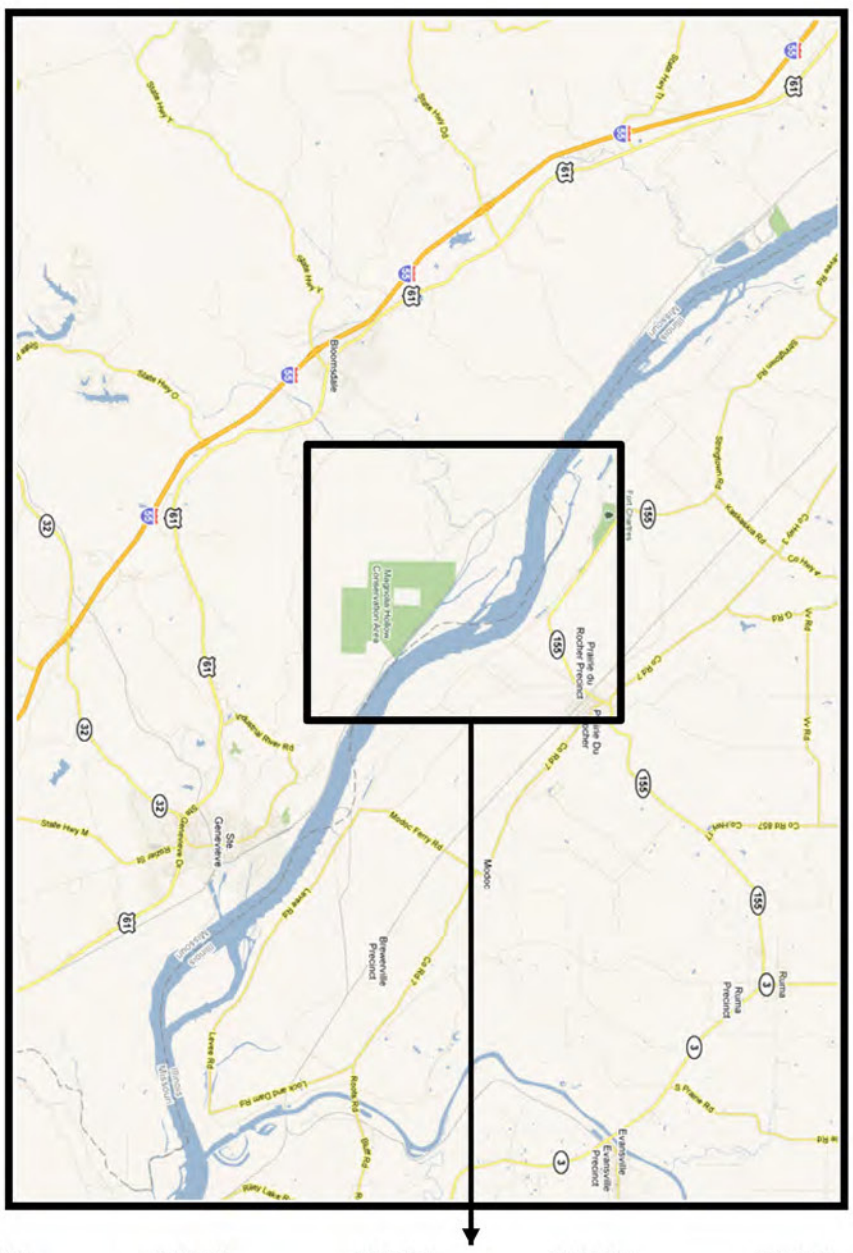

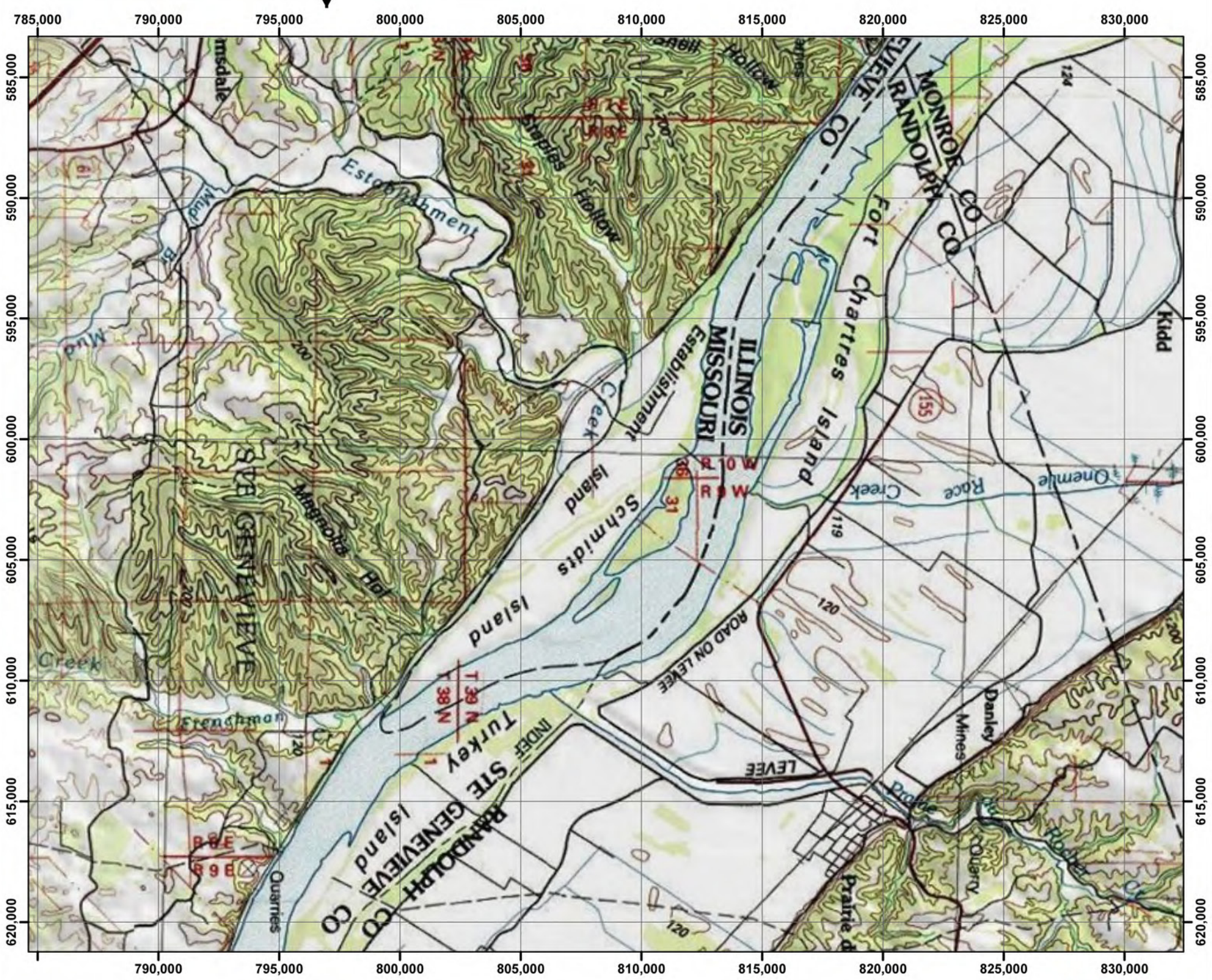

PLATE NUMBER 1

Location and Vicinity Map

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN
Establishment Chute HSR Model
River Miles 134.0-128.0

DESIGNED BY: B Krischel		
DRAWN BY: B Krischel	REVIEWED BY: A Cox	CHECKED BY: J Brown, P.E.
SUBMITTED: B Krischel	APPROVED: R Davinroy, P.E.	
FILE NAME: L:\Krischel\Establishment\Establishment 11X17.mxd	PLOT DATE:	

W S N E

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US Army Corps of Engineers®
St. Louis District
Center of Expertise for Photogrammetric Mapping

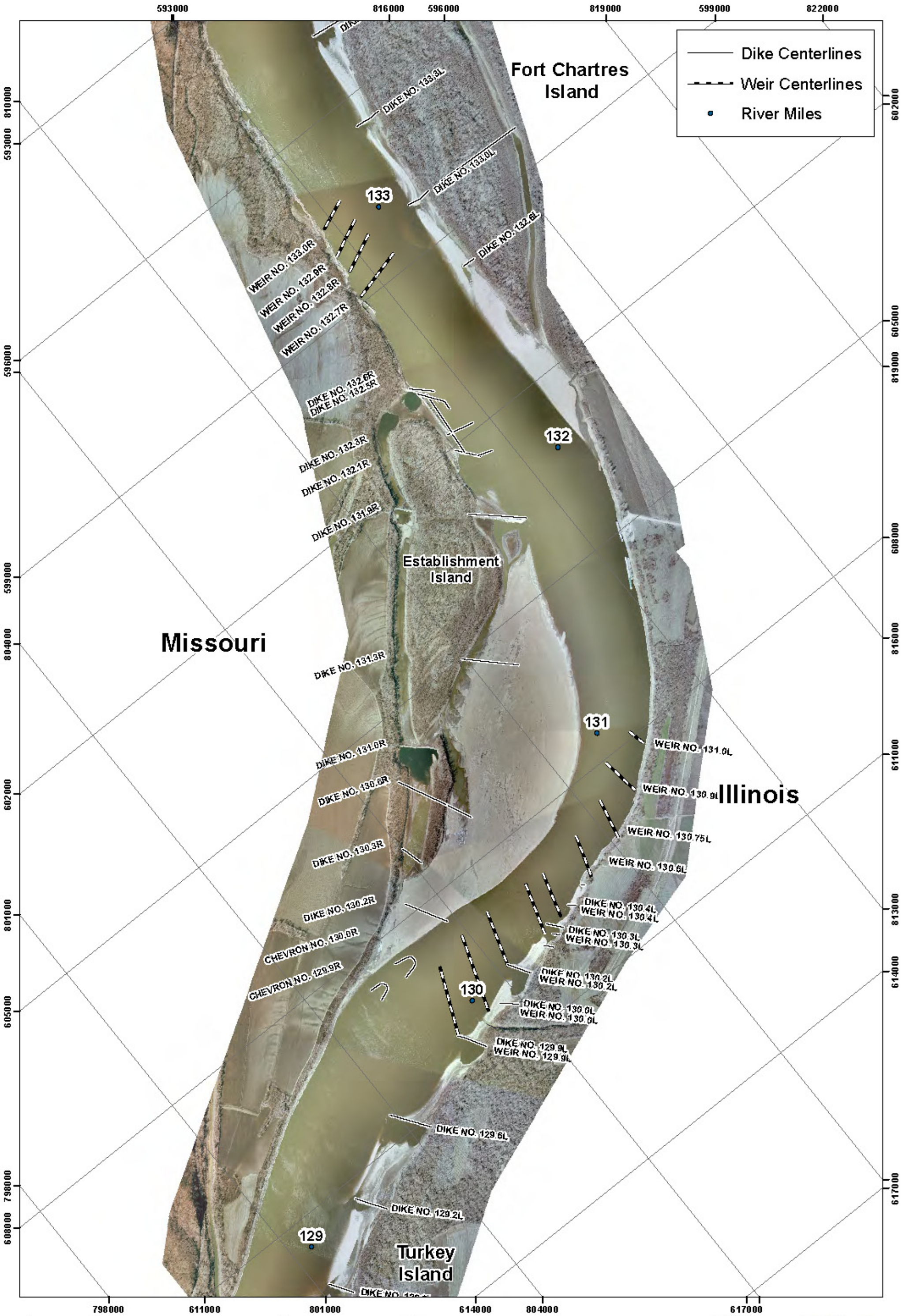

PLATE NUMBER 2

0 750 1,500 3,000 Feet

2006 Aerial Photograph

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN
Establishment Chute HSR Model
River Miles 134.0-128.0

B Erischel		
B Erischel	A Cox	J Brown, P.E.
B Erischel	R Davinroy P.E.	

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Looking downstream at the entrance of Establishment Chute.

Looking upstream at Dike 131.0R. The left hand side of the picture shows the lower tip of Establishment Island, and the right hand side of the picture shows the small, unnamed island.

Typical condition of the left descending bank (LDB) of Establishment Chute.

Typical condition of the right descending bank (RDB) of Establishment Chute.

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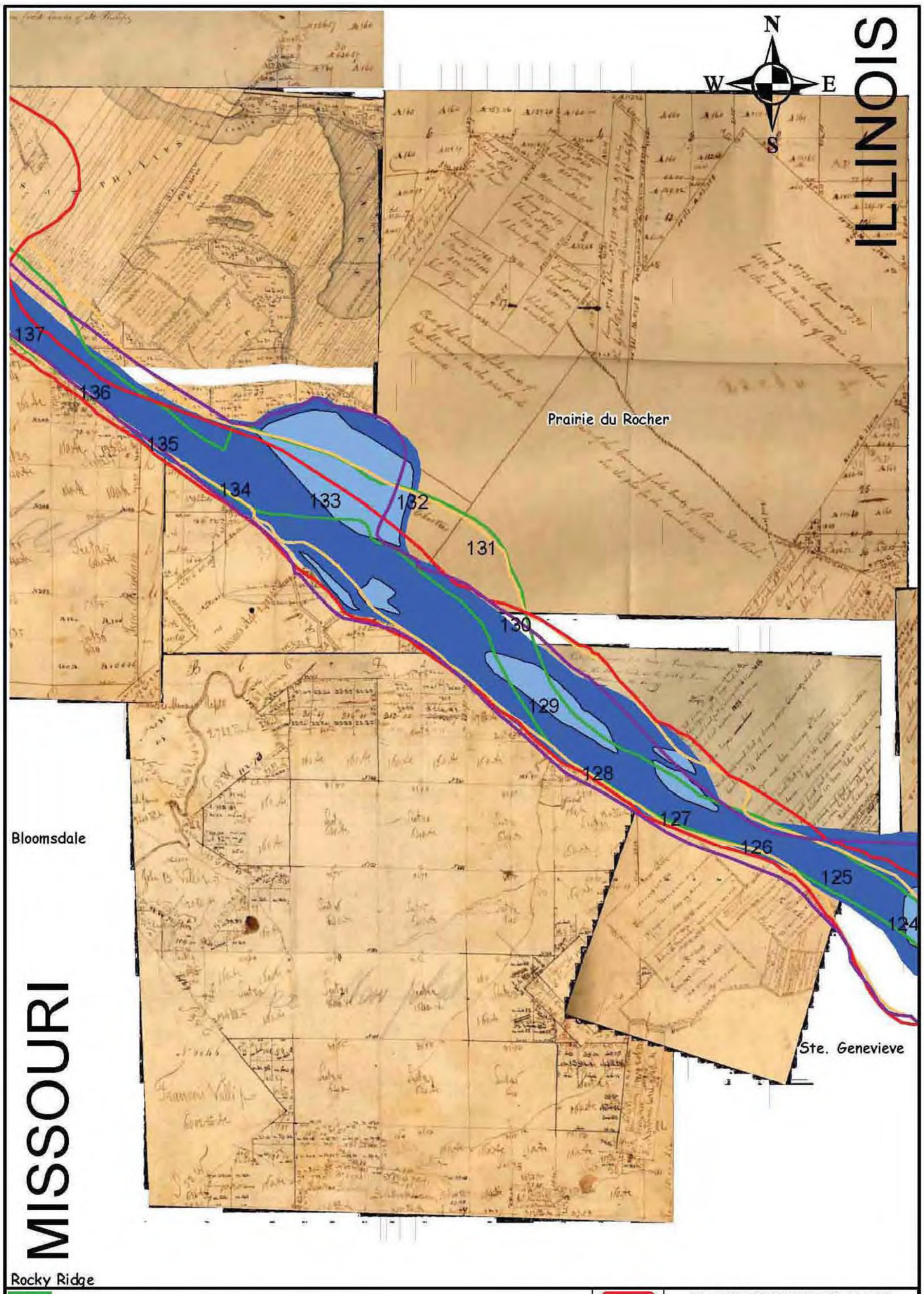
U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN
Establishment Chute HSR Model
River Miles 134.0-128.0

Site Visit Pictures
August 24, 2010

PLATE NUMBER
3



2003
1928
1881
1866
1817

0 5,280 10,560 21,120 Feet

SOURCE: 1817-1820 Government Land Office Surveys

U.S. ARMY ENGINEER DISTRICT, ST. LOUIS
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

GEOMORPHOLOGY OF THE MIDDLE MISSISSIPPI RIVER FROM ST. LOUIS, MO TO CAIRO, IL

1817 Planform

RIVER MILES 137-124

PLATE NO. 20

APPLIED RIVER ENGINEERING CENTER

PLATE NUMBER 4

Geomorphology (1817 - 2003)

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN
Establishment Chute HSR Model
River Miles 134.0-128.0

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FILE NAME: L:\Krischel\Establishment\Establishment 11X17.mxd	PLOT DATE:	

