



# FISH PASSAGE CENTER

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## MEMORANDUM

TO: Bill Tweit, WDFW  
Guy Norman, WDFW

*Michele DeHart*

FROM: Michele DeHart

DATE: June 10, 2011

RE: Columbia & Snake Rivers Smolt Monitoring Program Gas Bubble Trauma – June 9, 2011 Update

In response to your request the FPC staff has updated the June 3, 2011 memo titled: Columbia & Snake Rivers Smolt Monitoring Program Gas Bubble Trauma (June 2, 2011 Update), with data collected over the past week. Below is a list of the results from the GBT monitoring over the past week, followed by data for GBT monitoring for the 2011 season so far.

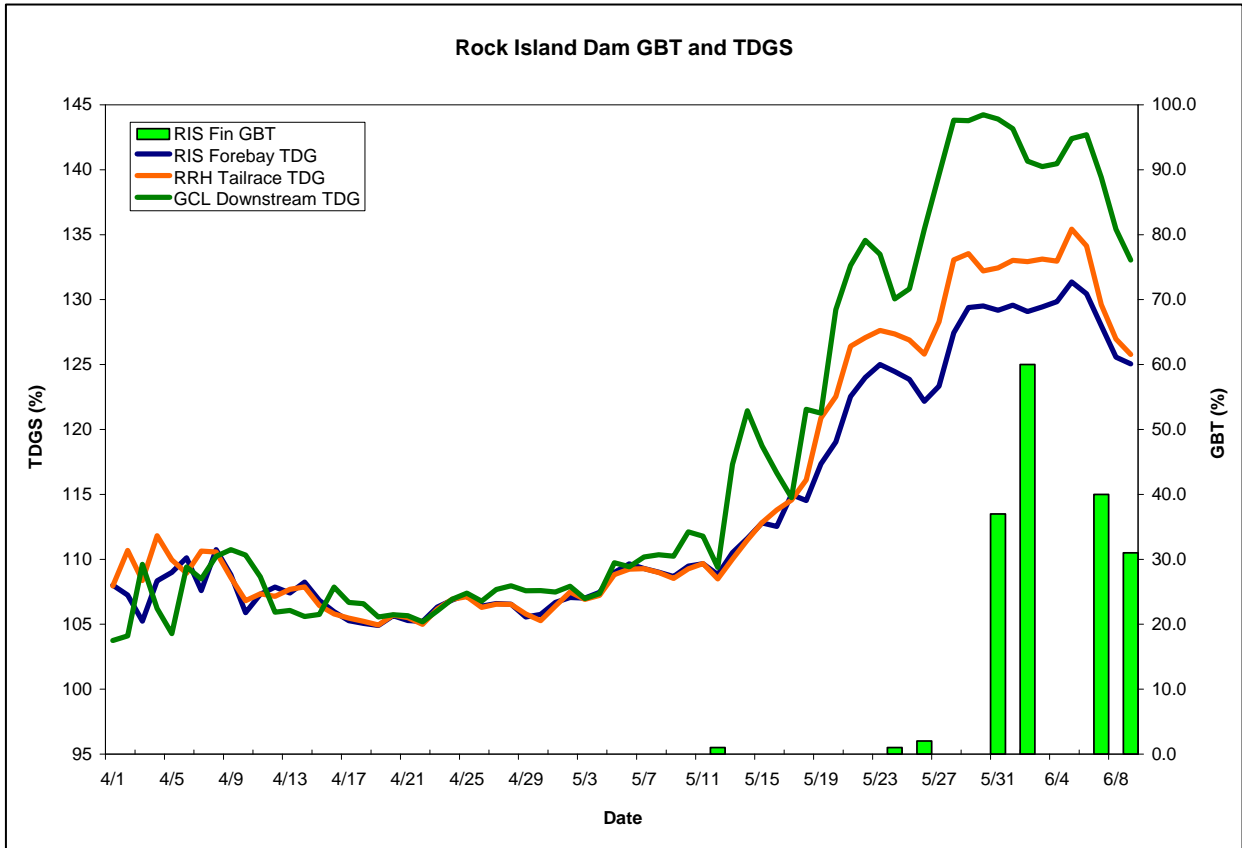
- The present spill and flow levels continue to be the result of the high run-off volume.
- The river system continues to be managed for flood control, with a target flow of 480 Kcfs at The Dalles Dam. The 480 Kcfs flood control target at The Dalles Dam exceeds the 7Q10 flow.
- Over the past week, total dissolved gas levels continued to exceed the 115/120% at almost all projects in the Mid Columbia, Snake and lower Columbia rivers, with the exception of the LGR forebay, LGR tailrace (June 1-3), LGS forebay (June 2-4 and June 7-8), and MCN forebay (June 8).
- Compared to last week, levels of gas bubble trauma have decreased at all SMP GBT monitoring sites this week. GBT monitoring results over the past week are as follows:
  - LGR – No signs of GBT
  - LGS – Monitoring resumed this week with 1% GBT incidence on June 6<sup>th</sup>
  - LMN – 1% GBT incidence on June 8<sup>th</sup>
  - MCN – 5% GBT incidence on June 3<sup>rd</sup>, 0% on June 5<sup>th</sup>, and 1% on June 9<sup>th</sup>
  - BON – 2.9% GBT incidence on June 4<sup>th</sup> and 0% incidence on June 7<sup>th</sup>

