Meeting Minutes
Thursday, July 23, 2020
Water Quality Management Planning Regulation Amendment

Regulatory Advisory Panel (RAP)
Electronic-only Meeting on GoToWebinar

Members Present: Jamison Brunkow, Pat Calvert, Tim Castillo, Allison Dienes, Frank Harksen, Ted Henifin , Grace LeRose, Timothy Mitchell, Scott Morris, Theresa O'Quinn, Andrew Parker, Chris Pomeroy, Ben Shoemaker, and Joe Wood.

Members Absent: Dickie Thompson and James Grandstaff.

Other Attendees: Melanie Davenport, Drew Hammond, John Kennedy, Allan Brockenbrough, Jutta Schneider, Austen Stevens, Gary Graham, Alison Thompson, W. Brandon Bull, Jane Chiffriller, Gregory Ewanitz, Patrick Fanning, KC Filippino, Normand Goulet, Steven Herzog, Lawrence Heyd, Lawrence Hoffman, Laurissa Hoyle, Anna Killius, Jessica Lassiter, Lewis Linker, Amanda Marsh, , Jeff McBride, Denise Nelson, Shelby Olsen, Jim Pletl , Shaun Reynolds, Peggy Sanner, Jian Shen, Katie Shultz, Gary Williams, Andrea Wortzel, Todd Asselborn, and Wendy Eikenberry (present online with Tim Castillo).

The meeting convened at 9:12 a.m. and adjourned at 11:50 a.m.

1. **Introductions, and Meeting Logistics** [Kevin Vaughan, DEQ and Allan Brockenbrough, DEQ]. Mr. Vaughan checked in the RAP members and other on-line attendees present for the electronic meeting and Mr. Brockenbrough introduced the staff members physically present for the meeting in the DEQ training room. Mr. Brockenbrough presented the final Agenda (Attachment 1) and reviewed how the meeting would proceed. The WQIF Needs Assessment (Attachment 2) was provided to members for information before the meeting in case members wanted to discuss it.

2. **Industrial Wasteload Allocations** [Allan Brockenbrough, DEQ]. Using the slides in Attachment 3, Mr. Brockenbrough reviewed the most recent discussions with industrial facilities and presented the two options available for reallocating some wasteload allocations from the industrial sector and the basis for doing so. Option 1 was to use only allocations from closed facilities. Option 2 involved also reducing allocations for facilities that have used less than 50% of their WLA over the life of the permit. New allocations at 125% of the highest year load, were used to demonstrate this option 2 approach. Applying the 125% criteria would potentially impact TP WLAs for three additional facilities that had not previously been discussed.

   One of the members indicated that using Option 1 (closed facilities) is the more appropriate option. Concern was expressed by some members that the excess allocations would no longer be available to the facilities from which they originated. Allan responded that the allocations would still be in the Nutrient Offset Fund (NOF) and would be available to be purchased by the original facilities. Another member was concerned about the J.H. Miles allocations being transferred to the NOF because they had been transferred for consideration given. Attachment 4 (the RAP Meeting #1 Technical Presentation) was reviewed in response to a comment that there might have to be a difference in credits reclaimed in Option 2 from facilities that operate at steady state and those that exhibit more effluent variability.

3. **Municipal Floating Wasteload Allocations** [Allan Brockenbrough, DEQ]. Using Attachment 5, Mr. Brockenbrough reviewed how changing the 9VAC25-720 regulation footnotes would be used to accomplish the floating WLA reductions in facilities greater than 5 MGD. These changes also include allocation changes for two James River facilities that have allocations based design flows greater than the currently constructed design flow.

   One member asked why only 5 MGD and above facilities were being demonstrated. Allan responded that this was the example available for this meeting, but it is not decided that only 5MGD facilities would be included in the changes.

4. **James River Chlorophyll-a** [John Kennedy, DEQ]. Using Attachment 6, Mr. Kennedy provided an update to the James River water quality modeling, which is focused on using adjusted 2025 climate change factors in the 9 point source nutrient reduction scenarios that test criteria attainment. As a prior note, the Chesapeake Bay Foundation and James River Association request for additional model runs extending the revised climate changes factors out to 2035 and using reduced BMP implementation rates for nonpoint sources, will require additional briefings for the Office of the Secretary of Natural Resource (OSNR) before DEQ can respond.

   Using the revised climate change factors, the seasonal mean criteria are attained for all scenarios; however, only two scenarios (VAMWA B+ and D) attain the short duration summer criteria. Both sets of criteria must be attained to be in compliance with the chlorophyll water quality standards. It was observed that the VAMWA B+ and D scenarios have in common relatively stringent phosphorus control (down to 0.2 mg/l TP for POTWs and 50% reduction at industrial facilities) across the entire James River watershed, compared to all other scenarios. DEQ intends to further model these TP reduction scenarios to try to determine if there are geographical or seasonal influences that may help further refine potential changes needed to the dischargers' nutrient waste load allocations in order to meet the chlorophyll criteria. Details were presented on the duration, location and magnitude of the criteria exceedances. Future updates to model results will be provided to the RAP as they are available.

   When asked for a summary of where the modelling schedule stands, Mr. Kennedy responded:

   - It must be recognized that the James River model (completed in 2015) was developed using existing monitoring data without the added climate change factors, which have been recently adjusted over just the past month to agree with those used by the larger CBP water quality modeling framework;
   - The OSNR briefing on the additional runs requested by CBF/JRA is July 24th , but the outcome is unknown;
   - The need to further develop, run and post-process model scenarios and point source options to resolve the predicted nonattainment may take precedence over the requested additional runs;
   - Both the EPA-CBPO modeling team and Dr. Shen/VIMS have been turning these runs around for the RAP very quickly, on the order of weeks; and
   - Dr. Robertson/DEQ, who performs the model run post-processing and criteria assessment analysis, may have limited participation for some time.

A recording of the meeting is available for review on-line.

Attachments:

1. Final Meeting 4 Agenda.
2. 2020 WQIF Needs Assessment.
3. WQMP Reg – RAP Meeting #5 Presentation.
4. WQMP Reg – RAP Meeting #1 Technical Presentation.
5. Example Municipal Waste Load Allocation Regulation Changes (5 MGD and Greater).
6. Assessment Results of Management Scenarios Under Adjusted Climate Change Factors Using the VIMS James River Water Quality Model – WQMP RAP Meeting 7/17/2020.

Attachment 1

Final Agenda
Water Quality Management Planning Regulation Regulatory Advisory Panel (RAP)
Meeting No. 5 – July 23, 2020, 9:00 a.m.

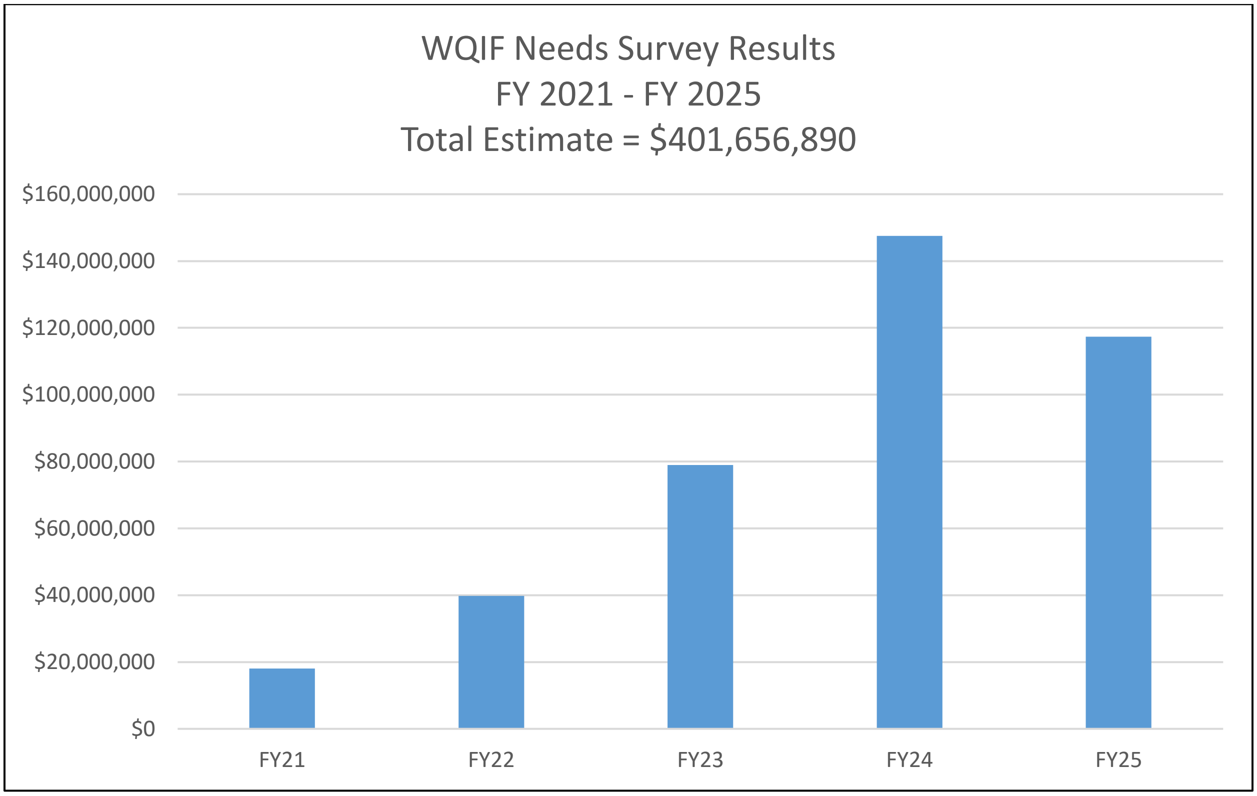
1. Meeting Logistics
2. Introductions
3. Industrial Wasteload Allocations
4. Municipal Floating Wasteload Allocations
5. James River Chlorophyll-a

Attachment 2

2020 WQIF Needs Assessment

Annual Funding Needs for Water Quality Improvement Fund (WQIF) Point Source Grants

The Water Quality Improvement Fund (WQIF) is a special permanent, nonreverting fund established to provide Water Quality Improvement Grants in accordance with the provisions of the Virginia Water Quality Improvement Act of 1997. In accordance with § 10.1-2134.1 of the *Code of Virginia* the Department of Environmental Quality, in consultation with stakeholders, including representatives of the Virginia Association of Municipal Wastewater Agencies, local governments, and conservation organizations, is required to annually determine an estimate of the amount of Water Quality Improvement grant funding expected to be requested by local governments for projects that are related to point source pollution and are eligible for grant funding. For the fiscal years 2021 to 2025, an estimate of $769 million may be required from state funds as well as locality financial contributions to meet water quality goals. Approximately 52% of this total ($401.6 million) could be needed from the WQIF.



The methodology for estimating the amount of Water Quality Improvement grant funding expected to be requested by local governments was established by DEQ in consultation with wastewater stakeholders from the Virginia Association of Municipal Wastewater Agencies (VAMWA). An electronic survey was created in consultation with stakeholders and distributed to significant dischargers in the Chesapeake Bay watershed. During the survey period two virtual tutorial and question and answer sessions were held with the VAMWA membership. The survey requested: 1) general information, 2) programmatic information, and 3) total project cost with no time horizon. General information included facility name and contact information. Programmatic information was requested on future WQIF funding needs over a five year time horizon (FY 2021 to FY 2025). This timeframe was selected because it generally aligns with the time horizons of typical Capital Improvement Plans (CIP). Total estimated project costs were also requested with no specified time horizon. This amount is assumed to include costs needed for the entire project beyond FY 2025.

A total of 29 responses to the survey were received identifying a programmatic funding need over the five year time horizon and total project costs. Programmatic funding need amounts were then multiplied by the estimated eligible grant percentage to determine the WQIF eligible funding need. The grant percentage from the previous WQIF grant for each locality was utilized for the calculation. Total estimated project costs were also multiplied by the estimated eligible grant percentage for each locality to determine the total WQIF eligible funding need. Two respondents had not previously received a WQIF grant, but were assigned percentages based on data available for their respective regions.

The overall project costs for those anticipating to request WQIF funds total $769,010,229 through FY 2025. Based on the estimated eligible grant percentage for each respondent, the amount of programmatic WQIF point source funding needed through FY 2025 is $401,656,890. The following is a breakdown of WQIF point source funding need by fiscal year:

FY 2021 – $18,018,474
FY 2022 – $39,792,860
FY 2023 – $78,961,097
FY 2024 – $147,518,333
FY 2025 – $117,366,125

These amounts include estimated funding needed for facilities to meet current permit limits and funding needed for future Chesapeake Bay WIP Phase III floating waste load allocations. Additionally, needs were included for nutrient removal technology and wastewater conveyance infrastructure projects.

WQIF Grants	2020 WQIF Needs Survey Results					
	2021-2022 Biennium		2023-2024 Biennium		2025	Total Need (2020 - 2025)
	FY21	FY22	FY23	FY24	FY25	
Applicant	$18,018,474	$39,792,860	$78,961,097	$147,518,333	$117,366,125	$401,656,890
TOTALS	**$57,811,334**		**$226,479,430**		**$117,366,125**	**$401,656,890**

The total estimated project costs identified by respondents is $1,230,947,484. Of that total, the amount of WQIF eligible project costs is estimated to be $790,010,229. Based on the estimated eligible grant percentage for each respondent, the amount of WQIF point source funding needed with no specified time horizon totals $409,006,890.

2020 WQIF Needs Survey Results - Total Project Costs (no time horizon)		
Est Total Project Costs	**WQIF Eligible Project Costs**	**Est Eligible Grant Amount**
$1,230,947,484	$790,010,229	$409,006,890

In order to improve upon the data collection methods, DEQ, with stakeholder participation, intends to re-evaluate the methodology utilized to determine the estimate of WQIF point source grant requests prior to conducting the needs assessment next year.

Attachment 3

WQMP Reg – RAP Meeting #5 Presentation.

DEQ

Virginia Department of Environmental Quality

If you are experiencing connection problems please call Kevin Vaughan at (804) 698-4470

9VAC25-720
Water Quality Management Planning Regulation
Regulatory Advisory Panel Meeting No. 5
July 23, 2020

Agenda

1. Meeting Logistics
2. Introductions
3. Industrial Wasteload Allocations
4. Municipal Floating Wasteload Allocations
5. James River Chlorophyll-a

If you are experiencing connection problems please call Kevin Vaughan at (804) 698-4470

Industrial WLAs – 2 Options

1. Limit action to 5 facilities addressed in § 62.1-44.19:14.D.2. a and b.

2. Use broader authority under § 62.1-44.19:14.D.1 and limit WLA to some percentage of historical loads.

DEQ

§ 62.1-44.19:14. Watershed general permit for nutrients

D. 1. The Board shall (i) review during the year 2020 and every 10 years thereafter the basis for allocations granted in the Water Quality Management Planning Regulation (9VAC25-720) and (ii) as a result of such decennial reviews propose for inclusion in the Water Quality Management Planning Regulation (9VAC25-720) either the reallocation of unneeded allocations to other facilities registered under the general permit or the reservation of such allocations for future use.

2. For each decennial review, the Board shall determine whether a permitted facility has:

a. Changed the use of the facility in such a way as to make discharges unnecessary, ceased the discharge of nutrients, and become unlikely to resume such discharges in the foreseeable future; or
b. Changed the production processes employed in the facility in such a way as to render impossible, or significantly to diminish the likelihood of, the resumption of previous nutrient discharges.

.
.
.
.

The Board shall not reduce allocations based solely on voluntary improvements in nutrient removal technology.

Option No. 1 – Closed Industries Only

Permit No.	Facility	Basin	TN WLA (lbs/yr)	TP WLA (lbs/yr)
VAN010008	J. P. Salyards - Alma Plant	Potomac	18,273	914
VAN030047	Plains Marketing LP Yorktown	York	167,128	17,689
VAN040078	The Sustainability Park LLC	James	25,583	1,556
	Tranlin/Vastly	James	80,000	0
VAN040091	J H Miles and Company Incorporated	James	153,500	21,500
		Totals	444,484	41,659

DEQ

Option No. 2 – 125% of Highest Load Example

VPDES No.	Facility	Basin	Current TN WLA (lbs/yr)	125% of Highest TN Load (lbs/yr)	TN WLA to NOF (lbs/yr)	Current TP WLA (lbs/yr)	125% of Highest TP Load (lbs/yr)	TP WLA to NOF (lbs/yr)
VAN010050	The Lycra Company	Potomac	78,941	36,891	42,050	1,009	655	354
VAN040073	Greif Riverville LLC - Fibre Plant	James	73,246	158,110	0	24,082	18,413	5,669
VAN040067	Mohawk Industries Inc	James	30,456	15,809	14,647	9,880	6,585	3,295
VAN040084	Philip Morris USA Incorporated - Park 500	James	139,724	68,159	71,565	2,149	4,995	0
VAN040086	Dominion Energy - Chesterfield Power Station	James	243,099	110,238	132,861	170	3,002	0
VAN040066	GP Big Island LLC	James	122,489	165,659	0	40,273	34,174	6,099
VAN040070	WestRock Virginia LLC - Covington	James	394,400	461,623	0	96,771	87,620	9,151
VAN040072	BWXT Nuclear Operations Group Inc	James	187,000	428,963	0	1,235	1,206	29
		Totals			261,122			24,597

DEQ

Attachment 4

WQMP Reg – RAP Meeting #1 Technical Presentation.

DEQ

Virginia Department of Environmental Quality

Regulatory Advisory Panel Meeting
Proposed Amendments to 9VAC25-720
Water Quality Management Planning Regulation

May 28, 2020

Allan Brockenbrough

Manager, Office of VPDES Permits

Virginia Department of Environmental Quality

Chesapeake Bay TMDL WIP III – Initiative #52

(52) Require additional nutrient reductions from wastewater treatment plants (WWTP)

The Commonwealth will initiate actions to achieve additional nutrient reductions from significant municipal treatment facilities that have not yet upgraded to achieve 4 mg/l of TN and 0.3 mg/l of TP. This action will consist of modifications to the Water Quality Management Planning Regulation to include secondary, "floating" wasteload allocations for significant municipal facilities. The floating wasteload allocations will be based on the flow treated by the facility in a given year and nutrient concentrations of 4 mg/l TN and 0.3 mg/l TP. Existing "primary" wasteload allocations will remain and in any given year the facility will be required to meet the lesser of the primary or floating allocations. A few facilities with special circumstances could be assigned alternative floating wasteload allocations (e.g. UOSA: 8 mg/l TN; Richmond: 8 mg/l TN; Lynchburg: 8 mg/l TN; and Hopewell: 12 mg/l TN) or possibly no floating wasteload allocation (e.g. UOSA TN). The Commonwealth may choose to exempt a subset of the smallest significant facilities that in aggregate represent a minor percentage of the expected load reductions from this initiative. Because this initiative is being implemented through the Water Quality Management Planning Regulation and the Watershed General Permit, no facilities will be required to upgrade but rather may choose to trade nutrient credits to achieve their reduction goals. Of the 87 significant publicly owned treatment works (POTWs) included in the Watershed General Permit, 41 have already upgraded their facilities to achieve 4 mg/l TN and 0.3 mg/l TP.

Under §62.1-44.19:14.D, DEQ is required to review the basis for allocations granted in the Water Quality Management Planning Regulation every 10 years (beginning in 2020) and propose the reallocation of any unneeded allocations to other facilities registered under the general permit or reserve such allocations for future use. See Report Prepared Pursuant to Executive Order 52 (2016).

Reevaluation of industrial WLAs

Executive Order 52 (2016)

Report Prepared Pursuant to Executive Order 52 (2016)

DEVELOPMENT OF LONG-TERM, OFFSETTING METHODS WITHIN

THE VIRGINIA NUTRIENT CREDIT EXCHANGE PROGRAM

I. Introduction

In 2005, the General Assembly established the Chesapeake Bay Watershed General Permit and an associated nutrient credit trading program for the purpose of managing total discharges of nitrogen and phosphorus from municipal and industrial wastewater (known as point sources) dischargers into the Chesapeake Bay watershed in order to meet established water quality standards.

Governor McAuliffe signed Executive Order 52 on January 28, 2016 that established a study committee to make recommendations regarding methods to offset discharges of nutrients by new or expanding point source dischargers in the Chesapeake Bay watershed. The committee roster is attached as appendix I.

DEQ

§ 62.1-44.19:14. Watershed general permit for nutrients

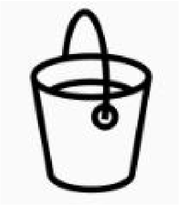
D. 1. The Board shall (i) review during the year 2020 and every 10 years thereafter the basis for allocations granted in the Water Quality Management Planning Regulation (9VAC25-720) and (ii) as a result of such decennial reviews propose for inclusion in the Water Quality Management Planning Regulation (9VAC25-720) either the reallocation of unneeded allocations to other facilities registered under the general permit or the reservation of such allocations for future use.

2. For each decennial review, the Board shall determine whether a permitted facility has:

a. Changed the use of the facility in such a way as to make discharges unnecessary, ceased the discharge of nutrients, and become unlikely to resume such discharges in the foreseeable future; or
b. Changed the production processes employed in the facility in such a way as to render impossible, or significantly to diminish the likelihood of, the resumption of previous nutrient discharges.

.
.
.
.

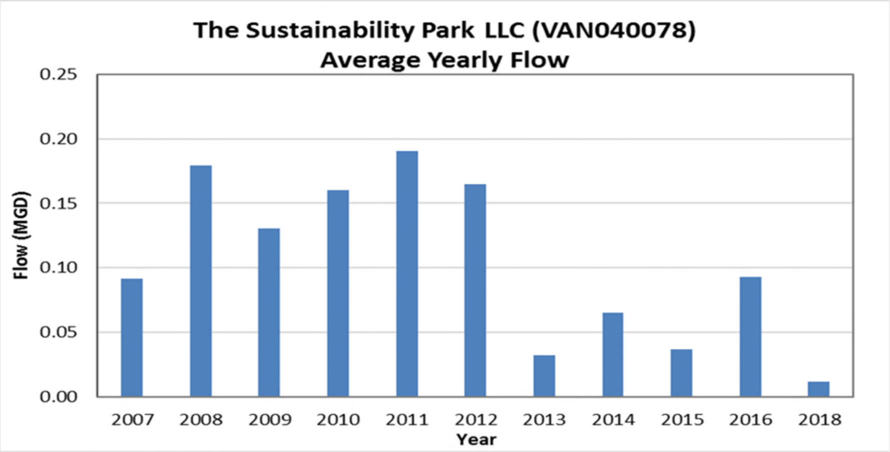
The Board shall not reduce allocations based solely on voluntary improvements in nutrient removal technology.

