



PROCEEDINGS OF THE

***FISHSMART MID ATLANTIC/NEW ENGLAND
WORKSHOP ON IMPROVING THE SURVIVAL
OF RELEASED FISH FOCUSING ON
BAROTRAUMA***

March 13-14, 2013

Providence, Rhode Island

Prepared by

Andrew J. Loftus and Gilbert C. Radonski

Acknowledgements

The FishSmart Barotrauma Workshop 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:

Mike Nussman, American Sportfishing Association
Patrick Campfield, Atlantic States Marine Fisheries Commission
Paul Perra, NOAA Fisheries, Gloucester, Massachusetts
Russ Dunn, NOAA Fisheries, Silver Spring, Maryland
Rip Cunningham, Saltwater Sportsman
Chris Moore, Mid Atlantic Fishery management Council
Mike Palmer, NOAA Fisheries
Gary Shepherd, NOAA Fisheries
John Page Williams, Chesapeake Bay Foundation
Gil Radonski, FishSmart
Andrew Loftus, FishSmart

Extensive logistical support was provided by Bob Beal, Patrick Campfield, Laura Leach and Cindy Robertson, Atlantic States Marine Fisheries Commission.

Paul Perra, Northeast Regional Recreational Fisheries Coordinator for NOAA Fisheries, signaled the importance of this workshop by providing the keynote address and taking considerable time from his schedule to interact with workshop participants.

Funding for the workshop was provided by NOAA Fisheries through a grant to the Atlantic States Marine Fisheries Commission.

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.

PROCEEDINGS OF THE FISHSMART MID ATLANTIC/NEW ENGLAND WORKSHOP ON IMPROVING THE SURVIVAL OF RELEASED FISH FOCUSING ON BAROTRAUMA

Executive Summary

The FishSmart regional workshop held in Providence, Rhode Island March 13-14, 2013 revealed that, unlike the regions covered in earlier workshops, the Mid Atlantic-New England regions are in a position to address the issue of high release mortality in recreational fisheries before it reaches a crisis level.

During the workshop, recreational anglers, industry, and for-hire operators gathered with fisheries managers and scientists in an interactive forum to focus on release techniques, fishing and management practices in fisheries where high release mortality may impede stock sustainability. With increasing regulations on cod, black sea bass, and other species, the number of fish that anglers are forced to release will likely increase dramatically in the coming years in the Mid Atlantic-New England, creating severe constrictions in recreational fishing opportunities similar to that faced with red snapper stocks in the Gulf of Mexico/South Atlantic and rockfish on Pacific coast. This will bring greater scrutiny to release techniques and the way that these fisheries are managed for recreational anglers. Although many anglers in these regions currently utilize dehooking devices which is considered a “best release practice,” few are aware of, or utilize, tools and techniques, such as recompression devices that may improve the survival of deep caught fish that are released. Many recreational species in these regions do not have a direct connection between the air bladder and esophagus that would allow them to release gases that expand as they are raised to the surface (a condition called barotrauma) and can benefit from special handling prior to release. Little research on species exhibiting barotrauma effects has been conducted specifically in this region, although black sea bass research has been conducted in the South Atlantic. Several research projects in the region have documented general release techniques that improve survival for all species – including near shore species targeted by small boat and shore-based anglers. During the workshop, researchers presented the results of numerous studies from the west coast, Gulf of Mexico, and South Atlantic documenting that appropriate deep water release techniques can improve the survival of released fish and that these fish retain visual acuity, reproductive viability, and have minimal long term organ damage. However, research is needed to verify these results for specific species and fishing conditions in the Mid Atlantic-New England regions.

Workshop participants recommended several modifications to the general release guidelines that have been evolving from the other workshops. These modifications are designed to stress the importance of initial survival of fish prior to applying any special practices, and to make the guidelines more applicable to near shore boat anglers and shore-based fishing that are prevalent in these regions.

Presenters at the workshop stressed that improving the survival of released fish was a long term investment in stock sustainability, and that reduced mortality may not be immediately reflected in

expanded fishing opportunities. However, reducing any source of mortality is important, particularly as more fish are released either voluntarily or due to regulation.

Finally, workshop participants strongly reiterated the basic tenet of the FishSmart effort that anglers should not be discouraged from keeping fish that they are lawfully allowed to keep or to discourage voluntary catch and release. However, where catch and release does occur, anglers should strive to ensure that every fish that is released survives.

The Mid Atlantic-New England FishSmart workshop completes a series of regional workshops conducted in the last year that also encompassed the South Atlantic, Gulf of Mexico and Pacific (including West Coast, Alaska and Hawaii) regions. This regional approach developed from recommendations made during the 2011 national workshop on improving the survival of released fish, focusing on barotrauma.

A full summary of the workshop is posted at www.fishsmart.org.