- RIS – 40% GBT incidence on June 7<sup>th</sup> and 31% incidence on June 9<sup>th</sup>
- The only project with GBT incidence above the criteria for the curtailment of spill was RIS. However, despite meeting the 15% fin GBT action criterion, all Snake and Columbia River projects are operating under uncontrolled spill and, thus, specific actions to curtail spill are not available. The 5% severe fin GBT action criterion has not been met at any of the GBT monitoring sites.

### **GBT Monitoring:**

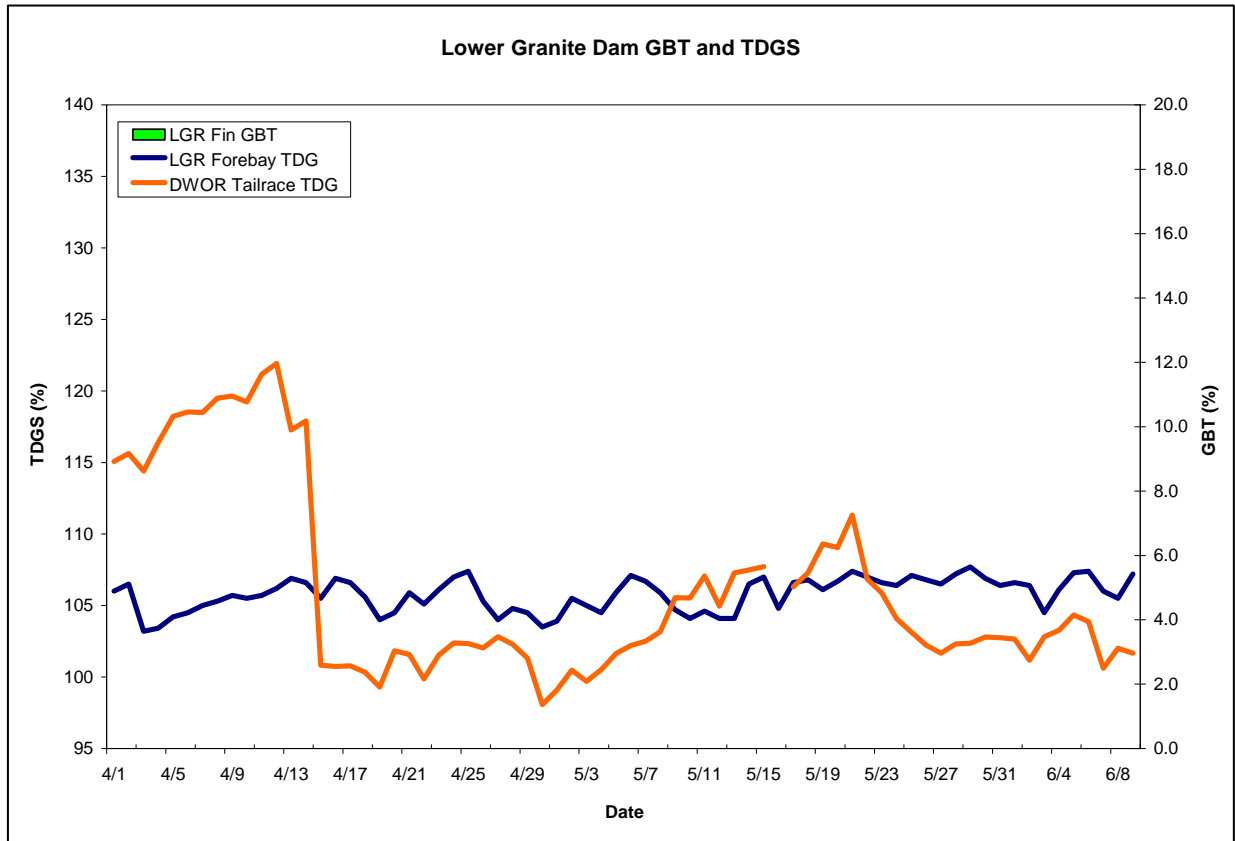
As part of the state TDG waivers, biological monitoring for Gas Bubble Trauma (GBT) is conducted throughout the Mid-Columbia, Snake, and Lower Columbia rivers. There are two action criteria for the curtailment of voluntary spill under this biological monitoring. First, spill can be curtailed if 15% of the examined fish show signs of fin GBT, regardless of their rank. Second, spill can be curtailed if 5% of the examined fish show severe signs ( $\geq 26\%$  fin occlusion) of GBT. GBT monitoring at each of the sites typically takes place once or twice a week.