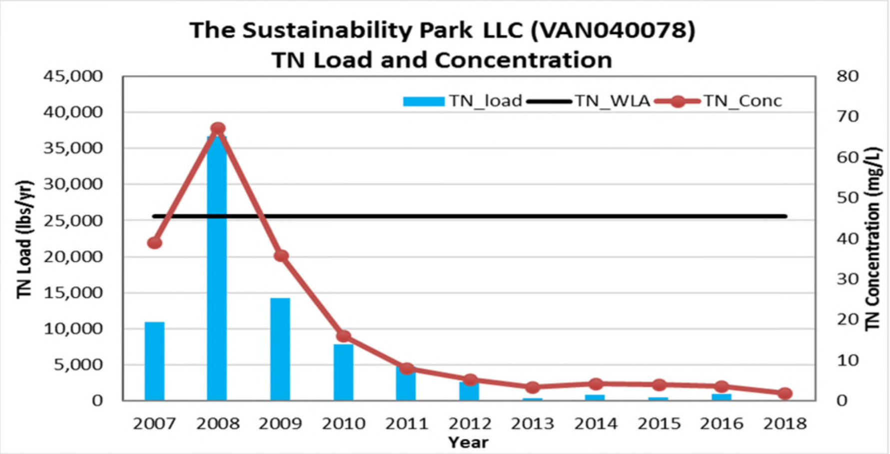


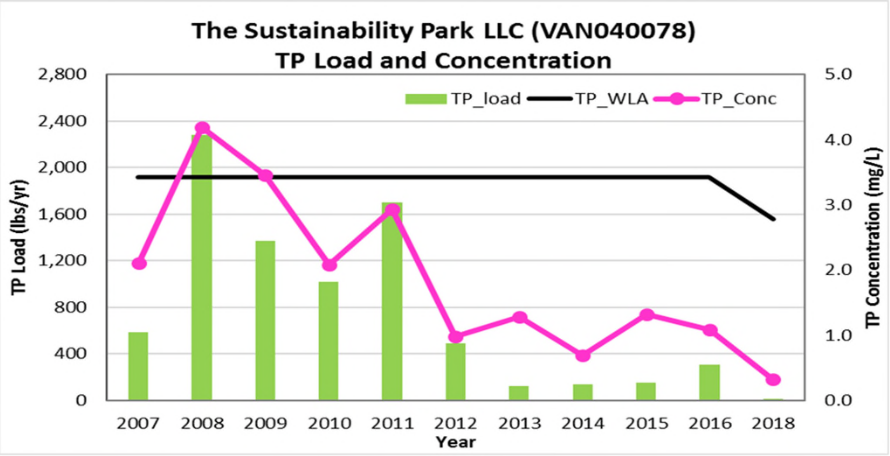
Buckets

Category	Comments
Facility Offline	WLA to Nutrient Offset Fund
Production Changes	Partial reduction of WLA - %?
Initial WLA > 200% of Highest Year	Partial reduction of WLA - %?
Poultry	No action
No Significant Reduction	No action
Significant Reductions	No action

Facility Offline

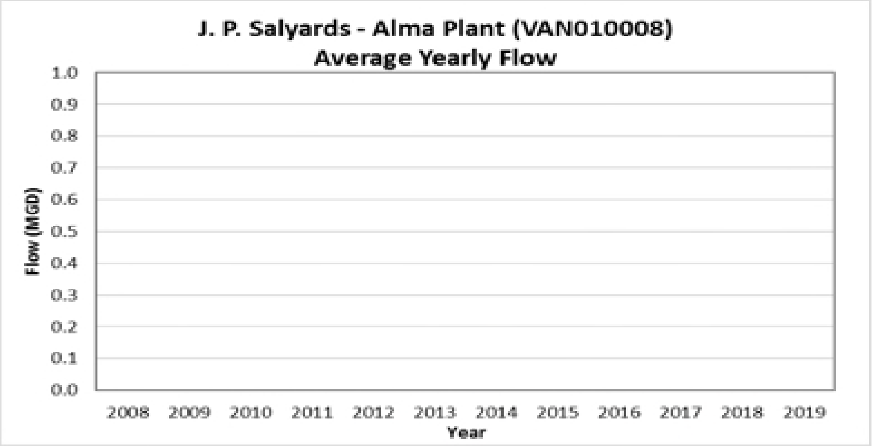


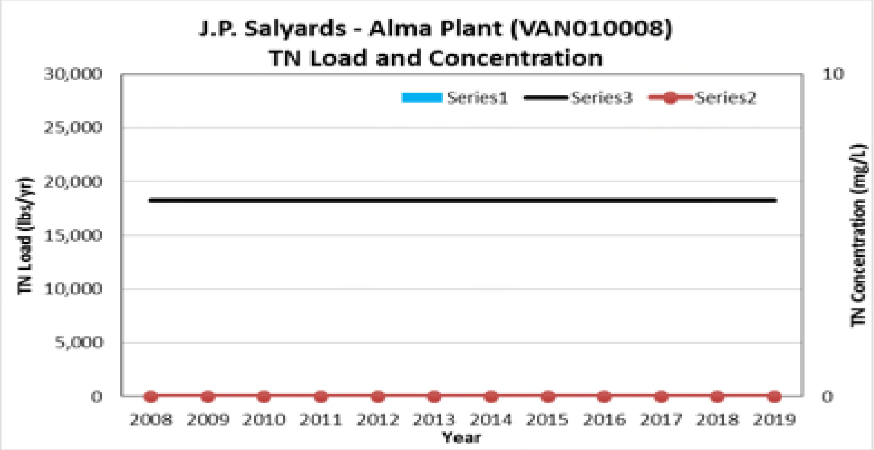


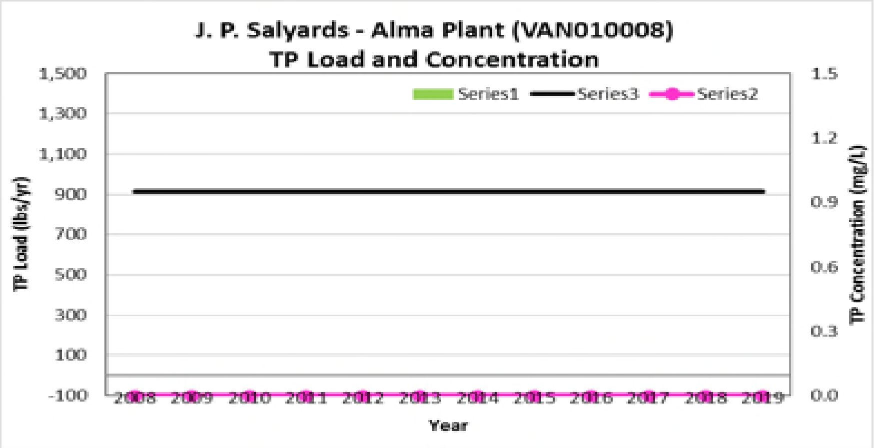


Graphed TN and TP loads based on annual average flows and concentrations and may not match results reported under the watershed GP

Facility Offline



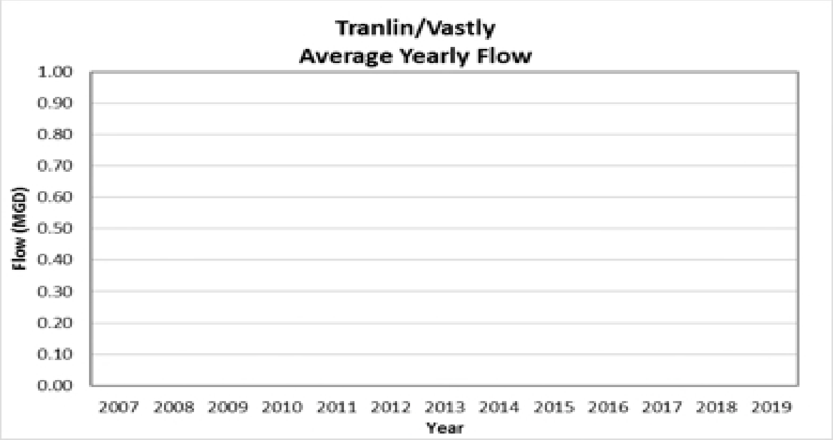


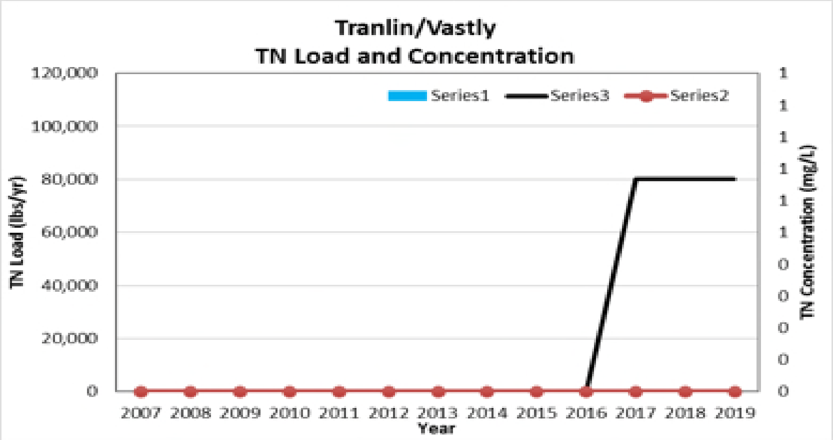


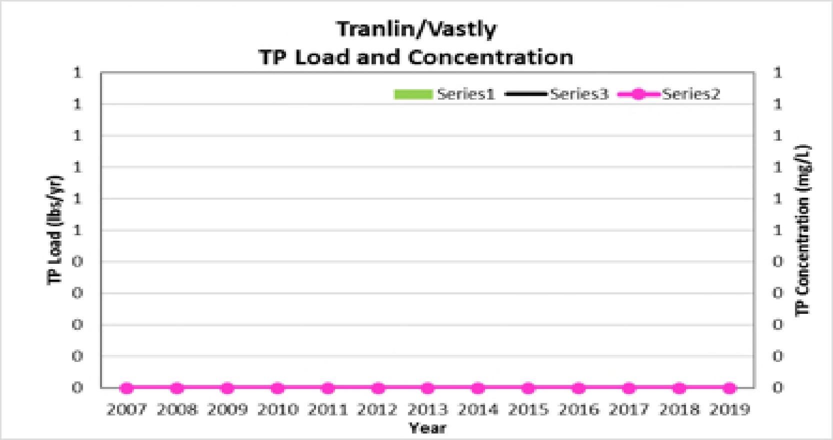
Graphed TN and TP loads based on annual average flows and concentrations and may not match results reported under the watershed GP

DEQ

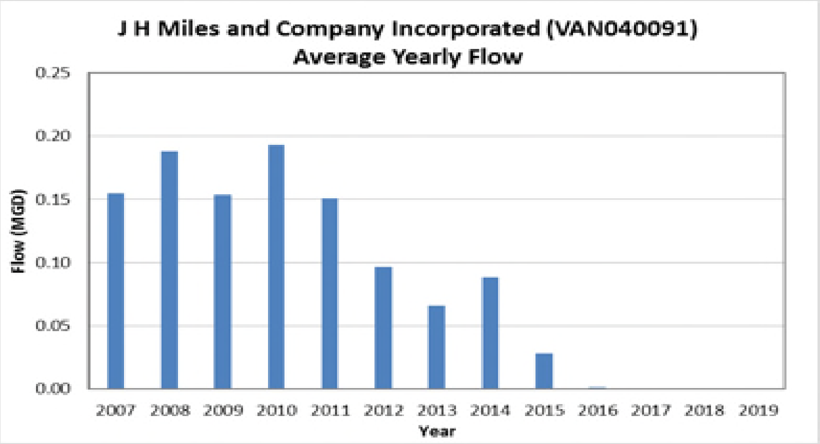
Facility Offline

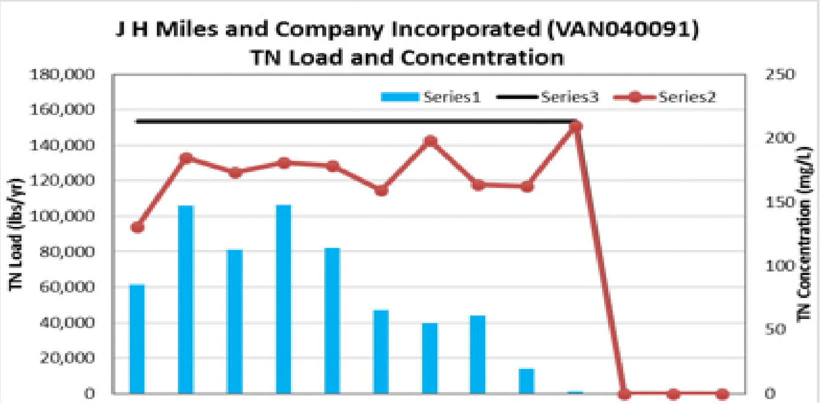


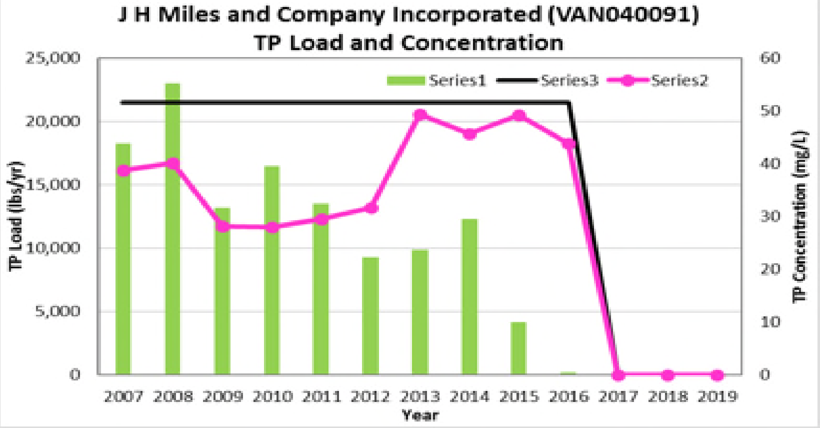




Facility Offline



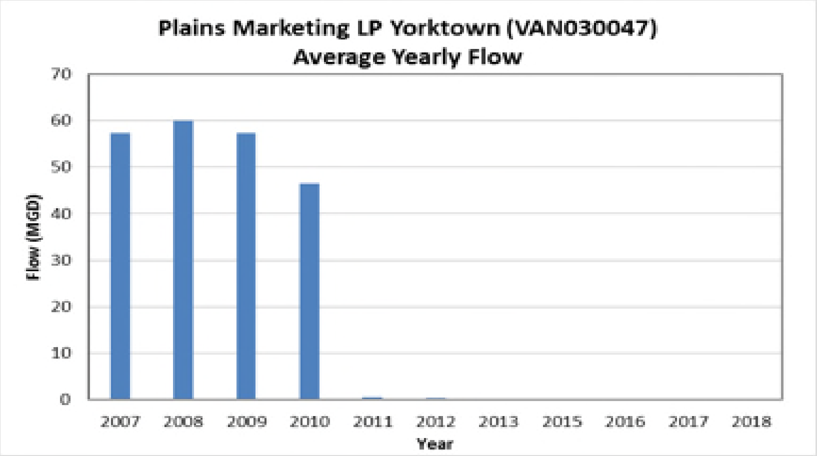


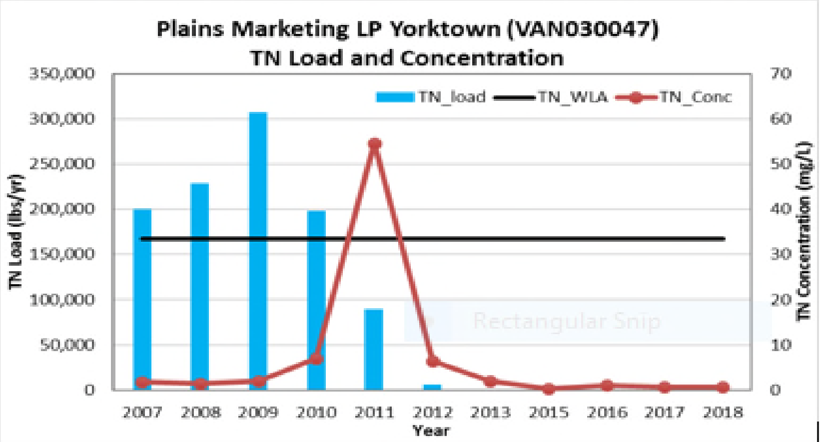


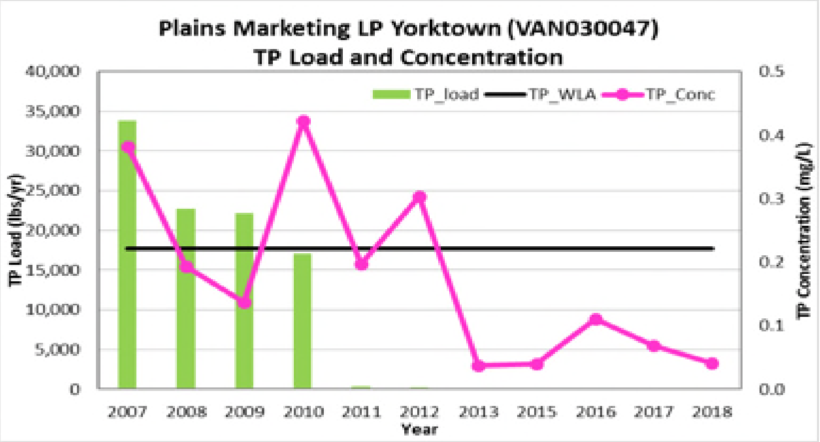
Graphed TN and TP loads based on annual average flows and concentrations and may not match results reported under the watershed GP

DEQ

Facility Offline



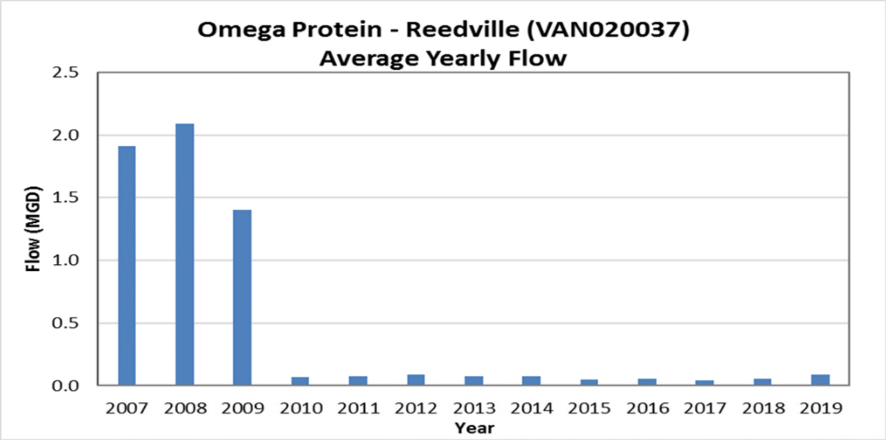


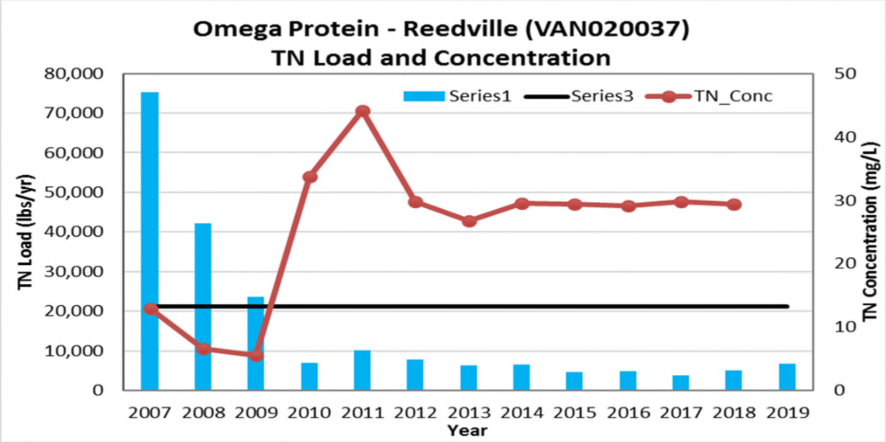


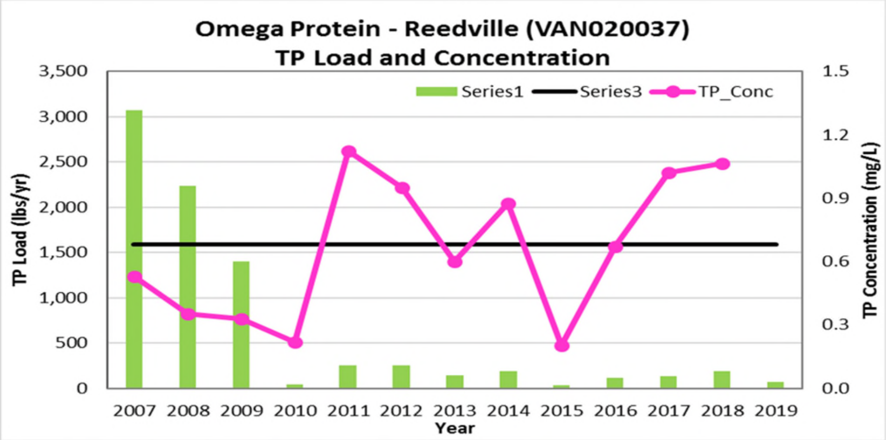
Graphed TN and TP loads based on annual average flows and concentrations and may not match results reported under the watershed GP

DEQ

Production Changes
Significant Reductions (TN, TP)





