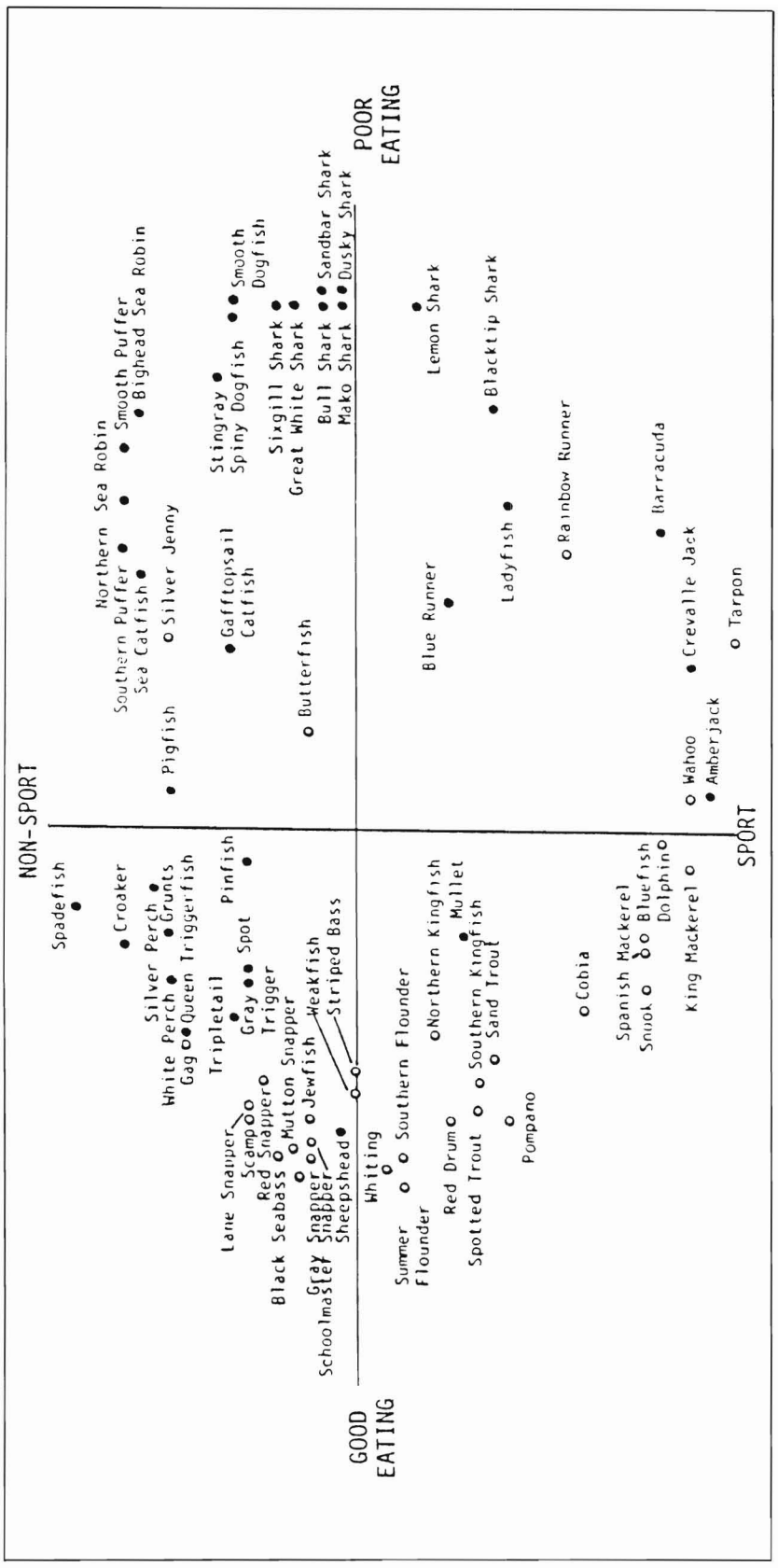


Figure 2.—Multidimensional scaling for east Florida: Dimension 1 vs. Dimension 2. Dots indicate underutilized species and circles represent utilized or preferred species.

North Carolina, on the other hand, is not nearly so well defined as east and west Florida in terms of the edibility and sport dimensions. This is because North Carolina fishermen seemed to group species on the basis of a variety of criteria, including size and shape, as well as the fight of the fish or its value as a food. In any case, it is still obvious that the hard-fighting fish cluster together at one end, the smaller species at the other, and that the groupers and snappers still fall into the same general region, opposite the trashfish.

Somewhat different than the other regions, Texans primarily distinguished between preferred and nonpreferred species. The three Texas favorites—spotted trout, reddrum, and flounder—all appeared together at the preferred end of the figure, and the nonpreferred species consist of both the good-fighting fish and the good-eating fish.

These differences reflect local preferences and further support our earlier contentions that the general criteria for targeting and rejecting fish remain more or less constant from region to region, while the specific stimuli that meet those criteria may vary.

Item-By-Use and Entailment

The results of the analysis of the item-by-use matrices are similar to what we found in the HCL and the MDS analyses. These matrices also have the added advantage of pointing out similarities and differences between the beliefs about fish (or similarities between belief-frames).

For each region, we constructed a matrix from the responses to the belief-frame comparisons. These sorted matrices are presented in Figures 6-9. Data in this form is useful for providing insights into the perceived characteristics of a fish that has an impact on its reputation or image as well as informing us of the combinations of characteristics and attributes that contribute to the clustering of species (and vice versa). In each of the figures, major clusters for belief-frames or sentence-frames are numerically identified along the rows, while major clusters for species are identified by letter along the columns.

An alternate way to view or model this data is through entailment analysis. Fig.

