Southeast Florida and South Carolina Anglers' Release Practices and Their Attitudes Toward Descending Devices

The Nature Conservancy

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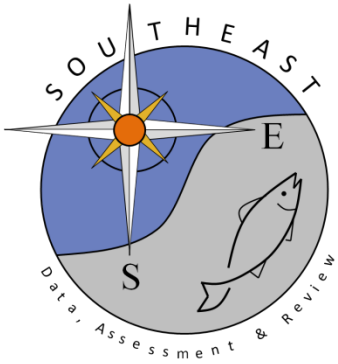

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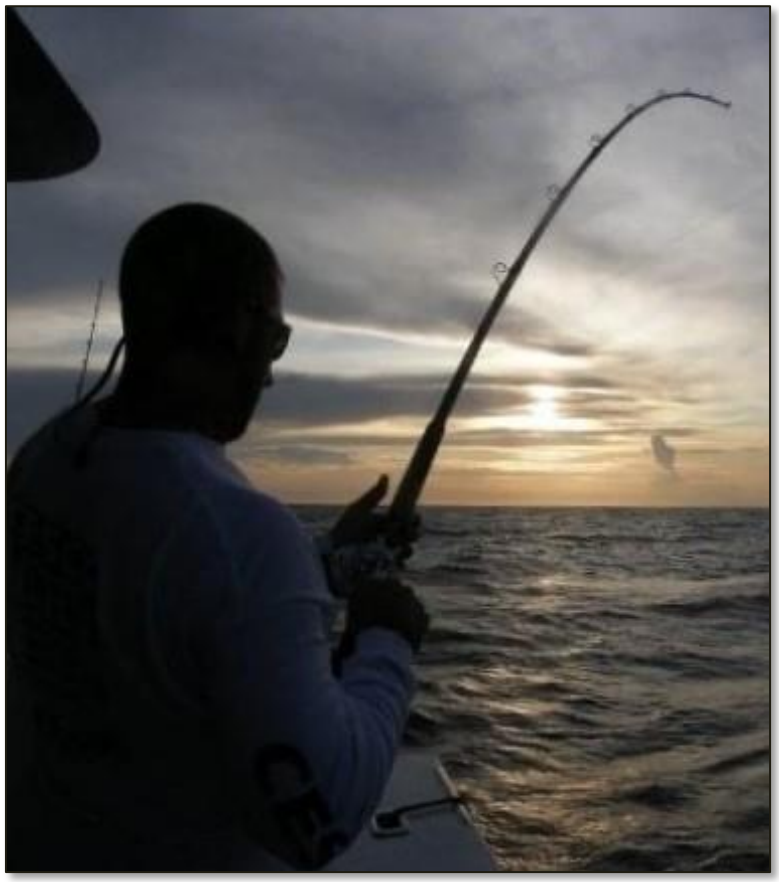

Study Conducted for
The Nature Conservancy

2022

RESPONSIVE MANAGEMENT

Southeast Florida and South Carolina Anglers' Release Practices and Their Attitudes Toward Descending Devices

2022

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David Moss, Fisheries Project Manager, The Nature Conservancy
Robert Crimian, Southeast Ocean Conservation Specialist, The Nature Conservancy

EXECUTIVE OVERVIEW

This study was conducted for The Nature Conservancy to understand Florida and South Carolina marine anglers' attitudes toward release practices and descending devices. The project provides statistically valid baseline information to inform current initiatives and assist decisionmakers in their understanding of angler release practices and their attitudes toward descending devices.

This project entailed a multi-modal survey of anglers who fished in Southeast Florida or South Carolina within the past 2 years in Atlantic coastal waters in 30 feet of water or more and who fished for any of several species of fish that included grouper and snapper (the full list is presented in the body of the report).

Responsive Management worked with The Nature Conservancy to develop the survey instrument for both telephone and online surveying. Note that the online survey was closed, meaning that only those anglers specifically invited and contacted could complete the online survey; a person surfing the internet could not access the survey.

The telephone questionnaire was coded for integration with Responsive Management's computer-assisted telephone interviewing (CATI) process. An important aspect of the CATI process is that the computer controls which questions are asked and allows for immediate data entry, but the telephone surveys are administered by live Responsive Management interviewers with extensive experience conducting surveys about fisheries and fishing. The online questionnaire was coded in an online platform. Responsive Management conducted pre-tests of the questionnaires to ensure proper wording, flow, and logic in the surveys.

The overall sample consisted of three source samples: a listing of Florida licensed anglers with a reef fishing endorsement provided by the Florida Fish and Wildlife Conservation Commission; a sample of anglers provided by MSG, a firm that provides statistically valid samples for survey research; and an internal sample maintained by Responsive Management of anglers derived from general population samples that were purchased (i.e., non-license database samples).

The overall sample was separated into anglers who fished in Florida and anglers who fished in South Carolina. These samples were never put together, and the results were analyzed and are presented for the states separately. Note that references to *anglers* in this report refers to only those who met the above criteria, not all anglers or anglers in general.

Responsive Management administered the survey using a multi-modal approach that included contact with anglers by telephone and email, with options to complete the survey online or by telephone. This multi-modal approach yielded the highest possible response rates, increased the representativeness of the sample, and reduced bias. For quality control, Survey Center Managers monitored the telephone interviews in real time and provided feedback to the interviewers.

After both the telephone and online surveys were obtained, the Survey Center Managers and/or statisticians checked each completed survey to ensure clarity and completeness. Additionally, the survey code included proprietary error checkers and other quality control

checks. In total, Responsive Management obtained 1,188 completed surveys of Florida anglers and 449 completed surveys of South Carolina anglers.

The analysis of data was performed using IBM SPSS Statistics as well as proprietary software developed by Responsive Management. The state results were kept separate, and the two state samples were never combined.

Note that *anglers* in the results below does not refer to all anglers in general but instead refers specifically to those who met the criteria for the survey: they were at least 18 years old and had fished in the previous 2 years in Atlantic coastal waters in at least 30 feet of water for any of several species of fish (grouper, snapper, red porgy, sea bass, and triggerfish—the full list is presented in the methodology in the body of this report).

AWARENESS AND KNOWLEDGE OF BAROTRAUMA

A slight majority of anglers in the survey have noticed signs of barotrauma and have heard of the term. Specifically, of those who sometimes release fish, a majority in each state (63% in Florida; 53% in South Carolina) have noticed that some fish are physically unable to return to the bottom, while 61% of Florida anglers and 44% of South Carolina anglers had heard of the term *barotrauma* prior to the survey. In particular, lack of knowledge of barotrauma is associated with being female and with not thinking it is important to help fish back to their catch depth.

All anglers were asked about signs of barotrauma, and most of the signs were known by a majority of anglers, although two signs (sluggish swimming and guts sticking out of the back end) were known by slightly less than a majority. Most of the signs that are incorrect—that are not signs of barotrauma—were not selected by most anglers.

Fortunately, most anglers recognize the necessity of helping fish that are suffering from barotrauma to return to depth of capture: 92% of Florida anglers and 87% of South Carolina anglers think it is *very* or *moderately* necessary to help the fish return to capture depth. Very low percentages think it is only *slightly* necessary or think it is *not* necessary.

AWARENESS AND USE OF VENTING AND DESCENDING DEVICES

Although pre-survey knowledge of venting (80% in Florida and 75% in South Carolina) was higher than that of descending devices, a majority of anglers knew what descending devices are (64% in Florida and 60% in South Carolina). The characteristics associated with not knowing what a descending device was prior to the survey are, in particular, being female and not thinking it is *very* or *moderately* necessary to help fish return to catch depth.

Regarding their use, a majority of anglers have used venting as a method to help address barotrauma (58% and 53% in Florida and South Carolina, respectively), but only about a third to a quarter have used descending devices (35% and 25%, respectively). Most commonly, use of venting or descending devices depends on whether *signs of barotrauma are visible*, with approximately three fourths of Florida anglers and two thirds of South Carolina anglers using them in those times.

Other than obvious signs of barotrauma, the factors that influence decisions whether to use venting or descending devices include depth of water, type of fish (some indicated always using these methods with certain types of fish), the presence of sharks or other predator fish, or the size of the fish (some saying they use the methods only for large fish).

Of those who use both methods, venting is preferred over descending devices by a majority of anglers in each state: 54% of Florida anglers and 64% of South Carolina anglers choose venting (among those who used both). Only about a third of Florida anglers (36%) and a quarter of South Carolina anglers (28%) prefer descending devices.

Those who prefer venting most commonly cite its ease of use or that it is quicker for the boater. About a fifth of those who prefer venting say it is a better method/better for the fish. Also, many like that one can actually see whether the fish swims down. Sharks taking both the fish and the devices themselves is also cited as a problem by some.

Those who prefer descending devices overwhelmingly cite the efficacy of the method. Some say it is easier to use, in part (according to the open-ended remarks) because of anglers' fear of harming the fish by puncturing it—such as if the venting process punctures an inner organ.

Among anglers who see signs of barotrauma and who release fish, their instances of using venting, using descending devices, or not making use of either can be apportioned as follows:

- In Florida, about a quarter of the time, venting or descending devices are not used. Otherwise, a little less than half the time, venting is used, and a little less than a quarter of the time, a descending device is used.
- In South Carolina, about a third of the time, venting or descending devices are not used. Well less than half of the time, venting is used, and a fifth of the time, a descending device is used.

CONSTRAINTS TO USING DESCENDING DEVICES

The leading constraint to using descending devices is a preference for venting over the use of a descending device. Part of this likely stems from a lack of familiarity with barotrauma as well as a lack of familiarity with descending devices themselves: not seeing signs of barotrauma and not knowing how to use a descending device are highly rated reasons for not using them.

Young anglers give higher ratings to cost as a factor for not using descending devices, compared to older anglers. Older anglers give higher ratings than do their counterparts for thinking that there is no utility in helping fish return to depth of catch and to simple inertia—preferring venting over descending devices.

FACTORS TO ENCOURAGE USE OF DESCENDING DEVICES

Lack of knowledge of how to use descending devices, as mentioned above, also plays a role in the factors that would encourage use of them: the top factor in the survey that would encourage use was if the devices were less complex and easier to use. Just under that as a factor was the cost. Furthermore, in a follow-up question (open-ended) that asked if anything else would encourage the use of descending devices, the top response was more information about them.

INFORMATION SOURCES ABOUT FISHING IN THE SOUTH ATLANTIC

One of the top-named sources of information about fishing is simple word-of-mouth. Also of substantial importance is the fishing regulations guide that each state agency puts out. Internet sources are important, as well as licensing agents/store personnel.

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INTRODUCTION AND METHODOLOGY

This study was conducted for The Nature Conservancy to understand Florida and South Carolina marine anglers' attitudes toward release practices and descending devices. The project provides statistically valid baseline information to inform current initiatives and assist decisionmakers in their understanding of angler release practices and their attitudes toward descending devices. These baseline data can later be compared to findings from any future surveys to examine trends in attitudes and behaviors. Results from this survey also will help guide current fisheries management decisions, outreach content, and agency communications with saltwater anglers.

The goals of the research were as follows:

- Quantify Florida and South Carolina recreational saltwater anglers' current release practices for snapper, grouper, and other species.
- Quantify Florida or South Carolina recreational saltwater anglers' knowledge of barotrauma and their use of and attitudes toward descending devices and release device requirements.
- Identify Florida or South Carolina recreational saltwater anglers' preferred information sources for fishing information.
- Examine how release practices, knowledge levels, conservation values, and attitudes differ by angler demographic group.
- Provide research findings to help The Nature Conservancy, its partners, and other marine stakeholders build support for descending devices and other ethical angler behaviors.

This project entailed a multi-modal survey of anglers who fished in Southeast Florida or South Carolina within the past 2 years in Atlantic coastal waters in 30 feet of water or more and who fished for any of several species of fish:

- Black grouper
- Gag grouper
- Red grouper
- Black sea bass
- Red porgy
- Gray snapper
- Mutton snapper
- Red snapper
- Vermillion snapper
- Yellowtail snapper
- Gray triggerfish

DESIGN OF SURVEY QUESTIONNAIRE

Responsive Management worked with The Nature Conservancy to develop the survey instrument for both telephone and online surveying. Separate questionnaires were developed for telephone and online surveying that were the same with the exception of wording differences to account for the survey mode. Note that the online survey was closed, meaning

that only those anglers specifically invited and contacted could complete the online survey; a person surfing the internet could not access the survey.

The telephone questionnaire was coded for integration with Responsive Management's computer-assisted telephone interviewing (CATI) process. An important aspect of the CATI process is that the computer controls which questions are asked and allows for immediate data entry, but the telephone surveys are administered by live Responsive Management interviewers with extensive experience conducting surveys about fisheries and fishing. The online questionnaire was coded in an online platform. Responsive Management conducted pre-tests of the questionnaires to ensure proper wording, flow, and logic in the surveys.

The survey was programmed to automatically skip and/or substitute phrases based upon previous responses, as necessary, for the logic and flow of the questionnaire. Responsive Management pretested the survey instrument and made any necessary revisions for logic, wording, and clarification.

SURVEY SAMPLES

The overall sample consisted of three source samples: a listing of Florida licensed anglers with a reef fishing endorsement provided by the Florida Fish and Wildlife Conservation Commission; a sample of anglers provided by MSG, a firm that provides statistically valid samples for survey research; and an internal sample maintained by Responsive Management of anglers derived from general population samples that were purchased (i.e., non-license database samples). Note that Responsive Management used the license database only for this survey and then deleted the database at the conclusion of the project; Responsive Management does not maintain samples or databases provided by state agencies.

The overall sample was separated into anglers who fished in Florida and anglers who fished in South Carolina. These samples were never put together, and the results were analyzed and are presented for the states separately.

The survey included screeners to ensure that the anglers in the survey:

- Were at least 18 years old.
- Had fished in the given state's Atlantic coastal waters in at least 30 feet of water within the previous 2 years.
- Had fished for one of the listed species in that time in the given state at that depth.

Note that references to *anglers* in this report refers to only those who met the above criteria, not all anglers or anglers in general. Additionally, although the survey was specific to *Southeast* Florida anglers fishing in the Atlantic, they are referred to as Florida anglers in the report.

SURVEY ADMINISTRATION

Responsive Management administered the survey using a multi-modal approach that included contact with anglers by telephone and email, with options to complete the survey online or by telephone. This multi-modal approach yielded the highest possible response rates, increased the representativeness of the sample, and reduced bias.

For the telephone portion of the surveying effort, telephone interviews were conducted Monday through Friday from 10:00 a.m. to 9:00 p.m., Saturday from 12:00 p.m. to 7:00 p.m., and Sunday from 2:00 p.m. to 9:00 p.m., local time, using interviewers with experience conducting computer-assisted surveys about fishing and fisheries. A five-callback design was used to maintain the representativeness of the sample, to avoid bias toward people easy to reach by telephone, and to provide an equal opportunity for all to participate. When a respondent could not be reached on the first call, subsequent calls were placed on different days of the week and at different times of the day. The telephone portion of the surveying effort was conducted in December 2021.

For quality control, Survey Center Managers monitored the interviews in real time and provided feedback to the interviewers. To further ensure the integrity of the telephone survey data, Responsive Management has interviewers who have been trained according to the standards established by the Council of American Survey Research Organizations. Methods of instruction included lecture and role-playing. The Survey Center Managers and other professional staff conducted briefings with the interviewers prior to the administration of this survey. Interviewers were instructed on type of study, study goals and objectives, handling of survey questions, interview length, termination points and qualifiers for participation, interviewer instructions within the survey questionnaire, reading of the survey questions, skip patterns, and probing and clarifying techniques necessary for specific questions on the survey questionnaire.

The online portion of the surveying effort entailed contacting anglers by email. These email invitations included an explanation of the purpose of the survey, a link to the survey for online administration, and a telephone contact for assistance if needed (as well as for those who wished to take the survey over the telephone—an example of this initial email is presented on the following page). Several reminder emails were sent to those who did not respond to the initial invitation to encourage participation in the survey. In the online survey, proprietary questions were used to help ensure the integrity of the online data. As stated previously, the online survey was closed, and only those specifically invited could complete the survey; a person surfing the internet could not access the survey. The online portion of the surveying effort was conducted in November and December 2021.

In total, Responsive Management obtained 1,188 completed surveys of Florida anglers and 449 completed surveys of South Carolina anglers.

After both the telephone and online surveys were obtained, the Survey Center Managers and/or statisticians checked each completed survey to ensure clarity and completeness. Additionally, the survey code included proprietary error checkers and other quality control checks.

Example of Invitation Email

Hello Saltwater Angler,

This study is being conducted in cooperation with the Florida Fish and Wildlife Conservation Commission and The Nature Conservancy to better understand some saltwater fisheries management issues in the South Atlantic. Your responses will help us understand these issues in detail and to better serve the saltwater fishing community.

A fishing license you purchased in the past suggests you may have fished in the South Atlantic. We are specifically reaching out to anglers and captains who have fished off the coast of South Carolina or Southeast Florida in the past 2 years for the following species: grouper species, snapper species, black sea bass, red porgy, and/or gray triggerfish. To ensure that the study results truly represent South Atlantic saltwater fishing for these species, it is very important that we hear from you!

Please take the survey now!
Click Here to Start the Survey
or visit [invite(survey_link)]

Your answers will be kept completely confidential and will not be associated with your name or contact information in any way.

Responsive Management, an independent research firm that specializes in natural resource and fish and wildlife issues, has been contracted to conduct this study. in cooperation with the Florida Fish and Wildlife Conservation Commission and The Nature Conservancy. If you need technical assistance with the survey, please contact Responsive Management via email at research@responsivemanagement.com.

Thank you for your time and feedback. We greatly appreciate your input on these important saltwater fisheries issues.

Sincerely,
Mark Damian Duda
Executive Director
Responsive Management

DATA ANALYSIS

The analysis of data was performed using IBM SPSS Statistics as well as proprietary software developed by Responsive Management. The state results were separated, and the two state samples were never combined.

The data obtained included many open-ended comments in response to questions. (Open-ended means that no answer set is provided to respondents, who can respond with anything that comes to mind.) For these results, analysts carefully reviewed the comments and categorized the responses into broad categories, based on the verbatim responses.

PRESENTATION OF RESULTS

In examining the results, it is important to be aware that the survey questionnaire included several types of questions:

- Open-ended questions are those in which no answer set is read to the respondents; rather, they can respond with anything that comes to mind from the question.
- Closed-ended questions have an answer set from which to choose.
- Single or multiple response questions: Some questions allow only a single response, while other questions allow respondents to give more than one response or choose all that apply. Those that allow more than a single response are indicated on the graphs with the label, "Multiple Responses Allowed."
- Scaled questions: Many closed-ended questions (but not all) are in a scale, such as a 0 to 10 scale.
- Series questions: Many questions are part of a series, and the results are primarily intended to be examined relative to the other questions in that series (although results of the questions individually can also be valuable). Typically, results of all questions in a series are shown together.

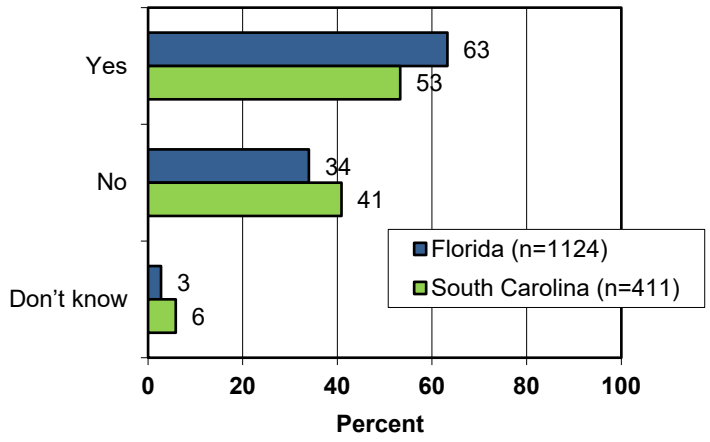
Most graphs show results rounded to the nearest integer; however, all data are stored in decimal format, and all calculations are performed on unrounded numbers. For this reason, some results may not sum to exactly 100% because of this rounding on the graphs. Additionally, rounding may cause apparent discrepancies of 1 percentage point between the graphs and the reported results of combined responses.

The survey concerns fish suffering from barotrauma. Fish that are unable to return to the bottom on their own after being released are referred to as *floaters*. They most likely are suffering from barotrauma, which is a buildup of swim bladder gases that makes it difficult or impossible for the fish to swim back down, caused by being brought to the surface from deep waters. Barotrauma that is not treated is usually fatal to the fish.

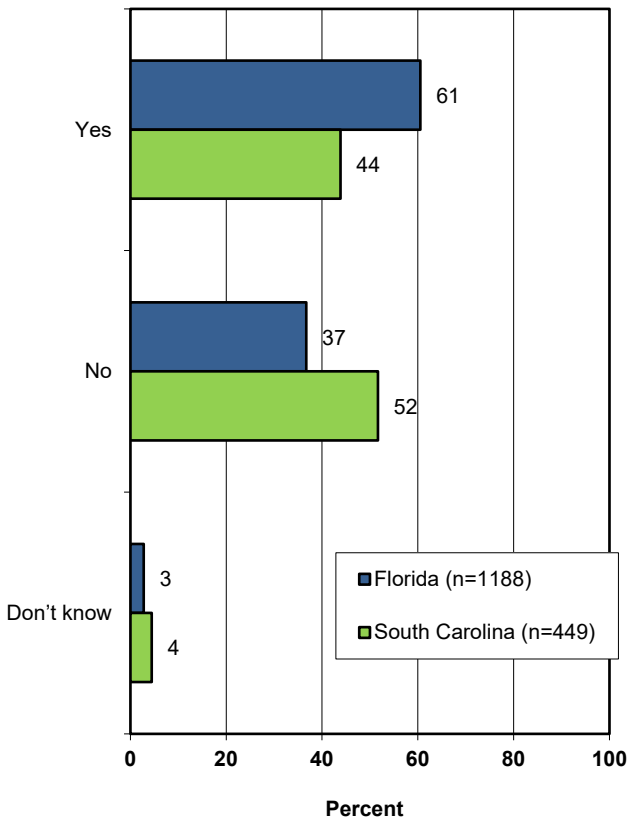
AWARENESS AND KNOWLEDGE OF BAROTRAUMA

Nearly all the anglers in the survey indicate that they sometimes release fish that have been caught; these anglers were asked the follow-up question about seeing signs of barotrauma (even if they did not yet know the term). Of those who sometimes release fish, a majority in each state (63% in Florida; 53% in South Carolina) have noticed that some fish are physically unable to return to the bottom—these fish are most likely are suffering from barotrauma.

Have you ever noticed that some fish were physically unable to return to the bottom on their own? Such fish are sometimes referred to as "floaters." (Asked of those who release any fish.)

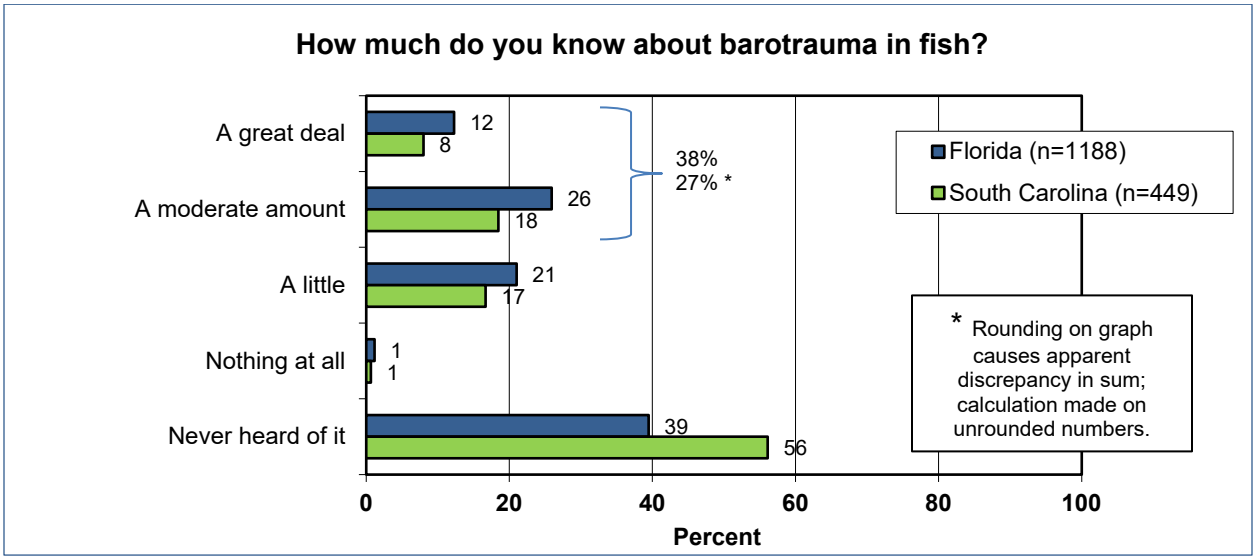


Prior to this survey, had you ever heard the term "barotrauma"?

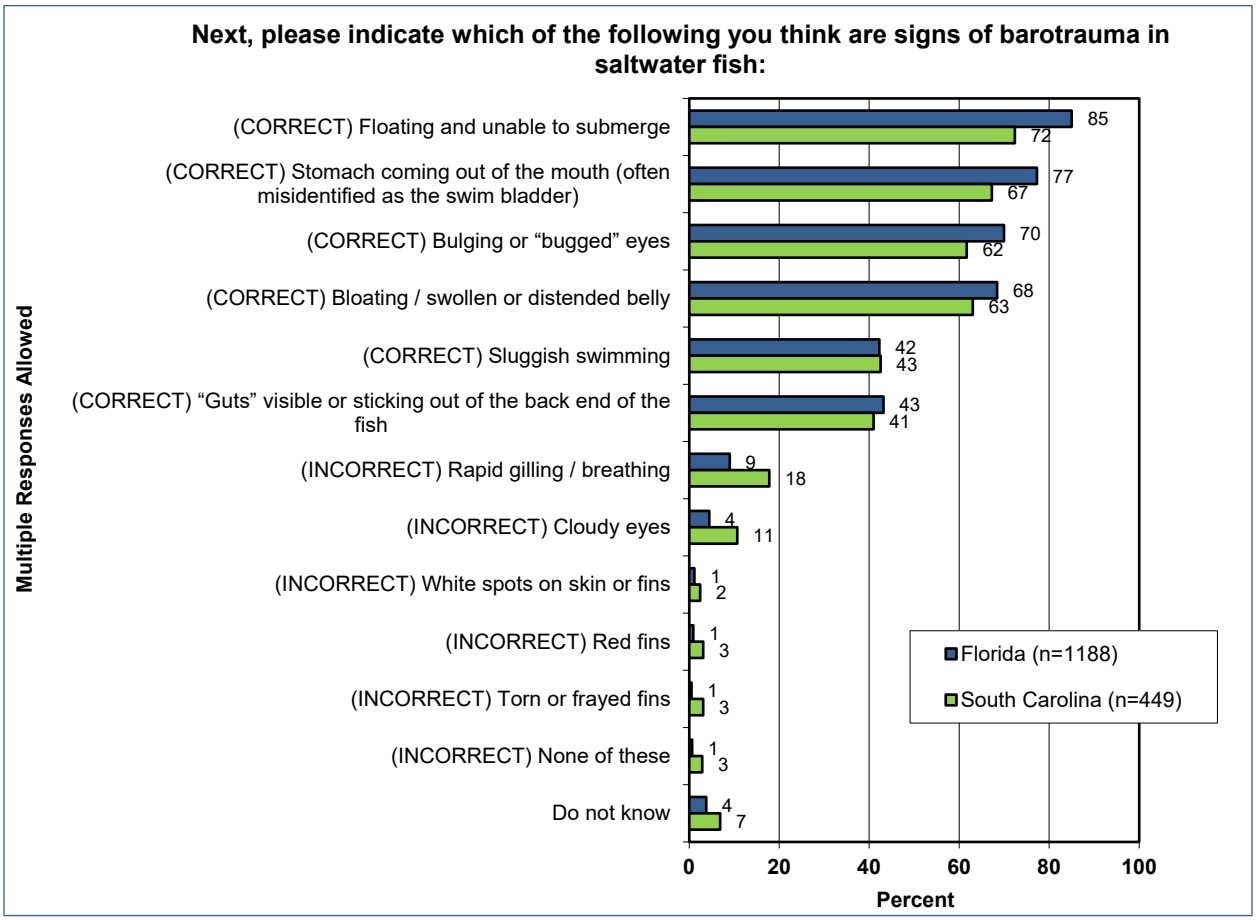


Among all anglers in the survey, a majority of those fishing in Florida's coastal waters (61%) and slightly less than a majority of those fishing in South Carolina's coastal waters (44%) had heard of the term *barotrauma* prior to the survey, as shown in the graph to the left.

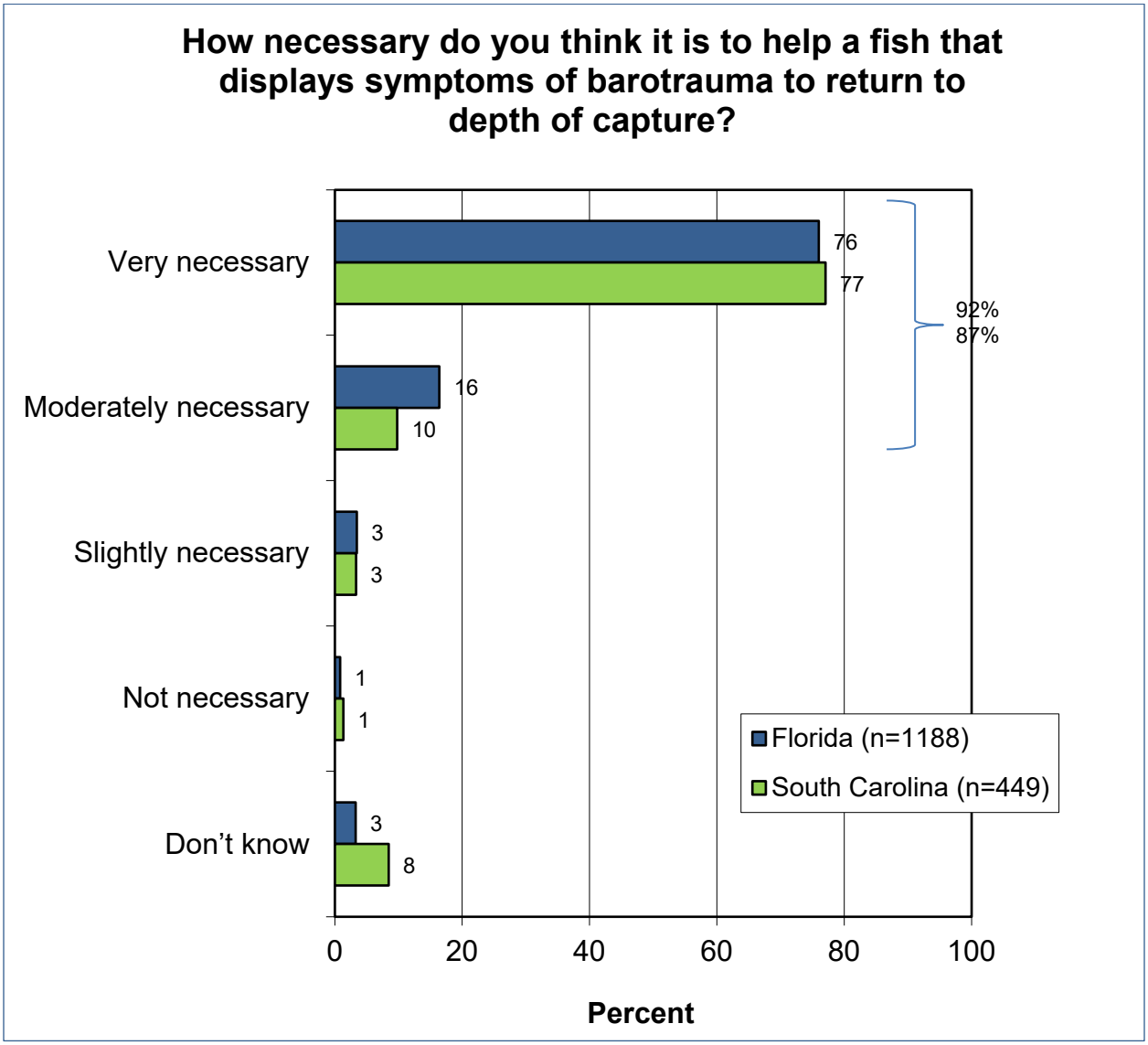
A follow-up question asked those who had heard of the term to indicate their knowledge level, and those who did not get the follow-up question were also coded into the results, as shown in the graph on the following page. Florida anglers are slightly more knowledgeable, with more than a third saying that they know a great deal or moderate amount, compared to South Carolina anglers, who have about a quarter saying that they are at that knowledge level (although the question is a self-assessment of knowledge, not a true test of knowledge).



All anglers, regardless of previous awareness or knowledge levels, were next asked about signs of barotrauma. Most of the signs were known by a majority of anglers, although two signs (sluggish swimming and guts sticking out of the back end) were known by slightly less than a majority. Most of the signs that are incorrect—that are not signs of barotrauma—were not selected by most anglers.

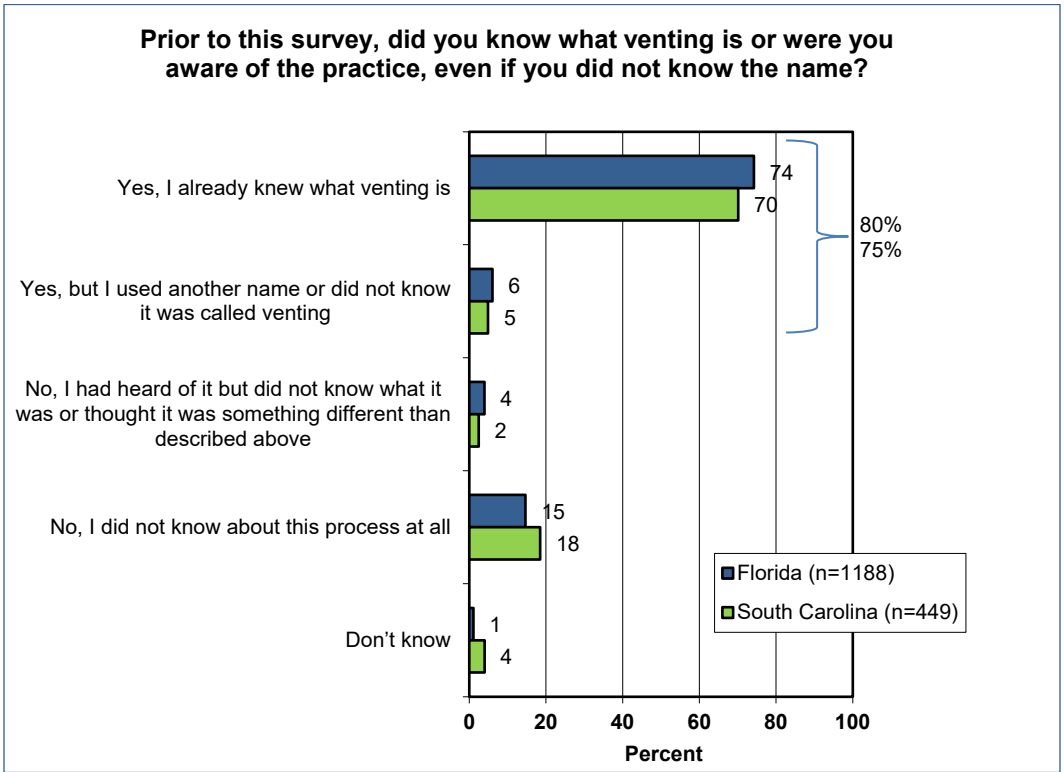


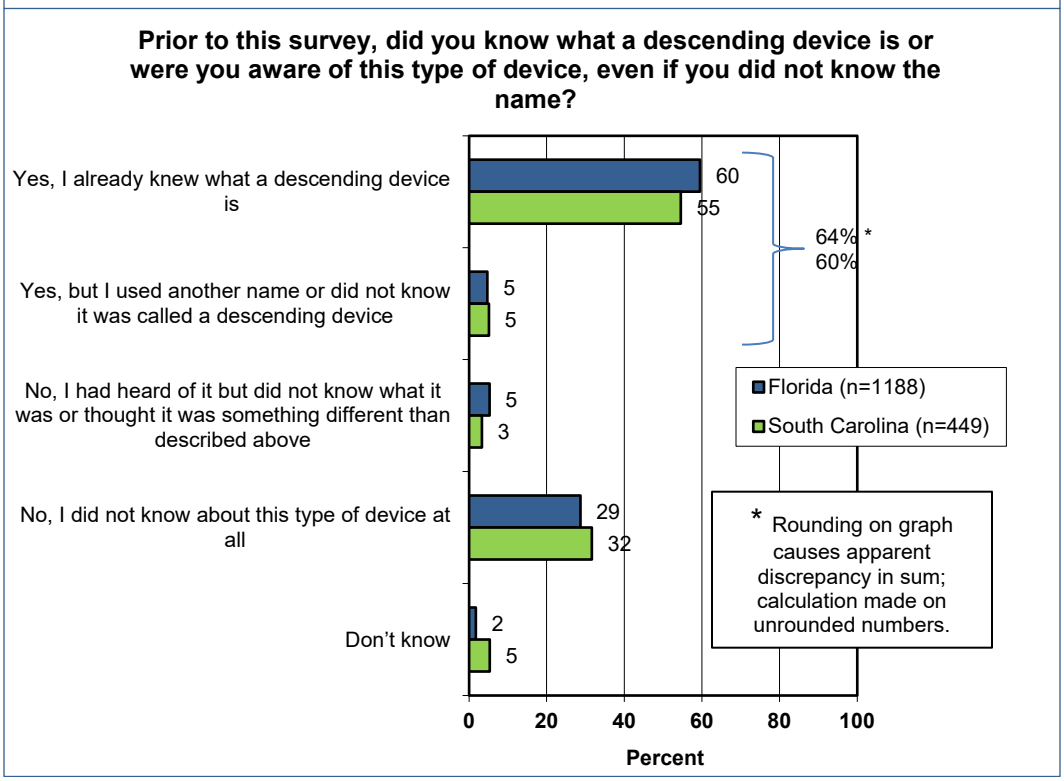
Fortunately, most anglers recognize the necessity of helping fish that are suffering from barotrauma to return to depth of capture: 92% of Florida anglers and 87% of South Carolina anglers think it is *very* or *moderately* necessary to help the fish return to capture depth. Very low percentages think it is only slightly necessary or think it is not necessary.