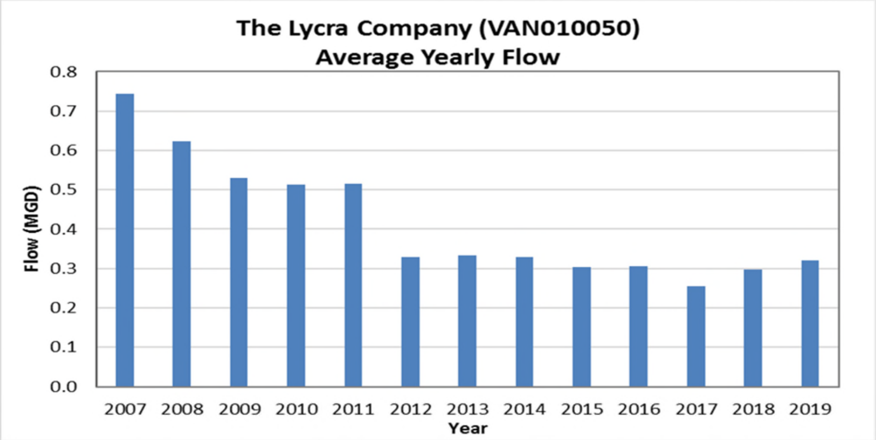


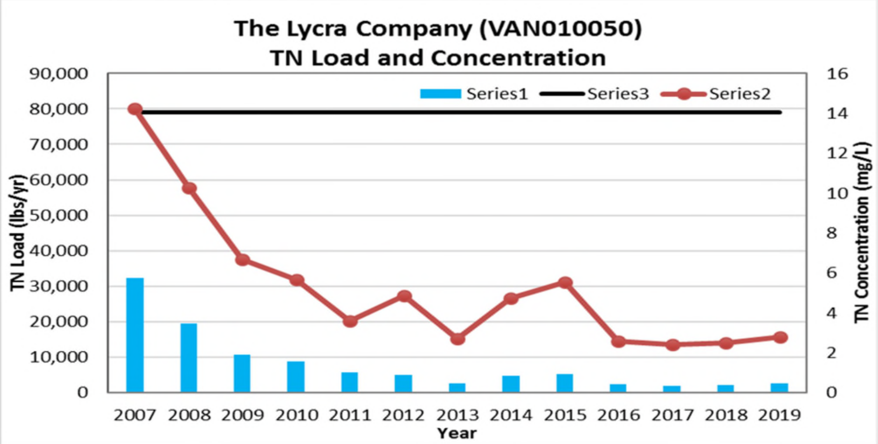
Graphed TN and TP loads based on annual average flows and concentrations and may not match results reported under the watershed GP

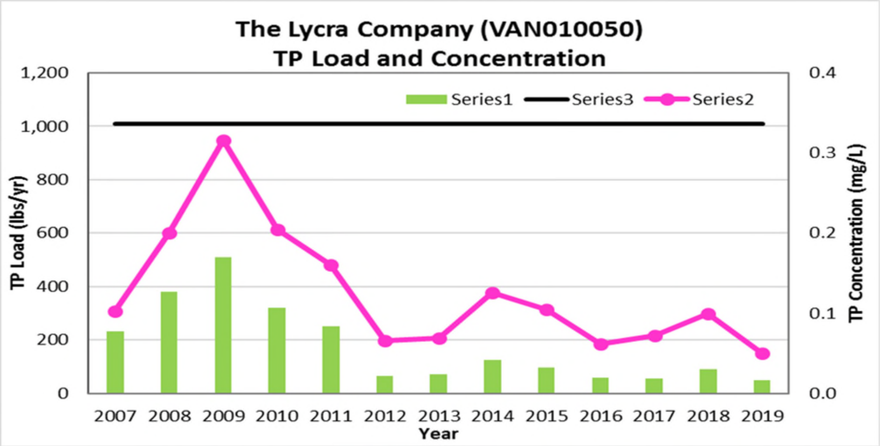
DEQ

Significant Reductions (TN, TP)

Initial WLA > 200% of Highest Year (TN)





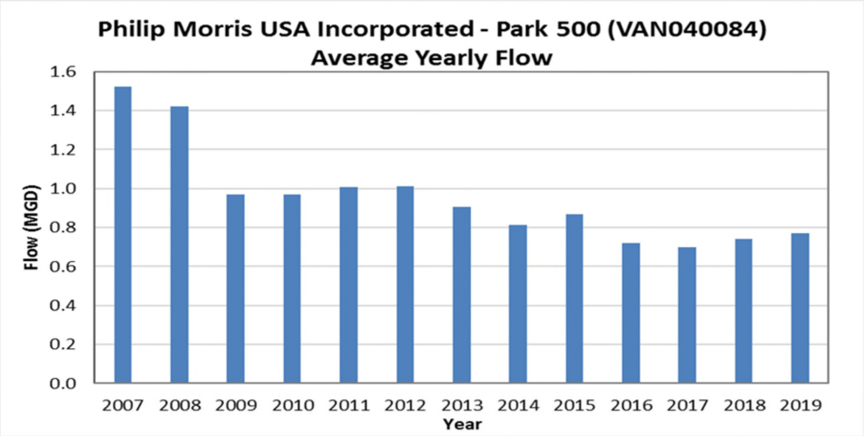


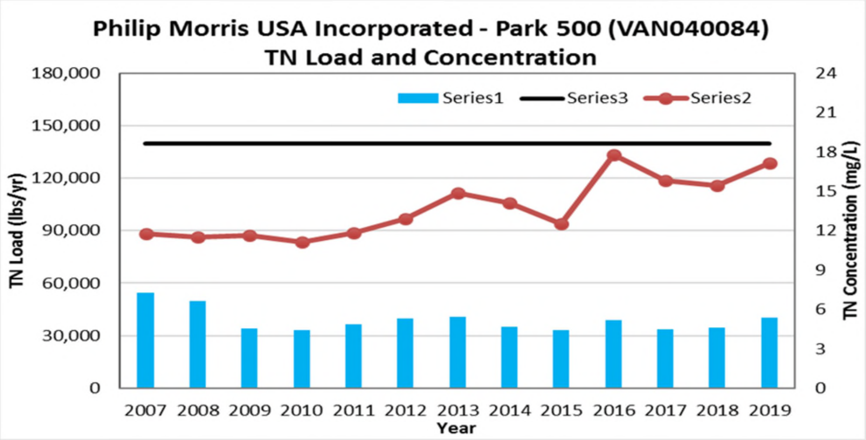
Graphed TN and TP loads based on annual average flows and concentrations and may not match results reported under the watershed GP

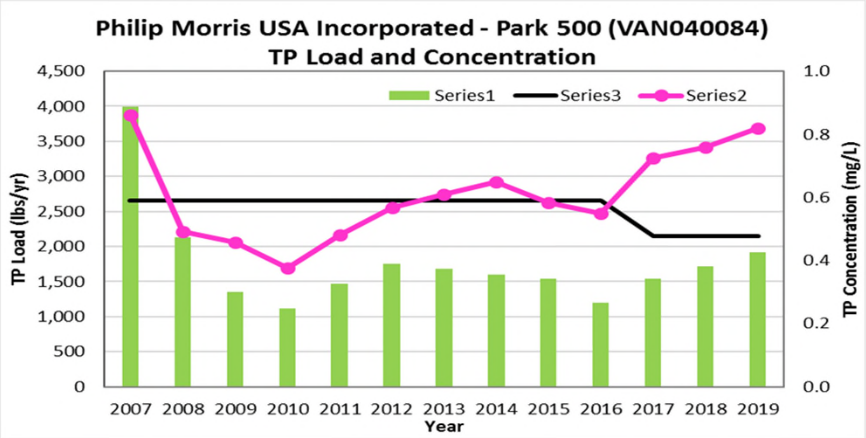
DEQ

Significant Reduction (TP)

Initial WLA > 200% of Highest Year (TN)



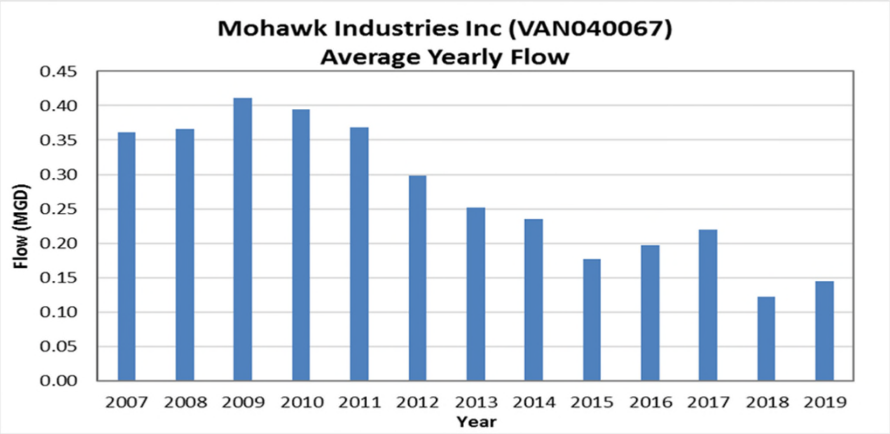


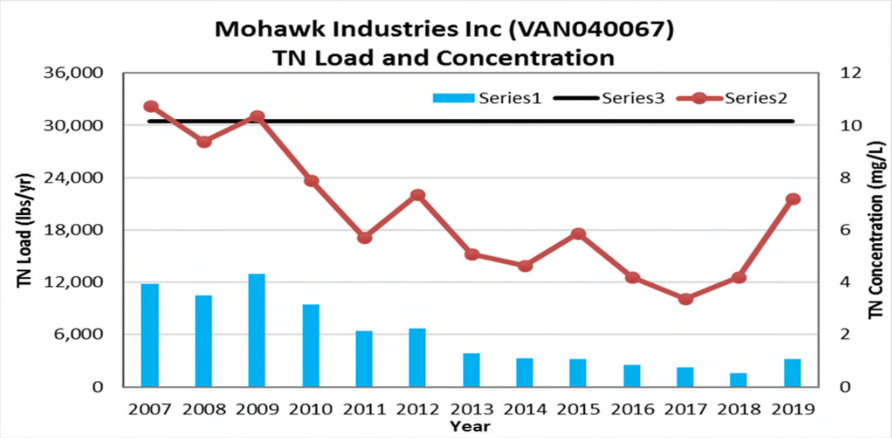


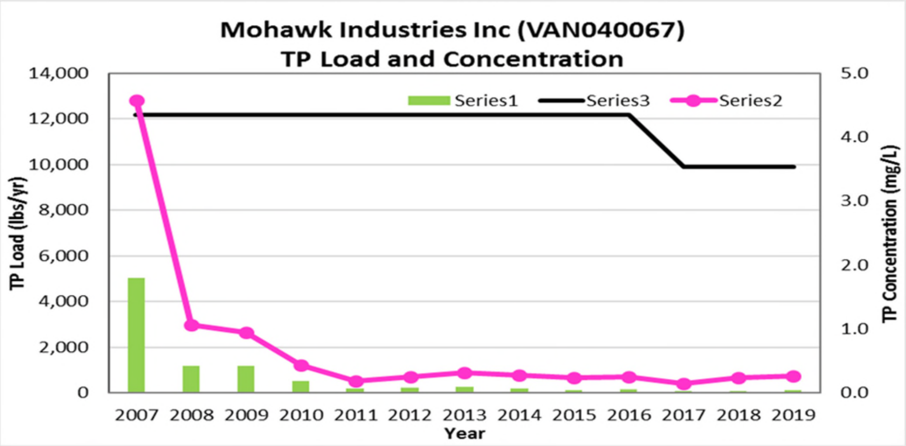
Graphed TN and TP loads based on annual average flows and concentrations and may not match results reported under the watershed GP

DEQ

Significant Reductions (TN, TP)
Initial WLA > 200% of Highest Year (TN, TP)







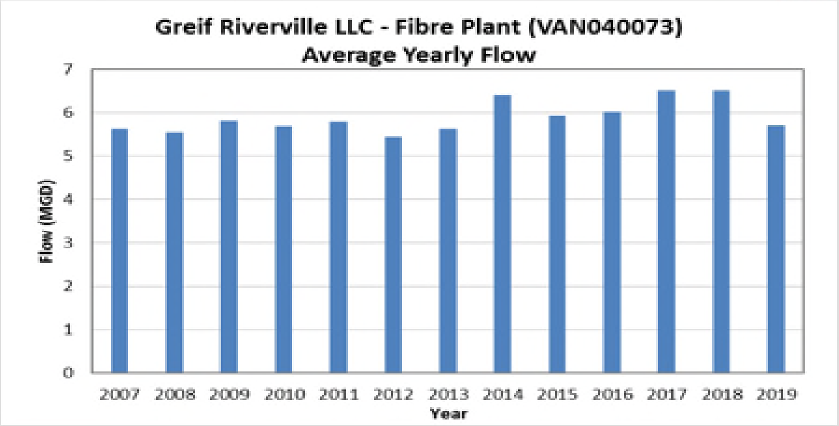
Graphed TN and TP loads based on annual average flows and concentrations and may not match results reported under the watershed GP

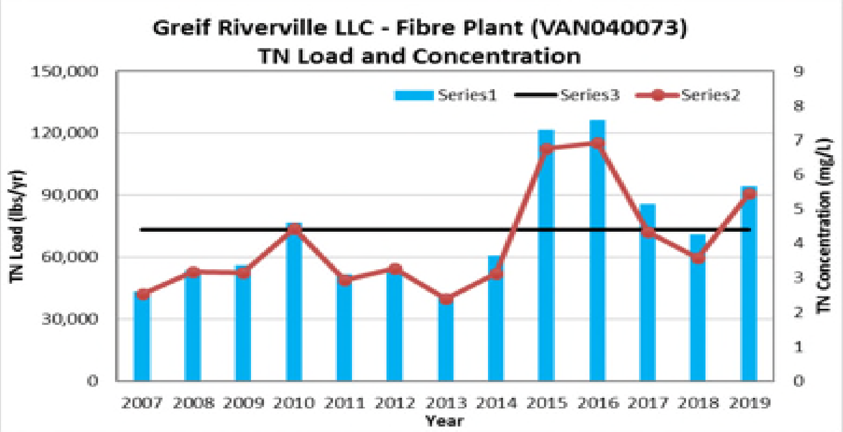
DEQ

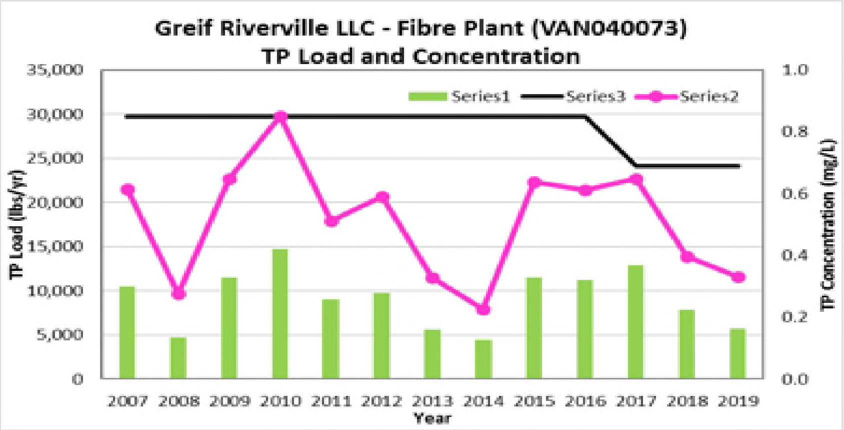
No Significant Reduction

Initial WLA > 200% Highest Year (TP)

Current TP WLA < 200% Highest Year

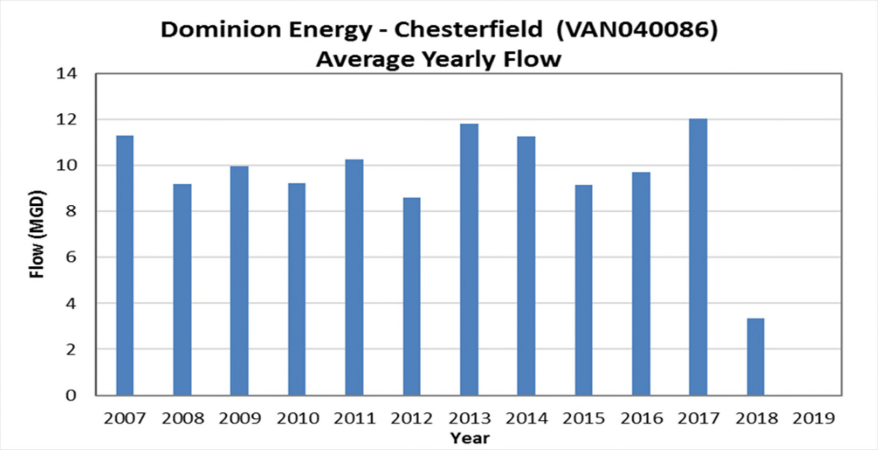


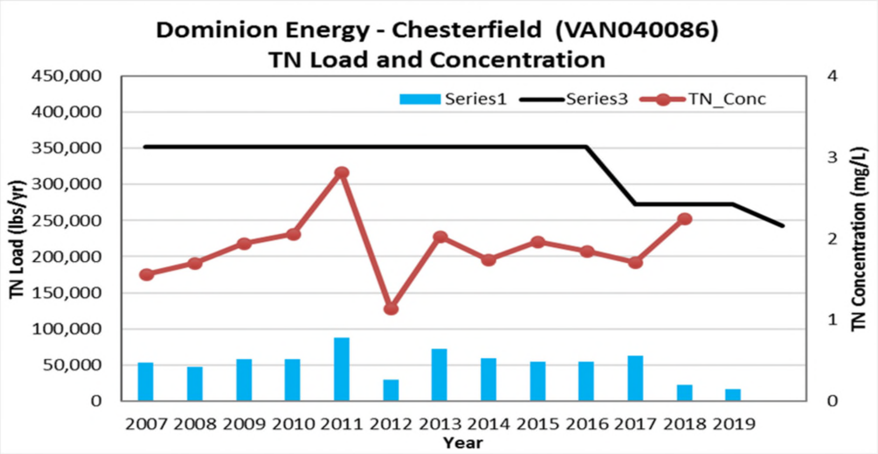


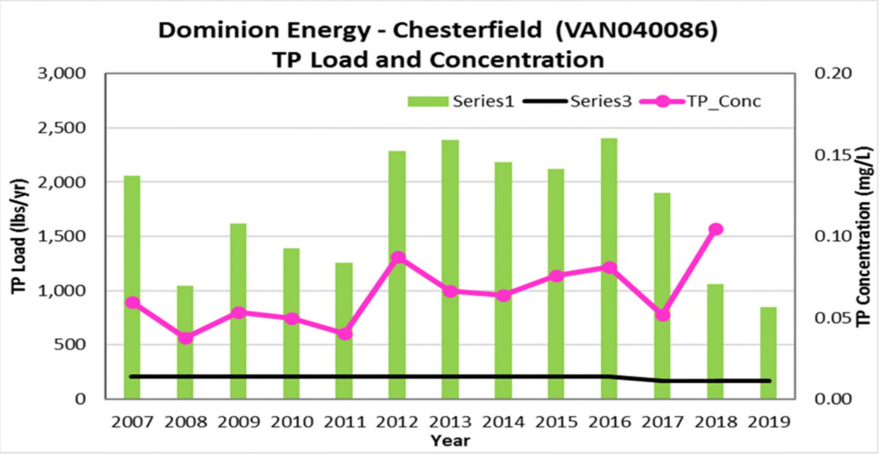


Graphed TN and TP loads based on annual average flows and concentrations and may not match results reported under the watershed GP

Initial WLA > 200% of Highest Year (TN)



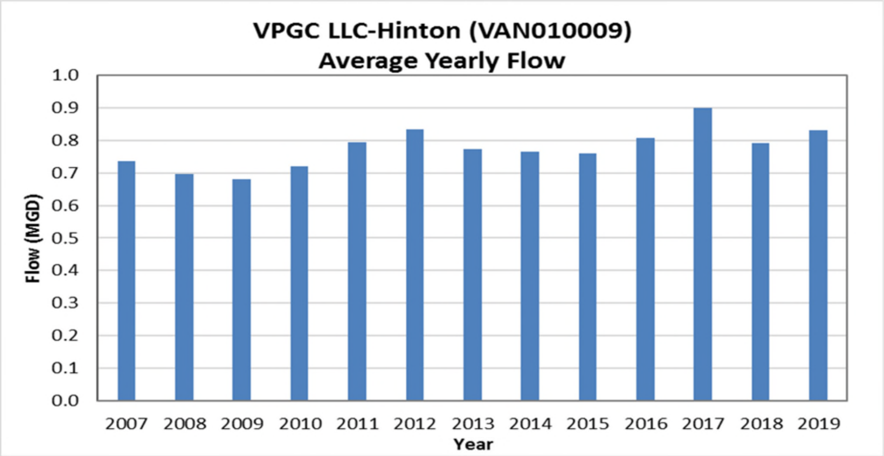


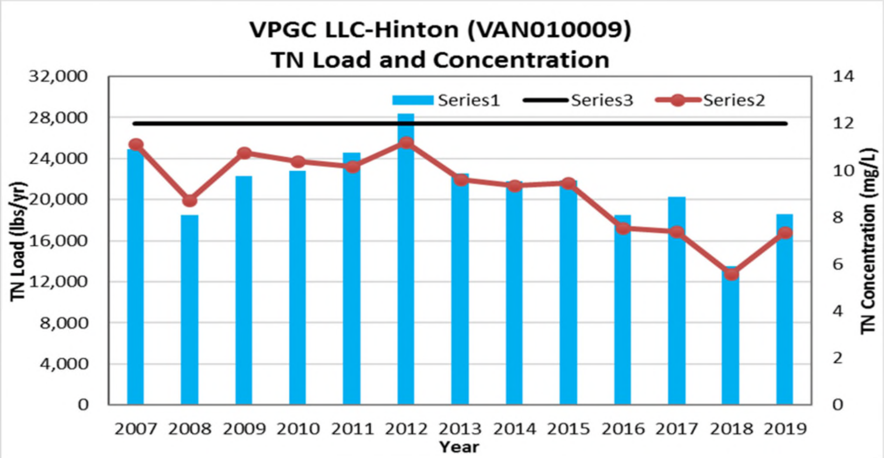


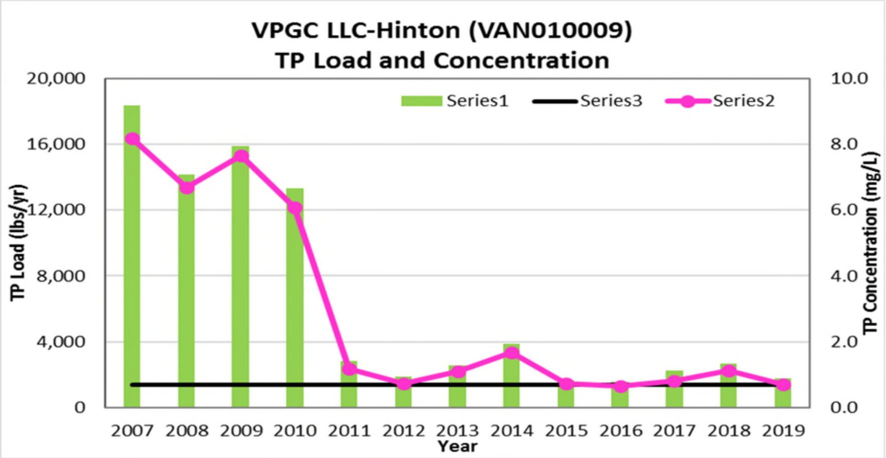
Graphed TN and TP loads based on annual average flows and concentrations and may not match results reported under the watershed GP

