



# Fish Care Study

2019 Ontario B.A.S.S. Nation Qualifier



# Fish Care Study – Background

- There are three primary phases of Fish Care in Tournaments
  1. Competitor's Livewells
  2. Weigh-in Staging Troughs
  3. Live Release Boat
- All phases must be monitored to ensure proper fish care and to identify potential issues through the process.
- The three primary factors fish care success are oxygen, temperature and fish waste.



## Fish Care Study – Background

- During the 2019 OBN Qualifier on Rice Lake, Ontario Jason Barnucz (OBN Conservation Director) and Dave Spence (OBN President) carried out a study of the events fish care system.
- This was done in collaboration with the Canadian Sport Fishing League who were in charge of event operation
- This study included monitoring of the following:
  - Weigh-in Troughs
  - Live Release Boat
  - Competitor's Livewells



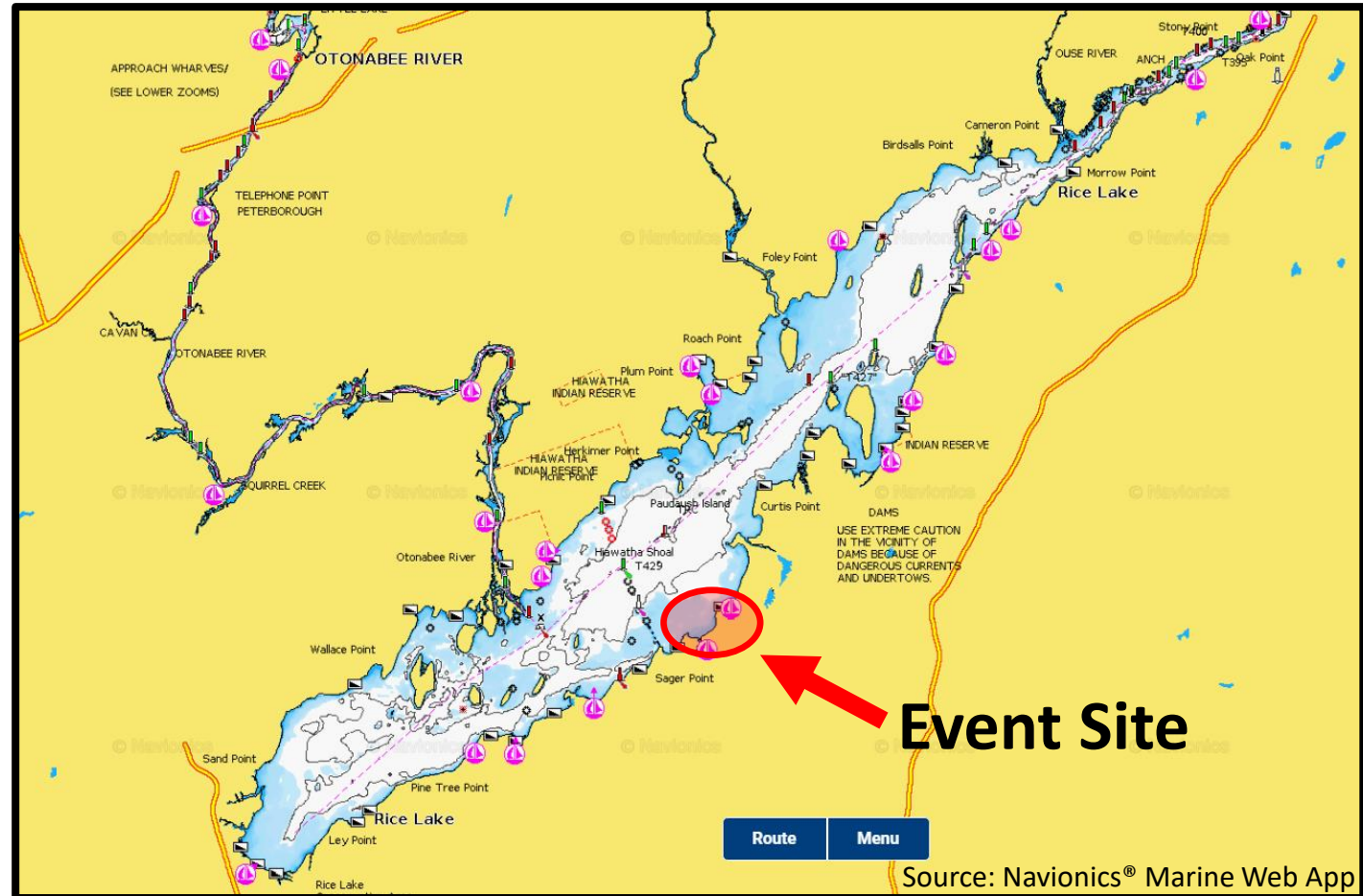
# Fish Care Study – Location



Rice Lake, Ontario

Area: ~10,000 hectares

From Toronto: ~100km drive NE





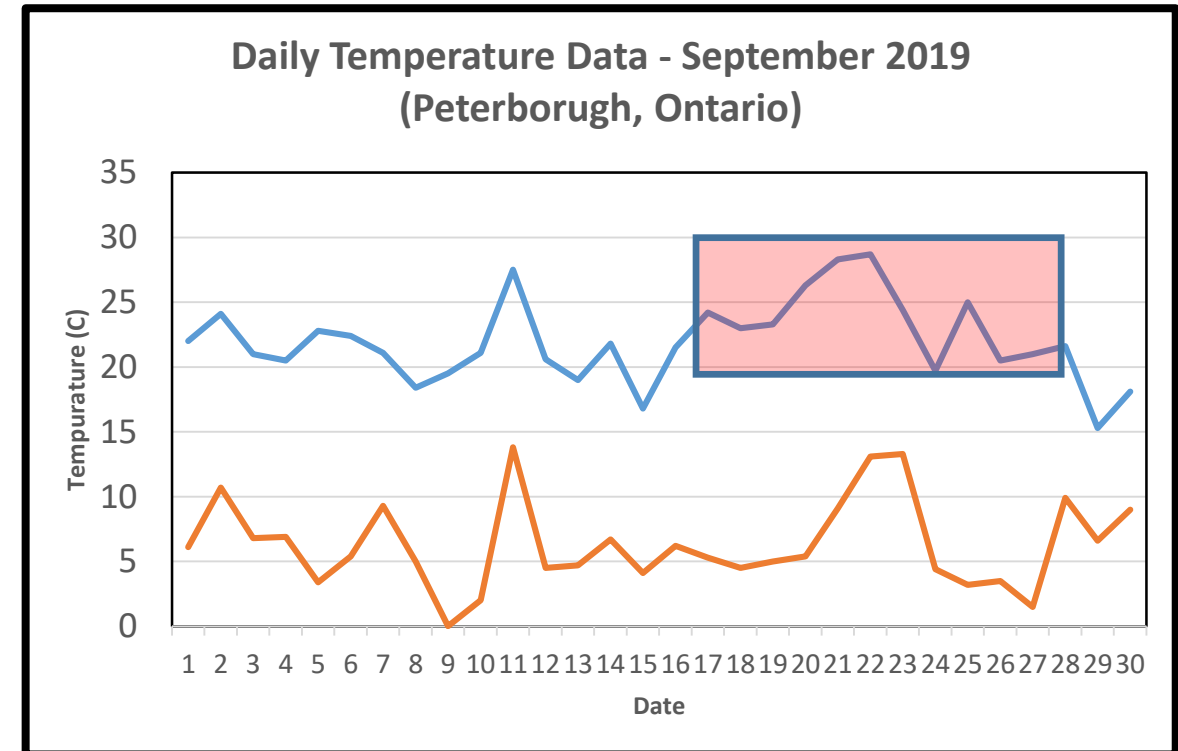