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St. Louis District

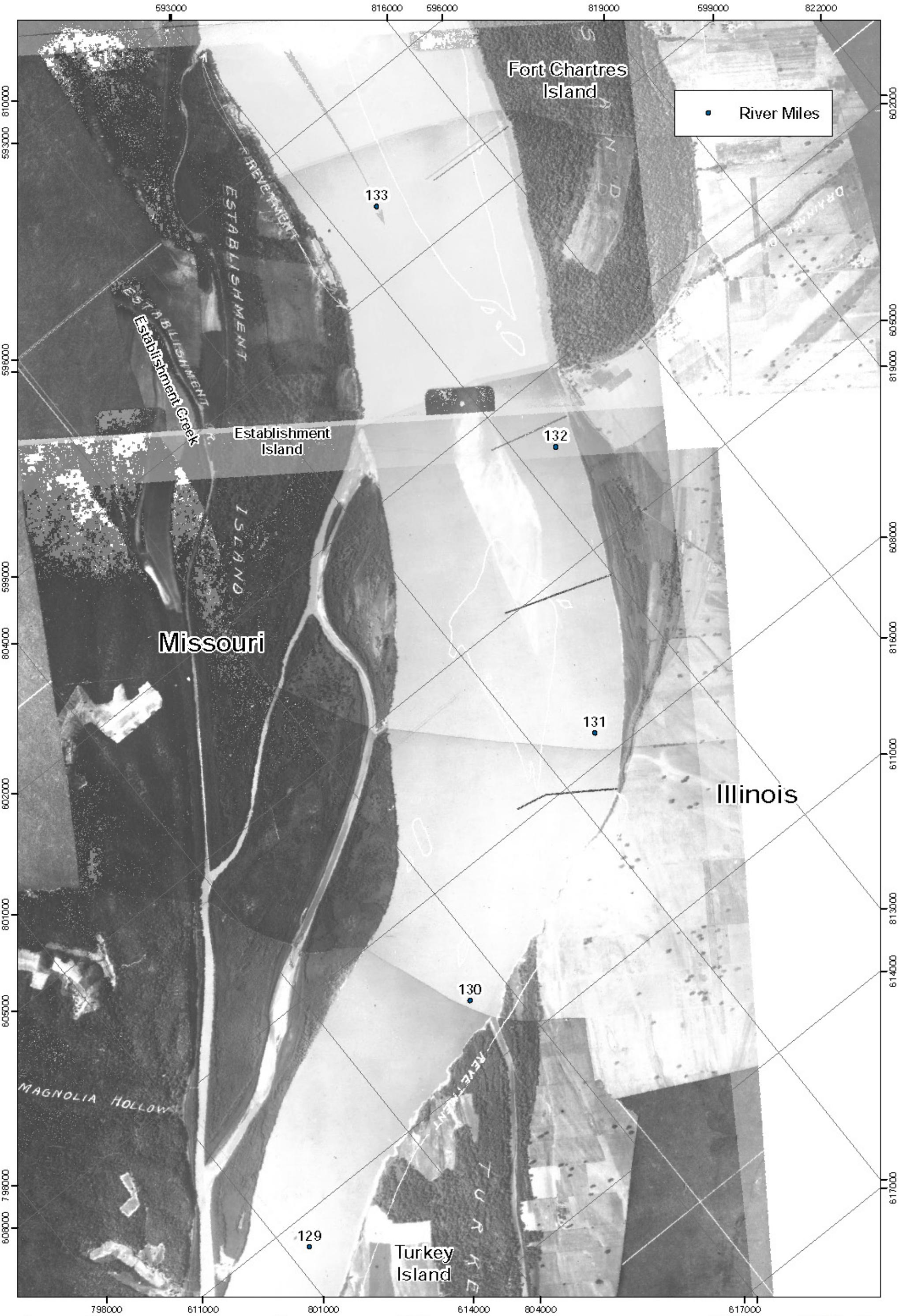

PLATE NUMBER 5

0 750 1,500 3,000
Feet

1928 Aerial Map

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN

Establishment Creek HSR Model
River Miles 134.0-128.0

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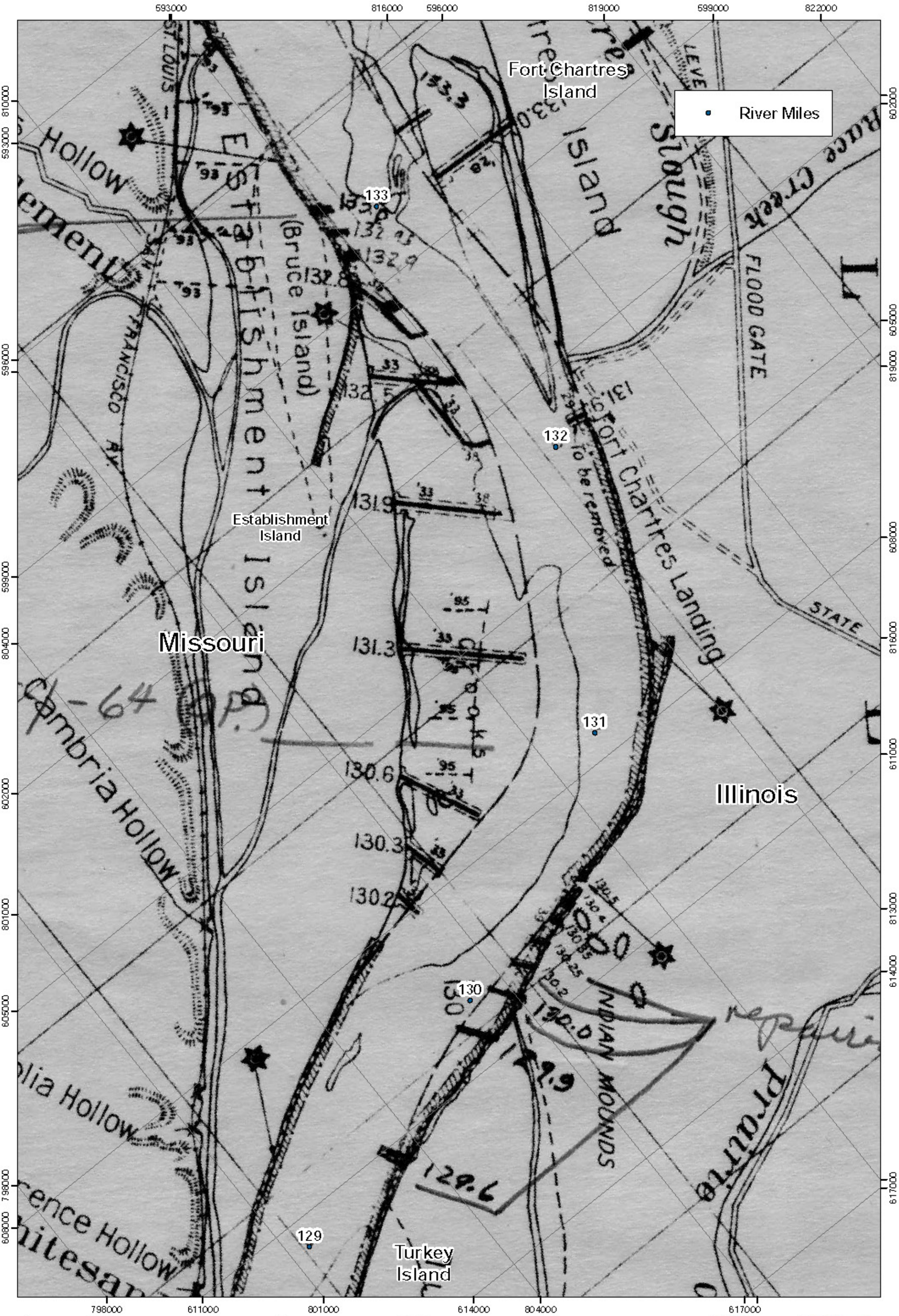

PLATE NUMBER 6

0 750 1,500 3,000
Feet

1942 Planform Map

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN
Establishment Chute HSR Model
River Miles 134.0-128.0

DESIGNED: B Erichel
DRAWN: B Erichel
REVIEWED: A Cox
DECIDED: J Brown, P.E.
SUBMITTED: B Erichel
APPROVED: R Davinroy, P.E.

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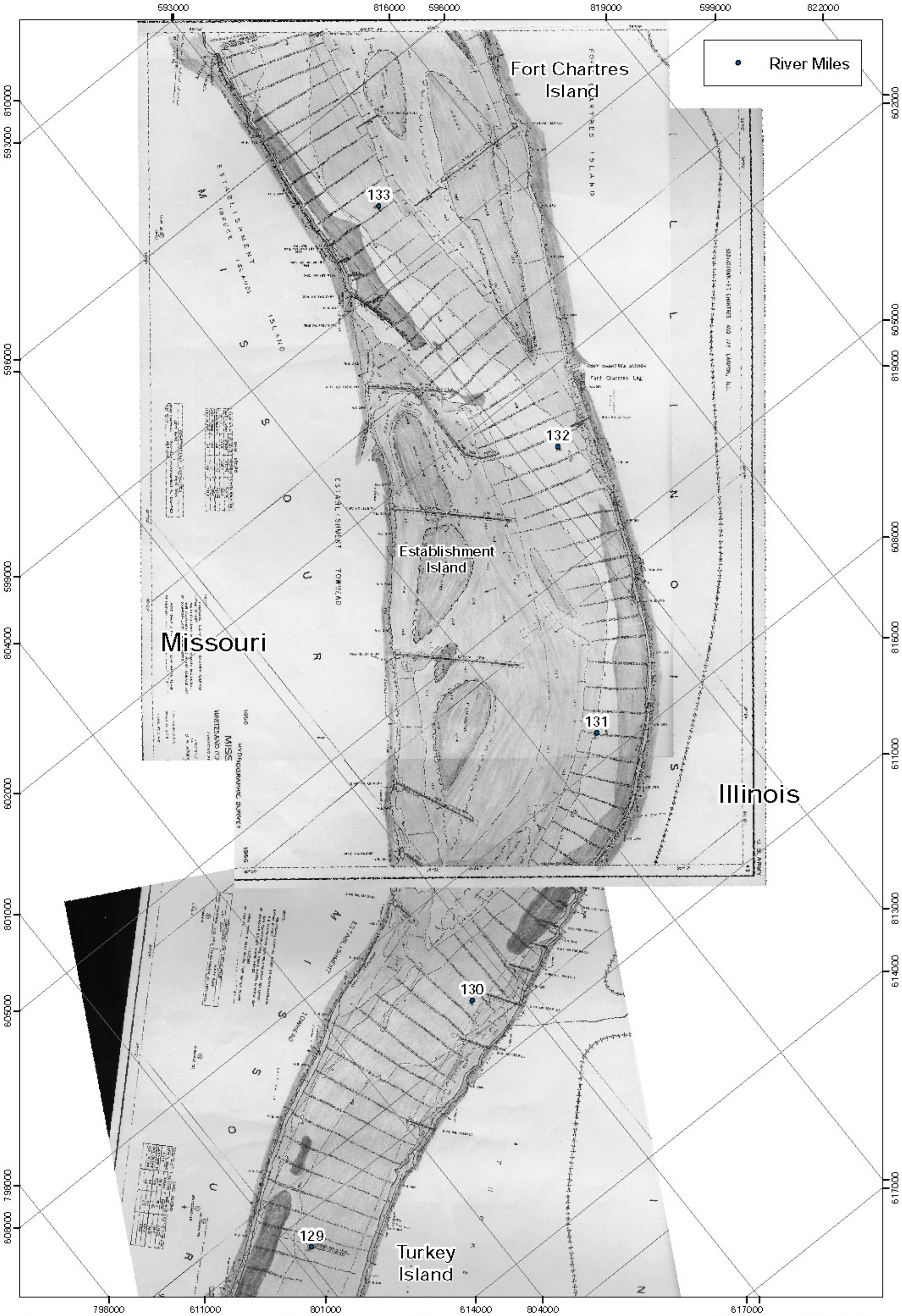

PLATE NUMBER 7

0 750 1,500 3,000
Feet

1956 Planform Map

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN
Establishment Chute HSR Model
River Miles 134.0-128.0

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REVIEWED: A Cox
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SUBMITTED: B Erischel
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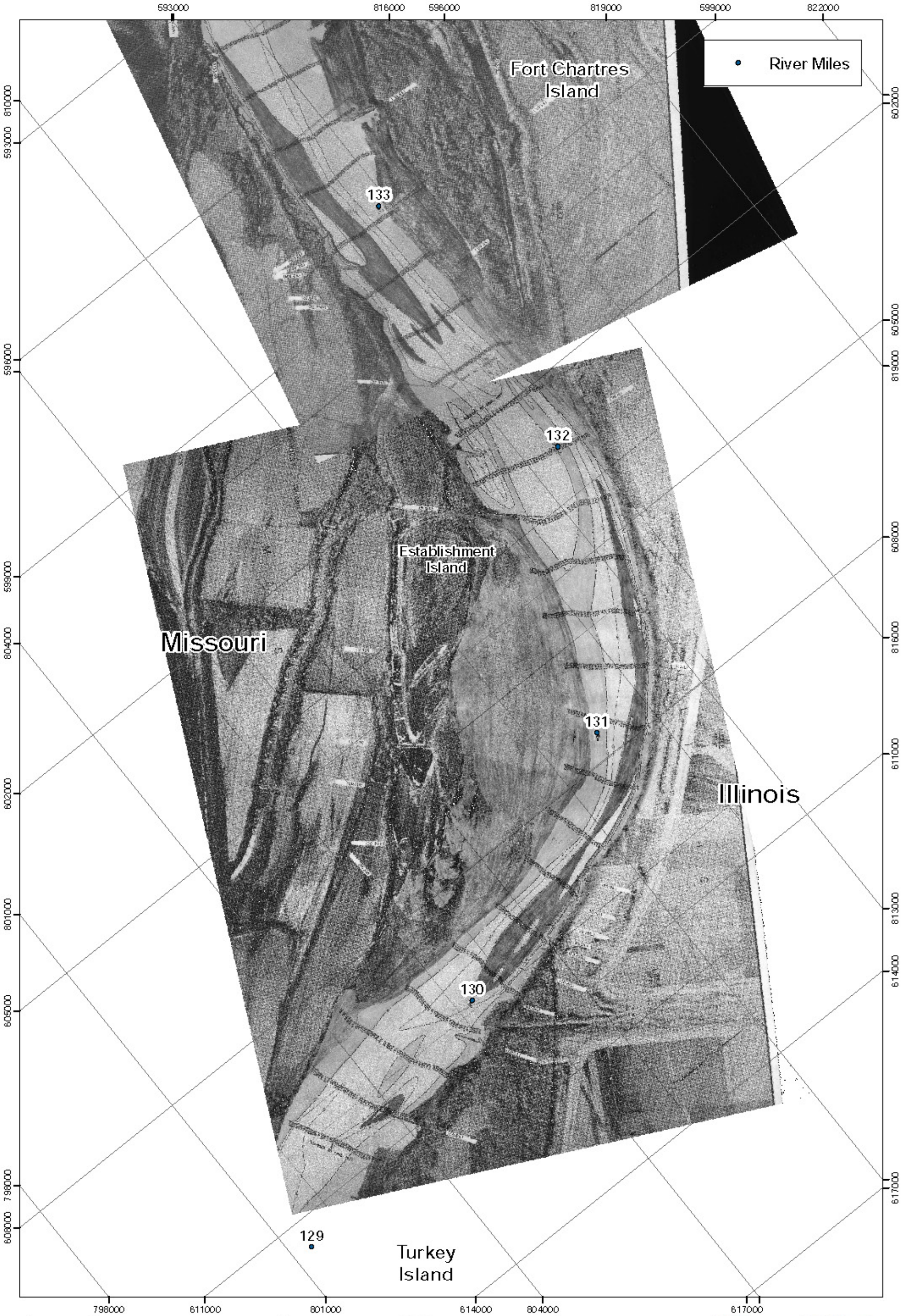

PLATE NUMBER 8

0 750 1,500 3,000
Feet

1977 Aerial Photograph

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN
Establishment Chute HSR Model
River Miles 134.0-128.0

DESIGNED: B Erichel
DRAWN: B Erichel
REVIEWED: A Cox
DISCIPLINE: J Brown, P.E.
SUBMITTED: B Erichel
APPROVED: R Davinroy, P.E.
FILE NAME: C:\Erichel\Establishment\Establishment11x17.mxd
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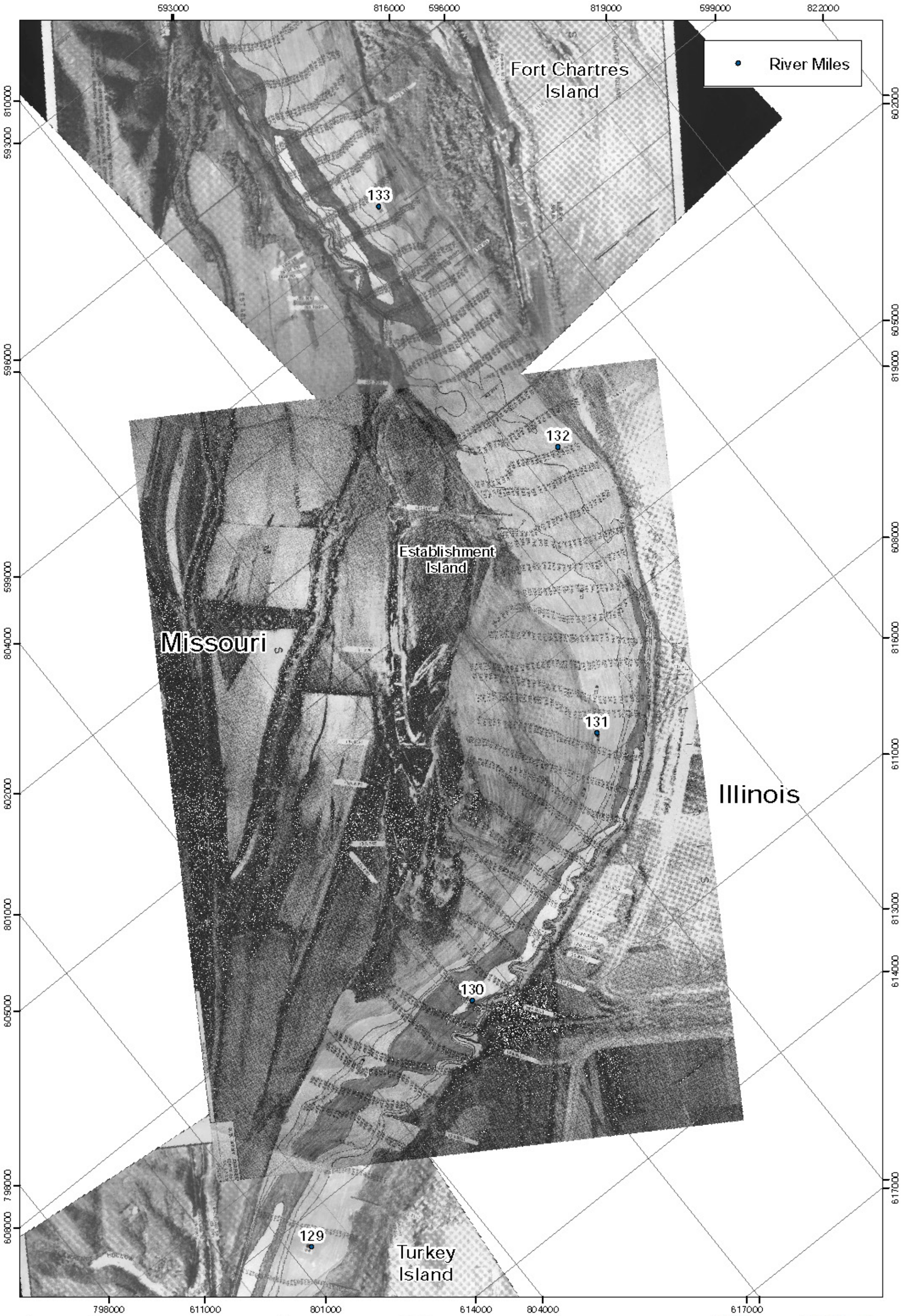

