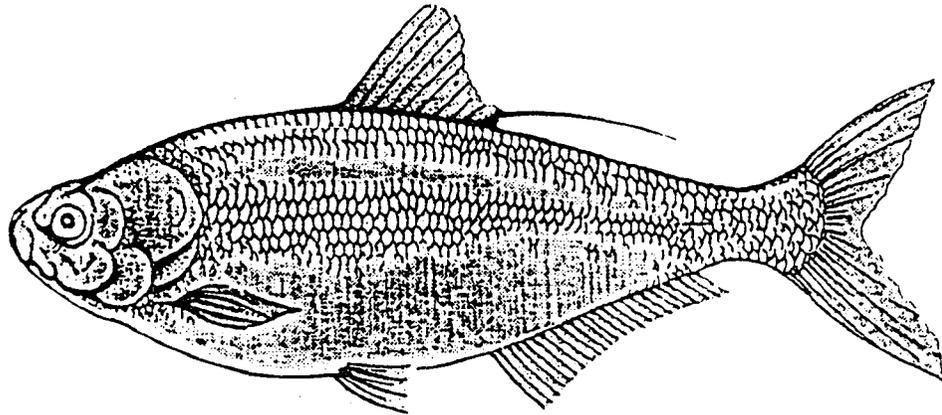

ROUGH FISH MARKET SURVEY
FINAL REPORT

JANUARY 1990 — OCTOBER 1990



GIZZARD SHAD

Dorosoma Cepedianum



TROPHIC STRUCTURE MANIPULATION PROJECT
PHASE III FISH MARKETING STUDY
SWIM 10-150-01-43-213

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ROUGH FISH MARKET SURVEY
FINAL REPORT
1991

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Palatka, Florida

1991

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TABLE OF CONTENTS

Title	Page
I. Introduction	1
II. Existing Markets For Whole Fish Product.	2
General Information	2
State Survey	2
Conclusion	2
III. Food Source Component Markets..	3-13
General Information	3
Product Development	4
Product Evaluation	5-9
Domestic Markets	10
International Markets	11
Conclusions	12
Special Note	13

Title	Page
IV. Industrial Market Applications	14-19
General Information	14
Preliminary Analysis - Whole Gizzard Shad	14-16
Preliminary Analysis - Fresh and Frozen Bait	17
Preliminary Analysis - Industrial Uses	
Fish Meal	17
Pet Food	18
Fertilizer	18
Pelletized Bait Forms	19
Conclusion	19
 V. Attachment I	
Survey Forms and Results	
 VI. Attachment II	
Canning and Deboning Process	
 VII. Attachment III	
German International Market	

TROPHIC STRUCTURE MANIPULATION PROJECT

PHASE III FISH MARKETING STUDY

SWIM 10-150-01-43-213

FINAL REPORT

JANUARY 1990 - OCTOBER 1990

I. INTRODUCTION

The St. Johns River Water Management District contracted with the Bureau of Marketing and Extension Services of the Department of Natural Resources (the Bureau) for a fish marketing study of the gizzard shad. The ongoing programs of the Bureau of Marketing provide assistance in the development of fish and seafood products through market research, product research and development, public education and information, and extension activities regarding seafood, qualifies the Bureau as an appropriate and knowledgeable contractor.

The scope of the project is defined by the tasks outlined below:

- (1) Determine values and locations of existing markets for a whole fish product.
- (2) Examine potential domestic and export markets for food source components derived from gizzard shad.
- (3) Investigate potential for industrial market applications from harvested fish.

DETERMINE VALUES AND LOCATIONS OF EXISTING MARKETS FOR A WHOLE FISH PRODUCT

GENERAL INFORMATION

Gizzard shad is distributed throughout the eastern seaboard and gulf states of the United States. Gizzard shad, nanny shad and stink shad are local names of the subject fish of this study.

The Bureau reviewed available information on the utilization of shad in the United States and contacted retail and food service operations in the southeast and northeast for information on current productions and market status of shad.

STATE SURVEY

The Bureau reviewed current production and market status of the gizzard shad by a survey conducted in seven states: Florida, Georgia, North Carolina, Virginia, Maine, Maryland, and Massachusetts. Survey forms requested information on shad in general with specific questions concerning knowledge of production and markets for gizzard shad.

Survey forms and results are shown in Attachment I.

CONCLUSION

The survey information and follow-up interviews revealed limited use of gizzard shad as bait for crab traps with an ex-vessel price of around five cents per pound.

**EXAMINE POTENTIAL DOMESTIC AND EXPORT MARKETS FOR FOOD SOURCE COMPONENTS
DERIVED FROM GIZZARD SHAD**

GENERAL INFORMATION

The Bureau initially evaluated gizzard shad in three (3) component parts; fish flesh, roe, and gizzard. Fish in both fresh and fresh-frozen form were analyzed in the Tallahassee test kitchen, and the laboratory in Gainesville. The staff analyzed market opportunities for gizzard shad in relationship to markets for American shad, a similar fish with limited food value.

Domestic market research focused on the North Carolina and Virginia area, the heart of the American shad fishery, including visits to wholesale dealers in North Carolina. Gizzard shad is a by-product of the herring pound-net fishery in those two states. As is the case in Florida, most states have large quantities of gizzard shad; however, the production is low due to limited market demand. The gizzard shad has not been considered a food fish and therefore is viewed with low regard. This attitude regarding the fish prompted the Bureau to devote more attention to product research seeking alternative processing and cooking methods to develop an acceptable product. The Gainesville staff processed the fish in both a canning and a deboning process. The processes are shown in Attachment II.

International markets were investigated with Mr. Karl-Hans Mau in Germany and Florida exporters doing business in Japan. Letter campaigns, personal visits, and sample shipments were initiated to generate interest and evaluate market opportunities. A complete report of the activity in Germany is shown in Attachment III.

PRODUCT DEVELOPMENT

Fresh or Fresh Frozen Shad: The staff processed 60 lbs of fresh shad and 50 lbs of frozen shad. The weight of each fish was recorded, as was weight of both the roe and gizzard. Shad was prepared several different ways in an attempt to remove the bones. The bone structure is extensive, making filleting impossible. The whole fish with the backbone removed was baked. During the cooking process the shad gave off a strong, non-offensive odor. Thin leather-like bones were so numerous the meat could not be easily separated. The fish had a moderate to strong flavor typical of most fish with high fat content. The baked fish was not tested on a consumer panel because of the numerous pin-bones present.

Deboning of shad after the fish had been headed, gutted and scaled, produced a minced product which represented 60% total weight of the fish. The flesh had an acceptable appearance and taste. One company in Canada showed interest in minced shad. The company, CAN-USA-FISH Products, is seeking an additional 30 million pounds of fish product. Contact with the Canadian company has been established and interest will be maintained.

Shad roe: Shad roe were prepared fried and poached. Taste test results were comparable to that of herring roe or American shad roe. The gizzard shad roe does not hold together as well as mullet roe and is smaller (approximately 2 ounces). The flavor of shad roe and its potential use as an hors d'oeuvre makes it a good candidate for market. (The shad tested were produced from Lake Denham. More research should be done on the fish from Lake Apopka to test for flavor differences.)

Product development continued with the canning of both the fish and roe. The Perry/Wynn Fish Company in North Carolina produced 15 cans of shad roe for testing and the Gainesville laboratory canned dressed shad as outlined in Attachment II.

Fresh shad gizzards: Fresh shad gizzards were prepared and found to be similar in taste to mullet gizzards, and about half the size. The gizzards were tender with a slight "off" flavor. Taste tests of the gizzards were sufficiently positive to warrant the exploration of the introduction of shad gizzards into market channels for mullet gizzards.

CANNED GIZZARD SHAD

7/30/90 65 cans shad meat canned in Gainesville

21 cans shad, canned in BBQ sauce

24 cans shad, canned in saltwater

20 cans shad, canned in tomato sauce

8/2/90 Served shad canned in BBQ sauce with lettuce, as a salad.

SCORECARD: Appearance 2 excellent, 1 very good, 3 good

Flavor 2 excellent, 1 very good, 2 good

Texture 2 excellent, 1 very good, 3 good

9/27/90 Served shad canned in BBQ sauce with added sauce on toasted garlic bread. Served shad canned in tomato sauce in traditional fish salad recipe.

SCORECARD: Appearance 2 excellent, 1 very good, 3 good

Flavor 2 excellent, 1 very good, 2 good

Texture 2 excellent, 1 very good, 3 good

7/31/90 Opened one can each of shad in BBQ sauce, saltwater, and tomato sauce.

COMMENTS: Backbone in smaller fish could be eaten. Larger fish backbones were too firm. Saltwater pack had strong, fishy smell. BBQ was most flavorful. Had a slight after taste (dry), meat looks oily.

11/13/90 6 cans sent to Florida seafood dealers for evaluation as export item to Third World Countries.

A taste panel of 12 students in the Food Science and Human Nutrition Department at the University of Florida evaluated the canned shad.

