

PROACTIVE APPROACH TO CHLORIDE REDUCTIONS

Village of Paddock Lake, WI

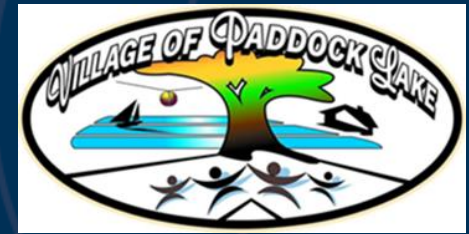
WWOA 50th Annual Conference
October 2016

Presented by:

John Szwedo-Baxter & Woodman

Jim Kleinschmidt, P.E.-Baxter & Woodman

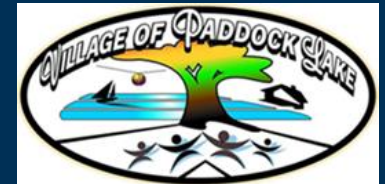
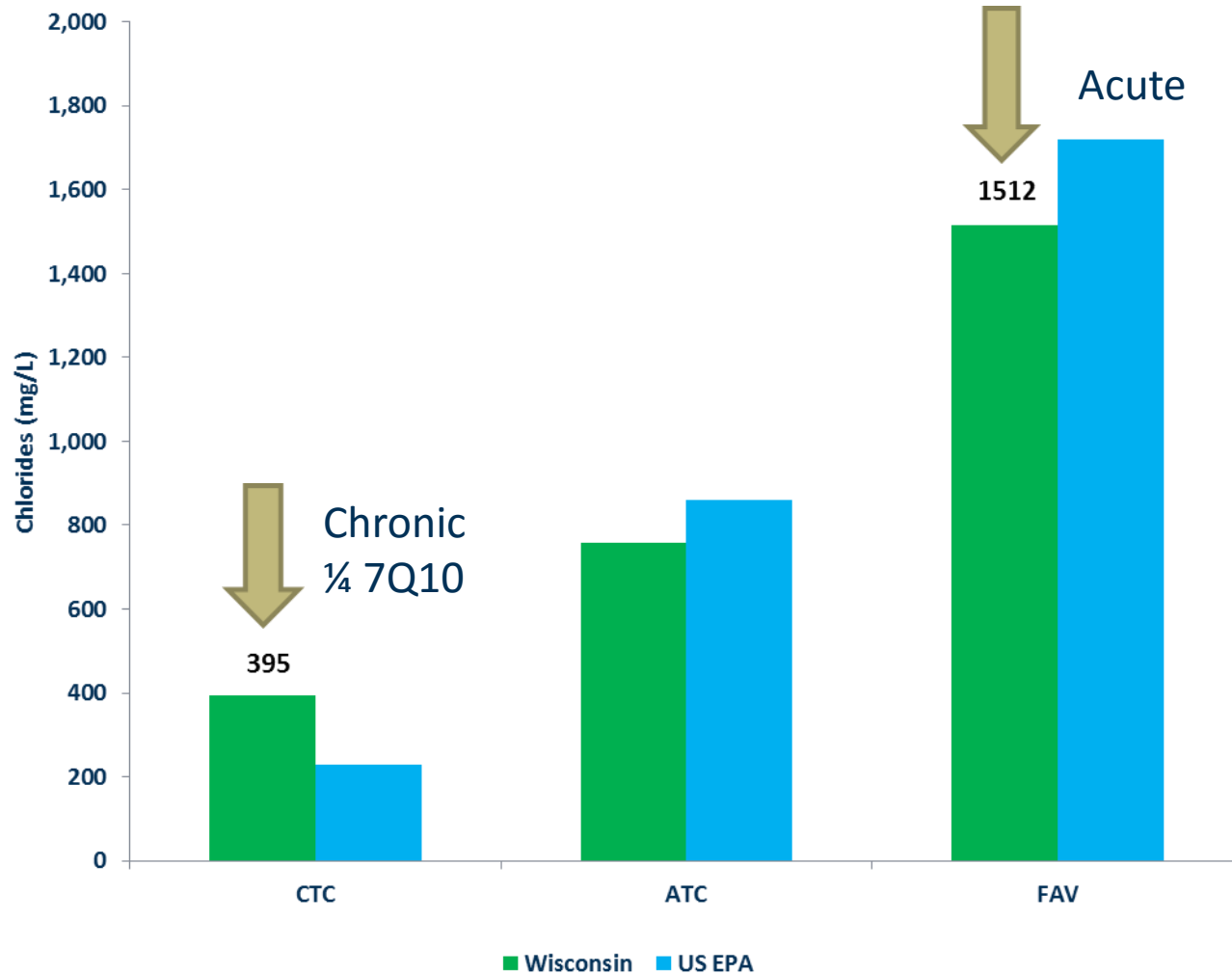
Tim Popanda-Village Administrator-Paddock Lake



