Implementation of the Biological Opinion

Annual Progress Report
Fiscal Year 2011

U.S. Army Corps of Engineers
Mississippi Valley Division
St. Louis District

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Background:

In April 1998, Region 3 of the U.S. Fish and Wildlife Service (FWS) and Mississippi Valley Division (MVD) of the U.S. Army Corps of Engineers (Corps) entered into formal Section 7 consultation under the Endangered Species Act. The consultation covered the continuation of operation and maintenance activities on the Upper Mississippi River Nine Foot Navigation Channel. Specifically addressed within the consultation were operation and maintenance direct effects, navigation traffic indirect effects, recreation indirect effects, and cumulative effects. The direct effects of operation and maintenance included navigation channel dredging, dike and revetment maintenance, water level management, and management of Corps lands. A 1998 baseline was established for the effects and a fifty-year evaluation period (to 2048) was used.

Formal consultation was concluded in August 2000, when the MVD Commander sent a letter to the Director of Region 3 FWS setting forth an implementation plan for the Corps project that would accommodate the findings of the FWS's Biological Opinion. The species of concern covered in the biological opinion that are germane to the St. Louis District include:

Decurrent False Aster – Likely to be adversely affected, but not jeopardized
Indiana Bat – Impacts offset by management actions; No incidental take
Interior Least Tern – Incidental take with Reasonable and Prudent Measures (RPM)
Pallid sturgeon – Jeopardy with Reasonable and Prudent Alternatives (RPA) and RPMs.

FY11 Activities:

The following is an outline of St. Louis District activities for fiscal year 2011. This was the eleventh year of implementation activities under the Biological Opinion.

1. **River Resources Action Team (RRAT) - Executive Team (RPA 2 & 4, Term and Condition 4, pallid sturgeon; Term and Condition 4, least tern).** The RRAT held a formal Executive Team conference call on 3 March 2011. Topics of discussion included potential locations for hydraulic sediment response models and status updates of current Biological Opinion funded work.

2. **River Resources Action Team – Technical Team (RPA 2 & 4, Term and Condition 4, pallid sturgeon; Term and Condition 4, least tern).** The Technical Team considered the September 13-14, 2011 boat trip as its yearly meeting. The RRAT annual coordination boat trip was held on a covered barge pushed by the MV Pathfinder as they traveled on the

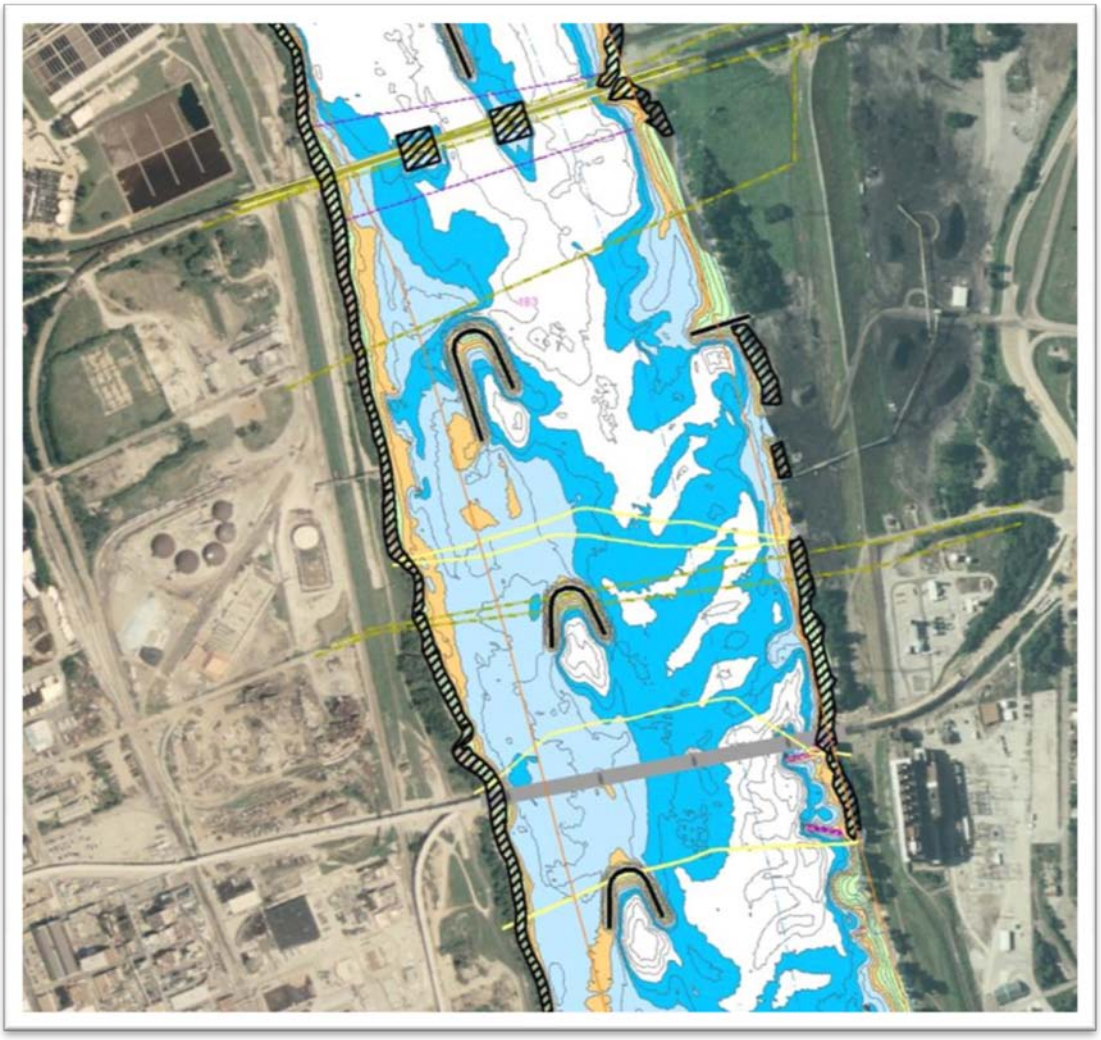
Middle Mississippi River from St. Louis to Cairo. A number of potential or active project sites were visited over the two-day trip. Topics discussed included river training structure construction and modification projects, ecosystem restoration projects, dredging program and flexible dredge pipe update, HSR model efforts, A&M program status, NESP status, EMP status, hydropower, BiOp program status and pallid sturgeon studies update, GAO review of the river training structures program, pinnacle rock removal, design considerations for MMR islands, and shovelnose sturgeon similarity of appearance listing.

3. **Pallid Sturgeon Habitat, Life History, and Population Demographics work (RPA 1, pallid sturgeon).** Current efforts are being conducted to quantify young-of-year pallid sturgeon habitat associations in the MMR. Field work and laboratory analyses in FY11 were completed by Southern Illinois University at Carbondale and the Missouri Department of Conservation. Activities included mini-Missouri trawling for collection of age-0 sturgeon and echosounding and Acoustic Doppler Current Profiling (ADCP) to characterize habitat associations. Genetic analysis is being conducted on all captured sturgeon in order to determine species. Approximately 300 age-0 sturgeon were captured in FY11; Genetic analysis is ongoing, but to date, no pallid sturgeon have been found. However, due to sample preservation issues, many of the FY11 sturgeon were unidentifiable with genetic analysis. A draft report will be submitted subsequent to completion of data analysis.

4. **Pallid Sturgeon Conservation and Restoration Plan (RPA 2, pallid sturgeon).** The development of this plan continued in FY11 to the extent possible exclusive of the results of ongoing studies. A draft plan is anticipated in FY12.

