EAST TEXAS ELECTRIC COOPERATIVE, INC.

In Cooperation with the Trinity River Authority of Texas
and the City of Houston, Texas

LAKE LIVINGSTON HYDROELECTRIC PROJECT

Federal Energy Regulatory Commission
Project No. 12632

PRE-APPLICATION DOCUMENT

December 21, 2007

ETEC
East Texas Electric Cooperative

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LIST OF ACRONYMS AND ABBREVIATIONS

AF	acre feet
ALP	Alternative Licensing Process
BOD	biochemical oxygen demand
CCN	Certificate of Convenience and Necessity
CFR	Code of Federal Regulations
cfs	cubic feet per second
DO	Dissolved Oxygen
EA	Environmental Assessment
El.	Elevation referenced to the 1988 North American Vertical Datum (NAVD-88)
ETEC	East Texas Electric Cooperative, Inc.
FERC	Federal Energy Regulatory Agency
FEMA	Federal Emergency Management Agency
F&W	Fish and Wildlife
H	Horizontal
ILP	Integrated Licensing Process
l	liter
KV	kilovolts
MCL	maximum contaminant level
mg	milligrams
MGD	million gallons per day
MW	megawatts
MWH	megawatt-hours
MSL	mean sea level
NEPA	National Environmental Policy Act
NOI	Notice of Intent
PAD	Preliminary Application Document
PDEA	Preliminary Draft Environmental Assessment
PUCT	Public Utilities Commission of Texas
RM	River Mile
RRCT	Railroad Commission of Texas

LIST OF ACRONYMS AND ABBREVIATIONS

RTE	Rare, Threatened, or Endangered
SY	square yards
STP	sewage treatment plant
TARL	Texas Archeological Research Laboratory
TCEQ	Texas Commission on Environmental Quality
TDWR	Texas Department of Water Resources
TLP	Traditional Licensing Process
TMDL	total maximum daily load
TPWD	Texas Parks and Wildlife Department
TRA	Trinity River Authority of Texas
TSI	Carlson Trophic State Index
TRIMS	Trinity River Information Management System
TRNWR	Trinity River National Wildlife Refuge
TSS	total suspended solids
TWDB	Texas Water Development Board
U.S.	United States
USDI	United States Department of the Interior
USGS	United States Geological Survey
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
V	Vertical

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LAKE LIVINGSTON HYDROELECTRIC PROJECT
EAST TEXAS ELECTRIC COOPERATIVE
BEFORE THE FEDERAL ENERGY REGULATORY COMMISSION
PRE-APPLICATION DOCUMENT (PAD)

MAJOR 24-MEGAWATT ELECTRIC GENERATING PROJECT ON EXISTING DAM

1.0 INTRODUCTION AND LICENSING PROCESS PLAN AND SCHEDULE (18 CFR § 5.6(d)(1))

The East Texas Electric Cooperative, Inc. (ETEC) proposes to develop a hydroelectric power generating facility at Lake Livingston Dam, located near the City of Livingston in Polk County, Texas. ETEC is a generation and transmission cooperative that supplies electric power at wholesale to ten local distribution cooperatives, which collectively serve over 307,000 retail accounts in 46 counties in eastern Texas. The proposed hydroelectric plant will provide a new source of clean, renewable, cost-effective energy, and will allow ETEC to diversify its power supply portfolio and reduce its dependence on fossil fuel-burning generation.

ETEC plans to develop the hydropower facilities in cooperation with the Trinity River Authority of Texas (TRA), which owns and operates the dam and reservoir, and with the City of Houston, which has rights to 70 percent of the water stored in the lake for municipal and industrial water supplies.

Before it can construct or operate a hydroelectric facility at Lake Livingston, ETEC is required to obtain a number of regulatory permits and approvals, including a license under the Federal Power Act from the Federal Energy Regulatory Commission (FERC or Commission). This Pre-Application Document (PAD) commences the formal FERC licensing process for the proposed Lake Livingston Hydroelectric Project (Project).

The purpose of the PAD is to provide interested agencies, stakeholders, and the public with existing, relevant, and reasonably available information about proposed project, its current environment, and its potential impacts. The PAD also serves as the initial scoping document for the Project's environmental analysis. The PAD is intended to assist interested parties to identify issues and related information needs, develop study requests and study plans, and prepare documents analyzing the subsequently-filed license application.

1.1 LICENSING PROCESS PLAN - ALTERNATIVE LICENSING PROCESS (18 CFR § 5.6(d)(1))

Concurrently with the filing of this PAD, ETEC has requested FERC's permission to utilize the "Alternative Licensing Process" (ALP) under § 4.34(i) of the Commission's regulations {(Title 18 Code of Federal Regulations (CFR) § 4.34(i))}. The ALP is one of three different licensing processes recognized by FERC – the others being the Traditional Licensing Process (TLP) and the Integrated Licensing Process (ILP). Since July 2005, the ILP has been the "default" process, which all applicants must use unless they seek and obtain the Commission's authorization to use either the ALP or the TLP.

After careful consideration and initial meetings with interested federal and state resource agencies, ETEC believes that the Alternative Licensing Process is the most appropriate licensing vehicle for the Lake Livingston Project. The ALP is a flexible process tailored to the circumstances of each case. It is intended to simplify and expedite the licensing process by combining the pre-filing consultation and environmental review processes into a single process, facilitating participation by interested agencies and stakeholders, and improving communication and cooperation among the participants. Under the ALP, the applicant and its consultants prepare a Preliminary Draft Environmental Assessment (PDEA) after engaging in collaborative consultations with agencies and stakeholders and after conducting any necessary field studies. The PDEA is submitted at the same time the license application is filed.

Although the default Integrated Licensing Process can be an efficient process for the licensing of major hydropower developments involving multiple complex resource issues, the ILP can, however, result in needlessly lengthy procedures for projects with relatively straightforward and benign resource impacts. Because the proposed Lake Livingston Hydropower Project would operate on a run-of-river basis, utilizing existing water releases that would otherwise be made in the ordinary course of reservoir operations, and because the project is not expected to involve highly complex environmental issues, ETEC believes that the ALP is a more appropriate licensing procedure than the ILP for this project. The ALP will allow the Project to be fully scoped and licensed over an approximately two-year process, whereas the ILP would likely involve at minimum a three-year process[1].

Any agency, Indian Tribe, individual or other entity that wishes to comment on ETEC's request to utilize the ALP may do so by submitting comments to the Secretary, Federal Energy Regulatory Commission, 888 First Street N.E., Washington, DC 20426. Alternatively, comments may be submitted electronically via the Commission's eFiling website: http://www.ferc.gov/docs-filing/efiling.asp. Any such comments should be filed not later than January 22, 2008, and should reference FERC Project No. 12632.

1.2 PROPOSED ALP SCHEDULE (18 CFR § 5.6(d)(1))

Table 1-1 contains a proposed licensing process schedule for of the Lake Livingston Project. This schedule provides a timeline for procedural milestones during the licensing process; however, the schedule is preliminary in nature and subject to modification as events unfold during the pre-filing consultation and study process and, subsequently,

[1] Additional information on the ALP and other FERC licensing processes can be found on the Commission's website at: http://www.ferc.gov/industries/hydropower/gen-info/licensing/licen-pro.asp.

In 1987, FERC issued a license to TRA for a similar but larger (50-megawatt) project at the same location, without any environmental or community opposition. FERC's Environmental Assessment accompanying the license order included a Finding of No Significant Impact. 39 FERC ¶ 62,205, at 63,488 (1987). TRA surrendered that license a year later because project economics were not favorable at that time.

during FERC's review of the license application and PDEA. The Commission is not bound to any particular processing schedule after the license application has been filed. Regardless of whether there are subsequent changes to the proposed schedule, ample public notice will be given of any public meetings or comment deadlines during the licensing process.

1.3 PROPOSED DATE AND LOCATION OF SCOPING MEETING (18 CFR § 5.8(b)(3)(VIII))

A scoping meeting is tentatively scheduled for Wednesday, March 26, 2008, at the Livingston-Polk County Chamber of Commerce, 1001 U.S. Highway 59 Loop North, Livingston, Texas. Two sessions of the meeting will be held, one in the afternoon from 1:30 to 3:30 p.m., and the other in the evening from 6:00 to 8:00 p.m. Following the afternoon session, a site visit will be conducted at TRA's Lake Livingston Project headquarters near Livingston. Any individual or representative of an agency, Indian tribe, or other stakeholder group may attend either session of the scoping meeting and/or the site visit. The two separate but duplicative sessions have been scheduled in order to accommodate interested persons whose schedules permit them to attend only during the work day or only during evening hours.

The purposes of the scoping meeting are to:

1. Initiate scoping issues pursuant to the National Environmental Policy Act (NEPA);
2. Review and discuss existing conditions and resource management objectives;
3. Review and discuss existing information and make preliminary identification of information and study needs;
4. Review, discuss, and finalize the process plan and schedule for pre-filing activity as outlined above, while maximizing, to the extent reasonably possible, coordination of federal and state permitting and certification processes, including consultation under section 7 of the Endangered Species Act (if applicable) and water quality certification or waiver thereof under Section 401 of the Clean Water Act; and
5. Discuss the appropriateness of any Federal or State agency or Indian tribe acting as a cooperating agency for development of an environmental document pursuant to the NEPA.

TABLE 1-1
PROPOSED ALTERNATIVE LICENSING PROCESS SCHEDULE FOR LAKE LIVINGSTON HYDROELECTRIC PROJECT

May-December 2007	Initial consultation with agencies, tribes, local governments.
October-December 2007	Obtain consensus of agencies/stakeholders to use ALP.
December 21, 2007	File Notice of Intent (NOI) and PAD and request permission to use ALP. (PAD serves as Initial Information Document required by 18 CFR § 4.34(i)(4)(i).) Publish notice of filing in newspaper of general circulation in each county where project is located.
January 22, 2008	Comments due at FERC on ETEC's request to use ALP.
February 21, 2008	FERC rules on request to use ALP; notices date, time and location of environmental scoping meeting in Livingston.
March 26, 2008	Initial information and scoping meeting and site visit to be held in Livingston.
April 25, 2008	Agencies/stakeholders comment on environmental scoping and submit requests for specific studies.
April 1-May 23, 2008	Applicant consults with agencies, stakeholders, and FERC Staff to reach consensus on required studies (if and as necessary).
November 2007-November 2008	Applicant conducts environmental and transmission routing studies, prepares study reports.
October 2008 (target date – subject to change)	ETEC files request for Clean Water Act §401 Water Quality Certification with TCEQ; files application for §404 permit with U.S. Army Corps of Engineers.
November 28, 2008	Study reports shared with interested agencies/stakeholders.
December 15, 2008	Last date for Agencies/stakeholders to inform ETEC whether additional studies are deemed necessary.
November 2008-March 2009	Applicant and consultant(s) prepare license application and PDEA; ETEC conducts follow-up studies (if and as necessary).
December 17, 2008	FERC solicits filing (by January 30, 2009) of preliminary fish & wildlife (F&W) recommendations, prescriptions, and comments (per 18 CFR § 4.34(i)(6)(vi)).
January 30, 2009	Agencies/stakeholders file preliminary F&W recommendations, prescriptions, and/or comments.
March 31, 2009	ETEC files license application and PDEA.
May 15, 2009	FERC issues Notice of Application and Solicitation of Final F&W conditions, prescriptions, comments, and interventions.
July 14, 2009	Comments on Application, Final Conditions and Prescriptions, and interventions due.
November 16, 2009	FERC issues Final EA (target date, subject to change).
30-90 days after Final EA	FERC issues license order (target date, subject to change).

At least 15 days prior to the scoping meeting and site visit, public notice of those events will be: (1) mailed or e-mailed to each entity on the Project distribution list (see ***Appendix A***), and (2) published in a newspaper of general circulation in each county where any part of the Project will be located[2]. In addition, if feasible, FERC will publish a *Federal Register* notice of the scoping meeting prior to the meeting.

1.4 COMMUNICATIONS PROTOCOL (18 CFR § 4.34(i)(3)(ii))

Appendix A to this PAD contains a Communications Protocol describing how the applicant and other participants in the pre-filing consultation process, including the FERC staff, may communicate with each other during the pre-filing consultation process regarding the merits of the proposed project and the proposals and recommendations of interested entities. The communications protocol includes a table listing, by subject area responsibility, of the principal members of the Project licensing team.

1.5 AUTHORIZED AGENTS FOR APPLICANT (18 CFR § 5.6(d)(2)(i))

The following individuals are designated as agents authorized to act on behalf of ETEC in connection with this licensing proceeding:

1. Edd Hargett, Manager
   East Texas Electric Cooperative, Inc.
   2905 Westward Drive
   P.O. Box 631623
   Nacogdoches, Texas 75963
   Phone: 936-560-9532
   Fax: 936-560-9215
   eddh@gtpower.com

[2] Specifically, ETEC intends to publish notice of the scoping meeting in the following newspapers: *The Polk County Enterprise; The San Jacinto News-Times; The Trinity Standard; The Corrigan Times; and The Huntsville Item.*

2. Brian Lawson, Project Manager
   GDS Associates, Inc.
   1850 Parkway Place, Suite 800
   Marietta, GA 30067
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1.6 DISTRIBUTION AND AVAILABILITY OF DOCUMENTS (18 CFR § 5.6(a),(c))

ETEC will distribute a copy of this PAD and other major licensing documents to all Federal and State resource agencies, Indian tribes, local governments, and members of the public likely to be interested in the Project licensing. ETEC will also maintain a public reference file at the offices of the Sam Houston Electric Cooperative (SHECO) in Livingston. Major documents such as the PAD, the Notice of Intent to file a license application (NOI), Study Plans, Study Reports, Semi-annual Progress Reports, the License Application, and the PDEA, will be available for viewing and copying at SHECO by appointment. SHECO's address and phone number are listed in the Communications Protocol (***Appendix A***). In addition, copies of all non-confidential documents in ETEC's possession that are related to the Project, including source materials cited in this PAD, will be provided upon request to any participant in the licensing process. Requests for documents should be directed to one of the official contacts listed above, preferably by e-mail. ETEC will supply the requested documents within 20 days of receipt of the request.

2.0 PROJECT DESCRIPTION: LOCATION, FACILITIES AND OPERATIONS (18 CFR § 5.6(d)(2))

2.1 LOCATION (18 CFR § 5.6(d)(2))

The proposed hydroelectric facilities will be located at the base of the existing Lake Livingston Dam, situated at river mile (RM) 129.2 of the Trinity River, in San Jacinto and Polk counties, Texas. The power facilities will be located near the east abutment of the dam, adjacent to the spillway tailwater basin, approximately seven miles southwest of the City of Livingston, in Polk County.

Lake Livingston has a surface area of approximately 83,000 acres and occupies portions of four counties in eastern Texas: Polk, San Jacinto, Trinity and Walker.

The Project's primary transmission line will interconnect the power generating station with the Entergy transmission system at the existing Rich substation, located about 2.5 miles east-southeast of the proposed power plant in Polk County.

2.2 MAPS (18 CFR § 5.6(d)(2)(ii))

Detailed maps showing lands and waters within the Project boundary, as well as the location of the proposed Project facilities, are found in ***Appendix B*** to this PAD. (There are no federal or tribal lands within the Project boundary.)

2.3 EXISTING PROJECT FACILITIES (18 CFR § 5.6(d)(2)(iii)(A)&(B))

2.3.1 Dam

The Lake Livingston Hydroelectric Project will use the existing Lake Livingston Dam, owned and operated by the TRA, that is located on the Trinity River in southeast Texas. Construction

of the dam began in mid-1966 and was completed in 1969. The dam is constructed at river mile (RM) 129.2, in San Jacinto and Polk counties, approximately 7 miles southwest of the City of Livingston, Texas.

The dam consists of a basic earth embankment section, which extends for the full length of the dam with stabilizing upstream and downstream berms of varying dimensions. The slopes are 1 Vertical (V) to 2.5 Horizontal (H). The dam is approximately 14,400 feet long following a near southwest-northeast alignment. Its height varies from 45 to 60 feet over most of its length and reaches a maximum height of 90 feet in the old river channel.

The basic section is comprised of random clay fill with a central impervious core with vertical chimney and horizontal drains downstream of the core. The crest at El. 145.0 feet is 24 feet wide. A 12-foot-wide, single-lane paved road along the crest provides maintenance access along the dam.

2.3.2 Spillway

The existing spillway for the Lake Livingston Dam is located within the main embankment about 1,400 feet from the east abutment. The spillway is a concrete structure with an ogee crest at El. 99.0 feet. It is approximately 546 feet long, housing twelve (12) tainter gates, each 40-feet wide by 35-feet high. The maximum height of the gate opening is 32 feet above the sill of the spillway, corresponding to the normal maximum pool elevation of the reservoir (99 feet + 32 feet = 131 feet). Concrete training walls and upstream and downstream aprons direct the water from the reservoir across the spillway and back to the original river channel. A bridge for the access road and tainter gate equipment is supported by the gate piers and spans the entire spillway width. Deck level for this bridge is at El. 145.0 feet.

2.3.3 Reservoir

The existing Reservoir, known as Lake Livingston, has a water surface area of approximately 83,000 acres and a gross storage capacity of about 1,750,000 acre-feet (AF) at normal water

surface elevation of 131.0 feet, mean sea level. The reservoir occupies portions of four counties: Polk, San Jacinto, Trinity and Walker.

2.3.4 Outlet Works

The existing outlet works are located within the embankment approximately 1,850 feet west of the spillway. They consist of a vertical inlet tower with five (5) gates, a 550-foot-long by 10-foot diameter conduit, a 170-foot-long stilling basin, and a concrete broad-crested weir. The tower is a 90-foot-high concrete structure that has four 5-foot-high by 4-foot-wide sluice gates at various levels and a 10-foot-high by 8-foot-wide sluice gate at the base. These five gates allow water to be released to the river in limited quantities from varying depths in the reservoir. The outlet works also provide a means of maintaining water releases in the event that the spillway gates need to be closed for an extended period of time, or should the reservoir level fall below the crest of the spillway. Access to the tower is gained via a steel and concrete bridge. Water from the tower passes through the conduit under the dam to the stilling basin. A short channel downstream of the stilling basin directs flows back to the river.

TRA awarded a construction contract in August 2007 for the rehabilitation of the intake tower and outlet conduit. The work will include fabrication and replacement of the 10-foot-high by 8-foot-wide sluice gate and two of the 5-foot-high by 4-foot-wide sluice gates, replacement of the gate hoisting equipment and concrete repairs to the inside of the intake tower and outlet conduit. The two deeper 5-foot high by 4-foot wide gates will be taken out of service.

2.3.5 Service Buildings

TRA has constructed several service buildings near the east abutment of the dam. Included are an administration building, a water quality laboratory, a maintenance compound, a boat house, and a fueling station. Also constructed in the same general area is a residence for the on site manager. Some existing service facilities, as well as a service road accessing those facilities, may have to be relocated to accommodate the power structures.

2.3.6 Downstream Tailwater Control Weir

In 2001, major displacement of riprap in the spillway tailwater channel was discovered following flood releases in excess of 80,000 cubic feet per second (cfs) during Tropical Storm Allison. It was determined that there has been a gradual lowering of the spillway channel downstream of the dam caused by scouring and erosion during flood flows. Reduction in the streambed levels of 10 to 15 feet had resulted in a reduction in tailwater levels. Reductions in tailwater levels had resulted in the hydraulic jump moving out of the basin into the downstream channel. Also, flows were sweeping out of the chute at low to moderate flows because of the lack of adequate tailwater. The sweep-out and formation of jump downstream of the stilling basin caused severe scour and displacement of the protective riprap. To prevent further tailwater erosion and scouring during high flows, a stilling basin was constructed at the end of the spillway chute to dissipate the energy of the spillway discharges. The energy should be dissipated by the formation of a hydraulic jump within the concrete basin. TRA made a determination to raise the tailwater elevation sufficiently to maintain the hydraulic jump within the stilling basin.

Remedial measures necessary to reestablish the tailwater elevation included the construction of a spillway tailwater control weir approximately 200 feet downstream from the spillway chute. The weir was constructed by driving two parallel sheet piling walls across the full width of the river channel, a distance of approximately 760 feet. The sheet piling was placed 20 feet apart and this 20-foot annular space was filled with concrete from El. 45.0 to El. 60.0. The sill elevation of the upstream sheet piling is at El. 63.0.

Construction of the tailwater control weir was initiated in the latter part of 2001. Due to the contractor's inability to complete the weir in a timely manner, the construction contract was terminated in the latter part of 2003. The project was re-bid in May 2004 and construction was completed by the end of 2004.

2.3.7 Recent Dam Remediation Work

TRA awarded a construction contract in October 1999 to rehabilitate Lake Livingston Dam. Rehabilitation measures included the sandblasting and painting of the 12 spillway tainter gates, spillway bridge, outlet tower bridge and all gate hoisting equipment. Additionally, the project included the replacement of all electrical control panels, feeders, conduits, motor control centers, lighting, and emergency generator. The trunnion pins were replaced on the tainter gates and a dual power supply, lightning protection and a control room that provides for remote operation of the gates were added to the facilities. The work was completed in January 2002.

2.3.8 Hurricane Rita – Damage and Repairs

As a direct result of strong wind and wave action created by Hurricane Rita in September 2005, Lake Livingston Dam sustained severe erosion of the upstream embankment protection as well as spot erosion of the underlying clay fill material on the upstream face of the dam. The 30-inch to 32-inch-diameter riprap had absorbed the force and the brunt of the waves; however, energy from the powerful wave action and the relatively steep slope of the embankment resulted in approximately 80 percent of the riprap (11,000 linear feet along the dam) being pulled down the slope from El. 145.0 to El. 127.0. This was discovered following an emergency drawdown of the lake to El. 127.0. The lake remained at this elevation until October 2006. From January 2006 until May 2006, a contractor placed 21,600 square yard (SY) of geotextile fabric, 17,000 tons of 8-inch stone bedding and 76,500 tons of 32-inch rock riprap on the upstream slope of Lake Livingston Dam. The roadway on the crest of the road was repaired with 18,000 SY of asphalt. This project was totally funded by a $7.8 million Public Assistance grant from the Federal Emergency Management Agency (FEMA).

2.4 PROPOSED NEW PROJECT FACILITIES (18 CFR § 5.6(d)(2)(iii))

The proposed hydroelectric facilities at Livingston Dam will be located east of the east abutment. It is anticipated that the project will require the construction of the following new facilities:[3]

2.4.1 Headrace Channel

Water for power generation will be directed from Lake Livingston to the intake structure by a headrace channel approximately 800 feet long. The channel will be lined with riprap on the bottom and slopes. The bottom will be approximately 100 feet wide with a slope ratio of 3 H to 1 V.

