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# FINAL REPORT

**CONFIDENTIAL**
**ATTORNEY/CLIENT PRIVILEGE**

**Prepared for:**

**MARATHON PIPE LINE COMPANY**

**FINDLAY, OHIO**

**Prepared by:**

**TERRA CONSULTING GROUP, INCORPORATED™**

**BATON ROUGE, LOUISIANA**

## FISH ECOLOGICAL SUMMARY REPORT

## AIRLINE HIGHWAY GASOLINE RELEASE

**July 1996**

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## 1.0 INTRODUCTION

On or about May 24, 1996, Marathon Pipe Line Company (Marathon) discovered a release of approximately 11,308 barrels of unleaded gasoline in the pipe line right-of-way adjacent to U.S. Highway 61 (Airline Highway) in St. James Parish approximately 3 miles northeast of Gramercy, Louisiana. The release resulted from a ruptured Garyville-to-Zachary 20-inch pipe line owned by Marathon. Two tributaries of Blind River in the vicinity of the gasoline release site served as conduits for the movement of an unknown quantity of the gasoline into Blind River (Figure 1). A cypress-tupelo gum swamp habitat (McElroy Swamp) surrounds the release site and borders Blind River (Figure 1).

### 1.1 Purpose

This report summarizes the ecology and natural history of selected fish species from Blind River. Anecdotal field observations are also reported for the period of May 25, 1996 - June 12, 1996.

## 2.0 OCCURRENCE OF FISH SPECIES IN BLIND RIVER

A total of 57 species of fish, representing 23 families and 12 orders have been reported from Blind River (Watson et al. 1981). Additional species expected to occur but not collected are also listed. Estuarine faunal components are not likely to occur within the upper portions of Blind River near the spill site, but are more abundant near the mouth of Blind River, which flows into the Lake Maurepas estuary system. Centrarchid fish species were most dominant, while clupeids, ictalurids, poecilids, and cyprinodontids were also numerically abundant (Watson et al. 1981). The Amite River Diversion Canal

was reported to be a point of separation between the upper portion and lower portion of Blind River. Low dissolved oxygen levels above the diversion canal may represent a distributional barrier for bottom-dwelling fish. Highest fish diversity was reported from lower Blind River where all 57 species were collected (Watson et al. 1981). This reflects the additional estuarine species that primarily occur in the lower reaches of Blind River.

An area for potential environmental impacts (e.g., gasoline or oil spills) is the Manchac Wildlife Management Area in adjacent St. John the Baptist Parish. The fish fauna of the Manchac Wildlife Management Area and Lake Maurepas was surveyed by Hastings (1987) and Hastings et al. (1987). The vegetation of this area was described by Platt (1988).

## 3.0 TARGET SPECIES ACCOUNTS

Fish species collected from Blind River on May 31, June 4, and June 13 of 1996 for chemical residue analysis were largemouth bass (Micropterus salmoides), bluegill (Lepomis macrochirus), choupique (Amia calva), and channel catfish (Ictalurus punctatus) (Figure 2). Therefore, species accounts/ecological profiles of these target species are presented in this section. Detailed ecological information may be found within the cited references. Habitat suitability index (HSI) models for largemouth bass, bluegill, and channel catfish have been presented by Stuber et al. (1982a, b) and McMahon and Terrell (1982). These HSI models are valuable tools for impact assessment and habitat management activities. Variables known to affect fish growth, survival, abundance, or other measures of well-being are addressed by the riverine HSI model. The following components are evaluated: food component, cover component,

water quality component, reproduction component, and "other" component. A model of reservoir largemouth bass populations that can be used for estimating stress-induced reductions in fish populations has been presented by Bartell (1990). Other species of sport fish in upper Blind River include redear sunfish (Lepomis microlophus), white crappie (Pomoxis annularis), black crappie (P. nigromaculatus), flathead catfish (Pylodictis olivaris), and blue catfish (Ictalurus furcatus). Economic values for these sport fishes, as determined by Louisiana Department of Wildlife and Fisheries (LDWF), were presented by Watson (1990). Table 1 summarizes life history characteristics of the five species of fish that are reported to have been most impacted by the spill.

