

**Milner Reservoir: Bass tournament
Dissolved oxygen and water temperatures during live fish weigh-in
September 13, 2014**

SUMMARY

The Idaho Department of Fish and Game (IDFG) monitored a bass tournament on Milner Reservoir on September 13, 2014. The purpose of the monitoring was to meet a request by the tournament organizers to evaluate custom modifications made to the live fish weigh in process. Specifically, the club(s) designed and implemented an oxygen supplementation system with the intention to minimize stress on tournament caught fish during the weigh-in process.

The IDFG evaluated water temperatures and dissolved oxygen (mg/l) at various stages of the weigh-in process. Four main “stations” were sequentially evaluated throughout the weigh-in: 1) Station 1 – water bath with oxygen supplementation lines, 2) Station 2 – tank on the right of the scale where creel bag water was poured into a sink, 3) Station 3 – tank on the left of the scale where recycled water was captured from Station 2 and fish were held in creel transport bags, and 4) Station 4 – picture taking station where bass were kept in creel bags during the photo opportunities. Three typed of readings were taken at each station: 1) Random – readings were randomly taken at each station, 2) Arrive – readings were taken immediately upon the arrival of the creel to the station, and 3) Depart – readings were taken just before the creel was leaving that station.

Overall, the modifications implemented by the tournament holders to minimize low dissolved oxygen situations during the weigh-in were successful. Dissolved oxygen levels were relatively low (but rarely reached levels below 5 mg/l) when creel transport bags first arrived from the boats and prior to oxygen supplementation; however, after oxygen supplementation (i.e. Station 1), dissolved oxygen levels were generally at or exceeded those found in Milner Reservoir on the day of the tournament (water temperature=64.3 F; D.O.=10.3mg/l).

This report did not address fish survival impacts related to removing fish from the water during the actual weigh-in and only addressed suitable “habitat” during times fish were held in water.

INTRODUCTION

Bass tournaments with live fish weigh-ins involve extensive handling of hundreds of bass, depending on the number of teams competing. For example, if all teams were successful, a tournament with 50 teams would result in the handling of 250 bass. In most cases, the bass caught and held during tournaments represent the larger fish within a fishery. In Milner Reservoir, there may be 10-25 tournaments a year which represents the potential to handle 2,500-12,500 fish if all tournaments were of the same size and realized the same success as the above listed example. Poor handling (i.e. high mortality: direct or delayed) of these tournament caught bass could impact the very resource the bass clubs enjoy, and some of the local clubs recognize this potential outcome are doing what they can to minimize their impact.

In 2012, local fishing clubs built and implemented a live fish weigh-in process that involved a water tank as the weigh-in device (i.e. water table). The IDFG was invited to evaluate dissolved oxygen and water temperatures related to this alternative method of conducting a live fish weigh-in. Problem areas were identified during that evaluation and recommendations were made to improve the water table system. Ultimately the transport, setup logistics, and cost to secure a more precise scale to avoid ties in contests forced a local club to abandon the water table design and to consider modifications to their previous methods. The clubs used information gathered during the 2012 evaluation to enhance. Oxygen supplementation was incorporated into the standard “dry” weigh-in techniques and the IDFG was invited to evaluate the modified setup in 2014.

METHODS

The weigh-in process was stratified into four stations/locations. Station 1 was the first site tournament participants encountered. Anglers brought their creel in tournament sponsor provided transport bags and were asked to place the bags in a large tank filled with water and to then insert a tube that provided oxygen through an aquarium bubbler stone. Station 2 was a tub where anglers dumped the entire contents of the fish bag into this tub. Large fish were hand selected and dry weighed, and then the entire catch was dry weighed. Station 3 was a tub that held the creel transport bag that was refilled from a valve located on the tub found at Station 2. After full creel weights were obtained, fish were transferred from the dry weigh baskets into the newly refilled transport bag and then taken to Station 4 which was the photo opportunity location. Fish remained in the same recycled water from Station 3 until they were transferred to the transport boat. It’s important to note here that the water in Station 2 ultimately proved to be a mix of water from several transport bags since anglers did not refill their transport bags with the same amount of water they dumped in initially (i.e. they typically refilled their bags with less water than they had in the bags at Station 1).

