SUPPLEMENTAL
ENVIRONMENTAL ASSESSMENT
WITH
FINDING OF NO SIGNIFICANT IMPACT

REMOVAL OF ROCK PINNACLES AND OUTCROPPINGS CONSIDERED TO BE NAVIGATION OBSTRUCTIONS DURING LOW-FLOW PERIODS ON THE MIDDLE MISSISSIPPI RIVER

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St. Louis District

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1. INTRODUCTION

This Environmental Assessment is a supplement to "Environmental Assessment with Draft Finding of No Significant Impact - Explosive Removal of Rock Pinnacles and Outcroppings Considered to be Navigation Obstructions During Low-Flow Periods on the Middle Mississippi River" dated November 2006; and Tier II Supplemental Environmental Assessment with Draft Finding of No Significant Impact - Removal of Rock Pinnacles and Outcroppings Considered to be Navigation Obstructions During Low-Flow Periods on the Middle Mississippi River" dated July 2009. The FONSI for the 2006 EA was signed on 14 February 2007; the FONSI for the 2009 SEA was signed on 30 September 2009; these documents are incorporated by reference, and can be found online at http://www.mvs.usace.army.mil/pm/pm-reports.html.

During 1988, an extremely low-water year, it was realized that there were a number of rock pinnacles and rock shelves that were a potential hazard to commercial navigation traffic on the Middle Mississippi River (MMR). These rock hazards were removed during 1988-1999 using explosive removal. Validation of safe elevations was conducted using an I-beam attached to two cables. The I-beam was used to sweep the removal areas after an area was lowered by blasting. The equipment used to delineate obstructions and to verify their removal was primitive by today's standards. With the potential for another extremely low-water period looming in late 2006, new state-of-the-art hydrographic multibeam surveys were conducted and a number of rock pinnacles and rock outcroppings, which were missed by the rock removal efforts in 1988-1999, were detected. These remnants that were missed during the previous blasting pose a potential hazard to commercial boat traffic (safety hazard), a threat to close the navigation system due to low water (economic impact), and a threat to the environment (hazardous spill) if there were a towboat grounding.

The proposed 2006 Rock Removal project was not executed because the U.S. Army Corps of Engineers (USACE) St. Louis District (MVS) was unable to find a contractor willing to conduct the work within a reasonable cost with reference to the Government Cost Estimate at that time. The proposed 2009 rock removal project was halted after the grinding method used by the contractor was determined to be ineffective.

The purpose of this Supplemental Environmental Assessment (SEA) is to provide the public with information concerning proposed additional rock removal locations which were not addressed in the 2006 or 2009 rock removal project EAs, and to assess the impacts of the additional rock removal.

1.1. Project Authority

The project is authorized under the Regulating Works Project that was authorized by the River and Harbor Acts of 1910, 1927, and 1930. The project provides a safe and dependable navigation channel. It consists of a navigation channel 9-feet deep and not less than 300 feet wide with additional width in bends, from the mouth of the Ohio River to the mouth of the Missouri River, a distance of approximately 195 miles. Project

improvements are achieved by means of dikes, revetment, construction dredging, and rock removal.

1.2. Project Description and Need

The Navigation Project, as authorized, is to provide a navigation channel with a minimum of 9 feet of depth and 300 feet of width, with additional width in bends as required. To facilitate engineering efforts on the Mississippi River, USACE Mississippi Valley Division (MVD) personnel have developed the Low Water Reference Plane (LWRP). LWRP is risk-based method used by engineers to maintain the 9 foot channel for the most likely occurring stages and river events during any given year. LWRP is calculated using a 97% exceedance discharge at individual gages. For instance, LWRP currently is taken as -3.5 feet on the St. Louis gage which currently equates to 66,100 cfs (although the 97% exceedance discharge is periodically reevaluated). MVD has widely used the accepted technical method of LWRP to design the navigation channel from St. Louis to New Orleans. A 9 ft depth for navigation at a -7.0 ft stage gives a required bottom elevation of -16.0 ft on the St. Louis gage. The -16.0 ft bottom elevation is equivalent to about -13 ft LWRP.

At the St. Louis gage, the average period of record (Jan 1861 to present) river stage is 11.3 ft. The average river stage for 1 January - 4 December 2012 is 4.9 ft. These levels are currently 6.4 ft below average. Figure 1 provides a visual of the low flows that have occurred during 2012. The primary concern is not that the river levels are currently below average; it is that the river levels are closer to historic record lows. The record low was set on 16 January 1940, and read -6.2 ft on the St. Louis gage. If drought conditions continue, river levels have the possibility to exceed historic record lows. The river stage for the St. Louis, MO gage was -2.1 ft on 4 December 2012.

As discussed in the 2006 and 2009 EAs, as the river stages get lower, remnant rock outcroppings (pinnacles and rock shelves) within the navigation channel will obstruct navigation, and the U.S. Army Corps of Engineers (USACE) will not be able to provide a safe and dependable navigation channel with the authorized minimum project dimensions. *Forecasts predict that the Middle Mississippi River will reach historic low levels sometime this winter* (Figure 1). This rock is an unavoidable obstruction, it poses a risk to both the navigation industry and the environment (should a grounding occur), and its removal has been determined to be absolutely necessary.

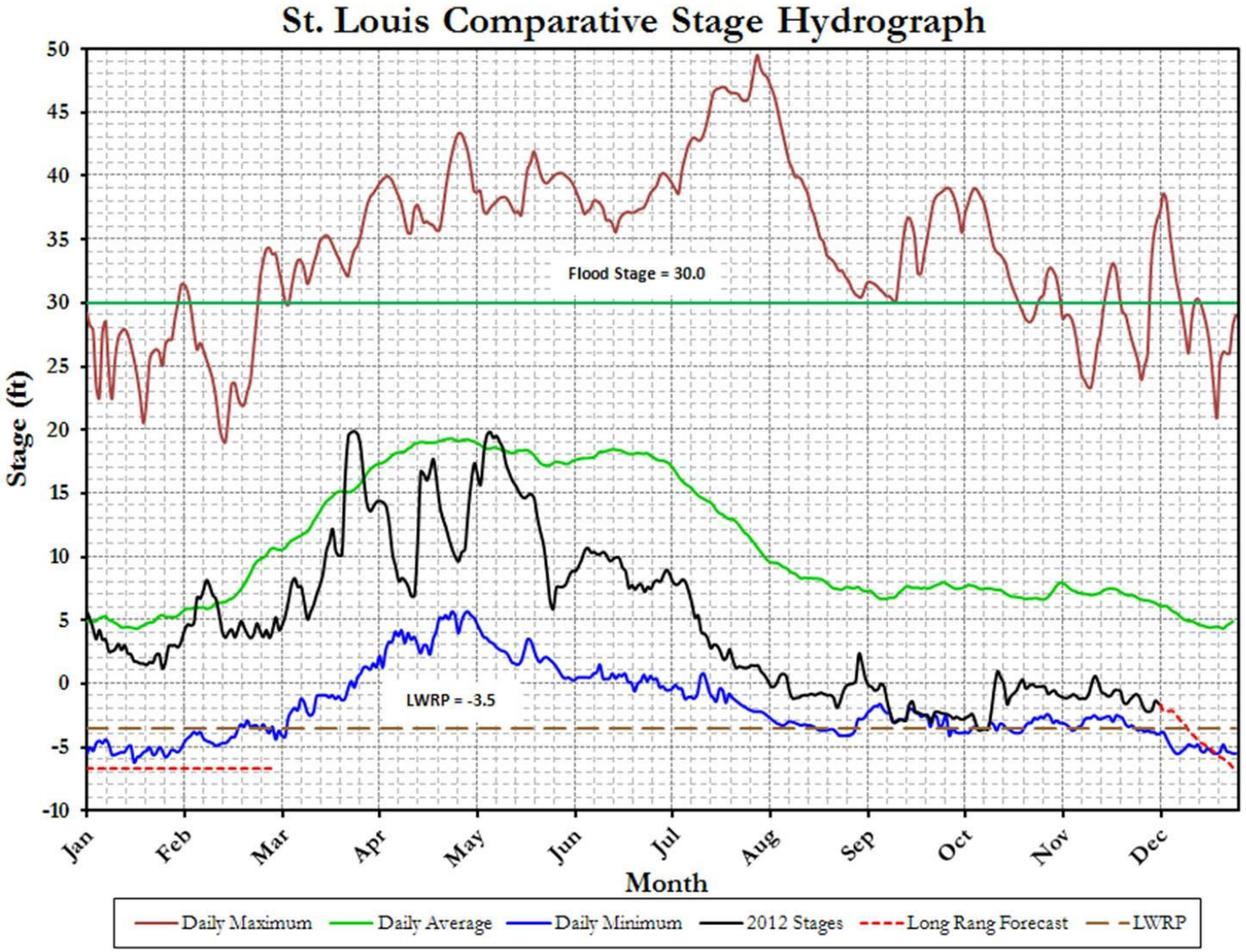

Figure 1: St. Louis, MO gage daily maximum, average, and minimum water levels for the period of record (Jan 1861 to present); and 2012 (current year) water level stages and projections compared to the Low Water Reference Plane (LWRP = -3.5; channel depth would be 9 foot) and flood level (30.00 feet).

1.3. Project Location

The proposed additional sites addressed in this SEA are located within the Thebes Gap Reach, MMR river miles (RM) 46.0 and 42.5, Scott County, Missouri, and Alexander County, Illinois. This reach is described in the 2006 EA and is incorporated by reference. Proposed rock removal will involve pinnacle rock within the navigation channel down to a bottom elevation of about -14.0 ft LWRP. This would then provide 9 ft of depth when the stage at the St. Louis gage is -7.0 ft. The location of the proposed additional rock pinnacle removal sites, descriptions of the rock to be removed, and approximate cubic yards of pinnacle rock to be removed are provided in Figures 2-9.

