



Workshop Summary

FishSmart Gulf of Mexico/South Atlantic Workshop on Improving the Survival of Released Fish Focusing On Barotrauma

**April 11-13, 2012
St. Petersburg, Florida**

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Executive Summary

FishSmart Gulf of Mexico/South Atlantic Workshop Makes Breakthroughs

Fifty-five fisheries researchers, managers, communications specialists, recreational anglers, for-hire sector and representatives of the sport fishing industry gathered for 2-1/2 days of interactive discussions to develop information that could help anglers improve the survival of fish that they catch and release. The workshop focused on barotrauma but recognized a variety of issues that are critical to providing released fish the greatest chance for survival. This FishSmart workshop, held in St. Petersburg, Florida April 11-13, focused on the recreational fisheries of the Gulf of Mexico and South Atlantic.

Since 2008 anglers have been mandated by the Gulf of Mexico Fishery Management Council and NOAA Fisheries to carry and utilize dehooking devices and venting tools on reef fish caught in the Gulf of Mexico. A similar measure was considered for the South Atlantic in 2010 but not implemented due to the uncertainty about the effectiveness of venting fish exhibiting barotrauma. During the workshop, current results of research on venting (removing swim bladder gasses from the fish's body to enable it to return to habitat depth on its own and recompress) as well as rapid release devices (sending a fish back down to deep water using weighted devices so it can recompress) were reviewed for each area. While venting was still considered to have potential benefits when conducted properly, workshop participants agreed that the Gulf of Mexico Fishery Management Council should be encouraged to look at expanding the language in the current regulations to include not only venting devices but also add an allowance for anglers to use rapid descent devices in lieu of venting. To improve the effectiveness of these techniques in the South Atlantic, the South Atlantic Fishery Management Council was encouraged to consider implementing a program which teaches anglers how to improve the survival of released fish.

Workshop participants also noted that the successes of both venting and rapid recompression are affected by other factors that impact the fate of released fish. For example, descent devices may allow fish to get back down to deeper cooler waters more quickly in the summer thereby potentially increasing their survival, particularly in warmer Gulf of Mexico waters. Workshop participants also emphasized the need to reduce other stressors on fish, including the amount of time the fish is out of the water and physical handling of the fish. In addition, in the Gulf of Mexico, predation on released fish by dolphins may reduce the effectiveness of either method. Workshop participants encouraged greater integration of the NOAA guidelines on interaction with marine mammals in messaging to anglers to help them deal with these situations.

A number of research needs were identified during the workshop, including:

- Determining the effectiveness of venting or rapid recompression using descent devices as they are actually conducted by anglers
- Quantifying the true extent of release mortality in the snapper and grouper fisheries
- The need to determine the degree of predation on released fish by marine mammals and predatory fishes

- Developing better data on survival rates based on species, size and age of the fish being released stressing the importance of large fish in the spawning population

Some of this needed research is already being planned but additional research will be dependent on funding.

The workshop was part of the larger FishSmart effort, a program lead by the sport fishing community to work with anglers and industry to improve the survival of caught and released fish. The initial phases of FishSmart are being funded by NOAA Fisheries through a grant to the Atlantic States Marine Fisheries Commission.

For more information about FishSmart, visit www.fishsmart.org.

Acknowledgements

The “FishSmart Gulf of Mexico/South Atlantic Workshop on Improving the Survival of Released Fish Focusing on Barotrauma” was assembled through the contributions and hard work of a number of individuals. Members of the steering committee deserve a great deal of credit, including:

Russ Dunn, NOAA Fisheries; Mike Nussman, American Sportfishing Association; Todd Kellison and Ken Brennan, NOAA Southeast Fishery Science Center; Kim Amendola, NOAA Fisheries, Karen Burns, Gulf of Mexico Fishery Management Council;, Steve Theberge, IAP World Services/NOAA Fisheries Douglass Boyd , Coastal Conservation Association/Gulf of Mexico Council/Sport Fishing and Boating Partnership Council, Bryan Fluech, Florida Sea Grant; Terrell Gould , North Carolina charter operator; and Patrick Campfield, Atlantic States Marine Fisheries Commission.

Miles Croom Deputy Regional Administrator for NOAA Fisheries Southeast Region signaled the importance of this workshop by providing the keynote address and taking time from his schedule to interact with workshop participants.

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Mostly, we have the presenters and participants in the workshop listed in an appendix to thank for their generous contribution of time and knowledge toward making the workshop a success. This report was prepared under award number NA10NMF4740124 from the National Oceanic and Atmospheric Administration, U.S. Department of Commerce to the Atlantic States Marine Fisheries Commission. The statements, findings, conclusions, and recommendations are those of the authors and do not necessarily reflect the views of the National Oceanic and Atmospheric Administration or the Department of Commerce.

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All Presentations available at www.FishSmart.org

Background Information

Keynote Address

Miles Croom, Deputy Regional Administrator, NOAA Fisheries

Miles Croom opened the workshop, telling participants that FishSmart compels innovative approaches to ensure high quality fisheries for the future. The goal of FishSmart is to address fishing mortality while enhancing fisheries which is fully consistent with the objectives of NOAA fisheries. Results of this workshop will be put directly into hands of anglers through social media, states, and regional communication efforts of NOAA. Croom thanked the American Sportfishing Association and recreational fishing community for driving this initiative forward and the Atlantic States Marine Fisheries Commission for coordinating the FishSmart workshops.

These Regional workshops are NOAA's continuing commitment to addressing a conservation need identified during the Recreational Saltwater Fisheries Summit: Engage recreational community in addressing barotrauma issues through joint NOAA/stakeholder workshops to improve the survival of released fish. NOAA sponsored the National Barotrauma Workshop in 2011, during which a recommendation was made to "step down" the process to the regional level, which has resulted in this workshop plus two more (Pacific and New England) in the coming months.

In the Gulf of Mexico and South Atlantic, fish stocks are regulated in ways that mandate the release of a large number of fish, increasing the need for developing and implementing ways to increase survival. The FishSmart Program is a proactive approach to addressing the mortality of fish stocks while enhancing the fishing experience. This will be accomplished through two basic approaches: 1) developing fishing techniques and management approaches that reduce the catch of non-target species or sizes, and; 2) improving the survival of released fish.

These workshops are actually the beginning of the process, not the end. The end result of the FishSmart program is to reduce the mortality of angler caught-and-released fish in marine recreational fisheries through application of science-based approaches. The four workshop goals recognize that science-based recommendations are very important in the effort to reduce mortality of angler caught and released fish.

1. *Identify best practices and equipment* to employ by anglers and regulatory agencies to increase the survival of angler-sought saltwater fishes, with emphasis on reef fishes under a variety of conditions/fisheries.
2. *Develop outline for messages* directed to anglers to employ best practices and equipment in their interaction with saltwater species, and
3. *Provide guidance* to management bodies to reduce the interaction and lethality of such interactions, with those species by anglers through the consideration of management actions such as time/area closures, gear modifications, restrictions/usage and size

restrictions and account for and incorporate release mortality/survivability into the regulatory process.