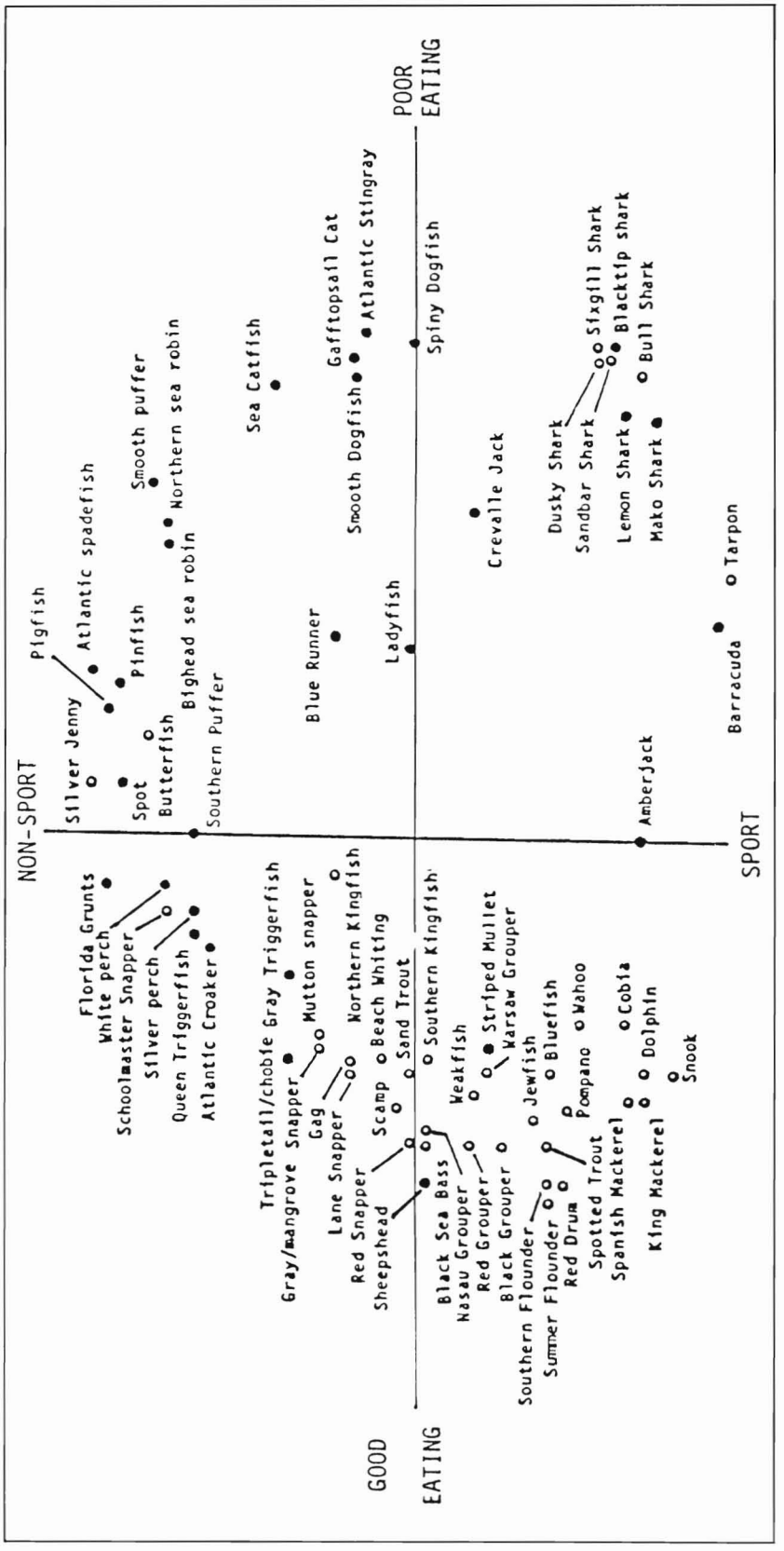


Figure 3.—Multidimensional scaling for west Florida: Dimension 1 vs. Dimension 2. Dots indicate underutilized species and circles represent utilized or preferred species.

ures 10 through 13 are entailograms showing both the implicational and contrast relationships among the belief-frames from the east Florida sample[6]. Cluster 1 (Fig. 10) contains belief-frames that are mostly negative in character. The following are two examples of how to interpret the diagram. The ordered relationship "only eaten by certain classes of people" entails that the fish is a "scavenger," which in turn entails that it "must be skinned." Many informants disparagingly described certain scavenger fish as being only eaten by certain classes of people. In addition, many of the scavengers were seen as requiring skinning (e.g., sea catfish).

A second example is the string "can only be cooked one or two ways" which entails that they "do not freeze well" (don't keep well in the freezer), which in turn entails that the "meat is oily-tasting." In contrast, for example, cluster II (Fig. 11) shows the relationship among positive characteristics with respect to freezing. Here the string "meat white when cooked" entails that the meat is "white when raw" which in turn entails that it will "freeze well."

Figure 13 shows examples of contrast relationships. Lines with cross-hatching denote these relationships. Contrast relationships are shown outside the clusters discussed above for the sake of simplicity and readability, but they could have just as well been included. An interesting example of such a relationship centers around the attribute "easy to clean." If a fish is perceived as "easy to clean," it will not be "poisonous," "ugly," or "slimy."

The importance of both the item-by-use and entailment analyses lies in their ability to inform and guide us in our attempts to change angler attitudes towards the less traditional sport fishes. These analyses, for example, tell us that fishermen routinely attribute negative culinary characteristics to fish they have never tried. It is much easier to change attitudes in situations where there is some degree

[6]Data from the east Florida item-by-use was dichotimized using the following break point: Alpha > 3. The entailogram was produced with the aid of a multidimensional Guttman scaling program written by Doug White at the University of California, Irvine. Relationships shown are with no exceptions.

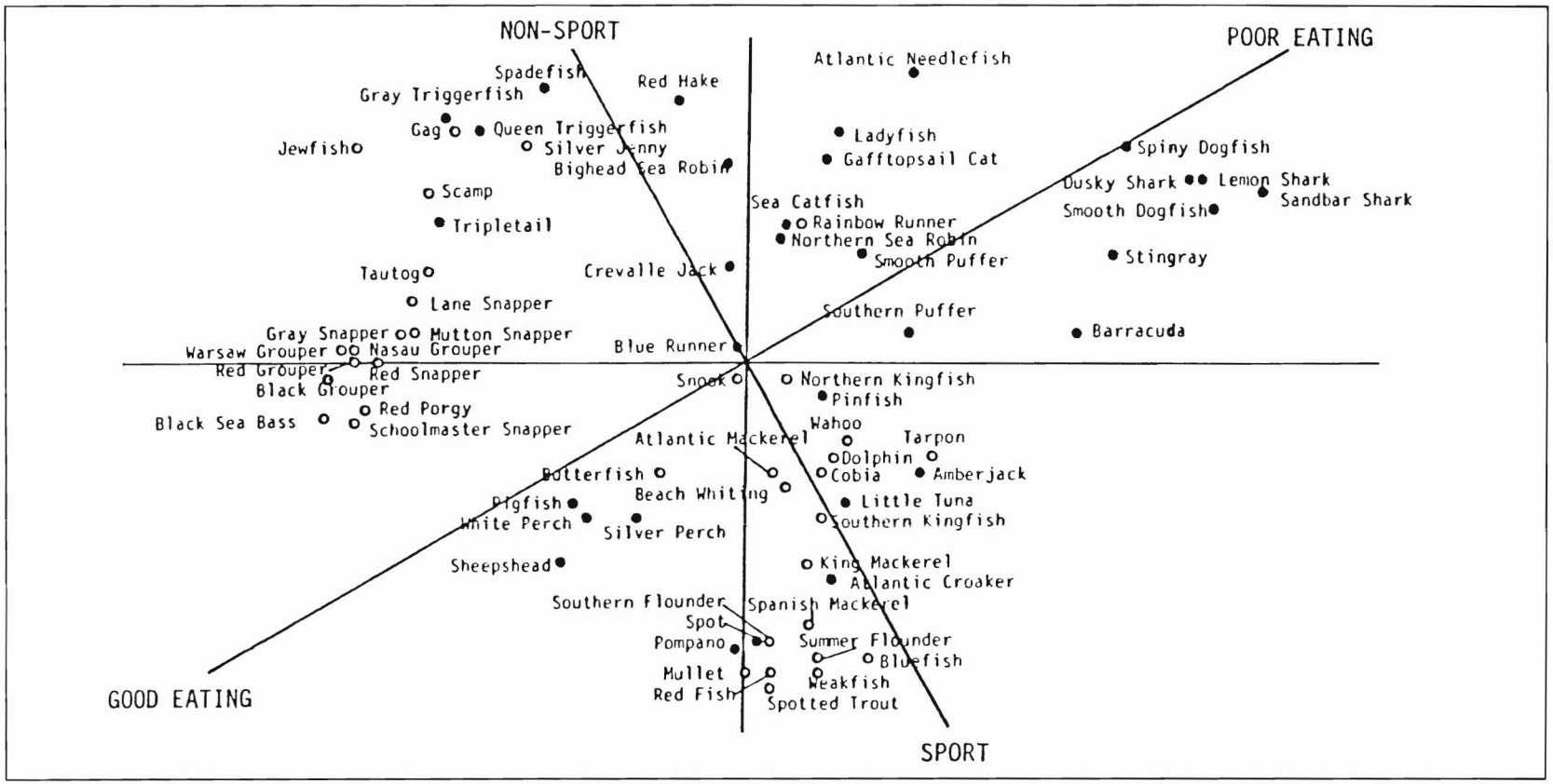


Figure 4.—Multidimensional scaling for North Carolina: Dimension 1 vs. Dimension 2. Dots indicate underutilized species and circles represent utilized or preferred species.

