FORT WORTH PARKS AND COMMUNITY SERVICES DEPARTMENT

Preserving Native Texas

A MASTER PLAN FOR THE FORT WORTH NATURE CENTER & REFUGE

"Look deep into nature, and then you will understand everything better."
Albert Einstein

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Front Cover & Page 2: Lotus Marsh Boardwalk, circa 2001

Page 1: Cross Timber Forest; Todd Island, circa 2001

Dear Friends:

Welcome to a Master Plan for the Fort Worth Nature Center and Refuge. The Parks and Community Services Department in collaboration with community stakeholders, has established guidelines and plans for improving the visitor's experience while preserving the natural environment for generations of future visitors.

I would like to thank all of our citizens, support groups and staff for the effort required to generate and assemble this plan. The vigilance and enthusiasm displayed in community meetings and throughout the course of this work reassures the entire community of the lasting value that can be derived from enhancing and preserving this valuable community resource.

Based on the recommendations included in the plan we anticipate working diligently with the community over the coming years to raise private funds and implement this vision. It is our hope and desire that when the next generation uses the Fort Worth Nature Center and Refuge that they will acknowledge the efforts of the planners and implementers of this plan and continue that effort well into the future. This is really just the beginning of a new era at the Fort Worth Nature Center and Refuge and we encourage all participants to work alongside us to implement this Plan.

Sincerely,

Richard Zavala

Director Parks and Community Services Department

The Heritage of our Land

The Fort Worth Nature Center and Refuge comprises over one-third of all the park system in Fort Worth, and at 3,621 acres, it is one of the largest nature centers in the United States. Located on the edge of the city limits, constant urban growth challenges its mission of preserving and restoring natural areas for alternative forms of nature based recreation. While development threatens the boundaries of the site, offered within are a wide range of ecosystems, from the very disturbed to an almost pristine state. In order to balance the desire for preservation with the demand of urban sprawl, the City recognizes the need to protect this valuable community resource, and has undertaken the task of commissioning a new master plan for the site. This master plan will serve as the guide for all future development, land management, and programming at the Fort Worth Nature Center & Refuge. The goal of this endeavor is to provide a plan that will accommodate future expansion, and allow more people to experience the value of the Nature Center, while preserving "wild" areas to maintain the integrity of the land. It is a plan that maps future changes and acknowledges adjacent and internal development patterns, partnerships, organizational structures, funding, and programs. The mission of the plan is to establish a signature heritage that reflects not only the regional character of Fort Worth and North Central Texas, but communicates Fort Worth's community values of preserving natural open space for future generations.

Acknowledging History:


Historic Levee

In order to fully understand the evolution of the Fort Worth Nature Center & Refuge (FWNC&R), one must first acknowledge its history. The foundation for the formation of the nature center site began with the creation of the local lakes. Lake Worth, created in 1914 by the City, established the original land ownership that designates the current boundaries of the site today. Over 2,779 acres were acquired by the city in order to create the lake. Lake Worth, being the first man-made lake in the state of Texas, initiated the public recreation movement in the Lone Star state. Remaining land was then leased out with long-term leases and marketed for recreational use. Soon thereafter in 1932, the adjacent Eagle Mountain lake was formed and the combination of these provided numerous recreational amenities to the surrounding community. Historic photographs of the area reflect recreational activities such as sail boating, swimming, and picnicking on native sites that were virtually untouched by surrounding development.

The 1920's and 30's brought about a new era for park and recreation development in Fort Worth.


Historic CCC Picnic area

The city population had grown from 106,482 in 1920 to 163,227 in 1930 with estimates to keep rising (population was 4,000 in 1873). Acquisition for park land was up to 4,503 acres (2,779 for Lake Worth alone) and the annual operating budget for parks and recreation was around $232,000 per year. The establishment of President FDR's Civilian Conservation Corps (CCC) in 1933 brought about the construction of numerous facilities within public parks, many of which are still in existence today. Projects constructed in the Lake Worth area included the Broadview Shelter and the Lone Point Shelter; both completed in 1935. Several other projects in the area included tree and shrub plantings, new roads and bridges, site clearing, seeding, and even fighting forest fires, which totaled $491,560 dollars of work performed by the CCC (company 1816) at the end of 1937. At this time in the late 1930's, the nature center did not exist. The area was labeled state park #31 and was later given back to the city by the Federal Government.


Lake Worth Beach site

Today, there is still much speculation about the history of the land up until 1963 at the nature center's inception. Much of the area that now comprises the Nature Center was leased for ranching, farming, and sand and gravel mining. One small 25 acre parcel was never purchased by the City but remained in private ownership as a retreat facility for a local meat packing company. The company eventually sold the property to a private family and it remains today as an in holding within the Refuge boundaries. An additional internal use included a police department qualifying facility in operation from the 40's to 80's. The casino beach area, several gun clubs, and a fish hatchery were surrounding uses at the time.


Fish Hatchery

The 1960's brought about additional opportunities of access to public lands. It has often been termed the "Golden Age of Nature Centers". The original site of the nature center began with suggestions from the Audubon Society for land designated for birding and natural history education. After numerous requests to the park department by the group, in 1963 the City set aside 368 acres for the "Greer Island Refuge & Nature Center". A parking lot was constructed on the island and several period photos indicate school buses actually parked on the island for student tours through nature. Starting in 1964, the Nature Center programming was provided by the Fort Worth Children's Museum (now the Fort Worth Museum of Science and History) for the first few years of its existence until 1967, when the city hired someone to direct programs and security. Due to programming success, as leases came up for renewal, the property was turned over to the Nature Center for management. This allowed the original 368-acre designation to expand to 3,300.

Acquisition of additional funding through grants allowed construction of the Hardwicke Interpretive Center in 1972. Around this same time, the buffalo and prairie dogs were introduced on the site. There were no documented plans for future expansion or programs. So, in 1972, a partial grant from the Sid Richardson Foundation and the Junior League funded a new master plan by the Audubon Nature Center Planning Commission based out of New York City. The Audubon Society had a "template" for typical nature centers that they were recommending.

1914 Lake Worth created

1932 Eagle Mountain Lake created

1933 CCC established

1935 Broadview & Lone Point Shelters constructed by CCC

1963 Greer Island Refuge & Nature Center established

1964-1967 Managed by the Natural Science & History Museum


Roaming Bison

The basic fundamentals of their recommendations still hold true in many ways: that the city should safeguard the natural integrity of the area with wise consideration to human involvement, there should be expansion of outdoor education and interpretation, the Nature Center should have full and complete control over the property, and finally that all future activities be compatible with the resource. Several additional recommendations made in their report were implemented including: the altering of the name to Fort Worth Nature Center and Refuge (FWNC&R), declaring it a permanent urban green space, the visiting of several prototype facilities in existence, and limiting the types of recreation. (Other recommendations from the 1972 study still in progress or yet to be achieved include: marking all existing boundary lines


Aerial view of Hardwicke Center

and implementation of a new expanded interpretive complex.) In 1974, the Friends were established as a non-profit volunteer organization. For the next 10-15 years, they acted as a large "volunteer guild", but significant funds were not consistently coming in the door.

Due to the unique mission of the Nature Center there have been differing views on the most appropriate management of the resource and the human carrying capacity of the site. For years, different directors of the nature center maintained the "leave it alone" mentality. Starting in 1985, vegetation inventories, birding lists, and many other scientific databases were strengthened, but no active development took place. In 1987, a push for a new master plan began. By this time, the direction of the nature center was unclear. There were problems with vandalism and poaching, which brought about the closing of several of the parking lots. This in turn


1935 CCC structure at Broadview

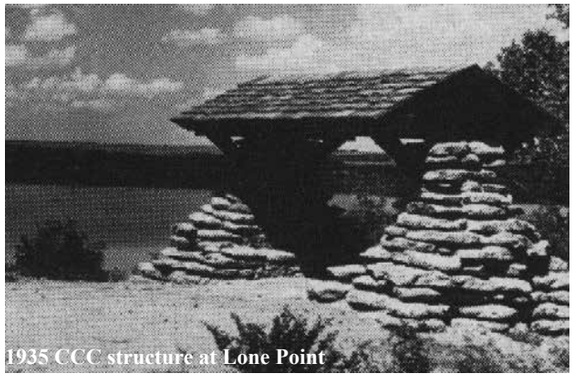
caused complaints from the community bird watchers. Fishing was banned in 1993, businesses along Jacksboro Highway began to change in character, and with very little increase to the operating budgets, the maintenance of the facility began to suffer. The general message to the public was that the nature center could not continue to maintain its size without taking a different direction.

Over the next few years, the Nature Center underwent a series of assessments including a MAP I (Museum Assessment Program) in 1992 which evaluated the entire operation compared to national standards. In 1995, the Institute of Museum Services conducted a MAP II (collections) study to evaluate artifacts, exhibits, and natural habitats. Recommendations from all of these studies reinforced the previous concepts which called for preservation, education, and funding. Later that same year, a strategic planning team was formed, and a draft was written. In 1996 a new five year strategic plan was adopted by the City Council, and by 1997, a Nature Center study team was formed to make recommendations regarding programs and projects. The plan process


Water's edge at the FWNC&R

involved park visitors, community leaders, local citizen groups, the Friends, academics, staff and other professionals in the field. It began to define the direction and focus for the Nature Center and is considered an outline for action. Through the formulation of the mission and core values, a balance between use and preservation is established. Specific objectives along with tactics and strategies were identified. In 1998 a Map III study was completed to assess the Nature Center and existing conditions. This map study continued to further support the recommendations of the study team, which included the need for a new master plan.

The master site development plan is one of the final stages to establish the future vision of the Nature Center. The consultant team for this plan initiated their process in September of 2001.


1935 CCC structure at Lone Point

1972 Master Plan by the Audubon Nature Center Planning Commission

1974 The FRIENDS were established as a non-profit volunteer organization

1987 A push for a new Master Plan began

1993 Fishing was banned, development along Jacksboro Hwy began to encroach

1996 New Five Year Strategic Plan Published

2003 New Master Plan

1972 The Hardwicke Interpretive Center was constructed

1992 MAP I (Museum Assessment Program) conducted

1995 MAP II conducted

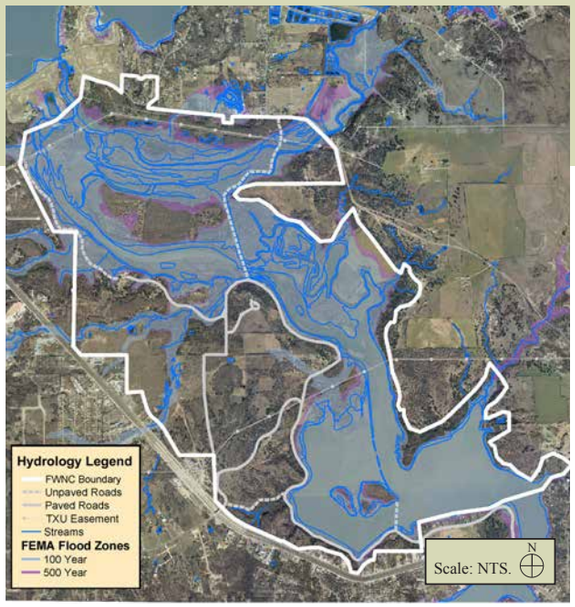
1998 MAP III conducted

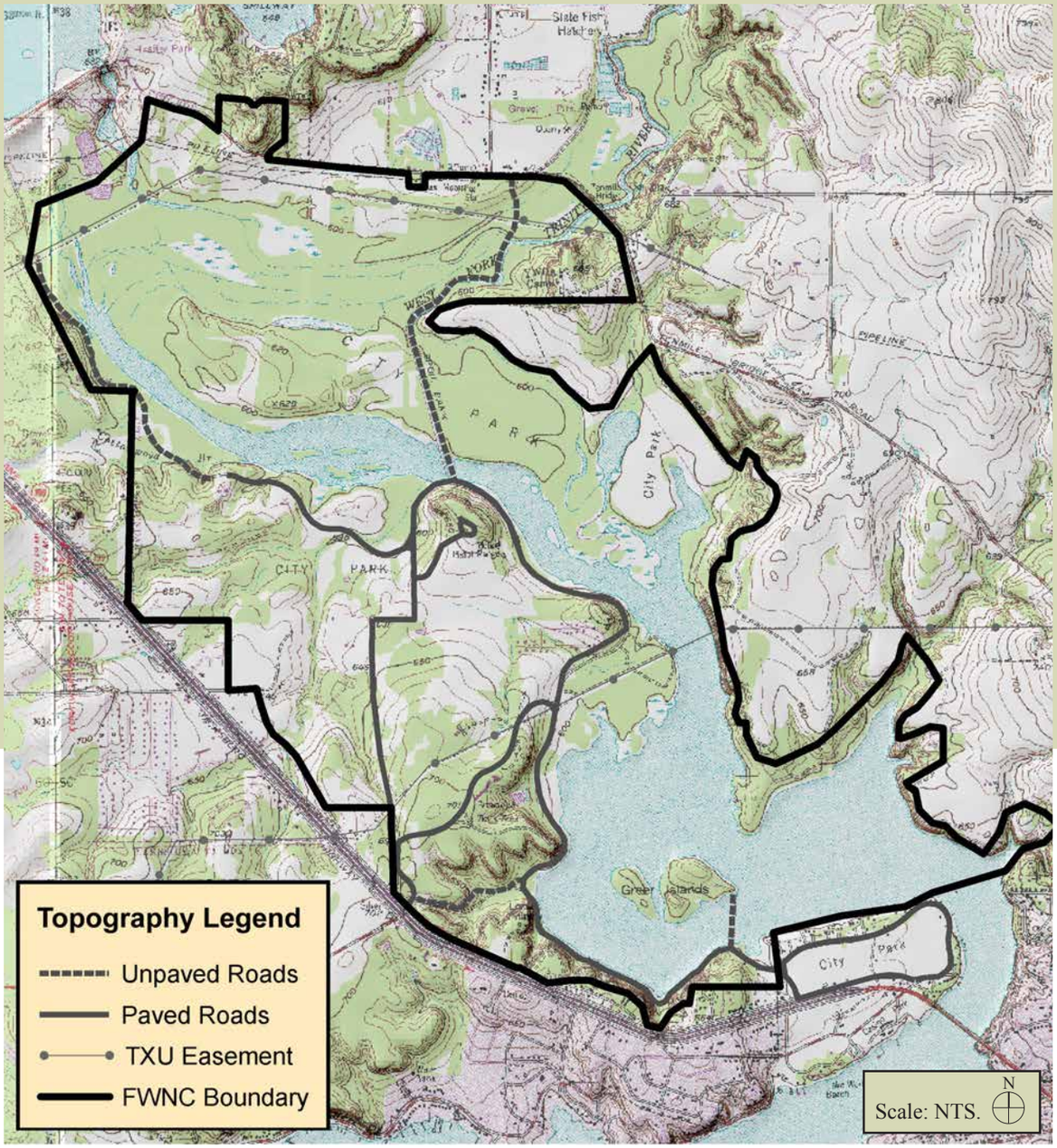
"Land management, preservation, public access - it's a delicate balance."
Wayne Clark, Director of the FWNC&R

The Natural Resources

A significant priority in synthesizing a master plan is to provide a clear understanding of three things: 1) what resources are present? 2) what is the condition of these resources? 3) how can the system provide a framework for the plan? A healthy Nature Center is a seed bank for future generations, providing both native vegetation and resources for wildlife populations. The value of these resources is difficult at best to estimate. When the opportunity to preserve is lost, it may take years if not generations to restore those natural resources to a version of earlier conditions. Preservation and conservation of this ecosystem is preferred over restoration. To achieve the understanding of existing resources noted above, it is helpful to view the Nature Center as possessing a chain of essential characteristics, with each link influencing the next link in the chain.

All of the resource links described below can be traced back to a single overarching factor that is, literally and figuratively, the "bedrock" for everything else that follows in the resource chain. This great overarching factor is geology, from which all other conditions and characteristics of the Nature Center derive. This unique geology influences hydrology, topography, and soils. These three factors, in turn, affect the biomass (total living things) within the preserve. The geology of the Nature Center is exposed at the surface as limestone caprock at the highest elevations (forming an escarpment-like community), and as sandstone.

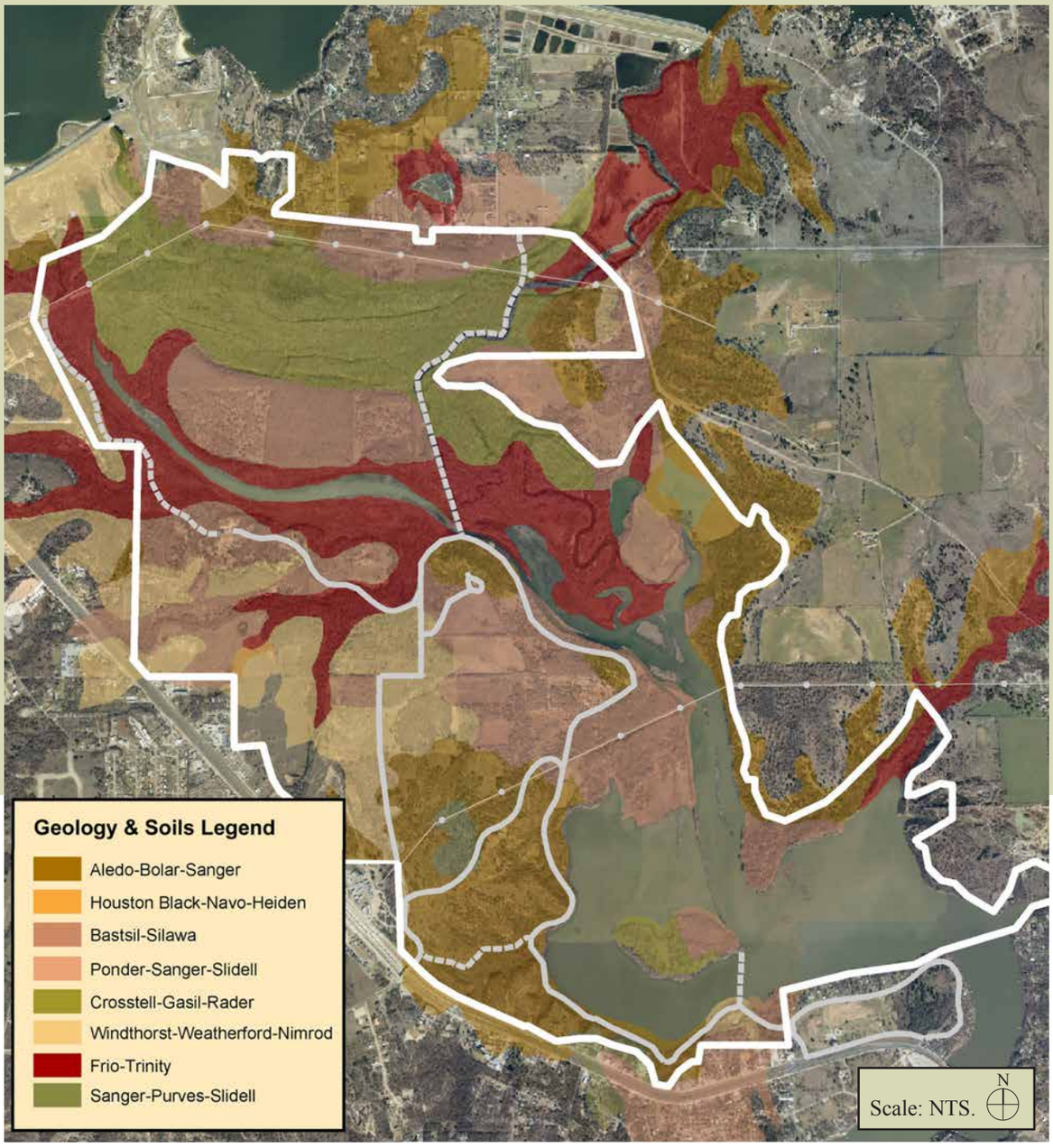




Hydrology

Although the hydrology of the area is conditioned by other factors such as climate and human intervention, the way water moves across the landscape or is held within the land is greatly affected by underlying geology. From a hydrologic standpoint, FEMA (Federal Emergency Management Agency) flood insurance rate maps indicate 50% of the Nature Center lies within the 100-year floodplain. The watershed encompassing the Nature Center includes the West Fork of the Trinity River, Forked-Tailed Creek, Cottonwood Creek, Lake Worth, and Eagle


Aerial photo of FWNC&R



Topography

The different layers of rock in the area, and their different rates of weathering, create topographic variation within the Nature Center. From a topographic perspective, the Center has four natural high points or promontories. These include the Lone Point (CCC picnic) site, the Hardwicke Center, the former YWCA site, and a point near the north end adjacent to the West Fork of the Trinity River. From these vantage points, a person can see most of the 3621.75 acres comprising the Nature Center, along with portions of downtown Fort Worth. Additionally, there is a ridge running along the boundary of the Nature Center that serves to protect the view shed from within, so that surrounding urbanization has lower visual and auditory impacts when one is inside the Center. In addition, topography affects types of vegetation and wildlife use, as well as creating opportunities for human use, both in the past and today.

Geology/ Soils

The geologic variation in the area of the Nature Center creates the opportunity for many types of soil to develop. Within Tarrant County (898 square


Rock outcroppings

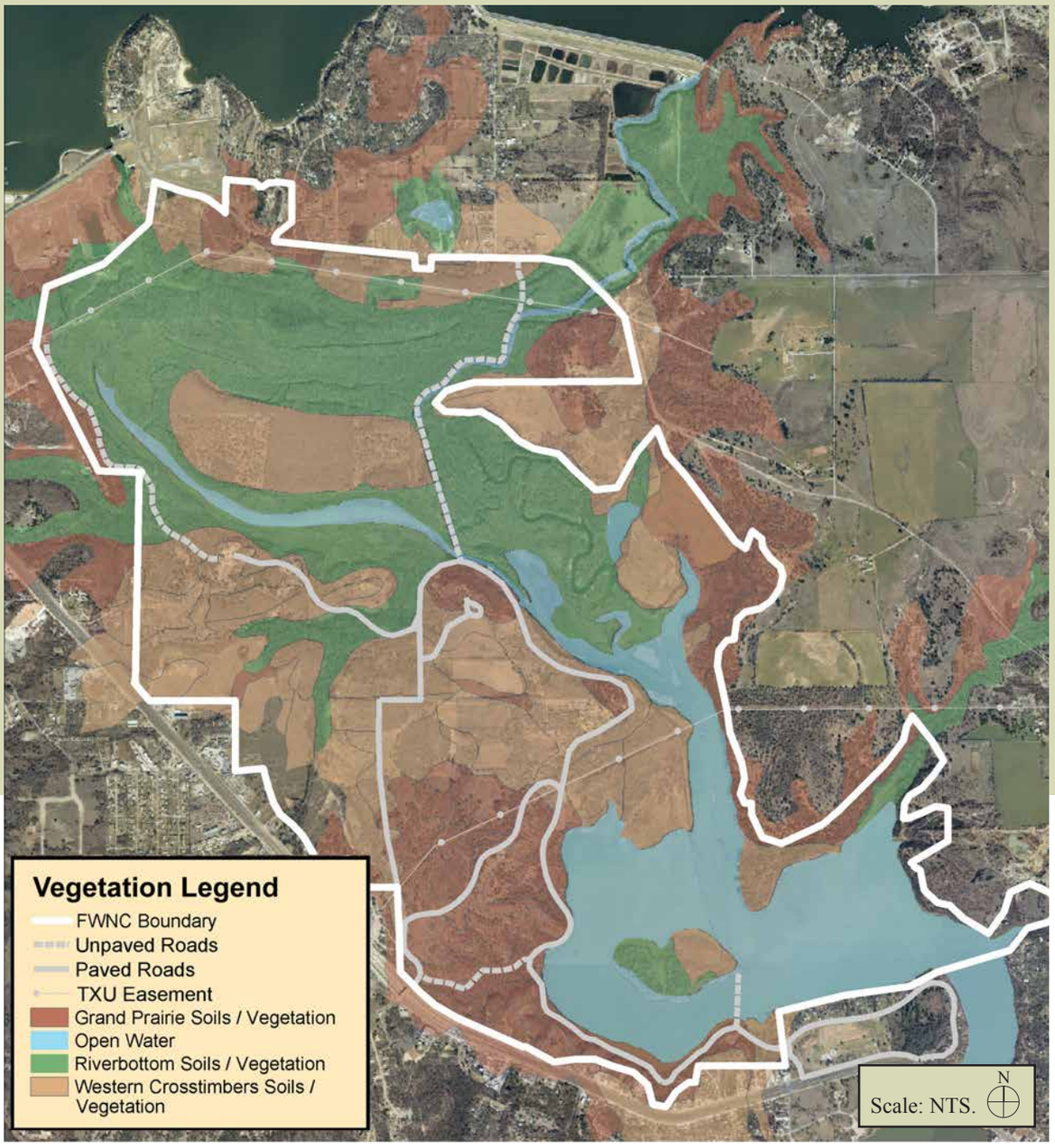
Mountain Lake. This watershed, and in particular the West Fork, filters stormwater runoff and can buffer the effects of urban development, with some limitations. Protection of this watershed is thus a critical preservation/conservation element for the Nature Center. These drainages demonstrate rare and exceptional aquatic conditions within Fort Worth and Tarrant County. The presence of riverine (river), lacustrine (lake), and palustrine (emergent wetlands) systems, are unique because of the extent and diversity of these systems within the Nature Center. These aquatic communities include the river, its tributaries, seasonally ponded areas, jurisdictional wetlands, a lake regime (both limnetic and littoral), and flooded bottomland forests. Unique also is the fact that they have evolved as hydrologically connected elements. The project area includes natural springs and groundwater seepages. Two in particular, Fund Springs and Williams Springs are located near the southeastern limits of the existing Nature Center. Due to groundwater and hydrologic characteristics, aquatic and terrestrial resources are diverse. A scene is set for an almost ideal aquatic laboratory. An effort should be made to describe these regionally limited natural resources and buffer the edges from the effects of erosion and ground disturbing activities.