4. Identify gaps in the current state of knowledge in need of additional research efforts/funding

Croom concluded by telling participants that it is important that these workshops develop solid recommendations for anglers to implement to reduce the mortality of fish, actions that management agencies can take for species that are subject to high barotrauma-related mortality that may still allow recreational fishing but also provide sustainable stocks of fish, and research that is needed to fill any identified gaps in knowledge.

The FishSmart Initiative and Overview of Atlanta Workshop Results/Gulf and South Atlantic FMP Analysis

Gil Radonski/Andrew Loftus

(Presentation available at www.FishSmart.org)

Andrew Loftus and Gil Radonski summarized the FishSmart initiative. In brief, the FishSmart Program is a proactive approach to reduce the release mortality of fish stocks while enhancing the fishing experience. This will be accomplished through two basic approaches:

1) developing fishing techniques and management approaches that reduce the catch of unwanted species or sizes, and; 2) improving the survival of released fish. The measure of our success will be at the angler/fish interface.

Although FishSmart has been under development for a few years, activities began in 2011 with the FishSmart Barotrauma Workshop. Accomplishments from that included:

- A comprehensive review of science and management (www.fishsmart.org)
- General guidelines for the release of saltwater fish
- Specific release guidelines for species caught at greater depths
- Recommendations for improving management of fisheries with high release mortality
- Identify crucial gaps in research impeding ability to improve management

One of the recommendations from that workshop was to conduct a series of regional workshops to develop information specific to regional fisheries and fishing conditions. The Gulf of Mexico/South Atlantic workshop is the first of those. Information from these workshops will be used to form the foundation for the information used in the communication and outreach program, specifically integrating into the established communication infrastructure of the Recreational Boating and Fishing Foundation (RBFF). Future efforts will be needed to enhance and expand the outreach component through state agencies and other communication mechanisms and to develop the information and communication infrastructure to address freshwater fisheries.

As part of the preparations for the 2011 workshop, a comprehensive review was conducted of the release mortality being incorporated into the fishery management plans of regional fishery

management councils. The councils were asked to identify those recreational fisheries where release mortality was a management action and indicate what rate they were using.

South Atlantic Release Mortality Used in Fishery Management Plan or Models

<u>Species</u>	<u>Release Mortality</u>
Black Sea Bass	15%
Red Drum	8%
King Mackerel	33% headboat; 20% Rec
Red Snapper	For-hire 41%; Rec 39%
Vermillion Snapper	25%
Mutton Snapper	15%
Red Grouper	20%
Black Grouper	20%
Goliath Grouper	None used
Gag Grouper	25%
Spanish Mackerel	None used
Greater Amberjack	20%
Red Porgy	8%

Gulf of Mexico Release Mortality Used in Fishery Management Plan or Models

<u>Species</u>	<u>Release Mortality</u>
Red Snapper (20-40m)	15%
Red Snapper (<40m)	40%
Gag Grouper	11-42%
Red Grouper	10%
Great Amberjack	20%
Vermillion Snapper	10%-60%

Framing the Issue of Release Mortality in the Gulf and South Atlantic

Steve Theberge, IAP World Services/MOAA Fisheries
(Presentation available at www.FishSmart.org)

Steve Theberge framed the overall issue of release mortality in the Gulf of Mexico and South Atlantic. The problem of high release mortality is ubiquitous around the world; some of the solutions can be transferred from other areas but other solutions are unique to the area and species that are affected. Awareness of the issue is expanding due to a variety of reasons, including:

- Minimum size limits are increasingly being used to protect reproductive ages;
- An increasing number of undersized reef fish being released due to a greater number of anglers, larger size limits, more restrictive bag limits, etc.

- Some species are rebuilding and have limited or no fishing allowed; “Choke Species” occur in mixed species fisheries and are those species where the catch limit is reached first, cutting off the ability for anglers to fish for other co-occurring species.
- Reef fisheries are mixed species complexes; some stocks doing well, some not, and are thereby effected by the issue of choke species.

In the Gulf of Mexico, red snapper stocks have been at record low levels for at least two decades but are showing signs of recovery, necessitating that all sources of mortality be addressed to ensure their recovery. There are ways to reduce release mortality, but we must develop methods for releasing or avoiding fish that will reduce mortality while still allowing fishing. Methods must be tested for effectiveness and practicality and we must get the information to anglers through education and outreach for them to implement in their interactions with the fish. There are advantages and disadvantages to both venting and rapid descent methods of returning fish:

	<u>Advantages</u>	<u>Disadvantages</u>
Venting	<ul style="list-style-type: none"> • Fast, cheap; equipment requires little space • Possible to vent large numbers of fish coming in quickly 	<ul style="list-style-type: none"> • Infection concern • Going too deep or in wrong place and puncturing other organs • Improper handling and venting
Rapid Descent (“recompression”)	<ul style="list-style-type: none"> • No possible damage to viscera from a needle • Less infection risk • Equipment is small, inexpensive 	<ul style="list-style-type: none"> • If not done correctly fish may fall off hook before getting in water (especially in rough weather with high sided boats) • Requires dedicated rod • Takes more time from fishing

The best advice will likely vary with species and region; the Different parts of the Gulf of Mexico/South Atlantic vary in temperature, depth of fishing, number and aggressiveness of predators. Fishermen input and buy-in are critical; include them in the decision-making process. Managers must remember that most anglers are out to enjoy themselves and therefore release techniques and messages to anglers need to be as simple as possible while still being effective.

Framing Regional Recreational Fisheries Impacted by High Release Mortality

Gulf of Mexico

Karen Burns

(Presentation available at www.FishSmart.org)

As a beginning to the discussion, Karen Burns noted that the Eastern and Western Gulf of Mexico are different from each other in many ways, including bathymetry, temperature profiles, and species complexes. Additionally, we must be careful to identify the source of release mortality when developing recommendations: is mortality due to barotrauma, hooking mortality, or other factors? Red grouper are very susceptible to barotrauma but have a low hook mortality. Red snapper are the opposite. Gag grouper have both problems.

In terms of gear, circle hooks are often promoted but there is non standardization in circle hooks. For example, the 5/0 size is not consistent among brands. Whether the fish sucks in the food fast effects if a circle hook works or not.

There are many factors affecting barotrauma, such as species, fish size, water depth, gear, etc. Physiology of species is one example. The swim bladder of red grouper is thinner and larger than red snapper. Red grouper swim bladder has a developmental change when they move offshore. Red snapper have a smaller tougher swim bladder because they swim more actively in the water column to chase fish as apposed to red grouper which stay on the bottom focusing on invertebrates. In general, hemorrhaging increases with size of fish; often the swim bladder is functional 2-4 days after rupture. There hasn't been any research on the impact on reproductive organs.