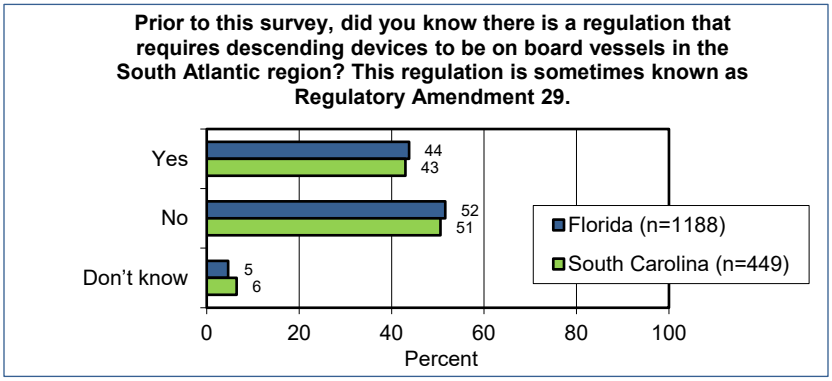


AWARENESS AND USE OF VENTING AND DESCENDING DEVICES

Pre-survey knowledge of venting is higher than that of descending devices: 80% (Florida) and 75% (South Carolina) of anglers knew what venting is, while 64% (Florida) and 60% (South Carolina) of anglers knew what descending devices are.

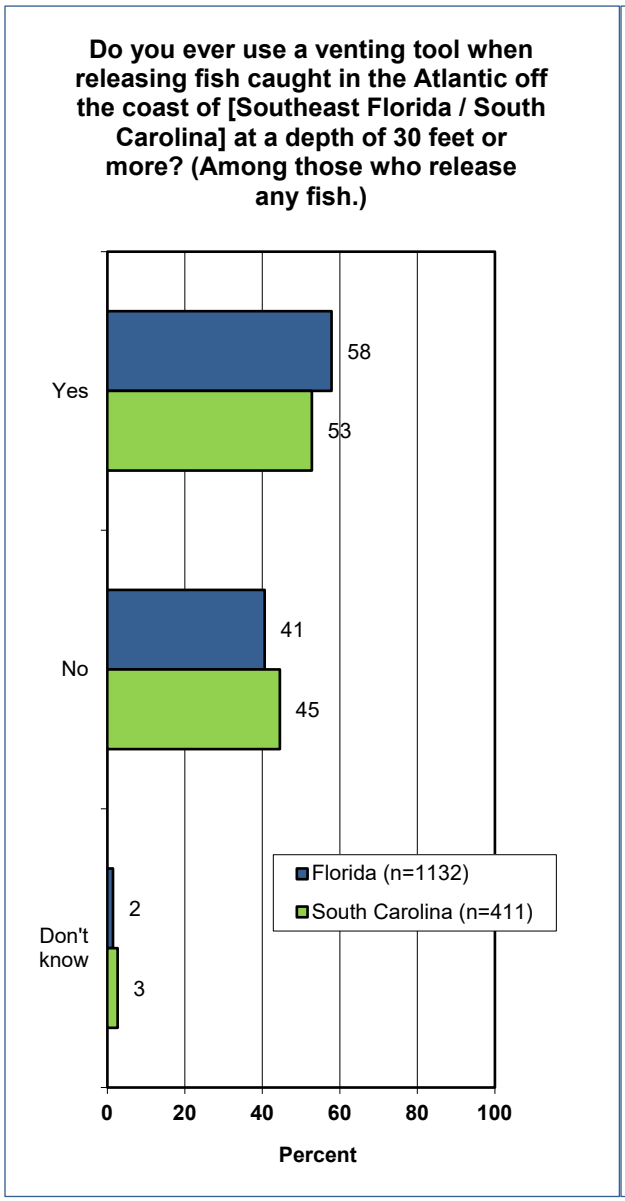


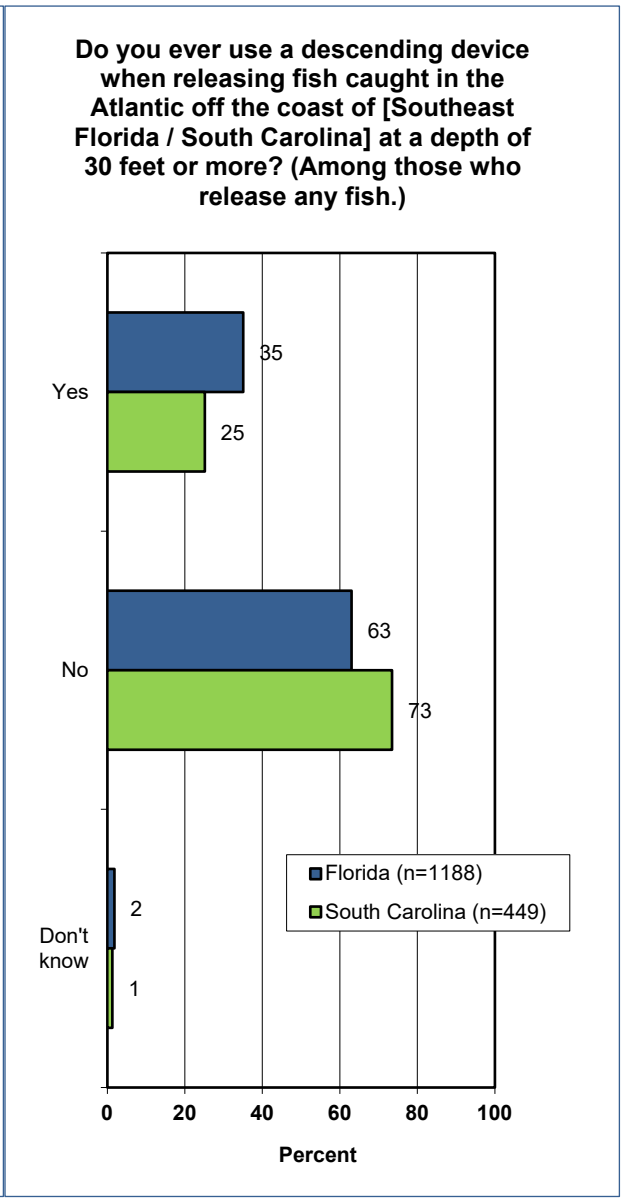


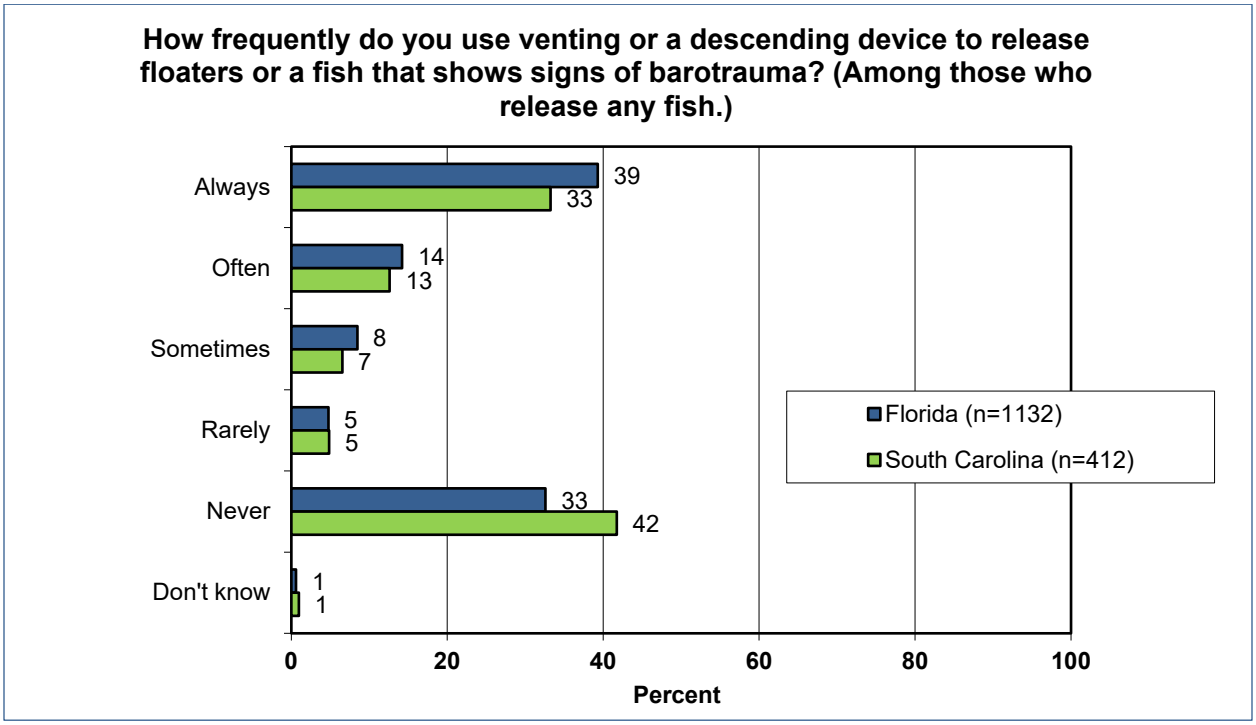


Just under half of the anglers in the survey knew about Regulatory Amendment 29, with state results almost identical to one another.

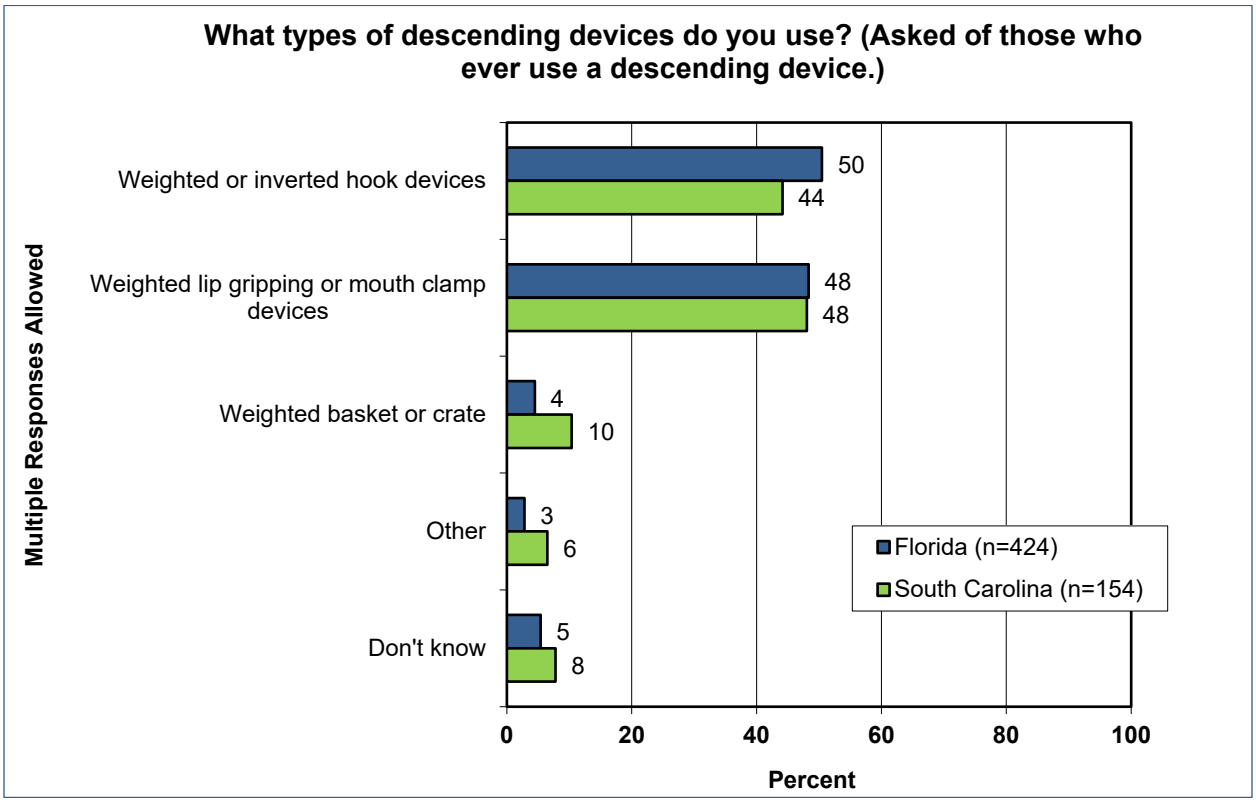
While a majority of anglers in the survey have used venting as a method to help address barotrauma (58% and 53% in Florida and South Carolina, respectively), only about a third to a quarter have used descending devices (35% and 25%). Frequency of use is shown on the following page.



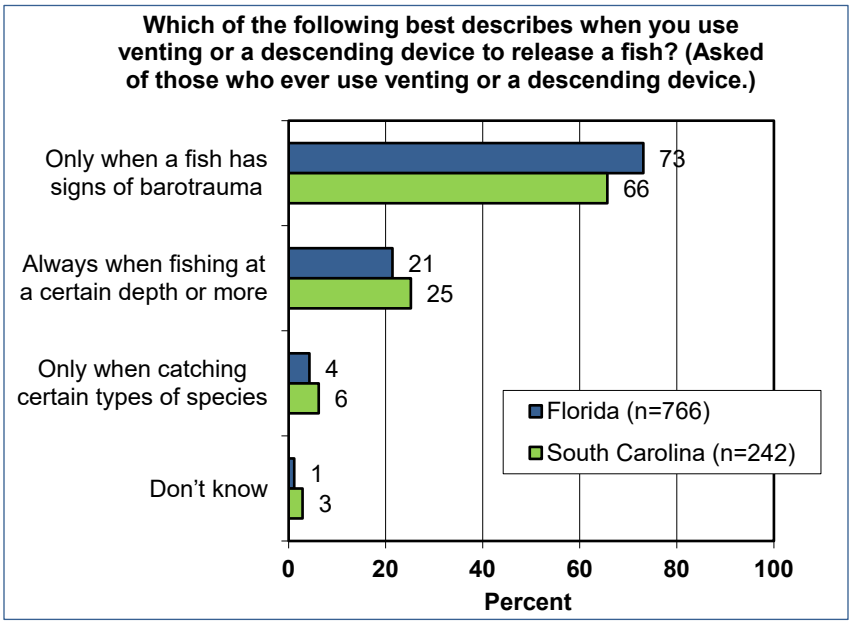




Those who use descending devices are about evenly split between use of weighted/inverted hook devices and weighted lip gripping/mouth clamp devices, with state results quite similar in use of these. A small percentage—higher in South Carolina than in Florida—use weighted baskets or crates.

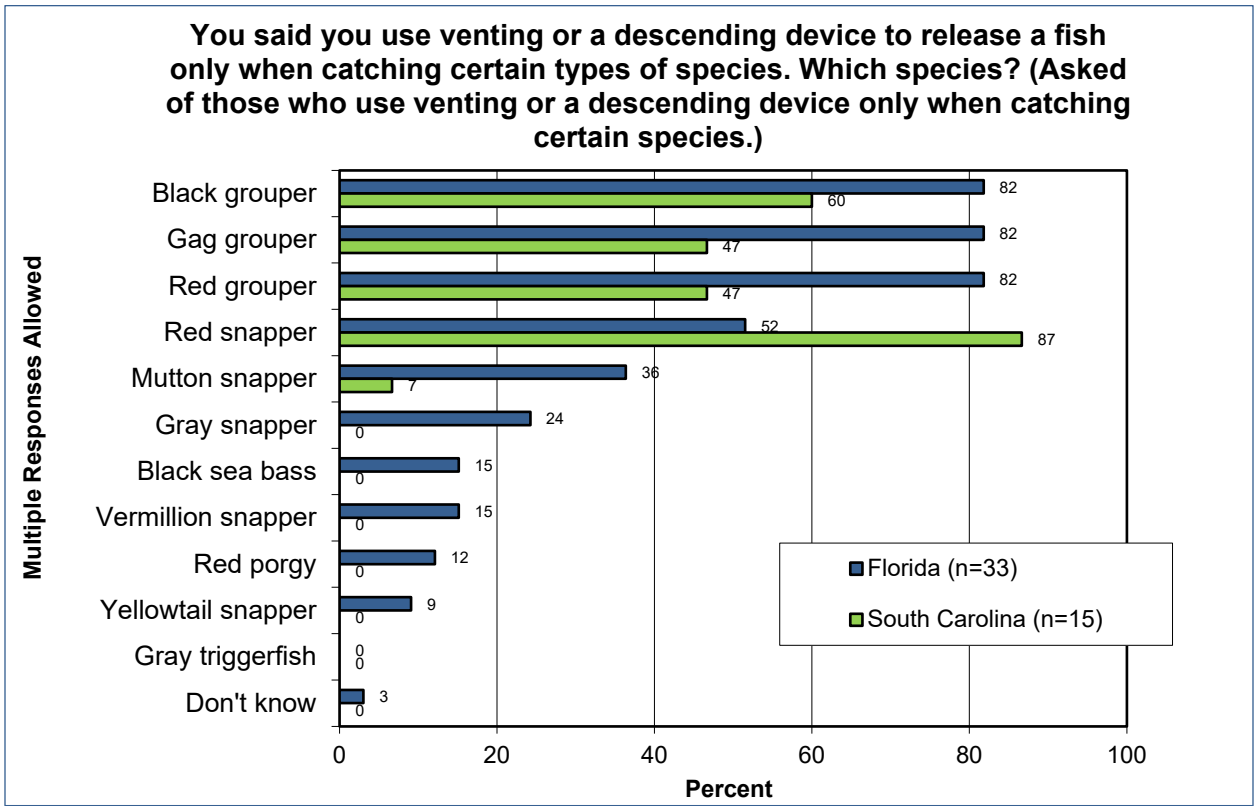


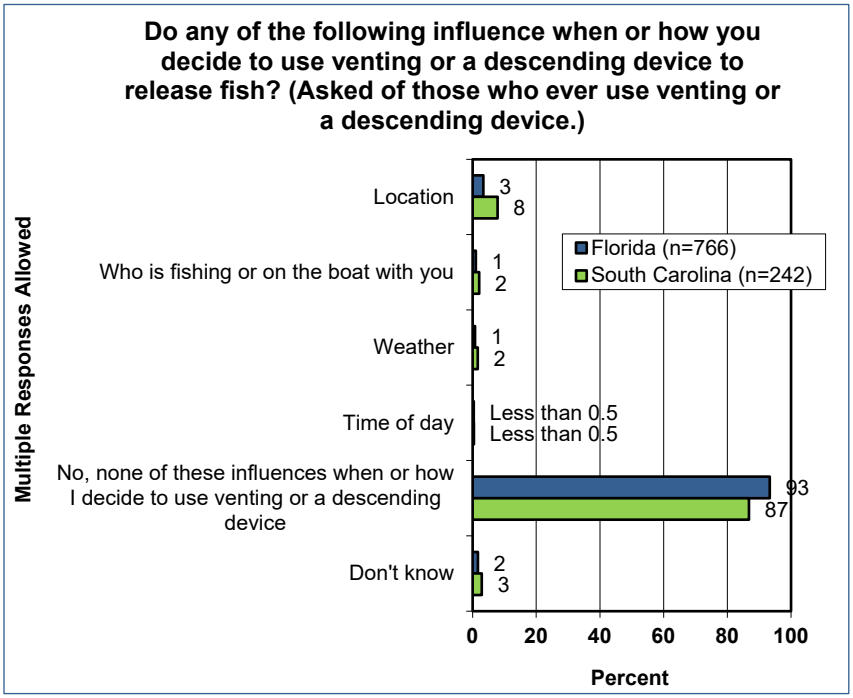
Most commonly, use of venting or descending devices depends on whether *signs of barotrauma are visible*, with approximately three fourths of Florida anglers and two thirds of South Carolina anglers using them in those times. Nonetheless, some anglers make use of the methods always when fishing *at certain depths*, while very few anglers make use of the methods solely based on the *species they catch*.



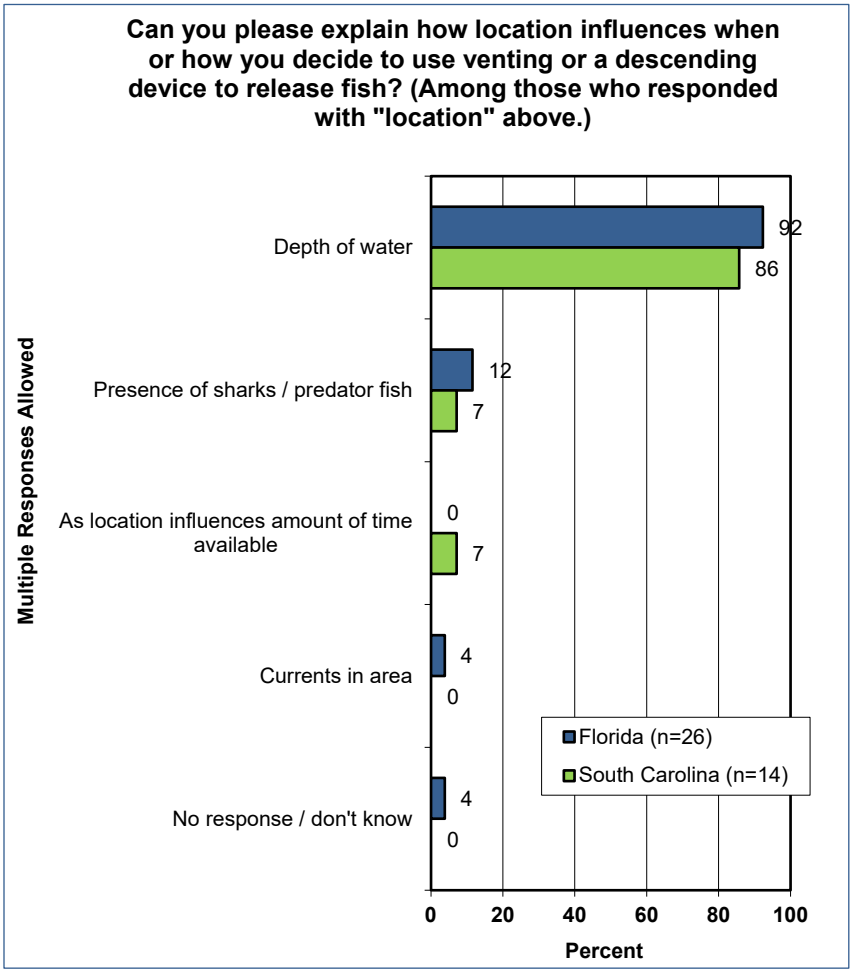
In Florida, venting and descending devices are used most commonly on black, gag, and/or red grouper, with red, mutton, and gray snapper next in the ranking. At the bottom are black sea bass, vermillion snapper, red porgy, and yellowtail snapper. Gray triggerfish was selected by no respondents but is left in the graph because it was included in the list specifically asked about.

In South Carolina, red snapper is the most common species for which venting or descending devices are used. This is followed by black, gag, and red grouper in that state.

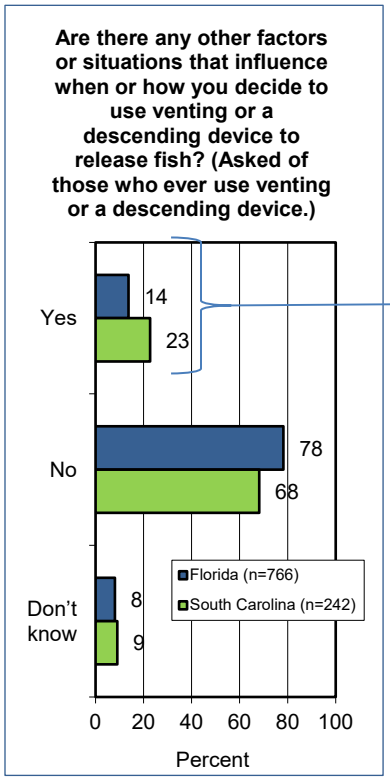


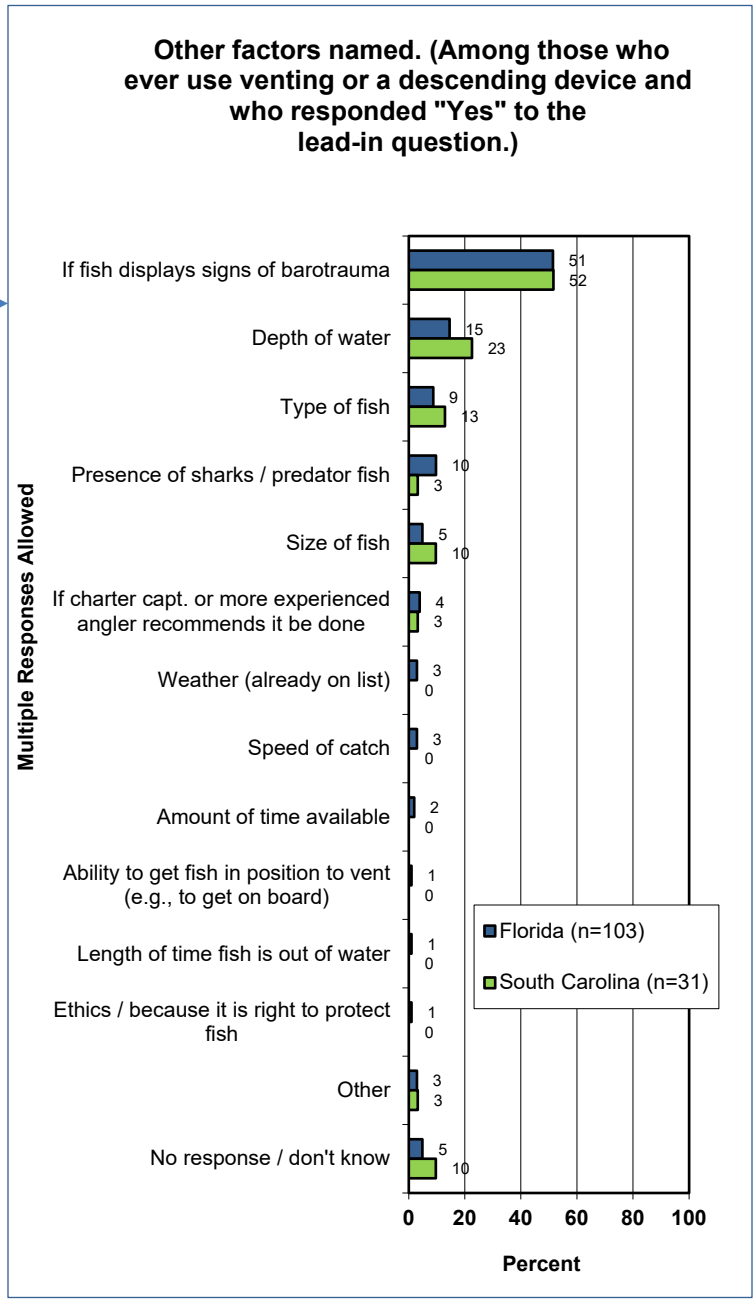


Most anglers are concerned about the factors asked about above (signs of barotrauma, the depth of the catch, or the species) when deciding whether to use venting or descending devices rather than any other factors. However, small percentages also consider their location, their fishing/boating companions, the weather, and/or time of day.

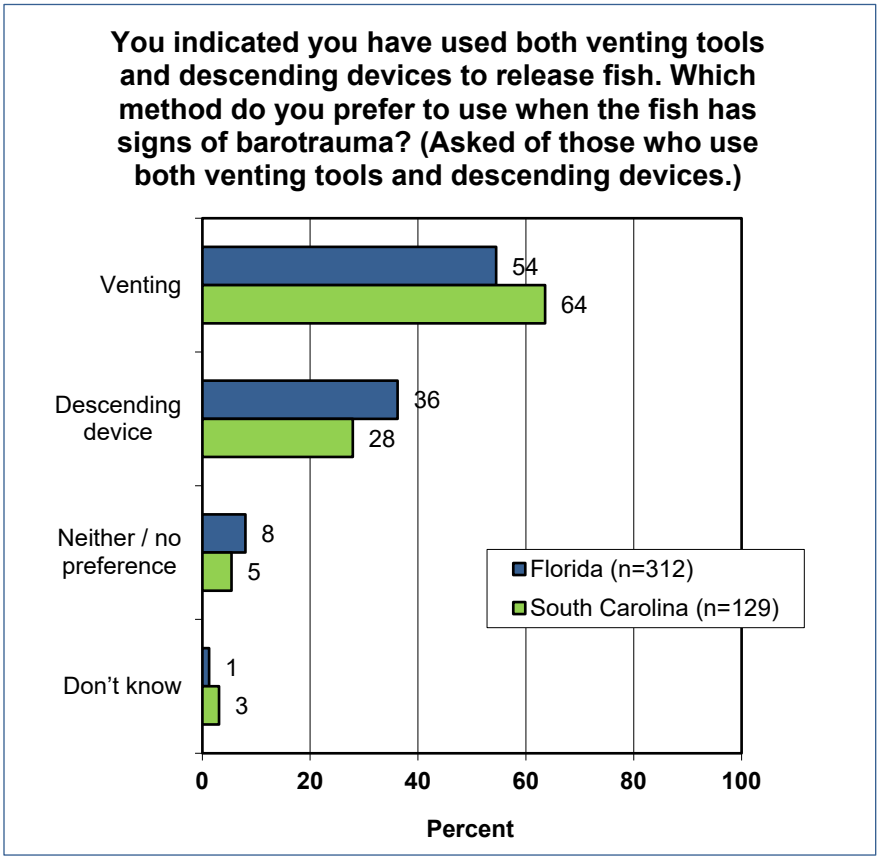


Locational factors were further broken down by anglers in the survey in an open-ended question. By far, location most often relates to the depth of water, although a minor factor is the presence of sharks and other predator fish (barracudas were mentioned).



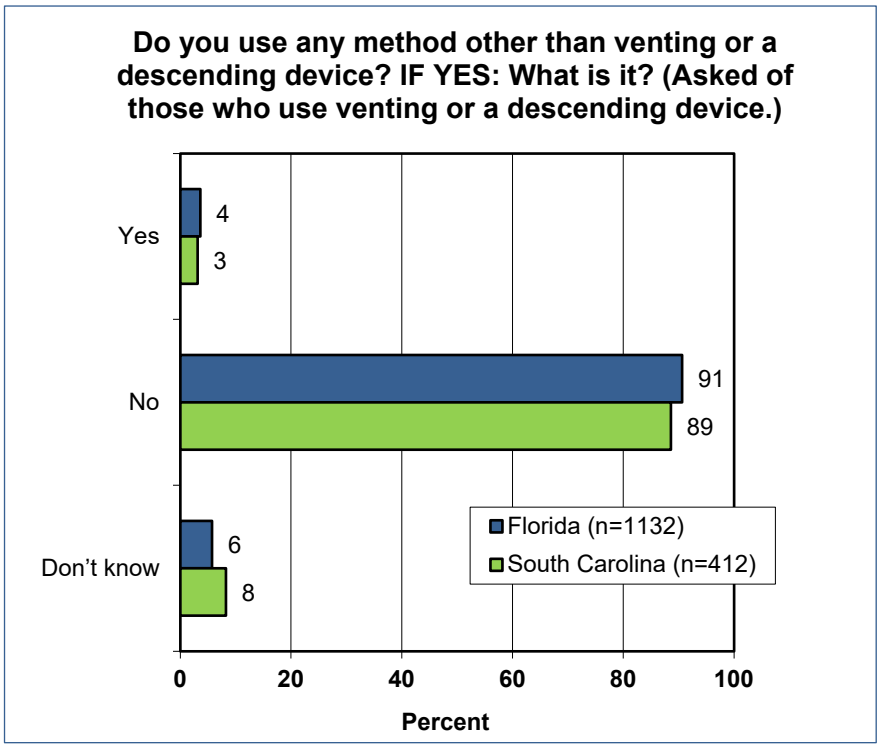


Other than obvious signs of barotrauma, the factors that influence decisions whether to use venting or descending devices include depth of water, type of fish (some indicated always using these methods with certain types of fish), the presence of sharks or other predator fish, or the size of the fish (some saying they use the methods only for large fish). The graph shows the full listing of responses given. (Note that "other" refers to other than location, who is fishing with or on the boat with the respondent, the weather, or the time of day. These are listed in the question shown at the top of the previous page.)

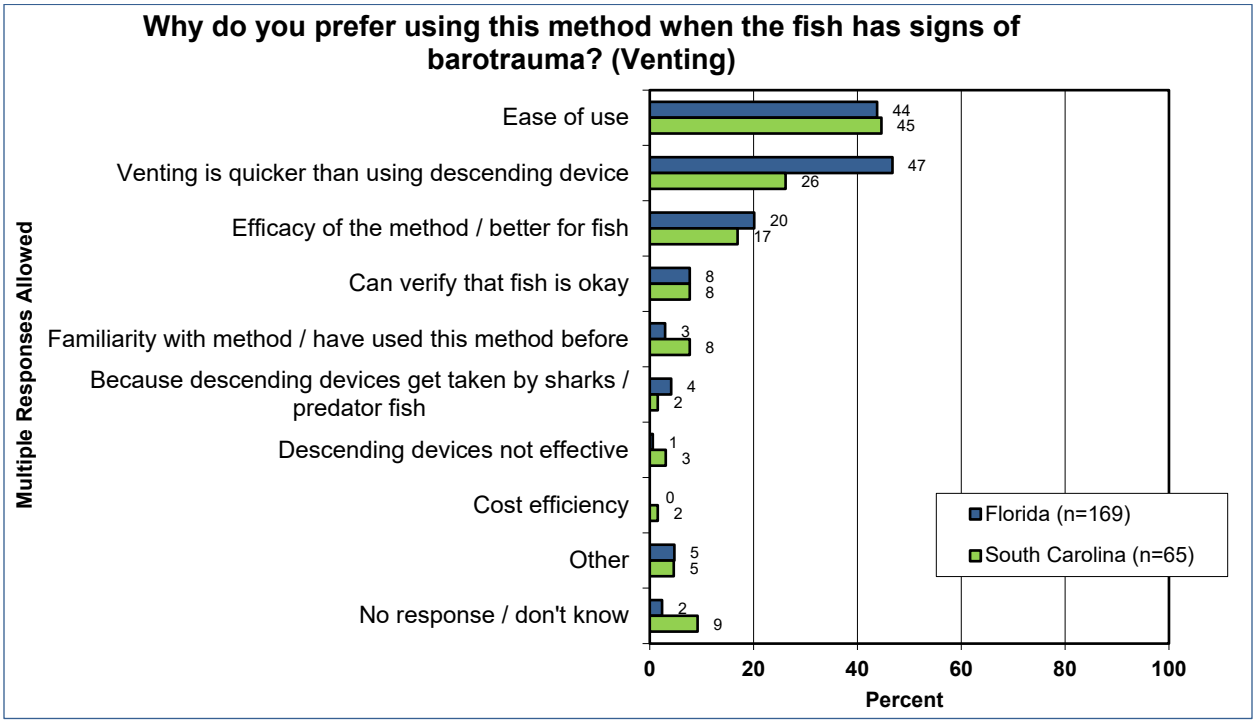


Of those who use both methods, venting is preferred over descending devices by a majority of anglers in each state: 54% of Florida anglers and 64% of South Carolina anglers choose venting. Only about a third of Florida anglers (36%) and a quarter of South Carolina anglers (28%) prefer descending devices.

