UPPER MISSISSIPPI RIVER SYSTEM
ENVIRONMENTAL MANAGEMENT PROGRAM
POST-CONSTRUCTION PERFORMANCE
EVALUATION REPORT SUPPLEMENT (PERS2)

MONKEY CHUTE HABITAT REHABILITATION AND ENHANCEMENT PROJECT

JUNE 2001
12-YRS POST CONSTRUCTION

US Army Corps
of Engineers
Rock Island District

POOL 21
MISSISSIPPI RIVER MILE 325
MARION COUNTY, MISSOURI

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING - P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO
ATTENTION OF

http://www.mvr.usace.army.mil

June 1, 2001

Planning, Programs, and
Project Management Division

SEE REPORT DISTRIBUTION LIST (APPENDIX E)

The Rock Island District of the U.S. Army Corps of Engineers has enclosed for your use the Post-Construction Performance Evaluation Report Supplement (PERS2) for the Monkey Chute, Missouri, Habitat Rehabilitation and Enhancement Project (HREP), dated June 2001. This report is a product of 12 years of post-construction observations and field monitoring since project completion in 1989. A 15-year supplemental report is due out in March 2004.

Performance Evaluation Reports, both initial and supplemental, are the Corps of Engineers' primary mechanism for documenting and communicating the effectiveness of Upper Mississippi River System – Environmental Management Program (UMRS-EMP) HREP's.

A March 2001 draft of this report was provided to the project sponsors for their review and comment. These comments are incorporated into this version of the report.

Should you have any questions regarding the report, please contact Mr. Jon Fleischman or Mr. Dan Holmes at the U.S. Army Corps of Engineers Rock Island District, Design Branch. You may reach them at (309) 794-5159 with comments.

Sincerely,

Gary L. Loss, P.E.
Chief, Planning, Programs, and Project
Management Division

Enclosure

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
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UPPER MISSISSIPPI RIVER SYSTEM ENVIRONMENTAL MANAGEMENT PROGRAM POST-CONSTRUCTION PERFORMANCE EVALUATION REPORT SUPPLEMENT (PERS2, 12 YEARS AFTER CONSTRUCTION)

MONKEY CHUTE HABITAT REHABILITATION AND ENHANCEMENT PROJECT

POOL 21, RIVER MILE 325 MARION COUNTY, MISSOURI

JUNE 2001

ACKNOWLEDGMENT

Many individuals of the Rock Island District of the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, the Missouri Department of Conservation, and the Illinois Department of Natural Resources contributed to the development of this Supplemental Post-Construction Performance Evaluation Report for the Monkey Chute Habitat Rehabilitation and Enhancement Project. These individuals are listed below:

ROCK ISLAND DISTRICT, U.S. ARMY CORPS OF ENGINEERS (Corps)

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ENVIRONMENTAL ANALYSIS:	Charlene Carmack
FORESTRY:	Gary Swenson
CADD SUPPORT:	Tom Dumoulin

U.S. FISH AND WILDLIFE SERVICE (USFWS)

PROJECT LEADERS:	Dick Steinbach/Karen Westphall

MISSOURI DEPARTMENT OF CONSERVATION (MDOC)

BIG RIVER PROGRAM COORDINATOR:	Dan Zekor
WILDLIFE BIOLOGIST:	Shawn Cleray
FISHERIES BIOLOGIST:	Ken Brummett
FISHERIES BIOLOGIST:	Travis Moore

ILLINOIS DEPARTMENT OF NATURAL RESOURCES (ILDNR)

FISHERIES BIOLOGIST:	Dan Sallee

US Army Corps of Engineers
Rock Island District

ACRONYMS

Corps	U.S. Army Corps of Engineers
DPR	Definite Project Report
EMP	Environmental Management Program
HREP	Habitat Rehabilitation and Enhancement Project
UMRS	Upper Mississippi River System
ILDNR	Illinois Department of Natural Resources
MDOC	Missouri Department of Conservation
USFWS	United States Fish and Wildlife Service
PERS	Performance Evaluation Report Supplement
PER	Performance Evaluation Report
RM	River Mile

Additional information about the Peoria Lake HREP and the UMRS-EMP is available via the Internet at the following addresses: www.mvr.usace.army.mil or www.mvr.usace.army.mil/EMP/default.htm

EXECUTIVE SUMMARY
Monkey Chute Rehabilitation and Enhancement Project
Post-Construction Performance Evaluation Report

November 1989 through March 2001

Two goals of Monkey Chute Project:

A. Encourage main channel, oxygen-rich flow into the chute and retain 88 acres of backwater lake.

1. Sedimentation Monitoring

B. Encourage aquatic and biological use of backwater lake.

1. Aquatic Monitoring
2. Vegetation and Waterfowl Use Monitoring

A. Encourage main channel, oxygen-rich flow into the chute

1. *Operation and Maintenance*: The Monkey Chute backwater area has no operational requirements. Maintenance is conducted as needed to maintain access into the chute by eliminating shallow areas created by silt accumulation. Maintenance needs are evaluated through sedimentation monitoring, through field inspections performed by the site manager and through site visits conducted jointly by the Corps of Engineers and project sponsors after such events as flooding and/or high water. To date, maintenance has not been performed or required to access the chute, although future inspections may justify the need for maintenance and/or dredging.

2. *Sedimentation Monitoring*: Sedimentation monitoring is accomplished through inspections and surveys performed by the Missouri Department of Conservation (MDOC) and U.S. Army Corps of Engineers (Corps) along the established dredging baseline and the five MDOC transects. Monitoring to date shows how silt accumulation and scour have adjusted along the dredged area of the chute, allowing deep holes (up to 10 feet) and shallow areas (down to 1 foot) to be created near MDOC transect 5. Monkey Chute's silt accumulation and scour have been attributed to such activities as the opening and closing of Lock and Dam 21, as well as high water events. Shallow areas are the main reason that flow and access becomes limited in the chute, while the deep holes provide a winter habitat for fish. Monitoring will continue as scheduled.

