

**BYCATCH REDUCTION DEVICE
TESTING MANUAL**

2016



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DEFINITIONS

Bycatch reduction criterion is the standard by which a BRD candidate will be evaluated. To be certified for use by the shrimp fishery in the Exclusive Economic Zone (EEZ) off the southeastern United States (North Carolina through Texas), the BRD candidate must demonstrate a successful reduction of total finfish bycatch by at least 30 percent by weight.

Bycatch reduction device (BRD) is any gear or trawl modification designed to allow finfish to escape from a shrimp trawl.

BRD candidate is a bycatch reduction device to be tested for certification for use in the commercial shrimp fishery of southeastern United States.

Certified BRD is a BRD that has been tested according to the procedure outlined herein and has been determined by the RA as having met the bycatch reduction criterion.

Control trawl means a trawl that is not equipped with a BRD during ~~the evaluation~~ **test**.

Experimental trawl means the trawl that is equipped with the BRD candidate during ~~an evaluation~~ **test**.

Evaluation and oversight personnel means scientists, observers, and other technical personnel who, by reason of their occupation or scientific expertise or training, are approved by the RA as qualified to evaluate and review the application and testing process.

Letter of Authorization (LOA) means a document signed by the RA that specifically exempts a person/vessel from federal regulations requiring the use of BRDs in federal waters. This LOA must be issued prior to conducting any tests on BRD candidates in federal waters.

Net/side bias means when the net(s) being fished on one side of the vessel demonstrate a different catch rate (fishing efficiency) than the net(s) being fished on the other side of the vessel during paired-net tests.

Observer means a person on the list maintained by the RA of individuals qualified to supervise and monitor a BRD certification test.

Paired-net test means a tow during certification trials where a control net and an experimental net are fished simultaneously, and the catches and catch rates between the nets are compared.

Provisional Certification Criterion means a secondary benchmark ~~which~~that would allow a BRD candidate to be used for a time-limited period in the southeastern shrimp fishery. To meet the criterion, the BRD candidate must demonstrate a successful reduction of total finfish bycatch by at least 25 percent by weight.

Provisionally certified BRD means a BRD that has been tested according to the procedure outlined herein and has been determined by the RA as having met the provisional certification criterion. A BRD meeting the provisional certification criterion would be certified by the RA for a period of 2 years.

Regional Administrator (RA) means the Southeast Regional Administrator, National Marine Fisheries Service.

Required measurements refers to the quantification of gear characteristics such as the dimensions and configuration of the trawl, the BRD candidate, the doors, or the location of the BRD in relation to other parts of the trawl gear that are used to assess the performance of the BRD candidate.

Sample size means the number of successful tows ~~(a minimum of 30 tows per test are required)~~.

Shrimp trawler means any vessel that is equipped with one or more trawl nets ~~whose~~where the on-board or landed catch of shrimp is more than 1 percent, by weight, of all fish comprising its on-board or landed catch.

Successful tow means that the control and experimental trawl were fished in accordance with the requirements set forth herein and the terms and conditions of the ~~letter~~Letter of ~~authorization~~Authorization, and there is no indication problematic events, such as those listed in Appendix D-5, occurred during the tow ~~to~~that would impact or influence the fishing efficiency (catch) of one or both nets.

Tow time means the total time (hours and minutes) an individual trawl was fished (i.e., the time interval beginning when the winch is locked after deploying the net overboard, and ending when retrieval of the net is initiated).

Trawl means a net and associated gear and rigging used to catch shrimp. The terms trawl and net are used interchangeably throughout the manual.

Try net means a separate net pulled for brief periods by a shrimp trawler to test for shrimp concentrations or determine fishing conditions (e.g., presence of absence of bottom debris, jellyfish, bycatch, seagrasses).

Tuning a net means adjusting the trawl and its components to minimize or eliminate any net/side bias that exists between the two nets that will be used as the control and experimental trawls during the certification test.

I. Introduction

This Bycatch Reduction Device Testing Manual (Manual) establishes a standardized process for evaluating the ~~abilityeffectiveness of~~ ~~whether~~ bycatch reduction device (BRD) candidates ~~to~~ meet the established bycatch reduction criterion, ~~and~~. BRDs that meet the criterion can be certified for use in the Exclusive Economic Zone (EEZ) by the southeastern shrimp fishery. BRDs are required for use in shrimp trawls fished shoreward of the 100-fathom (183-meter) depth contour in the Gulf of Mexico, and within the EEZ of the South Atlantic region.