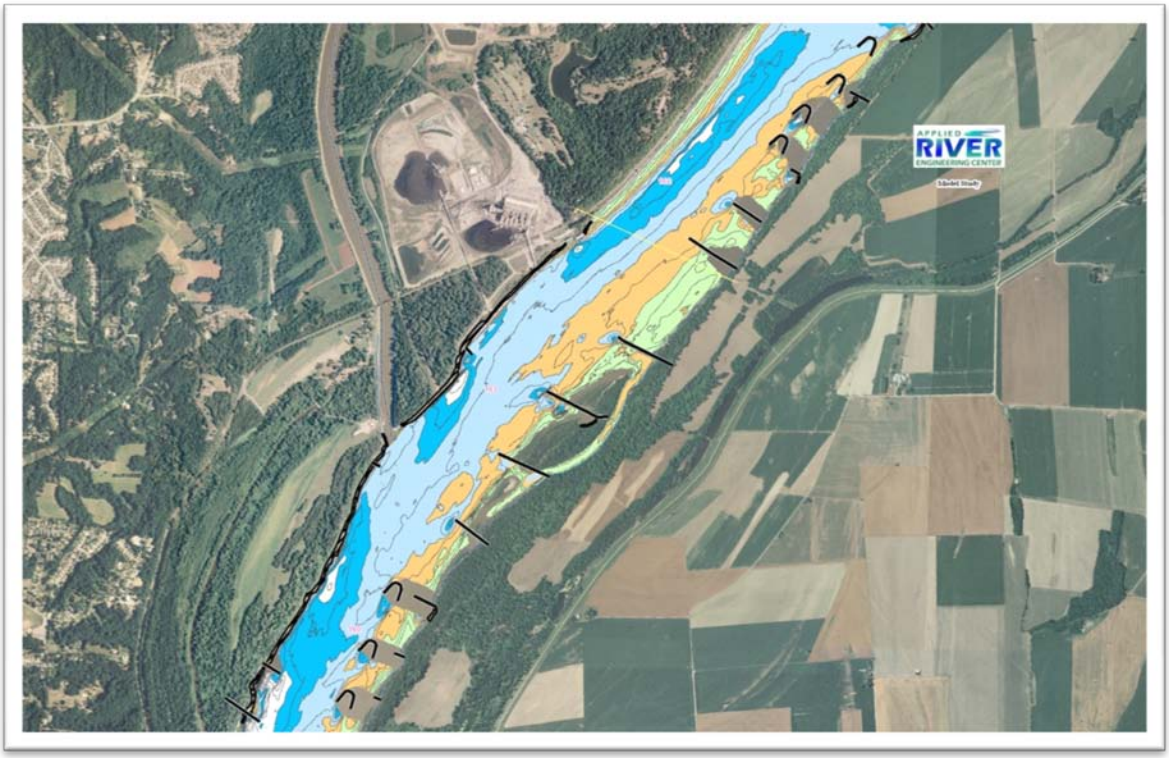
5. **St. Louis Harbor chevron construction, UMR River Miles (RM) 183.0-182.4(R) (RPA 3 & 4, Term and Condition 2, pallid sturgeon; RPM 1, Term and Condition 2, least tern).** Post-construction monitoring continued in FY11 at the St. Louis Harbor site. A final sample was taken yielding 495 individuals, 19 species, and 9 families. Species collected and number of individuals included: blue catfish (*Ictalurus furcatus*; 289), channel catfish (*Ictalurus punctatus*; 16), flathead catfish (*Pylodictis olivaris*; 6), gizzard shad (*Dorosoma cepedianum*; 100), freshwater drum (*Aplodinotus grunniens*; 21), silver chub (*Macrhybopsis storiena*; 2), Common carp (*Cyprinus carpio*; 9), emerald shiner (*Notropis atherinoides*; 16), silver carp (*Hypophthalmichthys molitrix*; 1), grass carp (*Ctenopharyngodon idella*; 1), goldeye (*Hiodon alosoides*; 18), bigmouth buffalo (*Ictiobus cyprinellus*; 2), smallmouth buffalo (*Ictiobus bubalus*; 4), blue sucker (*Cycleptus elongates*; 2), black buffalo (*Ictiobus niger*; 1), river carpsucker (*Carpiodes carpio*; 1), sauger (*Sander canadensis*; 1), white bass (*Morone chrysops*; 4), and shortnose gar (*Lepisosteus platostomus*; 1). The sample was conducted on September 20 and 21, 2011. Spring and summer samples could not be obtained due to high water. A final presentation of the combined data was given to all partners on the annual River Resources Action Team boat trip summarizing the results of the study. No further fish monitoring is planned. A final report will be initiated in FY12.

General Background: The St. Louis Harbor area has been experiencing a dredging problem for many years. An HSR model study was performed in 2003 for UMR miles 184.0-173.0 and an alternative was selected that uses non-traditional structures that reduce dredging requirements, improve navigation, and are intended to enhance aquatic habitat and diversity through the harbor. Part of the alternative included chevron construction between RM 183.0-182.4(R). St. Louis District biologists are using electrofishing and benthic trawling to collect fish at the project area and at non-project or "control" areas. Eleven species were collected at the chevron sites over the six pre-construction samples taken between September 2006 and July 2007. Construction of the three chevrons began in August 2007 and was completed by November 07. Post-construction monitoring began in FY08. Fish data collected over a number of years at chevrons in Pools 24-26 suggest that the scour holes developed after the chevrons get over-topped become ideal fish habitat.



6. **Cliff Cave – Kimmswick dike alteration and chevron construction site, RM 168-156.6 (Pallid Sturgeon - RPA 3 & 4, RPM 1, Terms and Conditions 2&4; Least Tern - RPM 1, Terms and Conditions 2&4).** During FY11, construction was completed on chevrons 162.8(L), 162.6(L), and 162.5(L), and shortening of dikes 162.6(L) and 162.3(L). This completed construction of features associated with this study. Some re-dressing of structures will be accomplished in FY12. Post-construction physical monitoring is scheduled for FY14.

General Background: An HSR model study for this reach was completed in FY06. The Biological Assessment for this contract has been completed. This project was selected from the Corps' 2002 Stone Dike Alteration Project Report. The purpose of the HSR study was to design structural modifications to the existing dike fields to enhance the aquatic habitat diversity and flow dynamics within the reach. The study was performed to address two separate sediment transport goals. The first goal was to create island and side channel aquatic habitat within the dike field. The second goal was to maintain current depths in the navigation channel to assure the need for additional dredging would not arise. A team participation meeting was held at the Applied River Engineering Center in St. Louis, Missouri, prior to the testing of alternatives to outline objectives and concerns in the study reach. It was brought to the team's attention that the bar on the right descending bank between RM 165.0-164.0(R) contained unique Pallid Sturgeon habitat. It was recommended that, if at all possible, no structures detrimental to this habitat be used in the final design. At this meeting the team decided on two areas of emphasis. These two areas were along the left descending bank (LDB) downstream of dike 163.0(L) and on the LDB downstream of dike 160.9(L). Alternative design analysis concluded that at Cliff Cave the Corps should notch a number of existing dikes and construct four chevrons, and at Kimmswick, three chevrons should be constructed.

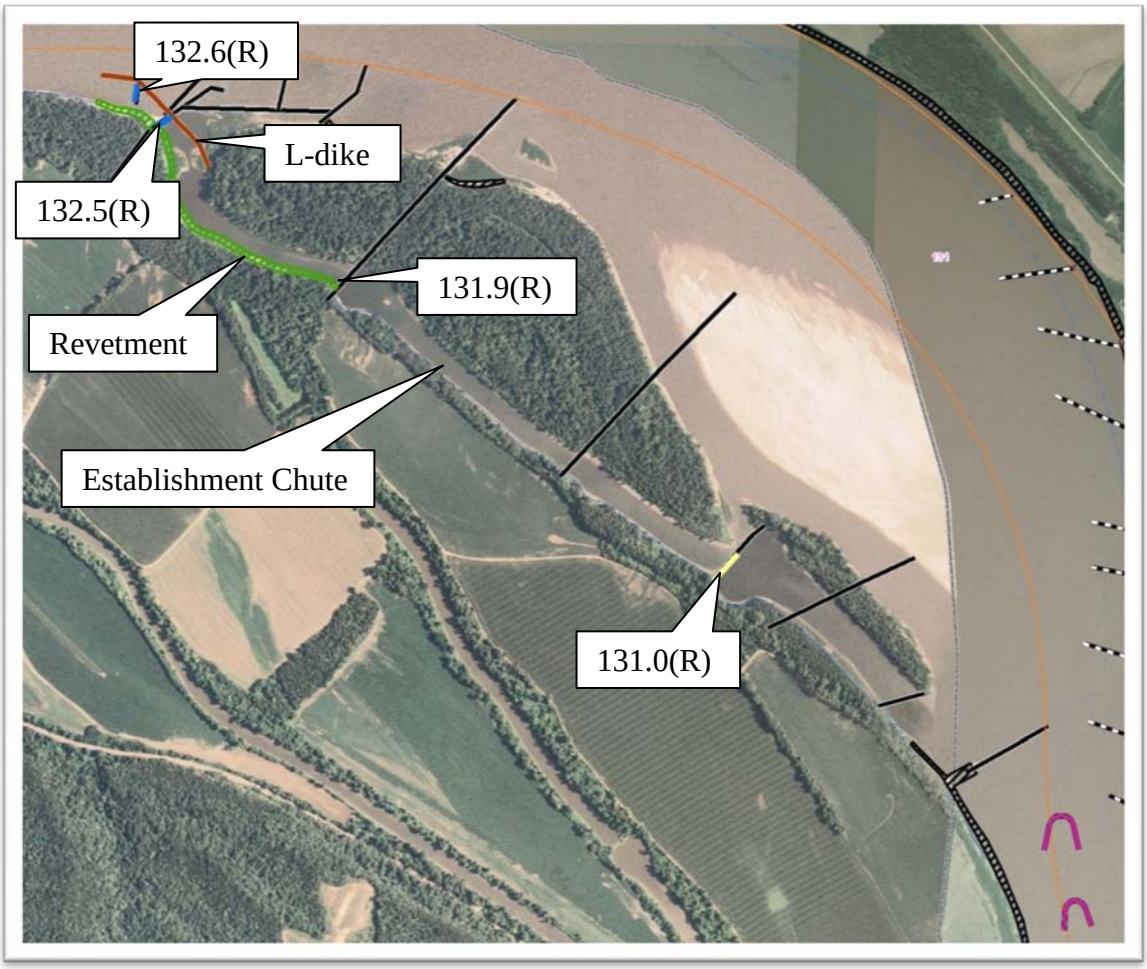


7. **Fort Chartres/Establishment Island new chevrons and rootless dike between RM 132.5-129.5(R) (Pallid Sturgeon - RPA 3 & 4, Term and Condition 2: Least Tern - RPM 1, Term and Condition 2).** Post-construction monitoring by the Missouri Department of Conservation began in February of FY09 and continued thru 2011. A summary report is anticipated in FY12.

