

Point Source Reduction Updates

Spokane River Stewardship Partners
NPDES Permit Holders

June 16, 2016

Sources, Transport, and Trends

- Sources, transport, and trends for selected trace metals and nutrients in the Coeur d'Alene and Spokane River basins, northern Idaho, 1990-2013, 2014, G.M. Clark and C.A. Mebane, USGS Scientific Investigations Report 2014-5204
- Finding:
 - WY 2009-13
 - Spokane River near outlet of CdA Lake – flow weighted TP: 0.008 mg/L



City of
Coeur d'Alene
IDAHO

Coeur d'Alene Advanced Wastewater Treatment Facility

2016 Ultra-Low Phosphorus Removal Report





Tertiary Treatment Building

Commissioned in February 2015 with 1 MGD (of 5.2 MGD) worth of membrane filtration.





One MGD Membrane Pilot – Success

- **Membrane surface area had to be increased to meet Design Specifications**
- **Lower seasonal water temperatures causing extra filter pressure**

Hayden Area Regional Sewer Board

- **2014 – 2015 \$14.3 M for Design and Build BNR Upgrade to Existing Plant.**
- **2016 – 2019 BNR Process Optimization and Tertiary Treatment Pilot testing.**
- **2016 BNR Performance.**
 - **Total Phosphorous Effluent**
Before BNR: 4 – 6 mg/l
 - **Total Phosphorous Effluent After BNR to Date: 0.4 -0.6 mg/l**

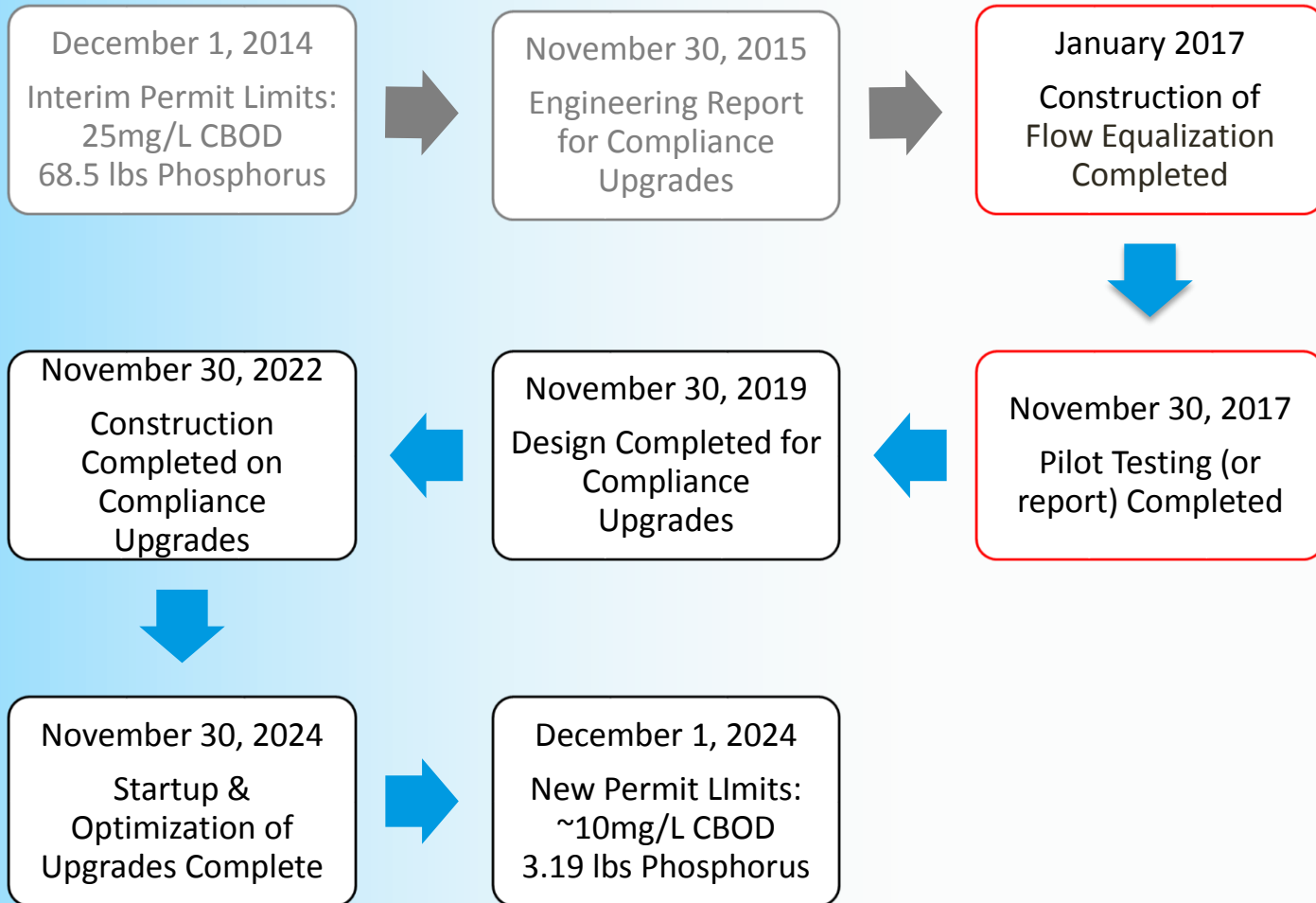
Hayden Area Regional Sewer Board

- **2016 to 2020 BNR Process Optimization and Tertiary Treatment Pilot Testing.**
- **2020 – 2022 Tertiary Treatment Design and Construction. \$14M est.**
- **2023 – 2024 NPDES Compliance.**



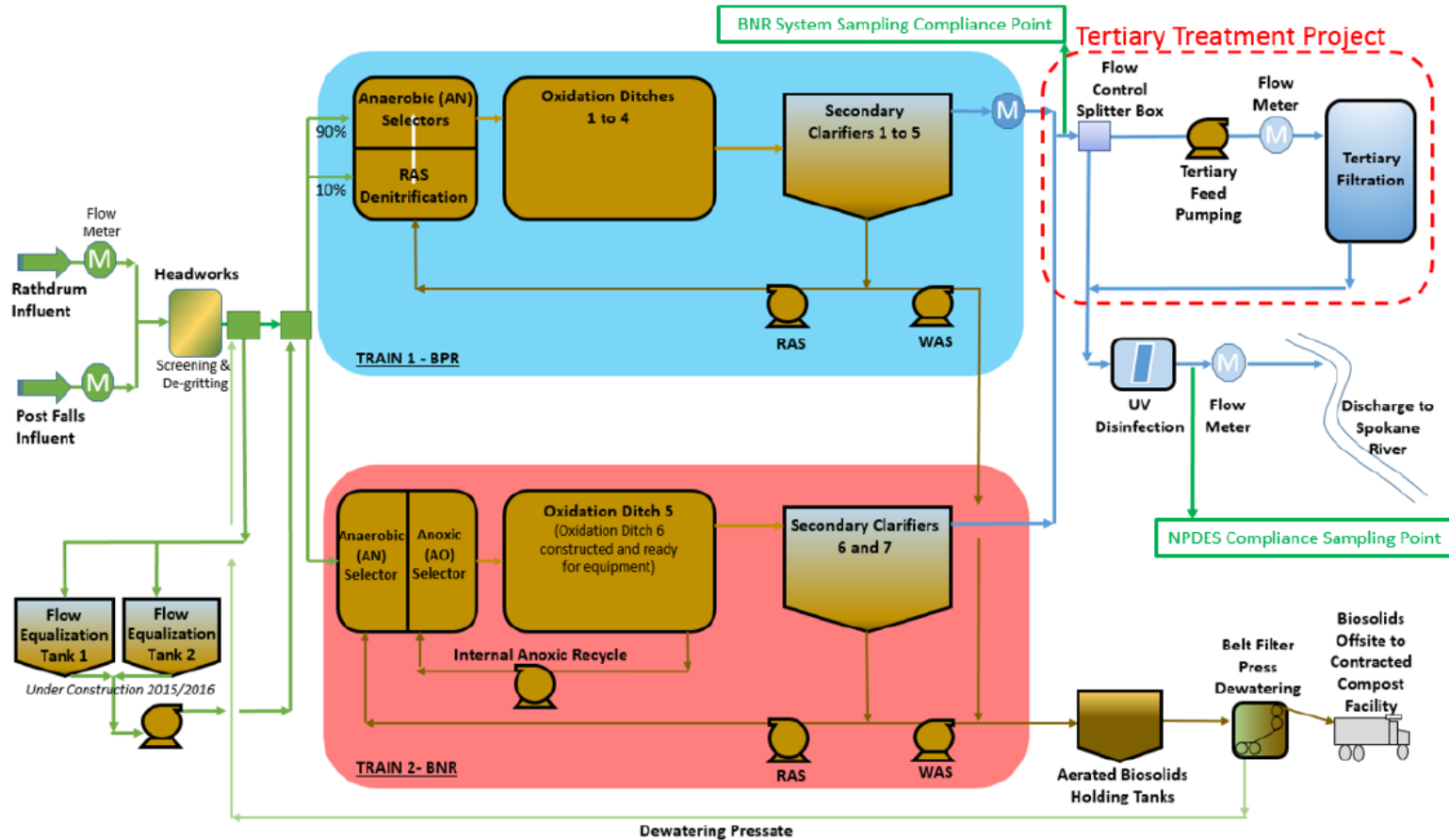
2016 – 2024 No River Discharge May Thru September.

City of Post Falls Compliance Schedule Progress



2015 Compliance Schedule Report

Figure 9 – Proposed WRF Schematic with Tertiary Filtration to Meet Compliance Schedule



Flow Equalization Upgrade



Sources, Transport, and Trends

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- Finding:
 - WY 2009-13
 - Spokane River near Post Falls – flow weighted TP: 0.009 mg/L

Liberty Lake Sewer and Water District Background

- The Liberty Lake Sewer and Water District collects and treats the sanitary wastewater from approximately 4,000 Equivalent Residential Units (ERUs) as well as commercial and light industrial dischargers
- Current average discharge is 0.8 MGD

Phase II Upgrade

- The construction contract for Phase 2 of the District's Water Reclamation Facility (WRF) upgrade is now underway
- On May 9th the District Board of Commissioners awarded the construction contract to Williams Brothers Construction, LLC/Clearwater Construction and Management, LLC as a joint venture
- Construction is anticipated to begin in the first part of June 2016 and completed by March 2018