October 12, 2016 10:45 AM Biomass Room

BAXTER & WOODMAN
Consulting Engineers

Chloride Criteria in Wisconsin



US EPA Criteria Development



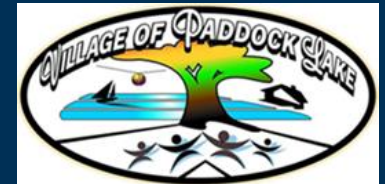
Daphnia



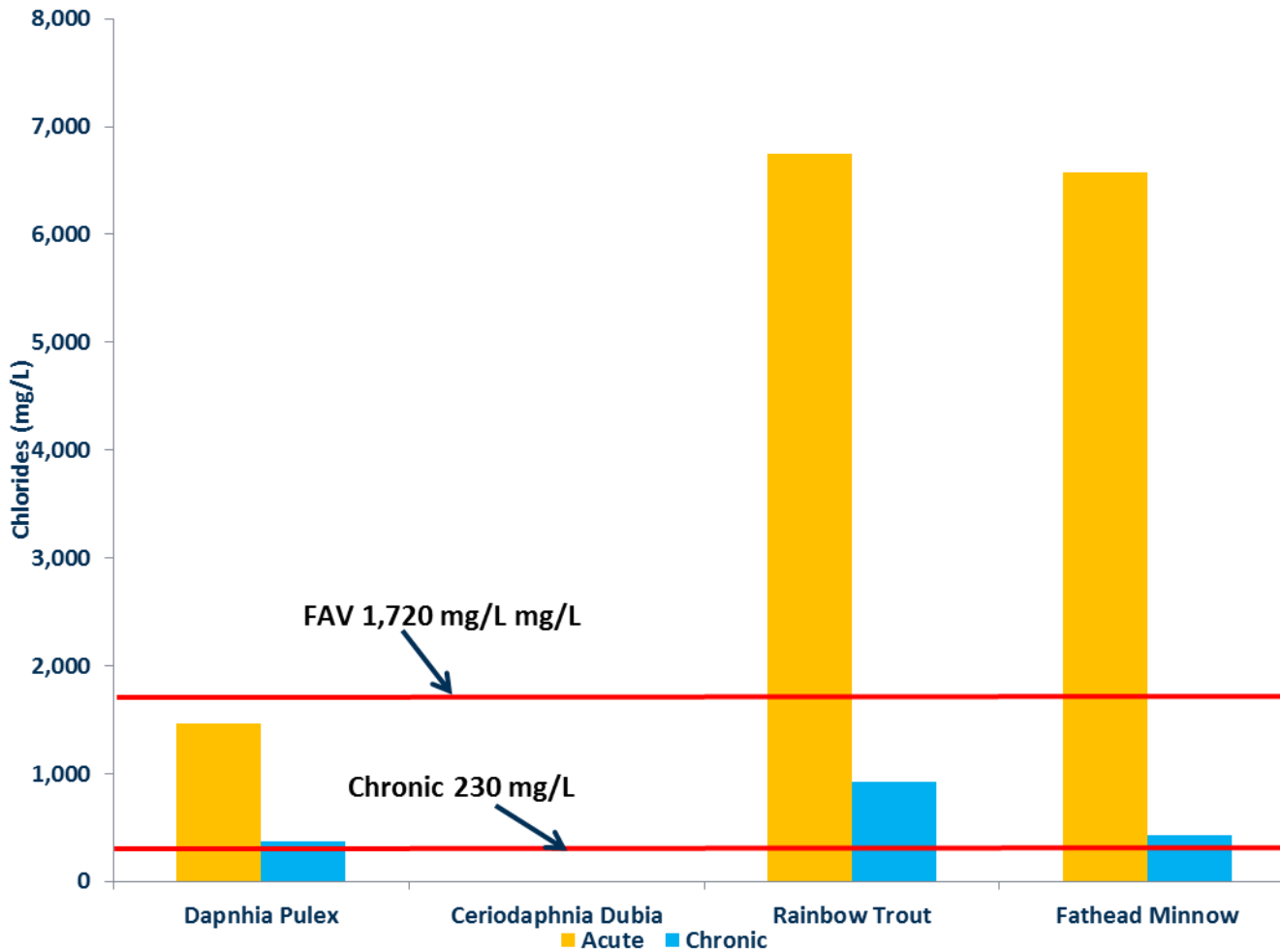
Fathead Minnow



Rainbow Trout



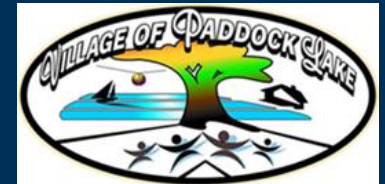
Basis for Criteria- US EPA



CTC= FAV/ACR

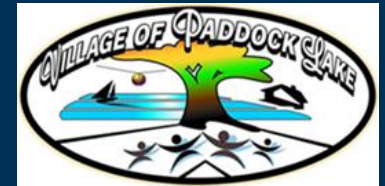
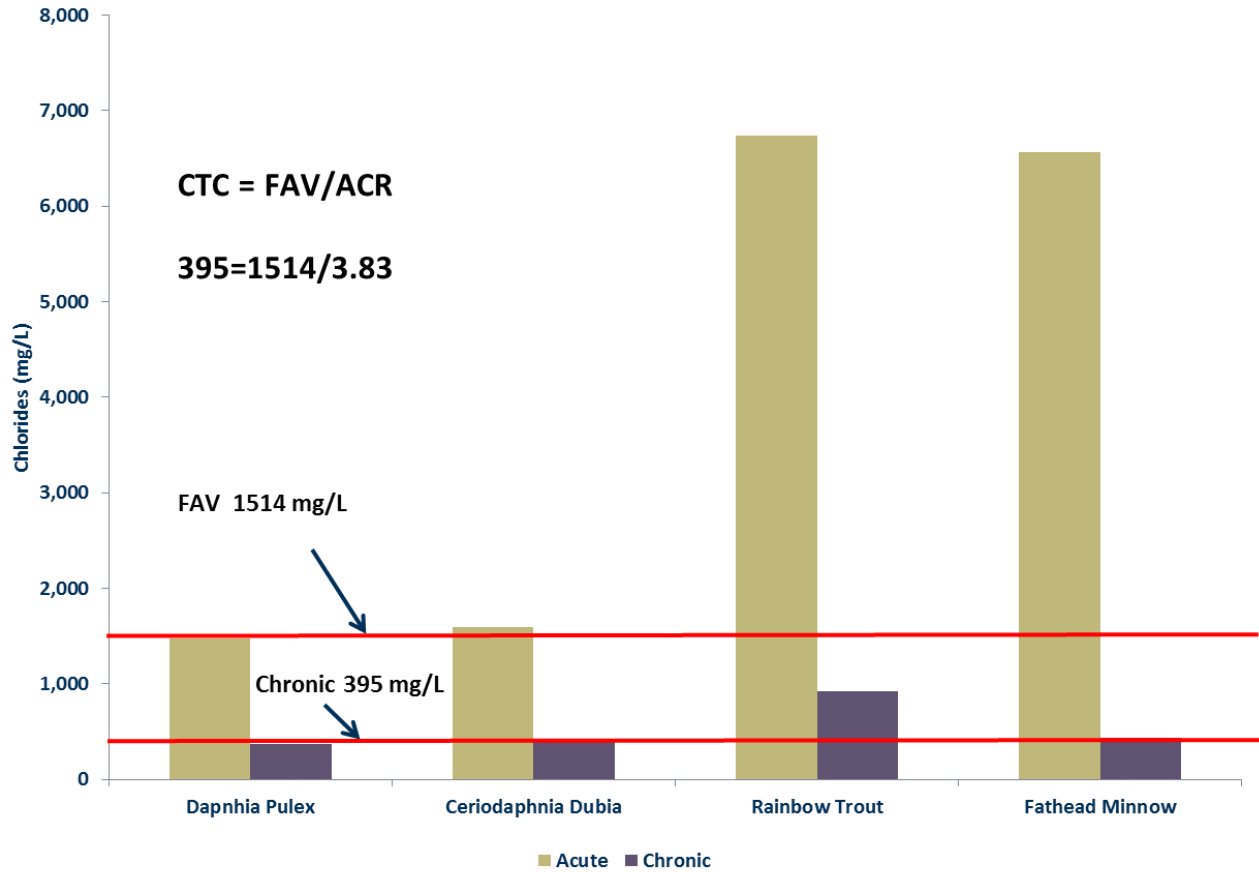
230=1720/7.59