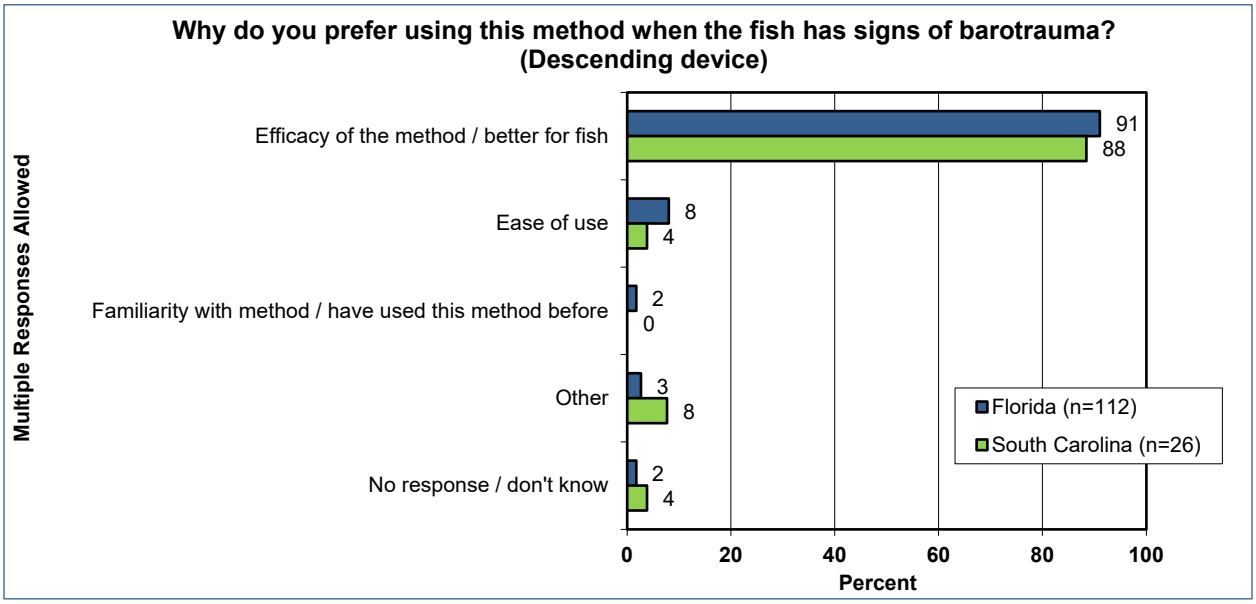
The survey also found that these two methods (venting and descending devices) are used to the exclusion of any other method, for the most part: less than 5% of anglers in either state say that they use another method.



In follow-up to the question regarding preferences, open-ended questions asked for the reasoning behind each preference. Those who preferred venting most commonly cite its ease of use or that it is quicker for the boater. About a fifth of those who prefer venting say it is a better method/better for the fish. Also, many like that one can actually see whether the fish swims down. Sharks taking the devices themselves is also cited as a problem by some.



Those who prefer descending devices overwhelmingly cite the efficacy of the method. Some say it is easier to use, in part (according to the open-ended remarks) because of anglers' fear of harming the fish by puncturing it—such as if the venting process punctures an inner organ.



Among anglers who see signs of barotrauma and who release fish, their instances of using venting, using descending devices, or not making use of either can be apportioned as follows:

- In Florida, about a quarter of the time, venting or descending devices are not used. Otherwise, a little less than half the time venting is used, and a little less than a quarter of the time, a descending device is used.
- In South Carolina, about a third of the time, venting or descending devices are not used. Well less than half of the time, venting is used, and a fifth of the time, a descending device is used.

For fish showing signs of BAROTRAUMA that you release, please indicate for what percentage you use each of the following methods:		
	Florida	**South Carolina**
	Mean Percentage Given in Response	
Using NO special method or gear other than dehooking	28	32
Venting tool	44	40
Descending device	22	20

Respondents estimated the percentages but were not required in the survey to make them sum to 100%. Those who were unfamiliar with venting were coded as using it 0% of the time, and those who were unfamiliar with descending devices were coded as using them 0% of the time. Also note that each respondent did not fish the same number of times, and their frequency of fishing was not paired with the results of this question, so the statement "...of the time" is not completely accurate but is an approximation. (In other words, a person who goes fishing only once a year is counted the same as one who goes multiple times.)

Finally in this section is an examination of the amount of time that various species of fish are kept out of the water. The survey data are shown in the table below.

For the fish you release, how long, in minutes, does a fish typically remain on deck before you are able to release it back into the water? (Asked of those who release any fish.)											
	Black grouper	**Gag grouper**	**Red grouper**	**Black sea bass**	**Red porgy**	**Gray snapper**	**Mutton snapper**	**Red snapper**	**Vermillion snapper**	**Yellowtail snapper**	**Gray triggerfish**
Florida											
More than 4 minutes	5	3	5	4	5	3	3	4	1	3	4
4 minutes	1	0	1	3	2	1	1	1	0	1	3
3 minutes	11	6	8	4	5	8	7	10	7	5	10
2 minutes	25	23	26	16	14	17	22	29	26	18	16
1 minute or less	58	68	60	73	73	72	67	55	66	73	67
South Carolina											
More than 4 minutes	5	8	8	4	4	3	5	7	4	4	3
4 minutes	1	2	2	1	2	2	0	0	1	3	1
3 minutes	7	8	4	6	7	3	8	6	5	7	4
2 minutes	35	25	29	25	16	23	26	22	22	23	23
1 minute or less	51	57	56	64	72	69	61	65	68	64	69

Based on the data in the table previously shown, a couple of thresholds are examined. While there is no definitive threshold where every fish either lives or dies, in general terms it is best that the fish not be out of the water long. Therefore, given below in the table is the percentage who typically keep the fish out of the water for more than 1 minute and for more than 2 minutes.

There may be problems with the catching of black grouper, red grouper, red snapper, and gray triggerfish among Florida anglers, as these fish have the highest percentages of anglers saying that the fish is out of the water for relatively long times (red shading). In South Carolina, that list of species includes black, gag, and red grouper.

For the fish you release, how long, in minutes, does a fish typically remain on deck before you are able to release it back into the water? (Asked of those who release any fish.)											
	Black grouper	Gag grouper	Red grouper	Black sea bass	Red porgy	Gray snapper	Mutton snapper	Red snapper	Vermillion snapper	Yellowtail snapper	Gray triggerfish
Florida											
More than 2 minutes	17	9	14	11	13	12	11	16	8	9	17
More than 1 minute	42	32	40	27	27	28	33	45	34	27	33
South Carolina											
More than 2 minutes	14	18	15	11	12	8	13	13	10	13	8
More than 1 minute	49	43	44	36	28	31	39	35	32	36	31

CONSTRAINTS TO USING DESCENDING DEVICES

The survey presented 11 possible reasons for not using a descending device and asked anglers to rate the importance of each as a possible reason for not doing so. This was asked only of those who release fish at least some of the time and who know what a descending device is but who do not use one. Simple preference for venting over using a descending device is the top rated reason. Another top reason is that the anglers do not usually see signs of barotrauma. Both of these reasons have ratings above the midpoint in Florida (5.00) or above or near the midpoint on South Carolina. Also with relatively high ratings is not knowing how to use a descending device.

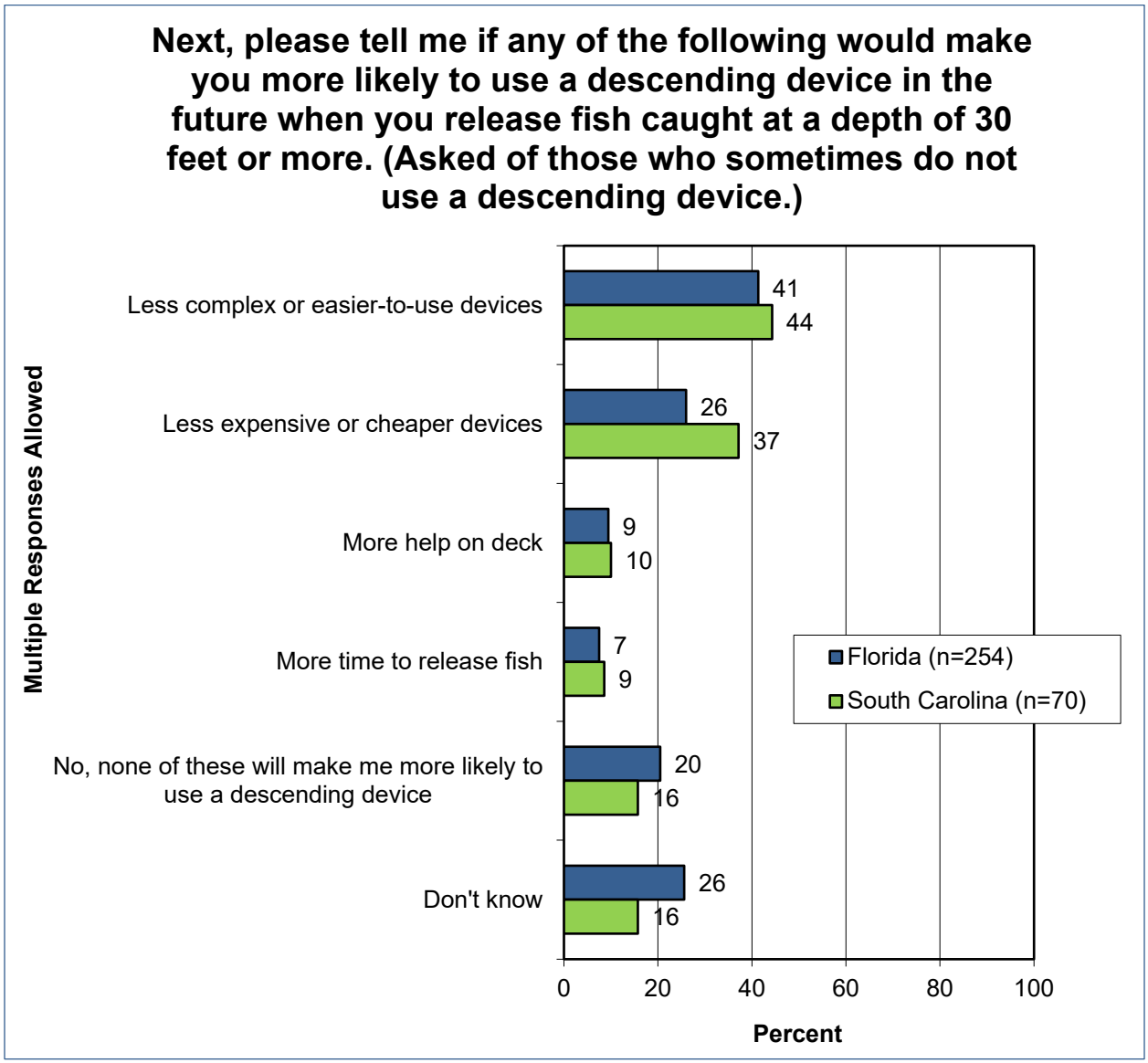
Next, please rate how important each of the following reasons is for why you do NOT use a descending device when you release fish caught at a depth of 30 feet or more, on a scale of 0 to 10, where 0 is not at all important and 10 is extremely important. (Among those who release any fish, know what a descending device is, but do not use one.)

	Florida	South Carolina
	Mean Rating	
Prefer to use a venting tool to treat barotrauma	6.71	6.61
Do not usually see signs of barotrauma	5.45	4.79
Don't know how to use a descending device	4.32	4.23
Do not think it helps the fish or think fish likely don't survive anyway	3.74	4.06
Too difficult, complicated, or cumbersome to use	3.70	3.34
Requires a dedicated rod that I can't use for fishing	3.80	3.10
Takes too much time to use	3.37	2.57
Unsafe to use on a moving deck	2.68	3.07
Sea conditions are usually too unfavorable, such as strong currents, choppy water, and more	3.07	2.48
Costs too much	2.80	2.59
Requires too much space for storage	2.60	2.27

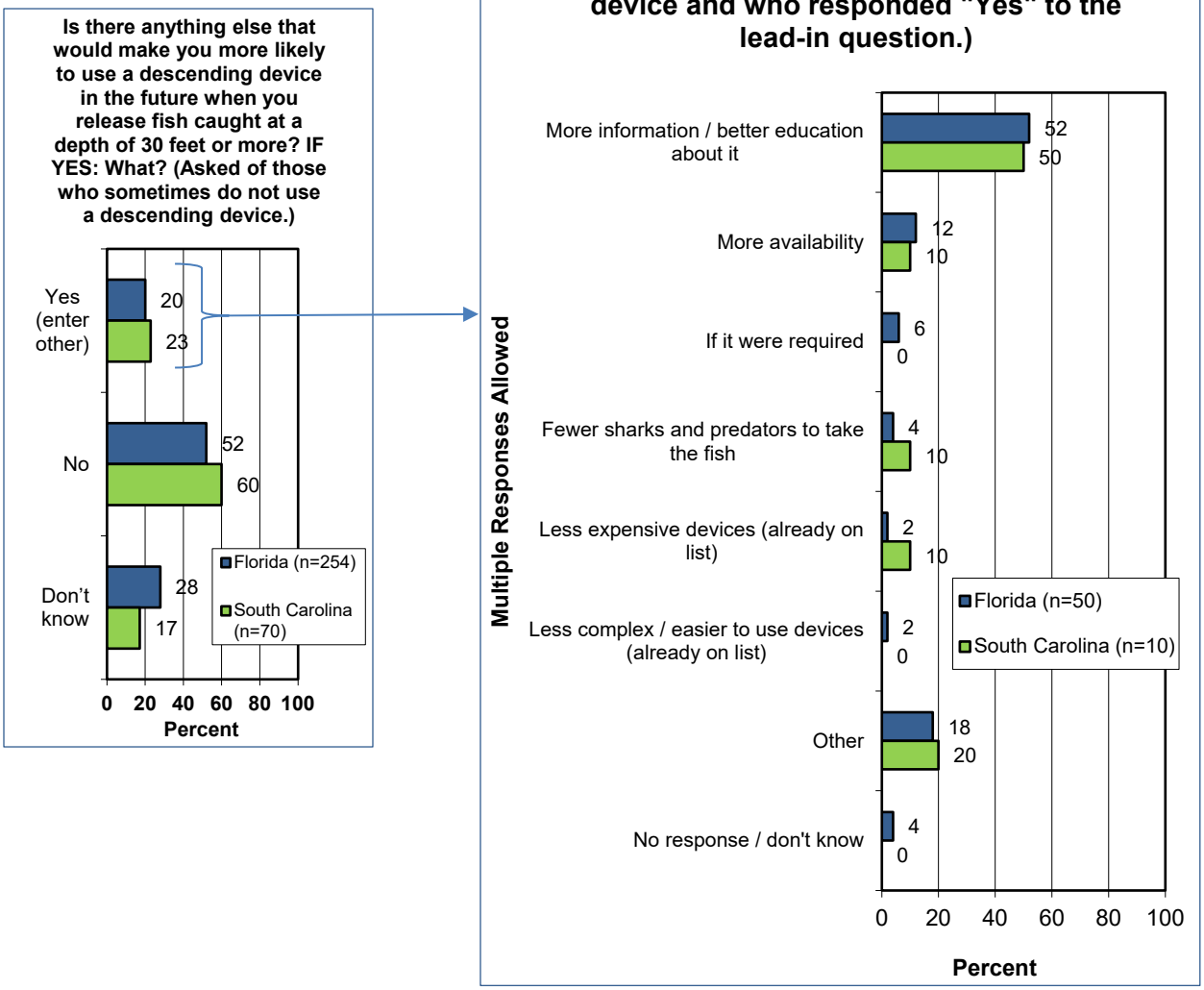
Ranking done on the mean of the two state means, which is not shown because it does not actually represent the overall mean (because the states had unequal sample sizes) but was used only to rank the reasons.

FACTORS TO ENCOURAGE USE OF DESCENDING DEVICES

Four possible factors to encourage use of descending devices were tested in the survey; anglers were asked if any of them would encourage use of descending devices. The top factor was if the devices were less complex and easier to use. Just under that as a factor was the cost. The other factors were less important, which is fortunate, as there is likely little that outside forces can do to affect them: more help on deck and more time to release the fish.

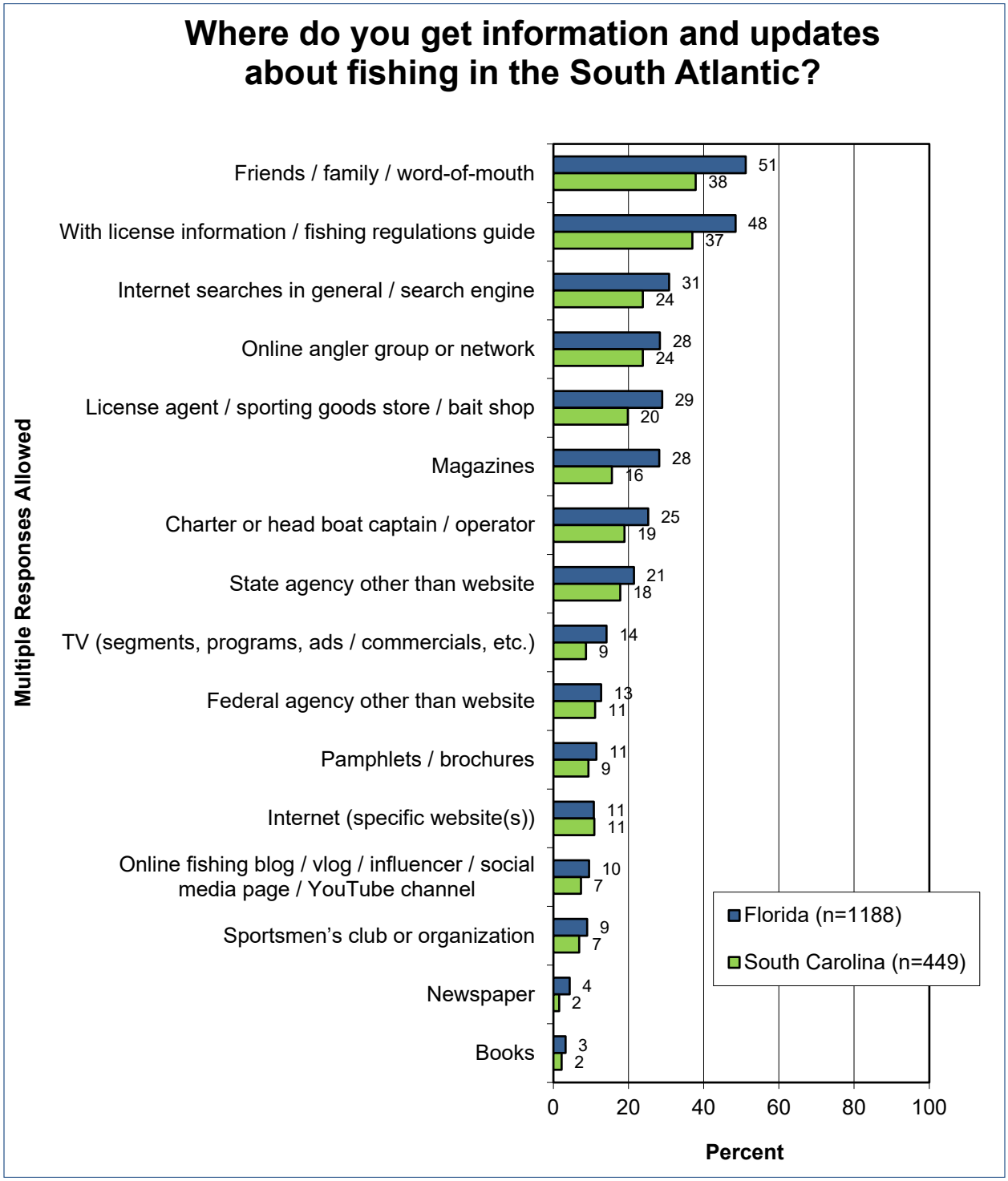


A follow-up question (open-ended) asked if anything else would encourage the use of descending devices. The top response was more information—roughly half of those who got the question said this. Other items named in the survey are shown in the graph.



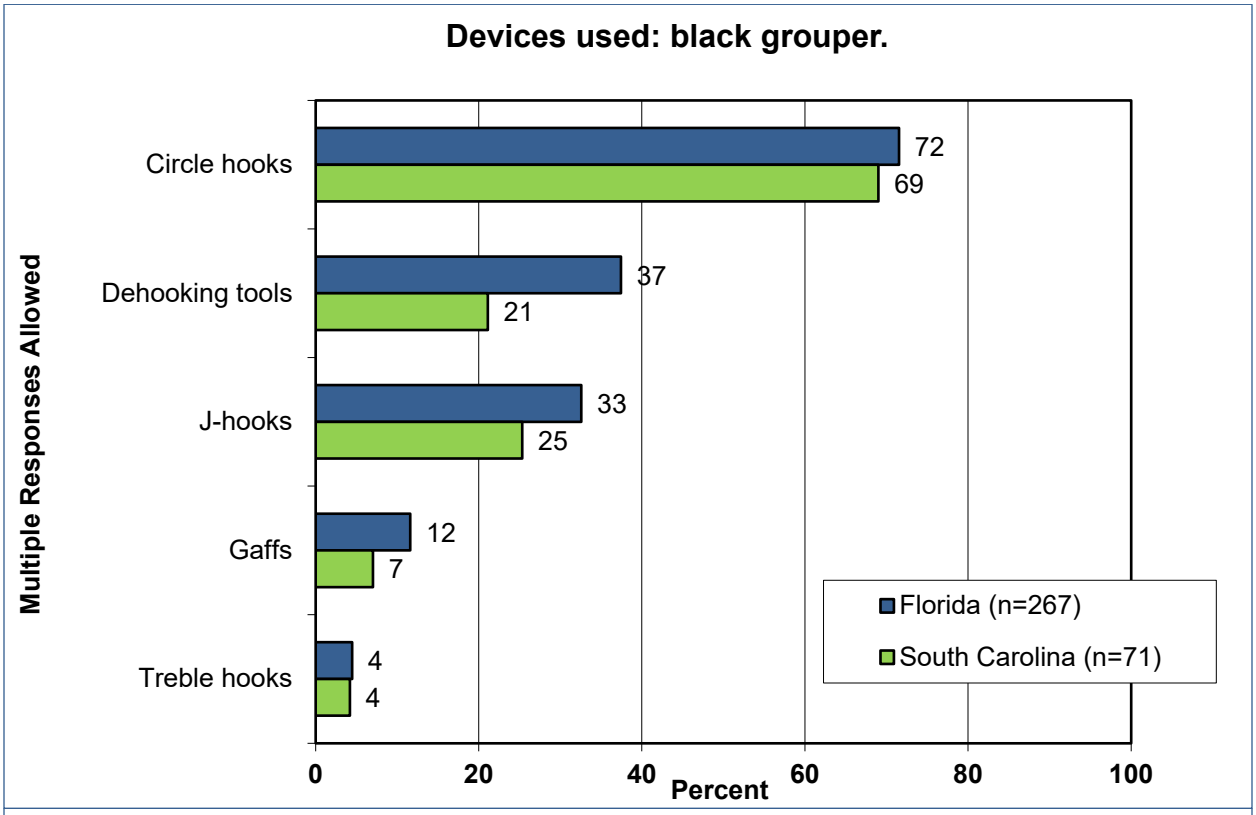
INFORMATION SOURCES ABOUT FISHING IN THE SOUTH ATLANTIC

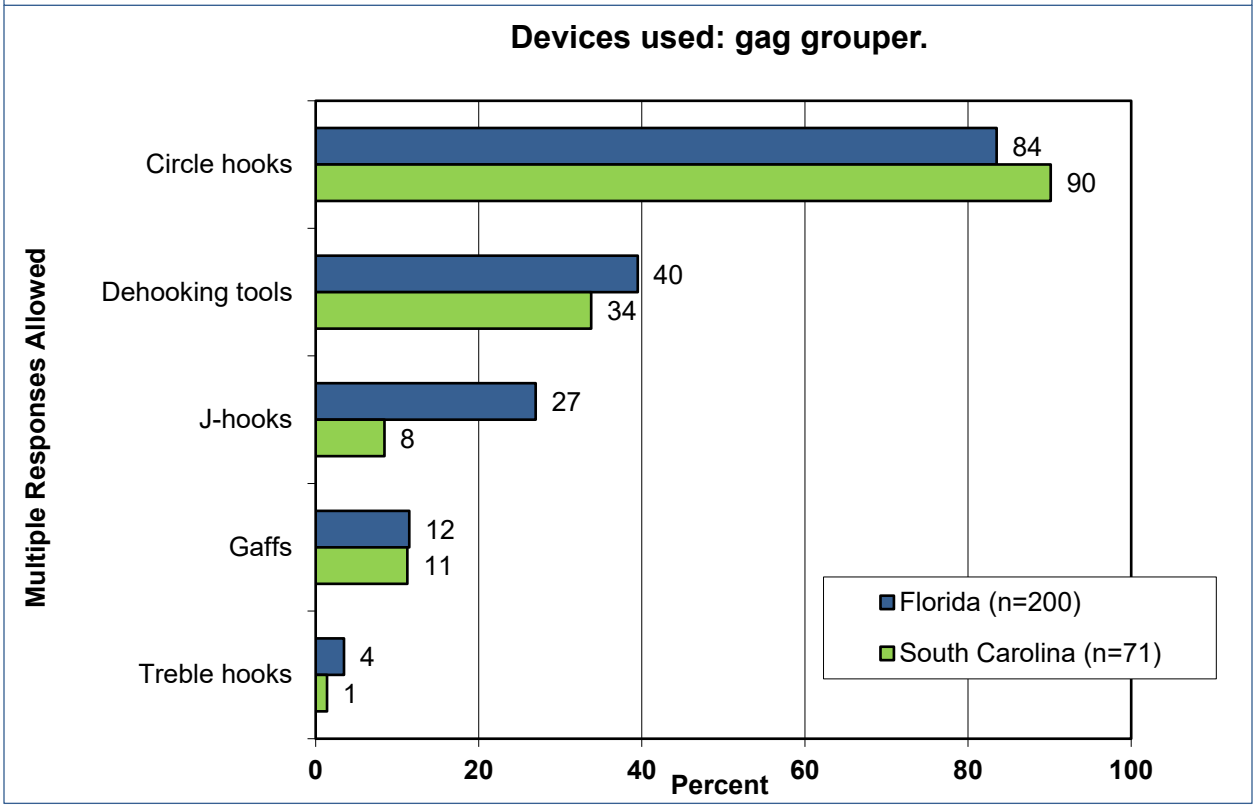
Information sources about fishing are quite varied, although one of the top-named sources is simple word-of-mouth. Of substantial importance is the fishing regulations guide that each state agency puts out. Internet sources are important, as well as licensing agents/store personnel. The full list is shown in the accompanying graph.

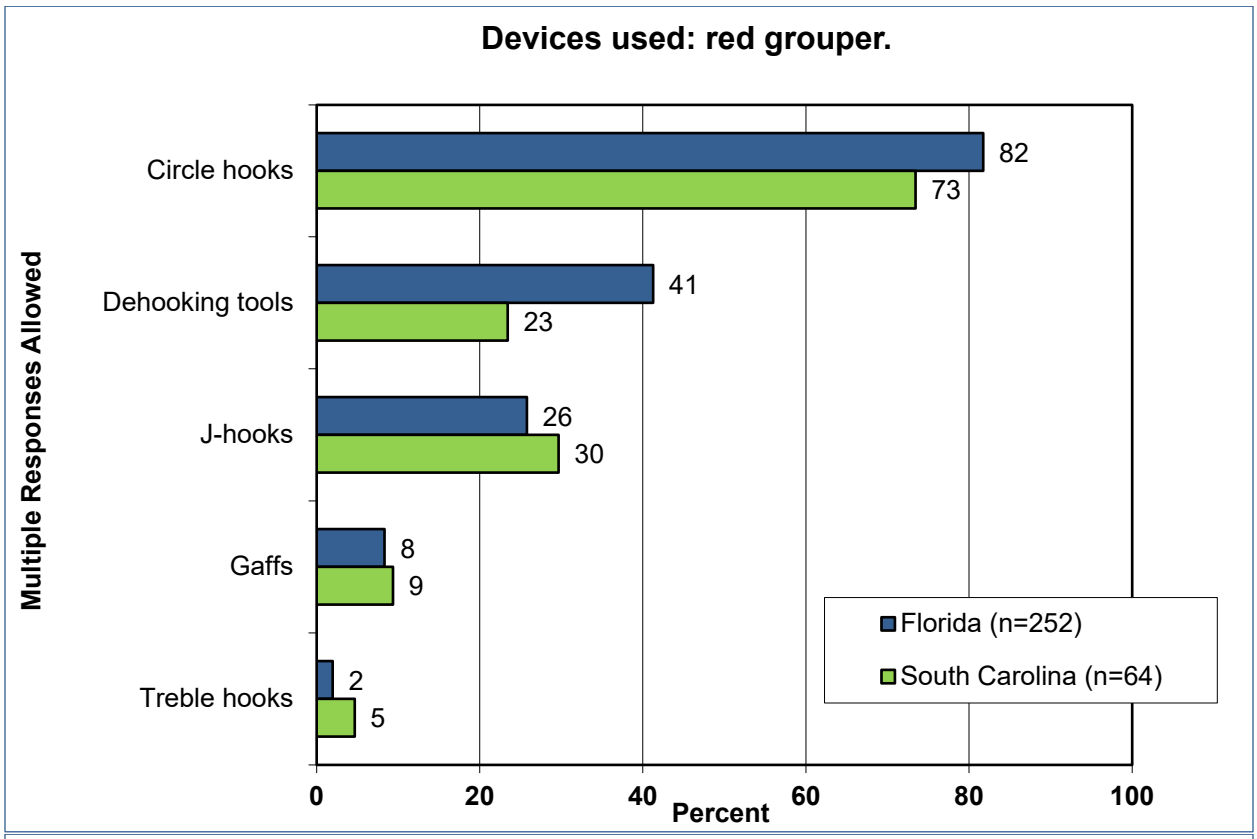


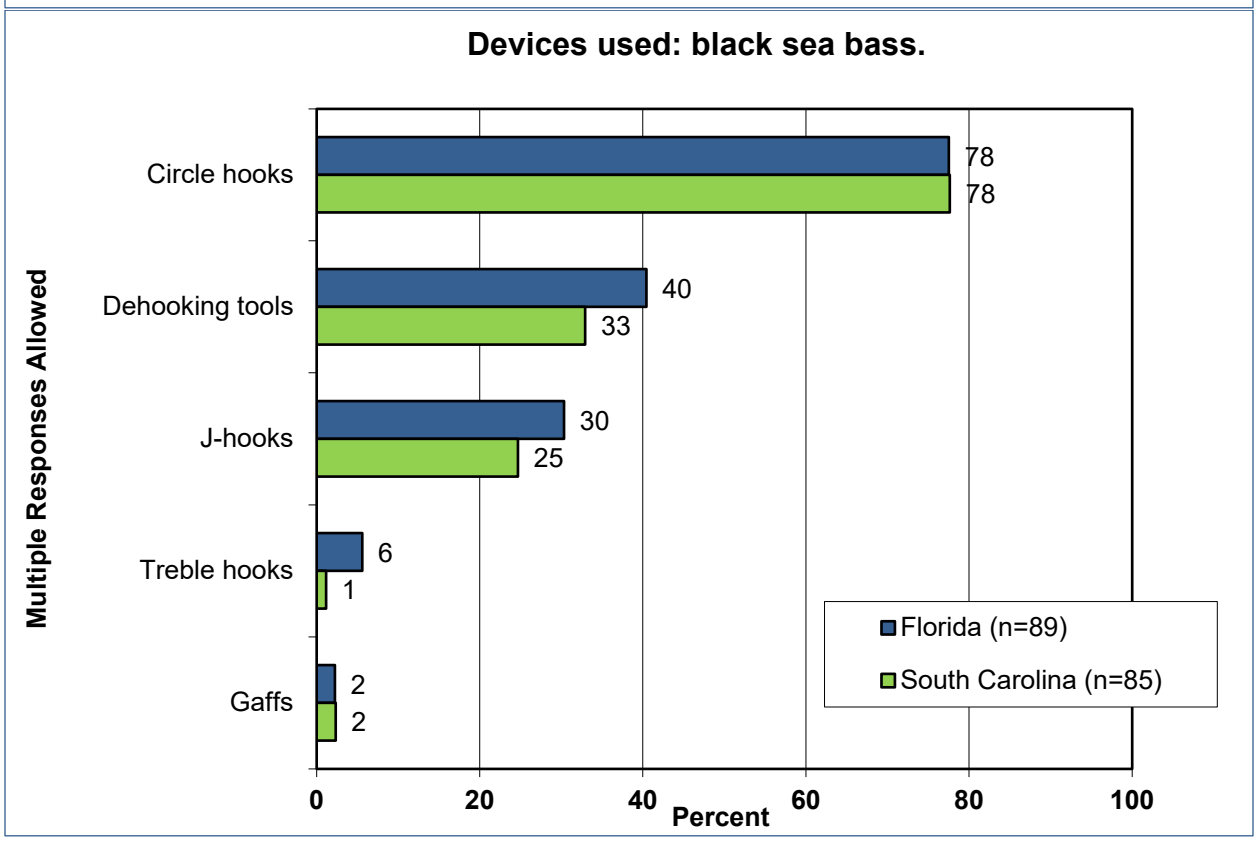
USE OF DEVICES FOR FISHING VARIOUS SPECIES

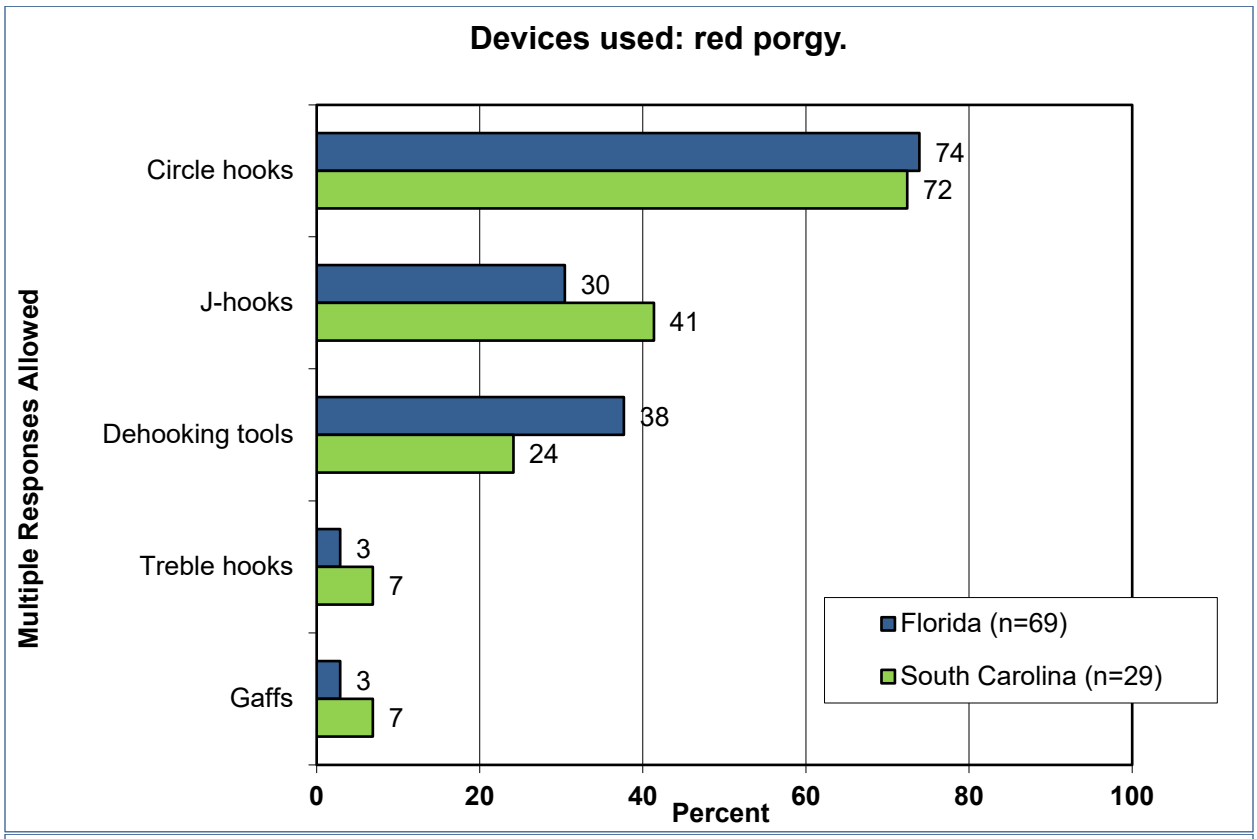
The following pages present the various equipment that anglers used when fishing for various species. Circle hooks top the list for every species.

