

Evaluation of Impacts of Commercial Gravel Dredging
to Three Unionid Bivalve Aggregations in the White River, Arkansas

23 October 1997

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Little Rock, Arkansas 72212

Prepared for:
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Post Office Box 109
Morrilton, Arkansas 72110

Evaluation of Impacts of Commercial Gravel Dredging to Three Unionid Bivalve Aggregations in the White River, Arkansas

Introduction

Christian (1995) surveyed the White River, AR from its confluence with the Black River to its mouth, mapped the areal extent of commercial unionid bivalve aggregations (mussel beds), and determined selected community parameters for three different types (qualitative, minor, major) of beds. Christian (1995) located 51 large (major and minor) mussel beds and numerous other smaller beds. Christian (1995) reported that a least 110 commercial quality mussels beds were known historically in the White River, and suggested that habitat alteration was the cause of decline in number of commercial mussel beds.

On 15 November 1995, the U.S. Army Corps of Engineers, Memphis District issued an Individual Section 404 permit (Department of the Army Permit No. White River - 368) to Mobley Construction Co., Inc., Morrilton, AR for the dredging of sand and gravel for commercial resale from the White River, AR between river miles (RMs) 70.0 - 125.0 and RMs 230.1 - 274.0. Special Conditions of the permit required that no dredging be performed within 0.25 mile (0.40 km) upstream and downstream of 44 mussel beds within the permit area (see Appendix A). In addition, Special Conditions required that a study be conducted for a period of two years at three mussel beds (RMs 251.04-251.40, RMs 235.96-236.65, RMs 241.00-241.33) to monitor for population changes. The permit Special Conditions also required that river bottom contours be provided at appropriate intervals to monitor for signs of headcutting (Hartfield, 1993) due to the mining activity.

Monitoring Area

Three mussel beds were monitored between White RMs 251.04-251.40 (RM 251), RMs 241.00-241.33 (RM 241), and 235.96-236.65 (RM 236). The locations of these monitoring

areas are illustrated in Figures 1 and 2 modified from Maps of White River (Corps of Engineers, 1988). The three beds monitored were located by Christian (1995) and termed “qualitative” beds, which are defined as having mussel densities averaging $<10/m^2$ but no restriction on total area of the bed. Christian (unpublished data, pers. comm.) estimated the mean unionid densities at RM 251, RM 241, and RM 236 to be $<4.0/m^2$, ca. $4.0/m^2$, and $3.0/m^2$, respectively.

Methods

Sampling methodology generally follows Christian (1995) and Harris, et al (1993). The mussel bed area was defined by diver searching transects oriented perpendicular to river flow. Successive transects were searched from upstream to downstream at 50m to 200m intervals until the length and width of the bed were defined. Total length of the bed was determined using a standardized rangefinder. Water depth was determined by a Hummingbird depthfinder.

Following definition of bed limits, quantitative samples were taken. If appropriate, beds were first divided into strata based on differences in substrate composition, physical river structure (e.g. meander, straightaway), and river depth. The number of samples taken was determined by total bed area: a minimum of 10 1- m^2 samples from beds of 500-999 m^2 area, and a bed with area ranging from 1,000-2,500 m^2 was sampled by 1% of its area (i.e. 10-25 samples). The number of samples from each stratum was based on the proportion of the total area each stratum represented. A minimum of three samples were taken from each stratum, and quadrat sample locations were determined from a computer generated random numbers table.

The diver collect unionid bivalves within a 1- m^2 area defined by a weighted 2.5 cm PVC pipe quadrat. The diver manually collected mussels from the substrate and placed them into a nylon mesh dive bag for transport to the surface. At the surface, bivalves were identified, sorted and measured for length, width, and depth to the nearest 0.1 mm using vernier calipers. All mussels collected were kept alive for transport to the Mammoth Spring Fish Hatchery for incorporation into the White River Refugium project.

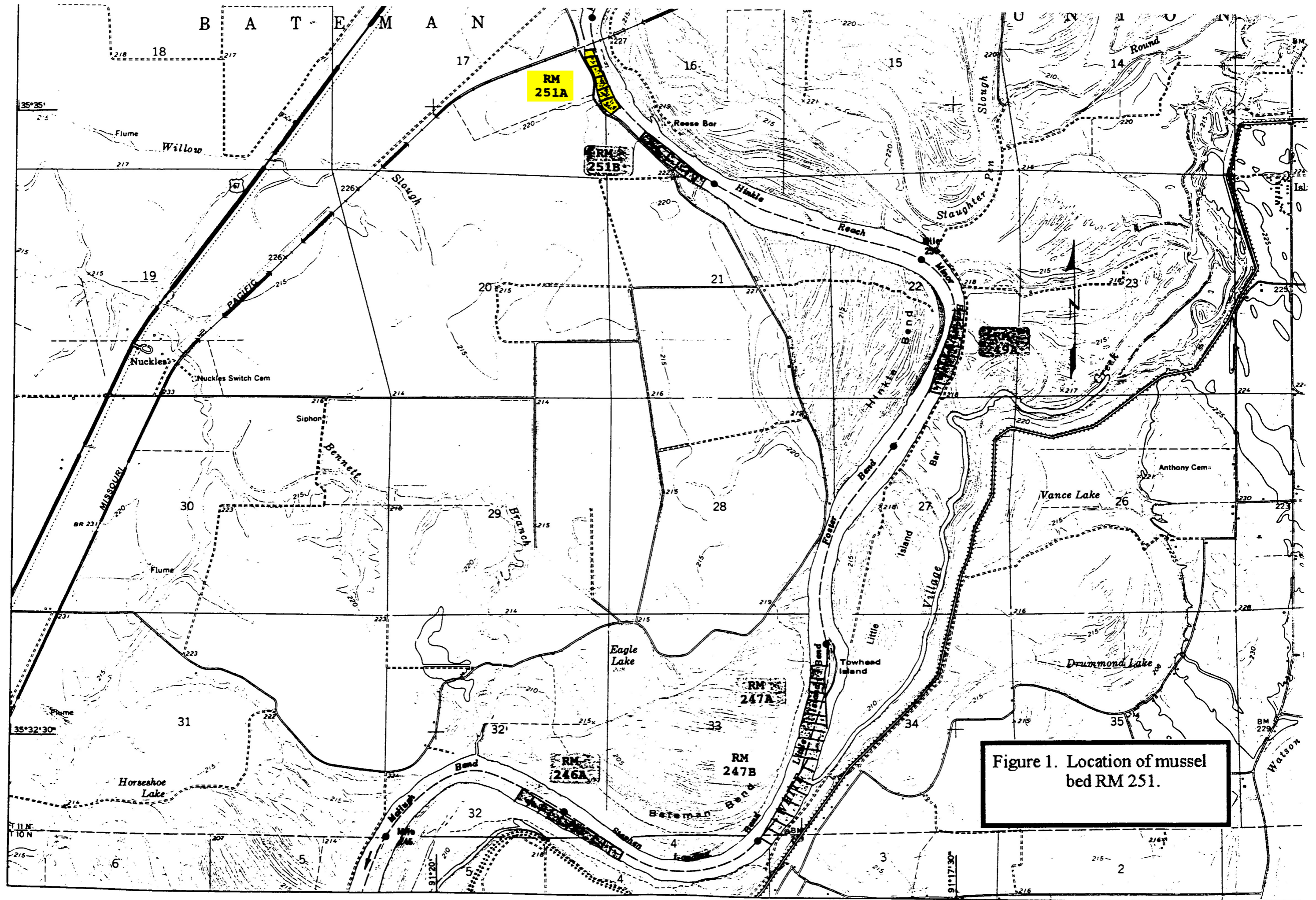


Figure 1. Location of mussel bed RM 251.