Score 1-5 1-excellent 5-unacceptable

Barbecue Sauce

	TASTE	APPEARANCE	ODOR	TEXTURE
1	2	4	1	3
2	1	3	1	2
3	2	2	2	3
4	2	3	1	2
5	3	4	2	4
6	4	4	2	4
7	1	3	2	3
8	2	3	2	2
9	2	3	1	3
10	3	3	2	3
11	1	2	1	2
12	3	2	2	3
AV.	2.2	2.8	1.6	2.8

Tomato Sauce

	TASTE	APPEARANCE	ODOR	TEXTURE
1	2	4	2	2
2	3	3	1	2
3	4	2	2	3
4	2	4	3	4
5	2	4	2	4
6	4	5	2	2
7	3	4	3	3
8	4	3	2	4
9	3	2	1	3
10	3	3	4	2
11	1	4	1	2
12	2	4	2	3
AV.	2.8	3.5	2.1	2.8

Saltwater

	TASTE	APPEARANCE	ODOR	TEXTURE
1	2	4	3	3
2	3	4	3	2
3	3	3	3	2
4	3	3	2	2
5	3	4	2	3
6	4	4	3	4
7	2	5	4	2
8	2	3	2	3
9	3	3	4	3
10	3	3	3	2
11	2	3	3	3
12	3	2	2	2
AV.	2.8	3.4	2.8	2.6

11/16/90 30 cans of shad meat remain in the Tallahassee test kitchen for further testing and distribution as requested.

PRODUCT EVALUATION

CANNED SHAD ROE

4/10/90 Can #1 was used in the Tallahassee test kitchen. Shad roe was microwaved with egg whites and seasonings.

Comment: Mild pleasant odor. Typical roe texture, non-fishy taste. This method could be improved with more testing.

4/24/90 Can #2 was used in the Tallahassee test kitchen. Sieved to separate eggs. Soaked in salt, rinsed and put in airtight container for Caviar recipe. Was stored for one week.

Comment: Eggs did not swell and remained firm. Slight fishy odor after one week. This recipe was not acceptable.

5/15/90 Can #3 was sent to Walt Godwin.

5/15/90 Cans #4 and #5 sent to Sigma International Inc.--Danny Woodson

5/23/90 Can #6 was used for Shad Roe Recipe Hors D'oeuvre. Five taste testers called. Recipe and score follows:

SHAD ROE RECIPE CAVIAR STYLE

8 ounces shad roe, cooked
8 ounces cream cheese, softened
1 teaspoon salt
1/4 teaspoon pepper

Combine all ingredients; mix well and chill. Serve on sliced cucumbers, assorted crackers.

SCORECARD FOR SHAD ROE RECIPE CAVIAR STYLE

APPEARANCE 2 EXCELLENT, 2 VERY GOOD, 1 BORDERLINE
FLAVOR 1 EXCELLENT, 2 VERY GOOD, 1 GOOD, 1 SLIGHTLY FAIR
TEXTURE 1 EXCELLENT, 2 VERY GOOD, 1 BORDERLINE, 1 FAIR
COMMENTS: TASTE FLAT - GRAINY TEXTURE

9/27/90 Cans #7 and #8 were used in Shad Roe Recipe Caviar Style in
Tallahassee test kitchen for Japanese seafood buyers.

SCORECARD FOR SHAD ROE RECIPE CAVIAR STYLE

APPEARANCE 2 EXCELLENT, 2 VERY GOOD, 1 GOOD
FLAVOR 2 EXCELLENT, 1 VERY GOOD, 2 GOOD
TEXTURE 2 EXCELLENT, 2 VERY GOOD, 2 GOOD

10/25/90 7 cans remain in Tallahassee test kitchen for testing and
distribution as requested.

DOMESTIC MARKETS

The Bureau feels the potential domestic fresh fish market for whole gizzard shad is low. Given the traditional taste for a white flaky fish with no bones, the marketability of whole fresh gizzard shad appears doubtful.

Canning of gizzard shad offers greater opportunities for developing a market for the fish. Processing the meat in a canned form, or a minced form, will provide more utility for home consumption and lend itself to possible introduction in mass feeding programs such as hospitals and prisons. A great deal more work is needed, but the potential for markets is much greater with canned or processed products. Market acceptance appears favorable.

Shad roe has market potential in both the fresh and canned form. Marketing efforts for gizzard shad roe should engage a multi-media program directed at both the retail and food service levels. The approach should be developed utilizing recipe brochures and food styling photography in electronic and print media. Professional chefs are actively seeking new products and show a willingness to use fresh shad roe. Introducing shad roe through the American Culinary Federation may present a key opportunity. Existing markets for mullet roe and mullet gizzards will continue to present an entry point for opportunities to market gizzard shad. Seafood dealers in mullet roe and gizzards should be invited to further explore this emerging fishery. The beginning of the shad roe season in late winter may be a timely rotation for mullet dealers to develop markets for shad roe and gizzards.

INTERNATIONAL MARKETS

The staff made initial contacts in Europe and Japan for gizzard shad. A complete report on the German effort is found in Attachment III. Frozen and canned samples were sent to interested companies. The Bureau will follow through on all leads to attract German and European interest in this project.

Shad gizzards were sent to Sigma International for market evaluation Taiwan and Japan. The results of the evaluation were negative. The taste was considered too strong with a "muddy" flavor. The company stated that fish quality was poor and could have impacted the evaluation (see page 13). Plans are to evaluate a second sample ensuring maximum quality care in handling, processing, and freezing gizzards for shipping. Even with the negative reaction to the first samples, interest in the gizzards remains positive from Japanese companies.

The international market potential for fresh shad and component parts appears to be low at this point. Shad samples will be evaluated in Europe for use in pickling processes similar to locally popular herring fish. International markets for similar species exist in both Europe and Japan. To follow this interest, the Bureau will use one or both of the following approaches: First, major processors in Europe will be invited to work with local dealers or fishermen to develop this fishery. Secondly, local dealers need to communicate production and selling prices. As shown in the export report on shad in Europe, the contacts are interested in samples and prices. The Bureau has sent information as a test market, leaving the question of production and prices a subject of negotiation.

CONCLUSION

Market research conducted for gizzard shad indicates low interest in the potential use of whole fresh or frozen fish. The potential of both the domestic and international markets appears to increase with the further processing of the fish such as canning and deboning.

The domestic and international market potential for the gizzard and roe appears to be positive. The product tested from good to excellent in taste tests, and comparable acceptance to mullet and herring roe was indicated. The export market for mullet roe in 1989 reached \$14.00 to \$16.00 per pound. Mullet gizzards reached market levels of \$2.50 to \$3.00 per pound. If the price remains stable for mullet roe and gizzards, a similar product such as shad, should receive positive market interest with the taste being similar and the price attractive.

Canning of both fish and roe increases the market potential for shad, both domestically and internationally. Taste tests support general acceptance of the canned product using different sauces. Future product development would most likely be carried out through cooperative private/state ventures with existing canneries in North Carolina. Regional fisheries development would greatly increase production and assure supply during peak seasons. The development of this fishery in the southeast would increase the likelihood of additional funding and marketing support.

Minced or deboned shad has the greatest potential for development. The use of shad would be year round and the markets support high volumes of fish. The minced product would be compatible with gizzard and roe market development. The ex-vessel price for shad entering the minced market appears to be about 15 to 20 cents per pound. The roe and gizzard could add additional value, assuming the price for shad products captures half the market price of mullet roe and gizzards. Mincing of shad would require that deboning equipment be available in Florida near the point of production to process large quantities of fish and to ensure top quality.

SPECIAL NOTE:

Production capacity and the ability to produce a fish product of high quality will be a major problem. Shad requires extreme care in handling to prevent loss of quality. This study has found that the routine icing on board vessels may not guarantee a quality product. Ice slushes may be required to maintain quality acceptable to food-grade standards.

INVESTIAGE POTENTIAL FOR INDUSTRIAL MARKET APPLICATIONS FROM HARVESTED FISH

GENERAL INFORMATION

The staff approach to this task was to go beyond the traditional use of gizzard shad as blue crab bait and update information on uses in other trap fisheries and industrial operations.

PRELIMINARY ANALYSIS-WHOLE GIZZARD SHAD

Analyses were done at the University of Florida. Four whole gizzard shad were blended together and mixed thoroughly. Aliquots of this mixture were used to obtain the following data:

Moisture Content (determined by using a moisture balance instrument from CSC Scientific Co., Inc.)

Approximately 3 grams of mixed sample were placed on a disposable weight pan and placed in a moisture balance. The balance was allowed to equilibrate and the moisture content was read. This analysis was done in triplicate.