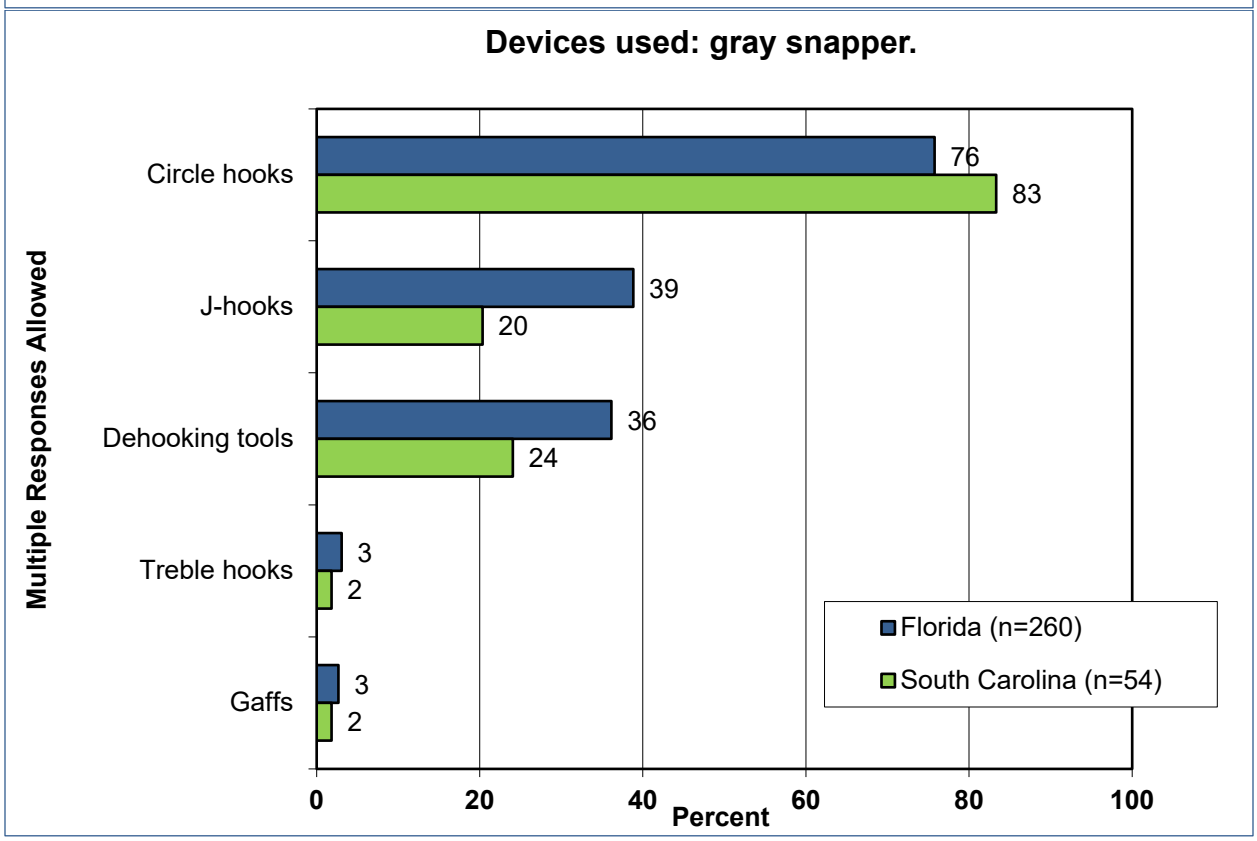


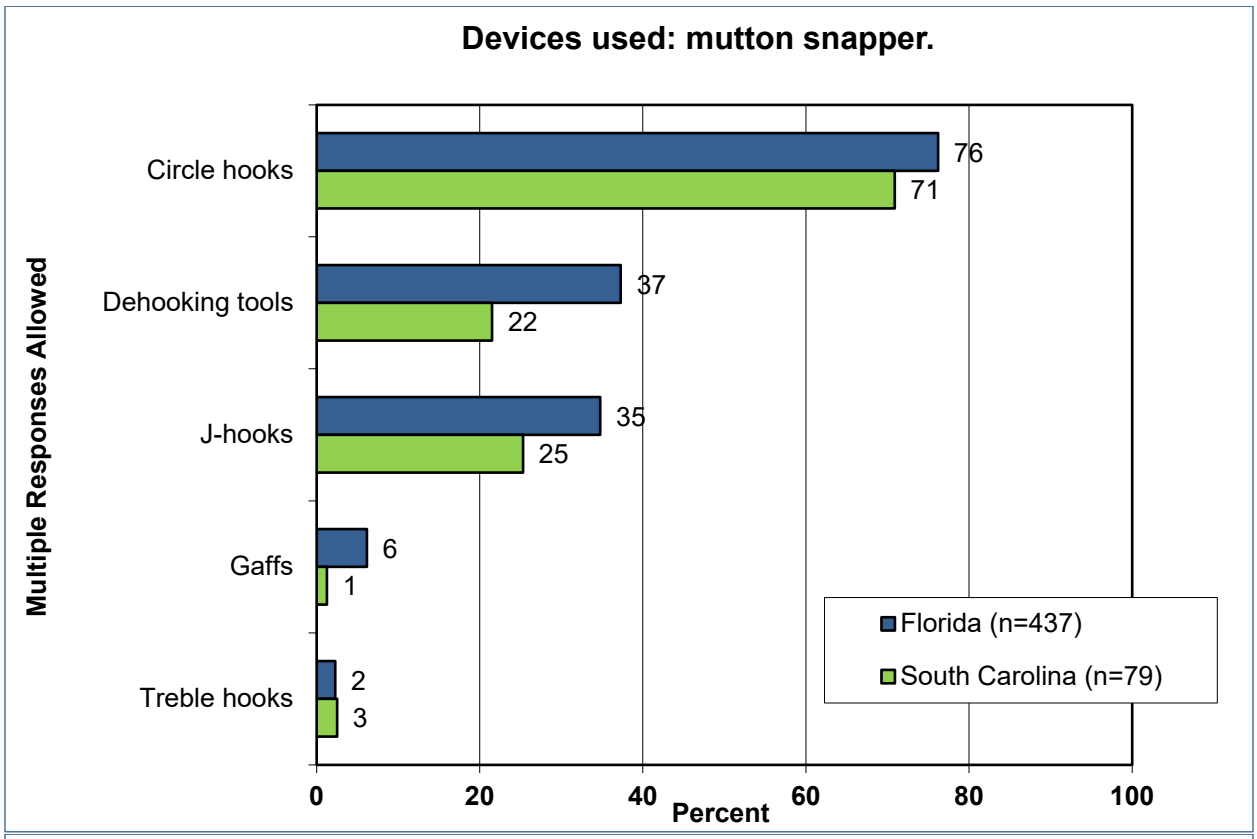


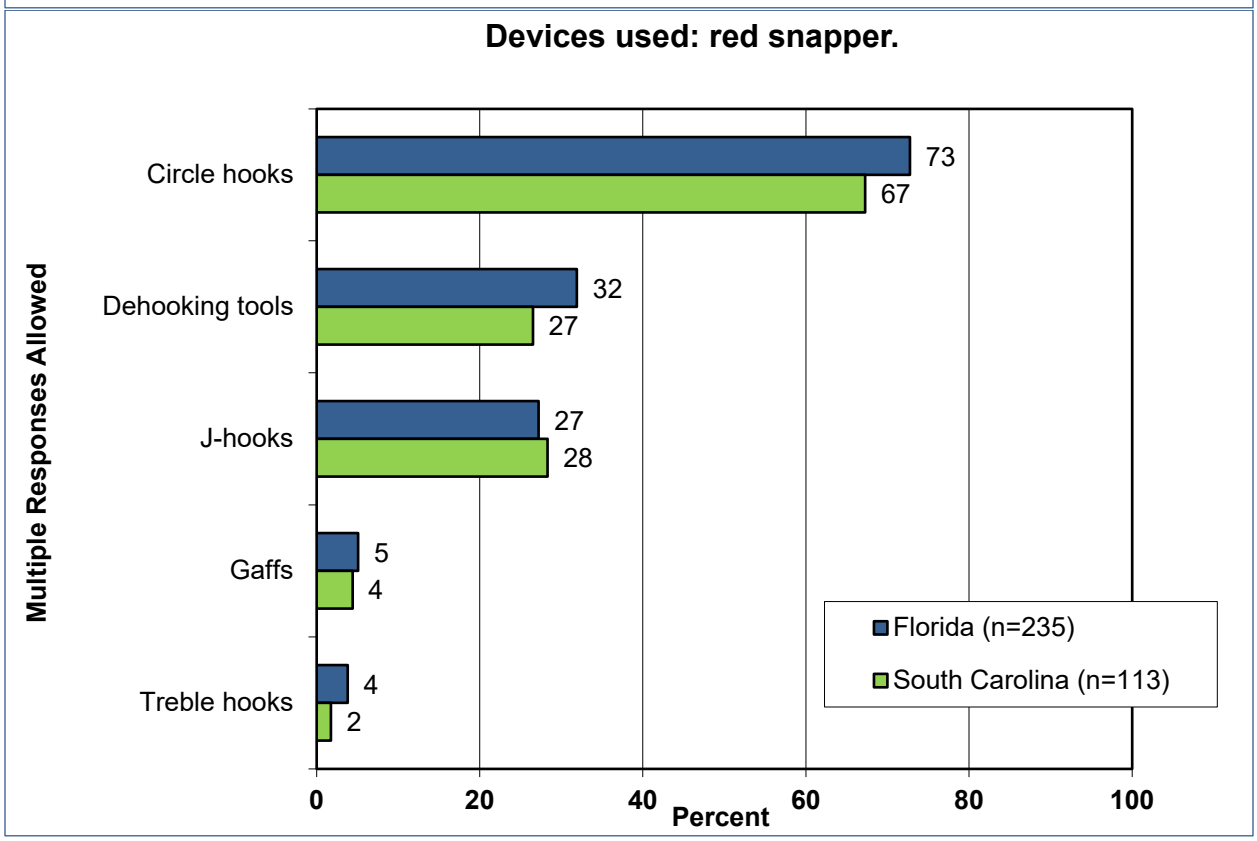

Devices used: red grouper.
Multiple Responses Allowed
Circle hooks
Dehooking tools
J-hooks
Gaffs
Treble hooks
82
73
41
23
26
30
8
9
2
5
Florida (n=252)
South Carolina (n=64)
0
20
40
60
80
100
Percent

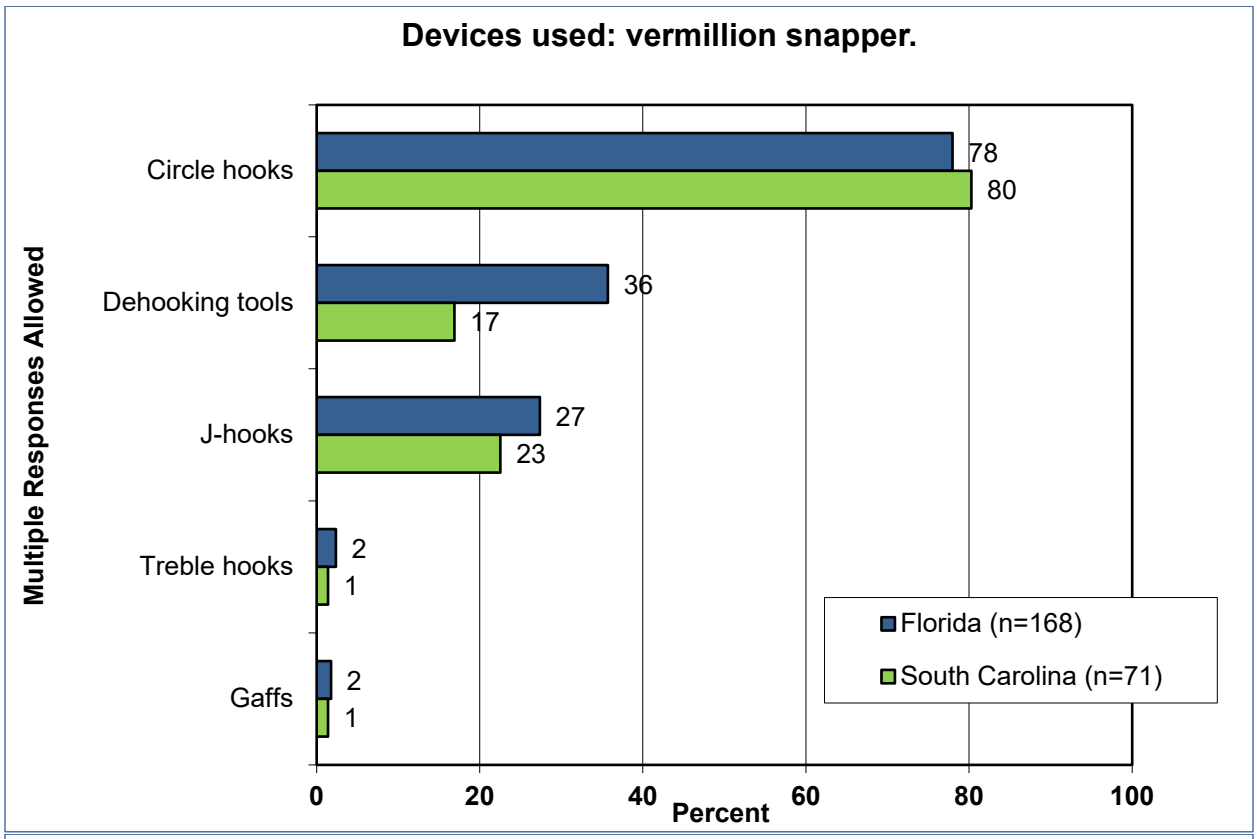

Devices used: black sea bass.
Multiple Responses Allowed
Circle hooks
Dehooking tools
J-hooks
Treble hooks
Gaffs
78
78
40
33
30
25
6
1
2
2
Florida (n=89)
South Carolina (n=85)
0
20
40
60
80
100
Percent

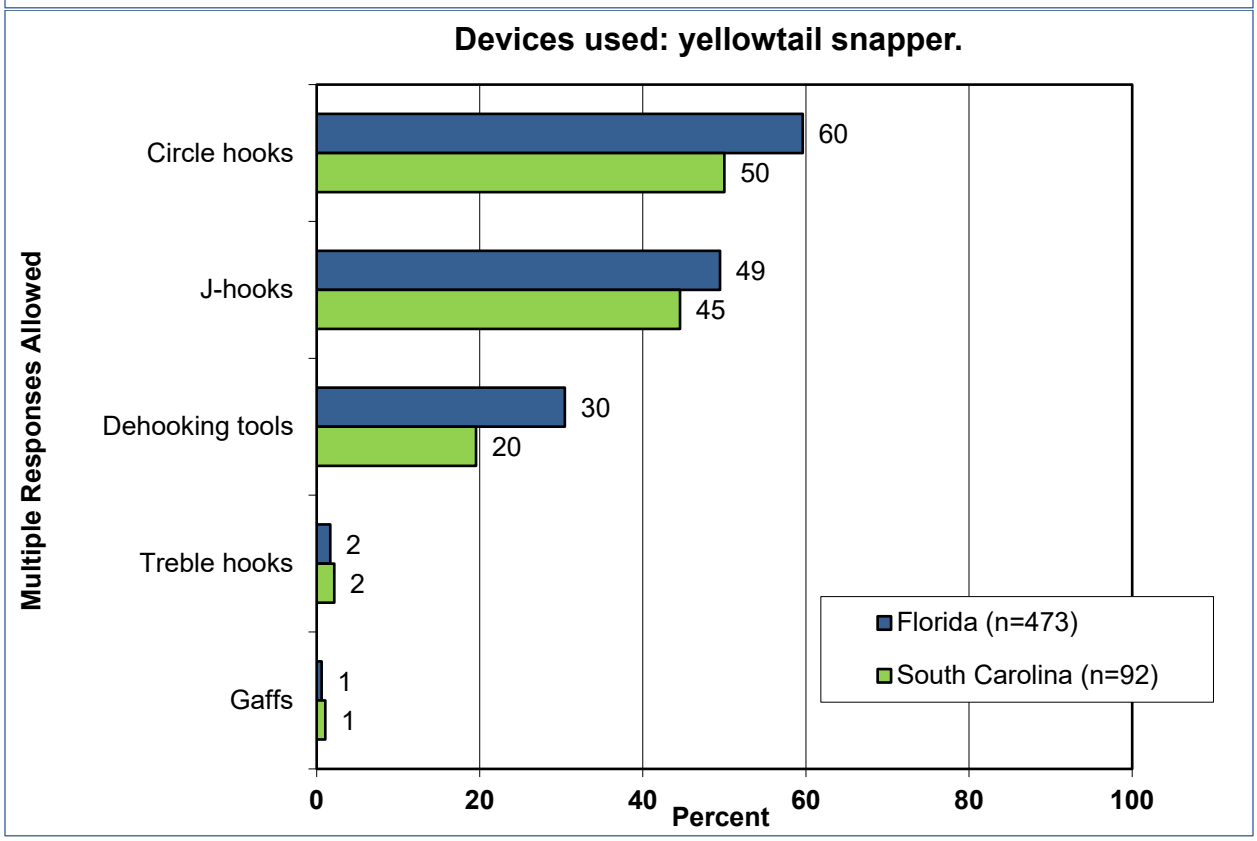

Devices used: red porgy.
Multiple Responses Allowed
Circle hooks
J-hooks
Dehooking tools
Treble hooks
Gaffs
74
72
30
41
38
24
3
7
3
7
Florida (n=69)
South Carolina (n=29)
0
20
40
60
80
100
Percent

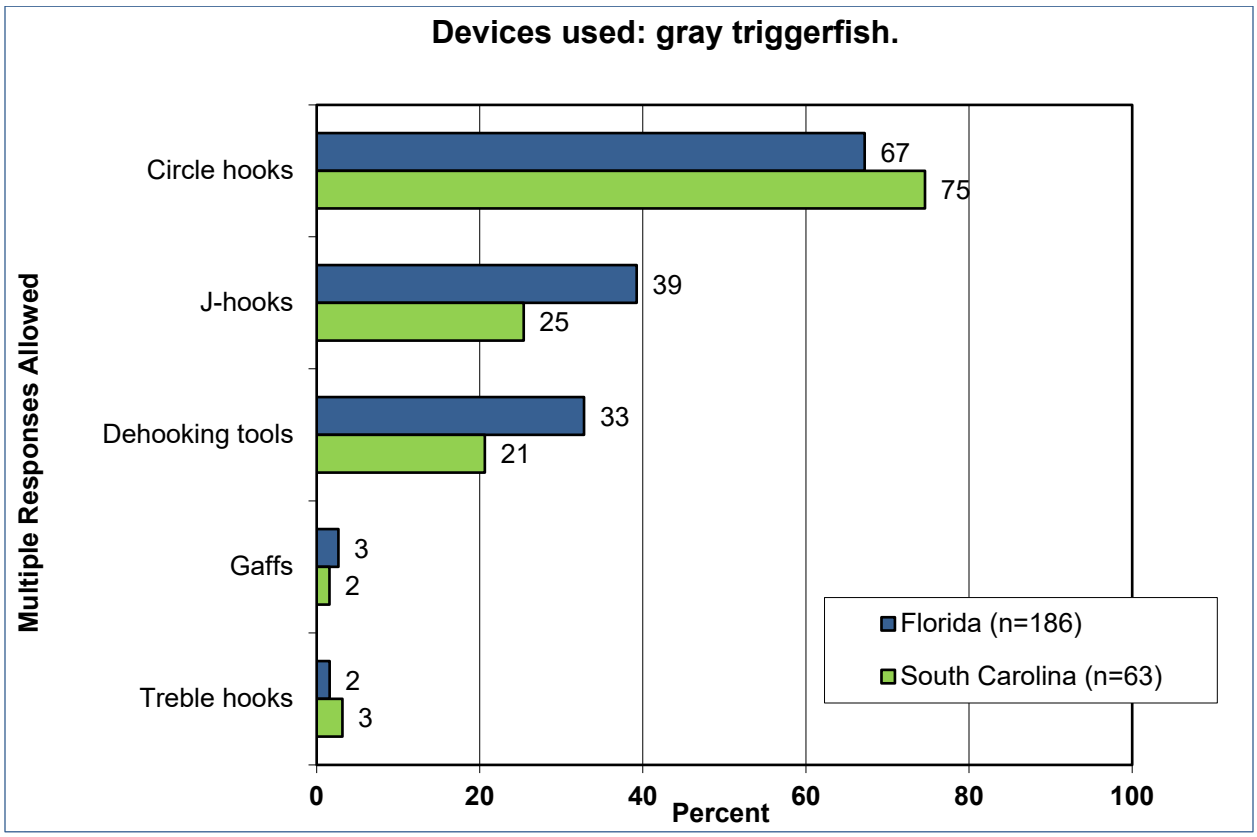

Devices used: gray snapper.
Multiple Responses Allowed
Circle hooks
J-hooks
Dehooking tools
Treble hooks
Gaffs
76
83
39
20
36
24
3
2
3
2
Florida (n=260)
South Carolina (n=54)
0
20
40
60
80
100
Percent


Devices used: mutton snapper.
Multiple Responses Allowed
Circle hooks
Dehooking tools
J-hooks
Gaffs
Treble hooks
76
71
37
22
35
25
6
1
2
3
Florida (n=437)
South Carolina (n=79)
0
20
40
60
80
100
Percent


Devices used: red snapper.
Multiple Responses Allowed
Circle hooks
Dehooking tools
J-hooks
Gaffs
Treble hooks
73
67
32
27
27
28
5
4
4
2
Florida (n=235)
South Carolina (n=113)
0
20
40
60
80
100
Percent

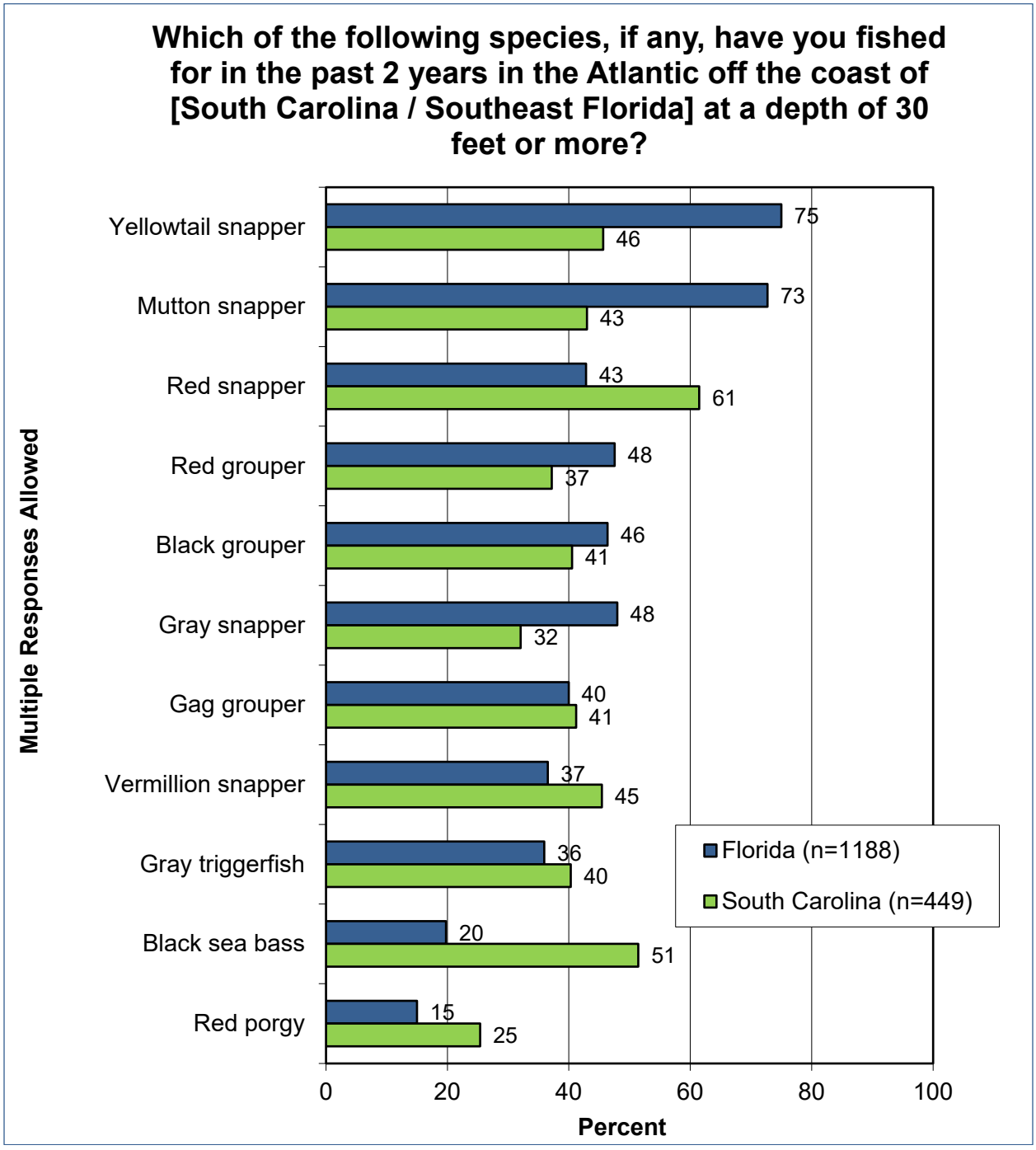

Devices used: vermillion snapper.
Multiple Responses Allowed
Circle hooks
Dehooking tools
J-hooks
Treble hooks
Gaffs
78
80
36
17
27
23
2
1
2
1
Florida (n=168)
South Carolina (n=71)
0
20
40
60
80
100
Percent


Devices used: yellowtail snapper.
Multiple Responses Allowed
Circle hooks
J-hooks
Dehooking tools
Treble hooks
Gaffs
60
50
49
45
30
20
2
2
1
1
Florida (n=473)
South Carolina (n=92)
0
20
40
60
80
100
Percent


Devices used: gray triggerfish.
Multiple Responses Allowed
Circle hooks
J-hooks
Dehooking tools
Gaffs
Treble hooks
67
75
39
25
33
21
3
2
2
3
Florida (n=186)
South Carolina (n=63)
0
20
40
60
80
100
Percent

SPECIES FISHED

Anglers had to have fished for at least one of the listed species to participate in the survey. In Florida, the most commonly fished of these species are yellowtail snapper and mutton snapper, with a second tier consisting of gray snapper, red grouper, black grouper, and red snapper. In South Carolina, red snapper is the most commonly fished for species of those listed. Nearly all the species listed form a second tier (ranging from about a third to a half fishing for them), the exception being red porgy, with only about a quarter seeking them.



The table below shows the percentage of fishing for the various species done at various depths. The first table shows the data on all the ranges given in the survey. The second table shows the cumulative percentages fishing at 90 feet or more. In general, vermillion snapper, red snapper, gag grouper, and red porgy are the species fished for at deep depths by substantial percentages of anglers.

You indicated that your fishing has included the species shown in the table below. For each species, please indicate at what depth you typically fish for that species in the Atlantic off the coast of [Southeast Florida / South Carolina].

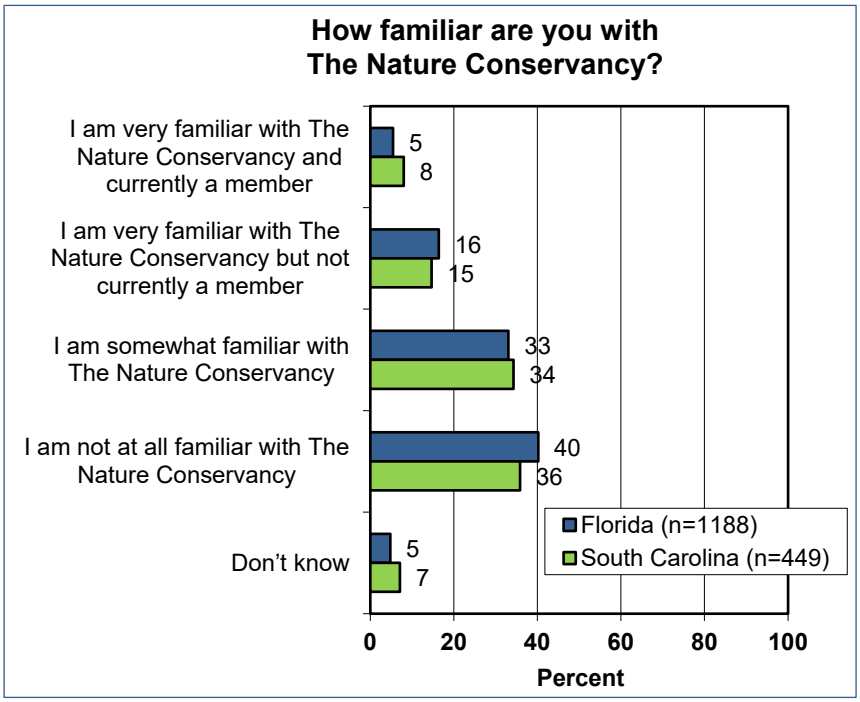
	Black grouper	Gag grouper	Red grouper	Black sea bass	Red porgy	Gray snapper	Mutton snapper	Red snapper	Vermillion snapper	Yellowtail snapper	Gray triggerfish
Florida											
30 to 59 feet	34	25	39	32	32	58	37	27	17	47	23
60 to 89 feet	24	27	26	37	22	22	24	21	31	32	40
90 to 119 feet	22	24	20	18	22	11	22	26	18	13	22
120 to 149 feet	8	13	7	3	7	2	9	13	10	3	6
150 to 199 feet	4	7	2	2	3	1	4	5	9	1	2
200 feet or more	2	1	2	1	7	0	1	2	12	0	2
Don't know	6	4	4	7	6	5	3	6	3	4	5
South Carolina											
30 to 59 feet	29	14	30	42	23	36	34	26	19	45	22
60 to 89 feet	18	27	14	29	21	11	19	19	29	20	26
90 to 119 feet	18	29	20	14	29	16	13	27	24	8	22
120 to 149 feet	8	10	12	3	8	9	9	7	10	4	11
150 to 199 feet	5	6	4	1	6	5	4	3	7	1	6
200 feet or more	3	1	3	1	0	0	2	2	2	1	2
Don't know	18	14	17	10	14	23	19	16	9	21	11

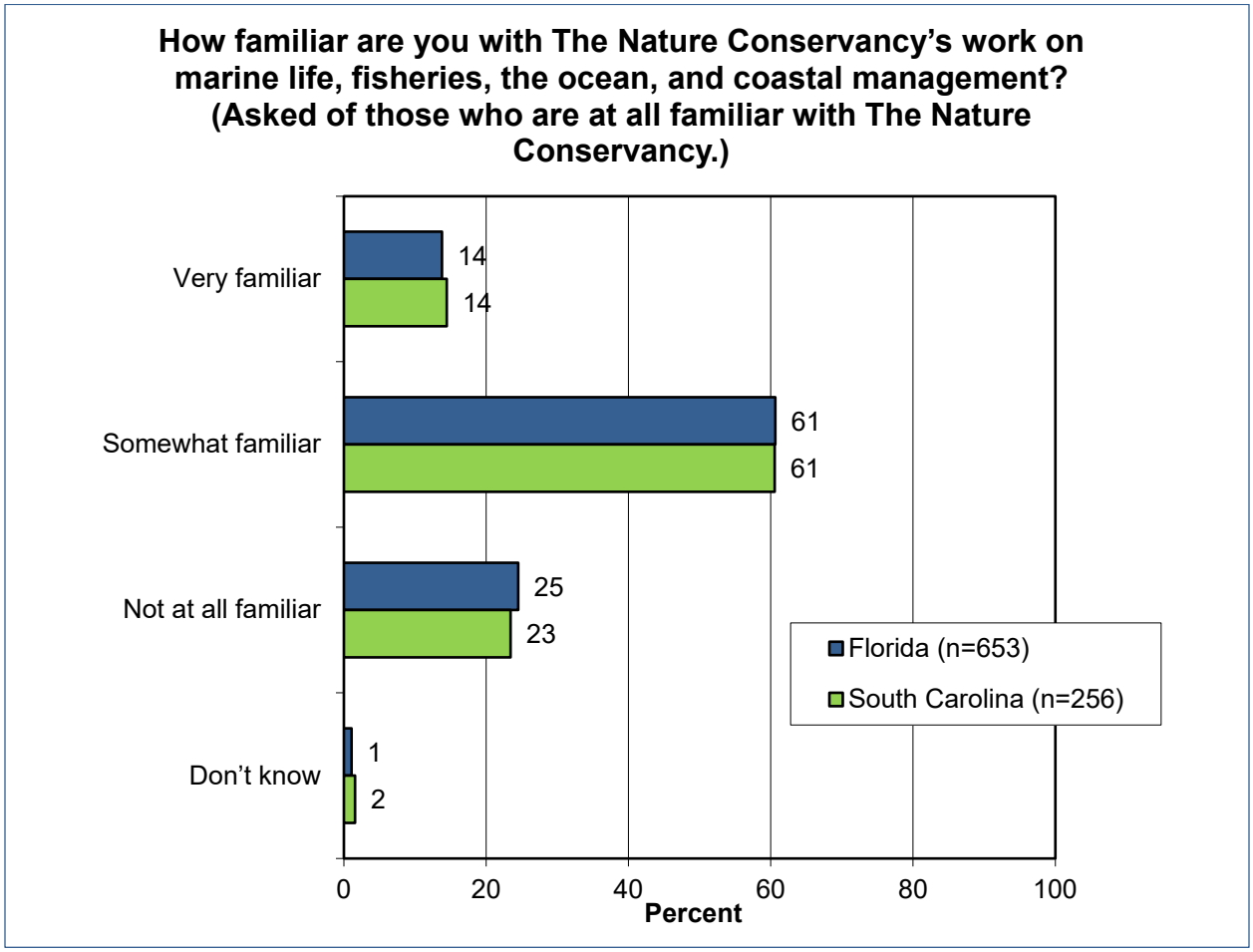
You indicated that your fishing has included the species shown in the table below. For each species, please indicate at what depth you typically fish for that species in the Atlantic off the coast of [Southeast Florida / South Carolina].

	Black grouper	Gag grouper	Red grouper	Black sea bass	Red porgy	Gray snapper	Mutton snapper	Red snapper	Vermillion snapper	Yellowtail snapper	Gray triggerfish
Florida											
Percentage at 90 feet or more	36	44	32	24	39	14	36	46	48	17	31
South Carolina											
Percentage at 90 feet or more	35	45	39	19	42	30	28	39	43	14	41

FAMILIARITY WITH THE NATURE CONSERVANCY

A small percentage anglers in the survey indicated membership in The Nature Conservancy. Additionally, about half of anglers indicate being *very* or *somewhat* familiar with the organization (but not a member). A second graph shows familiarity with The Nature Conservancy's work on marine life, fisheries, the ocean, and coastal management.





DEMOGRAPHIC ANALYSES OF RESULTS

The following graphs show the results of demographic analyses for selected questions. The following is a quick explanation of how to interpret these graphs.

AN EXPLANATION OF HOW TO INTERPRET DEMOGRAPHIC ANALYSES GRAPHS

The results of the question among the entire sample for the given state are shown in the bar labeled *Overall* on the graph, which is patterned, as shown in the graph on the next page. The rest of the bars in that graph show the results among the given groups. All those groups above the patterned bar are more likely to meet the criteria (for instance, in the graph on the next page, to have heard of barotrauma prior to the survey), while those groups below the patterned bar are less likely to meet the given criteria.

For the graph on the following page, 61% of Florida anglers overall have heard of barotrauma, as shown by the overall bar. Those groups more likely than Florida anglers overall to have heard of barotrauma prior to the survey include those who use descending devices (80% of them have heard of barotrauma) and those who knew what a descending device was prior to the survey (75%). As a further note to help understand the results, a finding that 80% of those who use descending devices have heard of barotrauma means that 20% (i.e., the inverse of 80%) of those who use descending devices have not heard of barotrauma.

On the other hand, groups below the overall (patterned) bar are less likely to have heard of barotrauma prior to the survey. This includes those who did not know what a descending device was prior to the survey (only 35% of them have heard of barotrauma), female anglers (43%), those who do not use descending devices (50%), those who do not think it is necessary to help the fish get back to catch depth (53%), those not familiar with The Nature Conservancy (55%), those in the lower income range (56%), and those in the lower educational bracket (56%).

