

Florida Sea Grant Fish Descending Project Final Report

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INTRODUCTION/PROJECT RATIONALE

Increasing closures of several Gulf reef fish fisheries (e.g. red snapper and groupers) have focused attention on the importance of successful release (survival) of fish caught in deeper water. These fish are particularly susceptible to mortality from barotrauma, the bloat and internal organ damage caused by pressure change. If discard mortality can be reduced, there is hope that the severity of closures and bag limits could be lessened and consequently reduce the economic impact on recreational angling and charter boat industries.

Scientists and fisheries managers have reported results from the US west coast that document that the survival of these fish can be significantly increased using a variety of methods that quickly return fish to depth while minimizing injury. Research shows high survival rates for rockfish (commercially and recreationally important west coast species) in depths up to 300 feet. The best methods for ensuring survival entail using a descending technique that safely returns the fish to depths, minimizing injury. Descending is the preferred option. Venting fish can also be a useful method to return fish to depth. Evidence has shown that it can be helpful for some species, but the research for many other species is either lacking or inconclusive.

It was recognized at a 2011 National Workshop that Florida Sea Grant has played a leadership role in disseminating information on successful deep water release practices, including educating anglers on proper use of venting practices. Florida Sea Grant aims to maintain a leadership role in deep water release strategies and assist in reducing discard mortality that could have significant fisheries and economic impacts.

OBJECTIVES

1. Train a cadre of Florida Sea Grant extension agents in the use of a variety of recompression gear and strategies designed to improve survival of deep water released fish.
2. Initiate introduction of recompression gear and practices to selected Marine Extension Advisory Committee members, fishing guides and recreational anglers.
3. Involve recreational anglers in the evaluation of the practical use of recompression gear.
4. Compile information from involved fishers regarding efficacy of recompression methods along the Florida Gulf Coast.

METHODS

Recompression gear kits containing a variety of recompression gear were purchased and organized for use by marine extension agents. This equipment complements the catch and release kits that marine extension agents currently have.

The types of descending devices evaluated in this project were:

- *Inverted Utility Crate*. This device is commercially available from West Marine. It can also be made by anglers by purchasing a utility crate and then attaching two four pound weights. Directions for building them can be found on YouTube <http://www.youtube.com/watch?v=bviQYGgKhw>



- *“Recompression Cage”*. This device was developed by former FSG Extension Agent Steve Theberge. It is a modified dungeness crab hoop “net” used on the U.S. west coast. It was built with a smaller mesh net (2 inch, commercially available nets have a 4 inch mesh). A smaller mesh is required as otherwise the fish gill plate can become entangled in the net. The rigging on the net is modified so that the net is lowered by attaching rope to the smaller hoop. When used as a crab trap it is rigged so that it is lowered by attaching the rigging to the larger hoop. In essence, the trap has been turned upside down to serve as a “basket” to descend the fish.



- *West Marine Catch and Release Recompression Tool*. This device is commercially available from [West Marine](#). It was developed for use on the U.S. west coast. The design uses a weight which holds the tool’s spring-loaded jaws securely, but safely on the fish’s mouth. When it reaches the bottom, the spring tension is relieved, causing the jaws to open and release the fish.



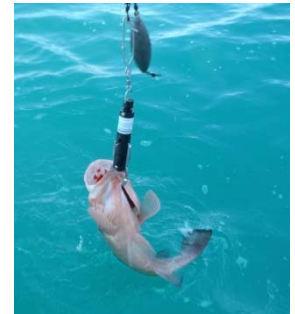
- *RokLees Fish Descending Device* (available from [Ecoleeser, inc.](#)). This is a weighted spring release device. The device is clamped on to the lower lip and when descended to appropriate depth, a solid jerk will release the fish.



- *Modified Cabella's Fish Gripper*. This device was not designed as a fish recompression/fish descending device. It was modified such that it could be used to grip the fish on the lip, with a weight attached to the handle so that when fish was lowered to an appropriate depth, a solid jerk on the line will release the fish. The concept is essentially the same as described for the RokLees device.