Figure 5.—Multidimensional scaling for Texas: Dimension 1 vs. Dimension 2. Dots indicate underutilized species and circles represent utilized or preferred species.

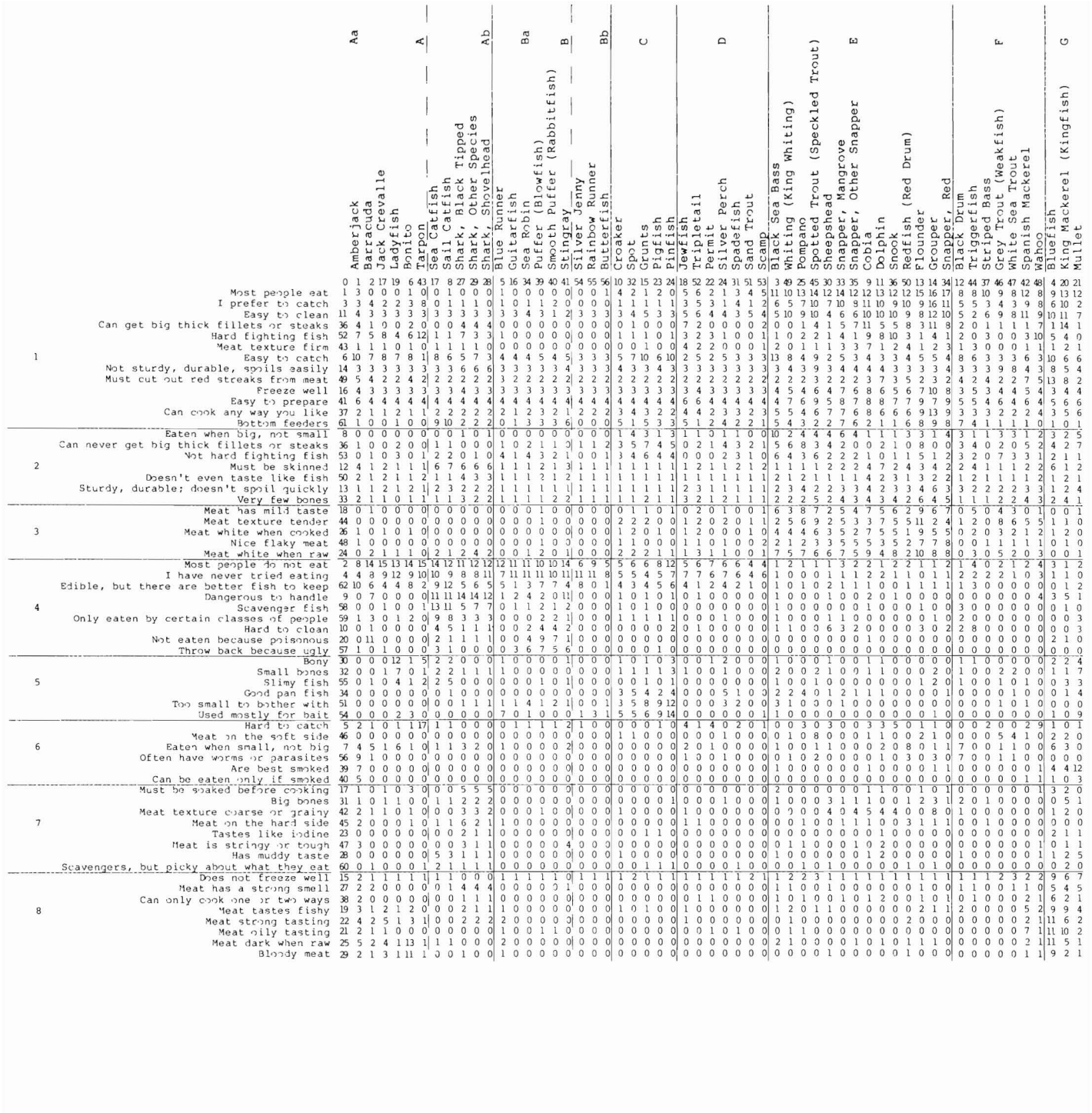


Figure 6.—East Florida sorted item-by-use matrix based on row-row and column-column similarities.

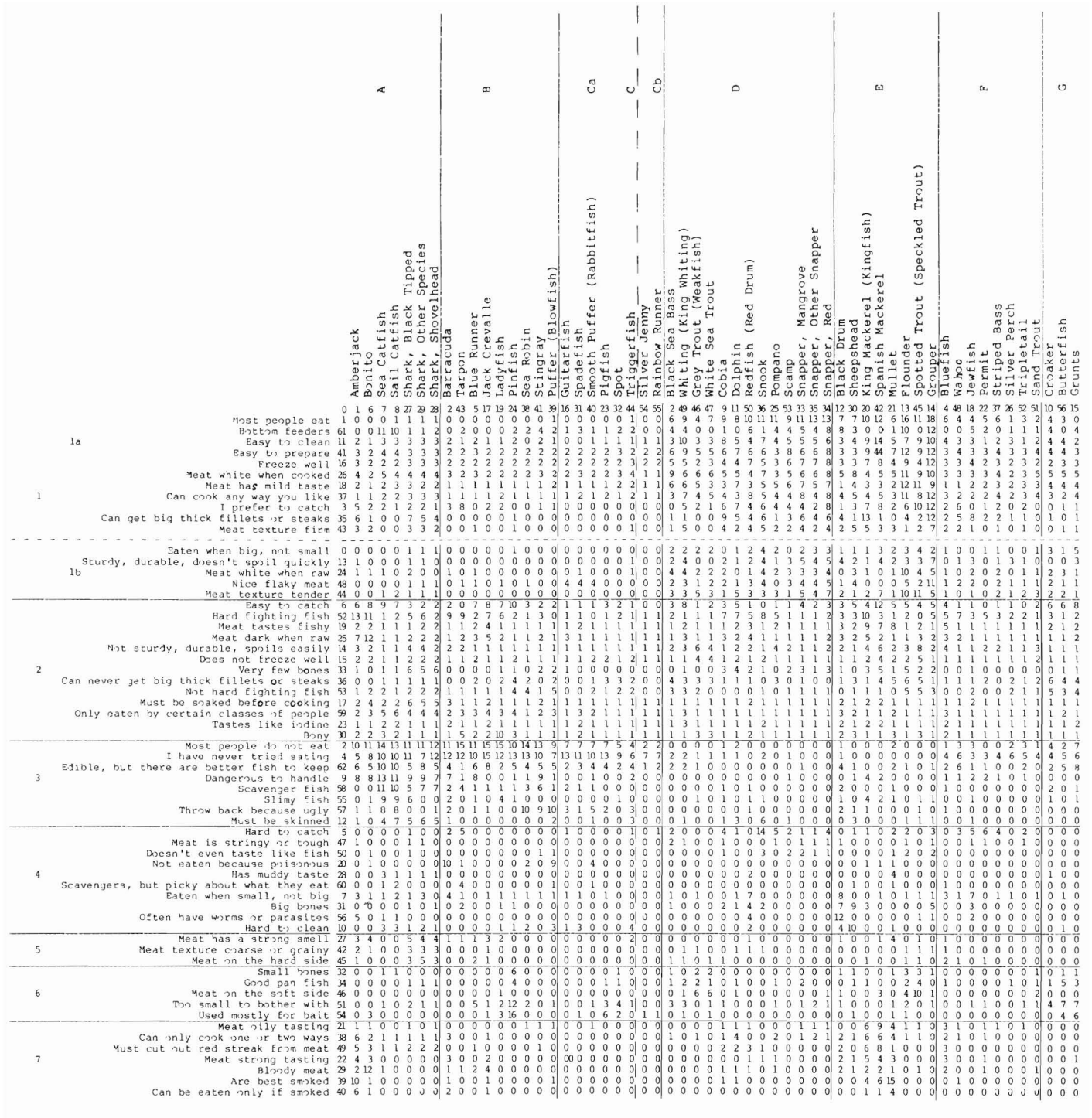


Figure 7.—West Florida sorted item-by-use matrix based on row-row and column-column similarities.