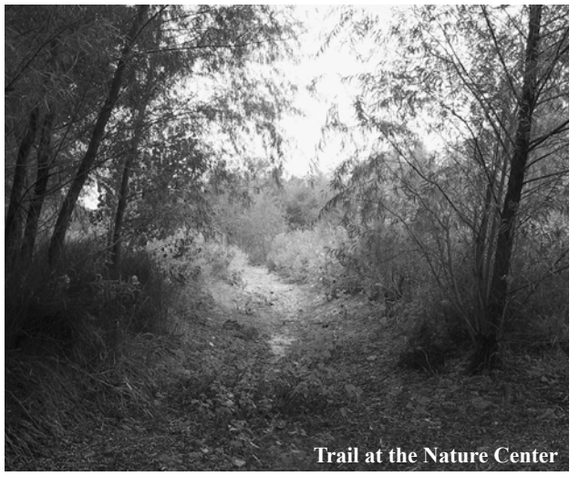
miles), there are eight different soil associations; portions of all eight occur within the Nature Center. This is a very rare situation, occurring only in one other small portion of the county that has already been disturbed by previous development. In other words, the Nature Center comprises only a small fraction of Tarrant County, but encompasses all these soils and associated vegetation and wildlife. Examples of this are the sandy soils derived from the sandstone, that give rise to oak savannahs, and the river clays and silts formed on floodplains and near the water's edge.

Vegetation

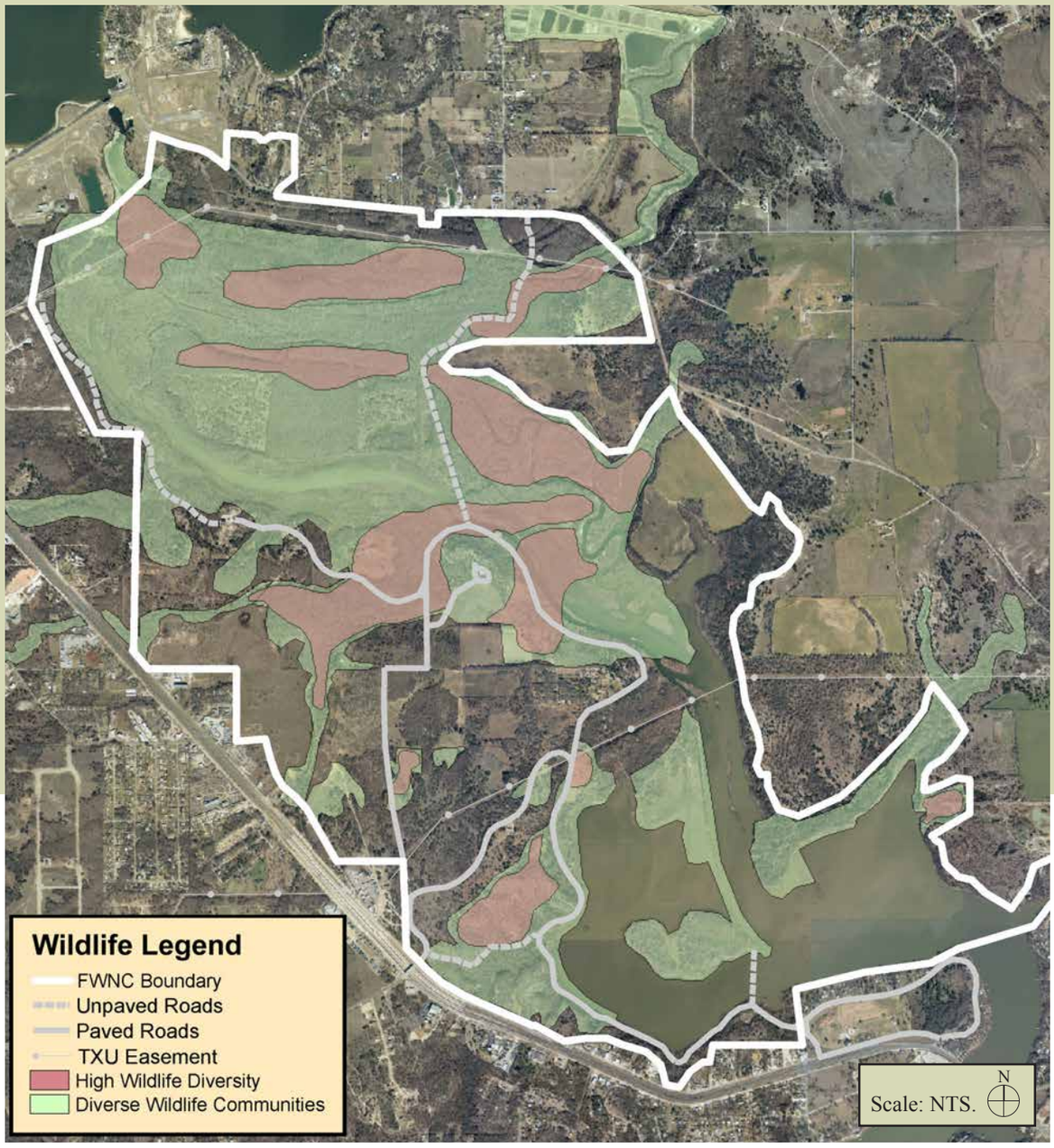
The specific characteristics of soils affect the vegetation that exists in the preserve. As the geology is eroded, soils form and vegetation patterns develop; importantly, wildlife can then exploit these evolving niches within this ecosystem. The three significant vegetational communities at the Nature Center include, The Grand Prairie (open expanse of tall grasses), the Cross-Timbers (belts of oak forest mixed with prairie grasses), and the Trinity bottomland (forests of elm; ash, oak; pecan, box elder, and willow). A particularly important feature is Todd Island, seasonally isolated by floodwaters and containing one of the oldest undisturbed areas at the Nature Center. Previous studies indicate that the existing Post Oak forest on Todd Island dates to approximately 1736, a highly unique and special woodland. It is considered part of the old growth Western Cross-Timbers forest, with sandy soils and large trees.

In contrast with the relatively untouched forests of Todd Island, portions of the Nature Center include non-native and invasive species of numerous grasses, thistles, burs, spurges, and nettles. These are prime areas for restoration efforts. Proven methods of restoration in selected areas should include prescribed burning and reseeding. Also existing within the Nature Center are native species like Indian grass, switchgrass, yucca, purple coneflower, Indian blanket, little bluestem, big bluestem, silver bluestem, sideoats grama, verbena, sumac, rough-leafed dogwood, and buffalograss, which are known to respond well to controlled burning. The Botanical Research Institute of Texas (BRIT), in Fort Worth, has collected botanical specimens at the Nature Center but additional survey work is recommended at this unique outdoor laboratory. This existing ecosystem and its vegetational communities should be carefully delineated and catalogued.




Trail at the Nature Center


Foliage at the Nature Center




Prairie Dog

Wildlife

The wildlife community of the Nature Center is dependent upon the character of the vegetation present, which, as we have seen, is dependent in turn upon soils, water, and underlying rock. Studies of the existing wildlife composition here describe species common in North Texas prior to European settlement. Habitat is comprised of several interdependent components including vegetation, water, soil, slope, size, and distribution. Simply put, diversity of habitat and wildlife is greater where these resources overlap. Wildlife species composition is dependent upon habitat, which is influenced by vegetation cover. Nearly all of the wildlife species present when Europeans first arrived are still known to occur at the Nature Center, excluding black bear and gray wolf. This includes mountain lion, fox, coyote, bobcat, mink, river otter, ringtail cat, and raccoon, all of which are carnivores. A large inventory of migratory and resident bird species has been recorded, making the Nature Center an ideal site for bird watching. Mammals, reptiles, amphibians, arachnids, and insects are diverse and abundant. An American Bison herd, corralled within 55 acres of the Nature Center coexists with the prairie dog village. Invasive or "problem" species include feral hogs that exploit the northern half of the project area, including Todd Island. Other negative impacts include the domestic pets (cat/dog) from adjacent developments that roam freely over the Nature Center, damaging populations of ground nesting birds and mammals.

This chain of resources at the Nature Center is not truly linear. The "chain" of characteristics described here, along with others, creates what is really a network of interlocking links, all affected by, and affecting, the others. Thus, the local biosphere offers an opportunity to understand a much bigger, more complex, and valuable picture of the natural world within Tarrant County and north-central Texas. The ecological history of the Nature Center can be interpreted from tree rings, geology, drainage patterns, species diversity, and historic literature. A significant effort should be made to make this information available to the different patrons of the Nature Center and foster research and education.

Unlike several states where large tracts of public land are designated as a refuge to wildlife, 97% of all the land in Texas is privately owned. The Nature Center is a relatively large tract of undeveloped public land containing rare resources, and providing a relatively rare chance to maintain a natural area for public use and ongoing gathering of scientific information. Fort Worth and North Texas have

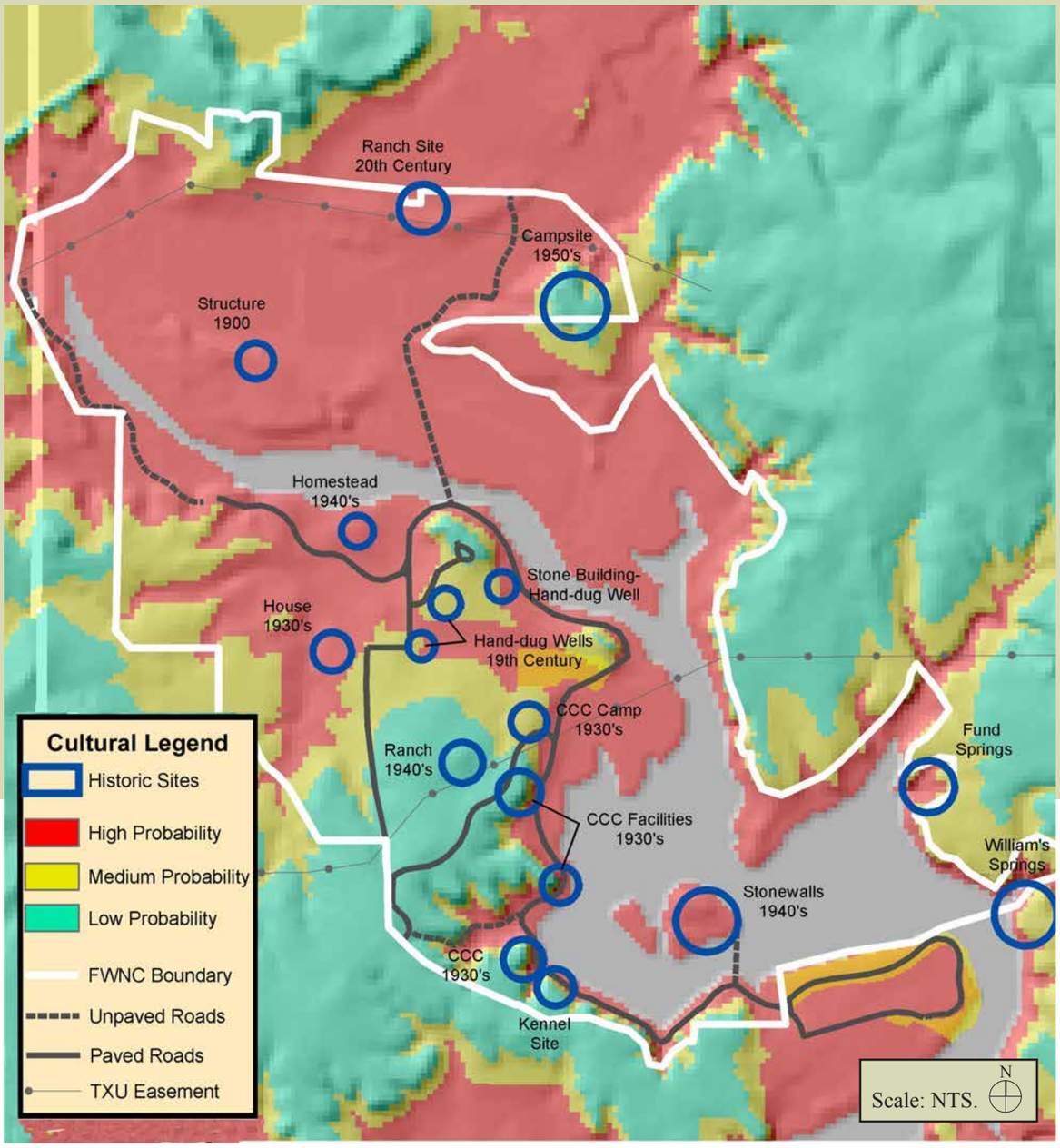

Deer living within the Bison Range

no similar resource, of this size, so close to our urban centers. To assure that this valuable opportunity is not lost, there is a need for a strong master plan to guide potential use and development. Various tools are available to conserve, appreciate, and protect the integrity of the Nature Center's resources. These conservation mechanisms may include conservation/ watershed easements, strong development guidelines, and protective covenants.

Cultural Resources

The value of the nature center is increased when one adds the historical timeline of human presence on the land. There is a clear pattern of cultural changes that occurred over time on the site, which should be researched, documented, and interpreted. Numerous hand-dug wells and historic homestead pads are scattered across the site indicating places of high human activity. The land formation itself lends well to human settlement. With its diversity of wildlife combined with its high lookout points and low creek beds, one can envision the early nomads utilizing both to their advantage for hunting for food and then making camp along the banks of the river. Later technology brought along agricultural cultivation of the land. No longer on the move, man began to settle in high places with close proximity to water for feeding of livestock and irrigation of crops. It is this pattern of progress that gives us cultural maps where one can begin to calculate the probability of additional artifact locations.

The Tarrant County Archeological Society of Fort Worth is currently in the process of cataloging over 10,000 artifacts that have been collected from the nature center site. This collection should be housed at the nature center for people to study and interpret. Although none of these items holds any high financial value, the bits and shards of pottery among other tools begin to explain the story of how humans have always used the land.




Broadview CCC Structure

Collection of artifacts is now prohibited on the site due to the need for preservation of the land. However, in the future, these areas of high probability should be prioritized and utilized for archeological studies and sample digs where the researchers can interact with the visitor who can be educated about the value of historical research.


Existing chimney at YWCA campsite

The First Steps ...

The first step in the master plan process identified several important priorities. The critical issues to be addressed included generation of public support, educating the community about the importance of conservation and preservation, addressing habitat loss or fragmentation along with restoration methods, balancing public use within a natural environment and recognition that there is a lack of adequate funding and overextended staff. In addition a network of surrounding factors such as watershed protection, incompatible zoning, and development encroachment heightened the need for a new plan. The City solicited the professional services of a consultant team to study these issues and begin this process.

The City selected a team approach for the master plan. The team, led by the landscape architecture and planning firm, MESA Design Group of Dallas included: The Portico Group out of Seattle whose experience specializes in interpretive planning for zoos, nature centers, and arboretums worldwide; The Lopez Garcia Group, based in both Dallas and Fort Worth provided research on the natural resources of the site and for environmental engineering; and Dean Runyan Associates of Portland was the economic analyst who provided economic comparisons of similar facilities.

Upon selection of the consultant team, the Mayor appointed a steering committee made up of Fort Worth citizens to guide the planning process. In addition to this group, several members from the park board and other affiliated organizations were asked to sit in on the meetings to provide input from various facility perspectives. A series of meetings with the group reviewed all of the research, so that together, the team could analyze the facts in order to guide the direction of the plan. Additional visits to the site, neighborhood meetings, and public presentations rounded out the process.

Throughout the development of the plan, many conditions were studied to determine the best course of action for the FWNC&R. These include the following:

Market Analysis

The appeal for environmental education, recreation and outdoor activities extends across demographic groups and geographic regions, and can be expected to grow for the foreseeable future. Nature centers appeal, in particular, to the young and to young families as dynamic, educational settings that are broadly accessible and understandable. Many facilities of this type are frequently visited by organized school groups, and some specialize in more detailed educational and research programs for more advanced participants. Many even offer overnight or multi-day educational activities. But, nature centers and refuges also appeal to those who are older – in particular empty nest and retirement age groups – who are more likely to seek tranquil, visually appealing and perhaps educational settings. This demographic segment is growing steadily in North America and elsewhere in the world, and represents an important market for existing and new natural resources facilities.

Based on these trends, the market analysis study focused on two visitor groups:

a) Residents of relatively nearby areas who represent a local market, and

b) Those who live further away and who will come to the Center as day or overnight visitors ("tourists") in the area.

Primary factors affecting attendance

The attendance of nature centers by these groups, is influenced to a substantial degree by several factors:

- Population size and growth trends, which particularly affect local and regional demand from both adults and school children
- Demographic characteristics; nature centers are particularly appealing to school-aged children and to those 50 and older
- Disposable income; income growth indicates there will be more spending on leisure and educational activities
- Travel costs (gasoline in particular), which affect the ability of visitors to travel to the area, and are particularly important for those traveling from 100 or more miles away
- Competition from other leisure, recreation and educational activities

Particularly, demographics and travel trends influence the demand for nature center facilities. Some of these considerations include:

Demographics

- The primary population growth is currently in the 40-50 age range. These are more likely to be empty nesters at this point; relatively few are retired yet. The retired population will increase strongly after 2010.
- With more than one worker in the family it is more difficult to schedule travel, which often means shorter trips, more frequently. Shorter trips tend to be more single-purposed- focused on one or a few activities.
- Incomes of professional, educated households have been increasing, producing a segment of the population with adequate resources for travel and recreation. However, much of the population is sharing in this income growth only to limited degree, and will continue to travel on a more limited basis and be very value oriented.
- The American population is becoming increasingly educated, with nearly a quarter of American adults currently holding a bachelor or advanced

Committee tour of the Nature Center for potential Visitor Center sites.

degree. Educated travelers are particularly interested in information-rich displays and programs.

Travel Trends

- North American households are more likely to take long weekend and other relatively short trips; the incidence of extended, multi-destination long distance travel is decreasing. More vacations are close to home 2-4 days, within 150 miles, often on weekends.
- More travel includes children, and accordingly, is more oriented to educational and recreational experiences. Children also require higher service levels (more bathrooms, child-oriented food service), and are not associated with "night life."
- Travel for meetings, conferences and conventions continues to grow along with U.S. economic activity, subject to what is probably a short-term decline during 2001. The relatively low cost of airfares is a contributing factor.
- Organized group travel – by motor coach, cruise ship or using air transportation – is increasing, and is related to the aging of the North American population and increasing incomes here and abroad. Much of this travel occurs during summer and is very value oriented.
- The preferred leisure travel season is April through October. Family travel, in particular, is oriented to summer months. Spring and Fall travel is popular among empty nesters. Meeting/convention travel is more oriented to fall and spring.
- More travelers are focused on educational experiences, particularly if children are involved, such as visits to natural or historic sites, interpretive facilities and programs, and activities oriented to wildlife and natural resources. Some of the strongest growth for the past decade has been in highly packaged recreation and entertainment, such as theme parks, cruises and gaming.
- Travelers sometimes extend business trips to include leisure activities and provide a good market for destinations adjacent to major metro areas. Business trips are also more likely to include spouses and children than in the past.
- Entertainment is an increasingly important component of travel and recreation, and of education as well; travelers and facility users expect very good presentation, interactivity, and visual appeal.
- Travel parties including grandparents are increasing. Many trips may have an educational focus.
- Travel associated with membership programs is increasing: RV clubs, senior citizen organizations, and membership reward programs (i.e. Frequent flyers). Family reunions are a popular reason for travel.
- Travel from foreign destinations is increasing, although down for the past several years, influenced by poor economic performance overseas and the events of September 11, 2001. The most important markets are Canada, Japan, the UK, Germany/Austria and other locations in Europe. These travelers are particularly interested in things that are historic, unique and memorable. International travel is strongly affected by exchange rates.

SITE FACTS

- THE NATURE CENTER IS COMPRISED OF 3621.75 ACRES, LOCATED 10 MILES NW OF DOWNTOWN FORT WORTH
- THERE IS CURRENTLY A PERMANENT HERD OF 6 BISON THAT ROAM 55 ACRES OF LAND
- ONE OF THE TOP TEN BIRDING SITES IN TEXAS WITH OVER 200 SPECIES OF BIRDS
- THERE ARE MORE THAN 650 PLANT SPECIES AT THE NATURE CENTER
- 100,000 TO 150,000 VISITORS ON THE PROPERTY EVERY YEAR (VIA CAR COUNT)
- 40,000 TO 50,000 VISITORS YEARLY AT THE HARDWICKE VISITOR CENTER
- 8 DIFFERENT SOIL ASSOCIATIONS OCCUR IN TARRANT COUNTY, THEY ALL CONVERGE ON THIS SITE
- PRAIRIE DOG VILLAGE
- CROSS TIMBERS FOREST CONTAINS TREES THAT ARE 250 - 300 YEARS OLD
- NUMEROUS HISTORIC CCC STRUCTURES STILL REMAIN ON SITE
- 25 MILES OF HIKING TRAILS
- THE ELEVATION CHANGE ACROSS THE SITE IS OVER 100 FEET
- OVER 10,000 HISTORICAL ARTIFACTS HAVE BEEN FOUND THROUGHOUT THE SITE
- 2 NATURAL SPRINGS
- 7 FULL TIME STAFF MEMBERS WORK AT THE NATURE CENTER
- THE OPERATION BUDGET, FOR THE FORT WORTH NATURE CENTER & REFUGE, FOR THE FISCAL YEAR 2001/2002 WAS $300,000.00




Regional Statistics

In addition to demographics and travel trends, regional based statistics will influence the level of demand for those geographic areas that will produce a large portion of Center attendance. Statistics to consider include:

The Nature Center is located adjacent to one of the largest and most active market areas in the US. For example, Texas had the second largest population increase between 1990 and 2000, after California, adding 3.9 million people to the state's population. Texas continues as the second largest state in the continental United States, after California, with approximately 21 million residents. Dallas-Fort Worth, the state's largest urban area, is the nation's ninth largest city with 5,221,801 residents—a quarter of the state's population.