- *SeaQualizer*. This device is commercially available (<http://www.seaqualizer.com/>). The device is clamped onto the lower fish lip. Depth release is determined at a preset depth based on water pressure. The device was designed so that the device release would be triggered at depths of 50 ft., 100 ft., and 150 ft.



Special Note: During the course of the study we were made aware of a number of other devices that have been developed by anglers. Due to limited resources it was not practical to test all devices. Information on these options will have to be included in FSG educational outreach materials.

Volunteers participating in the project were identified based on the local knowledge of FSG Extension Agents.

Data sheets were developed to record data on use of gear and anglers perceptions of gear use. Data collected included: type of species caught, depth of capture, time needed to successfully release fish, position of circle hook, signs of barotrauma, and whether release was successful. Comments from anglers on how well the gear worked and their perceptions on what gear attributes they either valued or did not like.

It is important to note that this project did not involve the evaluation of the survival of released fish that have suffered barotrauma.

RESULTS

Field trials and Extension Outreach (additional details available in Florida Sea Grant OARS database)

- A total of 25 field trials were conducted involving 70 volunteers. Volunteers included local anglers, charter boat captains, Florida Sea Grant advisory committee members, Florida Fish and Wildlife Commission outreach specialists, fishery managers, and environmental organizations interested in the deep water release discard mortality issue.

- A total of 11 FSG Extension agents participated in these field trials. Several agents participated in more than one field trial.
- Field trial results were presented at 13 professional conferences/workshops/meetings (oral presentations, posters and exhibits). These included three national venues (American Fisheries Society annual meeting, National Fisheries Extension meeting, National Sea Grant Association; eight regional venues (FishSmart workshops, Gulf Council Reef Fish Advisory Committee, South Atlantic Fisheries Council, Sea Grant programs in Louisiana, Virginia and North Carolina), and two state venues (Florida Coastal Science Symposium, Florida Outdoor Writers Association).
- A total of 17 FSG fish descending project communications products were developed by project participants. These included: PPTs, fact sheets, webinars, websites, blogs, videos and newspaper articles.

Collaborative Work with Florida Marine Research Institute Goliath Grouper Tagging Project

Although it was not a stated objective of this project, an opportunity developed to work collaboratively with FWRI to evaluate if fish descending could be used to successfully descend tagged goliath grouper without venting. Goliath grouper present a difficult challenge because of their size. Goliath grouper sometimes require repeated venting to expel enough gas so that they can return to depth. If a more efficient method could be developed to return the fish to depth, trauma to the fish would be reduced.

Working with SeaQualizer Inc. a special tool was developed with a clamp large enough to deal with these massive fish. Predetermined release depth was modified to release at 30ft. Most of the deep water caught goliath grouper suffering from barotrauma were caught in 60-80 ft. of depth.

An obvious problem is that a great deal of weight must be used descend fish weighing up to several hundred pounds. However, we discovered that 10-15 pounds of weight was sufficient to orient the fish head-down in the water column. Consequently, as the fish struggles it is pointed downward, enabling the fish to descend to the bottom. If it is left floating horizontally at the surface, it is helpless in trying to descend.

We found that it was possible to descend goliath grouper using a modified SeaQualizer and a manageable amount of weight. New release protocols which include the descending tool can be used in future goliath grouper tagging studies to reduce stress and trauma. These photos illustrate the problem and the success of this technique.