2.4.2 Intake Structure

The intake structure will be of reinforced concrete with embedded steel gates located at the downstream end of the headrace channel. It will direct the water for power generation to the penstocks through hydraulically efficient shaped openings each complete with trashracks, closure gates with individual operators, stoplogs, and venting.

2.4.3 Earth Embankment

The earth embankment will form the downstream closure of the headrace channel. It will consist of a basic embankment extending easterly from the east abutment of the existing dam across the penstocks to a point near an existing state highway. The embankment will be approximately 1,000 feet long.

[3] Project configuration is preliminary and is subject to refinement.

2.4.4 Penstocks

The intake structure will connect directly to three steel penstocks, each approximately 14 feet in diameter and 450 feet in length.

2.4.5 Powerhouse

A powerhouse will be built of reinforced concrete and house three turbine/generator units, a service bay, and all auxiliary mechanical and electrical equipment for station operation.

2.4.6 Turbine/Generator Units

The project will have three new vertical-shaft Kaplan turbines with direct drive synchronous propeller turbines (adjustable blade runners with wicket gates) with direct drive synchronous generators. Each of the units will have a capacity rating of approximately 8 megawatts (MW) for a total installed capacity of 24 MW.

2.4.7 Tailrace Channel

The tailrace will be approximately 2,000 feet long and will extend from the downstream side of the powerhouse to the point where the tailrace merges with the river, approximately 800 feet below the dam and 400 feet below the tailwater control weir. The tailrace will have a bottom width of 100 feet and the bottom and slopes will be lined with riprap.

2.4.8 Switchyard

An outdoor electric switchyard located to the east of the powerhouse will provide the necessary increase in voltage and electrical protection for the project interconnection to the grid.

2.4.9 Primary Transmission Line

A single circuit overhead 138-kV transmission line will be required to interconnect the proposed project to the grid. The proposed interconnection will be at the existing Rich substation (owned by Sam Houston Electric Cooperative) approximately 2.5 miles east-southeast of the proposed power plant. The project will be interconnected with transmission facilities owned and operated by Entergy. The exact route of the transmission line will be determined after ETEC completes ongoing routing and environmental studies and after ETEC applies for and receives an amendment to its existing certificate of convenience and necessity (CCN) from the Public Utility Commission of Texas (PUCT).

2.4.10 Access Roads

Several new roads will be constructed to gain access or maintain access to the intake structure, the main dam, the powerhouse, and other project facilities. A total length of about 2,200 feet of new paved or compacted gravel surface will likely be required.

2.5 HYDRAULIC CAPACITY (18 CFR § 5.6(d)(2)(III)(C))

The maximum hydraulic capacity of the proposed power plant under the design head of 75 feet is approximately 4,800 cfs. The minimum hydraulic capacity, with a single generating unit operating, is approximately 400 cfs.

2.6 GENERATING CAPACITY AND ESTIMATED ENERGY PRODUCTION (18 CFR § 5.6(d)(2)(iii)(E))

Each of the three proposed turbine/generator units will have an installed capacity of 8 MW, for a total installed capacity of 24 MW. The dependable capacity of the plant is approximately 13.5 MW. The Project is expected to operate at an average capacity factor of about 60 percent.

The Project's average annual energy production is estimated at 124,030 megawatt hours (MWH). The average monthly generation profile is projected as follows:

TABLE 2-1
PROJECTED AVERAGE MONTHLY GENERATION PROFILE

MONTH	ENERGY (MWH)
January	11,367
February	12,048
March	12,819
April	12,797
May	13,138
June	12,801
July	10,528
August	7,927
September	5,546
October	5,501
November	8,571
December	10,988
TOTAL	124,030

2.7 PROPOSED MODE OF OPERATION (18 CFR § 5.6(d)(2)(iv))

The proposed hydroelectric facilities will be operated on a run-of-river basis. TRA currently controls releases from the reservoir as a function of inflow, reservoir levels, and the demands of downstream water rights holders, including the City of Houston, which has rights to 70 percent of the lake's useful storage for municipal and industrial water supplies. The reservoir operating protocols are generally set forth in a document entitled, "Livingston Dam and Reservoir Gate Operating Procedures," prepared for TRA by URS Company in 1980.

ETEC does not propose to change existing reservoir operations with respect to the quantity or timing of releases. Rather, ETEC plans to generate hydropower utilizing releases from the reservoir pursuant to TRA's existing operating protocols. Water that would otherwise be released through the dam's spillway gates (or outlet works), up to the maximum hydraulic capacity of the power facilities, will instead be diverted into a power intake canal, through penstocks to turbine/generator units, and then discharged back into the Trinity River below the dam via a tailrace canal. When scheduled releases do not exceed the power plant's hydraulic

capacity, a minimum-flow release (currently projected at 200 cfs) will be discharged through one of the spillway gates to maintain adequate oxygenation in the spillway stilling basin. During periods when reservoir releases exceed the power plant's hydraulic capacity, the excess flows will be released through the spillway gates (or, in rare circumstances, through the dam's outlet works).

Accordingly, the quantity and timing of flows in the Trinity River downstream of the Project tailrace will be unaffected by the installation of hydropower facilities at the dam. Releases up to the power plant's hydraulic capacity will simply be rerouted through the power facilities.

3.0 DESCRIPTION OF EXISTING ENVIRONMENT AND RESOURCE IMPACTS (18 CFR § 5.6(d)(2))

In accordance with Commission regulations (18 CFR § 5.6), this section contains a compilation of the existing information relevant to this Project regarding the existing environment and potential impacts of the Project, including cumulative impacts. Information in this section is intended to assist the Commission and stakeholders in identifying environmental issues and related information needs, developing study requests and study plans, and preparing documents to support any license application that may be submitted. The following general areas are addressed in subsequent sections:

- Site setting and land use;
- Geology, topography, and soils;
- River basin description;
- Water resources;
- Fish and aquatic resources;
- Wildlife and botanical resources;
- Wetlands, riparian and littoral habitat;
- Rare, threatened and endangered species;
- Recreation and land use within the Project area;
- Aesthetic resources;
- Cultural resources;
- Socio-economic resources; and
- Tribal resources and impacts.

A discussion of the current baseline conditions and potential impacts of the proposed Project on each of these areas of significance, based on currently available information, is provided.

3.1 SITE SETTING AND LAND USE

The Lake Livingston Dam and Reservoir is located in the southeastern part of Texas on the Trinity River, several miles from the town of Livingston. TRA operates the Dam and has been granted State and Federal authority for managing the water resources of the Trinity River Basin in Texas. The TRA has developed the Trinity River Master Plan for management of water resources within the drainage basin region and coordination of all the interests of the region in maintaining water quality, serving water rights holders, and providing flood control. TRA performs extensive monitoring of water quality, wildlife, aquatic habitat, recreational use and resources, development, and aesthetics with regard to Lake Livingston. This information is chronicled in a number of summary reports prepared by TRA and generally made available to the public.

3.1.1 Site Location, Description, and Land Features

Livingston Dam, the actual site of the proposed Project, is located approximately seven miles southwest of the City of Livingston, Texas (60 miles north-northeast of Houston), in the counties of Polk and San Jacinto. The Dam is located at river mile 129.2 on the Trinity River and backs up the Trinity River forming the 83,000-acre Lake Livingston Reservoir. The Trinity River crosses the State, winding in a slightly easterly direction from the headwaters in the north central part of Texas, approximately 500 miles south to the Gulf of Mexico in the vicinity of Galveston. The Trinity River Basin and Lake Livingston Reservoir specifically, are an integral part of and a critical resource for maintaining the State's water supply, providing opportunity for recreation, continued economic growth, and preservation of environmental habitats.

Although the proposed hydroelectric facilities impact only the Dam and the river immediately downstream, for the purpose of the following discussion of the environment and potential impacts of the proposed Project, a larger Project study area was identified. This larger Project study area includes all of Lake Livingston and the river section on the Trinity River downstream of the Dam extending approximately 30 miles to Romayor. The four-county Lake Region (the four counties surrounding Lake Livingston in the immediate Project area) are Polk, San Jacinto, Trinity, and Walker Counties.

The overall length of the Trinity River basin is approximately 360 miles. The Trinity River originates in a 130-mile wide headwater region in Fannin, Graysson, Cooke, Montague, Clay, and Archer Counties. The main stream begins at the junction of the Elm and West Forks at Dallas and meanders some 500 river miles before reaching Trinity Bay. In total, the Trinity River Basin encompasses all or part of 38 counties in Texas (TRA, 1983).

Development around the Lake is controlled and limited. This is in part due to the TRA's policies limiting construction in proximity to the Lake (TRA, 1993a, 1993b). The region remains rural in character even though it is within 100 miles of the very populated Dallas - Ft. Worth and Houston metropolitan areas. There are some more densely developed areas in the vicinity but they are located away from the Lake, typically adjacent to the region's major roadways and intersections.

Major highways servicing the Dam and surrounding communities include Interstate 45 to the west (connecting the Houston and Dallas metropolitan areas) and State Route 59 to the east (connecting Houston to Lufkin) (***Figure 3-1***). Access to the Dam is from either Route 222 (western abutment) or Route 19 (eastern abutment) and TRA authorization is required to access the Dam. TRA's Lake Livingston headquarters is adjacent to the eastern abutment. The 25 acres comprising Southland Park is in the immediate vicinity of the downstream side of the Dam, adjacent to the Spillway. The Park provides convenient fishing access to the high quality and turbulent waters downstream of the Dam. A section of this area is reserved for the use of the Texas Parks and Wildlife Department (TPWD) to obtain high quality brooding fish for state hatcheries and fish stocking programs.

3.1.2 Climate

The Project area is located in the south temperate, and more humid, section of Texas, approximately 100 miles from the Gulf Coast, and is characterized by long, warm and humid summers, and short, mild winters. Summer temperatures are moderated by prevailing southeast (Gulf of Mexico) winds. Light snows occur in winter upon occasion. Rainfall in the watershed varies from 30 to 40 inches in the upper basin to 40 to 50 inches in the lower basin. All 12

months average over 3 inches of precipitation monthly, with the months of May, June, and September averaging over 4 inches (Texas Almanac, 1978-1979). The Trinity River is the major source of fresh water inflow to Galveston Bay.

3.1.3 Floodplain

Due to the extensive area drained within the Trinity River Basin, heavy rainfall events in the watershed have the potential to produce flooding. Rapid surface runoff during intense thunderstorm activity can produce flash floods on the smaller tributaries and upper reaches of the River. Slow-moving floods, sometimes of long duration, are common in the middle and lower basin areas where the floodplain is wide. The extreme lower reaches of the River are also subject to hurricane-induced surge tides and strong winds typical of the Gulf Coast region. The annual flow of the stream averages five million acre-feet but is highly irregular because the rainfall is often concentrated so much that it has caused several destructive floods.

The most disastrous flood on record was that of 1908. Damage caused by that flood prompted construction of a number of reservoirs, including Lake Livingston, on the upper branches of the river basin to control flooding and provide municipal water supply. The U.S. Army Corps of Engineers (USACE) has completed and operates eight lakes on the upper Trinity River Basin for flood control and allied purposes. These installations include the Lewisville, Ray Roberts, and Grapevine Lakes of the Elm Fork Project Office, and the five Lakes of the Trinity Project Office: Benbrook, Lavon, Navarro Mills, Bardwell, and Joe Pool. There are four Soil Conservation Service Reservoirs in the river basin that impound a total of 678,090 AF of water. In addition to Lake Livingston, the TRA operates 27 in-basin water supply Reservoirs above Lake Livingston, impounding over 5,000-acre-feet each, and two below the Lake Livingston Dam, which also assist in flood control. TRA operates nine additional Reservoirs outside of the Trinity River Drainage Basin for the same purposes.

Figure 3-2 provides an enhanced aerial view of the Lake region land use features and ***Figure 3-3*** depicts a 1:24,000 scale topographic survey of the region. ***Figure 3-4*** indicates the extent of the

regional 100-year floodplain for Lake Livingston and the upstream and downstream drainage areas. The floodplain map for the lake area and Project vicinity is provided from the Trinity River Information Management System (TRIMS) as part of the Clean Rivers Program of the TRA and Texas Council on Environmental Quality (TCEQ) (TRIMS, 2007). TRA maintains the Lake Elevation at 131 feet Mean Sea Level (MSL) at Livingston Dam plus or minus one to two feet depending on the season and weather conditions.

3.2 GEOLOGY, TOPOGRAPHY, AND SOILS

Topography combined with climate greatly determines the types of activities that are conducted in a region (such as farming, forestry, and recreation) as well as the potential for flooding, presence of environmental habitat, and the range of species that may become established.

The upper Trinity Basin has rolling topography and narrower stream channels. Soils in the region are deep to shallow clay, clay loam, and sandy loam (TSHO, 2007). Higher levels of precipitation and suitable soil support elms, sycamores, willows, oaks, junipers, mesquites, and grasses. The maximum elevation in the Upper Trinity River is 1,522 feet MSL in an area northwest of Fort Worth. From this area, which averages over 1,000 feet MSL, the land gradually slopes down to sea level along the southeasterly route of the River.

The middle and lower Trinity Basin areas are characterized by gently rolling to flat terrain with wide, shallow stream channels and a broad floodplain. Clay and sandy loams predominate and support water-tolerant hardwoods, conifers, and grasses. Soils have been influenced by geologically recent Cenozoic clay and sand sediments, producing the light colored and dark gray sands or sandy loams found in the area. These soils are somewhat acidic and tend to be poorly drained. Soils around the Lake are classified as Alfisols. These are generally light in color, thinly layered, loamy and somewhat leached near the surface. With increasing depth, soils become more clayey, basic and less permeable. Layers rich in carbonate and other salts may occur in deeper strata.

Around the Lake and Project study area, topographic elevation varies from 0 to 500 feet and does not influence vegetation substantially. Topography is characterized by rolling and hilly terrain consisting of alternating sands and shales of Eocene and Miocene age. Rock outcrops in the area are of sedimentary origin. Most of the material consists of loams, fine sand, clay, fine sandy loam, and loamy fine sand. Relatively young strata of Cretaceous, Tertiary and Quaternary rocks overlay older Paleozoic rocks in the province (TRA, 1983).

3.3 RIVER BASIN DESCRIPTION

Environmental, developmental, and socio-economic features of the Trinity River Basin are summarized as follows.

3.3.1 Land Use Eco Regions

The Trinity River Basin transects eight distinct topographic and Ecological Regions. Land use region designations help to define design conditions, environmental impacts, indigenous plants and animals, water resources, soil and geological conditions and other environment related aspects of a project area. USEPA has designated ecological and land use regions based on vegetation, topography, geological, and climatic conditions using a standard systematic methodology for all of North America (Omernik, 1995). Eco Regions across the Trinity River Basin along with their key features are described below:

- North Central Prairie – Approximately seven percent of the land area of the river basin is contained within this region. The North Central Prairie region is characterized by the lightest average rainfall of the entire watershed. The topography is stony, with steeply sloping ridges made up of dense, shallow soils.

- East Cross Timbers – The geology resources of this region includes oil bearing formations that were formed during different periods of time, but contain oil that is very similar in composition.

The East Cross Timbers region extends southward from the Red River through the eastern part of Denton County, along the Dallas-Tarrant County boundary, through Johnson County and into Hill County.

- West Cross Timbers – This region is a much larger formation that extends south from the Red River through Clay, Montague, Jack, Wise and Parker Counties and onto the Colorado River. The soils are adapted to fruit and vegetable crops.

- Grand Prairie – This region is a ten mile wide stretch that separates the East and West Cross Timbers, extending south from the Red River through Cooke, Montague, Wise, Denton, Tarrant, Parker, Hood, and Johnson Counties. Sometimes known as the Fort Worth Prairie, the area has a primarily agricultural economy. The area is largely rural with no large cities except Fort Worth. The soil is predominantly limestone, with generally rockier terrain that is steeper in the southern sections compared to the gentler rolling plains around Fort Worth. The area is largely treeless and is primarily used for livestock production including beef and dairy cattle, sheep and poultry. The majority of the crops are grown for livestock feed. Some cotton is produced as a cash crop.

- Blackland Prairies – This region includes the largest part of the Trinity River Basin, comprising approximately 38 percent of the land area. It is characterized by rich rolling prairies that have developed rapidly as a major cotton farming region, farming cotton for the state. The region extends from the Rio Grande, gradually widening as it runs northeast to the Red River. Because of early agricultural development, the Blackland Prairie region remains the

most populated region in the state. This region also has the most diversified manufacturing base of the state.

- East Texas Timberlands – This region covers approximately 25 percent of the Trinity River Basin and is divided into two distinct sections. The Post Oak Savannah is the transitionary region between the Blackland Prairie on the West and the East Texas Timberlands on the east. This area has characteristics of both regions, which include native grasses and trees.

- The Coast Prairie and Marsh can be seen in Chambers County and a portion of the Liberty County area of the basin, characterized by heavy rainfall and alluvial soil. The lower portion of the watershed is suited primarily for the production of rice and dense salt-tolerant grasses, which provide excellent forage for cattle. The virtually featureless terrain of the area is poorly drained as a result of the dense soils and low elevations. The lush grass grown along the Coastal Prairie supports the densest cattle population in the state.

- The Bottomland of the Trinity River Basin consists of the floodplain areas adjacent to the tributaries and main stream and consists primarily of alluvial soil washed from the Blackland Prairies upstream. While this region contains the most potentially productive soil resources of the basin, and possibly the state, farming is a gamble due to frequent flooding.

3.3.2 Population and Regional Residential Development

The U.S. Census Bureau 2000 Census reports that the largest counties in the Trinity River Basin, hosting approximately 70 percent of the population, are Dallas and Tarrant Counties. The largest cities include Dallas, with a 2000 Census reported population of 1,118,580, and

Fort Worth, with a population of 534,694. Other cities in the basin with a population of 50,000 or more include (in order of lower population): Arlington, Plano, Garland, Irving, Grand, Prairie, Mesquite, Carrollton, Richardson, Denton, Lewisville, North Richland Hills, McKinney, and Flower Mound. The reported population for the 395 cities and designated census places within the 38 county areas comprising the Trinity River Basin was 5,235,950 in 2000 (U.S. Census Bureau, 2000).

The four counties adjacent to Lake Livingston were relatively sparsely populated at the time the Dam was built in late 1960. As of 2000, the largest cities in the immediate area were Huntsville in Walker County, population 35,078, and Livingston, in Polk County, population 5,433.

A number of smaller cities and towns are located within five miles of the Lake (U.S. Census Bureau, 2000). Of these, Trinity and Onalaska have reported populations of over 1,000.

Beginning in the 1960s and continuing with the construction of the Dam and Reservoir, a number of residential subdivisions were opened along the Lake. As a result, population growth in the four-county Lake Region was significant, but leveled off within about 10 years. The total population grew from 49,028 to 56,467 between 1960 and 1970, reflecting an annualized growth rate of 1.42 percent. From 1970 to 1980, the population increased from 56,467 to 87,080, reflecting an annualized growth rate of 4.43 percent. From 1980 to 2000, the population increased from 87,080 to 138,916, reflecting a lower annualized growth rate of 2.37 percent. The regional sustained annualized growth rate was nearly 1 percent higher than before construction of the Dam, which is equivalent to an actual increase in the rate of change of growth of approximately 67 percent above pre-dam construction levels.

However, the area remains rural in character with a relatively low population density. There are 185 platted subdivisions on the Lake as of October 2007 (TRA, October 2007). Until the Lake created suburban growth in the 1970s, Walker County, the only Lake County that is more than half urban, had a population density of 26.8 persons per square mile in 1960, which just about tripled by the year 2000 to 77.1 persons per square mile. Trinity County, which is more typical of

the area until the Dam was built, had a density of 10.7 persons per square mile, experiencing more moderate growth through year 2000, achieving a population density of 19.3 persons per square mile.

3.3.3 Commercial and Industrial Economic Development

3.3.3.1 Commercial Land Use

Commercial Land use in the region is diverse, ranging from highly developed urbanized areas to open grazing lands, pine forest, and coastal wetlands. A higher amount of rainfall in the Trinity River Basin makes the River Basin productive for timber and forest products. Commercial land use in the vicinity of the Project is more rural and focused on recreation and other activities specifically associated with the Lake. Development around Lake Livingston is controlled to enhance the environment and minimize habitat loss. Residential development is allowed but controlled to protect water resources. Much of the development is related to property development for recreation, vacation, second home ownership, and retirement.

3.3.3.2 Oil and Gas Exploration and Production

The Mid-Continent oil field extends over several states including Oklahoma, Kansas, Louisiana, and Texas. Portions of this oil field are found within the Trinity River Basin and other parts of East Texas The immediate Project region has been explored for oil (including a historic well now shown beneath Lake Livingston). The area produces some oil and gas, although it is not known as a high production area like other parts of East Texas. There are also a number of transmission pipelines in the general region of the Dam but not near or traversing the immediate location of the proposed Project (Railroad Commission of Texas, 2007a, 2007b). The Railroad Commission of Texas is the State Agency that regulates the oil and gas industry, gas utilities, pipeline safety, safety in the liquefied petroleum gas industry, and surface coal and uranium mining. Established by the Texas Legislature in 1891, the commission is the state's oldest regulatory agency. The Agency maintains historic and current records and maps related to the exploration, development, mining, and recovery of oil and mineral resources.

Minerals, Mining, and Coal

There are some mineral, mining, and related processing activities within the 38 counties of the Trinity River Basin. Asphaltic cretaceous sandstones, which are not currently quarried, occur in Cook and Montague Counties. Cement is produced in Dallas, Ellis, and Tarrant Counties. Counties producing sand and gravel used mainly for construction include Dallas, Ellis, Johnson, Kaufman, Liberty, Parker, Val Verde, and Wise. High quality high silica sand for industrial use occurs and is produced in Hardin, Liberty, and Limestone Counties (TSHO, 2007). There are four surface coal and lignite mines located within the Trinity River Drainage Basin area (Railroad Commission of Texas, 2007a).

3.4 WATER QUALITY AND WATER RESOURCES OF THE TRINITY RIVER BASIN

The Texas Commission on Environmental Quality (TCEQ) has classified all state surface waters for "uses deemed desirable" by applying water quality criteria and standards identified in accordance with the federal Clean Water Act and USEPA guidelines.