ACR-Average of 3 Species

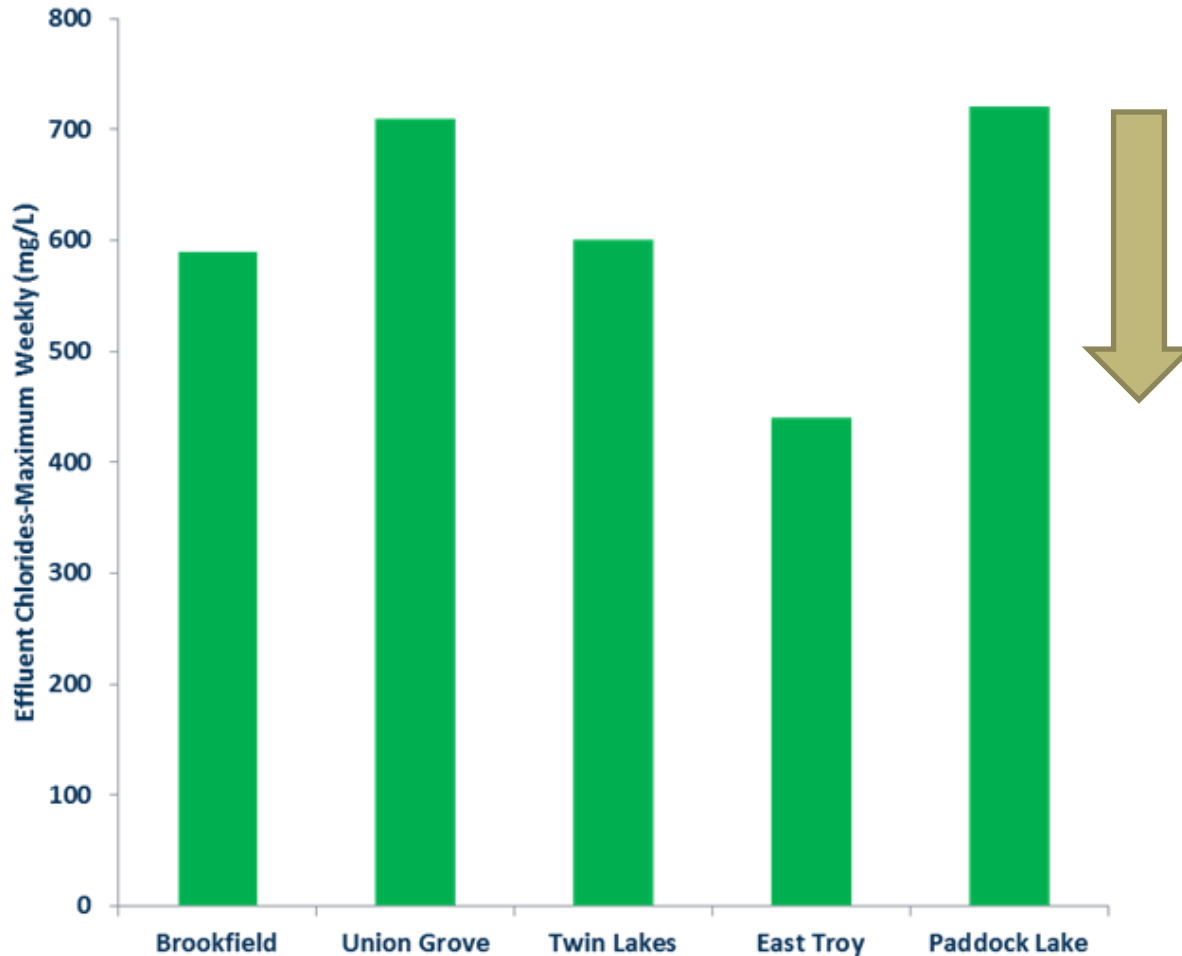


B&W

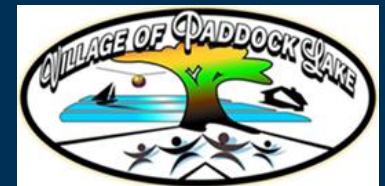
Basis for Criteria- Wisconsin



Basis for Criteria- Wisconsin



Added Ceriodaphnia
Dubia
Applicable to All
Waters-Ceriodaphnia
Dubia Controls
Test Species for WET
Robust Chlorides
Chronic Toxicity WET
Data Base