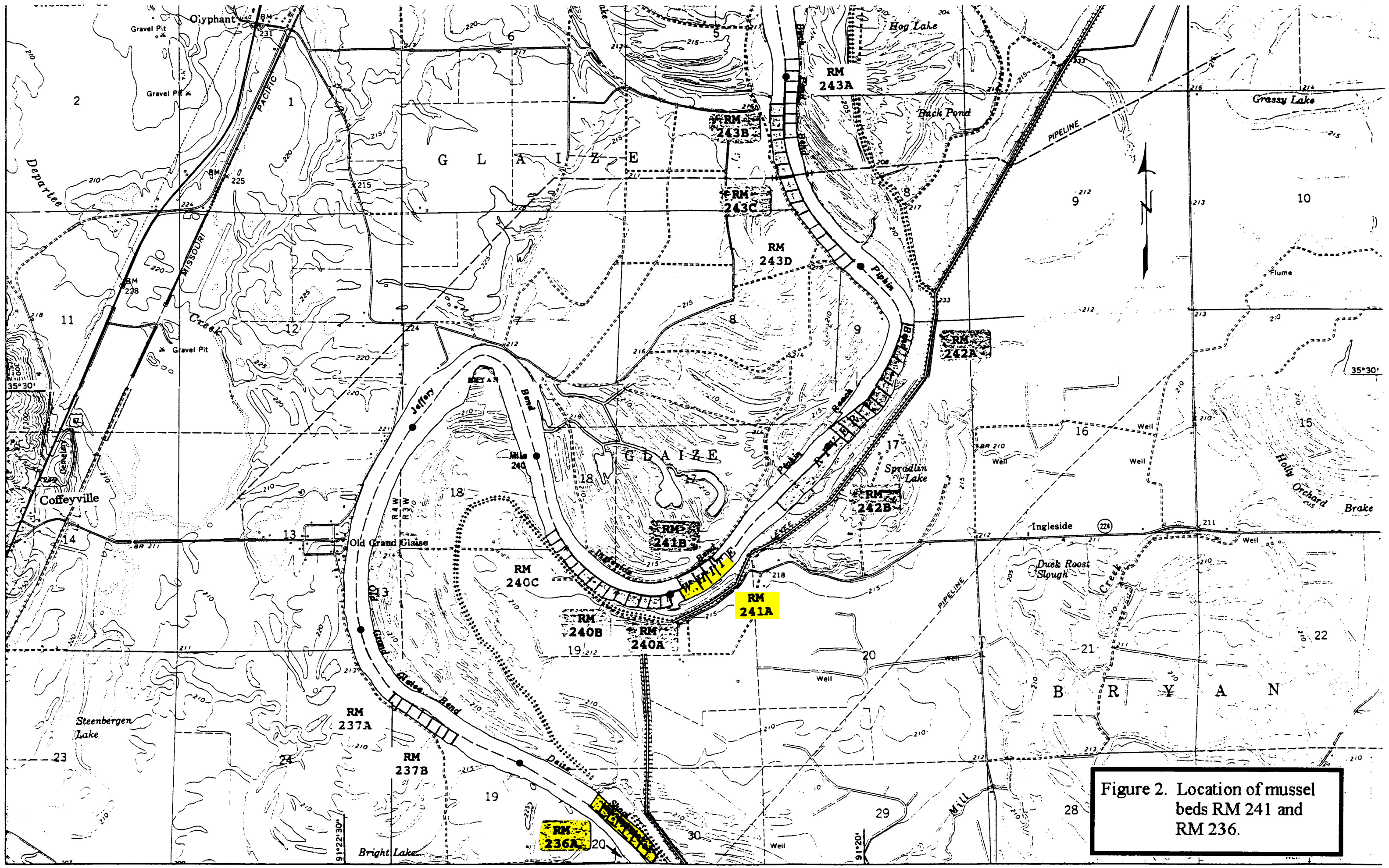


Figure 2. Location of musel beds RM 241 and RM 236.

Quantitative samples for the three monitoring sites were collected 6-8 July 1996.

Population and community standing crop estimates were calculated by the modified Sampford Method (Harris et al, 1993).

Changes over time to the river bottom contours were monitored by using sidescan sonar runs of the sites. Depth profiles were obtained prior to gravel mining and approximately one year after. Profiles for monitoring sites were taken on the following dates:

| | |
|-------------|------------------|
| Site RM 236 | 24 April 1995 |
| Site RM 236 | 15 June 1995 |
| Site RM 236 | 21 February 1996 |
| Site RM 236 | 2 April 1996 |
| Site RM 251 | 21 June 1995 |
| Site RM 251 | 20 February 1996 |

Results

Site RM 251 was estimated to encompass approximately 2500 m², and it was divided into three strata. Stratum 1 was 100 m long by 12 m wide and encompassed 1200 m². Stratum 2 was 100m long by eight meters wide and covered 800 m². Stratum 3 was 100 m long by five meters wide and 500 m² in total area. A total of 25 1-m² quadrats were taken with 12 samples collected from Stratum 1, eight samples collected form Stratum 2, and five samples collected from Stratum 3.

Site RM 241 was estimated to encompass 1500 m² and was divided into two strata 900 m² and 600 m² in area. Stratum 1 was determined to be 150 m long by six meters wide, and Stratum 2 was determined to be 150 m long by four meters wide. A total of 15 1-m² samples were taken with nine samples collected from Stratum 1 and six samples collected from Stratum 2.

Site RM 236 was estimated to be 200 m long by three meters wide and encompass approximately 600 m². RM 236 was not stratified, and a total of 10 1-m² quadrat samples were collected.

Tables 1-3 summarize the results of quantitative sampling at Sites RM 251, RM 241, and RM 236, respectively. Field data sheets with individual quadrat data and length, width, and depth measurements are found in Appendix B.

Site RM 251 yielded 15 unionid bivalve species including a single individual of the endangered pink mucket (*Lampsilis abrupta*). Dominant species sampled from RM 251 were *Obliquaria reflexa* (28.9%), *Quadrula pustulosa* (23.7%), and *Ellipsaria lineolata* (14.8%). The community standing crop estimate for this bed was 13,500 +/- 3,966, and the mean overall unionid bivalve density was 5.5/m². A total of 135 specimens were sampled from the 25 1-m² quadrats.

Site RM 241 yielded 10 unionid bivalve species from among the 46 specimens collected. The overall mean density at RM 241 was 3.1/m² from the 15 1-m² quadrat samples taken. The dominant species collected was *Quadrula pustulosa* (41.3%), and the total community standing crop estimate for RM 241 was 4,600 +/- 1437.

Eleven unionid bivalve species were represented among the 36 specimens collected in 10 1-m² quadrat samples at Site RM 236. *Obliquaria reflexa* (27.8%), *Quadrula pustulosa* (22.2%), and *Ellipsaria lineolata* (13.9%) were the dominant species sampled. The mean unionid bivalve density was 3.6/m² and the total community standing crop estimate was 2,160 +/- 756.