The State of Texas has 25 designated river drainage basins. The Trinity River Basin (Basin 08) is divided into 41 sub-basins. Within each sub-basin are additional divisions by area, section, stream branch, creek, and monitoring station. Of particular significance to the environmental evaluation of this Project are three segments within the Trinity River Drainage Basin:

- Segment 0802: The Trinity River Tidal to Livingston Dam,
- Segment 0803: Lake Livingston, and
- Segment 0804: Trinity River Above Lake Livingston.

On at least a biannual basis, the State of Texas surveys all surface water resources to identify water quality concerns. The most significant water quality problem impacting Lake Livingston and the greater region is non-point source pollution. Excess nutrients from urban runoff, development, and agriculture result in depressed oxygen levels, algal blooms, high bacteria levels,

and eutrophic conditions. Historically, lead and cadmium were an impairment issue in the upper Trinity River segment and cadmium was responsible for impairment in the lower Trinity, but this condition has abated, most likely attributable to improved industrial waste treatment or industrial waste minimization initiatives.

Regional water quality has improved significantly over the years since the Dam was constructed, particularly downstream of the Dam. Reduced dissolved oxygen (DO) in the Lake has been an ongoing concern and is largely due to excess nutrient loading (USEPA, 1977; Hydroscience, 1976; TRA, various years). Sulfate has recently been identified as a concern in Lake Livingston, as twelve monitoring stations during the biannual water quality survey in 2006 reported elevated sulfate concentrations for the first time (TCEQ, 2007a). The levels reported exceed levels considered non-supporting for "General Use." These levels do not impact contact recreation or potable water usage. However, they are of concern because they could potentially affect aquatic life in the Lake.

Low dissolved oxygen typically results from nitrogen and phosphate based nutrient loading or excessive sedimentation. Excessive nutrient loading results in both algal blooms and increased biological activity which consumes available oxygen. Further, when the algae dies, it decays and is then consumed through more biological activity depleting oxygen further. Depressed oxygen levels limit aquatic capacity and in extreme cases result in fish kills. Although impacted by nutrients, degradation of water quality to the point of inducing fish kills has not been observed at Lake Livingston.

Eutrophication is the term given to the situation in which surface waters receive an excess of nutrients, primarily phosphorus and nitrogen. Eutrophication is both beneficial and detrimental to fisheries. Increasing the primary production (algae and macrophytes) of a waterbody will generally increase overall fish yield. However, the resulting water quality changes such that the resulting decline in dissolved oxygen leads to changes in the quality of the fishery to favor those species that are generally more tolerant but less desirable for sport fishing. There is also evidence of reduced grazing ability of carnivorous fish brought about by increased turbidity from increased amounts of phytoplankton as well as suspended sediment. Some highly eutrophic waterbodies

also tend to produce large populations of stunted pan fish, which may be the result of inadequate predation on these fish arising from the inability of predators to see them due to increased turbidity from planktonic algae and suspended sediment (SWCSMH, 2006).

3.4.1 Existing and Proposed Water Use

Lake Livingston Reservoir was constructed by TRA to provide a dependable raw water supply for domestic, municipal, industrial, and irrigational needs to the Houston metropolitan area, the lower Trinity River Basin, and communities near the Lake.

The original water rights permit (Permit No. 1970) was issued jointly to TRA and the City of Houston in October 1960, authorizing construction of Lake Livingston Dam and impoundment for 1,750,000 AF of storm, flood and unappropriated waters of the Trinity River. The joint permittees were originally authorized to utilize 1,254,400 AF of water per year for municipal, industrial, and irrigation purposes.

Also in March 1960, Permit No. 1974 was issued jointly to TRA and Houston providing for the construction of the Wallisville Salt Water Barrier [by the U.S. Army Corps of Engineers (USACE)] on the lower Trinity River. TRA and Houston jointly were authorized to divert and use 89,600 AF of water per year from Wallisville.

In the mid-1980's the State adjudicated the water rights in the Trinity River basin. TRA's portions of Permits 1970 and 1974 were combined in Certificate of Adjudication No. 08-4248. This Certificate was issued by the State on June 9, 1986, but TRA retained its priority dates for the Livingston and Wallisville water rights of September 23, 1959, the date its original applications were filed. Houston's water rights were adjudicated separately. The State has amended TRA's Certificate of Adjudication on three occasions between 1988 and 2006 to: (1) add six counties to the service area of Lake Livingston; (2) grant TRA a permit to reuse treated waste water discharged into the Trinity River upstream of Lake Livingston; and (3) remove specific allocations of use noted above, so that TRA may use its entire water right for any permitted use (domestic, municipal, agricultural, and/or industrial).

All water used by Houston is discharged through the Dam and transported via the Trinity River to the Coastal Industrial Water Authority's pump station in Liberty County. TRA sells water and water rights to smaller consumers on a contract basis. There are currently 1341 small water sales contracts in place with TRA (TRA, 2007d). TRA utilizes its share of Lake Livingston water by entering into short-term (1 to 5 years) or long-term (22 to 44 years) water sales agreements with industries, municipalities, governmental bodies, and corporations. A summary of current major water rights and historic water use from Lake Livingston down to Wallisville is provided in ***Table 3-1***.

TABLE 3-1
LAKE LIVINGSTON/WALLISVILLE WATER RIGHTS

LAKE LIVINGSTON WATER RIGHTS:		
Houston	902,800 AF/yr =	806.0 MGD
TRA	351,600 AF/yr =	314.0 MGD
TOTAL	1,254,400 AF/yr =	1,120.0 MGD
WALLISVILLE WATER RIGHTS:		
Houston	38,000 AF/yr =	33.9 MGD
TRA	51,600 AF/yr =	46.1 MGD
TOTAL	89,600 AF/yr =	80.0 MGD
LIVINGSTON/WALLISVILLE TOTAL:		
Houston	940,800 AF/yr =	839.9 MGD
TRA	403,200 AF/yr =	360.1 MGD
TOTAL	1,334,400 AF/yr =	1,200.0 MGD
OTHER WATER RIGHTS BELOW LAKE LIVINGSTON:		
Dayton Canal System: • 33,000 AF/yr in Fixed Rights Agreement. • The City of Houston purchased the system and all water rights including the Fixed Rights.		
Devers Canal System: • 58,500 AF/yr permitted rights plus 27,500 AF/yr from TRA totaling 86,000 AF/yr in Fixed Rights. • San Jacinto River Authority purchased 56,000 AF/yr, Devers Canal retained 2,500 AF/yr + 27,500 AF/yr from TRA (total of 30,000 AF/yr) all as Fixed Rights. SJRA has no Fixed Rights on their 56,000 AF/yr.		
Chambers-Liberty Counties Navigation District: • 88,820 AF/yr in Fixed Rights Agreement. • 54,127 AF/yr if available, the diversion point is downstream of Wallisville Saltwater Barrier so the water is usually too salty. • SJRA purchased 30,000 AF/yr with no Fixed Rights. • CLCND retained 58,820 AF/yr with Fixed Rights.		
Houston: • In addition to 940,800 AF/yr from Livingston/Wallisville, Houston has 45,000 AF/yr that can be diverted from the Trinity River or Old River with no Fixed Rights.		

Historically, TRA was required to release from Lake Livingston during the irrigation season (May 15 to September 15) such quantities of water, not to exceed 1,000 cfs (approximately 2,000 AF/day), as was necessary to prevent the intrusion of salt water to existing pumping plant intakes. It was found that during a dry summer approximately 500 cfs was adequate to prevent salt water intrusion. However, the completion of the Wallisville Salt Water Intrusion Project in mid-1999 has helped to meet this water quality requirement and specific minimum releases from Lake Livingston are no longer necessary or required[4].

Other current, non-consumptive usages of Lake Livingston waters at this time are centered around various forms of recreation including fishing, hunting, water-skiing, swimming, sailing and motor boating, camping and hiking. Recreational use and opportunity in the region are discussed in ***Section 3.7***.

3.4.2 Existing Water Quality

Section 303(d) of the 1972 Federal Clean Water Act, as amended in 1985 and 1992, requires that states develop a list of water bodies that do not meet water quality standards, establish priority rankings for waters on the list, and develop action plans, called Total Maximum Daily Loads (TMDL), to improve water quality. The list of impaired water bodies is revised periodically (typically every two years).

Under this Federal requirement, the TCEQ is required to monitor the water resources of the state and report to USEPA biannually regarding the progress of achieving water quality goals. The state has established criteria to determine if a water body falls short of meeting the state's goal of maintaining its beneficial uses, such as drinking, fishing, and contact recreation. If it is determined that the designated uses of a water body are threatened or impaired, the affected water body is then placed on a list of impaired waters (commonly referred to as the 303(d) list) and the state develops action plans to achieve compliance. If the impact is severe enough, the state may recommend developing specific numerical water body-based TMDLs. A numerical TMDL is a

[4] The Wallisville Saltwater Barrier controls intrusion of salt water from Trinity Bay into the Trinity River by mechanically blocking the upstream movement of saltwater from Trinity Bay during low flow conditions.

calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards. A fraction of that amount is then allotted to each permitted discharger, so that the compliance goal for the affected receiving waterbody is not exceeded.

There have been a number of water quality assessments performed over the years for Lake Livingston. The original licensing application in 1983 contained an extensive summary of water quality data and studies conducted for biochemical oxygen demand (BOD), DO, and temperature profiles with reservoir depth; phytoplankton; macrophytes; and other parameters (TRA, 1983). These data, collected between 1973 and 1983 and presented on ***Figure 3-6***, confirmed that a similar trend toward low DO was present only 10 years after the reservoir was filled. Although Lake Livingston is considered eutrophic due to excess nutrient loading, DO levels below the spillway have always been high and overall regional water quality is improving.

Other studies of the Reservoir include a Sedimentation Survey performed by the U.S. Department of the Interior, Bureau of Reclamation (USDI, 1991) and a comprehensive water quality assessment conducted for TRA in 1998 (Espey, 1998). The latter study included a review of previous water quality studies conducted on Lake Livingston; an evaluation of the water quality database for Lake Livingston and proximate reaches of the Trinity River downstream of the reservoir for the sampling period 1988-1997; an assessment of historic and current water quality and trends; and an evaluation of TRA's water quality monitoring, data management, and QA/QC programs. This report also included an extensive analytical and field survey that included 50 physical and chemical parameters and fish tissue sampling results. Within those analyses, hundreds of chemical compounds such as pesticides, organics and metals, and water quality constituents were evaluated.

In the 1998 report, it was noted the reservoir exhibited depressed DO and increased presence of fecal coliform bacteria at the upper north end of the reservoir. Nutrient loading was also identified as a concern, but it was also noted that improvement occurred from the upper to lower end of the reservoir. Established Maximum Contaminant Levels (MCLs) for primary metals were not exceeded. Secondary MCLs for aluminum, iron, and manganese were exceeded but not at levels for human health concern.

The first 303(d) water quality assessments were reported in 1992 (TCEQ, 1992). The state reported in 1992 that only Trinity Basin Segment 0804 was identified as impaired, having high point source loadings, high usage, low DO, eutrophication, and high levels of fecal coliforms. In 1994, only Segment 0802 was listed as impaired, although the environmental stressors were not identified (TCEQ, 1994).

In the 1996 survey, Segment 0802 was listed again, indicating that aquatic life was not supported in the lower 25 miles because of mean dissolved cadmium concentration (TCEQ, 1997). Contact recreation is also not supported due to elevated bacteria at the lower end of the reach. Segment 0804 is also listed as impaired as a result of low DO. Contact recreation was also limited over a large part of the Trinity River above the Lake as a result of elevated fecal coliform bacteria.

By 1998, Segment 0802 remained impaired but only as a result of the presence of bacteria which sometimes limited contact recreation in certain areas. Segment 0803 – Lake Livingston appears on the impaired list for the first time, due to periodic low DO and high pH. Segment 0804 remained impacted by cadmium and lead. Bacteria levels on the upper 25 miles of that segment remain limiting for contact recreation (TCEQ, 1998).

The success of the Texas and TRA water quality programs is evidenced by the improvements in Segment 0802, as it was no longer listed as impaired in December of 1999 (TCEQ, 1999). Segment 0803 continued to have lower DO levels than optimum for aquatic life and a TMDL project was initiated at that time. Part of Segment 0804 remained impaired by dissolved lead and a TMDL project was also initiated for DO at determine the extent and severity of lead impact (TCEQ, 1999). Bacteria are no longer a reported concern above or below the Lake.

In December 2002, six specific monitoring locations in Lake Livingston (Segment 0803) were reported to have occasional low DO, including the Dam area, the lower-middle lake, the middle lake, the mouth of Kickapoo Creek Cove, the mouth of White Rock Creek Cover, and the upper portion of the Lake at State Highway 19. Each monitoring location represents about 5,210 acres of Lake Area. It was also reported that the area at the mouth of Kickapoo Creek also occasionally experienced high pH values. For Segment 0804, only the upper 25 miles remained listed as

impaired for contact recreation due to bacteria. Lead or cadmium were no longer identified as concerns (TCEQ, 2002).

On the 2004 list, only Segment 0803 remained listed. Five locations continued to have depressed DO levels, including the Dam area, the lower portion of the reservoir at East Willow Springs and East Wolf Creek, the middle reservoir at East Pointblank, and the upper reservoir at East Trinity. The upper reservoir at East Trinity as well as the section of the upper reservoir west of Carlisle was also impaired due to high pH (TCEQ, 2005).

The latest listing for reporting year 2006 (TCEQ, 2007a) notes impaired water quality at all 12 monitoring stations on Lake Livingston (Segment 0803) for sulfate. Sulfate is listed for the first time as a general use water quality impairment. The source of sulfate in the Lake was not identified and had not previously been identified as a concern in any prior assessment. Sulfate can originate naturally as a result of local geology and soil types. It can also result from human activity and contributions through water treatment, chemicals, aquatic herbicide application, nutrient discharge, acid mine drainage, sulfur oxide air pollution, and other sources. In Segment 0803, depressed oxygen levels were noted at the same monitoring stations in 2006 as in 2004. Segment 0804G, an unclassified water body identified as Catfish Creek, was listed as impaired for the first time due to depressed DO and an impaired macrobenthos community (TCEQ, 2007a).

The quality of water in Lake Livingston and the downstream Trinity River segment (as well as upstream) continues to be extensively monitored by TRA, TCEQ, and USGS. The Texas Water Development Board (TWDB) coordinates with these agencies and is charged with providing assistance, information, conservation education, financial resources and responsible development of Texas water resources. The TWDB also monitors regional groundwater. Figure 3-5 provides a location map for Trinity River Basin monitoring stations within the project regional area. Both Segments 0802 and 0803, which are used for water diversions, are designated suitable for recreation and domestic raw water supply.

3.4.3 Lake Livingston Reservoir

Lake Livingston Reservoir was developed primarily to provide a raw water supply for the east Texas region including the Houston metropolitan area. Since 1969, when filling the Reservoir began, it has been extensively and regularly studied for water quality and aquatic habitat.

3.4.3.1 Nutrients

Excessive nutrient inflow has produced a eutrophic state. USEPA (1977) ranked Lake Livingston the most eutrophic of 39 Texas Reservoirs surveyed in 1974. Available data show high levels of nutrients in all portions of the Reservoir with generally higher concentrations near the headwaters. Nitrogen has been determined to be the most probable limiting nutrient in Lake Livingston (Hydroscience, 1976; USEPA, 1977), though USEPA has cautioned that the apparent nitrogen limitation may be the result of excessive phosphorus inputs rather than from a scarce nitrogen supply. Although water quality has improved since the 1970s when the Lake water was first impounded, nutrients in runoff and DO levels remain a concern. Also, as noted above, sulfate has recently been listed for the first time as a water quality impairment at all 12 Lake Livingston monitoring station locations. The source of the sulfate is currently not identified.

3.4.3.2 Phytoplankton and Chlorophyll

An analysis of phytoplankton in Lake Livingston was conducted in 1977 (McCullough, 1977). Phytoplankton groups showed both seasonal and special variations in Lake Livingston. The annual mean standing crop reported was 8,511,000 cells/liter (1) with values ranging up to 22,806,000 cells/l. Values of up to 32,600,000 cells/l in 1974 have been recorded by USEPA (1977). These levels are indicative of the high rate of primary production in the Lake.

Total chlorophyll levels can be used to represent the total phytoplankton (algae) production in the Lake and is an indicator of Lake water quality and nutrient loading. Chlorophyll continues to be monitored regularly as an indication of the trophic condition of the reservoir, along with total phosphorus and Secchi disk analysis for water clarity. The TCEQ reports these data as part of the

303(d) monitoring program. The trophic classification is determined by calculating the "Carlson Trophic State Index" (TSI), which determines a standardized rating based on established formulas using inputs for Secchi disk (0 to 65 meters), total phosphorus (0 to 768 µg/l), and chlorophyll *a* (0 to 1,183 µg/l). The score for Lake Livingston in 2006 was 56.96, ranking it 73rd out of 101 Lakes in Texas (e.g., lowest ranking and lowest score means highest trophic index and poorest water quality) (TCEQ, 2007b).

3.4.3.3 Fecal Coliform

Maximum and mean concentrations of fecal coliform bacteria in Lake Livingston have shown marked declines since the Reservoir's creation. All monitoring agencies, including TRA, reported fecal coliform concentrations in excess of 1,000 organisms/100 ml during the early 1970s (TRA, 1989). However, TRA's monitoring results from 1975 to 1977 showed a maximum value of only 400 organisms/100 ml at an Upper Reservoir location. Results from locations near the Dam showed a mean value of only 9.7 organisms/100 ml from 1975 to 1982. No stretches in segments 0802, 0803, or 0804 are currently impaired by bacteria according to the 2006 303(d) reporting (TCEQ, 2007a).

3.4.3.4 Macrophytes

Studies of macrophytes in Lake Livingston (***Section 3.5 - Aquatic Resources***) have identified the major problem plants as duckweed (*Lemma*), water hyacinth (*Eichhornia carsspies*), and hydrilla (*Hydrilla verticillata*). Approximately 1,000 acres or about 1 percent of the Lake was covered with macrophytes in 2003 (TPWD, 2004). These plants are a nuisance to boaters and fishermen as they form thick mats over the water surface. Furthermore, they significantly affect the quality of the Lake in several ways: (1) they block light penetration of deeper waters in the photic zone; (2) they contribute to extreme daily changes in DO concentrations due to photosynthetic generation of oxygen in sunlight and depletion of oxygen at night; (3) upon dying, they increase the demand on DO and carry cellular nitrogen and phosphorus to the bottom of the Reservoir. TRA continues making efforts to control macrophytes.

3.4.3.5 Temperature and DO

Thermal stratification in deep reservoirs is common. Temperature induced density differences result in the formation of three quite distinct water layers: an epilimnion (warm surface water readily affected by atmospheric conditions); a thermocline (a middle layer showing a rapid temperature differential with elevation); and a hypolimnion (a relatively cold and stagnant bottom layer not directly influenced by atmospheric conditions). This impacts the distribution of DO in the affected Reservoir. Oxygen enters the system by absorption at the air-water interface and by plant photosynthesis. The maximum concentration of DO is limited by temperature. During cooler months (November through April) the water is circulated from top to bottom and substantial aeration and mixing occurs, permitting replenishment of DO utilized in the decomposition of organic matter. Continuous, 24-hour monitoring of DO at the Dam site by TRA has revealed daily fluctuations of up to 5.9 mg/l (M. Knight, personal communication).

DO is impacted by depth and temperature, and associated seasonal variability. ***Figure 3-6 and Figure 3-7*** show DO level and reservoir temperature with depth based on ten years of monitoring data collected between 1973 and 1983 (TRA, 1983).

3.4.3.6 Inorganic Constituents

Concentrations of dissolved solids, chloride, and sulfate compounds in Lake Livingston vary seasonally and are usually at their maximum during the summer and fall when evaporation is high and inflow is low. The water is usually moderately hard to hard (61 to 180 mg/l of calcium carbonate). Neither the seasonal variation of dissolved constituents in inflow nor that of water temperature has resulted in significant stratification of dissolved solids within the Reservoir (TCEQ, 1983). Concentrations of dissolved solids, chlorides, and sulfate usually average less than 250 mg/l, 40 mg/l, and 50 mg/l, respectively. Elevated sulfate concentrations recently were identified as an impairment issue throughout the entire lake.

3.4.3.7 Pesticides

Historically, the Texas Department of Water Resources (TDWR), which became the TWDB in 1985, conducted annual pesticide analyses on sediment samples taken at the State Highway 19 Bridge crossing station (0803.02). Analysis in 1982 indicated "elevated" levels of dieldrin and diazanon had been recovered from sediments at this location (TDWR, 1982). The TWDB sampling responsibilities of the Lake were later given to Texas Natural Resources Conservation Commission, which eventually became the TCEQ. Since the 1992, TCEQ has not reported Lake Livingston impairments or impaired stream segments in the sections above or below the Lake (Trinity River Basin segments 0802, 0803, or 0804) as a result of pesticides (TCEQ, 1992; TCEQ, 1994; TCEQ, 1997; TCEQ, 1998; TCEQ, 1999; TCEQ, 2002; TCEQ 2005; TCEQ 2007a). The TWDB still exists as a State agency, but is primarily involved in regional financing of water supply projects and groundwater monitoring. TRA also continues to monitor the reservoir extensively.

3.4.3.8 Metals

Iron and manganese are the most significant dissolved metals in Lake Livingston. Both are common in most soils and surface waters and both are important trace elements for plants and animals. The main problems associated with high iron and manganese concentrations are their effects on the taste of drinking water and their tendency to discolor laundry.

Surface water throughout the year, as well as bottom water during the cooler half of the year, usually contains less than 0.1 mg/l of iron and manganese. During the summer months, thermal stratification creates anaerobic conditions in the deepest portions of the Reservoir. The anaerobic decomposition of organic matter at these depths results in the release from bottom sediments of dissolved iron and manganese such that concentrations as high as 2.3 mg/l of iron and 4.7 mg/l of manganese have been observed. These values exceed the USEPA standards for drinking water (0.3 mg/l for iron and 0.05 mg/l for manganese). However, high concentrations are localized to the bottom downstream portion of the Reservoir and only occur during summer stratifications. Each year, the autumn overturn of water circulates oxygen to the bottom of the Reservoir and

causes the dissolved iron and manganese to precipitate out and settle to the bottom (TRA, 1983). During the period of 1988 to 1997 average total manganese concentrations in water ranged from 0.065 to 0.158 mg/l at six monitoring stations on the Lake. The maximum manganese concentration reported during that period was 1.987 mg/l in the main pool at the Dam (TRA, 1998).