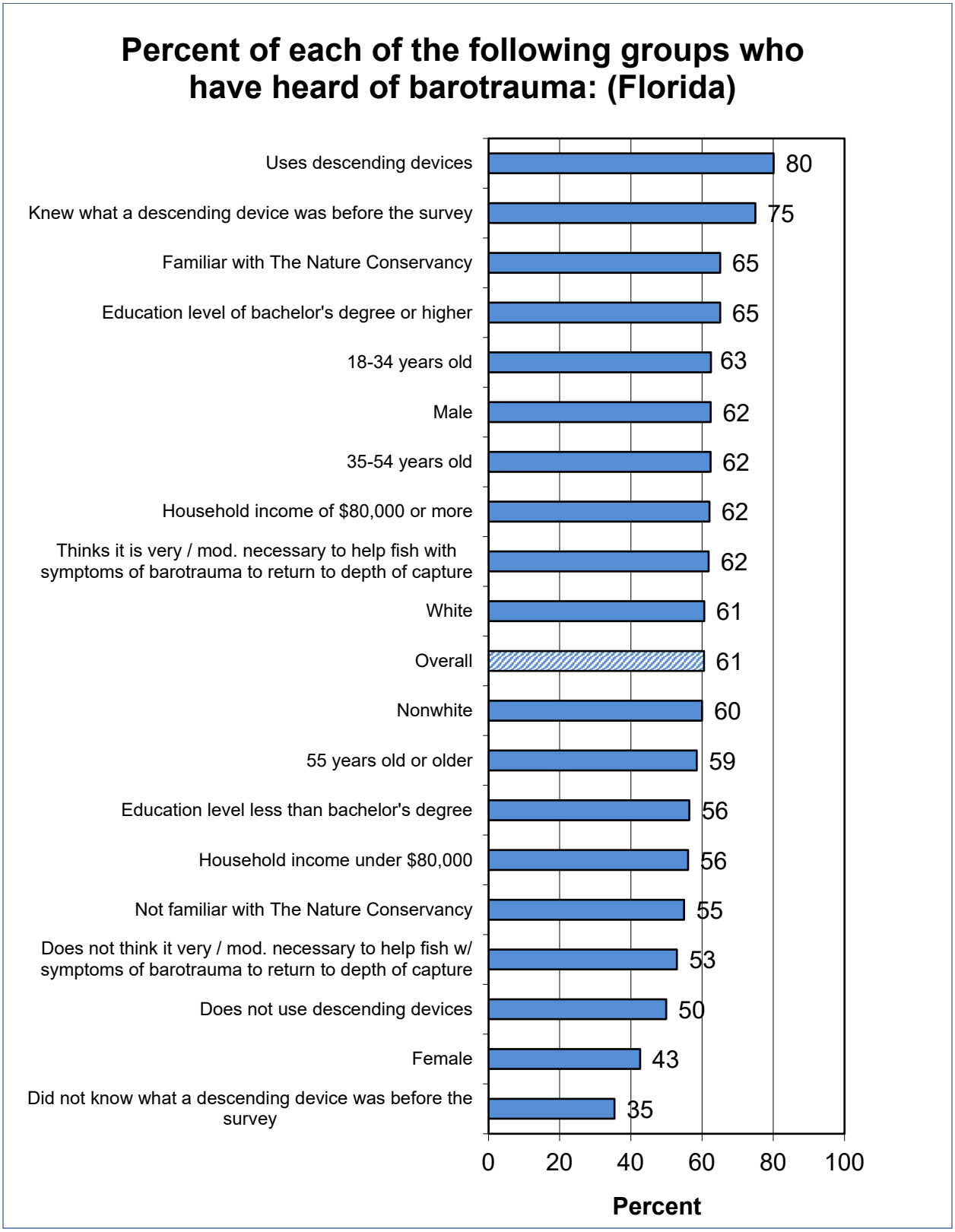
As a rule of thumb, only those groups that are at least 5 percentage points away from the overall bar should be considered markedly different. Also note that each variable is considered separate from the others. Therefore, the list of characteristics associated with any given question is not meant to describe one single person with all the characteristics.

AWARENESS AND KNOWLEDGE OF BAROTRAUMA

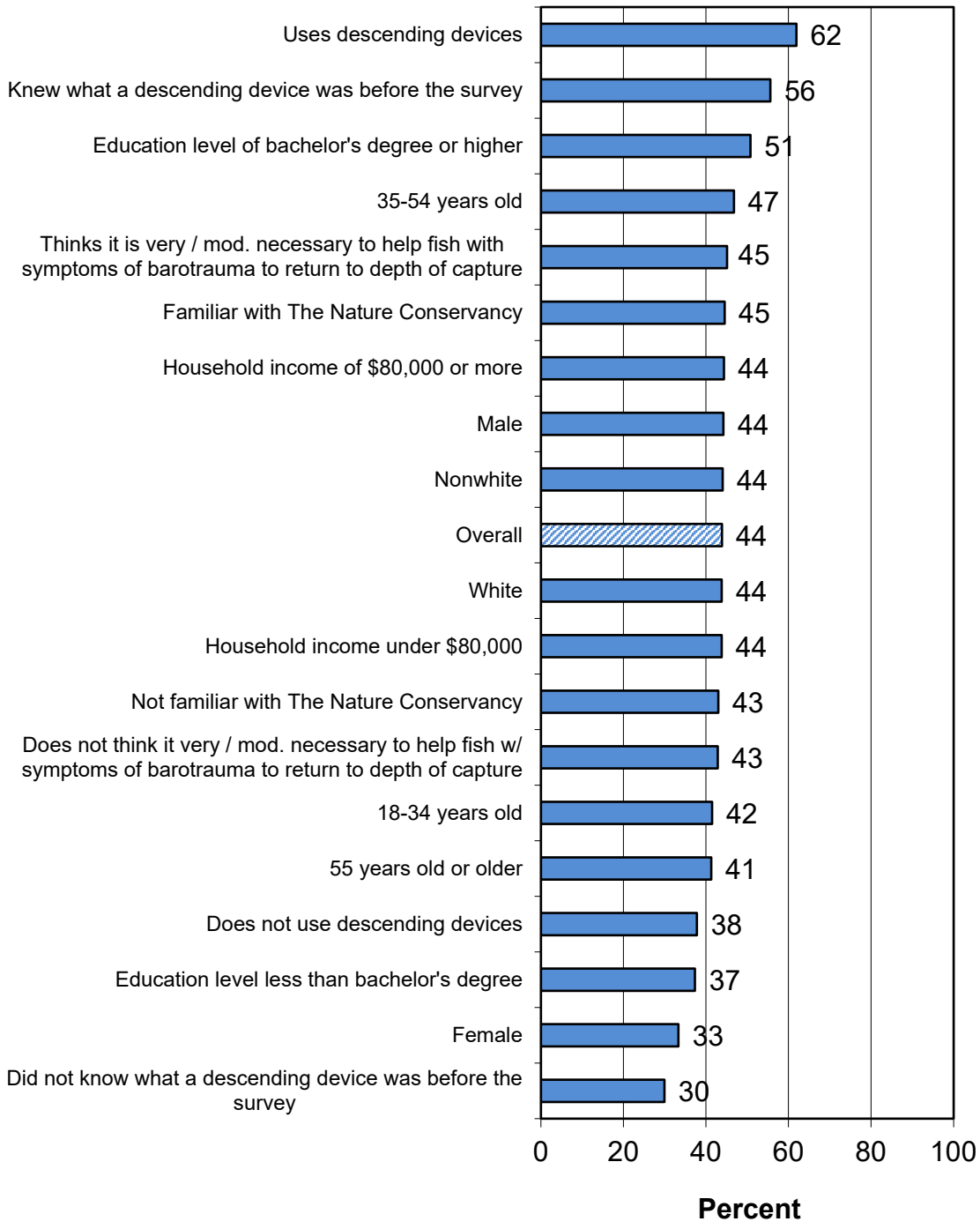
As mentioned above in the explanation of the demographic analyses graphs, among Florida anglers, having heard of barotrauma prior to the survey is associated with knowledge and use of descending devices.

On the other hand, lack of knowledge (shown by those bars below the patterned bar) of barotrauma is associated with (in Florida) lack of knowledge and use of descending devices, being female, not thinking it is important to help fish back to their catch depth, not being familiar with The Nature Conservancy, and being in the lower income and educational ranges. Among South Carolina anglers, use and knowledge of descending devices as well as being in the upper educational range are associated with knowing what barotrauma is. On the other hand,

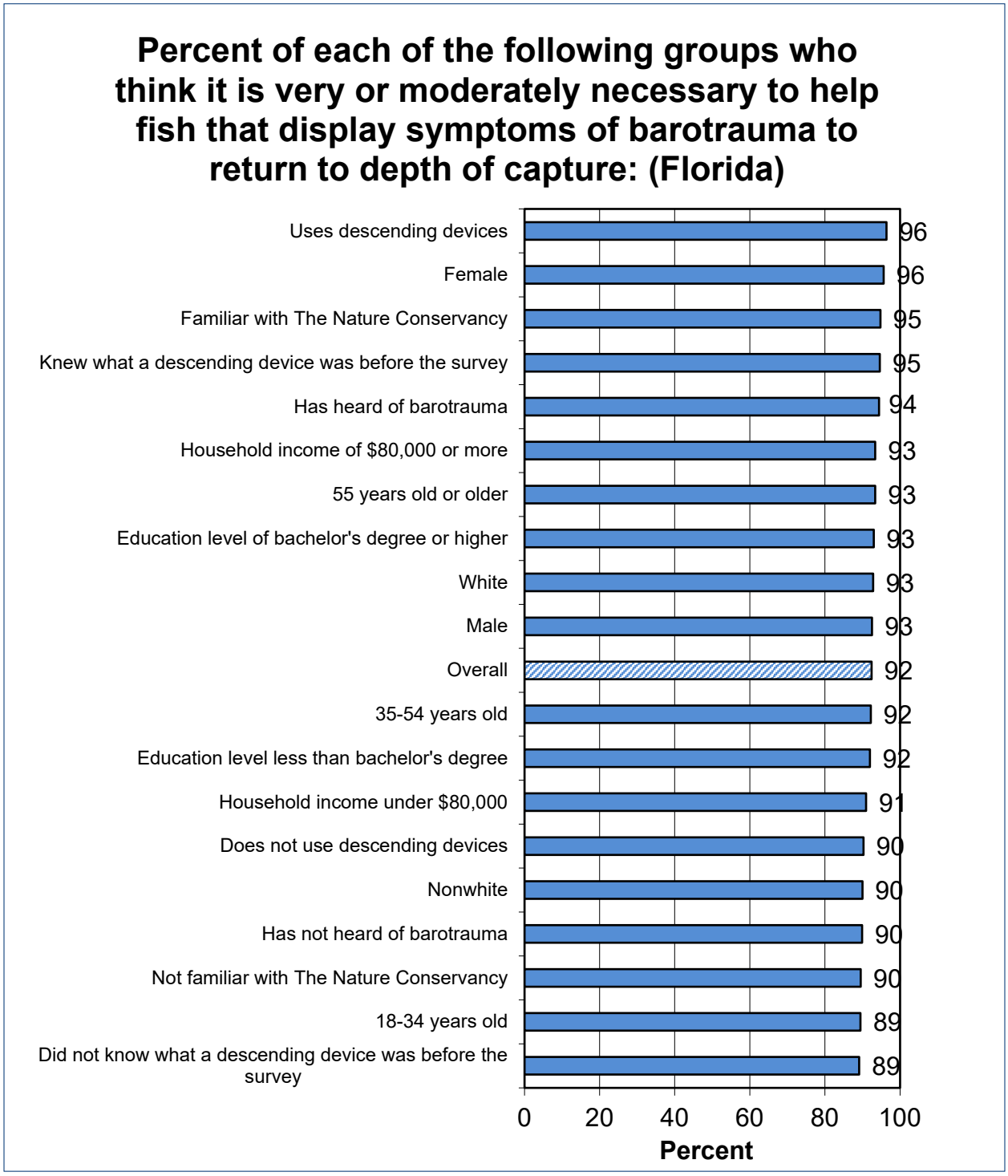
not knowing what barotrauma is has associations with not knowing what descending devices are and not using them, being female, and being in the lower educational range.



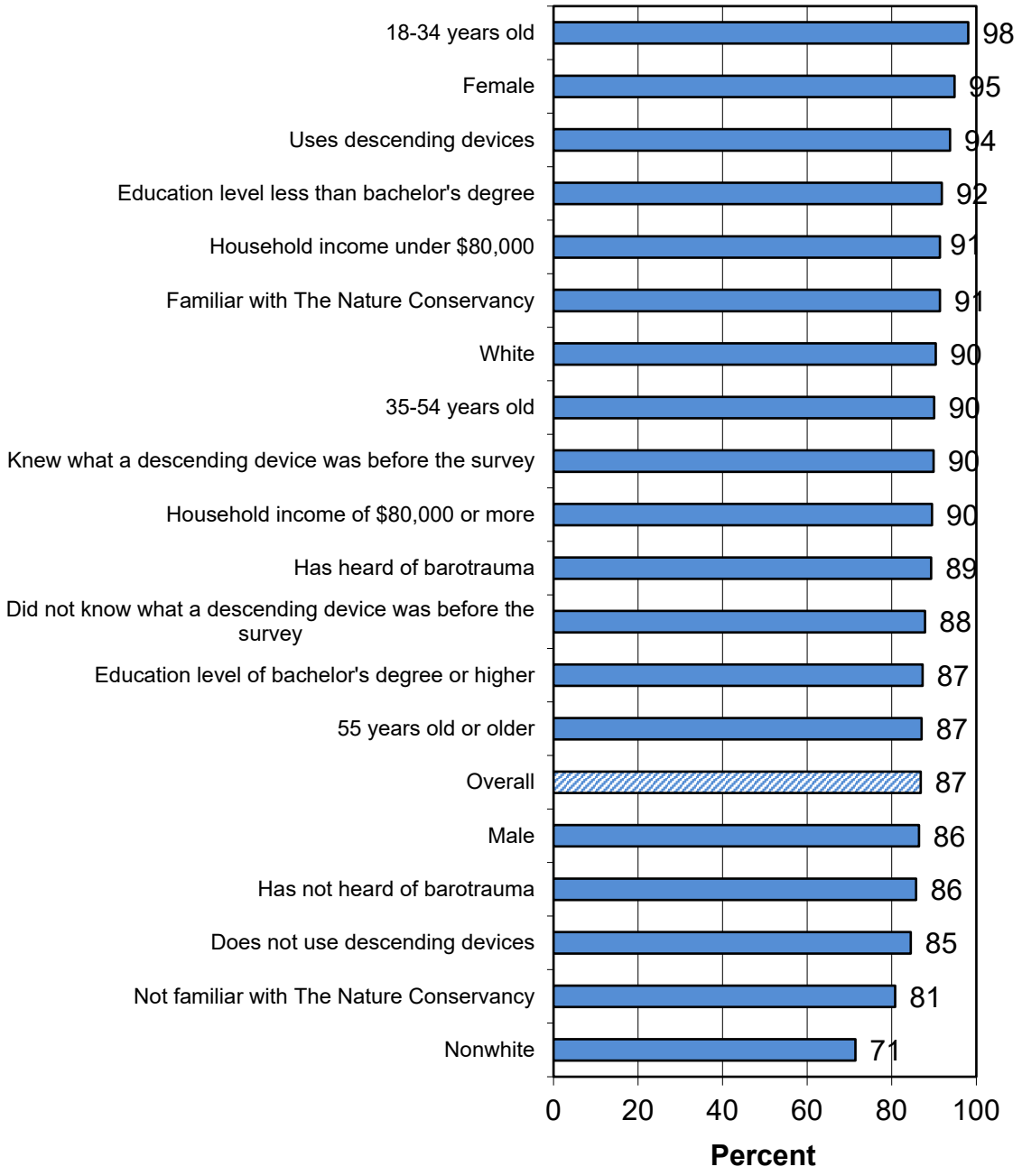
Percent of each of the following groups who have heard of barotrauma: (South Carolina)



In Florida, all groups are about the same regarding whether they think it is *very* or *moderately* necessary to help fish that show signs of barotrauma to return to depth of catch. In South Carolina, thinking it is *very* or *moderately* necessary to help fish return to depth of catch is associated with being young, being female, using descending devices, and being in the lower educational range. Meanwhile, being nonwhite and not being familiar with The Nature Conservancy is associated with not thinking it to be *very* or *moderately* necessary to help fish that show signs of barotrauma to return to depth of catch.



Percent of each of the following groups who think it is very or moderately necessary to help fish that display symptoms of barotrauma to return to depth of capture: (South Carolina)

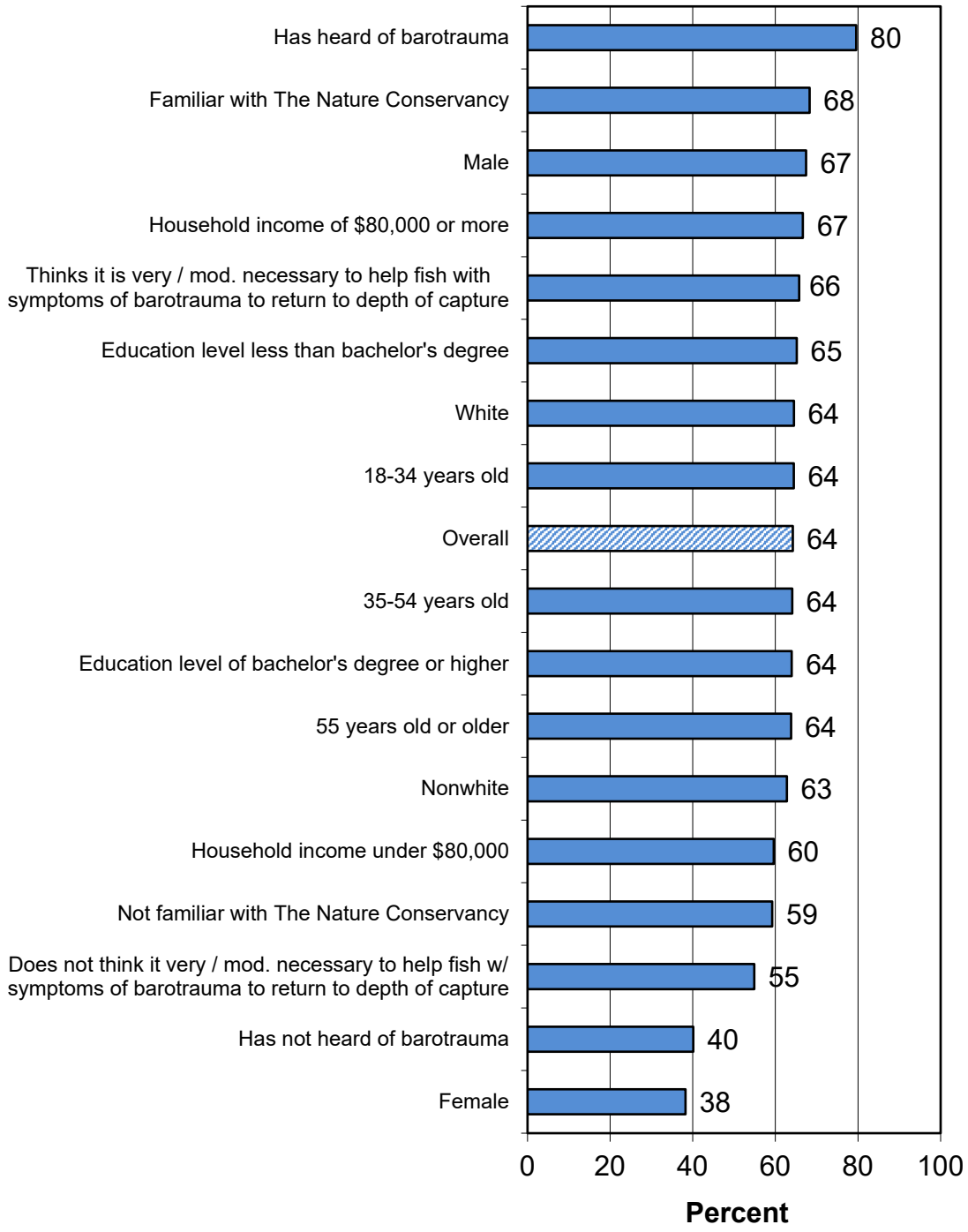


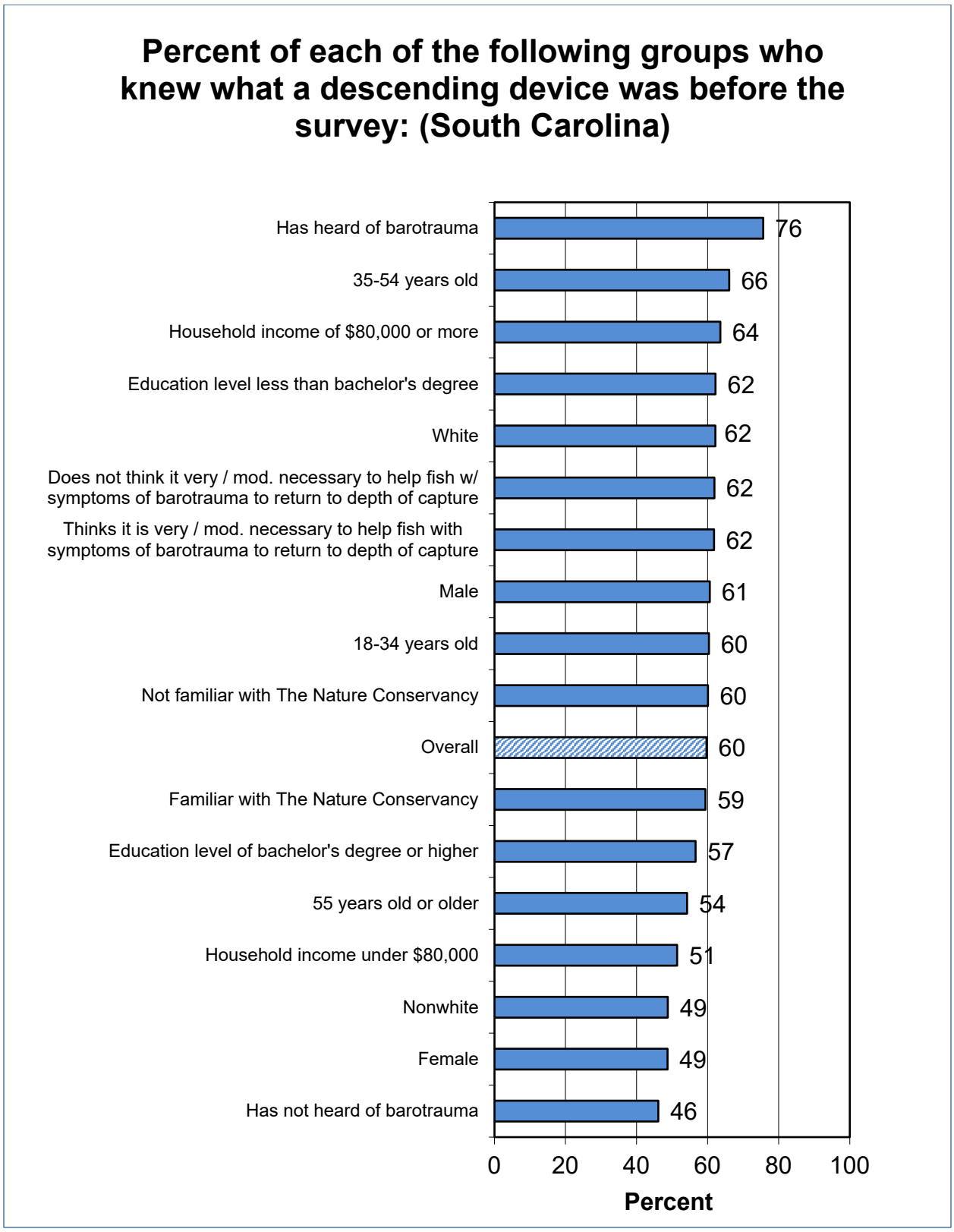
AWARENESS AND USE OF VENTING AND DESCENDING DEVICES

The demographic analyses examined knowing what a descending device was prior to the survey. In Florida, this is associated with having heard of barotrauma. In South Carolina, knowing what a descending device was prior to the survey is associated with having heard of barotrauma prior to the survey and being in the middle age range.

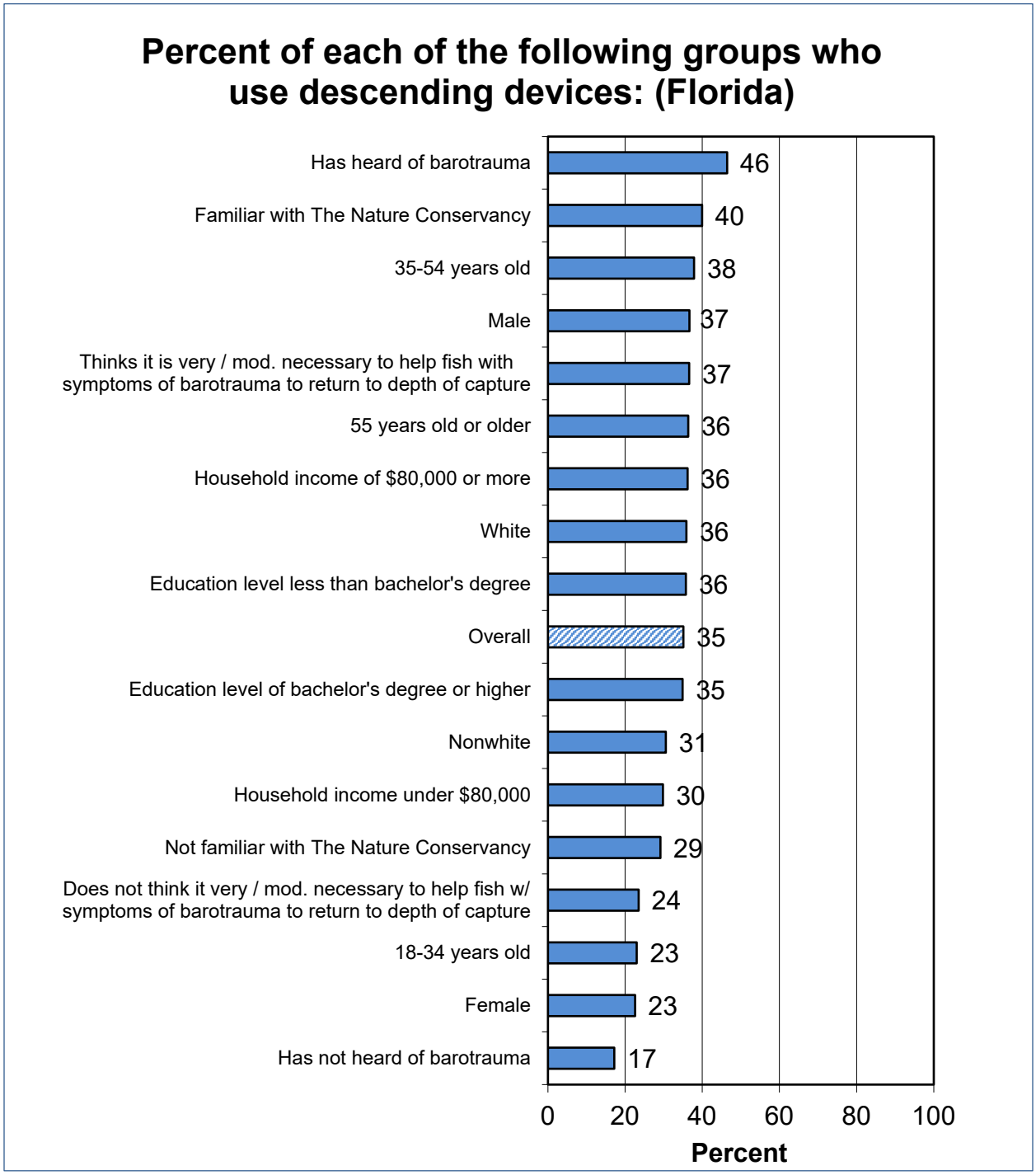
The opposite side of the analyses shows that characteristics associated with not knowing what a descending device was prior to the survey is, in Florida, being female, having not heard of barotrauma, not thinking it is *very* or *moderately* necessary to help fish return to catch depth, and not being familiar with The Nature Conservancy. In South Carolina, not knowing what a descending device was prior to the survey is associated with not having heard of barotrauma, being female, being non-white, being in the lower income range, and being 55 years old or older. These graphs start on the following page.

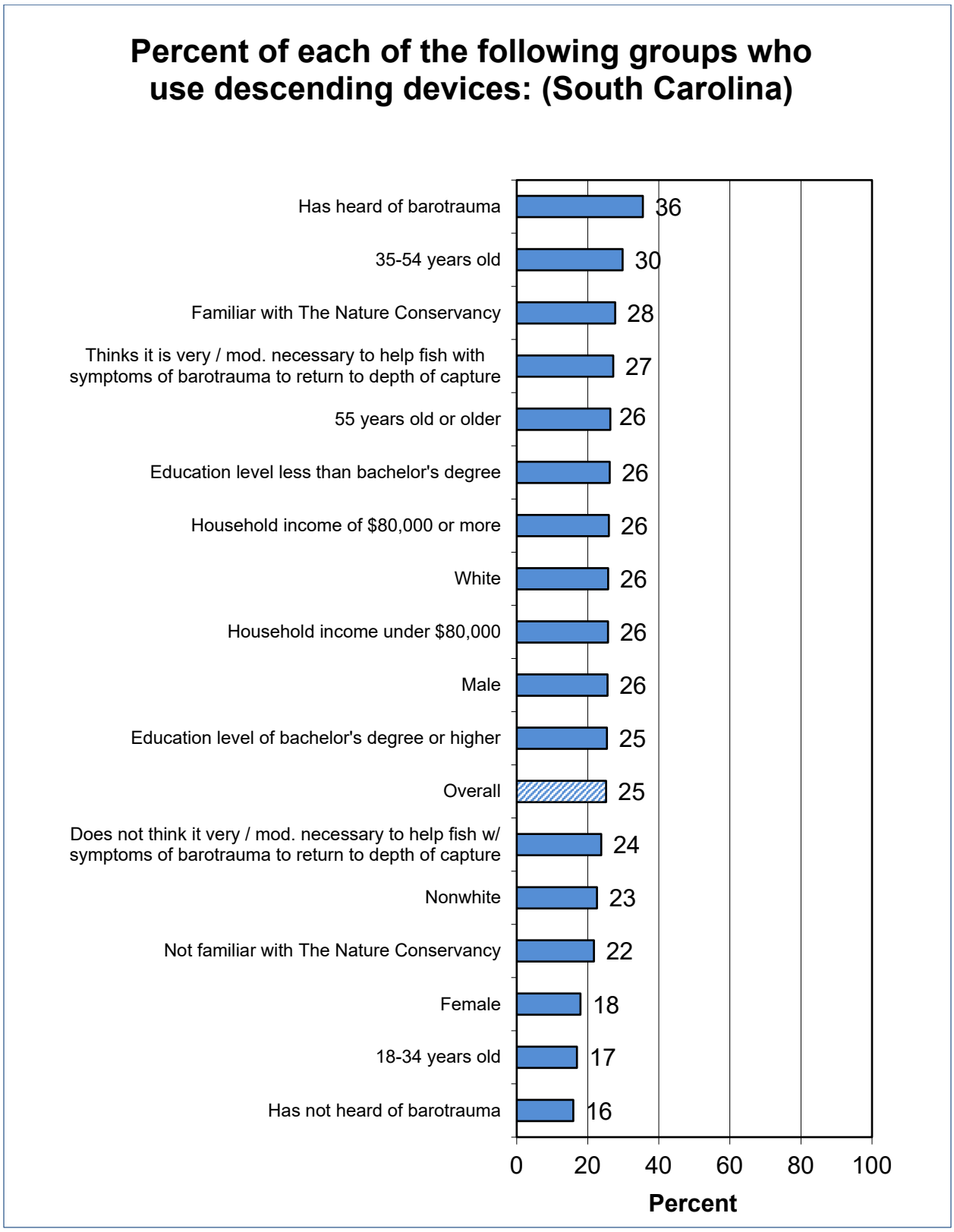
Percent of each of the following groups who knew what a descending device was before the survey: (Florida)




Percent of each of the following groups who knew what a descending device was before the survey: (South Carolina)
Has heard of barotrauma
76
35-54 years old
66
Household income of $80,000 or more
64
Education level less than bachelor's degree
62
White
62
Does not think it very / mod. necessary to help fish w/ symptoms of barotrauma to return to depth of capture
62
Thinks it is very / mod. necessary to help fish with symptoms of barotrauma to return to depth of capture
62
Male
61
18-34 years old
60
Not familiar with The Nature Conservancy
60
Overall
60
Familiar with The Nature Conservancy
59
Education level of bachelor's degree or higher
57
55 years old or older
54
Household income under $80,000
51
Nonwhite
49
Female
49
Has not heard of barotrauma
46
0
20
40
60
80
100
Percent

The next demographic analyses graphs examine the use of descending devices. One note: the entire sample was first put into the question, including those who do not release fish (and who, therefore, would not use a descending device). For this reason, the overall percentage of anglers who use descending devices is 35% (the use among those who release fish is 37%, as previously shown). Use of descending devices is associated with having heard of barotrauma and being familiar with The Nature Conservancy (in Florida) and with having heard of barotrauma and being 35-54 years old (in South Carolina).




Percent of each of the following groups who use descending devices: (South Carolina)
Has heard of barotrauma
36
35-54 years old
30
Familiar with The Nature Conservancy
28
Thinks it is very / mod. necessary to help fish with symptoms of barotrauma to return to depth of capture
27
55 years old or older
26
Education level less than bachelor's degree
26
Household income of $80,000 or more
26
White
26
Household income under $80,000
26
Male
26
Education level of bachelor's degree or higher
25
Overall
25
Does not think it very / mod. necessary to help fish w/ symptoms of barotrauma to return to depth of capture
24
Nonwhite
23
Not familiar with The Nature Conservancy
22
Female
18
18-34 years old
17
Has not heard of barotrauma
16
0
20
40
60
80
100
Percent

CONSTRAINTS TO USING DESCENDING DEVICES

The following tables show the mean ratings of reasons for not using descending devices broken down by various demographic factors. (These could not be analyzed using the types of graphs above because the questions were not asked of everybody but were asked only of those not using descending devices; demographic analyses graphs work best when done on questions that all respondents received.) Differences in the mean ratings of 0.50 or more are marked with red shading, with darker red for those differences of 1.00 or more. The tables start on the following page.

Among the Florida results:

- Regarding age:
  - Young anglers give higher ratings to cost as a factor, compared to older anglers.
  - Older anglers give higher ratings than do their counterparts for thinking that there is no utility in helping fish return to depth of catch and to preferring venting over descending devices.
  - Middle aged anglers give lower ratings than their counterparts to not using descending devices because they do not see signs of barotrauma.
- Women anglers give markedly higher ratings than do men for many of the potential reasons, in particular not seeing signs of barotrauma, not thinking there is utility in helping the fish return to catch depth, thinking sea conditions are unfavorable, and not knowing how to use descending devices.
- Anglers in the higher education bracket give higher ratings to several of the reasons: that it takes too much time, that it requires a dedicated rod, to not thinking use of descending devices is effective, and that it is too complex.
- White anglers give higher ratings than do non-white anglers in thinking use of descending devices does not help, that it takes too much time, that it is too difficult, and for preferring venting.
- Lower income anglers give higher ratings than their counterparts to cost as a reason not to use descending devices. Lower income anglers also give markedly higher ratings to sea conditions being unfavorable, that it requires a dedicated rod, to not thinking it will help to use the devices, that it is unsafe on a moving deck, and that the devices require too much storage.