Predation on fish that are released can be quite high. In particular, dolphin predation is a major issue in certain areas.

Sandy Diamond commented that in Australia, research has shown that fish caught in traps had worse symptoms than fish caught by hook and line.

South Atlantic

Chip Collier

(Presentation available at www.FishSmart.org)

Discard mortality is an important component of South Atlantic stock assessments - projections from stock assessment are influenced by it. Discard mortality is a function of both how well the fish survive when returned to the water and the number of fish that are returned. Even if a species exhibits a low discard mortality rate, high catch rates by anglers can produce a lot of dead fish and impact the stock. In general, increasing experience of anglers will increase the survival rate of released fish. The more experience the better they can use gear to increase survival.

There is a tremendous range in discard mortality rates, even among species. Mortality is affected by angler experience, hook type, and other factors. For example, red drum release mortality is estimated at a relatively low 8% but because of the high number of red drum released (approximately 2.3 million) nearly 200,000 are estimated as the discard mortality. For comparison, 400,000 are harvested by recreational anglers. The recreational fishery can be increased if you can decrease discard mortality.

Chip presented estimates currently used for species in the Inshore, Pelagic, and Reef fisheries (see presentation). Not all of the studies used to calculate the mortality rates were conducted in the South Atlantic; some came from studies of the same (or similar species) in other areas¹.

In the South Atlantic, states, the South Atlantic Fishery Management Council, and others (e.g., Sea Grant) currently conduct outreach to anglers through various means but additional resources are needed to reach more anglers.

Future research needs include:

- Estimate Effect of Regulation Changes
- Does Venting Help?
- Other Methods to Reduce Effects of Barotrauma
- Other Factors

As part of the discussion it was noted that not all species show greater release mortality with depth (e.g., Greater amberjack).

Current State of Research into Recreational Fisheries Impacted by High Release Mortality – summarize current research projects ongoing

Gulf of Mexico

Beverly Sauls

(Presentation available at www.FishSmart.org)

Beverly Sauls noted that two main types of research are conducted in the Gulf of Mexico:

- Specific factors and importance of those factors to survival
- Research to quantify total discards/mortality in a fishery

Both are relevant to management and contribute to the estimation of “discard mortality” in a specific fishery.

In general, in the shallower waters of the Gulf of Mexico, factors other than barotrauma are more important such as hook injury and temperature (snook, spotted sea trout, red drum), mortality

¹ Note: see Loftus, A.J. and G.C. Radonski. 2011. “Scoping Paper on Mortality Rates used in Regional Fishery Management Council Fisheries Management Plans for Angler-Caught and Released Fish Focusing on Barotrauma Related Mortality” available at www.fishsmart.org.

from predation (tarpon), and angling duration (pelagic species such as billfish). At deep depths, barotrauma can be the over riding factor

During the summer of 2007 a multivariable model was created to predict survival of red snapper using eight variables (capture depth, venting, retrieval rate, hook type, water temperature, predation, handling time and hook location). Based on this model, 20% of acute mortality was attributable just from the depth of capture alone. Other factors are additive, but a comprehensive study is needed to validate this model.

The distribution of fishing effort also factors into the overall discard mortality. For example, with gray snapper, A small number of fish released offshore suffer high mortality (possibly due to barotrauma), but the large number of fish released inshore contributes more to total release mortalities (even though the mortality rates are lower).

Several regional monitoring programs are used to quantify the fishing effort and characterize the distribution of this effort, including:

- Marine Recreational Fisheries Statistics Survey
- Redesign effort underway (MRIP)
- For-Hire Survey
- Texas Parks and Wildlife
- Southeast Headboat Survey

In 2010 a Blue Ribbon Panel on Marine Recreational Fishing Data released a report indicating that more data are needed on characteristics and disposition of discards, type of terminal gear, depth of capture, and spatial data (distribution of effort).

Research needs include:

- Sub-surface predation
- Effectiveness of de-hooking tools
- Recompression devices
- Effective release depths and weight for various species, sizes
- What about large fish?
- Effective depth to evade predator interactions
- Regional scale fishery characterization
- Better spatial and temporal coverage
- Higher resolution recreational data

South Atlantic

Jeff Buckel

(Presentation available at www.FishSmart.org)

Jeff Buckel discussed the state of research in the South Atlantic in terms of one of the key species, black sea bass. Black sea bass: discards have increased as more regulations were implemented. Studies have produced a range of discard mortality rates of 2% to 66% for hook and line fisheries. The most recent study was designed with three objectives:

- Estimate delayed survival by release condition
- Compare delayed survival to survival estimated from proxies

- Estimate discard mortality in recreational and commercial fisheries

They used a tagging study and assumed that tagged fish with no injury have 100% survival. Most of the anglers who participated in the study were experienced and educated anglers. The bulk of the recaptures were in a short time. Based on more than 1,000 tag returns, they developed these conclusions:

- Swimming down does appear to be reliable proxy for survival for black sea bass. However floating is not a reliable proxy for mortality.
- Tagging may act as a venting tool; little difference was seen in fish suffering from barotrauma versus those with no injury.
- Mean hook and line mortality (j-hooks) was approximately 4.5%
- Traps have lower discard mortality than hook and line. This is mostly because traps are used in shallow water.

Overview of Issues specific to the Gulf of Mexico and South Atlantic recreational fisheries being constrained by high release mortality

Venting and Decompression/Recompression: Techniques and appropriate uses of various techniques.

Sandra L. Diamond, PhD

Texas Tech University/University of Western Sydney (Australia)

Sandy Diamond provided a synopsis of several research projects in the Gulf of Mexico and in Australia related to release mortality, release techniques, and sources of mortality. She began by noting that management of recreational red snapper fisheries in the Gulf of Mexico is complex, with regulations often forcing anglers to release fish. Important research questions that must be answered to meet management needs include:

- What proportion of fish that are caught are released?
- What proportion of released fish die?
- Can you predict mortality of an individual fish?
- Why do fish have different symptoms of barotrauma?
- Do the different symptoms mean differential survival?
- What techniques reduce release mortality and why?

Summaries of studies conducted to answer some of these questions are below.

Discard Mortality Study

Cage Studies were conducted in the western Gulf of Mexico during July, September and October. Red snapper were returned in cages to depths ranging 30-50 meters. A longer term tagging study supplemented the cage studies. Results of these studies include:

- Long term survival (4-7 days) after submergence was substantially lower than short term survival; immediate survival averaged 84% and long term survival was 36%.

- Higher delayed mortality was predicted by condition index (everted stomach, bleeding, etc.)
- Contributing factors to initial mortality include: fish length (smaller fish more susceptible), fighting time, and others.
- Higher delayed mortality was predicted by the Condition index (poorer condition with symptoms such as floating or erratic swimming, bleeding).
- There were no significant tag return rates by treatment (shallow water release, vented or not vented, bottom release, size of fish).
-
- Predation adds 7-9 percent more to mortality
- Red snapper can survive from stomach inversion.