Table of Contents

Contents

Acknowledgements.....	i
Executive Summary.....	ii
Introduction.....	1
Goals of the Workshop	1
Background Information.....	2
Keynote Opening.....	2
FishSmart Initiative	2
Results of FMP Analysis	3
Overview of Previous Workshop Results.....	4
Frame the Overall Issue of Barotrauma and Release Mortality	5
Regional Recreational Fisheries Impacted by High Release Mortality	7
Mid Atlantic.....	7
New England	7
Overview of Issues	7
Avoidance	7
Size: Effect of Catching/Releasing Various Sizes of Fish on Stock Sustainability	9
Venting & Recompression: Appropriate Uses of Various Techniques	9
FishSmart Tackle: Techniques and Gear for Releasing Fish.....	10
Breakout Groups.....	11
Issue Resolution.....	11
Best Practices and Equipment; Outline for Messages Directed to Anglers.....	11
Develop Guidance to Regulatory Bodies	12
Gaps in the Current State of Knowledge	12
Voluntary Programs to Address a Management Issue in the Chesapeake.....	13
Communications: Development and Delivery of Message Content: How Will We Use It?.....	13
Online and Social Media	13
Region Specific Communications in the Mid Atlantic/New England.....	14
Communicating Messages on Best Practices and Management Guidance	14
Appendix I. Participants in Mid Atlantic-New England FishSmart Workshop, March 13-14, 2013.....	16
Appendix II. Agenda: FishSmart Barotrauma Workshop	17

Presentations available at www.FishSmart.org under “Workshops”

Introduction

The number of fish released in U.S. marine recreational fisheries regularly exceeds 200 million each year, reaching nearly 270 million in some years and routinely accounts for 60 percent of all fish caught in these fisheries¹. In some fisheries, particularly some Pacific rockfish fisheries, the mortality of these fish after being released is constraining the rebuilding schedules for these stocks and limiting the opportunities for recreational anglers to fish for these species. Developing and implementing mechanisms to help anglers improve the survival of released fish is not only a good conservation strategy but also will likely pay dividends to anglers in the form of enhanced angling opportunities.

In 2011, the Atlantic States Marine Fisheries Commission, in conjunction with NOAA Fisheries and the recreational fisheries community, hosted a "National Workshop on Barotrauma" to address the growing issue of the impact of high release mortality in marine recreational fisheries, focusing particularly on fisheries impacted by high release mortality. Of the many findings from this workshop, participants recommended that the process be stepped-down to the regional level to better address region-specific and fisheries-specific issues. As a result, during 2012-2013, regional workshops were held in the Gulf of Mexico/South Atlantic, Pacific (covering Alaska, Hawaii, and the U.S. West Coast), and New England/Mid Atlantic. This report documents the findings of the Mid Atlantic/New England workshop held March 13-14, 2013 in Providence, Rhode Island.

These workshops are part of a larger effort named "FishSmart," a scientifically-based outreach program in conjunction with the recreational fishing community to reduce the mortality of angler-caught and released fish. There is compelling evidence that angler behavior and gear choice can affect the success of catch-and-release, whether regulatory or voluntary, as a management and conservation strategy. Because anglers often look to natural resource agencies for guidance, and have significant insight on how to handle and release fish properly, there is a need to ensure that outreach materials are readily accessible and provide the necessary and correct information on the subject.

Goals of the Workshop

The intent of the Mid Atlantic/New England regional workshop was to identify best practices for anglers and regulatory agencies to increase the survival of angler-sought saltwater fishes, specific to the Mid Atlantic and New England regions that may be subject to high release mortality and develop guidance to communicate to anglers. In addition, actions that management bodies can implement to reduce the interaction between anglers and species that they must release, while still allowing for angling, were addressed.

The material developed through the workshop has several applications:

1. Identify best practices and equipment to employ by anglers and regulatory agencies in the region to increase the survival of angler-sought saltwater fishes under a variety of conditions/fisheries.
2. Develop outline for messages directed to anglers to employ in their interaction with these saltwater species in the regions.

¹ Based on NOAA Fisheries Marine Recreational Fisheries Statistics Survey, B2 "released alive" estimates.

3. Provide guidance to management bodies to reduce the interaction and lethality of such interactions, with these 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 in the regions.

Background Information

Keynote Opening

Paul Perra, Northeast Regional Recreational Fisheries Coordinator for NOAA Fisheries

Paul Perra opened the workshop by thanking the participants for taking the time to contribute their knowledge and insights into an issue that is becoming increasingly important in the management of marine recreational fisheries. He stressed that the FishSmart initiative is being driven by the marine recreational fishing community with the support of NOAA Fisheries. During the 2010 NOAA Saltwater Recreational Fisheries Summit, the issue of release mortality, especially as it related to deep water species that may be particularly vulnerable, was one of the major concerns expressed by the recreational community and NOAA's support of this initiative was a direct result of that concern.

High release mortality in the New England and the Mid Atlantic is an issue that will become increasingly important in some fisheries. Release mortality has always been factored into the modeling and management of most fisheries where information existed. In some fisheries, such as striped bass, release mortality has been studied fairly well (although some questions still remain). In other fisheries, such as Gulf of Maine cod, little information is known. As the cod fishery is increasingly reduced due to diminishing population levels, it will become very important to have knowledge of the degree to which released cod survive and methods and tools that anglers could use to improve this survival. Other regions such as the Gulf of Mexico have been struggling with this for years and there is much that the New England and Mid Atlantic regions can gain for the knowledge in these other regions so that we can be better prepared to manage these fisheries. He closed by reminding the audience that there was a diversity of backgrounds represented in the room, from scientific to management and on-the-water anglers, and that this diversity represented a strength that, through a collaborative approach, we could develop better solutions to the issues that are identified.

FishSmart Initiative

Gil Radonski/Andrew Loftus
(Presentation available at www.FishSmart.org)

The FishSmart Program is a proactive approach to reduce the release mortality of fish 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.

FishSmart is a program driven by the angling community, not a top-down government program.

FishSmart will utilize several approaches:

- 1) Collating and expanding our knowledge and understanding of released fish survival;
- 2) Developing and employing new technologies/equipment where necessary to enhance released fish survival;
- 3) Promoting the adoption of careful release techniques (best practices) to anglers, and;
- 4) Developing an angler communication infrastructure to disseminate best practices.

