

Total Dissolved Gas and Dam Operations

North Santiam River

Total Dissolved Gas Task Group (W-FPOM)
13 September 2017



Photo: CRITFC
website, Jeffrey Rich



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ISSUE

Total Dissolved Gas (TDG) caused by spill has negative impacts to salmonids below Big Cliff Dam in the North Santiam River (other rivers as well).



PURPOSE

Discuss How to Reduce Total Dissolved Gas / Impacts

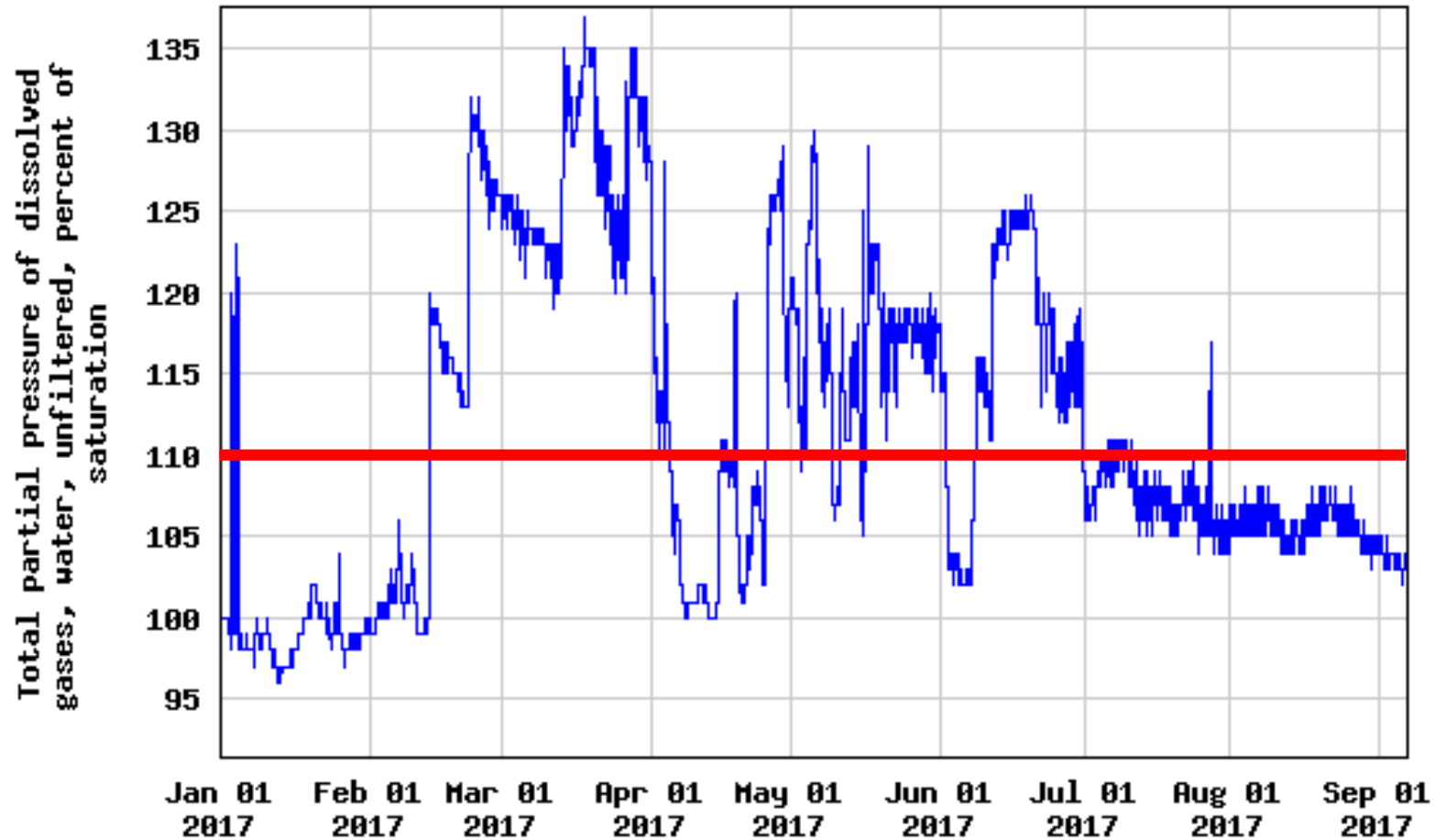
- Spill Configuration
- Turbine maintenance periods
- Willamette Fish Operations Plan



