

DRAFT
FINDING OF NO SIGNIFICANT IMPACT
NASH RELIEF WELLS, PARCEL 2
SEEPAGE CONTROL
CAPE GIRARDEAU AND SCOTT COUNTIES, MISSOURI
FLOOD CONTROL ACT OF 1938

The U.S. Army Corps of Engineers, Memphis District, intends to install 75 relief wells along the toe of an abandoned railroad spur adjacent to the Castor River diversion channel levee on the right descending bank. The relief wells would drain into both existing ditches or newly constructed collector ditches that are adjacent to the wells. These ditches would carry the relief well flow into existing Ditch 8. As a result of increased flows, Ditch 8 would require a cleanout for approximately one mile, with a channel enlargement on the lower one mile extending to the confluence of Ditch 1.

An environmental assessment (EA) was prepared to address potential impacts of this work on wetlands, prime and unique farmland, endangered species, cultural resources, and human environment. Revised water quality certification was received from the Missouri Department of Natural Resources.

Coordination with the Natural Resource Conservation Service revealed the presence of prime farmland in the project area; however, only 3.0 acres would be impacted and a 2.0 acre wetland would be converted to farmland. A site visit and mussel survey completed by Memphis District Personnel indicated that no known endangered or threatened species or critical habitats were present in the project area; this project was coordinated with the U.S. Fish and Wildlife Service. Also, no evidence of hazardous, toxic, or radioactive waste (HTRW) was observed during the site visit.

A cultural resources survey was conducted in the project area, and one unrecorded site was found. It was recommended as potentially eligible for inclusion in the National Register of Historic Places. The project design has been altered to avoid this site. Therefore, the proposed action will have no effect on cultural resources applicable under provisions of the National Historic Preservation Act. This determination included coordination with the State Historic Preservation Officer and the Quapaw Tribe of Oklahoma. Additional coordination will be made if inadvertent discovery of potentially significant cultural resources occurs during project construction.

As the environmental documentation for the proposed project does not indicate this to be a major federal action significantly affecting the human environment, I have determined that an environmental impact statement is not required.

Date

Charles O. Smithers, III
Colonel, Corps of Engineers
District Engineer

DRAFT

ENVIRONMENTAL ASSESSMENT

MISSISSIPPI RIVER LEVEES CONSTRUCTION PROJECT NASH RELIEF WELLS, PARCEL 2, CAPE GIRARDEAU AND SCOTT COUNTIES, MISSOURI SEEPAGE CONTROL

INTRODUCTION

The U.S. Army Corps of Engineers, Memphis District, has prepared this environmental assessment (EA) to evaluate potential impacts associated with installing relief wells and an outlet channel south of the Castor River diversion channel levee. The Memphis District has completed the final design for the Nash, Missouri, relief wells, Parcel 2, Item 48 R A.C., in the Mississippi River Levee (MRL) Enlargement and Seepage Control Final Supplemental Environmental Impact Statement (SEIS), dated July 1998. The SEIS indicated that the relief wells would be located along the right descending bank of the headwater diversion channel levee within stations 3/0+00 to 6/30+00. However, final design shows that the relief wells will be located further downstream on the diversion channel levee between stations 8/28+80 and 9/44+73 (2.2 miles) on the left descending bank. The proposed work is located near Nash, Cape Girardeau and Scott Counties, Missouri. A project map and construction plans are included in the Appendix.

This EA is prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, as interpreted by the U.S. Army Corps of Engineers Regulation ER-200-2-2, and employs a systematic, interdisciplinary approach. The following sections include a discussion of the need, authority, and impacts of alternative plans on natural and cultural resources associated with the proposed action.

PROJECT DESCRIPTION

The work would consist of installing 75 relief wells along the toe of an abandoned railroad spur adjacent to the Castor River diversion channel levee on the right descending bank. The relief wells would drain into both existing ditches or newly constructed collector ditches that are adjacent to the wells. These ditches would carry the relief well flow into existing Ditch 8. As a result of increased flows, Ditch 8 would require a cleanout for approximately one mile, with a channel enlargement on the lower one mile extending to the confluence of Ditch 1.

AUTHORITY

This project is authorized under the Flood Control Act of 1938 (Public Law 671-75) (CD1/75/1).

NEED/PURPOSE

The relief wells are necessary to reduce the high landside seepage pressures that can occur during flood conditions on the Mississippi River and to assure that the levee system is adequate for a project flood event.

ALTERNATIVES

There were four alternatives considered for this project.

Alternative 1: No Action: The no-action alternative is defined as termination of the project. High landside seepage pressures would continue to occur during flood conditions. This could eventually lead to levee failure during major flood events. Failure of the levee would result in property damage and human injuries.

Alternative 2: Install a Slurry Trench to Reduce Landside Seepage Pressures: This alternative would involve installing a slurry trench (cutoff wall) along the riverside toe of the headwater diversion channel levee to stabilize the levee and ensure protection from major flood events. Slurry trenches are costly to construct, and they can also alter the local groundwater regime, which could affect the wetland areas at the toe of the headwater diversion channel levee and the railroad spur.

Alternative 3: Install Relief Wells to Reduce Landside Seepage Pressures: This alternative would involve installing 75 relief wells along the toe of the abandoned railroad spur to stabilize the headwater diversion channel levee and ensure protection from flood events. Since drainage ditches exist near the project area, a small collector ditch would be constructed and connect to the existing channels to carry flow released from the relief wells. Some trees would be removed from the wetland area; however, well placement would be designed so that mainly smaller trees would be removed. Little maintenance would be required for the wells.

