FINAL REPORT

Survey for *Lampsilis rafinesqueana* in the Illinois River a the Proposed Siloam Springs Water Intake Structure

Prepared by:

John L. Harris, Ph.D.
Welch/Harris, Incorporated
12301 Pleasant Forest Drive
Little Rock, AR 72212

14 August 1991

Survey for *Lampsilis rafinesqueana* in the Illinois River at the Proposed Siloam Springs Water Intake Structure

Introduction

The City of Siloam Springs, Benton County, Arkansas has proposed to construct a water intake structure, pump station, and facility access in and adjacent to the Illinois River, Benton County, Arkansas. Lake Francis currently serves as the water supply for Siloam Springs but the dam was damaged during floods and is no longer functional. The project area is located between the Arkansas Highway 59 crossing of the Illinois River and the Oklahoma - Arkansas state line, approximately 7.5 kilomters (4.6 miles) south of Siloam Springs (Figure 1).

Project plans call for construction of a water intake structure in the Illinois River and a pump station building approximately 30 meters north of the river. The approximate location of the proposed structures is illustrated in Figure 2.

The Neosho mucket (*Lampsilis rafinesqueana*) is listed as a Category 2 species for proposed listing as a federally protected species (U.S. Fish and Wildlife Service, 1989), and is considered threatened in Arkansas (Harris and Gordon, 1987). This species is known only from the Illinois River within Arkansas, but also occurs in the Neosho (Grand) River drainage in Kansas, Missouri, and Oklahoma (Oesch, 1984). The Illinois River is designated an ecologically sensistive water body by the Arkansas Department of Pollution Control and Ecology (1988). Therefore, a survey was