   General Background: This reach of the river has been experiencing a dredging problem for many years. This contract was awarded in FY06 and five of six structures were completed. The two blunt-nosed chevrons were constructed at RM 130.05 and 129.9(R). The spur dikes and rootless dike were constructed between RM 132.0(R) and 132.5(R). No further construction is planned for this phase of the project after construction of a rootless dike at RM 130.2(R) was completed in FY07. This structure was planned to be a chevron; however, construction difficulties necessitated the change to a rootless dike. This change was coordinated with all partners. This work is intended to eliminate the need to dredge and add environmental features. Recent data shows that the scour holes that develop when the chevrons get over-topped are occupied by a number of fish species throughout the year. Pre-construction monitoring (biological & physical) was conducted by the Missouri Department of Conservation between 2002 and 2004 and a final report was submitted to the Corps in 2007. Preliminary results show that despite some environmental variation, there are some consistencies in species/habitat use at island complexes, setting the stage for post-construction evaluation at Establishment Island. It was also suggested that further analyses (ordination) may be needed to better explain the distribution and habitat use by fish species and guilds when comparing pre- and post-construction distributional patterns.

8. **Establishment Chute HSR Study, RM 134.0-128.0 (Pallid Sturgeon - RPA 3 & 4, RPM 1, Terms and Conditions 2&4; Least Tern - RPM 1 and 3, Term and Condition 2).** This study was completed in September 2011 (on-line report available here). The recommended design includes placement of a 1,400-foot Side Channel Enhancement Dike (SCED) at the entrance of Establishment Chute to facilitate water movement through the chute; notching existing dikes 132.6(R) and 132.5(R) at the upper end of the chute; and notching closure structures 131.9(R) and 131.0(R). Construction on Establishment Chute is scheduled to start in FY12 and is projected to take several years due to the size and associated cost of the project.

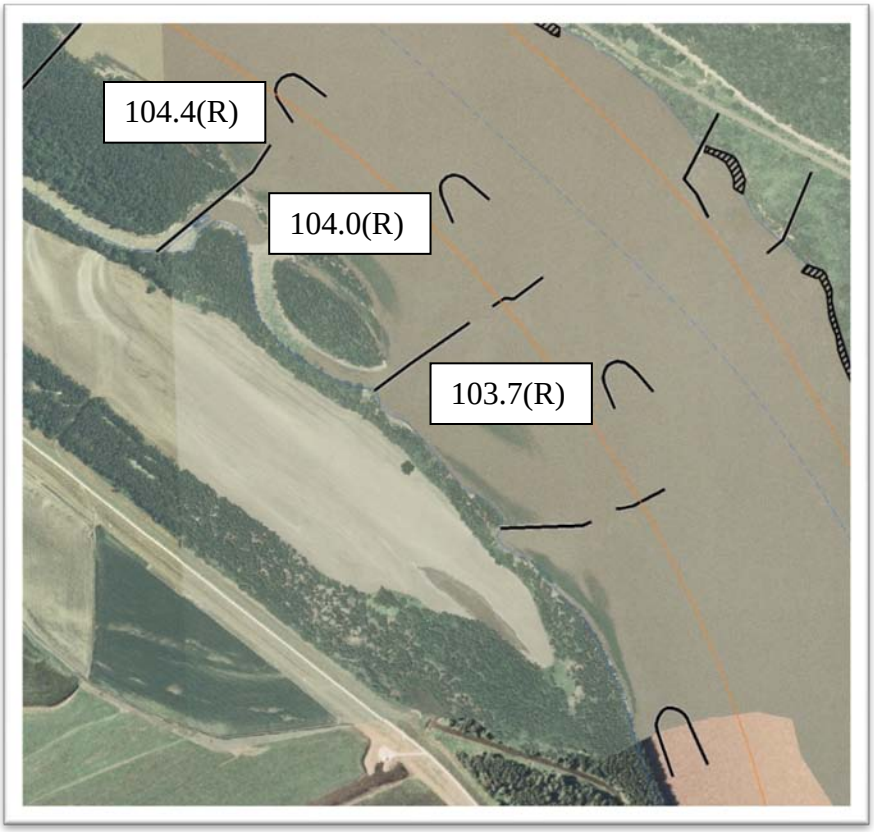
General Background: The St. Louis District initiated this study of the Middle Mississippi River between Miles 134.0 and 128.0, in January 2010. This study was funded by the Avoid and Minimize Program. The objective of the study was to evaluate environmental design alternatives for diversifying aquatic habitat within and around Establishment Chute without negatively impacting the adjacent point bar or the navigation channel. The selected alternative is projected to provide increased depth and depth diversity within the chute.



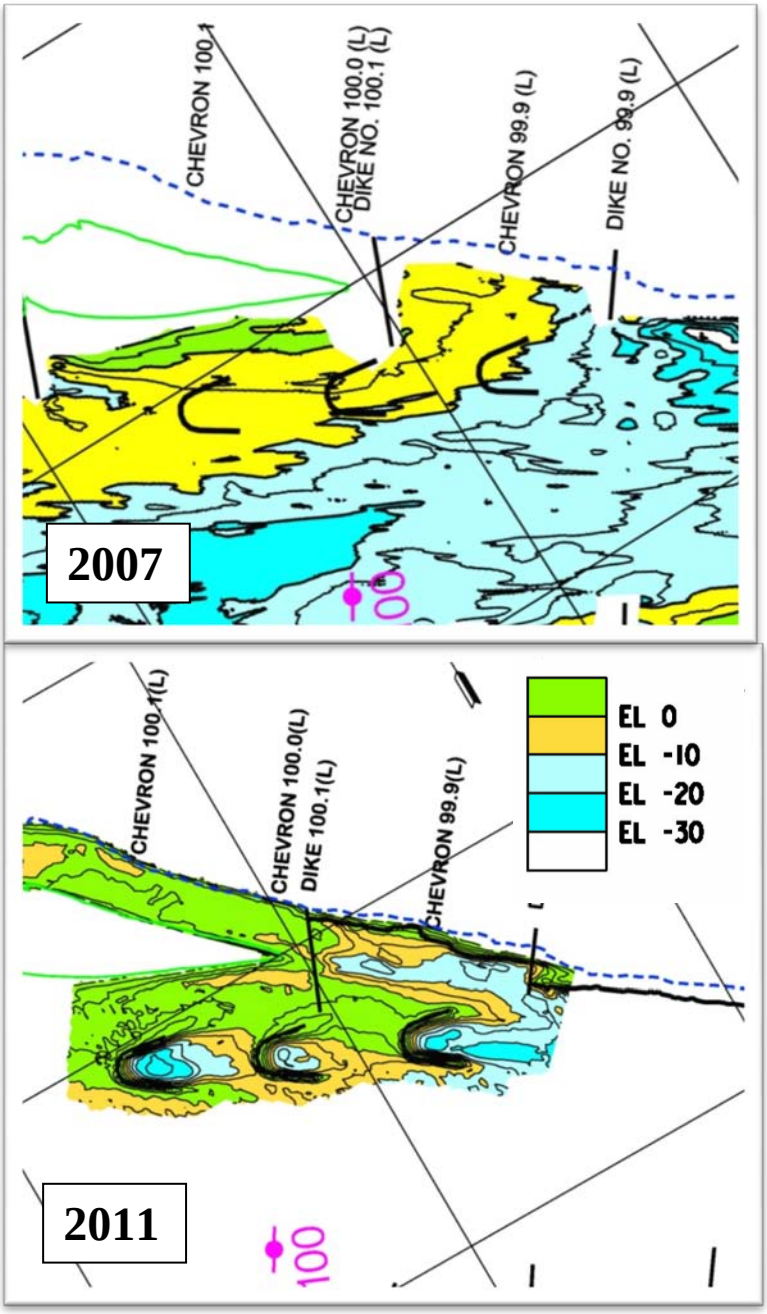
9. **Waters Landing HSR Study, RM 106.0-100.0 (Pallid Sturgeon - RPA 3 & 4, Term and Condition 2; Least Tern - RPM 1, Term and Condition 2).** This study was completed in January 2009 (on-line report available here). The recommended design includes removal of existing dike 104.4(R), construction of three chevrons at RM 104.4, 104.0, and 103.7(R), and extension and notching of dikes 104.0 and 103.5(R). Dikes 104.0 and 103.5(R) were extended and notched in FY10. Dike 104.4(R) was shortened and chevrons 104.4(R), 104.0(R), and 103.7(R) were constructed in FY11. This completed construction activities associated with this study.