Three different types of samples were collected at each station including: 1) Random - dissolved oxygen readings were taken at random times (data labeled “Random”) regardless of how long the catch was at the station, 2) Arrive – readings were recorded when the angler fish arrived at the station, and 3) Depart- readings were recorded just as the angler left that station. Dissolved oxygen and water temperature data were collected using a YSI 550A probe. Water temperatures were recorded many times; however, water temperatures were consistent throughout the event and therefore were not recorded at every instance. Dissolved oxygen and water temperatures were also recorded in Milner Reservoir as well as in the fish transport boat following the weigh-in event.

RESULTS

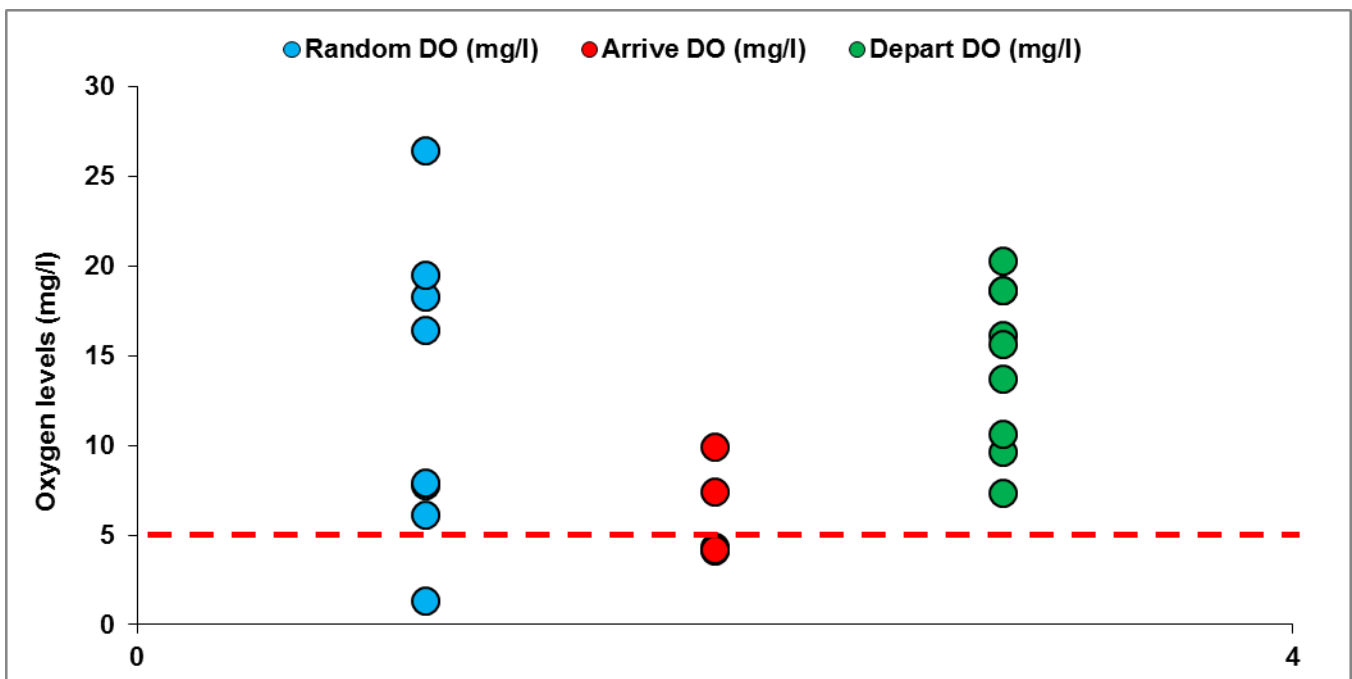
BASLINE

Milner Reservoir water temperatures and dissolved oxygen levels were 64.3 F and 10.3 mg/l, respectively.

STATION 1

Water temperatures were very consistent and ranged from 65-66 F. Dissolved oxygen ranged from 1.35 – 26.4 mg/l (Figure 1). Only 2 of 19 samples were documented below 5 mg/l which represents stressful levels for smallmouth bass. Dissolved oxygen levels were lowest when they first arrived at the Station and increased quickly once oxygen was introduced into the transport bag water. Generally, anglers stayed at this station approximately 5-7 minutes (observation, not timed).