DEQ

Poultry

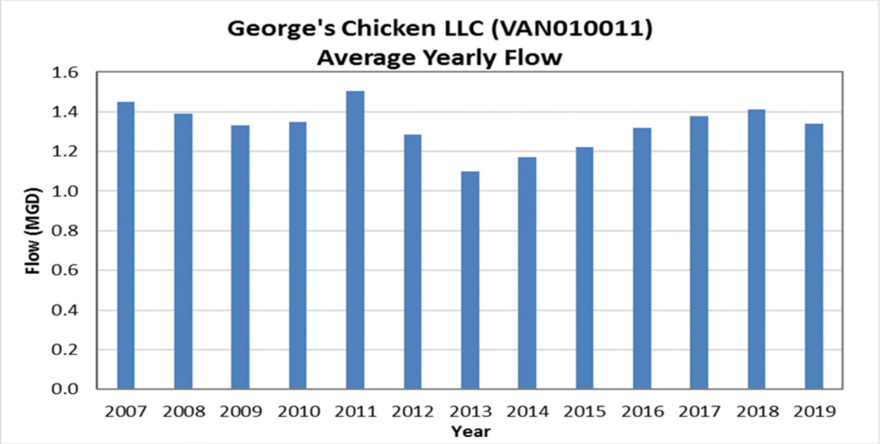


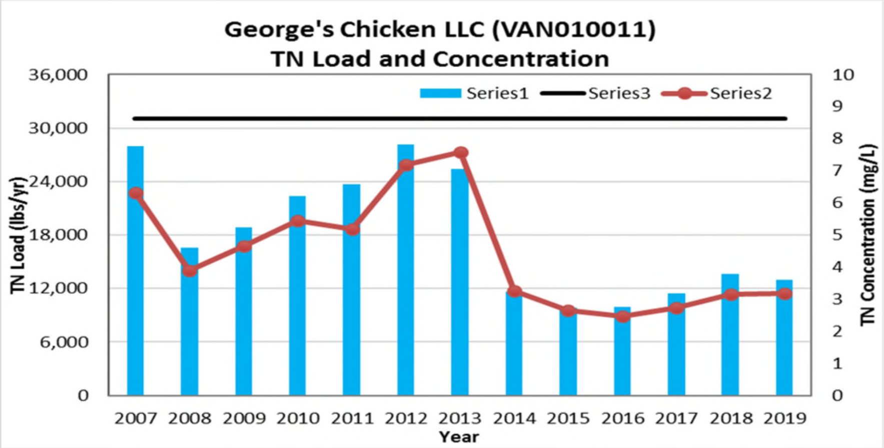


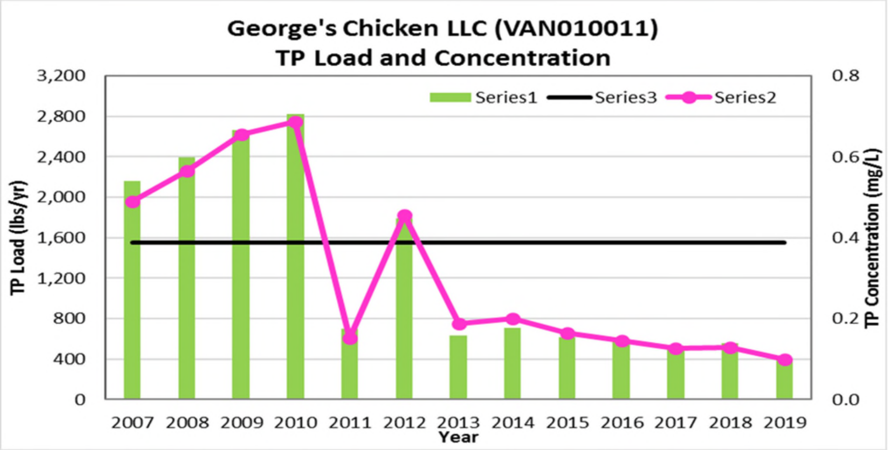


Graphed TN and TP loads based on annual average flows and concentrations and may not match results reported under the watershed GP

DEQ



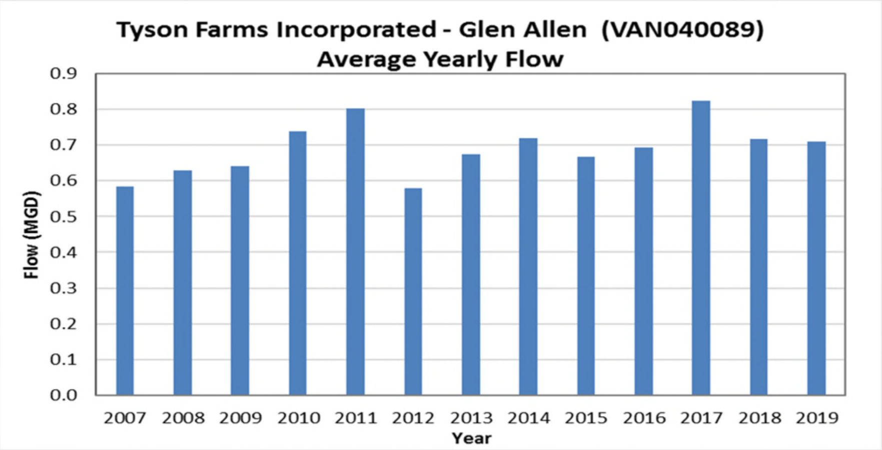


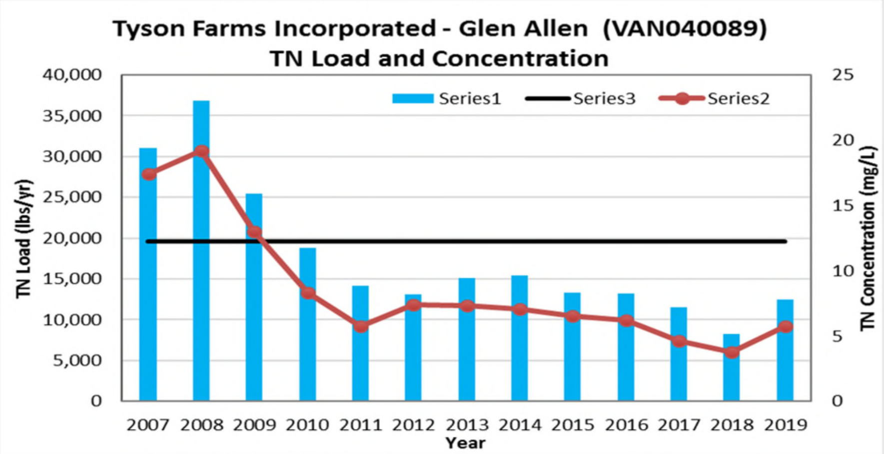


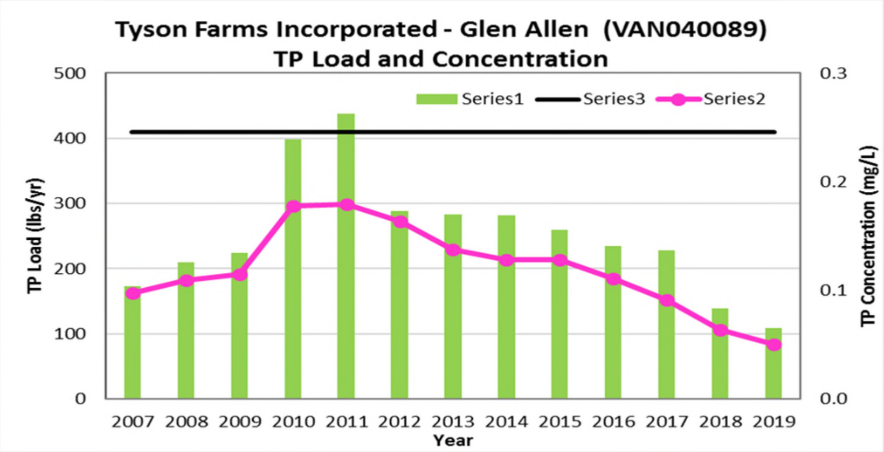
Graphed TN and TP loads based on annual average flows and concentrations and may not match results reported under the watershed GP

DEQ

Poultry

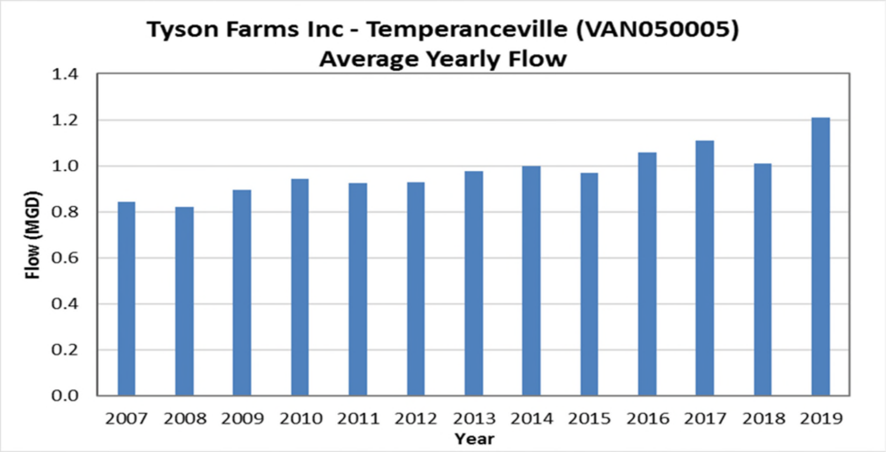


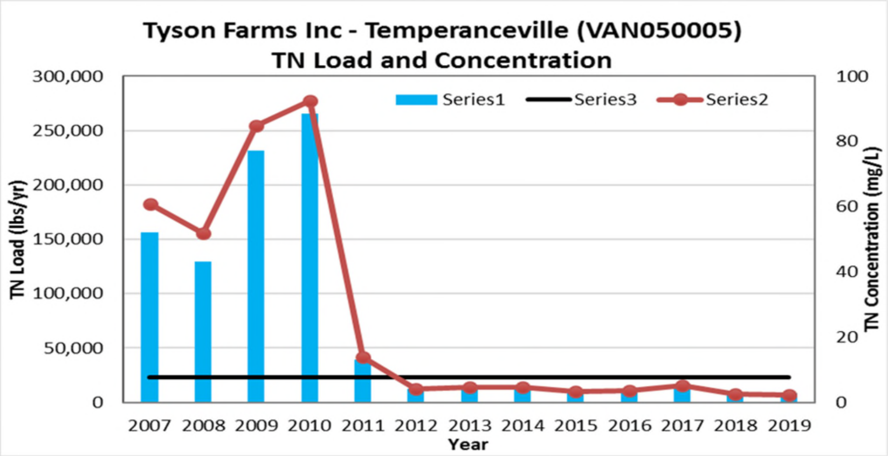


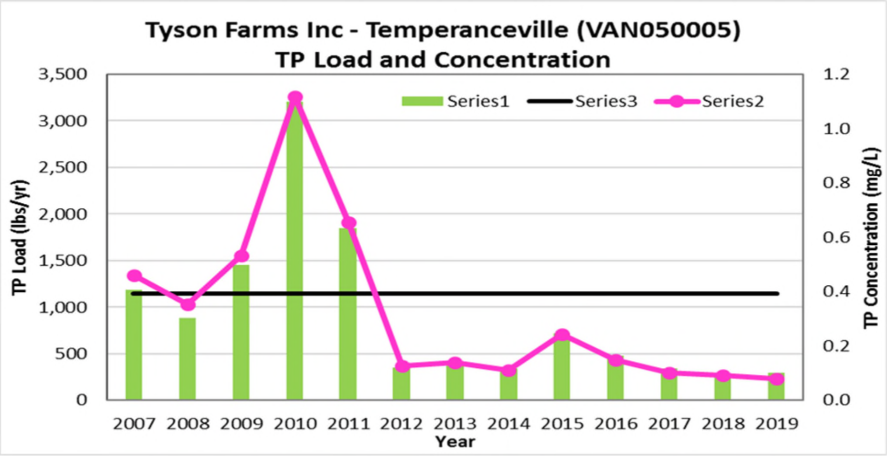


Graphed TN and TP loads based on annual average flows and concentrations and may not match results reported under the watershed GP

Poultry

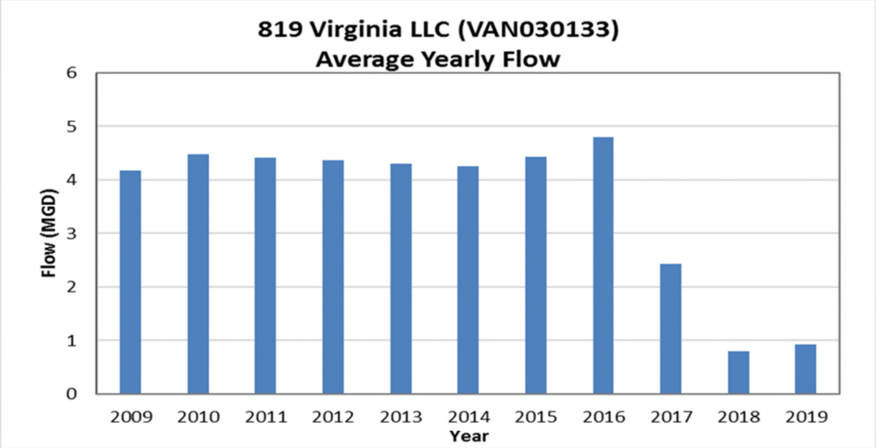


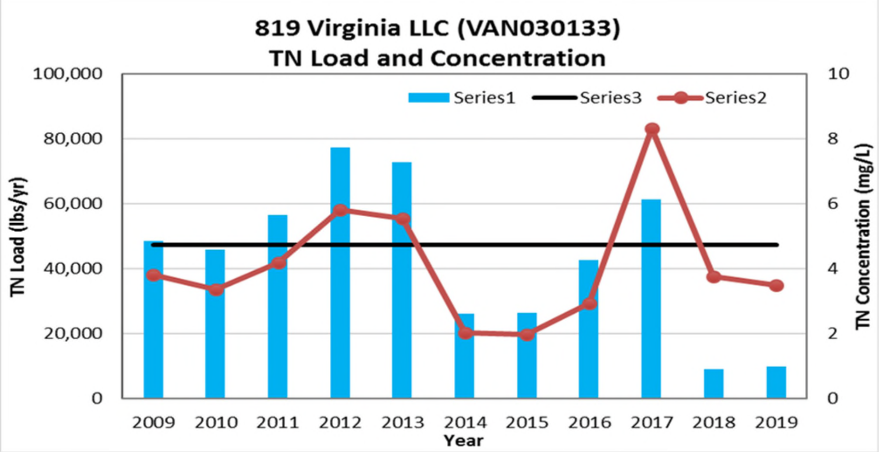


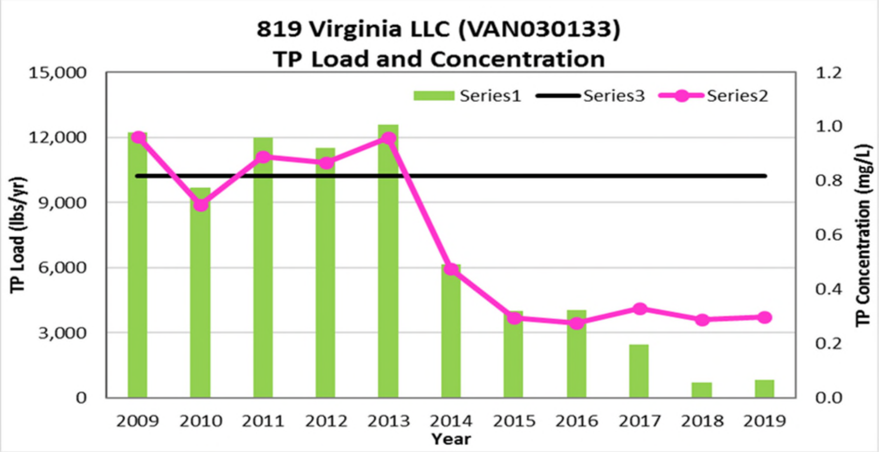


Graphed TN and TP loads based on annual average flows and concentrations and may not match results reported under the watershed GP

No Significant Reduction



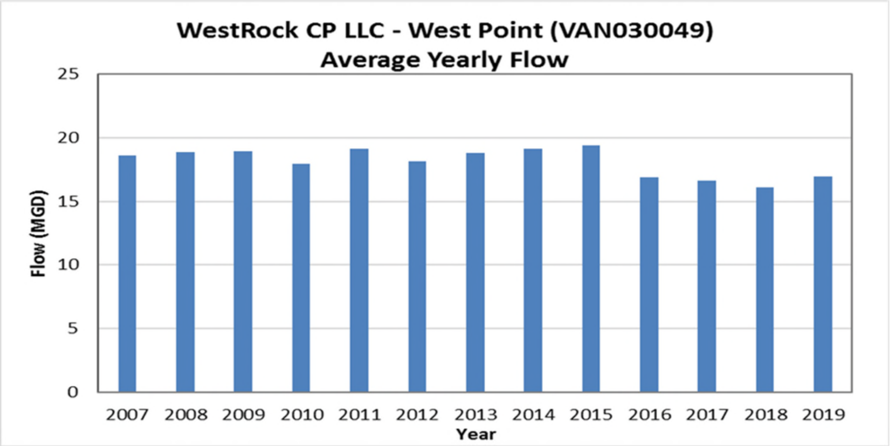


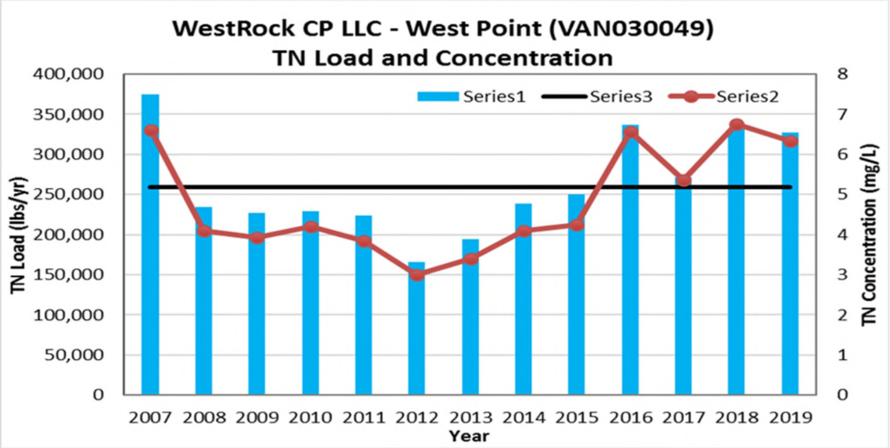


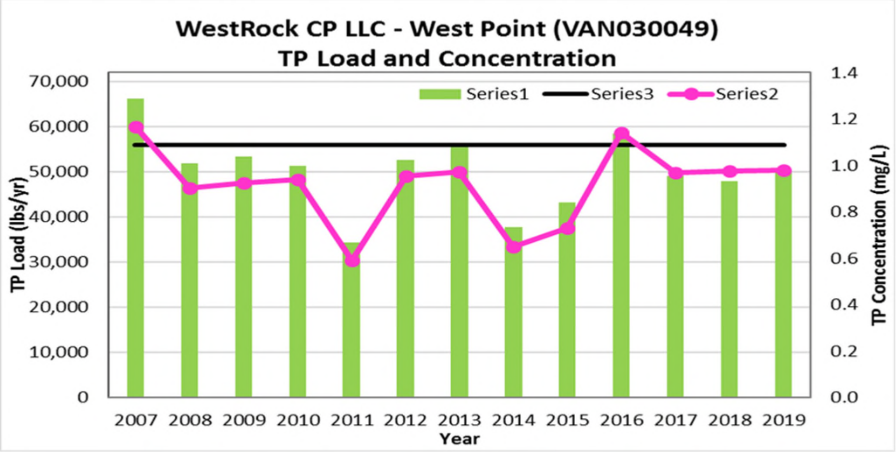
Graphed TN and TP loads based on annual average flows and concentrations and may not match results reported under the watershed GP

DEQ

No Significant Reduction







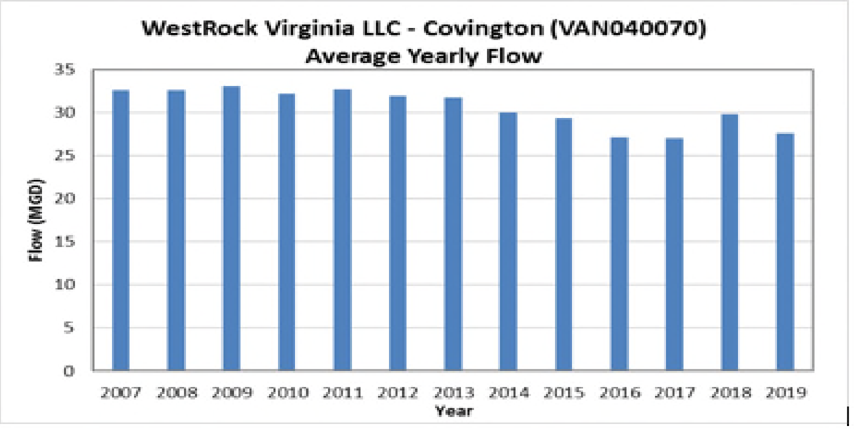
Graphed TN and TP loads based on annual average flows and concentrations and may not match results reported under the watershed GP

