



IN REPLY REFER TO:

# United States Department of the Interior

FISH AND WILDLIFE SERVICE  
Fish and Wildlife Enhancement  
Columbia Field Office  
608 East Cherry Street  
Columbia, Missouri 65201

**FILE COPY**

OCT 18 1994

**FWS/AES-CMFO**

Colonel Richard H. Goring  
District Engineer  
Kansas City District, Corps of Engineers  
700 Federal Building  
Kansas City, Missouri 64101

Dear Colonel Goring:

This planning assistance letter is submitted by the U.S. Fish and Wildlife Service (Service) to the Kansas City District, U.S. Army Corps of Engineers (Corps), for use in Missouri River Levee System Unit L-142 (MRLS Unit L-142) General Reevaluation Study at North Jefferson City, Callaway County, Missouri. Information and planning assistance are provided in accordance with the provisions of, and under the authority of, the Fish and Wildlife Coordination Act (Coordination Act) (48 stat. 401, as amended; 16 U.S.C. 661 et seq.), and the "Agreement Between the U.S. Fish and Wildlife Service and the U.S. Army Corps of Engineers for Funding Fish and Wildlife Coordination Activities." The comments of this letter do not, however, fulfill the reporting requirements of the Service under Section 2(b) of the Coordination Act.

This letter describes existing plants and animals and any threatened and endangered species or habitat in those parts of the Missouri River floodplain and adjacent upland habitat that could be affected by actions resulting from the General Reevaluation Study. This letter fulfills the Fiscal Year 1994 Scope-of-Work items as defined in the August 18, 1994, Order for Reimbursable Services (KC94-156).

### Description of the Study Area and Proposed Project

MRLS Unit L-142 is located on the left descending bank of the Missouri River at North Jefferson City, Missouri. The 1991 preliminary plan was 6.4 miles of levee averaging about 15.8 feet high extending from Turkey Creek on the upstream end to Niemans Creek Tributary Ditch at the downstream end, parallel with Mokane Road at the edge of the regulatory floodway on the riverward side. The alignment would have protected north Jefferson City including Cedar City west of Highway 54, the municipal airport, sewage treatment plant, Missouri Air National Guard, Cedarville and a number of commercial facilities. In 1993 an alternative was developed which reduced the levee length to about 5.4 miles by moving the downstream tie-back nearer to the airport and excluding undeveloped land at the downstream end.

After the 1993 flood, a modification to the alternative reduced the length of the levee to about 4.6 miles by excluding the Cedar City area. Jefferson City is in the process of buying out the properties in Cedar City and intends to convert the area to a park with minimal damageable development.

A third alternative is being developed which will assume a Missouri Highway and Transportation Department (MHTD) project as part of the Corps without-project condition. MHTD intends to construct flood protection along the upstream side of Highway 54 to prevent the road from being overtopped by future flood events. The 1.3 mile alignment of the MHTD project appears to be compatible with the MRLS Unit L-142 project. This alignment would require only 3.3 miles of additional levee to complete the line of protection. This proposed levee would begin at Highway 54 and extend about 2.2 miles along the landward side of Mokane Road. The levee would then turn to the northeast and tie back into the high ground on Highway 94 (Enclosed map # 1). This report will primarily address this alternative.

The project area is located on the floodplain. According to Thom and Wilson (1980), the Missouri River and its floodplains and terraces, are part of the Big Rivers natural division and contain deep alluvial, productive soils. Presettlement natural features included bottomland and upland forest, some wet prairie, marshes, sloughs, chutes, islands, sand bars, oxbow ponds, and rivers.

The proposed project is designed to protect both agriculture and developed land. Small grain crop production, such as corn, soybeans, and wheat occur in the project area.

### Fish and Wildlife Resources

Rick Hansen and Joanne Grady, Service biologists from the Columbia Field Office conducted a field reconnaissance of the project area on September 15, 1994. Given the reevaluation level of the current study, Mr. Hansen and Ms. Grady observed baseline conditions in order to gain information for a qualitative description of aquatic and terrestrial resources. The following description of natural resources is limited to the immediate area currently under consideration in the MRLS Unit L-142 study.

#### Aquatic and Wetland Environments

The aquatic environments of the project area are associated with the Missouri River and adjacent floodplain. The river has been significantly modified due to the Corps Missouri River Bank Stabilization and Navigation Project. The lower Missouri River (including the project site) has been channelized which has eliminated both aquatic and terrestrial habitat. The once extensive areas of bottomland forested wetlands and marsh wetlands have been converted primarily to agriculture. The transformation of the lower Missouri River from a wide, braided channel to a single main channel has eliminated many islands, sloughs, and backwater areas that were especially important for fish spawning and nursery habitat. A map from the Missouri River Commission's 1892 survey of the Missouri River shows that the river channel adjacent to the study area was approximately 4100 feet wide compared to an approximate width of 2000 feet today (Enclosed map # 2).