Rock Island Dam is the only site in the Mid-Columbia River where GBT examinations are conducted as part of the GBT monitoring program. These examinations are typically conducted twice a week. To date, the 12-hour average TDG levels (based on Oregon methodology) in the Rock Island Dam forebay (RIS) have ranged from 104.9 to 131.4%. These 12-hour average TDG levels in the Rocky Reach Dam tailrace (RRTW) and downstream of Grand Coulee Dam (GCL) have ranged from 104.9 to 135.4% and 103.7 and 144.2%, respectively. GBT incidences at Rock Island Dam have decreased over the past week. On June 7<sup>th</sup> the GBT incidence level was 40%, followed by 31% incidence on June 9<sup>th</sup> (Figure 1). These levels of incidence are much lower than the 60% incidence that was found on June 2<sup>nd</sup>. However, the both samples for this week exceeded the 15% GBT criterion for the curtailment of spill. The levels of severe fin GBT remain below the 5% criterion (3% severe fin GBT on June 7<sup>th</sup> and 0% severe fin GBT on June 9<sup>th</sup>).



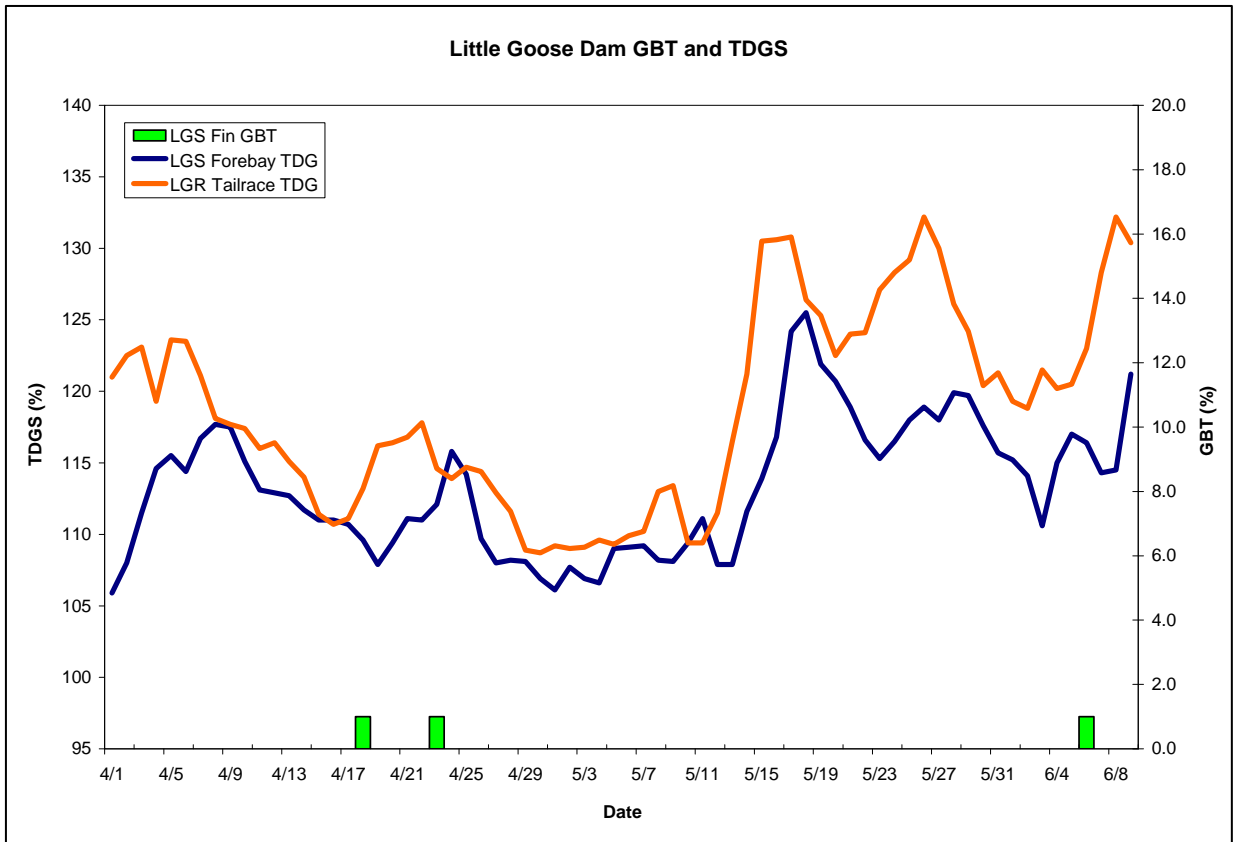
**Figure 1.** Percent of fish examined at Rock Island Dam showing signs of fin GBT with associated dissolved gas saturation levels in the Rock Island Dam forebay, the Rocky Reach Dam tailrace, and downstream of Grand Coulee Dam.