Discussion

Results of quantitative sampling of the unionid bivalves at three sites agreed with the preliminary, qualitative bed descriptions given by Christian. At the time the 1996 sampling was performed, there were no apparent adverse impacts to the bivalve beds that were attributable to commercial gravel mining. Appendix C provides information regarding the location of the commercial dredge boat prior to and after the monitoring samples were taken. No effort has been made to quantify the amount of gravel material removed from the White River in the vicinity of each monitoring site.

| Species Common name | <u>Stratum 1</u> | | <u>Stratum 2</u> | | <u>Stratum 3</u> | | <u>Total</u> | |
|--|---------------------|----------------|---------------------|----------------|---------------------|----------------|---------------------|------|
| | n | s ² | n | s ² | n | s ² | n | +/- |
| <i>Amblema plicata</i> threeridge | 1 | 0.08 | 0 | 0.00 | 2 | 0.08 | 300 | 448 |
| <i>Ellipsaria lineolata</i> butterfly | 5 | 0.45 | 8 | 1.43 | 7 | 2.80 | 2000 | 1105 |
| <i>Fusconaia ebena</i> ebony shell | 0 | 0.00 | 2 | 0.50 | 1 | 0.20 | 300 | 449 |
| <i>Lampsilis abrupta</i> pink mucket | 1 | 0.08 | 0 | 0.00 | 0 | 0.00 | 100 | 201 |
| <i>Lampsilis cardium</i> plain pocketbook | 0 | 0.00 | 0 | 0.00 | 2 | 0.30 | 200 | 251 |
| <i>Megalonaias nervosa</i> washboard | 1 | 0.08 | 0 | 0.00 | 0 | 0.00 | 100 | 201 |
| <i>Obliquaria reflexa</i> threehorn wartyback | 11 | 1.72 | 16 | 2.00 | 12 | 2.30 | 3900 | 1381 |
| <i>Pleurobema coccineum</i> round pigtoe | 2 | 0.15 | 3 | 0.55 | 0 | 0.00 | 500 | 500 |
| <i>Quadrula cylindrica</i> rabbitsfoot | 1 | 0.08 | 0 | 0.00 | 0 | 0.00 | 100 | 201 |
| <i>Quadrula metanevra</i> monkeyface | 1 | 0.08 | 0 | 0.00 | 0 | 0.00 | 100 | 201 |
| <i>Quadrula nodulata</i> wartyback | 3 | 0.21 | 0 | 0.00 | 0 | 0.00 | 300 | 325 |
| <i>Quadrula pustulosa</i> pimpleback | 8 | 0.79 | 13 | 1.13 | 11 | 2.70 | 3200 | 1126 |
| <i>Quadrula quadrula</i> mapleleaf | 3 | 0.21 | 4 | 0.57 | 4 | 1.20 | 1100 | 720 |
| <i>Tritogonia verrucosa</i> pistolgrip | 1 | 0.08 | 0 | 0.00 | 0 | 0.00 | 100 | 201 |
| <i>Truncilla truncata</i> deertoe | 4 | 0.24 | 5 | 0.55 | 1 | 0.20 | 1000 | 573 |
| TOTALS | 41 | 5.90 | 54 | 11.10 | 40 | 47.5 | 13500 | 3966 |
| MEAN DENSITY | 3.4/ m ² | | 6.8/ m ² | | 8.0/ m ² | | 5.5/ m ² | |

TABLE 1. Quantitative sample results for unionid bivalve bed at RM 251.

| Species Common name | Stratum 1 | | Stratum 2 | | Total | |
|--|--------------------------|----------------|--------------------------|----------------|--------------------------|-------------|
| | n | s ² | n | s ² | n | +/- |
| <i>Ellipsaria lineolata</i> butterfly | 3 | 0.50 | 2 | 0.27 | 500 | 503 |
| <i>Fusconaia ebena</i> ebony shell | 1 | 0.11 | 1 | 0.17 | 200 | 288 |
| <i>Lampsilis cardium</i> plain pocketbook | 1 | 0.11 | 0 | 0.00 | 100 | 202 |
| <i>Obliquaria reflexa</i> threehorn wartyback | 0 | 0.00 | 4 | 0.67 | 400 | 407 |
| <i>Obovaria olivaria</i> hickorynut | 1 | 0.11 | 2 | 0.27 | 300 | 328 |
| <i>Pleurobema coccineum</i> round pigtoe | 1 | 0.11 | 0 | 0.00 | 100 | 202 |
| <i>Quadrula nodulata</i> wartyback | 0 | 0.00 | 1 | 0.17 | 100 | 205 |
| <i>Quadrula pustulosa</i> pimpleback | 9 | 3.00 | 10 | 1.07 | 1900 | 1175 |
| <i>Quadrula quadrula</i> mapleleaf | 1 | 0.11 | 1 | 0.17 | 200 | 288 |
| <i>Truncilla truncata</i> deertoe | 3 | 0.25 | 0 | 0.00 | 300 | 305 |
| TOTALS | 25 | 2.69 | 21 | 4.30 | 4600 | 1437 |
| MEAN DENSITY | 2.8/m² | | 3.5/m² | | 3.1/m² | |

TABLE 2. Quantitative sample results for unionid bivalve bed at RM 241.

| Species Common name | <u>Stratum 1</u> | | <u>Total</u> | |
|---|---------------------|----------------------|---------------------|------------|
| | <u>n</u> | <u>s²</u> | <u>n</u> | <u>+/-</u> |
| <i>Ellipsaria lineolata</i> butterfly | 5 | 0.50 | 300 | 301 |
| <i>Fusconaia ebena</i> ebony shell | 2 | 0.18 | 120 | 180 |
| <i>Fusconaia flava</i> Wabash pigtoe | 1 | 0.10 | 60 | 134 |
| <i>Lampsilis cardium</i> plain pocketbook | 2 | 0.18 | 120 | 186 |
| <i>Lasmigona complanata</i> white heelsplitter | 1 | 0.10 | 60 | 134 |
| <i>Megaloniaias nervosa</i> washboard | 1 | 0.10 | 60 | 134 |
| <i>Obliquaria reflexa</i> threehorn wartyback | 10 | 1.78 | 600 | 567 |
| <i>Obovaria olivaria</i> hickorynut | 4 | 0.27 | 240 | 221 |
| <i>Quadrula nodulata</i> wartyback | 1 | 0.10 | 120 | 186 |
| <i>Quadrula pustulosa</i> pimpleback | 8 | 0.84 | 480 | 390 |
| <i>Tritogonia verrucosa</i> pistolgrip | 1 | 0.10 | 60 | 134 |
| <hr/> | | | | |
| TOTALS | 36 | 3.16 | 2160 | 756 |
| MEAN DENSITY | 3.6/ m ² | | 3.6/ m ² | |
| <hr/> | | | | |

TABLE 3. Quantitative sample results for unionid bivalve bed at RM 236.

The U.S Army Corps of Engineers Waterways Experiment Station is currently analyzing the sidescan sonar bottom contour data. Overlays of the bottom contours prior to and following commercial gravel mining will be prepared to show areas of aggradation and degradation within the White River channel. These data will be forwarded to the Corps of Engineers, Memphis District and the Arkansas Game and Fish Commission when they become available. Based on diver surveys of the river bottom, there were no discernible areas of headcutting (degradation) or sand buildup (aggradation) within the three sites surveyed.

Acknowledgements

S. Chordas, A. Christian, and B. Posey assisted with the diving and data collection for this project. P. Gaither, Corps of Engineers, Memphis District provided a copy of the final Section 404 permit issued to Mobley Construction and provided additional information regarding reporting requirements for the permit. C. Uyeda, Arkansas Game and Fish Commission, coordinated bottom contour data collection with the Corps of Engineers, Waterways Experiment Station.

Literature Cited

- Christian, A. C. 1995. Analysis of the commercial mussel beds in the Cache and White rivers in Arkansas. M.S. thesis, Dept. Biological Sciences, Arkansas State University, Jonesboro, AR. 197 p.
- Corps of Engineers. 1988. Maps of White River, vicinity of Batesville, Ark. to Mississippi River. Prepared under direction of the President, Mississippi River Commission, Corps of Engineers, U. S. Army by U. S. Army Engineer District, Memphis Corps of Engineers, Memphis, TN. 32 maps.
- Harris, J. L., P. Rust, S. W. Chordas, III, and G. L. Harp. 1993. Distribution and population structure of freshwater mussels (Unionidae) in Lake Chicot, Arkansas. Proc. AR Acad. Sci. Vol. 47:38-43.
- Hartfield, P. 1993. Headcuts and their effect on freshwater mussels. Pages 131-141 in K. S. Cummings, A. C. Buchanan, and L. M. Koch, eds. Conservation and management of freshwater mussels. Proceedings of a UMRCC symposium, 12-14 October 1992, St. Louis, Missouri. Upper Mississippi River Conservation Committee, Rock Island, Illinois.