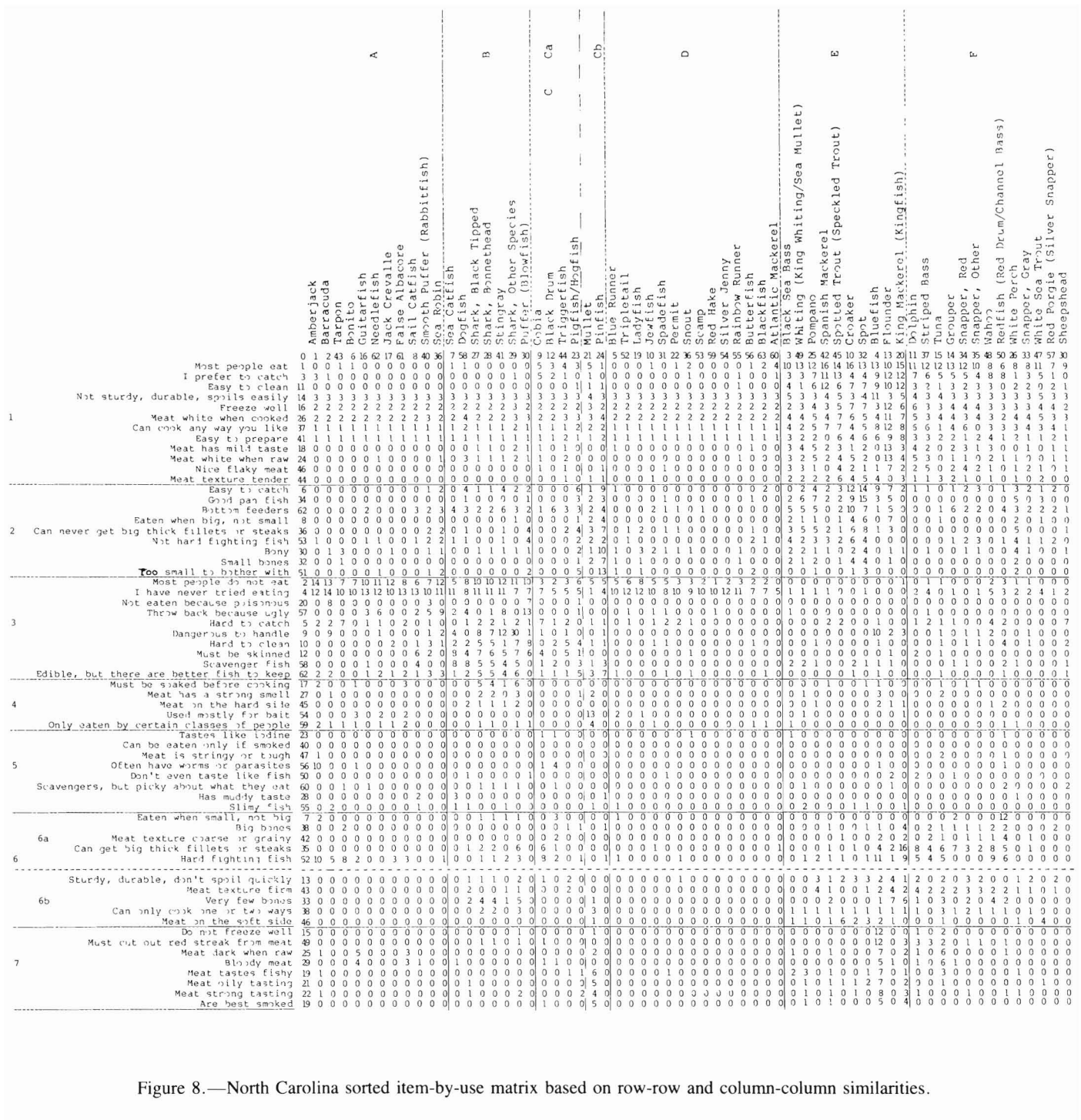


Figure 8.—North Carolina sorted item-by-use matrix based on row-row and column-column similarities.

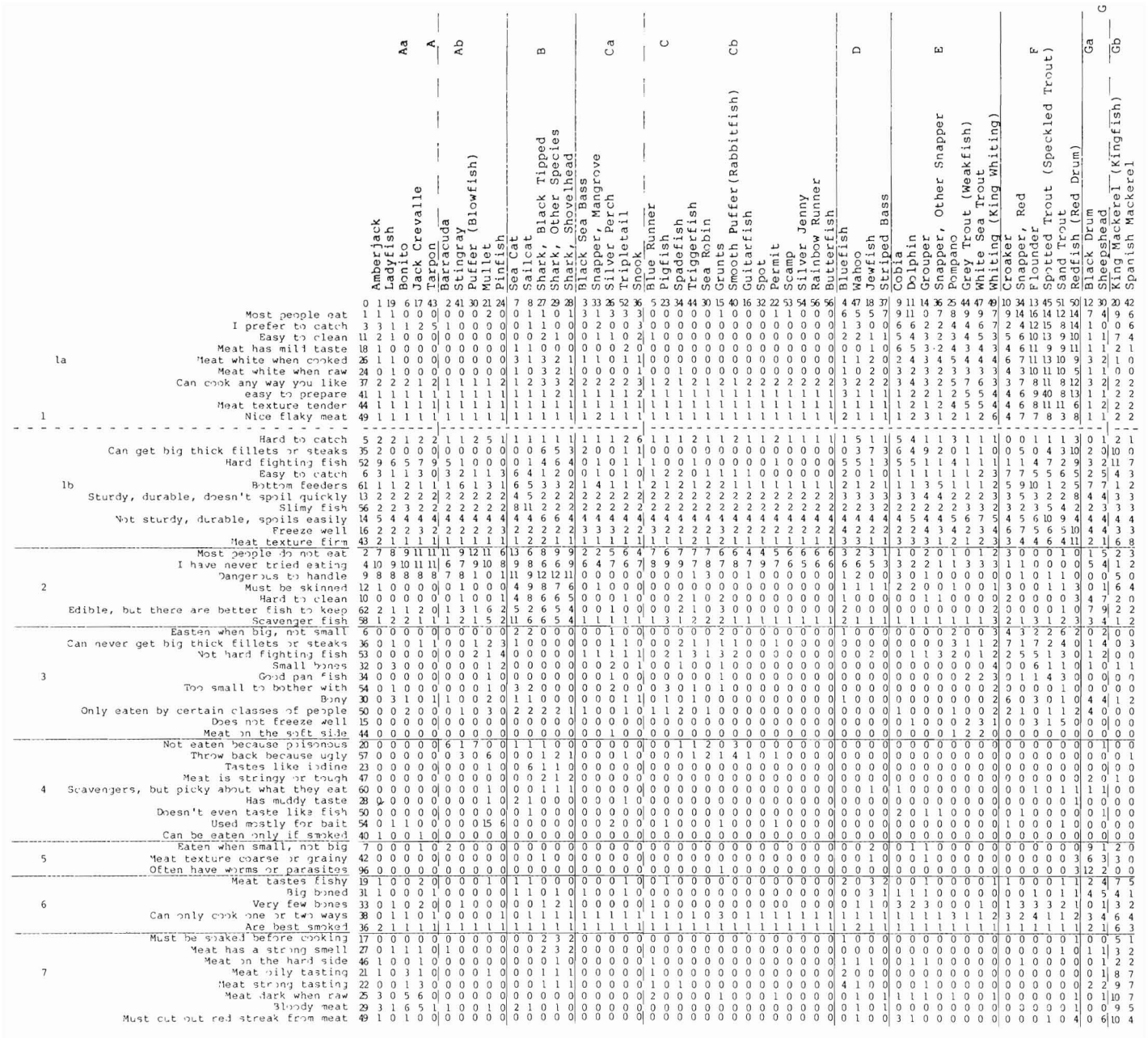


Figure 9.—Texas sorted item-by-use matrix based on row-row and column-column similarities.