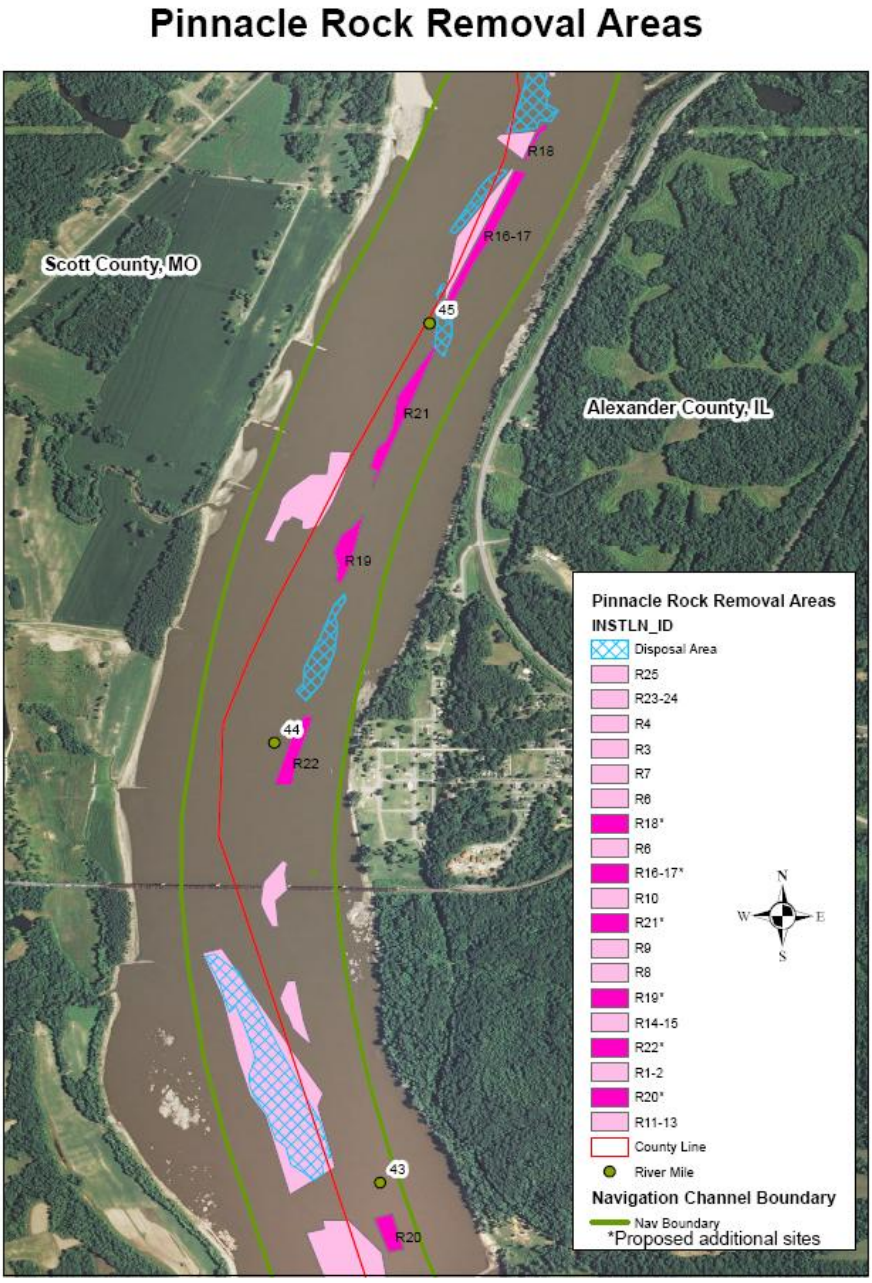

Figure 2. Location of pinnacle rock removal areas within the navigation channel of the MMR. The additional sites addressed in this SEA are shown in bright pink, and are indicated by an asterisk.

2. ALTERNATIVES CONSIDERED

Alternatives considered are "No Action" and "Pinnacle Rock Removal". Components of these alternatives were discussed in the 2006 and 2009 EAs and are incorporated by reference.

2.1. No Action Alternative

The "No Action" Alternatives implies that there is no Federal interest in the additional proposed sites and there would be no Federal action on these sites. As such, the existing conditions at these sites would remain the same. If water levels were to fall to the point that navigation would be endangered, then the Coast Guard, in coordination with the U.S. Army Corps of Engineers, would shut down the navigation channel. Residual traffic on the system would continue to move for some short period of time. During this period there is the potential for a towboat or barge grounding with the potential for a spill if the barge hull is ruptured. Although the risk is probably minimal, the environmental impacts could be catastrophic, depending on the cargo (i.e., hazardous material). Additionally, there are potential major, national economic implications of the No Action Alternative should the navigation channel close due to rock obstructions during low flow.

2.2. Pinnacle Rock Removal

The "Pinnacle Rock Removal" Alternative implies the use of explosive demolition and/or mechanical breakage, depending on the size and/or location of the additional pinnacle rock obstructions.

Explosive demolition methods are described in the 2006 EA and are incorporated by reference. Essentially, bore holes would be drilled, most likely using a drill rig or multiple drill rigs mounted on the side of a barge. The drill holes would then be loaded with explosives and stemmed with angular rock. The holes would be initiated with shock tube strung above the water surface leading to blasting caps at each hole. No detonation cord would be used.

Mechanical breakage methods involve using a mechanical device (i.e. rock punching or chiseling; hydrohammer; grinding) to break the obstructive pinnacle rock into pieces, which can then be left in place or moved to previously coordinated disposal areas (USACE 2006 EA). Although the use of alternative rock removal methods other than explosive demolition was eliminated from further consideration in the 2006 EA, specialists in rock removal currently consider it to be a viable alternative to explosive demolition on smaller pinnacle rock formations. Additionally, in the 2009 EA, "removal using mechanical dredging, rock punching or chiseling" was evaluated as a separate alternative to rock grinding, which would involve the use of a hydraulic cutter boom attachment or hydraulic rotary cutter. Because the methods and environmental impacts of all mechanical breakage methods are very similar in nature, and analogous to the 2009 impacts assessment of grinding (a mechanical measure) we are considering the use of these methods of mechanical breakage as a single alternative.

2.3. Project Schedule

The project to remove the additional rock described in this supplemental EA could begin as soon as environmental compliance and regulatory authorization is completed. The rock

removal project is anticipated to begin in FY13, with completion by FY18; provided it does not exceed previously authorized limits.

Additionally within each year, blasting would only be conducted during the dates permitted by the USFWS Biological Opinion (BO) (as amended).

3. TENTATIVELY SELECTED PLAN

The U.S. Army Corps of Engineers is required to provide a safe and dependable navigation channel as authorized by the River and Harbor Acts of 1910, 1927, and 1930. This consists of a navigation channel 9-feet deep and not less than 300 feet wide with additional width in bends, from the mouth of the Ohio River to the mouth of the Missouri River. In order to meet the requirements of the Navigation Channel Project, removing the additional pinnacle rock from the navigation channel is the tentatively selected plan. Additionally, the projection that the *Middle Mississippi River will likely reach historic low levels sometime this winter*, increases the potential for a navigation accident or a catastrophic spill event if no action is taken. T

3.1. Additional Amount of Material to be Removed - The total additional volume of rock pinnacles and shelf outcroppings to be removed amounts to approximately 2000 cubic yards (Figures 4-9). This results in a total volume of approximately 6700-7000 cy of pinnacle rock which would be removed from the navigation channel of the MMR (Figure 2). To put this value in perspective, a chevron dike constructed on the MMR for either channel maintenance or environmental purposes requires 5,500 cubic yards per structure. The amount of material is minimal.

3.2. Project Location: Additional Rock Removal Areas - Additional areas of pinnacle rock proposed to be removed from the navigation channel are located between MMR river miles 46.0 and 42.5, in the Thebes Gap Reach. This reach is described in the 2006 EA and is incorporated by reference.

Location of the rock removal sites, descriptions of the rock to be removed, and amounts are provided in Figures 2-9.

3.3. Removal and Disposal Requirements - The removal and disposal requirements are discussed in the 2006 EA and are incorporated by reference. Potential disposal areas for the Thebes Gap Reach (River Miles 46-38) are indicated by the yellow polygons shown in Figure 10. The additional amount of rock to be removed could still be accommodated by disposal sites discussed in the 2006 EA.

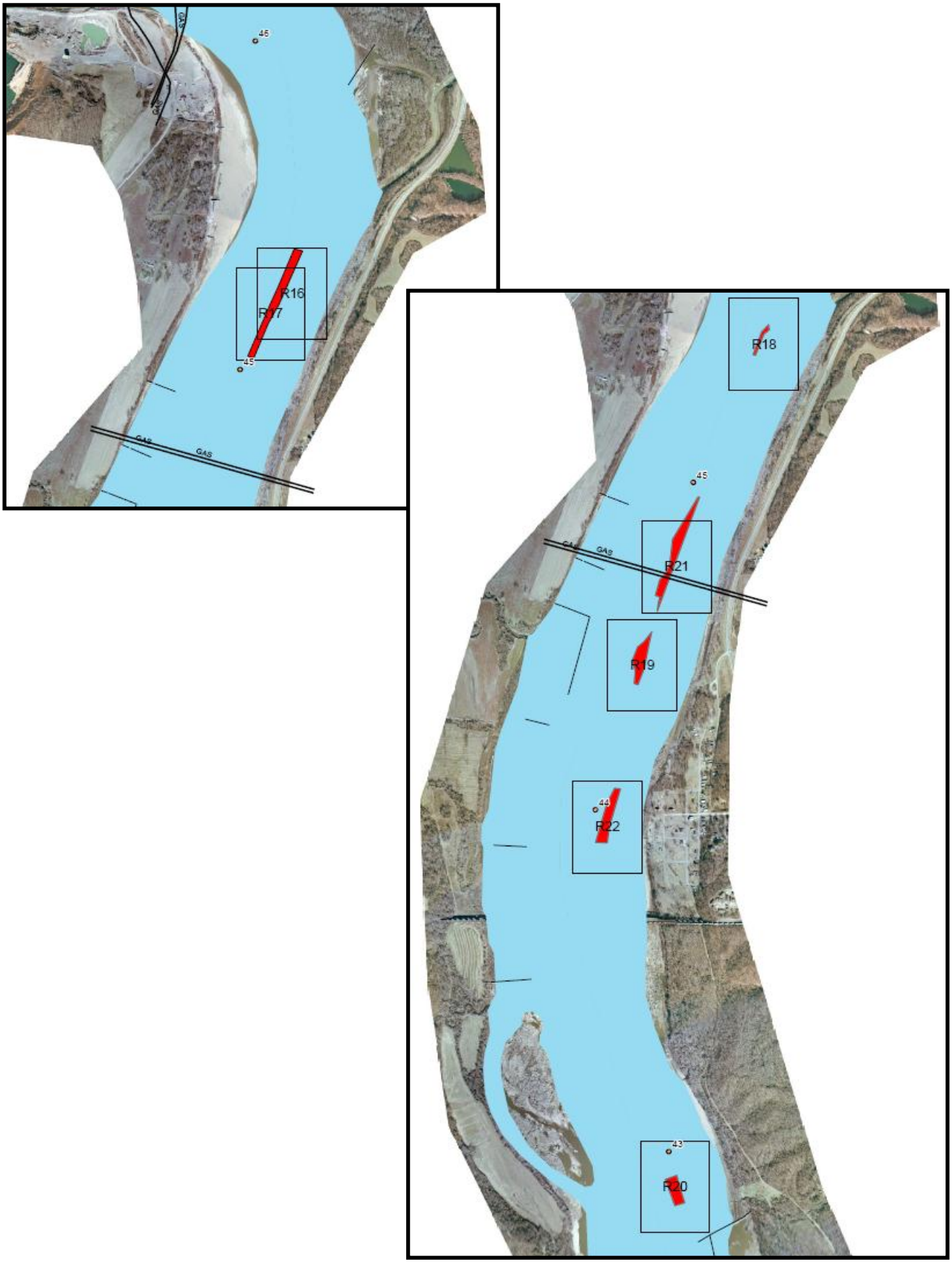

Figure 3. Aerial Photograph of work sites near MMR river mile 42.0-46.0.