Alternative 4: Installing a Landside Seepage Berm: This alternative would consist of construction of a seepage berm on the landside toe of the levee to block seep water from flowing underneath the levee. This would be costly and fill material to construct the berm would be required. Also, the wetland area would be filled in and all of the trees would be removed.

After careful consideration of all alternatives, it was determined that Alternative 1 (no action) was unacceptable, and Alternatives 2 (slurry trench) and 4 (seepage berm) were too costly and would require the removal of trees near the toe of the levee and railroad spur. Therefore, Alternative 3 was selected as the preferred plan.

FLOODPLAIN MANAGEMENT

The project area lies within the Mississippi River floodplain. Installing relief wells to allow seep water to escape is necessary to maintain the integrity of the levee. In order to prevent internal erosion of the soil and protect the levee, the project must be constructed within the floodplain.

HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE (HTRW)

No evidence of HTRW was observed during a site inspection on 29 April 2004. A record search was conducted by Corps personnel through the EPA EnviroMapper (<http://maps.epa.gov>). The EPA search engine did not indicate any superfund sites, toxic releases, or hazardous waste sites within the project area (see Appendix). Based upon information gathered during the preliminary assessment for the project area, it is reasonable to assume that no hazardous, toxic, or radioactive waste will be encountered within the project area. Coordination with Missouri Department of Natural Resources is in progress. No other analysis is required, unless new information is developed or HTRW is discovered.

ENVIRONMENTAL SETTING

Location

The project area is located near Nash, Cape Girardeau and Scott Counties, approximately 10 miles south of Cape Girardeau in southeast Missouri.

Climate

Average monthly temperatures in the general area of Nash range from 30 degrees Fahrenheit in January to 81 degrees Fahrenheit in July. Maximum temperatures can exceed 100 degrees Fahrenheit and minimum temperatures can go below minus 10 degrees. Annual precipitation ranges from 25 to 80 inches with a normal or average of approximately 50 inches over the general area. The heaviest rainfall generally occurs in the winter-spring period of January through May. The prevailing winds are from the southwest. The growing season has a length of approximately 7 months with the first and last killing frost occurring in the early parts of November and April, respectively. Snowfall is not uncommon, however, the area is not susceptible to accumulative snow pack; therefore, snowmelt as a source of runoff is insignificant.

State and Federal Holdings

No state or federal management areas, refuges, or other holdings are located near the project area.

Soils

The predominant soil types within the project area are Falaya silty loam. These soils are somewhat poorly drained, moderately permeable soils that formed in silty alluvium derived from loess deposits. They are typical of upland drainage ways and level areas adjacent to Crowley's Ridge. The surface layers are typically brown to pale brown, overlying grayish to yellowish brown subsoil.

SIGNIFICANT RESOURCES AND IMPACTS

Vegetation

Wooded wetlands exist along the toe of the railroad spur. Tree species in area include American elm, red oak, sweet gum, cottonwood, red maple, pecan, black willow, and green ash. The understory was composed of grape, poison ivy, cat briar, and Virginia creeper. Approximately 3.0 acres of vegetation along the right descending bank will be removed during project construction. Once construction of the relief wells and collector ditches is complete, the area should re-vegetate naturally, and with time, should develop into a woodland similar to the one that presently exists. Mitigation for the cleared wetlands would consist of reforesting 15 acres of prior converted or farmed wetlands with selected bottomland hardwood species as outlined in the 1998 SEIS.

Agricultural Lands

The Natural Resources Conservation Service (NRCS) was contacted regarding the presence of prime and unique farmland and prior converted wetlands in the project vicinity. The NRCS reported that there were soils within the project area are considered prime cropland. Approximately 3.0 acres of prime farmland will be impacted by relief well and collector ditch installations. The 2.0 acre wetland that would be filled with material excavated from the construction of new collector ditches and the channel cleanout of Ditch 8 will be added as cropland to the nearby agricultural field. NRCS also agreed that since the purpose of this project is to protect the integrity of the levee, and there would be such a small acreage involved that there would be no adverse impacts to this overall cropland type.

Cultural Resources

Panamerican Consultants, Inc. performed a cultural resources survey of the project area

consisting of approximately 76 acres. A literary and records search showed that there were preciously recorded historic properties and archaeological sites in the survey area, which included 23CG52, 23CG114, 23CG115, and 23CG116. One previously unrecorded site was found in the project area, 23CG304. This site was recommended as potentially eligible for inclusion in the National Register of Historic Places. The project limits have been altered so that the site would be avoided. The Memphis District has coordinated with the Missouri State Historic Preservation Office and the Quapaw Tribe of Oklahoma regarding the proposed project. See official correspondence in Appendix.

Should deeply buried artifacts or other site indicators be uncovered during construction, the Memphis District Staff Archeologist, Missouri State Historic Preservation Office, and Missouri State Archeological Office should be immediately notified to ensure compliance with all Federal and state laws and regulations.

Wildlife Resources

Wildlife expected to inhabit the project area include raccoons, beavers, opossums, rabbits, gray and fox squirrels, mice, rats, shrews, songbirds, amphibians, reptiles, snakes, coyote, deer, and waterfowl. Project-induced impacts to wildlife are expected to be minimal due to the limited construction area, nature of the proposed construction, and lack of extensive habitat in the project area.

Aquatic Resources

A freshwater mussel survey was conducted in Ditch 8 upstream of County Road 220 on 29 April 2004. The report and data sheet are attached in the Appendix. No threatened or endangered species were found in Ditch 8. Overall, no significant losses to aquatic resources are expected as a result of the proposed project.

Endangered and Threatened Species

Based on information collected during the site visits, no threatened or endangered species or critical habitat will be impacted by the project. The project is being coordinated with U.S. Fish and Wildlife Service.

