

Implementation of the Biological Opinion

Annual Progress Report Fiscal Year 2008

**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
Bald Eagle – delisted August 9, 2007
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

FY08 Activities:

The following is an outline of St. Louis District activities for fiscal year 2008. This was the eighth 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 - 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 on 6 February 2008 at the National

Great Rivers Museum in Alton, Illinois. Topics of discussion included: 1) dates for the upcoming summer RRAT Boat Trip, 2) WRDA 2007 authorization and other WRDA authorized projects (e.g., 514 and 519), 3) status of a number of CAP projects in the District, 4) Kaskaskia River Basin, 5) status of NESP and EMP, and 6) new Corps positions called Business Line Managers.

Another RRAT Exec meeting was held on 24 June 2008 following a joint meeting between the RRAT and the River Resources Conservation Team (Rock Island District). The topic of discussion was primarily the status of the NESP Reach Objective setting process and the role of the RRAT Exec as the process moves forward. There was discussion on the role of the Science Panel and what, if any, guidance the RRAT Exec has. There was a brief discussion on the status of the Hydrogeomorphic Study being developed by Mickey Heitmeyer and an upcoming meeting with the Middle Mississippi River Partnership.

The River Resources Action Team again met in a scheduled formal Executive Session on 8 September 2008, during the annual RRAT Boat Trip. The topic of discussion was primarily the structure of the Illinois River Working Group and the institutional arrangements proposed by Illinois that would focus on NESP and its planning reaches and geomorphic reaches. Comments from the group regarding concerns will be compiled. Also discussed were the development of NESP Reach Objectives for the Middle Mississippi and the replacement of Dave Busse as co-chair of the RRAT Exec.

2. **River Resources Action Team – Technical Team (Pallid Sturgeon - RPA 2 & 4, Term and Condition 4; Least Tern - Term and Condition 4).** The RRAT Technical Team meeting took place on 5 February 2008. Topics of discussion included: Hydraulic Sediment Response (HSR) Studies at Jones Chute, Carroll Island, Iowa-Squaw Islands, Cape Rock, Establishment Island, Thebes, and Waters Landing. Also discussed were construction at Mosenthein Reach/Ivory Landing Phase 2, Kaskaskia Bend, Grand Tower, Multiple Round Point Structures at Kelly Island, dike modification at Big Muddy confluence, spur dikes at Jones Chute, chevrons at Dogtooth Bend, Thompson Bend riparian corridor, and rock removal between UMR miles 95-35. The Middle Mississippi River Collaborative Planning Study, Pool Plans, flexible/floating pipe for dredging, hydropower proposals, and the NESP goals and objectives workshop were also covered.

The annual RRAT boat trip took place in the pools on 9 and 10 September 2008. This year's trip was from Lock and Dam 22 to the St. Louis Service Base. Topics of discussion focused primarily on current projects and construction, proposed and completed, along the way including EMP, NESP, HSR models, Regulating Works, NGO and Agency efforts, Biological Opinion work, Avoid and Minimize work among others.

3. **Pallid Sturgeon Habitat, Life History, and Population Demographics work (Pallid Sturgeon - RPA 1).** Sampling for larval/juvenile *Scaphirhynchus* began in FY08. Mini-Missouri trawls were used April through October focusing on the Mosenthein, Osborne, Rockwood, Cottonwood, Marquette, and Angelo island complexes. All age-0 sturgeon were kept for genetic analysis. 586 age-0 sturgeon were captured in FY08. Genetic analysis

showed that 584 were shovelnose, 1 was a pallid, and 1 was a hybrid. Sampling will continue in FY09.

4. **Pallid Sturgeon Conservation and Restoration Plan (Pallid Sturgeon - RPA 2).** The development of this plan continued in FY08 to the extent possible exclusive of the results of ongoing studies.
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).** Post-construction monitoring continued in FY08 at the St. Louis Harbor site. The first post-construction sample took place in August of 2008 and 20 species were collected at the chevron sites including shovelnose sturgeon. Earlier in the spring, island formation could be seen in the shadows of the chevrons (see image below). However, high water in the late spring and early summer scoured the islands to well below the surface when sampling took place in August. Post-construction monitoring will continue in FY09.

General Background: The St. Louis Harbor area has been experiencing a dredging problem for many years. A Hydraulic Sediment Response (HSR) model study was performed in 2003 for RM 184.0-173.0 and an alternative was selected that uses non-traditional structures to 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 river miles 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. Fish data collected over a number of years at chevrons in Pools 24-26 shows that the scour holes that develop after the chevrons get over-topped are occupied by a number of fish species throughout the year.



