



# Zebra Mussel Mitigation Update

February 13, 2019

Rick Coronado, P.E., Assistant Director - Operations

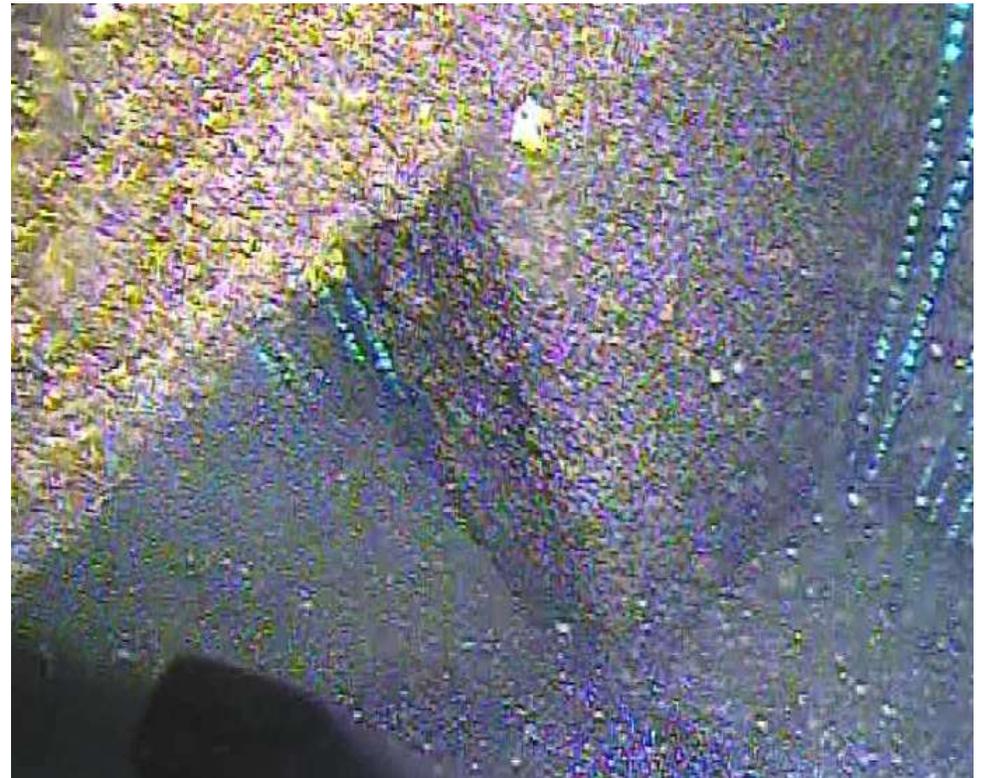


- Jun 2017            Mussels Detected in Lake Travis
- Aug 2017            Lake Travis Declared Infested  
                         Mussels Detected in Lake Austin
- Sep 2017            Initial Presentation to W&WW Commission  
<http://www.austintexas.gov/edims/document.cfm?id=283697>
- Nov 2017            Inspected All Intakes  
                         No Mussels at Ullrich or Davis WTPs  
                         Few Mussels on the Upper Screen of Handcox WTP



Handcox WTP Upper Intake Rim  
November 28, 2017

- |          |  |
|----------|--|
| Feb 2018 | Lake Austin Declared Infested  |
| Mar 2018 | Issued NTP to Black & Veatch to Investigate Zebra Mussels Mitigation Techniques  |
| May 2018 | Contract With Underwater Construction Corporation to Inspect & Clean All Intakes |
| Oct 2018 | Stakeholder Workshop With B&V<br>Boil Water Notice                               |
| Sep 2018 | Handcox WTP Top Intake Screen 100% Covered                                       |



Handcox WTP Upper Intake Screen  
September 2018

Jan, 2019

B&V Finalized the PER

Divers Removed ½"-2" Thick Layer of  
Mussels From All Intakes

Discovered Mussels in the Ullrich Raw Water Pipeline

Feb, 2019

Taste & Odor After Ullrich's Pipeline Was Placed in Service



Ullrich WTP Pump Isolation Gate  
January 7, 2019

## Lake Austin Temperatures

—●— Min. —●— Max.

Active Spawning 16-30 °C

Ideal Spawning 20-25 °C



JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER

## Lake Travis Temperatures

—●— Min. —●— Max.