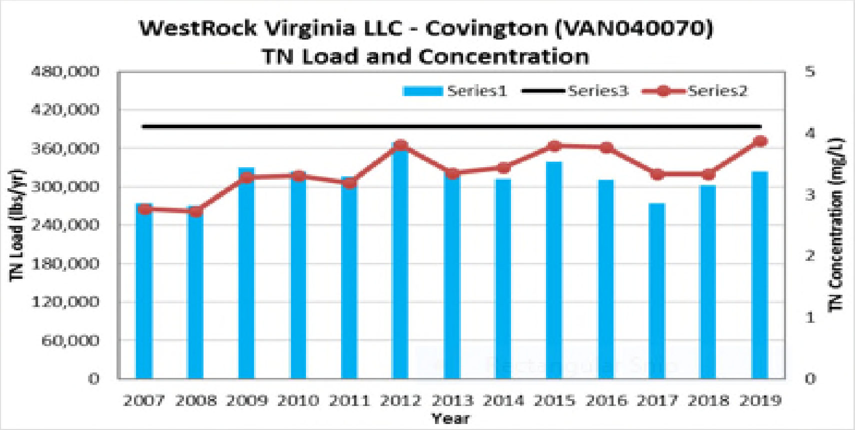
DEQ

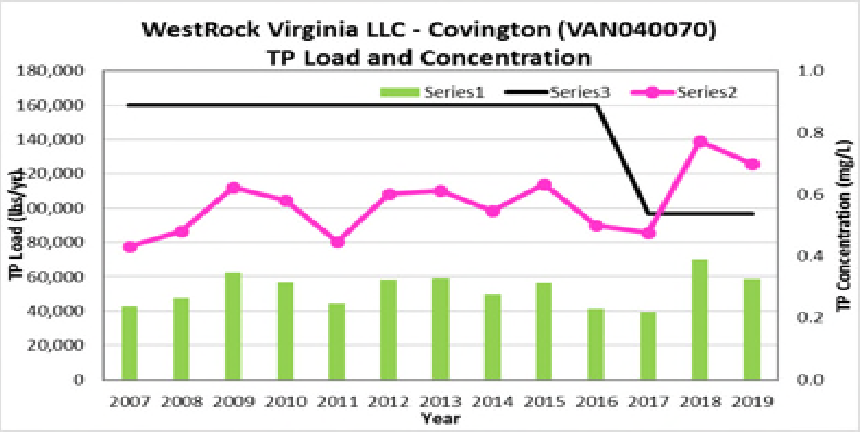
No Significant Reduction

Initial WLA > 200% Highest Year (TP)

Current TP WLA < 200% Highest Year

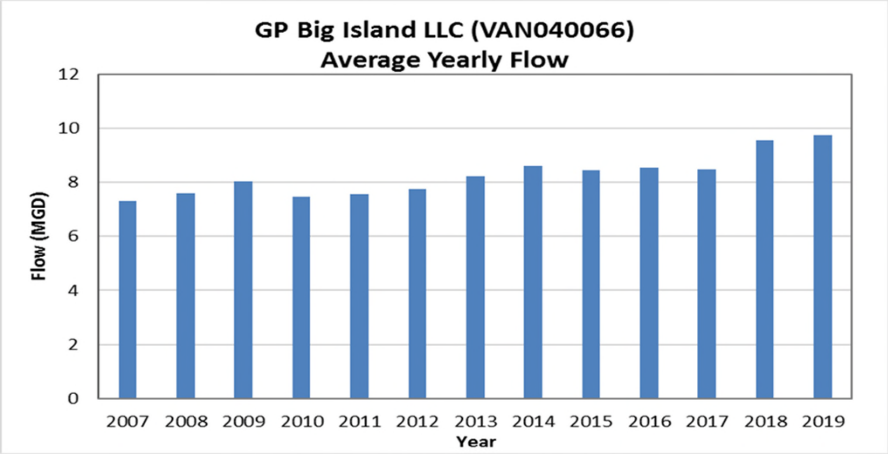


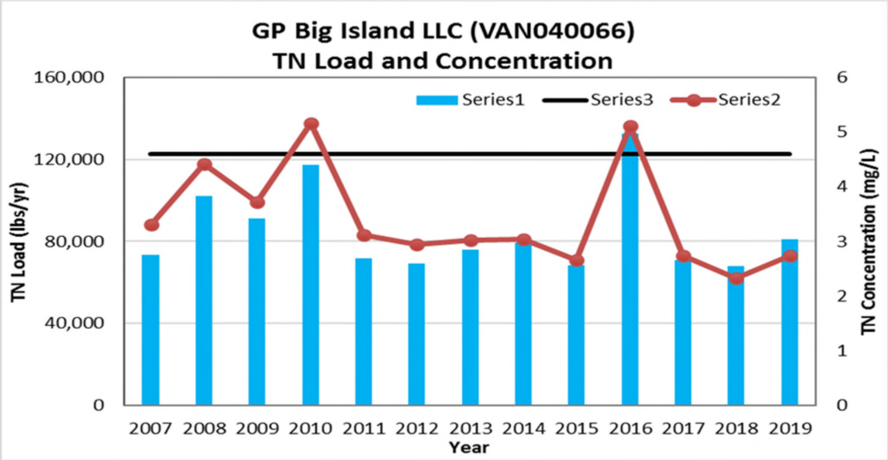


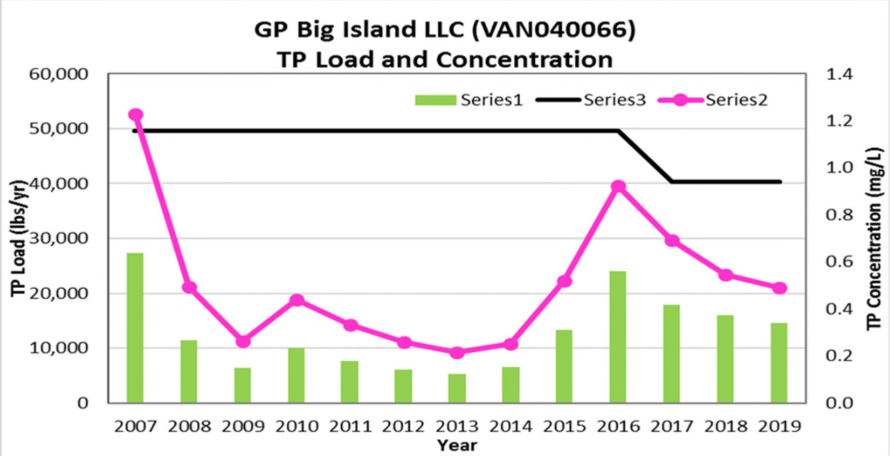


Graphed TN and TP loads based on annual average flows and concentrations and may not match results reported under the watershed GP

No Significant Reduction



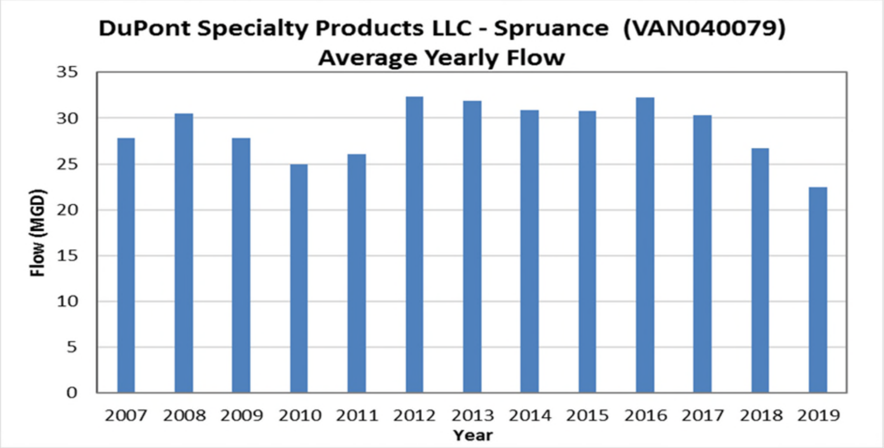


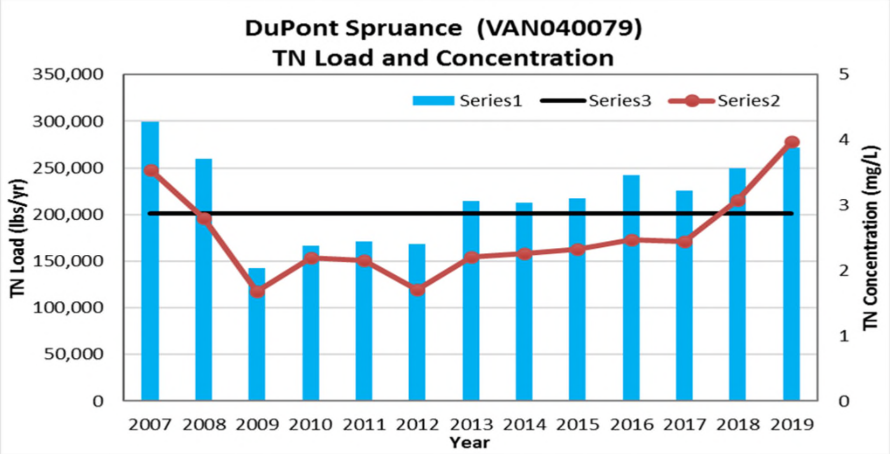


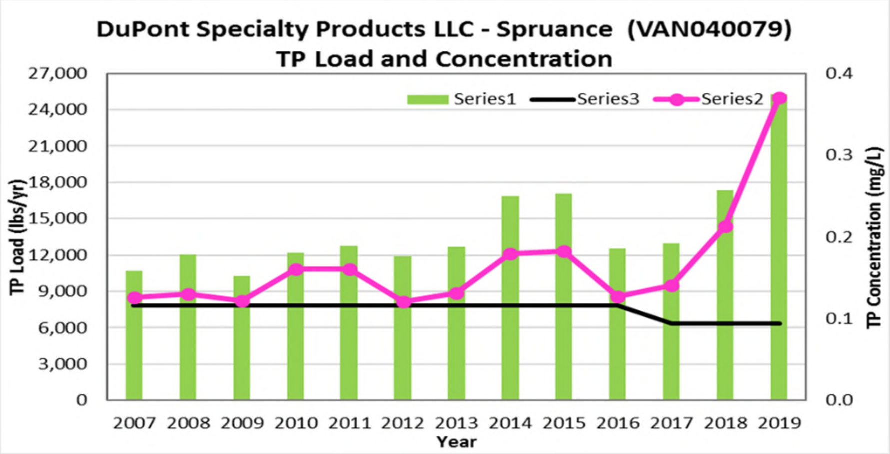
Graphed TN and TP loads based on annual average flows and concentrations and may not match results reported under the watershed GP

DEQ

No Significant Reduction



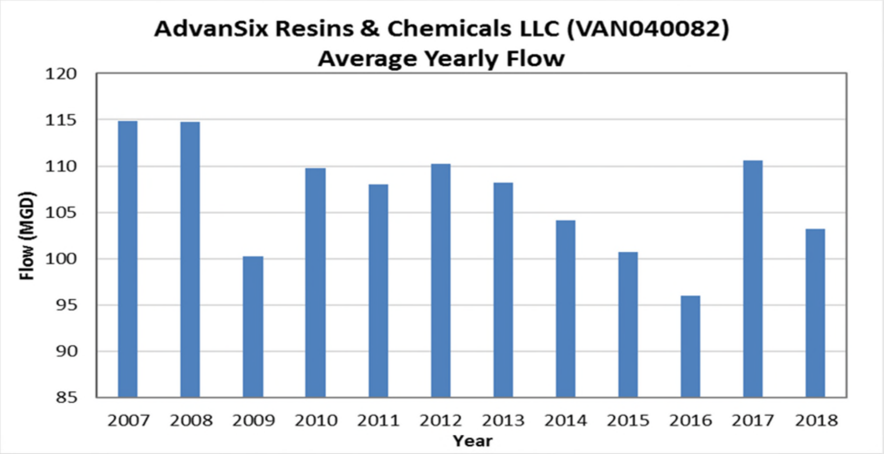


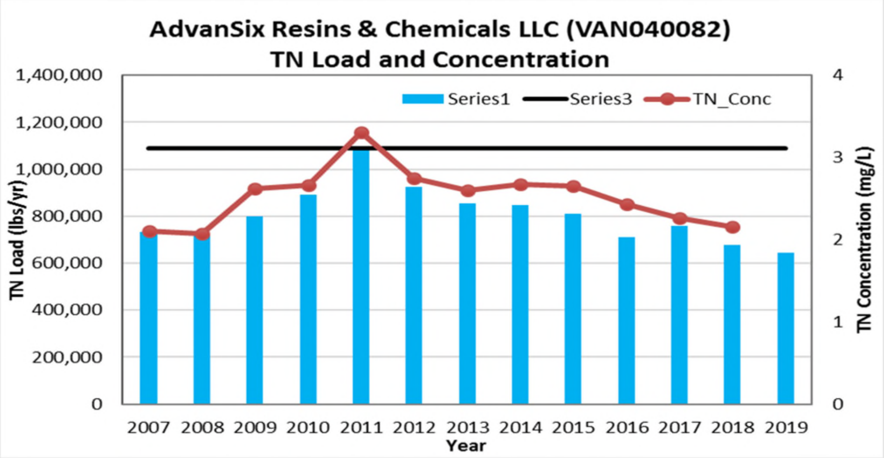


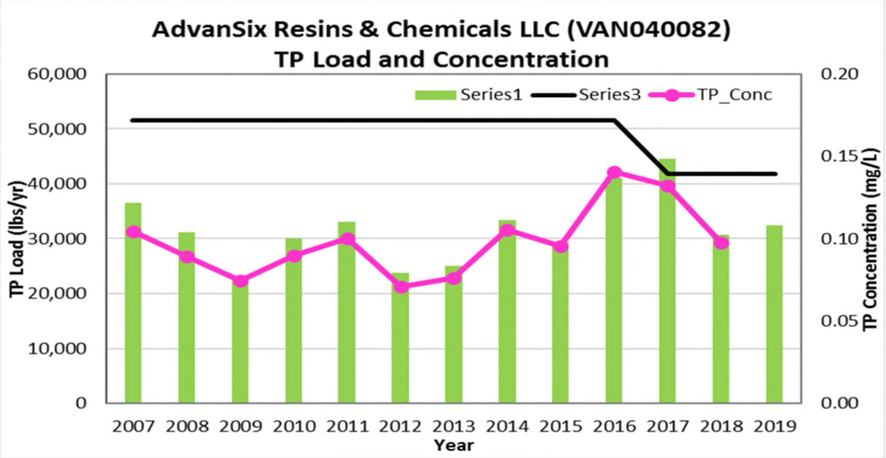
Graphed TN and TP loads based on annual average flows and concentrations and may not match results reported under the watershed GP

DEQ

No Significant Reduction



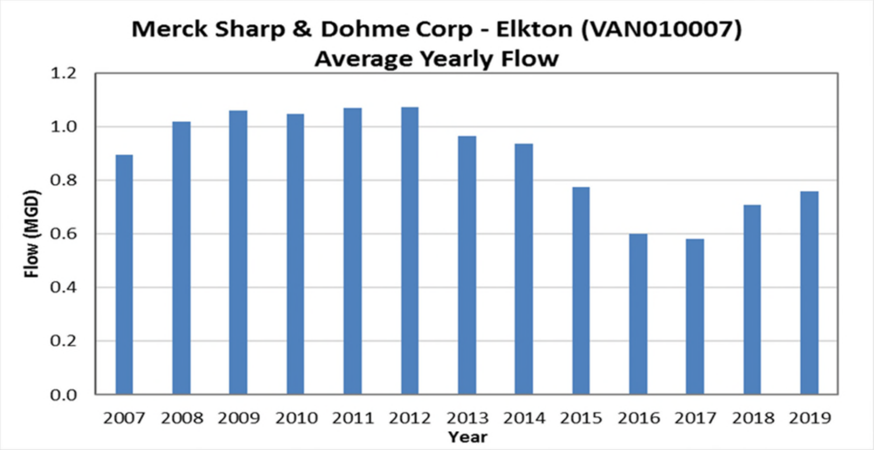


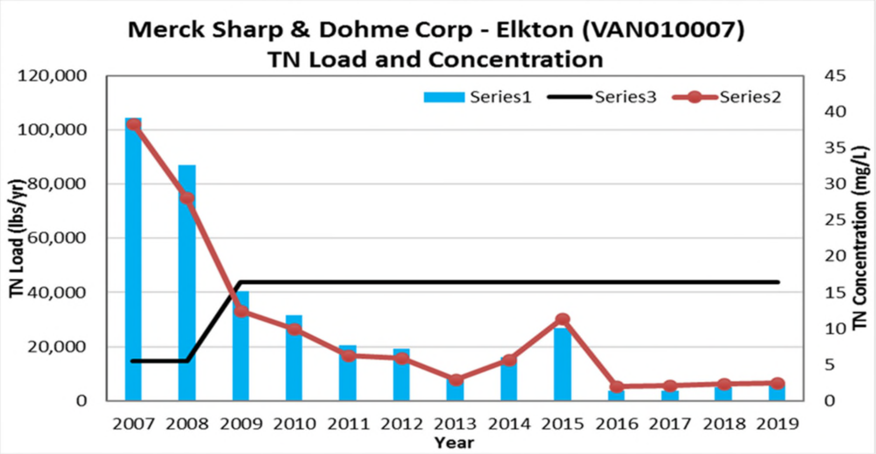


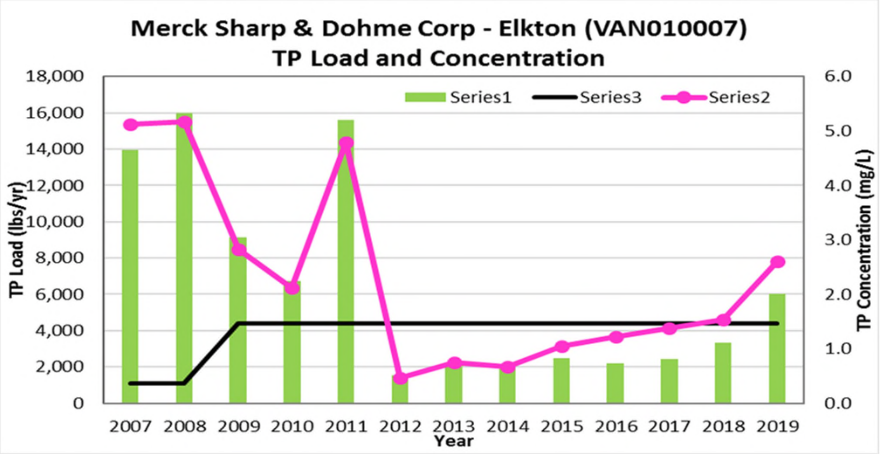
Graphed TN and TP loads based on annual average flows and concentrations and may not match results reported under the watershed GP

DEQ

Significant Reductions (TN,TP)



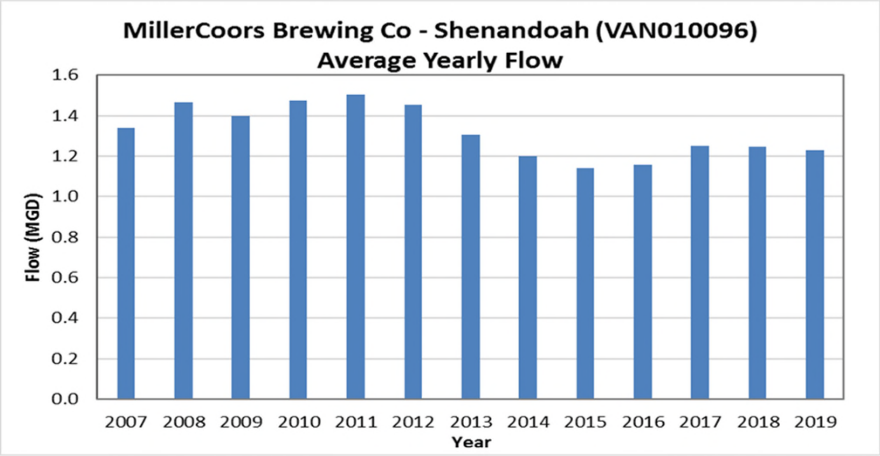


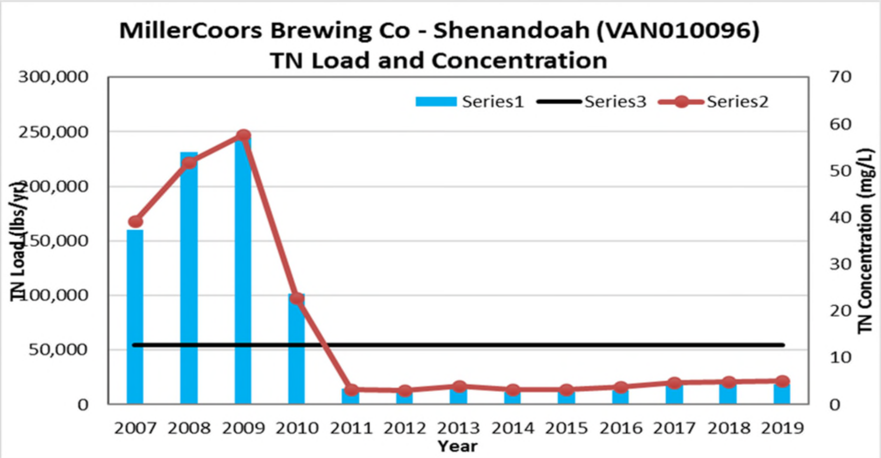


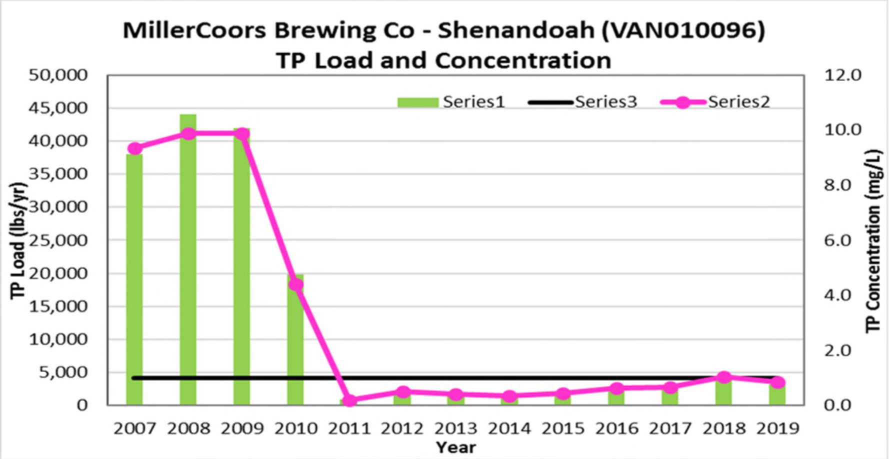
Graphed TN and TP loads based on annual average flows and concentrations and may not match results reported under the watershed GP