PLATE NUMBER 9

0 750 1,500 3,000
Feet

1982 Aerial Photograph

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN

Establishment Chute HSR Model
River Miles 134.0-128.0

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SUBMITTED: B Erischel
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St. Louis District

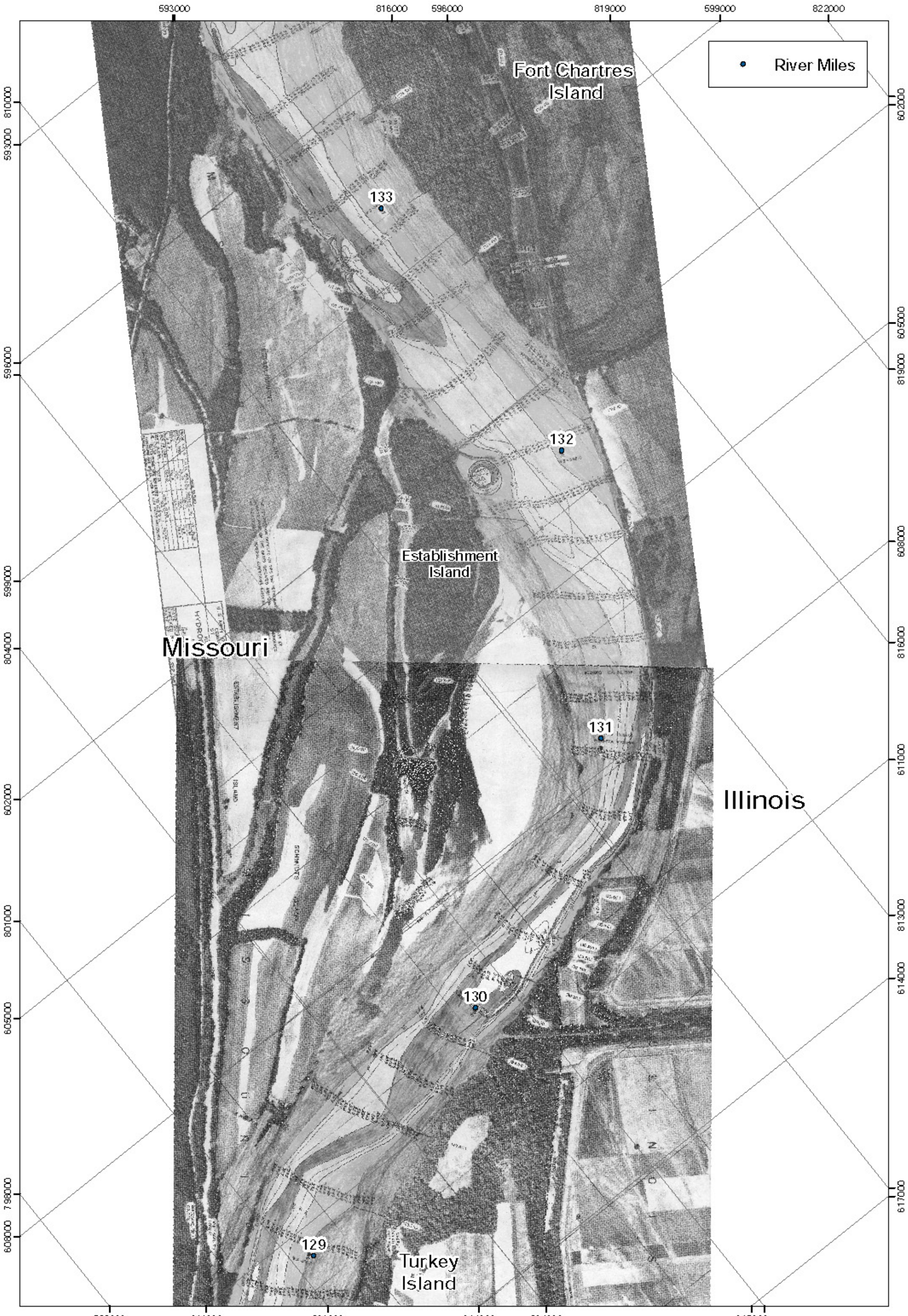

PLATE NUMBER 10

0 750 1,500 3,000 Feet

1987 Aerial Photograph

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN

Establishment Chute HSR Model
River Miles 134.0-128.0

DESIGNED: B Erichel
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CHECKED: J Brown, P.E.
SUBMITTED: B Erichel
APPROVED: R Davinroy, P.E.

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St. Louis District

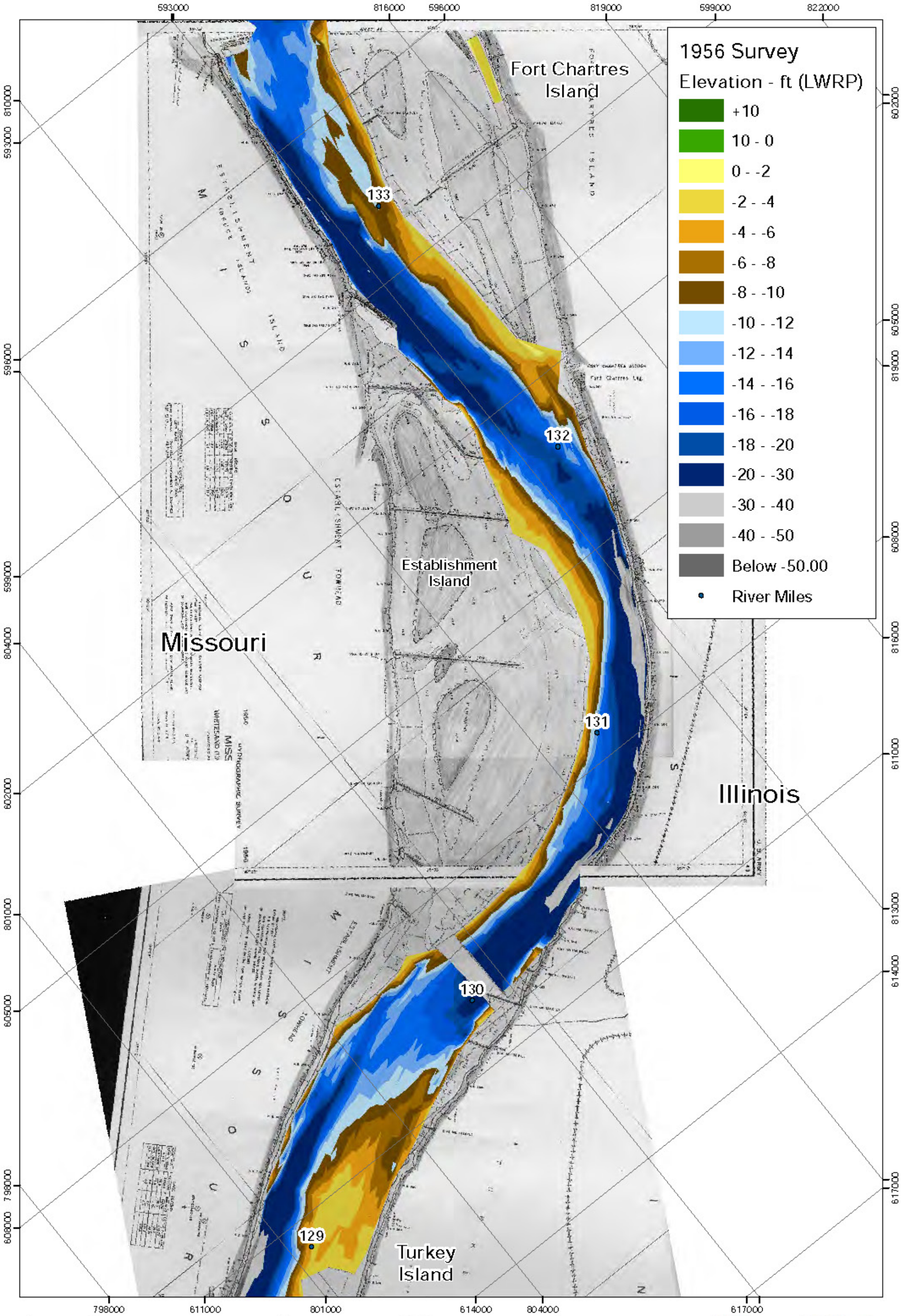

PLATE NUMBER 11

0 750 1,500 3,000
Feet

1956 Hydrographic Survey

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN
Establishment Chute HSR Model
River Miles 134.0-128.0

DESIGNED: B Erichel
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REVIEWED: A Cox
DESIGNED: J Brown, P.E.
SUBMITTED: B Erichel
APPROVED: R Davinroy, P.E.
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St. Louis District

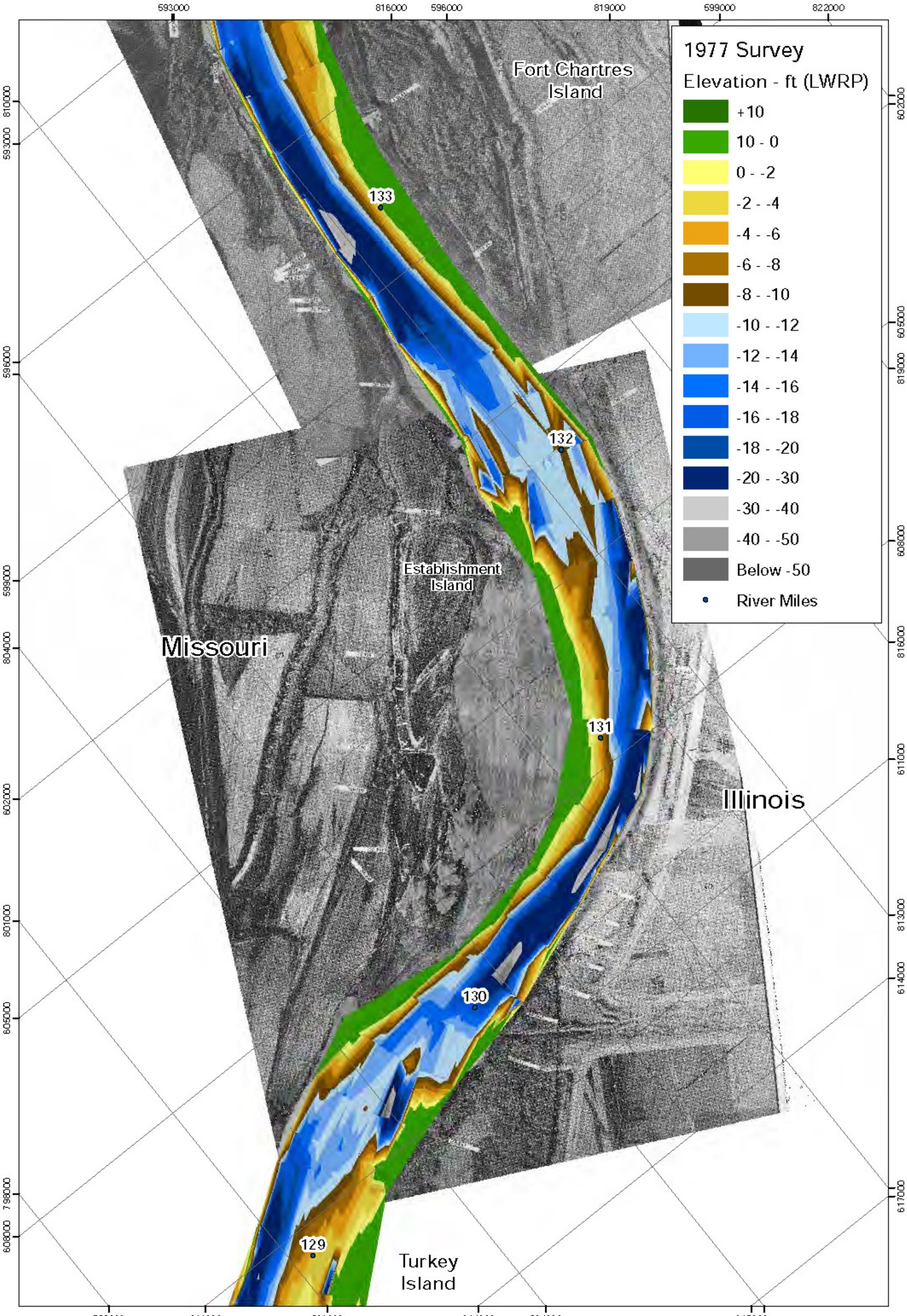

PLATE NUMBER 12

0 750 1,500 3,000 Feet

1977 Hydrographic Survey

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN
Establishment Chute HSR Model
River Miles 134.0-128.0

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DRAWN: B Erischel
REVIEWED: A Cox
DISCIPLINE: J Brown, P.E.
SUBMITTED: B Erischel
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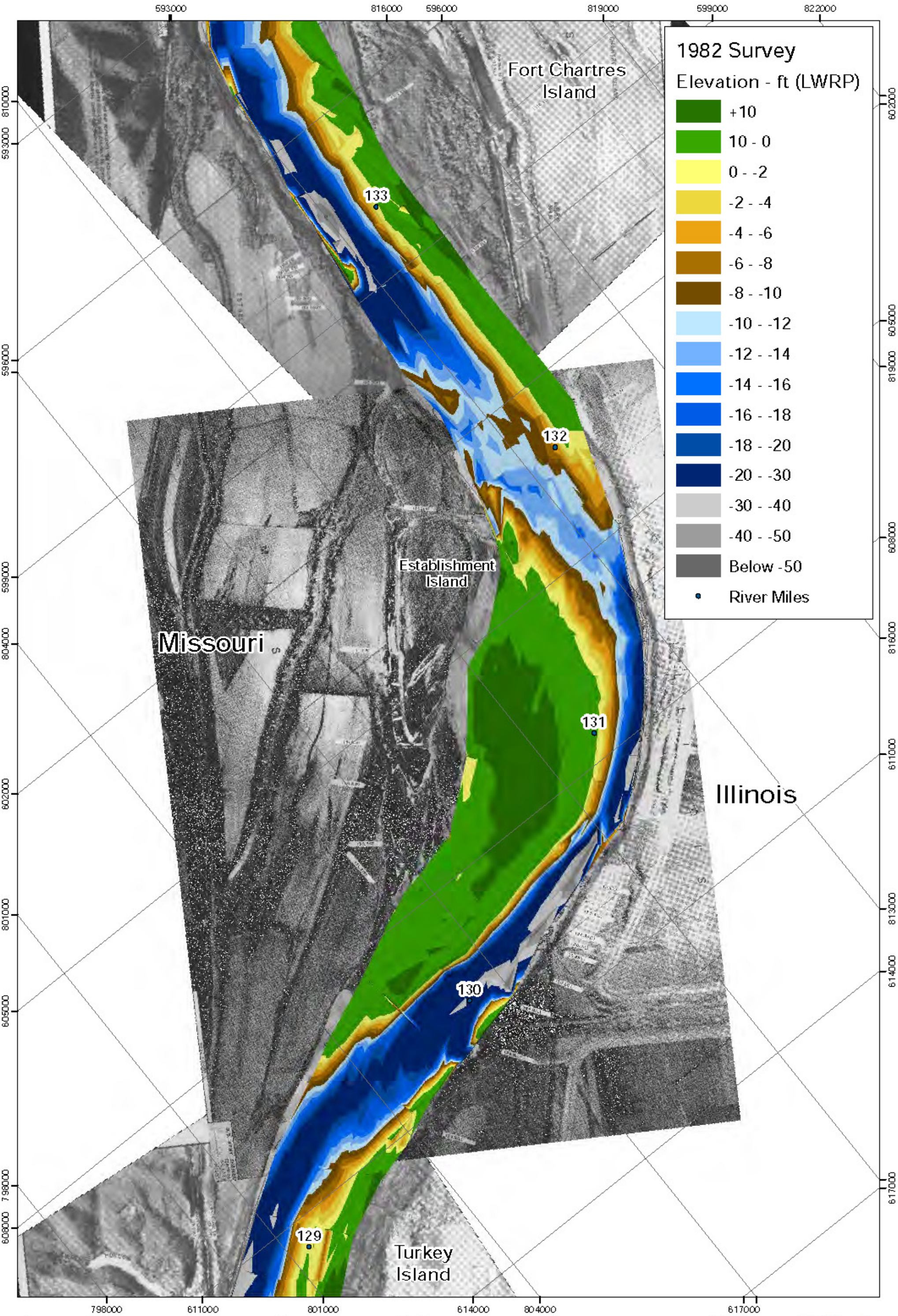

PLATE NUMBER 13

0 750 1,500 3,000
Feet

1982 Hydrographic Survey

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN

Establishment Chute HSR Model
River Miles 134.0-128.0

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SUBMITTED: B Erischel
APPROVED: R Davinroy, P.E.