General Background: The St. Louis District initiated this sedimentation improvement study of the Water's Landing reach of the Middle Mississippi River between RM 106.0 and 100.0 near Chester, Illinois, in May 2008. This study reach

was selected from the Stone Dike Alterations Project Report and funded by the Biological Opinion Program. The main objective of the study was to develop and evaluate design alternatives that would enhance the environmental diversity within the dike fields, in particular around RM 104.0 – 102.5(R). A number of fish species use deep pools, slow, shallow channels, and bar formations to fulfill various life history requirements. This type of habitat can be cultivated by altering existing dikes, i.e. notching, increasing or decreasing length and/or height, or by adding new structures, i.e. dikes, chevrons, weirs, or by using a combination of alterations and new structures. Along with the primary objective, a secondary goal was to alleviate repetitive channel maintenance dredging.



10. **Chevron construction at RM 100.1-99.9(L)** – (bottom of Liberty Chute).
General Background: During July and August of 2007 three chevrons were constructed at UMR miles 100.1, 100.0 and 99.9(L). These chevrons were constructed as part of the Red Rock Landing – Phase 5, Mile 103.0-90.0 General Plan. The primary purpose was to address dredging concerns of the main channel just south of Liberty Chute. Location of the chevrons was coordinated with agency and stakeholder partners to address concerns of increased siltation at the downstream end of Liberty Chute where pallid sturgeon have been captured. Bathymetric data around the chevrons was collected in FY11 (see images below).


CHEVRON 100.1
CHEVRON 100.0 (L)
DIKE NO. 100.1 (L)
CHEVRON 99.9 (L)
DIKE NO. 99.9 (L)
2007
100
CHEVRON 100.1(L)
CHEVRON 100.0(L)
DIKE 100.1(L)
CHEVRON 99.9(L)
EL 0
EL -10
EL -20
EL -30
2011
100

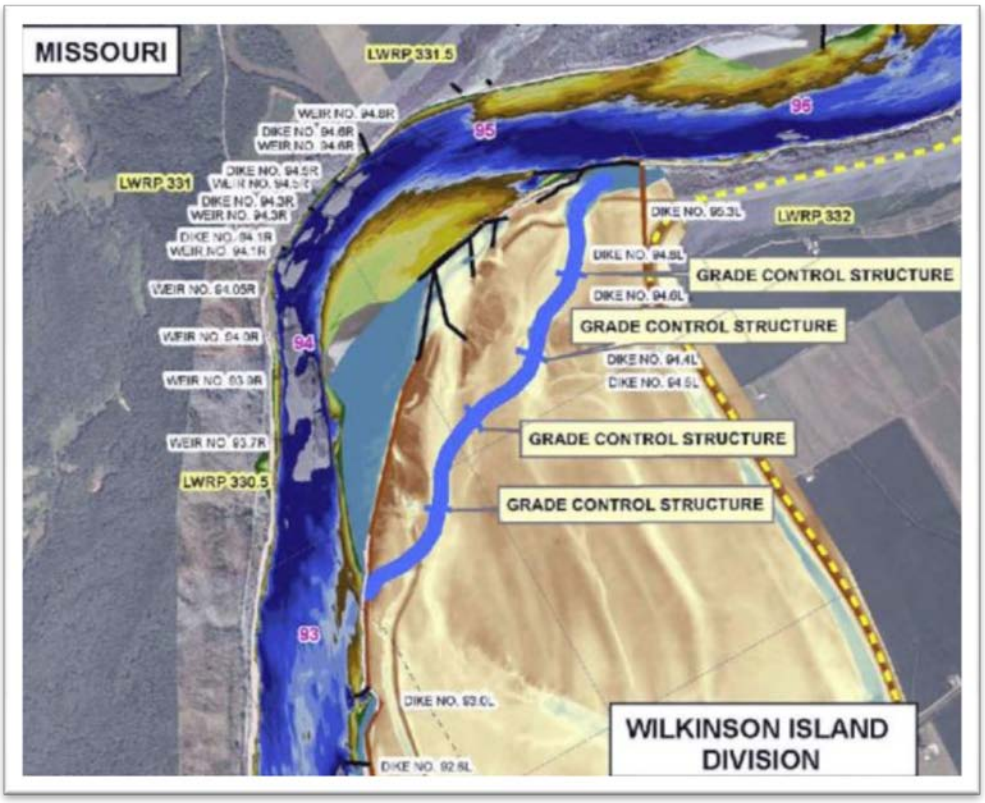
11. **Mile 100 Islands study (RPA 1, pallid sturgeon).** No new data analysis took place on this study during FY11. Manuscripts related to the results of this study may be submitted for publication during FY12.

    Background: Teri Allen (St. Louis District Corps biologist) conducted the study of fish assemblages at the Mile 100 dike field located along the right bank below Chester, Illinois between RM 100.1 and 98.9 until August 2006 when the benthic trawling, electrofishing, and mini-fyke net sampling was completed. The area consists of six notched dikes and five islands. The dikes were built in the early 1970's for the expressed purpose of sediment management and channel improvement. Notches were designed in the dikes at the time of construction with the intent of creating a scour pattern that would eventually form a secondary channel and associated islands. The study was designed to compare the fish assemblages at the island sites to nearby "non-notched" or "reference" dikes (5 sites between river miles 100.4 and 107.4).

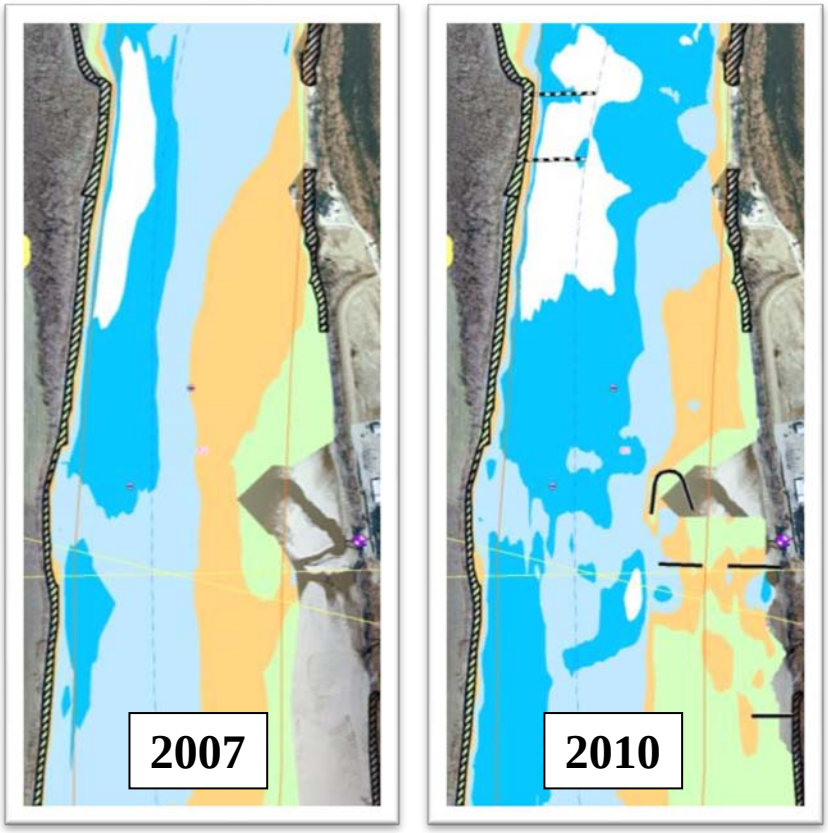
    Results Summary: Fish assemblages at five island and five non-island sites located within dike fields were studied over a two-year period. Habitat characteristics including velocity, water depth, water temperature, dissolved oxygen concentration, conductivity, turbidity, and pH were measured at each sample site. Fishes were collected using trawling, electrofishing, and mini fyke nets. Species richness was greater at islands than at reference sites. At habitat types, species richness was lowest at tip habitat, but similar among inside, outside, and reference. Fish assemblages differed significantly between islands and reference sites for total standardized count and for adult standardized count. The fish communities differed significantly among each of the habitat types, with the exception of outside and reference habitat, for total standardized count; and among the habitat types, with the exception of tip and reference sites, for adult standardized count. Additionally, average depth, conductivity, pH, velocity, water temperature, and Secchi visibility were significantly related to differences in fish community assemblages between islands and reference sites, and between habitat type and reference sites. These results demonstrate that created islands increase local habitat diversity by creating shallow backwater-like habitat, which is limited in the MMR, and support a fish assemblage which is distinct from that found in conventional dike fields.

12. **Wilkinson Island HSR Study RM 98-90 (Pallid Sturgeon – RPA 3 & 4, RPM 1; Least Tern – RPM 1).** In FY09 the St. Louis District initiated a study of the Upper Mississippi River between RM 98.0 and 90.0. The final report was completed in August 2010 (on-line report available here).

General Background: The purpose of the study was to evaluate potential side channel alignments to be excavated on the Wilkinson Island Division of the Middle Mississippi River National Wildlife Refuge. The goal of the study was to design a side channel with diverse bathymetry closely mirroring natural fluvial processes without negatively affecting the existing depths in the navigation channel. Additionally, the side channel was to be of a sustainable design, limiting future operational requirements. The recommended side channel alternative was alignment SC-G (see image below). This alignment fulfilled all of the study criteria including not having any negative impact to the navigation channel. Side channel alignment SC-G also successfully addressed all of the concerns of the study partners. There is currently no tentative schedule for construction due to the Wilkinson Island project being on hold.