B. Encourage aquatic and biological use of backwater lake

1. *Aquatic Monitoring*: Aquatic monitoring is performed by the MDOC in cooperation with the Illinois Department of Natural Resources (ILDNR). The sponsors have monitored aquatic activity by micro-tagging four paddlefish in the chute, by elecro-fishing for largemouth bass and through field inspections. The MDOC reported that fish populations can be affected by turbidity, silt covering-up eggs, carp destroying eggs by feeding and large-scale fishing of the chute. The MDOC reported in a December 2000 memo that the fish populations have improved from years past. The ILDNR also noted that Monkey Chute has become an important large mouth bass and crappie fishery, stating that stocked bass are surviving, growing and staying in the area. A fish community survey will be evaluated. Monitoring will continue as needed.

2. *Vegetation and Waterfowl Use Monitoring*: Vegetation monitoring was performed once post-construction and waterfowl use monitoring has not been performed to date. Since project completion in 1989, the vegetation growing on the dredged material has been completely voluntary, consisting of cottonwood, silver maple, box elder and black willow. The vegetation provides marginal benefits to wildlife and could be acting as a silt filter during high water events. Vegetation and waterfowl use monitoring is and will continue to be performed through field and site inspections.

Conclusions

Although silt accumulation and scour continue in the chute along the dredged area, creating some deep holes and shallow areas, the Monkey Chute backwater area continues to have main-channel flow allowing 88 acres of backwater lake to be maintained without limiting access into the chute. If access to the chute becomes limited due to shallow areas, maintenance may be required. Aquatic use of the chute seems to be constantly improving and continues to be adequate for local anglers with no fish kills reported to date.

APPENDIX A

POST-CONSTRUCTION MONITORING AND EVALUATION PLAN

TABLE A-1

MONITORING AND PERFORMANCE EVALUATION MATRIX

Project Phase	Type of Activity	Purpose	Responsible Agency	Implementing Agency	Funding Source	Implementation Instructions
Pre-Project	Sedimentation Problem Analysis	Define system-wide problem. Evaluate planning assumptions.	USFWS	USGS (UMESC)	LTRM	--
	Pre-Project Monitoring	Identify and define problems at HREP site. Establish need of proposed project features.	Sponsor	Sponsor	Sponsor	--
	Baseline Monitoring	Establish baseline for performance evaluation.	Corps	Field Station or Sponsor through Cooperative Agreements, or Corps	HREP/-Sponsor	--
Design	Data Collection for Design	Include quantification of project objectives, design of project, and development of performance evaluation plan.	Corps	Corps	HREP	--
Construction	Construction Monitoring	Assess construction impacts; assure permit conditions are met.	Corps	Corps	HREP	See State Section 401 Stipulations
Post-Construction	Performance Evaluation Monitoring	Determine success of project as related to objectives.	Corps (quantitative) Sponsor (field observations)	Sponsor through O&M, or Corps	HREP/-Sponsor	See Table A-2

TABLE A-2

RESOURCE MONITORING AND DATA COLLECTION SUMMARY

Type Measurement	Water Quality Data						Engineering Data			Natural Resource Data			Sampling Agency	Remarks
	Pre-Project Phase		Design Phase		Post-Const. Phase		Pre-Project Phase	Design Phase	Post-Const. Phase	Pre-Project Phase	Design Phase	Post-Const. Phase		
	Apr-Sep	Oct-Mar	Apr-Sep	Oct-Mar	Apr-Sep	Oct-Mar								
POINT MEASUREMENTS														
Fish Stations [1/] Electrofishing										1		2Y	MDOC/ILDNR	
TRANSECT MEASUREMENTS														
Sedimentation Transects [2/] Hydrographic Soundings							1/1		5Y				Corps/MDOC	
AREA MEASUREMENTS														
Mapping [3/] Vegetative Response												1	Corps	
Aerial Photography/ Remote Sensing										1		3	Corps	

Legend

Y = Yearly
nY = n-Year Interval
1,2,3 = Number of times data was collected within designated project phase

TABLE A-2 (Cont'd)

[1/] Fish Stations (Pre- and Post-Construction)

MDOC/ILDNR
Electrofishing surveys, 1983, 1984, 1996, 1997,1999, 2000

[2/] Sedimentation Channel Profiles and Transects (Pre- and Post-Construction)

Corps (Channel Profiles)
1986
1988
1989
1993
1994
1997
1998

MDOC (Transects)
1
2
3
4
5

[3/] Mapping (Pre- and Post-Construction)

1984 Aerial Photography
1989 Aerial Photography
1993 Aerial Photography
1994 Aerial Photography
1995 Black and White Aerial Photography
1996 Color Oblique Aerial Photography

APPENDIX B

COOPERATING AGENCY CORRESPONDENCE

MISSOURI DEPARTMENT OF CONSERVATION
FAX TRANSMISSION
P. O. BOX 428
HANNIBAL, MO 63401
PHONE: 573-248-2530 FAX: 573-248-2532

TO: CELIA KOOL (EMERGENCY MGMT)

FROM: TRAVIS MOORE

Ken asked me to offer my thoughts to you regarding Monkey Chute. I reviewed your fax and can provide the following thoughts:

You mentioned movement at transect 1, the mouth of Monkey Chute. Trees that were marked as boundary posts soon after the channel was dredged apparently fell into the river. We have noticed that there continues to be some movement at both upstream and downstream edges of the mouth. Current flowing into and out of the chute may saturate the banks and cause failures at the mouth.

As for the scour hole between transects 4 and 5, there could be a number of possible reasons for its existence and expansion. First, it is possible that the scour hole was created during the initial dredging and was never detected by me or my predecessors because it does not fall along one of the transects. It was first discovered by chance. We had purchased a new 3-D depth finder around 1995 and wanted to see if fish were using the chute. That's when we noticed the scour and verified it's existence with manual measurements.