Concentrations of heavy metals in water and sediment samples from Lake Livingston are generally not significant (USDI, 1993). However, instances of arsenic, chromium, manganese, mercury, silver and zinc levels in excess of federal criteria have been reported historically (TRA, 1978).

3.4.3.9 Summary of Lake Livingston Water Quality

In summary, Lake Livingston may be characterized as a eutrophic reservoir as evidenced by a high rate of primary production. Nutrient levels have been historically high throughout the Lake and are still a concern. Concentrations tend to be higher near the head waters; the likely contributing source is non-point source pollution in the upper Trinity. The lower 25 miles of the Trinity above Lake Livingston were identified as a segment of concern for nutrients and bacteria. These abundant nutrients contribute to excessive growths of aquatic macrophytes and algae, the metabolism of which cause substantial diurnal ranges in DO levels. Aquatic macrophytes also impede pleasure boats in certain parts of the Lake. DO levels in the Reservoir are generally high, with few samples falling below the 5.0 mg/l criterion. Waters are moderately hard and are suited for domestic water supply. There have been no problems with fecal coliform levels since the mid-1970s. Potential concerns are noted with respect to trace metals and inorganics, particularly sulfate, and also pesticides. The Lake water is considered acceptable for all uses and has high environmental value.

3.4.4 Trinity River Downstream of Livingston Dam

The river downstream of the Dam receives flow from the Reservoir either through twelve 40-foot-wide tainter gates or the outlet works, a multiple port outlet tower. Water released through the

tainter gates and the top three ports of the outlet tower usually emerge under about two atmospheres of pressure and drop up to 40 feet depending on the tailwater level. This causes an efficient exchange of oxygen to the discharged water and often results in super-saturation of the release. Conversely, flow through the two lowest tower ports does not significantly aerate the released water. Therefore, the lower ports are rarely utilized. ***Figure 3-8 and Figure 3-9*** show DO, Temperatures and Biochemical Oxygen Demand (BOD), for water downstream of the Dam. ***Figure 3-8*** data are based on ten years of sampling performed at the Lake Livingston Spillway. ***Figure 3-9*** data are based on the same ten years of sampling performed at the TRA Sampling Station at Goodrich, approximately 15 miles downstream of the Dam. These data indicate that sufficient DO is maintained in the waters below the Dam and, as noted in the discussion on water quality above, river water quality has been improving over time. The river section below the Dam, supports a vital fishery resource with a diversity of gamefish indigenous to the Region.

The river from the Dam to the tidal zone is classified by TCEQ as suitable for domestic raw water supply with no significant water quality problems. Analysis of these data in light of the occasionally poor water quality upstream of the Reservoir indicates that the Reservoir is a major recovery zone along the river system (TRA, 1983). Two tributaries to the Trinity River below the Dam bring in the only significant waste loadings in this segment. The effluent from the City of Livingston sewage treatment plant (STP) discharges into Long King Creek, and the City of Shepard STP discharges into Big Creek.

Another tributary to the downstream segment of the river is Manard Creek. This creek has not been affected by man-made developments and is a source of clean, uncontaminated water for the Trinity River (TRA, 1983).

In summary, the Trinity River below Lake Livingston Dam has no significant water quality problems. The presence of the Lake appears to act as a recovery zone for impacted waters prior to their release. Impacted water that enters the Lake does not have a significant impact on the Lake water quality and these waters do not prevent any designated use of the Lake. Non-point source discharges are the most significant contributors to water quality loading.

3.4.5 Minimum and Maximum Flow Releases

The proposed Project will operate as a run-of-river facility. There will be no change in the release procedure from the Reservoir as a result of the proposed hydroelectric development.

Since the construction of the Dam, the minimum recorded discharge in the river downstream of the Dam occurred in 1972 and was approximately 230 cfs. The highest recorded discharge since completion of the Reservoir occurred in October 1994, and was 120,000 cfs (USGS Goodrich gage). There have been a number of days that the recorded flow exceeded 100, 000 cfs. Discharges of 79,200 cfs were sustained for two days on September 24 –26, 2005 to release water following damage to the upstream face of the dam during Hurricane Rita (TRA, 2005). Limited flooding is occasionally a consequence of such controlled water release that, if not controlled, would result in catastrophic flooding.

3.4.6 Ongoing Measures by TRA to Protect Water Quality

TRA has the responsibility for maintaining high water quality standards within Lake Livingston. The organization currently is involved in four major, long-term programs designed to insure high quality water. These are: (1) a septic system program; (2) sewage treatment plant operation/technical assistance; (3) an intensive water quality monitoring program; and (4) yearly spraying to control nuisance growth of aquatic macrophytes. The programs are described as follows.

3.4.6.1 Septic System Program

On March 26, 1971, the Texas Water Quality Board (which through a series of consolidations and agency name changes became part of the TNRCC which became the TCEQ) passed and approved Order 69-5, thereby establishing rules and regulations governing the control of private sewage systems around Lake Livingston. This was done at the request of TRA and was the first such order in the state directed specifically to a Reservoir.

This regulation established a Water Quality Area around Lake Livingston from the operating pool elevation of 131.0 feet MSL landward for 2,000 feet. An area of 75 feet around the perimeter of the Lake and adjacent to the 131.0 foot level has been established as the Restricted Area in which no soil absorption lines may be placed.

The Septic System Program currently is responsible for over 6,700 conventional systems and more than 1,840 aerobic systems (TRA, 2007d), with an average of 400 new systems added yearly. Half of all systems are inspected yearly, so renewal licenses are issued for a two year period (TRA, 1983).

3.4.6.2 Sewage Treatment Operations

TRA owns and operates a number of wastewater facilities upstream of Lake Livingston, including Central (100 MGD) and Ten Mile Creek (7 MGD) in the Dallas area. TRA is involved in the issuance of bonds for the financing of small public and private water pollution control facilities upstream of the Lake, including the Huntsville STP, the Crockett STP, and the Buffalo STP.

In addition, TRA provides a technical assistance program for privately owned STPs. This program was started in 1975 by TRA and provides professional assistance in the operation of privately owned sewage treatment plants. This service is provided on a contract basis with each treatment plant owner. A licensed treatment plant operator employed by TRA visits each contracted facility a specified number of times each week to make process adjustments, to make field measurements and control tests, check on the maintenance of equipment, and to collect samples for laboratory analysis.

3.4.6.3 Water Quality Monitoring Program

TRA has been the formal local planning agency for the Trinity River Basin since 1971, operating under state and federal law. In this capacity, TRA is responsible for all water quality planning in the basin. A Water Quality monitoring program was initiated by TRA in 1972 for Lake Livingston. Several agencies, including TRA, USGS, and TCEQ routinely monitor more than 36

stations in the Reservoir, the Trinity River above and below the Lake, and in various tributaries entering the Lake and River. Other agencies such as USACE, TPWD, USEPA, and USFWS also monitor the hydrology, environmental health, ecology, and development throughout the Lake Region and River Basin. Monitoring along the main pool of the Reservoir reveals changes in water quality as water moves through the Lake. Shoreline and tributary stations are designed to show the effects of runoff and of development in areas around the Lake. River stations document the changes in water quality as the river flows into the Lake and flows downstream to the various water users. Wastewater treatment plants are monitored regularly to help insure that these facilities are operated adequately and meet current standards and best management practices for treatment.

The NPDES program regulates point source discharges, as well as requiring permits for non-point source discharge, such as stormwater associated with industrial activities and stormwater associated with construction. These non-point source permitting programs require obtaining NPDES permit coverage and implementing best management practices for controlling non-point source pollution in stormwater. This monitoring program provides coverage of water quality parameters, which relate to water supply suitability, eutrophication of the Reservoir, pollution control and the well-being of aquatic life. ***Figure 3-5*** shows the location of various monitoring stations throughout the region.

3.4.6.4 Control of Aquatic Macrophytes

Approximately 1,000 acres or about 1 percent of the Lake was covered with macrophytes in 2003 (TPWD, 2004). In an effort to control the spread of aquatic macrophytes (water hyacinths and hydrilla), TRA laboratory personnel have been chemically treating certain areas of the Lake with aquatic herbicides from 1974 to present. Additionally, TPWD has had an ongoing aquatic vegetation control program throughout the state waters. State and federal governments prohibit a number of invasive and exotic plant and animal species from being brought into the state and have rigorous controls and enforcement in place to protect state waters and wildlife.

3.4.7 Impact of Project on Water Quality

Construction activities associated with the Project may have short-term effects on the aquatic environment, primarily increases in turbidity and suspended sediments. Since much of the construction will be conducted "in the dry," sediment generating activities will be largely confined to the dredging removal of earth separating the river channel from the completed tailrace, and the dredging of the most distant portion of the headrace within the Lake, neither will have long-term effects on the Lake or the river downstream. It is anticipated that sediment containment measures will be applied at the headrace/lake and the tailrace/river junctions in the form of silt curtains, silt socks, or similar.

Operation of the new power facility will be in the "run-of-river mode," hence there will be no fluctuations of either lake-shoreline or downriver shoreline over those which would otherwise have been experienced. Water for power generation will be withdrawn from the upper 15 feet of the Lake; hence there will be little possibility of releasing anoxic, hypolimnic water downstream.

Erosion along the transmission line corridor is not expected to occur because of the relatively flat terrain. However, erosion control measures will be applied as necessary during development of the transmission corridor.

3.4.8 Water Quality Certification

ETEC will be requesting certification from the TCEQ as described in Section 401 of Federal Water Pollution Control Act, popularly referred to as the Clean Water Act (CWA). This request will be made in conjunction with both the FERC licensing and a dredge and fill permit application to the USACE, under Section 404 of the CWA.

3.4.9 Ecologically Significant Stream Segments

As a result of the passage of Senate Bill 1 in 1997, water planning in Texas became the responsibility of regional planning groups. The State was divided into 16 planning groups

designated A through P, generally corresponding to river drainage basins and eco-regions. The Lake Livingston Hydroelectric Project is located in State Water Planning Region H. A map of the water planning regions can be found on the TPWD web page (TPWD, 2007e). Each regional planning group may include recommendations for the designation of ecologically unique river and stream segments in their regional water plan. The following criteria are to be used when recommending a river or stream segment as being of unique ecological value:

1. **Biological Function:** Segments which display significant overall habitat value including both quantity and quality considering the degree of biodiversity, age, and uniqueness observed and including terrestrial, wetland, aquatic, or estuarine habitats.

2. **Hydrologic Function:** Segments which are fringed by habitats that perform valuable hydrologic functions relating to water quality, flood attenuation, flow stabilization, or groundwater recharge and discharge.

3. **Riparian Conservation Areas**: Segments which are fringed by significant areas in public ownership including state and federal refuges, wildlife management areas, preserves, parks, mitigation areas, or other areas held by governmental organizations for conservation purposes under a governmentally approved conservation plan.

4. **High Water Quality/Exceptional Aquatic Life/High Aesthetic Value:** Segments and spring resources that are significant due to unique or critical habitats and exceptional aquatic life uses dependent on or associated with high water quality.

5. **Threatened or Endangered Species/Unique Communities:** Sites along segments where water development projects would have significant detrimental effects on state or federally listed threatened and endangered species, and sites along segments that are significant due to the presence of unique, exemplary, or unusually extensive natural communities.

The Texas legislature may designate a river or stream segment of unique ecological value following the recommendations of a regional water planning group. This designation solely means that a state agency or political subdivision of the State may not finance the actual construction of a reservoir in a specific river or stream segment designated by the legislature under this subsection.

Two stream segments relevant to the project have been designated as Ecologically Significant Stream Segments. These are as follows:

Ecologically Significant Stream Segment Trinity River Below Lake Livingston: This section of the Trinity River meanders between gently sloping banks lined with interspersed bottomland hardwood forest, cultivated land, residential housing developments, and commercial development. This section of the river provides valuable recreational opportunities such as boating, fishing, and swimming and supports abundant wildlife habitat. Adjacent oxbow lakes and marshes associated with the bottomland forest also provide habitat for wildlife such as migrant waterfowl. The portion of the river downstream of IH 10 has many interconnecting sloughs and bayous that provide habitat for alligators, beavers, waterfowl, and other wildlife. Bald eagles have nested in this area for years and are commonly found during winter. Other commonly seen birds include anhingas, white-ibis, herons, cormorants, egrets, roseate spoonbills, red-shouldered hawks, and numerous migratory songbirds. The ecologically significant segment is from the confluence with Trinity Bay in Chambers County upstream to FM 787 in Liberty County. This is within TCEQ stream segment 0801 and 0802. The designation of this segment was made based on meeting the following listed criteria:

1. **Biological Function** - estuarine delta, extensive freshwater wetland habitat and bottomland hardwood forest that display significant overall habitat value.

2. **Hydrologic Function -** wetland habitats perform valuable hydrologic functions relating to flood attenuation and water quality.

3. **Riparian Conservation Area** - fringed by the Wallisville Lake Project (COE), the Trinity River National Wildlife Refuge and Davis Hill State Park.

4. **Threatened or Endangered Species/Unique Communities** - woodstork and alligator snapping turtle.

Ecologically Significant Stream Segment Trinity River Above Lake Livingston: The Trinity River upstream of Lake Livingston has steep muddy banks lined with elm, sycamore and willow trees. The river meanders through isolated areas and is fed by numerous scenic creeks that provide habitat to abundant fish and wildlife. The channel is wide and contains many sandbars that can be utilized for camping and day use. A variety of game fishes can be caught in this reach including freshwater drum, striped bass, white bass, yellow bass, flathead catfish, channel catfish, blue catfish, as well as a number of sunfish species. Also present are gar, shad, minnows, suckers, western mosquito fish, silversides, and dusky darters. The ecologically significant segment is from Lake Livingston in Walker/Trinity County upstream to State Highway 7 in Leon/Harris County. This is within TCEQ segments 0803 and 0804. The designation of this segment was made based on meeting the following criteria:

1. **Hydrologic Function** - performs valuable hydrologic functions relating to the groundwater recharge of the Chicot Aquifer

2. **Threatened or Endangered Species/Unique Communities -** one of the two largest populations of rare, endemic Texas heelsplitter remaining.

3.5 AQUATIC WILDLIFE, AND BOTANICAL RESOURCES

3.5.1 Aquatic Resources

Lake Livingston supports a healthy, diverse warm water fishery. At the time of the construction of the Lake Livingston Reservoir, The Trinity River Basin Water Quality Management Plan listed approximately 80 species of fish as possible inhabitants of the Lake and its major tributaries. Subsequent reports (Menn, 1976; Bounds et al., 1982) confirm the highly productive nature of the Lake. The TPWD reports that in 2007 the most abundant species in the Lake include largemouth bass; bluegill; blue, channel, and flathead catfish; white bass; striped bass; and crappie.

Over the years, the TPWD has stocked Lake Livingston to enhance sport fishing and resource conservation. From 1977 to 1980, TPWD biologists stocked 1,509,400 striped bass in Lake Livingston. The stocking has continued yearly, mainly for bass and other sport fish.

Reports on fish fauna, population composition, and abundance for the stretch of the Trinity River immediately below the Livingston Dam are not nearly as comprehensive as those for the Lake proper. The most frequently caught species in the tailrace below the Dam are catfish, crappie, freshwater drum, and striped and white bass (Bounds et al., 1982).

The Dam acts as a complete barrier to upstream movements of adromous and estuarine species of fish. Striped bass, in particular, tend to congregate at the base of the Dam and it is from these fish that TPWD biologists collect female brooders and sexually mature males, transporting them to one of the three state hatcheries for eventual spring stocking of lakes and rivers in Texas. In 1983, at the base of the Dam, TPWD collected 127 fish (73 female and 54 male) weighing between 7 and 28 pounds (TRA, 1983).

Limited study has been conducted of the benthic macro invertebrates inhabiting Lake Livingston and the Trinity River downstream of the Reservoir (McCullough, 1977; TRA, 1983). Benthic macro invertebrates in Lake Livingston were studied for the 1974 Trinity River Basin Water

Quality Management Plan (TRA 1983). McCullough (1977) surveyed the diversity of benthic macro invertebrate species in Lake Livingston. Results of these studies reveal low benthic diversity, dominated by chironomid fly larvae and oligochaetes, in the upstream end of the reservoir. Amphipods and damselfly and dragonfly nymphs were relatively abundant among the roots of water hyacinths floating in the lake. Other invertebrate taxa inhabiting water hyacinth roots included adult and larval water beetles (Dytiscidae and Hydrophilidae), spiders, water bugs (Hemiptera) and flies (Diptera). Standing trees and submerged aquatic vegetation provided substrate for crustaceans and caddisfly nymphs (Psychomyidae). At depth within the Reservoir, taxa diversity and abundance declined with the exception of the mayfly nymph, *Hexagenia limbata*.

McCullough (1977) performed intensive phytoplankton and zooplankton identification studies on the Reservoir. Since that time, TRA's frequent analyses of chlorophyll levels provide an appropriate indicator of phytoplankton numbers and primary production. Diatoms generally dominate the phytoplankton population on both upper and lower portions of the Lake. Blue-green algae often become an important part of the phytoplankton in the lower reaches of the Reservoir. Green algae and eugienophytes are also common plankton in the Lake. The Lake is subject to periodic phytoplankton blooms, although improvements in river basin water quality have helped to limit and control algae proliferation.

Bounds (Bounds et al., 1982) identified 23 species of aquatic vegetation in Lake Livingston. Hydrilla and water hyacinths are the most common (corroborated by McCullough, 1977). In a study conducted by Menn (1976), 6.9 percent of the total Lake area was infested with some form of aquatic vegetation with approximately 400 acres of water hyacinth and 150 acres of hydrilla. Bounds (Bounds et al., 1982) found increased acreage of hydrilla and water hyacinth over Mann's 1976 values, but a decrease in the amount of coontail. The total area infested by aquatic vegetation in 1981 (Bounds et al., 1982) was approximately 7 percent (not including the filamentous green algae of the Lake).

The Project area includes two distinct aquatic ecosystems – Lake Livingston (TCEQ Segment 0803) and the Trinity River above and below Lake Livingston Dam (TCEQ Segments 0802).

Further, the Lake water quality is strongly influenced by the quality of the inflow drainage contributions from Trinity River Basin drainage segments above the Lake (TCEQ segments 0804 to 0841). The impoundment of the Trinity River to form Lake Livingston significantly modified the hydrology and water quality of the river. The construction of Livingston Dam and Lake Livingston created a largely an artificial ecosystem, which is dominated by relatively few fish species that are adapted to lentic environments. The Trinity River downstream of Lake Livingston is relatively undeveloped and consists of natural stream features. As with other similar reservoirs and dams, the diversity of the aquatic community is generally reduced by the modified flow and temperature regimes associated with reservoir operations (Yeager, B.L., 1993). However, the reservoir and dam operations also provide significant benefits, including development of important sport fisheries, as described in the following sections.

Lake Livingston and the Trinity River downstream of Livingston Dam are particularly important to the TPWD striped bass (*Morone saxatilis*) stocking program. The reservoir and river downstream of the reservoir created an environment that favors this species. As a result, TPWD relies on Lake Livingston and the river below the dam to provide striped bass brood stock for the agency's stocking program. Striped bass are stocked in the reservoir, where some of the fish migrate downstream, through the dam. Many of the striped bass congregate immediately below the dam, where adult fish are harvested, transported to the TPWD hatcheries, and spawned. Offspring of these fish are reared in hatchery ponds and then stocked in selected waterbodies around the state. The following sections provide an overview of the reservoir and river in the vicinity of the Project and include discussions on the aquatic communities.

3.5.1.1 Lake Livingston

The aquatic flora and fauna are reflective of species adapted to lentic environments. The change in the ecosystem that occurred with the impoundment of the Trinity River resulted in the development of an important warm-water sport fishery.

The TPWD Inland Fisheries Division surveys the reservoir approximately every three years using standardized sampling techniques, including boat electrofishing, gill nets and trap (frame) nets.

These sampling techniques are designed to collect qualitative population data for monitoring sport fish and selected forage species (Murphy and Willis, 1996). In addition, the TPWD conducts periodic angler (creel) surveys. Monitoring results are summarized in performance reports as required by the Federal Aid in Fisheries Restoration Act.

Although sport fish and forage species are targeted when sampling, the reports often list all species collected in samples. A list of species collected from 1990 through 2004 is provided in Table 3-2. This is not believed to be an exhaustive list. Often, smaller species are not collected due to sample technique bias.

According to TPWD (TPWD, 2000; TPWD 2004), largemouth bass are the most popular sport fish with approximately 43 percent of directed angling effort is spent pursuing this species. However, electrofishing catch rates of largemouth bass are very low. During the most recent survey, only one largemouth bass was collected that was >14 inches in length (TPWD, 2004). The low abundance of largemouth bass is related to the scarcity of aquatic plants and turbidity/silt loading in the reservoir (TPWD, 2000; TPWD, 2004).

TABLE 3-2
SPECIES COLLECTED FROM LAKE LIVINGSTON DURING 1990, 1991, 1993, 1996, 1999, AND 2004 ELECTROFISHING, GILL NETTING, AND TRAP NETTING SURVEYS (TPWD, 2004; TPWD, 2000)

COMMON NAME	SCIENTIFIC NAME	COMMON NAME	SCIENTIFIC NAME
Spotted gar	*Lepisosteus spatula*	White bass	*Morone chrysops*
Gizzard shad	*Dorosoma cepedianum*	Striped bass	*M. saxatilis*
Threadfin shad	*D. petenense*	Yellow bass	*M. Mississippiensis*
Common carp	*Cyprinus carpio*	Warmouth	*Lepomis gulosus*
Bullhead minnow	*Pimephales vigilax*	Bluegill	*L. macrochirus*
Smallmouth buffalo	*Ictiobus bubalus*	Redear sunfish	*L. microlophus*
River carpsucker	*Carpiodes carpio*	Longear sunfish	*L. megalotis*
Flathead catfish	*Pylodictis olivaris*	Orangespotted sunfish	*L. humilis*
Blue catfish	*Ictalurus furcatus*	Largemouth bass	*Micropterus salmoides*
Channel catfish	*I. punctatus*	White crappie	*Pomoxis annularis*
Inland silverside	*Menidia beryllina*	Black crappie	*P. nigromaculatus*
Brook silverside	*Labidesthes sicculus*	Freshwater drum	*Aplodinotus grunniens*

White bass, striped bass crappie, blue catfish, flathead catfish, and channel catfish are also sought by anglers at Lake Livingston (TPWD, 2000; TPWD, 2004). Collection of white bass in gill nets is highly variable and the number of anglers that seek white bass is believed to be low. However, those that fish for white bass are generally successful. Although striped bass are stocked almost annually, their abundance is low and there does not appear to be a significant striped bass fishery in the reservoir. Blue catfish are the most common species of catfish in the reservoir. Channel catfish and flathead catfish also occur, but at much lower numbers than blue catfish. Catfish are important to recreational anglers, but there was not estimate of the directed angling effort for these species. In addition, there is limited commercial fishing allowed for catfish in Lake Livingston. Crappie catch rates in trap nets are highly variable and are believed to be the result of variable spawning and recruitment success. Approximately 2 percent of the angling effort is directed toward crappie.