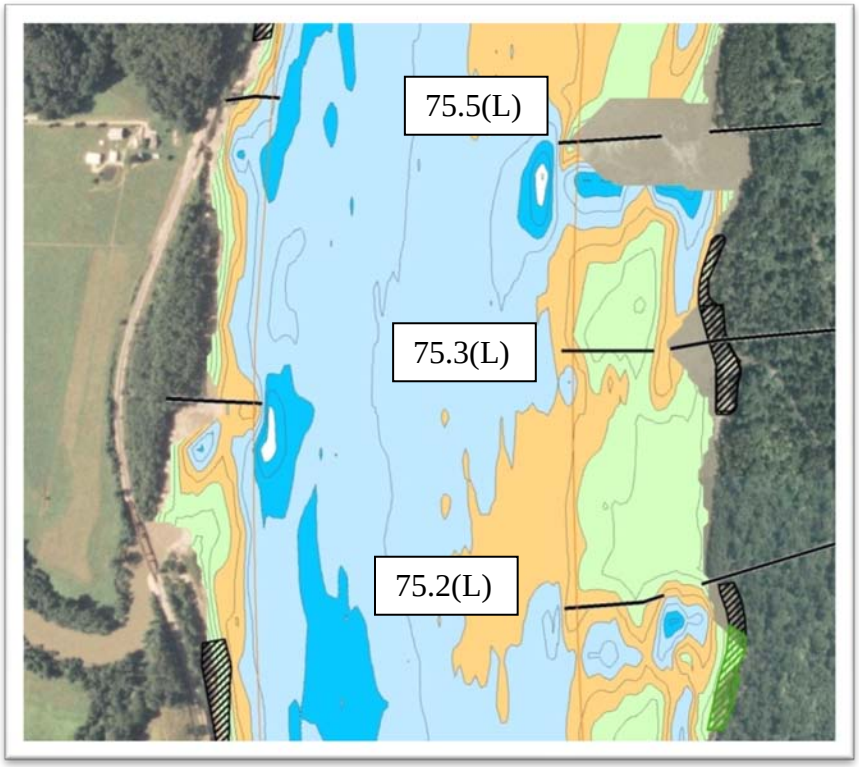


13. **Grand Tower HSR Study RM 84.0-79.0 (Pallid Sturgeon – RPA 4).** Based on this study, chevron 82.0(L), weirs 82.5(R) and 82.4(R), and dikes 81.85(L) and 81.65(L) were constructed during FY09 (see pre- and post-construction bathymetry below). This HSR study was conducted in 2004 to evaluate and propose design modification to existing stone dike and/or weir structures and the introduction of new structures for the purpose of improving navigation conditions and reducing dredging through the Grand Tower area (on-line report available here). An alternative that included the construction of two weirs, notching of an existing dike, construction of three new dikes and construction of one chevron was recommended. This alternative created the most environmental benefits with the possible creation of a secondary channel that has both upstream and downstream connectivity with the main channel.

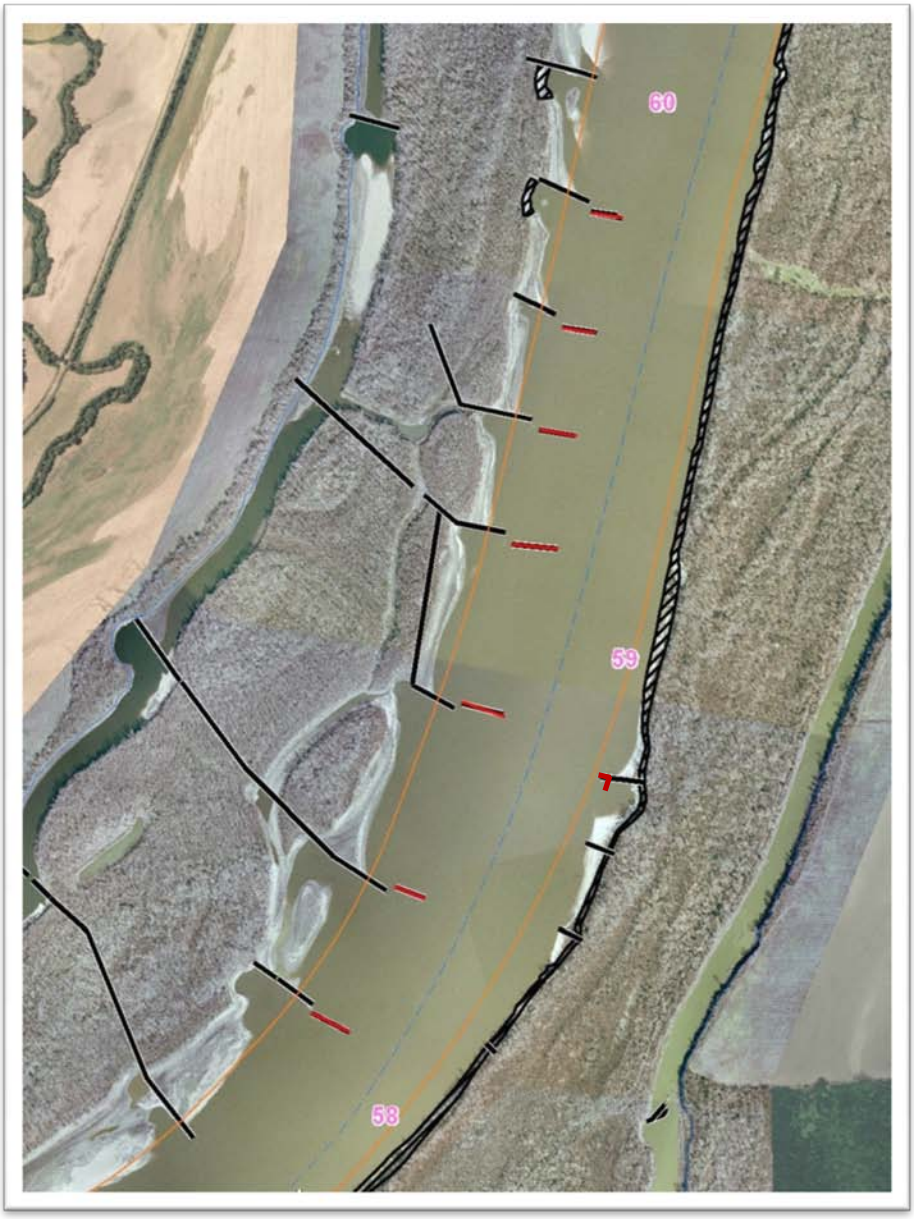


14. **Dike modifications at Big Muddy River confluence, RM 75.5(L) (Pallid Sturgeon - RPA 4, RPM 1; Least Tern RPM 1).** An extension of dike 75.3(L) was initiated in FY10 and was largely completed in FY11 (see image below; 2010 bathymetry does not reflect FY11 dike 75.3(L) impacts).

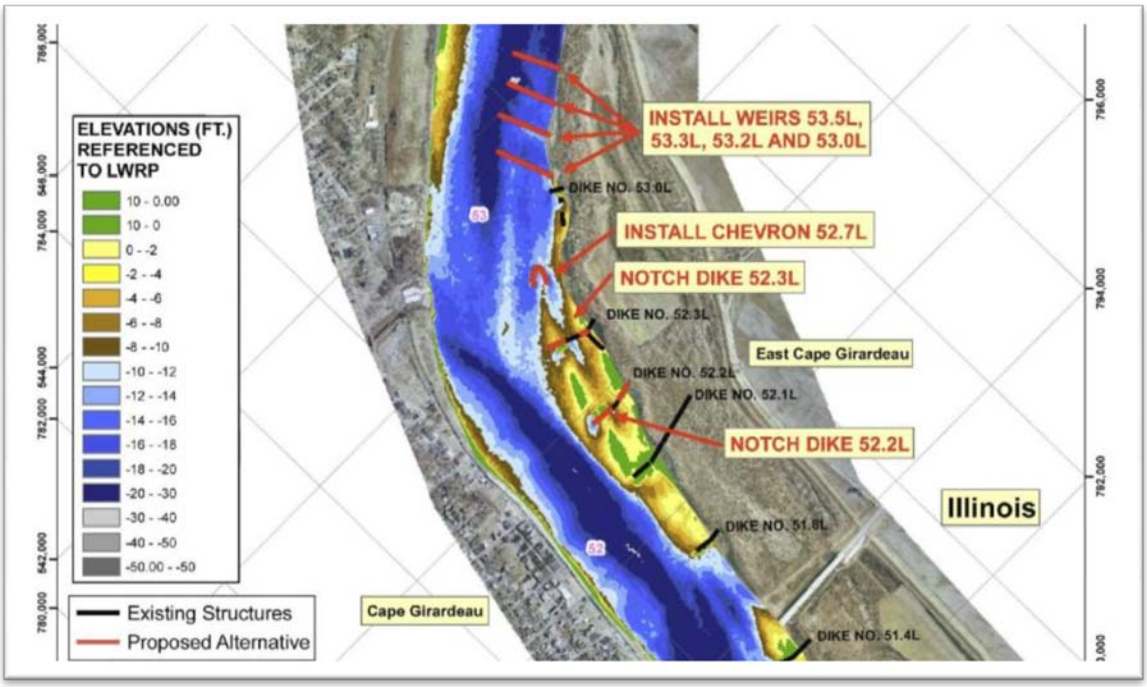
General Background: The purpose of this project was to modify three dikes (RM 75.5, 75.3, and 75.2[L]) to improve habitat diversity at the confluence of the Big Muddy and Mississippi rivers. The project included restoring and/or modifying these dikes to initiate a split flow condition that would develop/create a side channel complex. In FY07, the dike at river mile 75.5(L) was notched. This dike is located at Union Point/Wilson Landing just below the mouth of the Big Muddy River. A second dike was notched during FY09 at RM 75.2(L).