Bloated goliath grouper floating at surface



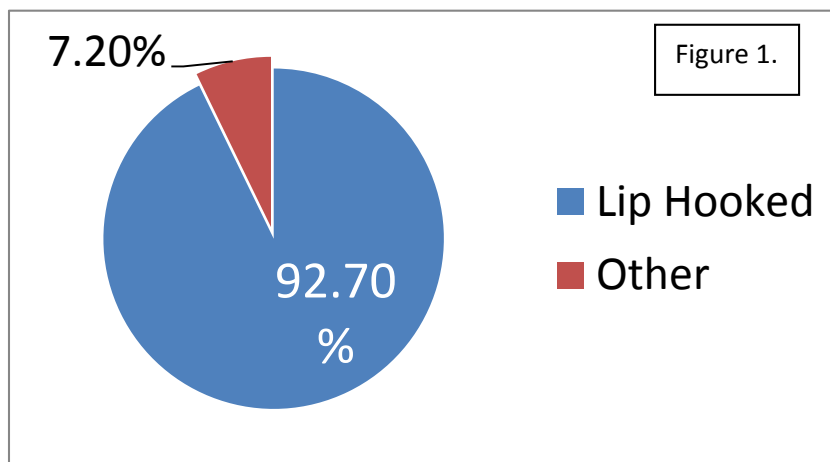
Weighted goliath grouper pointed head down so it can swim to the bottom

Data Analysis

Data was recorded for 379 fish. Species caught included: red grouper (*Epinephelus morio*), gag grouper, scamp (*Mycteroperca microlepis*), warsaw grouper (*Epinephelus nigritus*), black sea bass *Centropristis striat*, red snapper (*Lutjanus campechanus*), grey snapper (*Lutjanus griseus*), lane snapper (*Lutjanus synagris*), vermilion snapper (*Rhomboplites auroruben*), grey triggerfish (*Balistes capriscus*), grunts (*Haemulon* spp.) and porgies (*Sparidae*). The most robust sample size was for red grouper (N=222). This was due to the fact that the most extensive field work was conducted in southwest Florida where red grouper are prevalent.

Position of Circle Hook

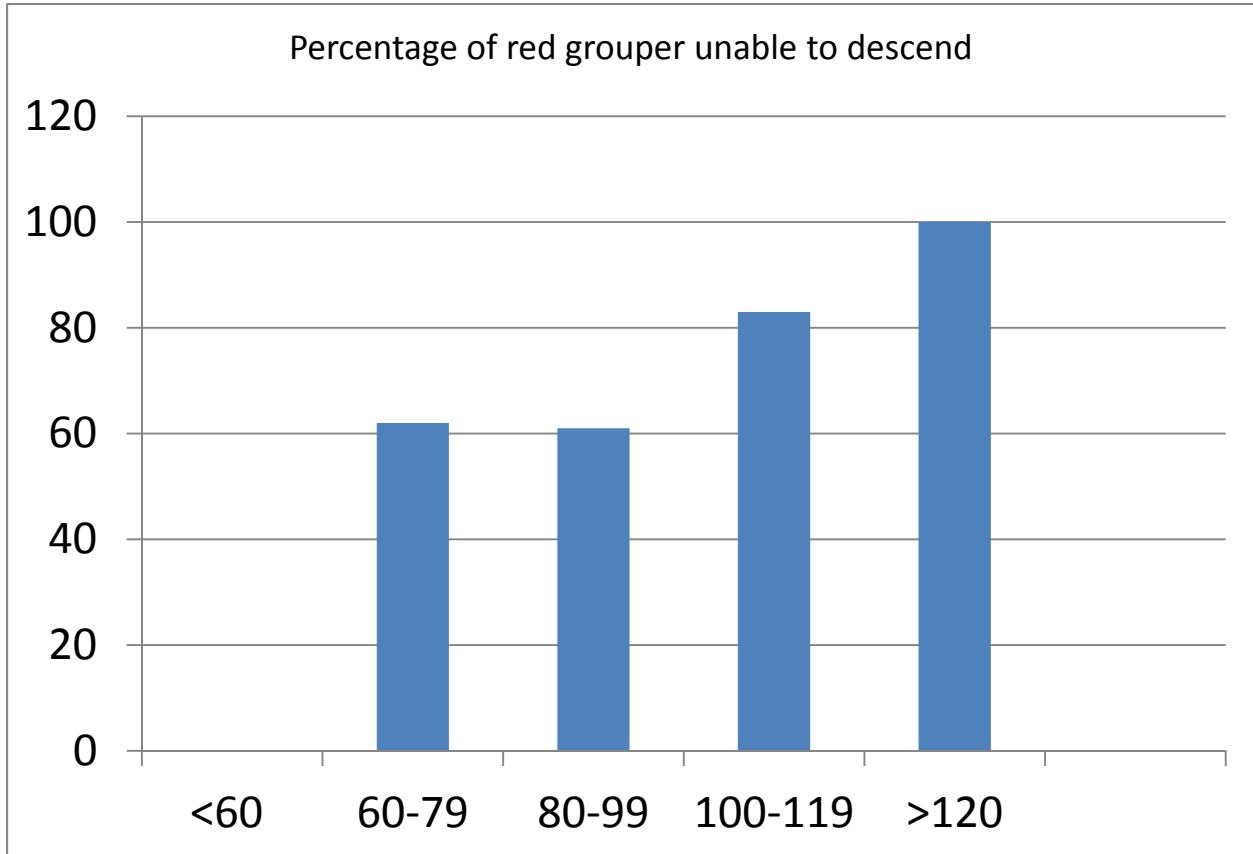
Results of our work (Figure 1.) were consistent with other studies that have documented that circle hooks are effective in reducing hook damage by resulting in a high percentage of lip hooked fish (Sauls and Alyala 2012).