Phase II Upgrade

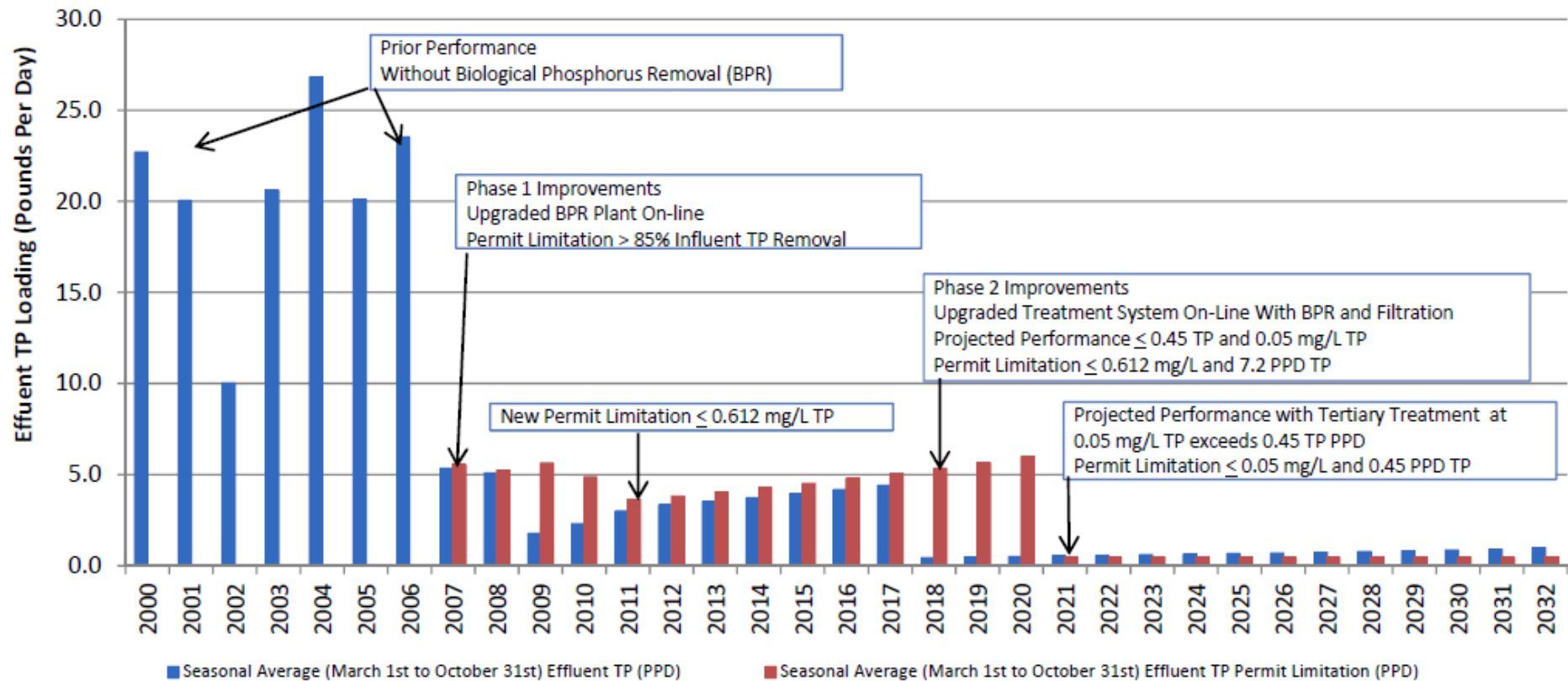
- The upgrade to the WRF includes the addition of effluent filtration with submerged membranes (GE ZeeWeed), chemical equipment for coagulation, modifications to the existing UV disinfection system for future reuse, addition of a second headworks fine screen, and other improvements to existing buildings and sites.

Implementation

- The improvements will upgrade effluent quality standards and objectives in the Spokane River/Lake Spokane Total Maximum Daily Load (TMDL) for Dissolved Oxygen
- This additional treatment will further reduce phosphorous discharge to less than ½ pound per day - equate to better than 99% removal of phosphorous entering the facility
- Total cost of this upgrade is \$17 million
 - In early 2015, the District received loan funding through Washington State Department of Ecology's State Revolving Fund. The \$15.1 million dollar loan must be paid back over 20 years
- The District's treatment facility upgrades and increase in sampling have ultimately resulted in increased sewer rates in the recent years, as well as planned increases for the future

Water Reclamation Facility Phosphorus Removal and Limits

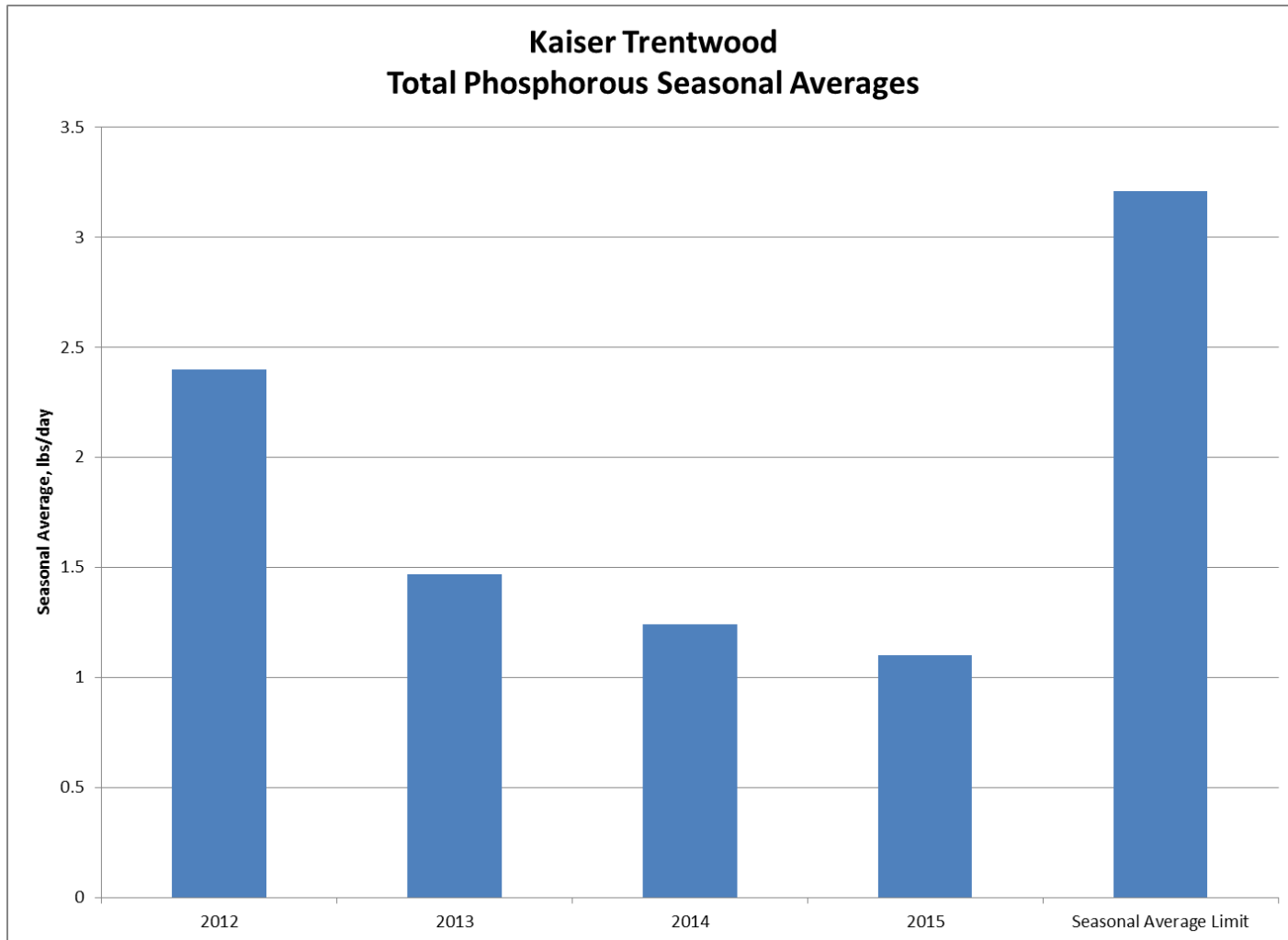
Liberty Lake Sewer and Water District
Treatment Plant Effluent Total Phosphorus Loading



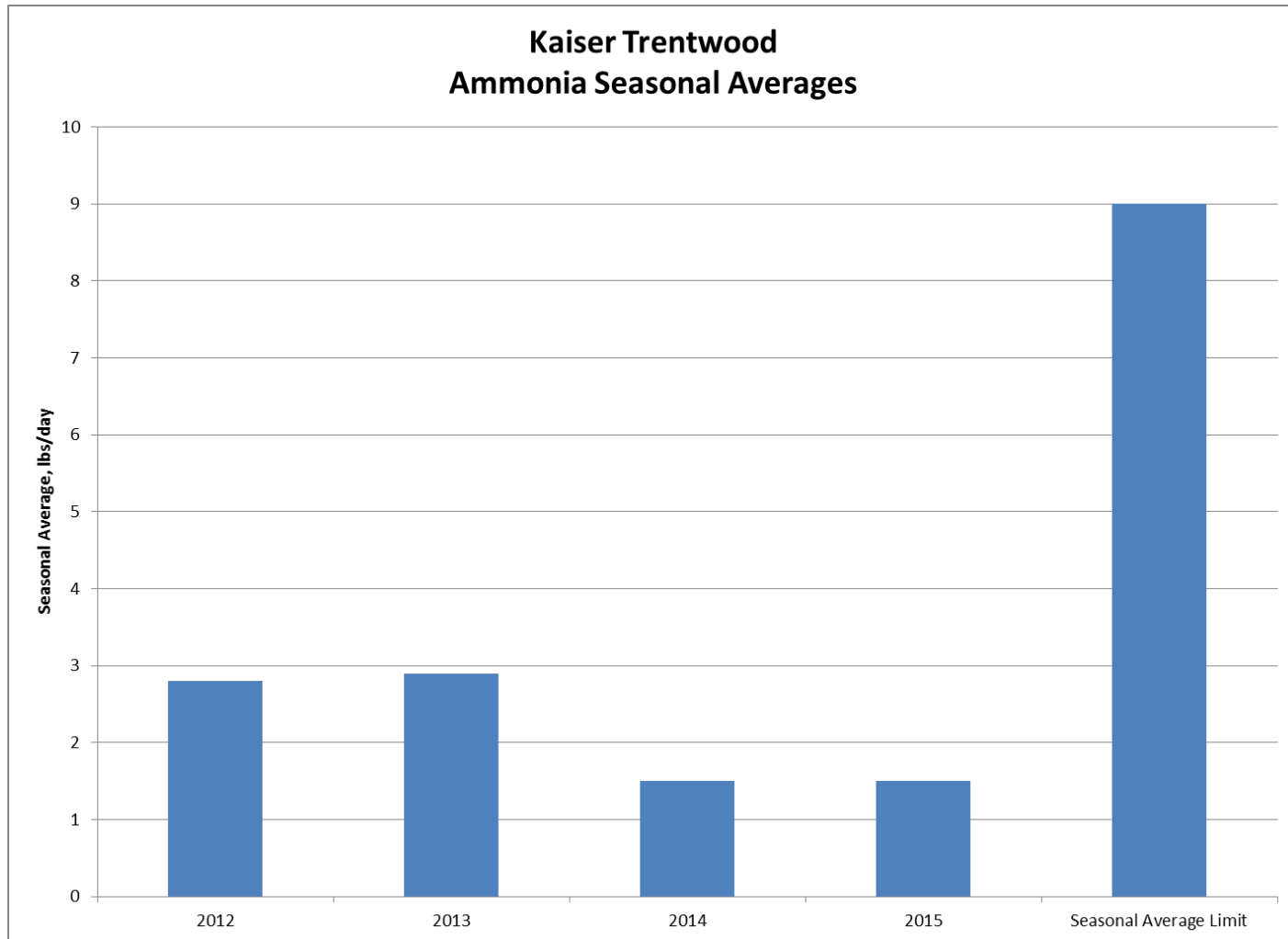
Additional Phosphorus Reduction Efforts

- LLSWD Stormwater requirements
- Annual “Beach and Leaf” cleanup
- Annual “Spring Clean” with the City of Liberty Lake
- Annual Phosphorus free fertilizer giveaway program with Greenstone Corporation
- In addition to the upgrades to the treatment facility, the LLSWD has installed reclaimed water mains in various locations in preparation for future water reuse projects