15. **Devils Island – Phase 4.** During FY11, construction of offset dikes 59.8(R), 59.6(R), 59.5(R), 59.3(R), 59.0(R), 58.7(R), and 58.3(R) and shortening and adding a trail dike to dike 58.8 (L) was completed (see image below). This stretch of river has a history of chronic dredging problems. The offset dikes are expected to improve navigation, add environmental diversity, and reduce the need to dredge at this site. Post-construction biological and physical monitoring is expected to take place in FY12.



16. **Cape Rock HSR Study RM 57-50**. In FY07 the St. Louis District initiated a study of the Middle Mississippi River between RM 57.0 and 50.0 near Cape Girardeau, Missouri. This study was funded as part of the Biological Opinion Program of the U. S. Army Corps of Engineers, St. Louis District. The primary goal of this study was to diversify aquatic habitat by modifying present dike structures, developing new side channels and bar formations while maintaining the integrity of the navigation channel. This study was completed in January 2009 and a final report was completed in May 2011 (on-line report available here). The recommended alternative called for placement of one chevron, notching of two dikes and placement of four weirs (see image below). However, the navigation industry and natural resource agencies voiced concerns with some of the structure locations and alignments proposed in the study. Therefore, the project has been put on hold.



17. **Thebes Reach HSR Study RM 46-36 (Pallid Sturgeon – RPA 3 & 4, RPM 1; Least Tern – RPM 1).** In FY07 the St. Louis District initiated a study of the Upper Mississippi River between RM 43.0 and 35.0, approximately nine miles downstream of Cape Girardeau, Missouri. The final report was completed in April 2010 (on-line report available here). The study did not recommend construction of any features due to the fact that new structures were being placed in the reach during the course of the study. Future construction based on model results may be merited after monitoring of new structures.

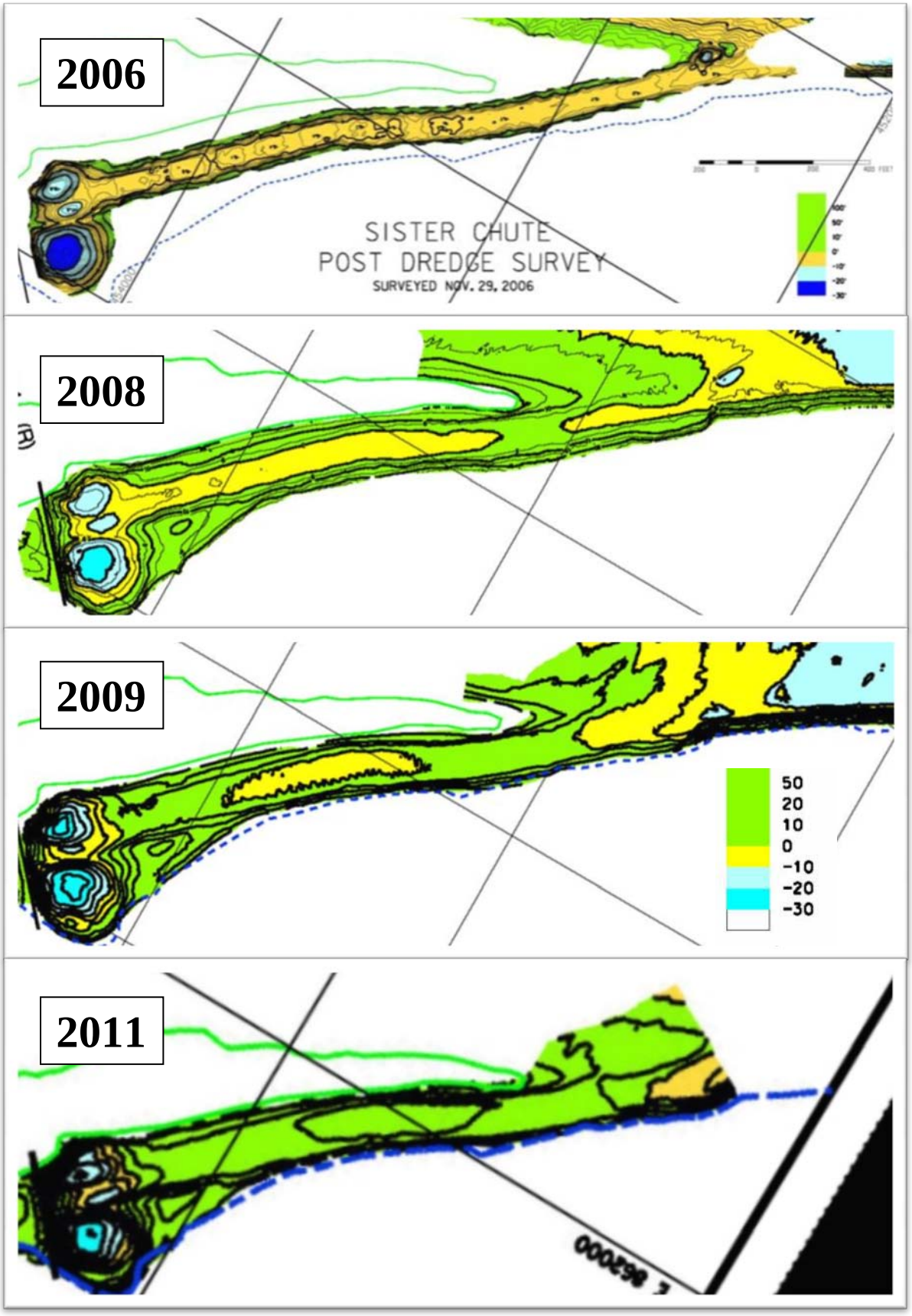
    General Background: The purpose of the study was to evaluate stone dike design alternatives for increasing habitat diversity within the study area while maintaining the integrity of the navigation channel. While two alternatives did produce some environmental benefit without negatively impacting the navigation channel, neither

alternative is currently recommended for construction. The habitat benefits gained were small when compared to construction costs, and several river training structures are currently slated for construction within the study area and may impact the results of the study. Future construction plans from the model may be warranted subsequent to monitoring of new structures.

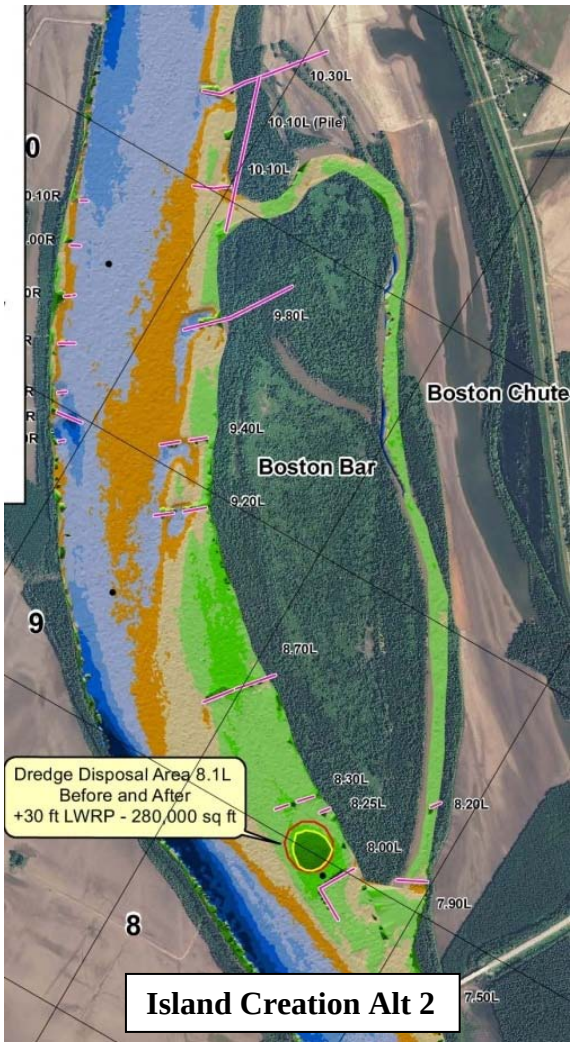
18. **Dogtooth Bend – Phase 3, RM 40.0-20.0.** During FY10, construction of chevrons 36.7(L), 36.5(L), 36.2(L), 35.9(L), 32.8(R), 32.6(R), and 32.4(R) took place. No new construction took place in FY11. This reach of the river has been experiencing a dredging problem for many years. This work is expected to improve navigation, add environmental features, and eliminate the need to dredge at this site. Post-construction biological and physical monitoring is expected to take place in FY12.

