

### Legend

**Dredge/Structures**

- Disposal Sites - Current
- Disposal Sites - Approved but Inactive
- Disposal Sites - Proposed
- Dredge Area - Current (Area routinely dredged - 1995 to 2003)
- Dredge Area - Proposed
- Structures Current
- Structures Proposed
- Proposed Tern Islands

**Gravel Bed Survey**  
Total acreage = 165 acres

- Gravel Beds

**Mussel Survey (live - sum)**

- 0
- 1 - 4
- 5 - 10
- 11 - 20
- 21 - 30
- 31 - 50
- 51 - 100

**Mitigation Sites**

CoverType

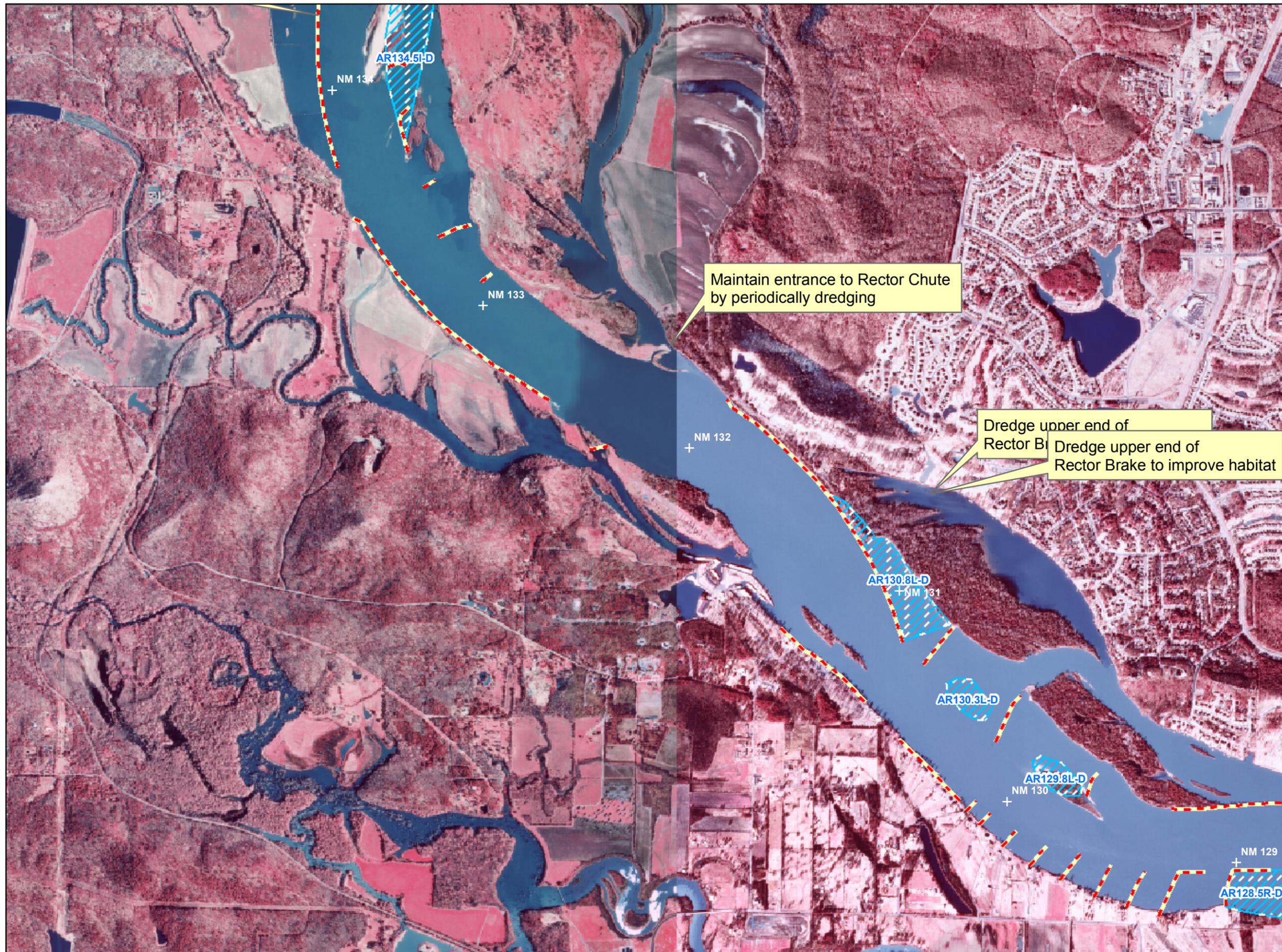
- AG
- BLH
- MARSH

**Arkansas River Navigation Study**  
**AUGUST 2005**

Map Sheet 26

1:24,000

USACE  
LITTLE ROCK DISTRICT  
TULSA DISTRICT



### Legend

- Dredge/Structures**
- Disposal Sites - Current
  - Disposal Sites - Approved but Inactive
  - Disposal Sites - Proposed
  - Dredge Area - Current (Area routinely dredged - 1995 to 2003)
  - Dredge Area - Proposed
  - Structures Current
  - Structures Proposed
  - Proposed Tern Islands

- Gravel Bed Survey**  
Total acreage = 165 acres
- Gravel Beds

- Mussel Survey (live - sum)**
- 0
  - 1 - 4
  - 5 - 10
  - 11 - 20
  - 21 - 30
  - 31 - 50
  - 51 - 100

- Mitigation Sites**
- CoverType
- AG
  - BLH
  - MARSH

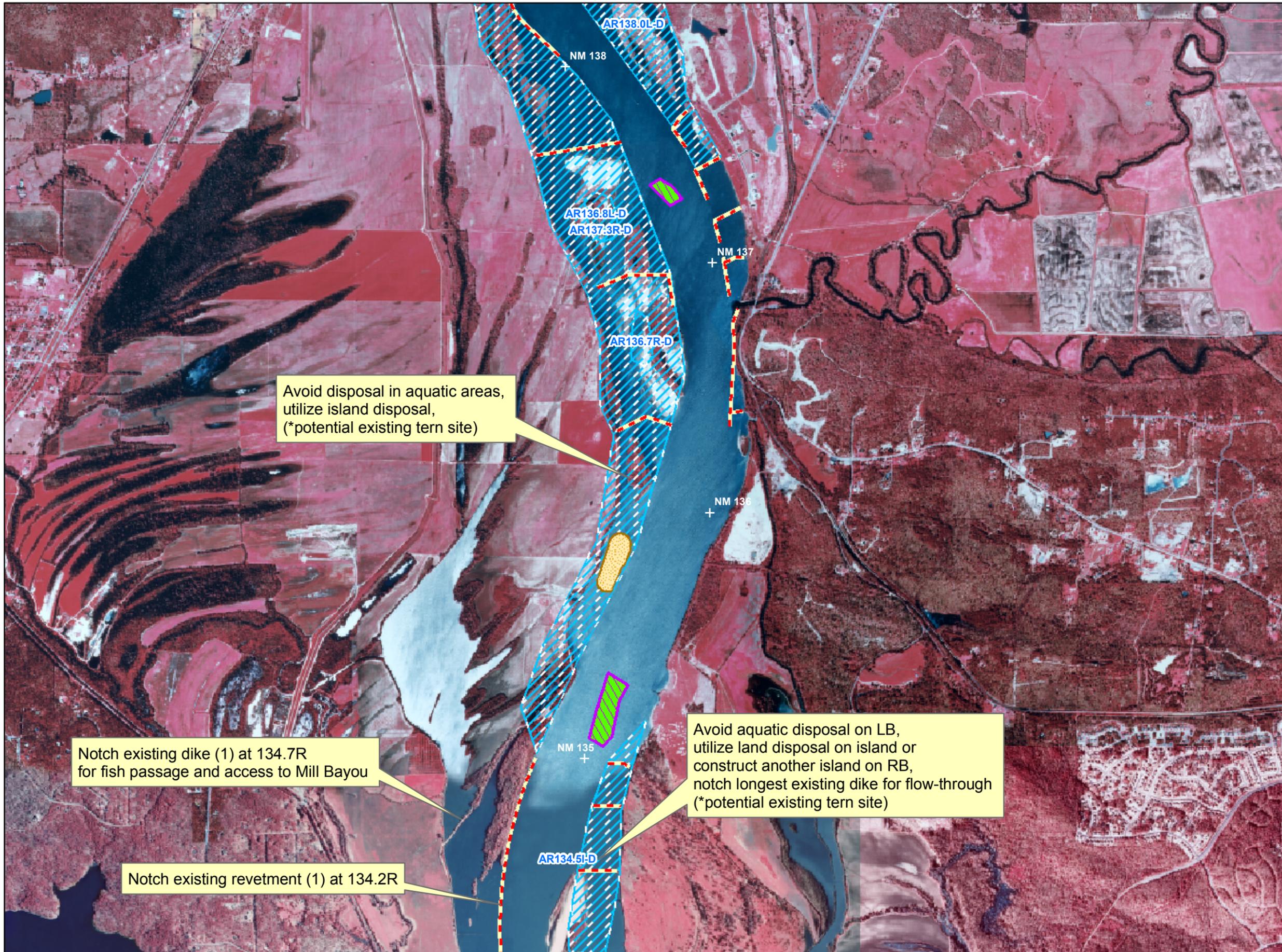
Maintain entrance to Rector Chute by periodically dredging

Dredge upper end of Rector Brake to improve habitat

### Arkansas River Navigation Study AUGUST 2005

Map Sheet 27





### Legend

#### Dredge/Structures

- Disposal Sites - Current
- Disposal Sites - Approved but Inactive
- Disposal Sites - Proposed
- Dredge Area - Current (Area routinely dredged - 1995 to 2003)
- Dredge Area - Proposed
- Structures Current
- Structures Proposed
- Proposed Tern Islands