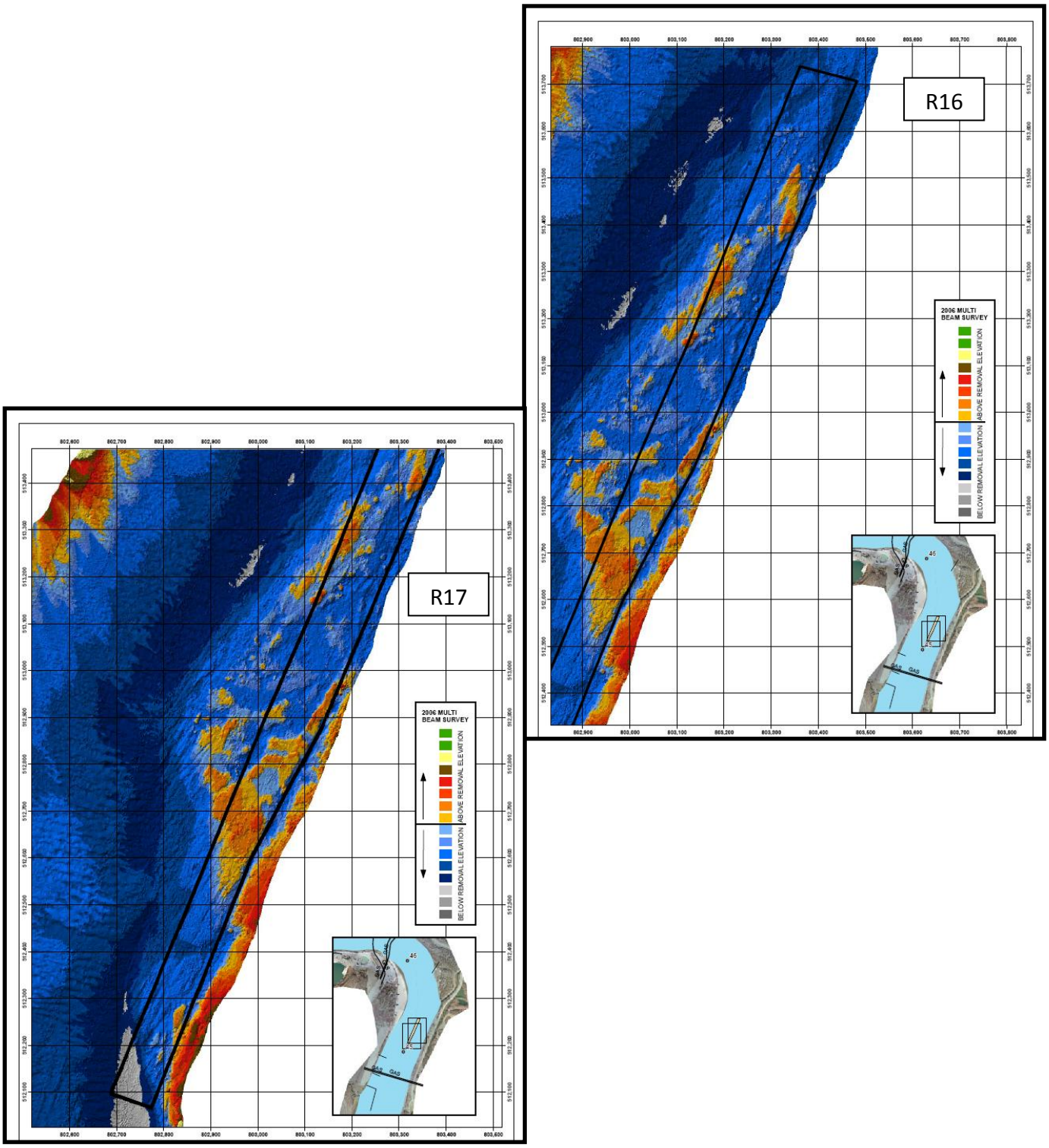

Figure 4. Work Area R16-R17 is located at approximately MMR River Mile 45.0-45.4. This work area consists of both limestone shelf rock and pinnacle rock. All material above an elevation of 291.6 ft NGVD 1929 is to be removed. The estimated quantity of material to be removed is 1188 cubic yards.

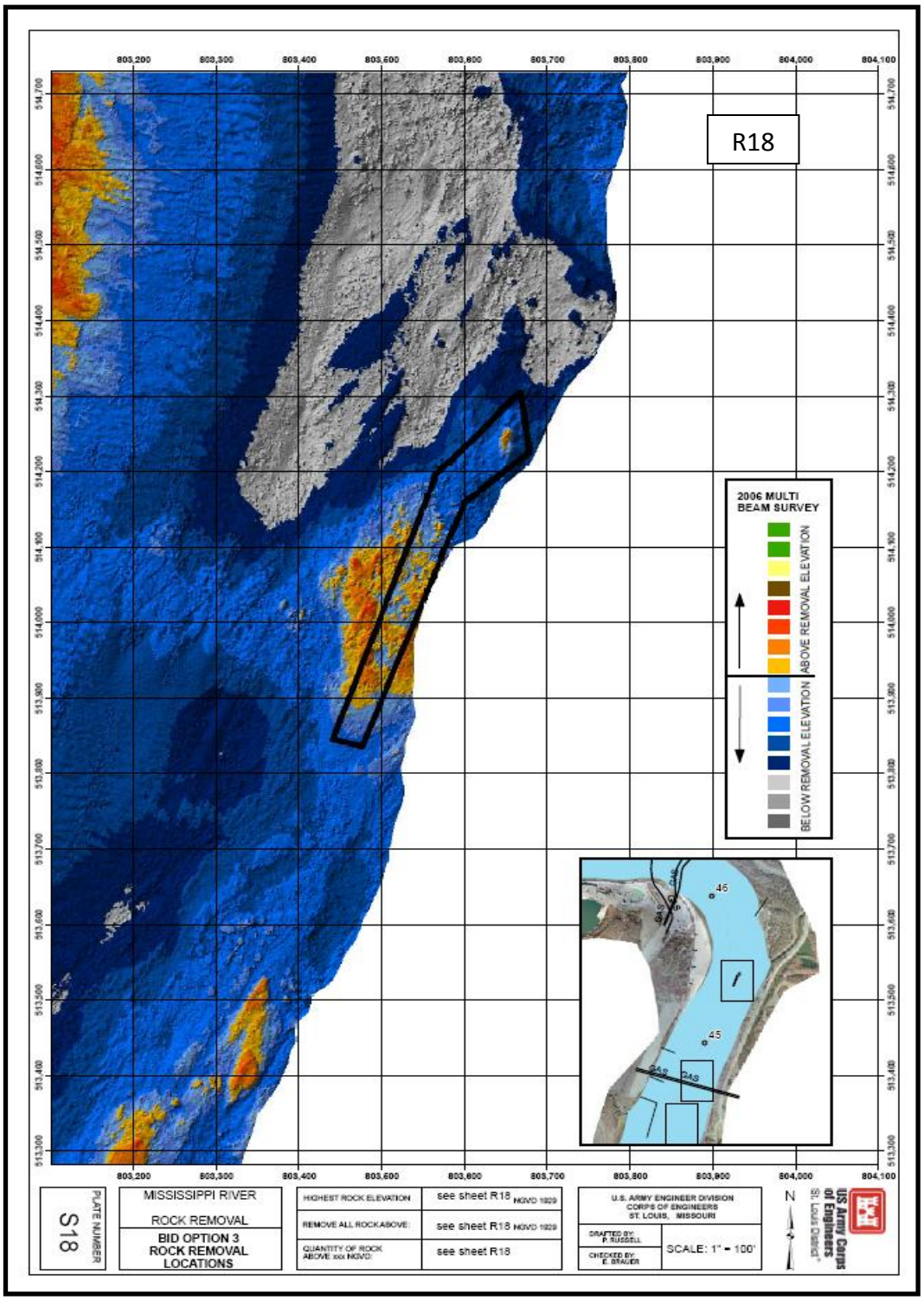

Figure 5. Work Area R18 is located at approximately MMR River Mile 45.4-45.5. This work area consists of both limestone shelf rock and pinnacle rock. All material above an elevation of 291.7 ft NGVD 1929 is to be removed. The estimated quantity of material to be removed is 161 cubic yards.

