

ALABAMA'S RECREATIONAL CATFISH PONDS



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INTRODUCTION

DEMAND FOR OUTDOOR RECREATION activities of various types increased steadily in Alabama and the United States during the past decade. People found escape from the pressures of modern life by spending weekends, holidays, and vacations in outdoor recreation areas. The Outdoor Recreation Resources Review Commission (ORRRC) predicted in 1962 (8) that the demand for outdoor recreation would double by 1976 and triple by the year 2000.

A 1970 study (4) indicated the present and projected demand for outdoor recreation in Alabama. To cope with the projected increases in demand, the State of Alabama began construction and upgrading of state parks, golf courses, camping sites, game management areas, and many other outdoor recreational facilities.

The development of water-oriented recreational facilities assumed priority because many different recreational activities are associated with water. Such activities as boating, water skiing, and fishing make primary use of water surface areas. Those like

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camping, picnicking, and hiking often are enhanced by proximity to water areas.

An increasing demand for fishing facilities in Alabama has been met partially by public stocking of rivers, streams, and reservoirs. The State has developed fishing lakes to supplement private lakes, and private concerns have established fish ponds and fishing clubs. Construction of dams has resulted in added areas suitable for water-oriented recreation, including fishing. Farmers have converted watering and irrigation ponds into recreation ponds (mainly fishing facilities) to supplement farm income.

Development of the catfish industry in Alabama also added to the supply of fishing facilities available. In 1965 the State had fewer than 50 public fishout ponds stocked primarily with catfish (1). Five years later there were 700 fishout and combination fishout-commercial catfish ponds¹. The Soil Conservation Service, which assists in construction of private ponds in Alabama, predicted the increase to continue based on number of requests for assistance. Since the supply of water acres devoted to fishing in lakes and reservoirs has not kept pace with predicted recreational demands, fishout ponds may be needed to fill the gap.

OBJECTIVES OF THE STUDY

The study was originated to investigate uses of Alabama's catfish ponds for recreational resource areas. Primary objectives were: (1) to determine the supply of recreational catfish water, and (2) to determine factors affecting demand for fishout catfish operations. Secondary objectives were to describe the characteristics of fishout catfish operations and to determine problems encountered both in production and marketing of fish.

DESCRIPTION OF PRODUCERS

Information was collected from 165 fishout operators and 152 combination fishout-commercial operators during spring and summer of 1971. Additional data regarding demand for facilities were obtained from 50 fishout and 50 combination operations.

¹Information from 1970 mailout questionnaire to all County Extension Chairmen and Soil Conservation Service District Conservationists.

Description of Operators

The average age of catfish pond operators was 49; however, 85 per cent were over 40 years of age, as shown by the following age-group tabulation:

| <i>Age</i> | <i>Percentage of operators</i> |
|--------------|--------------------------------|
| 21-30..... | 4 |
| 31-40..... | 11 |
| 41-50..... | 28 |
| 51-60..... | 28 |
| 61-70..... | 23 |
| Over 70..... | 6 |

Thirty-eight per cent of the operators were farmers, but only 5 per cent considered catfish production as their primary occupation. Non-farm employment was the primary source of income for the majority. Many of the catfish enterprises were operated for recreation or for supplemental income. Fifty-one per cent of the operators were raising catfish as a hobby. Percentage of operators, by occupation, is shown below:

| <i>Occupation</i> | <i>Percentage of operators</i> |
|---------------------|--------------------------------|
| Farmer..... | 38 |
| Merchant..... | 10 |
| Manager..... | 7 |
| Construction..... | 7 |
| Retired..... | 11 |
| Other non-farm..... | 27 |

Catfish production was a relatively new enterprise for many operators. Nineteen per cent had been raising catfish for 1 year or less, while the most experienced producer had been in business for 8 years. Average catfish production experience was approximately 3 years, as compared with 19 years in farming (either full time or for a hobby).