# Fish Care Study – Location

**Weather Station:** Peterborough, Ontario

**Dates of Event:** Sept 28<sup>th</sup> and 29<sup>th</sup> 2019

Value	Max Daily Temperature (°C)	Min Daily Temperature (°C)
Minimum	15.3	0
Mean	21.98	6.31
Max	28.7	13.8

\*September 2019 Temperature Data, Environment Canada



# Fish Care Study – Background

## Oxygen Meter and Optical Probe Model: YSI Pro DO



## Oxygen levels at the Event Site

- Day 1: 8.6 mg/L
- Day 2: 8.9 mg/L

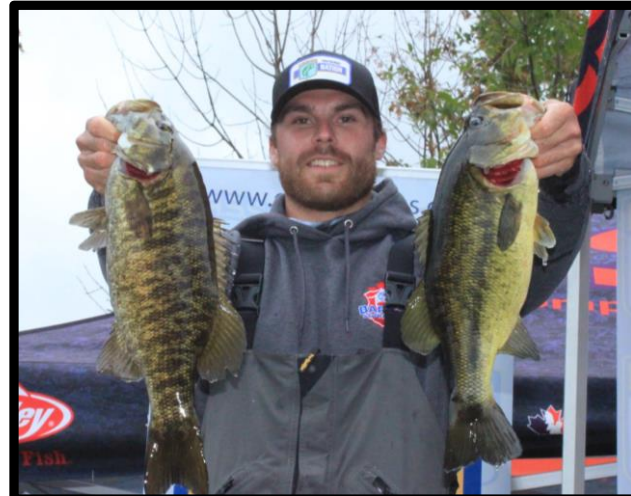
## Optical Oxygen Probes

Benefits: No membrane replacement, no electrolyte replacement, optical dissolved oxygen portable meters are easy to maintain.

Limitations: Exposure to alcohols and other organics must be limited to avoid damage to the sensor.



# Fish Care Study – Tournament Format



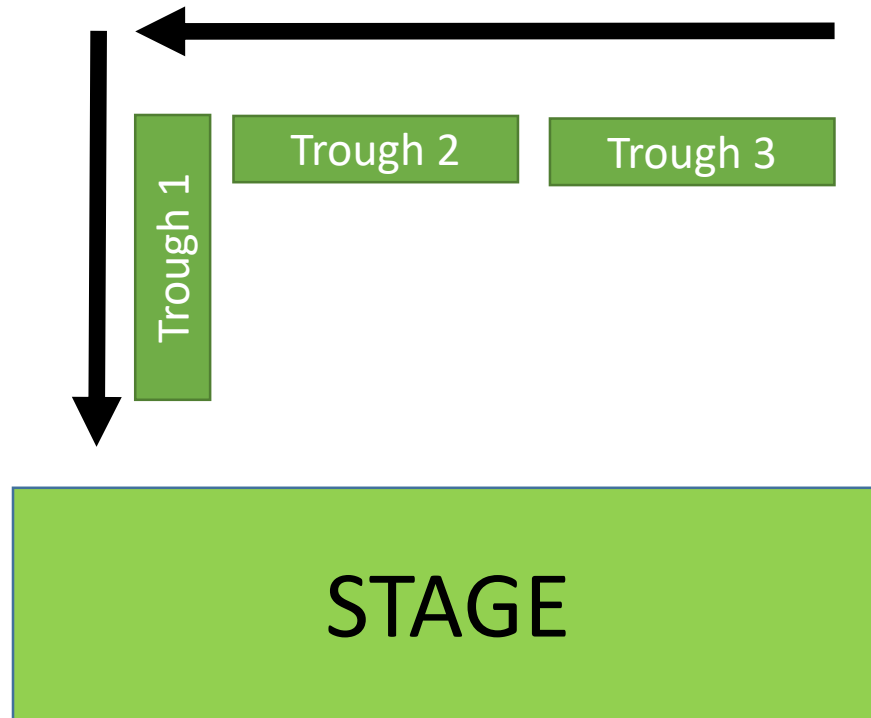
- Angler + Co-Angler
- 87 Boats
- Start: 7am, Check-In: 3pm
- Weigh-in Period: ~2-3hrs
- Limits:
  - Anglers: 3 Fish
  - Co-Anglers: 2 Fish
- Mixed Fishery
  - Largemouth Bass
  - Smallmouth Bass



