

# **LAND RESOURCES MANAGEMENT PLAN**

**Lavaca-Navidad River Authority  
March 2008**

# LAND RESOURCES MANAGEMENT PLAN

<u>Section</u>	<u>Page</u>
1.0 INTRODUCTION.....	1-1
2.0 OBJECTIVES .....	2-1
3.0 LAND RESOURCES.....	3-1
3.1 Regional Setting .....	3-1
3.2 LNRA Lands .....	3-3
3.2.1 Uses of LNRA Lands .....	3-3
3.2.2 Wildlife Habitat.....	3-7
3.2.3 Protected Species.....	3-8
3.2.4 LNRA Recreational Facilities .....	3-9
3.3 Existing Management Programs .....	3-11
3.3.1 Water Quality Management .....	3-11
3.3.2 Land Management .....	3-12
3.3.3 Hay Production and Pasture.....	3-15
3.3.4 Wildlife Habitat Management .....	3-16
3.4 Cultural Resources on LNRA Lands .....	3-16
4.0 LAND RESOURCES MANAGEMENT PLAN.....	4-1
4.1 Background .....	4-1
4.2 Implementation of LNRA Policies and Guidelines .....	4-2
4.2.1 LNRA Board Policy 501 – Property Rights.....	4-2
4.2.2 LNRA Board Policy 502 – Land Resources.....	4-3
4.2.3 Guidelines Pursuant to Board Policy 502 .....	4-3
4.2.3.1 Land Resources Acquisition .....	4-3
4.2.3.2 Land Resources Development, Operation, Use and Management.....	4-4
4.2.3.3 Disposal of Land Resources .....	4-8
4.2.3.4 Mineral Estate .....	4-9
4.3 Public Access .....	4-9
4.4 Wildlife Management .....	4-10
4.5 Recreation/Environmental Fund .....	4-15
4.6 Review and Update .....	4-16

**APPENDIX**

- A. LNRA Park and Open Space Master Plan 2002-2007**
- B. LNRA Hay Lease**
- C. LNRA 2001 Cultural Resources Management Plan**

**List of Tables**

<u>Table</u>	<u>Page</u>
3-1 Protected Species Reported to Occur in Jackson County, Texas.....	3-9
3-2 LNRA Land Use Practices.....	3-13

**List of Figures**

<u>Figure</u>	<u>Page</u>
3-1 Lake Texana and Associated LNRA Lands .....	3-5
3-2 Lake Texana Management Areas.....	3-6

# LAND RESOURCES MANAGEMENT PLAN

## 1.0 INTRODUCTION

The Lavaca-Navidad River Authority (“LNRA”), a Texas conservation and reclamation district, formerly known as the Jackson County Flood Control District, was created by the Texas Legislature more than sixty (60) years ago. LNRA’s enabling legislation authorizes LNRA, among other powers, to develop parks on lands owned or acquired by LNRA; to reclaim and drain the overflow lands of Jackson County; and to conserve and develop forests.

LNRA also has the authority to exercise the rights, privileges and functions essential to the accomplishment of the purposes of Section 59 of Article XVI, of the Texas Constitution.

Section 59, Article XVI, purposes include in part:

“ . . . the reclamation and irrigation of its arid, semi-arid and other lands needing drainage, the conservation and development of its forests, . . . and the preservation and conservation of all such natural resources of the State are each and all hereby declared public rights and duties.”

In order to accomplish the above-mentioned essential purposes of Section 59, Article XVI of the Texas Constitution and its enabling legislation, the LNRA Board of Directors, among other things, has adopted two (2) land resources related Board policies.

LNRA Board Policy 501 - Property Rights was adopted for the purpose of ensuring the protection of private property rights in the course of LNRA business and the completion of LNRA business in the manner least disruptive to private property rights and to the general public.

LNRA Board Policy 502 - Land Resources was adopted to establish guidelines for the acquisition, development, disposition, operation, use and management of all LNRA land resources. The LNRA General Manager is responsible for the implementation and coordination of these two Board policies.

The Palmetto Bend Conveyance Act, Public Law 106-512, November 13, 2000, authorized the United States Secretary of Interior to convey all rights, title and interest (excluding the mineral estate) to the Texas Water Development Board (“TWDB”) and the LNRA<sup>1</sup> in and to the Palmetto Bend Reclamation Project.

The conveyance to the TWDB and LNRA included several conditions regarding future management of the LNRA lands, water and facilities. The LNRA lands, water and facilities are continued to be managed and operated to provide a dependable municipal and industrial water supply, to conserve and develop fish and wildlife resources, and to enhance recreational opportunities. Additionally, LNRA is to:

- (1) provide full public access to LNRA’s lands, subject to reasonable restrictions for purposes of LNRA security, public safety, and natural resource protection;
- (2) not sell or otherwise dispose of the lands conveyed;
- (3) prohibit private or exclusive uses of lands conveyed;
- (4) maintain and manage the LNRA’s fish and wildlife resource and habitat for the benefit and enhancement of those resources;
- (5) maintain and manage LNRA’s existing recreational facilities and assets, including open space, for the benefit of the general public; and
- (6) not charge the public recreational use fees that are more than is customary and reasonable.

LNRA Board Resolution Nos. 2002-002 and 2002-003, authorizing the issuance of water supply contract revenue bonds, include the following restriction upon the sale or encumbrance of LNRA lands:

So long as any of the Bonds remain outstanding, the Authority shall not, except as otherwise prescribed herein or in the Bond Documents or in the Code or the Internal Revenue Code of 1954, as amended to October 22, 1986 (the “1954

---

<sup>1</sup> LNRA subsequently purchased the interests of the TWDB.

Code”), or as consented to by the Registered Owners of the Bonds, sell, or in any other manner dispose of any properties comprising the Palmetto Bend Reclamation Project, including Property acquired later with the proceeds of Additional Obligations. Notwithstanding anything herein to the contrary, the Board may dispose of property which in its judgment has become inexpedient for use in connection with the Palmetto Bend Reclamation Project. In the event of the disposition of any property under such circumstances, the proceeds from such sale shall be used to acquire other property suitable for use and needed by the Project or deposit the remainder to the credit of the Interest and Sinking Fund for the payment of the Bonds issued to pay all or a part of the property sold.

## **2.0 OBJECTIVES**

The purpose of this Land Resources Management Plan is to develop and present policy and program guidelines in the public interest for organized use, and management of the approximate 7,000 acres surrounding Lake Texana.

The major objectives of this Land Resources Management Plan are as follows:

- Identify potential public use and recreation opportunities and evaluate them for consistency with fish and wildlife needs and other natural resources;
- Determine appropriate and compatible land uses;
- Delineate management areas suitable for public use, considering recreation, and fish and wildlife protection;
- Characterize measures to protect important and sensitive natural, cultural, and socioeconomic resources;
- Develop implementation guidelines and policies for the LNRA.

### **3.0 LAND RESOURCES**

The initial task in developing the Land Resources Management Plan is the identification and delineation of natural, cultural, historic, and socioeconomic resources within LNRA owned land, and resources potentially affected by LNRA operations. In this task, a map-based methodology is used as the primary tool to provide an organized inventory of resources, including soils, topography, vegetation types, wildlife habitats and archaeological sites. The mapping methodology displays first order relationships among these and other land resource elements. Resources linked to the quantity and quality of water are documented in databases keyed to project maps. Elements that are mapped and evaluated include the following: (1) soils; (2) vegetation; (3) land use; (4) wildlife habitat; (5) water fowl use areas; (6) water access points; (7) existing usage by migrating water fowl; (8) protected species occurrences; (9) locations of aquatic and terrestrial habitat that are: (a) at risk, and/or (b) are candidates for enhancement; and, (10) cultural, historical and archeological sites.