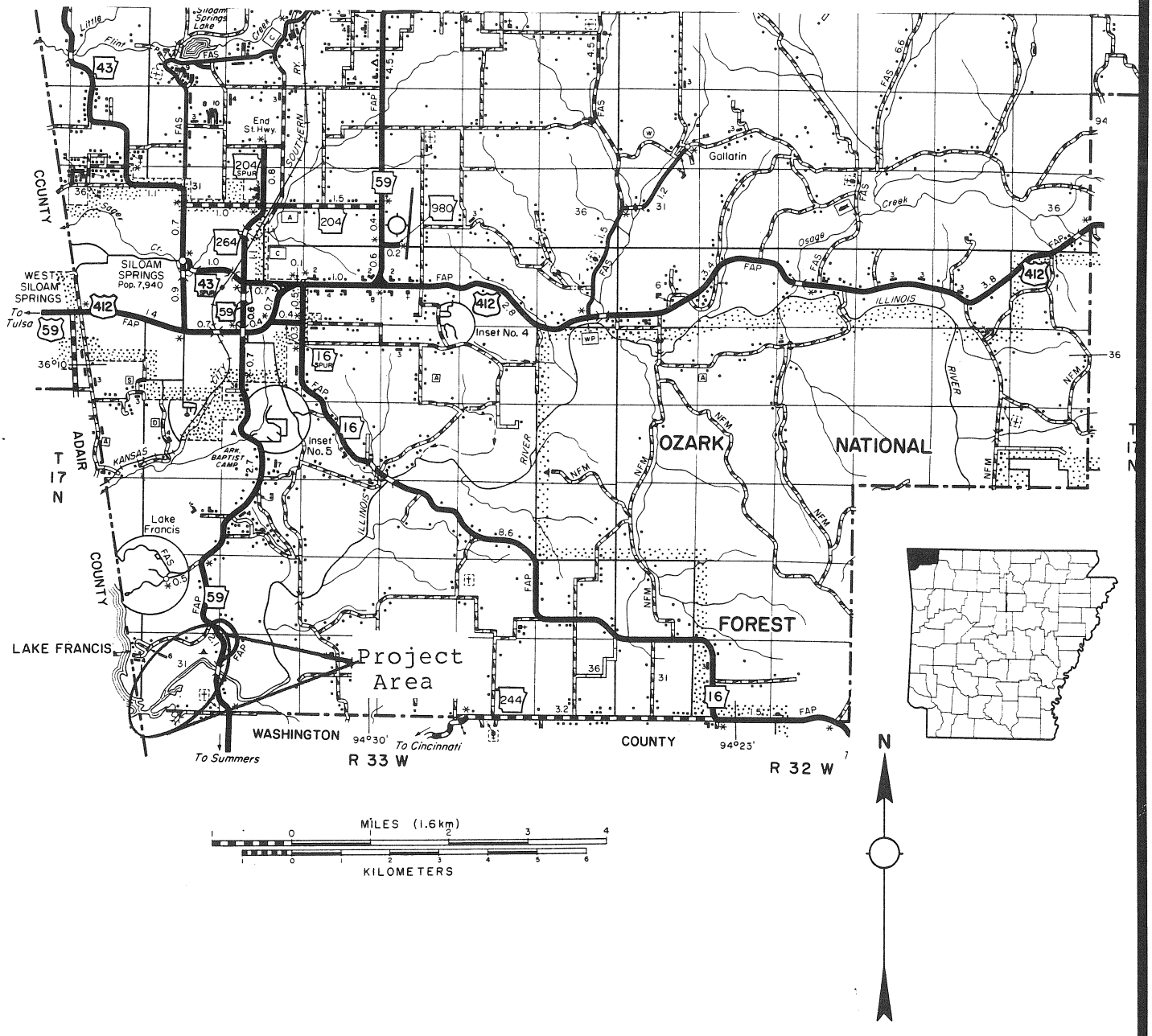

Figure 1. Project location map.