Near the Nature Center – within 25 miles – population amounted to over 1.5 million people in 2000, according to US Census figures. This circular area can serve as a reasonable definition for "*local,*" in that less than an hour's drive is necessary to access the Center, see Figure I-1.

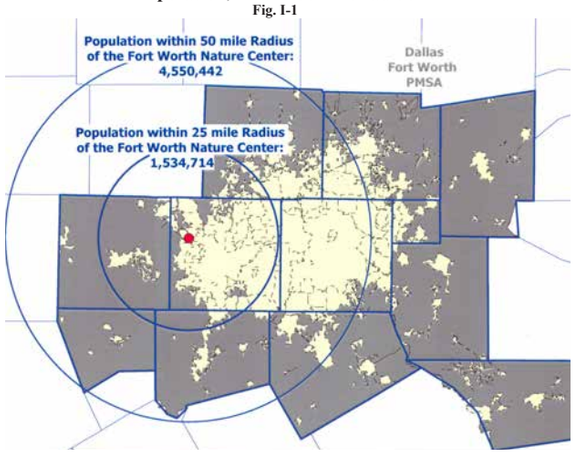
Within a somewhat larger radius -- 50 miles – there are a total of over 4.5 million residents. Many of those living within this area can reach the Center with an hour's drive or less.

The local area population will represent the primary group from which visitors are drawn, and will provide many of the visits by organized school groups. Frequent repeat visitors will also tend to live within this area. Finally, many corporate sponsors will probably be drawn from this area, and individuals and families in this area will probably be primary contributors to capital and ongoing campaigns.

School-aged children are a significant market for the Nature Center. This age segment is important because, traditionally, nature centers and their programs tend to draw significant portions of their attendance from the school-aged population and/or families with children. Numerous national and statewide studies on outdoor recreation usage have shown that outdoor recreation, ecological and nature education participation is significantly greater for households with children.

Within the local market area – the area from which the nature center will likely attract a majority of its visitors (Figure I-1) – there are just over 400,000 -school-aged children, with over 275,000 enrolled in the public school system (Table I-1). In the larger Dallas-Fort Worth area, there are nearly one and a half million school-aged children, and nearly one million in the public school system. These are certainly significant numbers, and should provide the nature center an ample market from which to draw the important organized school group visits.

Population, 20 and 50 mile radius
Fig. I-1



In addition, the school-aged segment of the Dallas-Fort Worth and Texas population is expected to grow more rapidly than other segments of the population (see Figure 1-4).

While the school-aged population and associated families will likely be the most important demographic market for the Nature Center, the second most important will be the empty nest and retirement-aged segment. This group, 50 years of age or older, tends to have the time, interest and income to participate in outdoor educational and nature programs.

Table I-1
School-aged Population and Public School Enrollment, Dallas-Fort Worth, 2000

	Population Under 18 Years	Enrollment K – 8	Enrollment 9 – 12	Enrollment K – 12
Texas	5,886,759	2,905,647	1,096,580	4,002,227
Dallas-Fort Worth, CMSA	1,463,038	690,497	245,817	936,314
Collin County	141,307	63,359	22,298	85,657
Dallas County	619,031	297,799	101,864	399,663
Denton County	120,110	49,369	17,870	67,239
Ellis County	33,644	17,268	6,866	24,134
Henderson County	17,800	7,234	2,860	10,094
Hunt County	20,328	10,093	3,968	14,061
Kaufman County	20,827	11,983	4,670	16,653
Rockwall County	12,953	6,972	2,768	9,740
Fort Worth-Arlington	477,038	226,420	82,653	309,073
Hood County	9,693	5,132	1,963	7,095
Johnson County	36,517	18,014	6,933	24,947
Parker County	24,356	11,451	4,521	15,972
Tarrant County	406,472	191,823	69,236	261,059

The number of people 50 years of age or older in the Dallas-Fort Worth area is only slightly lower than the number less than 18 years of age (1,131,096 vs. 1,463,038). As the Center grows and develops, it must keep in mind the needs of this particular segment.

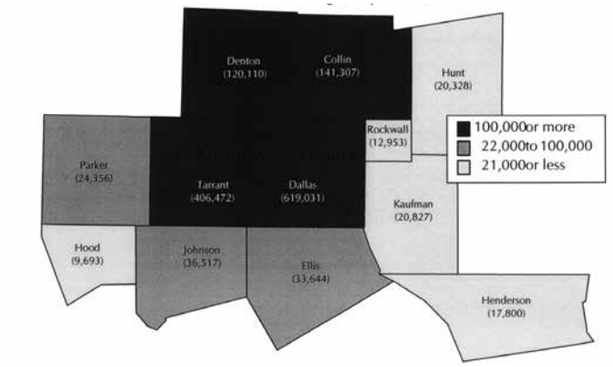
Some apparent differences from programs and facilities for school groups and school-aged participants would include: higher-level educational components, less physically demanding field components, and better facility amenities.

While school groups and school-aged participation tends to be more seasonal – spring and fall primarily – empty nesters will tend to visit year-round. Programs and developments should be targeted to this segment, which will increase attendance during the year when school-aged participants and their associated families are less likely to travel.

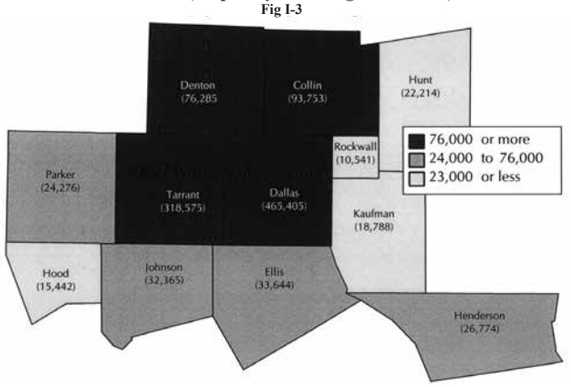
Figures I-2 and I-3 (on the following pages) show school-aged and empty nest populations for the Dallas-Fort Worth CMSA. Seventy percent (70%) of the school-aged population and public school enrollment is in Dallas and Tarrant Counties. Moreover, growth in public school enrollment has been heavily concentrated in these two counties.

Examples of outdoor activities that nature center facilities often provide.

School Age Population, DFW 2000
Fig I-2



Empty Nest Population, DFW 2000
Counties (Pop. 50 years of age and older)
Fig I-3



Like the area's school-aged population, the empty-nest population is heavily concentrated in Dallas and Tarrant County, with 69% of the area's empty nesters residing in these two counties. The northern counties of Denton and Collin are the Nature Center's next largest markets for both school-aged and empty nesters. These four counties contain the majority of both segments (88% and 84% respectively). The Center is ideally located to draw from these segments.

Education levels within The Dallas/Fort Worth Metro Area are above the US average, with about 30.7% of residents aged 25 or older holding at least a bachelors degree. Nationally, 25.6% of people 25 or older hold at least a bachelors degree. More specific data indicate that education is somewhat higher for residents of Dallas as compared to Fort Worth. However, both communities are well above the state overall, which averages 23.9%. These findings indicate that Center facilities and programs can appeal to those with good educational levels, although there is still a substantial market among those with more moderate educational attainment.

Population projections presented indicate substantial increases in the youngest age groups through 2025. This pattern is quite different than most other states, where it is expected older people will be the larger percentage of the population and younger people less so. Texas' younger segment will continue to dominate the population. This segment will be influenced by large increases in population in the Hispanic community.

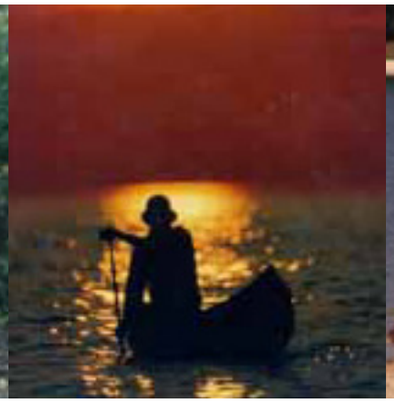
Shifts in age groups are also apparent in the demographic study. The age groups representing people 49 and under represent the largest portion of the state's population, and should continue to grow such that they continue this position. This pattern will obviously vary among regions and communities, some of which will see population declines while others experience rather rapid growth. Economic factors such as job and business prospects will be the determining factors. Through the 1990s, the majority of growth in Texas had occurred in the urban areas of the state. For Dallas-Fort Worth, growth had largely been in the northern metro area, Denton and Collin counties. Generally, these patterns should continue through the projected time frame.

Implications

Based on these studies the following are some of the primary implications of the market research findings.

- The Nature Center will benefit from a rapidly increasing number of people in its local/regional market area, and in particular those who are school-aged, i.e., under 18 years of age and empty nesters, i.e., those 50 and older; this is typically the primary demographic interest group for nature centers. (Source: DRA)
- The younger segments of the population, locally/regionally will grow more rapidly; the challenge will be penetrating a group that will increasingly be racially mixed with focuses on other attractions and activities.
- Exhibits and programs should be oriented to a wide variety of people with respect to education and income.
- A growing number of domestic and international visitors will provide opportunities for developing attendance; good visibility for the Center will be necessary to penetrate these markets.
- Demand will be somewhat seasonal; seasonally oriented Center programs can help to generate off-peak attendance.

The market research findings set a visitor population picture for the direction of the plan. This information is layered with each aspect of consideration. The next area of study is the natural resource.

Stating the Vision

With site history, natural resources and market analysis as the foundation, the team began to form the vision:

All master plans attempt to envision future uses and opportunities, but the essence of a good master plan lies in clearly articulating an organization's identity, values and goals, and linking these fundamental elements to projected actions and outcomes. Relating a strategic vision to physical planning creates the framework for unifying a broad range of individuals so that when opportunities arise, individuals are empowered to fulfill shared goals.

Early interviews with key stakeholders identified common beliefs about the Fort Worth Nature Center & Refuge core business:

- Manage the land in ways that care for its natural resources,
- Create opportunities for visitors to engage in informal, nature-based learning,
- Restore and enhance the site's natural habitats to provide visitors with guided and self-guided experiences,
- Showcase the role of the Parks and Community Services Department as a leader in environmental stewardship within the Fort Worth community.

Within these communal purposes, there are many possible forward looking scenarios that combine natural resources, environmental education, visitor experience and business plan economics. Though the future of the FWNC&R contains both vision and development, it is important to measure both against touchstone questions facing the FWNC&R:

- What communities does the FWNC&R currently serve?
- In which communities does the FWNC&R aspire to be a leader?
- How does the FWNC&R find partners to further common purposes?
- Can the FWNC&R simultaneously fulfill a recreational and educational mission?
- Is there community support for expanding the range of programs and facilities?
- What is the organizational identity required for future vision and development?

The vision, mission and goals of the FWNC&R must address diverse factors such as experience, education, economics and environment. Daily, the staff is immersed in complex challenges of repairing boundary fencing and gating, feral hog management, content development for naturalist talks, behavioral training of visiting individuals and groups, and accounts receivable/payable. To develop a long-term, relevant and ultimately successful master plan, the FWNC&R needs philosophic guidance that is firmly rooted in the quadruple bottom line whereby actions and opportunities are evaluated in terms of outcomes for the natural resource, visitor, organization and community.

Community attachment to the FWNC&R was explored by asking key people the question "Why do you come to the FWNC&R?" The predominant response tended to be variations either of the theme of "solitary experiences of wildlife" or of "experiences of wildlife with family and/or friends." Many of the stories given in illustration of the themes expressed joy in the surprise interactions with nature. Examples were the eyewitness account of a deer swimming across the lake, or figuring out with children what the 'little head in the little hole' could possibly be.

Secondary themes were the visceral sense of the Nature Center as a place where one could escape the city and its cares and problems for the awe-inspiring views of nature; and immersing in intimate activities of bird watching, photography and canoeing.

How well does the current mission statement directly support the reasons why people come to the Nature Center? The FWNC&R has the following mission:

> "To enhance the quality of life by enrolling and educating our community in the preservation and protection of natural areas while standing as an example of these same principles and values in North Central Texas"

Central to the mission is the idea that the quality of life of the community is enhanced when natural areas are preserved and protected. The mission acknowledges the civic role of education, membership and enrollment as means to further preservation and protection. To accomplish the stated mission, the use of education, membership and enrollment seem entirely compatible with individuals and groups visiting natural areas and doing so at a level to where people have significant and formative experiences of nature. The degree to which the mission statement gives impetus to involvement in activities that sustain the natural and cultural resources, it also accentuates the experience of natural areas by people.

When the mission is further elaborated with the FWNC&R core values, the purpose of the place begins to speak to the experiences people seek:

- Preservation of wildness
- Education through the living museum
- Refuge for people

The current mission statement clearly does not conflict with the needs and wants of individuals and the community but as the seminal organizing idea behind the FWNC&R; the mission should provide positive direction as to how the organization can accommodate and reward interaction with individuals and the community. To govern the development of the FWNC&R, the master plan proposes five goals.

Overall Master Plan Goals

- Protect the natural and cultural resources from destructive intervention.
- Welcome visitors and open them to educational resources.
- Expand the understanding of regional natural processes and their long-term management via use of this scientific resource.
- Develop means of financial independence by attracting local visitors and tourists.
- Become a noteworthy Fort Worth institution that participates and partners with other cultural and recreational elements within the City.

With the synthesis of mission, values and needs, the master plan makes specific recommendations for the further protection of the natural and cultural resources and the development of amenities that support the educational opportunities, nature-based recreational experiences and community-based activities. Additional goals established throughout the process included:

"... the opportunity for more people to experience nature."

Educational Goals

- Develop a thorough understanding of the needs of the various user groups.
- Provide opportunities for visitors to understand, observe, and enjoy wildlife and native habitat.
- Interpret the site in relation to the physical and cultural development of Fort Worth (old cattle trails, former recreational uses, CCC projects, archaeological settlements).
- Provide a diversity of educational venues and experiences.
- Make connections between the physical resources and interpretive programs whenever possible.

Natural Resource Goals

- Restore and manage the land to a historic early 19th century landscape.
- Maintain and enhance diverse habitats to support naturally sustainable populations of native wildlife.
- Eliminate non-native species.
- Properly restore damaged landscapes.

Cultural Resource Goals

- Promote the awareness of diverse cultures and their points of view.
- Restore significant historical architectural features of site.
- Protect, enhance, and interpret archaeological sites.

Planning/ Site context & Aesthetic Goals

- Enhance and maintain the quality of the site for long-term sustainability.
- Change the overall character of the FWNC&R to a more inviting and accessible public center.
- Provide interpretive graphics signage throughout the site to orient visitors.
- Visually define the boundary of the site.
- Provide a circulation system that takes a visitor through a sequence of events as shaped by the natural environment.
- Promote building structures that have a consistent architectural style that is visually connected with the site.
- Minimize the visual impact of utilities.
- Maximize the views from the high points of the site.
- The visitor should be able to experience all of the zones within the Nature Center.
- Provide the infrastructure to allow restoration, learning, and demonstration activities to occur.
- Limit motorized access to the site via boats, etc. from Lake Worth.
- Visually and programmatically link surrounding land uses.
- Utilize adjacent city owned park land to create an economic catalyst to generate funding for the FWNC&R.
- Protect the integrity of the natural and cultural resources through land acquisition. First priority would be the in-holdings. Secondary would be land that falls within conservation easements, leased properties that become available, and properties along Jacksboro Hwy. that directly border the FWNC&R.
- Define a conservation boundary.

Economic/ Marketing Strategy Goals

- Make good use of natural features.
- Create a high quality core that emphasizes the primary attributes of the site.
- Generate additional revenue through admission fees, enhanced activities, retail sales, and concessions.
- Continue to organize external private fundraising for both capital and programmatic functions.
- Become an independently run organization and reduce its reliance on City of Fort Worth revenues to the greatest degree possible.
- Draw more from various demographic groups.
- Enhance and create new partnerships that are mutually beneficial and will further the goals of the refuge.
- Transform the FWNC&R from a place-based resource managing organization to an institution generating much needed community ownership, peer recognition, and political and financial support.
- FWNC&R should control the experience on the water.

Outreach Goals

- Make staff expertise in the reestablishment and management of native natural systems available to other organizations and the general public.
- Develop community support for the institution by being out in the community contributing to the general improvement of local quality of life issues and enhance environmental management and ecosystem restoration in other city parks.

The Organizing Framework

An additional layer in the foundation of the Master Plan includes understanding the framework in which the facility markets itself.

As its complete name attests, the Fort Worth Nature Center & Refuge is both a nature center and a refuge with two inherent, and sometimes contradictory, missions. As a refuge, it is a place where the ongoing protection and restoration of the natural systems is paramount. As a nature center, it is a social resource used to intelligently introduce people into an understanding of the natural systems. As both a nature center and refuge, FWNC&R must sustain the interrelated natural systems that are its basis while creating a critical mass of natural learning, meaningful experience and social interaction to enable the institution to sustain itself over the long term.

What of the Fort Worth Nature Center & Refuge? The Parks Department, the site staff, many visitors and interested Fort Worth citizens share the aspiration to make the FWNC&R "noteworthy" both as a refuge and a nature center. Making the FWNC&R "noteworthy" will depend on how well the site resources and the institution co-exist and sustain each other. The driving force behind the FWNC&R must be actions that increase conservation of the refuge, develop and deepen the capabilities of the institution, and increase human presence in specific areas of the refuge and intensify social interaction at the Nature Center. When the FWNC&R successfully defines and implements a long-range comprehensive plan whereby conservation imperatives are balanced with organizational resilience and increased public use, then it will become noteworthy for expanding itself from a place-based resource-managing organization to a place-based conservation education institution with substantial community ownership, peer recognition, and political and financial support.

Determining the strategy for establishing FWNC&R as noteworthy in these roles requires first asking about the current state of the refuge and nature center, and to which nature preserve and/or nature center in other parts of the country it compares.

Investigating comparable facilities provides valuable information regarding markets, demand, operations and finances. This study involved identifying and gathering information from a selection of nine nature centers and related facilities, plus a number of other facilities that illustrate one or more aspects of potential Center development. Facilities that provided the most useful information for forecasting and planning purposes were selected for inclusion. The selection focused on successful facil-

Table II-1
Selected Comparable Nature Center and Related Facilities

Facility	Location	Governance	Opened	Acres
Nature Centers				
Armand Bayou Nature Center	Clear Lake City TX	Private nonprofit	1974	2,500
Audubon Louisiana Nature Center	New Orleans LA	Private nonprofit	1984	86
Fossil Rim Wildlife Center	Glen Rose TX	Private nonprofit	1987	1,640
Heard Museum and Wildlife Sanctuary	McKinney TX	Private nonprofit	1967	289
Oxley Nature Center; Redbud Valley	Tulsa OK	Municipal	1979+	840
Fort Worth Nature Center & refuge	*Fort Worth TX*	*Municipal*	*1914*	*3,621.*[75]
Gardens and Arboreta				
Crosby Arboretum	Picayune MS	University	1980	104
Lady Bird Johnson Wildflower Center	Austin TX	Private nonprofit	1982	43
Refuges				
Kerr Wildlife Management Area	Kerr County TX	TPW	1950	6,493
Balcones Canyonlands NWR	Travis County TX	USFW, others	1990	18,000

Source: Dean Runyan Associates

Table II-2
Attendance Summary, Selected Comparable Nature Center and Related Facilities

					Population (000)	
Facility	Total Attendance	School Group Attn	Non-School Attn	Admission Fee	Local Area	State
Nature Centers						
Armand Bayou Nature Center	51,000	3,000	48,000	3.00 adult, 1.00 youth	4,119	20,947
Audubon Louisiana Nature Center	56,000	21,000	35,000	5.00 adult, 4.00 youth	1,311	4,470
Fossil Rim Wildlife Center	120,000	10,000	110,000	14.95 adult, 9.95 youth	5,140	20,947
Heard Museum and Wildlife Sanctuary	35,000	15,000	20,000	5.00 adult, 3.00 youth	492	20,947
Oxley Nature Center; Redbud Valley	40,000	13,000	27,000	Free	788	3,453
Fort Worth Nature Center & refuge	*100,000*	*4,000*	*96,000*	*Free*	*5,140*	*20,852*
Gardens and Arboreta						
Crosby Arboretum	14,000	5,000	9,000	4.00 adult, 2.00 youth	92	2,849
Lady Bird Johnson Wildflower Center	100,000	10,000	90,000	4.00 adult, 2.50 youth	1,213	20,947
Refuges						
Kerr Wildlife Management Area	NA	NA	NA	Free	NA	20,947
Balcones Canyonlands NWR	3,000	NA	3,000	Free	NA	20,947

Source: Dean Runyan Associates

Table II-3
Staff and Other Resources
Selected Comparable Nature Center and Related Facilities

Facility	Staff (FTE) Full-Time	PT / Seas.	Ann. Avg.	Members	Volunteers
Nature Centers					
Armand Bayou Nature Center	9	3	10.5	1,200	200
Audubon Louisiana Nature Center	13	20	23	6,000	95
Fossil Rim Wildlife Center	76	6	79	4,300	150
Heard Museum and Wildlife Sanctuary	18	5	20.5	1,400	300
Oxley Nature Center; Redbud Valley	6	4	8	600	125
Fort Worth Nature Center & refuge	*7*	*3*	*8.5*	*350*	*NA*
Gardens and Arboreta					
Crosby Arboretum	5	1	5.5	750	60
Lady Bird Johnson Wildflower Center	40	10	45	21,000	450
Refuges					
Kerr Wildlife Management Area	8	0	8	0	2
Balcones Canyonlands NWR	13	1	13.5	0	40

Source: Dean Runyan Associates

Table III-1
Comparable Nature Center Attendance and Capture

Facility	Non-school Attn.	Attendance Distribution Local Area	State	Out-of-State	Population (000) Local Area	State	Capture Rate Local Area	State
Nature Centers								
Armand Bayou Nature Center	48,000	90%	7%	3%	4,119	20,947	10	0.20
Audubon Louisiana Nature Center	27,900	80%	10%	10%	1,311	4,470	17	0.88
Fossil Rim Wildlife Center	110,000	80%	5%	15%	5,140	20,947	17	0.35
Heard Museum and Wildlife Sanctuary	20,000	90%	5%	5%	492	20,947	37	0.05
Oxley Nature Center; Redbud Valley	27,000	80%	10%	10%	788	3,453	27	1.01
Fort Worth Nature Center & refuge	*96,000*	*83%*	*13%*	*4%*	*5,140*	*20,852*	*16*	*0.79*
Gardens and Arboreta								
Crosby Arboretum	9,000	80%	10%	10%	92	2,849	78	0.33
Lady Bird Johnson Wildflower Center	90,000	20%	25%	55%	1,213	20,947	15	1.14
Refuges								
Kerr Wildlife Management Area	4,000	NA	NA	NA	NA	20,947	NA	NA
Balcones Canyonlands NWR	3,000	NA	NA	NA	NA	20,947	NA	NA

Source: Dean Runyan Associates
Note: Capture rates expressed as annual visits per 1,000 residents of the market area.

ities that represent one or more components of the development for which the Center will strive.

