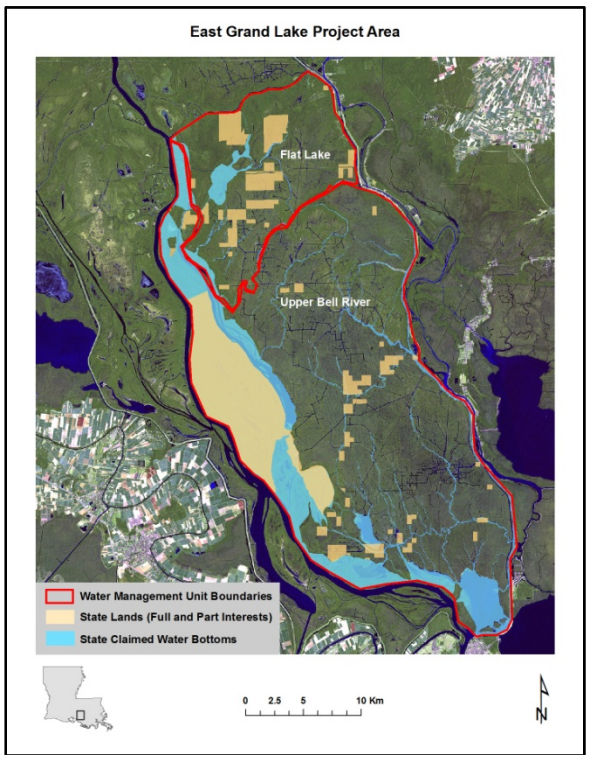
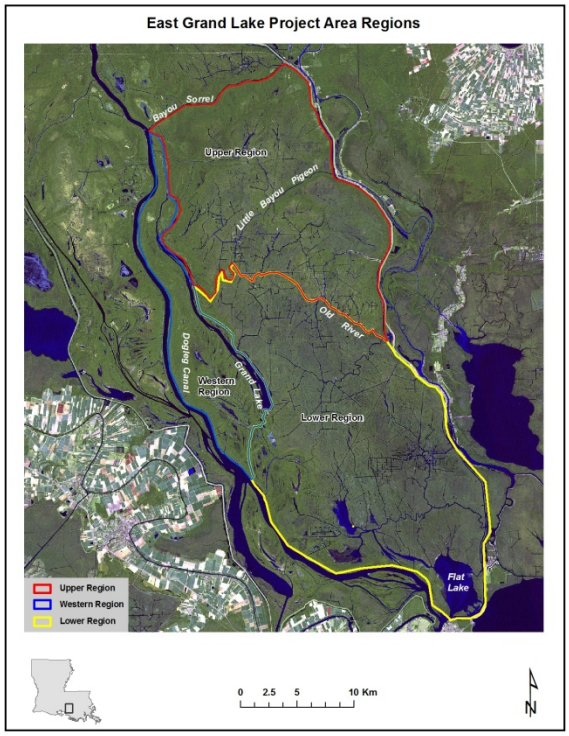
East Grand Lake Project Area
FY2012 Upper Region Project Descriptions

The East Grand Lake (EGL) Project area covers both the Flat Lake and Upper Belle River Water Management Units as designated by the United States Army Corps of Engineers (USACOE). The area is approximately 202,424 acres, stretching approximately 31 mi long by 13 mi wide (Fig. 1).

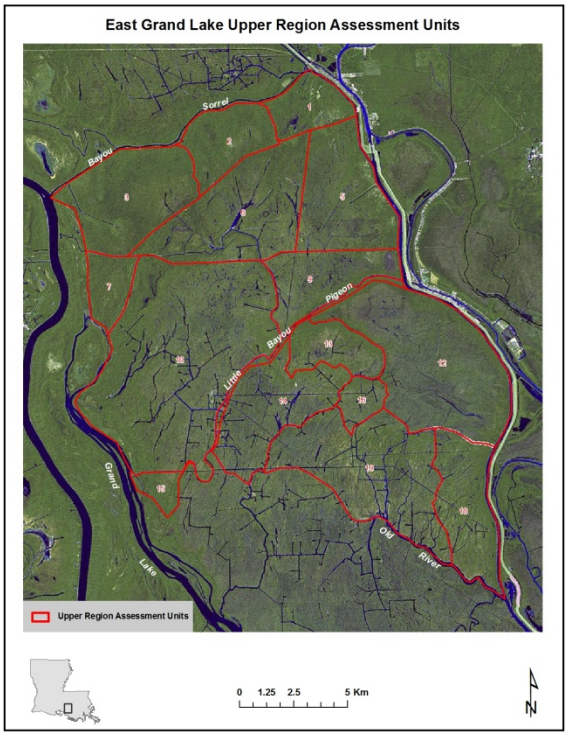


Given the size of the Project area, developing plans to realign sediment distribution and improve water quality conditions for the entire area would be a very difficult and costly task. In order to develop more realistic water and sediment realignment plans, the EGL Project area was broken down into smaller and more manageable areas for which reasonable forecast for improvements could be developed.

Our initial assessment of water flow, elevation, and sediment distribution patterns revealed 3 distinct regions in the Project area that provide a good planning platform; an Upper Region, a Western Region, and a Lower Region (Fig. 2).



Additionally, many segments exist within each Region that can be outlined into smaller and more manageable parts using the same type of evaluations used to define the Regions. Regions were therefore broken down into smaller isolated segments called Assessment Units (AUs) so that more detailed assessments of these segments can be performed as projects are developed (Fig. 3).



While it may seem a rather complex set of boundaries, dealing with small areas will provide a more precise characterization of Regional conditions and also provides a way to add new and specific information to the decision process that have been difficult to integrate accurately in the past.

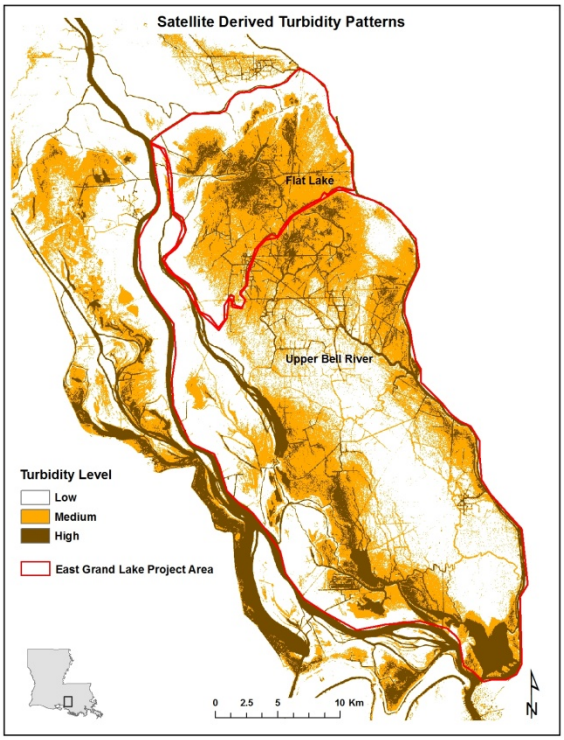
The Upper Region was chosen as the initial point of developing the overall strategy for the EGL Project area because there is a reasonable confidence in the projected benefits for realignment of flow and sediment. Additionally, since north-south flow patterns that disperse sediment more evenly throughout the Project area are desired, a north to south planning effort seems to be the most logical approach. Also, the Western and Lower Regions present greater uncertainty in realignment and will therefore require additional information before projects can be designed. However, general ideas are being considered for realignment in the Western and Lower Region and the development of proposals in the Upper Region are being formulated with some expectation of the needs in the other Regions.

While managers have spent much time evaluating water quality and sediment distribution problems in the Upper Region, we also acknowledge that it is difficult to formulate a management plan that addresses every aspect of a system as dynamic as the Atchafalaya Basin. As water levels pulse at different rates as the River rises and falls, some waterways that normally function as inputs or outputs into the Project area may reverse course. Additionally, it is difficult to improve water quality where mats of aquatic vegetation such as water hyacinth suddenly accumulate. These aquatic mats block waterways and interior swamps and greatly affect fresh water flow patterns, block sunlight from entering the water column and reduce photosynthesis rates, and create anoxic conditions as large mats die-off during freezing weather. These are just a few examples of how otherwise functional corrective measures can be hindered when trying to manipulate flow patterns and water quality in an ever changing system such as the Atchafalaya Basin. Therefore, an adaptive management approach that employs an on-going monitoring program and initiates timely corrective measures has been adopted by managers to monitor environmental changes related to sediment and water realignment efforts in the Project area.

Managing the EGL Upper Region

The Upper Region covers the area south of Bayou Sorrel to Old River and east of Grand Lake to the GIWW and covers an estimated 72,143 acres. The Region is comprised of 15

AUs (Units 1-3, 5-7, 9 -10, 12-16 and 18-19) and extends approximately 10 miles southward of Bayou Sorrel along its western boundary and 16 miles southward of Bayou Sorrel along its eastern boundary (Fig. 3). Turbidity patterns derived from numerous classified images at various water levels from 1983 – 2008 were used to make the initial assessment of how and where water enters and moves through the Upper Region. Turbidity measurements from the imagery provide an estimate of the amount of particles that are suspended in the water. The extent of turbid water in different areas of the Basin is an indication of the movement, or lack of movement, of fresh water through the system. Satellite images captured at various River levels can therefore be used to outline water movement patterns indicated by turbidity because particles remain suspended in the water column where water moves and turbidity is high (Fig. 4).