TDG LEVELS (2017)



USGS 14181500 NORTH SANTIAM RIVER AT NIAGARA, OR



----- Provisional Data Subject to Revision -----



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BIG CLIFF DISCHARGE (ANNUAL)

Internal:

http://nwp-wmlocal2.nwp.usace.army.mil/nwdp/nwp_teacup/www/willamette/bcl.pdf

External:

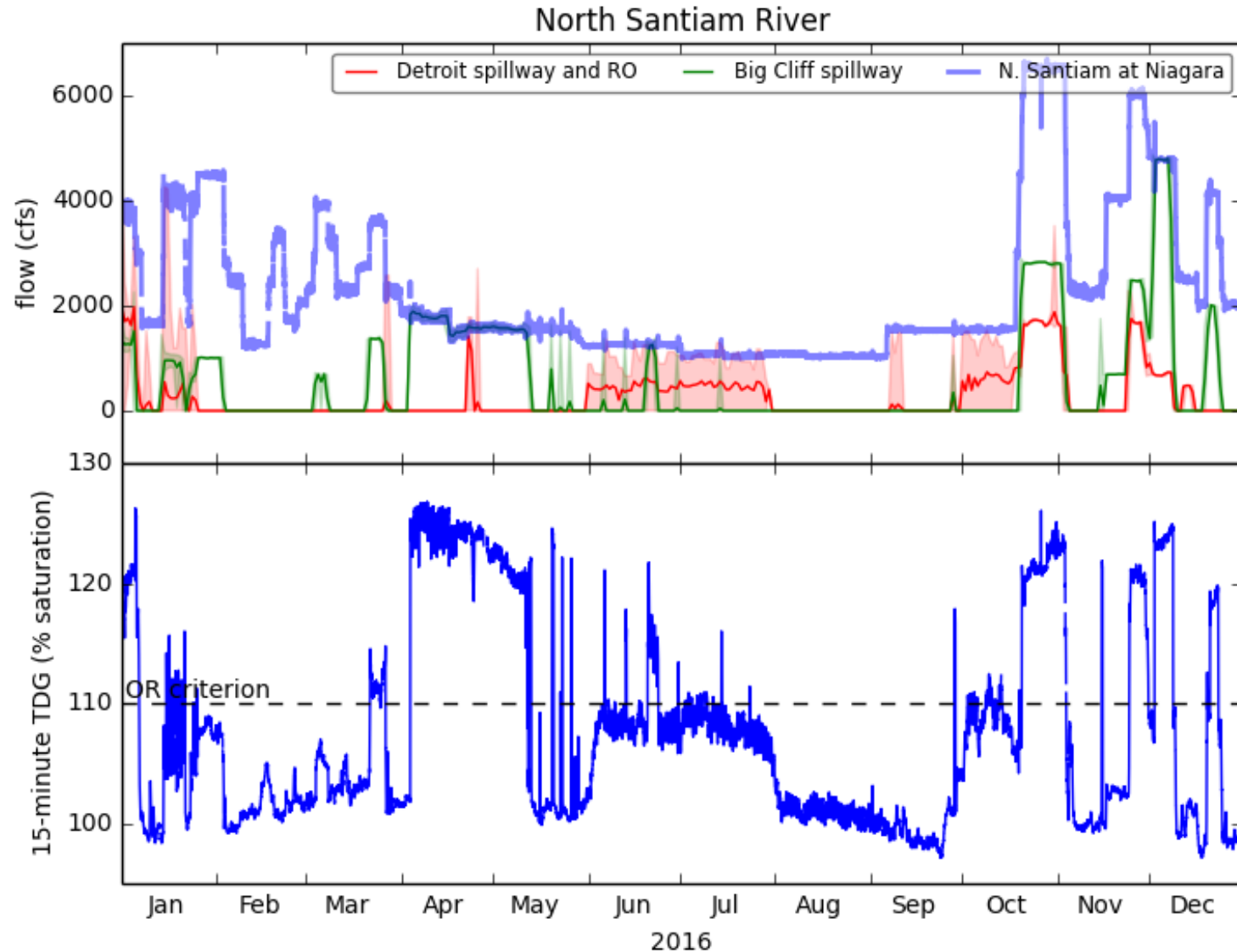
<http://www.nwd-wc.usace.army.mil/nwp/teacup/willamette/bcl.pdf>