Gas Bubble Trauma monitoring takes place at three sites in the Snake River: Lower Granite, Little Goose, and Lower Monumental dams. These examinations are typically conducted once a week at each site. GBT monitoring at Lower Granite Dam can be considered a baseline estimate, as there is little TDG production from the projects above LGR. To date, the 12-hour average TDG levels (based on Oregon methodology) in the Lower Granite Dam forebay have ranged from 103.2 to 107.7%, while the 12-hour average TDG levels in Dworshak Dam tailrace have ranged from 98.1 to 121.9%. To date, GBT monitoring at Lower Granite Dam has revealed no incidences of GBT (Figure 2).



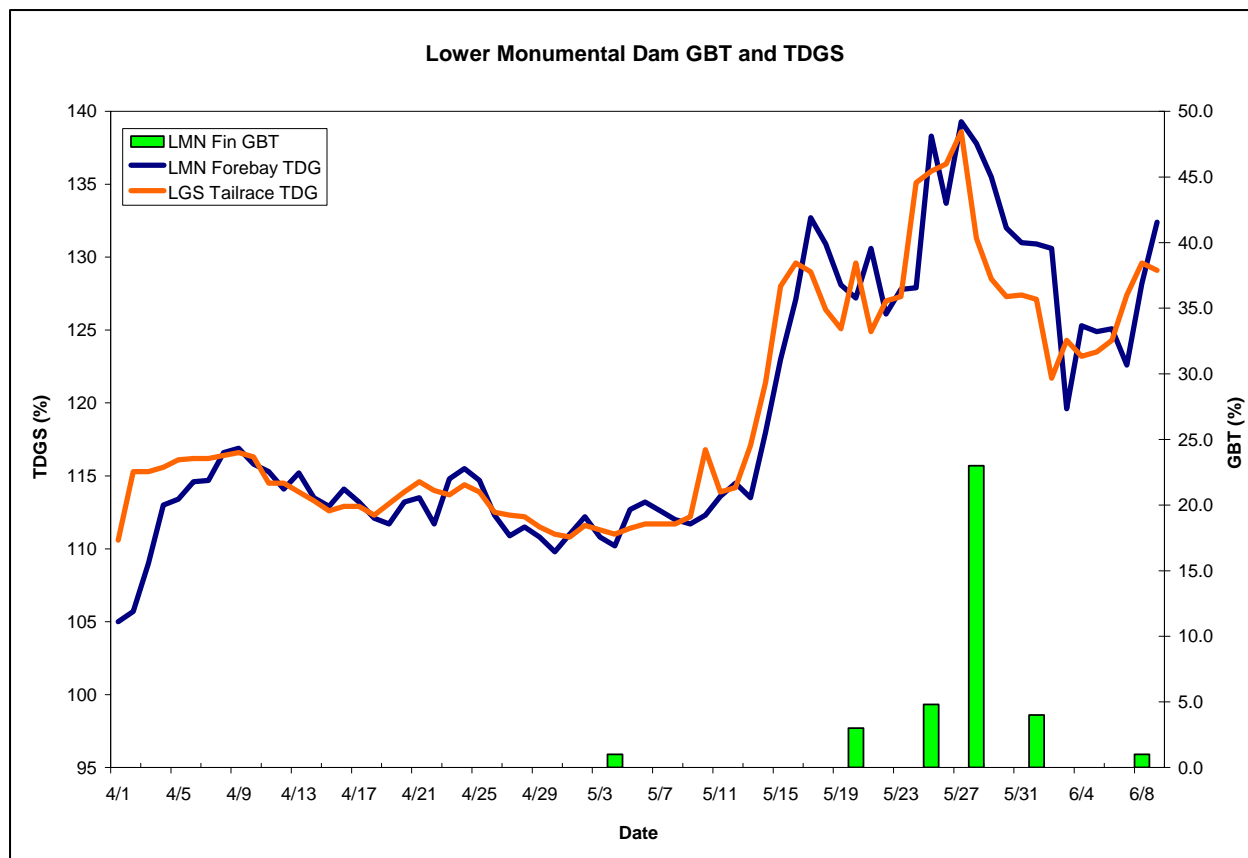
**Figure 2.** Percent of fish examined at Lower Granite Dam showing signs of fin GBT with associated dissolved gas saturation levels in the Lower Granite Dam forebay and the Dworshak Dam tailrace.