These initial assessments are complimented by actual discharge and water quality measurements collected by USGS and LSU, and while data collection efforts will not be complete until late 2011, preliminary evaluations using a combination of all these data have already identified areas of persistently good and bad water quality within the EGL Project area and the Upper Region.

While lidar data suggest the Upper Region has fewer restrictions to flow than other areas of the EGL Project area which allows for good water to enter and circulate throughout a large portion of the Region, the highly channelized delivery of water through the Coon Trap, the School Board Canal (Unnamed Canal), Indigo Bayou, Salt Mine Bayou, Williams Canal, and Bayou Pigeon has developed a sediment delivery network that carries sediment deep into the Project area which promotes further restriction of flow and isolation of small areas. Modifying this network of channelized water input was the initial target for realignment.

The strategy adopted to improve water quality seeks the realignment of water input through the northern part of the Upper Region so that water is still supplied to areas in the central part of the Region after it has been filtered of sediment in order to reduce the rate of sediment buildup along the channelized delivery network. To complement modified and new inputs in the north, planning teams designed gaps in flow barriers further south to promote sheet-flow patterns that deposit sediment more evenly throughout the Upper Region, deliver sediment to isolated forested areas that have been left without the sediment resources needed to

remain healthy and counter subsidence, and distributed gaps spatially such that Unit circulation and connectivity with adjacent Units is improved as well.

Planning teams were not only mindful of the problems associated with the Units in the north targeted for additional input, but were also mindful of problems associated with adjacent Units as well. The success of improving forest health and water quality conditions in the entire EGL Upper Region therefore hinge on the implementation of a suit of construction projects that complement each other in order to keep the water moving from north to south through the Region. With a limited amount of funding available to support all the projects needed to improve environmental conditions in the Upper Region, forecasting expected benefits will be dependent on the projects selected for funding. Also, it is important to note that conditions will likely get worse in some areas of the Upper Region before they get better. Managers expect to see some areas with persistently good water quality to be inundated with poor water as hypoxic water in ponded areas is displaced other locations in the Project area.

The following pages identify AUs in the Upper Region where turbidity, lidar, and water quality data suggest water and sediment realignment projects are needed to improve environmental conditions. Initial assessments describe the problems associated with each AU and then list projects that may not only improve conditions in the targeted AU, but are also compatible with solutions required for problems in adjacent AUs.

Evaluated Features Currently being considered in the EGL Project area

The following elements were evaluated by the TAG subcommittee and found to be the best possible solutions for achieving the desired goals of realigning sediment and water in the Upper Region of the EGL Project area. Elements that were excluded and found to be less than optimal for achieving the desired goals are listed at the end of the document and include projects that may be incorporated into future plans should the need arise.

Coon Trap

Coon Trap (Fig. 5)

Figure 5. Coon Trap weir project in the EGL Project area currently being considered for the Atchafalaya Basin 2012 Annual Plan.

is an important source of fresh water input for the EGL Project area, contributing as much as 4300 cfs of input when Atchafalaya River levels at Butte LaRose (BL) are near 15 ft. (USGS Synoptic 1 data). This volume represents nearly a third of the discharge entering Bayou Sorrel at the Atchafalaya River during the same time period (14,000 cfs), and more than two thirds of the total volume entering the Upper Region from the School Board Canal, Indigo Bayou, and Cannon Bayou combined (6,400 cfs).

Coon Trap overtops the rock weir when BL water levels are above approximately 8 -

8.5 ft., and the input helps supply fresh water to large areas of AU 6 and AU 10 via the Williams Canal, overbank flooding from Bee Bayou and Murphy Lake, and from Cross Bayou flowing southward out of Murphy Lake. Grand Lake also receives fresh water input from Coon Trap through Chicot Lake and Flat Lake Pass. But, much like other inputs in the northern part of the Upper Region, Coon Trap is a channelized system that deposits sediment in the interior of the Project area and continues to build sediment barriers that further restricts cross flow from adjacent areas. In addition, Flat Lake Pass is channeling sediment from Coon Trap into Grand Lake, one of the few remaining natural areas deep enough to provide fairly consistent and suitable water quality conditions for fish to take refuge when water quality problems occur throughout much of the EGL Project area.

While the addition of sediment to Grand Lake is certainly problematic on one hand, some mangers argue that unlike Henderson Lake which has clear water for long periods of time during the year and persistent problems with aquatic vegetation, the frequent addition of turbid water to Grand Lake may be partly responsible for preventing invasive aquatic plants from establishing a foothold in the Lake. In addition, the entire EGL Project area is approximately 31 miles long by 13 miles wide and the planning team views Coon Trap as the only current source of fresh water capable of providing the volume of input required to improve water quality conditions in parts of all three Regions. There are also managers who believe that the only way to effectively manage large portions of the Project area will be to lower parts of the Coon Trap weir so that both the volume and duration of input from Coon Trap is increased. Recent discharge measurements conducted by USGS when the River level was at about 5 ft. at BL, coupled with turbidity data, show that channelized flow from Indigo Bayou (322 cfs), and to a lesser extent the School Board Canal (89 cfs), were the only sources of fresh water input reaching the northern part of Grand Lake. And, since the current plans for realigning sediment distribution and flow in the Project area call for reducing greatly the negative impacts of channelized flow, these sources of fresh water may be affected by realignment efforts during low water periods. Reducing the height of the rock weir at selected locations at Coon Trap an additional three feet would therefore allow some measure of fresh water input into Grand Lake even during low water periods. Therefore, maintaining the benefits of the input supplied by Coon Trap to the Project area, while managing the negative impacts of excessive sedimentation in the interior of the Unit and in Grand Lake, was a major focus of the planning team.

The overall concept for managing Coon Trap begins with preventing further sediment deposition in the Williams Canal, Bee Bayou, and Murphy Lake areas by redirecting and dispersing its input into isolated areas of forest in the Upper and Western Regions that would benefit from additional sediment and input. These areas would in turn act as sediment filters and help deliver water with less sediment to areas further south and to Grand Lake. By creating or improving inputs capable of capturing and redirecting flow from Coon Trap at the Williams Canal and Flat Lake Pass, coupled with the force of additional input filtering down from the north through AUs 2 and 3 into the Williams Canal (via

Murphy Lake and Bee Bayou), flow from Coon Trap will be forced to flow southward down Flat Lake Pass. Projects proposed for redirecting Coon Trap input are listed under AUs 7 and 10 below, while projects proposed for improving input and flow in AUs 2 and 3 are listed under AU 2 and AU 3 below.

EGL8p1 – Keep Coon Trap open and redirect flow into Chicot Lake, AU 7 and AU 10. Maintain the option of modifying the weir to increase flow into the Project area by developing a gap with a bottom elevation of approximately 5 ft. and a bottom width of 30 ft. should the need arise.

Assessment Unit 1 (AU 1)

AU 1 is a 1,965 acre Unit that is east of Salt Mine Bayou and Unit 2, south of Bayou Sorrel, west of the GIWW, and north of the Florida Canal and Units 5 & 6 (Fig. 6).

Figure 6. Projects in Assessment Unit 1 of the EGL Project area currently being considered for the Atchafalaya Basin 2012 Annual Plan.

Sediment deposition along the perimeter of the Unit has virtually eliminated overbank flooding into the Unit at normal River levels. Additionally, sediment deposition in and along the pipeline canal that runs from the northeast to the south central part of the Unit from the GIWW has divided the Unit into eastern and western sections that function as independent hydrologic units except during extreme high water conditions.

The eastern section of Unit 1 is almost entirely cut off from flow until River levels rise to near approximately 12.5 ft. at BL, at which time water begins to backflow into the Unit across the Florida Canal from Unit 5 to the south. The northern part of the eastern section does not receive input until the River is near about 15 ft. at BL, at which time water flows into northern areas from the pipeline canal to the west.

The western section of Unit 1 has very few consistent sources of input. While Salt Mine Bayou supplies input into the western section at River levels near approximately 9 ft. at BL, the input enters at the southeastern corner of the western section and the head pressure created likely inhibits the Units ability to drain through this narrow corridor. Here, without modifications to this input, sedimentation is expected to continue and further reduce the ability of fresh water to enter or drain from the western section of Unit 1.

A relatively new input has been developed into the northeast part of the western section at the southwest end of the oil field location canal at the GIWW and Bayou Sorrel. However, the lack of recent turbidity data for this area makes it difficult to estimate the River level at which it functions as an input. At some point, it looks as if the location canal was further

developed to the southwest for oil and gas exploration and then subsequently dammed off. A site visit of this location in July, 2010 revealed water flowing through a boat sized gap in the earthen dam while the BL stage was near approximately 10.2 ft., indicating that water was able to move from this canal into some areas of western AU 1.

Similar in scope to projects proposed for AUs 2 & 3, projects proposed for AU 1 are designed to deliver water more consistently and efficiently to the Unit at normal River stages. The projects seek to develop or improve existing inputs at Salt Mine Bayou, the location canal at GIWW and Bayou Sorrel, and along the west bank of the GIWW to increase fresh water flow into both sections of the Unit. The proposed plans treat the two sections as independent hydrologic units, realigning input to more northern areas of each unit while developing drainage gaps along southern barriers to promote circulation and drainage. The goal is to redirect sediment and water to isolated areas to promote forest development and improve water quality conditions, promote southward sheet-flow patterns within the Unit, and deliver water with less sediment to AUs 5 and 6 to the south.