<u>sample</u>	<u>% moisture</u>
1	71.0
2	72.0
3	71.0
mean	71.4 ± 0.016

Protein Content (Total Kjeldal Nitrogen)

<u>sample</u>	<u>wt (g)</u>	<u>ml HCl</u>	<u>% protein</u>
1	1.89	37.0	17.13
2	1.94	37.6	16.99
3	2.18	42.9	17.26
4	2.20	41.9	16.64
mean			17.00 ± 0.016

$$\% \text{ protein} = (\text{ml HCl}) (0.1\text{N HCl}) (0.014) (6.25)$$

Phosphorus

Three samples (approximately 6.0 grams each) were ashed. The ash was resuspended in distilled water. Ten milliliters of the suspension was analyzed for phosphorus.

<u>sample</u>	<u>sample wt. (g)</u>	<u>ash wt. (g)</u>	<u>mg p/100g fish</u>
1	6.08	0.331	161.7
2	6.00	0.385	146.8
3	6.07	0.404	70.5
mean			126.3 ± 0.387

Calcium (AOAC Standard Method)

Approximately six grams of the mixed sample was ashed in triplicate. The ash was resuspended in 100ml of distilled water. Ten milliliters of this suspension was analyzed on a atomic absorption spectrophotometer.

<u>sample</u>	<u>sample wt. (g)</u>	<u>ash wt. (g)</u>	<u>mg Ca/100g fish</u>
1	6.05	0.274	302
2	6.07	0.325	267
3	6.20	0.190	286
mean			285 ± 0.061

Fat Content (AOAC Method 18.014)

Ten grams of mixed sample was put into Paley-type Babcock cheese bottles. Forty milliliters of reagent (20ml acetic acid + 20ml 70% chloroform) was added. The samples were placed in a water bath for twenty minutes and swirled occasionally to mix. When the samples were removed from the water bath, reagent was added until fat was in the calibrated neck of the bottle. The samples were then centrifuged 2 minutes at 600 rpm and % fat read.

<u>sample</u>	<u>sample wt. (g)</u>	<u>% fat</u>
1	10.00	9.2
2	10.00	12.6
3	10.00	10.1
mean		10.60 ± 0.166

ASH (AOAC method 18.008)

Approximately six grams of the mixed sample was ashed in a muffle furnace at 525°C overnight.

<u>sample</u>	<u>% ash</u>
1	5.4
2	6.4
3	6.7
4	4.5
5	5.4
6	3.1

PRELIMINARY ANALYSIS - FRESH AND FROZEN BAIT

Much of the gizzard shad used for bait go through Stokes Seafood Company in Leesburg, Florida. Mr. Stokes was requested to send samples of shad to fishermen in Monroe County for evaluation as bait in the lobster, shark, and stone-crab fisheries. Preliminary results show the fish is too soft for use as shark bait and its worth in lobster and stone-crab traps had mixed reviews. Additional information obtained with follow-up calls along the gulf coast indicate higher spot markets for shad as stone-crab bait in the Panhandle area during winter months. The general feeling of fishermen is that shad is a good attractant for stone crabs, but too soft when compared to other types of available baits.

PRELIMINARY ANALYSIS - INDUSTRIAL USES

FISH MEAL

The staff contacted five companies to process gizzard shad into fish meal. Fish meal is used to supplement food for cattle, hogs and poultry. The key requirement for fish meal is high protein content. Shad yields 15% to 18% protein. The following list indicates the companies and their evaluation of gizzard shad:

Florida Food Products
Eustis, Florida
Mr. Tommy Brown

Mr. Brown felt the unit cost of the raw product was too high to be profitable at five to eight cents per pound.

Liquid Fish Inc.
Bondrel, WI
Mr. Ray Couchaine

Mr. Couchaine indicated shad would not be profitable for their use.

Zeigler Brothers, Inc.
Gardners, PA
Mr. Ken Shafer

Mr. Shafer commented that the protein content was too low for their use and the price for the raw product would equate to five cents per pound.

Griffin Industries
Starke, Florida
Mr. Roger Jones

Mr. Jones stated that his rendering plant utilized only donated products. It would not be profitable for him to buy fish.

A company in Reading, Pennsylvania has developed an enzyme process to break down whole fish into fish meal. The company produces a food supplement without the cost associated with a cooking and evaporating process. The company has mobile equipment and could increase the potential for processing of shad and shad waste.

One of the by products in the manufacturing of fish meal is fish oil. The use of fish oils in certain foods is currently being evaluated by the Food and Drug Administration. The Food and Drug Administration's approval of fish oils in foods such as margarine could open up new opportunities for the use of shad.

PET FOOD

Several pet food manufacturers were contacted about the use of gizzard shad in their products. The general reply was that they receive most of their raw products free of charge and would not be interested in buying fish.

FERTILIZER

The process used to manufacture fertilizer from fish is the same process used for fish meal. The fact that gizzard shad are high in minerals makes it suitable for fertilizer. Menhaden fisheries currently supply this industry with high volumes of fish. Costs associated with production of lake fish coupled with transportation costs make shad too expensive for use in fertilizer.

PELLETIZED BAIT FORMS

The potential for gizzard shad as a bait appears to be limited. The Bureau had gizzard shad samples ground and pelletized, creating a bait which would be stable at room temperature and easily handled by fishermen for use in traps. This process would eliminate the problem of the fish being too soft for use in traps. While the process of pelletizing baits for use in aquaculture is widespread, the development of a long-term crab bait would require additional study. In addition to pelletizing of shad into bait blocks for blue crab, other types of bait blocks for lobster, stone crab, and fish chum could have increased potential. Fishermen would welcome the development of a shelf stable bait.

CONCLUSION

The industrial use of shad competes with many products currently on the market at a price and quantity in the range of three cents per pound. This market has improved in the last several years with current fish meal prices at approximately \$400.00 per ton.

The market does not appear to support ex-vessel prices higher than five cents per pound except on spot markets. Several changes could impact this market. First, the use of fish oils in food production would be a major advantage. Second, enzyme processing would reduce labor and energy costs, and make it possible to produce fish oils and fish meal on or near processing locations. Third, the use of pelletized bait forms could add value to the shad market. Pelleting has generated interest and hopes are to encourage private/state groups to further develop this process.

ATTACHMENT I

MARKET SURVEY
FOR
GIZZARD SHAD (*Dorosoma cepedianum*)

(Please print or type)

PRODUCTION

Does this fish or a similar shad occur in your State? _____ Yes _____ No

Do you produce commercially? _____ Yes _____ No

IF YES:

SPECIES NAME _____

AMOUNT PRODUCED _____

SEASON _____

EX-VESSEL PRICE RANGE PER POUND _____

PROCESSING

THE NAME OF COMPANIES THAT PROCESS SHAD (i.e. freeze, cut roe, fillets, etc.)

(Additional companies may be listed on back)

MARKET FORM

WHOLE FISH _____

FILLETS _____

BAIT OR INDUSTRIAL USE _____

ROE PRODUCTION

PEAK MONTHS _____

DISTRIBUTION: Local U. S. Markets Foreign Markets

Please Return To: SEAFOOD MARKETING
FLORIDA DEPARTMENT OF NATURAL RESOURCES
2051 EAST DIRAC DRIVE
TALLAHASSEE, FLORIDA 32310-3760
FAX: 904/488-1254

ATTACHMENT I

SURVEY RESULTS ON UTILIZATION OF SHAD SPECIES

1. GIZZARD SHAD

A. Does gizzard shad occur in your State's inland waters?

Yes: Georgia, Maryland, North Carolina, Virginia, Florida

No: Maine, Massachusetts

B. If yes, is there a commercial fishery for gizzard shad in your state?

Yes: North Carolina, Virginia, Florida

No: Georgia, Maryland

C. If there is, what were total landings and ex-vessel value in the latest available year?

North Carolina: 1988, 133,926 pounds valued at \$ 6,693.00

Virginia: 1989, 614,502 pounds valued at \$ 46,168.00

Florida: 1988, 1,877,471 pounds valued at \$262,846.00

D. If there is, what are the peak production months?

North Carolina: All year

Virginia: January, February, December

Florida: January, February, March

E. If there is, what are landings used for? Markets?

North Carolina: Bait, U. S. Local

Virginia: Bait, U. S. Local

Florida: Bait, Local

ATTACHMENT I

SURVEY RESULTS ON UTILIZATION OF SHAD SPECIES

Page 2

OTHER SHAD SPECIES

F. Are there commercial fisheries for other shad species in your State?

Georgia: American Shad, used for food, whole

Hickory Shad, used for food, whole

Market: local, regional, national, possibly
foreign

Maine: American shad, used for food, fillets

Market: Regional, national

North Carolina: Hickory shad, used for food, roe

Roe Shad, used for food, roe and bucks

Market: U. S. East Coast

Virginia: American Shad, food, whole and roe

Industrial, bait

Market: Regional, national, foreign

Florida: Gizzard shad, bait

Market: Local

ATTACHMENT II

ATTACHMENT II

CANNING OF SHAD MEAT

General Canning Process

(This is the process that was used at the University of Florida unless otherwise stated.)

1. Clean and wash dressed fish thoroughly. (whole meat with bones)
2. Cut fish into 1-inch chunks.
3. Pack fish into cans.
4. Heat sauces: 50° C. to 75° C.
5. Pour hot sauce into cans, leaving 1/2 inch headspace
6. Seal cans.
7. Place in retort.
8. Process using determined method.
9. Allow to cool.
10. Enjoy.