Wetlands

Approximately 3.0 acres of wooded wetlands would be impacted by the installation of the relief wells, and approximately 2.0 acres of shrub-scrub wetlands would be filled with material from the new collector ditches and Ditch 8 clean out. The 2.0 acre wetland that would be filled would be converted to agricultural land. The 3.0 acres of cleared bottomland hardwood wetlands would be cleared, but this area should revert back to bottomland hardwoods following construction. Fifteen acres of prior-converted or farmed wetlands would be restored to bottomland hardwoods to mitigate adverse impact associated with the project.

Air Quality

The area is in attainment for all air quality standards. Since the equipment to be used is a mobile source, the project is exempt from air quality permitting requirements. Although air emissions would not require a permit, best management practices shall be used throughout the construction to minimize air pollution.

Water Quality

Although water quality certification was granted for the project in the SEIS, changes in project design are being coordinated with the Missouri Department of Natural Resources and updated water quality certification has been requested.

CUMULATIVE EFFECTS

The cumulative effects of clearing 5.0 acres of wooded wetlands on the thousands of acres in the Mississippi floodplain are too small to evaluate. With time, the 3.0 acres of wooded wetlands cleared during construction would revert back to bottomland hardwoods. Mitigation lands consisting of 15 acres would offset the impacts to wetlands. The habitat value of the mitigation land would increase over time because it would be properly managed.

MITIGATION

Fifteen acres of frequently flooded prior-converted or farmed wetlands would be restored to bottomland hardwoods to mitigate adverse impact associated with the project as part of the mitigation plan outlined in the 1998 SEIS. Mitigation ratios were determined using the Missouri Department of Natural Resources' recommendations for the selected plan in the SEIS. A copy of this letter is contained within the Appendix.

COMPLIANCE WITH REGULATIONS

Project compliance with applicable federal and state regulations is shown on Table 1. Review of the draft EA by appropriate agencies and individuals and a finding of no significant impact (FONSI) would bring the project into full compliance with the listed laws and regulations.

RELATIONSHIP OF PLAN TO ENVIRONMENTAL LAWS AND REGULATIONS

The relationships of the recommended plan to the requirements of environmental laws, executive orders, and other policies are presented below:

<u>Federal Policies and Acts</u>	<u>Compliance Status</u>
Archeological Resources Protection Act of 1979	2*
Bald Eagle Act	1
Clean Air Act Amendments of 1977	1
Clean Water Act of 1977, as amended	2*
Endangered Species Act of 1973, as amended	2*
Farmland Protection Policy Act of 1984	2*
Fish and Wildlife Coordination Act of 1958	2*
Flood Control Act of 1946, as amended	
Food Security Act of 1985	1
National Environmental Policy Act of 1969	2 *
National Historic Preservation Act of 1966, as amended	2*
River and Harbor and Flood Control Act of 1970	1
Water Resources Development Act of 1986	1
Water Resources Planning Act of 1965	1
<u>Executive Orders</u>	
Floodplain Management (E.O. 11988)	
Protection, Enhancement of the Cultural Environment (E.O. 11593)	
Protection of Wetlands (E.O. 11990)	
<u>Other Federal Policies</u>	
Prime and Unique Farmlands	1
Water Resources Council, Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies	1

1/ Full compliance with the policy and related regulations has been accomplished.

2/ Partial compliance with the policy and related regulations has been accomplished.

3/ Not applicable.

*Full compliance will be met following public review and a Finding of No Significant Impact.

COORDINATION

United States Department of the Interior, U.S. Fish and Wildlife, Columbia, Missouri
Missouri Department of Natural Resources, Water Pollution Control Program, Jefferson City, Missouri
Missouri Department Natural Resources, Division of Environmental Quality, Hazardous Waste Program, Jefferson City, Missouri
U.S. Department of Agriculture, Natural Resources Conservation Service, Cape Girardeau County, Missouri
Missouri State Historic Preservation Office, Jefferson City, Missouri

RELATED ENVIRONMENTAL DOCUMENTATION/REFERENCES

U.S. Army Corps of Engineers, Environmental Desk Reference (IWR Report 96-PS-3), Institute for Water Resources Policy and Special Studies Division, July 1996.

U.S. Army Corps of Engineers, Supplement No. 1 to the Final Environmental Impact Statement, Mississippi River and Tributaries Project, Mississippi River Levees and Channel Improvement, July 1998.

USDA, Food Security Act

CONCLUSION

This office has assessed the environmental impacts of the proposed action and has determined that the proposed work will have no significant impacts upon vegetation, fish, wildlife, cultural resources, or the human environment.

PREPARER

For additional information contact Leighann Gipson at (901) 544-4015.