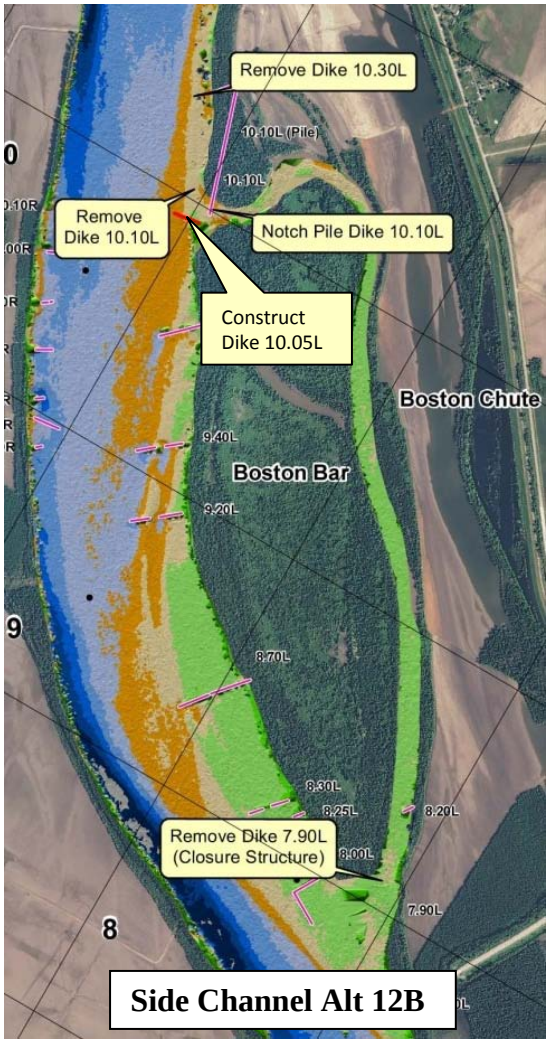
19. **Environmental dredging at Sister Chute RM 14.5-12.0(R) (Pallid Sturgeon - RPA 3 & 4, Term and Condition 4; Least Tern - Term and Condition 4).** Dredging at the lower end of Sister Chute, RM 12.0(R), was completed in FY07 (October 2006). Post-construction bathymetric surveys took place in 2006, 2008, 2009, and 2011 (see images below). A summary report is scheduled for completion in the third quarter of FY12. The results of the report and associated coordination with partner agencies will determine the future direction of the project.

    General Background: After initial coordination and evaluation with state and federal stakeholders, it was decided to dredge the lower end of Sister Chute with the primary purpose of creating overwintering fish habitat. The project is also being conducted to specifically benefit the pallid sturgeon by providing backwater habitat that is anticipated to provide an improved food base. Also, the mouths of chutes appear to be important habitat for larval sturgeon in general. In FY05, the Corps prepared an EA and Tier II BA for this effort and secured the necessary section 401 and 404 permits (CWA). The dredge cut created a channel to connect the open river area at the lower end of the chute to the deep water hole below dike 12.4(R) for better connectivity throughout critical over wintering timeframes. The dredge cut is also anticipated to provide other aquatic species with greater potential use of the side channel for resting, spawning, and feeding opportunities. Restoration of side-channels is one of the seven types of habitat restoration suggested by the FWS in the Biological Opinion. In addition, side channel restoration has been a priority of the natural resource agencies in Illinois and Missouri. Implementation of this environmental dredging project maintains the St. Louis District's commitment to comply with the ESA.

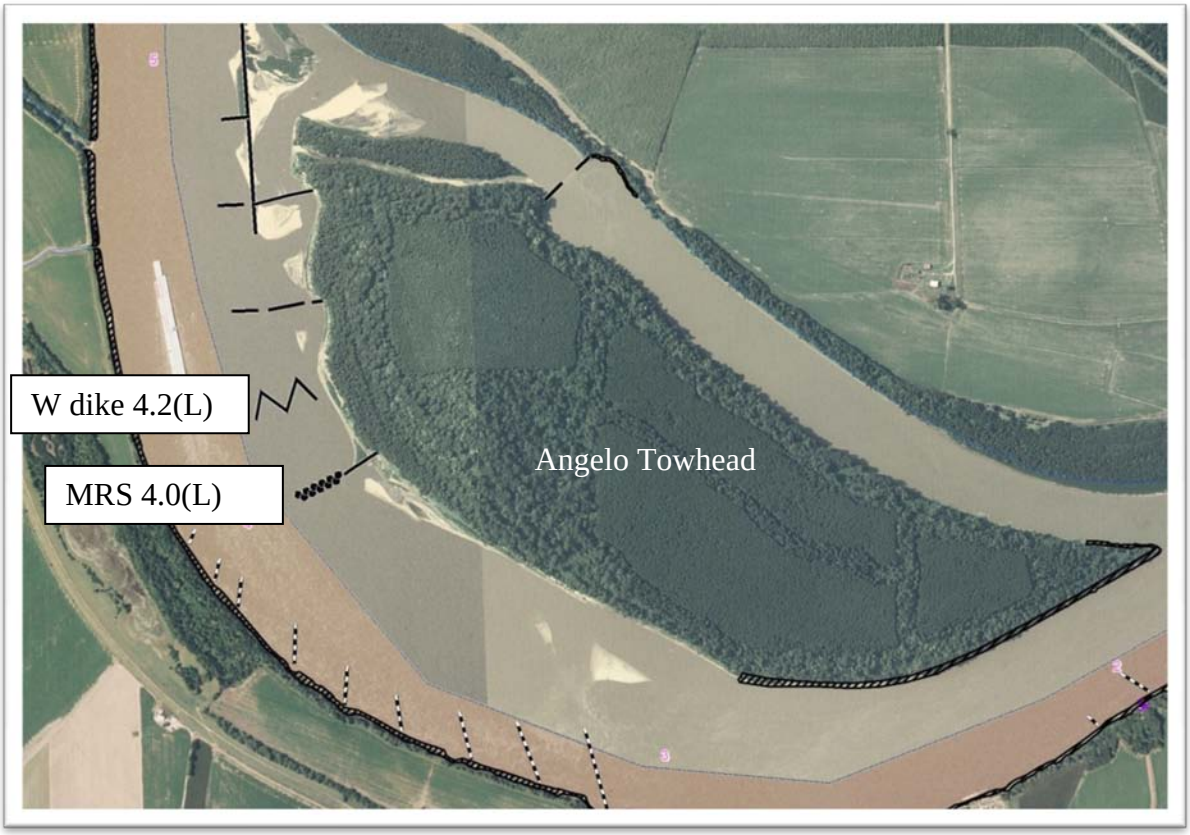

2006
SISTER CHUTE
POST DREDGE SURVEY
SURVEYED NOV. 29, 2006
2008
2009
50
20
10
0
-10
-20
-30
2011

20. **Boston Bar HSR Study RM 12-6. (Pallid Sturgeon – RPA 3 & 4, RPM 1; Least Tern – RPM 1).** In FY11 the St. Louis District initiated a sedimentation study of the Upper Mississippi River between RM 12 and 6 (on-line report available here). The study was designed to analyze potential dredge disposal locations for island creation adjacent to Boston Bar and to analyze potential structural alternatives for increasing flow in Boston Chute. The study looked at 10 potential locations for island creation and concluded that Alternative 2 (see image below), consisting of a 280,000-square-foot island at RM 8.1(L), was the best alternative due to the fact that it did not show significant erosion and maintained its design height. For structural alternatives in the side channel, the study considered 11 alternatives designed to increase flow in Boston Chute without introducing additional sediment, without negatively impacting the navigation channel, and without removing pile dikes 10.10(L) and 8.20(L) within Boston Chute. Alternative 12B was recommended as the most desirable alternative and consisted of: notching pile dike 10.10L; removing dike 7.90(L), dike 10.10(L), and dike 10.30(L); and constructing dike 10.05(L) at the tip of Boston Bar. Construction of the side channel features could take place as early as FY12. No definite plans are in place for placement of dredge material.





21. **Eliza Point / Greenfield Bend – Phase 2, RM 20-0.** During FY11, construction of W dike 4.2(L) and multiple roundpoint structure (MRS) 4.0(L) was completed (see image below). This reach of the river has been experiencing a dredging problem for many years. This work is expected to improve navigation, add environmental features, and reduce the need to dredge at this site. Post-construction biological and physical monitoring is expected to take place in FY12.



22. **Red Rock Landing – Phase 5.** During FY11, construction of vane dikes 96.9(R), 96.8(R), and 96.6(R) was completed (see image below). This stretch of river has a history of chronic dredging problems. The vane dikes are expected to improve navigation, add environmental diversity, and reduce the need to dredge at this site. Post-construction biological and physical monitoring is expected to take place in FY12.