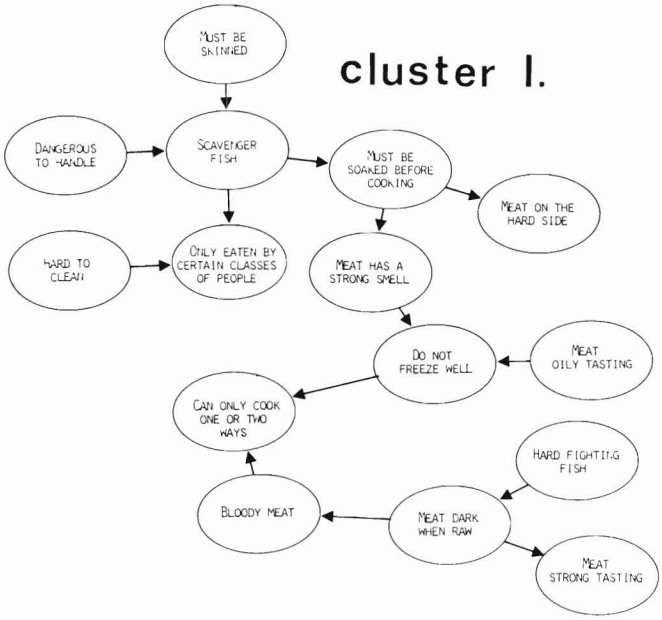
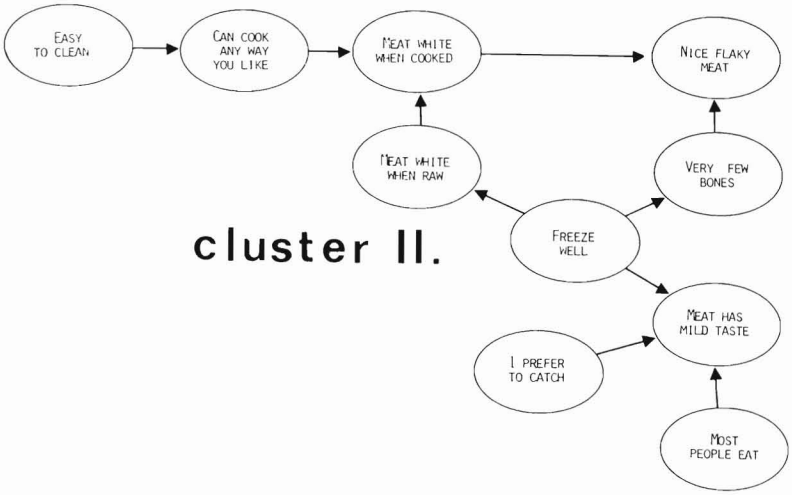
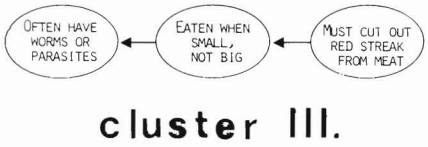


Figure 10.—Implicational relationships among negative belief-frames.





cluster III.

Figure 12.—Implicational relationships among a separate set of more negative belief-frames.

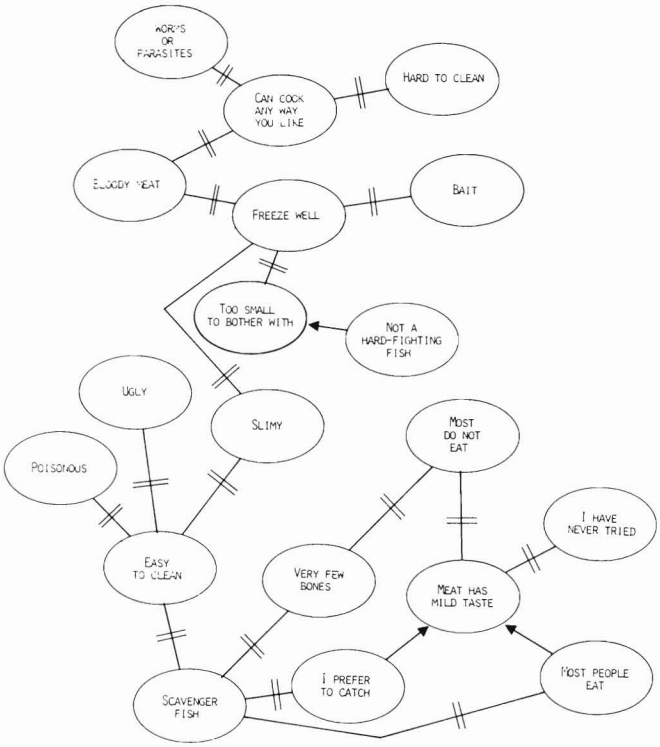


Figure 13.—Contrast relationships among belief-frames. Lines with cross-hatching indicate the contrast relationships.

of uncertainty; had fishermen actually eaten and rejected these fish, our task would have been much more difficult. In addition, this information helps establish parameters for determining an approach for enhancing the image of a particular underutilized species. Knowing what positive attributes to stress, and in what combinations (e.g., knowing the importance of the implicational relationships between "nice flaky meat," "meat white when cooked," cook any way you like," and " easy to clean"), can make a considerable difference in promoting fish. Similarly, and equally important, knowledge about negative attributes and their perceived relationships can help in determining appropriate ways to deal with the negative attributes of a particular species.

Discussion and Conclusions

These findings suggest that most perceptions concerning underutilized species are developed outside actual experiences. Beliefs relevant to these species are generally the result of hearsay and rumor perpetuated during a fisherman's socialization into recreational fishing. Ambiguities about the perceptions of underutilized species and lack of experience with such species are cognitively dealt with in terms of the general ways that recreational fishermen rank and classify fish.

Many of the findings of this study came as no surprise. That recreational fishermen target fish they perceive to be fun to catch, good to eat, easy to cook and clean, etc., are not earth-shattering revelations. Yet we would have suspected our techniques and interpretations had we not confirmed such banal knowledge. In many ways, this confirmation lends confidence to our findings.

This analysis has placed species of saltwater fish in relation to one another in terms of their similarities and differences as perceived by recreational fishermen. This information has served as the foundation for the development of educational/advertising materials designed to improve the reputations of underutilized species, thereby promoting their use. The methods used in the study complement one another in this regard. While the HCL yielded an understanding of the general perceived similarities and differences among species, the MDS further defined relationships between the species in terms of the specific dimensions of sportfish and meatfish. These relationships suggest possible ways that underutilized species' images may be improved via favorable comparisons with preferred species that, in the minds of fishermen, they already resemble. These relationships between species also suggest which underutilized species are the most and least likely to improve with an educational program. The item-by-use matrices and entailment analyses further defined relationships between the species in terms of attributes suggested by fishermen. An understanding of the relationships between attributes (belief-frames) suggests the proper and most appropriate ways to present a case for the increased utilization of underutilized species within an educational context. Together, the three types of information provide a clear and workable picture of the domain of saltwater species as perceived by people who regularly and actively deal with them.