Five of the facilities are nature centers, each of which represents established education-oriented facilities geared to wildlife, habitats, and botanical collections and associated programs. Two of the facilities represent gardens, exemplifying natural resource attractions with relatively developed exhibits and associated programs. Finally, two are wildlife refuges that are primarily oriented to managing habitats and wildlife populations. The results of this investigation are summarized in a series of tables.

Please refer to the following tables for comparable information; Tables II-1, II-2, II-3, and III-1.

Site Analysis

Upon looking at all of the surrounding influences such as history, economic market, and comparable facilities, and combining those with existing systems such as the resources, the next thing to consider is the site analysis. This looks at the physical function of the site and how it is currently working

for the users.

The Fort Worth Nature Center & Refuge sits north and west of Fort Worth, just below the outfall of Eagle Mountain Lake. Its boundary encompasses both the flow line of the lake spillways and the high ground that defines those flow-ways. Consequently, both natural processes and human intervention upon them shape the FWNC&R. As the center seeks to define itself within this context, it will have to find a way to connect itself with natural rhythms and forms augmented by the legacy of human intervention upon the flow of water. The role of water in shaping the landscape, exposing the geologic layers that define vegetative habitats, and giving form to human structures meant to acquire its benefits…is the story of the Nature Center as it exists today. As a result, the story of the Fort Worth Nature Center & Refuge is sequenced by the patterns and forms generated by water's steady and persistent work. However, the experience of the FWNC&R and the direction of its internal movement occur in reference to influences that are not natural. For the most part these influences are physical and legal constraints imposed by interference with the dynamic that created this very special landscape. This causes much of one's interaction with the FWNC&R to be shaped by externalities to nature itself. These conditions are extremely powerful in defining the FWNC&R and one's experience of it. These conditions include:

- Surrounding land uses
- Public improvements and thoroughfares
- Power line right-of-ways
- Encroachments
- Donated land
- Leases and other commitments
- Fence lines
- Previous agriculture
- Water controlling structures
- Land valuation

By combining the natural process of the land and human influence, a composite site analysis is formed. Using the site analysis mapping the following site based zones were identified: Development Interface Zone, High Ground Zone, Eroded and Excavated Zone, Lake Edge and Flow-way Zone, Marsh Retention Zone, Dam Interface Zone and Agricultural Zone. The natural and cultural resources of each zone vary along with the sensitivity of the resources to FWNCR conservation management and

The Development Interface Zone

increased visitation.

The Development Interface Zone is the primary approach to the Fort Worth Nature Center & Refuge and defines the context in which the center is located. The incrementally developed edge and the undeveloped center are a striking visual contrast. The difference between the two experiences is made more dramatic as the length of travel within the development corridor is increased. Each unit of travel length imposes more transitional development, yard storage, mobile home yards, and vacant properties/ buildings upon the approach.

The Jacksboro Hwy. Bridge crossing the lake channel at the southern end of the site is the visual start of the entry sequence for the majority of the public. The bridge is low and the road curves uphill as it approaches the current entry. The dynamics of this sequence are engaging and can bring the visitor into a kinetic experience of the landforms comprising this unique site. However, the visual clutter that accompanies this dynamic overwhelms the comprehension of it.

Therefore, the approach to the Fort Worth Nature Center & Refuge must be achieved in such a way that the visual contact between visitor and visual clutter assaulting the approach sequence is minimized. The elements to consider in this zone include:

- The Approach
- Roadway and apparent ridge
- Trees
- Visual Clutter
- Grade Changes
- Discontinuities in entrance and entrance problems
- Road widening directed movement
- Lack of edge
- Encroachments
- Roadway is an old cattle trail
- Nature of businesses
- Views are to south/ not north
- Elevation of uses are higher than highway
- Opportunity provided by the available city property
- Opportunity provided by the bridge

Educational Content

The Development Interface Zone demonstrates the impact on the land from development. The impact of zoning property strongly influences the ecological protection natural areas will receive. It is easy to see how existing ecologies can be disturbed and how development can encroach on the Nature Center.

- How zoning is determined
- Development, and it's influences from the natural environment

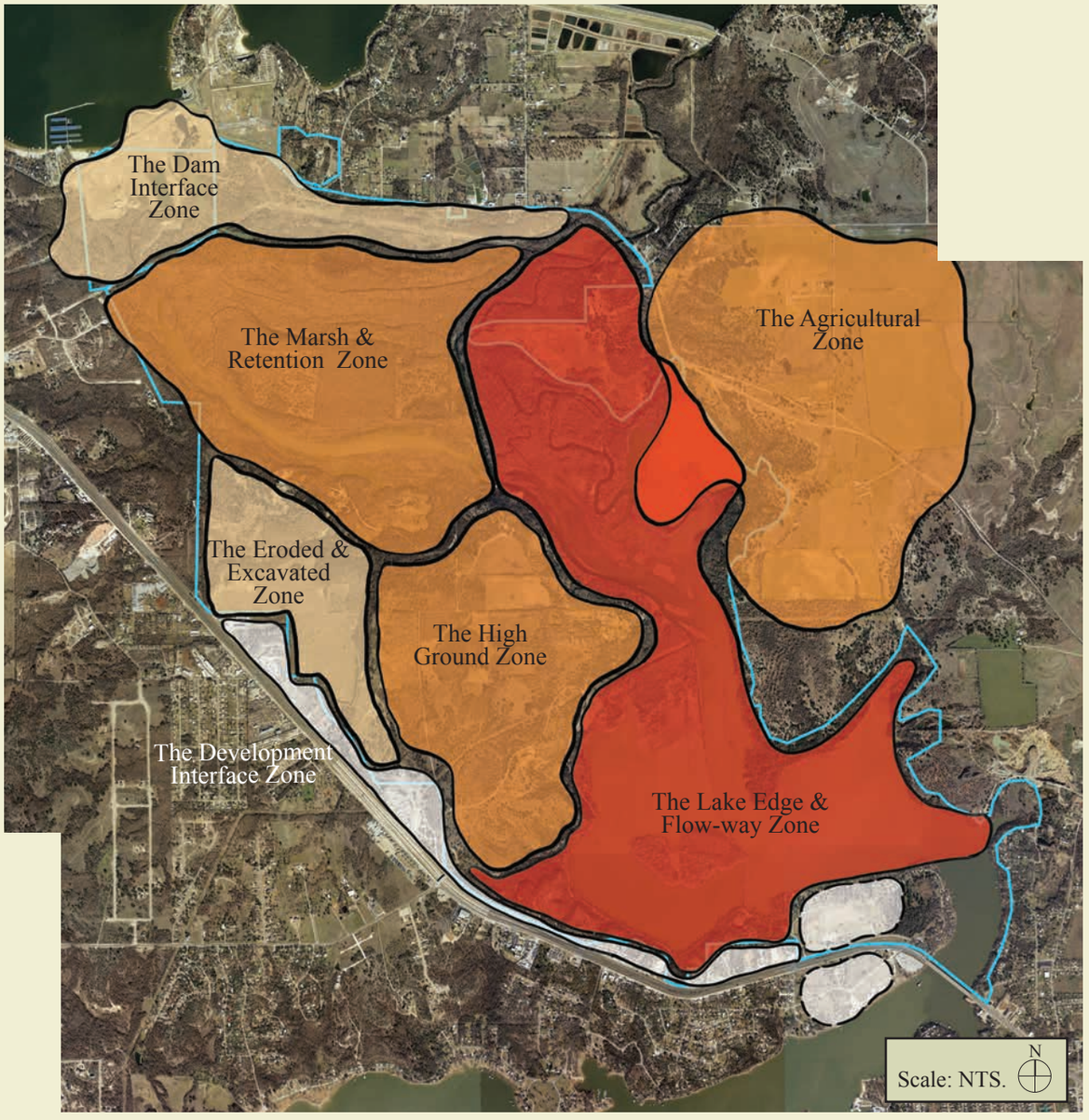
Interpretation Opportunities

The study of zoning property and the reasons for establishing protective zones and larger setbacks for development are important issues to monitor. Site-specific interpretation themes include:

- Conservation and Protection, especially of neighboring land
- Understanding Development
- Understanding the Past – Geology and fossil Record
- Understanding the Past – Landscapes, Climate, Human Use

The High Ground Zone

One's first encounter with the 'High Ground Zone' occurs at the Nature Center's current main entrance. This region includes land south of the power line clear cut, east of the water's edge and extends to meet the property boundary that parallels Jacksboro Hwy. Upon entry the trees are notably different. They are smaller and have a growth habit that expresses the geologic severity of their condition. Known as 'Escarpment Live Oaks' these trees grow on the limestone crown, also known as the Caprock, which is one of the land formations that define the Nature Center. Most of the Fort Worth Nature Center & Refuge buildings occur within this zone, which stretches from the east-facing ridge overlooking the Riverbottom Trail, backwater and Greer Island. The buildings range from the Visitor Center, to utilitarian storage structures, to historic CCC structures and ruins. The vegetation in the area includes Post Oak Savanna, Live Oak Savanna, Caprock ecosystems, Grand or Fort Worth Prairie, Western Cross-timbers and Mesquite and Honey locust Savanna.



The trails that occur in this zone are the Caprock Trail, Limestone Ledge Overlook, Oak Motte Trail, Prairie Trail, Deermouse Trail, and Wild Plum Trail.

The High Ground Zone also exposes the visitor to various types of wildlife, including bison, deer, prairie dogs, and many others.

Therefore, the proposed plan makes full use of the dramatically different landscape created by the tree forms of the High Ground Zone to achieve a sense of arrival. This helps convey a sense of identity and orientation to the movement system within the Nature Center. The area encompasses considerable acreage and topographic variation with the potential to develop easily accessible trails and vehicular access, and properly site educational and recreational activities. The land between the prairie restoration sites, the river bottomlands, and Greer Island offers close proximity to many natural resources and teaching tools. Elements of related interest in this zone include:

- Reduced size of trees
- Lack of tree canopy
- Attachment between road alignment and old fence row
- Visual character of the Nature Center Buildings
- The CCC structures
- Live oak escarpment
- Fences and other utilitarian structures
- Power line ROW
- Ridge at the Center
- Confusing road configuration
- Sensitivity of soil and vegetation

Educational Content

The High Ground Zone contains the representative ecologies of North Central Texas and include the existing vegetation management sites: Demon-

stration Prairie, Limestone Ledge Overlook, Fairview Prairie, Little Fairview Prairie, Far Point Savanna, Deermouse Savanna and Buffalo Haymeadow. Educational topics of interest include:

- North Central Texas Representative Ecosystems
- Prairie Landscape and Rain Water Collection/ Run-off
- Prairie Grass Root System
- Plant and Animal Identification and Species Management
- Wildlife Corridors
- Ancient History and Fossil Record

Interpretation Opportunities

Resource stewardship is a major and ongoing challenge involving active managing, maintaining and enhancing habitats through vegetation burning, eradicating exotic or invasive species, and restoring ecological communities. Relic and restored historic prairie plant communities are the foundations for the reintroduction of historic animal communities and are living connections to the historical North Central Texas landscape. Site-specific interpretation themes include:

- Understanding the Past – Geology and the Fossil Record
- Understanding the Past – Landscapes, Climate and Human Use
- Exploring the Diversity of Plants and Animals
- Prairie Grasses – Roots, Soil, Water and Nutrients
- Prairie Tall grass Communities – Natural Dynamics & Stewardship Actions
- Planting Native Tall grass in the City – Fostering Sustainable Behavior
- Establishing Connections with Other Places and People That Are Making a Difference

The large site area with undulating topography, scattered oak mottes and developed trail system has the capacity to handle large numbers of people with little negative psychological impact.

The Eroded & Excavated Zone

This important area of the Fort Worth Nature Center & Refuge is only accessible from a separate entry that is not part of the current internal circulation of the Nature Center. This area is bordered to the north by the Lotus Marsh and the upriver slough area and to the east by the visitor area and restoration zones. The trees in this zone are much taller, creating a canopy over the road and surrounding vegetation grows denser. The Eroded and Excavated Zone contains some areas of Western Crosstimbers with a majority of the savanna in a state of severe disturbance from previous farming/ ranching and gravel mining. A few of the structures of the former mining operation still exist on the site as well as a current SWAT team gun range and bomb disposal facility. Incompatible uses should be relocated to a site that is more conducive to their operating procedures. This area of the Nature Center has a long history of human involvement and reports of historic and prehistoric archeological sites. The trails that currently run through this area are the Riverbottom Trail and the Forkedtail Creek Trail.

The Eroded and Excavated Zone should be internally connected to the Nature Center and become a demonstration and restoration area in which to teach the public about human influence on the land. To an observer, the characteristics of this region are based more on being a residual collection of soil, habitat and cleared spaces rather than being a distinct entity or ecosystem. Elements of related interest in this zone are:

- Canopy over road
- Mined area
- Trees
- Wetland
- Attempts at restoration and is it appropriate
- Creek way trees
- Sudden open views
- Clearly visible cut edge line
- Archeological evidence

Educational Content

Archaeological finds create opportunities for guided archaeological digs and learning sessions. The area is concentrated and highly disturbed but offers long-term opportunities to create land restoration tools that investigate: a palette of primary ecosystems; soils and geology at former quarry pits; the role of bison in prairie ecology and herd behavior. Educational topics of interest include:

- Human Habitation and Use of Resources
- Land and Wildlife Management Demonstration Techniques
- Upland Water sources
- Upland Wetlands
- Soils and Geology
- Wildlife Corridors
- Plant and Animal Identification and Species Management

Interpretation Opportunities

Because the existing “nature” is highly disturbed – there is an opportunity to create plant, pond and creek habitats in close proximity as educational tools. Interpretive “Outposts” supports fun, enjoyment and learning at the Naturalist Camp. Site-specific interpretation themes include:

- Understanding the Past – Archaeology and Native American Habitation
- Understanding the Past – Human Uses, Disturbed Landscapes and Restoration
- Restoring Damaged Sites – Fostering Sustainable Behavior
- Prairie Ponds and Amphibians
- Holding It Together – Native Plant and Wildlife and Human Values

Activities that have high impact on natural and cultural resources can potentially find a good site here. The large site area and the opportunity to zone it with

plantings and trails provide the capacity to handle large numbers of people with little negative environmental impact. The semi-isolated area and the disturbed state provide a unique opportunity to bring together outdoors recreational activities such as overnight stays, camps and fire pits. A variety of user types at the same time enhance social interaction and learning experience.

The Lake Edge & Flow-way Zone

The Lake Edge and Flow-Way Zone is found along the banks of the major water body throughout the site (The Trinity River and Lake Worth). This zone exhibits characteristics that demonstrate the difference between the water and land, and the picturesque settings that occur. The upper and lower dams of the Trinity River also have a direct impact on the water level. Many visitors make their way down to the water by means of winding trails and roadways covered by towering tree canopies. The vegetation that occurs in the Lake Edge and Flow-Way Zone is mainly elm, oak, and hackberry trees with a wide variety of water plants. This aquatic-terrestrial ecosystem contains significant content for natural history and environmental education. Various water activities occur along the water's edge and the attraction of Greer Island draws many visitors as well. The wildlife is flourishing in this area and many bird species can be found.

Therefore, the resources provided in the Lake Edge and Flow-way Zone can become even more of an influence in educational programming as well as inviting more visitors to the heart of the site. Easy access is a key to getting visitors immersed in studying the environment, which frequently means getting them actually immersed in water and at a hands on level. Greer Island has a spatially compact aquatic–to–terrestrial range of habitats, yet lends itself to a great opportunity for visitors to learn and explore the water's edge. Elements for consideration relating to this zone are as follows:

- Clarity of differentiation between water and land
- Picturesque settings and 8 ft. roadway
- People activity
- Greer Island
- Levees, structure, lack of edge access
- Fund Spring/ Williams Spring
- Tree tunnels
- Views of water and birds
- YWCA Camp/ Ropes course

Educational Content

Water related activities have high visibility and this contributes to the image of the FWNC&R. Potential activities and educational topics of interest include:

- Water as Resource of Life
- Animal Identification and Management
- Water Quality, Quantity and Nutrient Recycling
- Wetlands & Riparian Edges
- Flood Dynamics
- Birding

Interpretation Opportunities

Seasonal changes in water level result in diverse aquatic-terrestrial habitat changes that require frequent interpretation of the changes in the environment. Site- specific interpretation themes include:

- Understanding the Past – Geology, Climate, Human Use
- Understanding Ecology – Predator/ Prey Relationships, Population Constraints and Multi-species Interaction
- Exploring the Diversity of Plants and Animals
- Protecting a Critical Resource in the City – Fostering Sustainable Behavior
- Establishing Connections with Other Places and People That Are Making a Difference

The Marsh & Retention Zone

The Marsh and Retention Zone occurs in the northern portion of the site and encompasses Todd Island and the Boardwalk area. The main water sources for this area are the Trinity River and the Eagle Mountain Spillway. The water creates a clearly visible slough with an adjacent seasonal habitat known as the Lotus Marsh. The Marsh wraps around a sandy area of land referred to as Todd Island. Todd Island is the location of the ancient cross-timbers forest, which sustains trees estimated to be 250-300 years old. This area should be considered a conservation area of high importance. There is much native wildlife on Todd Island, as well as invasive species of animals. Hiking trails wind around the island and lead to a levee, which divided the main Trinity Channel from the Lotus Marsh outflow. The Boardwalk extends out to a marshy area of the Trinity to a varying water depth and provides visitors with a clear view and sense of being surrounded by the water. Many canopy trees and water plants surround the Boardwalk, which is regarded as a highly important area for aquatic study. There are also locations for group gatherings that occur in this area. The conditions in this area include:

- The levee as a dam
- Marsh
- Todd Island
- Legumes come up when dry (5 yr. Interval)
- Lack of clear water channel
- Tree canopies over roadway
- Boardwalk area
- Lack of public access

Educational Content

The Lotus Marsh Boardwalk has a number of significant habitats within a close proximity. Todd Island cross-timbers and bottomland hardwood forest has long-term successional changes in ecotones that require advanced knowledge in ecology and frequent

visitation to the site to observe these subtle, natural processes. Marsh areas have good bird, beaver, and emergent wetland plant communities. Educational topics of interest include:

- Animal Identification and Species Management
- Water Quality and Nutrient Recycling
- Flood Dynamics and Successional Plant Communities
- Upland Plant Communities
- Wetland and Riparian Edges
- Aquatic-terrestrial Habitat Transect
- Wildlife Corridors

Interpretation Opportunities

Seasonal changes in water level result in noticeable aquatic-terrestrial habitat changes and successional changes in plant communities. Frequent and all-season visitation is necessary to observe subtle changes in the environment. Reversion from human land-use to natural ecosystem dynamics creates long-term successional changes. Site-specific interpretation themes include:

- Understanding the Past – Geology, Climate and Human Use
- Understanding Past Human Uses and Ecosystems
- Exploring the Diversity of Plants and Animals
- Basic Wetland Ecology
- Exploring the Waters Edge
- Exploring Natural Dynamics – Floor Disturbances and Successional Communities
- Wetland Research – Polishing Water
- Protecting a Wild Resource in the City – Fostering Sustainable Behavior
- Establishing Connections with Other Places and People That Are Making a Difference

The Dam Interface Zone

Occurring along the northern most portion of the site is the Dam Interface Zone. Wells-Burnett Road, Ten Mile Bridge Road and the Eagle Mountain Lake Dam border this zone. The road tends to serve as a division between the natural side (The Nature Center) and the residential side. Strawberry Creek development occurs within this zone as well as the significant views from the Dam into the Nature Center.

Therefore, the Dam Interface Zone is important as a neighboring piece of land and a buffer against encroachment and development. A few important issues to consider are:

- Incremental Nature of Experience
- Views from the dam structure
- Adjacent residential development, the need for guidelines
- Strawberry Creek
- High view from Youth Camp
- Road with two characters (residential/ nature)
- Need for entrances

Educational Content

The Dam Interface Zone provides the opportunity to study the effects of water on the land, especially in low-lying areas. The importance of habitat protection and utility management can be demonstrated.

- Water run-off and water quality
- Conservation and preservation of ecosystems
- Studying the habitats of plants and animals

Interpretation Opportunities

The FWNC&R would contain an extremely different environment if the Eagle Mountain Dam did not exist. By controlling the flow of water into the Nature Center, aquatic ecosystems are regularly maintained all year around.

- Exploring the diversity of plants and animals
- Understanding the past – prior to the Eagle Mountain Dam
- Enhancing the water resource

The Agricultural Zone

The Agricultural Zone falls along the eastern side of the site and reaches outside of the Fort Worth Nature Center & Refuge boundary onto the neighboring farmland. Ten Mile Bridge Road is the main thoroughfare through this area. The open views of the pastures are a key asset to this zone especially since they occur within the property as well as outside. The buildings are located far from the road and do not obstruct your view.

Therefore, the land occurring in the Agricultural Zone is very important with regards to development. To maintain the existing use on the land would be very supportive for the Nature Center. Elements of consideration for this zone include:

- The vertical and horizontal movement of the roadway
- Pastures and open views
- Sameness of both sides of the roadway
- Buildings far from the roadway

Educational Content

Extending the trail system to increase use of the Agricultural Zone incorporates environmental issues as property boundaries, resource conservation and habitat protection in the educational message. Educational topics of interest include:

- Conservation and Preservation of Resources
- Animal Identification and Species Management
- Wildlife Corridors
- Water Run-off and Water Quality Research

Interpretation Opportunities

Along an extended trail system are interpretive "Outposts" that support visitor comfort, interest and learning. Site-specific interpretation themes include:

- Exploring the Diversity of Plants and Animals
- Understanding the Past – Human Uses, Disturbed Landscapes and Restoration
- Conservation and Protection – Taking the Long-Term View of Stewardship
- Living Lightly on the Land – Fostering Sustainable Behavior
- Protecting Water Resource in the City – Fostering Sustainable Behavior

The semi-isolated uplands and its disturbed state provides a unique opportunity to bring together classic outdoor recreational activities such as overnight camp stays, fire pits and open meadow play fields with potentially higher level development such as conference center activities.

The characteristics of the site analysis which form distinct zones begins to translate how the site is interpreted by the user and where educational opportunities need to be either strengthened or showcased. The final study prior to specific recommendations looks at how programming is utilized to merge all of the influencing systems.

Refining the Program

At the FWNC&R, programming public use for nature-based and recreational-based activities has been complicated by the fact that the refuge has not had the financial or staff resources to accommodate a higher visitor-ship within the Refuge. Consistently low levels of funding for capital projects and annual operating costs have forced the staff to make difficult choices between resource management and maintenance of amenities that encourage the public to visit the Nature Center. (An example is the closing of several parking lots due to vandalism which also served as convenient stopping points for avid bird watchers.)

With these difficult choices, a management strategy had emerged that reduced human presence on the site thus minimizing human impacts on the flora, fauna, land and water resources, and attendant management costs. These conditions have resulted in a loss of potential expanded public experiences and understanding of the Nature Center.

This is not to deny that there is support at the FWNC&R for educational programs and an enthusiastic response to individual visitors, yet there is an underlying uneasiness about expanding usage. Many people fear that it will undermine the resources and "natural wilderness" of the place. When choices about the allocation of resources have to be made, the preservation of the Nature Center's natural resource base is of high importance. However, due to the minimal financial support that is available, it has been difficult for the FWNC&R to grow socially in the public eye.

Managing a nature center from a strictly resource management perspective is fraught with problems when most decisions about appropriate use are determined by the following hierarchy of priorities:

1. The ability of life forms and processes to withstand alteration.
2. The ability of the non-living environment to withstand additional forms of use.
3. The impact of greater human use on a visitor's experience of nature.