Next, please rate how important each of the following reasons is for why you do NOT use a descending device when you release fish caught at a depth of 30 feet or more, on a scale of 0 to 10, where 0 is not at all important and 10 is extremely important. (Among those who release any fish, know what a descending device is, but do not use one.) (Florida)

	Takes too much time to use	Costs too much	Unsafe to use on a moving deck	Sea conditions are usually too unfavorable, such as strong currents, choppy water, and more	Requires too much space for storage	Requires a dedicated rod that I cannot use for fishing	Too difficult, complicated, or cumbersome to use	Don't know how to use a descending device	Do not think it helps the fish or think fish likely do not survive anyway	Prefer to use a venting tool to treat barotrauma	Do not usually see signs of barotrauma
Mean Scores											
18-34	3.16	3.48	3.14	3.32	2.59	4.07	3.57	4.37	3.36	5.90	5.68
35-54	3.55	2.76	2.71	3.18	2.62	3.85	3.67	4.20	3.52	6.61	5.03
55+	3.37	2.56	2.52	2.92	2.59	3.76	3.80	4.47	4.16	7.08	5.62
Differences in the Mean Scores											
Young vs. middle	-0.39	0.72	0.43	0.14	-0.03	0.22	-0.10	0.17	-0.16	-0.71	0.65
Young vs. older	-0.21	0.92	0.62	0.40	0.00	0.31	-0.23	-0.10	-0.80	-1.18	0.06
Middle vs. older	0.18	0.20	0.19	0.26	0.03	0.09	-0.13	-0.27	-0.64	-0.47	-0.59

Next, please rate how important each of the following reasons is for why you do NOT use a descending device when you release fish caught at a depth of 30 feet or more, on a scale of 0 to 10, where 0 is not at all important and 10 is extremely important. (Among those who release any fish, know what a descending device is, but who do not use one.) (Florida)

	Takes too much time to use	Costs too much	Unsafe to use on a moving deck	Sea conditions are usually too unfavorable, such as strong currents, choppy water, and more	Requires too much space for storage	Requires a dedicated rod that I cannot use for fishing	Too difficult, complicated, or cumbersome to use	Don't know how to use a descending device	Do not think it helps the fish or think fish likely do not survive anyway	Prefer to use a venting tool to treat barotrauma	Do not usually see signs of barotrauma
Mean Scores											
Male	3.35	2.79	2.69	3.00	2.58	3.89	3.66	4.31	3.71	6.83	5.30
Female	4.25	3.07	3.40	4.63	3.07	3.67	4.00	5.81	5.47	5.87	7.24
Differences in the Mean Scores											
Diff.	-0.90	-0.28	-0.71	-1.63	-0.49	0.22	-0.34	-1.50	-1.76	0.96	-1.94

Next, please rate how important each of the following reasons is for why you do NOT use a descending device when you release fish caught at a depth of 30 feet or more, on a scale of 0 to 10, where 0 is not at all important and 10 is extremely important. (Among those who release any fish, know what a descending device is, but who do not use one.) (Florida)

	Takes too much time to use	Costs too much	Unsafe to use on a moving deck	Sea conditions are usually too unfavorable, such as strong currents, choppy water, and more	Requires too much space for storage	Requires a dedicated rod that I cannot use for fishing	Too difficult, complicated, or cumbersome to use	Don't know how to use a descending device	Do not think it helps the fish or think fish likely do not survive anyway	Prefer to use a venting tool to treat barotrauma	Do not usually see signs of barotrauma
Mean Scores											
Education level less than bachelor's degree	2.97	2.86	2.87	3.23	2.53	3.44	3.38	4.17	4.16	6.77	5.24
Education level of bachelor's degree or higher	3.84	2.78	2.53	3.01	2.70	4.17	4.01	4.47	3.44	6.60	5.70
Differences in the Mean Scores											
Difference	-0.87	0.08	0.34	0.22	-0.17	-0.73	-0.63	-0.30	0.72	0.17	-0.46

Next, please rate how important each of the following reasons is for why you do NOT use a descending device when you release fish caught at a depth of 30 feet or more, on a scale of 0 to 10, where 0 is not at all important and 10 is extremely important. (Among those who release any fish, know what a descending device is, but who do not use one.) (Florida)

	Takes too much time to use	Costs too much	Unsafe to use on a moving deck	Sea conditions are usually too unfavorable, such as strong currents, choppy water, and more	Requires too much space for storage	Requires a dedicated rod that I cannot use for fishing	Too difficult, complicated, or cumbersome to use	Don't know how to use a descending device	Do not think it helps the fish or think fish likely do not survive anyway	Prefer to use a venting tool to treat barotrauma	Do not usually see signs of barotrauma
Mean Scores											
White	3.52	2.78	2.65	3.05	2.68	3.79	3.58	4.40	3.93	6.62	5.39
Nonwhite	2.58	2.86	2.86	3.19	2.22	3.83	4.29	3.91	2.72	7.19	5.76
Differences in the Mean Scores											
Difference	0.94	-0.08	-0.21	-0.14	0.46	-0.04	-0.71	0.49	1.21	-0.57	-0.37

Next, please rate how important each of the following reasons is for why you do NOT use a descending device when you release fish caught at a depth of 30 feet or more, on a scale of 0 to 10, where 0 is not at all important and 10 is extremely important. (Among those who release any fish, know what a descending device is, but who do not use one.) (Florida)

	Takes too much time to use	Costs too much	Unsafe to use on a moving deck	Sea conditions are usually too unfavorable, such as strong currents, choppy water, and more	Requires too much space for storage	Requires a dedicated rod that I cannot use for fishing	Too difficult, complicated, or cumbersome to use	Don't know how to use a descending device	Do not think it helps the fish or think fish likely do not survive anyway	Prefer to use a venting tool to treat barotrauma	Do not usually see signs of barotrauma
Mean Scores											
Household income under $80,000	3.87	3.81	3.38	3.75	3.18	4.48	4.06	4.38	4.33	6.78	5.32
Household income of $80,000 or more	3.48	2.55	2.54	2.85	2.46	3.58	3.58	4.14	3.53	6.66	5.44
Differences in the Mean Scores											
Difference	0.39	1.26	0.84	0.90	0.72	0.90	0.48	0.24	0.80	0.12	-0.12

Note that the results for South Carolina are based on a smaller sample size than the Florida results, which is particularly true when further breaking down the results by demographic factors. For this reason, differences tend to be larger in general than among the Florida anglers; the results should be examined with this in mind.

Among the South Carolina results:

- Regarding age, older anglers give higher ratings than do their counterparts for thinking that it takes too much time, that sea conditions are usually unfavorable, that it is too difficult, and to not thinking it helps the fish.
- Women anglers give markedly higher ratings than do men for many of the potential reasons, in particular that it takes too much time, costs too much, to not thinking there is utility in helping the fish return to catch depth, that the devices require too much storage, and to not seeing signs of barotrauma.
- Anglers in the lower education bracket give higher ratings to several of the reasons, in particular to not knowing how to use a descending device, to not thinking use of descending devices is effective, and that sea conditions are usually unfavorable.
- White anglers give lower ratings than do non-white anglers to nearly all of the potential reasons.
- Lower income anglers give higher ratings than their counterparts to that doing so requires a dedicated rod and to the cost.

Next, please rate how important each of the following reasons is for why you do NOT use a descending device when you release fish caught at a depth of 30 feet or more, on a scale of 0 to 10, where 0 is not at all important and 10 is extremely important. (Among those who release any fish, know what a descending device is, but do not use one.) (South Carolina)											
	Takes too much time to use	Costs too much	Unsafe to use on a moving deck	Sea conditions are usually too unfavorable, such as strong currents, choppy water, and more	Requires too much space for storage	Requires a dedicated rod that I cannot use for fishing	Too difficult, complicated, or cumbersome to use	Don't know how to use a descending device	Do not think it helps the fish or think fish likely do not survive anyway	Prefer to use a venting tool to treat barotrauma	Do not usually see signs of barotrauma
Mean Scores											
18-34	1.75	2.94	3.38	1.75	1.93	3.15	2.75	4.62	4.50	5.67	5.27
35-54	2.15	2.49	2.89	1.50	2.19	2.79	2.24	4.27	2.81	7.03	4.08
55+	3.29	2.58	3.06	3.71	2.58	3.29	4.48	4.35	5.14	6.76	5.39
Differences in the Mean Scores											
Young vs. middle	-0.40	0.45	0.49	0.25	-0.26	0.36	0.51	0.35	1.69	-1.36	1.19
Young vs. older	-1.54	0.36	0.32	-1.96	-0.65	-0.14	-1.73	0.27	-0.64	-1.09	-0.12
Middle vs. older	-1.14	-0.09	-0.17	-2.21	-0.39	-0.50	-2.24	-0.08	-2.33	0.27	-1.31

Next, please rate how important each of the following reasons is for why you do NOT use a descending device when you release fish caught at a depth of 30 feet or more, on a scale of 0 to 10, where 0 is not at all important and 10 is extremely important. (Among those who release any fish, know what a descending device is, but who do not use one.) (South Carolina)

	Takes too much time to use	Costs too much	Unsafe to use on a moving deck	Sea conditions are usually too unfavorable, such as strong currents, choppy water, and more	Requires too much space for storage	Requires a dedicated rod that I cannot use for fishing	Too difficult, complicated, or cumbersome to use	Don't know how to use a descending device	Do not think it helps the fish or think fish likely do not survive anyway	Prefer to use a venting tool to treat barotrauma	Do not usually see signs of barotrauma
Mean Scores											
Male	2.51	2.87	3.14	2.54	2.43	3.19	3.37	4.38	4.19	6.79	4.59
Female	5.00	0.40	3.75	3.00	0.60	3.00	2.40	3.40	2.20	6.75	5.60
Differences in the Mean Scores											
Diff.	-2.49	2.47	-0.61	-0.46	1.83	0.19	0.97	0.98	1.99	0.04	-1.01

Next, please rate how important each of the following reasons is for why you do NOT use a descending device when you release fish caught at a depth of 30 feet or more, on a scale of 0 to 10, where 0 is not at all important and 10 is extremely important. (Among those who release any fish, know what a descending device is, but who do not use one.) (South Carolina)

	Takes too much time to use	Costs too much	Unsafe to use on a moving deck	Sea conditions are usually too unfavorable, such as strong currents, choppy water, and more	Requires too much space for storage	Requires a dedicated rod that I cannot use for fishing	Too difficult, complicated, or cumbersome to use	Don't know how to use a descending device	Do not think it helps the fish or think fish likely do not survive anyway	Prefer to use a venting tool to treat barotrauma	Do not usually see signs of barotrauma
Mean Scores											
Education level less than bachelor's degree	2.78	2.66	3.28	2.78	2.41	2.85	3.16	4.92	4.60	6.98	4.56
Education level of bachelor's degree or higher	2.16	2.47	2.62	1.73	1.87	3.32	3.49	3.67	3.49	6.11	5.13
Differences in the Mean Scores											
Difference	0.62	0.19	0.66	1.05	0.54	-0.47	-0.33	1.25	1.11	0.87	-0.57

Next, please rate how important each of the following reasons is for why you do NOT use a descending device when you release fish caught at a depth of 30 feet or more, on a scale of 0 to 10, where 0 is not at all important and 10 is extremely important. (Among those who release any fish, know what a descending device is, but who do not use one.) (South Carolina)

	Takes too much time to use	Costs too much	Unsafe to use on a moving deck	Sea conditions are usually too unfavorable, such as strong currents, choppy water, and more	Requires too much space for storage	Requires a dedicated rod that I cannot use for fishing	Too difficult, complicated, or cumbersome to use	Don't know how to use a descending device	Do not think it helps the fish or think fish likely do not survive anyway	Prefer to use a venting tool to treat barotrauma	Do not usually see signs of barotrauma
Mean Scores											
White	2.35	2.42	2.79	2.35	2.04	3.04	2.80	3.94	3.85	6.82	4.44
Nonwhite	3.92	4.00	4.69	3.33	3.83	3.50	6.46	5.86	5.29	5.36	6.79
Differences in the Mean Scores											
Difference	-1.57	-1.58	-1.90	-0.98	-1.79	-0.46	-3.66	-1.92	-1.44	1.46	-2.35

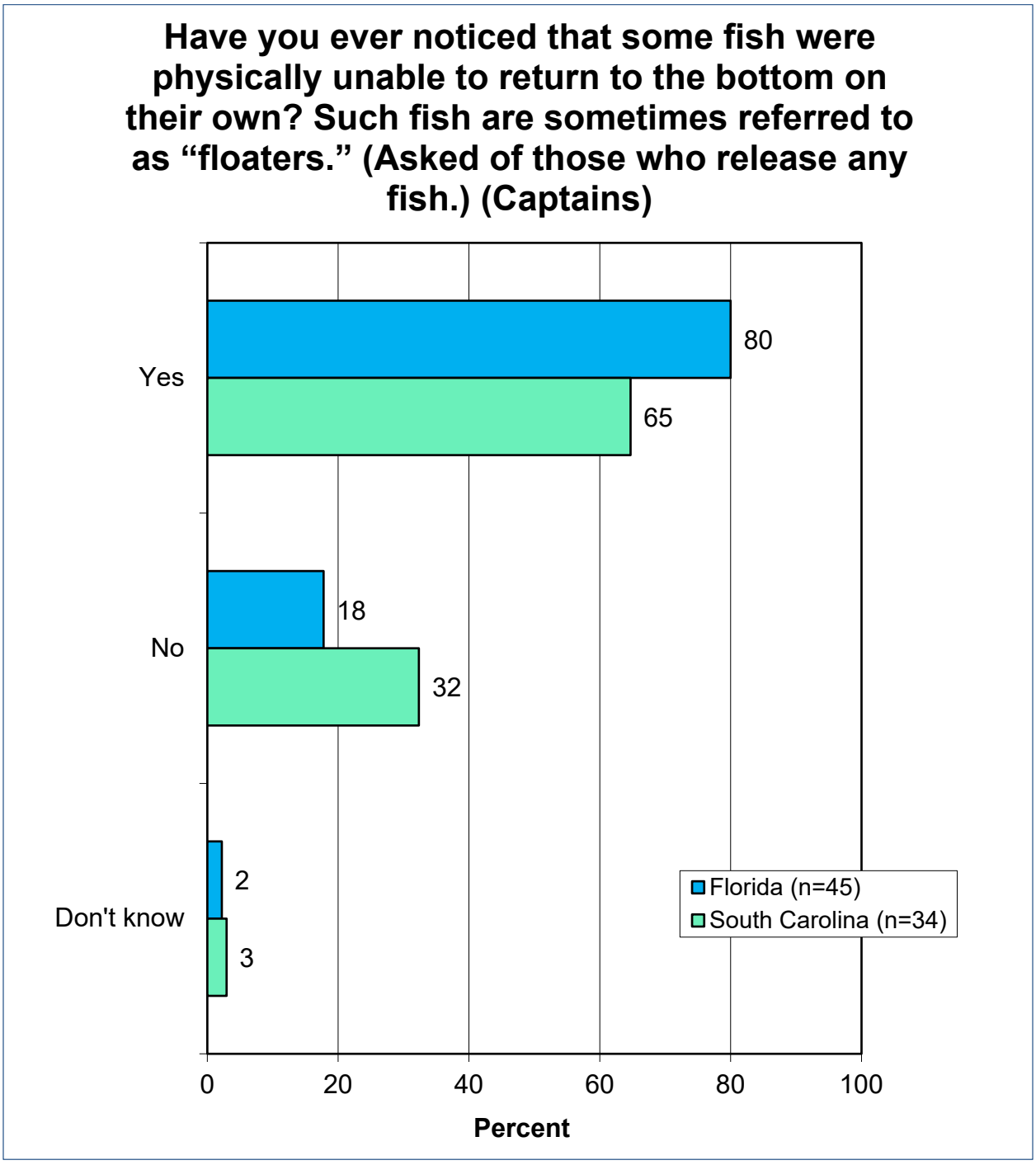
Next, please rate how important each of the following reasons is for why you do NOT use a descending device when you release fish caught at a depth of 30 feet or more, on a scale of 0 to 10, where 0 is not at all important and 10 is extremely important. (Among those who release any fish, know what a descending device is, but who do not use one.) (South Carolina)

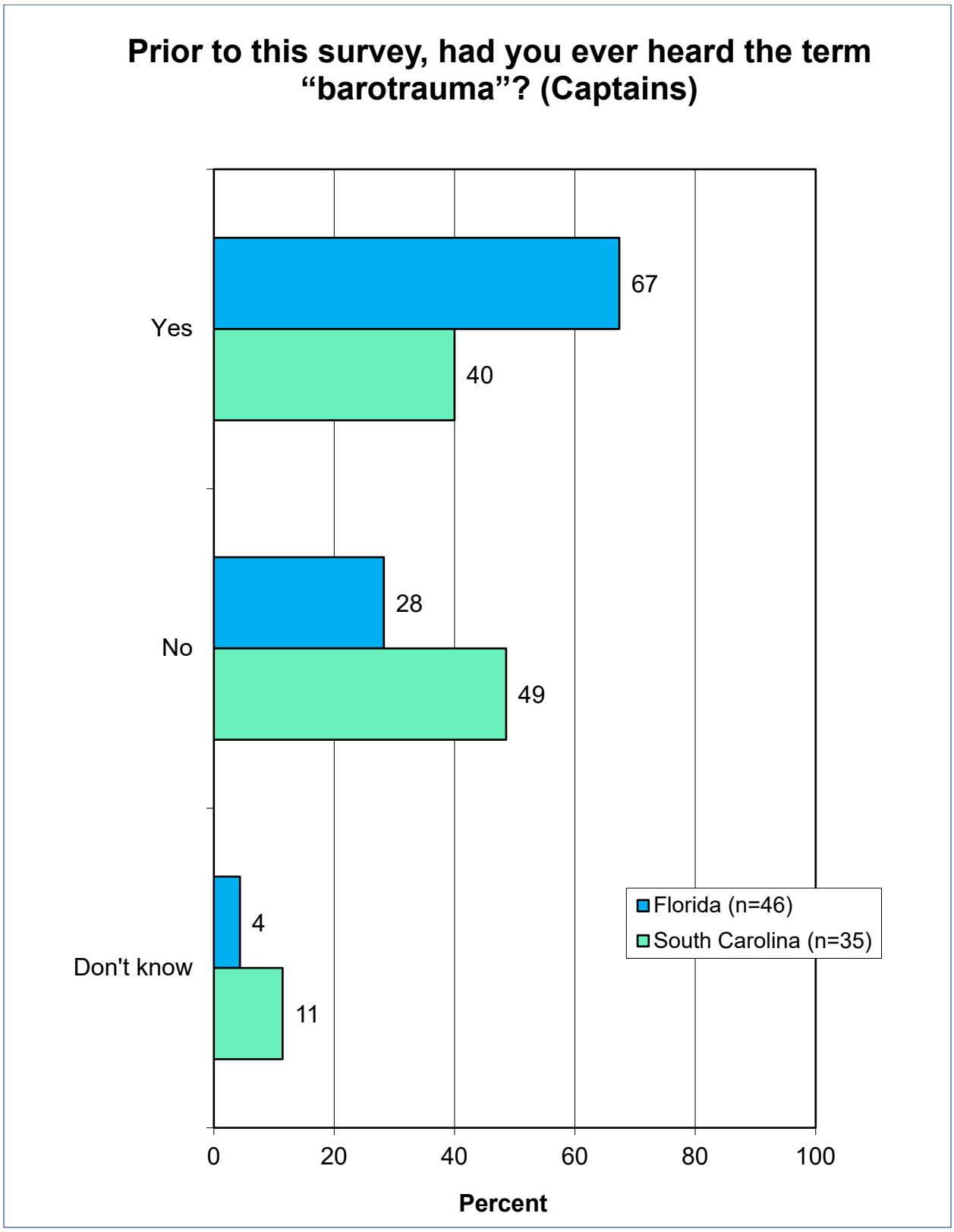
	Takes too much time to use	Costs too much	Unsafe to use on a moving deck	Sea conditions are usually too unfavorable, such as strong currents, choppy water, and more	Requires too much space for storage	Requires a dedicated rod that I cannot use for fishing	Too difficult, complicated, or cumbersome to use	Don't know how to use a descending device	Do not think it helps the fish or think fish likely do not survive anyway	Prefer to use a venting tool to treat barotrauma	Do not usually see signs of barotrauma
Mean Scores											
Household income under $80,000	2.95	3.62	3.85	2.05	2.71	1.79	2.84	4.70	4.25	6.89	4.50
Household income of $80,000 or more	2.56	2.56	2.93	2.58	2.30	3.82	3.68	4.09	4.09	6.77	5.19
Differences in the Mean Scores											
Difference	0.39	1.06	0.92	-0.53	0.41	-2.03	-0.84	0.61	0.16	0.12	-0.69

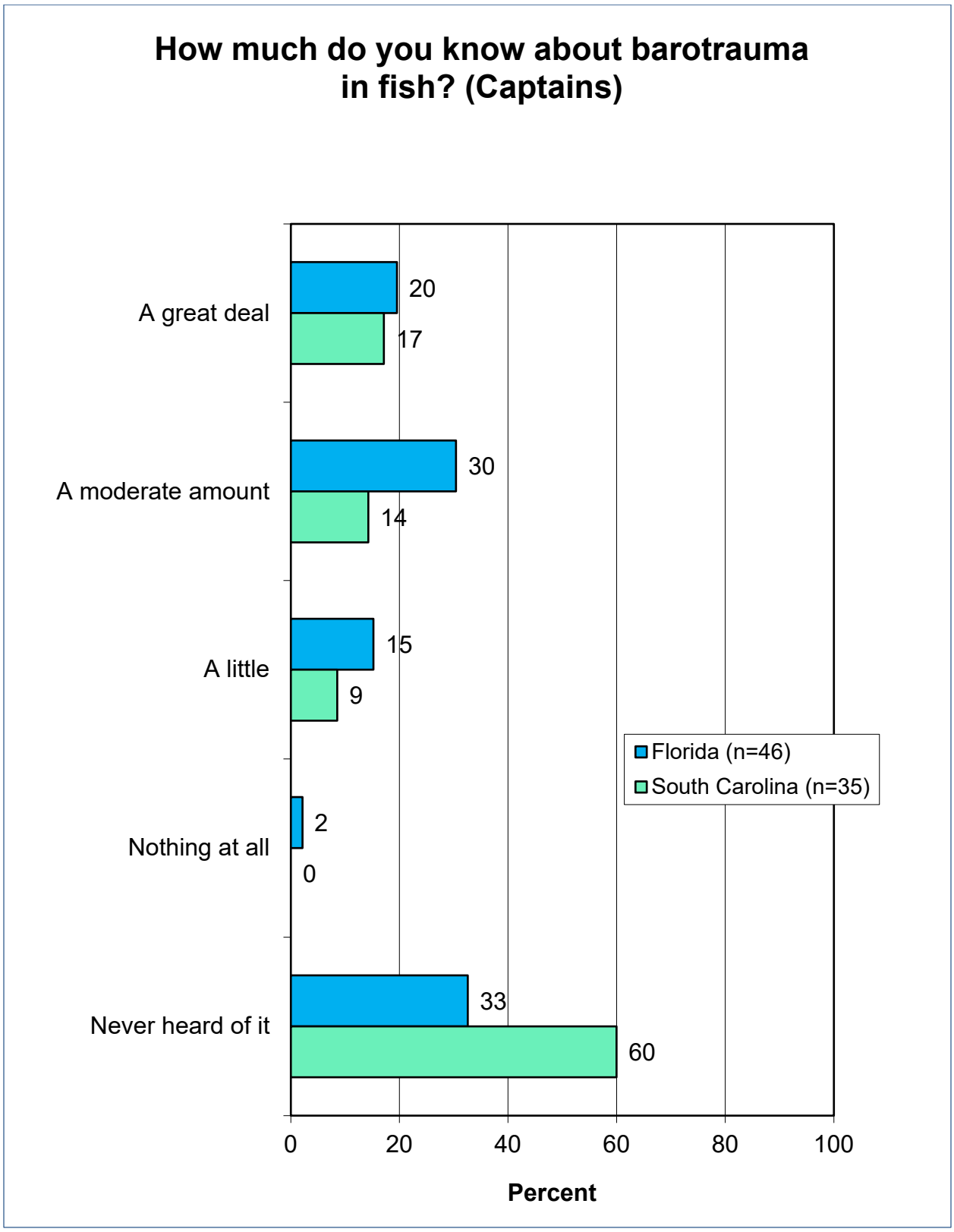
RESULTS AMONG HEAD BOAT AND CHARTER BOAT CAPTAINS

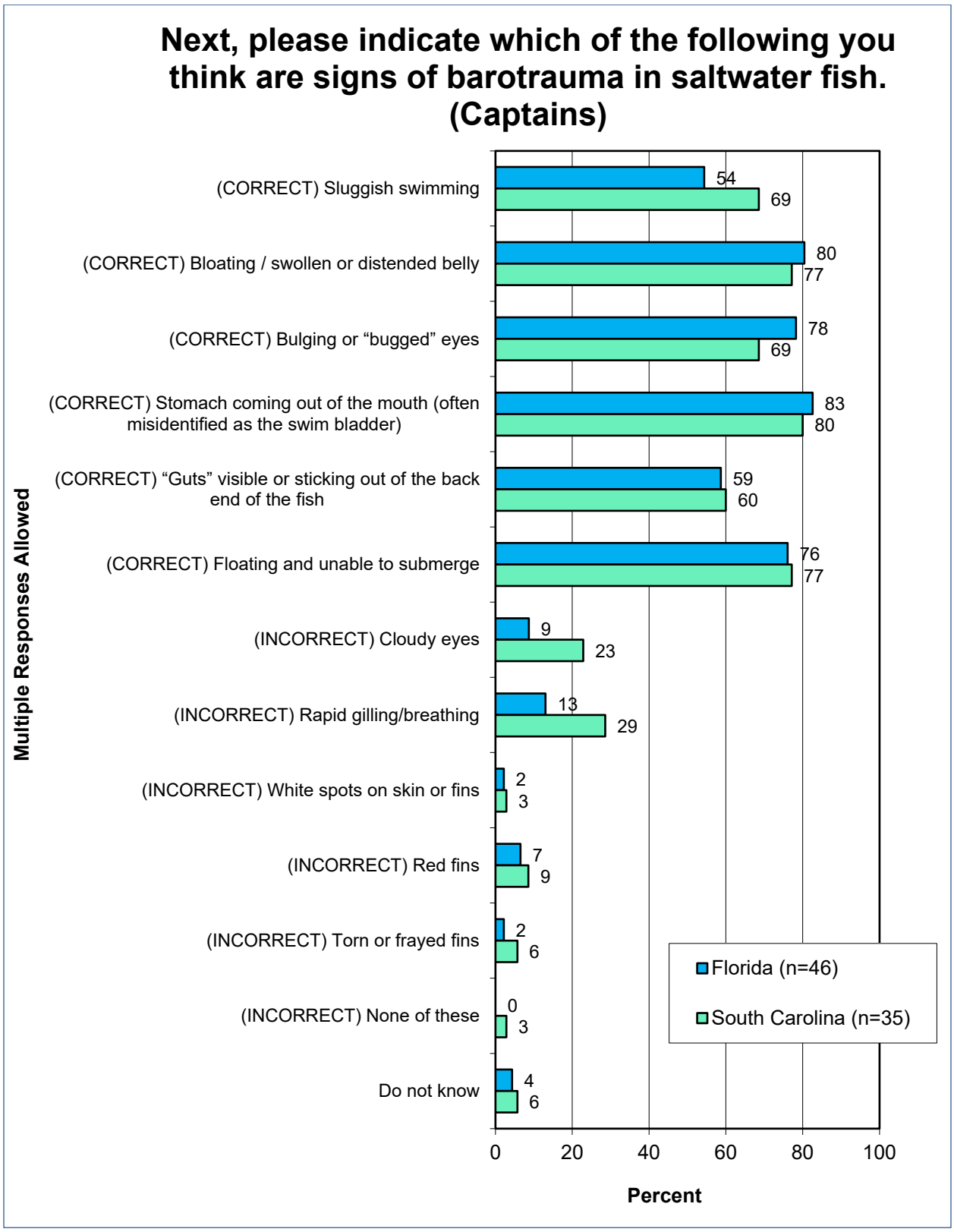
The following shows the results among boat captains. Note that the sample size is somewhat low for these, particularly South Carolina captains. These graphs are presented in the same thematic sections as in the main findings of the report.

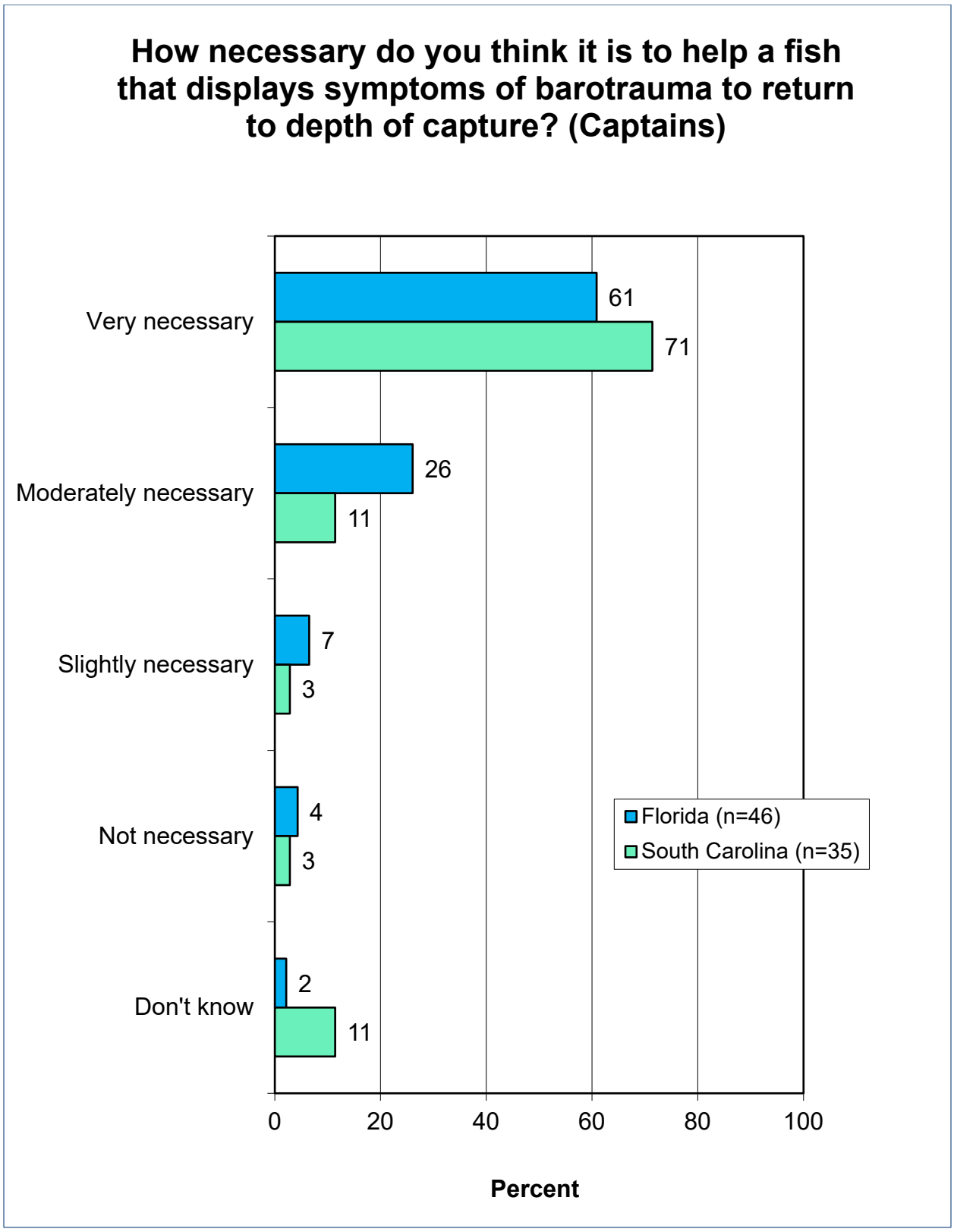
AWARENESS AND KNOWLEDGE OF BAROTRAUMA



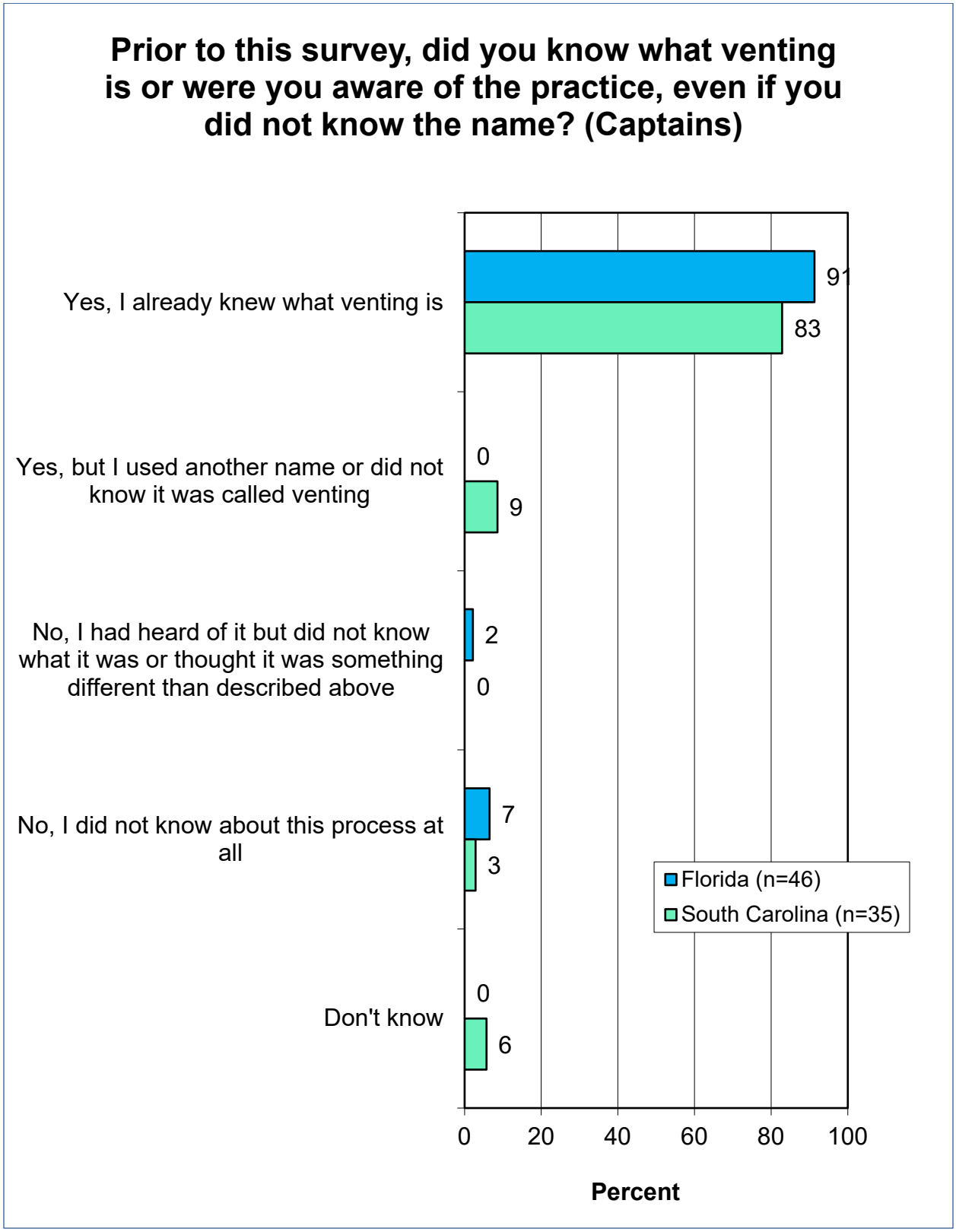

Prior to this survey, had you ever heard the term "barotrauma"? (Captains)
Yes
No
Don't know
67
40
28
49
4
11
Florida (n=46)
South Carolina (n=35)
0
20
40
60
80
100
Percent


How much do you know about barotrauma in fish? (Captains)
A great deal
20
17
A moderate amount
30
14
A little
15
9
Nothing at all
2
0
Never heard of it
33
60
Florida (n=46)
South Carolina (n=35)
0
20
40
60
80
100
Percent