Small local drainages and remnant sloughs occur in the project area but probably flow only intermittently as shown on the final National Wetland Inventory (NWI) maps (Enclosed map # 3). The NWI map shows that the following wetlands (described in Cowardin et al., 1979) occur in the project area:

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- PEMA - Temporarily Flooded Palustrine Emergent Wetland
- PEMC - Seasonally Flooded Palustrine Emergent Wetland
- PUBGx - Excavated Unconsolidated Bottom Intermittently Exposed Palustrine Wetland
- PSS1C - Seasonally Flooded Broad-leaved Deciduous Scrub Shrub Wetland
- R2UBH - Lower Perennial Unconsolidated Bottom Permanently Flooded Riverine Wetland

Both the PEMA and the PEMC wetlands are herbaceous marshes that during dry years are probably farmed in the project area. The PUBGx was located next to a rock quarry in the bluff area and probably was excavated as part of the quarry operation. The PSS1C was located along a drainage ditch/disturbed creek channel and is probably a transition between a forested wetland and a former herbaceous wetland. The R2UBH is the main channel of the Missouri River.

The Callaway County Soil Survey indicates that approximately 60% of the project area on the landward side of the proposed levee consists of hydric soils (Waldron silty clay and Booker silty clay). There are some remnant sloughs and depressional areas throughout the project area. It appears that the entire project area has been hydrologically altered either by the construction of levees and/or drainage ditches or the placing of tiles. If the entire area was allowed to go fallow, facultative wetland plants (FAC+ or FACW) would probably predominate the project area. However, because of the hydrological modification, probably only 5% or less of the area would be classified as wetland habitat (NWI map or Section 404 jurisdiction) if fallowed.

The Callaway County Soil Survey also indicated that approximately 40% of the project area on the riverward side of the proposed levee consisted of hydric soils (Waldron silty clay and Booker silty clay) prior to the flood of 1993. Several wetlands in the area were created and destroyed due to scouring and subsequent filling during this flood. Many of these scour areas provide habitat for wetland plants, invertebrates, amphibians, reptiles, fish, waterfowl and other birds, and mammals. Numerous wetland plants were observed on the riverward side of the proposed levee on September 15, 1994 (Appendix 1). Of

particular importance to wildlife are smartweeds *Polygonum* spp., docks *Rumex* spp., barnyard grass *Echinochloa crusgalli*, rice cutgrass *Leersia oryzoides*, and pin oak *Quercus palustris*.

None of the wetlands on the landward side of the proposed levee were of very high quality. The wetlands are dry during the majority of the year, although pools may temporarily form in the low spots. The temporary waters of wetlands on both sides of the proposed levee are capable of providing breeding grounds for amphibians such as American toads *Bufo americanus*, Fowler's toads *Bufo fowleri*, leopard frogs *Rana pipiens*, spring peepers *Hyla crucifer*, cricket frogs *Acris crepitans*, chorus frogs *Pseudacris triseriata*, bullfrog *Rana clamitans*. These temporary wetlands may also provide habitat during portions of the year for reptiles such as the common snapping turtle *Chelydra serpentina*, painted turtle *Chrysemys picta*, eastern hognose snake *Heterodon platyrhinos*, northern water snake *Nerodia sipedon*, midland brown snake *Storeria dekayi*, and eastern garter snake *Thamnophis sirtalis*,

Many fish species inhabit the Missouri River, its tributaries, overflow chutes, and scour areas. The scour holes on the riverward side of the proposed levee, which were created during the flood of 1993, increased the diversity of habitat for these species. A careful selection of borrow areas on the riverward side of the proposed levee, and the protection of existing depression areas, may also increase the post project habitat availability for shortnose gar *Lepisosteus platostomus*, longnose gar *Lepisosteus osseus*, carp *Cyprinus carpio*, silver chub *Hybopsis storeriana*, speckled chub *Hybopsis aestivalis*, flathead chub *Hybopsis glacilis*, emerald shiner *Notropis atherinoides*, silverband shiner *Notropis shumardi*, river shiner *Notropis blennioides*, red shiner *Notropis lutrensis*, mimic shiner *Notropis volucellus*, western silvery minnow *Hybognathus argyritis*, bluntnose minnow *Pimephales notatus*, bigmouth buffalo *Ictiobus cyprinellus*, smallmouth buffalo *Ictiobus bubalus*, river carpsucker *Carpionodes carpio*, channel catfish *Ictalurus punctatus*, blue catfish *Ictalurus furcatus*, flathead catfish *Pylodictis olivaris*, white bass *Morone chrysops*, largemouth bass *Micropterus salmoides*, warmouth *Lepomis gulosus*, green sunfish *Lepomis cyanellus*, bluegill *Lepomis macrochirus*. Borrow site selections may also provide additional habitat for the federal candidate species blue sucker *Cycleptus elongatus*, sturgeon chub *Macrhybopsis gelida*, sicklefin chub

*Macrhybopsis meeki*, paddlefish *Polyodon spathula*, and the endangered pallid sturgeon *Scaphirhynchus albus*.