Although not listed in the TPWD reports, longnose (*Losseus*), spotted, and alligator gar (*L. spatula*) are often sought by bow anglers. In particular, the alligator gar is one of the more important gar species for bow anglers. There are several species of gar within the Lake whose populations (based upon collection frequencies) appear to be stable from 1975 to 1981. In 1981, an alligator gar that was 7-foot long and weighed 160 pounds was collected from a cove near the Livingston Dam during a 1981 fisheries survey (TRA, 1983) survey near the dam (TRA, 1983)

Habitat surveys (TPWD, 2000; TPWD, 2004) indicated that habitats are severely limiting in Lake Livingston (TPWD, 2000). There were no submerged aquatic plant species in the reservoir. Approximately 106 miles of shore (36 percent) consisted of bulkhead. Flooded timber/brush was the most common habitat feature and was found in approximately 14 percent of the reservoir.

Although physical habitats in Lake Livingston are inadequate for cover-dependent species, the reservoir is highly productive with respect to phytoplankton communities (Menn, 1976; Bounds et al., 1982). As described in more detail under Section 3.4, the reservoir receives treated wastewater both locally and from the drainage area above the Lake including the heavily populated areas of the Dallas-Ft. Worth metroplex. While significant improvements in wastewater treatment have occurred since the reservoir was built, the Trinity River and Lake Livingston remain high in nutrients. The nutrients from both point and non-point sources, promote phytoplankton production, which serves as an important basis for the food web in the reservoir. Forage species, such as shad and sunfish benefit from the plankton communities. The TPWD (2000 and 2004) reported high electrofishing catch rates of shad and sunfish. In turn, these species are important prey for the recreationally important species.

The TPWD frequently stocks fish in Lake Livingston (TPWD, 2007g). Striped bass are stocked almost every year. Approximately 15 million striped bass were stocked from 1977 through 2007. Florida largemouth bass are periodically stocked, with the latest stocking in 2006 and 2007, which totaled approximately 400,000 fish. Other historically stocked species included blue and channel catfish and paddle fish (*Pylodon spatula*).

Management strategies for Lake Livingston include establishing native aquatic plants to improve habitat and stocking of advanced-size Florida largemouth bass and crappie (TPWD, 2004; TPWD, 2000). The stocking of advanced-size juvenile fish might help to increase recruitment of these species since nursery habitat is limiting.

As noted above, Lake Livingston supports a warm water fishery. At the time of the construction of the Lake Livingston Reservoir, The Trinity River Basin Water Quality Management Plan listed approximately 80 species of fish as possible inhabitants of the Lake and its major tributaries. The TPWD reported that in 2007 the most abundant species in the Lake include largemouth bass; bluegill; blue, channel, and flathead catfish; white bass; striped bass; and crappie. Nutrient loading and turbidity from upstream shoreline erosion and development in the upper Basin continue to be water quality concerns as these contributors can promote eutrophic conditions in the Lake and over time, can impact the diversity and quality of fisheries resources in the Lake.

3.5.1.2 Macroinvertebrates

Limited study has been conducted of the benthic macroinvertebrates inhabiting Lake Livingston and the Trinity River downstream of the reservoir (McCullough, 1977; TRA, 1983). Benthic macroinvertebrates in Lake Livingston were studied for the 1974 Trinity River Basin Water Quality Management Plan (TRA 1983). McCullough (1977) surveyed the diversity of benthic macroinvertebrates in Lake Livingston or benthic macro invertebrate species in Lake Livingston. Results of these studies reveal low benthic diversity, dominated by chironomid fly larvae and oligochaetes, in the upstream end of the reservoir. Amphipods and damselfly and dragonfly nymphs were relatively abundant among the roots of water hyacinths floating in the lake. Other invertebrate taxa inhabiting water hyacinth roots included adult and larval water beetles (Dytiscidae and Hydrophilidae), spiders, water bugs (Hemiptera) and flies (Diptera). Standing trees and submerged aquatic vegetation provided substrate for crustaceans and caddisfly nymphs (Psychomyidae). At depth within the reservoir, taxa diversity and abundance declined with the exception of the mayfly nymph, Hexagenia limbata.

3.5.1.3 Phytoplankton and Zooplankton

McCullough (1977) performed an intensive phytoplankton and zooplankton identification studies on the Reservoir. However, TRA's frequent analyses of chlorophyll levels provide an appropriate indicator of phytoplankton numbers and primary production. Diatoms generally dominate the phytoplankton population on both upper and lower portions of the Lake. Blue-green algae often become an important part of the phytoplankton in the lower reaches of the Reservoir. Green algae and eugienophytes are also common plankton in the Lake. The Lake is subject to periodic phytoplankton blooms, although improvements in river basin water quality have helped to limit and control algae proliferation.

3.5.1.4 Macrophytes

Bounds (Bounds et al., 1982) identified 23 species of aquatic vegetation in Lake Livingston. Hydrilla and water hyacinths are the most common (corroborated by McCullough, 1977). In a study conducted by Menn (1976), 6.9 percent of the total Lake area was infested with some form of aquatic vegetation with approximately 400 acres of water hyacinth and 150 acres of hydrilla. Bounds (Bounds et al., 1982) found increased acreage of hydrilla and water hyacinth over Mann's 1976 values, but a decrease in the amount of coontail. The total area infested by aquatic vegetation in 1981 (Bounds et al., 1982) was approximately 7 percent (not including the filamentous green algae of the Lake. TPWD reported approximately 1,000 acres or about 1 percent of the Lake was covered with invasive macrophytes (mainly hyacinth and water lettuce) in 2003 (TPWD, 2004). TRA reported treatment of approximately 988.75 acres of hyacinth and water lettuce in 2007 (TRA 2007d).

3.5.1.5 Paddlefish

Paddlefish are a State-listed threatened species in Texas. Their native range is limited to rivers in east Texas and prior to the 1990s, most of the species was believed extirpated from most of its range in Texas due to construction of dams on the rivers (Betsill, 1999). A program to reintroduce paddle fish to selected river segments through stocking was conducted in the 1990's

by the TPWD. Results of the restoration efforts are provided in TPWD (1999). The Trinity River upstream of Lake Livingston was one of the river reaches that was identified as possible paddlefish spawning habitat. Paddlefish were stocked in Lake Livingston from 1990 through 1992, where approximately 110,000 juvenile paddlefish were released. A tracking study using radio telemetry was performed on the Neches River to identify habitat use and movement of young paddlefish (Pitman and Parks, 1994). Results of the study indicated that paddlefish moved downstream through a reservoir floodgate on the Neches River. Although not specifically studied by TPWD, paddlefish were found in the Trinity River, downstream of Livingston dam, which indicated that some of the stocked fish moved through the dam. While paddlefish are presently found in the Trinity River, spawning of the fish has not been documented (Todd Engling, TPWD, personal communication).

3.5.1.6 Trinity River Downstream of Livingston Dam

The Trinity River basin supports a broad diversity of fish species. Hubbs et al. (1991), Thomas et. al. (2007), and Bonner (2007) lists approximately 110 species of fish that occur in the Trinity River and its tributaries. However, there were no recent studies located that document fish or invertebrate species diversity immediately below Livingston Dam.

Livingston Dam is a complete barrier for the upstream migration of fish and adromous and estuarine species. However, fish frequently pass downstream, through the flood gates, as evident by the passage of striped bass from the reservoir into the Trinity River below the dam.

The tailrace of the Livingston Dam supports a unique and important fishery. Striped bass, in particular, tend to congregate at the base of the Dam and it is from these fish that TPWD biologists collect female brooders and sexually mature males, transporting them state hatcheries for spring stocking Lakes and rivers in Texas. The tailrace is also very popular destination for anglers who seek a variety of species, including striped bass. The highest period of angler utilization is during the spring, when large numbers of striped and white bass congregate below the dam. According to the TPWD (2004), some of the striped bass are believed to be andromous, migrating upstream from Trinity Bay during the spring. Periodic spawning of striped bass is

believed to occur. In addition to the temperate bass, other species are also recreationally important, including crappie and catfish (Bounds et al., 1982). The reach of river from the dam to Trinity Bay is also important to recreational anglers who primarily seek catfish, but freshwater drum and smallmouth buffalo are also important. Longnose, spotted, and alligator gar are also sought by bow anglers along this reach of the river. Limited commercial fishing is allowed for smallmouth buffalo in the river and immediately below the dam. In addition, anglers use the tailrace area to collect bait fish, including gizzard and threadfin shad.

Fish and benthic macroinvertebrate diversity is believed to be relatively low immediately downstream of the dam due to flow, temperature, and habitat modifications. Species with specific natural habitat requirements (e.g. Cyprinidae and Percidae) are likely absent or occur in low numbers near the tailrace (Yeager, 1993). However, marine species are known to occur below the dam including blue crab (*Callinectes sapidus*), stripe mullet (*Mugil cephalus*), and skipjack herring (*Alosa chrysochloris*). American eel (*Anguilla rostrata*) are a catadromous species that also occurs in the Trinity River downstream of the dam. As previously discussed, paddlefish also occur in the Trinity River below Livingston Dam, which are probably stocked fish from the TPWD paddlefish restoration effort.

3.5.2 Wildlife Resources

The middle section of the Trinity River Basin (including Lake Livingston) hosts an enormous diversity of reptiles, birds, mammals, and fish. All of these are potential inhabitants of the Lake Livingston regional area, but their presence at the Powerhouse Site, which is located to the edge of the Dam, or along the transmission corridor, is limited by the residential and agricultural development of the areas to be traversed (TRA, 1983).

3.5.3 Botanical Resources

Plant distribution and vegetation composition are a function of climate, geology, topography and soils in addition to biotic (wildlife, insects, disease, etc.) factors. The vegetation in the Project area is largely a result of anthropogenic influences. Lumbering, burning for cultivation and

grazing, agriculture, and residential development have all contributed to the distribution and diversity (or lack of diversity) of vegetation. Most of the native vegetation has been logged, with clear-cutting the most common logging practice. Timber production in Texas has grown substantially throughout the 1990s. Major commercial timber species are loblolly, shortleaf, longleaf and splash pines. Hardwoods (oaks, hickory, and maple) are also present in the overstory, but much of the area has been cleared and typically replanted with pine. Vegetation along the Trinity River Basin has been sampled by Gould (1969), Mahler (1972), Nixon (1972a, b, 1973), and Nixon and Willett (1974). An ecological study of the vegetation was undertaken in the Big Thicket, an area approximately 20 miles east of Lake Livingston, by Marks and Harcombe (1981).

Sweetgum and oak are the dominant overstory species and are abundant in areas surrounding Lake Livingston. Willow, laurel, and southern red are the dominant oaks. Black willow, hawthorn, and water locust make up the other principal hardwood overstory. Loblolly pine is the predominant conifer of the area.

There are a number of aquatic plant species that live the shallow and marginal zones of the Lake. Hydrilla, rhizoclonium, water hyacinth, smartweed, senna bean, and coontail are the most prevalent. Water hyacinth and hydrilla in particular are invasives and an active program is ongoing to control their extent on the Lake. TCWD reports that in September 2003, approximately 900 acres of Lake Livingston or about 1 percent of the lake surface were covered by aquatic vegetation. Despite being a nuisance plant, hyacinth was found to provide extensive habitat for macroinvertebrates as noted previously.

3.5.4 Wetlands, Riparian, and Littoral Habitat

The USFWS defines wetlands as "lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water." For purposes of this classification, wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports hydrophytes, (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is non-soil and is saturated with water or covered by

shallow water at some time during the growing season of each year (Cowardin, 1979)[5]. The USFWS definition includes swamps; freshwater, brackish water, and saltwater marshes; bogs; vernal pools, periodically inundated salt flats, intertidal mudflats, wet meadows, wet pastures; springs and seeps; portions of lakes, ponds, rivers and streams; and all other areas which are periodically or permanently covered by shallow water, or dominated by hydrophytic vegetation, or in which the soils are predominantly hydric in nature. In some instances wetlands may also be defined as riparian or littoral zones.

The site is located within the Pineywoods Vegetation Region in an area also known as the Big Thicket. The majority of historically wetland and riparian areas above the dam are currently under the waters of the lake. As is evident from National Wetland Inventory (NWI) maps, there are numerous forested and unforested wetlands in the area near and downstream of the dam. Most are located within the 100-year floodplain of the Trinity River (which serves as the Polk / San Jacinto County line) and its tributaries. Laurent Lake and Baker Lake are two water features that occur this area. Riparian areas may be wetland or not and may include forested and nonforested areas. The following descriptions from available literature are typical for the area, but are not necessarily specific to the study site.

The riparian areas may include dry upland forests, with common or dominant loblolly pine (Pinus taeda), mixed with broad-leaved deciduous trees commonly including sweetgum (Liquidambar styriciflua), southern red oak (Quercus falcata), post oak (Q. stellata), winged elm (Ulmus alata), and hickory (Carya spp.). In the broad flat portions of the floodplains that are seasonally flooded, forests are a mix of flood-tolerant deciduous hardwoods, including willow oak (Quercus phellos), laurel oak (Q. laurifolia), overcup oak (Q. lyrata), swamp chestnut oak (Q. michauxii), sweetgum (Liquidambar styriciflua), American elm (Ulmus americana), swamp tupelo (Nyssa biflora), and red maple (Acer rubrum). Deciduous holly (Ilex decidua), American snowbell (Styrax americana), and mayhaw (Vaccinium opaca) are common understory shrubs. On the higher portions of broad floodplains, inter slough areas or old sandy ridges, common species are loblolly

[5] Similarly, the Environmental Protection Agency (EPA) defines wetlands as follows: "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas." 40 CFR § 230.3(t).

pine (Pinus taeda), water oak (Quercus nigra), sweetgum, white oak (Q. alba), and cherry-bark oak (Q. falcata var. pagodifolia). Thickets of giant cane (Arundinaria giagantea) are common. Swamps are the lowest wettest areas within the floodplains. They form in old stream channels, like abandoned oxbows. They may be seasonally or semi-permanently flooded. Common species in the more permanently flooded areas include bald-cypress (Taxodium distichum), and water tupelo (Nyssa aquatica). Less wet areas support forests of Carolina ash (Fraxinus caroliniana), black willow (Salix nigra), and water elm (Planera aquatica).

Most of the marshes (i.e., nonforested wetlands) in this area would eventually grow into swamps or other forested wetlands if left undisturbed. Typical species include sedges (Cyperaceae), rushes (Juncaeae), and grasses (e.g., marsh millet (Zizaniopsis milaccea), rice cut-grass (Leersia oryzoides)). Cattails (Typha spp.) are also common as well as aquatic (floating and submerged species) like arrowhead (Saggittaria spp.), water primrose (Ludwigia spp.), coontail; (Ceratophyllum spp.), fanwort (Cabomba spp.), and others. (Diggs, Libscomb, and O'Kennon, 2006).

In 1983, field surveys of the proposed project area downstream of the dam uncovered no areas which fall within the general definition of wetlands where saturation with water is a dominant factor and biota are adapted for life in water or in saturated soil. Except for the transmission corridor, all Project construction will be performed on TRA land presently kept as lawn or otherwise improved, and portions of Southland Park currently covered by lawn, roads, or rip-rap (see ***Sections 3.7.1 and 3.7.2***, below). Since the Hydroelectric Project will operate in a run-of-river mode, there will be no changes in Lake water levels impacting upstream or downstream wetlands, littoral, or riparian zones. Terrestrial and aquatic resource impacts will be limited to the immediate area of the Dam during the construction of the Powerhouse and tailrace areas.

From June 2003 through May 2004, the TPWD conducted an extensive fisheries survey of Lake Livingston (Henson and Webb, 2004). An extensive littoral zone and physical habitat survey was conducted. The survey identified the miles of shoreline of each environment and relative percent of each. The littoral habitats in the Project area consist of the shallow shoreline zone along the southern end of Lake Livingston and the Trinity River below Livingston Dam. Residential

development is common along the lower end of Lake Livingston. TPWD (Henson and Web 2004) reported that approximately 35 percent of the shoreline consists of bulkhead. Due to the large fetch associated with the broad, open water on this end of the reservoir, shoreline erosion has deteriorated much of the shoreline, which is one reason for the extensive bulkhead development. Shortly after impoundment, flooded timber and brush was common throughout Lake Livingston. However, most of the flooded terrestrial vegetation that once was common is presently absent or scarce.

Substrates along the shoreline are primarily sand and clay, but in coves and tributaries, the substrates often consist of soft sediments. With the exception of water hyacinth, there are few, if any, aquatic plants in the Project vicinity. Water hyacinth is common in the protected areas of the reservoir and can sometimes drift into areas near the dam. Rip-rap armoring is the primary littoral habitat features immediately adjacent to the Project. Large rock and boulders were used to armor Livingston Dam and extend nearly the entire reach of the dam.

The habitats in the Trinity River downstream of Livingston Dam are reflective of other, large-order southeast Texas rivers. The riverbed immediately below the dam is scoured due to the hydraulic alterations that resulted from reservoir operations. Substrates consist of gravel, course sand, and clay. Man-made alterations, including rip-rap armoring, provide substantial fish habitat in the tailrace of the dam; however, the river channel is generally incised and uniform downstream of the tailrace. The scoured reach below the tailrace gives way to clay and sand substrates farther down the river. From distances of approximately 2 miles to 5 miles downstream of the dam, large sand bars are common and logs and brush piles are common in the river. Immediately downstream of this reach, the river channel is constricted by a series of rock outcrops that form a complex of riffles and runs that extend several hundred yards. Beyond this reach, the river channel is deeply incised with slow velocities, homogeneous, and the substrates consist primarily of clay, sand, and soft sediments. Major tributaries are absent from Livingston Dam to State Highway 59, although some small, ephemeral streams intersect the river channel.

3.6 RARE, THREATENED, AND ENDANGERED (RTE) SPECIES

3.6.1 List of RTE Species in Project Vicinity

Table 3-3 contains a consolidated list of fauna currently designated under federal or Texas law (or both) as rare, threatened, or endangered, which are believed to exist in one or more of the four-Lake counties in the vicinity of the proposed Project (TPWD,2007b)

Bald eagles recently were removed from the endangered species list. The bald eagle will continue to be monitored and protected as a recovering. Both bald and golden eagles are protected under the Eagle Protection Act of 1940 as amended (16 U.S.C. §§ 668-668d, June 8, 1940, amended 1959, 1962, 1972, and 1978)

Alligators are no longer listed as threatened or endangered. In Texas they are protected and managed through hunting and wildlife regulation. They can be hunted under a general hunting license during a limited annual period (TPWD, 2007a).

3.6.2 Potential Impact of Project on RTE Species

The proposed Project is not anticipated to have any adverse impacts on the identified RTE species. With regard to bald eagles and other raptors known to inhabit the Lake shore and regional areas, construction activities will neither remove favored perching trees nor impact the species hunting activities at the Dam, over the Lake, or throughout the region both above and below the Dam. The Project's transmission lines will be routed away from the Lake Shore and river and should not be utilized as perches by fish-feeding birds. Other raptors would be deterred from nesting and perching by using current state-of-the-art transmission tower design that incorporates deterrents.

TABLE 3-3
LAKE LIVINGSTON COUNTIES - RARE, THREATENED, AND ENDANGERED SPECIES
(Source: TPWD, 2007b, refer to key on last page of table)

4-COUNTY RANGE	COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	STATE STATUS
		BIRDS		
Polk, San Jacinto, Trinity, & Walker Counties	**American Peregrine Falcon**	*Falco peregrinus anatum*	DL	E
	Year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.			
Polk, San Jacinto, Trinity, & Walker Counties	**Arctic Peregrine Falcon**	*Falco peregrinus tundrius*	DL	T
	Migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.			
Polk, San Jacinto, Trinity, & Walker Counties	**Bachman's Sparrow**	*Aimophila aestivalis*		T
	Open pine woods with scattered bushes or understory, brushy or overgrown hillsides, overgrown fields with thickets and brambles, grassy orchards; nests on ground against grass tuft or under low shrub.			

TABLE 3-3
LAKE LIVINGSTON COUNTIES - RARE, THREATENED, AND ENDANGERED SPECIES
(Source: TPWD, 2007b, refer to key on last page of table)

4-COUNTY RANGE	COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	STATE STATUS
Polk, San Jacinto, Trinity, & Walker Counties	**Bald Eagle**	*Haliaeetus leucocephalus*	DL	T
	Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds.			
Polk, San Jacinto, Trinity, & Walker Counties	**Henslow's Sparrow**	*Ammodramus henslowii*		
	Wintering individuals (not flocks) found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking.			
Polk, San Jacinto, Trinity, & Walker Counties	**Peregrine Falcon**	*Falco peregrinus*	DL	E T
	both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, thus the species level shows this dual listing status; because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.			
Polk, San Jacinto, Trinity, & Walker Counties	**Piping Plover**	*Charadrius melodus*	LT	T
	wintering migrant along the Texas Gulf Coast; beaches and bayside mud or salt flats			
Polk, San Jacinto, Trinity, & Walker Counties	**Red-cockaded Woodpecker**	*Picoides borealis*	LE	E
	cavity nests in older pine (60+ years); forages in younger pine (30+ years); prefers longleaf, shortleaf, and loblolly			

TABLE 3-3
LAKE LIVINGSTON COUNTIES - RARE, THREATENED, AND ENDANGERED SPECIES
(Source: TPWD, 2007b, refer to key on last page of table)

4-COUNTY RANGE	COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	STATE STATUS
Polk & San Jacinto Counties	**Swallow-tailed Kite**	*Elanoides forficatus*		T
	Lowland forested regions, especially swampy areas, ranging into open woodland; marshes, along rivers, lakes, and ponds; nests high in tall tree in clearing or on forest woodland edge, usually in pine, cypress, or various deciduous trees.			
Trinity County	**White-faced Ibis**	*Plegadis chihi*		T
	Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats.			
Polk, San Jacinto, Trinity, & Walker Counties	**Wood Stork**	*Mycteria americana*		T
	Forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960.			