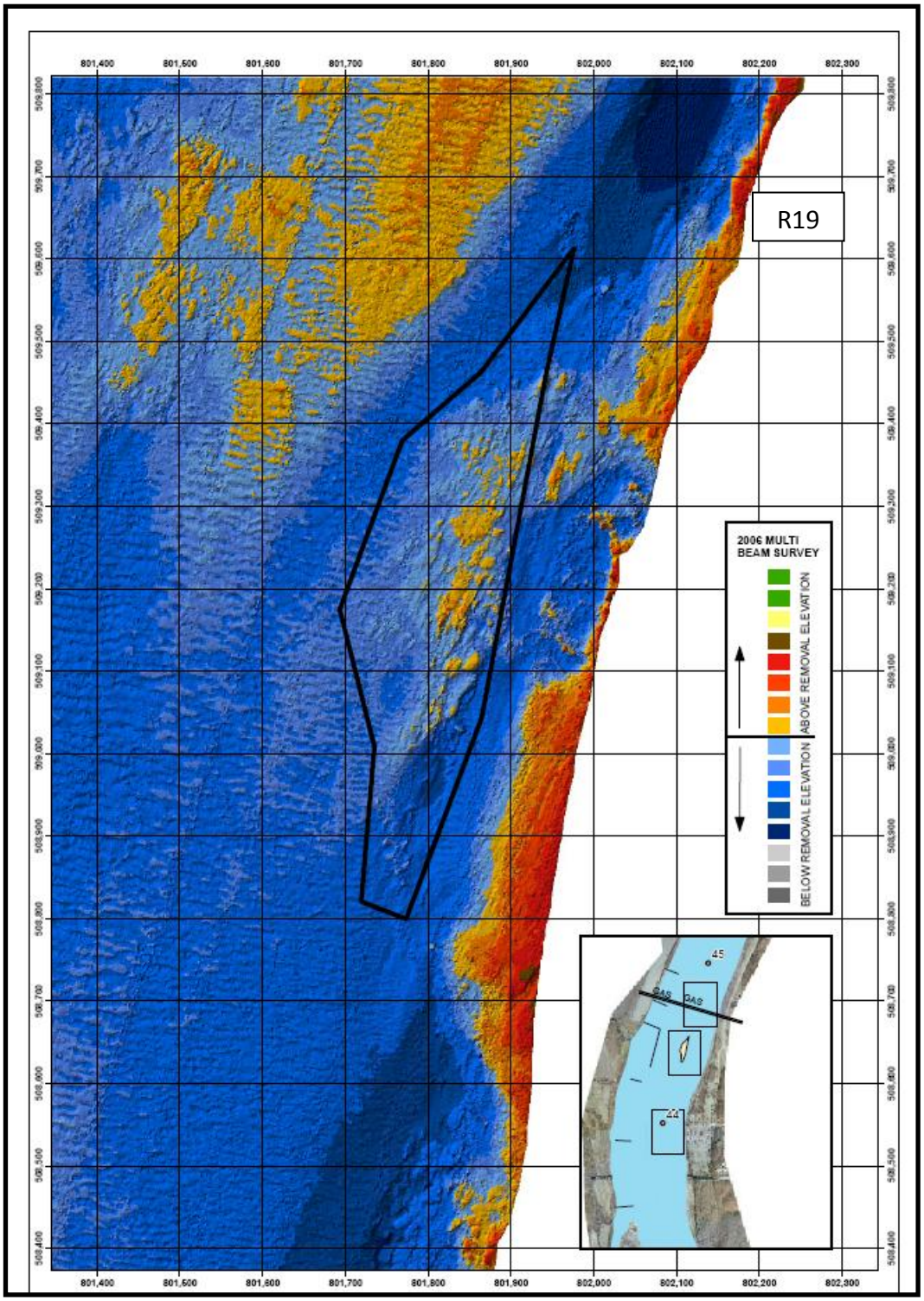

Figure 6. Work Area R19 is located at approximately MMR River Mile 44.5-44-3. This work area consists of both limestone shelf rock and pinnacle rock. All material above an elevation of 291.3 ft NGVD 1929 is to be removed. The estimated quantity of material to be removed is 123 cubic yards.

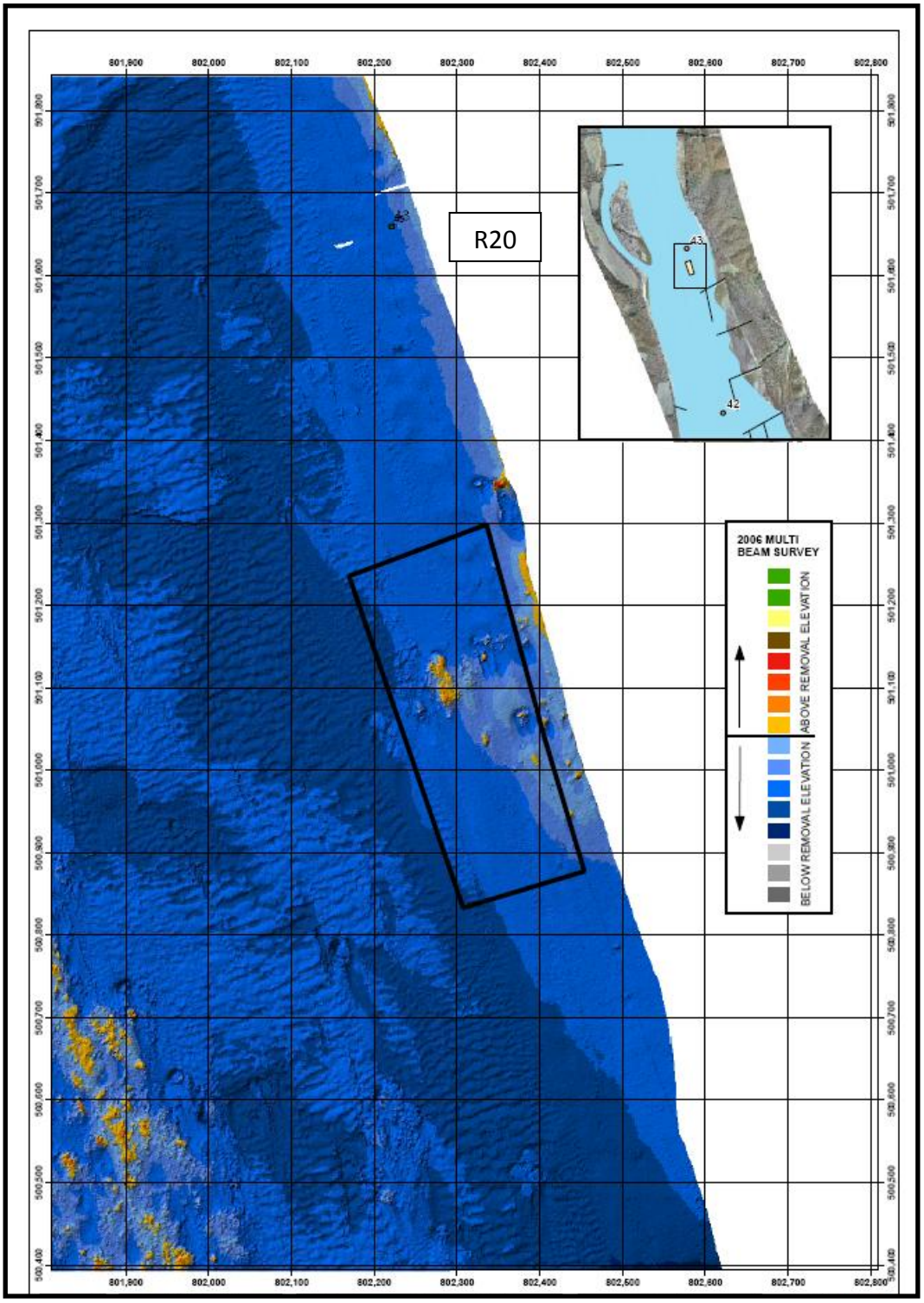

Figure 7. Work Area R20 is located at approximately MMR River Mile 42.8-42.9. This work area consists of both limestone shelf rock and pinnacle rock. All material above an elevation of 290.1 ft NGVD 1929 is to be removed. The estimated quantity of material to be removed is 19 cubic yards.

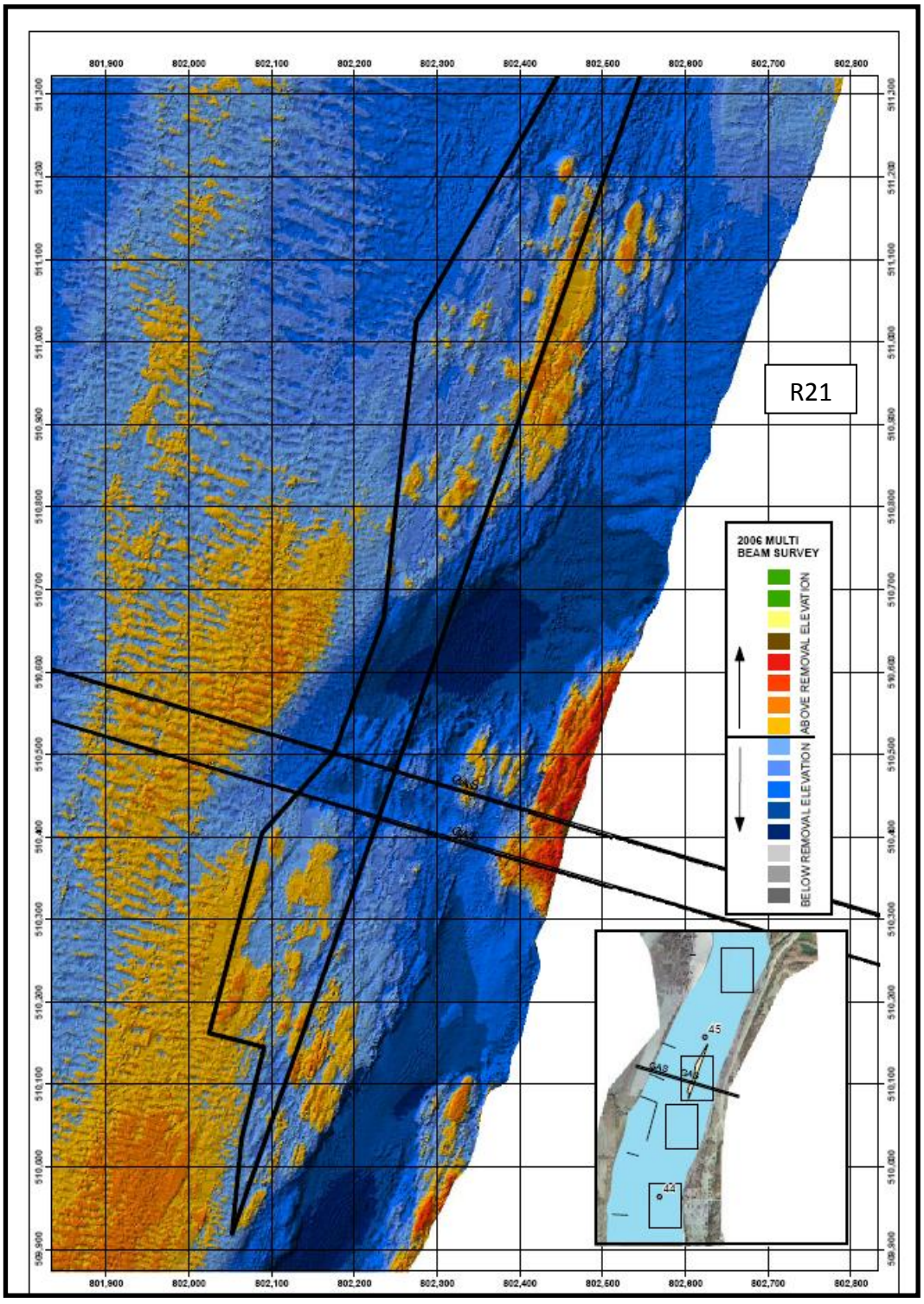

Figure 8. Work Area R21 is located at approximately MMR River Mile 45.0-43.9. This work area consists of both limestone shelf rock and pinnacle rock. All material above an elevation of 291.4 ft NGVD 1929 is to be removed. The estimated quantity of material to be removed is 474 cubic yards.