# Fish Trough Monitoring

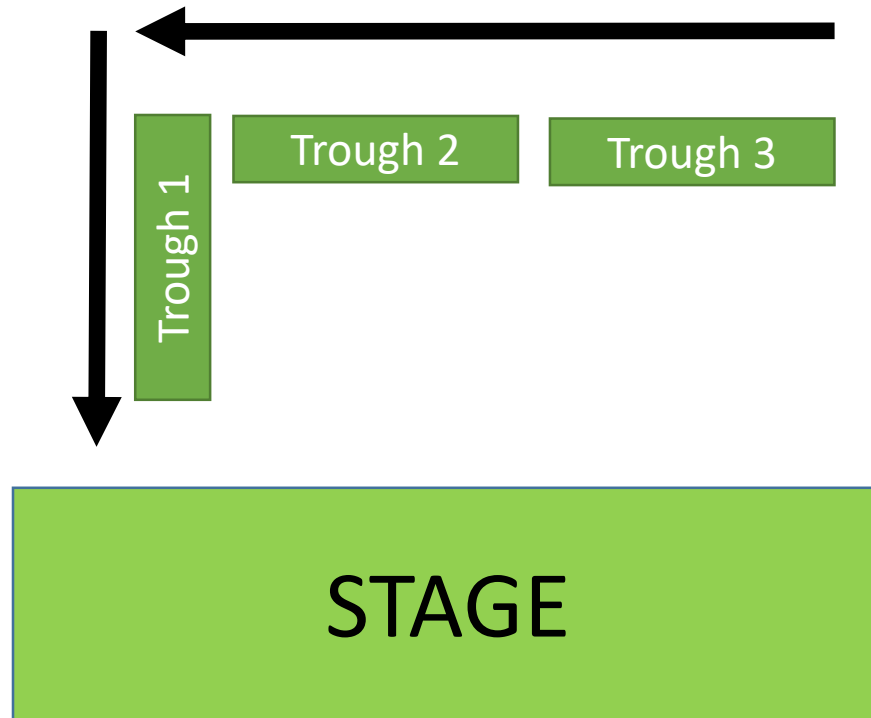


# Fish Care Study – Fish Troughs



- All troughs were filled at 1400hrs
- Water supply was a an aquifer/artesian well.
- The baseline oxygen was 6.5 mg/L.

# Fish Care Study – Fish Troughs



- Troughs 1 and 2 included aeration and additional raw oxygen at a rate of 1 L/min.
- Trough 3 was only aeration.



*Aerator and Stone*



*Oxygen Flow Meter*

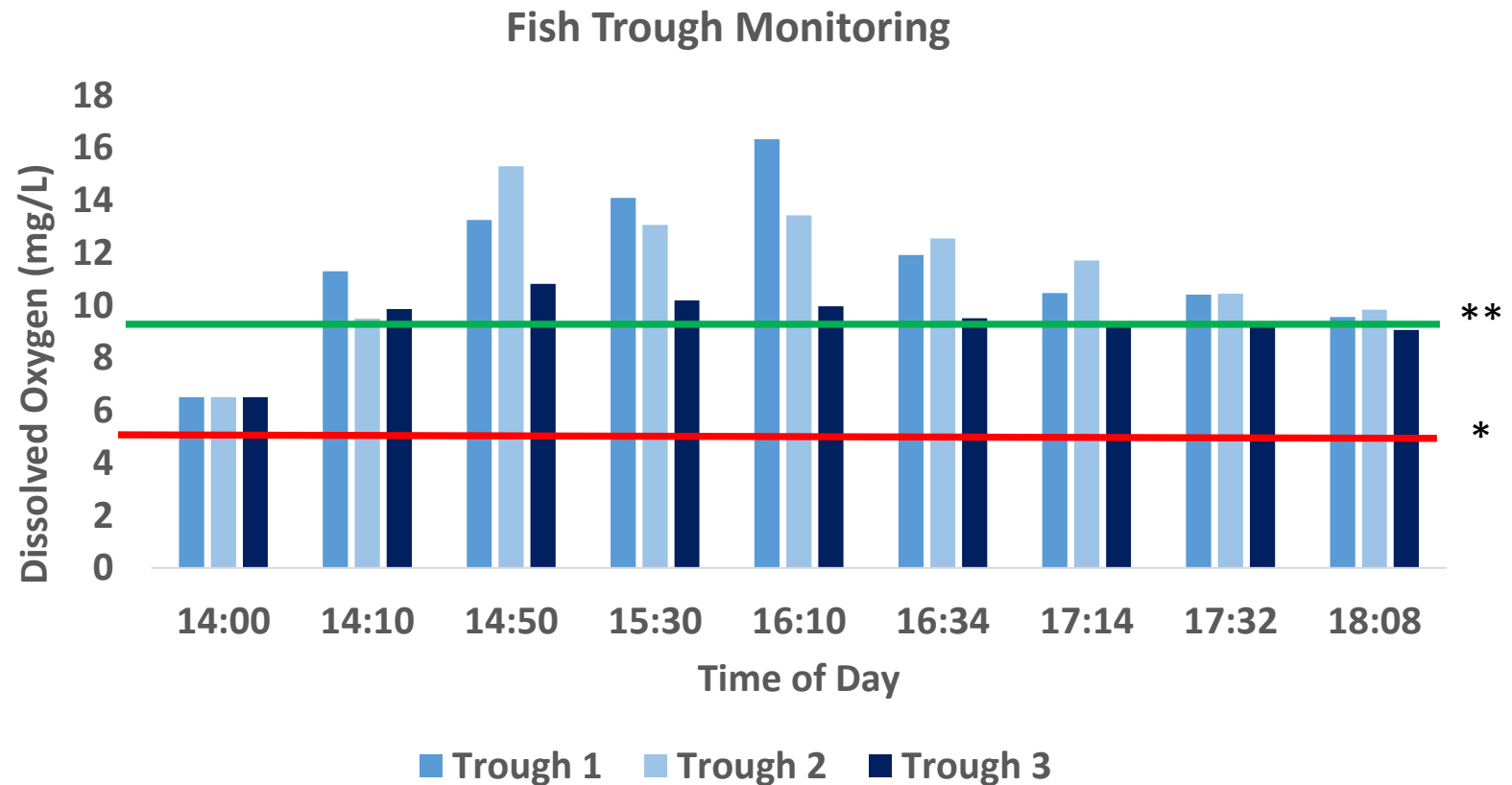
# Fish Care Study – Fish Handling Troughs