### 3.1 Largemouth Bass (Micropterus salmoides)

Two subspecies occur in Louisiana, the northern largemouth bass (Micropterus salmoides salmoides) and the Florida largemouth bass (Micropterus s. floridanus). Because of the great sport demand for this species, largemouth bass have been stocked throughout North America. Spawning in Louisiana occurs in the spring when water temperature reaches 12.0 - 15. 5 °C, and may continue from February to the middle of summer. Peak months for spawning are March and April when temperatures range from 16 to 22°C. Spawning females are at least one year old or 10 inches long.

Largemouth bass seldom build nests in areas with current or wave action. The males construct the nests which consists of depressions near the shore at a depth of 0.3 - 0.9 m, in a substrate of submerged vegetation, sand, gravel, or mud, based on availability. A female may mate with several males in different nests, therefore depositing several batches of eggs in nests during a short period of time. Eggs (2,000 - 50,000) are laid in

the center of the nest and some eggs may be covered with substrate as a result of the spawning activity. Eggs are enclosed by a glutinous mass and sink to the bottom where they become attached to sticks and other debris. Males guard the nests and the resulting larvae. At 18.9 °C, eggs hatch in 5 days and in 2 days at 22.2 °C. Hatchling larvae are unpigmented and remain in the nest for several days before moving to the surface and forming a school near the spawning area. After a period of growth and increased activity, larvae eventually disperse into shallow water and weedy areas. Small juveniles remain in tightly formed schools. Plant beds are used as refuge for juveniles.

Phenotypic plasticity in body size is observed, even in juveniles hatched from the same batch. As juveniles grow larger, cannibalism may occur. Larger juveniles may become more solitary. For juveniles, major food items are cladocerans, chironomid larvae, amphipods, copepods, and small invertebrates. Larger juveniles prey on aquatic insects or small fish such as golden shiner, threadfin shad, bluegill, and largemouth bass larvae. The feeding strategy of juveniles includes ambushing and chasing of prey at high speeds. Adult bass feed mainly on other fish and crawfish, but will consume nearly anything that lives in the water. The age of maturity ranges from one year in the south to 2 - 4 years in the north. The maximum recorded age is 15 years.

In Louisiana, the average size of largemouth bass is probably less than two pounds, but larger specimens commonly occur. The normal rate of growth is 454 g per year. Largemouth bass may tolerate a wide variety of water types, including fresh or brackish, murky or clear. Successful stocking of Florida largemouth bass has been conducted by

LDWF. Specific habitat requirements are discussed in the HSI model (Gresham; Stuber et al. 1982b; Wang 1986; Constant 1990; LDWF, 1995a).

### 3.2 Bluegill (Lepomis macrochirus)

Spawning occurs from April through September in shallow waters (17 - 31 °C; peak 24 - 27 °C) with vegetation, tree roots, and tree shade. Bluegills spawn between one year of age, or younger, if they weigh more than one ounce, and three years. Males excavate depressions of one to two feet in diameter on sandy, gravel, or hard clay bottoms and then add sticks, dead leaves and pine needles as spawning substrate. Individual males build and defend their own nest. Several males may nest in close proximity and nesting areas may become overcrowded. Eggs (2,000 - 64,000), hatch in approximately 32 hours at 22.2 - 23.2 °C. In the field, hatching may take 2 - 3 days at 20 °C. Most nests are empty by August, although males may continue to guard them. Hatchling larvae remain in the nest until their eyes are pigmented and the yolk is absorbed. Fry become free-swimming after six days. Larvae occur at all depths, but are most concentrated towards the bottom.