ATTACHMENT II

Page 2

Estimated Cost Analysis For Canning Process

(Fish dressed and ready to be packed in cans)

Production

Pack, seal and process

optimum - 60 cases/hr

realistic - 50 cases/hr

(The realistic figure takes into account equipment breakdowns, faulty cans, etc. . .)

The realistic value was used for this analysis.

(A case of cans consists of 24 cans, size 300 X 407 in this analysis)

Labor

To process 50 cases/hr

1 supervisor \$10.00 to \$12.00/hr

5 people at minimum wage \$3.85/hr

= approximately \$0.60/case

Incidental

Case of 24 cans (300 X 407)	\$4.56/case
Cartons	\$0.25/case
Electricity & steam	\$0.25/case
Loading/moving product	\$0.10/case
Labeling/sealing case/stack	\$0.50/case
Labels \$12.00/1000	\$0.30/case

Estimated Total Cost \$6.56/case .27/can

This cost is low and represents a nonprofit margin.

ATTACHMENT II

Page 3

DEBONING OR MINCING OF SHAD

1. 44 pounds of whole gizzard shad were scaled in an automatic fish scaler
2. Shad headed and eviscerated by using a band saw
3. 25 pounds of dressed shad meat was processed in a Baader Fish Processing Machine
4. Process yielded 20 pounds of deboned product

ATTACHMENT III

Karl-Hans Mau
International Consultant

103400 Overseas Highway, Suite No 2
KEY LARGO, FL 33037
USA
Tel. (305) 451 6226

Wirtheimer Straße 18
D 6480 WÄCHTERSACH
Germany
Tel. 011-49-6053-9476

Department of Natural Resources
Seafood Marketing
Attn. Janice Ralph
2051 East Dirac Drive
Tallahassee, Fl. 32390

September 12, 1990

Dear Charly,

Attached please find my report covering the last two months. I hope you will find it useful in the further work concerning the export of fish from Florida. The companies who are interested in receiving a sample of the Rex Eel are marked. Full addresses are in the attached list of names.

If you have any questions concerning any one of the companies I have spoken to, I will gladly give you any information available to me.

Attached please find the original invoice for the business cards and I would appreciate your transferring the according funds in US Dollars to my account, as discussed.

Let me thank you very much for the opportunity to do this work for you and would be pleased if we could find a way to continue. I think we have only started and have not even scratched the surface of the opportunities which Europe offers to the serious exporter. It will take a lot of effort, but promises very good rewards.

I hope that you are satisfied with my work and will give me the opportunity to continue to support you.

Sincerely,

Karl

**EXPORT
OF
REX EEL AND GIZZARD SHAD
TO
EUROPE**

**Purchase Order 116032
REPORT FOR THE PERIOD
JUNE 18 - AUGUST 19, 1990**

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Miami, Fl. 33101
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TABLE OF CONTENTS

Introduction	1
General	2
The German Economy	2
The Fish Industry	3
The Fish Industry and Fish Wholesalers/Importers.	3
Quality Control	3
Taxes	3
Contingents	4
Marketing	4
German Democratic Republic (GDR)	5
Competitiveness of the GDR Fish Producing Industry	5
EEC and Nordic Countries	6
The Herring in West German Statistics	6
Production, Sales and Supply	6
Prices	7
Employment	7
Imports	7
Contacts	8
Conclusion	10
Further Actions	11
Information - Material	11
Letter Action	11

1. Introduction

The limited time and resources available for this project suggest that the survey should be undertaken for one country only as an example. The whole project can only touch the surface and any details can only be treated as a small part of a rather comprehensive picture. For that reason and due to its importance as a fish consuming country, Germany was selected.

Due to problems encountered in the US, to establish a list of qualified German potential importers, processors and distributors, the trip to Europe had to be started without the planned letter action, which proved not to be a disadvantage after all, as the results show.

Business cards were ordered and received in Germany.

Research concerning fish imports, processing and distribution in Germany revealed the situation as described on the following pages.

2. General

2.1. The German Economy

The uninterrupted economic boom in Germany continued in its seventh year. The increase of the GNP of 4 % represents the highest increase in the eighties. With 28 million gainfully employed the highest level of employment in German history was reached in 1989, while unemployment was reduced by 1 % compared to the previous year. The shortage of qualified labor is becoming an ever increasing problem.

The unprecedented and unforeseen political changes in Eastern Europe and especially in Eastern Germany present a new challenge for Germany. As 17 million people of the GDR (East Germany) have to be integrated into the free enterprise system of West Germany. This challenge does not only represent a heavy burden on the West German economy, but it also offers opportunities - not only for German entrepreneurs - the extent of which can hardly be overestimated.

Besides the integration of East Germany into West Germany several hundred thousand persons from all over the world (as far as India and Africa) are asking for, and are being granted, asylum in Germany and are taxing the West German social security system.

3. The Fish Industry

3.1. The Fish Industry and Fish Wholesalers/Importers.

The Report of the Association of the German Fish Industry and Fish Wholesalers issued in June 1990 indicates that the considerable problems (*Nematodes*) which were encountered in 1987 have been overcome and the drastic reduction in fish consumption as a result thereof, could be counteracted in a combined effort of all concerned. In 1989 consumption in Germany has reached a new high (13.5 kg/person = 29.7 lbs/person) and has now surpassed the record figures of 1986, the year before the problems with *Nematodes* escalated.

These efforts were conducted by the Association of the German Fish-Industry and the German Government, and resulted - in cooperation with the fish-industry, scientists and the different associations concerned with fish-catches, imports, processing, distribution and trade - in new laws and controls. Amongst others the Institute for Biochemistry and Technology as well as the State Veterinary Department are charged with the supervision of these new laws and codes. These rules apply also to the *Shad* and the *Rex Eel* as well as to their related products. Specifics will be attached to this report. (*Fisch-Verordnung vom 8.8.1988*).

3.2. Quality Control

Special emphasis is being put on quality control in order to maintain and improve the image of fish in general. This concerns freshness of the product as well as the temperatures at which fish has to be transported and kept. Here a very important number is to be achieved in the foreseeable future: +4° C, but it is appreciated that reducing the temperature alone will not be the solution to the problem. The uninterrupted cooling chain is considered to be the critical point of the problem.

3.3. Taxes

The ASSOCIATION OF GERMAN FISH-INDUSTRY AND FISH-TRADE is very active in all legislative committees of Germany and EEC and is determined to assist in the procurement of sufficient raw materials for their members. As Europe and especially Germany is dependent on imports from Third Countries (any country outside the EEC) this association is fighting to reduce taxes and import duties as well as to increase the quotas for imports. The main adversaries in this respect are the newer members in the South of the EEC who consider the protection of EEC-fishermen

to be more important than the supply of the EEC population with the low price commodity fish.

Specifically under attack, by the German Association within the EEC, is the taxation of fish imports from Third Countries which concern fish not caught within the EEC or by EEC member countries, as these taxes are considered without protective function and are antisystem elements of free trade.

Efforts to drop or reduce import taxes and to achieve an unlimited (in reference to time and quantity) import from Third Countries are on the way and are being negotiated with the German Government.

3.4. Contingents

Proposals to reduce the tax tariffs for certain *herring* raw materials have been rejected again by the EEC commission. The GATT herring contingency of 34.000 metric tons per year is considered to be sufficient, but the sharp drop in quotas to be caught in the North Sea will necessitate a change in those figures.

3.5. Marketing

On all fish whether caught at sea, imported or raised in aquaculture an amount equivalent to 0.25 % of the value is collected and specifically earmarked for advertising and marketing efforts by the Association.

Considerable efforts are being undertaken concerning the information of consumers in respect of nourishment-physiology and convenience aspects of fish consumption.

Public reactions in respect of *Nematodes* have had a considerable impact on the demotionalization (Versachlichung) of the discussion of the *Nematode* problem.

Since July 1, 1990, when the GDR was opened for general trade, old and traditional markets are again available to the West German fish industry and importers. The present GDR fish industry has already several agreements with West German companies. Since the fall of "The Wall" sales of deep-frozen fish, canned fish, marinades and other products have dramatically increased.

3.6. German Democratic Republic (GDR)

At the same time the authorities in the GDR (Ministerium für Land-, Forst- und Nahrungsgüterwirtschaft, Ministerium für Gesundheitswesen, Ministerium für Bezirksgeleitete Industrie und Lebensmittelindustrie der DDR) issued rules for the determination of the presence of *Nematode Larvae* in fish and fish-products with specific information concerning the *herring*.

3.6.1. Competitiveness of the GDR Fish Producing Industry

Up to now it was very difficult to get any information concerning productivity, production or other information concerning the GDR Fish Industry. Since July 1990 certain information is available and shows the following situation:

Consumption per person in West Germany and the GDR based on the raw material quantities are in both countries on a similar level.

