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
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 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.
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. 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.

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

**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...
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, spurge, 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, side oats grama, verbena, sumac, rough-leaved 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.
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
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.

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.
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...
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.

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

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
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.

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 I-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.

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.
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.

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.
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 and canoing.

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 wilderness
- 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.

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.
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-
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 exhib-
its and associated programs. Finally, two are wild-
life refuges that are primarily oriented to managing

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<thead>
<tr>
<th>Table II-3</th>
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<tbody>
<tr>
<td><strong>Staff and Other Resources</strong></td>
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<tr>
<td><strong>Selected Comparable Nature Center and Related Facilities</strong></td>
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<thead>
<tr>
<th>Facility</th>
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<tr>
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<td>Full-Time</td>
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<td>Ann.</td>
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<td>Volunteers</td>
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<tr>
<td></td>
<td></td>
<td>Seas.</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Armand Bayou Nature Center</td>
<td>9</td>
<td>3</td>
<td>10.5</td>
<td>1,200</td>
<td>200</td>
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<tr>
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<td>13</td>
<td>20</td>
<td>23</td>
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<tr>
<td>Fossil Rim Wildlife Center</td>
<td>76</td>
<td>6</td>
<td>79</td>
<td>4,300</td>
<td>150</td>
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<tr>
<td>Heard Museum and Wildlife Sanctuary</td>
<td>18</td>
<td>5</td>
<td>20.5</td>
<td>1,400</td>
<td>300</td>
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<tr>
<td>Oxley Nature Center; Redbud Valley</td>
<td>6</td>
<td>4</td>
<td>8</td>
<td>600</td>
<td>125</td>
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<tr>
<td>Fort Worth Nature Center &amp; refuge</td>
<td>7</td>
<td>3</td>
<td>8.5</td>
<td>350</td>
<td>NA</td>
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<tr>
<td><strong>Gardens and Arboreta</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crosby Arboretum</td>
<td>5</td>
<td>1</td>
<td>5.5</td>
<td>750</td>
<td>60</td>
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<tr>
<td>Lady Bird Johnson Wildflower Center</td>
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<td>45</td>
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<td><strong>Refuges</strong></td>
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<td></td>
<td></td>
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<td>2</td>
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<tr>
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<td>13.5</td>
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Source: Dean Runyan Associates

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<thead>
<tr>
<th>Table III-1</th>
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<tr>
<td><strong>Comparable Nature Center Attendance and Capture</strong></td>
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<thead>
<tr>
<th>Facility</th>
<th>Non-school</th>
<th>Attendance Distribution</th>
<th>Population (000)</th>
<th>Capture Rate</th>
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<tr>
<td></td>
<td></td>
<td>Non-school</td>
<td>Local</td>
<td>State</td>
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<tr>
<td><strong>Nature Centers</strong></td>
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<td></td>
</tr>
<tr>
<td>Armand Bayou Nature Center</td>
<td>48,000</td>
<td>90%</td>
<td>7%</td>
<td>3%</td>
</tr>
<tr>
<td>Audubon Louisiana Nature Center</td>
<td>27,900</td>
<td>80%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Fossil Rim Wildlife Center</td>
<td>110,000</td>
<td>80%</td>
<td>5%</td>
<td>15%</td>
</tr>
<tr>
<td>Heard Museum and Wildlife Sanctuary</td>
<td>20,000</td>
<td>90%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Oxley Nature Center; Redbud Valley</td>
<td>27,000</td>
<td>80%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Fort Worth Nature Center &amp; refuge</td>
<td>56,000</td>
<td>87%</td>
<td>13%</td>
<td>4%</td>
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<tr>
<td><strong>Gardens and Arboreta</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crosby Arboretum</td>
<td>9,000</td>
<td>80%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Lady Bird Johnson Wildflower Center</td>
<td>90,000</td>
<td>20%</td>
<td>25%</td>
<td>55%</td>
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<tr>
<td><strong>Refuges</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kerr Wildlife Management Area</td>
<td>4,000</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Balcones Canyonlands NWR</td>
<td>3,000</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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</tbody>
</table>

Source: Dean Runyan Associates

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

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 FWNC&R conservation management and 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
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 eco-systems, 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-
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

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 eco-system 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

**The Dam Interface Zone**

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

Educational Content

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

**The Agricultural 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
- 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.
The breadth and 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-
The Experience Seekers

oriental 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

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.

A. Key Characteristics of the User

- Annual and seasonal repeat visitors
- View being in the “outdoors,” or some

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
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

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
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 Lake-land 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.
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.

**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
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-
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 through 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,
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 rental 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 landmark. 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 way 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.
“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.
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 to: 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.
**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. It 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
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-...
“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

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...
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.

Preliminary Sketch of educational/interactive dock at the boardwalk 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 dif-
f erent 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 ele-
vated 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 manage-
ment, 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 visi-
tor might stop to use the restroom, return a piece of
rental equipment, or pick up literature about future
events.
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.
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.

- 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 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).