#### **3.1 Regional Setting**

LNRA lands are located in the Western Gulf Coastal Plain of Texas.<sup>2</sup> The coastal plain is a nearly featureless depositional plain rising from sea level to about 200 ft. elevation. It is underlaid by a series of sedimentary formations that range in age from Recent to Eocene and outcrop in bands parallel to the coastline. The formations consist of interbedded lenses and strata of gravels, sands, silts, and clays.<sup>3</sup>

Distinguished by its mosaic of bluestem grasslands, croplands and grazing lands, Gould categorizes the coastal plain as the Gulf Prairies and Marshes vegetational region of Texas, while

---

<sup>2</sup> Omernik, James M. 1987. Ecoregions of the Conterminous United States. *Annals of the Association of American Geographers*, 77(1) pp. 118-125.

<sup>3</sup> *Ibid.*



Omernik refers to it as Western Gulf Coastal Plain Ecoregion.<sup>4,5</sup> Regional elevations range from 150 feet above mean sea level (msl) about 100 miles inland to the sea level marshes immediately adjacent to the coast. The crescent of prairies, woodlands and marshes are dissected by streams flowing generally northwest to southeast into the Gulf. The region's climax vegetation is tall grass prairie and post oak savanna, originally dominated by grasses such as big bluestem, seacoast bluestem, Indian grass, eastern gama grass, gulf muhly, numerous species of *Panicum* and others.<sup>6</sup> However, nearly all of the climax vegetation has been impacted by planting improved pastureland grasses, domestic livestock grazing, and row cropping, and has been invaded by mesquite, oak, prickly pear, and several acacias. Primary agricultural uses are cattle grazing, hay production, and grain crops.

The Gulf Prairies and Marshes occupy the southern portion of Blair's Texan Biotic Province,<sup>7</sup> a broad ecotone between western grasslands and eastern forests. Blair's biogeographical listing of wildlife fauna for these two provinces is a mix of western grassland-associated and eastern forest associated species.

Typical of the Western Gulf Coastal Plain Ecoregion, most of the land in Jackson County is in agricultural use as cropland, hay production or improved pasture. Although the climax vegetation is grassland and post oak savanna, the actual vegetation on vacant or dormant land is dominantly weedy and brushy species that have invaded the area as a result of land disturbance by farming, ranching, and urbanization.

---

<sup>4</sup>Omernik, James M. 1987. Ecoregions of the Conterminous United States. *Annals of the Association of American Geographers*, 77(1) pp. 118-125.

<sup>5</sup> Gould, F.W. 1975. *The Grasses of Texas*. Texas A&M University Press, College Station, Texas.

<sup>6</sup> Correll, D.S., and M.C. Johnston. 1979. *Manual of the Vascular Plants of Texas*. Texas Research Foundation, Renner, Texas.

<sup>7</sup> Blair, W. F. 1950. The biotic provinces of Texas. *Texas Journal of Science* 2(1): pp. 93-117.

In contrast, the floodplains of the Lavaca and Navidad Rivers are much less disturbed, typically vegetated with water-tolerant hardwoods and a variety of shrubs and grasses. This vegetation generally includes pecan (*Carya illinoensis*), hickory (*Carya* sp.), live oak (*Quercus virginiana*), water oak (*Q. nigra*), blackjack oak (*Q. marilandica*), elm (*Ulmus* sp.), hackberry (*Celtis* sp.), sweet gum (*Liquidambar styraciflua*), red haw (*Crataegus* sp.), ash (*Fraxinus* sp.), mesquite (*Prosopis glandulosa*), huisache (*Acacia* sp.), gamma grass (*Tripsacum dactyloides*), switch grass (*Panicum virgatum*), little bluestem (*Schizachyrium scoparium*), brownseed paspalum (*Paspalum plicatulum*), Indian grass (*sorghastrum averaceum*), carpet grass (*Axonopus affinis*), bermuda grass (*Cynodon dactylon*), green briar (*Smilax bona-nox*), and yaupon (*Ilex vomitoria*), except in agricultural areas where crops or cattle have altered the vegetation.

## **3.2 LNRA Lands**

### **3.2.1 Uses of LNRA Lands**

In addition to the approximate 10,000 acres of land underlying Lake Texana, LNRA also owns over 7,000 acres of land surrounding the lake (Figure 3-1). This land currently has four primary uses: (1) Recreation; (2) Hay production and pasture; (3) Wildlife habitat management; and (4) Housing for LNRA operational and administrative facilities (Figure 3-1).

Typical of much of the Western Gulf Coastal Plains, the soils are a mosaic of loamy acid sands, silts, and clays. Uplands range from dark, tight clays (Blacklands) like Dacosta and Mercado sandy clay loams and Laewest clays to deep, friable sands (Kuy and Milby sands).

Stream terraces tend to be sandy or silty, while bottomlands are composed of frequently flooded clays such as the Chicolate and Ganado clays. All of these soils have properties (corrosivity, wetness, excess or limited permeability, low strength, or shrink-swell characteristics) that may result in problems when constructing and maintaining roads, buildings,

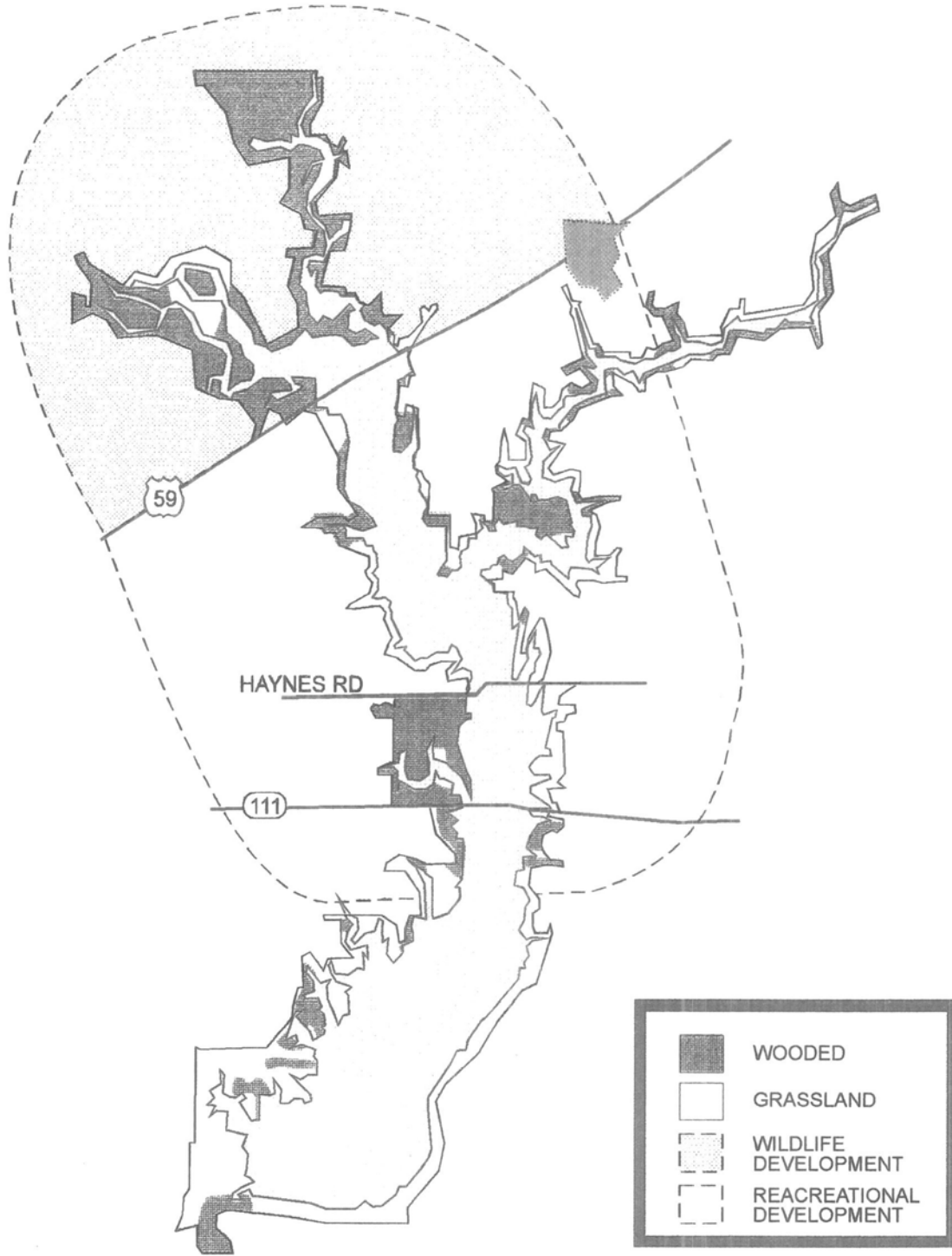
and waste treatment facilities. None of these problems are particularly serious, however, as they are commonly encountered and addressed during all types of construction projects in this region.

