Implementation of the Biological Opinion

Annual Progress Report
Fiscal Year 2006

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 (ESA). The consultation covered the continuation of operation and maintenance activities on the Upper Mississippi River (UMR) 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
Bald Eagle – Impacts negligible or offset by management actions; No incidental take
Indiana Bat – Impacts negligible or 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), incidental take, and RPMs.

FY06 Activities

The following is an outline of St. Louis District activities for fiscal year 2006. This was the sixth year of implementation activities under the Biological Opinion. For the immediate future, funding and manpower requirements will continue to be addressed on a year by year basis. Our partners, in particular the states, have voiced similar concerns with regard to funding and manpower constraints. With this in mind, we will continue to closely monitor the burden placed on their agencies as a result of meetings and planning efforts required under this Biological Opinion and will work with them to minimize impacts where possible.

1. **River Resources Action Team (RRAT) - Executive Team (Pallid Sturgeon - RPA 2 & 4, Term and Condition 4; Least Tern - Term and Condition 4).** The River Resources Action Team met in a scheduled formal Executive Session two times during the fiscal year,

in November 05 and June 06. Topics of discussion included (1) the Middle Mississippi River Collaborative Planning Project, (2) Pool Planning efforts, (3) Reach Planning efforts, (4) new project proposals and coordination with the RRAT, (5) status of the Corps decision to use threatened and endangered species justification or Water Resources Development Act authorization for the Environmental Management Program (EMP) Schenimann Chute Project, (6) ranking status of EMP projects in regard to the System Ecological Team, (7) placement of dredged material, and (8) RRAT Memorandum of Understanding.

2. **River Resources Action Team (RRAT) – Technical Team (Pallid Sturgeon - RPA 2 & 4, Term and Condition 4; Least Tern - Term and Condition 4).** The Technical Team considered the June 06 boat trip as its yearly meeting. The River Resource Action Team annual coordination boat trip was held aboard the M/V Pathfinder and covered inspection barge as they traveled from Lock and Dam No. 22 at Saverton, Missouri to the Corps' Service Base in St. Louis. A number of potential or active main-channel, side-channel, island and backwater project sites were visited over the two day trip. Topics discussed during the boat trip included Hydraulic Sediment Response (HSR) models, bank stabilization, island erosion, dike modifications, closing structures, dredged material disposal, chevron and multiple round point structure constructions, chute restoration, land acquisitions, the Middle Mississippi River Collaborative Planning Project, revetment modifications, and hardpoints.

3. **Pallid Sturgeon Habitat, Life History, and Population Demographics work (RPA 1, pallid sturgeon).** The draft report, due to the Corps from the Missouri Department of Conservation, Southern Illinois University at Carbondale, and the Corps' Engineer Research and Development Center, was in progress during FY06. On 24 August 2006, a letter was sent to the FWS by the Corps requesting an extension of the deadline for this report to 30 September 2006. In the interim of receiving a response from the Fish and Wildlife Service, the Corps received the draft report which was subsequently sent to the Fish and Wildlife Service and received on 19 October 2006. The results of this study are fundamental to the development of a pallid sturgeon conservation and restoration plan.

   Summary of results from draft report:

   - The most likely threat to population recovery is reduced reproductive capacity through limited rearing and nursery habitat and loss of reproductively mature adults
   - 139 pallid sturgeon were sampled over the course of the study. Pallid sturgeon were rare relative to shovelnose sturgeon, with ratios of pallid sturgeon in samples declining with increasing latitude.
   - Pallid and shovelnose sturgeon use different habitat when non-reproductive. Pallid adults select wing dike areas with sandy substrate. Ecotone between contrasting flow velocities appears to be important non-reproductive habitat for adults.
   - Pallids moved long distances following a spring rise in water level and temperature to apparent upstream or downstream spawning locations (frequently to Chain of Rocks).
   - Recaptured sturgeon demonstrated movement out of the MMR into the Missouri River and the lower Mississippi River.