TABLE 3-3
LAKE LIVINGSTON COUNTIES - RARE, THREATENED, AND ENDANGERED SPECIES
(Source: TPWD, 2007b, refer to key on last page of table)

4-COUNTY RANGE	COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	STATE STATUS
		FISHES		
Polk, San Jacinto, & Trinity Counties	**American eel**	*Anguilla rostrata*		
	Coastal waterways below reservoirs to gulf; spawns January to February in ocean, larva move to coastal waters, metamorphose, then females move into freshwater; most aquatic habitats with access to ocean, muddy bottoms, still waters, large streams, lakes; can travel overland in wet areas; males in brackish estuaries; diet varies widely, geographically, and seasonally.			
Polk, San Jacinto, Trinity, & Walker Counties	**Creek chubsucker**	*Erimyzon oblongus*		T
	Tributaries of the Red, Sabine, Neches, Trinity, and San Jacinto rivers; small rivers and creeks of various types; seldom in impoundments; prefers headwaters, but seldom occurs in springs; young typically in headwater rivulets or marshes; spawns in river mouths or pools, riffles, lake outlets, upstream creeks.			
Polk, San Jacinto, Trinity, & Walker Counties	**Paddlefish**	*Polyodon spathula*		T
	Prefers large, free-flowing rivers, but will frequent impoundments with access to spawning sites; spawns in fast, shallow water over gravel bars; larvae may drift from reservoir to reservoir.			

TABLE 3-3
LAKE LIVINGSTON COUNTIES - RARE, THREATENED, AND ENDANGERED SPECIES
(Source: TPWD, 2007b, refer to key on last page of table)

4-COUNTY RANGE	COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	STATE STATUS
		MAMMALS		
Polk, San Jacinto, & Trinity Counties	**Black bear**	*Ursus americanus*	T/SA;NL	T
	Bottomland hardwoods and large tracts of inaccessible forested areas; due to field characteristics similar to Louisiana Black Bear (LT, T), treat all east Texas black bears as federal and state listed Threatened.			
Polk, San Jacinto, Trinity, & Walker Counties	**Louisiana black bear**	*Ursus americanus luteolus*	LT	T
	Possible as transient; bottomland hardwoods and large tracts of inaccessible forested areas.			
Polk, San Jacinto, Trinity, & Walker Counties	**Plains spotted skunk**	*Spilogale putorius interrupta*		
	Catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie.			
Polk, San Jacinto, Trinity, & Walker Counties	**Rafinesque's big-eared bat**	*Corynorhinus rafinesquii*		T
	Roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned man-made structures.			

TABLE 3-3
LAKE LIVINGSTON COUNTIES - RARE, THREATENED, AND ENDANGERED SPECIES
(Source: TPWD, 2007b, refer to key on last page of table)

4-COUNTY RANGE	COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	STATE STATUS
Polk, San Jacinto, Trinity, & Walker Counties	**Red wolf**	*Canis rufus*	LE	E
	Extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies.			
Polk, San Jacinto, Trinity, & Walker Counties	**Southeastern myotis bat**	*Myotis austroriparius*		
	Roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned man-made structures.			
	MOLLUSKS			
Polk, Trinity, & Walker Counties	**Creeper (squawfoot)**	*Strophitus undulatus*		
	Small to large streams, prefers gravel or gravel and mud in flowing water; Colorado, Guadalupe, San Antonio, Neches (historic), and Trinity (historic) River basins.			
Polk & Walker Counties	**Fawnsfoot**	*Truncilla donaciformis*		
	Small and large rivers especially on sand, mud, rocky mud, and sand and gravel, also silt and cobble bottoms in still to swiftly flowing waters; Red (historic), Cypress (historic), Sabine (historic), Neches, Trinity, and San Jacinto River basins.			

TABLE 3-3
LAKE LIVINGSTON COUNTIES - RARE, THREATENED, AND ENDANGERED SPECIES
(Source: TPWD, 2007b, refer to key on last page of table)

4-COUNTY RANGE	COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	STATE STATUS
Polk & Walker Counties	**Little spectaclecase**	*Villosa lienosa*		
	Creeks, rivers, and reservoirs, sandy substrates in slight to moderate current, usually along the banks in slower currents; east Texas, Cypress through San Jacinto River basins.			
	CRUSTACEANS			
Trinity Country	**A crayfish**	*Procambarus nechesae*		
	Simple burrows in temporary or semi permanent pools in roadside ditches.			
	INSECTS			
San Jacinto	**A mayfly**	*Plauditus gloveri*		
	NY, SC, TX; mayflies distinguished by aquatic larval stage; adult stage generally found in bankside vegetation.			
San Jacinto & Walker Conties	**Gulf Coast clubtail**	*Gomphus modestus*		
	Medium river, moderate gradient, and streams with silty sand or rocky bottoms; adults forage in trees, males perch near riffles to wait for females, larvae overwinter; flight season late April - late June.			
San Jacinto, Trinity, & Walker Counties	**Texas emerald dragonfly**	*Somatochlora margarita*		
	East Texas pineywoods; springfed creeks and bogs; small sandy forested streams with moderate current.			

Status Key:

LE, LT - Federally Listed Endangered/Threatened
PE, PT - Federally Proposed Endangered/Threatened
E/SA, T/SA - Federally Listed Endangered/Threatened by Similarity of Appearance
C - Federal Candidate for Listing; formerly Category 1 Candidate
DL, PDL - Federally Delisted/Proposed for Delisting
NL - Not Federally Listed
E, T - State Listed Endangered/Threatened
NT -Not tracked or no longer tracked by the State
"blank" - Rare, but with no regulatory listing status
Due to continuing data updates, refer to http://www.tpwd.state.tx.us/landwater/land/maps/gis/ris/endangered_species.phtml for the most current information available from Texas Parks and Wildlife Department, Wildlife Division, Diversity and Habitat Assessment Programs.

Of the three prominent local fish species listed, the paddle fish is the subject of active conservation measures. The paddle fish is a state-listed threatened species. Formerly a state game fish, protection and conservation measures have been ongoing since the late 1980s. No taking of the paddle fish is allowed in the State. Lake Livingston was stocked with paddlefish in the late 1980s and early 1990s. Additionally, the Trinity River was stocked with more than 313,000 paddlefish between 1990 and 1999. The conservation effort has seen paddlefish recover in areas that previously had no record of the presence of the species for upwards of 50 years. (Betsill, TPWD et al., 1999).

After stocking in the Lake Livingston Reservoir, some paddlefish were believed to migrate downstream through the floodgates on the dam and a limited number now reside downstream in the river. While the survival of stocked paddlefish was believed to be good, there has been no indication that reproduction has or is occurring. In the absence of natural reproduction and recruitment, the population is expected to dwindle over time. The project would likely have little impact to the restoration effort since stocking ceased in the 1990s and there are not believed to be any young paddlefish in the reservoir which would potentially be impacted by the Project. The remaining larger paddlefish in the reservoir would be excluded from the Project due to the bar screens. Furthermore, downstream migration of paddlefish from the reservoir would likely occur under flood conditions, when the floodgates are open on the dam. Conservation efforts continue and the species remains under state protection.

In Texas most populations of the red-cockaded woodpecker, which is listed as Endangered under the ESA and State law, are found on state and federal lands in mature pine stands. The proposed hydroelectric facility will not disturb any such areas. The proposed transmission line routing is anticipated to traverse mostly open field and pasture land, and there will be no significant acreage of mature trees of any type impacted.

The bat species listed prefer caves, mine tunnels, old buildings, culverts, beneath bridges, etc., as roosting sites. The proposed Project will have no impact on such habitats. The Texas horned lizard prefers a dry, open, sandy habitat and will not be affected by the Project.

The mollusks, crustaceans, and insects listed would typically be found in the Lake, in the littoral zone, amongst flowers and plants in wetlands areas, or upland areas that are near shore or just beyond the wetlands and influenced by the Lake and its ecology. Since the new hydroelectric facility will be operated as run of the river, there is no expectation that the habitats for any of these species would be affected by the construction or operation. The American Crayfish, which lives in water and also can burrow into moist upland soils during dryer weather, are reported in Trinity County. Although not reported in San Jacinto and Polk Counties, the normal habitat of crayfish would not exclude its presence from being in the Lake or surrounding areas. However, the construction and operation of the Project will have minimal impact on this habitat.

3.7 RECREATIONAL RESOURCES AND LAND USE IN THE PROJECT AREA

3.7.1 Existing Recreational Facilities in the Project Vicinity

Within the Trinity River Basin is a wide range of both public and privately owned recreational areas. Included in the public sector are two major national forests, a national grassland area, a wildlife area, and approximately a dozen state and federal public outdoor recreational areas. Both national forests are within 20 miles of the Lake Livingston site. The Davy Crockett National Forest, located in Houston County, is 20 miles north of the Lake. This forest measures approximately 64,000 acres and contains the Ratcliff Lake area as its major recreational development. Sam Houston National Forest, southwest and adjacent to Lake Livingston, is between 140,000 and 160,000 acres and is divided into three areas including Lake Conroe, Central, and the Winters Bayou/Tracking Creek. There are 11 recreational areas within the forest: Stubblefield, Double Lake, Kelley Pond, Scotts Ridge, Cagle, Lone Star Hiking Trail, the Big Creek Scenic area and Big Woods, Nebletts, Tarkington, and Shell hunting camps. Recreation within these sites includes camping, hiking, fishing, swimming and hunting.

The largest recreational resource in the basin is the Lake Livingston Reservoir, with more than 450 miles of shoreline, a width of 7 miles at its widest point, and a length of 39 miles. Covering 83,000 acres and a capacity of more than 1.75 million AF of water, the Lake, with its 450 miles of

shoreline, offers the region endless recreational opportunity. Numerous public parks and privately owned concessions allow the public ample access to the lake's amenities.

The state-owned and operated Lake Livingston Recreational Area is a 653-acre site on Lake Livingston just north of Swartwout in Polk County. This facility contains a marina and concession for boating, fishing, and other amenities.

TRA has recognized the importance of its holdings and responsibility with regards to recreational potential of the area. TRA manages 2,900 acres of shoreline lands and islands at Lake Livingston and administers commercial and marina leases.

Wolf Creek Park, located north of the town of Coldspring in San Jacinto County, includes 137 acres and a mile of Lake Shoreline and is largest of the TRA-developed facilities. This Park is operated solely by TRA and annually receives more than 100,000 visitors.

The second recreational facility operated by TRA is Tigerville Park. This facility consists of almost 14 acres of non-fee-day use facilities located in Polk County. It has approximately 2,100 feet of shoreline and includes a boat ramp and day-use facilities.

TRA has also provided for two marina concessions, one located in Bridgeport, and the Wolf Creek Marina, located in Wolf Creek Park. TRA operates and maintains five public non-fee boat ramps and leases land for the San Jacinto and Southland County Parks, developed at the base of the Livingston Dam.

In addition, there are many recreational facilities around Lake Livingston that are privately owned but open to the public or available for rental. There are a number of private and public facilities on the lake, including at least 30 licensed marinas that serve the recreational needs of boaters, paddlers, water sports enthusiasts, fishermen, campers, and other Lake visitors. Two privately owned, residential summer camps for children – Camp Olympia and YMCA Camp Cullen – are operated on lakefront property near Trinity.

Southland Park is located on the eastern bank of the Trinity River just below the Dam Site and may be affected by construction of the Powerhouse and the tailrace. The Park encompasses 33.35 acres of which TRA owns and leases 13.35 acres to Polk County, which owns the remaining acreage. It consists of lawn and trees on flat, graded land. There is a boat launch area, an observation pavilion, a convenience store and cafe, picnic tables, and several travel trailer sites. This Park was developed by Polk County with federally provided funds. In recent years Southland Park has seen declining usage, and its amenities have not been well maintained by the private concessionaire who operates those facilities under an arrangement with Polk County. At the time this PAD was filed, the County and TRA were considering closing the park at the end of the year.

TRA owns San Jacinto County Park, which consists of 8.83 acres located below the Dam on the western bank of the river. The access road is south of and parallel to the land and is a continuation of an existing county road. No facilities are provided, as the site is subject to periodic flooding.

Two boat ramps maintained by a private concessionaire, one on either side of the river, are located approximately 0.4 mile below the Dam and are readily accessible from a county road. These ramps provide the primary access to the tailwater fishery below the Dam. Because of safety and homeland security concerns, the public is restricted from access to the Dam and tailrace area immediately below the Dam.

3.7.2 Applicant's Proposal to Create, Preserve or Enhance Recreational Opportunities

The construction of the Powerhouse and the tailrace may encroach upon the upstream (northern) end of the existing Southland Park. To the extent that the Project interferes with or displaces any parkland or facilities in active use, ETEC proposes to replace such amenities "in kind." Among possible in-kind mitigation, ETEC would consider improvements to the San Jacinto County Park area to provide access for fishing from the west bank of the river below the Dam.

Because of the wide array of existing recreational resources and public access points on and around the reservoir, and the minimal impact of the hydroelectric Project on existing recreational and aesthetic resources, ETEC does not propose to develop additional recreational amenities on Lake Livingston at this time (other than in-kind mitigation for any displacement of Southland Park property or facilities in active use). If public input during the scoping for this Project indicates that existing recreational opportunities are inadequate to satisfy demand, and that additional recreational development is needed, ETEC will consider contributing toward the sponsorship of additional amenities.

3.7.3 Wild and Scenic Rivers and Wilderness Areas

There are no Wild and Scenic River designations or Wilderness areas within the proposed Project boundary or in the area impacted by the Project. The Rio Grande is the only river in Texas designated as Wild and Scenic under the Federal Wild and Scenic Rivers Act (16 U.S.C. §§ 1271 – 1287). As discussed in ***Section 3.4.9,*** two sections of the Trinity River, one above and one below Lake Livingston have been designated as "Ecologically Significant River Segments" by TPWD.

3.7.4 Shoreline Development Policy and Buffer Zones

Most of the land surrounding Lake Livingston is in private ownership, and TRA does not own a "buffer strip" in fee around the reservoir above El. 131 msl. However, TRA owns a flood easement surrounding Lake Livingston established in increments from El. 135.0 feet to 140.0 feet. Guidelines are provided for construction of dwellings within the flood easement area which is subject to specific policies and provisions of TRA. The erection of facilities within the easement area over water owned or controlled by TRA (such as fishing piers, bulkheads, and boat docks) requires permits and is reviewed by TRA on an individual basis (TRA, 1993a, 1993b)

TRA also has a number of policies and ordinances that further regulate development and sanitary discharges along shorelines of Lake Livingston. There are two principal zones that are subject to varying types of regulation. The first is known as the "Restricted Area," defined as the area lying

between the contour line at El. 131 msl. (the normal maximum reservoir operating level) and a parallel line lying 75 feet from the 131' line, measured horizontally away from the lake. TRA closely restricts activities in the Restricted Area, including a ban on wastewater discharges from the installation of on-site sewage facilities of any kind. other than sealed holding tanks (TRA, 1993a, 1993b, 2000).

The second regulated zone is called the "Water Quality Area," and is defined as the land area extending from the upper end of the Restricted Area to a parallel line 2,000 feet landward from the 131' msl line. By ordinance, TRA regulates the installation of all on-site sewage facilities septic discharges and certain other activities and uses within the Water Quality Area, including the initial inspection, licensing and bi-annual follow-up inspections of these facilities (TRA, 1993a, 1993b, 2000).

ETEC does not propose to acquire any lands in fee around the reservoir as a buffer zone, as doing so would render the Project economically infeasible and could interfere with TRA's effective regulation of uses surrounding the lake. Instead, ETEC intends to acquire from TRA the minimum easement rights necessary to satisfy its obligations as a FERC licensee.

3.8 AESTHETIC RESOURCES

3.8.1 Aesthetics of the Lake Area

Lake Livingston and the surrounding region afford significant opportunity for recreation and enjoyment of the natural and created environments. The Lake itself is a significant aesthetic resource enjoyed by the region. The Reservoir is surrounded by a combination of forest, pasture and range, cropland, residential, and urban lands. The area's aesthetic values are described more fully in ***Sections 3.1, 3.2 and, 3.3*** above.

3.8.2 Measures to Blend Project with Surrounding Environment

Efforts will be made in the final design to blend in the Project with the surroundings and provide a pleasant aesthetic appearance. TRA has always maintained high visual standards for its

developments, and ETEC is committed to designing the hydropower facilities using the same high standards. Redevelopment of parkland and the location of structures would be completed in such a way as to enhance the area downstream and in the vicinity of the Dam. Homeland Security considerations would be accommodated in the design.

The proposed 138-kV transmission line connecting the power facilities to the point of interconnection with the electric grid will entail some unavoidable impact on aesthetics in the immediate vicinity of the line's route. Aesthetic considerations are one of the factors that ETEC will take into account when conducting its Alternative Route Analysis and Environmental Assessment for the proposed transmission line (see ***Section 4.3*** below).

3.9 ARCHAEOLOGICAL, HISTORIC, AND CULTURAL RESOURCES

3.9.1 Archaeology and Archeological Resources

Review of sources on archaeology in the area provides no evidence concerning existence of archaeological resources at the Dam Site. In previous studies, the archeology of the area has been investigated dating back more than 5000 BC (TRA, 1983). The construction of the Project, to a large extent, will take place in areas already disturbed or cleared at the tip of the construction of the Reservoir.

In 1965-1966 an archaeological salvage project was carried out in the area slated for inundation. Six sites were investigated in Polk and San Jacinto Counties (McCluran, 1968).

3.9.2 Texas and Regional State History

Early European explorations of the Trinity River Basin were conducted by the Spanish in true late 1600s. The Spanish established several missions, and named the river the "Rio de is Santisima Trinidad." The river became the site of a number of army posts and fortified settlements to defend Spanish Texas against the French and subsequent Anglo-Americans.

When Europeans entered Texas there were already a number of Indian Tribes living in the general vicinity of Lake Livingston. The Hasinai Confederation of the Caddo (credited with providing the State name Texas meaning "ally" or "friend") was located to the northeast of the Dam Site. The Akokisa or Bidai Tribes located in the area of Lake Livingston spoke Ataapan.

After the Texas Revolution in 1836 the Trinity River became a steamboat route with service between Galveston and Cincinnati, Texas.

The Coushatta and Alabama Indians moved into the region from the Mississippi River sometime after 1800. The two Tribes belonged to the Creek Confederacy. There were Indian settlements up and down the Trinity River. As settlement increased, the way of life of the Indian Tribal was impacted. Eventually, the remaining Indian peoples given 1280 acres of reservation land in 1854, located between Livingston and Woodville in Polk County. Thereafter, the Reservation was increased by an additional 3,000 acres. These Indian Peoples had significant influence on the development of this region during the 1800s. Texas fought for the Confederacy during the Civil war and 19 members of the Alabama-Coushatta tribe were sworn into service. The region was prized for its thick woods. Today there are hundreds of historic sawmill sties that utilized these woodland resources.

3.9.3 State Historical Markers and State Listed Historic Places

The State Historical Survey Committee has placed two historical markers near the Project site. One marks the location of the once important river town of Swartwout and the second commemorates the steamboat tradition.

A review of historical sites listed on the Texas Historic Commission's Website (www.atlas.thc.state.tx.us/shell-county.htm) indicates there are 2,066 listed historical sites located in Polk, San Jacinto, Trinity and Walker Counties. These site listings include historical buildings, residences, museum sites, cemeteries, historical markers, national historical registered sites, military sites, and historical neighborhoods. In addition there are 381 historical saw mill sites listed for the four-county Lake Region.

3.9.4 National Register of Historic Places

The Texas Historical Commission lists the following sites on the National Register of Historic Sites within the four-county Lake Region:

- Polk County
  - McCardell, William Keenan and Nancy Elizabeth McCardell House, and
  - Polk County Courthouse and 1905 Courthouse Annex.

- San Jacinto County
  - San Jacinto County Courthouse, and
  - San Jacinto County Jail & Old Records Vault Building.

- Trinity County
  - Old Red Schoolhouse,
  - Riverside Swinging Bridge,
  - State Highway 19 Bridge at Trinity River, and
  - Trinity County Courthouse Square.

- Walker County
  - Sam Houston House,
  - Riverside Swinging Bridge,
  - State Highway 19 Bridge at Trinity River, and
  - John W. Thomason House.

3.9.5 Project Impact on Archaeological, Historic, and Cultural Resources

Because the construction of the proposed hydroelectric generation facilities will occur entirely on land previously excavated and disturbed during the construction of Lake Livingston Dam, the facilities' construction is not expected to impact any of the above identified historic and cultural

resources. Further, because the proposed mode of Project operation will not affect reservoir levels or rates of river flow below the Project, its operations will not impact any such resources.

The primary transmission line connecting the power facilities to the point of interconnection with the electric grid will traverse privately owned, previously undisturbed lands. ETEC will conduct a thorough environmental analysis of alternative transmission routes, including a cultural resources survey for each of the principal alternatives studied. Details of ETEC's planned Alternative Route Analysis and Environmental Assessment for the Lake Livingston-Rich 138-kV Transmission Line are discussed in ***Sections 4.2.4 and 4.3*** below.

3.10 IMPACT ON NATIVE AMERICAN TRIBAL CULTURAL OR ECONOMIC INTERESTS

This section provides detail on Tribal Resources and interests found within the Project region. In particular, within the Project area is found the Reservation of the Alabama-Coushatta Indian Tribe, one of three recognized and remaining Indian Tribes in Texas. The Alabama-Coushatta Tribe is Texas' oldest Indian Tribe and is still active and vital with a membership of about 1,000. The Tribe historically has ranged within the four-county Lake Region, and currently owns and manages their historic 4,593.7-acre reservation on U.S. Highway 190, seventeen miles east of Livingston in Polk County. The potential to encounter Indian and other historic artifacts will be evaluated further through cultural resources assessments, particularly for the routes planned for the transmission corridor.

The construction of the new hydroelectric plant at the Lake Livingston Dam is expected to have no negative impact on historic Native American Indian lands, reservation land, or other tribal resources of the four-county Lake Region, including those lands and resources of the local Alabama-Coushatta Tribe specifically. As a major construction project, there would be a demand for labor, equipment, and resources such as timber, which could include materials, and services that might be provided by the Tribe or Tribal members that own or work for local businesses. The additional capacity added to the regional electric grid by the new Lake Livingston Hydroelectric power plant would be indirectly potentially beneficial to the goals and

intents of the Tribe to expand its businesses and economic development opportunity within the region.