#### Gravel Bed Survey

Total acreage = 165 acres

- Gravel Beds

#### Mussel Survey (live - sum)

- 0
- 1 - 4
- 5 - 10
- 11 - 20
- 21 - 30
- 31 - 50
- 51 - 100

#### Mitigation Sites

- CoverType
- AG
  - BLH
  - MARSH

### Arkansas River Navigation Study AUGUST 2005

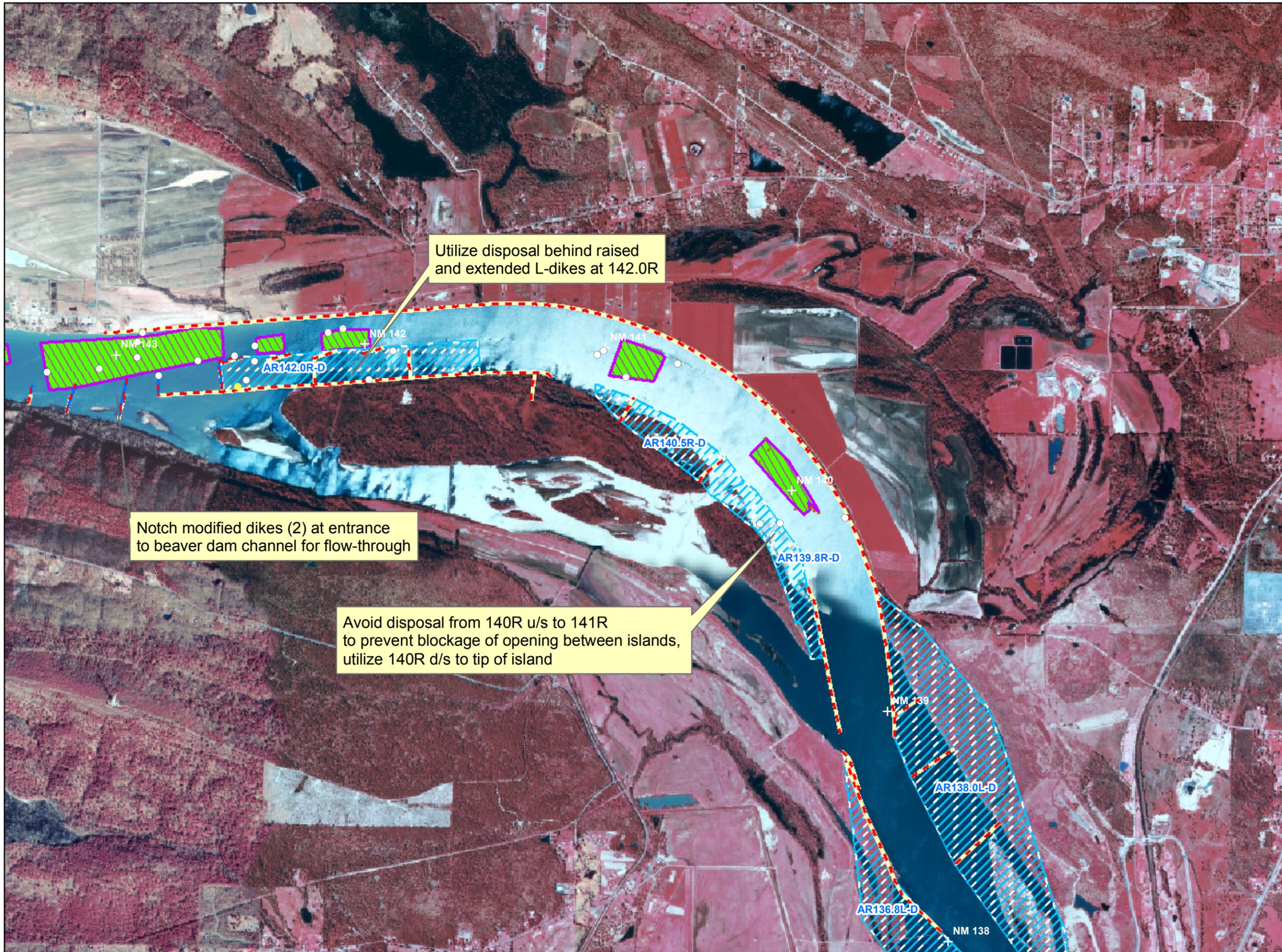
Map Sheet 28



1:24,000



USACE  
LITTLE ROCK DISTRICT  
TULSA DISTRICT



### Legend

#### Dredge/Structures

- Disposal Sites - Current
- Disposal Sites - Approved but Inactive
- Disposal Sites - Proposed
- Dredge Area - Current (Area routinely dredged - 1995 to 2003)
- Dredge Area - Proposed
- Structures Current
- Structures Proposed
- Proposed Tern Islands

#### Gravel Bed Survey

- Total acreage = 165 acres
- Gravel Beds

#### Mussel Survey (live - sum)

- 0
- 1 - 4
- 5 - 10
- 11 - 20
- 21 - 30
- 31 - 50
- 51 - 100

#### Mitigation Sites

- CoverType
- AG
  - BLH
  - MARSH

### Arkansas River Navigation Study AUGUST 2005

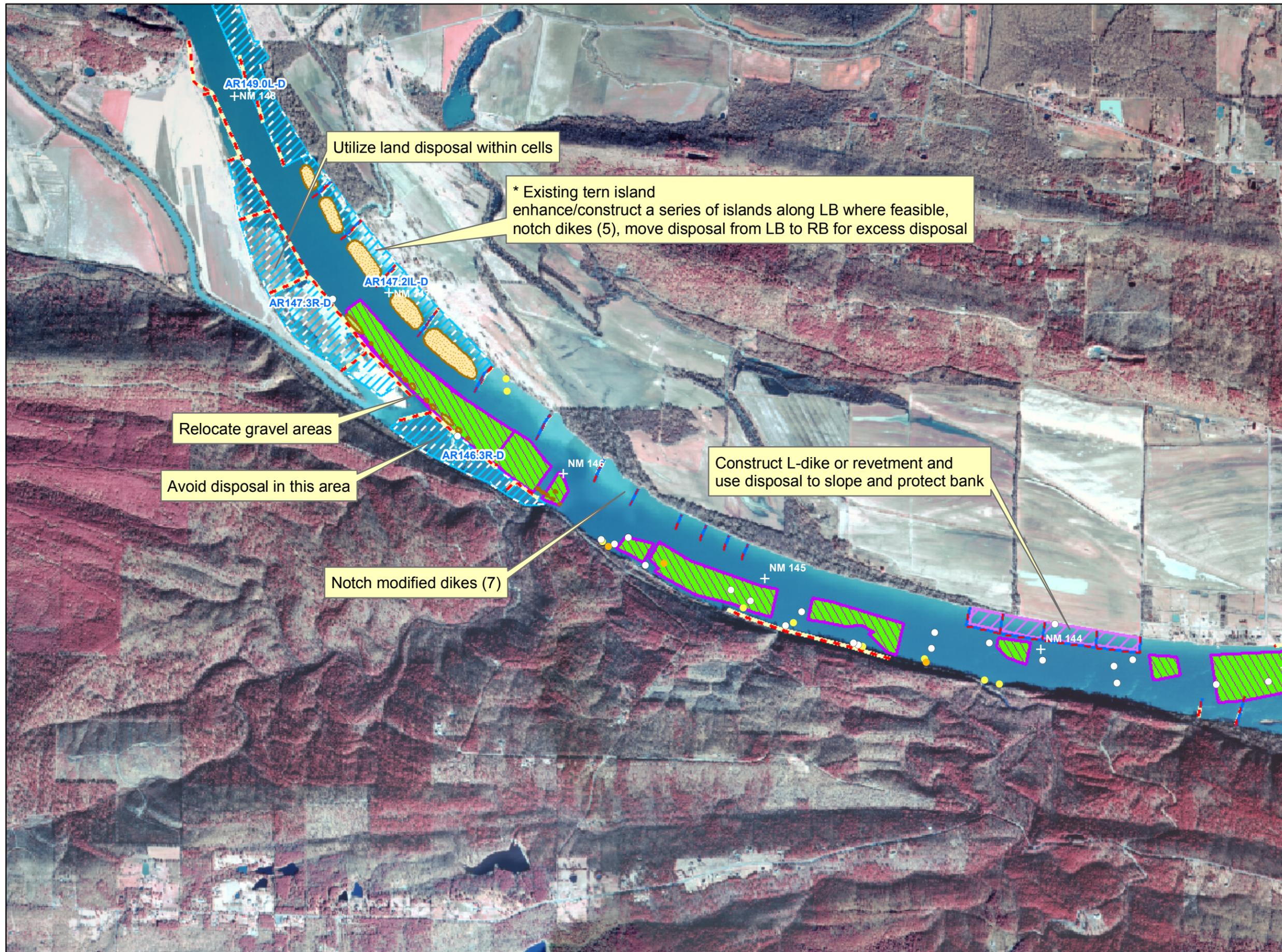
Map Sheet 29



1:24,000



USACE  
LITTLE ROCK DISTRICT  
TULSA DISTRICT



### Legend

#### Dredge/Structures

- Disposal Sites - Current
- Disposal Sites - Approved but Inactive
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- Dredge Area - Proposed
- Structures Current
- Structures Proposed
- Proposed Tern Islands