Effect of depth of capture on ability of fish to descend

In conducting barotrauma educational programming for anglers it is important to be able to have quantifiable information on what anglers can expect in terms of the need for treating fish caught at different depths. Of the species we collected data for, we were only able to meaningfully evaluate the

data for red grouper due to a small sample size over a range of depths for the other species caught. We did have a robust sample size (N=222) for red grouper over a spectrum of water depths.



The data indicate that in water depths less than 60 ft., anglers should not anticipate a problem with releasing red grouper able to return to the bottom. The depth range from 60 to 99 ft. is a gray area. More than half (approximately 60%) were unable to descend on their own. However, a significant portion (approximately 40%) was able to descend on their own. If a fish is able to descend on its own, it is best to simply return to the water as quickly as possible. The problem is confounded by the fact that in this water depth range, it can be difficult to judge which fish to treat. For those fish that were visually judged to be suffering from barotrauma (at least slight bloating), 31% were still able to descend. It is important to note that we only recorded indications of any barotrauma. We did not try to rank severity of barotrauma according to how severely the stomach or intestines were protruding.

Angler experience with evaluating condition of fish when brought to the surface (liveliness, color and making progress in descending) can improve angler judgment. Unfortunately, once the fish has been released and the fish is unable to descend, it may be difficult and time consuming to recapture the floating fish for further treatment. Fish descending devices in this depth range might be preferable to venting because the fish is returned to the water with less damage and less harm would be done if the fish is able to descend on its own.

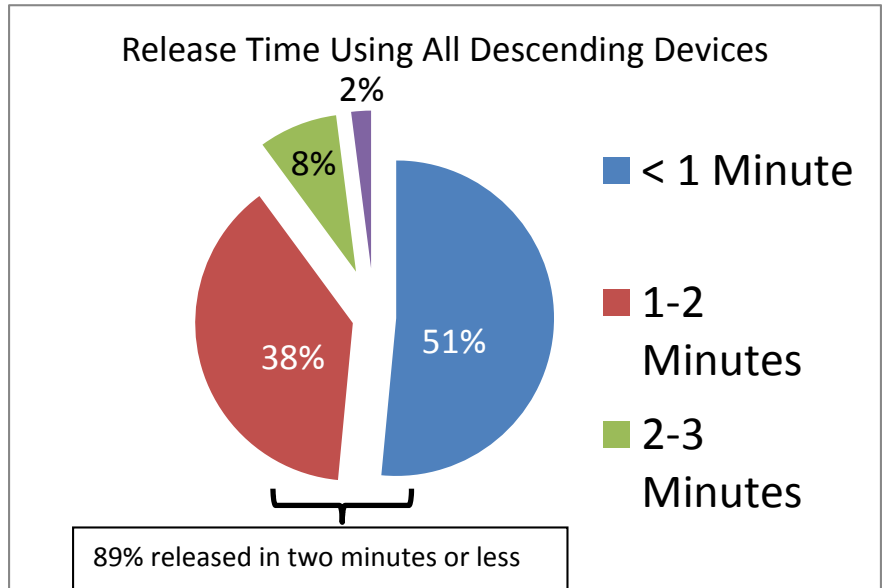
It is impossible to provide anglers fishing in this depth range with a specific depth at which fish should be treated.