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).** An HSR model study for this reach was completed in FY06. The Biological Assessment for this contract has been completed. Construction was scheduled for FY08 but was deferred due to funding. Construction is scheduled for FY09.

General Background: 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 (AREC) 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 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 is planned to begin during FY09.

General Background: Construction of a rootless dike at RM 130.2(R) was completed in FY07. The 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 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). This work is intended to eliminate the need to dredge and add environmental features. Recent data shows that the scour holes that develop after 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 patterns.

8. **Kaskaskia Bend, RM 125.0-112.0.** Three dike modifications were completed here in FY08. At RM 123.4(R) the existing dike was notched and raised. At RM 113.9(L) and RM 113.2(L) the existing dikes were notched and extended. This reach of the river has been experiencing a dredging problem for many years. This work is intended to reduce dredging requirements, improve navigation, and add environmental features. The Biological Assessment for this contract has been completed.
9. **Waters Landing, RM 106.0-100.0 (Pallid Sturgeon - RPA 3 & 4, RPM 2, Term and Condition 2; Least Tern - RPM 1, Term and Condition 2).** The St. Louis District initiated a sedimentation improvement study of the Waters 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 Corps' 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, or 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) (Pallid Sturgeon – RPA 3 & 4, Term and Condition 2).**

General Background: During July and August of 2007 three chevrons were constructed at RM 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. The 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 surveys of the area will be forthcoming to see if the chevrons performed as expected.
11. **Mile 100(R) Islands study (Pallid Sturgeon - RPA 1).** Data analysis continued during FY08 for this study.

General 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. Data analysis continued in FY08. The area consists of six notched dikes and five islands. The dikes were built in the early 1970s 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 river miles 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 fish communities.

12. **Upper and Lower Jones Chute, located between Upper Mississippi RM 98.4 and 94.8 (Pallid Sturgeon - RPA 3 & 4, RPM 1, Term and Condition 2).** In 2008 construction took place at Jones Chute following recommendations from the 2004 HSR study. Eleven hardpoints were built in the lower portion of the chute between RM 96.15 and 94.8 and the closing structure at the lower end of the chute was notched. In addition, several banks in the chute and main channel border were revetted, two dikes were built and parts of three dikes were removed.

General Background: The main purpose of the study was to evaluate environmental design alternatives in Upper and Lower Jones chutes in order to diversify aquatic habitat by modifying present dike structures, developing 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. Post-construction monitoring is pending.

13. **Red Rock/Tower Rock project RM 93.0-86.0 (Pallid Sturgeon - RPA 3 & 4, Term and Condition 2; Least Tern - RPM 1, Term and Condition 2).** The third chevron from the 2002 Red Rock to Tower Rock HSR study was constructed at RM 89.15(L) during FY08.

General Background: Other previous construction that has taken place from this study includes one chevron that was constructed during early FY06 at RM 89.5(L) and another chevron that was constructed at river mile 90.4(R) during 2005. Each alternative from the HSR study 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 MDOC captured two pallid sturgeon near the center of the chevron legs and another off the main channel side leg – this was the chevron at RM 90.4(R) that was built in FY05. This reach of the river was one of the top three reaches ranked for modification in the Corps' Stone Dike Alteration Project Report.

14. **Dike modifications at Big Muddy River confluence, RM 75.5(L) (Pallid Sturgeon - RPA 4, RPM 1; Least Tern - RPM 1).** No further dike modification took place for this project during FY08. Modification of the remaining two dikes is scheduled for FY09.

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.

15. **Cape Rock HSR Study RM 57-50 (Pallid Sturgeon – RPA 3 & 4, RPM 1; Least Tern – RPM 1).** 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 continued thru FY08.

General Background: The purpose of the study was to evaluate environmental design alternatives for the development of side channel and island habitat, utilizing an existing dike field on the Mississippi River. This study was funded as part of the Biological Opinion Program of the US 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. A final report with recommendations is forthcoming.

16. **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. This study continued thru FY08. The study's main purpose was to evaluate design alternatives to the existing stone dike configurations in this reach of the river with intent to improve environmental habitat. Within the model is Santa Fe Chute. The challenges are the rock bottom in the river and the structures enclosing the entrance to Santa Fe Chute. A final report with recommendations is forthcoming.

17. **Dogtooth Bend – Phase 3, RM 40.0-20.0.** This contract was scheduled for an FY08 award but has been delayed until FY09. This reach of the river has been experiencing a dredging problem for many years. This work can eliminate the need to dredge, improve navigation, and add environmental features at this site. This work will be coordinated with the FWS, IDNR, MDOC, and RIAC.