<table>
<thead>
<tr>
<th>Description</th>
<th>Priority 1</th>
<th>Priority 2</th>
<th>Priority 3</th>
<th>Priority 4</th>
<th>Priority 5</th>
<th>Priority 6</th>
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<tbody>
<tr>
<td>Land Acquisition (Lakeland Addition, Love Circle Entry, OLC Agricultural land)</td>
<td>$250,000</td>
<td>$625,000</td>
<td>$1,125,000</td>
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<td>Conduct basic historical research &amp; record; develop cultural resources management plan</td>
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<td>FWNC Tower at Peninsula</td>
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<td>New Entrance Signage at Love Circle (Walls &amp; Landscaping)</td>
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<tr>
<td>New entry &amp; loop road (new segments @ 20’ width =24,120 lf; demolition of existing road = 15,840; reduction of current width for bike lane = 42,240 lf) To be divided into 3 phases</td>
<td>$580,800</td>
<td>$1,686,000</td>
<td>$1,597,200</td>
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<td>Bicycle Route (8’ width concrete path; 10,000 lf of striping; 25,000 lf of new off vehicular pavement)</td>
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<td>Pedestrian Hiking Trails (non-paved, 4’ wide; 6 miles; 16,000 lf of gravel; 16,000 lf of soft surface)</td>
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<tr>
<td>Temporary Site Graphics (overall wayfinding)</td>
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<td>Main Road Entry Signage Improvements</td>
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<td>Temporary gate system</td>
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<tr>
<td>Immediate composting toilet system (4 toilets, 2 per phase)</td>
<td>$75,000</td>
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<td>Initial site furnishings (benches, trash, picnic)</td>
<td>$50,000</td>
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<td>Demolition of old fencing, run down buildings, etc.</td>
<td>$100,000</td>
<td>$100,000</td>
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<tr>
<td>Repair of boardwalk</td>
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<td>$250,000</td>
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<tr>
<td>Acquisition/ Demolition of Lakeland Addition, Maintenance Building</td>
<td>$2,200,000</td>
<td>$121,500</td>
<td>$121,500</td>
<td>$121,500</td>
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<td>Description</td>
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<td>Priority 2</td>
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<td><strong>The Centers</strong></td>
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<tr>
<td>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 &amp; 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)</td>
<td>$22,161,500</td>
<td>$75,000</td>
<td>As funding is available</td>
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<tr>
<td>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 &amp; new utilities)</td>
<td>As funding or partnerships are available</td>
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<tr>
<td>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 &amp; way-finding, site furnishings, grading &amp; utilities, and lighting for evening scheduled use)</td>
<td>As funding is available</td>
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<tr>
<td>Refurbishment of Hardwick (5,000 sf remodeling, new graphics &amp; signage, refurbish parking lot, new outdoor education development, new library, labs, and furnishings)</td>
<td>As funding is available</td>
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<tr>
<td>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 &quot;great room&quot; - 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 &amp; boardwalk, new boardwalk and canoe launch near storage for instruction purposes only, site grading &amp; utilities, lake edge pavilion for 25 students)</td>
<td>$5,666,800</td>
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<td><strong>The Exhibits</strong></td>
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<tr>
<td>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 &amp; small parking lot with trail access)</td>
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<td>$1,160,000</td>
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<tr>
<td>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)</td>
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<td>$1,032,800</td>
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<td>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 &amp; utilities, safety lighting, parking lot for 100 cars) Phase I: restore existing facility at Broadview</td>
<td>$150,000</td>
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<td>$1,747,500</td>
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<tr>
<td>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)</td>
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<td>$1,229,800</td>
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<tr>
<td>Lotus Marsh Boardwalk (new parking for 20 buses &amp; 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)</td>
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<td>$1,193,000</td>
<td>$90,000</td>
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<tr>
<td>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)</td>
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<td>$189,500</td>
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<tr>
<td>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 &amp; overlook with rest rooms, walkways to exhibits)</td>
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<td>$2,862,800</td>
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<tr>
<td>Man's Settlement (cabin homestead with fenced yard, demonstration gardens, restrooms, interpretive graphics, 2,500 lf walk to exhibit from bison range)</td>
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<td>$625,000</td>
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<tr>
<td>Prairie Dogs (new parking lot for 20 cars, covered viewing station, 1,500 lf of fencing, interpretive graphics, 2,500 lf in new paths)</td>
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<td>$627,000</td>
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<tr>
<td>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)</td>
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<td>$340,800</td>
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<tr>
<td><strong>Total Cost</strong></td>
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<td>$7,727,350.00</td>
<td>$25,877,950</td>
<td>$15,037,200</td>
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<tr>
<td><strong>A&amp;E Fees - 12%</strong></td>
<td>$411,000.00</td>
<td>$927,282.00</td>
<td>$3,881,693</td>
<td>$2,255,580</td>
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<tr>
<td><strong>Admin. &amp; Contingency - 15%</strong></td>
<td>$513,750.00</td>
<td>$1,159,102.50</td>
<td>$3,881,693</td>
<td>$2,255,580</td>
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<tr>
<td><strong>OVERALL GRAND TOTAL PROJECT COST</strong></td>
<td>$4,349,750.00</td>
<td>$9,813,734.50</td>
<td>$33,641,335</td>
<td>$19,548,360</td>
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</table>
Financial Analysis

