Draft
Supplemental Environmental Assessment

Appendix H: Clean Water Act Section 404(b)(1) Analysis

Arkansas River Navigation Study
Arkansas and Oklahoma

January 2024

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DRAFT
Clean Water Act Section 404(b)(1) Analysis

McClellan-Kerr Arkansas River Navigation System (MKARNS) 12-Foot Channel Deepening Project

Oklahoma and Arkansas

January 2024

Regional Planning and Environmental Center
U.S. Army Corps of Engineers

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Section 1- Project Description

This Clean Water Act (CWA) Section 404(b)(1) Analysis has been prepared by the U.S. Army Corps of Engineers (USACE) Regional Planning and Environmental Center to evaluate the deepening of the McClellan-Kerr Arkansas River Navigation System (MKARNS) from its current 9-ft depth to a new navigation depth of 12-ft. In addition to this analysis, the USACE has prepared a Supplemental Environmental Assessment (SEA) to evaluate the proposed changes to the MKARNS project. The SEA supplements the 2005 Arkansas River Navigation Study, Arkansas and Oklahoma (2005 ARNS) Final Environmental Impact Statement (FR/FEIS). It has been prepared in accordance with 33 Code of Federal Regulations (CFR) Part 230 and the 1978 Council on Environmental Quality (CEQ) regulations 40 CFR Parts 1500-1508, as amended in 1986 and 2005, as reflected in the USACE Engineering Regulation (ER) 200-2-2. In fulfillment of these and all other legal, regulatory, and policy requirements, the SEA describes the purpose and need for the action, the range of alternatives considered, and discloses the environmental impacts of the alternatives.

1.1 Purpose and Need

The USACE Little Rock (SWL) and Tulsa (SWT) Districts seek to improve commercial navigation operation on the MKARNS by deepening the current 9-ft navigation channel to 12-ft throughout the 445-mile navigation system. This action would be accomplished while maintaining the other project purposes of flood control, recreation, hydropower, water supply, and fish and wildlife.

SWL and SWT are charged with accomplishing various Civil Works missions, including the operation and maintenance of the MKARNS. Dating to federal laws enacted in 1824, part of the USACE Civil Works mission includes supporting navigation by improving and maintaining channels. Improving a channel means making the channel deeper and/or wider. Maintaining a channel means keeping the channel at specified depths and widths by dredging and other means.

Commercial navigation is not at optimum productivity within the MKARNS since its 9-foot draft navigation channel limits towboat loads compared to the Lower Mississippi River’s authorized 12-foot draft channel.

- Today, shipments between the Arkansas and Lower Mississippi amount to 9.0 million tons (78% of all shipments on the MKARNS in terms of volume). Channel deepening would enhance shipments of commodities that benefit from increased depth (such as agricultural chemicals and farm products). Thus, a larger percentage of tonnage could be shipped between the Lower Mississippi and Arkansas River. A detailed analysis of the economic benefits associated with the connectivity between these two systems is presented in the Economics Analysis Appendix of the Final Feasibility Report (USACE 2005).

- Because the barge drafts are limited by the MKARNS 9-foot draft channel, and it is not cost-effective to re-load at the MKARNS/Mississippi confluence, upbound tows from the Mississippi must be configured to the limitations of the MKARNS channel.

- Similarly, downbound tows on the MKARNS are not able to take advantage of the Mississippi River's 12-foot draft channel and are loaded to accommodate the 9-foot channel rather than a 12-foot channel.

The disparity between the navigation channel depths in the two river systems results in less efficient barge operations than could be achieved with a consistent 12-foot navigation channel throughout the MKARNS and Lower Mississippi River commercial navigation systems.

1.2 Location

The proposed project will be confined to the entire length of the MKARNS system, from Catoosa, OK to the confluence of the White River and the Mississippi River. The total length of the MKARNS is 445 miles, of which 375 miles is the lower Arkansas River (navigation miles 394 to19). Other MKARNS components include approximately 50 miles of the Verdigris River (navigation miles 445 to 394); the Arkansas Post Canal, a 9-mile canal connecting the Arkansas River to the lower portion of the White River (navigation miles 19 to 10); and the lower 10 miles of the White River (navigation miles 10 to 0). A series of 18 locks and dams (including Montgomery Point Lock and Dam), 13 in Arkansas and 5 in Oklahoma, provides for commercial navigation throughout the length of the MKARNS (Figure 1).

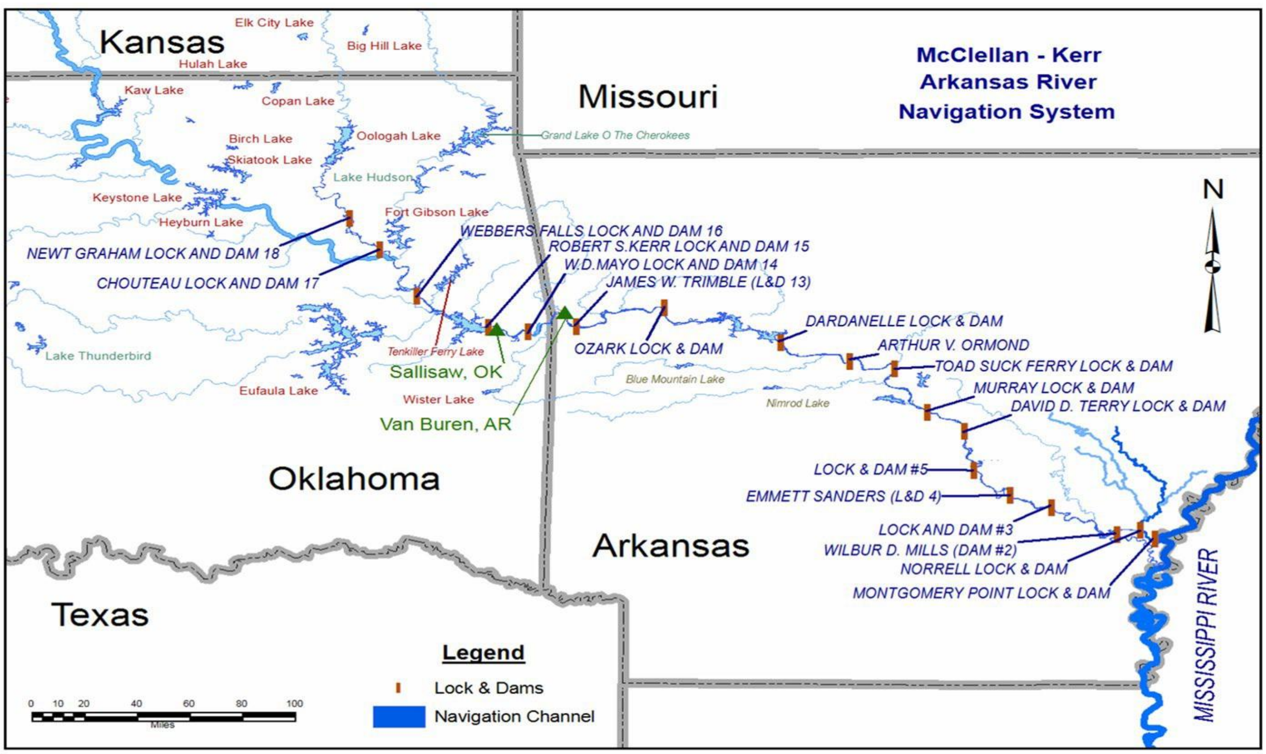

Figure 1: McClellan-Kerr Arkansas River Navigation System Study Area

1.3 Project Authority

The development of the Arkansas River for navigation, flood control, hydroelectric power generation, and other purposes was authorized by the Rivers and Harbor Act of July 24, 1946. Construction of the system began in 1949 with the construction of emergency bank stabilization. The system was declared open to commercial traffic on December 2, 1970. Public Law 91-649, passed by Congress in 1971, designated it as the McClellan Kerr Arkansas River Navigation System to honor Senators Robert S. Kerr, Oklahoma, and John L. McClellan, Arkansas, who pushed its authorizing legislation through Congress.