Grasslands are the dominant vegetational type on LNRA lands, occupying some 3,175 acres surrounding Lake Texana. Of these open lands, 2674 acres are currently leased for hay production or grazing, and the remainder are occupied by LNRA headquarters facilities or are part of the recreational areas (Figure 3-1).

Wildlife habitat lands, about 2,865 acres, are concentrated in the Navidad River bottoms above U.S. Highway 59, where they consist primarily of riparian woodlands and savannas dominated by live and post oak, elm and hackberry. Approximately 1,869 acres of these woodlands are part of a larger block of frequently flooded woodlands flanking the Navidad River channel that have not been subjected to the degree of agricultural disturbance that the uplands have (Figure 3-2).

Numerous petroleum wells and petroleum pipelines are located within, or cross, Lake Texana and the surrounding LNRA lands. These features have been mapped and are maintained in LNRA's files.

Figure 3-1



8000 FEET  
 4000 METERS



Figure 3-1

Lake Texana  
Management Areas

Paul Price Associates, Inc.

ECOLOGY, WATER QUALITY, CULTURAL RESOURCES, PLANNING

Figure 3-2

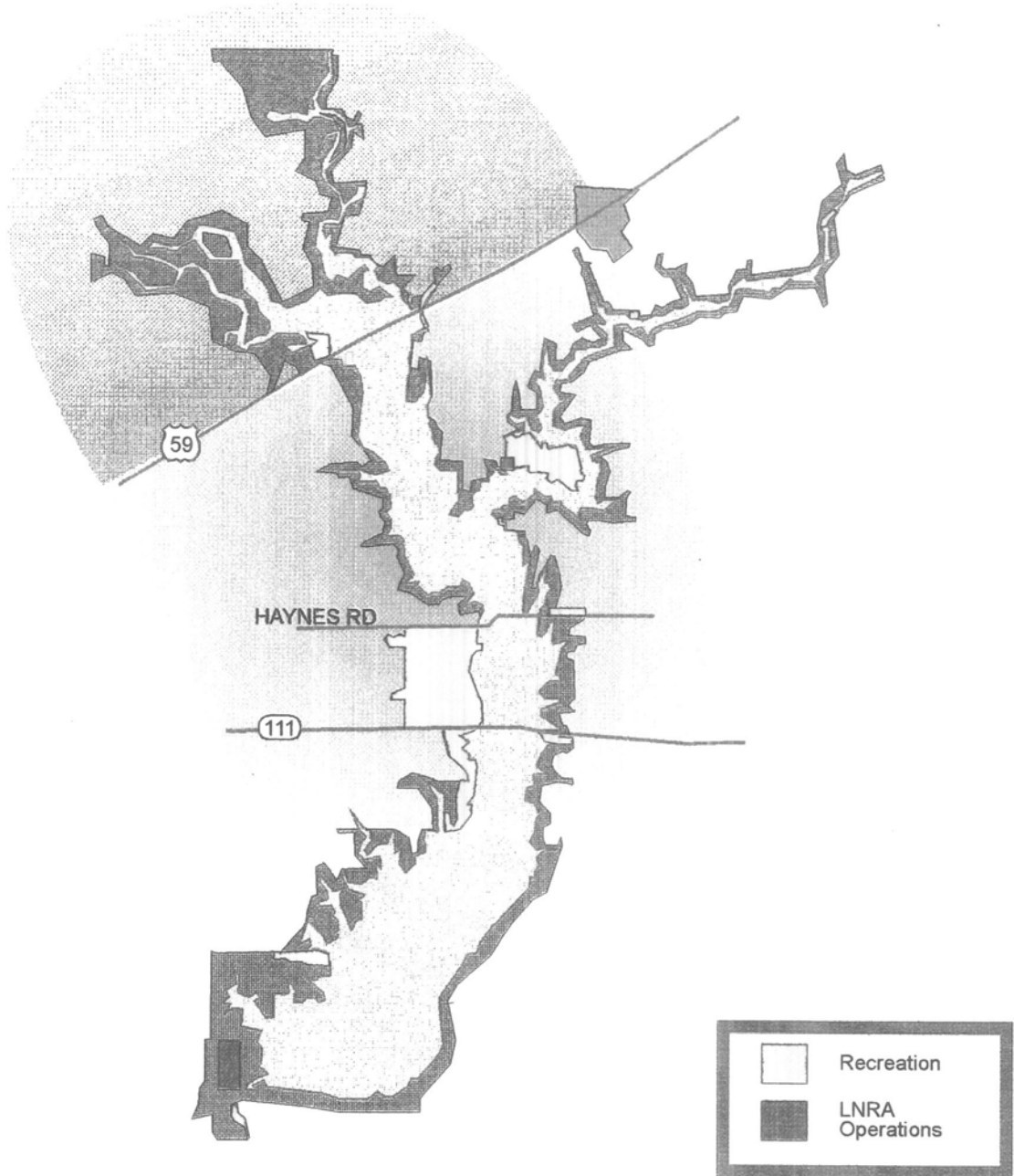


Figure 3-2

Lake Texana  
Management Areas

Paul Price Associates, Inc.

ECOLOGY, WATER QUALITY, CULTURAL RESOURCES, PLANNING

### 3.2.2 Wildlife Habitat

Wildlife habitat in the vicinity of Lake Texana, as is generally the case in the Western Gulf Coastal Plain Ecoregion, consists primarily of wooded bottomland bordered by pasture and cropland. The ecoregion, in spite of intensive agricultural development in some areas, consistently has white-tailed deer, *Odocoileus virginianus*, and densities well above the average for the state. The wooded areas, particularly bottomlands that are present primarily on LNRA lands above U.S. Highway 59, are considered high quality habitat for white-tailed deer and other species that prefer edge habitat among dense woodlands, brush and open grassland.<sup>8</sup>

Other game and non game wildlife present in LNRA grass and woodlands include bob white quail *Coturnix coturnix*, cotton tail and swamp rabbits, *Sylvalagus floridanus* and *S. aquaticus*, respectively, gray and fox squirrels, *Sciurus carolinensis* and *S. niger*, nine-banded armadillos *Dasypus novemcinctus*, coyotes, *Canis latrans*, skunks, *Spilogale putorius* and *Mephitis mephitis*, opossums, *Didelphis virginiana*, the introduced nutria, *Myocastor coypus*, and other rodents (beaver, *Castor canadensis* are commonly thought to be absent from the coastal plain, have been observed). Amphibians and reptiles, including the American alligator, *Alligator mississippiensis*, and several species of poisonous snakes including rattlesnakes, copperheads, and cottonmouth (*Agkistrodon* spp.) are present, particularly in bottomland and fringe areas.<sup>9</sup> **Alligators are abundant** in Lake Texana.

The marshes and freshwater wetlands of the Western Gulf Coastal Plain Ecoregion provide some of the most important waterfowl habitat in the United States. The more isolated upper portion of Lake Texana provides fall and winter habitat for migratory waterbirds, including

---

<sup>8</sup> Young, E.L. and B. Richards. 1994. White-tailed deer population trends. Federal Aid in Wildlife Restoration Project No. W-127-R-2 Texas Parks and Wildlife Department, Austin, Texas.

<sup>9</sup> BOR. 1974. Final Environmental Impact Statement, Palmetto Bend Project. Department of the Interior Bureau of Reclamation FES 74-54.