- Hatchery-produced fish have recruited to the pallid sturgeon population.
- Annual mortality rate of pallids was high and similar to independently derived estimates for commercially fished shovelnose sturgeon.
- Adult pallid population density in the MMR is estimated to be between 1,600 and 4,900.
- Yield-per-recruit harvest modeling for MMR shovelnose suggested that overfishing was reducing both biomass and offspring production. Given that pallid sturgeon have a similar mortality rate and mature later, more severe demographic responses to harvest are likely.
- DNA microsatellites distinguished among pallid, shovelnose, and hybrid sturgeon. Genetic and morphological identification were largely concordant. Hybrids were genetically more similar to shovelnose, indicating that they were backcrosses.
- Pallid sturgeon exhibited significant genetic differences among reaches across their range indicating historical restrictions to gene flow. Stocking programs should use local broodstock to prevent outbreeding depression.
- Production of annual cohorts in shovelnose sturgeon declined with increasing harvest in the MMR. Assuming a similar response to harvest by pallids, incidental or intentional harvest will greatly curtail pallid reproductive success.
- The availability and quality of reproductive habitat for spawning and production of offspring in the MMR is currently the greatest knowledge gap and likely the key for developing a fruitful conservation plan for recovery. The future of the pallid population in the MMR depends on high survival of adults through maturity combined with high survival of eggs, embryos, and larvae at several likely spawning and nursery areas within the MMR, which include the Chain of Rocks, tributary confluences, and perhaps side channels.

4. **Pallid Sturgeon Conservation and Restoration Plan (RPA 2, pallid sturgeon).** The development of this plan was ongoing in FY06 to the extent possible exclusive of the results of the above habitat, life history, and demographics study. In a letter dated 24 October 2006, the Corps requested from the FWS that the deadline for a draft restoration and conservation plan be delayed until the Corps and the Service can jointly participate in a review of the study results.

5. **St. Louis Harbor chevron construction UMR River Miles (RM) 183.0-182.4(R) (Pallid Sturgeon - RPA 3 & 4, Term and Condition 2; Least Tern - RPM 1, Term and Condition 2).** The St. Louis Harbor area has been experiencing a dredging problem for many years. An HSR model study was performed in 2003 for RM 192.0-172.0 and an alternative was selected that uses non-traditional structures that reduce dredging requirements, improve navigation, and is intended to enhance aquatic habitat and diversity through the harbor. Part of the alternative included chevron construction between RM 183.0-182.4(R). Preconstruction fish monitoring began in September FY06. St. Louis District biologists are using electrofishing and benthic trawling to collect fish at the project area and at non-project or "control" areas. Recent data from other chevrons constructed in the UMR shows that scour holes that develop after the chevrons get over-topped become ideal fish habitat. Pre-construction monitoring will continue into FY07. Chevron

construction is scheduled for FY07. Biologists will conduct post-construction monitoring, similar to pre-construction monitoring, beginning in winter 2008.

6. **Jefferson Barracks, RM 171.5-168.5(L) (Pallid Sturgeon - RPA 4, RPM 1).** One of the four existing dikes (RM 169.45[L]) along this reach was modified in FY05 and the remaining three existing dikes were scheduled to be modified in FY06; however, construction did not take place due to low water levels. This reach of the river has been experiencing a dredging problem for many years and an HSR model study was completed in 2001. An alternative was selected that was designed to reduce dredging requirements, improve navigation, and add environmental features. The Corps received a letter from the US Environmental Protection Agency (EPA) in 2006 stating that samples taken at this site show the presence of polychlorinated biphenyls and pesticides that exceed EPA Region 5 ecological screening levels. This work has been deferred to a date to be determined. The Corps will be contacting the EPA and requesting the plan and schedule for the cleanup of the contaminants at this site.

7. **Cliff Cave - Kimmswick dike alteration and chevron construction RM 168.0-156.6 (Pallid Sturgeon - RPA 3 & 4, RPM 1, Terms and Conditions 2&4; Least Tern - RPM 1, Terms and Conditions 2&4).** This project was selected from the Corps' 2002 Stone Dike Alteration Project Report. This reach of the river has been experiencing a dredging problem for many years and an HSR model study was completed in FY06. The purpose of this 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. Personnel from the St. Louis District Corps of Engineers, Missouri Department of Conservation (MDC), Illinois Department of Natural Resources, FWS and the River Industry Action Committee were present at this meeting. 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. Although not part of the HSR study, in 2006 the Corps raised and extended dike 166.6(L), leaving the head rootless, and constructed notched dike 166.3(L). Other construction is scheduled for FY08.