## Observations

### Trough 1

(O<sub>2</sub> + aeration)

- Start: 6.5mg/L
- Peak: 16.32 mg/L
- End: 9.55 mg/L



*\*5 mg/L: Critical value for Keeping Bass Alive, \*\*~8.5 mg/L: Dissolved Oxygen at Tournament Site*



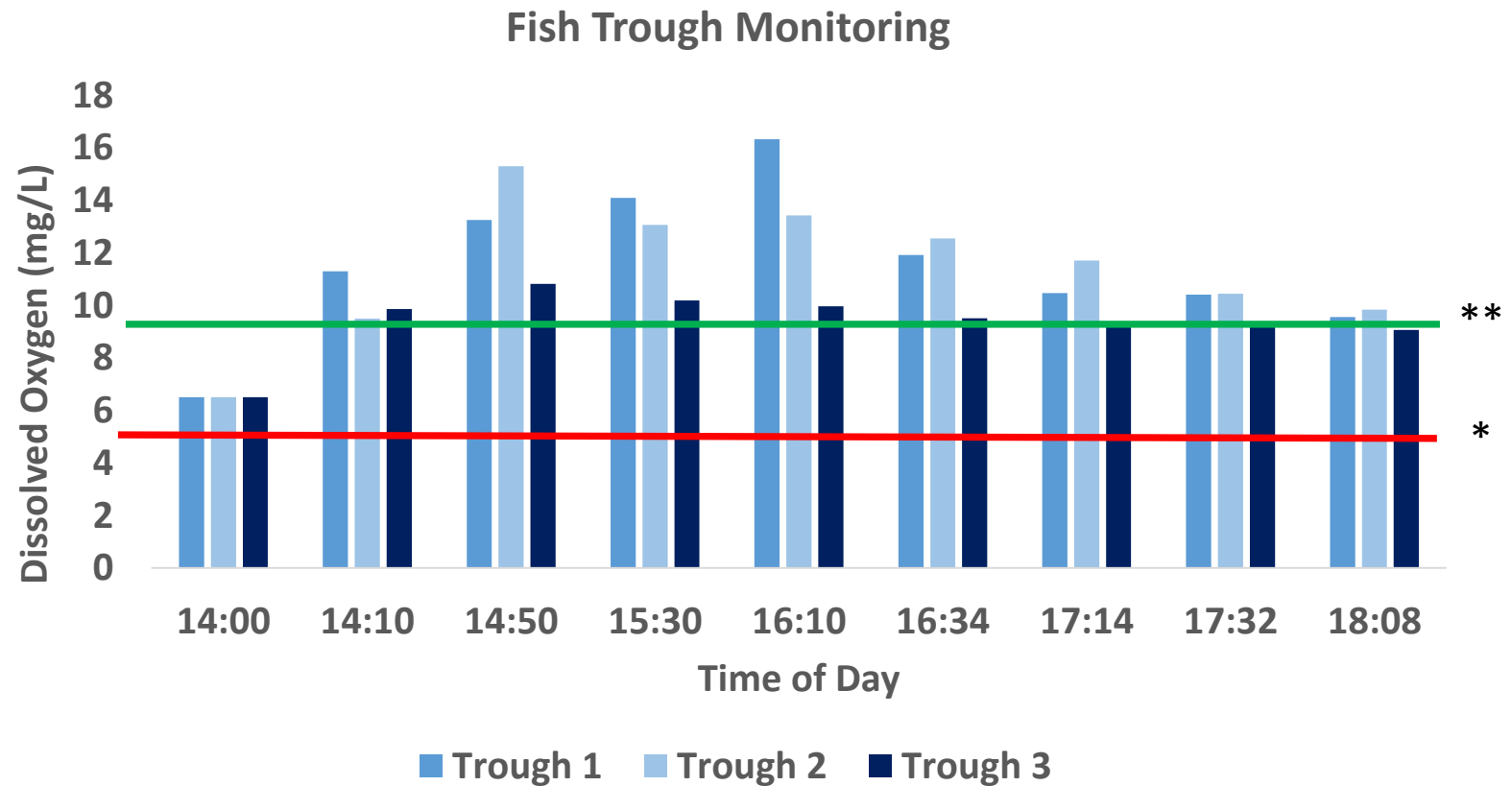
# Fish Care Study – Fish Handling Troughs

