

AMITE RIVER BASIN FLOODPLAIN MANAGEMENT PLAN

In Support of the **Comite River Diversion Canal Project**
Per Project Cooperation Agreement



Prepared for



Amite River Basin
Drainage and Water Conservation District
3535 S. Sherwood Forest Boulevard
Baton Rouge, Louisiana 70816-2255

Prepared by



G.E.C., Inc.
8282 Goodwood Boulevard
Baton Rouge, Louisiana 70806
225/612-3000 ■ www.gecinc.com

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AMITE RIVER BASIN FLOODPLAIN MANAGEMENT PLAN

Section 1.0: INTRODUCTION

1.1 PURPOSE OF THE FLOODPLAIN MANAGEMENT PLAN

The Water Resources Development Act (WRDA) of 1996 required that before construction of any project for local flood damage reduction the non-Federal interest must agree to participate in and comply with applicable Federal flood plain management and flood insurance programs. The act also requires the non-Federal interests to prepare a Flood Plain Management Plan (FPMP) designed to reduce the impacts of future flood events.

In 2001 the Amite River Basin Drainage and Water Conservation District (ARBC), along with the following eight local government bodies: Ascension, East Baton Rouge, Livingston parishes; City of Baker; City of Denham Springs; City of Zachary; Village of Port Vincent; and Village of French Settlement, entered into a Project Cooperation Agreement (PCA) with the U.S. Army Corps of Engineers (USACE) for the construction of the region's most significant flood control project to-date -- the Comite River Diversion Canal. The project, 70 percent federally funded under the 1996 WRDA, is estimated to cost \$163 million dollars and to save \$375 million dollars in flood damages over the life of the project.

One of the requirements of this PCA is for the ARBC and the local communities to prepare and implement a Floodplain Management Plan to ensure that flood damage reductions achieved by the project are preserved. The FPMP encompasses a comprehensive review of current local flood risk and damage reduction measures and a plan of action to enhance these measures.

1.2 HISTORY OF FLOOD RISK REDUCTION MEASURES

Efforts to improve drainage in the Amite River Basin (ARB) were undertaken as early as 1928. An increasing number of projects were performed in the 1950s and 1960s with the expanding population and development of East Baton Rouge Parish. In 1972 the USACE completed a flood control study of the ARB and considered a range of reservoir and diversion plans, including a plan for diverting Comite River flood flow to the Mississippi River. At the time none of the projects were deemed to be economically justifiable.

As a result of the April 1983 record flood, the Louisiana Department of Transportation and Development (LADOTD) revisited the plans and economics of the potential flood control projects and recommended pursuing a reservoir on the Amite River near Darlington and a Comite River diversion to the Mississippi River (LADOTD 1984). In 1985 LADOTD entered into cost-sharing agreements with the USACE to initiate feasibility studies on both projects. The Feasibility Study for the Comite River Basin was finalized in September 1990 and recommended construction of the Comite River Diversion project. The project was authorized in the 1992 WRDA.

The USACE completed an initial design memorandum for the Comite River Diversion project in 1995 and federal support for construction was re-authorized by the 1996 WRDA. Engineering and construction planning efforts continued through 2002.

In 2000 voters in affected areas of Ascension, East Baton Rouge, and Livingston parishes approved a 10-year 3 mill tax to fund the local share of the project construction. This approval cleared the way for finalization of a Project Cooperation Agreement (PCA) by the ARBC, LADOTD, East Baton Rouge Parish, and the USACE on September 6, 2001. The PCA was amended on August 18, 2006. In October of 2010 the citizens of the Taxing District voted to renew a 10 year, 2.65 mills drainage tax for the purpose of providing revenues to carry out the District's local share of the Comite Diversion Canal Project. The estimated revenue from the present millage is \$2.4 million a year.

1.3 JURISDICTIONS

The principal national agencies and programs that address public floodplain interests in the ARB are:

- The Federal Emergency Management Administration (FEMA) which has responsibility for:
 - Implementing the National Flood Insurance Program (NFIP) in conjunction with participating local communities;
 - Assisting local communities in floodplain mapping (the Flood Insurance Rating Maps, or FIRMs);
 - Administration of the voluntary Community Rating Systems (CRS) which offers local communities the opportunity to improve floodplain management and reduce the cost of insurance premiums;
 - Flood disaster preparedness, response, and recovery; and
 - Disaster mitigation planning (under the Disaster Mitigation Act of 2000, DMA) to reduce the financial and human impact of floods, including coordinating with and sponsoring state and local efforts in mitigation planning.
- The USACE, which has responsibility for:
 - Identifying, planning, design, and construction of flood control projects of “national interest;” this is undertaken primarily through periodic reauthorizations of the Water Resource Development Act (WRDA);
 - Review and permitting of floodplain wetland dredging, filling, and modification projects per the Clean Water Action Section 404.
- The U.S. Geological Survey (USGS), which collects and analyzes hydrologic data for major waterways;
- The National Weather Service (NWS), which forecasts rainfall accumulation and river stages;
- The U.S. Environmental Protection Agency (USEPA), which monitors water and floodplain ecosystem quality and reviews and permits point and non-point discharges under the Clean Water Act (CWA); and
- The U.S. Fish and Wildlife Service (USFWS), which monitors sensitive habitat under the Threatened and Endangered Species Act.

The principal state agencies and programs that address public floodplain interests in the ARB are:

- The Amite River Basin Drainage and Water Conservation District, also known and referred to in this plan as the ARBC, which was created by the Louisiana legislature in 1981 to plan, implement, and finance basin-wide drainage and flood control measures in the ARB. The ARBC jurisdiction includes the majority of the ARB that lies within the State of Louisiana (see Figure 1-1). Figure 1-2 describes the Amite River Basin Foundation jurisdiction.

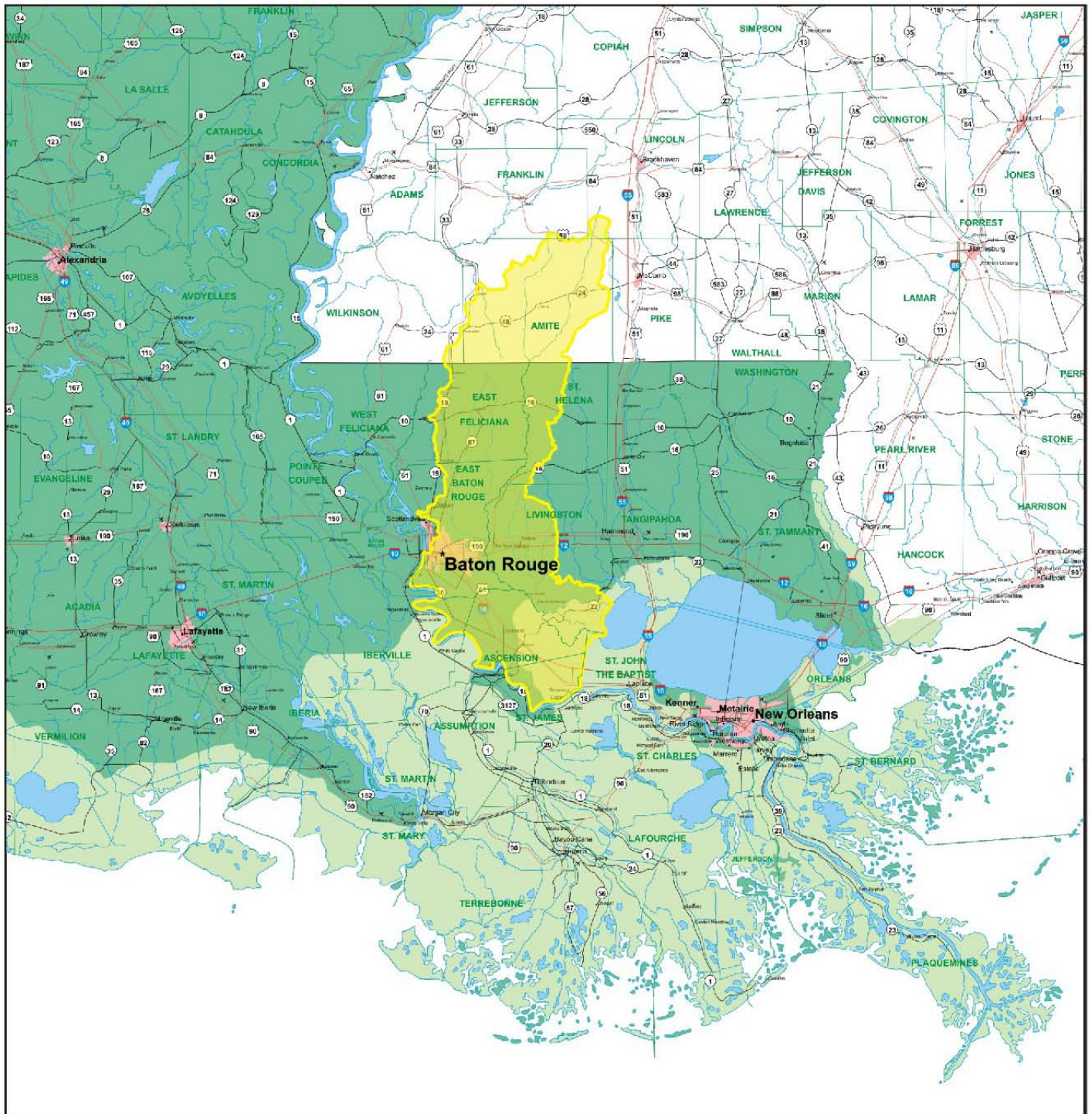


Figure 1-1. Amite River Basin Location

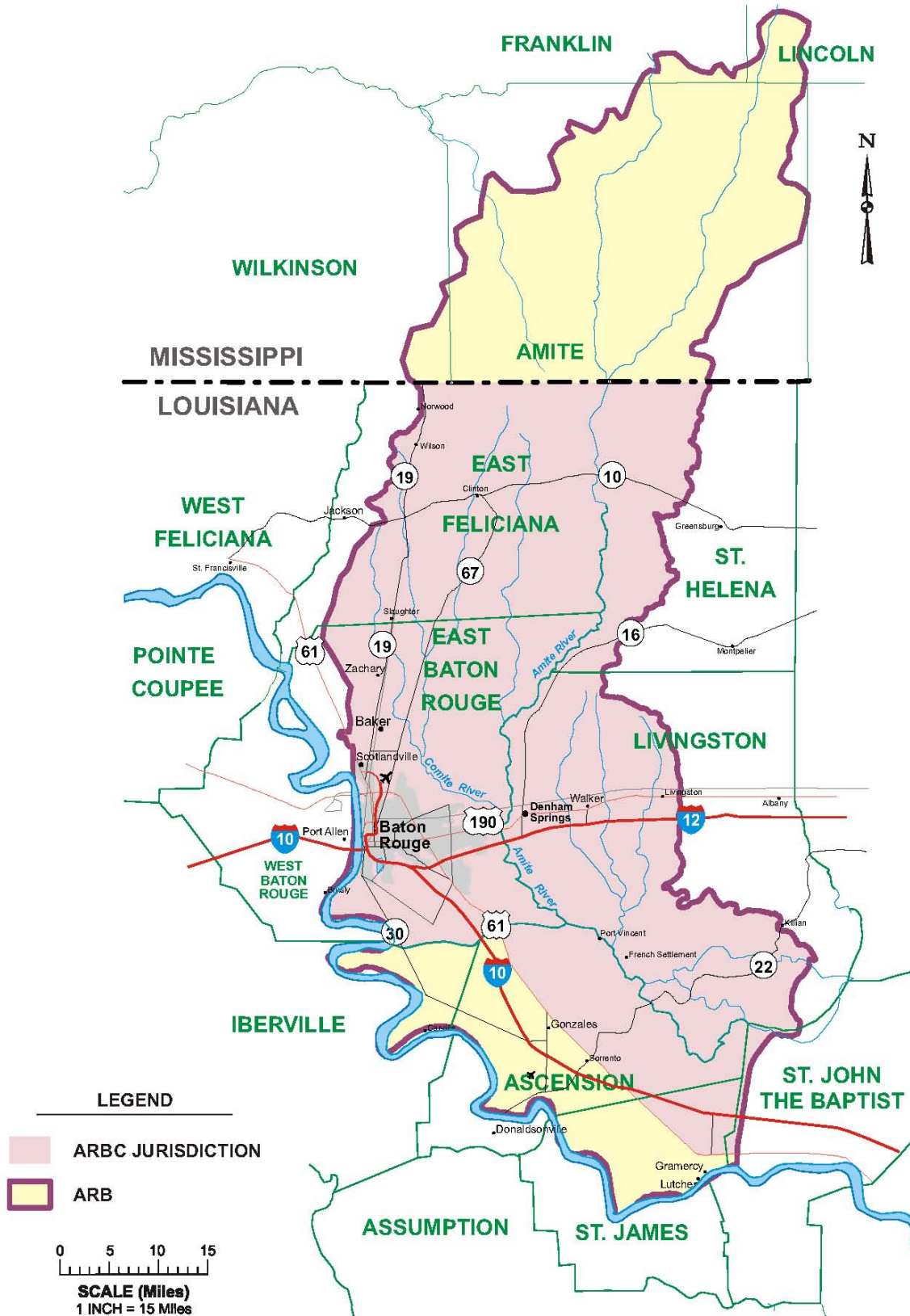


Figure 1-2. Amite River Basin Commission Jurisdiction

- Portions of the ARB that lie west of Airline Highway (U.S. Highway 61), including all of Iberville Parish that lies east of the Mississippi River and some of Ascension and St. James parishes, are not within the ARBD & WCD jurisdiction. These areas fall under the Pontchartrain Levee District, which plans, implements, and finances drainage and flood control projects in these areas, as well as in downriver east St. John and St. Charles parishes.
- The LADOTD, Public Works and Water Resources Division, which provides engineering and technical assistance services to local communities on the NFIP and CRS and on flood control and other water related projects. LADOTD funds about \$10 million per year in construction of flood control projects through the Transportation Trust Fund.
- The Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP), which coordinates flood disaster preparedness, response, and recovery with FEMA, and which administers FEMA sponsored flood hazard mitigation programs under DMA.
- The Louisiana Department of Environmental Quality (LDEQ), which administers delegated USEPA CWA environmental quality and discharge permitting programs, as well as state environmental water quality programs.

Important local jurisdictions within the ARB include portions of seven Louisiana parishes:

- East Baton Rouge, which includes the City of Baton Rouge under a consolidated government;
- Ascension
- Livingston
- St. Helena
- St. James
- East Feliciana
- Iberville (not included in the ARBD and WCD)

Iberville, Ascension, and St. James Parishes straddle the Mississippi River, with the eastern half of these parishes lying in the ARB. Each of the seven parishes participates in the NFIP and covers the unincorporated portions of the parishes.

The ARB encompasses eight local municipalities, which currently participate in the NFIP directly:

- City of Gonzales (Ascension Parish)
- City of Denham Springs (Livingston Parish)
- Village of French Settlement (Livingston Parish)
- Village of Port Vincent (Livingston Parish)
- City of Walker (Livingston Parish);
- City of Baker (East Baton Rouge Parish)
- City of Zachary (East Baton Rouge Parish)
- Town of Clinton (East Feliciana Parish)
- City of Central in (East Baton Rouge Parish)

Participation in the NFIP requires the local governments to adopt and enforce floodplain management regulations that meet or exceed minimum criteria established by FEMA. A local Floodplain Administrator oversees the program implementation. Participation in the CRS program is voluntary.

Each of the local governments -- through parish-wide departments, special drainage districts, or municipal departments of public works -- plan, implement, and finance drainage and flood risk reduction measures. These measures typically consist of minor channel improvements and maintenance. Larger flood risk

reduction projects are typically undertaken with the technical support and financial assistance of the USACE WRDA Program and LADOTD Statewide Flood Control Program.

1.4 FPMP OBJECTIVES

A FPMP attempts to lessen the damaging effects of floods and/or storm surges, maintain and enhance natural floodplain values, and make effective use of water and related land resources within the flood plain. A FPMP attempts to balance benefits obtainable from use of the floodplain with potential losses arising from such use. The comprehensive nature of such a plan stresses consideration of the full range of structural and non-structural measures potentially useful in achieving its objectives.

The FPMP address potential measures, practices and policies which will reduce the impacts of future flooding, preserve the flood risk reduction measures provided by the Comite River Diversion Canal Project, and enhance natural flood plain values.

Since actions upstream or downstream of the benefit area can affect the performance of the flood risk reduction project, the non-federal sponsor should not be limited to addressing measures solely within the immediate project boundaries. Section 4, Basin-Wide Floodplain Management Strategies address planning and floodplain management issues on a watershed level.

Specific objectives addressed by this FPMP include:

1. Preparation of the FPMP in accordance with the 1996 WRDA requirement that the non-Federal interest shall prepare a floodplain management plan designed to reduce the impacts of future flooding in a project area.
2. Addressing potential measures, practices and policies which will reduce the impacts of future residual flooding, and preserve levels of protection provided by the USACE project. These measures, practices, and polices seek to:
 - a) Conform to the 1994 Unified National Program for Floodplain Management;
 - b) Be compatible with the FEMA CRS;
 - c) Incorporate recognized "state-of-the-practice" principles and methods of floodplain management, including No Adverse Impact; and
 - d) Be consistent with flood hazard mitigation planning efforts conducted under the DMA. A report entitled *Floodplain Management in the Amite River Basin* was prepared for FEMA in September 2003 as a mitigation planning effort in the wake of the June 2001 Tropical Storm Allison disaster declaration. This FPMP has made extensive use of that report. Furthermore, the ARB parishes and the GOHSEP have been engaged in preparation of Natural Hazard Mitigation Plans under the DMA. Review of these plans has been incorporated into this FPMP.
3. Use of post-project floodplain conditions established in the *Comite Diversion Project Feasibility Study*. Given that in the ARB large damage increases are associated with very small increases in flood elevation, the FPMP addresses future planning efforts—such as modeling—that are needed to carefully evaluate and implement recommendations to preserve post-project conditions.
4. Addressing the risk of future flood damages to structures within the post-project floodplain and issues related to other USACE ARB projects.
5. Addressing measures outside the immediate project boundaries -- such as actions within the ARB upstream and downstream from the project area which might affect the performance of the Comite River Diversion Canal Project.

6. Supporting the preservation, enhancement, and restoration of enhancing natural floodplain values for fish and wildlife habitat, groundwater interaction, moderation of floods, water quality improvement, and reduced erosion and sedimentation.
7. Providing for and supporting the long-term, continuing consideration of floodplain impacts by all government levels and the public in order to
 - a) Further reduce flood damages and hardships, particularly the loss of life and injury;
 - b) Eliminate the need for additional public expenditures for construction of flood damage reduction measures;
 - c) Reduce the need for emergency response actions and post-disaster assistance; and
 - d) Stop and reverse the loss of natural floodplain values.

1.5 PROCESS OF DEVELOPING FPMP

This FPMP is the culmination of intensive planning effort on the part of the ARBC and the local communities. The process of developing this FPMP has followed recommendations identified in the USACE *Guidance*, including the steps listed below.

