

An Introduction to Harvest Tags for Marine Recreational Fisheries¹

Edward Camp, Zachary Siders, Andrew Ropicki, and Frank Asche²

Abstract

Managing recreational fisheries is always a challenge of balancing sustainability against allowing as much access and harvest as possible. Maintaining sustainability is made harder by discard mortality. Any fishing activity, even catch and release, has some chance of causing released fish to die from injuries, predation, or other causes. Discard mortality is especially a problem for Florida reef fish species that live at depths and in habitats where barotrauma increases mortality and depredation by larger fish, sharks, or marine mammals. One management option that could potentially reduce overharvest, lower discard mortality, and allow fishers more freedom to choose when to fish would be harvest (or trip) tags. Harvest tags would limit the total fish harvested but *could* eliminate one of the least popular current management restrictions, harvest seasons. This publication describes harvest tag approaches further. It talks about how they are already used in fishing and hunting and explains some of the potential benefits and costs if they were applied to reef fish fisheries in Florida.

Introduction

Managing recreational reef fisheries like those so popular in Florida can be challenging. Most fishers want as much “access” or days that they can legally harvest fish as possible; however, longer seasons can increase not just overall

harvest but also discard mortality. Discard mortality occurs when landed fish are released and die from injuries, predation, or other causes associated with being caught. High levels of discard mortality can make it necessary to shorten harvest seasons to prevent overfishing and fishery collapse. There are no perfect solutions to this challenge. Still, there are some new options that fishers, management agencies, and scientists alike are studying. One such new option is a “harvest” tag system, in which fishers are given a certain number of individual tags to harvest fish (harvest tags). This approach has several benefits as well as drawbacks. This publication introduces some of the scientific justification for considering harvest tags, particularly the challenge posed by discard mortality. Then the publication describes some of the benefits, and challenges and potential unintended consequences harvest tags might cause. The primary purpose of this publication is to provide information to the public, especially recreational fishers who may not be familiar with harvest tags. It may also be useful to management agencies and Extension/outreach personnel who need to discuss these options with their colleagues and stakeholders.

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2. Edward Camp, assistant professor, School of Forest, Fisheries, and Geomatics Sciences, Program in Fisheries and Aquatic Sciences; Zachary Siders, assistant research scientist, School of Forest, Fisheries, and Geomatics Sciences, Program in Fisheries and Aquatic Sciences; Andrew Ropicki, assistant professor and Extension economist, Food and Resource Economics Department and Florida Sea Grant College Program; and Frank Asche, professor, School of Forest, Fisheries, and Geomatics Sciences, Program in Fisheries and Aquatic Sciences; UF/IFAS Extension, Gainesville, Florida 32611.

The big picture problem: restricting fishing is no fun but necessary

Fisheries management requires weighing the costs of restricting current fishing opportunities against the risks of overfishing, leading to decreased future fishing opportunities and/or stock collapse. The costs associated with restricting current fishing opportunities are measured in terms of less fisher satisfaction because the restrictions keep recreational fishers from fishing the way they would otherwise want to. For example, if the harvest season for a species is reduced from eight months to four months, this limits the number of times people can fish and constrains their choices of when they can fish. On the other hand, a complete lack of restrictions can lead to disaster, both ecologically and economically. If there were no restrictions on fish harvest, it is almost certain that some species would become extremely overharvested. This would lead not only to ecosystem concerns but also to less satisfying fishing (e.g., lower catch rates) in the future. Even if restrictions were implemented following such a collapse, poor fishing could last for a long time. This is especially true for long-lived species like some snappers and groupers, whose populations can take decades to recover. Additionally, a complete absence of regulations would likely cause an unequal distribution of the resource (fish), which is often considered socially undesirable. For example, with no restrictions on season or bag limit, the most skilled fishers and/or those who could fish most often would be able to harvest a disproportionate amount of fish before the population collapsed.