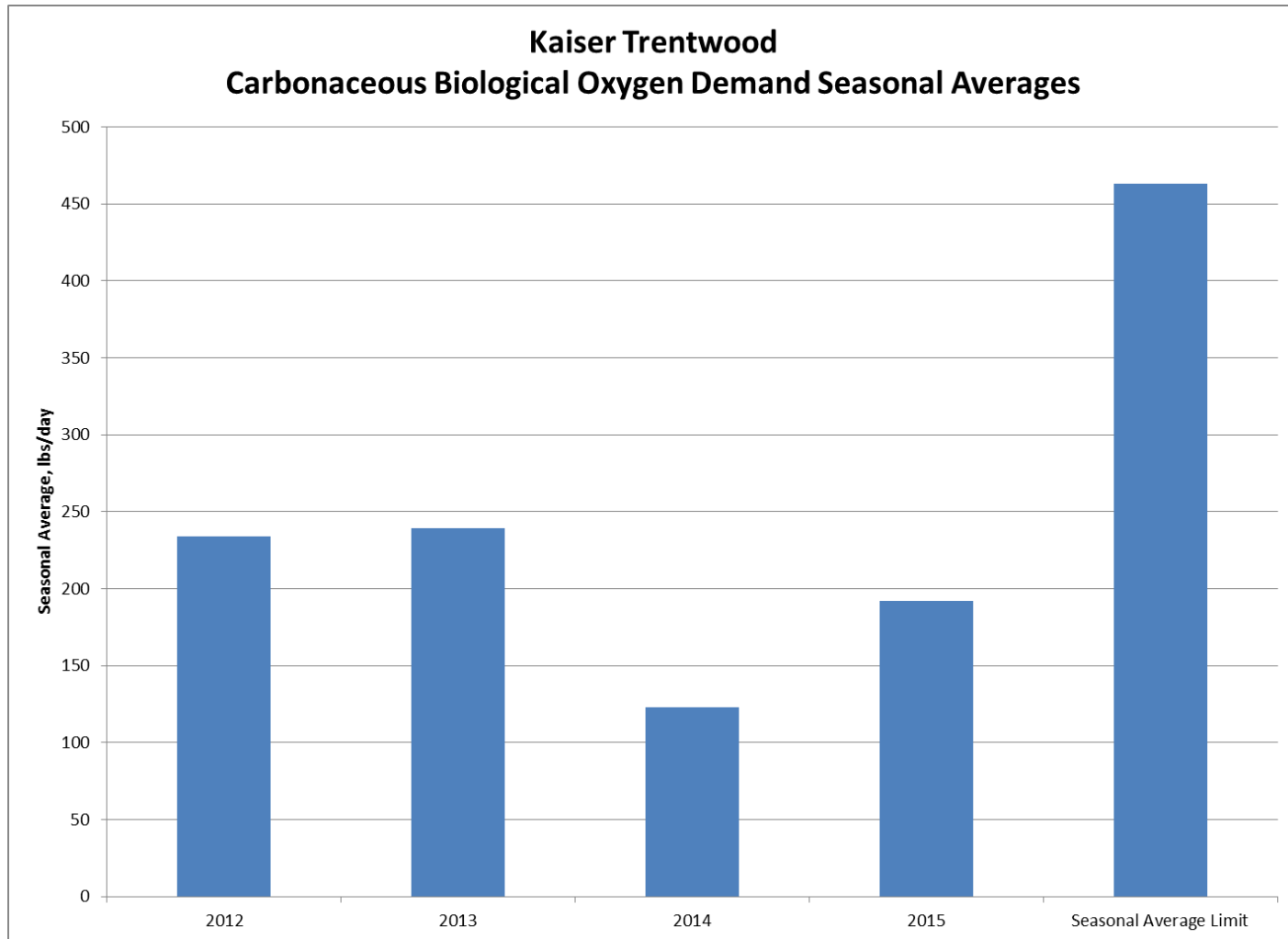
Kaiser Trentwood



Kaiser Trentwood



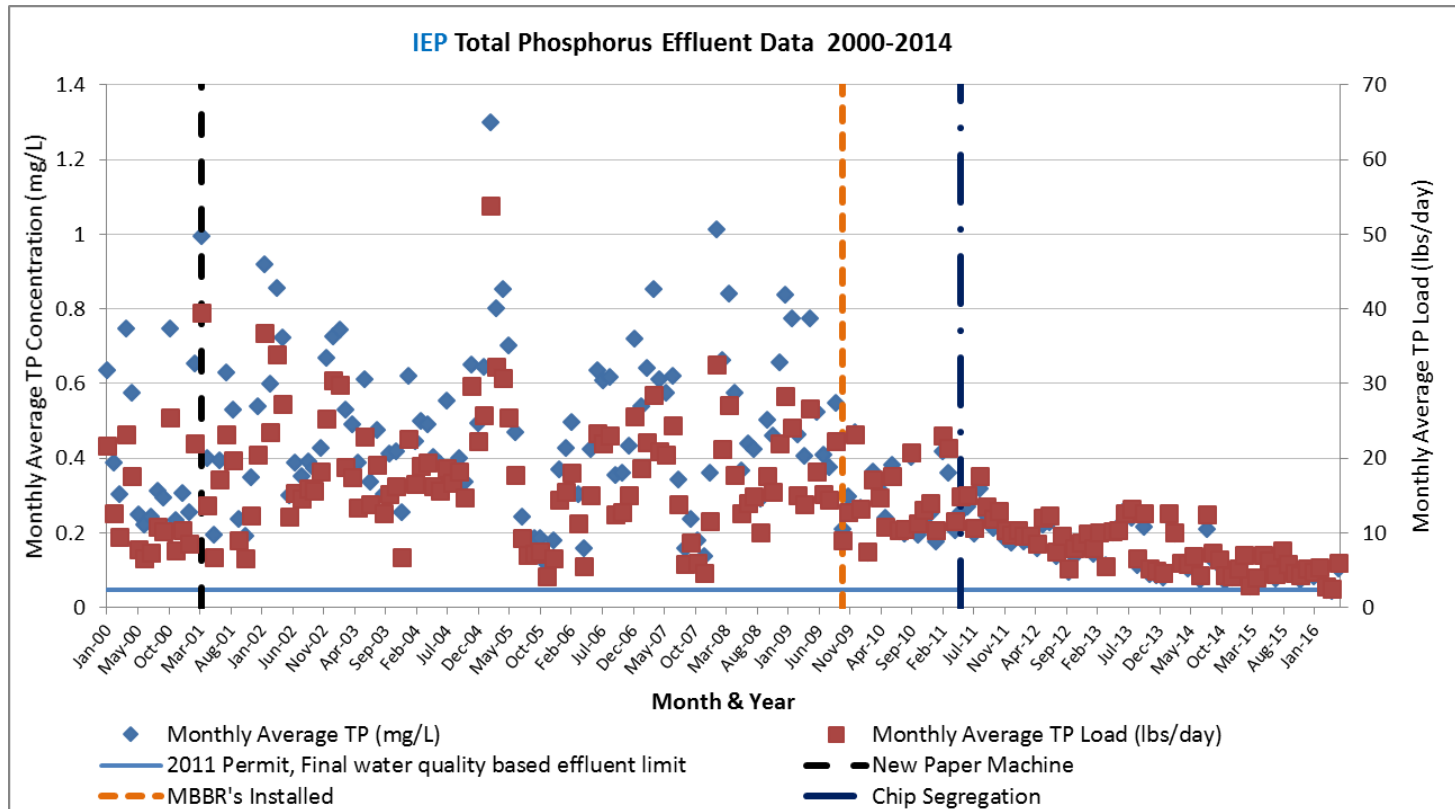
Kaiser Trentwood



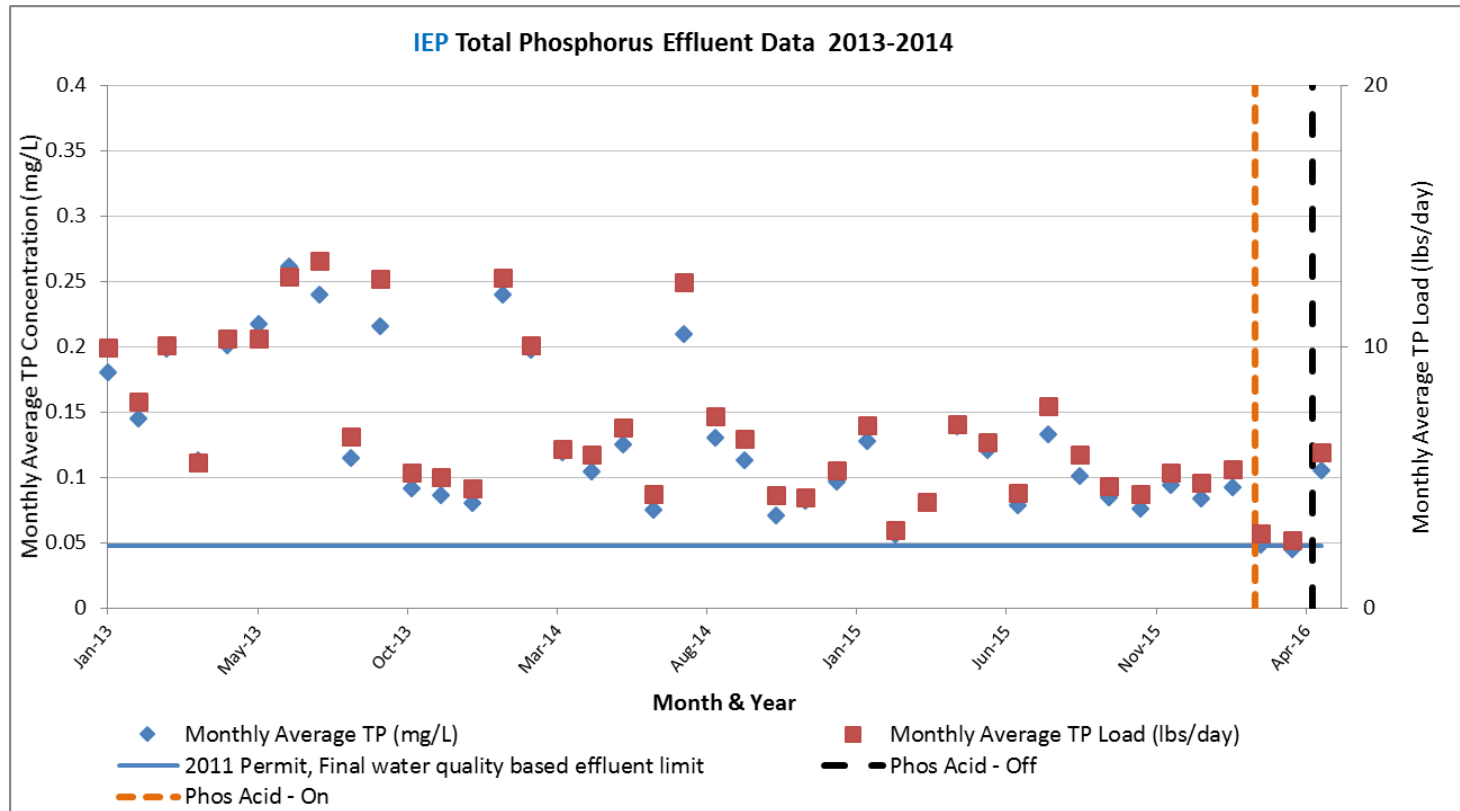
Inland Empire Paper Co.