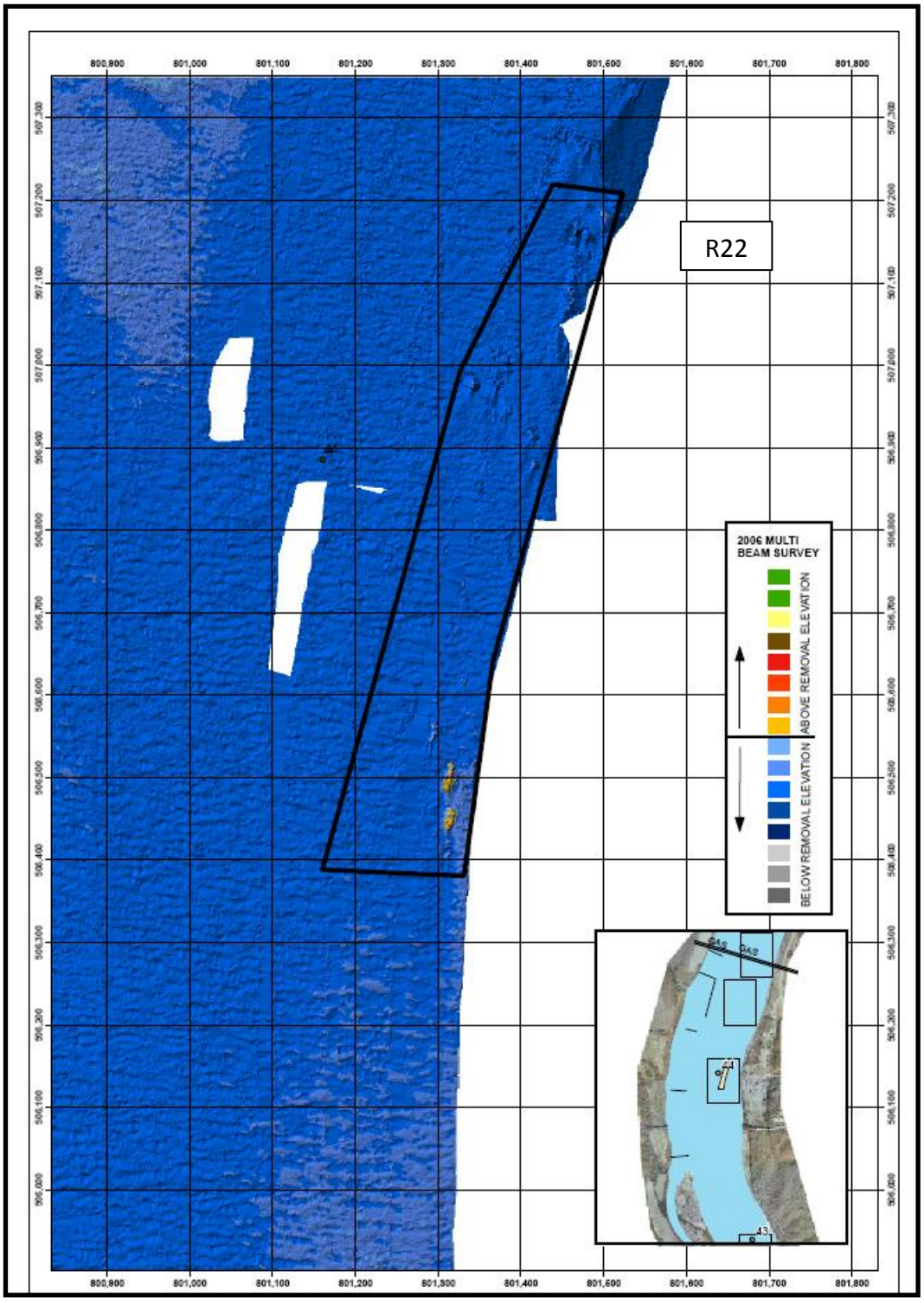

Figure 9. Work Area R22 is located at approximately MMR River Mile 43.9-44.1. This work area consists of limestone pinnacle rock. All material above an elevation of 291.0 ft NGVD 1929 is to be removed. The estimated quantity of material to be removed is 6 cubic yards.

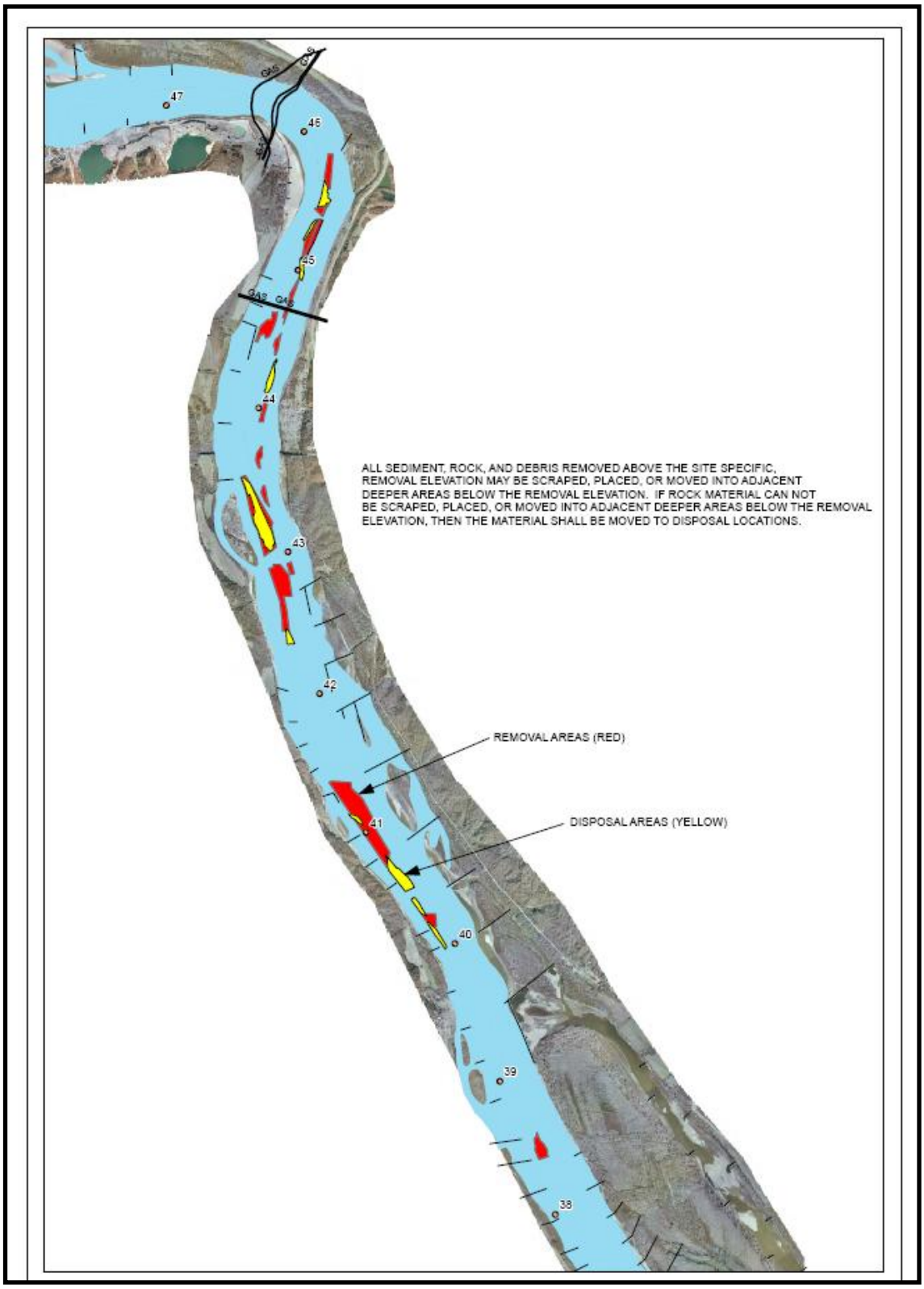

Figure 10. Potential disposal areas for the Thebes Gap Reach (River Miles 46-38) are indicated by the yellow polygons.

4. IMPACT ASSESSMENT

4.1. No Action Alternative

Impact assessment of the "No Action" alternative is discussed in Section 2.1 of this document, as well as in the 2006 and 2009 EAs and is incorporated by reference.

Should an accident occur during low water conditions, because no actions were taken to remove pinnacle rock, there is a potential (however small that might be) of a catastrophic spill event.

4.2. Pinnacle Rock Removal Alternative - Tentatively Selected Plan

Impact assessment of the tentatively selected plan, the Pinnacle Rock Removal Alternative, using explosive demolition is thoroughly discussed in the 2006 EA and is incorporated by reference. The impacts of adding additional sites and approximately 2000 cy of material have impacts similar to those of the 2006 recommended plan, but would be more extensive because more areas would have to be blasted and there would be increased volumes of material disposal. However, the additional sites are interspersed with the Thebes Gap Reach sites described in the 2006 documents, thus the impacts would occur in the same overall area described in the 2006 EA.