Acreage of water for catfish production ranged from 1 to 95 acres, with an average of approximately 10. Fifty-six per cent of the enterprises had less than 5 acres and 5 per cent had more than 15 acres of water. Number of ponds per operation averaged slightly over two, with a range of one to eight reported, as shown below:

| <i>Number of ponds</i> | <i>Percentage of operators</i> |
|------------------------|--------------------------------|
| 1..... | 46 |
| 2..... | 22 |
| 3..... | 13 |
| 4-7..... | 13 |
| 8 and over..... | 6 |

A steady and unpolluted supply of water was essential to pre-

vent diseases and off-flavoring of catfish. Ninety-four per cent of the operations were able to supply sufficient water. The main source of water was watersheds or springs, although many ponds had more than one source, as shown below:

| <i>Source of water</i> | <i>Percentage of operators</i> |
|------------------------|--------------------------------|
| Watershed..... | 48 |
| Spring..... | 67 |
| Well..... | 15 |
| Other..... | 6 |

Drainage facilities for catfish ponds were not required for recreational fishout operations since the fish were harvested by hook and line. For combination fishout-commercial operations, however, drainage facilities were imperative for harvesting purposes. Fishout operations also found drainage facilities helpful for cleaning ponds and harvesting remaining fish prior to restocking. Eighty-two per cent of the operations had only drainable ponds and 9 per cent had ponds that were not drainable. The remaining 9 per cent had some ponds that were drainable and some that were not drainable.

A majority of catfish enterprises were located in rural areas, with distance from population centers averaging 7½ miles for all operations. The average population center had 3,700 people. Forty-two per cent of the operations were within 5 miles of a population center and only 3 per cent were over 20 miles away.

Twenty-nine per cent of the farms were close to towns of less than 1,000 people while 21 per cent were near towns larger than 9,000 population, as indicated below.

| <i>Population of nearest town</i> | <i>Percentage of operators</i> |
|-----------------------------------|--------------------------------|
| 0-999..... | 29 |
| 1,000-4,999..... | 34 |
| 5,000-8,999..... | 16 |
| 9,000 or more..... | 21 |

Only 14 per cent of the catfish operations were adjacent to a main Alabama highway, but 68 per cent were adjacent to a farm road. Sixty-one per cent were located on an all-weather access road. Only 57 per cent of the operations had signs that indicated fishing privileges were available.

Production Procedures

Because of transportation costs and the high death rate associated with transporting fish, producers generally purchased their

fingerlings from nearby hatcheries. Alabama producers purchased fingerlings from more than 20 hatcheries in Alabama, Georgia, and Mississippi.

Although stocking occurred during the entire year, a majority of operators stocked fingerlings during the winter months. Stocking rate averaged 2,000 fingerlings per acre of water.

An equal proportion of producers fed floating and sinking feed. The consumption and chart methods were widely used to determine the amount to feed. The consumption method — “feeding the fish all they would clean up” — was used by producers who fed floating feed. Feeding charts generally were used by producers who fed sinking feed. The charts, which indicated amount to feed according to age, size, and weight of the fish, were supplied by fingerling producers, feed companies, and extension workers. Also used was the weight method, which consisted of weighing a sample of the fish and feeding an amount equal to 3 per cent of the estimated body weight of the fish. Growth rate of fish was checked by 48 per cent of the producers, but only 13 per cent fed by the weight method. Some used the “guess method,” despite it being a haphazard and often inefficient method of determining amount to feed.

Producers fed the fish on varying schedules. The 5-day, 6-day, and every-other-day methods were used, but a majority of operators used the 7-day method. Sixty-seven per cent fed in the evening, 29 per cent in the morning, and 4 per cent fed both morning and evening. Convenience was the main consideration in determining when to feed.

Private feed and seed stores supplied the largest percentage of feed, although three supply sources were named by producers, as shown below:

| <i>Sources of feed</i> | <i>Percentage of operators</i> |
|-----------------------------------|--------------------------------|
| Private feed and seed stores..... | 45 |
| Direct from feed mills..... | 35 |
| Co-op feed stores or mills..... | 20 |

Forty per cent of the producers fertilized their ponds, primarily to improve water color. Discolored water resulting from fertilization tended to screen sun rays and inhibit weed and grass growth in pond bottoms. Sixty-five per cent of the producers used regular fish pond fertilizer (20-20-5).

Chemicals were used for weed and disease control by 25 per cent of the producers. At the time of survey, Terramycin was the only chemical cleared by the Food and Drug Administration for disease control. A majority of the operators also used chemicals during periods of oxygen distress.

Feed, fertilizer, chemicals, and waste materials all represented potential sources of pollution if ponds were drained into other water sources.

Financial Procedures

Only 10 per cent of the fishout and fishout-commercial catfish producers were insured. Half of those insured had riders on their homeowners policy to provide coverage during the fishing season in case of accidents to people while fishing.