<u>Salt Mine Bayou and the Florida Canal</u>

EGL1p2 – Salt Mine Bayou east bank shave and channel development project to increase flow into northwestern AU 1. The project is designed to distribute water and sediment to isolated areas in the western part of the Unit to promote forest development and improve water quality conditions.

EGL1p3 – Clean existing stream in old location canal to increase flow to isolated areas in northwestern AU 1 to promote forest development and improve water quality conditions in the western part of the Unit.

EGL1p45 – Block flow from entering the swamp at the eastern end of Salt Mine Bayou. Eliminating flow into the swamp at this narrow corridor will reduce head pressure and may promote more efficient draining of the Unit.

EGL1p53 – Develop a north bank gap and channel in an existing stream bed to improve Unit drainage and improve connectivity with Unit 6 to the south.

EGL1p46, EGL1p48, EGL1p52 & EGL1p56 – Develop north bank gaps and channels to improve Unit drainage and improve connectivity with Unit 6 to the south.

EGL1p46b - EGL1p47b, EGL1p53b, EGL1p57b & EGL1p61 – Develop south bank gaps and channels to improve AU 1 and AU 6 connectivity.

<u>Oil Field Canal at Bayou Sorrel and the GIWW</u>

EGL1p7 – Increase gap size and depth at the end of the oil field canal to increase flow into the location canal further south.

EGL1p8, EGL1p11 & EGL1p13 – Dredging projects to increase flow from EGL1p7 to the end of the old location canal.

EGL1p9 & EGL1p14 - **EGL1p15** – Stream cleaning projects to convey flow from the old location canal into the northern part of AU 1 to promote forest development and improve water quality conditions.

EGL1p10 – Create a gap on the south bank of the stream at EGL1p9 to convey flow southward into western AU 1 to promote forest development and improve water quality conditions.

<u>GIWW</u>

EGL1p30, EGL1p33 - EGL1p35, & 1p33b – Clean and develop old stream beds to convey flow from GIWW into isolated areas of eastern AU 1 to promote forest development and improve water quality conditions. EGL1p33b is an experimental birds' foot development project at the end of EGL1p33 to disperse flow in multiple directions.

EGL1p36 - EGL1p36 is an experimental birds' foot formation at the end of EGL1p35 designed to disperse flow in multiple directions.

<u>Florida Pipeline Canal at GIWW</u>

EGL1p38, EGL1p40, EGL1p42 & EGL1p44 – Develop gaps and channels across the Florida Canal levees to create drainage for Unit 1, improve AU 1 and AU 5 connectivity, and increase fresh water flow into northern AU 5.

Assessment Unit 2 (AU 2)

AU 2 is a 2,718 acre Unit that is east of Indigo Bayou and Unit 3, south of Bayou Sorrel, west of Salt Mine Bayou and Unit 1, and north of the Florida Canal and Unit 6 (Fig. 7).

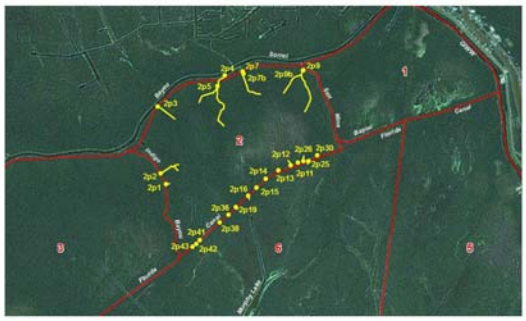


Figure 7. Projects in Assessment Unit 2 of the EGL Project area currently being considered for the Atchafalaya Basin 2012 Annual Plan.

Sediment deposition along Bayou Sorrel limits significant overbank flooding into the Unit until River levels are near approximately 18 ft. at BL, and high banks along Salt Mine Bayou prevent overbank flooding until River levels are near about 17 ft. at BL. Bank elevations are lower along Indigo Bayou however, and overbank flooding occurs on lower Indigo when water levels are near about 15 ft. at BL. Jones Bayou provides input to the north central part of the Unit from Bayou Sorrel and Old Cannon Bayou provides input to the northeastern part of the Unit from Salt Mine Bayou when gage heights are near approximately 15 ft. BL.

With the exception of high water conditions, Salt Mine Bayou supplies

virtually all input to Unit 2 and does so via the Florida Pipeline Canal about 1.5 miles south of the northern Unit boundary at Bayou Sorrel. Salt Mine Bayou is therefore the only consistent source of input into Unit 2 at normal River stages. And while Salt Mine Bayou receives fresh water from Bayou Sorrel even during low water conditions, the channelized system delivers input deep into the Unit where sediment deposition is creating isolated areas of forest with persistent water quality problems. TM imagery reveals the presence of turbid water in the main channels of both systems (Salt Mine Bayou and the Florida Canal) at water levels near approximately 4.5 ft. at BL, however very little fresh water is delivered to the interior swamps of Unit 2 until gage heights reach about 9 ft. at BL.

Projects proposed for AU 2 are designed to deliver water more consistently and efficiently to the Unit by creating or modifying inputs at Indigo Bayou, Bayou Sorrel, and Salt Mine Bayou, provide improved circulation and connectivity within the Unit, and provide a more uniform flow of water with less sediment and improved water quality southward to AU 6. Newly constructed or modified inputs at Indigo Bayou, Bayou Sorrel, and Salt Mine Bayou are designed to deliver water and sediment to more northern and central areas of the Unit to promote forest development and improve water quality conditions, while bank gaps along the Florida Canal west of Salt Mine Bayou to Indigo Bayou are designed to promote sheet-flow patterns within the Unit and improve connectivity with AU 6 to the south.

Bayou Sorrel

EGL2p3, EGL2p7 & 2p7b – These sites are possible locations to develop bank shaving projects that would connect with old stream beds in the Unit interior in order to provide additional input into AU 2 from Bayou Sorrel during higher River stages. EGL2p7 & EGL2p7b would connect to old location canal to convey flow to the Unit interior. The projects seek to increase water and sediment to the northern parts of the Unit interior to promote forest development and improve water quality conditions.

EGL2p4 - EGL2p5 – Clean Jones Bayou at EGL2p4 to increase flow from Bayou Sorrel into north central AU 2. EGL2p5 is an optional west bank gap and channel development project to divert flow to isolated areas in the northwestern part of the Unit. Both projects seek to redirect water and sediment to isolated areas of the Unit to promote forest development and improve water quality conditions.

Indigo Bayou

EGL2p1 – Indigo Bayou east bank shave and channel development project to introduce consistent flow into western AU 2. The project seeks to redirect water and sediment from Indigo Bayou to isolated areas within the Unit to promote forest

development and improve water quality conditions.

EGL2p2 – Indigo Bayou east bank shave and channel development project to introduce consistent flow into western AU 2. The project seeks to develop a channel in an existing stream bed to redirect water and sediment from Indigo Bayou to isolated areas of the Unit to promote forest development and improve water quality conditions.

Salt Mine Bayou

EGL2p9 & EGL2p9b – EGL2p9 is a project to clean and develop an input channel in the Old Cannon Bayou stream bed to increase flow into eastern AU 2. EGL2p9b is a project to develop a gap and channel off of Cannon Bayou to divert input into the northeastern part of Unit 2. Both projects are designed to increase input into isolated areas of the Unit to promote forest development and improve water quality conditions.

The Florida Canal

EGL2p11 - EGL2p14, EGL2p26 & EGL2p30 – Develop gaps and channels along the north bank of the Florida Canal to promote sheet-flow patterns through AU 2 and improve connectivity with Unit 6. EGL2p12 is located at an existing stream that will require cleaning in order to function as an efficient drain.

EGL2p15 – Cutoff flow to the bayou at the west end of the Florida Canal. Eliminating northward flow will eliminate head pressure in the Unit and allow new inputs in the northern part of the Unit to function more efficiently.

EGL2p25 – Develop a gap and channel along the south bank of the Florida Canal to improve connectivity with Unit 6 and promote sheet-flow patterns through AU 2.

Unit Interior at the Florida Canal

EGL2p16, EGL2p19, EGL2p36, EGL2p38, EGL2p41 - EGL2p43 – Gap north and south levees along the Florida Canal to improve connectivity between AU 2 and AU 6 and promote sheet-flow patterns in both Units.

Assessment Unit 3 (AU 3)

AU 3 is a 5,431 acre Unit that is east of the Atchafalaya River, south of Bayou Sorrel, west of Indigo Bayou and Unit 2, north of the Williams Canal and Unit 7, and north of the Florida Canal and Unit 6 (Fig. 8).

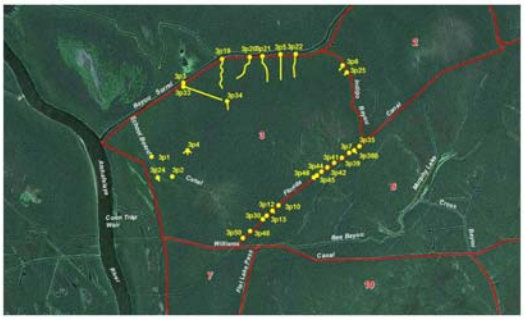


Figure 8. Projects in Assessment Unit 3 of the EGL Project area currently being considered for the Atchafalaya Basin 2012 Annual Plan.