~~Various BRD requirements also exist~~The requirement to use BRDs in state waters ~~in the South Atlantic and off Florida and Texas in the Gulf of Mexico~~ varies by state. Persons wishing to conduct BRD candidate ~~evaluation~~tests exclusively in state waters do not need to apply to the National Marine Fisheries Service (NOAA Fisheries ~~Service~~) for authorization to conduct these tests, but should contact the appropriate state officials for authorizations. However, for data collected in such ~~evaluation~~tests to be considered by NOAA Fisheries ~~Service~~ for certification of the BRD candidate for use in federal waters, the operations plan and data collection procedures must meet the criteria established in this Manual.

II. BRD Candidate ~~Evaluations~~Tests

A. Application

Persons interested in evaluating the ~~efficiency~~effectiveness of a BRD candidate to reduce finfish from a shrimp trawl must apply for, receive, and have on board the approved vessel(s) during the ~~evaluation~~test, a Letter of Authorization (LOA) from the NOAA Fisheries Southeast Regional Office Regional Administrator (RA). To receive an LOA, the applicant must submit the following documentation to the RA: (1) ~~a completed application form (Appendix A);~~ (2) name, address, and contact information of the applicant; (2) a list of vessels to be used during the sampling program, including the vessels' U.S. Coast Guard documentation numbers or state registration numbers; (3) name, address, and contact information of the vessel owners and/or vessel operators; (4) a brief statement of the purpose and goal of the activity for which the LOA is requested; (35) an operations plan (see Section C below) describing the scope, duration, dates, and location of the test, and methods that will be used to conduct the test; (4) ~~an 8.5-inch x 11-inch~~ (21.6) an 8.5-inch x 11-inch (21.6-cm x 27.9-cm) diagram drawn to scale of the BRD

~~candidate~~ design; ~~(5)~~ an 8.5-inch x 11-inch (21.6-cm x 27.9-cm) diagram drawn to scale of the BRD in the shrimp trawl; ~~(6)~~ and (8) a description of ~~how~~ the mechanism by which the BRD ~~candidate~~ is ~~supposed~~ expected to work; ~~(7)~~ a copy of the testing vessel's U.S. Coast Guard documentation or its state registration; and ~~(8)~~ a copy of the testing vessel's Federal commercial shrimp vessel permit ~~exclude finfish~~.

An applicant requesting an LOA to test an unapproved turtle excluder device (TED) as a BRD (including modifications to a ~~TED that would enhance finfish exclusion~~ certified TED where the modifications would make the configuration of the TED illegal_[MLI]) must first apply for and obtain from the RA an experimental TED authorization pursuant to 50 CFR 223.207(e)(2). Applicants should contact the Protected Resources Division of NOAA Fisheries Service's Southeast Regional Office for further information. The LOA applicant must include a copy of that authorization with the application.

Incomplete applications will be returned to the applicant along with a letter from the RA indicating what actions the applicant may take to make the application complete.

There is no cost to the applicant for the ~~RA's~~ RA's administrative expenses such as reviewing applications, issuing LOAs, evaluating test results, or certifying BRDs. However, all other costs associated with the actual testing activities are the responsibility of the applicant, or any associated sponsor.

If an application for an LOA is denied, the RA will provide a letter of explanation to the applicant, together with relevant recommendations to address the deficiencies that resulted in the denial.

B. Allowable Activities

Issuance of an LOA to test a BRD candidate in the South Atlantic or Gulf of Mexico allows the applicant to remove or disable the existing certified BRD in one outboard net (to create a control net), and to place the BRD candidate in another outboard net in lieu of a certified BRD (to create an experimental net). All other trawls under tow during the test must have a certified BRD, unless these nets are specifically exempted in the LOA. All ~~trawls~~ nets under tow during the test must have an approved TED unless operating under an authorization issued pursuant to 50 CFR 223.207(e)(2), whereby the test is being conducted on an experimental TED. The LOA, and experimental TED authorization if applicable, must be on board the vessel(s) while the test is being conducted. The term of the LOA will be 60 days; should circumstances

require a longer test period, the applicant may ~~apply to the RA for~~request a 60-day extension.

C. Operations Plan

An operations plan should be submitted with the application describing a method to compare the catches of shrimp and fish in a control net (net without a BRD candidate installed) to the catches of the same species in an experimental net (a net configured identically to the control net but also equipped with the BRD candidate).