Knowing what fishermen like or do not like and understanding the manner in which they express their beliefs concerning fish is critical for producing appropriate and effective educational materials. In Part II, (Murray et al., 1987) we look at the application of this information to the development of educational materials directed at encouraging marine anglers to better utilize nontraditional fish in the southeastern United States.

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Encouraging the Use of Underutilized Marine Fishes by Southeastern U.S. Anglers, Part II: Educational Objectives and Strategy

JAMES D. MURRAY, JEFFREY C. JOHNSON, and DAVID C. GRIFFITH

ABSTRACT—This paper, the second of a two-part series, focuses on the educational program and the process of increasing demand for underutilized marine fishes by recreational fishermen in the southeastern United States. Short- and long-term objectives, strategy, development of educational materials, and results are discussed. We point out how the species were selected for development and how the research findings influenced the information presented in the materials. The advantages of initiating projects that contain both research and extension components are pointed out. We show how marketing and consumer behavior research techniques can be used to shape an educational program. Also discussed is the importance of producing multifaceted educational materials and training a network of educators to conduct educational programs to achieve widespread distribution and adoption of information.

Introduction

In Part I of this study, Johnson et al. (1987) gathered information about southeastern U.S. marine recreational fishermen's perceptions of and preferences for marine fishes. In Part II we initiated an educational program to change the sport fisherman's beliefs about selected underutilized marine fishes.

Given the potential benefits of increased utilization, the question becomes: How do you change the sport fisherman's attitudes and behavior toward nontraditional species? There are, of course, many steps involved in this process. They include basic research, development of consumer education materials, and distribution of these materials. Although all these steps are important in effecting change, we concentrate on the educational component in this paper, Part II.

The long-range goals of the overall project were to: 1) Reduce conflicts between sport and commercial fishermen, 2) enhance tourism at the local level by increasing the demand for sport-caught underutilized species, 3) increase the consumption and reduce the waste of recreationally caught underutilized species, and 4) enhance the recreational fishing experience by emphasizing positive attributes of various underutilized species.

These goals fit within the mission of the National Sea Grant Program, which has a basic goal "to promote the wise use and conservation of our nation's marine resources." And, the goals were consistent with the Program Development Plan of the Southeast Region, National Marine Fisheries Service, for marine recreational fisheries. The plan had proposed activities to distribute information on opportunities for increasing use of sport-caught species (NMFS, 1983).

Educational Program and Objectives

We developed educational objectives with a general goal of having 50 percent of the estimated 9 million marine anglers in the southeastern United States better understand recreational fishing opportunities for selected underutilized species over a 10-year period. Achieving such a goal will not be easy or immediate. An orderly, long-range informational program should be multifaceted and should include different strategies for different species and angler audiences.

In this case, the informational tools were diverse. We used a mix of radio, television, publications, news articles, video productions, and special events to reach the recreational fishing public. Even though the project will end, the program developed will not. The project goal was to develop lasting materials that will be easy to use by a variety of marine educators and sportfishing opinion leaders.

Specific objectives of the educational program were to: 1) Develop a variety of educational materials, based on the research discussed by Johnson et al. (1987) in Part I, for distribution throughout the southeastern United States, and 2) develop a network of sportfishing opinion leaders and educators and inform them on the use of these products to achieve a "snowballing" effect.

Procedure

The first step in developing the educational program was to analyze the data from Johnson et al. (1987) and determine general perception patterns regarding fish. Popular or target fishes usually ranked high on four characteristics: Availability, reputation, edibility, and fighting style. Even though most target species ranked high on these four characteristics, it was not mandatory for target species to be graded high on all four. For example, the tarpon, *Megalops atlanticus*, is a target species, but it ranks low in

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edibility and availability. However, it ranks high enough in reputation and fighting style to outweigh the negative characteristics. Ultimately, 16 marine fishes (Table 1) were chosen for increased utilization by sport fishermen. All ranked high on at least one of the four characteristics, allowing us at least one positive trait or characteristic upon which to build an educational program.

Aside from the four general characteristics mentioned above, we discovered several other factors which were important in understanding perceptions and thus building an educational program. For several species of fish, regional variations in perception were found. For example, greater amberjack is more likely to be targeted in the Gulf than in North Carolina, while mullet is more likely to be sought in Florida than in Texas. Atlantic croaker is a popular sport fish in North Carolina, but is likely to be ignored in Florida. Because of such variations, we decided to use the positive impressions of a fish in one region to help overcome negative attributes the fish had in another region.

We also found that sport fishermen often obtain information from other anglers without learning it firsthand (Johnson et al., 1987). The fishing "grapevine" works, and many fishermen will go to great lengths to relate that a particular fish is "hard to clean" or "tastes sour." But, when asked if they have tried the fish, the answer is quite often "no."

The following hypothetical example shows how some misinformation can start. When a fisherman catches a shark, he may throw it on the deck so pictures can be taken when he reaches the dock. Later he takes it home in the evening and cleans it. And then, when he cooks it a day or two later, it does taste "sour." He then may tell his fishing friends that he's tried shark and "even his cat wouldn't eat it." In this case the angler's first mistake was in treating the shark as he would any other fish. He did not realize shark should be bled, gutted, and iced within 20 minutes.

Our strategy was to turn this information "grapevine" to our advantage. We targeted the sportfishing opinion leaders to whom the average fisherman is most likely to look to for information. And we tried to change their attitudes about the selected underutilized species.

Table 1.—Species or species groups of marine fishes selected for improved utilization by sport fishermen in southeastern United States waters

Greater amberjack, *Seriola dumerili*[1]
Northern searobin, *Prionotus carolinus*[2]
Skates and rays[2]
Rajiformes (various species)
Gray triggerfish, *Balistes capriscus*[1]
Panfishes[2]
White grunt, *Haemulon plumieri*
Silver perch, *Bairdiella chrysoura*
Pinfish, *Lagodon rhomboides*
Crevalle jack, *Caranx hippos*[1]
Sharks[1]
Shortfin mako, *Isurus oxyrinchus*
Blacktip shark, *Carcharhinus limbatus*
Lemon shark, *Negaprion brevirostris*
Sheepshead, *Archosargus probatocephalus*[1]
Atlantic bonito, *Sarda sarda*[1]
Atlantic croaker, *Micropogonias undulatus*[2]
Black drum, *Pogonias cromis*[1]
Bluefish, *Pomatomus saltatrix*[1]
Ladyfish, *Elops saurus*[1]
Striped mullet, *Mugil cephalus*[1]
Pigfish, *Orthopristis chrysoptera*[2]
Ocean catfishes[2]
Gafftopsail catfish, *Bagre marinus*
Hardhead catfish, *Arius felis*

[1]Potential target species.
[2]Incidentally caught species in need of greater utilization.

For example, if an unfamiliar fish looks "different," it is not perceived to be good. Examples include skates and rays, searobin, triggerfish, and Atlantic spadefish, *Chaetodipterus faber*. But we were able to draw upon exceptions to this rule to help overcome some misconceptions. For example, the odd appearing flounder is highly sought by some anglers but not others. To help fishermen overcome the hesitation of trying something new or different, we selected and used relevant anecdotes. For example, one fisherman told us that when he first moved to Florida from a northern state, he threw back all the flounder he caught until he discovered what they were. He didn't think anything so "ugly" could be a flounder. We used such stories to convince fishermen to try such species such as searobin.