This is the heart of the challenge for managing fisheries. Managers should try to find the regulations that offer the least restrictions possible while still ensuring that populations are not overfished. Some common ways managers try to achieve this balance is through things like size limits (size of fish that can be harvested; Figure 1), bag limits (number of fish that can be harvested per fisher or boat per trip), and season limits (specific days of the year in which fish can be harvested). When enforced, these restrictions can be reasonably effective at preventing over-harvest; however, as fishing effort increases, regulations that restrict harvest often need to be made even more restrictive. This can be done by changing size limits, decreasing bag limits or season length, or some combination of the three. Increasingly restrictive regulations are often unsatisfactory to fishers, but it also creates an inherently more pernicious problem: discard mortality.



Figure 1. Most reef fish are currently managed with a series of minimum size, bag, and harvest season limits.

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The difficult problem of discard mortality

Discard mortality is the death of fish that don't survive catch-and-release. There are several ways released fish might die.

- Fish can die from hooking injuries (e.g., hooks that damage gills, throat, body, etc.; Figure 2).
- Fish brought up from depth can die from barotrauma, a condition in which the gases in their bodies expand and either damage organs or leave them stranded on the surface and unable to swim back down;
- Released fish can be preyed upon and killed by larger predators like sharks and dolphins while they are attempting to recover from displacement, stress, and possible injury after they are released.

Discard mortality is a substantial problem for many fisheries, especially for Florida reef fish. Released fish that die offer no future value to fishers or the stock, and discard mortality can have substantial negative effects on fish populations (Coggins et al. 2007). The problem of discard mortality in reef fish lacks easy, effective, and popular solutions. The most considered options for addressing discard mortality have shortcomings. Actions fishers can take, like venting and use of descending devices, can reduce specifically barotrauma-related discard mortality of fish caught in deep water, but these strategies do not reduce mortality from hooking injuries or depredation. (See [FE1010](#) and [SG160](#) for additional details.) Another alternative is regulations restricting fishing gear (e.g., the required use of circle hooks with natural bait when targeting reef fish). This can decrease but usually not eliminate injuries from hooking,

but it does not address barotrauma or depredation. More specific gear restrictions have also been considered, such as requiring hook sizes large enough to reduce the chance of catching an undersized fish. This regulation modification has shown some success in mostly North Atlantic fisheries (Salierno et al. 2018; Gilman et al. 2018; O'Neill et al. 2019), but some species in the snapper-grouper complex commonly targeted in the Gulf of Mexico and South Atlantic may attack lures or baits much larger than expected (Figure 2). Even if catching an undersized fish can be prevented, these restrictions will not help prevent discard mortality of released legal-sized fish. A legal-sized fish may be released for a variety of reasons. They may be captured out of season, captured by a fisher who has already reached their daily bag limit, or captured by a fisher who simply does not want to keep that fish. All of these approaches alone or combined may decrease discard mortality, but it is unclear if it can be decreased enough to solve the problem. Some amount of discard mortality is unavoidable when releasing deep-water fish species that are preyed upon by larger marine predators like sharks and dolphins. As a result, there is an increased effort to understand both how to decrease the number of fish discarded and how to reduce the rate of mortality among discarded fish (Chagaris et al. 2019).



Figure 2. Despite being used to target larger fish, like the “legal sized” gag in panel B, the exact same lure may also hook much smaller gag that are far too small to keep (panel A).

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An obvious way to decrease the number of discarded fish dying may be to reduce fishing seasons and not just the harvest season. However, decreasing fishing seasons can substantially decrease the social and economic value from fishing. Fishers would only be allowed to fish in certain seasons, which may or may not align with when they want

to fish. Also, strong seasonal patterns in fishing-related revenue might be very damaging to coastal economies that rely on recreational fisher expenditures. So, the idea of having shorter seasons when it is legal to fish for reef fish has been wildly unpopular among fishers and coastal communities (Chagaris et al. 2019). The challenge of discard mortality, then, is to find a way to decrease the amount of discards while still allowing fishers to have as much freedom as possible when making their decisions about when to fish.