The Missouri River floodplain is part of a major waterfowl migratory route. Along the river floodplain thousands of geese and ducks pass by with the changing seasons. As a result of their long migrations and associated expenditure of energy, they stop along the way to feed on waste grain or unharvested row crops. Waterfowl species include Canada goose *Branta canadensis*, snow goose *Chen caerulescens*, mallard duck *Anas platyrhynchos*, wood duck *Aix sponsa*, blue-winged teal *Anas discors* and the green-winged teal *Anas carolinensis*. The Canada goose, wood duck and mallard may also nest in the area.

Other birds that probably occur in the study area include northern harrier *Circus cyaneus*, red-tailed hawk *Buteo jamaicensis*, red-shouldered hawk *Buteo lineatus*, bald eagle *Haliaeetus leucocephalus*, American kestrel *Falco sparverius*, great egret *Casmerodius albus*, cattle egret *Bubulcus ibis*, great blue heron *Ardea herodias*, green heron *Butorides virescens*, sora *Porzana carolina*, american coot *Fulica americana*, killdeer *Charadrius vociferus*, solitary sandpiper *Tringa solitaria*, greater yellowlegs *Totanus melanoleucus*, least sandpiper *Erolia minutilla*, semipalmated sandpiper *Ereunetes pusillus*, barred owl *Strix varia*, rough-winged swallow *Stelgidopteryx ruficollis*, long-billed marsh wren *Telmatodytes palustris*, yellow warbler *Dendroica petechia*, yellow throat *Geothlypsis trichas*, eastern meadowlark *Sturnella magna*, red-winged blackbird *Agelaius phoeniceus*, american goldfinch *Spinus tristus*, dickcissel *Spiza americana*, song sparrow *Melospiza melodia* and the white-throated sparrow *Zonotrichia albicollis*.

Mammals that probably occur in the study area include the opossum *Didelphis virginiana*, muskrat *Ondatra zibethicus*, beaver *Castor canadensis*, meadow vole *Microtus pennsylvanicus*, deer mouse *Peromyscus leucopus*, eastern cottontail *Sylvilagus floridanus*, raccoon *Procyon lotor*, striped skunk *Mephitis mephitis*, mink *Mustela vison*, coyote *Canis latrans*, and the white-tailed deer *Odocoileus virginianus*.

Endangered Species Comments

In accordance with Section 7(c) of the Endangered Species Act (ESA), we have determined that the following federally-listed species may occur in the project area. No designated critical habitat occurs in the project area:

Endangered

Bald eagle

*Haliaeetus leucocephalus*

Indiana bat

*Myotis sodalis*

Pallid sturgeon

*Scaphirynchus albus*

Bald eagles have become more common nesters in Missouri, largely because of increased management efforts. A formerly active nest (active in 1992) occurs approximately two miles upstream of the project site in a cottonwood tree on the left descending bank. The nest was not active during the flood of 1993 and the eagles did not return in 1994.

The Indiana bat is a permanent resident of Missouri. It usually winters in caves. During the spring and summer months, the females congregate in maternity colonies under loose bark of trees. The Indiana bat forages extensively along riparian area and over streams.

The Missouri River within the proposed area is also within the historic range of the pallid sturgeon. The range of the pallid sturgeon is primarily the Missouri River and the Mississippi River downstream of its confluence with the Missouri River. Pallid sturgeon require large, turbid, free-flowing, braided-channel riverine habitat with sandy and rocky substrates. Modifications to this species' habitat have blocked movements, destroyed or altered its spawning areas, reduced its food sources or its ability to obtain food, altered water temperatures, and changed the hydrograph of the large riverine habitat it requires to successfully complete its life cycle. Over-fishing, pollution, and hybridization also may have led to the species' dramatic decline and ultimate listing as endangered.

The preceding table includes federally-listed species that may occur in the project area, and does not constitute consultation nor fulfill requirements under Section 7(a)(2) of the ESA. When specific project information is made available, we will be able to provide more detailed comments. If the Corps determines that a project may affect listed species, formal or informal consultation should be initiated with this office.