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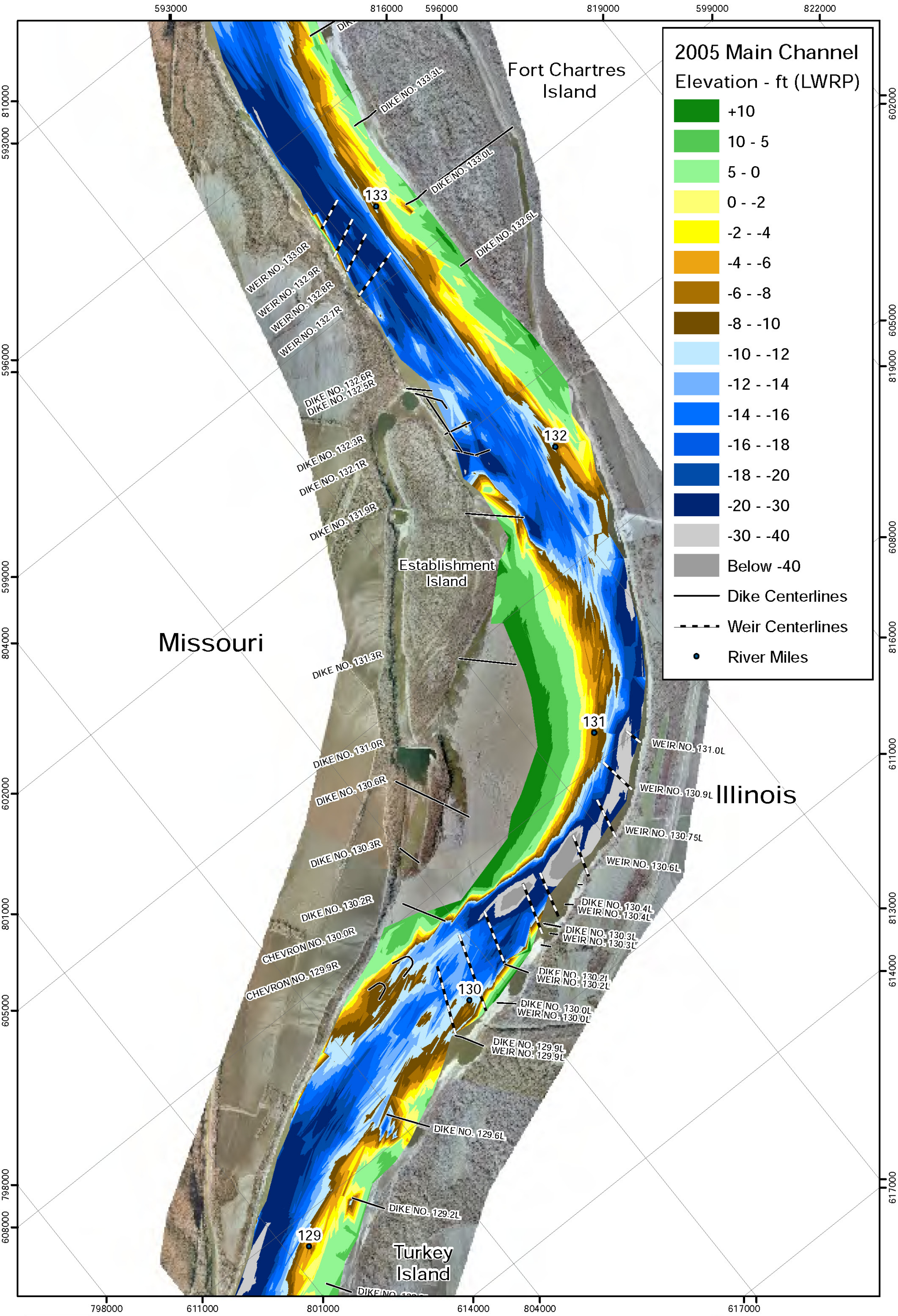

PLATE NUMBER 14

0 750 1,500 3,000
Feet

2005 Hydrographic Survey

2006 Aerial Photograph

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN

Establishment Chute HSR Model
River Miles 134.0-128.0

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SUBMITTED: B Krischel	APPROVED: R Davinroy, P.E.	
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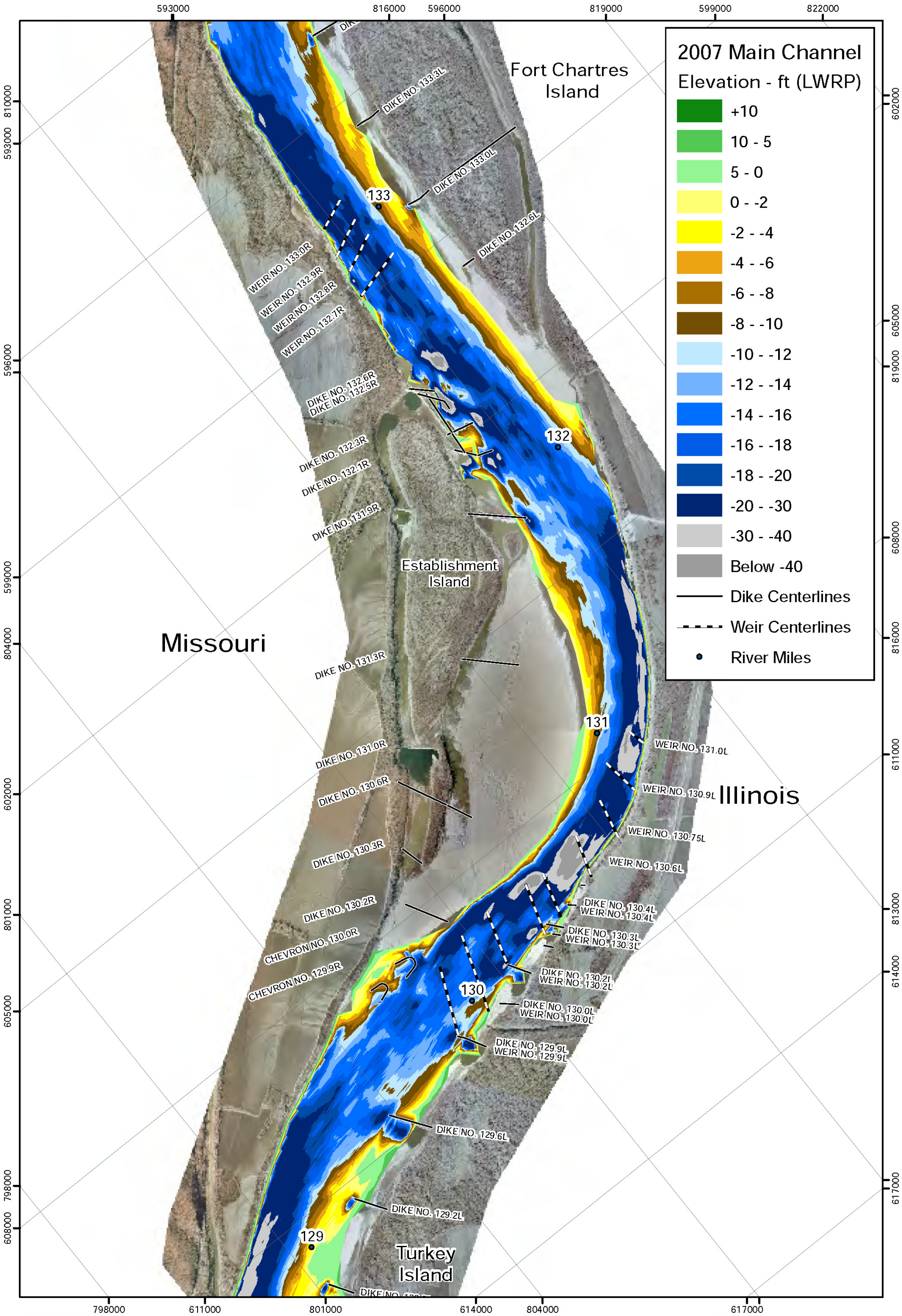

PLATE NUMBER 15

0 750 1,500 3,000
Feet

2007 Hydrographic Survey

2006 Aerial Photograph

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN

Establishment Chute HSR Model
River Miles 134.0-128.0

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SUBMITTED: B Krischel	APPROVED: R Davinroy, P.E.	
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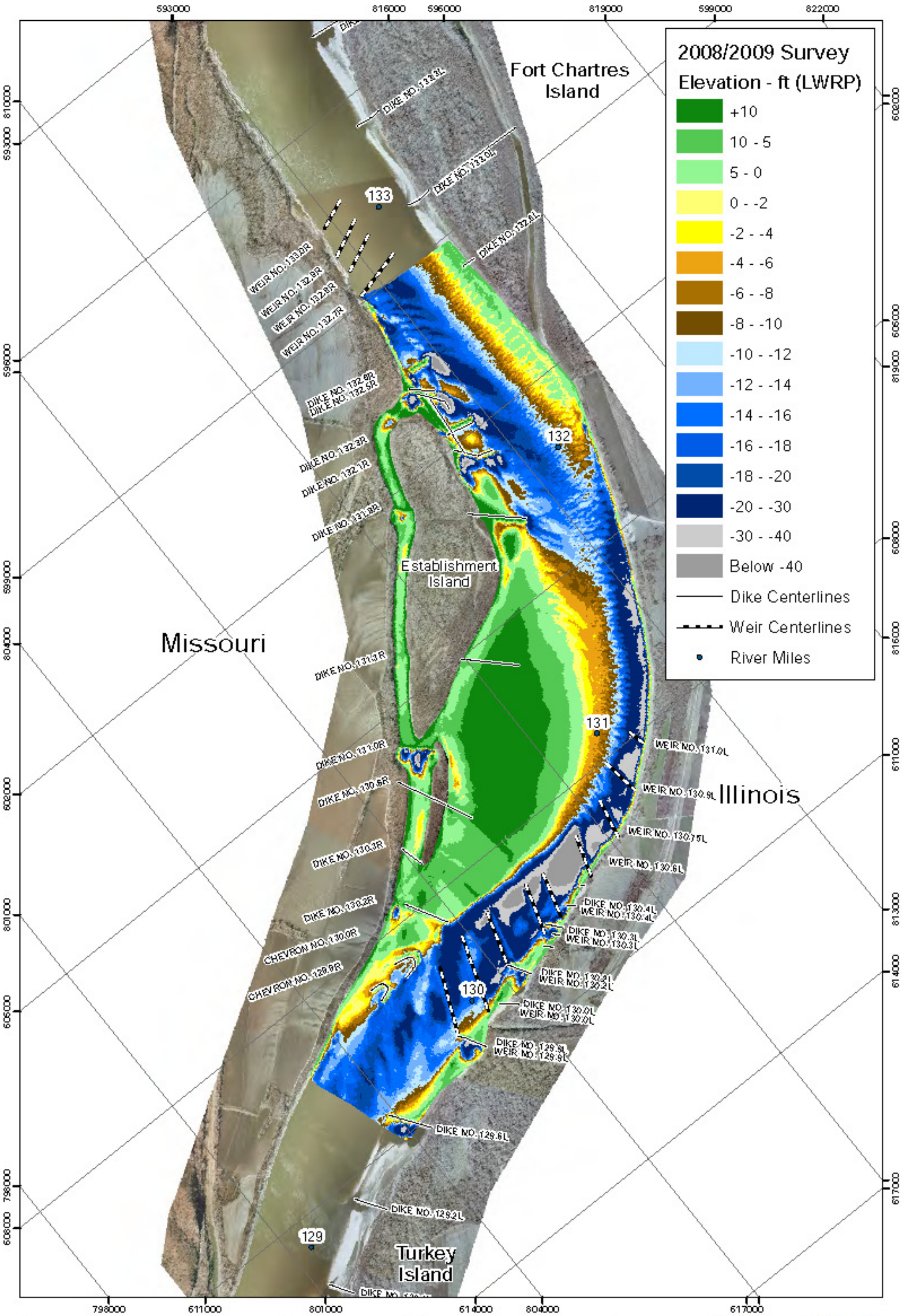
2008/2009 Survey
Elevation - ft (LWRP)
+10
10 - 5
5 - 0
0 - -2
-2 - -4
-4 - -6
-6 - -8
-8 - -10
-10 - -12
-12 - -14
-14 - -16
-16 - -18
-18 - -20
-20 - -30
-30 - -40
Below -40
Dike Centerlines
Weir Centerlines
River Miles
Fort Chartres Island
Establishment Island
Turkey Island
Missouri
Illinois
133
132
131
130
129
DIKE NO. 133.8L
DIKE NO. 133.0L
DIKE NO. 132.8L
WEIR NO. 133.0R
WEIR NO. 132.9R
WEIR NO. 132.8R
WEIR NO. 132.7R
DIKE NO. 132.0R
DIKE NO. 132.5R
DIKE NO. 132.3R
DIKE NO. 132.1R
DIKE NO. 131.8R
DIKE NO. 131.3R
DIKE NO. 131.0R
DIKE NO. 130.6R
DIKE NO. 130.3R
DIKE NO. 130.2R
CHEVRON NO. 130.0R
CHEVRON NO. 129.9R
DIKE NO. 129.2L
WEIR NO. 131.0L
WEIR NO. 130.9L
WEIR NO. 130.75L
WEIR NO. 130.6L
DIKE NO. 130.4L
WEIR NO. 130.4L
DIKE NO. 130.3L
WEIR NO. 130.3L
DIKE NO. 130.2L
WEIR NO. 130.2L
DIKE NO. 130.0L
WEIR NO. 130.0L
DIKE NO. 129.9L
WEIR NO. 129.9L
DIKE NO. 129.6L
593000
816000
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819000
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822000
810000
804000
801000
798000
611000
614000
617000
608000
606000
0 750 1,500 3,000
Feet
2008/2009 Combined Hydrographic Survey
2006 Aerial Photograph
PLATE NUMBER 16
U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI
UPPER MISSISSIPPI RIVER BASIN
B Rhodel
B Rhodel
A Cox
J Brown, P.E.
B Rhodel
B Dorroney, P.E.
APPLIED RIVER ENGINEERING CENTER
US Army Corps of Engineers
St. Louis District

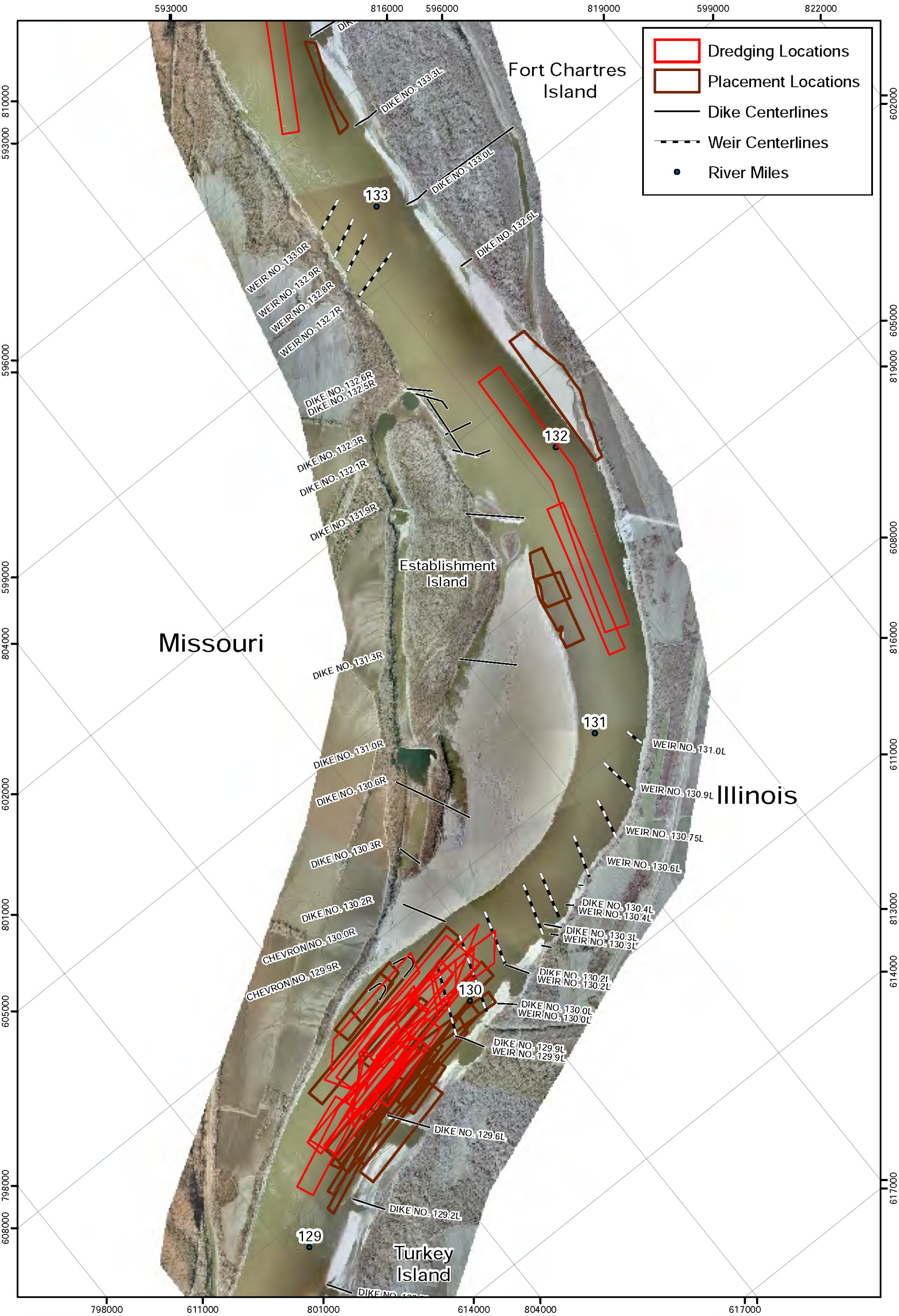

PLATE NUMBER 17

0 750 1,500 3,000
Feet

Dredging Locations

2006 Aerial Photograph

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN

Establishment Chute HSR Model
River Miles 134.0-128.0

DESIGNED BY: B Krischel		
DRAWN BY: B Krischel	REVIEWED BY: A Cox	CHECKED BY: J Brown, P.E.
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A view of the Establishment Chute HSR Model. The entrance is located on the right hand side of the picture, while the drain is located on the left hand side of the picture.

This is a view of the Establishment Chute HSR Model taken from above. Again, the entrance is located on the right hand side of the picture, while the drain is located on the left hand side of the picture.