- Paper Machine #5 (2001)
- Water Conservation Projects:
 - Conustrenner (2004)
 - Pump Seals (2005 to 2007)
 - Retention Aid Carrier Water (2012)
 - Disk Filter Shower Water (2014)
 - PM5 Vacuum Roll Seal (2015)
- MBBR #1 (2006)
- MBBR's #2 and #3 (2009)
- #5 TMP (2009)
- Surge control (2009)
- Elimination of Starch (2010)
- Chip segregation (2011)
- Nutrient Optimization (2012 to present)
- Stock Blending (2013)
- Phosphoric Acid (2016)
- Speece Cone In-line Superoxygenation System (2016)
- Nutrient Monitoring and Automation (2016)
- Tertiary Treatment:
 - Trident HS
 - AlgEvolve
 - Membrane Only

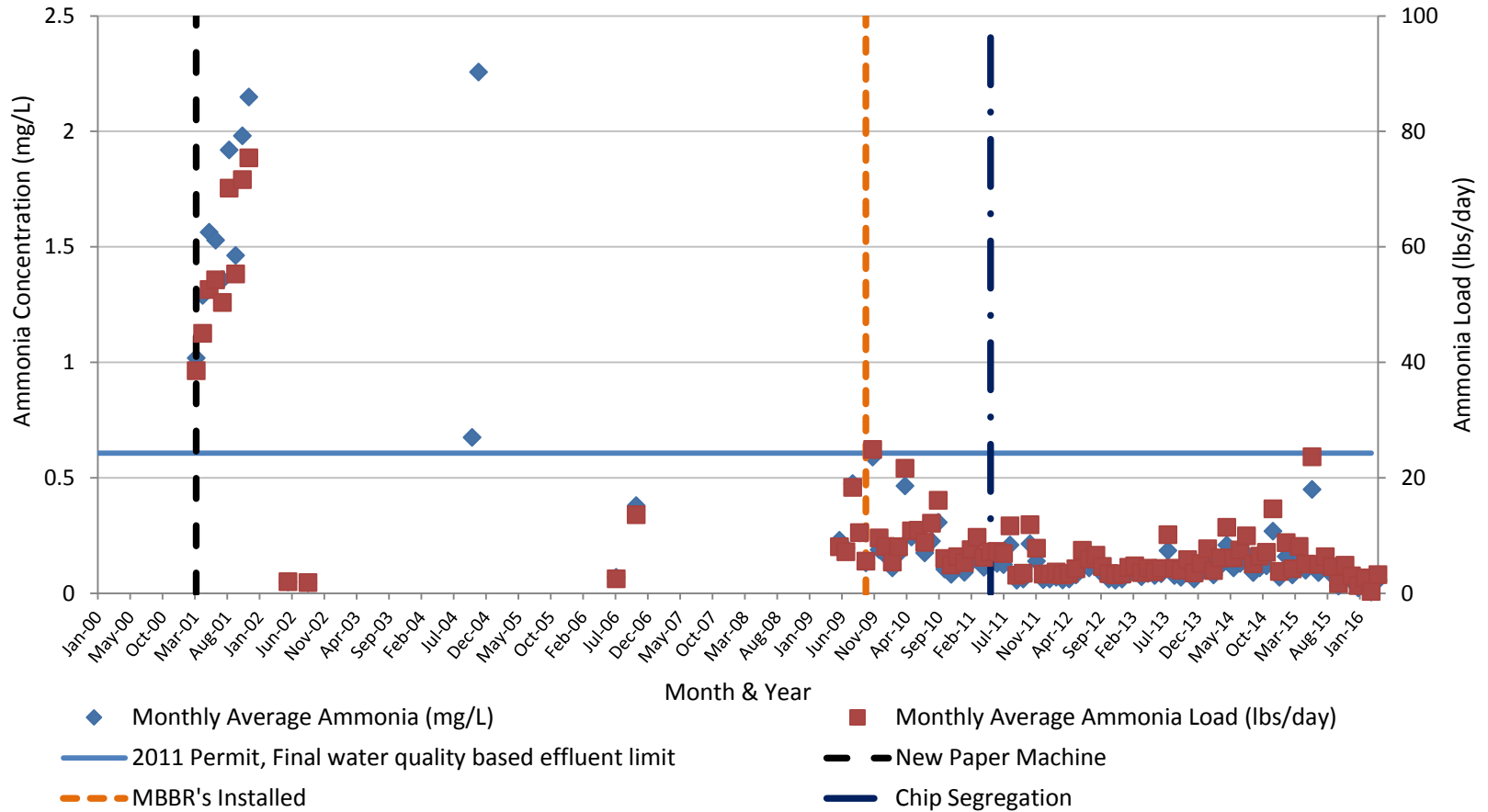
Inland Empire Paper Co.



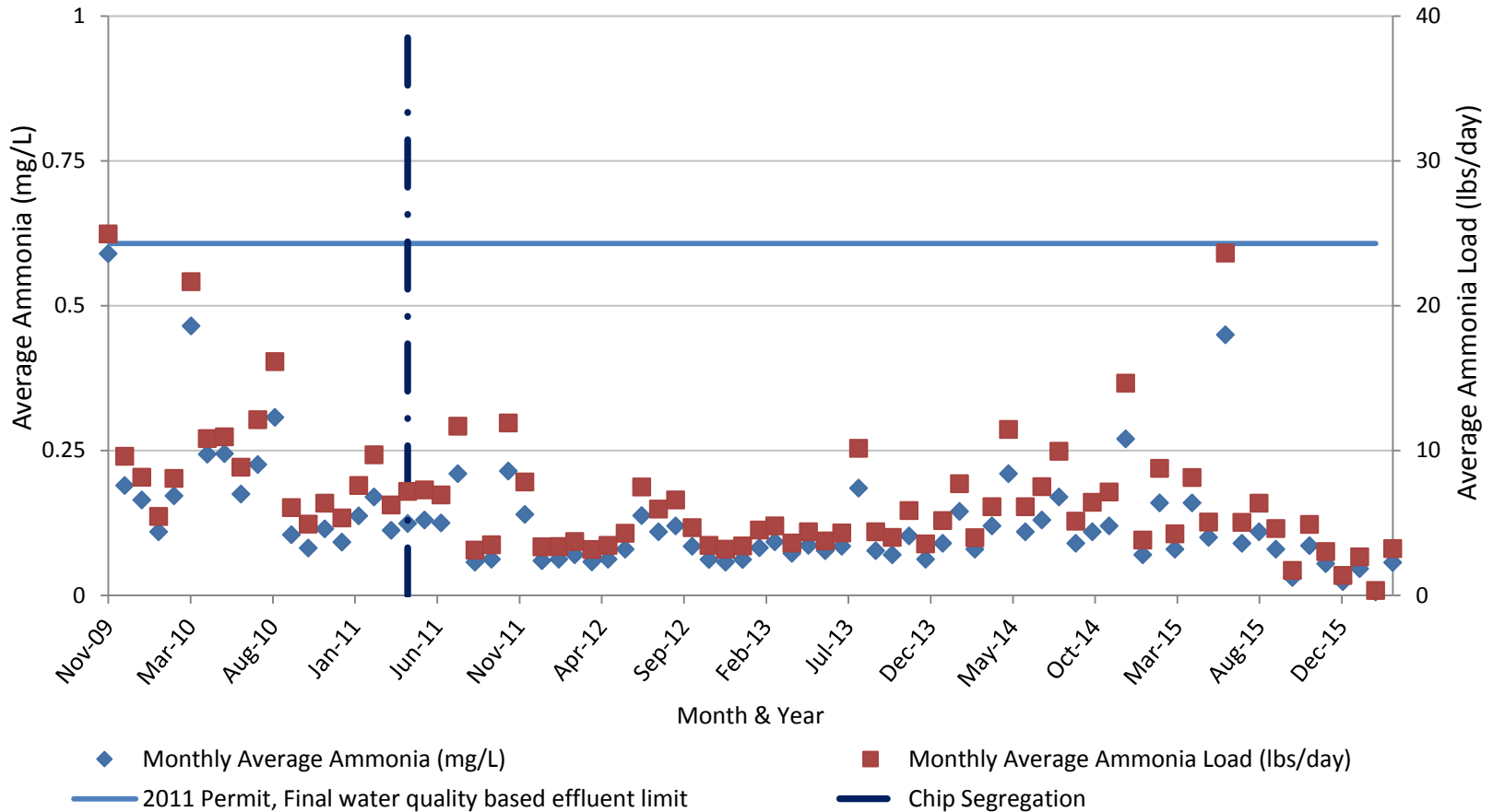
Inland Empire Paper Co.



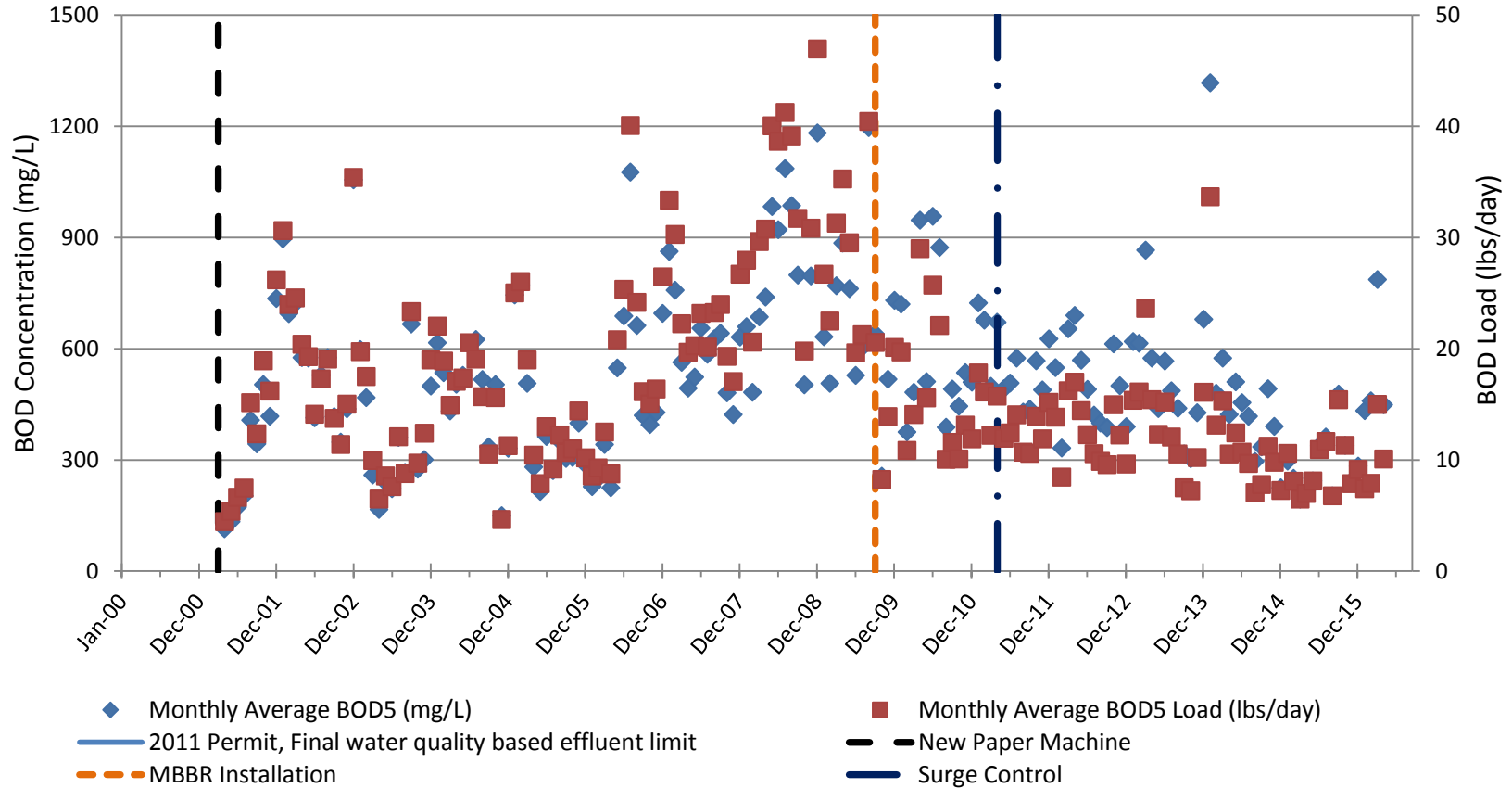
Inland Empire Paper Co.