1. Responsibility for the FPMP development has been undertaken by the local partner; in this case the ARBC and their planning staff, supported by consulting engineers with extensive local experience.
2. The ARBC has closely coordinated the development of the FPMP with representatives of local parish and municipal governments, and Floodplain Administrators. Following a joint introductory “kick-off” meeting, individual initiation meetings will be held with each entity.
3. A broad cross section of interested agencies and public officials were included, which helped to ensure that a wide range of floodplain issues and interests were addressed.
4. The FPMP includes a thorough identification and evaluation of ARB floodplain issues associated with achieving the objectives noted in Section 1.4, a comprehensive discussion of the basin-wide and community strategies and goals for addressing these issues, and ten (10) individual community Action Plans (see Appendices B through J).
5. The Action Plans are blueprints for implementing the FPMP, and cover a range of actions to be implemented on three time scales:
 - Prior to completion of the Comite River Diversion Canal Project construction;
 - Within one-year following completion of the Comite River Diversion Canal Project construction; and
 - Long-term, including revision and updating of the FPMP.

1.6 ORGANIZATION

As noted in the USACE *Guidance*, there is no “standard formula” or “cookbook” FPMP. This FPMP is organized into the following additional major sections:

Section 1. Introduction

- Section 2.** The Amite River Basin, describes the physical geography of the ARB, population and land-use trends, and a history of floodplain management.
- Section 3.** Comite River Diversion Canal Project, provides information on the project, including previous determinations of post-project conditions; (i.e., benefits).
- Section 4.** Basin-Wide Floodplain Management Strategies, discusses strategies and goals for addressing issues at the watershed level, principally by the ARBC.

Section 2.0: The Amite River Basin

This section provides important information on the ARB and includes the following six sections:

- A geographic description of the general landforms, topography, climate, hydrology, soils, and geology of the ARB, (Section 2.1);
- A brief history of development in the ARB (Section 2.2);
- A discussion of recent population and land-use trends (Section 2.3);
- A review of major floods in the ARB (Section 2.4);
- A summary of floodplain environmental quality (Section 2.5); and
- A chronology of floodplain management in the Basin over the past 50 years (Section 2.6).

2.1 GEOGRAPHY OF THE BASIN

2.1.1 Landforms and Topography

The ARB encompasses a watershed area of approximately 2,200 square miles. About three-fourths of the Basin area lies in eight parishes of southeastern Louisiana, located east of the Mississippi River and north of Lake Maurepas (see Figures 1-1). The upper one-fourth of the ARB drainage area lies in four southwestern Mississippi counties.

The ARB can be roughly divided into three regions with distinctive landforms, topographies, and associated floodplain characteristics (see Figure 2-1):

- The High Terraces, which primarily includes the Mississippi counties, East Feliciana Parish and St. Helena Parishes, and northern East Baton Rouge Parish;
- The Intermediate and Prairie Terraces, which includes most of East Baton Rouge and Livingston Parishes, and upland portions of Iberville and Ascension Parishes; and
- The Recent Alluvial Floodplain, which includes lower Livingston Parish, the remainder of Iberville and Ascension Parishes, as well as St. James Parish.

The upper reaches of the ARB are considered part of the regional Southern Pine Hills located on the relatively higher Plio-Pleistocene Terraces. The area is characterized by rolling hills at elevations typically ranging from 80 to 500 ft. above mean sea level (MSL). The upper Amite and Comite Rivers and their tributaries are incised within the terraces (typically 20 feet or more). Consequently the floodplains are very narrow and well defined.

Midway through the ARB the landscape transitions from rural hilly older Plio-Pleistocene Terraces to the flatter, mid-elevation (20 to 80 ft. MSL) recent Intermediate and Prairie Pleistocene Terraces. As the terrain descends, the floodways of the Amite and Comite Rivers and their major tributaries become less incised and well-defined, and the floodplains spread to widths over one thousand feet. Towards the southern end of these terraces, the floodplains of the Amite and Comite Rivers and the major tributaries (e.g., Bayou Manchac, Jones Creek, Clay Cut Bayou, Gray's Creek, and Colyell Creek) begin to carve out broad bottomland swamps.

In the lower third of the ARB the landscape is dominated by expansive, low-lying (1 to 5 ft. MSL), alluvial floodplains filled during the recent Holocene. Prior to the early-1900s and leveeing of the Mississippi River, these floodplains and their major remnant channels (e.g., Bayou Manchac, the lower Amite River, Bayou Paul, the New River, and the Blind River) served as natural outlets for the Mississippi River crevasses and overbank spring floods, carrying water to Lake Maurepas. The forested wetlands transition from occasionally to seasonally inundated bottomland hardwoods to more frequently inundated bald cypress and tupelo swamps. The numerous channels and backswamp areas in the lower Amite

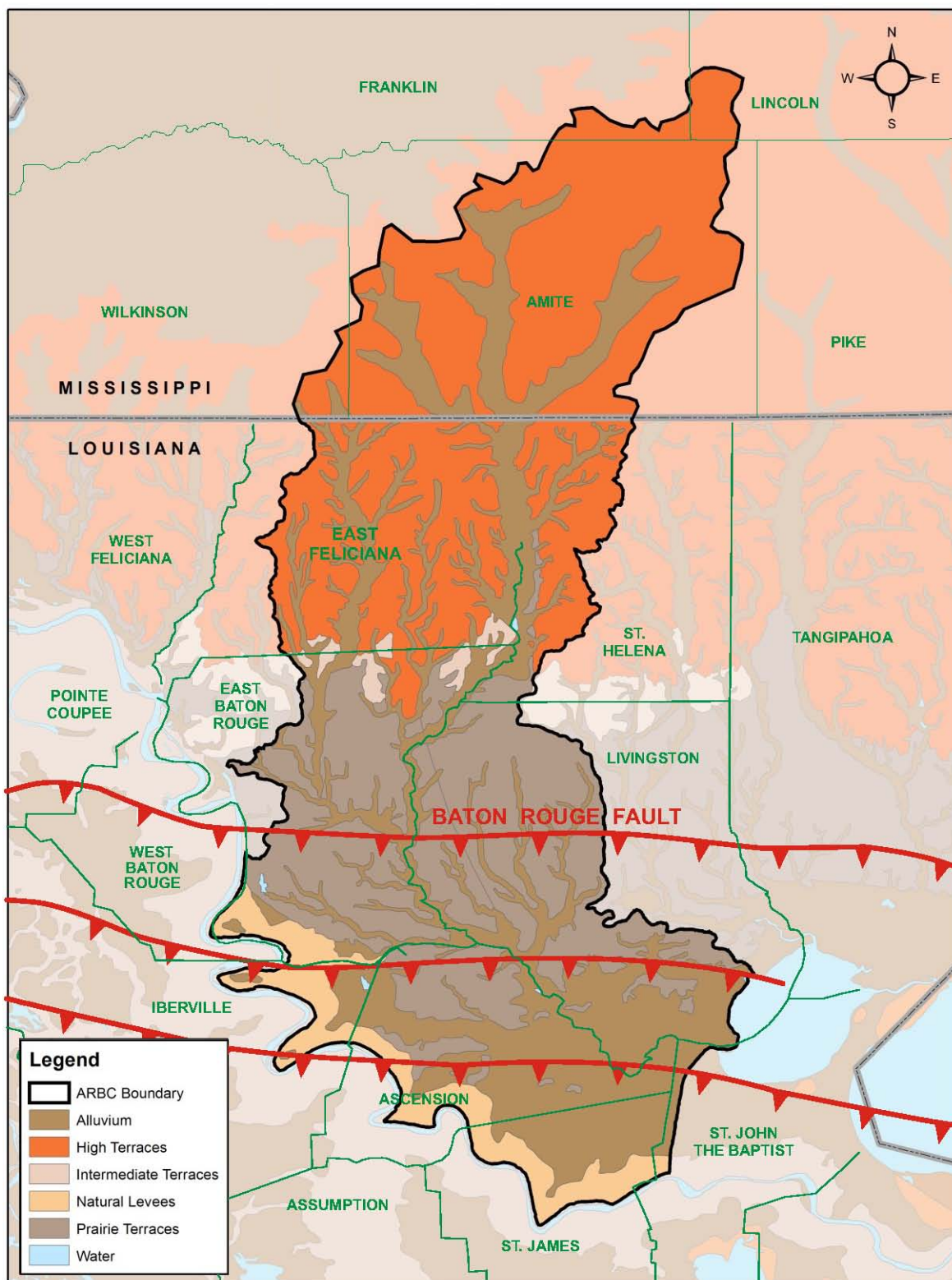


Figure 2-1. ARB Topography, Landforms and Floodplain Characteristics

River Basin provide habitat for wildlife and important hunting and recreational boating opportunities for area residents.

2.1.2 Climate

Climate in the region is humid subtropical, being heavily influenced by the movements of warm moist air off of the Gulf of Mexico. Average monthly temperatures vary from 51.2 °F in January to 82.0 °F in July. Winter nighttime lows below freezing are common, as are summer daytime highs in the mid-90s.

Normal annual precipitation for the ARB is 60.5 inches, although for the period 1980 through 1991 rainfall averaged 64 inches a year. The ARB experienced drought conditions (-2 or less on the Palmer Drought Severity Index) during the modern era years of 1952, 1963, 1981, 1999, and 2000. Southerly, maritime winds prevail for much of the year, resulting in the potential for highly variable rainfall over the ARB. Daily variations are frequently measured in inches. Even for a 30-year averaging period annual precipitation at various weather stations throughout the ARB ranged from 56 to 67 inches. The wettest month is December with an average monthly normal rainfall of 6.14 inches. October is the driest month averaging 3.50 inches.

High cumulative rainfall events (e.g., 6 inches or more in less than 72 hours) over large areas of the basin are caused under two typical scenarios: slow moving cold fronts encountering warm moist coastal air in late-winter or early spring; and slow moving tropical storms in summer or early fall. High short-term localized rainfall intensities (e.g., over one inch in an hour) can occur under these two scenarios, and are also experienced in a third scenario—heavy summer-time thunderstorms.

Severe riverine flooding in the lower ARB has occurred under extreme examples of all three scenarios, with minor localized flood events typically occurring at least once per year in small, poorly drained catchments. Record floods often result when significant rainfall events occur in the context of above-average seasonal rainfall patterns, which sustain high soil moisture saturation and floodplain water levels. In addition to rainfall-riverine flood events, the Lower ARB is also subject to wind-driven coastal flooding associated with slow-moving tropical storms. Prolonged heavy southerly winds cause high water levels along the southeastern Louisiana coast (e.g., Breton and Mississippi Sounds), causing back-step rises in Lakes Borgne, Pontchartrain, and Maurepas. Lake Maurepas levels above 3 ft. MSL typically impact the Lower ARB at least once per year. Tropical storms have pushed levels above 6 ft. MSL.

2.1.3 General Hydrology

The principal hydrologic features of the ARB are the 170 mile long Amite River, and its largest tributary, the 64 mile long Comite River, which joins the Amite River at Denham Springs 55 miles above its mouth in Lake Maurepas. The total drainage area of the ARB above Denham Springs is approximately 1,280 square miles, with the 348 square-mile watershed of the Comite River comprising about 27 percent of this area.

Above Denham Springs the Amite and Comite Rivers and their tributaries are relatively fast flowing. Average flows are 480 cfs, for the Comite River near Comite Louisiana, and 2,080 cfs for the combined flow in the Amite River at Denham Springs.

The ARB consists of seven major watersheds (Figure 2-2):

- The Upper Amite River
- The Middle Amite River
- The Comite River
- Jones Creek
- Bayou Manchac
- Colyell Creek

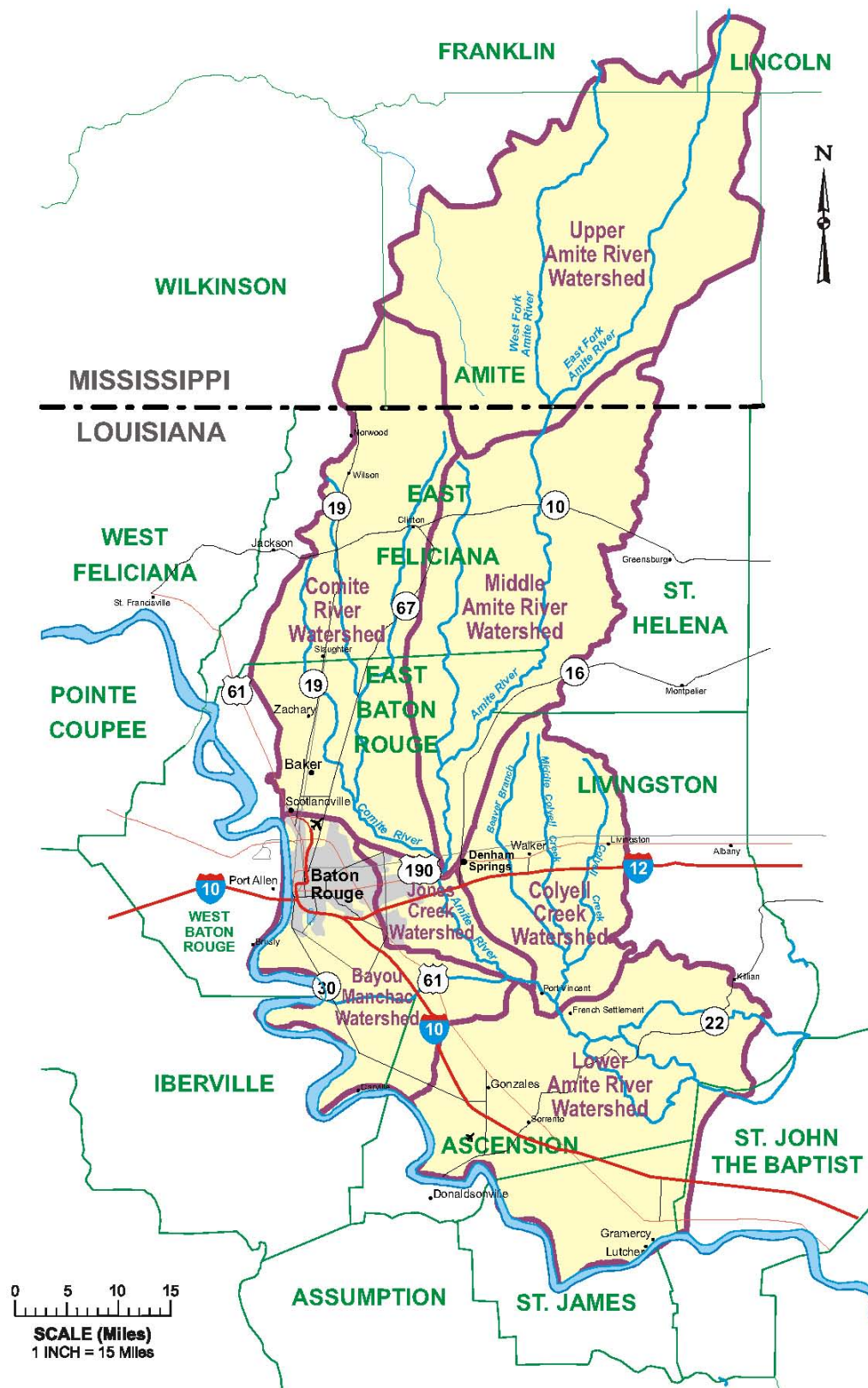


Figure 2-2. ARB Major Watersheds

- Lower Amite and Blind Rivers

The Upper Amite River watershed includes the drainage of the East and West Forks, which join together above the Louisiana-Mississippi State line, and the drainage of Beaver and Darlings Creeks. Beaver Creek enters the Amite River from the west, about four miles south of the confluence of the East and West Forks. A few miles further south Darlings Creek joins from the east. Above Darlings Creek, the watershed is estimated to encompass an area of about 580 square miles.

Continuing southward for roughly 30 miles to the City of Denham Springs, the Middle Amite River is joined by some dozen smaller creeks on the east and west. Sandy Creek flows into the Amite River from the west near the community of Greenwell Springs.

The Comite River originates in Wilkinson and Amite counties in Mississippi. After it crosses the State Line the river is joined by several small tributaries as it descends through the western part of the upper ARB, in which most of the watershed lies. In the middle ARB several significant tributaries join the Comite River, including Cypress and White Bayous which drain the Cities of Baker and Zachary, Blackwater and Beaver Bayous which drain the rapidly growing City of Central, and Hurricane Creek, which serves much of the northern part of the City of Baton Rouge.

South of Denham Springs two major watersheds drain the majority of the metropolitan Baton Rouge area west of the Amite River—Jones Creek/Claycut Bayou and Bayou Manchac. Jones Creek, Claycut Bayou, and Bayou Manchac capture the heavily urbanized southern half of East Baton Rouge Parish. Bayou Manchac also serves the rapidly developing northern portions of Ascension Parish and Iberville Parish.

Gray's Creek and Colyell Creek enter the Amite River near the community of Port Vincent. This watershed drains the increasingly developed areas of western Livingston Parish, including the City of Denham Springs and the Town of Walker.

Most of the various tributaries within these urban watersheds have been extensively modified—cleared, straightened, widened, deepened, and in some cases lined—to enhance drainage.

Downstream of Denham Springs, with the added flows, flatter terrain, and broader swamp floodplains, the Amite River and its tributaries become sluggish. Below the community of French Settlement, the river and the miles of surrounding swamps are hydraulically inseparable. The river winds to the east, ultimately emptying into Lake Maurepas. The swamps are dissected by an extensive network of very shallow bayous and sloughs, some of which have been dredged to improve drainage of adjacent uplands and access to interior resources—cypress in the late-1800s and early-1900s, oil and gas in the mid-1900s.

The New and Blind Rivers have historically drained much of Ascension Parish—including the communities of Gonzales and Sorrento, and lower Livingston, and St. James Parish via adjacent floodplain swamps to Lake Maurepas. Interconnecting bayous (e.g. the Petit Amite) between the Amite and Blind River allowed periodic floodwater to escape into the wider swamp and Lake Maurepas via the steepest route. In the late 1950s the USACE constructed a direct outlet from the Amite River to the Blind River to facilitate release of floodwaters from the Amite River. The Amite River Diversion Canal begins at a weir located just below French Settlement and extends for 10 miles to its outlet in the Blind River, some 5 miles above Lake Maurepas. The weir height was reportedly designed to provide diversion of approximately one-half of the Amite River flow at normal flows and two-thirds at high flows.

Lake Maurepas is a brackish estuarine waterbody that is tidally connected to the much larger Lake Pontchartrain to the east and the Gulf of Mexico. Lake levels typically average about 1.0 ft. above MSL but frequently range from -0.5 to 2.5 ft. MSL with the combined effects of tides and seasonal coastal winds.

2.1.4 Geology and Soils

The regional landforms shown in Figure 2-1 reflect over one million years of regional alluvial erosion-depositional cycles associated with Quaternary transgressive deltaic processes of lower Mississippi River. This alluvial system deposited continental loads of sediment—to thicknesses of hundreds of feet—during interglacial episodes, and then eroded stream valleys within these deposits by near similar depths during the glacial periods. This repetitive process produced a set of regional “stair-steps” that begins at its base with the current Holocene floodplain swamps and natural levees and proceeds up (generally northward) a series of older terraces (Figure 2-3). The overlying soils within the ARB closely parallel the geological formations and all soil types are alluvial in nature.