DEQ

Significant Reductions (TN,TP)



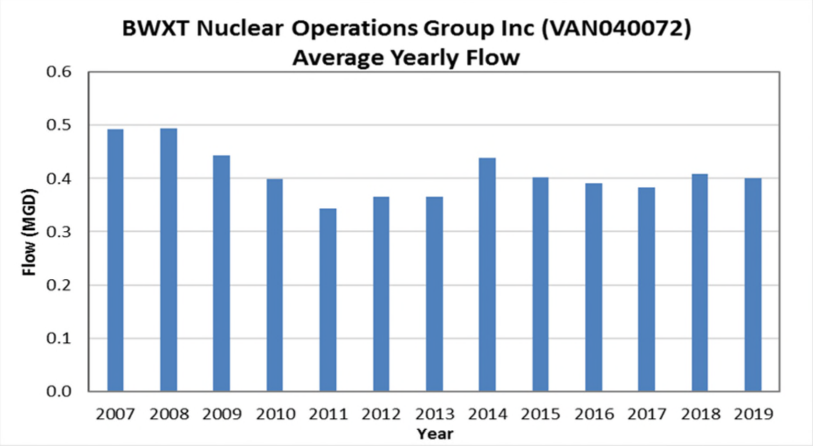


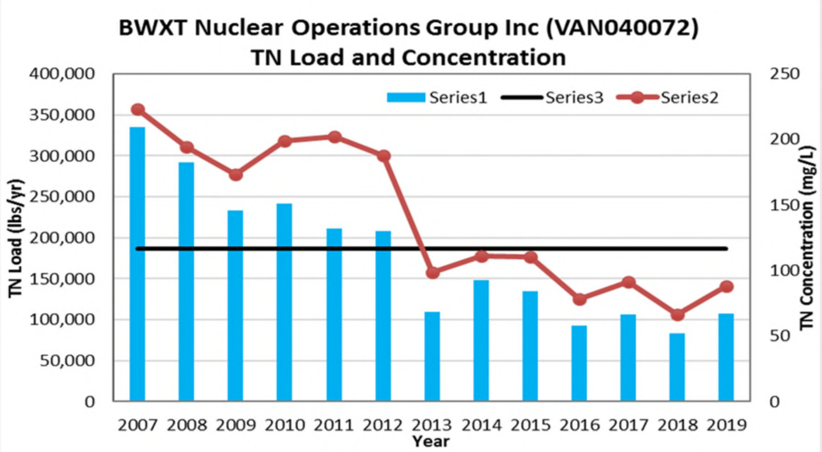


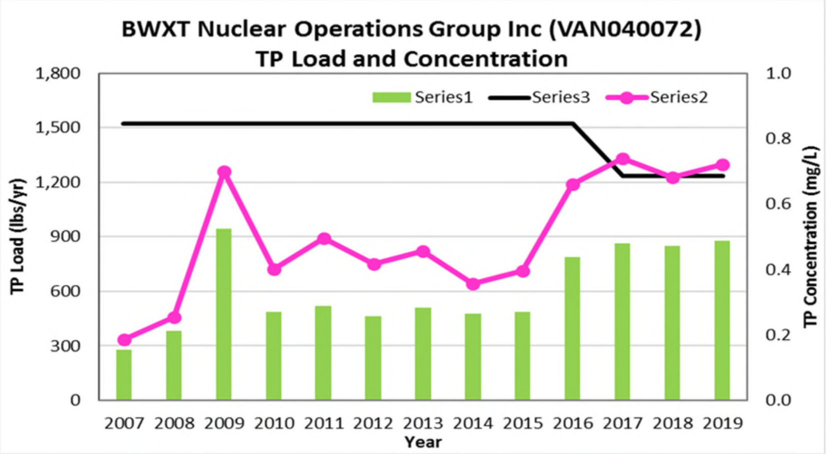
Graphed TN and TP loads based on annual average flows and concentrations and may not match results reported under the watershed GP

DEQ

Significant Reductions (TN)

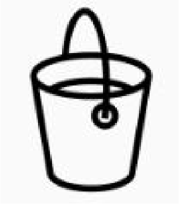






Graphed TN and TP loads based on annual average flows and concentrations and may not match results reported under the watershed GP

DEQ



Buckets

Category	Comments
Facility Offline	WLA to Nutrient Offset Fund
Production Changes	Partial reduction of WLA - %?
Initial WLA > 200% of Highest Year	Partial reduction of WLA - %?
Poultry	No action
No Significant Reduction	No action
Significant Reductions	No action

Consideration of 3 Municipal WLAs

- Chickahominy WWTP – VA0088480
  - Facility offline and no longer permitted

- Lake Monticello STP – VA0024945
  - WLA based on design flow of 0.995. Actual design flow = 0.775 MGD

- Lower Jackson River STP – VA0090671
  - WLA based on a consolidated design flow of 3.5 MGD (1.5 MGD for Lower Jackson STP and 2.0 for Clifton Forge STP). Consolidated treatment plant constructed at design flow of 2.6 MGD.

Chesapeake Bay TMDL WIP III – Initiative #52

(52) Require additional nutrient reductions from wastewater treatment plants (WWTP)

The Commonwealth will initiate actions to achieve additional nutrient reductions from significant municipal treatment facilities that have not yet upgraded to achieve 4 mg/l of TN and 0.3 mg/l of TP. This action will consist of modifications to the Water Quality Management Planning Regulation to include secondary, "floating" wasteload allocations for significant municipal facilities. The floating wasteload allocations will be based on the flow treated by the facility in a given year and nutrient concentrations of 4 mg/l TN and 0.3 mg/l TP. Existing "primary" wasteload allocations will remain and in any given year the facility will be required to meet the lesser of the primary or floating allocations. A few facilities with special circumstances could be assigned alternative floating wasteload allocations (e.g. UOSA: 8 mg/l TN; Richmond: 8 mg/l TN; Lynchburg: 8 mg/l TN; and Hopewell: 12 mg/l TN) or possibly no floating wasteload allocation (e.g. UOSA TN). The Commonwealth may choose to exempt a subset of the smallest significant facilities that in aggregate represent a minor percentage of the expected load reductions from this initiative. Because this initiative is being implemented through the Water Quality Management Planning Regulation and the Watershed General Permit, no facilities will be required to upgrade but rather may choose to trade nutrient credits to achieve their reduction goals. Of the 87 significant publicly owned treatment works (POTWs) included in the Watershed General Permit, 41 have already upgraded their facilities to achieve 4 mg/l TN and 0.3 mg/l TP.

Under §62.1-44.19:14.D, DEQ is required to review the basis for allocations granted in the Water Quality Management Planning Regulation every 10 years (beginning in 2020) and propose the reallocation of any unneeded allocations to other facilities registered under the general permit or reserve such allocations for future use. See Report Prepared Pursuant to Executive Order 52 (2016).

Floating WLAs for municipal WWTPs

DEQ

Budget Provision – Item 377 #6c

"F.2. The Department shall work with permittees operating under the Chesapeake Bay Watershed Nutrient General Permit and interested stakeholders through a workgroup including local government representatives, the Chesapeake Bay Foundation and the James River Association to review the assumptions used in estimating the effluent nutrient concentrations and trends of wastewater facilities and to identify cost-effective options to achieve wastewater nutrient load levels with reasonable assurance consistent with the needs of the Chesapeake Bay TMDL Phase III Watershed Implementation Plan. The review shall be completed and provided to the Chairs of the House Appropriations Committee, the Senate Finance and Appropriations Committee, the House Committee on Agriculture, Chesapeake and Natural Resources, the Senate Committee on Agriculture, Conservation, and Natural Resources and the Virginia delegation of the Chesapeake Bay Commission by December 1, 2020. The Department shall continue issuing Water Quality Improvement Fund grants for additional nutrient removal projects in accordance with the appropriations under Items 379 and C-70 of this act and §§ 10.1-1186.01 and 10.1-2117 of the Code of Virginia."

Explanation:

(This amendment directs The Department of Environmental Quality to review the assumptions used to estimate nutrient concentrations and trends of wastewater facilities and to identify cost-effective options to achieve wastewater nutrient load levels consistent with the needs of Phase III of the Watershed Implementation Plan.)

DEQ

Example Floating WLA Provisions

[1] The wasteload allocations for any given calendar year are the lesser of (i) the values above and (ii) the floating wasteload allocations calculated as follows:

TN WLA (lbs/yr) = Annual average treated flow (MGD) x (4.0, 8.0 or 12.0) mg/l x 8.345 x 365

TP WLA (lbs/yr) = Annual average treated flow (MGD) x 0.30 mg/l x 8.345 x 365

Annual average treated flow is the sum of 12 monthly average treated flows divided by 12. Floating wasteload allocations shall be calculated to the nearest pound without regard to mathematical rules of precision.

Note: the use of "treated flow" allows WWTP's with significant reclamation and reuse or other treatment systems which divert flow from the discharge to calculate floating WLAs using influent flow.

Example Floating WLA Provisions

CSO Provision

Wasteload allocations for localities served by combined sewers are based on dry weather design flow capacity. Calculations of average treated flow shall use dry weather design flow for days on which the dry weather design flow is exceeded. During wet weather flow events the discharge shall achieve a TN concentration of (8.0 or 4.0) mg/l and a TP concentration of (1.0 or 0.18) mg/l.

HRSD Aggregate WLA

The aggregate floating WLAs for the James River HRSD facilities shall include 216,675 lbs/yr of TN and 16,251 lbs/yr of TP through the year 2032. These additional allocations represent an average of 17.8 MGD of wastewater flow to be diverted from the Chesapeake-Elizabeth STP (VA0081264) out of the Chesapeake Bay watershed to the Atlantic STP (VA0081248).

DEQ

Issues to resolve

- All significant facilities vs. larger facilities only
- What happens to the “capacity” WLA (the difference between the existing WLA and the floating WLA?
  - Capacity WLA changes from year-to-year until the floating WLA exceeds the existing WLA. Capacity credits are held in the Nutrient Offset Fund.
- Can capacity credits be traded to accommodate new and expanding point sources registered under the GP?
- Are there sufficient credits under the floating WLAs to meet demands from other sectors (e.g. MS4s)?

Attachment 5

Example Municipal Waste Load Allocation Regulation Changes (5 MGD and Greater).

Municipal Floating WLA Examples

See separate Word documents

9VAC25-720-50. Potomac-Shenandoah River Basin.

C. Nitrogen and phosphorus wasteload allocations to restore the Chesapeake Bay and its tidal rivers. The following table presents nitrogen and phosphorus wasteload allocations for the identified significant dischargers and the total nitrogen and total phosphorus wasteload allocations for the listed facilities.

Virginia Waterbody ID	Discharger Name	VPDES Permit No.	Total Nitrogen (TN) Wasteload Allocation (lbs/yr)	Total Phosphorus (TP) Wasteload Allocation (lbs/yr)
B37R	Coors Brewing Company	VA0073245	54,820	4,112
B14R	Fishersville Regional STP	VA0025291	48,729	3,655
B32R	~~INVISTA - Waynesboro~~The Lycra Company (Outfall 101)	VA0002160	78,941	1,009
B39R	Luray STP	VA0062642	19,492	1,462
B35R	Massanutten PSA STP	VA0024732	18,273	1,371
B37R	Merck - Stonewall WWTP (Outfall 101)~~[1]~~	VA0002178	43,835	4,384
B12R	Middle River Regional STP	VA0064793	82,839[1]	6,213[2]
B23R	North River WWTF	VA0060640	253,391[1]	19,004[2]
B22R	VA Poultry Growers -Hinton	VA0002313	27,410	1,371
B38R	~~Pilgrims Pride - Alma~~Nutrient Offset Fund	Formerly VA0001961	18,273	914

Commented [BA(1]: Does not include any Industrial WLA reduction

B31R	Stuarts Draft WWTP	VA0066877	48,729	3,655
B32R	Waynesboro STP	VA0025151	48,729[1]	3,655[2]
B23R	Weyers Cave STP	VA0022349	6,091	457
B58R	Berryville STP	VA0020532	8,528	640
B55R	Front Royal STP	VA0062812	48,729[1]	3,655[2]
B49R	Georges Chicken LLC	VA0077402	31,065	1,553
B48R	Mt. Jackson STP	VA0026441	8,528	640
B45R	Broadway Regional WWTF	VA0090263	29,481	2,211
B49R	Stoney Creek SD STP	VA0028380	7,309	548
B51R	Strasburg STP	VA0020311	11,939	895
B50R	Woodstock STP	VA0026468	24,364	1,827
A06R	Basham Simms WWTF	VA0022802	18,273	1,371
A09R	Broad Run WRF	VA0091383	134,005	3,350
A08R	Leesburg WPCF	VA0092282	121,822	9,137
A06R	Round Hill Town WWTF	VA0026212	9,137	685
A25R	DSC - Section 1 WWTF	VA0024724	42,029	2,522
A25R	DSC - Section 8 WWTF	VA0024678	42,029	2,522
A25E	H L Mooney WWTF	VA0025101	219,280[1]	13,157[2]
A22R	UOSA - Centreville	VA0024988	1,315,682	16,446
A19R	Vint Hill WWTF	VA0020460	11,573	868
B08R	Opequon WRF~~[2]~~[3]	VA0065552	121,851[1]	11,512[2]
B08R	Parkins Mills STP	VA0075191	60,911	4,568

Commented [BA(2]: Original Design Q = 4 MGD. Current Design Q = 5.3 MGD.

A13E	Alexandria Renew Enterprises~~[3]~~[4]	VA0025160	493,381[1]	29,603[2]
A12E	Arlington County Water PCF	VA0025143	365,467[1]	21,928[2]
A16R	Noman M Cole Jr PCF	VA0025364	612,158[1]	36,729[2]
A12R	Blue Plains (VA Share)	DC0021199	581,458	26,166
A26R	Quantico WWTF	VA0028363	20,101	1,206
A28R	Aquia WWTF	VA0060968	73,093[1]	4,386[2]
A31E	Colonial Beach STP	VA0026409	18,273	1,827
A30E	Dahlgren WWTF	VA0026514	9,137	914
A29E	King George County Service Authority - Fairview Beach	VA0092134	1,827	183
A30E	US NSWC-Dahlgren WWTF	VA0021067	6,578	658
A31R	Purkins Corner STP	VA0070106	1,096	110
	~~Unallocated Reserve WLA~~Nutrient Offset Fund		9,137	685
	TOTALS:		5,156,169	246,635

Notes:

[1]The Total Nitrogen wasteload allocation for any given calendar year is the lesser of (i) the values listed above and (ii) the floating wasteload allocation calculated as follows:

TN WLA (lbs/yr) = Annual average treated flow (MGD) x 4.0 mg/l x 8.345 x 365

Annual average treated flow is the sum of 12 monthly average treated flows divided by 12. Floating wasteload allocations shall be calculated to the nearest pound without regard to mathematical rules of precision.

[2]The Total Phosphorus wasteload allocation for any given calendar year is the lesser of (i) the values listed above and (ii) the floating wasteload allocation calculated as follows:

TN WLA (lbs/yr) = Annual average treated flow (MGD) x 0.30 mg/l x 8.345 x 365

Annual average treated flow is the sum of 12 monthly average treated flows divided by 12. Floating wasteload allocations shall be calculated to the nearest pound without regard to mathematical rules of precision.

~~[1]Merck-Stonewall – (a) these wasteload allocations will be subject to further consideration, consistent with the Chesapeake Bay TMDL, as it may be amended, and possible reduction upon "full-scale" results showing the optimal treatment capability of the 4-stage Bardenpho technology at this facility consistent with the level of effort by other dischargers in the region. The "full scale" evaluation will be completed by December 31, 2011, and the results submitted to DEQ for review and subsequent board action; (b) in any year when credits are available after all other exchanges within the Shenandoah-Potomac River Basin are completed in accordance with § 62.1-44.19:18 of the Code of Virginia, Merck shall acquire credits for total nitrogen discharged in excess of 14,619 lbs/yr and total phosphorus discharged in excess of 1,096 lbs/yr; and (c) the allocations are not transferable and compliance credits are only generated if discharged loads are less than the loads identified in clause (b).~~

[~~2~~3]Opequon WRF: (a) the TN WLA is derived based on 3 mg/l of TN and 12.6 MGD; (b) the TN WLA includes an additional allocation for TN in the amount of 6,729 lbs/yr by means of a landfill leachate consolidation and treatment project; and (c) the TP WLA is derived based on 0.3 mg/l of TP and 12.6 MGD.

[~~3~~4]Wasteload allocations for localities served by combined sewers are based on dry weather design flow capacity. During wet weather flow events the discharge shall achieve a TN concentration of 4.0 mg/l and TP concentration of 0.18 mg/l.

9VAC25-720-60. James River Basin.

C. Nitrogen and phosphorus wasteload allocations to restore the Chesapeake Bay and its tidal rivers.

The following table presents nitrogen and phosphorus wasteload allocations for the identified significant dischargers and the total nitrogen and total phosphorus wasteload allocations for the listed facilities.

Virginia Waterbody ID	Discharger Name	VPDES Permit No.	Total Nitrogen (TN) Wasteload Allocation (lbs/yr)	Total Phosphorus (TP) Wasteload Allocation (lbs/yr)
I37R	Buena Vista STP	VA0020991	41,115	~~3,426~~2,778
I09R	Covington STP	VA0025542	54,820	~~4,568~~3,705
H02R	Georgia Pacific	VA0003026	122,489	~~49,658~~40,273
I37R	~~Lees Carpets~~Mohawk Industries, Inc.	VA0004677	30,456	~~12,182~~9,880
I35R	Lexington-Rockbridge WQCF	VA0088161	54,820	~~4,568~~3,705
I09R	Low Moor STP	VA0027979	9,137	~~761~~617
I09R	Lower Jackson River STP	VA0090671	~~63,957~~47,516	~~5,330~~3,211
I09R	Nutrient Offset Fund	Formerly VA0090671	16,441	2,119
I04R	~~MeadWestvaco~~WestRock Virginia LLC - Covington	VA0003646	394,400	~~159,892~~96,771
H12R	Amherst STP	VA0031321	10,964	~~914~~741
H05R	BWX Technologies Inc.	VA0003697	187,000	~~1,523~~1,235
H05R	Greif Inc.	VA0006408	73,246	~~29,694~~24,082
H31R	Lake Monticello STP	VA0024945	~~18,182~~14,164	~~1,515~~957
H31R	Nutrient Offset Fund	Formerly VA0024945	4,018	558

Commented [BA(1]: Does not include any Industrial WLA reduction

Commented [BA(2]: Does not include any Industrial WLA reduction

Commented [BA(3]: Based on constructed Design Q of 2.6 MGD. Unreduced WLAs would be 63,957 TN and 4,322 TP

Commented [BA(4]: Does not include industrial TP WLA reduction

Commented [BA(5]: Does not include any Industrial WLA reduction

Commented [BA(6]: Does not include any Industrial WLA reduction for TP

Commented [BA(7]: Based on constructed Design Q of 0.775 MGD. Unreduced WLAs would be 18,182 TN and 1,229 TP

H05R	Lynchburg STP[1]	VA0024970	536,019[5]	~~33,501~~27,169[4]
H28R	Moores Creek Regional STP[6]	VA0025518	~~274,100~~282,994[3]	~~22,842~~~~18,525~~1,112[4]
H38R	Powhatan CC STP	VA0020699	8,588	~~716~~581
J11R	Crewe WWTP	VA0020303	9,137	~~761~~617
J01R	Farmville WWTP	VA0083135	43,856	~~3,655~~2,964
G02E	~~The Sustainability Park, LLC~~Nutrient Offset Fund	Formerly VA0002780	25,583	~~1,919~~1,556
G01E	E I du Pont - Spruance	VA0004669	201,080	~~7,816~~6,339
G01E	Falling Creek WWTP	VA0024996	~~153,801~~182,738[3]	~~15,380~~12,473[4]
G01E	Henrico County WWTP	VA0063690	1,142,085[3]	~~114,209~~92,623[4]
G03E	Honeywell – Hopewell	VA0005291	1,090,798	~~51,592~~41,841
G03R	Hopewell WWTP	VA0066630	1,827,336[7]	~~76,139~~61,749[8]
G15E	HRSD – Boat Harbor STP	VA0081256	~~740,000~~473,538[3]	~~76,139~~43,177[4]
G11E	HRSD – James River STP	VA0081272	~~1,250,000~~378,830[3]	~~60,911~~34,541[4]
G10E	HRSD – Williamsburg STP	VA0081302	~~800,000~~426,184[3]	~~68,525~~38,859[4]
G02E	Philip Morris – Park 500	VA0026557	139,724	~~2,650~~2,149
G01E	Proctors Creek WWTP	VA0060194	411,151[3]	~~41,115~~33,344[4]
G01E	Richmond WWTP[1]	VA0063177	1,096,402[5]	~~68,525~~55,574[4]
G02E	Dominion-Chesterfield[2]	VA0004146	~~272,036~~243,099	~~210~~170
J15R	South Central WW Authority	VA0025437	350,239[3]	~~35,024~~28,404[4]
G07R	~~Chickahominy WWTP~~Nutrient Offset Fund	Formerly VA0088480	6,167	123
G05R	Tyson Foods – Glen Allen	VA0004031	19,552	409

Commented [BA(8]: Include Camelot consolidation??

Commented [BA(9]: Reflects acquisition of 28,937 lbs/yr TN from Dominion

Commented [BA(10]: Does not include any Industrial WLA reduction

Commented [BA(12]: Reflects 28,937 lbs/yr transfer to Falling Creek WWTP

Commented [BA(13]: Does not include any Industrial WLA reduction

Commented [BA(11]: Deleted net WLA provision and added retirement provision following retirement of coal fired units

G11E	HRSD – Nansemond STP	VA0081299	~~750,000~~568,245[3]	~~91,367~~51,812[4]
G15E	HRSD – Army Base STP	VA0081230	~~610,000~~340,947[3]	~~54,820~~31,087[4]
G15E	HRSD – VIP WWTP	VA0081281	~~750,000~~757660[3]	~~121,822~~69,083[4]
G15E	~~JH Miles & Company~~Nutrient Offset Fund	Formerly VA0003263	153,500	~~21,500~~17,437
C07E	HRSD – Ches.-Elizabeth STP[9]	VA0081264	~~1,100,000~~454,596	~~108,674~~41,450
G01E	~~Tranlin/Vastly~~Nutrient Offset Fund	Formerly Tranlin/Vastly	80,000	0
	TOTALS		~~14,901,739~~12,301,740	~~1,354,375~~904,688

Notes:

[1]Wasteload allocations for localities served by combined sewers are based on dry weather design flow capacity. During wet weather flow events the discharge shall achieve a TN concentration of 8.0 mg/l and a TP concentration of 1.0 mg/l.