In short, FishSmart is a nationwide program to marry the scientific knowledge of the survival of released fish with on-the-ground implementation by the anglers.

The information gathered as part of the FishSmart Regional Workshops will 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) as well as into the existing communication infrastructure at the state, regional, and national levels.

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.

Results of FMP Analysis

Gil Radonski/ Andrew Loftus
(Presentation available at www.FishSmart.org)

Prior to initiating these workshops, a comprehensive review was conducted of how recreational release mortality was being factored into modeling and management of fisheries covered by Fishery Management Council's fishery management plans (FMP's). For the Atlantic coast, this analysis also included management plans of the Atlantic States Marine Fisheries Commission. In summary, the following estimates are currently used in specific FMP's:

Mid Atlantic

Species	Release Mortality	Study Or Other Source?	Citation
Summer Flounder	10%	Study	Multiple Studies
Black Sea Bass	25%	Study + Delphi model	Bugley and Shepherd 1991
Bluefish	15%	Study + modified	Malchoff 1995
Spiny Dog Fish	25%	Assumed	Based on similar species

New England

Species	Release Mortality	Study Or Other?	Citation
Cod & Haddock	30% (?)	Assumed	
Winter Flounder	15%	Study	Durso and Iswanowicz 1982
Pollock	100%	Study + Assumed	Rec catch a small part of the harvest

Atlantic near shore (ASMFC plans)

Species	Release Mortality	Study Or Other Source?	Citation
Striped Bass	8%	Study	Diodati and Richards (1996)
Red Drum	5%	Study	Murphy 2005
Tautog	2.50%	Study	Simpson and Gates 1999
Weakfish	10%	Study	Multiple Studies
Atlantic Croaker	10%	Assumed	

Overview of Previous Workshop Results

Gil Radonski/ Andrew Loftus

(Presentation and detailed reports of all workshops available at www.FishSmart.org)

The full results of the other workshops held as part of the FishSmart workshop are too voluminous to reiterate in this workshop. Workshop participants are encouraged to visit www.fishsmart.org to review those reports in their entirety. However, some general examples of previous workshop findings as they related to the common workshop goals were summarized as follows:

:

National Workshop, 2011

Management Guidance

- Host regional workshops to develop region and species-specific guidance on handling techniques and management strategies.

- Conduct exempted fishing permit studies certifying anglers for fishing in closed areas for the purposes of collecting data (e.g., population and research).
- Identify needed changes to the existing legal framework

Gaps in Knowledge

- Effectiveness of recompression techniques for specific areas/fisheries.
- How far down to release fish.
- Quantify the impact of different release mortalities for fisheries assessments/catch estimation within season.
- Species-specific effects of barotrauma, predation, warm water temperatures and hook mortality.

Communications

- FishSmart website-for program information.
- Establish brand identity.
- Initiated work with RBFF to integrate into web delivery.
- Initiate with ASA FishSmart Tackle program.
- Develop a basis for “best practices.”

FishSmart Gulf of Mexico/South Atlantic April 11-13, 2012

- Begin process to expand regulations allowing for recompression.
- Encourage outreach to anglers on release techniques.
- Modified FishSmart general release guidelines.
- Discussion on modifying recommendations for depth of release in recompression.

FishSmart Pacific Workshop May 8-9, 2012

- Anglers need to avoid catching restricted species.
- Supported using weighted devices to return a fish to the depth where caught (or as deep as possible).
- Venting only where recompression is not possible (Hawaii catch fish 1,200 feet).
- Sufficient science exists to incorporate “improved survival” into management and address mechanisms to allow limited fishing in closed areas.

Frame the Overall Issue of Barotrauma and Release Mortality

Alena Pribyl, Ocean Science Trust

Alena Pribyl provided summary of the general issue of barotrauma release mortality as it relates to research, management, and fishing practices. Four main factors affect release mortality:

- Species, swim bladder morphology and life history. Physoclistous species (those with no connection between the air bladder and esophagus) such as Pacific rockfish and more spiny rayed fish have a harder time adjusting to changes in pressure since they must exchange expanding gases through blood vessels. Physostomous species (such as salmon and trout) have a direct connection between the swim bladder and the esophagus allowing them to release expanding gases through actions similar to burping. Species life history and behavior - pelagic fish are more reliant on their swim bladder to maintain buoyancy. Demersal fish (that live on or close to the bottom) rely to a lesser extent on the swim bladder.
- Retrieval conditions, including hook type and location, depth from which the fish is caught, and other factors.

- Handling once the fish is out of the water (or at the boat). Time exposed to the air influences the number and size of embolisms that form in the blood stream. Angler familiarity with species organs is particularly important if venting is practiced.
- Release conditions, including temperature difference between surface and depth from where they are caught, predation after they are released, etc.

Pribyl stressed that working with anglers to ensure that they have the information necessary to implement Best Practices for handling and releasing fish was extremely important and often less than adequate.

See the full presentation at www.fishsmart.org for additional details.

Questions/Comments

A charter captain remarked that a large percentage of catch and release may come from a small percentage of anglers. Voluntarily adopting techniques requires changes in behavior that may not come without being mandated via regulations.

Several individuals responded that utilizing peer pressure often helped to change behaviors in the angling community without regulations. Recruiting angler leaders to adopt practices often led to other anglers following.