The main fish species are: *Herring, mackerel, and fresh water fish.*

Production of fresh fillets and deep frozen products is low. Smoked fish, marinades, and canned fish have definite significance.

Although specialists consider the **quality** of products to be similar to West German standards, packaging appears to be at a significant disadvantage (sales support, user-friendliness).

Considerable disadvantage in respect of competitiveness is apparent as the **technology** of the industry are outdated and machinery is overaged.

Sales and **distribution** are at a considerable disadvantage due to the previous system and the completely insufficient infrastructure for fish distribution (communication, transport means and transport system).

At present some 20,000 persons are **employed** in the GDR fish industry, but it is feared that a large number will be unemployed due to a restructuring of the industry. It is assumed that this restructuring will take the best part of five years.

3.7. EEC and Nordic Countries

During recent years inter-EEC agreements have been reached as well as agreements with the Nordic countries as to the procedures concerning the tests and limits of the number of *Nematodes* and *Nematode Larvae* permissible in *herring*.

3.8. The Herring in West German Statistics

3.8.1. Production, Sales and Supply

In 1989 Germany achieved an all time high in production, valued at approximately 2 billion DM ex factory, an increase of 8.5 % against 1988, resulting from a production increase of 12 % and an average price reduction of 3.2 %.

This is a result of the changing attitude and consumer habits due to environmental and health consciousness.

Added emotional advantages, "Zusatznutzen", of health and good nourishment were the hope for fitness, good looks and preservation of efficiency. Furthermore consumers are looking for practical solutions to their feeding problems and time saving opportunities.

While some **smoked** commodities fell in their popularity, *herring* consumption increased by 7.5 %.

Deep frozen products are among the fastest growing market segments. (+ 5.7 %). Breaded deep frozen products grew at a rate of 10 % (77,000 tons). Fishsticks are the most popular as they are considered "kinderfreundlich" or child friendly.

Ready made meals with a high convenience character show an above-average growth rate of 17.6 % (23,000 tons) and will increase in the future due to advancing technologies and low calory meals with combinations including rice/potatoes, vegetables and gravies.

Deep frozen fillets have the advantage of freshness, are ready for home processing without a lot of "throwaways", and are very well suited to be used in microwave ovens. Increase: 16.7 % (16,500 to).

With an increase of 24 %, compared to the previous year, **marinated** fish products achieved the highest increase of all groups of fish products. Specialities have had a

very good increase in the consumed quantities, plus 100 % over the last ten years, 14,000 tons in 1989 and considerably higher than average prices.

3.8.2. Prices

Sales increased in 1989 by 500 mio DM (+ 14.7 %) to 3.2 billion DM. Better production methods and a better distribution system as well as a stricter quality control lead to 13.5 kg fish consumption per person in 1989, a new record level.

Fish prices have increased in general due to good presentation and optimum quality control. Production quality and -technology have played an important part in this development which was also influenced by the price increase of meat (cold cuts and sausages) and health considerations.

This is especially true for the **canned** sector (*herring, mackerel*), resulting in 39,000 tons production (+ 9 %). For 1990 further price increases are expected due to price increases for raw material (*herring*), spices and other additions (tomato) as well as packaging material.

Smoked fish could maintain its position (11,000 tons, + 6,3 %) and has its main products in form of mackerel, salmon, and eel. New smoking methods and computer assisted and controlled smoking contributed to a longer shelf life and a better quality of the finished products, especially concerning herring.

3.8.3. Employment

The fish industry increased their employment by 6 % and was working at the maximum capacity available.

3.8.4. Imports

Germany is the second largest fish importer (quantity) in the world after Japan but before the United States. It has own catches of 202,000 tons, which are supplemented by imports of 2,714,000 to. This relationship indicates the tremendous importance of imports to the German fish industry. These figures represent an increase of 500,000 tons, over the last ten years. West Germany is the 8th largest fish-user in terms of tons caught and occupies position number seven in respect of value. Other import positions:

- No. 1 - fresh trout
- No. 1 - herring
- No. 2 - eels, frozen herrings, and sardines

- No. 4 - tuna, mackerel
- No. 5 - salmon, mussels

Herring is the largest imported kind of fish and Germany is the largest importer of this commodity. With 3.15 % of the world consumption of fish products and only 1 % of the world population Germany has a more than proportionate fish-consumption. The enormous deficit in own fish supply in Germany could not be satisfied by other EEC members and Third Countries (Non-EEC-Countries) had to make up for the deficit. While Germany could only supply 27 % of its requirements, the other EEC-countries contributed 34,000 tons or 27 % of the German requirements. The balance of 46% had to be imported from Third Countries and represented an increase of more than 40% compared to the previous year.

For the first time in many years Germany's contingent for *herring* could be caught due to catches of foreign boats fishing under the German flag. Nevertheless are imports of herring from Third Countries of utmost importance to the German Fish Industry as these imports satisfied 59 % of the German requirements of frozen, separated herring (as an example).

Complete statistics concerning *herring* and can be obtained if necessary.

One of the important problems to be solved in supplying the German Fish Industry is the timing of the availability and the quality required at that time. Another problem area in importing *herring* lies in the restricted quantities allowed and the import duties which make the *herring* artificially more expensive than necessary.

3.9. Contacts

Contacts in Germany were established by telephone and appointments.

The general impression is that the supply of fish is adequate and problems fulfilling the orders of the fish industry in Germany do not exist.

Different types of fish, crustaceans and shellfish are being imported from all over the world. The primary consideration in any case is the quality and freshness of the product, the dependability of the supplier. If these aspects are satisfactory, the price appears to be of secondary importance. Time and again it was stressed that dependability is factor number one.

Except for specialized companies who deal only in a particular market niche, like caviar, salmon etc., the companies are openminded concerning new products and some are actually actively looking for new products to be added to their range of

production. This includes also new recipes and new ways to prepare or present a product.

The approach was to interview managers of buying departments of supermarkets and stores as one group in order to determine whether there is any chance to introduce a new product like the *Shad* or the *Rex Eel* into the market via the retail chains. The answer is a qualified yes. Qualified because any introduction of a new product is connected with risks which are not only limited to financial aspects, but also contain such risks as the reputation of a company, their goals etc. As the introduction of a new product and its success depends heavily on advertising, this question has to be addressed by the US-supplier and arrangements have to be negotiated with potential importer/supermarket chains.

The second approach concerned importing companies, who are in a position to order larger quantities as they have, as a rule, a number of connections to whom they sell the imported products. Here the impression was, that the new products have to be tested by their clients in order to determine the potential and quantity. The transport chain and quality as well as dependability of the supplier, i.e. the exporter, are of very high importance.

A number of companies have requested more comprehensive information as to the way in which the products will be delivered. In any case a sample is requested and an offer with quantity available, price cif German harbor or air port is expected. A list of interested parties is attached to this report.

The requirements of some of the companies contacted are not restricted to the *Shad* or *Rex Eel*, but include other fish, crustaceans and shellfish and there is a specific interest in "exotic" products.

One company has indicated that they might be interested in a joint venture and a visit to the US is planned for September. The necessary arrangements will be made within the next few days. The person responsible will be introduced to the Seafood Marketing Department. Contact will be established with Florida Fisheries. Irrespective who will do it, the DNR or the fisheries.

A list of German companies acting as importers and wholesalers is attached as exhibit A.

A list of German companies processing and distributing processed fish is attached as exhibit B.

4. Conclusion

The German fish market is open for imports in accordance with the rules and regulations of the EEC. Interest in new fish is noticeable due to expected decreases of present supplies in the North Sea and other resources. Great care must be taken though concerning the quality of the fish, as only top quality has any chance to enter the market in Germany or any other country of the EEC.

Any new types of fish which are not caught in the waters of the EEC or by fishermen of the EEC should not have any penalties in form of import duties and should not encounter quotas. The German Association of Fisheries is a great supporter of free trade and is well represented in the EEC committees dealing in such matters as import, quotas and duties. Its basic intention is to keep the market as free as possible from undue restrictions for the industry.

To establish the extent of interest in importing *Rex Eel*, *Shad* and its roe, it is necessary to evaluate the results of testing the products. A list of parties to receive samples is attached as exhibit C.

These initial tests can be extended when the results have been evaluated and if it is considered adviseable.

5. Further Actions

5.1. Information - Material

I suggest that a series of pamphlets (1 sheet per fish) will be developed, depicting the fish, with a complete description, including the time of year when catches can be expected, the quantities and form of preparation or shipment available. The languages used should include: Scientific Name, English, German, French, Spanish, Italian, Danish, Polish, Russian and Japanese). This would cover the main consumers of fish world wide and would allow a cost effective production in a good quality and reasonable quantity. Beside the biological information a summary of known uses and some recipes should be included. The goal should be that the recipients will have good and correct information and that they will collect the pages for future reference in a file (By the way an international standard size like DIN A 4 or DIN A 5 should be used in order to facilitate filing).

An alternative would be to have the colored picture printed and the text for each language will be added in a separate printing process. This would have the advantage of language-specific information, but would require far greater funds.