#### Gravel Bed Survey

Total acreage = 165 acres

- Gravel Beds

#### Mussel Survey (live - sum)

- 0
- 1 - 4
- 5 - 10
- 11 - 20
- 21 - 30
- 31 - 50
- 51 - 100

#### Mitigation Sites

##### CoverType

- AG
- BLH
- MARSH

### Arkansas River Navigation Study JUNE 2005

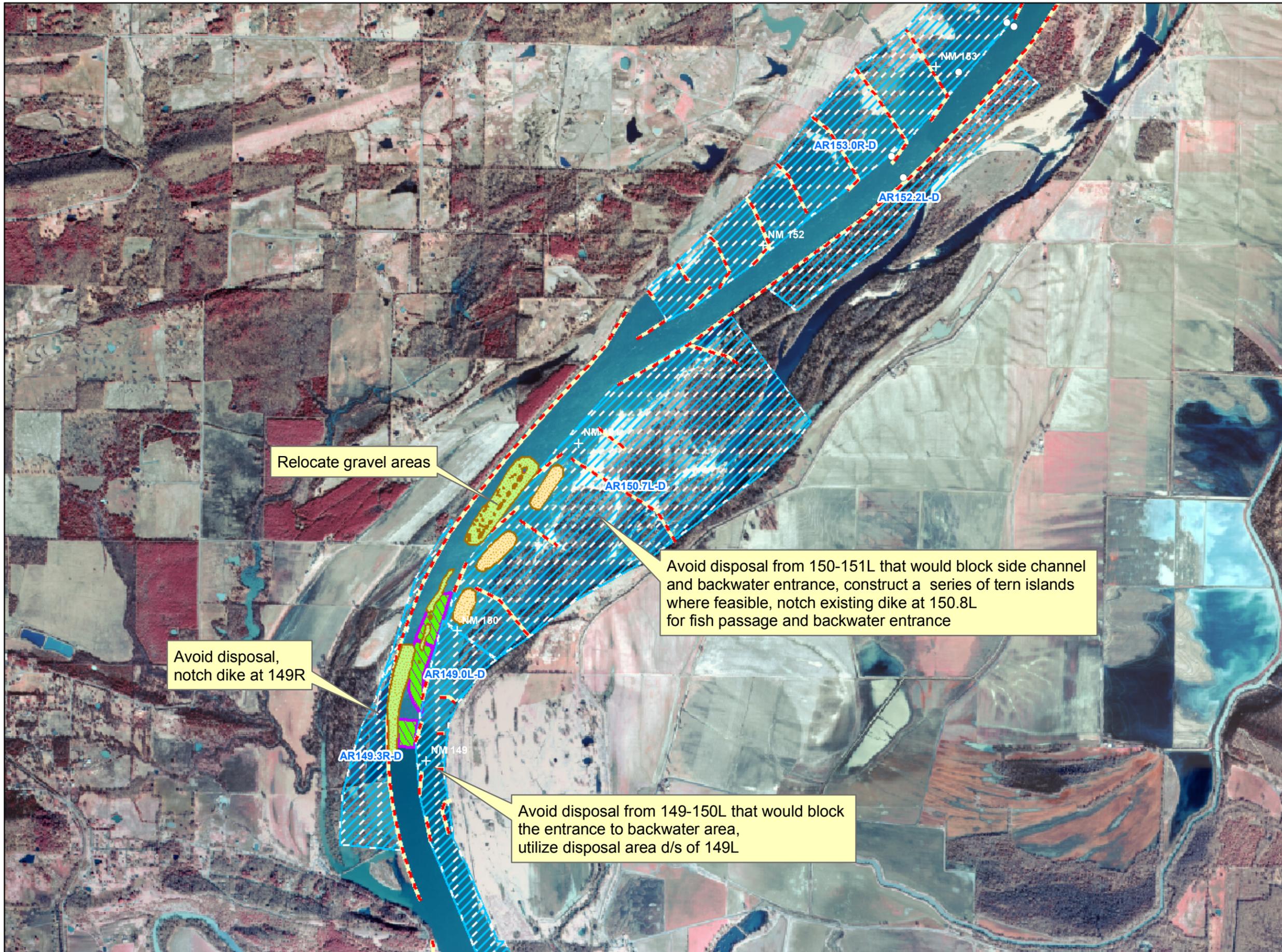
Map Sheet 30



1:24,000



USACE  
LITTLE ROCK DISTRICT  
TULSA DISTRICT



### Legend

#### Dredge/Structures

-  Disposal Sites - Current
-  Disposal Sites - Approved but Inactive
-  Disposal Sites - Proposed
-  Dredge Area - Current (Area routinely dredged - 1995 to 2003)
-  Dredge Area - Proposed
-  Structures Current
-  Structures Proposed
-  Proposed Tern Islands

#### Gravel Bed Survey

Total acreage = 165 acres

-  Gravel Beds

#### Mussel Survey (live - sum)

-  0
-  1 - 4
-  5 - 10
-  11 - 20
-  21 - 30
-  31 - 50
-  51 - 100

#### Mitigation Sites

##### CoverType

-  AG
-  BLH
-  MARSH

### Arkansas River Navigation Study JUNE 2005

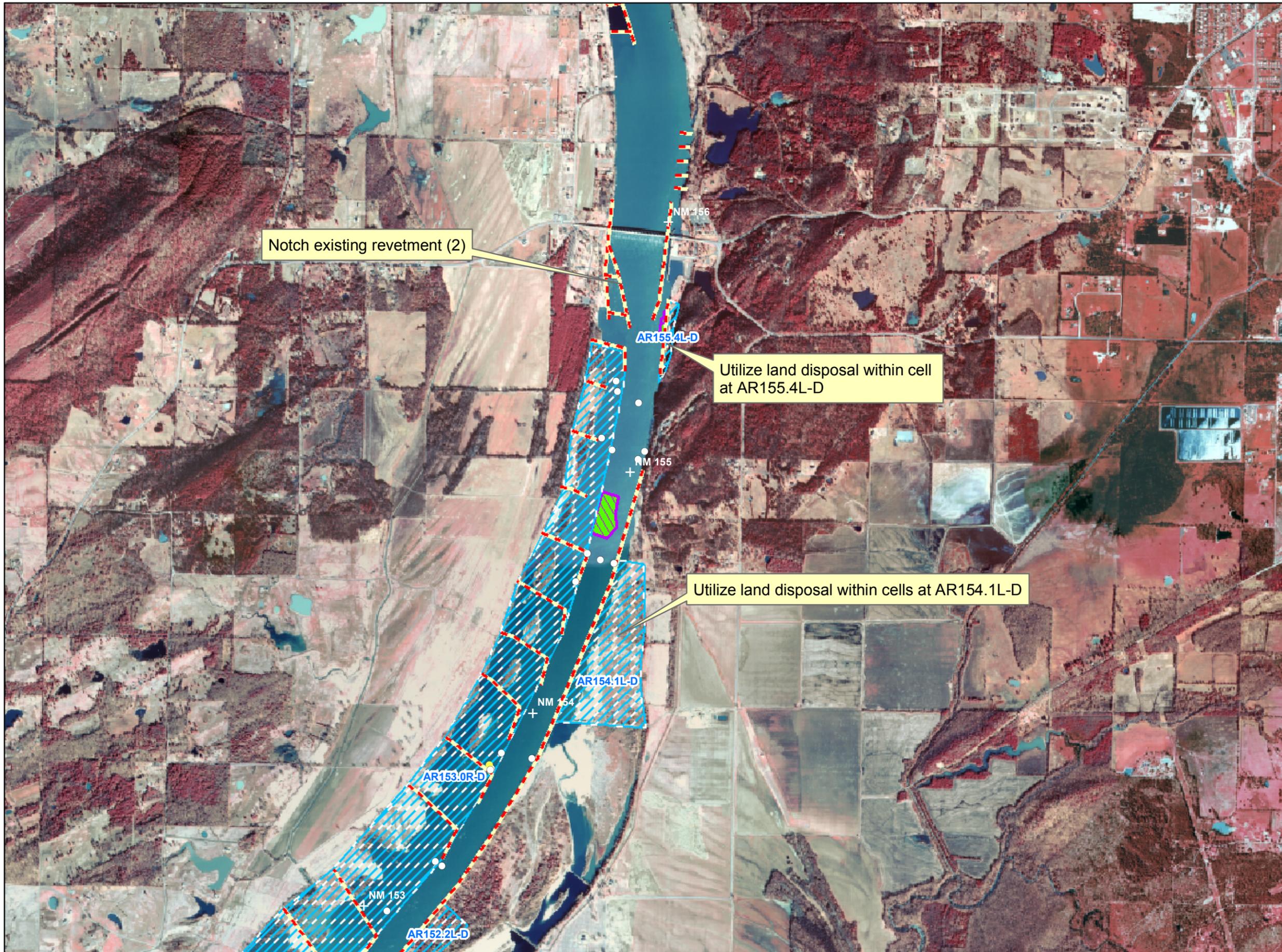
Map Sheet 31



1:24,000



USACE  
LITTLE ROCK DISTRICT  
TULSA DISTRICT



### Legend

#### Dredge/Structures

-  Disposal Sites - Current
-  Disposal Sites - Approved but Inactive
-  Disposal Sites - Proposed
-  Dredge Area - Current  
(Area routinely dredged - 1995 to 2003)
-  Dredge Area - Proposed
-  Structures Current
-  Structures Proposed
-  Proposed Tern Islands

#### Gravel Bed Survey

- Total acreage = 165 acres
-  Gravel Beds

#### Mussel Survey (live - sum)

-  0
-  1 - 4
-  5 - 10
-  11 - 20
-  21 - 30
-  31 - 50
-  51 - 100

#### Mitigation Sites

- CoverType
-  AG
  -  BLH
  -  MARSH

### Arkansas River Navigation Study JUNE 2005

Map Sheet 32



1:24,000



USACE  
LITTLE ROCK DISTRICT  
TULSA DISTRICT



Utilize existing island for disposal and/or construct tern islands

s from 161.2-162.2L 161.2

Brevetment out n

### Legend

#### Dredge/Structures

- Disposal Sites - Current
- Disposal Sites - Approved but Inactive
- Disposal Sites - Proposed
- Dredge Area - Current (Area routinely dredged - 1995 to 2003)
- Dredge Area - Proposed
- Structures Current
- Structures Proposed
- Proposed Tern Islands