Appendix A

Individual Section 404 Permit

DEPARTMENT OF THE ARMY PERMIT

RECEIVED
A.H.T.D.
120 1997/
ENVIRONMENTAL
DIVISION

Permittee: Mobley Construction Co., Inc.
Permit Number: White River-368
Issuing Office: U.S. Army Engineer District, Memphis
Corps of Engineers
167 North Main Street, Room B202
Memphis, Tennessee 38103-1894

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: Dredge sand and gravel from the White River for commercial resale.

Project Location: Between White River Miles 70.0 - 125.0 and 230.1 - 274.0

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on December 28, 1999. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.
2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.
3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.
4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.
5. If a conditioned water quality certification has been issued for your project, you must comply with conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.
6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

1. No dredging will be allowed between Miles 256.5 - 259.0 due to occurrence of paddlefish in the area.
2. No dredging will be allowed from March 1 until May 31 of each year between Miles 120 - 125 and 259 - 274.0 due to fish spawning.
3. If mussel shells are encountered during dredging, operations should cease and the Corps of Engineers should be contacted.

5/6/11/11
P.C.

4. No dredging will be allowed within one-quarter (1/4) mile from the upstream and downstream points of each identified mussel bed on the attached list.
5. A study will be conducted for a period of two (2) years from the downstream points of reaches River Miles 251.04 - 251.40, 235.96- 236.65, and 241.00 - 241.33. A survey will be implemented (within a reasonable time after each dredging season) that will monitor the mussel beds for changes in the population. River bottom contours will be provided at appropriate intervals reflecting any signs of headcutting in the river bottom due to this mining activity. This permit may be modified to increase or decrease the 1/4-mile restriction per the results of this study.
6. No dredging will be allowed between Miles 230.0 - 232.3 and 88.9 to 92.5 which have been designated as Arkansas Game and Fish Commission refuges.
7. Upon completion of a mussel survey encompassing river Miles 264.0 - 274.00, the applicant will abide by the 1/4-mile restriction for all mussel beds greater than 10 mussels per square meter, and any mussel beds (regardless of density) containing endangered species.

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:
 - (X) Section 10 of the River and Harbor Act of 1899 (33 U.S.C. 403).
 - (X) Section 404 of the Clean Water Act (33 U.S.C. 1344).
 - () Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).
2. Limits of this authorization.
 - a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.
 - b. This permit does not grant any property rights or exclusive privileges.
 - c. This permit does not authorize any injury to the property or rights of others.
 - d. This permit does not authorize interference with any existing or proposed Federal projects.
3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:
 - a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.
 - b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.
 - c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.
 - d. Design or construction deficiencies associated with the permitted work.
 - e. Damage claims associated with any future modification, suspension, or revocation of this permit.
4. Reliance on Applicant's Data. The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.
5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:
 - a. You fail to comply with the terms and conditions of this permit.
 - b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (see 4 above).
 - c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General Condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

Mobley Construction Co., Inc.
by [Signature]
(PERMITTEE)

11/9/95
(DATE)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

William [Signature]
Gregory G. Bean
Colonel, District Engineer

11/15/95
(DATE)

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(TRANSFEREE)

(DATE)

OCCURRENCE OF MUSSEL BEDS IN THE
WHITE RIVER BY RIVER MILES

| | | |
|--------|---|--------|
| 298.71 | - | 298.97 |
| 256.00 | - | 256.16 |
| 251.04 | - | 251.40 |
| 245.76 | - | 246.32 |
| 241.00 | - | 241.33 |
| 236.25 | - | 236.65 |
| 233.9 | - | 234.38 |
| 230.56 | - | 231.08 |
| 228.90 | - | 229.55 |
| 228.40 | - | 228.72 |
| 223.74 | - | 224.04 |
| 221.63 | - | 222.00 |
| 220.25 | - | 221.1 |
| 218.06 | - | 218.57 |
| 203.43 | - | 203.78 |
| 201.23 | - | 201.54 |
| 200.21 | - | 200.84 |
| 197.55 | - | 197.97 |
| 156.58 | - | 157.00 |
| 145.12 | - | 145.30 |
| 141.13 | - | 141.53 |
| 135.45 | - | 135.86 |
| 122.18 | - | 122.37 |
| 121.26 | - | 121.55 |
| 119.10 | - | 119.46 |
| 116.42 | - | 116.81 |
| 115.43 | - | 115.66 |
| 113.27 | - | 113.43 |
| 98.87 | - | 99.50 |
| 97.10 | - | 97.28 |
| 96.41 | - | 96.6 |
| 95.75 | - | 96.03 |
| 92.27 | - | 92.49 |
| 91.24 | - | 91.71 |
| 89.51 | - | 89.87 |
| 87.97 | - | 88.38 |
| 86.76 | - | 87.12 |
| 85.25 | - | 85.57 |
| 81.79 | - | 82.49 |
| 76.09 | - | 76.38 |
| 73.30 | - | 73.55 |
| 71.31 | - | 71.61 |
| 67.76 | - | 68.55 |
| 63.46 | - | 63.68 |

MOBLEY

CONSTRUCTION COMPANY, INC.
SAND • GRAVEL • READY MIX CONCRETE
P. O. BOX 109 PH. (501) 354-3617 MORRILTON, AR 72110

DARDANELLE
RUSSELLVILLE
MORRILTON
NEWPORT
MCCORDY

November 28, 1995

Mrs. Patricia Gaither
Memphis District/COE
167 North Main Street B-202
Memphis, TN 38103-1894

RE: MCo Permit White River-368
Amended List of Mussel Bed Locations

Dear Mrs. Gaither:

The mussel study of our newly permitted reach on White River (MP 265.0 275.0) has identified specific mussel beds. Per our discussion last week, we are submitting for your agreement the attached list adding such mussel beds as exclusion areas. The areas are restricted from dredging one-quarter mile above and below in accordance with Special Condition 4 of the permit.

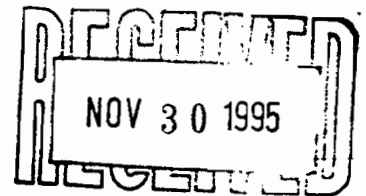
This list was developed by examining the mussel study report as submitted by Dr. John Harris dated 15 October 1995. Our examination of this study showed that there was only one specifically identified mussel bed with a density of or greater than ten per square meter. This threshold is not a factor however since this site and three others also contained an endangered species, the pink mucket. Those four beds are the ones added to the list of exclusion areas.

Please examine our conclusions and added exclusion areas for accuracy and completeness. If there are corrections please let me know. If you concur, please indicate your agreement by signing and dating below. Thank you for your help.

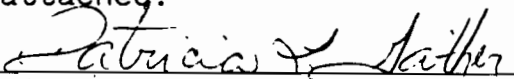
Yours truly,

MOBLEY CONSTRUCTION COMPANY, INC.


Bryce Mobley
President



The Memphis District/COE agrees with the amended list of mussel bed locations for permit White River-368 as attached.