In 1999, a reconnaissance study of flooding in unprotected areas outside the existing flood control levees at Fort Smith, Arkansas was initiated. As a result of the reconnaissance study, a Section 905(b) (WRDA 86) Analysis dated September 1999 was prepared and approved in January 2000. The analysis identified the current MKARNS operating plan as the cause of some of the flooding problems. Concurrently, the navigation industry was asking that the operating plan be re-evaluated to reduce the navigation losses due to high flows. The navigation industry also requested an investigation to increase the channel depth from 9 feet to 12 feet. Based on an initial assessment of possible benefits, the reconnaissance study recommended a feasibility study to improve navigation conditions while incidentally improving flood control, hydropower, recreation, and fish and wildlife.

In 2005, the ARNS FR/FEIS was completed by SWL and SWT, and originally consisted of two phases. Phase I examined how to reduce flooding and expand the number of days that barges could operate on the MKARNS while balancing any changes against the needs of existing project purposes that include navigation, flood control, water supply, hydropower, water quality, recreation, and fish and wildlife habitat. Phase II investigated deepening the channel over the entire system and widening the Verdigris River in Oklahoma. Each phase was to have a separate FR and EIS. However, to properly address cumulative environmental impacts, it was subsequently determined that both phases as well as ongoing operations and maintenance of the existing 9-foot channel should be addressed in one FR and EIS.

The 2005 ARNS FR/EIS and Report of the Director of Civil Works (Director’s Report), signed on 27 September 2005, recommended three broad components: 1) changes to the existing MKARNS Dredge Material Disposal Plan (DMMP) for the existing 9-foot channel with new dredge material disposal sites; 2) replacing the existing flow management plan for the MKARNS with an Operations Only component to improve navigation and hydropower; and 3) deepening the navigation channel throughout the MKARNS from 9 feet to 12 feet (referred to as the 12-foot channel).

The MKARNS project was authorized to a 12-foot depth by Congress in the Energy and Water Development Appropriations Act of 2004 (Section 136 of Public Law 108-137). Congressional appropriations were received for the first two components of the plan, which were and continue to be implemented throughout the MKARNS.

The project area includes the entire MKARNS in Arkansas and Oklahoma including:

Approximately 445 miles of river from the Mississippi River to the Port of Catoosa near Tulsa, Oklahoma.

Section 2- Alternatives Evaluation

2.1 Alternatives

Alternatives for achieving flow management, channel depth and widening, and navigation channel maintenance objectives along the Arkansas River were evaluated in

Chapter 4 of the 2005 ARNS FR/FEIS. The 2005 ARNS Feasibility Study and FEIS are incorporated by reference and should be consulted for detailed information on the alternative formulation and evaluation process, as well as the other alternatives evaluated but not selected as the Proposed Action.

The SEA only evaluated the No Action Alternative and the MKARNS 12-Foot Deepening Component of the 2005 ARNS FR/FEIS recommended plan. Features include design changes in dredging quantities, upland and in-water disposal acreages and locations, and the number, rock volumes, and locations for training structures. This section describes the 2005 12-foot Channel Deepening Project to provide a baseline for comparison of changes.

2.1.1 No Action Alternative

The No Action Alternative conditions and repercussions remain the same as outlined in the 2005 FEIS, modified to incorporate the implementation of the new flow management plan and DMMPs. The following statements characterize what would occur for each study feature/component under the No Action Alternative.

Navigation Channel Maintenance: Existing dredging and disposal to maintain the 9' navigation channel would continue. Dredged material would continue to be disposed of at existing sites until they reached their holding capacity. Only disposal sites approved in the 2018 SWT and SWL DMMPs would be used, and new sites identified in the 2018 DMMPs may need to be constructed and mitigated for.

Flow Management: The existing river flow management plan, implemented after the finalization of the 2005 ARNS, would be used.

Navigation Channel Depth: The current 9' navigation channel would be retained along the entire MKARNS.

In-water disposal was not approved by the Oklahoma Department of Environmental Quality in Oklahoma when the 1974 Operation and Maintenance Program EIS was approved. Therefore, future dredge material would have to be deposited in inactive terrestrial sites identified and approved in the 1974 EIS. Many of the terrestrial sites approved in the 1974 EIS have not been utilized since creation of the navigation channel, thus habitat characteristics on many of these sites have changed. Utilizing these sites would require significant re-working and additional mitigation for terrestrial impacts. Additionally, cultural resources investigations would be required for those previously approved locations and for any terrestrial mitigation areas, just as they would for the 12-foot channel.

2.1.2 MKARNS 12ft Deepening Alternative

The MKARNS 12-Foot Deepening alternative consists of 1) adding new dredged material disposal sites in Oklahoma to supplement current disposal site capacity, which will reach capacity at some locations along the MKARNS in the near future, 2) replacing the existing flow management plan with the Operations Only Flow Management Plan, and 3) increasing the depth of the navigation channel throughout the MKARNS from 9 feet to 12 feet.

The following characterizes what would occur for each study feature/component under the MKARNS 12-Foot Deepening alternative:

Navigation Channel Maintenance: Existing dredging and disposal to maintain the navigation channel would continue under this alternative. After currently utilized dredged material disposal sites reach their holding capacity, dredged material would be disposed of in disposal sites identified in the Dredge Management Plan. Under this alternative, areas with high quality habitats, such as bottomland forest or wetlands would be avoided wherever practical.

Navigation Channel Depth: The current 9-foot navigation channel would be deepened to a 12-foot navigation channel throughout the entire length of the MKARNS.

Section 3- Least Environmentally Damaging Practicable Alternative

It was determined by USACE that the selected 12ft Channel Deepening Alternative was the Least Environmentally Damaging Practicable Alternative compared to the No Action Alternative because only the 12ft Channel Deepening Alternative met the overall purpose and need of the project. The MKARNS is currently operational and undergoes routine dredging and channel maintenance, actions and impacts proposed in the 12ft Channel Deepening Alternative would not be significantly different. Additionally, current surveys show that over 80% of the MKARNS system is already deep enough to support 12ft draft vessels. This means, while the entire system is being reviewed, most of the work will be isolated to small sections of the river.

3.1 Minimization and Avoidance Measures

In order to reduce impacts from the proposed project the following minimization measures will be implemented.

Dredging: Preliminary estimates of material amounts needing to be dredged are significantly lower than those estimated during the 2005 ARNS FR/FEIS. The first phase of the proposed action includes the installation of training structures in the Arkansas portion of the MKARNS. This will allow time for the river to self-scour, ultimately reducing the amount of dredging needed. Because of the narrower river widths in the Oklahoma portion of the MKARNS, training structures will have limited applicability, thus phase one work in OK will consist of dredging. Because most of the MKARNS system is already at depths greater than 12 feet, the required dredging is already minimal and will be targeted to specific areas. As a result, impacts will remain very localized and temporary.

Disposal: While the proposed project looks at numerous in-water and upland disposal locations, not all disposal sites are anticipated to be used. As mentioned above, the total quantities of dredge material are likely to be much lower than originally anticipated. As a result, new disposal sites will be constructed on an as needed basis. Best Management Practices (BMPs) for sediment containment and erosion control will be implemented during construction to reduce impacts.

Outflows from new upland disposal sites in OK (while not fully designed yet) will meet ODEQ and ADEQ water quality standards to ensure our return flows do not cause degradation of habitat or water quality.

Despite initial temporary impacts during construction, in-water disposals sites may provide a net benefit by increasing habitat diversity and refuge areas for birds and fish species.

Finally, because of the long-term nature of the project, anticipated minor temporary impacts will be spread out over a long period of time.

3.1.1 Best Management Practices

To further minimize impacts to the environment, the proposed project will abide by specific Best Management Practices (BMPs) that will be outlined in the construction contracts. Some examples of the BMPs regarding dredging and disposal of materials are listed below.

- Navigation: No activity may cause more than a minimal adverse effect on navigation.
- Aquatic Life Movements: No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area.
- Spawning Areas: Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable.
- Migratory Bird Breeding Areas: Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.
- Suitable Material: No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts.
- Water Supply Intakes: No activity may occur in the proximity of a public water supply intake.
- Adverse Effects from Impoundments: If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.
- Soil Erosion and Sediment Controls: Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills must be permanently stabilized at the earliest practicable date.
- Proper Maintenance: Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety.
- Tribal Rights: No activity or its operation may impair reserved Tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

3.2 Mitigation

Due to the disposal of sediment within emergent wetlands, forested wetlands, and bottomland hardwoods, compensatory mitigation will be required and enacted in accordance with Section 404 of the CWA and Section 10 of the River and Harbors Act. The mitigation standard for this project falls under Engineering Regulation 1105-2-100, Appendix C and Executive Order 11990.