### **Impacts to Fish and Wildlife Resources**

This planning aid letter has presented a general description of the project area, and some of the major natural features and fish and wildlife resources present. Land-use changes and their impacts to natural aquatic, terrestrial, and wetland communities have been discussed.

Only small remnant wetlands occur on the landward side of the proposed levee. These wetlands are seasonally inundated primarily from local drainage into the depressional areas. We do not know the frequency or duration of out-of-bank flows from the Missouri River that would recharge the wetlands. With the construction of the proposed levee, the Missouri River would not be able to interact with this part of the floodplain.

The Missouri River and floodplain has been significantly modified in the last 50 years. Channelization of the Missouri River has eliminated both aquatic and terrestrial habitat. Former bottomland forested and emergent wetlands have been converted primarily to agriculture. In the reach downstream of Sioux City, Iowa, approximately 95% of the original floodplain has been converted to intensive agricultural, industrial and municipal uses. Average channel widths of the lower River have been reduced from 2,440 feet to 790 feet. Considering the trend of wetland and aquatic habitat loss and alteration of the Missouri River floodplain over the past 75 years, and the intensity of farming and drainage, fish and wildlife values are likely to continue to diminish over time.

Impoundment, channelization and levee construction have resulted in elimination of some plant and animal species and significant reduction in the numbers of others. Currently, eight species of fish, 15 birds, six mammals,

four reptiles, six insects, four mollusks, and seven plants indigenous to the river system are listed as threatened or endangered, or are under status review. These include the listed pallid sturgeon, Indiana bat and bald eagle as described in the endangered species section.

The Corps' Missouri River Mitigation Project authorized in October 1986 by the Water Resources Development Act will result in the acquisition and management of 29,900 acres of aquatic, wetland and terrestrial habitats along the river. This represents only 6.3% of the habitat lost in the original floodplain from Sioux City to the mouth of the Missouri River.

It is important for fish and wildlife resources on the Missouri River and floodplain that further acquisitions and habitat restorations continue. The proposed levee may contribute further to restricting over-bank flooding onto the floodplain.

### **Conclusions and Recommendations**

Strategic placement of borrow sites in non wetland areas may partially offset the loss of levee protected floodplain acreage landward of the proposed levee. Borrow areas connected to the main channel in conjunction with existing scour holes would have flowing current during high river stages and would benefit a wide variety of fish and other aquatic species. Quantity and quality of backwater chutes and wetlands would be increased. Restoration and re-creation of the quantity and diversity of riverine habitats would ensure access to seasonal habitats and nutrient inputs through periodic overbank flooding and would benefit fishery resources.

It is expected that the proposed project will not have a significant effect on the hydrology of the landward wetlands. A more accurate description of impacts on fish and wildlife of the proposed project will be included in the Coordination Act Report. The Corps will need to supply the Service additional necessary information (exact alignment of the proposed levee, location of the borrow areas and hydrology of the area both out-of-bank and local drainage) during the Feasibility Study.

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In the Scope of Work for Unit L-142, the Corps has indicated that a Coordination Act Report will be necessary during the Feasibility Study. It is estimated that the Service will require approximately 23 staff days to fulfill the reporting requirements under Section 2(b) of the Coordination Act. The estimated cost at \$320/day and 38% overhead would be \$10,200. It is anticipated that wildlife and aquatic habitat will be evaluated during the Coordination Act Report phase. The Service would probably use the Wildlife Habitat Appraisal Guide (WHAG) to evaluate existing conditions, future without project conditions and future with project conditions. The WHAG produces a rating of habitat quality for each habitat type.

It is our understanding that a field trip to the project site is planned in the latter part of October to discuss more fully project needs both from an engineering and environmental perspective.

Our recommendations for the reevaluation report will address possible borrow areas for construction of the proposed levee. In keeping with the Service's Mitigation Policy (46 FR 7644) to develop alternatives with measures to avoid, minimize, reduce and compensate for adverse impacts, we provide the following comments to assist the Corps in developing a project proposal for the MRLS Unit L-142 that would benefit fish and wildlife and their habitats:

- since channelization and levee construction have already resulted in the loss of riparian and wetland habitats in the Missouri River basin, these habitats should be protected when selecting borrow sites for the proposed levee.
- All borrow areas should be out of the bird strike zone around the Jefferson City Airport. Federal Aviation Administration guidelines prevent the creation of habitats that would attract animal species around airport runways.
- Borrow areas should be irregular in shape and have an irregular bottom providing both shallow and deep water habitat. If possible borrow areas should be hydrologically connected to the Missouri River.

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- Levees should be seeded with warm season grasses such as switch grass.
- A buffer strip around the borrow areas should be planted with a mixture of warm season grasses, shrubs and trees that occur on the floodplain of the Missouri River.

