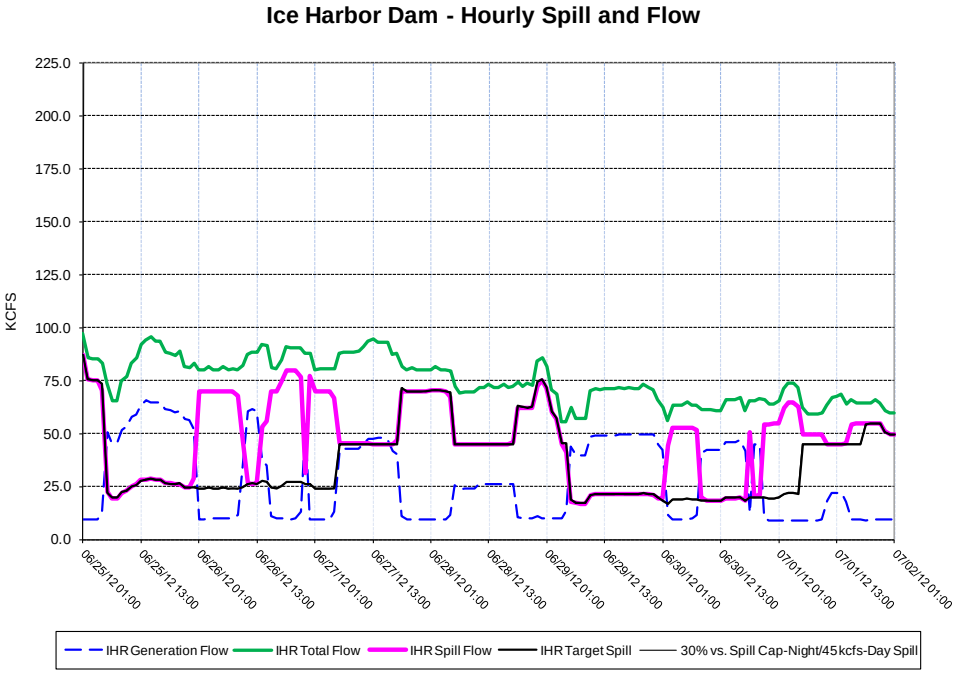
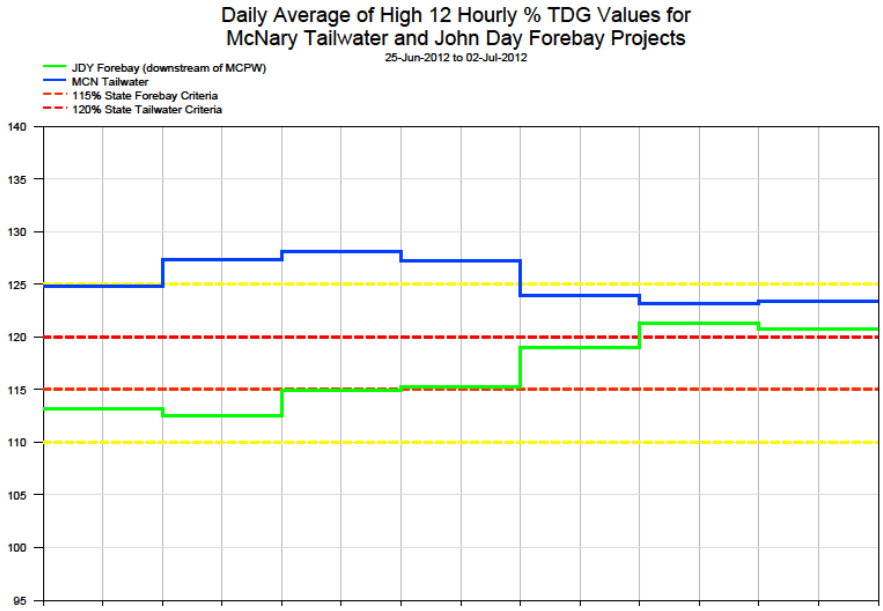

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
06/25/12 01:00
06/25/12 13:00
06/26/12 01:00
06/26/12 13:00
06/27/12 01:00
06/27/12 13:00
06/28/12 01:00
06/28/12 13:00
06/29/12 01:00
06/29/12 13:00
06/30/12 01:00
06/30/12 13:00
07/01/12 01:00
07/01/12 13:00
07/02/12 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
30% vs. Spill Cap-Night/45 kcfs-Day Spill

Figure 37


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
25-Jun-2012 to 02-Jul-2012
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

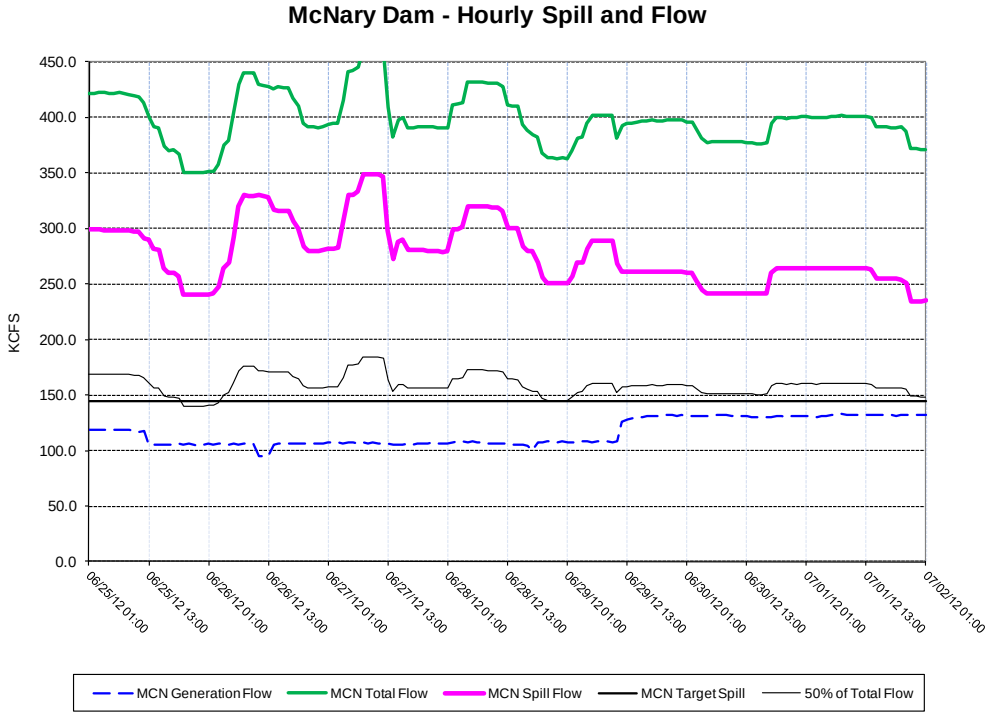
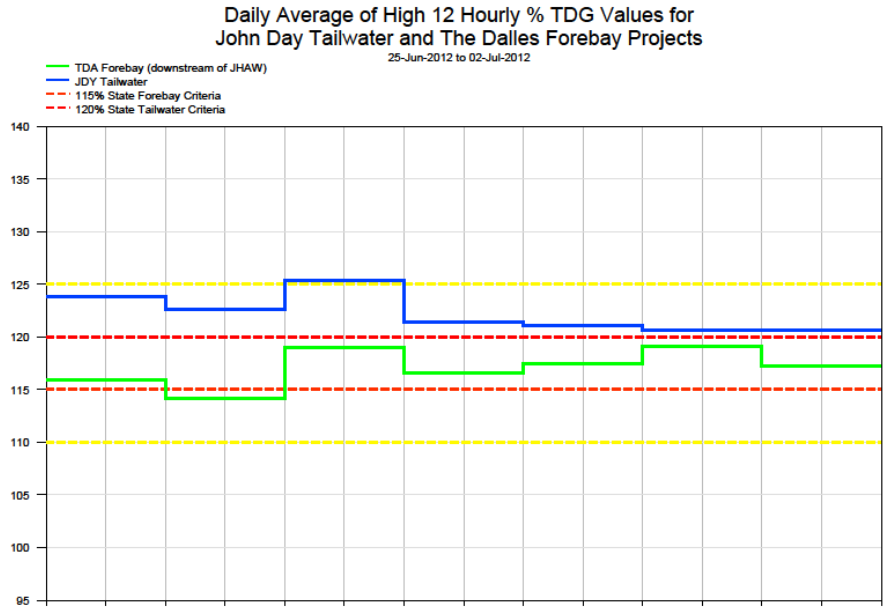

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
06/25/12 01:00
06/25/12 13:00
06/26/12 01:00
06/26/12 13:00
06/27/12 01:00
06/27/12 13:00
06/28/12 01:00
06/28/12 13:00
06/29/12 01:00
06/29/12 13:00
06/30/12 01:00
06/30/12 13:00
07/01/12 01:00
07/01/12 13:00
07/02/12 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
50% of Total Flow

Figure 38


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
25-Jun-2012 to 02-Jul-2012
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

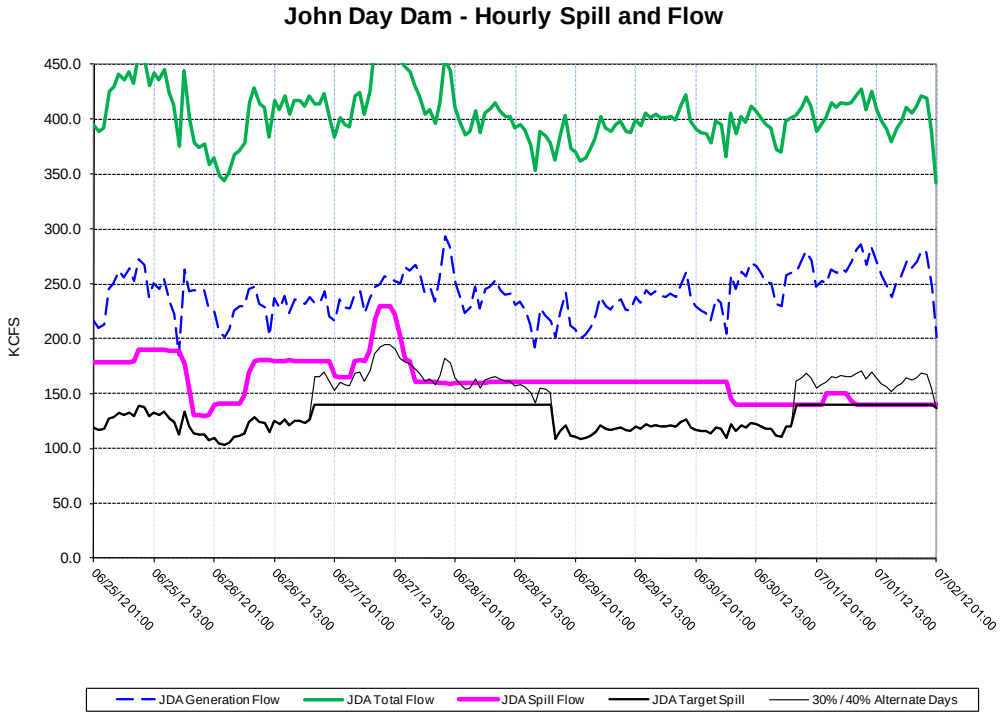
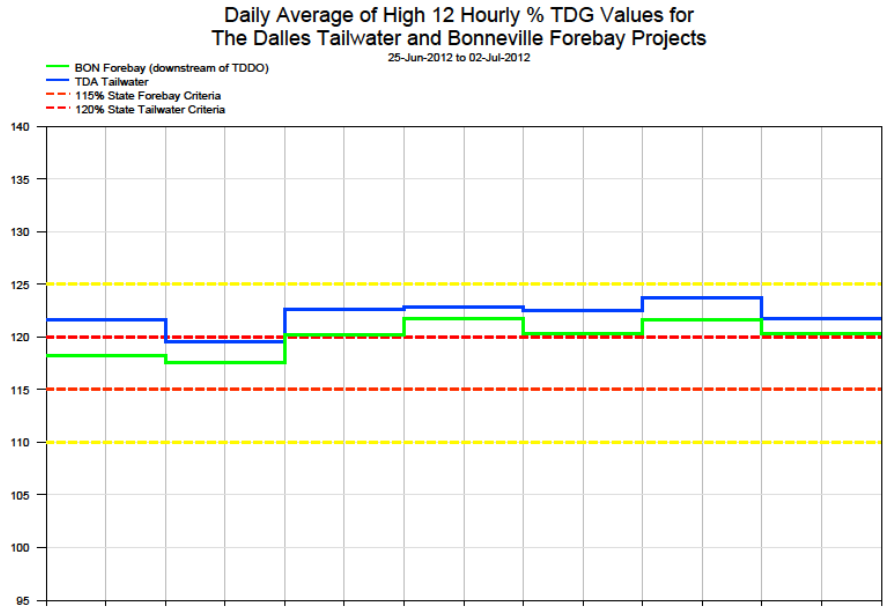

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
06/25/12 01:00
06/25/12 13:00
06/26/12 01:00
06/26/12 13:00
06/27/12 01:00
06/27/12 13:00
06/28/12 01:00
06/28/12 13:00
06/29/12 01:00
06/29/12 13:00
06/30/12 01:00
06/30/12 13:00
07/01/12 01:00
07/01/12 13:00
07/02/12 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% / 40% Alternate Days

Figure 39


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
25-Jun-2012 to 02-Jul-2012
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

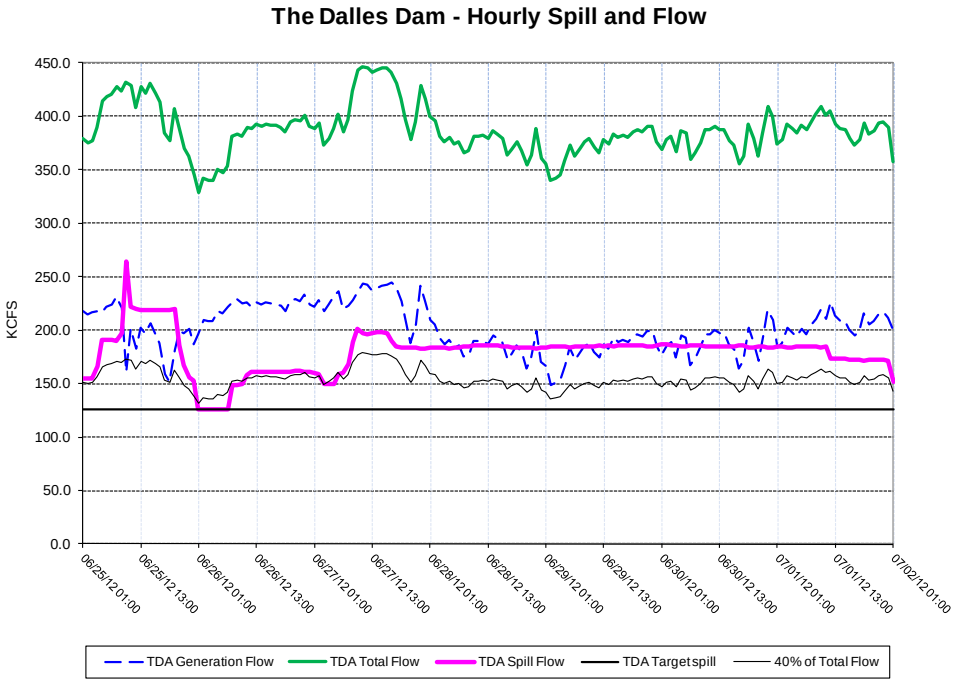
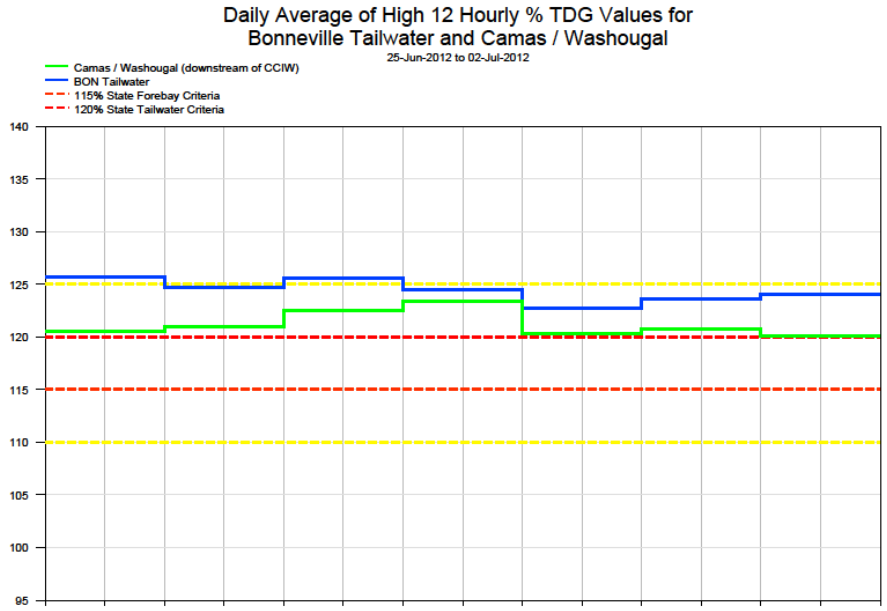
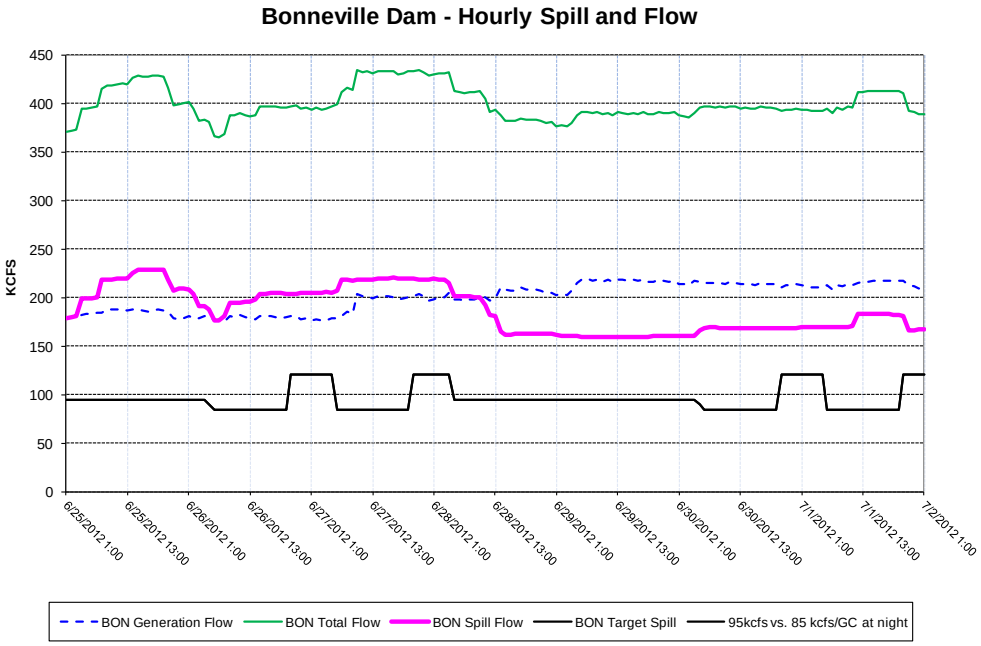

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
06/25/12 01:00
06/25/12 13:00
06/26/12 01:00
06/26/12 13:00
06/27/12 01:00
06/27/12 13:00
06/28/12 01:00
06/28/12 13:00
06/29/12 01:00
06/29/12 13:00
06/30/12 01:00
06/30/12 13:00
07/01/12 01:00
07/01/12 13:00
07/02/12 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 40


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
25-Jun-2012 to 02-Jul-2012
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95


Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
6/25/2012 1:00
6/25/2012 13:00
6/26/2012 1:00
6/26/2012 13:00
6/27/2012 1:00
6/27/2012 13:00
6/28/2012 1:00
6/28/2012 13:00
6/29/2012 1:00
6/29/2012 13:00
6/30/2012 1:00
6/30/2012 13:00
7/1/2012 1:00
7/1/2012 13:00
7/2/2012 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
95kcfs vs. 85 kcfs/GC at night

Average Percent TDG for Highest 12-Hours: May 28 – July 1, 2012

Date	FIXED MONITORING STATIONS																
	LWG	LGNW	LGSA	LGSW	LMNA	LMNW	IHRA	IDSW	MCNA	MCPW	JDY	JHAW	TDA	TDDO	BON	CCIW	CWMW
5/28/2012	103.8	110.6	109.1	113.1	113.5	118.8	112.9	115.2	112.9	117.3	111.4	117.7	112	117.4	113.7	---	113.6
5/29/2012	103.7	110.5	108.6	112.3	112.1	118.7	114.6	115.9	112.8	117.9	110.8	117.2	110.9	116.8	114.3	---	115.9
5/30/2012	103.8	110.2	109.2	113.2	112.2	118.6	115	116.6	112.8	116.2	110.4	118.3	112.9	117.7	114.7	---	115.9
5/31/2012	104.4	110.6	110	113.3	112.9	119.1	115.8	116.2	115.8	115.9	111.1	118.2	113.4	118.5	116.7	---	116.6
6/1/2012	104.9	110.7	111	111.5	114.3	119.4	117	116.9	116.3	116	111.8	115.7	113.3	118.3	118.1	---	117.6
6/2/2012	104.7	110.4	111.2	113.4	114.2	118.7	116.9	116.7	115.8	116	112.5	116.2	112	117.3	116.9	---	116.5
6/3/2012	104.5	110.3	110.8	114.4	112	118.5	115.8	117.8	115.2	115.5	112.4	118.1	113.4	117.5	114	---	115.1
6/4/2012	104.4	110.5	111.6	114.7	114.1	119.2	115.3	119.1	114.8	118.5	113.4	118.3	114.1	118.7	116.3	---	114.5
6/5/2012	103.4	117.7	110.5	115.8	113.3	118.9	113.7	119.3	111	118.2	111.5	117.8	111.7	118.6	114	---	113.1
6/6/2012	103	119	105.4	118.8	110.5	117.6	111	120.1	107.4	119.3	108.5	120	112.6	123.9	114.1	119.6	114
6/7/2012	103.7	117.9	109.4	116	116.5	119.6	113.1	118.3	108.1	120.8	108.4	120	113.5	120.3	121.6	124.9	118.3
6/8/2012	105.1	120.3	113.1	121	116.6	117.9	113.8	119.1	111.1	123.2	106.8	119.7	112.3	118.7	117.7	122.3	117.4
6/9/2012	104.4	120.3	112.4	120.9	116.2	117.8	113.8	119.5	111.3	122.8	107.6	120.4	110.7	118.7	114.5	123.8	115.4
6/10/2012	103.3	120	110.8	118.2	116.2	118.9	113.7	118.2	111.8	119.6	108.6	119.2	112	117.7	113	121.7	115.1
6/11/2012	103.5	116.4	113.6	114.9	118.9	119.9	115.6	117.6	113.8	121.5	110.3	119.5	113.8	119.8	115.4	123.4	116.7
6/12/2012	104.8	115.3	116.8	116.3	118.4	119.8	117.8	116.8	116.5	120.3	111.5	119.1	114.4	120.5	117.5	124.1	117.9
6/13/2012	105.1	119.8	117	119.3	115.9	118.3	117.9	116.7	115	121.1	111.5	119.7	113.4	119.6	116.3	123.2	117.7
6/14/2012	104.6	117	114.5	114.6	115.4	119.5	117	117.1	114.9	120.6	111.9	119	112.8	118	114.3	123.4	117
6/15/2012	103.5	113.9	112.3	113.9	117.2	119.2	116.6	116.9	115.5	120.8	111.6	119.2	114.9	118.8	115.1	124	115.9
6/16/2012	104.3	117.2	116.7	113.9	115.7	114.9	117.5	117.3	116.9	119.9	113.1	118.4	114.3	119.9	117.8	123.1	119.1
6/17/2012	105.2	117.8	116.1	115.1	116	114.3	118	118.2	116.9	120.3	114.5	118.9	113.9	120.4	116.9	122	116.3
6/18/2012	104.7	117.6	114.5	114.9	115	114.1	115.7	117.5	113.2	120.8	113.2	118.7	112.5	119.1	114.2	123.1	114.5
6/19/2012	103.4	118.3	111.1	115.1	112.6	117.3	112.4	118.2	111.7	122.1	109.2	120.4	111.9	118	113.9	123.5	115.1
6/20/2012	102.5	110.3	112.1	113.5	113.5	119.5	112.6	117.1	114.5	122.3	108	119.6	113.3	119.1	117.5	124	119.6
6/21/2012	104.7	113.7	116	113.5	115.6	116.6	115.7	116.7	117.9	122.4	111.4	119.5	114	119.1	119.1	124.2	120.9
6/22/2012	105.8	119.9	116.3	115.9	115.5	119.3	117.4	117.2	119.1	122.6	115.7	119.7	113.5	119.4	116.3	123.6	119
6/23/2012	105.3	120	111.7	114.5	114.4	118.4	115.5	117.1	117	122.3	116.5	120	115.4	119.5	115.6	123.5	117.9
6/24/2012	103.7	119.5	111.3	114.5	113.7	118.3	113.3	116.9	114.9	123	115.3	121.5	115.4	121	116.1	123.7	117.8
6/25/2012	103	113.7	113.8	114.1	114.4	118.1	114.5	116.8	117	124.8	113.2	123.8	115.9	121.6	118.2	125.8	120.6
6/26/2012	102.6	119.4	113.6	114.9	114	118.1	113.8	117.4	116.1	127.4	112.5	122.6	114.1	119.6	117.5	124.7	121
6/27/2012	102	116.7	111	113.7	112.1	117.3	112.5	116.9	116.6	128.1	114.9	125.4	119	122.6	120.2	125.7	122.5
6/28/2012	101.6	113.2	110.3	111.9	114.2	118	114.2	116	121	127.2	115.3	121.4	116.6	122.8	121.7	124.6	123.4
6/29/2012	102.9	116.2	113.8	112.8	114.5	117.3	113.9	115.6	120.5	124	119	121.1	117.4	122.5	120.3	122.8	120.2
6/30/2012	103.9	119.4	114.4	115.7	112.2	118.4	114.6	115.7	120.6	123.2	121.3	120.7	119.1	123.7	121.6	123.7	120.8
7/1/2012	103.3	119.8	112.8	119.6	113	118.1	114.5	116.9	119.9	123.4	120.7	120.6	117.3	121.8	120.3	124.1	120.1

--- denotes missing data due to gauge malfunctioning.

Generated: Thru July 5 14:25:01 2012

Number of hours of data used:

OR: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Red text denotes exceedances.

• indicates no data due to malfunctioning gauge

- indicates gauge is out of service for winter

Dates run from hour 1 to 24 (not 0 to 23).

The gas caps shown only apply when spilling to facilitate juvenile fish passage ("voluntary spill") between April 3rd and August 31st. At all other times, the gas cap is 110%.

Total Dissolved Gas Monitoring Stations

Code	Station Name
LWG	Lower Granite Forebay
LGNW	Lower Granite Tailwater
LGSA	Little Goose Forebay
LGSW	Little Goose Tailwater
LMNA	Lower Monumental Forebay
LMNW	Lower Monumental Tailwater
IHRA	Ice Harbor Forebay
IDSW	Ice Harbor Tailwater
MCNA	McNary Forebay
MCPW	McNary Tailwater
JDY	John Day Forebay
JHAW	John Day Tailwater
TDA	The Dalles Forebay
TDDO	The Dalles Tailwater
BON	Bonneville Forebay
CCIW	Bonneville Tailwater (Cascade Island)
CWMW	Camas / Washougal

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UNITED STATES DISTRICT COURT

DISTRICT OF OREGON

PORTLAND DIVISION

NATIONAL WILDLIFE FEDERATION, et al.,

Plaintiffs,

v.

NATIONAL MARINE FISHERIES SERVICE, et al.,

Defendants,

Case No.: 3:01-CV-00640-SI

NOTICE OF FEDERAL DEFENDANTS' FOURTH 2012 SPILL IMPLEMENTATION REPORT

In accordance with the Court's August 2, 2011 Opinion and Order (ECF No. 1855) and Federal Defendants' Notice Re: 2012 Spill Operations at 7 (ECF 1887) (filed Mar. 9, 2012), Federal Defendants submit their fourth 2012 spill implementation status report. *See* Exhibit 1. This status report includes, among other things: the hourly flow through the powerhouse at each dam; the hourly flow over the spillway compared to the target spill for that hour; and the resultant 12-hour average total dissolved gas ("TDG") for the tailwater at each project and for the next project's forebay downstream. The report also provides written explanations of variances that occurred during the reporting period.

Dated this 16th day of August, 2012.

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CERTIFICATE OF SERVICE

I certify that on August 16, 2012, the foregoing will be electronically filed with the Court's electronic filing system, which will generate automatic service upon on all Parties enrolled to receive such notice. The following will be manually served by overnight mail:

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FISH OPERATIONS PLAN IMPLEMENTATION REPORT
July 2012

Submitted by the U.S. Army Corps of Engineers
Northwestern Division
Portland, OR

Introduction:

The U.S. Army Corps of Engineers (Corps) is submitting this report in accordance with the 2012 Fish Operations Plan (2012 FOP) submitted to the U.S. District Court of Oregon on March 9, 2012. The 2012 FOP describes the Corps' project operations for fish passage at its Federal Columbia River Power System (FCRPS) dams during the fish migration season, generally April through August. To the extent Corps project operations are not specified in the 2012 FOP, the FCRPS operations will be consistent with the 2010 NOAA Fisheries Supplemental Biological Opinion (2010 Supplemental BiOp), the USFWS 2000 and 2006 BiOps, and/or other operative documents, including the 2012 Water Management Plan (WMP), WMP seasonal updates, and the 2012 Fish Passage Plan (FPP).

The Corps' July 2012 lower Snake and Columbia River project and fish passage operations are contained in this report. In particular, information in this report includes the following:

- hourly flow through the powerhouse at each dam;
- hourly flow over the spillway compared to the spill target for that hour; and,
- resultant high 12-hour average percent Total Dissolved Gas (%TDG) levels in the tailrace at each project and in the subsequent downstream project's forebay and the Camas-Washougal gauge below Bonneville Dam.

This report also provides information on presented issues and unanticipated or emergency situations that arose during implementation of the 2012 FOP in July.

Data Reporting:

I. For each project providing fish passage operations, this report contains two graphs per operational week[1] in July displaying the performance of the spill program as follows:

(A). Daily Average of the High 12 Hourly %TDG Values - described in the upper graph.
(B). Hourly Spill and Generation Flows - described in the lower graph.

The weekly graphs begin on July 2 and end on July 29 for the following lower Snake River and lower Columbia River projects: Lower Granite, Little Goose, Lower Monumental, Ice Harbor, McNary, John Day, The Dalles, and Bonneville.

[1] Operations are implemented from Monday through Sunday.

Each figure represents one week of a project's operation. The graphs start at 0000 hours (%TDG graphs) and 0100 hours (flow/spill graphs) on July 2 for the lower Snake River and the lower Columbia River projects.

July 2 – July 8	Figures 1 – 8
July 9 – July 15	Figures 9 – 16
July 161 – July 22	Figures 17 – 24
July 23 – July 29	Figures 25 – 32

A. Upper Graph: Shows the resultant daily average %TDG for the 12 highest hours. This is primarily a result of spill at dams. The objective is to operate each project up to the TDG limits without exceeding those limits to the extent practicable.

1. The blue line represents the %TDG in the tailrace of the dam. 120 percent TDG is the upper operating limit[2].
2. The green line represents the %TDG in the forebay of the next dam downstream. 115 percent TDG is the upper operating limit.

B. Lower Graph: Shows the hourly flow and spill at the dam.

- The dotted blue line shows the flow through the powerhouse each hour, in thousand cubic feet per second (kcfs).
- The medium green line represents the average hourly total river flow through the project in kcfs.
- The heavy pink line represents the average hourly flow through the spillway in kcfs.
- The thin black line represents the hourly spill level as defined in the 2012 FOP.
- The heavy black line represents the target spill. This is the hourly maximum spill level. The hourly target spill may vary as a function of total river flow, forebay elevation and generator capacity, subject to the following conditions:

    - spill percentage or flow rate specified in the 2012 FOP;
    - spill caps as set daily for TDG management;
    - test spill levels for fish passage research;
    - minimum generation for power system needs;
    - minimum spill at Bonneville (50 kcfs) dam;
    - minimum spill at John Day is 25 percent of project outflow.

II. A table is included at the end of the figures that lists the average daily %TDG for the 12 highest hours for all projects. The numbers in red indicate the project exceeded the %TDG gas cap - 115 percent (forebay of the next downstream dam) or 120 percent (tailwater) for each project.

[2] The Lower Monumental tailwater TDG gauge was not operable due to a ruptured membrane on July 22 at 1500 and was returned to service on July 23 at 1200.

General Implementation Remarks:

For all projects that spill for fish passage, the target spill may be reduced due to various conditions as described below. When spill levels briefly deviate below or above the level specified in the 2012 FOP, the heavy pink line will be below or above the heavy black line in the graphs. Actual operation deviations from the target operation during voluntary spill hours are described below. The July 2012 Spill Variance Table includes average hourly data; therefore, while spill may vary from target spill for only a portion of an hour, the July 2012 Spill Variance Table characterizes the reduction as a full hour. There are instances when the hourly spill levels are not achievable due to mechanical limitations in setting spill gates to implement the regionally coordinated spill pattern. The project operator sets the spill gate stops to most closely approximate the 2012 FOP level of spill while also avoiding exceeding the %TDG spill cap to the extent practicable.

"Low flow" operations at the lower Columbia and Snake projects are triggered when inflow is insufficient to provide both minimum generation and the specified spill levels. In these situations, the projects operate at minimum generation and pass the remainder of project inflow as spill and through other miscellaneous routes, such as fish ladders, sluiceways, and navigation locks. As flows transition from higher flows to low flows, there may be situations when flows recede at a higher rate than forecasted. In addition, inflows provided by nonfederal projects upstream are variable and uncertain.

The combination of these factors may result in instances when unanticipated changes to inflow result in forebay elevations dropping to the low end of the Minimum Operating Pool (MOP). Since these projects have limited operating flexibility, maintaining minimum generation, MOP elevation, and the target spill may not be possible throughout every hour. During low flow periods at Little Goose Dam, the overall project spill percentage appears to be reduced because the calculations do not account for the volume of water released during navigational lockages; however, the actual spill volume remains constant. When these variances occur, they are recorded in the monthly Spill Variance Table for Little Goose under the variance type "Navigation."

Actual spill levels at Corps projects with set flow targets may vary up to ±2 kcfs (Bonneville Dam may range up to ±3 kcfs, 2012 FOP p. 19) compared to those specified in the 2012 FOP and the RCC spill priority list (defines the projects' %TDG spill caps). A number of factors influence actual spill, including hydraulic efficiency, exact gate opening calibration, spillway gate hoist cable stretch due to temperature changes, and forebay elevation (e.g. a higher forebay results in a greater volume of spill since more water can pass under the spill gate).

The 2012 FOP describes project "Operations during Rapid Load Changes" (p. 6). For reporting purposes, the notation "Transmission Stability" in the Spill Variance Report Table replaces "Rapid Load Changes," and identifies instances when hourly spill levels were not met as a result of load swing hours and other related within-hour load variability issues. "Transmission Stability" occurs because projects must be available to respond to within-hour load variability to satisfy North American Electric Reliability Corporation (NERC) reserve requirements ("on response"). In addition to within-hour load variability, projects on response must be responsive

to within hour changes resulting from intermittent generation (such as wind generation). During periods of rapidly changing loads and intermittent generation, projects on response may have significant changes in turbine discharge within the hour while spill quantity remains the same within the hour. Under normal conditions, within-hour load changes primarily occur immediately preceding and following the peak load hours; however, within-hour changes in intermittent generation can occur at any hour of the day. Occasionally, several hours after peak load hours, the project may be decreasing total outflow and generation faster than the corresponding spill decreases causing the percent spill to be slightly higher. Due to the high variability of within-hour load, reporting actual spill percentages that vary by more than the ±1 percent requirement (or other ranges specified in the 2012 FOP) may occur with greater frequency with "Transmission Stability" hours than other hours.

Occurrences requiring an adjustment in operations and/or regional coordination are described in greater detail in the "Operational Adjustments" section below.

July Operations:

The month of July was characterized by below average flows for the lower Snake and above average flows for the lower Columbia Rivers. Over the month, flows receded both on the lower Snake and the lower Columbia. The NOAA Northwest River Forecast Center's Runoff Processor indicated July 2012 adjusted volume runoff was above the 30 year average (1971-2000): 23.9 MAF (million acre feet) or 151 percent of average as measured at The Dalles. The Runoff Processor also indicated July 2012 adjusted runoff was below the 30 year average (1971-2000): 2.2 MAF or 86 percent of average as measured at Lower Granite Dam. The monthly precipitation summary for July was slightly below average at 83 percent on the Snake above Ice Harbor Dam and greater than average, 112 percent on the Columbia above The Dalles Dam (data through July 31).

The high runoff flows resulted in instances of involuntary spill due to lack of turbine capacity and lack of load throughout the month. In some of these instances of involuntary spill, the resulting Daily Average of High 12 Hourly %TDG values exceeded the 115 percent forebay and 120 percent tailrace standards[3] as shown in the corresponding %TDG graphs for the lower Columbia and Snake rivers.

During the July reporting period, the planned 2012 FOP spill operations were carried out as follows:

- Lower Granite Dam - The hourly target spill level was 18 kcfs 24-hours/day.
- Little Goose Dam - The hourly target spill level was 30 percent of total river flow 24-hours/day.
- Lower Monumental Dam - The hourly target spill level was 17 kcfs 24 hours/day.
- Ice Harbor Dam - The hourly target spill alternated every two days between 30 percent of total river flow rate for 24-hours/day vs. 45 kcfs daytime and the %TDG gas cap nighttime

[3] As provided for in the 2012 FOP (see p. 2-3).

until July 13 when the operation transitioned to the summer operation of 45 kcfs daytime and the %TDG gas cap nighttime. Nighttime spill hours are 1800-0500.

- McNary Dam - The hourly target spill level was 50 percent of total river flow for 24-hours/day.
- John Day Dam - The hourly target spill alternated between 40 percent and 30 percent of total river flow rate for 24-hours/day due to the two-day treatment until July 14 when the operation transitioned to the summer operation of 30 percent of total river flow rate for 24-hours/day.
- The Dalles Dam - The hourly target spill level was 40 percent of total river flow for 24-hours/day.
- Bonneville Dam - The hourly target spill level alternated every two days between 95 kcfs 24-hours/day vs. 85 kcfs daytime/121 kcfs nighttime until July 20 when the summer operation transitioned to the operation of 75 kcfs daytime and the %TDG gas cap nighttime.

Operational Adjustments

1. McNary Dam:

On July 17, a System Operations Request (SOR 2012-03) was submitted recommending juvenile transportation operations at McNary Dam not be initiated as specified in the 2012 FOP. The 2012 FOP states that barge transportation will be initiated at McNary Dam sometime between July 15-30 in coordination with NOAA Fisheries and the TMT. The SOR stated that higher river flow projected through the remainder of summer, along with the preliminary data indicating high survival through the newly constructed juvenile bypass outfall provides adequate protection for bypassed fish. The Corps agreed to implement the operation identified in the SOR and concurred there was sufficient information to justify the change in operation. Truck transportation will still occur at McNary Dam as described in the 2012 FOP beginning on August 17. This operation was coordinated with FPOM on July 12 and TMT on July 11 and 25. FPOM and TMT members either supported or did not object to this operational change.

July 2012 Spill Variance Table

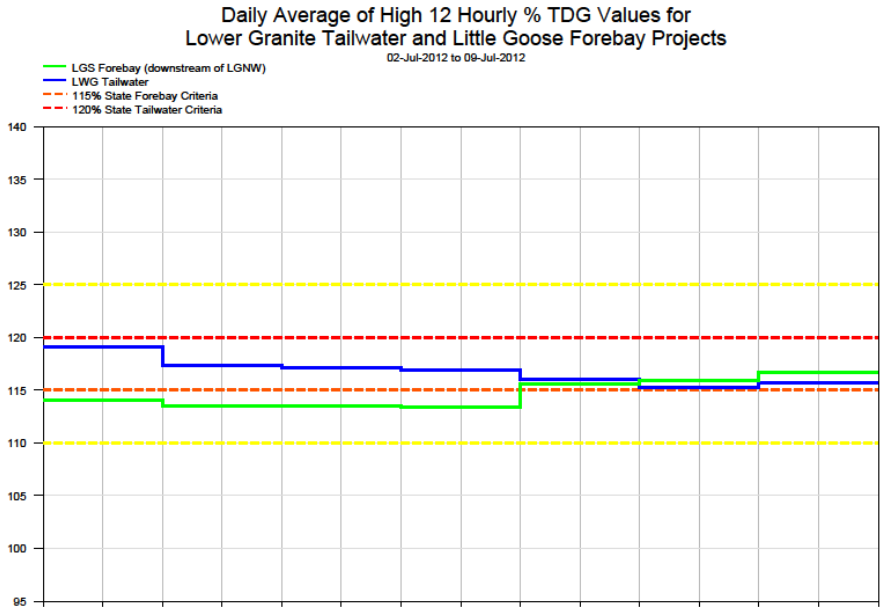
Table 1: July 2012 (7/2 - 7/29) - FOP Implementation Report Table

Project	Parameter	Date	Time	Hours	Type	Reason
Lower Granite	Additional Spill	7/25/12	0800-0900	2	Human/ Program Error	Hourly spill increased to 20.3 kcfs (above 18 kcfs) due to electronic control system malfunction that allowed spill to drift upward.
Little Goose	Reduced % Spill	7/10/12	1000	1	Navigation	Hourly spill decreased to 28.8 % (below 30 +/- 1%) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 38.0%.
Little Goose	Reduced % Spill	7/10/12	1900	1	Navigation	Hourly spill decreased to 28.9 % (below 30 +/- 1%) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 38.0%.
Little Goose	Reduced % Spill	7/18/12	0800	1	Navigation	Hourly spill decreased to 28.9 % (below 30 +/- 1%) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 35.5%.
Little Goose	Reduced % Spill	7/21/12	1300	1	Navigation	Hourly spill decreased to 28.9 % (below 30 +/- 1%) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 42.3%.
Little Goose	Reduced % Spill	7/23/12	2000	1	Navigation	Hourly spill decreased to 28.9% (below 30 +/- 1%) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 34.9%.
Little Goose	Reduced % Spill	7/24/12	0300	1	Navigation	Hourly spill decreased to 28.8% (below 30 +/- 1%) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 29.8%.
Little Goose	Reduced % Spill	7/26/12	0800	1	Navigation	Hourly spill decreased to 28.8% (below 30 +/- 1%) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 29.9%.
Little Goose	Reduced % Spill	7/26/12	2200	1	Navigation	Hourly spill decreased to 28.9% (below 30 +/- 1%) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 29.9%.
Lower Monumental	Reduced Spill	7/3/12	1800-1900	2	Navigation	Hourly spill decreased to 6.9 kcfs (below 17 kcfs). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	7/5/12	1800	1	Navigation	Hourly spill decreased to 13.9 kcfs (below 17 kcfs). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	7/7/12	1800	1	Navigation	Hourly spill decreased to 10.6 kcfs (below 17 kcfs). Reduced spill for safe passage of fish barge.

Lower Monumental	Reduced Spill	7/9/12	1700	1	Navigation	Hourly spill decreased to 12.7 kcfs (below 17 kcfs). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	7/11/12	1800-1900	2	Navigation	Hourly spill decreased to 12.0 kcfs (below 17 kcfs). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	7/13/12	1800	1	Navigation	Hourly spill decreased to 11.7 kcfs (below 17 kcfs). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	7/15/12	1800	1	Navigation	Hourly spill decreased to 11.6 kcfs (below 17 kcfs). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	7/17/12	1800-1900	2	Navigation	Hourly spill decreased to 11.2 kcfs (below 17 kcfs). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	7/19/12	1800-1900	2	Navigation	Hourly spill decreased to 13.3 kcfs (below 17 kcfs). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	7/23/12	1800	1	Navigation	Hourly spill decreased to 12.3 kcfs (below 17 kcfs). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	7/27/12	1800-1900	2	Navigation	Hourly spill decreased to 12.4 kcfs (below 17 kcfs). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	7/29/12	1700-1800	2	Navigation	Hourly spill decreased to 12.4 kcfs (below 17 kcfs). Reduced spill for safe passage of fish barge.
Ice Harbor	Reduced % Spill	7/4/12	1300	1	Navigation	Hourly spill decreased to 28.4 % (below 30 +/- 1%) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 35.4%.
Ice Harbor	Reduced % Spill	7/8/12	0300	1	Navigation	Hourly spill decreased to 28.9 % (below 30 +/- 1%). Reduced spill for safe passage of fish barge. 24 hr avg. spill was 29.9%.
Ice Harbor	Reduced % Spill	7/8/12	0800	1	Navigation	Hourly spill decreased to 28.7 % (below 30 +/- 1%) due to volume of water needed to empty the navigation lock. See p. 3. 24 hr avg. spill was 29.9%.
Ice Harbor	Reduced % Spill	7/23/12	0800	1	Operational Limitation	Generated 10.6 kcfs, outside of FOP minimum generation range (8.5-10.3 kcfs) to push fish out prior to unit maintenance. Spill was 23.1 kcfs rather than between 23.4 to 25.7 kcfs. This operation is specified in the 2012 FPP 4.3.2 (p. IHR-20).
Ice Harbor	Reduced % Spill	7/26/12	0800	1	Operational Limitation	Generated 13.6 kcfs, outside of FOP minimum generation range (8.5-10.3 kcfs) to push fish out prior to unit maintenance. Spill was 28.1 kcfs rather than between 31.9 to 33.7 kcfs. This operation is specified in the 2012 FPP 4.3.2 (p. IHR-20).

Ice Harbor	Reduced % Spill	7/26/12	1300	1	Operational Limitation	Generated 14.9 kcfs, outside of FOP minimum generation range (8.5-10.3 kcfs) to push fish out prior to maintenance. Spill was 39.9 kcfs rather than 45 kcfs, This operation is specified in the 2012 FPP 4.3.2 (p. IHR-20).
John Day	Reduced % Spill	7/9/12	1100	1	Human/ Program Error	Hourly spill decreased to 38.1 % (below 40 +/- 1%) due to miscalculating spill amount. 24 hr avg. spill was 38.8%.
John Day	Additional % Spill	7/16/12	1800	1	Transmission Stability	Hourly spill increased to 31.1% (above 30% ± 1.0% range). Reduced generation at John Day due to the DC line tripping off.
John Day	Additional % Spill	7/16/12	2200	1	Transmission Stability	Hourly spill increased to 31.2% (above 30% ± 1.0% range). Project on response during intermittent generation. See p. 3-4.
John Day	Additional % Spill	7/17/12	1900	1	Transmission Stability	Hourly spill increased to 31.7% (above 30% ± 1.0% range). Project on response during intermittent generation. See p. 3-4.
John Day	Reduced % Spill	7/24/12	1000	1	Transmission Stability	Hourly spill decreased to 28.9% (below 30% ± 1.0% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 30.1%
The Dalles	Reduced % Spill	7/18/12	1000	1	Transmission Stability	Hourly spill decreased to 37.5% (below 40% ± 1.0% range). Project on response during rapidly changing load and/or intermittent generation. See p. 3-4. 24 hr avg. spill was 40.2%.
The Dalles	Reduced % Spill	7/24/12	1000	1	Human/ Program Error	Hourly spill decreased to 38.2% (below 40% ± 1.0% range) due to miscalculating spill amount. 24 hr avg. spill was 39.9%.
The Dalles	Additional % Spill	7/24/12	2100	1	Human/ Program Error	Hourly spill increased to 41.1% (above 40% ± 1.0% range) due to miscalculating spill amount. 24 hr avg. spill was 39.9%.
The Dalles	Reduced % Spill	7/26/12	0600	1	Human/ Program Error	Hourly spill decreased to 38.8% (below 40% ± 1.0% range). Premature implementation of change in spill amount.

Figure 1


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
02-Jul-2012 to 09-Jul-2012
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

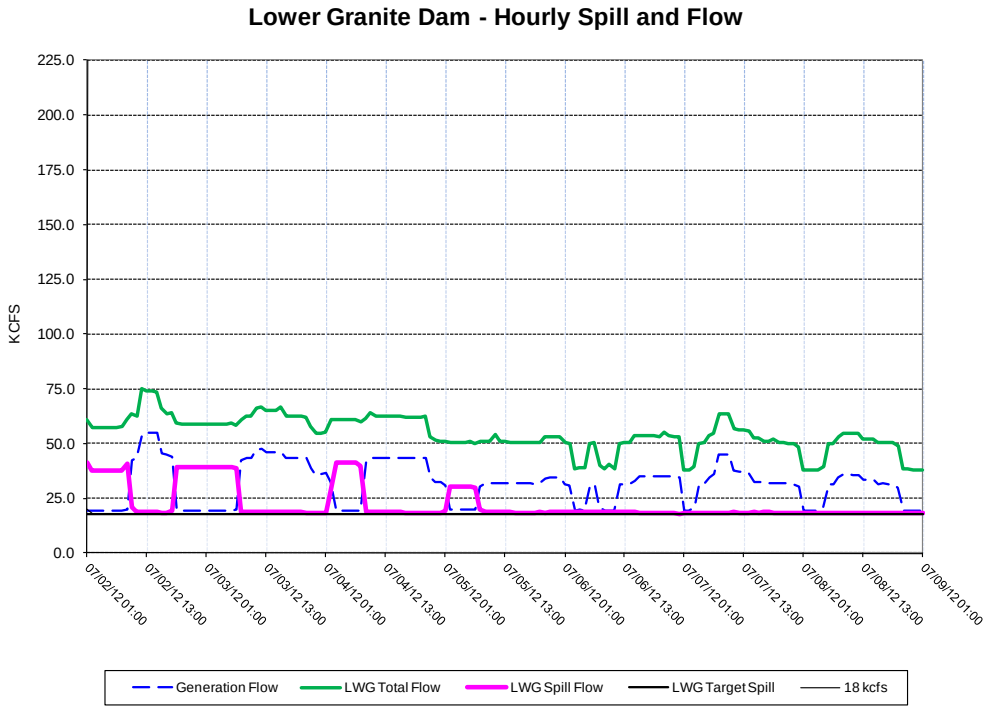
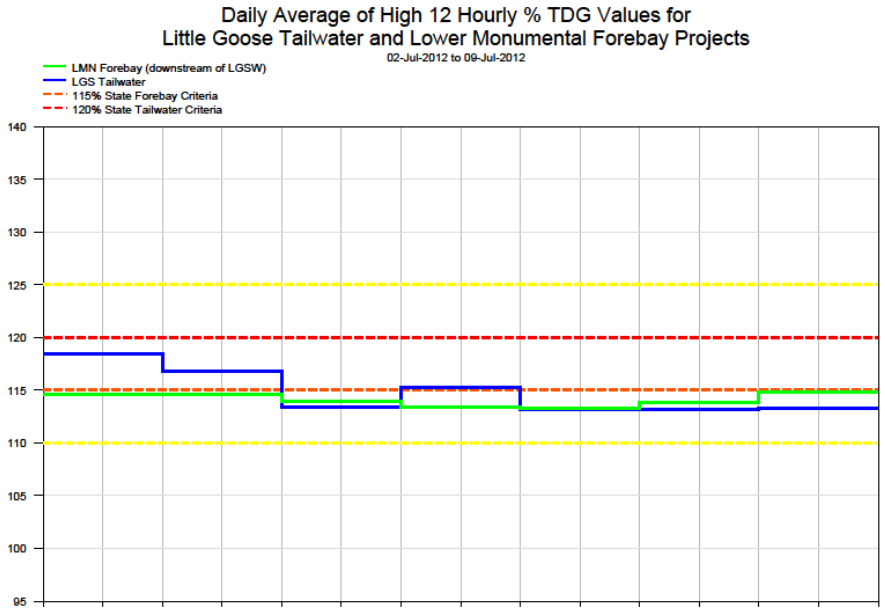

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/02/12 01:00
07/02/12 13:00
07/03/12 01:00
07/03/12 13:00
07/04/12 01:00
07/04/12 13:00
07/05/12 01:00
07/05/12 13:00
07/06/12 01:00
07/06/12 13:00
07/07/12 01:00
07/07/12 13:00
07/08/12 01:00
07/08/12 13:00
07/09/12 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
18 kcfs

Figure 2


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
02-Jul-2012 to 09-Jul-2012
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

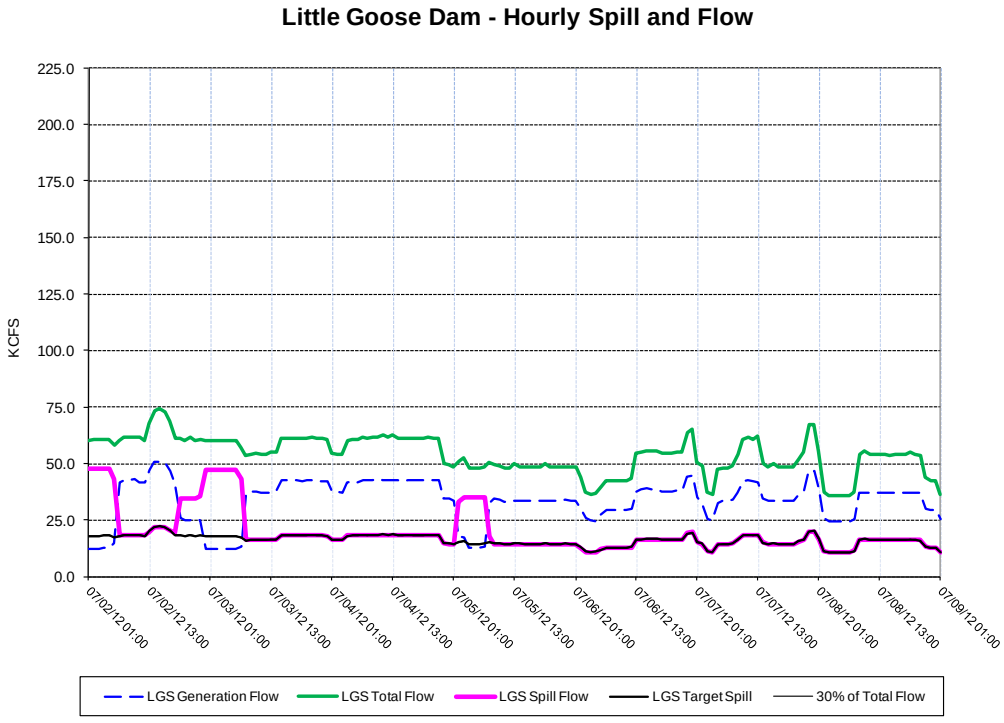
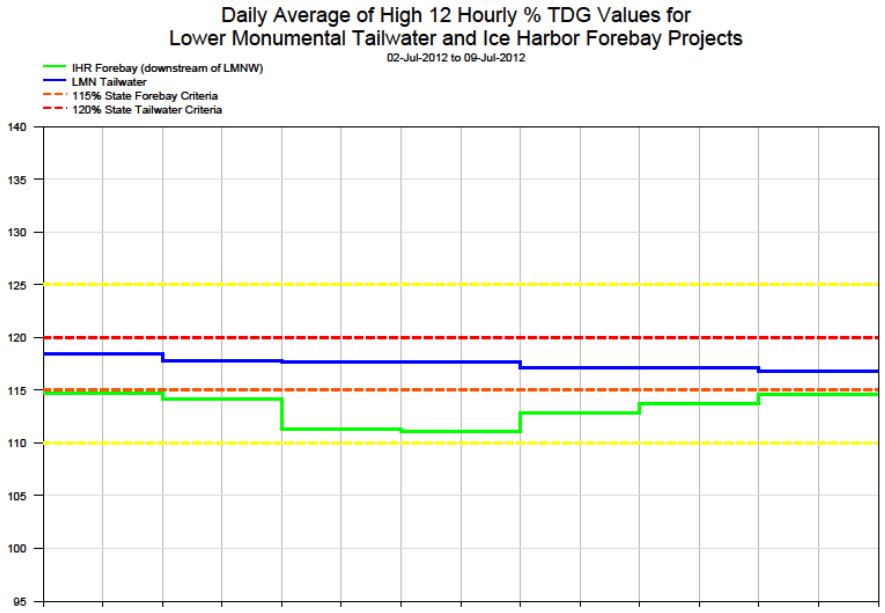

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/02/12 01:00
07/02/12 13:00
07/03/12 01:00
07/03/12 13:00
07/04/12 01:00
07/04/12 13:00
07/05/12 01:00
07/05/12 13:00
07/06/12 01:00
07/06/12 13:00
07/07/12 01:00
07/07/12 13:00
07/08/12 01:00
07/08/12 13:00
07/09/12 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 3


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
02-Jul-2012 to 09-Jul-2012
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

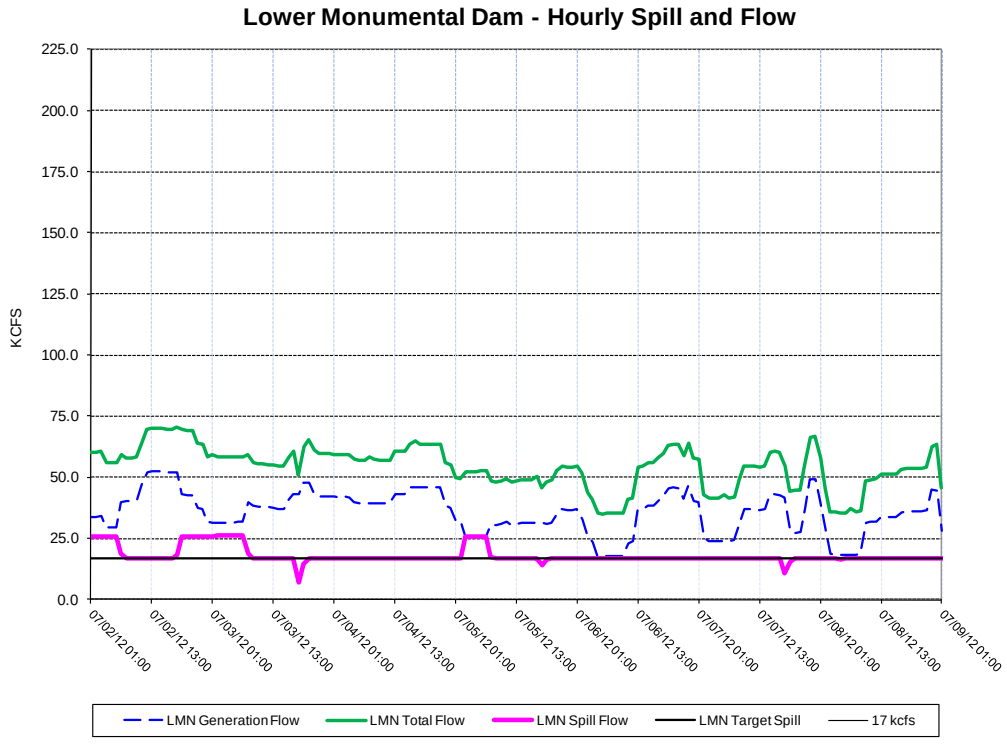
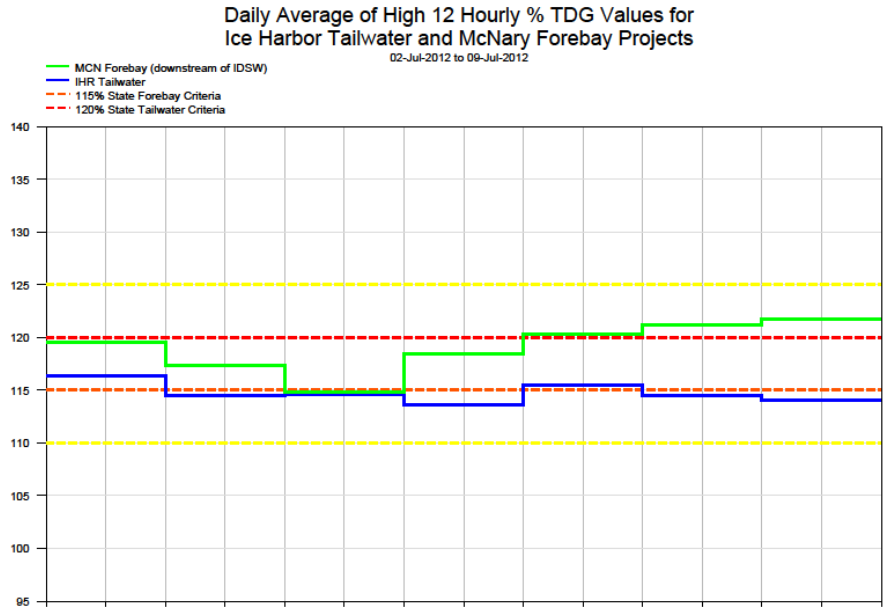

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/02/12 01:00
07/02/12 13:00
07/03/12 01:00
07/03/12 13:00
07/04/12 01:00
07/04/12 13:00
07/05/12 01:00
07/05/12 13:00
07/06/12 01:00
07/06/12 13:00
07/07/12 01:00
07/07/12 13:00
07/08/12 01:00
07/08/12 13:00
07/09/12 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
17 kcfs

Figure 4


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
02-Jul-2012 to 09-Jul-2012
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

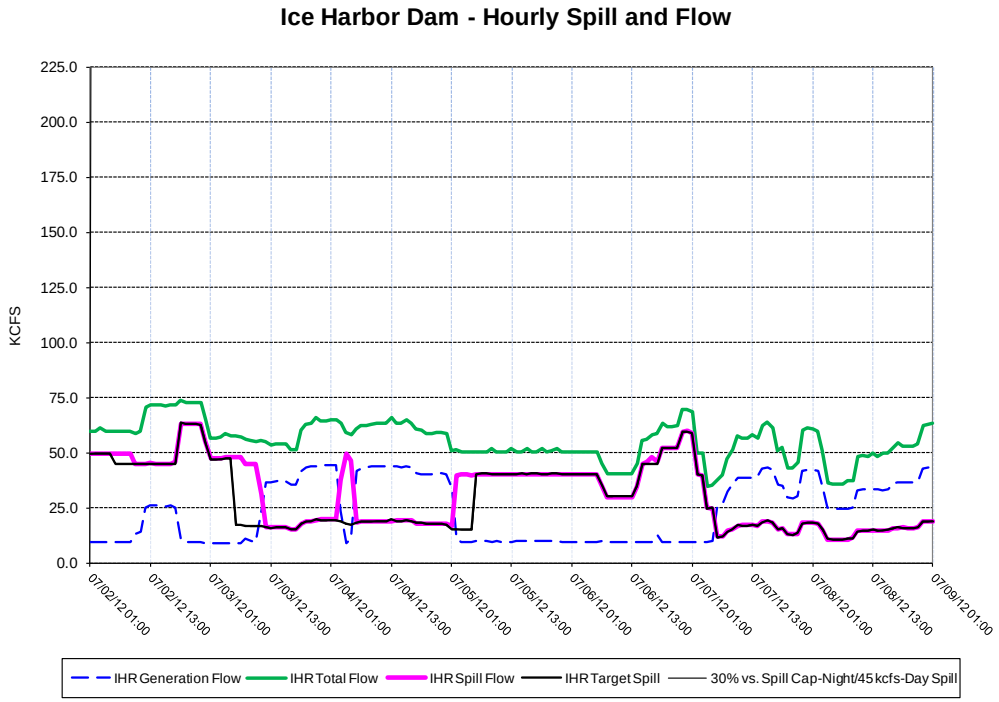
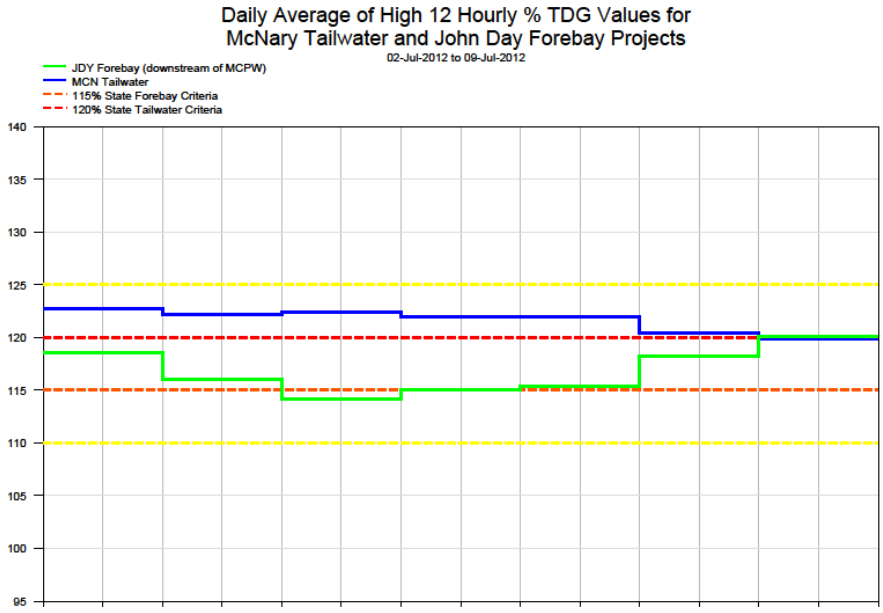

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/02/12 01:00
07/02/12 13:00
07/03/12 01:00
07/03/12 13:00
07/04/12 01:00
07/04/12 13:00
07/05/12 01:00
07/05/12 13:00
07/06/12 01:00
07/06/12 13:00
07/07/12 01:00
07/07/12 13:00
07/08/12 01:00
07/08/12 13:00
07/09/12 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
30% vs. Spill Cap-Night/45 kcfs-Day Spill

Figure 5


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
02-Jul-2012 to 09-Jul-2012
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

