

# Cooperative Science Services, LLC Dolphinfish Research Program

May 2015



## How to Increase Your Tag Recovery Rate

There are some ardent dolphin taggers out there who have tagged more than 100 fish and have not had one of their fish reported recovered. Then there are those taggers who have had a recovery after tagging no more than five fish. Chance does play a major role in a tagged dolphin being recovered, but there are many things that anglers can do to enhance the odds of their fish being recovered.

The following lists six steps fishermen should follow to significantly increase the odds that their fish will be recaptured. The **first** action fishermen should take when starting to fish is locate the tag kit, make sure there is a tag in the applicator, and that you know where the associated card is that matches the tag number. Have these in an easy-to-reach location.



*The use of circle hooks increases the likelihood that the hook will catch in the corner of the mouth.*

The **second** action anglers can take to ensure healthy fish for tagging is to use circle hooks. It does take some practice to learn to use these hooks properly, but once you learn, you will lose fewer fish and have few fish deep-hooked or hooked in the gills.



*A tag inserted just under the skin, as shown above, will result in the tag being shed within a few days. This is a virtual waste of the tag.*

The **third** action taggers can take is to insert the tag deeply into the fish to provide a secure implant. Shallow tagging is a common problem that results in the tag being shed just days after it is released. The tag should be inserted into the dorsal muscle about one-third the fish's length behind the head. It should be inserted at a 45° angle toward the head and deep enough so that the barb of the tag passes between the fish's spines from the backbone. This allows the barb to lock around a spine, securing it in the fish.

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*A tag locked around a dorsal spine will remain with the fish for its life. This 49-pound dolphin was tagged 18 months earlier as an eight-pounder and the tag is still firmly attached.*

The **fourth** action is simply choosing not to tag seriously injured fish. Fish that remain out of the water for more than one minute, or those that are deeply hooked or bleeding, should not be tagged. While these fish will swim off, they will likely die a short time later (latent mortality).



*Fish that are losing a lot of blood indicate that they have sustained a serious injury and should not be tagged.*

The **fifth** action fishermen need to take is to handle the fish gently. I know that is saying to be gentle with a fish that is trying to beat the tar out of you. Grasping the fish in its gut region or gill area and forcefully holding it there will likely inflict significant damage to its organs or its gills. Either way it will be dead a short time later. It is best to throw a wet towel over the eyes of a fish that has escaped into the cockpit. Once the fish's eyes are covered it will normally calm down. Also tags should never be placed near or in the gut cavity, gills, or the head. Tags in these areas will also lead to an early death.



*Fish do not cooperate when being tagged, which can result in fishermen having to use strong force to control them. This can lead to serious internal injury and later to death.*

The **sixth** action anglers can take to maximize recovery chances is to use a dipnet to lift the fish out of the water. Using a net reduces the chance of injuring the lower throat area, which has many blood vessels that supply blood to the gills, critical to the fish's breathing. Once in the net the fish has little chance of escaping into the cockpit, which is a big plus. This shortens the time that the fish is out of the water.



*The use of a dipnet to lift the fish out of the water reduces the chances of injury and helps prevent the fish's escaping into the boat's cockpit.*

A dipnet offers other advantages in controlling the fish. It allows the angler to easily tag the fish and remove the hook. Small school fish can even be measured without being removed. This all adds up to a quicker return to the water for the fish. A dipnet with rubber webbing is the most fish-friendly and easiest to get the hooks out of.

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*Using a net to lift the fish into the boat minimizes damage from the hook and, with a cloth over the fish's eyes, gives the fisherman full control of the fish while tagging.*

None of these actions involve rocket science, nor do they require much additional effort on the part of the fisherman. Just a little bit of planning and preparation will make tagging dolphin easier and more fun while producing a healthier fish for science.

### Do Dolphin Anglers Support Fishery Welfare?

If asked, I would have to say that they do. Waiting for government to get around to studying a stock of fish is fishery welfare. The lack of private financial support for the DRP from the vast number of the offshore anglers who fish for dolphin suggests that they are content with the government's management of the sport fisheries.