In total, approximately 74 acres of woody wetlands, 3,780 acres of emergent herbaceous wetlands, and 165 acres of gravel bars are anticipated to be impacted by the proposed action and will be mitigated for by use of on-site mitigation measures. Because this action was used to address the sedimentation of the MKARNS, many adverse impacts were unavoidable. Table 1 displays the ratios required to compensate the adverse impacts as well as the resulting acres required to mitigate the action.

Table 1: Habitat Type, Acres Impacted, and Required Mitigation Acreage Associated with the Proposed Action

Habitat Type	Permanent Impact (acres)	Habitat Mitigation	
		Acres	AAHUs
Bottomland Hardwood (Woody Wetlands)	74	135	45
Emergent Herbaceous Wetlands	3,780	2,225	1,365
Gravel Bars	165	165	165
Total	**4,019**	**2,525**	**1,575**

The objective of the bottomland hardwood and wetland mitigation is to create a minimum of 135 acres of bottomland hardwood, 2,225 acres of emergent wetland habitat, and 165 acres of gravel bars in areas that would not be adversely impacted by creation of habitat and would be self-sustaining upon completion of mandatory monitoring and adaptive management guidelines.

The objectives to compensate the loss of bottomland hardwood forest and wetland habitat are listed below.

- Establishment of native plant communities for wildlife.
- Bottomland hardwood - Plant native bottomland hardwood seedlings.
- Forested Wetland - Plant appropriate native species of shrubs and tree seedlings.

- Emergent wetland - Planting of emergent wetland vegetation
- Develop and maintain hydrologic characteristics for created habitats

Some of the open water disposal sites through the Arkansas portion of the river extend above the water, increasing the area and volume of sediment above the normal pool elevation. Open water habitat in the immediate area of the disposal sites is not unique in this portion of the Arkansas River and is not critical habitat to the survival of any species of fish, invertebrates, or threatened and endangered species. Floating larvae and eggs of various species of aquatic organisms are expected to be found at and near the water surface in the area of open water disposal sites. The stress and possible mortality of individual organisms encountering adverse conditions during the dredged disposal operations in the Arkansas River would be minor compared to the majority of aquatic organisms in the river.

Changing the substrate elevations of local open water habitats is beneficial for aquatic species because it provides new habitat for shallow dwelling micro/macro invertebrates; creates additional spawning areas for certain fish species; and new areas to promote the growth of hydrophytic plants. In addition to aquatic species, the introduction of sediment to these areas creates new loafing and nesting habitat for waterfowl and waterbirds.

The sediment disposed in open water habitat will be moved from one location within the MKARNS to another, so any adverse effects would be localized and will be subsequently dispersed over time similar to the No Action Alternative. The open water impacts as described above are self-mitigating. Therefore, mitigation of open water will not occur as part of this project.

Section 4- Recommended Plan

4.1 Project Description

The MKARNS system (Figure 1) is approximately 445 miles in length, running from the Port of Catoosa near Tulsa, Oklahoma, downstream to confluence with the Mississippi River and consists of a series of 18 locks and dams. Currently, the Corps, SWL and SWT cooperatively control flows in the Arkansas River system in Kansas, Oklahoma, and Arkansas. However, SWL's operational flexibility in controlling flows is very limited.

Channel widths vary throughout, including 250 feet along the Arkansas River, 150 feet along the Verdigris and Poteau rivers, and 225 feet along the Sans Bois Creek. The depth of the navigation channel varies, but is currently maintained to a minimum of 9 feet. However, a majority of the system is already naturally at depths of 12 feet or greater.

The proposed project is divided into three separate components. The first will include the construction or modification of approximately 112 training structures (AR: 18 new and 85 modified; OK: 5 new and 5 modified). These rock training structures will allow the river to self-scour naturally over time, minimizing the total amount of mechanical dredging that is required. The MKARNS system already has a number of these training structures installed, some of which will be re-built, raised, lengthened, or notched to allow appropriate water movement to support the new proposed action.

The second component of the proposed project will include the mechanical and hydraulic dredging of approximately 3,700 acres. Clamshell barge style and hydraulic cutter head style dredging equipment will be utilized to mechanically dredge any area that is unable to self-scour.

The final component addresses the disposal locations for the dredged material. This project will include the use of both upland and in-water disposal locations that will be used for the deposition of dredge materials. These areas include approximately 39 new upland sites and 170 in-water sites. Most of the upland disposal sites that have been selected are a mix of open agricultural lands or barren grasslands.

4.2 Installation of River Training Structures

As part of this supplemental action, new training structures would need to be constructed in a similar manner as those constructed in the past throughout the life span of the MKARNS. Additionally, some of the existing training structures may require modification (e.g. reconstructed or lengthened) to perform as intended with a deeper channel. The river training structures and dikes use the river's energy to naturally self- scour areas of built-up sediments overtime as well as support maintenance operations to keep the river to stay at a navigable depth. These structures would primarily consist of rock and stone fill and run perpendicular to the river extending from the shoreline. The height, length, and width of structures vary depending on location and design needs. A typical design plan for these structures is located in Appendix J of the 2024 SEA for the MKARNS 12-Foot Channel Deepening Project.

The structures would be constructed entirely from the river, which limits the need for access roads along the river. The rock would be placed via hopper barges and then construction equipment, such as excavators, stationed on a separate flat-top barge would be used to place the rock more precisely creating the intended slope and dimensions of the structure.

For new structures, a section of the bank would need to be excavated to key the structures into the shoreline to prevent erosion and the river flanking the structure. Additionally, the bank line is paved with stone for a few hundred feet upstream and downstream of the key to also protect from flanking.

4.3 Dredging Operations

This phase of the proposed project will include the deepening of the navigation channel with the intent of allowing the MKARNS to accommodate vessels with a draft of 12 feet. This will require the system to maintain depths of approximately 13-15 feet to accommodate 12-foot draft vessels through the entire system from the Mississippi River to the Port of Catoosa, Oklahoma, which includes the Arkansas River, the Verdigris River, and a section of the White River. Template widths were set to the currently authorized navigation widths of 250 feet on the Arkansas, 300 feet on the White, 150 feet on the Verdigris, and 225 feet on the Sans Bois as authorized. These widths were tapered appropriately for the lock approaches.

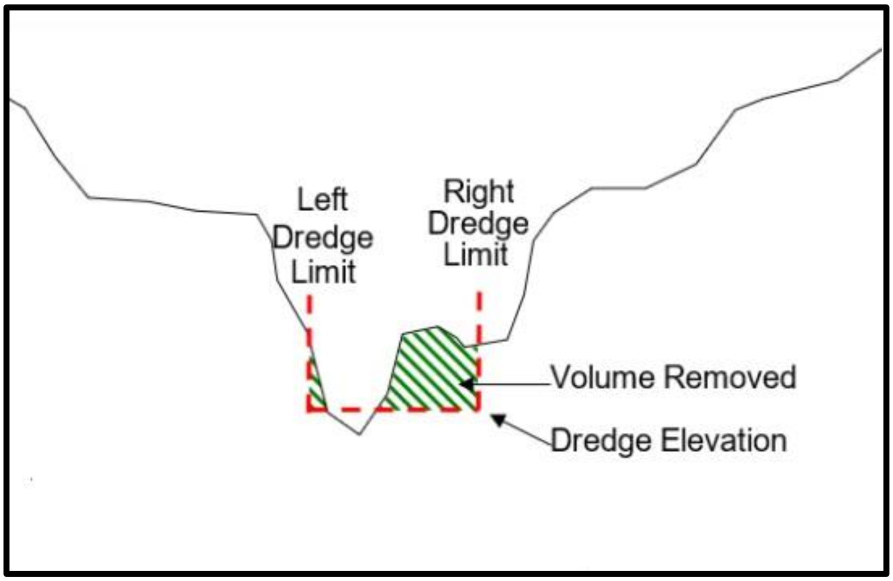

Figure 2: Typical Dredge Cross-section

Mechanical dredging operations would take place in all areas where river training structures were unsuccessful or unable to reach the required depth without dredging.

Dredging will be accomplished by two different mechanisms:

- Hydraulic dredging--Removal of loosely compacted materials by cutterheads, dustpans, hoppers, hydraulic pipeline plain suction, and sidecasters, usually for maintenance dredging projects.
- Mechanical dredging--Removal of loose or hard, compacted materials by clamshell, dipper, or ladder dredges, either for maintenance or new-work projects.