A general discussion was held on how to get the information on release practices and where to purchase devices. Thoughts included:

- Charter captains making release practices an interactive part of the customer experience (something presented by charter captains in the Gulf of Mexico). However, it was noted that this may work better on 6-pack boats, but not on head boats where customers are often after food, and not just fun.
- Developing a smartphone app to provide an overview of options and training videos.
- Educating anglers on what defines a deep water release and what doesn't require special release practices.

Q: Are solid studies of release mortality/survival rates when using recompression devices available? What is the best approach to reducing regulatory discards? How effective is recompression over the long-term?

A: Much of this information will be presented in a later talk, but in the Pacific rockfish recreational fisheries, substantial improvements in survival are achieved, with studies showing that fish survive more than a year later. However, this same success is not seen in commercial trawl or other commercial fisheries since there are combined stress factors that add to deep water decompression that work to reduce survival in those fisheries.

Comment: There is little use or awareness of release devices or venting in the Mid-Atlantic. Some head boats have them but can't keep up when fishing is hot. Pribyl noted that there is a learning curve when using recompression devices, but experienced anglers can often recompress fish just as quickly venting fish.

Comment: Education of all angler sectors is critical but there are challenges for charter and head boats where captains don't have time to deal with all fish caught by dozens of customers.

Regional Recreational Fisheries Impacted by High Release Mortality

Mid Atlantic

Rob O'Reilly, Virginia Marine resources Commission
(Presentation available at www.FishSmart.org)

Recreational fisheries are typically managed with minimum size limits that may encourage targeting larger, older fish while protecting younger fish. Additionally, trophy fisheries and citation programs encourage anglers to target the largest fish. All of this leads to increased release of fish which contributes to more release mortality. Release mortality studies have been conducted for most of the higher profile recreational fisheries in the Mid Atlantic although additional fluke release mortality studies may be needed. Slot-size limits may reduce release mortality if they are properly followed by anglers (e.g., no high grading).

Additional data and details are contained in the presentation available at www.fishsmart.org.

New England

Matt Ayer, Massachusetts Division of Marine Fisheries
(Presentation available at www.FishSmart.org)

The New England recreational fisheries take place largely in two distinct bio-geographic regions: Gulf of Maine and the Mid-Atlantic Bight (Northern edge). The Gulf of Maine is colder and deeper while the Mid-Atlantic Bight is shallower and warmer, setting up different fisheries and fishing conditions that may affect release mortality. Common species are groundfish, summer flounder, scup, black sea bass, and tautog along with species more widespread along the coast including striped bass, bluefish, tuna, etc. release mortality rates are generally incorporated into management measures, although data for cod, pollock, cusk, and a few other species is much more tenuous. He highlighted a study just getting underway to determine the release mortality of cod.

Additional data and details are contained in the presentation available at www.fishsmart.org.

Overview of Issues

Avoidance

Management techniques and fishing techniques designed to prevent encounters of unwanted species/sizes - Panel Discussion

A panel discussion was held to discuss techniques to help anglers (and management agencies) take action to avoid catching fish that were not being targeted. *It was noted that this did not include voluntary catch-and-release fisheries*, particularly where anglers were practicing conservation by releasing fish that they could have retained. The discussion was led by a panel consisting of:

- Rick Belevance, charter captain, Rhode Island
- Skip Feller, charter captain, Virginia
- Jessica Coakley, Mid Atlantic Fishery management Council

Jessica Coakley noted that the focus of management on single species often created a spillover effect on other species: each new regulation imposed on a species shifts effort from one stock/fishery to another. One possible solution to explore would be greater multispecies management that might reduce

the number of fish being discarded within all fisheries. The Mid Atlantic Fishery management Council has been distributing a brochure on best catch and release techniques and favored gear. This has been provided to tackle shops; also promoting TV show audiences. However, there are also bad examples and information in popular fishing shows where taking pictures is often emphasized over release techniques.

Rick Belevance noted that reducing striper effort by charter customers during warm water months might reduce mortality. Often they practice catch and release for stripers after filling their bag limit to keep customers happy. Diversifying their catches by moving to other available species should be considered more. Using larger baits on fluke to select against undersized but aggressive fish that can't take larger baits is another way for anglers to avoid catching large numbers of undersized fish. Communication with other charter boats while fishing often helps to avoid areas where large numbers of fish that can't be retained are found.

Skip Feller indicated that improved communication between charter boats could help to stop black sea bass effort over wrecks when bags or quota are reached. If they knew where to move to keep catching other species and keep customers happy, they might be more willing to do so. Promoting greater use of circle hooks in the fluke fishery might improve the overall survival of discards.

Discussion

Alena Pribyl mentioned a west coast initiative for developing mobile app to communicate where spawning aggregations of protected species are found and so that other boats can avoid catching large numbers of them. Another participant mentioned that there is evidence of Gulf of Maine boats communicating and moving away from sensitive aggregations

It was noted that the minimum size of target species is an important factor; charter captains' behavior is often to start the day targeting little fish so they have some success, then later go after larger fish so customers can take something home.

Some fisheries such as black sea bass in Massachusetts do not have much catch and release because people take fish home; the opposite is true for striped bass where greater numbers are released.

The use of circle hooks was discussed. In the mid Atlantic, circle hooks are commonly used in offshore fisheries both to reduce mortality but also because deep water fish stay on circle hooks better, true for fluke and marlin. In New England, English wide-gap hook (hybrid J/circle) was mentioned as being good for jaw hooking fluke and easy to release but getting the MAFMC to develop mandatory regulation, has not been successful.