We appreciate the opportunity to provide comments and recommendations on this project. As planning progresses, we will continue to comment when appropriate. Should you have questions concerning these comments and recommendations, or if we can be of any further assistance, please contact Rick Hansen or Joanne Grady at the address above, or by telephone at (314) 876-1911.

Sincerely,

**/s/ Gary D. Frazer**

Gary D. Frazer  
Field Supervisor

Enclosures

cc: MDC; Jefferson City, MO (Attn: Dan Dickneite)  
MDC; Jefferson City, MO (Attn: Dennis Figg)

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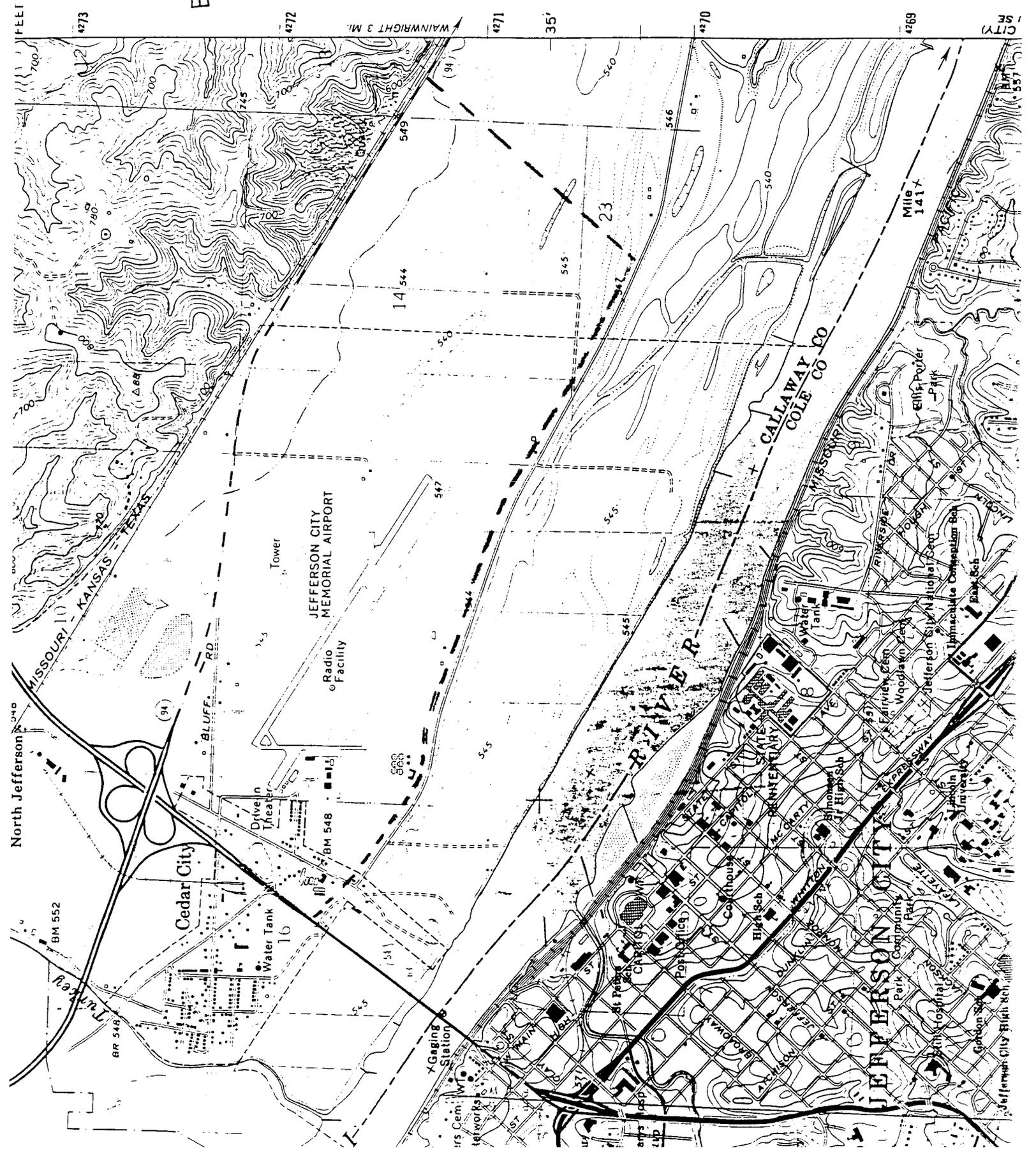
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#### LITERATURE CITED

Thom, R.H., and J.H. Wilson, 1980. The Natural Divisions of Missouri. Transactions of the Missouri Academy of Sciences, Vol. 14, pp.9-23.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. USDI, Fish and Wildlife Service. Washington, D.C. 131pp.