Hydraulic dredges remove and transport sediment in liquid slurry form. They are usually barge mounted and carry diesel or electric-powered centrifugal pumps with discharge pipes ranging from 6 to 48 in. in diameter. The pump produces a vacuum on its intake side, and atmospheric pressure forces water and sediments through the suction pipe. The slurry is transported by pipeline to a disposal area. Hopper dredges are included in the category of hydraulic dredges for this report even though the dredged material is simply pumped into the self-contained hopper on the dredge rather than through a pipeline. It is often advantageous to overflow hopper dredges to increase the load; however, this may not always be acceptable due to water quality concerns near the dredging site.

Mechanical dredges remove bottom sediment through the direct application of mechanical force to dislodge and excavate the material at almost in situ densities. Backhoe, bucket (such as clamshell, orange-peel, and dragline), bucket ladder, bucket wheel, and dipper dredges are types of mechanical dredges. Sediments excavated with a mechanical dredge are generally placed into a barge or scow for transportation to the disposal site.

Additional details of the disposal areas and their locations have been included in Appendix J of the 2024 SEA and a table of expected dredge quantities and area is included in Appendix A of the 2024 SEA.

4.4 Dredged Material Disposal

The removal or excavation, transport, and placement of dredged sediments are the primary components of the “dredging process”. After the sediment has been excavated, it is transported from the dredging site to the designated disposal area. This transport operation is accomplished by the dredge itself or by using additional equipment such as barges or pipelines with booster pumps. The collected and transported dredged material is placed in either open water, permitted in-water disposal sites, or in upland locations. This project is anticipated to use up to 170 in-water disposal sites, all of which are within the Arkansas section of the river. Additionally, it is anticipated that up to 37 new upland sites will be utilized throughout the Oklahoma section of the project and 2 new sites in Arkansas. These sites have been identified for use but will only be constructed and used as needed, depending on the final quantities of dredged materials produced.

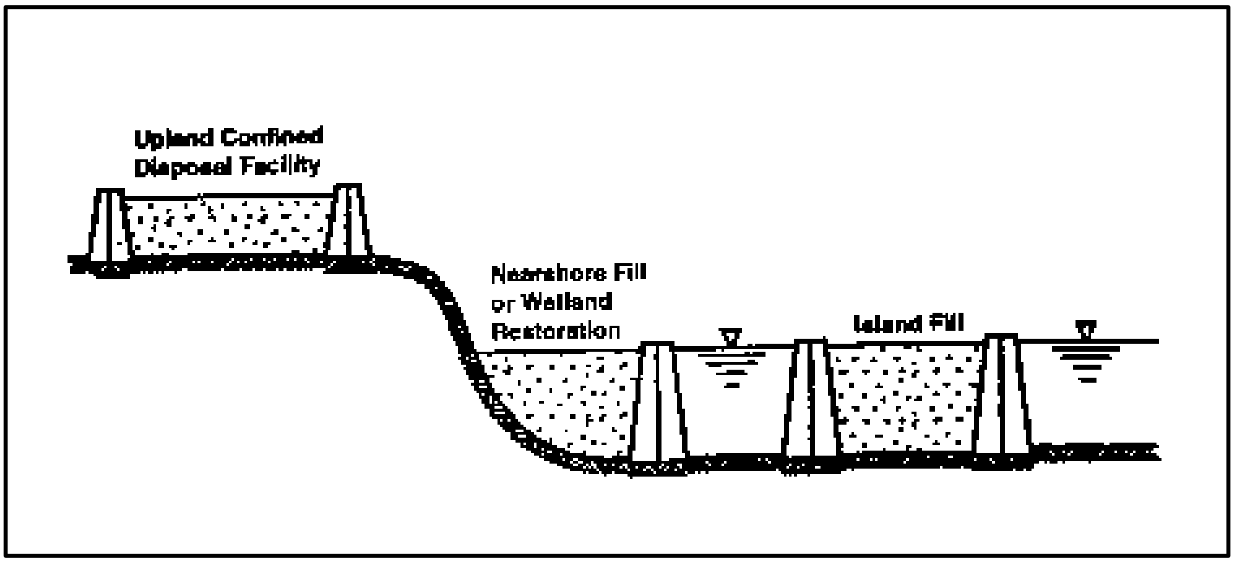

Figure 3: Types of Disposal Facilities

4.4.1 Upland Placement

Upland dredge disposal sites will be specifically located as close as possible to areas along the navigation channel that are expected dredging locations. This will allow the dredged materials to effectively be piped over in a slurry to the sites directly from the barges.

To prepare these sites for use, they are first surveyed for natural and cultural resources. Following surveys, the usable section of the disposal property is cleared and prepared for use with the construction of appropriate containment structures, dewatering ponds, and access roads to allow access for construction vehicles from land.

Following the disposal of the dredged materials on the site, the materials are stabilized using heavy equipment to create appropriate slopes and compaction to avoid erosion or the need for long term maintenance.

4.4.2 In-water Placement

Open water disposal is the placement of dredged material at designated sites within the river channel via pipeline or release from hopper dredges or barges. Dredged material can be placed in open-water sites using direct pipeline discharge, direct mechanical placement, or release from hopper dredges or scows. The most common operation of hopper dredges results in a mixture of water and solids stored in the hopper for transport to the disposal site. At the disposal site, hopper doors in the bottom of the ship's hull are opened, and the entire hopper contents are emptied in a manner of minutes; the dredge then returns to the dredging site to reload.

The disposal locations are typically located along the edges of the river where it is unlikely the sediments will end up back in the navigation channel. Additionally, the dredged material is placed behind hardened structures such as dikes, training structures, or containment structures built to further prevent materials from re-entering the channel. The areas used for in water disposal sites are first surveyed and containment structures are constructed prior to filling.

Furthermore, 30 sites have been selected for development into sandbar islands. In these locations, dredged materials will be placed within the river system and modeled after natural islands typically found within the river system. These will provide important habitat for migratory and nesting shorebirds such as the federally listed piping plover and red knot, as well as the recently delisted interior least tern.

4.5 General Description of Dredged or Fill Material

4.5.1 General Characteristics of Material

Material dredged from the navigation channel within the MKARNS is composed primarily of sand and other naturally occurring inert material. This material is naturally carried downstream in the Arkansas River as it flows. Some sections of the river, primarily within Oklahoma, contain hard bottom and sections of rock and gravel suggestive of the natural river bottom.

4.5.2 Quantity of Material

The quantity of dredged or fill material varies over time and throughout the channel. While dredging quantities may not be ultimately known until just before dredging operations begin, recent surveys suggest that there is a potential for up to 5,791,099 cubic yards of material to be dredged, which is an approximately 47% reduction in dredging volume estimated in the 2005 ARNS FR/FEIS.

4.6 Description of the Disposal Site(s)

4.6.1 Location

The proposed project plans to construct a total of 39 upland disposal sites to store dredged material. Thirty-seven of those sites are in Oklahoma and just two are in Arkansas. In addition to upland disposal sites, up to 170 in-water sites located in Arkansas may be utilized, depending on the proximity to dredging sites. The complete list of discharge site locations can be found in Appendix B of the 2024 SEA.

4.6.2 Size

The combined total of discharge could be up to 5.8 million cubic yards which could impact up to 3,780 acres of emergent herbaceous wetland and marsh, and 74 acres of forested woody wetlands.

It is anticipated that 2,225 acres of emergent wetland and 135 acres of forested wetland habitat will be created to compensate for the impacts of the discharge listed above.

4.6.3 Type(s) of Sites

All aquatic sites impacted by sediment discharge will be adjacent to the dredge locations and include emergent wetland, forested wetland, and open water habitat.

4.6.4 Type(s) of Habitat

Dredging and sediment transport operations will have impacts to open water and emergent wetland habitats within Oklahoma and Arkansas. The loss of emergent and forested wetland habitats will be as a result of the sediment discharge. However, as discussed, upland sites have been selected in Oklahoma for the disposition of dredged materials. This will help reduce the need for aquatic disturbances or destruction of wetland areas.

4.6.5 Waters and Wetlands

Waters and wetlands within the project's dredge and disposal operations boundaries are likely to either be temporarily or permanently impacted due to the proposed action.

4.6.6 Timing and Duration of Discharge

It is anticipated that construction of the proposed project will occur in phases over a period of 8 years. The timing and duration of dredging and placement of fill material is unknown as surveys, modeling, and detailed designs are still ongoing.