Discard Rate Study

A study to estimate discard rate of red snapper on headboats and charter boats was conducted during the months of May-August over 3 years in Texas. Approximately 75% of red snapper were discarded in these fisheries.

- A big source of mortality is discard mortality.
- 48% of red snapper in the Texas headboat fishery is killed due to the size limit forcing anglers to return their catch.
- other parts of the Gulf may be less due to smaller fish and deeper water in Texas compared to other places.

Predator Studies

A study was conducted to determine how many released fish were eaten by predators. Predators were observed eating moderately impaired fish, not the most impaired fish. Dolphin ate the middle range red snapper, not the floaters or the dead ones but uncertain as to why this is occurring. Predation adds about 7-9% mortality.

Condition Studies

The condition of released fish (based on Condition indices containing burst swimming speed and reflexes) was determined to be a good proxy for mortality.

Rapid recompression

A study was conducted to ascertain the benefits of rapid recompression, but due to low sample size (58 tag returns) the results are unclear. There were no significant differences in mortality due to release methods, but unvented surface releases were better in cooler mixed water.

Release Studies (low sample size)

No significant differences in release methods but unvented surface better in cooler mixed water Bottom releases didn't improve survival. There were significant difference in mortality related to depth, year, and fish length but additional work would need to be done to evaluate this..

Australia work

Work has been conducted in Australia on Mulloway and Snapper to observe the physiological effects of catching fish through the use of CT scans. This revealed various effects including hemorrhaging in the eyes. There were no visible symptoms in fish with internal ruptured swim bladders even though CT scans revealed these ruptures. Some of the air stays in the body cavity even after venting.

Conclusion

Size limits are not best for deep water reef fish; bag limits are better with cessation of fishing once the limit is reached. Depth and thermocline (temperature differences) play a large role in mortality. Additional research is needed to verify some of these findings.

Size: Effect of catching/releasing various sizes of fish on stock sustainability

Todd Kellison

(Presentation available at www.FishSmart.org)

The issue of release mortality varying with size of fish has implications for management and stock sustainability. Questions about increasing fecundity of fish with size, viability of eggs of different sizes and number of spawns per year varying with size of fish, weigh into stock dynamics. For example, spawning frequency increases with size for gray triggerfish and gag grouper but it decreases with size for vermilion snapper. This relationship varies by species. In general, larger fish not only have more reproductive output but also have better quality leading to better offspring survival. This is likely true for most reef species in the southeast.

Fisheries tend to target the largest fish, leading to size/age truncation and repeated removal of largest fish over time removes “fast growing” genotypes from the population and can result in slower growth rates and decreased stock productivity.

Given the importance of size to the reproductive capacity of a fish stock, does release mortality vary by size? Bartholomew and Bohnsack (2005) reviewed 274 studies and 14 mortality factors but did not find a significant relationship between fish size and release mortality. Most other studies came to a similar conclusion, including black sea bass, Red grouper and red snapper, although dolphin predation *may* be higher on smaller fish.

However, depth of capture affects release mortality and there may be a relationship with larger fish being caught at deeper depths. Gag, black sea bass, red snapper show this relationship.

Another consideration is that many groupers change from female to male with age; with the largest fish predominantly male. Removal of largest fish can result in skewed sex ratios.

Research needs include improved species-specific information on release mortality, size effects,

the effects of recompression on release mortality and more.

FishSmart Tackle: Techniques and gear for releasing fish

Steve Theberge
(Presentation available at www.FishSmart.org)

Steve Theberge noted that there were several steps involved to increasing the survival of released fish and tools that helped with each of the steps. These steps include:

- Using gear that reduced injury to the fish. Circle hooks sometimes reduce deep hooking but this is not universal across all species and fishing conditions.
- Reducing the time out of the water. Tools such as fish shakers (dehookers) for lip hooked fish, reduces handling, and loss of slime and scales.
- Handling them properly. The body should be supported and anglers should avoid handling gills but some fish are not easy to handle without holding gills. Is handling gills better than dropping? If holding fish by gills helps get the fish back in the water faster, is this a good trade off? There are tools such as lip grippers that help to handle fish and other devices to restrain fish. Covering eyes to calm down, helps in getting them back quickly with less damage.
- Deciding whether additional treatment such as venting or rapid descent was needed. Karen Burns had found that in the absence of barotraumas, vented and nonvented fish had the same tag return rate. There are several tools on the market for both venting and rapid descent.

There is not a universal solution but there are tools that can help in most cases. What works best is to get them back in the water quickly with least amount of handling.

Discussion among the audience concluded that we need to know how successful these devices are, how widespread their use is, and then quantify the in the stock assessments. For example, if venting red snapper reduces mortality by 5% then we can reduce discard mortality by 5%.

Practical Evaluation of Fish Recompression Tools

Bryan Fluech and John Stevely
(Presentation available at www.FishSmart.org)

John Stevely and Bryan Fluech summarized the work that they had been doing with Florida anglers to introduce recompression gear to in the Gulf of Mexico and south Atlantic. Anglers universally held that floaters” are not a pretty sight and they wanted to be involved in the evaluation process. The work involves practical evaluation of various fish recompression tools available on the market as well as some improvised tools. They did not look at quantifying

survival after release. In the Gulf of Mexico you need except permission to not vent fish since the current law indicates that you must carry a venting tool and use it as appropriate.

They stressed that venting and recompression was an option of last resort; get the fish back into the water as quickly as possible and minimize handling. But sometimes difficult to determine if treatment is necessary – that’s why it is important to help anglers understand when treatment might be necessary from outward signs, fishing conditions, etc. Their conclusions to date include:

- At a minimum, improved catch and release practices (including venting and recompression) do some fish some good.
- Not at a point yet were we can measure how much good.
- From what we know so far, recompression devices are probably a good tool for angler to have.
- Angler involvement critical

Anglers will likely need a tool kit of various devices to meet various situations.

Minimizing Discard Mortality and Marine mammal Interactions in the Red Snapper Fishery; How it Impacts the Release of Fish

Greg Stunz

(Presentation available at www.FishSmart.org)

Dr. Greg Stunz discussed in brief studies for minimizing discard mortality as well as studies on marine mammal interactions. The “iSnapper” smart phone app has been useful for collecting data in the For-Hire Fishery in Texas and quantifying the extent of the discard issue.

Dolphin Studies

In terms of studies of deterring marine mammal predation on released fish, they conducted studies using an acoustic deterrent device (Aquamark 200 cetaceal deterrent devices, or ADD) which emits a “ping” and is occasionally used on commercial fishing nets. They took 131 trips, 21 of these with dolphin present in the area. Of these limited occurrences, dolphin remained in the area nearly all of the time when the device was not active but only remained in the area less than 10% of the time when it was active.