Bluegills may grow from 0.5 - 3 inches during their first summer, depending on their hatching date and food availability. In their second year, bluegills may reach 8 - 10 inches if food and space are abundant. Overpopulation of bluegill may result in stunted growth and may prevent or reduce spawning. Juveniles occur in small schools near or among plant beds. Juveniles feed on copepods and cladocerans, planktonic crustaceans, and aquatic and flying insects. Juveniles and adults feed on zooplankton, and aquatic and terrestrial insects. Maximum life span has been reported at 8 - 10 years, but most

bluegills live one to four years. The maximum length is 39 cm and the Louisiana record is about two pounds. Bluegills are tolerant of fresh and brackish conditions, and a wide range of water types. Specific habitat requirements are discussed in the HSI model (Gresham; Stuber et al. 1982a; Wang 1986; LDWF, 1995a).

### 3.3 Channel Catfish (Ictalurus punctatus)

Spawning occurs in late May through mid-July when water temperatures reach 21 °C. The body of males becomes darker and lips thicken during the reproductive season. One or both parents construct nests in crevices and holes. Spawning sites may include undercut banks, hollow containers, submerged logs, and other secluded or dark places. Eggs, which are adhesive, are deposited in a large, flat gelatinous mass. After spawning occurs, the male drives the female away, and starts to guard and aerate the eggs. During incubation, the male may eat some of the eggs. Eggs hatch in 7 - 10 days at 24 - 26 °C and in 6 days at 24 °C. Hatchlings stay at or near the nest for a few days. Males guard the nest until the young disperse. Subsequently, the school of young may stay together for several days or perhaps weeks before breaking up. Small juvenile catfish have been reported to swim near the surface. Channel catfish less than 100 mm total length (TL) feed on aquatic invertebrates. Individuals less than 20 cm feed mainly on crustaceans and insect larvae. Larger juveniles may consume aquatic insects, crawfish and fishes.

Maturity is reached at 2 - 8 years. Adults are opportunistic feeders with a diet that includes terrestrial and aquatic insects, detrital and plant material, crawfish, and molluscs. Fish may make up a substantial part of the diet in catfish greater than 50 cm in length.

Bottom feeding is characteristic, but food is also acquired throughout the water column. The channel catfish has been extensively used for aquaculture in the United States. Large rivers are the preferred channel catfish habitat, but the species can adapt to small turbid farm ponds. Specific habitat requirements are discussed in the HSI model (McMahon and Terrell 1982; Wang 1986).

### 3.4 Choupique (Amia calva)

The choupique is a relic of an ancient group of fish. It is a large predator that is usually found in sluggish, shallow, weedy lakes, swamps, and backwater areas. This species has a fleshy and vascular swimbladder connected to the esophagus that allows for surface respiration to supplement oxygen supplied by the gills. This physiological adaptation allows the choupique to inhabit waters low in oxygen. Choupique are used as food in some areas, including Louisiana. Spawning occurs during the spring (April through June) at a water temperature of 16 - 19 °C. The male constructs a nest in shallow water in quiet bays or backwaters of rivers and then guards the excavation. Eggs hatch in about 10 days. Hatchlings have an adhesive organ at the tip of the lower jaw. The male parent guards young choupique, which associate in compact schools until a size of 10 cm. Sexual maturity is reached at a length of about 18 in. (males) and 24 in. (females) at ages of 2 - 4 years. Females which are between 4 - 5 lbs may produce 23,000 - 64,000 eggs.

The life span has been reported to be as long as 30 years in an aquarium, but is normally about 10 years in wild populations. The world record size is a 9.74 kg (21.5 lb) specimen from South Carolina. In Louisiana, adult choupique have been reported to feed on grass shrimp, crawfish, fish and insects. Food items for fingerlings include planktonic

crustaceans, and small insect larvae and naiads (Stacy 1967; Etnier and Starnes 1993; LDWF 1995b).

## 4.0 FIELD OBSERVATIONS OF AQUATIC ORGANISMS

Data concerning the species and total numbers initially killed after the gasoline spill are retained by Marathon Pipe Line Company and the Louisiana Department of Wildlife and Fisheries (LDWF). Although game fish have been emphasized in the assessment of the fish kill, it should be noted that all fish species (game fish and non-game fish) and other aquatic organisms (e.g., frogs, salamanders, turtles, snakes, invertebrates) in close proximity to the spill were likely killed. The following narrative provides anecdotal observations concerning the fish kill in Blind River.