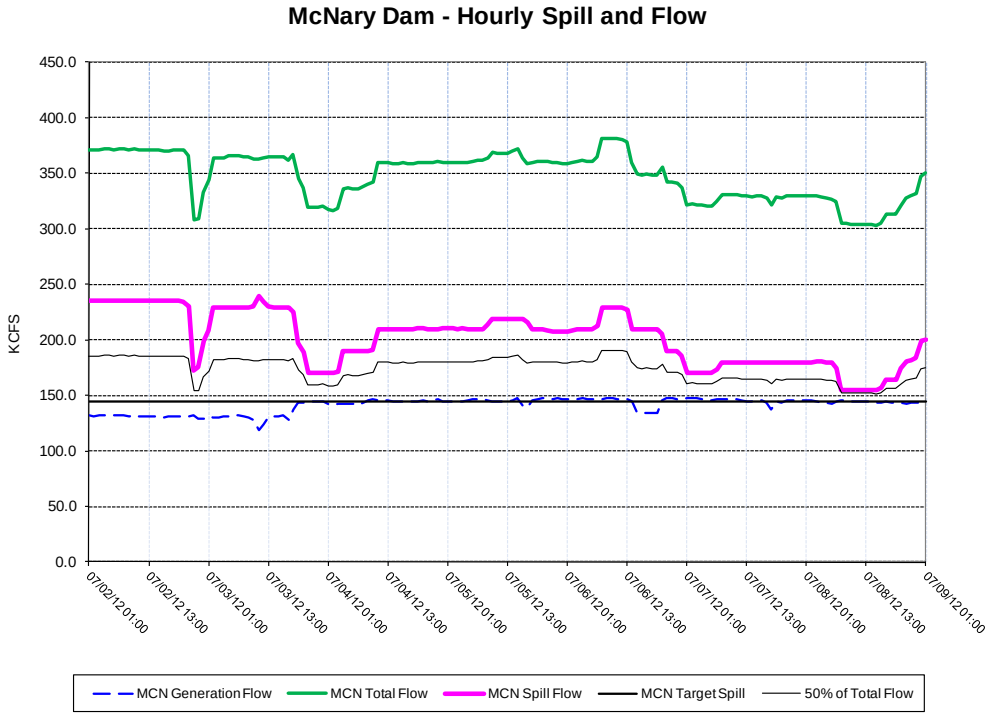
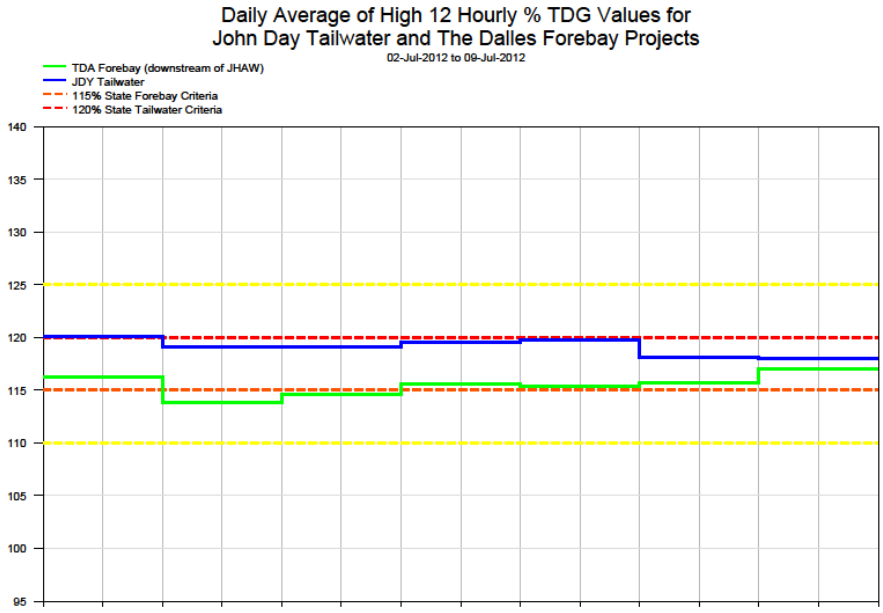

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/02/12 01:00
07/02/12 13:00
07/03/12 01:00
07/03/12 13:00
07/04/12 01:00
07/04/12 13:00
07/05/12 01:00
07/05/12 13:00
07/06/12 01:00
07/06/12 13:00
07/07/12 01:00
07/07/12 13:00
07/08/12 01:00
07/08/12 13:00
07/09/12 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
50% of Total Flow

Figure 6


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
02-Jul-2012 to 09-Jul-2012
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

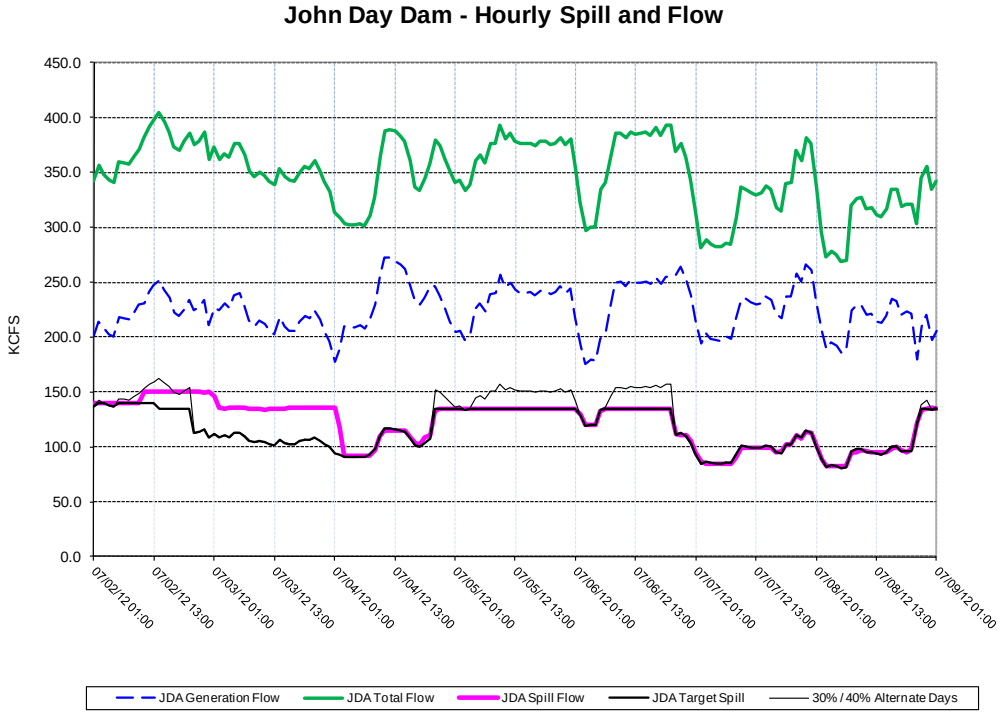
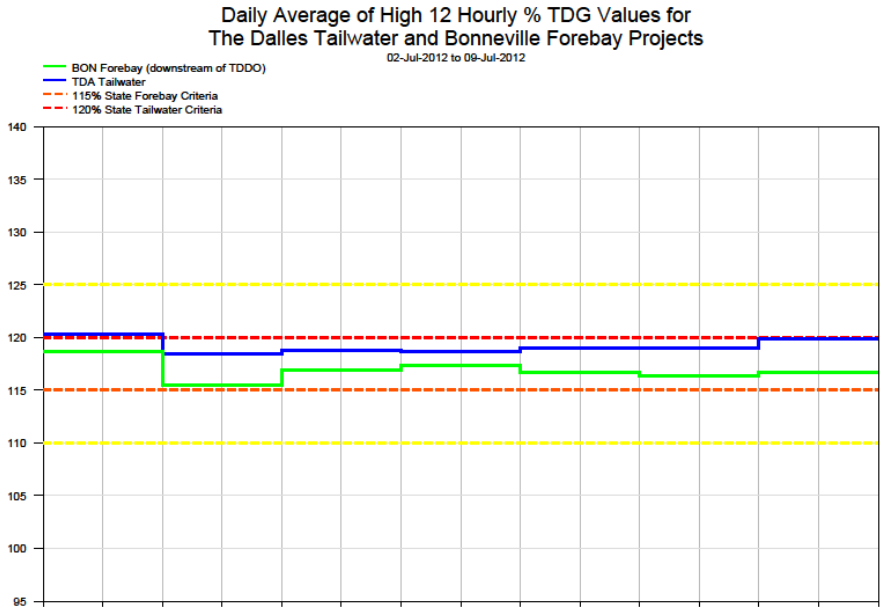

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/02/12 01:00
07/02/12 13:00
07/03/12 01:00
07/03/12 13:00
07/04/12 01:00
07/04/12 13:00
07/05/12 01:00
07/05/12 13:00
07/06/12 01:00
07/06/12 13:00
07/07/12 01:00
07/07/12 13:00
07/08/12 01:00
07/08/12 13:00
07/09/12 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% / 40% Alternate Days

Figure 7


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
02-Jul-2012 to 09-Jul-2012
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

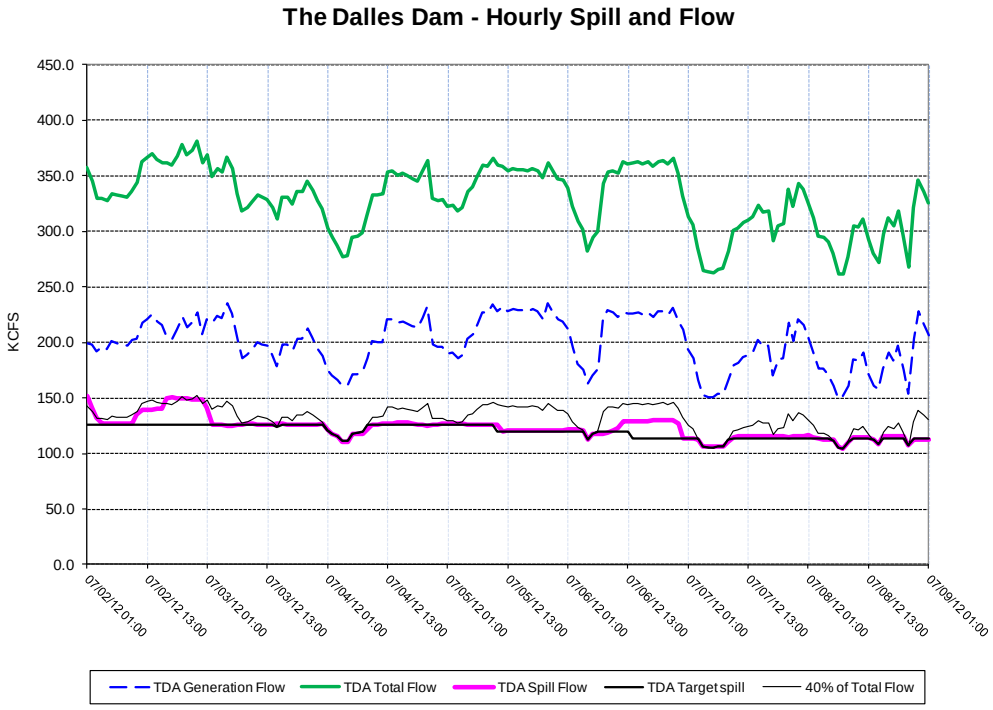
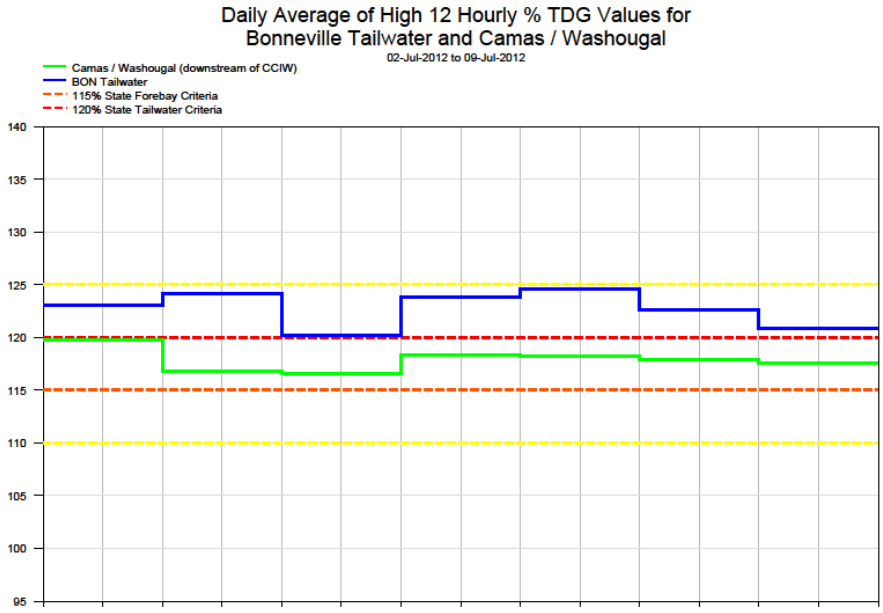

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/02/12 01:00
07/02/12 13:00
07/03/12 01:00
07/03/12 13:00
07/04/12 01:00
07/04/12 13:00
07/05/12 01:00
07/05/12 13:00
07/06/12 01:00
07/06/12 13:00
07/07/12 01:00
07/07/12 13:00
07/08/12 01:00
07/08/12 13:00
07/09/12 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 8


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
02-Jul-2012 to 09-Jul-2012
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

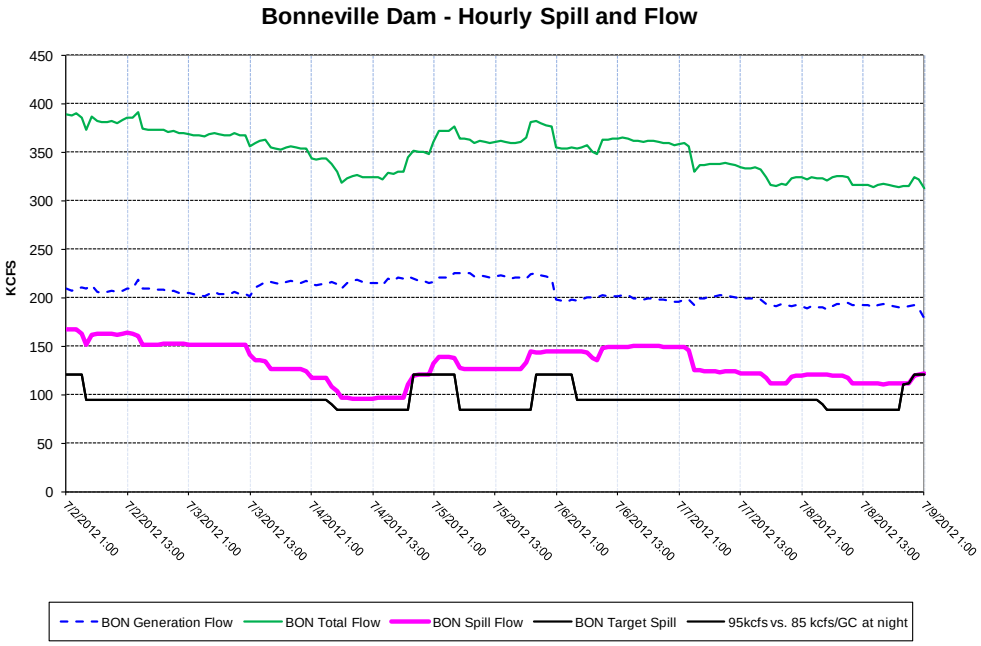
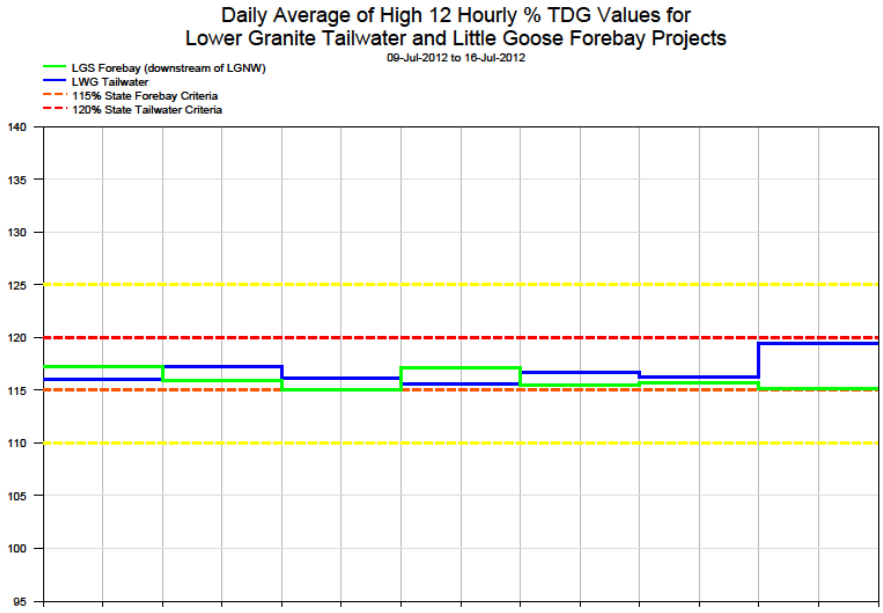

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
7/2/2012 1:00
7/2/2012 13:00
7/3/2012 1:00
7/3/2012 13:00
7/4/2012 1:00
7/4/2012 13:00
7/5/2012 1:00
7/5/2012 13:00
7/6/2012 1:00
7/6/2012 13:00
7/7/2012 1:00
7/7/2012 13:00
7/8/2012 1:00
7/8/2012 13:00
7/9/2012 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
95kcfs vs. 85 kcfs/GC at night

Figure 9


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
09-Jul-2012 to 16-Jul-2012
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

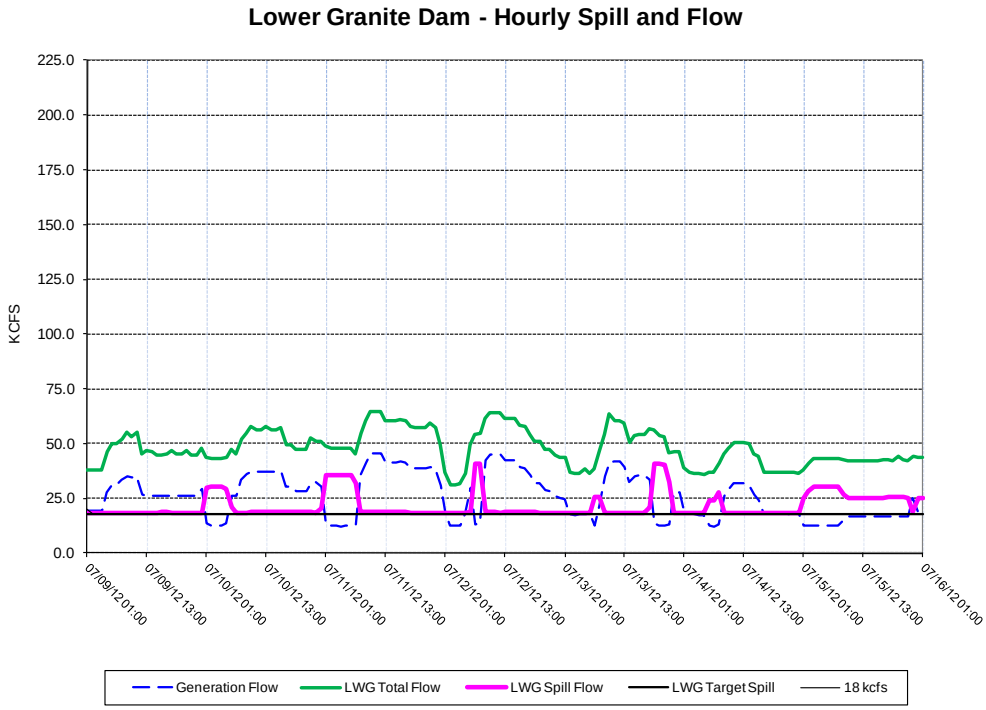
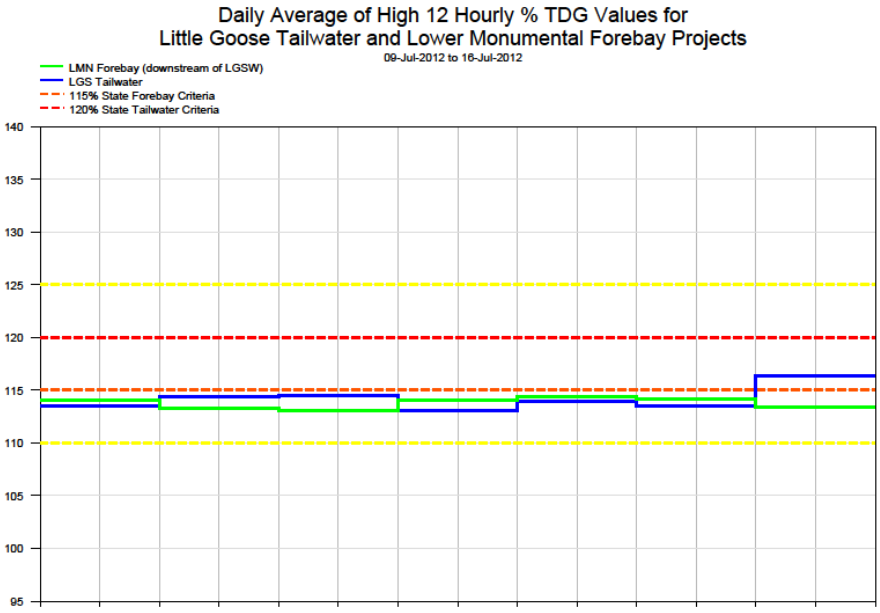

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/09/12 01:00
07/09/12 13:00
07/10/12 01:00
07/10/12 13:00
07/11/12 01:00
07/11/12 13:00
07/12/12 01:00
07/12/12 13:00
07/13/12 01:00
07/13/12 13:00
07/14/12 01:00
07/14/12 13:00
07/15/12 01:00
07/15/12 13:00
07/16/12 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
18 kcfs

Figure 10


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
09-Jul-2012 to 16-Jul-2012
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

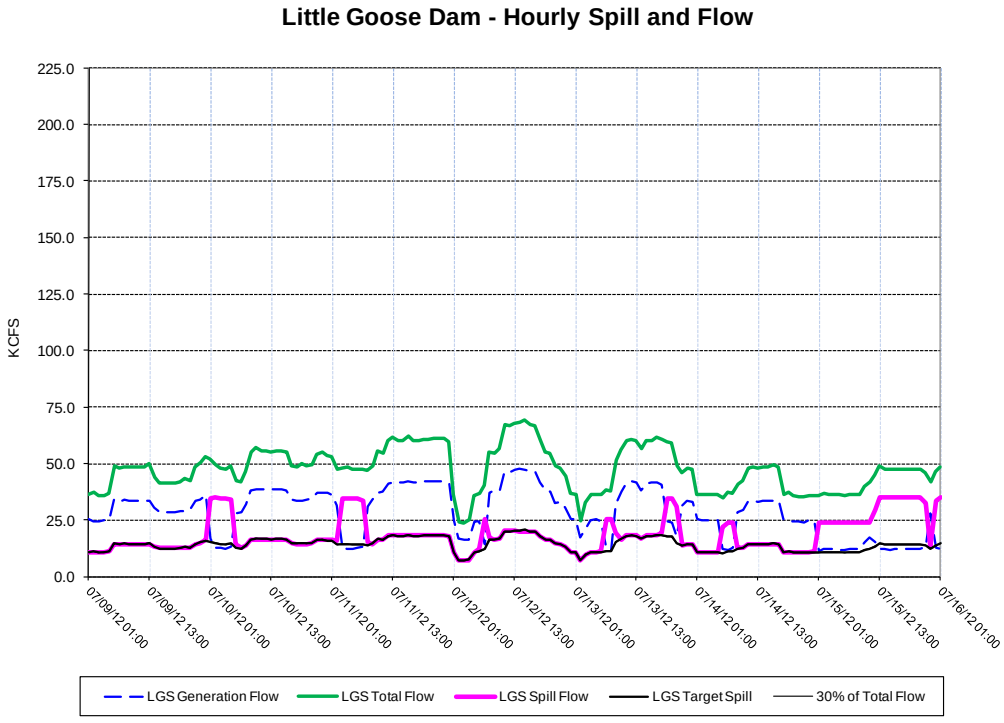
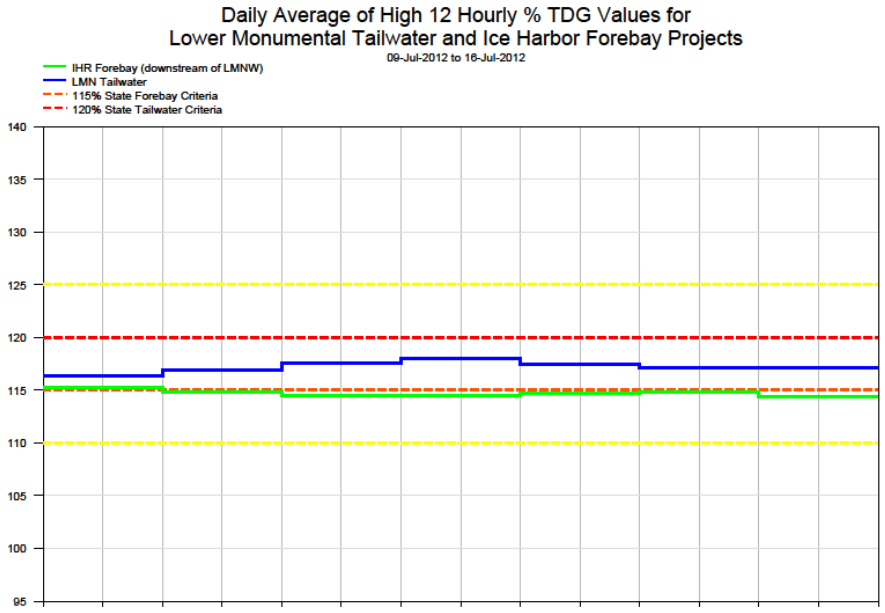

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/09/12 01:00
07/09/12 13:00
07/10/12 01:00
07/10/12 13:00
07/11/12 01:00
07/11/12 13:00
07/12/12 01:00
07/12/12 13:00
07/13/12 01:00
07/13/12 13:00
07/14/12 01:00
07/14/12 13:00
07/15/12 01:00
07/15/12 13:00
07/16/12 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 11


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
09-Jul-2012 to 16-Jul-2012
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

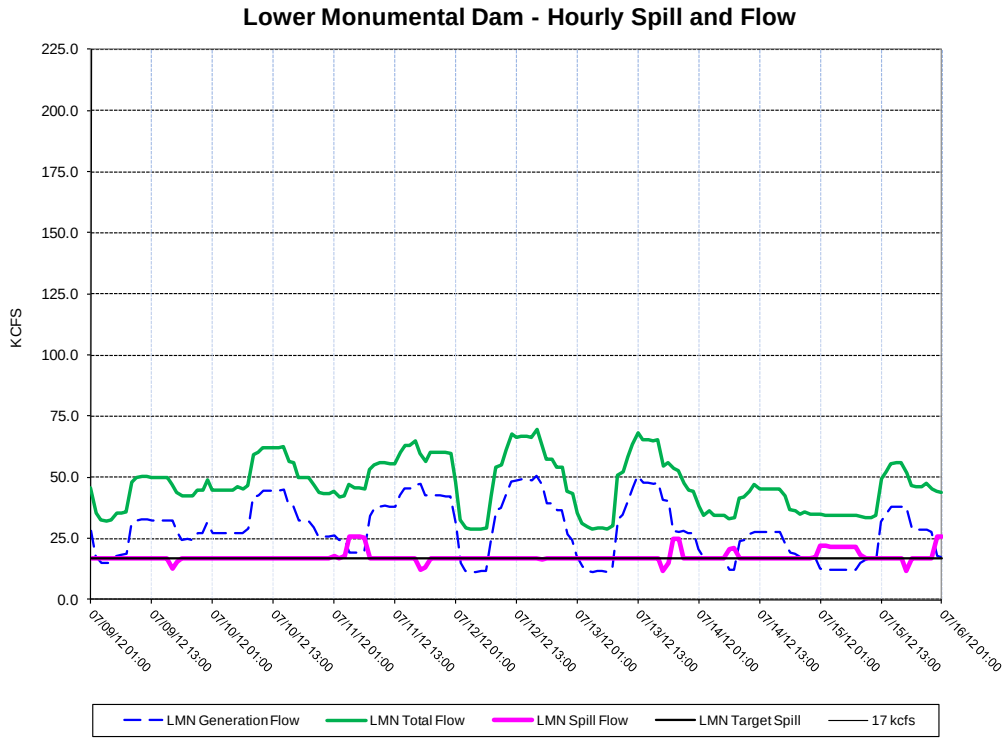
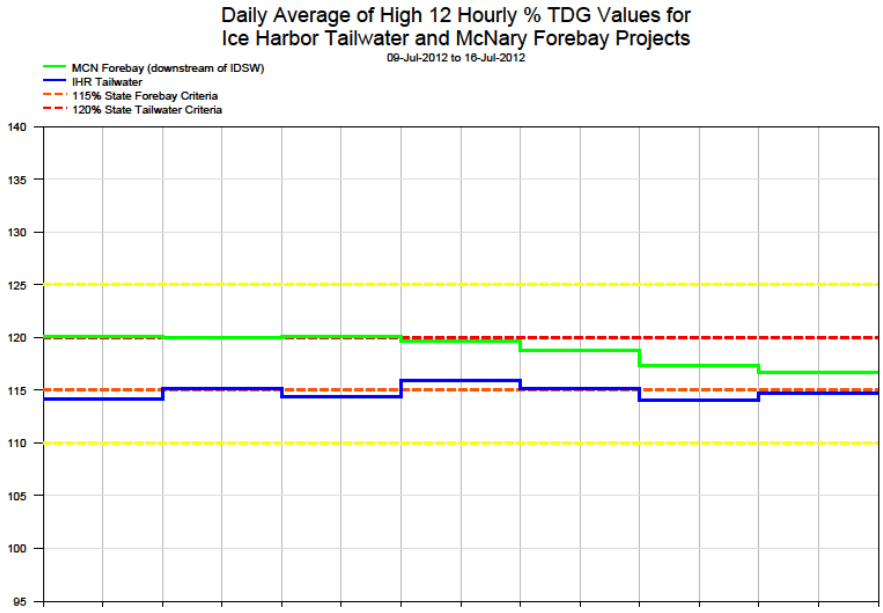

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/09/12 01:00
07/09/12 13:00
07/10/12 01:00
07/10/12 13:00
07/11/12 01:00
07/11/12 13:00
07/12/12 01:00
07/12/12 13:00
07/13/12 01:00
07/13/12 13:00
07/14/12 01:00
07/14/12 13:00
07/15/12 01:00
07/15/12 13:00
07/16/12 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
17 kcfs

Figure 12


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
09-Jul-2012 to 16-Jul-2012
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

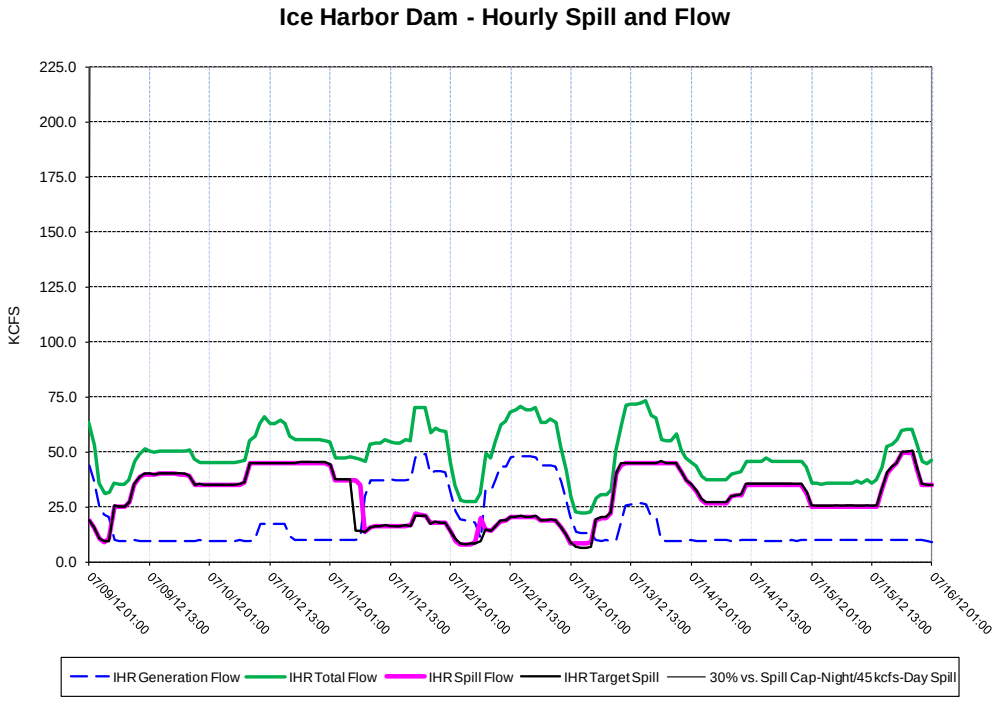
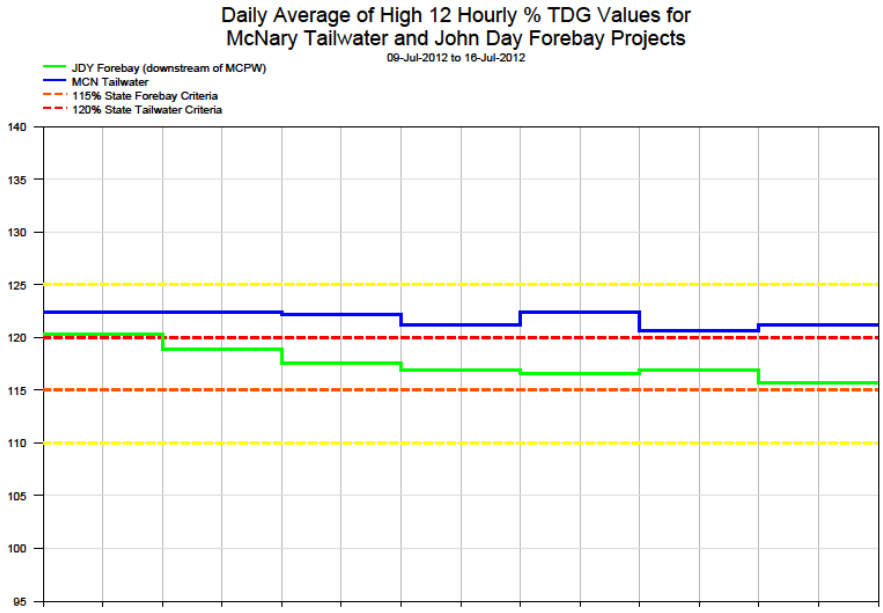

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/09/12 01:00
07/09/12 13:00
07/10/12 01:00
07/10/12 13:00
07/11/12 01:00
07/11/12 13:00
07/12/12 01:00
07/12/12 13:00
07/13/12 01:00
07/13/12 13:00
07/14/12 01:00
07/14/12 13:00
07/15/12 01:00
07/15/12 13:00
07/16/12 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
30% vs. Spill Cap-Night/45 kcfs-Day Spill

Figure 13


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
09-Jul-2012 to 16-Jul-2012
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

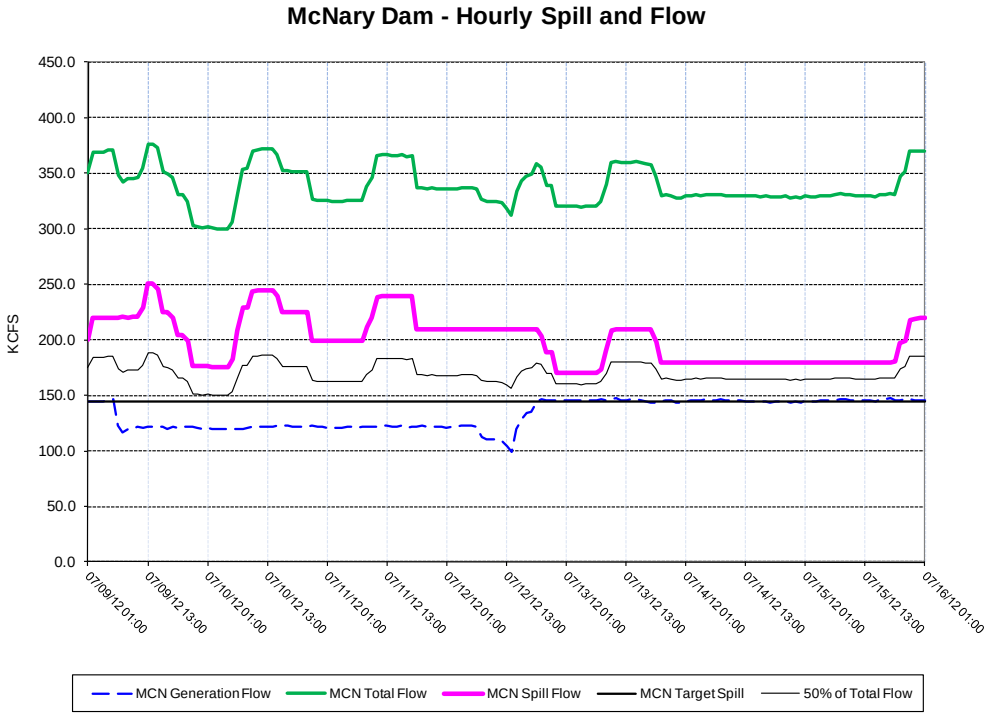
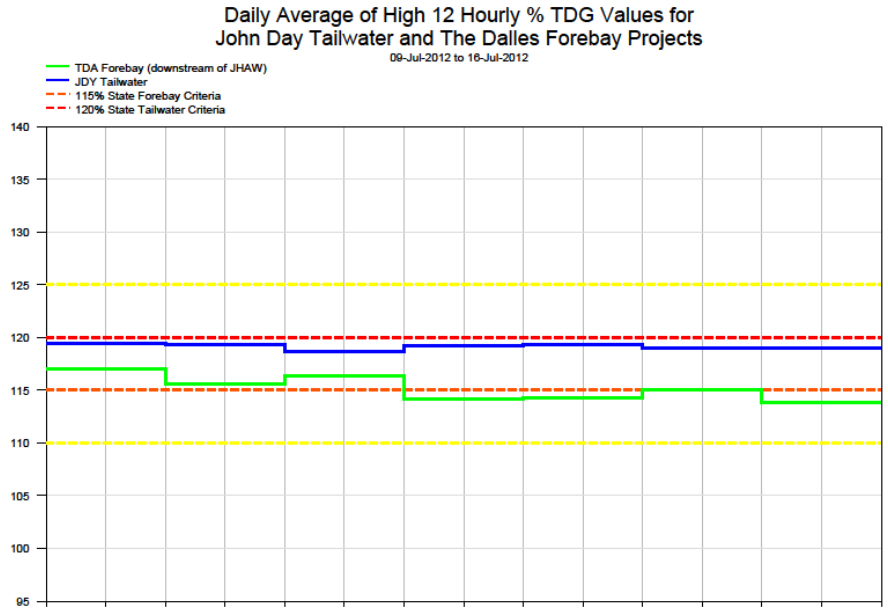

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/09/12 01:00
07/09/12 13:00
07/10/12 01:00
07/10/12 13:00
07/11/12 01:00
07/11/12 13:00
07/12/12 01:00
07/12/12 13:00
07/13/12 01:00
07/13/12 13:00
07/14/12 01:00
07/14/12 13:00
07/15/12 01:00
07/15/12 13:00
07/16/12 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
50% of Total Flow

Figure 14


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
09-Jul-2012 to 16-Jul-2012
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

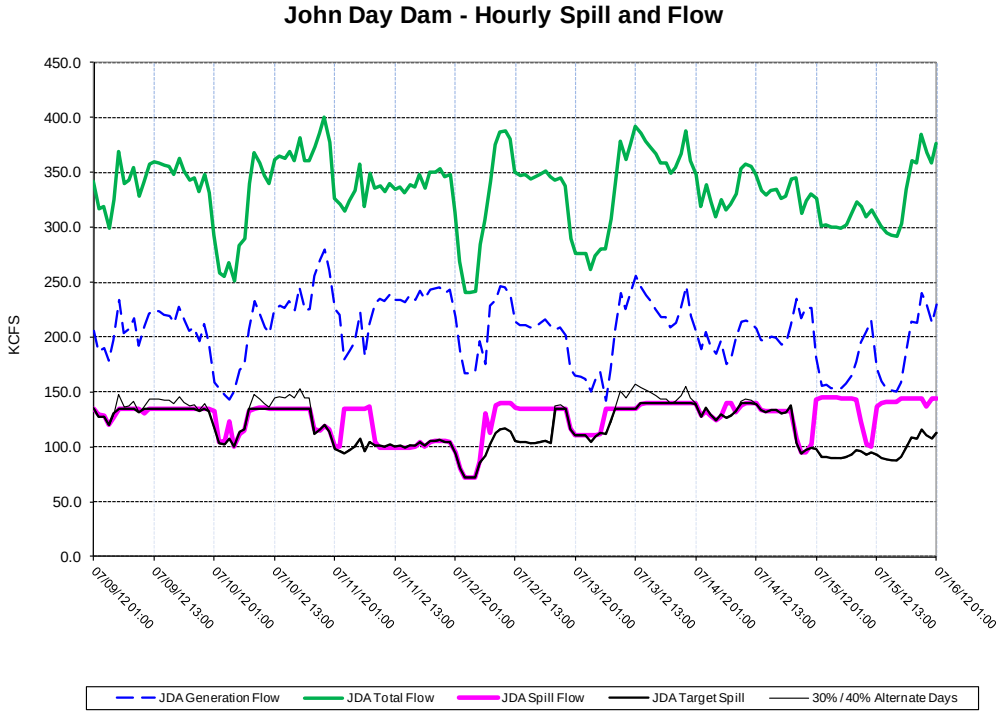
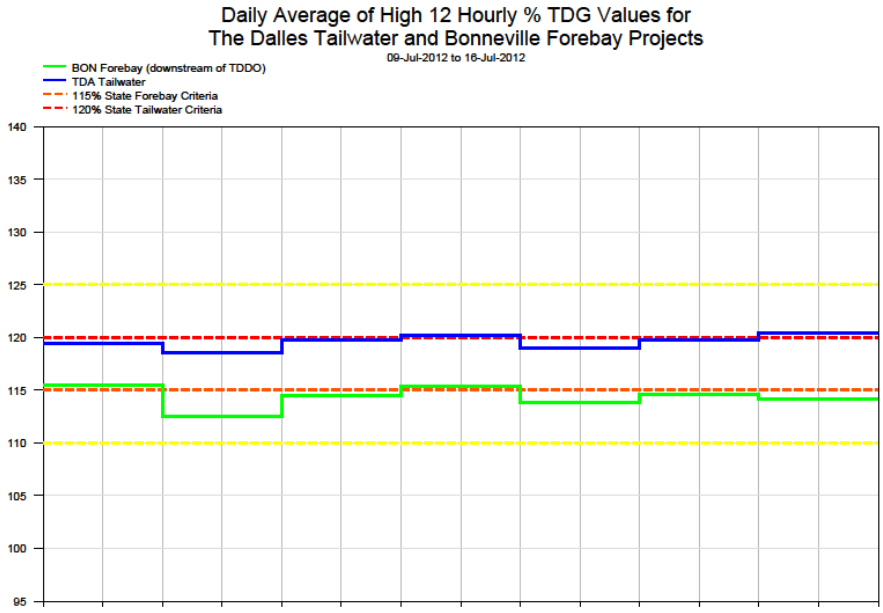

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/09/12 01:00
07/09/12 13:00
07/10/12 01:00
07/10/12 13:00
07/11/12 01:00
07/11/12 13:00
07/12/12 01:00
07/12/12 13:00
07/13/12 01:00
07/13/12 13:00
07/14/12 01:00
07/14/12 13:00
07/15/12 01:00
07/15/12 13:00
07/16/12 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% / 40% Alternate Days

Figure 15


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
09-Jul-2012 to 16-Jul-2012
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

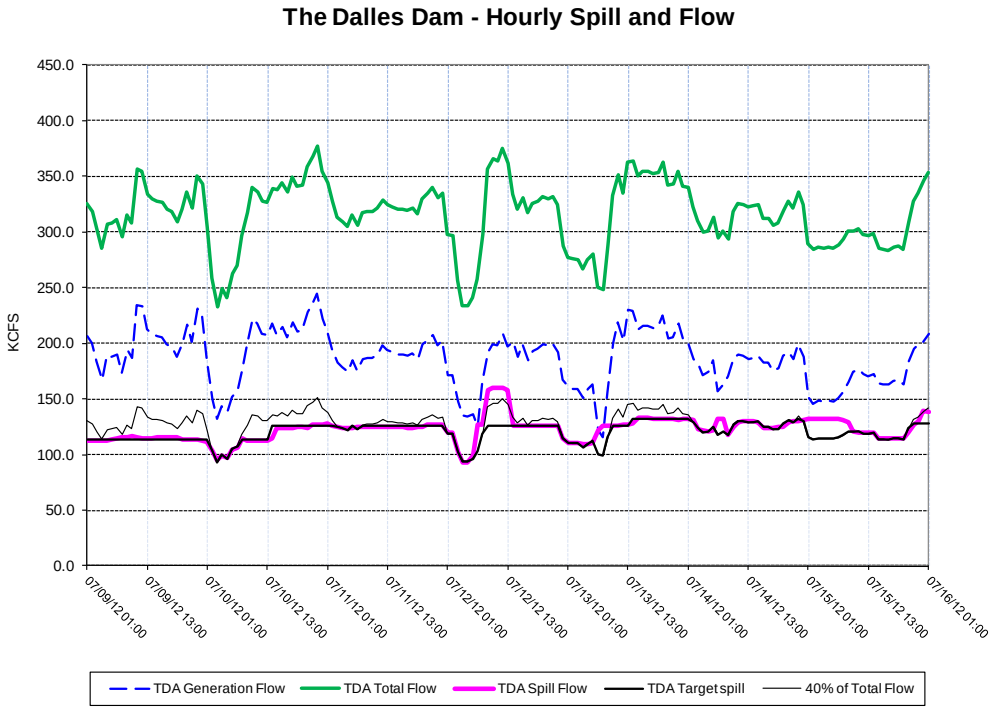
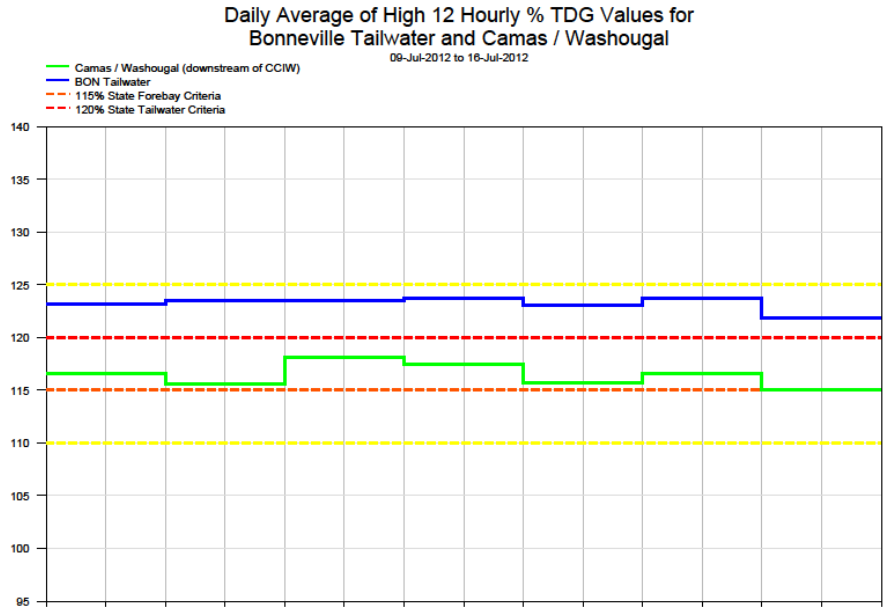

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/09/12 01:00
07/09/12 13:00
07/10/12 01:00
07/10/12 13:00
07/11/12 01:00
07/11/12 13:00
07/12/12 01:00
07/12/12 13:00
07/13/12 01:00
07/13/12 13:00
07/14/12 01:00
07/14/12 13:00
07/15/12 01:00
07/15/12 13:00
07/16/12 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 16


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
09-Jul-2012 to 16-Jul-2012
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

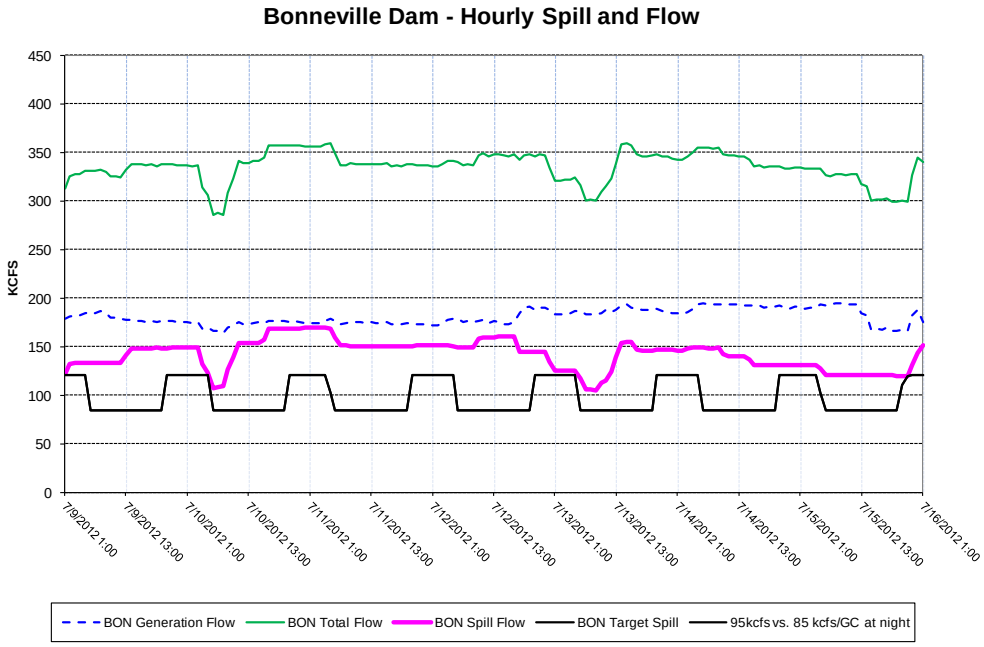
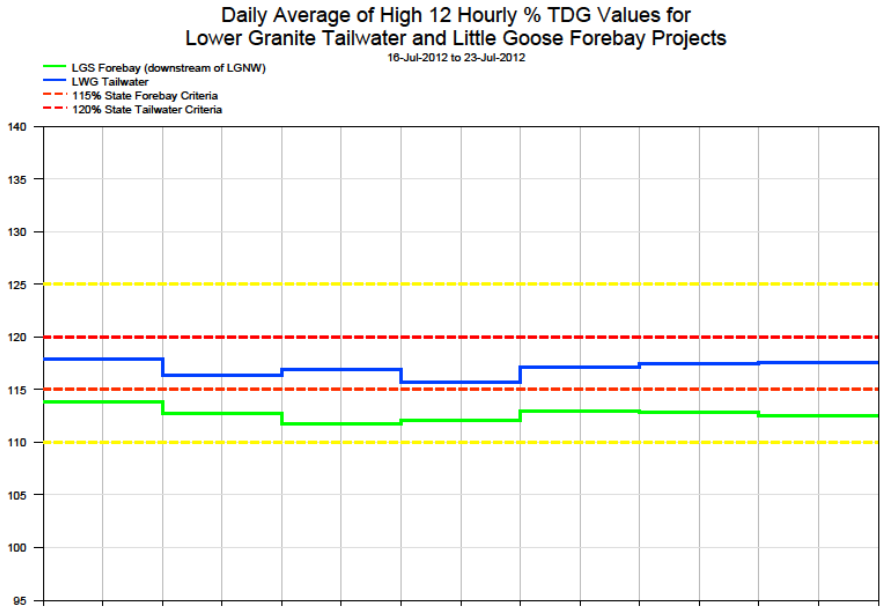

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
7/9/2012 1:00
7/9/2012 13:00
7/10/2012 1:00
7/10/2012 13:00
7/11/2012 1:00
7/11/2012 13:00
7/12/2012 1:00
7/12/2012 13:00
7/13/2012 1:00
7/13/2012 13:00
7/14/2012 1:00
7/14/2012 13:00
7/15/2012 1:00
7/15/2012 13:00
7/16/2012 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
95kcfs vs. 85 kcfs/GC at night

Figure 17


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
16-Jul-2012 to 23-Jul-2012
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

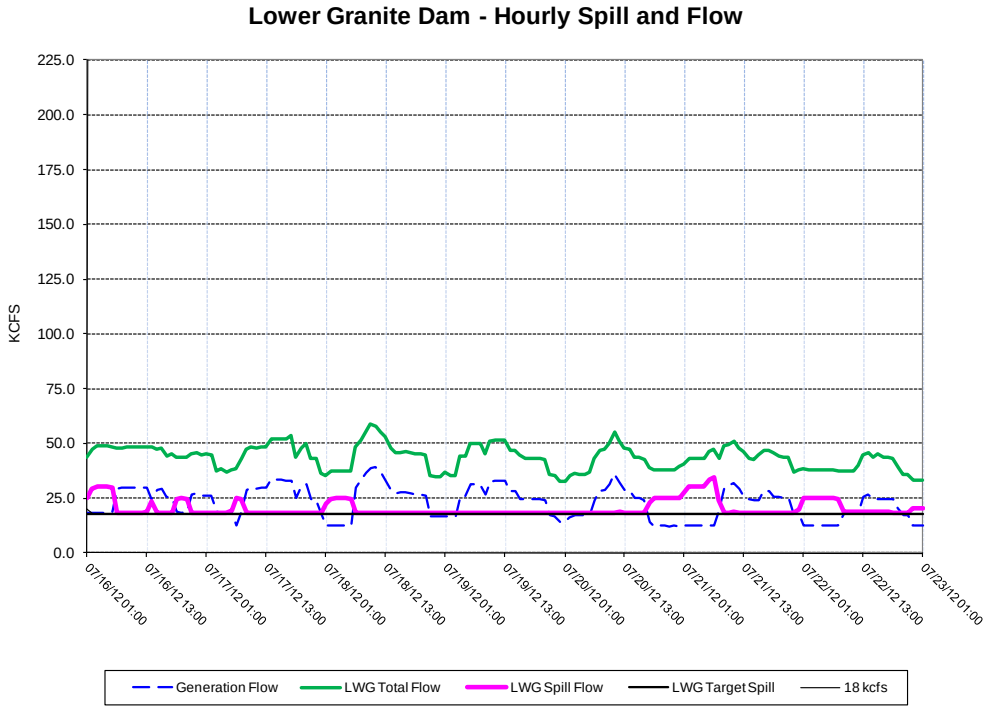
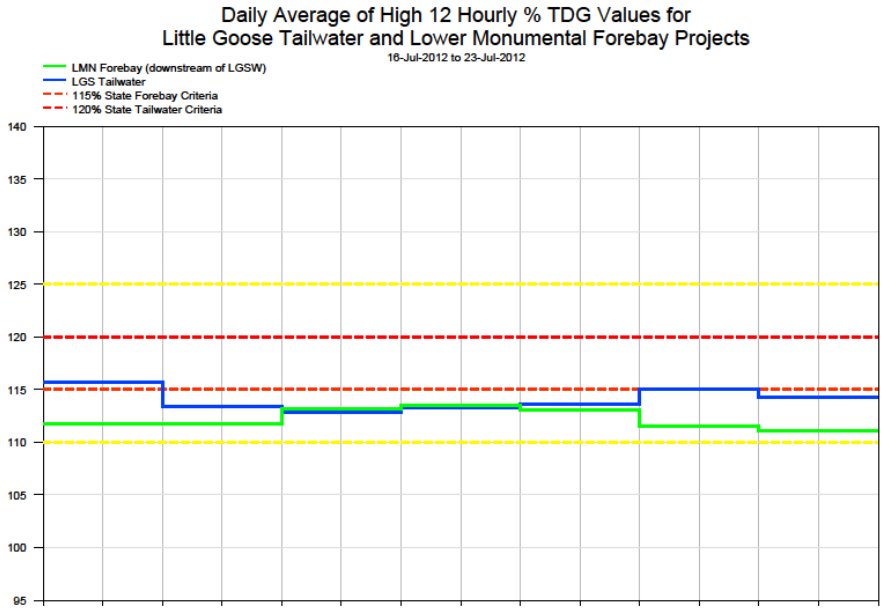

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/16/12 01:00
07/16/12 13:00
07/17/12 01:00
07/17/12 13:00
07/18/12 01:00
07/18/12 13:00
07/19/12 01:00
07/19/12 13:00
07/20/12 01:00
07/20/12 13:00
07/21/12 01:00
07/21/12 13:00
07/22/12 01:00
07/22/12 13:00
07/23/12 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
18 kcfs

Figure 18


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
16-Jul-2012 to 23-Jul-2012
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

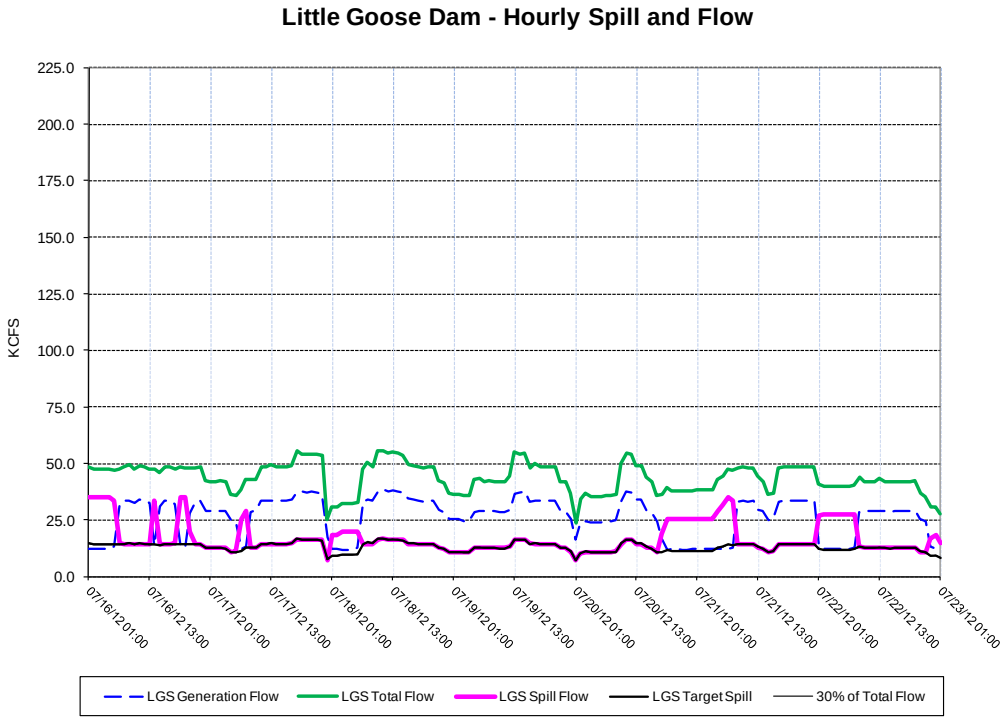
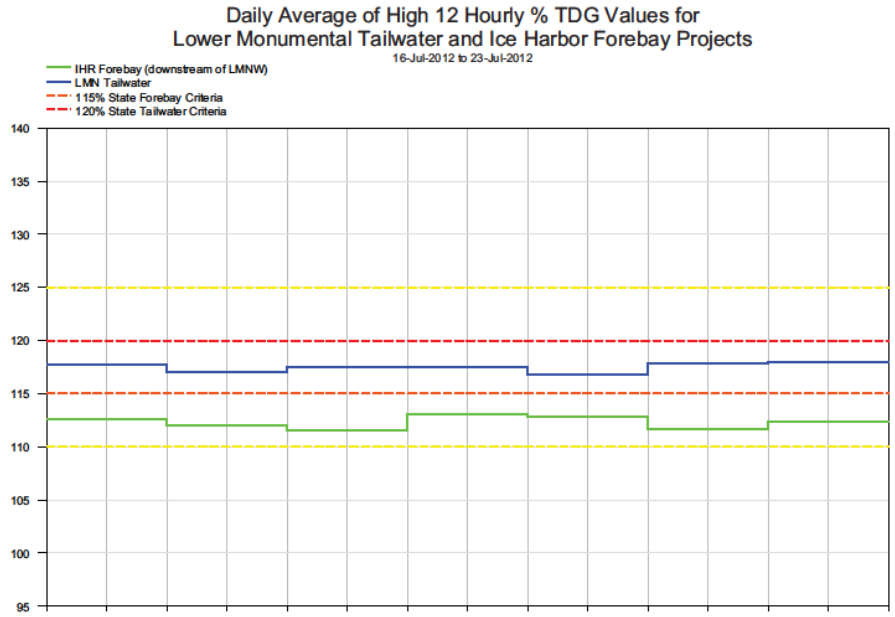

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/16/12 01:00
07/16/12 13:00
07/17/12 01:00
07/17/12 13:00
07/18/12 01:00
07/18/12 13:00
07/19/12 01:00
07/19/12 13:00
07/20/12 01:00
07/20/12 13:00
07/21/12 01:00
07/21/12 13:00
07/22/12 01:00
07/22/12 13:00
07/23/12 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 19


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
16-Jul-2012 to 23-Jul-2012
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

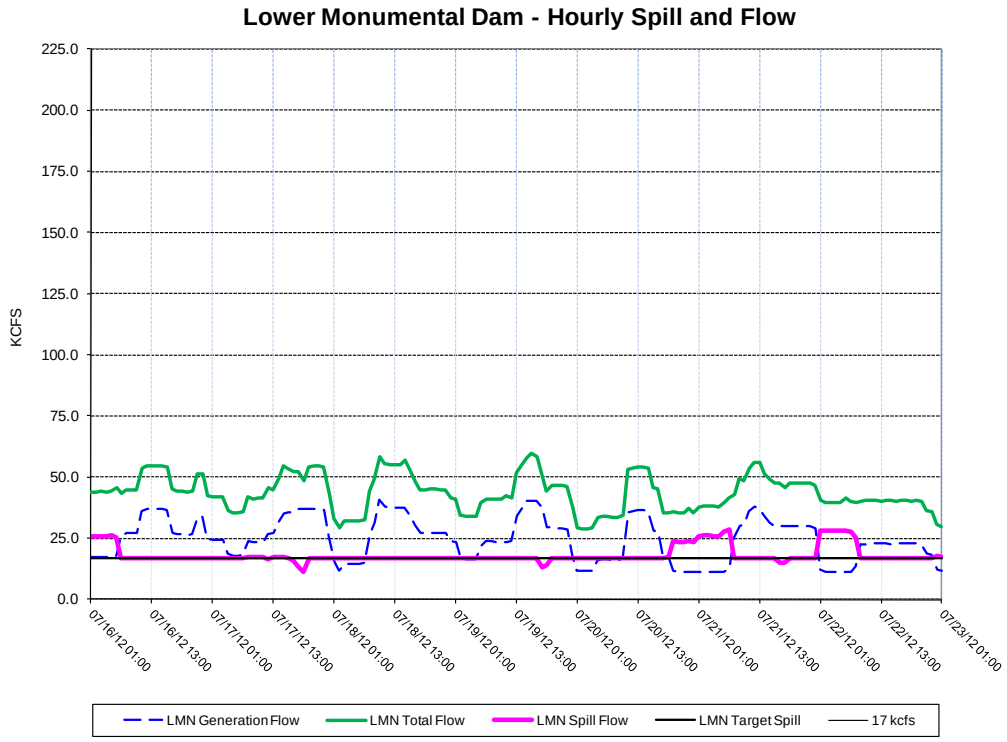
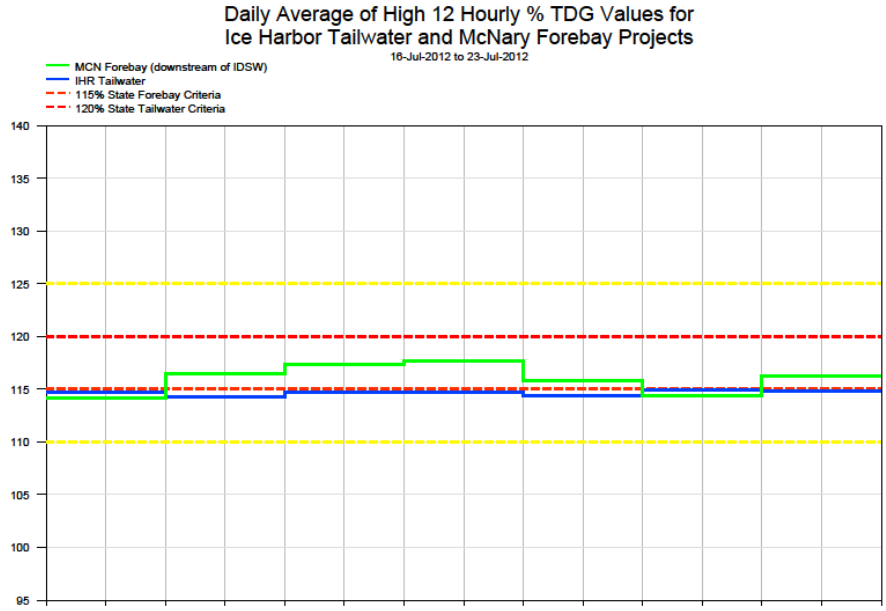

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/16/12 01:00
07/16/12 13:00
07/17/12 01:00
07/17/12 13:00
07/18/12 01:00
07/18/12 13:00
07/19/12 01:00
07/19/12 13:00
07/20/12 01:00
07/20/12 13:00
07/21/12 01:00
07/21/12 13:00
07/22/12 01:00
07/22/12 13:00
07/23/12 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
17 kcfs

Figure 20


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
16-Jul-2012 to 23-Jul-2012
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

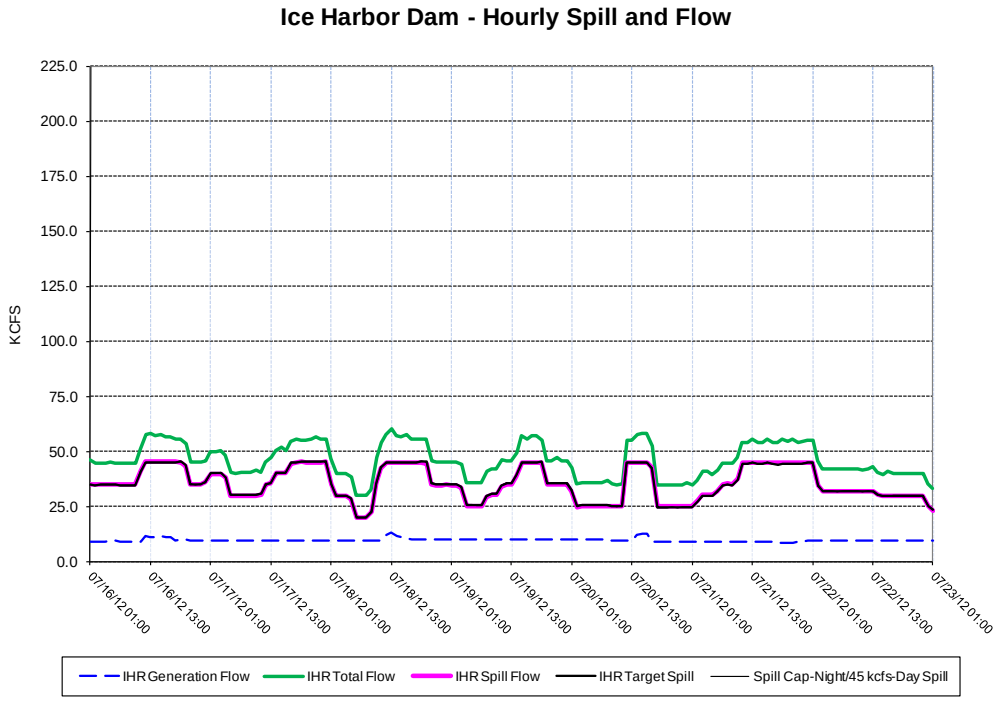
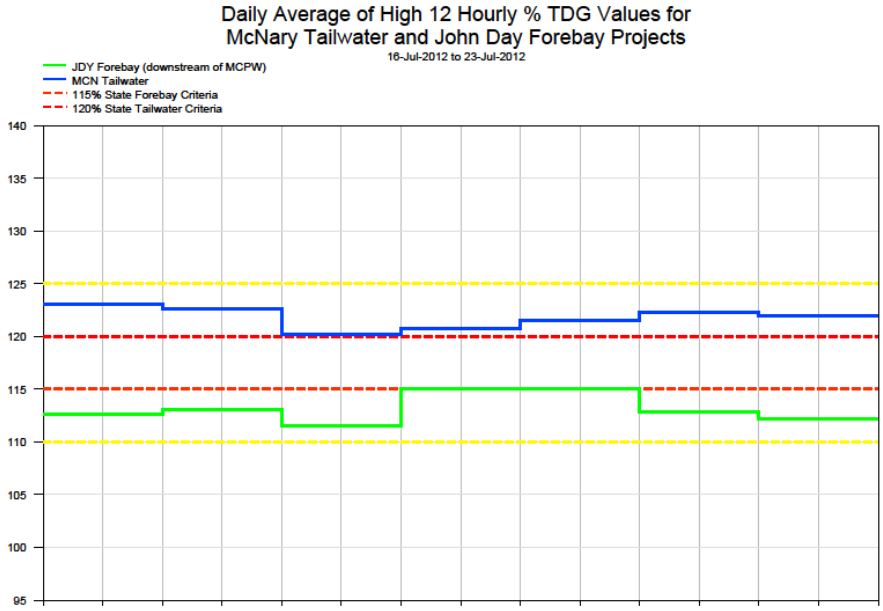