## Observations

### Trough 2

(O<sub>2</sub> + aeration)

- Start: 6.5mg/L
- Peak: 13.42 mg/L
- End: 9.83 mg/L



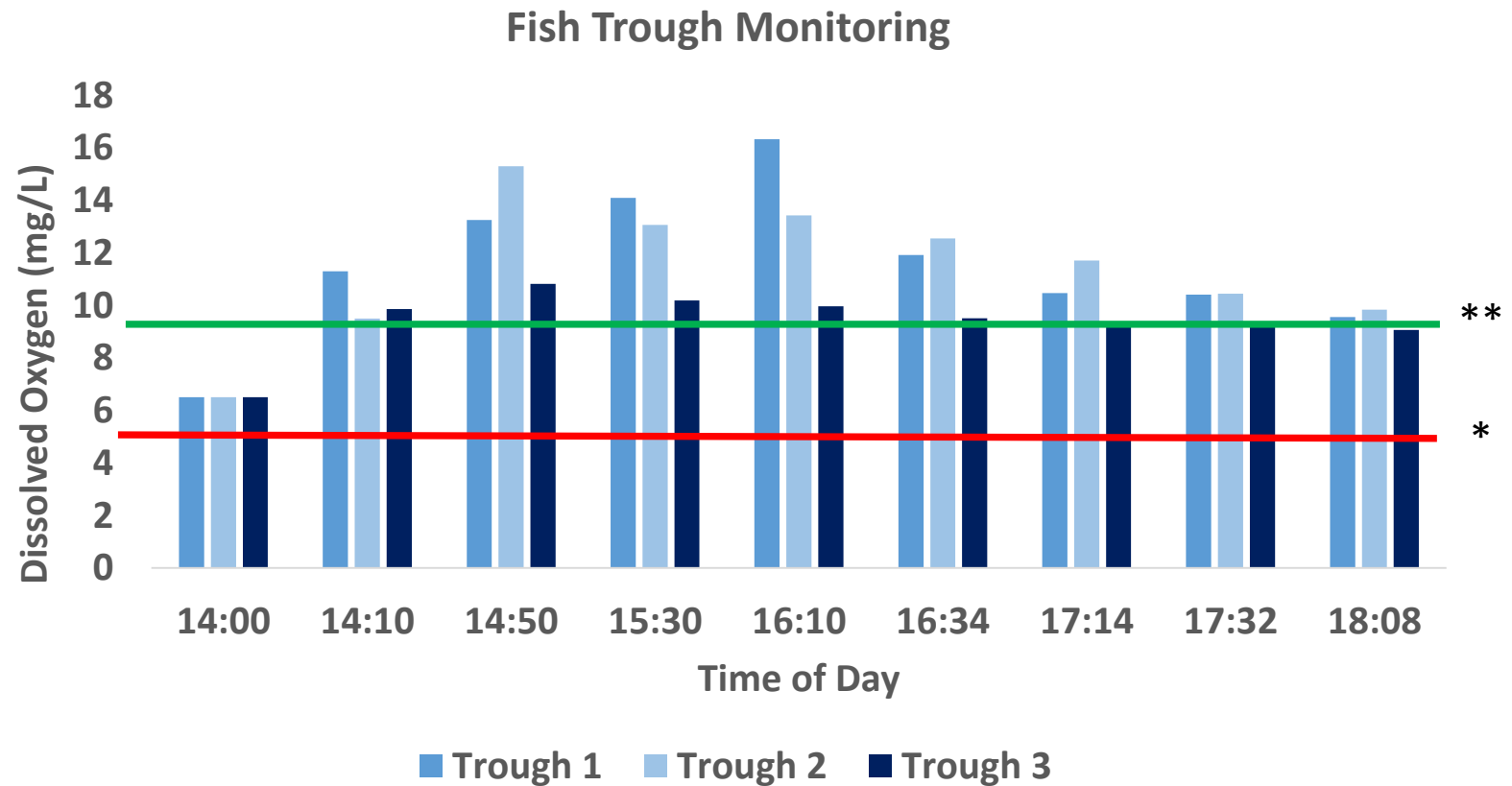
*\*5 mg/L: Critical value for Keeping Bass Alive, \*\*~8.5 mg/L: Dissolved Oxygen at Tournament Site*

# Fish Care Study – Fish Handling Troughs

## Observations

Trough 3  
(only aeration)

- Start: 6.5 mg/L
- Peak: 10.82 mg/L
- End: 9.06 mg/L.



*\*5 mg/L: Critical value for Keeping Bass Alive, \*\*~8.5 mg/L: Dissolved Oxygen at Tournament Site*



# Fish Care Study – Fish Handling Troughs

## Results – Weigh-in Trough Monitoring

- Fish care management in the troughs exceeded what is recommended for competitive bass tournaments.
- Monitoring and maintaining oxygen levels throughout the event was important as fluctuations were observed.
- Monitoring oxygen levels and using proper regulators can reduce oxygen use and result in cost/time savings for tournament organizers.