A compromise could be the production of three or four languages per fish sheet, resulting in only two different print sets.

This system could be used by fisheries in their export endeavors guaranteeing correct nomenclature and eliminating any translation mistakes by the individual fishery or exporter.

5.2. Letter Action

The addresses have - to a certain extent - been contacted so that only the balance should receive a general letter introducing the *Rex Eel* and the *Shad*. The companies who have been contacted should receive information in accordance with the requirements stated during my contact with them, i. e. offers and samples.

Ehibit

A and B

Processors: Code 11073300000

Wholesalers: Code 11073800000

Importers: Code 11073600000

ADDRESSES OF GERMAN FISH-IMPORTERS, WHOLESALERS AND PROCESSORS

Date 09/11/90

No	Codeno	Compname	Streetno	Streetname	P.O.Box	ZIP	City	Country
259	11073000000	Atlantis Seafoods GmbH & Co.	40	Am Lunedeich	29 04 39	2850	Bremerhaven 29	Germany
336	11073000000	Copa Bade GmbH & Co KG	1	Am Straßbach		6360	Friedberg	Germany
348	11073000000	Dan Lachs GmbH	16	Lise-Meitner-Straße		2313	Raisdorf	Germany
408	11073000000	Flamingo-Fisch GmbH & Co KG	.	Halle 8	29 01 65	2850	Bremerhaven	Germany
413	11073000000	Flügel & Partner	6A	Plantangenstraße		6450	Hanau	Germany
423	11073000000	Friedrich Wilhelm Lubbert	.	Wittlingerstraße	402	2850	Bremerhaven	Germany
500	11073000000	Johann Frings GmbH	42 - 44	Arnold Dehnen Straße		4100	Duisburg	Germany
504	11073000000	Jürgen Gosch	15	Hafenstraße		2282	List	Germany
224	11073300000	Abba GmbH Import & Export GmbH	160	Große Elbstraße		2000	Hmburg 50	Germany
719	11073300000	Appel & Frenzel GmbH/Werk Werber &Schutt			760	2190	Cuxhaven-F.	Germany
720	11073300000	AQUILA Caviar Im- und Export GmbH	210	Große Elbstraße		2000	Hamburg 50	Germany
749	11073300000	Artur Heymann & Co. Fischkonservenfabrik	36	Seelandstraße		2400	Lübeck 14	Germany
721	11073300000	Beek Feinkost GmbH KG	2/8	Humphry-Davy-Straße		2190	Cuxhaven	Germany
722	11073300000	Beek Feinkost KG	35	Albert-Schweitzer-Ring		2000	Hamburg70	Germany
753	11073300000	Beratungslabor Iben			29 02 19	2000	Bremerhaven 29	Germany
295	11073300000	Carl Kühne	39	Provinzstraße		1000	Berlin 51	Germany
731	11073300000	DAN LACHS GmbH	16	Lise-Meitner-Straße		2313	Raisdorf	Germany
732	11073300000	Dieckmann & Hansen	210	Große Elbstraße	50 03 62	2000	Hamburg 50	Germany
734	11073300000	DREWS FEINKOST GmbH	277	Große Elbstraße		2000	Hamburg 50	Germany
755	11073300000	Erich König, Fischverarbeitung	10	Nordbahnstraße		1000	Berlin 51	Germany
737	11073300000	FBEG Fischereihafen-Betriebs-/Entw. mbH	.	Lengstraße	29 01 62	2850	Bremerhaven 29	Germany
738	11073300000	Feinkost Dittmann Halbleib GmbH	6	Im Maisel		6204	Taunusstein 5	Germany
759	11073300000	Fischfeinkost Martens KG			713	2190	Cuxhaven	Germany
750	11073300000	Fritz Homann Lebensmittelw. GmbH & Co GK	4	Bahnhofstraße	11 80	4503	Dissen/TW	Germany
746	11073300000	HAWESTA Feinkost Hans Westphal	140	Mecklenburger Straße	16 02 29	2400	Lübeck 16	Germany
751	11073300000	Heinrich Humme Feinkost GmbH	36	Ophauser Straße		5800	Hagen 1 - Vorhalle	Germany
747	11073300000	Helgoland Weser Frishfishprod.ges. mbH			29 02 62	2850	Bremerhaven 29	Germany
798	11073300000	Hubert wenning - Delikat GmbH & Co. KG	32	In der Schlenke	5	4709	Bergkamen-Oberaden	Germany
764	11073300000	Karl Niehusen, Fischfeinkost	158	Große Elbstraße		2000	Hamburg 50	Germany
779	11073300000	Karl Sandelmann, Fischindustrie	Halle 14		29 01 85	2850	Bremerhaven 29	Germany
724	11073300000	Krabben-Bremer GmbH	1	Blickhausener Landstraße		2853	Nordseebad Dorum	Germany
760	11073300000	Mövenpick "Deutsche EIG"	67	Morickestraße		7000	Stuttgart 1	Germany
763	11073300000	Nadler Feinkost GmbH	.	Maifischstraße	29 03 62	2850	Bremerhaven 29	Germany
762	11073300000	Nadler Feinkost GmbH	190	Käfertaler Straße	10 23 61	6800	Mannheim 1	Germany
765	11073300000	NORDA-LYSELL Fischspezialitäten			6 20	2190	Cuxhaven	Germany
578	11073300000	NORDSEE, Deutsche Hochseefischerei GmbH	3	Klußmannstraße		2850	Bremerhaven	Germany
768	11073300000	PFENNIGS Feinkostfabrik Hannover GmbH &	9	Am Teinkamp	13 60	3203	Sarstedt	Germany
770	11073300000	PFENNIGS Feinkostfabrik Hannover GmbH &	22/30	Ringbahnstraße		1000	Berlin 42	Germany
603	11073300000	Pickenpack Tiefkühlgesellschaft	9	Luner Rennbahn		2120	Lüneburg	Germany
772	11073300000	Preisler & Schneider GmbH	6/8	Präsident Herwig-Straße		2190	Cuxhaven	Germany
774	11073300000	Rheinische Feinkost GmbH	44	Ludenberger Straße	5 50	4006	Erkrath 1	Germany
775	11073300000	Richter & Greif Feinkost GmbH & Co. KG	.	Neufelder Schanze	550	2190	Cuxhaven	Germany
778	11073300000	Ro-Ma GmbH Fisch- und Feinkostfabrik	14	Untere Fischerstraße	3 51	8510	Fürth/Bay.	Germany