The outcome of low funding and limited staffing has resulted in low participation at the Nature Center. Some visitors who do use the FWNC&R are passionate about it. They appreciate the staff, have fond memories of the site and are quite concerned with the health of the FWNC&R. In addition, they may be willing to provide financial support to overcome immediate threats to it. Yet their numbers are inadequate to secure the future of the FWNC&R.

The breadth and the depth of interdependent ecosystems make the conservation of the FWNC&R natural resources imperative. Urban growth with its resulting increase in housing, transportation infrastructure and centers of significant density, is likely to surround the FWNC&R. This growth will inevitably impact the FWNC&R over time by degrading its natural assets unless we can plan methods of protection and encourage a wide-ranging love of the place that supports those protections. The primary objective in developing programs at the FWNC&R is to link the conservation of the refuge, with the development of the capabilities of the institution, and with an increase in the social importance of the Nature Center. Institutional objectives and day-to-day actions need to develop in mutually supportive ways:

1. The support and stewardship of the broader community should provide FWNC&R with resources to survive as a viable refuge for wildlife, native plants, soils and geological formations. It needs a large base of dedicated volunteers and a broad base of supporters to ensure that there is political commitment to its future and public/private sources of funding.
2. The use of the FWNC&R natural and cultural resources for recreational and educational experiences should develop institutional supporters.
3. The natural history of the north-central Texas region should be told through collections based objects to expand fundamental public knowledge and link the identity of FWNC&R to the region.
4. The educational programming should inspire commitment to protecting the environment in general and the FWNC&R and its resources in particular. It should also impart knowledge, techniques and tools for environmental stewardship and advocacy.
5. The educational programs should offer integrated curricula in support of stated learning goals and objectives
6. The educational programming should include outreach to students and teachers from communities that lack resources to provide environmental education experiences.
7. Educational and recreational activities must be inviting, satisfying and worth repeating in order to encourage the repeat users from which volunteers and stewards will be recruited. They must also be compatible with the plant and animal life.
8. Recreational activities should have a clear and meaningful relationship to the mission and objectives of the FWNC&R.

Public Audiences - Categorizing Visitors and Special Users

To consider possible programs, it is important to understand visitors and the potential visitor experience. Nature-based institutions like the FWNC&R, can classify potential visitors into groups that range from the casual, one-time visitor to the committed volunteer who is willing to donate time and money to the institution. In nature-based activities, visitors can be divided into five groups based on frequency of visits, commitment to institution and what the institution receives back from them. The visitor groups are: Experience Seekers; Outdoors Active; Participants, Tellers and Teachers; Events Attendees; and Special Users.

The diagram (p. 27) entitled, *Nature – based Institutions and their Visitors Groups,* demonstrates the outcomes for each of the visitor groups. This helps to distinguish the number of visitors per category and where to concentrate efforts.

The diagram (p. 27) entitled, *Visitor Groups – Involvement and Expectations,* expresses the sophistication levels of three of the visitors groups.

Each visitor group is a composite of key characteristics, typical experiences, and opportunities and outcomes for the institution vis-à-vis the visitor category. The following descriptions put forward an initial profile of each visitor group. As the FWNC&R develops through time its organizational structure will more than likely change as well as an increase in staff will occur. As educational programs refine, the Nature Center's relationship to its community alters, so does the composite description of its typical visitors. The FWNC&R should frequently and formally update its visitor group descriptions, and the opportunities and outcomes visitation confers to the institution.

The Special User

A. Key Characteristics of the User
   - Nearly all attendees are visiting the refuge for the first time.

B. Typical User Experiences at FWNC&R
   - Attend as part of a group or organizations (camping, conferencing, party)
   - Break time and free time exposure to educational and interpretive messages

C. Opportunities for Use
- Naturalist Camp should be operated year-round with full-time camp educators and staff. It can become a model for resource conservation by operating a sustainable campsite.
- Market conference space to educator groups needing sites for continuing education, and for regional professional meetings of interpretation, historical, ecological and naturalist groups
- Provide meeting space for community organizations and private sector companies.

D. Desired Outcomes for the User
- Admire the Nature Center as a place of natural beauty, a place where fun and enjoyment is natural, and a place where they are welcomed.
- To become aware of the Nature Center's offerings and visit on their own as Experience Seekers or Outdoors Actives

The Event Attendees

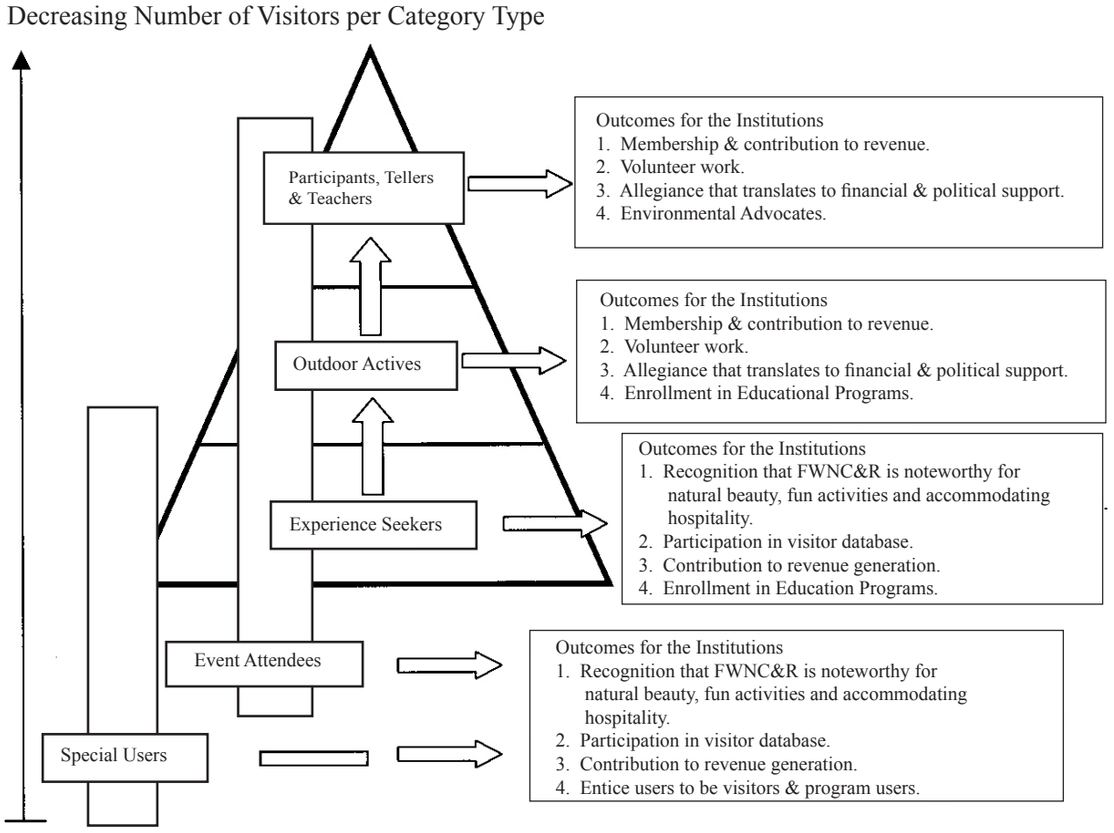
A. Key Characteristics of the Attendees
- Nearly all attendees are visiting the refuge for the first time.

B. Typical User Experiences at FWNC&R
- Once a year events such as Buffalo Boogie, Buffalo Chip Festival, Snakes of Tarrant County and Nature Center Field Days. Buffalo Boogie is the only festival that generates revenue.

C. Opportunities for the User
- Chisholm Trail History, Civilian Conservation Corps, Catch & Release, how to tie other sites into programming, Prehistory Encampment

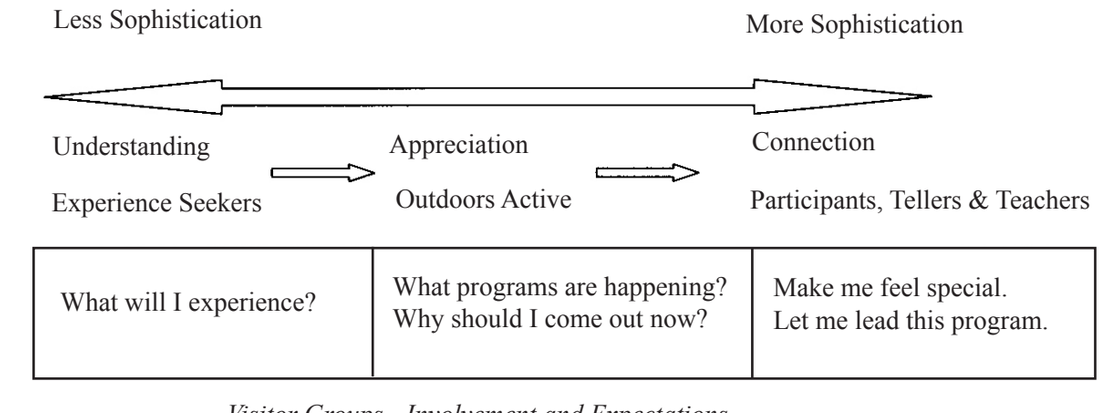
D. Desired Outcomes for the User
- Admire the Refuge as a place of natural beauty, a place where they are cared for, and fun and enjoyment is natural.
- Provide information for database with periodic mailings of information concerning introductory programs and special events.
- Spend money for entry fee, concessions and gift store.
- Aware of the Refuge's offerings and visit on their own as Experience Seekers or Active Outdoors.

A. Key Characteristics of Experience Seekers
- First-timers or bi-annual repeat visitors.
- Search for fun, moments that are expe-



Nature-based Institutions and their Visitors Groups

Each of the visitor groups tend to differ in how they value experience at the FWNC&R and have different levels of knowledge concerning the natural and cultural resources, the institution, their place in ecological relationships, and the cause and effect impacts of their actions.



Visitor Groups - Involvement and Expectations

Typical Visitor Groups experiencing Nature

The Experience Seekers

riential and memorable, and make little distinction between nature-based experiences and nature-based recreation.

- Few prior first-hand memorable experiences of nature, little knowledge of flora and fauna, land and water or basic ecology.
- No allegiance to the FWNC&R as an institution.

B. Typical User Experiences at FWNC&R

- Size of refuge and the dispersal of "attractions" present a barrier to getting around the site and confusion in knowing where to go for a good experience.
- Comfort facilities are sparse which shortens length of visit and adds frustration of having always to double back to starting point for drinking water and toilets.
- Concentration of staff at starting point and large area of land presents rare opportunity to initiate interactions with docents / educators at attractions.
- Attends educational programs rarely if at all.

C. Opportunities for the User

- The motivation for Experience Seekers to visit is their belief that they can enjoy and relate to nature. The Nature Center should not prove them wrong through barriers that deny or temper accessibility to good experiences.
- Immerse Experience Seekers in social interactions that provide abundant opportunity and considerable choice on the part of the learner as to when, where, with whom, and what to learn.

D. Desired Outcomes for the User

- Experience Seekers admire the Refuge as a place of natural beauty, a place were fun and enjoyment is natural, and a place where they are welcomed.
- Experience Seekers provide information for database with periodic mailings of information concerning introductory programs and special events.
- Experience Seekers spend money for entry fee, concessions and gift store.
- Experience Seekers increase their participation in the Refuge and become Outdoor Actives

The Outdoor Actives

A. Key Characteristics of the User

- Annual and seasonal repeat visitors
- View being in the "outdoors," or some aspect of it as a life defining hobby or recreation
- Value experiences that prompt self-discovery and self-learning
- Attend programs and special events but primarily to increase their knowledge
- Primary allegiance is to the place and its natural resources, indirectly acknowledge an on-going relationship with the institution and staff

B. Typical User Experiences at FWNC&R

- Behavior enacts the maxim: "The more time spent outdoors, the more meaningful the experience"
- Don't mind a big site, and having to walk a distance to the restroom. Having "comfort" facilities all over the site tends to distract from their Nature Center experience.

C. Opportunities for the User

- Promote social interactions among Outdoor Actives that lead toward the formation of a common vocation group such as a monthly bird watching club or society
- Develop educational programs that initiate Outdoor Actives to focused and detailed learning and that convey the rewards that can flow from Naturalist's point-of-view and knowledge base

D. Desired Outcomes for the User

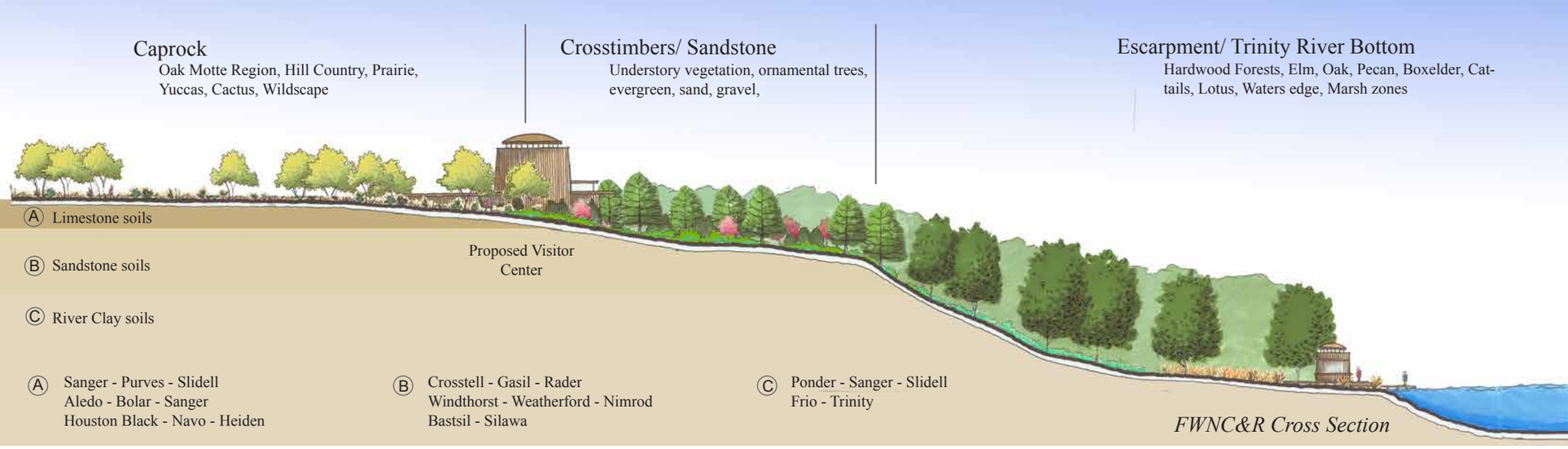
- Realization that the motivation for being outdoors and for learning about the natural environment can incorporate both individual desires and community interactions
- Instill the importance of the FWNC&R as a natural preserve and as a collection of interdependent ecosystems that makes conservation of its natural resources an on-going, critical and difficult effort
- Convince Outdoor Actives that personal involvement with the FWNC&R starts with institutional membership, and that both the institution and members receive benefits. Personal involvement need not stop with membership dues. Involvement can deepen to commitment through volunteer work for the institution.

A. Key Characteristics of the User

- High frequency repeat visitors

The Participants, Tellers, and Teachers

- Curious on principle, confident in assertion, and opinionated on what can be done better
- Like to "talk shop" and search out the latest "scoop" on what is happening that



FWNC&R Cross Section

is atypical, unusual or remarkable and pass it on to others
- Strong allegiance to the FWNC&R as a critical ecological preserve,
- Some have an equally strong allegiance to the FWNC&R as the organization at which they can make a difference

B. Typical User Experiences at FWNC&R
- Haunt favorite plant and wildlife community for which they develop a repertoire of interesting facts, figures, observations and stories based on prior experience
- Seasonal and frequent presence at the Nature Center helps develop skills in noticing small changes that take place gradually in flora and fauna, land and water due to seasonal and climatic factors
- Gravitate to roles that allow them to interact with staff as a peer, and with first-time visitors as a teacher

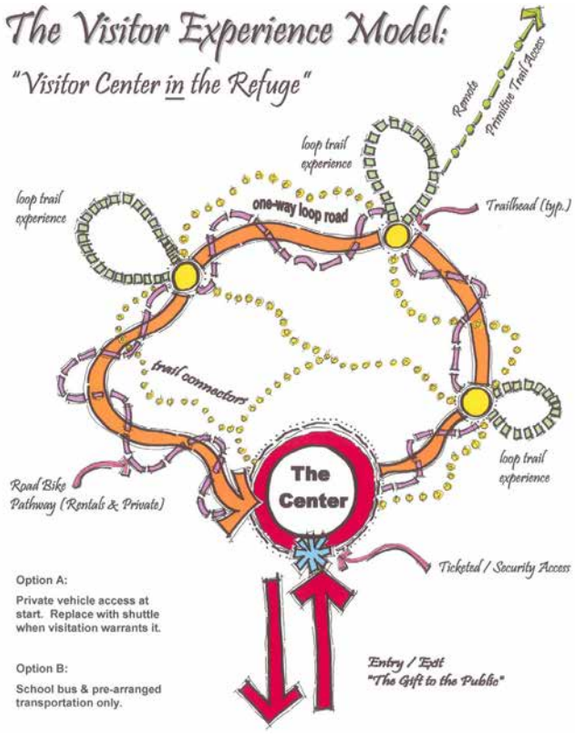
C. Opportunities for the User
- Combine individual efforts with a group of like-minded peers to share their endeavor to become a complete amateur Naturalist inclusive to points-of-view, language and stores of experiences
- Broaden their nature-based knowledge to include environmental issues of central concern to the FWNCR
- Link experiences at the FWNC&R to environmental advocacy

D. Desired Outcomes for the User
- Participants helping the staff in their daily work
- Participants could provide individuals who combine the role of amateur Naturalist with communication skills, and personal and business connections to help FWNC&R convey its relevance to the larger social, political and cultural communities
- Participants help other visitors integrate their experiences at FWNC&R with their lives.

Translating the Visitor Experience onto the site

In looking at how a visitor begins the experience, circulation becomes an important factor. The Visitor Experience Model serves as a basic layout and circulation through the site. The diagram begins with the entrance to the site, which leads a visitor to The Center. This entry/exit experience is prior to any gate or ticketing and becomes the free 'gift to the public.' It also reinforces decompression time to divide the outside, developed world experience. At The Center the guest will pass through a ticket gate where a fee will be collected. From The Center a one-way loop road carries the visitor through the site and along the way allows the visitor to experience multiple exhibits and demonstration areas. Off of each of the exhibits are internal trails. Winding through the site are additional hiking trails, which utilize existing trail systems as well as new ones. Bike trails run parallel, alongside the loop road. The loop road continues back to The Center and the exit road carries the visitor out of the Nature Center. As the master plan develops, it is important that this Visitor Experience Model is translated onto the site.

Another important experience for the visitor is the circulation between various ecosystems. This 'crossing of zones' allows a visitor to see the differences between the various habitats. The cross section at the top of the page is taken from a high point down through the proposed visitor center site to the water's edge. This section reveals the varying soil types that occur from the high ground to the low ground, as well as the change in vegetation that occurs at different elevations. The purpose of this section is to demonstrate how a visitor can be exposed to so many different zones within the Nature Center.



Recommendations

Resource Management Recommendations

1. Develop a Cultural Resources Management Plan (CRMP) in conjunction with the master plan.
2. Conduct basic historical research.
3. Publish a paper / booklet on CCC historical research.
4. Create a confidential map of all known CR's on site (record all known sites to current standards).
5. Assist Tarrant County Archaeological Society in completing current report - publicize as appropriate.
6. Complete investigations to assess impacts from proposed construction when and where necessary as master plan progresses.
7. Implement new exhibit program - both indoors and out exploring themes of cultural landscapes (how have humans used this site through time, how has it altered the site? Discuss historical use of landforms - bison range, escarpment, etc.).
8. Augment current programming with one or more items specifically involving history and archaeology (Time trip, mock site).
9. Develop items that can be marketed at the FWNC&R that incorporate cultural resource themes
10. Acquire in-depth natural resource data study and thorough resource management plan that aligns with the vision of the master plan.
11. Analyze pre-European settlement patterns within the Nature Center and preserve or restore portions of the land toward these conditions.
12. Set up wildlife and resource management plan including enhanced habitat for all native species; remove exotic species immediately; utilize bison as a management tool for prairie and grassland maintenance and restoration.
13. Encourage research and academic pursuits within the boundaries of the Nature Center
14. Develop resource management plan for vegetation communities.
15. Prescribed burning should be used as a management tool to restore the health of the prairie back to its state before European settlement.
16. Preserve all connections between aquatic communities within the nature center. Provide enhancement of new wetlands.
17. Provide research funds for both professional and "lay" scientific study within the Nature Center.
18. Develop a database for all natural and cultural resource inventories.
19. Encourage bird watching and ecological interaction.
20. Encourage connectivity for wildlife corridors that tie into the Nature Center
21. Utilize imaginative and to the extent possible, non-verbal signage.

Land Use Recommendations

1. Attempt to buy visual easement rights across all land visible from Ten Mile Bridge Road in order to maintain it as agricultural quality (or transfer development density to other land) also conservation easements.
2. Acquire in-holding properties in the Lakeland Addition as it becomes available.
3. Eliminate incompatible uses on the FWNC&R; such as the SWAT Team gun range and Fire Department bomb disposal facility. The City should look for alternate sites to relocate this use within the next two years.
4. Strike a mutually beneficial use agreement with Tarrant County Water District for land adjacent to FWNC&R and Eagle Mountain Lake Dams.
5. Annex property along Jacksboro Hwy and all farmland within the watershed.
6. Provide development incentives offering development guidelines, which encourage better building types, screen parking and service, encourage landscape buffers along the highway, and encourage green architecture.
7. Provide escarpment & watershed conservation incentives, which would serve to limit development within a 200' distance of the contact line, limiting development along slopes and providing incentives which encourage biological filtering of storm water before discharging toward Lake Worth.
8. Acquire agricultural peninsula near old YMCA camp to protect resource & expand area for future Environmental Learning Center.
9. Sell out-parcel (Joe Eidson Alternative School Site) north east of Ten Mile Bridge Road.
10. Acquire lease land along Love Circle as it becomes available.
11. Conduct a detailed site analysis and environmental assessment prior to the implementation of any new facilities.

Operations/ Governance/ Economic Growth Recommendations

1. Install self-serve payment gate system immediately
2. Increase annual operating budget to $750,000 immediately
3. Hire a marketing / development director. Consider renaming facility to meet marketing vision of master plan.
4. Enlist aid of professional fundraiser for capital campaign
5. Develop a five year plan for staff growth (include a recreation manager)
6. Develop a five year plan for educational program expansion
7. Restructure docent / volunteer support system
8. Develop an advertising and marketing budget

View from proposed Visitor Center Site looking towards the Waterfowl exhibit.

Master Plan Exhibit Summary:

When determining the location of facilities and programming of the site, it was divided into four systems of uses: The Centers, The Natural Eco-Systems, The Exhibits, and The Supporting Infrastructure. These organizing systems help to describe the functions of different areas.

The Centers

The Centers are clusters of buildings where intense human education takes place in an organized man-made environment. These four facilities are areas of the site where large groups of people can be concentrated for different venues without impacting the remainder of the property.

- Lone Point Visitor Center – This is the educational home base for the nature center.
- Environmental Learning Center – Provides a large group overnight facility for various user groups.
- Hardwicke Research and Restoration Center – Reutilized as a higher learning facility for study and instruction.
- Alice Ashley Environmental Education Camp – Serves as a staff guided and overnight environmental education camp for organized groups.