High banks along Bayou Sorrel limit over bank flooding into AU 3 except during extreme high water conditions (above approximately 17 ft. at BL). The School Board Canal and Indigo Bayou are the

primary sources of input to the Unit, and while these two inputs deliver water from Bayou Sorrel into the Unit even during low water conditions, both are channelized systems that deliver input deep into the Unit where sediment deposition is creating isolated areas of forest with persistent water quality problems. TM imagery reveals the presence of turbid water in the main channels of both systems at water levels near about 7 ft. at BL, however very little fresh water is delivered to the interior swamps of AU 3 until gage heights are near approximately 9 ft. at BL.

Projects proposed for AU 3 are designed to deliver water more efficiently to the Unit by creating or modifying inputs at the School Board Canal, Bayou Sorrel, and Indigo Bayou, provide improved circulation and connectivity within the Unit, and provide a more uniform flow of water with less sediment and improved water quality southward to AU 6. The School Board Canal and Indigo Bayou currently deliver most of their flow into the Unit anywhere from 1 - 2.5 miles south of the northern Unit boundary at Bayou Sorrel. Newly constructed or improved inputs at Bayou Sorrel and the School Board Canal are designed to redirect and disperse water and sediment to more northern and central areas of the Unit to promote forest development and improve water quality conditions. And bank gaps along the Florida Canal west of Indigo Bayou to the Williams Canal are designed to promote sheet-flow patterns within the Unit and improve connectivity with AU 6 to the south.

School Board Canal (Unnamed Canal)

EGL3p1 – School Board Canal east bank gap and channel development to divert some of School Board flow to isolated areas of Unit 3 to improve forest and water quality conditions and deliver water with less sediment to the Williams Canal and eventually Grand Lake. The project also seeks to prolong the life of the School Board Canal as an input source by redirecting some of its flow and sediment away from the large delta that is rapidly building at the end of the School Board Canal north of the Williams Canal.

EGL3p2 - School Board Canal west bank gap and channel development to divert some of School Board flow to isolated areas of the Unit to improve forest and water quality conditions and deliver water with less sediment to the Williams Canal and eventually Grand Lake. The project also seeks to prolong the life of the School Board Canal as an input source by redirecting some of its flow and sediment away from the large delta that is rapidly building at the end of the School Board Canal north of the Williams Canal.

EGL3p24 – Bank gap and channel development off of the School Board Canal stream to redistribute water and sediment currently being channelized to the Williams Canal to isolated areas to promote forest development, improve water quality

conditions, and to deliver water with less sediment to the Williams Canal at the southern Unit boundary.

Bayou Sorrel

EGL3p3, EGL3p4 & EGL3p33 – EGL3p34 – EGL3p3 is a stream cleaning project to improve flow to EGL3p33, where a new gap and channel would deliver flow to the north central part of Unit 3. EGL3p34 is a project to reduce the elevation of the levees on the old oil field canal to allow cross flow from EGL3p33. And EGL3p4 is and experimental birds' foot development designed to deliver and disperse water in multiple directions from the end of the bayou at EGL3p3.

EGL3p5 & EGL3p19 - EGL3p22 – These sites are possible locations to develop bank shaving projects that would connect with old stream beds in the Unit interior in order to provide additional input into AU 3 from Bayou Sorrel during higher River stages. The projects seek to increase water and sediment to the northern parts of the Unit interior to promote forest development and improve water quality conditions.

Indigo Bayou and the Florida Canal

EGL3p6 & EGL3p25 – Construct new input channels on the west bank of Indigo Bayou to provide input into the northeastern part of AU 3 where water quality problems are persistent. Both projects are designed to increase input and redirect sediment and water to isolated areas in the northeastern part of the Unit to promote forest development and improve water quality conditions.

EGL3p7, EGL3p35, EGL3p39, EGL3p41 - EGL3p42, & EGL3p44 – Create drainage gaps on the north bank of the Florida Canal west of Indigo Bayou to improve connectivity with Unit 6 and promote sheet-flow patterns through AU 3. These gaps are critical for dispersing water and sediment from new input channels along Bayou Sorrel and Indigo Bayou to isolated areas within the Unit to promote forest development and improve water quality conditions.

EGL3p36b – Develop a south bank gap and channel to improve AU 3 and AU 6 connectivity to increase input into northern AU 6.

Unit Interior at the Florida Canal

EGL3p10, EGL3p12 – EGL3p13, EGL3p30, 3p45 – 3p46, EGL3p48 & EGL3p50 – Create gaps in the north and south banks of the Florida Pipeline Canal to promote sheet-flow patterns within AU 3 and improve connectivity with AU 6 to the south.

Assessment Unit 5 (AU 5)

AU 5 is a 15,154 acre Unit that is east of Unit 6, south of the Florida Canal and Unit 1, has the GIWW on its eastern boundary and is north of the Williams Canal and Unit 9 (Fig. 9).

Figure 9. Projects in Assessment Unit 5 of the EGL Project area currently being considered for the Atchafalaya Basin 2012 Annual Plan.

Turbidity data indicates that poor water conditions are persistent throughout large areas of the northern and eastern parts of the Unit even at River levels near about 15 ft. at BL. Lidar and TM imagery indicates that sediment deposition along the northern and eastern boundaries of the Unit has greatly reduced input into the Unit from the Florida Canal and the GIWW and that connectivity with Unit 1 to north has been greatly diminished as well. With the absence of fresh water input into northern areas, circulation is greatly diminished in northern, central and eastern parts of the Unit where poor water quality is persistent.

An added problem is that at higher River levels (near approximately 11 ft. at BL), channelized flow from the Williams Canal directed westward into the Project area along the Units southern boundary creates a hydrological barrier that inhibits drainage. Gaps along the south bank of the Williams Canal near the GIWW, coupled with additional input flowing southward through Unit 5 to the north, may help divert discharge from the Williams Canal into Unit 9 to the south and reduce the hydrological impact on drainage during higher River stages.

Projects proposed for AU 5 are designed to improve circulation patterns at lower River stages by increasing input into northern areas and improving drainage in the south. Additional input will be provided from Unit 1 to the north and from new or improved inputs at the GIWW, while gaps along the south bank of the Williams Canal may reduce hydrological barrier affects and improve drainage. Collectively, projects proposed for Unit 5 are designed to redirect water and sediment to isolated areas to promote forest development and improve water quality conditions.

<u>Florida Pipeline Canal at GIWW</u>

EGL5p3, EGL5p16, EGL5p19 – Create drainage gaps and channels through the north and south banks of the Florida Canal along the northern boundary of Unit 5 to improve circulation within Unit 1, improve connectivity between AU 1 and AU 5, and improve flow to isolated areas in the northern part of Unit 5.

EGL5p4 – Clean existing stream on the south bank of the Florida Canal to improve

circulation within Unit 1, improve connectivity between AU 1 and AU 5, and improve flow to isolated areas in the northern part of Unit 5.

GIWW

EGL1p50 – Develop a gap and channel on the west bank of the GIWW to introduce flow into the northeastern part of Unit 5.

EGL5p9 – Bank shaving and channel development project to introduce flow into the northeastern part of the Unit.

EGL5p11 – Dredge opening and clean existing small bayou to increase flow from the GIWW into AU 5.

EGL5p14 – Create a gap in the east bank of the existing small bayou at EGL5p11 to convey flow to isolated areas in the eastern part of the Unit to promote forest development and improve water quality conditions.

Assessment Unit 6 (AU 6)

AU 6 is a 6,741 acre Unit that is south of Units 1, 2, and 3, west of Unit 5, and north of the Williams Canal and Units 9 and 10 (Fig. 10).

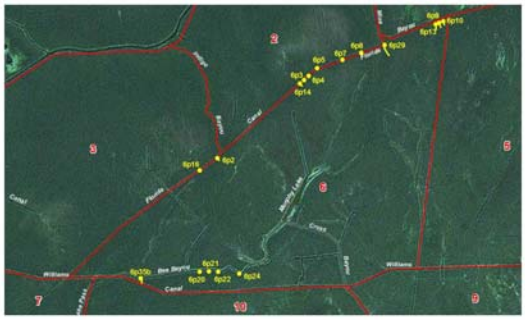


Figure 10. Projects in Assessment Unit 6 of the EGL Project area currently being considered for the Atchafalaya Basin 2012 Annual Plan.

Channelized flow from Indigo Bayou and Salt Mine Bayou into the Florida Canal have developed sediment barriers that greatly reduced the amount of input entering the Unit from AU 1, 2 and 3 to the north, while channelized flow from Coon Trap and Indigo Bayou have developed sediment barriers along the Williams Canal and Bee Bayou that impedes drainage in the south. With a lack of flow filtering down through the northern part of the Unit into central areas near Murphy Lake, channelized flow from Coon Trap and Indigo Bayou enters the Lake from Bee Bayou (USGS discharge data, BL gage about 15 ft. at BL) and deposits sediment throughout the area. When River levels are lower (near about 10.2 ft. at BL), and Coon Trap discharge rates are greatly reduced, or stopped (below approximately 8.0 – 8.5 ft. at BL), some flow from Indigo Bayou is able flow southward to the Williams Canal, while the remainder flows northward into Murphy Lake (USGS discharge data and turbidity data). While these flow patterns are more favorable at lower River stages, mangers seek to promote southward flow patterns through Murphy Lake into Bee Bayou throughout various River stages.