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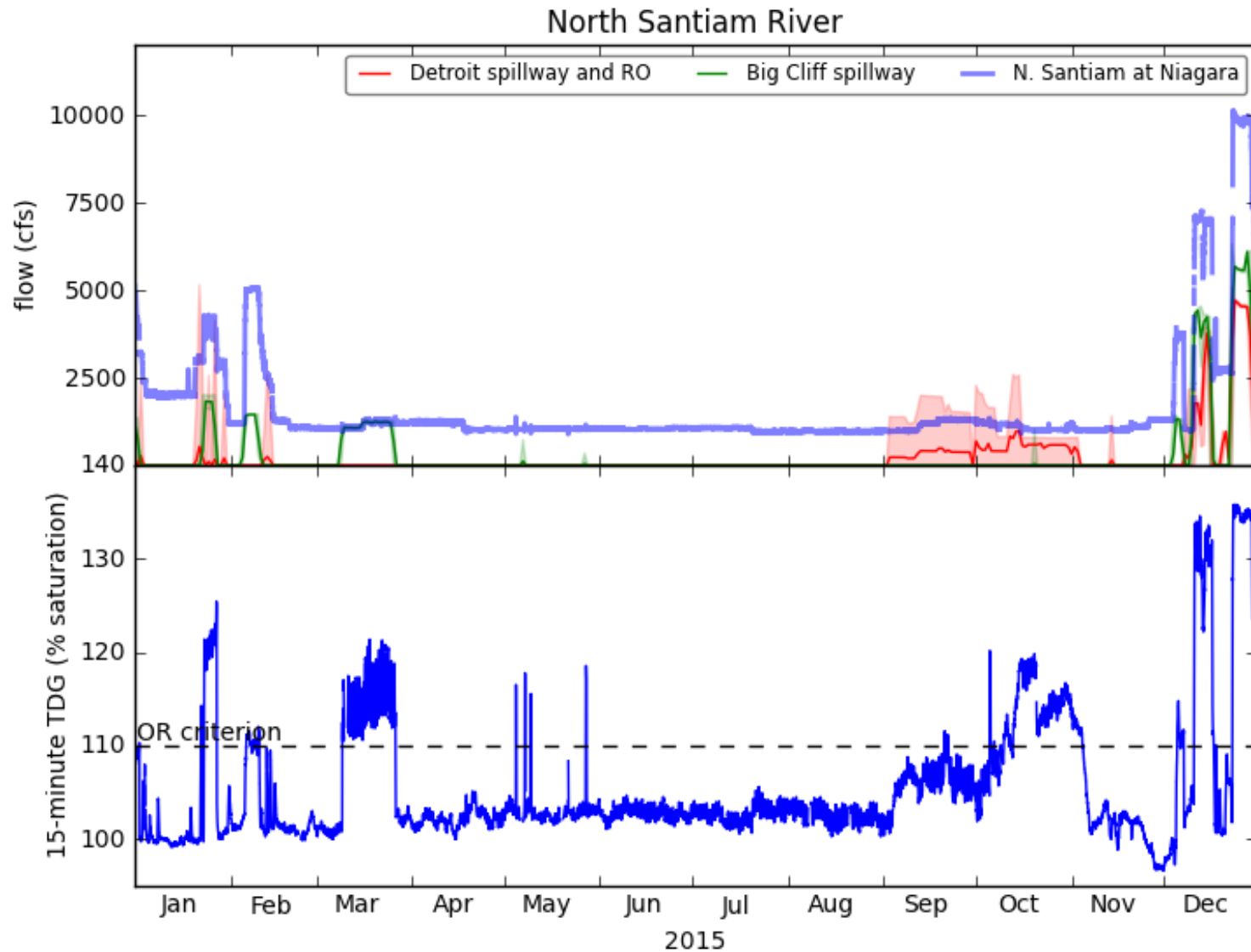
TDG AND DISCHARGE (2016)