Canada, blue, snow, and white-fronted geese, mallard and pintail ducks, blue- and green-winged teal, wood ducks, and others such as egrets, herons, and kingfishers.

### **3.2.3 Protected Species**

Table 3-1 lists 12 protected species that have been known to use or migrate through Jackson County, Texas. Any of these species have the potential to occur within LNRA lands, but none are presently known to do so. The American Bald Eagle is known to nest in tall floodplain trees below the Texana dam, upstream of Highway 59 in the heavily wooded bottomlands, and in the riparian corridors bordering the lake's major tributaries; i.e.; Navidad River and Sandy Creek. LNRA, in cooperation with the Texas Parks and Wildlife Department ("TPWD"), has established public viewing areas at Lake Texana Boat Ramp No. 4, above Highway 59 and at the Palmetto Bend Spillway, for viewing nesting eagles.

**Table 3-1  
Protected Species Reported to Occur in Jackson County, Texas**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Habitat Preference</b>	<b>USFWS</b>	<b>TPWD</b>	<b>Occurrence in County</b>
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Large bodies of water with nearby resting sites; nesting in riparian forests near water	T	T	wintering / nesting
Brown Pelican	<i>Pelecanus occidentalis</i>	Ocean, salt bays, and coastal areas	E	E	resident
Peregrine Falcon, American	<i>Falco peregrinus anatum</i>	Open coastal areas	E	E	migratory
Peregrine Falcon, Arctic	<i>Falco peregrinus tundrius</i>	Open coastal areas	T	T	migratory
Reddish Egret	<i>Egretta rufescens</i>	Coastal wetland islands	C2	T	migratory
White-tailed Hawk	<i>Buteo albicaudatus</i>	Grasslands and coastal prairies	NL	T	resident
White-faced Ibis	<i>Plegadis chihi</i>	Freshwater marshes	C2	T	resident
Whooping Crane	<i>Grus americana</i>	Coastal wetlands; Matagorda & Aransas islands	E	E	migratory
Wood Stork	<i>Mycteria americana</i>	Coastal wetlands, dispersal	T	T	migratory
Texas Diamondback Terrapin	<i>Malaclemys terrapin</i>	Littoral zone and coastal waters of Gulf of Mexico	C2	NL	
Texas Horned Lizard	<i>Phrynosoma cornutum</i>	Open arid and semi-arid regions with sparse vegetation ( grass, cactus, scattered brush , scrubby trees);when inactive burrows in soil (various rocky to sandy), rodent burrow, or hides under rocks	C2	T	resident
Marshelder Dodder	<i>Cuscuta attenuata</i>	Parasitic; only collected on Marsh-Elder Iva annua in Texas	C2	NL	endemic

### 3.2.4 LNRA Recreational Facilities

On May 15, 2002 the LNRA Board of Directors adopted LNRA's Park and Open Space Master Plan, 2002-2007. A copy of said plan is attached hereto as Appendix A. The purpose of the Park and Open Space Master Plan was to make an assessment of current needs and create a document that would assist LNRA in planning and developing parks and open space opportunities for the public's use. In October, 2004, LNRA amended the Park and Open Space Master Plan and established the following priorities:



- Covered Event Center
- ADA Accessible Fishing Pond
- Day Use/Picnic Area
- RV Sites
- Outdoor Sports Courts
- Playgrounds
- Birding Opportunities
- Multi-Use Indoor Exhibition Center
- Shooting Sports Center
- Fitness Center
- Cabins

LNRA has three (3) parks on its lands. LNRA owns and operates Brackenridge Plantation Park and Campground and the Mustang Wilderness Campground. Lake Texana State Park is also located on LNRA lands but is leased to and operated by the TPWD.

The Brackenridge Plantation Park and Campground consists of approximately 240 acres and includes one hundred thirty-two (132) campsites, two (2) wastewater dump stations, four (4) comfort stations (handicapped accessible), marina, recreation center, nature trail, historic trail, wastewater treatment plant, lighted fishing pier, two (2) volleyball courts, group pavilion, playgrounds and picnic areas. Specific details of such facilities are listed on Table 5.1 of LNRA's Park and Open Space Master Plan 2002-2007. Items not listed on Table 5.1 include components of the Brackenridge Recreation Complex, a new recreation development project being constructed by LNRA on a 187 acre tract recently acquired by LNRA adjacent to Brackenridge Park. Amenities include a 200,000 S.F. covered arena and multi-use space metal building, 10 acre fishing pond with ADA pier, picnic area and playground, 2 youth soccer fields, paintball course, softball field, and a new day use area including 6 picnic pavilions, horseshoe and washer pits, playground and a disc golf course all linked to the existing hike and bike trail system. Additionally, LNRA has constructed a 6.5 mile looped equestrian and mountain bike

trail that includes a trailhead campsite with 2 picnic pavilions, warm up arena, animal storage pens, and 2 additional picnic pavilions and ecological signage on the trail

The Mustang Wilderness Campground consists of approximately 250 wooded acres and includes 28 tent campsites, 2.2 miles of trail, adjacent boat ramps and information and registration site. LNRA recently constructed a public water supply, restroom and shower facilities onsite.

The Lake Texana State Park consists of approximately 590 wooded acres, of which 92 acres are developed. TPWD leases the land from LNRA. TPWD owns and operates the park facilities including park headquarters with handicapped accessible restrooms, and interpretive displays; a day-use area with restrooms, fishing pier, group pavilion, boat ramps, 71 picnic tables, playground, paved access woods and parking; tent camping area with 55 campsites, 2 restrooms, 1 lighted fishing pier, playground, floating pier and rental boats.

Boat access to the lake is provided by public boat ramps. Boat ramps No. 1, 2, 3, 4, 5, 6, and 8 are open while boat ramps No. 9 and 10 are presently closed. Fishing can also be done from the banks of Lake Texana at the Oscar Cherry Park north of US Hwy. 59 and the Spillway fishing area at the west end downstream from Palmetto Bend Dam and Spillway. Birdwatchers and wildlife enthusiasts can view all types of wildlife from the concrete walkways on the spillway bridge at the Spillway Viewing Area

### **3.3 Existing Management Programs**

#### **3.3.1 Water Quality Management**

Most of LNRA's lands are adjacent to land that is in agricultural use. LNRA lands are managed to control and/or prevent non-point source pollution from agriculture and silviculture.

### **3.3.2 Land Management**

The Texas State Soil and Water Conservation Board and LNRA in the mid 1990's developed land use practices that will protect the water quality of Lake Texana. Table 3-2 presents the land use practices by LNRA tract.