Because of the phased nature of the project, discharges associated with the river training structures will occur within the first few years of the project. Dredging and disposal events will likely occur in subsequent years following the determination of the effectiveness of the training structures. This phased approach also means that only certain areas of the project length will be impacted at any given time. Dredging and construction of disposal areas will only occur as needed. The timing and duration of discharge for each of these phases is expected to vary for each location.

4.7 Description of Disposal Method

The project will use hydraulic dredging to remove loosely compacted sediment materials from the navigation channel. Hydraulic dredges remove and transport sediment in liquid slurry form. They are usually barge mounted and carry diesel or electric-powered centrifugal pumps with discharge pipes ranging from six to 48 inches in diameter. The pump produces a vacuum on its intake side, and atmospheric pressure forces water and sediments through the suction pipe. The slurry will be transported by pipeline to a disposal area. Pipeline dredges are commonly used for open water disposal adjacent to channels. Material from this dredging operation consists of a slurry with solids concentration ranging from a few grams per liter to several hundred grams per liter (USACE, 2018).

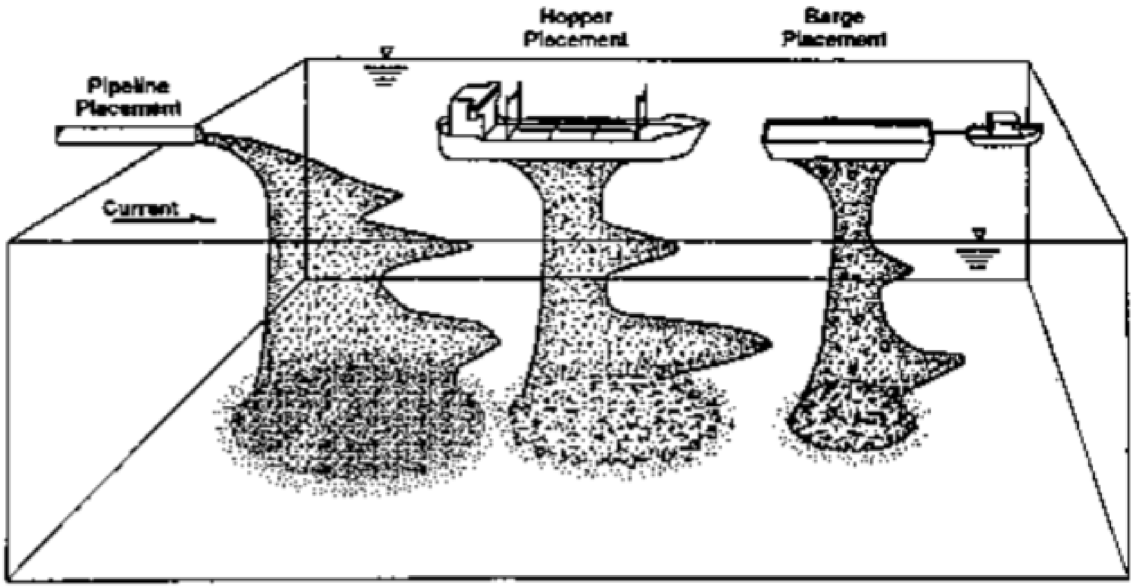

Figure 4: Plume Shape by Dredge Type

Heavy construction vehicles, such as backhoes, track hoes, bulldozers, dump trucks, and front-end loaders are then utilized to spread the dredged materials within the disposal sites and create appropriate slopes and compaction of the materials to prevent erosion.

Section 5- Factual Determinations

5.1 Physical Substrate Determinations

5.1.1 Substrate Elevation and Slope

The MKARNS has been channelized and stabilized with dikes and revetments to improve navigation on the system. This channelization has reduced the historic breadth of the floodplain in these areas. The placement of levees along the system to retain floodwaters and control normal flood events has also impacted the systems' historic floodplain (USACE, 2005).

The substrate dredged and disposed of within the Arkansas River is attributed to upstream sedimentation. This substrate is similar in size and shape of the existing substrate within the project areas because it can be attributed to the overall study area.

Open water disposal is expected to alter the bottom elevation of the Arkansas River; however, these effects are not considered permanent. Their placement does not match existing channel flows and it is likely the sediment will be pushed downstream over an extended period of time. The disposal of the dredge material will help to create sandbar islands which will increase biodiversity and are suitable for wading, loafing, and foraging for birds and in low flows can be utilized for nesting habitat.

Disposal operations are generally left in one place, which would lead to mounding even in open water habitats. Due to the amount of sediment discharged within open water, there will be some minor to major scouring around the edges of the disposal site. Over time, this will decrease as the sediment is pushed downstream.

The elevation and slope of the constructed mitigation areas would experience minor impacts due to contouring and excavation. Overall, these impacts are considered beneficial in the long-term because they will enhance the structure and function of the newly created wetlands.

5.1.2 Sediment Type

During periods of high river flows, water velocities are reached that cause river sediments in the form of silt and sand to be carried in suspension. As river flow decreases and velocities slow, the heavier suspended materials are dropped, and shoals develop in eddies and slower moving water. These shoals, when they occur in the navigation channel, are removed by dredging to maintain the MKARNS to authorized depths and dimensions. Under normal conditions, dredged materials are disposed of in designated disposal areas on shore adjacent to the river or behind bank stabilization and channel alignment structures. The material dredged from the Arkansas River is normally sand. Dredged material is most likely to be free of contaminants if the material is composed primarily of sand, gravel, or similar materials and of high current or wave action.

5.1.3 Dredge/Fill Material Movement

As discussed earlier up to approximately 5.8 million cys of sediment could removed from the channel of the MKARNS by means of self-scouring thanks to training structures or dredging operations. The dredged material will be disposed within prepared upland disposal sites and approved in-water disposal sites. The upland sites will be contained and eventually revegetated which will help reduce sediments from returning to the river. Water velocities associated with the river will carry deposited sediments further downstream. The rate of transport will be dependent upon future rain events. Extreme precipitation events, such as a 100-year flood are more likely to force water and sediment at a faster rate downstream, as compared to a two- or five-year flood.

5.2 Physical Effects on Benthos

Excavation of sediments removes and buries benthic organisms, whereas placement of dredged material and structures smothers or buries benthic communities. Dredging and placement activities can cause ecological damage to benthic organisms due to physical disturbance, mobilization of sediment contaminants, and increasing concentrations of suspended sediments (Montagna et al., 1998).

It is anticipated that implementation of the proposed action may cause unavoidable impacts to benthic organisms. It is likely that the discharges in these habitat types smother bottom-dwelling immobile organisms and require mobile benthos to migrate to areas unaffected by disposal. However, it is likely benthic forms may recolonize discharge sites that have appropriate elevations within the water because the discharge would be very similar to sediments found throughout the project due to regularly occurring sedimentation. Additionally, these types of dredging impacts already occur regularly through maintenance dredging operations that are continually on going and are not unique in this system.

Lateral displacement of dredged material would adversely affect all the open water disposal sites due to the regular water velocity in the Arkansas River. Emergent and forested wetland disposal sites may experience less frequent lateral dispersal due to their location above the water’s surface. However, it is expected high flow events will eventually carry less compacted sediments further downstream over time.

5.3 Other Effects

Temporary impacts to aquatic organisms and fish may occur during dredging and disposal activities with the potential for temporary sedimentation and water quality degradation within the river. However, the aquatic organisms will be expected to return upon settling of sediment.

5.4 Water Chemistry and Characteristics Determinations

5.4.1 Salinity

The project would not impact salinity within the Arkansas River.

5.4.2 Water Chemistry

Dredging and disposal actions will result in short-term and localized impacts and would not be expected to degrade the long-term water quality within the project area. These patterns should return to their previous condition following completion of dredging. Temporary changes to dissolved oxygen (DO), nutrients, turbidity, and contaminant levels could occur due to sediment disturbance and mixing during dredging. Temporary DO decreases also happen from aerobic decomposition from short-term increases in organic matter suspended within the water column.

5.4.3 Clarity

There would be some temporary increase in local turbidity during dredging and placement operations. Water clarity is expected to return to normal background levels shortly after operations are completed.

5.4.4 Color

Water immediately surrounding the construction area can be discolored temporarily due to disturbance of the sediment during dredging and placement actions, but is expected to return to normal after operations cease.