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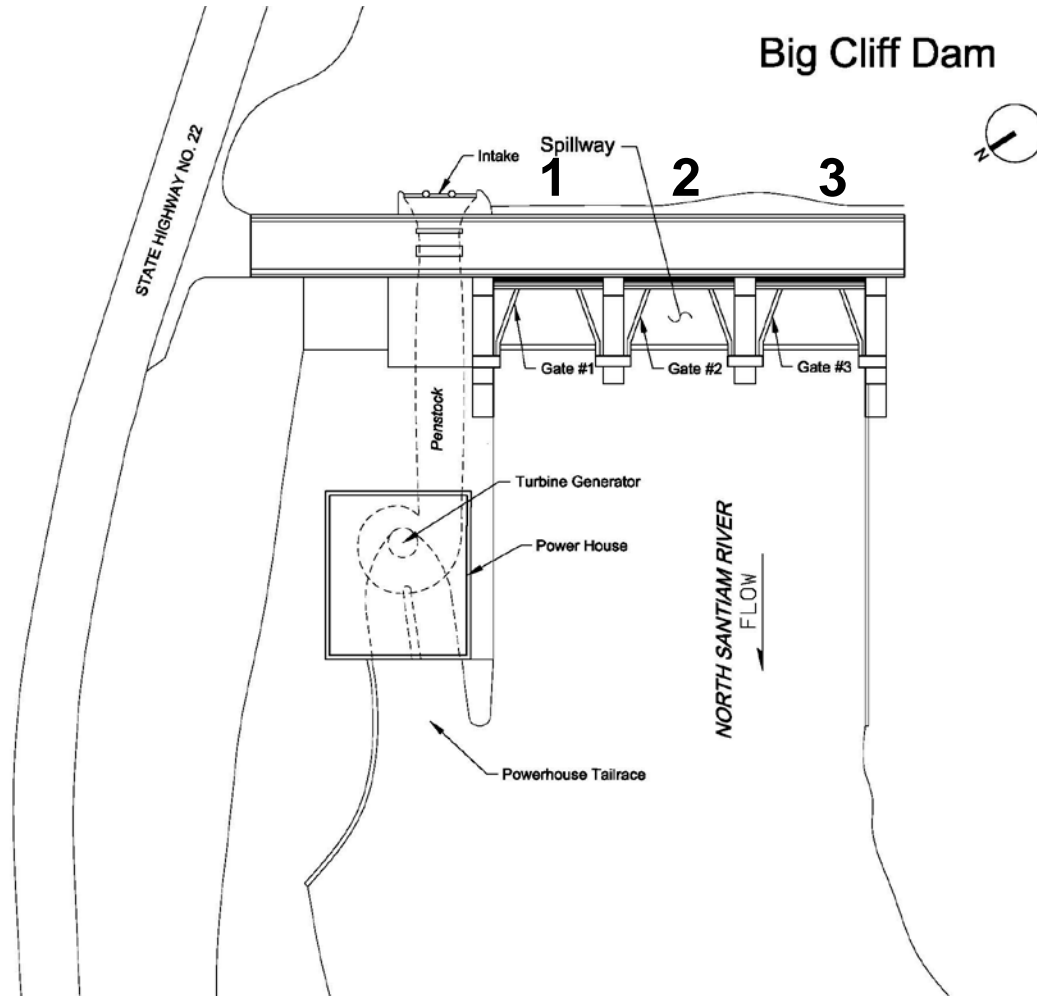
TDG AND DISCHARGE (2015)



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BIG CLIFF DAM



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GATE RATING TABLE – BIG CLIFF DAM

Examples over power pool elevation range:

Forebay Elevation 1,185 ft	=>	1,370 cfs	----- (TDG~120%)
Forebay Elevation 1,190 ft	=>	1,810 cfs	
Forebay Elevation 1,195 ft	=>	2,280 cfs	
Forebay Elevation 1,200 ft	=>	2,800 cfs	
Forebay Elevation 1,205 ft	=>	3,340 cfs	----- (TDG~130%)



ACTIONS

Change Spill Configuration

“When operating the spillway (SW), the initial gate opening (GO) will be to the minimum set by the SW rating table (RT) for the current lake elevation.

As the lake elevation or desired outflow changes, continue with the single gate opening until a second gate can be opened. Set that second SW GO to the minimum set by the SW RT for the current lake elevation.

With increasing desired outflow continue to spread flow across the available SW gates, setting each gate to at least the minimum SW GO.

If a higher level of spill is desired and all gates are set to the minimum SW GO, increase the GO of the middle gate until the desired outflow is achieved. With increasing SW flow, increase the gate openings so that the middle gate has the largest opening and the gates on the left and right sides have the smaller gate opening. This will channel the flow down the center of the raceway and will reduce bank erosion.

This operation will ensure that the SW gates are operated in the range that causes less vibration on each gate, will potentially reduce total dissolved gas production, and will allow for larger gate openings for safer downstream fish passage.”



ACTIONS (CONT)

Change/Adjust Turbine Maintenance Periods

Current Maintenance Periods:

Mar 1-Jun 30: Primary target period.

Jul 1-Aug 31: Limited outage scheduling due to power valuation considerations.