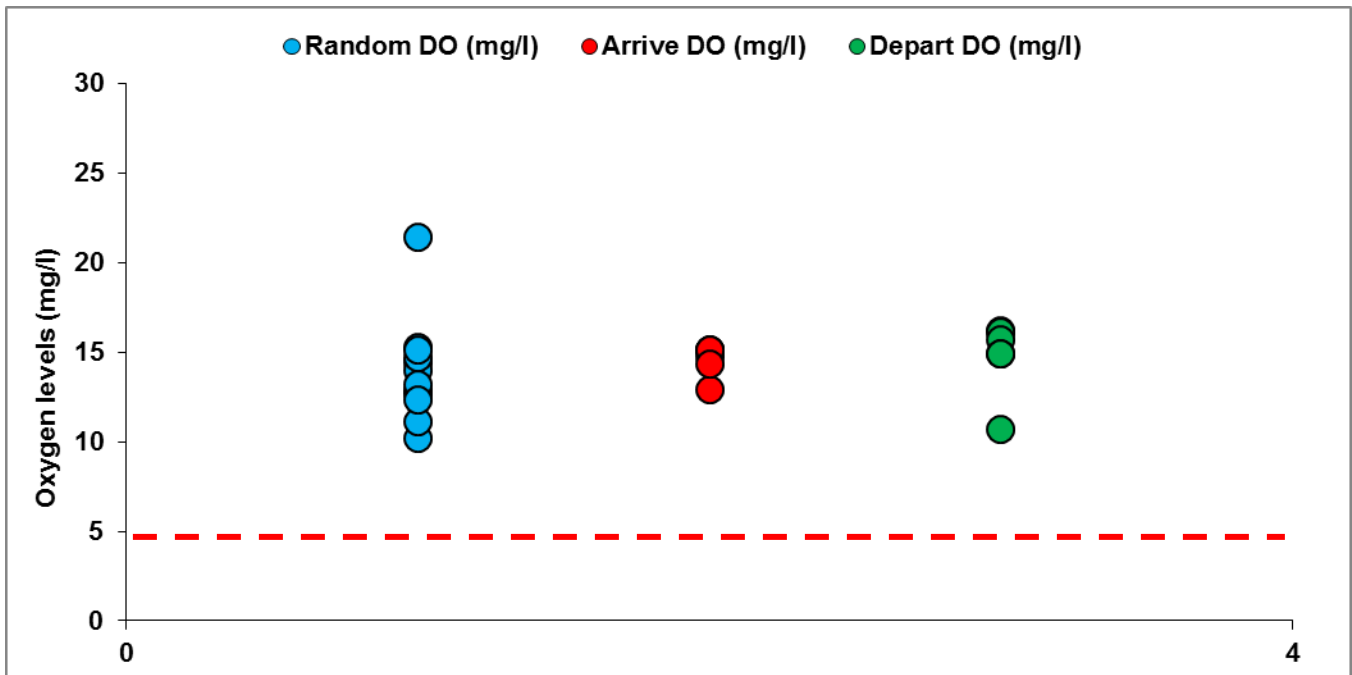
Figure 1. Dissolved oxygen measured at Station 1. Dashed red line depicts dissolved oxygen level where bass would be exposed to stressful conditions.



STATION 2

Water temperatures were very consistent and ranged from 65-66 F. Dissolved oxygen ranged from 1.35 – 26.4 mg/l (Figure 2). None of 15 samples were documented below 5 mg/l which represents stressful levels for smallmouth bass. Dissolved oxygen levels were lowest when they first arrived at the Station and increased slightly as oxygen rich water from Station 1 was introduced into the tank. Generally, anglers stayed at this station approximately 1 minute (observation, not timed).