On May 25, 1996, one dead juvenile alligator (Alligator mississippiensis) (1.5 - 2.0 m) was observed on the shoulder of I-10, approximately 0.25 miles south of the Blind River bridge. It is possible that this alligator was killed by oncoming traffic and that the mortality is not related to the gasoline spill. However, based on field experience in southern Louisiana, alligators infrequently cross Interstate roads. Most crossings occur at lowland state or parish highways. On May 26, 1996, two dead channel catfish (Ictalurus punctatus) were observed at water sample station three, which is south of the railroad bridge and within the area considered by LDWF to be the main impact zone. This species has not previously been reported in fish kill counts.

On May, 26, 1996, many dead spotted gar (Lepisosteus oculatus) and one large dead alligator gar (Lepisosteus spatula) were observed on the river bank near the main impact

zone. One live juvenile (1 m) alligator was observed near water sample station four, which is within the main impact zone. On May 27, 1996, green treefrogs (Hyla cinerea) and bird-voiced treefrogs (Hyla avivoca) were heard calling near the railroad bridge at Blind River; one alligator was also observed in the vicinity.

On May 29, 1996, one dead spotted gar (Lepisosteus oculatus), one dead Amphiuma tridactylum, and one dead stinkpot turtle (Sternotherus odoratus) were observed at the junction of tributary #5 and Blind River. During a fish shocking trip on May 31, 1996, several alligators were observed between the U.S. 61 bridge and the I-10 bridge and one green water snake (Nerodia cyclopion) was observed near the St. James Boat Club boat launch. On June 5, 1996, one dead red swamp crawfish (Procambarus clarkii) was observed floating in tributary #5.

On June 11, 1996, several dead mussels (Anodonta sp.) and one dead red-eared slider (Trachemys scripta) were observed along the river bank in the vicinity of tributary #5. The following live species were observed north of I-10 on June 12, 1996: two red-eared sliders, one stinkpot, one alligator (approximately 2 m), and cricket frogs (Acris sp.) were heard calling.

Bronze frogs (Rana clamitans) were heard calling on numerous occasions throughout the area of concern. A St. James Parish deputy sheriff reported that, at night, he had caught approximately 17 catfish and approximately 12 large bullfrogs (Rana catesbeiana) upstream near the intersection of the southern access canal with Blind River. The deputy also noted that he had eaten both the catfish and frog legs.

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# TABLES

# TABLE 1
## Summary of Life History Characteristics of Selected Fish Species from Blind River, Louisiana

| Species | Sport Fish | Spawning | Habitat/WQ | Physiological Adaptation | Adult Diet | Economic Ranking |
|---|---|---|---|---|---|---|
| Largemouth Bass | Yes | February - Summer | Adaptable WQ | ------- | Fish/Crawfish/ Other Vertebrates | 1 |
| Bluegill Crappie Other Sunfish | Yes | Repeat spawners Spring - Summer | Tolerant WQ | ------- | Insects, Fish, Crustaceans | 2 |
| Channel Catfish | Yes | May - July | Benthic | ------- | Opportunistic: Insects, Crawfish, Molluscs, Fish | 3 |
| Gars | No, but human consumption | Late Spring | Surface/Shallow Water | Swim Bladder | Fish | 4 |
| Choupique | No, but human consumption | Spring April - June | Surface/Shallow Water | Swim Bladder | Crustaceans Fish | 5 |