The applicant may choose to conduct a pre-certification test of a prototype BRD candidate. A pre-certification test would be conducted when the intent is to assess the preliminary effectiveness of a prototype BRD candidate under field conditions, and to make modifications to the prototype BRD candidate during the field test. For pre-certification testing, the operations plan must include only a description of the scope, duration, dates, and location of the test, along with a description of methods that will be used to conduct the test. No observer is required for a pre-certification test, but the applicant may choose to use an observer to maintain a written record of the test. The applicant will maintain a written record for both the control and experimental net during each tow. Mandatory data collection is limited to the weight of the shrimp catch and the weight of the total finfish catch in each test net during each tow. ~~These data must be submitted to NOAA Fisheries Service at the conclusion of the test.~~ Although not required, the applicant may wish to incorporate some or all the certification test requirements listed below.

For a BRD candidate to be considered for certification, the operations plan must be more detailed and address the following topics:

- The primary assumption in assessing the bycatch reduction ~~efficiency~~effectiveness of ~~the~~a BRD candidate during paired-net tests is that the inclusion of the BRD candidate in the experimental net is the only factor causing a difference in catch from the control net. Therefore, the nets to be used in the tests must be calibrated (tuned) to minimize, to the extent practicable, any net/side bias in catch efficiency prior to beginning a test series, and tuned again after any gear modification or change. Additional information on tuning shrimp trawls to minimize bias is available from the Harvesting Technology Branch, Mississippi Laboratories, Pascagoula Facility, 3209 Frederic Street, Pascagoula, Mississippi 39568-1207; phone (601) 762-4591.
- A standard tow time for a proposed evaluation should be defined. Tow times must be representative of the tow times used by commercial shrimp trawlers. The applicant should

indicate what alternatives will be considered should the proposed tow time need adjustment once the test begins.

- A minimum sample size of 30 successful tows using a specific BRD candidate design is required for the statistical analysis described in Section F. No alterations of the BRD candidate design are allowed during a specific test series. If the BRD candidate design is altered, a new test series must be started. If a gear change (i.e., changing nets, doors, or rigging) is required, the nets should be tuned again before proceeding with further tests to complete the 30-tow series. Minor repairs to the gear (e.g., sewing holes in the webbing; replacing a broken tickler chain with a new one of the same configuration) are not considered a “gear change.”
- For tests conducted on twin-rig vessels, **(one net on the port side and one net on the starboard side)**, biases that might result from the use of a try net should be minimized. Total fishing times for a try net must be a consistent percentage of the total tow time during each tow made in the test.
- To incorporate any potential net/side bias that remains after the tuning tows (e.g., the effect of a try net), or to accommodate for bias that develops between the control and experimental nets during the test, the operations plan should outline a timetable ensuring that an equal number of successful tows are made with the BRD candidate employed in both the port and starboard nets.
- Mandatory data to be collected during a test includes: (1) detailed **vessel and gear specifications as set forth in Appendices B and C**, and (2) pertinent information concerning the location, duration, and catch from individual tows as set forth in **Appendices D and F**. **forms available from the Science and Research Director (SRD) of the Southeast Fisheries Science Center. Applicants should contact the NOAA Fisheries Galveston Laboratory 4700 Avenue U, Galveston, Texas 77551-5997; phone (409) 766-3500.**
- Following each paired tow, the catches from the control and experimental nets must be examined separately. This requires that the catch from each net be kept separate from each other, as well as from the catch taken in other nets fished during that tow. Mandatory data collections include recording the weight of the total catch of each test net (control and experimental nets), **and the catch weight of the total shrimp catch** (i.e., brown, white, pink, rock, or other shrimp by species) **in each test net, and the catch of total finfish in aggregate** in each test net.

§• ~~When recording~~To determine the detailed information on the species found in the total finfish catch, if the in each test net, two procedures may be used under different conditions. If the total catch in a net does not fill one standard 1-bushel [(ca. 10 gallon)] (or 30 liters) polyethylene shrimp basket (ca. 70 pounds) ([31.8 kg] of catch), but the tow is otherwise considered successful, data must be collected on the entire catch of the net, and recorded as a "select" sample (see Appendices D and F),, indicating that the values represent the total catch of the particular net. If the catch in a net exceeds 70 pounds (31.8 kg), a well-mixed sample consisting of one standard 1-bushel [ca. 10 gallon] (30 liters) polyethylene shrimp basket must be taken from the total catch of the net. The total weight of the sample must be recorded, as well as the weights (and numbers as applicable) of the various species or species groups found within that sample. These sample values can then be extrapolated to estimate the quantity of those species or species groups found in the total catch of the particular net. weight (and number as applicable) of finfish in aggregate.