Signature

12-15-95
Date

OCCURRENCE OF MUSSEL BEDS IN THE
WHITE RIVER BY RIVER MILES

298.71 - 298.97
256.00 - 256.16
251.04 - 251.40
245.76 - 246.32
241.00 - 241.33
236.25 - 236.65
233.9 - 234.38
230.56 - 231.08
228.90 - 229.55
228.40 - 228.72
223.74 - 224.04
221.63 - 222.00
220.25 - 221.1
218.06 - 218.57
203.43 - 203.78
201.23 - 201.54
200.21 - 200.84
197.55 - 197.97
156.58 - 157.00
145.12 - 145.30
141.13 - 141.53
135.45 - 135.86
122.18 - 122.37
121.26 - 121.55
119.10 - 119.46
116.42 - 116.81
115.43 - 115.66
113.27 - 113.43
98.87 - 99.50
97.10 - 97.28
96.41 - 96.6
95.75 - 96.03
92.27 - 92.49
91.24 - 91.71
89.51 - 89.87
87.97 - 88.38
86.76 - 87.12
85.25 - 85.57
81.79 - 82.49
76.09 - 76.38
73.30 - 73.55
71.31 - 71.61
67.76 - 68.55
63.46 - 63.68

ADDITIONAL LOCATIONS
(Amended 11/28/95)

274.0 - 274.3
272.0
269.4
265.2 - 266.0

Appendix B

Field Notes and Original Data

Mobley Report

Diver J LH WR 234.7
Location:
Depth: 12 ft
Dens: 2-5 max
Dim 4m
Subs: Gravel w/sand
Spp:

Dive: J LH WR 234.5
Loc:
Dep:
Dens:
Dim:
Sub: Sand
Spp:

Diver: J LH 2:30 - 2:37
Loc LHB WR 234.8
Dep: 15.7 f
Dens:
Dim:
Sub:
Spp:

Diver J LH 1:59 - 2:05
Loc LHB FDS (WR 234.2)
Depth: 14-13
Dens 5/12
Sub: ^{Per} gravel
Spp: Mixed

Diver J LH - 2:09 - 2:19
Loc LHB - Green Bosh = End
Depth (WR 233.9)
Dens 1m
Sub:
Spp:

Diver J LH
Loc LHB FDS (WR 233.8)
Depth 17-11
Dens —
Sub Sand
Spp No' in v

-1 To INSIDE NEAR BANK
 -3 To OUTSIDE TO MID CHANNEL.

ASU-Commercial Shell Bed Research

Quantitative Sample Data Sheet

Field ID # WR235

Date: 8-July-96

| | Species | Length | Depth | Width | Wet Wt. | I.D. # Dry Wt. | Age |
|-------|------------------------|--------|-------|-------|---------|------------------------------|-----|
| 14-3 | LAMPUS L'S CARDIUM ✓ | 158.1 | 108.7 | 78.4 | | WHITE - 110 | |
| 35-3 | QUADRULA QUADRULA ✓ | 54.4 | 45.8 | 33.0 | | WHITE - 198 | |
| | OBOLIVARIA OLIVARIA ✓ | 37.0 | 30.5 | 23.4 | | WHITE - 152 | |
| | OBLIQUARIA REFLEXA ✓ | 52.8 | 44.8 | 31.7 | | WHITE - 199 | |
| | " " ✓ | 45.1 | 36.1 | 28.1 | | WHITE - 159 | |
| 52-1 | ELLIPSORIA LINEOLATA ✓ | 91.6 | 67.7 | 44.4 | | WHITE - 105 | |
| | OBLIQUARIA REFLEXA ✓ | 68.7 | 52.1 | 39.9 | | WHITE - 144 | |
| | " " ✓ | 50.0 | 39.5 | 36.1 | | WHITE - 138 | |
| 71-2 | ELLIPSORIA LINEOLATA ✓ | 74.8 | 58.3 | 43.3 | | WHITE - 160 | |
| | " " ✓ | 71.5 | 56.3 | 39.4 | | WHITE - 173 | |
| | OBLIQUARIA REFLEXA ✓ | 61.8 | 53.0 | 39.1 | | WHITE - 106 | |
| | " " ✓ | 55.9 | 45.7 | 35.3 | | WHITE - 170 | |
| | " " ✓ | 52.3 | 39.6 | 44.8 | | WHITE - 226 | |
| | " " ✓ | 47.9 | 37.8 | 28.2 | | WHITE - 201 | |
| | QUADRULA PUSTULOSA ✓ | 66.3 | 60.7 | 40.8 | | WHITE - 235 | |
| 89-1 | ELLIPSORIA LINEOLATA ✓ | 106.2 | 79.4 | 43.4 | | WHITE - 222 | |
| | QUADRULA PUSTULOSA ✓ | 83.1 | 67.7 | 48.7 | | WHITE - 236 | |
| | " " ✓ | 48.7 | 44.3 | 41.6 | | WHITE - 203 | |
| | QUADRULA QUADRULA ✓ | 76.5 | 64.6 | 47.5 | | WHITE - 242 | |
| | OBLIQUARIA REFLEXA ✓ | 43.2 | 44.2 | 27.0 | | WHITE - 205 | |
| 150-1 | ELLIPSORIA LINEOLATA ✓ | 63.7 | 48.4 | 27.8 | | WHITE - 206 | |
| | QUADRULA NODULATA ✓ | 53.1 | 47.0 | 34.6 | | WHITE - 209 | |
| | TRITONELLA VERrucosa ✓ | 70.5 | 43.4 | 25.2 | | WHITE - 214 | |

7/7/96 Harris, Chords, Christa

1st bed 150x6 - upper bed

at 1st bed 150x4 - sparse

15min Bed 24⁷³ 1st Down - top of cut bank
13'-14' deep At down - dead sycamore w/ large root ball on bed
2 pieces 20m upstream - 3/4 m² ca 40m wide / gravel substrate
F. den, Oly, Qg, Qp.

7 100m DS thin seam of mixed clay fragment zone -
30m from end of 1st bed dip 17+ ' deep
15min

400m DS - 60-70m DS of 1st bed dip - 17-19' deep
1-2 m² 4m wide - gravel Qmit, F. den, Oly, Qg, Qp
15min better than 100m US - lat down

5-100 m DL 13.5' deep start of med. size stand of trees -
DS cut of med. size trees down dry bank
15min scattered shells. < 1/m² - occasionally 4/m² -
End of bed ca 20m upstream of stand of dead trees.

11' deep top of landing - 50m US of sheller's hole
5min pudding & sand - no shells

50m US of 1st down - large live sycamore
leaning over river - gently sloping bank
cut to 12' deep - shallow trough 1m² starts here