Sep 1-Oct 31: Secondary target period.

Nov 1-Feb 28: Restricted from outage scheduling.

Notes:

Sep 1-Oct 31: The secondary outage period is not preferred but outages are allowed.

Nov 1-Mar 31: Minimize generation outages in order to maintain TDG below limit due to impacts on sac fry.

Proposed Change/Adjustment: ???



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DISCUSSION / OPTIONS / RECOMMENDATIONS / NEXT STEPS

???

Incorporate into Willamette Fish Operations Plan (WFOP)



WILLAMETTE TEACUP

Internal:

http://nwp-wmlocal2.nwp.usace.army.mil/nwdp/nwp_teacup/www/willamette/

External:

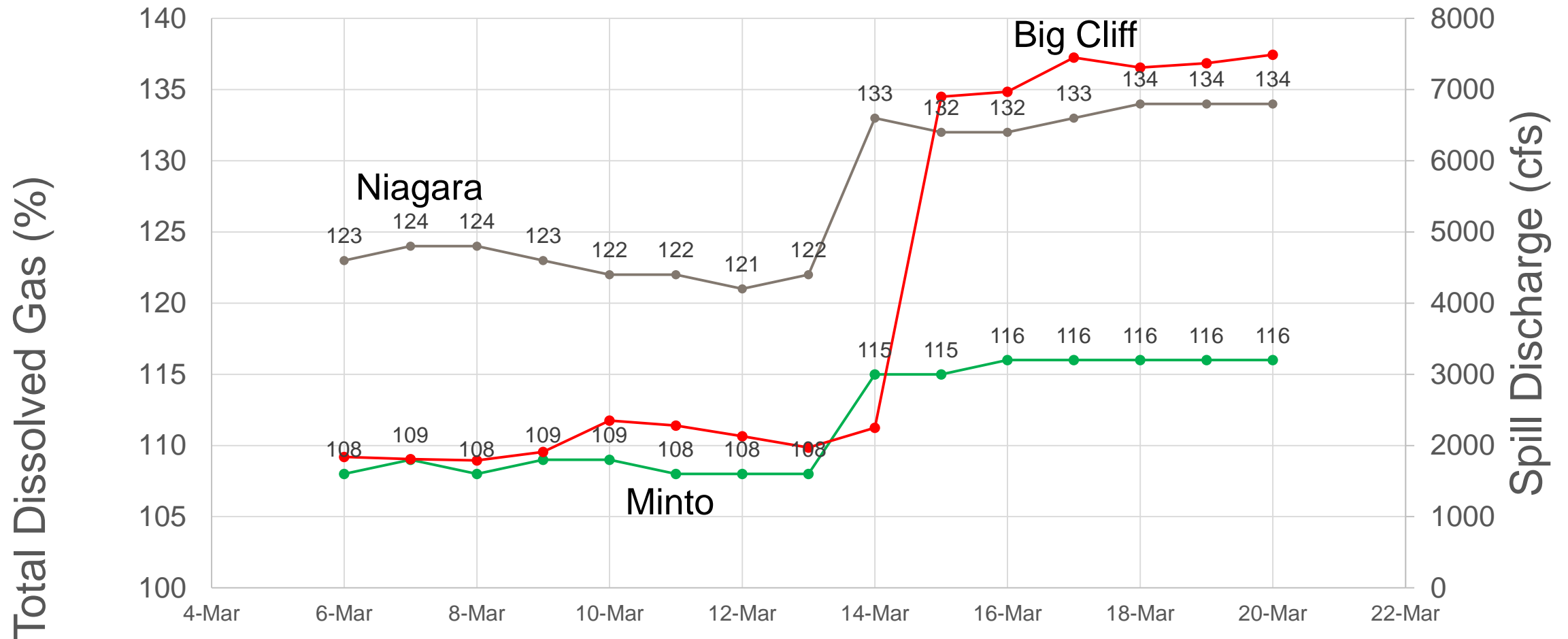
<http://www.nwd-wc.usace.army.mil/nwp/teacup/willamette/>



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TDG LONGITUDINAL PROFILE, BIG CLIFF => MINTO (2017)



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NOTES

Web/WFOP outage period link

time turbine outages when flow and TDG is going to be high already, another period suggested in the past was August, lay out fish life history timing, ChS and StS

Call GT

Slide, fish outplanting,



OUTLINE (ADJUST ACCORDING TO PRES)

- Issue
- Purpose
- TDG
- Actions