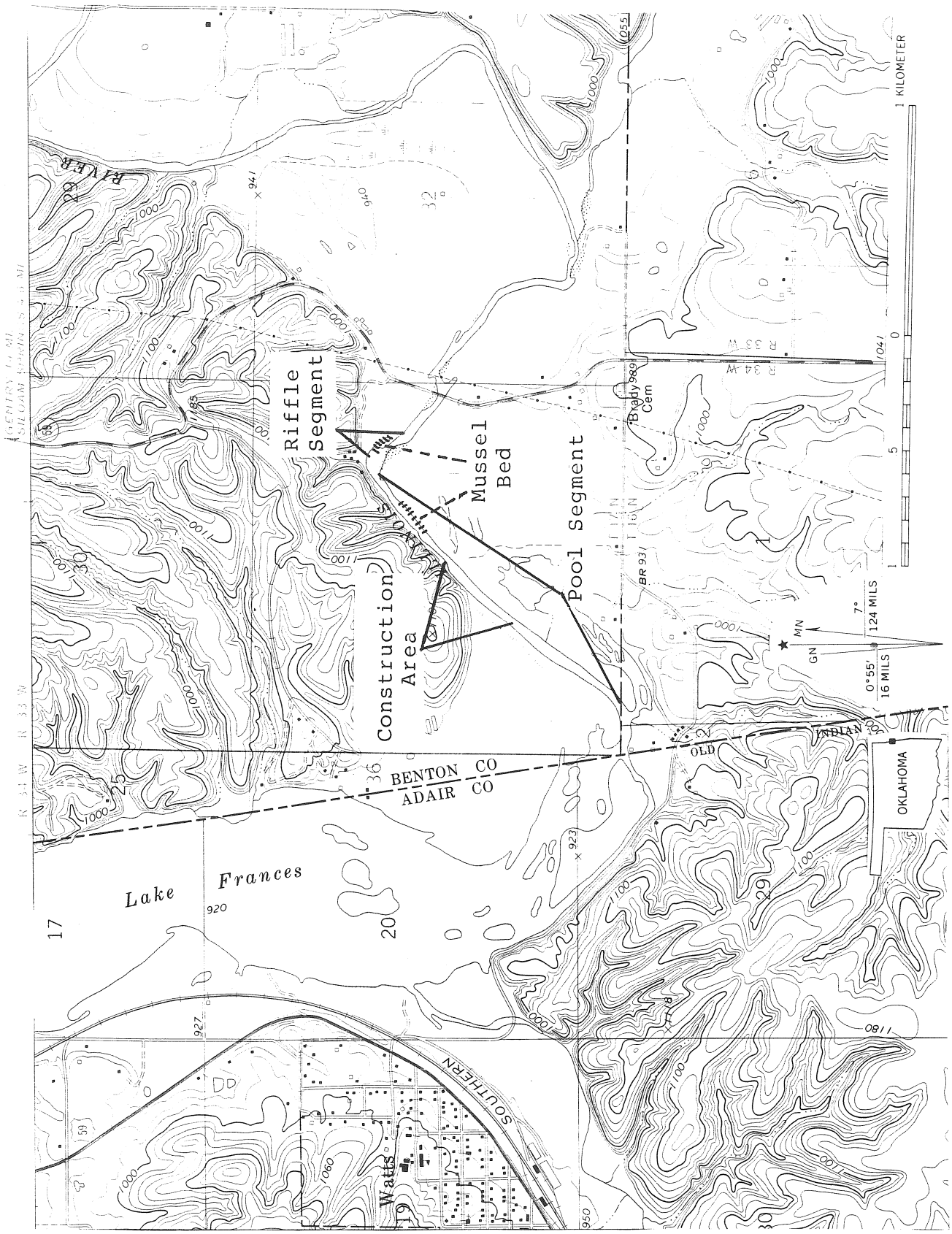

Figure 2. Survey location map.

performed to determine the presence/absence of the Neosho mucket and the condition of mussel resources within the project area.

Survey Area

The Illinois River in the survey area has an upstream drainage of approximately 1475 km^2 (570 mi^2) (Sullavan and Terry, 1970). The survey area is located immediately upstream of the former pool stage for Lake Francis. The pool segment of the river ranged approximately 35 - 40 m in width with water depth ranging 1.5 - 5.0 m. Substrates were predominately gravel and rock with some large expanses of smooth bedrock. Much of the pool segment was very steep banked with little transition zone where silt, sand, or clay deposits had formed. Sand and silt substrates were limited to small patchy areas, primarily along the south bank at the upstream end of the pool segment.

A riffle/run segment was located at the upper end of the survey area. The riffle was divided into two sections by a gravel island. Each riffle segment was approximately 60 - 90 m in length with water depth ranging from a few centimeters to approximately 1.5 m. The substrate was predominately gravel with some sand/gravel mixed at the downstream end of the riffle segment. Figure 3 illustrates the pool and riffle run segments of the survey area.

Land use in the area was primarily for livestock grazing, poultry production, and timber production. There appeared to be significant fishing and other recreational use of the pool segment of the survey area. A fishing camp with electricity for

trailer hookups was located on the south side of the pool segment of the survey area.

Methods

The entire length of the survey area was searched by diving in the pool segment and snorkeling in the riffle segment. Dives were performed using a Brownie's Third Lung generator/compressor attached by reinforced hose to a Hookah type regulator.

Approximately 10 man hours were spent diving the pool segment, and approximately four man hours were spent snorkeling the riffle segment. During the survey, underwater visibility was limited to approximately one meter. A zig-zag search pattern from inshore to mid-river and back was utilized in searching the survey area while ascending the river. This procedure was repeated along each shoreline until the entire survey area had been traversed.

Live mussels encountered were collected, identified, enumerated, and replaced in the substrate. Voucher specimens of each species were collected and will be placed in an appropriate museum collection

Results

Table 1 summarizes the results of the survey. The majority of pool segment specimens were collected from a mussel concentration that was approximately 110 m long and one to two meters wide. The shell concentration was located adjacent to the descending left hand bank in approximately 1.5 - 2.0 meters of water over gravel, gravel/sand, and sand/silt substrate. The

Species	Pool Segment		Riffle Segment	
	Live	Dead	Live	Dead
Actinonaias ligamentina mucket	1	3	2	0
Amblema plicata threeridge	47	14	27	0
Anodonta grandis giant floater	4	0	0	0
Anodonta imbecillis paper pondshell	1	0	0	0
Elliptio dilatata spike	2	0	1	1
Fusconaia flava Wabash pigtoe	1	1 1v	9	0
Lampsilis cardium plain pocketbook	2	0	11	0
Lampsilis rafinesqueana Neosho mucket	0	0	3	0
Lampsilis siliquoidea fatmucket	15	1	6	0
Ligumia subrostrata pondmussel	4	0	1	0
Pleurobema coccineum round pigtoe	1	1	0	0
Quadrula pustulosa pimpleback	2	2	1	1
Toxolasma lividus purple lilliput	1	0	0	0
Tritogonia verrucosa pistolgrip	2	0	1	0
Villosa lienosa little spectaclecase	2	0	0	0
Total 15 species	85	22	62	2

Table 1. Mussels collected during survey.

approximate location of this shell concentration is mapped in Figure 2. A few other individuals of threeridge, fatmucket, and pondmussel were found scattered along the length of the pool segment in areas where silt or sand/silt had accumulated.