Stacey Horstman, Bottlenose Dolphin Conservation Coordinator for NOAA Fisheries, noted that while it is not illegal to have an acoustic device, the potential for harassment is there so in some case you may indeed need a permit. Research on the use of pingers as a deterrent device for bottlenose dolphins in the southeast U.S. has shown them statistically ineffectual for preventing depredation and may in fact produce a dinner-bell effect and attract bottlenose dolphins to gear, increasing the risk of an unwanted and interactions. Additional work needed to be done on this issue.

Through audience discussion, it was unclear whether there was seasonality to higher dolphin predation, but most felt that warmer summer months were worse.

Recent Barotrauma Studies

Field and laboratory studies have been conducted to evaluate Venting vs non-venting, depth effects, and rapid recompression at 30m and 50m. In both sets of studies, there was a clear seasonal effect on mortality with higher temperature leading to higher discard mortality. The lab study also demonstrated a depth effect with the lowest survival being when fish were brought up from 60 meter depth. They recommend venting in the warmer months, but cautioned that additional research was needed.

Panel Discussion on Avoidance: Management techniques and Fishing Techniques designed to prevent encounters of unwanted species/sizes.

A panel discussion with audience participation was held on practical fishing techniques and gear to avoid encountering species or sizes of fish that might need to be returned to the water.

Panelists were;

- Shane Cantrell, Fishin' Addiction Charters, Galveston, Texas. They operate all 6 pack charters. The best venting tool is the one that adjusts the depth of venting. They also use release devices that allow the crew to quickly flip the fish off of the hook and back into the water. He felt that anglers will get used to using new tools if they are proven to be effective, even if they resist them at first. Using larger hooks to target larger snappers; 8-10 lb red snapper is pretty good and if they get into small fish they leave an area when you catch undersize fish. If they hit a spot with mostly little fish they may not come back to it for a year or more. The physical condition of fish plays into how they treat fish; if they think something will be a dead discard they will keep it if legal. Customers do not like to see floaters are to be forced to release fish any more than the captain and crew. Guests want to know why fish are floating; no problem devoting a rod to get fish back down. One way to reach anglers is to identify key guides in each port and get them involved; they will influence others. Social media is becoming more important; they use Facebook, Twitter, and a blog (fishing report) to help keep people engaged.
- Sonny Schindler, Shore Thing Charters, Bay St. Louis, Mississippi. They run 6 pack charters also. They utilize larger hook sizes to help avoid smaller fish. Efficiency and the “clutter factor” determine what they will use for release tools. Tools that take up too much space are not preferred. They find that their customers are interested in more than just fishing; they get questions about life histories of the fish and questions about releasing and survival. It is good for business to “save fish” by venting. Pelicans should be added to list of predators for floating fish.
-

- Duane Harris, Georgia in-shore guide. He agreed with the comments made by the previous panelists that it was important for business and for the fish stocks to do everything possible to help fish survive. In addition, he tries to get the fish to the boat and release it as quickly as possible.

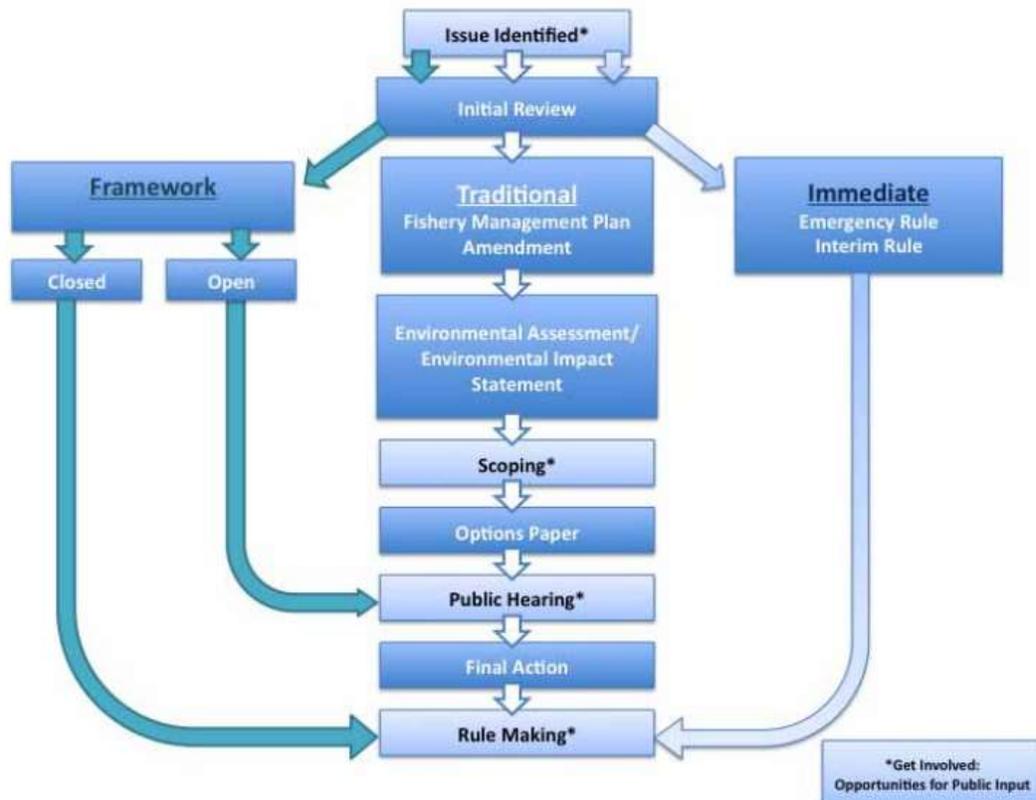
General Discussion

- There may be several solutions to improving the survival of released fish depending on where you are fishing. The Gulf of Mexico is very diverse – fishing conditions in western Gulf, eastern Gulf, southern Gulf all are different and therefore advice to anglers may be different.
- Clients seem to be more willing to learn in recent years than in the past and eager for information. The internet and social media such as blogs, Facebook and Twitter are important for communicating to larger audiences, but it is important not to overwhelm people with large blocks of text, but utilize pictures and interactive content (videos) as much as possible for communication.

The Journey from Science to Management;” what does it take to go from developing/compiling information to change management and regulations

Andy Strelchek, NOAA Fisheries Southeast Regional Office
(Presentation available at www.FishSmart.org)

Andy Strelchek provided a detailed perspective on what actions are necessary to implement findings and recommendations into federal fisheries policy and law. It is a complicated process and can be very time consuming. The Fishery Management Council process was designed to help the public navigate through and participate in this process. In terms of best release tools and techniques, the research questions must first be asked about what information is needed and what information is already in hand. If focused research is needed, it will take time and money to conduct that and submit it through the peer review process. The information gathered then needs to be integrated into the stock assessment process to help determine how it will impact management. The Magnuson-Stevens Act lays out National Standards that must be followed in fisheries management, including the use of “best available information.” Certification as best available science is the strongest. Through every step, public involvement is important. Emergency interim rules can be used in some cases to implement actions that are deemed necessary, which have some level of information to support them, and which need to be implemented sooner than the lengthier process would allow.