The Natural Ecosystems

- Caprock - Oak Motte Preserve & Tall Grass Prairie
- Western Cross Timbers – Oak Savannah & Forest
- Riverbottom - Hardwoods & Marsh
- Open Water – Lake and River zones

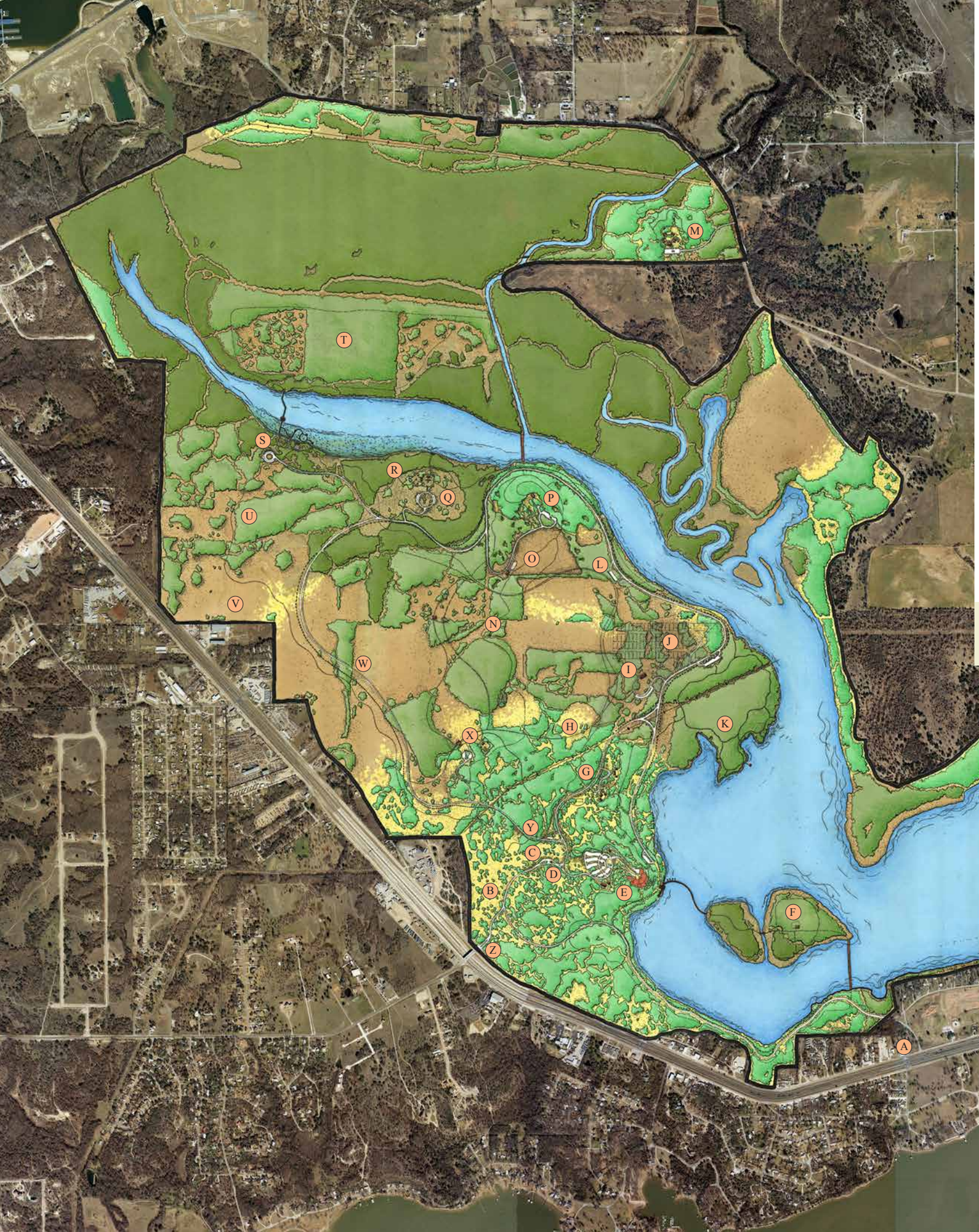
(Ecosystems indicated on map designate interpretation locations only.)

The Exhibits

- Greer Island - An exploration and interpretive experience.
- CCC Structures – Many structures exist throughout the site. They range from culvert abutments, to small bathrooms and picnic areas.
- Waterfowl Exhibit - The first stop on the loop road; observation of birds through the use of bird blinds.
- Bison Range Viewing Stations - Interpretive area about the nomadic animals and their habitat.
- Prairie Dog Village – An established prairie dog home.
- Lotus Marsh Exhibit - Formerly the Boardwalk but now with more interactive docks and programming.
- Archaeological Exhibit (Pre-Tribal Man) - Self guided tours about historic artifacts and their importance as well as incorporating a sample dig site.
- Reclamation & Demonstration Exhibit (Quarries) - Staff guided tour regarding the impact of man.
- Homestead Exhibit (European Man) - Learn about how our early ancestors lived.
- Photo Opportunity (Bison sculptures) – Whether leaving or going the loop again, take time for a photo with friends and family.

The Supporting Infrastructure

- Primary / Future Main Entry Drive - Location is off of Love Circle and will enter by the waters edge with a view to the Visitor Center.
- Nature Center Entry / Exit Gate - Established in order to generate entry fees and provide directional information.
- The Loop Road
- Large Rental Pavilion - For small to medium size gatherings and celebrations.
- Project Exit / Secondary Entry Drive - Located at the current entrance off Jacksboro Hwy
- Bison Barn
- Maintenance Facility
- Restroom Facilities



Legend

- A Primary/ Future Main Entry Drive
- B Oak Motte Preserve
- C Prairie Restoration
- D Nature Center Entrance/ Exit Gate
- E Lone Point Visitor Center
- F Greer Island
- G CCC Picnic Area
- H Western Cross Timbers Savannah
- I Large Rental Pavilion
- J Lakeland Addition
- K Waterfowl Exhibit
- L Bison Range Viewing Station
- M Environmental Learning Center
- N Prairie Dog Village
- O Tall Grass Prairie
- P Hardwicke Research & Restoration
- Q Alice Ashley Environmental Education Camp
- R Bottomland Hardwoods
- S Lotus Marsh Exhibit
- T Todd Island/ Ancient Cross Timbers Forest
- U Archaeological Exhibit (Pre-Tribal Man)
- V Reclamation/ Demonstration Exhibit
- W Bison Range Viewing Station
- X Homestead Exhibit (European Man)
- Y Photo Opportunity
- Z Project Exit/ Secondary Entry Drive

FWNC&R Aerial Masterplan

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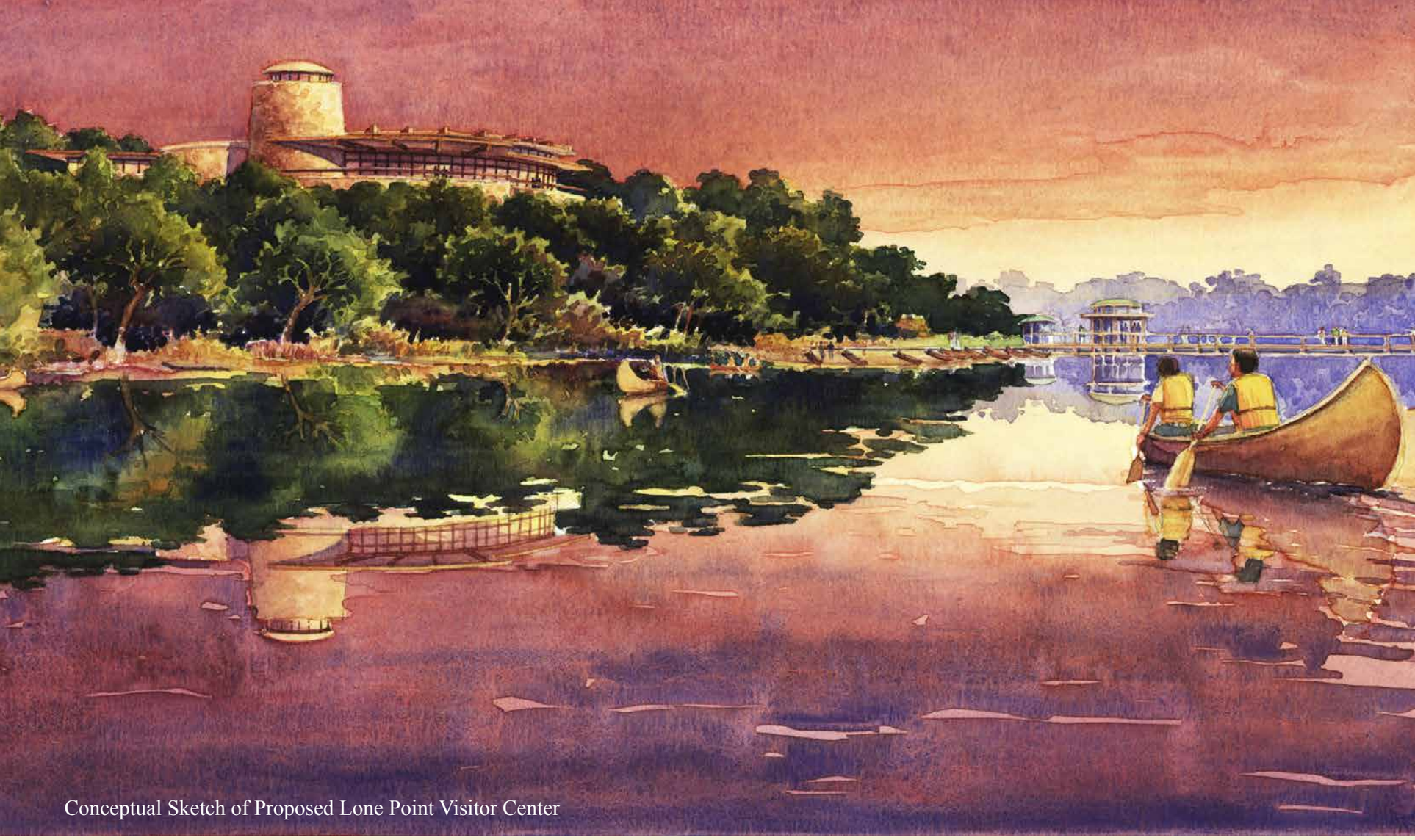

Conceptual Sketch of Proposed Lone Point Visitor Center

The following areas are in sequence of the new proposed visitor experience.

Main Entry Drive Experience

The entrance to a facility is one of the most important elements in setting the scene for a visitor's experience. Currently, a detracting factor of the FWNC&R visitor experience is the current location of the project entry in relation to the existing land uses along Jacksboro Highway.

One of the driving factors about the entry to the site is the amount of decompression time allotted between the turn-off from Jacksboro Highway and the official entrance gate to the facility. When one enters the site, it should be a significant enough distance to allow the influences of the surrounding development to not be a determining factor on the impression one develops as entering. The current entry road to the Hardwicke is approximately 2 miles, but it is set so deeply within the site that visitors tend to stop at points without any sense of orientation. The proposed entry drive would enter the site closer to the Jacksboro Highway bridge allowing a couple of things to occur: 1.) It moves the entrance closer to the bridge experience where there is additional, existing city land. This land could be enhanced to signify the FWNC&R entry. 2.) It decreases the amount of development one must pass before entering the site. There are currently incompatible businesses in the area, so this type of change requires a change in zoning. (Until this takes place, the current entry would remain.) This new approach would allow two entries into the site with a one-way exit. This brings all visitors to a front gate for orientation. This is where a ticketing system would be implemented. This process needs to be in close proximity to the visitor center and loop road entry for maximum orientation and exposure, as well as for controlled access into the center.

The entry gate to the Fort Worth Nature Center & Refuge is designed to be the first welcome everyone receives. At the gate, a visitor will receive information about the day's events and a map of the area. An entry fee will be collected or visitors can utilize a membership system pass. The entrance gate also acts as the exit gate. Upon exiting, the visitor can pick up information regarding future events.

The entry drive experience begins to entice the visitor with glimpses of nature and events. An example element would be a hanging bridge on the canyon ridge trail that the visitor drives by on the approach to the new Visitor Center. Along the approach one can begin to experience the different ecosystems. One of these is the water's edge as the drive hugs the lake. The second is the oak motte preserve. The third area as you approach the entrance gate is the prairie restoration. The prairie is an open area to your left that provides the perfect habitat and ecology for a prairie restoration and demonstration. All of these areas are accessible from the visitor center via trails. Interpretive graphics should be utilized to maximize understanding of these ecosys-

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tems. This area is the first zone in the high ground region as you approach the entrance gate. The area is characterized by small clumps of oak trees that are short in stature and have more of a thinning appearance than a typical oak grove.

Lone Point Visitor Center

Upon entering the ticket gate, the visitor has a choice of stopping at the new proposed Visitor Center or continuing on the one-way loop road through the site. This choice begins to satisfy the needs of different users: the one-time visit tourist, who will come for a 2 hour experience at the center only vs. the nature enthusiast whose mission is to bypass the programmed zones and escape into the wild areas. There are also the repeat users who simply want to streamline their experience to one or two exhibits. This is one of the bonus points with a facility of this size. It can supplement a variety of users at one time allowing the majority of users to concentrate in a few select zones.

At the Visitor Center, it is still the goal that people get out of their vehicles and into nature. So, the parking lot which should be an environmentally friendly ecosystem of its own, is set far enough away that one has a short walk to the facility though a series of wild and native landscapes. This 'wildscape' becomes the approach for the main building.

Situated on the precipice of a dramatic promontory, the Visitor Center building should be an architectural expression of this landform. The shape, grade change, view from and visual prominence of Lone point are inherent qualities of the site that give form to the building design.

The Peninsula configuration of Lone Point forces the building to assume a concave shape relative to its entry. Such a shape "opens" the view side of the structure and allows a full panorama to be captured toward the lake and Greer Island.

A peninsula site shape also affords a natural subdivision of the building plan into its two component parts. These are educational functions and Interpretative/ exhibit functions, which can be allocated to the right and left of the entry mezzanine. Between these functions are the shared spaces. These spaces include elements such as the auditorium, the gift shop, the food court, and the view gallery. In this way, the crowd management associated with school related activities does not disrupt the often-contemplative character of exhibits and interpretive settings. This spacial association is demonstrated in the proposed floor.

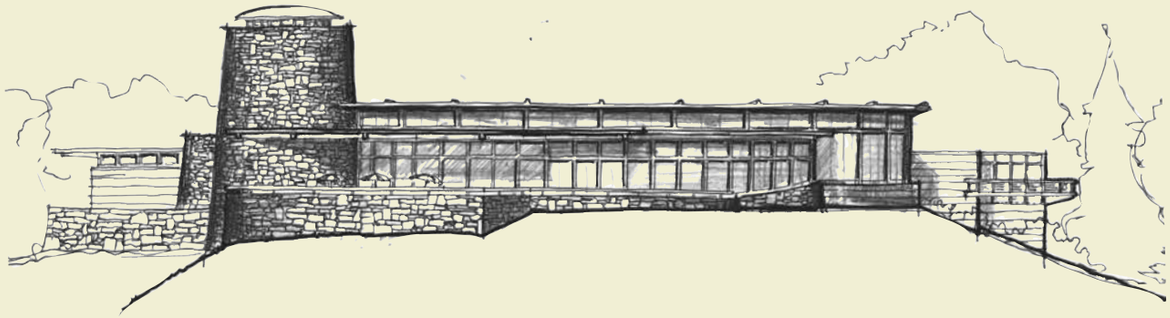
Finally, a peninsula shaped site establishes a point of organizing energy…a center…around which the building naturally organizes with the underlying landform. This point is expressed in the design as a rain-harvesting cistern at the entry doors. To some extent, water needs of the building can be served from this rain-harvesting element. To further integrate the visitor center and the natural context of the site, the historic CCC structures that remain on the peninsula will be included into the design of the

facility. This will inherently add value to the site and maintain the natural feel of the area.

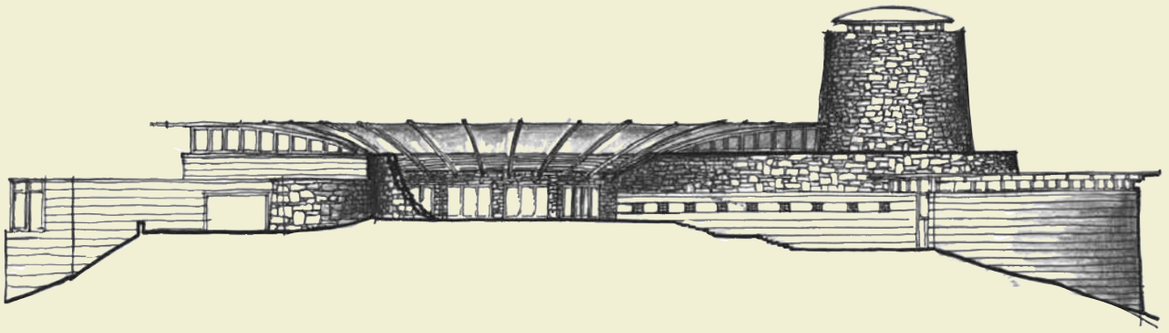
Significant grade changes within the Lone Point site allow the design of a building in which volume can be experienced through changes in the relationship of floors rather than the increase of ceiling height. This creates a dynamic space that engages people as they move through it. Mezzanine overlooks, ramps, and vertically related activities can create interesting special relationships. The grade change also allows the creation of high interior ceilings without increasing the height of the structure as one approaches it. In this way the scale/ mass of the building is not overpowering the height of natural elements on the site (such as trees). A lower elevation on the uphill side of the building allows this side to be expressed as a stone wall…eroded and weathered over time. Thereby the normal rectangular expression of "building" is redefined as a meandering stone plane…a wall…, which defines the transition from approach to panorama view (attained when one steps beyond the wall and into the building. Except for this one opaque element, which emanates from a landmark tower form, the rest of the building is transparent glazing…permitting broad views.

The views from Lone Point (and consequently the views from the visitor center) are compelling because the placement of the structure creates a view that has no foreground. This lack of ground plane, which normally stands between the viewer and the space being viewed, brings home the scale and power of the landscape in a dramatic way. Just as visitors to the Grand Canyon are affected by the view seen without ground plane reference, so the visitors to the Fort Worth Nature center will be similarly affected…creating a lasting impression.

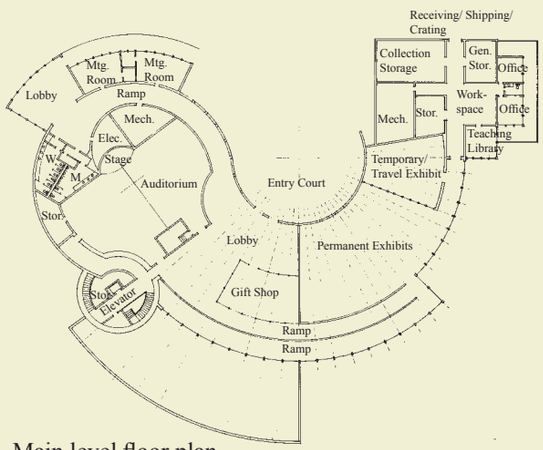
Approaching Lone Point from the relocated entry (as shown on the Master Plan) reveals visual prominence of this site. Any structure properly designed for the site will attain "landmark" significance without destroying the natural landform. The Visitor Center is the beginning point, ending point,



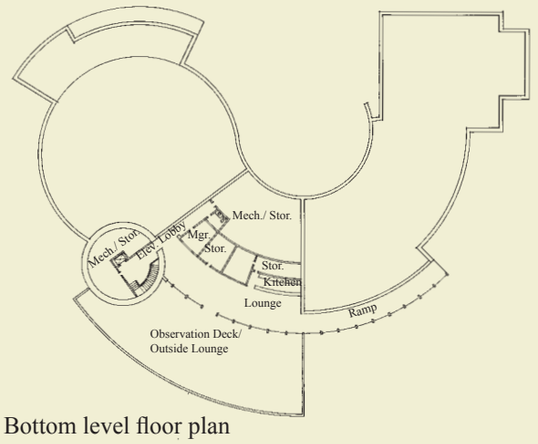
Rear View looking at Lone Point from Greer Island



Front Entry from Visitors approach



Main level floor plan



Bottom level floor plan



and exchange point for most of the activities relevant to the FWNC&R visitor. Therefore, the landmark prominence of the visitor center establishes a visual reference and element of identity that is needed by the visitor in order to make use of this facility. In order to enhance landmark significance of the visitor center, the design should be organized around a tower form that has the shape, height, and recognition potential to become a powerful landmark. Externally the tower form is a landmark; internally the tower form is the means of vertical circulation through the visitor center building. Vertical circulation also allows the tower form to serve as a viewing platform from which the entire nature center can be seen and understood. This is a compelling way to tell the story and create a marketing identity for the FWNC&R.

The Visitor Center becomes the programming hub for activities at the FWNC&R. It should house exhibits, classrooms, meeting space, and other functions that support the vision of the site. The Visitor Center will act as the main building within a small campus of functions. These functions might include other administration offices, and a small auxiliary retail point for snacks, film, etc. for people who are not going to the Visitor Center. This area could also act as a rental station for binoculars, bicycles, etc. These design considerations should be acknowledged when an actual facility is constructed. Although designs may change to meet specific needs, the intent and character should be in keeping with the landform. All architectural elements constructed from this point forward should be of a very high caliber of design in order to provide quality facilities, but also create signature statements that speak to one another across the site.

Greer Island & Canoe Launch

Currently, there are remnants of a path in existence from Lone Point down to the lake edge. When the Visitor Center is established, this trail should tie into it and end at a new canoe launch area at the bottom of the 80’ grade change. This canoe launch would provide a boardwalk link to Greer Island. Greer Island sits in a marsh off the main water flow of the river and down hill from Lone Point. A pedestrian trail will start at the canoe launch and loop to the island, across a levee, and back to the entry drive. There are various trails that wind through the island that should be used as teaching tools. The majority of the island is made of Bottomland Hardwoods and Cross Timbers. The Canoe Launch is positioned to take advantage of the oxbow that is created between the Greer Island Levee and the waterfowl marsh. This creates the perfect environment for contained canoeing events without disturbing the remainder of the waterway ecosystems. Events would continue such as the Youth Camps, guided canoe tours or a simple family picnic lunch outing to the island. In keeping with the nature center mission of preservation, no motorized boats would be allowed within the FWNC&R boundary; however, fishing on a catch and release basis would be permissible. Children, particularly will be mystified with an island experience, so interpretive opportunities should be handled in a playful way that is friendly to youth.

Loop Road & CCC Picnic Area

The circulation beyond the Visitor Center follows the model which established the vehicular flow as a one-way loop road. Along this road are the nodes or trailheads at each interpretive station.

Running parallel to the loop road is a paved bicycle path. The introduction of bicycles onto the site should be in a controlled fashion and only on designated paved bicycle trails. Interior solutions until these trails are built would be to paint a striped bicycle lane onto the one-way loop road.

The first stop along the one-way loop road would be at the Historical CCC Broadview area. This area is a historic site of interest due to the CCC structures that date back to 1935. Many of the structures have suffered from weathering as well as vandalism; however, restoring the buildings would provide a great asset to the FWNC&R. The land the CCC Picnic Area sits upon overlooks a large part of the water and Greer Island. At this area, the master plan vision entails the renovation of the current structure into a full-fledged usable picnic pavilion with the future addition of two more clusters of picnic areas. In all types of public facilities, these open air covered pavilions get very high use and become popular rental facilities. The architectural style of the new additions should be in keeping with the historical elements.

Large Rental Pavilion

In addition to the picnic pavilions, the master plan suggests a future large rental pavilion. This large rental pavilion is located off the main loop road on the way to the lotic waterfowl exhibit. The open-air style or closed pavilion sits on the hill off to the left. The facility could house a series of events such as community meetings, family reunions, company gatherings, small performances, or interpretive educational programs. Besides providing additional function space, this type of facility generates revenue for the FWNC&R.