ASU Commercial Shell Bed Research

Quantitative Sample Data Sheet

Field ID # WR 241 Moberg Date: 7/7/96 Harris, Christian, Chouhan

| | Species | Length | Depth | Width | Wet Wt. | I. O. # Dry Wt. | Age |
|-----------------------|-------------------------|--------|-------|-------|---------|--------------------|-----|
| STRATUM 04-3 | ✓ QUADRULA PUSTULOSA ✓ | 63.1 | 61.5 | 41.2 | | WHITE - 123 | |
| | ✓ TRUNCILLA TRUNCATA ✓ | 37.7 | 31.6 | 25.4 | | WHITE - 111 | |
| STRATUM I 36-2 | ✓ VOBURIA OLIVARIA ✓ | 67.4 | 56.7 | 46.3 | | WHITE - 121 | |
| | ✓ OBLIQUARIA REFLEXA ✓ | 50.4 | 39.7 | 35.7 | | WHITE - 154 | |
| | ✓ PLEUROBEMA SP. ✓ | 62.7 | 48.4 | 40.8 | | WHITE - 181 | |
| STRATUM I 47-3 | ✓ QUADRULA PUSTULOSA ✓ | 58.1 | 56.6 | 37.2 | | WHITE - 176 | |
| | ✓ " " ✓ | 73.7 | 69.3 | 49.1 | | WHITE - 145 | |
| | ✓ ELIPSARIA LINEOLATA ✓ | 96.5 | 72.8 | 43.8 | | WHITE - 112 | |
| | ✓ LAMPYLIS CARDIUM ✓ | 114.3 | 79.6 | 66.4 | | WHITE DID NOT KEEP | |
| | ✓ TRUNCILLA TRUNCATA ✓ | 45.1 | 40.3 | 27.9 | | WHITE - 193 | |
| STRATUM I 75-2 | ✓ FUSONATA EBENA ✓ | 96.5 | 82.2 | 59.6 | | WHITE - 134 | |
| | ✓ QUADRULA PUSTULOSA ✓ | 74.1 | 64.7 | 52.7 | | WHITE - 186 | |
| STRATUM I 77-6 | ✓ ELIPSARIA LINEOLATA ✓ | 82.7 | 63.1 | 44.0 | | WHITE - 156 | |
| | ✓ " " ✓ | 108.9 | 76.3 | 46.4 | | WHITE - 175 | |
| STRATUM I 96-3 | OBLIQUARIA REFLEXA ✓ | 62.7 | 52.4 | 44.0 | | WHITE - 139 | |
| | " " ✓ | 62.9 | 48.7 | 43.4 | | WHITE - 162 | |
| | " " ✓ | 64.1 | 49.1 | 42.0 | | WHITE - 131 | |
| | QUADRULA PUSTULOSA ✓ | 72.2 | 65.1 | 49.1 | | WHITE - 128 | |
| | " " ✓ | 68.3 | 57.7 | 47.4 | | WHITE - 162 | |
| | " " ✓ | 67.1 | 65.3 | 48.9 | | WHITE - 127 | |
| STRATUM I 101-6 | QUADRULA PUSTULOSA ✓ | 69.8 | 64.1 | 47.1 | | WHITE - 155 | |
| | TRUNCILLA TRUNCATA ✓ | 41.5 | 34.3 | 25.9 | | WHITE - 163 | |
| STRATUM I 134-2 | OBLIQUARIA REFLEXA ✓ | 52.3 | 44.4 | 36.8 | | WHITE - 126 | |

ASU-Commercial Shell Bed Research

Quantitative Sample Data Sheet

Field ID # WR 241 Nobley Date: 8-JULY-1996

| | Species | Length | Depth | Width | Wet Wt. | J.O. # Dry Wt. | Age |
|---------------------|------------------------|--------|-------|-------|---------|-------------------|-----|
| STRATUM I 142-5 | QUADRULA PUSTULOSA ✓ | 61.9 | 57.9 | 37.9 | | WHITE - 141 | |
| | QUADRULA QUADRULA ✓ | 37.0 | 34.6 | 25.2 | | WHITE - 168 | |
| STRATUM II 01-4 | QUADRULA PUSTULOSA ✓ | 66.4 | 57.2 | 48.5 | | WHITE - 151 | |
| | " " ✓ | 65.2 | 60.3 | 38.4 | | WHITE - 125 | |
| | " " ✓ | 56.8 | 50.6 | 37.8 | | WHITE - 132 | |
| STRATUM II 25-2 | FUSCONARIA EBENA ✓ | 79.7 | 65.7 | 46.8 | | WHITE - 191 | |
| | QUADRULA PUSTULOSA ✓ | 45.8 | 43.6 | 29.0 | | WHITE - 113 | |
| | " " ✓ | 34.0 | 34.7 | 23.2 | | WHITE - 117 | |
| | QUADRULA QUADRULA ✓ | 49.8 | 52.3 | 35.0 | | WHITE - 190 | |
| | QUADRULA NODULATA ✓ | 43.5 | 42.3 | 32.9 | | WHITE - 165 | |
| | OBOVARIA OLIVARIA ✓ | 70.1 | 56.3 | 45.0 | | WHITE - 114 | |
| | OBLIQUARIA REFLEXA ✓ | 52.0 | 43.1 | 32.9 | | WHITE - 116 | |
| STRATUM II 43-3 | QUADRULA PUSTULOSA ✓ | 69.7 | 63.0 | 45.3 | | WHITE - 129 | |
| | " " ✓ | 64.8 | 60.5 | 40.4 | | WHITE - 187 | |
| | ELLIPTICARIA LINEATA ✓ | 72.1 | 61.6 | 41.3 | | WHITE - 174 | |
| | OBLIQUARIA REFLEXA ✓ | 45.0 | 41.1 | 29.6 | | WHITE - 177 | |
| | " " ✓ | 45.3 | 39.0 | 27.8 | | WHITE - 120 | |
| STRATUM II 52-2 | QUADRULA PUSTULOSA ✓ | 66.4 | 59.1 | 42.9 | | WHITE - 109 | |
| | OBLIQUARIA REFLEXA ✓ | 57.5 | 46.6 | 39.3 | | WHITE - 195 | |
| STRATUM II 72-4 | ELLIPTICARIA LINEATA ✓ | 85.5 | 60.3 | 39.8 | | WHITE - 178 | |
| | OBOVARIA OLIVARIA ✓ | 31.8 | 27.6 | 20.6 | | WHITE - 140 | |
| STRATUM II 131-1 | QUADRULA PUSTULOSA ✓ | 70.2 | 62.2 | 42.7 | | WHITE - 180 | |
| | " " ✓ | 47.4 | 44.5 | 32.0 | | WHITE - 108 | |

Mobley Report

- 6 July 96

(WR 251.7)

Location: RHBFDS ~~200~~ m below RR

Depth: 12 ft

Sub: Sand/Clay; Gravel

Density: $\approx 4/m^2$

Width: 10 m

Spp: *Pileolobena*, *C. aberti*, *L. complanata* Spp. *O. olivari*

Diver: Harris 11:16 - 11:35

(WR 251.4)

Location: RHBFDS - 200 m below first dive

Depth: 14-20

Sub: Sand

Density: Scattered

Width: Scattered

Spp: *A. tigriventris*

Diver: Harris 11:40 - 11:55

Location: RHBFDS (WR 251.3)

Depth

Sub

Density =

Spp:

Width - None

Location: RHBFDS (WR 251.1)

Depth

Sub: Sand

Density: 1 *O. sethii*

Width - None

(WR 251.8)

Location: RHBFDS - 75 m below train Bids

Depth: 20 - 25 ft - 47.5 ft in ddy

Sub: Sand gravel

Dens:

Width:

Spp: *O. olivari*

Diver: JLH 12:45 - 12:55

Diver: JLH 12:00 - 12:10

Location: RHBFDS to CC - 150 m below RR Bel

Depth: 16 - 23 ft

Sub: Large gravel to Sand gravel + Sacc

Dens: 15-20 cc to 1-3 BHO

Width: 12-16

Spp: *E. lineolata*, P

Diver: JLH 1:20 -

Location: RHBFDS (WR 251.5)