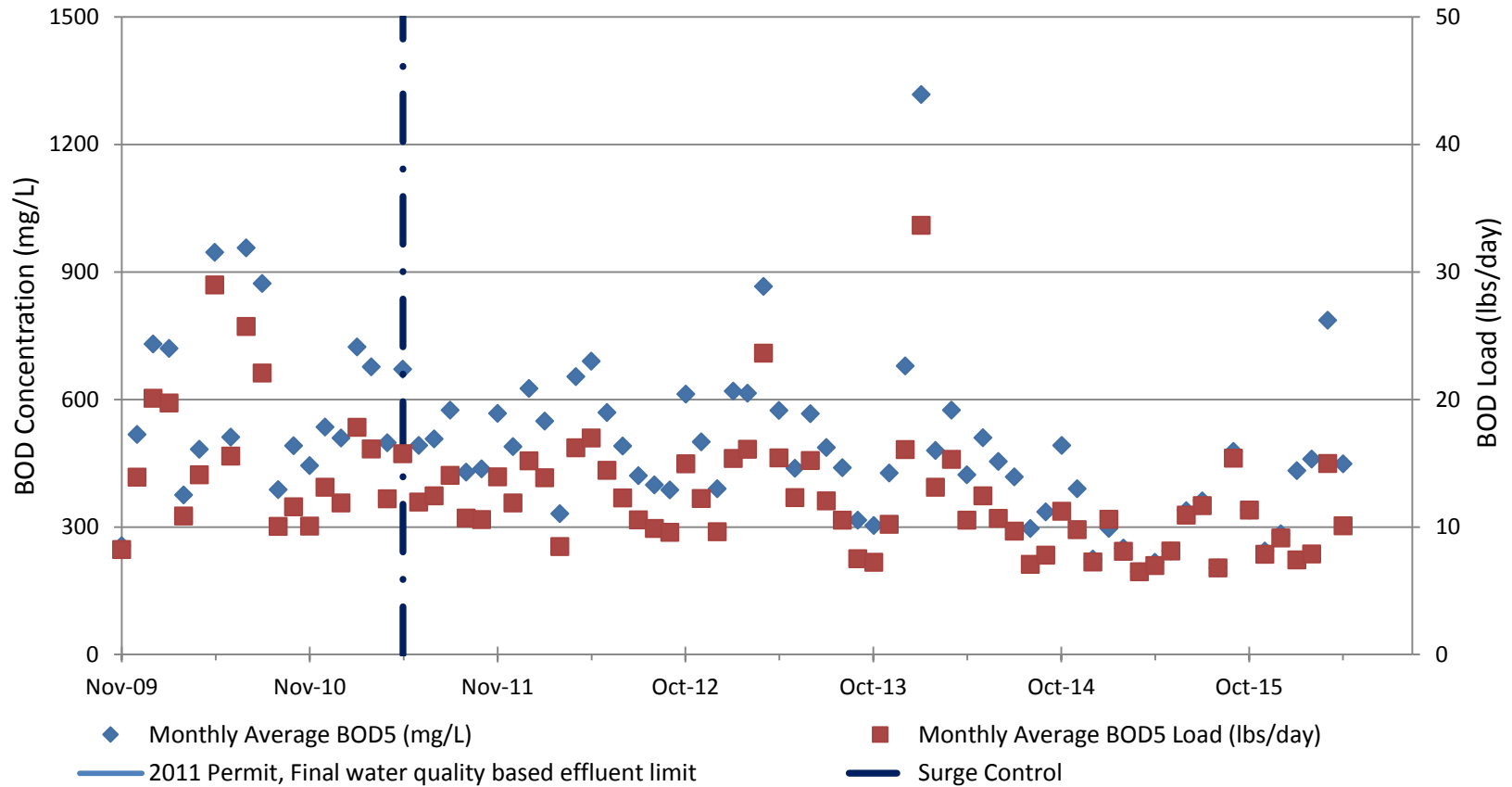
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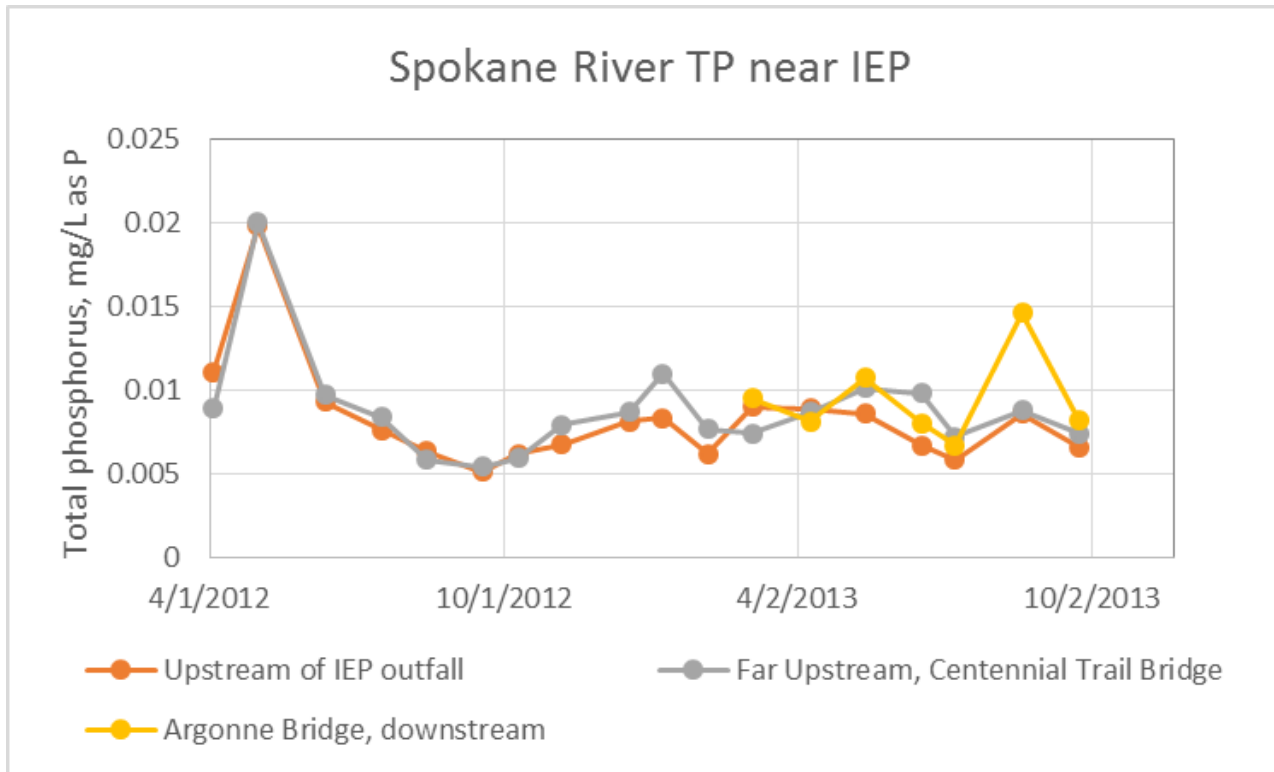
Ecology Groundwater Study in vicinity of IEP

- River sampling April 2012 through September 2013
 - 50 river samples collected across three locations near IEP
- Study purpose:

“...to formally evaluate the relationship between the river and underlying aquifer at the IEP facility during at least one critical season (February to October)...to consider an allowance for nutrient concentrations in the facilities NCCW to the extent that nutrient concentrations in groundwater at the IEP site are equivalent to those in the river upstream of the site...”

- NCCW = non-contact cooling water

Ecology Groundwater Study in vicinity of IEP



April 2012 through September 2013

- Number of samples: max. 22 per site
- Median: 0.0082 mg/L
- Average: 0.0085 mg/L

Notes:

- Data below the detection limit or estimated are shown as the detection limit and or estimated value
- Duplicate samples are averaged
- Report is not final



SPOKANE COUNTY ENVIRONMENTAL SERVICES



Spokane County Regional Water Reclamation Facility



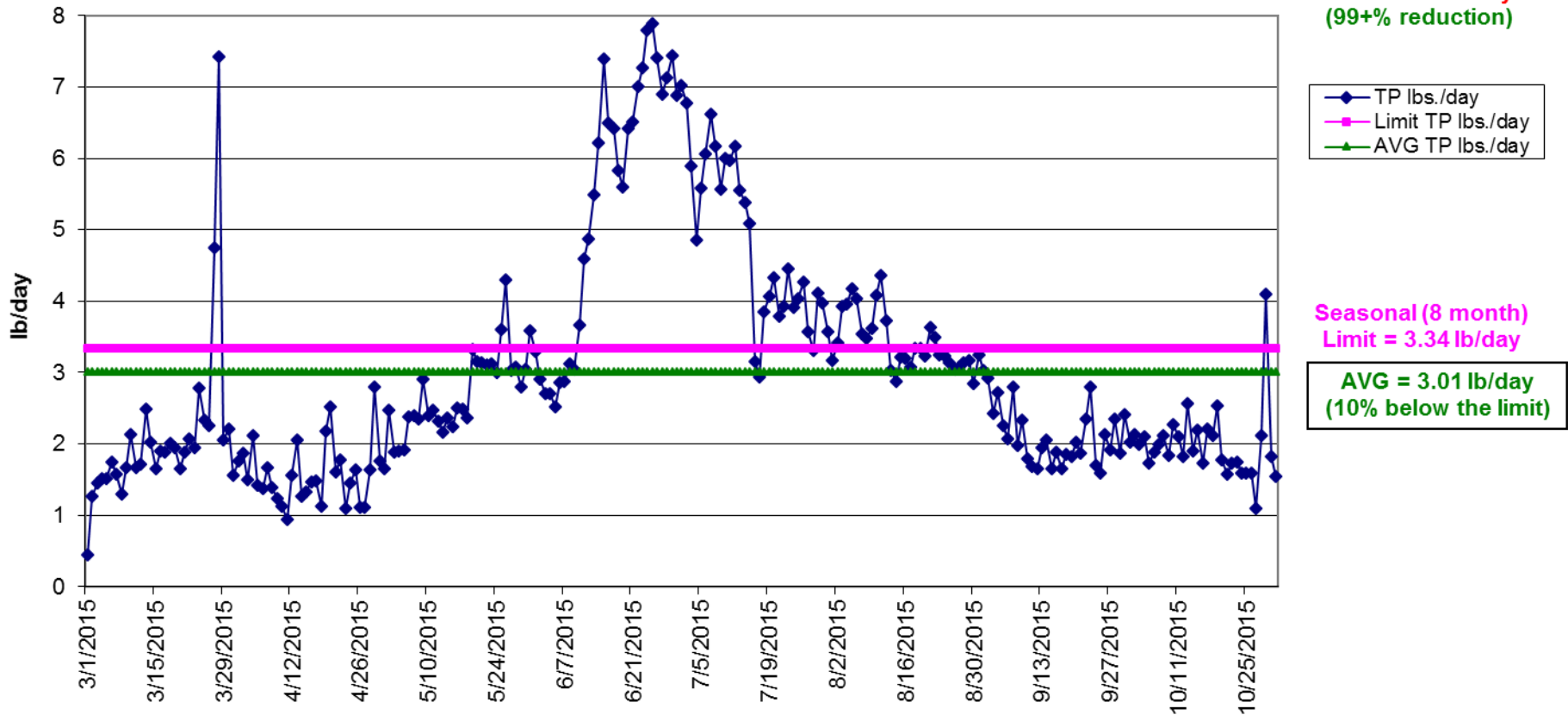
DO TMDL – POINT SOURCE REDUCTION UPDATES