Site Specific Limit-WER

Lab Water



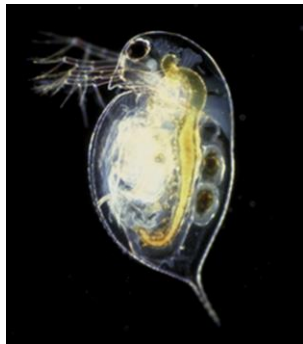
Fathead Minnow

Simulated Water



Hardness
Alkalinity
pH

WER = Simulated/Lab
Acute
Chronic

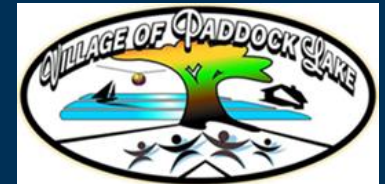


Ceriodaphnia Dubia

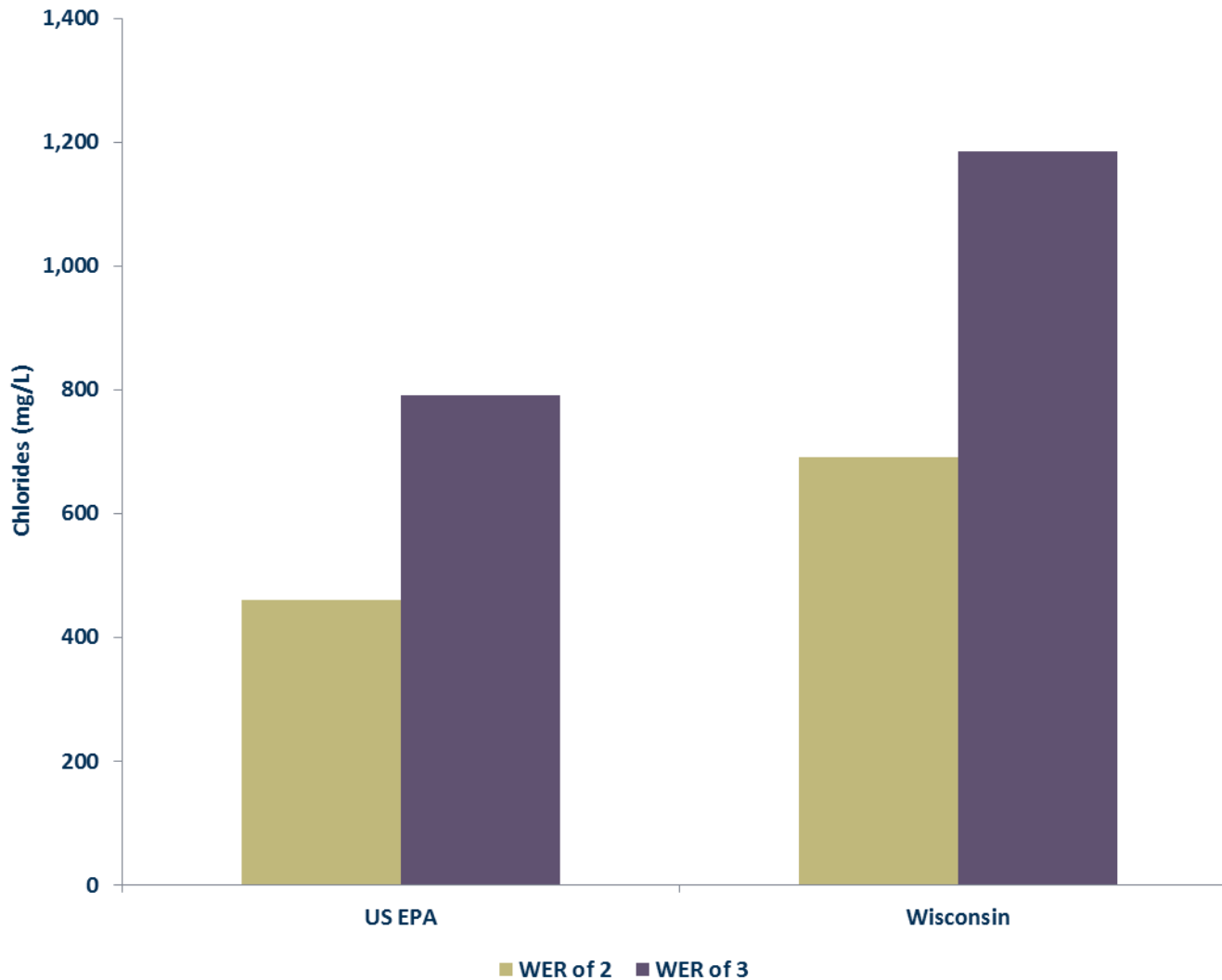


Lab Tests Hardness < 100 mg/L

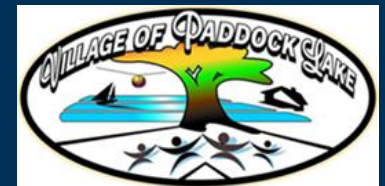
WER=
Water Effects
Ratio



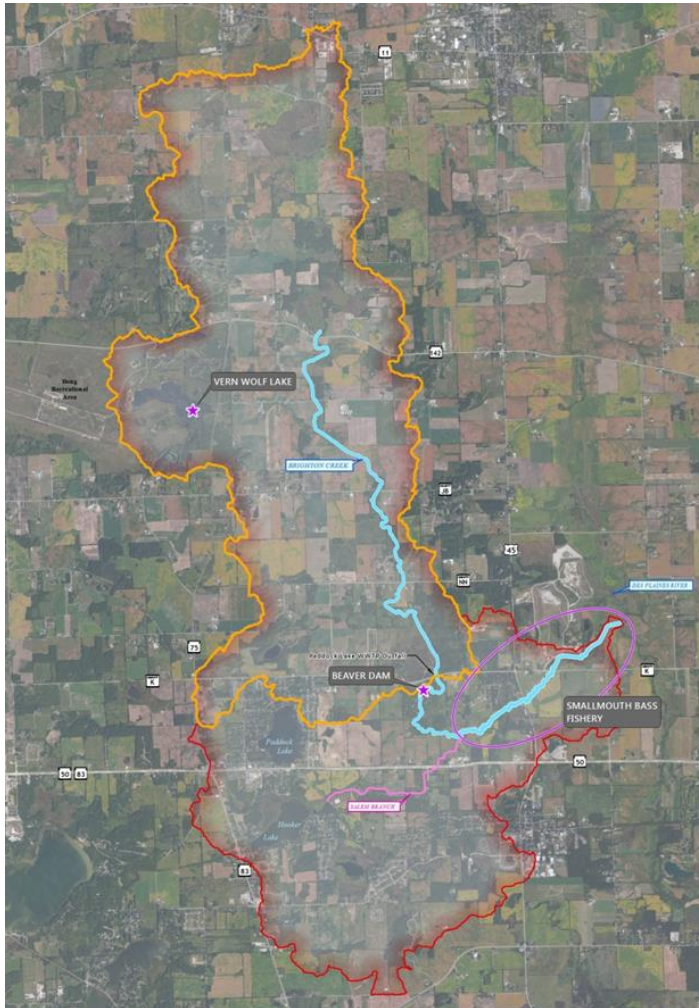
Impact of WER



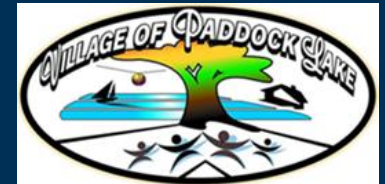
Chronic Toxicity
Limits



Paddock Lake Overview



Population 3,000
High School 1,300
Students



Paddock Lake-WWTP and Brighton Creek



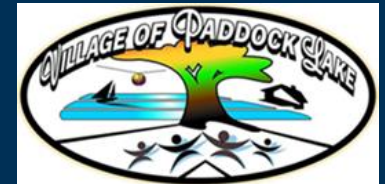
Design Average Flow 0.8 MGD

Chlorides Limits-Interim

612 Weekly Average-May to
November

683 Weekly Average-December to
April

Ultimate Limit-395 mg/L (At Criteria)



Brighton Creek

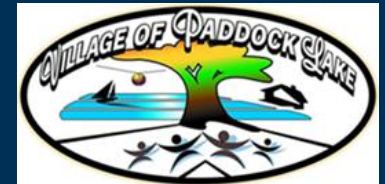


Chloride Reduction Activities

Public Education and Outreach

Good Housekeeping for Municipal Operations

Sewer System Improvement-Best Management Practice



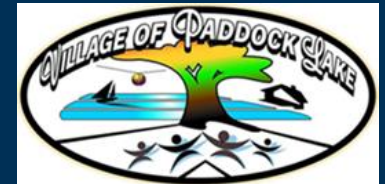
Public Education and Outreach

Newsletters and Web Page-Residents

Business and Institutional Users-Proper Use of Deicing Materials

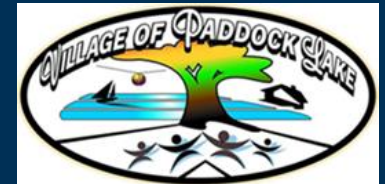
Business and Institutional Users-Efficient Water Softeners