#### Gravel Bed Survey

Total acreage = 165 acres

- Gravel Beds

#### Mussel Survey (live - sum)

- 0
- 1 - 4
- 5 - 10
- 11 - 20
- 21 - 30
- 31 - 50
- 51 - 100

#### Mitigation Sites

##### CoverType

- AG
- BLH
- MARSH

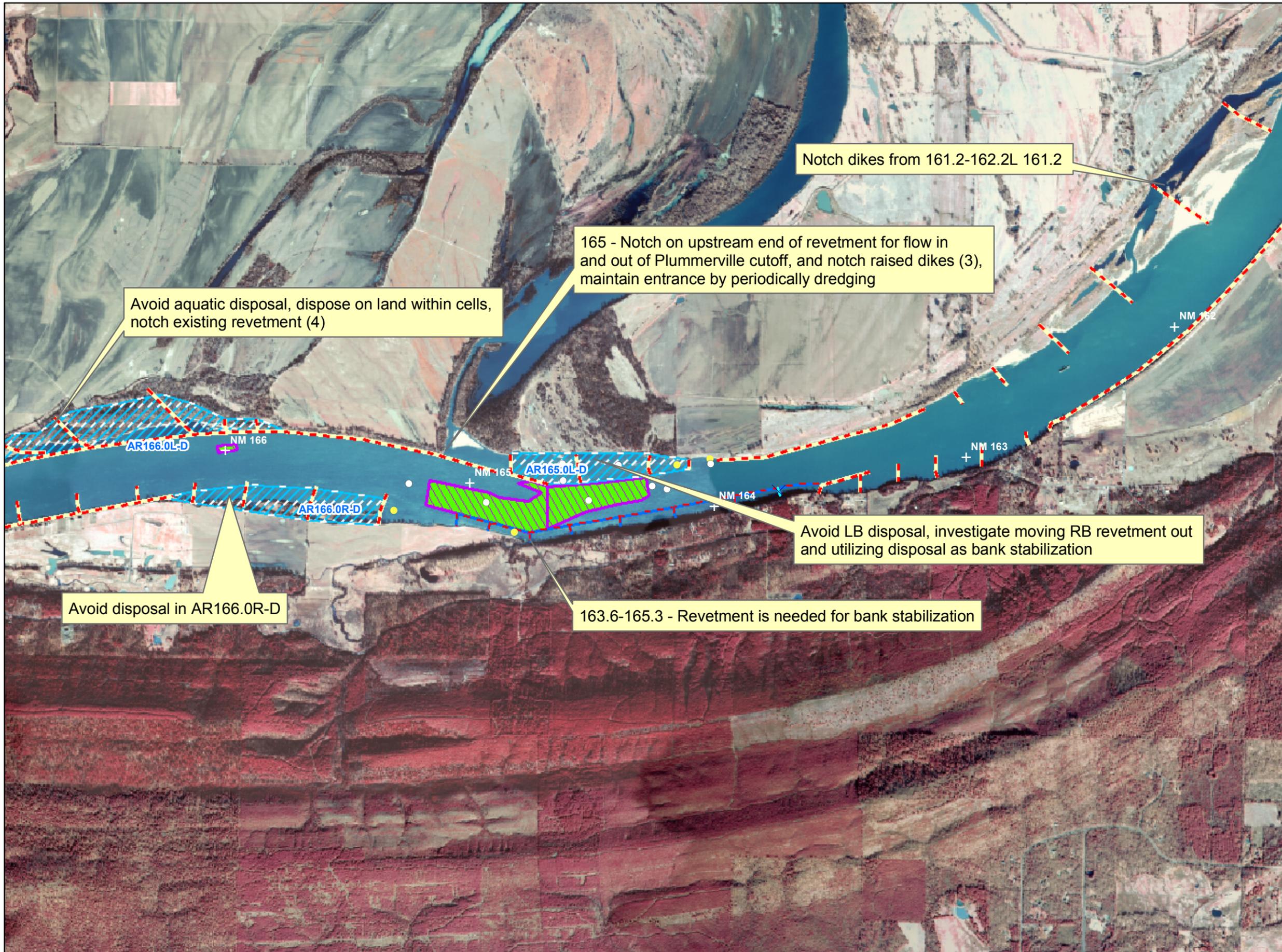
### Arkansas River Navigation Study JUNE 2005

Map Sheet 33



1:24,000





### Legend

- Dredge/Structures**
- Disposal Sites - Current
  - Disposal Sites - Approved but Inactive
  - Disposal Sites - Proposed
  - Dredge Area - Current (Area routinely dredged - 1995 to 2003)
  - Dredge Area - Proposed
  - Structures Current
  - Structures Proposed
  - Proposed Tern Islands

- Gravel Bed Survey**  
Total acreage = 165 acres
- Gravel Beds

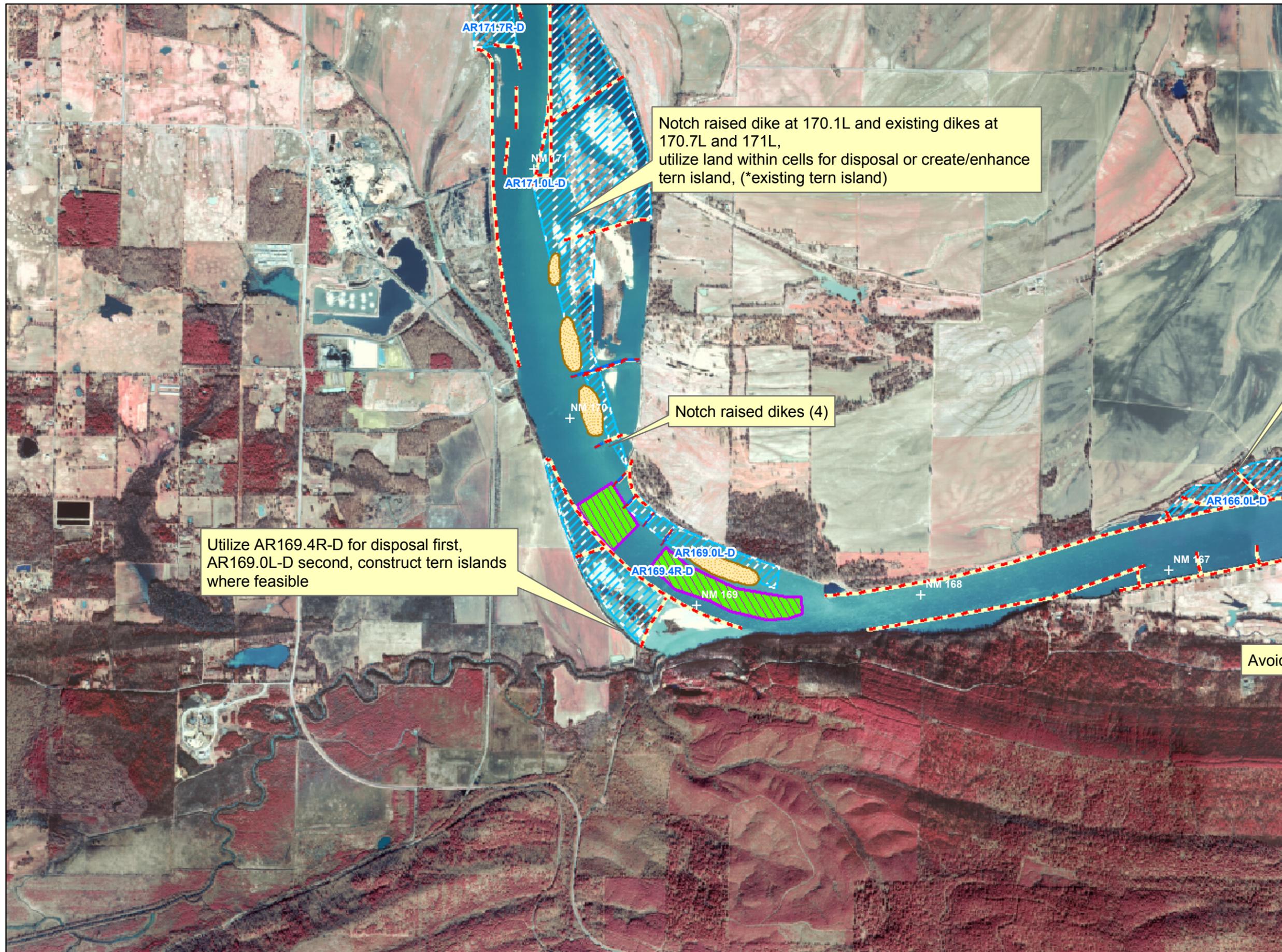
- Mussel Survey (live - sum)**
- 0
  - 1 - 4
  - 5 - 10
  - 11 - 20
  - 21 - 30
  - 31 - 50
  - 51 - 100

- Mitigation Sites**
- CoverType
- AG
  - BLH
  - MARSH

**Arkansas River  
Navigation Study  
JUNE 2005**

Map Sheet 34





Notch raised dike at 170.1L and existing dikes at 170.7L and 171L, utilize land within cells for disposal or create/enhance tern island, (\*existing tern island)

Notch raised dikes (4)

Utilize AR169.4R-D for disposal first, AR169.0L-D second, construct tern islands where feasible

Avoid

### Legend

- Dredge/Structures**
- Disposal Sites - Current
  - Disposal Sites - Approved but Inactive
  - Disposal Sites - Proposed
  - Dredge Area - Current (Area routinely dredged - 1995 to 2003)
  - Dredge Area - Proposed
  - Structures Current
  - Structures Proposed
  - Proposed Tern Islands

- Gravel Bed Survey**  
Total acreage = 165 acres
- Gravel Beds

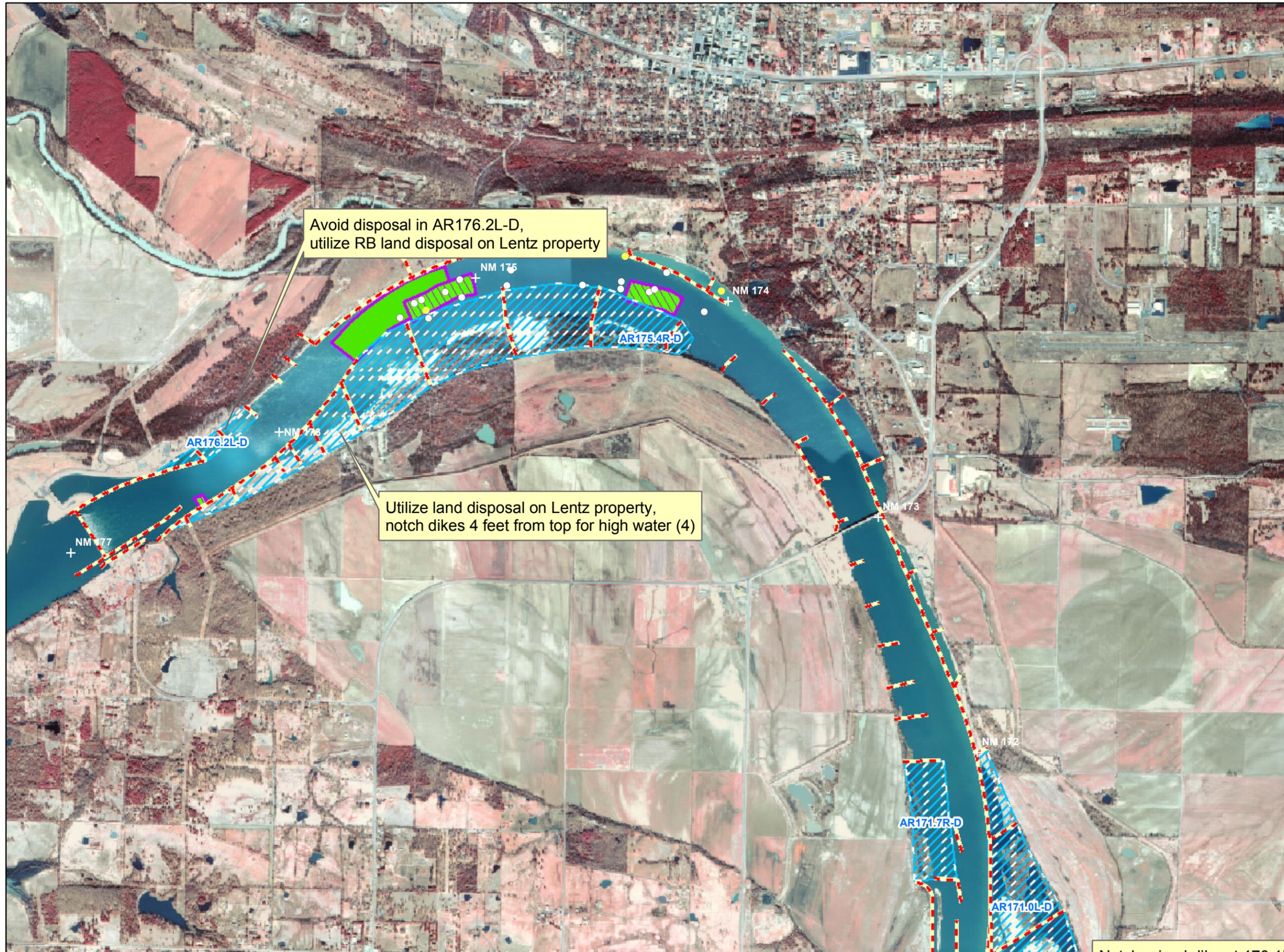
- Mussel Survey (live - sum)**
- 0
  - 1 - 4
  - 5 - 10
  - 11 - 20
  - 21 - 30
  - 31 - 50
  - 51 - 100