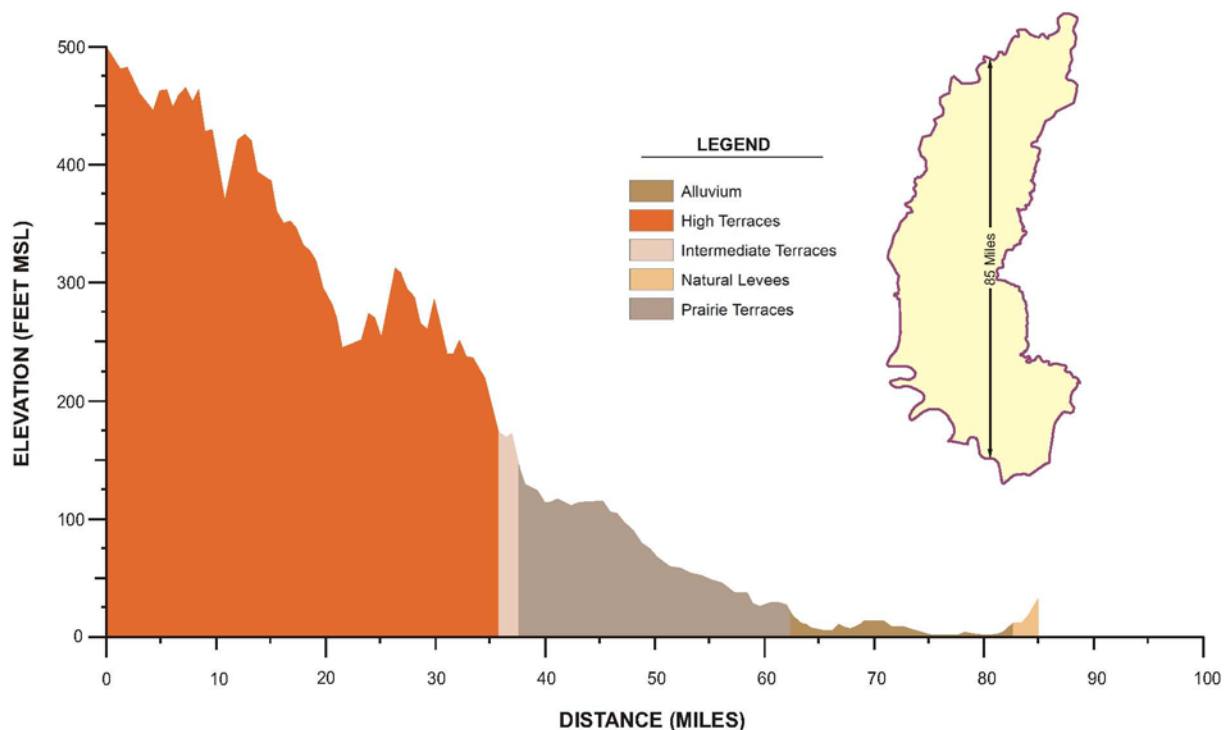


Figure 2-3. Regional Surface Profile

The northern-most part of the Upper (older) ARB includes the Plio-Pleistocene Terraces (also referred to as the Citronelle Formation), which generally consist of a gradational sequence of fluvial gravels, cross-bedded sands, silts, and clays, with coarser deposits at the base of each sequence. To the south and through the Middle ARB the Intermediate Pleistocene Terraces are typically less variable, with a lithology of silt and sandy clay grading downward to fine-to-coarse grained sand with some gravel. The most recent of these are the Prairie Terraces of southern East Baton Rouge Parish, Livingston Parish, and northern Ascension Parish.

Northward in the ARB, the fast-flowing meandering streams incise the terraces, yielding a largely sand-gravel bedload and narrow riverine floodplain sequences of fine sands and silts grading downward into coarse sands and gravels. A thin veneer of wind-blown loess deposits blanket blankets much of the terraces, consisting of silt with some clay and very fine sand.

Southward, at the base of the terraces lie the fine-grained alluvial overbank floodplain deposits of the recent Holocene, reworked by a network of sluggish bayous and swamps. The swamp soils are dominated by poor-draining, highly plastic, organic clays overlain by organic muck several inches thick. Soils found along the natural levee on the East Bank of the Mississippi River and historic distributaries have a higher percentage of sands and silts.

Extensive geologic investigations of underlying Miocene (and older) alluvial and deltaic deposits have been undertaken throughout the ARB in support of oil and gas exploration and withdrawal of fresh groundwater. Regional deposits experience continuous downward movement in response to the long-term down-warping of the regional crust under the load of millions of years (and up to many thousands of feet thick) of deposition. The concurrent effect of crustal down-warping, consolidation of deeper sedimentary deposits—some under the added stress of fluid (oil, gas, groundwater) withdrawal—and compaction of recent sediments, is regional subsidence, which ranges from a few inches to three feet per century in the middle to lower ARB. A complex network of local faults have been documented (see Figure 2-1), including the Baton Rouge Fault which serves as an important block to northward encroachment of saline groundwater into the important reservoirs of very high quality fresh groundwater. Movement along the faults tends to have not generally been traumatic.

2.2 HISTORY OF DEVELOPMENT IN THE BASIN PRIOR TO 1970

The modern cultural history of the ARB reflects two distinct upper and lower geographic influences. The East Feliciana, St. Helena, East Baton Rouge, and Livingston Parishes lie within the “Florida” Parish region of the Louisiana. The settlement of the upper Florida Parishes was dominated by Anglo-Saxon Protestants, in contrast with the lower ARB, which generally shares a French-Spanish Catholic imprint with the nearby Acadian Parishes.

19th and early 20th Century development of the upper ARB altered nearly 100 percent of the natural forested landscape of this area, resulting in a combination of pastureland, commercial pine stands, and new-growth mixed hardwood forests. Rural expansion within the High Terraces generally did not include occupation of the narrow, deeper floodplains. As a result, very few structures were erected within the floodplains in the Upper ARB. Southward and into the middle ARB, the broader bottomland hardwood transitions between the Intermediate Terraces and the cypress swamp floodways were replaced with croplands.

Agricultural development within the lower ARB also concentrated on the hardwood edges of the Prairie Terraces and natural levees above the adjacent cypress swamps. A typical example is the terrace bluffs along the banks of Bayou Manchac in Ascension Parish. However, in addition to farming, many early settlers in the lower ARB earned or supplemented their livelihood by fishing, hunting, and trapping in the swamps. Consequently many inhabitants established residences on or near the floodplains, often building cabins on piers, following a practice used throughout Acadiana.

The major towns of the middle ARB (Figure 2-4) rose in response to the demand for governmental/commercial centers located on perennial high ground in proximity to the major water routes. These included Baton Rouge—the state capital, Gonzales, Denham Springs, Port Vincent, and French Settlement. Further urbanization occurred with development of local rail and highway networks at the turn of 19th/20th Century. Since that time the middle ARB has been home to heavily-developed urban and suburban landscapes, interspersed with pastureland and some isolated hardwood stands.

Rapid expansion of state government, two universities, and the local refining and petrochemical industry beginning in the 1930s, and spurred on by World War II, initiated a steady population boom for the Baton Rouge area. The history of population growth of the Basin is shown in Table 2-1 by the following comparisons of census data for the three key regional parishes from 1900 to 2010.

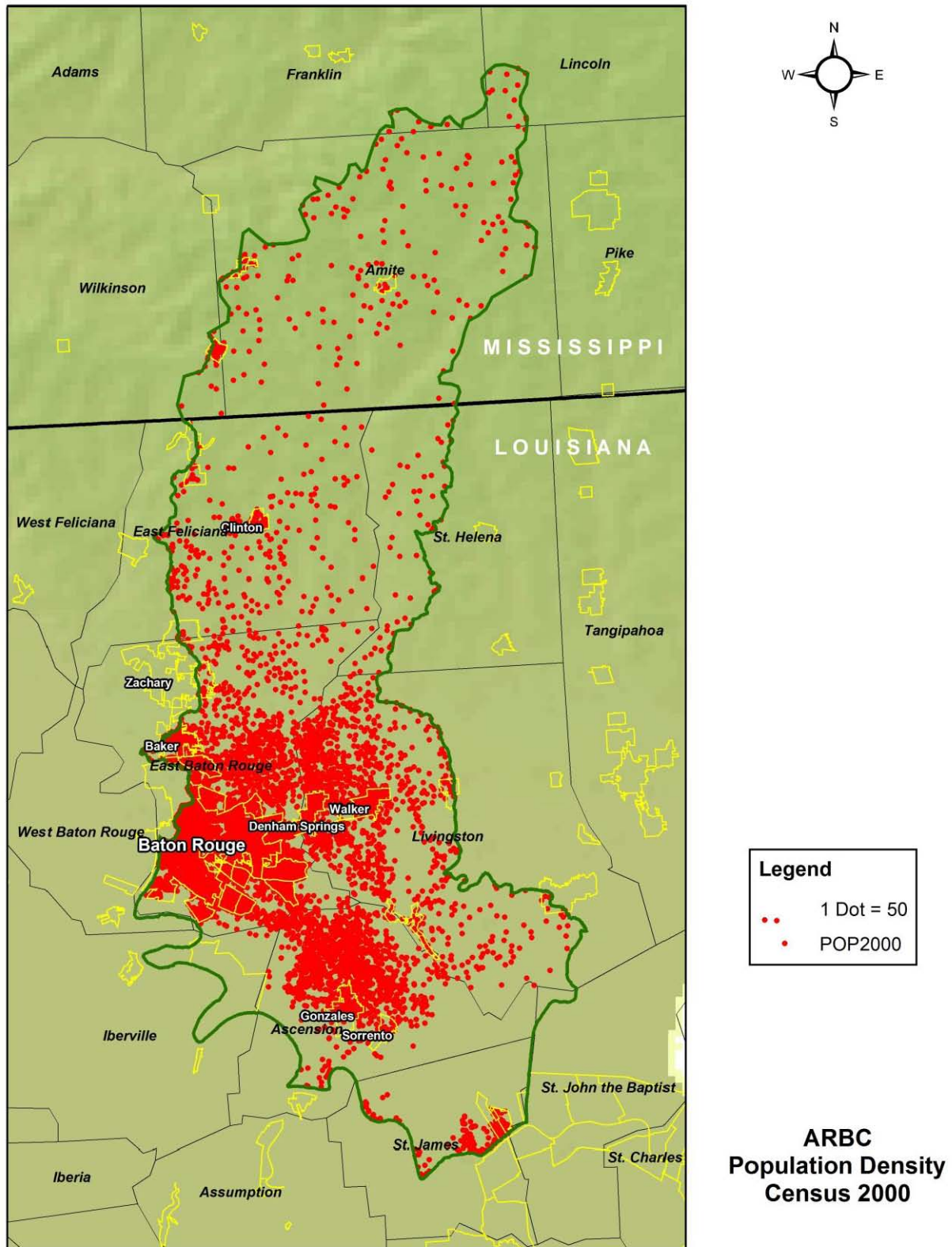


Figure 2-4. ARBC Population Density Census 2000

Table 2-1. Comparisons of Census Data

	1900	1920	1940	1960	1980	2000	2010
East Baton Rouge	31,153	44,513	88,415	230,058	366,191	412,852	440,171
Livingston	8,100	11,643	17,790	26,974	58,806	91,814	128,026
Ascension (East & West)	24,142	22,155	21,215	27,927	50,068	76,627	107,215
St. Helena	8,479	8,427	9,542	9,162	9,827	10,525	11,203
East Feliciana	20,443	17,487	18,039	20,198	19,015	21,360	20,267

Source: <http://www.census.gov/population/cencounts/la190090.txt>

The post-World War II boom of Baton Rouge stimulated demand for residential and commercial development with easy local access to centers of employment. Extensive encroachments upon the floodplain margins of the Middle ARB occurred throughout the mid-20th Century

Along with the rapid population rise of the Baton Rouge came development pressure on the surrounding areas. Low density residential development intensified in the southern reaches of the Upper ARB. Rural residential development began encroaching on the bottomland hardwood floodplains of the Comite River Sub-basin in the latter half of the 20th century, particularly prior to the documentation of recurring flood elevations. Development throughout the Lower ARB terraces and ridges also became extensive and encroached upon floodplain fringes. In addition, Lower ARB residents began expanding the number of riverbank residences for week-end and seasonal recreational camps.

2.3 RECENT TRENDS IN POPULATION AND LAND-USE

Growth in Basin population and changes in land-use accelerated after 1960, with the Baton Rouge Metropolitan Area consistently being the fastest growing urban area in Louisiana. Important local factors have included expansion of the state government, universities, and refining/petrochemical industries, in addition to national trends in urbanization.

Today's Metropolitan Statistical Area (MSA) of Baton Rouge includes the ARB parishes of Ascension, East Baton Rouge, Livingston, as well as West Baton Rouge Parish, situated on the west bank of the Mississippi River. The Middle ARB includes the major metropolitan area of Baton Rouge—with an approximate population of 600,000—and the cities of Baker, Zachary, and Denham Springs.

In the recent decades, Livingston and Ascension Parishes have experienced rapid population increases due to the rise of bedroom communities in the areas bordering East Baton Rouge Parish. Table 2-2 illustrates the population increases for parishes and communities within in the ARBC boundaries.

**Table 2-2. U.S. Census Data for Parishes and Communities
(1970 to 2010)**

Parish/Community	1970	1980	1990	2000	2010
Ascension (East)	37,086	50,068	58,214	65,818	92,091
Gonzales	4,512	7,287	7,208	8,156	9,782
East Baton Rouge	285,167	366,191	380,105	412,852	440,171
Baton Rouge	165,192	220,394	219,531	227,818	229,493
Baker	8,281	12,865	13,087	13,793	13,895
Zachary	4,964	7,297	9,306	11,275	14,960
East St. John (East)	23,813	31,924	39,996	38,278	40,839
East St. James (East)	19,733	21,495	20,879	12,434	12,953
East Iberville (East)	30,746	32,159	4,392	6,726	6,740
Livingston	36,511	58,806	70,523	91,814	128,026

Parish/Community	1970	1980	1990	2000	2010
Denham Springs	6,752	8,563	8,381	8,757	10,215
Walker	1,363	2,957	3,727	4,801	6,138
Port Vincent	387	450	446	463	741
French Settlement	670	761	829	945	1,116
East Feliciana	17,657	19,015	19,211	21,360	20,267
Clinton	1,884	1,919	3,891	1,998	1,653
St. Helena	9,937	9,827	9,874	10,525	11,203
Total	386,358	503,07	537,927	613,178	703,110

The following population trends for parishes and communities in the ARBC can be drawn from an analysis of the U.S. Census data:¹

- For the jurisdictions listed in Table 2-3, the population increased by 316,752 between 1970 and 2010, reflecting an annual growth rate for the Basin of approximately 2 percent.
- The two rural parishes in the northern portion of the ARBC (East Feliciana and St. Helena) have experienced very limited population growth over the same time period (0.4 and 0.3 percent annual growth, respectively), most likely due to out migration of younger residents and a low in-migration rate to the parishes.
- The population of Livingston Parish grew by 91,515 people from 1970 to 2010, reflecting an astonishing 250 percent increase over 40 years and an annual growth rate of 6.3 percent, almost twice the average annual growth rate for the surrounding region.
- The population growth in Livingston Parish over these four decades (61, 20, 30 and 39 percent per decade, respectively) occurred primarily in the western unincorporated portion of the Parish within the ARB; only limited population increases occurred in the communities of Denham Springs, French Settlement and Port Vincent.

The significant population growth in the three urbanizing parishes has been accompanied by a steady increase in the land coverage for residential and commercial land uses within the ARB over the past two decades. As part of a 2003 FEMA sponsored study, a new land use and land cover classification was prepared for the Louisiana portion of the Amite River Basin, using satellite imagery taken in 2001. Figure 2-5 depicts recent land cover classification for the Amite River Basin boundary in Louisiana. Noteworthy findings include:

- The Louisiana portion of the Amite River Basin is predominantly rural with 50 percent forested and approximately 20 percent in agricultural production (cropland, pasture and hay production).
- Approximately 11 percent of the Basin is urbanized with 8.17 percent classified as residential (2001 data).
- About 16 percent of the Basin is open water, emergent wetlands, or forested wetlands.
- Approximately 3 percent falls in other categories such as bare ground, gravel pits, or transitional.
- The upper reaches of the Basin in Mississippi are almost entirely rural with extensive forested areas, agricultural land uses, and scattered small farming communities.
- Pine forests are extensive in the gently rolling terrain of East Feliciana and St. Helena parishes while bottomland hardwoods occur in the dissected stream valleys.

¹ The U.S. Census data reflected in Table 5 reflects population size for the political jurisdiction. It is important to note that for most of the parishes and communities, at least a portion of the jurisdiction falls outside of the Amite River Basin or the ARBC boundaries.

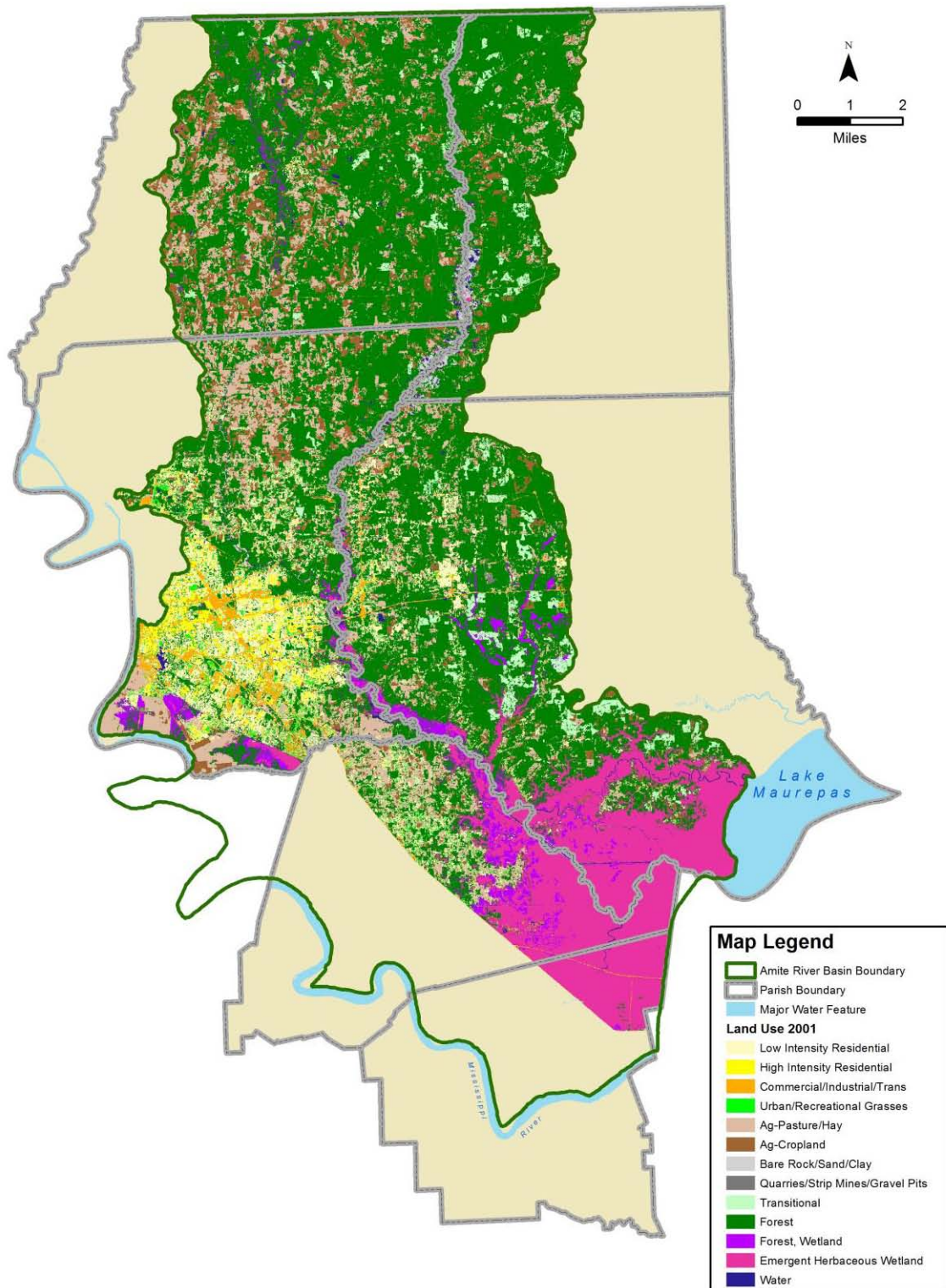


Figure 2-5. Recent Land Cover Classification for the Amite River Basin

- Commercial forestry operations are a major industry in these two rural parishes.
- Forest and agricultural losses have occurred in the periphery of the Baton Rouge Metropolitan Area, especially in Livingston and Ascension parishes, primarily as a consequence of urban growth.
- Farming is still a major factor in the economy of Livingston Parish. Livestock, poultry, cash crops, and lumber are the main agricultural products.
- Industrial development within the ARBC is primarily concentrated along the water, rail and highway transportation corridor from the East Bank of the Mississippi to Route 61.
- Transitional area is considered in transition from one land use to another.