8. **Fort Chartres/Establishment Island new chevrons and rootless dike between RM 132.5-129.5(R) (Pallid Sturgeon - RPA 3 & 4, RPM 1, Term and Condition 2&4; Least Tern - RPM 1, Term and Condition 2&4).** This reach of the river has been experiencing a dredging problem for many years. After coordination with stakeholders it was decided to

construct three chevrons, two spur dikes, and one rootless dike. This contract was awarded in FY06 and five of six structures were completed - one chevron at RM 130.2(R) is scheduled to be built in FY07. The two blunt-nosed chevrons were constructed at RM 130.0 and 129.9(R). The spur dikes and rootless dike were constructed between RM 132.0(R) and 132.5(R). This work is intended to eliminate the need to dredge and add environmental features. Pre-construction monitoring (biological & physical) was conducted by the MDC between 2002 and 2004 and a final report has been submitted to the Corps. 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 statistical analyses (multivariate ordination) may be needed to better explain the distribution and habitat use by fish species and guilds when comparing pre- and post-distributional patterns. Post-construction monitoring will begin a year after construction is completed.

9. **Mile 100(R) Islands study (Pallid Sturgeon - RPA 1).** Teri Allen (St. Louis District Corps biologist) continued the study of fish assemblages at the Mile 100 dike field located near 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 is designed to compare the fish assemblages at the island sites to nearby "non-notched" or "control" dikes (5 sites between RM 100.4 and 107.4[R]). Teri will be looking at spatial and temporal differences in such parameters as fish species diversity and composition, habitat variation, and water quality. The study is intended to examine the benefits of notched dikes and island creation to the fish community. Data analysis will follow in FY07.

10. **Upper and Lower Jones Chute, located between RM 98.4 and 95.0(R) (Pallid Sturgeon - RPA 3 & 4, Term and Condition 2)**. This reach was selected from the Corps year 2000 Middle Mississippi River Side Channel Report and an HSR model study was completed in FY06. The main purpose of the study was to evaluate environmental design alternatives in Upper and Lower Jones Chutes that will diversify aquatic habitat by modifying present dike structures to develop new side channels and bar formations, while maintaining the integrity of the navigation channel. Upper and Lower Jones Chutes can lose their connectivity with the main channel and become dry during low water periods. Therefore, alternatives primarily focused on restoring connectivity between side channel and main channel aquatic habitat for extended periods of the year, thus re-establishing more access to off channel habitat for aquatic organisms. Side channel habitats provide refuge from the swift currents of the thalweg and may be particularly beneficial as spawning, rearing, food production, feeding, and seasonal refuge areas for several species of fishes. Monitoring of water quality began in FY06 and included, among other things, total suspended solids, dissolved oxygen, nitrates, and phosphates. Jones Chute is scheduled for construction in FY08.

11. **Red Rock/Tower Rock, RM 93.0-86.0 (Pallid Sturgeon - RPA 3 & 4, Term and Condition 2; Least Tern - RPM 1, Term and Condition 2).** One chevron was

constructed during FY06 at RM 89.5(L). This chevron is the second of five structures to be constructed (three chevrons and two dikes) as part of the accepted alternative from the Red Rock to Tower Rock HSR study (RM 93.0-86.0) completed in 2002. Each alternative was tested with the intention of using innovative and traditional structures to create new island, side channel, and deep scour hole aquatic habitat within the dike fields of the study reach while maintaining the integrity of the navigation channel. Importantly, in March of 2006 the MDC captured two pallid sturgeon near the center of the chevron legs and another off the main channel side leg – this chevron was constructed in 2005 at RM 90.4(R). This reach of the river was one of the top three reaches ranked for modification from the Stone Dike Alteration study. The remaining four structures are scheduled for construction in FY07.

12. **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 FY06. Post-construction bathymetric surveys are scheduled to begin in FY 07. 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 access to 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 Environmental Assessment and Tier II Biological Assessment for this effort and secured the necessary section 401 and 404 permits for Clean Water Act compliance. The dredge cut created a channel to connect the open river area at the lower end of the chute to the deep scour hole within the chute for better connectivity during low water periods and over-wintering timeframes. The dredge cut will also 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.