June 16, 2015

SPOKANE COUNTY ENVIRONMENTAL SERVICES

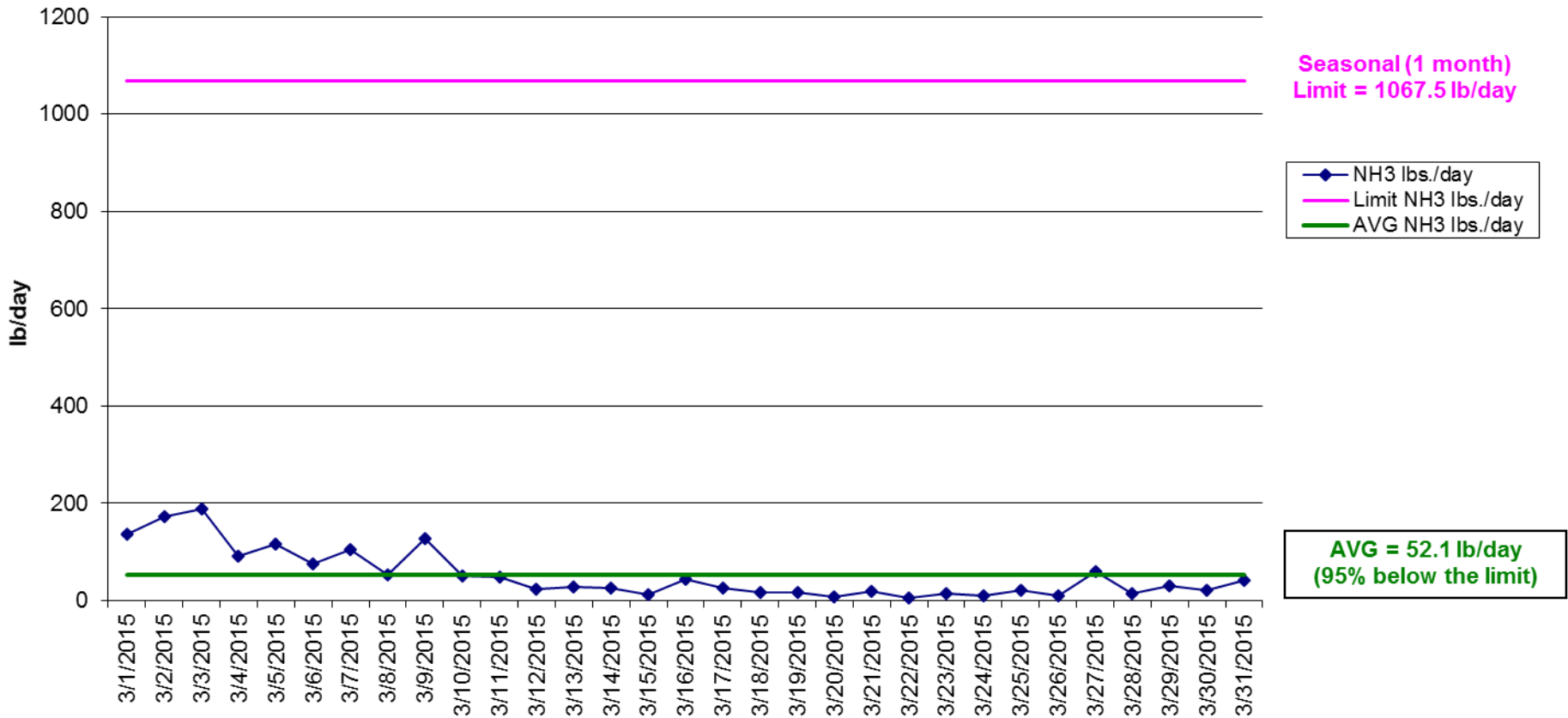
Phosphorus Treatment (8 months)

SCRWRF Effluent - Total P (Mar - Oct 2015)
(8 months)



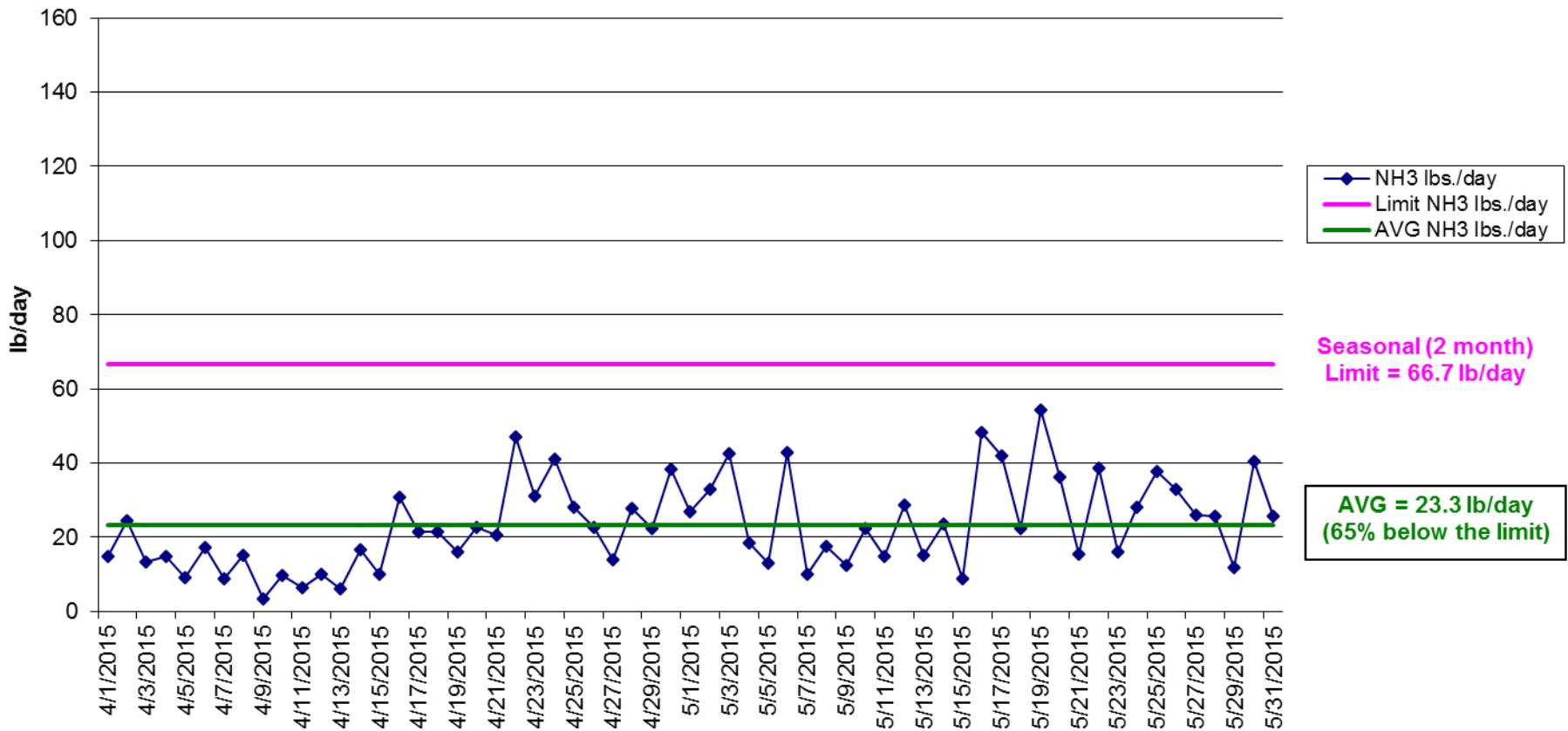
Ammonia Treatment (March 2015)

SCRWRF Effluent - Ammonia (March 2015)
(1 month)



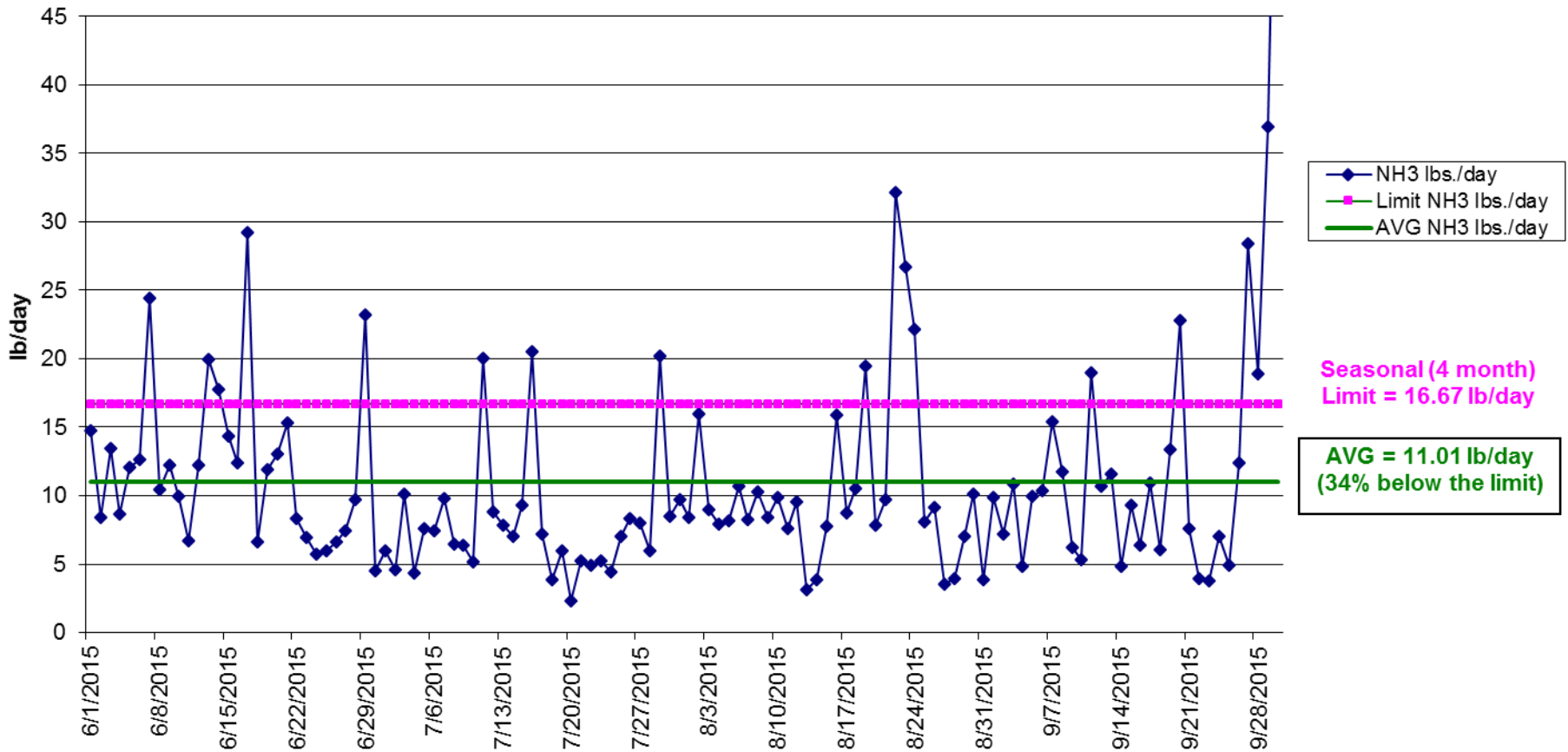
Ammonia Treatment (April - May)

SCRWRF Effluent - Ammonia (Apr - May 2015)
(2 months)