Impact assessment of the tentatively selected plan, the Pinnacle Rock Removal Alternative, using mechanical breakage is discussed in the 2009 EA and is incorporated by reference. The project impacts of mechanical breakage would be the same as the explosive demolition, with the exception that there would not be any impacts associated with the use of explosives. As such, impacts would be reduced at locations where mechanical breakage is feasible.

4.2.1. Water Quality Impacts

Water quality impacts are discussed in the 2006 and 2009 EAs and are incorporated by reference.

Explosive demolition - Short-term turbidity increases would be expected. However, these increases would be small considering the background levels. No major water quality impacts are expected from the use of explosives. The explosives themselves are consumed in the explosion producing water and a number of gases.

Mechanical Breakage - It is anticipated that the rock to be removed will be chipped into cobble or larger pieces depending on the formation. However, some fines will result. Short-term turbidity increases would be expected. However, these increases would be small and localized considering the existing suspended sediment background levels.

4.2.2. Physical Impacts

Physical impacts are discussed in the 2006 and 2009 EAs and are incorporated by reference.

The majority of the work to be conducted will involve removal of rock pinnacles and rock outcroppings. Rock pinnacles, where practical, will be dropped in place. Larger amounts of rock will be moved to disposal areas as previously discussed. The volumes of rock to be removed are small and the impacts from these actions are considered minor.

4.2.3. Terrestrial Impacts

Terrestrial impacts are discussed in the 2006 and 2009 EAs and are incorporated by reference.

The project will be conducted entirely in the water. All work will be conducted from work barges. As such, there are no anticipated impacts to the terrestrial environment.

4.2.4. Archaeological Impacts

Archival review of historic shipwreck inventory survey reports suggest that the proposed Mississippi River pinnacle rock removal and off-channel lithic debris relocation would occur near the reported location of the structural remains of an historic wreck site. Aerial archaeological surveys of both bankline locations and in-stream bar deposits conducted during historical low water episodes during 1988 and 1989 by the St. Louis District, found no evidence of any potentially significant archaeological or historic remains within the proposed project area boundaries. Compliance with Section 106 of the National Historic Preservation Act (1966 as amended) has been conducted by means of coordination and consultation with Missouri and Illinois State Historic Preservation Offices.

4.2.5. Recreational Impacts

Recreational impacts are discussed in the 2006 and 2009 EAs and are incorporated by reference.

Rock removal will be confined to a small geographical area and is not expected to have any major impacts on recreational river use.

4.2.6. Infrastructure Impacts

Existing infrastructure (i.e., pipelines, railroad bridge) in both the Grand Tower and Thebes Gap Reaches, as well as measures required to avoid impacts during pinnacle rock removal are described in detail in the USACE contract documents and are incorporated by reference. Measures include, but are not limited to, submission of a general plan for approval for all drilling and blasting; individual blast plans for each blast to be performed; employment of a certified seismic specialist trained in vibration control methods and capable of analyzing results obtained from blasting seismographs, and with experience in rock excavation dredging projects near vibration sensitive foundations where duties include designing blast plans, and predicting ground vibrations, air blast and fly rock; employment of a blasting specialist and a seismograph operator. With the measures described in the USACE contract documents in place, pinnacle rock removal is not expected to have any impacts on existing infrastructure.

4.2.7. Biological Impacts

Biological impacts are discussed in the 2006 and 2009 EAs and their associated Biological Assessments (BA), and are incorporated by reference.

Explosive demolition - Bore holes would be drilled, most likely using a drill rig or multiple drill rigs mounted on the side of a barge. The drill holes would then be loaded with explosives and stemmed with angular rock. The holes would be initiated with shock tube strung above the water surface leading to blasting caps at each hole. No detonation cord would be used. A thorough analysis of fish and bird injury and mortality are discussed in the 2006 EA and is incorporated by reference.

Mechanical Breakage - It is anticipated that the head of the mechanical breakage equipment would be avoided by young-of-year, juvenile, and adult fish. The hammering action of the mechanical unit would likely produce noise that would result in fish avoidance. Should rock removal continue into the spawning season, due to unforeseen circumstances, larval fish could potentially be injured or killed by the unit head. However, the area of actual work (moving unit head) is very small and the impacts should be minimal. Some benthic invertebrates could be displaced or killed by the rock removal.

Biological impacts are not anticipated to be different due to the incorporation of these additional pinnacle rock removal sites.

4.2.8. Threatened and Endangered Species

Background Information - Programmatic Endangered Species Compliance:

A programmatic (Tier I) consultation, conducted under Section 7 of the Endangered Species Act, considered the systemic impacts of the Operation and Maintenance of the 9-Foot Channel Navigation Project on the Upper Mississippi River System on listed species as projected 50 years into the future (USFWS 2000). The 2000 Biological Opinion presented the Service's evaluation of the impacts of operation and maintenance on seven species: the decurrent false aster *(Boltonia decurrens),* the Higgins' eye pearly mussel *(Lampsilis higginsi),* the winged mapleleaf mussel *(Quadrula fragosa*), the pallid sturgeon *(Scaphirhynchus albus),* the least tern *(Sterna antillarum),* the bald eagle *(Haliaeetus leucocephalus),* and the Indiana bat *(Myotis sodalis).* The consultation did not include individual, site specific project effects or new construction. It was agreed that site specific project impacts and new construction impacts would be handled under separate Tier II consultations. Although channel maintenance dredging impacts were covered under the Tier I consultation, rock removal is not considered as a normal channel maintenance technique.

Background Information - Project Specific Endangered Species Compliance:

In November 2006, a Tier II Biological Assessment evaluating the potential impacts of the drilling and blasting (a previous tentatively recommended plan) on the bald eagle, least tern, and pallid sturgeon was conducted by the USACE St. Louis District and provided to the U.S. Fish and Wildlife Service (USACE 2006). The BA provided a number of proposed mitigation measures to be employed to reduce blasting effects. After reviewing the effects of the

proposed project, the St. Louis District made the determination that the project "***may affect but is not likely to adversely affect"*** the bald eagle or least tern. Based on the density of pallid sturgeon in the Middle Mississippi River and the use of avoid and minimize techniques, it was the St. Louis District's opinion that project impacts will be minor. However, there is not a 100% guarantee that a pallid sturgeon could not be injured or killed during the rock removal and disposal activities. For that reason, the District made the determination that the project "***may affect and is likely to adversely affect"*** the pallid sturgeon. A Biological Opinion concurring with USACE determinations, and including Reasonable and Prudent Measures to protect endangered species at risk was provided by the U.S. Fish and Wildlife Service (February 2007). The BO contained an Incidental Take Statement for pallid sturgeon, based on the removal of 4,600-4,700 cy of pinnacle rock material.

In 2009, a Tier II Biological Assessment (integrated with the 2009 EA) evaluating the potential impacts of mechanical grinding to remove pinnacle rock was conducted by the St. Louis District and provided to the U.S. Fish and Wildlife Service (USACE 2009). Based on the best available scientific information (small impact zone, probable avoidance of the site by pallid sturgeon), the District made the determination that the project "***may affect but is not likely to adversely affect"*** the pallid sturgeon. The Service concurred with the new approach and determination during Section 7 Consultation.

Section 7 Compliance for the Additional Pinnacle Rock Material:

In compliance with Section 7(c) of the Endangered Species Act of 1973, as amended, on 7 December 2012 the St. Louis District consulted via phone with Mr. Matthew Mangan of the U.S. Fish and Wildlife Service (USFWS) Marion, IL field office to provide a listing of federally threatened or endangered species currently classified or proposed for classification that may occur in the vicinity of the proposed Pinnacle Rock Removal project. The USFWS stated that the species identified in Table 1 have the potential to be found in Scott County, Missouri and/or Alexander County, Illinois. There is no designated critical habitat in the project area at this time.

Table 1. Federally threatened, endangered, or candidate species potentially occurring in Scott County, Missouri and/or Alexander County, Illinois.

Common Name	Scientific Name	Status	County	Habitat
Gray bat	*Myotis grisecens*	FE	A	Caves and mines; rivers & reservoirs adjacent to forests
Indiana bat	*Myotis sodalis*	FE	S, A	Caves, mines (hibernacula); small stream corridors with well developed riparian woods; upland forests (foraging)
Pallid sturgeon	*Scaphirhynchus albus*	FE	S, A	Large rivers
Least tern	*Sterna antillarum*	FE	S, A	Bare alluvial and dredged spoil islands
Rabbitsfoot mussel	*Quadrula cylindrica cylindrica*	PFT	A	Ohio River
Sheepnose mussel	*Plethobasus cyphyus*	FE	A	Shallow areas in larger rivers and streams

FE – Federally endangered, FT – Federally threatened, PFT – Proposed as Federally threatened
S – Scott County, MO; A – Alexander County, IL

Gray bat (*Myotis grisecens*)
The gray bat is listed as endangered and occurs in several Illinois and Missouri counties where it inhabits caves both during summer and winter. This species forages over rivers and reservoirs adjacent to forests. A search for this species should be made prior to any cave impacting activity. The St. Louis District has determined that the project "***may affect but not likely to adversely affect***" the gray bat.

Indiana bat (*Myotis sodalis*)
The endangered Indiana bat has been noted as occurring in several Illinois and Missouri counties. Indiana bats are considered to potentially occur in any area with forested habitat. Indiana bats migrate seasonally between winter hibernacula and summer roosting habitats. Winter hibernacula include caves and abandoned mines. Females emerge from hibernation in late March or early April to migrate to summer roosts. The Indiana bat is not anticipated to be in the project area during most of the project construction. The St. Louis District has determined that the project "***may affect but not likely to adversely affect***" the Indiana bat.