# FIGURES

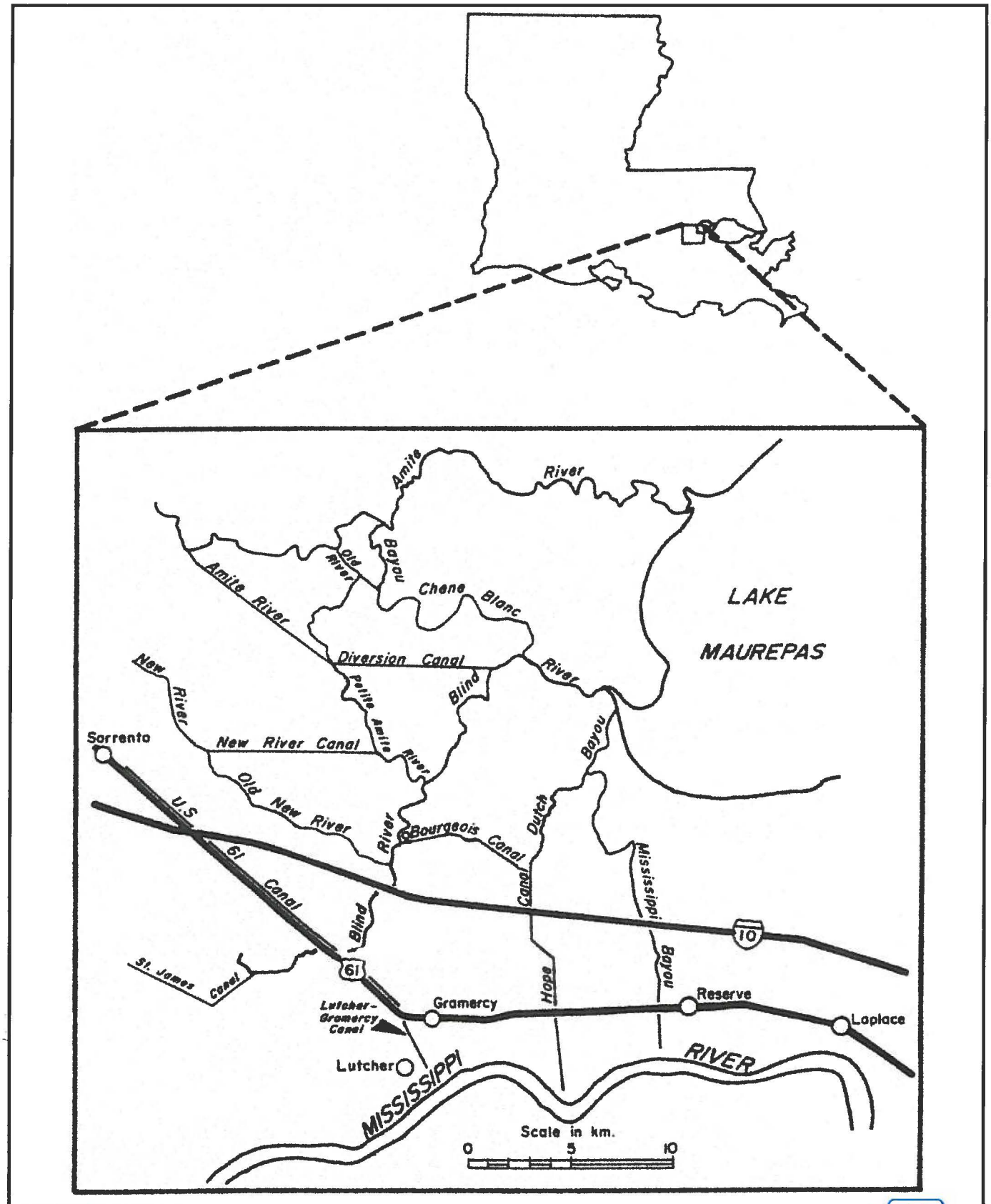


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**Figure 1: Blind River Reference Map** (adapted from Watson et al. 1981)

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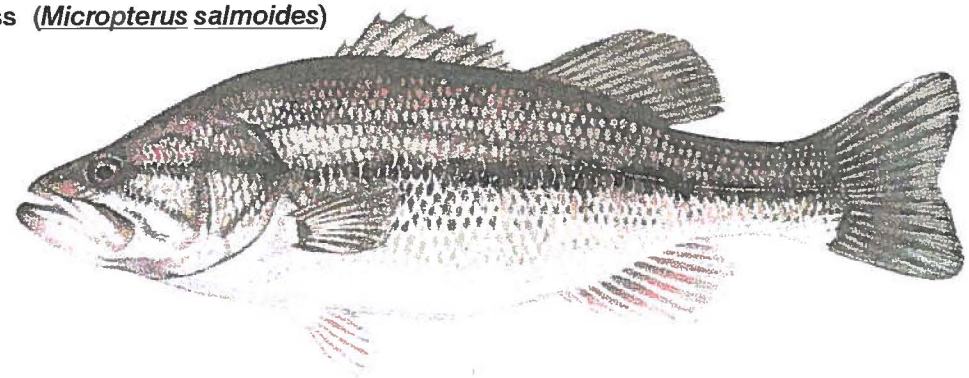
Largemouth Bass (*Micropterus salmoides*)