The use of angler tagging programs for promoting careful catch and release was discussed. In Australia, they rely a great deal on this type of program, both to promote careful release and to supply data for data-poor fisheries. However, it was cautioned that some programs here in the U.S. have resulted in higher mortality and the data has not always been useful for management. The long term American Littoral Society tagging program data has been used for length information but not the actual tagging data. Some thought that there was great potential for organized group tagging, as long as anglers are trained correctly; anglers want to protect the resource; promote better collaboration among anglers and scientists. Virginia has had an angler tagging program since 1995 (19 years of data for 8 species); a lot of support and interest but without a priori design results the data haven't been terribly useful. A MAFMC workshop on voluntary angler tagging data produced a mixed bag of result. Some

states use the information from these programs more than others due to issues with data reliability, validity, etc.

Size: Effect of Catching/Releasing Various Sizes of Fish on Stock Sustainability

Gary Shepherd, NOAA Northeast Fisheries Science Center
(Presentation available at www.FishSmart.org)

Changes in discard mortality effect stock assessments in varied ways including:

- Impacting stock assessment results;
- Impacting biological reference points;
- Impacting allocation

Currently, recreational discard mortality used in modelling Mid Atlantic and New England species ranges from 0% to 100% (the latter for pollock).

There is a direct relationship between shifting discard mortality and population abundance. However, due to the nature of modelling (VPA, which is a retrospective approach relying on past data to project current stock status) reducing discard mortality and/or magnitude may actually lower near-term fishing quotas but promote stock growth over the long-term. Shepherd cautioned that these expectations should be built into messages related to the impacts (or benefits) of reducing the mortality of released fish. Greater uncertainty in discard mortality can also contribute to higher uncertainty in model results. Additionally, the variability (and uncertainty) associated with the number of fish discarded (B2's in the MRFSS/MRIP sampling) due to poor recall bias impacts the reliability of modeling various population parameters.

Additional data and details are contained in the presentation available at www.fishsmart.org.

Venting & Recompression: Appropriate Uses of Various Techniques

Alena Pribyl, Ocean Science Trust
(Presentation available at www.FishSmart.org)

Alena Pribyl presented a summary of the current state of knowledge related to various release techniques based mainly on a scientific literature review (readers are encouraged to review her full presentation).

Venting - Of 18 species studied, only 4 species were shown to benefit from venting (black sea bass, gag grouper, mangrove snapper and saddletail snapper). Venting may be beneficial in limited circumstances, including when a fish is unable to submerge and no other option is available to overcome buoyancy and in non-catch and release purposes (aquariums, laboratory use, aquaculture, live fish markets, etc.). To be successful, it must be done properly.

Recompression - Recompression (sending fish back down to depth near where they were caught) was beneficial to a greater number of species. Recompression has a number of benefits over venting, including:

- Simple and easy to use
- Devices can be made cheaply, or purchased
- Fish can be released quickly

- No risk of infection from unsterile needles
- No risk of puncturing internal organs
- Release cages can protect fish from predation

Some studies have shown very high release survival (99%) when using descending devices.

The physiological effects on fish after recompression have been studied, including:

- Reproduction - Hochhalter (University of Alaska) demonstrated rockfish fully reproductively viable after 1 year post released and descended.
- Immune system – returned to normal within 30 days after being descended.
- Vision impairment – not present up to four days following recompression.

There are several research items still pending, including the rate of long term survival of fish caught greater than 220 feet. We know that fish survive more than a year, but is it a high percentage or low? Research on the west coast using long term tagging data is currently underway. Also need to conduct additional research on the impact of a ruptured swim bladder on survival.

In Alaska, charter captains are now required to carry release device on vessels when fishing for Pacific rockfish.

A new video on rockfish barotrauma was introduced; view at <http://www.youtube.com/watch?v=EiZFghwVOyI> .

Additional data and details are contained in the presentation available at www.fishsmart.org.

FishSmart Tackle: Techniques and Gear for Releasing Fish

Steve Theberge, NOAA Panama City
(Presentation available at www.FishSmart.org)

Steve Theberge presented a summary of gear intended to help anglers improve the survival of fish that they release. This includes tools for releasing fish, venting fish, and recompressing fish. Improving survival begins when you catch the fish and bring them to the boat. If anglers need to handle the fish, they should use knotless, rubberized dip nets or fish grippers to hold fish (instead of handling) to reduce slime loss or blunt force trauma caused by flopping around or being dropped. Commercial dehookers can help to remove hooks quickly and safely (both for the fish and the angler). If venting the fish is necessary, anglers should be trained and use a proper venting tool that has a hollow core to allow the gases to escape – an ice pick or other similar solid shaft should not be used. Descending, which is gaining support over venting, can be done with a variety of devices. One of the simplest is the upside down milk crate or inverted weighted Dungeness crab ring which can be made at home. There are a number of commercially available descending devices on the market also which make it easier to carry and use on individual fish. Managers and anglers should remember that tools should make it faster and easier to release fish and let anglers get back fishing.

Additional data and details are contained in the presentation available at www.fishsmart.org.

Discussion

A general discussion related to appropriate hook type and composition took place. It was noted that hook composition has changed in last 15 years; most are not made of tin anymore and do not contain compounds dangerous to the fish (see Lukakovic study comparing hook composition and deterioration

comparisons). Not all ‘circle hooks’ are truly circle hooks. There are numerous models of circle hooks available. The Florida Sea Grant has summarized the 2012 circle hook conference findings on their website. Non-offset circle hooks are generally considered to be the most effective. It was also noted that deep hook releasers not only help to remove hooks safely but also help anglers retrieve pricey lures that may have been lost without them. Squid/octopus hooks are commonly used, non-offset circles are not always easy to find.