18. **Eliza Point / Greenfield Bend – Phase 2, RM 20-0.** This contract was scheduled for an FY08 award but has been delayed until FY09. This reach of the river has been experiencing a dredging problem for many years. This work can eliminate the need to dredge, improve navigation, and add environmental features at this site. This work will be coordinated with the FWS, IDNR, MDOC, and RIAC.

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). A post-construction bathymetric survey took place at the end of November 2006 and another was conducted in March 2008. Additional surveys are scheduled for 2009. A final report is forthcoming.

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 will create a channel to connect the open river area at the lower end of the chute to the deep water hole for better connectivity throughout critical 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.

20. **Perform pre-dredge monitoring of Angelo Chute, RM 4.7 – 1.6(L).** Project cancelled.
21. **MVS River Reach Plans (Pallid Sturgeon - RPA 2 & 4).** River reach planning efforts in FY08 included continued work on data, maps, and other information toward completion of the final report 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 NESP and the Middle Mississippi River Partnership. In addition, work continues on the hydrogeomorphic study for the Middle Mississippi River that was initiated in 2007. This study will be used to help determine what ecosystems existed along the Middle Mississippi River before European settlement and also how to restore these ecosystems.
22. **Interior Least Tern (Term and Condition 3).** Random monitoring for least terns within the Riverlands Migratory Bird Sanctuary (RMBS) continued through partnership with the St. Louis Audubon Society. In partnership with the University of Illinois and Illinois Department of Natural Resources, a temporary artificial breeding/nesting structure was placed, maintained and monitored on Least Tern Island in Ellis Bay (RM 201.6[R]), RMBS. Using decoys and a call box the site was monitored randomly and no increased use was noted as a result of luring methods. The process to acquire a surplus floating pontoon barge to be utilized as potential temporary artificial breeding/nesting structure in Ellis Bay, RMBS was continued.
23. **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 FY08.

24. **Purchase flexible/floating pipe for dredging.** Plans continue to acquire 2100 feet of flexible pipeline for the Dredge Potter. The existing pipe is 800 feet of straight pipeline and leaves the dredged material in windrows. The floating flexible pipe can be used to create islands near shore or behind chevrons and generally gives more options for placing dredged material for ecological benefits.

Projected FY09 Activities:

Based on current projections of FY09 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. The **Pallid Sturgeon Habitat Conservation and Restoration Plan** effort will continue in cooperation with MDOC, IDNR and FWS.
3. Continue **pallid sturgeon** work (ERDC/SIU-C). Telemetry and larval fish survival study – report due in FY09. Continue larval/juvenile sampling in FY09.
4. **St. Louis Harbor chevron construction RM 183.0-182.4(R)**. Post-construction monitoring including bathymetry, ADCP, water quality, and fish data will continue during FY09.
5. **Cliff Cave – Kimmswick dike alteration and chevron construction site, RM 168.0-156.6**. Construction is scheduled for FY09.
6. **Fort Chartres/Establishment Island new chevrons and rootless dike between RM 132.5-129.5(R)**. Post-construction monitoring by the Missouri Department of Conservation is scheduled to begin in FY09.
7. **Initiate Establishment Chute HSR model study, RM 133-129**.
8. **Complete Waters Landing HSR model study, RM 106-100**.
9. **Chevron construction at RM 100.1-99.9(L) – (bottom of Liberty Chute)**. Follow-up bathymetry forthcoming.
10. **Mile 100(R) Islands study**. Continue data analysis.
11. **Grand Tower RM 90.0-67.0**. Scheduled for FY09 award although further coordination may 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)**. Construction on the remaining two dikes is planned for FY09.
13. **Complete Cape Rock HSR model study, RM 57-50**.
14. **Complete Thebes HSR model study, RM 46.0-36.0**.

15. **Perform bathymetric post-dredge monitoring surveys at Sister Chute, RM 14.5-12.0.**
16. **Dogtooth Bend – Phase 3, RM 40.0-20.0.** This contract is scheduled for an FY09 award. This work will be coordinated with the FWS, IDNR, MDOC, and RIAC.
17. **Eliza Point / Greenfield Bend – Phase 2, RM 20-0.** This contract is scheduled for an FY09 award. This work will be coordinated with the FWS, IDNR, MDOC, and RIAC.
18. **River reach plans RM 300-0.** Complete work on data, maps, and other information and finish the final report 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.
19. **Purchase flexible/floating pipe for dredging.** Plans to acquire 2100 feet of flexible pipeline for the Dredge Potter continue.
20. Continue random monitoring for **Least Tern** within the RMBS through partnership with St. Louis Audubon Society. Continue the process to acquire a surplus floating pontoon barge to be utilized as potential temporary artificial breeding/nesting structure to be placed in Ellis Bay, RMBS.
21. 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.