- Mitigation Sites**
- CoverType
- AG
  - BLH
  - MARSH

**Arkansas River  
Navigation Study  
JUNE 2005**

Map Sheet 35





### Legend

#### Dredge/Structures

- Disposal Sites - Current
- Disposal Sites - Approved but Inactive
- Disposal Sites - Proposed
- Dredge Area - Current (Area routinely dredged - 1995 to 2003)
- Dredge Area - Proposed
- Structures Current
- Structures Proposed
- Proposed Tern Islands

#### Gravel Bed Survey

- Total acreage = 165 acres
- Gravel Beds

#### Mussel Survey (live - sum)

- 0
- 1 - 4
- 5 - 10
- 11 - 20
- 21 - 30
- 31 - 50
- 51 - 100

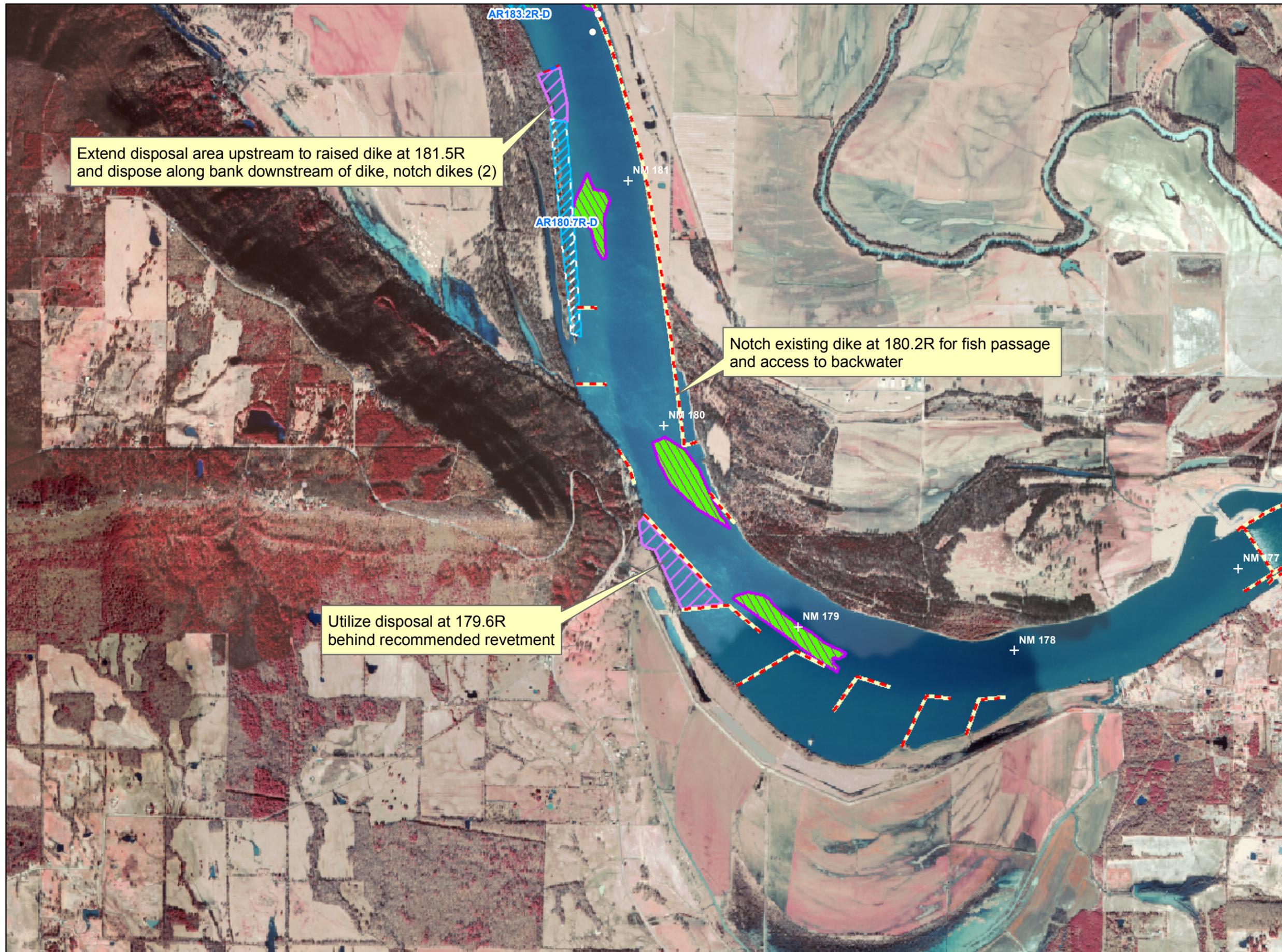
#### Mitigation Sites

- CoverType
- AG
  - BLH
  - MARSH

### Arkansas River Navigation Study JUNE 2005

Map Sheet 36





Extend disposal area upstream to raised dike at 181.5R and dispose along bank downstream of dike, notch dikes (2)

Notch existing dike at 180.2R for fish passage and access to backwater

Utilize disposal at 179.6R behind recommended revetment

### Legend

#### Dredge/Structures

- Disposal Sites - Current
- Disposal Sites - Approved but Inactive
- Disposal Sites - Proposed
- Dredge Area - Current (Area routinely dredged - 1995 to 2003)
- Dredge Area - Proposed
- Structures Current
- Structures Proposed
- Proposed Tern Islands

#### Gravel Bed Survey

Total acreage = 165 acres

- Gravel Beds

#### Mussel Survey (live - sum)

- 0
- 1 - 4
- 5 - 10
- 11 - 20
- 21 - 30
- 31 - 50
- 51 - 100

#### Mitigation Sites

##### CoverType

- AG
- BLH
- MARSH

**Arkansas River  
Navigation Study  
JUNE 2005**

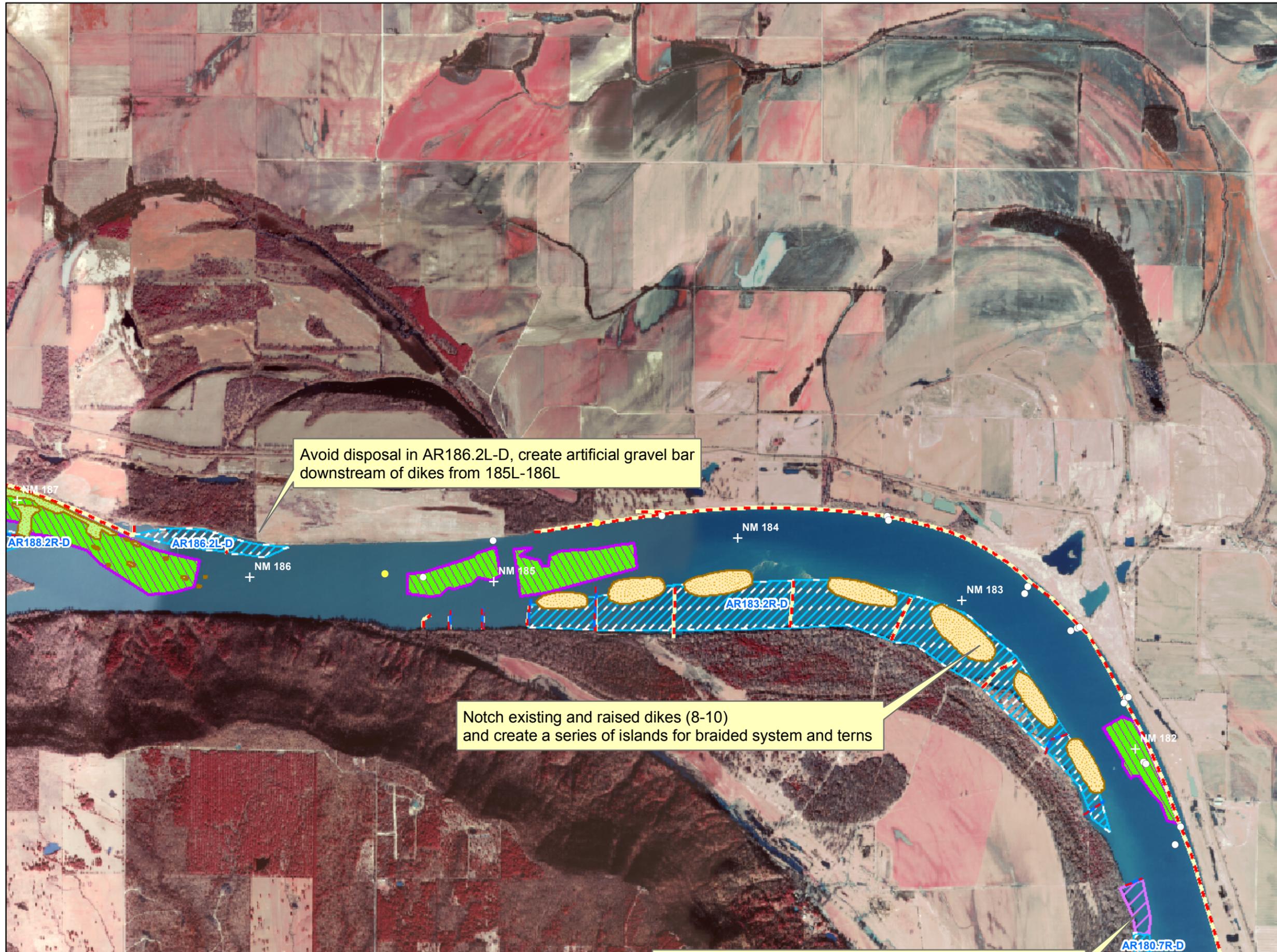
Map Sheet 37



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USACE  
LITTLE ROCK DISTRICT  
TULSA DISTRICT



Avoid disposal in AR186.2L-D, create artificial gravel bar downstream of dikes from 185L-186L