Pallid sturgeon (*Scaphirhynchus albus*)
The endangered pallid sturgeon is found in the Mississippi River downstream of Melvin Price Locks and Dam. Potential impacts to the pallid sturgeon were covered extensively in the November 2006 EA and BA, and the 2007 BO, and are incorporated by reference. The St. Louis District made the determination that the project "***may affect and is likely to adversely affect"*** the pallid sturgeon. The U.S. Army Corps of Engineers, St. Louis District sent a letter to the USFWS dated 11 December 2012 requesting re-initiation of formal consultation for the pallid sturgeon (*Scaphirhynchus albus*) in order to: 1) amend locations to include the additional pinnacle rock removal sites, and to increase the quantity of rock pinnacles / rock shelves to be removed by 2000 cy, for a total of approximately 6700-7000 cy; 2) modify the blasting work dates from "July and August or December, January and February" to "July and August and 1 November through 12 April" in order to be consistent with the "no dredging" restriction dates and avoid fall sturgeon migration; and 3) eliminate Terms and Conditions 2a, which required a study to investigate the effectiveness of repelling charges on "existing" (in 2006) radio tagged pallid sturgeon, since the implanted transmitters are no longer active.

The 2006 Biological Assessment and Biological Opinion included a study using existing radio tagged pallid sturgeon in the Middle Mississippi River to validate the effectiveness of repelling charges. This study is being cancelled since the implanted transmitters are no longer active. In 2006, radio tagged pallid sturgeon which were being used in other studies, were present in the Middle Mississippi River. Scientists had planned to use them in 2007 to evaluate the effectiveness of repelling charges on pallid sturgeon, but funding was withdrawn before the study could be conducted. At the present time, there are very few (<10) pallid sturgeon with active transmitters in the entire MMR (D. Herzog pers. comm., 16 Nov 2012). Based on recent conversations between USACE, USFWS, and the Missouri Department of Conservation, it was established that the requirements now necessary to conduct this study have the potential to be unreasonably detrimental to pallid sturgeon (i.e., collecting a sufficient number of pallids, implanting them with transmitters, pursuing them and setting off repelling charges near them).

The U.S. Fish and Wildlife Service provided a revised Biological Opinion, dated 17 December 2012. The BO: 1) concurs with the District's request to amend locations to include the additional pinnacle rock removal sites, and to increase the quantity of rock pinnacles / rock shelves to be removed by 2000 cy by FY 2018; 2) stated that the blasting contractor complete the proposed work during the low discharge period of July and August, and 1 November through 12 April; and 3) eliminated the requirement to investigate the effectiveness of repelling charges on "existing" (in 2006) radio tagged pallid sturgeon. The Incidental Take Statement, Reasonable and Prudent Measures, and Terms and Conditions section of the BO were revised accordingly.

Least tern (*Sterna antillarum*)
The least tern is a colonial, migratory waterbird, which resides and breeds along the Mississippi River during the spring and summer. Least terns arrive on the Mississippi River from late April to mid-May. Potential impacts to the interior least tern were covered extensively in the November 2006 EA and BA, and the 2007 BO, and are incorporated by reference. The St. Louis District made the determination that the project "***may affect but is not likely to adversely affect"*** the least tern.

Rabbitsfoot mussel (*Quadrula cylindrica cylindrica*)
The rabbitsfoot is a freshwater mussel found in rivers and streams. It is proposed to be listed as federally threatened. It is listed as potentially occurring in the Ohio River, Alexander County, Illinois. The rabbitsfoot mussel does not occur in the proposed project location, thus the St. Louis District made the determination that the project poses "**no effect**" to the rabbitsfoot mussel.

Sheepnose mussel (*Plethobasus cyphyus*)
The sheepnose mussel is listed as endangered. It lives in larger rivers and streams where it is usually found in shallow areas with moderate to swift currents flowing over coarse sand and gravel. The sheepnose mussel does not occur in the proposed project location, thus the St. Louis District made the determination that the project poses "**no effect**" to the sheepnose mussel.

5. MITIGATION ANALYSIS AND RECOMMENDATIONS

Mitigation analysis and recommendations are discussed in the 2006 and 2009 EAs, the 2006 BA, and the 2007 BO and are incorporated by reference. USACE will continue to comply with the Reasonable and Prudent Measures, and Terms and Conditions provided in the Biological Opinion (as amended).

6. CLEAN WATER ACT/RIVERS & HARBORS ACT COMPLIANCE

Clean Water Act/Rivers and Harbors Act compliance are discussed in the 2006 and 2009 EAs and are incorporated by reference.

The impact of the activity on the public interest will be evaluated in accordance with the Environmental Protection Agency guidelines pursuant to Section 404 (b)(1) of the Clean Water Act. This authorization will be processed under the provisions of Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) and Section 404 of the Clean Water Act (33 U.S.C. 1344).

7. INDIRECT & CUMULATIVE IMPACTS

Direct impacts were evaluated in the 2006 and 2009 EAs, and associated BAs. Indirect (Secondary Impacts) are not anticipated. Cumulative Impacts for the Navigation Project were extensively studied (WEST Consultants, Inc. 2000), and described in U.S. Corps of Engineers (2004). The additive impacts of the explosive demolition work as described and evaluated in the 2006 EA and BA, when considering cumulative effects as previously addressed, are not considered to be significant. The additive impacts of the mechanical breakage work as described and evaluated in the 2009 EA, when considering cumulative effects as previously addressed, are not considered to be significant.

8. GLOBAL CLIMATE CHANGE

Extreme weather events could lead to more extreme high or low water events in the Middle Mississippi River. If water levels fall to the point that navigation would be endangered, then the Coast Guard, in coordination with the U.S. Army Corps of Engineers, would shut down the navigation channel. There are potential major, national economic implications of navigation channel closure due to rock obstructions during low flow conditions. Additionally, during low water periods, there is increased potential for a towboat or barge grounding with the potential for a spill if the barge hull is ruptured. The environmental impacts could be catastrophic, depending on the cargo (i.e., hazardous material).

9. RELATIONSHIP OF PLAN TO ENVIRONMENTAL REQUIREMENTS

Table 2 summarizes the project's compliance status with respect to applicable statutes.

Table 2. Federal Policy Compliance Status.

Federal Policy	Compliance Status
Archaeological and Historic Preservation Act, as amended, 16 USC 469, et seq.	N/A
Bald and Golden Eagle Protection Act, 42 USC 4151-4157	Full
Clean Air Act, 42 USC 7401-7542	Full
Clean Water Act, 33 USC 1251-1375	Full
Comprehensive Environmental Response, Compensation, and Liability Act, 42 USC 9601-9675	Full
Endangered Species Act, 16 USC 1531-1543	Full
Federal Water Project Recreation Act, as amended, 16 USC 4601, et seq.	Full
Fish and Wildlife Coordination Act, 16 USC 661-666c	Full
Food Security Act of 1985, 7 USC varies	N/A
Land and Water Conservation Fund Act, 16 USC 460d-461	N/A
National Environmental Policy Act, 42 USC 4321-4347	Partial[3]
National Historic Preservation Act, 16 USC 470 et seq.	Full
Noise Control Act, 42 USC 7591-7642	Full
Migratory Bird Treaty Act of 1918, 16 USC 703-712	Full
Resource Conservation and Recovery Act, 42 USC 6901-6987	Full
Rivers and Harbors Act, 33 USC 401-413	Full
Water Resources Development Acts of 1986, 1990, 2000 and 2007	Full
Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (EO 12898)	Full
Floodplain Management (EO 11988 as amended by EO 12148)	Full
Prevention, Control, and Abatement of Air and Water Pollution at Federal Facilities (EO 11282 as amended by EOs 11288 and 11507)	Full
Protection and Enhancement of Environmental Quality (EO 11991)	Full
Protection of Wetlands (EO 11990 as amended by EO 12608)	N/A
Protection and Enhancement of the Cultural Environment (EO 11593)	Full
Protection of Migratory Birds (EO 13186)	Full

[1]Full compliance will be attained after all required archaeological coordination has been completed.
[2]Full compliance will be attained upon completion of coordination with state and/or federal agencies
[3]Full compliance will be attained upon completion of public review and signing of decision document.

10. COORDINATION, PUBLIC VIEWS, AND RESPONSES

Notification of this Supplemental Environmental Assessment and unsigned Finding of No Significant Impact were placed on the USACE St. Louis District website for a 30 day public review and comment on 14 December 2012. The electronic versions of these documents were available online at **http://www.mvs.usace.army.mil/pm/pm-reports.html**, or a request for a copy of the EA and FONSI could be made.

Comments received are included in the project file, and are summarized below:

- A letter from the U.S. Fish and Wildlife Service, dated 15 January 2013, stating that "with the implementation of the various conservation measures and mitigation techniques described in the 2006 EA and referenced in the SEA, the Service concurs with the Corps' FONSI".

- An e-mail from the Missouri Department of Conservation, dated 18 January 2013, stating that "The Department concurs that the recommended plan will not have significant adverse effects on the natural resources of this Mississippi Reach, and we have no objection with the work proceeding as described.

- An e-mail from the Illinois Department of Natural Resources, dated 12 January 2013, stating "We concur with your assessment that the recommended plan will not have significant adverse effects on the environmental quality of this Mississippi River reach and will reduce the likelihood of the catastrophic towboat grounding which could adversely affect said environmental quality. Therefore, we have no objection to the implementation of the recommended plan".

- A letter from the Illinois Department of Agriculture, dated 21 December 2012, stating that "Based upon the information contained in the SEA, the IDOA fully supports the "TENTATIVELY SELECTED PLAN" for the removal of additional rock between MMR river miles 46.0 and 42.5, in the Thebes Gap Reach. Further, the IDOA also supports the use of the potential areas designated for rock disposal in the Thebes Gap Reach between river miles 46-38. We understand that there will be no impacts to agricultural resources and agricultural operations in conjunction with the Corps' recommended plan".

- A letter from the Illinois Historic Preservation Agency, dated 14 November 2012, stating that "We have reviewed the documentation submitted for the referenced project(s) in accordance with 36 CFR Part 800.4. Based upon the information provided, no historic properties are affected. We, therefore, have no objection to the undertaking proceeding as planned".

- A letter from the State of Missouri Department of Natural Resources, dated 10 December 2012, stating that "We have reviewed the information provided concerning the above referenced project. We concur with your determination that the removal and

disposal of rock outcrops in the Grand Tower and Thebes reaches of the Middle Mississippi River, with buffer zones to be established as needed, will have no adverse effect on properties that may be eligible for inclusion in or are listed in the National Register of Historic Places".