County Highway Department-Proper Use of Deicing Materials

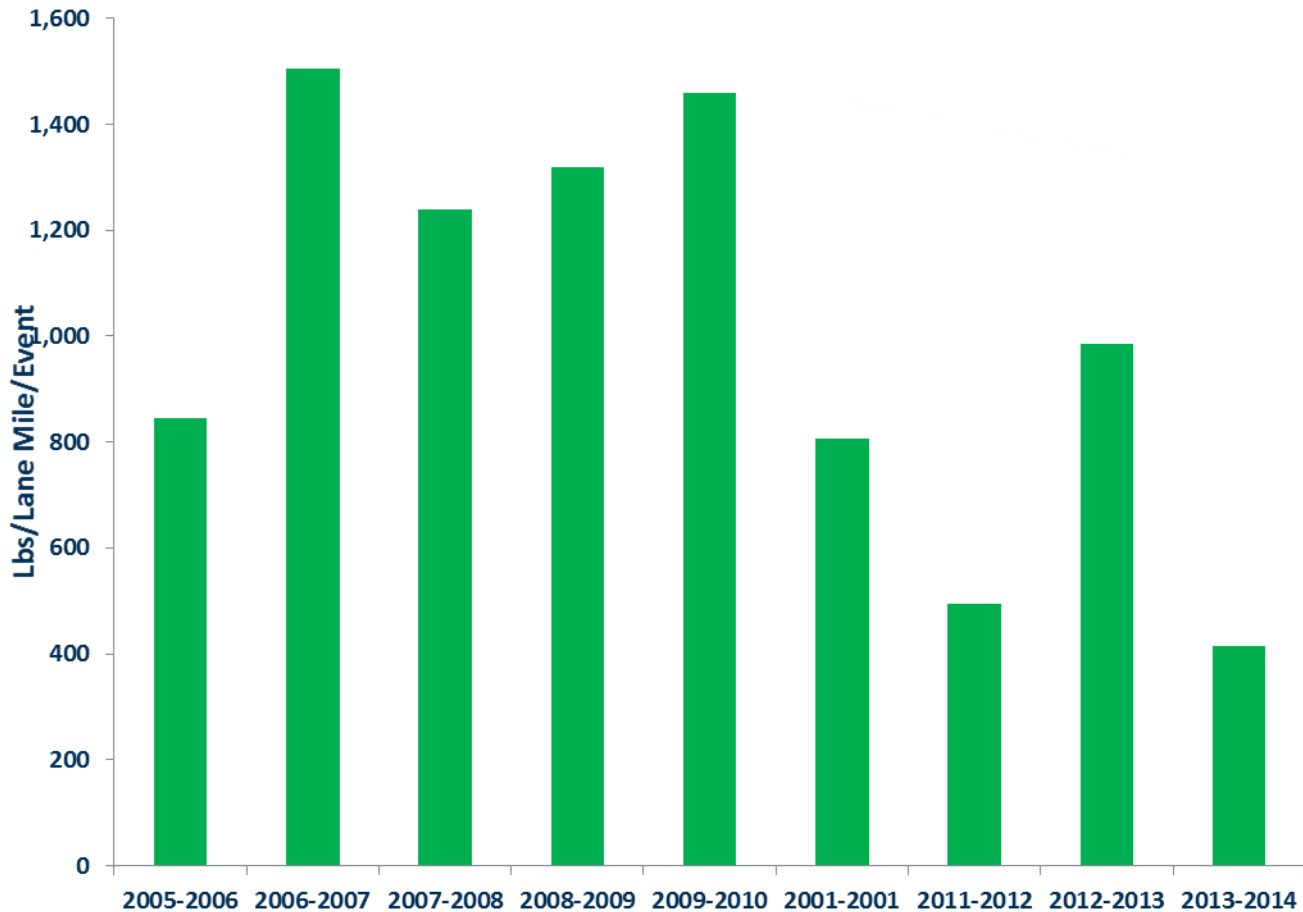


Chloride Reduction-Road Salt

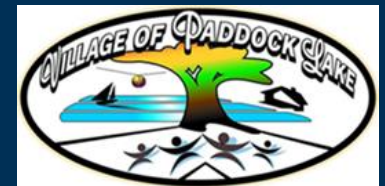
- Audit of Snow Removal Operations
 - 40 % Reduction Target
 - Plow then Salt
 - Southern Exposure Reductions
- Snow Removal and Salt Use Policy
 - Priority Zones
 - Snow Fence in Selected Locations
- Public Works Housekeeping
 - Pre-wash Cleaning (600 lbs)
- Annual Training
 - Calibrate Truck Salters
- Road Salt Additives-Mixture
 - Birds Eye Stone
 - 40 % to 50 % Ratio
- Equipment Purchases
 - Spill Guards
 - Infrared Thermometers
- County Coordination-Spring Road Cleaning



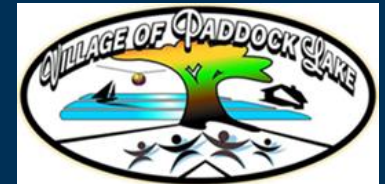
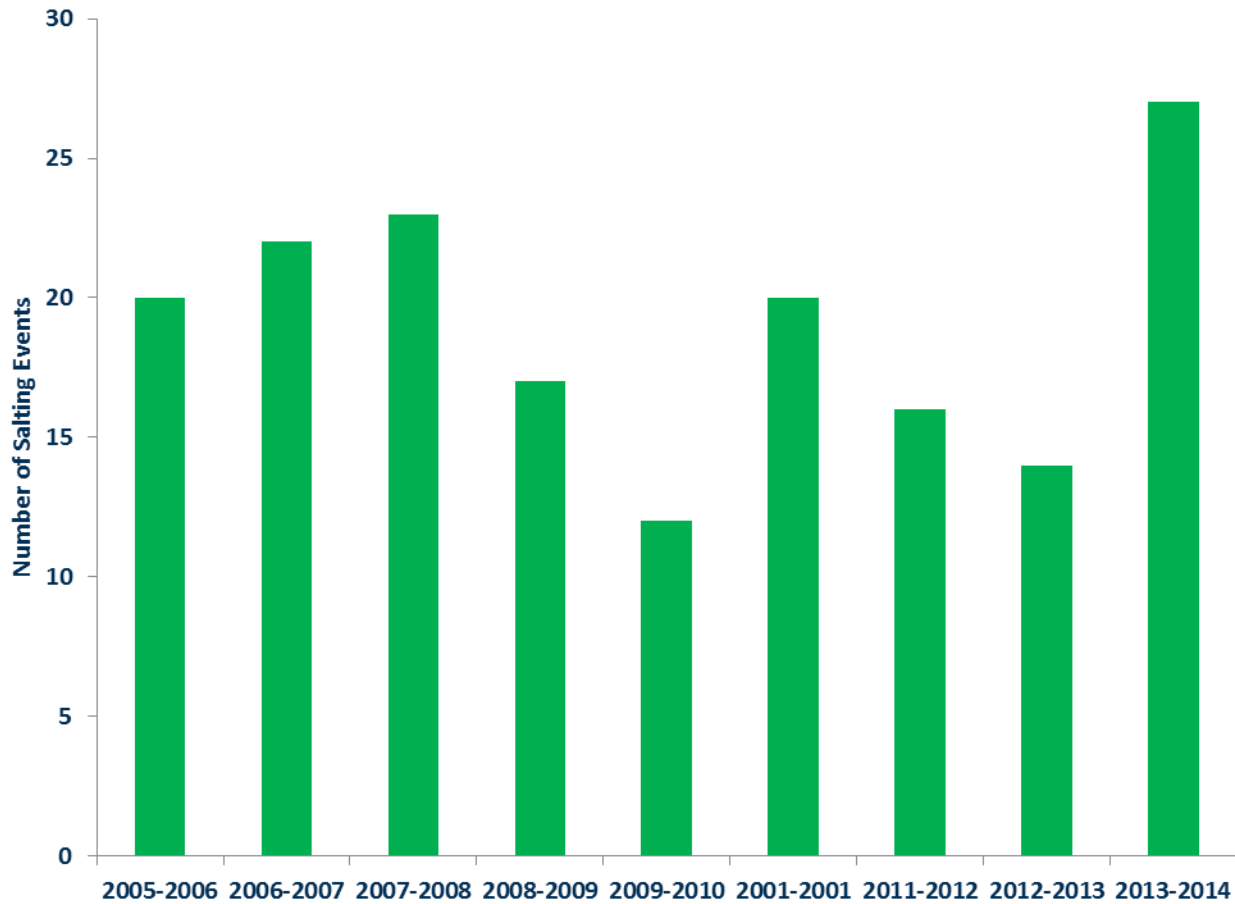
Village Reductions-Road Salt Use