[2]~~Wasteload allocations are "net" loads, based on the portion of the nutrient discharge introduced by the facility's process waste streams, and not originating in raw water intake.~~Dominion-Chesterfield wasteload allocations shall be transferred to the Nutrient Offset Fund on January 1st following the retirement of the last coal fired generating unit.

[3]The Total Nitrogen wasteload allocation for any given calendar year is the lesser of (i) the values listed above and (ii) the floating wasteload allocation calculated as follows:

TN WLA (lbs/yr) = Annual average treated flow (MGD) x 4.0 mg/l x 8.345 x 365

Annual average treated flow is the sum of 12 monthly average treated flows divided by 12. Floating wasteload allocations shall be calculated to the nearest pound without regard to mathematical rules of precision.

[4]The Total Phosphorus wasteload allocation for any given calendar year is the lesser of (i) the values listed above and (ii) the floating wasteload allocation calculated as follows:

TN WLA (lbs/yr) = Annual average treated flow (MGD) x 0.30 mg/l x 8.345 x 365

Annual average treated flow is the sum of 12 monthly average treated flows divided by 12. Floating wasteload allocations shall be calculated to the nearest pound without regard to mathematical rules of precision.

[5]The Total Nitrogen wasteload allocation for any given calendar year is the lesser of (i) the values listed above and (ii) the floating wasteload allocation calculated as follows:

TN WLA (lbs/yr) = Annual average treated flow (MGD) x 8.0 mg/l x 8.345 x 365

Annual average treated flow is the sum of 12 monthly average treated flows divided by 12. Floating wasteload allocations shall be calculated to the nearest pound without regard to mathematical rules of precision.

[6]The Moores Creek Regional STP WLA includes 8,894 lbs/yr of Total Nitrogen and 1,112 lbs/yr of Total Phosphorus from the consolidation of the Camelot WWTP (VA0025488).

[7]The Total Nitrogen wasteload allocation for any given calendar year is the lesser of (i) the values listed above and (ii) the floating wasteload allocation calculated as follows:

TN WLA (lbs/yr) = Annual average treated flow (MGD) x 12.0 mg/l x 8.345 x 365

Annual average treated flow is the sum of 12 monthly average treated flows divided by 12. Floating wasteload allocations shall be calculated to the nearest pound without regard to mathematical rules of precision.

[8]The Total Phosphorus wasteload allocation for any given calendar year is the lesser of (i) the values listed above and (ii) the floating wasteload allocation calculated as follows:

TN WLA (lbs/yr) = Annual average treated flow (MGD) x 0.70 mg/l x 8.345 x 365

Annual average treated flow is the sum of 12 monthly average treated flows divided by 12. Floating wasteload allocations shall be calculated to the nearest pound without regard to mathematical rules of precision.

[9]The aggregate floating WLAs for the James River HRSD facilities shall include 216,675 lbs/yr of TN and 16,251 lbs/yr of TP through the year 2032. These additional allocations represent an average of 17.8 MGD of wastewater flow to be diverted from the Chesapeake-Elizabeth STP (VA0081264) out of the Chesapeake Bay watershed to the Atlantic STP (VA0081248). Effective January 1, 2033, the HRSD – Chesapeake-Elizabeth STP wasteload allocations transfer to the Nutrient Offset Fund.

9VAC25-720-70. Rappahannock River Basin.

C. Nitrogen and phosphorus wasteload allocations to restore the Chesapeake Bay and its tidal rivers.

The following table presents nitrogen and phosphorus wasteload allocations for the identified significant dischargers and the total nitrogen and total phosphorus wasteload allocations for the listed facilities.

Virginia Waterbody ID	Discharger Name	VPDES Permit No.	Total Nitrogen (TN) Wasteload Allocation (lbs/yr)	Total Phosphorus (TP) Wasteload Allocation (lbs/yr)
E09R	Culpeper WWTP	VA0061590	73,093[1]	5,483[2]
E02R	Marshall WWTP	VA0031763	7,797	585
E13R	Orange STP	VA0021385	36,547	2,741
E11R	Rapidan STP	VA0090948	7,309	548
E02R	Fauquier County Water & Sewer Authority-Remington WWTP	VA0076805	24,364	1,827
E02R	Clevengers Village WWTP	VA0080527	10,964	822
E02R	Warrenton Town STP	VA0021172	30,456	2,284
E18R	Wilderness WWTP	VA0083411	15,228	1,142
E20E	FMC WWTF	VA0068110	48,737	3,655
E20E	Fredericksburg WWTF	VA0025127	54,820	4,112
E21E	Haymount WWTF	VA0089125	7,066	530
E24E	Haynesville CC WWTP	VA0023469	2,802	210
E21E	Hopyard Farms STP	VA0089338	6,091	457

E20E	Little Falls Run WWTF	VA0076392	97,458[1]	7,309[2]
E20E	Massaponax WWTF	VA0025658	114,505[1]	8,405[2]
E23R	Montross Westmoreland WWTP	VA0072729	1,584	119
E21E	Oakland Park STP	VA0086789	1,706	128
E23E	Tappahannock WWTP	VA0071471	9,746	731
E26E	Urbanna WWTP	VA0026263	1,218	91
E21R	US Army - Ft. A P Hill WWTP	VA0032034	6,457	484
E23E	Warsaw Aerated Lagoons	VA0026891	3,655	274
C01E	Omega Protein - Reedville	VA0003867	21,213	1,591
C01E	Reedville Sanitary District	VA0060712	2,436	183
C01E	Kilmarnock WTP	VA0020788	6,091	457
	~~Unallocated Reserve WLA~~Nutrient Offset Fund		22,904	1,900
	TOTALS:		614,245	46,068

[1]The Total Nitrogen wasteload allocation for any given calendar year is the lesser of (i) the values listed above and (ii) the floating wasteload allocation calculated as follows:
TN WLA (lbs/yr) = Annual average treated flow (MGD) x 4.0 mg/l x 8.345 x 365
Annual average treated flow is the sum of 12 monthly average treated flows divided by 12. Floating wasteload allocations shall be calculated to the nearest pound without regard to mathematical rules of precision.
[2]The Total Phosphorus wasteload allocation for any given calendar year is the lesser of (i) the values listed above and (ii) the floating wasteload allocation calculated as follows:
TN WLA (lbs/yr) = Annual average treated flow (MGD) x 0.30 mg/l x 8.345 x 365

Annual average treated flow is the sum of 12 monthly average treated flows divided by 12. Floating wasteload allocations shall be calculated to the nearest pound without regard to mathematical rules of precision.

9VAC25-720-120. York River Basin.

C. Nitrogen and phosphorus wasteload allocations to restore the Chesapeake Bay and its tidal rivers. The following table presents nitrogen and phosphorus wasteload allocations for the identified significant dischargers and the total nitrogen and total phosphorus wasteload allocations for the listed facilities.

Virginia Waterbody ID	Discharger Name	VPDES Permit No.	Total Nitrogen (TN) Wasteload Allocation (lbs/yr)	Total Phosphorus (TP) Wasteload Allocation (lbs/yr)
F20R	Caroline County STP	VA0073504	9,137	609
F01R	Gordonsville STP	VA0021105	17,177	1,145
F04R	Ashland WWTP	VA0024899	36,547	2,436
F09R	Doswell WWTP	VA0029521	18,273	1,218
F09R	~~Bear Island Paper Company~~819 Virginia LLC	VA0029521	47,328	10,233
F27E	~~Plains Marketing L.P. - Yorktown~~Nutrient Offset Fund	Formerly VA0003018	167,128	17,689
F27E	HRSD - York River STP	VA0081311	275,927[1]	18,395[2]
F14R	Parham Landing WWTP	VA0088331	36,547	2,436
F14E	~~RockTenn~~WestRock CP LLC - West Point	VA0003115	259,177	56,038
F12E	Totopotomoy WWTP	VA0089915	182,734[1]	12,182[2]

F25E	HRSD - West Point STP	VA0075434	10,964	731
	TOTALS:		1,060,939	123,112

[1]The Total Nitrogen wasteload allocation for any given calendar year is the lesser of (i) the values listed above and (ii) the floating wasteload allocation calculated as follows:

TN WLA (lbs/yr) = Annual average treated flow (MGD) x 4.0 mg/l x 8.345 x 365

Annual average treated flow is the sum of 12 monthly average treated flows divided by 12. Floating wasteload allocations shall be calculated to the nearest pound without regard to mathematical rules of precision.

[2]The Total Phosphorus wasteload allocation for any given calendar year is the lesser of (i) the values listed above and (ii) the floating wasteload allocation calculated as follows:

TN WLA (lbs/yr) = Annual average treated flow (MGD) x 0.30 mg/l x 8.345 x 365

Annual average treated flow is the sum of 12 monthly average treated flows divided by 12. Floating wasteload allocations shall be calculated to the nearest pound without regard to mathematical rules of precision.

Attachment 6

Assessment Results of Management Scenarios Under Adjusted Climate Change Factors Using the VIMS James River Water Quality Model – WQMP RAP Meeting 7/17/2020

Chlorophyll-a WLAs

Assessment Results of Management Scenarios Under Adjusted Climate Change Factors Using the VIMS James River Water Quality Model

WQMP RAP Meeting
7/17/2020

Summary of Criteria Assessment Results

All scenarios include adjusted climate change factors

Nonattainment predicted under scenario

Full attainment predicted under scenario

Scenario	Seasonal Criteria	Short-duration Criteria
Observed 2005-2013		
2017 WGP Waste Load		
VAMWA B+		
VAMWA B/D		
VAMWA C		
POTWs at Design-Q: TN=4, TP=0.3		
VAMWA D		
WIP2 LOE		
WIP3 Final on 2025 Land Use		
WIP3 PS Discharged Loads		

Scenario	Upper Estuary Above Fall Line	Upper Estuary Below Fall Line	Lower Estuary (HRSD)
"B" TMDL Chl-a Stage 1B	Typical POTW=WQMP/WGP (TN=6, TP=0.41 mg/L) Industrial=WQMPR	Typical POTW= WQMP/WGP (TN=5, TP=0.41 mg/L) Industrial=WQMPR	HRSD TN=3.554 Mlb/yr HRSD TP=0.318 Mlb/yr (Typically TN=6.500, TP=0.582 mg/L) No Industrials Present
"B+" P Sensitivity Stage 1B+	All POTW & Industrial TN= Same as Stage 1B All POTW TP=0.2 mg/L (-50% from 1B) All Industrial TP=Same % Reduction	All POTW & Industrial TN= Same as Stage 1B All POTW TP=0.2 mg/L (-50% from 1B) All Industrial TP=Same % Reduction	HRSD TN=Same as Stage 1B HRSD TP=0.109 Mlb/yr (0.2 mg/l)
"B/D" Seasonal Hybrid	Scenario B as Annual Avg Scenario D as Summer Avg (May – Sept)	Scenario B as Annual Avg Scenario D as Summer Avg (May – Sept)	Scenario B as Annual Avg Scenario C as Summer Avg (May – Sept)
"C" Intermediate Scenario 1C	Typical POTW Reductions TN=5 mg/L (-17% from 1B) TP=0.3 mg/L (-25%) Indus=Same % Reduction	Typical POTW Reductions TN=4 mg/L (-20% from 1B) TP=0.3 mg/L (-25%) Indus=Same % Reduction	HRSD TN= 2.734 Mlb/yr HRSD TP= 0.164 Mlb/yr (TN=5 mg/L, TP=0.3 mg/L)
"D" Intermediate Scenario 1D	Typical POTW Reductions TN=4 mg/L (-33% from 1B) TP=0.2 mg/L (-50%) Indus=Same % Reduction	Typical POTW Reductions TN=4 mg/L (-20% from 1B) TP=0.2 mg/L (-50%) Indus=Same % Reduction	HRSD TN= 2.187 Mlb/yr HRSD TP= 0.109 Mlb/yr (TN=4 mg/L, TP=0.2 mg/L)
WIP2 LOE	Base on Input Deck Used to Achieve Chl-a Attainment During 2010 TMDL Model	Base on Input Deck Used to Achieve Chl-a Attainment During 2010 TMDL Model	Base on Input Deck Used to Achieve Chl-a Attainment During 2010 TMDL Model

Baseline

Seasonal Means (µg/l)

SPRING	Baseline				
Year	JMSTFU	JMSTFL	JMSOH	JMSMH	JMSPH
2005	2	5	10	**8**	**11**
2006	7	8	10	6	5
2007	5	6	4	4	7
2008	4	4	7	6	5
2009	7	7	**23**	6	6
2010	4	4	7	5	**10**
2011	7	8	6	4	6
2012	**10**	**13**	2	5	4
2013	5	5	5	**8**	5
SUMMER	**Baseline**				
Year	JMSTFU	JMSTFL	JMSOH	JMSMH	JMSPH
2005	14	14	10	**10**	**9**
2006	9	11	8	6	6
2007	8	12	3	5	7
2008	12	15	8	**9**	**8**
2009	**26**	22	7	6	**8**
2010	**30**	**25**	10	4	3
2011	20	**33**	7	4	4
2012	15	**29**	2	3	**8**
2013	20	22	5	4	6

Short-duration criteria Exceedance Frequency

SUMMER	Baseline				
Period	lower JMSTFU	upper JMSTFL	lower JMSTFL	JMSMH	JMSPH
2005-2010	0%	0%	0%	0%	6%
2006-2011	0%	**12%**	0%	0%	6%
2007-2012	0%	**12%**	0%	0%	10%
2008-2013	0%	**12%**	0%	0%	9%

Exceedance rates of short-duration criteria. Red values indicate excessive exceedence rates (> 10%)

NONATTAINMENT

Values are estimated seasonal chlorophyll means (µg/l).

Red values are exceedances of criteria.

Red boxes indicate 6-year periods of non-attainment.

2017 WGP Waste Load Allocations

Predicted Seasonal Means (µg/l)

SPRING	2017 WGP Waste Load Allocations (Scenario 1)				
Year	JMSTFU	JMSTFL	JMSOH	JMSMH	JMSPH
2005	1	2	7	7	**9**
2006	3	2	8	4	3
2007	2	3	2	4	5
2008	1	2	5	5	5
2009	4	4	**18**	5	5
2010	3	3	6	5	**9**
2011	4	5	4	2	5
2012	8	10	3	5	4
2013	4	4	4	7	4
SUMMER	**2017 WGP Waste Load Allocations (Scenario 1)**				
Year	JMSTFU	JMSTFL	JMSOH	JMSMH	JMSPH
2005	7	8	8	7	7
2006	4	6	5	5	5
2007	4	10	2	4	5
2008	5	12	7	7	6
2009	16	17	6	5	6
2010	**22**	20	8	4	3
2011	17	**31**	6	3	4
2012	12	**33**	3	3	7
2013	14	16	4	4	5

Predicted Short-duration criteria Exceedance Frequency

SUMMER	2017 WGP Waste Load Allocations (Scenario 1)				
Period	lower JMSTFU	upper JMSTFL	lower JMSTFL	JMSMH	JMSPH
2005-2010	0%	0%	0%	0%	4%
2006-2011	0%	**12%**	6%	0%	4%
2007-2012	0%	**12%**	**12%**	0%	6%
2008-2013	0%	**12%**	**12%**	0%	7%

NONATTAINMENT

2017 WGP Waste Load Allocations with climate change

Predicted Seasonal Means (µg/l)

SPRING	2017 WGP Waste Load Allocations (Scenario 1)				
Year	JMSTFU	JMSTFL	JMSOH	JMSMH	JMSPH
2005	1	2	7	7	**9**
2006	3	2	8	4	3
2007	2	3	2	4	5
2008	1	2	5	5	5
2009	4	4	**18**	5	5
2010	3	3	6	5	**9**
2011	4	5	4	2	5
2012	8	10	3	5	4
2013	4	4	4	7	4

SUMMER	2017 WGP Waste Load Allocations (Scenario 1)				
Year	JMSTFU	JMSTFL	JMSOH	JMSMH	JMSPH
2005	7	8	8	7	7
2006	4	6	5	5	5
2007	4	10	2	4	5
2008	5	12	7	7	6
2009	16	17	6	5	6
2010	**22**	20	8	4	3
2011	17	**31**	6	3	4
2012	12	**33**	3	3	7
2013	14	16	4	4	5

Predicted Short-duration criteria Exceedance Frequency

SUMMER	2017 WGP Waste Load Allocations (Scenario 1)				
Period	lower JMSTFU	upper JMSTFL	lower JMSTFL	JMSMH	JMSPH
2005-2010	0%	0%	0%	0%	4%
2006-2011	0%	**12%**	6%	0%	4%
2007-2012	0%	**12%**	**12%**	0%	6%
2008-2013	0%	**12%**	**12%**	0%	7%

NONATTAINMENT

Values are estimated seasonal chlorophyll means (µg/l).

Red values are exceedances of the criteria.

WIP III with climate change

Predicted Seasonal Means (µg/l)

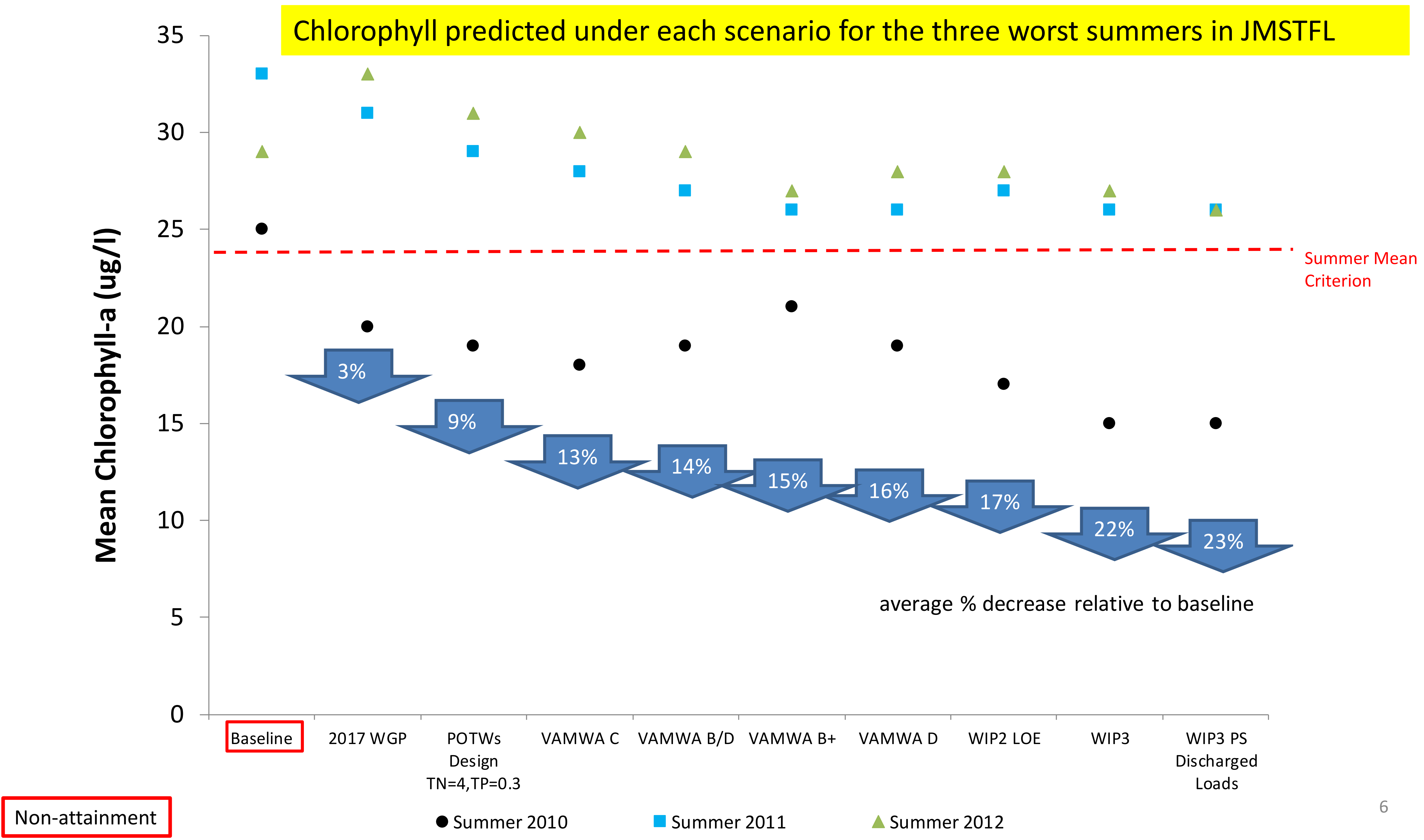
SPRING	WIP III (Scenario 0)				
Year	JMSTFU	JMSTFL	JMSOH	JMSMH	JMSPH
2005	1	2	6	6	8
2006	2	2	7	3	2
2007	1	3	2	3	5
2008	1	2	4	4	4
2009	3	3	**16**	4	5
2010	2	2	5	4	8
2011	4	5	3	2	4
2012	7	9	2	4	3
2013	3	4	3	6	4

SUMMER	WIP III (Scenario 0)				
Year	JMSTFU	JMSTFL	JMSOH	JMSMH	JMSPH
2005	6	6	6	6	6
2006	3	5	4	4	5
2007	4	6	2	3	4
2008	4	9	5	6	6
2009	13	13	4	3	5
2010	16	15	7	2	2
2011	14	**26**	5	3	3
2012	10	**27**	2	2	6
2013	12	14	3	3	4

Predicted Short-duration criteria Exceedance Frequency

SUMMER	WIP III (Scenario 0)				
Period	lower JMSTFU	upper JMSTFL	lower JMSTFL	JMSMH	JMSPH
2005-2010	0%	0%	0%	0%	4%
2006-2011	0%	6%	6%	0%	4%
2007-2012	0%	6%	**12%**	0%	6%
2008-2013	0%	6%	**12%**	0%	7%