Other possible reasons: 1) The scour may have filled with loose sediment after dredging then was flushed out during recent high water events (93, 95, 97). Since that time, vegetation on the islands has slowed water velocity and caused the bedload to be dropped farther upstream, on the islands.

2) When the dam gates are closed and flow is limited, water backs up into the

MISSOURI DEPARTMENT OF CONSERVATION

MEMORANDUM

Date: December 15, 1997

FROM: Ken Brummett

TO: Celia Kool

SUBJECT: Monkey Chute Evaluation Report

I wonder if the deep hole at Transects 4-5 is a result of the dredging. Does sediment "flow" under water to a lower elevation. That may explain the enlargement. It may be moving into the original cut, or something may be scouring the years' accumulation of fine sediment.

From the recreational fishery aspect, Monkey Chute supports a relatively high bass fishing effort by tournament anglers. Those guys naturally home in on a slack water area with good depth. Tournament weigh-ins are conducted somewhere else, so a bass caught in Monkey Chute probably has little chance of finding its way home. If normal carrying capacity of the chute for top predators (bass etc.) is only 25 lbs. per acre and a series of tournaments removes 10 lbs. per acre over a season, that is a 40% reduction. This was just an example, but we consider 10 lbs. per acre to be a relatively high harvest on a lake bass population.

Bass sampling with Sallee showed relatively few large (12-inch or longer) bass were present, but several small ones were captured. In a balanced population, we should find about 40% of the stock size (8-inch or longer) bass over 12-inches and about 20% over 15 inches. This was not so in Monkey Chute. First, the turbidity inhibits growth of sight-feeding fish, silt smothers the eggs in a nest if muddy water occurs while they are spawning, feeding activity of bottom-feeders such as carp destroys nests, flow during spawning may result in a spawning failure, and then a fisherman comes along and catches one of the few bass that are present. All these factors make life for a species that has evolved in a slack-water situation very difficult.

On a lighter note, the creation of better off-channel habitat at Cottonwood Chute may ease the pressure on game species in Monkey Chute.

I assisted Kim Graham with paddlefish micro-tagging in May. We caught 8 in Cottonwood Chute and 4 in Monkey Chute. You have the measurements on those (not total length, eye to fork of tail). The micro-tagging was part of the MICRA effort. We got too few paddlefish to make a judgement about the population. One reason I took Kim into Monkey Chute was because I was fairly confident we would find some in there.

I hope this information/opinion helps you out. If you need more, I'll be in mornings through Friday, then on annual leave until January 2.

Happy Holidays!

MISSOURI DEPARTMENT OF CONSERVATION

Headquarters
2901 West Truman Boulevard, P.O. Box 180, Jefferson City, Missouri 65102-0180
Telephone: 573/751-4115 ◆ Missouri Relay Center: 1-800-735-2966 (TDD)

JERRY M. CONLEY, Director

May 16, 2001

Mr. Jon Fleischman
U.S. Army Engineer District, Rock Island
ATTN: CEMVR-ED-DS
P. O. Box 2004
Rock Island, IL 61204-2004

Dear Mr. Fleischman:

Thank you for providing the Missouri Department of Conservation (MDC) the opportunity to review and comment on the Post-Construction Performance Evaluation Report Supplement (PERS2) for the Monkey Chute, Missouri, Habitat Rehabilitation and Enhancement Project (HREP), dated March 2001. This draft report is a product of 12 years of post-construction observations and monitoring conducted by the Rock Island District, Illinois Department of Natural Resources and MDC.

Our agency comments are minor in that we noted two references to the Monkey Chute Project being located in Iowa. Please note this error occurred in your March 7, 2001, letter of transmittal and on page 2 of the report. Other than this one comment, MDC finds the contents in the PERS2 for Monkey Chute acceptable as we totally agree with the need for future project monitoring and assessment. Also, our agency is pleased that the Monkey Chute Project was the first HREP constructed by the Rock Island District at the beginning of the Environmental Management Program. We are also extremely pleased to note that after 12 years of operation, the Monkey Chute Project is still functioning as intended.

Again, thank you for providing this opportunity to comment.

Sincerely,

DAN ZEKOR
POLICY COORDINATION SUPERVISOR

DZ:GF:bg
c: Dan Sallee (Illinois DNR)

COMMISSION

ANITA B. GORMAN, Kansas City
RANDY HERZOG, St. Joseph
RONALD J. STITES, Plattsburg
HOWARD L. WOOD, Bonne Terre

APPENDIX C

MDOC POST-CONSTRUCTION DATA

Monkey Chute Period 60 Minutes 25 September 1996*			
	Number	**Length, mm**	
Largemouth bass	1	460's	
Largemouth bass	1	410's	
Largemouth bass	1	380's	
Largemouth bass	1	370's	Hook injury
Largemouth bass	1	350's	
Largemouth bass	3	330's	Hook injury - 1
Largemouth bass	2	320's	
Largemouth bass	1	310's	
Largemouth bass	2	300's	
Largemouth bass	1	290's	
Largemouth bass	1	280's	
Largemouth bass	1	270's	Hook injury
Largemouth bass	1	260's	
Largemouth bass	1	210's	
Largemouth bass	1	130's	
Largemouth bass	1	120's	
Largemouth bass	4	110's	
Largemouth bass	2	100's	
Largemouth bass	4	80's	
Largemouth bass	1	70's	

* Sampling conducted by the Illinois Department of Natural Resources and the Missouri Department of Conservation.

Combined Pool 21* Largemouth Bass Length Frequency Data - 1997** Period 200 Minutes Total 15 July 1997		
	Number	**Length (mm)**
Largemouth bass	38	<110 (Age 0)
Largemouth bass	19	110-300
Largemouth bass	6	>300

* Combined Pool 21 data includes sampling in Monkey Chute (60 minutes of sampling effort), Cottonwood Island (90 minutes), Quincy Bay (40 minutes), and dike fields (10 minutes).