To date, the 12-hour average TDG levels (based on Oregon methodology) in the Little Goose Dam forebay have ranged from 105.9 to 125.5%, while the 12-hour average TDG levels in Lower Granite Dam tailrace have ranged from 108.7 to 132.2%. Gas Bubble Trauma monitoring at Little Goose Dam has revealed low incidence of GBT, with a maximum incidence level of 1% of the examined fish on April 18<sup>th</sup>, April 23<sup>rd</sup>, and June 6<sup>th</sup> (Figure 3). However, it is important to note that, GBT monitoring at LGS did not take place during the full powerhouse outage from May 24<sup>th</sup> to June 1<sup>st</sup>. The first examination after powerhouse operations were restored (June 6<sup>th</sup>) revealed a 1% incidence of GBT.



**Figure 3.** Percent of fish examined at Little Goose Dam showing signs of fin GBT with associated dissolved gas saturation levels in the Little Goose Dam forebay and the Lower Granite Dam tailrace.

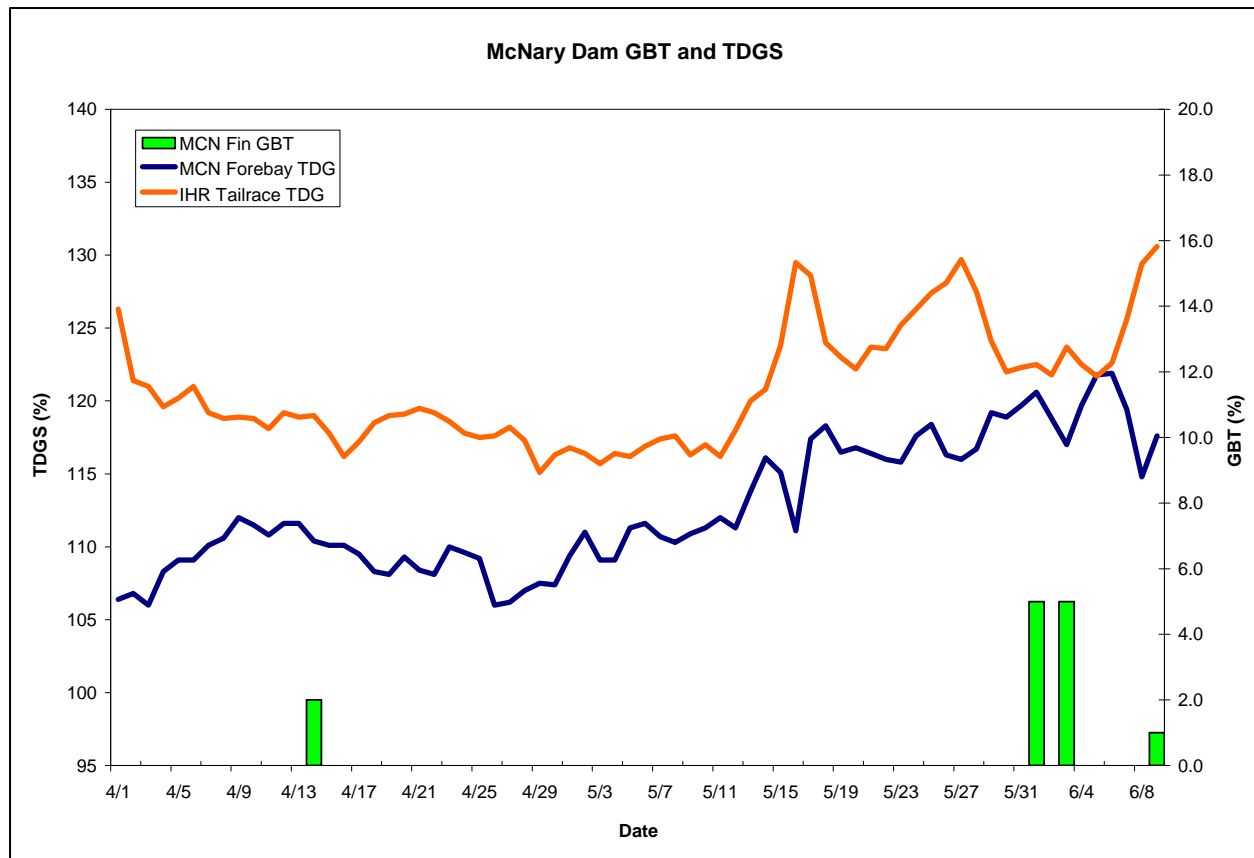
To date, the 12-hour average TDG levels (based on Oregon methodology) in the Lower Monumental Dam forebay have ranged from 105.0 to 139.3%, while the 12-hour average TDG levels in Little Goose Dam tailrace have ranged from 110.6 to 138.6%. Incidences of GBT at LMN has decreased over the past week. In fact, since the May 28<sup>th</sup> GBT sample, GBT incidence levels have been below the 15% action criterion for the curtailment of spill. In fact, the June 8<sup>th</sup> GBT sample at LMN revealed only a 1% incidence of fin GBT.