Twenty-one per cent of the producers borrowed money to enter the catfish business, with banks being the major source of loans. The money was used primarily for pond construction and fingerling and feed purchases. The average length of loan was 16 months.

Financial aid was granted to 44 per cent of producers to assist in pond construction costs. The Agricultural Stabilization and Conservation Service (ASCS) supplied aid to 68 per cent of those receiving assistance. The remaining funds were obtained from commercial sources. A majority of producers received technical assistance for pond construction from the Soil Conservation Service (SCS).

Equipment

Fishout and combination fishout-commercial catfish producers utilized a wide range of equipment. Trucks were used by most, but since a large majority of producers were not in the catfish business as their primary occupation, their trucks were not used primarily for catfish. A portion of their truck cost was attributed to catfish production.

Barns and sheds also served purposes other than catfish production, while providing storage space for feed, seines, and other equipment. Fishout producers also utilized sheds for selling bait and fishing equipment and for cleaning fish.

Motors and pumps aided in preventing oxygen deficiencies and

were used to pump water between ponds and drain ponds for harvest. Boats and motors were employed for feeding purposes. For operators with more than one pond, a problem was encountered in moving the boat and motor between ponds. Rental boats were furnished as a concession at some fishout operations. In cases of oxygen deficiency problems, boats and motors were used to agitate the water surface and add oxygen to the water.

The primary use of tractors and mowers was controlling growth on banks, dams, and surrounding areas for the comfort of fishermen. Keeping vegetative growth low to allow clear passage of air across the pond surface also aided in oxygenation.

Only 32 per cent of the operations required maintenance. A majority of the work was associated with the pond, mainly drain repair, cleaning pond bottoms, and general cleanup.

Marketing Procedures

The majority of producers permitted fishing in their ponds approximately 1 year after stocking. Length of the fishing seasons varied from an entire year to only 1 month per year. Over 50 per cent of the operations were open 6 days a week. Combination fishout-commercial operations drained the ponds after fishout operations and sold the remaining fish to processors, fish markets, eating establishments, grocery stores, and individuals.

A specific rate per pound was the most common method used to charge for fishing. Operators weighed all fish caught and charged a poundage rate, usually 50 or 60 cents per pound. A combination of a set fee and a per pound rate was charged by 12 per cent of the producers. This procedure consisted of maintaining a set entry fee at the gate and also charging a per pound rate for the fish caught. Nine per cent of the operations were new and had not opened for fishing. These operators had not determined a method for charging at time of the study.

Collecting money was a primary problem for operators. Since the fishout enterprise was not the main occupation of over 90 per cent of the operators, they were not always present at the pond. Many operators paid hired help a percentage of the gross to collect fees and/or poundage rates. Some operators opened their ponds only when they could be present and others used the honor system for collecting fees.

Additional facilities, such as food concessions and picnic tables, were used by a small number of operations, as listed:

| <i>Type of facility</i> | <i>Percentage of operators</i> |
|-------------------------|--------------------------------|
| Concessions..... | 8 |
| Picnic tables..... | 2 |
| Bait sales..... | 7 |
| Boat rental..... | 2 |

Many operators permitted picnicking around the pond, but no extra facilities were provided. At many ponds, operators allowed gratis use of their feeding boat.

Forty-eight per cent of the operators drained and harvested their ponds after fishout was completed. Most of these harvested catfish were sold to processors and individuals.

Eight different processors in Alabama, Georgia, and Mississippi purchased fish from the combination fishout-commercial producers. All producers were within 100 miles of the processor who purchased their fish. Operators of small enterprises drained their ponds and sold to individuals at the pond site or cleaned and froze the fish for later sale. Operators of larger ponds (over 3 acres) found drainage and pond-site sale to be unfeasible because they were not assured of sufficient demand for their fish. Without sufficient demand, many of the remaining fish would spoil before they could be cleaned and frozen.

Producer Expansion Plans

Fifty-four per cent of the operators reported they were not able to supply all the catfish their customers wanted. Twenty per cent could meet their demand and 26 per cent were unable to answer the question because they had not sold an entire crop.

While 52 per cent said they were satisfied with their income potential from the catfish business, 20 per cent had not increased their incomes because of catfish. Another 9 per cent had not been open for an entire season and reported no returns. Twenty-two per cent of the operators attributed over 10 per cent of their income to the catfish enterprise and 25 per cent said catfish accounted for 1 to 10 per cent of their income.