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/16/12 01:00
07/16/12 13:00
07/17/12 01:00
07/17/12 13:00
07/18/12 01:00
07/18/12 13:00
07/19/12 01:00
07/19/12 13:00
07/20/12 01:00
07/20/12 13:00
07/21/12 01:00
07/21/12 13:00
07/22/12 01:00
07/22/12 13:00
07/23/12 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
Spill Cap-Night/45 kcfs-Day Spill

Figure 21


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
16-Jul-2012 to 23-Jul-2012
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

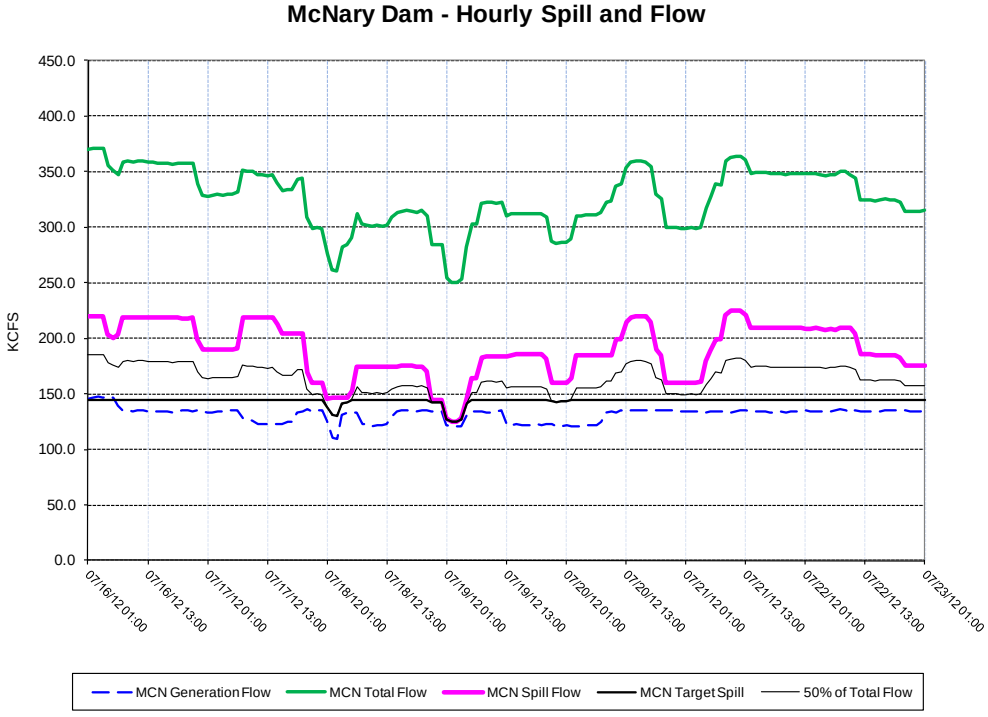
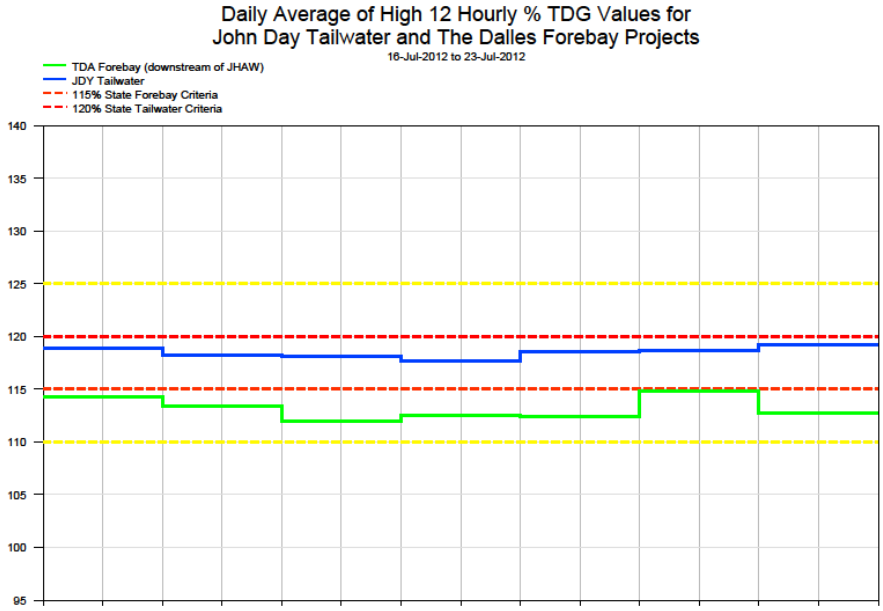

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/16/12 01:00
07/16/12 13:00
07/17/12 01:00
07/17/12 13:00
07/18/12 01:00
07/18/12 13:00
07/19/12 01:00
07/19/12 13:00
07/20/12 01:00
07/20/12 13:00
07/21/12 01:00
07/21/12 13:00
07/22/12 01:00
07/22/12 13:00
07/23/12 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
50% of Total Flow

Figure 22


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
16-Jul-2012 to 23-Jul-2012
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

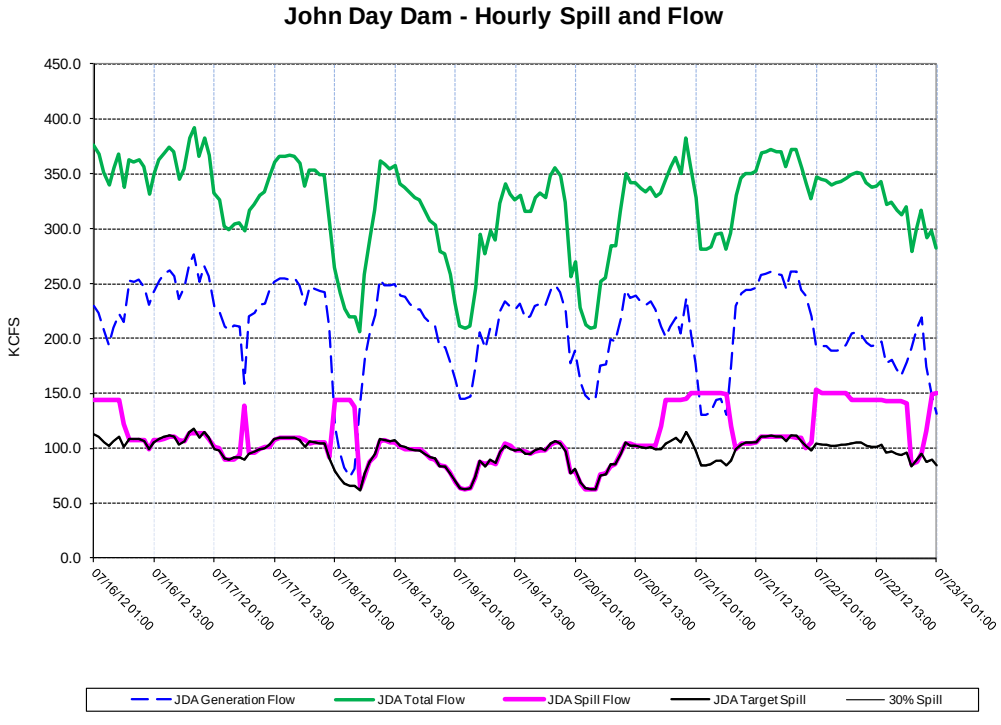
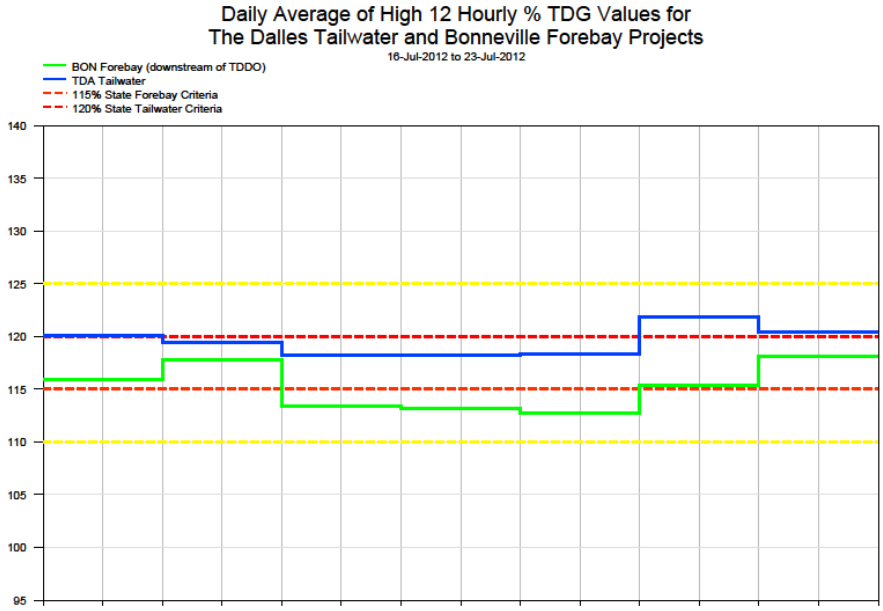

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/16/12 01:00
07/16/12 13:00
07/17/12 01:00
07/17/12 13:00
07/18/12 01:00
07/18/12 13:00
07/19/12 01:00
07/19/12 13:00
07/20/12 01:00
07/20/12 13:00
07/21/12 01:00
07/21/12 13:00
07/22/12 01:00
07/22/12 13:00
07/23/12 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% Spill

Figure 23


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
16-Jul-2012 to 23-Jul-2012
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

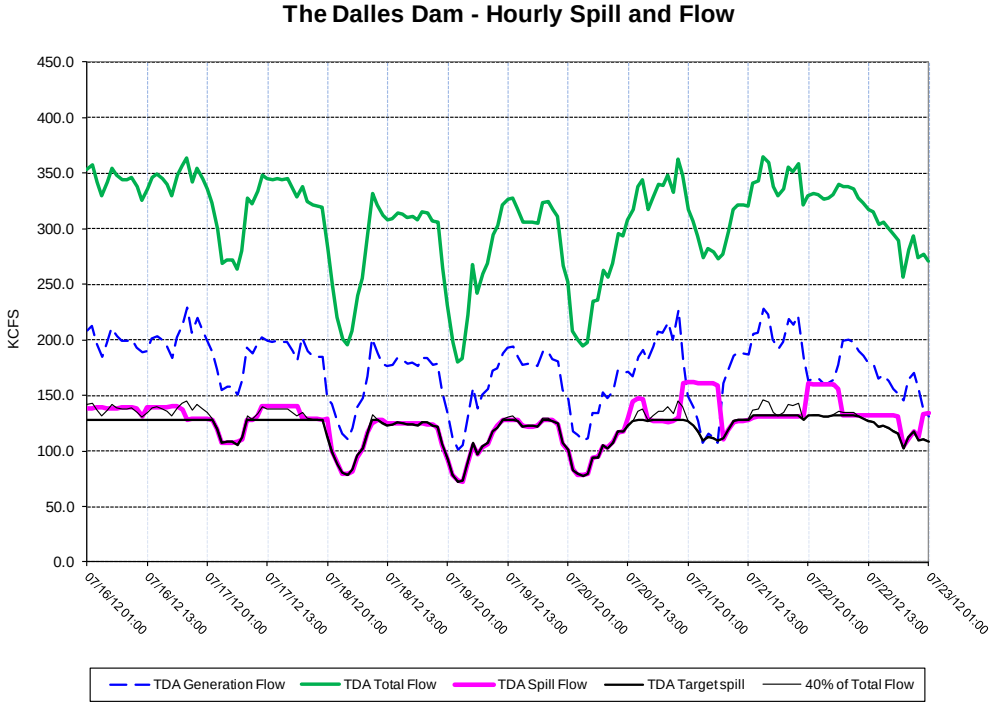
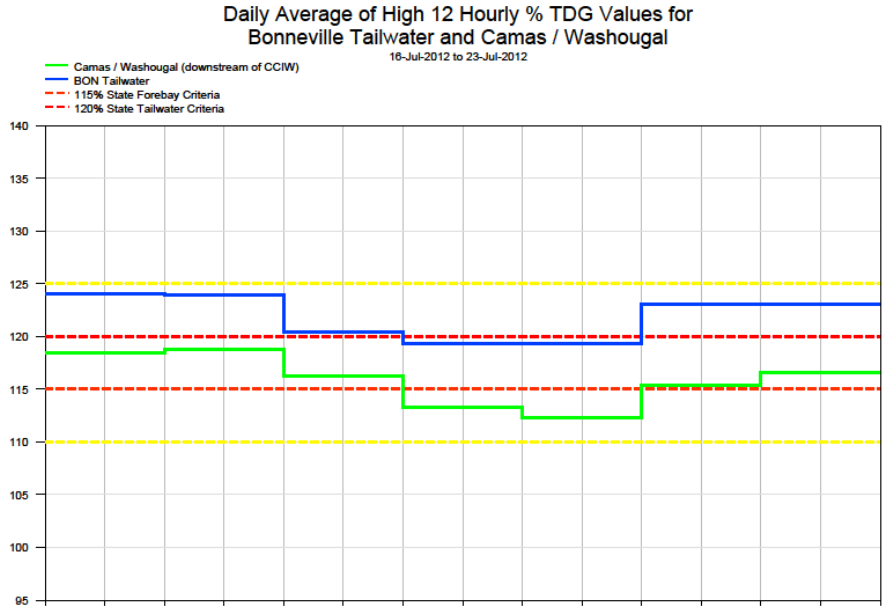

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/16/12 01:00
07/16/12 13:00
07/17/12 01:00
07/17/12 13:00
07/18/12 01:00
07/18/12 13:00
07/19/12 01:00
07/19/12 13:00
07/20/12 01:00
07/20/12 13:00
07/21/12 01:00
07/21/12 13:00
07/22/12 01:00
07/22/12 13:00
07/23/12 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 24


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
16-Jul-2012 to 23-Jul-2012
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

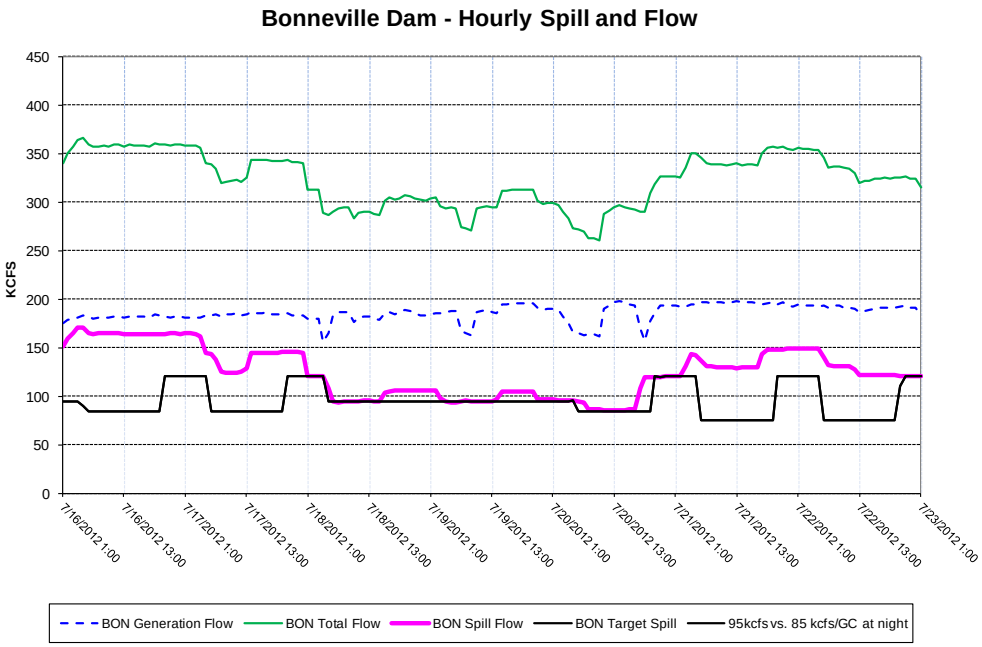
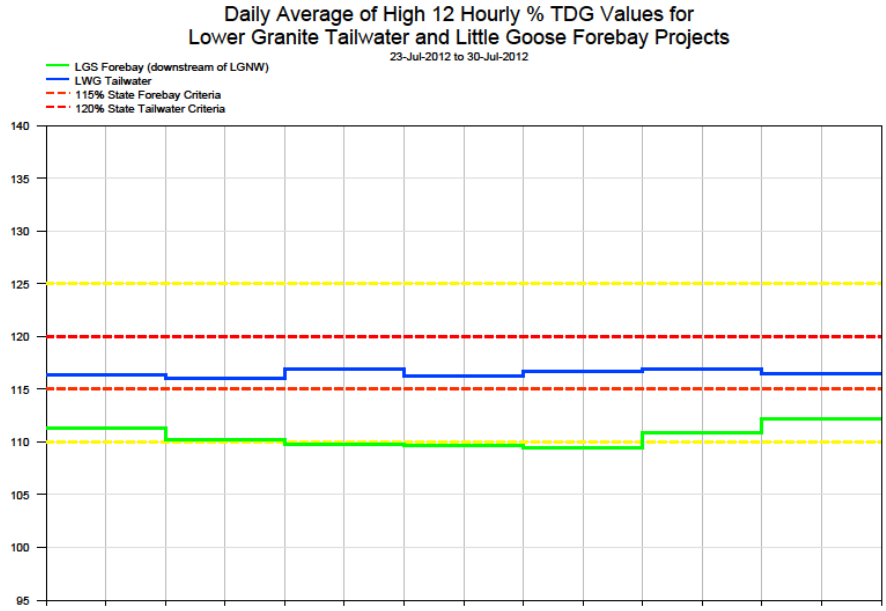

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
7/16/2012 1:00
7/16/2012 13:00
7/17/2012 1:00
7/17/2012 13:00
7/18/2012 1:00
7/18/2012 13:00
7/19/2012 1:00
7/19/2012 13:00
7/20/2012 1:00
7/20/2012 13:00
7/21/2012 1:00
7/21/2012 13:00
7/22/2012 1:00
7/22/2012 13:00
7/23/2012 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
95kcfs vs. 85 kcfs/GC at night

Figure 25


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
23-Jul-2012 to 30-Jul-2012
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

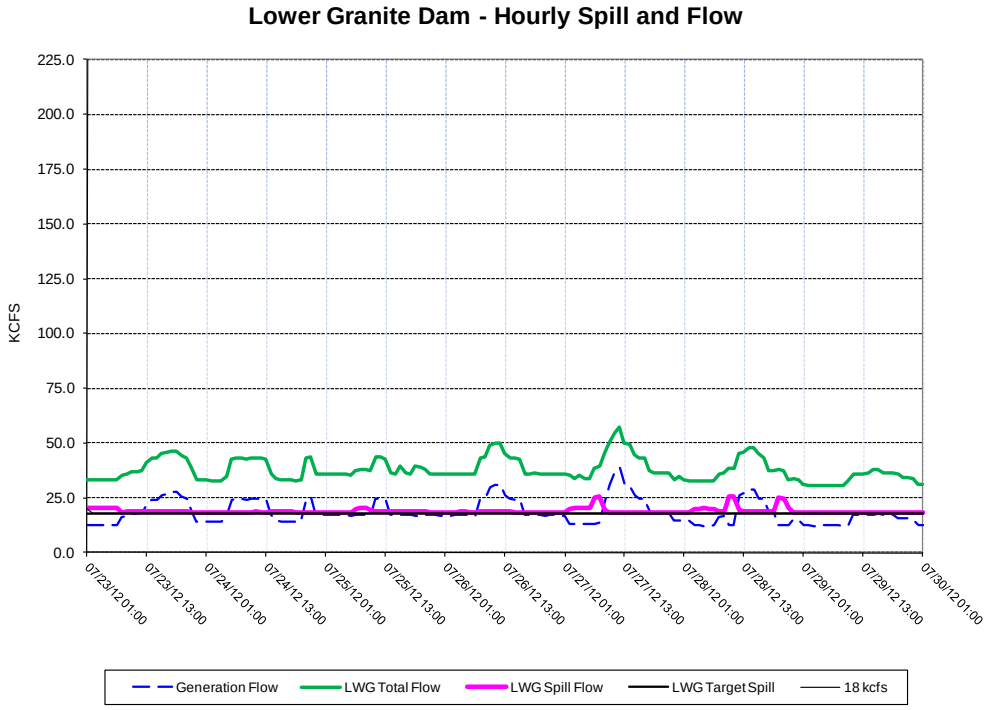
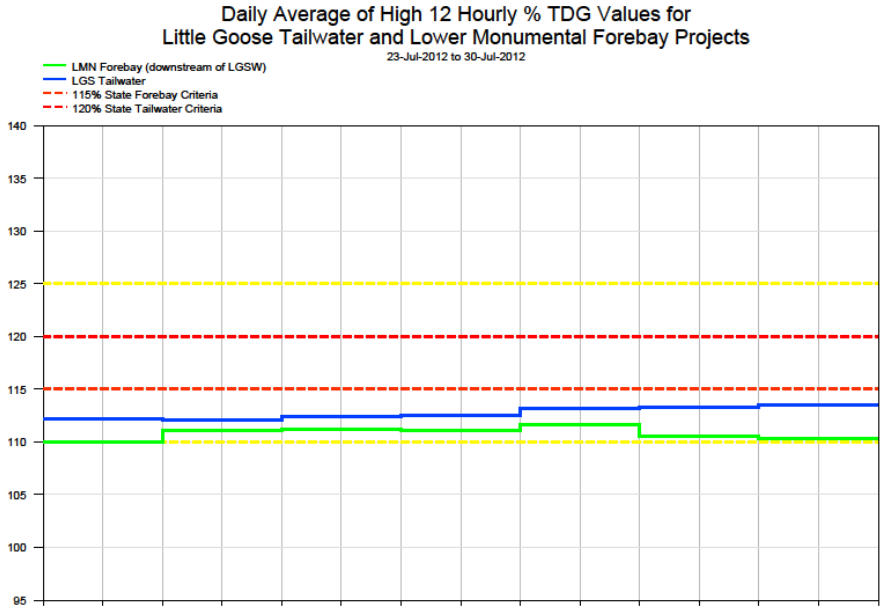

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/23/12 01:00
07/23/12 13:00
07/24/12 01:00
07/24/12 13:00
07/25/12 01:00
07/25/12 13:00
07/26/12 01:00
07/26/12 13:00
07/27/12 01:00
07/27/12 13:00
07/28/12 01:00
07/28/12 13:00
07/29/12 01:00
07/29/12 13:00
07/30/12 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
18 kcfs

Figure 26


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
23-Jul-2012 to 30-Jul-2012
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

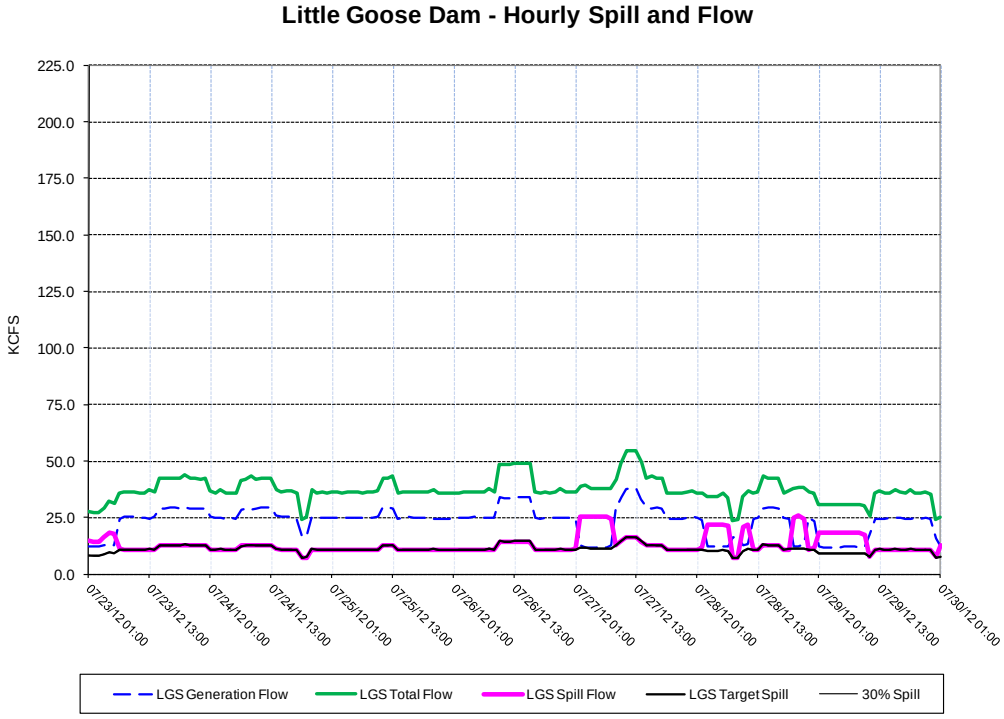
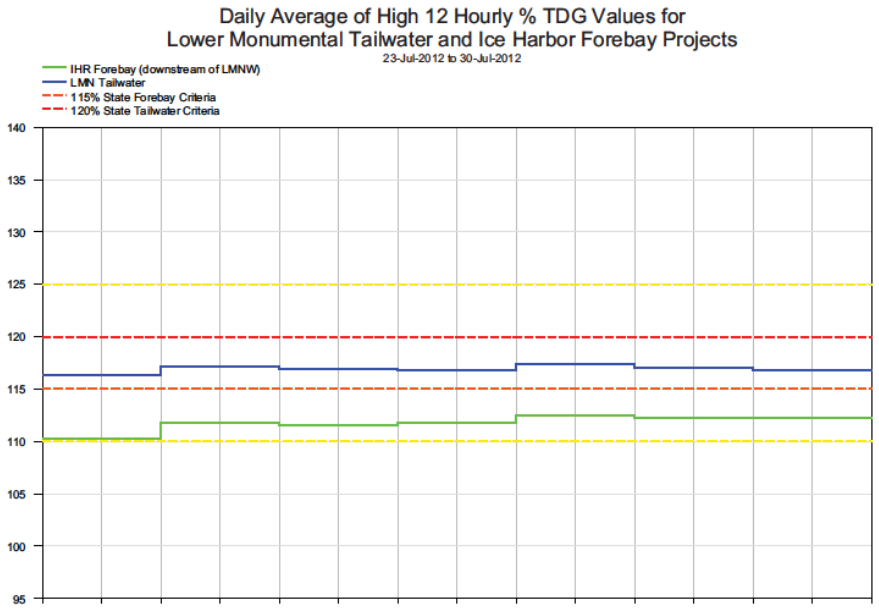

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/23/12 01:00
07/23/12 13:00
07/24/12 01:00
07/24/12 13:00
07/25/12 01:00
07/25/12 13:00
07/26/12 01:00
07/26/12 13:00
07/27/12 01:00
07/27/12 13:00
07/28/12 01:00
07/28/12 13:00
07/29/12 01:00
07/29/12 13:00
07/30/12 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% Spill

Figure 27


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
23-Jul-2012 to 30-Jul-2012
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

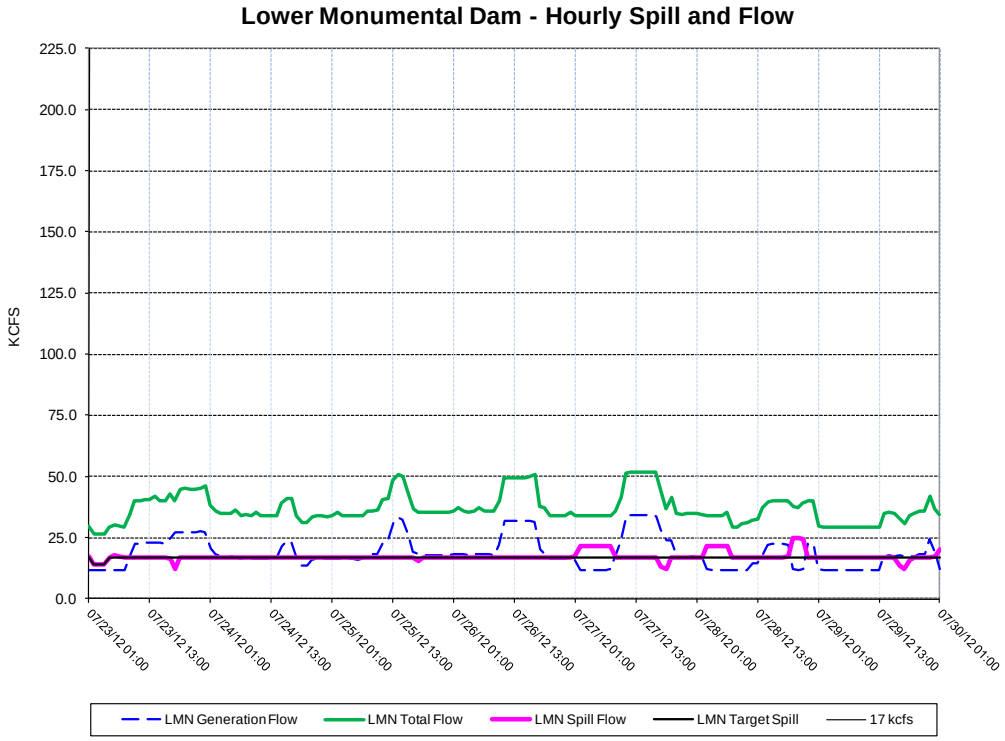
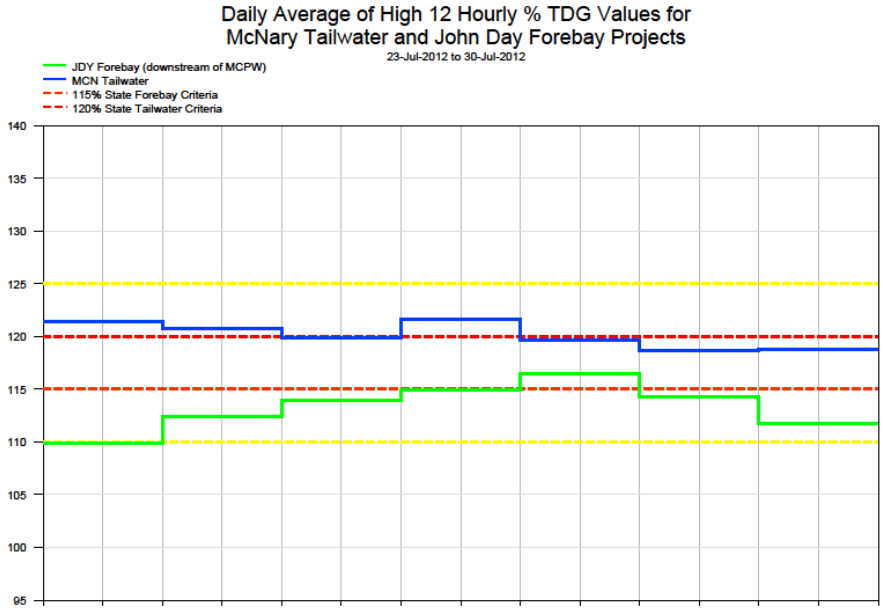

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/23/12 01:00
07/23/12 13:00
07/24/12 01:00
07/24/12 13:00
07/25/12 01:00
07/25/12 13:00
07/26/12 01:00
07/26/12 13:00
07/27/12 01:00
07/27/12 13:00
07/28/12 01:00
07/28/12 13:00
07/29/12 01:00
07/29/12 13:00
07/30/12 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
17 kcfs

Figure 28


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
23-Jul-2012 to 30-Jul-2012
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

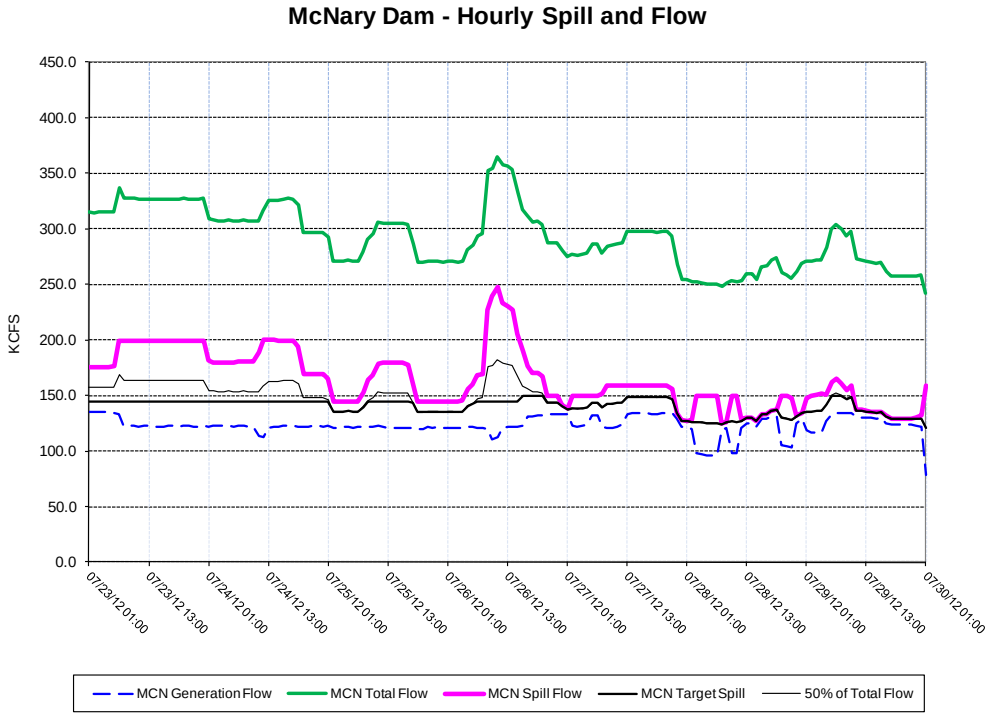
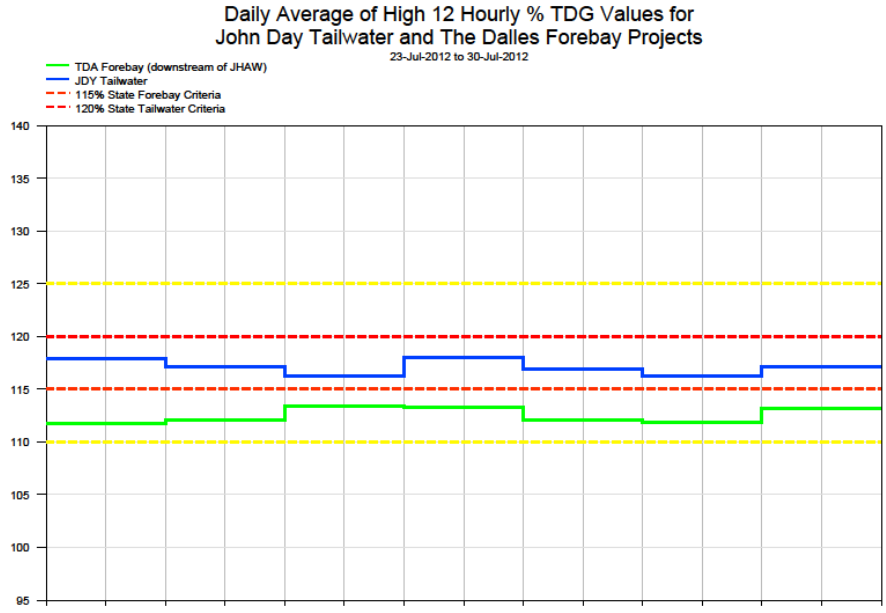

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/23/12 01:00
07/23/12 13:00
07/24/12 01:00
07/24/12 13:00
07/25/12 01:00
07/25/12 13:00
07/26/12 01:00
07/26/12 13:00
07/27/12 01:00
07/27/12 13:00
07/28/12 01:00
07/28/12 13:00
07/29/12 01:00
07/29/12 13:00
07/30/12 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
50% of Total Flow

Figure 29


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
23-Jul-2012 to 30-Jul-2012
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

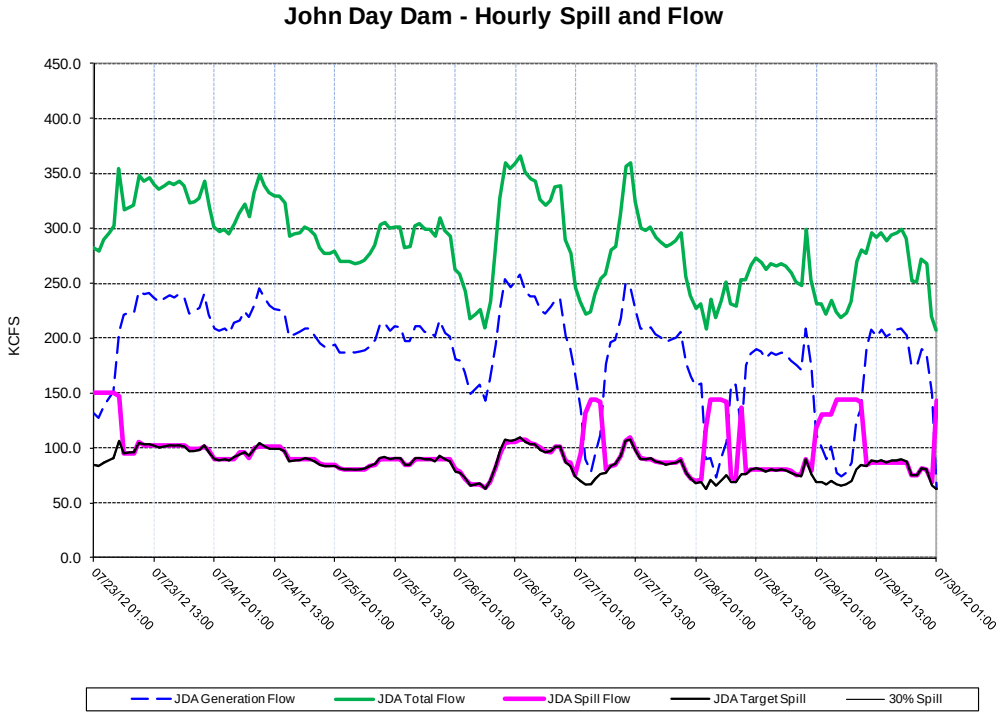
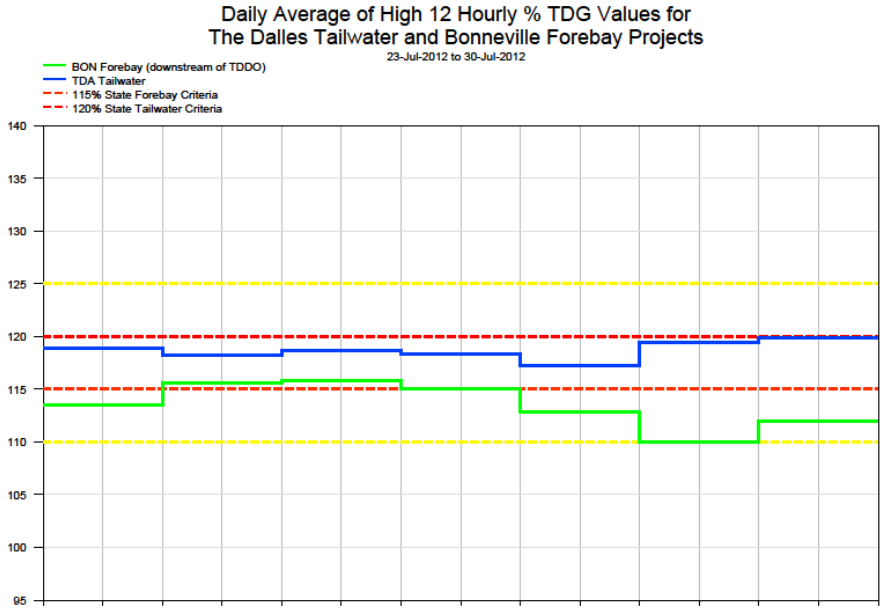

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/23/12 01:00
07/23/12 13:00
07/24/12 01:00
07/24/12 13:00
07/25/12 01:00
07/25/12 13:00
07/26/12 01:00
07/26/12 13:00
07/27/12 01:00
07/27/12 13:00
07/28/12 01:00
07/28/12 13:00
07/29/12 01:00
07/29/12 13:00
07/30/12 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% Spill

Figure 30


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
23-Jul-2012 to 30-Jul-2012
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

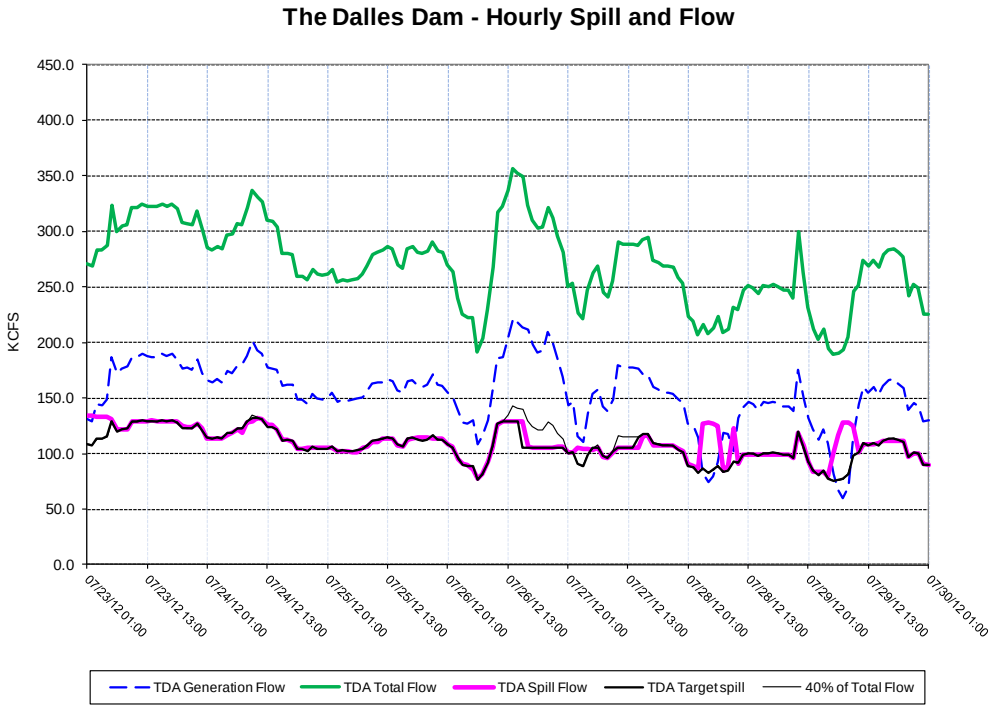
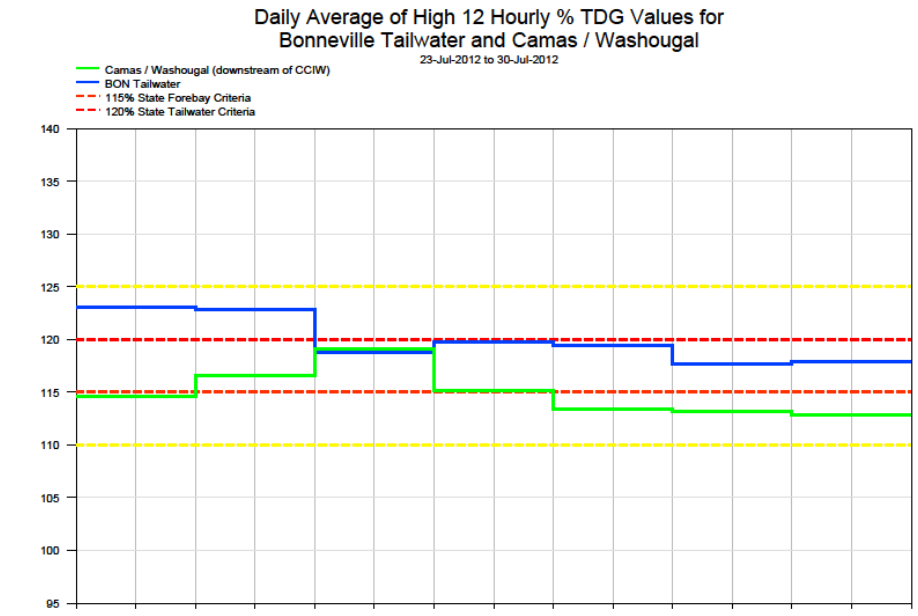
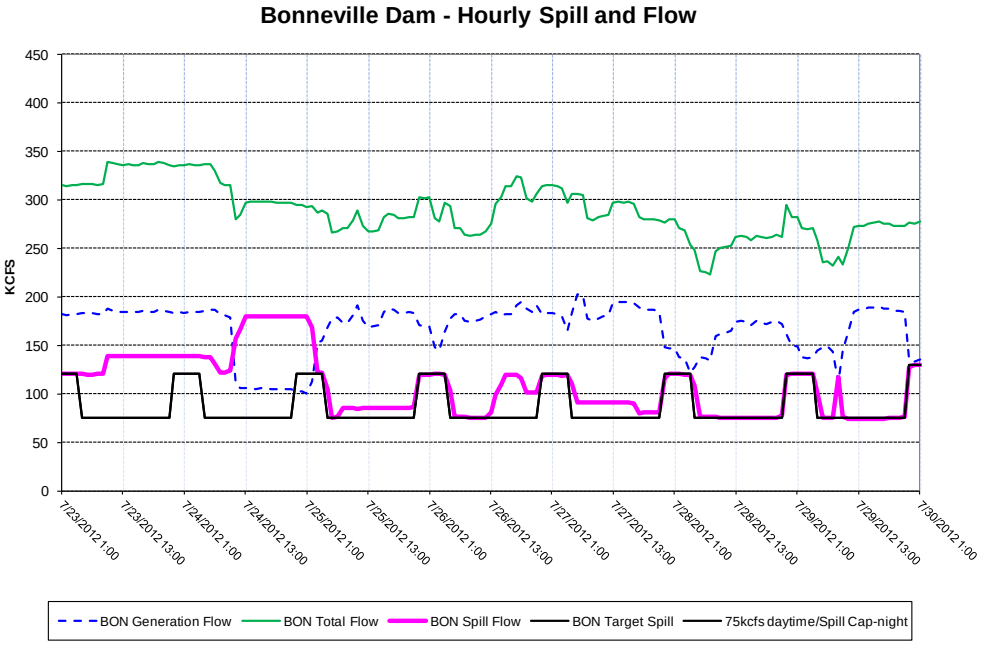

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/23/12 01:00
07/23/12 13:00
07/24/12 01:00
07/24/12 13:00
07/25/12 01:00
07/25/12 13:00
07/26/12 01:00
07/26/12 13:00
07/27/12 01:00
07/27/12 13:00
07/28/12 01:00
07/28/12 13:00
07/29/12 01:00
07/29/12 13:00
07/30/12 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 31


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
23-Jul-2012 to 30-Jul-2012
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95


Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
7/23/2012 1:00
7/23/2012 13:00
7/24/2012 1:00
7/24/2012 13:00
7/25/2012 1:00
7/25/2012 13:00
7/26/2012 1:00
7/26/2012 13:00
7/27/2012 1:00
7/27/2012 13:00
7/28/2012 1:00
7/28/2012 13:00
7/29/2012 1:00
7/29/2012 13:00
7/30/2012 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
75kcfs daytime/Spill Cap-night

Average Percent TDG for Highest 12-Hours: July 2 – July 29, 2012

Date	FIXED MONITORING STATIONS																
	LWG	LGNW	LGSA	LGSW	LMNA	LMNW	IHRA	IDSW	MCNA	MCPW	JDY	JHAW	TDA	TDDO	BON	CCIW	CWMW
7/2/2012	103.3	119.1	114.1	118.4	114.6	118.5	114.7	116.3	119.5	122.7	118.6	120.1	116.2	120.3	118.6	123.1	119.8
7/3/2012	102.5	117.4	113.5	116.8	114.6	117.7	114.2	114.5	117.3	122.2	116	119.1	113.8	118.4	115.5	124.2	116.8
7/4/2012	101.5	117.1	113.5	113.3	113.9	117.7	111.3	114.6	114.8	122.4	114.1	119.1	114.6	118.7	116.9	120.3	116.6
7/5/2012	101.8	116.9	113.4	115.3	113.4	117.6	111.1	113.6	118.4	121.9	115.1	119.5	115.6	118.7	117.4	124	118.3
7/6/2012	100.9	116.1	115.6	113.1	113.3	117.1	112.8	115.5	120.3	122	115.3	119.8	115.3	118.9	116.6	124.7	118.3
7/7/2012	101.5	115.2	115.9	113.2	113.8	117.1	113.7	114.5	121.2	120.4	118.3	118.1	115.7	119	116.4	122.8	117.8
7/8/2012	102.3	115.6	116.7	113.2	114.8	116.8	114.6	114.1	121.7	119.9	120.1	118	117	119.9	116.7	121	117.6
7/9/2012	103.3	116.1	117.2	113.5	114.1	116.4	115.2	114.2	120	122.4	120.3	119.4	117	119.4	115.4	123.3	116.5
7/10/2012	103.1	117.2	115.9	114.3	113.2	116.9	114.8	115.1	119.9	122.4	118.9	119.3	115.6	118.5	112.6	123.6	115.6
7/11/2012	102.6	116.2	115	114.4	113.1	117.6	114.5	114.4	120	122.2	117.6	118.6	116.3	119.7	114.5	123.7	118.1
7/12/2012	101.7	115.5	117.1	113.1	114	117.9	114.5	115.9	119.6	121.2	116.9	119.2	114.1	120.2	115.3	123.8	117.5
7/13/2012	102.4	116.6	115.5	113.9	114.4	117.5	114.7	115.1	118.8	122.4	116.6	119.3	114.3	119	113.8	123.2	115.7
7/14/2012	103.2	116.2	115.7	113.5	114.1	117.1	114.8	114.1	117.3	120.7	116.9	118.9	115	119.8	114.6	123.7	116.5
7/15/2012	103.3	119.4	115.1	116.3	113.4	117.1	114.3	114.7	116.7	121.1	115.7	119	113.8	120.4	114.2	121.9	115
7/16/2012	102.6	117.9	113.8	115.7	111.8	117.8	112.7	114.7	114.2	123	112.6	118.9	114.3	120	115.9	124.2	118.4
7/17/2012	102.3	116.3	112.7	113.4	111.7	117	112	114.3	116.4	122.6	113	118.2	113.4	119.4	117.8	124	118.7
7/18/2012	103.2	116.9	111.8	112.8	113.2	117.5	111.5	114.7	117.3	120.2	111.5	118.1	111.9	118.2	113.4	120.5	116.3
7/19/2012	103	115.7	112	113.2	113.5	117.5	113	114.7	117.6	120.8	115	117.7	112.5	118.2	113.2	119.4	113.3
7/20/2012	102.9	117.2	112.9	113.6	113.1	116.8	112.8	114.4	115.8	121.5	115	118.6	112.4	118.3	112.7	119.4	112.3
7/21/2012	102.8	117.5	112.8	115.1	111.5	117.8	111.7	114.9	114.4	122.3	112.9	118.7	114.8	121.9	115.3	123.2	115.4
7/22/2012	102.5	117.5	112.5	114.3	111.1	134.4	112.4	114.8	116.3	122	112.2	119.2	112.8	120.5	118.1	123.2	116.5
7/23/2012	101	116.4	111.3	112.1	110	135.1	110.2	114.2	114.8	121.4	109.8	117.9	111.7	118.9	113.5	123.1	114.6
7/24/2012	100.6	116	110.2	112.1	111.1	117.1	111.8	113.9	115.8	120.7	112.4	117.1	112	118.2	115.6	122.9	116.6
7/25/2012	101.9	116.9	109.7	112.4	111.2	116.9	111.5	114.2	118.8	119.9	113.9	116.2	113.4	118.7	115.8	118.8	119.1
7/26/2012	102.2	116.2	109.7	112.5	111.1	116.8	111.7	114.1	119.4	121.6	114.9	118	113.2	118.4	115	119.9	115.1
7/27/2012	102.2	116.7	109.5	113.1	111.7	117.3	112.5	114.4	118.7	119.6	116.5	116.9	112.1	117.2	112.8	119.6	113.3
7/28/2012	102.2	116.9	110.8	113.2	110.6	117	112.2	114.5	115.6	118.6	114.3	116.2	111.8	119.4	110	117.8	113.1
7/29/2012	102.8	116.5	112.2	113.5	110.3	116.8	112.3	113.5	113.8	118.8	111.8	117.1	113.2	119.9	111.9	118	112.8

Generated: Wed Aug 1 23:27:07 2012

Red text denotes exceedances.

• indicates no data due to malfunctioning gauge

- indicates gauge is out of service for winter

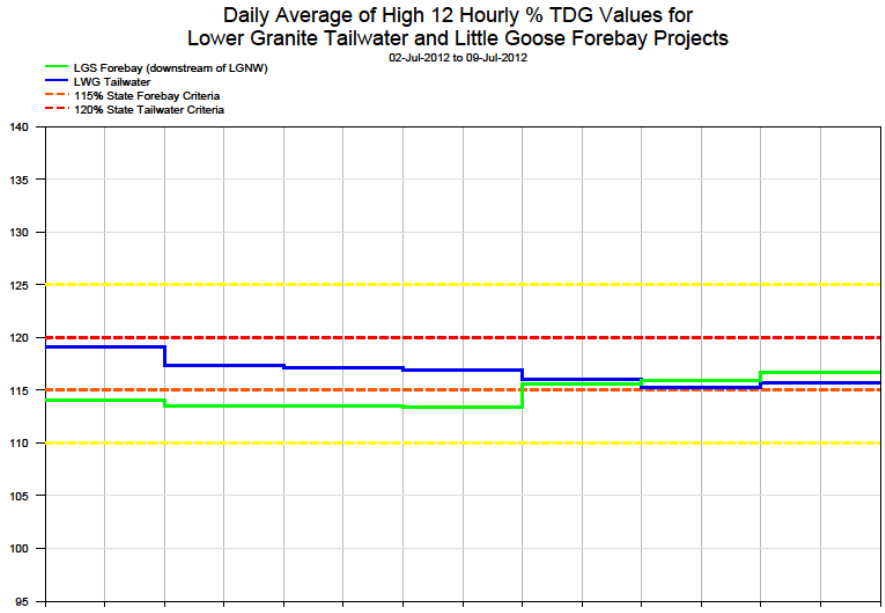
Dates run from hour 1 to 24 (not 0 to 23).

The gas caps shown only apply when spilling to facilitate juvenile fish passage ("voluntary spill") between April 3rd and August 31st. At all other times, the gas cap is 110%.

Total Dissolved Gas Monitoring Stations

Code	Station Name
LWG	Lower Granite Forebay
LGNW	Lower Granite Tailwater
LGSA	Little Goose Forebay
LGSW	Little Goose Tailwater
LMNA	Lower Monumental Forebay
LMNW	Lower Monumental Tailwater
IHRA	Ice Harbor Forebay
IDSW	Ice Harbor Tailwater
MCNA	McNary Forebay
MCPW	McNary Tailwater
JDY	John Day Forebay
JHAW	John Day Tailwater
TDA	The Dalles Forebay
TDDO	The Dalles Tailwater
BON	Bonneville Forebay
CCIW	Bonneville Tailwater (Cascade Island)
CWMW	Camas / Washougal

Figure 1


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
02-Jul-2012 to 09-Jul-2012
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

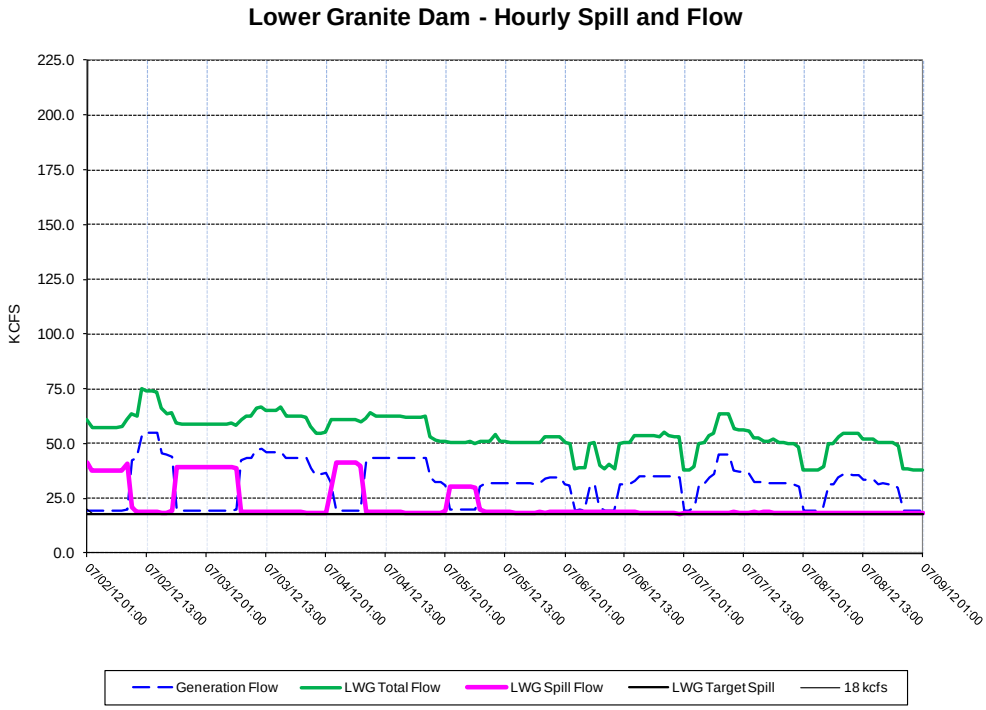
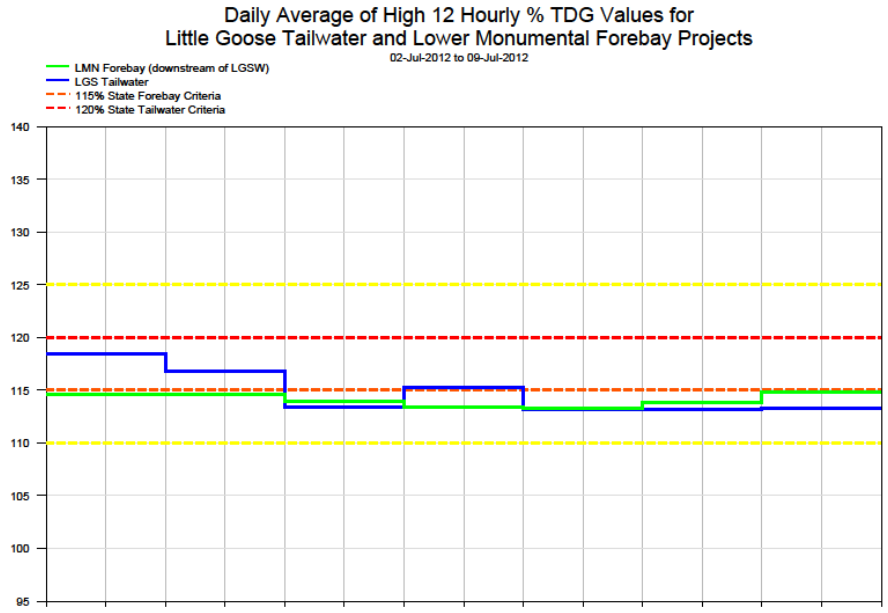

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/02/12 01:00
07/02/12 13:00
07/03/12 01:00
07/03/12 13:00
07/04/12 01:00
07/04/12 13:00
07/05/12 01:00
07/05/12 13:00
07/06/12 01:00
07/06/12 13:00
07/07/12 01:00
07/07/12 13:00
07/08/12 01:00
07/08/12 13:00
07/09/12 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
18 kcfs

Figure 2


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
02-Jul-2012 to 09-Jul-2012
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

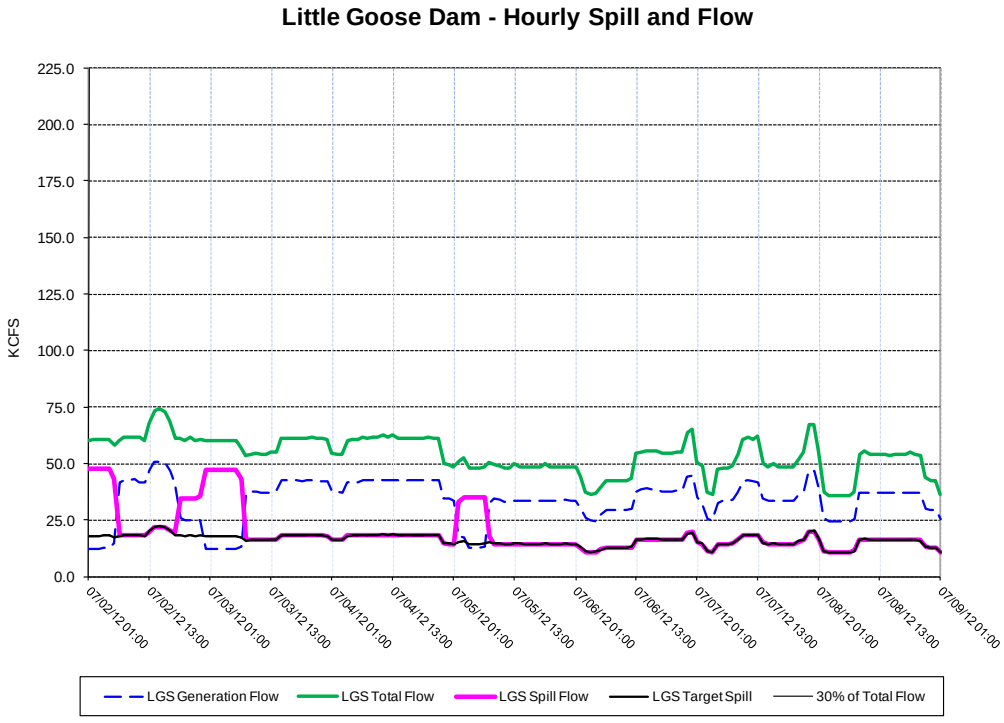
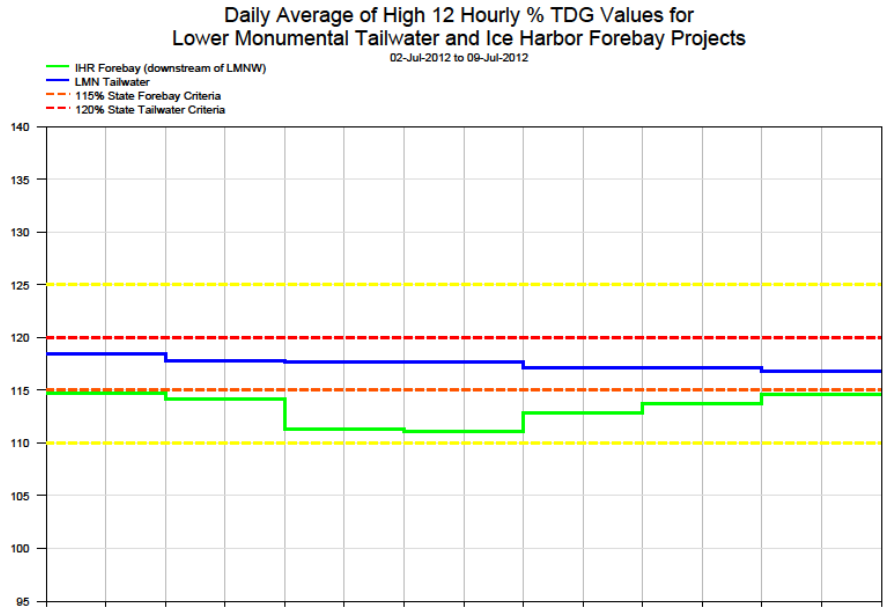

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/02/12 01:00
07/02/12 13:00
07/03/12 01:00
07/03/12 13:00
07/04/12 01:00
07/04/12 13:00
07/05/12 01:00
07/05/12 13:00
07/06/12 01:00
07/06/12 13:00
07/07/12 01:00
07/07/12 13:00
07/08/12 01:00
07/08/12 13:00
07/09/12 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 3


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
02-Jul-2012 to 09-Jul-2012
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