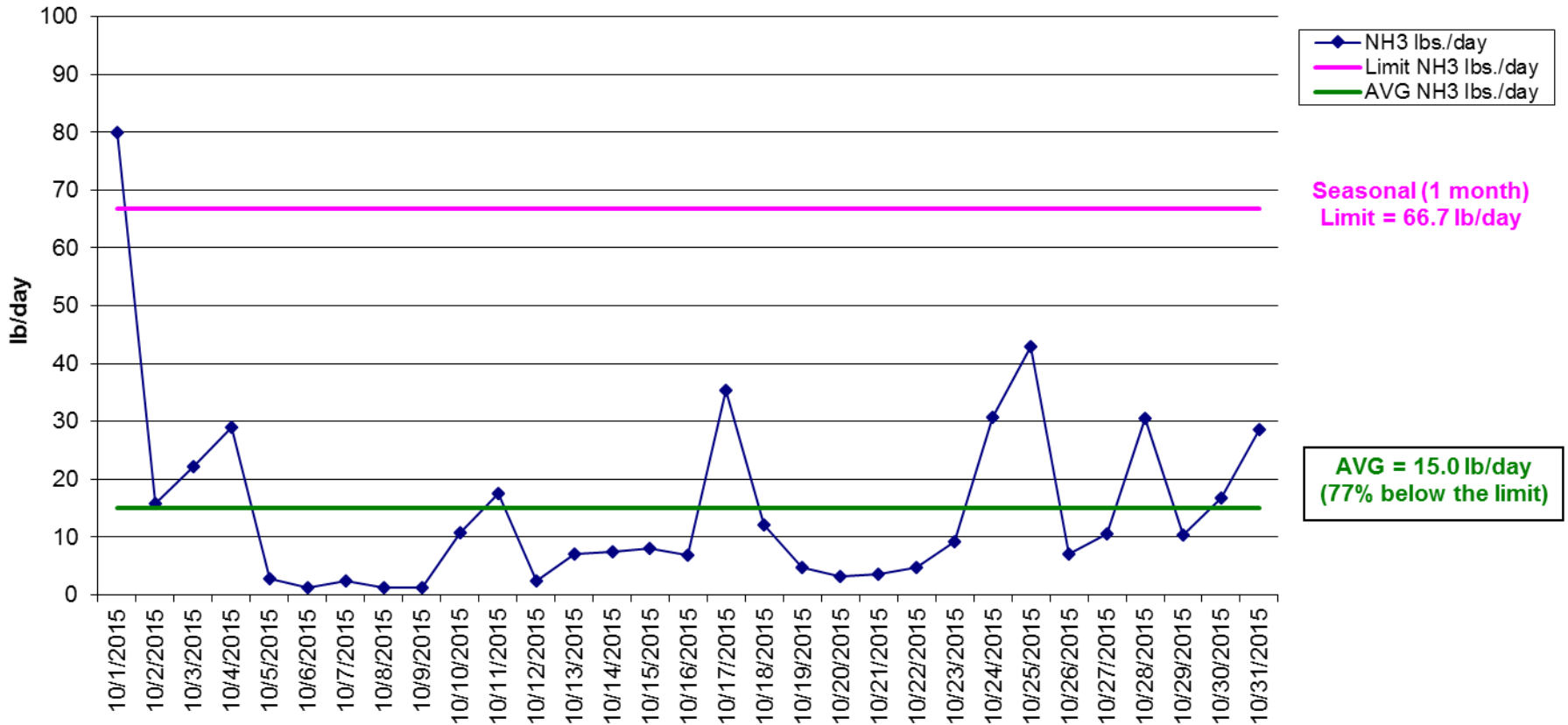
Ammonia Treatment (June - September)

SCRWRF Effluent - Ammonia (Jun - Sep 2015)
(4 months)



Ammonia Treatment (October 2015)

SCRWRF Effluent - Ammonia (October 2015)
(1 month)



Carbonaceous Biochemical Oxygen Demand (CBOD) – 2015 Status

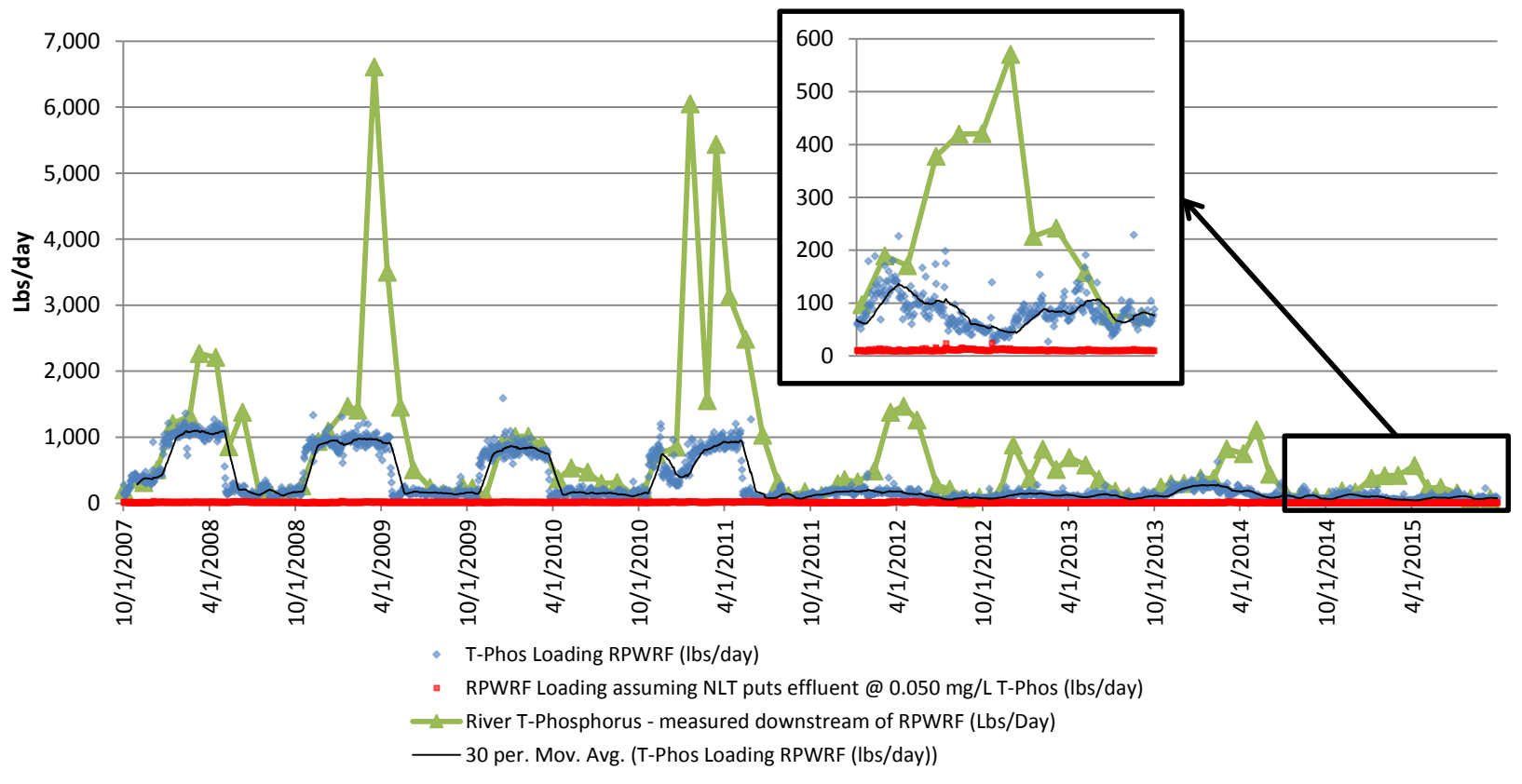
- The County's NPDES permit limit (monthly average) for CBOD is 2.0 mg/L (133 lbs/day)
- The lab detection limit for CBOD is 2.0 mg/L
- Essentially every day is “non-detect” and the DMR value is reported as <2.0 mg/L

Total Phosphorus Treatment March – October

	2013	2014	2015
Total P, SCRWRF influent (lbs)	76,700	76,300	87,056
Total P, SCRWRF effluent (lbs)	600	585	738
Total P, SCRWRF treatment reduction	99.2%	99.2%	99.2%

Riverside Park Water Reclamation Facility

RPWRF and Spokane River Phosphorus Loading



- Lower Phosphorus loading since 2011 due to Chemically Enhanced Primary Treatment (CEPT)
- Phosphorus Loading from RPWRF often makes up majority of loading to the river
- Next Level Treatment (NLT) expected to bring phosphorus levels in the river to near background concentrations

RPWRF Current and Upcoming Construction Projects



- Digester #3 currently under construction

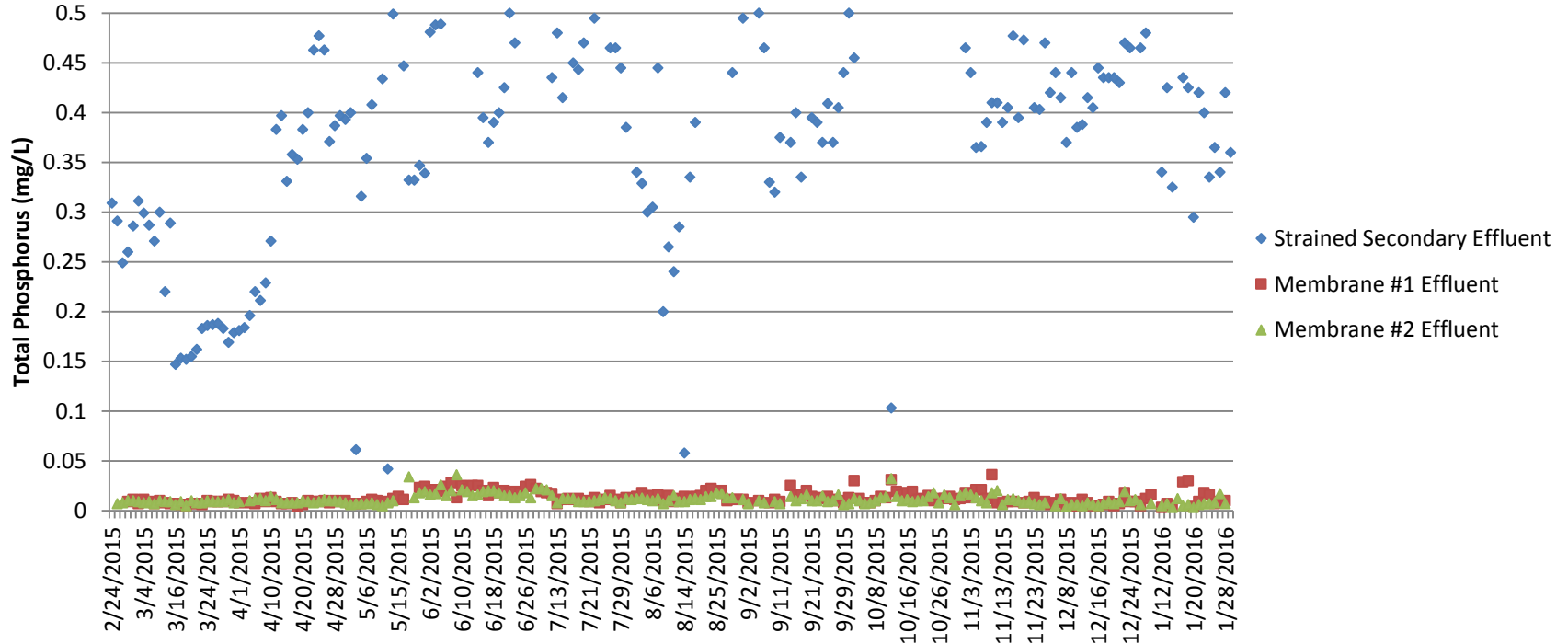
Next Level of Treatment – Phase One

- Primary Clarifier #5
- Chemical Storage Facility
- Aeration Basin Modifications
- Filtrate Pump Station