§• ~~Although not a criterion for certification~~The forms available from the SRD include record keeping opportunities for additional species; collection of this information is optional for certification evaluation purposes. However, applicants testing BRD candidates are encouraged to collect additional information that may be pertinent to addressing bycatch issues in their respective regions. For example, in the western Gulf of Mexico applicants are especially encouraged to collect information on the bycatch of juvenile red snapper. If the applicant chooses to collect these data, the total (Aselect@) catch of the target species from each test net (not just from the sample) should be recorded along with lengths for as many individuals per net per tow as set forth in Appendices E and F. Additional information in regard to the catch can be recorded on forms such as Appendix G. Such data collection would follow the same procedure as sampling the total finfish catch.

The operations plan should address what the applicant will do should it become necessary to deviate from the primary procedures outlined in the operations plan. The plan should describe in detail what will be done to continue the test in a reasonable manner that is consistent with the primary procedures. For example, it may become necessary to alter the pre-selected tow time to adapt to local fishing conditions to successfully complete the test. Prior to issuing a LOA, the RA may consult with evaluation personnel to review the acceptability of these proposed alterations.

D. Observer Requirement

It is the responsibility of the applicant to ensure that a qualified observer is on board the vessel during the certification tests. A list of qualified observers is available from the RA. Observers may include employees or individuals acting on behalf of NOAA Fisheries Service, state fishery management agencies, universities, or private industry, ~~who meet the minimum requirements outlined in Appendix H.~~ Any change in information or testing circumstances, such as replacement of the observer, must be reported to the RA within 30 days. Under 50 CFR 600.746, when any fishing vessel is required to carry an observer as part of a mandatory observer program under the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801, *et seq.*), the owner or operator of the vessel must comply with guidelines, regulations, and conditions to ensure their vessel is adequate and safe to carry an observer, and to allow normal observer functions to collect information as described in this Manual. A vessel owner is deemed to meet this requirement if the vessel displays one of the following: ~~(#1)~~ a current Commercial Fishing Vessel Safety Examination decal, issued within the last 2 years, that certifies compliance with regulations found in 33 CFR, chapter I, and 46 CFR, chapter I; ~~(#2)~~ a certificate of compliance issued pursuant to 46 CFR 28.710; or ~~(#3)~~ a valid certificate of inspection pursuant to 46 U.S.C. 3311. The observer has the right to check for major safety items, and if those items are absent or unserviceable, the observer may choose not to sail with the vessel until those deficiencies are corrected.

E. Reports

A report on the BRD candidate test results must be submitted by the applicant or associated sponsor before the RA will consider the BRD for certification. The report must contain a comprehensive description of the ~~teststest~~, copies of all completed data forms used during the ~~teststest~~, and photographs, drawings, and similar material describing the BRD. ~~The captain, vessel owner, or the applicant must sign and submit the cover form (Appendix I).~~ The report must include a description and explanation of any unanticipated deviations from the operations plan which occurred during the test. These deviations must be described in sufficient detail to ~~indicate~~ **allow evaluation and oversight personnel selected by NOAA Fisheries to determine if** the tests were continued in a reasonable manner consistent with the approved operations plan procedures. Applicants must provide information on the cost of materials, labor, and installation of the BRD candidate. In addition, any unique or special circumstances of the tests, such as special operational characteristics or fishing techniques which enhance the ~~BRD's~~ **BRD's** performance, should be described and documented as appropriate.

F. Certification

The RA will determine whether the required reports and supporting materials are sufficient to evaluate the BRD ~~candidate's efficiency~~ **candidate's effectiveness**. The determination of sufficiency would be based on whether the applicant adhered to the prescribed testing procedure or provided adequate justification for any deviations from the procedure during the test. If the RA determines that the data are sufficient for evaluation, the BRD candidate will be evaluated to determine if it meets the bycatch reduction criterion. In making a decision, the RA may consult with evaluation and oversight personnel. Based on the data submitted for review, the RA will determine the effectiveness of the BRD candidate, using appropriate statistical procedures such as Bayesian analyses, to determine if the BRD candidate meets the following conditions:

- ~~#~~(1) There is at least a 50-percent probability that the true reduction rate of the BRD candidate meets the bycatch reduction criterion (i.e., the BRD candidate demonstrates a best point estimate [sample mean] that meets the certification criterion); and
- ~~#~~(2) There is no more than a 10-percent probability that the true reduction rate of the BRD candidate is more than 5 percentage points less than the bycatch reduction criterion.

To be certified for use in the fishery, the BRD candidate will have to satisfy both ~~criteria~~ **conditions**. The first condition ensures that the observed reduction rate of the BRD candidate has an acceptable level of certainty that it meets the bycatch reduction criterion. The second condition ensures the BRD candidate demonstrates a reasonable degree of certainty the observed reduction rate represents the true reduction rate of the BRD candidate. This determination ensures the operational use of the BRD candidate in the shrimp fishery will, on average, provide a level of bycatch reduction that meets the established bycatch reduction criterion. Interested parties may obtain details regarding the hypothesis testing procedure to be used by contacting the Harvesting Technology Branch, Mississippi Laboratories, Pascagoula Facility, 3209 Frederic Street, Pascagoula, Mississippi 39568-1207; phone (228) 762-4591. Following a favorable determination of the certification analysis, the RA will certify the BRD (with any appropriate conditions as indicated by test results) and publish the notice of certification in the *Federal Register*.