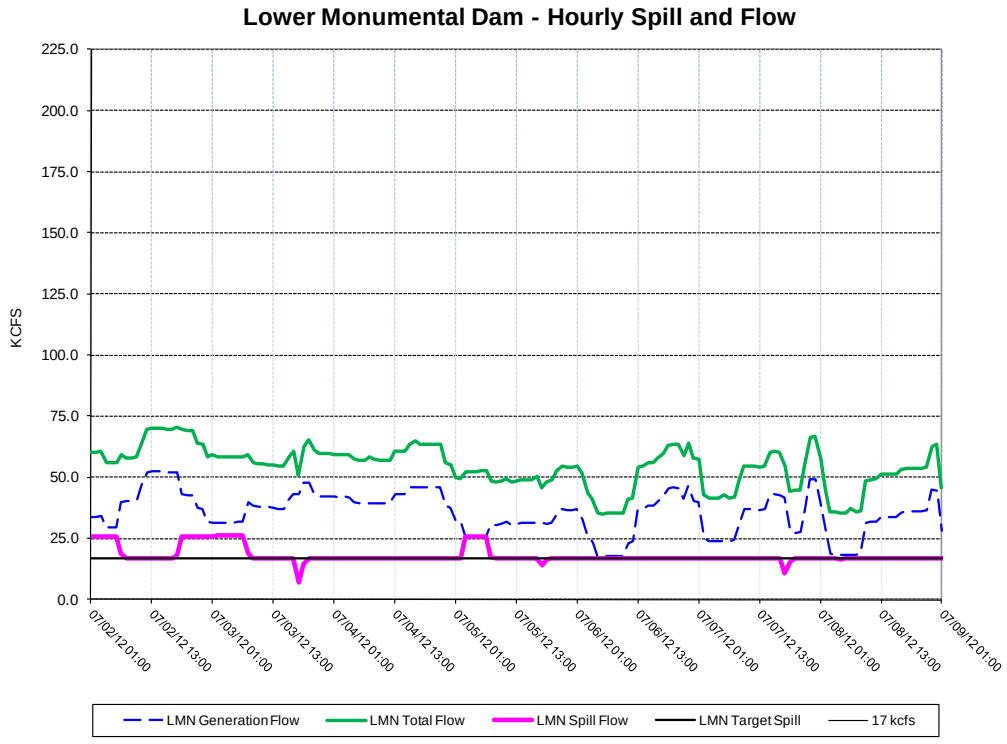
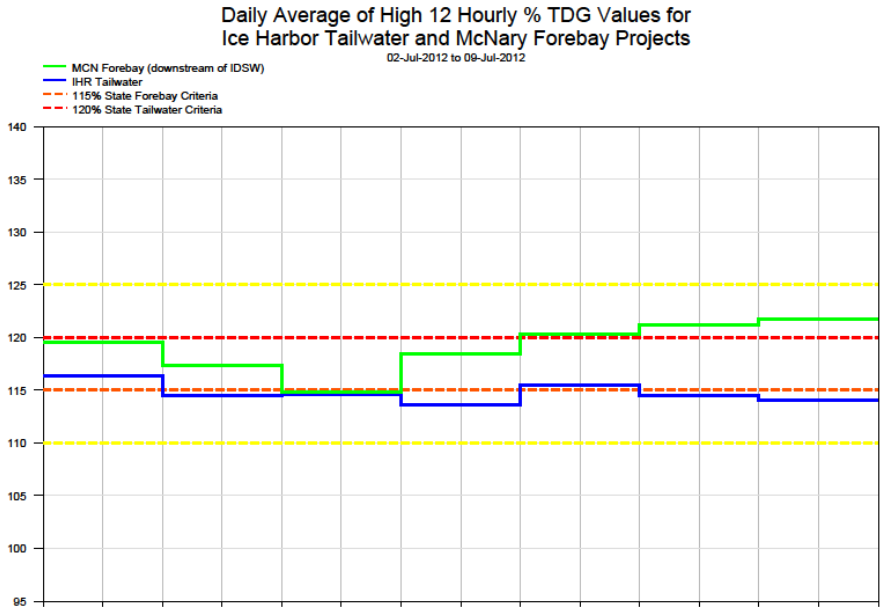

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/02/12 01:00
07/02/12 13:00
07/03/12 01:00
07/03/12 13:00
07/04/12 01:00
07/04/12 13:00
07/05/12 01:00
07/05/12 13:00
07/06/12 01:00
07/06/12 13:00
07/07/12 01:00
07/07/12 13:00
07/08/12 01:00
07/08/12 13:00
07/09/12 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
17 kcfs

Figure 4


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
02-Jul-2012 to 09-Jul-2012
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

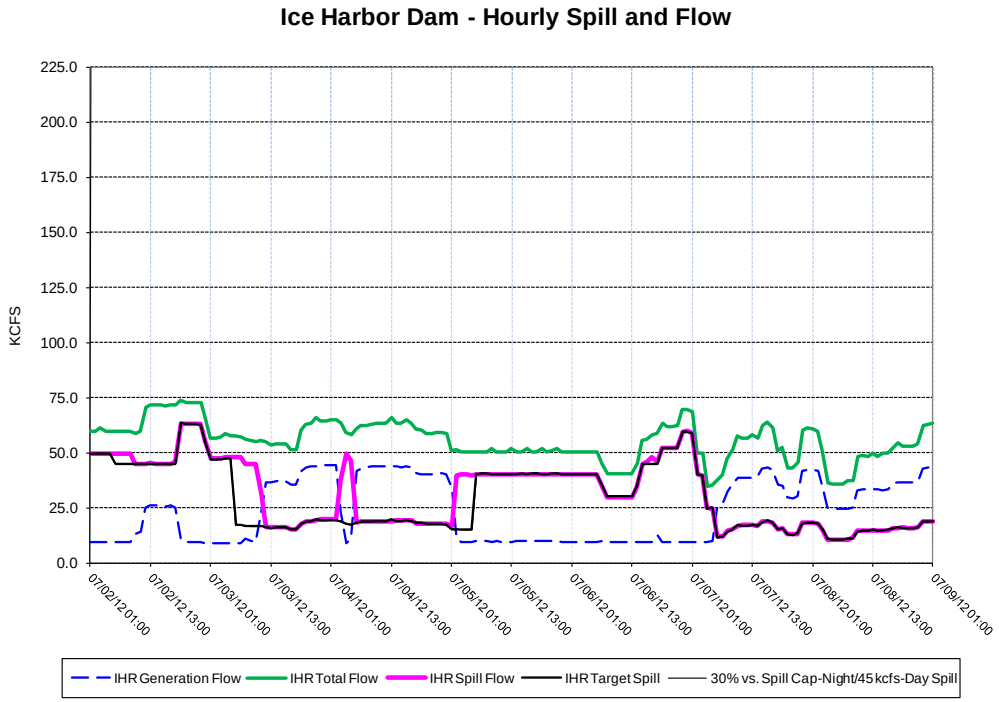
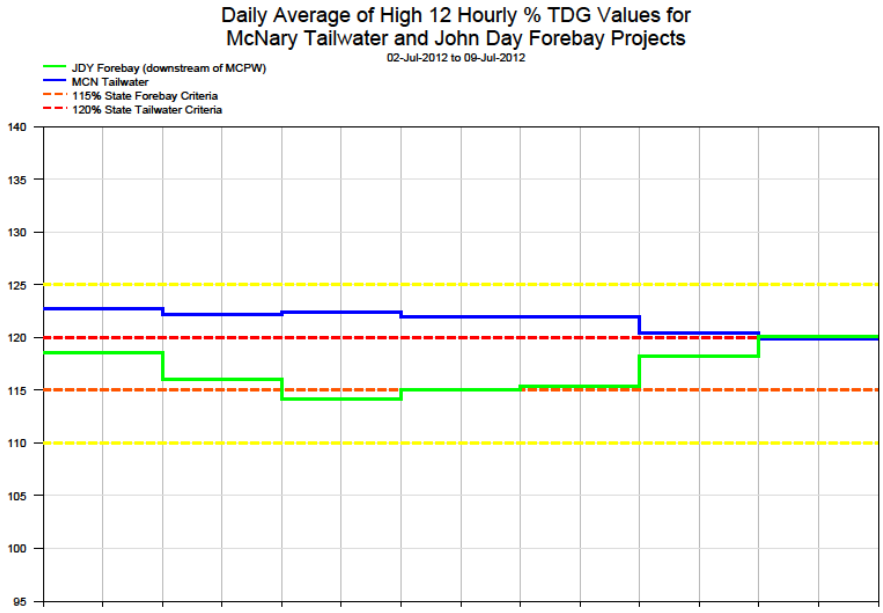

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/02/12 01:00
07/02/12 13:00
07/03/12 01:00
07/03/12 13:00
07/04/12 01:00
07/04/12 13:00
07/05/12 01:00
07/05/12 13:00
07/06/12 01:00
07/06/12 13:00
07/07/12 01:00
07/07/12 13:00
07/08/12 01:00
07/08/12 13:00
07/09/12 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
30% vs. Spill Cap-Night/45 kcfs-Day Spill

Figure 5


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
02-Jul-2012 to 09-Jul-2012
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

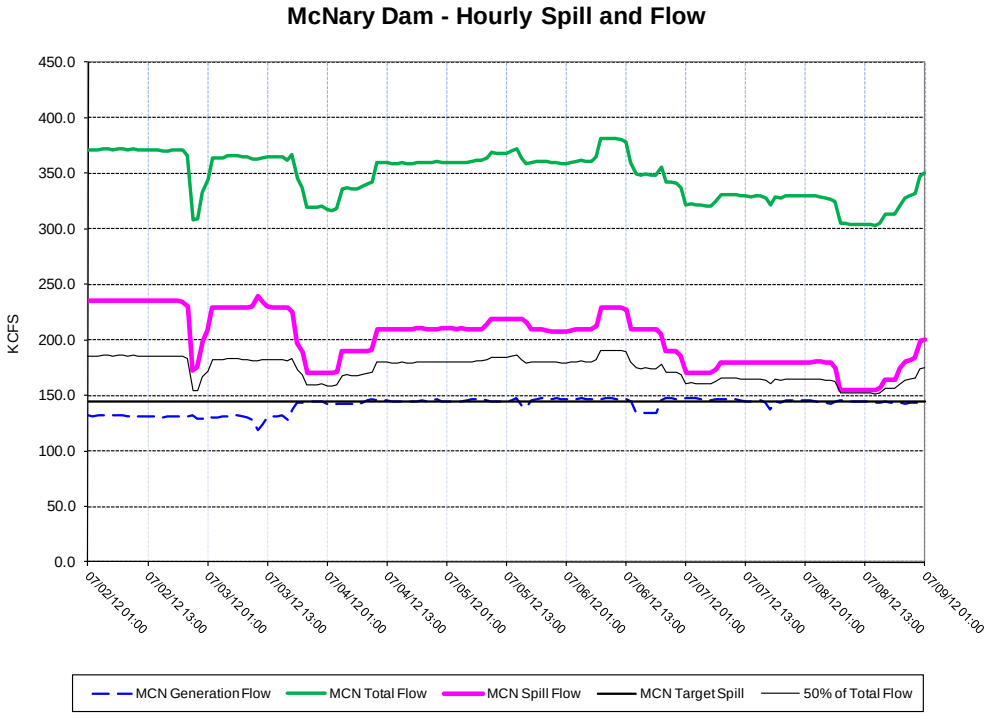
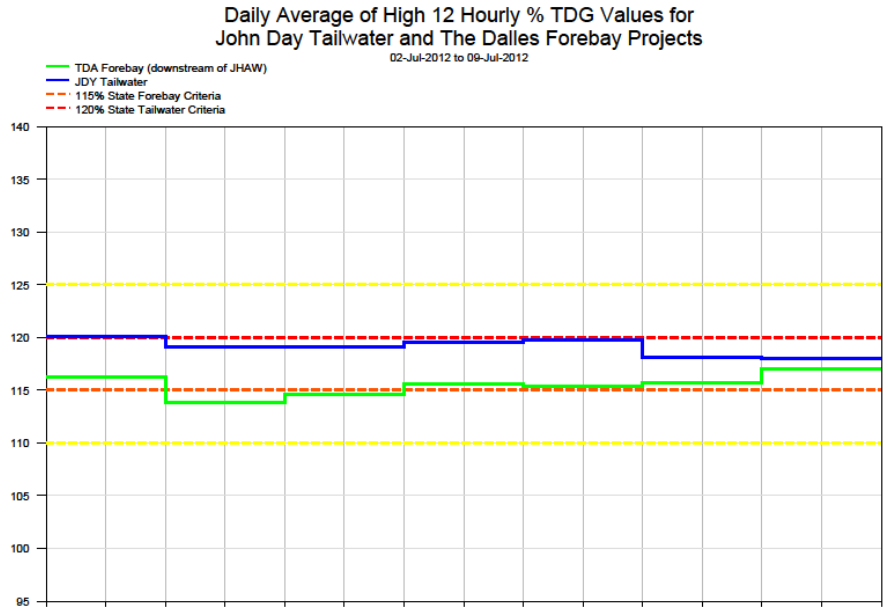

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/02/12 01:00
07/02/12 13:00
07/03/12 01:00
07/03/12 13:00
07/04/12 01:00
07/04/12 13:00
07/05/12 01:00
07/05/12 13:00
07/06/12 01:00
07/06/12 13:00
07/07/12 01:00
07/07/12 13:00
07/08/12 01:00
07/08/12 13:00
07/09/12 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
50% of Total Flow

Figure 6


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
02-Jul-2012 to 09-Jul-2012
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

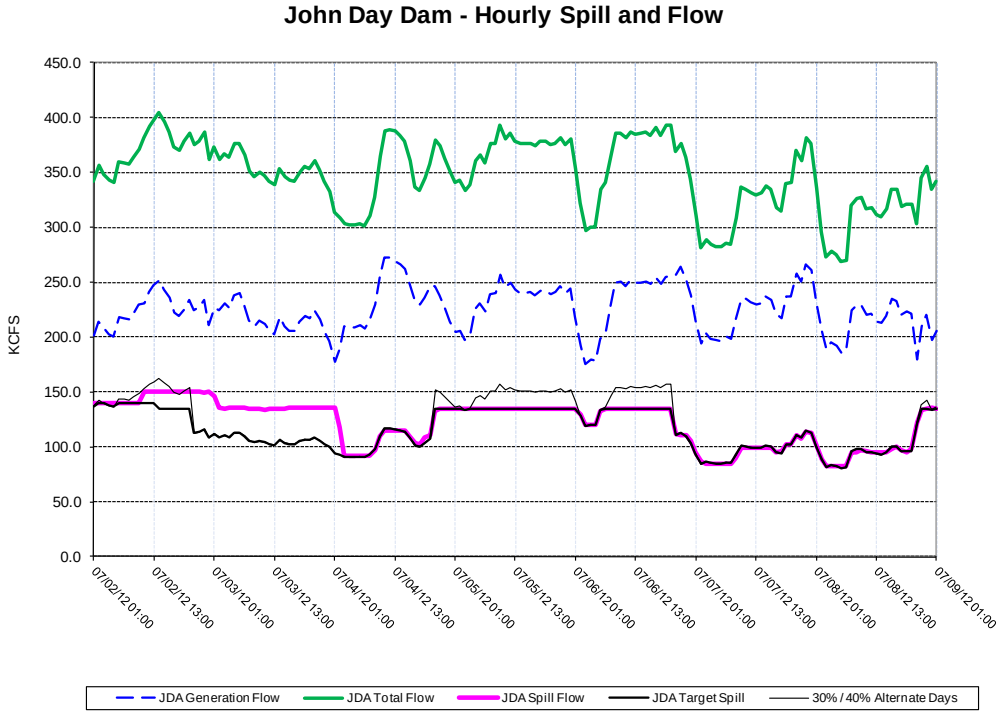
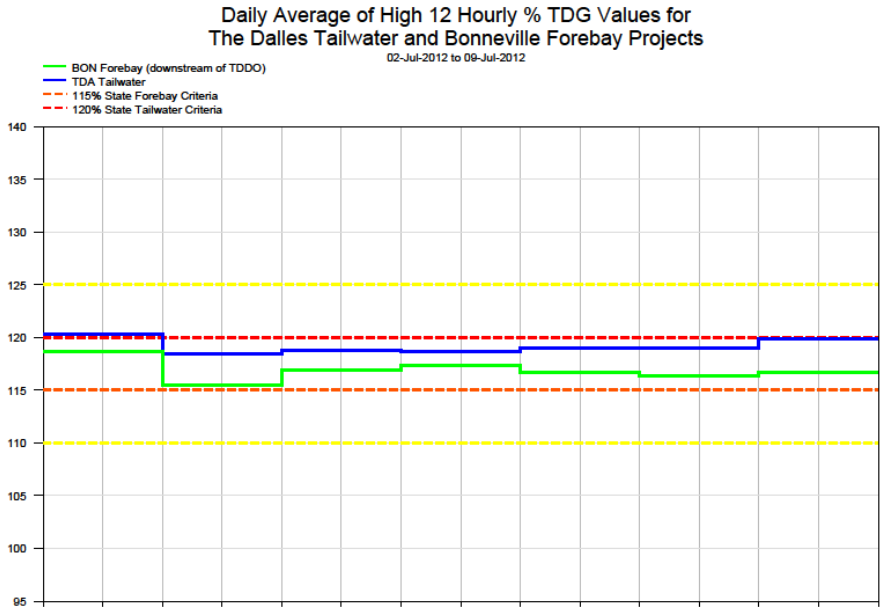

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/02/12 01:00
07/02/12 13:00
07/03/12 01:00
07/03/12 13:00
07/04/12 01:00
07/04/12 13:00
07/05/12 01:00
07/05/12 13:00
07/06/12 01:00
07/06/12 13:00
07/07/12 01:00
07/07/12 13:00
07/08/12 01:00
07/08/12 13:00
07/09/12 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% / 40% Alternate Days

Figure 7


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
02-Jul-2012 to 09-Jul-2012
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

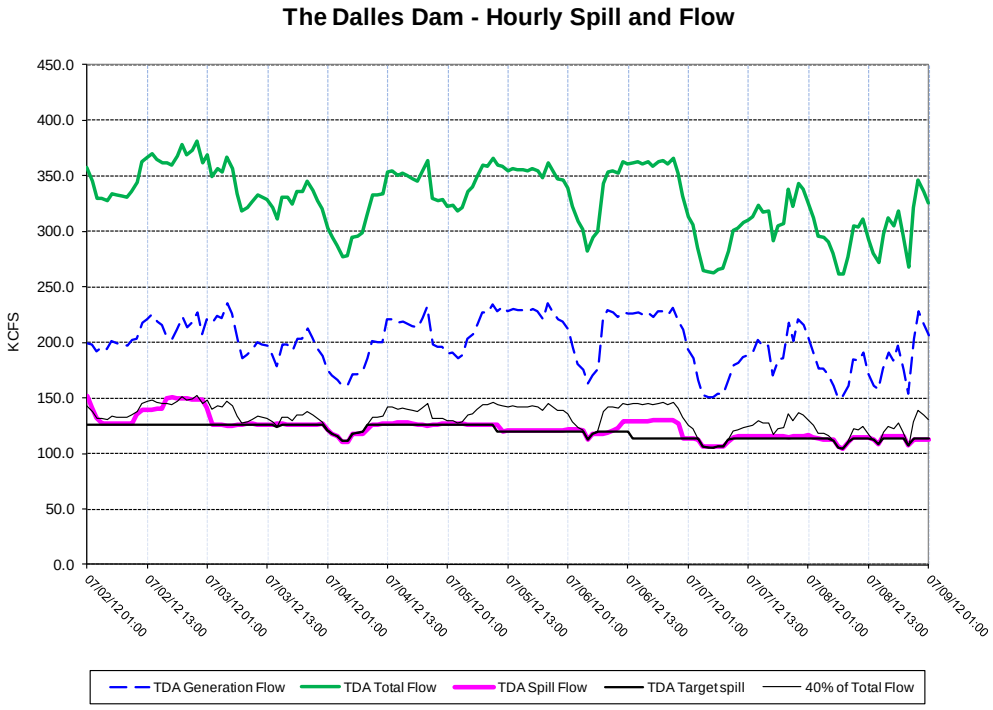
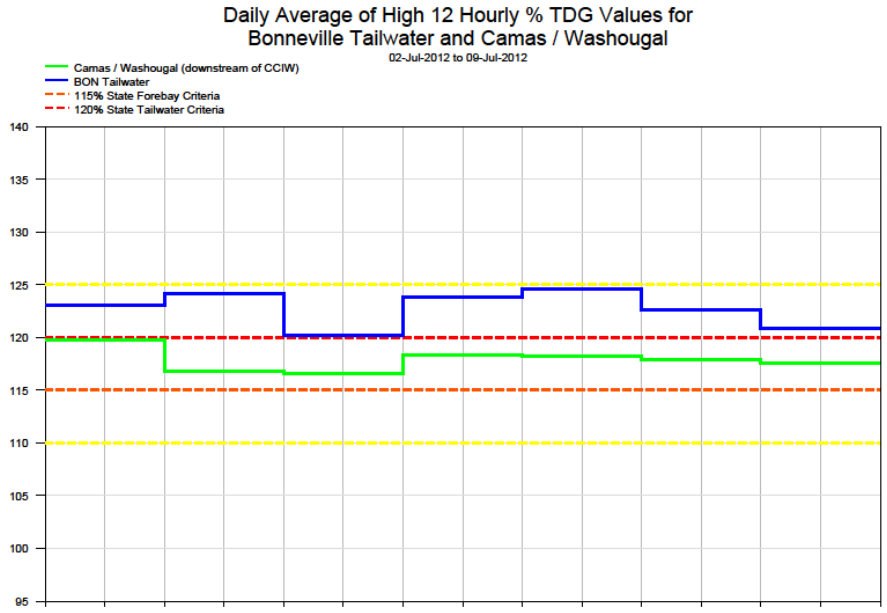

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/02/12 01:00
07/02/12 13:00
07/03/12 01:00
07/03/12 13:00
07/04/12 01:00
07/04/12 13:00
07/05/12 01:00
07/05/12 13:00
07/06/12 01:00
07/06/12 13:00
07/07/12 01:00
07/07/12 13:00
07/08/12 01:00
07/08/12 13:00
07/09/12 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 8


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
02-Jul-2012 to 09-Jul-2012
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

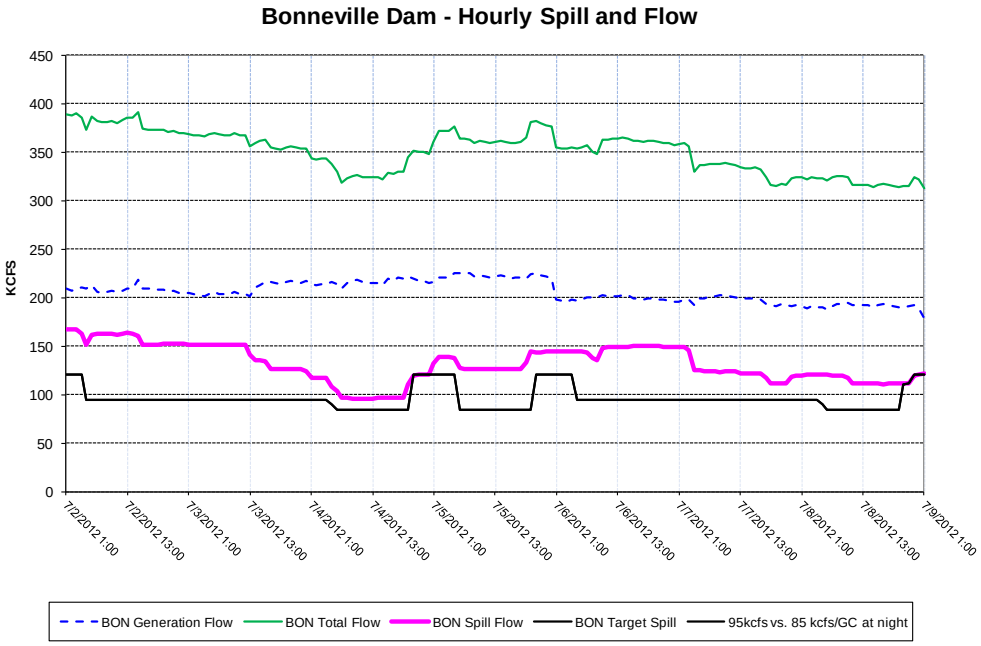
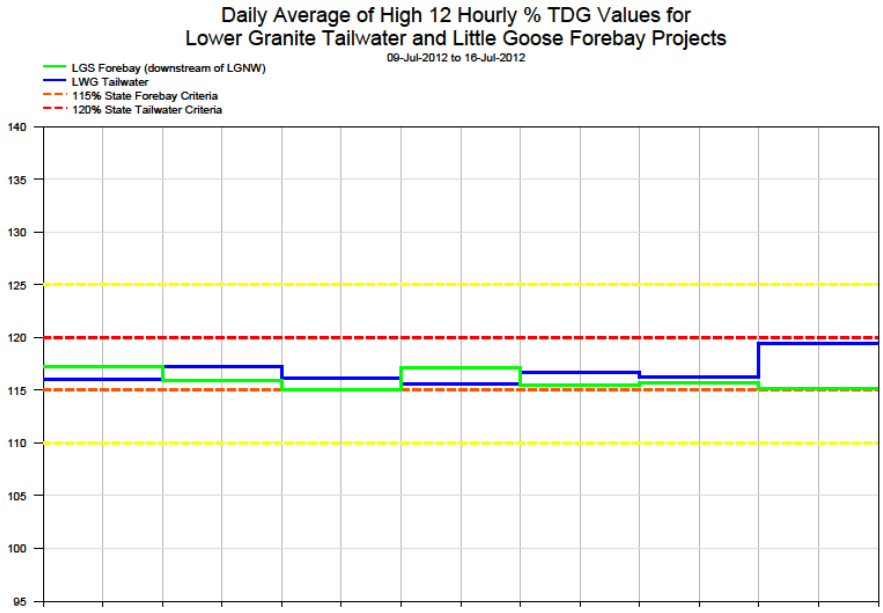

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
7/2/2012 1:00
7/2/2012 13:00
7/3/2012 1:00
7/3/2012 13:00
7/4/2012 1:00
7/4/2012 13:00
7/5/2012 1:00
7/5/2012 13:00
7/6/2012 1:00
7/6/2012 13:00
7/7/2012 1:00
7/7/2012 13:00
7/8/2012 1:00
7/8/2012 13:00
7/9/2012 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
95kcfs vs. 85 kcfs/GC at night

Figure 9


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
09-Jul-2012 to 16-Jul-2012
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

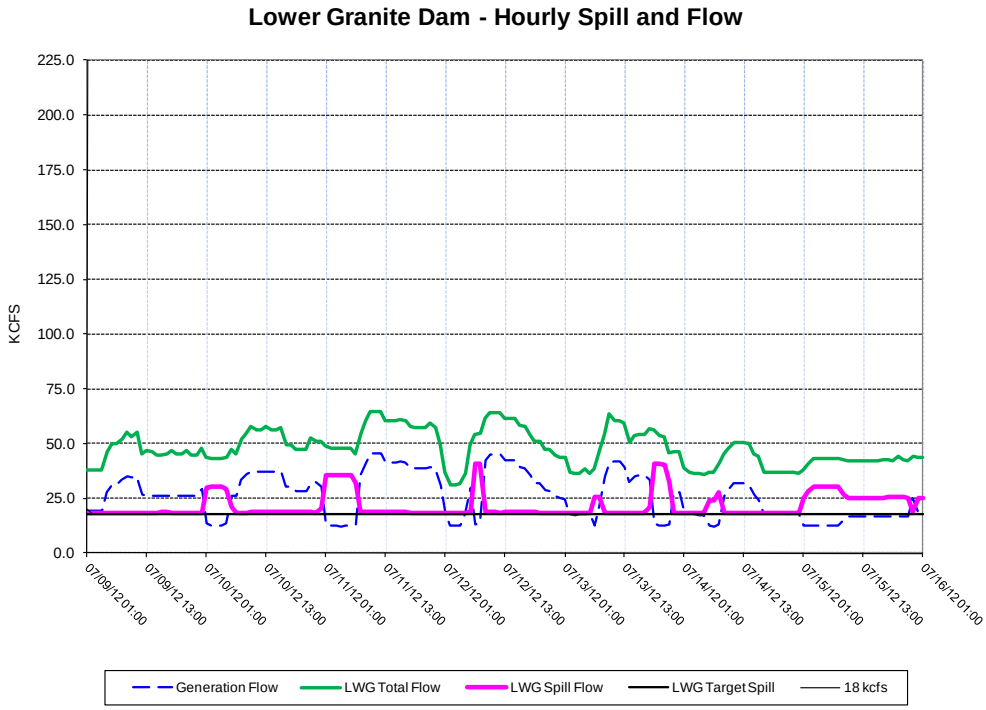
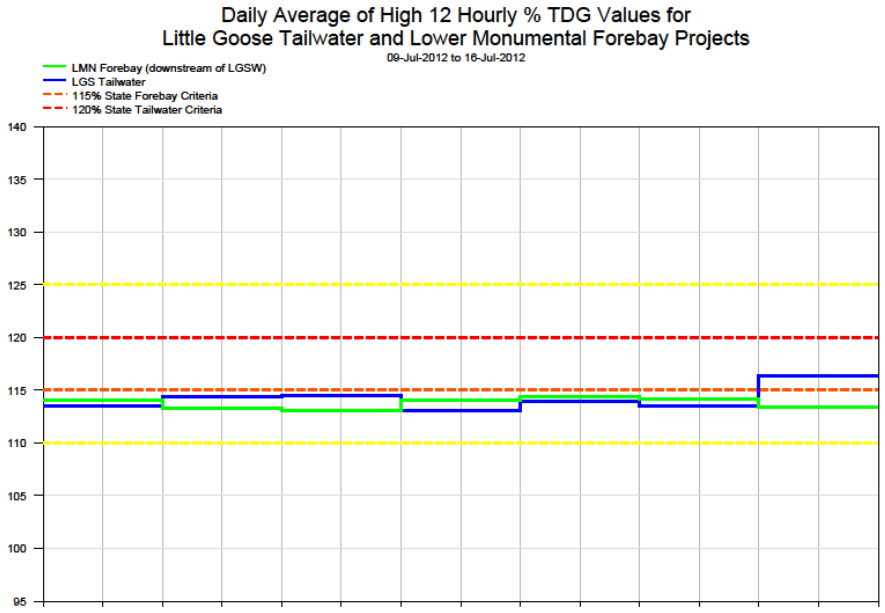

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/09/12 01:00
07/09/12 13:00
07/10/12 01:00
07/10/12 13:00
07/11/12 01:00
07/11/12 13:00
07/12/12 01:00
07/12/12 13:00
07/13/12 01:00
07/13/12 13:00
07/14/12 01:00
07/14/12 13:00
07/15/12 01:00
07/15/12 13:00
07/16/12 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
18 kcfs

Figure 10


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
09-Jul-2012 to 16-Jul-2012
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

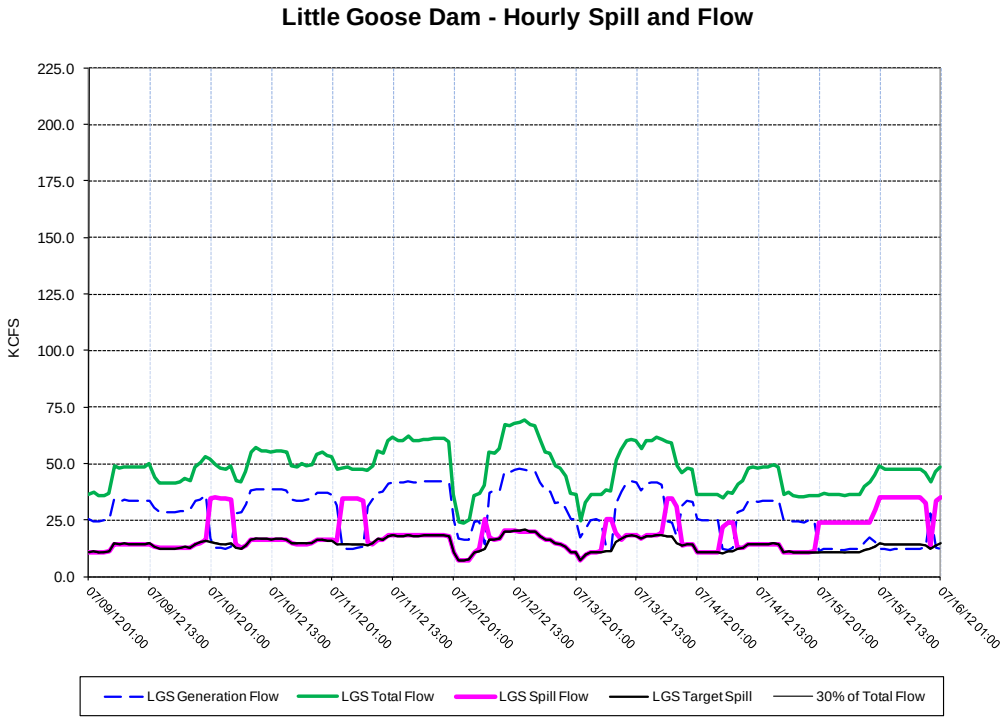
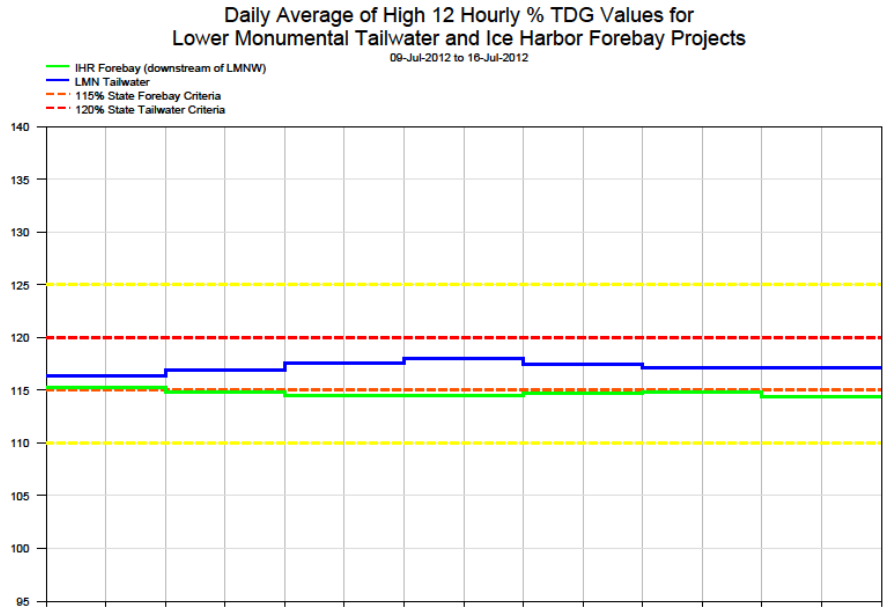

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/09/12 01:00
07/09/12 13:00
07/10/12 01:00
07/10/12 13:00
07/11/12 01:00
07/11/12 13:00
07/12/12 01:00
07/12/12 13:00
07/13/12 01:00
07/13/12 13:00
07/14/12 01:00
07/14/12 13:00
07/15/12 01:00
07/15/12 13:00
07/16/12 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 11


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
09-Jul-2012 to 16-Jul-2012
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

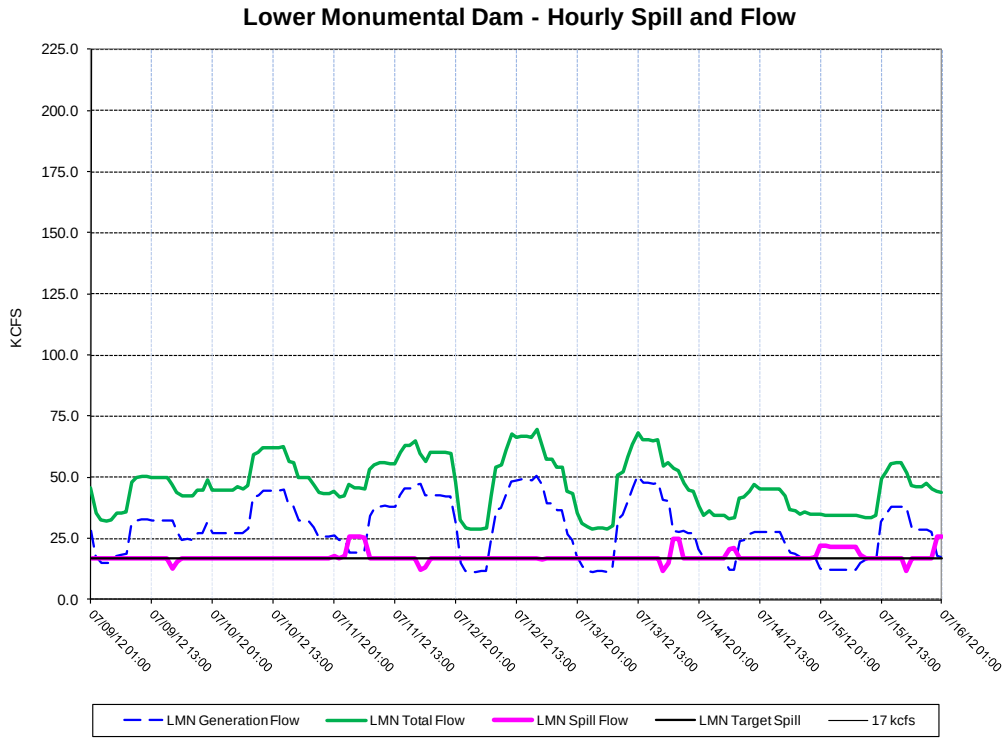
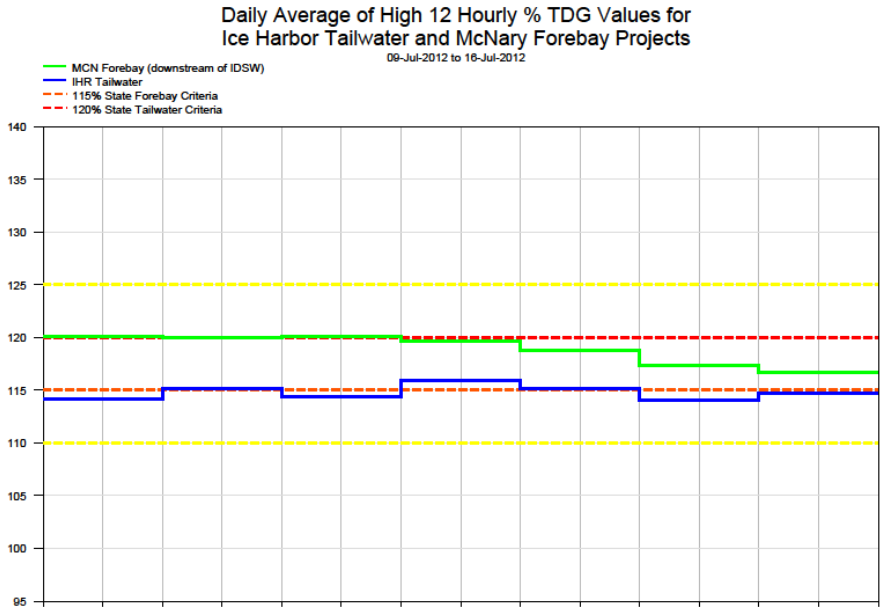

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/09/12 01:00
07/09/12 13:00
07/10/12 01:00
07/10/12 13:00
07/11/12 01:00
07/11/12 13:00
07/12/12 01:00
07/12/12 13:00
07/13/12 01:00
07/13/12 13:00
07/14/12 01:00
07/14/12 13:00
07/15/12 01:00
07/15/12 13:00
07/16/12 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
17 kcfs

Figure 12


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
09-Jul-2012 to 16-Jul-2012
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

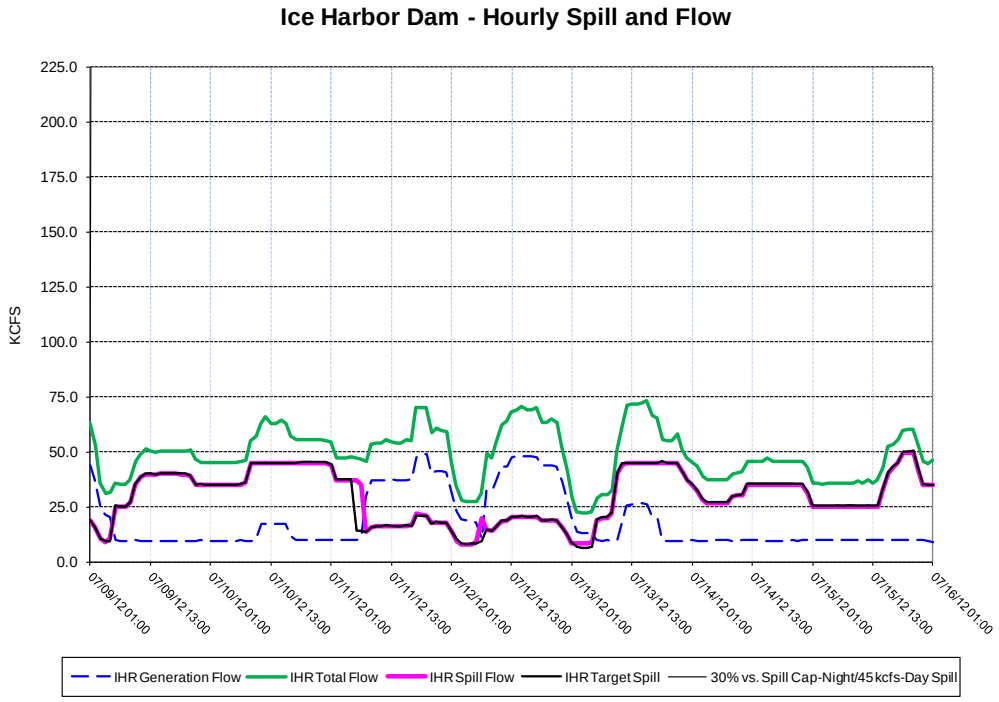
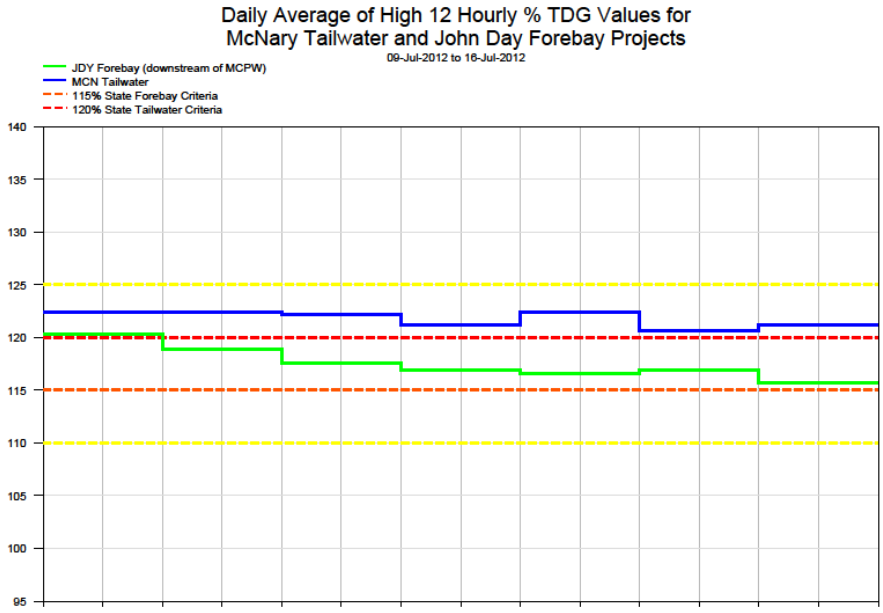

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/09/12 01:00
07/09/12 13:00
07/10/12 01:00
07/10/12 13:00
07/11/12 01:00
07/11/12 13:00
07/12/12 01:00
07/12/12 13:00
07/13/12 01:00
07/13/12 13:00
07/14/12 01:00
07/14/12 13:00
07/15/12 01:00
07/15/12 13:00
07/16/12 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
30% vs. Spill Cap-Night/45 kcfs-Day Spill

Figure 13


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
09-Jul-2012 to 16-Jul-2012
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

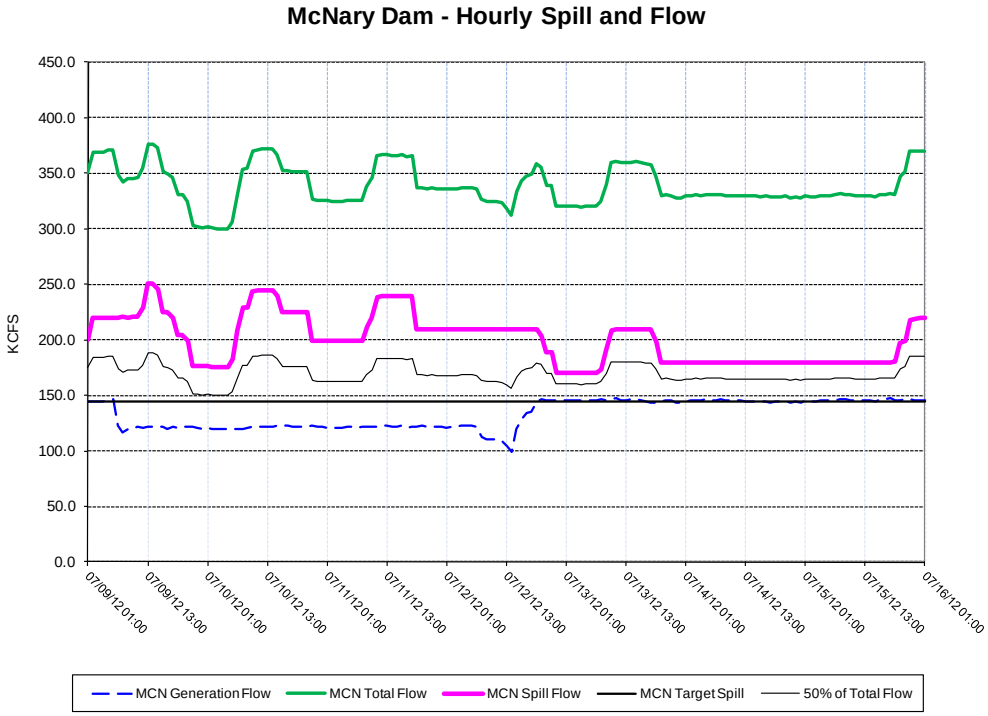
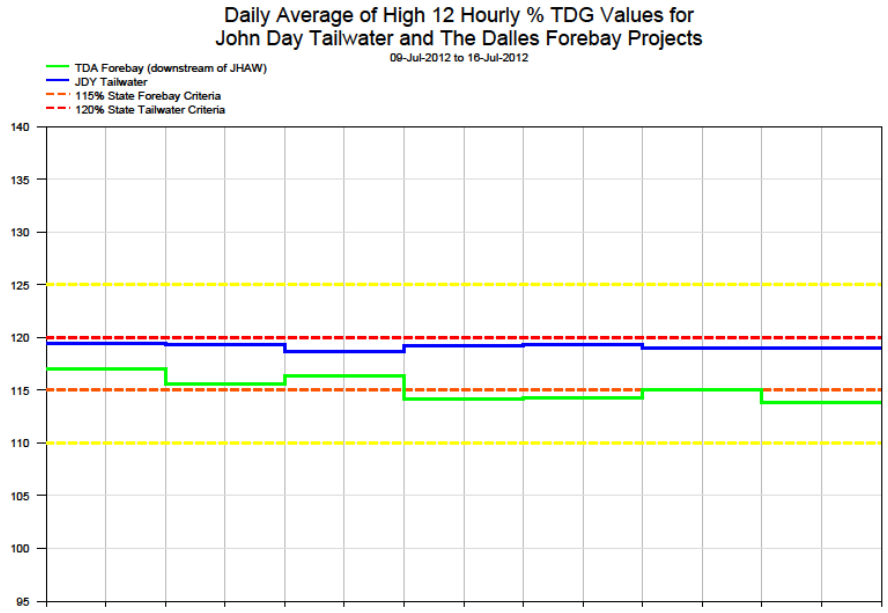

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/09/12 01:00
07/09/12 13:00
07/10/12 01:00
07/10/12 13:00
07/11/12 01:00
07/11/12 13:00
07/12/12 01:00
07/12/12 13:00
07/13/12 01:00
07/13/12 13:00
07/14/12 01:00
07/14/12 13:00
07/15/12 01:00
07/15/12 13:00
07/16/12 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
50% of Total Flow

Figure 14


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
09-Jul-2012 to 16-Jul-2012
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

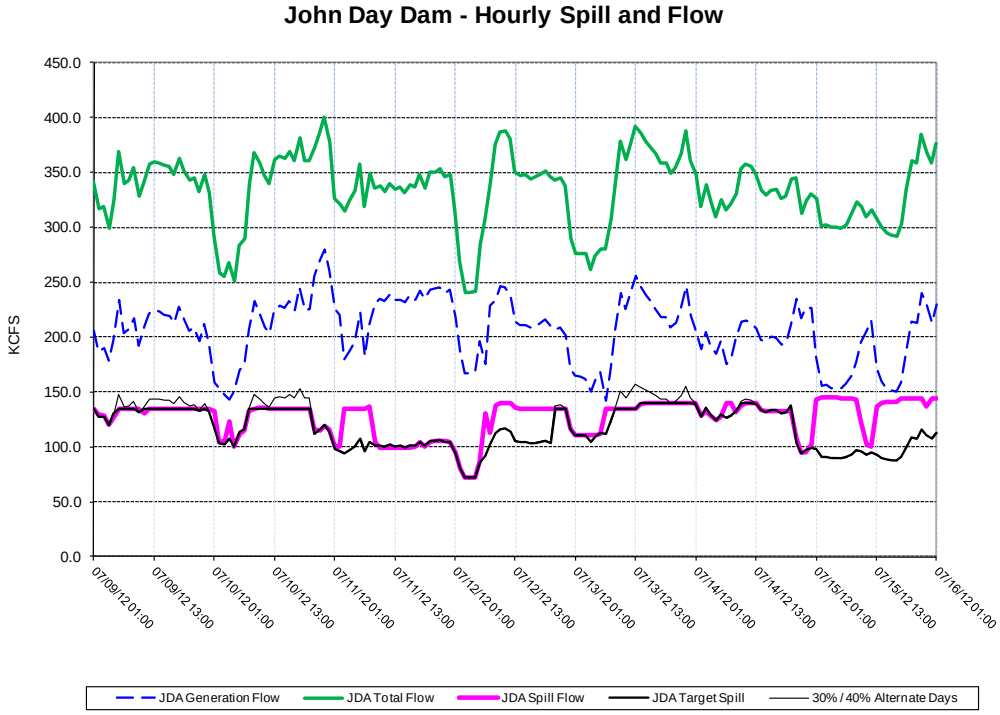
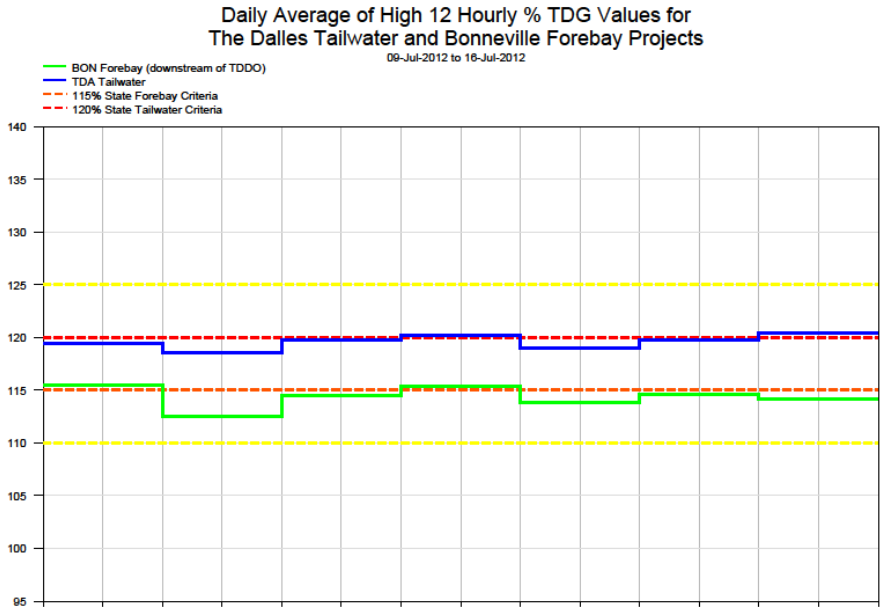

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/09/12 01:00
07/09/12 13:00
07/10/12 01:00
07/10/12 13:00
07/11/12 01:00
07/11/12 13:00
07/12/12 01:00
07/12/12 13:00
07/13/12 01:00
07/13/12 13:00
07/14/12 01:00
07/14/12 13:00
07/15/12 01:00
07/15/12 13:00
07/16/12 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% / 40% Alternate Days

Figure 15


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
09-Jul-2012 to 16-Jul-2012
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

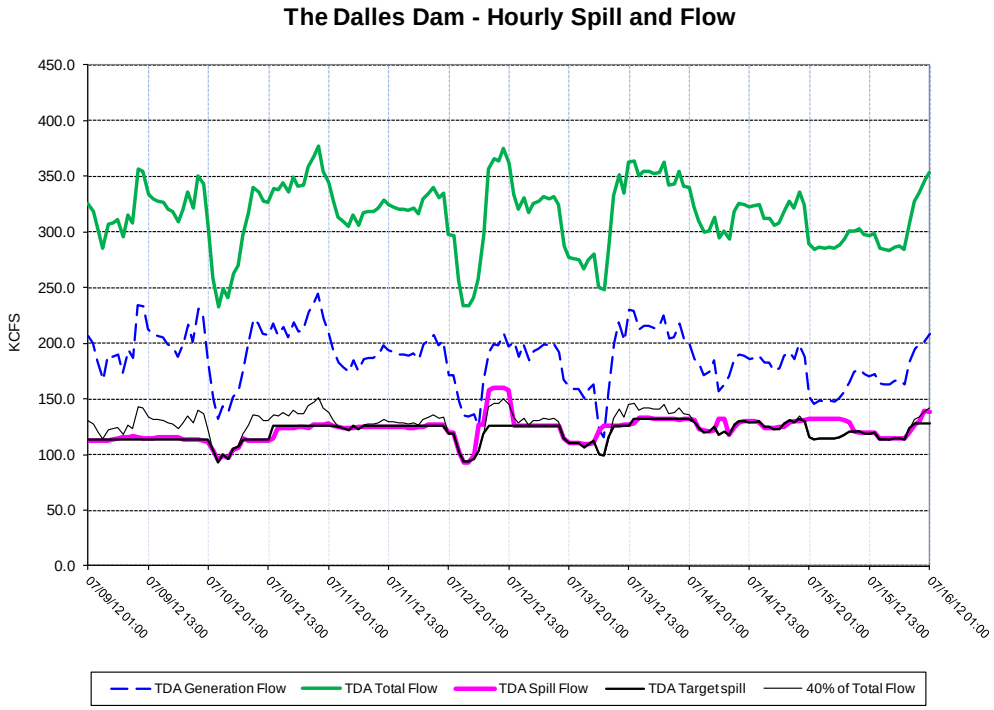
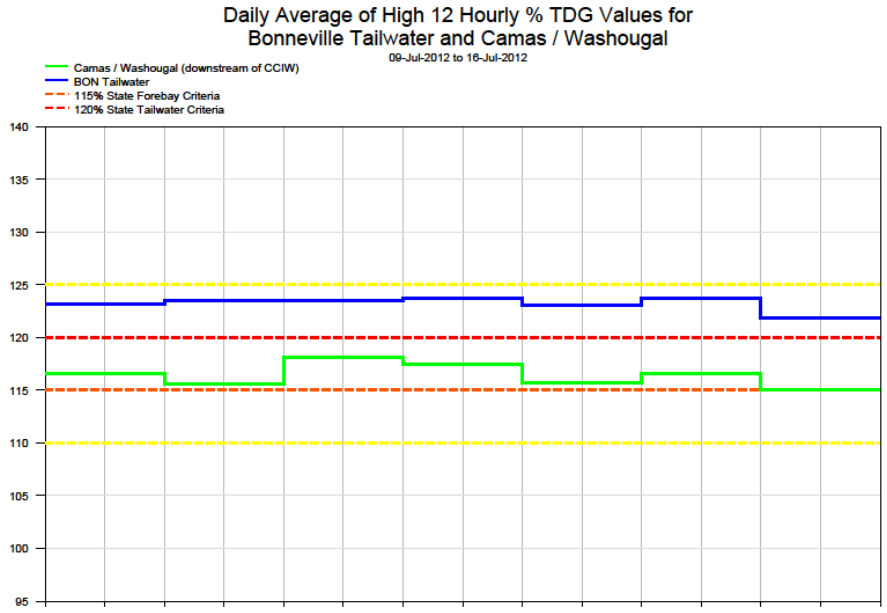

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/09/12 01:00
07/09/12 13:00
07/10/12 01:00
07/10/12 13:00
07/11/12 01:00
07/11/12 13:00
07/12/12 01:00
07/12/12 13:00
07/13/12 01:00
07/13/12 13:00
07/14/12 01:00
07/14/12 13:00
07/15/12 01:00
07/15/12 13:00
07/16/12 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 16


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
09-Jul-2012 to 16-Jul-2012
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

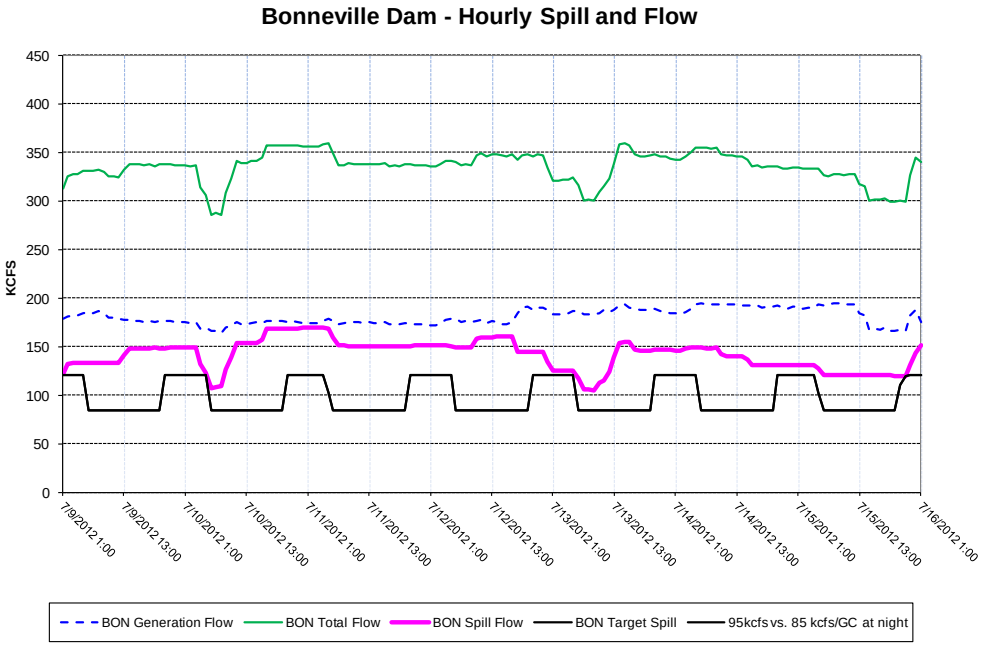
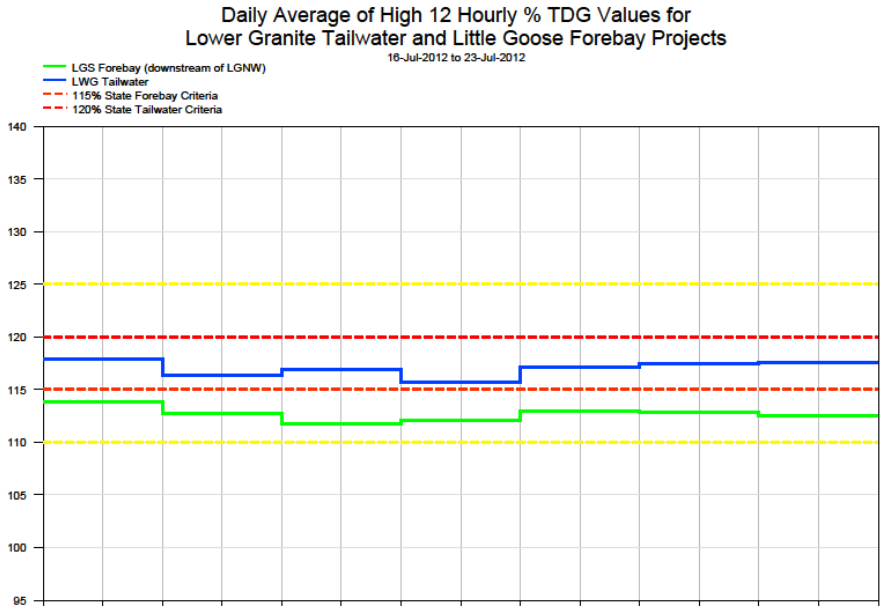

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
7/9/2012 1:00
7/9/2012 13:00
7/10/2012 1:00
7/10/2012 13:00
7/11/2012 1:00
7/11/2012 13:00
7/12/2012 1:00
7/12/2012 13:00
7/13/2012 1:00
7/13/2012 13:00
7/14/2012 1:00
7/14/2012 13:00
7/15/2012 1:00
7/15/2012 13:00
7/16/2012 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
95kcfs vs. 85 kcfs/GC at night

Figure 17


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
16-Jul-2012 to 23-Jul-2012
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

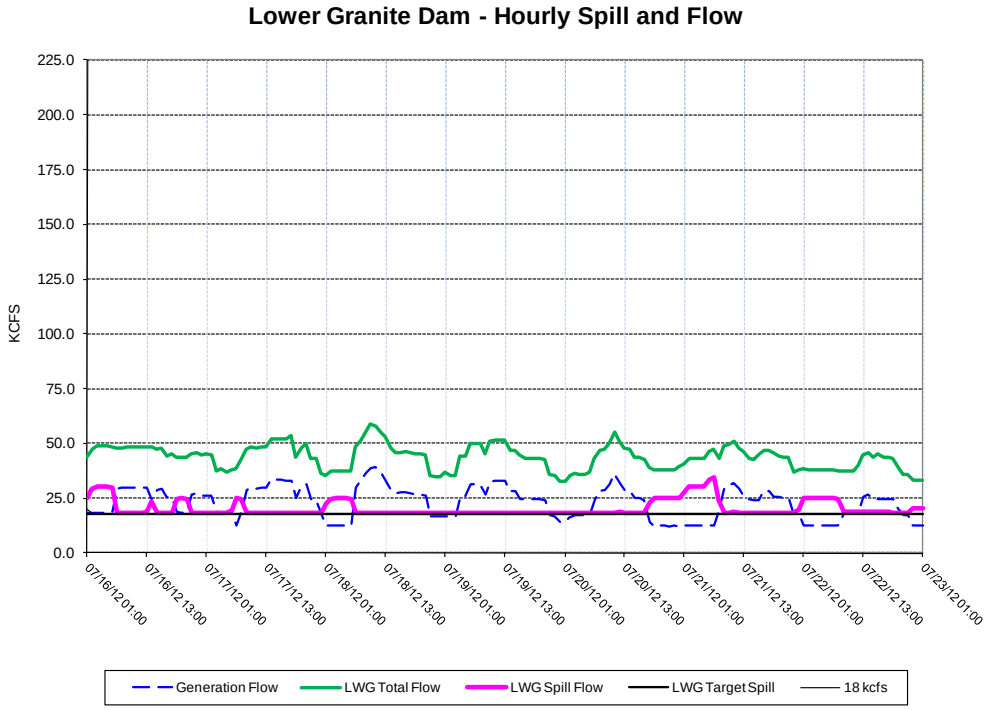
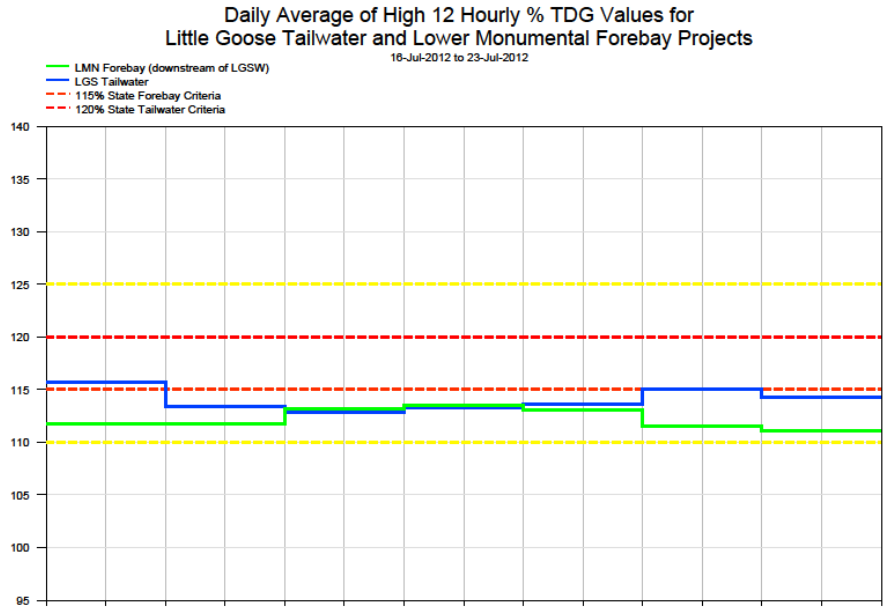

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/16/12 01:00
07/16/12 13:00
07/17/12 01:00
07/17/12 13:00
07/18/12 01:00
07/18/12 13:00
07/19/12 01:00
07/19/12 13:00
07/20/12 01:00
07/20/12 13:00
07/21/12 01:00
07/21/12 13:00
07/22/12 01:00
07/22/12 13:00
07/23/12 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
18 kcfs

Figure 18


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
16-Jul-2012 to 23-Jul-2012
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

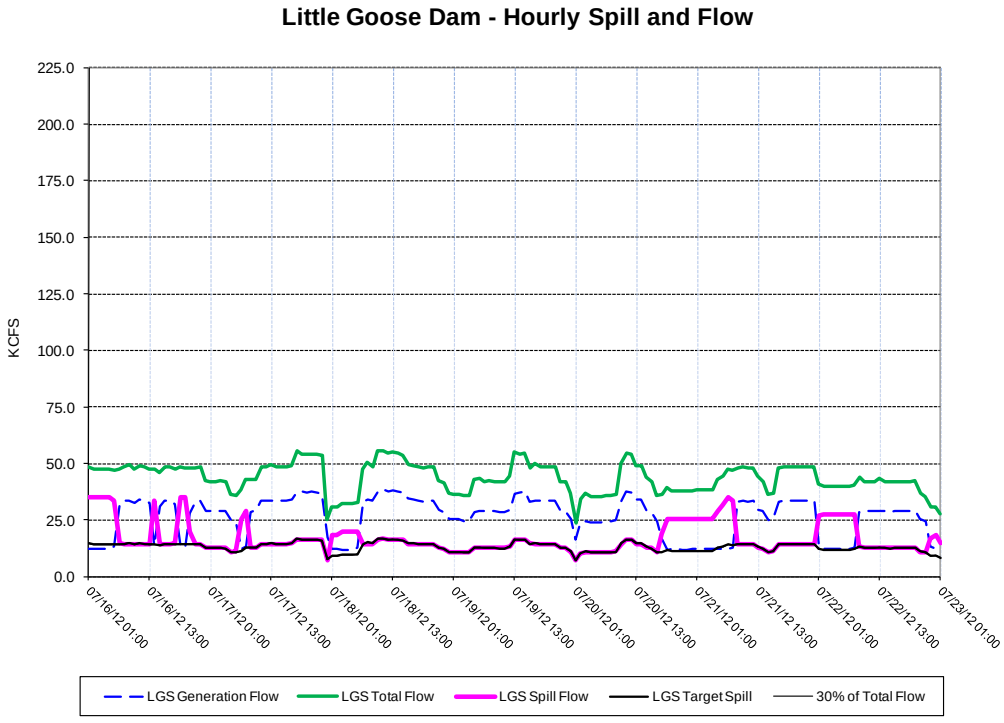
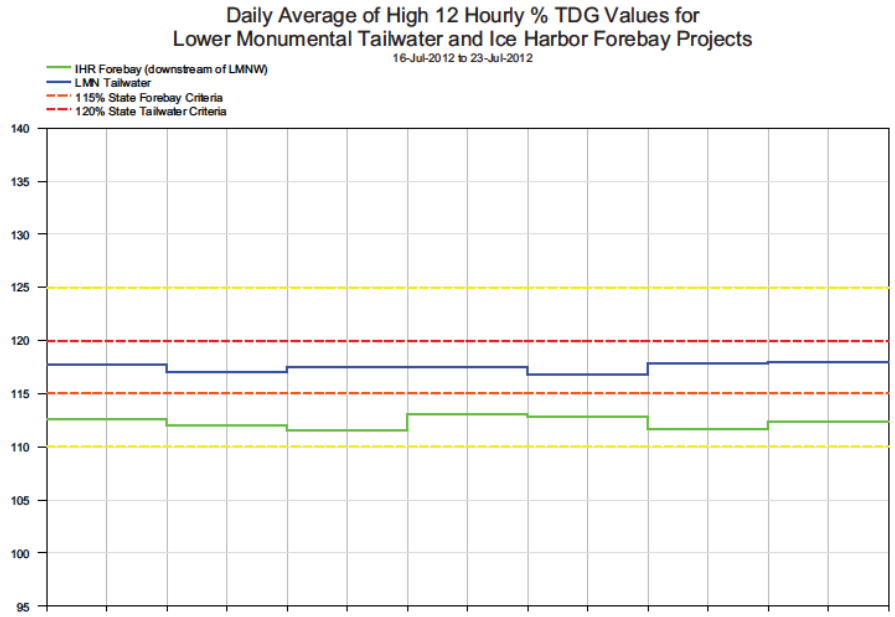