Projects designed for Units 1, 2, 6, 7 and 10 are designed to work collaboratively to achieve more consistent north/south flow patterns through these Units at various River stages. Projects proposed for Units 1 and 2 are designed to supply additional flow to the Units at lower River levels and disperse flow from Indigo Bayou and Salt Mine Bayou throughout northern areas of Unit 6. Projects for Unit 6 are also designed to increase input into the northern part of the Unit by improving Unit connectivity with Units 1, 2 and 3 to the north, improving interior Unit circulation at Bee Bayou, and improving drainage in the south

at the Williams Canal. And projects for Units 7 and 10 are designed to prevent Coon Trap from flowing into the central part of the Project area east of Flat Lake Pass and into Bee Bayou.

Specifically, projects proposed for AU 6 involve developing or cleaning a series of bank gaps and channels throughout the Unit to improve circulation patterns. Gaps and channels along the north and south banks of the Florida Canal will improve flow into northern parts of the Unit from Units 1, 2, and 3, while gaps along the south bank of Bee Bayou and the Williams Canal will improve interior Unit connectivity, promote sheet-flow patterns, and improve connectivity with Unit 10 to the south. Collectively, these projects seek to disperse input and sediment into isolated areas of the Unit to promote forest development and improve water quality conditions.

<u>Florida Canal west of Indigo Bayou</u>

EGL6p2 & EGL6p16 – Develop gaps and channels along the south bank of the Florida Canal to improve AU 3 and AU 6 connectivity and introduce flow into northern areas of Unit 6.

<u>Florida Canal west of Salt Mine Bayou</u>

EGL6p3 - EGL6p5, EGL6p7 - EGL6p8, & EGL6p29 – Develop gaps and channels in the south bank of the Florida Canal to improve AU 2 and AU 6 connectivity. EGL2p15 proposes cutting off flow to the bayou at the end of the Florida Canal in Unit 2 that delivers flow northward into AU 2 in order to reduce head pressure. EGL6p3 was designed to redirect the remaining flow in the Florida Canal southward into Unit 6.

EGL6p14 – Clean existing stream on south bank of Salt Mine Bayou to increase flow into isolated areas in west central AU 6.

<u>Florida Canal east of Salt Mine Bayou</u>

EGL6p9 - EGL6p10 & EGL6p13 – Develop gaps and channels in the north and south banks of the Florida Canal to improve AU 1 and AU 6 connectivity, promote circulation in Unit 1, and deliver flow into isolated areas of northeastern AU 6.

<u>Bee Bayou</u>

EGL6p20 – EGL6p22 & EGL24 – Clean existing gaps on the south bank of Bee Bayou to improve interior Unit connectivity and improve circulation.

EGL6p35b – Dredge Bee Bayou near the Williams Canal to improve access and improve drainage and circulation in the Murphy Lake area of AU 6.

Assessment Unit 7 (AU 7)

AU 7 is a 1,505 acre Unit that is east of Chicot Lake and Keelboat Pass, south of the Williams Canal and Unit 3, and has Flat Lake Pass on its eastern boundary (Fig. 11).

Figure 11. Projects in Assessment Unit 7 of the EGL Project area currently being considered for the Atchafalaya Basin 2012 Annual Plan.

Sediment deposition along the western boundary of AU 7 at Chicot Lake and Keelboat Pass, the northern boundary at the Williams Canal, and the eastern boundary at Flat Lake Pass has largely isolated the Unit from flow during normal River levels. Turbidity data suggest the area of AU 7 east of the Florida Canal is largely isolated from flow and has persistent water quality problems when River levels are below about 12.5 ft. at BL., and therefore may be an area that would benefit from additional sediment and input. Also, the northern part of Chicot Lake is an area in transition dominated by willow growth and may also be an area suitable for additional sediment and input.

Projects for AU 7 are meant to serve as alternatives to closing Coon Trap. Collectively, they seek to redirect and disperse portions of Coon Trap flow into isolated areas of Chicot Lake and AU 7 to promote forest development, improve water quality conditions, deliver water with less sediment to Grand Lake, and force Coon Trap to flow southward down Flat Lake Pass. Newly constructed and improved inputs into AU 7 at the Williams Canal, Flat Lake Pass, and Chicot Lake, coupled with drainages in the lower part of the Unit at Flat Lake Pass and Keelboat Pass, are designed to deliver water with less sediment to Grand Lake.

The Williams Canal

EGL7p1 – EGL7p1 is a dredging project that improves flow in the bayou at the Williams Canal leading to Chicot Lake. This project, coupled with Coon Trap diversions into AUs 7 and 10 at Flat Lake Pass, are designed to disperse Coon Trap input into northern areas of Chicot Lake and prevent Coon Trap input from flowing into the interior of the project area east of Flat Lake Pass.

While the current project footprint is currently approximately 2,925 ft., managers would like to retain the option of extending the footprint of EGL7p1 down to the area north of Hog Island. The exact length and placement of the project is yet undetermined largely because current bathymetry data for Chicot Lake, Keelboat Pass and Grand Lake is unavailable. Shallow water areas dominated by willow growth in Chicot Lake are the targeted areas to receive additional input from Coon Trap. These forested wetlands in transition will benefit from the addition of sediment and serve as sediment filters to deliver water with less sediment to deeper water habitats in Grand Lake.

EGL7p1b - EGL7p1b is an example of a project to divert a portion of the flow entering the bayou at EGL7p1 into isolated areas of Chicot Lake to promote forest development, improve water quality conditions, and deliver water with less sediment to lower Chicot Lake and eventually Grand Lake. In the event managers decide additional flow from Coon Trap is needed in EGL7p1, managers may use a series of such diversions in different areas of the Lake to compensate for the increased sediment load.

EGL7p15 – Clean the southern end of the Florida Pipeline Canal to improve AU 7 connectivity with Chicot Lake. This canal serves as an input into the northwestern part of the Unit when Coon Trap flows but delivers little flow into the area east of the Florida Canal. Cleaning the southern part of the Canal and developing gaps and channels in the east bank will improve flow into eastern areas of AU 7.

EGL7p11 - EGL7p12, EGL7p14, EGL7p28, & EGL7p32 - EGL7p33 - Develop gaps and channels in the east bank of the Florida Canal to improve flow into eastern AU 7.

EGL7p17 & EGL7p17b– Develop an input gap and channel along the north bank of the Williams Canal to divert a portion of Coon Trap flow into AU 7. EGL7p17b is an experimental birds' foot development at the end of EGL7p17 to disperse flow into different areas of the Unit interior.

EGL7p18 - EGL7p21 & EGL7p21b, & EGL7p27 – Develop new inputs, and improve flow in existing streams (EGL7p21 & EGL7p21b), along the west bank of Flat Lake Pass to divert a portion of Coon Trap flow into AU 7.

EGL7p22 - EGL7p23 – Develop gaps and channels in the southern part of the Unit at Flake Lake Pass and Keelboat Pass to drain AU 7 and deliver water with less sediment to Grand Lake.

Assessment Unit 9 (AU 9)

AU 9 is a 3,320 acre Unit that is east of Cross Bayou and Unit 10, south of the Williams Canal and Units 5 and 6, west of the GIWW, and north of Little Bayou Pigeon and Unit 12 (Fig. 12).

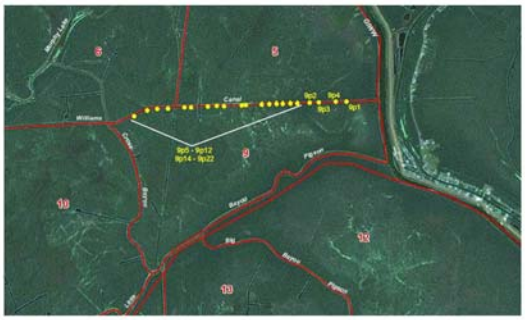


Figure 12. Projects in Assessment Unit 9 of the EGL Project area currently being considered for the Atchafalaya Basin 2012 Annual Plan.

Turbidity patterns suggest a complicated array of hydrologic forces presently determine the distribution and quality of water in Unit 9, and this is especially true at lower River levels when Unit 9 is dependent on Indigo Bayou and Cannon Bayou for fresh water input. The underlying problem is the lack of input into Unit 5 to the north, coupled with a loss of connectivity between Units 5 and 9. The Williams Canal is channeling flow into the Unit from the GIWW that is creating both sediment and hydrologic barriers that impede cross flow. When River levels are low (near about 4.5 ft. at BL) and discharge from the Williams Canal into the Project area is low as well, turbidity data and aerial photography (2007 NC DOQs) reveal a distinct pattern of poor water flowing across the Williams Canal from the north about 2 mi. west of the GIWW. However, as water levels near about 11 ft. at BL, flow rate from the Williams Canal exceeds that of the poor water to the north and these drainage patterns are interrupted. Therefore, long term management plans for both Units 5 and 9 must include plans for realigning flow from the Williams Canal in order to reduce

sediment deposition and the development of hydrologic barriers in the interior of the Project area that impede cross flow.

Projects proposed for AU 9 are designed to increase input into the Unit by improving connectivity with Unit 5 to the north and reducing channelized flow from the Williams Canal into the Project area by redirecting its flow into the northeastern part of Unit 9 where isolated areas of forest would benefit from additional sediment and input. Improving water quality conditions in Units 5 and 9 is largely dependent on increasing input into Unit 5 to the north and realigning flow from the Williams Canal in the south.