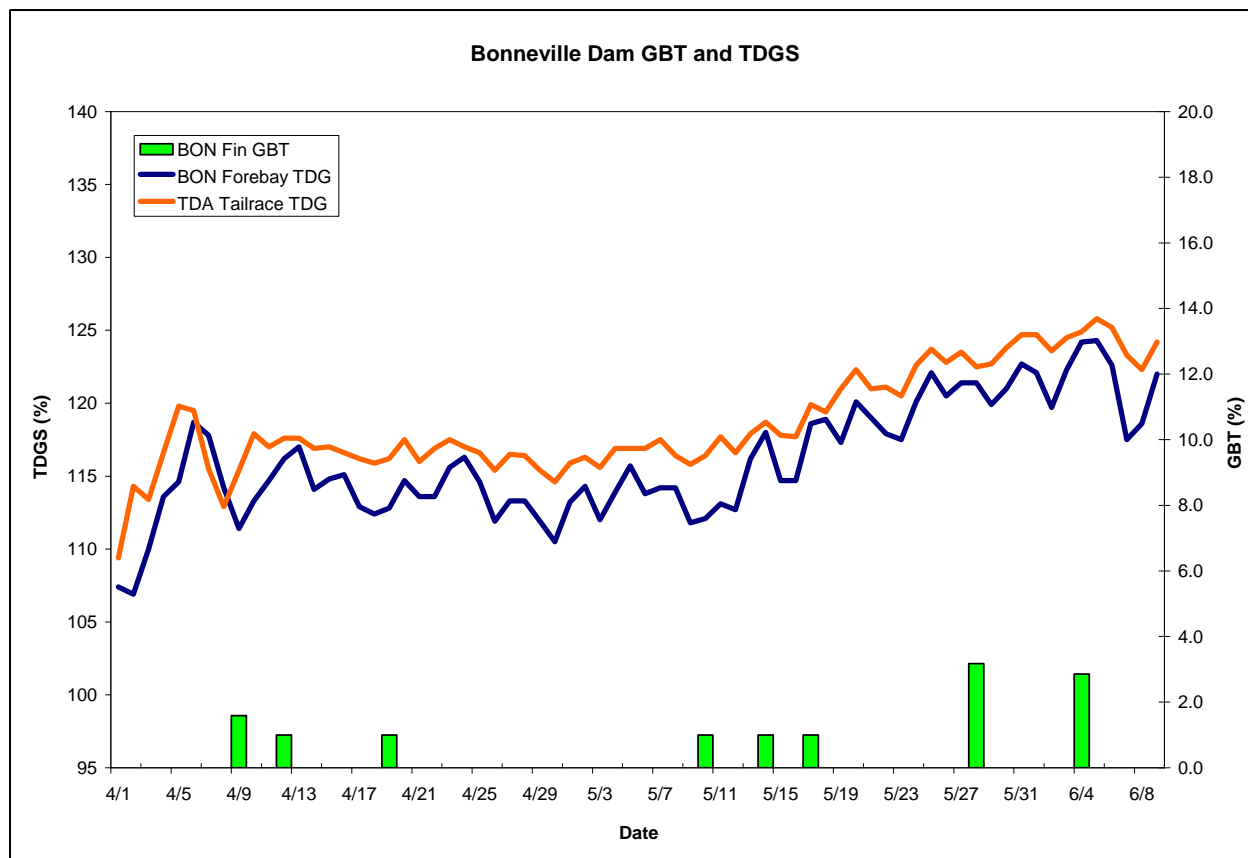
**Figure 4.** Percent of fish examined at Lower Monumental Dam showing signs of fin GBT with associated dissolved gas saturation levels in the Lower Monumental Dam forebay and the Little Goose Dam tailrace.

Gas Bubble Trauma monitoring takes place at two sites in the Lower Columbia River: McNary and Bonneville dams. These examinations are typically conducted twice a week at each site. To date, the 12-hour average TDG levels (based on Oregon methodology) in the McNary Dam forebay have ranged from 106 to 121.9%, while the 12-hour average TDG levels in the Ice Harbor Dam tailrace have ranged from 115.1 to 130.6%. GBT incidence at McNary Dam has decreased over the past week, with a 5% fin GBT incidence on June 3<sup>rd</sup>, 0% GBT on June 5<sup>th</sup>, and 1% GBT on June 9<sup>th</sup> (Figure 5).

To date, the 12-hour average TDG levels (based on Oregon methodology) in the Bonneville Dam forebay have ranged from 106.9 to 124.3%, while the 12-hour average TDG levels in The Dalles Dam tailrace have ranged from 109.4 to 125.8%. GBT incidence at Bonneville Dam has decreased this week, with 2.9% fin GBT on June 4<sup>th</sup> and 0% GBT on June 7<sup>th</sup> (Figure 6).