We also found that if a species requires special handling, it is not as likely to be utilized (Johnson et al., 1987). Sharks, skates, and rays need to bled and iced within 20 minutes or off-flavors will develop. Most fishermen don't know this and, when they treat these fishes like other (nonshark) species they have poor results. Triggerfish require different cuts than a typical trout-type fillet. Sea catfish need to be skinned, and other fish such as Atlantic bonito, need to be bled and iced rapidly upon landing. When fishermen lack this information they often have bad experiences with the fish.

As discussed in Part I, dark-meated fishes (i.e., crevalle jack, Atlantic bonito, and bluefish) were not viewed as well as species with lighter flesh, although there are some exceptions. King mackerel is generally considered to have darker flesh, but it is extremely popular. Similarities with king mackerel were highlighted in information regarding bluefish.

The need to use different fishing methods is sometimes an obstacle to utilization. Atlantic spadefish, for example, will not strike an artificial lure or typical cut bait. Their diet consists of sponges, tunicates, and sea anemones, and they can be caught by fishing with jellyfish. Information on this technique, developed by the South Carolina Division of Wildlife and Marine Resources, was distributed widely with apparent success.

Selecting Species

To determine the species to target for an informational program, we reviewed the data in Part I (Johnson et al., 1987). Multi-dimensional scaling and hierarchical clustering techniques were used to determine the judged similarities and differences between the different species. This facilitated an understanding of relationships between the species and helped to identify both their positive and negative attributes. The item-by-use procedure and entailment analysis helped determine the relationships between the attributes.

Finally, 16 species or species groups, were selected (Table 1). Those chosen either had attributes which were similar to popular species, or information about their positive characteristics was lacking. The list was approved by the Southeast Regional Office of the National Marine Fisheries Service prior to developing the educational program. This step was necessary to make certain NMFS biologists did not see immediate future stock concerns with the resource. Puffers, *Sphoeroides* spp., and great barracuda *Sphyraena barracuda*, were not approved by NMFS because of potential health problems associated with toxins.

Information is needed for these species, but it was determined that misinterpretation or improper application of it could lead to serious health risks, and they were therefore left out.

In general, the 16 species fell into two broad categories: 1) Fish which could become potential target species and 2) incidentally caught fish which could be utilized to a greater extent. Potential target species included amberjack, triggerfish, ladyfish, and crevalle jack. Species caught incidentally which could be more fully utilized included searobin, skates and rays, and several of the "panfishes".

Crevalle jack and ladyfish, which are plentiful, easy to catch, and good fighters, are not targeted owing to their edibility characteristics. For those species we suggested alternative uses such as inshore tournaments for newcomers to marine fishing. We also discussed preparation methods which overcome their shortcomings as food fishes. On the other hand, we assumed that fishermen probably were not going to target dogfish sharks (Squalidae) or searobin. Both species, often caught while fishing for other more popular fishes, are usually discarded. The dogfish and searobin information centered on preparation methods so more would be used and fewer discarded.

Materials

We produced a variety of materials to get our messages across. Our basic approach was to confront the species' negative images and to emphasize their positive characteristics. By confronting the negative perceptions, we felt the information would be more believable to fishermen. For example, we admitted that amberjack have worms, but pointed out that other popular species, such as groupers, do too. We also noted that any area that obviously contains the worms (usually the meat near the tail) can be removed. The remaining amberjack meat is white when cooked and compares in quality and texture with other highly desirable species.

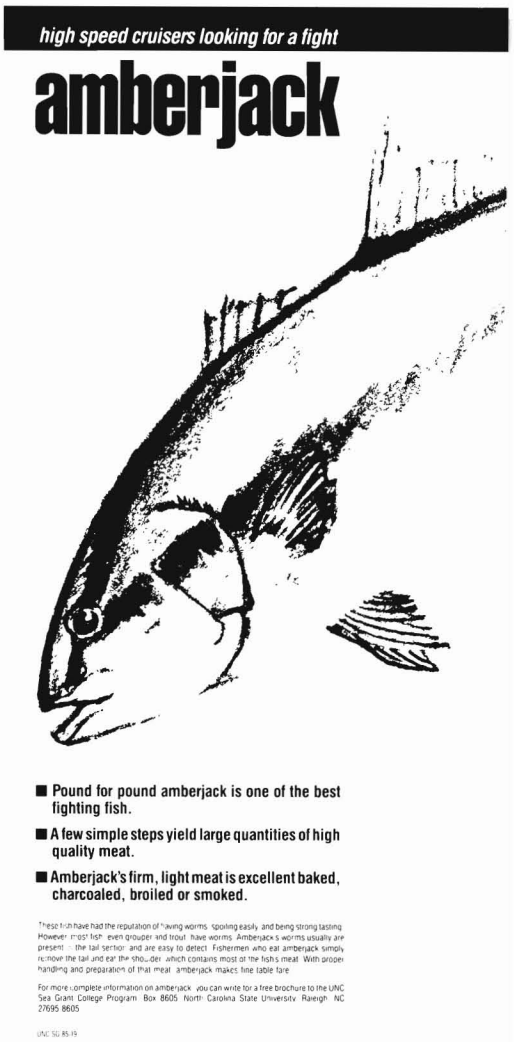
Where possible, we provided examples of the use of the underutilized species from other regions, countries, or from the commercial fishing sector. Examples here include mullet (highly utilized in Florida but not in Texas) and searobin (used extensively in Europe and one of the ingredients in classic French bouillabaisse). Also, a commercial fishery exists for crevalle jack in Florida, and the meat is frequently sold in Central and South American markets.

Additionally, our research in Part I provided clues as to how experienced fishermen used some of the species. For example, we found that ladyfish were targeted in a "powderpuff tournament" in Florida. Therefore, materials discussed the ladyfish as a candidate for "powderpuff," children's, and senior citizen's fishing tournaments in the Florida area.

Another strategy was to develop a combination of short idea-generating materials and more in-depth information for fishermen who take a more serious interest in a species. News releases, posters, and radio and television spots accomplished the former, while the brochures, recipe book, and tournament publication accomplished the latter.

A 21-minute slide-tape program with 133 slides was developed primarily for sportfishing club meetings. The professionally narrated program visually introduced the project and directed fishermen how to obtain the other materials. The program was also produced on videotape. Free copies were distributed to each Sea Grant program and state fisheries agency in the southeast region, as well as to the National Marine Fisheries Service and Sport Fishing Institute. Copies are available through the UNC Sea Grant Program for a 2-week loan or for sale (slide-tape, $65; video, $15). Accompanying the program is a teacher's manual, which describes the project and gives a third party (i.e., a sportfishing club program chairman) enough information to be able to introduce the program. The slide-tape has also been used by other groups (i.e., civic clubs, Boys Scouts, 4-H, power squadrons, and school groups).

A set of 12 posters, each highlighting major points about a different species, was developed for public places where fishermen were likely to gather. For example, the poster on skates and rays compared their flavor and texture with the highly prized scallop. It also provided in-



Amberjack poster.

structions on bleeding and icing skates and rays, tips on avoiding the barbs, and drawings showing a five-step method of dressing a skate. All posters directed readers to the UNC Sea Grant College Program for more information. To encourage retail stores to display the posters, they were professionally and attractively designed and brightly colored. Free posters were sent to bait and tackle shops, fishing piers, marinas, and charter and head-boat captains throughout the region.

Brochures were produced (12,000 each) for all 16 species, and they were the backbone of the educational materials. Each began by highlighting the major

messages about the species. Additional information was provided on each species' life history, tips on how and where to catch them, and data on preserving, dressing, and preparing them, including some recipes.