Issue Resolution

The four workshop issues, Avoidance, Size, FishSmart Tackle, and Venting/Recompression, were addressed through two primary mechanisms. First, keynote speakers framed each issue, highlighting the major aspects that needed consideration by the workshop participants. Following those presentations, the participants broke into two groups with each addressing all four issues. The groups came back together and discussed the findings of each.

Best Practices and FishSmart Tackle

The best tools and techniques for releasing fish must be determined on a case-by-case basis. The general guidelines provided by the workshop participants were:

- 1) The most important factor is to get the fish back into the water as quickly as possible.
 - a. Before bringing fish out of water, determine how lively the fish is. If it appears stressed do not bring out of water if possible.
 - b. If the fish comes up at from any depth with clear signs of barotrauma, more vigilant action should be taken to prevent mortality such as venting or rapid descent (recompression).
- 2) If beyond a certain critical depth (100 feet was suggested):
 - a. Rapid recompression or venting techniques should be applied. Note that currently in the Gulf of Mexico it is required that anglers vent fish, but a consensus discussed later was to modify this rule).

- 3) In warmer temperatures:
 - a. Rapid descent or venting techniques should be applied.
- 4) Species Specific guidelines could be considered:
 - a. **Species:** Snappers, groupers, black sea bass, porgies, hogfish, amberjack, etc. Species list is somewhat dynamic, and can be categorized by vulnerability into red, yellow, green for recommending venting/recompression. (bigger fish can be harder to vent)
- 5) In shallower depths, need to be more vigilant to make a decision.
 - a. Most fish don't require venting within 100 feet, but these are the symptoms may need to be considered before just letting them go without doing something.

Outline of Messages Directed to Anglers/For-Hire

Considering the recommendations from the 2011 FishSmart workshop, workshop participants made the following suggestions:

- 1) Plan ahead – Add “Expect to release fish and have the appropriate tools to do so.”
- 2) Consider restating “Avoid Encountering” to “target the size fish you want to keep and avoid encountering fish that you don't want to keep”
- 3) Use hook types and bait appropriate to the species and size targeted
 - a. “Weak hooks” – might be able to be removed for the Gulf/South Atlantic region since it may not be applicable here. Consider changing to “selective hook size, bait type, and leader” rather than weak hooks (additional research is needed).
- 4) Land the fish as quickly as possible (this is very important) – suggest adding “If you must handle them, support the fish horizontally. Minimize the handling of the fish, removal of slime layer, and try not to drop the fish. Careful handling practices should be taken to keep the fish from physical injury.”
 - a. Provide a link to photo guidelines from FWC web site.
 - b. Use wet hands to handle the fish (not wet towels-remove this from the recommendations).
 - c. Some chose to use gloves,
 - d. Strike “wet towels to” and change to “and avoid”
- 5) “Have a dehooker that is the proper length to reach the fish”
- 6) Time is of the Essence.

Deepwater release notes:

- 1) Change this statement – In this region, we are not ready to state that rapid descent/recompression is the first choice, suggest changing it to say “Getting the fish back in the water is most important. The use of descender devices and venting tools and techniques to help get fish to depth is a good choice and should be considered. Attempting to improve the survival of a released fish is and good for fish and good for the fishery.”
 - a. Venting, descender tool, fish doing it on its own are the 3 methods
- 2) Change to:

- a. “Fish caught as shallow as 30 feet may suffer some symptoms, fish caught below 30 feet have an increased likelihood of suffering symptoms of barotrauma”
- b. “Research indicates that returning fish to depth has dramatically increased the rate of survival.”
- c. Getting the fish started (to get back to depth) is going to be the biggest help, once they can get back to 30-60 feet, they can go the rest of the way themselves.
- d. If there are predators (i.e. dolphin) in the area, suggest adding a link to marine mammal guidelines; getting the fish to the bottom, or move to another area.
 - i. “Best practice is to release catch quietly as quickly as possible, returning them to depth”
- e. Provide a link to the FWC release guidelines.

Develop guidance to regulatory bodies

1) Regulation change should be made:

- a. The current Gulf of Mexico regulation requiring the use of venting devices should be expanded: “Use rapid descent devices for recompression or venting as needed to increase the maximum likelihood of survival and have a manual and certain gear on board”.
- b. Encourage allowing the user to make a common sense judgment, also encourages personal responsibility.
- c. Consistency in the guidelines that are recommended by the different agencies
- d. The actual amount of regulation to require was discussed, a few different suggestions were made:
 - i. Allowing a suite of tools to be available in the regulations (currently states must have the venting tools on board and must be used in Gulf).
 - 1. There is a lot of controversy regarding what is actually required--- need to revisit the regulation text
 - ii. Have regulations point to guidelines, because guidelines will change as we learn more. The regulations need to be flexible enough to allow this. (There is somewhat of a split between whether the tools should be required on board or just recommended).
 - iii. The tools should be required on the boats, because if they know how to use the tools, but don’t have the tools on the boat it won’t do any good.

Possibility of having stamp or endorsement in order identify the audience and better target through outreach

- 2) **Possible season adjustment:** There seems to be a positive correlation with temperature and depth and mortality of released fish.
 - a. Consider shifting open season (of red snapper) to spring or fall because of catch data (being higher in summer) and the likelihood of barotrauma being fatal is higher in hotter months. It was debated if shifting the time of the season would increase or decrease the length of the season.
 - b. Why hasn’t this come before the Council before? The temperature effects have not yet- there is a publication coming out in the next few months. It is in the

summer now because that is when the highest demand occurs. It is the opposite for gag.

- c. During open season fewer dead discards, argument that when the weather is warm, it would be a worse time to have bycatch because they would be saving the fish anyway

Gaps in the Current State of Knowledge in Need of Additional Research

- 1) Additional research on venting. Steven Atran commented that there was a lack of information on the correct use of venting fish. This hurt the success of the venting tool.
- 2) Puncturing the stomach. Currently, the advice is not to puncture the stomach if it is protruding from the mouth, but the stomach may contain expanded gases, There was discussion on whether it would harm the fish if the stomach was punctured to release these gases. Karen Burns commented that fish can survive the puncture of the stomach.
- 3) Additional data are need on the selectivity of hook size, bait type, and leader strength.
- 4) Reevaluation should be made of the effect of size limits by species on stock rebuilding, incorporating release mortality resulting from an increased number of fish being returned to the water due to regulation.
- 5) Air time effects on catch-and-release mortality should be evaluated.
- 6) Temperature and seasonal effects on barotrauma should be investigated more.
- 7) Depth and temperature effects by species on survival of release
 - a. Survivability of fish using venting and recompression tools. Does venting have a benefit over recompression techniques?
 - b. Interaction with predators, which method is best?
 - i. Which deterrent devices (ADD) or fishing techniques are not harmful to marine mammals and also increase survival of the species?
 - ii. Dolphin avoidance - What is the best depth to release fish to reduce mortality and interaction?
- 8) Summarize what is known about venting and recompressions tools and provide the gaps that need to be addressed.
- 9) Species specific can be expensive, so consider using comparative anatomy to for bycatch mortality classifications.
 - a. Current estimates of bycatch mortality. General characterizations:
 - i. What are the fishing practices that are currently used? Rates of use? Consider a survey of what is used, what is working, who is using it? Where? Consider collecting socio-economic data as well.
 - ii. Why are they throwing the fish back?