The picture becomes much clearer when fishing in water depths ranging from 100-119 ft. At this depth most red grouper were unable to descend (80%) and observation of some degree of barotrauma is a better predictor of ability to descend. Only 14.6 % of red grouper showing some sign of barotrauma were able to descend on their own. Beyond 120 feet, anglers can assume all fish need treatment.

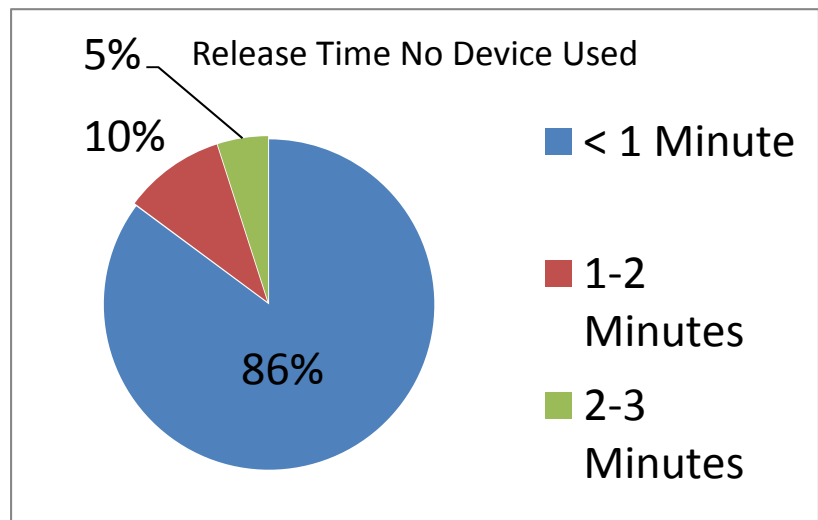
Release Time

In this study the release time was defined as time interval from when fish was brought to the surface until the fish was returned to the water at the surface. It did not include the time spent reeling the fish up and time spent descending and then releasing the fish.

Using all the different release devices, 89% of fish were released within 2 minutes or less. From these data it is apparent that fish can be returned to the water in a reasonable time using fish descending gear.