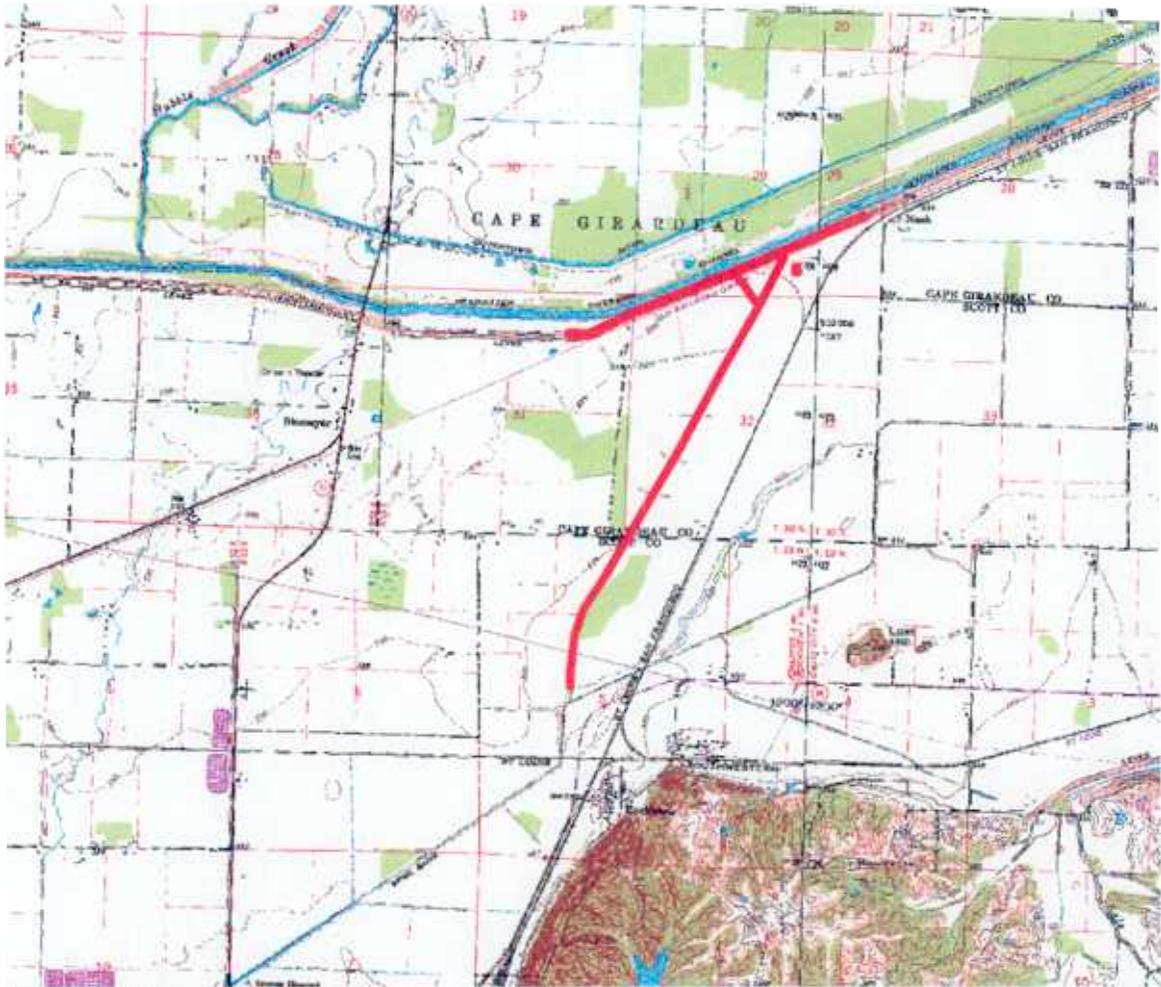
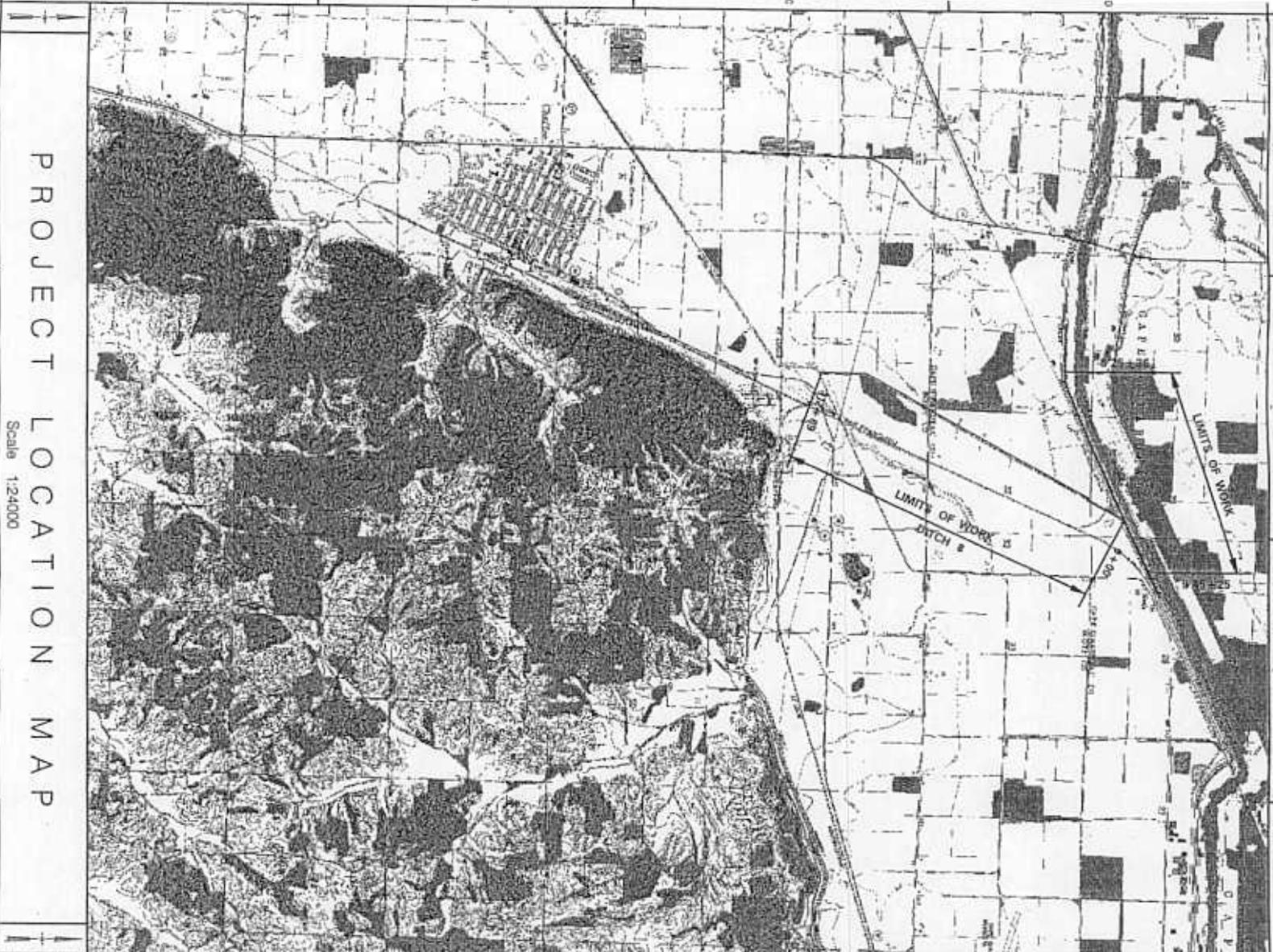