Key trends in land use and land cover classifications in the three rapidly urbanizing parishes (Ascension, East Baton Rouge and Livingston) for the period from 1992 through 2011 include:

- Expansion of the Baton Rouge urbanized areas is proceeding to the north, east, and south;
- Infill development is continuing to occur within the Baton Rouge Metropolitan Area;
- There is increasing density of new residential development in areas bordering urbanized areas;
- Surrounding farmland and forested lands is being converted to low and medium density residential development;
- Commercial development is increasing along the major arteries; and,
- Forested wetlands along the floodplain fringe are being rapidly converted to residential development. [Note: the losses shown for wetland land cover types are most likely underrepresented in the percent land cover change data because of the difficulties in delineating wetland classifications using remote sensing, and recent losses of forested wetlands due to increased salinity in Lake Maurepas.]

In addition to continued development of the floodplain fringe, recent decades have seen extensive construction along the Lower ARB riverbanks of expensive, year-round residences (see Table 2-3).

Table 2-3. Land Use Changes in Ascension, East Baton Rouge, and Livingston Parishes (1992-2001)

Class Description	1992 Acreage	2001 Acreage	2011 Acreage	1992-2001 % Change	2001-2011 % Change
Ascension Parish					
Residential	693.0	3501.0	4705.0	405%	34%
Urban Recreation/Open Space	3166.7	3080.2	3910.8	-3%	27%
Agriculture	8923.6	8610.3	6448.8	-4%	-25%
Bare Rock/Sand/Clay	14.0	92.4	182.0	563%	97%
Transitional	395.8	1809.8	2218.5	357%	23%
Forest	9360.9	2120.7	1581.8	-77%	-25%
Forested Wetland	27041.8	11851.9	11921.7	-56%	1%
Emergent Wetland	6413.4	568.3	432.3	-91%	-24%
Open Water	381.1	314.3	439.2	-18%	40%
East Baton Rouge Parish					
Residential	21492.3	49085.4	52844.7	128%	8%
Urban Recreation/Open Space	44930.3	32446.1	30947.9	-28%	-5%

Class Description	1992 Acreage	2001 Acreage	2011 Acreage	1992-2001 % Change	2001-2011 % Change
Agriculture	55016.0	45932.2	39490.0	-17%	-14%
Bare Rock/Sand/Clay	791.1	1488.7	1307.5	88%	-12%
Transitional	3618.7	19157.7	24405.2	429%	27%
Forest	93010.4	19851.0	16907.0	-79%	-15%
Forested Wetland	55634.1	56867.1	57015.1	2%	0%
Emergent Wetland	3547.2	671.5	902.2	-81%	34%
Open Water	3137.7	2494.4	2538.0	-21%	2%
Totals	231077.8	227994.1	226357.6		
Livingston Parish					
Residential	2032.8	11478.4	13974.5	465%	22%
Urban Recreation/Open Space	8410.1	14152.0	15084.6	68%	7%
Agriculture	28223.9	22119.8	16607.8	-22%	-25%
Bare Rock/Sand/Clay	211.5	1059.1	1408.5	401%	33%
Transitional	2119.6	45133.1	56191.8	2029%	25%
Forest	141952.0	39353.0	31398.1	-72%	-20%
Forested Wetland	78227.1	78660.3	77074.0	1%	-2%
Emergent Wetland	24348.7	2741.1	2250.6	-89%	-18%
Open Water	2619.7	2773.3	3168.6	6%	14%

2.4 HISTORY OF FLOODING

Floods associated with ARB streams—not including Mississippi River floods—were most certainly a frequent and significant issue for indigenous villagers and early European settlers of the region who chose to occupy important natural transition zones at the floodplain margins. Documentation and analysis of major floods, spurred by a growing need to improve drainage in the increasing urbanized areas, emerged in the 20th Century. Professional studies beginning in the mid-1900s have documented significant basin flood events in 1921, 1928, 1942, 1947, 1953, 1957, 1962, 1964, 1967, March 1973, April 1977, April 1979, April 1983, August 1983, October 1985, January 1990, January 1993, January 1994, and June 2001.

The crest elevation—along with peak discharge and estimate recurrence interval where available—for the Amite River at Denham Springs during the late winter-early spring floods of March 1973, April 1977, April 1979, April 1983, January 1990, January 1993, January 1994, and the Tropical Storm Allison flood of June 2001 are shown in Table 2-4.

The April 1983 flood established the record discharge and stage at Denham Springs. About 5,300 homes and 200 businesses were flooded and an estimated \$172 million of damages incurred (1983 dollars). Flood damages in the Comite River Sub-basin were estimated \$48 million.

Table 2-4. Crest Elevations, Peak Discharges, and Recurrence Intervals for Amite River Floods at Denham Springs

Flood	Crest (Feet NGVD)	Peak Discharge*	Recurrence Interval, Years
March 1973	36.50	60,200	6
April 1977	41.08	110,000	52
April 1979	36.70	68,600	9
April 1983	41.50	112,000	60
January 1990	39.88	96,700	35
January 1993	38.15	81,900	20
January 1994	36.10	66,500	8
June 2001	39.34	82,700	22

Hurricane Juan (October 1985), which became stalled along the Louisiana coast for several days, produced extremely high tides in Lake Maurepas (six to eight feet above normal), and six day rainfall totals of five to eleven inches throughout the basin. These combined to produce extreme flooding in the Lower ARB. However, upstream portions of the ARB were largely unaffected, as shown by the crest and peak discharge at Denham Springs—32.19 ft NGVD and 43,900 cfs, respectively.

In June 2001, Tropical Storm Allison stalled over east Texas and southern Louisiana extending the period of rainfall through seven days. Measured rainfall totals within the ARB included 19.66 inches in Baton Rouge; 14.07 inches in Denham Springs; and, 23.29 inches in Ascension Parish. Based upon the seven day rainfall totals, the storm recurrence interval represented a 100-year *precipitation* event. [Largely due to a significant drought and very low soil moisture conditions present prior to the event, stream flow measurements exhibited a much lower recurrence interval.]. Damages for Tropical Storm Allison in the ARB included the evacuation of 1,800 residents and flooding of 1,000 homes in East Baton Rouge Parish, and the flooding of over 2,000 homes in Livingston, Lafourche, St. Tammany, and Ascension Parishes. This was the most significant flooding of the Amite and Comite Basins since 1983. Damage in excess of \$65 million has been attributed to Tropical Storm Allison in Louisiana.

Figure 2-6 illustrates the location of the 100-year floodplain in the three Louisiana parishes which participate in the NFIP. In general, due to the historical pattern of floodplain fringe development in the ARB, the number of potential flood damage structures tends to be highest in the Middle ARB. Residential and commercial expansion into the floodplain fringes northward into the Upper ARB and southward into the Lower ARB has resulted in damage exposures in these areas. Figure 2-6 shows the general location of repetitive loss structures in the ARB. Current estimates show a total of 1,869 structures in the eight ARB NFIP communities. The adaptation of pier construction in recognized flood-prone areas, particularly in the Lower ARB, has typically protected structures from past mid-recurrence frequency events (less than 50-year). More extreme event conditions may need to be better defined—both for river floods and wind-driven coastal floods—to evaluate the quality of existing flood-prone construction.

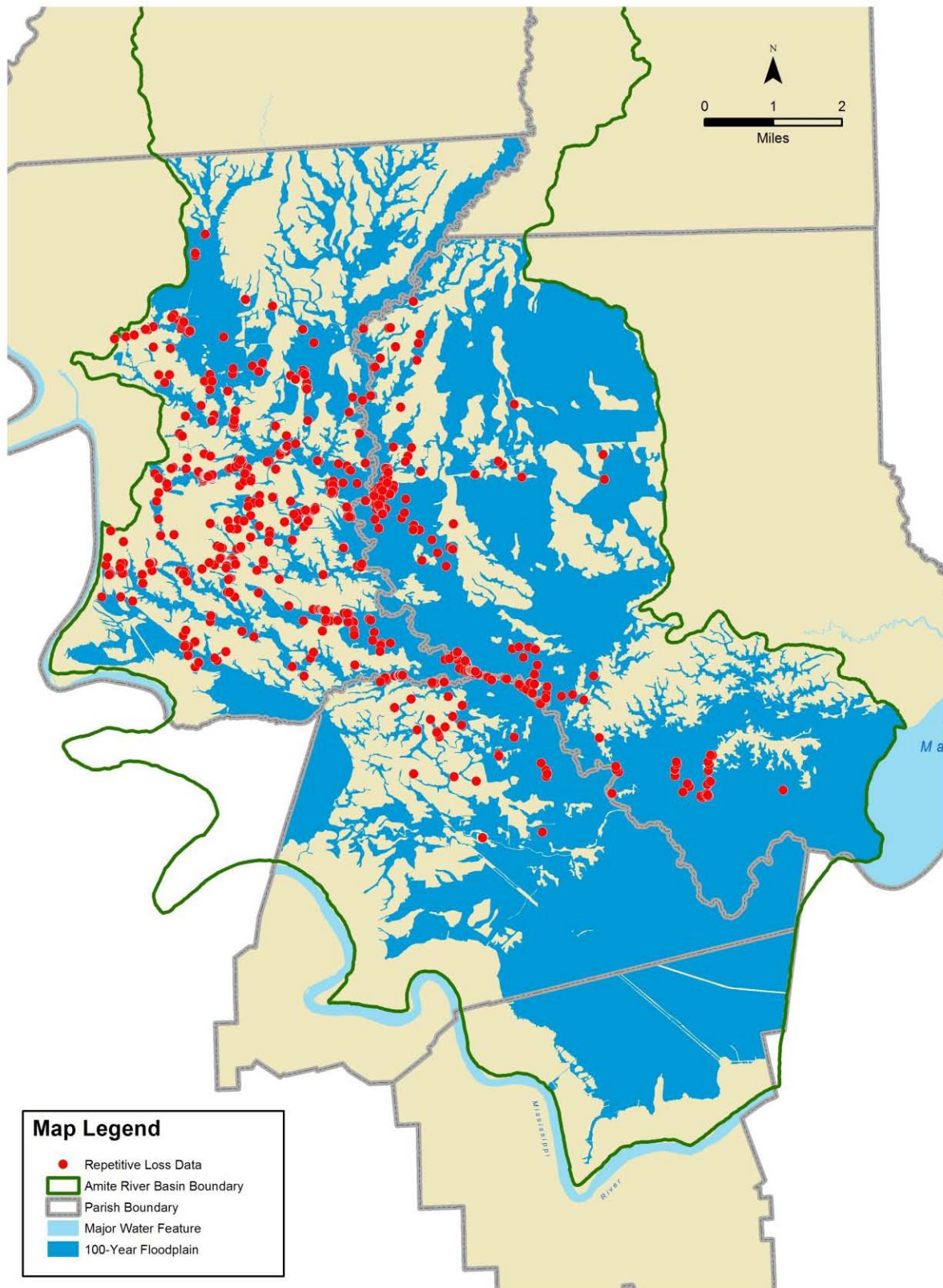


Figure 2-6. 100-Year Floodplain and Repetitive Loss Data within the ARB

2.5 CHRONOLOGY OF FLOODPLAIN MANAGEMENT

The following, Table 2-5, is a chronology of major floodplain management efforts in the ARB.

Table 2-5. Major Watershed Management Efforts in the Amite River Basin

Year	Flood Control Project
1928	USACE completed construction of channel improvements (clearing, snagging, dredging) in the Amite River from KCS railroad crossing to Lake Maurepas.
1953 - 1967	DOTD and East Baton Rouge made improvements to Ward Creek, Clay Cut Bayou, Jack's Bayou, Bayou Duplantier, and White Bayou.
1955	USACE published a flood control study of the ARB and its tributaries.
1964	USACE completed construction of further upstream channel improvements (clearing, snagging, dredging) of Amite River, and to lower portions of Comite River, Blind River, and Bayou Manchac; including construction of the Amite River Diversion Channel;
1972	USACE completed a flood control study for the Amite River and Tributaries; evaluated four reservoir plans; two diversion plans; and four channel modifications.
1978 to present	Development and updating of flood insurance studies for participating communities within the Amite River Basin.
1981	ARBD&WCD formed.
1984	USACE completed a reconnaissance level study of a number of flood control alternatives and initiated feasibility studies on Comite Diversion, Darlington Reservoir, East Baton Rouge Parish Watershed, and in Livingston Parish.
1984-1989	Louisiana Department of Transportation and Development (LDOTD) contracted for conceptual and engineering studies for development of the Darlington Reservoir
1990	Governor's Interagency Task Force on Flood Prevention and Mitigation produced a Final Report, including recommendations for the Amite River Basin.
1990	East Baton Rouge Parish completed a Comprehensive Land Use and Development Plan (known as the Horizon Plan); study addressed current and future drainage and flood control needs.
1991	USACE completed feasibility study for Comite Diversion
1992	USACE completed feasibility study for Darlington Reservoir; found insufficient project benefits.
1995	USACE completed feasibility study for channel improvement flood control measures in East Baton Rouge Parish.
1995	City of Baton Rouge Department of Public Works, through C. E. Metrailler & Assoc., completed a study of additional flood storage measures.
1997	USACE completed feasibility study for channel improvement flood control measures in Livingston Parish.
1997	Additional studies completed for ARBD&WCD and LDOTD to evaluate Darlington Reservoir recreational benefits.
1997	USACE completed a re-evaluation of Darlington Reservoir benefits and costs; found sufficient benefits; further work on the project halted due to a lack of state and local sponsorship funds.
1998	ARBC in conjunction with USGS and the LDOTD, LOEP, and the USACE established a Flood Warning System for the Amite River Basin.
1999	Dr. Jim Cruise, formerly at Louisiana State University (LSU) and now at the University of Alabama, Huntsville, under grants from NASA and FEMA initiated development of real-time rainfall runoff and flood inundation forecasting model for Amite River Basin.
December 1999	Local governments and ARBC completed <i>Amite River Basin Flood Hazard Mitigation Plan</i>
2000	USACE completed design studies for the Comite Diversion
2000	USACE completed a reconnaissance study for ecosystem restoration measures in the mid-stream portions of the Amite River previously impacted by sand and gravel mining operations.
2001	ARBD&WCD succeeds in getting property tax passed to provide local funding for Comite Diversion.
2001	USACE completed a reconnaissance study for Bayou Manchac Clearing and Snagging Project.
2002	ARBC creates web site.
2002	ARBC drafts <i>Watershed Management Program</i>
2002	ARBC evaluated potential issues with flood mapping resolution and use of Light Detection and Ranging (LIDAR) technology in conjunction with LSU.
2002	USACE completed a reconnaissance study for Bayou Manchac Watershed Flood Damage Reduction and Ecosystem Restoration.
2002	Comite Diversion project authorization
2003	Construction on Lily Bayou Drop Structure for Comite Diversion begun.
2003	FEMA sponsored report reviewing earlier <i>Amite River Basin Flood Hazard Mitigation Plan</i> completed.
2006	USACE & Pontchartrain Levee District (PLD) updated HEC-HMS and HEC-RAS models of Amite River.
2008	PLD under Section 211 of WRDA (1996) assumed the lead role for Bayou Manchac flood risk reduction feasibility study
2010	PLD completed the HEC-HMS, HEC-RAS, Sediment Transport (HEC6T), and geomorphologic analysis of Amite River basin in support of the Bayou Manchac feasibility study.

Section 3.0: COMITE RIVER DIVERSION CANAL PROJECT

3.1 PLANNED FEATURES

Figure 3-1 illustrates the location and features of the project, which extends roughly 12 miles from the Comite River in the east, passing north of Baker and south of Zachary, to the Mississippi River on the west. The main features of the project include:

- The inlet diversion structure at the Comite River and 1,800 foot long inflow channel;
- The 8-mile long diversion channel;
- The outlet control structure at Lilly Bayou and one mile pilot channel;
- Intersections with White, Cypress, and Baton Rouge Bayous and McHugh Road area drainage;
- Five road bridges and two railroad bridges;
- An earthen closure at Brooks Lake;
- Improvements to White, Cypress, and Baton Rouge Bayous north of the diversion channel; and
- Environmental mitigation areas.

The project is capable of diverting flows from floods up to a 0.2 percent Annual chance of storm event on the Comite River without inducing higher stages on the intercepted streams.



Figure 3-1. Comite River Diversion Canal Project

3.1.1 Comite River Diversion Structure

At the east end of the project will be the diversion inlet channel intersection with the Comite River (see Figure 3-2). This junction is located about 1.5 river miles below the Zachary Road (LA Highway 64) bridge. The existing Comite River channel invert elevation at the diversion point is approximately 58.0. (All elevations are given in NGVD per USACE documents.) The inflow channel base with a width of 130 feet, will slope upward from the Comite River invert to an invert elevation of 65.0. From this point to the inlet weir (known as the Comite River Diversion Structure) the inflow channel invert will remain at 65.0.