# Live Release Boat Monitoring

# Fish Care Study – Live Release Boat

## Boat Setup

- The CSFL Live Release Boat was filled with the same water as the troughs.
- The boat was operated by two volunteers throughout both days of the event.
- Live Release Boat was equipped with oxygen and aeration systems.



*Aerator and Stone*



*Flow Meter*

# Fish Care Study – Live Release Boat

## Boat Setup

- Baseline oxygen in the tanks was  $\sim 7$  mg/L at 1500hrs.
- Oxygen regulators were set at 1L/min.
- The levels were monitored through the event.



*Aerator and Stone*



*Flow Meter*

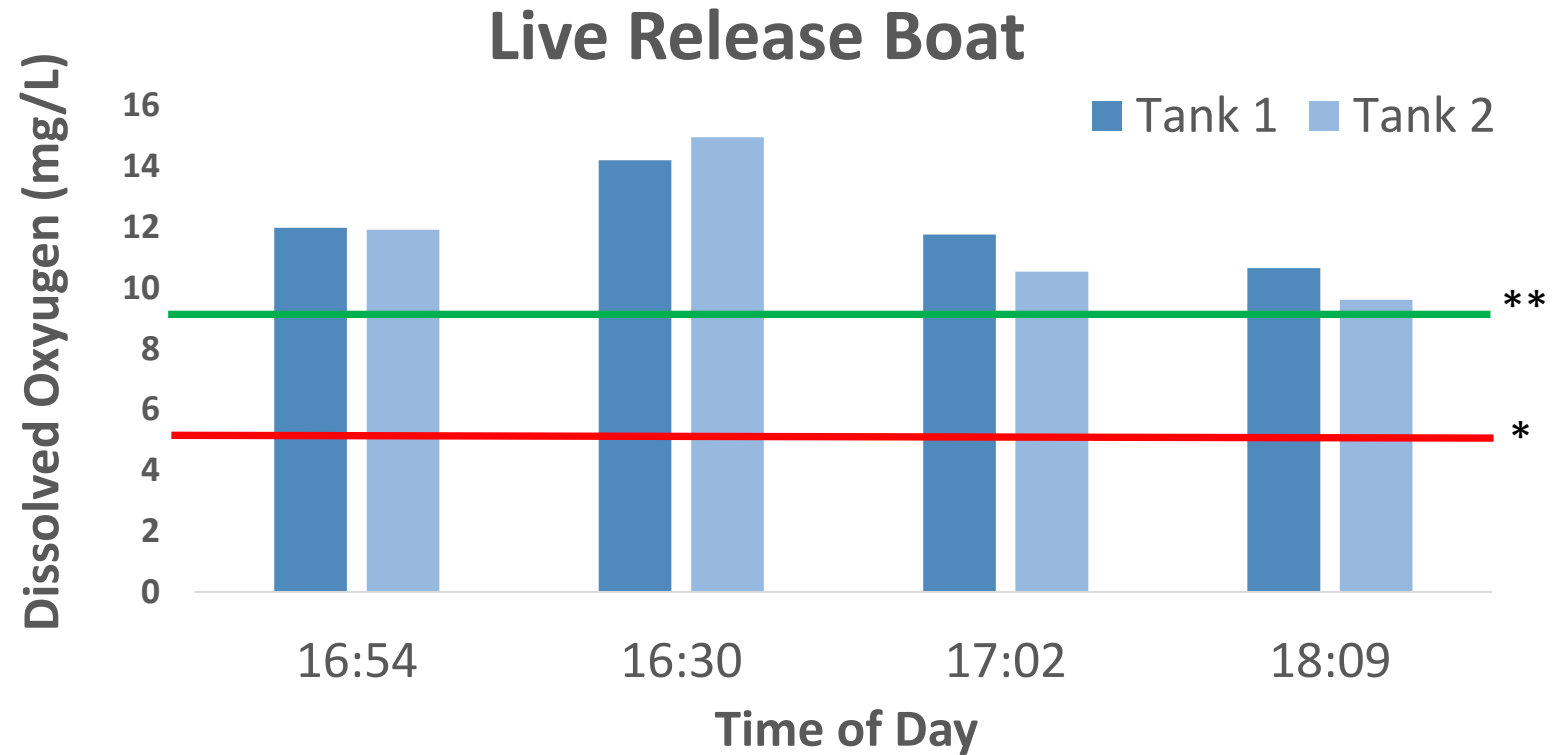




# Fish Care Study – Live Release Boat

## Observations

- First check: 12 mg/L
- Peak: 14.96 mg/L
- Final check : 9.21mg/L
- Fish were divided equally per tank.
- One release dump per day.



*\*5 mg/L: Critical value for Keeping Bass Alive*

*\*\*8.5 mg/L: Dissolved Oxygen of Tournament Site*



# Fish Care Study – Live Release Boat

## Results – Live Release Boat Monitoring

- Live Release Boat oxygen levels were maintained above recommended levels.
- There was additional capacity if needed but was not required for this event.



# Live Well Monitoring



# Fish Care Study – Live Well Monitoring

## Methods

- Competitor boats were selected at random during the weigh-in each day.
- Boats were surveyed as time allowed between monitoring troughs and live release boat.





# Fish Care Study – Live Well Monitoring

## Methods

- Observations recorded included the boat number and the dissolved oxygen level of all livewells, whether divided or undivided.