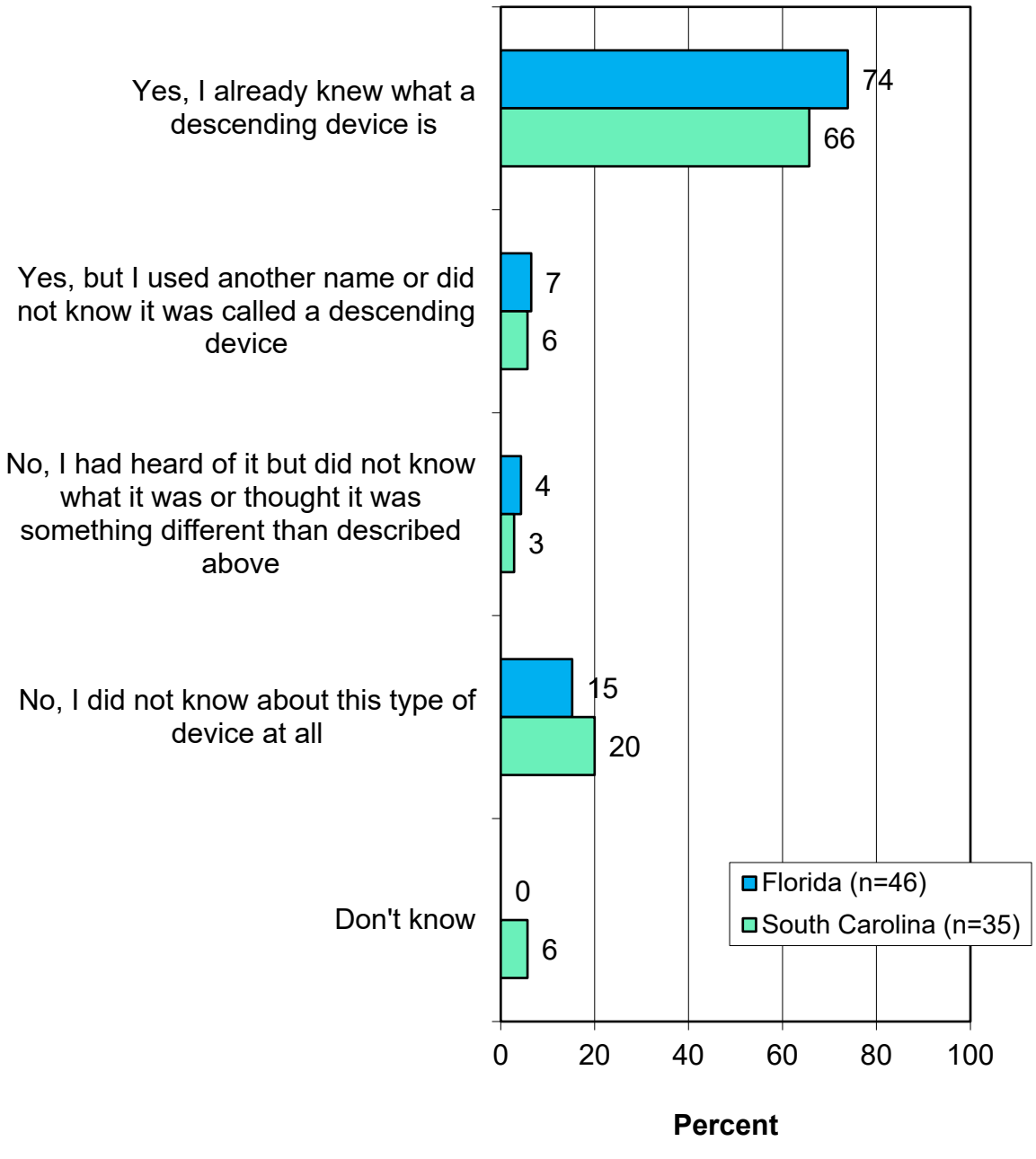

Next, please indicate which of the following you think are signs of barotrauma in saltwater fish. (Captains)
Multiple Responses Allowed
(CORRECT) Sluggish swimming
54
69
(CORRECT) Bloating / swollen or distended belly
80
77
(CORRECT) Bulging or "bugged" eyes
78
69
(CORRECT) Stomach coming out of the mouth (often misidentified as the swim bladder)
83
80
(CORRECT) "Guts" visible or sticking out of the back end of the fish
59
60
(CORRECT) Floating and unable to submerge
76
77
(INCORRECT) Cloudy eyes
9
23
(INCORRECT) Rapid gilling/breathing
13
29
(INCORRECT) White spots on skin or fins
2
3
(INCORRECT) Red fins
7
9
(INCORRECT) Torn or frayed fins
2
6
(INCORRECT) None of these
0
3
Do not know
4
6
Florida (n=46)
South Carolina (n=35)
0
20
40
60
80
100
Percent

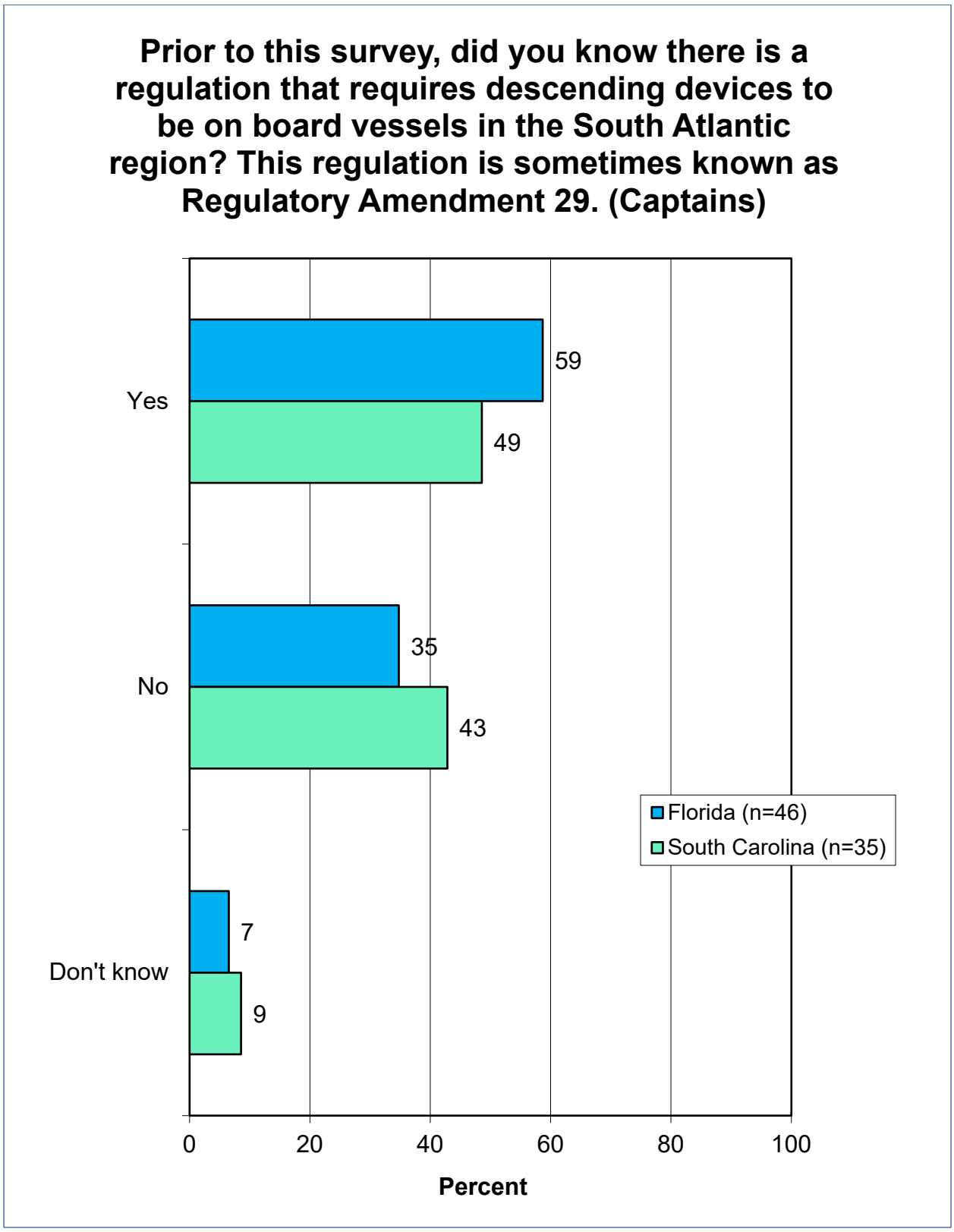

How necessary do you think it is to help a fish that displays symptoms of barotrauma to return to depth of capture? (Captains)
Very necessary
61
71
Moderately necessary
26
11
Slightly necessary
7
3
Not necessary
4
3
Don't know
2
11
Florida (n=46)
South Carolina (n=35)
0
20
40
60
80
100
Percent

AWARENESS AND USE OF VENTING AND DESCENDING DEVICES

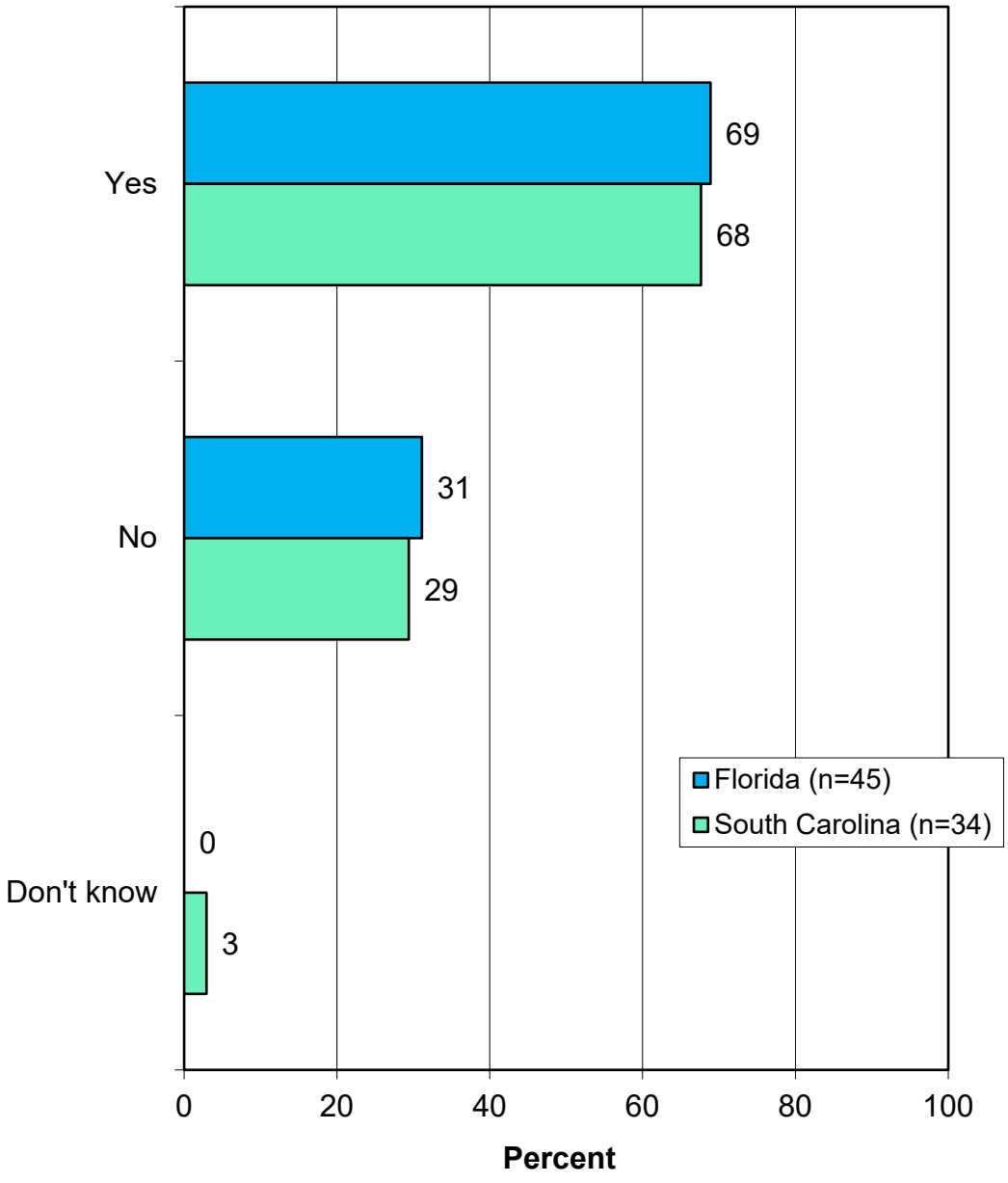


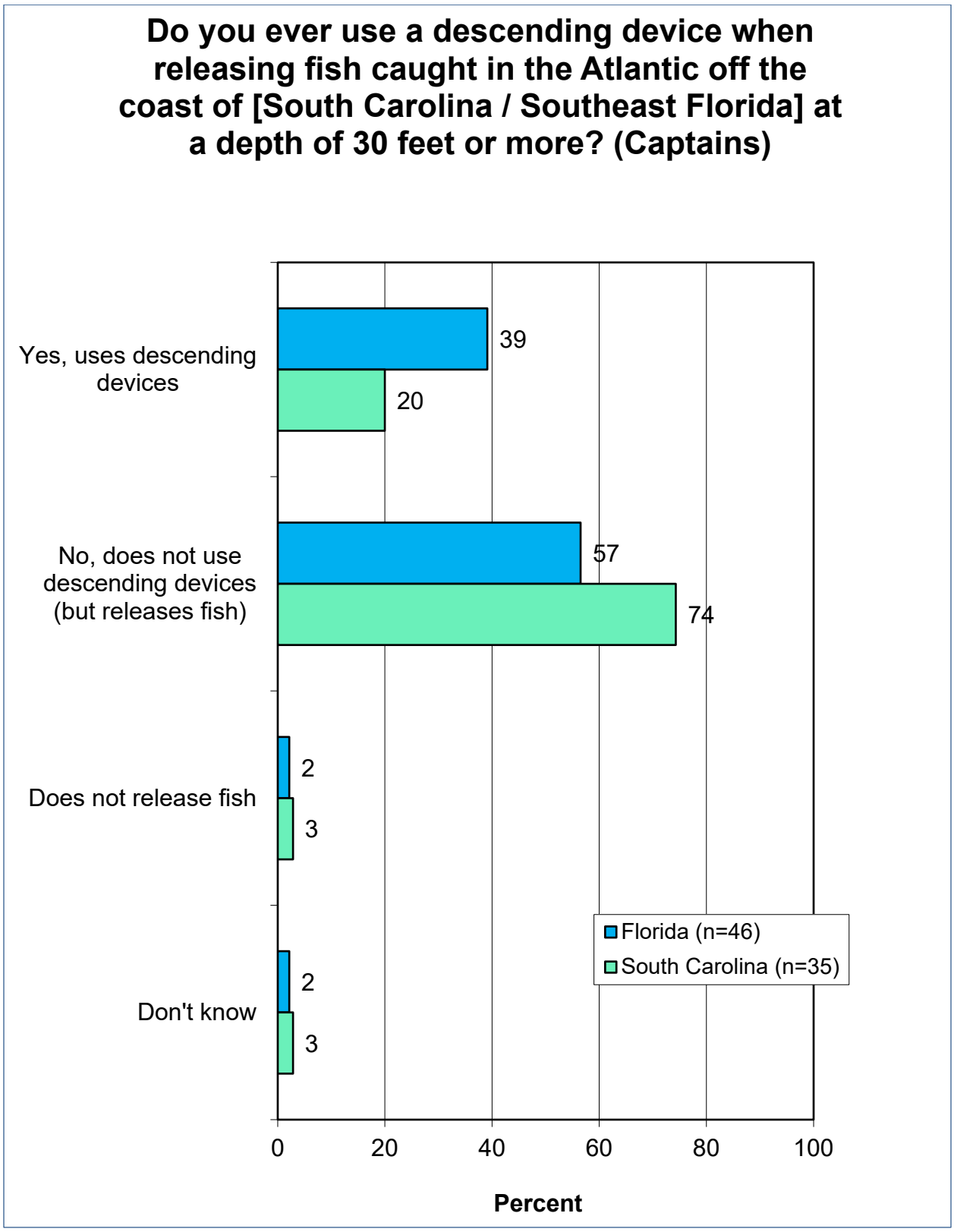
Prior to this survey, did you know what a descending device is or were you aware of this type of device, even if you did not know the name? (Captains)



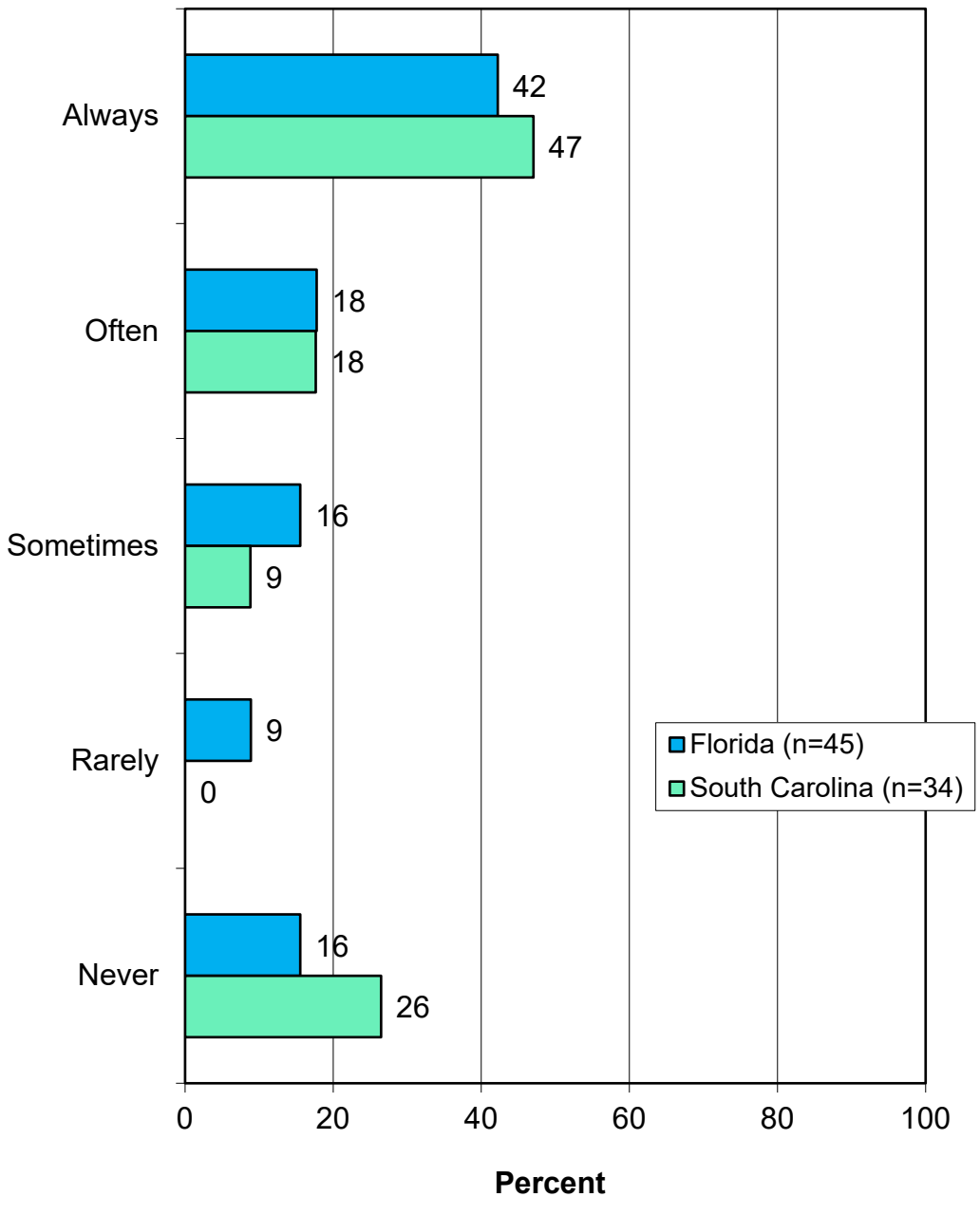

Prior to this survey, did you know there is a regulation that requires descending devices to be on board vessels in the South Atlantic region? This regulation is sometimes known as Regulatory Amendment 29. (Captains)
Yes
59
49
No
35
43
Don't know
7
9
Florida (n=46)
South Carolina (n=35)
0
20
40
60
80
100
Percent

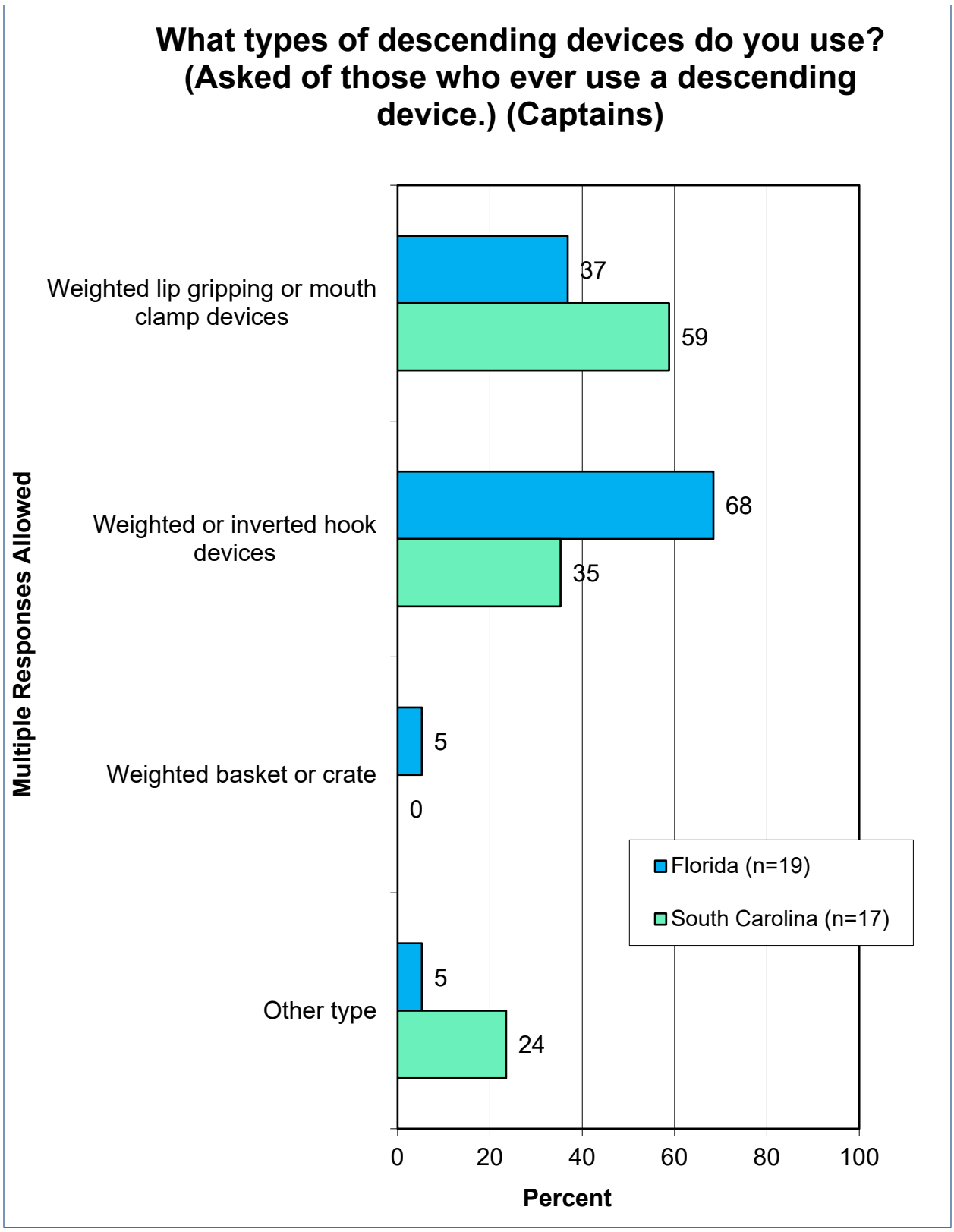
Do you ever use a venting tool when releasing fish caught in the Atlantic off the coast of [South Carolina / Southeast Florida] at a depth of 30 feet or more? (Asked of those who release any fish and who know what venting is.) (Captains)



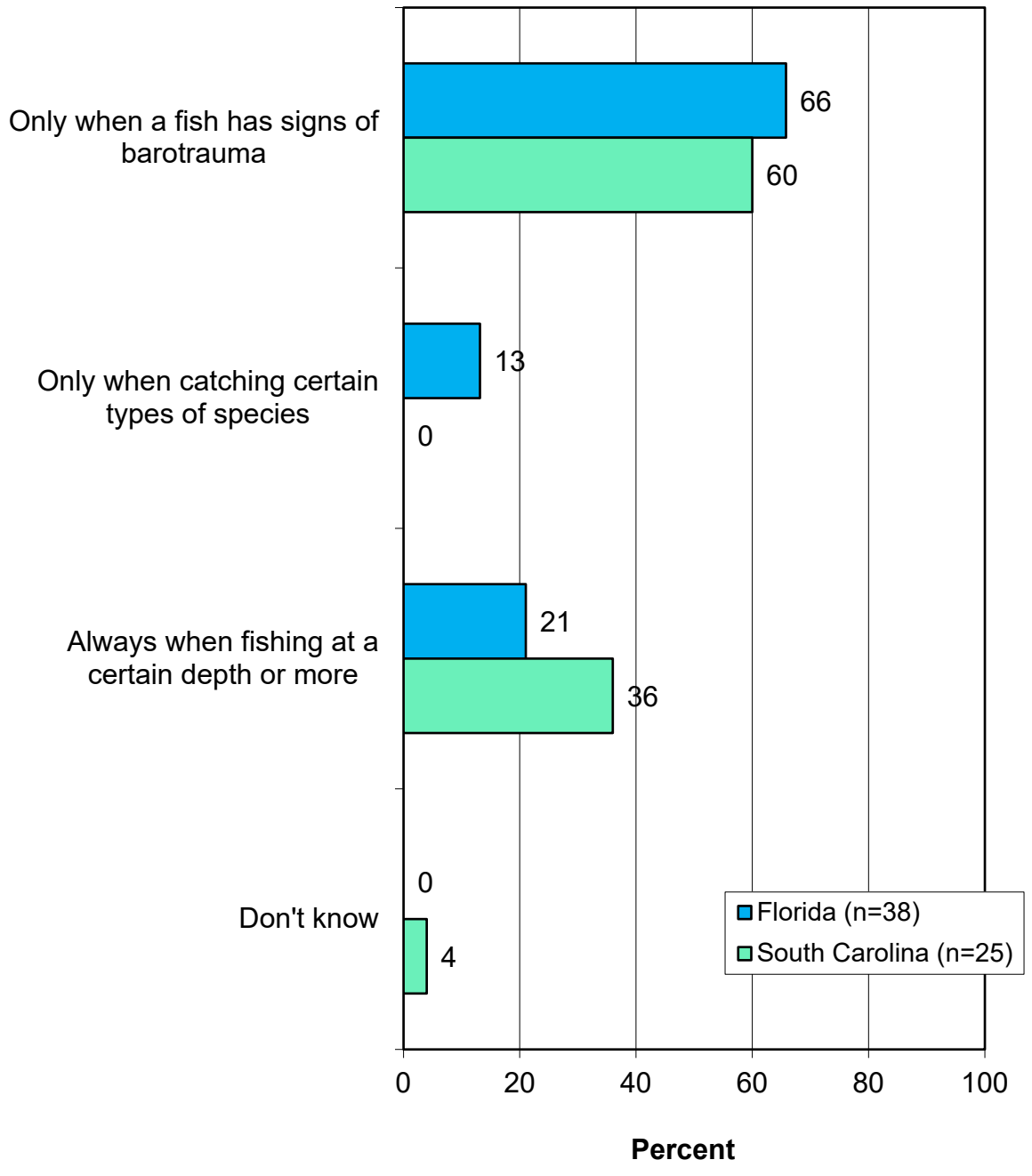

Do you ever use a descending device when releasing fish caught in the Atlantic off the coast of [South Carolina / Southeast Florida] at a depth of 30 feet or more? (Captains)
Yes, uses descending devices
39
20
No, does not use descending devices (but releases fish)
57
74
Does not release fish
2
3
Don't know
2
3
Florida (n=46)
South Carolina (n=35)
0
20
40
60
80
100
Percent

How frequently do you use venting or a descending device to release floaters or a fish that shows signs of barotrauma? (Asked of those who ever use venting or a descending device.) (Captains)

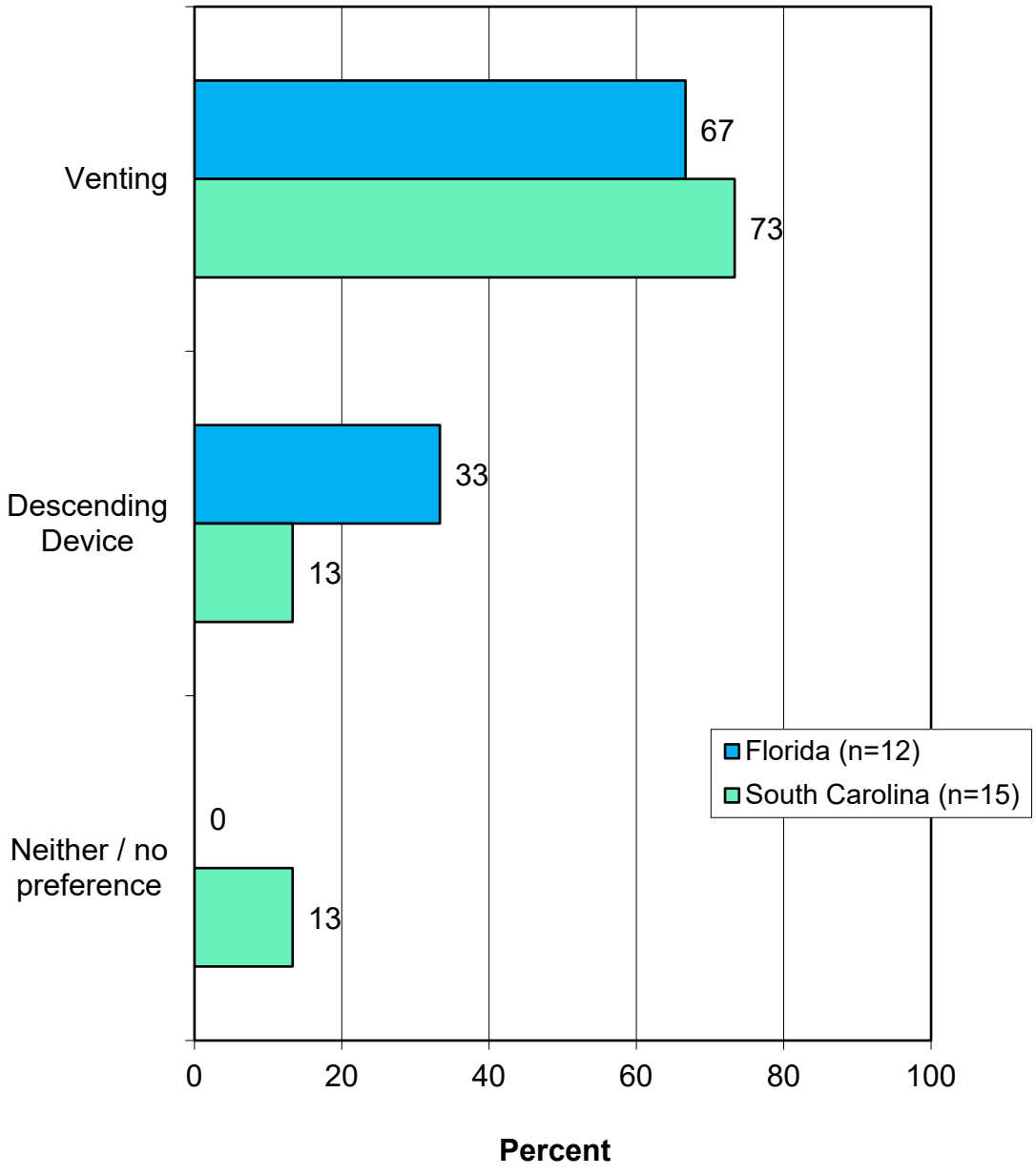



What types of descending devices do you use? (Asked of those who ever use a descending device.) (Captains)
Multiple Responses Allowed
Weighted lip gripping or mouth clamp devices
37
59
Weighted or inverted hook devices
68
35
Weighted basket or crate
5
0
Other type
5
24
Florida (n=19)
South Carolina (n=17)
0
20
40
60
80
100
Percent

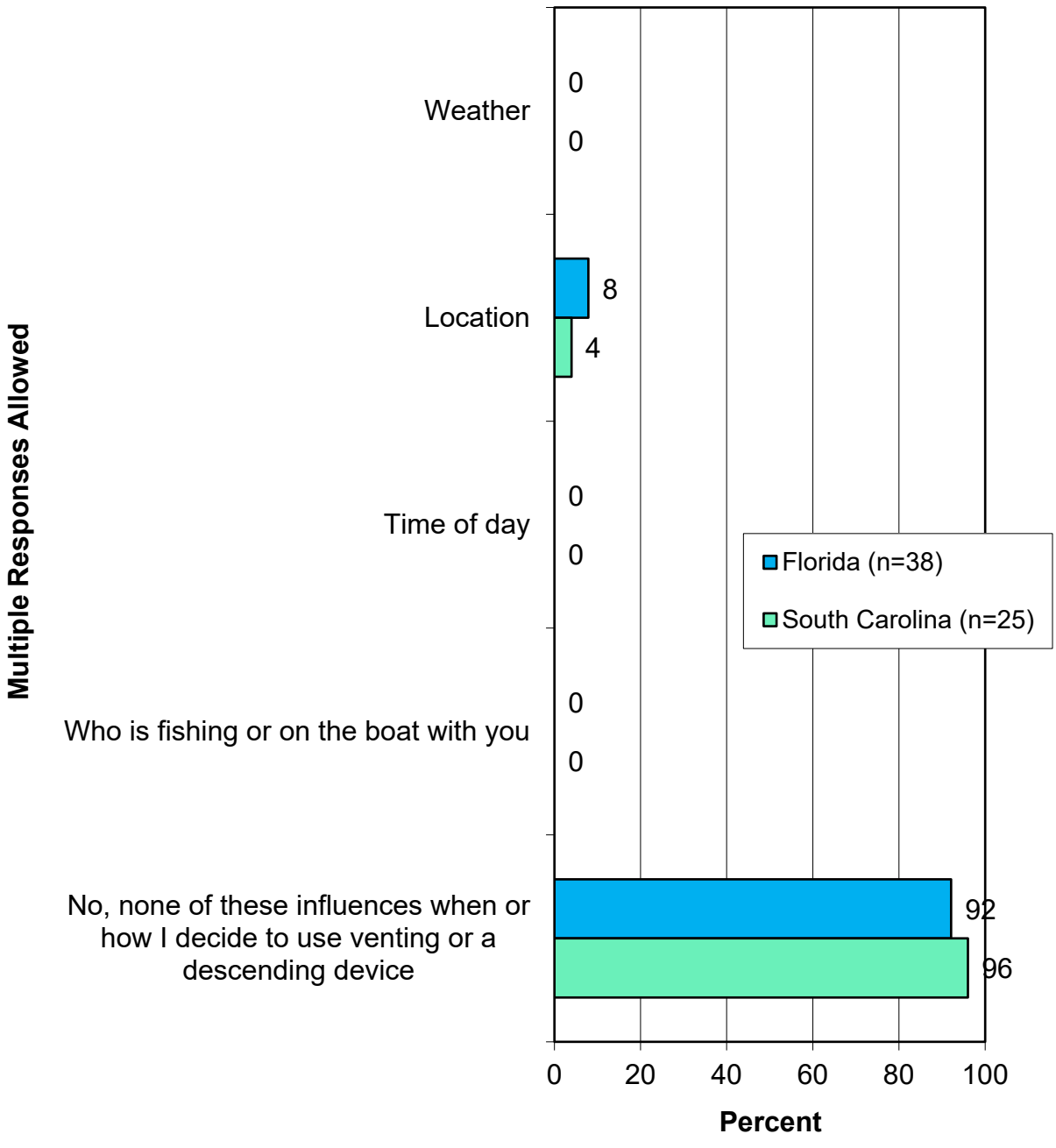
Which of the following best describes when you use venting or a descending device to release a fish? (Asked of those who ever use venting or a descending device.) (Captains)

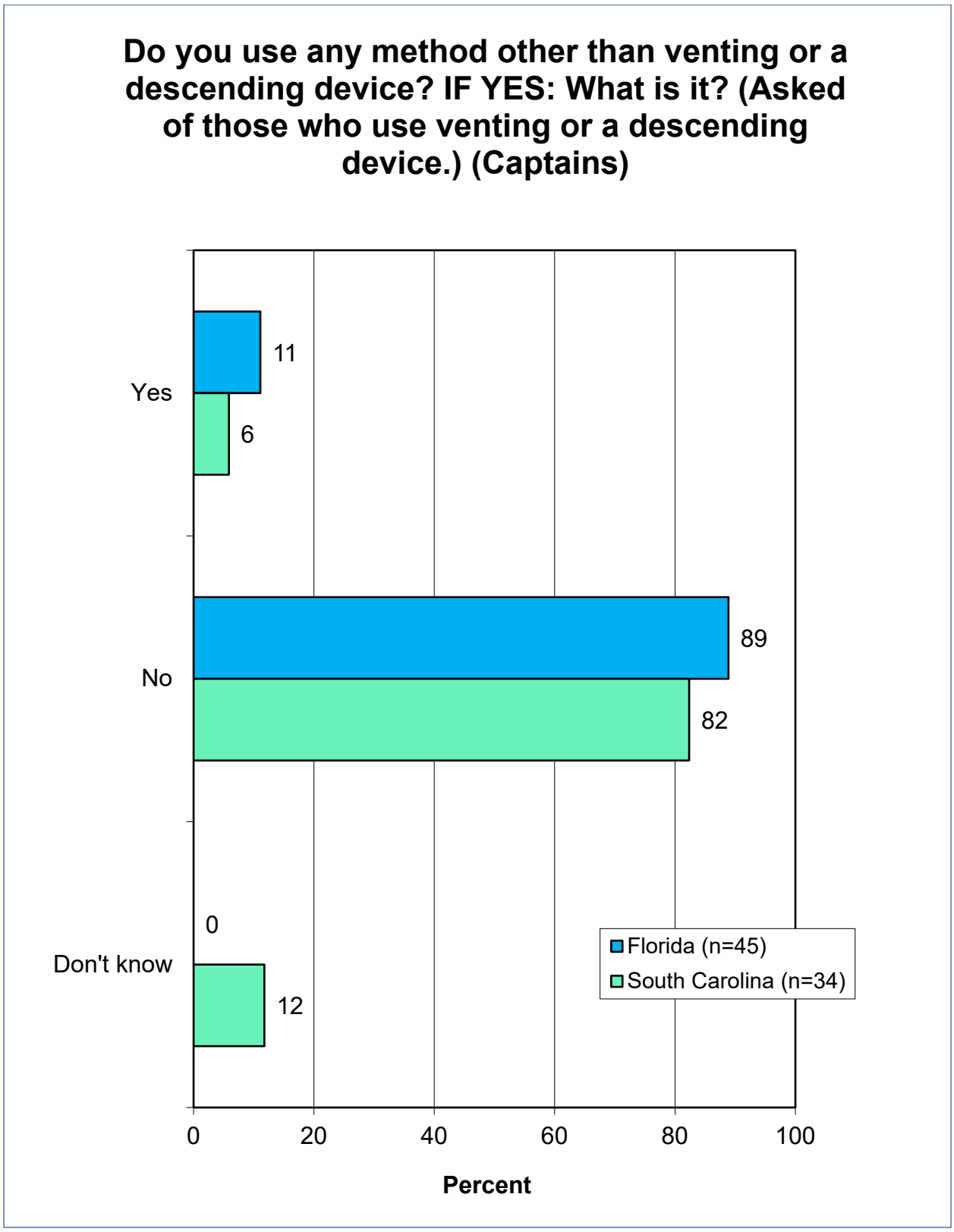


You indicated you have used both venting tools and descending devices to release fish. Which method do you prefer to use when the fish has signs of barotrauma? (Asked of those who use both venting tools and descending devices.) (Captains)



Do any of the following influence when or how you decide to use venting or a descending device to release fish? (Asked of those who ever use venting or a descending device.) (Captains)




Do you use any method other than venting or a descending device? IF YES: What is it? (Asked of those who use venting or a descending device.) (Captains)
Yes
No
Don't know
11
6
89
82
0
12
Florida (n=45)
South Carolina (n=34)
0
20
40
60
80
100
Percent

For fish showing signs of BAROTRAUMA that you release, please indicate for what percentage you use each of the following methods: (Captains)		
	Florida	**South Carolina**
Using NO special method or gear other than dehooking	29	17
Venting tool	50	46
Descending device	27	23

Respondents estimated the percentages but were not required in the survey to make them sum to 100%. Those who were unfamiliar with venting were coded as using it 0% of the time, and those who were unfamiliar with descending devices were coded as using them 0% of the time. Also note that each respondent did not fish the same number of times, and their frequency of fishing was not paired with the results of this question, so the statement "...of the time" is not completely accurate but is an approximation. (In other words, a person who goes fishing only once a year is counted the same as one who goes multiple times.)