Because tournament fishermen were considered to be opinion leaders, we attempted to introduce underutilized species at traditional saltwater fishing tournaments. For example, we helped a traditional king mackerel tournament add a prize category for greater amberjack, and we developed an inshore tournament for crevalle jack, Atlantic spadefish, and skates and rays. Here, our aim was to determine if this appraoch had merit and, if so, to gain first-hand experience with it. A booklet titled "Using Nontraditional Fish in Saltwater Sportfishing Tournaments" by Murray et al. (1986) was published, and our results were discussed at the National Sportfish Tournament Directors Conference in Miami, Fla., in 1986.

Many of the problems associated with underutilization of marine fish by anglers center around a lack of information about a fish's edibility characteristics. Each brochure contained two or three recipes for a given species. These and other recipes were compiled in a recipe book (Murray and Taylor, 1976) which contains more than 50 recipes as well as tips on bleeding, icing, and dressing many of the species.

These materials provided reinforcement for a variety of other educational activities. They were used as handouts when addressing sport fishing organizations. They accompanied news releases to the print media. And, they served as a backdrop for boat shows, sportfishing shows, and other exhibits attended by large numbers of recreational fishermen.

Mailing Lists

The investigators felt strongly that if the program were to work, it must be pro-active rather than reactive. Besides developing the written materials, we developed mailing lists of sportfishing opinion leaders in the southeast region. Opinion leaders were identified as fishing pier owners, bait and tackle shop owners, members of sportfishing clubs, outdoor writers, marina owners, charter boat captains, tournament directors, Sea Grant advisory agents, and state and Federal fisheries agency personnel.

Sources used to compile the mailing lists included directories from the state and Federal fisheries agencies and Sea Grant institutions, and in some cases, telephone directory yellow pages. Over 2,000 opinion leaders were placed on our mailing list, and they received the brochures and posters, as well as the news releases about the other products.

Developing a Network of Educators

Recognizing that the project was geographically large and should be of long duration, we decided to form a network of educators in the southeast region who could work locally and continuously with their constituencies. To actively encourage their participation, we asked the directors of the Sea Grant Marine Advisory Services and the state recreational fisheries programs to appoint one person to act as liaison with this project. This gave us one university and one state agency contact in all eight southeastern coastal states. Of the 16 possibilities, we had 15 participating.

Funds were provided to cover their travel to an indepth, 2-day training program covering the research, the materials, and the potential uses of them. A meeting was held in Charleston, S.C., in 1985 for representatives of the south Atlantic states and in 1986 in New Orleans, La., for the Gulf states. The meetings were open to other educators and interested parties (i.e., Gulf Coast Conservation Association). At the end of the meetings we distributed bulk quantities of the written materials, news releases about the program, and materials for participants to take to their home state. Since agents are better known locally by the press, news releases from them were more likely to be printed. It also reinforced the role of the local agent as the conduit for information.

Results

Part I (Johnson et al., 1987) provided useful information on marine angler's perceptions of target and nontarget fishes. The information formed a solid basis for designing an educational program to increase use of underutilized species. It showed us where there was potential for improvement of a species' "image" or how improving the image could be accomplished by pointing out its similarities with more desired species. The procedures show how understanding the relationships among attributes can provide guidance in producing culturally appropriate descriptions of nontraditional species. They can help in identifying speices with the most potential for increased utilization and can provide critical guidelines for the production of educational materials.

Once the perceptions that influenced behavior were understood, a more effective educational program could begin. The overall goal of extension education is to stimulate behavior change. In essence, an educational effort should stimulate someone to do something different as a result of the information provided.

In this program, our long-range goal was to have 50 percent of the fishermen in the southeast region utilize new species of underutilized fish. As mentioned, this is a 10-year goal that will be difficult to evaluate even after 10 years. We are presently conducting a survey of individuals who have requested our materials to determine whether or not they changed their fishing patterns or use of fish as a result of their exposure to our program and materials.

While a formal evaluation of behavioral change has been launched, other quantitative and anecdotal evidence indicates that the program and materials have been well received. The slide-tape program was shown at least 35 times during 1986. This does not include the presentations that have been given by state agencies or agents who have access to the slide-tape program in their own states. An evaluation of the slide-tape program was sent to all individuals who used it. Of the 20 respondents, all recommended the program for showing to other groups similar to theirs.

The first series of 10 brochures was printed in December 1985. By December 1986, about 8,000 of the 12,000 copies of each brochure were distributed for a total of 80,000 brochures distributed in the first year of the program. Although some of the distribution was in bulk form

to agents, the majority were distributed by individual requests. During the first 3 months of the program we received an average of 500 individual requests per brochure per month[1]. The brochures also stimulated many letters and phone calls from fishermen. The print and electronic media were sent the brochures which triggered radio shows and newspaper and magazine coverage. For example, a daily St. Petersburg, Fla., newspaper covered the project and finished with a recommendation to contact the NMFS Southeast Regional Office in St. Petersburg for copies of the brochures. This generated over 200 phone calls and about 40 visitors to the SERO the following day.

The Scotts Hill, N.C., King Mackerel Tournament, which added a greater amberjack category for its 1985 tournament, was satisfied with the results and doubled the prize money for the species in 1986. They again asked UNC Sea Grant for assistance with news releases, filleting and cooking demonstrations, and brochures for distribution at the tournament. In 1986 three major king mackerel tournaments in southeastern North Carolina added greater amberjack as a prize category and two of the tournaments recorded 8,000 and 6,000 pounds of greater amberjack landings. Several underutilized species tournaments have developed in the Gulf region, and a tournament scheduled in the Tampa, Fla., area for 1987 will concentrate on ten underutilized species.

The recipe book retailed at the UNC Sea Grant printing cost ($2 per copy), and the agency had 1,000 individual prepublication requests for it. It also stimulated many articles by food editors in southeastern newspapers. Our materials were displayed at the Lobo Sportfishing Show in New Orleans, La., and the Miami Boat Show. Although a fair amount of interest was generated at the shows, we felt they were not a cost-effective way to alert the public to the program. Future attempts will be made to distribute materials through other sportfishing organizations which have booth space at shows rather than doing it on our own.

[1]According to the communications staff of the UNC Sea Grant College Program (personnal commun.), the brochures were the most popular UNC Sea Grant publications in the past 6 years.

Conclusions

1) Marketing research techniques can be used to understand attitudes of marine recreational fishermen. Too often, educational and promotional materials are developed without a full understanding of what the perceptions are that we are trying to change. By understanding the perceived positive and negative attributes of the various species fishermen catch, we were better able to structure the educational products to overcome the negative perceptions or to enhance the positive ones.

2) Where appropriate, research and extension should be built into a project like this one from the beginning. The investigators on this project represented both the research and extension communities. The extension component was able to help structure the research, and the researchers were able to help the extension component implement the research findings. Often, research is done without a clear view of implementation of the findings. Similarly, extension is often done without a firm research base upon which to build the educational efforts. This project included the total package from the beginning, thus avoiding these potential problems.

3) Judged similarities of fish were obtained from recreational fishermen and their perceptions were used in the educational materials and program. This format added to the credibility of the materials.

4) A multifaceted educational program allows the educator to reach a greater audience. The materials targeted different sportfishing audiences. When trying to reach a large and diverse audience, it is beneficial to categorize the population and target different materials to these different segments. It is also important to develop a good mailing list. Rather than waiting for the clientele to contact us for information, the opinion leaders were identified and were sent the materials unsolicited.

5) Training others to become familiar with the entire program is an important step in getting others to use it. Most extension agents and educators are quite busy conducting their routine programs. A news release is not generally sufficient to interest someone to discontinue one program and begin another. Providing in-depth training sessions and paying travel expenses to attend will help make educators active participants in the program. This will generate enthusiasm, a better knowledge of the goals and objectives, and greater utilization and dissemination of the information.

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