**Table 3-2  
LNRA Land Use Practices**

<b>Tract No.</b>	<b>Acreage</b>	<b>Land Use</b>	<b>Development Zone</b>
1	110	Hay Production	Flood Plain Management
1a	33	Hay Production	Flood Plain Management
1b	100	HQ Operations	Flood Plain Management
2	82	Hay Production	Flood Plain Management
2a	20	Hay Production	Flood Plain Management
3	30	Hay Production	Flood Plain Management
3a	19	Hay Production	Flood Plain Management
4	40	Hay Production	Flood Plain Management
4a	45	Hay Production	Flood Plain Management
5	64	Hay Production	Flood Plain Management
5a	161	Wildlife Habitat	Flood Plain Management
5g	20	Pasture	Multiple Use Area
6	23	Hay Production	Flood Plain Management
6a	17	Recreation Facility	Flood Plain Management
7	29	Hay Production	Multiple Use Area
7a	44	Wildlife Habitat	Multiple Use Area
8	40	Hay Production	Multiple Use Area
8a	33	Recreation Facility	Wildlife Management Area
8b	12	Wildlife Habitat	Multiple Use Area
9	13	Hay Production	Wildlife Management Area
9a	15	Hay Production	Wildlife Management Area
10	11	Hay Production	Wildlife Management Area
11	80	Hay Production	Wildlife Management Area
11a	1869	Wildlife Habitat	Wildlife Management Area
12	40	Hay Production	Multiple Use Area
12a	243	Recreation Facility	Multiple Use Area
12b	54	Wildlife Habitat	Multiple Use Area
13	14	Hay Production	Wildlife Management Area
13a	2	Recreation Facility	Wildlife Management Area
14	18	Hay Production	Flood Plain Management
14a	143	Wildlife Habitat	Flood Plain Management
15	25	Hay Production	Flood Plain Management
15a	20	Hay Production	Flood Plain Management
15b	24	Recreation Facility	Flood Plain Management
15c	51	Wildlife Habitat	Flood Plain Management
15d	114	Pasture	Flood Plain Management
15e	23	Wildlife Habitat	Flood Plain Management
16	43	Hay Production	Multiple Use Area
16a	26	Wildlife Habitat	Multiple Use Area
16b	617	Recreation Facility	Multiple Use Area
16c	182	Recreation Facility	Flood Plain Management
17	42	Hay Production	Multiple Use Area
18	32	Hay Production	Multiple Use Area
19g	155	Pasture	Multiple Use Area
20	22	Hay Production	Flood Plain Management
20a	20	Wildlife Habitat	Flood Plain Management
20b	4	Recreation Facility	Flood Plain Management
21	26	Hay Production	Flood Plain Management
21a	4	Wildlife Habitat	Flood Plain Management
22	42	Hay Production	Flood Plain Management
23	21	Hay Production	Flood Plain Management
23a	57	Hay Production	Flood Plain Management
23b	68	Hay Production	Flood Plain Management
23c	49	Wildlife Habitat	Flood Plain Management
24	29	Hay Production	Flood Plain Management
24b	8	Wildlife Habitat	Flood Plain Management

<b>Table 3-2 Continued</b>			
<b>Tract No.</b>	<b>Acreage</b>	<b>Land Use</b>	<b>Development Zone</b>
25	26	Hay Production	Flood Plain Management
26	39	Hay Production	Flood Plain Management
27	58	Hay Production	Flood Plain Management
28	68	Hay Production	Multiple Use Area
28a	3	Recreation Facility	Multiple Use Area
29a	71	Hay Production	Flood Plain Management
29b	27	Hay Production	Flood Plain Management
29c	29	Hay Production	Flood Plain Management
29d	20	Hay Production	Flood Plain Management
29e	15	Hay Production	Flood Plain Management
29f	14	Hay Production	Flood Plain Management
30	38	Hay Production	Multiple Use Area
30a	78	Wildlife Habitat	Multiple Use Area
30b	7	Recreation Facility	Multiple Use Area
31	22	Wildlife Habitat	Multiple Use Area
33	47	Wildlife Habitat	Multiple Use Area
33a	14	Hay Production	Multiple Use Area
33b	13	Wildlife Habitat	Multiple Use Area
34	20	Wildlife Habitat	Multiple Use Area
34a	5	Recreation Facility	Multiple Use Area
34b	10	Hay Production	Multiple Use Area
34c	25	Hay Production	Multiple Use Area
34d	25	Hay Production	Multiple Use Area
34e	20	Hay Production	Multiple Use Area
34f	36	Wildlife Habitat	Multiple Use Area
34g	15	Recreation Facility	Multiple Use Area
34n	84	Wildlife Habitat	Multiple Use Area
34s	67	Wildlife Habitat	Multiple Use Area
35	32	Wildlife Habitat	Multiple Use Area
35a	4	Recreation Facility	Multiple Use Area
36	16	Wildlife Habitat	Multiple Use Area
37	27	Hay Production	Multiple Use Area
38	18	Hay Production	Multiple Use Area
38a	12	Wildlife Habitat	Multiple Use Area
39	45	Hay Production	Multiple Use Area
40	63	Hay Production	Multiple Use Area
40a	32	Wildlife Habitat	Multiple Use Area
42	37	Hay Production	Multiple Use Area
42a	21	Wildlife Habitat	Multiple Use Area
43	35	Hay Production	Multiple Use Area
44	15	Hay Production	Multiple Use Area
44a	7	Wildlife Habitat	Multiple Use Area
50	15	Hay Production	Multiple Use Area
51	40	Hay Production	Multiple Use Area
52	39	Hay Production	Multiple Use Area
53	26	Hay Production	Multiple Use Area
54	21	Hay Production	Multiple Use Area
54a	4	Wildlife Habitat	Multiple Use Area
54b	4	Recreation Facility	Multiple Use Area
55	32	Hay Production	Multiple Use Area
56	10	Hay Production	Multiple Use Area

### **3.3.3 Hay Production and Pasture**

An estimated 2,192 acres of LNRA lands are currently managed for hay production. In the improved hay producing lands, the most desirable grass species are gordo bluestem, bahiagrass, K.R. bluestem and improved varieties of Bermuda grass. Nutrients on land in hay production are managed to sustain soil fertility, since organic production is removed. Soils analysis provides guidance for nutrient application. Weed invasion is controlled through a combination of mechanical and chemical means. Shredding mechanisms are set to shred weeds one inch above the average height of the grass. Prescribed burns are performed on an “as needed” basis to promote healthy herbaceous vegetation and retard undesirable vegetation.

Hay cutting is scheduled to maximize hay production without compromising healthy and vigorous plants. A copy of LNRA’s standard hay lease is attached as Appendix B.

All lands including those used for hay production and pasture are managed for wildlife benefits. In this land use practice, the most valuable species is the native bluestem and associated climax species. Soil nutrients, water sources, vegetation composition and conditions are evaluated. Fields are burned to promote healthy herbaceous vegetation and retard undesirable species, on an as-needed basis, when conditions allow. Weeds are controlled through appropriate mechanical and chemical means. As part of LNRA’s management program, LNRA may, independently or working with a tenant, elect to improve the productivity of a lease by removing the existing vegetation and introducing improved varieties of grasses.

### **3.3.4 Wildlife Habitat Management**

Wildlife habitat management focuses on managing a healthy indigenous white-tailed deer population, controlling feral hogs and enhancing habitat for diverse species including upland bird populations. Habitat enhancement plans include controlling brushy vegetation mast, encouraging horizontal growth in brush and woody vegetation and enhancing edge effect through proscribed burning and select plantings of cover and forage

### **3.4 Cultural Resources on LNRA Lands**

Prior to the construction of the Palmetto Bend Reservoir, now called Lake Texana, a series of cultural resource studies and surveys were performed in the Lavaca River Basin. In January 2001, the Bureau of Reclamation entered into a Memorandum of Agreement (“MOA”) with the Texas State Historic Preservation Officer (“SHPO”) and the LNRA concerning the transfer of lands and structures of the Palmetto Bend Project out of federal ownership. A copy of the MOA is attached as Appendix A to the LNRA 2001 Cultural Resources Management Plan for the Palmetto Bend Project, Lake Texana, Jackson County, Texas attached hereto as Appendix C. The MOA governs the management of the archaeological and historical sites of Lake Texana and site eligibility status. According to the Bureau of Reclamation thirty-three (33) cultural properties located within LNRA lands are either eligible or potentially eligible for listing in the National Register of Historic Places. These sites include 41 JK 16, 19, 20, 21, 32, 33, 36, 40, 41, 42, 43, 44, 46, 52, 53, 54, 57, 59, 60, 66, 67, 105, 106, 161, 162, 163, 164, 166, 167, 172, 176, 177, and 179. Management and protection of these thirty-three (33) sites is an ongoing task and is carried out pursuant to the LNRA 2001 Cultural Resources Management Plan, as required by the MOA and accepted by the Texas Historical Commission.