Catfish production should not decrease in the near future. Only 3 per cent of the operators planned to decrease production in the next 1 to 3 years while 53 per cent planned an increase. Of those planning to increase production, 38 per cent proposed to do so by building new ponds, 11 per cent by increasing their stocking rate, and 4 per cent planned to increase both acreage and stocking rate.

Some operators had more than one motive for increasing their catfish business, but the primary reason was to increase income. This reason was cited by 39 per cent, as given below:

| <i>Reason for increasing catfish production</i> | <i>Percentage of operators</i> |
|---|--------------------------------|
| Make more money..... | 39 |
| Has available land..... | 4 |
| Has demand for more fish..... | 11 |
| Want a large scale operation..... | 10 |
| Enjoyment..... | 5 |

Some operators planned continued expansion of catfish acreage. New pond construction and preparation for stocking for 1972 was planned at rates equal to those of 1970 and 1971. Plans for 1973 and 1974, however, indicated a decrease in new pond construction.

Forty-four per cent of operators planned to hold production at a constant level. Factors influential in regulating demand — time and money — also served to influence supply.

A majority of operators not planning to increase production were relatively new in the business and were not confident of the money making potential of catfish. Land, time, capital, and apathy problems could be overcome with confidence in the profit potential of catfish production.

Only 35 per cent of the producers reported any type of problems with the catfish business. The primary one named was oxygen deficiency. Aeration and the use of chemicals were the solutions most commonly used for oxygen deficiency. Six per cent of the operators reported theft of fish from ponds as a problem.

From their experiences, 64 per cent of the operators said if they had the opportunity they would make changes in their ponds. Several producers saw the need for more than one improvement. Smoothing the bottom of ponds to facilitate seining was the primary improvement anticipated by combination producers. Stumps and holes in ponds cause loss of time and fish in the harvesting process. Changes desired are listed below:

| <i>Changes that would be made</i> | <i>Percentage of operators</i> |
|-----------------------------------|--------------------------------|
| Smooth bottom..... | 28 |
| Use larger drain pipe..... | 16 |
| Make larger ponds..... | 10 |
| Cut off banks..... | 8 |
| Improve catch basin..... | 7 |
| Remove trash..... | 5 |
| Make smaller ponds..... | 4 |
| Other..... | 8 |

Seventy per cent of the producers stated they would advise others to enter the catfish business on a fishout or a combination fishout-commercial basis. There were various reasons for the advice, but 28 per cent said money could be made while only 5 per cent thought money could not be made. Fourteen per cent of the operators said they would not advise others to enter the business and 16 per cent were uncertain at that time.

One of the primary problems for all operators was lack of prior knowledge regarding markets for their fish. The expected income from fishout was based entirely on "educated guesses" regarding demand. In many cases the demand was overestimated, and subsequent profits were lower than anticipated.

MARKETING PROBLEMS

Combination producers received the major portion of their income from commercial sales while fishout producers' income came from fee fishing and/or payment for fish caught. Since marketing problems were quite different for the two types of production, separate analysis was made of data from the fishout producers and that from combination producers.

Over 90 per cent of fishout customers were considered non-local. In some cases the nonlocal designation indicated only that the customers were not from the community where the pond was located. Few ponds were close enough to population centers to attract sufficient customers from the local area.

Fishout operations received an average gross income from catfish of \$2.76 per fisherman per year while combination operations received about \$0.90. The combination ponds averaged 823 yearly customers, while fishout ponds averaged 629. Fishermen caught about 1½ pounds of fish per trip, which amounts to an annual harvest of 1,234 pounds from combination and 943 pounds from fishout operations. Since combination operators had about 13 acres of water and fishout close to 7 acres, many fish remained in the ponds after fishout was completed. Combination producers drained the ponds and harvested the fish for sale. For fishout producers, the fish remaining after fishout operations ended represented a problem. Of the 108 fishout producers with fish remaining in their ponds after the fishing season ended, the majority left the fish there for the next season's fishout. Some producers drained ponds and moved the fish to another pond. A few gave the fish away after draining ponds.

The relatively low returns from fishout operations created a degree of dissatisfaction among some of the producers. The nine specific marketing problems cited by fishout producers were loosely grouped into two categories: (1) problems in attracting enough customers for adequate income, and (2) problems in running a fishout operation open to the public.