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/16/12 01:00
07/16/12 13:00
07/17/12 01:00
07/17/12 13:00
07/18/12 01:00
07/18/12 13:00
07/19/12 01:00
07/19/12 13:00
07/20/12 01:00
07/20/12 13:00
07/21/12 01:00
07/21/12 13:00
07/22/12 01:00
07/22/12 13:00
07/23/12 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 19


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
16-Jul-2012 to 23-Jul-2012
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

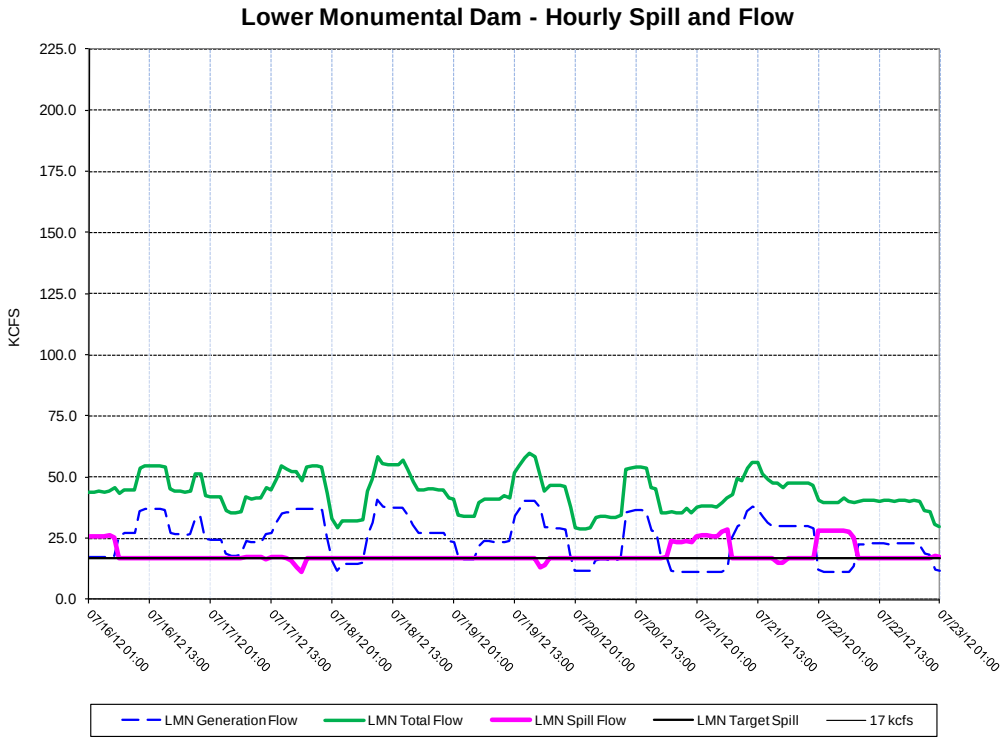
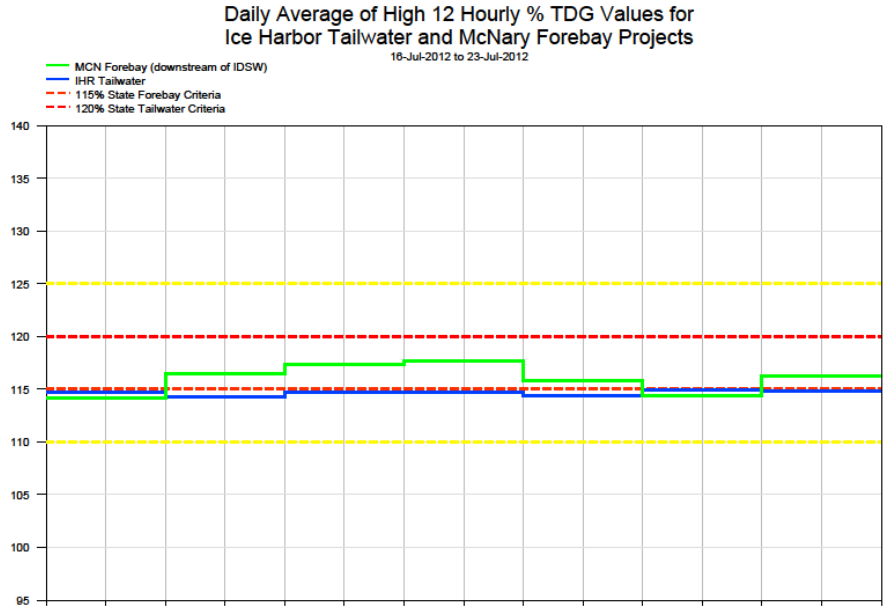

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/16/12 01:00
07/16/12 13:00
07/17/12 01:00
07/17/12 13:00
07/18/12 01:00
07/18/12 13:00
07/19/12 01:00
07/19/12 13:00
07/20/12 01:00
07/20/12 13:00
07/21/12 01:00
07/21/12 13:00
07/22/12 01:00
07/22/12 13:00
07/23/12 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
17 kcfs

Figure 20


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
16-Jul-2012 to 23-Jul-2012
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

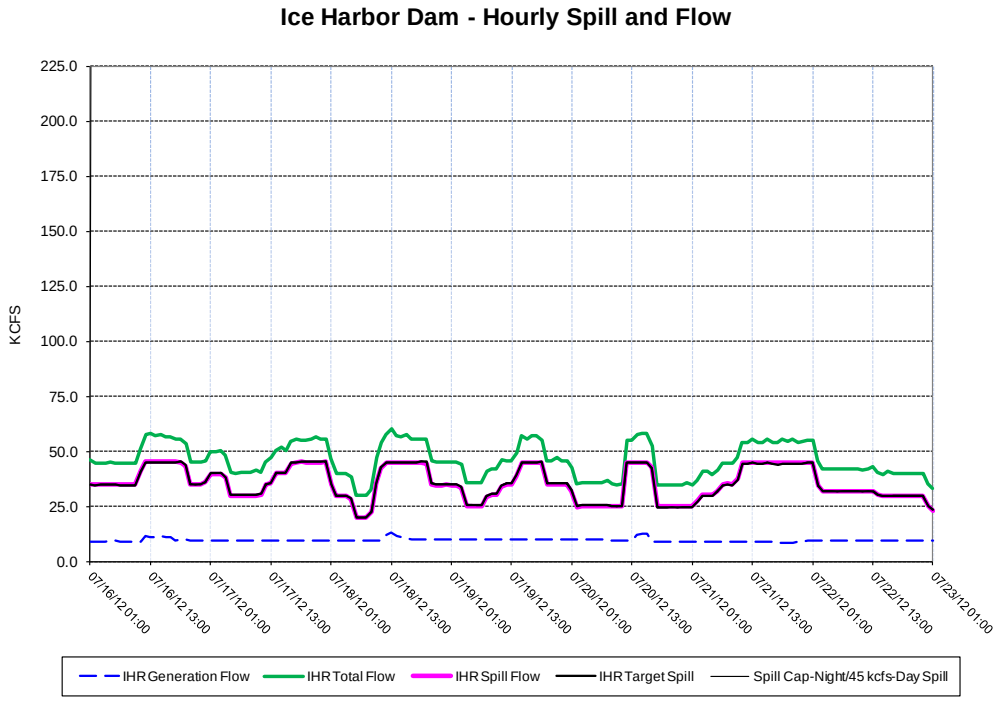
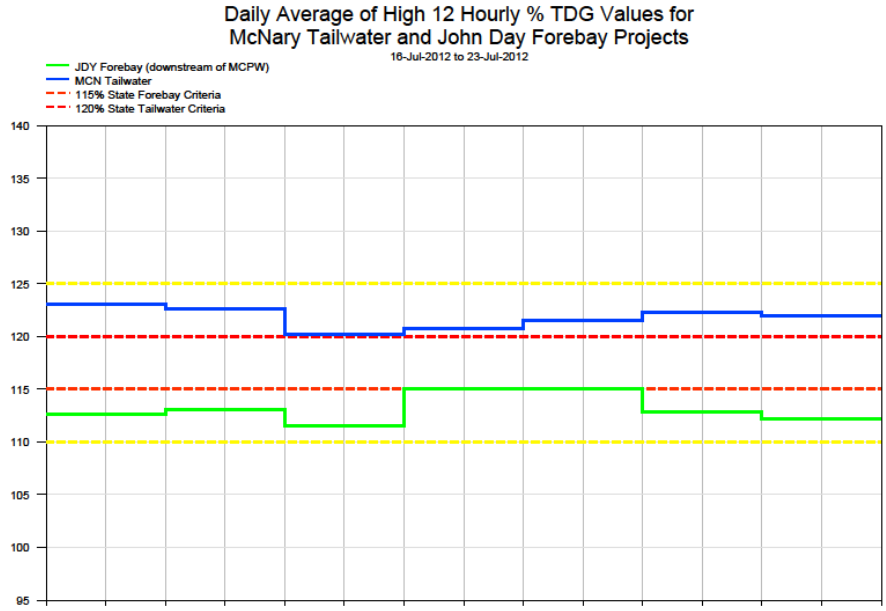

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/16/12 01:00
07/16/12 13:00
07/17/12 01:00
07/17/12 13:00
07/18/12 01:00
07/18/12 13:00
07/19/12 01:00
07/19/12 13:00
07/20/12 01:00
07/20/12 13:00
07/21/12 01:00
07/21/12 13:00
07/22/12 01:00
07/22/12 13:00
07/23/12 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
Spill Cap-Night/45 kcfs-Day Spill

Figure 21


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
16-Jul-2012 to 23-Jul-2012
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

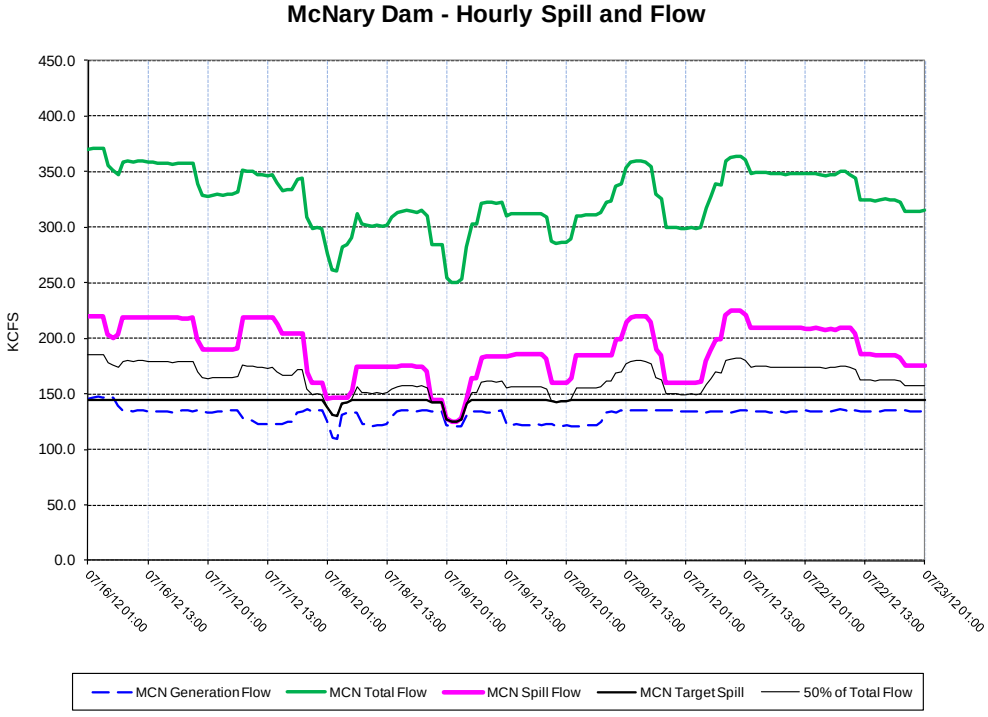
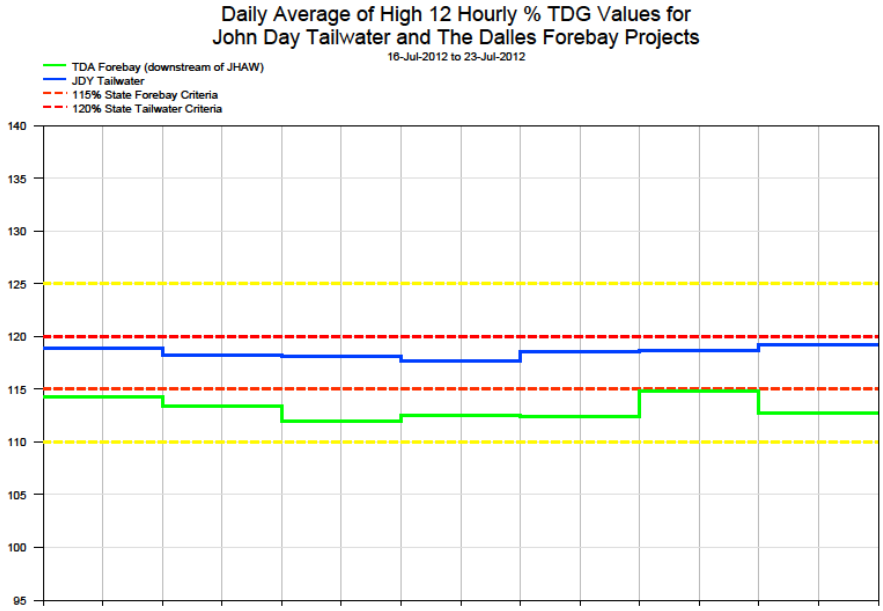

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/16/12 01:00
07/16/12 13:00
07/17/12 01:00
07/17/12 13:00
07/18/12 01:00
07/18/12 13:00
07/19/12 01:00
07/19/12 13:00
07/20/12 01:00
07/20/12 13:00
07/21/12 01:00
07/21/12 13:00
07/22/12 01:00
07/22/12 13:00
07/23/12 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
50% of Total Flow

Figure 22


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
16-Jul-2012 to 23-Jul-2012
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

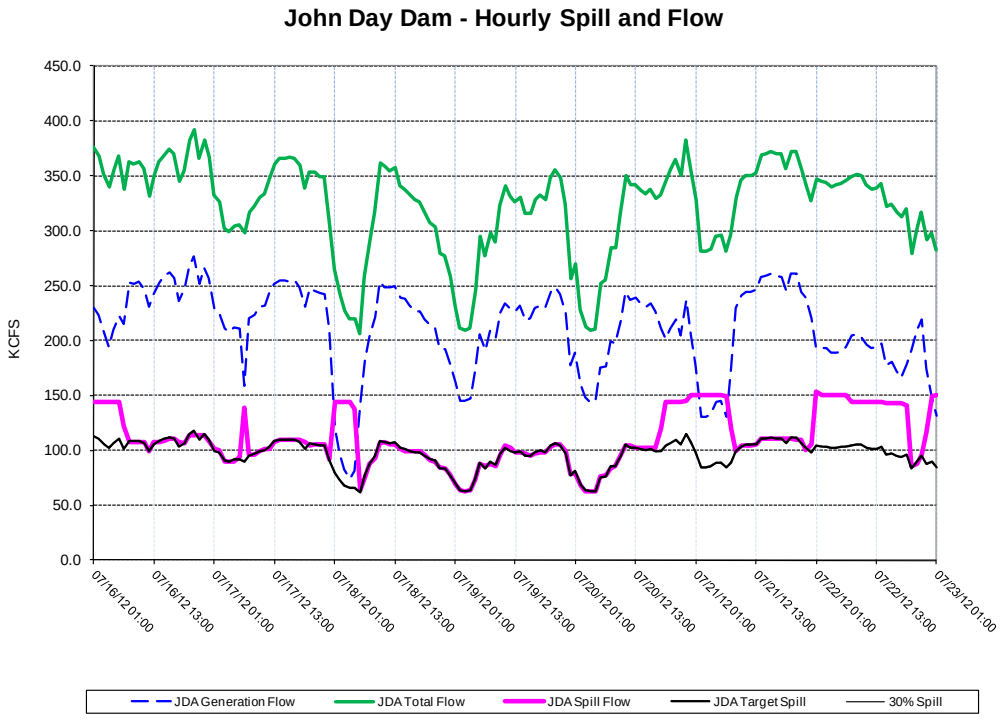
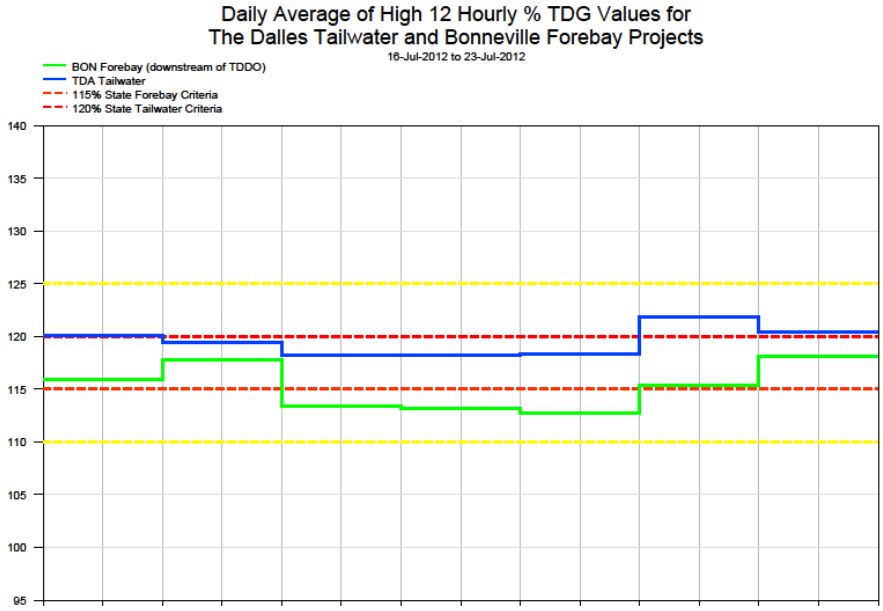

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/16/12 01:00
07/16/12 13:00
07/17/12 01:00
07/17/12 13:00
07/18/12 01:00
07/18/12 13:00
07/19/12 01:00
07/19/12 13:00
07/20/12 01:00
07/20/12 13:00
07/21/12 01:00
07/21/12 13:00
07/22/12 01:00
07/22/12 13:00
07/23/12 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% Spill

Figure 23


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
16-Jul-2012 to 23-Jul-2012
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

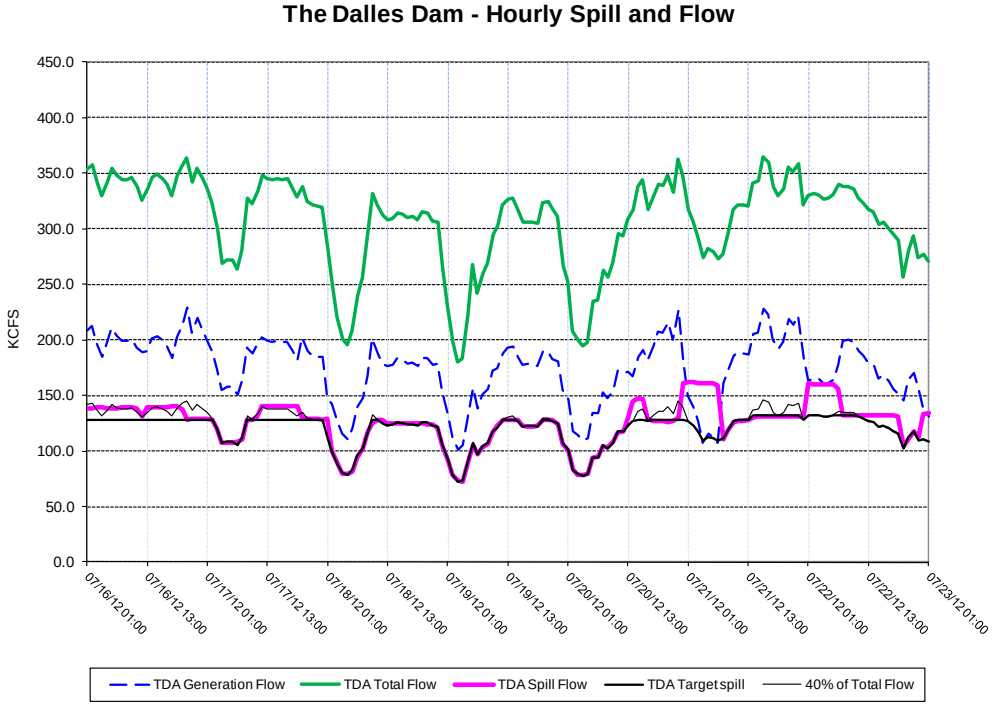
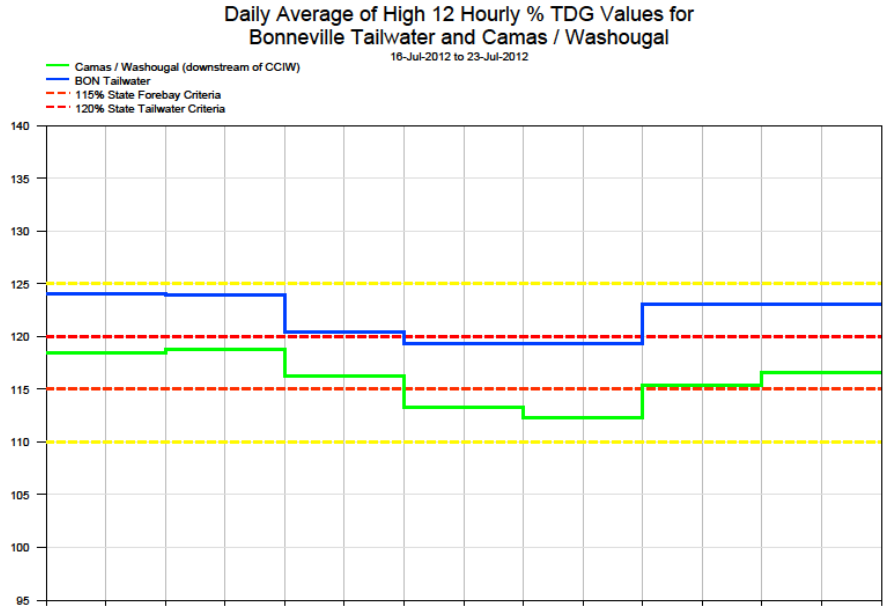

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/16/12 01:00
07/16/12 13:00
07/17/12 01:00
07/17/12 13:00
07/18/12 01:00
07/18/12 13:00
07/19/12 01:00
07/19/12 13:00
07/20/12 01:00
07/20/12 13:00
07/21/12 01:00
07/21/12 13:00
07/22/12 01:00
07/22/12 13:00
07/23/12 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 24


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
16-Jul-2012 to 23-Jul-2012
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

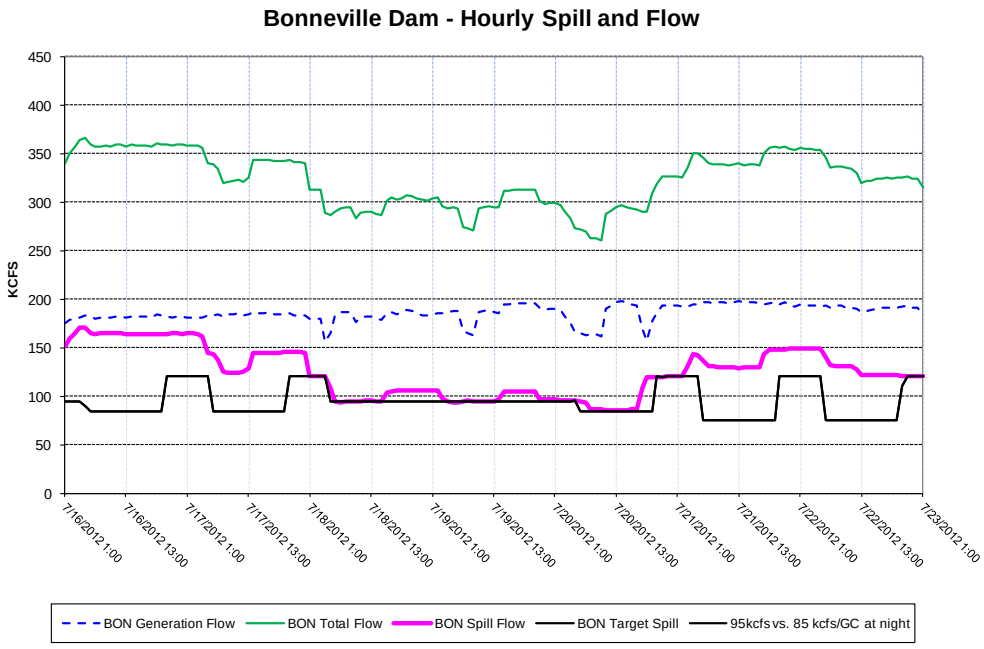
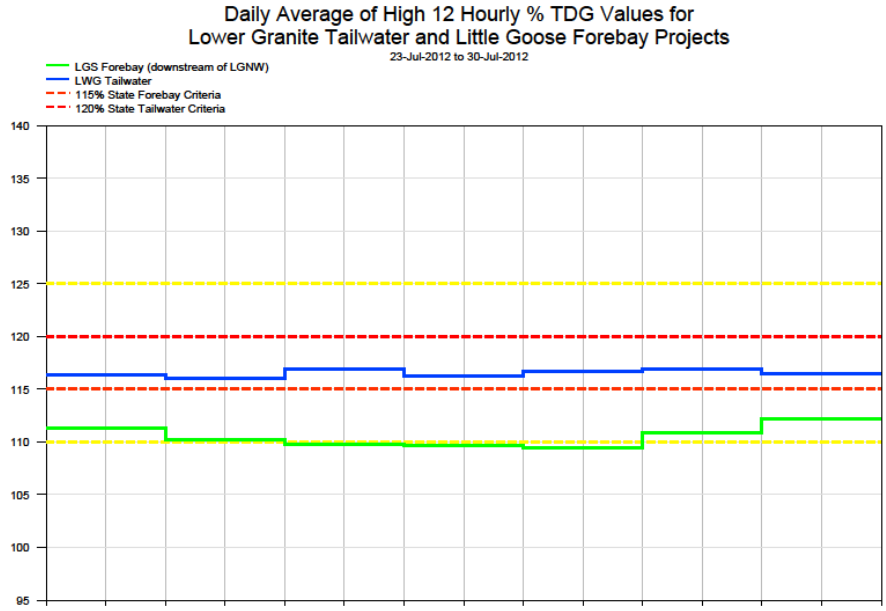

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
7/16/2012 1:00
7/16/2012 13:00
7/17/2012 1:00
7/17/2012 13:00
7/18/2012 1:00
7/18/2012 13:00
7/19/2012 1:00
7/19/2012 13:00
7/20/2012 1:00
7/20/2012 13:00
7/21/2012 1:00
7/21/2012 13:00
7/22/2012 1:00
7/22/2012 13:00
7/23/2012 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
95kcfs vs. 85 kcfs/GC at night

Figure 25


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
23-Jul-2012 to 30-Jul-2012
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

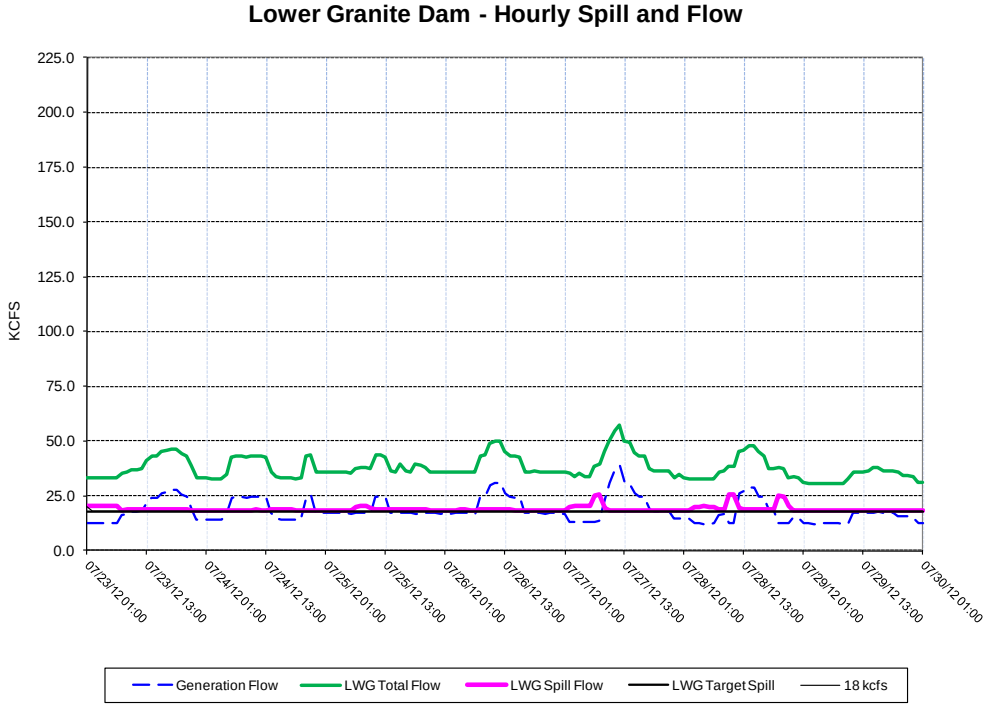
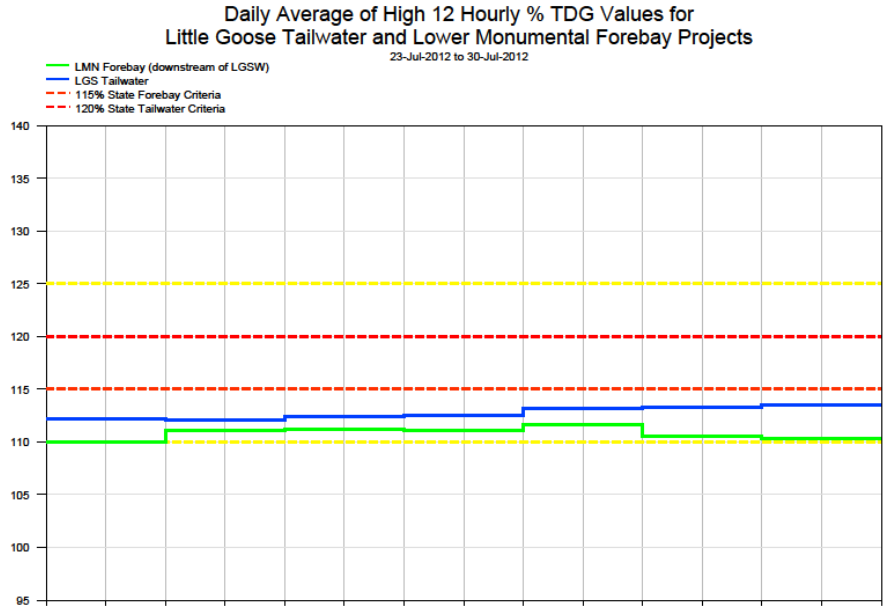

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/23/12 01:00
07/23/12 13:00
07/24/12 01:00
07/24/12 13:00
07/25/12 01:00
07/25/12 13:00
07/26/12 01:00
07/26/12 13:00
07/27/12 01:00
07/27/12 13:00
07/28/12 01:00
07/28/12 13:00
07/29/12 01:00
07/29/12 13:00
07/30/12 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
18 kcfs

Figure 26


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
23-Jul-2012 to 30-Jul-2012
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

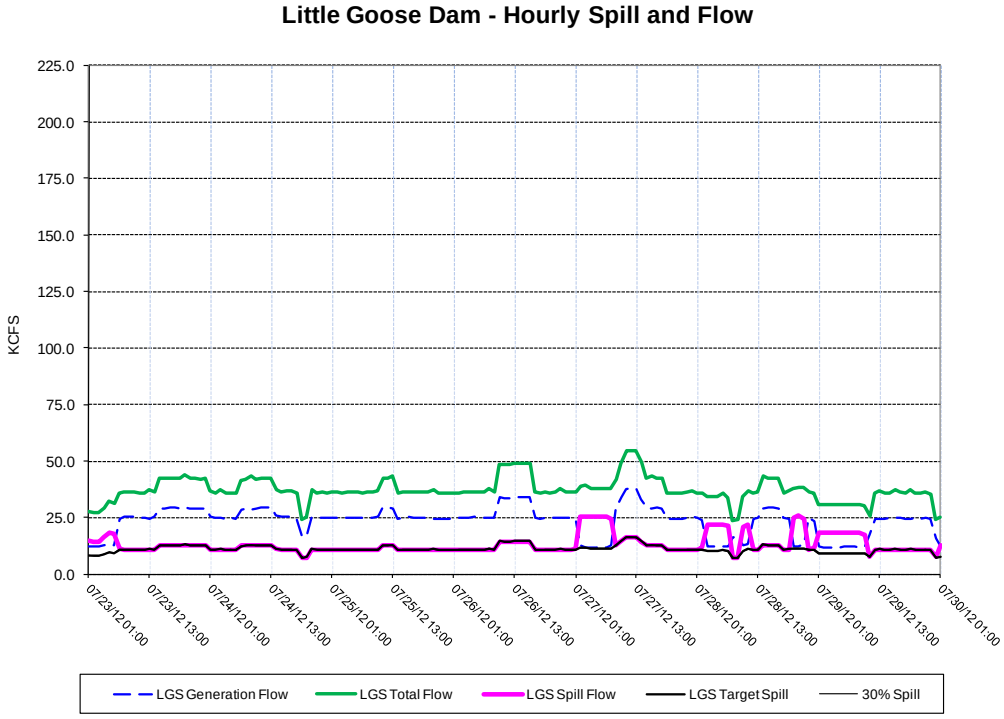
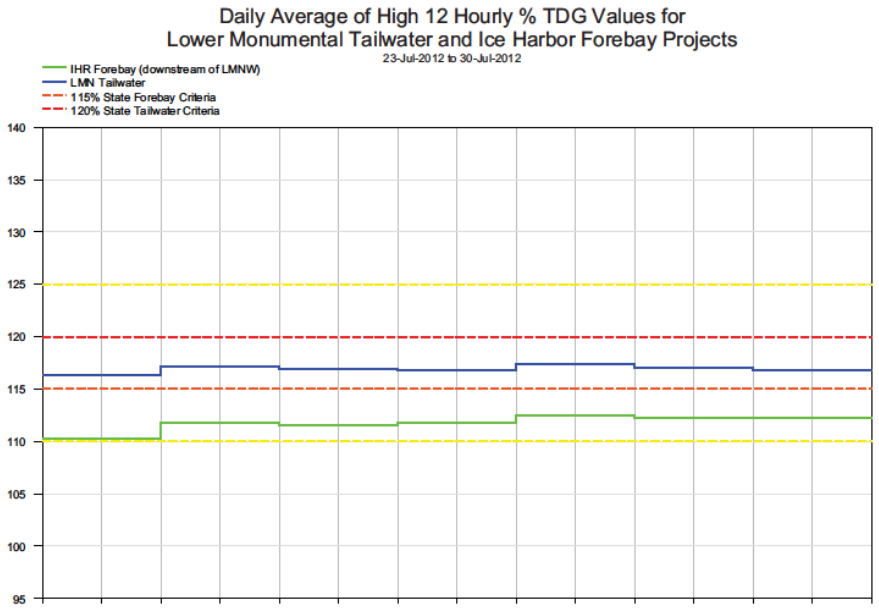

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/23/12 01:00
07/23/12 13:00
07/24/12 01:00
07/24/12 13:00
07/25/12 01:00
07/25/12 13:00
07/26/12 01:00
07/26/12 13:00
07/27/12 01:00
07/27/12 13:00
07/28/12 01:00
07/28/12 13:00
07/29/12 01:00
07/29/12 13:00
07/30/12 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% Spill

Figure 27


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
23-Jul-2012 to 30-Jul-2012
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

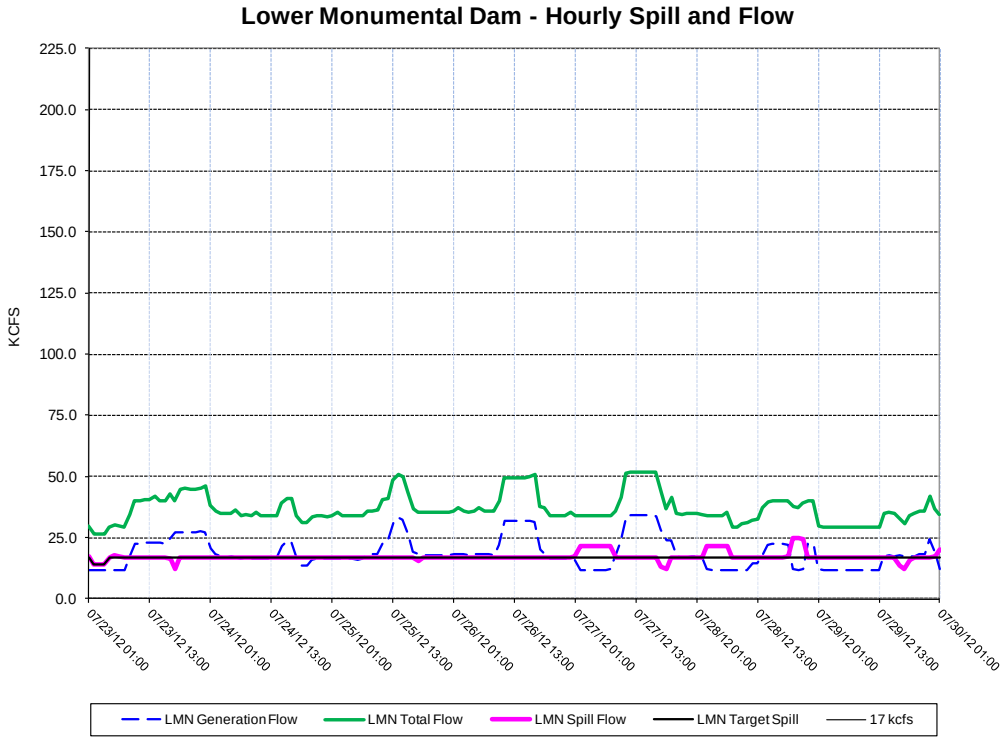
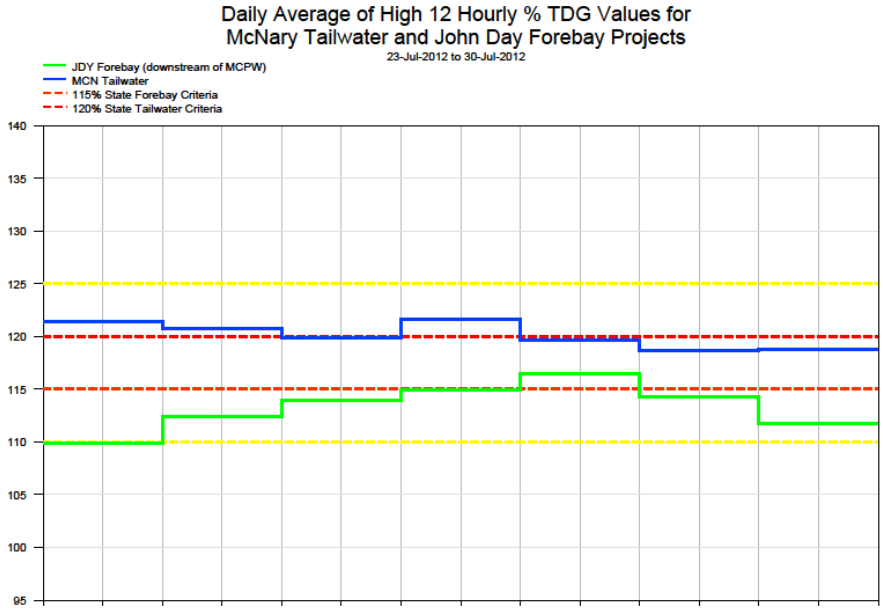

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/23/12 01:00
07/23/12 13:00
07/24/12 01:00
07/24/12 13:00
07/25/12 01:00
07/25/12 13:00
07/26/12 01:00
07/26/12 13:00
07/27/12 01:00
07/27/12 13:00
07/28/12 01:00
07/28/12 13:00
07/29/12 01:00
07/29/12 13:00
07/30/12 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
17 kcfs

Figure 28


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
23-Jul-2012 to 30-Jul-2012
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

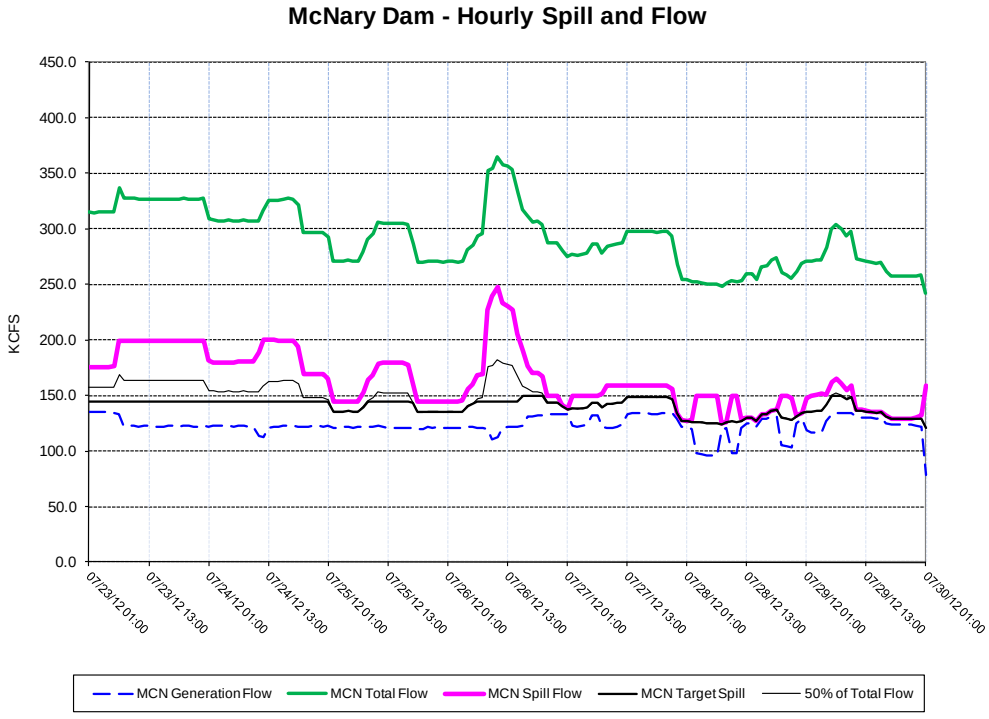
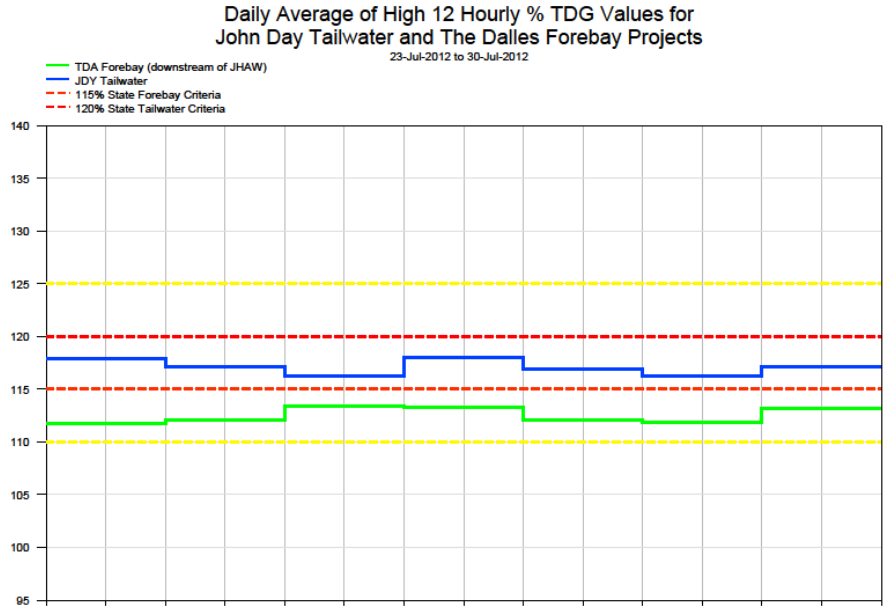

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/23/12 01:00
07/23/12 13:00
07/24/12 01:00
07/24/12 13:00
07/25/12 01:00
07/25/12 13:00
07/26/12 01:00
07/26/12 13:00
07/27/12 01:00
07/27/12 13:00
07/28/12 01:00
07/28/12 13:00
07/29/12 01:00
07/29/12 13:00
07/30/12 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
50% of Total Flow

Figure 29


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
23-Jul-2012 to 30-Jul-2012
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

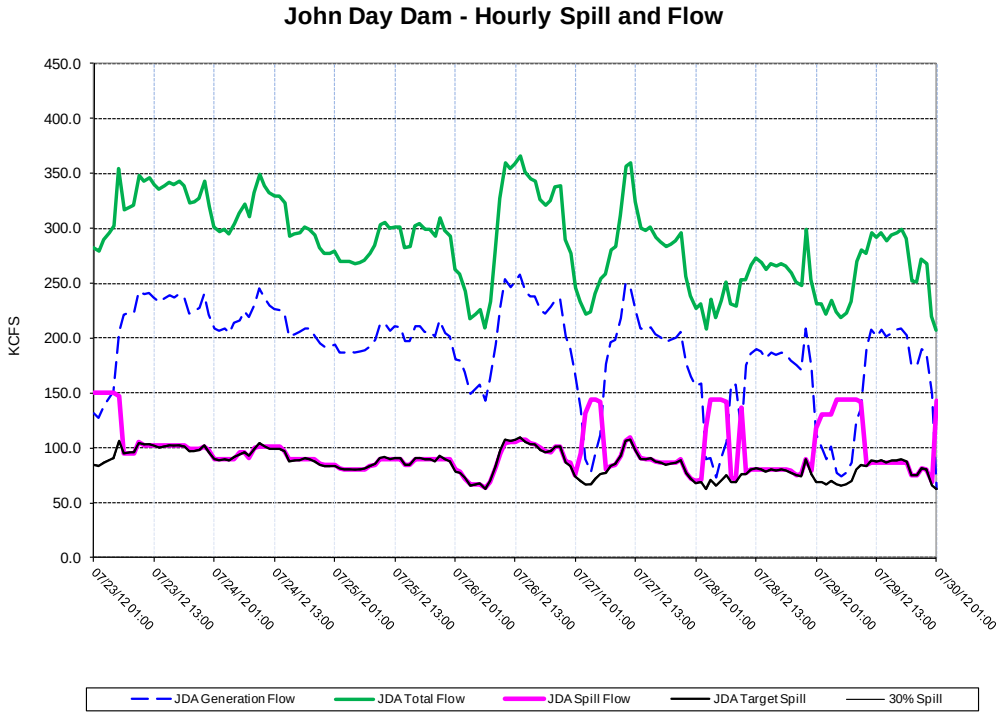
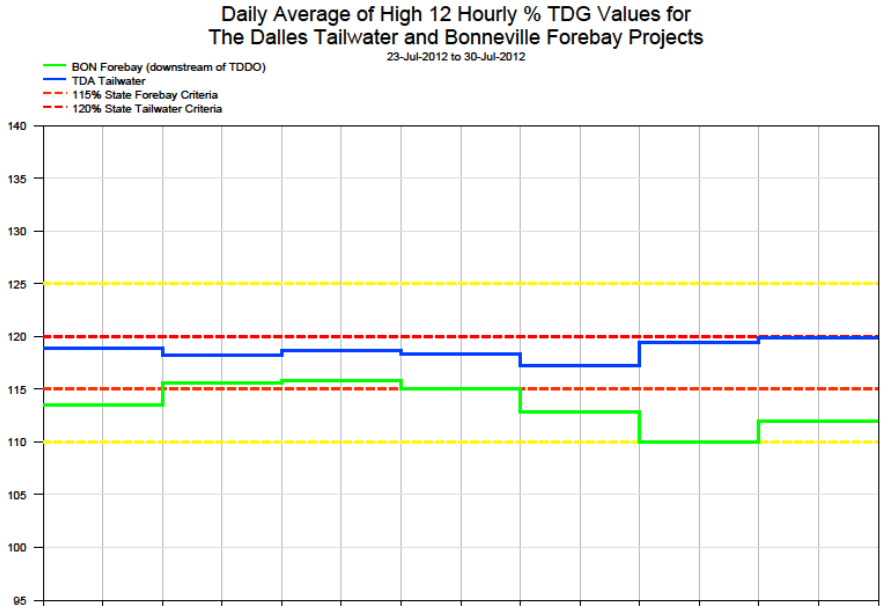

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/23/12 01:00
07/23/12 13:00
07/24/12 01:00
07/24/12 13:00
07/25/12 01:00
07/25/12 13:00
07/26/12 01:00
07/26/12 13:00
07/27/12 01:00
07/27/12 13:00
07/28/12 01:00
07/28/12 13:00
07/29/12 01:00
07/29/12 13:00
07/30/12 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% Spill

Figure 30


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
23-Jul-2012 to 30-Jul-2012
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

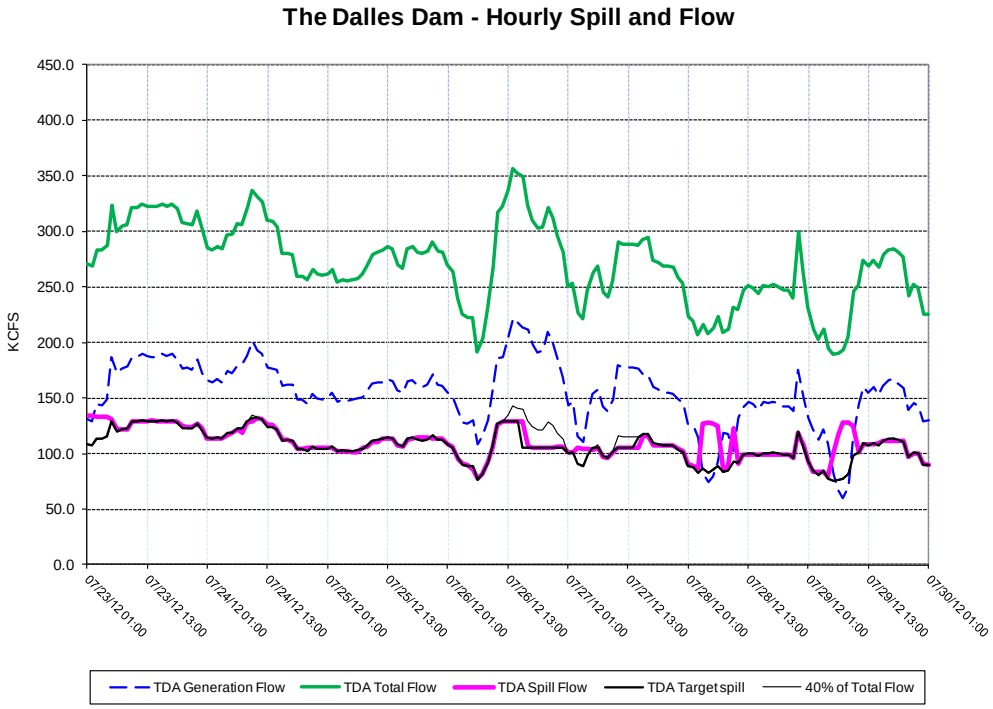
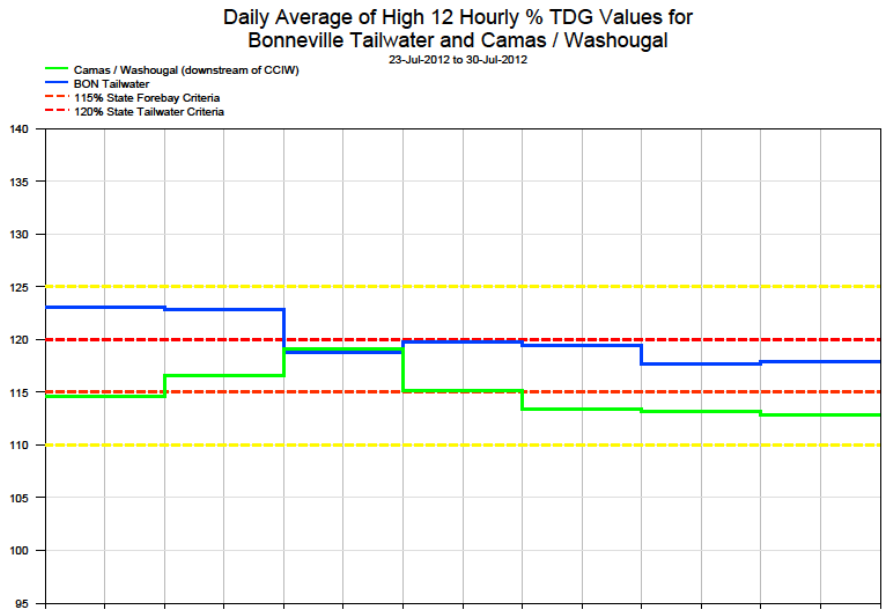
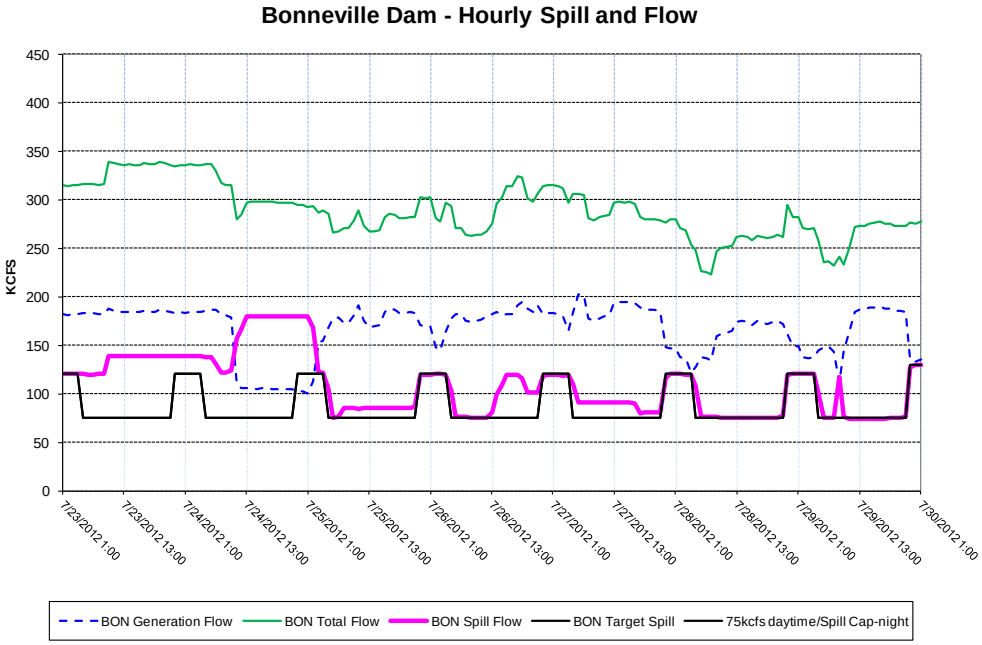

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/23/12 01:00
07/23/12 13:00
07/24/12 01:00
07/24/12 13:00
07/25/12 01:00
07/25/12 13:00
07/26/12 01:00
07/26/12 13:00
07/27/12 01:00
07/27/12 13:00
07/28/12 01:00
07/28/12 13:00
07/29/12 01:00
07/29/12 13:00
07/30/12 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 31


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
23-Jul-2012 to 30-Jul-2012
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95


Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
7/23/2012 1:00
7/23/2012 13:00
7/24/2012 1:00
7/24/2012 13:00
7/25/2012 1:00
7/25/2012 13:00
7/26/2012 1:00
7/26/2012 13:00
7/27/2012 1:00
7/27/2012 13:00
7/28/2012 1:00
7/28/2012 13:00
7/29/2012 1:00
7/29/2012 13:00
7/30/2012 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
75kcfs daytime/Spill Cap-night

Average Percent TDG for Highest 12-Hours: July 2 – July 29, 2012

Date	FIXED MONITORING STATIONS																
	LWG	LGNW	LGSA	LGSW	LMNA	LMNW	IHRA	IDSW	MCNA	MCPW	JDY	JHAW	TDA	TDDO	BON	CCIW	CWMW
7/2/2012	103.3	119.1	114.1	118.4	114.6	118.5	114.7	116.3	119.5	122.7	118.6	120.1	116.2	120.3	118.6	123.1	119.8
7/3/2012	102.5	117.4	113.5	116.8	114.6	117.7	114.2	114.5	117.3	122.2	116	119.1	113.8	118.4	115.5	124.2	116.8
7/4/2012	101.5	117.1	113.5	113.3	113.9	117.7	111.3	114.6	114.8	122.4	114.1	119.1	114.6	118.7	116.9	120.3	116.6
7/5/2012	101.8	116.9	113.4	115.3	113.4	117.6	111.1	113.6	118.4	121.9	115.1	119.5	115.6	118.7	117.4	124	118.3
7/6/2012	100.9	116.1	115.6	113.1	113.3	117.1	112.8	115.5	120.3	122	115.3	119.8	115.3	118.9	116.6	124.7	118.3
7/7/2012	101.5	115.2	115.9	113.2	113.8	117.1	113.7	114.5	121.2	120.4	118.3	118.1	115.7	119	116.4	122.8	117.8
7/8/2012	102.3	115.6	116.7	113.2	114.8	116.8	114.6	114.1	121.7	119.9	120.1	118	117	119.9	116.7	121	117.6
7/9/2012	103.3	116.1	117.2	113.5	114.1	116.4	115.2	114.2	120	122.4	120.3	119.4	117	119.4	115.4	123.3	116.5
7/10/2012	103.1	117.2	115.9	114.3	113.2	116.9	114.8	115.1	119.9	122.4	118.9	119.3	115.6	118.5	112.6	123.6	115.6
7/11/2012	102.6	116.2	115	114.4	113.1	117.6	114.5	114.4	120	122.2	117.6	118.6	116.3	119.7	114.5	123.7	118.1
7/12/2012	101.7	115.5	117.1	113.1	114	117.9	114.5	115.9	119.6	121.2	116.9	119.2	114.1	120.2	115.3	123.8	117.5
7/13/2012	102.4	116.6	115.5	113.9	114.4	117.5	114.7	115.1	118.8	122.4	116.6	119.3	114.3	119	113.8	123.2	115.7
7/14/2012	103.2	116.2	115.7	113.5	114.1	117.1	114.8	114.1	117.3	120.7	116.9	118.9	115	119.8	114.6	123.7	116.5
7/15/2012	103.3	119.4	115.1	116.3	113.4	117.1	114.3	114.7	116.7	121.1	115.7	119	113.8	120.4	114.2	121.9	115
7/16/2012	102.6	117.9	113.8	115.7	111.8	117.8	112.7	114.7	114.2	123	112.6	118.9	114.3	120	115.9	124.2	118.4
7/17/2012	102.3	116.3	112.7	113.4	111.7	117	112	114.3	116.4	122.6	113	118.2	113.4	119.4	117.8	124	118.7
7/18/2012	103.2	116.9	111.8	112.8	113.2	117.5	111.5	114.7	117.3	120.2	111.5	118.1	111.9	118.2	113.4	120.5	116.3
7/19/2012	103	115.7	112	113.2	113.5	117.5	113	114.7	117.6	120.8	115	117.7	112.5	118.2	113.2	119.4	113.3
7/20/2012	102.9	117.2	112.9	113.6	113.1	116.8	112.8	114.4	115.8	121.5	115	118.6	112.4	118.3	112.7	119.4	112.3
7/21/2012	102.8	117.5	112.8	115.1	111.5	117.8	111.7	114.9	114.4	122.3	112.9	118.7	114.8	121.9	115.3	123.2	115.4
7/22/2012	102.5	117.5	112.5	114.3	111.1	134.4	112.4	114.8	116.3	122	112.2	119.2	112.8	120.5	118.1	123.2	116.5
7/23/2012	101	116.4	111.3	112.1	110	135.1	110.2	114.2	114.8	121.4	109.8	117.9	111.7	118.9	113.5	123.1	114.6
7/24/2012	100.6	116	110.2	112.1	111.1	117.1	111.8	113.9	115.8	120.7	112.4	117.1	112	118.2	115.6	122.9	116.6
7/25/2012	101.9	116.9	109.7	112.4	111.2	116.9	111.5	114.2	118.8	119.9	113.9	116.2	113.4	118.7	115.8	118.8	119.1
7/26/2012	102.2	116.2	109.7	112.5	111.1	116.8	111.7	114.1	119.4	121.6	114.9	118	113.2	118.4	115	119.9	115.1
7/27/2012	102.2	116.7	109.5	113.1	111.7	117.3	112.5	114.4	118.7	119.6	116.5	116.9	112.1	117.2	112.8	119.6	113.3
7/28/2012	102.2	116.9	110.8	113.2	110.6	117	112.2	114.5	115.6	118.6	114.3	116.2	111.8	119.4	110	117.8	113.1
7/29/2012	102.8	116.5	112.2	113.5	110.3	116.8	112.3	113.5	113.8	118.8	111.8	117.1	113.2	119.9	111.9	118	112.8

Generated: Wed Aug 1 23:27:07 2012

Red text denotes exceedances.

• indicates no data due to malfunctioning gauge

- indicates gauge is out of service for winter

Dates run from hour 1 to 24 (not 0 to 23).

The gas caps shown only apply when spilling to facilitate juvenile fish passage ("voluntary spill") between April 3rd and August 31st. At all other times, the gas cap is 110%.

Total Dissolved Gas Monitoring Stations

Code	Station Name
LWG	Lower Granite Forebay
LGNW	Lower Granite Tailwater
LGSA	Little Goose Forebay
LGSW	Little Goose Tailwater
LMNA	Lower Monumental Forebay
LMNW	Lower Monumental Tailwater
IHRA	Ice Harbor Forebay
IDSW	Ice Harbor Tailwater
MCNA	McNary Forebay
MCPW	McNary Tailwater
JDY	John Day Forebay
JHAW	John Day Tailwater
TDA	The Dalles Forebay
TDDO	The Dalles Tailwater
BON	Bonneville Forebay
CCIW	Bonneville Tailwater (Cascade Island)
CWMW	Camas / Washougal

FISH OPERATIONS PLAN IMPLEMENTATION REPORT
August 2012

Submitted by the U.S. Army Corps of Engineers
Northwestern Division
Portland, OR

Introduction:

The U.S. Army Corps of Engineers (Corps) is submitting this report in accordance with the 2012 Fish Operations Plan (2012 FOP) submitted to the U.S. District Court of Oregon on March 9, 2012. The 2012 FOP describes the Corps' project operations for fish passage at its Federal Columbia River Power System (FCRPS) dams during the fish migration season, generally April through August. To the extent Corps project operations are not specified in the 2012 FOP, the FCRPS operations will be consistent with the 2010 NOAA Fisheries Supplemental Biological Opinion (2010 Supplemental BiOp), the USFWS 2000 and 2006 BiOps, and/or other operative documents, including the 2012 Water Management Plan (WMP), WMP seasonal updates, and the 2012 Fish Passage Plan (FPP).

The Corps' August 2012 lower Snake and Columbia River project and fish passage operations are contained in this report. In particular, information in this report includes the following:

- hourly flow through the powerhouse at each dam;
- hourly flow over the spillway compared to the spill target for that hour; and,
- resultant high 12-hour average percent Total Dissolved Gas (%TDG) levels in the tailrace at each project and in the subsequent downstream project's forebay and the Camas-Washougal gauge below Bonneville Dam.

This report also provides information on presented issues and unanticipated or emergency situations that arose during implementation of the 2012 FOP in August.

Data Reporting:

I. For each project providing fish passage operations, this report contains two graphs per operational week[1] in August displaying the performance of the spill program as follows:

(A) Daily Average of the High 12 Hourly %TDG Values - described in the upper graph.
(B) Hourly Spill and Generation Flows - described in the lower graph.

The weekly graphs begin on July 30 and end on September 2 for the following lower Snake River and lower Columbia River projects: Lower Granite, Little Goose, Lower Monumental, Ice Harbor, McNary, John Day, The Dalles, and Bonneville.

[1] Operations are implemented from Monday through Sunday.

Each figure represents one week of a project's operation. The graphs start at 0000 hours (%TDG graphs) and 0100 hours (flow/spill graphs) on July 30 for the lower Snake River and the lower Columbia River projects.

July 30 – August 5	Figures 1 – 8
August 6 – August 12	Figures 9 – 16
August 13 – August 19	Figures 17 – 24
August 20 – August 26	Figures 25 – 32
August 27 – September 2	Figures 33 - 40

A. Upper Graph: Shows the resultant daily average %TDG for the 12 highest hours. This is primarily a result of spill at dams. The objective is to operate each project up to the TDG limits without exceeding those limits to the extent practicable.

1. The blue line represents the %TDG in the tailrace of the dam. 120 percent TDG is the upper operating limit[2].
2. The green line represents the %TDG in the forebay of the next dam downstream. 115 percent TDG is the upper operating limit.

B. Lower Graph: Shows the hourly flow and spill at the dam.

- The dotted blue line shows the flow through the powerhouse each hour, in thousand cubic feet per second (kcfs).
- The medium green line represents the average hourly total river flow through the project in kcfs.
- The heavy pink line represents the average hourly flow through the spillway in kcfs.
- The thin black line represents the hourly spill level as defined in the 2012 FOP.
- The heavy black line represents the target spill. This is the hourly maximum spill level. The hourly target spill may vary as a function of total river flow, forebay elevation and generator capacity, subject to the following conditions:

    - spill percentage or flow rate specified in the 2012 FOP;
    - spill caps as set daily for TDG management;
    - test spill levels for fish passage research;
    - minimum generation for power system needs;
    - minimum spill at Bonneville (50 kcfs) dam;
    - minimum spill at John Day is 25 percent of project outflow.

II. A table is included at the end of the figures that lists the average daily %TDG for the 12 highest hours for all projects. The numbers in red indicate the project exceeded the %TDG gas cap - 115 percent (forebay of the next downstream dam) or 120 percent (tailwater) for each project.