13. **MVS River Reach Plans (Pallid Sturgeon - RPA 2 & 4).** River reach planning efforts in FY06 included work on data tabulation forms 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. Each reach has been subdivided into a number of subareas. For each subarea, the following information is being 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 the Navigation and Ecosystem Sustainability Program and the Middle Mississippi River Partnership.

14. **Special issue of the Journal of Applied Ichthyology (RPA 1 & 2, pallid sturgeon).** Dr. Tom Keevin (St. Louis District) is co-editing a special issue of the *Journal of Applied Ichthyology* on the life history of the sturgeon genus *Scaphirhynchus*. These papers are a result of the *Scaphirhynchus* 2005 Conference hosted by the St. Louis District. Dr. Keevin has been delayed by late submissions from some of the participants. Publication is anticipated during FY07.

15. ***Boltonia decurrens* (Decurrent False Aster).** Dr. Tom Keevin co-authored the paper "Habitat characterization and geospatial metapopulation dynamics of the threatened floodplain species *Boltonia decurrens* using a GIS," which was published in "The Society of Wetland Scientists," June 2006.

16. **Interior Least Tern (Term and Condition 3, least tern).** Coordination continued with the Interior Least Tern Working Group - expanding the nesting and usage survey effort was investigated. Maintenance on the least tern habitat island (RM 201.6[R]) continued and included herbicide application to remove and control perennial vegetation and light disking/harrowing. Random monitoring for least terns within the Riverlands Migratory Bird Sanctuary continued through partnership with St. Louis Audubon Society.

17. **Emergency Dredging Biological Assessment (Pallid Sturgeon - Term and Condition 5**). 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 FY06.

Projected FY07 Activities

Based on current projections of FY07 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. 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. Continue **pallid sturgeon work with Corps' Engineer Research and Development Center and Southern Illinois University at Carbondale; UMR mile 195-0**. A telemetry and larval fish survival study report is due in FY07.

3. **St. Louis Harbor chevron construction,** scheduled for FY07 Award. Construct chevrons for the St. Louis Harbor project, RM 183.0-182.4(R).

4. **Cliff Cave – Kimmswick dike alteration and chevron construction site, RM 168-156.6.** Construction is scheduled for FY08.

5. **Fort Chartres/Establishment Island new chevrons and rootless dike between RM 132.5 and 129.5 RDB.** One chevron remains to be built in FY07.

6. **Kaskaskia Bend, RM 125.0-112.0.** This contract is scheduled for an FY07 award.

7. **Chevron construction at RM 100.1-99.9 L** (bottom of Liberty Chute) is included in the next UMR miles 195-98.6 D&R contract, FY07 award.

8. **Mile 100(R) Islands study.** Data analysis is expected to continue in FY07.

9. **Upper and Lower Jones Chute between RM 98.4-95.0(R)**. Continue with pre-construction monitoring that will include water quality, and physical and hydrographic parameters. Construction is scheduled for FY08.

10. **Red Rock/Tower Rock RM 93-86**. Continue construction.

11. **Grand Tower RM 90.0-67.0.** Scheduled for FY08 award although further coordination will be required because of stakeholder concerns regarding the location of the weirs, dikes, and chevron.

12. Dike modifications at **Big Muddy River confluence, RM 75.5-75.2(L).** Notch two dikes, restore degraded dike and include notch, create side channel.

13. **Initiate Cape Rock HSR model study, RM 58.0-50.0**. This reach was requested for evaluation by the Missouri Department of Conservation.

14. **Thebes Reach RM 46.0-36.0**. Initiate HSR model study. This reach was selected using the Stone Dike Alteration Plan.

15. **Sister Chute, RM 12.0(R)**. Perform post-dredge bathymetric monitoring.

16. Continue efforts toward buying **flexible/floating pipe** for dredging.

17. **River reach plans (RM 300-0)**. It is anticipated that all data forms work will be completed, and a substantial start made on the evaluation and prioritization of the various subareas for future ecosystem restoration work. Threatened and endangered species considerations have been and will continue to be a component part of the reach planning effort.

18. Continue coordination with the **Interior Least Tern Working Group** and investigate expanding the nesting and usage survey effort. Continue random monitoring for least terns within the Riverlands Migratory Bird Sanctuary through partnership with St. Louis Audubon Society.

19. Continue coordination and work on effort to address *Boltonia decurrens* listing question and associated future management strategies with the FWS Recovery Team and Team Leader. Write five-year update.