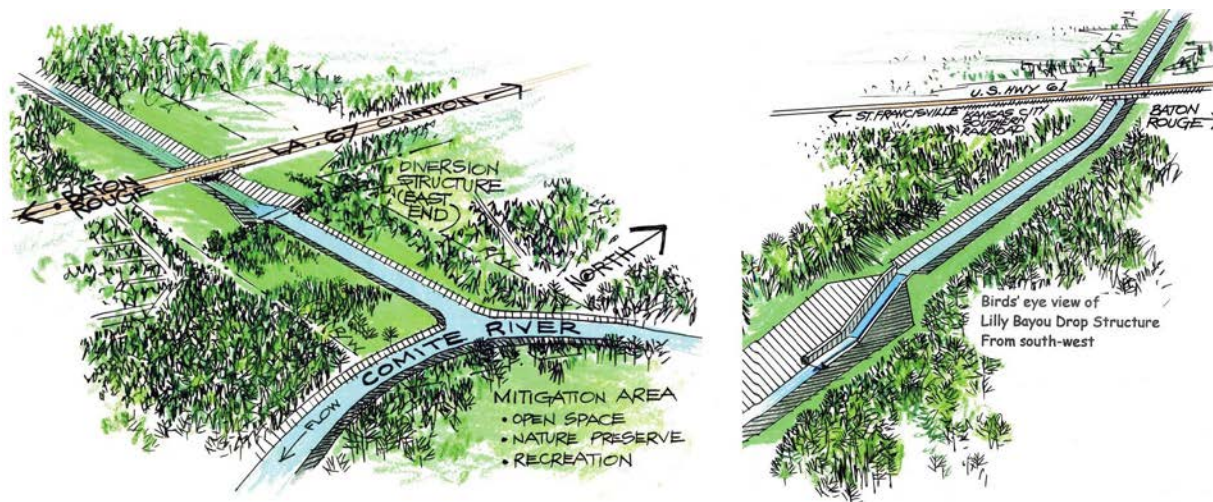


Figure 3-2. Sketches of Comite River Diversion and Lilly Bayou Control Structure

The Diversion Structure, with a weir crest elevation of 65.0, will be constructed of roller compacted concrete. From the weir, the structure's spillway will slope westward into a stilling basin elevation of 43.0. The stilling basin will also have a width of 130 feet and extend from the toe of the spillway for 60 feet. At that point the channel will transition from 130 feet wide to the final diversion channel bottom width of 15 feet.

To ensure an even flow distribution at the inlet the Comite River will be lined with 12 inches of riprap for a distance of 500 feet upstream and downstream of the Comite River/inflow channel intersection point. In addition, the inflow channel will also be lined with 12 inches of riprap to top of bank. Downstream of the Diversion Structure, the diversion channel will also be lined with riprap to the top of banks for a distance of 100 feet downstream of the LA Highway 67 bridge (Plank Road), a total distance of about 700 feet.

Flood waters from the Comite River will enter the channel across the inlet structure when the Comite River reaches a stage of 65.0 feet. Based on their review of Comite River gage data from 1973 to 1990 the USACE estimated that diversions would have occurred about 5 to 6 times during that period, for 1 to 4 days duration. Sediment carried by the flood waters entering the diversion will be deposited in the inlet stilling basin and the upper 3 to 4 miles of the diversion channel. The USACE estimates that dredging of about 275,000 cubic yards of sediment will be required once every 10 years.

3.1.2 Diversion Channel

The diversion channel extends approximately 7.8 miles from the Comite River Diversion Structure westward to the Lilly Bayou Control Structure. The typical dimensions of the channel are:

- 15 foot bottom width;
- 300 to 400 foot top width;
- Total depth averaging approximately 40 feet;
- Channel invert elevation beginning at 43.0 at the inlet stilling basin and sloping downward to 35.1 at the entrance to the Lilly Bayou Control Structure;
- Bank slopes ranging from 3:1 to 4.25: (horizontal:vertical); and
- Minimum pool (set by Lilly Bayou Control Structure Weir) at 54.7.

Extreme event channel velocities in the 5-7 ft/sec range have been considered in the diversion channel design. To prevent excessive scour and erosion, the channel will be lined with riprap up to elevation 56.7 (minimum pool elevation plus 2 feet). Above the riprap to the top of banks, the side slopes will be reinforced with a geosynthetic and grass lining. At bridges and structures the channel will be lined to top of banks with riprap for approximately 100 feet upstream and downstream.

Adjacent disposal of excavated soil is included for the eastern portion of the channel (between Louisiana Highway 19 and the Comite Diversion Structure). A small levee is located to the north side of the channel in areas where there is no adjacent disposal, to prevent drainage from running into the channel and eroding the top of bank. A drainage ditch to collect runoff and deliver it to the drop structures is located along the north side of the north levee/disposal area.

3.1.3 Lilly Bayou Control Structure

At its west end, the diversion must descend down the 60-foot high natural bluff to bring flow from the upland terraces into the Mississippi River floodplain. The high discharges and velocities of the diversion are expected to cause erosion and headcutting downstream of the stilling basin along Lilly and Cooper Bayous down to the Profit Island Chute on the Mississippi River. The Lilly and Cooper Bayou channels will experience enlargement from the increased flows of this project. The Lilly Bayou Control Structure (see Figure 3-2) has been designed to preclude failure from the expected erosion and headcutting during the project life (50 years).

The diversion channel approaching the Lilly Bayou Control Structure has an invert elevation of 35.1 and is concrete-lined for 78 feet. At the structure the invert slopes up to a weir crest of 54.7 and length (channel width) of 132 feet. From the crest the spillway slopes downward to the stilling basin at elevation 8.0. The stilling basin is 132 feet wide and 86 feet long. The spillway and stilling basin will have 15 foot high vertical sidewalls. Above the vertical sidewalls, the structure will slope upward to natural ground elevations (approximately 85).

From the end of the stilling basin, the channel and banks are riprapped for a distance of 400 feet, to protect the 132-ft wide channel for a maximum anticipated flow velocity of 10 ft/sec. From this point, a pilot (or transition) channel passes the flows from the structure to the natural Lilly and Cooper Bayou channels. The natural channel inverts range from above 60 feet at the structure site to below 0 feet where Cooper Bayou empties into Profit Island Chute. The pilot channel will transition from the end of the stilling basin riprap invert elevation of 8.0, downstream for a distance of approximately 1,600 feet to an invert elevation of 38.0. From that point, the pilot channel invert elevation will remain at 38.0 for approximately the next 2,300 feet with the bottom width tapering from 132 to 50 feet. The pilot channel will then taper to the existing channel cross-section over the next 1,200 feet.

3.1.4 Drainage Intersections

The diversion channel will intercept three existing streams, White Bayou (50 square miles total drainage area), Cypress Bayou (13 square miles total drainage area), and Bayou Baton Rouge

(18 square miles total drainage area). The diversion will intercept the drainage from the upper portions of each of these watersheds (White Bayou -- 47.0 square miles, Cypress Bayou -- 9.0 square miles, and Bayou Baton Rouge -- 15.0 square miles). Drop structures have been included in the project to adequately convey the stream flows into the diversion channel without inducing flood stages upstream and without scour and erosion of the streams.

The three drop structures will be constructed of reinforced concrete and will have the following weir crest elevations:

- | | | |
|---|-------------------|-----------|
| • | Whites Bayou | 64.0 feet |
| • | Cypress Bayou | 66.0 feet |
| • | Bayou Baton Rouge | 59.0 feet |

To maintain minimal flow and water quality in the three streams south of the diversion channel the project provides for a 1.5 cfs pump station at each stream to divert water from the channel as needed. A fourth minor control structure has been included in the project to convey drainage that normally flows south unimpeded between McHugh Road and Highway 19 that would otherwise be trapped by the diversion channel. The structure consists of two 70-inch, approximately 200-foot-long concrete pipe conduits with 15-foot high, 102-inch concrete pipe risers fitted with antivortex plates and trash racks.

3.1.5 Highway and Rail Road Bridges:

The project includes seven bridges that will cross the diversion channel—five highway and two railroad bridges:

- Highway 67 – Two lane concrete highway bridge approximately 325' in length.
- Highway 964 – Two lane concrete highway bridge approximately 315' in length.
- Highway 61 and KSC RR – Four lane concrete highway bridge approximately 400' in length and adjacent concrete railroad bridge.
- Highway 19 and CN/IC RR – Four lane concrete highway bridge approximately 305' in length and adjacent concrete railroad bridge.
- McHughs Road – Two lane concrete parish road bridge approximately 320' in length.

The low chord of the bridges will be above the 500-year flowline and only the bridge piers will be within the flows. Hydraulic studies estimated that the total head loss from the bridges would be about 1-foot (0.1-0.2 feet per bridge).

3.1.6 Brooks Lake Closure

Brooks Lake lies below the Lilly Bayou Control Structure and approximately one mile upstream of the mouth of Cooper Bayou. Brooks Lake is on the south overbank of Cooper bayou and drains into the bayou through one of its outlets. A closure with a drainage culvert has been designed for this outlet. Without the Brooks Lake closure, some flows from the diversion would enter Brooks Lake, increasing flood stages in the lake, and potentially impact a local access road and barge off-loading facility.

The closure and drainage culvert in Brooks Lake Outlet will be placed approximately 1,000 feet upstream of the outlet junction with Cooper Bayou. This site provides relatively high overbank elevations and is beyond the expected scour and channel widening expected to occur to Cooper Bayou as a result of this project. The earthen closure will have a 10 foot crown width and extend from the natural ridge just east of Brooks Lake west to Profit Island Chute. The closure and levee will have a top elevation of 43.0 at the drainage structure and slope to 40.0 feet NGVD at the Profit Island Chute end. Natural overbank elevations are approximately 40.0. During high stages on the Mississippi River, stages should be approximately equal and the levee will occasionally be below the water surface.

The drainage culvert will consist of a 54-inch diameter culvert, about 310 feet long with an invert elevation of 16.0 which is slightly above the existing channel invert. The culvert will be flap-gated on the Cooper Bayou end to prevent diversion flows from entering Brooks Lake. At each end of the drainage culvert, riprap will be placed to minimize channel scour for a distance of 25 feet.

3.1.7 Clear and Snag Bayous

The project provides for clearing and snagging of the intercepted bayous and the removal of channel plugs in portions upstream of the diversion channel. The approximate portions include:

- White Bayou 3.6 miles
- Cypress Bayou 1.8 miles
- Bayou Baton Rouge 2.3 miles

3.1.8 Environmental Mitigation

The recommended mitigation plan consists of purchasing 1,484 acres of land along the Comite River to offset the environmental losses due to the project. The plan also calls for the planting of trees on 679 acres of cleared land (included in the 1,484 acres) and fencing a portion of the land.

3.2 POST-PROJECT CONDITIONS (PROJECT BENEFITS)

The diversion project will reduce stages on the Comite River from the diversion point to the confluence with the Amite River, on the Amite River from the confluence with the Comite River near Denham Springs downstream to Port Vincent and French Settlement, and on the critical Comite River tributaries of Hurricane Creek, Robert Canal, and White's, Cypress and Baton Rouge Bayous.

Flood stage reductions have been estimated for last six major floods, had the project been in place:

<u>Date</u>	<u>Comite River @ Comite, LA (Joor Road)</u>	<u>Amite River @ Denham Springs</u>
April 1977	4.3 ft.	1.5 ft.
April 1979	4.5 ft.	1.5 ft.
April 1983	4.0 ft.	1.4 ft.
January 1990	4.5 ft.	1.5 ft.
January 1993	4.3 ft.	1.5 ft.
January 1994	4.5 ft.	1.5 ft.

Figure 3-3 presents some of the anticipated stage reductions for several estimated flood frequencies. Over the 50 year project life the annual benefits have been estimated at \$26,800,000 per year. The vast majority of the benefits come from flood inundation area reductions. The Feasibility Study estimated that 30 percent of the structures located in the 100-year floodplain would be located above a post-project 100-year floodplain. An estimated 3,300 structures will be removed from the 500-year floodplain. The savings in flood insurance premiums to owners of homes that will no longer be in the floodplain will be several hundred dollars per year.

In addition to flood reduction other expected benefits include reduced emergency planning and response, lower vehicle damages, and some recreational improvements.

The ratio of the annualized benefit to the annualized cost of the project (including construction, operations, and maintenance) is currently estimated at 2.3.

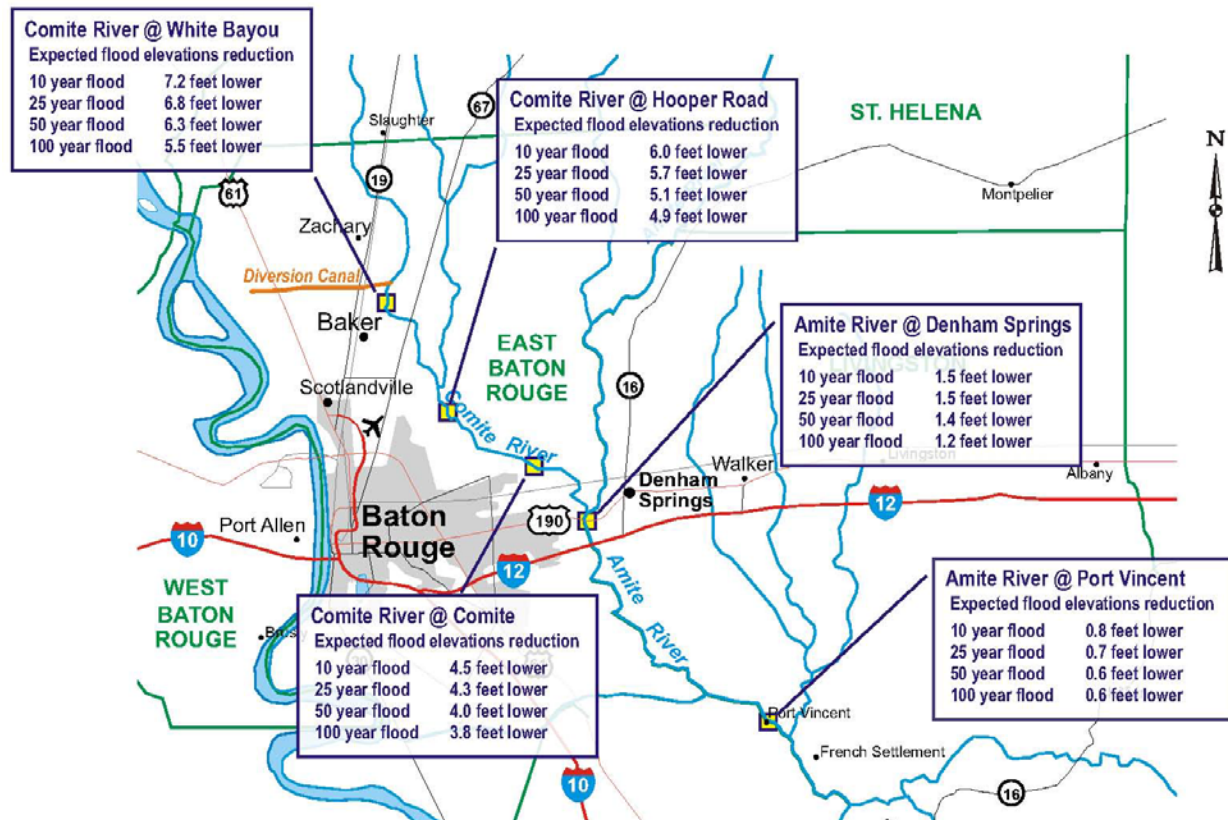


Figure 3-3. Stage Reductions Over the 50-Year Project Life

Section 4.0: BASIN-WIDE FLOODPLAIN MANAGEMENT STRATEGIES

Basin-wide floodplain management for the ARB falls primarily under the jurisdiction of the ARBC, in coordination with the LADOTD Floodplain Management Section. In recent years the ARBC has initiated strategies aimed at improving floodplain management for the ARB as a whole using a “watershed” approach. These strategies, which are translated into numerous ARBC sponsored goals and actions, fall into eight categories:

1. Comprehensive watershed planning,
2. Support for community NFIP participation,
3. Floodplain conservation,
4. Flood preparedness,
5. Flood reduction,
6. Reduction of repetitive flood losses,
7. Flood response and recovery, and
8. Public outreach and education.

Most of these efforts also fall under NFIP and DMA requirements for state-level and community flood hazard mitigation planning and implementation, as well as the floodplain planning activities encouraged under the voluntary CRS.

The ARBC is committed to reviewing, updating, and implementing these strategies. The ARBC Action Plan (Appendix A) provides a breakdown of goals and planned actions which are being undertaken by ARBC in pursuance of the eight strategy categories discussed in this section.

The ARBC is specifically committed to formulating strategies, goals, and action plans that will preserve and enhance the flood reduction benefits of this project. Furthermore, the ARBC is committed to monitoring the progress of implementing these strategies, goals, and plans and taking steps to provide for their achievement.

4.1 COMPREHENSIVE WATERSHED PLANNING

Since the founding of ARBC in 1981, and particularly in the aftermath of the 1983 record flood, the ARBC has led public consideration of flooding issues on a basin-wide basis. The ARBC has served as a key local participant in two major flood reduction project studies (Comite River Diversion and Darlington Reservoir Feasibility Studies) and the recent *Amite River and Tributaries Ecosystem Restoration Reconnaissance Study*. The ARBC was the local partner for the preparation of the December 1999 Amite River Basin Flood Hazard Mitigation Plan, as well as the 2003 review of this plan following the 2001 flood disaster declaration for Tropical Storm Allison. The ARBC addresses planning needs through the work of its full-time paid Executive Director, the Board, and the technical committees.

In June 2002 the ARBC drafted a *Watershed Management Program for the Amite River Basin* to focus attention on flooding issues in the context of **natural** as opposed to political boundaries and to “develop a management system whose basic geographical unit is based on a watershed.” As stated in the document, the ARBC calls for floodplain management that emphasizes **coordination**, **cooperation**, and **continuity**. Greater coordination and cooperation among the various local jurisdictions (municipalities and parishes), and between the multiple local communities, the state-level departments (LADOTD, LDEQ, LDW&F, LOHS&EP), and federal agencies (USACE, FEMA, USEPA, etc.) is considered a fundamental strategy.

The *Watershed Management Program* discusses the ARBC support for the ongoing development of two key tools to support improved basin-wide planning: Geographical Information System (GIS) and hydrologic and hydraulic modeling.

4.1.1 Geographic Information Systems

The ARBC initiated development of an ARB GIS in 2000. In 2002-2003 the ARBC and FEMA sponsored upgrading of the GIS in conjunction with the review of the 1999 Flood Hazard Mitigation Plan. Key components of the current GIS include:

Socio-Economic Data Layers

- Geographic Names Information System (GNIS)
- Urban Areas
- Powerlines/Pipelines
- Census Data
- Major and Local Roads
- Railroads
- Land Use/Land Cover

Environmental and Natural Resource Data Layers

- Flood Zones
- Tropical Storm Allison High Water Marks
- Major Waterbodies and Hydrography
- Geology
- Soil Associations
- Wildlife Refuges and Management Areas
- Wellhead Recharge Areas/Aquifers
- Repetitive Loss Data
- ARBC Boundary
- Hydrologic Structures/Projects

Spatial data development and information management technologies are rapidly advancing in ways that facilitate basin-wide floodplain planning and management. Key advances include:

- High resolution LIDAR topographic data are currently being acquired by the Louisiana Oil Spill Coordinator's Office (LOSCO). This data will allow the preparation of more accurate digital terrain models, which in turn can support upgraded hydrologic and flood inundation models and a variety of NFIP administration and floodplain planning activities.
- The Louisiana Geographic Information Systems Council is coordinating ongoing acquisition, compilation, standardization, and dissemination of digital data for a comprehensive scheme of geographic data themes. These themes include geodetic control, ortho-imagery, topography and bathymetry, transportation, utilities and infrastructure, hydrography, political boundaries, demography, cadastral, land-use and land cover.