US Army Corps of Engineers
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U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
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UPPER MISSISSIPPI RIVER BASIN
Establishment Chute HSR Model
River Miles 134.0-128.0

Establishment HSR Model

PLATE NUMBER
18

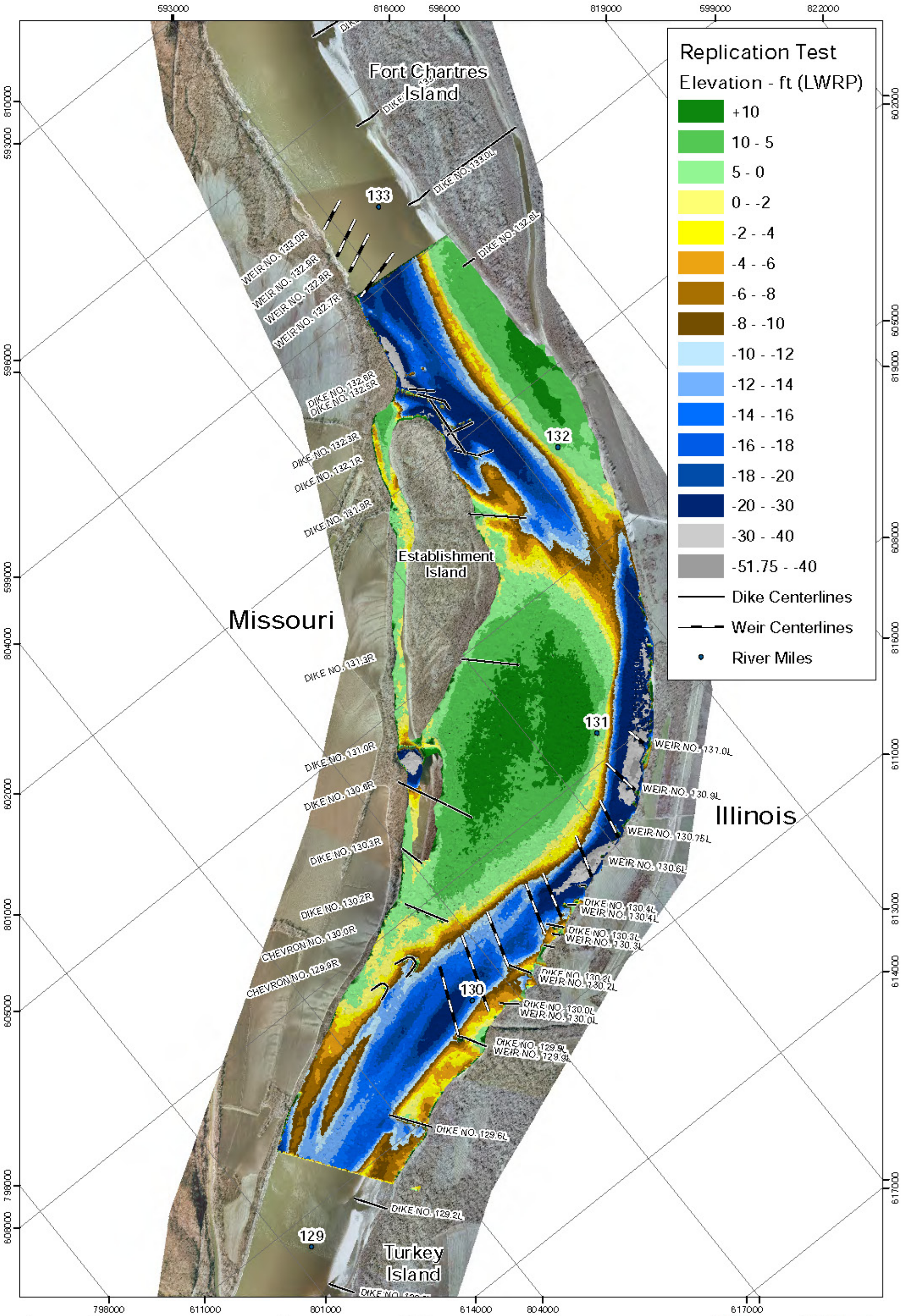

PLATE NUMBER 19

0 750 1,500 3,000 Feet

Replication Test

2006 Aerial Photograph

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN

Establishment Chute HSR Model
River Miles 134.0-128.0

DESIGNED: B Erischel		
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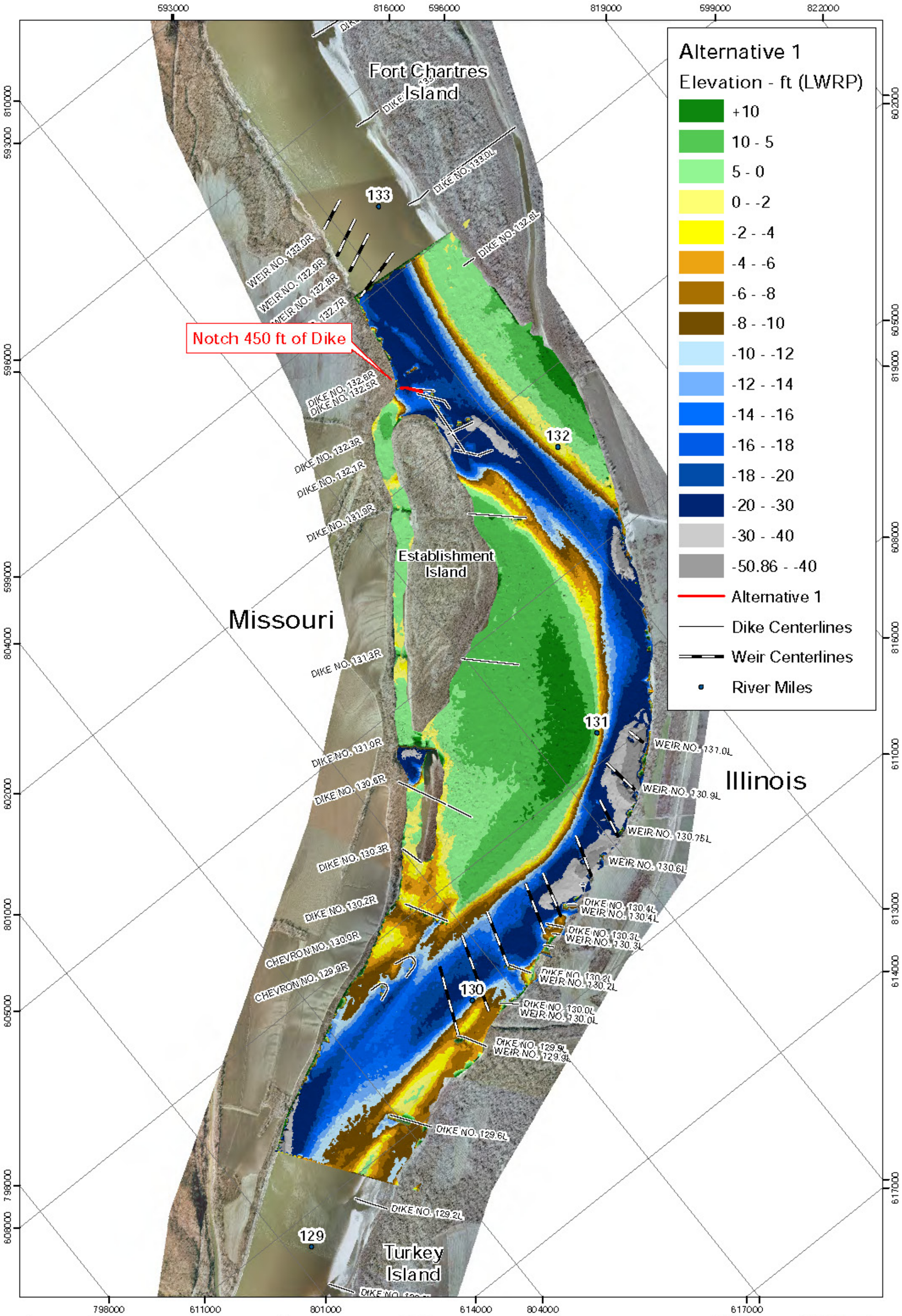

PLATE NUMBER 20

0 750 1,500 3,000 Feet

Alternative 1

2006 Aerial Photograph

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN

Establishment Chute HSR Model
River Miles 134.0-128.0

DESIGNED: B Erischel
DRAWN: B Erischel
REVIEWED: A Cox
DESIGNED: J Brown, P.E.
SUBMITTED: B Erischel
APPROVED: R Davinroy, P.E.

US Army Corps of Engineers
St. Louis District

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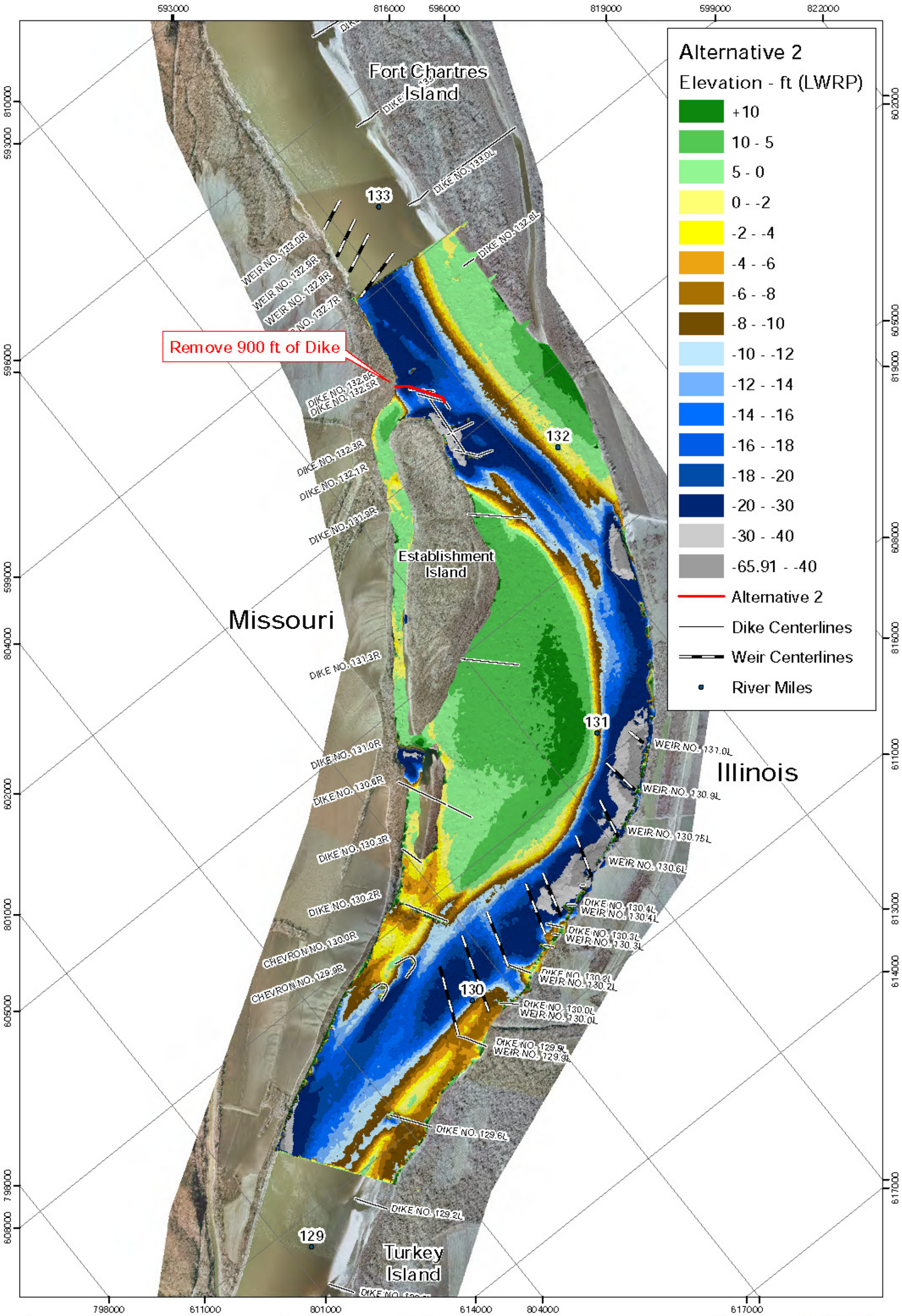

PLATE NUMBER 21

0 750 1,500 3,000 Feet

Alternative 2

2006 Aerial Photograph

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN

Establishment Chute HSR Model
River Miles 134.0-128.0

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DRAWN B Krischel	REVIEWED A Cox	DECIDED J Brown, P.E.
SUBMITTED B Krischel	APPROVED R Davinroy, P.E.	
FILE NAME L:\Krischel\Establishment\Establishment 11x17.mxd	PLOT DATE	

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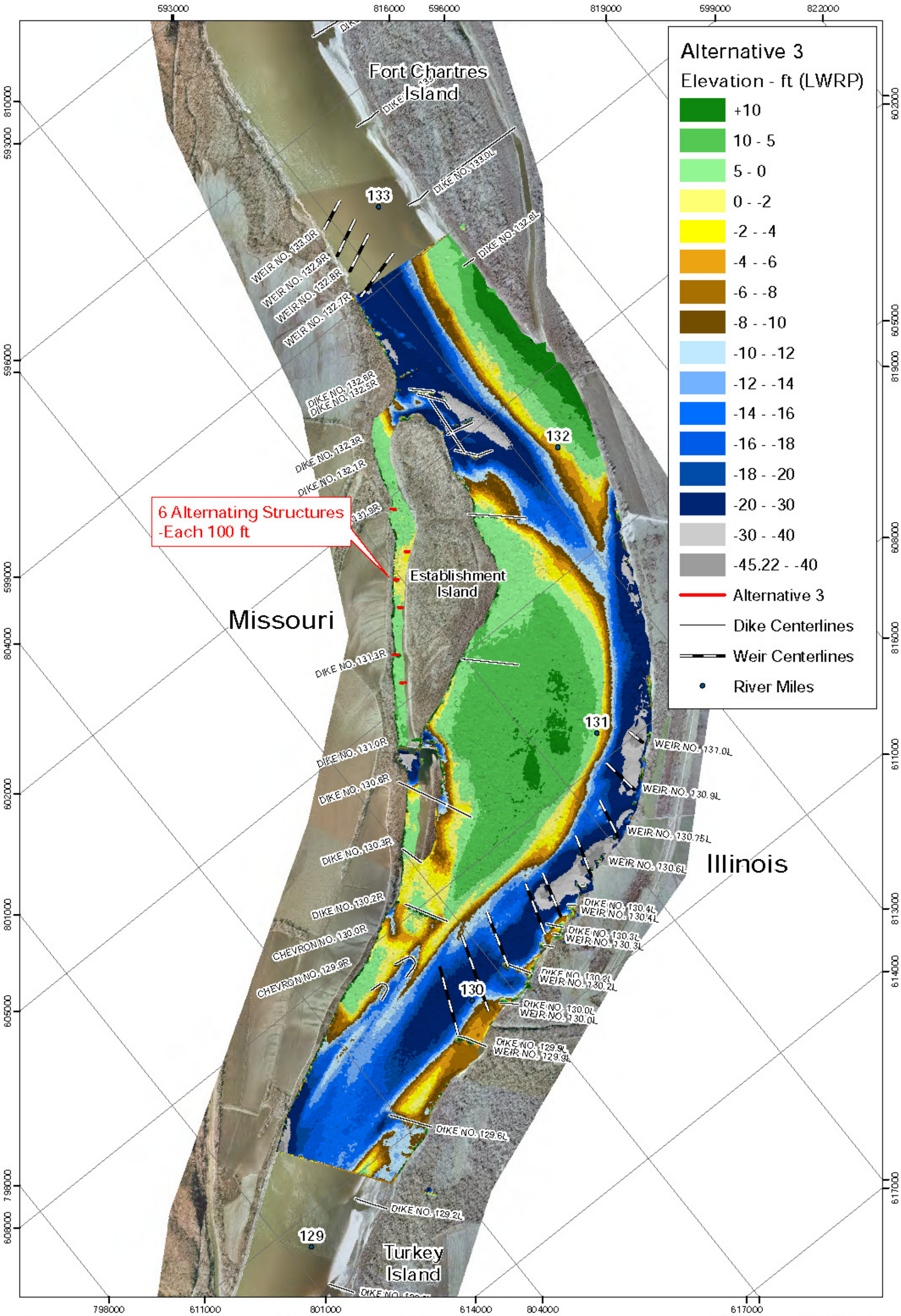

PLATE NUMBER 22

Alternative 3

2006 Aerial Photograph

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN

Establishment Chute HSR Model
River Miles 134.0-128.0

DESIGNED: B Krischel
DRAWN: B Krischel
REVIEWED: A Cox
DISCIPLINE: J Brown, P.E.
SUBMITTED: B Krischel
APPROVED: R Davinroy, P.E.

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St. Louis District

APPLIED RIVER ENGINEERING CENTER

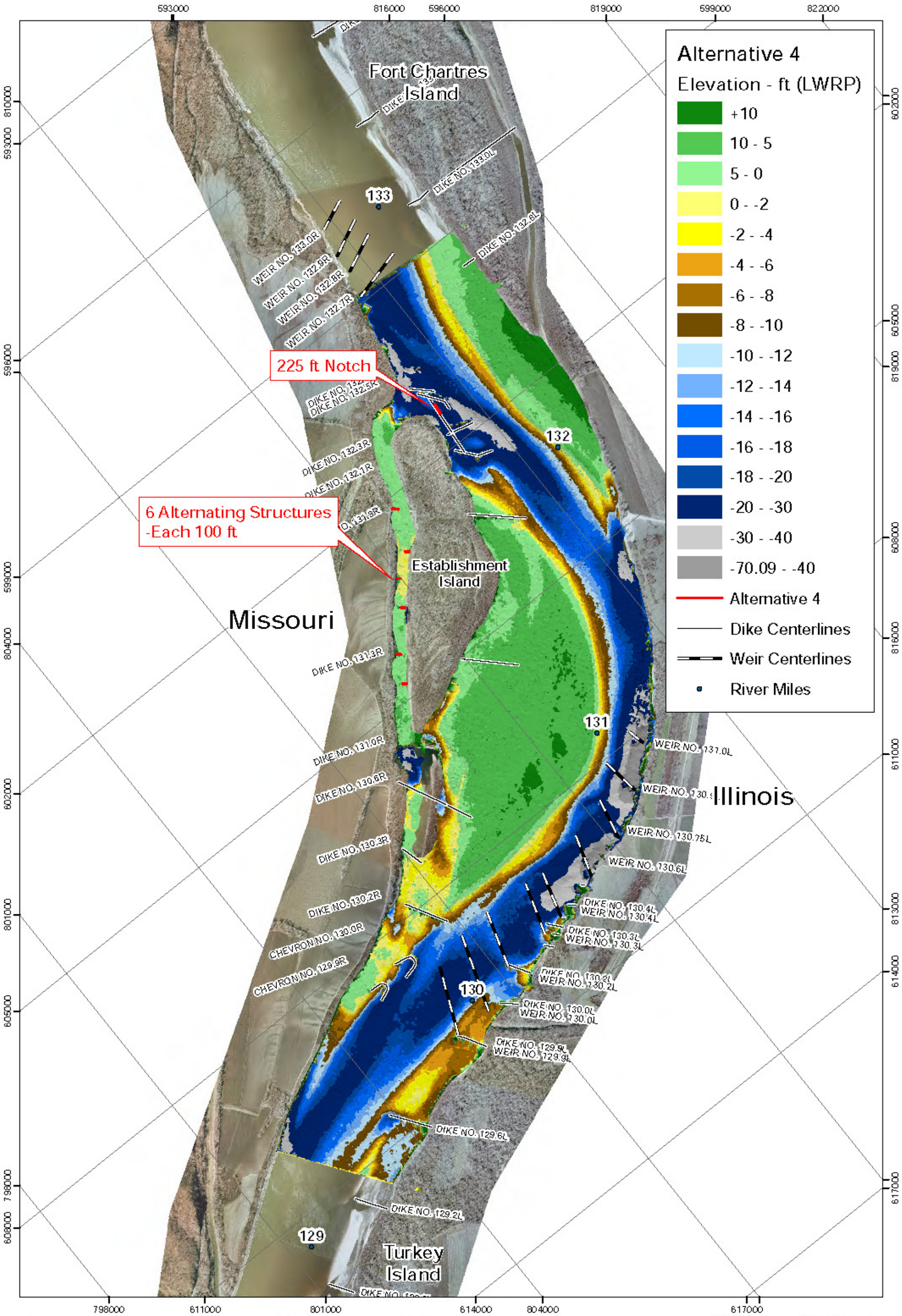


PLATE NUMBER 23

0 750 1,500 3,000 Feet

Alternative 4

2006 Aerial Photograph

U.S. ARMY ENGINEER DIVISION CORPS OF ENGINEERS ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN

Establishment Chute HSR Model River Miles 134.0-128.0

DESIGNED: B Erischel

DRAWN: B Erischel | REVIEWED: A Cox | CHECKED: J Brown, P.E.