** Sampling conducted by the Illinois Department of Natural Resources and the Missouri Department of Conservation.

APPENDIX D

REFERENCES

REFERENCES

Published reports which relate to the Monkey Chute Habitat Rehabilitation and Enhancement EMP Project or which were used as references in production of this document are presented below.

(1) *Definite Project Report (R1), Monkey Chute Restoration Project, Pool 21, Upper Mississippi River, Marion County, Missouri*, February 1987. The Definite Project Report (DPR) presented a proposal to dredge the downstream end of Monkey Chute to retain 88 acres of backwater lake as year-round fish habitat and maintain its suitability for waterfowl and furbearers. The report marked the conclusion of the planning process and serves as a basis for approval of the preparation of final plans and specifications and subsequent project construction.

(2) *Monkey Chute Dredging, Mississippi River, Marion County, Missouri*, Plans and Specifications, September 1987 and June 1988. These documents were prepared to provide sufficient detail of project features to allow construction of the project by a contractor. At the request of the contractor, the first contract was terminated. The second contract was awarded 15 July 1988. Work was 100 percent completed on 5 May 1989.

(3) *Monkey Chute Habitat Rehabilitation and Enhancement Project, Great Flood of 93 Damage Assessment*, March 1994. This report was prepared to provide a summary describing the damage, proposed corrective actions, and estimated cost for repairs to Flood of 1993 damage.

(4) *Monkey Chute Restoration Project, Post-Construction Performance Evaluation Report,* March 1995. This document was prepared to summarize all available monitoring data, project inspections, and project observations by the Corps and the MDOC for the period November 1989 through March 1994.

(5) *Monkey Chute Restoration Project, Post-Construction Performance Evaluation Report Supplement,* April 1998. This document was prepared to summarize all available monitoring data, project inspections, and project observations by the Corps and the MDOC for the period November 1989 through April 1997.

APPENDIX E

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Ms. Karen Westphall HREP Coordinator Mark Twain National Wildlife Refuge 1704 North 24th Street Quincy, IL 62301	1
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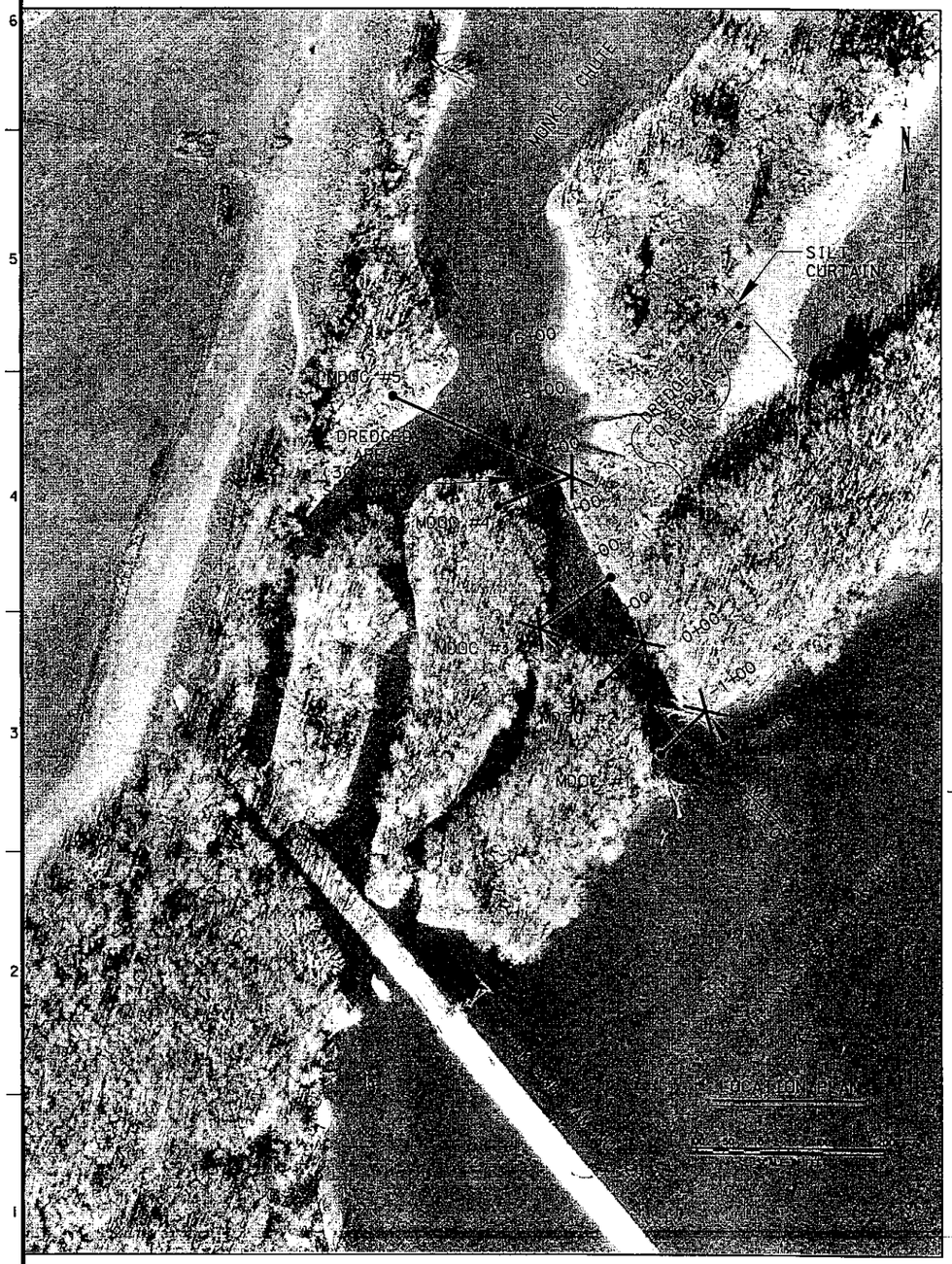
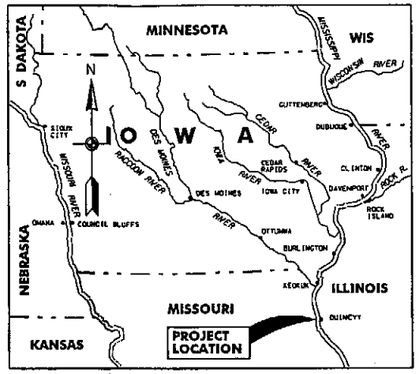
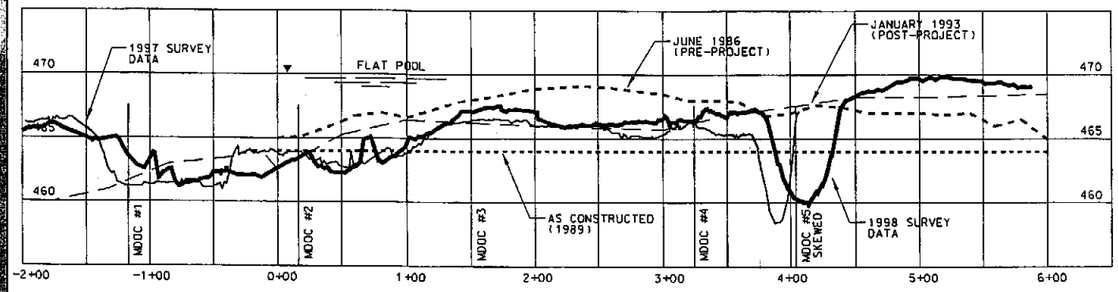
APPENDIX F