Breakout Groups

Workshop participants broke into two groups to address the four issues of the workshop:

- Identify best practices and equipment
- Develop outline for messages directed to anglers
- Provide guidance to management bodies
- Identify gaps in the current state of knowledge

Summaries and commonalities are presented under Issue Resolution.

Issue Resolution

Best Practices and Equipment; Outline for Messages Directed to Anglers

Workshop participants generally agreed with the draft “Best Practices” that had been developed in previous workshops but recommended several adjustments to better reflect fisheries in the Mid Atlantic and New England and broaden language for shore anglers:

General Guidelines

Modify language under “2. Avoid encountering...If catching fish you cannot keep or are unlikely to survive, avoid...(certain depths, and so on)” to make it less specific to barotrauma species.

Add proactive language including “be aware of regulations” and “learn the skills to target species that you wish to catch, based on size.”

- Emphasize that catch and release fishing is appropriate in some cases.
- Perhaps add language to minimize bycatch by fishing on areas with less undersize fish.
- Be aware of the effects of fishing on non-target species may have, their likelihood of dying
- Re-order the Best Practices to reflect the chronology of a fishing trip: before leaving house/dock, arriving on fishing grounds, fishing, returning to dock.
- Overall, modify to short bulleted list; need to strive for brevity. Guidance that is too long will be ignored.
- Does language about dropping the fish refer to dropping in the boat, dropping over the water, off a pier, Conowingo dam?
- Add a point about using circle hooks where appropriate.
- Modify language to use a wet towel **ONLY** to cover eyes and calm fish; do not use wet towel to hold fish.
- Should provide guidance on revival techniques for certain species; if needed, move in direction of current, water across the gills; what are signs fish is revived.

Guidelines for Deep Water Fish

Not every fish needs to be treated for deep water (barotrauma), so messages to anglers should identify New England/Mid Atlantic species here barotrauma treatment may be necessary, and species where not necessary. Also add language about “slow, steady retrieval to minimize barotrauma.” Perhaps the

FishSmart website should provide region-specific guidance; e.g., current guidance is not necessary for northeast pelagic species. A GIS mapper tool might be helpful – perhaps a task for ASMFC Recreational Committee?

Messages should help anglers identify when a fish might be suffering from barotrauma and require additional treatment. Where possible, provide exemplary photos of symptomatic fish so anglers know what to look for.

Messages should communicate that these practices may decide the future of fishing for specific species where high release mortality may be a problem (e.g., ‘today’s small fish could become tomorrow’s big spawner’). This is pertinent in the Northeast at the moment where anglers and managers could get out in front of cod release mortality, before it becomes a crisis and forces regulatory actions

Develop Guidance to Regulatory Bodies

The following topics were discussed but do not necessarily reflect the consensus of the workshop participants:

- Managers need to recognize the greater amount of catch and release fishing and impacts of greater discards; magnitude is greater than it was even 10 years ago; managers need to be part of education to improve angler behavior toward reducing mortality.
- New England has a chance to get ahead of the cod issue by investigating release mortality and supplementing the current study to add a component to evaluate the benefits of recompression rather than simple surface release.
- In some fisheries, it may be worthwhile to consider the option of shifting the current dynamic from ‘maximize landings where discard magnitudes are secondary’ to ‘moderate landings, maybe increase discards’ to allow more fishing activity to satisfy anglers. We may need to investigate and try to identify the happy medium that satisfies multiple, diverse interests of recreational sub-sectors (For-Hire seeking poundage/food, private seeking fun, fly fishing catch and release, seeking fun, conservation). This might mean multispecies rec fishery management, coupled with regulations that complement one another and may require shifting anglers’ expectations.
- Managers need to consider individual stock life histories when designing management strategies and regulations. Also need to identify constraints on fishery, collectively, regional, and in each state. Without this, managers may be thinking that they are fixing the problem, but actually are creating a new problem elsewhere.

Gaps in the Current State of Knowledge

There was general consensus among workshop participants that additional research needed to be done specific to Mid Atlantic and New England species to evaluate and quantify the benefits of deep release techniques (e.g., recompression) as has been done on the west coast and Gulf of Mexico. Specific recommendations included:

- Current research on cod release mortality in the Northeast will provide baseline surface release mortality estimates but the research could be enhanced to add a component to evaluate deep release techniques.
- Focal species for research should include cod, pollock, haddock, cusk, black sea bass, weakfish – we only have dated studies, new studies need to match occurrence of fishing activity).

- Gear specific studies such as evaluating hook types would provide more solid basis for recommendations.
- Researchers need to validate B2 (number of released fish by species) magnitude through at-sea documentation compared to MRIP B2 estimates that are subject to recall bias. This is critical for calculations of mortality rate.
- Need to evaluate the recommendation to use rubberized gloves (e.g., do they protect the slime coating? Should they be wet or dry? etc.).
- Survey angler populations to determine whether anglers are adopting best practices.
-

Prioritizing and funding research were also discussed, with recommendations being presented:

- Need to prioritize research based on the needs of management.
- Need to find and develop non-traditional ways of collecting data to monitor the fisheries (Sea Grant role? Volunteer angler data?) to accommodate impending budget shortfalls for traditional research funding.
- cooperative research and RSA opportunities can support release mortality studies

Voluntary Programs to Address a Management Issue in the Chesapeake

Shawn Kimbro, “Careful Catch”
www.carefulcatch.com

Guest speaker Shawn Kimbro provided a summary of a volunteer effort in the Chesapeake Bay region to promote careful catch and release practices. “Careful Catch” was begun in 1992 to promote catch and release ethics. Through workshops and other forums, they provided anglers with information and tools that would help them release fish better. They have taken a science-based approach much like FishSmart and since its inception have started to move toward a more social media-based approach for communication. Their newly-designed website includes a media section as well as bulletin board to allow anglers to communicate on topics related to recreational fishing. For more information, visit the website at www.carefulcatch.com.