[2] The Camas/Washougal tailwater TDG gauge was not operable due to a ruptured membrane on August 5 at 1400 and was returned to service on August 7 at 1100.

General Implementation Remarks:

For all projects that spill for fish passage, the target spill may be reduced due to various conditions as described below. When spill levels briefly deviate below or above the level specified in the 2012 FOP, the heavy pink line will be below or above the heavy black line in the graphs. Actual operation deviations from the target operation during voluntary spill hours are described below. The August 2012 Spill Variance Table includes average hourly data; therefore, while spill may vary from target spill for only a portion of an hour, the August 2012 Spill Variance Table characterizes the reduction as a full hour. There are instances when the hourly spill levels are not achievable due to mechanical limitations in setting spill gates to implement the regionally coordinated spill pattern. The project operator sets the spill gate stops to most closely approximate the 2012 FOP level of spill while also avoiding exceeding the %TDG spill cap to the extent practicable.

"Low flow" operations at the lower Columbia and Snake projects are triggered when inflow is insufficient to provide both minimum generation and the specified spill levels. In these situations, the projects operate at minimum generation and pass the remainder of project inflow as spill and through other miscellaneous routes, such as fish ladders, sluiceways, and navigation locks. As flows transition from higher flows to low flows, there may be situations when flows recede at a higher rate than forecasted. In addition, inflows provided by nonfederal projects upstream are variable and uncertain.

The combination of these factors may result in instances when unanticipated changes to inflow result in forebay elevations dropping to the low end of the Minimum Operating Pool (MOP). Since these projects have limited operating flexibility, maintaining minimum generation, MOP elevation, and the target spill may not be possible throughout every hour. During low flow periods at Little Goose Dam, the overall project spill percentage appears to be reduced because the calculations do not account for the volume of water released during navigational lockages; however, the actual spill volume remains constant. When these variances occur, they are recorded in the monthly Spill Variance Table for Little Goose under the variance type "Navigation."

Actual spill levels at Corps projects with set flow targets may vary up to ±2 kcfs (Bonneville Dam may range up to ±3 kcfs, 2012 FOP p. 19) compared to those specified in the 2012 FOP and the RCC spill priority list (defines the projects' %TDG spill caps). A number of factors influence actual spill, including hydraulic efficiency, exact gate opening calibration, spillway gate hoist cable stretch due to temperature changes, and forebay elevation (e.g., a higher forebay results in a greater volume of spill since more water can pass under the spill gate).

The 2012 FOP describes project "Operations during Rapid Load Changes" (p. 6). For reporting purposes, the notation "Transmission Stability" in the Spill Variance Report Table replaces "Rapid Load Changes," and identifies instances when hourly spill levels were not met as a result of load swing hours and other related within-hour load variability issues. "Transmission Stability" occurs because projects must be available to respond to within-hour load variability to satisfy North American Electric Reliability Corporation (NERC) reserve requirements ("on response"). In addition to within-hour load variability, projects on response must be responsive

to within hour changes resulting from intermittent generation (such as wind generation). During periods of rapidly changing loads and intermittent generation, projects on response may have significant changes in turbine discharge within the hour while spill quantity remains the same within the hour. Under normal conditions, within-hour load changes primarily occur immediately preceding and following the peak load hours; however, within-hour changes in intermittent generation can occur at any hour of the day. Occasionally, several hours after peak load hours, the project may be decreasing total outflow and generation faster than the corresponding spill decreases causing the percent spill to be slightly higher. Due to the high variability of within-hour load, reporting actual spill percentages that vary by more than the ±1 percent requirement (or other ranges specified in the 2012 FOP) may occur with greater frequency with "Transmission Stability" hours than other hours.

Occurrences requiring an adjustment in operations and/or regional coordination are described in greater detail in the "Operational Adjustments" section below.

August Operations:

The month of August was characterized by below average flows for the lower Snake River and above average flows for the lower Columbia River. Over the month, flows continued to recede, both on the lower Snake and the lower Columbia rivers. The NOAA Northwest River Forecast Center's Runoff Processor indicated August 2012 adjusted volume runoff was above the 30 year average (1971-2000): 9.15 MAF (million acre feet) or 108 percent of average as measured at The Dalles. The Runoff Processor also indicated August 2012 adjusted runoff was below the 30 year average (1971-2000): 1.02 MAF or 77 percent of average as measured at Lower Granite Dam. August is one of the driest precipitation months for the Columbia basin as a whole, but was exceptionally dry in 2012. The monthly precipitation summary for August was well below average at 18 percent on the Snake River above Ice Harbor Dam and also well below average, 25 percent, on the Columbia River above The Dalles Dam.

Involuntary spill occurred from July 30 through August 1 due to the need to carry systemwide reserves and/or lack of load. This involuntary spill did not result in the Daily Average of High 12 Hourly %TDG values exceeding the 115 percent forebay and 120 percent tailrace standards[3] which are shown in the corresponding %TDG graphs for the lower Snake and Columbia rivers.

During the August reporting period, the planned 2012 FOP spill operations were carried out as follows:

- Lower Granite Dam - The hourly target spill level was 18 kcfs 24-hours/day.
- Little Goose Dam - The hourly target spill level was 30 percent of total river flow 24-hours/day until August 6 when a constant spill level from 7 to 11 kcfs was implemented (FOP p. 6).
- Lower Monumental Dam - The hourly target spill level was 17 kcfs 24 hours/day.
- Ice Harbor Dam - The hourly target spill level was 45 kcfs daytime and the %TDG gas cap nighttime. Nighttime spill hours are 1800-0500.

[3] As provided for in the 2012 FOP (see p. 2-3).

- McNary Dam - The hourly target spill level was 50 percent of total river flow for 24-hours/day.
- John Day Dam - The hourly target spill level was 30 percent of total river flow for 24-hours/day.
- The Dalles Dam - The hourly target spill level was 40 percent of total river flow for 24-hours/day.
- Bonneville Dam - The hourly target spill level was 75 kcfs daytime and the %TDG gas cap nighttime.

Operational Adjustments

1. John Day Dam:

On August 13 from 1200 – 1415 hours, spill at John Day Dam (JDA) was reduced below the 2012 FOP level of 30%. This spill reduction occurred in order to provide safe tailrace hydraulic conditions for a Remotely Operated Vehicle (ROV) underwater survey of potential structural undermining at the north adult fish ladder entrance. During this operation, the average hourly spill percentages were: 10.6% (1200-1300 hours), 8.9% (1300-1400 hours) and 23.7% (1400-1500 hours). The project resumed normal spill operations at 1415 hours. The daily (24-hour) average spill percentage for August 13 was 27.7%. This operation was coordinated during the August 9 FPOM meeting and participants either supported or did not object to the operation.

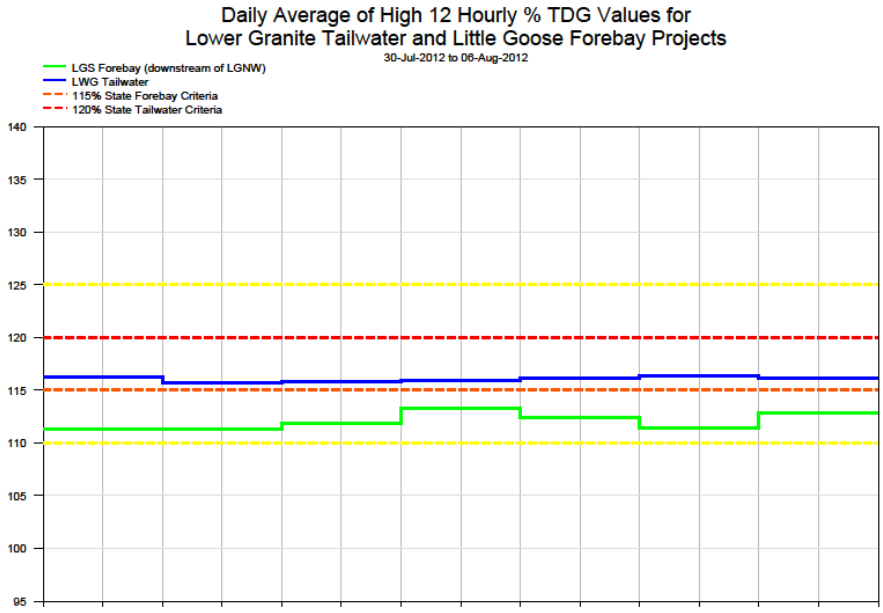
August 2012 Spill Variance Table

Table 1: August 2012 (7/30 - 8/31) - FOP Implementation Report Table

Project	Parameter	Date	Time	Hours	Type	Reason
Little Goose	Reduced % Spill	7/31/12	1300	1	Navigation	Hourly spill decreased to 28.5% (below 30 +/- 1%) due to volume of water needed to empty the navigation lock. (p. 3). 24 hr avg. spill was 32.9%.
Little Goose	Reduced % Spill	8/1/12	2400	1	Navigation	Hourly spill decreased to 28.9% (below 30 +/- 1%) due to volume of water needed to empty the navigation lock. (p. 3). 24 hr avg. spill was 30.2%.
Little Goose	Reduced % Spill	8/3/12	1100	1	Navigation	Hourly spill decreased to 28.9% (below 30 +/- 1%) due to volume of water needed to empty the navigation lock. (p. 3). 24 hr avg. spill was 29.9%.
Little Goose	Reduced % Spill	8/3/12	1800-1900	2	Navigation	Hourly spill decreased to 28.8% (below 30 +/- 1%) due to volume of water needed to empty the navigation lock. (p. 3). 24 hr avg. spill was 29.9%.
Little Goose	Reduced % Spill	8/4/12	1400	1	Navigation	Hourly spill decreased to 28.3% (below 30 +/- 1%) due to volume of water needed to empty the navigation lock. (p. 3). 24 hr avg. spill was 30.0%.
Little Goose	Reduced % Spill	8/5/12	1000	1	Navigation	Hourly spill decreased to 28.5% (below 30 +/- 1%) due to volume of water needed to empty the navigation lock. (p. 3). 24 hr avg. spill was 30.0%.
Little Goose	Additional Spill	8/30/12	1800	1	Maintenance	Hourly spill increased to 10.4 kcfs (above FOP spill of 7 kcfs) while generation decreased to speed no load for testing after annual maintenance. 24 hr avg. spill was 30.2%.
Lower Monumental	Additional Spill	7/30/12	1000-1800	9	Maintenance	Hourly spill increased to 34.8 kcfs (above FOP spill of 17 kcfs) while generation decreased to speed no load for testing after annual maintenance.
Lower Monumental	Reduced Spill	8/2/12	1800-1900	2	Navigation	Hourly spill decreased to 11.2 kcfs (below FOP spill of 17 kcfs). Reduced spill for safe passage of fish barge.
Lower Monumental	Additional Spill	8/3/12	1900-2000	2	Maintenance	Hourly spill increased to 22.5 kcfs (above FOP spill of 17 kcfs) while generation decreased to speed no load for testing after annual maintenance.
Lower Monumental	Reduced Spill	8/4/12	1900	1	Navigation	Hourly spill decreased to 13.4 kcfs (below FOP spill of 17 kcfs). Reduced spill for safe passage of fish barge.
Lower Monumental	Reduced Spill	8/8/12	1400	1	Operational Limitation	Generated 14.0 kcfs, outside of FOP minimum generation range (11.3-13.1 kcfs) to push fish out prior to unit maintenance. Spill was 10.9 kcfs rather than between 12.4 to 14.2 kcfs.

Ice Harbor	Reduced Spill	8/3/12	0900-1000	2	Human/ Program Error	Generated between 11.0-13.3 kcfs, outside of minimum generation range (8.5-10.3 kcfs for units 1&3). Request to exceed minimum generation levels was corrected as soon as identified.
Ice Harbor	Reduced Spill	8/16/12-8/17/12	2200-0100	4	Operational Limitation	Generated between 11.2-11.9 kcfs, outside of minimum generation range (8.5-10.3 kcfs for units 1&3). STS fish screen on unit 1 malfunctioned requiring use of unit 22 which has a higher minimum generation flow requirement while screen was repaired.
Ice Harbor	Reduced Spill	8/20/12	1400-1600	3	Operational Limitation	Generated between 11.0-11.9 kcfs, outside of minimum generation range (8.5-10.3 kcfs for units 1&3). Fish screen maintenance on unit 1 requiring use of unit 22 which has a higher minimum generation flow requirement.
John Day	Additional % Spill	8/7/12	2300	1	Transmission Stability	Hourly spill increased to 31.2% (above 30% ± 1.0% range). On response during rapidly changing load and/or intermittent generation. (p. 3-4). 24 hr avg. spill was 30.0%.
John Day	Reduced % Spill	8/13/12	1300-1500	3	Maintenance	Hourly spill decreased between 8.9 to 23.7 % (below 30% ± 1.0% range) due to divers repairing fish pumps. 24 hr avg. spill was 28.0%.
John Day	Reduced % Spill	8/23/12	1300	1	Transmission Stability	Hourly spill decreased to 28.7% (below 30% ± 1.0% range). On response during rapid changing load and/or intermittent generation. (p. 3-4). 24 hr avg. spill was 30.0%.
John Day	Additional % Spill	8/27/12	1500	1	Transmission Stability	Hourly spill increased to 31.1% (above 30% ± 1.0% range). On response during intermittent generation. (p. 3-4). 24 hr avg. spill was 30.1%.
The Dalles	Additional % Spill	8/19/12	2400	1	Transmission Stability	Hourly spill increased to 41.4% (above 40% ± 1.0% range). On response during intermittent generation. (p. 3-4). 24 hr avg. spill was 40.1%.
The Dalles	Reduced % Spill	8/25/12	1400	1	Transmission Stability	Hourly spill decreased to 38.8% (below 40% ± 1.0% range). On response during rapid changing load and/or intermittent generation. (p. 3-4 0. 24 hr avg. spill was 40.0%.
The Dalles	Reduced % Spill	8/31/12	1300	1	Transmission Stability	Hourly spill decreased to 38.9% (below 40% ± 1.0% range). On response during rapid changing load and/or intermittent generation. (p. 3-4). 24 hr avg. spill was 40.0%.
The Dalles	Reduced % Spill	8/31/12	1800	1	Transmission Stability	Hourly spill decreased to 38.8% (below 40% ± 1.0% range). On response during rapid changing load and/or intermittent generation. (p. 3-4). 24 hr avg. spill was 40.0%.

Figure 1


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
30-Jul-2012 to 06-Aug-2012
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

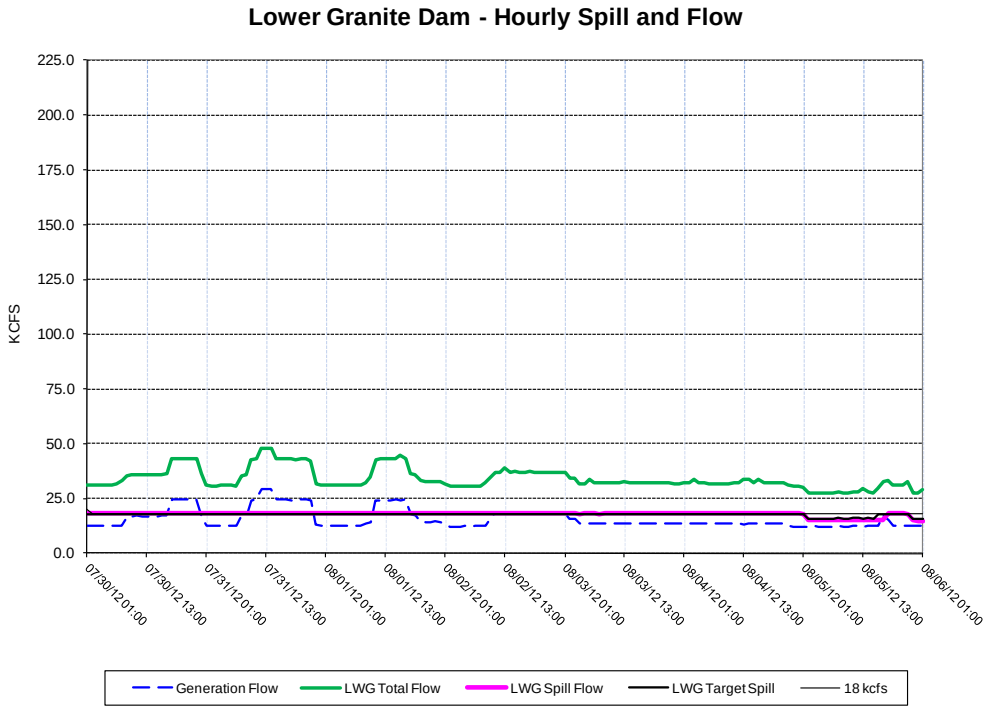
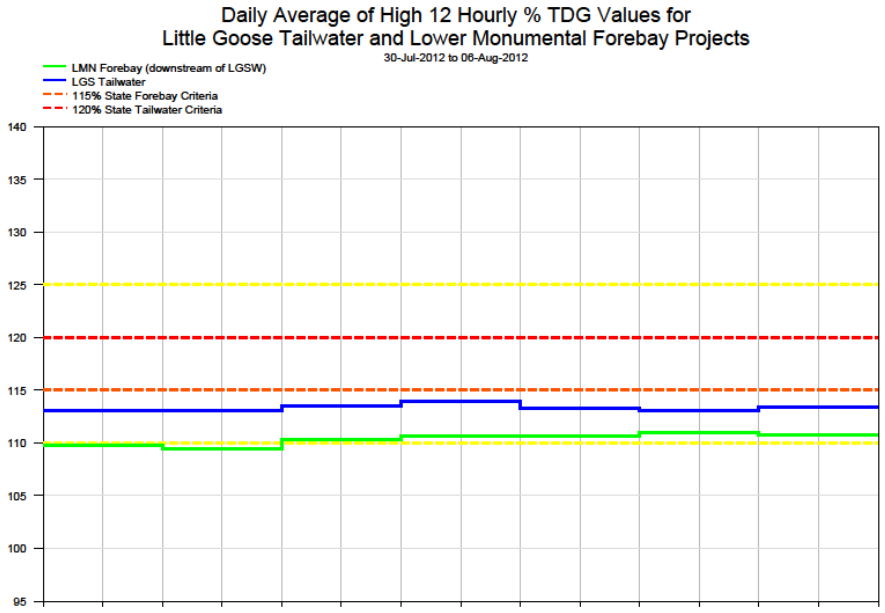

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/30/12 01:00
07/30/12 13:00
07/31/12 01:00
07/31/12 13:00
08/01/12 01:00
08/01/12 13:00
08/02/12 01:00
08/02/12 13:00
08/03/12 01:00
08/03/12 13:00
08/04/12 01:00
08/04/12 13:00
08/05/12 01:00
08/05/12 13:00
08/06/12 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
18 kcfs

Figure 2


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
30-Jul-2012 to 06-Aug-2012
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

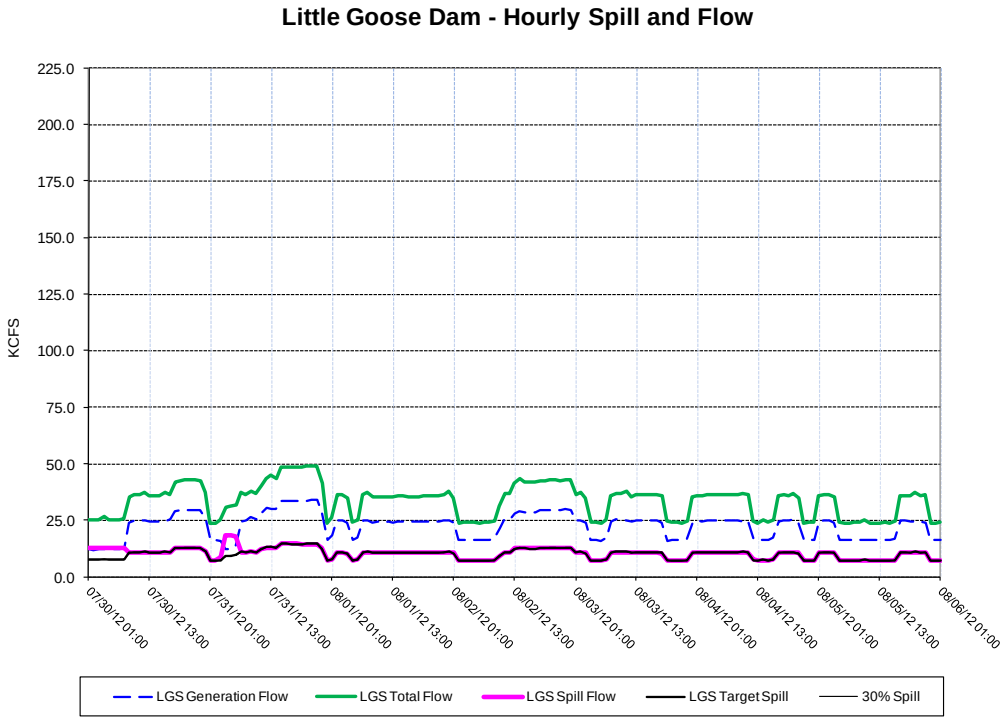
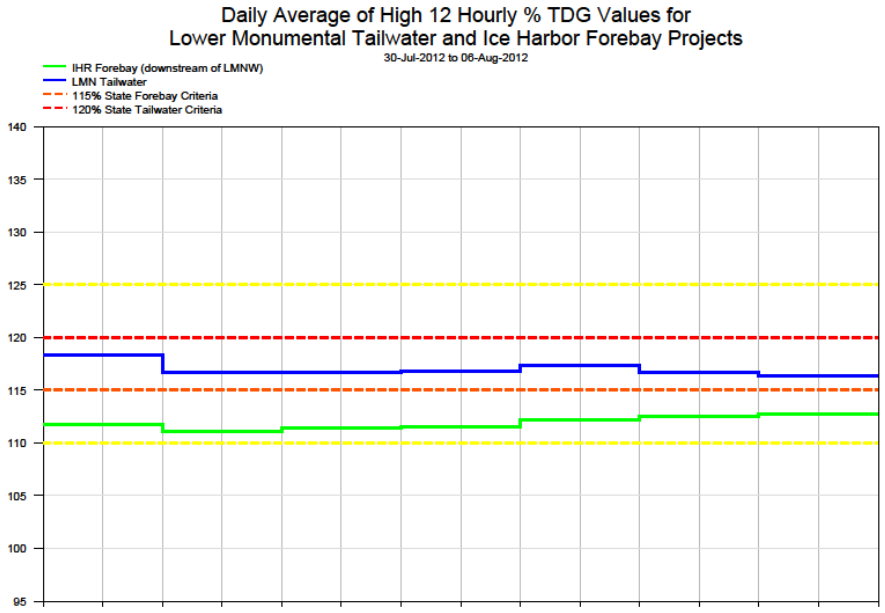

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/30/12 01:00
07/30/12 13:00
07/31/12 01:00
07/31/12 13:00
08/01/12 01:00
08/01/12 13:00
08/02/12 01:00
08/02/12 13:00
08/03/12 01:00
08/03/12 13:00
08/04/12 01:00
08/04/12 13:00
08/05/12 01:00
08/05/12 13:00
08/06/12 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
30% Spill

Figure 3


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
30-Jul-2012 to 06-Aug-2012
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

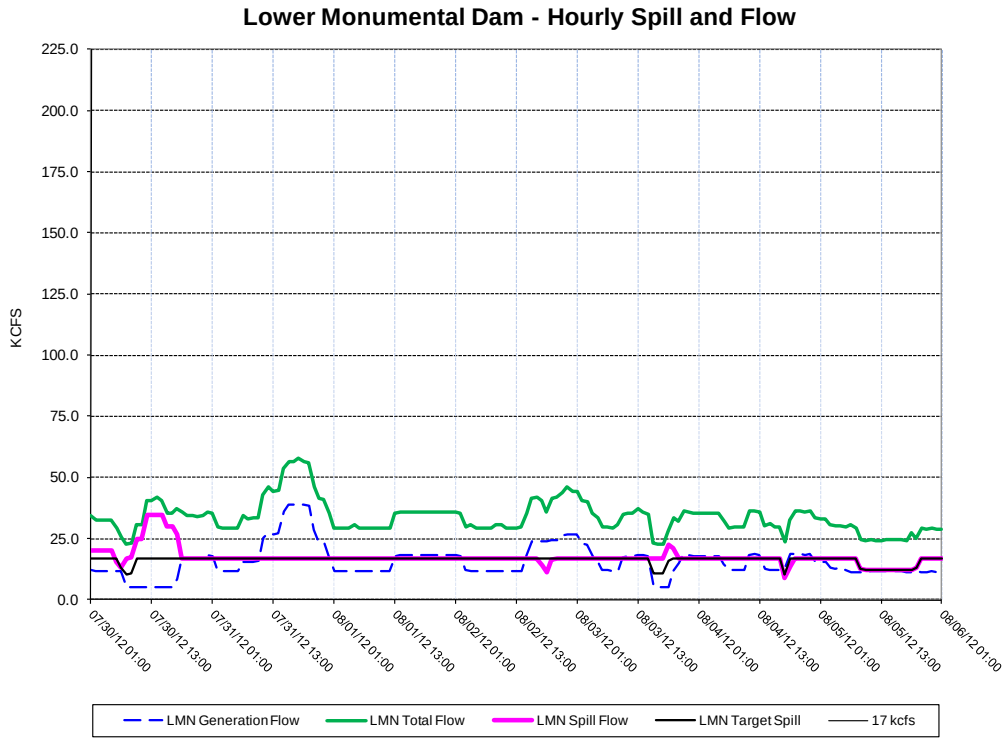
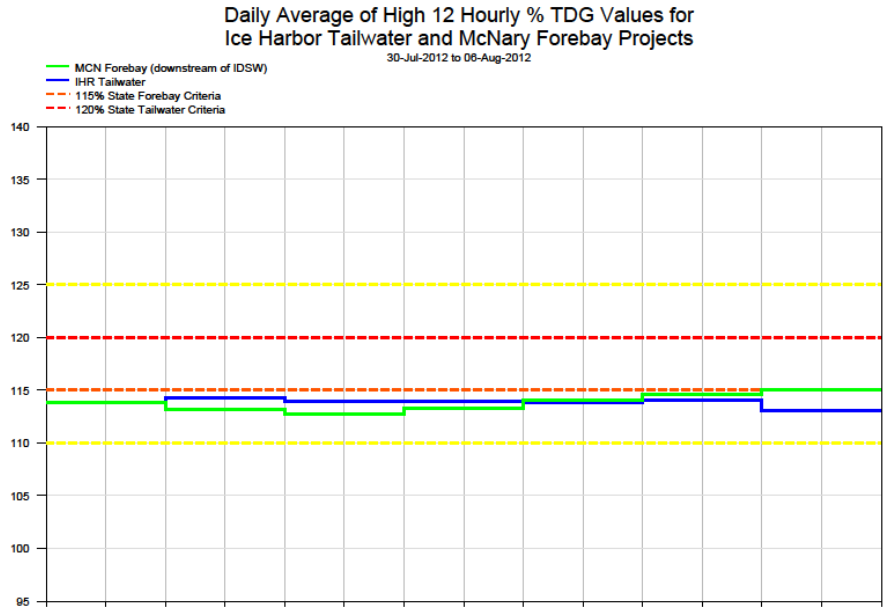

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/30/12 01:00
07/30/12 13:00
07/31/12 01:00
07/31/12 13:00
08/01/12 01:00
08/01/12 13:00
08/02/12 01:00
08/02/12 13:00
08/03/12 01:00
08/03/12 13:00
08/04/12 01:00
08/04/12 13:00
08/05/12 01:00
08/05/12 13:00
08/06/12 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
17 kcfs

Figure 4


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
30-Jul-2012 to 06-Aug-2012
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

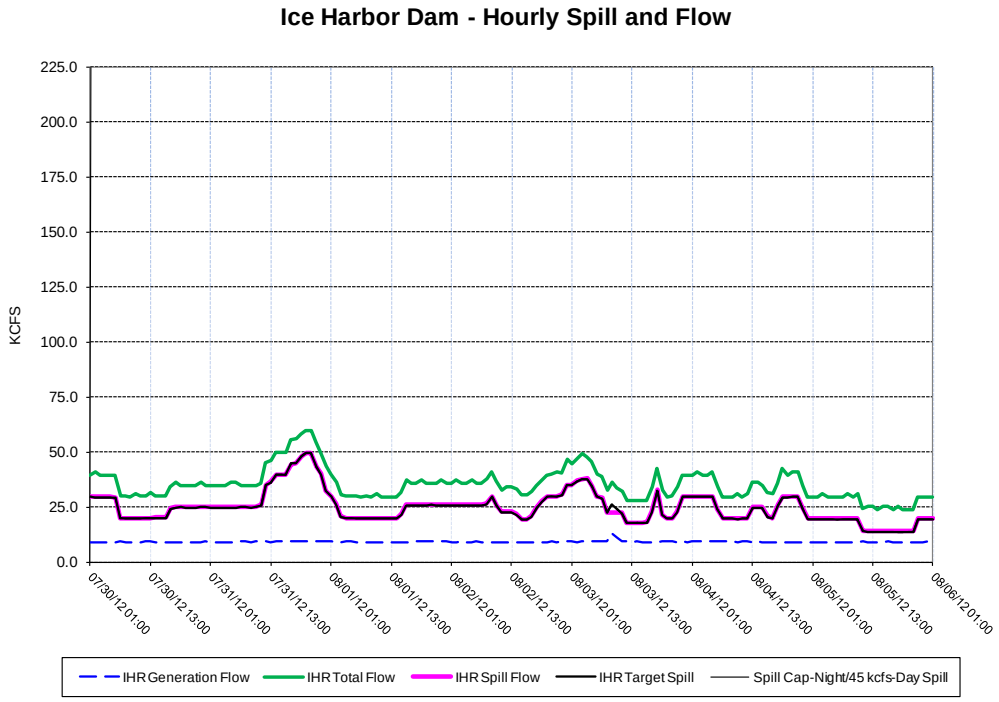
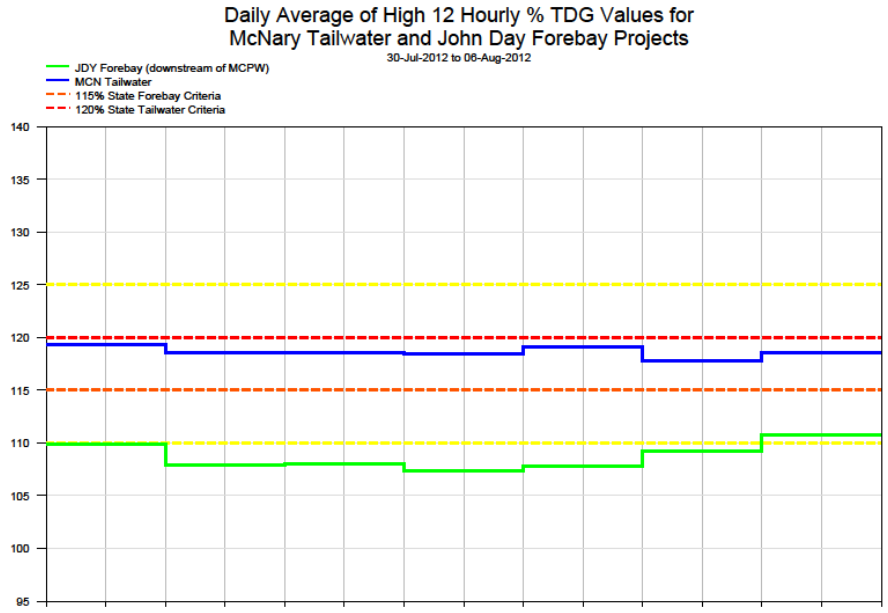

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
07/30/12 01:00
07/30/12 13:00
07/31/12 01:00
07/31/12 13:00
08/01/12 01:00
08/01/12 13:00
08/02/12 01:00
08/02/12 13:00
08/03/12 01:00
08/03/12 13:00
08/04/12 01:00
08/04/12 13:00
08/05/12 01:00
08/05/12 13:00
08/06/12 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
Spill Cap-Night/45 kcfs-Day Spill

Figure 5


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
30-Jul-2012 to 06-Aug-2012
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

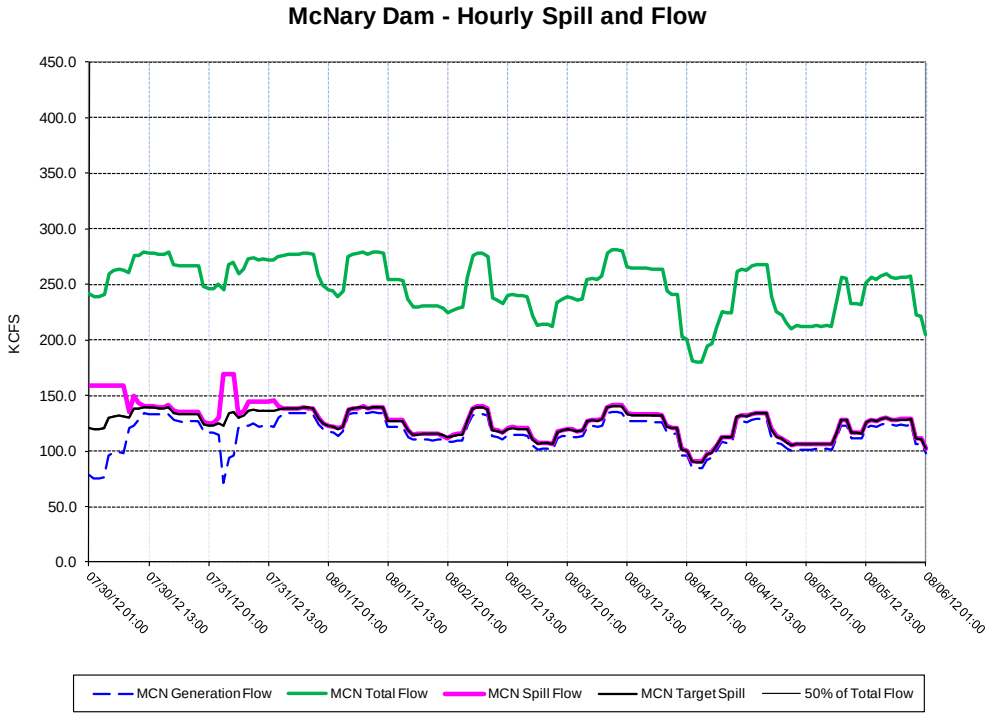
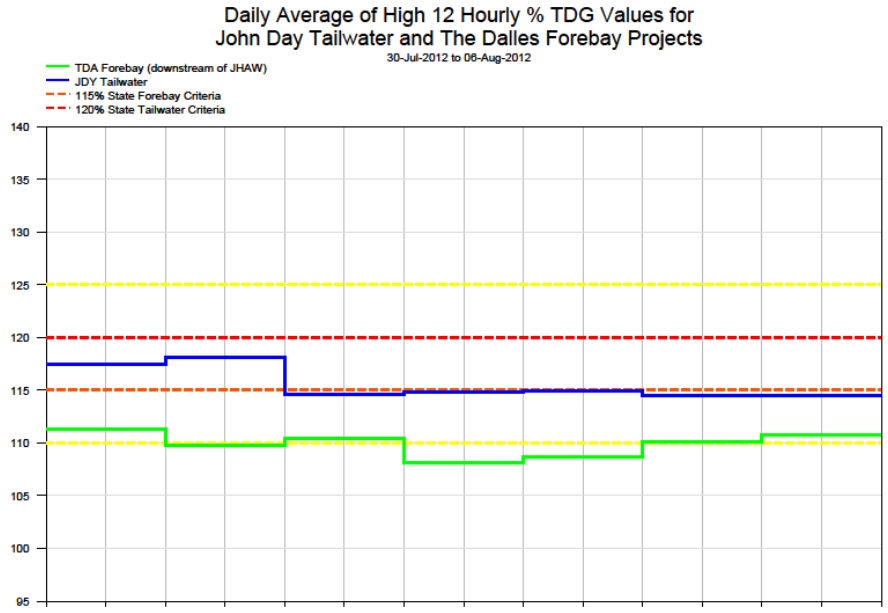

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/30/12 01:00
07/30/12 13:00
07/31/12 01:00
07/31/12 13:00
08/01/12 01:00
08/01/12 13:00
08/02/12 01:00
08/02/12 13:00
08/03/12 01:00
08/03/12 13:00
08/04/12 01:00
08/04/12 13:00
08/05/12 01:00
08/05/12 13:00
08/06/12 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
50% of Total Flow

Figure 6


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
30-Jul-2012 to 06-Aug-2012
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

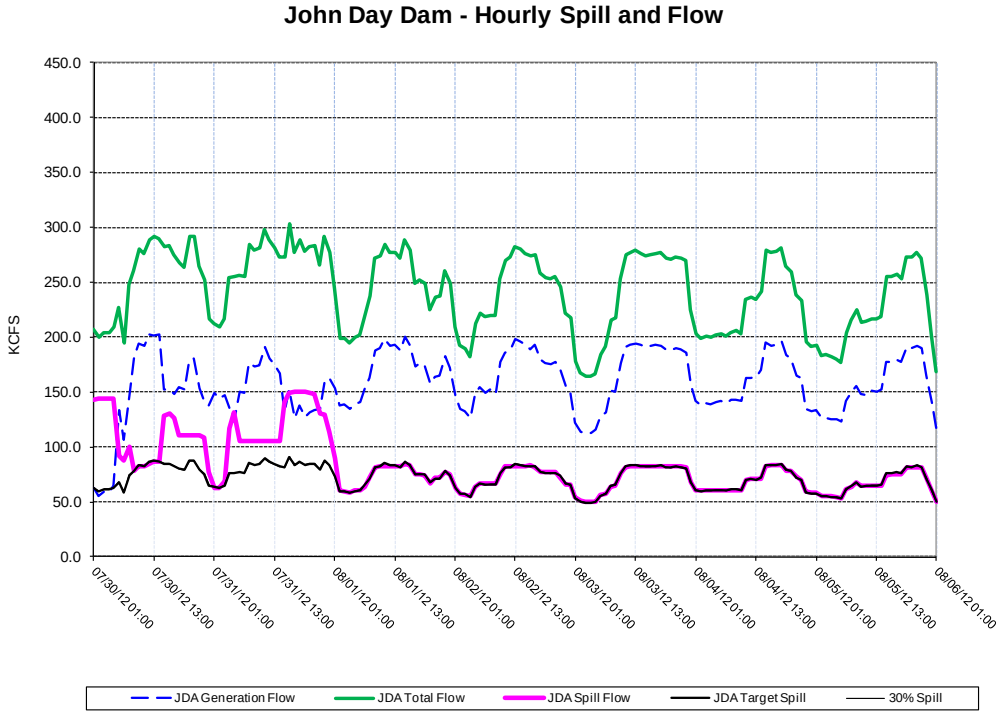
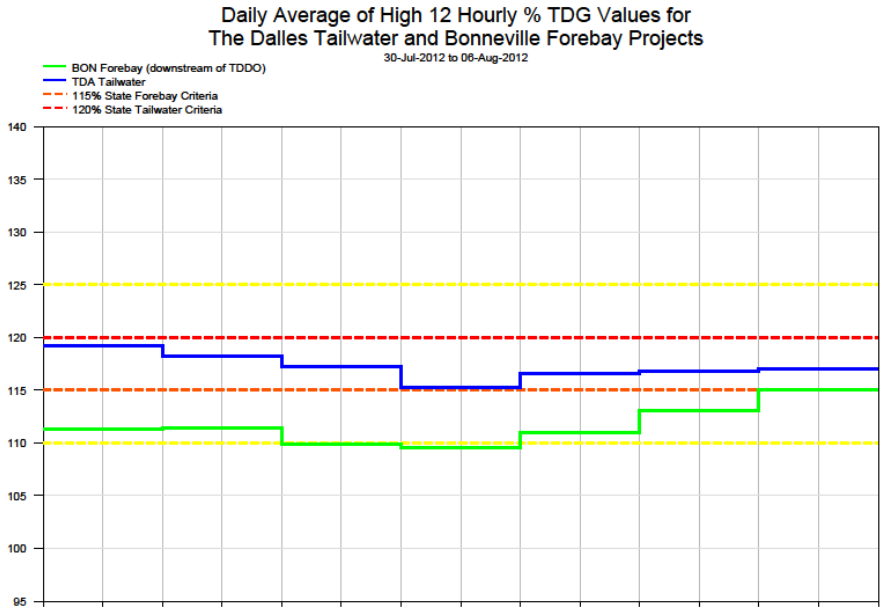

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/30/12 01:00
07/30/12 13:00
07/31/12 01:00
07/31/12 13:00
08/01/12 01:00
08/01/12 13:00
08/02/12 01:00
08/02/12 13:00
08/03/12 01:00
08/03/12 13:00
08/04/12 01:00
08/04/12 13:00
08/05/12 01:00
08/05/12 13:00
08/06/12 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% Spill

Figure 7


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
30-Jul-2012 to 06-Aug-2012
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

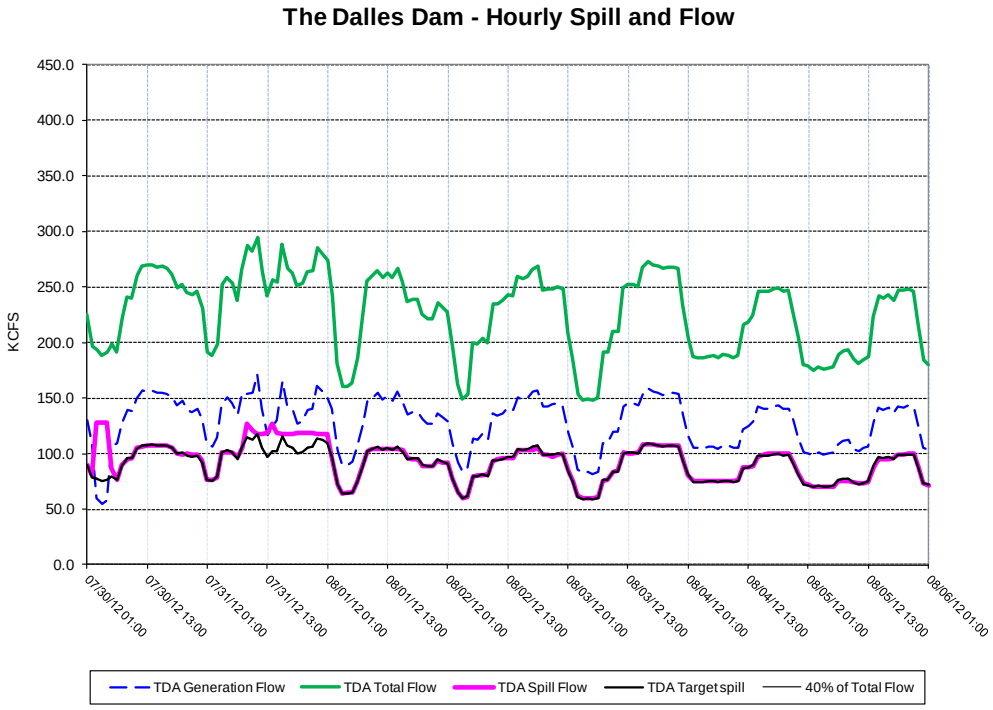
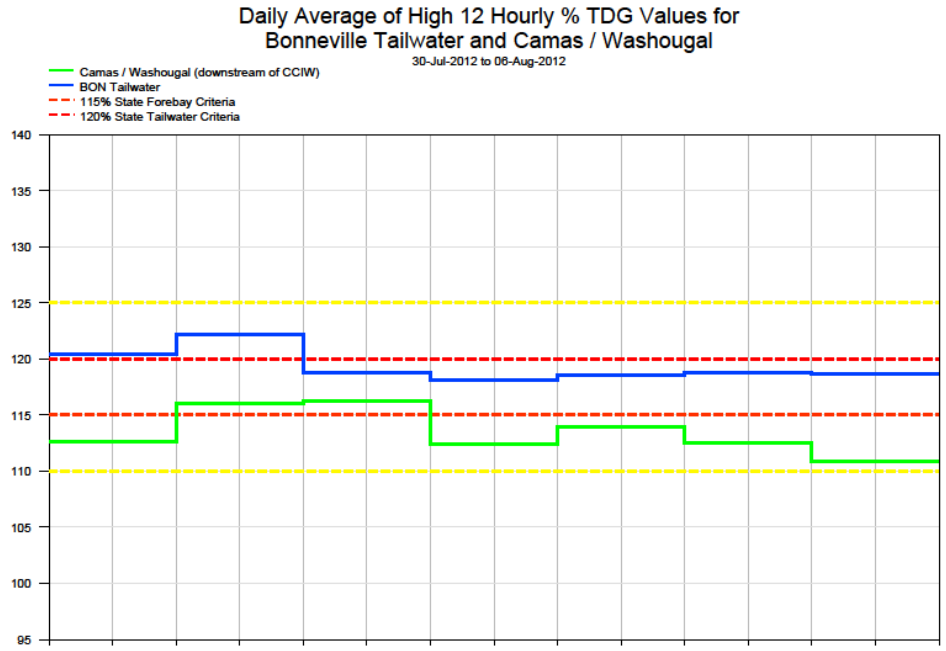

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
07/30/12 01:00
07/30/12 13:00
07/31/12 01:00
07/31/12 13:00
08/01/12 01:00
08/01/12 13:00
08/02/12 01:00
08/02/12 13:00
08/03/12 01:00
08/03/12 13:00
08/04/12 01:00
08/04/12 13:00
08/05/12 01:00
08/05/12 13:00
08/06/12 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 8


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
30-Jul-2012 to 06-Aug-2012
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

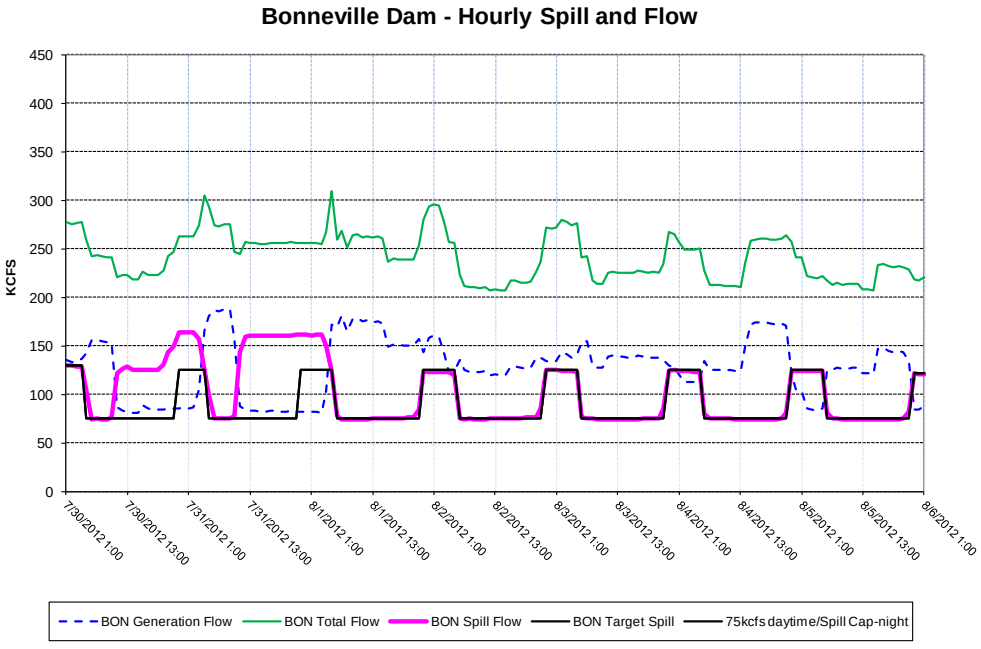
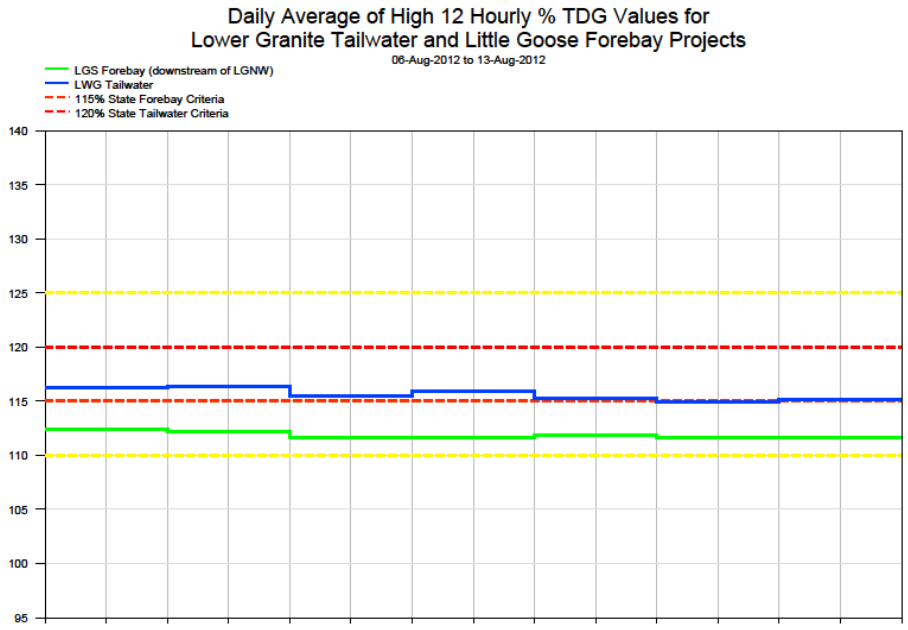

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
7/30/2012 1:00
7/30/2012 13:00
7/31/2012 1:00
7/31/2012 13:00
8/1/2012 1:00
8/1/2012 13:00
8/2/2012 1:00
8/2/2012 13:00
8/3/2012 1:00
8/3/2012 13:00
8/4/2012 1:00
8/4/2012 13:00
8/5/2012 1:00
8/5/2012 13:00
8/6/2012 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
75kcfs daytime/Spill Cap-night

Figure 9


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
06-Aug-2012 to 13-Aug-2012
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

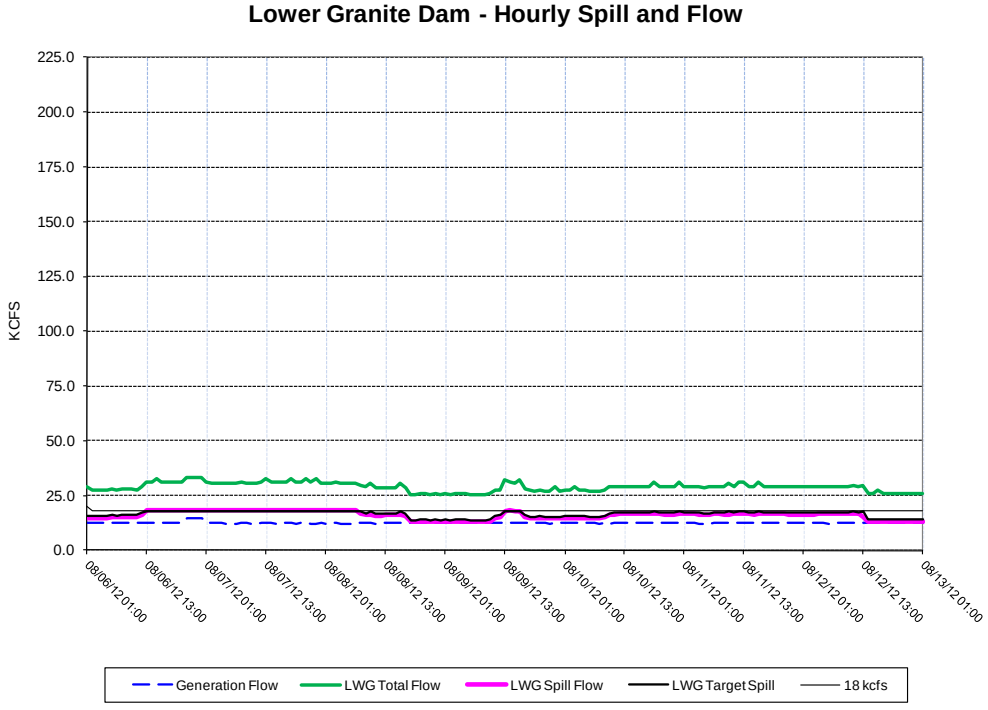
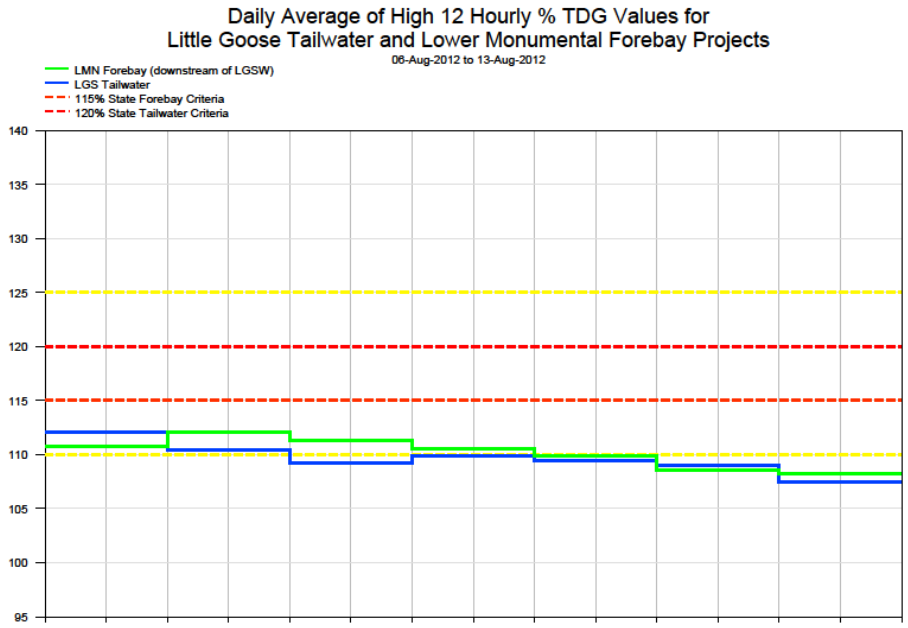

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/06/12 01:00
08/06/12 13:00
08/07/12 01:00
08/07/12 13:00
08/08/12 01:00
08/08/12 13:00
08/09/12 01:00
08/09/12 13:00
08/10/12 01:00
08/10/12 13:00
08/11/12 01:00
08/11/12 13:00
08/12/12 01:00
08/12/12 13:00
08/13/12 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
18 kcfs

Figure 10


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
06-Aug-2012 to 13-Aug-2012
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

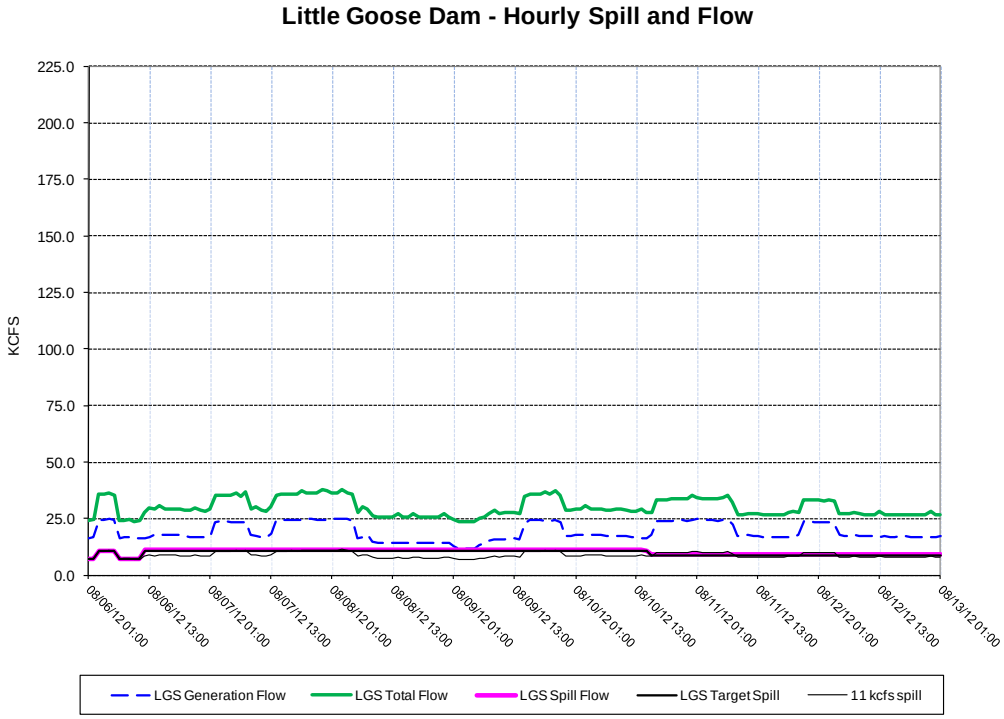
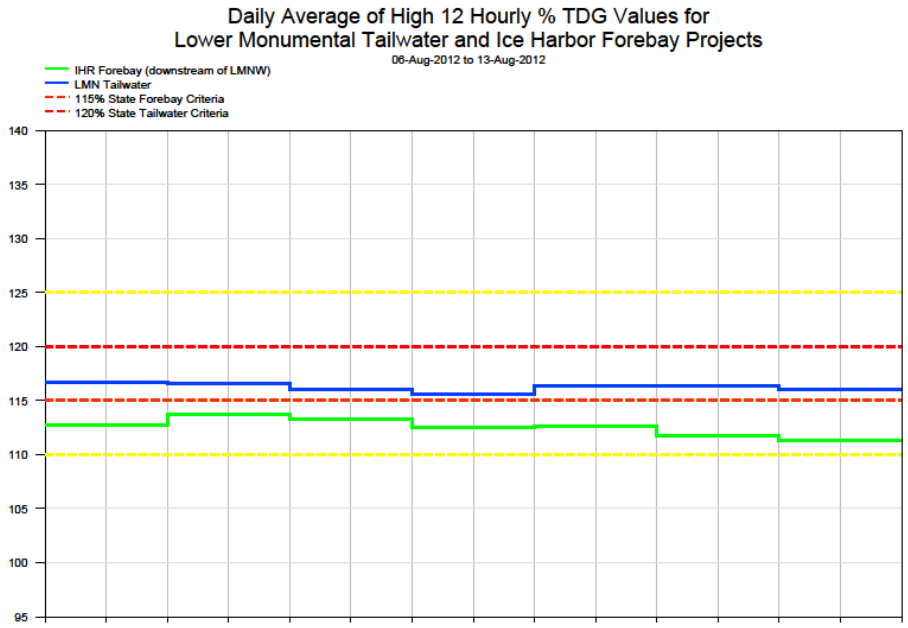

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/06/12 01:00
08/06/12 13:00
08/07/12 01:00
08/07/12 13:00
08/08/12 01:00
08/08/12 13:00
08/09/12 01:00
08/09/12 13:00
08/10/12 01:00
08/10/12 13:00
08/11/12 01:00
08/11/12 13:00
08/12/12 01:00
08/12/12 13:00
08/13/12 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
11 kcfs spill

Figure 11


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
06-Aug-2012 to 13-Aug-2012
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

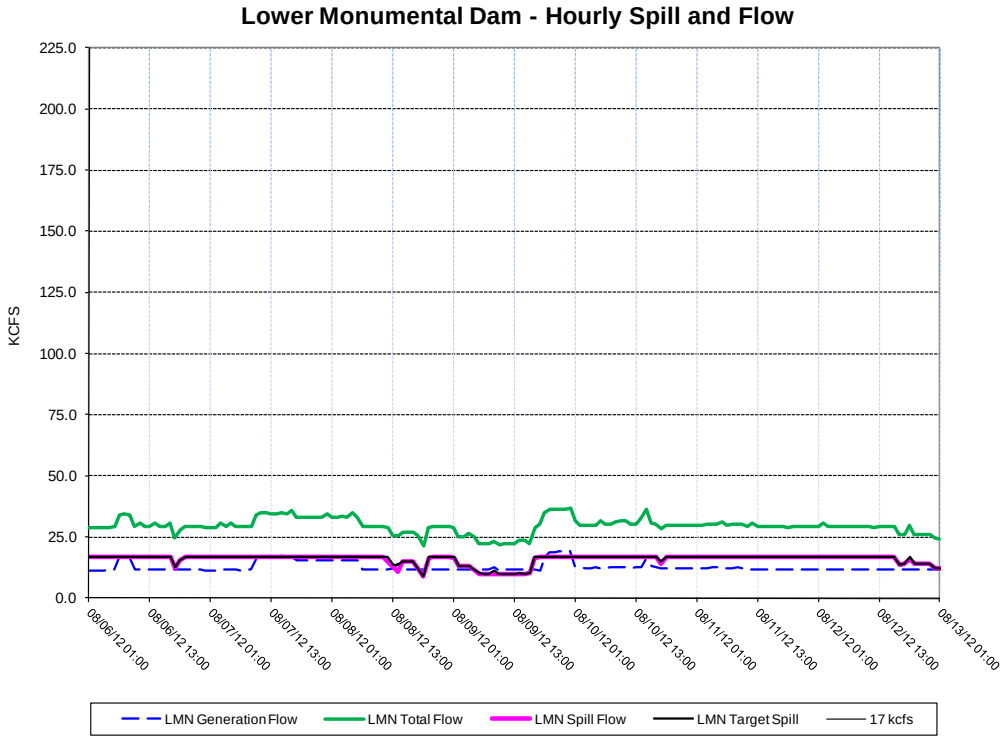
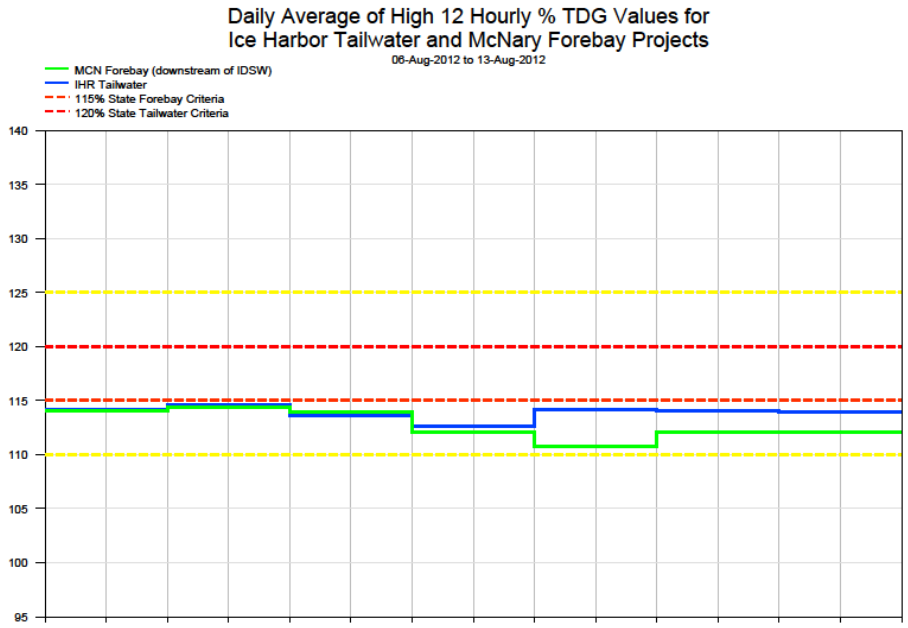

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/06/12 01:00
08/06/12 13:00
08/07/12 01:00
08/07/12 13:00
08/08/12 01:00
08/08/12 13:00
08/09/12 01:00
08/09/12 13:00
08/10/12 01:00
08/10/12 13:00
08/11/12 01:00
08/11/12 13:00
08/12/12 01:00
08/12/12 13:00
08/13/12 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
17 kcfs

Figure 12


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
06-Aug-2012 to 13-Aug-2012
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

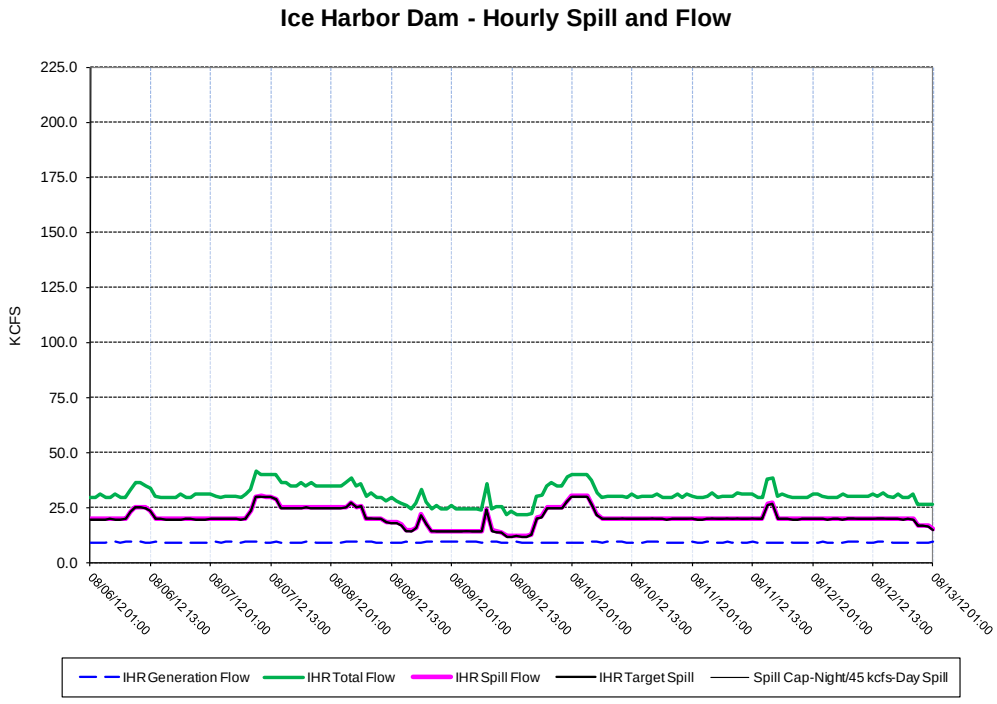
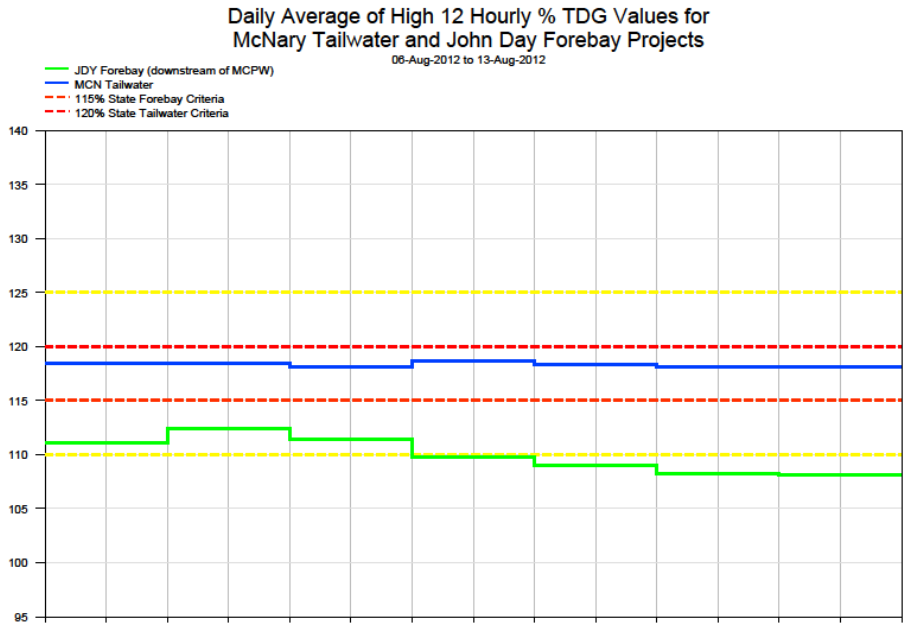