PLATES





VICINITY MAP



MONKEY CHUTE EMP
CHANNEL PROFILE

1998 SURVEY

1997 SURVEY

1993 SURVEY (POST-PROJECT)

1989, AS CONSTRUCTED

1986 SURVEY (PRE-PROJECT)

NOTES:

1. WATER DEPTHS SHOWN INCLUDE THE PRE-PROJECT SURVEY (1986), AS CONSTRUCTED SURVEY (1989) AND POST-PROJECT SURVEYS OF 1993, 1997 AND 1998, AFTER HIGH WATER IN 1997.
2. SOUNDINGS TAKEN IN MARCH 1994 INDICATED WATER DEPTHS SIMILAR TO JAN. 1993 SOUNDINGS, AS SHOWN ABOVE.
3. THE "X" DESIGNATES THE STARTING POINT OF MDOC TRANSECTS (TYP.).
4. THE 1997 CHUTE PROFILE INDICATED SCOUR HOLES BETWEEN MDOC TRANSECTS #1/#2 AND #4/#5. THIS REMAINS EVIDENT ON THE 1998 CORPS PROFILES SHOWN ON PLATE #3.
5. SURVEY OF THE MDOC TRANSECTS IS SCHEDULED FOR THE SUMMER OF 2001 BY THE MDOC.

US Army Corps of Engineers
Rock Island District

Symbol	Description	Date	Approved
	Revisions		

Designed By: AWG
Drawn By: TPD
Checked By: JPF
Reviewed By: JPF
Date: 03/06/01
Scale: AS SHOWN
Drawing Code:
Solicitation Number:

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

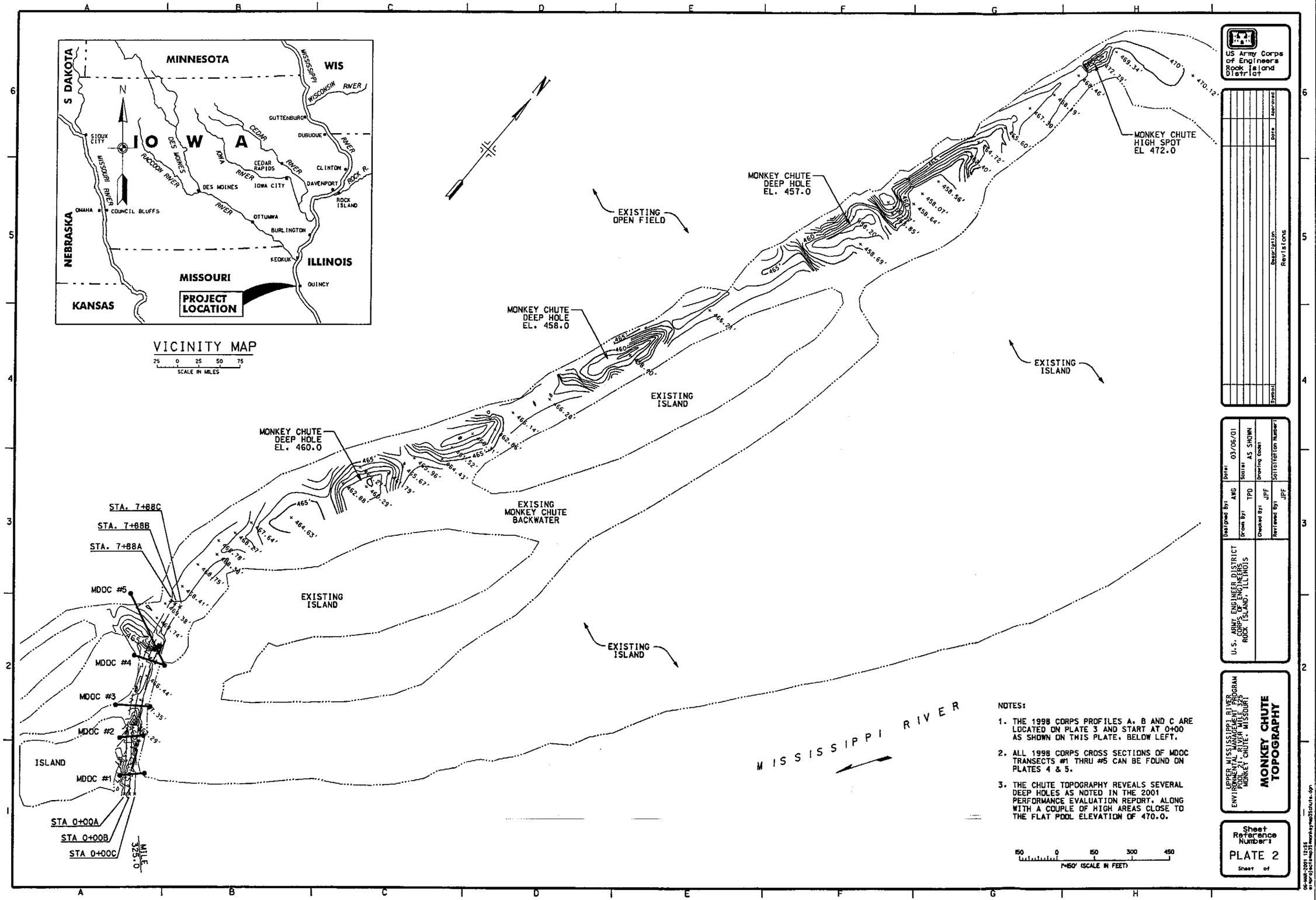
UPPER MISSISSIPPI RIVER
ENVIRONMENTAL MANAGEMENT PROGRAM
POOL 21, RIVER MILE 325
MONKEY CHUTE, MISSOURI