To alleviate problems in the first classification, producers considered several alternatives. Since revenues were low, an increase in price would increase income if the same number of customers continued to visit the site. Little information was available regarding the reaction of buyers to changes in prices for fishout catfish services. While recreational activities generally are considered to be income elastic, the price elasticity for recreational catfish has not been established. Increasing total revenue by changing prices requires a proportionately larger increase in visitation when price is decreased or a proportionately smaller decrease in visitation when price is increased. Producers might determine customer response by varying the price charged and determine the effect on total revenue from catfish. Conceivably, the price may be too high in terms of the recreational services offered. Except in urbanized areas fishermen usually have many alternative fishing sites available.

Reasons for poor returns are indicated in the following marketing problems cited by fishout producers:

| <i>Specific marketing problems</i> | <i>Percentage of operators</i> |
|------------------------------------|--------------------------------|
| Price too low..... | 23 |
| Lack of customers..... | 30 |
| Unreliable market for fish..... | 19 |
| Loss of fish by theft..... | 10 |
| Poor treatment by customers..... | 9 |
| Fishout too time consuming..... | 3 |
| Irregular size of fish..... | 2 |
| Fish won't bite..... | 7 |

The problems created by customers included littering of pond banks, failure to pay for all of the fish caught, failure to keep all of the fish caught, and vandalism. Many customer problems were directly related to lack of pond supervision. The revenue was too low to warrant full-time supervision, yet lack of supervision decreased revenue and increased costs of maintenance.

Two related problems contributing to reduced revenue were the irregular size of fish in the pond and the failure of fish to take the hook. Some loss was reported from release of small fish by

fishermen. In some instances the fishermen discarded smaller fish on the pond bank. Failure of fish to bite has plagued fishermen since the first primitive man attached a sharp bone to a strip of rawhide. Persons who pay an entrance fee to fish expect to receive some return on the expenditure. Word-of-mouth advertising also is enhanced by persons who have a pleasant fishing experience.

DEMAND FOR RECREATIONAL CATFISH FACILITIES

Factors Affecting Demand

The primary consideration in determining the feasibility of establishing a fishout catfish operation is the magnitude of demand. Without sufficient demand even the ideally managed operation will fail because of insufficient revenue. The demand for fishout enterprises is determined by the amount of fee fishing customers desire at a specified location at a specified price. Several factors influence this demand.

Population of the surrounding area must be considered before establishing a fishout facility. Large population areas in the vicinity of the ponds generate a greater demand. For the sample taken, the average population center nearest a catfish operation was 3,700 people, but 21 per cent of the operations were close to population centers of over 9,000 people. Since increases in population lead to a proportional increase in outdoor recreation participation, ponds located in areas that have demonstrated population growth have higher visitation potential than ponds in areas of declining population.

The distance to population centers from the fishing facilities also affects demand. Among the sample interviewed, 42 per cent of the operations were within 5 miles of a population center and only 3 per cent were over 20 miles from a town. Short travel distance increases fishout participation since less time is required and expensive modes of transportation are not necessary. Longer distances require more time and expense in reaching the site, and this could be expected to reduce business.

Fishout demand is also influenced by the location of ponds with respect to nearby highways. Ponds close to main highways have a higher potential demand than ponds adjacent to farm or all weather roads. Ponds that can be seen from the road also have higher demand than ponds that cannot be seen. The pres-

ence of signs indicating that fishing privileges are available also increases fishout demand.

Acreage of water and number of ponds in catfish production also affect demand. The catfish operations studied averaged 9.16 acres of water and slightly more than two ponds per operation. Operations with larger acreage have greater demand than smaller operations, and those with multiple ponds and different sizes and varieties of fish also enjoy greater demand than single-pond operations.

In the survey conducted, the average enterprise had been in operation approximately 2.5 years. Time in business has an important effect on successful operation of catfish ponds. Not only do managerial techniques improve with experience, but demand changes with time as more potential customers have time to become acquainted with the operation through written and word-of-mouth advertising. Longer operating time also indicates larger fish for the strictly fishout operations. In recreational fishing, operations with larger fish size experience a different demand than operations with smaller fish.

The amount of fish harvested from a pond is important when determining fishout demand. Although highest returns from properly managed ponds result when a high proportion of the fish are harvested, the operator must keep a large supply of catchable size fish available. Ponds with more fish available supply and generate a greater demand than ponds with a small number of fish remaining. In a pond almost harvested, fishermen will not catch fish as frequently as in a fully stocked pond and, as a result, fishout demand will dwindle.