What are harvest tags?

One approach increasingly considered is the use of individual harvest tags (Johnston et al. 2007, 2009; Jackson et al. 2016). The concept of a harvest tag is that individual fishers would obtain a certain number of individual, non-reusable fish tags per season or year. Any legally harvested fish would need to be tagged (with a plastic zip-type tag through the mouth, a wire tag through the base of the dorsal fin, etc.) (Johnston et al. 2007). This concept has been employed in hunting for decades. In many states, an individual tag is required to harvest deer or other species. Even in Florida, there is an annual maximum limit of five deer per person, which functions similarly to a tag system. Other species in Florida, such as alligators also have harvest tags. Harvest tags are currently used for trophy fish such as Atlantic tarpon and, in 2021, a trial harvest tag system was approved for goliath grouper in Florida. Since harvest tags are uncommon in recreational fisheries, it is not always easy to know what the potential “pros and cons” of this system might be. Nonetheless, their theoretical advantages and disadvantages can be described, and several studies have evaluated them more specifically.

Potential advantages for harvest tags

The potential advantages of harvest tag-based management include the following:

- Harvest could be directly controlled via the number of harvest tags allotted, making it easier to manage total harvest.
- Harvest tags would make closed seasons unnecessary, meaning fishers could harvest their allotted number of fish whenever it was most valuable for them to do so.
- Harvest tags could be used without imposing size or daily bag limits, which *could* decrease discard mortality.

The economic value of not having a closed harvest season for recreational fishers could be tremendous, as it would allow fishers to fish when they prefer to do so. For example, if an fisher possessed ten harvest tags for gag grouper,

they would have the option of harvesting those grouper throughout the calendar year. This would allow them to pick days that worked best for them, whether that was due to free time, availability of fishing partners, good weather, or simply to “space out” their harvest so it could all be consumed fresh. Abbot et al. (2018) established how common management regulations that restrict harvest via season, size, gear etc., limit fisher options and have massive economic costs. In addition, harvest tags could also decrease discards by reducing the number of fish released due to seasonal harvest closures. For example, a fisher fishing off Citrus County, Florida, would be required to release a legal-sized gag grouper captured in April. With a harvest tag, that fish could be harvested, decreasing the potential for it to be lost to discard mortality. The possibility of eliminating size and bag restrictions could also reduce discards by allowing fishers the option to use tags on fish that would otherwise be released (fish that would be undersized or over bag limit per traditional regulations).

Another potential advantage of harvest tags is a more equitable distribution of harvest opportunities and possibly the harvest itself across fishers. For example, imagine a type of fisher that has a flexible schedule (such as no required work) and possesses a very capable and well-equipped vessel for targeting snapper and grouper (such as a 30'+ catamaran hull with dual or triple engines and top-of-the-line electronics). This first type of fisher could fish many days per year because they have the time and a vessel capable of safely operating under a wider range of weather conditions. Now imagine another type of fisher that is only able to fish on weekends (because they have a 9–5 job) with a smaller, lower-powered vessel (such as a 17- to 20-foot single engine flat or bay boat). Under traditional harvest restrictions (size, daily bag, season limits) the first type of fisher will almost certainly have the opportunity to harvest many more fish than the second, simply because being able to fish more allows more harvest of fish. Harvest tags would almost certainly make that distribution of harvest more equitable between the two types of fishers.

