

# **Appendix M**

**2013 TDG TMDL**

**Implementation Summary**

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## **Introduction**

This appendix provides a summary of the status of the short-term, operational and long-term Corps TDG TMDL implementation activities recommended in the Summary Implementation Strategy (SIS) of the TDG TMDLs for the lower Columbia River (approved by EPA on November 18, 2002) and the lower Snake River (approved by EPA on September 30, 2003). The summary implementation strategy (SIS) incorporates actions described and analyzed by the NOAA Fisheries in the 2000 and 2004 Biological Opinions and by the Corps in the Dissolved Gas Abatement Study (DGAS). The SIS was developed in consultation with NOAA Fisheries, so that TMDL implementation would be coordinated with requirements of the ESA. Both short-term (Phase I) and long-term (Phase II) measures are described with specific TDG and spill reduction measures. Phase I was in effect through 2012. Phase II began after 2003 and continues through 2020.

## **The TMDL summary implementation Actions:**

The following summary tables provide an overview of the status of the short-term and long-term Corps TDG TMDL implementation activities. Table M-1 provides the current status of the short-term TDG TMDL implementation actions. Table M-2 provides the operational implementation actions that are used to minimize TDG. Table M-3 provides the current status of the long-term TDG TMDL implementation activities.

**TABLE M-1**  
**SHORT TERM – PHASE I TMDL IMPLEMENTATION ACTIVITIES**  
**Structural Implementation Actions**

<b>2000 Biological Opinion Action Item Description</b>	<b>Status</b>	<b>Estimated Completion Date</b>	<b>Actual Completion</b>
Chief Joseph Deflectors	Construction of spill bay deflectors completed October 2008.	2008	2008
Little Goose Temporary Spillway Weir (TSW)	Construction and Installation of TSW completed.	2009	2009
Little Goose TSW	Testing occurred during 2012.	2014	---
Lower Monumental Removable Spillway Weir (RSW)	Construction completed.	2008	2008
Lower Monumental RSW	Evaluation and testing after RSW construction completed. Began 2008 and completed 2009.	2009	2009
Lower Monumental Extended Screens	Extended screens are suspended because of the cost-to-benefit ratio.	Unknown	Unknown
Ice Harbor RSW	RSW construction completed.	2005	2005
Ice Harbor RSW	Post - construction testing occurred in 2009-2010.	2010	2010
Ice Harbor Modernization, Turbine Runner Prototype.	Construction of new Turbine Runners. Ongoing - Fixed Runner installation in unit 1, kaplan in unit 2 during winter 2015-2016.	2015-2016	---
McNary Temporary TSW	Construction of TSW completed on bays 20 and 22.	2007	2007
McNary Temporary TSW	The TSWs were moved to various bays to optimize for surface fish passage. Move spanned two years from 2008 to 2009.	2009	2009
McNary Temporary TSW	Biological testing after TSW construction was completed. Testing spanned three years from 2007 to 2009.	2009	2009
McNary Modernization	Biological testing completed 10/26/07. Testing spanned three years from 2005 to 2007.	2007	2007
McNary Modernization, Turbine Runner Prototype.	Work design suspended.	N/A	N/A
McNary Bypass Improvements (New Outfall Flume)	Completed in 2012, and post-construction testing occurred.	2012	2012
McNary Bypass Improvements (temperature)	A prototype model has been developed by M. Schneider to assist with temperature issues.	2013	---
John Day TSW	Construction of 2 TSWs completed in bays 15 and 16.	2008	2008
John Day TSW	Moved 2 TSWs closer to the Powerhouse.	2010	2010
John Day Tailrace Improvements	Construct extended length flow deflector in Bay 20 and extend avian wires. Completed.	2010	2010
John Day TSW	Biological testing after TSW construction is completed. Ongoing.	2010-14	---

**TABLE M-1 (continued)**  
**SHORT TERM – PHASE I TMDL IMPLEMENTATION ACTIVITIES**  
**Structural Implementation Actions**

2000 Biological Opinion Action Item Description	Status	Estimated Completion Date	Actual Completion Date
Bonneville Endbay Deflectors	Deflectors construction completed.	2002	2002
Bonneville Powerhouse 2 Corner Collector (B2CC)	Construction of corner collector in Powerhouse 2 completed.	2004	2004
Bonneville Powerhouse 2 Behavioral Guidance System (BGS)	Behavioral Guidance System (BGS) for improved guidance for yearling and subyearling chinook to the B2CC installation completed.	2008	2008
Bonneville Powerhouse 2 Fish Guidance Efficiency Improvement	Installed turning vanes on Submerged Traveling Screens (STS). Installed ceiling gap closure device.	1997	1997
Bonneville Powerhouse 2 Fish Guidance Efficiency (FGE)	Decision Document Completed FY05 – FGE and in-take improvements. Modified Vertical Barrier Screens (VBS).	2008	2008
Bonneville Powerhouse 2 Fish Guidance Efficiency (FGE)	Completed biological evaluations after new designed VBS.	2009	2009
Bonneville Powerhouse 1 Surface Bypass or Extended Screens	Biological evaluations completed but biological benefits were out weighted by cost, thus suspending progress.	2002	2002
Bonneville sluiceway improvement study*	Finished letter report for modification of B1 sluiceway chain gates.	2007	2007
Bonneville spillway gate re-design*	Bonneville spillway gate re-design of 18 gates began in 2008. Completed.	2009	2009
Bonneville sluiceway improvement*	Removed the Juvenile Bypass System (JBS) channel.	2009	2009
Bonneville sluiceway improvement *	Construction of 3 automated sluiceway gate begin in 2008. Completed.	2009	2009
All Projects - Survival based spill caps at all dams (e.g. 40% at The Dalles).	Studies are on-going.	N/A	N/A
* Additional items untaken as part of adaptive management.			