Presentation available at www.FishSmart.org

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

Online and Social Media

Andrew Loftus
(Presentation available at www.FishSmart.org)

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 in the Mid Atlantic/New England

Rip Cunningham

(Presentation available at www.FishSmart.org)

Rip Cunningham emphasized that messages need to be tailored as much as possible to the audience. In the case of FishSmart, for example, are you trying to convey messages to experienced anglers or to newcomers to the sport? Different demographic features of these audiences (e.g., older versus younger) may play a role in how they communicate (e.g., more print media versus greater use of social media). There has been a general decline in print media coverage of outdoor sports; electronic media is offering new and easy ways to get messages to large audiences. The avenue through which communication is presented is also important. Government agencies offer some possibilities but need to be careful about the perceptions that each avenue may create. In general, there is no single solution to reaching an audience as diverse as saltwater recreational anglers. Successful communication will come through a variety of avenues and mediums.

Additional data and details are contained in the presentation available at www.fishsmart.org.

Communicating Messages on Best Practices and Management Guidance

A general discussion was held to address avenues through which FishSmart messages could be conveyed. Thoughts about this included:

- Who should the audience be?
 - Entry level anglers, because they’re curious to learn how to catch fish, they have a lot more to learn, they inherently already have the conservation ethic, and it’s easier to ‘change behaviors’ early on instead of after years of experience and being set in their ways.
 - Angler opinion leaders - reputable anglers as spokesman are very effective in swaying angler community behavior (“protect e.g., big spawner stripers”)
 - Outdoor writers have been a very effective mechanism in some areas.

- Workshop participants also discussed the importance of understanding the market and target audiences, and then tailoring outreach to those audiences while also dealing with conflicting information. Most of the fisheries science and management professionals are biologists and not communication experts.
- Need to incorporate guidance and release practices into wallet cards geared toward kids. This needs to be kept general so there’s no need to revise and reprint.

- Need to develop and brand fishing gear that companies produce that are used in best practices; becomes attractive to anglers and promotes sales. (Note: this is being done through the FishSmart Tackle Program of the American Sportfishing Association).
 - Produce a ruler or ruler sticker for coolers to measure fish, with program logo.
 - Focus work on an individual equipment manufacturer or two, utilizing ‘FishSmart conservation branding’ to communicate and grow program.
 - Create an incentive for manufacturers to seek out FishSmart labeling, and possibly generate research funding by the manufacturer.
- Need to include language in messages to “Avoid Waste” and “don’t leave floaters.”
- Partnering with Bait and Tackle Stores
 - Some stores will post as much material as they can because it brings anglers into the store as well.
 - Material needs to be attractive so that stores want to display it.
- State and federal agency fishing guides
 - A single Western Massachusetts publisher prints license and regulation materials for 19 states, including all 6 in the northeast. This would make it simpler to incorporate similar messages in each of those states of the agencies agreed.
- Fishing Guides and Lecture - rotating around different ports and hosting various TV fishing shows. Popular guides have a big following and a lot of sway with the angler community.
- Setting expectations – some messages need to be accompanied with explanations of what happens to the stock assessments if release mortality rates are lowered so that anglers are misled into believing that allocations or harvest levels will be immediately increased if release mortality is reduced.

***** Readers are encouraged to view the associated presentations where available for complete workshop results *****

Appendix I. Participants in Mid Atlantic-New England FishSmart Workshop, March 13-14, 2013

Matt	Ayer	Massachusetts Division of Marine Fisheries
Rick	Belavance	Rhode Island Party and Charter Boat Association
Eleanor	Bochenek	Rutgers University
Bill	Brown	Seaqualizer, LLC
Michael	Bucko	Rhode Island Bait and Tackle shop owner
Pat	Campfield	Atlantic States Marine Fisheries Commission
Jessica	Coakley	Mid Atlantic Fishery Management Council
Rip	Cunningham	Saltwater Sportsman
Anthony	DiLernia	Rocket Charters/MAFMC
Sandra	Dumais	NY Dept. of Environmental Conservation
Skip	Feller	Rudee Inlet Charters
Bryan	Fluech	Florida Sea Grant
Mike	Hogan	Hogy Lures
Steven	James	Stellwagon Bank Charter Boat Assoc/ Boston Biggame Tournament
Shawn	Kimbro	Careful Catch
Jeffrey	Liederman	Seaqualizer, LLC
Andrew	Loftus	Loftus Consulting
Brad	McHale	NOAA Fisheries
John	McMurry	Mid Atlantic Fishery Management Council
Dave	Monti	Rhode Island Party & Charter Boat Association
Rob	O'Reilly	Virginia Marine Resources Commission
Michael	Palmer	NOAA Fisheries
Patrick	Paquette	Massachusetts Striped Bass Association
Paul	Perra	NOAA Fisheries
Alena	Pribyl	California Ocean Science Trust
Gil	Radonski	Loftus Consulting
Gary	Shepherd	NOAA Fisheries
Steve	Theberge	IAP World Services
Jim	Tietje	Patriot Party Boats, Inc.
Charlie	Wade	Stellwagon Bank Charter Boat Association
Paul	White	N E Tackle Wholesaler
John Page	Williams	Chesapeake Bay Foundation
Greg	Wojcik	CT Department of Energy and Environmental Protection
Doug	Zemeckis	SMAST - UMASS Dartmouth