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/06/12 01:00
08/06/12 13:00
08/07/12 01:00
08/07/12 13:00
08/08/12 01:00
08/08/12 13:00
08/09/12 01:00
08/09/12 13:00
08/10/12 01:00
08/10/12 13:00
08/11/12 01:00
08/11/12 13:00
08/12/12 01:00
08/12/12 13:00
08/13/12 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
Spill Cap-Night/45 kcfs-Day Spill

Figure 13


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
06-Aug-2012 to 13-Aug-2012
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

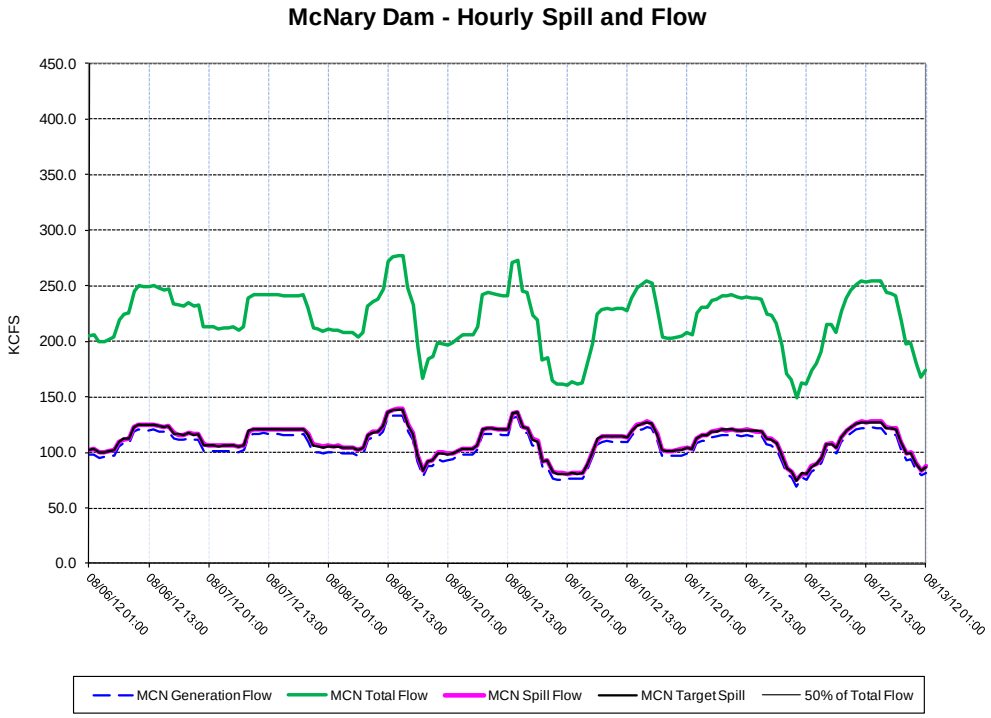
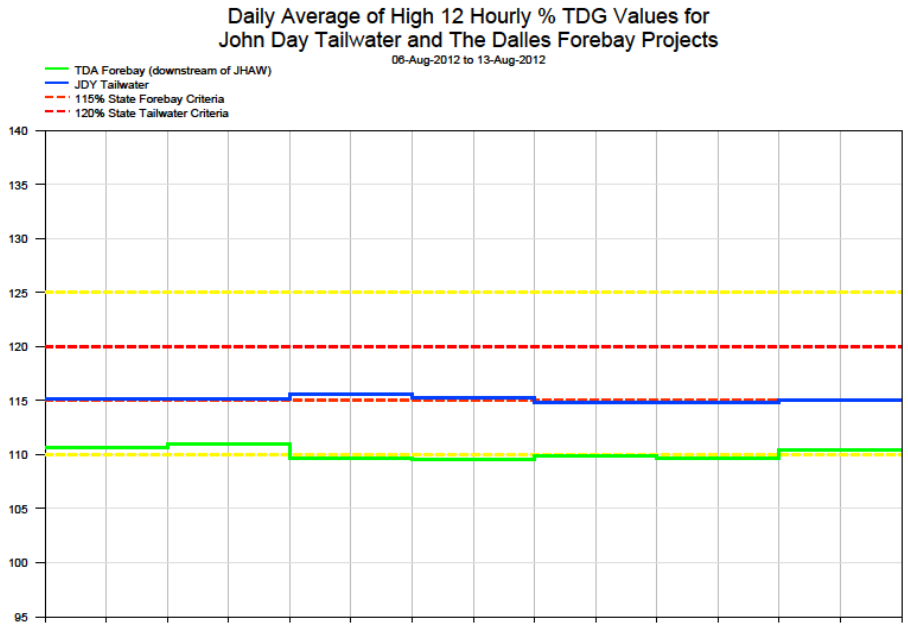

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
08/06/12 01:00
08/06/12 13:00
08/07/12 01:00
08/07/12 13:00
08/08/12 01:00
08/08/12 13:00
08/09/12 01:00
08/09/12 13:00
08/10/12 01:00
08/10/12 13:00
08/11/12 01:00
08/11/12 13:00
08/12/12 01:00
08/12/12 13:00
08/13/12 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
50% of Total Flow

Figure 14


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
06-Aug-2012 to 13-Aug-2012
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

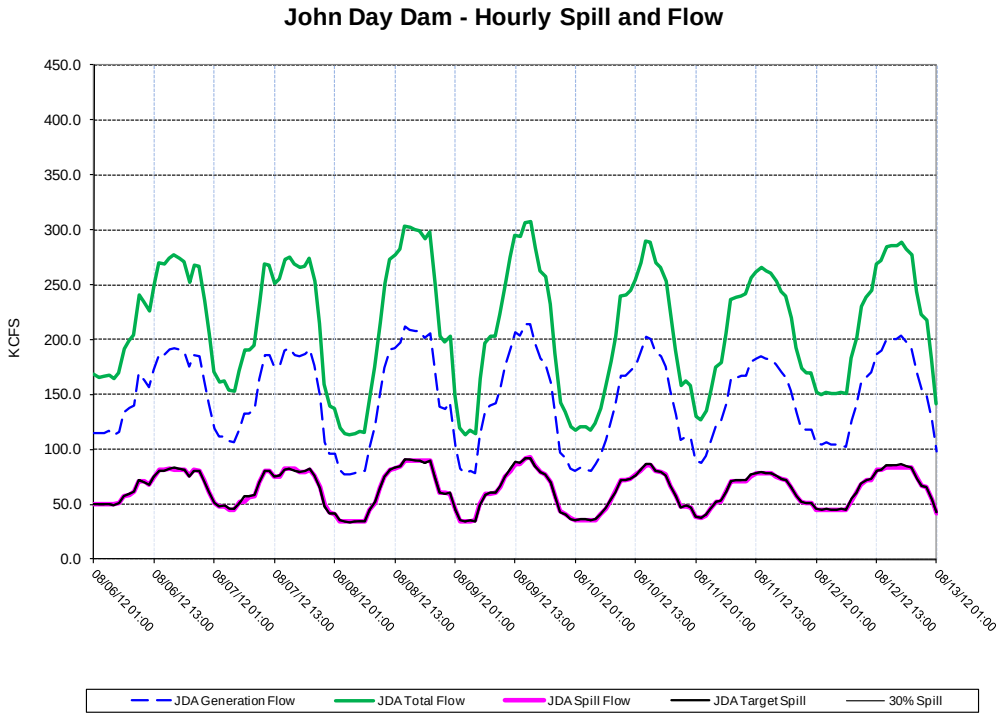
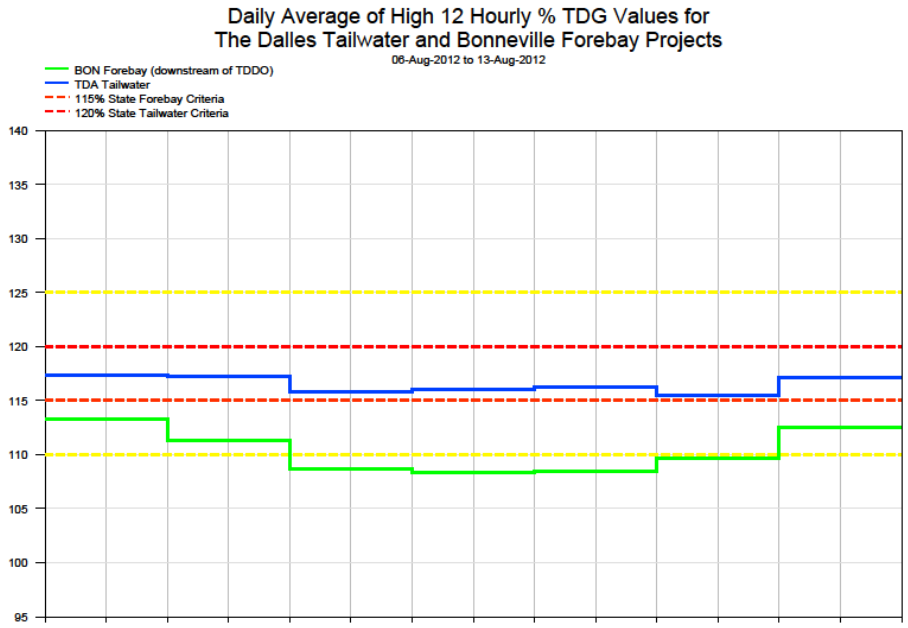

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
08/06/12 01:00
08/06/12 13:00
08/07/12 01:00
08/07/12 13:00
08/08/12 01:00
08/08/12 13:00
08/09/12 01:00
08/09/12 13:00
08/10/12 01:00
08/10/12 13:00
08/11/12 01:00
08/11/12 13:00
08/12/12 01:00
08/12/12 13:00
08/13/12 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% Spill

Figure 15


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
06-Aug-2012 to 13-Aug-2012
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

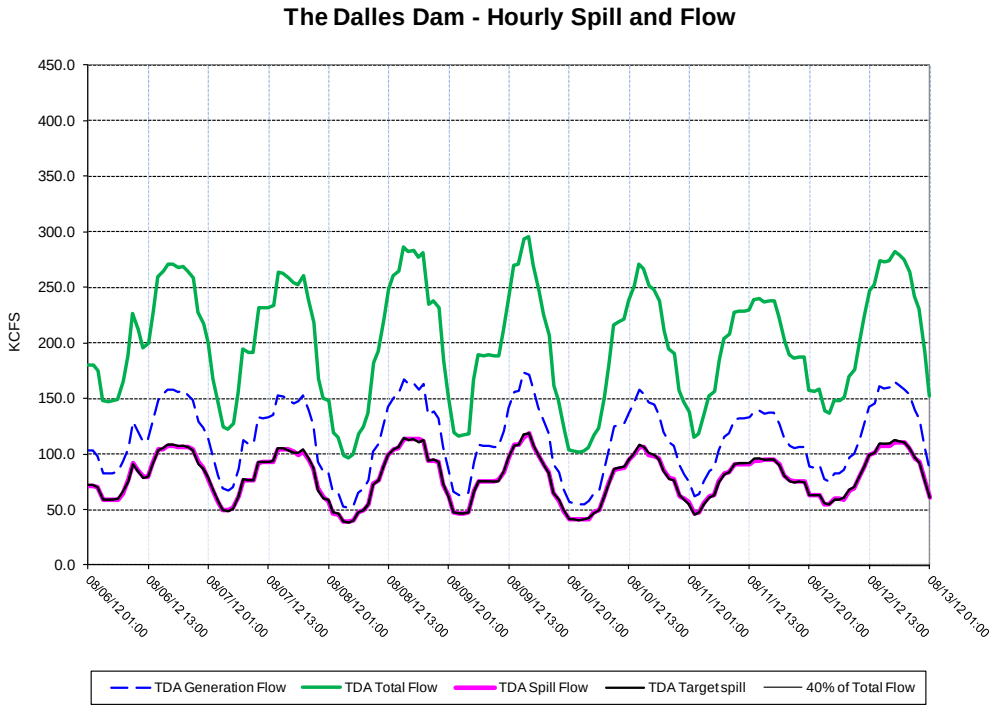
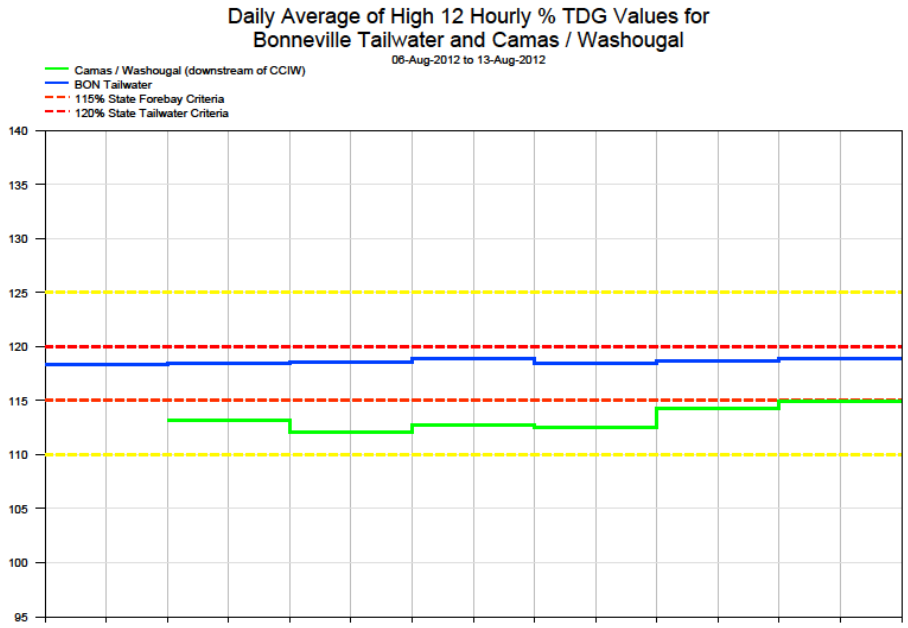

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
08/06/12 01:00
08/06/12 13:00
08/07/12 01:00
08/07/12 13:00
08/08/12 01:00
08/08/12 13:00
08/09/12 01:00
08/09/12 13:00
08/10/12 01:00
08/10/12 13:00
08/11/12 01:00
08/11/12 13:00
08/12/12 01:00
08/12/12 13:00
08/13/12 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 16


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
06-Aug-2012 to 13-Aug-2012
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

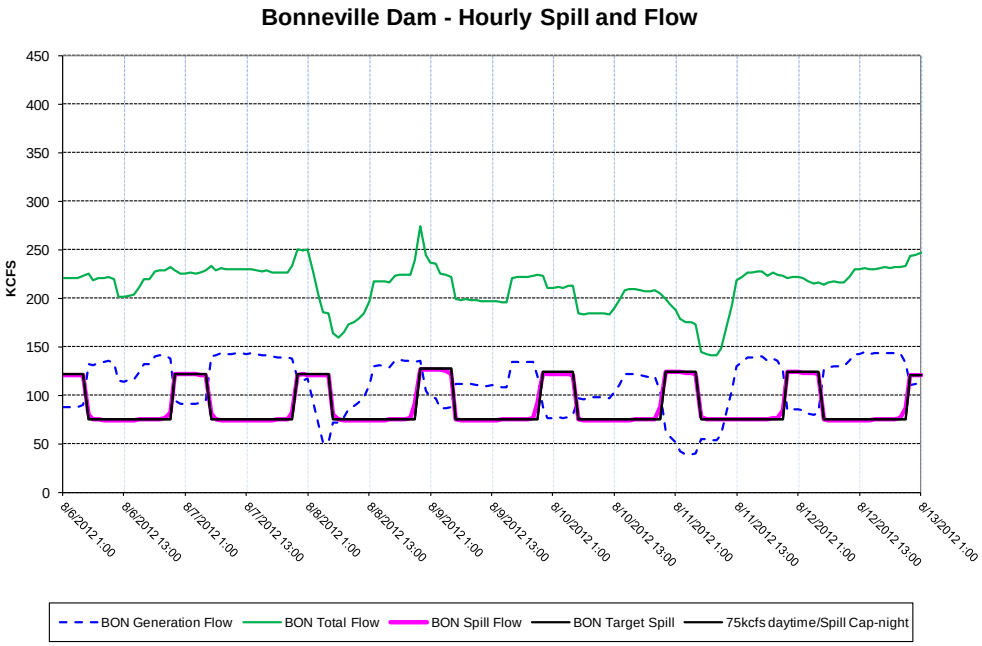
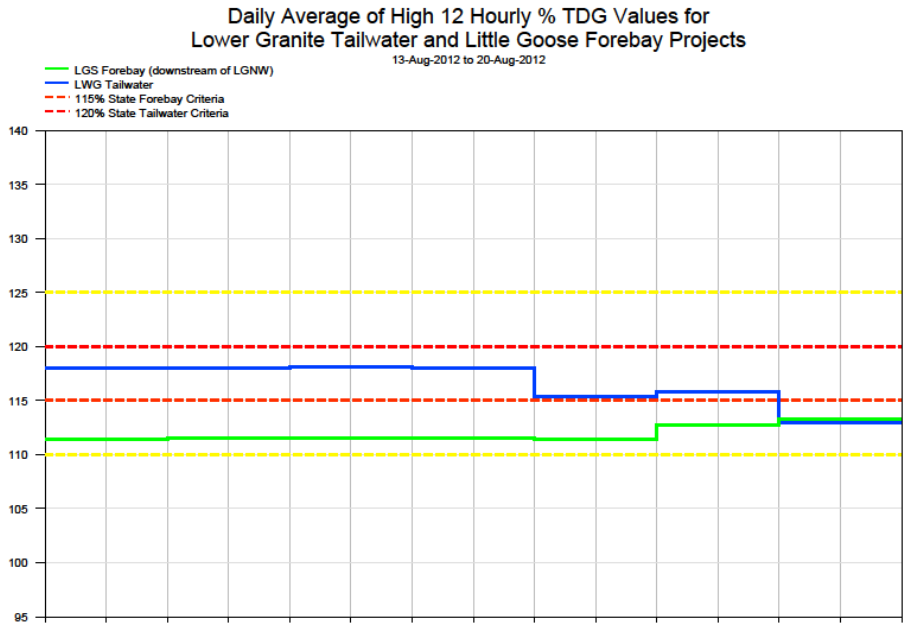

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
8/6/2012 1:00
8/6/2012 13:00
8/7/2012 1:00
8/7/2012 13:00
8/8/2012 1:00
8/8/2012 13:00
8/9/2012 1:00
8/9/2012 13:00
8/10/2012 1:00
8/10/2012 13:00
8/11/2012 1:00
8/11/2012 13:00
8/12/2012 1:00
8/12/2012 13:00
8/13/2012 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
75kcfs daytime/Spill Cap-night

Figure 17


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
13-Aug-2012 to 20-Aug-2012
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

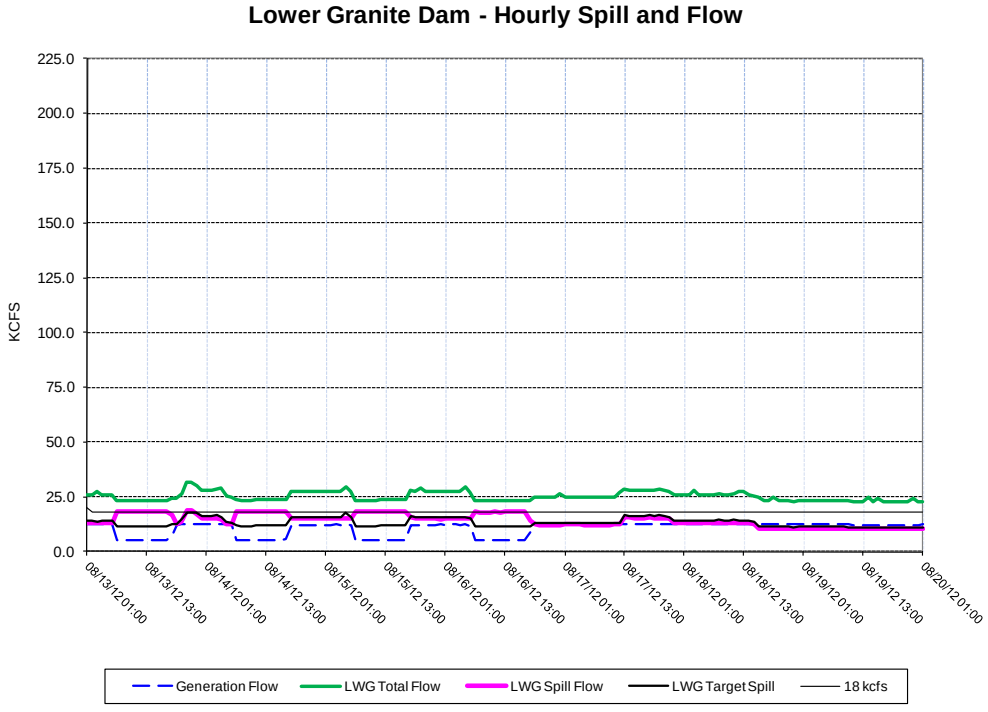
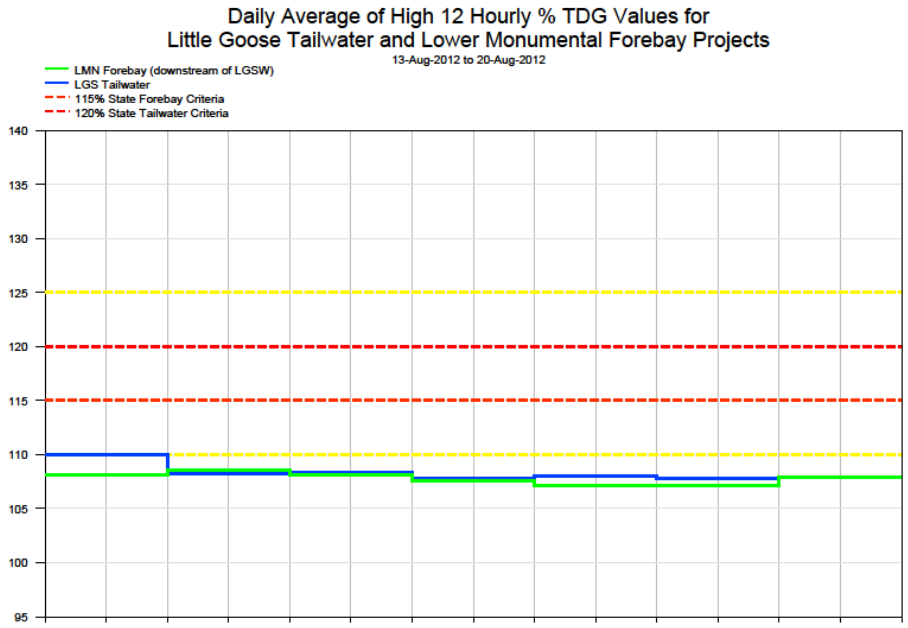

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/13/12 01:00
08/13/12 13:00
08/14/12 01:00
08/14/12 13:00
08/15/12 01:00
08/15/12 13:00
08/16/12 01:00
08/16/12 13:00
08/17/12 01:00
08/17/12 13:00
08/18/12 01:00
08/18/12 13:00
08/19/12 01:00
08/19/12 13:00
08/20/12 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
18 kcfs

Figure 18


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
13-Aug-2012 to 20-Aug-2012
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

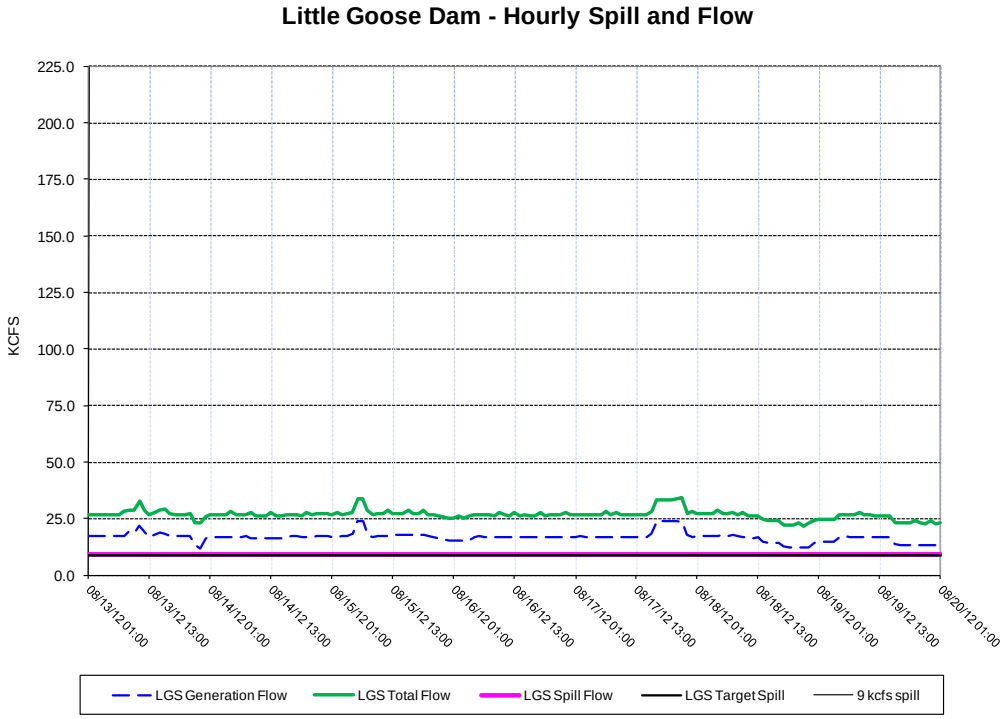
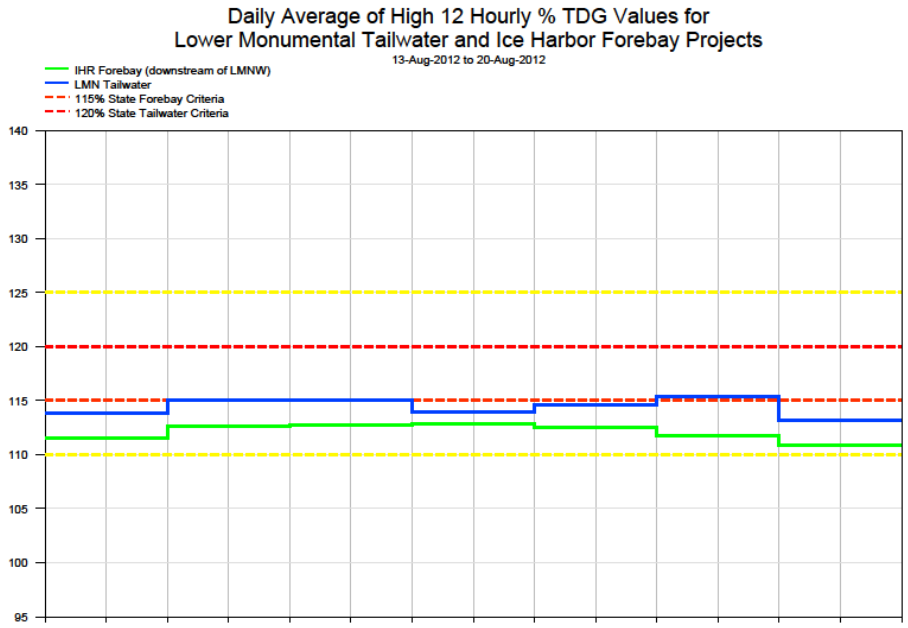

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/13/12 01:00
08/13/12 13:00
08/14/12 01:00
08/14/12 13:00
08/15/12 01:00
08/15/12 13:00
08/16/12 01:00
08/16/12 13:00
08/17/12 01:00
08/17/12 13:00
08/18/12 01:00
08/18/12 13:00
08/19/12 01:00
08/19/12 13:00
08/20/12 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
9 kcfs spill

Figure 19


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
13-Aug-2012 to 20-Aug-2012
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

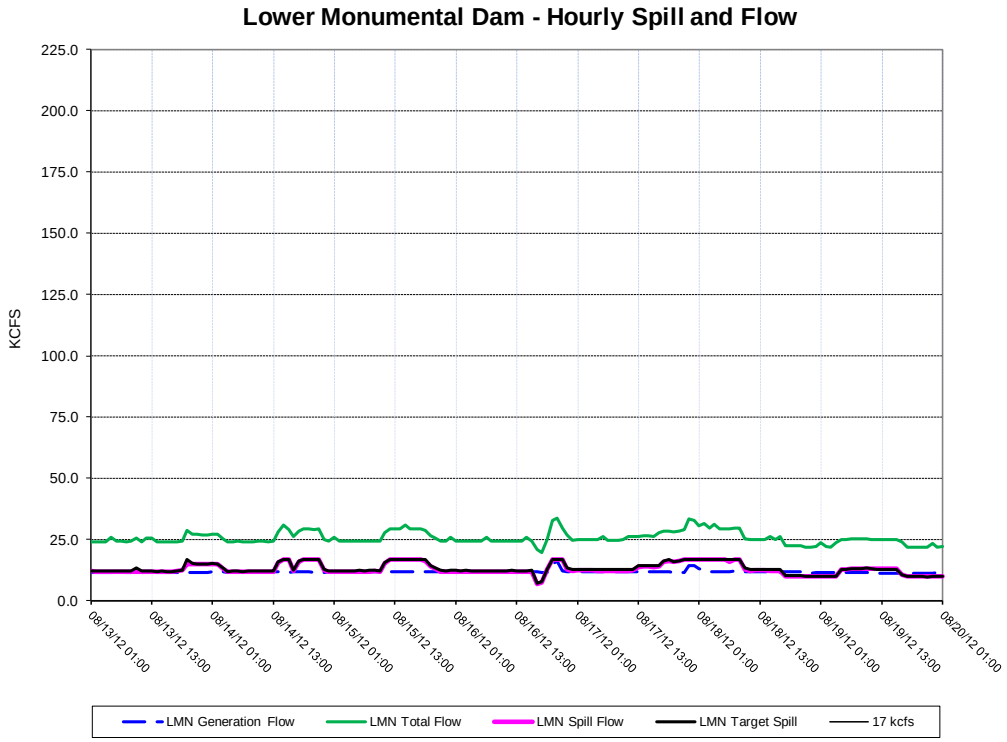
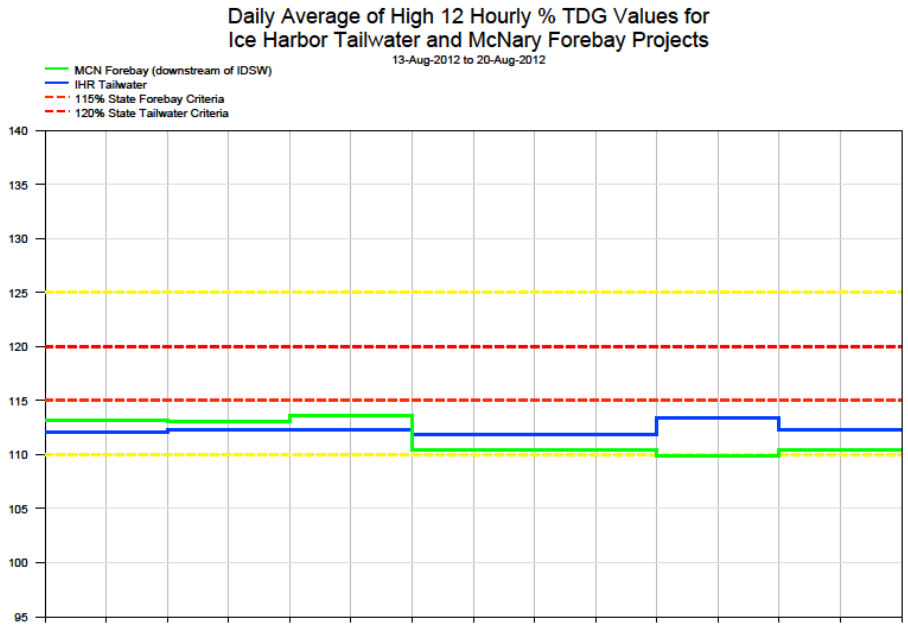

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/13/12 01:00
08/13/12 13:00
08/14/12 01:00
08/14/12 13:00
08/15/12 01:00
08/15/12 13:00
08/16/12 01:00
08/16/12 13:00
08/17/12 01:00
08/17/12 13:00
08/18/12 01:00
08/18/12 13:00
08/19/12 01:00
08/19/12 13:00
08/20/12 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
17 kcfs

Figure 20


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
13-Aug-2012 to 20-Aug-2012
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

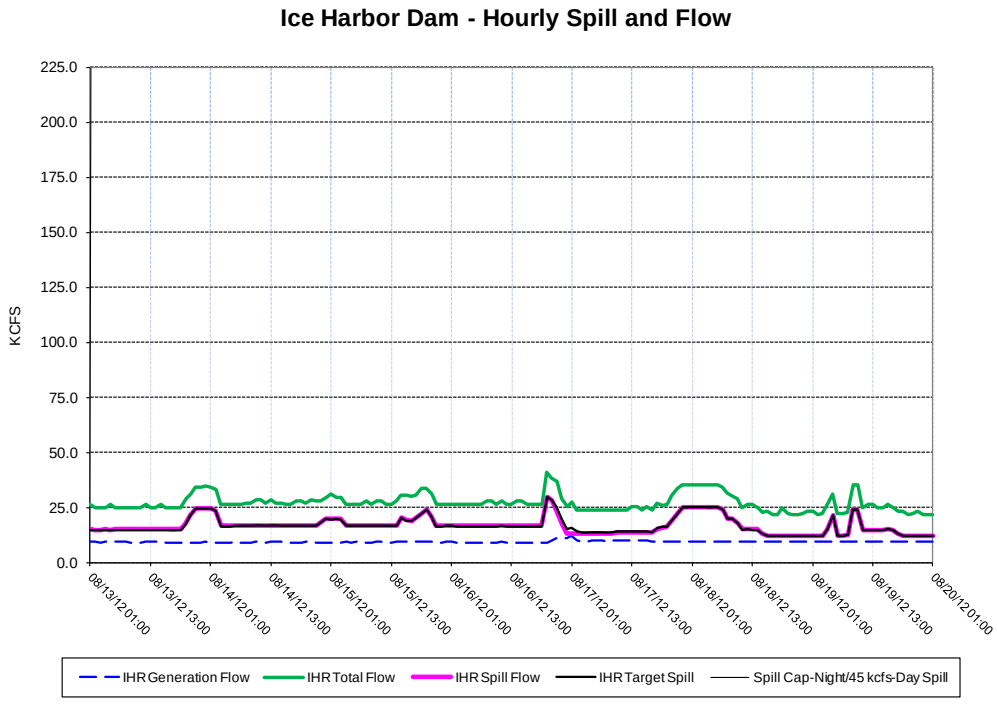
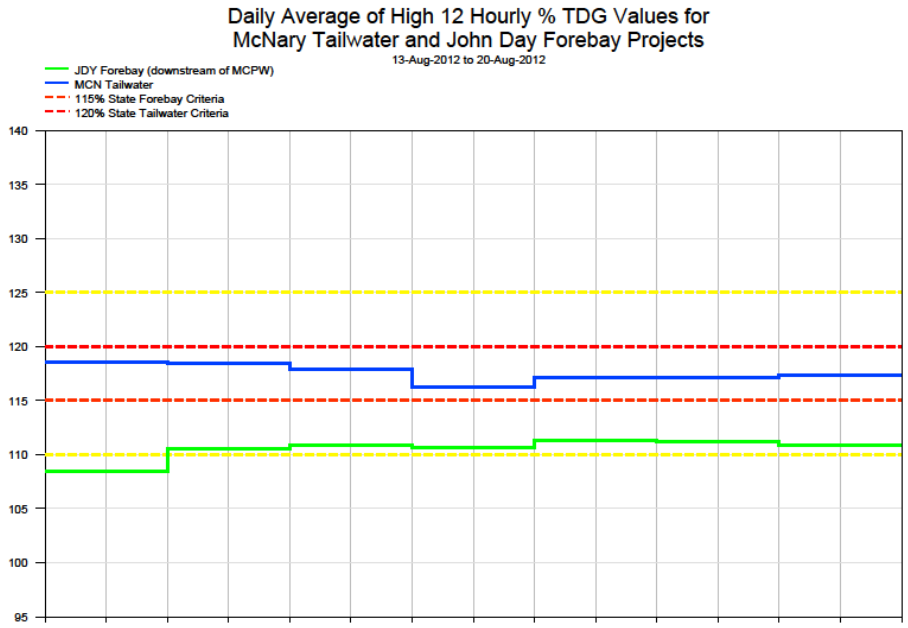

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/13/12 01:00
08/13/12 13:00
08/14/12 01:00
08/14/12 13:00
08/15/12 01:00
08/15/12 13:00
08/16/12 01:00
08/16/12 13:00
08/17/12 01:00
08/17/12 13:00
08/18/12 01:00
08/18/12 13:00
08/19/12 01:00
08/19/12 13:00
08/20/12 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
Spill Cap-Night/45 kcfs-Day Spill

Figure 21


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
13-Aug-2012 to 20-Aug-2012
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

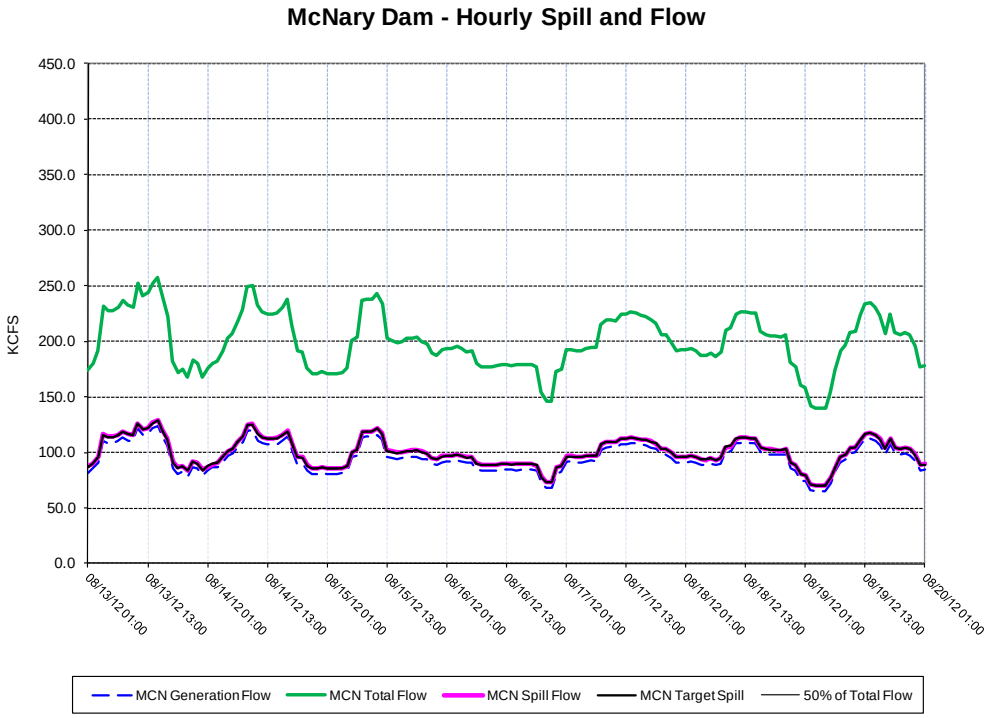
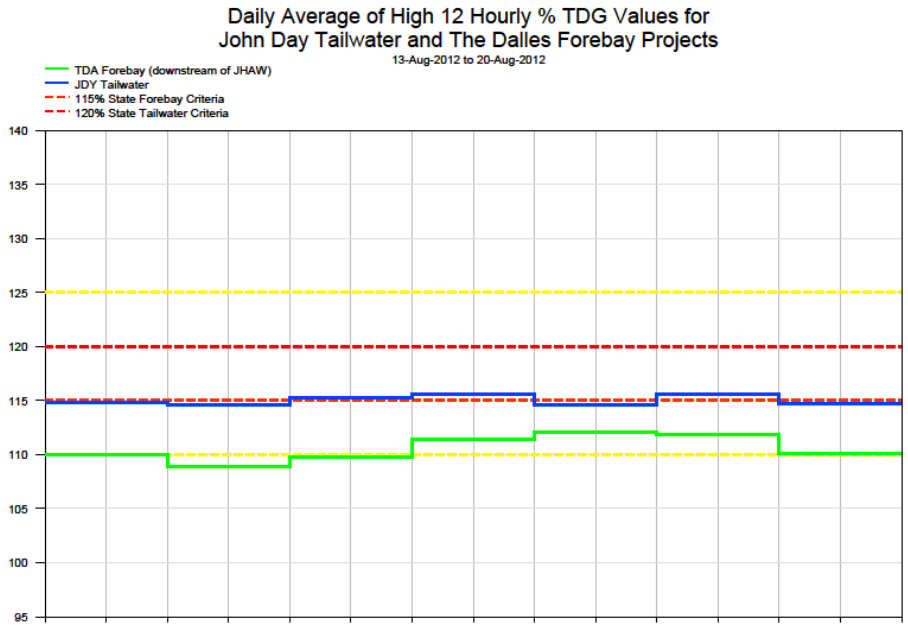

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
08/13/12 01:00
08/13/12 13:00
08/14/12 01:00
08/14/12 13:00
08/15/12 01:00
08/15/12 13:00
08/16/12 01:00
08/16/12 13:00
08/17/12 01:00
08/17/12 13:00
08/18/12 01:00
08/18/12 13:00
08/19/12 01:00
08/19/12 13:00
08/20/12 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
50% of Total Flow

Figure 22


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
13-Aug-2012 to 20-Aug-2012
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

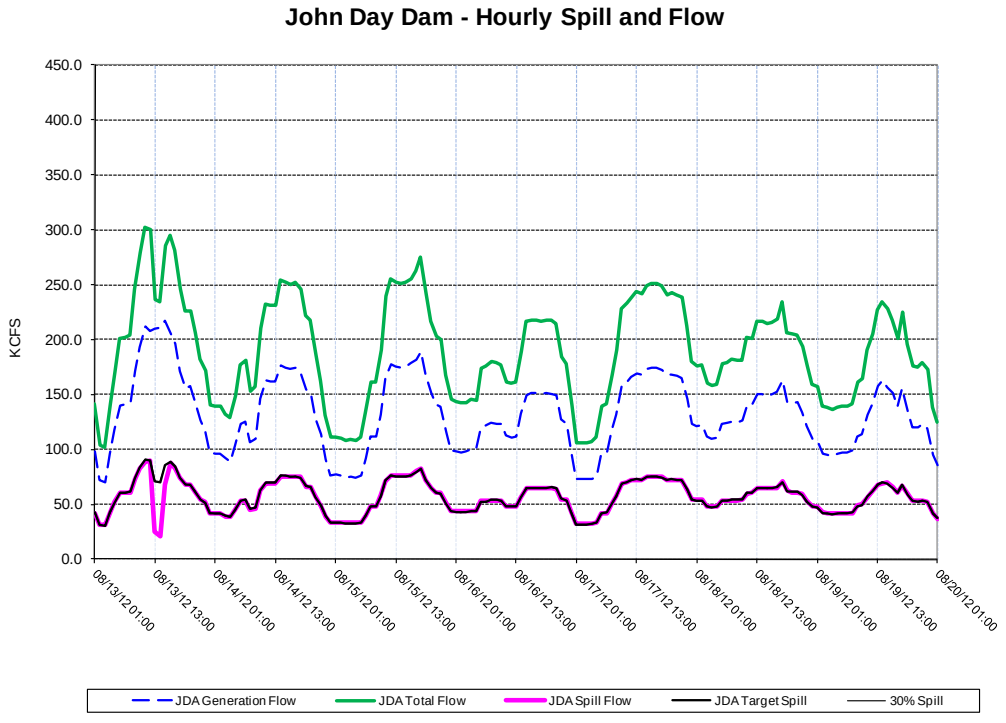
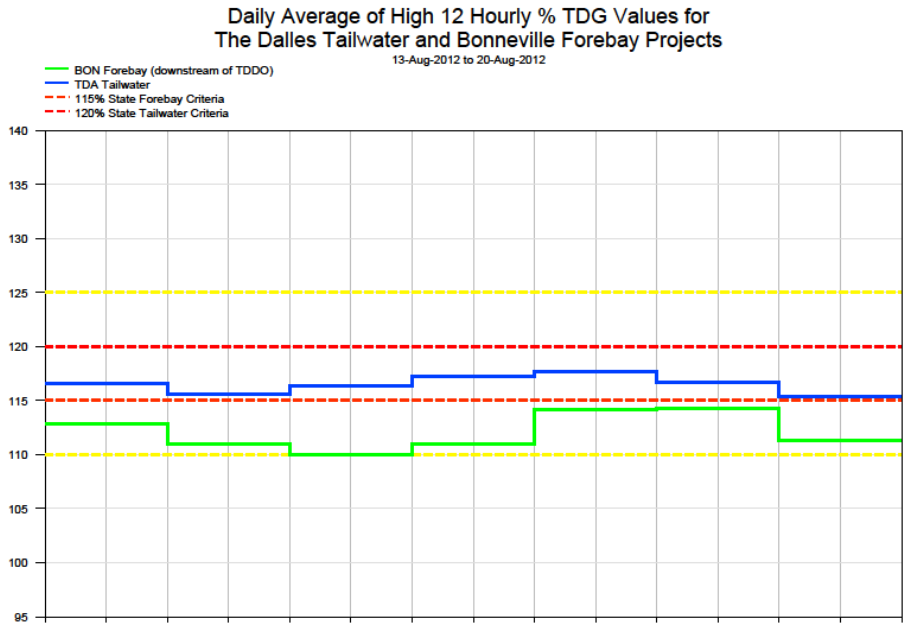

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
08/13/12 01:00
08/13/12 13:00
08/14/12 01:00
08/14/12 13:00
08/15/12 01:00
08/15/12 13:00
08/16/12 01:00
08/16/12 13:00
08/17/12 01:00
08/17/12 13:00
08/18/12 01:00
08/18/12 13:00
08/19/12 01:00
08/19/12 13:00
08/20/12 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% Spill

Figure 23


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
13-Aug-2012 to 20-Aug-2012
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

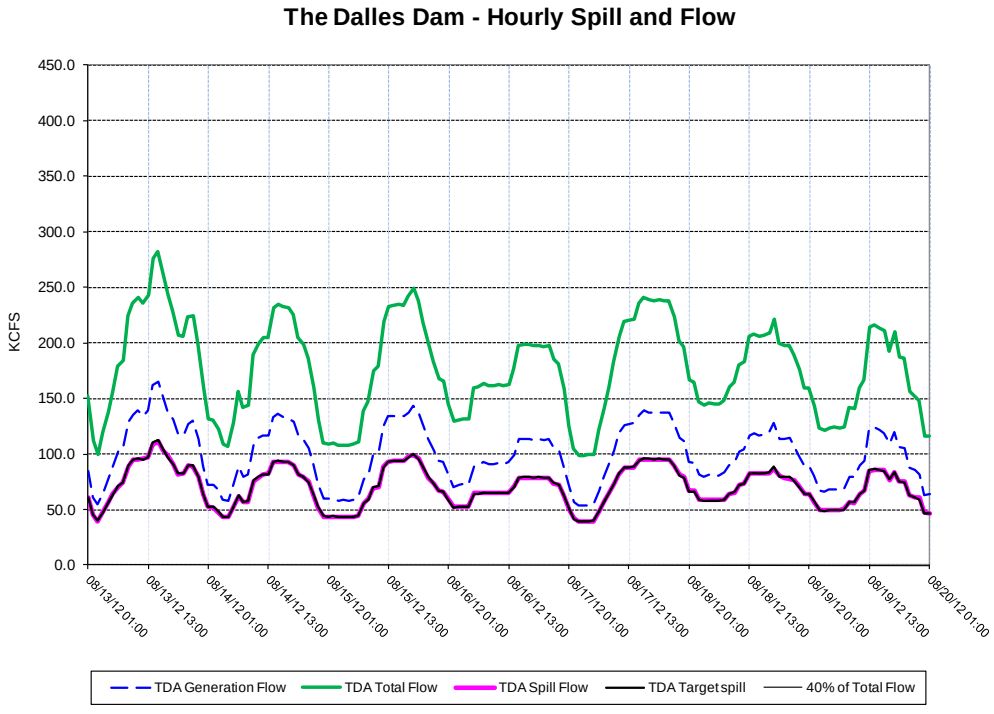
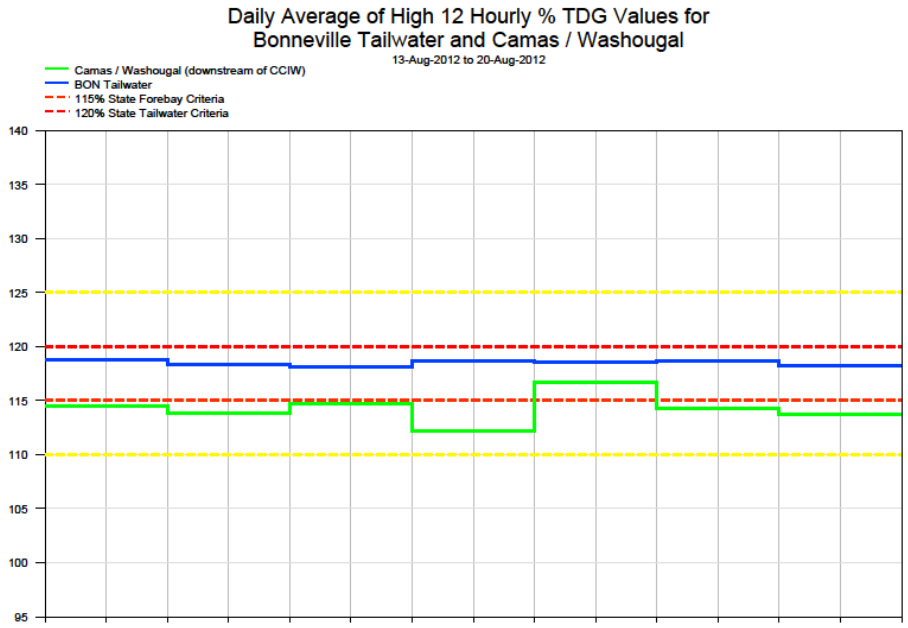

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
08/13/12 01:00
08/13/12 13:00
08/14/12 01:00
08/14/12 13:00
08/15/12 01:00
08/15/12 13:00
08/16/12 01:00
08/16/12 13:00
08/17/12 01:00
08/17/12 13:00
08/18/12 01:00
08/18/12 13:00
08/19/12 01:00
08/19/12 13:00
08/20/12 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 24


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
13-Aug-2012 to 20-Aug-2012
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

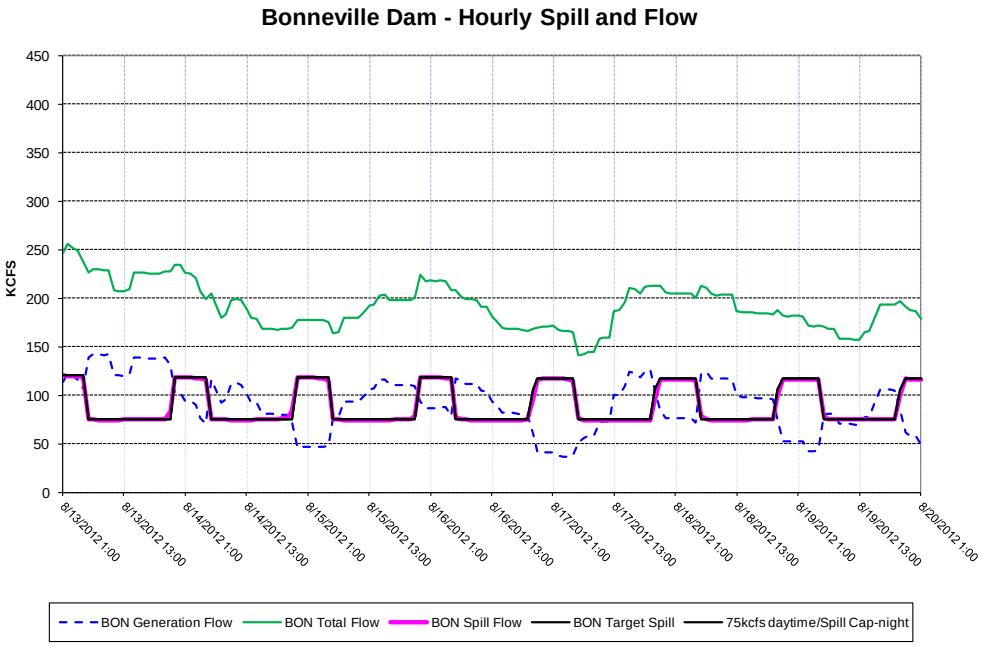
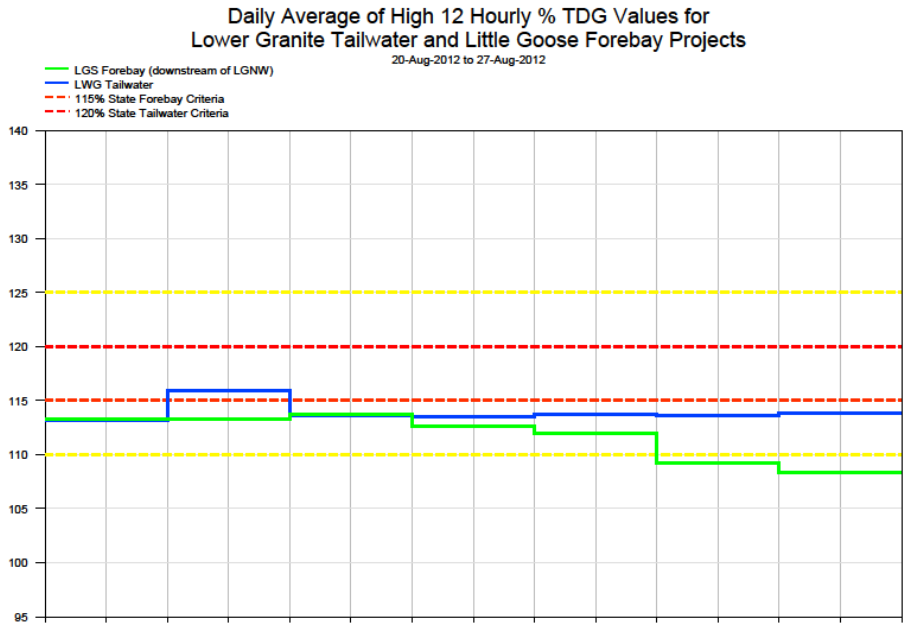

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
8/13/2012 1:00
8/13/2012 13:00
8/14/2012 1:00
8/14/2012 13:00
8/15/2012 1:00
8/15/2012 13:00
8/16/2012 1:00
8/16/2012 13:00
8/17/2012 1:00
8/17/2012 13:00
8/18/2012 1:00
8/18/2012 13:00
8/19/2012 1:00
8/19/2012 13:00
8/20/2012 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
75kcfs daytime/Spill Cap-night

Figure 25


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
20-Aug-2012 to 27-Aug-2012
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

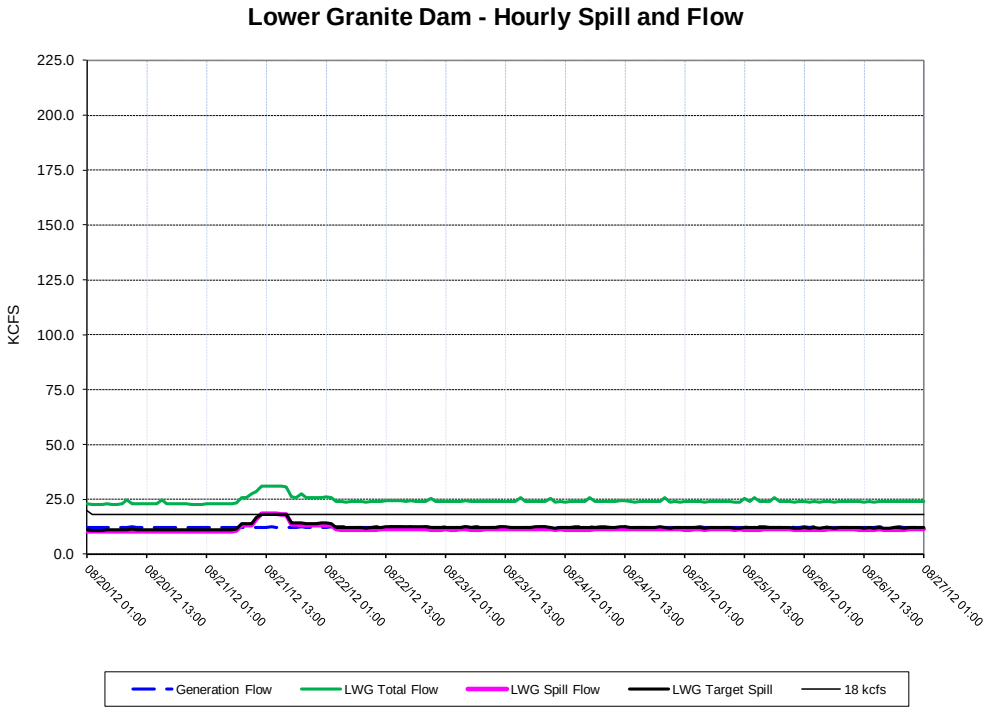
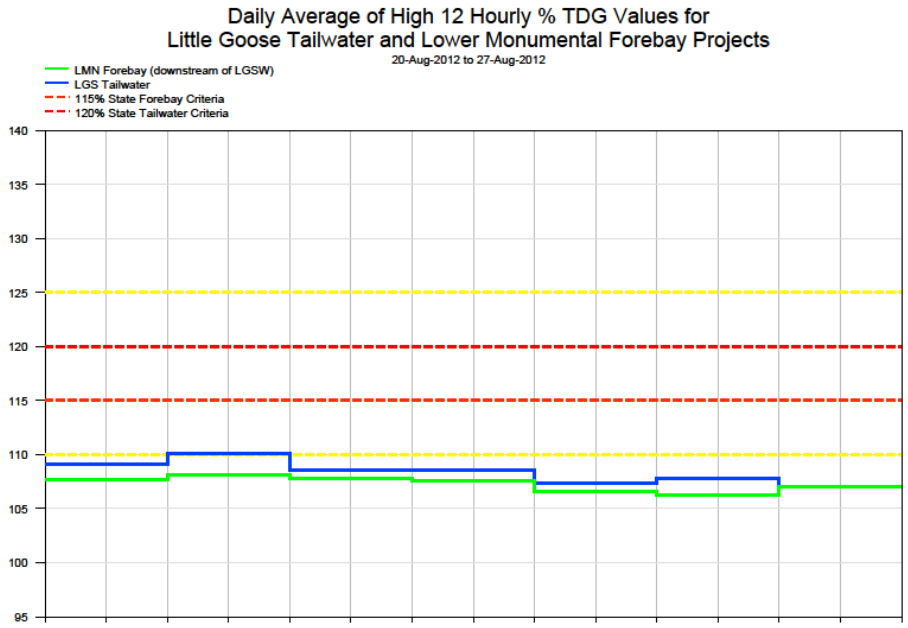

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/20/12 01:00
08/20/12 13:00
08/21/12 01:00
08/21/12 13:00
08/22/12 01:00
08/22/12 13:00
08/23/12 01:00
08/23/12 13:00
08/24/12 01:00
08/24/12 13:00
08/25/12 01:00
08/25/12 13:00
08/26/12 01:00
08/26/12 13:00
08/27/12 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
18 kcfs

Figure 26


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
20-Aug-2012 to 27-Aug-2012
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

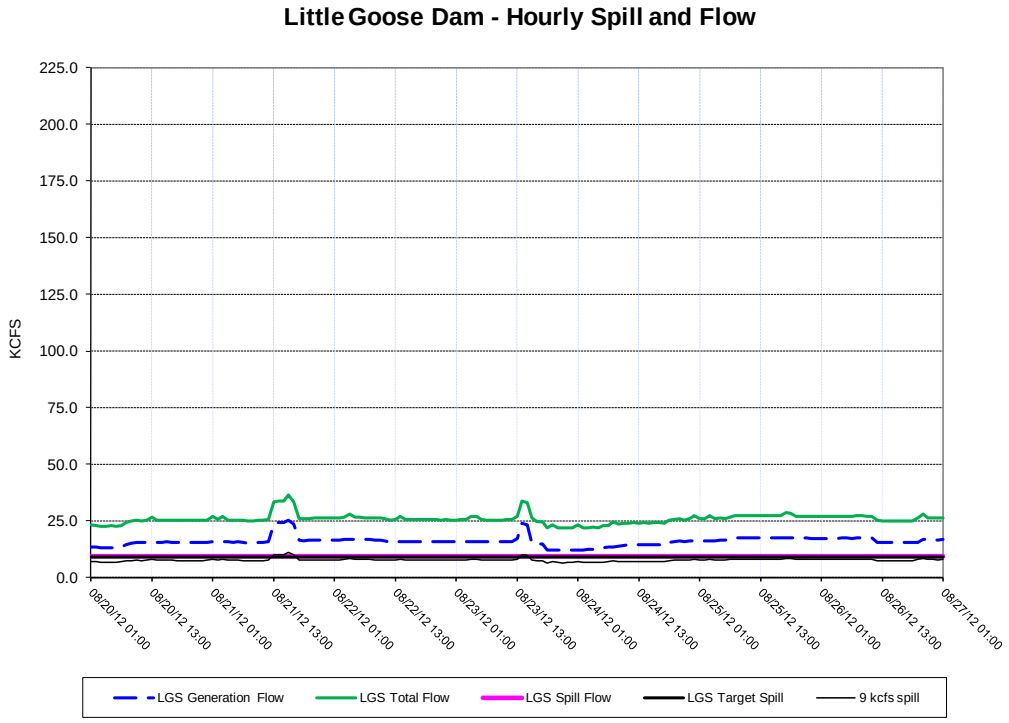
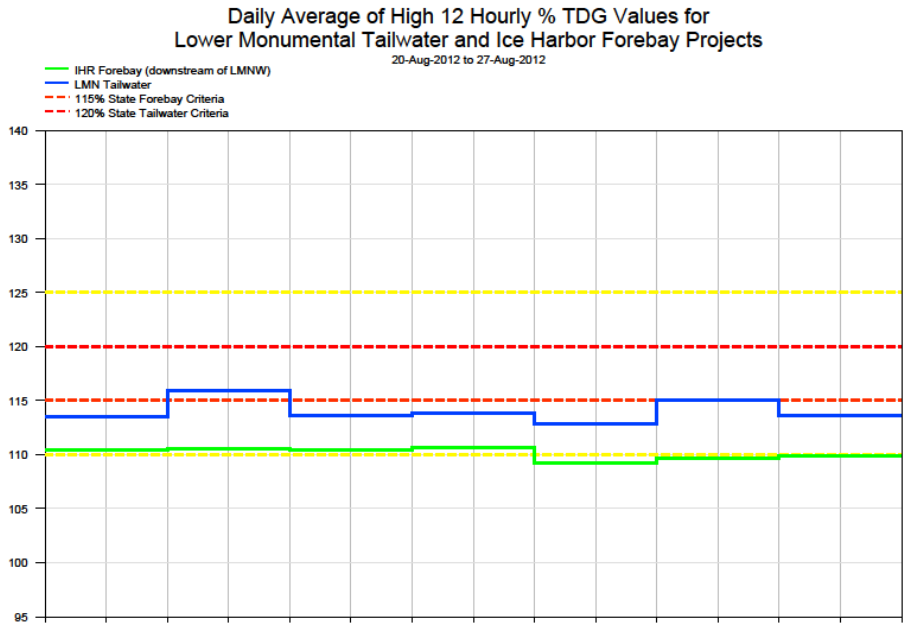

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/20/12 01:00
08/20/12 13:00
08/21/12 01:00
08/21/12 13:00
08/22/12 01:00
08/22/12 13:00
08/23/12 01:00
08/23/12 13:00
08/24/12 01:00
08/24/12 13:00
08/25/12 01:00
08/25/12 13:00
08/26/12 01:00
08/26/12 13:00
08/27/12 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
9 kcfs spill

Figure 27


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
20-Aug-2012 to 27-Aug-2012
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

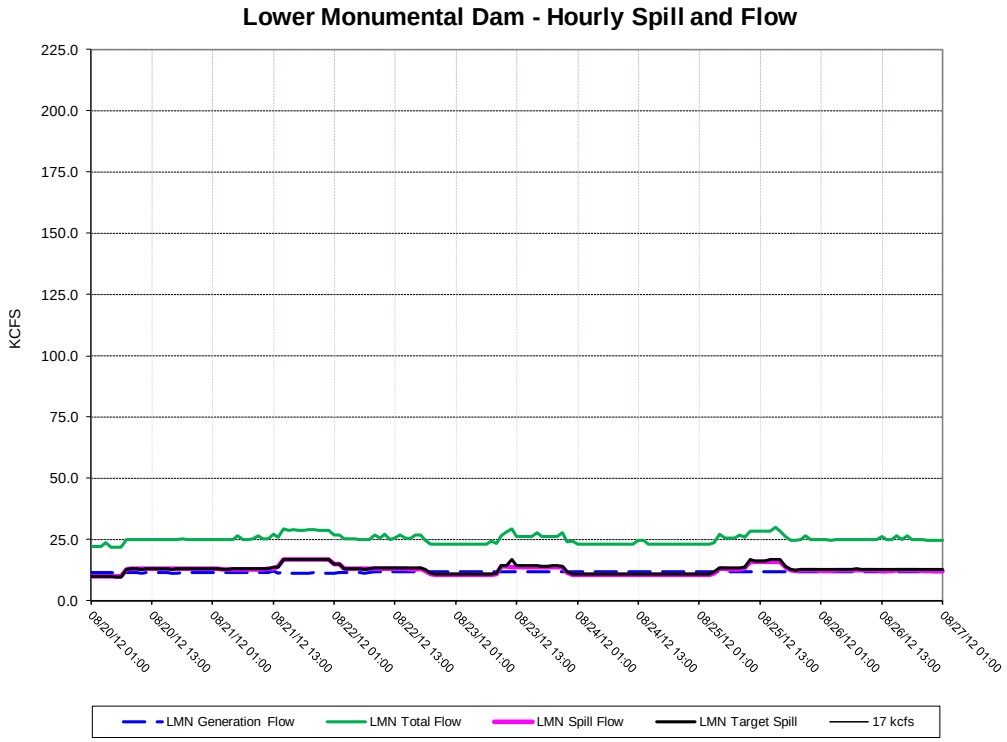
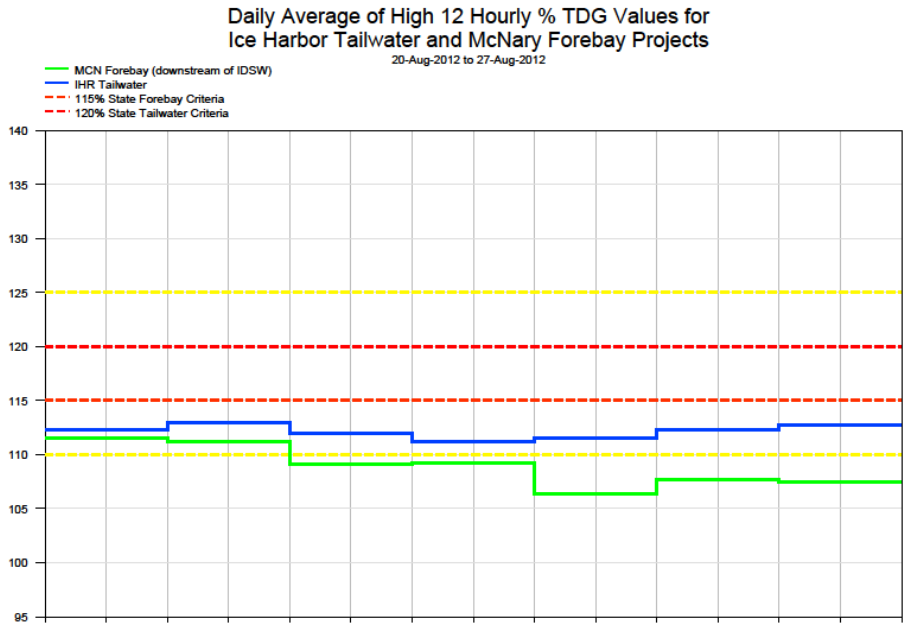