4.1.2 Hydrologic and Hydraulic Modeling

The centerpiece in watershed management for the ARB is the development of an integrated basin-wide hydrologic and hydraulic (H&H) model:

- Updating FIRMs on a sub-basin basis -- which would facilitate higher resolution/quality mapping sought by local officials and stakeholders
- Eliminate the inconsistencies associated with jurisdictional FIRMs
- Facilitate timely revision to FIRMs as conditions within sub-basins change.
- Flood hazard assessments such as the potential impacts of new development.

- Flood mitigation planning such as the evaluation of flood risk reduction projects

4.1.3 Analysis of Basin-Wide Development Trends

The ARBC supports the analysis of development trends with important ramifications for floodplain management, including long-term changes in regional demographics and land use/land-cover. Urbanization tends to translate into increased development pressure in the floodplain; as well as increase flood elevations due to alteration of land cover and hydrology. Given that much of the historic flooding in the middle and lower ARB is associated with backwater, future land-use trends in the upper ARB is particularly critical. These areas typically do not experience flooding and therefore may not be sensitive to flooding issues and the need to prepare a drainage impact analysis for new developments.

As part of the 2003 review of the 1999 Flood Hazard Mitigation Plan, the ARBC supported an analysis of recent population land cover trends (see Section 2.3). The ARBC Action Plan in Appendix A, discusses further goals and actions for monitoring basin-wide development trends.

4.2 NFIP PARTICIPATION

The ARBC does not have a direct role in the administration of the NFIP. As noted in Section 1.2 the state-lead role is shared by LADOTD and GOHSEP, with the parishes and municipalities responsible for implementing the program in their jurisdictions. The ARBC, as the leading advocate for basin-wide floodplain planning and management, is a strong partner and supporter of a cost-effective NFIP. Through its basin-wide planning initiatives the ARBC is an active partner in the NFIP in two key program areas: modernizing FIRMs and the CRS.

In 2000 the ARBC became a Cooperating Technical Partner (CPT) with FEMA and the ARBC has completed five Mapping Activity Statements.

4.2.1 Flood Insurance Rate Maps

In the ARB the majority of the Flood Insurance Studies (FIS) and FIRMs were prepared in the early 1980s. For the majority of the detailed study streams the hydraulic analysis and the FIRMs used NGVD29 datum. In 2005 the FIRMs were adjusted to the NAVD88 datum. The datum adjustments did not account for subsidence. A study Understanding Subsidence in Coastal Louisiana prepared by University of New Orleans, 2009, concluded the subsidence rate due to Holocene sediment compaction ranges from 1 to 5 mm per year (4 to 24 inches in 100 years). In the Lower Amite River Basin the rate of subsidence is high, near the 5 mm per year rate. Accounting for the datum adjustment, the rate of subsidence and the date of the effective model the adjustment of the BFE can be as high as -1 foot. In addition to issues with subsidence and datum adjustments there have been significant improvements to the Hydrology and Hydraulic models used to calculate the Base Flood Elevations (BFE). Updating the effective models with a new survey, on the NAVD88 datum and using LIDAR data will resolve the issue with datum adjustments and subsidence.

The ARBC should continue through its CPT agreement with FEMA to assist the parishes and local communities with updating the FIRMs.

The flat topography within the floodplains of the middle and lower ARB dictate that detailed and accurate elevation maps are critical to the delineation of flood inundation risk areas. These maps are also crucial to proper administration of the NFIP and sound floodplain planning and management. The ARBC is engaged in strategic efforts to improve both the resolution and accuracy of FIRMs.

4.2.1.1 Higher Resolution

The majority of the effective models and the FIRMs largely reflect older topography data based USGS 5-foot contour maps. In floodplains of the middle and lower ARB the vertical accuracy of this topography may vary over +/- 2 feet, due to limitations of the older, low resolution topographic maps. The

consequence of map inaccuracies of +/- 2 feet can have a major impact on whether an existing structure is located within or outside of the designated 100-year floodplain. Recently the updating of FIRM maps for Livingston Parish along the Amite River resulted in numerous complaints from the public and local officials over mapping inaccuracies.

LOSCO has undertaken a statewide topographic data acquisition based on LIDAR, a remote sensing application that can produce high resolution 5 m topographic DEMs. [Oversight responsibility of this multi-year program, funded by FEMA and the State, has recently been shifted to GOHSEP.] In 2001, ARBC retained investigators from Louisiana State University (LSU) to evaluate the potential use of new LIDAR DEMs to improve accuracy in delineation of floodplain topography. The results of this study showed using high resolution DEMs can yield significant improvements in the horizontal delineation of the 100-year floodplain when compared to the current FIRMs (Pine, 2002).

As a result of these studies, the ARBC is advocating the use of high resolution LIDAR DEMs to refine existing FIRMs, to update future 100-year flood models and inundation maps, and for analysis and planning purposes.

4.2.1.2 Benchmark Elevation Accuracy

There is a major concern with the accuracy of benchmark elevations within the ARB. In particular, floodplain soils in the middle and lower Amite River Basin experience subsidence rates as high as 1 to 2 feet per century. Networks of high-quality vertical benchmarks are not available throughout most of the ARB floodplain. This problem is common throughout south Louisiana and has been the subject of recent studies (see NOAA, 2005).

The benchmark quality issue affects the full range of flood related uses of elevation information, including:

- River and flood stage data collection;
- Flood forecasting;
- Flood modeling;
- FIRM generation;
- NFIP elevation determinations; and
- Hazard mitigation planning.

FEMA Guidelines and Specifications for Flood Hazard Mapping Partners (2003) states that GPS is the preferred method for survey vertical control and require 5-centimeter accuracy or better GPS procedures.

4.2.2 Community Rating System

Through its basin-wide floodplain planning and management the ARBC assists each of the local communities in their voluntary participation in the FEMA CRS program, and in their efforts to attain improved ratings and reduced flood insurance premiums for community policy-holders. As previously noted, the ARBC co-sponsored the preparation of the 1999 Flood Hazard Mitigation Plan, which was required under the NFIP, and which also addressed many floodplain management planning goals of the CRS.

In addition to general floodplain planning and management, the ARBC has a strategic leadership role in the critical CRS program areas of floodplain conservation; floodplain preservation and restoration; flood preparedness; flood reduction; repetitive flood loss reduction; flood response and recovery; and public outreach and education -- which are all addressed below.

4.3 FLOODPLAIN CONSERVATION

The crucial demographic and land-use trends in the ARB discussed previously -- increasing density of existing urban areas in the middle ARB, along with expanding population and conversion of forested and agricultural land to urban and suburban use in surrounding areas -- are modifying the floodplain and altering hydrologic conditions. While the ARBC has no jurisdiction over new development planning or construction, with its watershed perspective the ARBC does have a strategic role in reviewing and evaluating the effectiveness of local efforts to conserve the floodplain, and to assess the basin-wide impacts of those efforts.

4.3.1 Planned Development

4.3.1.1 No Adverse Impact

East Baton Rouge, Livingston, and Ascension Parishes have established requirements for drainage impact studies for development projects.

The ARBC supports the philosophy of “No Adverse Impact” regarding development within the floodplain. A drainage impact study should be required for new developments.

4.3.1.2 Floodplain Construction/Elevation

Under the NFIP, participating parish and municipal governments are required to establish minimal elevation requirements -- or freeboard -- for new construction in a floodplain. The NFIP minimum elevation requirement is that the lowest floor elevation must be at or above the 100-year flood elevation. Currently all of the floodplain management jurisdictions within the Amite River Basin incorporate this requirement. Ascension and East Baton Rouge parishes exceed this minimum by requiring that the lowest floor elevation be 1-foot above the 100-year flood elevation.

Significant changes to the 100-year floodplain are likely to continue over the coming decades, due not only to development and changing land-uses but to subsidence. The ARBC supports adoption of consistent, rigorous elevation requirements with adequate margins of safety for construction within floodplains throughout the Basin.

4.3.1.3 Floodplain Fill Compensation

Development both within and near the floodplain, particularly in the lower ARB, is commonly accompanied by the placement of foundation fill. The fill is used both to raise the structure elevation, often to meet floodplain elevation requirements, and to improve foundation strength. Fill is also frequently used in floodplains for roads, driveways and parking lots. However, fill within the floodplain can reduce the existing floodplain volume and can increase the risk of flooding to adjacent properties. While FEMA requires participating communities to review development projects that might adversely impact flooding, there is no NFIP requirement to regulate fill projects within the 100 year floodplain.

The ARBC supports the adoption ordinances regulate fill in the floodplain. East Baton Rouge Parish has a fill ordinance that requires no reduction of storage capacity in the 1 percent annual chance (100-year) floodplain.

4.4 FLOOD PREPAREDNESS

The experience of ten significant floods in the ARB since 1970 has stimulated significant improvements in flood preparedness throughout the Basin. This section describes the following three ARBC flood preparedness initiatives.

4.4.1 Real-Time Flood Stage Information

A network of 30 river stage gages is presently maintained throughout the ARB by the USGS, USACE, ARBC, and local parishes. Current stages for these gages are made available by the USGS Louisiana HydroWatch service via their web page: <http://waterdata.usgs.gov/la/nwis/current>.

A link to this page is also provided at the ARBC web page: <http://www.amitebasin.org>.

The ARBC is committed to working with these agencies to maintain and improve the gage network.

4.4.2 Flood Warning System

In 1998, the ARBC, together with USGS, USACE, LADOTD, and GOHSEP established a Flood Warning System for the Amite River Basin, which includes a Flood Tracking Chart. A network of nine automated river stage stations provides data that is used by the National Weather Service to forecast flood crests.

The Flood Tracking Chart (Figure 4-1) provides baseline stage information for five recent floods at each of the nine automated gauging stations. By comparing the current stage and predicted crest at a nearby gage station, property owners, emergency responders, and public officials can make informed decisions for the protection of life and property.

The Flood Tracking Chart is also available on the ARBC web page: <http://www.amitebasin.org>.

The ARBC is committed to working with these agencies to maintain and improve the Flood Tracking Chart.

4.5 FLOOD RISK REDUCTION

The ARBC continues to support the evaluation of other new construction and maintenance projects, such as:

- A multi-use reservoir, located on the Amite River in the upper Basin;
- Maintenance of the Amite River Diversion Channel, including the diversion weir;
- Flood control for the upper Bayou Manchac watershed to reduce backwater flooding;
- Improved flood control for existing development in lower Livingston and Ascension Parishes; and
- Replacement or upgrading of bridges and abutments at key crossings for the Amite and Comite Rivers (e.g., the three Amite River bridges in Denham Springs: the Illinois Central railroad crossing, US 190 -- Florida Boulevard, and I-12; Louisiana Highway 42 at Port Vincent; Louisiana Highway 64 at Whites Bayou

4.6 REPETITIVE FLOOD LOSS REDUCTION

FEMA defines a repetitive loss structure as one with two or more losses greater than \$1,000 in any 10-year period since 1978. Figure 2-7 shows the FEMA mapped 100-year floodplain and repetitive loss locations as of 2003. Of the 1,018 repetitive loss structures mapped within the ARBC boundaries, 760 or 75 percent occurred within the mapped 100-year floodplain. However, 25 percent were located outside the 100-year floodplain, providing an indication that some FIRMs in the ARB are outdated.

Most ARB repetitive loss structures share the following characteristics:

- They were built before the NFIP was implemented;
- They are single-family residential buildings;
- They are owner occupied; and
- They have slab foundations



Repetitive loss structures are the single largest financial drain on the NFIP. FEMA, together with the GOHSEP and the local participating communities, have made reduction of repetitive losses the highest priority for hazard mitigation funding.

4.7 FLOOD RESPONSE AND RECOVERY

While the ARBC itself is not charged with any flood response and recovery responsibilities, the Board members and Executive Director are typically involved in these efforts by virtue of their extensive history with community flood problems. ARBC representatives typically serve on multi-agency disaster response and post-disaster recovery committees. In 2002 to 2003 the ARBC served as a focal point for a post-disaster review of community flood hazard mitigation plans.

4.8 PUBLIC OUTREACH AND EDUCATION

The ARBC provides leadership in public outreach and education strategies to promote the watershed approach to floodplain management and rational, cost-effective floodplain public policies. Examples of the ARBC's efforts include:

- Publishing the ARBC website;
- Development of a Web-enabled ARB GIS;
- Co-sponsoring of the Web-enabled real-time river gaging network;
- Development of the Flood Tracking Chart;
- Sponsoring of April as "Flood Awareness Month;" and
- Frequent presentations by the Executive Director at civic, professional, and community venues.

In addition, the ARBC supports local community activities by providing copies of the Flood Tracking Chart and other educational materials and by participating in local flood awareness and education events.

The ARBC holds monthly meetings which are open to the public and includes an invitation for public comments and questions at each meeting. The meeting activities are regularly reported in the "Baton Rouge Morning Advocate."

Appendix A

COMITE RIVER DIVERSION CANAL PROJECT ARBC FLOODPLAIN MANAGEMENT PLAN

Appendix A

COMITE RIVER DIVERSION CANAL PROJECT ARBC FLOODPLAIN MANAGEMENT PLAN

As noted in Section 4, Basin-Wide Floodplain Management Strategies of the Amite River Basin Floodplain Management Plan, the Amite River Basin Commission (ARBC) has initiated strategies aimed at improving floodplain management for the ARB as a whole using a “watershed” approach. These strategies fall into eight categories:

1. Comprehensive watershed planning;
2. Support for community NFIP participation;
3. Floodplain conservation;
4. Flood preparedness;
5. Flood reduction;
6. Reduction of repetitive flood losses;
7. Flood response and recovery; and
8. Public outreach and education.

This Action Plan translates these eight strategies into ARBC sponsored goals (indefinite timetable) and action items (targeted schedule). Many of these goals and actions can be used by local communities meet NFIP and DMA requirements for state-level and community flood hazard mitigation planning and implementation, as well as the floodplain planning activities encouraged under the voluntary CRS.

A.1 COMPREHENSIVE WATERSHED PLANNING

Strategy: *Institutionalize watershed planning that emphasizes coordination, cooperation, and continuity.*

1. Formally establish the ARBC Planning and Technical Committee and hold regular quarterly meetings;
2. Conduct a biannual review of the Floodplain Management Plan;
3. Hold a biannual meeting with each local community Floodplain Coordinators and other officials to advance the strategies, goals, and actions of basin-wide floodplain planning; and
4. Establish a protocol with State of Mississippi to coordinate floodplain management planning in upper ARB.

Strategy: *Support continued development of an ARB Geographic Information System (GIS).*

1. Complete the set-up of an ARB web-enabled GIS using the 2003 GIS and link it to the ARBC website;
2. Maintain and update GIS demographic and other socio-economic layers as data becomes available;
3. Maintain and update GIS geographic, land use, land cover, and political jurisdictional boundary layers;
4. Support continued acquisition and updating of ARB LIDAR topographic data, including in portions of the ARB in Mississippi;
5. Maintain and update topographic LIDAR data as part of the ARB GIS; as it becomes available, making use of information prepared by the Corps of Engineers, LDOTD, LDNR, LSU and other agencies; and
6. Prepare, maintain, and update a basin wide Digital Terrain Model (DTM) with information on topographic features supplementing the LIDAR data. DTMs will be prepared by sub-basins on a priority basis, e.g. Comite River sub-basin first.

Strategy: *Continue to plan for and develop a basin-wide watershed modeling capability to support floodplain mapping, flood hazard assessment, flood mitigation planning, and environmental planning.*

1. Complete a comprehensive review of all previous basin H&H modeling studies.
2. Develop sub-basin hydrologic and hydraulic models prioritized by sub-ARBC initiatives.
3. Develop a comprehensive basin-wide hydrologic and hydraulic model.

Strategy: *Support the analysis of development trends with important ramifications for floodplain management, such as demographics and land-use/land cover.*

1. Establish protocols and interagency agreements with local communities for use of ARBC basin-wide GIS and H&H models for supporting floodplain management/planning decisions; and
2. Every 5 years, conduct a review of demographic, socio-economic, geographic, and other trends in the ARB and evaluate the implications for floodplain management at the basin-wide and community level.

A.2 NFIP PARTICIPATION

Strategy: *Support the modernizing of FIRMS, in particular the resolution and accuracy of FIRMS.*

1. Using the ARB GIS, monitor the status and general reliability of FIRMs within the ARB;
2. Monitor requests for map changes and review as appropriate;
3. Support communities in making requests for map updates;
4. Participate in planning and review of map development process;
5. Facilitate use of high quality DTMs based on LIDAR for mapping; and
6. Support use of up-to-date H&H models, including ARBC models

Strategy: *Support the construction and maintenance of a high quality benchmark network.*

1. Support the expansion of the state Continuous Operating Reference Stations throughout the ARB to provide accurate and economical surveying;
2. Support efforts by state and parishes and communities to establish, "blue-book," maintain, and update high quality fixed benchmarks as needed to supplement CORS; and
3. Advocate adoption of appropriate surveying methods for floodplain surveying.

Strategy: *Continue to assist local communities in voluntary participation in the Community Rating System.*

1. Make the ARB Floodplain Management Plan, Action Plan, GIS, models, and other items available to local communities to support their CRS participation;
2. Sponsor an annual meeting with local NFIP participating communities to discuss CRS issues; and
3. Facilitate the development and sharing of approaches and solutions to upgrading CRS ratings.

A.3 FLOODPLAIN CONSERVATION

Strategy: *Support adoption of the "No Adverse Impact" principle among local communities to control development.*

1. Develop and adopt a protocols and interagency agreements for the ARBC to provide GIS, modeling, analysis, and general guidance to local communities in support of development planning.

Strategy: *Support adoption of consistent, rigorous elevation requirements for construction in the floodplain with adequate margins of safety.*

1. Work with local governments towards a uniform standard that will protect property owners into the future, particularly given levels of uncertainty in flood plain delineation.

Strategy: *Support adoption of consistent, rigorous compensation requirements for placing fill within the floodplain compensation with adequate margins of safety.*

1. Work with local governments towards a uniform standard that will protect property owners into the future, particularly given levels of uncertainty in flood plain delineation.

Strategy: *Support adoption of consistent, rigorous drainage impact analysis requirements with adequate margins of safety.*

1. Work with local governments towards a uniform standard that will protect property owners into the future, particularly given levels of uncertainty in flood plain delineation.

Strategy: *Coordinate with the LDEQ, Corps of Engineers, Pontchartrain Levee District and other agencies on watershed preservation and restoration efforts.*

1. Actively participate in ongoing Amite River Ecosystem Restoration Study and Mississippi River Diversion into Maurepas Swamp Study;
2. Use ARBC GIS and H&H model to support ecosystem preservation and restoration efforts; and
3. Work with appropriate agencies to review settlement of the Amite Diversion Canal rock weir near French Settlement and possible need for raising the weir height to improve water quality in the lower fork of the Amite River.

A.4 FLOOD PREPAREDNESS

Strategy: *Continue working with the USGS to maintain and improve the ARB gage network.*

1. Continuing annual agreement and funding with USGS—approximately \$40,000 in funding support from the ARBC; and
2. Conduct a biannual review of ARB river stage gaging plan.