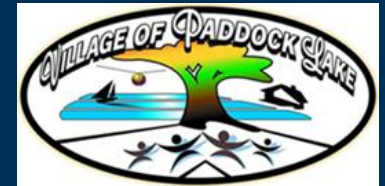
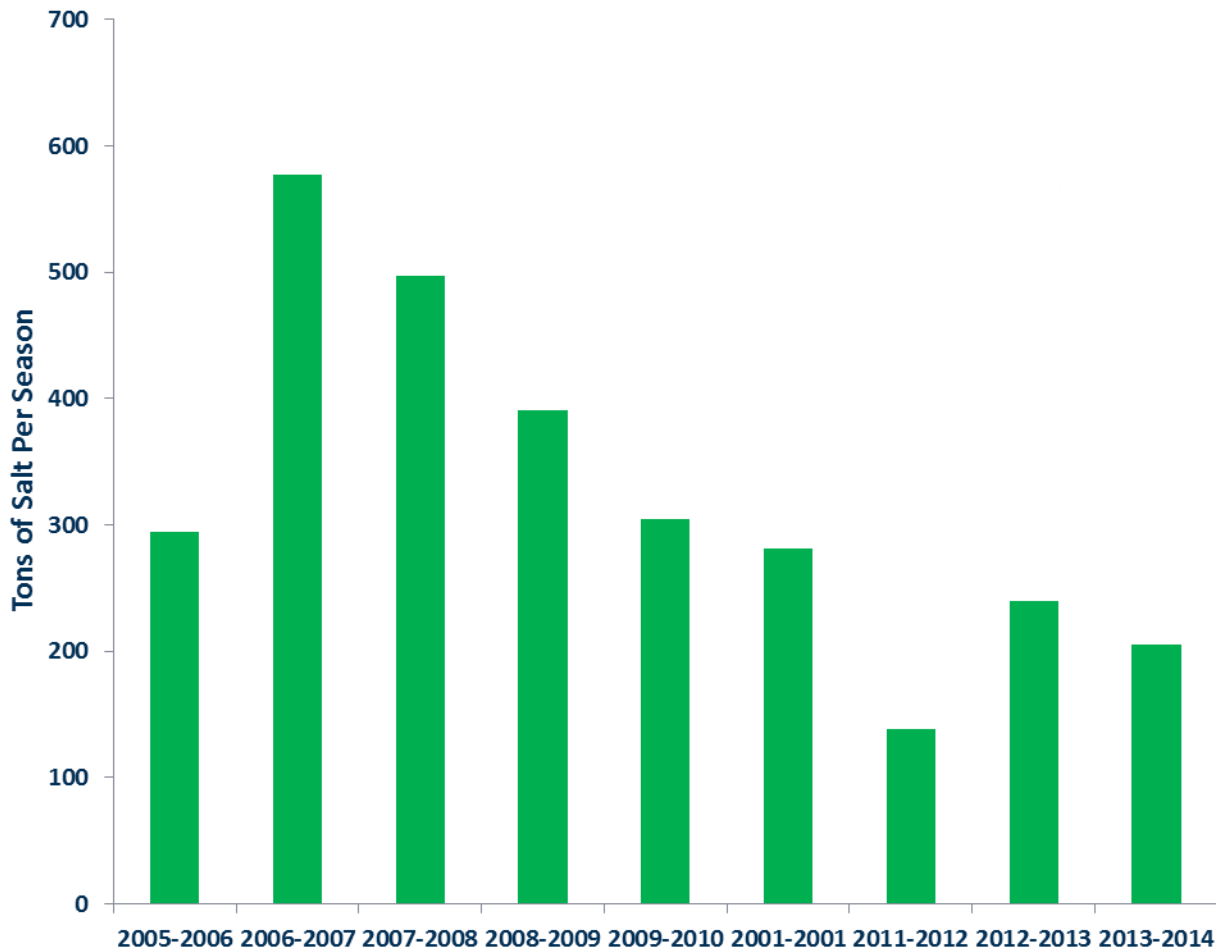
Village Network- 37
Miles



Number of Salting Events



Salt Usage



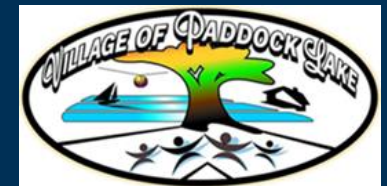
Institutional Users-High School



Village Population
3,000
School Census
1,300

Hardness
> 300 mg/L

Impervious
Pavement
35 acres



Manual Softening Regeneration
1971 and 1992 Equipment



Investigation and Negotiation

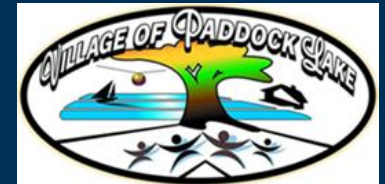
Grab Sampling

1,523 mg/L

780 mg/L

Softening-Irrigation Water

School's Potential Costs-Village Reduction of
Effluent Chlorides



Solution-Brine Regeneration and Controls



Culligan MATRIX SOLUTIONS

Culligan® Available Options
Customize your water treatment equipment for improved return on investment

To operate your facility at improved levels of efficiency and achieve accelerated ROI, customize your water treatment system with Culligan exclusive accessories:

- Brine Reclaim
- Aqua Sensor®
- Progressive Flow.