In 2014 the DRP received financial support from only 55 individuals, clubs, businesses, and foundations. Donations last year were at an all-time low, and yet the program's discoveries about dolphinfish, along with the number of fish tagged, were at one of its highest points. Last month we revealed the first documented migration route for a dolphin traveling from the East Coast to the Caribbean.

Every offshore boat owner who fishes for dolphin should donate \$100 to support this important research each year. Today, two quality offshore lures rigged out cost that much. I would think that fishermen would place a much higher value on being able to catch fish that they can bring home. Dolphinfish has long been those fish.

Donations to the DRP are fully tax deductible, thanks to the Hilton Head Reef Foundation, a registered 501 (c) 3 organization that works with the study receiving donations for the program. To make a donation, the check should be

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made out to the Reef Foundation/Dolphin Study and sent to the address at the end of this newsletter.

How important is catching dolphin to you?

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# Cooperative Science Services, LLC

## Dolphinfish Research Program

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### Toxicity of Crude Oil

We hear each month in the news about reports of new oil spills or the damage past spills have caused to marine life. Just recently a report came out in which science showed that an additional 46 mammal dolphins died as a result of the Deepwater Horizon oil spill that occurred in 2010. This is in addition to the more than 1,000 reported by the Associated Press as being killed in the years immediately following the spill. Now there has been another major oil spill in the ocean off Santa Barbara, California, forming slicks over nine miles of ocean. We get graphic images of the dead and dying animals that are immediately affected by the spill, but scientists know there will be long-term effects as well on the spawning success of fish in the area for years to come.

Scientists with the Ecotoxicology Program at NOAA's Northwest Fisheries Science Center in Seattle, Washington, have been working to understand the toxicity of oil. Even before the Deepwater Horizon disaster, research demonstrated that relatively low concentrations of oil could cause developmental abnormalities in fish. But in the five years since, scientists have shown that oil damages the still-forming hearts of fish embryos and larvae, and they have discovered the causes for that injury at a molecular level.

Researchers at NOAA's Alaska Laboratory showed that larval fish exposed to oil as embryos suffer a broad range of developmental deformities in the heart, jaw, eye, and other areas. They were able to show that larval fish exposed to trace concentrations of oil develop into fish that look normal but are less likely to survive when released into the ocean.

In the years between the Exxon Valdez and the Deepwater Horizon spills, NOAA scientists discovered

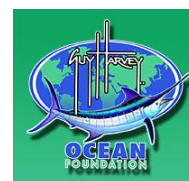
that compounds found in oil called polycyclic aromatic hydrocarbons (PAHs) target the developing hearts of fish embryos and larvae. Most of the other abnormalities, which together have become called crude oil toxicity syndrome, were shown to be a consequence of a misshapen heart that functions poorly.

A study led by University of Miami Rosenstiel School of Marine and Atmospheric Science scientists showed that even a relatively brief, low-level exposure to oil decreases the overall swimming performance of juvenile dolphinfish up to 37 percent. The study shows that toxic effects of oil harm the swimming capabilities of dolphinfish, and likely other large pelagic fish, during the early life stages. Altering the swimming capabilities of the larval fish affects their ability to capture food and avoid predators.

An oil leak in the Gulf of Mexico has gone largely unnoticed for more than a decade, according to the Associated Press, even though it is responsible for miles-long slicks. Taylor Energy, the company tasked with fighting the oil leak, and the government agencies overseeing it have both downplayed the spill saying it was nothing more than a minor spill, such as those that happen dozens of times and which the Gulf absorbs.

Findings from the AP investigations indicate that this spill is 20 times larger than the most recent estimate by the company. Experts say it could be one of the largest ever in the Gulf of Mexico. This leak was caused by hurricane Ivan when it destroyed the Taylor platform. The president of Skytruth, an environmental watchdog group, estimates that between 300,000 and 1.4 million gallons of crude oil have leaked into the waters of the Gulf since 2004, and leakage continues today.

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NOAA researchers are working to determine at what level does PAH begin to affect larval fish. This information will not cure or prevent future damage. At best, it will only allow a better prediction of the damage. No one knows how long these contaminants will continue to kill larval fish and whether lethal levels of these toxins will be spread to other areas by the ocean's currents. Such toxins in our oceans are silent, invisible killers that will continue to have a deadly effect on larval fish for years to come. We could be left to wonder what happened to the dolphin and never know what caused their decline.