Notch existing and raised dikes (8-10) and create a series of islands for braided system and terns

### Legend

#### Dredge/Structures

- Disposal Sites - Current
- Disposal Sites - Approved but Inactive
- Disposal Sites - Proposed
- Dredge Area - Current (Area routinely dredged - 1995 to 2003)
- Dredge Area - Proposed
- Structures Current
- Structures Proposed
- Proposed Tern Islands

#### Gravel Bed Survey

Total acreage = 165 acres

- Gravel Beds

#### Mussel Survey (live - sum)

- 0
- 1 - 4
- 5 - 10
- 11 - 20
- 21 - 30
- 31 - 50
- 51 - 100

#### Mitigation Sites

##### CoverType

- AG
- BLH
- MARSH

### Arkansas River Navigation Study JUNE 2005

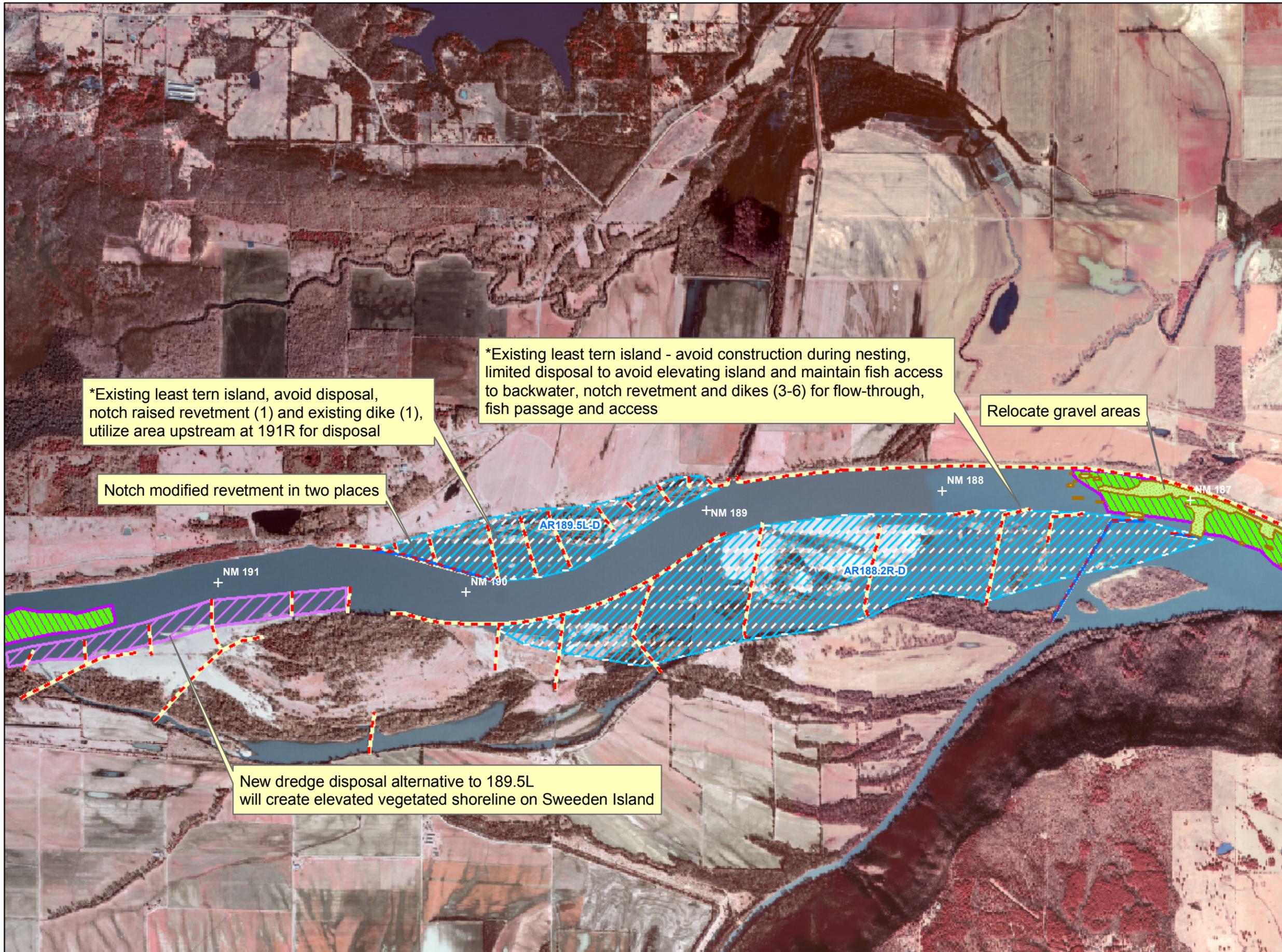
Map Sheet 38



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USACE  
LITTLE ROCK DISTRICT  
TULSA DISTRICT



\*Existing least tern island, avoid disposal, notch raised revetment (1) and existing dike (1), utilize area upstream at 191R for disposal

\*Existing least tern island - avoid construction during nesting, limited disposal to avoid elevating island and maintain fish access to backwater, notch revetment and dikes (3-6) for flow-through, fish passage and access

Notch modified revetment in two places

Relocate gravel areas

New dredge disposal alternative to 189.5L will create elevated vegetated shoreline on Sweeden Island

### Legend

- Dredge/Structures**
- Disposal Sites - Current
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  - Disposal Sites - Proposed
  - Dredge Area - Current (Area routinely dredged - 1995 to 2003)
  - Dredge Area - Proposed
  - Structures Current
  - Structures Proposed
  - Proposed Tern Islands

- Gravel Bed Survey**  
Total acreage = 165 acres
- Gravel Beds

- Mussel Survey (live - sum)**
- 0
  - 1 - 4
  - 5 - 10
  - 11 - 20
  - 21 - 30
  - 31 - 50
  - 51 - 100

- Mitigation Sites**
- CoverType
- AG
  - BLH
  - MARSH

### Arkansas River Navigation Study JUNE 2005

Map Sheet 39



1:24,000





### Legend

- Dredge/Structures**
- Disposal Sites - Current
  - Disposal Sites - Approved but Inactive
  - Disposal Sites - Proposed
  - Dredge Area - Current (Area routinely dredged - 1995 to 2003)
  - Dredge Area - Proposed
  - Structures Current
  - Structures Proposed
  - Proposed Tern Islands

- Gravel Bed Survey**  
Total acreage = 165 acres
- Gravel Beds

- Mussel Survey (live - sum)**
- 0
  - 1 - 4
  - 5 - 10
  - 11 - 20
  - 21 - 30
  - 31 - 50
  - 51 - 100

- Mitigation Sites**
- CoverType
- AG
  - BLH
  - MARSH

**Arkansas River  
Navigation Study  
JUNE 2005**

Map Sheet 40





### Legend

- Dredge/Structures**
- Disposal Sites - Current
  - Disposal Sites - Approved but Inactive
  - Disposal Sites - Proposed
  - Dredge Area - Current (Area routinely dredged - 1995 to 2003)
  - Dredge Area - Proposed
  - Structures Current
  - Structures Proposed
  - Proposed Tern Islands

- Gravel Bed Survey**  
Total acreage = 165 acres
- Gravel Beds

- Mussel Survey (live - sum)**
- 0
  - 1 - 4
  - 5 - 10
  - 11 - 20
  - 21 - 30
  - 31 - 50
  - 51 - 100

- Mitigation Sites**
- CoverType
- AG
  - BLH
  - MARSH

Utilize land disposal within cells from 200.8L d/s to 200L, avoid disposal u/s of 200.8L

**Arkansas River  
Navigation Study  
JUNE 2005**

Map Sheet 41





### Legend

- Dredge/Structures**
- Disposal Sites - Current
  - Disposal Sites - Approved but Inactive
  - Disposal Sites - Proposed
  - Dredge Area - Current (Area routinely dredged - 1995 to 2003)
  - Dredge Area - Proposed
  - Structures Current
  - Structures Proposed
  - Proposed Tern Islands

- Gravel Bed Survey**  
Total acreage = 165 acres
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- Mussel Survey (live - sum)**
- 0
  - 1 - 4
  - 5 - 10
  - 11 - 20
  - 21 - 30
  - 31 - 50
  - 51 - 100

- Mitigation Sites**
- CoverType
- AG
  - BLH
  - MARSH

Utilize in-channel disposal to keep gravel in-stream

### Arkansas River Navigation Study JUNE 2005

Map Sheet 42





### Legend

#### Dredge/Structures

-  Disposal Sites - Current
-  Disposal Sites - Approved but Inactive
-  Disposal Sites - Proposed
-  Dredge Area - Current  
(Area routinely dredged - 1995 to 2003)
-  Dredge Area - Proposed
-  Structures Current
-  Structures Proposed
-  Proposed Tern Islands

#### Gravel Bed Survey

- Total acreage = 165 acres
-  Gravel Beds

#### Mussel Survey (live - sum)

-  0
-  1 - 4
-  5 - 10
-  11 - 20
-  21 - 30
-  31 - 50
-  51 - 100

#### Mitigation Sites

- CoverType
-  AG
  -  BLH
  -  MARSH

### Arkansas River Navigation Study JUNE 2005

Map Sheet 43



1:24,000



USACE  
LITTLE ROCK DISTRICT  
TULSA DISTRICT



### Legend

#### Dredge/Structures

-  Disposal Sites - Current
-  Disposal Sites - Approved but Inactive
-  Disposal Sites - Proposed
-  Dredge Area - Current  
(Area routinely dredged - 1995 to 2003)
-  Dredge Area - Proposed
-  Structures Current
-  Structures Proposed
-  Proposed Tern Islands