Enclosed  
Map #1



1000 Feet

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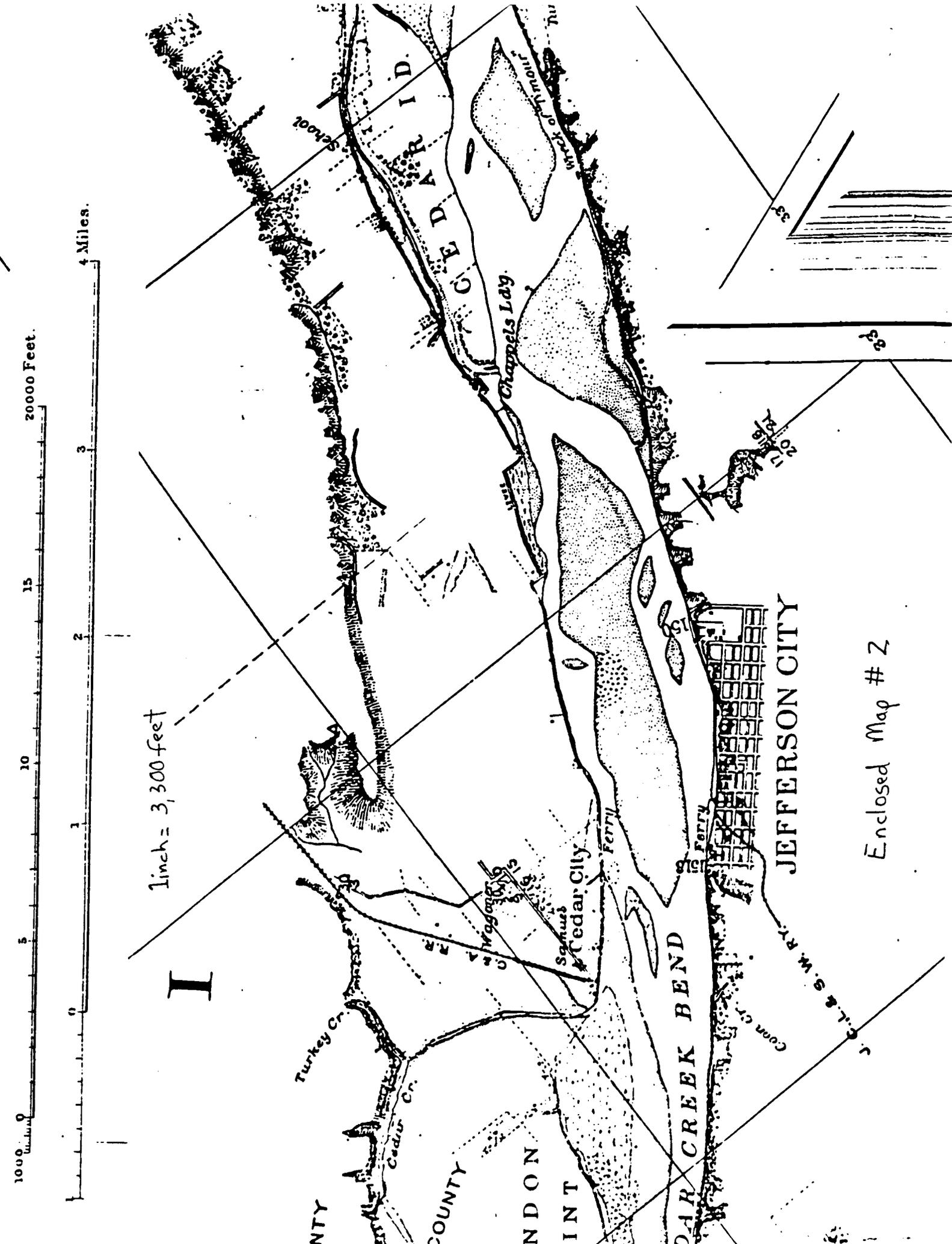