**TABLE M-2**  
**OPERATIONAL TMDL IMPLEMENTATION ACTIONS**

Operational Action	Status
Scheduling routine turbine maintenance and repair during low-power load and river flow periods.	Ongoing
Preventative maintenance of turbines to prevent breakdown.	Ongoing
System management of water release from upstream storage reservoirs to minimize involuntary spill at dams in the TMDL area.	Ongoing
Optimizing power purchasing to allow maximum use of powerhouse capacity and minimization of involuntary spill. This has become more complex with the increase in wind energy in the Columbia River Basin.	Ongoing
Testing various spill patterns to find the most effective for fish passage and TDG production. If spill pattern produces undesirable results, modify spill pattern.	Ongoing

**TABLE M-3**  
**LONG TERM – PHASE II TMDL IMPLEMENTATION ACTIVITIES**  
**Fish Passage Actions That Support TDG Water Quality Goals**

<b>2000 Biological Opinion Action Item Description</b>	<b>Status</b>	<b>Estimated Completion Date</b>	<b>Actual Completion</b>
Chief Joseph Deflectors	Construction of spill bay deflectors completed October 2008.	2008	2008
Little Goose Temporary Spillway Weir (TSW)	Construction and Installation of TSW completed.	2009	2009
Little Goose TSW	Testing occurred during 2012.	2014	---
Lower Monumental Removable Spillway Weir (RSW)	Construction completed.	2008	2008
Lower Monumental RSW	Evaluation and testing after RSW construction completed. Began 2008 and completed 2009.	2009	2009
Lower Monumental Extended Screens	Extended screens are suspended because of the cost-to-benefit ratio.	Unknown	Unknown
Ice Harbor RSW	RSW construction completed.	2005	2005
Ice Harbor RSW	Post - construction testing occurred in 2009-2010.	2010	2010
Ice Harbor Modernization, Turbine Runner Prototype.	Construction of new Turbine Runners. Ongoing - Fixed Runner installation in unit 1, kaplan in unit 2 during winter 2015-2016.	2015-2016	---
McNary Temporary TSW	Construction of TSW completed on bays 20 and 22.	2007	2007
McNary Temporary TSW	The TSWs were moved to various bays to optimize for surface fish passage. Move spanned two years from 2008 to 2009.	2009	2009
McNary Temporary TSW	Biological testing after TSW construction was completed. Testing spanned three years from 2007 to 2009.	2009	2009
McNary Modernization	Biological testing completed 10/26/07. Testing spanned three years from 2005 to 2007.	2007	2007
McNary Modernization, Turbine Runner Prototype.	Work design suspended.	N/A	N/A
McNary Bypass Improvements (New Outfall Flume)	Completed in 2012, and post-construction testing occurred.	2012	2012
McNary Bypass Improvements (temperature)	A prototype model has been developed by M. Schneider to assist with temperature issues.	2013	---
John Day TSW	Construction of 2 TSWs completed in bays 15 and 16.	2008	2008
John Day TSW	Moved 2 TSWs closer to the Powerhouse.	2010	2010
John Day Tailrace Improvements	Construct extended length flow deflector in Bay 20 and extend avian wires. Completed.	2010	2010
John Day TSW	Biological testing after TSW construction is completed. Ongoing.	2010-14	---

**TABLE M-3 (continued)**  
**LONG TERM – PHASE II TMDL IMPLEMENTATION ACTIVITIES**  
**Fish Passage Actions That Support TDG Water Quality Goals**

2000 Biological Opinion Action Item Description	Status	Estimated Completion Date	Actual Completion Date
John Day Extended Screens	Tested prototype performed well. Shelved due to information indicating lower SARs for bypassed fish and high O&M costs.	2003	2003
The Dalles predator removal program (pikeminnow fishery)	Ongoing removal program at Lower Columbia River dams. Funded by BPA. Ongoing.	N/A	N/A
Bonneville Sea Lion Exclusion Device (SLED)	SLED devices constructed and installed.	2007	2007
Bonneville Powerhouse 1 Minimum Gap Runners	Construction of unit 10 began in 2009 and was completed in 2010.	2010	2010
Bonneville Powerhouse 1 Minimum Gap Runners	Units 1,2,3,4,5,6,9 completed.	1990-2007	1990-2007
Bonneville Powerhouse 1 Minimum Gap Runners	Construction completed on Unit 7.	2007	2007
Bonneville Powerhouse 1 Minimum Gap Runners	Construction completed on Unit 8.	2008	2008
All Projects - Improved O&M	Ongoing.	N/A	N/A
All Projects - Implement Turbine Survival Program Results	Ongoing.	N/A	N/A
All Projects - Spill Effectiveness Studies	Ongoing, site-specific as warranted.	Site-specific	Site-specific