NONATTAINMENT



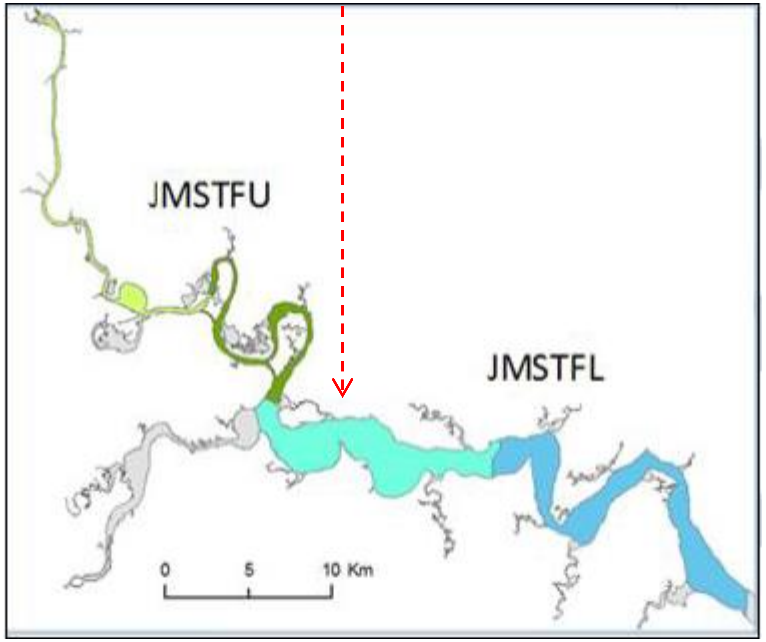
Chlorophyll predicted under each scenario for the three worst summers in JMSTFL
Mean Chlorophyll-a (ug/l)
35
30
25
20
15
10
5
0
Summer Mean Criterion
3%
9%
13%
14%
15%
16%
17%
22%
23%
average % decrease relative to baseline
Baseline
2017 WGP
POTWs Design TN=4,TP=0.3
VAMWA C
VAMWA B/D
VAMWA B+
VAMWA D
WIP2 LOE
WIP3
WIP3 PS Discharged Loads
Non-attainment
Summer 2010
Summer 2011
Summer 2012

Baseline

Short-duration criteria

SUMMER	Baseline				
Period	lower JMSTFU	upper JMSTFL	lower JMSTFL	JMSMH	JMSPH
2005-2010	0%	0%	0%	0%	6%
2006-2011	0%	12%	0%	0%	6%
2007-2012	0%	12%	0%	0%	10%
2008-2013	0%	12%	0%	0%	9%

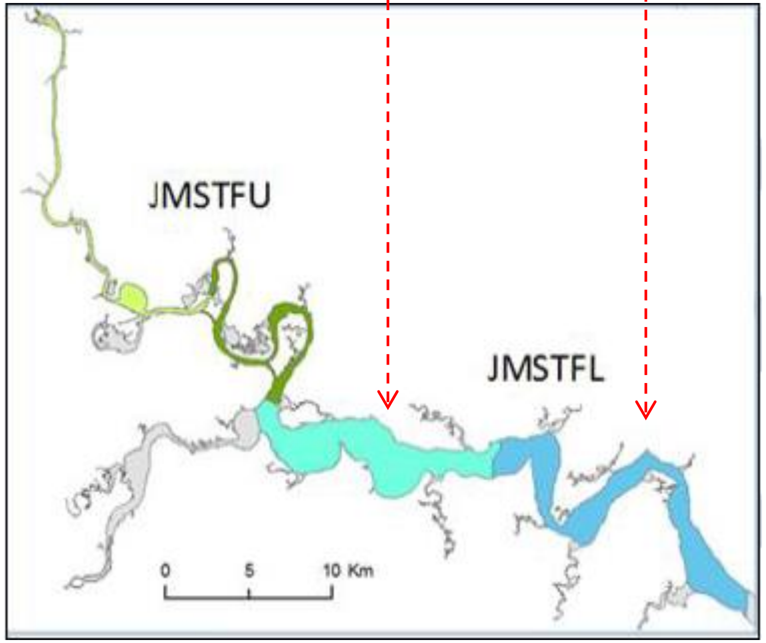
Exceedance rates of short-duration criteria. Red values indicate excessive exceedence rates (> 10%)



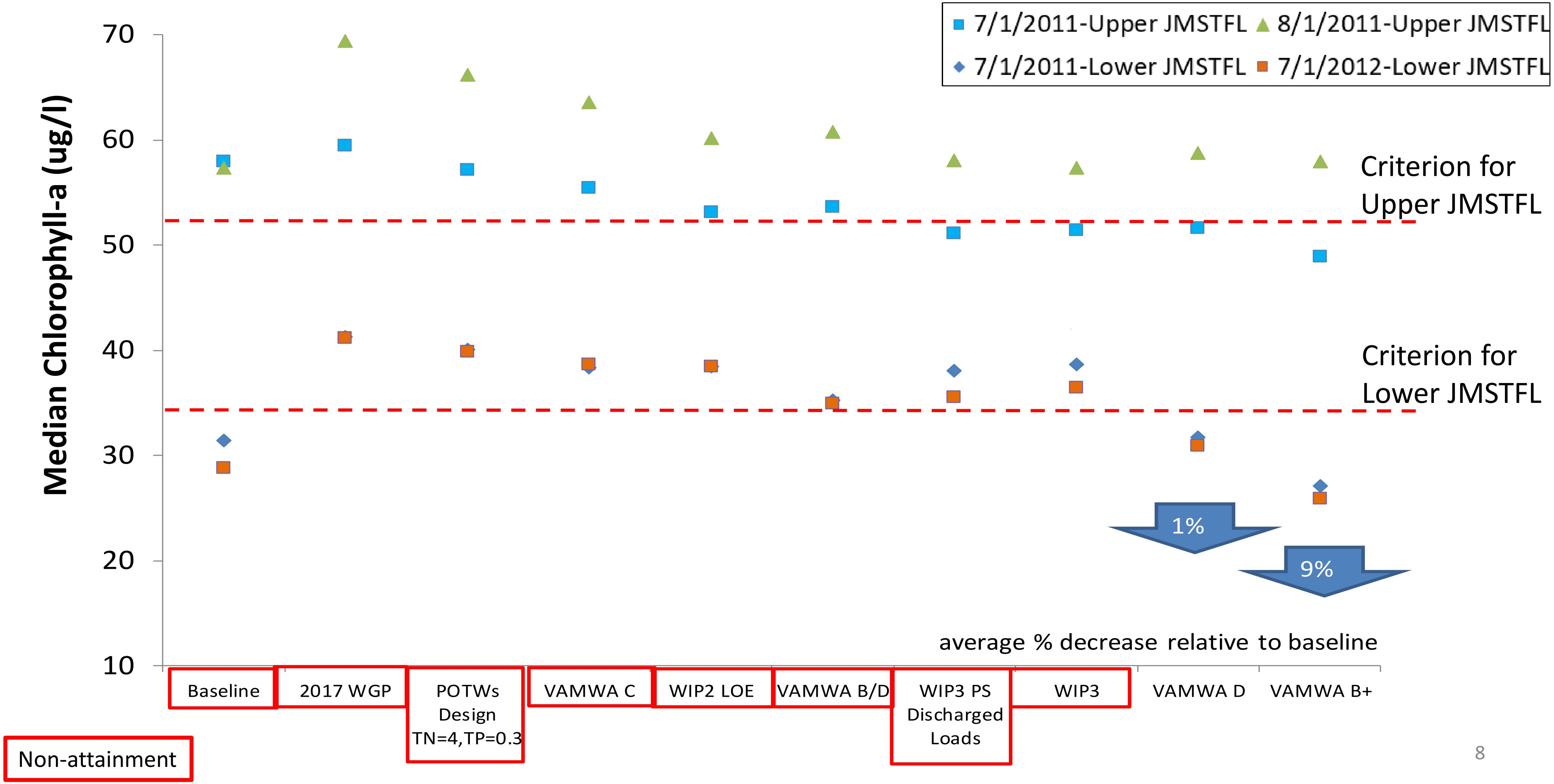
2017 WGP Waste Load Allocations

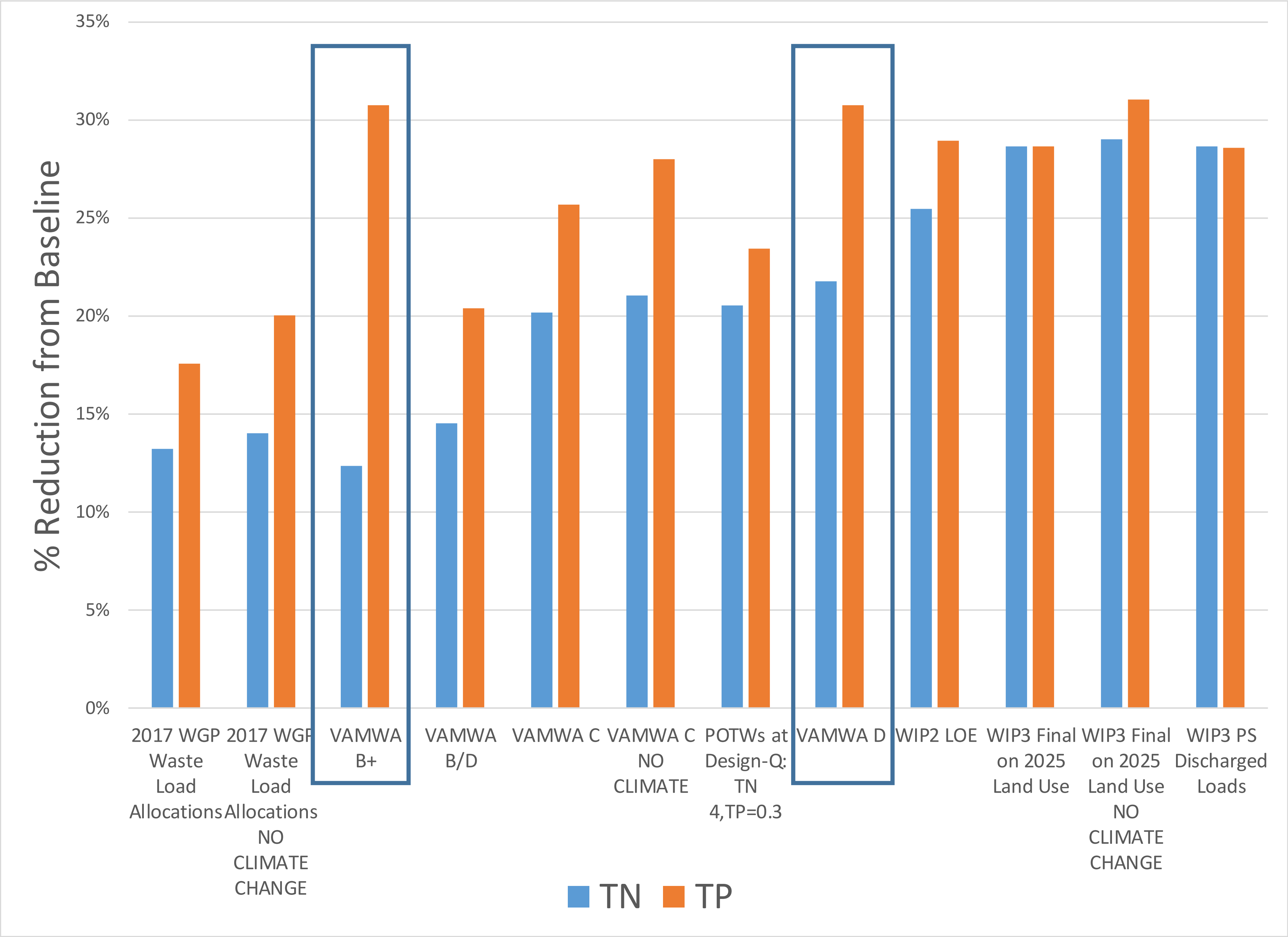
Short-duration criteria

SUMMER	2017 WGP Waste Load Allocations (Scenario 1)				
Period	lower JMSTFU	upper JMSTFL	lower JMSTFL	JMSMH	JMSPH
2005-2010	0%	0%	0%	0%	4%
2006-2011	0%	12%	6%	0%	4%
2007-2012	0%	12%	12%	0%	6%
2008-2013	0%	12%	12%	0%	7%



Chlorophyll predicted under each scenario for the two worst summer months in the upper portion of JMSTFL and two worst summer months in the lower portion of JMSTFL





% Reduction from Baseline
35%
30%
25%
20%
15%
10%
5%
0%
2017 WGP Waste Load Allocations
2017 WGP Waste Load Allocations NO CLIMATE CHANGE
VAMWA B+
VAMWA B/D
VAMWA C
VAMWA C NO CLIMATE
POTWs at Design-Q: TN 4,TP=0.3
VAMWA D
WIP2 LOE
WIP3 Final on 2025 Land Use
WIP3 Final on 2025 Land Use NO CLIMATE CHANGE
WIP3 PS Discharged Loads
TN
TP

Observed Chlorophyll Concentrations for 2013-2018

SPRING Seasonal Means					
Year	JMSTFU	JMSTFL	JMSOH	JMSMH	JMSPH
2013	5	6	4	**8**	5
2014	4	6	12	6	**9**
2015	5	7	11	7	6
2016	3	8	5	4	6
2017	4	**18**	8	4	4
2018	3	7	9	6	6

SUMMER Seasonal Means					
Year	JMSTFU	JMSTFL	JMSOH	JMSMH	JMSPH
2013	19	22	7	5	6
2014	13	16	**13**	6	6
2015	20	**35**	**13**	3	6
2016	11	**30**	9	4	6
2017	**25**	**29**	7	5	6
2018	14	**32**	**12**	4	5

SUMMER	2013-2018 Short-Duration Criteria Exceedance Frequency				
Period	lower JMSTFU	upper JMSTFL	lower JMSTFL	JMSMH	JMSPH
2013-2018	0%	6%	**17%**	1%	1%

2017 WGP Waste Load Allocations with climate change

Predicted Seasonal Means (µg/l)

SPRING	2017 WGP Waste Load Allocations (Scenario 1)				
Year	JMSTFU	JMSTFL	JMSOH	JMSMH	JMSPH
2005	1	2	7	7	**9**
2006	3	2	8	4	3
2007	2	3	2	4	5
2008	1	2	5	5	5
2009	4	4	**18**	5	5
2010	3	3	6	5	**9**
2011	4	5	4	2	5
2012	8	10	3	5	4
2013	4	4	4	7	4

SUMMER	2017 WGP Waste Load Allocations (Scenario 1)				
Year	JMSTFU	JMSTFL	JMSOH	JMSMH	JMSPH
2005	7	8	8	7	7
2006	4	6	5	5	5
2007	4	10	2	4	5
2008	5	12	7	7	6
2009	16	17	6	5	6
2010	**22**	20	8	4	3
2011	17	**31**	6	3	4
2012	12	**33**	3	3	7
2013	14	16	4	4	5

Predicted Short-duration criteria Exceedance Frequency

SUMMER	2017 WGP Waste Load Allocations (Scenario 1)				
Period	lower JMSTFU	upper JMSTFL	lower JMSTFL	JMSMH	JMSPH
2005-2010	0%	0%	0%	0%	4%
2006-2011	0%	**12%**	6%	0%	4%
2007-2012	0%	**12%**	**12%**	0%	6%
2008-2013	0%	**12%**	**12%**	0%	7%

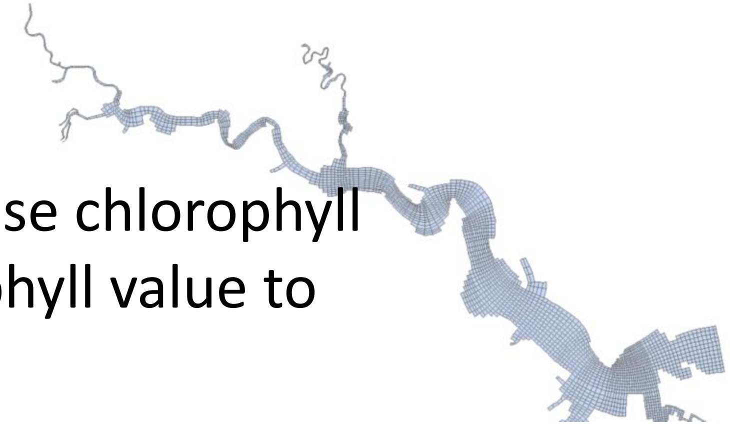
Quantile mapping

- Generate (inverse) CDFs for calibration and climate base output aggregated by grid cell-month-year.

- Use the calibration CDF to estimate the percentile rank for observed chlorophyll.
- Find the chlorophyll value at the corresponding percentile rank in the climate base CDF.

- Subtract the observed chlorophyll value from the climate base chlorophyll value—this is the delta to be added to the observed chlorophyll value to generate the climate-modified value.

- The climate-modified chlorophyll value will be what we scenario-modify.



	One-Step (linear regression only)	Two-Step (quantile mapping + linear regression)	One-Step (linear regression only)	Two-Step (quantile mapping + linear regression)
Segment	**AverageSpringR2**	**AverageSpringR2**	**AverageSummerR2**	**AverageSummerR2**
JMSTFU-upper	0.821009259	0.72596571	0.397845679	0.532643512
JMSTFU-lower	0.910384259	0.84277986	0.873148148	0.901768561
JMSTFL-upper	0.969157407	0.937090722	0.923152778	0.9278569
JMSTFL-lower	0.961092593	0.926899005	0.931703704	0.947721958
JMSOH	0.917497685	0.961980036	0.917046296	0.972047723
JMSMH	0.944591787	0.955265544	0.973428341	0.960285238
JMSPH	0.918803321	0.883725093	0.896074074	0.823257868
average	**0.92036233**	**0.890529424**	**0.844628431**	**0.86651168**

One-StepPost-Processing

WIPIII

PredictedSeasonalMeans(µg/l)

SPRING	WIP3 Final on 2025 Land Use (Scenario 0)				
Year	JMSTFU	JMSTFL	JMSOH	JMSMH	JMSPH
2005	1	2	6	6	8
2006	2	2	6	3	3
2007	1	3	2	3	5
2008	1	2	4	4	5
2009	3	3	**14**	5	5
2010	2	3	5	4	8
2011	4	5	4	2	3
2012	7	9	3	4	3
2013	3	4	3	6	4
SUMMER	WIP3 Final on 2025 Land Use (Scenario 0)				
Year	JMSTFU	JMSTFL	JMSOH	JMSMH	JMSPH
2005	5	8	7	6	6
2006	3	5	5	4	5
2007	4	8	1	3	4
2008	5	10	5	6	6
2009	14	13	4	3	5
2010	17	16	7	2	2
2011	14	**28**	6	3	3
2012	10	**25**	2	2	6
2013	13	15	4	3	4

PredictedShort-durationcriteriaExceedanceFrequency

SUMMER	WIP3 Final on 2025 Land Use (Scenario 0)				
Period	lower JMSTFU	upper JMSTFL	lower JMSTFL	JMSMH	JMSPH
2005-2010	0%	0%	0%	0%	4%
2006-2011	0%	6%	6%	0%	4%
2007-2012	0%	6%	**12%**	0%	6%
2008-2013	0%	6%	**12%**	0%	7%

NONATTAINMENT

Two-Step Post-Processing

WIPIII

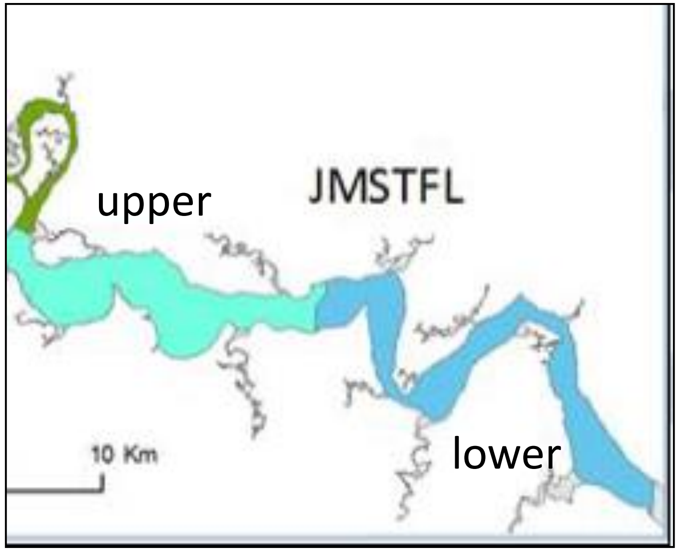
PredictedSeasonalMeans(µg/l)

SPRING	WIP III (Scenario 0)				
Year	JMSTFU	JMSTFL	JMSOH	JMSMH	JMSPH
2005	1	2	6	6	8
2006	2	2	7	3	2
2007	1	3	2	3	5
2008	1	2	4	4	4
2009	3	3	**16**	4	5
2010	2	2	5	4	8
2011	4	5	3	2	4
2012	7	9	2	4	3
2013	3	4	3	6	4
SUMMER	WIP III (Scenario 0)				
Year	JMSTFU	JMSTFL	JMSOH	JMSMH	JMSPH
2005	6	6	6	6	6
2006	3	5	4	4	5
2007	4	6	2	3	4
2008	4	9	5	6	6
2009	13	13	4	3	5
2010	16	15	7	2	2
2011	14	**26**	5	3	3
2012	10	**27**	2	2	6
2013	12	14	3	3	4

PredictedShort-durationcriteriaExceedanceFrequency

SUMMER	WIP III (Scenario 0)				
Period	lower JMSTFU	upper JMSTFL	lower JMSTFL	JMSMH	JMSPH
2005-2010	0%	0%	0%	0%	4%
2006-2011	0%	6%	6%	0%	4%
2007-2012	0%	6%	**12%**	0%	6%
2008-2013	0%	6%	**12%**	0%	7%

NONATTAINMENT



Worst months	Baseline	One Step WIP III	% change
JMSTFL-upper 7/2011 (>52)	58	55	-5%
JMSTF-upper 8/2011 (>52)	57	46	-19%
JMSTF-lower 7/2011 (>34)	31	61	97%
JMSTF-lower 7/2012 (>34)	29	52	79%

Worst months	Baseline	Two Step WIP III	% change
JMSTFL-upper 7/2011 (>52)	58	51	-12%
JMSTF-upper 8/2011 (>52)	57	57	0%
JMSTF-lower 7/2011 (>34)	31	39	26%
JMSTF-lower 7/2012 (>34)	29	36	24%