



# Fish and Shellfish Handling Protocols

## Introduction

A key element in the survival of aquatic life such as fish and shellfish (oysters and freshwater mussels) which are caught and released is how they are handled during the process. Physiologically, these organisms experience many stressors during a catch and release and transport. By minimizing the amount of stress, the chance of survival after release improves greatly. During a catch and release event, fish, as well as shellfish, can experience a combination of many stress factors. Below is a list of some types of stressors that aquatic life can experience during catch and release.

- behavior stress – crowding
- handling stress – capture, struggle, confinement
- exercise stress – prolonged swimming, being chased
- temperature stress – change in temperature
- salinity stress – change in salinity
- hypoxial stress – removal from the water/low oxygen
- toxicity stress – exposure to ammonia

The primary response of stress is the releasing of hormones into the blood causing a disturbance to the physical state of the fish. The secondary stress responses are disturbances to osmoregulation, blood chemistry, metabolism, and immune system. These effects can reduce the fish's resistance to fungal and bacterial infections that lead to mortality in some cases.

In order to reduce these effects, proper care and procedures should be taken when catching and releasing aquatic life. In order to minimize these stressors, follow the recommendations listed below.

## Handling, Maintaining, and Transporting Aquatic Life

### Fish

- Catch the fish fast and efficiently. As the fish resists capture, its oxygen demand increases. The fish will need oxygen to recuperate after the capture. Therefore, keep the water in the transport basin well aerated.

- If a landing net is used, rubber netting works best for minimizing mucous loss. Cloth and nylon type dip nets disrupt the protective mucous coating, disturb scales, and increase the possibility of injury or secondary infection that usually results in fish mortality.
- Help keep the protective mucous coat and scales of the fish from rubbing off by using wet hands when handling fish.
- Keep handling of the fish to a minimum. If at all possible, do not grab fish with hands. Instead, go directly to the transport basin. Avoid excess handling and/or dropping of the fish on the ground and the floor of the boat.
- Help keep the protective mucous coat and scales of the fish from rubbing off by using wet hands when handling fish. NovAqua ® or StressCoat ® can be added to the water in holding tanks to help mitigate the abrasive damage of capture and handling to the external mucous coating.
- Keep the fish in the water as much as possible to reduce stress. As a rule, keep the fish out of water no longer than you can hold your breath. Fish can suffer from brain damage from pro-longed loss of oxygen.
- Water temperatures above 84° Fahrenheit tend to be stressful for warm water fish. Therefore, adding ice to the transport basin can minimize stress.
- Avoid overcrowding fish in the transport basin. A good rule of thumb to use would be to place no more than 5 fish in the 15"-20" range for a 120 quart cooler equipped with some type of an aeration system. Plan on 25% water exchange every 20-30 minutes. About 7.5 gallons (1.5 buckets if using a five gallon bucket). Use common sense, the more fish (>5) and the longer they sit in the transport basin, the more frequent water exchanges need to occur.
- Live-wells or other holding tanks should be fitted with a water recirculation system. Oxygen cylinders are expensive, but provide the best aeration while maintaining water temperature.
- Run the aeration system continuously! Transport basins should be filled with ambient water to aid in acclimating the fish to the transport conditions.

When transporting saltwater fish, it is important to keep the transport water as close to the same salinity and temperature as the water from which the fish were collected. If possible, it is preferable to lower the water temperature a couple of degrees to reduce stress during the transport procedure. The oxygen concentration in the water should be between 5.0 - 7.0 mg/L. Water with oxygen levels lower than 4.0 mg/L can cause stress and eventually lead to a fish kill. The pH of the water should range between 8.0-8.3 for saltwater fish and 6.5-8.0 for freshwater fish.

## **Shellfish (freshwater mussels)**

- While collecting freshwater mussels, place them in 3-5 gallon mesh bags or 5 gallon buckets keeping them inundated in the water until they are ready to be brought ashore.
- Once brought to shore, place the mussels in appropriate sized ice chests containing ambient water (with small amounts of ice if necessary) for use in transportation to the relocation site.
- Keep live mussels in transportation containers no longer than 8 hours.
- When placing mussels back in the sediment at the relocation site, carefully hand place them with the anterior end down.

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