Figure 1: Map of project area.

DRAWING INDEX

Drawing No.	Drawing Title	Proj. No.	File No.
1	MAPS AND INDEX	41L 00100080	
2	RIGHT OF WAY PLAN	41L 00200080	
3	PLAN VIEW	41L 00300080	
4	PROF. VIEW - 0110008 - 2'-3", 3'-3", 3'-6" & 0110008 - 4'-0"	41L 00400080	
5	CROSS SECTIONS - 0110008 - 3'-6"	41L 00500080	
6	CROSS SECTIONS - 0110008 - 3'-6"	41L 00600080	
7	CROSS SECTIONS - 0110008 - 2'-6"	41L 00700080	
8	CROSS SECTIONS - 0110008 - 3'-6"	41L 00800080	
9	CROSS SECTIONS - 0110008 - 3'-6"	41L 00900080	
10	CROSS SECTIONS - 0110008 - 3'-6"	41L 01000080	
11	RELIEF WELL AND PILEDRIVER DETAILS	41L 01100080	
12	CONCRETE DETAILS	41L 01200080	
13	LATERAL OILTOW STRIP PROTECTION DETAILS	41L 01300080	
14	STATE HYDROGRAPHY - CAPR STANDARD SIZE	41L 01400080	
15	SOILING LOGS	41L 01500080	
16	STANDARD SOILING LOGS	41L 01600080	
17	TEMPORARY EROSION CONTROL SERVICES	41L 01700080	



PROJECT LOCATION MAP

Scale 1:24,000



- LEGEND
- MEMPHIS DISTRICT BOUNDARY
 - U.S. HIGHWAY
 - COUNTY LINE
 - STATE BOUNDARY
 - INTERSTATE HIGHWAY
 - PROJECT LOCATION

VICINITY MAP



BCOE
SEPTEMBER 2004

THIS PROJECT WAS DESIGNED BY THE MEMPHIS DISTRICT OF THE U.S. ARMY CORPS OF ENGINEERS. THE LIMITS ON SIGNATURES AND PROFESSIONAL DESIGNATIONS OF INDIVIDUALS APPEAR ON THESE PROJECT DOCUMENTS WITHIN THE SCOPE OF THEIR EMPLOYMENT AS REQUIRED BY BR1101-1-112.



<p>APPROVED AND AUTHORIZED FOR RELEASE UNDER PROJECT</p> <p>ITEM NO. R-48.88 A.C. (PARCEL NO. 2) RELIEF HILLS NASH, MISSOURI MAPS AND INDEX LITTLE ROCK DISTRICT</p>	<p>U.S. ARMY DISTRICT DISTRICT OFFICE OF ENGINEERS MEMPHIS, TENNESSEE</p>	<p>DESIGNED BY JOHN L. MOORE, C.E. Civil Engineering Division</p>	<p>APPROVED BY DAVID ALLEN, P.E. Civil Engineering Division</p>	<p>DATE 2004</p>	<p>PROJECT NO. 2004</p>	<p>SCALE 1:24,000</p>	<p>DATE 2004</p>
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<p>Redraw Map</p> <p>Map Features</p> <p><input type="checkbox"/> Regulated sites</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Multi-activities <input checked="" type="checkbox"/> Superfund <input checked="" type="checkbox"/> Toxic releases <input checked="" type="checkbox"/> Water dischargers <input checked="" type="checkbox"/> Air emissions <input checked="" type="checkbox"/> BRS <input checked="" type="checkbox"/> Hazardous waste <p><input checked="" type="checkbox"/> Places</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Highways <input checked="" type="checkbox"/> Streets <p><input checked="" type="checkbox"/> Water features</p> <ul style="list-style-type: none"> <input type="checkbox"/> Demographics <p><input checked="" type="checkbox"/> Political boundaries</p> <ul style="list-style-type: none"> <input type="checkbox"/> Air monitors <input type="checkbox"/> Water monitors <p><input checked="" type="checkbox"/> Flood zones <small>EXT EPA</small></p> <ul style="list-style-type: none"> <input type="checkbox"/> Special Flood Hazard Area <input type="checkbox"/> Moderate Flood Hazard Area <p>Redraw Map</p>		<p>Your Window</p> <p>All features interse appear as part of the fact sheet below</p> <hr/> <p>Community (Town, State) County(s)</p> <p>Area of Window Width of Window Approx. population (2000) Watershed(s)</p> <p>Waterbody(s)</p> <p>Congressional Dist (s) Urban area</p> <p>No. of facilities reporting to EPA</p>
<p> <input type="radio"/> Zoom In <input type="radio"/> Zoom Out <input checked="" type="radio"/> Recenter <input type="checkbox"/> Locator Map <input type="checkbox"/> Identify Select a feature <input type="checkbox"/> Legend Choose: a view </p>		