3.11 SOCIO-ECONOMIC RESOURCES

The region offers perhaps some of the best recreational opportunity found in the state with an expansive Lake, clean rivers and streams, wooded areas, and a rich cultural heritage. The region remains largely rural despite relative proximity to such large population centers as Dallas, Fort Worth and Houston. The four county Lake Region relies primarily on recreation and tourism, agriculture, timber, mining, and oil and gas for its economy. In Census Year 2000, there were a reported 113,460 employment-aged individuals living in the four county Lake Region and there were 2,046 business establishments (U.S. Census Bureau, 2007).

Walker County had the largest number of both businesses and employment-aged individuals, with approximately 46.04 percent of the employment aged individuals in Census Year 2000. A reported 4,212 (about 3.7 percent) of these individuals reported being unemployed in Year 2000, which is a relatively low unemployment number (U.S. Census Bureau, 2000). In Census Year 2005, 47.8 percent of the listed business establishments were located in Walker County.

Employment in the educational, health, and social services area, and retail trade were the two largest employment categories in all four counties, employing at least 30 percent of the working population in each of the four counties (U.S. Census Bureau, 2000).

Employment in the construction industry ranges from 6.3 percent in Walker County to 12.5 percent in San Jacinto County, which indicates sufficient local resources, should be available for performing much of the necessary work, excluding any highly specialized trades (U.S. Census Bureau, 2000).

Despite the tremendous recreational opportunity afforded by the region, employment in the recreation and food service industry is not exceptionally high, ranging from 4.9 percent in San Jacinto County to 8.8 percent in Walker County (U.S. Census Bureau, 2000).

Median household income was reported the lowest among the four counties in Trinity County at $27,070 and the highest in San Jacinto County at $32,220 (U.S. Census Bureau, 2000).

4.0 PRELIMINARY ISSUES AND STUDIES LIST (18 CFR § 5.6(18 CFR § 5.6(D)(2))(4))

In accordance with FERC requirements, this section notes issues, studies, and any consultations made in anticipation of preparing the License Application.

4.1 PRELIMINARY IDENTIFICATION OF POTENTIAL ISSUES

To date, ETEC has identified the following list of potential issues associated with the proposed hydropower Project:

- Impact of hydropower operations on DO levels in the spillway tailwater basin and in the river below the Project discharge.
- Impact of hydropower operations on water temperature levels in the spillway tailwater basin and in the river below the Project discharge.
- Impacts of hydropower operations on ability of fish to pass safely from the Reservoir to the river below the Dam and associated measures needed to prevent entrainment.
- Measures necessary to avoid adverse impact on TPWD's spring collection of striped bass broodstock for its hatchery and stocking program.
- Optimal routing of the transmission line from the Project to Rich Substation to minimize impacts on environmental, aesthetic and cultural resources and private property rights.

4.2 ADDITIONAL STUDIES

ETEC has identified a number of studies that will be necessary to characterize the baseline environment in the vicinity of the Project. The studies listed below are currently underway or scheduled for implementation.

4.2.1 DO Monitoring Program

ETEC has contracted with TRA to conduct a DO monitoring program to supplement its regular monitoring of the Reservoir and river. The purpose of this program is to obtain baseline data on DO concentrations both upstream and downstream of the proposed Project. The data will be used

to determine if the Project design should incorporate measures to mitigate adverse impacts on the DO concentrations immediately downstream of the Project. Sampling and analyses will be performed on a monthly basis for up to 12 months. Analyses will be performed at two locations upstream of Livingston Dam, in the tail race, and at three locations downstream of the Dam. The protocol will include measurement of DO, temperature, pH and conductivity at five-foot intervals at locations within the Reservoir and at five and ten foot depths downstream of the Dam. TRA will also report the amount of release from Livingston Dam at the time of monitoring and any rainfall events within the prior 24-hour period. These data will be used in evaluating DO fluctuations.

4.2.2 Aquatic Community Surveys

Studies to characterize the baseline aquatic community in the Reservoir, the tailrace, and the river adjacent to the proposed Project location will be performed. Samples of fish and benthic macroinvertebrates will be collected at multiple locations within these three areas to identify the species present. Habitat characterization studies and water quality profiles will be completed. Details of the investigative program are as follows:

Fish Surveys

A fish survey will be conducted at up to four sample stations downstream of the Dam. Where habitats are conducive, fish sampling will consist of boat electrofishing, backpack electrofishing, seining, gill netting, and trap netting. Fish sampling stations will be identified by specific habitat types and geographic location with respect to the Project area. The number of locations will depend on the observed variability in species composition between locations. The surveys will be conducted quarterly for a period of one year, beginning in early December 2007.

Habitat Evaluation

A habitat evaluation will be performed at each station (including at the bank and at the center of the river) during each sample event. The general characteristics of the habitat as well as basic water quality parameters (temperature, DO, pH, conductivity) will be measured at each station. In addition, water clarity will be estimated with a Secchi disc.

Survey of Benthic Macroinvertebrates

Benthic macroinvertebrates will be collected at two stations between the Dam and the U.S. 59 bridge. Sampling at each station will include collection of samples in triplicate with an Ekman dredge to collect organisms in fine substrates. Kick-sampling with a D-frame benthic macroinvertebrates net will also be performed where appropriate. Large woody debris, cobble, and other debris will be collected and organisms removed for identification. Samples will be preserved in the field and processed later in the laboratory.

Qualitative Mussel Survey

A qualitative assessment of the mussel community will be made at the benthic invertebrate sample stations. This will involve a presence/absence survey for the purpose of identifying species that are present. Collected mussels will be photographed. In addition, at least one specimen of each species will be transferred to the TPWD to assist them in maintaining mussel distribution records.

4.2.3 Reservoir Fish Survey

Operation of the hydroelectric facility will require a change in location of the water release from the Reservoir. Under existing operating conditions, water is released from a depth of approximately 30 feet through gates on the Dam. During summer months, Lake Livingston stratifies with hypoxia typically present at approximately the depth of release or deeper. During the remainder of the year, the reservoir is generally mixed. Under future operating conditions, water releases would be diverted through the hydroelectric facility and would be obtained from a depth of approximately 15 feet. This more shallow water is likely to contain a greater quantity of DO and to be more biologically active than the water released under existing conditions.

The question of the passage of fish through the gates has been raised by the agencies with respect to identifying baseline conditions in order to assess differences in the fish population resulting from passage through the turbines. Fish passage through the gates under existing conditions is largely unknown, but there is no known information that would suggest high mortality rates associated with fish passage.

A survey of the fish community in Lake Livingston in the vicinity of the Project and in the vicinity of the existing spillway/gates will be performed. A minimum of three survey locations will be selected. This study is designed to identify the species that may pass through the Dam or hydropower plant, characterize the population with respect to spatial and temporal distribution, estimate relative abundance of adult fish, and quantify specifically the threadfin shad (*Dorosoma petenense*) and Age-0 and Age-1 gizzard shad (*D. cepedianum*) populations. The study design will include a comparison between the fish community present at the location in which water is presently released from the Reservoir and the fish community at approximately 15 feet in the vicinity of the Project.

Reservoir sampling will consist of three sample techniques, gill netting, boat electrofishing, and paired-frame trawling. Up to three stations will be selected in the vicinity of the Dam and Project, one station near the proposed Project, one near the existing gates, and a third potentially in the main body of the Reservoir.

4.2.4 Cultural Resources Survey

Cultural resources investigations will be performed to document known locations of archaeological or cultural resources or artifacts. A records and literature search will be conducted at the Texas Archaeological Research Laboratory (TARL) by a state registered archaeologist. Reports of previous archaeological investigations and previously recorded cultural resource sites in the project area or vicinity and proposed transmission line corridor zones will be reviewed. Sources concerning the prehistoric and historic background of the region will be accessed and reviewed.

An intensive archaeological field survey of the proposed Project area will be conducted, including selected shovel tests to investigate the potential for buried cultural resources. Once the final routing is confirmed and right of way agreements obtained, areas to be disturbed within the transmission line corridor (i.e., locations of transmission towers) will be surveyed. Any located cultural resources will be fully defined and documented for reporting to the SHPO.

4.3 ALTERNATIVE ROUTE ANALYSIS AND ENVIRONMENTAL ASSESSMENT FOR THE LAKE LIVINGSTON-RICH 138-KV TRANSMISSION LINE

4.3.1 Transmission Line Routing Evaluation

As part of the siting analysis for the transmission corridor, an evaluation of three to five primary alternative routes for a proposed 138-kV transmission line to connect the Lake Livingston Hydro Generation Facility with the Rich Substation will be described and evaluated. The distance between the Project and Rich Substation is approximately 2.5 miles.

The evaluation will identify preliminary alternative routes. Analysis of these alternative routes will be completed using recent aerial photographs, USGS topographic maps, and substation sites/land ownership/property boundary information. A general reconnaissance of the study area will be performed including both on-the-ground and windshield surveys from publicly accessible locations.

The Public Utility Commission of Texas (PUCT) regulations require that affected landowners must be individually notified of alternate routes crossing over or within 300 feet of their land. Once ETEC has determined its primary alternative routes, all affected landowners will be identified and notified of, among other things, a public meeting to be held to scope environmental and other issues associated with the routing.

Field investigations of the potential transmission corridor routes will be conducted to support literature documentation. Field studies will include socioeconomics/land use, terrestrial and aquatic ecology (including wetlands and endangered species habitat evaluation) and cultural resources.

4.3.2 Environmental Assessment

Once the various environmental factors present in proximity to the alternative routes have been determined, an overall environmental evaluation of each potential transmission route will be

performed in order to select the most favorable route alignment from an environmental/land use standpoint. Environmental disciplines to be addressed in the report will include land use, (habitable structures, etc.) community values, aesthetics, socioeconomics, recreation and park areas, cultural resources (archaeological/historical), ecology, terrestrial and botanical resources, endangered and threatened species, wetlands, floodplains, soils/prime farmland, geology, and surface- and ground-water features, and impact on Indian Tribal interests.

4.4 CONSULTATIONS

ETEC and its consultants have met with a number of federal, state, local, and tribal agencies and government representatives to discuss the Project. All have been initially encouraging that the Project will be beneficial to the region with no obvious negative environmental or socio-economic impacts. The formal contacts with these representatives are discussed below.

4.4.1 Trinity River Authority (TRA)

ETEC and its consultants have been in close and continuing contact with TRA regarding all aspects of the Project. The TRA has expressed concerns regarding the overall impact of the Project on TRA's operations, including the structural integrity of the Dam, the ability of TRA to access the Dam for routine maintenance, and the need to prevent interference with water rights held by TRA and the City of Houston. Modifications to the original Project design have been incorporated to address certain of TRA's concerns (e.g., relocating the tailrace discharge from the spillway stilling basin to a point shortly below the tailwater control weir). In addition, ETEC has negotiated a Memorandum of Understanding (MOU) with TRA and the City of Houston that provides ETEC access to the site for construction and operations, while indemnifying TRA and the City against any interference with their consumptive water rights and providing TRA and the City compensation for the necessary property rights. (ETEC and TRA have already signed the MOU; at the time of this filing, the agreement was still awaiting formal approval by the Houston City Council.)

4.4.2 Texas Commission on Environmental Quality (TCEQ)

TCEQ Headquarters on May 30, 2007, at TCEQ's headquarters in Austin. Representatives of the Office of Permitting, Remediation, and Registration and the Divisions of Water Rights Permitting, Water Supply, and Water Quality were given an overview of the Project. A general discussion was held in which the views of the agency representatives were sought regarding their concerns about the Project and potential issues which they felt may need to be addressed. Major items discussed included the Water Right Permit, water quality certification process (Clean Water Act § 401), and Stormwater General Construction Permits.

TCEQ Region 10 on June 21, 2007, at TCEQ's offices in Beaumont. Representatives of TCEQ's Water Program (Manager), Waste and Emergency Response, and Air Quality Program attended. Following an overview of the Project, a general discussion was held. Topics included the water quality impairment program (§ 303(d)) as it pertains to the Trinity River Basin, potential need for Clean Water Act § 401 and § 402 permits, Stormwater General Construction Permit, a request to keep local citizens informed, and the paddlefish (protected in Texas and known to be present in the Basin).

TCEQ on November 20, 2007 in Austin. The purpose of this meeting was to describe the initial water quality and aquatic biota sampling program to be undertaken by ETEC in 2007-2008 to describe the current environment. The participants also discussed ETEC's proposed process plan and schedule for the ALP licensing process.

A conference call was held between ETEC representatives and TCEQ staff on December 14, 2007, to discuss refinements to the Project design and matters related to ongoing and planned studies.

4.4.3 Texas Parks and Wildlife Department (TPWD)

TPWD on May 30, 2007, at TPWD's headquarters in Austin. Representatives of TPWD included the Water Resources Branch Chief, the Inland Fisheries/Wetlands Program Leader and

representatives from the Inland Fisheries/Wetlands, Water Resources/Water Quantity, Water Resources/Inland Fisheries, and Terrestrial Resources groups. The general discussion revealed that TPWD's principal concerns are likely to be (1) DO levels; (2) striped bass; (3) the Corps of Engineers § 404 permit, if the project isn't eligible for a nationwide permit; (4) endangered and threatened species; (5) migratory birds and their nests; and (6) recreation.

TPWD on November 20, 2007 in Austin. The purpose of this meeting was to describe the initial water quality and aquatic biota sampling program to be undertaken by ETEC in 2007-2008 to describe the current environment. The participants also discussed ETEC's proposed process plan and schedule for the ALP licensing process.

Telephone conferences between ETEC and TPWD representatives were held on December 12 and 14, 2007, to discuss refinements to the Project design, matters related to ongoing and planned studies, and ETEC's proposed ALP process schedule.

4.4.4 Trinity River National Wildlife Refuge (TRNWR)

TRNWR (a branch of USFWS) headquarters in Liberty on June 21, 2007. Following a discussion of the Project, the TRNWR asked questions concerning the Project water flow in cubic feet per second as compared with the flow of the river, the survival rate of species going through the turbine and the Project's mechanisms for minimizing losses, wetlands, paddle fish, and DO. A concern was expressed about the Project weakening the overall structural integrity of the Dam. TRNWR noted that the transmission line should follow the route of least environmental impact, not necessarily the shortest route.

4.4.5 U.S. Fish & Wildlife Service (USFWS)

USFWS on June 21, 2007 in Clear Lake (Houston). Following an introduction to the Project, the USFWS asked questions concerning the impact of the Project on downstream temperature, DO, and the potential for fluctuating flow regime. Additional areas of interest include wetlands, habitat, threatened and endangered species, the American eel, and downstream fisheries.

4.4.6 U.S. Army Corps of Engineers (USACE)

USACE – Galveston District on June 20, 2007. After a discussion of the elements of the Project, the USACE indicated that a Section 10 River & Harbors Act of 1899 permit may be required, as well as a CWA § 404 dredge and fill permit. ETEC and its consultants are required to submit all the details of the proposed Project, and the USACE will evaluate the Project for both § 404 and § 10 applicability. All of the Trinity River is considered a navigable waterway. The USACE has the responsibility to inform adjacent property owners and interested parties of the Project and will publish a public notice.

4.4.7 Alabama-Coushatta Indian Tribe

Alabama-Coushatta Indian Tribe on July 24, 2007, at the Tribe Reservation Headquarters. The purpose of this meeting was to describe the Project and solicit input on historical and cultural sites in the region by the Alabama-Coushatta Tribe and other tribes that may have interests in the area of the hydroelectric plant or transmission lines. The tribe members noted that there are at least five tribes that have historically used the area along the Trinity River, including:

- Caddo
- Kickapoo
- Pakana Muskogee
- Bedias
- Alabama-Coushatta

Tribe members asked to be kept informed of any archaeological or cultural finds obtained during the construction of the Project, and to be kept informed of any public meetings that may be held on the Project.

5.0 REFERENCES AND SOURCES OF INFORMATION

Betsill, Robert K., TPWD, et al. 1999, "Statewide Fishers Research Assessment of Paddlefish Stockings in the Neches, Trinity, Agnelina, and Sabine River Systems," December 31, 1999, Texas Parks and Wildlife Department.

Bonner, T.H, 2007, "Texas Freshwater Fishes, Trinity River." http://www.bio.txstate.edu/~tbonner/txfishes/Trinity.htm. Access on December 10, 2007.

Bounds et al., 1982, Bounds, R.L., C.T. Menn, D.D. Travis, E.G. Simmons, R.J. Kemp, "Existing Reservoir and Stream Management Recommendations, Lake Livingston, 1981," Performance Report.

Bureau of Economic Geology, 1992, University of Texas – Austin, "Geology of Texas" (map).

Bureau of Economic Geology, 1999, University of Texas – Austin, "Land-Resources Map of Texas."

Bureau of Economic Geology, 2000, University of Texas – Austin, "Vegetation/Cover Types of Texas" (map).

Carlander, K., 1977, "Handbook of Freshwater Fishery Biology," Ames: Iowa State University Press.

Diggs, G.M., B.L. Lipscomb, and R.J. O'Kennon, 2006, "Illustrated Flora of East Texas, Vol. I: Introduction, Pteridophyets, Gymnosperms, and Monocotyledons, Sida, Botanical Miscellany No. 26," Botanical Research Institute of Texas and Austin College, Fort Worth, Texas.

Espey, Padden Consultants, Inc., March 1998, "Lake Livingston Water Quality Assessment," prepared for TRA in cooperation with TCEQ.

Federal Energy Regulatory Commission, Project No. 3285-002, 1987, "Order Issuing License (Major Project – Existing Dam)," 39 FERC ¶ 62,205.

Federal Energy Regulatory Commission, Project No. 3285-002, 1986, "Environmental Assessment," 39 FERC ¶ 62,205 at p. 63,480 (appended to 1987 license order, cited above).

FirstGov, 2007, Official United States Government Portal, 1982, "Code of Federal Regulations, Title 42, The National Environmental Policy Act of 1969, as Amended (Public Law 91-190, 42 United States Code 4321-4347, January 1, 1970, as amended by Public Law 94-52, July 3, 1975, Public Law 94-83, August 9, 1975, and Public Law 97-258, § 4(b), Sept. 13, 1982)", Accessed August 17, 2007.

Gould, F.W., "Texas Plants - A Checklist and Ecological Summary," 1977, Texas Agricultural Experimental Station, Bulletin MP-585.

Griffith, G.E., S.A. Bryce, J.M. Omernik, J.A. Comstock, A.C. Rogers, B. Harrison, S.L. Hatch, and D.L. Bezanson, 2004, "Ecoregions of Texas (Color Poster Map, Descriptive Text, and Photographs)," Reston, Virginia, U.S. Geological Survey (map scale 1:2,500,000).

Henson, J and Webb, M.,2004, "2003 Survey Report Livingston Reservoir," July 31, 2004, Federal Aid in Sport Fish Restoration Act Texas Federal Aid Project F-30-R-29, Statewide Freshwater Fisheries Monitoring and Management Program, Texas Parks and Wildlife Department, Inland Fisheries Division, District 3-E, Bryan, Texas.

Hubbs, C., R.J. Edwards, and G.P. Garrett, 1991, "An Annotated Checklist of the Freshwater Fishes of Texas, with Keys to Identification of Species," The Texas Journal of Science: Volume 43, Number 4, 56 pp.

Hydroscience, Inc., 1976, "Eutrophication Analysis of Lake Livingston Reservoir," prepared for the Texas Water Quality Control Board, Texas, 155 pgs.

Knight, M., Personal Communications Between M. Tumerldy and M. Knight of TRA Water Quality Monitoring Laboratory, July 1983.

Mahler, William F., 1972, "Botanical Literature Survey of the Trinity River, Environmental and Cultural Resources within the Trinity River Basin," Southern Methodist University, U.S. Army Corps of Engineers Contract No. DACW63-72-C-0075, 306 pgs.

McCullough, J.D.,1977, "A Study of Effects of Eutrophication – Livingston Reservoir, Texas," Stephen F. Austin, State University, Nacogdoches, Texas, U.S. Army Corps of Engineers Contract No. DACW# 76-C-1055, 267 pgs.

Menn, C.T., 1977, "Existing Reservoir and Stream Management Recommendations, Lake Livingston," Texas Parks and Wildlife Department, performance report, 20 pgs.

Murphy, B.R. and D.W. Willis, editors, 1996, "Fisheries Techniques," 2nd edition, American Fisheries Society, Bethesda, Maryland.

National Weather Service, Southeast Regional Climate Data Center "Record of Huntsville, Texas Weather Station (414382), Period of Record General Climate Summary – Temperature from Year 1946 to Year 2000."

Nixon, Elray S., "Botanical Elements, Tennessee Colony Reservoir, Environmental and Cultural Impact Proposed Tennessee Colony Reservoir, Trinity River, Texas," Stephen F. Austin, State University, Nacodoches, Texas, U.S. Army Corps of Engineering Contract No. DACW63-72-C005, 1972.

Nixon, Elray S. "Botanical Elements in Ecological Survey Data for Environmental Considerations on the Trinity River and Tributaries, Texas," U.S. Army Corps of Engineers Contract No. DACW-63-73-C-0016.

Omernik, James M., 1995, "Ecoregions, A Spatial Framework for Environmental Management," Lewis Publishers, edited by Wayne S. Davis and Thomas P. Simon, Chapter 5: "Biological Assessment and Criteria: Tools for Water Resource Planning and Decision Making."

Pass, F.E., Editor, 1978, "Texas Almanac, 1978-1979."

Pitman, V.M. and J.O. Parks, 1994, "Habitat use and movement of young paddlefish (*Pylodon spathula*)," Journal of Freshwater Ecology, Volume 9 (3): 181-189.

Railroad Commission of Texas (RRCT), 2007a, (oil, gas, and minerals map search), http://www.rrc.state.tx.us/formpr/index.html, Accessed 8/15/07.

Railroad Commission of Texas (RRCT), 2007b , "Railroad Commission of Texas, Public GIS Map Viewer," Gas and Oil Wells, Pipelines, and Surveys for the State of Texas, http://gis2.rrc.state.tx.us/public/, Accessed 8/15/08.

Soil & Water Conservation Society of Metro Halifax (SWCSMH), 2006, "A Brief Treatise on Eutrophication," April 06, 2006 (http://lakes.chebucto.org/eutro.html), Accessed 11/30/07.