ADDRESSES OF GERMAN FISH-IMPORTERS, WHOLESALERS AND PROCESSORS

Date 09/11/90

No	Codeno	Compname	Streetno	Streetname	P.O.Box	ZIP	City	Country
725	11073300000	Rudolf Brickmann GmbH & Co KG	358	Stolberger Straße 358		5000	Köln 41 - Braunsfel	Germany
726	11073300000	Rudolf Brickmann GmbH & Co KG			45	4815	Stukenbrock	Germany
793	11073300000	Tiptop-Fischwerke Alber Holst GmbH&CoKG	23/27	Fabrikstraße	16 01 48	2400	Lübeck 16	Germany
696	11073300000	Viktor Leege jr. Seelachsfabrik GmbH			29 02 63	2850	Bremerhaven 29	Germany
796	11073300000	VOSS Feinkost und Lebensmittel GmbH	10	Werner-von-Siemens-Straße		2358	Kaltenkirchen	Germany
736	11073300000	Walter von Eitzen GmbH			240	2190	Cuxhaven-F.	Germany
797	11073300000	Wefina Günther Wehowsky GmbH & Co. KG	36	Seelandstraße		2400	Lübeck 14	Germany
800	11073300000	WESTFALIA-STRENTZ Fischindustrie GmbH&Co			29 00 64	2850	Bremerhaven 29	Germany
801	11073300000	WESTFALIA-STRENTZ GmbH & Co. KG			3 60	2190	Cuxhaven	Germany
703	11073300000	Wilhelm Egele GmbH	47	Hauptstraße		7914	Pfaffenhofen	Germany
767	11073300000	"Nordsee" Deutsche Hochseefischerei GmbH				2190	Cuxhaven	Germany
766	11073300000	"Nordsee" Deutsche Hochseefischeri GmbH		Am Lunedeich	29 03 52	2850	Bremerhaven 29	Germany
266	11073310000	BALMI, Albröt & Mirnik GmbH	56-78	Lahnstraße		1000	Berlin 44	Germany
757	11073310000	Carl Krellenberg, Fischräucherei	7	Am Teich	16 01 01	2400	Lübeck 16	Germany
733	11073310000	Dreistern Räucherei Dieter de Haas			29 02 04	2850	Bremerhaven 29	Germany
741	11073310000	Friedrich Föh oHG, Aalräucherei	28	Dehnthof		2340	Kappeln/Schlei	Germany
802	11073310000	Heinrich Wiese KG, Fischräucherei	5/7	Werftstraße		2400	Kile 14	Germany
792	11073310000	Karl Ternäben, Aalräucherei	15	Im Gewerbegebiet	11 23	2841	Lembruch/Dümmer See	Germany
794	11073310000	Theodor Ubber, Aal und Forellenräucherei	36	Klappertorstraße		4019	Monheim-Baumberg	Germany
723	11073310000	Winfried Blenz, Moselräucherei	52	Fahrstraße		5593	Pommern/Mosel	Germany
235	11073600000	Alsa Import & Export GmbH	35	Schützenstraße		2000	Hamburg 50	Germany
237	11073600000	Altonaer Kaviar-Importhaus Max Schuldt	44	Schmarjestaße	50 01 07	2000	Hamburg 50	Germany
246	11073600000	Anglo Skandia Import & Export GmbH	133	Große Elbstraße		2000	Hamburg 50	Germany
718	11073600000	Appel & Frenzel GmbH	240	Kieshacker Weg		4000	Düsseldorf 30	Germany
252	11073600000	Arnold Otto Meyer	1-3	Ballindamm		2000	Hamburg 1	Germany
265	11073600000	A. F. Rassau	65	Ost-West Straße	60 53 80	2000	Hamburg 11	Germany
267	11073600000	Baltic Seafood GmbH	1-3	Wischhofstraße		2300	Kiel 14	Germany
269	11073600000	Barlu Seafood	85	Große Elbstraße		2000	Hamburg 50	Germany
289	11073600000	B. A. Hellmann GmbH	133	Große Elbstraße		2000	Hamburg 50	Germany
291	11073600000	B. Eßmann & Co	212	Große Elbstraße		2000	Hamburg 50	Germany
296	11073600000	Carl Simonson	26	Elbchaussee		2000	Hamburg 50	Germany
309	11073600000	Christian Gödeken	210	Große Elbstraße		2000	Hamburg 50	Germany
340	11073600000	Crustimex Seafood GmbH	133	Große Elbstraße		2000	Hamburg 50	Germany
373	11073600000	Dr. Hochstrasser Handelsges. mbH & Co KG			29 02 15	2850	Bremerhaven 29	Germany
383	11073600000	Ernst Katzenstein & Co.	58	Rothenbaumchaussee		2000	Hamburg 13	Germany
385	11073600000	Euro-Trade KG, BS Handelsges. mbH & Co	20	Neufelder Straße		2190	Cuxhaven	Germany
389	11073600000	E. W. A. Wessendorf KG	4	Kosterwall		2000	Hamburg 1	Germany
390	11073600000	E.W.A. Wessendorf KG	4	Kosterwall		2000	Hamburg 1	Germany
394	11073600000	FIMEX GmbH	133	Große Elbstraße		2000	Hamburg 50	Germany
425	11073600000	Friigo Import GmbH	141	Große Elbstraße		2000	Hamburg 50	Germany
426	11073600000	frisch frost Vertriebsges. mbH	143/39	Malteserstr.		1000	Berlin 48	Germany
427	11073600000	Frost-Import GmbH	8a	Rheingoldstraße		5401	Fleckertshöhe	Germany
428	11073600000	Fr. Petersen	152	Große Elbstraße		2000	Hamburg 50	Germany

ADDRESSES OF GERMAN FISH-IMPORTERS, WHOLESALERS AND PROCESSORS

Date 09/11/90

No	Codeno	Comprname	Streetno	Streetname	P.O.Box	ZIP	City	Country
430	11073600000	F. Schottke GmbH & Co. KG.	Halle 20	Am Lunedeich		2850	Bremerhaven 29	Germany
431	11073600000	F. W. Lübbert	133	Große Elbstraße		2000	Hamburg 50	Germany
442	11073600000	Gottfried Friedrichs KG	26	Borselstraße		2000	Hamburg 50	Germany
444	11073600000	Gourmet Import	8	Hugo-von-Eltz-Straße		6234	Hattersheim 2	Germany
451	11073600000	Hamburger Feinfrost GmbH	28	Völckerstraße 28		2000	Hamburg 50	Germany
460	11073600000	Hugo Martens & Co.	17	Lübbertstraße		2190	Cuxhaven - F.	Germany
461	11073600000	Hußmann & Hahn GmbH	9	Niedersachsenstraße	360	2190	Cuxhaven - F.	Germany
462	11073600000	Huzo Frozen Food Im- und Export GmbH	18	Nordwall		4172	Strälen 1	Germany
467	11073600000	H. G. Schulze	117 - 123	Große Elbstraße		2000	Hamburg 50	Germany
465	11073600000	H. G. Schulze	117 123	Große Elbstraße		2000	Hamburg 50	Germany
466	11073600000	H. W. Wessel	2	Dusselring		4020	Mettmann 1	Germany
748	11073600000	H.-I. HERING-Import GmbH	36	Deichstraße		2000	Hamburg 11	Germany
468	11073600000	IFICO International Fischhandels-Co. mbH	Abt. 19	Halle IX,	29 0059	2850	Bremerhaven	Germany
501	11073600000	Jorgen Chistensen	32	Papenstraße		2000	Hamburg 76	Germany
503	11073600000	Juan Höfferle GmbH & Co.	5	Curschmannstraße		2000	Hamburg 20	Germany
508	11073600000	Kälte 2000 Tiefkühlprodukte L. Reinacher	Gebäude 5	Seefischmarkt		2300	Kiel 14	Germany
509	11073600000	Kagerer & Co.	36	Emeranstraße		8016	Feldkirchen b. Münch	Germany
510	11073600000	Karl Massen GmbH & Co KG	4	Kaiserstraße		4000	Düsseldorf	Germany
521	11073600000	Koch Tiefkühlkost	14/16	Binger Straße		1000	Berlin 13	Germany
527	11073600000	Langbein	27	Heinrichstraße		2000	Hamburg 50	Germany
534	11073600000	Lindenberg	2	Morsestraße		1000	Berlin 10	Germany
541	11073600000	Mares, Meeresfrüchte Import GmbH	15	Am Karlsbad		1000	Berlin 30	Germany
564	11073600000	Moller & Reichenbach	117	Große Elbstraße		2000	Hamburg 50	Germany
569	11073600000	NAHRIMEX GmbH	28	Winsbergring		2000	Hamburg 54	Germany
574	11073600000	Neptun-Meeresfrüchte Handelsges. mbH	26/3	Malmsheimer Straße		7253	Renningen	Germany
577	11073600000	Norda Heringshandelsgesellschaft mbH	156	Behringstraße		2000	Hamburg 50	Germany
627	11073600000	Rud. Kanzow	90	Hammerbrookstraße		2000	Hamburg 1	Germany
628	11073600000	Rungis Expres GmbH	2	Am Hambuch		5309	Meckenheim	Germany
635	11073600000	Schreiber & Moll GmbH	4	Klosterwall		2000	Hamburg 1	Germany
644	11073600000	Signum GmbH	7	Beethovenstraße	360	6600	Saarbrücken	Germany
660	11073600000	Standard Übersee Handelsgesellschaft mbH	3	Rothenbaumchaussee		2000	Hamburg 13	Germany
667	11073600000	Supreme Sales GmbH	6-8	Dieselstraße		6052	Mühlheim	Germany
671	11073600000	Thormählen & Co.	7	Alte Landstraße		2070	Großhansdorf	Germany
692	11073600000	Ute Herrmann Import GmbH	8	Amselweg		6087	Büttelborn	Germany
698	11073600000	Walter Hoffmeister Fischhandel GmbH	396/402	Lüneburger Straße		1000	Berlin 21	Germany
699	11073600000	Werner Lauenroth Feinfischkost GmbH	133	Große Elbstraße		2000	Hamburg 50	Germany
700	11073600000	Werner Strasser	17	Freischützenstraße		8000	München 81	Germany
704	11073600000	Wilhelm H. Schwiecker GmbH	16	Zimmerstraße		2000	Hamburg 76	Germany
222	11073800000	A & P Warenhandels GmbH	7	Im Heidewinkel		2091	Radbruch	Germany
728	11073800000	Busumer Fischerei-Gesellschaft mbH			11 62	2242	Büsum	Germany
727	11073800000	Carl Bruns & Co. Seefischgroßhandlung	Abt. 47	Halle V,	154	2190	Cuxhaven	Germany
788	11073800000	Clara-Fisch, Inh. Johannes Steffen	1	Am Dövensee	16 01 42	2400	Lübeck 16	Germany
729	11073800000	Cuxhavener Fischvertriebs-Co, Schmidt&Co			360	2190	Cuxhaven-F.	Germany