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Last updated on Monday, November 03, 2003
 URL: <http://134.67.99.109/wme/myWindow.asp>



480 W. Jackson Trails, Jackson, MO 63755 Phone 573-243-1467

Leighann Gipson
USACOE – Memphis
167 N. Main Street, Room B-202
Memphis TN 38103-1894

April 6, 2004

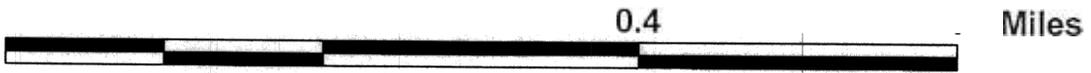
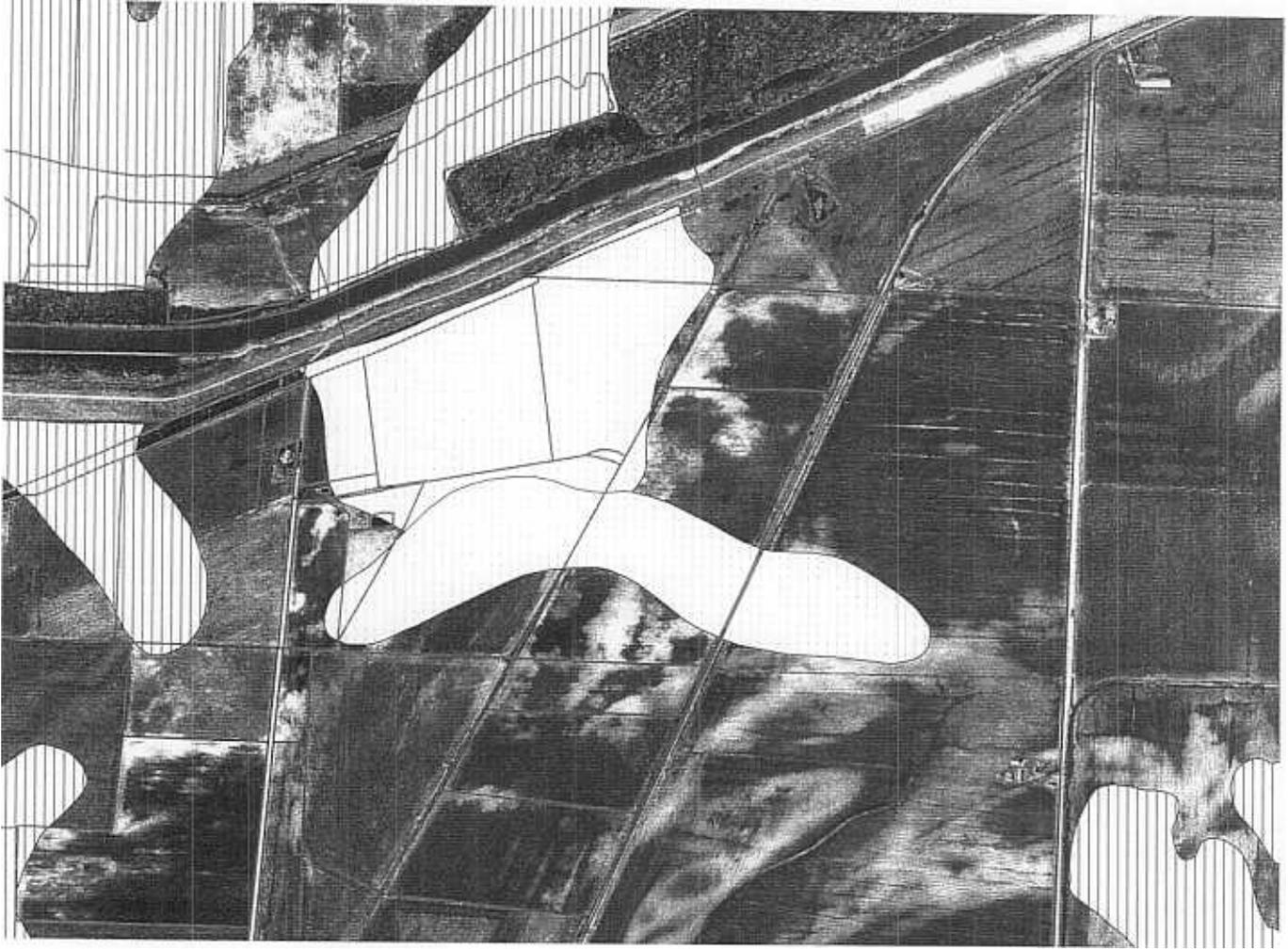
Mrs. Gipson,

I am returning a copy of the map you sent. I have highlighted one small (1.1 ac) wetland that was identified on the Wetland Inventory. This off the inventory and therefore not an on site certified wetland. I am also sending a map of the prime soils in the area.

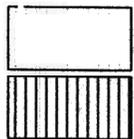
Call me if you have any questions.