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/20/12 01:00
08/20/12 13:00
08/21/12 01:00
08/21/12 13:00
08/22/12 01:00
08/22/12 13:00
08/23/12 01:00
08/23/12 13:00
08/24/12 01:00
08/24/12 13:00
08/25/12 01:00
08/25/12 13:00
08/26/12 01:00
08/26/12 13:00
08/27/12 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
17 kcfs

Figure 28


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
20-Aug-2012 to 27-Aug-2012
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

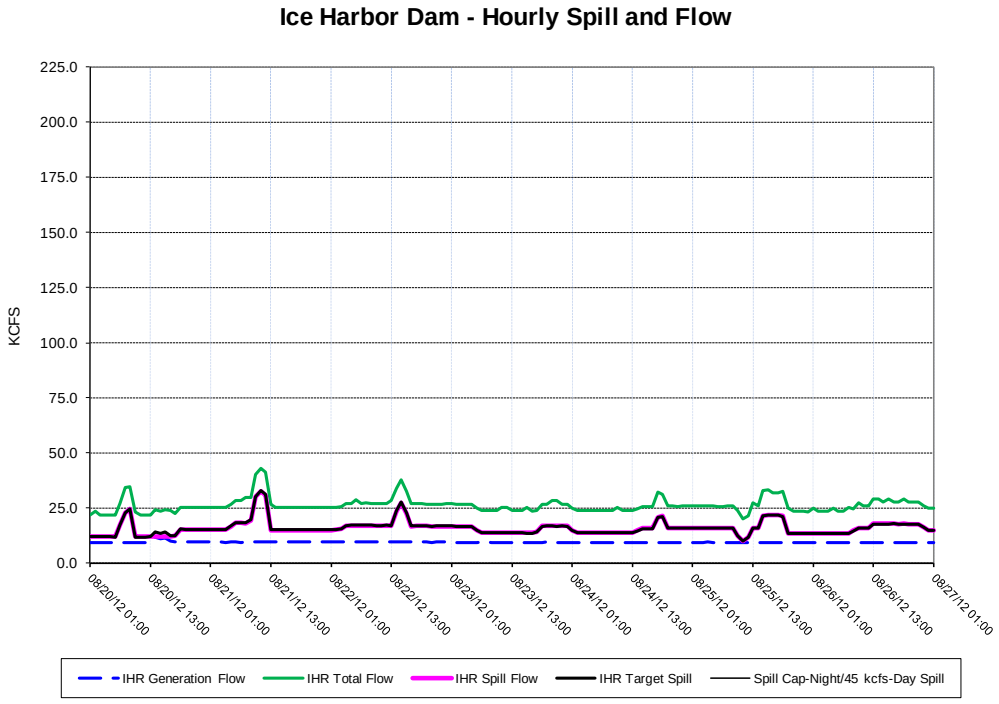
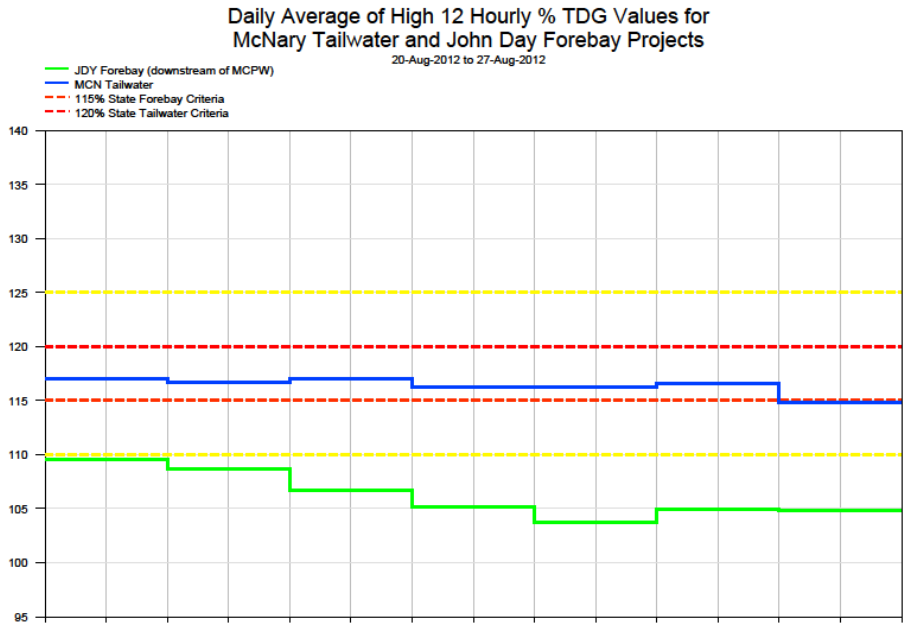

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/20/12 01:00
08/20/12 13:00
08/21/12 01:00
08/21/12 13:00
08/22/12 01:00
08/22/12 13:00
08/23/12 01:00
08/23/12 13:00
08/24/12 01:00
08/24/12 13:00
08/25/12 01:00
08/25/12 13:00
08/26/12 01:00
08/26/12 13:00
08/27/12 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
Spill Cap-Night/45 kcfs-Day Spill

Figure 29


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
20-Aug-2012 to 27-Aug-2012
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

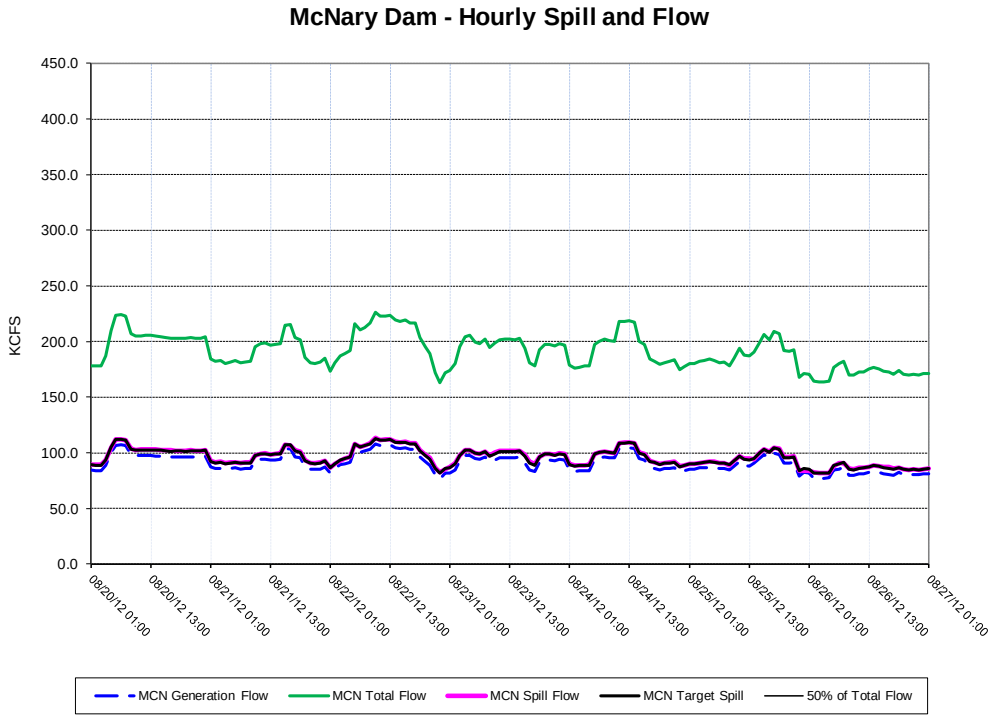
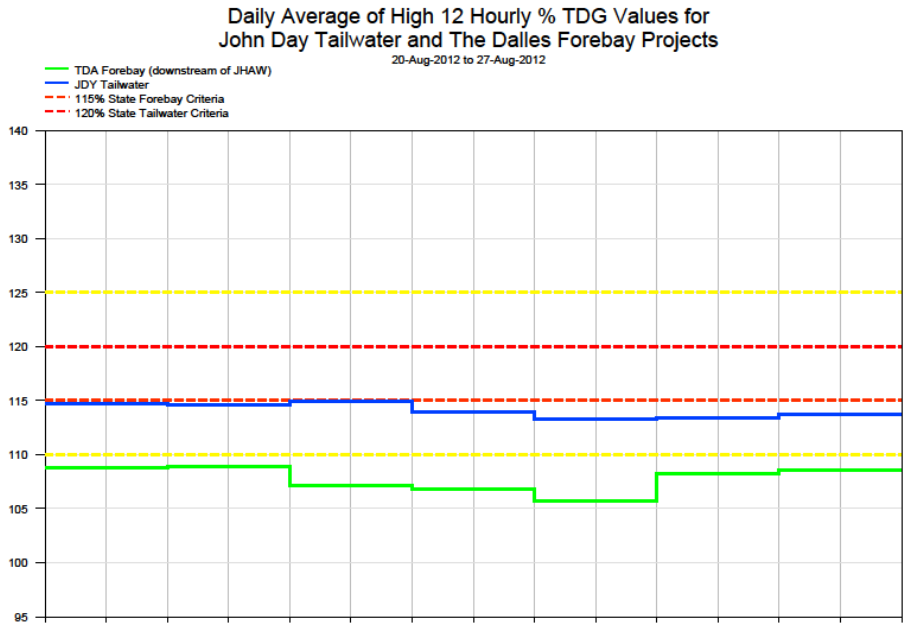

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
08/20/12 01:00
08/20/12 13:00
08/21/12 01:00
08/21/12 13:00
08/22/12 01:00
08/22/12 13:00
08/23/12 01:00
08/23/12 13:00
08/24/12 01:00
08/24/12 13:00
08/25/12 01:00
08/25/12 13:00
08/26/12 01:00
08/26/12 13:00
08/27/12 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
50% of Total Flow

Figure 30


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
20-Aug-2012 to 27-Aug-2012
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

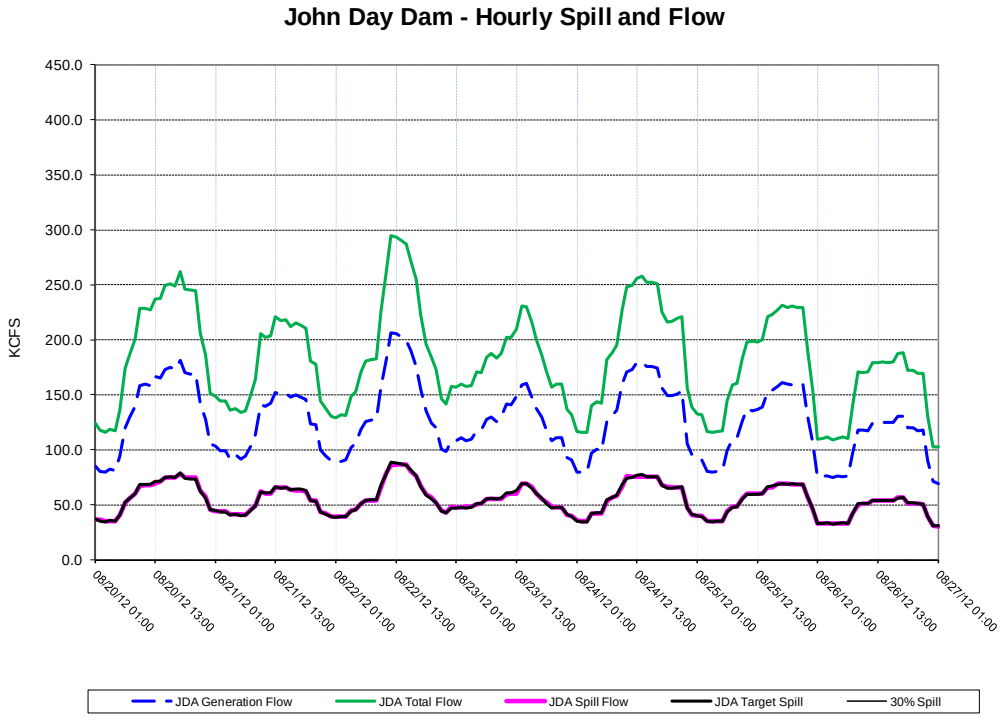
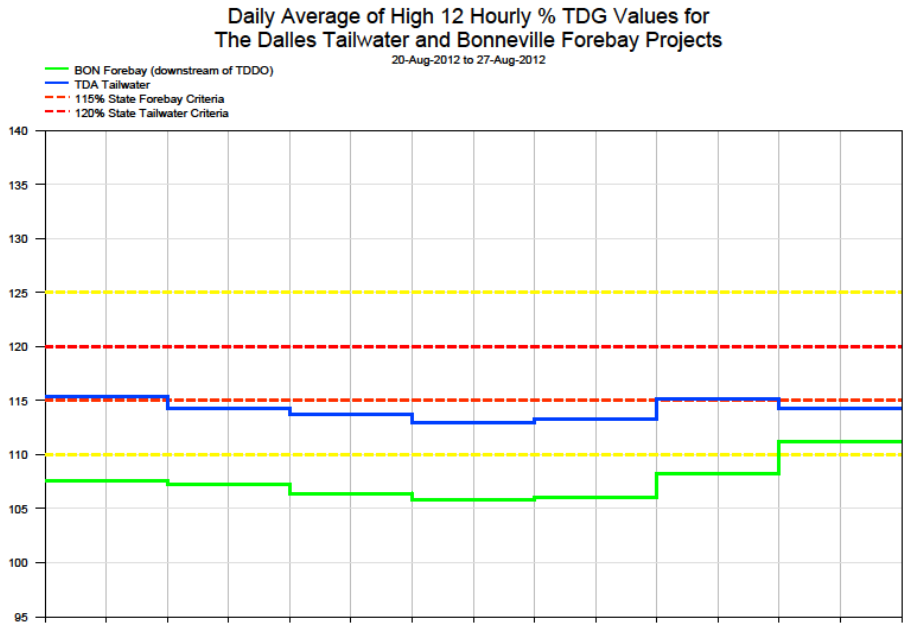

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
08/20/12 01:00
08/20/12 13:00
08/21/12 01:00
08/21/12 13:00
08/22/12 01:00
08/22/12 13:00
08/23/12 01:00
08/23/12 13:00
08/24/12 01:00
08/24/12 13:00
08/25/12 01:00
08/25/12 13:00
08/26/12 01:00
08/26/12 13:00
08/27/12 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% Spill

Figure 31


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
20-Aug-2012 to 27-Aug-2012
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

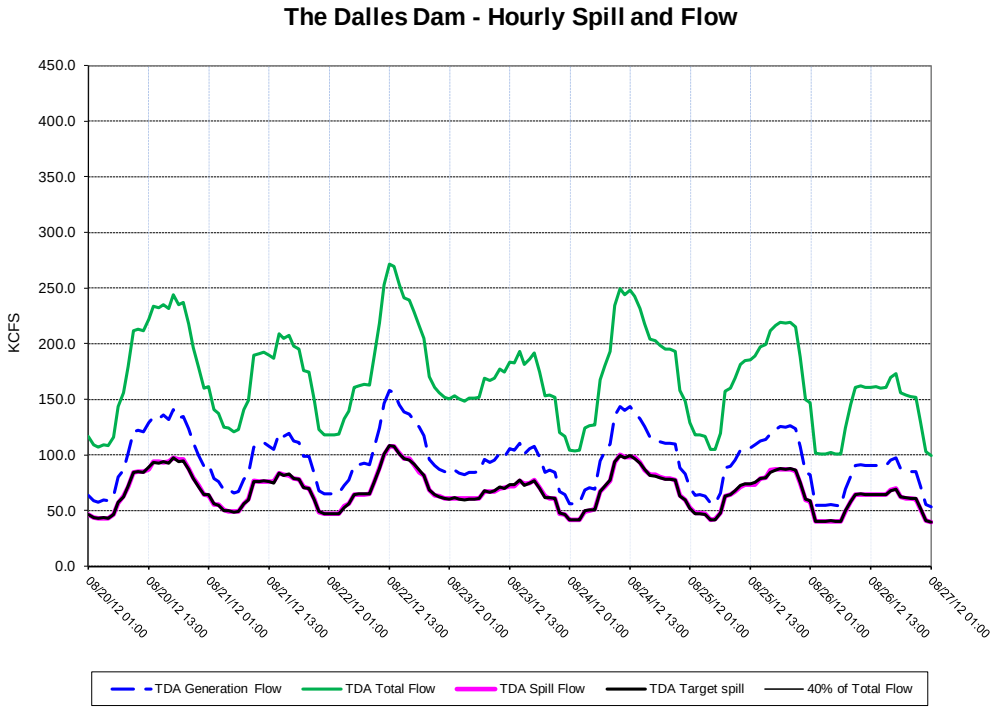
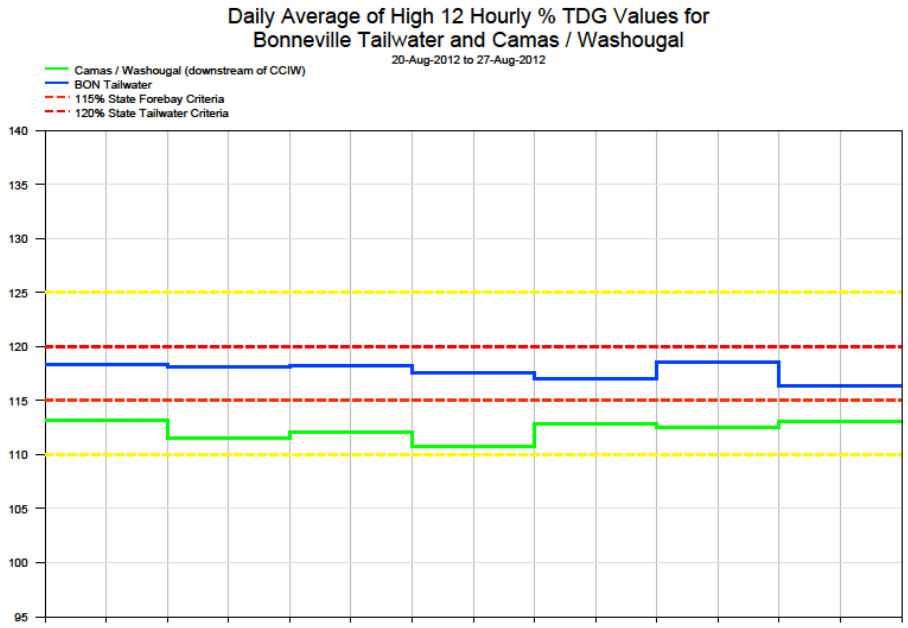

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
08/20/12 01:00
08/20/12 13:00
08/21/12 01:00
08/21/12 13:00
08/22/12 01:00
08/22/12 13:00
08/23/12 01:00
08/23/12 13:00
08/24/12 01:00
08/24/12 13:00
08/25/12 01:00
08/25/12 13:00
08/26/12 01:00
08/26/12 13:00
08/27/12 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 32


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
20-Aug-2012 to 27-Aug-2012
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

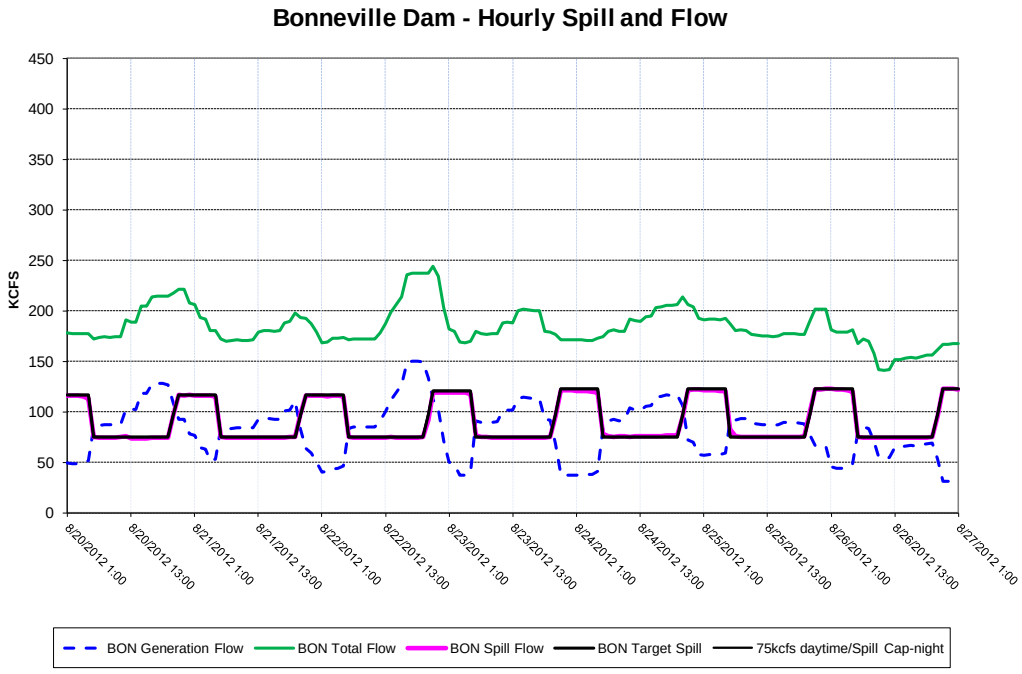
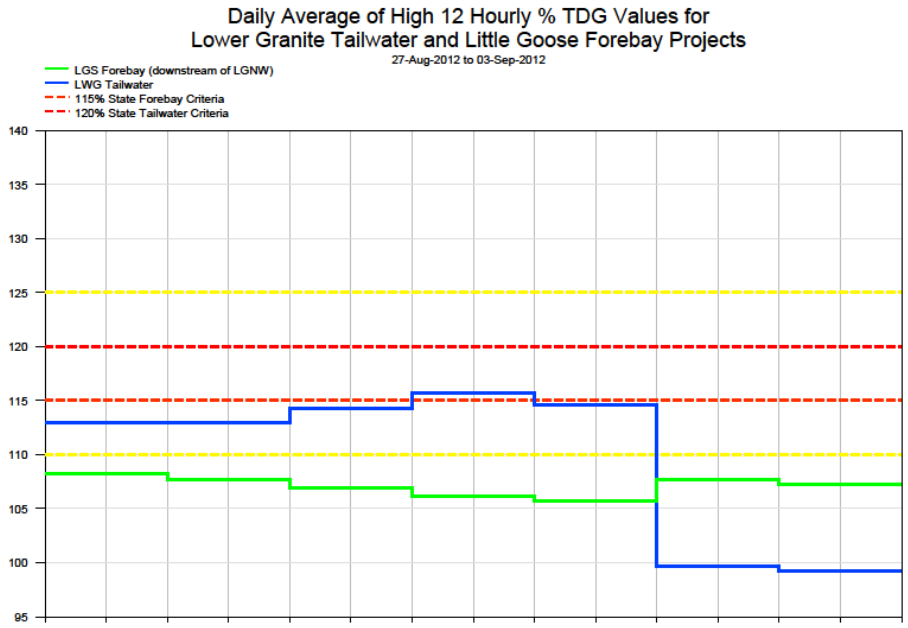

Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
8/20/2012 1:00
8/20/2012 13:00
8/21/2012 1:00
8/21/2012 13:00
8/22/2012 1:00
8/22/2012 13:00
8/23/2012 1:00
8/23/2012 13:00
8/24/2012 1:00
8/24/2012 13:00
8/25/2012 1:00
8/25/2012 13:00
8/26/2012 1:00
8/26/2012 13:00
8/27/2012 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
75kcfs daytime/Spill Cap-night

Figure 33


Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects
27-Aug-2012 to 03-Sep-2012
LGS Forebay (downstream of LGNW)
LWG Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

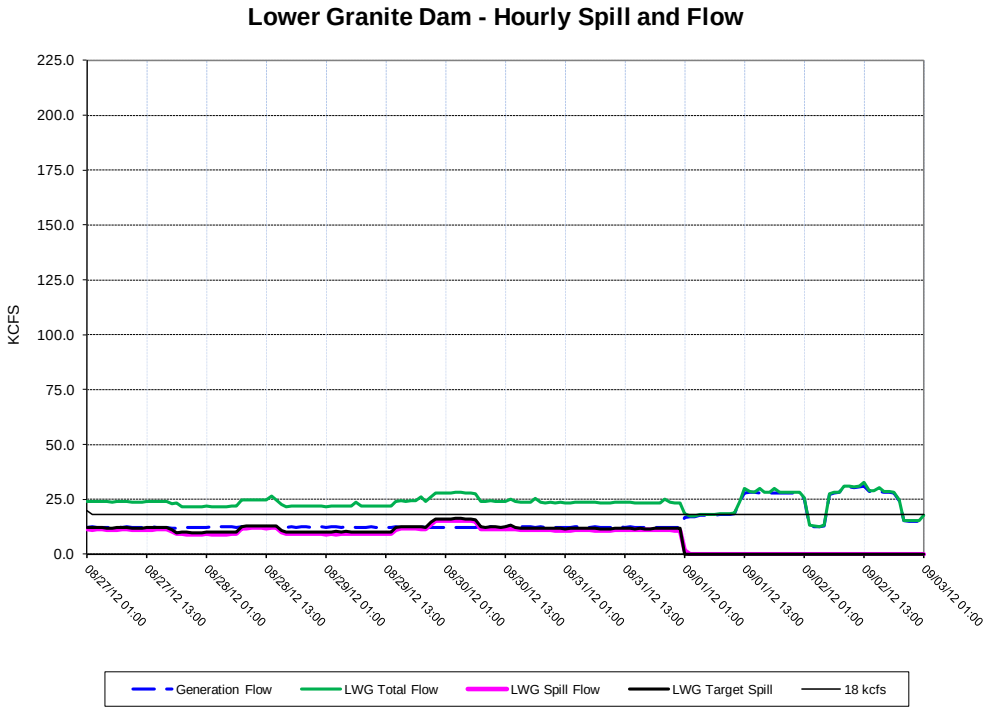
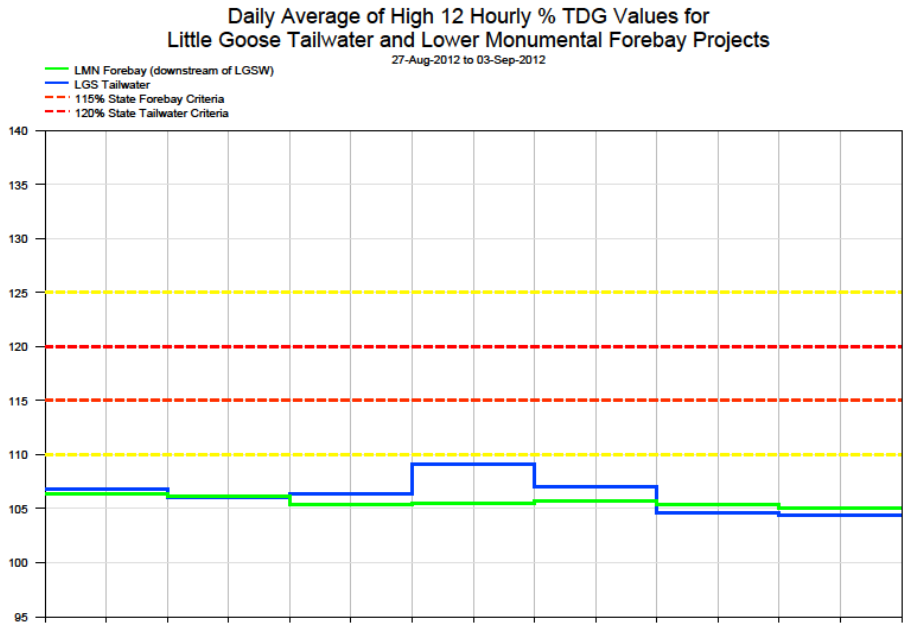

Lower Granite Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/27/12 01:00
08/27/12 13:00
08/28/12 01:00
08/28/12 13:00
08/29/12 01:00
08/29/12 13:00
08/30/12 01:00
08/30/12 13:00
08/31/12 01:00
08/31/12 13:00
09/01/12 01:00
09/01/12 13:00
09/02/12 01:00
09/02/12 13:00
09/03/12 01:00
Generation Flow
LWG Total Flow
LWG Spill Flow
LWG Target Spill
18 kcfs

Figure 34


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
27-Aug-2012 to 03-Sep-2012
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

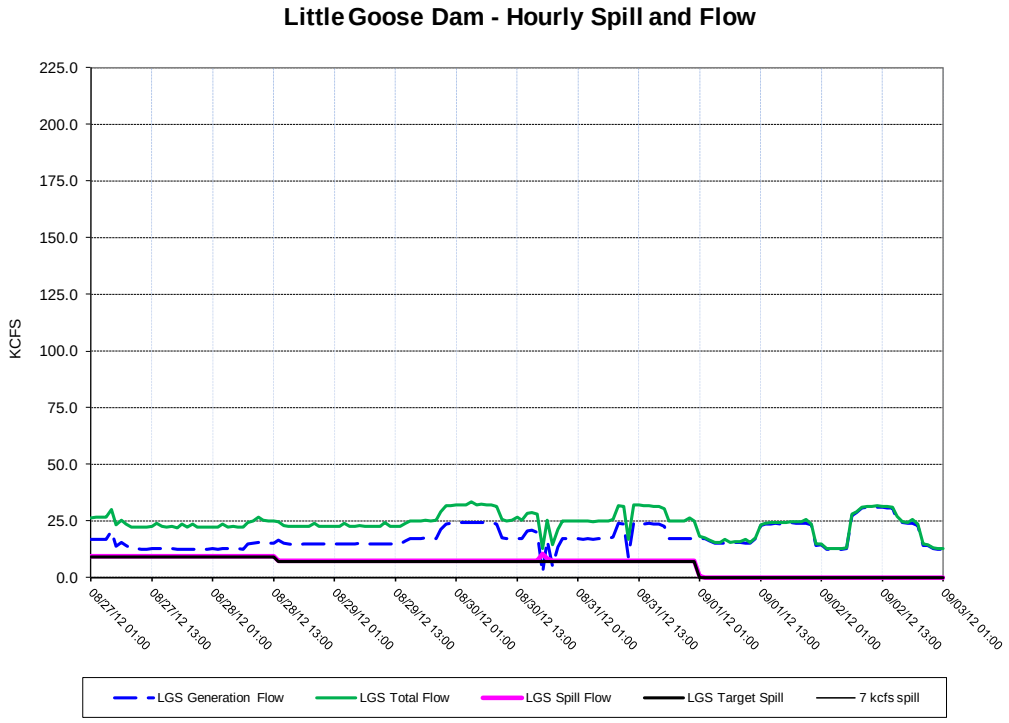
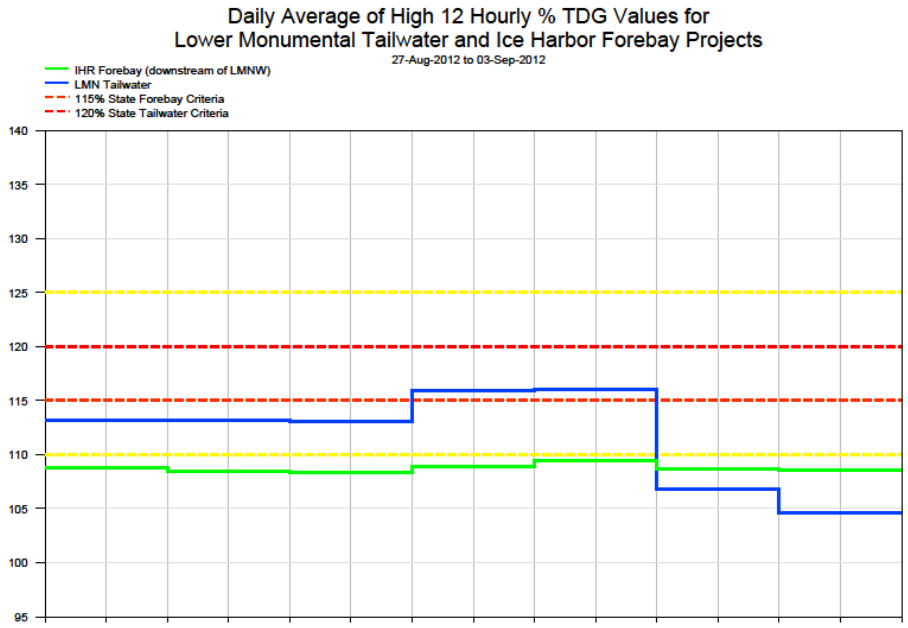

Little Goose Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/27/12 01:00
08/27/12 13:00
08/28/12 01:00
08/28/12 13:00
08/29/12 01:00
08/29/12 13:00
08/30/12 01:00
08/30/12 13:00
08/31/12 01:00
08/31/12 13:00
09/01/12 01:00
09/01/12 13:00
09/02/12 01:00
09/02/12 13:00
09/03/12 01:00
LGS Generation Flow
LGS Total Flow
LGS Spill Flow
LGS Target Spill
7 kcfs spill

Figure 35


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
27-Aug-2012 to 03-Sep-2012
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

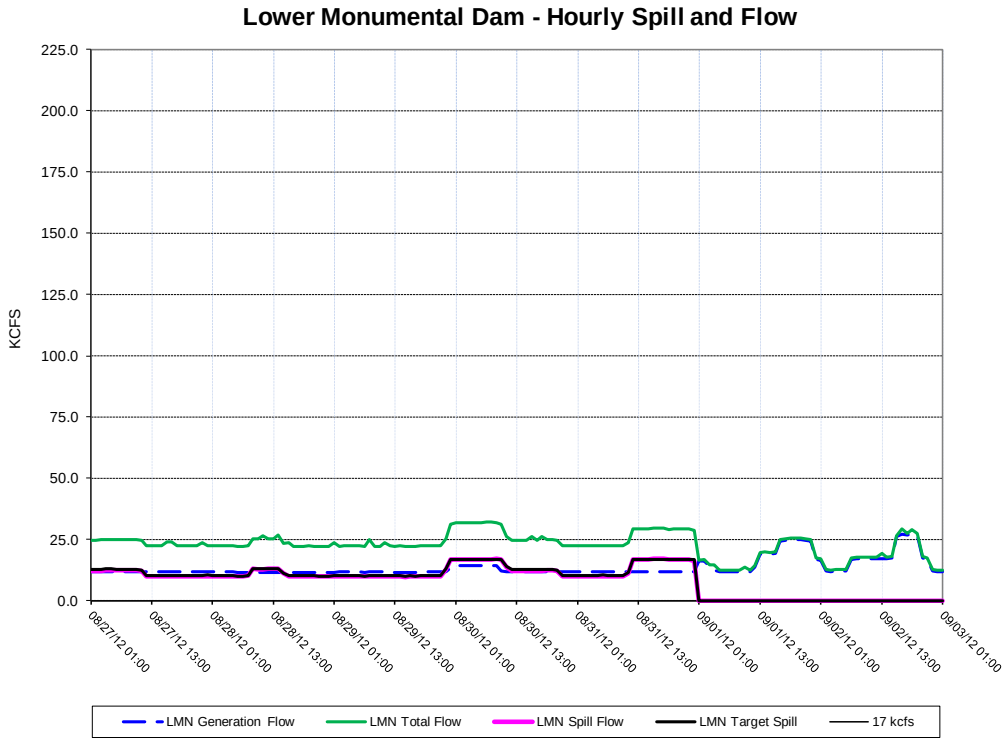
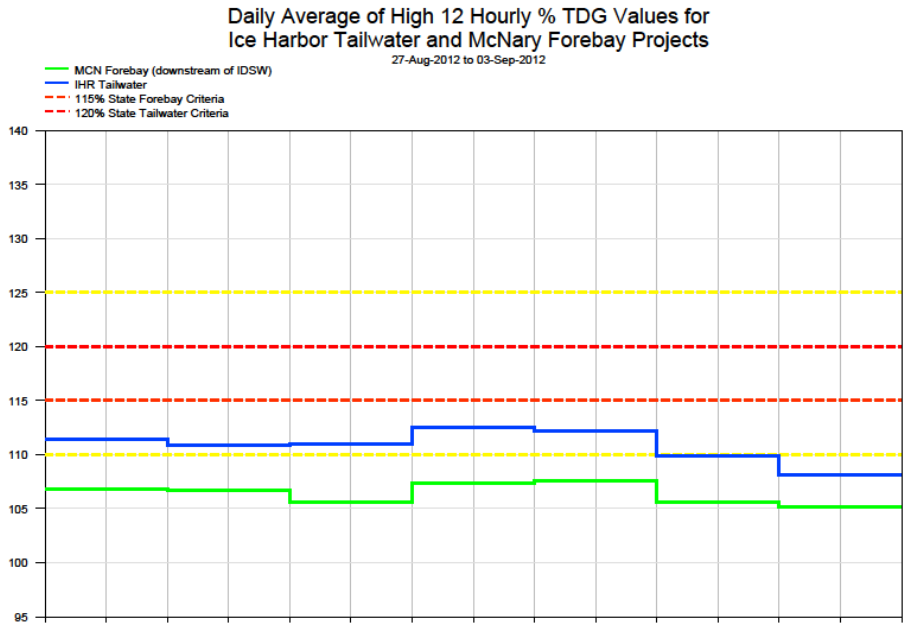

Lower Monumental Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/27/12 01:00
08/27/12 13:00
08/28/12 01:00
08/28/12 13:00
08/29/12 01:00
08/29/12 13:00
08/30/12 01:00
08/30/12 13:00
08/31/12 01:00
08/31/12 13:00
09/01/12 01:00
09/01/12 13:00
09/02/12 01:00
09/02/12 13:00
09/03/12 01:00
LMN Generation Flow
LMN Total Flow
LMN Spill Flow
LMN Target Spill
17 kcfs

Figure 36


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
27-Aug-2012 to 03-Sep-2012
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

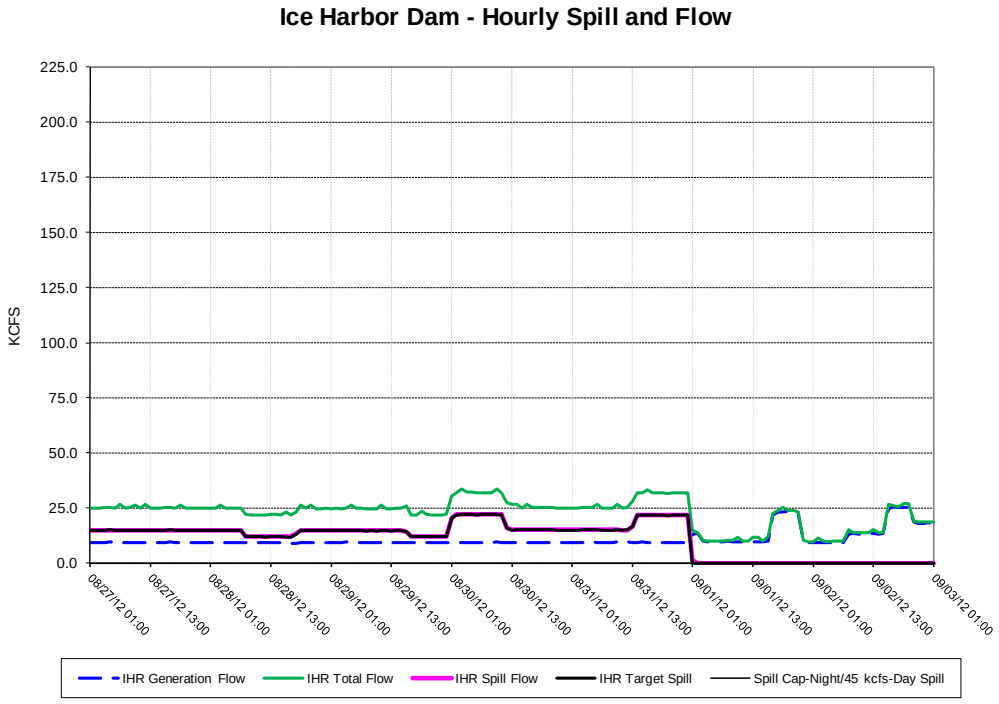
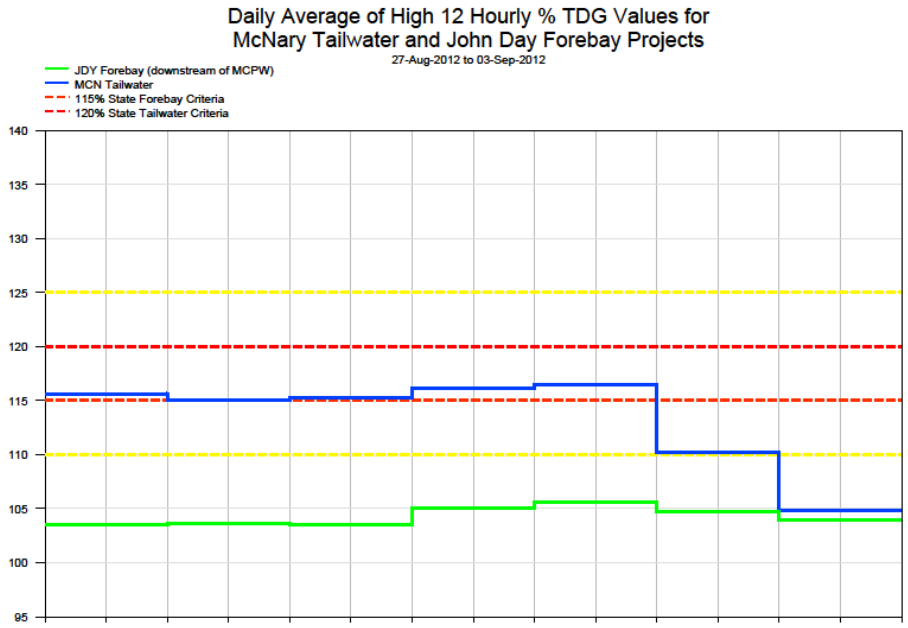

Ice Harbor Dam - Hourly Spill and Flow
KCFS
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
08/27/12 01:00
08/27/12 13:00
08/28/12 01:00
08/28/12 13:00
08/29/12 01:00
08/29/12 13:00
08/30/12 01:00
08/30/12 13:00
08/31/12 01:00
08/31/12 13:00
09/01/12 01:00
09/01/12 13:00
09/02/12 01:00
09/02/12 13:00
09/03/12 01:00
IHR Generation Flow
IHR Total Flow
IHR Spill Flow
IHR Target Spill
Spill Cap-Night/45 kcfs-Day Spill

Figure 37


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
27-Aug-2012 to 03-Sep-2012
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

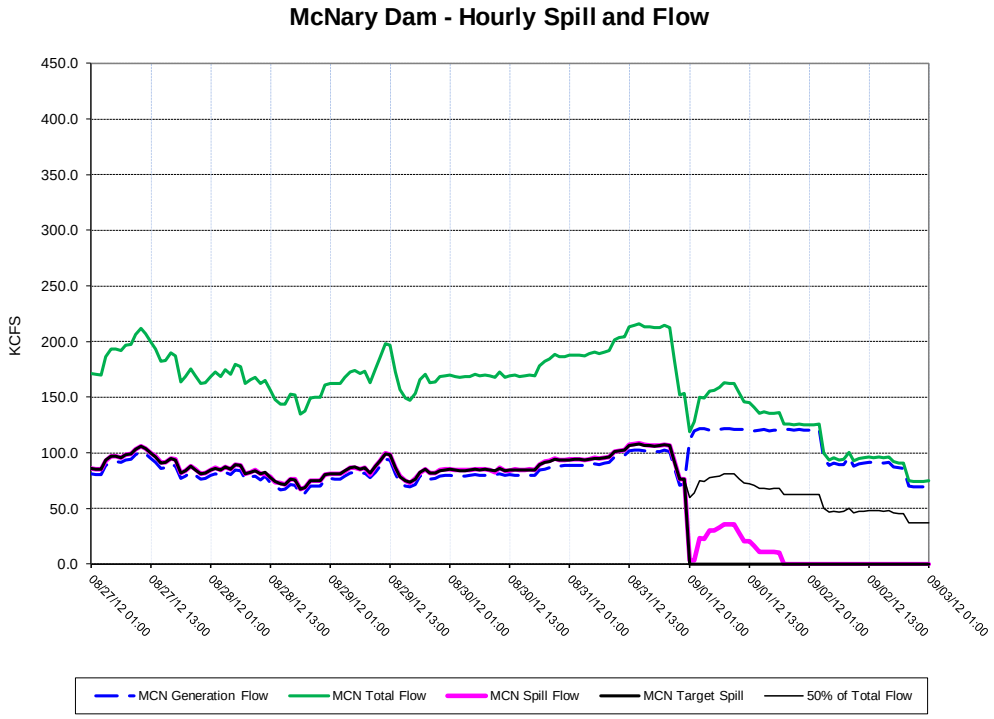
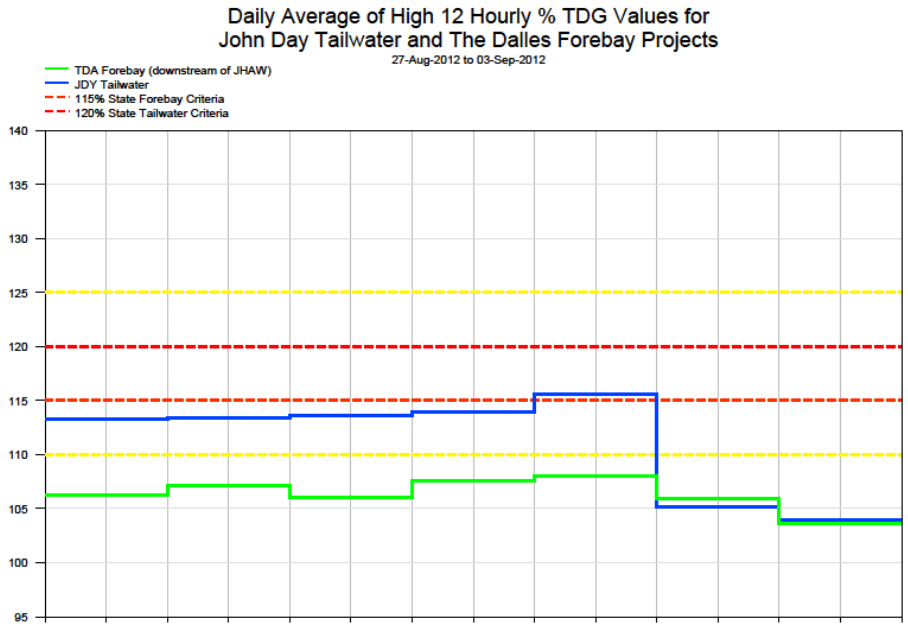

McNary Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
08/27/12 01:00
08/27/12 13:00
08/28/12 01:00
08/28/12 13:00
08/29/12 01:00
08/29/12 13:00
08/30/12 01:00
08/30/12 13:00
08/31/12 01:00
08/31/12 13:00
09/01/12 01:00
09/01/12 13:00
09/02/12 01:00
09/02/12 13:00
09/03/12 01:00
MCN Generation Flow
MCN Total Flow
MCN Spill Flow
MCN Target Spill
50% of Total Flow

Figure 38


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
27-Aug-2012 to 03-Sep-2012
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

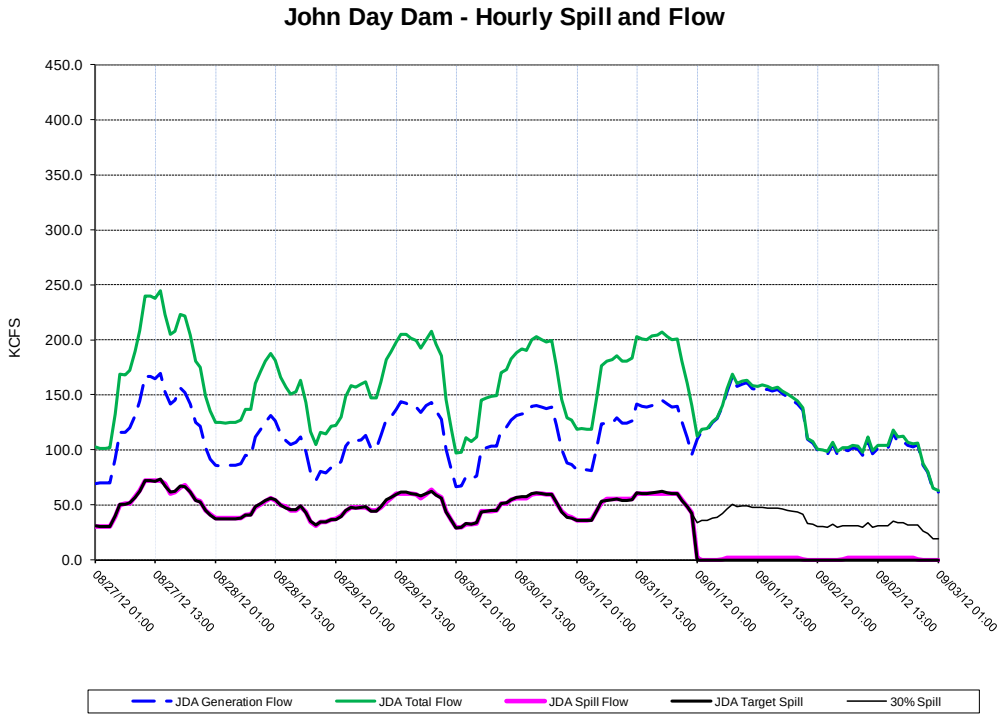
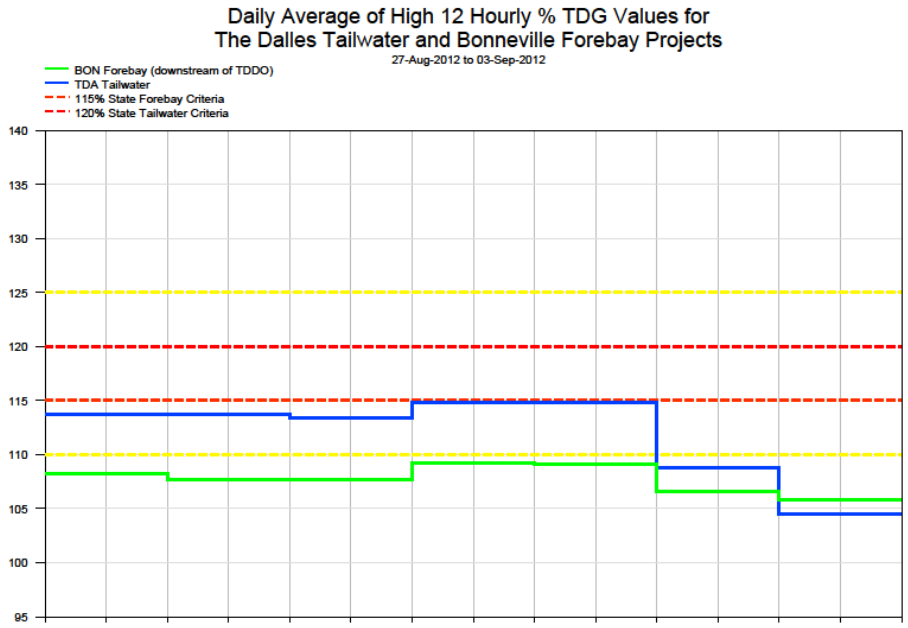

John Day Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
08/27/12 01:00
08/27/12 13:00
08/28/12 01:00
08/28/12 13:00
08/29/12 01:00
08/29/12 13:00
08/30/12 01:00
08/30/12 13:00
08/31/12 01:00
08/31/12 13:00
09/01/12 01:00
09/01/12 13:00
09/02/12 01:00
09/02/12 13:00
09/03/12 01:00
JDA Generation Flow
JDA Total Flow
JDA Spill Flow
JDA Target Spill
30% Spill

Figure 39


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
27-Aug-2012 to 03-Sep-2012
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95

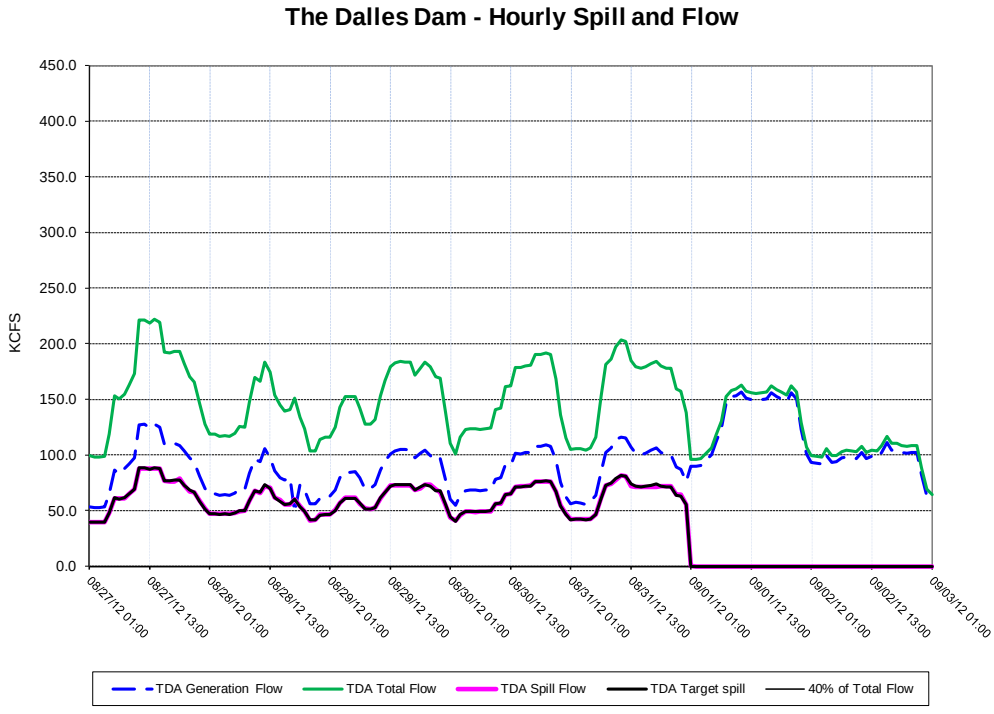
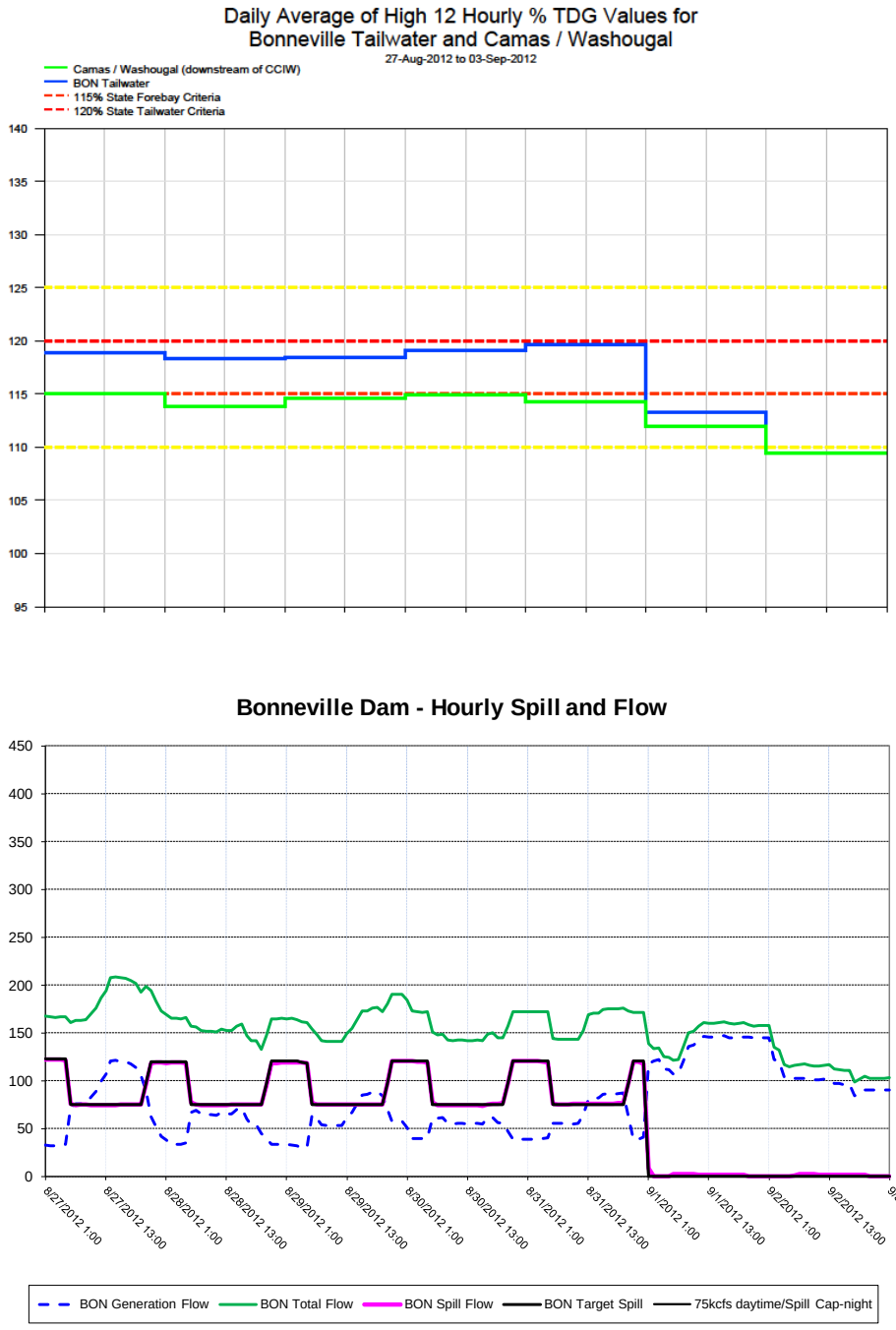

The Dalles Dam - Hourly Spill and Flow
KCFS
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
08/27/12 01:00
08/27/12 13:00
08/28/12 01:00
08/28/12 13:00
08/29/12 01:00
08/29/12 13:00
08/30/12 01:00
08/30/12 13:00
08/31/12 01:00
08/31/12 13:00
09/01/12 01:00
09/01/12 13:00
09/02/12 01:00
09/02/12 13:00
09/03/12 01:00
TDA Generation Flow
TDA Total Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 40


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
27-Aug-2012 to 03-Sep-2012
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
140
135
130
125
120
115
110
105
100
95
Bonneville Dam - Hourly Spill and Flow
KCFS
450
400
350
300
250
200
150
100
50
0
8/27/2012 1:00
8/27/2012 13:00
8/28/2012 1:00
8/28/2012 13:00
8/29/2012 1:00
8/29/2012 13:00
8/30/2012 1:00
8/30/2012 13:00
8/31/2012 1:00
8/31/2012 13:00
9/1/2012 1:00
9/1/2012 13:00
9/2/2012 1:00
9/2/2012 13:00
9/3/2012 1:00
BON Generation Flow
BON Total Flow
BON Spill Flow
BON Target Spill
75kcfs daytime/Spill Cap-night

Average Percent TDG for Highest 12-Hours: July 30 – August 31, 2012

Date	FIXED MONITORING STATIONS																
	LWG	LGNW	LGSA	LGSW	LMNA	LMNW	IHRA	IDSW	MCNA	MCPW	JDY	JHAW	TDA	TDDO	BON	CCIW	CWMW
7/30/2012	103.1	116.3	111.3	113.1	109.8	118.3	111.8	113.8	113.9	119.4	109.9	117.5	111.3	119.2	111.3	120.6	112.6
7/31/2012	102.6	115.7	111.3	113	109.4	116.7	111.1	114.3	113.1	118.5	107.9	118.1	109.8	118.2	111.4	122.3	116.1
8/1/2012	102	115.8	111.9	113.4	110.3	116.7	111.5	113.9	112.7	118.6	108	114.6	110.4	117.2	109.9	118.9	116.3
8/2/2012	101.9	115.9	113.3	113.9	110.7	116.8	111.6	114	113.3	118.5	107.4	114.8	108.1	115.2	109.5	118.3	112.4
8/3/2012	101.4	116.1	112.4	113.3	110.7	117.4	112.2	113.8	114	119.1	107.8	115	108.6	116.5	111	118.6	114
8/4/2012	101.3	116.3	111.4	113.1	111	116.6	112.5	114.1	114.6	117.8	109.2	114.5	110.1	116.8	113.1	118.8	112.5
8/5/2012	101.3	116.1	112.8	113.3	110.7	116.3	112.7	113.1	115.1	118.5	110.7	114.5	110.8	117	115	118.8	110.8
8/6/2012	101.5	116.2	112.4	112.1	110.7	116.7	112.7	114.2	114	118.4	111.1	115.1	110.7	117.4	113.3	118.5	•
8/7/2012	102	116.4	112.2	110.5	112.1	116.6	113.7	114.6	114.4	118.5	112.4	115.2	111	117.2	111.3	118.6	113.2
8/8/2012	102.2	115.5	111.6	109.3	111.3	116	113.2	113.6	113.9	118.1	111.5	115.5	109.7	115.8	108.7	118.6	112.1
8/9/2012	103.1	115.9	111.6	109.9	110.5	115.6	112.5	112.7	112.1	118.6	109.8	115.2	109.5	116	108.3	119	112.7
8/10/2012	103.1	115.3	111.8	109.4	109.9	116.4	112.6	114.1	110.8	118.3	109	114.8	109.9	116.2	108.5	118.6	112.5
8/11/2012	103.4	114.9	111.6	109	108.6	116.4	111.7	114	112.1	118.1	108.2	114.8	109.6	115.4	109.6	118.8	114.2
8/12/2012	103.4	115.2	111.6	107.5	108.2	116	111.3	113.9	112	118.1	108.1	115	110.4	117.1	112.5	119.1	114.9
8/13/2012	103.2	118	111.4	110	108.1	113.8	111.5	112.1	113.2	118.6	108.5	114.8	110	116.6	112.8	118.9	114.5
8/14/2012	103.7	118	111.5	108.2	108.6	115	112.6	112.3	113.1	118.5	110.5	114.6	108.8	115.6	111	118.4	113.8
8/15/2012	103.4	118.1	111.5	108.3	108.1	115.1	112.7	112.3	113.6	117.8	110.9	115.2	109.8	116.4	110	118.2	114.7
8/16/2012	103	118	111.5	107.8	107.5	114	112.8	111.9	110.4	116.2	110.6	115.6	111.4	117.2	111	118.8	112.2
8/17/2012	102.8	115.3	111.5	108	107.1	114.6	112.5	111.8	110.5	117.2	111.3	114.6	112.1	117.6	114.1	118.7	116.7
8/18/2012	103.5	115.8	112.7	107.8	107.1	115.3	111.7	113.4	109.9	117.1	111.2	115.6	111.8	116.7	114.3	118.8	114.2
8/19/2012	103.4	112.9	113.3	107.9	107.9	113.2	110.9	112.3	110.4	117.4	110.9	114.7	110.1	115.4	111.3	118.4	113.7
8/20/2012	102.6	113.2	113.3	109.1	107.7	113.5	110.5	112.3	111.6	117	109.6	114.6	108.8	115.3	107.6	118.4	113.2
8/21/2012	102.5	115.9	113.3	110.1	108.1	115.9	110.5	112.9	111.2	116.7	108.7	114.6	108.8	114.3	107.3	118.3	111.5
8/22/2012	101.8	113.6	113.7	108.6	107.8	113.7	110.4	112	109.1	117	106.7	114.9	107.1	113.7	106.4	118.3	112
8/23/2012	102.1	113.5	112.6	108.6	107.6	113.8	110.6	111.2	109.2	116.2	105.1	114	106.8	112.9	105.8	117.7	110.7
8/24/2012	101.4	113.7	111.9	107.3	106.6	112.8	109.2	111.5	106.4	116.3	103.7	113.3	105.7	113.2	106	117.2	112.8
8/25/2012	102	113.6	109.2	107.8	106.2	115	109.6	112.2	107.7	116.5	104.9	113.4	108.2	115.2	108.3	118.6	112.5
8/26/2012	101.8	113.8	108.3	107	107.1	113.6	109.9	112.7	107.5	114.9	104.8	113.7	108.5	114.3	111.2	116.5	113.1
8/27/2012	100.6	113	108.3	106.8	106.4	113.2	108.8	111.4	106.8	115.6	103.5	113.3	106.2	113.8	108.2	119	115
8/28/2012	100	112.9	107.7	106.1	106.2	113.2	108.5	110.9	106.7	115	103.6	113.4	107.2	113.8	107.7	118.4	113.8
8/29/2012	100	114.3	106.9	106.3	105.3	113	108.3	110.9	105.5	115.2	103.5	113.6	106	113.4	107.7	118.6	114.6
8/30/2012	100.4	115.7	106.1	109.1	105.5	115.9	108.9	112.5	107.4	116.2	105	113.9	107.6	114.8	109.2	119.3	114.9
8/31/2012	100.6	114.6	105.7	107.1	105.8	116	109.4	112.2	107.6	116.5	105.5	115.6	108.1	114.8	109.1	119.8	114.3

Generated: Sat Sep 1 23:26:57 2012

Red text denotes exceedances.

• indicates no data due to malfunctioning gauge

- indicates gauge is out of service for winter

Dates run from hour 1 to 24 (not 0 to 23).

The gas caps shown only apply when spilling to facilitate juvenile fish passage ("voluntary spill") between April 3rd and August 31st. At all other times, the gas cap is 110%.

Total Dissolved Gas Monitoring Stations

Code	Station Name
LWG	Lower Granite Forebay
LGNW	Lower Granite Tailwater
LGSA	Little Goose Forebay
LGSW	Little Goose Tailwater
LMNA	Lower Monumental Forebay
LMNW	Lower Monumental Tailwater
IHRA	Ice Harbor Forebay
IDSW	Ice Harbor Tailwater
MCNA	McNary Forebay
MCPW	McNary Tailwater
JDY	John Day Forebay
JHAW	John Day Tailwater
TDA	The Dalles Forebay
TDDO	The Dalles Tailwater
BON	Bonneville Forebay
CCIW	Bonneville Tailwater (Cascade Island)
CWMW	Camas / Washougal