- A letter from the United State Environmental Protection Agency, dated 11 January 2013, identified three main issues:

  - *USEPA Issue 1: "…none of the documents addressed the possibility of raising stage through the target reaches by increased releases from tributary reservoirs. Raising the river stage would meet the project purpose. At a minimum, an early determination of the reasonableness of raising the stage instead of removing rock outcroppings could have been undertaken in one of the documents and either dismissed or carried forward for analysis".*

    The District responded in a letter dated 30 January 2013, stating that the Missouri River is managed for several primary purposes, including recreation, water supplies, hydropower and Missouri River navigation. Since aiding navigation on the Mississippi River is not a primary purpose of the Missouri River Basin nor is such aid provided in the Corps' Missouri River Master Manual due to the current drought conditions, the Corps cannot legally release water from Missouri River reservoirs to benefit navigation on the Mississippi River unless authorized to do so, and current authority for such releases does not presently exist. Furthermore, during periods of low water when the pinnacle rocks pose a potential hazard to commercial navigation traffic on the Middle Mississippi River, the amount of water required to meet the Missouri River authorized uses *plus* increase Middle Mississippi River water levels for an extended period of time is simply not available in the basin. Thus, an alternative of simply raising the river stage over a long term in order to maintain a safe and reliable navigation channel as authorized within the Middle Mississippi River during a wide spread drought is not a viable nor legal option.

  - USEPA Issue 2: "*We recommend the 2012 SEA document existing infrastructure in both the Grand Tower and Thebes Gap Reaches, assess the potential for direct impacts to infrastructure from drilling and blasting, and describe measures taken to avoid disruption of services in a revised 2012 SEA*".

    The District responded in a letter dated 30 January 2013, that "Existing infrastructure (i.e., pipelines, railroad bridge) in both the Grand Tower and Thebes Gap Reaches, as well as measures required to avoid impacts during pinnacle rock removal are described in detail in the USACE contract documents. A paragraph addressing this issue has been added to the final version of the SEA. Item "o" has been added to the FONSI".

- USEPA Issue 3: "*The 2012 SEA, Section 8, addresses Global Climate Change and the potential for continuing drought further lowering the river stage through the Middle Mississippi River in these and other reaches. The 2012 SEA did not indicate whether additional rock outcropping removals might be authorized under these circumstances at these sites or additional sites and in other reaches. The cumulative impact of multiple and repeated drilling and blasting in these and other reaches in response to falling river stages in the future should be analyzed prior to initiating future action beyond these projects to lower the river bed and/or destroy rock structures within and along the navigation channel*".

  The District responded in a letter dated 30 January 2013, stating that "With the exception of the Grand Tower and Thebes Gap reaches, the river bottom of the Middle Mississippi River is composed primarily of loose sediment. Currently, the District does not anticipate the need to request authorization for additional drilling and blasting for rock removal at these sites or additional sites or in other reaches. We concur that cumulative impact of multiple and repeated drilling and blasting in these and other reaches in response to possible future falling river stages should be analyzed prior to initiating future action beyond these projects to lower the river bed and/or destroy rock structures within and along the navigation channel".

The FONSI summarizes the anticipated effects of the project on the environment, and is unsigned during the public review period. The FONSI will be signed into effect only after comments received as a result of the public review have been carefully considered. A signed FONSI is required before implementation of the project can occur.

To assure compliance with the National Environmental Policy Act, Endangered Species Act and other applicable environmental laws and regulations, coordination with the appropriate state and federal agencies would continue as required throughout the planning and construction phases of the proposed project.

11. LIST OF PREPARERS

Preparers are discussed in the 2006 and 2009 EAs and are incorporated by reference. Additional preparers of the 2012 EA include:

Teri C. Allen, Ph.D., Aquatic Ecologist, Certified Fisheries Professional
Experience: 11 years Environmental Branch, USACE; 10 years private sector
Role: EA Coordinator, Environmental Impact Analysis, NEPA and Environmental Compliance

Alan R. Edmondson., Forester, Project Manager
Experience: 12 years Regulatory Branch, USACE
Role: Regulatory Compliance

Dawn Lamm, Hydraulic Engineer
Experience: 3 years Regulatory Branch, 12 years Hydraulics Branch, USACE
Role: Engineering Coordinator

Michael T. Rodgers, PE, Hydraulic Engineer
Experience: 11 years Hydraulics Branch, USACE
Role: Project Manager for River Works Projects

Peter Russell, PE, Hydraulic Engineer
Experience: 4 years Hydraulic Branch, USACE
Role: Technical Lead

Mark A. Smith, Ph.D., Archaeologist
Experience: 25 years private sector; USACE Curation and Archives Analysis Branch
Role: GIS Coordinator

12. REFERENCES

References are discussed in the 2006 and 2009 EAs and the 2006 BA and are incorporated by reference. The 2006 and 2009 documents can be located on the U.S. Army Corps of Engineers St. Louis District website at **http://www.mvs.usace.army.mil/pm/pm-reports.html.**

FINDING OF NO SIGNIFICANT IMPACT

REMOVAL OF ROCK PINNACLES AND OUTCROPPINGS CONSIDERED TO BE NAVIGATION OBSTRUCTIONS DURING LOW-FLOW PERIODS ON THE MIDDLE MISSISSIPPI RIVER – JANUARY 2013

1. I have reviewed and evaluated the documents concerning the proposed removal of additional rock pinnacles and outcroppings located within the Thebes Gap Reach of the Middle Mississippi River, between river miles 46.0 and 42.5, Scott County, Missouri, and Alexander County, Illinois. Recent state-of-the-art hydrographic surveys have found a number of additional rock pinnacles and rock outcroppings that pose a potential hazard to commercial navigation traffic (safety hazard), a threat to close the navigation system due to low water (economic impact), and a threat to the environment (hazardous spill) if there was a towboat grounding.

2. I have also evaluated other pertinent data and information on rock removal. As part of this evaluation, I have considered the following project alternatives.

a. No Federal Action - The "No Action" Alternatives implies that there is no Federal interest in the additional proposed sites and there would be no Federal action on these sites. As such, the existing conditions at these sites would remain the same.

b. Pinnacle Rock Removal - This Alternative includes the use of explosive demolition and/or mechanical breakage, depending on the size and/or location of the additional rock obstructions, to remove approximately 2,000 cubic yards of rock.

3. The possible consequences of these alternatives have been studied for physical, environmental, cultural, social and economic effects, and engineering feasibility. Significant factors evaluated as part of my review include:

a. The additional volume of rock pinnacles and shelf outcroppings to be removed amounts to approximately 2,000 cubic yards (Figures 4-9 of SEA).

b. There are potential major economic implications should the navigation channel close due to rock obstructions during low flow.

c. Rock disposal methods and disposal areas have been coordinated with the U.S. Fish and Wildlife Service (Service), Missouri Department of Conservation, and Illinois Department of Natural Resources.

d. The total amount of rock being removed would not significantly change flows or flow patterns.

e. The fish kill radius associated with the confined blasting is estimated to be from 6 to 62 feet. A number of mitigation techniques are being deployed to reduce this potential for mortality.

f. The potential to impact birds flying over the blasting area is considered minimal. A bird would have to be within a few meters of a shock tube to be killed or injured. Because of the endangered status of the least tern, and the protected status of the bald eagle, a blast will not be initiated if any bird species is observed flying within 500 feet of the blast.

g. The project will be conducted entirely in the water. All work will be conducted from work barges. As such, there are no anticipated impacts to the terrestrial environment.

h. Rock removal will be confined to a small geographical area and is not expected to have any major impacts on recreational river use.

i. Short-term turbidity increases would be expected. However, these increases would be small considering the background levels. No major water quality impacts are expected from the use of explosives. The explosives themselves are consumed in the explosion producing water and a number of gasses.

j. Compliance with Section 106 of the National Historic Preservation Act (1966 as amended) has been conducted by means of coordination and consultation with Missouri and Illinois State Historic Preservation Offices.

k. The impact of the activity on the public interest has been evaluated in accordance with the Environmental Protection Agency guidelines pursuant to Section 404 (b)(1) of the Clean Water Act. This authorization will be processed under the provisions of Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) and Section 404 of the Clean Water Act (33 U.S.C. 1344).

l. The St. Louis District made the determination that the project poses "**no effect**" to the rabbitsfoot mussel or the sheepnose mussel; the project "***may affect but not likely to adversely affect***" the gray bat, the Indiana bat, and the least tern. Based on the density of pallid sturgeon in the Middle Mississippi River and the use of avoid and minimize techniques, it is the St. Louis District's opinion that project impacts will be minor. However, there is not a 100% guarantee that a pallid sturgeon could not be injured or killed during the rock removal and disposal activities. For that reason, the District made the determination that the project "***may affect and is likely to***

adversely affect" the pallid sturgeon. The District received a Biological Opinion with an Incidental Take Statement from the Service in 2007 for 4,700 cy of rock removal. The U.S. Army Corps of Engineers, St. Louis District sent a letter to the USFWS dated 11 December 2012 requesting re-initiation of formal consultation for the pallid sturgeon (*Scaphirhynchus albus*) in order to: 1) amend locations to include the additional pinnacle rock removal sites, and to increase the quantity of rock pinnacles / rock shelves to be removed by 2000 cy, for a total of approximately 6700-7000 cy; 2) modify the blasting work dates from "July and August or December, January and February" to "July and August and 1 November through 12 April" in order to be consistent with the "no dredging" restriction dates and avoid fall sturgeon migration; and 3) eliminate Terms and Conditions 2a, which required a study to investigate the effectiveness of repelling charges on "existing" (in 2006) radio tagged pallid sturgeon, since the implanted transmitters are no longer active. A revised BO from the USFWS, dated 17 December 2012, granted the requested modifications.

m. USACE will comply with the Reasonable and Prudent Measures, and Terms and Conditions provided in the Biological Opinion (as amended).

n. Numerous mitigation measures have been developed to avoid and minimize impacts and to validate the conclusions made during the Environmental Assessment(s) and Biological Assessment(s).

o. Impacts to existing infrastructure (i.e., pipelines, railroad bridge) are not anticipated.

4. Based on my analysis and evaluation of the alternative courses of action presented in the Supplemental Environmental Assessment, I have determined that the implementation of the recommended plan will not have significant effects on the quality of the environment. Therefore, an Environmental Impact Statement will not be prepared prior to proceeding with this action.

2/25/13
Date

Christopher G. Hall
Colonel, U.S. Army
District Commander