EGL9p1 – EGL9p4 – Divert flow from the Williams Canal into isolated areas of northeastern AU 9 to promote forest development and improve water quality, reduce channelized flow into the interior of the Project area, and inhibit the development of a hydrological barrier in the Williams Canal that impedes Unit 5 drainage.

EGL9p5 – EGL9p10 – Develop north bank gaps, clean existing south bank gaps, and develop channels across the Williams Canal linking the gaps to facilitate cross flow at lower River stages when the Williams Canal is nearly dry. These projects seek to improve AU 5 and AU 9 connectivity and promote circulation in both Units.

EGL9p11 - EGL9p12 & EGL9p14 – EGL9p22 – Clean existing gaps on the south bank of the Williams Canal to improve AU 5 and AU 9 connectivity.

Assessment Unit 10 (AU 10)

AU 10 is a 15,154 acre Unit that is east of Flat Lake Pass, south of the Williams Canal and AU 6, west of Cross Bayou and Little Bayou Pigeon, and north of the Pigeon Cut-off Canal and AU 15 (Fig. 13).

Figure 13. Projects in Assessment Unit 10 of the EGL Project area currently being considered for the Atchafalaya Basin 2012 Annual Plan.

While water quality conditions are generally good throughout much of the Unit at River levels near approximately 12 - 12.5 ft. at BL, a lack of connectivity between AU 10 and Grand Lake prevent water from circulating to the Catfish Bayou, Bayou Cowan, and Smith Bayou area in the southwestern part of the Unit. Also, sediment deposition from Coon Trap in the northwestern part of the Unit at the Williams Canal restricts cross flow from AU 6 to the north and inhibits flow into AU 10 at River levels below approximately 11 ft. at BL.

Projects proposed for AU 10 are designed to improve Unit connectivity with AU 6 to the north, improve input into the northwestern part of the Unit from Flat Lake Pass, and improve circulation in the western and southern parts of the Unit by re-establishing Unit connectivity with Grand Lake. Coon Trap is an important source of fresh water input for AU 10, either directly from the Williams Canal, or indirectly via overbank flooding from Bee Bayou and Murphy Lake. The Unit is approximately 7 miles long and if Coon Trap flow were reduced or stopped the southern part of AU 10 would be

dependent on fresh water input filtering down from AUs 2, 3 and 6 to the north to maintain good water quality conditions. Similar to projects proposed for AU 7, a new input source for AU 10 at Flat Lake Pass is designed to capture a portion of Coon Trap flow and redirect it into isolated areas of the Unit to promote forest development and improve water quality conditions. Coupled with newly created or improved drainages at Grand Lake, the projects are designed to improve circulation in western and southern areas of the Unit and deliver water with less sediment to Grand Lake.

Flat Lake Pass

EGL10p26 – Develop an input gap and channel to increase flow into the northwestern part of AU 10 near Flat Lake. Additional input will increase fresh water flow to areas in the western part of AU 10 where gaps and channels will reestablish Unit connectivity with Grand Lake.

East Grand Lake

EGL10p6, EGL10p10, EGL10p19 & EGL10p28 - Create drainage gaps and channels on the east bank of Grand Lake to restore connectivity of Unit 10 with the Lake. Drainages at Grand Lake may promote circulation of fresh water to western areas of the Unit near Catfish Bayou, Bayou Cowan, and Smith that have persistent water quality problems.

Williams Canal

EGL10p4 – Clean existing stream on the south bank of the Williams Canal to increase flow to the northwestern part of AU 10. Additional flow is needed in the western part of the Unit if drainage gaps and channels are developed to reestablish connectivity of the Unit with the Lake. Additional fresh water input into the northwestern areas will help ensure water draining into the Lake from AU 10 does not have a negative impact on fish habitat.

EGL10p31 - EGL10p40 – Clean existing gaps on the south bank of the Williams Canal to improve AU 6 and AU 10 connectivity.

Assessment Unit 12 (AU 12)

AU 12 is a 9,216 acre Unit that is east of Big Bayou Pigeon and Units 13 and 16, south of Little Bayou Pigeon and Unit 9, west of the GIWW, and north of Bayou Postillion and Unit 18 (Fig. 14).

Figure 14. Projects in Assessment Unit 12 of the EGL Project area currently being considered for the Atchafalaya Basin 2012 Annual Plan.

High levees along the south bank of Little Bayou Pigeon and the west bank of the GIWW limit significant flow into northern and northeastern parts of the Unit until River levels are above approximately 15 ft. at BL. At these levels, water overtops the eastern bank of Big Bayou Pigeon and flows into northwestern areas, but poor water isolated in the eastern part of the Unit prevents fresh water from circulating through the area. The underlying problem with AU 12 is that not enough fresh water is supplied to northern and eastern areas of the Unit from Little Bayou Pigeon and the GIWW at lower River stages to force poor water southward out of the Unit. Enough

fresh water must enter the Unit in the north to overcome the hydrological barrier that Bayou Postillion creates along southern boundary in order to promote circulation patterns in Unit 12.

Improving connectivity of both Units 12 and 18 with Bayou Postillion would likely increase the chances of obtaining the desired flow patterns necessary to improve water quality conditions in both Units, but there are currently many more higher priority projects proposed for the Upper Region than can possibly be funded. These potential improvements will therefore be addressed in the next round of funding for EGL projects.

Projects proposed for AU 12 are designed to increase flow into the northern and eastern parts of the Unit from the GIWW in order to improve Unit circulation patterns. These projects seek to realign sediment and flow to isolated areas to promote forest development and improve water quality conditions in Unit 12.

<u>GIWW</u>

EGL12p3 & EGL12p21 – Bank shave and channel development to increase flow into the eastern part of the Unit to promote forest development and improve water quality conditions. Additional input in the northern part of the Unit is also designed to promote draining in the southern areas of the Unit.

EGL12p5, EGL12p5b, EGL12p6 & EGL12p22 – Develop existing stream beds to increase flow into eastern AU 12 at lower River levels. Additional input into the Unit is designed to promote forest development and improve water quality and promote draining in the southern areas of the Unit.

EGL12p6 & EGL12p5b are channels off of EGL12p5 designed to divert some input into more eastern areas of the Unit to slow the progression of levee development in the interior of the Unit. The project length of EGL12p6 is less than 100 ft. and in an area of low elevation so construction cost should be minimal.

Assessment Unit 15 (AU 15)

AU 15 is a 749 acre Unit that is somewhat pie shaped, with its widest boundary in the north and narrowest boundary in the south (Fig. 15).

Figure 15. Projects in Assessment Unit 15 of the EGL Project area currently being considered for the Atchafalaya Basin 2012 Annual Plan.

The Unit is east of Grand Lake, south of the Pigeon Cut-off Canal and Unit 10, and has Little Bayou Pigeon running along or near its eastern, southern, and western boundaries as it meanders towards Grand Lake. Levees on both sides of the Bayou, along with accumulated sediment and vegetation in the Bayou itself, form a v-shaped sediment barrier in the Unit that prevents water from circulating through the Unit. Turbidity data reveals water attempting to push into the Unit along the northeastern boundary at the Cut-off Canal when River levels are near approximately 8 ft. at BL, but barriers near the eastern, southern and western boundaries prevent water from circulating through the Unit. The 2011 Annual Basin

Plan includes dredging a long stretch of Little Bayou Pigeon that includes the segment running through Unit 15. While dredging the Bayou is a first step to getting flow restored to the Unit, a gap and channel along the north bank of the Bayou near the southern boundary may promote drainage in the south and therefore allow water to enter from the Cut-off Canal along the northern boundary. Restoring flow through Unit 15 may also help promote circulation patterns through Unit 10 to the north.

Given that AU15 is a small area, and the success of restoring flow to the Unit hinges on dredging Little Bayou Pigeon, only two projects have been proposed for the Unit. Both projects seek to restore drainage to isolated areas of forest to promote circulation patterns through those areas in order to improve water quality conditions.

Little Bayou Pigeon

EGL15p1 - Develop a north bank gap and channel to provide drainage and promote circulation patterns in an isolated area of forest in the southern part of the Unit.

Evaluated Features Not Currently being considered in the EGL Project area

The following elements were evaluated by the TAG subcommittee and found to be less than optimal for achieving the desired goals of realigning sediment and water in the EGL Upper Region. The planning team may however reconsider some of these projects for the 2013 round of proposals for EGL.

Assessment Unit 1 (AU 1)

EGL1p54 – EGL1p55 – Develop gaps and channels in the south bank of Bayou Sorrel to increase flow into isolated areas of northern AU 1.

Cannon Bayou

EGL1p1 – Cannon Bayou east bank shave and input channel development to distribute water and sediment to isolated areas to promote forest development and improve water quality conditions within the Unit.

EGL1p4 – Develop a gap and channel off of EGL1p3 to increase flow into the northwestern part of AU 1. Not needed if EGL1p2 is selected.

EGL1p47, EGL1p57 - EGL1p59 & EGL1p62 – Develop north bank gaps and channels to improve AU 1 and AU 6 connectivity.

EGL1p48b, EGL1p56b, EGL1p58b & EGL1p60 – Develop south bank gaps and channels to improve AU 1 and AU 6 connectivity.