ADDRESSES OF GERMAN FISH-IMPORTERS, WHOLESALERS AND PROCESSORS

Date 09/11/90

No	Codeno	Compname	Streetno	Streetname	P.O.Box	ZIP	City	Country
363	11073800000	Deutsche See Großverbraucher-Service Gmb	44 n-q	Beusselstraße		1000	Berli 21	Germany
364	11073800000	Deutsche See Großverbraucher-Service Gmb				1000	Hamburg	Germany
735	11073800000	Duisburger Fischzentrale Gerhard Wilken	19	Paulusstraße		4100	Duisburg 1	Germany
377	11073800000	Wilhelm Egele GmbH	47	Hauptstraße		7914	Pfaffenhofen	Germany
786	11073800000	Emil Suhr			3 60	2190	Cuxhaven	Germany
743	11073800000	Ernst J.L. Franke	141	Große Elbstraße		2000	Hamburg 50	Germany
791	11073800000	Ernst Stührk	2	St. Michaelisdonner Straße		2222	Marne/Hostein	Germany
395	11073800000	FIMEX GmbH		Seefischmarkt		2300	Kiel	Germany
739	11073800000	Fischverwertung Heiligenhafen-Neustadt			181	2447	Heiligenhafen	Germany
740	11073800000	Flamingo-fisch GmbH & Co KG			29 01 65	2850	Bremerhaven 29	Germany
742	11073800000	Fokken & Müller	11/13	Am Eisendock	20 05	2970	Emden	Germany
803	11073800000	Friedrich Wilhelm Wilken			7 51	2190	Cuxhaven-F.	Germany
424	11073800000	Friedrichs	15-16	Lipaer Straße		1000	Berlin-45	Germany
773	11073800000	Fritz Reuter oHG	245	Oldenkirchener Straße		4050	Mönchengladbach 2	Germany
787	11073800000	F. Schottke GmbH & Co. KG	Halle 18	Am Lunedeich	29 03 63	2850	Bremerhaven 29	Germany
761	11073800000	Georg Nachtigall KG	24/26	Fischerstraße	13 45	2330	Eckernförde 1	Germany
745	11073800000	Glyngore Limfjord GmbH		Grönfahrtweg	27	2398	Harrislee	Germany
752	11073800000	Hußmann / Hahn GmbH / Co.	Halle 9	Niedersachsenstraße	360	2190	Cuxhaven-F.	Germany
790	11073800000	Johann Steinhauer & Carl Specht GmbH	36	Am Lunedeich	29 03 50	2850	Bremerhaven 29	Germany
756	11073800000	Krabben- und Seefischgroßhandlung Rentel	5	Deichstraße		2242	Büsum	Germany
579	11073800000	Norfolk Delikatessen GmbH	6	Boschweg		1000	Berlin 44	Germany
583	11073800000	NUG Optimus	37-39	Hahnstraße		6000	Frankfurt/Main	Germany
754	11073800000	Otto Kellr GmbH, Fischgroßhandlung	152	Kolonienstraße	10 09 62	4100	Duisburg 1	Germany
589	11073800000	Otto Reichelt GmbH	97/111	Daimler Straße		1000	Berlin-48	Germany
781	11073800000	Paul Seifert, Seefischgroßhandel			29 03 36	2850	Bremerhaven 29	Germany
789	11073800000	Peter Steffen	13	Schlutupur Kirchstraße		2400	Lübeck 16	Germany
771	11073800000	Pickenpack Tiefkühlgesellschaft GmbH & C	9	Löner Rennbahn		2120	Lüneburg	Germany
776	11073800000	Richter & Co. GmbH	130 A III	Spaldinger Straße	10 30 03	2000	Hamburg 1	Germany
780	11073800000	Seefisch Vertriebsges. mbH & Co. KG			29 01 78	2850	Bremerhaven 29	Germany
782	11073800000	Select Food Int. GmbH	Halle IX	Niedersachsenstraße		2190	Cuxhaven	Germany
783	11073800000	Senne-Forellen G. Welschhof GmbH & Co. KG	72	Augustdorfer Straße		4815	Stukenbrock	Germany
785	11073800000	SEWE-FROST GmbH	2 B	Am Marktplatz		2000	Wedel	Germany
795	11073800000	V.I.K. GmbH Verkaufszentrale	76	Oberaltenallee		2000	Hamburg 76	Germany
799	11073800000	WESER Fischgroßhandelsges. mbH & Co. KG			29 04 05	2850	Bremerhaven 29	Germany
804	11073800000	Woldemar GmbH	14/16	Hansastraße	24 53	2970	Emden	Germany
744	11073800000	"KÄPTN" Frings GmbH Fischgroßhandel	9 Nr. 3	An der Packhalle		2850	Bremerhaven 29	Germany
758	11073800000	"Luvat" Johannes Nauen GmbH	7	Den Ham		4150	Krefeld 29 - Hüls	Germany
777	11073800000	"ROLAND" Fisch- und Heringshandelsges.			29 03 45	2850	Bremerhaven 29	Germany
506	11073810000	KaDeWe	21	Taumentzenstraße		1000	Berlin 30	Germany
507	11073810000	KaDeWe	21 - 24	Taumentzenstraße		1000	Berlin 30	Germany
505	11073810000	KaDeWe	21 -24	Taumentzenstraße		1000	Berlin 30	Germany
469	11073810000	Langnese-Iglo GmbH	15	Dammtorwall		2000	Hamburg 36	Germany
258	11073900000	Atlantik Fisch Klaus Pasche	42	Barnerstraße		2000	Hamburg 50	Germany

ADDRESSES OF GERMAN FISH-IMPORTERS, WHOLESALERS AND PROCESSORS

Date 09/11/90

No	Codeno	Compname	Streetno	Streetname	P.O.Box	ZIP	City	Country
376	11073900000	Edgar Lichtenberger	2	Gerhofstraße		2000	Hamburg 36	Germany
414	11073900000	Forellenhof Roter oHG	127	Weinmeisterhornweg		1000	Berlin 20	Germany
452	11073900000	Hamburger Feinfrost GmbH	28	Völckerstraße		2000	Hamburg 50	Germany
537	11073900000	Luzius & Stüff	7	Stadtdeich		2000	Hamburg 1	Germany
540	11073900000	Manfred Maxein International			71 02 48	2000	Hamburg 71	Germany
630	11073900000	SAS Seafood Agentur Schwarz GmbH & Co.	5	Niihooger		2280	Morsum/Sylt	Germany

Exhibit C

"Nordsee" Deutsche Hochseefischerei GmbH

H. Ellinhausen, Dir. 0471-13-674
REX Sample, very large organization

H. Bröckelschen 04721-12-119
H. Gröschel - Canned imports
Export interested to US

Appel & Frenzel GmbH

H. Scholten 0211-4159-0
Importing, Wholesale and Processing
Offer Rex Eel, Shad in writing to
Import Division
Interested in Sous Vide
Sample Rex

Beek Feinkost GmbH

H. Tietz 04721-22648
Daughter of Campbells and sister of
LaCroix
written offer for Rex and shad as well
as other fish Sample

Christian Gödecken jun. GmbH

H. Carsten
H. Stuck 040-389080
ref to Dieckmann & Hansen
Rex Eel and Shad
Sous Vide
H. Carstens 040 389-80114
Import and processing, no herring though
Rex Eel after offer trial order
interested in Sous vide

DREWS Feinkost GmbH

H. Schäftke 040-391080
Import and processing
Marinades from Herrings only

Edelfisch

H. Schirrmeister 069-730121
complete info.
Res Sample, other fish interested, too

Fritz Homann Lebensmittelwerke GmbH & Co

H. Bentlage 05421-311
Import of Tuna in cans
processing Herring
contact and offer to Product development
H. Kuchenbecker 05421-31-260
Sample Rex

Gottfried Friedrichs

H. Sommer Trading Agents
send info

HAWESTA Feinkost

Herr Stoppel 0451-69350
Herring and Mackerel processing only
offer shad and mackerel

Hertie, NUG OPTIMUS

H. Lorentz, Dir.
H. Munck
H. Schauerte
069-66302-122
Herring

KaDeWe, Berlin

H. Morsch 030-2121-426
importing Goosefish (Seeteufel) from US
and Red Snapper
interested in Herring, Rex Eel possibly
other "exotic" Fish
interested in Sous Vide and also fruits
Brotschneidemaschine
H. Minzyk TK Obst/Gemüse
H. Morsch in Gls:Krusten, Schalentiere
complete information and Samples

Lindenberg

H. Schulz 030-3916006
complete info re Rex and Shad

Mövenpick Deutsche "EIG"

contact H. GoBen 0711-64690
offer Herring

Nadler Feinkost GmbH

H. Lautenschläger 0621-33050
importing and processing of herring
offer herring in different forms,
whole, fillets, without skin and gills
contact H. Dietze 0471-3011 interested
to expand
variety
Rex, shad other fish, samples
Sous Vide

NORDA- LYSELL , UNION Deutsche Lebensm.

04721-13-0
processing herring
offer to Import division Shad

Reichelt

H. Verhees 030-7493-388
Rex and Shad Samples to be sent
largest supermarket chain in Berlin

Technische Universität Berlin

Prof. U. Höpke?H. Landmann
Sample Rex

Veterinär- & Lebensmittel Aufsichtsamt

Dr. Woltzke 030-87031

Wilhelm Egle GmbH

H. Raith 07302-8143

highquality canned fisch

Tuna, Mackerel, Herring

Samples Rex, shad