Potential problems with harvest tags

However, the efficacy of harvest tags suffers from some known downsides and likely unknown issues. First, stakeholder acceptance of harvest tags is largely unknown (Shideler et al. 2015). While harvest tags are used for some big game fish (e.g., tarpon, Guindon 2011; walleye, Radomski 2003; and Australasian snapper, Jackson et al. 2016) and hunting of big game mammals, they are not the norm with most finfish (Johnston et al. 2009). It is likely that even if harvest tags were seriously considered, they

would only be so for the most heavily sought-after and exploited species, such as red snapper, gag, etc. Second, if harvest tags are implemented without any additional regulations specifying the legality of optionally releasing fish, they are not guaranteed to decrease discard mortality. That is, fishers could choose not to harvest fish they caught and release them anyway. Fishers might voluntarily release fish for conservation reasons, to use their tag on a larger fish, or because they do not possess harvest tags for all the fish they catch. To truly limit discard mortality, harvest tags may require additional rules—such as restrictions of what fish could be legally released or even whether trips targeting species could be taken without possession of harvest tags. It is also important to acknowledge the challenges in interpreting socioeconomic and ecological feedback from major management changes (Camp et al. 2020). Implementing a harvest tag system would almost certainly change how and when fishers fished, which would in turn affect fish populations, and these changes could eventually “feedback” to further influence how fishers fished. There would likely also be some issues in how harvest tags are governed—that is, who has the power to make important decisions such as how many harvest tags are made available and how they are distributed, as well as the process for these decisions being made, contested, and changed. Other specific issues that could arise would be whether and how harvest tags might be transferred (i.e., can fishers purchase additional tags from each other?), and how used harvest tags would need to be reported. Of course, as with all regulations, there is the question enforcement.

Finally, the redistribution of harvest away from fishers with more time, skill, or equipment to more casual fishers is not likely to be popular with those fishers who are negatively impacted. Fishers often have invested large amounts of time or money to harvest fish and may resent being constrained to a smaller number of harvested fish. This brings up the possibility of being allowed to purchase additional harvest tags, either from the state (if there is estimated to be surplus harvest) or perhaps even from other fishers. The transfer or purchase of additional harvest tags could introduce multiple unintended consequences that would need to be examined. One unfortunate possibility would be if non-fishers applied for tags for the sole purpose of selling them (as this would make tags more scarce and valuable), or if other folks purchased tags with no intent of using them (i.e., to prevent harvest of fish). Some of these issues have been addressed in big game hunting, for example, which usually uses lotteries for distribution when demand for tags exceeds allowable harvest, generally does not allow transferability of tags, and requires used tags to be reported

shortly after harvest of animals. The main point is that there without doubt would be challenges to implementing harvest tags, but (1) it is not clear that these challenges are greater than those currently faced with shrinking harvest seasons and increasingly dissatisfied fishers, and (2) some of the challenges have precedent of being reasonably well addressed.

Summary

A major challenge of recreational fisheries management is to fisher satisfaction while ensuring ecological sustainability and socioeconomic value for the future. The challenges with harvest or even trip tags are substantial, but the potential benefits could also be substantial (Johnston et al. 2007; Abbot et al. 2018). Harvest tags could put a hard limit on the total number of fish a fisher could harvest in a year, which some fishers will not agree with. Harvest tags also would make closed harvest seasons unnecessary, which many fishers would probably like. The implementation of tags would most likely also benefit fish populations by decreasing discard mortality, and, more generally, better controlling overall recreational fishing mortality. So, the potential positives and negatives are real; what is unknown is which is greater. Determining the answer to that question will depend on future research and planning to understand:

1. Logistics of implementation—how would this be done practically?
2. Fisher perception and preference—how would fishers like it?
3. Fisher behavioral changes in response to this new management approach—how would fisher behavior change?
4. Effect of harvest tags on fish populations—how would all fisher behavioral feedbacks taken together change the numbers?

The final question of effect on fish populations is probably of greatest importance. This is because the reef species to which this would most likely be applied are generally governed by federal fisheries management and specifically the Sustainable Fisheries Act, which emphasizes sustainability. Initial socioecological simulation studies, such as that done by van Poorten and Camp (2019) would be good first steps, but they would likely need to be followed by human dimensions and quantitative fisheries approaches as well.

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