5.4.5 Odor

The dredged materials are not expected to be anoxic, so there shouldn't be a potential of adverse odors associated with the proposed dredging or its placement.

5.4.6 Taste

Water within the various pools of the MKARNS are used as public or emergency water supply. Due to the potential of increased turbidity during dredging and placement, there could be some temporary adverse impacts to taste. However, these are likely to be highly limited and temporary in nature.

5.4.7 Dissolved Gas Levels

Hydrogen sulfide and other gases like methane are associated with high amounts of decaying organic matter. These gases are unlikely to be present in excavated and placed materials. Disposed sediments are very low in total organic carbon, an indicator of organic content. Dissolved gases have not been identified as a problem with maintenance material of the current channel. Localized oxygen reductions associated with dredging for the Proposed Action are expected to be short lived and are anticipated to return to normal soon after the work is complete. The installation of dike notches as part of this project will also help mitigate any localized reduction in oxygen.

5.4.8 Nutrients

A slight and temporarily increase in nutrient levels can be expected during dredging and near the disposal areas, however given the low organic content of the material as discussed above, any major changes in nutrient levels are unlikely.

5.4.9 Eutrophication

Nutrients are not expected to reach levels high enough, nor for periods long enough to lead to eutrophication of the surrounding waters.

5.5 Current Patterns and Circulation

5.5.1 Current Patterns and Flow

The Van Buren gauging station is used as the control point for river stages on the MKARNS. River flows are defined as follows:

- Optimum river flows are defined as less than 61,000 cfs. This definition correlates to optimum conditions for commercial navigation on the MKARNS;
- Moderate river flows are defined as those between 61,000 cfs and 100,000 cfs. Flooding of some fields along the main stem of the Arkansas River in western Arkansas begins at flows greater than 61,000 cfs;
- High river flows are defined as those between 100,000 cfs and 175,000 cfs. The 100,000 cfs level is considered critical because any flow above 100,000 cfs renders the navigation system non-navigable for commercial barge traffic; and
- Very high river flows are defined as those greater than 175,000 cfs. A flow of 175,000 cfs is notable because that is the point in the modeled condition data above which no appreciable difference is shown from the baseline or between alternatives.

Any impacts from dredging are minimal because the MKARNS is regularly dredged for maintenance purposes.

Installation of river training structures and open water disposal sites are expected to have impacts to the current patterns and flow. The amount of disposal located off the main navigation channel will produce changes in substrate elevation, and new bottom levels would impact current patterns by reducing the capacity of water flow within that area. However, these impacts will be very localized and flow changes to the system as a whole will be negligible.

5.5.2 Velocity

There are no substantial impacts to velocity anticipated. The proposed project will not cause any significant restrictions to the general flow of the river that would cause an overall increase in velocity.

5.5.3 Stratification

It is anticipated that impacts to stratification resulting from dredge disposal in wetlands and open water may occur as part of the proposed project. Open water and wetland habitats in some areas will be filled in and lack any traces of water. The open water disposal sites will either expand the boundary of an existing island or create additional land space and new islands. As a result, the dredge disposal could disrupt the water stratification by removing the hypolimnion, thermocline, and epilimnion layers from the water column in localized areas.

5.5.4 Hydrologic Regime

No impacts to hydrologic regime are expected. Navigation channel modification by dredge or disposal will not alter the overall volume of streamflow or precipitation patterns within the Arkansas River.

5.5.5 Normal Water Level Fluctuations

A characteristic of the river hydraulics in the project area are high-frequency, large amplitude flow fluctuations resulting from large rain events. Flows within the study area regularly fluctuate from little to no water to large flows from storms. There would be no impacts to current water level fluctuations from implementation of the proposed project.

5.5.6 Salinity Gradients

The water is slightly saline due to large, natural salt beds in Oklahoma and Kansas that the Arkansas River traverses. However, there would be no impacts to salinity gradients as a result of the proposed project.

5.6 Suspended Particulate and Turbidity Determinations

5.6.1 Expected Changes in Suspended Particulates/Turbidity Levels in Vicinity of Disposal Site

An increase in suspended particulates and the concomitant turbidity levels is expected to occur during dredging and placement operations of material removed from the navigation channel.

A Stormwater Pollution Prevention Plan (SWPPP) would be prepared before construction of the upland disposal sites occur, which would outline site-specific BMPs (e.g. silt curtains) to minimize the erosion and the potential for sediment to enter receiving waters during construction activities.

5.6.2 Effects (degree and duration) on Chemical and Physical Properties of the Water Column

Light Penetration: Changes to light penetration may occur during dredge and disposal. These impacts would be associated with turbidity increases. Conditions are anticipated to return to normal levels of light penetration following project completion, except in areas where water is no longer present.

Dissolved Oxygen: Temporary DO decreases associated with extended periods of dredge and dredged material disposal may occur from aerobic decomposition from short-term increases in organic matter suspended within the water column.

Toxic Metals and Organics: Sediment testing will be conducted in the project area ahead of construction. Sediments are not expected to contain toxic metals and organics. Results of previous sediment testing in regard to the MKARNS can be found in the *Arkansas River Navigation Study Feasibility Report and Environmental Impact Statement (EIS) August 2005* (USACE, 2005).

Pathogens: Sediments were not expected to contain or influence pathogens.

Others as Appropriate: A hazardous, toxic, and radioactive waste (HTRW) review was performed. There are seven upland sites and seven inland sites that have a recognized environmental concern (REC) in close proximity. (see Appendix G of the 2024 SEA for the

MKARNS 12-foot Channel Deepening). These RECs may have impacted the planned sites to be acquired and used for this project and will require further investigation, which may require sampling and analysis of soil and water at and around the proposed sites, in order to make that determination.

5.6.3 Effects on Biota

Primary Production, Photosynthesis: Permanent loss to wetland biota may occur as a result of dredge disposal. As sediment is placed within wetland habitats, it could suffocate any existing vegetation. Additionally, as water is displaced by sediment, reestablishment of vegetation in the wetland sites is not likely to occur in some areas. Any vegetation within open water disposal sites would also be suffocated by sediment but is likely to return. Primary producers would be restored over time within these disposal locations. Any permanently impacted wetlands will be restored through the proposed mitigation.

Suspension/Filter Feeders: Permanent loss to suspension and filter feeders will likely occur due to open water disposal. It can be expected that any suspension/filter feeders that are located adjacent to disposal would simply disperse to undisturbed areas. However, there may be adverse impacts to those individuals that could become immobile or trapped during disposal. Upon final disposal in areas, suspension and filter feeders are expected to repopulate to existing levels. The total area of impact, could be expected to have minor to major impacts on these aquatic species depending upon the discharge area.

Sight Feeders: Sight feeders will be temporarily displaced during dredging and disposal activities. Sight feeders are expected to repopulate to the current population upon completion of the proposed action. Some net loss of sight feeders may occur, but these effects are considered to be minor.

5.7 Contaminant Determinations

Dredging within the navigation channel will not introduce or increase contaminants. Chemical constituents in bottom sediments dredged were already subject to relocation and redistribution through currents, and other natural climatic and weather-related forces in the Arkansas River. Hydraulic dredging, the primary dredging method, tends to limit the size of turbidity plumes due to the suction nature of the dredging. The increase in turbidity will be temporary and limited in size. The main effect at the dredge site would be the removal of sediments with relocation to proposed dredged material disposal sites. For use of existing disposal areas, the material would be placed to raise or repair existing dikes, or placed within dikes. In addition, the materials will also be placed within wetland and open water sites.

The potential impacts from hazardous, toxic, and radioactive waste (HTRW) related to dredging activities was considered in accordance with USACE ER 1165-2-132, "*Hazardous, Toxic, and Radioactive Waste (HTRW) Guidance for Civil Works Projects*", dated June 26, 1992, and in general accordance with portions of ASTM E1527-13: *Standard Practice for Environmental Site Assessment: Phase 1 Environmental Site Assessment Process.*

USACE reviewed publicly available databases and sources, using the proposed footprint of each of the proposed 39 upland disposal sites. A 'desktop' records review was conducted by the US Army Corps of Engineers (USACE) using various sources to determine the presence of HTRW sites on or near the subject properties.