The number of days an operation opens for business is a direct factor in determining demand. An operation open for business only 1 day a week has a different demand than an operation open 7 days a week. Operations opened on weekends also show a different demand than ponds closed on weekends. In the survey, over 70 per cent of the operations were open on Saturday and less than 40 per cent were open on Sunday.

Income is accorded a primary position in demand determination. The cost of participating in fishout facilities has an important effect on demand, as does type of fee system used. The majority of fishout operations charged either 50 or 60 cents a pound for the fish caught. Some charged entrance fees and ad-

ditional charges for fish caught. The average income of the population of surrounding areas affects demand determination. Low income areas offer less potential demand for fishout facilities than high income areas.

The presence of concessions also affects demand for fishout operations. Food and soft drink facilities, bait shops, boats, and picnic areas are among the attractions that fishout operations utilized to increase demand. Extra facilities are not always employed to make more profit, but often as a drawing card. Many recreationists devote an entire day to fishing, and concession facilities influence their choice of sites.

Demand determining factors are of two types — qualitative and quantitative. An example of a qualitative factor is the presence of a farm road or main highway adjacent to a pond. The fact that total revenue is increased or decreased by the presence or absence of certain levels of qualitative factors is evident, but relationships are not so obvious as is the case with quantitative factors. Acreage of water in an operation is an example of a quantitative factor. As the number of acres increases, the relationship to increases or decreases in total revenue can be determined. Other examples of quantitative factors are distance of pond from the highway and amount of advertising. Among qualitative factors is the presence of picnic or boating facilities.

Demand Relationships

Three factors were significantly associated with the level of total fishout revenue. Increased distance from a main thoroughfare was inversely related to total revenue. On the average, total revenue was reduced by about \$830 for every additional mile the fishout operation was located from a main highway. Access was important to fishout operations. When ponds were difficult to find, the number of visitors dropped accordingly. While fishout operations can exist some distance from main access roads, lower revenue generally results. Land acquisition costs may be decreased with increasing distance from towns, freeways, or main highways; thus, operators must balance the lower land costs against the tradeoff for lower revenue from fishout operations.

In many cases operators added fishout operations to existing farms. Therefore, locational factors were fixed by ownership patterns. Since the owner had little possibility of determining location with respect to roadways, his decision was simply one of

whether a fishout catfish operation was a reasonable alternative at the existing location.

Total available water acreage influenced total revenue. While the relationship appeared obvious, the solution was not trivial. The number of ponds available did not influence total revenue; thus, fishermen were seeking larger bodies of water and not more individual ponds per operation. A larger pond had the advantage of allowing both boat and bank fishermen. Each fisherman could attain a relatively greater degree of isolation. On the average, the addition of 1 acre of water increased fishout revenue by about \$120. The revenue gain from the additional acreage of water must be weighed against construction costs of the additional acreage. The form of adding the acre would influence the amount of cost involved. Construction of a 10-acre pond was not 10 times as great as construction of a 1-acre pond.

Given a fixed location and pond acreage, an operator can increase revenue only by harvesting a greater quantity of fish. Many of the fishout operations visited were constructed for commercial production and changed to fishout when marketing problems were encountered. While commercial ponds may be used for fishout, the goals of the buyer are entirely different. Commercial buyers are seeking regular shaped, smooth-bottom ponds with catch basins. Customers of fishout ponds are seeking pleasant recreational experiences enhanced by pleasant surroundings, shade, and an irregular shoreline and bottom for testing different fishing theories. The primary feature for fishout, however, is success in attracting fish to the hook.

Management techniques that increased the probability of successful catches were completely foreign to commercial operations. Feeding at random intervals over the entire pond instead of regular feeding at a fixed location accustoms the fish to receiving feed at all times and all locations in the pond. While maximum growth and feed efficiency are not obtained in this manner, customer satisfaction increases.

Since the number of fish in the pond is directly related to the probability of fishing success, the operator can increase fishout returns by continually stocking grown fish to replace fish that are caught. Some commercial producers grow fish strictly for sale to fishout operations. Stocking grown fish eliminates the lag time while fingerlings grow to maturity.

Managers able to capitalize on various techniques realized an

extra \$65.71 for each additional 1 per cent of the stocked fish that were harvested. Each fish that remained unharvested represented a cost of production unmatched by any returns. A rapid turnover of stocked fish lowered feed cost per pound harvested and allowed fixed costs to be spread over more units.

