

Fish Health

A fish caught during a tournament is extremely stressed. It has just engaged in a struggle for its life. It has been hooked and handled by a fisherman, and has likely undergone the physiological stress associated with being removed from its wild environment and kept in a confined space onboard a boat.

Dissolved oxygen is the most critical factor affecting the survival of stressed fish. Fish need to be kept in oxygenated water to revive them and to help them survive. On a boat, this means holding fish in a recirculating or aerated livewell that is operated continuously with a flow of replacement water through the livewell pump.

A resuscitation tank at the tournament weigh station provides oxygenated water by directly injecting fine bubbles of oxygen into the water through a ceramic oxygen diffuser. The typical air stone used in an aquarium will not work because it does not provide small enough bubbles to sufficiently diffuse oxygen. In fact, the large bubbles from an aquarium tank air stone can be harmful to fish.

A ceramic oxygen diffuser provides a faint, grayish looking mist cloud of bubbles in the resuscitation tank water. But, too much oxygen can be harmful. A large cloud of oxygen is too much. Only open the oxygen valve to the point that a faint mist cloud is visible in the water. See the Dissolved Oxygen Test Kit illustration below that demonstrates the optimal and safe range for water oxygen content.



Temperature is also critical as it affects the amount of dissolved oxygen, and the metabolism of the fish. Keep the tank shaded and out of direct sunlight. As temperature increases, the solubility of oxygen in water actually decreases (see table). Experienced anglers know that it is much more difficult to keep bait alive and successfully release fish in the hot summer months. Monitoring

the temperature of the resuscitation tank water during warm weather is essential. Keep the water cool to lower fish metabolism and conserve oxygen available to the fish. Maintain temperature within 10 degrees F of local conditions.

Under extreme conditions it may be necessary to lower the water temperature. Placing recycled milk jugs containing frozen water in the tank is one way to do that; placing bags of ice in airtight containers, such as 5-gallon buckets with closely fitting lids, is another. (Note: Do not place ice, or bags of ice directly in the tank as this will alter the water salinity uncontrollably as it melts.)

Salinity is another important factor in maintaining resuscitation tank water and in contributing to fish health. The flow-through systems used with onboard livewells continuously replenish water in the tank. However, salinity levels vary considerably from open ocean to bay waters, and are altered by any recent rainfall and runoff into bay waters. Since fresh water is more buoyant than seawater, it remains on the surface zone where it is pumped through the in-hull fittings that supply water to the onboard livewells.

Resuscitation tanks are seldom set up as a flow-through system. A resuscitation tank cycles the same water. This allows control over salinity, which can be regulated with a commercial livewell additive or salt – rock salt, ice cream salt or sea salt are acceptable. Do not use table salt or iodized salt, as these contain iodine, which is toxic to fish. Conversely, salinity can be reduced by adding fresh, de-chlorinated water. Tap water and even bottled water are not normally suitable without treatment.

Water quality is often an overlooked aspect of an onboard livewell or a resuscitation tank's contribution to fish health and avoidance of stress. Shallow or disturbed

Table 1. Oxygen saturation at different temperatures and salinities of saltwater.*

F°	Oxygen Level (mg/l)	
	Bay	Ocean
50	9.9	9.0
59	8.9	8.1
68	8.1	7.4
72	7.8	7.1
75	7.5	6.9
79	7.2	6.6
83	7.0	6.4
86	6.8	6.2
95	6.2	5.8

*Adapted from "Live Bait Recirculating Systems for Coastal Locations," Texas Sea Grant, 1999.

Figures given are for dissolved oxygen measured in milligrams per liter (mg/l). Bay water contains 5-25 parts per thousand (ppt) salinity; ocean water is 35 ppt.

water with high turbidity can introduce water of lower quality into the system. A large number of fish in the livewell can also reduce water quality by introducing toxic ammonia resulting from digestive excretions. Continuous livewell pump operation normally clears this effect. Since the time that resuscitation tanks are used is limited to the time of the weigh-in, this is not normally a problem, and the tanks do not require a biological filter. Water should be changed daily in tournaments lasting more than one day.

Proper handling reduces physical damage to fish. Wet bare hands will cause the least damage in handling fish. Towels and gloves – even when wet – are abrasive, and result in lost scales and mucous coating that protect the fish.

BogaGrips® are commonly used in handling fish, but not always properly. Maintain a good hold on the fish's lower jaw with the tool in one hand, and cradle the belly of the fish with your other hand. This maintains control of the fish and keeps it in a horizontal position. Holding the fish vertically will tear mouth and jaw cartilage, and displace its organs, causing internal damage.



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IMPORTANT: The proper use of BogaGrips® requires supporting the belly of the fish and keeping the fish in a horizontal position. Holding the fish vertically will tear mouth and jaw cartilage and cause internal damage.

Weigh Station Protocols

Fishermen may participate in many tournaments over the season, and standard protocols help guarantee a smooth-running event.

Procedures

1. Fishermen will place fish from livewell into fish box, secure lid and carry to weigh scale.
2. Weight is observed and recorded. Weigh scale should be tared to weigh fish in box.
3. Fish is transferred to measuring board and length recorded.
4. Fish is returned to fish box for transfer to open water. If fish appears stressed or lethargic, place in resuscitation tank.
5. Once fish is in resuscitation tank, minimize handling. In case fish wants to roll onto its back, handle gently and keep in an upright position. Fish will have recovered when it is finning (swimming in place)



Fishermen should transport fish using shallow plastic fish boxes.

regularly and responds to external stimulus such as a hand waved over the tank.

6. After fish recovers, release at a suitable site in open waters, outside of a terminal basin or canal.
7. Only after fish swims away may fisherman sign and submit the scorecard to the weigh station area.

Tips

- The tournament weigh-in process will run smoother if:
- All participants are given instruction on the protocols in advance of the tournament.
 - Weigh station equipment is placed dockside or beachside as close as practical to the contestants' return point.
 - Equipment is placed in assembly line fashion, with weigh station scales, measurement board and resuscitation tank close to each other.
 - Tables or other flat surfaces are provided at each step of the weigh station to hold fish boxes, and to facilitate unloading and transfer of fish with minimal handling.
 - A weigh station scorecard checkpoint is provided for entrants to sign and submit their official scorecard to tournament officials.
 - Congestion in the weigh station zone is minimized. Restrict the area to tournament entrants, and to those that are involved in the weigh-in process underway.