23. **MVS River Reach Plans (Pallid Sturgeon - RPA 2 & 4).** River reach planning efforts were concluded in FY09 for the St. Louis (RM 200-160), Harlow (RM 160-120), Crains (RM 120-80), Hamburg (RM 80-40), and Dogtooth (RM 40-0) reaches of the Mississippi River. The final report entitled, *"Middle Mississippi River Regional Corridor Reach Reports,"* was developed and made available by the Southwestern Illinois Resource Conservation and Development (RC&D) under an agreement with the Corps. The report contains data, maps, and information developed by the Corps (St. Louis District) and many of the other agencies and organization involved in the Middle Mississippi River Partnership. The report is available online at http://www.swircd.org/mmrp/reach_reports_09.htm

    General Background: Each reach was subdivided into a number of subareas. For each subarea, the following information was gathered: site related problems, ecosystem goals and objectives, available ecosystem restoration measures, applicable agency programs, existing management activities, existing management plans, federal and state T&E species of concern, available prior reports and scientific literature, a

general site characterization, additional data needs, modeling needs, monitoring needs, potential ecosystem restoration projects, potential conservation partners, maps, and miscellaneous other notes. This information is important for future reach planning efforts especially regarding NESP and the Middle Mississippi River Partnership. As part of this effort, a hydrogeomorphic study for the Middle Mississippi River was conducted. This study identified what ecosystems existed along the Middle Mississippi River before European settlement, evaluated differences between pre-European settlement and current conditions, and identified restoration and management approaches for successful ecosystem restoration.

24. ***Boltonia decurrens* (Decurrent False Aster).** Annual *B. decurrens* inventory surveys continued in FY11. The surveys were conducted in August and September 2011 by Drs. Marian Smith and Paige Mettler-Cherry (Southern Illinois University Edwardsville) and Dr. Thomas Keevin (St. Louis District). *B. decurrens* was located in 26 areas in 9 counties along the Illinois River and 2 counties along the Mississippi River. A summary report of eleven years of decurrent false aster inventory surveys was initiated by Southern Illinois University Edwardsville personnel in FY11. The report is expected to be completed in FY12.

25. **Interior Least Tern (Term and Condition 3, least tern).** Random least tern monitoring within the Riverlands Migratory Bird Sanctuary (RMBS) through partnership with the St. Louis Audubon Society continued in FY11. The Least Tern Floating Habitat Project continued during summer 2011. Additional anti-predator measures were installed before arrival of terns in the spring. Least terns first arrived on May 5th of 2011. Least terns were suspected of nesting and were confirmed by boat on July 14th, when 3 nests with 4 eggs were observed. Peak numbers of nests and eggs were observed on July 26th, 2011 with 3 nests containing 5 eggs. By August 8th, 2011, 2 chicks were hatched and ready to be banded. On August 11, 2012, one least tern chick remained to be banded. On August 16, 2012 one day prior to banding, no least tern chicks remained. It is unclear what happened to the chicks, but successful fledging is unlikely given the short time period between when the chicks were first discovered and their disappearance. Predation by a nocturnal predator and weather events are possible explanations.

26. **Emergency Dredging Biological Assessment (Term and Condition 5, pallid sturgeon**). In FY02, the Corps received a Biological Opinion which contains an Incidental Take statement with Reasonable and Prudent Measures and Terms and Conditions to be implemented should dredging become necessary during the 12 April through 30 June timeframe. No dredging was required during this time frame for FY11.

27. **Flexible/floating pipe for dredging.** 2400 feet of flexible pipeline for the Dredge Potter was purchased in FY09. The floating flexible pipe can be used to create islands and/or sandbars near shore or behind chevrons and generally gives more options for placing dredged material for ecological benefits. Work was completed in FY11 on creating a temporary spill barge necessary to support the dredge pipe at the point of discharge (see image below). The spill barge was successfully tested in September 2011. A permanent spill barge is expected to be procured in FY12. In order to prioritize locations where the flexible pipe might be used for a pilot project to create shallow sandbar or island habitat, St. Louis District personnel coordinated with agency stakeholders and Corps dredge personnel in FY11. Manskers Landing (RM 103) and Vancil Towhead (RM 67.5) were determined to be the best potential locations for a pilot project to be executed in Fall 2011 based on dredging needs, operational considerations, and compatibility with river training structures. The pilot project was not completed prior to the end of FY11 but is anticipated to occur in FY12. Pre- and post-construction bathymetric data will be collected. Post-construction biological data may also be collected.

28. **Indiana Bat Survey.** In FY11, a scope of work was developed and put out for bid to continue the mist-net and Anabat surveys that were completed in FY10. The surveys will cover the same areas in pools 27, 26, and 25 that the FY10 surveys covered as well as five additional areas. The work is expected to be completed between May 15 and August 15, 2012.

Projected FY12 Activities:

Based on current projections of FY12 funding in the St. Louis District, we anticipate proceeding with the following work. However, these are projections only, and may require adjustment in the event adequate funding cannot be maintained, water levels are not in the range needed for construction, etc. Not all of these items will be completed in the next FY as some of them are multi-year continuing efforts and others may require extensive outside coordination.

1. Continue coordination with the **RRAT Technical Team** and **RRAT Executive Team**. Continue work on refining coordination efforts through the RRAT framework.

2. The **Pallid Sturgeon Habitat Conservation and Restoration planning** effort will continue in cooperation with MDOC, IDNR and FWS. A draft conservation and restoration plan is expected to be completed in FY12.

3. **Pallid Sturgeon Habitat, Life History, and Population Demographics work** (ERDC/SIU-C) may continue in FY12 but is dependent upon a population monitoring plan being completed first.

4. **St. Louis Harbor chevron construction, RM 183.0-182.4(R)**. Post construction monitoring has been completed. A summary report will be initiated in FY12 but will likely be completed in FY13.

5. **Cliff Cave – Kimmswick dike alteration and chevron construction site, RM 168.0-156.6.** During FY11, construction was completed on chevrons 162.8(L), 162.6(L), and 162.5(L), and shortening of dikes 162.6(L) and 162.3(L). This completed construction of features associated with this study. Some re-dressing of structures will be accomplished in FY12.

6. **Fort Chartres/Establishment Island new chevrons and rootless dike between RM 132.5-129.5(R).** A post-construction monitoring report by the Missouri Department of Conservation is due in FY12.

7. **Establishment Chute HSR Study, RM 134.0-128.0.** Construction on Establishment Chute is scheduled to start in FY12. Construction is projected to take several years due to the size and associated cost of the project.

8. **Waters Landing HSR model study, RM 106-100.** No further activities are anticipated in association with the study.

9. **Chevron construction at RM 100.1-99.9(L) – (bottom of Liberty Chute).** No data collection is anticipated for FY12.

10. **Mile 100(R) Islands study.** Data analysis has been completed. No further analysis is scheduled. Manuscripts related to the results of this study may be submitted for publication during FY12.

11. **Wilkinson Island HSR model study, RM 98-90.0.** Final report completed. No further analysis scheduled. Project on hold.

12. **Grand Tower RM 90.0-67.0**. No further construction based on this study is anticipated.

13. **Dike modifications at Big Muddy River confluence, RM 75.5-75.2(L).** No further construction is anticipated.

14. **Devils Island – Phase 4.** Post-construction biological and physical monitoring is expected to take place in FY12.

15. **Cape Rock HSR model study, RM 57-50.** The project has been put on hold indefinitely. No action is anticipated in FY12.

16. **Thebes Reach HSR model study, RM 46.0-36.0**. No construction currently planned. Future construction may be merited after monitoring of new structures in the reach.

17. **Dogtooth Bend – Phase 3, RM 40.0-20.0**. Post-construction biological and physical monitoring is planned for FY12.

18. **Environmental dredging at Sister Chute RM 14.5-12.0(R).** A summary report is scheduled for completion in the third quarter of FY12. The results of the report and associated coordination with partner agencies will determine the future direction of the project.

19. **Boston Bar HSR model study RM 12-6.** Construction of the side channel features could take place as early as FY12 depending on prioritization with other potential construction projects. No definite plans are in place for placement of dredge material.

20. **Eliza Point / Greenfield Bend – Phase 2, RM 20-0**. Post-construction biological and physical monitoring is expected to take place in FY12.

21. **Red Rock Landing – Phase 5.** Post-construction biological and physical monitoring is planned for FY12.

22. **Flexible/floating pipe for dredging.** The pilot project was not completed prior to the end of FY11 but is anticipated to occur in FY12. Pre- and post-construction bathymetric data will be collected. Post-construction biological data may also be collected. Selection of a dredge disposal site for longer-term pre- and post-construction biological monitoring is also planned for FY12.

23. **Least Tern**. Continue random monitoring within the RMBS through partnership with St. Louis Audubon Society. Monitor the floating island and test anti-predation measures on the barge.

24. ***Boltonia decurrens* (Decurrent False Aster).** A summary report of eleven years of inventory surveys should be completed in FY12.