SUBMITTED: B Erischel | APPROVED: R Davinroy, P.E.

FILE NAME: L:\Erischel\Establishment\Establishment 11x17.mxd

PLOT DATE

APPLIED RIVER ENGINEERING CENTER

US Army Corps of Engineers St. Louis District

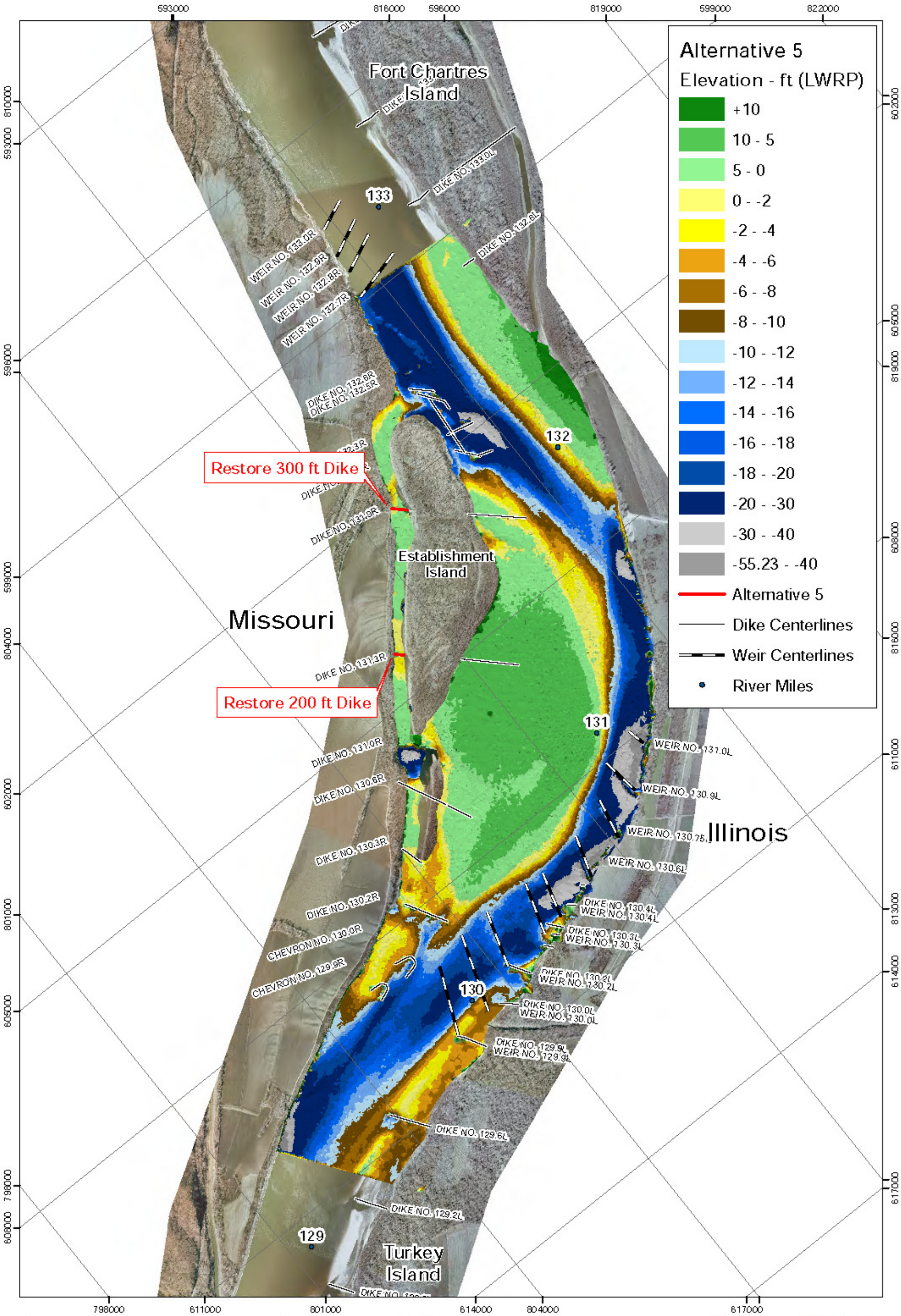


PLATE NUMBER 24

0 750 1,500 3,000 Feet

Alternative 5

2006 Aerial Photograph

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN

Establishment Chute HSR Model
River Miles 134.0-128.0

DESIGNED: B Erischel
DRAWN: B Erischel
REVIEWED: A Cox
DISCIPLINE: J Brown, P.E.
SUBMITTED: B Erischel
APPROVED: R Davinroy, P.E.

APPLIED RIVER ENGINEERING CENTER

US Army Corps of Engineers
St. Louis District

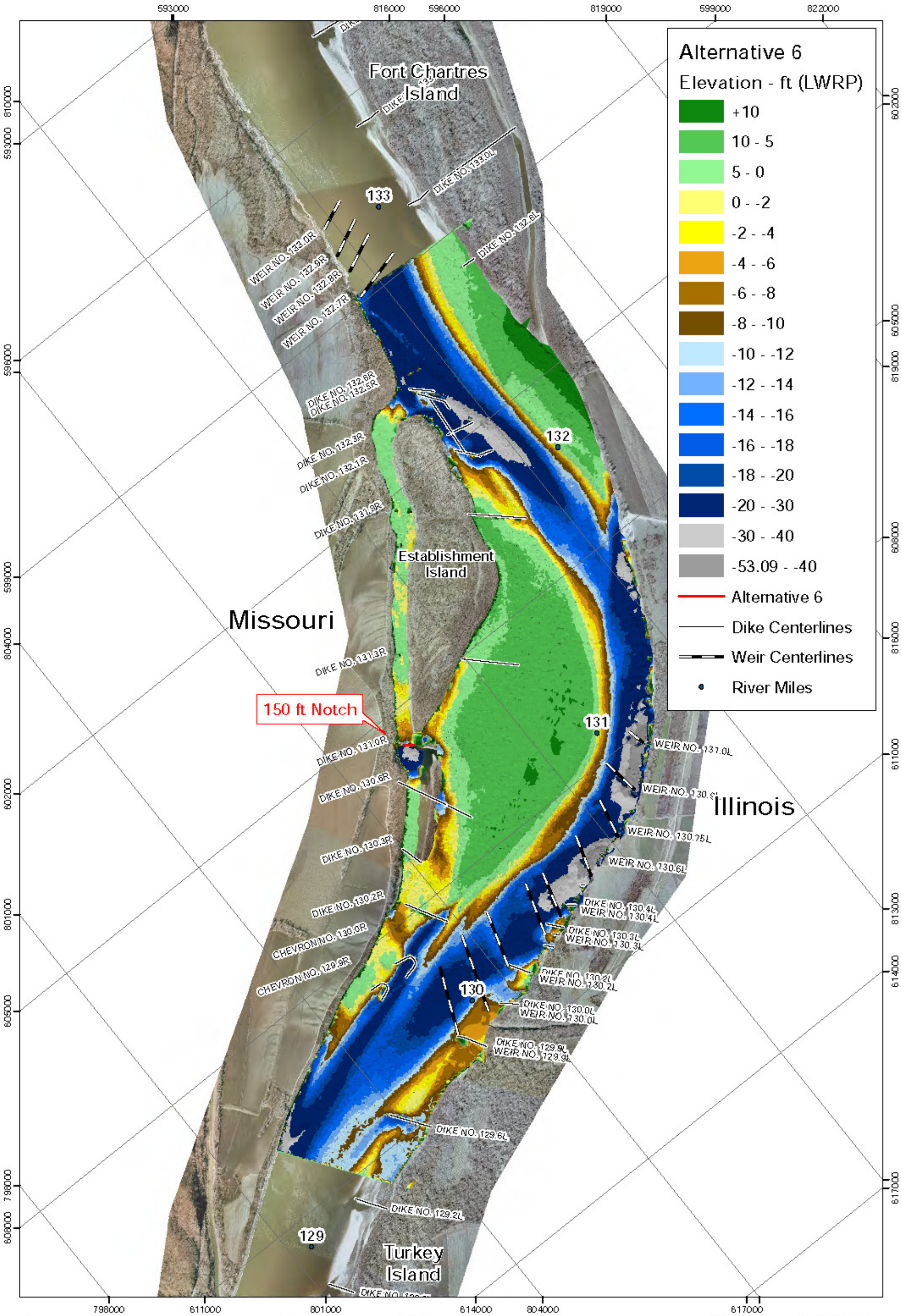


PLATE NUMBER 25

0 750 1,500 3,000 Feet

Alternative 6

2006 Aerial Photograph

U.S. ARMY ENGINEER DIVISION CORPS OF ENGINEERS ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN

Establishment Chute HSR Model River Miles 134.0-128.0

DESIGNED: B Erischel

DRAWN: B Erischel | REVIEWED: A Cox | DESIGNED: J Brown, P.E.

SUBMITTED: B Erischel | APPROVED: R Davinroy, P.E.

FILE NAME: L:\Erischel\Establishment\Establishment 11x17.mxd | PLOT DATE

APPLIED RIVER ENGINEERING CENTER

US Army Corps of Engineers St. Louis District

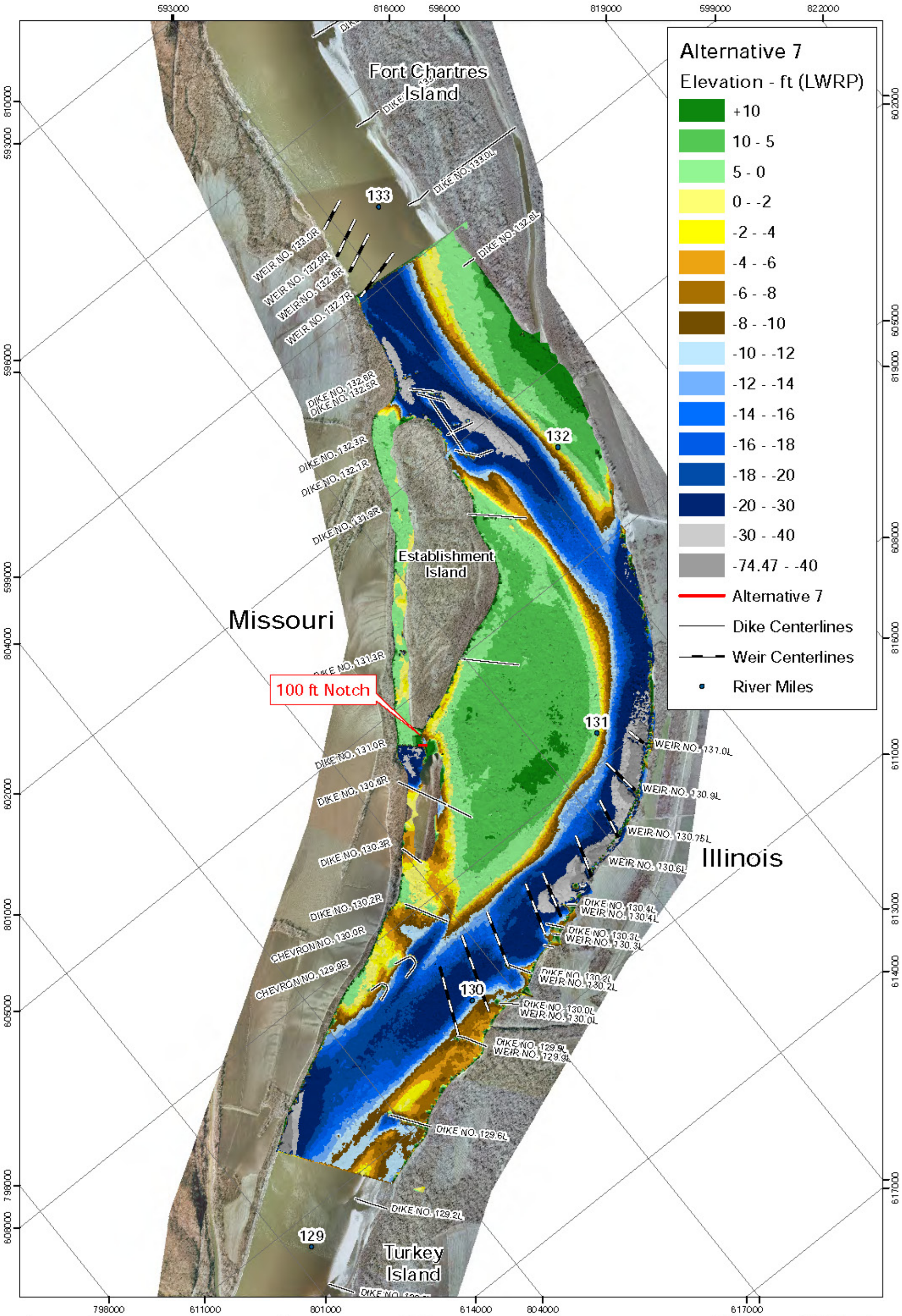


PLATE NUMBER 26

0 750 1,500 3,000 Feet

Alternative 7

2006 Aerial Photograph

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN

Establishment Chute HSR Model
River Miles 134.0-128.0

DESIGNED: B Erischel
DRAWN: B Erischel
REVIEWED: A Cox
DESIGNED: J Brown, P.E.
SUBMITTED: B Erischel
APPROVED: R Davinroy, P.E.