- iii. What was the fishes' general condition?
 - iv. Allow flexible questions to be added: depth of capture, basic characteristics of discards
 - v. If the survey is coupled with a larger scale survey (MRFFS/MRIP), these companion surveys can be pieced together to answer bigger picture questions; Can also be used comparatively to question the validity of the survey.
 - vi.
- 10) Are there methods that exist other than venting and recompression that can better increase the rates of survival?
- 11) Acute mortality: what happens immediately after capture and release?
- 12) What is the critical depth for each species triggering barotrauma?
- 13) Predation below the surface on descent down?
- a. ROVs to follow fish down
 - b. Tag-return studies

Communication

Communications: Development and Delivery of Message Content: How Will We Use It?

Online and Social Media

Andrew Loftus

Andrew Loftus provided details of the communication infrastructure of RBFF that will be utilized to reach specific target audiences (e.g., angler populations). RBFF's main outlet for information is through www.takemefishing.org, which currently hosts 4 million unique visitors and growing. They partner with state natural resources agencies (48 states currently partner with them) and have several other programs. Through these programs, they reach 1 million K-12 students and 200,000 educators, giving them a foothold to influencing the future generation of anglers on issues such as proper release techniques. "Catch and Release" was one of the top three conservation issues identified by the RBFF Conservation Roundtable.

It is important to recognize that the takemefishing.org website is not a static "post the information and let anglers find it approach." The RBFF program is oriented around a comprehensive professional marketing and advertising campaign designed to drive anglers to the information. One application for applying this to fisheries where reduced release mortality is desired is to implement a direct marketing/advertising campaign in specific markets to reach those anglers that will be most likely to implement improved release techniques and adopt appropriate gear.

In the short term, the FishSmart effort will begin to integrate information from workshops and others into the existing infrastructure of RBFF.

However, this is only one avenue for reaching anglers. There are millions of anglers that we need to connect with – to accomplish this we need to utilize all possible avenues of communication including recreational fishing industry advertising, states NOAA Fisheries, Sea Grant, and others.

Region Specific Communications

Dorothy Zimmerman, Florida Sea Grant
(Presentation available at www.FishSmart.org)

Dorothy Zimmerman outlined the outreach and education program that was implemented in the Gulf region as a result of the June 1, 2008 Reef Fish Amendment requiring the use of venting tools, dehooking devices, and non-stainless steel circle in reef fish fisheries. They were faced with a need to quickly educate 3.3 million anglers in the Gulf of Mexico on the new rules and how to comply with them. They had several partners including NOAA Fisheries, Florida Fish and Wildlife Conservation Commission, Mote Marine Lab, and the University of Florida, providing an opportunity for a coordinated effort. They focused on “training the trainers,” establishing a web presence (catchandrelease.org), workshops, and printed material as needed. They measured increase in knowledge among anglers, and industry participated through donation of gear as well as developing new venting tools. Communication pathways are now changing to favor increased use of social media, and Sea Grant is currently exploring greater use of “Community-Based Social Marketing.”

Communication Recommendations

- a. Outreach needs to be conducted through workshops etc, to educate fishers
 - i. Suggested that it not be spearheaded by NOAA- it might be counterproductive to be done by NOAA, better if done by states.
- b. Could require or strongly encourage outreach training for charter captains but not required for public anglers- just strongly encouraged.
- c. Video tutorials for how to recompress/vent are needed
- d. Having a guide which is color coded by species on a chart (red yellow green) flow chart for venting/recompression
- e. Pictures go a long way to help educate people of the signs of barotraumas.
- f. Put the products that are available out there, without endorsing any product specifically.

Finding a Unifying Message: Communicating Messages on Best Practices and Management

The messages developed during the 2011 FishSmart workshop, as modified by the suggestions discussed earlier, are a good foundation for the core communications program. Release of fishing using the best available tools and techniques needs to be made an integral part of the overall angling experience, not a burden placed upon anglers. Communications tools should include as much interactive and visual content as possible and be light on heavy text content that is likely not to be read. Communication should be targeted to reach the audience where it will

have the greatest impact; “90% of the Gulf anglers fish offshore” and in deeper waters so that’s where the messages should be directed. Reaching the for-hire community should include identifying and engaging key opinion leaders from that community in each port, they are the individuals who others will follow. Messages communicated through each avenue (states, Sea grant, the takemefishing.org website, etc.) should integrate with each other to send clear and consistent messages to anglers.

Appendix A. Workshop Participants

FishSmart Gulf of Mexico/South Atlantic Workshop on Improving the Survival of Released Fish Focusing on Barotrauma, April 11-13, 2012, St. Petersburg, Florida

Kim	Amendola	NOAA Fisheries SERO
Steve	Atran	Gulf of Mexico Fishery Management Council
Oscar	Ayala	Florida Fish & Wildlife Research Inst.
Steve	Baglio	West Marine
Michael	Bailey	NOAA Fisheries SERO
Luiz	Barbieri	Florida Fish and Wildlife Conservation Comm
Patrick	Brown	Seaqualizer, LLC
Catie	Bruger	NOAA Fisheries
Jeff	Buckel	North Carolina State University
Karen	Burns	Gulf of Mexico Fishery Management Council
Shane	Cantrell	Fishin' Addiction Charters
Libby	Carnahan	Florida Sea Grant
Ed	Chesney	Louisiana Universities Marine Consortium
Chip	Collier	NC Division of Marine Fisheries
Angela	Collins	Florida Fish & Wildlife Research Inst.
Miles	Croom	NOAA Fisheries SERO
Sandy	Diamond	Texas Tech University
Jon	Dodrill	Florida Fish and Wildlife Conservation Comm
Russ	Dunn	NOAA Fisheries
Ann Marie	Eich	NOAA Fisheries
Kerry	Flaherty	Florida Fish & Wildlife Research Inst.
Bryan	Fluech	Florida Sea Grant
Allison	Garrett	NOAA Fisheries
Terry	Gibson	Pew Charitable Trust
Daniel	Gillon	Environmental Defense Fund
Doug	Gregory	Florida Sea Grant
Kathy	Guindon	Florida Fish & Wildlife Research Inst.
Chad	Hanson	Pew Charitable Trust
Duane	Harris	South Atlantic Fishery Management Council
Bob	Heagey	Florida Fish & Wildlife Research Inst.
Peter	Hood	NOAA Fisheries
Scott	Jackson	Sea Grant
Todd	Kellison	NOAA Fisheries, SEFSC
Mike	Larkin	NOAA Fisheries
Janet	Ley	Florida Fish & Wildlife Research Inst.