In addition, based on the data provided, **if the BRD candidate does not meet the bycatch reduction certification criterion in accordance with the conditions outlined above**, the RA may provisionally certify a BRD candidate based on the following condition:

- #1) There is at least a 50-percent probability that the true reduction rate of the BRD candidate is no more than 5 percentage points less than the bycatch reduction criterion (i.e., the BRD candidate demonstrates a best point estimate [sample mean] within 5 percentage points of the certification criterion).

A provisional certification will be effective for 2 years from the date of publication of a notice in the *Federal Register* announcing this provisional certification. This time period will allow additional wide-scale industry evaluation of the BRD candidate, during which additional effort would be made to improve the efficiency of the BRD to meet the certification criterion.

III. BRDs Not Certified and Resubmission Procedures

The RA will advise the applicant, in writing, if a BRD is not certified. This notification will explain why the BRD was not certified and what the applicant may do to either modify the BRD or the testing procedures to improve the chances of having the BRD certified in the future. If certification was denied because of insufficient information, the RA will explain what information is lacking. The applicant must provide the additional information within 60 days from receipt of such notification. If the RA subsequently certifies the BRD, the RA will announce the certification in the *Federal Register*.

IV. Decertification of BRDs

The RA will decertify a BRD whenever NOAA Fisheries ~~Service~~ determines a BRD no longer satisfies the bycatch reduction criterion. Before determining whether to decertify a BRD, the RA will notify the appropriate Fishery Management Council(s) in writing, and the public will be provided an opportunity to comment on ~~the advisability of~~ any proposed decertification: ~~through a publication of a proposed rule in the *Federal Register* with a comment period of not less than 15 days.~~ The RA will consider any comments from the ~~affected~~ Council(s) and public, and if the RA elects to proceed with decertification of the BRD, the RA will publish ~~proposed~~ ~~and a final rule~~ ~~in the *Federal Register* with a comment period of not less than 15 days~~ ~~on,~~ which would remove the ~~proposed rule~~ BRD from the certified list of BRDs.

V. Interactions with sea turtles

The following section is provided for informational purposes. Sea turtles are listed under the Endangered Species Act as either endangered or threatened. The following procedures apply to incidental take of sea turtles under 50 CFR 223.206(d)(1):

Any sea turtles taken incidentally during the course of fishing or scientific research activities must be handled with due care to prevent injury to live specimens, observed for activity, and returned to the water according to the following procedures:

A) Sea turtles that are actively moving or determined to be dead (as described in paragraph (B)(4) below) must be released over the stern of the boat. In addition, they must be released only when fishing or scientific collection gear is not in use, when the engine gears are in neutral position, and in areas where they are unlikely to be recaptured or injured by vessels.

B) Resuscitation must be attempted on sea turtles that are comatose or inactive by:

(1) Placing the turtle on its bottom shell (plastron) so that the turtle is right side up and elevating its hindquarters at least 6 inches (15.2 cm) for a period of 4 to 24 hours. The amount of elevation depends on the size of the turtle; greater elevations are needed for larger turtles. Periodically, rock the turtle gently left to right and right to left by holding the outer edge of the shell (carapace) and lifting one side about 3 inches (7.6 cm) then alternate to the other side. Gently touch the eye and pinch the tail (reflex test) periodically to see if there is a response.

(2) Sea turtles being resuscitated must be shaded and kept damp or moist but under no circumstance be placed into a container holding water. A water-soaked towel placed over the head, carapace, and flippers is the most effective method in keeping a turtle moist.

(3) Sea turtles that revive and become active must be released over the stern of the boat only when fishing or scientific collection gear is not in use, when the engine gears are in neutral position, and in areas where they are unlikely to be recaptured or injured by vessels. Sea turtles that fail to respond to the reflex test or fail to move within 4 hours (up to 24, if possible) must be returned to the water in the same manner as that for actively moving turtles.

(4) A turtle is determined to be dead if the muscles are stiff (rigor mortis) and/or the flesh has begun to rot; otherwise, the turtle is determined to be comatose or inactive and resuscitation attempts are necessary.

Any sea turtle so taken must not be consumed, sold, landed, offloaded, transshipped, or kept below deck-@.