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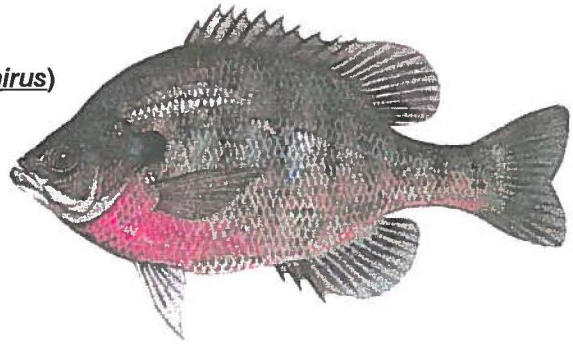

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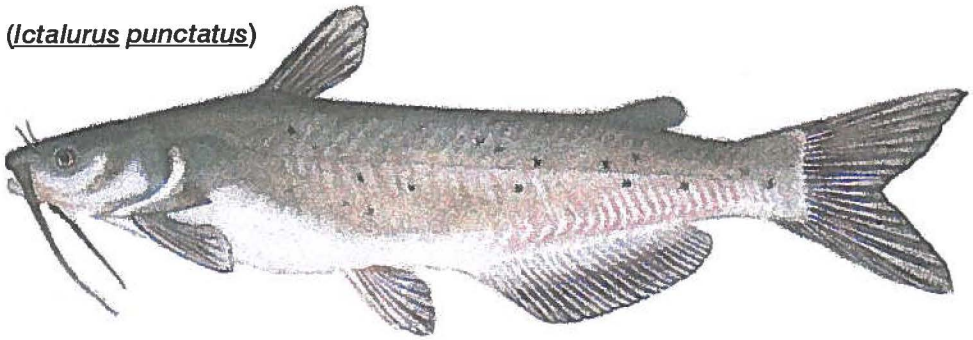

Choupique (*Amia calva*)

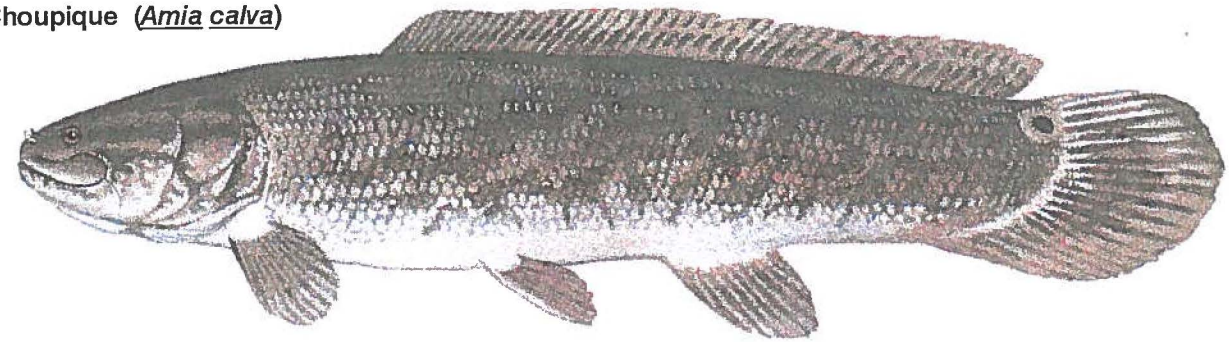

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**Figure 2: Blind River Target Fish Species (May/June 1996)**

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