Strategy: *Continue working with the USGS to maintain and improve the Flood Tracking Chart.*

1. Periodically update Flood Tracking; and
2. Review Chart at least once every five years and update as needed.

A.5 FLOOD REDUCTION

Strategy: *Continue represent the basin-wide interest in flood reduction projects.*

1. Continue to share in local sponsorship responsibilities for the Comite River Diversion Project;
2. Continue to take an active leadership role securing a long-term reliable state-share funding for the completion;
3. Through the Planning and Technical Committee, gage interest among various communities, interest groups, affect parties, other agencies in the ARB reservoir concept;
4. Through the Planning and Technical Committee, work with communities to develop a long-term maintenance plan and secured maintenance funding for major drainage channels in the Lower ARB; and
5. Through the Planning and Technical Committee, hold meetings with representatives of each parish to identify and discuss priority projects in the parishes and what the ARBC can do to support the projects.

A.6 REPETITIVE LOSS REDUCTION

Strategy: *Support evaluation and implementation of cost-effective programs to reduce repetitive flood losses.*

1. Update GIS as appropriate with latest repetitive loss data; and
2. Support local communities in developing mitigation grant applications to address repetitive losses.

A.7 FLOOD RESPONSE AND RECOVERY

Strategy: *Support disaster response and post-disaster recovery operations and planning.*

1. Contact each community disaster response official and discuss ways in which the ARBC can support local disaster response and recovery, such as with the GIS, inundation maps, etc.

A.8 PUBLIC OUTREACH AND EDUCATION

Strategy: *Provide leadership in promoting watershed management approach and rational, cost-effective floodplain policies.*

1. Schedule and give a presentation on floodplain management to each of the parish councils and municipal councils;
2. Give presentations at local business and volunteer groups;
3. Continue to support local communities in Flood Awareness Month activities; and
4. Provide support to high school environmental science classes on floodplain issues.

Appendix B

COMITE RIVER DIVERSION CANAL PROJECT FLOODPLAIN MANAGEMENT PLAN COMMUNITY ACTION PLAN FOR THE PARISH OF EAST BATON ROUGE, LOUISIANA

Appendix B

COMITE RIVER DIVERSION CANAL PROJECT FLOODPLAIN MANAGEMENT PLAN COMMUNITY ACTION PLAN FOR THE PARISH OF EAST BATON ROUGE, LOUISIANA

B.1 BACKGROUND

East Baton Rouge Parish is located in the southeastern portion of Louisiana. This Parish lies in the west central part of the Amite River Basin. The total land area within the Parish is 455.7 square miles. According to the 2004 census, East Baton Rouge Parish has a population of 412,633.

As of December 31, 2009, the Parish of East Baton Rouge had 26,216 National Flood Insurance Program (NFIP) policies in place providing \$5,255,213,500 in total insurance coverage. Since 1978, 7,559 claims have been filed amounting to \$98,226,235.07.

The Parish of East Baton Rouge has 968 repetitive loss structures as of December 31, 2009, indicating that within the previous 10-year period, 968 structures had filed at least two insurance claims of at least \$1,000 each.

B.2 FLOOD RISK REDUCTION MEASURES

In 1987, the Parish of East Baton Rouge adopted a Flood Damage Prevention Ordinance. Under the Flood Damage Prevention Ordinance, the Parish of East Baton Rouge established a Floodplain Administrator, whose responsibilities include review of permit and applications to ensure compliance with the regulations set-forth in the ordinance.

B.2.1 New Structures and Improvements

East Baton Rouge Parish requires, through its floodplain ordinance, that all new residential, nonresidential, manufactured homes and substantial improvements (regardless of the zone - A, B, C, or X) be built to the highest elevation as defined by the following criteria:

- with the minimum lowest finished floor elevation one foot above the FIRM base flood elevation, or
- one foot above the record of inundation, or
- one foot above the center line of the closest (fronting) street, or
- one foot above the top of the nearest upstream or downstream sanitary sewer manhole.

The Metropolitan Council of the Parish of East Baton Rouge and City of Baton Rouge's Code of Ordinances has been frequently amended to address flood damage prevention:

- 7/13/83 - Land Transfer Flooding Disclosure Amendment
- 4/08/92 - Obstruction of Drainage Amendment
- 4/15/92 - Flood Zone Violation Penalty Amendment
- 2/23/94 - Drainage Impact Study Amendment
- 10/25/95 - Flood Damage Prevention Amendment
- 2/25/98 - Re-subdivision Plan Amendment

B.2.2 Maintenance of Existing Drainage Improvements

The Parish of East Baton Rouge has developed a program to clean-out, upgrade, and maintain rivers, creeks, ditches, canals, culverts, and catch basins to alleviate flooding throughout the Parish.

Inspections are made on a routine basis, as well as when work orders are written based on resident's complaints.

All debris, leaves, limbs, and trash is manually removed from canals and ditches. All canals and ditches are sprayed twice a year for weed control. In addition, these areas are maintained by regular cutting several times a year and on an as-needed basis.

B.3 NFIP PARTICIPATION

The National Flood Insurance Program was created to reduce the loss of life and property, and the rising disaster relief costs caused by flooding. The NFIP is a voluntary program based on an agreement between the federal government and the local community. Federally-backed flood insurance coverage is available to any property owner in return for mitigation of flood risks by community regulation of floodplain development. Flood insurance is only available to those communities that adopt and enforce a floodplain management ordinance that meets or exceeds the minimum NFIP standards.

B.3.1 CRS

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote the awareness of flood insurance.

The Parish of East Baton Rouge joined the CRS program in 1990 and has a rating of 7, which qualifies them for a 15 percent discount in insurance premium rates. The Parish is currently undergoing its 2005 Cycle Visit for compliance with the CRS program.

B.4 PUBLIC OUTREACH AND EDUCATION

An important step in reducing the damage caused by floods is to ensure that the public understands their roles in prevention and preparation. Each year, the Parish sends informational packages to property owners in special hazard areas and owners of RLS properties. These packets are used to inform owners of flood hazards and to suggest possible actions that the owners can take to protect life and property. In addition, information is available to all residents through the public library.

The Parish posts messages on utility bills to inform residents that the Parish offers free flood prevention information, available through the Inspection Department. The Parish of East Baton Rouge annually informs local realtors, lending institutions, and insurance companies of their participation in the NFIP CRS program.

B.5 EBRP HAZARD MITIGATION PLAN

The following link is the 2011 EBRP Hazard Mitigation Plan:
<http://brgov.com/dept/oep/mitigation/hmpln.asp>

Appendix C

COMITE RIVER DIVERSION CANAL PROJECT FLOODPLAIN MANAGEMENT PLAN COMMUNITY ACTION PLAN FOR THE PARISH OF ASCENSION, LOUISIANA

Appendix C

COMITE RIVER DIVERSION CANAL PROJECT FLOODPLAIN MANAGEMENT PLAN COMMUNITY ACTION PLAN FOR THE PARISH OF ASCENSION, LOUISIANA

C.1 BACKGROUND

Ascension Parish is located in the southeastern portion of Louisiana in the Southwestern part of the Amite River Basin. The total land area within the Parish is 289.98 square miles. According to the 2004 census, Ascension Parish has a population of 114,393.

As of December 31, 2009, the Parish of Ascension had 10,850 National Flood Insurance Program (NFIP) policies in place providing \$2,546,371,500 in total insurance coverage. Since 1978, 2,624 claims have been filed amounting to \$27,628,173.

The Parish of Ascension has 10,881 repetitive loss structures as of December 31, 2009, indicating that within the previous 10-year period, 10,881 structures had filed at least two insurance claims of at least \$1,000 each.

C.2 FLOOD RISK REDUCTION MEASURES

Under the Flood Damage Prevention Ordinance of 1987, the Parish of Ascension established a Floodplain Administrator, whose responsibilities include review of permit and applications to ensure compliance with the regulations set-forth in the ordinance.

The Parish has taken many measures to reduce flooding, including the adoption of construction ordinances, development of a routine maintenance plan for drainage ditches and culverts, and several community projects to reduce flooding.

C.2.1 New Structures and Improvements

Regulations were adopted in the Flood Damage Prevention Ordinance and require that new residential and commercial construction have the lowest floor (including basement), one foot above the base flood elevation.

For construction in areas of shallow flooding, all new construction and substantial improvements of residential structures have the lowest floor (including basement) elevated above the highest adjacent grade at least as high as the depth number specified in feet on the community's FIRM (at least two feet if no depth number is specified).

C.2.2 Maintenance of Existing Drainage Improvements

The Parish of Ascension has developed a program to clean-out, upgrade, and maintain rivers, creeks, ditches, canals, culverts, and catch basins to alleviate flooding throughout the Parish. Inspections are made on a routine basis, as well as when work orders are written based on resident's complaints.

All debris, leaves, limbs, and trash is manually removed from canals and ditches. All canals and ditches are sprayed twice a year for weed control. In addition, these areas are maintained by regular cutting several times a year and on an as-needed basis.

C.3 NFIP PARTICIPATION

The National Flood Insurance Program was created to reduce the loss of life and property, and the rising disaster relief costs caused by flooding. The NFIP is a voluntary program based on an agreement between the federal government and the local community. Federally-backed flood insurance coverage is available to any property owner in return for mitigation of flood risks by community regulation of floodplain development. Flood insurance is only available to those communities that adopt and enforce a floodplain management ordinance that meets or exceeds the minimum NFIP standards.

C.3.1 CRS

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote the awareness of flood insurance.

The Parish of Ascension joined the CRS program in 1990 and has a rating of 8, which qualifies them for a 10 percent discount in insurance premium rates. The Parish is currently undergoing its 2015 Cycle Visit for compliance with the CRS program.

C.4 PUBLIC OUTREACH AND EDUCATION

An important step in reducing the damage caused by floods is to ensure that the public understands their roles in prevention and preparation. Each year, the Parish sends informational packages to property owners in special hazard areas and owners of RLS properties. These packets are used to inform owners of flood hazards and to suggest possible actions that the owners can take to protect life and property. In addition, information is available to all residents through the public library.

The Parish posts messages on utility bills to inform residents that the Parish offers free flood prevention information, available through the Inspection Department. The Parish of Ascension annually informs local realtors, lending institutions, and insurance companies of their participation in the NFIP CRS program.

C.5 ASCENSION PARISH HAZARD MITIGATION PLAN

The following link is the 2011 Ascension Parish Hazard Mitigation Plan:
<http://www.ascensionparish.net/downloads%5Coep%5C2015HazardPlanDraft.pdf>

Appendix D

COMITE RIVER DIVERSION CANAL PROJECT FLOODPLAIN MANAGEMENT PLAN COMMUNITY ACTION PLAN FOR THE PARISH OF LIVINGSTON, LOUISIANA

Appendix D

COMITE RIVER DIVERSION CANAL PROJECT FLOODPLAIN MANAGEMENT PLAN COMMUNITY ACTION PLAN FOR THE PARISH OF LIVINGSTON, LOUISIANA

D.1 BACKGROUND

Livingston Parish is located in the southeastern portion of Louisiana in the east central part of the Amite River Basin. The total land area within the Parish is 703 square miles. According to the 2010 census, Livingston Parish has a population of 128,026.

As of May 2014, the Parish of Livingston had 10,075 National Flood Insurance Program (NFIP) policies in place providing \$6,373,632 in total insurance coverage. Since 1978, 2,938 claims have been filed amounting to \$27,628,173.

The Parish of Livingston has 632 repetitive loss structures as of June 2011, indicating that within the previous 10-year period, 632 structures had filed at least two insurance claims of at least \$1,000 each.

D.2 FLOOD RISK REDUCTION MEASURES

Under the Flood Damage Prevention Ordinance of 1987, the Parish of Livingston established a Floodplain Administrator, whose responsibilities include review of permit and applications to ensure compliance with the regulations set-forth in the ordinance.

The Parish has taken many measures to reduce flooding, including the adoption of construction ordinances, development of a routine maintenance plan for drainage ditches and culverts, and several community projects to reduce flooding.

D.2.1 New Structures and Improvements

Regulations were adopted in the Flood Damage Prevention Ordinance and require that new residential and commercial construction have the lowest floor (including basement), one foot above the base flood elevation.

For construction in areas of shallow flooding, all new construction and substantial improvements of residential structures have the lowest floor (including basement) elevated above the highest adjacent grade at least as high as the depth number specified in feet on the community's FIRM (at least two feet if no depth number is specified).

D.2.2 Maintenance of Existing Drainage Improvements

The Parish of Livingston has developed a program to cleanout, upgrade, and maintain rivers, creeks, ditches, canals, culverts, and catch basins to alleviate flooding throughout the Parish. Inspections are made on a routine basis, as well as when work orders are written based on resident's complaints. All debris, leaves, limbs, and trash is manually removed from canals and ditches. All canals and ditches are sprayed twice a year for weed control. In addition, these areas are maintained by regular cutting several times a year and on an as-needed basis.

D.3 NFIP PARTICIPATION

The National Flood Insurance Program was created to reduce the loss of life and property, and the rising disaster relief costs caused by flooding. The NFIP is a voluntary program based on an agreement between the federal government and the local community. Federally-backed flood insurance coverage is available to any property owner in return for mitigation of flood risks by community regulation of floodplain development. Flood insurance is only available to those communities that adopt and enforce a floodplain management ordinance that meets or exceeds the minimum NFIP standards.

D.3.1 CRS

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote the awareness of flood insurance.

The Parish of Livingston joined the CRS program in 1992 and has a rating of 9, which qualifies them for a 5 percent discount in insurance premium rates. The Parish is currently undergoing its 2015 Cycle Visit for compliance with the CRS program.

D.4 PUBLIC OUTREACH AND EDUCATION

An important step in reducing the damage caused by floods is to ensure that the public understands their roles in prevention and preparation. Each year, the Parish sends informational packages to property owners in special hazard areas and owners of RLS properties. These packets are used to inform owners of flood hazards and to suggest possible actions that the owners can take to protect life and property. In addition, information is available to all residents through the public library.

The Parish posts messages on utility bills to inform residents that the Parish offers free flood prevention information, available through the Inspection Department. The Parish of Livingston annually informs local realtors, lending institutions, and insurance companies of their participation in the NFIP CRS program.

D.5 LIVINGSTON PARISH HAZARD MITIGATION PLAN

The Livingston Parish Hazard Mitigation Plan is available through the Livingston Parish floodplain administrator Chuck Vincent.

Appendix E

COMITE RIVER DIVERSION CANAL PROJECT FLOODPLAIN MANAGEMENT PLAN COMMUNITY ACTION PLAN FOR THE CITY OF ZACHARY, LOUISIANA

Appendix E

COMITE RIVER DIVERSION CANAL PROJECT FLOODPLAIN MANAGEMENT PLAN COMMUNITY ACTION PLAN FOR THE CITY OF ZACHARY, LOUISIANA

E.1 BACKGROUND

The City of Zachary is located in East Baton Rouge Parish about 15 miles north of the City of Baton Rouge. This Parish lies in the west central part of the Amite River Basin. Zachary's population growth has paralleled that of the United States. According to the 2003 census, Zachary had a population of 11,791. A steady growth is expected for the city in the future.

Zachary encompasses more than 10 square miles. Businesses of all types are found in Zachary; however, most are small retail stores. The topography of the area varies from flat to hilly. Most of the land is used primarily for agriculture, consisting mainly of beef cattle and soybean farming. According to the 2010 census, the City of Zachary has a population of 14,960.

As of May 2014, the City of Zachary had 537 National Flood Insurance Program (NFIP) policies in place providing \$6,921,759 in total insurance coverage. Since 1978, 2,938 claims have been filed amounting to \$27,628,173.

The City of Zachary has 12 repetitive loss structures as of June 2011, indicating that within the previous 10-year period, 12 structures had filed at least two insurance claims of at least \$1,000 each.

E.2 FLOOD RISK REDUCTION MEASURES

Under the Flood Damage Prevention Ordinance of 1987, the City of Zachary established a Floodplain Administrator, whose responsibilities include review of permit and applications to ensure compliance with the regulations set-forth in the ordinance.

The City has taken many measures to reduce flooding, including the adoption of construction ordinances, development of a routine maintenance plan for drainage ditches and culverts, and several community projects to reduce flooding.

E.2.1 New Structures and Improvements

Regulations were adopted in the Flood Damage Prevention Ordinance and require that new residential and commercial construction have the lowest floor (including basement), one foot above the base flood elevation.

For construction in areas of shallow flooding, all new construction and substantial improvements of residential structures have the lowest floor (including basement) elevated above the highest adjacent grade at least as high as the depth number specified in feet on the community's FIRM (at least two feet if no depth number is specified).

E.2.2 Maintenance of Existing Drainage Improvements

The City of Zachary has developed a program to clean-out, upgrade, and maintain rivers, creeks, ditches, canals, culverts, and catch basins to alleviate flooding. Inspections are made on a routine basis, as well as when work orders are written based on resident's complaints.

All debris, leaves, limbs, and trash is manually removed from canals and ditches. All canals and ditches are sprayed twice a year for weed control. In addition, these areas are maintained by regular cutting several times a year and on an as-needed basis.

E.3 NFIP PARTICIPATION

The National Flood Insurance Program was created to reduce the loss of life and property, and the rising disaster relief costs caused by flooding. The NFIP is a voluntary program based on an agreement between the federal government and the local community. Federally-backed flood insurance coverage is available to any property owner in return for mitigation of flood risks by community regulation of floodplain development. Flood insurance is only available to those communities that adopt and enforce a floodplain management ordinance that meets or exceeds the minimum NFIP standards.

E.3.1 CRS

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote the awareness of flood insurance.

The City of Zachary joined the CRS program in 1991 and has a rating of 9, which qualifies them for a 5 percent discount in insurance premium rates. The City is currently undergoing its 2015 Cycle Visit for compliance with the CRS program.

E.4 PUBLIC OUTREACH AND EDUCATION

An important step in reducing the damage caused by floods is to ensure that the public understands their roles in prevention and preparation. Each year, the sends informational packages to property owners in special hazard areas and owners of RLS properties. These packets are used to inform owners of flood hazards and to suggest possible actions that the owners can take to protect life and property. In addition, information is available to all residents through the public library.

The posts messages on utility bills to inform residents that the offers free flood prevention information, available through the Inspection Department. The of City of Zachary annually informs local realtors, lending institutions, and insurance companies of their participation in the NFIP CRS program.

E.5 CITY OF ZACHARY HAZARD MITIGATION PLAN

The City of Zachary Hazard Mitigation Plan is available at the following link:
<http://brgov.com/dept/oep/mitigation/hmpln.asp>

Appendix F

COMITE RIVER DIVERSION CANAL PROJECT FLOODPLAIN MANAGEMENT PLAN COMMUNITY ACTION PLAN FOR THE CITY OF BAKER, LOUISIANA

Appendix F

COMITE RIVER DIVERSION CANAL PROJECT FLOODPLAIN MANAGEMENT PLAN COMMUNITY ACTION PLAN FOR THE CITY OF BAKER, LOUISIANA

F.1 BACKGROUND

The City of Baker is located in East Baton Rouge Parish about 15 miles north of the City of Baton Rouge. This Parish lies in the west central part of the Amite River Basin. Baker's population growth has paralleled that of the United States. According to the 2003 census, Baker had a population of 11,791. A steady growth is expected for the city in the future.