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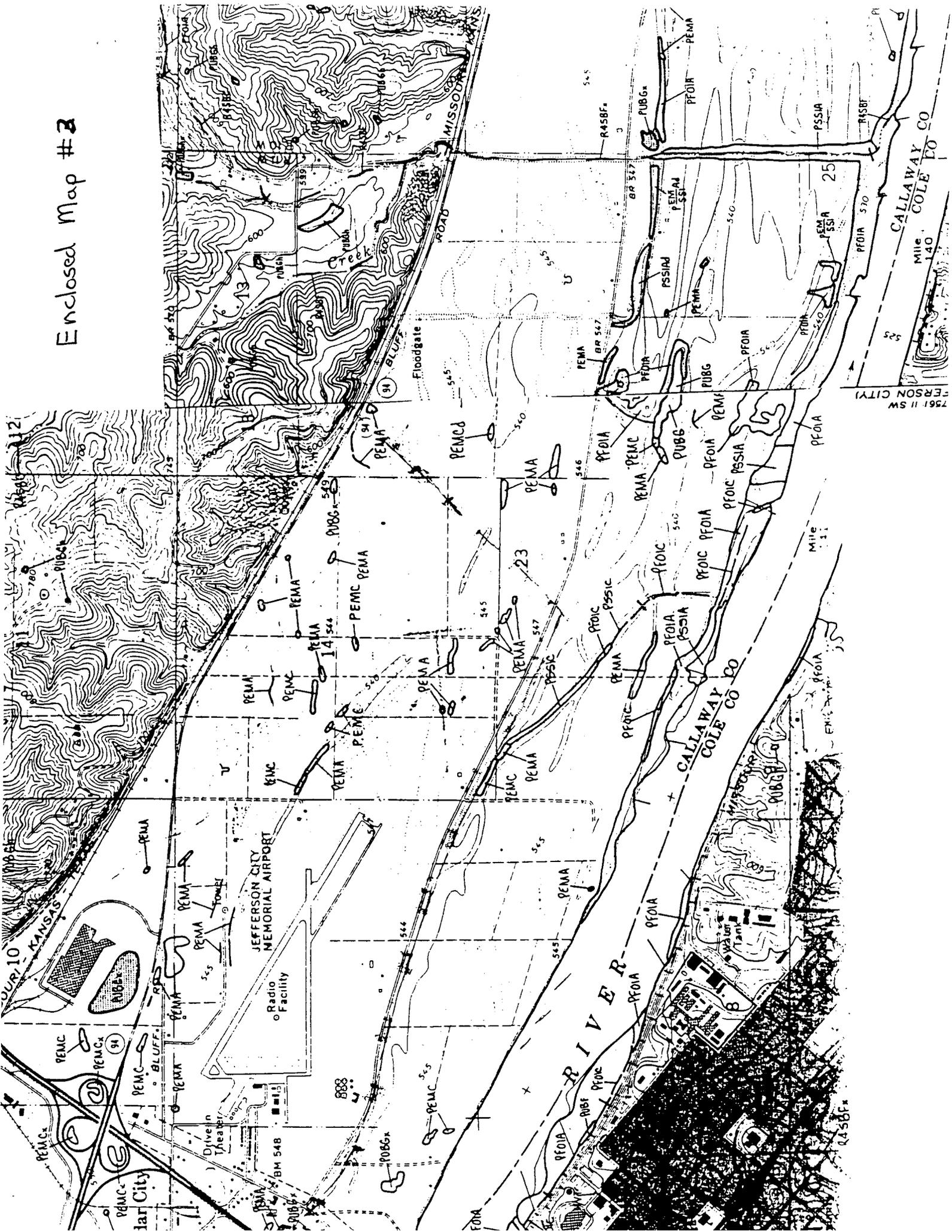
1 inch = 3,300 feet