# Comparing Day 1 and Day 2 Livewell Oxygen Levels







# Fish Care Study – Live Well Monitoring

A total of 67 livewells were checked at random during the event

- Day 1: 36 boats
- Day 2: 31 boats





# Fish Care Study – Live Well Monitoring

## Results

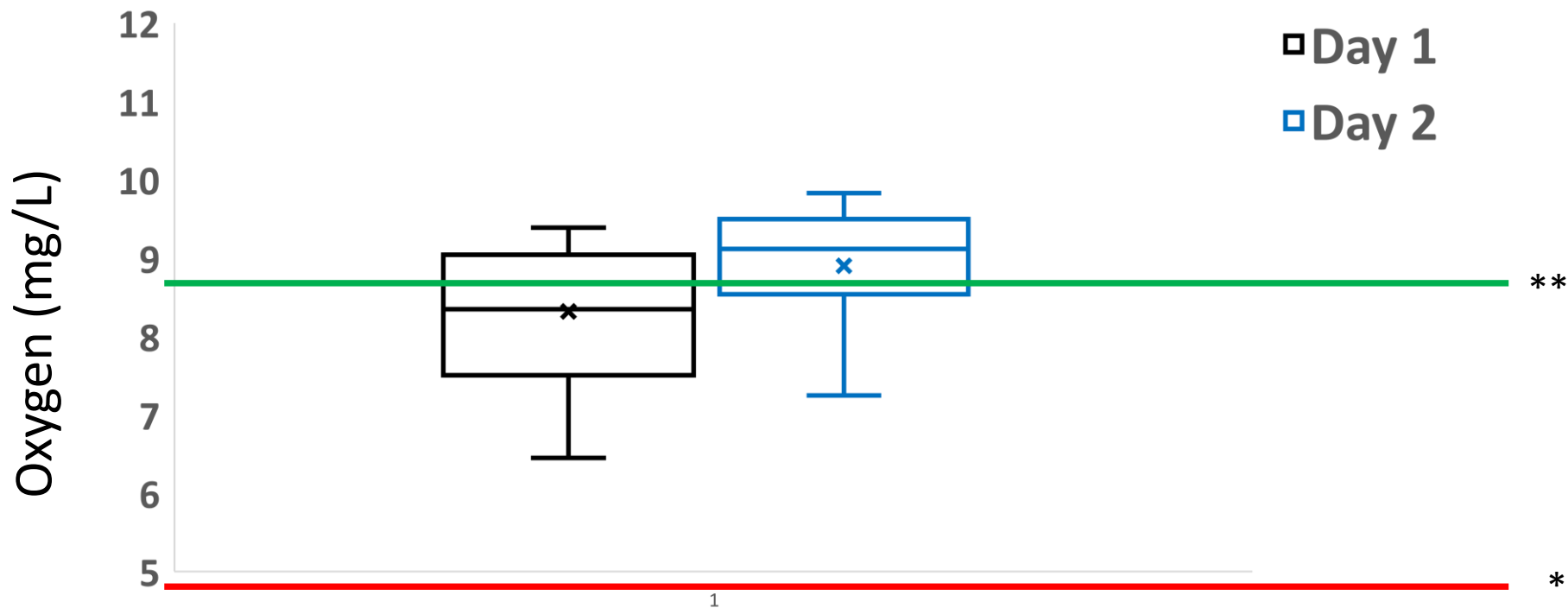
- Oxygen levels in livewells on Day 1 and Day 2 were sufficient.
- A significant difference was observed between Day 1 and Day 2.

	<u>Day 1</u>	<u>Day 2</u>
<b>No. of Boats</b>	36	31
<b>Minimum</b>	6.45*	5.90*
<b>Mean</b>	<b>8.3</b>	<b>8.9</b>
<b>Maximum</b>	11.98	9.83

*\*5 mg/L: Critical value for Keeping Bass Alive, \*\*~8.7 mg/L: Dissolved Oxygen at Tournament Site*



# Fish Care Study – Live Well Monitoring



*\*5 mg/L: Critical value for Keeping Bass Alive, \*\*~8.7 mg/L: Dissolved Oxygen at Tournament Site*



# Fish Care Study – Live Well Monitoring

## Results - Livewell Monitoring

- The mean oxygen level on Day 1 was below event site levels.
- Several competitors assumed the oxygen at the site was insufficient and operated livewells on recirculation and not using the fill/auto setting.
- Competitors were advised to reduce their use of recirculation and rely more on auto/fill to manage livewells.
- The observed result of this guidance was a significant difference in oxygen levels was observed on Day 2.



# Comparing Day 1 and Day 2 Individual Livewells



# Fish Care Study – Live Well Monitoring

## Methods

- Livewells from 14 competitors were compared between Day 1 and Day 2 to determine if a difference was observed.