*Larval and early juvenile dolphin have been shown to be highly susceptible to the toxins present in crude oil, suggesting that all dolphin young spawned in an affected area could be killed.*

### What Will 2015 Bring in Dolphin Fishing?

At the start of each fishing season, fishermen are always wondering what kind of fishing the year will bring. As I delve deeper into the life history of dolphin, I am learning about more and more factors that influence dolphin abundance in any given area; sea surface temperatures, ocean current flow patterns, upwelling patterns, prevailing winds, quantity of Sargassum present, baitfish abundance, etc. Then on top of these factors the weather conditions will dictate whether boats can get offshore to fish. With so many variables at play, I have learned that is currently impractical to attempt to predict dolphin's future abundance in any area.

What we can do is to look at the hard data that have been collected at the same location and under similar methodology for multiple years. The survey that the DRP has carried out starting with the 2013 season at the Ripley Light Marina basin in Charleston, South Carolina, offers that opportunity. This is one time where there is no substitute for a long-term study.

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A survey of the dolphin harvested by the boats operating out of this marina can offer insight to the day-to-day fluctuations in the number of dolphin harvested daily by boats fishing off South Carolina. Unfortunately, records of the number of fish harvested by individual boat-trips were not kept in 2013, allowing only for a comparison of the harvest rates for the month of May in 2014 and 2015.

Sampling between the two years was very close with 16 days sampled in 2014 and 18 days in 2015. There were 10 percent more trips surveyed in 2015 than 2014 and a 16 percent rise in the total number of dolphin harvested in 2015 from 2014. Looking at the overall trip average in May for the two years, we see just a small, 5.8 percent, increase in the number of fish harvested per trip in 2015 over the previous year. (See following table.) However, this table does not address the variability in the harvest for each year.

### Overall results from vessels surveyed in May.

Year	Number Trips	Number Dolphin	Overall Ave.
2014	79	667	8.44
2015	87	777	8.93

The overall average number of fish harvested per boat trip does give a good overview for comparing the two years but it does not show the daily variations in the harvest. The following figure plots out the average number of dolphin caught each day of May for the two years. The most prominent difference between the daily harvest rates was that the largest catches occurred in the last half of the month in 2014 and the first half to middle in 2015.

Just looking at the ragged lines that represent each year's daily harvest rate, it is hard to see any developing trend. By adding a polynomial trend line, we can get a sense of how the harvest changed during the month. The 2014 trend line (red) indicated the harvest gradually improved as the days passed. In 2015 the trend line

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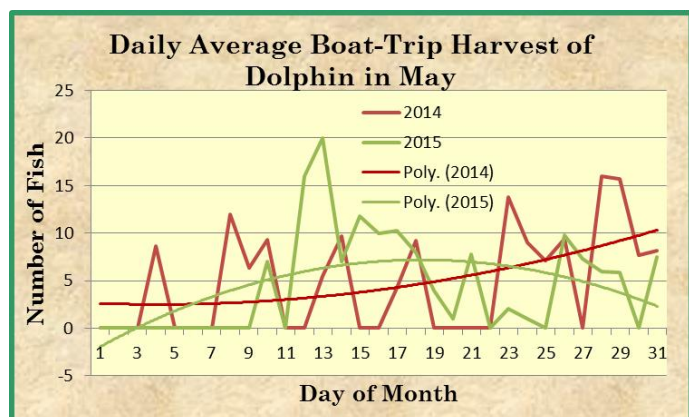


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shows the harvest improving from the first of the month to mid-month where it peaked. After mid-May the harvest rate began to decline.



So just what does this mean? In 2014 the average harvest for the first two weeks of June was 8.58 fish per boat trip, a slight rise above the overall harvest average for May, but the last half of June saw the bottom fall out of the harvest dropping to an average of 3.53 fish per boat trip. With the trend line indicating an earlier start to the decline in catches for 2015, one has to wonder if it means an early end to our primary dolphin season? As I said at the beginning of this article, I don't know. But I will be monitoring the catch.

This article was written at the first of June 2015, so by the time you read this, I should be close to an answer as to how the dolphin fishery fared in June. Stay tuned to get the results.

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