Next Level of Treatment – Phase Two

- Flow Split Structure
- Pre-treatment System
- Membrane Facility

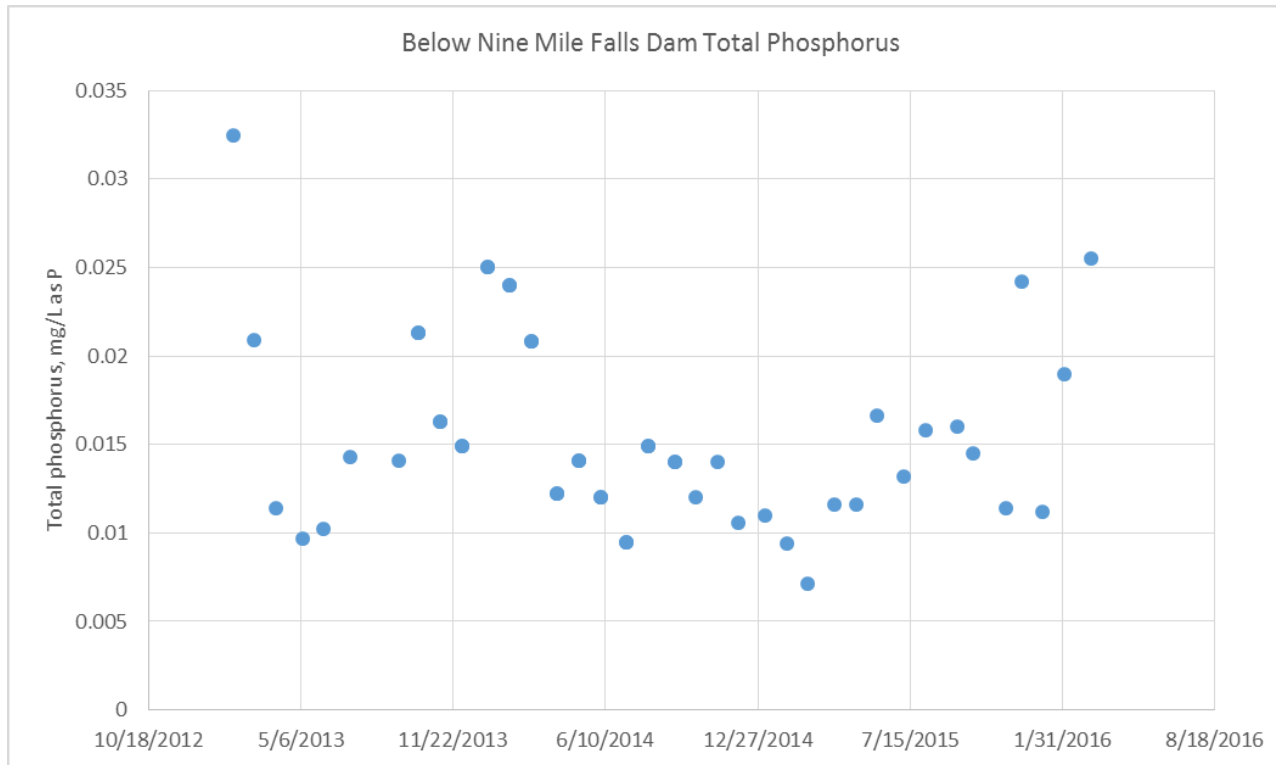
RPWRF NLT Membrane Pilot Project Results 2015-2016



Summary of NPDES Permit Compliance with DO TMDL WLA

NPDES Permit	Total P	Ammonia	CBOD
Coeur d'Alene	Implementing	Compliant	Compliant
HARSB	Implementing	Compliant	Compliant
Post Falls	Compliant, some months	Compliant	Compliant
LLSWD	~90% reduced since 2000	Compliant	Compliant
Kaiser Trentwood	Compliant	Compliant	Compliant
Inland Empire Paper Co.	~80% reduced since 2000	Compliant	Implementing
SCRWRF	Compliant	Compliant	Compliant
RPWRF	~90% reduced in Nov-May since 2000	Compliant	Compliant

Ecology 9-Mile Falls Site, monthly sampling



2013 through March 2016

- Number of samples: 49
- Median: 0.014 mg/L
- Average: 0.016 mg/L

Notes:

- Data below the detection limit are shown as the detection limit
- Data from WY 2015 and 2016 are preliminary

Longitudinal Sampling

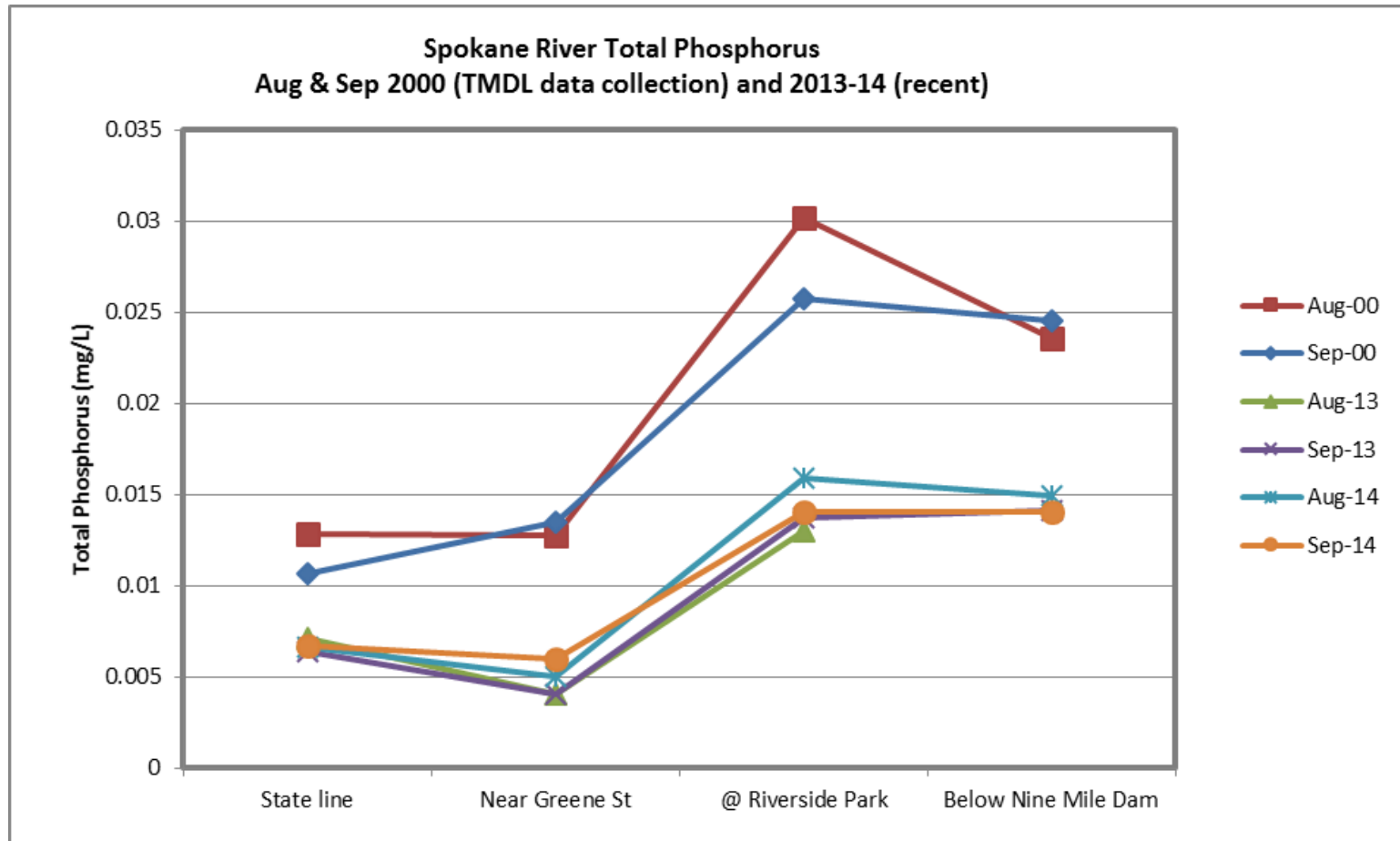
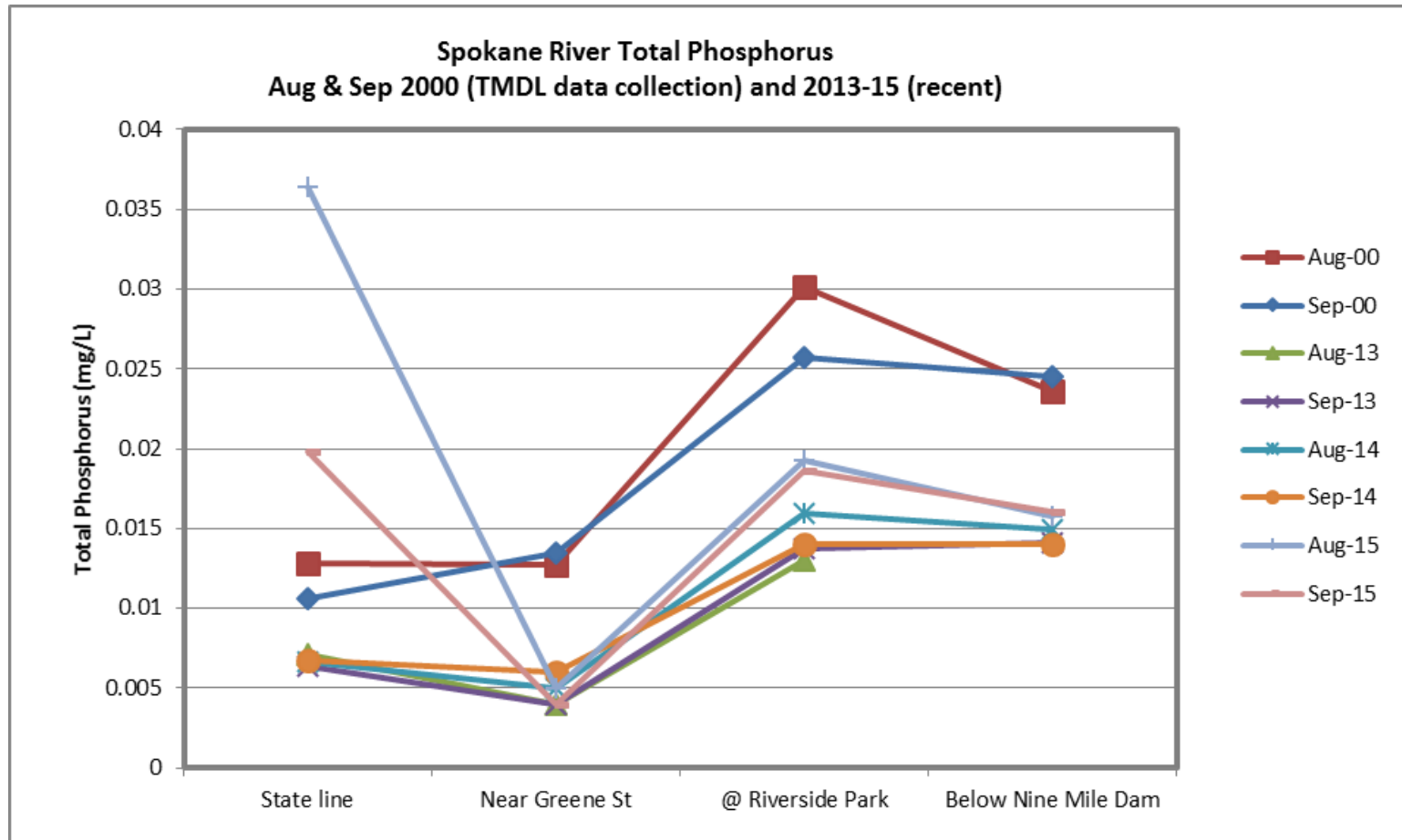


Figure 21, Spokane River and Lake DO TMDL 2010-2014 Implementation Report, Ecology, publication no. 15-10-038

Longitudinal Sampling



Update Figure 21:

Attenuation of TP prior to Greene and Nine Mile, even during low 2015 flows

Adaptive Management