EGL1p51 – Close Cannon Bayou to promote efficient draining in the western part of the Unit.

Oil Field Canal at Bayou Sorrel and the GIWW

EGL1p5 – East bank shave and channel development project to distribute flow into an existing stream bed to convey flow to an isolated area of swamp between the oil field canal at the GIWW and the pipeline to the southeast. The project seeks to distribute water and sediment to isolated areas to promote forest development and improve water quality conditions in this part of the Unit.

EGL1p6 – West bank shave project to distribute flow to an isolated area of swamp between the west bank of the oil field canal and Bayou Sorrel. The project seeks to distribute water and sediment to isolated forest to promote forest development and improve water quality conditions.

EGL1p12 – Create gap on the east bank of the old location canal to convey flow into isolated areas of AU 1 to promote forest development and improve water quality conditions.

North/South Pipeline Canal at GIWW

EGL1p16 – Dredging and cleaning project to increase GIWW flow into the pipeline canal. The project seeks to increase flow to projects further south that will convey flow to isolated areas to promote forest development and improve water quality conditions in this part of the Unit. Option to develop/clean to EGL1p19 may reduce project cost and provide a reliable source of input into the eastern part of the Unit.

EGL1p17 – West bank gap and channel development to convey flow to an existing stream/stream bed.

EGL1p18 & EGL1p27 – EGL1p28 – Create gap on the west bank of the existing stream/stream bed to convey flow (from EGL1p17) to isolated areas of the Unit to promote forest development and improve water quality conditions.

EGL1p19 – Create gap on the east bank of the pipeline canal to convey water to EGL1p20.

EGL1p20 – Same project as EGL1p19.

EGL1p21 – Create gap and channel on the west bank of the pipeline canal to convey flow to isolated areas to promote forest development and improve water quality in the Unit.

EGL1p22 – East bank shave project to convey flow to isolated areas to promote forest development and improve water quality in this part of the Unit.

EGL1p23 - EGL1p25 – Create gaps on the east and west spoil banks of the old location canal and a channel linking the gaps to promote flow from EGL1p19 and EGL1p22 to the northeastern part of AU 1.

EGL1p26 – Clean low area to promote flow from EGL1p19 and EGL1p22 to isolated areas of east central AU 1 to promote forest development and improve water quality conditions.

EGL1p29 – Create a gap on the east bank of the pipeline canal to convey fresh water to isolated areas of south central AU 1 to promote forest development and improve water quality conditions.

GIWW

EGL1p31 – West bank shave to convey flow from EGL1p30 to isolated areas of eastern AU 1 to promote forest development and improve water quality conditions.

EGL1p32 – East bank shave to convey flow from EGL1p30 to isolated areas of eastern AU 1 to promote forest development and improve water quality conditions.

Florida Pipeline Canal at GIWW

EGL1p37, EGL1p39, EGL1p41, EGL1p43 & EGL1p49 – Develop gaps and channels across the Florida Canal levees to improve AU 1 and AU 5 connectivity and improve fresh water flow into northern AU 5.

Assessment Unit 2 (AU 2)

Bayou Sorrel

EGL2p6 & EGL2p8 – These sites are possible locations to develop new input channels into AU 2 from Bayou Sorrel. They are believed to have lower elevations relative to other areas along the south bank of the Bayou and seek to develop input channels to existing stream beds to help convey flow to the northern parts of the Unit interior to promote forest development and improve water quality conditions.

Florida Canal

EGL2p10, EGL2p22, EGL2p27 - EGL2p29, EGL2p31 - EGL2p34 – Develop gaps and channels along the north bank of Cannon Bayou on the southeastern Unit boundary

to improve connectivity with Unit 6 and promote sheet-flow patterns through AU 2. Unlike the other proposed gaps, EGL2p22 is an old stream bed that may require extensive cleaning to function as an efficient drain.

EGL2p13b, EGL2p23 - EGL2p24, EGL2p26b, EGL2p28b, EGL2p32b & EGL2p34b – Develop gaps and channels along the south bank of Cannon Bayou on the southeastern Unit boundary to improve connectivity with Unit 6 and promote sheet-flow patterns through AU 2.

EGL2p21 – Clean existing stream on the south bank of the Florida Canal to improve input into AU 6 to the south. Ground visit revealed good flow in the stream and its likely it does not require cleaning.

Unit Interior at the Florida Canal

EGL2p17 – EGL2p18, EGL2p20, EGL2p35, EGL2p37, EGL2p39 - EGL2p40 & EGL2p44 – Gap north and south levees along the Florida Canal to improve connectivity between AU 2 and AU 6 and promote Unit sheet-flow patterns.

Assessment Unit 3 (AU 3)

Bayou Sorrel

EGL3p18 – These sites are possible locations to develop new input channels into AU 3 from Bayou Sorrel. The locations are believed to have lower elevations relative to other areas along the south bank of the Bayou and seek to develop input channels to existing stream beds to help convey flow to the north central and northeastern parts of the Unit interior to promote forest development and improve water quality.

EGL3p32 – Formerly proposed as EGL7, this project is a new input channel similar to Indigo Bayou with a +3 elevation.

Florida Canal

EGL3p8 - EGL3p9, EGL3p36, EGL3p38, EGL3p40 & EGL3p43 – Create gaps and channels on the north bank of the Florida Canal to improve Unit circulation and promote sheet-flow patterns through the swamps of AU 3.

EGL3p35b & EGL3p37 – develop south bank gaps and channels on the Florida Canal to increase flow into AU 6.

Unit Interior at the Florida Canal

EGL3p11, EGL3p28 - EGL3p29, EGL3p31, EGL3p47, EGL3p49, & EGL3p51 – Create gaps in the north and south banks of the pipeline canal to improve interior Unit connectivity and promote sheet-flow patterns.

EGL3p23 – Increase the elevation of the pipeline canal entrance on the west bank of the location canal at Indigo Bayou to prevent flow from entering the Florida Canal at all water levels. Water entering the Canal in the past has deposited sediment along the banks of the canal and created barriers to sheet-flow in the interior of Unit.

Williams Canal

EGL3p14 – Close or partially close pipeline opening at the Williams Canal to prevent

Coon Trap flow from entering. If Coon Trap is left open, further sediment deposition along the pipeline canal banks could create sediment barriers and head pressure that will further degrade or hinder interior Unit connectivity.

EGL3p15 – EGL3p17 – Create gaps and channels along the north bank of the Williams Canal to improve drainage of western AU 3. Drainage gaps will help direct water and sediment entering from the School Board Canal to isolated areas to promote forest development and improve water quality conditions.

EGL3p26 – Block the bayou opening north of Flat Lake Pass on the north bank of the Williams Canal to prevent Coon Trap flow from channeling sediment to the interior of the Unit and interrupting sheet-flow patterns.

EGL3p27 – Divert bayou flow at EGL3p26 to the east side of the Williams Canal blockage at EGL10p29. Proposed drainages at EGL3p15-EGL3p17 may not be feasible to construct due to high levees. Developing EGL3p27 so as to maintain the bayou as a drain for the Unit, coupled with proposed connectivity gaps along the Florida Canal, may be an alternative to constructing some or all of the proposed drainages at EGL3p15-EGL3p17.

Assessment Unit 5 (AU 5)

North/South Pipeline Canal (AU 5/AU 6 boundary)

EGL5p1 – Create gap in south bank of the existing stream at EGL5p15 and develop channel to convey flow into northwestern AU 5 to promote forest development and improve water quality conditions.

EGL5p2 – Create a gap in the east spoil bank of the pipeline canal along the northwestern boundary to direct flow to isolated areas in AU 5 to promote forest development and improve water quality conditions.

EGL5p15 – Clean existing stream off of the pipeline canal to convey flow to EGL5p1.

Florida Pipeline Canal at GIWW

EGL5p1, EGL5p5, EGL5p7, EGL5p18 & EGL5p20 - Develop gaps and channels across the Florida Canal levees to increase AU 1 and AU5 connectivity.

EGL5p6 – Create a gap in the east bank of the small bayou at EGL1p40 to direct flow to isolated areas in the north central part of AU 5 to promote forest development and improve water quality conditions.

EGL5p8 – Create a gap in the south spoil bank of the pipeline canal and develop channel to direct GIWW flow to isolated areas in the northeastern part of AU 5 to promote forest development and improve water quality conditions.

GIWW

EGL5p12 – Create a gap in the north bank of the existing small bayou and develop a channel to direct GIWW flow to an isolated area of swamp to the north of the bayou to promote forest development and improve water quality conditions.

EGL5p10 – Create a gap in the south bank of the existing small bayou and develop a channel to provide drainage for the isolated swamp to the north of EGL5p12.

EGL5p13 – Create a gap in the south bank of the existing small bayou at EGL5p11 to convey GIWW flow to isolated areas to the south to promote forest development and improve water quality conditions in this part of the Unit.

EGL5p17 – Develop a new input to introduce flow into isolated areas in the northeastern part of the Unit to promote forest development and improve water quality conditions. This project was formerly proposed as EGL18.

Assessment Unit 6 (AU 6)

Florida Canal west of Indigo Bayou

EGL6p1 – Create a ridge gap and channel to improve connectivity in the western part of AU 6.

EGL6p30 – Develop gaps and channels along the south bank of Indigo Bayou to introduce flow into isolated areas of AU 6 to promote forest development and improve water quality conditions.