Depth: 10 - 13 ft

Sub: Large Gravel

Dens: Approx 2-8 m^2

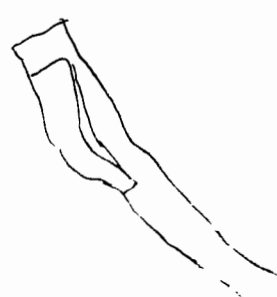
Dimension: 5 m

Spp: *O. olivari*

Dimension: 12 x 12 100 x 8 500 100 x 5

of Samples: 25

12 - 8 - 5



ASU-Commercial Shell Bed Research

Quantitative Sample Data Sheet

Field ID # WR 251.8-.5

Date: 6 July 1996

| STRATUM # | Species | Length | Depth ^(HINGE TO VENTRAL MARGIN) | Width | Wet Wt. | I.D. Dry Wt. | Age |
|-----------|--|--------|--|-------|---------|----------------|-----|
| 2-2 | ✓ <i>QUADRUA METANEURA</i> | 65.1 | 54.2 | 44.0 | | Yellow - 223 ✓ | |
| | ✓ <i>ELIPSARIA LINEOLATA</i> | 113.7 | 77.6 | 46.5 | | Yellow - 246 ✓ | |
| 3-2 | ✓ <i>E. lineolata</i> | 105.1 | 76.8 | 47.8 | | Yellow - 228 ✓ | |
| | ✓ <i>O. reflexa</i> | 60.2 | 48.6 | 39.5 | | Yellow - 219 ✓ | |
| | ✓ " " | 63.7 | 48.4 | 40.9 | | Yellow - 226 ✓ | |
| | ✓ <i>QUADRUA QUADRUA</i> | 78.9 | 64.4 | 42.1 | | Yellow - 240 ✓ | |
| | ✓ <i>QUADRUA PUSTULOSA</i> | 62.3 | 56.3 | 41.9 | | Yellow - 217 ✓ | |
| | ✓ " " | 73.3 | 69.1 | 49.2 | | Yellow - 250 ✓ | |
| | ✓ <i>TRUNCILLA TRUNCATA</i> | 45.9 | 40.0 | 30.1 | | Yellow - 241 ✓ | |
| 19-10 | ✓ <i>ELIPSARIA LINEOLATA</i> | 96.5 | 71.7 | 42.8 | | Yellow - 236 ✓ | |
| | ✓ " " | 43.2 | 32.9 | 16.4 | | Yellow - 230 ✓ | |
| | ✓ <i>QUADRUA QUADRUA</i> | 82.8 | 70.1 | 52.8 | | Yellow - 216 ✓ | |
| | ✓ <i>OBLIQUARIA REFLEXA</i> | 65.1 | 51.8 | 38.5 | | Yellow - 242 ✓ | |
| | ✓ " " | 51.4 | 39.9 | 33.2 | | Yellow - 214 ✓ | |
| | ✓ " " | 49.5 | 43.3 | 37.0 | | Yellow - 229 ✓ | |
| | ✓ " " | 37.2 | 29.4 | 23.8 | | Yellow - 221 ✓ | |
| | ♀ <i>LAMPYLIS ABRUPTA</i> | 115.1 | 91.4 | 66.6 | | Yellow - 239 ✓ | |
| 2-12 | ✓ <i>AMBIEMA PLICATA</i> | 38.8 | 30.8 | 24.5 | | Yellow - 249 ✓ | |
| | ✓ <i>TRUNCILLA TRUNCATA</i> | 45.0 | 35.6 | 25.6 | | Yellow - 248 ✓ | |
| 0-3 | ✓ <i>MEGALONAIAS NERVOSA</i> | 199.9 | 128.0 | 70.5 | | Yellow - 234 ✓ | |
| | ✓ <i>QUADRUA CYLINDRICA</i> | 83.3 | 41.2 | 27.6 | | Yellow - 225 ✓ | |
| | ✓ <i>OBLIQUARIA REFLEXA</i> | 65.6 | 53.7 | 41.2 | | Yellow - 244 ✓ | |
| | NEUROBEMA <i>QUADRUA OBLIQUARIA</i> | 34.3 | 29.9 | 24.1 | | Yellow - 211 ✓ | |

ASU-Commercial Shell Bed Research

Quantitative Sample Data Sheet

Field ID # WR 251.8-5 Stratum II Date: 7 July 96

| | Species | Length | Depth | Width | Wet Wt. | I. O. # Dry Wt. | Age |
|---------------------|----------------------|--------|-------|-------|--------------|--------------------|-----|
| Stratum II 07-2 | ✓ QUADRULA PUSTULOSA | 63.7 | 59.5 | 39.6 | | Yellow - 136 | ✓ |
| | ✓ " " | 45.7 | 42.6 | 39.9 | | Yellow - 141 | ✓ |
| | ✓ OBLIQUARIA REFLEXA | 34.0 | 26.9 | 20.1 | | Yellow - 147 | ✓ |
| | ✓ TRUNCILLA TRUNCATA | 41.6 | 34.9 | 27.6 | | Yellow - 192 | ✓ |
| Stratum II 07-5 | ✓ ELIPSARIA LINEATA | 61.3 | 48.9 | 33.9 | | Yellow - 135 | ✓ |
| | ✓ " " | 49.1 | 38.1 | 23.9 | | Yellow - 158 | ✓ |
| | ✓ " " | 56.1 | 41.4 | 21.2 | | Yellow - 148 | ✓ |
| | ✓ OBLIQUARIA REFLEXA | 62.9 | 49.2 | 36.6 | | Yellow - 144 | ✓ |
| | ✓ " " | 52.2 | 41.9 | 35.0 | | Yellow - 107 | ✓ |
| | ✓ TRUNCILLA TRUNCATA | 36.2 | 30.7 | 20.0 | | White - 149 | ✓ |
| Stratum II 19-6 | ✓ QUADRULA PUSTULOSA | 58.1 | 53.6 | 38.0 | | Yellow - 130 | ✓ |
| | ✓ " " | 43.4 | 39.3 | 30.9 | | Yellow - 193 | ✓ |
| | ✓ ELIPSARIA LINEATA | 77.1 | 55.9 | 35.4 | | Yellow - 140 | ✓ |
| Stratum II 5-6 | ✓ ELIPSARIA LINEATA | 94.3 | 72.6 | 36.2 | | Yellow - 194 | ✓ |
| | ✓ QUADRULA PUSTULOSA | 74.9 | 65.0 | 47.5 | | Yellow - 184 | ✓ |
| | ✓ " " | 67.8 | 66.5 | 47.5 | | Yellow - 102 | ✓ |
| | ✓ " " | 64.6 | 62.8 | 41.8 | | Yellow - 111 | ✓ |
| | ✓ OBLIQUARIA REFLEXA | 60.0 | 50.6 | 41.3 | | Yellow - 155 | ✓ |
| | ✓ " " | 61.6 | 47.6 | 40.0 | | Yellow - 164 | ✓ |
| | ✓ " " | 42.1 | 33.8 | 25.7 | | Yellow - 159 | ✓ |
| | ✓ " " | 40.3 | 32.7 | 27.9 | | Yellow - 128 | ✓ |
| ✓ OBOVARIA OBOVARIA | 42.0 | 35.0 | 25.0 | | Yellow - 162 | ✓ | |