Culligan exclusive accessories are part of Culligan Matrix Solutions® that combine durable and efficient equipment, systems experience, and technical experts who understand your unique requirements. From planning your system to installing your water treatment equipment, Culligan Matrix Solutions offer options that help deliver the quality of water to meet your needs.

CULLIGAN MATRIX SOLUTIONS ADVANTAGES:

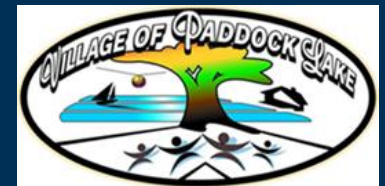
- Single System Integration
- Global Product Platform
- Flexible Configurations
- Quick Delivery/Easy Installation
- Exclusive Culligan Advanced Electronics
 - Historical Operating Data
 - Alarm Recognition
 - 25 Standard and Metric Readings
 - Wireless Remote Monitoring Options
 - Telemetry Options

Markets Served:

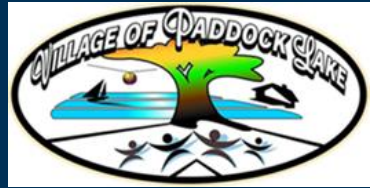
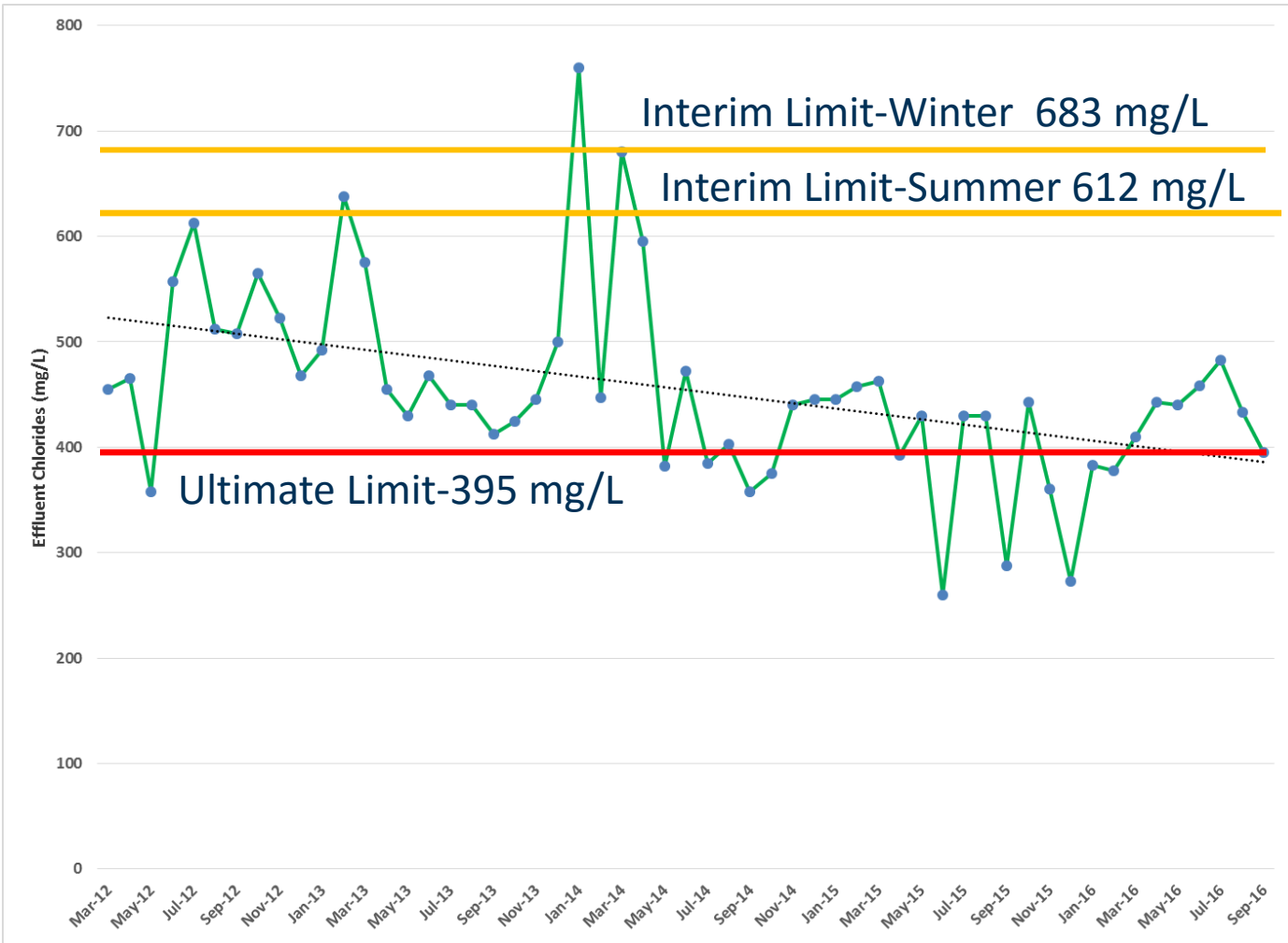
- Clinic
- Municipal/Inflow
- Group/Pool
- Food Beverage Production
- Food Service/Restaurant
- Brewery
- Health Care/Hospital/Pharmaceutical
- Hospital/Lab/Long
- Manufacturing
- Municipal Drinking Water
- Office

END TO END SOLUTIONS.