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Enclosed Map # 2

Enclosed Map #3



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**APPENDIX 1. WETLAND PLANTS  
THAT OCCUR AT THE SITE**

<i>Mimulus alatus</i>	Sharp-winged monkey flower
<i>Mimulus ringens</i>	Square-stem monkey flower
<i>Scutellarea lateriflora</i>	Skullcap
<i>Mollugo verticillata</i>	Carpetweed
<i>Perilla frutescens</i>	Beefsteak plant
<i>Phlox paniculata</i>	Garden phlox
<i>Physostegia virginiana</i>	False dragonhead
<i>Pilea pumila</i>	Clearweed
<i>Prunella vulgaris</i>	Common selfheal
<i>Pycnanthemum tenuifolium</i>	Mountain mint
<i>Silphium perfoliatum</i>	Cup plant
<i>Spermacoce glabra</i>	Smooth buttonweed
<i>Stachys tenuifolia</i>	Smooth hedge nettle
<i>Verbena hastata</i>	Blue vervain
<i>Veronica peregrina</i>	Purslane speedwell
<i>Lycopus americanus</i>	American bugleweed
<i>Mentha arvensis</i>	Field mint
<i>Teucrium canadensis</i>	Germander
<i>Phyla lanceolata</i>	Frogfruit
<i>Boehmeria cylindrica</i>	False nettle
<i>Urtica dioica</i>	Stinging nettle
<i>Laportea canadensis</i>	Wood nettle
<i>Bidens arisota</i>	Tickseed sunflower
<i>Bidens frondosa</i>	Beggarstick
<i>Eupatorium perfoliatum</i>	Boneset
<i>Cicuta maculata</i>	Water hemlock
<i>Rorippa sylvestris</i>	Yellow cress
<i>Ranunculus spp.</i>	Buttercups
<i>Senecio aureus</i>	Golden ragwort
<i>Hibiscus moscheutos</i>	Swamp rose-mallow
<i>Hibiscus laevis</i>	Halberd-leaved rose-mallow
<i>Penthorum sedoides</i>	Ditch stonecrop
<i>Solidago spp.</i>	Goldenrods
<i>Vernonia sp.</i>	Ironweed
<i>Helenium autumnale</i>	Sneezeweed
<i>Aster spp.</i>	Asters
<i>Ludwigia alterifolia</i>	Seedbox
<i>Ludwigia repens</i>	Water primrose
<i>Amaranthus rudis</i>	Pigweed
<i>Rumex altissimus</i>	Pale dock
<i>Rumex verticillatus</i>	Swamp Dock
<i>Polygonum hydropiperoides</i>	Mild water-pepper
<i>Polygonum pensylvanicum</i>	Pinkweed
<i>Polygonum scandens</i>	False buckwheat
<i>Polygonum spp.</i>	Smartweeds
<i>Vitis spp.</i>	Grapes
<i>Mikania scandens</i>	Climbing hempweed
<i>Cephalanthus occidentalis</i>	Buttonbush
<i>Ulmus americana</i>	American elm
<i>Celtis laevigata</i>	Sugarberry
<i>Platanus occidentalis</i>	Sycamore

<i>Calystegia sepium</i>	Hedge bindweed
<i>Campanula americana</i>	American bellflower
<i>Cardamine bulbosa</i>	Spring Cress
<i>Chenopodium album</i>	Lamb's quarters
<i>Cycloloma atriplicifolium</i>	Winged pigweed
<i>Erigeron spp.</i>	Erigerons
<i>Impatiens capensis</i>	Spotted touch-me-not
<i>Ipomoea lacunosa</i>	White morning glory
<i>Lobelia siphilitica</i>	Blue lobelia
<i>Lythrum alatum</i>	Winged lythrum
<i>Oenothera biennis</i>	Common evening primrose
<i>Populus deltoides</i>	Cottonwood
<i>Acer negundo</i>	Boxelder
<i>Acer saccharinum</i>	Silver maple
<i>Platanus occidentalis</i>	Sycamore
<i>Quercus palustris</i>	Pin oak
<i>Salix spp.</i>	Willows
<i>Betula nigra</i>	River birch
<i>Rudbeckia laciniata</i>	Tall coneflower
<i>Xanthium strumarium</i>	Cocklebur
<i>Abutilon theophrasti</i>	Velvet leaf
<i>Commelina communis</i>	Common dayflower
<i>Cornus spp.</i>	Dogwoods
<i>Potentilla fruticosa</i>	Shrubby cinquefoil
<i>Sambucus canadensis</i>	American elder
<i>Virburnum spp.</i>	Viburnums
<i>Barbarea sp.</i>	Wintercress
<i>Ambrosia trifida</i>	Giant ragweed
<i>Eclipta alba</i>	Yerba de Tajo
<i>Gratiola neglecta</i>	Clammy hedge-hyssop
<i>Helianthus grosseserratus</i>	Sawtooth sunflower
<i>Iva annua</i>	Rough sumpweed
<i>Lysimachia ciliata</i>	Fringed loosestrife
<i>Lysimachia nummularia</i>	Moneywort
<i>Galium spp.</i>	Bedstraws
<i>Lindernia dubia</i>	False pimpernel
<i>Rotala ramosior</i>	Toothcup
<i>Ammania coccinea</i>	Toothcup
<i>Asclepias incarnata</i>	Swamp milkweed
<i>Agrostis alba</i>	Red top grass
<i>Echinocloa crusgalli</i>	Barnyard grass
<i>Panicum spp.</i>	Panicums
<i>Leersia oryzoides</i>	Rice cutgrass
<i>Juncus spp.</i>	Juncus
<i>Eleocharis spp.</i>	Spike rush
<i>Carex spp.</i>	Carex sedges
<i>Cyperus spp.</i>	Umbrella sedges
<i>Scirpus spp.</i>	Bullrushes
<i>Sparganium americanum</i>	American burreed
<i>Alisma subcordatum</i>	Water plantain
<i>Saggitaria latifolia</i>	Arrow heads
<i>Equisetum spp.</i>	Horsetails
<i>Gratiola neglecta</i>	Clammy hedge-hyssop
<i>Hemicarpha micrantha</i>	Hemicantra sedge