#### Gravel Bed Survey

Total acreage = 165 acres

-  Gravel Beds

#### Mussel Survey (live - sum)

-  0
-  1 - 4
-  5 - 10
-  11 - 20
-  21 - 30
-  31 - 50
-  51 - 100

#### Mitigation Sites

##### CoverType

-  AG
-  BLH
-  MARSH

### Arkansas River Navigation Study JUNE 2005

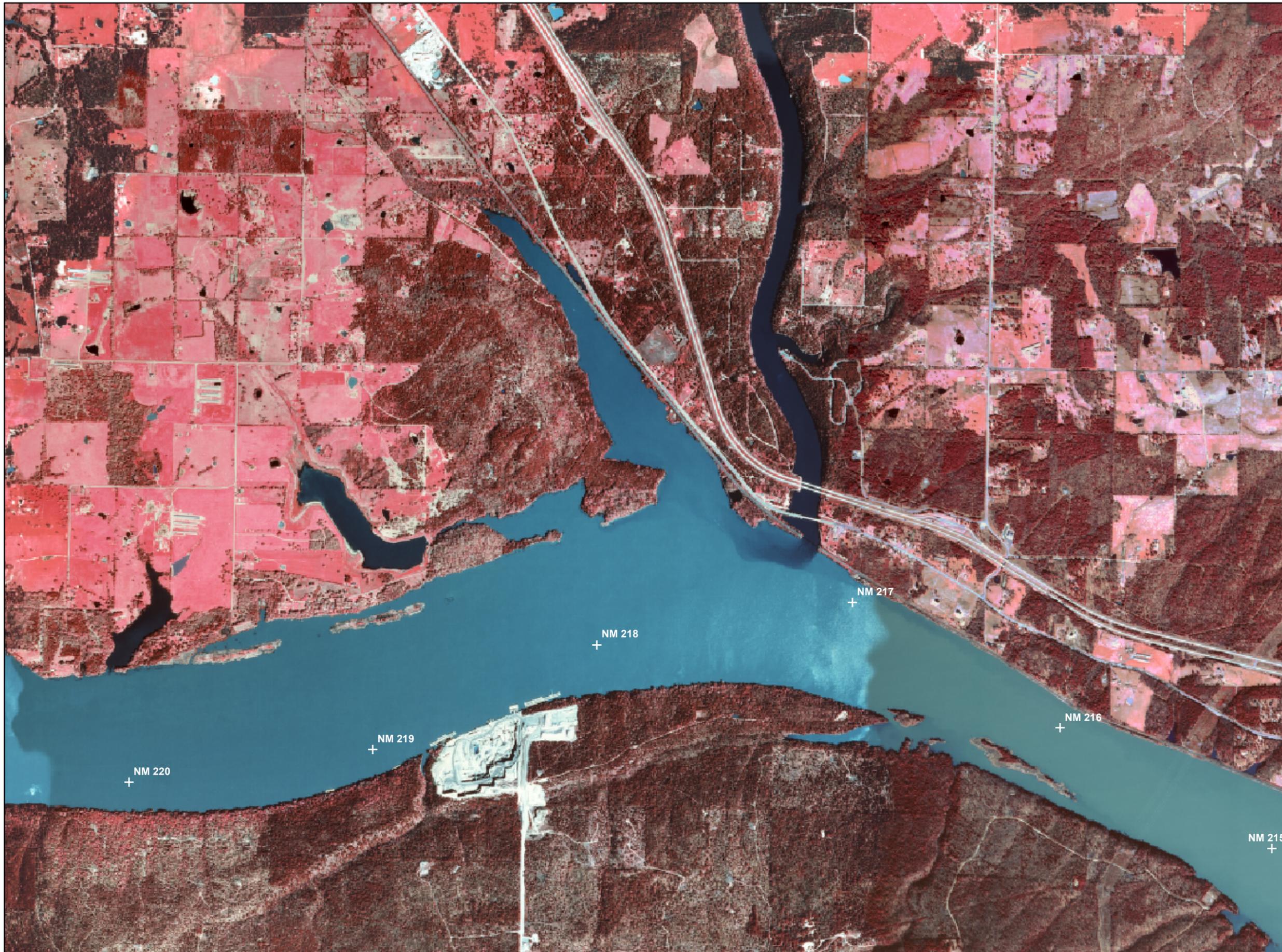
Map Sheet 44



1:24,000



USACE  
LITTLE ROCK DISTRICT  
TULSA DISTRICT



### Legend

- Dredge/Structures**
-  Disposal Sites - Current
  -  Disposal Sites - Approved but Inactive
  -  Disposal Sites - Proposed
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(Area routinely dredged - 1995 to 2003)
  -  Dredge Area - Proposed
  -  Structures Current
  -  Structures Proposed
  -  Proposed Tern Islands

- Gravel Bed Survey**  
Total acreage = 165 acres
-  Gravel Beds

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-  0
  -  1 - 4
  -  5 - 10
  -  11 - 20
  -  21 - 30
  -  31 - 50
  -  51 - 100

- Mitigation Sites**
- CoverType
-  AG
  -  BLH
  -  MARSH

**Arkansas River  
Navigation Study  
JUNE 2005**

Map Sheet 45





Construct islands along RB if feasible

### Legend

#### Dredge/Structures

-  Disposal Sites - Current
-  Disposal Sites - Approved but Inactive
-  Disposal Sites - Proposed
-  Dredge Area - Current  
(Area routinely dredged - 1995 to 2003)
-  Dredge Area - Proposed
-  Structures Current
-  Structures Proposed
-  Proposed Tern Islands

#### Gravel Bed Survey

- Total acreage = 165 acres
-  Gravel Beds

#### Mussel Survey (live - sum)

-  0
-  1 - 4
-  5 - 10
-  11 - 20
-  21 - 30
-  31 - 50
-  51 - 100

#### Mitigation Sites

- CoverType
-  AG
  -  BLH
  -  MARSH

### Arkansas River Navigation Study JUNE 2005

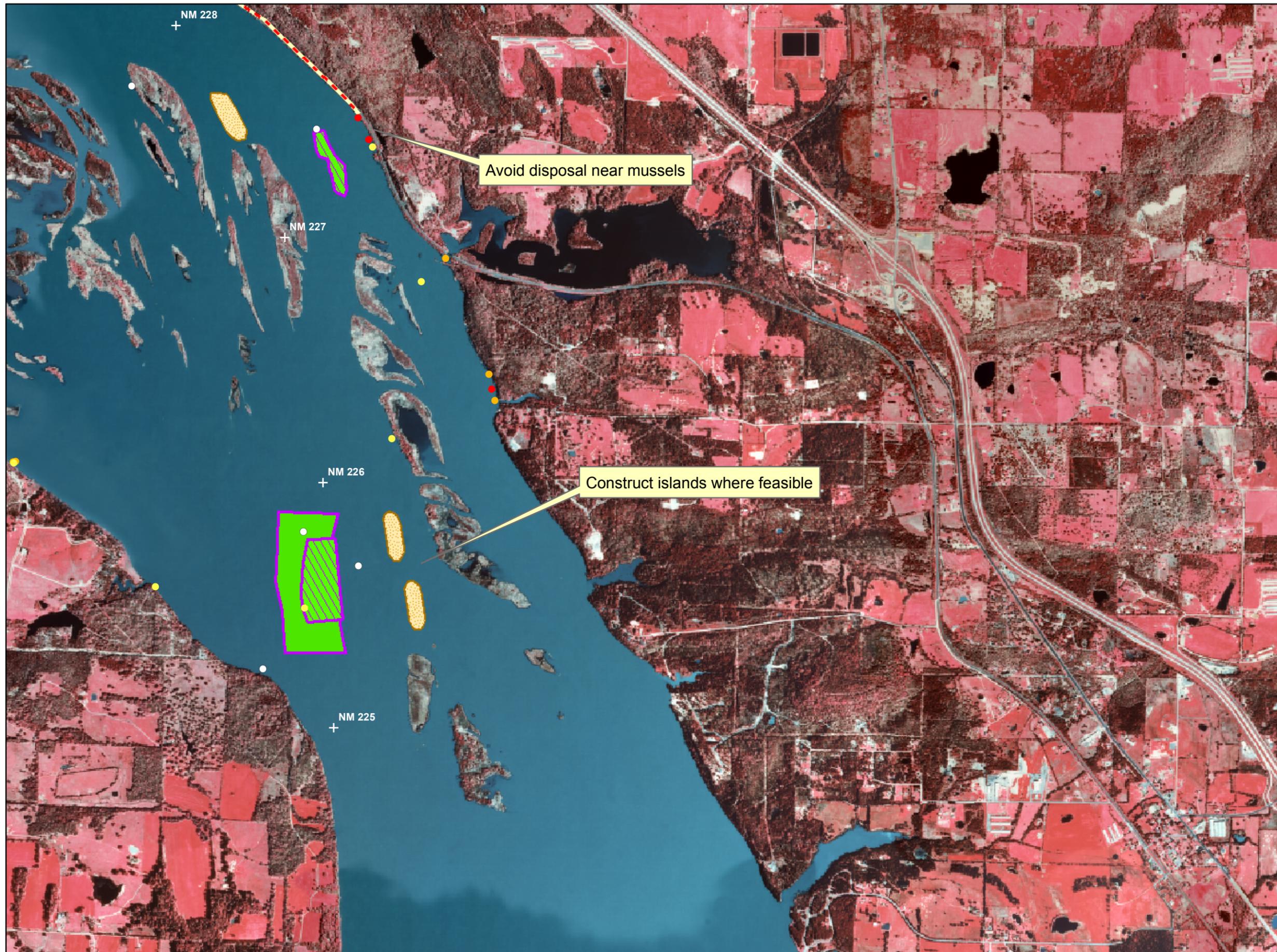
Map Sheet 46



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USACE  
LITTLE ROCK DISTRICT  
TULSA DISTRICT



### Legend

#### Dredge/Structures

-  Disposal Sites - Current
-  Disposal Sites - Approved but Inactive
-  Disposal Sites - Proposed
-  Dredge Area - Current  
(Area routinely dredged - 1995 to 2003)
-  Dredge Area - Proposed
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-  Structures Proposed
-  Proposed Tern Islands

#### Gravel Bed Survey

Total acreage = 165 acres

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-  0
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-  11 - 20
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-  31 - 50
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#### Mitigation Sites

##### CoverType

-  AG
-  BLH
-  MARSH

### Arkansas River Navigation Study JUNE 2005

Map Sheet 47



1:24,000



USACE  
LITTLE ROCK DISTRICT  
TULSA DISTRICT



### Legend

- Dredge/Structures**
- Disposal Sites - Current
  - Disposal Sites - Approved but Inactive
  - Disposal Sites - Proposed
  - Dredge Area - Current (Area routinely dredged - 1995 to 2003)
  - Dredge Area - Proposed
  - Structures Current
  - Structures Proposed
  - Proposed Tern Islands