Lakeland Addition

The Lakeland Addition is an existing community located inside the boundary of the Fort Worth Nature Center & Refuge. The long-term vision would be for the City of Fort Worth to acquire as much of the Lakeland Addition as possible. This would allow for the FWNC&R to be one contiguous piece of property. Until that time, the Lakeland Addition is to be treated similar to a gated community. The Parks and Community Services Department has proceeded to acquire property in the Lakeland Addition to add to the Nature Center, but it is the PACS Department policy to only acquire property in the area from those willing to sell.

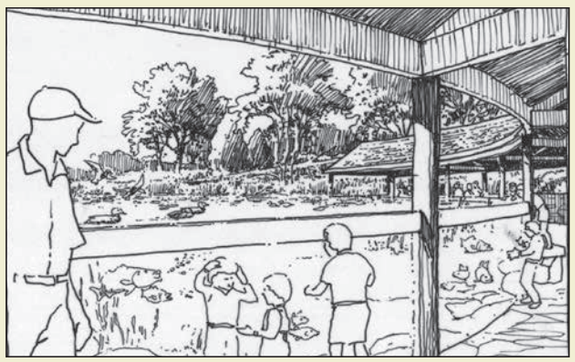
Examples from the Waterfowl exhibit and the Environmental Learning Center

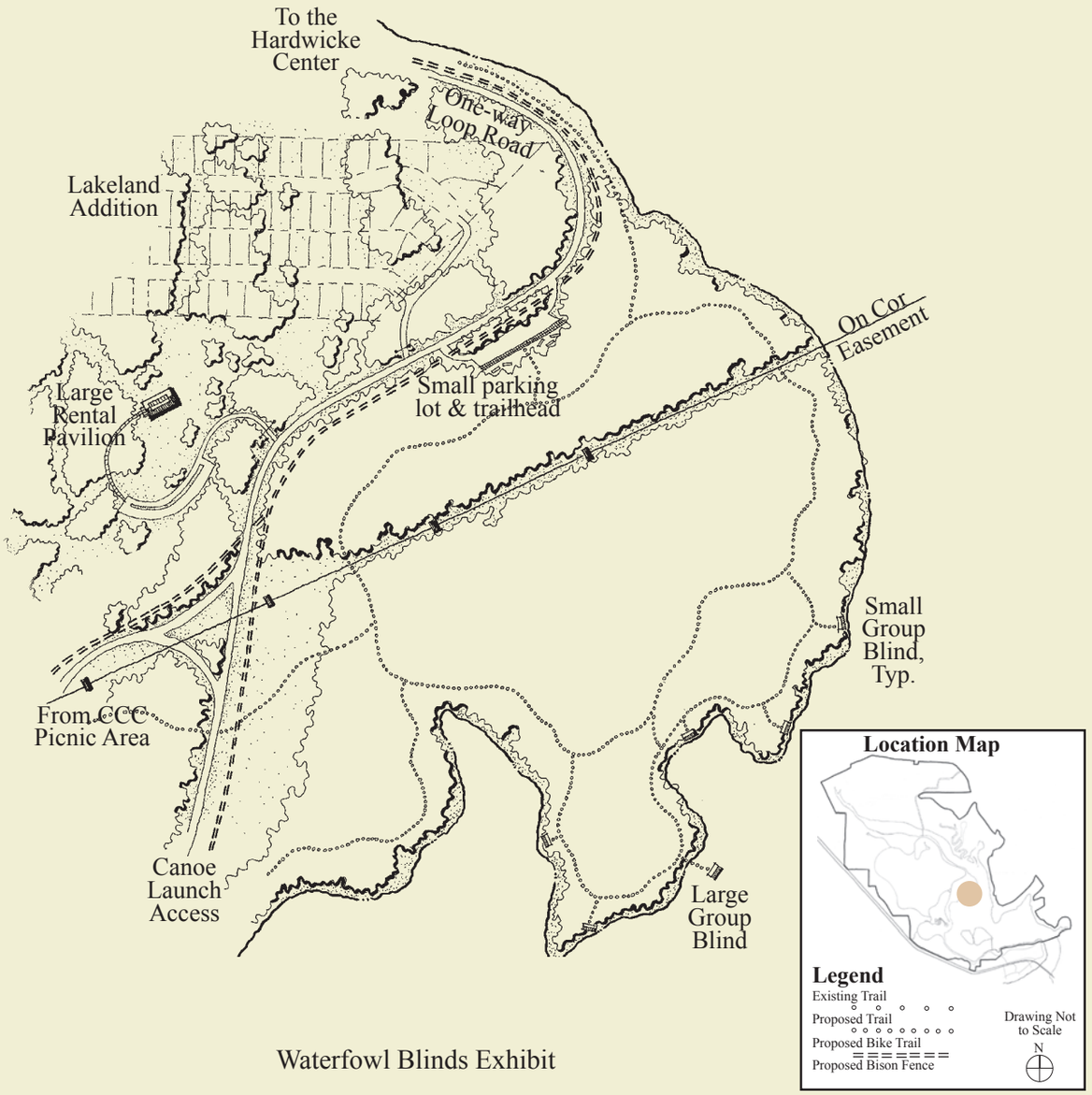
"It's so frustrating that Fort Worth has a huge asset at the nature center and it is not being used the way it should."

Doug Harmon, President of the Fort Worth Convention & Visitors Bureau

Waterfowl Blinds

The waterfowl area is one of the first major stops off the loop road and it is the first habitat exhibit one encounters at the FWNC&R. Based on an active area of the river, the term Lotic is a derivative taken from the meaning 'flowing water', providing a haven for many types of birds which differ from species found in other aquatic areas of the site. The Fort Worth Nature Center and Refuge is currently ranked in the top 10 for prominent birding spots in the state of Texas. The intent of this exhibit is to help provide the public with information about birding. Located within the Waterfowl Exhibit will be 6 bird blinds which enable a group of people to get an up close and personal look at various species of birds. There will be 2-5 family size blinds. This particular type will hold approximately five people and will be tucked into the shoreline vegetation to be as discrete and hidden as possible. In addition to these, there will be one large bird blind that can hold 20 – 25 people for classroom use. This blind will be located close to the water for maximum observation. There will be interpretive graphics located within each bird blind that will provide information on bird species, habitat, and plant material.





Waterfowl Blinds Exhibit




Bison Range

A significant change in the bison habitat exhibit at the FWNC&R is to increase the size of their range from 55 to approx. 275 acres. The philosophy behind this approach is to establish the herd as a true land management tool much as they used to do naturally across the plains of the U.S. By increasing the range to this size with built-in grazing cells, the staff can rotate the herd in order to manage this part of the site. Because the herd would be over a larger portion of the site, additional viewing stations are necessary to ensure visitors get this experience. There are four bison range viewing stations located off the loop road. Three of the viewing stations are small pull-offs located alongside the road for a short visit. The main viewing station is located toward the end of the loop road and includes an overview of the bison and their habitat as well as a homestead exhibit.

Environmental Learning Center

The Environmental Learning Center (ELC) at the Nature Center is located off Ten Mile Bridge Road at the location of the old YWCA campsite. The ELC is designed to be a large group overnight facility including but not limited too: corporate groups, non-profit groups, boy scouts, and girl scouts. The facility can park approximately 50 cars. The primary building structures would consist of a Main Lodge and 4 Cabins. The Main Lodge would house large meeting areas as well as a multipurpose room, kitchen, and restrooms. The Cabins would accommodate 35-40 people with restroom and shower facilities. All of these buildings would be new construction at the site, as the only existing structures are concrete slabs and remnants of an old chimney. At the ELC emphasis would be placed on outdoor recreational activities; a few of these would include: hiking trails, canoe launch, high and low ropes course, pavilions to be used for outdoor educational space, and additional open space for group activities. The hiking trail would also connect into the main trail system of the Nature Center. This would allow those staying at the Environmental Learning Center to access the facilities and exhibits at the Nature Center.

Environmental Learning Center

Imagery from the Hardwicke Research & Restoration Center and the Alice Ashley Camp.

Prairie Dog Village

The Prairie Dog Village is located off a trail that begins at the bend in the road leading to the Hardwicke Research and Restoration Center. The town is only accessible by foot traffic; no vehicular traffic. The prairie dogs were established in this area by the Nature Center staff; however, they roam freely as fences do not contain them. The master plan proposes to leave the village location as is, but to increase the amount of interpretive graphics as well as improve the design of the viewing opportunities without disrupting the colony.

Tall Grass Prairie

The prairies of the Fort Worth Nature Center and Refuge include a few original sites as well as restored sites where the plants and animals native to the local prairies can thrive. Maintenance and restoration of the sites require ongoing management. The techniques used to maintain these areas range from hand-planting native grasses and hand-pulling invasive species to prescribed burning. The Tall Grass Prairie adjacent to the Hardwicke Center is one of the restored areas. Additional restoration sites within the FWNC&R should be identified and utilized for educational purposes to the public.

Hardwicke Research & Restoration Center

The Hardwicke is the existing Visitor Center located at the Fort Worth Nature Center and Refuge. he Hardwicke is currently an area of study and interpretation of a variety of wildlife and ecological zones including: an aquatic division, restoration development for prairies, cross timbers, caprock and other geological areas, preservation of existing habitats, and maintaining wildlife diversity. The intent of this facility should be to increase the educational level of study as well as provide additional services for the surrounding areas. In the future with the addition of a new Visitor Center, the Hardwicke should act as

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... a well balanced Master Plan that recognizes the importance of pure preservation..."
Bill Meadows, Nature Center Endowment Committee

a scientific library not only for the public but specifically for the associated industry based disciplines. Affiliations with other organizations, such as BRIT, would be encouraged to be a part of this expanded facility. The Hardwicke also serves as an animal education center, and consistently maintains a greenhouse development for native indigenous materials. The facility would also be a prime home base for possible interns in the study of the environment and ecology.

Western Cross Timbers Savanna

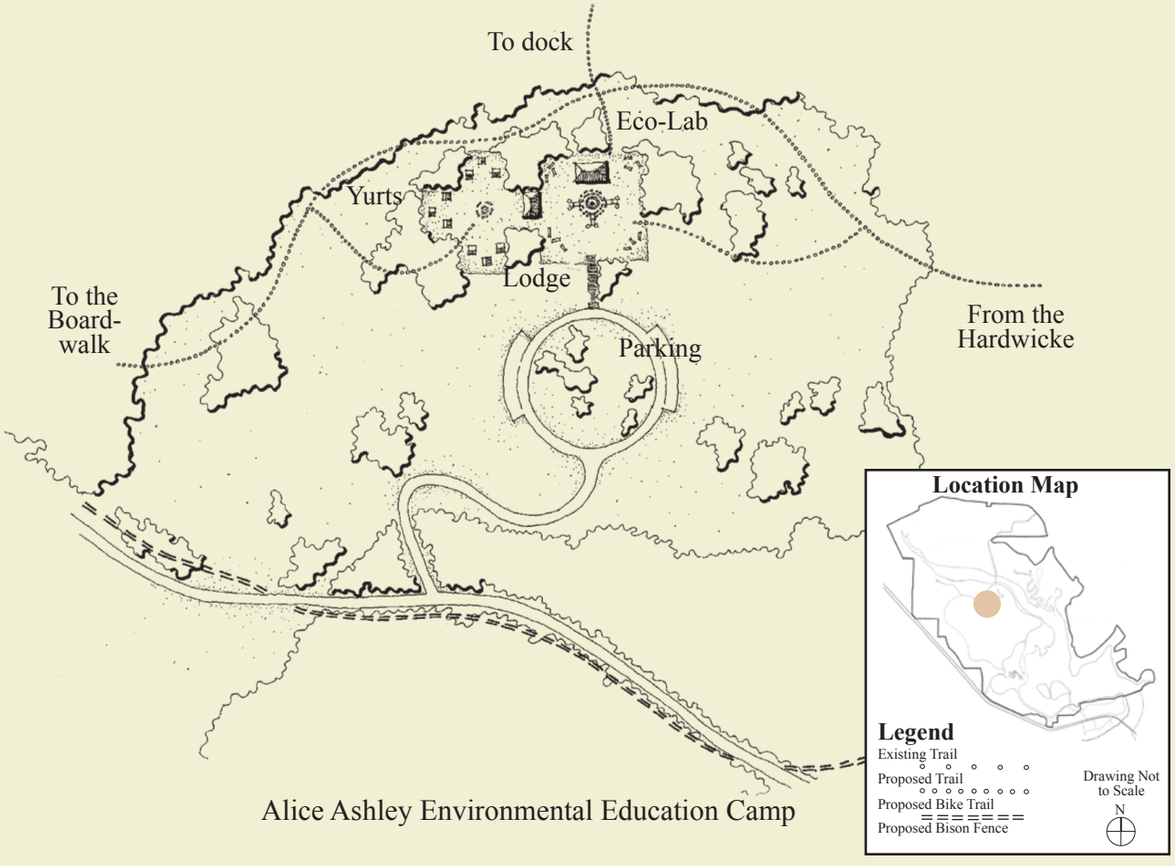
The Western Cross Timbers Savanna is grassland containing minimal trees scattered in places. One of the prominent areas to find the Savanna is near the Alice Ashley Camp.

Alice Ashley Environmental Education Camp

The Alice Ashley Camp is located near a Riparian wetland forest. The area is located in close proximity to many diverse habitats from water, to forest cover, to open land. This provides many transition zones and a great opportunity for observing wildlife. The Savannah and Bottomland Hardwood area is known for birding, as well as sightings of fox and bobcats. Parking for approximately 20 cars and 3 buses will be provided, however; this is not intended to be a destination for the general public. The intent of Alice Ashley camp is for staff and guided group use. The facilities consist of a Grand Hall or Eco-Lab for 120 students or a teacher training facility. Overnight camping will be provided for 30 students located in tent/ yurt style housing. A Main Lodge consisting of kitchen facilities, a meeting room, bathrooms and a campfire area. The hiking trails from the Camp area lead to a small dock located down by the water and connects into the Nature Center Trails allowing immediate access to the Hardwicke Center and the Lotus Marsh for further educational opportunities.

Bottomland Hardwoods

This region is a very large area and includes all of the Bottomland Hardwoods, Closed Canopy Cross Timbers and Post Oak Savanna habitat to the north of the open water along the base of the Limestone Ledge and Lotus Marsh. The area also includes Todd Island which is primarily sandy soils and supports the ancient Cross Timbers Forest. Many sea-



Alice Ashley Environmental Education Camp

Examples from the Lotus Marsh exhibit and Todd Island.

" Human subtlety will never devise an invention more beautiful, more simple or more direct than does Nature, because in her inventions, nothing is lacking and nothing is superfluous."

Leonardo da Vinci

sonal water sloughs and ditches also occur in this area. The predominant habitats are in succession from former pasturelands; however, a secondary habitat is an annual flood zone along the water's edge. There is an existing cleared path that allows for limited four-wheel drive truck access. Interpretive graphics should be added to portray the characteristics of this habitat.

Lotus Marsh Exhibit

The Lotus Marsh Exhibit consists of the current area known as the Boardwalk. This area's significant environment is based on a lentic water system. The term lentic comes from a derivative meaning "still water." The Lotus Marsh is the perfect zone for aquatic programming as many types of aquatic life thrive amongst the lotus. As you approach the area enough parking will be provided for 30 cars and 3 buses. A drop-off and loading zone will make it convenient for large groups. Once approaching the water's edge there are two directions to follow. To the left is the large boardwalk with pavilion. This boardwalk stretches across the river and terminates at a viewing pavilion. The trail system on Todd Island is accessible at this point for 'members only' or staff guided group tours. To the right is a smaller and more intricate boardwalk system designed for the classroom programming of the exhibit. At various places along the route are floating docks, in order to get closer to the water. Off the same path is an amphitheater for 30-50 people, particularly school groups. The amphitheater contains a small stage for demonstration purposes as well as restrooms and a storage facility for equipment. The entire exhibit would also contain interpretive signage and graphics to help educate people about the area and envi-

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ronment. Explanations would be provided for the marsh, river/lake, aquatic plants, and human intervention in the ecosystem. In addition to the boardwalk stretching over to Todd Island and the Ancient Cross Timbers Forest, other trails lead to the Alice Ashley Camp and to the Archeological Interpretive zone.

Todd Island & the Ancient Cross Timbers Forest

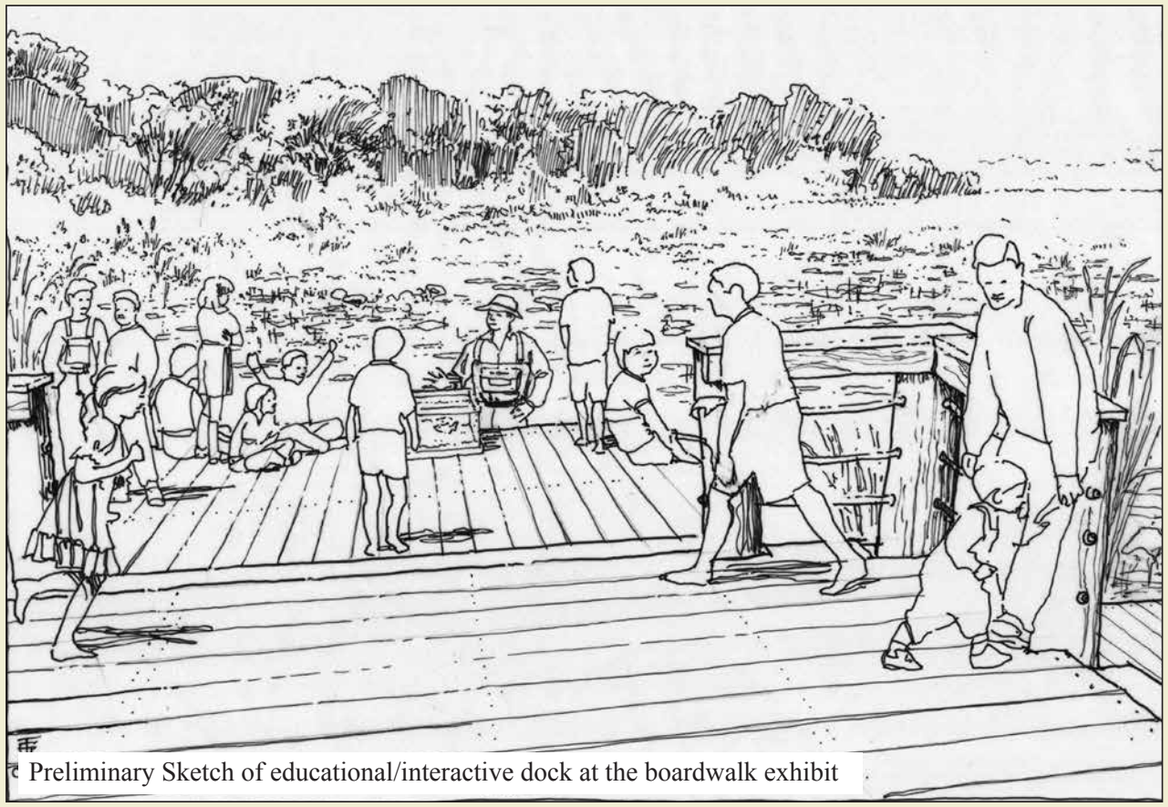
The area of Todd Island contains much historical value especially in reference to the Cross Timbers Forest, which sustains trees from 250-300 years old. The intent is for the area to remain as natural and free from man's influence as it is today. A few primitive trails wind through the area; however, these are only meant for the tellers, teachers & outdoor actives. Only naturalists and select members of the FWNCR are likely to venture due to its remoteness. Previous scientific studies have been conducted in the Cross Timbers Forest and range from studies of ecology to arachnids. Although not every visitor will want to access to this zone, educational materials about its unique value should be readily available.

Archaeological Exhibit

The Archaeological Interpretive Zone is the next stop on the trail system from the Lotus Marsh Exhibit. This exhibit is designed to provide the public with information regarding archaeological digs and the appropriate way to approach historical artifacts. This is an area of the site where human influence on the land can be interpreted through discussion about what archaeological digs prove to later generations. Since over 10,000 objects have been found at the FWNC&R, it is important to educate the public about what these things are, and what historical information they provide. Due to the sensitive nature of the archaeological digs, the only access to this area is by foot trails. There is no vehicular access. Some of the zones within the Archaeological Interpretive Zone have limited access and are only accessible by staff guided tours.

Reclamation/ Demonstration Exhibit

Following the trail system from the Lotus Marsh Exhibit you will reach the Reclamation/ Demonstration Area. This area is designed to teach the public about the restoration of land and vegetation that has been disturbed by man such as the old quarries. This site is similar to the Archeological Interpretive Zone as the only access to this area is by foot trails since regular vehicular traffic could further deteriorate the land that is being reclaimed. Some of the areas have limited access and are only accessible by staff guided tours.



Preliminary Sketch of educational/interactive dock at the boardwalk exhibit

Images of the area around the Bison Range and Homestead Exhibit.

Bison Range Viewing Station/ Homestead Exhibit

The last habitat stop on the loop road is the Bison Range and Homestead Settlement. There are currently 6 bison roaming 55 acres of land. The intent of the new bison range is to expand the land area and triple the head count of the herd. Bison are considered nomadic animals. A bison herd can be used as a land management tool by providing different grazing cells for them to roam and various bison viewing stations would accompany the range. Visitors would experience the herd not only from the viewing stations but also by driving along side the range and experiencing the habitat first hand. The main bison viewing station would consist of an elevated platform to provide an unobstructed view of the herd. Interpretive graphics and signs would provide information about the bison such as the history of the animal, food sources, and habitat. In addition to the Bison Range is the Homestead Settlement. This exhibit is to demonstrate the historical sequences that took place on the land many years ago. Demonstrations would include: food cultivation, land management, and housing from the period in time the Nature Center intends to represent.

Bison Sculpture (Photo Opportunity)

The last encounter on the loop road is a larger than life size Bison Sculpture, which acts as a photo opportunity for the visitors. This allows the visitors to take a memory home with them and lets them know they have reached the end of the tour. Here, the visitor has a choice of going back around the entire loop road again or proceeding back toward the visitor center and exit gate. The typical visitor might stop to use the restroom, return a piece of rental equipment, or pick up literature about future events.

Bison Range Viewing Station & Homestead Exhibit




Supporting Infrastructure

In order to create and sustain these exhibits, much consideration needs to be placed on the supporting infrastructure of the site. The first element would be the road system. The loop road is proposed to be a one-way loop system approximately 15 feet wide with intentions of utilizing existing roads where possible. This will help minimize additional paving throughout the site. The Entry/Exit gate provides a service not only to collect entrance fees to generate funding for the FWNC&R but to assist in providing directional information to the visitor. Another important element would be restroom facilities. Composting toilets would be located at three areas around the site: the CCC Picnic area (Broadview), the Boardwalk, and the Bison Viewing and Settlement Exhibit. Additional restrooms would be provided at the proposed Visitor Center and the Hardwicke Research and Restoration Center (which currently exist). A Bison Barn currently located on the site will continue to support the herd and range. In addition, a Maintenance facility will be relocated in order to provide service to areas of the site.

Changes in Operation

The exhibits for the FWNC&R provide a wide range of activities from recreation such as canoeing and biking to nature based education opportunities. The expansion of facilities to provide these opportunities will be a phased endeavor. However, with the addition of these exhibits, many changes in the operation and governance of the center should occur. One specific element would be the hours of operation. Currently the Nature Center is open from 9am to 5pm. The master plan proposes that the FWNC&R should be open from sun-up to sun-down for maximum visitor use. But changes such as this require additional staffing which leads to a domino effect of needing additional funding and operating budgets. The following section addresses a plan of action for accommodating these changes.