The fishout operations received approximately \$1,000 more gross revenue from fish than combination operations received from the fishout portion of the operation. The demand equations reflected this difference. Combination firms allowed fishing before draining the ponds, but major revenue was from commercial sales.

The qualitative variables generally did not influence fishout returns. Only the presence of advertising signs was significantly related to the level of returns. Operators with signs were conducting fishout catfish operations in a business-like manner, as reflected by their gross revenue of about \$2,500 above the average of all fishout operations. The remaining qualitative variables were not expressed since essentially all operators either did or did not have each activity considered. Thus, all operators allowed picnicking but few had picnic facilities and few sold bait or rented boats.

Analysis of the qualitative factors indicated that increased awareness of the existence of a well stocked catfish pond by the surrounding population increased total revenue at the pond. People learned about existence of the pond by various means, such as the pond could be seen from the road, signs were present, or other means of advertising had been used. Since a majority of the samples were taken from areas of limited population, effects of population were not readily visible. However, ponds located in larger population areas experienced greater demand.

The demand for recreational catfishing at any individual site was influenced by amount of water available, access to the site, awareness of the site, and management practices that attempted to ensure a full creel of fish. All the variables were related. Fishout catfish operators must recognize the market demand and attempt to supply a product — a recreational catfishing experience — in an acceptable package that includes a scenic lake, picnic tables, bait, boats, and additional recreational facilities for members of families not fishing. Such a product package is necessary to maximize revenue and ensure continuance in a highly competitive industry.

SUMMARY AND CONCLUSIONS

Increasing population, higher incomes, greater mobility, and urbanization have resulted in an increase in the amount of natural recreation per capita. The decline in the ratio of natural fishing areas to fishing demand opened opportunities for fee fishing as a farm enterprise. Consideration of fee fishing should be subject to the same analysis as consideration of a hog or poultry operation. This analysis must determine if requirements of the enterprise fit within the land, labor, and management capabilities of the farm.

A complete inventory of all fishout catfish operations in Alabama was undertaken during 1971. Two types of fishout operations were identified: (1) operations where fish were harvested only by hook and line, and (2) operations where some fish were harvested by hook and line, after which the pond was drained and the remaining fish harvested with nets. The strictly fishout operations received higher incomes from fishing than combination operations yet experienced difficulties attaining enough customers to sustain the business.

The level of business was low for most fishout operations and did not warrant full-time supervision of the lakes. Lack of supervision reduced revenue and increased maintenance problems. Some customers did not keep all of the fish caught and others did not pay for their catch. In addition, fishout producers were subject to similar production problems as commercial producers.

Three factors were highly related to the demand for fishout at any site: (1) distance of the site from the main highway, (2) the number of acres of water available at the site, and (3) the percentage of stocked fish harvested. The distance from the highway could be partially overcome by advertising. The percentage harvested could be increased by various management techniques, and the amount of water could be increased if suitable pond sites were available.

Most of the fishout ponds were not originally designed for that purpose. The operators built ponds intending to drain, harvest, and sell to commercial buyers. When buyers were not available in some locations, the operators attempted to recover a portion of production costs by allowing fishout.

Before a farm operator enters fishout production the answer to several questions should be determined. First, is the surround-

ing population of sufficient size to ensure an adequate demand for catfish fishing? Second, can an attractive fishout pond operation be designed and built on existing land or on land subject to purchase? Third, does the operator have the knowledge and skill necessary to raise catfish and conduct a fishout business? Fourth, is sufficient labor available to properly supervise and maintain the operation? Fifth, do management and labor have the personality and desire to engage in a business where income depends on customer satisfaction? All of these questions must be answered in the affirmative.

A recreational catfish pond is not precisely similar to hog or poultry production in terms of marketing. Rather than taking the production to market for sale the market must come to the production. The problem is enticing sufficient customers to visit the catfish pond so that revenue will cover production costs. Unless the availability of fishing is publicized in some manner, returns from fishout may be disappointing.