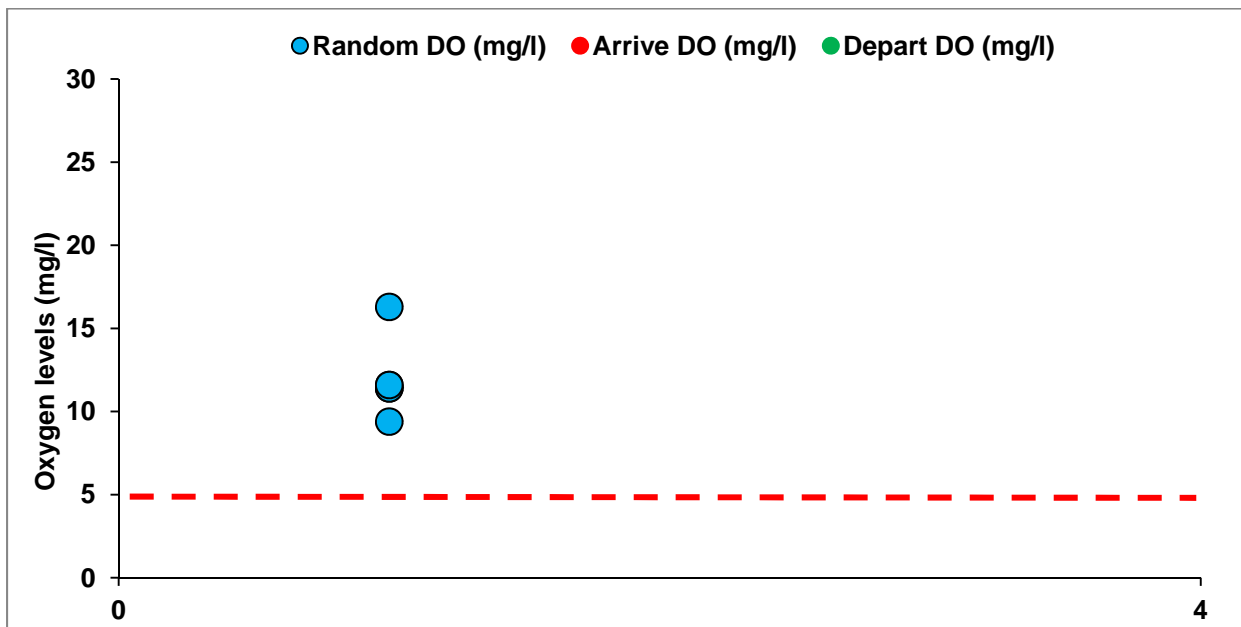
Figure 2. Dissolved oxygen measured at Station 2. Dashed red line depicts dissolved oxygen level where bass would be exposed to stressful conditions.



STATION 3

Water temperatures were very consistent and ranged from 65-66 F. Dissolved oxygen ranged from 1.35 – 26.4 mg/l (Figure 3). None of 4 samples were documented below 5 mg/l which represents stressful levels for smallmouth bass. We stopped sampling at this location earlier given the short duration of the stay at that station. Dissolved oxygen levels generally reflected the same levels as those documented in Station 2 at Departure. Generally, anglers stayed at this station less than 1 minute (observation, not timed).

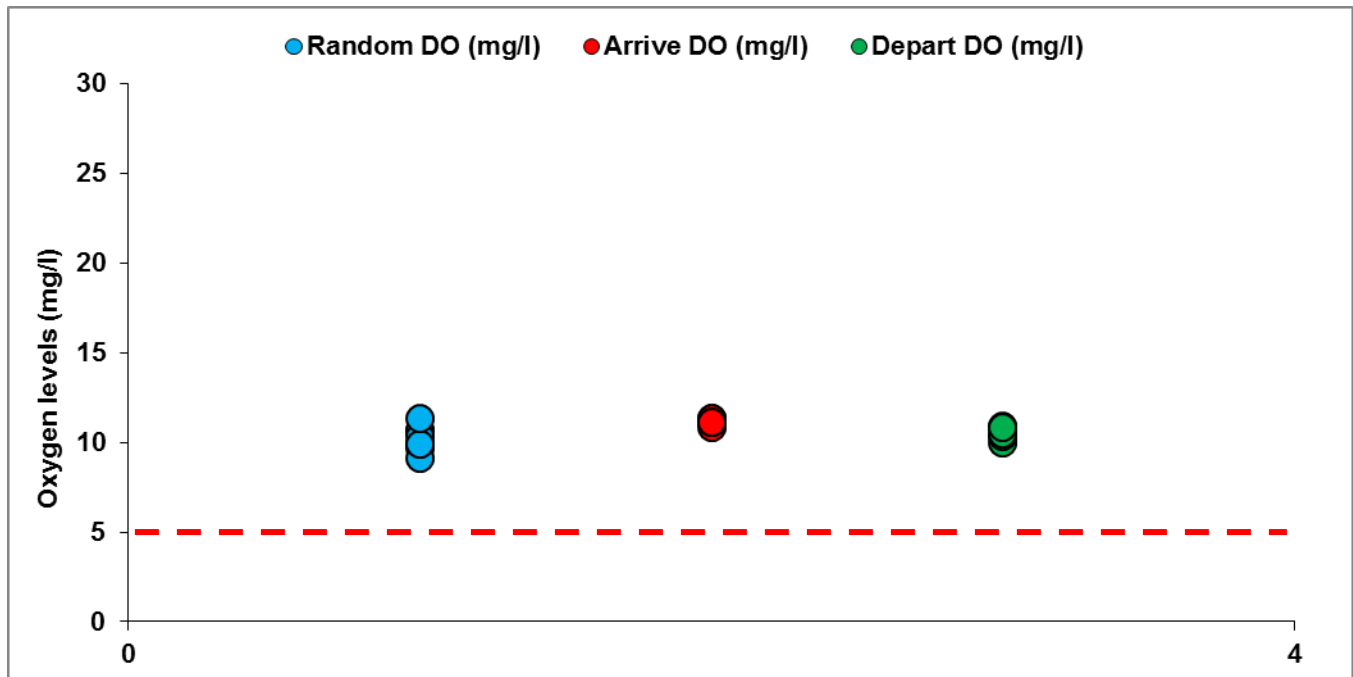
Figure 3. Dissolved oxygen measured at Station 3. Dashed red line depicts dissolved oxygen level where bass would be exposed to stressful conditions.