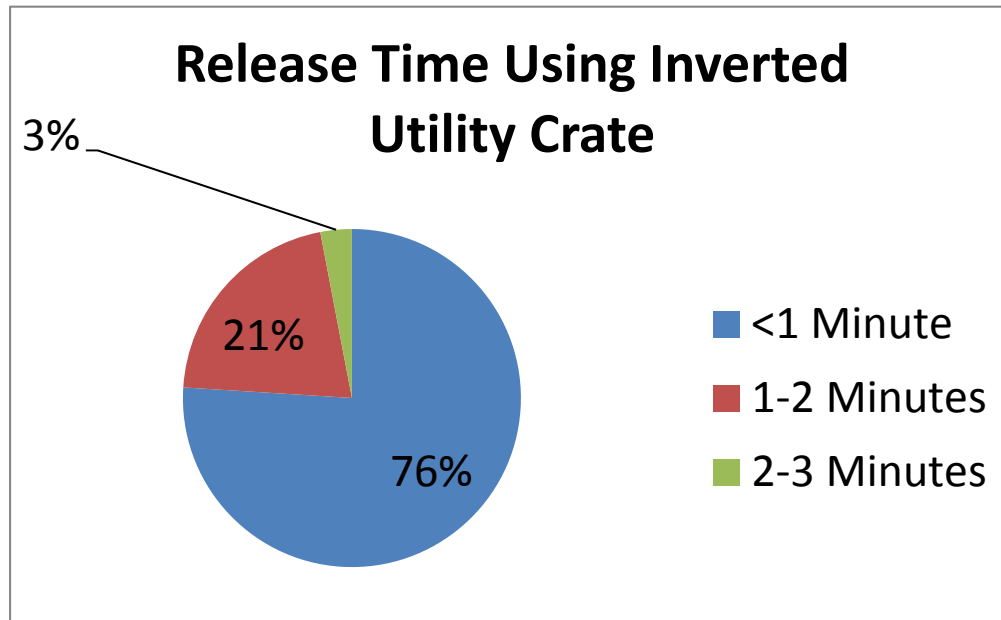


When the fish were obviously able to descend on their own and the fish were released without using descending gear, the release time was less. Ninety six percent were released in two minutes or less, 86% were released in one minute or less. Using descending gear does result in some delay in getting fish back into the water.



There did seem to be some advantage in using the Inverted Utility Crate (IUC) in terms of reduced release time. The release time of two minutes or less was (87%) for the IUC was very similar to all descending devices (89%). However, a

higher percentage of fish were released in one minute or less using the IUC (76%) compared to 51% using all devices.



Summary/Conclusions

Objectives 1-3 were successfully completed. As a result of FSG extension agents working with advisory committee members and volunteer anglers, FSG now has a trained cadre of agents trained to deal with options available to anglers dealing with barotrauma. This is especially important as federal and Florida state regulations have changed so that fish venting is not the only option available to anglers.

Furthermore, a number of educational materials have been developed to assist in conducting educational programming on this topic. More work needs to be done on refining these materials, but we have a good start.

The work with volunteer anglers documented that they could be taught to use the different types of devices in manner that would enable them to return fish to the water in a reasonable amount of time. Our results were presented to the Gulf of Mexico Fishery Management Council Reef Fish Advisory Panel. This coupled with the fact researchers on the U.S. west coast has shown that descending gear properly used can reduce release mortality resulted in the Reef Fish Advisory Council passing a motion to advise the Gulf Council to allow anglers to use options other than venting in treating barotrauma. Subsequently, the Gulf Council and state of Florida passed such a rule change.

As part of objective 4, we tried to compile information on angler perceptions of the different attributes of different gear (for examples: ease of use of gear, cost, capacity for gear storage, etc.). However, it must be clearly stated here that this information was never intended to provide a recommendation or

endorsement of one type of gear (brand) over another one. The purpose was to try and identify those factors that would inhibit anglers from adopting fish descending gear so that this information could be used in developing more effective educational programming.

This proved to be a difficult challenge for a number of reasons. The majority of field work was conducted along the Florida west coast that would bias opinions based on the types of fishing conditions encountered by anglers (depth of water, strength of water currents, etc.).

Another important problem was that that fishing success varied greatly between trips. Some trips were very productive in terms of number of fish caught, while on other trips success was limited in number of fish caught. This meant that many times there was not the opportunity for all the volunteers to use all the different devices on a single trip.

In the process of interviewing anglers it became abundantly clear that their perception of different devices was determined by personal preferences. One group of anglers might prefer a device because they felt it was simple and durable. Another group of anglers might perceive the same device as complicated and perhaps not sufficiently durable. It is difficult to objectively assess why anglers would have such different perception of the same device.

It cannot be over emphasized that more research is needed in the Gulf and Atlantic on determining how successful venting and fish descending/recompression in increasing the long-term survival of deep water caught fish.