## **4.0 LAND RESOURCES MANAGEMENT PLAN**

### **4.1 Background**

As a part of the process of developing the Lake Texana Land and Water Resource Plan of 1997<sup>10</sup>, a Citizen's Advisory Committee ("CAC") was convened and participated in the development of that plan. The CAC recommended several policies and proposed land management strategies including:

#### **Lands Management**

##### **Public Access**

- Public access should be controlled and limited to designated/manageable locations, and boundary fences should be kept in place.
- Special permits/license (for a fee) could be made available, where appropriate, for additional public recreation access to Lake Texana for such purposes as boat docks and fishing piers. Such facilities should only be permitted in compliance with strict specifications, conditions and inspection by LNRA. Consideration should be given to location, environmental quality, appearance, and public safety (structural integrity and lighting).
- Unlimited public access should never be permitted because:
  1. Environmental damage to wildlife habitat.
  2. There would be no control of illegal hunting.
  3. Unsightly and unsanitary solid waste problems.
  4. Possible harm to water quality.

##### **Fish and Wildlife Management**

- Approximately 2700 acres of LNRA lands in upper reservoir zone (above US Hwy 59) should be maintained as a resource management area for wildlife.
- A waterfowl management area should be maintained for use by overwintering waterfowl.
- Manage Lake Texana shorelines to control erosion and improve fisheries.

---

<sup>10</sup> Such plan is being separated and updated into this Land Resources Management Plan and the Water Management Plan for Lake Texana and Palmetto Bend Stage 2 Dam and Reservoir on Lavaca River.

---



## Recreation

- The 1994 Lake Texana Recreation Master Plan should be implemented, with particular emphasis upon expansion of outdoor recreation facilities to better provide for winter season users.

## Water Quality

- Inflows to Lake Texana and water in Lake Texana should be continuously monitored for potential pollution, and immediate action should be taken to stop and/or clean up sources of pollution when identified. These include:
  1. Petroleum wastes;
  2. Spills; and,
  3. Non-point sources.
- Existing rural wastewater system (septic systems) surrounding Lake Texana should be continually inspected to determine potential pollution. If necessary, exercise statutory powers of LNRA to provide better control.

## Recreation/Environmental Fund

- Develop a recreation/environmental fund to be used to:
  1. Maintain resource management area for wildlife;
  2. Create waterfowl management area;
  3. Implement the 1994 Lake Texana Recreation Master Plan as amended.

## **4.2 Implementation of LNRA Policies and Guidelines**

### **4.2.1 LNRA Board Policy 501 - Property Rights**

The Policy provides:

In order to serve the public and fulfill its statutory mission, the LNRA must have strong public understanding of and support for its programs, construction projects, ordinances and other projects. The LNRA shall strive to earn that support by fulfilling public expectations and, with respect to private landowners and other members of the public, to work to:

- Minimize disruptions to business and intrusions into private lives caused by LNRA activities;
- Provide appropriate notification of LNRA activities to affected parties;

- Provide full and open disclosure of LNRA siting and construction plans, data and environmental information upon request, subject to the provisions of the Texas Open Meetings and Records Acts, when they inquire;
- Allow landowners and other members of the public an opportunity to provide verbal and written comments when LNRA creates regulations, construction or utility service plans or sets rates for services; and
- Provide personal identification that designates LNRA staff and agents as LNRA representatives to owners and occupiers of private property.

#### **4.2.2 LNRA Board Policy 502 - Land Resources**

The Policy provides that LNRA will acquire, develop, use, manage, operate and dispose of its land resources consistent with the Palmetto Bend Conveyance Act, Public Law 106-512, Board Resolution Nos. 2002-002 and 2002-003, Chapter 49, Texas Water Code, and to fulfill its essential corporate purposes and responsibilities prescribed by the LNRA enabling legislation and the Board's policies.

#### **4.2.3 Guidelines Pursuant to Board Policy 502**

##### **4.2.3.1 Land Resources Acquisition**

The Board will determine whether acquisition of particular land resources is necessary and will authorize the General Manager or his designee to acquire the land resources subject to the following conditions:

- If deemed appropriate, an environmental due diligence assessment will be prepared on all land resources considered for acquisition.
- Information obtained during the due diligence and on-site assessments will be evaluated prior to final acquisition.
- In determining the method of land resources acquisition, factors to consider include (i) the purpose, type, and life of the facilities to be located on the land, (ii) how the surface of the land will be used, (iii) significance of mineral rights to the integrity of the facility, and (iv) the present or future use of the land by the property owner.

- An independent appraiser licensed by the State of Texas will be engaged to provide an opinion of fair market value as a basis for negotiations on all sales, leases, purchases or exchanges of land resources; provided, however, in instances where LNRA is acquiring land resources from, or disposing of land resources to another public utility or governmental or quasi-governmental agency, such an appraisal is discretionary.
- Acquisition of specific land resources through eminent domain proceedings may be initiated (i) after an official written offer, based upon the amount determined to be just compensation, has been transmitted to the owners of the land resources and the owners have been unable to agree with LNRA upon the fair market value of the land resources and further negotiations for settlement have become futile; (ii) if the title cannot be conveyed without a court judgment; or (iii) if there is a conflict of interest of the owner(s). In no event shall the power of eminent domain be exercised by LNRA beyond the limits of Jackson County. Additionally, the power of eminent domain may not be used for the condemnation of land resources for the purpose of acquiring rights to groundwater or of water or water rights.
- The classification of land resources acquired shall be approved by the Board.

#### **4.2.3.2 Land Resources Development, Operation, Use and Management**

All LNRA land resources will be classified for use as Conservation Land Use, Government Land Use, or Public Recreational Land Use.

- Conservation Land Use – Land that is not intended for development or public recreational land use, and is managed in its natural state as open space including hay production and pastures, wildlife habitat and management, water quality protection, visual buffers or natural science laboratories. It also may include significant archaeological, scenic or historical features that should be preserved.
- Government Land Use – Land that is developed and managed for government service or administrative activities and is not public recreational or conservation land use. Such land use may include facilities associated with LNRA’s Headquarters, with power production and distribution, flood control, water treatment and distribution, wastewater treatment and collection, public access, utilities, and non-recreational leases or agreements.
- Land Resources – Interests in real property, including, but not limited to, easements, leases, and fee simple ownership and aerial, subsurface, and surface and groundwater rights.
- Public Recreational Land Use – Land which is developed and managed by public or private entities for parks, campgrounds, lodging, food services, boat launching and other water access or recreation facilities.

LNRA will manage its land resources in accordance with its classified use; however, the Board may approve land resources uses other than those assigned if those uses fulfill LNRA corporate purposes or policy.

LNRA may enter into permits, leases, easements, development agreements or other legally binding land use agreements with public, private, or non-profit entities. Such land use agreements will conform to the following criteria:

- Monetary consideration of agriculture/grazing, commercial, (recreation or non-recreation) and private uses will be full fair market rental value.
- Leases for agricultural/grazing uses will be managed such that the lease agreement conserves, protects and maintains LNRA's land resources.
- May be granted for less than full fair-market value to governmental entities or nonprofit organizations when the use of the land resources furthers LNRA's ability to meet its statutory responsibilities or is deemed to be in LNRA's best interest.
- Require the user to undertake full financial responsibility for proper maintenance and use of the land and/or facility. Such financial responsibility may include liability insurance coverage protecting LNRA.
- Will include provisions allowing periodic adjustments of monetary consideration.
- The term will be commensurate with the use of the land, the purposes of the agreement, the amount of capital to be invested by LNRA and/or the user, the anticipated capital payback period, and the projected revenue to LNRA.
- Will contain, as appropriate and necessary, provisions for environmental protection and compliance with applicable laws and regulations, including LNRA ordinance and policies for water quality, nonpoint-source pollution prevention and other environmental quality considerations, such as impacts to cultural and archaeological resources, wetlands, and threatened or endangered species and their habitats.

Except as provided herein, the Board shall approve long-term land use agreements. The following types of land use agreements may be executed by the General Manager or his designee without Board approval:

- Leases, temporary use permits, licenses and construction permits.

Agreements with the private sector for commercial recreation project development, operation and management will conform to the following criteria:

- Private development, operation and management of LNRA land resources shall be consistent with LNRA's role of providing public access for public recreational and conservation land use of LNRA land resources.
- A request for proposals (RFP) must be issued to solicit bids for any such development, operation and management agreement. The RFP process shall be designed to encourage local participation. Board authorization is required prior to issuance of an RFP. Selection of the successful bidder and terms of the agreement require Board approval.