APPLIED RIVER ENGINEERING CENTER

US Army Corps of Engineers
St. Louis District

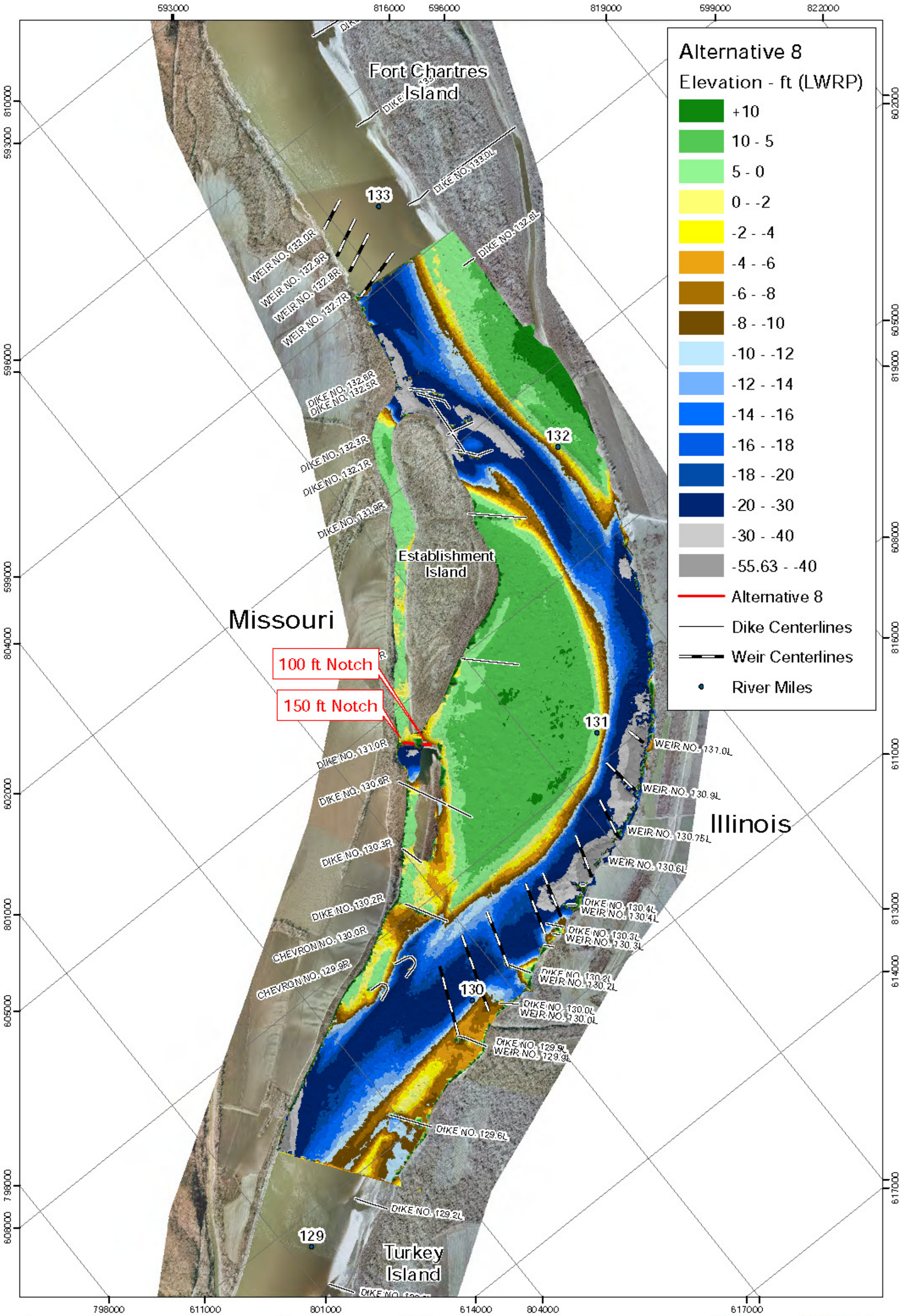


PLATE NUMBER 27

0 750 1,500 3,000 Feet

Alternative 8

2006 Aerial Photograph

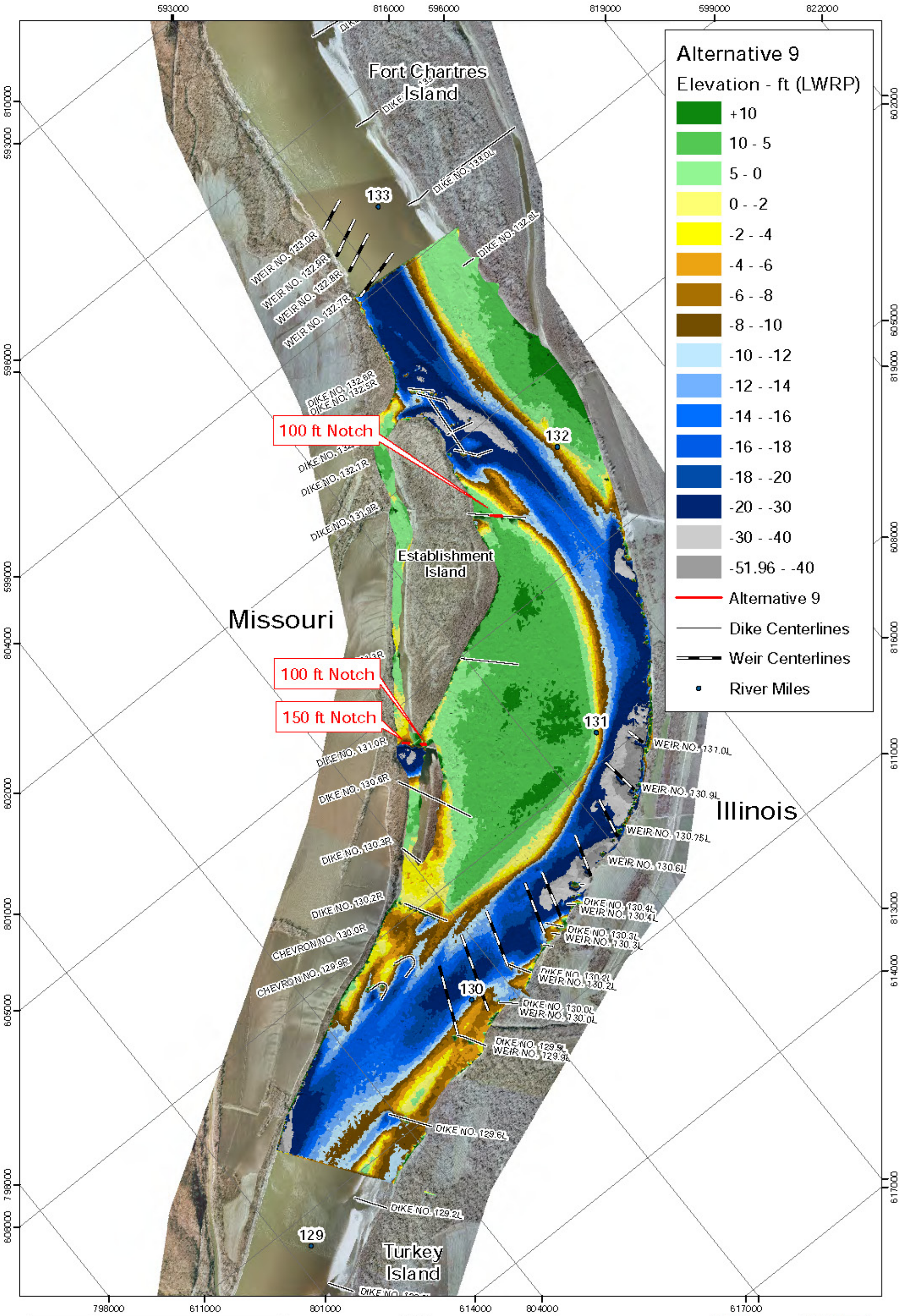
U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN

Establishment Chute HSR Model
River Miles 134.0-128.0

DESIGNED: B Erischel
DRAWN: B Erischel
REVIEWED: A Cox
DESIGNED: J Brown, P.E.
SUBMITTED: B Erischel
APPROVED: R Davinroy, P.E.

US Army Corps of Engineers
St. Louis District


Alternative 9
Elevation - ft (LWRP)
+10
10 - 5
5 - 0
0 - -2
-2 - -4
-4 - -6
-6 - -8
-8 - -10
-10 - -12
-12 - -14
-14 - -16
-16 - -18
-18 - -20
-20 - -30
-30 - -40
-51.96 - -40
Alternative 9
Dike Centerlines
Weir Centerlines
River Miles
Fort Chartres Island
Establishment Island
Turkey Island
Missouri
Illinois
100 ft Notch
100 ft Notch
150 ft Notch
133
132
131
130
129
DIKE NO. 133.0L
DIKE NO. 132.6L
WEIR NO. 133.0R
WEIR NO. 132.9R
WEIR NO. 132.8R
WEIR NO. 132.7R
DIKE NO. 132.6R
DIKE NO. 132.5R
DIKE NO. 132.1R
DIKE NO. 131.9R
DIKE NO. 131.0R
DIKE NO. 130.8R
DIKE NO. 130.3R
DIKE NO. 130.2R
CHEVRON NO. 130.0R
CHEVRON NO. 129.9R
WEIR NO. 131.0L
WEIR NO. 130.9L
WEIR NO. 130.75L
WEIR NO. 130.6L
DIKE NO. 130.4L
WEIR NO. 130.4L
DIKE NO. 130.3L
WEIR NO. 130.3L
DIKE NO. 130.2L
WEIR NO. 130.2L
DIKE NO. 130.0L
WEIR NO. 130.0L
DIKE NO. 129.9L
WEIR NO. 129.9L
DIKE NO. 129.6L
DIKE NO. 129.2L
593000
816000
596000
819000
599000
822000
810000
602000
605000
608000
611000
613000
614000
617000
798000
611000
801000
614000
804000
617000
0 750 1,500 3,000
Feet
PLATE NUMBER 28
Alternative 9
2006 Aerial Photograph
U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI
UPPER MISSISSIPPI RIVER BASIN
Establishment Chute HSR Model
River Miles 134.0-128.0
DESIGNED B Erichel
DRAWN B Erichel
REVIEWED A Cox
DECIDED J Brown, P.E.
SUBMITTED B Erichel
APPROVED R Davinroy, P.E.
W N S E
APPLIED RIVER ENGINEERING CENTER
US Army Corps of Engineers
St. Louis District

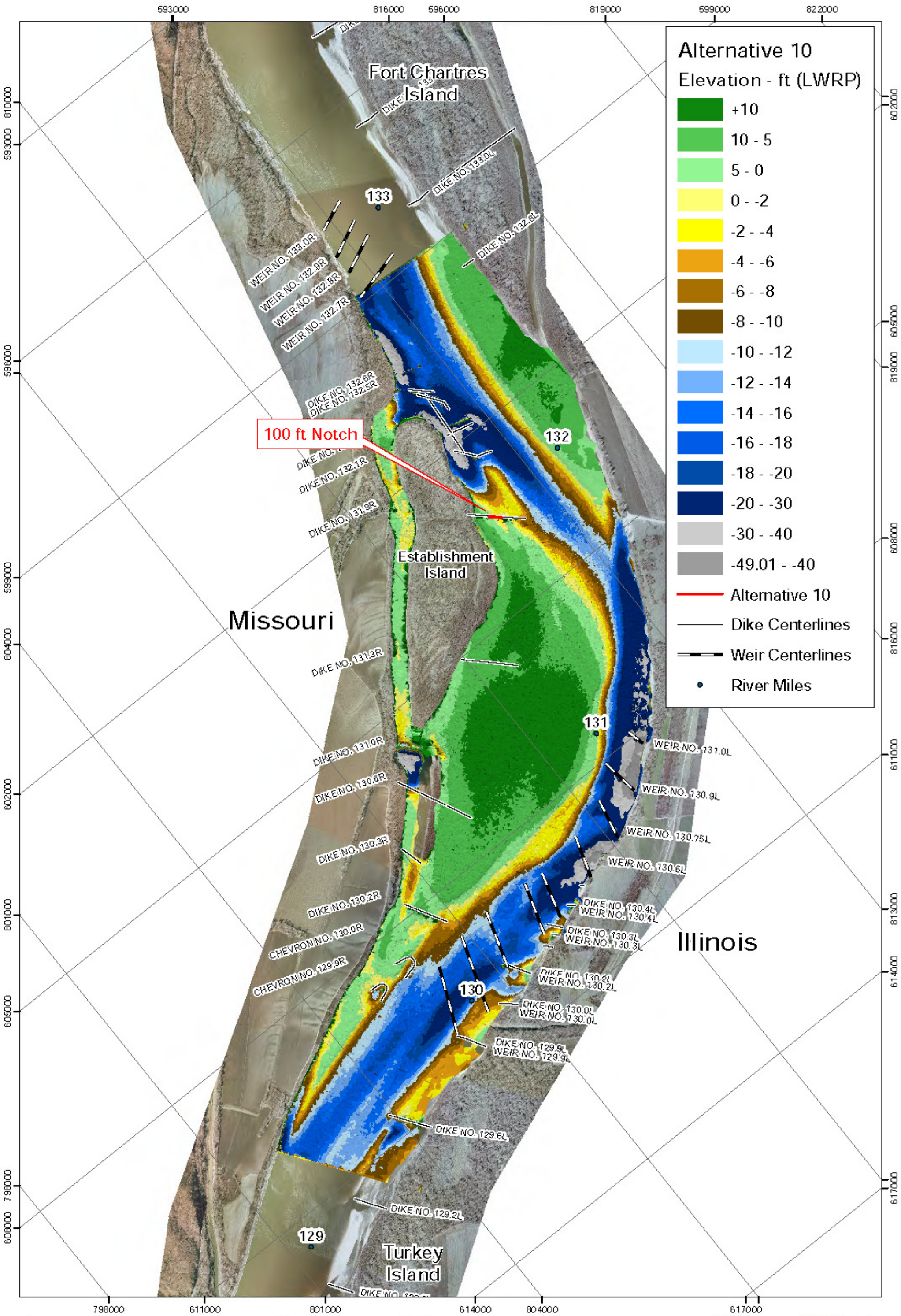


PLATE NUMBER 29

Alternative 10

2006 Aerial Photograph

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN

Establishment Chute HSR Model
River Miles 134.0-128.0

DESIGNED BY B Erischel
DRAWN BY B Erischel
REVIEWED BY A Cox
CHECKED BY J Brown, P.E.
SUBMITTED B Erischel
APPROVED R Davinroy, P.E.

APPLIED RIVER ENGINEERING CENTER

US Army Corps of Engineers
St. Louis District

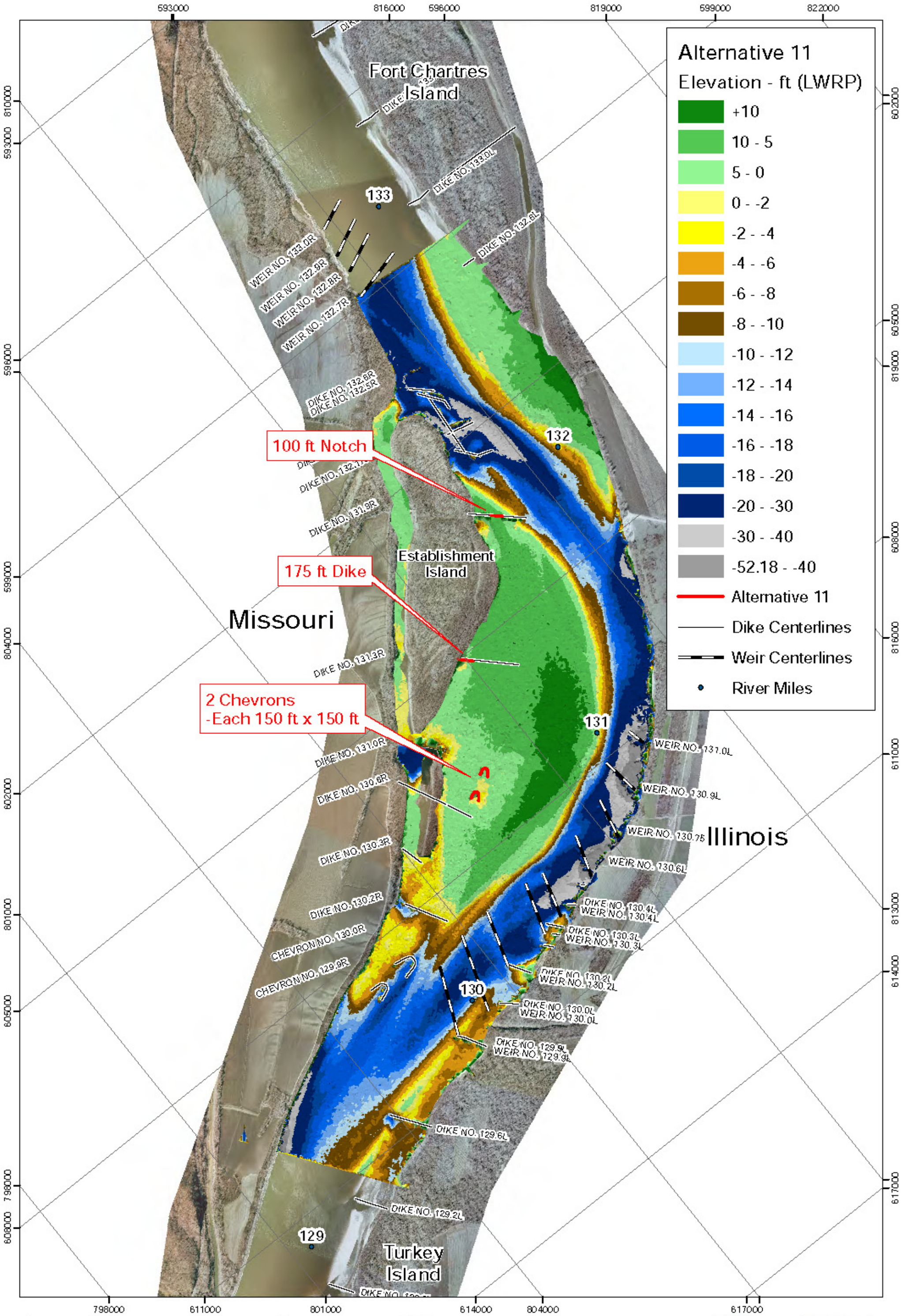


PLATE NUMBER 30

0 750 1,500 3,000 Feet

Alternative 11

2006 Aerial Photograph

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

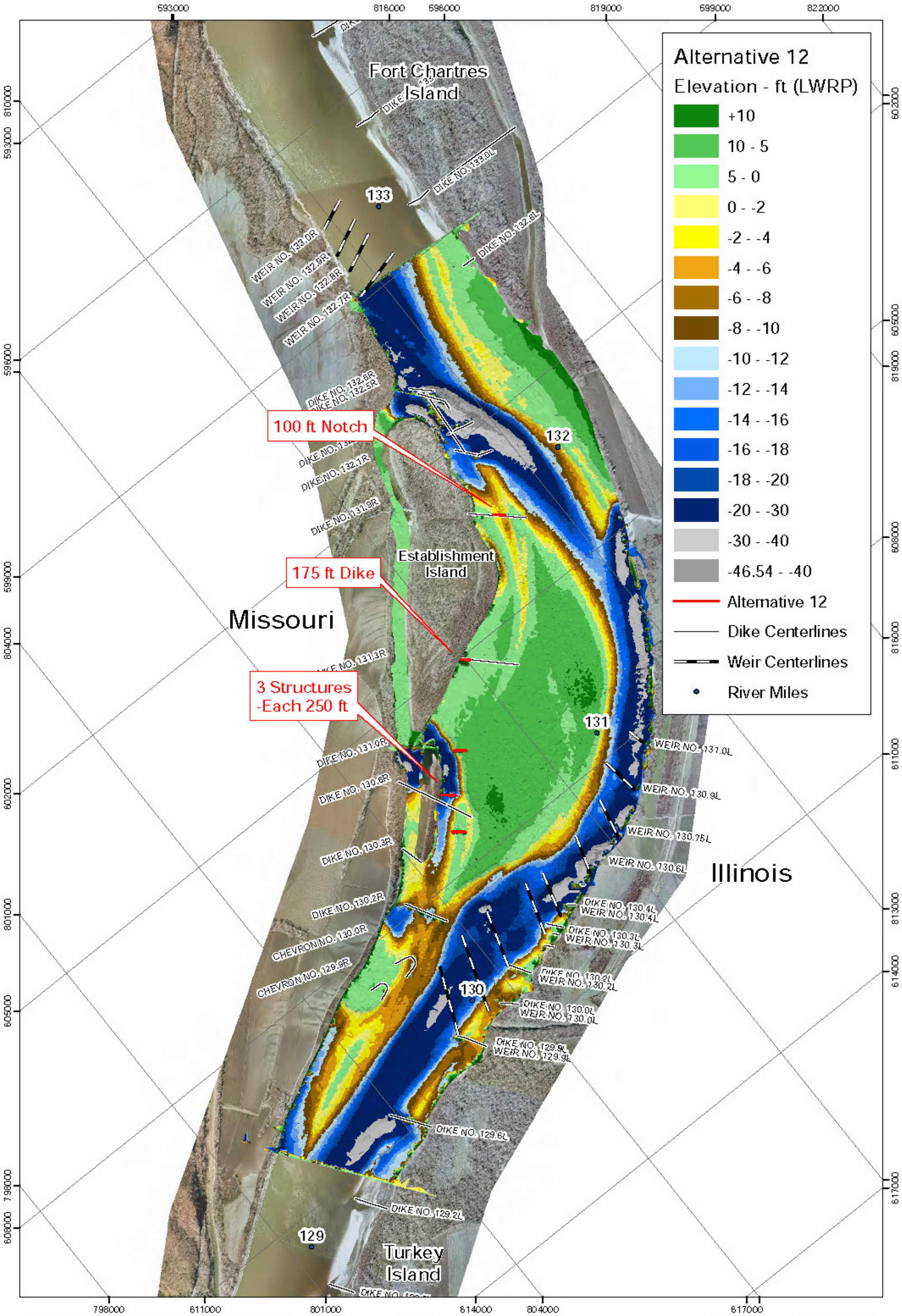
UPPER MISSISSIPPI RIVER BASIN

Establishment Chute HSR Model
River Miles 134.0-128.0

DESIGNED BY B Erischel
DRAWN BY B Erischel
REVIEWED BY A Cox
DISCIPLINE LEAD J Brown, P.E.
SUBMITTED B Erischel
APPROVED R Davinroy P.E.