Appendix II. Agenda: FishSmart Barotrauma Workshop

AGENDA

FISHSMART MID ATLANTIC/NEW ENGLAND WORKSHOP ON IMPROVING THE SURVIVAL OF RELEASED FISH

March 13-14, 2013

Renaissance Providence Downtown Hotel
Providence, Rhode Island

Workshop Goals:

Specific to the Mid Atlantic/New England fisheries constrained by high release mortality:

1. *Identify best practices and equipment* to employ by anglers and regulatory agencies in the region to increase the survival of angler-sought saltwater fishes constrained by high release mortality under a variety of conditions/fisheries.
2. *Develop outline for messages* directed to anglers to employ in their interaction with these saltwater species in the region.
3. *Provide guidance* to management bodies to reduce the interaction and lethality of such interactions, with these 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 in the region

Wednesday, March 13: Plenary

7:30 Continental breakfast available

8:00 Welcome & Logistics

8:10 Introduction- NOAA Fisheries/ASMFC

8:30 FishSmart Initiative – Gil Radonski/Andrew Loftus

Overview of Previous Workshop Results/Results of FMP Analysis -Gil Radonski/ Andrew Loftus

9:00 Framing the Issue of Release Mortality in General –Alena Pribyl, NOAA Southwest Fisheries Science Center

9:30 Questions

9:45 Break

10:00 Framing Mid Atlantic/New England Regional Recreational Fisheries Impacted by High Release Mortality

- Mid Atlantic Rob O'Reilly (Virginia Marine resources Commission) (20 minutes)
- New England Matt Ayer (Massachusetts Division of Marine Fisheries) (20 minutes)

10:45 – Questions/Discussion

11:00 Overview of Issues

- ◆ Avoidance: Management techniques and Fishing Techniques designed to prevent encounters of unwanted species/sizes - Panel Discussion
 - Anglers/For Hire New England-Rick Belevance
 - Anglers/For Hire Mid Atlantic-Skip Feller
 - Management Mid Atlantic-Jessica Coakley

12:00 Lunch

1:15 Continue Overview of Issues (20 minutes each)

- ◆ Size: Effect of catching/releasing various sizes of fish on stock sustainability and Implications of lowering release mortality on stock assessments---Gary Shepherd, NOAA Northeast Fisheries Science Center
- ◆ Overview of Research: Venting *and* Decompression/Recompression – Alena Pribyl, NOAA Southwest Fisheries Science Center
 - ◆ FishSmart Tackle: Techniques and gear for releasing fish-Steve Theberge, NOAA Panama City

2:15 Breakout groups:

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.

3:00 Break

3:15 Reconvene in Breakout groups

5:30 Adjourn

Thursday, March 14

7:30 Continental breakfast available

8:00 Announcements

8:15 Breakout reports-20 minutes each-each group reports on the results of their

discussions addressing the 5 issues. Commonalities and divergences between groups will be identified.

9:00 Group Discussion Develop final recommendations on best practices, angler messages, and management guidance for fisheries constrained by high release mortality in the region

- ◆ *Best practices and gear* for anglers to increase the survival of angler-sought saltwater fishes under variety of conditions (species, temperature, depth caught, hook size, etc.
- ◆ Messages for regulatory bodies
- ◆ *Develop the outline of messages* directed to anglers to employ in their interaction with these saltwater species

10:00 Break

10:15: Continue Development of Recommendations

- ◆ *Develop guidance* to regulatory bodies to reduce the interaction (avoidance) and lethality of such interactions, with those species by anglers.
- ◆ Catalogue gaps in the current state of knowledge in need of additional research efforts/funding and initial prioritization of research in the region
- ◆ Identify ways to improve the connection between research and management implementation by identifying and supporting robust, actionable science on release mortality rates.--
- ◆ Setting expectations: Perceptions of anglers of what happens to the stock assessments if release mortality rates are lowered. --

12:00 Lunch

Lunch Speaker:

Voluntary programs to Address a Management Issue in the Chesapeake-Shawn Kimbro “Careful Catch” See www.carefulcatch.com

1:00 Communications: Development and Delivery of Message Content: How Will We Use It?

- ◆ Online and Social Media – RBFF (20 minutes)
- ◆ Region Specific Communications in the Mid Atlantic/New England – (20 minutes)-Rip Cunningham

2:15 Facilitated Group Collaboration : Finding a Unifying Message: Communicating Messages on Best Practices and Management Guidance (3 workshop goals). –Andrew Loftus/Gil Radonski facilitators

Using the previous day outcomes, develop messages specific to the region for:

- ◆ Best practices and gear for anglers 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 to employ in their interaction with saltwater species
- ◆ How do we communicate best practices to anglers when we don't have a baseline
- ◆ Develop guidance to regulatory bodies to reduce the interaction (avoidance) and lethality of such interactions, with those species by anglers.
- ◆ Communication tools and pathways

3:15 Break

3:30 Finalize Recommendations

4:15 Wrap Up

4:30 Adjourn