Shells collected in the riffle segment were concentrated along the right hand descending chute as mapped in Figure 2. This shell concentration was approximately 60 m long and one to three meters wide. The shell bed was located in slower current of the riffle where sand/gravel substrate had formed. Water depth ranged from approximately 0.5 to two meters deep in the shell bed area. Examples of specimens collected in both pool and riffle habitats are shown in Figure 4.

Discussion

Gordon, et al (1979) reported 23 species of unionid mussels from the Illinois River in Arkansas, including the Neosho mucket. Harris and Gordon (1987) determined that it was locally abundant from second order streams to the Arkansas - Oklahoma line in the Illinois River. The Neosho mucket is typically associated with riffle/run habitat in gravel/sand substrate (Oesch, 1984; Harris, unpublished data).

This investigation revealed two concentrations of mussels within the survey area. The pool segment shell bed did not contain specimens of the Neosho mucket, and this bed is probably not of sufficient size, density, or composed of enough high quality shells to be considered a commercial shell resource.

The riffle segment mussel bed did contain specimens of the Neosho mucket and the density of this bed was judged to be approximately twice that of the pool segment bed. It is unlikely that the riffle segment bed can be considered a significant commercial shell resource because of its limited areal size and mussel density. It is likely that additional specimens of the Neosho mucket exist in similar habitat upstream of the survey area limit. However, it is unlikely that the Neosho mucket exists downstream of the survey limit due to the recent influence of Lake Francis.

The proposed construction project is unlikely to directly physically disturb either of the shell beds. Increased turbidity and sedimentation due to intake structure construction and river bank alterations may adversely impact the pool segment mussels. Barring channelization or alteration of flow patterns due to weir construction, it is unlikely that the riffle segment bed will be adversely affected by the proposed project. Therefore, populations of the Neosho mucket are unlikely to be affected by construction of the proposed project.

Best management practices should be implemented during construction of the intake structure and pump station. These should include:

1) No dredging upstream of station 18+00 which is located approximately 200 m downstream of the pool segment bed.

2) If construction of the intake structure must be performed in the dry, cofferdam materials should be pollution free (i.e. sheet metal or lined rock) and bilge water should be pumped through a filtering basin before being returned to the river.

3) Straw filter or fabric filter barriers should line the disturbed slopes of the river bank to filter sediments draining into the river during construction.

4) Temporary and permanent erosion control seeding should be implemented promptly during the project.

5) River bank alterations should be reduced to the absolute minimum necessary to complete the project.

Literature Cited

Arkansas Department of Pollution Control and Ecology. 1988. Regulation establishing water quality standards for surface waters of the state of Arkansas, Regulation No. 2 as amended. Little Rock. 77 pp.

Gordon, M. E., A. V. Brown, and L. R. Kraemer. 1979. Mollusca of the Illinois River, Arkansas. Proceedings Arkansas Academy of Science Volume XXXIII:35-37.

Harris, J. L. and M. E. Gordon. 1987. Distribution and status of rare and endangered mussels (Mollusca: Margaritiferidae, Unionidae) in Arkansas. Proceedings Arkansas Academy of Science, Volume 41:49-56.

Oesch, R. D. 1984. Missouri naiades, a guide to the mussels of Missouri. Missouri Department of Conservation, Jefferson City. 270 pp.

Sullavan, J. N. and J. E. Terry. 1970. Drainage areas of streams in Arkansas: Arkansas River Basin. U. S. Geological Survey, Little Rock. 75 pp.

U. S. Fish and Wildlife Service. 1989. Endangered and threatened wildlife and plants; animal notice of review. Federal Register 54(4):554-579.