LNRA may grant easements on, across, and/or under land it owns, permit easements to occupy the same easement corridor it has acquired, and/or release its easement rights or portions of land from easements when the best interests of LNRA, its customers and the public are served.

Requests for easements on, across, and/or under LNRA land will conform to the following criteria and must be specifically approved by the Board:

- Monetary consideration for easements that serve a private or commercial use will be the full fair-market value as determined by an appraisal obtained by or provided to and approved by LNRA.
- Monetary consideration for easements that serve a public or non-profit use may be less than full fair-market value at the discretion of the Board.
- Easements will contain, as appropriate and necessary, provisions for environmental protection and compliance with existing laws, regulations and LNRA ordinances and policies for water quality, non-point source pollution prevention and other environmental quality considerations, such as impacts to cultural and archaeological resources, wetlands, and threatened or endangered species and their habitats.

Requests to occupy a portion of an LNRA easement on, across, and/or under lands that are not owned by LNRA may be approved by the General Manager, or his designee, if they meet the following criteria:

- The requesting entity will first obtain written permission from the landowner to occupy a portion of said land.

- The requesting entity will obtain the written statement of LNRA's non-objection to the proposed easement/use. Such statement of non-objection only will be granted if the proposed joint use of the easement corridor will not interfere with LNRA's superior easement rights, safety, and efficient operations within the easement area.
- The requesting entity may be required to obtain the easement rights, subordinate to LNRA's superior easement rights, from the landowner(s).

LNRA's easements on, across and/or under private lands that are not necessary to the operation of LNRA may be released by the General Manager. Requests of LNRA to release its easement rights will conform to the following criteria:

- Management will determine that LNRA has no further or anticipated need for easement rights in the area to be released.
- Any processing costs, including the cost of a survey, if required, will be at the expense of the property owner or party requesting the release.
- Easement rights which are considered unnecessary due to an abandonment of a line or facility by LNRA may be released to the current landowner(s).

Public or private use of (including aerial use above or over) LNRA land, except where expressly authorized by LNRA, will be considered an encroachment. Those encroaching on or over LNRA lands will be required to either remove the encroachment as well as any constructed improvements or to secure rights to use the land by entering into an acceptable land use agreement with LNRA. The General Manager, or his designee, may institute appropriate legal action to remove any non-conforming encroachments.

Any use of land classified as Conservation Land Use for mitigation purposes under the Endangered Species Act and associated regulations must be specifically approved by the Board. Management shall notify the Board upon receipt of any request for use of LNRA land for mitigation purposes or any proposal to donate land to LNRA for mitigation purposes.

#### **4.2.3.3 Disposal of Land Resources**

Subject to the Palmetto Bend Conveyance Act, Public Law 106-512, Board Resolution Nos. 2002-002 and 2002-003, any land resources owned by LNRA, which are found by the Board to be surplus and no longer needed for carrying out the business of LNRA, may be sold, under order of the Board either by public or private sale, exchanged for other land resources needed by LNRA for the like fair market value, leased or otherwise disposed. Before a public sale of land resources, LNRA shall give notice of the intent to sell by publishing notice once a week for two consecutive weeks in one or more newspapers with general circulation in Jackson County. In connection with the sale of surplus land resources, the Board, at its discretion, may impose restrictions on the development and use of any disposed land resources.

Any land resources dedicated to or acquired by LNRA without expending LNRA funds may be abandoned or released to the original grantor, the grantor's heirs, assigns, executors, or successors upon terms and conditions deemed necessary or advantageous to LNRA and without receiving compensation for such abandonment or release. Land resources may also be abandoned, released, exchanged, or transferred to another district, municipality, county, countywide agency, or authority upon terms and conditions deemed necessary or advantageous to LNRA.

Narrow strips of land resulting from boundary or surveying conflicts or similar causes, or from insubstantial encroachments by abutting property owners, or land of larger configuration that has been subject to encroachments by abutting property owners for more than 25 years may be abandoned, released, exchanged, or transferred to such abutting owners upon terms and conditions deemed necessary or advantageous to LNRA. Chapter 272, Local Government Code, does not apply to this paragraph.

#### **4.2.3.4 Mineral Estate**

All mineral interests in LNRA land resources retained by the United States or owned by LNRA shall be managed consistent with Federal law and in a manner that will not interfere with the purposes for which the Palmetto Bend Reclamation Project was authorized. LNRA has adopted General Stipulations Regarding Oil, Gas and Mineral Leases defining the requirements that shall be met by any lessee prior to development of any oil, gas and mineral interests in LNRA lands.

#### **4.3 Public Access**

Public access to LNRA lands is provided at LNRA and TPWD park and recreational facilities, and at boat ramps maintained by LNRA. Public access to and use of LNRA lands is encouraged through LNRA participation in state and regional programs, publications, and activities promoting outdoor and conservation oriented recreation.<sup>11</sup> Access to other LNRA lands, including wildlife conservation lands, wooded shorelines, and agricultural lease lands is permitted in a controlled fashion. Non consumptive activities are encouraged, but activities that may adversely impact habitat, disturb wildlife, or cause conflict with agricultural lessees and adjacent property owners are forbidden or strictly controlled, as described below.

Use of LNRA property other than the designated recreational lands is permitted, however vehicular access, land disturbing activities, and erection of any structure within these areas is restricted to agricultural lessees and employees or designees of LNRA pursuant to official business. Activities not allowed include overnight camping (except in designated recreational

---

<sup>11</sup> Golden Crescent Regional Planning Commission. 1994. Golden Crescent Magazine. Adventure Advertising & Public Relations, Inc., Victoria, Texas.

Wauer, R.H. 1996. The Great Texas Coastal Birding Trail. Texas Highways. Texas Department of Transportation, Austin, Texas.

Bellomy, C. 1996. Lake Texana State Park. Texas Parks & Wildlife. Texas Parks and Wildlife Department, Austin, Texas.



areas), fire building, wood cutting or collection, hunting, trapping, and harvest of living plant material, except as needed to accomplish specific management activities. In order to maintain control of public access, prevent erosion and water quality problems, and to reduce potential conflicts among LNRA property users and adjacent landowners, it is LNRA policy to maintain existing property line fencing.

#### **4.4 Wildlife Management**

Lands devoted primarily to wildlife conservation at Lake Texana are the shallow headwaters and wooded bottomlands located north of Highway 59, and the primitive recreation areas within Lake Texana State Park and Mustang Wilderness Campground (Figure 3-1). Other areas providing significant, though more limited, habitat for wildlife include the LNRA lands located below the dam and the shoreline woodlands occurring throughout the lower portion of the reservoir.

The shoreline woodlands, brushy areas along fencelines, and swampy swales are interspersed among extensive grasslands on LNRA lands south of US Highway 59. This mosaic of wooded and open land, with a variety of species and cover types provides significant amounts of edge habitat which needs to be maintained to support wildlife diversity. Most of the grassland on LNRA lands has been leased to local citizens for hay production or pasturage. However, the latter accounts for only a small area (less than 200 acres on three tracts, and was leased while the LNRA lands were under the control of the Bureau of Reclamation. Present LNRA policy does not permit long-term grazing leases.

The present hay production lease program was instituted as an economical method of preventing brush invasion of the grasslands due to a lack of natural disturbance (i.e., fire and buffalo herds), and their eventual domination by agricultural domestics, exotic species, and

uncontrolled natives such as mesquite. Mowing costs are estimated at about \$100,000 per year if performed by LNRA personnel, while net revenues to LNRA from the leased hay production program has averaged about \$9,500 per year since 1991. Other vegetation maintenance methods, such as chemical applications, would be significantly more expensive and labor intensive, and require much more management effort than mowing, due to the fragmented nature of the LNRA grasslands.