Texas Commission Environmental Quality (TCEQ), 1992, "State of Texas Clean Water Act Section 303(d) List," 1992 State of Texas Clean Water Act Section 303(d) List, http://www.tceq.state.tx.us/assets/public/compliance/monops/water/92_303d.pdf, Accessed 11/30/07.

Texas Commission on Environmental Quality (TCEQ), 1994, "1994 State of Texas Clean Water Act Section 303(d) List", http://www.tceq.state.tx.us/assets/public/compliance/monops/water/94_303d.pdf, Accessed 11/30/07.

Texas Commission on Environmental Quality (TCEQ), 1997, "State of Texas 1996 303(d) List", April 4, 1997, http://www.tceq.state.tx.us/assets/public/compliance/monops/water/96_303d.pdf, Accessed 11/30/07.

Texas Commission on Environmental Quality (TCEQ), 1998, "1998 State of Texas 1998 Clean Water Act Section 303(d) List," , June 26,1998, http://www.tceq.state.tx.us/assets/public/comm_exec/pubs/sfr/058_98/98_303d.pdf, Accessed 11/30/07.

Texas Commission on Environmental Quality (TCEQ), 1999, "State of Texas 1999 Clean Water Act Section 303(d) List," December 1999, http://www.tceq.state.tx.us/assets/public/comm_exec/pubs/sfr/058_99/99_303d.pdf, Accessed 11/30/07.

Texas Commission on Environmental Quality (TCEQ), 2002a, "2002 Texas 303(d) List," Texas 303(d) List, October 1, 2002, http://www.tceq.state.tx.us/assets/public/compliance/monops/water/02twqmar/02_303d.pdf, Accessed 11/30/07.

Texas Commission on Environmental Quality (TCEQ), 2002b, "Texas 2000 Clean Water Act Section 303(d)," December 19, 2002, http://www.tceq.state.tx.us/assets/public/compliance/monops/water/00_303d.pdf, Accessed 11/30/07.

Texas Commission on Environmental Quality (TCEQ), 2004, "Atlas of Texas Surface Waters," August 2004, http://www.tceq.state.tx.us/comm exec/forms_pubs/pubs/gi/gi-316/index.html, Accessed 8/17/07.

Texas Commission on Environmental Quality (TCEQ), 2005, "2004 Texas 303(d) List," 2004 Texas 303(d) List, May 13, 2005, http://www.tceq.state.tx.us/assets/public/compliance/monops/water/04twqi/04_303d.pdf, Accessed 11/30/07.

Texas Commission on Environmental Quality (TCEQ), 2007a, "Draft 2006 Texas 303(d) List, 2006 Texas 303(d) List," June 27, 2007, http://www.tceq.state.tx.us/assets/public/compliance/monops/water/06twqi/2006_303d.pdf, Accessed 11/30/07.

Texas Commission on Environmental Quality (TCEQ), 2007b, "Trophic Classification of Resources, 2006 Texas Water Quality Inventory and 303(d) List," September 20, 2007, http://www.tceq.state.tx.us/assets/public/compliance/monops/water/06twqi/2006_reservoir_narrative.pdf, Accessed 11/30/07.

Texas Department of Water Resources (TDWR), 1982, "The State Water Quality Inventory," 6th Edition.

Texas Natural Resources Information System, "StratMap, " http://www.tnris.state.tx.us/datadownload/download.jsp, Accessed 08/17/07,

Texas Parks and Wildlife Department (TPWD), 1999, "Project 77: Assessment of Paddlefish Stocking in the Neches, Trinity, Angelina, and Sabine Rive Systems," Texas Parks and Wildlife Department, Austin.

Texas Parks and Wildlife Department (TPWD), 2000, "Survey report for Lake Livingston," TPWD Austin.

Texas Parks and Wildlife Department (TPWD), 2004, "Survey report for Lake Livingston," TPWD Austin.

Texas Parks and Wildlife Department (TPWD), 2007a, "Alligator Hunting Regulations for 2007," http://www.tpwd.state.tx.us/newsmedia/releases/?req=20070326f, Accessed 11/30/07.

Texas Parks and Wildlife Department (TPWD), 2007b "Rare, Threatened, and Endangered Species of Texas, http://gis.tpwd.state.tx.us/TpwEndangeredSpecies/DesktopDefault.aspx, Accessed 8/17/07.

Texas Parks and Wildlife Department (TPWD), 2007c "An Analysis of Texas Waterways – A Report on the Physical Characteristics of Rivers, Streams, and Bayous in Texas," http://www.tpwd.state.tx.us/publications/pwdpubs/pwd_rp_t3200_1047/index.phtml, accessed 12/13/07.

Texas Parks and Wildlife Department (TPWD), 2007d, "Ecologically Significant River and Stream Segments – Trinity River (Downstream of Lake Livingston)," http://www.tpwd.state.tx.us/publications/pwdpubs/pwd_rp_t3200_1059c/trinity_river2.phtml, Accessed 12/13/07.

Texas Parks and Wildlife Department (TPWD), 2007e, "Ecologically Significant River and Stream Segments – Trinity River (Upstream of Lake Livingston)," http://www.tpwd.state.tx.us/publications/pwdpubs/pwd_rp_t3200_1059c/trinity_river1.phtml, Accessed 12/13/07.

Texas Parks and Wildlife Department (TPWD), 2007f, "Ecologically Significant River and Planning Data by Region," http://www.tpwd.state.tx.us/landwater/water/environconcerns/water_quality/sigsegs/, Accessed 12/16/07.

Texas Parks and Wildlife Department (TPWD), 2007g, "Stocking History of lake Livingston," http://www.tpwd.state.tx.us/fishboat/fish/action/stock_bywater.php?WB_code=0451, Accessed 12/17/07.

Texas State Historical Association (TSHA), 2007a, "The Texas State Handbook," http://www.tsha.utexas.edu/handbook/online/, Accessed 8/17/07.

Texas State Historical Association (TSHA), 2007b, "Handbook of Texas Online," s.v. "Trinity River," http://www.tsha.utexas.edu/handbook/online/articles/TT/rnt2_print.html, Accessed 11/30/07.

Texas Water Development Board (TWDB), 2003, "Major River Basins of Texas Over DEM" (map), prepared by Mark Hayes Mapping Coordinator, January 2003.

Thomas, C., T.H. Bonner, and B.G. Whiteside, 2007, "Freshwater fishes of Texas," Texas A&M Press, College Station, 202 pp.

Trinity River Authority of Texas, (TRA), 1974, "Trinity River Basin Water Quality Management Plan."

Trinity River Authority of Texas (TRA), 1977, "A Synoptic Review of Water Quality Data in Lake Livingston, Texas for the Period of 1975 – 1977," Planning and Environmental Management Division.

Trinity River Authority of Texas (TRA), 1983, "Before the Federal Energy Regulatory Commission Application for License for Major Project – Existing Dam, Lake Livingston Hydroelectric Project – FERC Project 3285-002."

Trinity River Authority of Texas (TRA), 1993a, "TRA Ordinance No. 0-9AAA Defining the Restricted Area," October 27, 1993.

Trinity River Authority of Texas (TRA), 1993b, "TRA Ordinance No. 0-20AAAA, Pertaining to Lake Livingston Dam and Reservoir, Establishing Rules and Regulations Regarding Development On and Use of Reservoir," October 27, 1993.

Trinity River Authority of Texas (TRA), 2006, "Resolution No. R-1048-1 Order Authorizing Regulation of On-site Sewage Facilities, June 6, 2000, from TNRCC,", April 26, 2000.

Trinity River Authority (TRA), 2001, "2001 Master Plan," 35 pages.

Trinity River Authority (TRA), "InTRA" Public Information News Letter," December 2003/January 2004

Trinity River Authority of Texas (TRA), "Lake Livingston Update: Trinity Review Authority Curtails Release from Lake Livingston Dam," Press Release, September 27, 2005.

Trinity River Authority (TRA), 2007a, "2007 Basin Highlights Report," 20 pages.

Trinity River Authority (TRA), 2007b, "2007 Master Plan," 48 pages.

Trinity River Authority of Texas (TRA), 2007c, "List of Development Activity around Lake Livingston," November 4, 2007.

Trinity River Authority of Texas (TRA), 2007d, "TRA Letter to Spencer Karr from Robert L. Hall; Subject: Aquatic Vegetation Treatment Recap FY 2007," TRA Lake Livingston Project, October 8, 2007.

Trinity River Authority of Texas (TRA), 2007d, "T.R.I.M.S. - Trinity River Information Management System," http://trims.tamu.edu/trims/Trims.aspx?map=recreation, Accessed November 30, 2007.

URS Company and Trinity River Authority, 1980, "Livingston Dam and Reservoir Gate Operating Procedures."

U.S. Census Bureau (USCB), 2000, "Census 2000 Data for the State of Texas," http://www.census.gov/census2000/states/tx.html, Accessed November 30, 2007

U.S. Department of Agriculture (USDA), May 1961, "Technical Paper No. 40 – Rainfall Frequency Atlas of the United States," Soil Conservation Service.

U.S. Department of the Interior (USDI), May 1993, "Lake Livingston 1991 Sedimentation Survey," Bureau of Reclamation.

U.S. Environmental Protection Agency (USEPA), 1977, "Report on Livingston Reservoir," Working Paper No. 651, USEPA Environmental Research Laboratory, Corvallis, Oregon, 19 pgs.

U.S. Fish and Wildlife Service (USFWS), December 1979, "Classification of Wetlands and Deepwater Habitats of the United States," FWS/OBS 79/31.

U.S. Government Printing Office, "Code of Federal Regulations, Title 18 - Conservation of Power and Water Resources, Federal Energy Regulatory Commission Department of Energy," http://www.access.gpo.gov/nara/cfr/waisidx_04/18cfrv1_04.html, Accessed August 17, 2007.

Yeager, B.L., 1993, "Dams," Chapter "Impacts on Warmwater Streams: Guidelines for Evaluation," C.F. Bryan and D.A. Rutherford, Editors, Southern Division, American Fisheries Society, Little Rock, Arkansas.

FIGURES

APPENDIX A

PROJECT COMMUNICATIONS PROTOCOL AND NOTIFICATION LIST

COMMUNICATIONS PROTOCOL
FOR LICENSING OF THE
LAKE LIVINGSTON HYDROELECTRIC PROJECT
FERC PROJECT NO. 12632

INTRODUCTION

The East Texas Electric Cooperative, Inc. (ETEC) currently holds a preliminary permit under the Federal Power Act to study the potential development of hydroelectric power facilities at the existing Lake Livingston Dam near Livingston, Texas. Having completed an initial feasibility analysis, ETEC now intends to seek a license from the Federal Energy Regulatory Commission (FERC) to construct and operate the Lake Livingston Hydroelectric Project (Project).

ETEC will seek FERC's permission to utilize the "Alternative Licensing Process" (ALP) described in Section 4.34(i) of the FERC regulations (18 CFR § 4.34(i)). The ALP is one of three hydropower licensing processes currently recognized by FERC (the other two being the "Traditional" and the "Integrated" licensing processes). The goals of the ALP are to:

- Facilitate participation and communication among the applicant, resource agencies, Indian tribes, the public, and FERC staff in a pre-filing consultation process tailored to the circumstances of the particular project;
- Combine into a single process the pre-filing consultation process and environmental review processes under the National Environmental Policy Act and other statutes; and
- Allow for preparation of a preliminary draft environmental assessment (PDEA) by the applicant, which is submitted along with the license application in lieu of a separate environmental exhibit.

Among other requirements, a prospective applicant wishing to use the ALP must develop a "communications protocol" governing how the applicant and other participants in the pre-filing consultation process, including the FERC staff, may communicate with each other regarding the merits of the proposed project and the proposals and recommendations of interested entities. Accordingly, the following communications protocol provides guidelines for how information

will be disseminated and how communications will occur among participants in the licensing process.

PARTICIPANTS IN THE LICENSING PROCESS

The licensing process for the Project, especially the scoping of issues and review of the PDEA, is open to the general public. The participation of any individuals and entities with legitimate interests in the Project is welcomed and encouraged. Because the ALP can be successful only if the process plan and schedule are adhered to, it is important that any interested stakeholder take advantage of the opportunity to participate in the process at the appropriate juncture, and in a timely manner. This will insure that the stakeholder's concerns can be given proper consideration and addressed by the applicant.

Distribution List – ETEC has compiled an initial list of federal and state resource agencies, local governmental authorities, Indian tribes, and other entities that appear to have interests in the Project. (See Distribution List included with Pre-Application Document (PAD).) Those entities will receive copies of all public notices and all major documents produced in connection with the Project's licensing. Any other individual or entity that wishes to be included on the Project's distribution list can request to be added by contacting the Project Manager, whose contact information is as follows:

Brian Lawson, Project Manager
GDS Associates, Inc.
1850 Parkway Place, Suite 800
Marietta, GA 30067
Phone: 770-425-8100
Fax: 770-426-0303
Brian.Lawson@GDSassociates.com

Individuals and entities also can request to be placed on the distribution list by attending the public scoping meeting to be held in Livingston in early March, 2008. Public notice of the scoping meeting will be sent to the distribution list and published in local newspapers at least 15 days prior to the meeting.

Entities that file motions to intervene in the FERC licensing proceeding will also be added to the Project distribution list. It is not necessary, however, to intervene formally at FERC to be placed on (or to remain on) the distribution list. The FERC will not solicit motions to intervene until relatively late in the ALP process, after ETEC has submitted its final license application. ETEC encourages interested parties to participate early in the pre-filing consultation process; those who wait until after the application has been filed will have very limited opportunity to provide substantive input

DOCUMENT ACCESS AND DISTRIBUTION

Relevant non-confidential documents generated or received by ETEC during the pre-filing consultation and licensing processes will be made available to the public.

Website – Major documents such as the Pre-Application Document (PAD), the Notice of Intent to file a license application (NOI), Study Plans, Study Reports, Semi-annual Progress Reports, the License Application, and the PDEA, will be posted electronically on a web page dedicated to the Project licensing on the ETEC website. These major documents will also be mailed to participants on the Project distribution list, unless a particular entity has indicated a preference not to receive such materials. The website's URL address will be disclosed to participants and linked from the main ETEC website (http://www.etec.coop) as soon as the site is operational.

Public Reference File – ETEC will maintain a complete public reference file at the headquarters of one of its member distribution cooperatives, the Sam Houston Electric Cooperative (SHECO). In addition to the major documents identified above, the public reference file will contain copies of all written correspondence, meeting minutes, and telephone discussion notes submitted to or generated by ETEC relating to the licensing of the Project. The file will also include copies of primary reference materials utilized by ETEC in preparing the PAD, PDEA, and license application (*e.g.*, the current Trinity River Basin Master Plan). The public reference file will be located at:

Sam Houston Electric Cooperative
1157 East Church Street
Livingston, Texas 77351
Phone: 936-327-5711

Persons desiring to utilize the public reference file should call SHECO's offices in advance to ensure that personnel are available to produce the documents. Paper copies of file documents in addition to those distributed as part of the consultation process will be available for a reproduction cost of $0.20 per page.

FERC e-Library – The FERC maintains a public electronic library of all non-confidential documents filed in the licensing proceeding. The e-Library is accessed through FERC's website at: http://www.ferc.gov/docs-filing/elibrary.asp. Filings relating to this Project can be viewed or downloaded by selecting "General Search," entering Docket No. P-12632, and selecting the appropriate date range.

WRITTEN COMMUNICATIONS

Unless a subject-specific line of communication has been established between a participant and a particular member of the Project licensing team, all written communications pertaining to the Project should be addressed to the Project Manager, as follows:

Brian Lawson, Project Manager
GDS Associates, Inc.
1850 Parkway Place, Suite 800
Marietta, GA 30067
Phone: 770-425-8100
Fax: 770-426-0303
Brian.Lawson@GDSassociates.com

Once a participant has identified a particular member of the licensing team with whom to communicate on a specific subject area (see attached list of licensing team members), the participant may communicate directly with that team member. However, any written communication that a participant intends to become part of the official record of the FERC licensing proceeding should also be copied to ETEC's licensing counsel:

Michael McCarty, Licensing Counsel
Brickfield, Burchette, Ritts & Stone, P.C.
1025 Thomas Jefferson St. NW, Ste. 800 West
Washington, DC 20007
Phone: 202-342-0800
Fax: 202-342-0807
Michael.McCarty@bbrslaw.com

Although written correspondence may be communicated by e-mail, by fax, or by regular mail, e-mail is the preferred method.

TELEPHONIC COMMUNICATIONS

Periodic teleconference calls among licensing participants may occur on an as-needed basis. A member of ETEC's licensing team will be assigned the responsibility to record and distribute written notes of teleconferences involving more than two participants (including ETEC), unless ETEC is not involved in the call or unless all parties to the call agree that written notes need not be recorded. Unless otherwise agreed among participants in a teleconference, the written notes or summary of the call will be included in ETEC's semi-annual reports to FERC and in the official documentation of ETEC's pre-filing consultation.

PUBLIC MEETINGS AND NOTICE

ETEC currently plans to hold a public information and scoping meeting in the Project vicinity for the purpose of receiving comments and recommendations on the scoping of environmental and other issues involved in the Project's licensing. The public scoping meeting is tentatively scheduled for the last full week of March, 2008 (on or about 3/26/08), and the probable location is the Livingston – Polk County Chamber of Commerce, 1001 US Hwy 59 Loop North, Livingston, Texas. The meeting will include two sessions – one in the afternoon and one in the evening – to accommodate persons whose schedules permit them to attend only one session or the other. The afternoon session will be followed by a site visit to Lake Livingston Dam, during which interested persons can view the location of the proposed hydroelectric facilities.

At least 15 days prior to the scoping meeting and site visit, public notice of the meeting will be: (1) mailed or e-mailed to each entity on the Project distribution list, and (2) published in a

newspaper of general circulation in each county where any part of the Project will be located.[6] In addition, if feasible, FERC will publish a *Federal Register* notice of the scoping meeting prior to the meeting.

ETEC also intends to hold a separate scoping meeting in connection with the Environmental Assessment and Alternate Route Analysis for the proposed 138-kV primary transmission line from the Project switchyard to the Rich substation near Goodrich, Texas. Notice of the transmission routing scoping meeting will be sent to land owners within the study area and to potentially interested federal, state and local agencies in accordance with regulations of both the FERC and the Public Utility Commission of Texas (PUCT). In addition to the FERC license (which includes the Project's primary transmission line), ETEC is required to obtain a Certificate of Convenience and Necessity (CCN) from the PUCT before it can install the transmission facilities.

In the event that ETEC decides to hold any additional public meetings to receive input on the licensing (*e.g.*, to discuss the PDEA), it will provide the same type of public notice as described in the preceding paragraphs.

SIX-MONTH PROGRESS REPORTS

Under FERC regulations, ETEC is required to file semi-annual progress reports summarizing the progress made in the pre-filing consultation process and providing summaries or minutes of meetings held with ALP participants. These progress reports will be available on the Project website and via FERC's e-Library website.

COMMUNICATIONS WITH FERC STAFF

The FERC has determined that its *ex parte* rule prohibiting off-the-record communications with Staff does not apply to pre-filing consultation in the ALP because this process occurs before the commencement of any "contested proceeding" at FERC. (Order No. 607, 88 FERC ¶ 61,225 (1999).) Therefore, any participant may communicate with the FERC Staff during the pre-filing

[6] ETEC intends to publish notice of the scoping meeting in the following newspapers: *The Polk County Enterprise; The San Jacinto News-Times; The Trinity Standard; The Corrigan Times, and The Huntsville Item.*

period without any special documentation of the communication. The FERC Office of Energy Projects, Division of Hydropower Licensing has assigned Sarah Florentino as the staff's Project Coordinator for the Lake Livingston Project. Her phone number is (202) 502-6863, and her e-mail address is Sarah.Florentino@ferc.gov.

CRITICAL ENERGY INFRASTRUCTURE INFORMATION (CEII)

Certain types of documentation that are relevant to the Project licensing may be withheld from public access because they contain material that FERC classifies as Critical Energy Infrastructure Information (CEII). The Commission defines CEII as:

Information concerning proposed or existing critical infrastructure (physical or virtual) that:

1. Relates to the production, generation, transmission or distribution of energy;
2. Could be useful to a person planning an attack on critical infrastructure;
3. Is exempt from mandatory disclosure under the Freedom of Information Act; and,
4. Gives strategic information beyond the location of the critical infrastructure.

Typically, FERC classifies as CEII detailed drawings of dams and other project structures, as well as dam safety and inspection reports. ETEC will not make these types of documents available to the general public during the pre-filing consultation process (however, federal and state agencies whose responsibilities in the licensing process so require may be supplied certain CEII). Once ETEC has filed its license application, a participant who can demonstrate a legitimate need to obtain Project-related CEII can file a CEII request through FERC's Office of External Affairs. Instructions for making a CEII request are found on the Commission's website: http://www.ferc.gov/help/filing-guide/file-ceii.asp.

ATTACHMENTS

Attached to this communications protocol are the following:

- Table listing current members of ETEC's Lake Livingston Hydroelectric Project licensing team, and their contact information.

- Proposed ALP Process Plan and Schedule [omitted from reproduction in PAD because it appears elsewhere in that document]

EAST TEXAS ELECTRIC COOPERATIVE, INC.

LAKE LIVINGSTON HYDROELECTRIC PROJECT

FERC PROJECT NO. 12632

PROJECT LICENSING TEAM

AFFILIATION	NAME	ROLE
ETEC Management	Edd Hargett, Manager East Texas Electric Cooperative, Inc. 2905 Westward Drive P.O. Box 631623 Nacogdoches, TX 75963 Phone: 936-560-9532 Fax: 936-560-9215 eddh@gtpower.com	ETEC's chief executive
	Tambra Offield, Office Manager East Texas Electric Cooperative, Inc. (same address and phones as above) tambrao@gtpower.com	ETEC's office manager
Consultants	Brian Lawson GDS Associates, Inc. 1850 Parkway Place, Suite 800 Marietta, GA 30067 Phone: 770-425-8100 Fax: 770-426-0303 Brian.Lawson@GDSassociates.com	Project Manager
	Dan Wittliff, P.E. GDS Associates, Inc. 919 Congress Avenue, Suite 800 Austin, Texas 78701 Phone: 512-494-0369 Fax: 512-494-0205 Dan.Wittliff@GDSassociates.com	Regulatory Liaison
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APPENDIX B

PROJECT MAPS AND PLANS