MONKEY CHUTE
LOCATION PLAN

Sheet Reference Number:
PLATE 1
Sheet of

VICINITY MAP

25 0 25 50 75
SCALE IN MILES



NOTES:

1. THE 1998 CORPS PROFILES A, B AND C ARE LOCATED ON PLATE 3 AND START AT 0+00 AS SHOWN ON THIS PLATE, BELOW LEFT.
2. ALL 1998 CORPS CROSS SECTIONS OF MDOC TRANSECTS #1 THRU #5 CAN BE FOUND ON PLATES 4 & 5.
3. THE CHUTE TOPOGRAPHY REVEALS SEVERAL DEEP HOLES AS NOTED IN THE 2001 PERFORMANCE EVALUATION REPORT, ALONG WITH A COUPLE OF HIGH AREAS CLOSE TO THE FLAT POOL ELEVATION OF 470.0.

US Army Corps of Engineers Rock Island District

Symbol	Description	Date	Approved
	Revisions		

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CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

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MONKEY CHUTE, MISSOURI

MONKEY CHUTE TOPOGRAPHY

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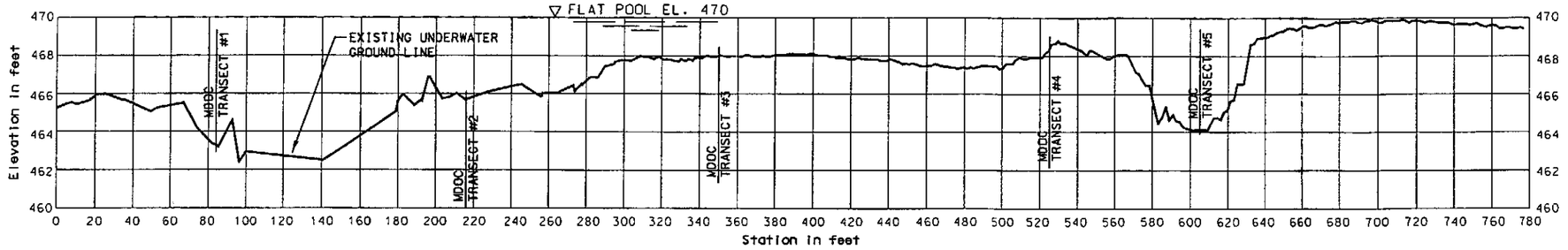
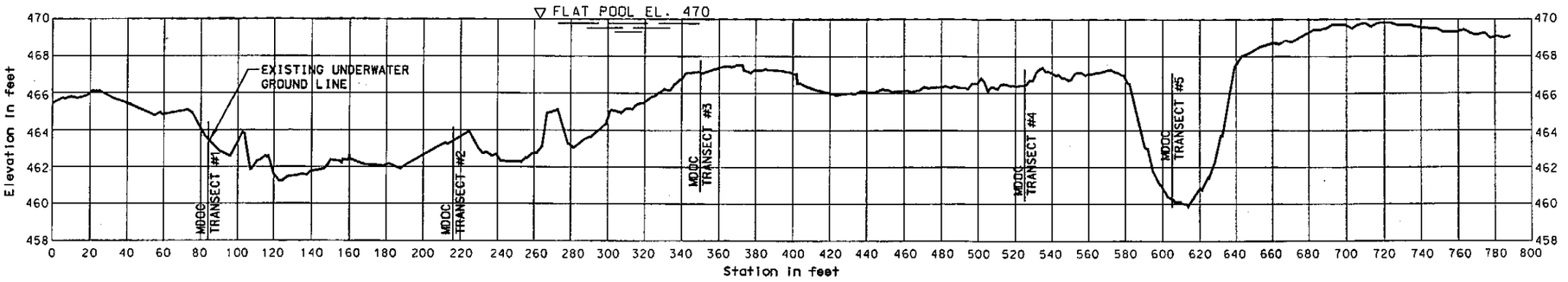
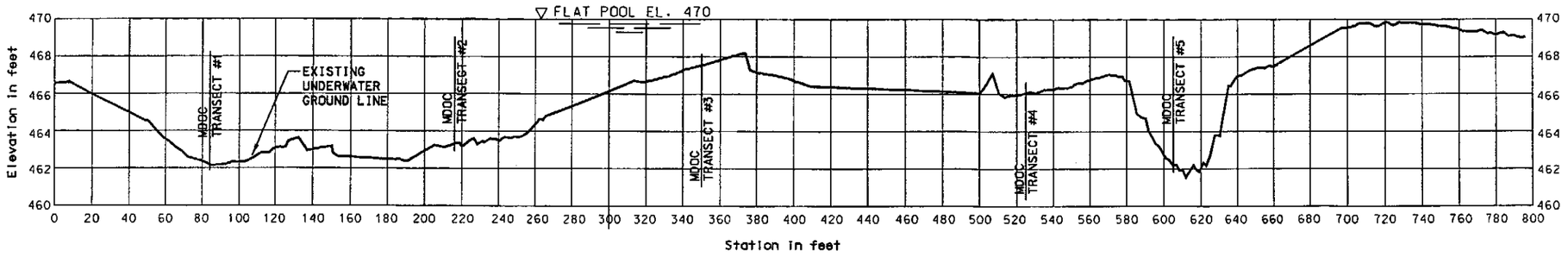
PLATE 2
Sheet of