Baker encompasses more than 10 square miles. Businesses of all types are found in Baker; however, most are small retail stores. The topography of the area varies from flat to hilly. Most of the land is used primarily for agriculture, consisting mainly of beef cattle and soybean farming. According to the 2010 census, the City of Baker has a population of 13,895.

As of May 2014, the City of Baker had 492 National Flood Insurance Program (NFIP) policies in place providing \$ \$74,069,400 in total insurance coverage. Since 1978, 208 claims have been filed amounting to \$ 1,469,934.89.

The of City of Baker has 61 repetitive loss structures as of June 2011, indicating that within the previous 10-year period, 12 structures had filed at least two insurance claims of at least \$1,000 each.

F.2 FLOOD RISK REDUCTION MEASURES

Under the Flood Damage Prevention Ordinance of 1987, the of City of Baker established a Floodplain Administrator, whose responsibilities include review of permit and applications to ensure compliance with the regulations set-forth in the ordinance.

The has taken many measures to reduce flooding, including the adoption of construction ordinances, development of a routine maintenance plan for drainage ditches and culverts, and several community projects to reduce flooding.

F.2.1 New Structures and Improvements

The City of Baker requires, through its floodplain ordinance, that all new residential, nonresidential, manufactured homes and substantial improvements (regardless of the zone - A, B, C, or X) be built to the highest elevation as defined by the following criteria:

- with the minimum lowest finished floor elevation one foot above the FIRM base flood elevation, or
- one foot above the record of inundation, or
- one foot above the center line of the closest (fronting) street, or
- one foot above the top of the nearest upstream or downstream sanitary sewer manhole.

The Metropolitan Council of the Parish of East Baton Rouge and City of Baton Rouge's Code of Ordinances has been frequently amended to address flood damage prevention:

- 7/13/83 - Land Transfer Flooding Disclosure Amendment
- 4/08/92 - Obstruction of Drainage Amendment

- 4/15/92 - Flood Zone Violation Penalty Amendment
- 2/23/94 - Drainage Impact Study Amendment
- 10/25/95 - Flood Damage Prevention Amendment
- 2/25/98 - Re-subdivision Plan Amendment

F.2.2 Maintenance of Existing Drainage Improvements

The City of Baker has developed a program to clean-out, upgrade, and maintain rivers, creeks, ditches, canals, culverts, and catch basins to alleviate flooding. Inspections are made on a routine basis, as well as when work orders are written based on resident's complaints.

All debris, leaves, limbs, and trash is manually removed from canals and ditches. All canals and ditches are sprayed twice a year for weed control. In addition, these areas are maintained by regular cutting several times a year and on an as-needed basis.

F.3 NFIP PARTICIPATION

The National Flood Insurance Program was created to reduce the loss of life and property, and the rising disaster relief costs caused by flooding. The NFIP is a voluntary program based on an agreement between the federal government and the local community. Federally-backed flood insurance coverage is available to any property owner in return for mitigation of flood risks by community regulation of floodplain development. Flood insurance is only available to those communities that adopt and enforce a floodplain management ordinance that meets or exceeds the minimum NFIP standards.

F.3.1 CRS

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote the awareness of flood insurance.

The City of Baker joined the CRS program in 1991 and has a rating of 9, which qualifies them for a 5 percent discount in insurance premium rates. The City is currently undergoing its 2015 Cycle Visit for compliance with the CRS program.

F.4 PUBLIC OUTREACH AND EDUCATION

An important step in reducing the damage caused by floods is to ensure that the public understands their roles in prevention and preparation. Each year, the City sends informational packages to property owners in special hazard areas and owners of RLS properties. These packets are used to inform owners of flood hazards and to suggest possible actions that the owners can take to protect life and property. In addition, information is available to all residents through the public library.

The City posts messages on utility bills to inform residents that the City offers free flood prevention information, available through the Inspection Department. The City of Baker annually informs local realtors, lending institutions, and insurance companies of their participation in the NFIP CRS program.

F.5 CITY OF BAKER HAZARD MITIGATION PLAN

The City of Baker Hazard Mitigation Plan is available at the following link:
<http://brgov.com/dept/oep/mitigation/hmplan.asp>

Appendix G

COMITE RIVER DIVERSION CANAL PROJECT FLOODPLAIN MANAGEMENT PLAN COMMUNITY ACTION PLAN FOR THE CITY OF DENHAM SPRINGS, LOUISIANA

Appendix G

COMITE RIVER DIVERSION CANAL PROJECT FLOODPLAIN MANAGEMENT PLAN COMMUNITY ACTION PLAN FOR THE CITY OF DENHAM SPRINGS, LOUISIANA

G.1 BACKGROUND

The City of Denham Springs is located in Livingston Parish immediately east of the City of Baton Rouge. The city lies in the west central part of the Amite River Basin. Denham Springs's and Livingston Parish is the second fastest growing population in Louisiana.

Denham Springs encompasses more than 10 square miles. Businesses of all types are found in Denham Springs; however, most are small retail stores. The topography of the area varies from flat to hilly. Residential and commercial developments are expanding southward of the city center with some farming and agriculture still present. According to the 2010 census, the City of Denham Springs has a population of 10,215.

As of May 2014, the City of Denham Springs had 492 National Flood Insurance Program (NFIP) policies in place providing \$ 74,069,400 in total insurance coverage. Since 1978, 208 claims have been filed amounting to \$ 1,469,934.89.

The of City of Denham Springs has 61 repetitive loss structures as of June 2011, indicating that within the previous 10-year period, 12 structures had filed at least two insurance claims of at least \$1,000 each.

G.2 FLOOD RISK REDUCTION MEASURES

Under the Flood Damage Prevention Ordinance of 1987, the of City of Denham Springs established a Floodplain Administrator, whose responsibilities include review of permit and applications to ensure compliance with the regulations set-forth in the ordinance.

The has taken many measures to reduce flooding, including the adoption of construction ordinances, development of a routine maintenance plan for drainage ditches and culverts, and several community projects to reduce flooding.

G.2.1 New Structures and Improvements

The City of Denham Springs requires, through its floodplain ordinance, that all new residential, nonresidential, manufactured homes and substantial improvements (regardless of the zone - A, B, C, or X) be built to the highest elevation as defined by the following criteria:

- with the minimum lowest finished floor elevation one foot above the FIRM base flood elevation, or
- one foot above the record of inundation, or
- one foot above the center line of the closest (fronting) street, or
- one foot above the top of the nearest upstream or downstream sanitary sewer manhole.

G.2.2 Maintenance of Existing Drainage Improvements

The of City of Denham Springs has developed a program to clean-out, upgrade, and maintain rivers, creeks, ditches, canals, culverts, and catch basins to alleviate flooding. Inspections are made on a routine basis, as well as when work orders are written based on resident's complaints.

All debris, leaves, limbs, and trash is manually removed from canals and ditches. All canals and ditches are sprayed twice a year for weed control. In addition, these areas are maintained by regular cutting several times a year and on an as-needed basis.

G.3 NFIP PARTICIPATION

The National Flood Insurance Program was created to reduce the loss of life and property, and the rising disaster relief costs caused by flooding. The NFIP is a voluntary program based on an agreement between the federal government and the local community. Federally-backed flood insurance coverage is available to any property owner in return for mitigation of flood risks by community regulation of floodplain development. Flood insurance is only available to those communities that adopt and enforce a floodplain management ordinance that meets or exceeds the minimum NFIP standards.

G.3.1 CRS

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote the awareness of flood insurance.

The City of Denham Springs joined the CRS program in 1991 and has a rating of 9, which qualifies them for a 5 percent discount in insurance premium rates. The City is currently undergoing its 2015 Cycle Visit for compliance with the CRS program.

G.4 PUBLIC OUTREACH AND EDUCATION

An important step in reducing the damage caused by floods is to ensure that the public understands their roles in prevention and preparation. Each year, the sends informational packages to property owners in special hazard areas and owners of RLS properties. These packets are used to inform owners of flood hazards and to suggest possible actions that the owners can take to protect life and property. In addition, information is available to all residents through the public library.

The posts messages on utility bills to inform residents that the offers free flood prevention information, available through the Inspection Department. The City of Denham Springs annually informs local realtors, lending institutions, and insurance companies of their participation in the NFIP CRS program.

G.5 CITY OF DENHAM SPRINGS HAZARD MITIGATION PLAN

The City of Denham Springs Hazard Mitigation Plan is available at the following link:
<http://brgov.com/dept/oep/mitigation/hmplan.asp>

Appendix H

COMITE RIVER DIVERSION CANAL PROJECT FLOODPLAIN MANAGEMENT PLAN COMMUNITY ACTION PLAN FOR THE TOWN OF PORT VINCENT, LOUISIANA

Appendix H

COMITE RIVER DIVERSION CANAL PROJECT FLOODPLAIN MANAGEMENT PLAN COMMUNITY ACTION PLAN FOR THE TOWN OF PORT VINCENT, LOUISIANA

H.1 BACKGROUND

The Town of Port Vincent is located in Livingston Parish immediately east of the City of Baton Rouge. The city lies in the west central part of the Amite River Basin. Port Vincent's and Livingston Parish is the second fastest growing population in Louisiana.

Port Vincent encompasses more than 10 square miles. Businesses of all types are found in Port Vincent; however, most are small retail stores. The topography of the area varies from flat to hilly. Residential and commercial developments are expanding southward of the city center with some farming and agriculture still present. According to the 2010 census, the Town of Port Vincent has a population of 741.

As of May 2014, the Town of Port Vincent had 100 National Flood Insurance Program (NFIP) policies in place providing \$18,319,600 in total insurance coverage. Since 1978, 185 claims have been filed amounting to \$ 1,677,026.83.

The of Town of Port Vincent 33 repetitive loss structures as of 2005 indicating that within the previous ten-year period, 33 structures had filed at least two insurance claims of at least \$1,000 each. The claims during this ten- year time period totaled \$244,349.

H.2 FLOOD RISK REDUCTION MEASURES

Under the Flood Damage Prevention Ordinance of 1987, the of Town of Port Vincent established a Floodplain Administrator, whose responsibilities include review of permit and applications to ensure compliance with the regulations set-forth in the ordinance.

The has taken many measures to reduce flooding, including the adoption of construction ordinances, development of a routine maintenance plan for drainage ditches and culverts, and several community projects to reduce flooding.

H.2.2 Maintenance of Existing Drainage Improvements

The of Town of Port Vincent has developed a program to clean-out, upgrade, and maintain rivers, creeks, ditches, canals, culverts, and catch basins to alleviate flooding throughout the . Inspections are made on a routine basis, as well as when work orders are written based on resident's complaints.

All debris, leaves, limbs, and trash is manually removed from canals and ditches. All canals and ditches are sprayed twice a year for weed control. In addition, these areas are maintained by regular cutting several times a year and on an as-needed basis.

H.3 NFIP PARTICIPATION

The National Flood Insurance Program was created to reduce the loss of life and property, and the rising disaster relief costs caused by flooding. The NFIP is a voluntary program based on an agreement between the federal government and the local community. Federally-backed flood insurance coverage is available to any property owner in return for mitigation of flood risks by community regulation of floodplain

development. Flood insurance is only available to those communities that adopt and enforce a floodplain management ordinance that meets or exceeds the minimum NFIP standards.

H.3.1 CRS

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote the awareness of flood insurance.

The Town of Port Vincent joined the CRS program in 1997 and has a rating of 10, which qualifies them for a no discount in insurance premium rates. The City is currently undergoing its 2015 Cycle Visit for compliance with the CRS program.

The Town of Port Vincent was removed from the CRS program in October, 1999 for not maintaining the points required for participation in the program.

Appendix I

COMITE RIVER DIVERSION CANAL PROJECT FLOODPLAIN MANAGEMENT PLAN COMMUNITY ACTION PLAN FOR THE VILLAGE OF FRENCH SETTLEMENT, LOUISIANA

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COMITE RIVER DIVERSION CANAL PROJECT FLOODPLAIN MANAGEMENT PLAN COMMUNITY ACTION PLAN FOR THE VILLAGE OF FRENCH SETTLEMENT, LOUISIANA

I.1 BACKGROUND

The Village of French Settlement is located in Livingston Parish immediately east of the City of Baton Rouge. The city lies in the west central part of the Amite River Basin. French Settlement's and Livingston Parish is the second fastest growing population in Louisiana.

French Settlement encompasses more than 10 square miles. Businesses of all types are found in French Settlement; however, most are small retail stores. The topography of the area varies from flat to hilly. Residential and commercial developments are expanding southward of the city center with some farming and agriculture still present. According to the 2010 census, the Village of French Settlement has a population of 1,110.

As of May 2014, the Village of French Settlement had 130 National Flood Insurance Program (NFIP) policies in place providing \$ 25,131,700 in total insurance coverage. Since 1978, 95 claims have been filed amounting to \$ 1,002,692.69.

The Village of French Settlement has 5 repetitive loss structures as of 2005 indicating that within the previous ten-year period, 5 structures had filed at least two insurance claims of at least \$1,000 each. The claims during this ten- year time period totaled \$244,349.

I.2 FLOOD RISK REDUCTION MEASURES

Under the Flood Damage Prevention Ordinance of 1987, Livingston Parish established a Floodplain Administrator, whose responsibilities include review of permit and applications to ensure compliance with the regulations set-forth in the ordinance.

The has taken many measures to reduce flooding, including the adoption of construction ordinances, development of a routine maintenance plan for drainage ditches and culverts, and several community projects to reduce flooding.

I.2.1 Maintenance of Existing Drainage Improvements

The of Village of French Settlement has developed a program to clean-out, upgrade, and maintain rivers, creeks, ditches, canals, culverts, and catch basins to alleviate flooding throughout the . Inspections are made on a routine basis, as well as when work orders are written based on resident's complaints.

All debris, leaves, limbs, and trash is manually removed from canals and ditches. All canals and ditches are sprayed twice a year for weed control. In addition, these areas are maintained by regular cutting several times a year and on an as-needed basis.

I.3 NFIP PARTICIPATION

The National Flood Insurance Program was created to reduce the loss of life and property, and the rising disaster relief costs caused by flooding. The NFIP is a voluntary program based on an agreement between the federal government and the local community. Federally-backed flood insurance coverage is

available to any property owner in return for mitigation of flood risks by community regulation of floodplain development. Flood insurance is only available to those communities that adopt and enforce a floodplain management ordinance that meets or exceeds the minimum NFIP standards.

I.3.1 CRS

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote the awareness of flood insurance.

The Village of French Settlement joined the CRS program in 1992 and has a rating of 9, which qualifies them for a 5 percent discount in insurance premium rates. The City is currently undergoing its 2015 Cycle Visit for compliance with the CRS program.

Appendix J

COMITE RIVER DIVERSION CANAL PROJECT FLOODPLAIN MANAGEMENT PLAN COMMUNITY ACTION PLAN FOR THE CITY OF CENTRAL, LOUISIANA

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COMITE RIVER DIVERSION CANAL PROJECT FLOODPLAIN MANAGEMENT PLAN COMMUNITY ACTION PLAN FOR THE CITY OF CENTRAL, LOUISIANA

I.1 BACKGROUND

The City of Central is located in East Baton Rouge Parish immediately east of the City of Baton Rouge. The city lies in the west central part of the Amite River Basin. The city of Central is on of the fastest growing populations in Louisiana.

Central encompasses more than 10 square miles. Businesses of all types are found in Central; however, most are small retail stores. The topography of the area varies from flat to hilly. Residential and commercial developments are expanding southward of the city center with some farming and agriculture still present. According to the 2010 census, the City of Central has a population of 26,864.

As of May 2014, the City of Central had 2033 National Flood Insurance Program (NFIP) policies in place providing \$ 393,736,000 in total insurance coverage. Since 1978, 8 claims have been filed amounting to \$ 30,354.

I.2 FLOOD RISK REDUCTION MEASURES

Under the Flood Damage Prevention Ordinance of 1987, the of City of Central established a Floodplain Administrator, whose responsibilities include review of permit and applications to ensure compliance with the regulations set-forth in the ordinance.

The has taken many measures to reduce flooding, including the adoption of construction ordinances, development of a routine maintenance plan for drainage ditches and culverts, and several community projects to reduce flooding.

I.2.1 New Structures and Improvements

The City of Central requires, through its floodplain ordinance, that all new residential, nonresidential, manufactured homes and substantial improvements (regardless of the zone - A, B, C, or X) be built to the highest elevation as defined by the following criteria:

- with the minimum lowest finished floor elevation one foot above the FIRM base flood elevation, or
- one foot above the record of inundation, or
- one foot above the center line of the closest (fronting) street, or
- one foot above the top of the nearest upstream or downstream sanitary sewer manhole.

Prior to the incorporation of the City of Central, the Metropolitan Council of the Parish of East Baton Rouge and City of Baton Rouge's Code of Ordinances has been frequently amended to address flood damage prevention:

- 7/13/83 - Land Transfer Flooding Disclosure Amendment
- 4/08/92 - Obstruction of Drainage Amendment
- 4/15/92 - Flood Zone Violation Penalty Amendment
- 2/23/94 - Drainage Impact Study Amendment
- 10/25/95 - Flood Damage Prevention Amendment

- 2/25/98 - Re-subdivision Plan Amendment

I.2.1 Maintenance of Existing Drainage Improvements

The City of Central has developed a program to clean-out, upgrade, and maintain rivers, creeks, ditches, canals, culverts, and catch basins to alleviate flooding throughout the city. Inspections are made on a routine basis, as well as when work orders are written based on resident's complaints.

All debris, leaves, limbs, and trash is manually removed from canals and ditches. All canals and ditches are sprayed twice a year for weed control. In addition, these areas are maintained by regular cutting several times a year and on an as-needed basis.

I.3 NFIP PARTICIPATION

The National Flood Insurance Program was created to reduce the loss of life and property, and the rising disaster relief costs caused by flooding. The NFIP is a voluntary program based on an agreement between the federal government and the local community. Federally-backed flood insurance coverage is available to any property owner in return for mitigation of flood risks by community regulation of floodplain development. Flood insurance is only available to those communities that adopt and enforce a floodplain management ordinance that meets or exceeds the minimum NFIP standards.

I.3.1 CRS

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote the awareness of flood insurance.

The City of Central joined the CRS program in 2014 and has a rating of 8, which qualifies them for a 10 percent discount in insurance premium rates. The City is currently undergoing its 2015 Cycle Visit for compliance with the CRS program.

I.4 PUBLIC OUTREACH AND EDUCATION

An important step in reducing the damage caused by floods is to ensure that the public understands their roles in prevention and preparation. Each year, the City sends informational packages to property owners in special hazard areas and owners of RLS properties. These packets are used to inform owners of flood hazards and to suggest possible actions that the owners can take to protect life and property. In addition, information is available to all residents through the public library.

The City posts messages on utility bills to inform residents that the City offers free flood prevention information, available through the Inspection Department. The City of Central annually informs local realtors, lending institutions, and insurance companies of their participation in the NFIP CRS program.

I.5 CITY OF CENTRAL HAZARD MITIGATION PLAN

The City of Central Hazard Mitigation Plan is available at the following link:
<http://brgov.com/dept/oep/mitigation/hmpln.asp>