James T. Hunt,
District Conservationist

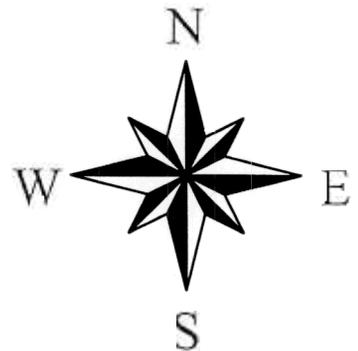


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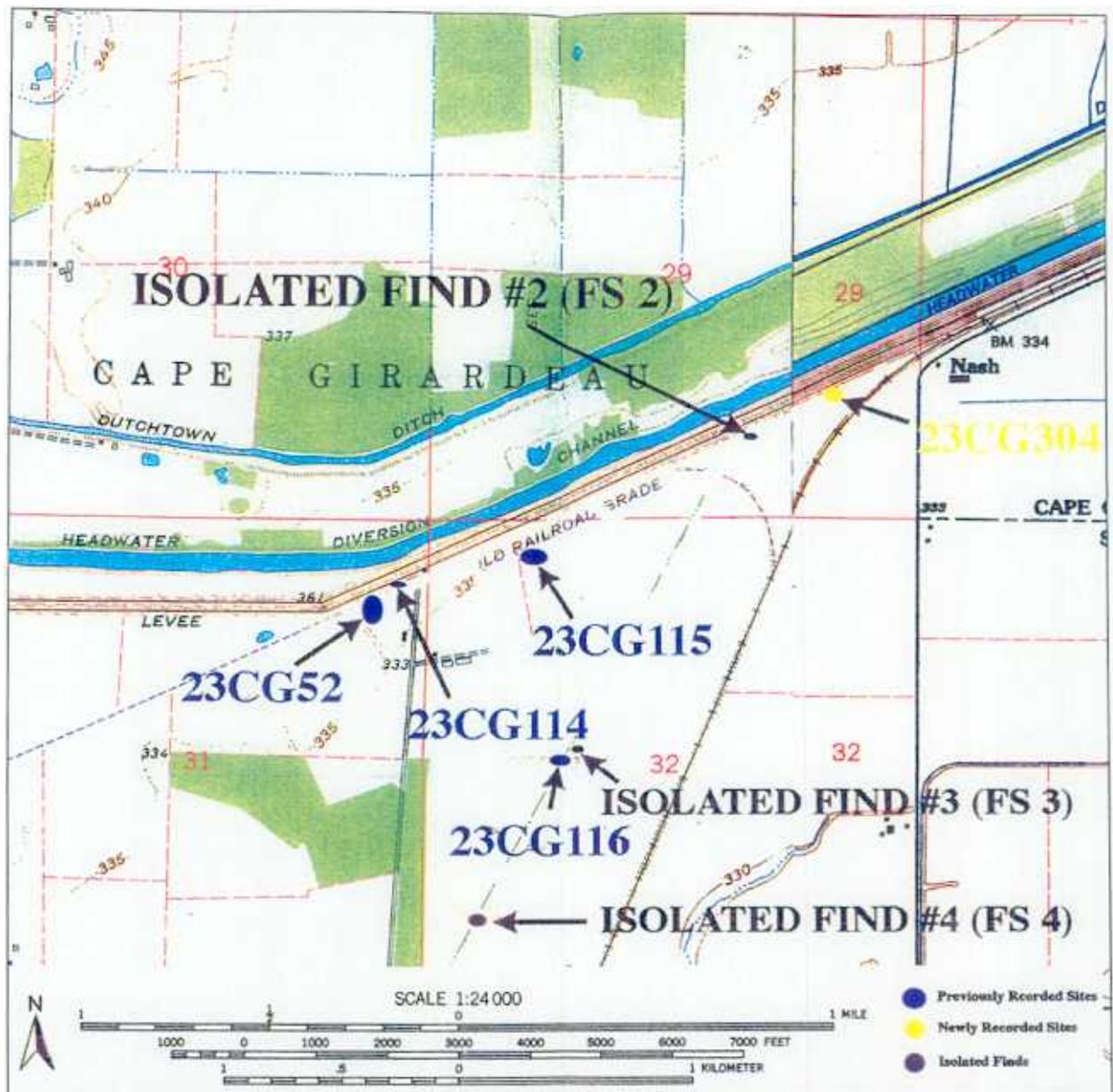


Figure X-1. Site location map (base map: Chaffee, MO 7.5-min. quad, provisional edition 1963, photorevised 1978; and Scott City, MO 7.5-min. quad, edition 1993).



Bob Holden, Governor • Stephen M. Mahfood, Director

DEPARTMENT OF NATURAL RESOURCES

www.dnr.mo.gov

August 2, 2004

Jimmy McNeil
District Archeologist
Corps of Engineers, Memphis District
167 North Main Street B-202
Memphis, Tennessee 38103-1894

Re: Nash Relief Wells Parcel 2 Project (COE) Cape Girardeau & Scott Counties, Missouri

Dear M. McNeil:

Thank you for submitting information on the above referenced project for our review pursuant to Section 106 of the National Historic Preservation Act (P.L. 89-665, as amended) and the Advisory Council on Historic Preservation's regulation 36 CFR Part 800, which require identification and evaluation of cultural resources.

We have reviewed the July 2004 report entitled *Cultural Resources Survey of Nash Relief Wells Parcel 2 Project Area, Cape Girardeau and Scott Counties, Missouri* by Panamerican Consultants, Inc. Based on this review, it is evident that a thorough and adequate cultural resources survey has been conducted. We concur with the investigator's recommendation that archaeological site 23CG304 may be eligible for inclusion in the National Register of Historic Places.

If at all possible, the proposed project should be designed to avoid archaeological site 23CG304. Plans detailing the redesign of the project should be submitted to this office in order to document successful avoidance. If avoidance is not feasible, subsurface testing of 23CG304 should be conducted in order to determine if this site is eligible for inclusion in the National Register of Historic Places. The results of the evaluation should be submitted to the State Historic Preservation Office in accordance with the Council's regulations. Pending completion of this process, no actions should be taken that would foreclose consideration of alternatives to avoid or satisfactorily mitigate any adverse effects to historic properties.