Florida Canal west of Salt Mine Bayou

EGL6p6 – Develop a gap and channel in the south bank of the Florida Canal to improve AU 2 and AU 6 connectivity.

EGL6p15 – Clean existing streams on the south bank of Cannon Bayou to increase flow into isolated areas in the west central part of AU 6 to promote forest development and improve water quality conditions.

Florida Canal east of Salt Mine Bayou

EGL6p11 - Block the Florida Canal in northeastern AU 6 to force canal input to flow southward through AU 6. The blockage would also prevent flow from entering the Florida Canal from the pipeline canal to the north and inhibit the development of a hydrological barrier that may disrupt AU 1 drainage.

EGL6p12 – Dredge canal bottom along AU 5 and 6 boundaries to increase flow into AU 5 via EGL5p15.

Bee Bayou

EGL6p17 – EGL6p19 & EGL6p23 – South bank shavings and channel development to improve unit connectivity.

EGL6p25 - EGL6p28 – Clean existing south bank gaps to improve unit connectivity.

Williams Canal

EGL6p31 – EGL6p34 – Develop north bank gaps and channels to improve AU 6 and AU 10 connectivity.

EGL6p35 – Dredge the end of Bee Bayou to the Williams Canal to improve drainage from Murphy Lake area of Unit 6.

Assessment Unit 7 (AU 7)

EGL7p2 – Clean existing stream to increase flow from Coon Trap into AU 7.

EGL7p3 – Develop channel to increase flow from Coon Trap flow into AU 7.

EGL7p4 - EGL7p6 – clean and develop existing stream at EGL7p4 on the Williams Canal south bank to increase flow from Coon Trap into AU 7. EGL7p5 and EGL7p6 are stream cleaning/development projects

designed to distribute flow to isolated areas within AU 7.

EGL7p7 & EGL7p7b – Dredging project to increase the width and depth of the pipeline canal to EGL7p8 (EGL7p7) or EGL7p9 (EGL7p7b) to redirect Coon Trap flow into AU 7.

EGL7p8 – Develop east bank gap and channel to increase flow into northeastern AU 7.

EGL7p9 – Develop gaps and channel to provide input into AU7 from EGL7p7b, or in lieu of constructing EGL7p7b, develop a gap and channel to allow cross flow from western to eastern areas.

EGL7p10, EGL7p30 - EGL7p31 - Develop gaps and channels across the Florida Canal banks to improve interior Unit connectivity and circulation.

EGL7p13 - Develop a channel to link EGL7p14 to lower interior Unit elevations.

EGL7p16 – Canal closure to cutoff Coon Trap flow to the Williams Canal, Bee Bayou, and Murphy Lake areas to reduce sediment deposition in the interior of the Upper Region and redirect flow into Chicot Lake at EGL7p1, into AU 7 at EGL7p3, EGL7p4, EGL7p7, and EGL7p17, and into AU 10 at 10p1 & 10p23 – 10p26.

EGL7p24 – Develop gaps and channels on the west bank of Flat Lake Pass to restore connectivity and drain AU7.

EGL7p25 & EGL7p26 – Develop gaps and channels on the east bank of Chicot Lake to restore connectivity and drain AU7.

EGL7p29 - Develop gaps and channels to improve Unit connectivity and circulation.

Assessment Unit 9 (AU 9)

EGL9p13, EGL9p23 – EGL9p24 – Clean existing gaps on the south bank of the Williams Canal to improve AU 5 and AU 9 connectivity.

Assessment Unit 10 (AU 10)

Williams Canal

EGL10p3 – Develop a gap and channel on the south bank of the Williams Canal to increase flow to the northwestern part of the Unit.

EGL10p29 – Block the Williams Canal east of Flat Lake Pass to prevent Coon Trap from entering.

EGL10p30 – Develop an access channel around Williams Canal blockage at old pipeline canal.

EGL10p41 – Develop a backflow diversion channel off of EGL10p30 to divert backflow from Flat Lake Pass into northwestern AU 10.

EGL10p42 – Clean existing stream to improve flow from the Flat Lake area in northwestern AU 10.

Flat Lake Pass

EGL10p1 – Construct new input channel at Flat Lake Pass to existing oil field canal to provide additional input to the western part of Unit 10. The channel, coupled with newly developed drains on the east bank of Grand Lake, may help convey water with less sediment entering Flat Lake Pass from Units 3, 6 and 7 to the Catfish Bayou, Bayou

Cowan and Smith Bayou area of AU 10 and southward to Unit 5.

EGL10p2 – Dredge the oil field canal to remove sediment and growth to improve flow from Flat Lake Pass at EGL10p1.

EGL10p23 – EGL10p25 – Construct new input channels at Flat Lake Pass to provide additional input to the northwestern part of Unit 10 near Flat Lake. Channels may help convey water with less sediment entering Flat Lake Pass from Units 3, 6 and 7 to the western part of the Unit 10.

Keelboat Pass

EGL10p7 & EGL10p8 – Dredge bayou opening at Keelboat Pass (EGL10p7) and the oil field canal (EGL10p8) to increase flow into the western part of the Unit. Projects may provide additional flow to surrounding swamps near Catfish Bayou, Bayou Cowan and Smith Bayou in the western and southern parts of the Unit and southward to Unit 5.

EGL10p9 – Reduce ridge elevation west of Catfish Bayou to promote flow towards proposed drainages at East Grand Lake (EGL10p6 & EGL10p19).

East Grand Lake

EGL10p17, EGL10p20 & EGL10p22 – Create drainage gaps and channels on the east bank of Grand Lake to restore connectivity of Unit 10 with the Lake. Drainages at Grand Lake may promote circulation of fresh water to western areas of the Unit near Catfish Bayou, Bayou Cowan, and Smith Bayou that have persistent water quality problems.

EGL10p11 - EL10p15, & EGL10p18 – Create gaps and channels to restore connectivity between isolated ponded areas near Grand Lake in the southwestern part of the Unit. Gaps at EGL10p13 & EGL10p18 may restore flow to these areas while gaps at EGL10p12, EGL10p14 - EGL10p15 may provide necessary drainage to improve circulation. After looking at conditions on the ground, these projects would be much more extensive than initially anticipated and therefore look less feasible given the limited area of improvement.

EGL10p21 & EGL10p27 – EGL10p27 was originally designed to promote Unit 10 draining through EGL10p21 and the EGL10p22. However, a site visit revealed extensive levees present at 10p21 and a high density of trees at EGL10p22. Drainages at Grand Lake were designed to promote circulation to western and southwestern areas of the Unit that are now isolated from flow.

Cut-off Canal

EGL10p5 – Create a drainage gap on the west bank of Smith Bayou near the Cut-off Canal to reestablish AU 10 connectivity with Grand Lake via the Cut-off Canal.

EGL10p16 – Clean the lower part of Smith Bayou to reestablish AU 10 connectivity with Grand Lake via the Cut-off Canal. Cleaning the Bayou may improve drainage in the southern part of the Unit and improve unit circulation in the Smith Bayou area.

Assessment Unit 12 (AU 12)

Bayou Pigeon

EGL12p1 – Clean existing bayou to increase flow from Bayou Pigeon to the northeastern part of the Unit to promote forest

development and improve water quality conditions.

EGL12p2 – Create a gap in the east bank of the bayou at EGL12p1 to direct a portion of the flow eastward towards isolated forest in the extreme northeastern part of AU 12 to promote forest development and improve water quality conditions.

GIWW

EGL12p23 – EGL12p24 – Clean existing Bayous to increase flow into AU 12. These two bayous may be too far south and increasing flow in the southern part of the Unit may create hydrological barriers that could interrupt sheet-flow patterns.
EGL12p4 – Create gaps in the north and south banks of the old oil field canal to allow cross flow from EGL12p3.

Bayou Postillion

EGL12p9 – EGL12p15 & EGL12p18 - EGL12p20 – Clean existing gaps on the north bank of Bayou Postillion to provide drainage for the Unit and promote sheet-flow patterns towards Postillion.

EGL12p16 – EGL12p17 – The bottom elevation of these north bank gaps should be investigated as possible bottom elevation targets for all gaps along Bayou Postillion.

Assessment Unit 15 (AU 15)

Smith Bayou

EGL15p2 – Develop a west bank gap and channel to provide drainage and promote circulation patterns in an isolated area in the northwestern part of the Unit. This project would only serve to improve a small part of the Unit.

Assessment Unit 18 (AU 18)

EGL18p1 – EGL18p14 – Clean or re-develop existing gaps along the south bank of Bayou Postillion to re-establish connectivity with Postillion and increase flow to the northern part of the Unit to promote forest development and improve water quality conditions.

Assessment Unit 19 (AU 19)

EGL19p1 – EGL19p4 – Clear existing gaps of sediment and vegetation along the south bank of Postillion to increase input into isolated areas to promote forest development and improve water quality conditions.

EGL19p5 – Reconnect Bayou Postillion to Old River (formerly proposed as Project 200917). Dredging Bayou Postillion to Old River may improve water quality conditions in lower Old River and minimize channelized flow to the interior of the Unit. Water quality conditions are often poor in Old River because it functions as the primary drain for much of the Upper Region of EGL. Fresh water input into the River from Bayou Postillion and Bayou Fouchea, coupled with fresh water filtering down through AU 18, may improve water quality conditions in lower Old River and into Bayou Long, an input for the northeastern part of the Lower Region near the GIWW.