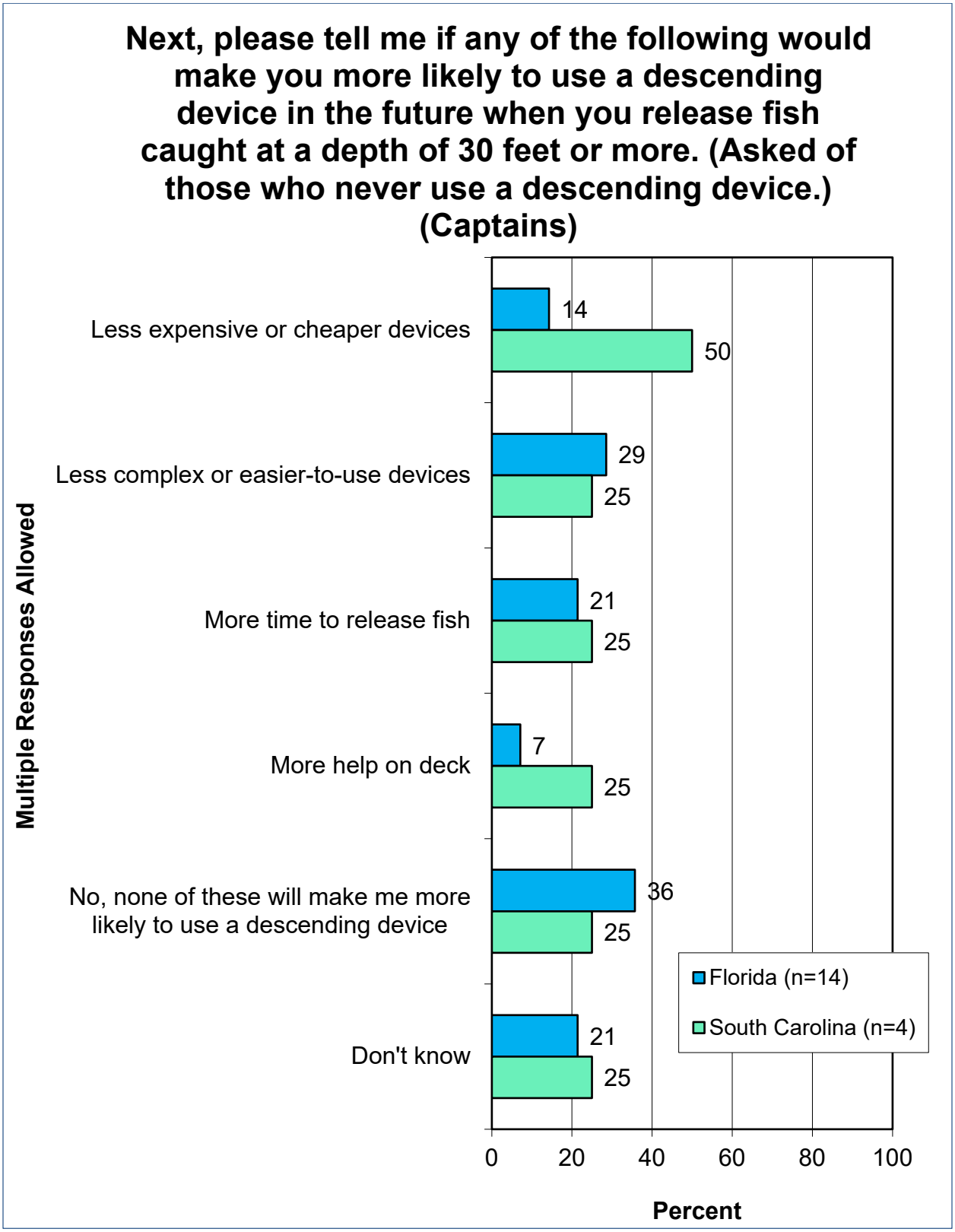
For the fish you release, how long, in minutes, does a fish typically remain on deck before you are able to release it back into the water? (Asked of those who release any fish.) (Captains)											
	Black grouper	**Gag grouper**	**Red grouper**	**Black sea bass**	**Red porgy**	**Gray snapper**	**Mutton snapper**	**Red snapper**	**Vermillion snapper**	**Yellowtail snapper**	**Gray triggerfish**
Florida											
More than 4 minutes	8	0	5	0	33	0	10	10	7	0	12
4 minutes	0	7	16	0	0	13	5	10	13	0	12
3 minutes	17	20	21	20	0	25	19	20	33	17	24
2 minutes	75	73	58	80	67	63	67	60	47	83	53
1 minute or less	8	0	5	0	33	0	10	10	7	0	12
South Carolina											
More than 4 minutes	13	14	29	11	0	0	0	6	14	0	0
4 minutes	0	0	14	0	0	0	0	0	0	0	0
3 minutes	13	14	0	6	0	0	11	0	0	0	0
2 minutes	25	14	29	6	0	25	22	12	0	20	22
1 minute or less	50	57	29	78	100	75	67	82	86	80	78

CONSTRAINTS TO USING DESCENDING DEVICES

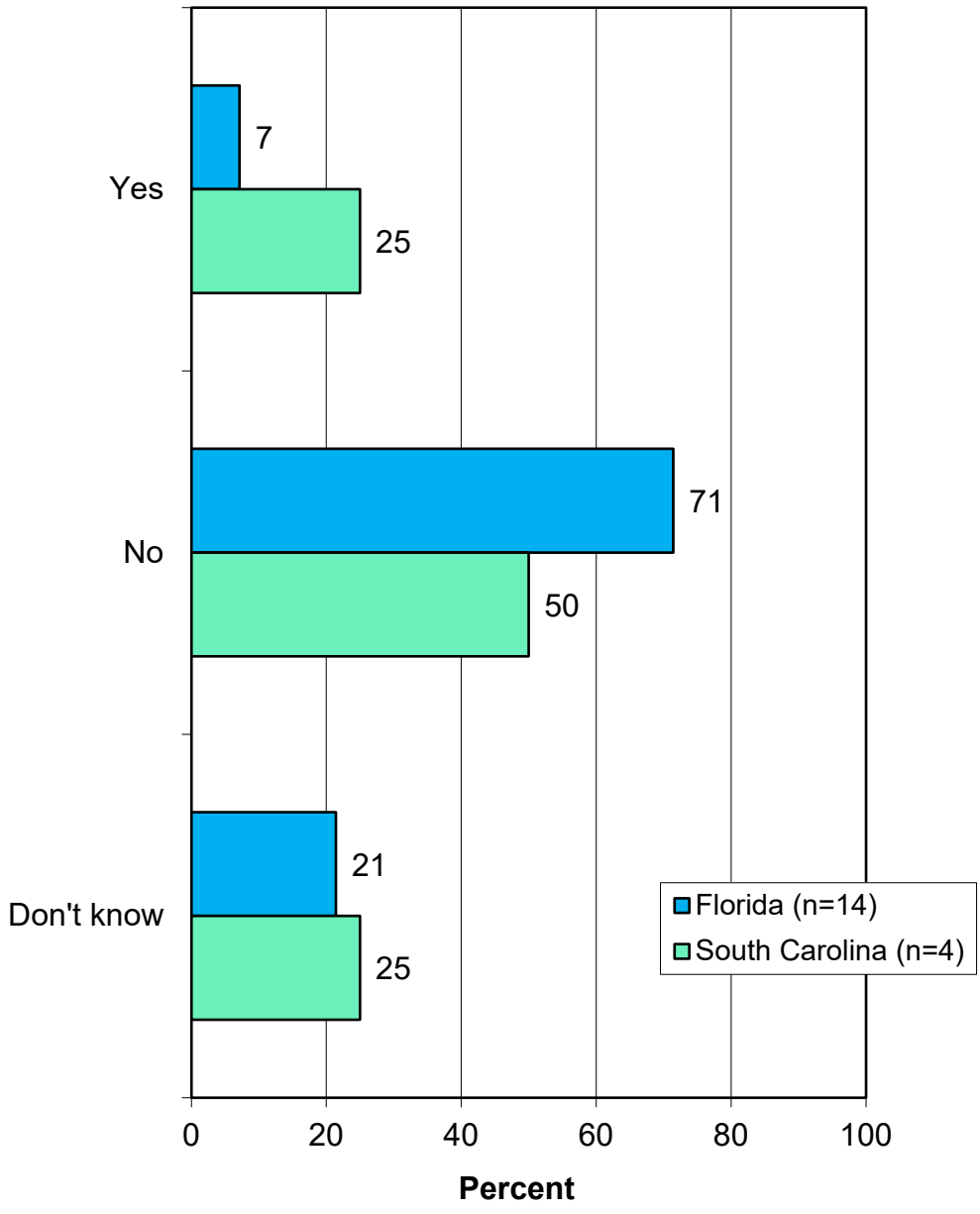
Next, please rate how important each of the following reasons is for why you do NOT use a descending device when you release fish caught at a depth of 30 feet or more, on a scale of 0 to 10, where 0 is not at all important and 10 is extremely important. (Among those who release any fish, know what a descending device is, but who do not use one.) (Captains)		
	Florida	**South Carolina**
	Mean Rating	
Prefer to use a venting tool to treat barotrauma	7.82	7.14
Requires a dedicated rod that I can't use for fishing	4.35	6.43
Do not usually see signs of barotrauma	5.28	5.14
Too difficult, complicated, or cumbersome to use	4.18	4.14
Do not think it helps the fish or think fish likely don't survive anyway	3.61	4.29
Takes too much time to use	5.18	2.50
Sea conditions are usually too unfavorable, such as strong currents, choppy water, and more	3.65	2.43
Don't know how to use a descending device	2.82	2.86
Costs too much	2.50	3.14
Requires too much space for storage	2.76	1.43
Unsafe to use on a moving deck	2.22	1.43

Ranking done on the mean of the two state means, which is not shown because it does not actually represent the overall mean (because the states had unequal sample sizes) but was used only to rank the reasons.

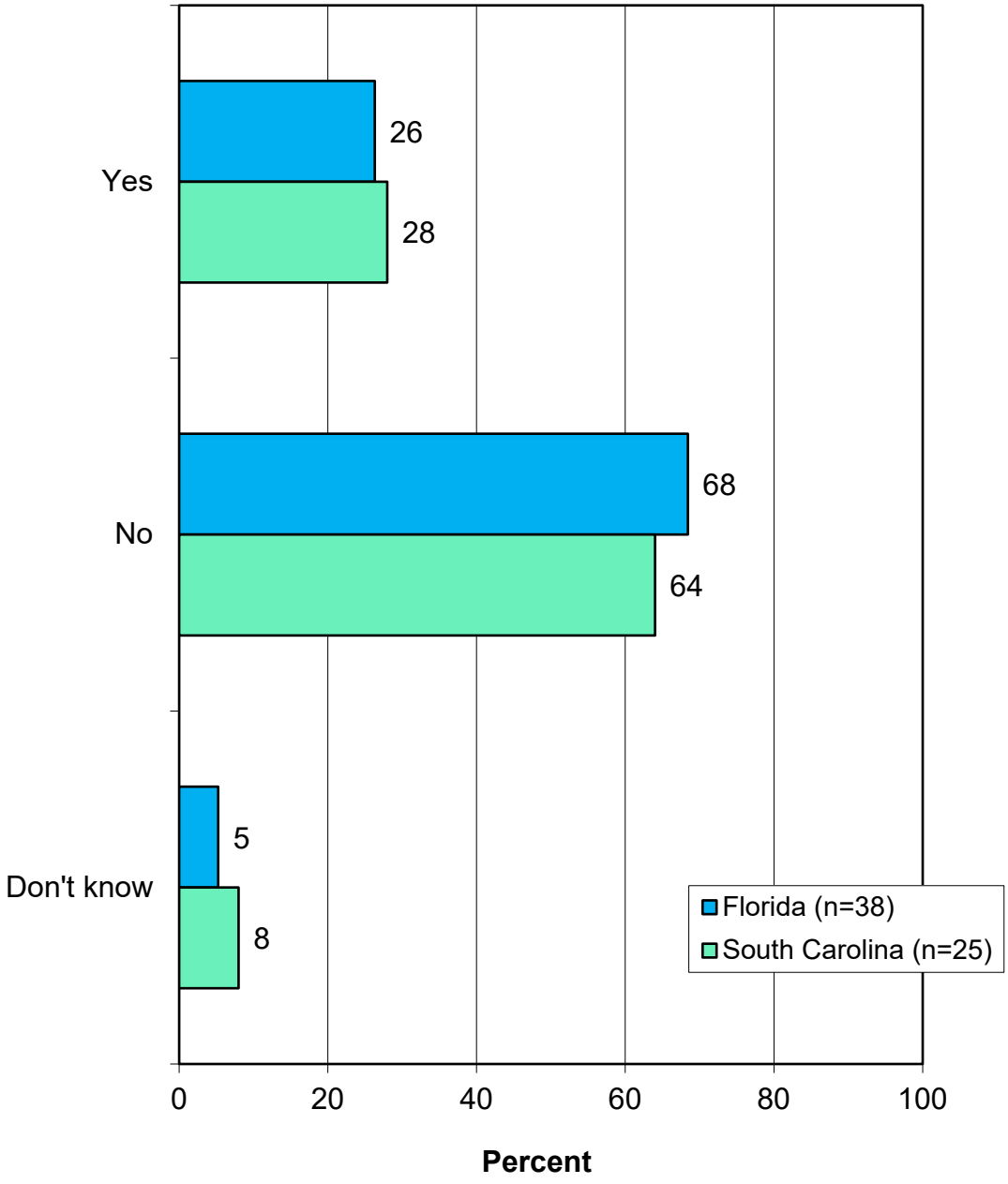
FACTORS TO ENCOURAGE USE OF DESCENDING DEVICES



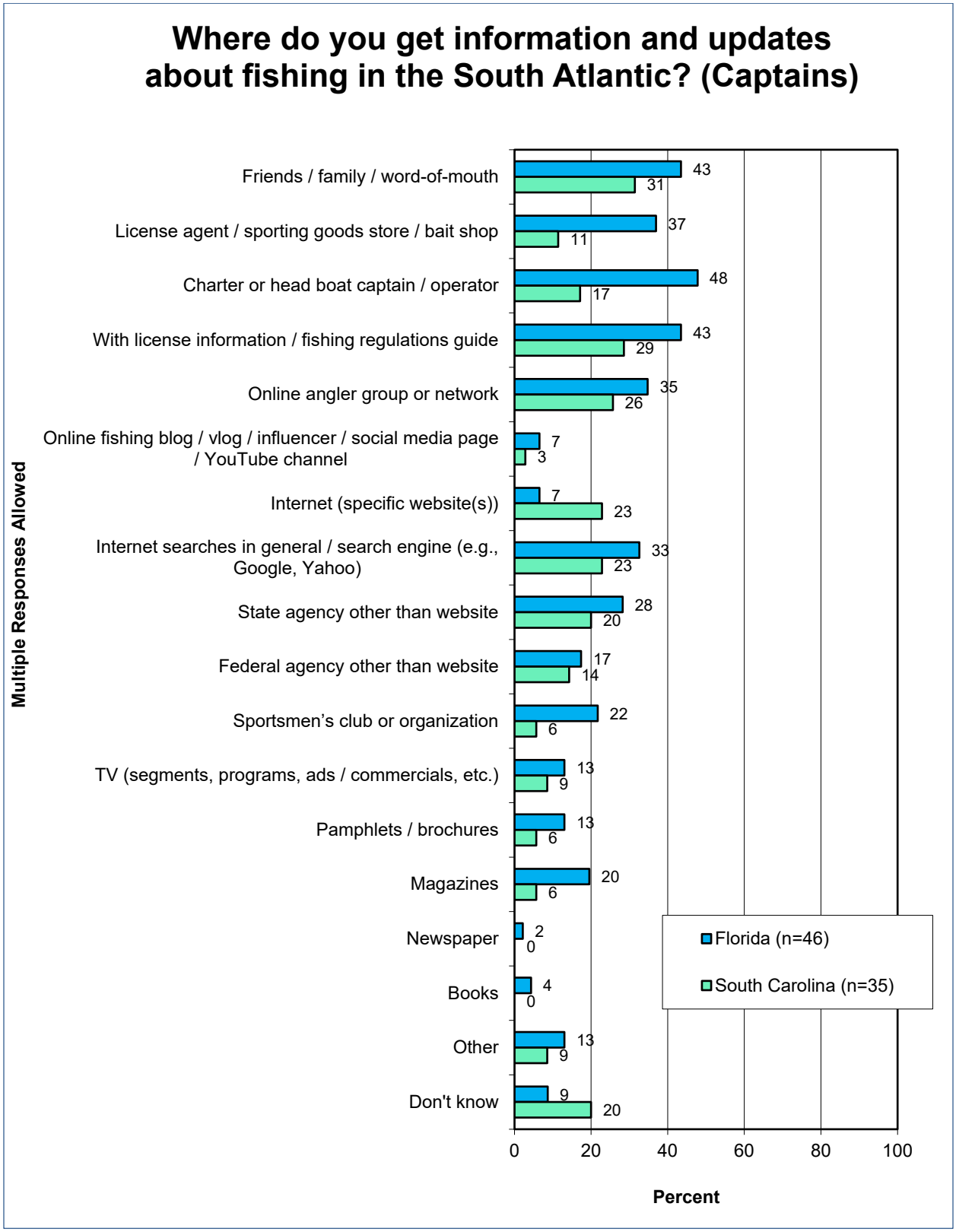
Is there anything else that would make you more likely to use a descending device in the future when you release fish caught at a depth of 30 feet or more? IF YES: What? (Asked of those who never use a descending device.) (Captains)



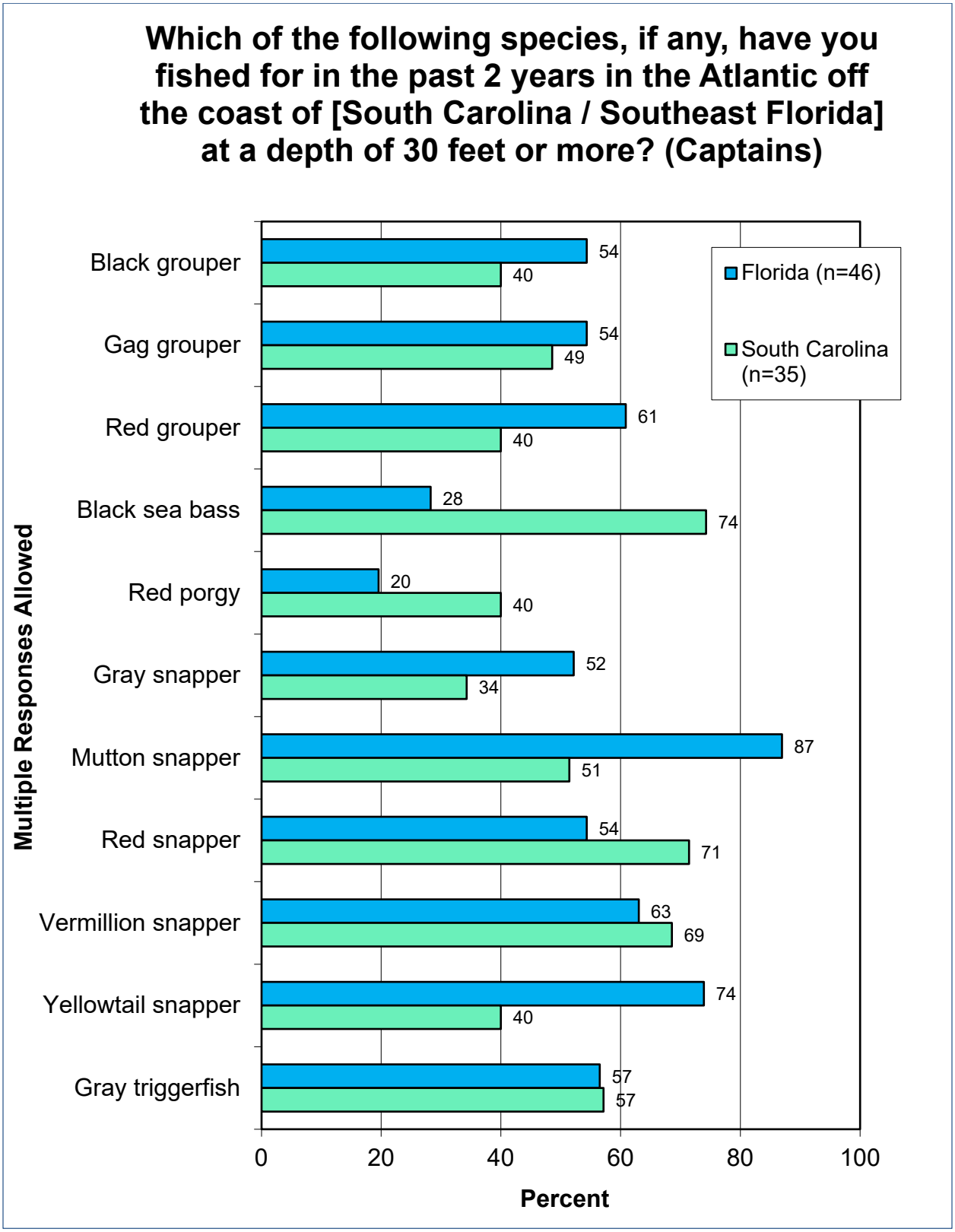
Are there any other factors or situations that influence when or how you decide to use venting or a descending device to release fish? (Asked of those who ever use venting or a descending device.) (Captains)



INFORMATION SOURCES ABOUT FISHING IN THE SOUTH ATLANTIC

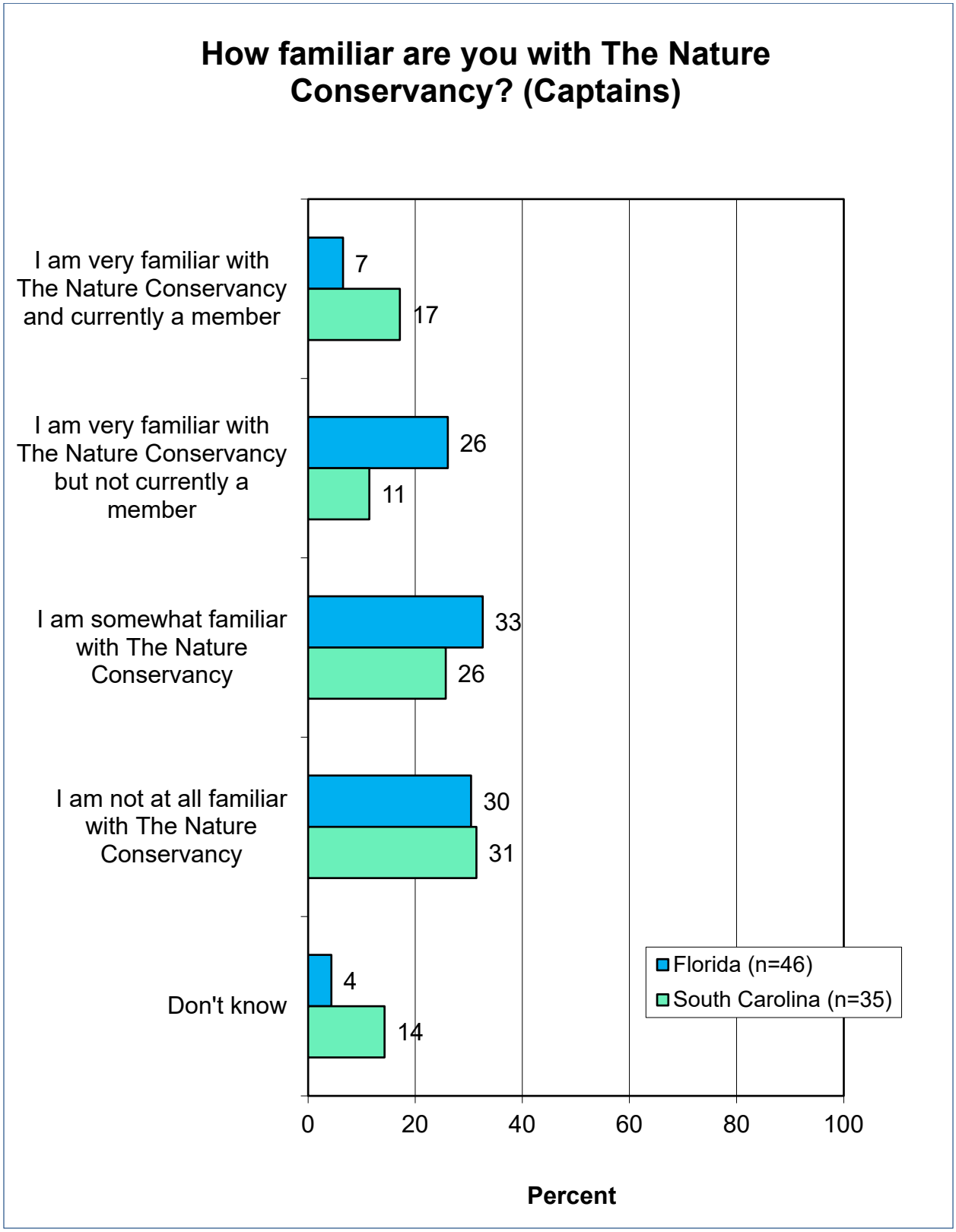


SPECIES FISHED

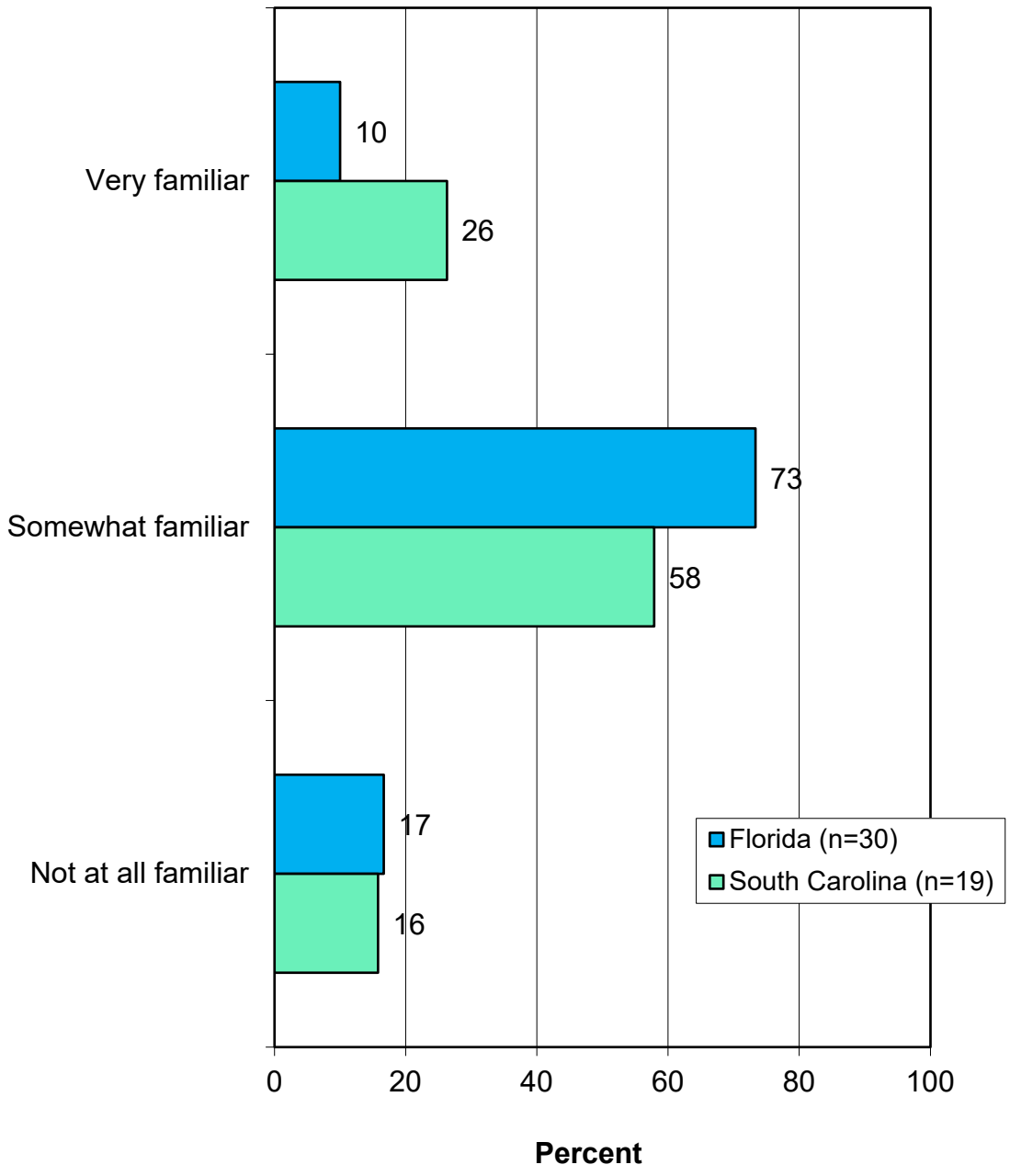


You indicated that your fishing has included the species shown in the table below. For each species, please indicate at what depth you typically fish for that species in the Atlantic off the coast of [Southeast Florida / South Carolina]. (Captains)											
	Black grouper	**Gag grouper**	**Red grouper**	**Black sea bass**	**Red porgy**	**Gray snapper**	**Mutton snapper**	**Red snapper**	**Vermillion snapper**	**Yellowtail snapper**	**Gray triggerfish**
Florida											
30 to 59 feet	21	20	30	17	0	69	17	0	0	35	25
60 to 89 feet	43	27	30	67	0	15	38	27	39	55	35
90 to 119 feet	21	20	15	0	50	8	17	18	11	10	30
120 to 149 feet	7	13	5	0	25	0	25	45	11	0	5
150 to 199 feet	0	7	5	17	0	8	4	0	17	0	0
200 feet or more	0	13	10	0	0	0	0	9	22	0	0
Don't know	7	0	5	0	25	0	0	0	0	0	5
South Carolina											
30 to 59 feet	25	0	0	26	14	25	20	10	13	67	18
60 to 89 feet	0	22	33	47	29	0	40	33	47	0	36
90 to 119 feet	38	56	33	11	43	38	10	43	33	33	18
120 to 149 feet	13	11	11	5	0	25	0	10	0	0	0
150 to 199 feet	13	0	22	0	14	13	20	5	0	0	18
200 feet or more	0	0	0	5	0	0	0	0	0	0	0
Don't know	13	11	0	5	0	0	10	0	7	0	9

FAMILIARITY WITH THE NATURE CONSERVANCY



How familiar are you with The Nature Conservancy's work on marine life, fisheries, the ocean, and coastal management? (Asked of those who are at all familiar with The Nature Conservancy.) (Captains)



ABOUT RESPONSIVE MANAGEMENT

Responsive Management is an internationally recognized survey research firm specializing in natural resource and outdoor recreation issues. Our mission is to help natural resource and outdoor recreation agencies, businesses, and organizations better understand and work with their constituents, customers, and the public. Focusing only on natural resource and outdoor recreation issues, Responsive Management has conducted telephone, mail, and online surveys, as well as multi-modal surveys, on-site intercepts, focus groups, public meetings, personal interviews, needs assessments, program evaluations, marketing and communication plans, and other forms of human dimensions research measuring how people relate to the natural world for more than 30 years. Utilizing our in-house, full-service survey facilities with 75 professional interviewers, we have conducted studies in all 50 states and 15 countries worldwide, totaling more than 1,000 human dimensions projects *only* on natural resource and outdoor recreation issues.

Responsive Management has conducted research for every state fish and wildlife agency and every federal natural resource agency, including the U.S. Fish and Wildlife Service, the National Park Service, the U.S. Forest Service, Bureau of Land Management, U.S. Coast Guard, and the National Marine Fisheries Service. Additionally, we have also provided research for all the major conservation NGOs including the Archery Trade Association, the American Sportfishing Association, the Association of Fish and Wildlife Agencies, Dallas Safari Club, Ducks Unlimited, Environmental Defense Fund, the Izaak Walton League of America, the National Rifle Association, the National Shooting Sports Foundation, the National Wildlife Federation, the Recreational Boating and Fishing Foundation, the Rocky Mountain Elk Foundation, Safari Club International, the Sierra Club, Trout Unlimited, and the Wildlife Management Institute.

Other nonprofit and NGO clients include the American Museum of Natural History, the BoatUS Foundation, the National Association of Conservation Law Enforcement Chiefs, the National Association of State Boating Law Administrators, and the Ocean Conservancy. As well, Responsive Management conducts market research and product testing for numerous outdoor recreation manufacturers and industry leaders, such as Winchester Ammunition, Vista Outdoor (whose brands include Federal Premium, CamelBak, Bushnell, Primos, and more), Trijicon, Yamaha, and others. Responsive Management also provides data collection for the nation's top universities, including Auburn University, Clemson University, Colorado State University, Duke University, George Mason University, Michigan State University, Mississippi State University, North Carolina State University, Oregon State University, Penn State University, Rutgers University, Stanford University, Texas Tech, University of California-Davis, University of Florida, University of Montana, University of New Hampshire, University of Southern California, Virginia Tech, West Virginia University, Yale University, and many more.

Our research has been upheld in U.S. Courts, used in peer-reviewed journals, and presented at major wildlife and natural resource conferences around the world. Responsive Management's research has also been featured in many of the nation's top media, including *Newsweek*, *The Wall Street Journal*, *The New York Times*, CNN, National Public Radio, and on the front pages of *The Washington Post* and *USA Today*.

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