# Fish Care Study – Live Well Monitoring

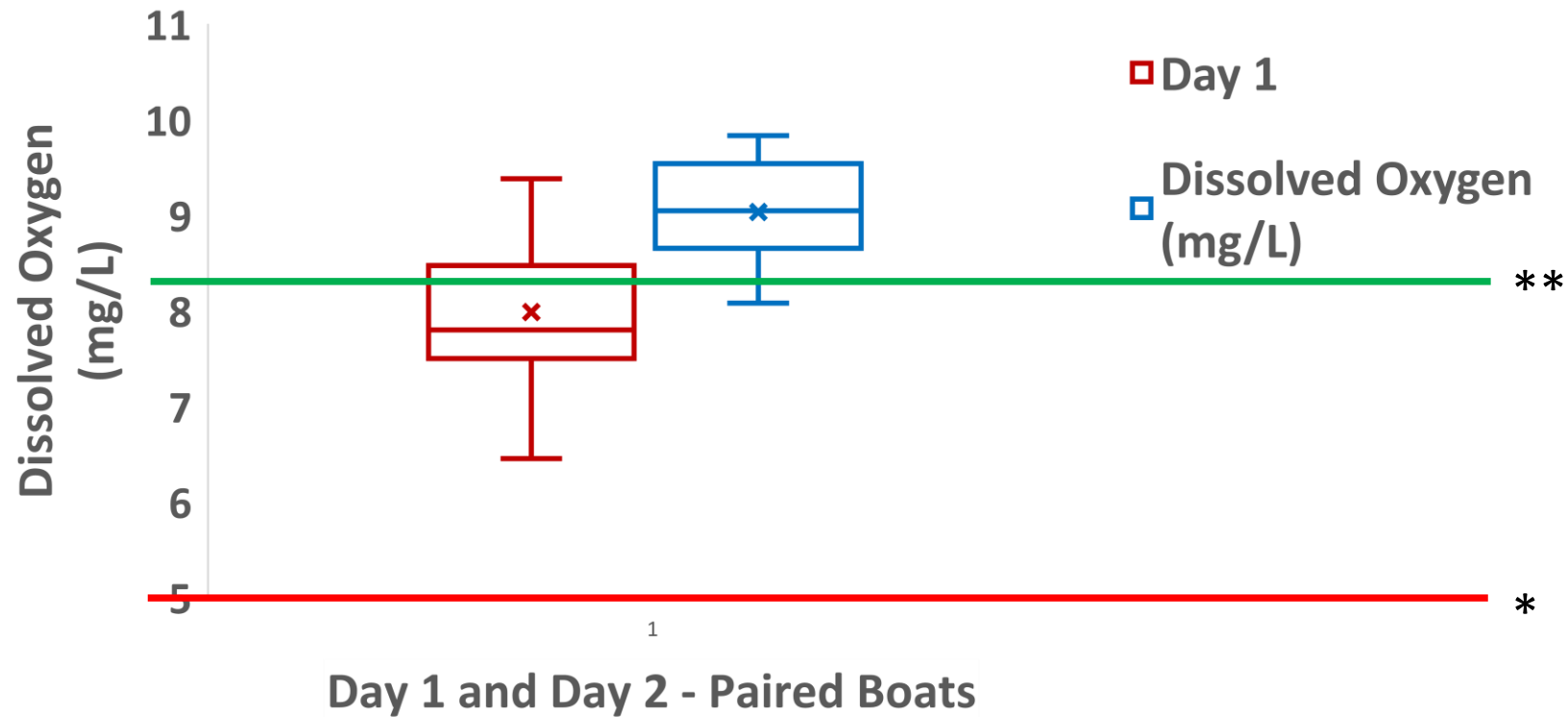
## Results of Individual Boats

- There was a significant difference observed between the oxygen levels between Day 1 and Day 2.

	<u>Day 1</u>	<u>Day 2</u>
<b>Sample</b>	14	14
<b>Minimum</b>	6.45*	8.08*
<b>Mean</b>	<b>7.99</b>	<b>9.03</b>
<b>Maximum</b>	9.38	9.83

*\*5 mg/L: Critical value for Keeping Bass Alive, \*\*~8.7 mg/L: Dissolved Oxygen at Tournament Site*

# Fish Care Study – Live Well Monitoring



*\*5 mg/L: Critical value for Keeping Bass Alive, \*\*~8.7 mg/L: Dissolved Oxygen at Tournament Site*



# Tournament Fish Care Management Recommendations





# Fish Care Study – Live Well Monitoring

## Fish Trough Management Recommendations

- Organizers must have an ample supply of good quality water to fill troughs in advance of the weigh-in.
- Having water pumps/hoses on hand to for filling troughs and to provide effective water changes is recommended.
- Using raw oxygen for fish care at a live release tournament is vital. Raw oxygen components (regulators, hoses, fittings etc.) is an investment that pays big dividends.
- *Oxygen is highly flammable!* Competitors need to be informed and organizers need to take precautions.





# Fish Care Study – Live Well Monitoring

## Livewell Release Boat Management Recommendations

- Follow the procedure of 1lb of bass per gallon of tank water.
- Always monitor oxygen levels to make sure capacity is not exceeded in the live release boat holding tanks.
- If only **one** live release is used organizers should consider stand-by tanks. This allows a live release boat to leave release fish and return without holding up the event OR cause ill effects on caught fish.
- Double handling of fish with stand-by tanks is not optimal but can be done if needed.



# Fish Care Study – Live Well Monitoring

## Livewell Management Recommendations

- During tournaments competitors may rely too much on recirculation to manage livewells.
- Auto/Fill settings with short timing intervals is a better way to manage livewells for most situations.
- Competitors should have good working knowledge of their livewell system and make sure their system is in good working order.
- Primarily pumps and batteries should be serviced and monitored to ensure livewells will operate effectively.



# Fish Care Study – Live Well Monitoring

## Tournament Site Management and Information

- Many competitors may assume oxygen levels at an event staging areas are poor and manage livewells using recirculation.
- Having knowledge of water quality at an event site, especially the conditions in the boat staging area, can provide valuable insight to livewell management for competitors.
- Tournament organizers should be communicating with competitors information about livewell management during the weigh-in staging process of events.



# Fish Care Study – Live Well Monitoring

## Next Steps - 2020 Ontario B.A.S.S. Nation Qualifier

- The 2020 Ontario B.A.S.S. Qualifier will be held at the same location at the same time of the year.
- A review is underway to possibly increase limits from 3/2 (Angler/Co-angler) to 4/3 to better mirror the B.A.S.S. Nation limits of 5/3.
- This will be discussed by the Ontario B.A.S.S. Nation Board of Directors and Tournament Organizers.
- Information from this study will help to inform this decision.