- Gravel Bed Survey**  
Total acreage = 165 acres
- Gravel Beds

- Mussel Survey (live - sum)**
- 0
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  - 5 - 10
  - 11 - 20
  - 21 - 30
  - 31 - 50
  - 51 - 100

- Mitigation Sites**
- CoverType
- AG
  - BLH
  - MARSH

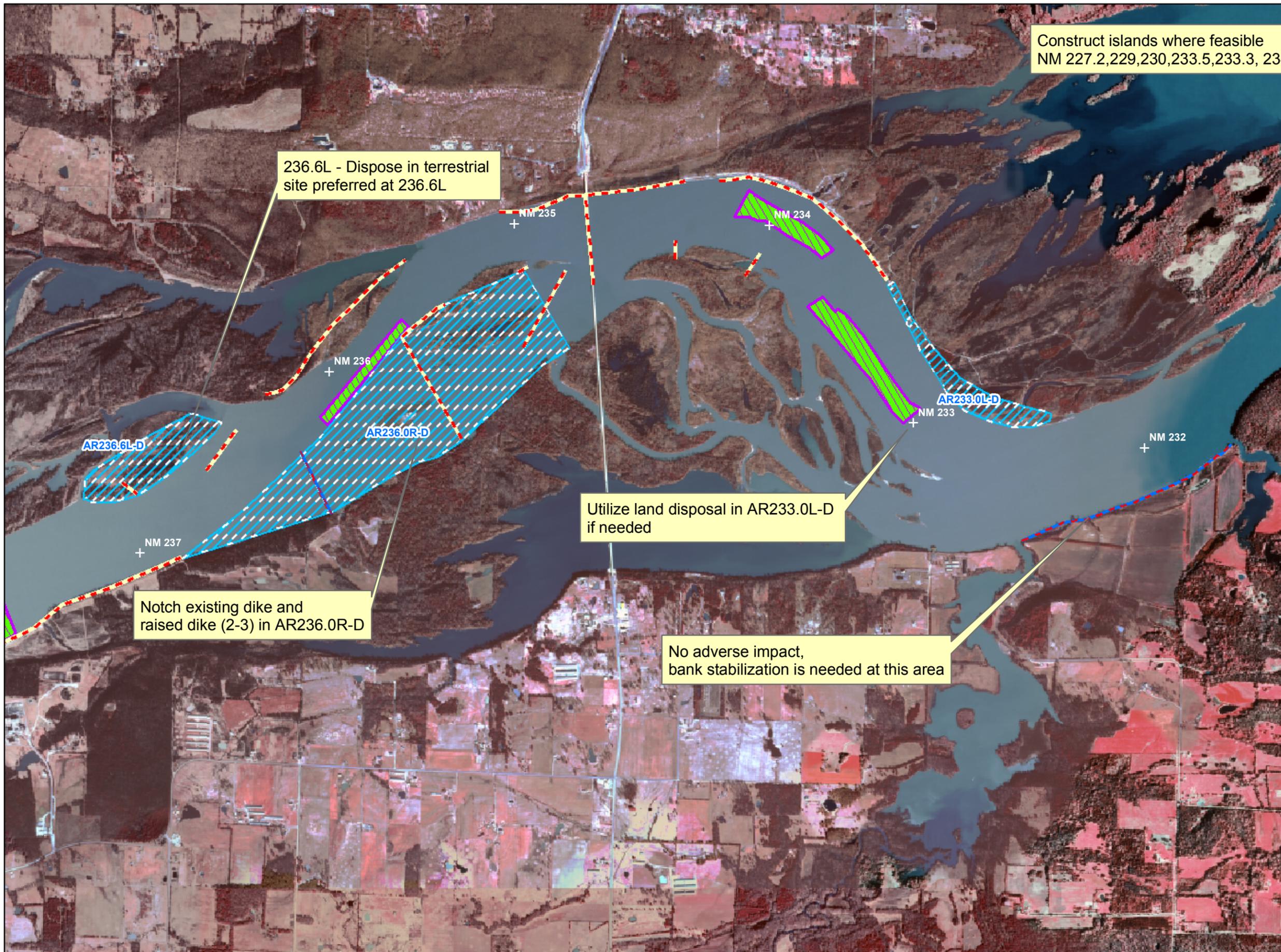
**Arkansas River  
Navigation Study  
JUNE 2005**

Map Sheet 48



1:24,000





Construct islands where feasible  
 NM 227.2, 229, 230, 233.5, 233.3, 234

236.6L - Dispose in terrestrial  
 site preferred at 236.6L

Utilize land disposal in AR233.0L-D  
 if needed

Notch existing dike and  
 raised dike (2-3) in AR236.0R-D

No adverse impact,  
 bank stabilization is needed at this area

**Legend**

- Dredge/Structures**
- Disposal Sites - Current
  - Disposal Sites - Approved but Inactive
  - Disposal Sites - Proposed
  - Dredge Area - Current (Area routinely dredged - 1995 to 2003)
  - Dredge Area - Proposed
  - Structures Current
  - Structures Proposed
  - Proposed Tern Islands

- Gravel Bed Survey**  
 Total acreage = 165 acres
- Gravel Beds

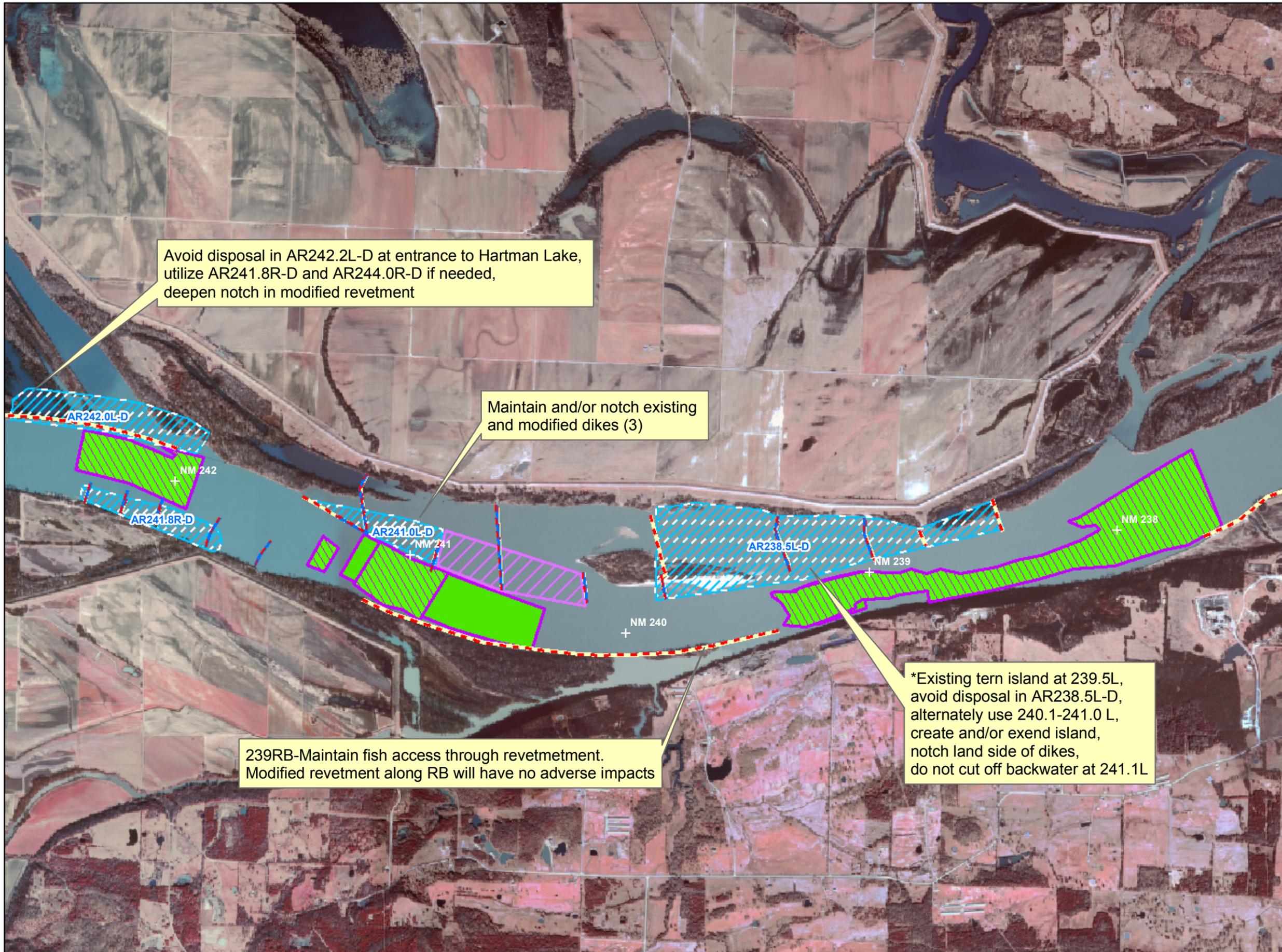
- Mussel Survey (live - sum)**
- 0
  - 1 - 4
  - 5 - 10
  - 11 - 20
  - 21 - 30
  - 31 - 50
  - 51 - 100

- Mitigation Sites**  
 CoverType
- AG
  - BLH
  - MARSH

**Arkansas River  
 Navigation Study  
 JUNE 2005**

Map Sheet 49





### Legend

#### Dredge/Structures

-  Disposal Sites - Current
-  Disposal Sites - Approved but Inactive
-  Disposal Sites - Proposed
-  Dredge Area - Current  
(Area routinely dredged - 1995 to 2003)
-  Dredge Area - Proposed
-  Structures Current
-  Structures Proposed
-  Proposed Tern Islands

#### Gravel Bed Survey

- Total acreage = 165 acres
-  Gravel Beds

#### Mussel Survey (live - sum)

-  0
-  1 - 4
-  5 - 10
-  11 - 20
-  21 - 30
-  31 - 50
-  51 - 100

#### Mitigation Sites

- CoverType
-  AG
  -  BLH
  -  MARSH

### Arkansas River Navigation Study JUNE 2005

Map Sheet 50



1:24,000



USACE  
LITTLE ROCK DISTRICT  
TULSA DISTRICT