ASU Commercial Shell Bed Research

Quantitative Sample Data Sheet

Field ID # WR251.8-.5

Date: 2-JULY-1996

| | Species | Length | Depth | Width | Wet Wt. | Dry Wt. | Age |
|-----------------------|-----------------------|--------|-------|-------|--------------|--------------|-----|
| STRATUM II 91-6 | ✓ ELIPSARIA LINEOLATA | 60.4 | 46.1 | 30.9 | | Yellow - 195 | ✓ |
| | ✓ FUSCONAIA EBENA | 67.2 | 55.0 | 40.5 | | Yellow - 189 | ✓ |
| | ✓ " " | 24.7 | 23.3 | 17.4 | | White - 122 | ✓ |
| | ✓ PLEUROBEMA SP. | 39.0 | 36.2 | 26.6 | | Yellow - 191 | ✓ |
| | ✓ " " | 26.4 | 25.2 | 21.0 | | Yellow - 166 | ✓ |
| | ✓ QUADRULA QUADRULA | 62.1 | 54.9 | 37.9 | | Yellow - 152 | ✓ |
| | ✓ QUADRULA PUSTULOSA | 73.7 | 69.3 | 47.4 | | Yellow - 199 | ✓ |
| | ✓ OBLIQUARIA REFLEXA | 43.9 | 36.6 | 28.8 | | Yellow - 185 | ✓ |
| | ✓ TRUNCALIA TRUNCATA | 46.4 | 36.4 | 30.3 | | Yellow - 124 | ✓ |
| | ✓ QUADRULA PUSTULOSA | 23.3 | 23.2 | 16.5 | | Yellow - 160 | ✓ |
| ✓ " " | 19.7 | 18.0 | 14.3 | | Yellow - 133 | ✓ | |
| STRATUM III 48-4 | ✓ ELIPSARIA LINEOLATA | 85.1 | 61.9 | 36.5 | | Yellow - 118 | ✓ |
| | ✓ " " | 52.5 | 41.1 | 24.5 | | Yellow - 198 | ✓ |
| | ✓ QUADRULA PUSTULOSA | 54.0 | 49.4 | 36.0 | | Yellow - 139 | ✓ |
| | ✓ " " | 57.3 | 53.6 | 44.3 | | Yellow - 129 | ✓ |
| | ✓ LAMPYLIS CARDIUM | 130.4 | 82.2 | 66.4 | | Yellow - 168 | ✓ |
| | ✓ OBLIQUARIA REFLEXA | 49.1 | 40.4 | 36.1 | | Yellow - 149 | ✓ |
| STRATUM III 59-2 | ✓ QUADRULA QUADRULA | 64.4 | 55.6 | 36.6 | | Yellow - 122 | ✓ |
| | ✓ " " | 71.6 | 62.3 | 42.4 | | Yellow - 134 | ✓ |
| | ✓ QUADRULA PUSTULOSA | 66.0 | 60.3 | 40.3 | | Yellow - 180 | ✓ |
| | ✓ " " | 64.7 | 59.8 | 44.1 | | Yellow - 176 | ✓ |
| | ✓ OBLIQUARIA REFLEXA | 60.6 | 50.2 | 35.8 | | Yellow - 126 | ✓ |
| | ✓ " " | 57.7 | 48.3 | 38.4 | | Yellow - 186 | ✓ |
| | ✓ " " | 62.6 | 51.5 | 39.1 | | Yellow - 190 | ✓ |
| | ✓ " " | 58.4 | 46.7 | 41.6 | | Yellow - 146 | ✓ |
| | ✓ LAMPYLIS CARDIUM | 145.1 | 99.3 | 76.5 | | Yellow - 119 | ✓ |
| ✓ ELIPSARIA LINEOLATA | 72.0 | 55.8 | 38.2 | | Yellow - 120 | ✓ | |

Appendix C

Dredge Location and Date

Profile Data

White River

Three Specific Dredging Sites at River Miles:

River Mile: 250
River Mile: 241
River Mile: 235

Segment:

1/2 - 1 mile stretch which would include area to be dredged.

Schedule:

The Memphis District, USCE would, at a minimum, like to collect data:

1. Now (present conditions)
2. Just before dredging (a couple days advance notice will be needed)
3. Just after dredging
4. Sometime after everything stabilizes (past conditions)

Note: Bryce Mobley has agreed to notify the Arkansas Game and Fish Commission (Craig Uyeda) by FAX (223-6425) when dredging is scheduled for each of the three sites referenced. Craig Uyeda will notify the Memphis District, USCE (Bill Gross, or Larry Tillman) also by FAX (#544-3877).

ARKANSAS GAME AND FISH COMMISSION
#2 NATURAL RESOURCES DR.
LITTLE ROCK, AR 72205

(501) 223-6338
Fax # (501) 223-6425

FACSIMILE TRANSMISSION

DATE: 4-7-95

TO: Bryce Mobley

FROM: Craig Uyeda

DEPT: Arkansas Game & Fish Commission

SUBJ: White River Profile Work

WE ARE TRANSMITTING YOU THE FOLLOWING NUMBER OF PAGES (including this one) 2. IF ALL ARE NOT RECEIVED, PLEASE ADVISE IMMEDIATELY.

REMARKS: As per our telecon this date and your suggestion, please
find attached a brief outline, including my FAX number which
will be used to help coordinate the Corps' profile work with your
dredging sites on the White River.

THANKS, CRAIG

cc: Bill Gross, Navigation Branch
/ Memphis District, USCE
✓ John Harris, Highway Dept.
Allen Carter
Steve Filipek

RECEIVED
A.H.T.O.
APR 10 1995
ENVIRONMENTAL
DIVISION

A: PLEASE
PC.
ALLIEN CARTER
STEVE FILIPEK
JOHN HARRIS
BILL GROSS M.D. JJ
CU.

VIA FAX

April 7, 1995

TO: Neal/MCCo Newport
David Steele/DSD

CC: Craig Uyeda/AG&FC

FROM: 

RE: Profile Studies by Corps of Engineers (COE)
for Arkansas Game & Fish Commission

Part of the new dredging permit will require a profile study of the river bottom in three specific reaches: MP 250, 241, and 235. At G&F's request, COE has agreed to do the detail study with their equipment and personnel in order to identify the headcutting effects by our dredging on mussel bed locations upstream of our activity. The above three mile post locations are the selected locations for the COE to do the profile studies.

For this study to work, G&F need our cooperation in providing our dredging schedule on a continuous basis until the study is complete. Attached is a memo from Craig Uyeda (G&F) outlining what is needed. Please fax your dredging locations and schedule directly to him as soon as you know what the details are.

Craig: For your reference, our contact at Newport is
Neal Pankey, Plant Manager
Phone: 501-523-2276
Fax: 501-523-3715

Craig Uyeda
AGdFC

MOBLEY

CONSTRUCTION COMPANY, INC.
SAND • GRAVEL • READY MIX CONCRETE
P.O. BOX 109 (501) 354-3617 MORRILLTON, AR 72110

SUBJECT

DSD - Headcutting

DATE

4-13-95

MESSAGE

AFTER +

MONTH AFTER

At present DSD is dredging at mile 238.5 and will be there until water forces a move. I will keep you posted of any changes.

247.94
250.14

Thank-you

Special Thanks

RECEIVED
APR 13 1995

523-2276

523-3715 (FAX)

RIVER BASINS

RECEIVED
APR 18 1995

RIVER BASINS

DATE INFO
Craig
FYI
bw 4-18-95
CU
Rich - MOBLEY
S+G
UPPER

Mr. ALLEN BATER / AB&EC - SR
T Mrs. PATRICIA BATHER / PDE - MEMPH

MOBLEY

CONSTRUCTION COMPANY, INC.
SAND • GRAVEL • READY MIX CONCRETE
P.O. BOX 109 (501) 354-3617 MORRILTON, AR 72110

SUBJECT

THREATS TO DSD EQUIP - WHITE RIVER @ NEWPORT, AR

DATE

4/14/95

MESSAGE

ALLEN & PATRICIA:

Attached is a note to me from David that speaks for itself. I'd advised him to report it to the Jackson County authorities & his insurance as well as to send me a written report. The purpose of me sending it on to each of your offices is to document the incident.

RECEIVED
APR 17 1995
Fisheries

AC

Bryce Mobley

cc: Billy White

SIGNED

RECEIVED
APR 17 1995

Federal Coordination and Support Services Division

Lraig Kyeeda
TO AG+FC

MOBLEY

CONSTRUCTION COMPANY, INC.
SAND • GRAVEL • READY MIX CONCRETE
P.O. BOX 109 (501) 354-3617 MORRILLTON, AR 72110

SUBJECT
DSD - Headcutting

DATE
5.2.95

MESSAGE

At present DSD is dredging at rate 338.37 and will be there until water or material condition force a move

BILL
LARRY
I JUST WANTED
YOU TO KEEP YOU UPDATED

Sharon

ON WHERE WORKING
DREDGE IS
DRAW

Paul Parky

523-2276

523-3715 (Ext)

RECEIVED
MAY 2 1995

RIVER BASINS

Craig Uyeda

AG & FC

MOBLEY

CONSTRUCTION COMPANY, INC.
SAND • GRAVEL • READY MIX CONCRETE
P.O. BOX 109 (501) 354-3617 MORRILTON, AR 72110

SUBJECT

DSD - Headcutting

DATE

5-3-95

MESSAGE

DSD was forced to move today to mile 239.75. Some moving each day will probably be necessary until river stabilizes. I will keep you apprised of the situation.

Stash

Neal Pankey

523-2276

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