Profile C



Profile B



Profile A

NOTES:

1. THE STARTING LOCATION FOR PROFILES A, B AND C (0+00) EQUALS -2+00 AS SHOWN ON PLATE #1.
2. THE 1998 CORPS PROFILES A, B AND C SHOW HOW SILT ACCUMULATION IS REACHING THE FLAT POOL ELEVATION OF 470.0 AROUND STATIONS 680 TO 780, ABOVE.

US Army Corps of Engineers Rock Island District

Revisions

Symbol	Description	Date	Approved

Designed By: AMG	Date: 03/06/01		
Drawn By: TPD	Scale: AS SHOWN	Drawing Code:	
Checked By: JPF	Solicitation Number:		
Reviewed By: JPF			

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

UPPER MISSISSIPPI RIVER
ENVIRONMENTAL MANAGEMENT PROGRAM
POOL 21, RIVER MILE 325
MONKEY CHUTE, MISSOURI

MONKEY CHUTE
PROFILES A, B AND C

Sheet Reference Number:
PLATE 3
Sheet of

06-MAR-2001 13:01
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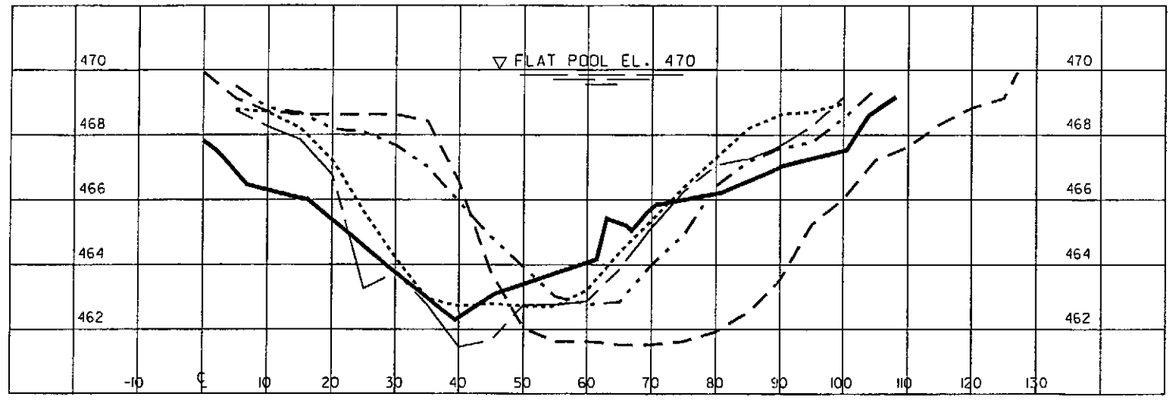
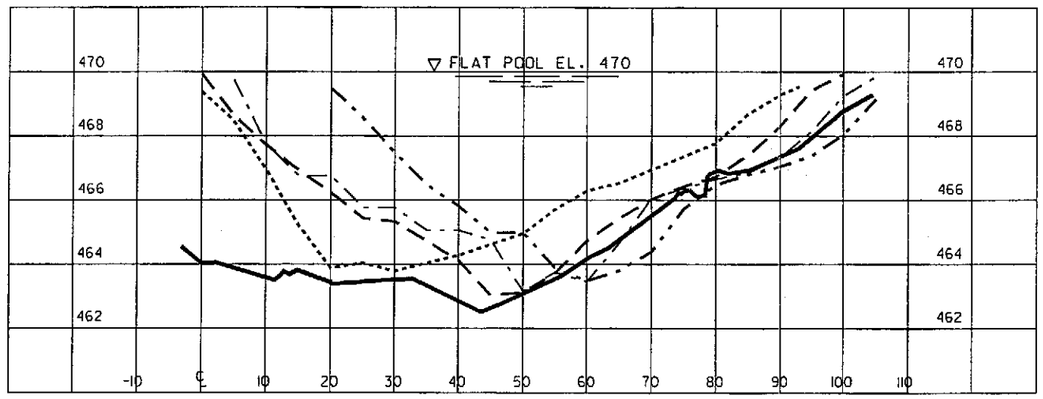