Although LNRA is implementing the recommended grassland management program as discussed below, small scale prairie restorations, where soils are favorable and the vegetation has substantial prairie remnants, has been undertaken, primarily as a plant species conservation measure and educational effort. LNRA partners with the USDA and Jackson County Soil and Water Conservation Board to implement these projects.

For Wildlife Upland Habitat LNRA recommends enhancing edge effects by selective clearing and maintenance of a mosaic of wooded and open (grassland) habitats, and by lowering the mast of brushy vegetation (making growing points of woody vegetation available to wildlife). This is a standard wildlife management recommendation in Texas, intended to maintain a savanna type landscape that favors production of both cattle and whitetail deer.<sup>12</sup> This type of management also tends to maximize vegetational and structural diversity, since it provides a wide range of cover types and food plants, and is considered beneficial to a wide variety of wildlife species, particularly when the alternative is development of extensive, dense stands of brush.

The extensive woodlands that occupy the wildlife management lands north of Highway 59 include ash and elm dominated bottomlands and live oak uplands. These woodlands tend to

---

<sup>12</sup> Inglis, J.M., B.A. Brown, C.A. McMahan, and R.E. Hood. 1986. Deer-brush relationships on the Rio Grande plain, Texas. Kleberg Studies in Natural Resources, The Texas Agricultural Experiment Station Project S-1203.

be mature, with extensive areas of closed canopy. Surrounding private lands, which are primarily used for livestock grazing, consist of grasslands and more open woodlands, typically with numerous access roads and other openings that provide an abundance of edge habitat. While the larger mammal and grassland fauna in the wildlife management area might benefit from additional clearing and brush control activities, there is an abundance of this type of habitat both in the immediate area and the region, and the species favored by the savanna habitat also tend to be relatively abundant.

Because of a general lack of woodland habitat in this region of intensive agriculture, and the value of this type of habitat to secretive species, or those requiring heavy cover, the woodlands of the wildlife management area will be left in their current condition. Extensive woodland areas without significant openings appear to be particularly important to migratory song birds, whose nesting success is adversely affected by the nest parasitism of brown-headed cowbirds and predation by feral domestic dogs and cats. Activities that disrupt or retard the development of mature woodland habitats and disturb wildlife, including removal of live and dead timber, clearing of underbrush, road construction or other developments, are prohibited in the wildlife management area, except on a very limited basis, as necessary to carry out policies of LNRA.

Wildlife populations on LNRA lands are monitored in cooperation with TPWD. LNRA also recommends controlled harvests of deer and hog populations before densities become great enough to adversely affect vegetation and habitat. This is particularly important, since hunting without LNRA's permission, is not allowed on LNRA property and a substantial risk of overpopulation exists in the absence of predators in controlling large mammals. The results of the population monitoring are used in consultation with TPWD biologists to determine if and

when such harvests need to be conducted. Attempts to control predator populations on LNRA lands have not been recommended. Feral hog harvests were conducted beginning in 1996 to reduce densities on LNRA property and is ongoing. Measures to control the abundant alligator population were undertaken during 1996 and are on-going as well. LNRA works with a licensed alligator egg collector who hatches the eggs and sells the juvenile alligators to farmers. A permit was obtained by the collector from the TPWD. LNRA also works with a licensed trapper to remove the maximum number of animals allowed each year and will continue to make every effort to control the alligator population.

Migratory waterfowl utilize shallow water habitats in Lake Texana, on adjacent LNRA lands, and surrounding Jackson County lands, for overwintering and resting stops along their migratory routes. To maximize their use of the wetland wildlife habitat, shoreline attributes such as shallow water areas and preferred vegetation will continue to be protected in the wildlife management area. Protective measures include prohibition of channel modifications, restriction of powerboats in sensitive, shallow areas, and erosion control programs to conserve fish nesting and nursery habitat.

LNRA recommends continuing the current program of leasing existing LNRA grasslands for use in hay production. Soil types and moisture regimes on these generally upland sites tend to be those favoring grassland climax communities. Since native prairie has been nearly extirpated from the Texas coastal plain, it would be desirable to return some acreage to native prairie. However, the generally small, fragmented nature of the Lake Texana tracts makes prairie restoration efforts impractical on any extensive scale, although restoration efforts are recommended for those grasslands in the wildlife management area north of US Highway 59.

The standard lease used by LNRA for agricultural lands includes restrictions beneficial to wildlife and protective of lake water quality. Pesticide use is by written approval of LNRA and is required to comply with all state and federal pesticide regulations. Use of chemical toxicants for killing mammals or birds is prohibited, as is the use of toxicants which cause secondary poisoning of mammals, birds and reptiles. Land use is required to be in a manner preventing soil erosion, and clearing of woody vegetation, removal of dead timber, removal of rock or soil material, and development of mineral resources are prohibited. Burning is prohibited except with the express permission of LNRA, and then only with all necessary permits.

At all LNRA facility locations, landscape shrubs and trees can be added to the property as cover for disturbance tolerant wildlife. Limiting pesticide use at facility locations as much as possible and using only EPA approved pesticides when pesticides are necessary will improve wildlife. One of the most important steps to help maintain wildlife habitat, though, is to prevent development of new facilities in previously undisturbed plots.

The following methods are recommended for recreational lands in order to maintain and improve wildlife habitat. Access should be regulated on plots managed for wildlife habitat and in order to avoid habitat destruction of parks, forbs and grasses due to foot traffic. Public education through literature, signs and kiosks of the identification and life history of endemic species the public may encounter will provide reminders to the general public of the reasons for restrictive regulations and also make visitors more aware and alert to the types of wildlife they will encounter while visiting. Monitoring use of recreational areas for excessive use and facility degradation should be a main activity. If use begins to exceed capacity, additional or seasonal use areas should be considered, as appropriate, in hay production lease lands or multiple use lands not reserved for wildlife conservation.

Although Lake Texana currently has an abundance of littoral habitat along the shoreline provided by *Water Hyacinth*, native emergents, and flooded dead terrestrial vegetation, prevailing winds have resulted in erosion on some western and eastern shorelines leading to siltation in adjacent shallow nursery areas.<sup>13</sup> Shoreline erosion control measures are being applied with the primary intention of halting encroachment on adjoining LNRA haylands, recreation facilities, cultural and archaeological sites, and neighboring land while also benefiting shallow nesting centrarchid species.

Lake Texana has historically had a problem with Water Hyacinth and typically treated about 500 acres of the aquatic macrophyte by boat and over 2000 acres by air annually, to maintain control.<sup>14</sup> Aquatic vegetation, which provides food and cover for numerous fish species, is controlled using only EPA and TPWD approved methods and limiting application to that necessary to maintain access to boat ramps and to limit areas of coverage to less than 20 percent.<sup>15</sup> Aquatic vegetation control will be continued by LNRA to maintain access at public-use points on the reservoir.

#### **4.5 Recreation/Environmental Fund**

The revenues from the sale of interruptible water out of Lake Texana are used to support an “environmental-recreation” fund for the development of wildlife management and recreation programs and projects that cannot be financed with revenues from normal water sales. LNRA will follow the guidance of the Park and Open Space Master Plan 2002-2007 as amended for implementation of recreation priorities. Wildlife priorities would be established after consultation with the TPWD. An example of such environmental enhancement to be considered

---

<sup>13</sup> TPWD - Texas Parks and Wildlife Department Inland Fisheries District 1-E: Lake Texana Fisheries Management

<sup>14</sup> Ibid.

<sup>15</sup> Durocher, P.P.; Provine, W.C.; Kraai, J.E. 1984. Relationship Between Abundance of Largemouth Bass and Submerged Vegetation in Texas Reservoirs. *North American Journal of Fisheries Management* 4:84-88.

is the Water Fowl Management Area, described in the original Project EIS (1974), but never funded by the U.S. Bureau of Reclamation.

#### **4.6 Review and Update**

The Land Resources Management Plan is a comprehensive plan reflecting the current status of the LNRA lands and what is believed to be the most appropriate way for LNRA to beneficially use these land resources. As various programs are implemented and the needs of the public change, the Land Resources Management Plan will be updated to reflect the needs of its users.