**Figure 5.** Percent of fish examined at McNary Dam showing signs of fin GBT with associated dissolved gas saturation levels in the McNary Dam forebay and the Ice Harbor Dam tailrace.



**Figure 6.** Percent of fish examined at Bonneville Dam showing signs of fin GBT with associated dissolved gas saturation levels in the Bonneville Dam forebay and The Dalles Dam tailrace.

Based on the GBT monitoring this week, the 15% fin GBT action criterion for curtailment of voluntary spill was met at Rock Island Dam on June 7<sup>th</sup> and June 9<sup>th</sup>. The 5% severe fin GBT action criterion has not been met at any of the GBT monitoring sites.





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### DATA REQUEST FORM

Request Taken By: Miguel DeAart Date: 8-June-2011

Data Requested By:

Name: Bill Tesit (WDFW) Phone: \_\_\_\_\_  
Address: \_\_\_\_\_ Fax: \_\_\_\_\_  
\_\_\_\_\_  
Email: \_\_\_\_\_  
\_\_\_\_\_

Data Requested:

Update 6/3/2011 memo on GBT samples  
by Snake, Mid-col, and Lower Col. - include data  
through June 9

Data Format: Hardcopy  Text  Excel   
Delivery: Mail  Email  Fax  Phone

Comments:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Data Compiled By: Frank Godley Date: 10-June-2011

Request # 49