Preliminary Sketch of Bison Viewing Station

Implementing the Strategy:

The implementation of this master plan is intended to expand over multiple decades. We cannot change the backbone of a system overnight. In order to expand the quality and educational content of the visitor experience, the new components of the master plan (visitor center, exhibits, etc.) have been outlined into a phased cost of construction for all future improvements. Much of the funding required for these improvements will be generated from a combination of bond programs, matching grants, and capital campaigns. The budget has been categorized in the following phases:

Priority 1 – Pre-building Clean-up (Thru-2004 timeframe)

- Acquire land within Lakeland Addition as it becomes available.
- Complete resource studies pertaining to future exhibit development.
- Develop guidelines for surrounding land use.
- Provide new entrance signage.
- Install a new temporary way-finding and interpretive graphics.
- Implement temporary gating system with non-staffed fee collection device.
- Convert roadway system to one-way.
- Introduce composting toilets.
- Provide new site furnishings.
- Demolish old fencing and un-used buildings.
- Restore Broadview CCC Pavilion.

Priority 2 – Wildlife Exhibits (2004 & 2008 bond elections)

- Continue acquiring land within Lakeland Addition as it becomes available.
- Implement phase I of loop road.
- Add new paved bicycle trails.
- Add new waterfowl exhibit.
- Add new upgraded facilities at Lotus Marsh Exhibit.
- Expand bison range w/ additional viewing stations.
- Upgrade facilities at Prairie Dog Exhibit.

Priority 3 – Visitor Center Campaign (2012 bond election)

- Continue acquiring land within Lakeland Addition as it becomes available
- Add segments of loop road.
- Add new paved bicycle trails.
- Add new entry / ticket gate building.
- Add new entry drives and parking lot for 200 cars with bio-filtration device for run off.
- Grading and general landscape improvements / restoration of disturbed areas.
- New Visitor Center (33,000 sf).
- New Maintenance Facility (50,000 sf).
- New Native Wildscape Demonstration Gardens.
- New interpretive graphics program.
- New walkways and site furnishings.
- Extension of site utilities to new facilities.

Priority 4 – Additional Exhibits (2016, 2020, 2024, and 2028 bond elections or as funding is available)

- Continue acquiring land within Lakeland Addition as it becomes available.
- Removal of existing paving not needed for one-way loop road.
- Refurbished trail access to lake edge.
- New canoe launch area at lake edge.
- New Greer Island exhibit.
- New Picnic pavilions at Broadview.
- New Environmental Education Camp with eco-labs, pavilion, and small group overnight camping facilities for staff guided groups.
- New archeology/ reclamation exhibit.
- New homestead settlement exhibit.
- New photo opportunity (bison sculptures).

Priority 5 – Woodland Pavilion, Administrative Buildings, & Hardwicke Restoration

- New administration building (up to 30,000 sf).
- New Living Machine Greenhouse.
- New hanging bridge connection between bldgs.
- New large rental pavilion with parking, graphics, and composting toilets.
- Refurbish Hardwicke Building (timeframe is as needed or as funding is available).

Priority 6 – Environmental Learning Center

- New lodges, overnight dormitories, teaching labs, meeting rooms, parking lot, trails, etc. (timeframe is as partnerships are developed or as funding is available).

Description	Priority 1	Priority 2	Priority 3	Priority 4	Priority 5	Priority 6
General Site Improvements / Support Infrastructure						
Land Acquisition (Lakeland Addition, Love Circle Entry, OLC Agricultural land)	$250,000	$625,000	$1,125,000	$1,500,000	As needed	As needed
Conduct basic historical research & record; develop cultural resources management plan				$300,000		
FWNC Tower at Peninsula			$250,000			
New Entrance Signage at Love Circle (Walls & Landscaping)			$200,000			
New entry & loop road (new segments @ 20' width =24,120 lf; demolition of existing road = 15,840 lf; reduction of current width for bike lane = 42,240 lf) To be divided into 3 phases		$580,800	$1,686,000	$1,597,200		
Bicycle Route (8' width concrete path; 10,000 lf of striping; 25,000 lf of new off vehicular pavement)		$268,750	$218,750	$437,500		
Pedestrian Hiking Trails (non-paved, 4' wide; 6 miles; 16,000 lf of gravel; 16,000 lf of soft surface)		$115,200	$115,200	$153,600		
Temporary Site Graphics (overall wayfinding)	$150,000					
Main Road Entry Signage Improvements	$100,000					
Temporary gate system	$100,000					
Immediate composting toilet system (4 toilets, 2 per phase)	$75,000	$75,000				
Initial site furnishings (benches, trash, picnic)	$50,000	$50,000				
Demolition of old fencing, run down buildings, etc.	$100,000	$100,000				
Repair of boardwalk	$250,000					
Acquisition/ Demolition of Lakeland Addition, Maintenance Building	$2,200,000.00		$121,500	$121,500	As acquired	As acquired

Description	Priority 1	Priority 2	Priority 3	Priority 4	Priority 5	Priority 6
The Centers						
New Visitor Center at Lone Point (Education building of 33,000 sf; entry / ticket gate building; parking lot for 200 cars with bio-filtration; rental and concessions; furnishings, refurbishment of CCC structures, new site utilities = 3,000 lf, grading; wildscape demonstration native gardens, walkways, trails, lighting for evening use, site furnishings, interpretive graphics - interior & exterior - regulatory, way-finding, interpretive exhibits, bi-lingual; new operations and maintenance center will be built in the phase, trail access to lake is priority 3 Add 9,865 Living Machine Greenhouse and additional 10,000 sf in administrative space and hanging bridge as funding is available)			$22,161,500	$75,000	As funding is available	
Outdoor Learning Center (2 lodges @ 10,000 sf each, overnight dormitories - 25 @ 12 per room, 12 @ 2 per room, teaching labs - 2 @ 10,000 sf each, meeting room building - 6 rooms, furnishings, parking lot for 100 cars, 1,000 lf of entry drive from Ten Mile Bridge Road, 15,000 sf of walks and demonstration areas, 1.5 miles of trails, site furnishings, grading & new utilities)						As funding or partnerships are available
Woodland Rental Pavilion (new 6,000 sf rental pavilion with 1,000 sf of office / administration space, parking lot for 60 cars, 750 lf of drive from loop road, paths, gardens at entry, signage & way-finding, site furnishings, grading & utilities, and lighting for evening scheduled use)					As funding is available	
Refurbishment of Hardwicke (5,000 sf remodeling, new graphics & signage, refurbish parking lot, new outdoor education development, new library, labs, and furnishings)					As funding is available	
Alice Ashley Educational Camp (parking for 20 buses and cars, graphics and signage, 6,000 sf day use pavilion / eco-lab with meeting rooms, restrooms, and a "great room" - serves 120 people; 6,000 sf night use pavilion / lodge for campers with small dining, restrooms, and meeting space, 9 yurts @ 3 sets of 3 - each holds 6 people; furnishings, campfire area with seating, demonstration areas for eco-lab instruction, trails to lake edge & boardwalk, new boardwalk and canoe launch near storage for instruction purposes only, site grading & utilities, lake edge pavilion for 25 students)				$5,666,800		
The Exhibits						
Canoe Launch (1,200 sf pavilion for rr, rentals, vending, storage; 1,000 lf boardwalk for pedestrians to island - 10' wide; boat slips, docks for sailboats, canoes, paddle boats, kayaks; interpretive graphics, 140 lf boardwalk across to Greer Island, site utilities & small parking lot with trail access)				$1,160,000		
Greer Island (2,400 lf of concrete bike trails on island, 7,200 lf of soft surface trails, 900 lf repair of causeway to loop road, new educational playground for small children, paths, wildscape, interpretive graphics, and shade pavilion with picnic seating)				$1,032,800		
Broadview Picnic Area (refurbish CCC structures; add 2 new clusters of 3 pavilions each with 1 large for 25 people and 3 small for 15 people each); new restroom pavilion, 7,500 sf of patios and plazas between picnic areas, .5 miles of soft trail connection, interpretive graphics about the history of the CCC, site furnishings, site grading & utilities, safety lighting, parking lot for 100 cars) Phase I: restore existing facility at Broadview	$150,000			$1,747,500		
Waterfowl Exhibit (new parking lot for 20 cars, graphics and signage, blinds - 1 large for class size of 25-30 people, 5 small for family size of 4-6 people each, site grading, furnishings, and 2,400 sf of trails connecting blinds)		$1,229,800				
Lotus Marsh Boardwalk (new parking for 20 buses & cars, 2,500 lf of concrete trail to boardwalk - 10' width, new 1,000 sf main pavilion on water, interpretive graphics about Trinity River and aquatics, 4 small floating docks for instruction, 1,500 lf in new boardwalk paths, 450 lf boardwalk to Todd Island (Priority 4), site utilities and grading, and one amphitheater with small stage, storage, restrooms - seats 30-40 people)		$1,193,000		$90,000		
Archeology / Reclamation (new 350 lf gravel path from lotus marsh parking lot, interpretive graphics about pre-tribal man and modern-day digs, site furnishings, 2,500 lf fencing for dig demonstration)				$189,500		
Bison Range (Expanded acreage, 2 major viewing stations with small parking lots - 1 with 5-8 cars, 1 with 20 cars, 20,000 lf of fencing for main range, 15,000 lf for secondary range, interpretive graphics, 900 lf roadway to parking lot, viewing station - covered raised pavilion & overlook with rest rooms, walkways to exhibits)		$2,862,800				
Man's Settlement (cabin homestead with fenced yard, demonstration gardens, restrooms, interpretive graphics, 2,500 lf walk to exhibit from bison range)				$625,000		
Prairie Dogs (new parking lot for 20 cars, covered viewing station, 1,500 lf of fencing, interpretive graphics, 2,500 lf in new paths)		$627,000				
Exit Photo Opportunity (large bronze bison statues crossing road - 3 total, parking pull off for 5-8 cars, 10,000 sf of fine grading and planting, 2,500 lf of trail connection)				$340,800		
Total Cost	$3,425,000.00	$7,727,350.00	$25,877,950	$15,037,200		
A&E Fees - 12%	$411,000.00	$927,282.00	$3,881,693	$2,255,580		
Admin. & Contingency - 15%	$513,750.00	$1.159,102.50	$3,881,693	$2,255,580		
OVERALL GRAND TOTAL PROJECT COST	**$4,349,750.00**	**$9,813,734.50**	**$33,641,335**	**$19,548,360**	**As needed**	**As needed**

In order to fund for future improvements, it is essential to take into consideration the following items.

Attendance

Nature Center attendance projections are prepared primarily in order to estimate operating revenue. These projections are approximations, and should be viewed as working figures that allow preparation of preliminary operating budgets. Since many factors will affect actual Center attendance – the pace and type of capital investments, marketing programs, scheduling of special events, and outside economic factors, to name a few – these figures should not be considered firm forecasts. Rather, they are useful estimates that can be made at this point in time, based on the information available, which, in turn, allow us to present well-founded and consistent financial scenarios for future Center operations.

Current 2003 attendance numbers for the nature center are approximately 35,000-40,000 per year at the visitor center, including school groups. A number of other visitors come onto the site without ever stopping at the visitor center. Car counts average a range of 100,000 – 200,000 visitors a year on the site.

Membership

It is anticipated that the Center will develop an active membership program, so as to encourage both educational and recreational use of the site. Accordingly, the site will feature recreational amenities that will attract membership and repeated member visits. These recreational amenities will be superior to those offered by many other recreation sites in the area, and will include high quality bicycle paths, trails, shoreline facilities, boardwalks, canoeing, birding and other wildlife viewing, and locations for picnics (in addition to the group rental pavilions, which will be reserved for group use).

The current membership of the Friends group is about 350. Members are expected to grow to 2,000 by the year 2008 and to a count of 4,000 by 2015, with an average annual use of five visits per member. These membership levels are similar to those that currently exist for Fossil Rim and the Audubon Nature Center. Table III-4 shows anticipated annual member attendance (in terms of person visits), and the associated annual member revenue.

Preliminary Operating Budget

This budget is intended to illustrate how the Center can operate financially, given a specified level of facility and program development. In particular, the budget indicates the revenue that will be necessary, and includes a distribution of this revenue among the likely sources that will be available.

Budget figures are provided for the three points in time for which attendance projections are presented in Chapter III. The first point in time – 2004 – will occur prior to any substantial construction at the Center, but after some initial upgrading can be completed. The Center, at this time, will be similar in many respects to its current form, but enhanced in order to begin the process of redevelopment. In particular, it is assumed that the Center has constructed an entrance control structure and will begin collecting initial admission fees of $2 per adult and $1 per child. The entrance fees should increase in relation to the addition/renovation of the facilities.

Table III-2
Nature Center Attendance Projections

	Annual Visitors			
	Year 2008		*Year 2015*	
	(000)	Percent	(000)	Percent
Non-school Attendance:				
Local area	58	65%	129	70%
Other Texas	8	10%	18	10%
Out-of-state, foreign	2	2%	8	4%
Subtotal	68	77%	154	84%
Organized school groups	20	23%	30	16%
Total	88	100%	184	100%
Demand Characteristics:				
	Year 2008		*Year 2015*	
Local area capture	10		20	
Other Texas capture	0.5		1	
Out of state proportion	3%		5%	
Local area population (000)	5,790		6,426	
State population (000)	22,683		24,319	

Table III-4
Membership Use Projections

Factor	2008	2015
Number members	2,000	4,000
Annual membership fee	$40	$40
Annual visits/member	5	5
Annual member attendance	10,000	20,000
Annual revenue	$80,000	$160,000

The second point in time – 2008 – represents a point in Center development when attendance is growing on the basis of new buildings and exhibits, as well as emerging educational and other programs. The third budget – for 2015 – represents a time when the Center is more fully developed, although not necessarily yet to its full potential.

The current annual operating budget of the nature center totals about $339,000. Of this amount about $286,000 is dedicated toward staff salaries with the remainder for operating costs. To date, the Friends group provides about $30,000 toward the overall budget.

Staff

The cost of staff is the single largest budget item and is treated separately here. When considering staffing commitments, as well as budget expenditures overall, it is important to keep in mind that Center staff and other expenditures will grow only as funds become available.

Operating staff for 2004 totals 19 people (current 2003 full time staff is 7), not including construction and other staff, if the Center is still under development at that time. This substantial increase from current staff levels assumes that proposed program improvement support becomes available and the associated enhancements in programs can be implemented. The total salary expense for this staff is $593,000 per year, represented in 2003 dollars. The cost of employment taxes and fringe benefits is not included in these figures.

Operating staff for 2008 grows to 30 and a total staff budget of $979,000. A substantial volunteer force is still envisioned for maintenance, retail, special event and other functions for which volunteers are suitable.

Staff for 2015 increase further to a total of 50, representing a staff budget of about $1.5 million. This compares to current staffing for Fossil Rim of 76 and their current operating budget.

A preliminary operating budget for the three points in time appears in Table IV-2. The revenue amounts for "Other Revenue" have been adjusted to show revenues necessary to produce a balanced budget. Other conventions include:

- Taxes and fringe benefits are assumed to be 26% of staff salaries.
- Retail sales represent gross amounts; the cost of sales is shown as an expense item.
- Staff costs are assumed to be approximately 85% of the Center's budget, based on the current experience and comparisons to other facilities.

Staff costs and revenues from various education, event and other programming were estimated using appropriate projections of employees, levels of activity, prices and other factors.

During 2004, the Center will increase its revenue collection substantially above current levels, generating nearly a quarter of its operational revenue from sources such as admissions, retail sales, memberships and event/donation sources. The remaining revenue would be provided from the City, sources, as at present.

By 2008, revenue will have increased substantially due to increased attendance, additional program and rental revenue, and increased income from endowment and other sources. Although "other" revenue remains at $750,000, at this point this amount represents less than half of all revenue.

Projecting to 2015, revenue from "other" sources remains at the same level, but a substantial portion of additional revenue is from earned income (entry fees, facility and equipment rentals) and event/donation sources. At this point, City support represents about 30% of total operating costs.

Governance

Based on the needs for increased funding support and generation, the need exists for a re-evaluation of the governing structure of the nature center. Upon increase of non-city funds, the nature center should be operated by a governing board similar to the management of the Fort Worth Zoo. The Friends membership should migrate toward a strong volunteer pool for the facility, since this group provides a significant basis of the programming support.

Conclusions

The analysis indicates that a market exists for the proposed enhancements to the Fort Worth Nature Center, based on the following factors:

- The Center has received substantial support to-date from local government, business interests and individuals, and should continue to represent a desirable addition to the City of Fort Worth.
- An attendance projection, based on capture rates and use levels that typify nature centers and a variety of other related facilities such as the one proposed, indicates that attendance can be about 94,000 by 2008, rising to over 220,000 by 2015. A substantial portion of this attendance is due to nature based recreation activity and events attendance at the FWNC&R.

The size of the fundraising requirements during the early years of the project indicate that a detailed pro-forma financial analysis should be prepared as part of the facility design process. This analysis would show the annual cash flow for the facility, and in particular, specify the annual and cumulative cash requirements that will be necessary to cover construction, startup and initial operations.

Conditions for Success

In order to meet attendance and budget projections that appear in this report, it will be necessary for the Center to satisfy a number of assumptions regarding its facility and programs. These assumptions represent important operating goals for the facility and should guide its development, organization and management for the next decade.

- The preliminary operating budgets show a substantial need for and increasing City budget support, as well as support from private grant, donation, sponsorship and event sources; the need for revenue from these sources diminishes as the Center grows and its potential for gate, event, space rental, retail, and program income increases.
- Establish a particularly appealing, well-organized and high quality facility that represents the resources of Texas and the Fort Worth region, and which provides high quality educational and recreational programming that appeals to residents of the entire Metroplex.
- Establish educational programs that appeal in particular to youth and to those 50 and older.
- Provide venues for a variety of on-site events that will help generate operating revenue for the facility; provide staff and other services that position the Center as a high quality venue in the Metroplex region.
- Provide consistent, careful management for the land, the Visitor Center, and its programs.
- Market the facility well, both locally and regionally; establish partnerships locally and regionally in order to enhance the use of the Center as an event, educational and recreational destination.
- Establish good working relationships with local

and regional community organizations, government units, destination marketing organizations, universities and other educational institutions, business and economic development organizations, environmental organizations, the nursery and landscape business community, and organizations with specific animal, plant and other interests.

- Establish an endowment of at least $2 million, growing to $3 million by 2015; draw no more than 5% per year from this fund for operating purposes.
- Meet the projections that appear in this document for grant, donation, special event and related fundraising.

Table IV-2
Preliminary Operating Budget

	Year 2004		Year 2008		Year 2015	
Category	Amount	Percent	Amount	Percent	Amount	Percent
Revenue:						
Admissions:						
Non-school attendees	$46,719	5%	$186,875	12%	$509,652	20%
School groups	$12,500	1%	$40,000	2%	$60,000	2%
Retail sales	$39,199	4%	$156,797	10%	$338,238	13%
Memberships	$18,000	2%	$80,000	5%	$160,000	6%
Class fees	$4,250	0%	$50,500	3%	$76,750	3%
Event income	$8,488	1%	$54,240	3%	$171,792	7%
Pavilion rental fees	$0	0%	$8,000	0%	$72,000	3%
Endowment	$5,000	1%	$100,000	6%	$150,000	6%
Annual giving	$3,000	0%	$10,000	1%	$20,000	1%
Benefit events	$20,000	2%	$80,000	5%	$100,000	4%
Grants/Donations	$50,000	6%	$100,000	6%	$100,000	4%
Other	$700,000	77%	$750,000	46%	$750,000	30%
Total	$907,156	100%	$1,616,412	100%	$2,508,432	100%
Expenses:						
Staff	$593,000	65%	$979,000	61%	$1,513,000	60%
Fringe @ 26%	$154,180	17%	$254,540	16%	$393,380	16%
Cost of sales (55%)	$21,560	2%	$86,238	5%	$186,031	7%
Operations costs	$60,000	7%	$120,000	7%	$180,000	7%
Administrative costs	$60,000	7%	$120,000	7%	$180,000	7%
Contingency/other	$20,000	2%	$50,000	3%	$50,000	2%
Total	$908,740		$1,609,778	100%	$2,502,411	100%
Net Revenue	-$1,584		$6,634		$6,021	

Note: Does not include research programs, recreation equipment fees or food service, nor net income from amphitheater operations

Assumptions:	2004	2008	2015
Endowment amount ($ million)	$0.1	$2.0	$3.0
Annual earnings (% of principal)	5%	5%	5%
Members	600	2,000	4,000
Average membership fee	$40	$40	$40
Average giving/member	$5	$5	$5
Membership fee revenue	$24,000	$80,000	$160,000
Annual giving revenue	$3,000	$10,000	$20,000

Budgets are based on minimum assumptions. Recommendations would be in favor of higher endowment values.

Although this master plan process encompassed over a year of study, debate, public input, and decision making, it is a miniscule timeframe in the big picture of the plan. Decades of history have shaped the Fort Worth Nature Center and Refuge to date, and centuries into the future we will still strive for the balance between human intervention and nature. We must keep in mind that the documentation of our vision is only a milestone that designates the beginning of an action plan.

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Appendix
The following sessions and their contents are documented in the appendix of this publication. Some of the documents include: meeting minutes, maps, reports, power-point presentations, financial analysis, graphic drawings, and images of the FWNC&R. This information is available from the Fort Worth Parks and Community Services Department.

Workshop #1 – (Nov. 2001)
Workshop #2 – (Feb. 2002)
Public Meeting – (Feb. 2002)
Workshop #3 – (April 2002)
Workshop #4 – Site visit (May 2002)
Public Meeting - (May 2002)
Workshop #5 – (July 2002)

The City of Fort Worth Parks and Community Services would like to thank the countless people who have dedicated time and effort to the Fort Worth Nature Center & Refuge. It is their continued support and volunteerism that has brought about the completion of this plan, which will lead us into the future.


Taylor's Directory Map of
LAKE WORTH
LOCATED NINE MILES NORTH WEST OF FORT WORTH, TEXAS
AREA OVER 5,400 ACRES ★ ABOUT 14 MILES LONG
A BIG FEATURE OF FORT WORTH'S AMUSEMENT and RECREATION FACILITIES
CONCESSIONS at LAKE WORTH
LAKE WORTH SAFETY RULES
VICINITY MAP SHOWING ROADS to LAKE WORTH
PARKER
TARRANT
DALLAS
LAKE WORTH
FORT WORTH
LEGEND of SYMBOLS
Private Home, Camp, Club
Rent House or Camp
Commercial Camp
Spring or Fountain
Comfort Station
Public Picnic Area
High or Shallow Area
Cat-Tails or Reeds
Stump Field
Driftwood Etc.
Approx. City Limits
Section Marker
Look Out House
Meandering Road
Old River Channel
FISHES of LAKE WORTH
HOW TO USE DIRECTORY
Sections and Numbers run clock-wise. Section A is located at south end of dam. Sec. A is area between A & B — Sec. B is area between B & C and so on. Each section has a separate set of numbers at the house site. For example we want to locate Mr. Sam E. Whiting — we find him in the W's and being in Section J and No. 3 site — We can easily find him on the map.
GRAPHIC SCALE IN
TO AZLE & JACKSBORO
9 MILE BRIDGE—AZLE ROAD
4½ MI. TO FORT WORTH
JACKSBORO HIGHWAY
INDIAN OAKS CUT-OFF
CITY LIMIT
TRINITY RIVER CHANNEL
RESTRICTED AREA
INSPIRATION POINT
Spillway Elev.
MOSQUE POINT
CAMP BOWIE—LAKE WORTH CUT-OFF
GRANT'S LANE
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Tarrant County Historical Commission

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