Jeffrey	Liederman	Seaqualizer, LLC
Andrew	Loftus	Loftus Consulting
Miguel	Lugo	NOAA Fisheries
Sharon	McBreen	Pew Charitable Trust
Jack	McGovern	NOAA SERO
Russell	Nelson	Coastal Conservation Association
Mike	Nussman	American Sportfishing Association
Todd	Phillips	Ocean Conservancy
Gil	Radonski	Loftus Consulting
Ryan	Rindone	Gulf of Mexico Fishery Management Council
Rick	Roberts	Snook and Gamefish Foundation
Beverly	Sauls	Florida Fish & Wildlife Research Inst.
Sonny	Schindler	Shore Thing Charters
John	Stevly	Florida Sea Grant
Andy	Strelcheck	NOAA Fisheries SERO
Greg	Stunz	Texas A&M University
Steve	Theberge	IAP World Services/NOAA Fisheries
Glenn	Thomas	Louisiana Department of Wildlife and Fisheries
Brent	Winner	Florida Fish & Wildlife Research Inst.
Dorothy	Zimmerman	Florida Sea Grant

Appendix B. Agenda

April 11-13, 2012
Florida Fish and Wildlife Research Institute
100 Eighth Avenue SE
St. Petersburg, FL
33701-5020
Phone: 727- 896-8626

Workshop Goals:

Specific to the Gulf of Mexico and South Atlantic Recreational Fisheries being constrained by high release mortality:

1. *Identify best practices and equipment* to employ by anglers/for-hire and regulatory agencies in the Gulf of Mexico and South Atlantic to increase the survival of angler-sought saltwater fishes, with emphasis on reef fishes under a variety of conditions/fisheries.
2. *Develop outline for messages* directed to anglers/for-hire to employ in their interaction with saltwater species in the Gulf of Mexico and South Atlantic.
3. *Provide guidance* to management bodies to reduce the interaction and lethality of such interactions, with those species by anglers/for-hire through the consideration of management actions such as time/area closures, gear modifications, restrictions/usage and size restrictions and account for and incorporate release mortality/survivability into the regulatory process in the Gulf of Mexico and South Atlantic.
4. Identify gaps in the current state of knowledge in need of additional research efforts/funding in the Gulf of Mexico and South Atlantic.

Wednesday, April 11: Plenary

8:00 Welcome & Logistics

8:10 Introduction – Miles Croom, Deputy Regional Administrator, NOAA Fisheries

8:30 FishSmart Initiative – Gil Radonski/Andrew Loftus

8:50 Overview of Atlanta Workshop Results/Gulf and South Atlantic Results of FMP Analysis
-Gil Radonski/ Andrew Loftus

9:10 Framing the Issue of Release Mortality in the Gulf and South Atlantic-Steve Theberge

10:00 Break

10:15 Framing Regional Recreational Fisheries Impacted by High Release Mortality

- Gulf of Mexico – Karen Burns (20 minutes)
- South Atlantic – Chip Collier (20 minutes)

11:00 Current State of Research into Recreational Fisheries Impacted by High Release Mortality
– summarize *current* research projects ongoing (15 minutes each)

- Gulf of Mexico - Beverly Sauls
- South Atlantic- Jeff Buckell

11:30 Questions/Discussion

Noon Lunch

1:00 Overview of Issues *specific to the Gulf of Mexico and South Atlantic recreational fisheries being constrained by high release mortality*: (30 minutes each)

- ◆ Venting *and* Decompression/Recompression: Techniques and appropriate uses of various techniques. –Sandy Diamond
- ◆ Size: Effect of catching/releasing various sizes of fish on stock sustainability- Todd Kellison
- ◆ FishSmart Tackle: Techniques and gear for releasing fish - Steve Theberge
- ◆ Marine mammal Interactions; How it impacts the release of fish-Greg Stuntz (Note; we will have someone from NOAA’s Protected Resources program on hand to answer questions on Speaker: policy implications of Marine Mammal interactions as they relate to release issues.)

3:00 Break

3:15 Introducing recompression gear to anglers in the Gulf of Mexico and South Atlantic – Bryan Fluech and John Stevely, Florida Sea Grant

3:45 Questions/Discussion

4:00 Panel Discussion on Avoidance: Management techniques and Fishing Techniques designed to prevent encounters of unwanted species/sizes.

5:00 Adjourn

Thursday April 12

8:00 Announcements and Breakout Instructions

Attendees will be assigned to one of two breakout groups. The purpose of each breakout group is to delve into the current state of knowledge of each of the issues, describe what is known about the issue and address each of the four workshop objectives *specific to the Gulf of Mexico and South Atlantic recreational fisheries being constrained by high release mortality*

8:30 Regroup in breakout sessions –Each group addresses all 4 issues in the context of workshop goals. Loftus/Radonski group leaders.

12:00 Lunch Speaker: The Journey from Science to Management;” what does it take to go from developing/compiling information to change management and regulations -Andy Strelchek

1:15 Regroup in breakouts

3:00 Break

3:20 Meet in plenary

- ◆ Breakout reports-20 minutes each-each group reports on the results of their discussions addressing the 4 issues. Commonalities and divergences between groups will be identified.

4:20 Group Discussion

5:00 Adjourn

Friday, April 13

8:00 Communications: Development and Delivery of Message Content: How Will We Use It?

- ◆ Online and Social Media – Andrew Loftus (20 minutes)
- ◆ Region Specific Communications – Dorothy Zimmerman, Florida Sea Grant (30 minutes)

9:00 Facilitated Group Collaboration (plenary): Finding a Unifying Message: Communicating Messages on Best Practices and Management Guidance (workshop goals) *specific to the Gulf of Mexico and South Atlantic recreational fisheries being constrained by high release mortality* – Andrew Loftus/Gil Radonski facilitators

(Using the previous day outcomes, develop:

- ◆ Best practices and fish friendly tackle to increase the survival of angler-sought saltwater fishes under variety of conditions (species, temperature, depth caught, hook size, etc.
- ◆ Develop the outline of messages directed to anglers/for-hire to employ in their interaction with saltwater species, and
- ◆ Develop guidance to regulatory bodies to reduce the interaction (avoidance) and lethality of such interactions, with those species by anglers/for-hire.
- ◆ Catalogue gaps in the current state of knowledge in need of additional research efforts/funding

10:00 Break

10:15 Finalize Recommendations

11:15: Wrap Up- Russ Dunn, National Policy Advisor for Recreational Fisheries, NOAA Fisheries

11:30 Adjourn