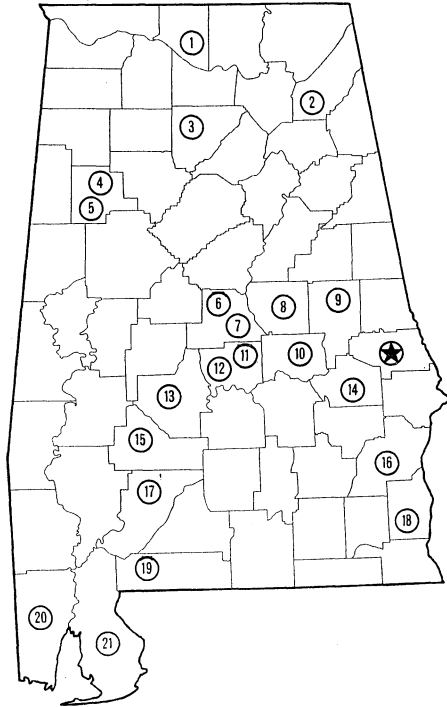
Recreational catfish ponds may be developed as a business or a hobby. In either situation the operator should recognize the realities of demand. Only a limited number of persons desire to pay to fish for catfish. If the pond is located in a sparsely populated area, the number of customers will be quite small unless the fishout operation is established as part of an entire recreational complex with facilities for numerous recreational activities to attract customers from greater distances.

SELECTED BIBLIOGRAPHY

- (1) AUBURN UNIVERSITY COOPERATIVE EXTENSION SERVICE. 1965. Alabama Outdoor Recreation Directory. Auburn Univ., Auburn, Ala.
- (2) CLAWSON, MARION. 1964. "How Much Leisure, Now and in the Future?" Leisure in America: Blessing or Curse? The Amer. Acad. of Pol. and Soc. Sci. Philadelphia.
- (3) BUREAU OF OUTDOOR RECREATION. 1965. Survey of Outdoor Recreation. U.S. Gov. Print. Off. Washington, D.C.
- (4) DEPARTMENT OF AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY. 1970. Alabama's Statewide Comprehensive Outdoor Recreation Plan, Volume 2, Demand for Outdoor Recreation in Alabama. Dept. of Con. and Nat. Res. and Auburn Univ. (Ala.) Agr. Exp. Sta. Auburn, Ala.
- (5) ----- . 1970. Alabama's Statewide Comprehensive Outdoor Recreation Plan, Volume 6. Ala. Dept. of Con. and Nat. Res. and Auburn Univ. (Ala.) Agr. Exp. Sta. Auburn, Ala.
- (6) HORVATH, JOSEPH C. 1969. "The Leisure Time Industry - Its Future in Georgia." Atlanta Economic Review, XIX, No. 4.
- (7) MCCOY, E. W. AND L. A. WRIGHT. 1970. Vacation Activities of Alabama Residents. Auburn Univ. (Ala.) Agr. Exp. Sta. Cir. 178. Auburn, Ala.
- (8) OUTDOOR RECREATION RESOURCES REVIEW COMMISSION. 1962. Outdoor Recreation for America (A Report to the President and to the Congress). U.S. Gov. Print. Off. Washington, D.C.

AGRICULTURAL EXPERIMENT STATION SYSTEM OF ALABAMA'S LAND-GRANT UNIVERSITY

With an agricultural research unit in every major soil area, Auburn University serves the needs of field crop, live-stock, forestry, and horticultural producers in each region in Alabama. Every citizen of the State has a stake in this research program, since any advantage from new and more economical ways of producing and handling farm products directly benefits the consuming public.



Research Unit Identification

★ Main Agricultural Experiment Station, Auburn

1. Tennessee Valley Substation, Belle Mina.
2. Sand Mountain Substation, Crossville.
3. North Alabama Horticulture Substation, Cullman.
4. Upper Coastal Plain Substation, Winfield.
5. Forestry Unit, Fayette County.
6. Thorsby Foundation Seed Stocks Farm, Thorsby.
7. Chilton Area Horticulture Substation, Clanton.
8. Forestry Unit, Coosa County.
9. Piedmont Substation, Camp Hill.
10. Plant Breeding Unit, Tallassee.
11. Forestry Unit, Autauga County.
12. Prattville Experiment Field, Prattville.
13. Black Belt Substation, Marion Junction.
14. Tuskegee Experiment Field, Tuskegee.
15. Lower Coastal Plain Substation, Camden.
16. Forestry Unit, Barbour County.
17. Monroeville Experiment Field, Monroeville.
18. Wiregrass Substation, Headland.
19. Brewton Experiment Field, Brewton.
20. Ornamental Horticulture Field Station, Spring Hill.
21. Gulf Coast Substation, Fairhope.