The records were focused on active clean-up sites and sites with a reasonable risk of HTRW release. Three search engines were used to search databases, helping to narrow down the number of searches. These search engines are the Environmental Protection Agency (EPA) Cleanups in my Community (CIMC) database, and either of two state search engines: Oklahoma Department of Environmental Quality (DEQ) DataViewer or Arkansas DEQ EnviroView. These search engines query several federal or state databases for user-selected information with an approximate 1-mile search distance for each of the sources. A closer search distance of 0.5-mile from a property boundary is recommended to identify specific types of environmental risks. However, a wider radius was used to ensure that sites having large acreage could be searched using one location within the property boundary that would still capture risks beyond the boundary for this feasibility level records review.

The information collected from the desktop records review was analyzed for recognized environmental conditions (RECs) that could affect the proposed project or need further investigation, given the proposed project measures. This is a high-level records review and may need to be expanded or repeated as the project progresses. For this records review, all areas immediately adjacent to project features were searched.

The results of the feasibility level records review indicated that there are seven sites proposed for use as upland placement areas and an additional seven sites proposed for inland disposal having RECs in close proximity to each subject property. Further investigation of these RECs will be conducted, however, none of these sites will be used in Phase I of the construction project so that the results will not affect Phase I. Further details of the study results can be found in 2024 SEA for the MKARNS 12-foot Channel Deepening.

5.8 Aquatic Ecosystem and Organism Determinations

5.8.1 Effects on Plankton and Nekton

Plankton and nekton that occupied the sediments and water columns in the existing sites of the project features would be adversely impacted by disposal activities, but it is anticipated that the impact would be temporary and short-term as these species would recolonize the sites once disposal is complete.

Impacts to free-floating or limited-mobility nekton during dredging would occur. These impacts, such as entrainment into cutterheads or vessel cooling water in takes and discharges would be temporary and minor. The amount of water exchange involved is volumetrically minor compared to the navigation channel, and the ubiquity and high turnover in populations of these types of fauna would quickly replace any impacted organisms. Finfish would be readily able to avoid impacts given their mobility. No permanent or long-term impacts on nekton from the proposed action and the disposal of maintenance material.

Turbidity from total suspended solids tends to reduce light penetration, and thus, reduce photosynthetic activity by phytoplankton (Wilber and Clarke, 2001). Such reductions in primary productivity would be localized around the immediate area of the dredging and placement operations. This reduced productivity may offset by an increase in nutrients released into the water column during dredging activities that can increase productivity in the area surrounding the dredging activities (Newell et al., 1998; Wilber and Clarke, 2001).

In past studies of impacts of dredged material placement from turbidity and nutrient release, the effects are both localized and temporary (May, 1973). Due to the capacity and natural variation in phytoplankton populations, the impacts to phytoplankton from the proposed action, dredging within the project area, and dredged material placement of material would be temporary.

5.8.2 Effects on Aquatic Food Web

The discharge of sediment on wetland and open water habitats has the potential to adversely impact fish, crustaceans, mollusks and other organisms. Immobile organisms or species too slow to move out of the disposal areas can be killed by the smothering sediments. Changes to the water column in the open water sites would also cause permanent adverse impacts to species dependent upon substrates. Suspended particulates can also cause adverse impacts to the aquatic food web; however, these impacts would be temporary as sediments begin to settle after disposal occurs.

5.8.3 Effects on Special Aquatic Sites

Sanctuaries and Refuges: The Sequoyah National Wildlife Refuge is 20,800 acres of open water, wetland, and bottomland hardwood habitat spread throughout USACE fee-owned property (USFWS, 2020) (Figure 5). Lands were designated for the refuge to replace wildlife habitat and waterfowl hunting opportunities lost due to the construction of the Robert S. Kerr Pool (USACE, 2015). The primary management practice within the Sequoyah National Wildlife Refuge is the establishment of large food plots within the refuge to attract large concentrations of migrating and wintering waterfowl. The principal crops which are grown on these plots are corn, grain sorghums, wheat, soybeans, millet, and buckwheat. Another highly successful management practice within the refuge is the construction and maintenance of large, controlled water level marshes.
These marshes can be drained during the growing season; planted to crops; and then reflooded in the fall. Due to the nonfluctuating water level of the navigation project, the crops on the refuge produce a good yield every year.

Migrating birds regularly use the refuge as an important nesting and stopover destination (USFWS, 2020). There are approximately 250-plus species of birds that are likely to use bottomland hardwood forests in eastern Oklahoma. The refuge is intensively managed for wading bird, shorebird, and waterfowl food production and are actively managed to provide an appropriate food source during winter months.

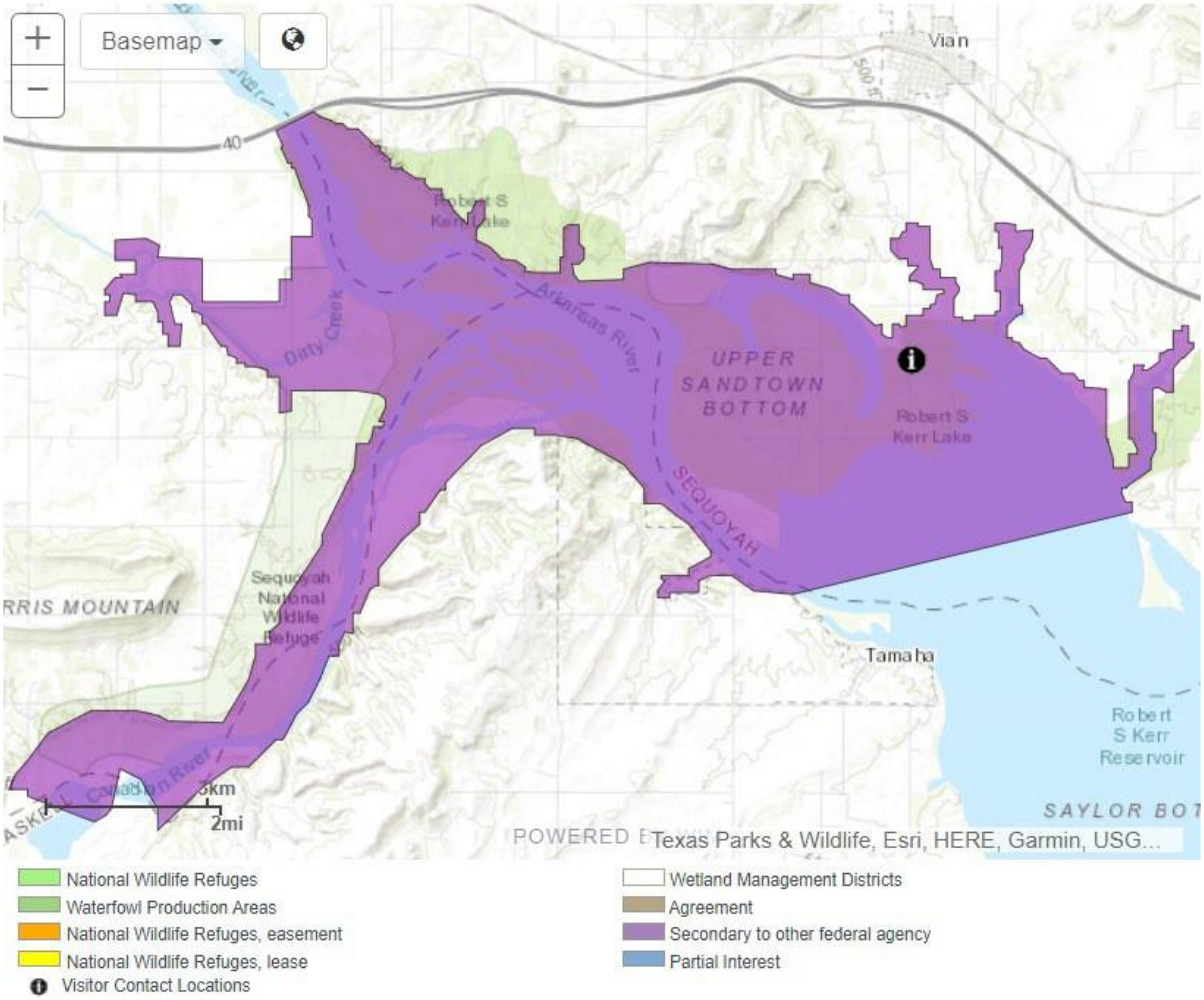

Figure 5: Sequoyah National Wildlife Refuge (USFWS, 2020)

As described above, this refuge is an area designated under Federal law to be managed principally for the preservation and use of fish and wildlife resources. The discharge of dredge material will change the balance of water and land areas needed to provide cover, food, and other fish and wildlife habitat requirements.