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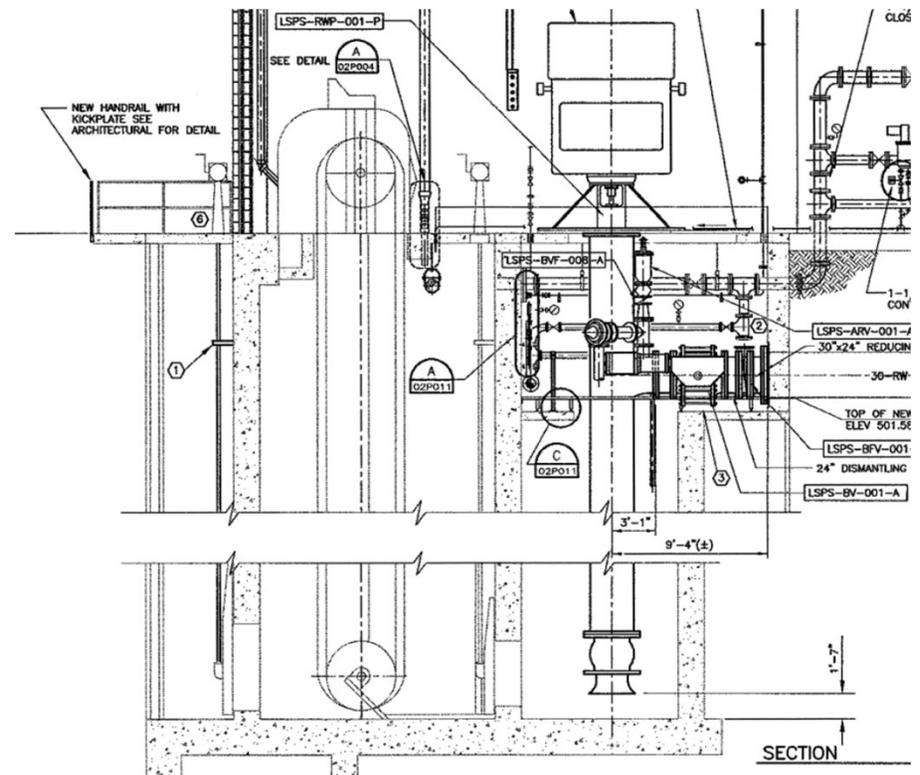
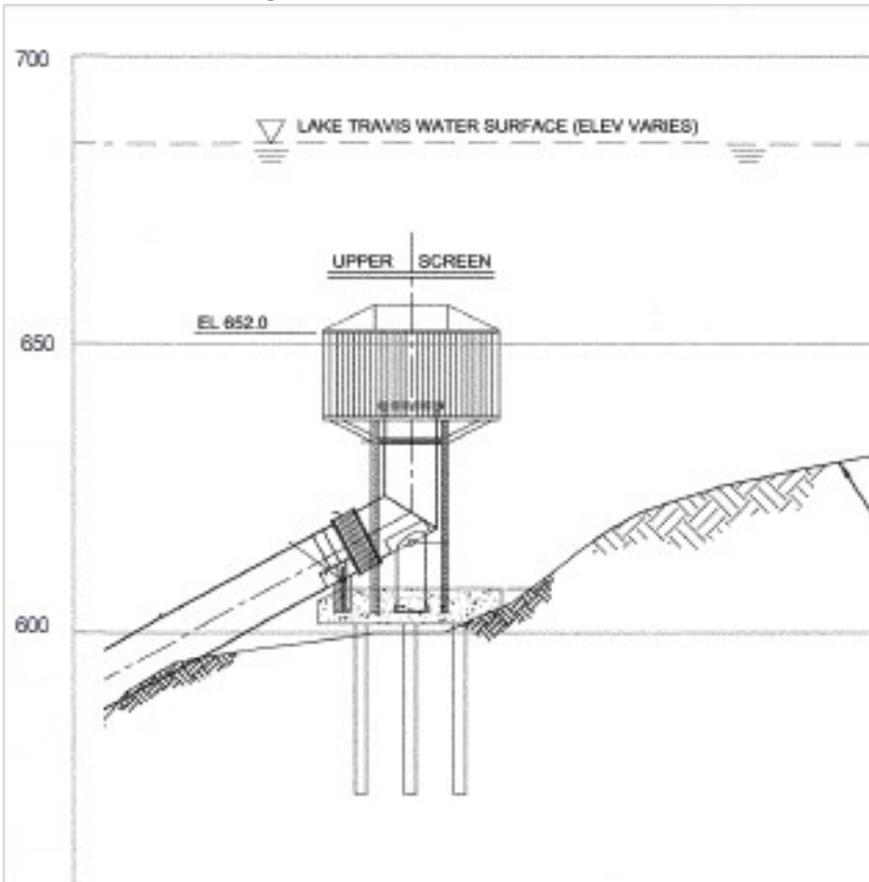
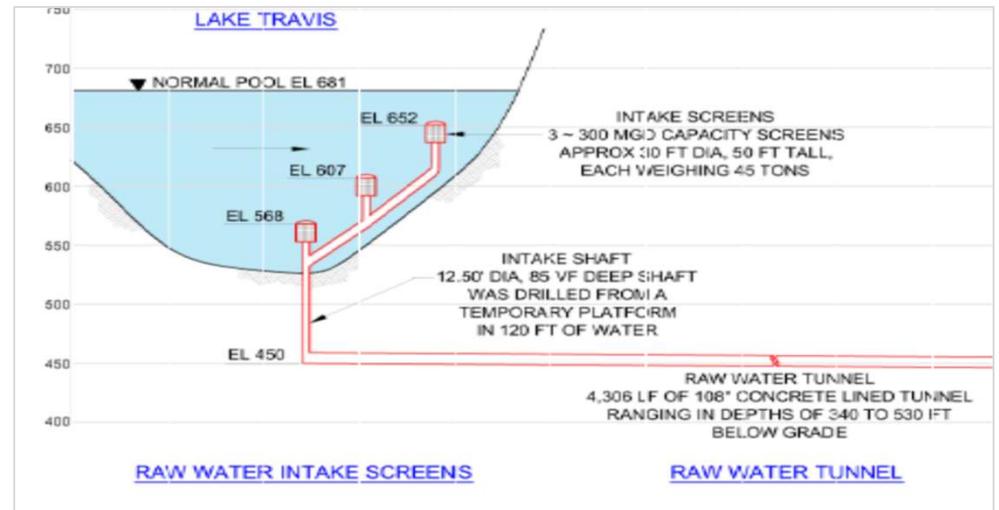
Ideal Spawning 20-25 °C



JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER

# Intake Cleaning & Inspection

- Targeted Service every 3-6 months
  - Davis WTP
  - Ullrich WTP
  - Handcox WTP
  - Emma Long WTP
  - River Place Intake
  - Longhorn Dam



## Zebra Mussels can:

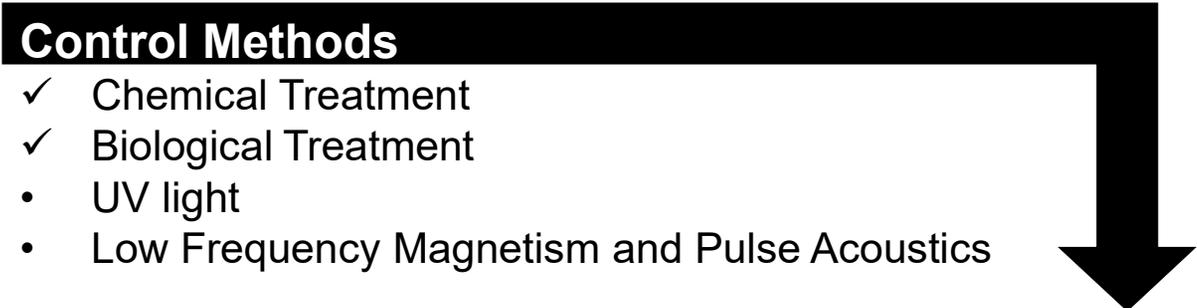
- Restrict intake structures and pipelines
  - Reducing plant capacity
  - Increasing energy consumption
- Cause Taste and Odor issues
  - Directly through decaying dead mussels
  - Indirectly by increasing the population of blue-green plankton
- Damage pumps and valves



## Preventative Methods

- Repellent Materials
- Coatings
- Filters and Screens

## Control Methods



- ✓ Chemical Treatment
- ✓ Biological Treatment
- UV light
- Low Frequency Magnetism and Pulse Acoustics

## Reactive Methods

- ✓ Physical / Mechanical Removal
- Pressure Washing
- Dewatering
- Oxygen Deprivation

## Treatment Mitigation Methods Evaluated:

- Chlorine
- Chloramines
- Chlorine Dioxide
- Ozone
- Polymer
- PAC
- Sodium or Potassium Permanganate
- Copper Ionization
- Copper-Based Molluscicides
- Biological Molluscicides

## Control Strategies Implemented by Other Texas Utilities

Table 4-1

UTILITY	ZEBRA MUSSEL MITIGATION STRATEGY
Upper Trinity Regional Water District	Sodium permanganate
City of Lewisville	Copper ionization
Dallas Water Utilities	Sodium permanganate
City of Denton	Sodium permanganate (in operation) Copper ionization (in progress)
Tarrant Regional Water District	Copper ionization (75 million gallons per day {mgd} pilot in progress)
North Texas Municipal Water District	No chemical control – existing pressure reducing sleeve valve at the intake prevents mussel attachment.

## Copper Ion Generation Selected for Implementation

- Adds 5 - 10  $\mu\text{g/L}$  of Copper Ion to Raw Water (Tap Action Level = 1.3 mg/L)
- Lime Softening Process removes Copper
- Smallest Footprint
- Lowest Life Cycle Cost
- 18 Months Design & Construction



20 MGD Copper Ion Generator  
Lawrence, KS

## **Current Measures Taken**

- Purchased sodium permanganate for Handcox WTP
- Directed Black & Veatch to design temporary permanganate feed systems for Ullrich and Davis WTPs
  - in the process of establishing a sodium permanganate contract
- Developing methods for evaluation of raw water pipelines
- Researching taste and odor mitigation methods
- Training O&M Technicians to perform Threshold Odor Number (TON) Test at every facility