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

<table>
<thead>
<tr>
<th></th>
<th>Year 2008</th>
<th>Year 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(000)</td>
<td>Percent</td>
</tr>
<tr>
<td><strong>Non-school Attendance:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local area</td>
<td>58</td>
<td>65%</td>
</tr>
<tr>
<td>Other Texas</td>
<td>8</td>
<td>10%</td>
</tr>
<tr>
<td>Out-of-state, foreign</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>68</td>
<td>77%</td>
</tr>
<tr>
<td><strong>Organized school groups</strong></td>
<td>20</td>
<td>23%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>88</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Year 2008</th>
<th>Year 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local area capture</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Other Texas capture</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>Out of state proportion</td>
<td>3%</td>
<td>5%</td>
</tr>
<tr>
<td>Local area population (000)</td>
<td>5,790</td>
<td>6,426</td>
</tr>
<tr>
<td>State population (000)</td>
<td>22,683</td>
<td>24,319</td>
</tr>
</tbody>
</table>

Table III-4
Membership Use Projections

<table>
<thead>
<tr>
<th>Factor</th>
<th>2008</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number members</td>
<td>2,000</td>
<td>4,000</td>
</tr>
<tr>
<td>Annual membership fee</td>
<td>$40</td>
<td>$40</td>
</tr>
<tr>
<td>Annual visits/member</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Annual member attendance</td>
<td>10,000</td>
<td>20,000</td>
</tr>
<tr>
<td>Annual revenue</td>
<td>$80,000</td>
<td>$160,000</td>
</tr>
</tbody>
</table>
Retail sales represent gross amounts; the cost of employment taxes and fringe benefits is assumed to be 26% of budget. Other conventions include:

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.

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

<table>
<thead>
<tr>
<th>Category</th>
<th>Year 2004</th>
<th>Year 2008</th>
<th>Year 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Amount</td>
<td>Percent</td>
<td>Amount</td>
</tr>
<tr>
<td>Revenue:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Admissions:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-school attendees</td>
<td>$46,719</td>
<td>5%</td>
<td>$186,875</td>
</tr>
<tr>
<td>School groups</td>
<td>$12,500</td>
<td>1%</td>
<td>$40,000</td>
</tr>
<tr>
<td>Retail sales</td>
<td>$39,199</td>
<td>4%</td>
<td>$156,797</td>
</tr>
<tr>
<td>Memberships</td>
<td>$18,000</td>
<td>2%</td>
<td>$80,000</td>
</tr>
<tr>
<td>Class fees</td>
<td>$4,250</td>
<td>0%</td>
<td>$50,500</td>
</tr>
<tr>
<td>Event income</td>
<td>$8,488</td>
<td>1%</td>
<td>$54,240</td>
</tr>
<tr>
<td>Pavilion rental fees</td>
<td>$0</td>
<td>0%</td>
<td>$8,000</td>
</tr>
<tr>
<td>Endowment</td>
<td>$5,000</td>
<td>1%</td>
<td>$100,000</td>
</tr>
<tr>
<td>Annual giving</td>
<td>$3,000</td>
<td>0%</td>
<td>$10,000</td>
</tr>
<tr>
<td>Benefit events</td>
<td>$20,000</td>
<td>2%</td>
<td>$80,000</td>
</tr>
<tr>
<td>Grants/Donations</td>
<td>$50,000</td>
<td>6%</td>
<td>$100,000</td>
</tr>
<tr>
<td>Other</td>
<td>$700,000</td>
<td>77%</td>
<td>$750,000</td>
</tr>
<tr>
<td>Total</td>
<td>$907,156</td>
<td>100%</td>
<td>$1,616,412</td>
</tr>
<tr>
<td>Expenses:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff</td>
<td>$593,000</td>
<td>65%</td>
<td>$979,000</td>
</tr>
<tr>
<td>Fringe @ 26%</td>
<td>$154,180</td>
<td>17%</td>
<td>$254,540</td>
</tr>
<tr>
<td>Cost of sales (55%)</td>
<td>$21,560</td>
<td>2%</td>
<td>$86,238</td>
</tr>
<tr>
<td>Operations costs</td>
<td>$60,000</td>
<td>7%</td>
<td>$120,000</td>
</tr>
<tr>
<td>Administrative costs</td>
<td>$60,000</td>
<td>7%</td>
<td>$120,000</td>
</tr>
<tr>
<td>Contingency/other</td>
<td>$20,000</td>
<td>2%</td>
<td>$50,000</td>
</tr>
<tr>
<td>Total</td>
<td>$908,740</td>
<td></td>
<td>$1,609,778</td>
</tr>
<tr>
<td>Net Revenue</td>
<td>-$1,584</td>
<td></td>
<td>$6,634</td>
</tr>
</tbody>
</table>

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

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

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.
The following sessions and their contents are documented in the appendix of this publication. Some of the documents include: meeting minutes, maps, reports, powerpoint 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.