Direct impacts to the Sequoyah National Wildlife Refuge due to the proposed project will likely be limited. The greatest impacts coming from the use of two upland disposal sites within the refuge. Any impacts to wetlands within these sites will be mitigated and once naturally revegetated, will continue to be usable as habitats for many species that use the refuge. Further, the proposed project also calls for the in-water disposal of material to be used as sandbar islands which will provide benefits for shorebirds. While open water disposal can have adverse effects to water quality, this action provides beneficial wading bird habitat by increasing the abundance of islands beneath the water surface.

Wetlands: It is anticipated that there will be no net loss in high quality wetlands as a result of the proposed action. Discharge of fill material may locally destroy habitats and adversely affect the biological productivity of individual wetland ecosystems by smothering, dewatering, and altering substrate elevation and water movement. However, any wetlands lost will be fully mitigated for as outlined in the proposed SEA and mitigation plan.

There are approximately 74 acres of woody wetlands and 3,780 acres of emergent herbaceous wetlands that will be impacted through construction of the proposed project components. Compensatory mitigation will be required and enacted in accordance with Section 404 of the CWA and Section 10 of the River and Harbors Act. The mitigation standard for this project falls under ER200-2-2, ER 1005-2-100 Appendix C. As a result, a minimum of 2,225 acres of emergent wetland and 135 acres of forested wetland habitats will be created to compensate for these impacts.

Mudflats: There are no mudflats that occur within the project area.

Vegetated Shallows: As discussed above, there is the potential for adverse impacts to vegetated shallows as a result of upland and in-water disposal. In these situations, vegetation within the project area will be smothered by sediments. However, these impacts are expected to be fully mitigated as outlined above and would result in no net loss of vegetated shallows.

Riffle and Pool Complexes: There are no riffle and pool complexes within the project area.

Threatened and Endangered Species: There are federally listed threatened and endangered species within the project areas. Additional discussion can be found in Section 3.8 of the 2024 SEA for the MKARNS 12-Foot Channel Deepening Project. Consultation is being conducted with the US Fish and Wildlife Service Oklahoma and Arkansas Field Offices in compliance with the Endangered Species Act for this project.

Other Wildlife: Wildlife inhabiting the aquatic habitats within the project area will be temporarily displaced during dredging and disposal. Mobile species would emigrate to nearby adjacent habitats. Although sessile species would be impacted during construction activities, they are expected to repopulate suitable habitat areas following construction.

5.8.4 <u>Other Effects</u>

Land Use, Transportation, and Utilities: Temporary, adverse impacts to land use and transportation, such as an increase in construction traffic, are expected in relation to the preparation of upland disposal sites. However, these will be limited and temporary in nature.

Cultural Resources: The construction of upland dredge disposal facilities involves construction of berms, which, when possible, will be constructed using fill excavated from the interior of the disposal facilities. When it is not possible, fill will be obtained from elsewhere. These actions have potential to significantly adversely impact cultural resources eligible for the National Register of Historic Places (NRHP).

The locations of the disposal facilities and other impact areas have not been investigated for cultural resources. Therefore, identification, evaluation, effect determination, and resolution of impacts in compliance with Section 106 of the NHPA is required. The compliance process is outlined in the Programmatic Agreement (PA) attached to the SEA as Appendix E. By following the procedures outlined in the PA, impacts can be mitigated to below the threshold of significance.

5.9 Disposal Site Determinations

5.9.1 <u>Mixing Zone Determination</u>

Mixing zones will be established in accordance with applicable state requirements and regulations.

5.9.2 *Determination of Compliance with Applicable Water Quality Standards*

Under 40 CFR § 230.10(b)(1) there shall be no discharge of dredged or fill material that "causes or contributes, after consideration of disposal site dilution and dispersion, to violations of any applicable State water quality standard." Oklahoma and Arkansas water quality standards were adopted in accordance with the Clean Water Act, federal regulations, and state pollution control and administrative procedure statutes. The WQC consists of three components: designation of beneficial uses, water quality criteria to protect designated uses, and antidegradation policies.

5.9.3 *Potential Effects on Human Use Characteristics*

Municipal and Private Water Supply: The proposed action will have no effect on water supplies. No apparent private, public, or industrial water wells will be destroyed and/or affected by the proposed action.

Recreational and Commercial Fisheries: During dredging and placement, some localized areas may be temporarily excluded from recreational and commercial fish/shellfish harvest, and the dredging activities may temporarily impact reproduction and recruitment of certain species. However, these impacts will be limited in space and time, and are not expected to have long-term impacts to the value of these resources.

Dredging and fill activities for the proposed action would have a temporary impact on recreational and commercial boaters moving up and down the river, as they would have to avoid dredging equipment and barges. However, these impacts would be temporary and short term. Further, during construction the river will remain fully navigable. There would be negligible, if any long-term impact with respect to water quality, and there should be no long-term impacts to fisheries once the Project is complete.

Water Related Recreation: Boating and recreational/commercial fishing are important in the study area. As discussed above, there should be no long-term impacts associated with the Project. However, short-term impacts may be associated with localized increases in turbidity, causing boaters to avoid the area. In addition, some of the areas will be excluded from boaters due to dredging and placement activities.
Impacts to recreational boating would be nominal.

Aesthetics: Minor temporary adverse impacts to aesthetics may occur as a result of the proposed action. Sediment placed within wetland habitat is not pleasing to the eye. However, the effects are considered minor due to the proximity of other wetland habitats that can be observed within the MKARNS and are less obvious when the disposal piles become revegetated.

Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Areas, and Similar Preserves: No parks, national or historic monuments, national seashores, wilderness areas, or research sites were negatively impacted by the project.

Section 6- Determination of Cumulative Effects of the Aquatic Ecosystem

The proposed action is not expected to have significant adverse cumulative effects on the aquatic environment. Most impacts are expected to be localized within the dredging and disposal areas. Movement and dispersal of sediment is likely to occur over time.

Section 7- Determination of Secondary Effects on the Aquatic Ecosystem

No significant adverse secondary effects on the aquatic ecosystem will occur from implementing the proposed action. It is expected that impacts resulting from the dredging operations will only by minor and temporary in nature. Any permanent impacts resulting from the disposal of the dredged material will be offset using in-kind mitigation.

Section 8- Summary of 404(b)(1) Analysis, Findings of Compliance or Non-Compliance with Restrictions on Discharge

Section 404(b)(1) of the CWA of 1972 requires that "any recommended discharge of dredged or fill material into Waters of the U.S. must be evaluated using the guidelines developed by the Administrator of the U.S. Environmental Protection Agency (EPA) in conjunction with the Secretary of the Army". These guidelines are in Title 40, Part 230 of the CFR. The Section 404(b)(1) evaluation in this report analyzes all activities associated with the proposed action that involve the discharge of dredged or fill material into Waters of the U.S. Under the 404(b)(1) guidelines, no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the recommended discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences.
An alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

An alternatives analysis was done as part of this Clean Water Act Section 404(b)(1) Analysis. The USACE determined there are two practicable alternatives as discussed in Section 2. The 12-Foot Channel Deepening alternative was determined to sufficiently meet the overall project purposes and was considered the least environmentally damaging practicable alternative.

Implementation of the proposed action will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, or recreation and commercial fishing.

The USACE is preparing a mitigation plan that will adequately address the adverse impacts to the wetland habitats and open water disposal sites. This mitigation plan is addressed in Appendix F of the 2024 SEA.

In Oklahoma and Arkansas, the state's Department of Environmental Quality (DEQ) is the permitting authority and administers the National Pollutant Discharge Elimination System. Operators of construction activities that disturb five or greater acres must prepare a SWPPP, submit a Notice of Intent to DEQ and obtain authorization, conduct onsite posting and periodic self-inspection, and follow and maintain the requirements of the SWPPP. During construction, the operator shall assure that measures are taken to control erosion, reduce litter and sediment carried offsite (silt fences, hay bales, sediment retention ponds, litter pick-up, etc.), promptly clean-up accidental spills, utilize BMPs onsite, and stabilize site against erosion before completion.

Upon completion of the SEA, where more details will be developed regarding placement of project features, all resource agencies, including both Arkansas and Oklahoma DEQ, will be invited to review updated figures, designs, and alignments to ensure mitigation plans are sufficient and appropriate permits will be obtained prior to the start of construction.

Section 9- References

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