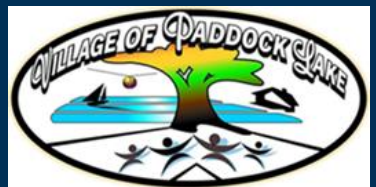
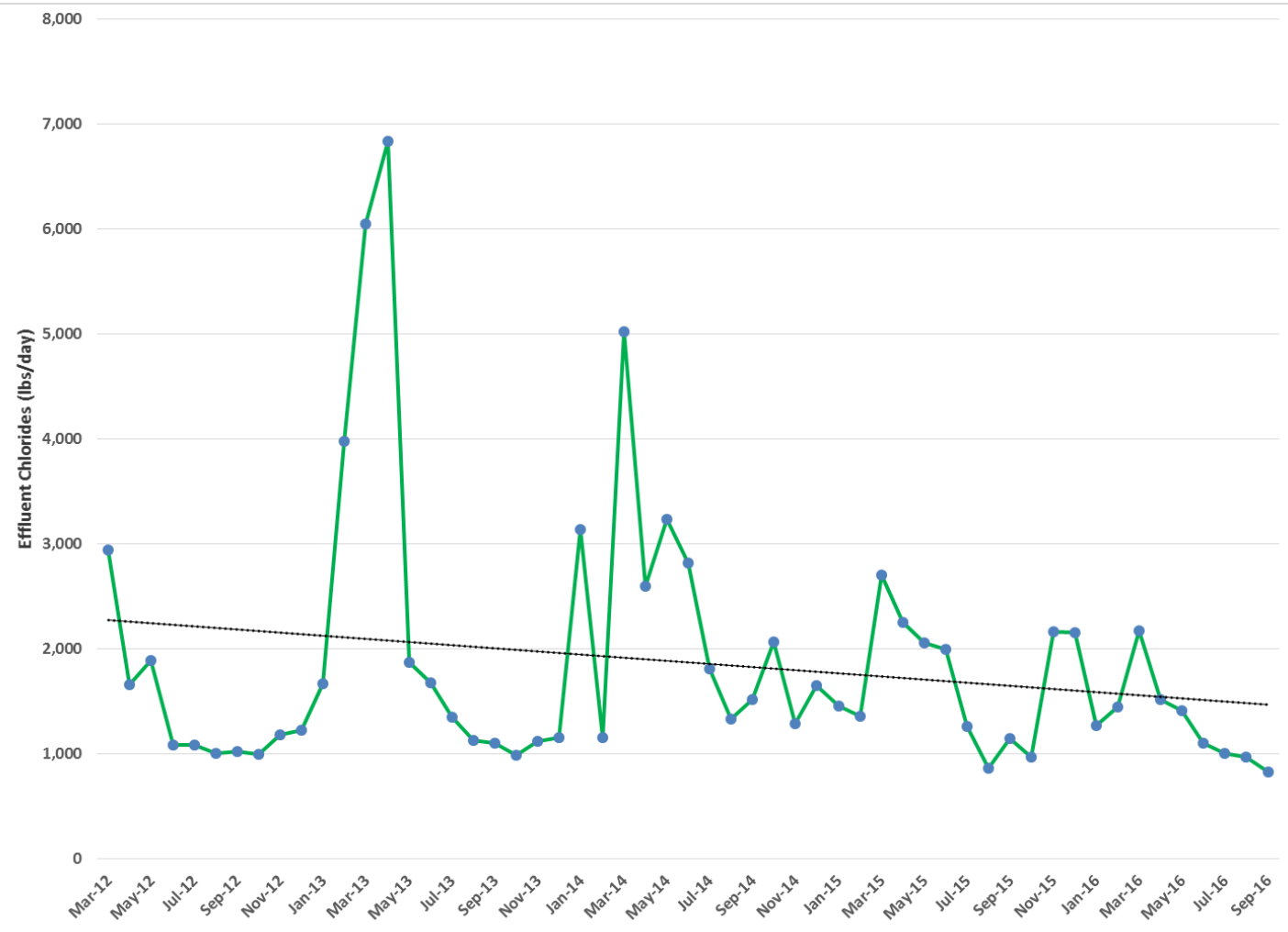
Automated
Operation
Brine Reclaim 25 %
Reduction
Cost to School-
\$50,000



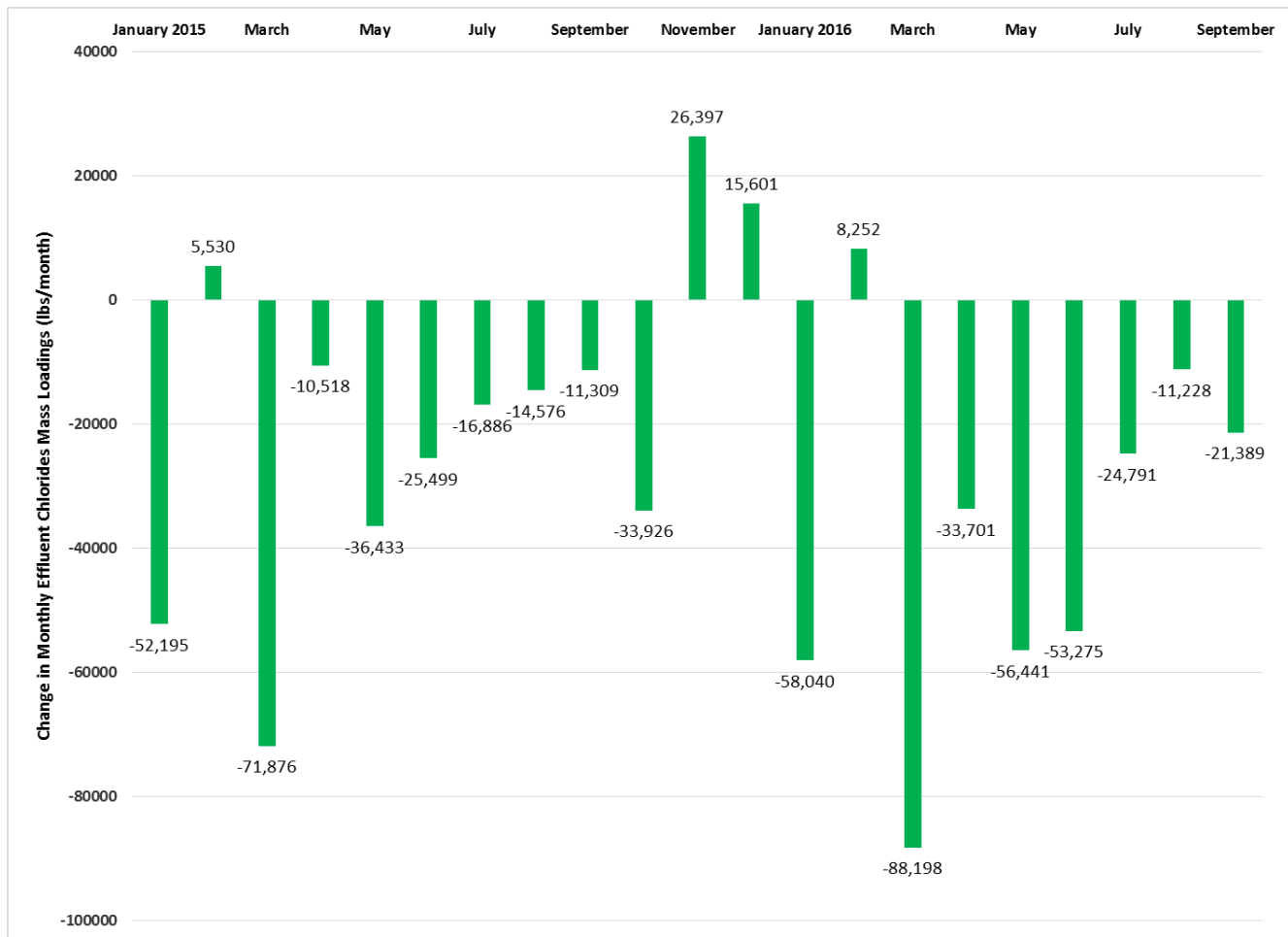
Effluent Chloride Concentrations



Long Term Trend-Effluent Chlorides



Annual Comparison 2014 to 2015 and 2016



Annual Reduction
110 Tons of Chlorides
(2015 to 2014)

Projected Reduction
225 of Tons of
Chlorides
(2016 to 2014)



Questions