APPLIED RIVER ENGINEERING CENTER

US Army Corps of Engineers
St. Louis District


Alternative 12
Elevation - ft (LWRP)
+10
10 - 5
5 - 0
0 - -2
-2 - -4
-4 - -6
-6 - -8
-8 - -10
-10 - -12
-12 - -14
-14 - -16
-16 - -18
-18 - -20
-20 - -30
-30 - -40
-46.54 - -40
Alternative 12
Dike Centerlines
Weir Centerlines
River Miles
Fort Chartres Island
Establishment Island
Turkey Island
Missouri
Illinois
100 ft Notch
175 ft Dike
3 Structures -Each 250 ft
133
132
131
130
129
DIKE NO. 133.0L
DIKE NO. 132.6L
WEIR NO. 133.0R
WEIR NO. 132.9R
WEIR NO. 132.8R
WEIR NO. 132.7R
DIKE NO. 132.6R
DIKE NO. 132.5R
DIKE NO. 132.1R
DIKE NO. 131.9R
DIKE NO. 131.3R
DIKE NO. 131.0R
DIKE NO. 130.8R
DIKE NO. 130.3R
DIKE NO. 130.2R
CHEVRON NO. 130.0R
CHEVRON NO. 129.9R
WEIR NO. 131.0L
WEIR NO. 130.9L
WEIR NO. 130.75L
WEIR NO. 130.6L
DIKE NO. 130.4L
WEIR NO. 130.4L
DIKE NO. 130.3L
WEIR NO. 130.3L
DIKE NO. 130.2L
WEIR NO. 130.2L
DIKE NO. 130.0L
WEIR NO. 130.0L
DIKE NO. 129.9L
WEIR NO. 129.9L
DIKE NO. 129.6L
DIKE NO. 129.2L
593000
816000
596000
819000
599000
822000
810000
602000
605000
608000
611000
613000
614000
617000
798000
611000
801000
614000
804000
617000
0 750 1,500 3,000
Feet
PLATE NUMBER 31
Alternative 12
2006 Aerial Photograph
U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI
UPPER MISSISSIPPI RIVER BASIN
Establishment Chute HSR Model
River Miles 134.0-128.0
B Erichel
B Erichel
A Cox
J Brown, P.E.
B Erichel
R Davinroy, P.E.
APPLIED RIVER ENGINEERING CENTER
US Army Corps of Engineers
St. Louis District

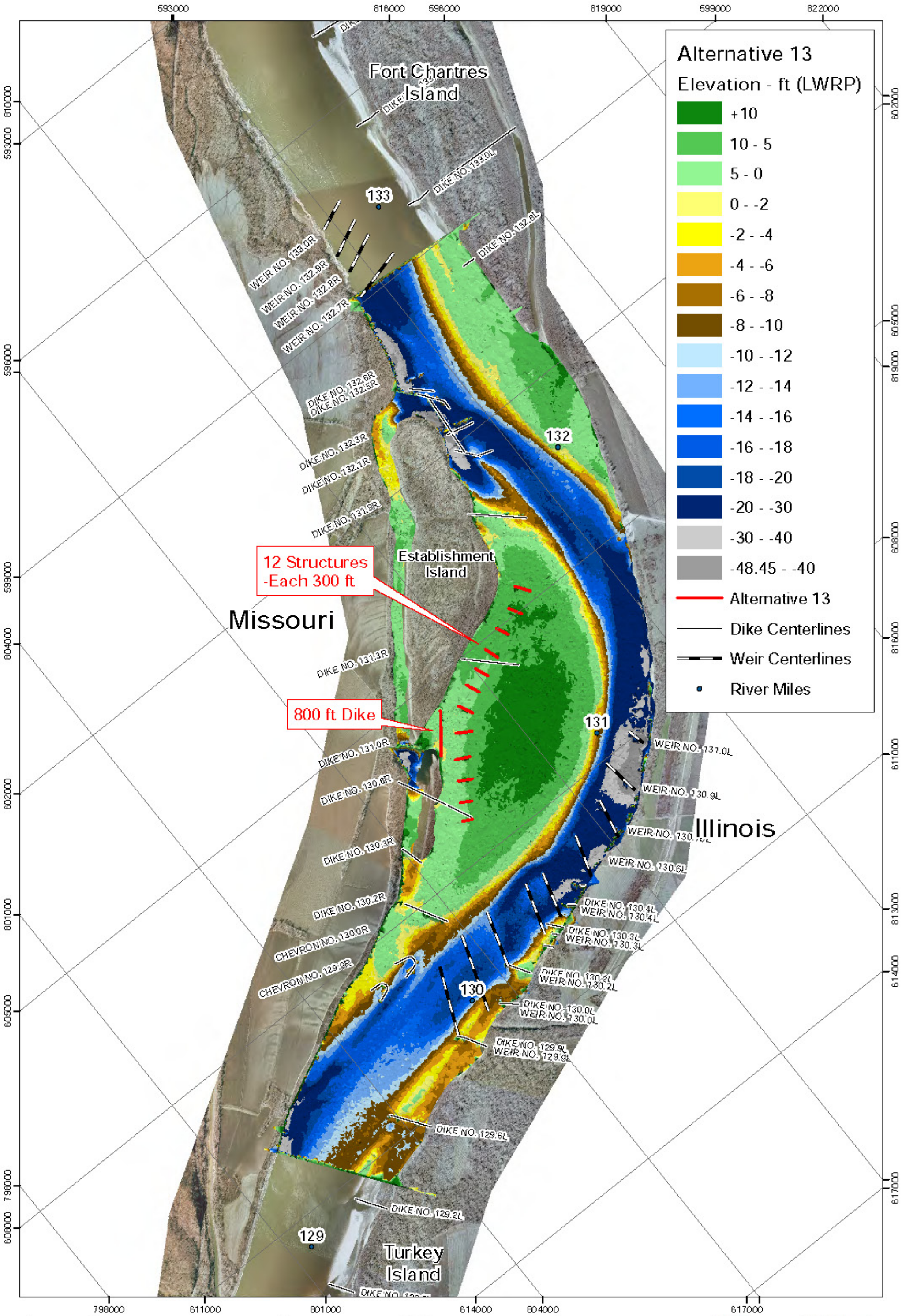


PLATE NUMBER 32

0 750 1,500 3,000 Feet

Alternative 13

2006 Aerial Photograph

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN

Establishment Chute HSR Model
River Miles 134.0-128.0

DESIGNED BY B Krischel
DRAWN BY B Krischel
REVIEWED BY A Cox
DESIGNED BY J Brown, P.E.
SUBMITTED B Krischel
APPROVED R Davinroy, P.E.

APPLIED RIVER ENGINEERING CENTER

US Army Corps of Engineers
St. Louis District

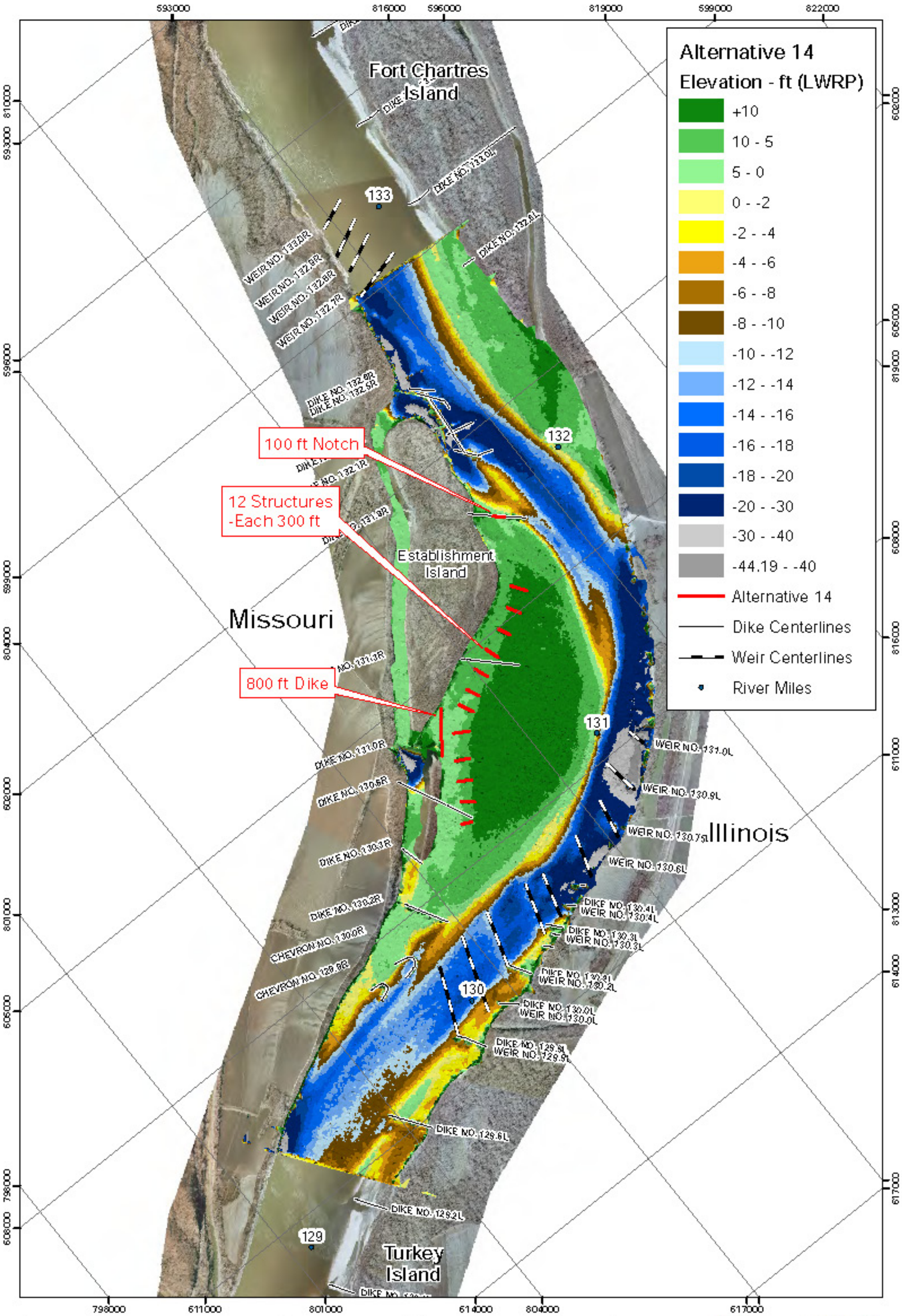


PLATE NUMBER 33

0 750 1,500 3,000
Feet

Alternative 14

2006 Aerial Photograph

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN

S. Kriedel | S. Kriedel | A. Cox | J. Brown, P.E.

S. Kriedel | B. Demoray, P.E.

US Army Corps of Engineers
St. Louis District

APPLIED RIVER ENGINEERING CENTER

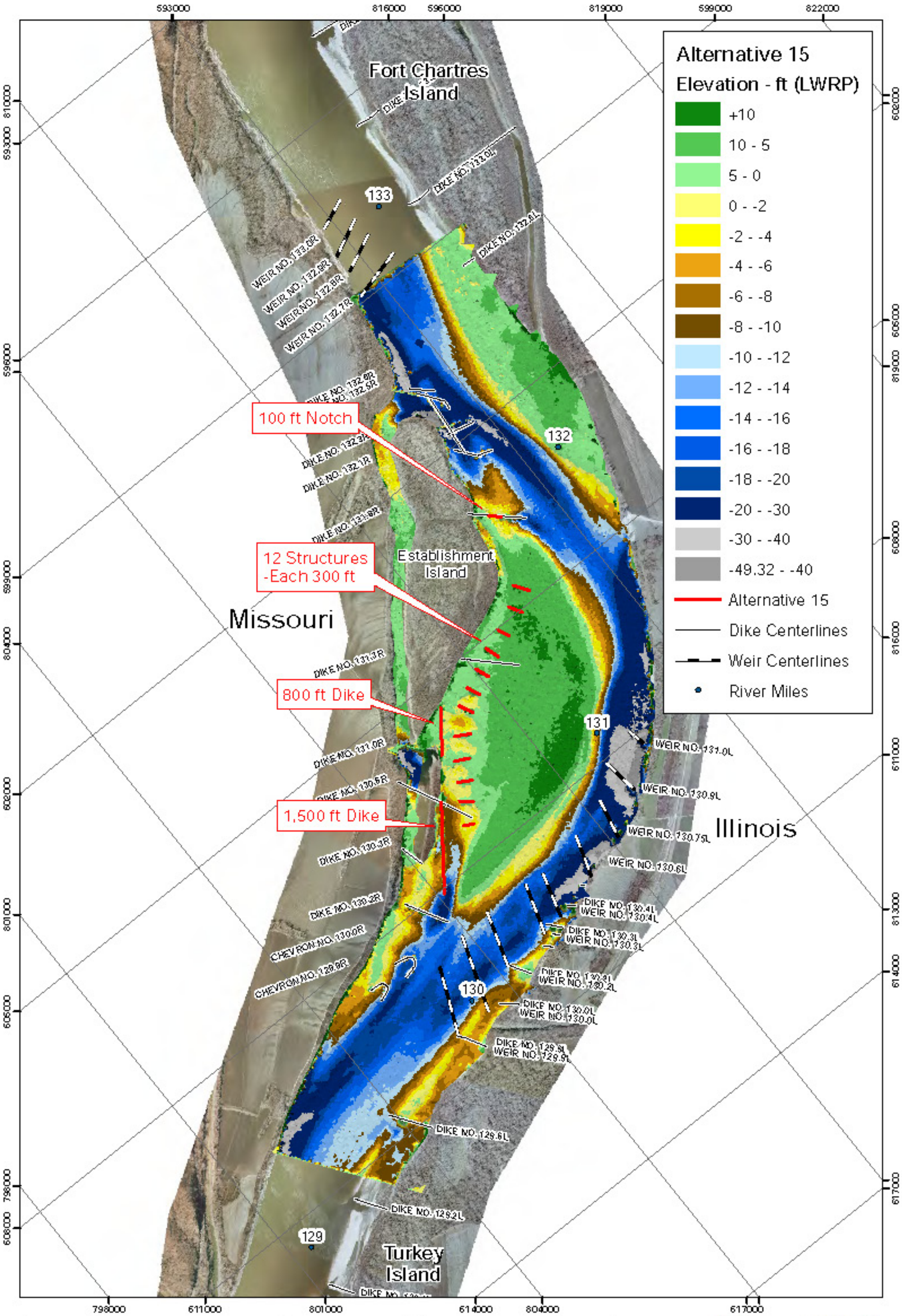


PLATE NUMBER 34

Alternative 15

2006 Aerial Photograph

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN

S. Kriedel | S. Kriedel | A. Cox | J. Brown, P.E. | S. Kriedel | B. Dameron, P.E.

US Army Corps of Engineers
St. Louis District

APPLIED RIVER ENGINEERING CENTER

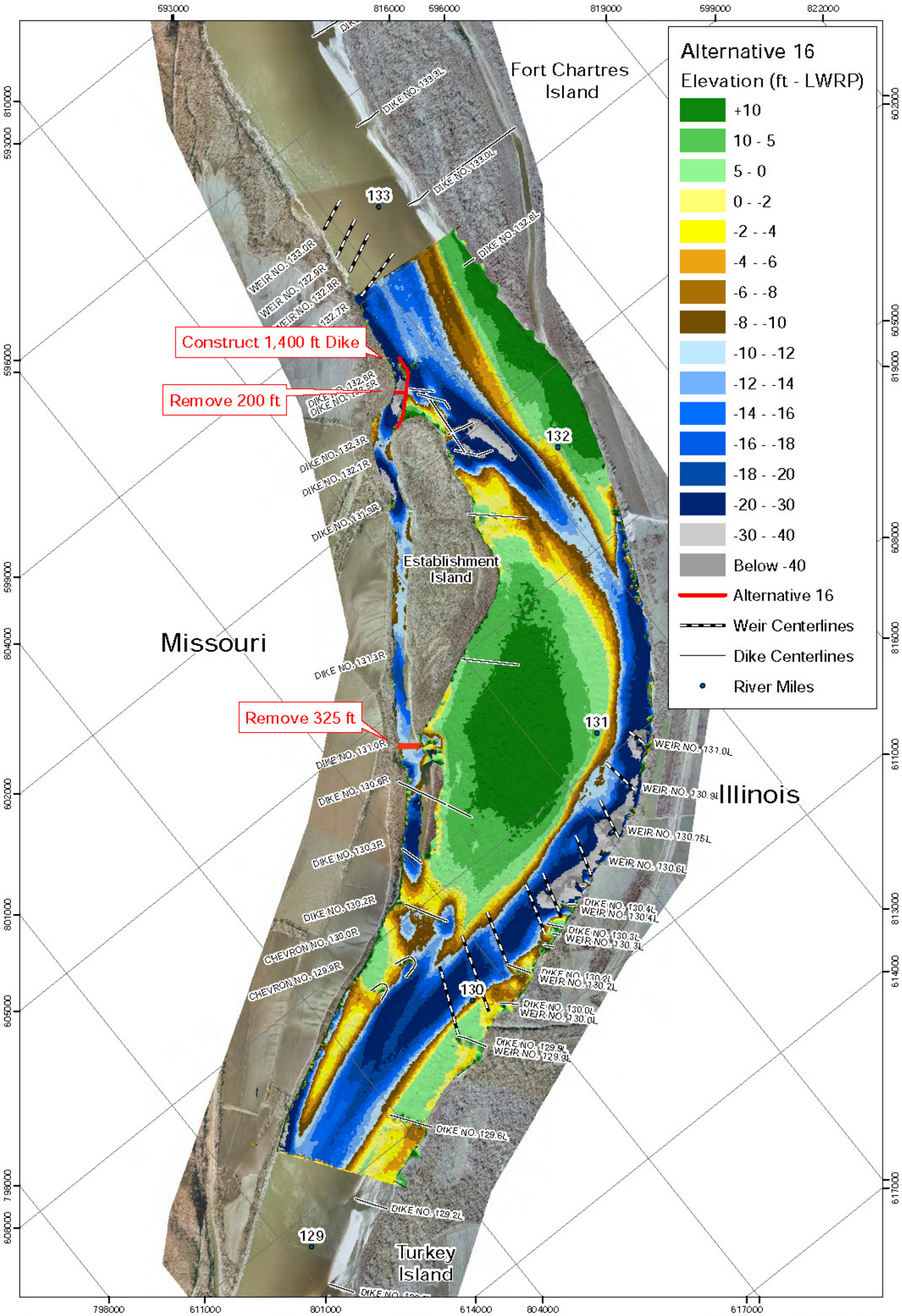


PLATE NUMBER 35

0 750 1,500 3,000 Feet

Alternative 16

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

UPPER MISSISSIPPI RIVER BASIN

Establishment Chute HSR Model
River Miles 134.0-128.0

DESIGNED: B Erischel
DRAWN: B Erischel
REVIEWED: A Cox
DESIGNED: J Brown, P.E.
SUBMITTED: B Erischel
APPROVED: R Davinroy, P.E.

APPLIED RIVER ENGINEERING CENTER

US Army Corps of Engineers
St. Louis District