MDOC TRANSECT #1



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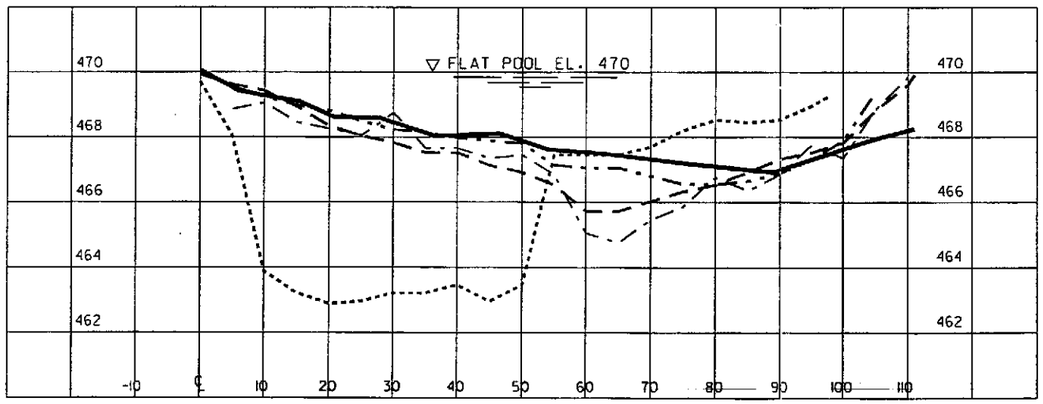


MDOC TRANSECT #3

NOTES:

1. THE MDOC TRANSECTS #1 THRU #5 SHOW HOW SILT ACCUMULATION HAS SHIFTED ALONG THE MOUTH AND DREDGED AREA OF THE CHUTE FROM 1989 TO 1998.

1998
1997
1995
1994
1989

US Army Corps of Engineers Rock Island District

Revisions

Symbol	Description	Date	Approved

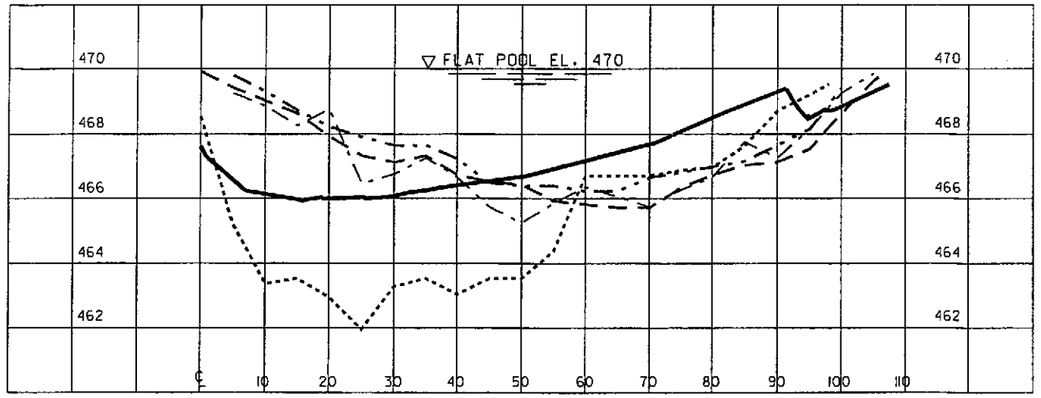
Designed By: AWG
Drawn By: TPD
Checked By: JPF
Reviewed By: JPF
Date: 03/06/01
Scale: AS SHOWN
Drawing Code:
Solicitation Number:

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

UPPER MISSISSIPPI RIVER
ENVIRONMENTAL MANAGEMENT PROGRAM
POOL 21, RIVER MILE 325
MONKEY CHUTE, MISSOURI

MONKEY CHUTE TRANSECTS 1,2 AND 3

Sheet Reference Number:
PLATE 4
Sheet of



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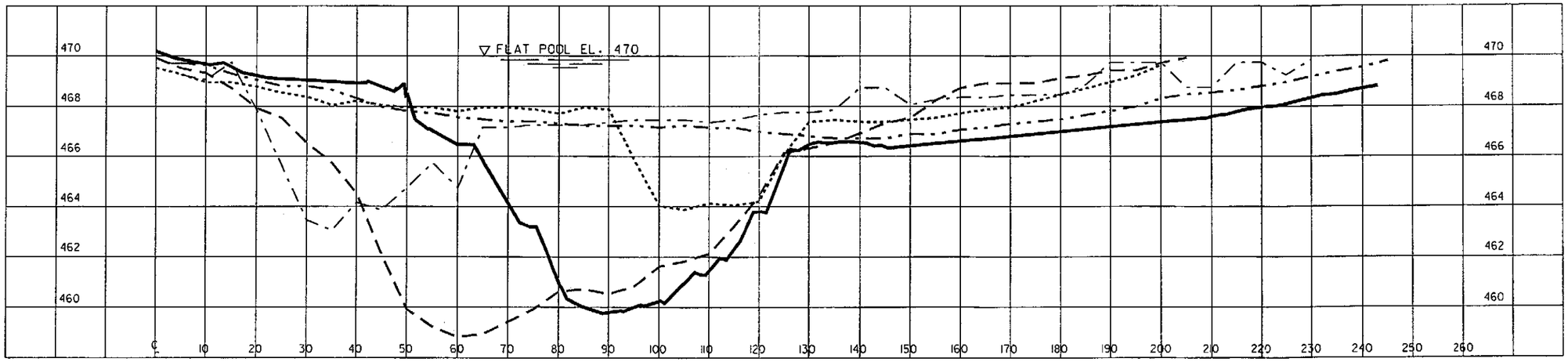

MDOC TRANSECT #5

NOTES:

1. THE MDOC TRANSECTS #1 THRU #5 SHOW HOW SILT ACCUMULATION HAS SHIFTED ALONG THE MOUTH AND DREDGED AREA OF THE CHUTE FROM 1989 TO 1998.

1998
1997
1995
1994
1989

US Army Corps of Engineers Rock Island District

Symbol	Description	Date	Approved

Revisions

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

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Checked By: JPF
Reviewed By: JPF
Date: 03/06/01
Scale: AS SHOWN
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Solicitation Number:

UPPER MISSISSIPPI RIVER
ENVIRONMENTAL MANAGEMENT PROGRAM
POOL 21, RIVER MILE 325
MONKEY CHUTE, MISSOURI

MONKEY CUTE, MDOC TRANSECTS 4 AND 5

Sheet Reference Number:
PLATE 5
Sheet of