We also concur that archaeological sites 23CG52, 34CG114, 23CG115 and 23CG116 are not eligible for inclusion in the National Register of Historic Places. No further actions are needed in regards to these sites.

If you have any questions, please write Judith Deel at State Historic Preservation Office, P.O. Box 176, Jefferson City, Missouri 65102 or call 573/751-7862. Please be sure to include the SHPO Log Number (027-CG-04) on all future correspondence or inquiries relating to this project.

Sincerely,

STATE HISTORIC PRESERVATION OFFICE

A handwritten signature in black ink that reads "Mark A. Miles".

Mark A. Miles
Director and Deputy State
Historic Preservation Officer

Integrity and excellence in all we do

c Andrew Buchner, PCI



**Site Visit
Nash Relief Wells, Ditch 8
Cape Girardeau County, Missouri**

Date: 29 April 2004

Participants: L. Gipson (USACE Memphis)
M. Smith (USACE Memphis)

On 29 April 2004, representatives of the Corps of Engineers (USACE) conducted a mussel survey in Ditch 8, Cape Girardeau County, Missouri (Figure 1). USACE is proposing to perform a channel cleanout and enlarge the channel for additional flows as a result of relief wells that will be installed to protect the Castor River Diversion Channel levee.

A qualitative freshwater mussel survey was conducted by wading in the ditch upstream of the CR 204 bridge (Figures 2, 3), where a hand search method was used to locate mussels (See Field Data Sheet). The survey reach was approximately 100 meters in length and the width of channel was searched. A total of six live mussels and one relic representing two species were collected in the reach (Table 1). The substrate consisted of mainly clay with some silt. There was no current, and the water was relatively turbid. Maximum water depth was 1.5 feet. The reach was searched for 0.83 person-hours. No evidence of other threatened or endangered species was observed at the site.

Table 1. Results of the Ditch 8 mussel survey.

Species	Site
<i>Toxolasma spp.</i>	1
<i>Unio merus declivus</i>	5
TOTAL NUMBER LIVE SPECIES	6



Figure 1. Survey site on Lower Buffalo Creek.



Figure 2. Survey area upstream of CR 204 bridge.



Figure 3. Ditch 8 downstream of CR 204 bridge.

**FIELD DATA SHEET
FRESHWATER MUSSEL SURVEY**

Project Name: Nash Relief Wells

Date: 29 April 2004 GPS:

Survey Site: Ditch 8

Reach (m): 100m River Stage:

Surveyors: Smith/Gipson

Search Time: 25 x 2

Survey Methods Used (circle all applied): Relic Hand Rake Snorkel Scuba

Species	Common Name	Number Identified		Total
		Relic	Live	
<i>Actinonaias ligamentina</i>	Mucket			
<i>Alasmidonta marginata</i>	Elktoe			
<i>Amblema plicata</i>	Threeridge			
<i>Anodonta suborbiculata</i>	Flat floater			
<i>Arcidens confragosus</i>	Rock pocketbook			
<i>Corbicula fluminea</i>	Asian clam			
<i>Cyclonaias tuberculata</i>	Purple wartyback			
<i>Cyprogenia aberti</i>	Western Fanshell			
<i>Dreissena polymorpha</i>	Zebra mussel			
<i>Ellipsaria lineolata</i>	Butterfly			
<i>Elliptio dilatata</i>	Spike			
<i>Fusconaia ebena</i>	Ebonysshell			
<i>Fusconaia flava</i>	Wabash pigtoe			
<i>Lampsilis abrupta</i>	Pink mucket			
<i>Lampsilis cardium</i>	Plain pocketbook			
<i>Lampsilis hydiara</i>	Louisiana fatmucket			
<i>Lampsilis teres</i>	Yellow sandshell			
<i>Lasmigona complanata</i>	White heelsplitter			
<i>Leptodea fragilis</i>	Fragile papershell			
<i>Leptodea leptodon</i>	Scaleshell			
<i>Ligumia recta</i>	Black sandshell			
<i>Ligumia subrostrata</i>	Pondmussel			
<i>Megalonaias nervosa</i>	Washboard			
<i>Obovaria olivaria</i>	Hickorynut			
<i>Obliquaria reflexa</i>	Threehorn wartyback			
<i>Plectomerus dombeyanus</i>	Bankclimber			
<i>Pleurobema rubrum</i>	Pyramid pigtoe			
<i>Pleurobema sintoxia</i>	Round pigtoe			
<i>Potamilus alatus</i>	Pink heelsplitter			
<i>Potamilus capax</i>	Fat pocketbook			
<i>Potamilus ohioensis</i>	Pink papershell			
<i>Potamilus purpuratus</i>	Bleufer			
<i>Pyganodon grandis</i>	Giant floater			
<i>Quadrula cylindrica</i>	Rabbitsfoot			
<i>Quadrula metanevra</i>	Monkeyface			
<i>Quadrula nodulata</i>	Wartyback			
<i>Quadrula pustulosa</i>	Pimpleback			
<i>Quadrula quadrula</i>	Mapleleaf			
<i>Strophitus undulatus</i>	Creeper			
<i>Toxolasma spp.</i>	Lilliput spp		1	
<i>Tritogonia verrucosa</i>	Pistolgrip			
<i>Truncilla donaciformis</i>	Fawnsfoot			
<i>Truncilla truncata</i>	Deertoe			
<i>Unioemerus declivus</i>	Tapered Pondhorn	1	5	
<i>Unioemerus tetralasmus</i>	Pondhorn			
<i>Utterbackia imbecillis</i>	Paper pondshell			
Total			6	