STATION 4

Water temperatures were very consistent and ranged from 65-66 F. Dissolved oxygen ranged from 1.35 – 26.4 mg/l (Figure 4). None of 12 samples were documented below 5 mg/l which represents stressful levels for smallmouth bass. Dissolved oxygen levels decreased slightly during the time at this station which was generally 1-2 minutes (observation, not timed). The total decrease was related to the number of fish in the bag and/or the time taken for photographs.

Figure 4. Dissolved oxygen measured at Station 4. Dashed red line depicts dissolved oxygen level where bass would be exposed to stressful conditions.



DISCUSSION

Overall, we did not document water temperatures or dissolved oxygen levels that would be considered overly stressful to smallmouth bass during the weigh-in process. In most cases, the oxygen content in the creel transport bags were at or above the levels documented in Milner Reservoir just prior to the weigh-in event. The lowest recorded dissolved oxygen was documented at Station 1 after fish were gathered from boat live wells and brought to the weigh-in location.

The oxygen supplementation system demonstrated substantial benefits with respect to the amount of oxygen available to bass throughout the weigh-in. This boost of oxygen carried forward throughout the process (Stations 2 – 4) preventing additional stress placed on tournament caught fish. The lowest values were documented in transport bags waiting to have access to the supplemental oxygen at Station 1 or in bags that just arrived. In most cases, oxygen levels quickly climbed to suitable levels within 1-2 minutes.

Water temperatures were not an issue at this particular tournament. In no case did water temperatures increase by more than 2 °F. September air and water temperatures do not typically present the most thermal challenges to smallmouth bass, and these results are not unexpected.

The Department would offer a few suggestions for tournament holder consideration. First, we recommend staff be located at Station 1 to inform and direct participants. We observed occasions where anglers were distracted and did not attempt to use the oxygen supplementation immediately upon arrival. Second, this same staff member could also facilitate line movement as anglers advance through the weigh-in process. In some instances, anglers lined up based on time or arrival but did not advance forward in the tank as others in front of them had their fish weighed. This created a jam-up where those who arrived with the next wave did not have room to use the supplemented oxygen and they would not step in front of others because it would disrupt the order of the weigh-in. Third, we would recommend weights be added to the oxygen stones on each of the delivery hoses. In some cases anglers would insert the hose but not pay attention to its location in the bag. Lower oxygen levels were found in bags where the oxygen stones were either not in the water, or just sitting on top. Oxygen levels increased rapidly when the stones were on the bottom of the bag. Lastly, if anglers were prompted, they could agitate the bags inducing better mixing. Bottom line, if a non-participant were assisting and overseeing Station 1, then better and quicker results would be likely.

The club might consider purchasing a low-cost dissolved oxygen meter quality control and for educational purposes. There was a great sense of awareness by many of the participants when they were provided real-time feedback about the condition of their fish in the transport bags. It's our opinion tournament anglers would also appreciate feedback about oxygen impacts to live well designs, whether or not there's an impact when you pull your boat prior to the weigh-in, or perhaps doing demonstrating to anglers how quickly oxygen is lost in a transport bag containing 5 large bass.

We thank you for the opportunity to assist our Idaho anglers. Please contact Doug Megargle – Fishery Manager if you have any questions or require clarification of any of the content in this report.

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